



TM_MULTI_R32_3D INV_EU_S_NA_2202

MULTI SPLIT TYPE R32 INVERTER CONTROL

TECHNICAL MANUAL

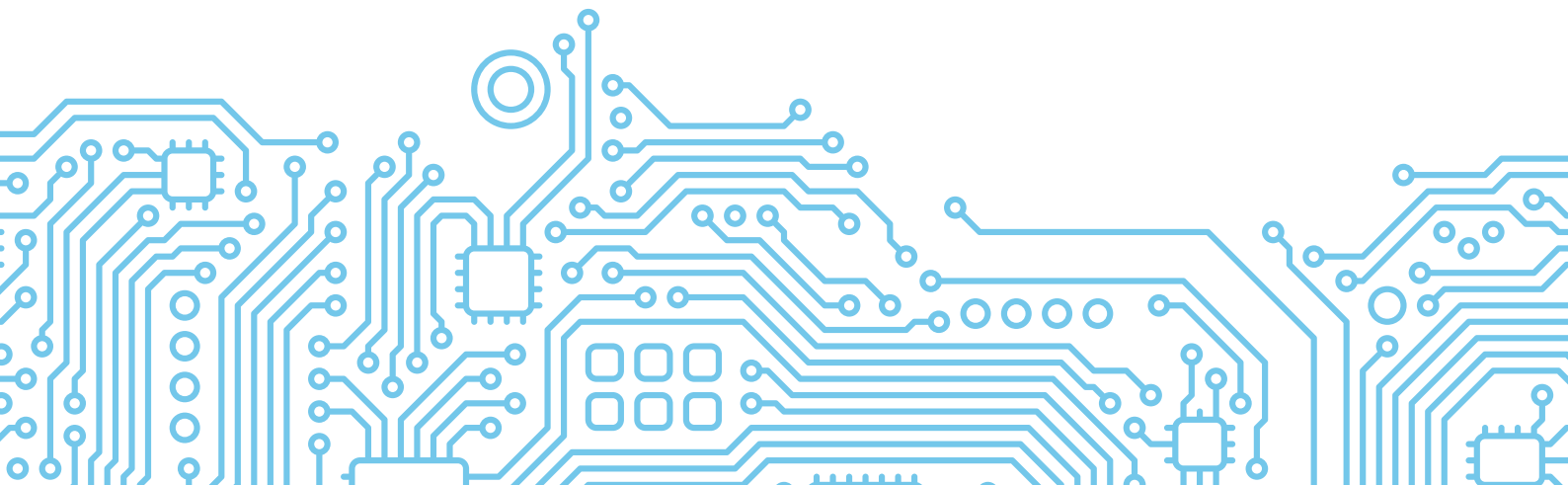
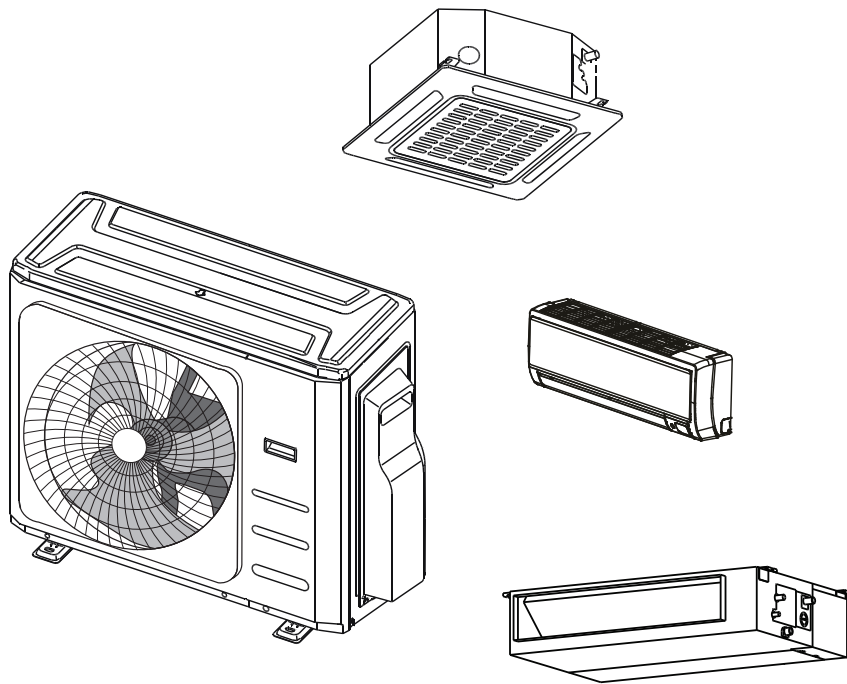


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Specifications

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1. Model Reference

Refer to the following table to determine the specific indoor and outdoor unit model number of your purchased equipment.

| Indoor Unit | | Outdoor Unit | Power Supply |
|-----------------------|-------------------------|--|----------------------|
| A6 Duct type | MTIU-07HWFNX-QRD0W | M2OG-14HFN8-Q M2OD-18HFN8-Q M2OC-18HFN8-Q M3OF-21HFN8-Q M3OF-27HFN8-Q M3OE-27HFN8-Q M4OE-28HFN8-Q M4OB-36HFN8-Q M5OD-42HFN8-Q M5OE-42HFN8-Q M2OH-14HFN8-Q M2OE-18HFN8-Q M3OG-21HFN8-Q M3OA-27HFN8-Q | 1Ph, 220-240V~, 50Hz |
| | MTIU-07HWFNX-QRD0W(GA) | | |
| | MTIU-09HWFNX-QRD0W(GA) | | |
| | MTIU-09HWFNX-QRD0W | | |
| | MTIU-12HWFNX-QRD0W | | |
| | MTIU-18HWFNX-QRD0W | | |
| Compact Cassette type | MCA3I-07HRFNX-QRD0 | | |
| | MCA3U-07HRFNX-QRD0W(GA) | | |
| | MCA3U-09HRFNX-QRD0W(GA) | | |
| | MCA3I-09HRFN8-QRD0 | | |
| | MCA3U-12HRFNX-QRD0W | | |
| | MCA3U-18HRFNX-QRD0W | | |

| Indoor Unit | | Outdoor Unit | Power Supply |
|----------------------------|---------------------------|--|----------------------|
| Wall mounted type- Forest | MSAFBU-07HRDNX-QRD0GW | M2OG-14HFN8-Q M2OD-18HFN8-Q M2OC-18HFN8-Q M3OF-21HFN8-Q M3OF-27HFN8-Q M3OE-27HFN8-Q M4OE-28HFN8-Q M4OB-36HFN8-Q M5OD-42HFN8-Q M5OE-42HFN8-Q M2OH-14HFN8-Q M2OE-18HFN8-Q M3OG-21HFN8-Q M3OA-27HFN8-Q | 1Ph, 220-240V~, 50Hz |
| | MSAFBU-09HRDN8-QRD0GW | | |
| | MSAFBU-12HRDN8-QRD0GW | | |
| | MSAFBU-18HRFN8-QRD0GW | | |
| | MSAFDU-24HRFN8-QRD0GW | | |
| Wall mounted type-Aurora | MSABAU-09HRFN8-QRD0GW | | |
| | MSABBU-12HRFN8-QRD0GW | | |
| | MSABDU-18HRFN8-QRD0GW | | |
| | MSABEU-24HRFN8-QRD0GW | | |
| Wall mounted type-All Easy | MSAEBU-09HRFN8-QRD6GW | | |
| | MSAEBU-12HRFN8-QRD0GW | | |
| | MSAECU-18HRFN8-QRD0GW | | |
| | MSAEDU-24HRFN8-QRD0GW | | |
| Wall mounted type-XTREME | MSAGAU-09HRFNX-QRD0GW | | |
| | MSAGBU-09HRFN8-QRD1GW(GA) | | |
| | MSAGBU-12HRFNX-QRD0GW | | |
| | MSAGBU-12HRFN8-QRD1GW(GA) | | |
| | MSAGCU-18HRFNX-QRD0GW | | |
| | MSAGDU-24HRFN8-QRD0GW | | |

2. Functions

| Functions \ Model | A6 Duct type | Compact Cassette type |
|--|--------------|-----------------------|
| Standard filter | O | ● |
| Flange | O | X |
| Healthy filter | X | X |
| Drainage pump | O | ● |
| IDU auxiliary electric heater | X | X |
| Infrared wired controller (KJR-12B, KJR-90A) | ● | O |
| 485 wired controller (KJR-120C, KJR-120G2) | O | O |
| 2 cores non-polarity wired controller (KJR-120G) | O | O |
| Wifi | O | O |
| XYE port for central controller | ● | ● |
| Alarm output terminal | ● | ● |
| Remote on/off terminal | ● | ● |
| Golden Fin(Outdoor unit) | ● | ● |

Note:

●: Standard

O: Optional

X: Not available

| Functions Model | All Easy | Aurora | Forest | XTREME |
|---|----------------------|--------|--------|--------|
| High Density Filter | ● | ● | ● | ● |
| Cold Catalyst Filter | ● | ● | ● | ● |
| Fire Proof | ● | ● | ● | ● |
| Turbo | ● | ● | ● | ● |
| Sleep | ● | ● | ● | ● |
| Auto-restart | ● | ● | ● | ● |
| Timer | ● | ● | ● | ● |
| super ionizer | ●(9k~18k)/ O(24k) | X | X | O |
| horizontal louver autoswing | ● | ● | ● | ● |
| 2 ways piping connection | ● | ● | ● | ● |
| H-shaped installation plate | X | ● | ● | ● |
| Monolithic installation plate | O | O | O | O |
| louver position memory function | ● | ● | ● | ● |
| follow me | O | O | O | O |
| ECO | O | ● | O | ● |
| Remote on/off terminal | O | O | X | O |
| Alarm output terminal | O | X | X | O |
| XYE port for control control&weekly timer | O | O | X | O |
| wired controller(simplex KJR- 12B,etc.) | O | O | O | O |
| wired controller(duplex KJR-120G/ TF-E,non-polarity) | O | X | X | O |
| WIFI | O | O | O | O |
| Golden Fin(Outdoor unit) | ● | ● | ● | ● |

Note:

●: Standard

O: Optional

X: Not available

3. General Specifications

| Indoor model | | | MTIU-07HWFNX-QRDOW | MTIU-09HWFNX-QRDOW | MTIU-12HWFNX-QRDOW | MTIU-18HWFNX-QRDOW |
|----------------------------------|--------------------------------|----------|------------------------------|------------------------------|------------------------------|------------------------------|
| Power supply (Indoor) | | V- Ph-Hz | 220~240-1-50 | 220~240-1-50 | 220~240-1-50 | 220~240-1-50 |
| Cooling | Capacity | Btu/h | 7000 | 9000 | 12000 | 18000 |
| | Input | W | 170 | 180 | 185 | 200 |
| | Current | A | 1.0 | 1.1 | 1.1 | 1.3 |
| Heating | Capacity | Btu/h | 8000 | 10000 | 13000 | 19000 |
| | Input | W | 170 | 180 | 185 | 200 |
| | current | A | 1.0 | 1.1 | 1.1 | 1.3 |
| Indoor fan motor | Model | | ZKFN-55-8-22 | ZKFN-55-8-22 | ZKFN-55-8-22 | ZKFN-160-8-1-2 |
| | Qty | | 1 | 1 | 1 | 1 |
| | Input | W | 130.0 | 130.0 | 130.0 | 90.0 |
| | Capacitor | uF | / | / | / | / |
| | Speed(Hi/Mi/Lo) | r/min | 1080/920/790 | 1080/920/790 | 1170/1030/850 | 1650/1300/1000 |
| Indoor coil | a.Number of rows | 3.0 | 3.0 | 3 | 3 | 3 |
| | b.Tube pitch(a)x row pitch(b) | mm | 21x13.37 | 21x13.37 | 21x13.37 | 21x13.37 |
| | c.Fin spacing | mm | 1.4 | 1.4 | 1.4 | 1.4 |
| | d.Fin type (code) | | Hydrophilic aluminum(Golden) | Hydrophilic aluminum(Golden) | Hydrophilic aluminum(Golden) | Hydrophilic aluminum(Golden) |
| | e.Tube outside dia.and type | mm | Φ7,Inner groove tube | Φ7,Inner groove tube | Φ7,Inner groove tube | Φ7,Inner groove tube |
| | f.Coil length x height x width | mm | 526x210x40.11 | 526x210x40.11 | 526x210x40.11 | 695x252x40.11 |
| | g.Number of circuits | | 4 | 4 | 4 | 4 |
| Indoor air flow (Hi/Mi/Lo) | | m3/h | 500/340/230 | 500/340/230 | 600/480/300 | 880/650/350 |
| ESP | Rated | Pa | 25 | 25 | 25 | 25 |
| | Range | Pa | 0-40 | 0-40 | 0-60 | 0-100 |
| Indoor sound pressure level (Hi) | | dB(A) | 40/34.5/27.5 | 40/34.5/27.5 | 40/34.5/27.5 | 41.5/38/33 |
| Indoor sound power level (Hi) | | dB(A) | 58 | 58 | 59 | 59 |
| Indoor unit | Dimension(W*D*H) | mm | 700x506x200 | 700x506x200 | 700x506x200 | 880x674x210 |
| | Packing (W*D*H) | mm | 860x540x275 | 860x540x275 | 860x540x275 | 1070x725x280 |
| | Net/Gross weight | Kg | 18/22 | 18/22 | 18/22 | 24.3/29.6 |
| Design pressure | | MPa | 4.3/1.7 | 4.3/1.7 | 4.3/1.7 | 4.3/1.7 |
| Drainage water pipe dia. | | mm | ODΦ25 | ODΦ25 | ODΦ25 | ODΦ25 |
| Refrigerant piping | Liquid side/ Gas side | mm(inch) | Φ6.35/Φ9.52(1/4"/3/8") | Φ6.35/Φ9.52(1/4"/3/8") | Φ6.35/Φ9.52(1/4"/3/8") | Φ6.35/Φ12.7(1/4"/1/2") |
| Controller | | | Wired Control | Wired Control | Wired Control | Wired control |
| Operation temperature | | °C | 17~30 | 17~30 | 17~30 | 17~30 |
| Room temperature | Cooling | °C | 17~32 | 17~32 | 17~32 | 17~32 |
| | Heating | °C | 0~30 | 0~30 | 0~30 | 0~30 |

Notes:

1) Capacities are based on the following conditions:

Cooling(T1): - Indoor Temperature 27°C(80.6°F) DB /19 °C(66.2°F) WB Heating: - Indoor Temperature 20°C(68°F) DB / 15°C(59°F) WB
 -Outdoor Temperature 35 °C(95°F) DB /24 °C(75.2°F) WB -Outdoor Temperature 7°C(44.6°F) DB / 6°C(42.8°F) WB
 -Interconnecting Piping Length 5m - Interconnecting Piping Length 5 m
 - Level Difference of Zero. - Level Difference of Zero.

2) Capacities are Net Capacities.

3) Due to our policy of innovation some specifications may be changed without notification.

| Indoor model | | | MTIU-07HWFNX-QRD0W(GA) | MTIU-09HWFNX-QRD0W(GA) | MCA3U-07HRFNX-QRD0W(GA) | MCA3U-09HRFNX-QRD0W(GA) |
|----------------------------------|--------------------------------|----------|------------------------------|------------------------------|-------------------------|------------------------------|
| Power supply (Indoor) | | V- Ph-Hz | 220~240-1-50 | 220~240-1-50 | 220~240-1-50 | 220~240-1-50 |
| Cooling | Capacity | Btu/h | 7000 | 9000 | 7000 | 9000 |
| | Input | W | 170 | 180 | 40 | 40 |
| | Current | A | 1.0 | 1.1 | 0.18 | 0.18 |
| Heating | Capacity | Btu/h | 8000 | 10000 | 7500 | 10000 |
| | Input | W | 170 | 180 | 40 | 40 |
| | current | A | 1.0 | 1.1 | 0.18 | 0.18 |
| Indoor fan motor | Model | | ZKFN-55-8-22 | ZKFN-55-8-22 | ZKFP-46-8-1 | ZKFP-46-8-1 |
| | Qty | | 1 | 1 | 1 | 1 |
| | Input | W | 130.0 | 130.0 | 45 | 45 |
| | Capacitor | uF | / | / | - | - |
| | Speed(Hi/Mi/Lo) | r/min | 1050/900/820 | 1170/1030/850 | 600/520/460 | 600/520/460 |
| Indoor coil | a.Number of rows | 3.0 | 3.0 | 3 | 1.0 | 1.0 |
| | b.Tube pitch(a)x row pitch(b) | mm | 21x13.37 | 21x13.37 | 21x13.37 | 21x13.37 |
| | c.Fin spacing | mm | 1.4 | 1.4 | 1.3 | 1.3 |
| | d.Fin type (code) | | Hydrophilic aluminum(Golden) | Hydrophilic aluminum(Golden) | Hydrophilic aluminum | Hydrophilic aluminum(Golden) |
| | e.Tube outside dia.and type | mm | Φ7,Inner groove tube | Φ7,Inner groove tube | Φ7,Inner groove tube | Φ7,innergroove tube |
| | f.Coil length x height x width | mm | 526x210x40.11 | 526x210x40.11 | 1380x210x13.37 | 1380x210x13.37 |
| | g.Number of circuits | | 4 | 4 | 2 | 2 |
| Indoor air flow (Hi/Mi/Lo) | | m3/h | 500/340/230 | 500/340/230 | 540/500/460 | 540/500/460 |
| ESP | Rated | Pa | 25 | 25 | / | / |
| | Range | Pa | 0-40 | 0-40 | / | / |
| Indoor sound pressure level (Hi) | | dB(A) | 40/34.5/27.5 | 40/34.5/27.5 | 37.5/33.5/31.5 | 38/34.5/33 |
| Indoor sound power level (Hi) | | dB(A) | 56 | 57 | 53 | 53 |
| Indoor unit | Dimension(W*D*H)(body) | mm | 700x506x200 | 700x506x200 | 570x570x260 | 570x570x260 |
| | Packing (W*D*H)(body) | mm | 860x540x275 | 860x540x275 | 662x662x317 | 662x662x317 |
| | Dimension(W*D*H)(panel) | mm | / | / | 647x647x50 | 647x647x50 |
| | Packing (W*D*H)(panel) | mm | / | / | 715x715x123 | 715x715x123 |
| | Net/Gross weight(body) | kg | 17.8/21.5 | 17.8/21.5 | 14.5/17.5 | 14.5/17.5 |
| | Net/Gross weight(panel) | kg | / | / | 2.5/4.5 | 2.5/4.5 |
| Design pressure | | MPa | 4.3/1.7 | 4.3/1.7 | 4.3/1.7 | 4.3/1.7 |
| Drainage water pipe dia. | | mm | ODΦ25 | ODΦ25 | ODΦ25 | ODΦ25 |
| Refrigerant piping | Liquid side/ Gas side | mm(inch) | Φ6.35/Φ9.52(1/4"/3/8") | Φ6.35/Φ9.52(1/4"/3/8") | Φ6.35/Φ9.52(1/4"/3/8") | Φ6.35/Φ9.52(1/4"/3/8") |
| Controller | | | Wired Control | Wired Control | Remote Control | Remote Control |
| Operation temperature | | °C | 17~30 | 17~30 | 17~30 | 17~30 |
| Room temperature | Cooling | °C | 17~32 | 17~32 | 17~32 | 17~32 |
| | Heating | °C | 0~30 | 0~30 | 0~30 | 0~30 |

Notes:

1) Capacities are based on the following conditions:

Cooling(T1): - Indoor Temperature 27°C(80.6°F) DB /19 °C(66.2°F) WB

-Outdoor Temperature 35 °C(95°F) DB /24 °C(75.2°F) WB

-Interconnecting Piping Length 5m

- Level Difference of Zero.

Heating: - Indoor Temperature 20°C(68°F) DB / 15°C(59°F) WB

-Outdoor Temperature 7°C(44.6°F) DB / 6°C(42.8°F) WB

- Interconnecting Piping Length 5 m

- Level Difference of Zero.

2) Capacities are Net Capacities.

3) Due to our policy of innovation some specifications may be changed without notification.

| Indoor model | | | MCA3I-07HRFNX-QRD0 | MCA3I-09HRFN8-QRD0 | MCA3U-12HRFNX-QRD0W | MCA3U-18HRFNX-QRD0W |
|----------------------------------|--------------------------------|----------|------------------------|------------------------------|------------------------------|------------------------------|
| Power supply (Indoor) | | V- Ph-Hz | 220~240-1-50 | 220~240-1-50 | 220~240-1-50 | 220~240-1-50 |
| Cooling | Capacity | Btu/h | 7000 | 9000 | 12000 | 18000 |
| | Input | W | 40 | 40 | 40 | 102 |
| | Current | A | 0.18 | 0.18 | 0.18 | 0.44 |
| Heating | Capacity | Btu/h | 7500 | 10000 | 14000 | 18500 |
| | Input | W | 40 | 40 | 40 | 102 |
| | current | A | 0.18 | 0.18 | 0.18 | 0.44 |
| Indoor fan motor | Model | | ZKFP-46-8-1 | ZKFP-46-8-1 | ZKFP-46-8-1 | ZKFP-46-8-1 |
| | Old Model | | WZDK46-38G | WZDK46-38G | WZDK46-38G | WZDK46-38G |
| | Qty | | 1 | 1 | 1 | 1 |
| | Input | W | 45 | 45 | 45 | 45 |
| | Capacitor | uF | - | - | - | / |
| | Speed(Hi/Mi/Lo) | r/min | 600/520/460 | 600/520/460 | 700/580/500 | 720/625/540 |
| Indoor coil | a.Number of rows | 3.0 | 1.0 | 1.0 | 2 | 2 |
| | b.Tube pitch(a)x row pitch(b) | mm | 21x13.37 | 21x13.37 | 21x13.37 | 21x13.37 |
| | c.Fin spacing | mm | 1.3 | 1.3 | 1.3 | 1.3 |
| | d.Fin type (code) | | Hydrophilic aluminum | Hydrophilic aluminum(Golden) | Hydrophilic aluminum(Golden) | Hydrophilic aluminum(Golden) |
| | e.Tube outside dia.and type | mm | Φ7,Inner groove tube | Φ7,innergroove tube | Φ7,innergroove tube | Φ7,innergroove tube |
| | f.Coil length x height x width | mm | 1380x210x13.37 | 1380x210x13.37 | 1360x210x26.74 | 1360x210x26.74 |
| | g.Number of circuits | | 2 | 2 | 4 | 4 |
| Indoor air flow (Hi/Mi/Lo) | | m3/h | 580/500/450 | 580/500/450 | 617/504/415 | 680/560/500 |
| Indoor sound pressure level (Hi) | | dB(A) | 37.0/33.0/31.5 | 38/33/29 | 41/37/34 | 44/42/41 |
| Indoor sound power level (Hi) | | dB(A) | 51 | 53 | 58 | 56 |
| Indoor unit | Dimension (W x Dx H)(body) | mm | 570x570x260 | 570x570x260 | 570x570x260 | 570x570x260 |
| | Packing (W x Dx H)(body) | mm | 662x662x317 | 662x662x317 | 662x662x317 | 662x662x317 |
| | Dimension (W x Dx H)(panel) | mm | 647x647x50 | 647x647x50 | 647x647x50 | 647x647x50 |
| | Packing (W x Dx H)(panel) | mm | 715x715x123 | 715x715x123 | 715x715x123 | 715x715x123 |
| | Net/Gross weight(body) | kg | 14.5/17.3 | 14.5/17.3 | 16.2/21.4 | 16.2/21.4 |
| | Net/Gross weight(panel) | kg | 2.5/4.5 | 2.5/4.5 | 2.5/4.5 | 2.5/4.5 |
| Design pressure | | MPa | 4.3/1.7 | 4.3/1.7 | 4.3/1.7 | 4.3/1.7 |
| Drainage water pipe dia. | | mm | ODΦ25 | ODΦ25 | ODΦ25 | ODΦ25 |
| Refrigerant piping | Liquid side/ Gas side | mm(inch) | Φ6.35/Φ9.52(1/4"/3/8") | Φ6.35/Φ9.52(1/4"/3/8") | Φ6.35/Φ9.52(1/4"/3/8") | Φ6.35/Φ12.7(1/4"/1/2") |
| Controller | | | Remote Control | Remote Control | Remote Control | Remote control |
| Operation temperature | | °C | 17~30 | 17~30 | 17~30 | 17~30 |
| Room temperature | Cooling | °C | 17~32 | 17~32 | 17~32 | 17~32 |
| | Heating | °C | 0~30 | 0~30 | 0~30 | 0~30 |

Notes:

1) Capacities are based on the following conditions:

Cooling(T1): - Indoor Temperature 27°C(80.6°F) DB /19 °C(66.2°F) WB Heating: - Indoor Temperature 20°C(68°F) DB / 15°C(59°F) WB
 -Outdoor Temperature 35 °C(95°F) DB /24 °C(75.2°F) WB -Outdoor Temperature 7°C(44.6°F) DB / 6°C(42.8°F) WB
 -Interconnecting Piping Length 5m - Interconnecting Piping Length 5 m
 - Level Difference of Zero. - Level Difference of Zero.

2) Capacities are Net Capacities.

3) Due to our policy of innovation some specifications may be changed without notification.

| Indoor model | | | MSAFBU-07HRDNX-QRD0GW | MSAFBU-09HRDN8-QRD0GW | MSAFBU-12HRDN8-QRD0GW |
|----------------------------------|--------------------------------|-------------------|------------------------|------------------------|------------------------|
| Power supply (Indoor) | | V- Ph-Hz | 220~240-1-50 | 220~240-1-50 | 220~240-1-50 |
| Cooling | Capacity | Btu/h | 7000 | 9000 | 12000 |
| | Input | W | 20 | 20 | 20 |
| | Current | A | 0.09 | 0.09 | 0.09 |
| Heating | Capacity | Btu/h | 8000 | 10000 | 13000 |
| | Input | W | 20 | 20 | 20 |
| | current | A | 0.09 | 0.09 | 0.09 |
| Indoor fan motor | Model | | YKFG-13-4-38L | YKFG-13-4-38L | YKFG-13-4-38L |
| | Input | W | 40 | 40 | 40 |
| | Capacitor | uF | 1.2 | 1.2 | 1.2 |
| | Speed(Hi/Mi/Lo) | r/min | 1030/850/700 | 1030/850/700 | 1130/950/750 |
| Indoor coil | a.Number of rows | 3.0 | 2.0 | 2.0 | 2.0 |
| | b.Tube pitch(a)x row pitch(b) | mm | 19.5x11.6 | 19.5x11.6 | 19.5x11.6 |
| | c.Fin spacing | mm | 1.2 | 1.2 | 1.2 |
| | d.Fin type (code) | | Hydrophilic aluminum | Hydrophilic aluminum | Hydrophilic aluminum |
| | e.Tube outside dia.and type | mm | Φ5,innergroove tube | Φ5,innergroove tube | Φ5,innergroove tube |
| | f.Coil length x height x width | mm | 595x273x23.2 | 595x273x23.2 | 595x273x23.2 |
| | g.Number of circuits | | 4 | 4 | 4 |
| Indoor air flow (Hi/Mi/Lo) | | m ³ /h | 520/460/340 | 520/460/340 | 600/500/360 |
| Indoor sound pressure level (Hi) | | dB(A) | 40/30/26/21 | 40/30/26/21 | 40/34/26/22 |
| Indoor sound power level (Hi) | | dB(A) | 54 | 53 | 53 |
| Indoor unit | Dimension(W*D*H) | mm | 805x194x285 | 805x194x285 | 805x194x285 |
| | Packing (W*D*H) | mm | 870x270x360 | 870x270x360 | 870x270x360 |
| | Net/Gross weight | Kg | 7.5/9.7 | 7.5/9.7 | 7.5/9.7 |
| Design pressure | | MPa | 4.3/1.7 | 4.3/1.7 | 4.3/1.7 |
| Refrigerant piping | Liquid side/ Gas side | mm(inch) | Φ6.35/Φ9.52(1/4"/3/8") | Φ6.35/Φ9.52(1/4"/3/8") | Φ6.35/Φ9.52(1/4"/3/8") |
| Controller | | Wired Control | Remote Control | Remote Control | Remote Control |
| Operation temperature | | °C | 17~30 | 17~30 | 17~30 |
| Room temperature | Cooling | °C | 17~32 | 17~32 | 17~32 |
| | Heating | °C | 0~30 | 0~30 | 0~30 |

Notes:

1) Capacities are based on the following conditions:

Cooling(T1): - Indoor Temperature 27°C(80.6°F) DB /19 °C(66.2°F) WB Heating: - Indoor Temperature 20°C(68°F) DB / 15°C(59°F) WB
 -Outdoor Temperature 35 °C(95°F) DB /24 °C(75.2°F) WB -Outdoor Temperature 7°C(44.6°F) DB / 6°C(42.8°F) WB
 -Interconnecting Piping Length 5m - Interconnecting Piping Length 5 m
 - Level Difference of Zero. - Level Difference of Zero.

2) Capacities are Net Capacities.

3) Due to our policy of innovation some specifications may be changed without notification.

| Indoor model | | | MSAFCU-18HRFN8-QRD0GW | MSAFDU-24HRFN8-QRD0GW |
|----------------------------------|--------------------------------|---------------|------------------------|------------------------|
| Power supply (Indoor) | | V- Ph-Hz | 220~240-1-50 | 220~240-1-50 |
| Cooling | Capacity | Btu/h | 18000 | 24000 |
| | Input | W | 34 | 62 |
| | Current | A | 0.15 | 0.28 |
| Heating | Capacity | Btu/h | 19000 | 25000 |
| | Input | W | 34 | 62 |
| | current | A | 0.15 | 0.28 |
| Indoor fan motor | Model | | ZKFP-30-8-3 | ZKFP-58-8-1 |
| | Input | W | 36 | 58.0 |
| | Capacitor | uF | / | / |
| | Speed(Hi/Mi/Lo) | r/min | 1130 / 900 / 800 | 1150 / 1000 / 850 |
| Indoor coil | a.Number of rows | 3.0 | 2.0 | 2.0 |
| | b.Tube pitch(a)x row pitch(b) | mm | 21x13.37 | 21x13.37 |
| | c.Fin spacing | mm | 1.2 | 1.3 |
| | d.Fin type (code) | | Hydrophilic aluminum | Hydrophilic aluminum |
| | e.Tube outside dia.and type | mm | Φ7,Inner groove tube | Φ7,Inner groove tube |
| | f.Coil length x height x width | mm | 750x294x26.74 | 780x315x26.74 |
| | g.Number of circuits | | 3 | 4 |
| Indoor air flow (Hi/Mi/Lo) | | m3/h | 840/680/540 | 980/817/662 |
| Indoor sound pressure level (Hi) | | dB(A) | 44/37/30/25 | 44.5/42/34.5/28 |
| Indoor sound power level (Hi) | | dB(A) | 55 | 59 |
| Indoor unit | Dimension(W*D*H) | mm | 957x213x302 | 1040x220x327 |
| | Packing (W*D*H) | mm | 1035x295x380 | 1120x405x310 |
| | Net/Gross weight | Kg | 10/13 | 12.3/15.8 |
| Design pressure | | MPa | 4.3/1.7 | 4.3/1.7 |
| Refrigerant piping | Liquid side/ Gas side | mm(inch) | Φ6.35/Φ12.7(1/4"/1/2") | Φ9.52/Φ15.9(3/8"/5/8") |
| Controller | | Wired Control | Remote control | Remote control |
| Operation temperature | | °C | 17~30 | 17~30 |
| Room temperature | Cooling | °C | 17~32 | 17~32 |
| | Heating | °C | 0~30 | 0~30 |

Notes:

1) Capacities are based on the following conditions:

Cooling(T1): - Indoor Temperature 27°C(80.6°F) DB /19 °C(66.2°F) WB Heating: - Indoor Temperature 20°C(68°F) DB / 15°C(59°F) WB

-Outdoor Temperature 35 °C(95°F) DB /24 °C(75.2°F) WB

-Outdoor Temperature 7°C(44.6°F) DB / 6°C(42.8°F) WB

-Interconnecting Piping Length 5m

- Interconnecting Piping Length 5 m

- Level Difference of Zero.

- Level Difference of Zero.

2) Capacities are Net Capacities.

3) Due to our policy of innovation some specifications may be changed without notification.

| Indoor model | | | MSABAU-09HRFN8-QRD0GW | MSABBU-12HRFNX-QRD0GW | MSABDU-18HRFNX-QRD0GW | MSABEU-24HRFNX-QRD0GW |
|----------------------------------|--------------------------------|---------------|--|----------------------------|-----------------------------|-----------------------------|
| Power supply (Indoor) | | V- Ph-Hz | 220~240-1-50 | 220~240-1-50 | 220~240-1-50 | 220~240-1-50 |
| Cooling | Capacity | Btu/h | 9000 | 12000 | 18000 | 25000 |
| | Input | W | 24 | 24 | 34 | 62 |
| | Current | A | 0.11 | 0.11 | 0.15 | 0.28 |
| Heating | Capacity | Btu/h | 10000 | 13000 | 19000 | 26000 |
| | Input | W | 24 | 24 | 34 | 62 |
| | current | A | 0.11 | 0.11 | 0.15 | 0.28 |
| Indoor fan motor | Model | | ZKFP-20-8-6-7 | ZKFP-20-8-6-7 | ZKFP-30-8-3 | ZKFP-58-8-1 |
| | Input | W | 50.0 | 50.0 | 36 | 58 |
| | Capacitor | uF | / | / | / | / |
| | Speed(Hi/Mi/Lo) | r/min | 1150/850/700 | 1100/1000/700 | 1100/800/700 | 1100/900/700 |
| Indoor coil | a.Number of rows | 3.0 | 2 | 2 | 2 | 2 |
| | b.Tube pitch(a)x row pitch(b) | mm | 21x13.37 | 21x13.37 | 21x13.37 | 21x13.37 |
| | c.Fin spacing | mm | 1.3 | 1.3 | 1.2 | 1.3 |
| | d.Fin type (code) | | Hydrophilic aluminum | Hydrophilic aluminium | Hydrophilic aluminium | Hydrophilic aluminium |
| | e.Tube outside dia. and type | mm | Φ7,Inner groove tube | Φ7,innergroove tube | Φ7,innergroove tube | Φ7,innergroove tube |
| | f.Coil length x height x width | mm | 525x84x13.37+525x105x26.74+525x105x26.74 | 605x210x26.74+605x84x26.74 | 750x210x26.74+750x126x26.74 | 820x210x26.74+820x126x26.74 |
| | g.Number of circuits | | 2 | 2 | 4 | 4 |
| Indoor air flow (Hi/Mi/Lo) | | m3/h | 416/309/230 | 515/459/294 | 750/505/420 | 1020/830/640 |
| Indoor sound pressure level (Hi) | | dB(A) | 39/23/20 | 38/22/21 | 41/28/20 | 46/30/26 |
| Indoor sound power level (Hi) | | dB(A) | 54 | 56 | 58 | 62 |
| Indoor unit | Dimension(W*D*H) | mm | 722x187x290 | 802x189x297 | 965x215x319 | 1080x226x335 |
| | Packing (W*D*H) | mm | 790x270x375 | 875x285x380 | 1045x305x410 | 1155x415x320 |
| | Net/Gross weight | Kg | 7.3/9.7 | 8.2/10.7 | 10.8/14.1 | 12.9/16.5 |
| Design pressure | | MPa | 4.3/1.7 | 4.3/1.7 | 4.3/1.7 | 4.3/1.7 |
| Refrigerant piping | Liquid side/ Gas side | mm(inch) | Φ6.35/Φ9.52(1/4"/3/8") | Φ6.35/Φ9.52(1/4"/3/8") | Φ6.35/Φ9.52(1/4"/3/8") | Φ6.35/Φ9.52(1/4"/3/8") |
| Controller | | Wired Control | Remote Control | Remote Control | Remote Control | Remote Control |
| Operation temperature | | °C | 17~30 | 17~30 | 17~30 | 17~30 |
| Room temperature | Cooling | °C | 17~32 | 17~32 | 17~32 | 17~32 |
| | Heating | °C | 0~30 | 0~30 | 0~30 | 0~30 |

Notes:

1) Capacities are based on the following conditions:

Cooling(T1): - Indoor Temperature 27°C(80.6°F) DB /19 °C(66.2°F) WB

-Outdoor Temperature 35 °C(95°F) DB /24 °C(75.2°F) WB

-Interconnecting Piping Length 5m

- Level Difference of Zero.

Heating: - Indoor Temperature 20°C(68°F) DB / 15°C(59°F) WB

-Outdoor Temperature 7°C(44.6°F) DB / 6°C(42.8°F) WB

- Interconnecting Piping Length 5 m

- Level Difference of Zero.

2) Capacities are Net Capacities.

3) Due to our policy of innovation some specifications may be changed without notification.

| Indoor model | | | MSAEAU-09HRFNX-QRD0GW | MSAEBU-12HRFNX-QRD0GW | MSAECU-18HRFNX-QRD0GW | MSAEDU-24HRFNX-QRD0GW |
|----------------------------------|--------------------------------|---------------|---|---|-----------------------------|-----------------------------|
| Power supply (Indoor) | | V- Ph-Hz | 220~240-1-50 | 220~240-1-50 | 220~240-1-50 | 220~240-1-50 |
| Cooling | Capacity | Btu/h | 9000 | 12000 | 18000 | 25000 |
| | Input | W | 24 | 24 | 34 | 62 |
| | Current | A | 0.11 | 0.11 | 0.15 | 0.28 |
| Heating | Capacity | Btu/h | 10000 | 14000 | 19000 | 26000 |
| | Input | W | 24 | 24 | 34 | 62 |
| | current | A | 0.11 | 0.11 | 0.15 | 0.28 |
| Indoor fan motor | Model | | ZKFP-20-8-6-7 | ZKFP-20-8-6-7 | ZKFP-30-8-3 | ZKFP-58-8-1 |
| | Input | W | 50 | 50 | 36 | 58 |
| | Capacitor | uF | / | / | / | / |
| | Speed(Hi/Mi/Lo) | r/min | 1100/900/750 | 1100/900/750 | 1100/1000/800 | 1100/1000/800 |
| Indoor coil | a.Number of rows | 3.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| | b.Tube pitch(a)x row pitch(b) | mm | 21x13.37 | 21x13.37 | 21x13.37 | 21x13.37 |
| | c.Fin spacing | mm | 1.2 | 1.2 | 1.2 | 1.3 |
| | d.Fin type (code) | | Hydrophilic aluminum | Hydrophilic aluminum | Hydrophilic aluminum | Hydrophilic aluminum |
| | e.Tube outside dia. and type | mm | Φ7,Inner groove tube | Φ7,Inner groove tube | Φ7,Inner groove tube | Φ7,Inner groove tube |
| | f.Coil length x height x width | mm | 598x84x13.37+598x105x26.74+598x84x26.74 | 598x84x13.37+598x105x26.74+598x84x26.74 | 750x189x26.74+750x105x26.74 | 820x189x26.74+820x126x26.74 |
| | g.Number of circuits | | 2 | 2 | 3 | 5 |
| Indoor air flow (Hi/Mi/Lo) | | m3/h | 549/482/357 | 549/482/357 | 809/718/545 | 978/864/646 |
| Indoor sound pressure level (Hi) | | dB(A) | 39.5/25.5/22.5 | 41.5/28/23 | 44.5/28.5/24 | 45.5/35.5/27 |
| Indoor sound power level (Hi) | | dB(A) | 53 | 54 | 57 | 59 |
| Indoor unit | Dimension(W*D*H) | mm | 805x193x302 | 805x193x302 | 964x222x325 | 1106x232x342 |
| | Packing (W*D*H) | mm | 875x375x290 | 875x375x290 | 1045x405x310 | 1195x420x320 |
| | Net/Gross weight | Kg | 8.3/11 | 8.2/10.9 | 10.8/14.3 | 14.3/18.2 |
| Design pressure | | MPa | 4.3/1.7 | 4.3/1.7 | 4.3/1.7 | 4.3/1.7 |
| Refrigerant piping | Liquid side/ Gas side | mm(inch) | Φ6.35/Φ9.52(1/4"/3/8") | Φ6.35/Φ9.52(1/4"/3/8") | Φ6.35/Φ9.52(1/4"/3/8") | Φ6.35/Φ9.52(1/4"/3/8") |
| Controller | | Wired Control | Remote Control | Remote Control | Remote Control | Remote Control |
| Operation temperature | | °C | 17~30 | 17~30 | 17~30 | 17~30 |
| Room temperature | Cooling | °C | 17~32 | 17~32 | 17~32 | 17~32 |
| | Heating | °C | 0~30 | 0~30 | 0~30 | 0~30 |

Notes:

1) Capacities are based on the following conditions:

Cooling(T1): - Indoor Temperature 27°C(80.6°F) DB /19 °C(66.2°F) WB

-Outdoor Temperature 35 °C(95°F) DB /24 °C(75.2°F) WB

-Interconnecting Piping Length 5m

- Level Difference of Zero.

Heating: - Indoor Temperature 20°C(68°F) DB / 15°C(59°F) WB

-Outdoor Temperature 7°C(44.6°F) DB / 6°C(42.8°F) WB

- Interconnecting Piping Length 5 m

- Level Difference of Zero.

2) Capacities are Net Capacities.

3) Due to our policy of innovation some specifications may be changed without notification.

| Indoor model | | | MSAGAU-09HRFNX-QRD0GW | MSAGBU-09HRFN8-QRD1GW(GA) | MSAGBU-12HRFNX-QRD0GW |
|----------------------------------|--------------------------------|---------------|--|-----------------------------|-----------------------------|
| Power supply (Indoor) | | V- Ph-Hz | 220~240-1-50 | 220~240-1-50 | 220~240-1-50 |
| Cooling | Capacity | Btu/h | 9000 | 9000 | 12000 |
| | Input | W | 21 | 23 | 23 |
| | Current | A | 0.09 | 0.10 | 0.10 |
| Heating | Capacity | Btu/h | 10000 | 10000 | 13000 |
| | Input | W | 21 | 23 | 23 |
| | current | A | 0.09 | 0.10 | 0.10 |
| Indoor fan motor | Model | | ZKFP-20-8-6-7 | ZKFP-13-8-4 | ZKFP-13-8-4 |
| | Input | W | 50 | 18.2 | 18.2 |
| | Capacitor | uF | / | / | / |
| | Speed(Hi/Mi/Lo) | r/min | 1050/700 | 1050/450 | 1050/700 |
| Indoor coil | a.Number of rows | | 2 | 2 | 2 |
| | b.Tube pitch(a)x row pitch(b) | mm | 21x13.37 | 21x13.37 | 21x13.37 |
| | c.Fin spacing | mm | 1.3 | 1.3 | 1.3 |
| | d.Fin type (code) | | Hydrophilic aluminum | Hydrophilic aluminum | Hydrophilic aluminum |
| | e.Tube outside dia.and type | mm | Φ7,Inner groove tube | Φ7,Inner groove tube | Φ7,Inner groove tube |
| | f.Coil length x height x width | mm | 525x84x13.37+525x105x26.74+525x105x26.74 | 605x210x26.74+605x105x26.74 | 605x210x26.74+605x105x26.74 |
| | g.Number of circuits | | 2 | 2 | 2 |
| Indoor air flow (Hi/Mi/Lo) | | m3/h | 460/330/260 | 510/360/300 | 530/400/350 |
| Indoor sound pressure level (Hi) | | dB(A) | 37.0/32.0/22.0 | 37/0/22 | 37.0/32.0/22.0 |
| Indoor sound power level (Hi) | | dB(A) | 54 | 55 | 55 |
| Indoor unit | Dimension(W*D*H) | mm | 726x210x291 | 835x295x208 | 835x208x295 |
| | Packing (W*D*H) | mm | 790x270x375 | 905x355x290 | 905x355x290 |
| | Net/Gross weight | Kg | 8.0/10.5 | 8.7/11.5 | 8.7/11.5 |
| Design pressure | | MPa | 4.3/1.7 | 4.3/1.7 | 4.3/1.7 |
| Refrigerant piping | Liquid side/ Gas side | mm(inch) | Φ6.35/Φ9.52(1/4"/3/8") | Φ6.35/Φ9.52(1/4"/3/8") | Φ6.35/Φ9.52(1/4"/3/8") |
| Controller | | Wired Control | Remote Control | Remote Control | Remote Control |
| Operation temperature | | °C | 16~30 | 16~30 | 16~30 |
| Room temperature | Cooling | °C | 16~32 | 16~32 | 16~32 |
| | Heating | °C | 0~30 | 0~30 | 0~30 |

Notes:

1) Capacities are based on the following conditions:

Cooling(T1): - Indoor Temperature 27°C(80.6°F) DB /19 °C(66.2°F) WB Heating: - Indoor Temperature 20°C(68°F) DB / 15°C(59°F) WB

-Outdoor Temperature 35 °C(95°F) DB /24 °C(75.2°F) WB

-Outdoor Temperature 7°C(44.6°F) DB / 6°C(42.8°F) WB

-Interconnecting Piping Length 5m

- Interconnecting Piping Length 5 m

- Level Difference of Zero.

- Level Difference of Zero.

2) Capacities are Net Capacities.

3) Due to our policy of innovation some specifications may be changed without notification.

| Indoor model | | | MSAGBU-12HRFN8-QRD1GW(GA) | MSAGCU-18HRFNX-QRD0GW | MSAGDU-24HRFN8-QRD0GW |
|----------------------------------|--------------------------------|-------------------|-----------------------------|-----------------------------|-----------------------------|
| Power supply (Indoor) | | V- Ph-Hz | 220~240-1-50 | 220~240-1-50 | 220~240-1-50 |
| Cooling | Capacity | Btu/h | 12000 | 18000 | 24000 |
| | Input | W | 23 | 38 | 68 |
| | Current | A | 0.10 | 0.17 | 0.30 |
| Heating | Capacity | Btu/h | 13000 | 19000 | 25000 |
| | Input | W | 23 | 38 | 68 |
| | current | A | 0.10 | 0.17 | 0.30 |
| Indoor fan motor | Model | | ZKFP-13-8-4 | ZKFP-30-8-3 | ZKFP-58-8-1-5 |
| | Input | W | 18.2 | 36.0 | 58.0 |
| | Capacitor | uF | / | / | / |
| | Speed(Hi/Mi/Lo) | r/min | 1100/900/750 | 1150/1000/850 | 1150/1000/850 |
| Indoor coil | a.Number of rows | 3.0 | 2 | 2 | 2 |
| | b.Tube pitch(a)x row pitch(b) | mm | 21x13.37 | 21x13.37 | 21x13.37 |
| | c.Fin spacing | mm | 1.3 | 1.2 | 1.3 |
| | d.Fin type (code) | | Hydrophilic aluminum | Hydrophilic aluminum | Hydrophilic aluminum |
| | e.Tube outside dia.and type | mm | Φ7,Inner groove tube | Φ7,Inner groove tube | Φ7,Inner groove tube |
| | f.Coil length x height x width | mm | 605x210x26.74+605x105x26.74 | 750x210x26.74+750x126x26.74 | 820x210x26.74+820x126x26.74 |
| | g.Number of circuits | | 2 | 4 | 4 |
| Indoor air flow (Hi/Mi/Lo) | | m ³ /h | 520/370/310 | 800/600/500 | 1090/770/610 |
| Indoor sound pressure level (Hi) | | dB(A) | 38/33/22 | 41/37/31 | 46/37/34.5 |
| Indoor sound power level (Hi) | | dB(A) | 60 | 56 | 62 |
| Indoor unit | Dimension(W*D*H) | mm | 835x208x295 | 969x241x320 | 1083x244x336 |
| | Packing (W*D*H) | mm | 905x355x290 | 1045x315x405 | 1155x415x315 |
| | Net/Gross weight | Kg | 8.7/11.3 | 11.2/14.6 | 13.6/17.3 |
| Design pressure | | MPa | 4.3/1.7 | 4.3/1.7 | 4.3/1.7 |
| Refrigerant piping | Liquid side/ Gas side | mm(inch) | Φ6.35/Φ9.52(1/4"/3/8") | Φ6.35/Φ12.7(1/4"/1/2") | Φ9.52/Φ15.9(3/8"/5/8") |
| Controller | | Wired Control | Remote Control | Remote Control | Remote Control |
| Operation temperature | | °C | 16~30 | 16~30 | 16~30 |
| Room temperature | Cooling | °C | 16~32 | 16~32 | 16~32 |
| | Heating | °C | 0~30 | 0~30 | 0~30 |

Notes:

1) Capacities are based on the following conditions:

Cooling(T1): - Indoor Temperature 27°C(80.6°F) DB /19 °C(66.2°F) WB Heating: - Indoor Temperature 20°C(68°F) DB / 15°C(59°F) WB
 -Outdoor Temperature 35 °C(95°F) DB /24 °C(75.2°F) WB -Outdoor Temperature 7°C(44.6°F) DB / 6°C(42.8°F) WB
 -Interconnecting Piping Length 5m - Interconnecting Piping Length 5 m
 - Level Difference of Zero. - Level Difference of Zero.

2) Capacities are Net Capacities.

3) Due to our policy of innovation some specifications may be changed without notification.

| Outdoor model | | | M2OG-14HFN8-Q | M2OC-18HFN8-Q | M2OD-18HFN8-Q |
|------------------------------|------------------------------|---------|-----------------------|-------------------------|-------------------------|
| Indoor unit combination | | | MSAFBU-07HRDN8-QRD0GW | MSAFBU-09HRDN8-QRD0GW | MSAFBU-09HRDN8-QRD0GW |
| Power Supply (Outdoor) | | V-Ph-Hz | 220~240-1-50 | 220~240-1-50 | 220~240-1-50 |
| Cooling | Capacity | Btu/h | 14000(6210~16400) | 18000(3860~18000) | 18000(3860~19000) |
| | Input | W | 1270(168~1714) | 1630(150~2000) | 1630(150~2000) |
| | Rated current | A | 5.52(0.73~9.3) | 7.1(0.7~9.27) | 7.1(0.7~9.21) |
| | EER | W/W | 3.2 | 3.24 | 3.24 |
| Heating | Capacity | Btu/h | 15000(5220~17400) | 19000(6120~19000) | 19000(6120~20000) |
| | Input | W | 1185(265~1707) | 1390(300~1670) | 1390(300~1650) |
| | Rated current | A | 5.15(1.15~9.4) | 6.1(1.4~7.74) | 6.1(1.4~7.41) |
| | COP | WWW | 3.71 | 4.01 | 4.01 |
| Max. input consumption | | W | 2650 | 2300 | 2850 |
| Max. current | | A | 11.5 | 12 | 13 |
| Compressor | Model | | KSN140D21UFZ | KSM135D23UFZ | KSN140D21UFZ |
| | Type | | ROTARY | ROTARY | ROTARY |
| | Brand | | GMCC | GMCC | GMCC |
| | Capacity | Btu/h | 4385 | 4230 | 4385 |
| | Input | W | 1140 | 1080 | 1140 |
| | Rated current(RLA) | A | 7.50 | 7.1 | 7.50 |
| | Locked rotor Amp(LRA) | A | / | / | / |
| | Thermal protector position | | / | / | / |
| | Capacitor | μF | / | / | / |
| Outdoor fan motor | Refrigerant oil | ml | VG74 440 | VG74/450 | VG74 440 |
| | Model | | ZKFN-34-8-1-3 | ZKFN-40-8-1L-5 | ZKFN-34-8-1-3 |
| | Qty | | 1 | 1 | 1 |
| | Output | W | 34 | 40.0 | 34 |
| | Capacitor | uF | / | / | / |
| Outdoor coil | Speed | r/min | 850/750/650 | 850/750/650 | 850/750/650 |
| | Number of rows | | 1 | 2.0 | 2 |
| | Tube pitch(a)x row pitch(b) | mm | 21x22 | 25.4x22 | 25.4x22 |
| | Fin spacing | mm | 1.2 | 1.4 | 1.4 |
| | Fin type (code) | | Hydrophilic aluminum | Hydrophilic aluminum | Hydrophilic aluminum |
| | Tube outside dia.and type | mm | Φ7,Inner groove tube | Φ9.52,Inner groove tube | Φ9.52,Inner groove tube |
| | Coil length x height x width | mm | 870x504x22 | 860x508x44 | 860x508x44 |
| Number of circuits | | | 2 | 4 | 4 |
| Outdoor air flow | | m3/h | 2200 | 2200 | / |
| Outdoor sound pressure level | | dB(A) | 56 | 56 | 55.5 |
| Outdoor sound power level | | dB(A) | 64 | 64 | 65 |
| Throttle type | | | EXV+Capillary | EXV+Capillary | EXV+Capillary |
| Outdoor unit | Dimension(W*D*H) | mm | 800x333x554 | 800x333x554 | 800x333x554 |
| | Packing (W*D*H) | mm | 920x390x615 | 920x390x625 | 920x390x615 |
| | Net/Gross weight | Kg | 31.8/34.9 | 36/39 | 35.5/38.5 |
| Refrigerant type | Type | - | R32 | R32 | R32 |
| | GWP | - | 675 | 675 | 675 |
| | Charged quantity | Kg | 1.1 | 1.3 | 1.25 |

| Design pressure | | MPa | 4.3/1.7 | 4.3/1.7 | 4.3/1.7 |
|---------------------|--|----------|----------------------------|----------------------------|----------------------------|
| Refrigerant piping | Liquid side/ Gas side | mm(inch) | 2 x Ø6.35/Ø9.52(1/4"/3/8") | 2 x Ø6.35/Ø9.52(1/4"/3/8") | 2 x Ø6.35/Ø9.52(1/4"/3/8") |
| | Max. length for all rooms | m | 40 | 40 | 40 |
| | Max. length for one indoor unit | m | 25 | 25 | 25 |
| | Max. height difference between indoor and outdoor unit | m | 15 | 15 | 15 |
| | Max. height difference between indoor units | m | 10 | 10 | 10 |
| Ambient temperature | Cooling | °C | -15~50 | -15~50 | -15~50 |
| | Heating | °C | -15~24 | -15~24 | -15~24 |

Notes:

1) Capacities are based on the following conditions:

| | | | |
|--------------|--|----------|--|
| Cooling(T1): | - Indoor Temperature 27°C(80.6°F) DB /19 °C(66.2°F) WB | Heating: | - Indoor Temperature 20°C(68°F) DB / 15°C(59°F) WB |
| | -Outdoor Temperature 35 °C(95°F) DB /24 °C(75.2°F) WB | | -Outdoor Temperature 7°C(44.6°F) DB / 6°C(42.8°F) WB |
| | -Interconnecting Piping Length 5m | | - Interconnecting Piping Length 5 m |
| | - Level Difference of Zero. | | - Level Difference of Zero. |

2) Capacities are Net Capacities.

3) Due to our policy of innovation some specifications may be changed without notification.

4).For other combination, refer to the combination table.

| Outdoor model | | | M30E-27HFN8-Q | M30F-21HFN8-Q | M30F-27HFN8-Q |
|------------------------------|------------------------------|---------|-------------------------|-----------------------|-------------------------|
| Indoor unit combination | | | MSAFBU-09HRDN8-QRD0GW | MSAFBU-07HRDNX-QRD0GW | MSAFBU-09HRDN8-QRD0GW |
| Power Supply (Outdoor) | | V-Ph-Hz | 220~240-1-50 | 220~240-1-50 | 220~240-1-50 |
| Cooling | Capacity | Btu/h | 27000(7370~27000) | 21000(6619~23420) | 27000(10100~29000) |
| | Input | W | 2440(200~3070) | 1950(180~2240) | 2450(235~3220) |
| | Rated current | A | 10.6(0.9~13.5) | 9.0(1.09~9.9) | 13.7(2.2~14.3) |
| | EER | W/W | 3.24 | 3.23 | 3.23 |
| Heating | Capacity | Btu/h | 28800(6400~31500) | 22500(5900~24740) | 28000(6950~32000) |
| | Input | W | 2270(320~2850) | 1780(325~1920) | 2100(310~2890) |
| | Rated current | A | 10.0(1.4~12.5) | 8.5(1.94~8.5) | 12.5(2.5~12.9) |
| | COP | W/W | 3.72 | 3.71 | 3.91 |
| Max. input consumption | | W | 3100 | 3300 | 3600 |
| Max. current | | A | 15 | 15.5 | 17.5 |
| Compressor | Model | | KTF235D22UMT | KSN140D21UFZ | KTM240D57UMT |
| | Type | | ROTARY | ROTARY | ROTARY |
| | Brand | | GMCC | GMCC | GMCC |
| | Capacity | Btu/h | 7650 | 4385 | 7715 |
| | Input | W | 2065 | 1140 | 2085 |
| | Rated current(RLA) | A | 9.4 | 7.50 | 9.45 |
| | Locked rotor Amp(LRA) | A | / | / | / |
| | Thermal protector position | | / | / | / |
| | Capacitor | μF | / | / | / |
| Outdoor fan motor | Refrigerant oil | ml | RB74A F/670 | VG74 440 | VG74 670 |
| | Model | | ZKFN-50-8-2 | ZKFN-50-8-2-3 | ZKFN-50-8-2-3 |
| | Qty | | 1 | 1 | 1 |
| | Output | W | 50 | 50 | 50 |
| | Capacitor | μF | / | / | / |
| Outdoor coil | Speed | r/min | 850/750/600 | 750/650/550 | 850/650/550 |
| | Number of rows | | 2 | 2 | 1 |
| | Tube pitch(a)x row pitch(b) | mm | 25.4x22 | 21x22 | 25.4x22 |
| | Fin spacing | mm | 1.4 | 1.2 | 1.4 |
| | Fin type (code) | | Hydrophilic aluminum | Hydrophilic aluminum | Unhydrophilic aluminium |
| | Tube outside dia.and type | mm | Φ9.52,Inner groove tube | Φ7,Inner groove tube | Φ9.52,Inner groove tube |
| | Coil length x height x width | mm | 730x660x44 | 730x651x44 | 730x660x22 |
| Number of circuits | | | 4 | 4 | 4 |
| Outdoor air flow | | m3/h | 2700 | / | / |
| Outdoor sound pressure level | | dB(A) | 59 | 57.5 | 59 |
| Outdoor sound power level | | dB(A) | 66 | 65 | 67 |
| Throttle type | | | EXV+Capillary | EXV+Capillary | EXV+Capillary |
| Outdoor unit | Dimension(W*D*H) | mm | 845x363x702 | 845x363x702 | 845x363x702 |
| | Packing (W*D*H) | mm | 965x395x775 | 965x395x775 | 965x395x775 |
| | Net/Gross weight | Kg | 54.4/59.2 | 46.8/51.1 | 51.1/55.8 |
| Refrigerant type | Type | - | R32 | R32 | R32 |
| | GWP | - | 675 | 675 | 675 |
| | Charged quantity | Kg | 1.57 | 1.4 | 1.72 |

| Design pressure | | MPa | 4.3/1.7 | 4.3/1.7 | 4.3/1.7 |
|---------------------|--|----------|----------------------------|----------------------------|----------------------------|
| Refrigerant piping | Liquid side/ Gas side | mm(inch) | 3 x Ø6.35/Ø9.52(1/4"/3/8") | 3 x Ø6.35/Ø9.52(1/4"/3/8") | 3 x Ø6.35/Ø9.52(1/4"/3/8") |
| | Max. length for all rooms | m | 60 | 60 | 60 |
| | Max. length for one indoor unit | m | 30 | 30 | 30 |
| | Max. height difference between indoor and outdoor unit | m | 15 | 15 | 15 |
| | Max. height difference between indoor units | m | 10 | 10 | 10 |
| Ambient temperature | Cooling | °C | -15~50 | -15~50 | -15~50 |
| | Heating | °C | -15~24 | -15~24 | -15~24 |

Notes:

1) Capacities are based on the following conditions:

Cooling(T1): - Indoor Temperature 27°C(80.6°F) DB /19 °C(66.2°F) WB Heating: - Indoor Temperature 20°C(68°F) DB / 15°C(59°F) WB
 -Outdoor Temperature 35 °C(95°F) DB /24 °C(75.2°F) WB -Outdoor Temperature 7°C(44.6°F) DB / 6°C(42.8°F) WB
 -Interconnecting Piping Length 5m - Interconnecting Piping Length 5 m
 - Level Difference of Zero. - Level Difference of Zero.

2) Capacities are Net Capacities.

3) Due to our policy of innovation some specifications may be changed without notification.

4).For other combination, refer to the combination table.

| Outdoor model | | | M4OE-28HFN8-Q | M4OB-36HFN8-Q | M5OD-42HFN8-Q | M5OE-42HFN8-Q |
|------------------------------|------------------------------|---------|------------------------------|-------------------------|-------------------------|----------------------------------|
| Indoor unit combination | | | MSAFBU-07HRDNX-QRD0GW | MSAFBU-09HRDN8-QRD0GW | MSAFBU-09HRDN8-QRD0GW | MSAFBU-09HRDN8-QRD0GW |
| Power Supply (Outdoor) | | V-Ph-Hz | 220~240-1-50 | 220~240-1-50 | 220~240-1-50 | 220~240-1-50 |
| Cooling | Capacity | Btu/h | 28000(8000~34200) | 36000(12430~37000) | 42000(10170~42000) | 42000(10300~42000) |
| | Input | W | 2550(204~3446) | 3300(330~4250) | 4320(280~4580) | 3810(280~4650) |
| | Rated current | A | 11(1.17~15) | 15.0(1.5~18.5) | 18.9(1.2~20.0) | 16(1.4~20.7) |
| | EER | W/W | 3.23 | 3.2 | 2.85 | 3.23 |
| Heating | Capacity | Btu/h | 30000(8100~35800) | 37000(9730~41000) | 42000(9370~42000) | 42000(11800~42000) |
| | Input | W | 2050(431~3050) | 2760(470~4210) | 3100(510~4000) | 3300(650~3800) |
| | Rated current | A | 9(2.55~13.3) | 12.1(2.1~18.4) | 13.5(2.2~17.6) | 14.6(3.0~16.6) |
| | COP | W/W | 4.0 | 3.93 | 3.97 | 3.73 |
| Max. input consumption | | W | 4150 | 4600 | 4700 | 4700 |
| Max. current | | A | 19 | 21.5 | 22 | 22 |
| Compressor | Model | | KTM240D5UMT | KTF310D43UMT | KTF310D43UMT | KTF310D43UMT |
| | Type | | ROTARY | ROTARY | ROTARY | ROTARY |
| | Brand | | GMCC | GMCC | GMCC | GMCC |
| | Capacity | Btu/h | 7715 | 10010 | 10010 | 10010 |
| | Input | W | 2085 | 2765 | 2765 | 2765 |
| | Rated current(RLA) | A | 9.45 | 5.38 | 5.38 | 5.38 |
| | Locked rotor Amp(LRA) | A | / | / | / | / |
| | Thermal protector position | | / | EXTERNAL | EXTERNAL | EXTERNAL |
| | Capacitor | μF | / | / | / | / |
| | Refrigerant oil | ml | VG74 670 | VG74/1000 | VG74/1000 | VG74/1000 |
| Outdoor fan motor | Model | | ZKFN-120-8-2 | ZKFN-120-8-2 | ZKFN-120-8-2 | ZKFN-120-8-2 |
| | Qty | | 1 | 1 | 1 | 1 |
| | Output | W | 120 | 120 | 120 | 120 |
| | Capacitor | uF | / | / | / | / |
| | Speed | r/min | 900/750/600 | 900/750/600 | 900/750/600 | 900/750/600 |
| Outdoor coil | Number of rows | | 2 | 2.0 | 3.0 | 3 |
| | Tube pitch(a)x row pitch(b) | mm | 21x13.37 | 25.4x22 | 25.4x22 | 25.4x22 |
| | Fin spacing | mm | 1.4 | 1.3 | 1.3 | 1.3 |
| | Fin type (code) | | Hydrophilic aluminum | Hydrophilic aluminum | Hydrophilic aluminum | Hydrophilic aluminum |
| | Tube outside dia.and type | mm | Φ7,Inner groove tube | Φ9.52,Inner groove tube | Φ9.52,Inner groove tube | Φ9.52,Inner groove tube |
| | Coil length x height x width | mm | 1005x756x13.37+985x756x13.37 | 995x762x44 | 978x762x44+580x762x22 | 995x762x22+960x762x22+580x762x22 |
| | Number of circuits | | 6 | 4 | 4 | 4 |
| Outdoor air flow | | m3/h | / | 4000 | 3850 | 3850 |
| Outdoor sound pressure level | | dB(A) | 61.5 | 61 | 64 | 64 |
| Outdoor sound power level | | dB(A) | 67 | 67 | 69 | 69 |
| Throttle type | | | EXV+Capillary | EXV+Capillary | EXV+Capillary | EXV+Capillary |
| Outdoor unit | Dimension(W*D*H) | mm | 946x410x810 | 946x410x810 | 946x410x810 | 946x410x810 |
| | Packing (W*D*H) | mm | 1090x500x885 | 1090x500x885 | 1090x500x885 | 1090x500x885 |
| | Net/Gross weight | Kg | 62.1/67.7 | 68.8/75.6 | 73.3/80.4 | 74.1/79.5 |
| Refrigerant type | Type | - | R32 | R32 | R32 | R32 |
| | GWP | - | 675 | 675 | 675 | 675 |
| | Charged quantity | Kg | 2.1 | 2.1 | 2.4 | 2.9 |
| Design pressure | | MPa | 4.3/1.7 | 4.3/1.7 | 4.3/1.7 | 4.3/1.7 |

| | Liquid side/ Gas side | mm(inch) | 4 x Φ6.35/3x Φ9.52+1xΦ12.7(4x1/4"/3x3/8"+1x1/2") | 4 x Φ6.35/3x Φ9.52+1xΦ12.7(4x1/4"/3x3/8"+1x1/2") | 5 x Φ6.35/4x Φ9.52+1xΦ12.7(5x1/4"/4x3/8"+1x1/2") | 5 x Φ6.35/4x Φ9.52+1xΦ12.7(5x1/4"/4x3/8"+1x1/2") |
|---------------------|--|----------|--|--|--|--|
| Refrigerant piping | Max. length for all rooms | m | 80 | 80 | 80 | 80 |
| | Max. length for one indoor unit | m | 35 | 35 | 35 | 35 |
| | Max. height difference between indoor and outdoor unit | m | 15 | 15 | 15 | 15 |
| | Max. height difference between indoor units | m | 10 | 10 | 10 | 10 |
| | | | | | | |
| Ambient temperature | Cooling | °C | -15~50 | -15~50 | -15~50 | -15~50 |
| | Heating | °C | -15~24 | -15~24 | -15~24 | -15~24 |

Notes:

1) Capacities are based on the following conditions:

Cooling(T1): - Indoor Temperature 27°C(80.6°F) DB /19 °C(66.2°F) WB

-Outdoor Temperature 35 °C(95°F) DB /24 °C(75.2°F) WB

-Interconnecting Piping Length 5m

- Level Difference of Zero.

Heating: - Indoor Temperature 20°C(68°F) DB / 15°C(59°F) WB

-Outdoor Temperature 7°C(44.6°F) DB / 6°C(42.8°F) WB

- Interconnecting Piping Length 5 m

- Level Difference of Zero.

2) Capacities are Net Capacities.

3) Due to our policy of innovation some specifications may be changed without notification.

4).For other combination, refer to the combination table.

| | | | | |
|------------------------------|------------------------------|---------|-----------------------|-------------------------|
| Outdoor model | | | M2OH-14HFN8-Q | M2OE-18HFN8-Q |
| Indoor unit combination | | | MSAFBU-07HRDNX-QRD0GW | MSAFBU-09HRDN8-QRD0GW |
| Power Supply (Outdoor) | | V-Ph-Hz | 220~240-1-50 | 220~240-1-50 |
| Cooling | Capacity | Btu/h | 14000(5100~17000) | 18000(7800~19500) |
| | Input | W | 1270(115~1672) | 1635(690~2000) |
| | Rated current | A | 5.8(1.12~7.35) | 7.3(3.20~9.00) |
| | EER | W/W | 3.23 | 3.23 |
| Heating | Capacity | Btu/h | 15000(5200~17000) | 19000(8200~19600) |
| | Input | W | 1185(253~1592) | 1500(600~1780) |
| | Rated current | A | 5.4(1.9~7.0) | 6.6(2.80~7.95) |
| | COP | W/W | 3.71 | 3.71 |
| Max. input consumption | | W | 2750 | 3050 |
| Max. current | | A | 12 | 13.0 |
| Compressor | Model | | KSN140D58UFZ | KSN140D58UFZ |
| | Type | | ROTARY | ROTARY |
| | Brand | | GMCC | GMCC |
| | Capacity | Btu/h | 4315 | 4315 |
| | Input | W | 1090 | 1090 |
| | Rated current(RLA) | A | 7.15 | 7.15 |
| | Locked rotor Amp(LRA) | A | / | / |
| | Thermal protector position | | / | / |
| | Capacitor | μF | / | / |
| | Refrigerant oil | ml | ESTER OIL VG74 440 | ESTER OIL VG74 440 |
| Outdoor fan motor | Model | | ZKFN-34-10-1-3 | ZKFN-34-10-1-3 |
| | Qty | | 1 | 1 |
| | Output | W | 34 | 34 |
| | Capacitor | uF | / | / |
| | Speed | r/min | 760/700/500 | 760/700/500 |
| Outdoor coil | Number of rows | | 1.0 | 2.0 |
| | Tube pitch(a)x row pitch(b) | mm | 21x22 | 21x22 |
| | Fin spacing | mm | 1.3 | 1.3 |
| | Fin type (code) | | Hydrophilic aluminum | Hydrophilic aluminum |
| | Tube outside dia.and type | mm | Φ7,Inner groove tube | Φ9.52,Inner groove tube |
| | Coil length x height x width | mm | 870x504x44 | 860*504*44 |
| | Number of circuits | | 2 | 4 |
| Outdoor air flow | | m3/h | 2100 | 2100 |
| Outdoor sound pressure level | | dB(A) | 56 | 54.0 |
| Outdoor sound power level | | dB(A) | 64 | 65 |
| Throttle type | | | EXV+Capillary | EXV+Capillary |
| Outdoor unit | Dimension(W*D*H) | mm | 805x330x554 | 805x330x554 |
| | Packing (W*D*H) | mm | 915x370x615 | 915x370x615 |
| | Net/Gross weight | Kg | 31.6/34.7 | 35.0/38.0 |
| Refrigerant type | Type | - | R32 | R32 |
| | GWP | - | 675 | 675 |
| | Charged quantity | Kg | 1.1 | 1.25 |
| Design pressure | | MPa | 4.3/1.7 | 4.3/1.7 |

| Refrigerant piping | Liquid side/ Gas side | mm(inch) | 2 x Ø6.35/Ø9.52(1/4"/3/8") | 2 x Ø6.35/Ø9.52(1/4"/3/8") |
|---------------------|--|----------|----------------------------|----------------------------|
| | Max. length for all rooms | m | 40 | 40 |
| | Max. length for one indoor unit | m | 25 | 25 |
| | Max. height difference between indoor and outdoor unit | m | 15 | 15 |
| | Max. height difference between indoor units | m | 10 | 10 |
| Ambient temperature | Cooling | °C | -15~50 | -15~50 |
| | Heating | °C | -15~24 | -15~24 |

Notes:

1) Capacities are based on the following conditions:

Cooling(T1): - Indoor Temperature 27°C(80.6°F) DB /19 °C(66.2°F) WB

-Outdoor Temperature 35 °C(95°F) DB /24 °C(75.2°F) WB

-Interconnecting Piping Length 5m

- Level Difference of Zero.

Heating: - Indoor Temperature 20°C(68°F) DB / 15°C(59°F) WB

-Outdoor Temperature 7°C(44.6°F) DB / 6°C(42.8°F) WB

- Interconnecting Piping Length 5 m

- Level Difference of Zero.

2) Capacities are Net Capacities.

3) Due to our policy of innovation some specifications may be changed without notification.

4).For other combination, refer to the combination table.

| | | | | |
|------------------------------|------------------------------|---------|-----------------------|-----------------------|
| Outdoor model | | | M30G-21HFN8-Q | M30A-27HFN8-Q |
| Indoor unit combination | | | MSAFBU-07HRDNX-QRD0GW | MSAFBU-09HRDN8-QRD0GW |
| Power Supply (Outdoor) | | V-Ph-Hz | 220~240-1-50 | 220~240-1-50 |
| Cooling | Capacity | Btu/h | 21000(6800~22500) | 27000(10850~28000) |
| | Input | W | 1905(180~2200) | 2450(290~3100) |
| | Rated current | A | 8.3(1.8~10.0) | 11.2(2.0~13.5) |
| | EER | W/W | 3.23 | 3.23 |
| Heating | Capacity | Btu/h | 22000(6800~22800) | 28000(7800~29000) |
| | Input | W | 1738(350~1800) | 2210(370~2900) |
| | Rated current | A | 7.6(2.6~8.0) | 10.1(2.4~13) |
| | COP | W/W | 3.71 | 3.71 |
| Max. input consumption | | W | 3910 | 4100 |
| Max. current | | A | 17 | 18 |
| Compressor | Model | | KSN140D58UFZ | KTM240D57UMT |
| | Type | | ROTARY | Twin-ROTARY |
| | Brand | | GMCC | GMCC |
| | Capacity | Btu/h | 4315 | 7740 |
| | Input | W | 1090 | 2085 |
| | Rated current(RLA) | A | 7.15 | 9.45 |
| | Locked rotor Amp(LRA) | A | / | / |
| | Thermal protector position | | / | / |
| | Capacitor | μF | / | / |
| | Refrigerant oil | ml | ESTER OIL VG74 440 | ESTER OIL VG74 670 |
| Outdoor fan motor | Model | | ZKFN-80-8-3 | ZKFN-80-8-3 |
| | Qty | | 1 | 1 |
| | Output | W | 80 | 80 |
| | Capacitor | μF | / | / |
| | Speed | r/min | 750/700/600 | 800/580 |
| Outdoor coil | Number of rows | | 1.6 | 2 |
| | Tube pitch(a)x row pitch(b) | mm | 21x22 | 21x13.37 |
| | Fin spacing | mm | 1.3 | 1.3 |
| | Fin type (code) | | Hydrophilic aluminum | Hydrophilic aluminum |
| | Tube outside dia.and type | mm | Φ7,Inner groove tube | Φ7,Inner groove tube |
| | Coil length x height x width | mm | 900*609*22+540*609*22 | 900*609*22+865*609*22 |
| | Number of circuits | | 5 | 6 |
| Outdoor air flow | | m3/h | 3000 | 3000 |
| Outdoor sound pressure level | | dB(A) | 58.0 | 58 |
| Outdoor sound power level | | dB(A) | 65 | 67 |
| Throttle type | | | EXV+Capillary | EXV+Capillary |
| Outdoor unit | Dimension(W*D*H) | mm | 890x342x673 | 890x342x673 |
| | Packing (W*D*H) | mm | 1030x438x750 | 1030x438x750 |
| | Net/Gross weight | Kg | 43.3/47.1 | 48/51.8 |
| Refrigerant type | Type | - | R32 | R32 |
| | GWP | - | 675 | 675 |
| | Charged quantity | Kg | 1.5 | 1.85 |
| Design pressure | | MPa | 4.3/1.7 | 4.3/1.7 |

| Refrigerant piping | Liquid side/ Gas side | mm(inch) | 3 x Ø6.35/Ø9.52(1/4"/3/8") | 3 x Ø6.35/Ø9.52(1/4"/3/8") |
|---------------------|--|----------|----------------------------|----------------------------|
| | Max. length for all rooms | m | 60 | 60 |
| | Max. length for one indoor unit | m | 30 | 30 |
| | Max. height difference between indoor and outdoor unit | m | 15 | 15 |
| | Max. height difference between indoor units | m | 10 | 10 |
| Ambient temperature | Cooling | °C | -15~50 | -15~50 |
| | Heating | °C | -15~24 | -15~24 |

Notes:

1) Capacities are based on the following conditions:

Cooling(T1): - Indoor Temperature 27°C(80.6°F) DB /19 °C(66.2°F) WB

-Outdoor Temperature 35 °C(95°F) DB /24 °C(75.2°F) WB

-Interconnecting Piping Length 5m

- Level Difference of Zero.

Heating: - Indoor Temperature 20°C(68°F) DB / 15°C(59°F) WB

-Outdoor Temperature 7°C(44.6°F) DB / 6°C(42.8°F) WB

- Interconnecting Piping Length 5 m

- Level Difference of Zero.

2) Capacities are Net Capacities.

3) Due to our policy of innovation some specifications may be changed without notification.

4).For other combination, refer to the combination table.

4. Indoor Unit Combination

M2OG-14HFN8-Q, M2OH-14HFN8-Q

| One Unit | Two Units | |
|----------|-----------|------|
| 7 | 7+7 | 9+9 |
| 9 | 7+9 | 9+12 |
| 12 | 7+12 | |
| 18 | | |

M2OC-18HFN8-Q, M2OD-18HFN8-Q, M2OE-18HFN8-Q

| One Unit | Two Units | |
|----------|-----------|-------|
| 7 | 7+7 | 9+9 |
| 9 | 7+9 | 9+12 |
| 12 | 7+12 | 12+12 |
| 18 | | |

M3OF-21HFN8-Q, M3OG-21HFN8-Q

| One Unit | Two Units | | Three Units | |
|----------|-----------|-------|-------------|-------|
| 7 | 7+7 | 9+9 | 7+7+7 | 7+9+9 |
| 9 | 7+9 | 9+12 | 7+7+9 | 9+9+9 |
| 12 | 7+12 | 9+18 | 7+7+12 | |
| 18 | 7+18 | 12+12 | | |

M3OE-27HFN8-Q, M3OF-27HFN8-Q, M3OA-27HFN8-Q

| One Unit | Two Units | | | Three Units | | |
|----------|-----------|------|-------|-------------|---------|----------|
| 7 | 7+7 | 7+18 | 9+18 | 7+7+7 | 7+9+12 | 9+9+12 |
| 9 | 7+9 | 9+9 | 12+12 | 7+7+9 | 7+12+12 | 9+12+12 |
| 12 | 7+12 | 9+12 | 12+18 | 7+7+12 | 9+9+9 | 12+12+12 |
| 18 | | | | 7+9+9 | | |

M4OE-28HFN8-Q

| One Unit | Two Units | | | Three Units | | | Four Units | |
|----------|-----------|------|-------|-------------|---------|----------|------------|----------|
| 7 | 7+7 | 9+9 | 12+12 | 7+7+7 | 7+9+12 | 9+9+12 | 7+7+7+7 | 7+9+9+9 |
| 9 | 7+9 | 9+12 | 12+18 | 7+7+9 | 7+9+18 | 9+9+18 | 7+7+7+9 | 7+9+9+12 |
| 12 | 7+12 | 9+18 | 12+24 | 7+7+12 | 7+12+12 | 9+12+12 | 7+7+7+12 | 9+9+9+9 |
| 18 | 7+18 | 9+24 | 18+18 | 7+7+18 | 9+9+9 | 12+12+12 | 7+7+9+9 | |
| 24 | 7+24 | | | 7+9+9 | | | | |

M4OB-36HFN8-Q

| One Unit | Two Units | | | Three Units | | | |
|----------|-----------|------|-------|-------------|---------|---------|----------|
| 7 | 7+7 | 9+9 | 12+12 | 7+7+7 | 7+9+12 | 7+18+18 | 9+12+18 |
| 9 | 7+9 | 9+12 | 12+18 | 7+7+9 | 7+9+18 | 9+9+9 | 9+12+24 |
| 12 | 7+12 | 9+18 | 12+24 | 7+7+12 | 7+9+24 | 9+9+12 | 9+18+18 |
| 18 | 7+18 | 9+24 | 18+18 | 7+7+18 | 7+12+12 | 9+9+18 | 12+12+12 |
| 24 | 7+24 | | | 7+7+24 | 7+12+18 | 9+9+24 | 12+12+18 |
| | | | | 7+9+9 | 7+12+24 | 9+12+12 | |

| Four Units | | | |
|------------|-----------|------------|-------------|
| 7+7+7+7 | 7+7+9+12 | 7+9+9+12 | 9+9+9+12 |
| 7+7+7+9 | 7+7+9+18 | 7+9+9+18 | 9+9+9+18 |
| 7+7+7+12 | 7+7+12+12 | 7+9+12+12 | 9+9+12+12 |
| 7+7+7+18 | 7+7+12+18 | 7+12+12+12 | 9+12+12+12 |
| 7+7+9+9 | 7+9+9+9 | 9+9+9+9 | 12+12+12+12 |

M5OD-42HFN8-Q, M5OE-42HFN8-Q

| One Unit | Two Units | | | Three Units | | | | |
|----------|-----------|------|-------|-------------|---------|---------|---------|----------|
| 7 | 7+7 | 9+9 | 12+12 | 7+7+7 | 7+9+9 | 7+12+18 | 9+9+18 | 9+18+18 |
| 9 | 7+9 | 9+12 | 12+18 | 7+7+9 | 7+9+12 | 7+12+24 | 9+9+24 | 12+12+12 |
| 12 | 7+12 | 9+18 | 12+24 | 7+7+12 | 7+9+18 | 7+18+18 | 9+12+12 | 12+12+18 |
| 18 | 7+18 | 9+24 | 18+18 | 7+7+18 | 7+9+24 | 9+9+9 | 9+12+18 | 12+12+24 |
| 24 | 7+24 | | | 7+7+24 | 7+12+12 | 9+9+12 | 9+12+24 | 12+18+18 |

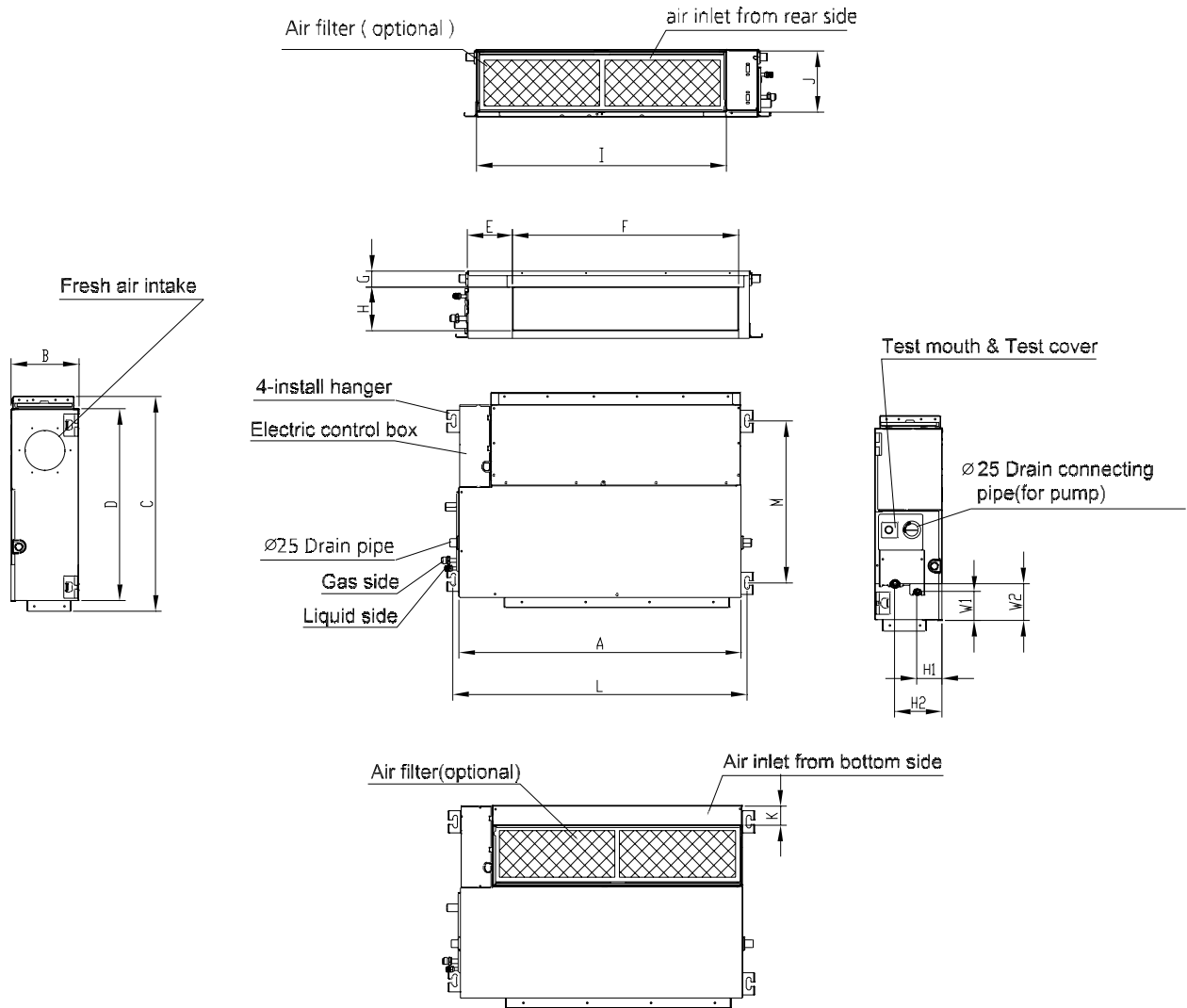
| Four Units | | | | | | |
|------------|-----------|-----------|-----------|------------|-----------|-------------|
| 7+7+7+7 | 7+7+9+9 | 7+7+12+18 | 7+9+9+18 | 7+9+18+18 | 9+9+9+18 | 9+12+12+12 |
| 7+7+7+9 | 7+7+9+12 | 7+7+12+24 | 7+9+9+24 | 7+12+12+12 | 9+9+9+24 | 9+12+12+18 |
| 7+7+7+12 | 7+7+9+18 | 7+7+18+18 | 7+9+12+12 | 7+12+12+18 | 9+9+12+12 | 12+12+12+12 |
| 7+7+7+18 | 7+7+9+24 | 7+9+9+9 | 7+9+12+18 | 9+9+9+9 | 9+9+12+18 | 12+12+12+18 |
| 7+7+7+24 | 7+7+12+12 | 7+9+9+12 | 7+9+12+24 | 9+9+9+12 | 9+9+12+24 | |

| Five Units | | | | |
|------------|-------------|--------------|--------------|--------------|
| 7+7+7+7+7 | 7+7+7+9+18 | 7+7+9+12+12 | 7+9+9+9+18 | 9+9+9+12+12 |
| 7+7+7+7+9 | 7+7+7+12+12 | 7+7+9+12+18 | 7+9+9+12+12 | 9+9+12+12+12 |
| 7+7+7+7+12 | 7+7+7+12+18 | 7+7+12+12+12 | 7+9+12+12+12 | |
| 7+7+7+7+18 | 7+7+9+9+9 | 7+7+12+12+18 | 9+9+9+9+9 | |
| 7+7+7+9+9 | 7+7+9+9+12 | 7+9+9+9+9 | 9+9+9+9+12 | |
| 7+7+7+9+12 | 7+7+9+9+18 | 7+9+9+9+12 | 9+9+9+9+18 | |

5. Dimensional Drawings

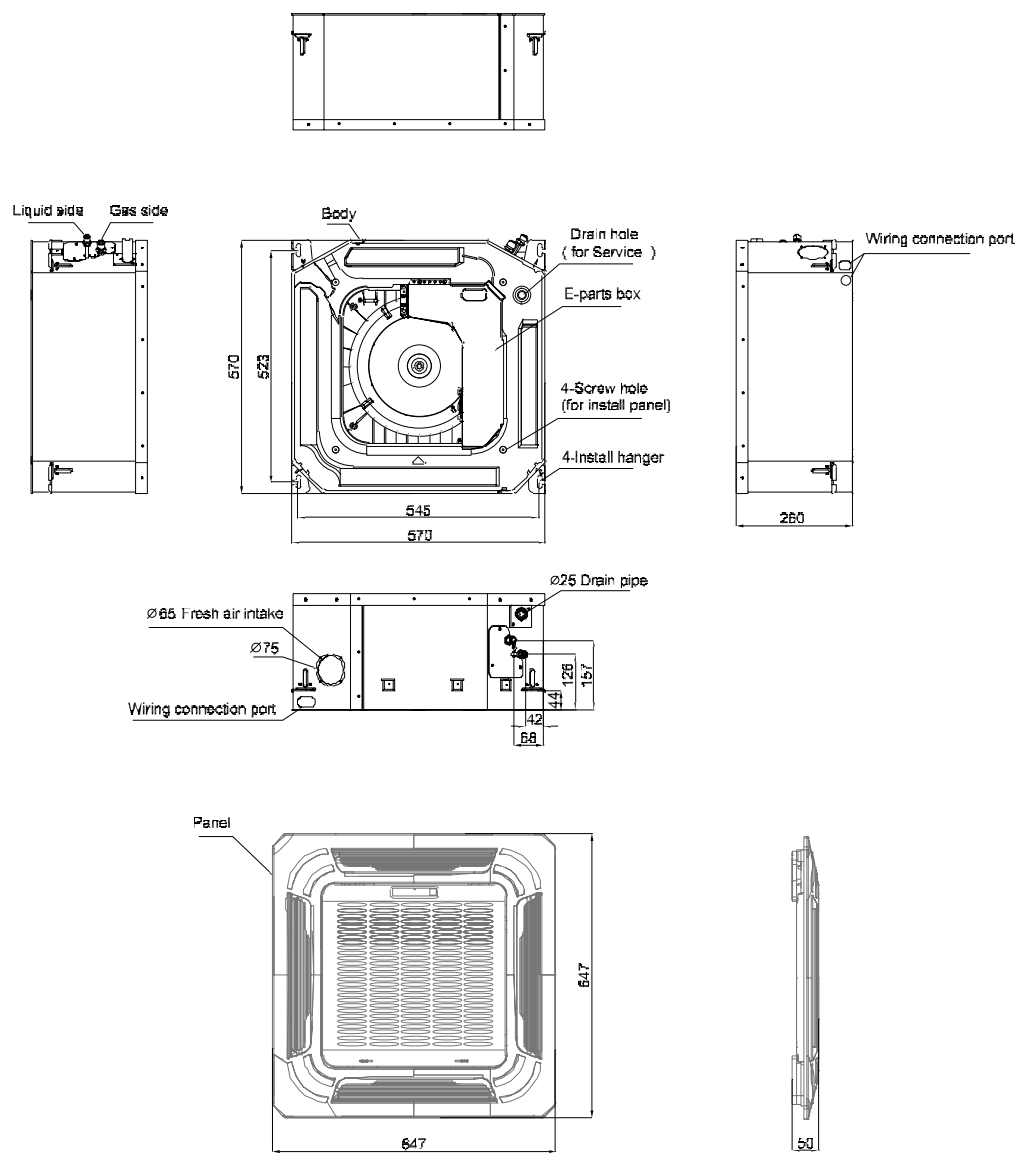
5.1 Indoor Unit

A6 Duct type

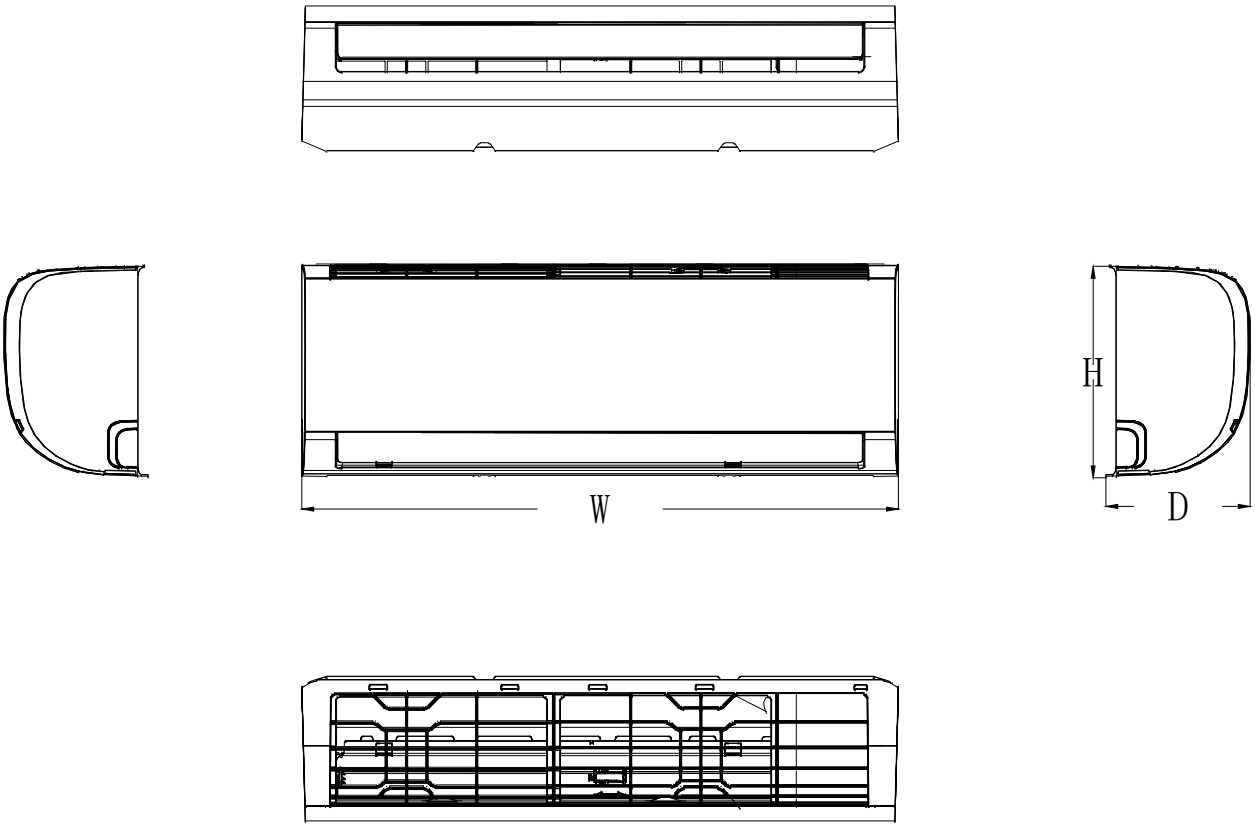


| Capacity (Btu/h) | unit | A | B | C | D | E | F | G | H | I | J | K | L | M | H1 | H2 | W1 | W2 |
|---------------------|------|-------|------|-------|-------|------|-------|------|------|-------|------|------|-------|-------|------|------|------|------|
| 7k~12k | mm | 700 | 200 | 506 | 450 | 137 | 537 | 30 | 152 | 599 | 186 | 50 | 741 | 360 | 84 | 140 | 84 | 84 |
| | inch | 27.56 | 7.87 | 19.92 | 17.72 | 5.39 | 21.14 | 1.18 | 5.98 | 23.58 | 7.32 | 1.97 | 29.17 | 14.17 | 3.31 | 5.51 | 3.31 | 3.31 |
| 18k | mm | 880 | 210 | 674 | 600 | 140 | 706 | 50 | 136 | 782 | 190 | 40 | 920 | 508 | 78 | 148 | 88 | 112 |
| | inch | 34.65 | 8.27 | 26.54 | 23.62 | 5.51 | 27.8 | 1.97 | 5.35 | 30.79 | 7.48 | 1.57 | 36.22 | 20 | 3.07 | 5.83 | 3.46 | 4.41 |

Compact Cassette type

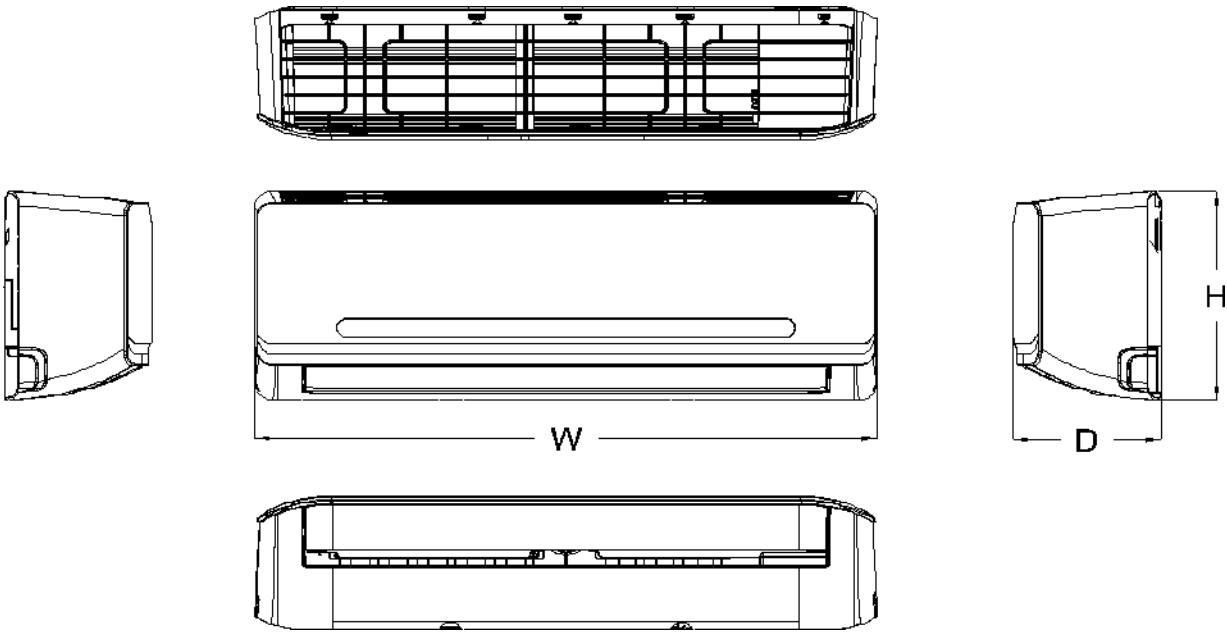


Forest



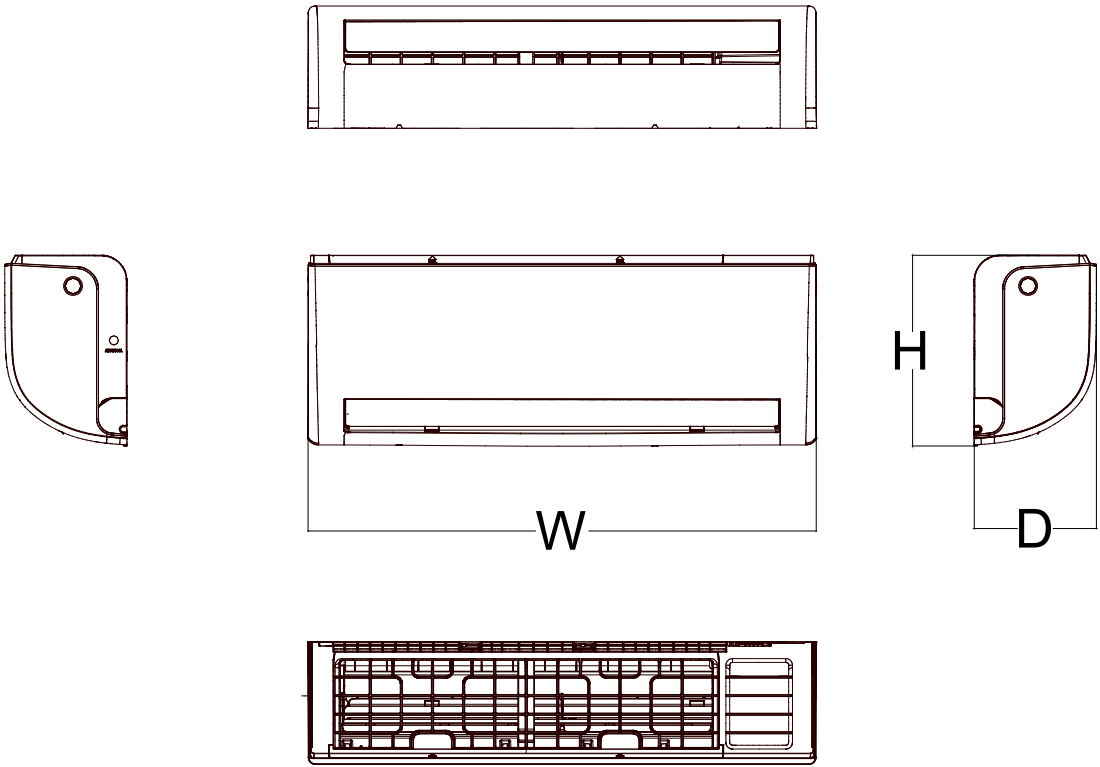
| Capacity(Btu/h) | unit | W(mm) | D(mm) | H(mm) |
|-----------------|------|-------|-------|-------|
| 9k/12k | mm | 805 | 194 | 285 |
| | inch | 31.7 | 7.6 | 11.2 |
| 18k | mm | 957 | 213 | 302 |
| | inch | 37.7 | 8.4 | 11.9 |
| 24k | mm | 1040 | 220 | 327 |
| | inch | 40.9 | 8.7 | 12.9 |

Aurora



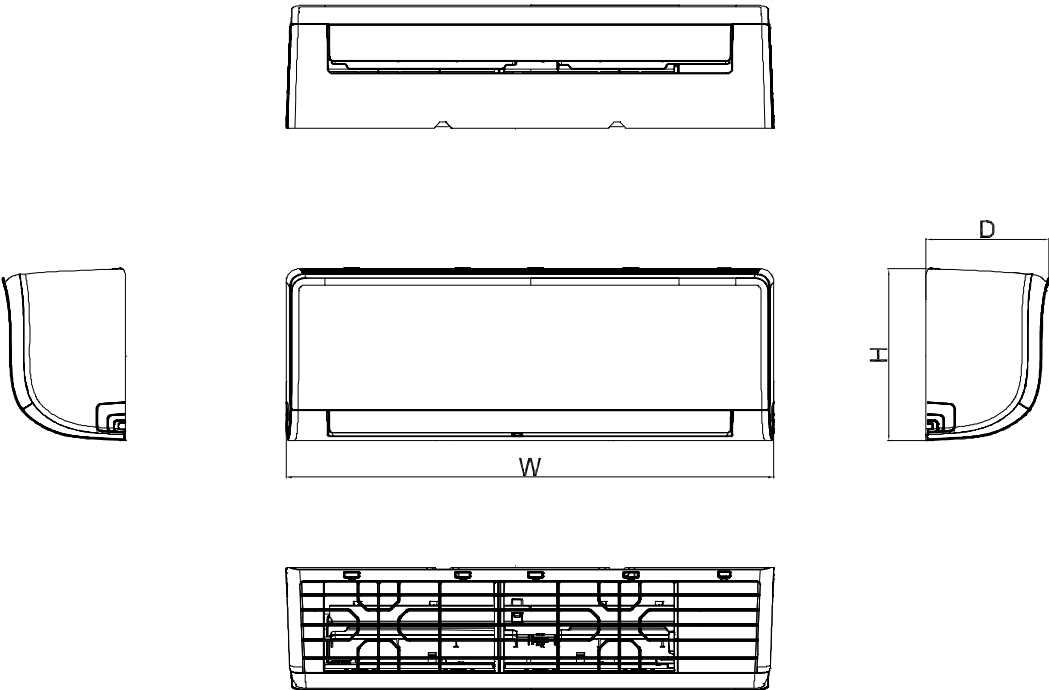
| Capacity(Btu/h) | W(mm) | D(mm) | H(mm) |
|-----------------|-------|-------|-------|
| 9k | 722 | 187 | 290 |
| 12k | 802 | 189 | 297 |
| 18k | 965 | 215 | 319 |
| 24k | 1080 | 226 | 335 |

All Easy



| Capacity(Btu/h) | W(mm) | D(mm) | H(mm) |
|-----------------|-------|-------|-------|
| 9k/12k | 805 | 193 | 302 |
| 18k | 964 | 222 | 325 |
| 24k | 1106 | 232 | 342 |

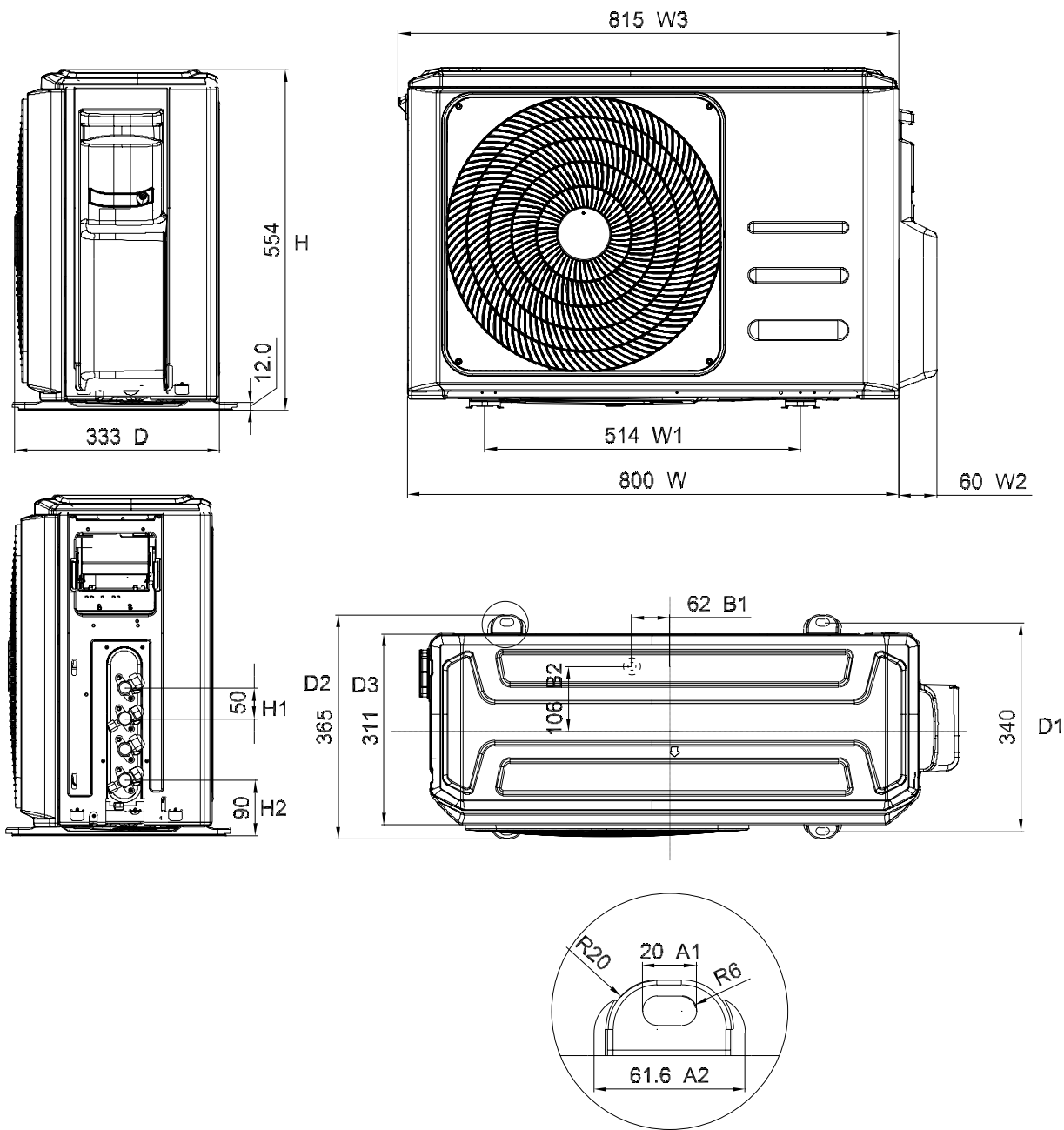
XTREME



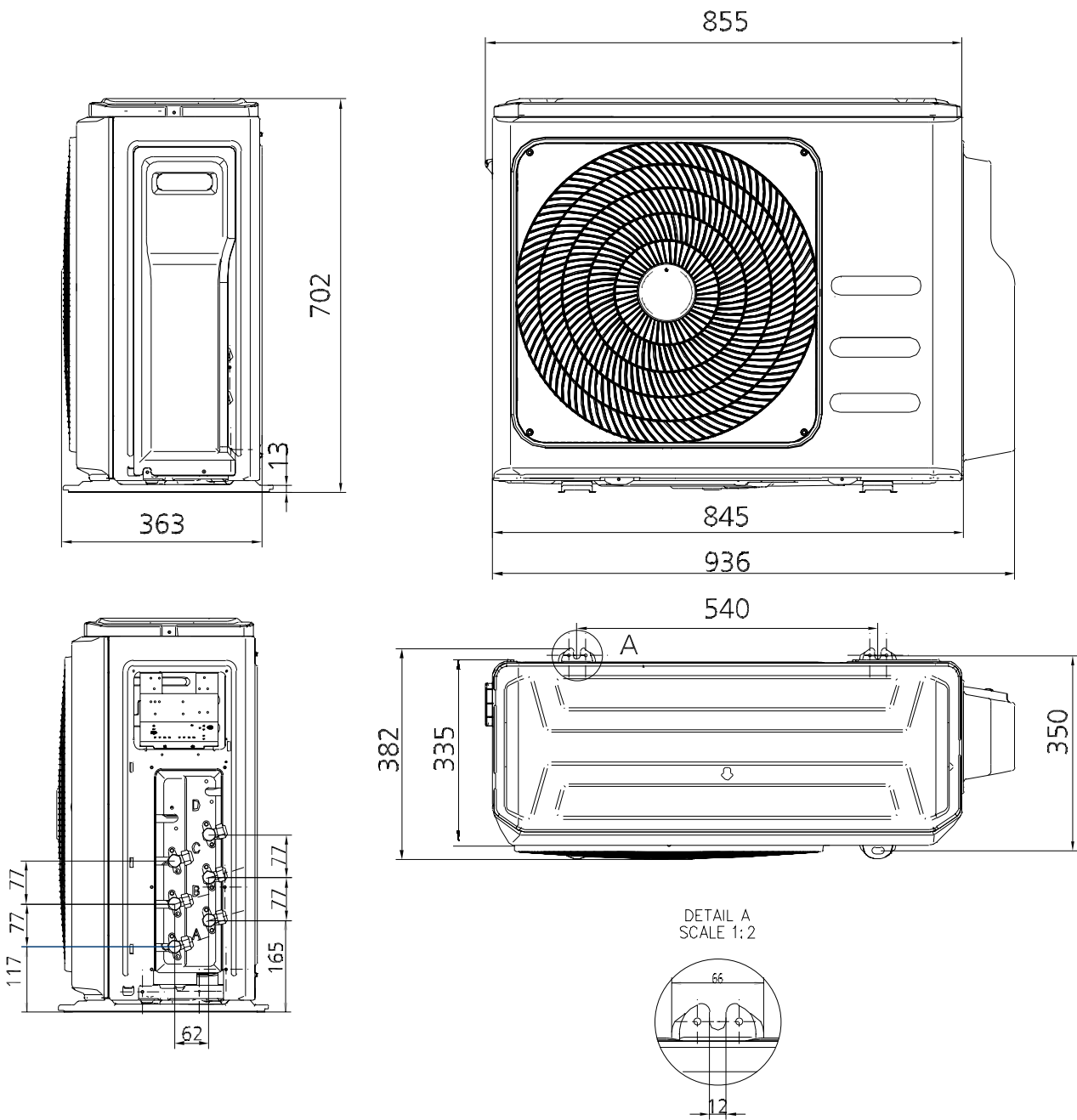
| Model | W(mm) | D(mm) | H(mm) |
|---------------------------|-------|-------|-------|
| MSAGAU-09HRFNX-QRD0GW | 726 | 210 | 291 |
| MSAGBU-12HRFNX-QRD0GW | 835 | 208 | 295 |
| MSAGBU-09HRFN8-QRD1GW(GA) | | | |
| MSAGBU-12HRFN8-QRD1GW(GA) | | | |
| MSAGCU-18HRFNX-QRD0GW | 969 | 241 | 320 |
| MSAGDU-24HRFN8-QRD0GW | 1083 | 244 | 336 |

5.2 Outdoor Unit

M2OG-14HFN8-Q, M2OC-18HFN8-Q, M2OD-18HFN8-Q

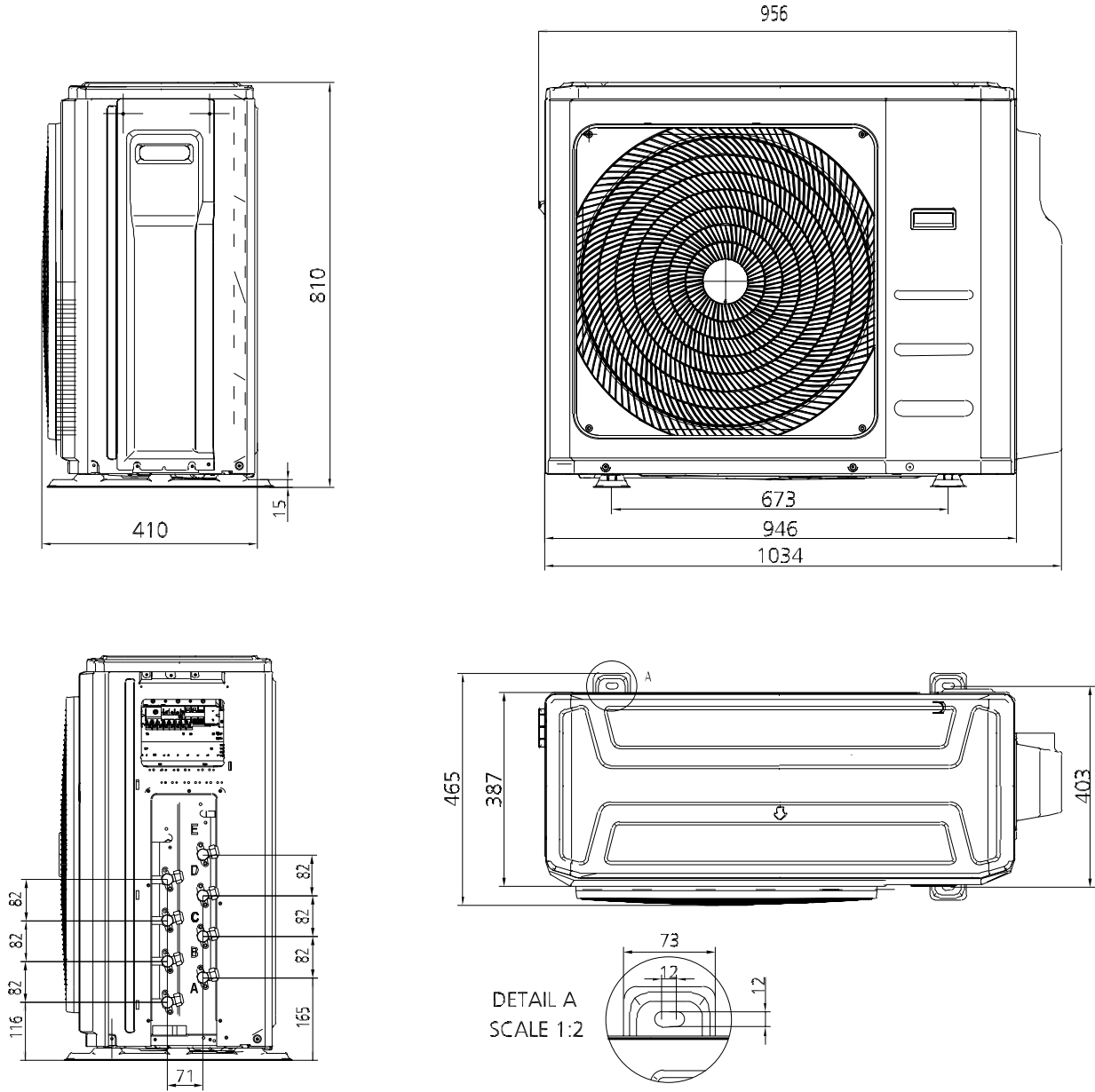


M3OF-21HFN8-Q, M3OE-27HFN8-Q, M3OF-27HFN8-Q

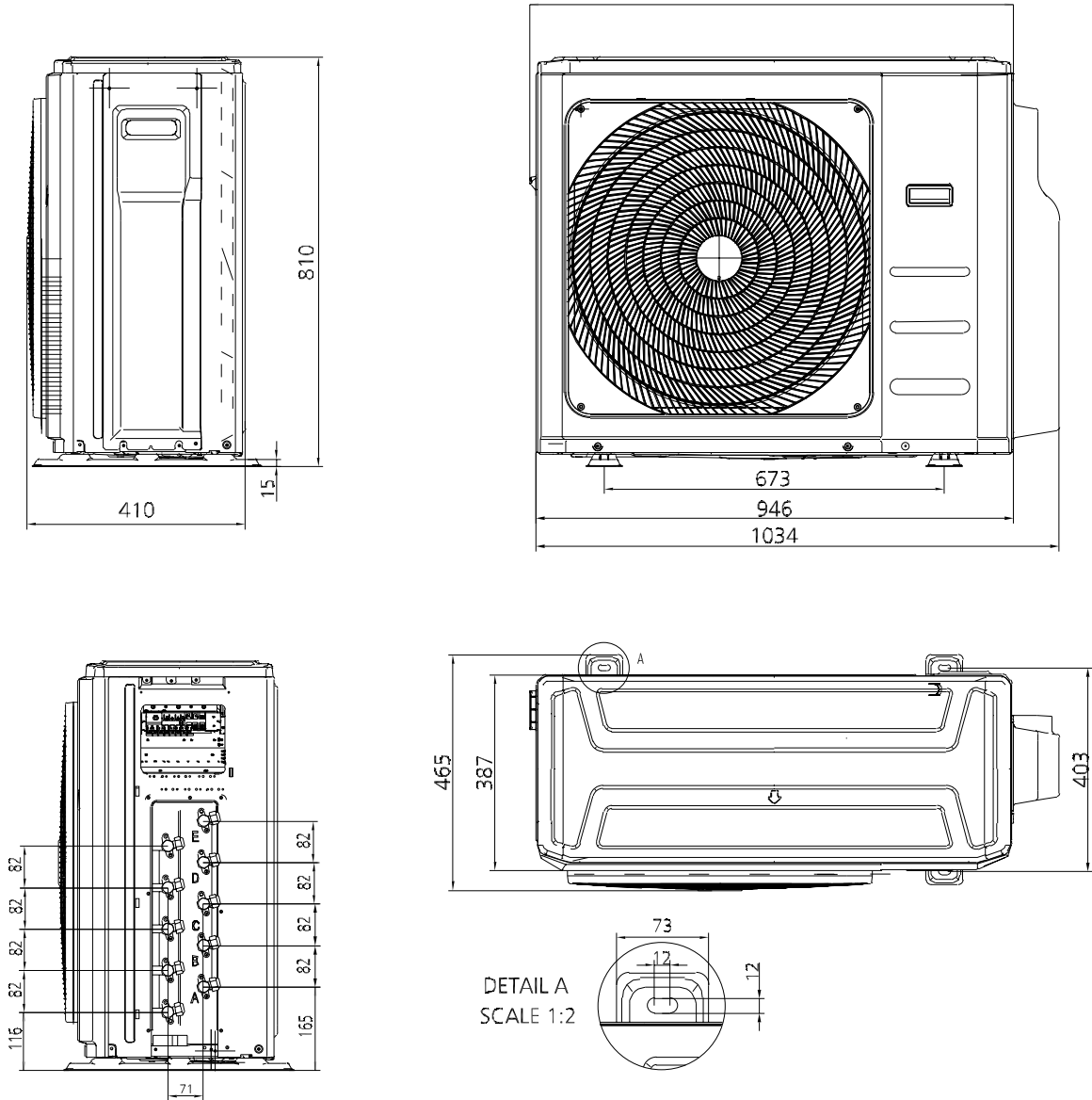


Specifications

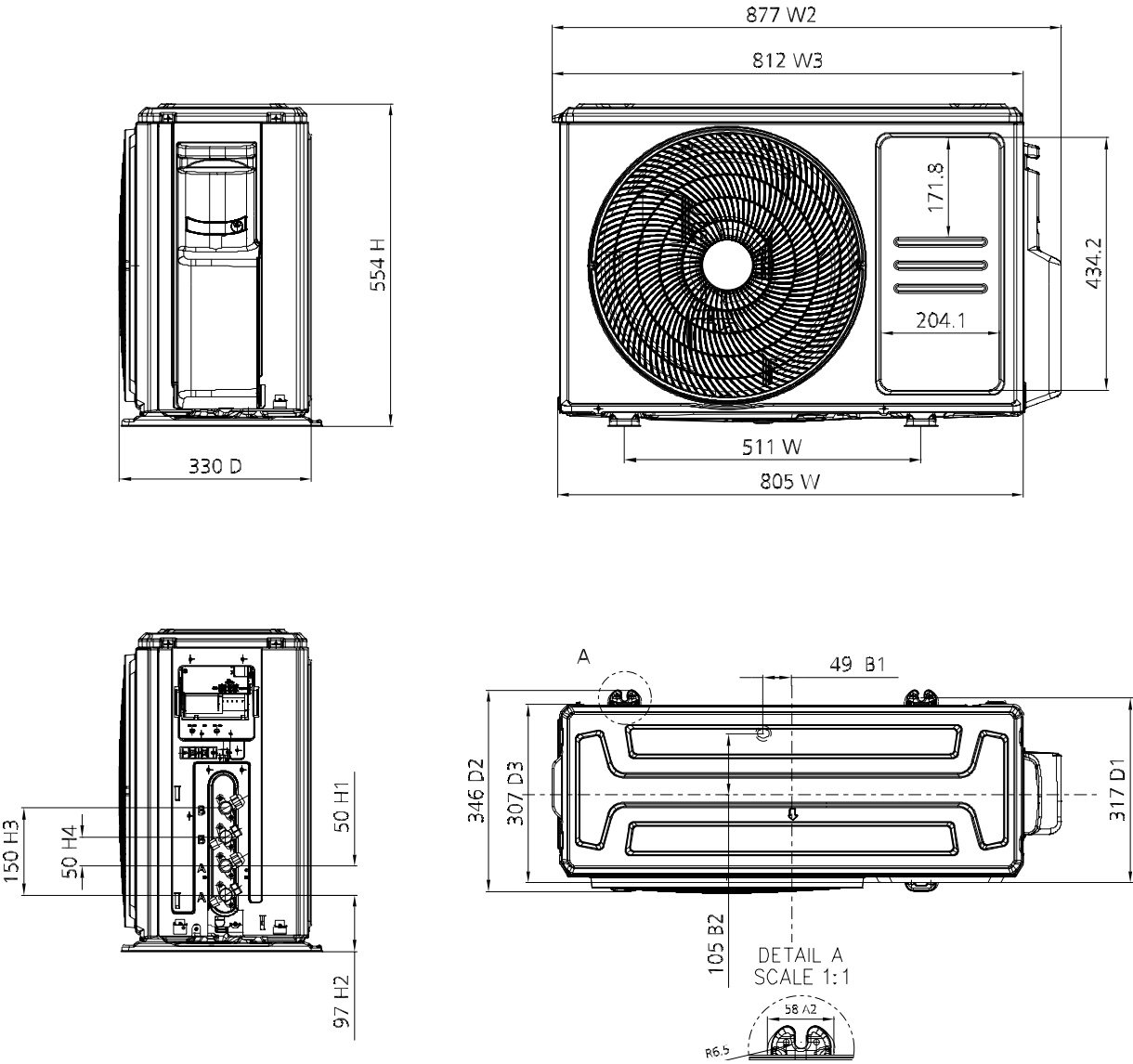
M4OE-28HFN8-Q, M4OB-36HFN8-Q



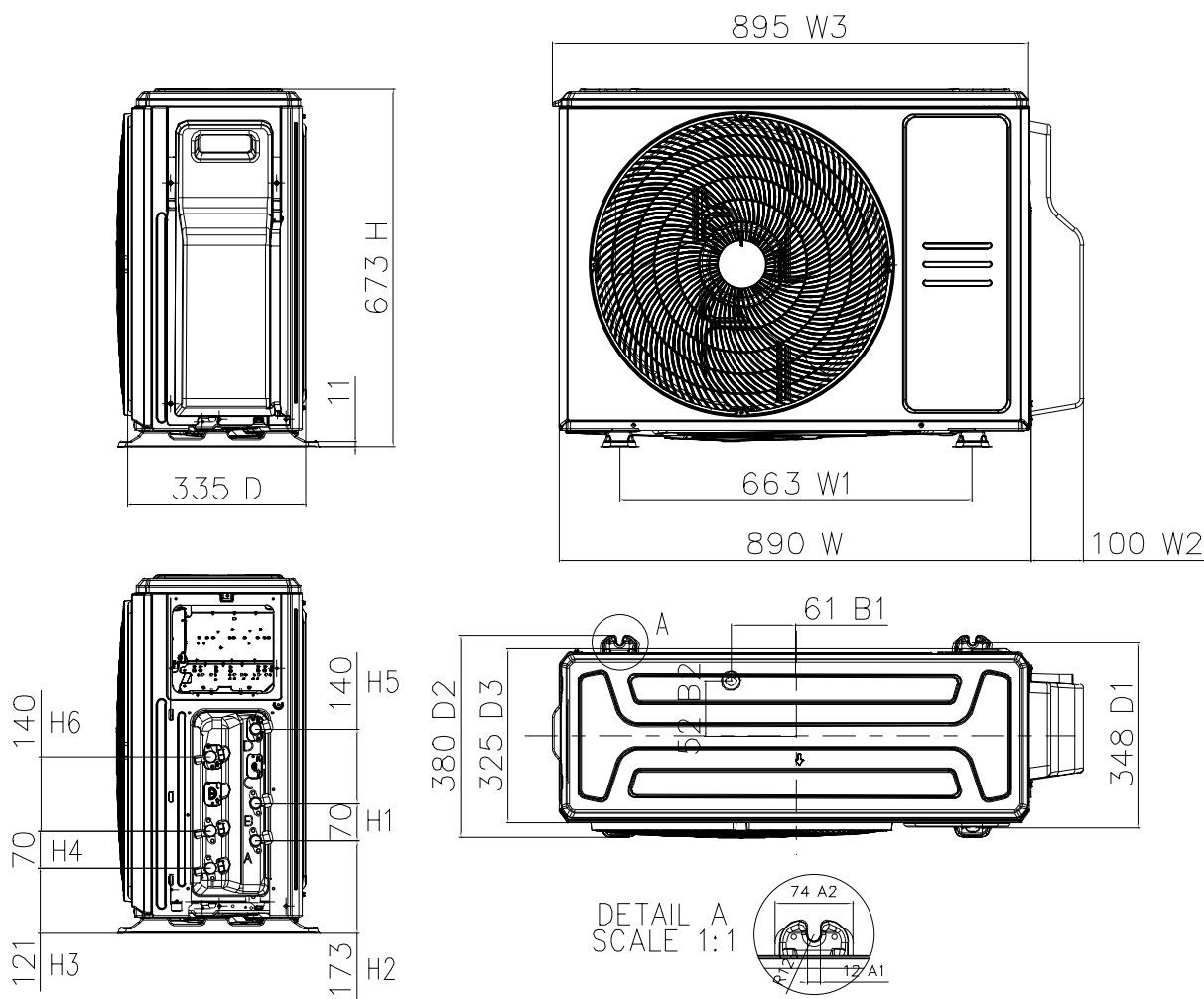
M5OD-42HFN8-Q, M5OE-42HFN8-Q



M2OH-14HFN8-Q, M2OE-18HFN8-Q



M3OG-21HFN8-Q, M3OA-27HFN8-Q

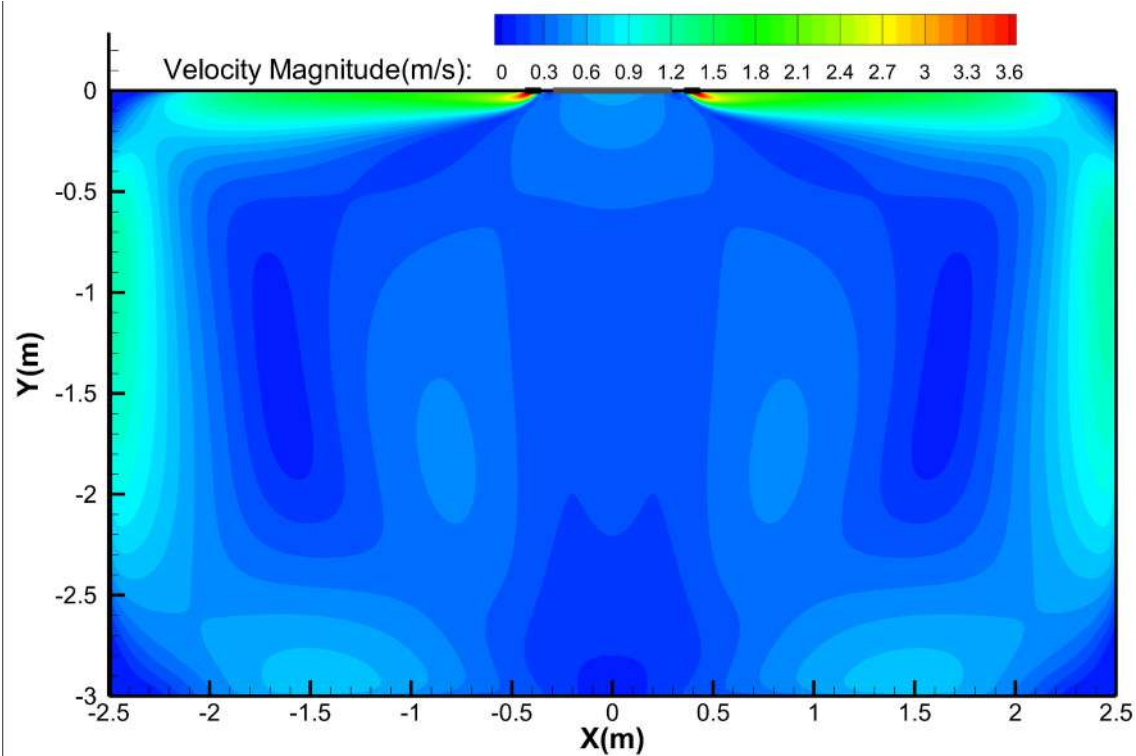


6. Air Velocity and Temperature Distributions

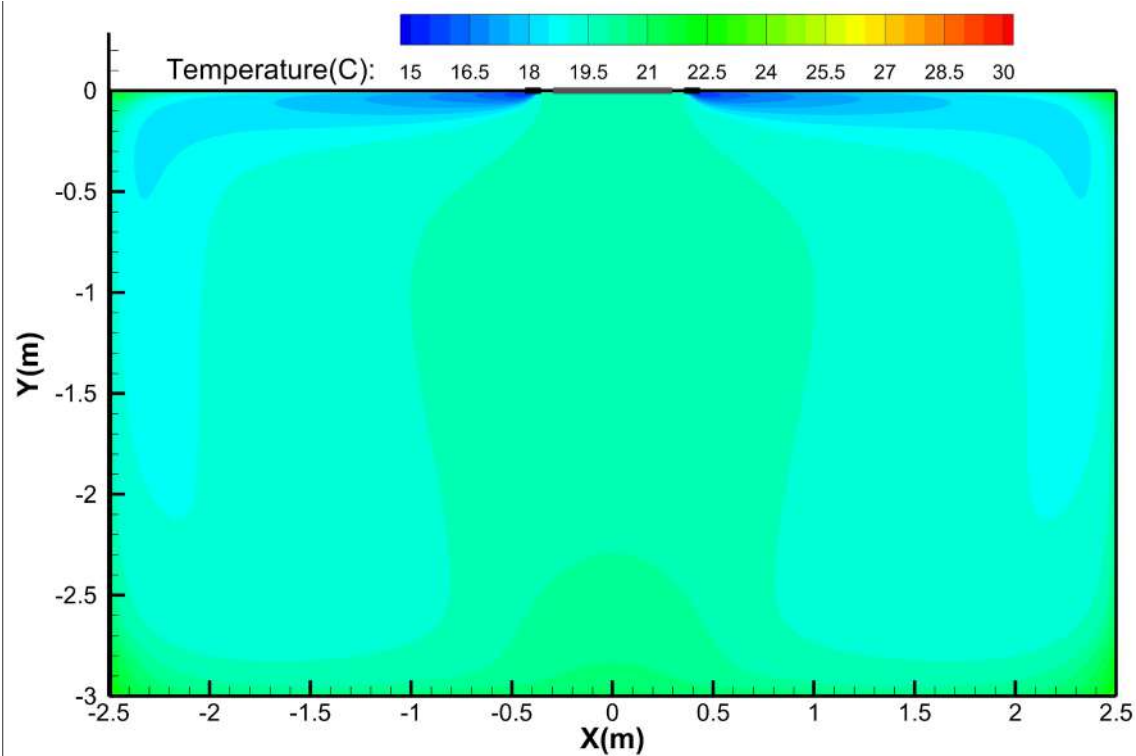
Compact Cassette type -7k, 9k &12k

Discharge Angle 30°

Cooling airflow velocity distributions

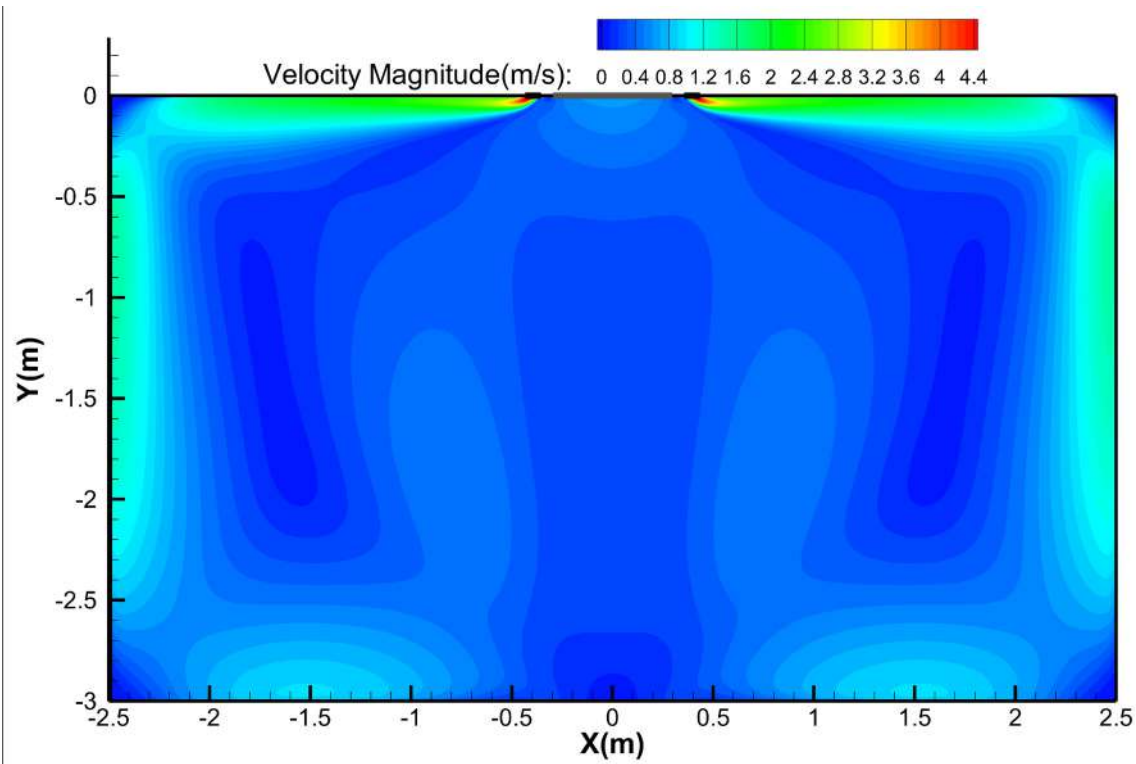


Cooling temperature distributions

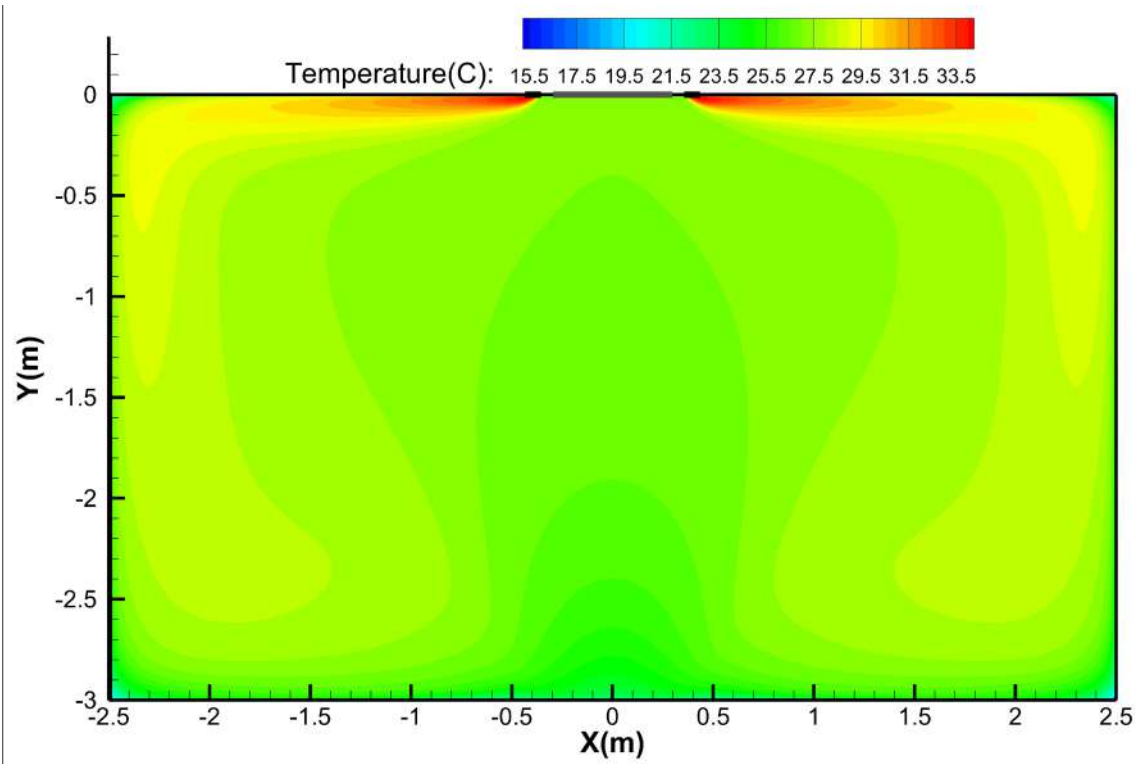


Compact Cassette type -7k, 9k &12k

Heating airflow velocity distributions



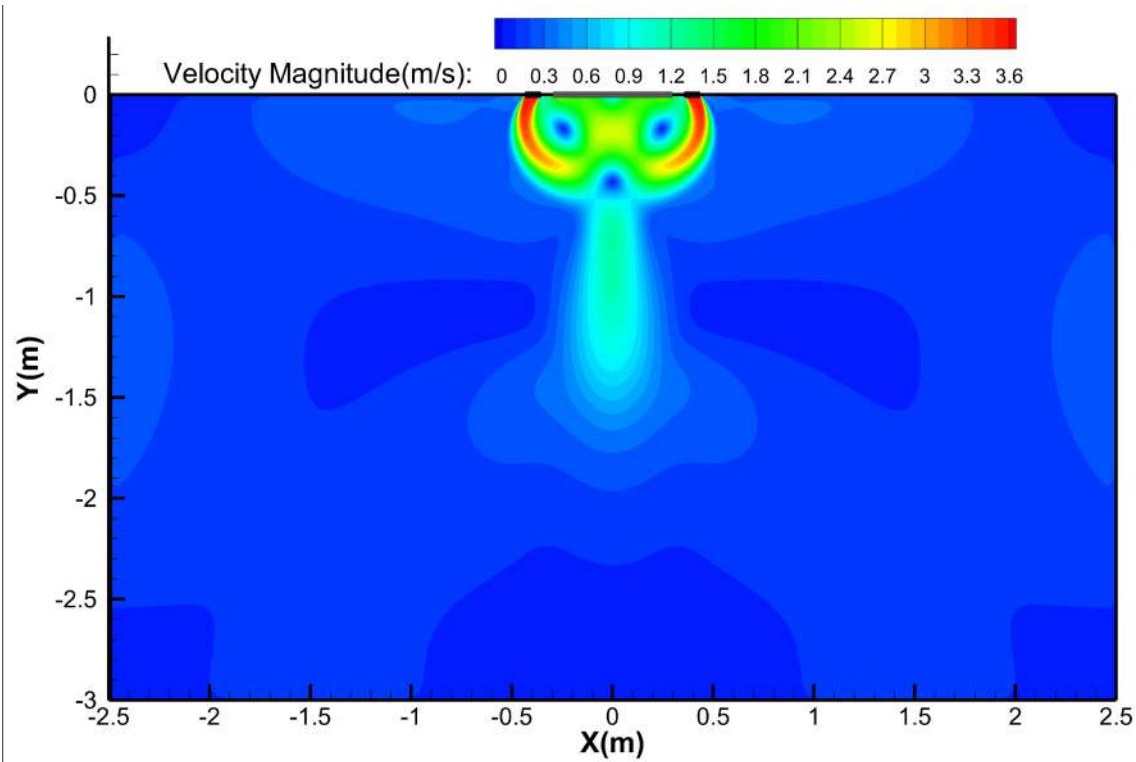
Heating temperature distributions



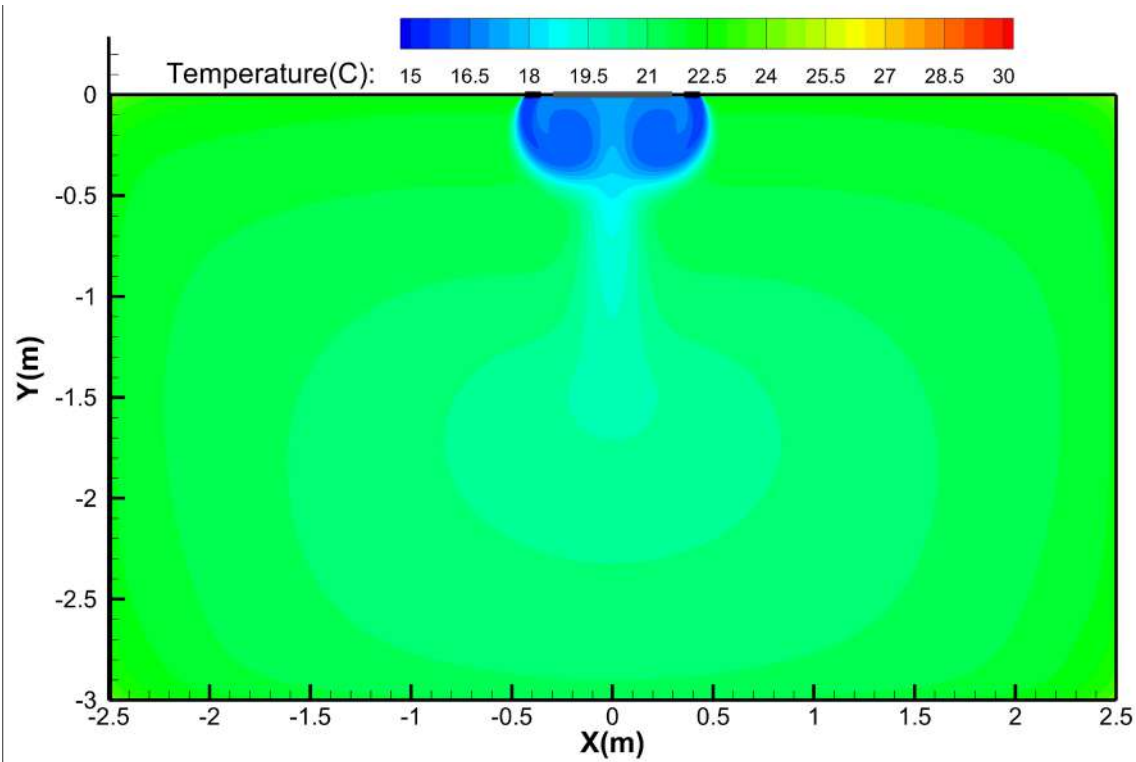
Compact Cassette type -7k, 9k &12k

Discharge Angle 60°

Cooling airflow velocity distributions

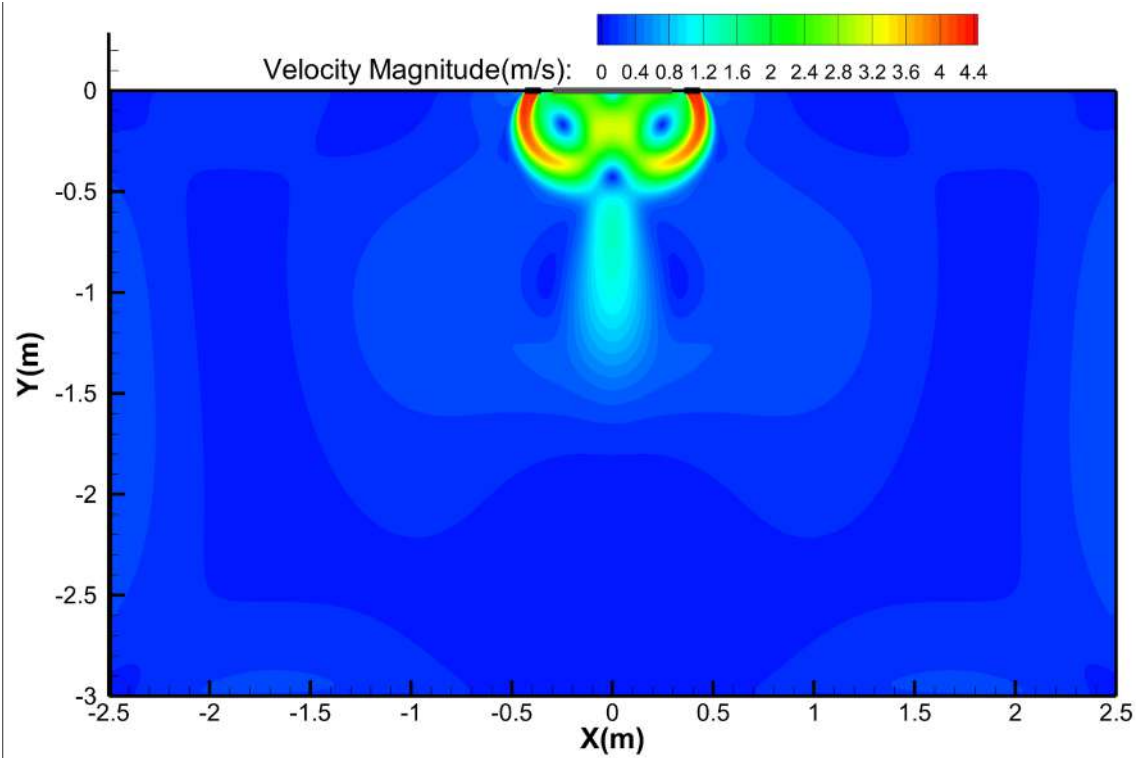


Cooling temperature distributions



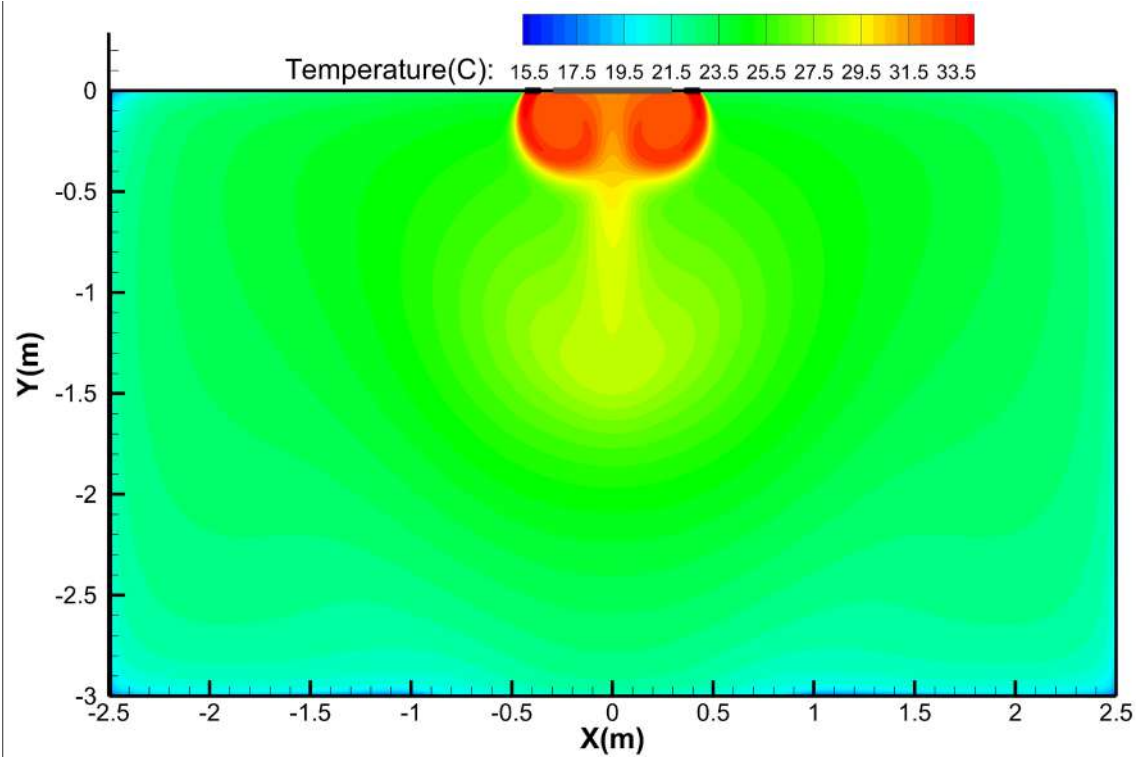
Compact Cassette type -7k, 9k &12k

Heating airflow velocity distributions



Specifications

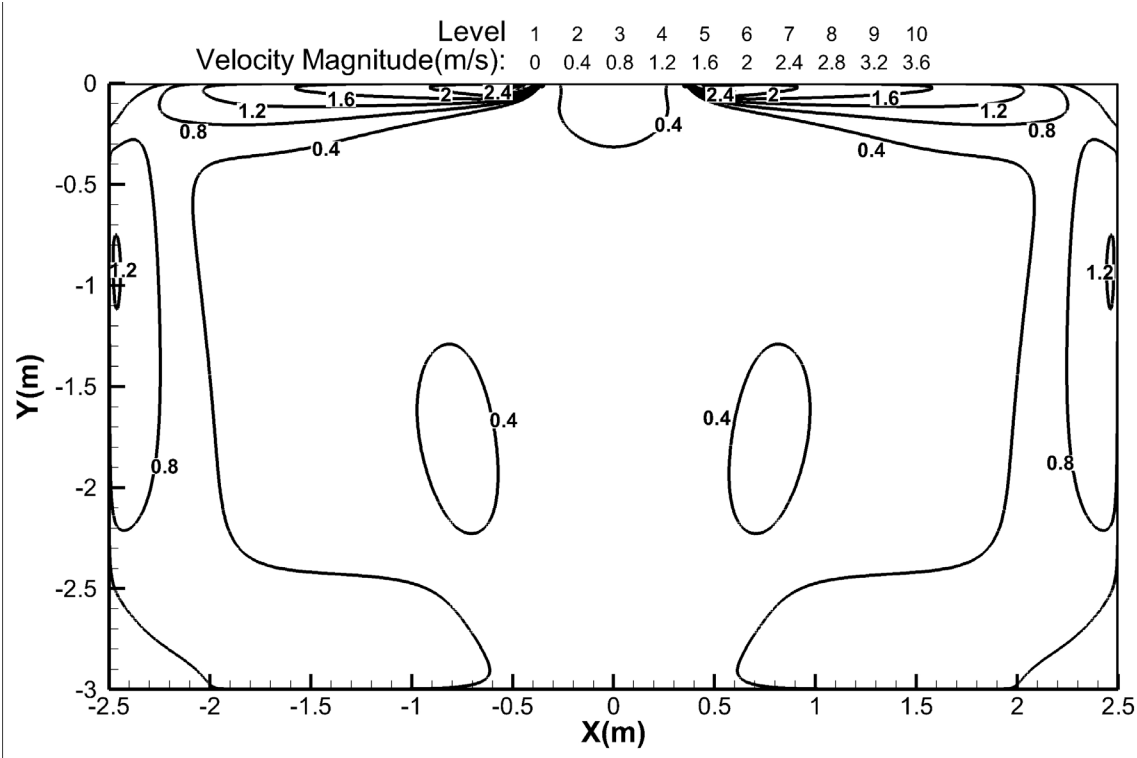
Heating temperature distributions



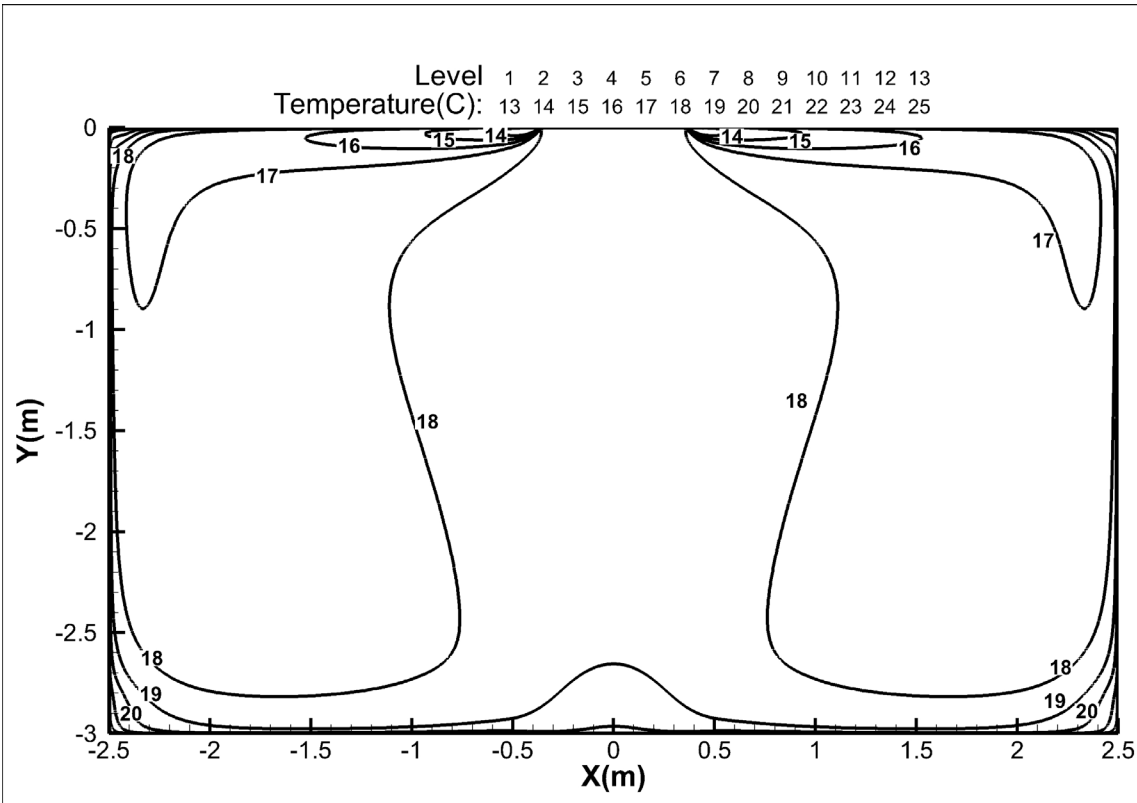
Compact Cassette type -18k

Discharge Angle 30°

Cooling airflow velocity distributions

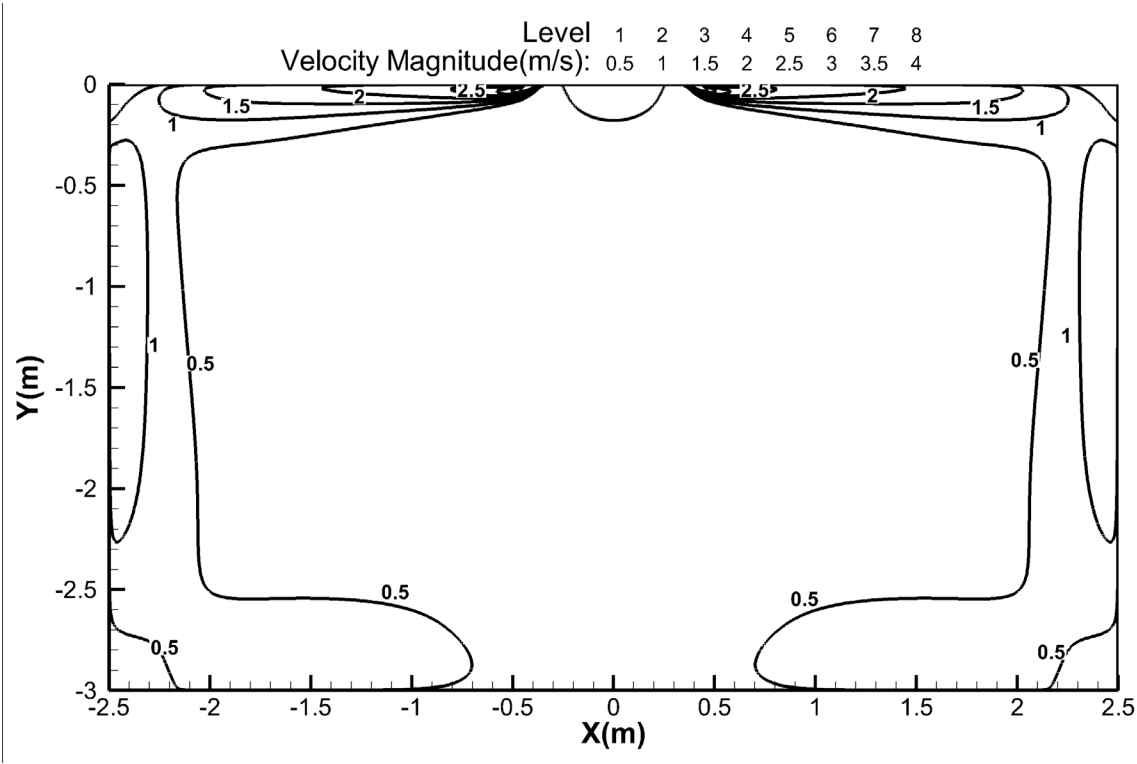


Cooling temperature distributions

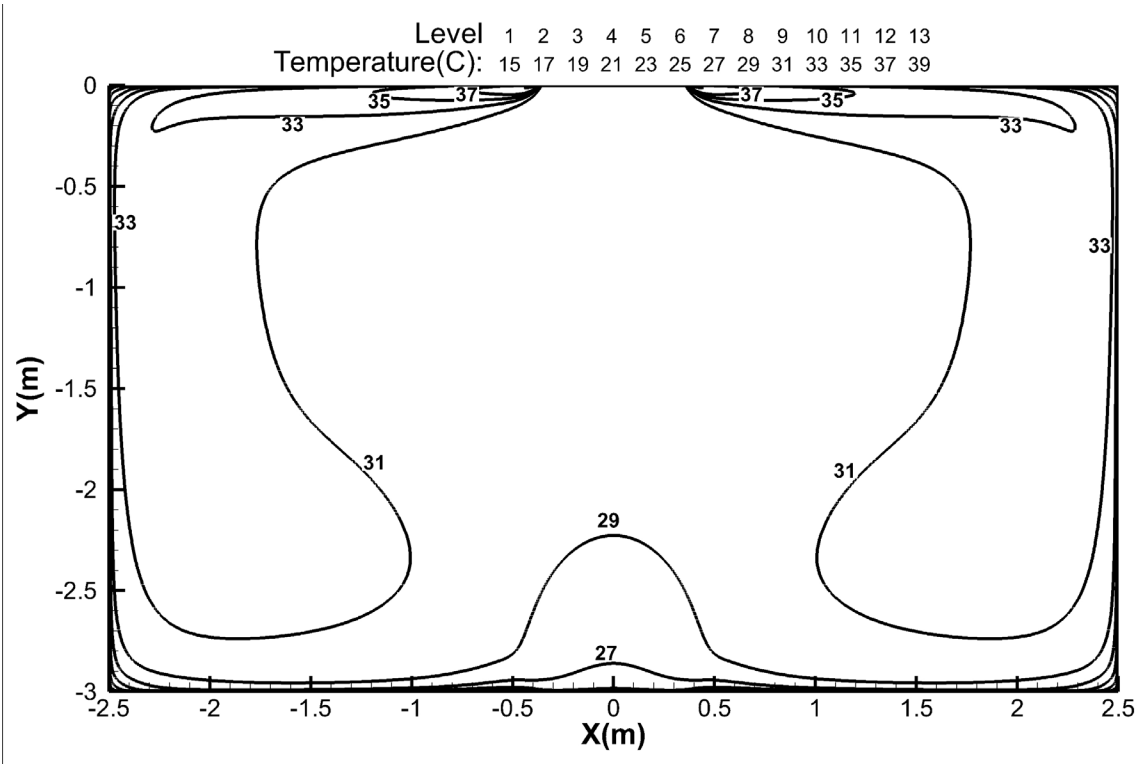


Compact Cassette type -18k

Heating airflow velocity distributions



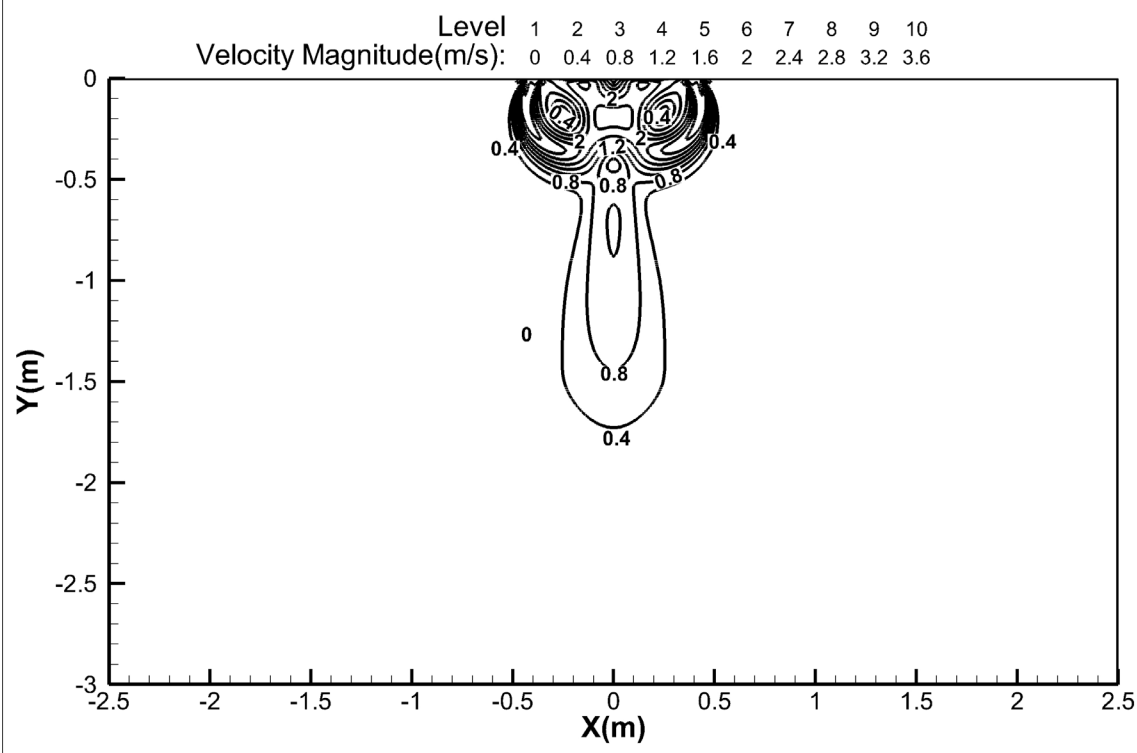
Heating temperature distributions



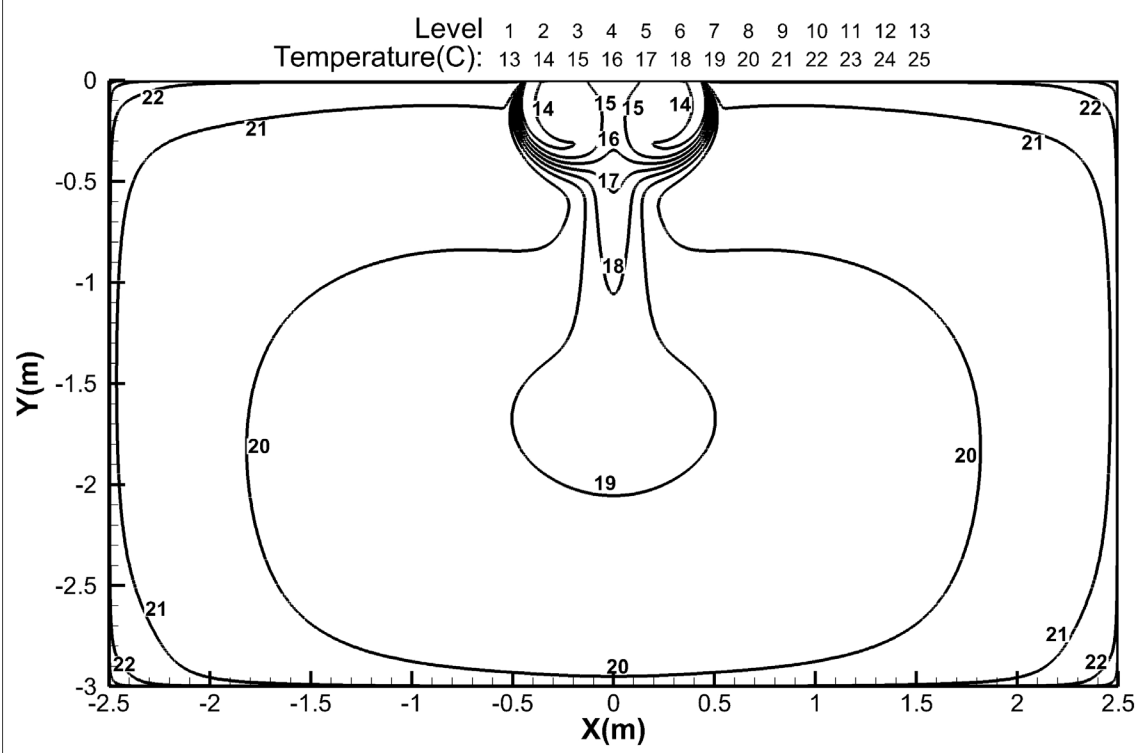
Compact Cassette type -18k

Discharge Angle 60°

Cooling airflow velocity distributions

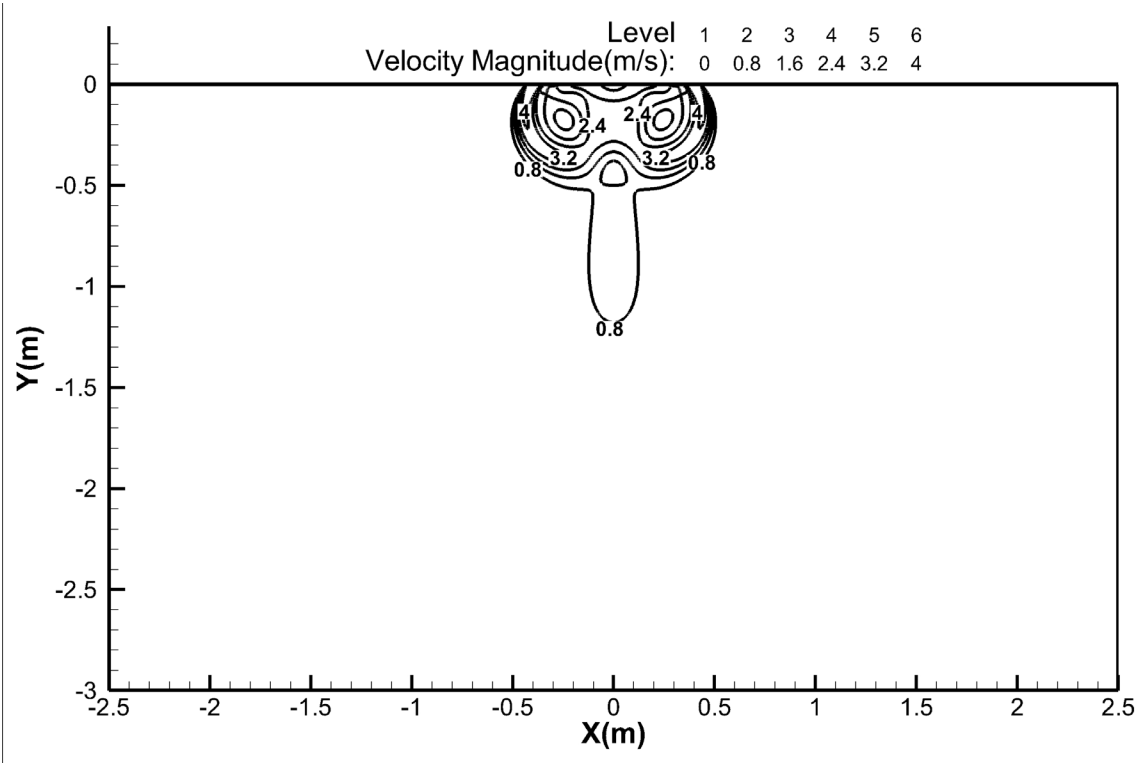


Cooling temperature distributions

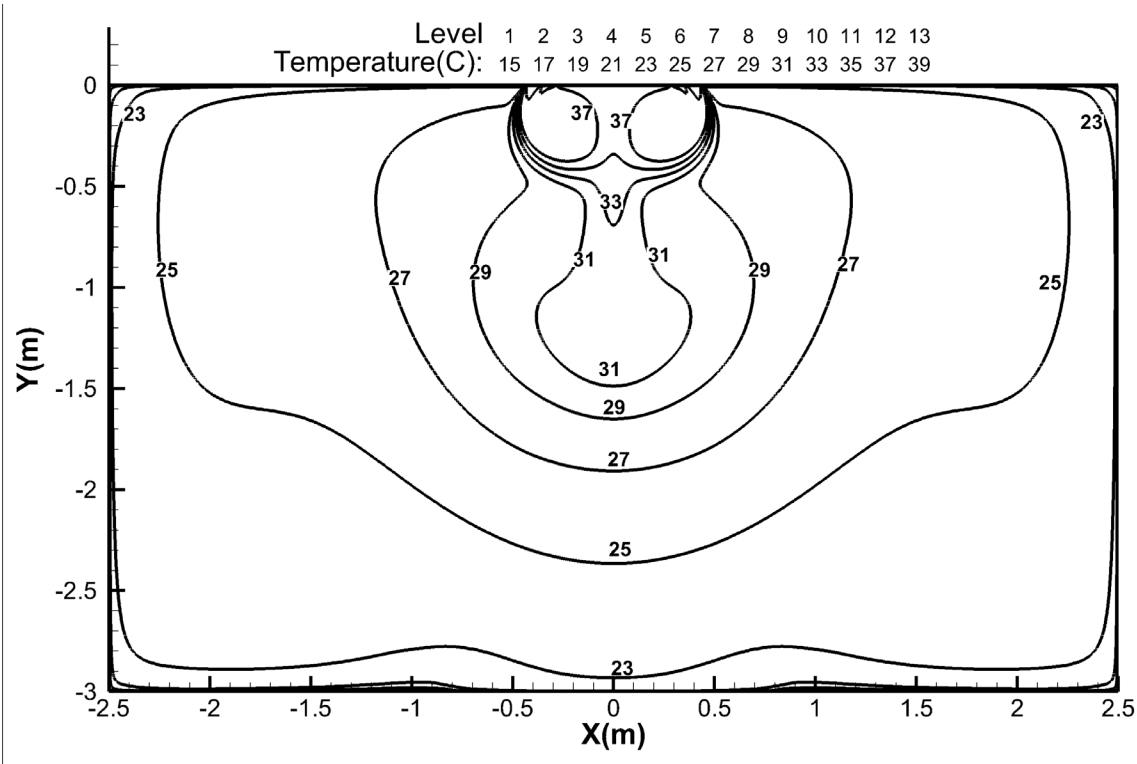


Compact Cassette type -18k

Heating airflow velocity distributions



Heating temperature distributions

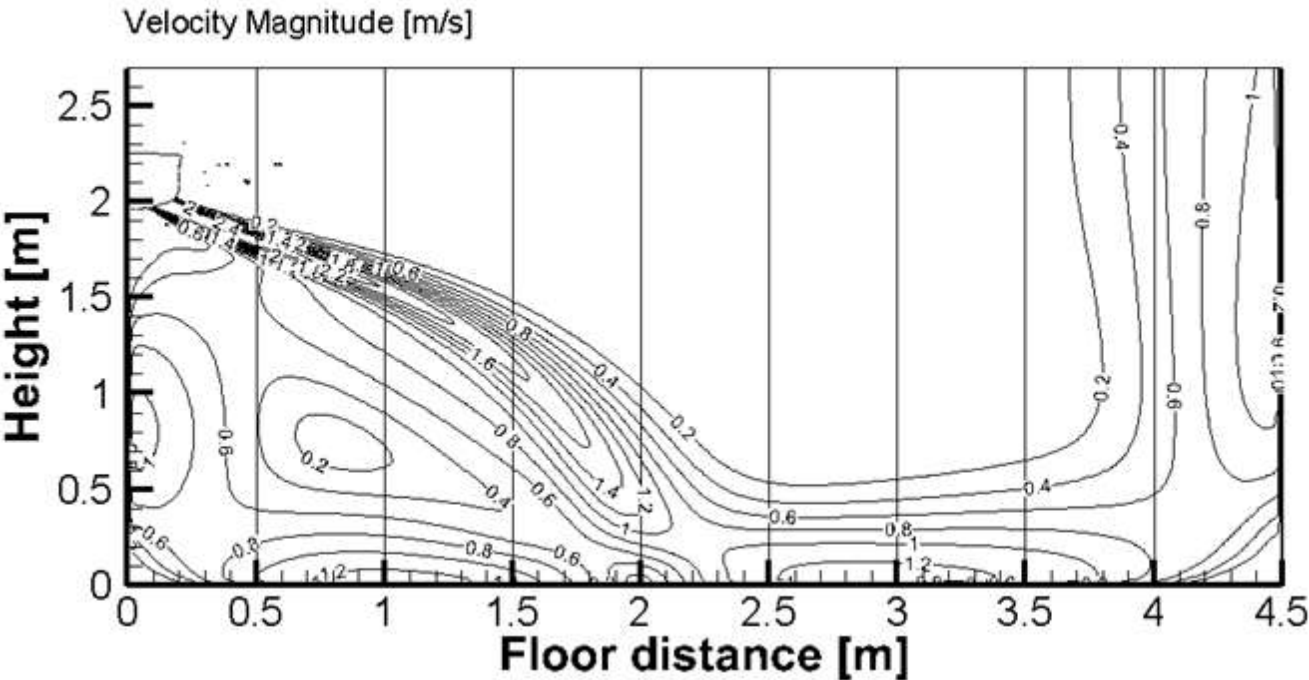


XTREME-9k

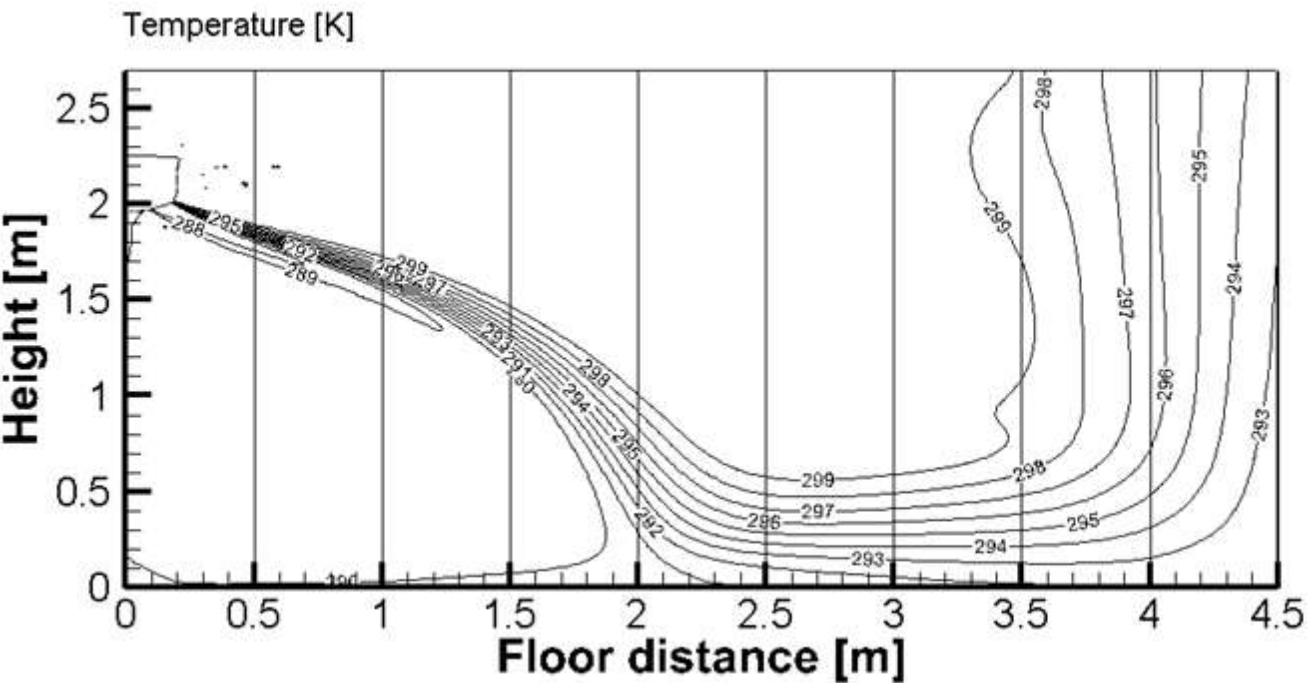
Discharge Angle 58°

Cooling airflow velocity distributions

Specifications



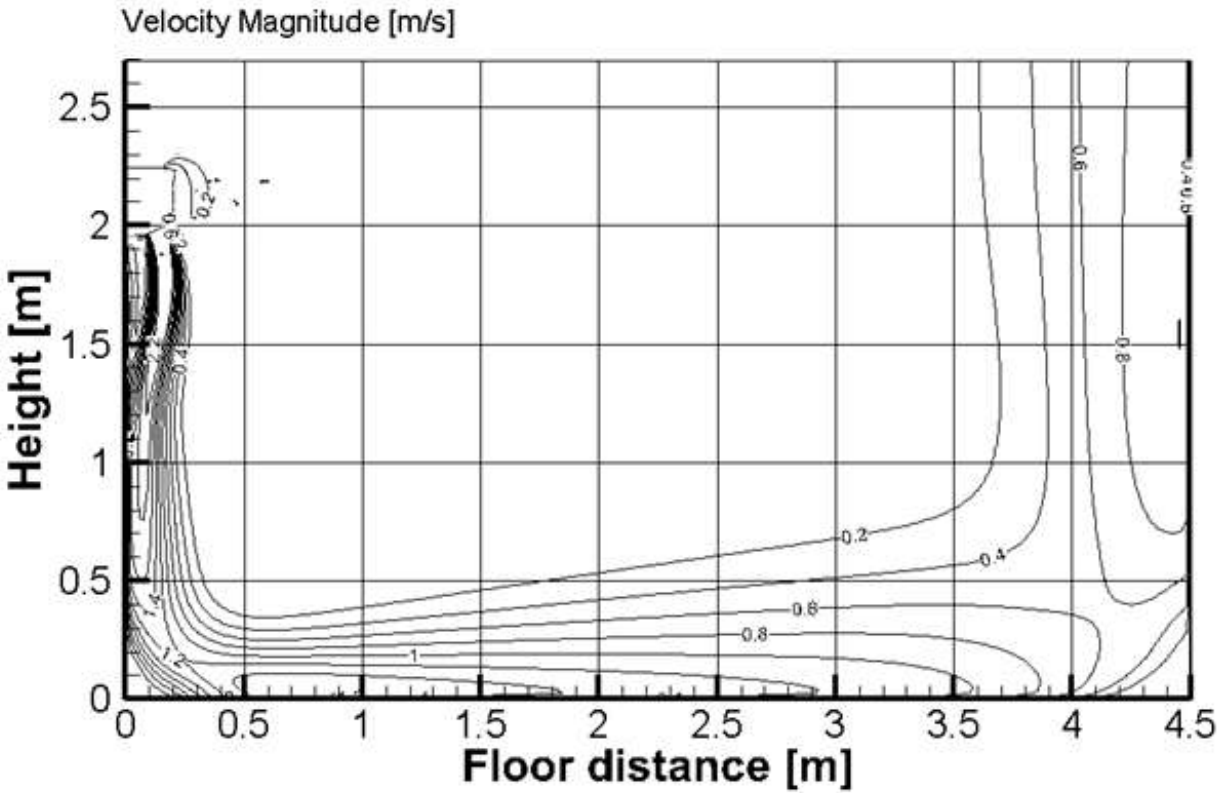
Cooling temperature distributions



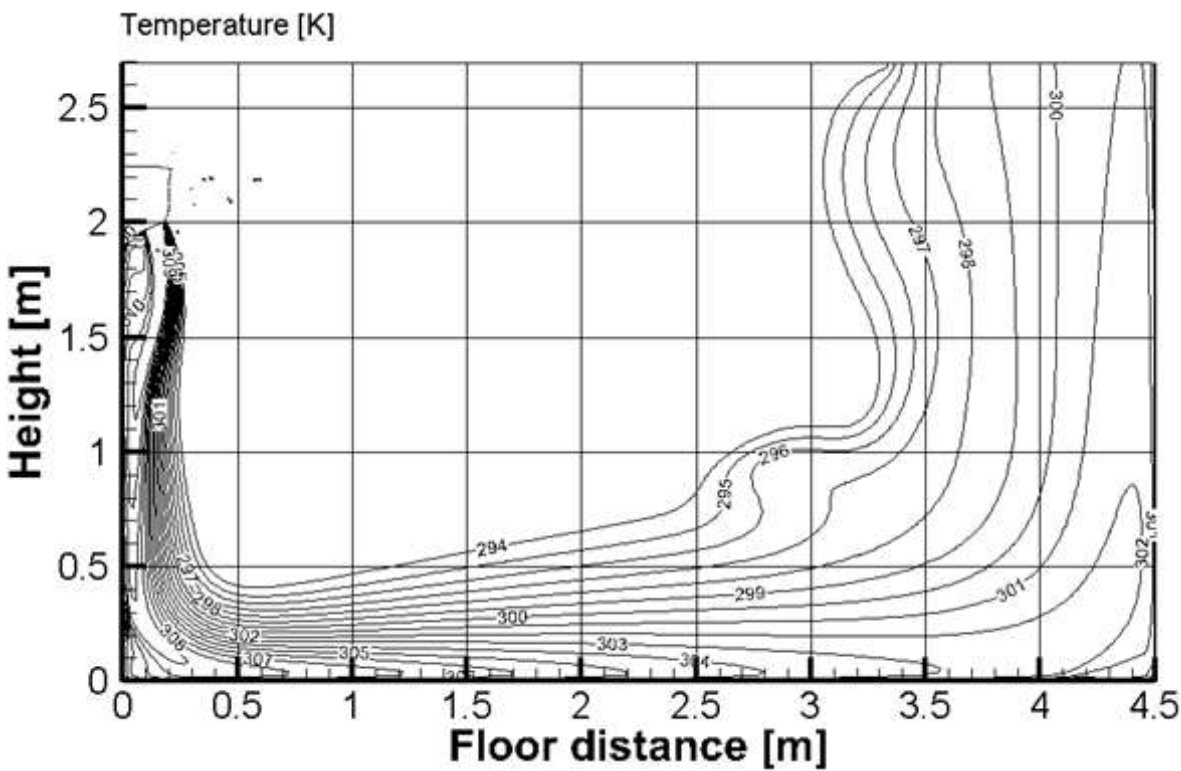
XTREME-9k

Discharge Angle 90°

Heating airflow velocity distributions



Heating temperature distributions

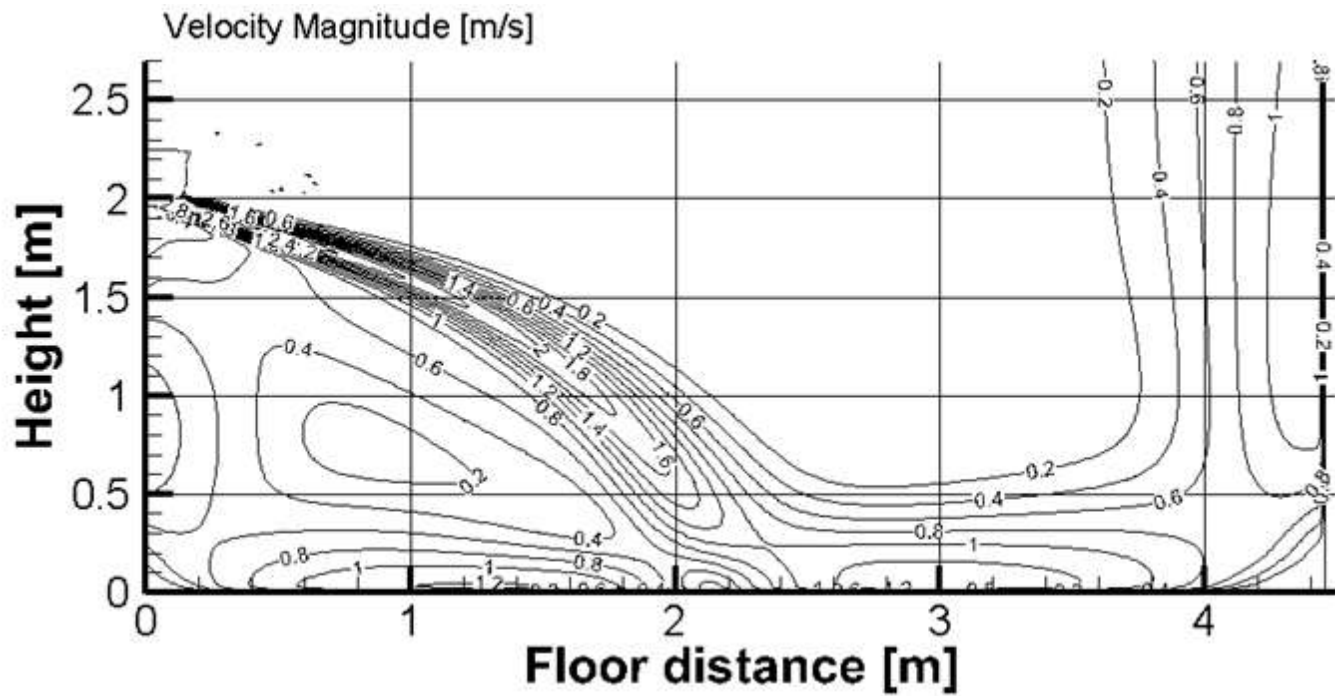


XTREME-12k

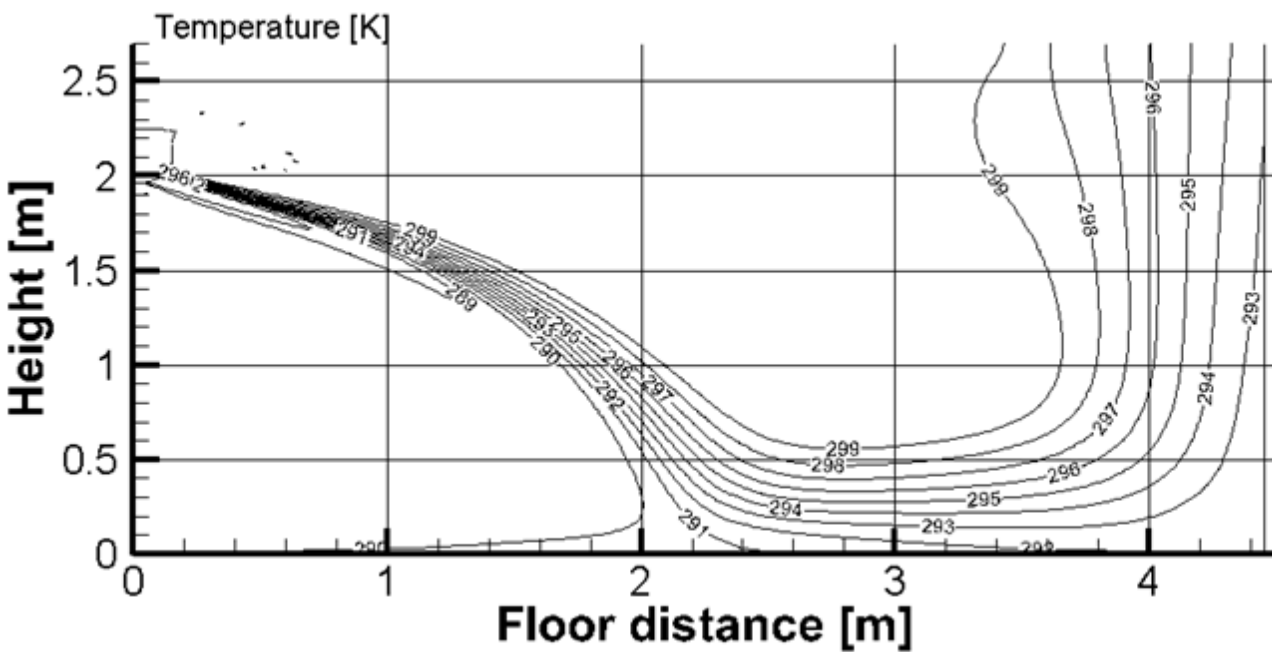
Discharge Angle 58°

Cooling airflow velocity distributions

Specifications



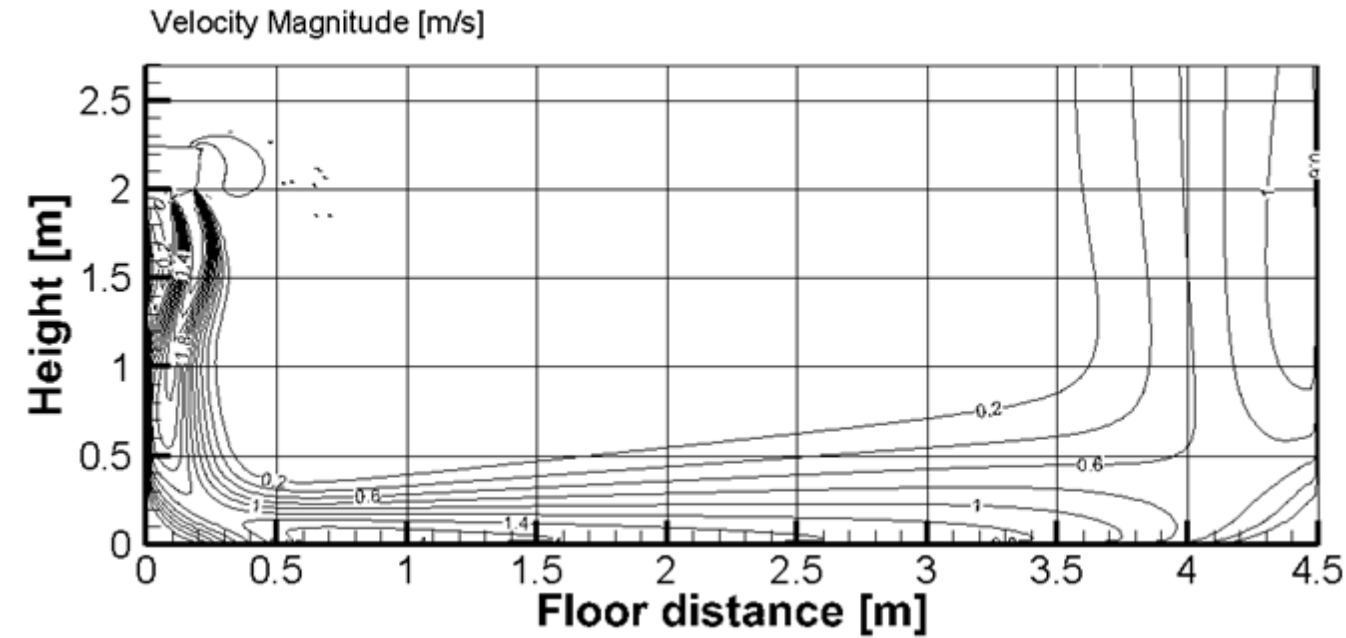
Cooling temperature distributions



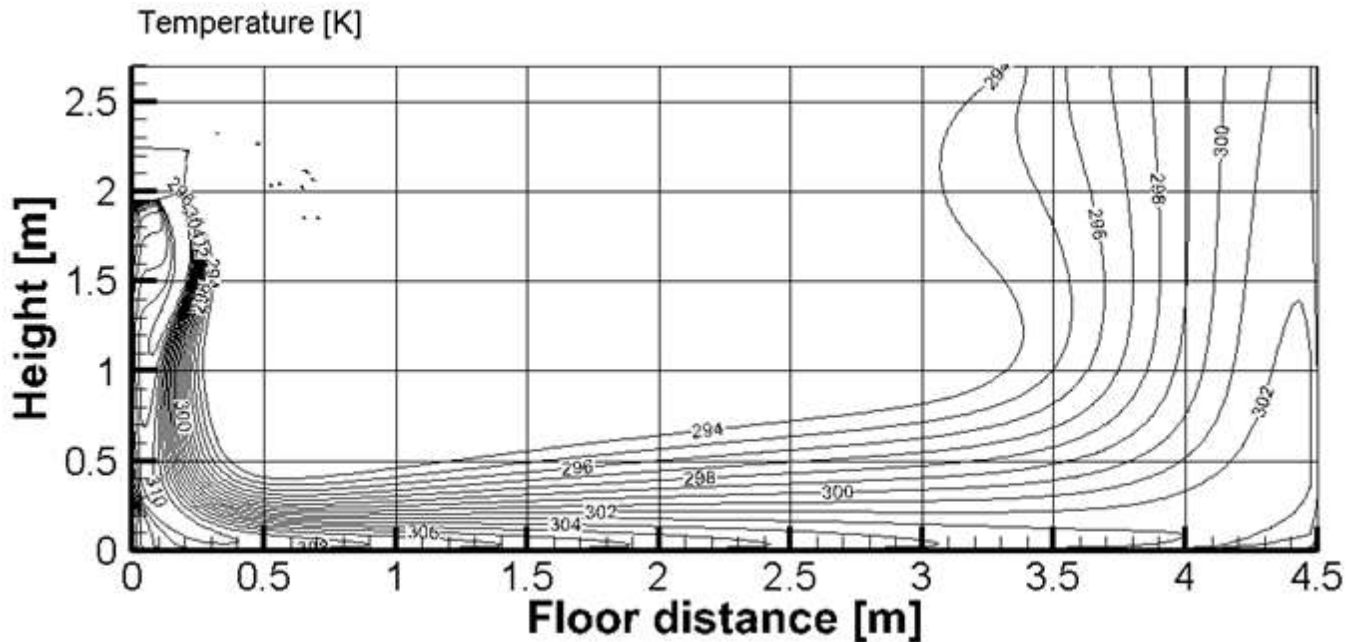
XTREME-12k

Heating airflow velocity distributions

Discharge Angle 90°



Heating temperature distributions

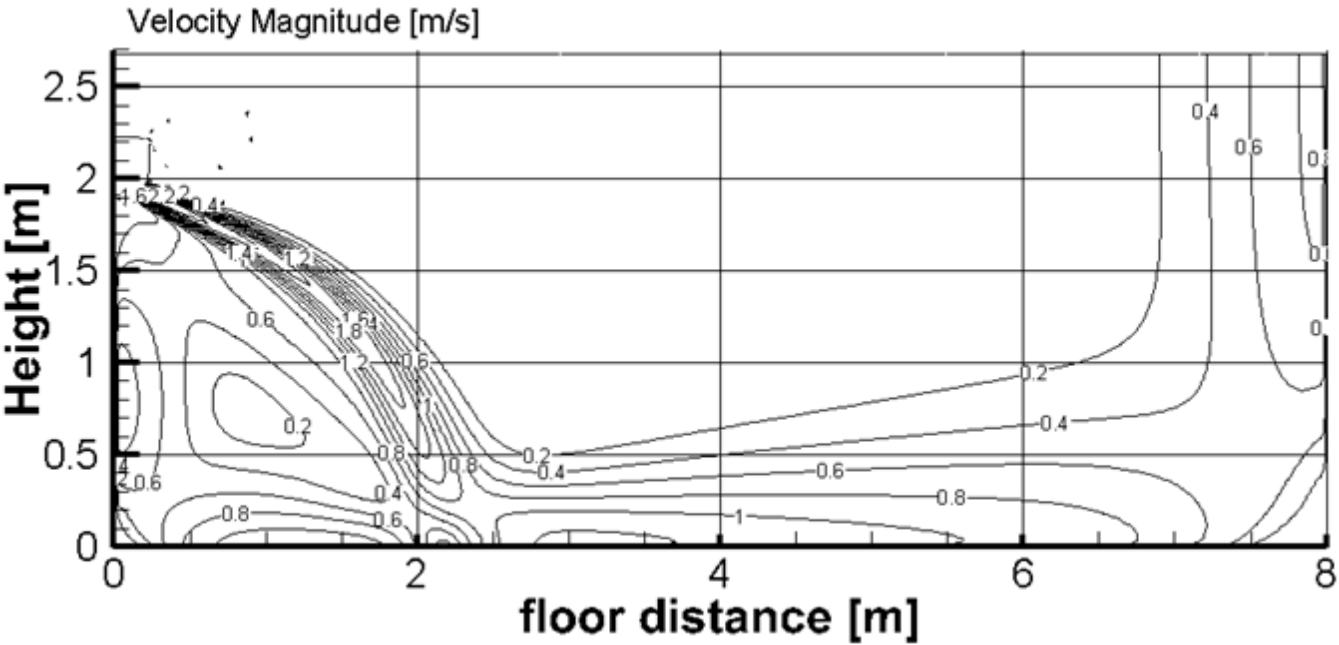


XTREME-18k

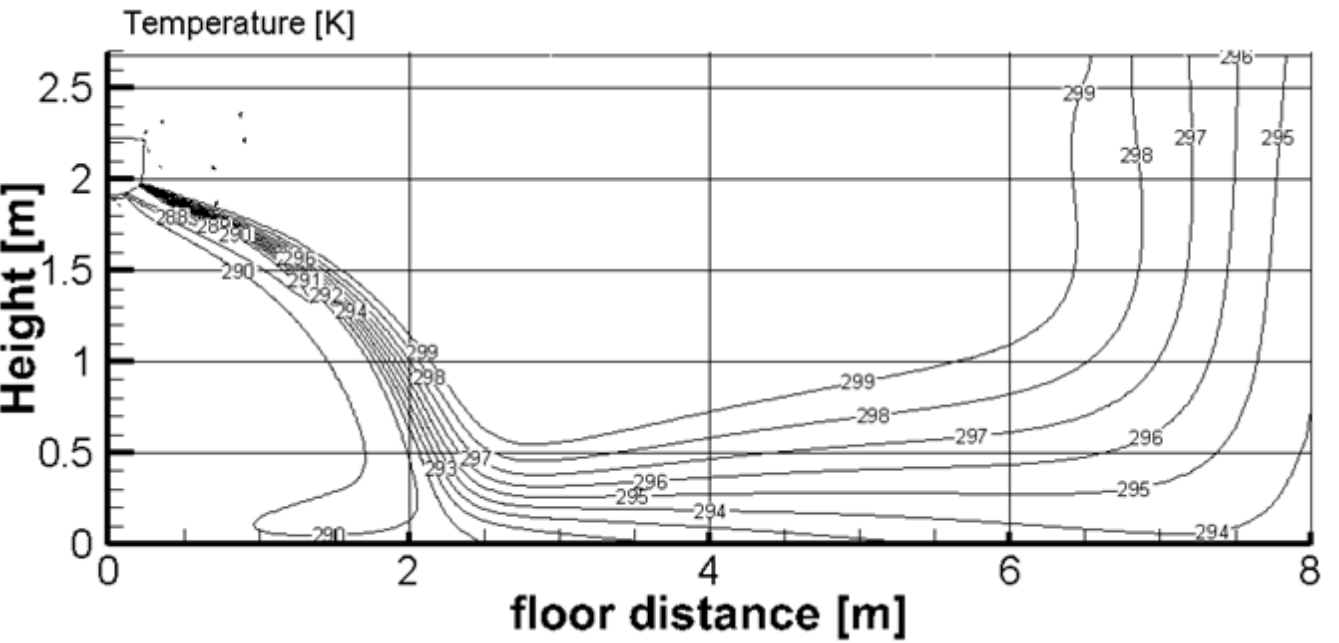
Discharge Angle 50°

Cooling airflow velocity distributions

Specifications



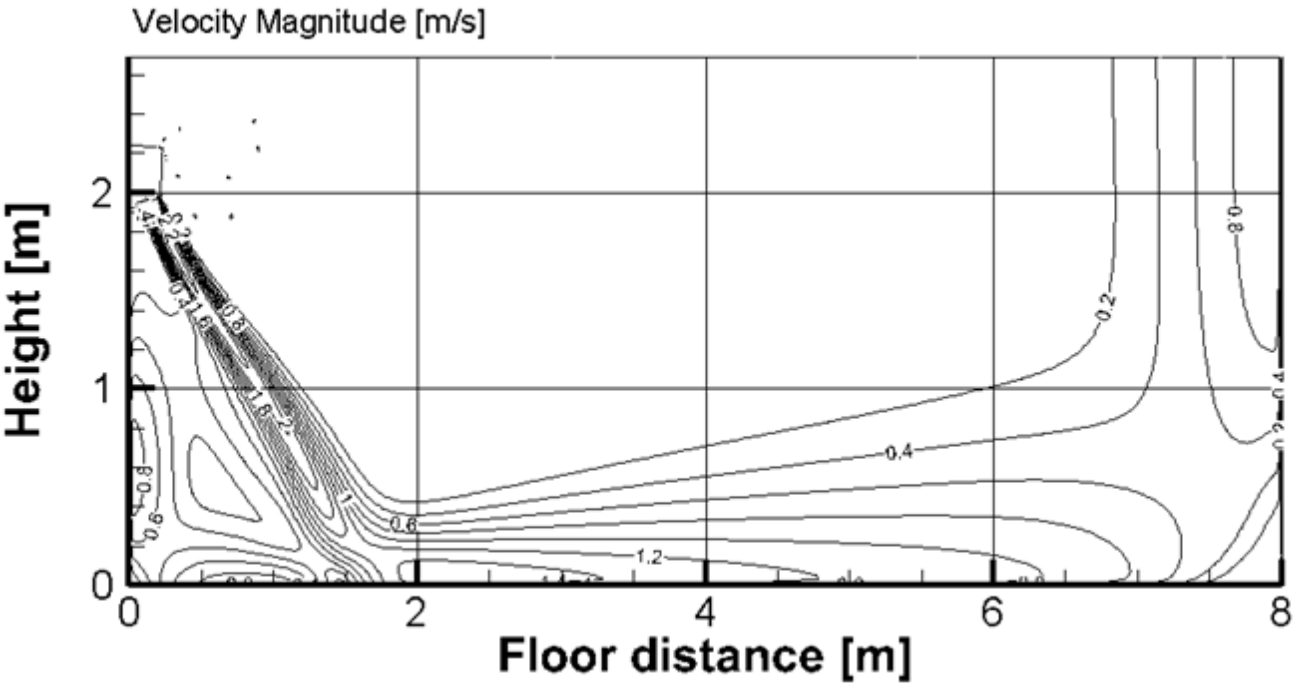
Cooling temperature distributions



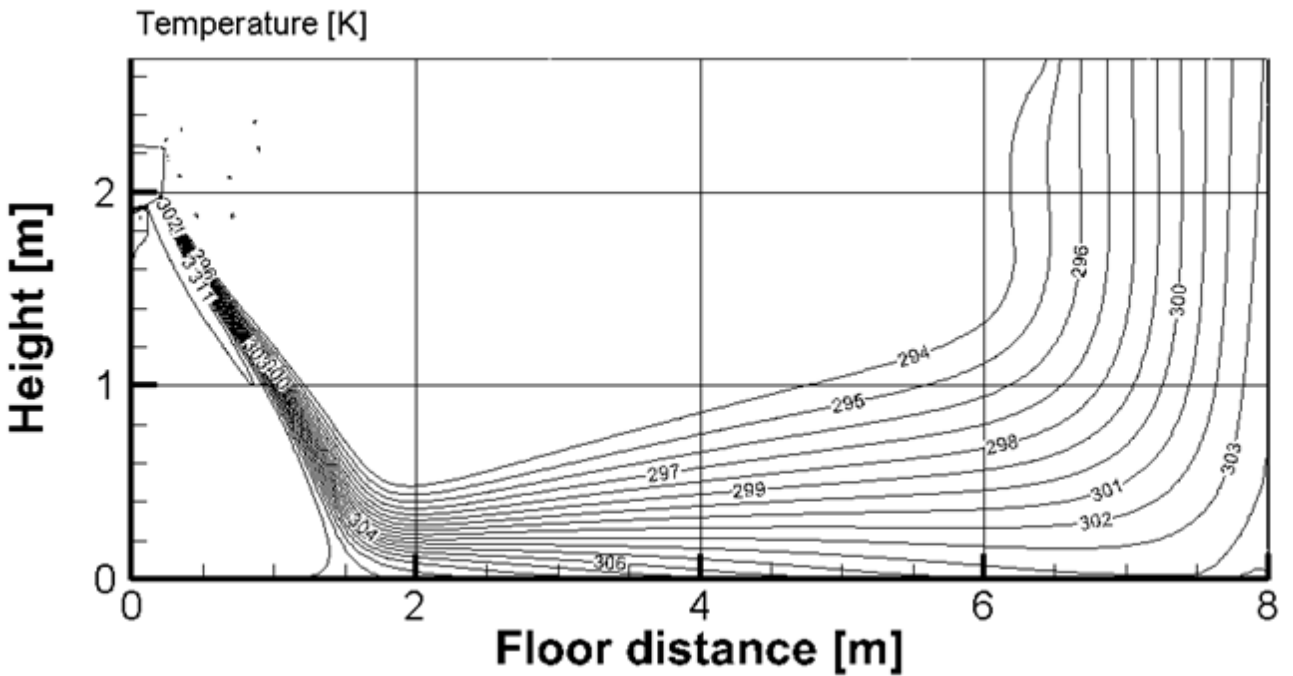
XTREME-18k

Discharge Angle 84°

Heating airflow velocity distributions



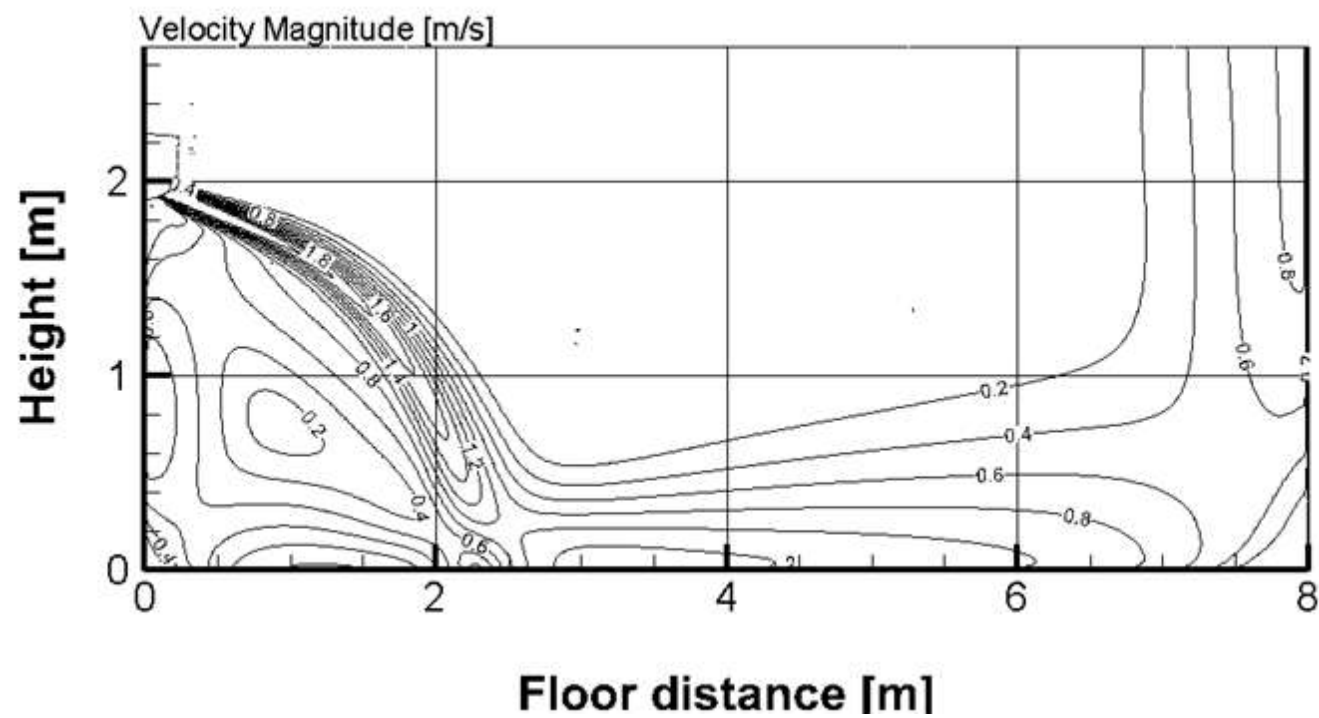
Heating temperature distributions



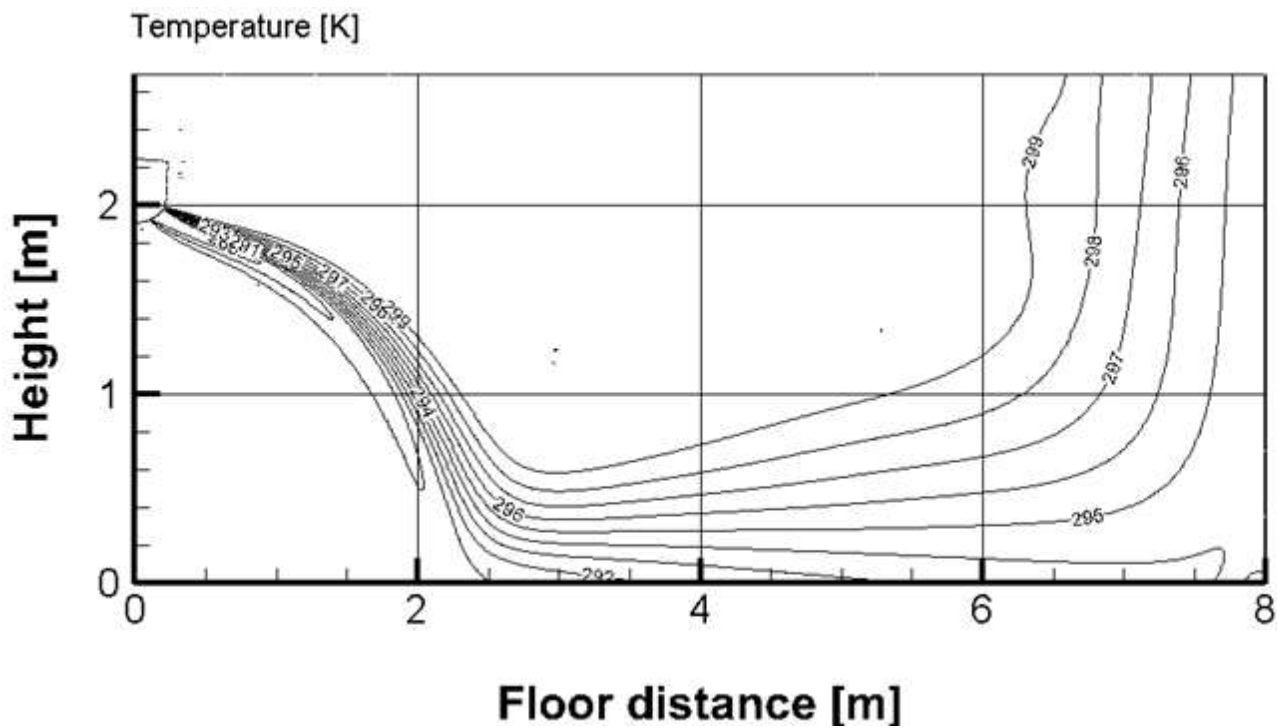
XTREME-24k

Discharge Angle 50°

Cooling airflow velocity distributions



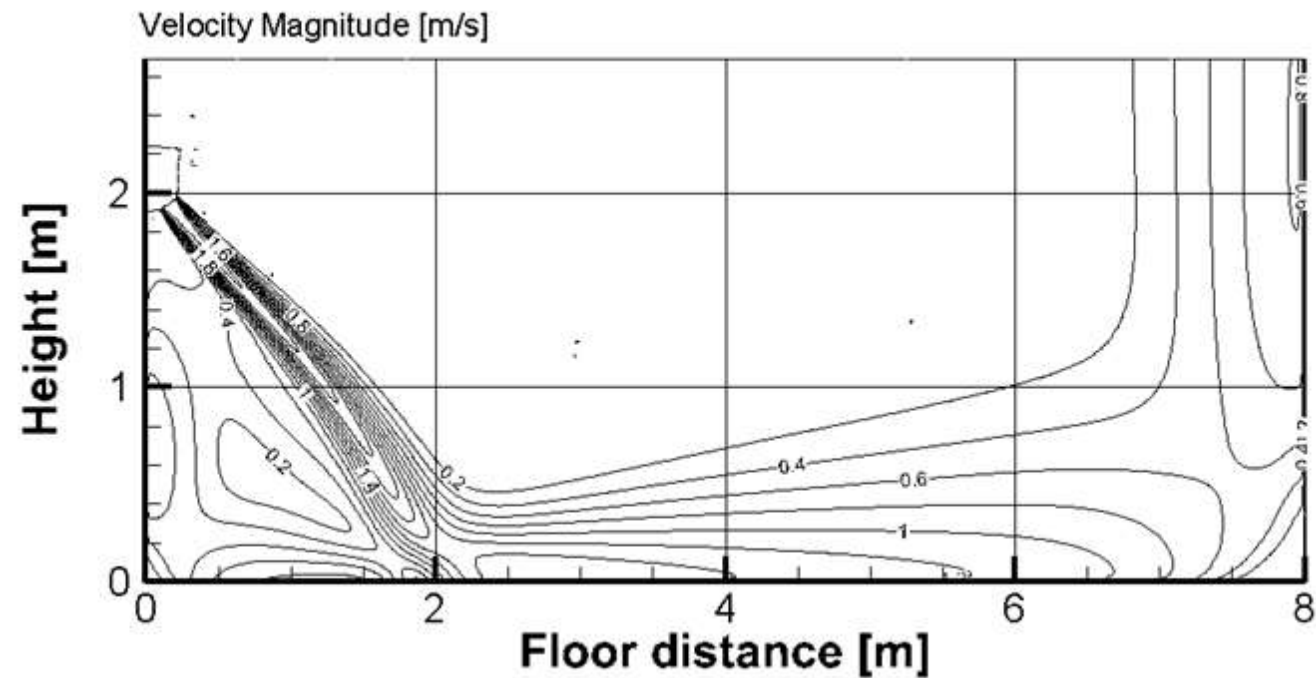
Cooling temperature distributions



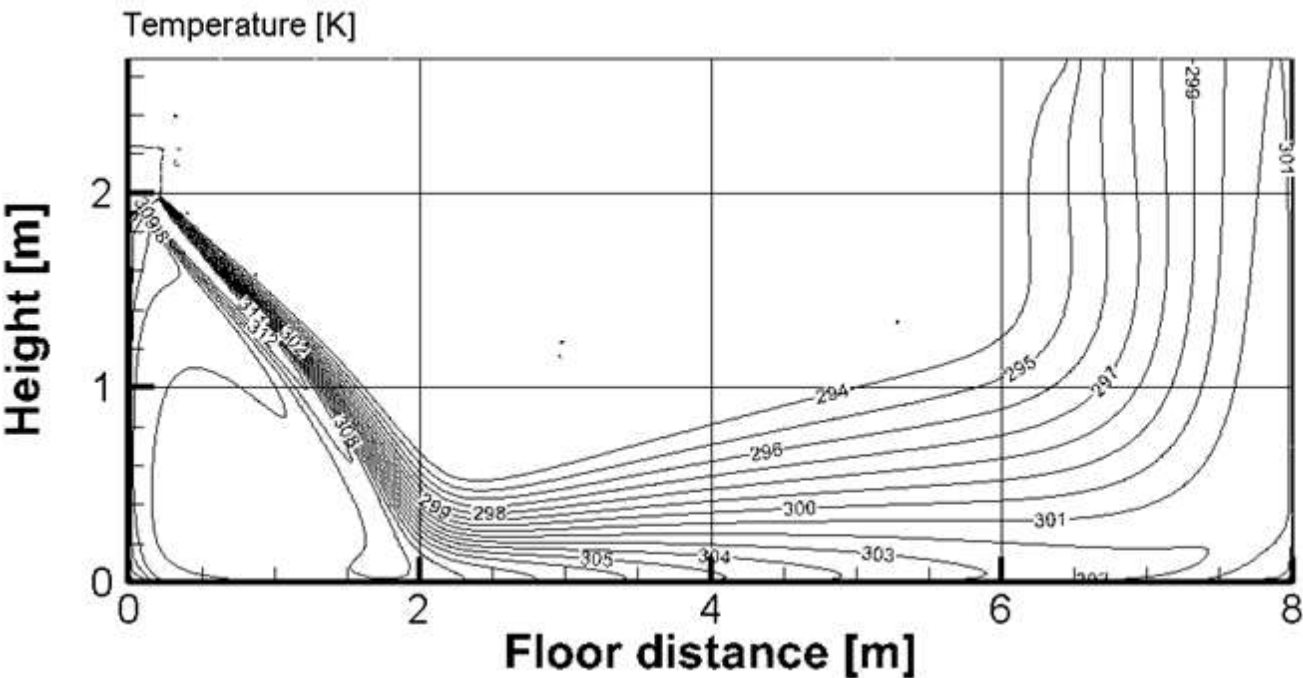
XTREME-24k

Discharge Angle 67°

Heating airflow velocity distributions



Heating temperature distributions

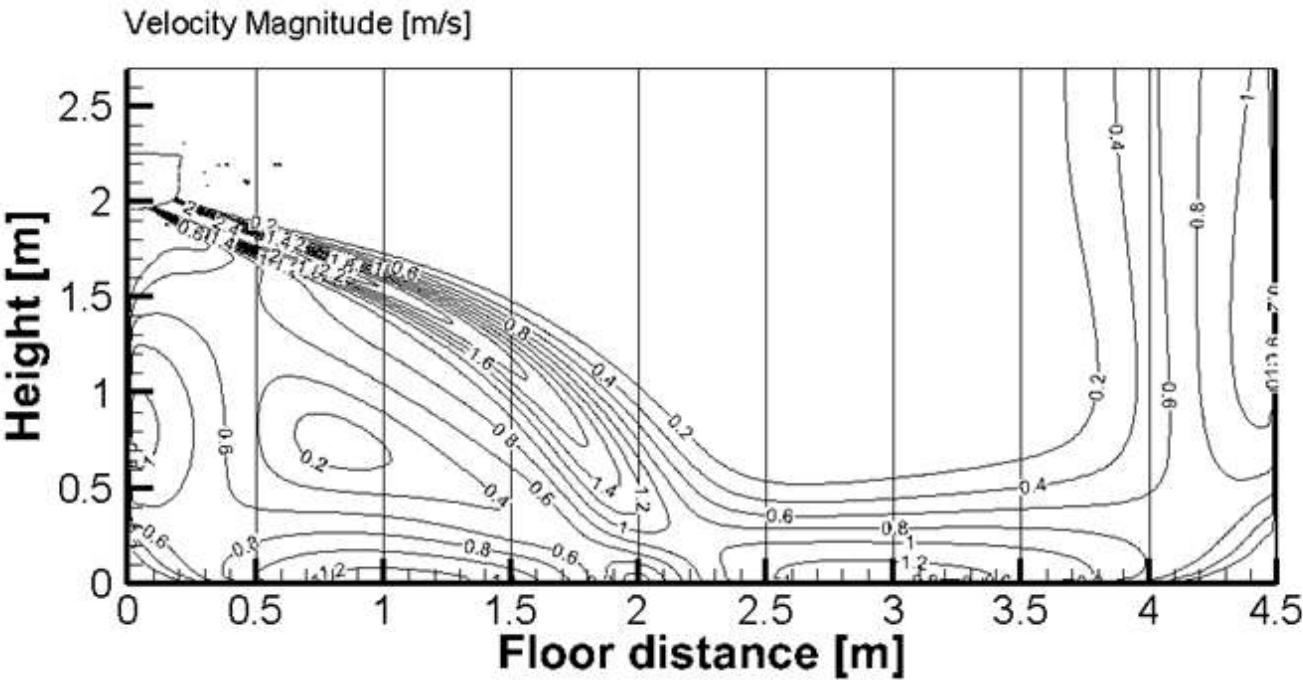


AURORA-9k

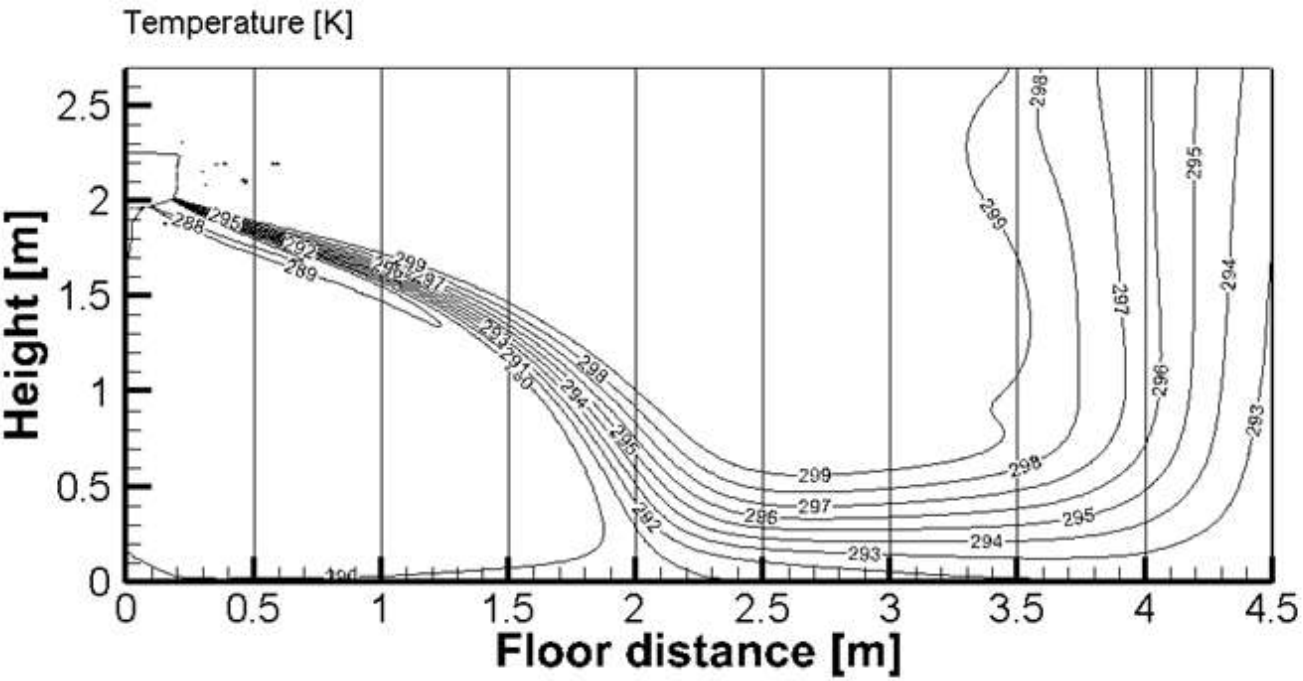
Discharge Angle 58°

Cooling airflow velocity distributions

Specifications



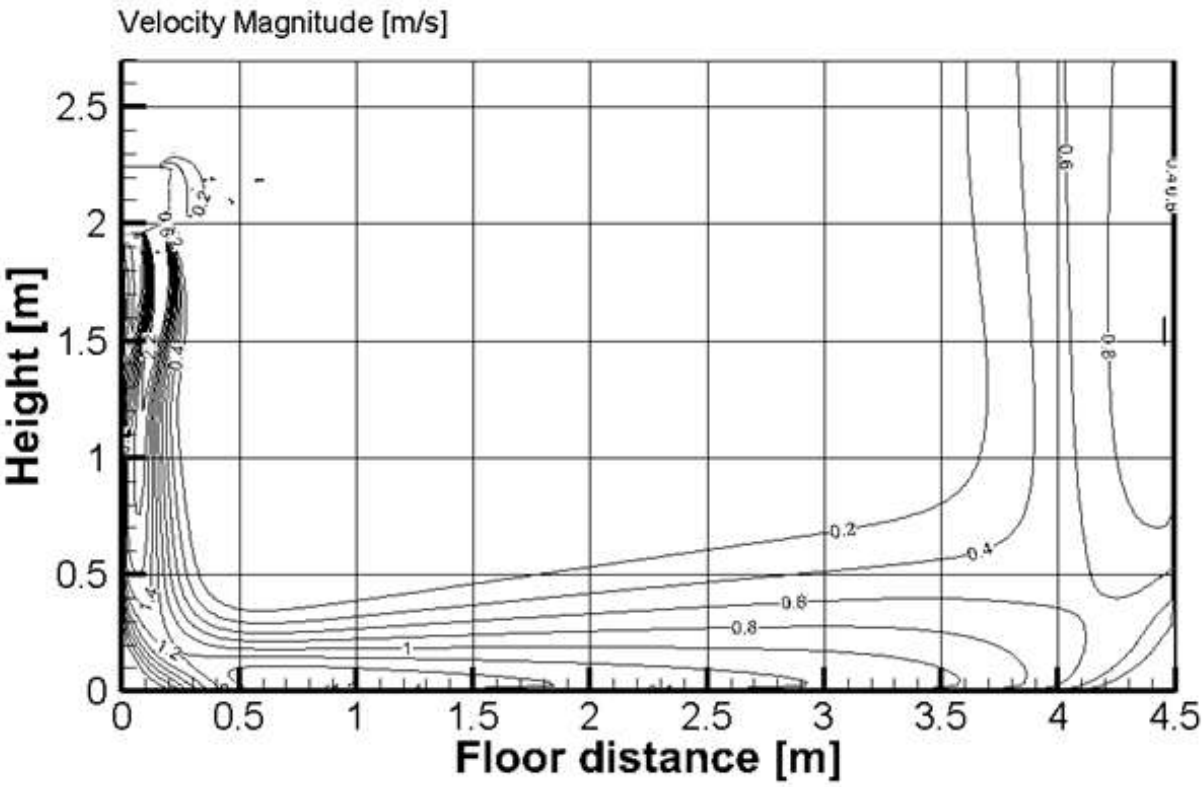
Cooling temperature distributions



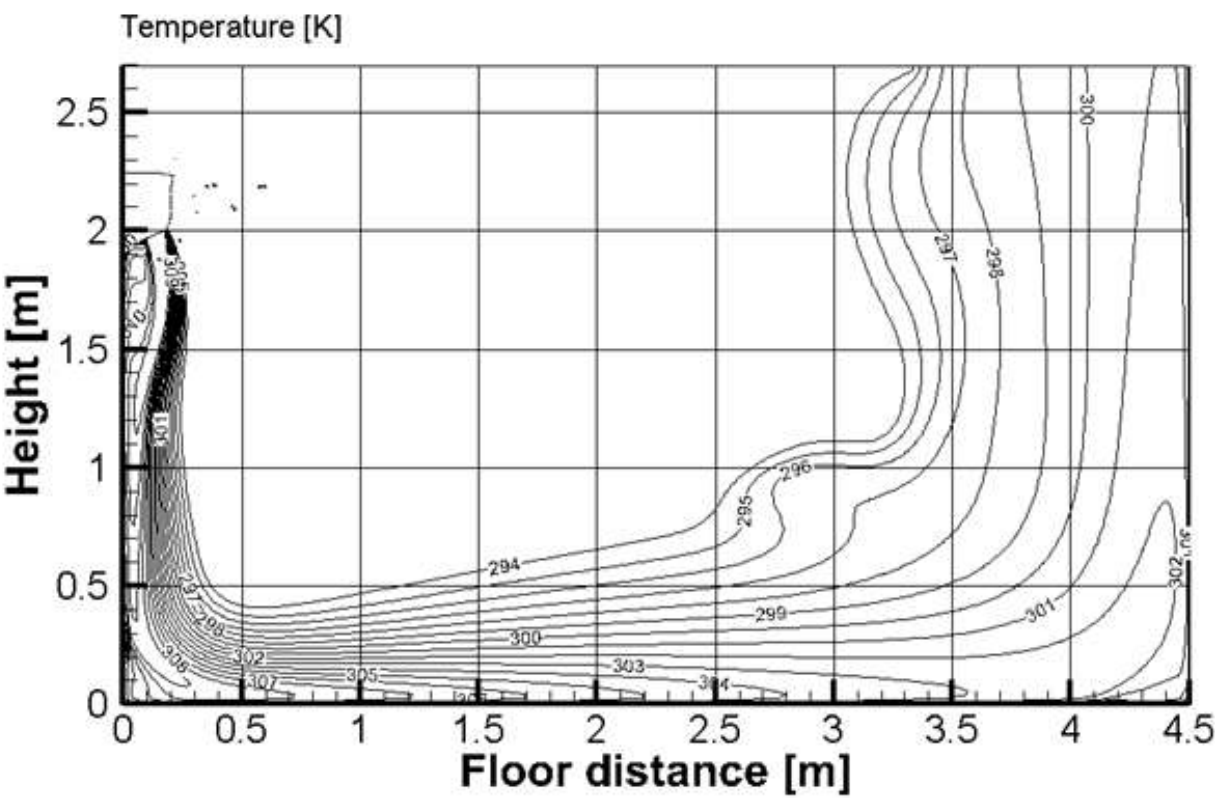
AURORA-9k

Discharge Angle 90°

Heating airflow velocity distributions



Heating temperature distributions

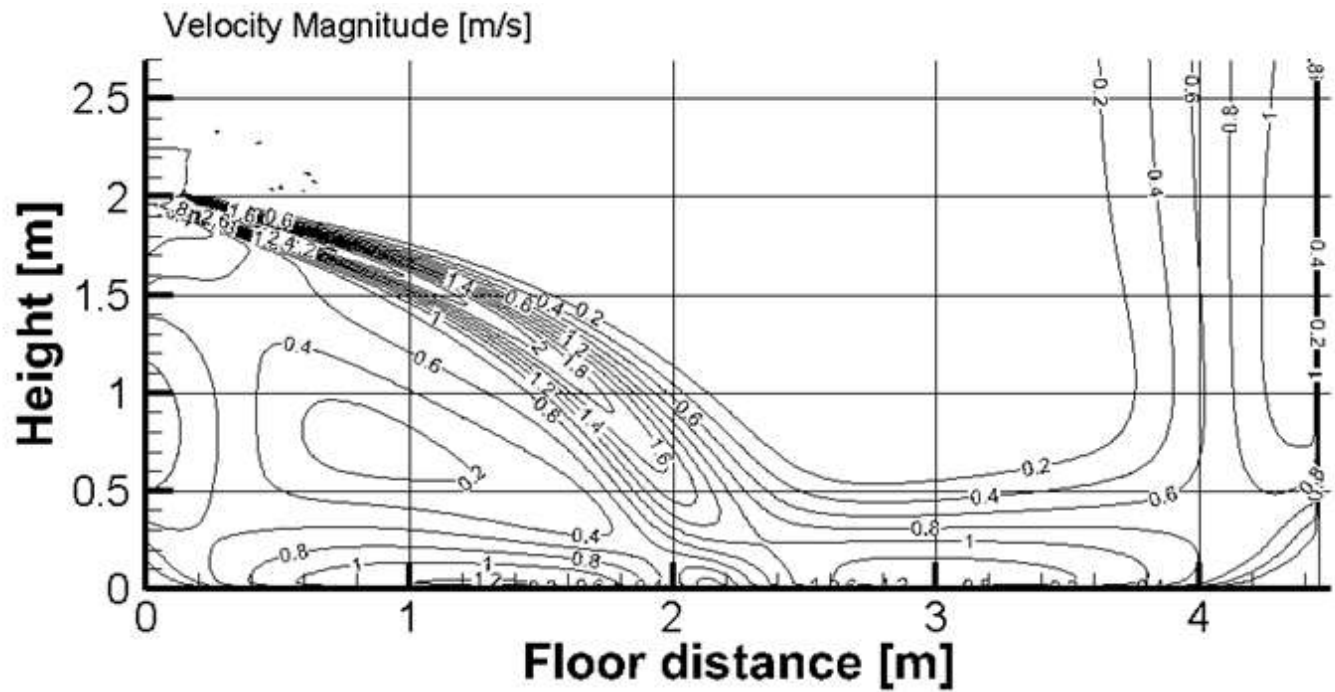


AURORA-12k

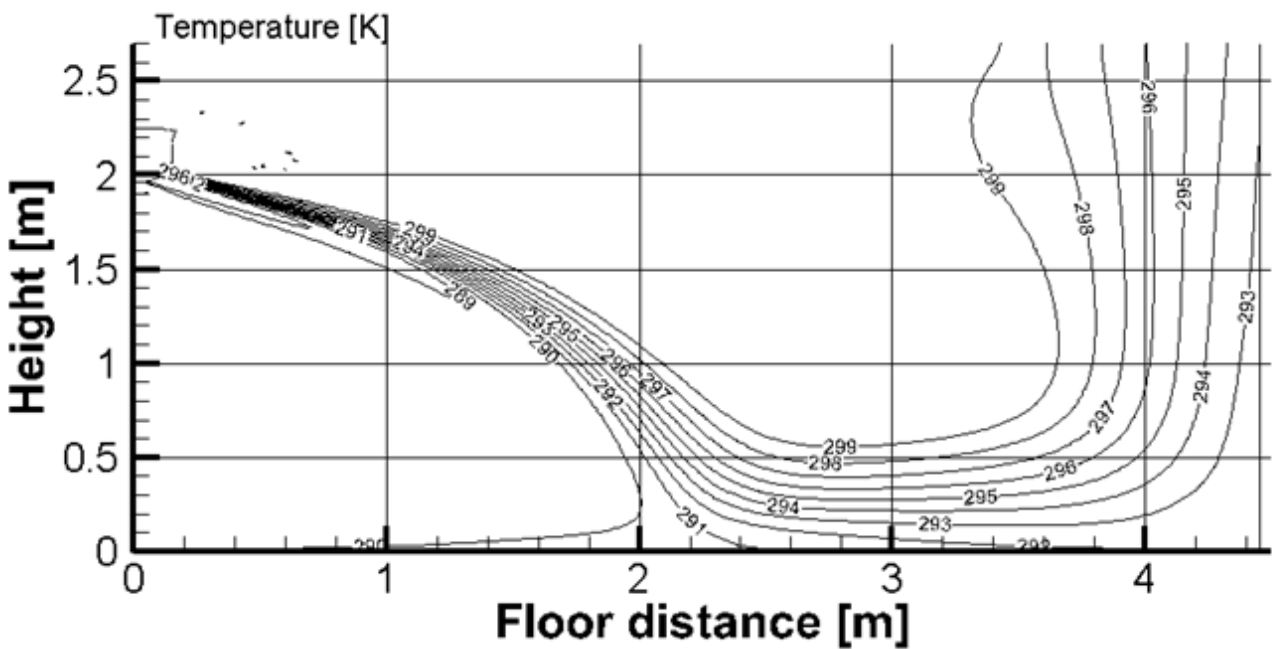
Discharge Angle 58°

Cooling airflow velocity distributions

Specifications



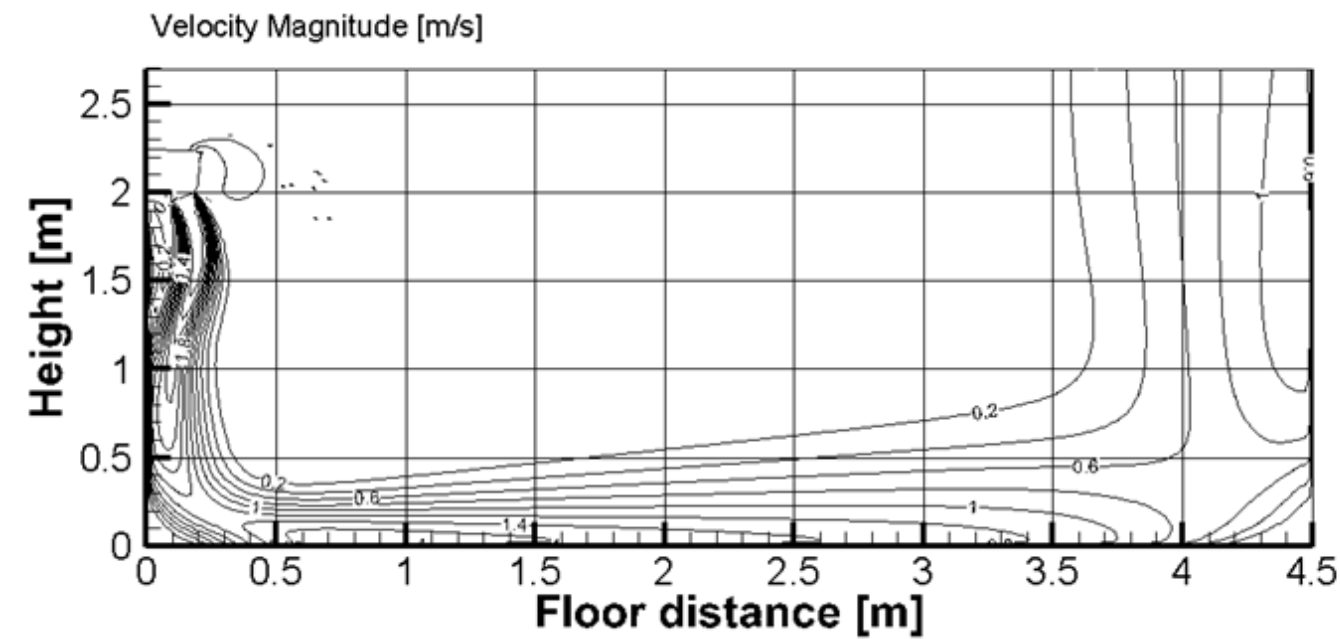
Cooling temperature distributions



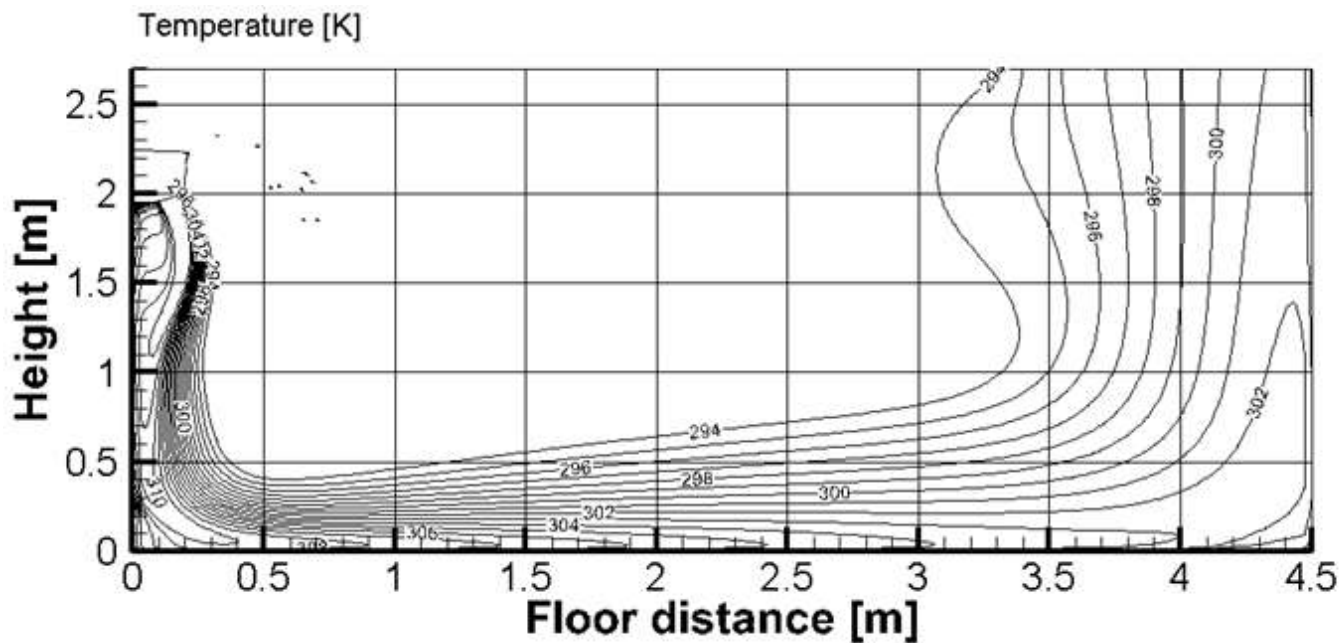
AURORA-12k

Discharge Angle 90°

Heating airflow velocity distributions



Heating temperature distributions

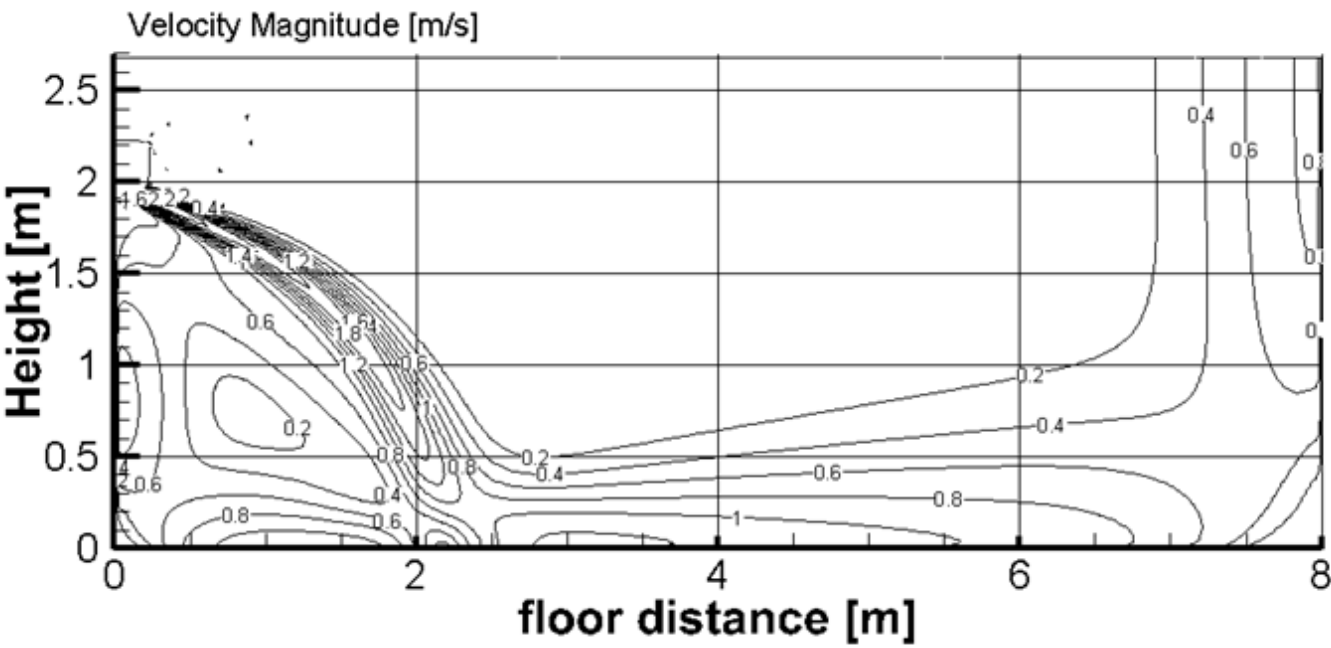


AURORA-18k

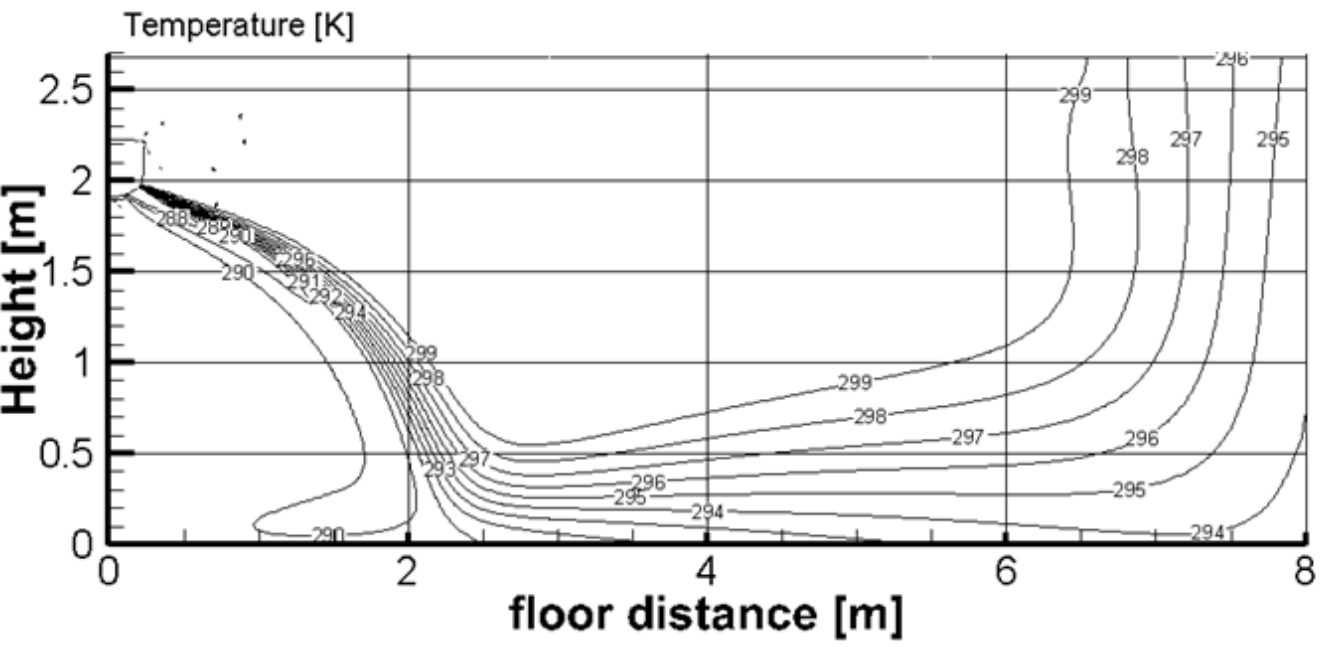
Discharge Angle 50°

Cooling airflow velocity distributions

Specifications



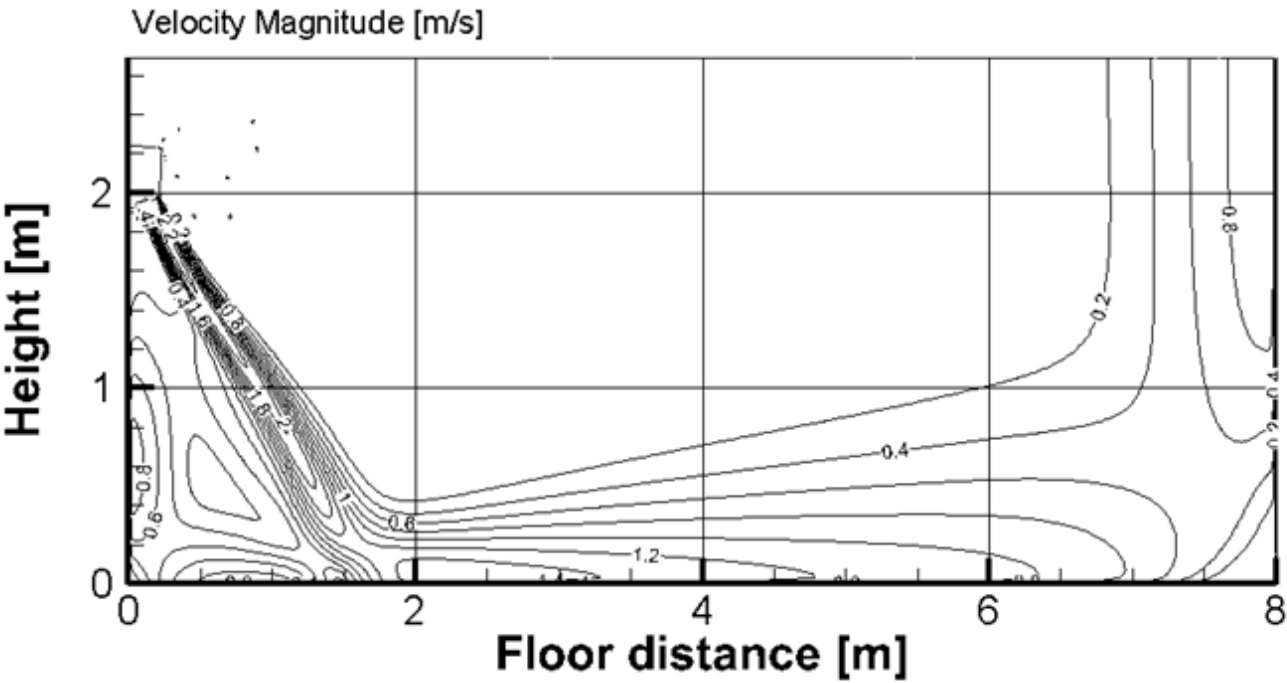
Cooling temperature distributions



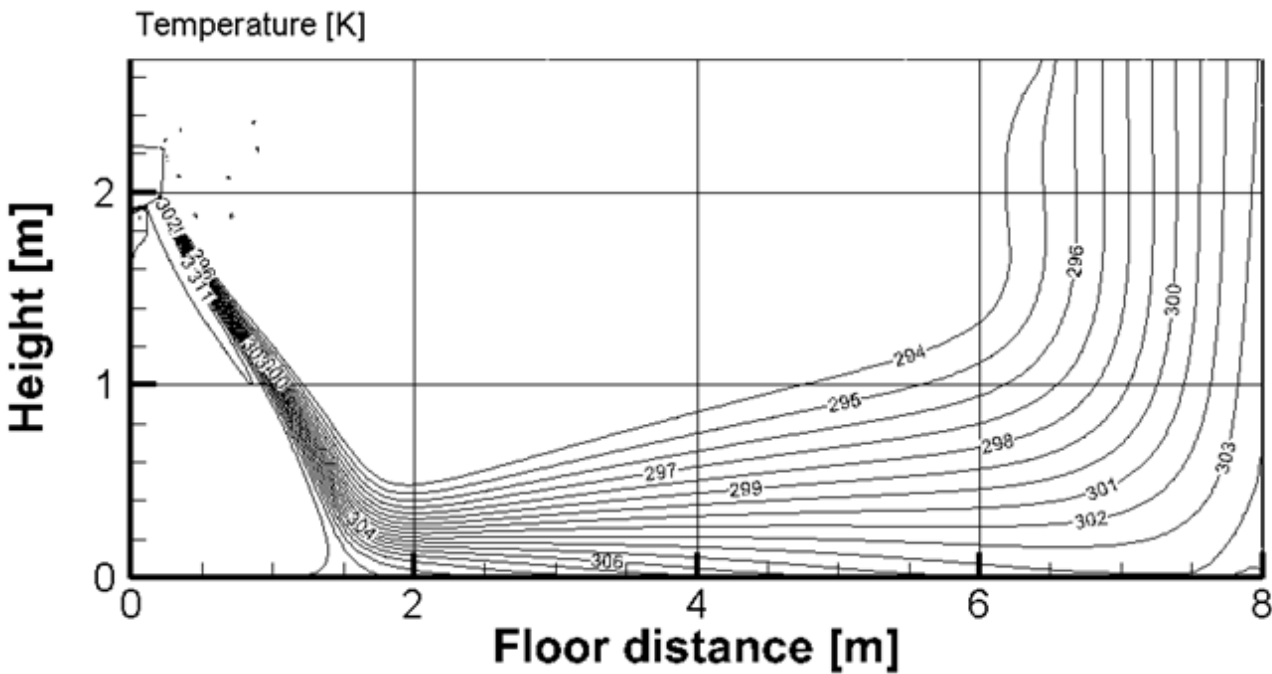
AURORA-18k

Discharge Angle 84°

Heating airflow velocity distributions



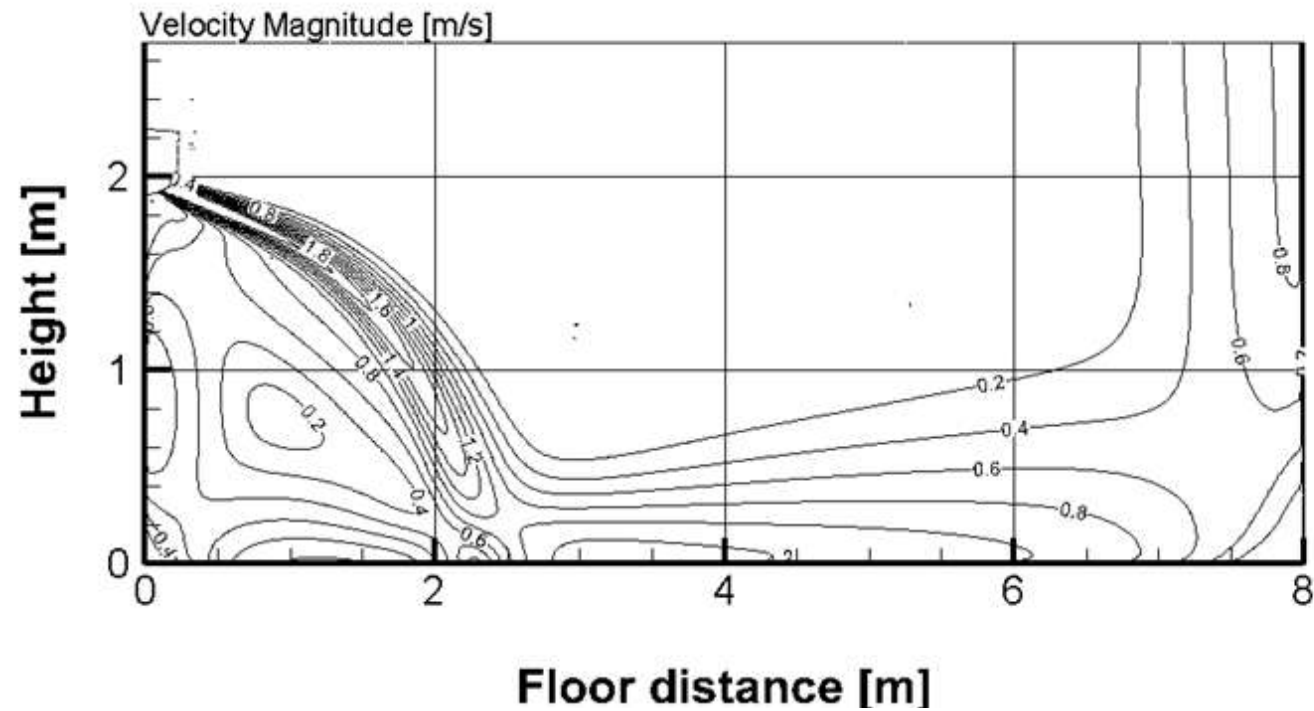
Heating temperature distributions



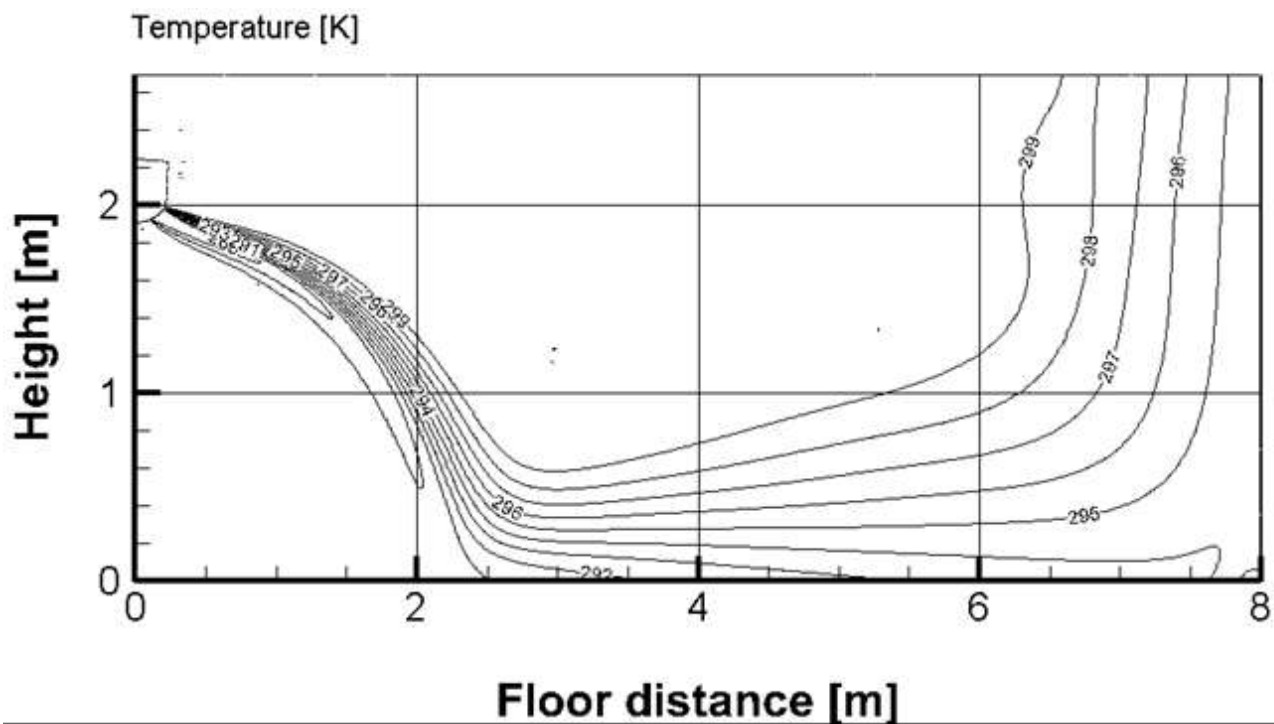
AURORA-24k

Discharge Angle 50°

Cooling airflow velocity distributions



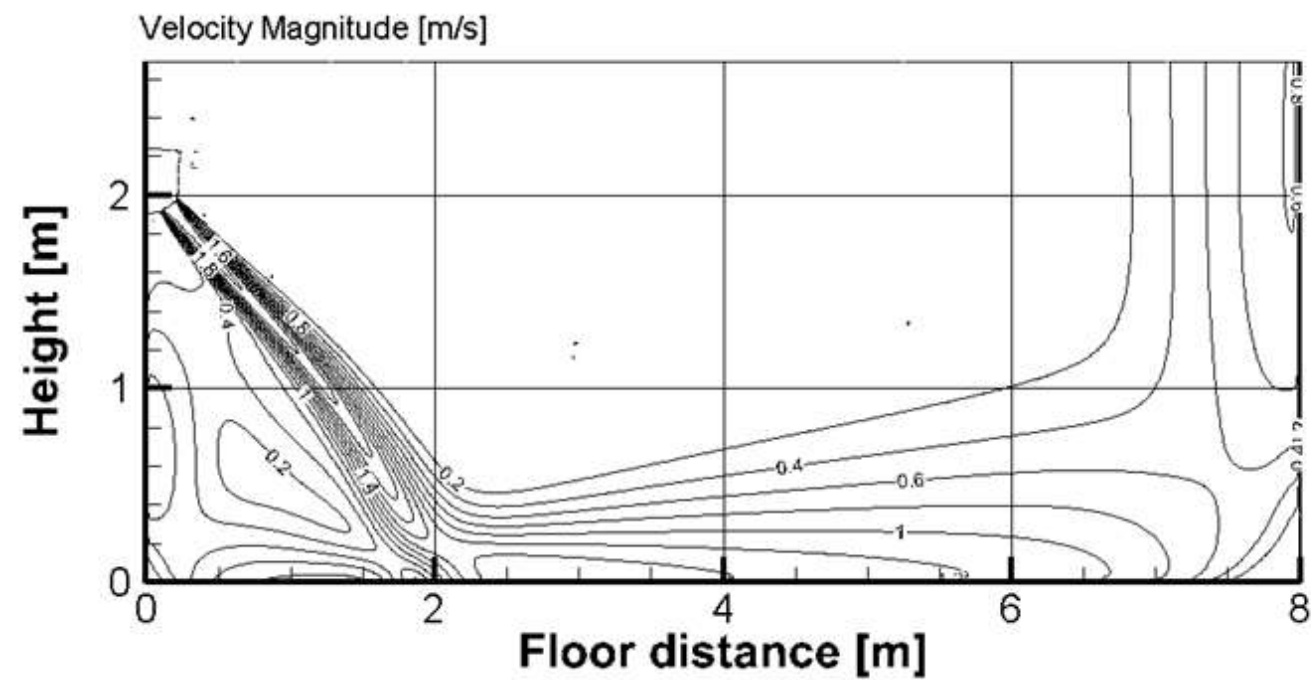
Cooling temperature distributions



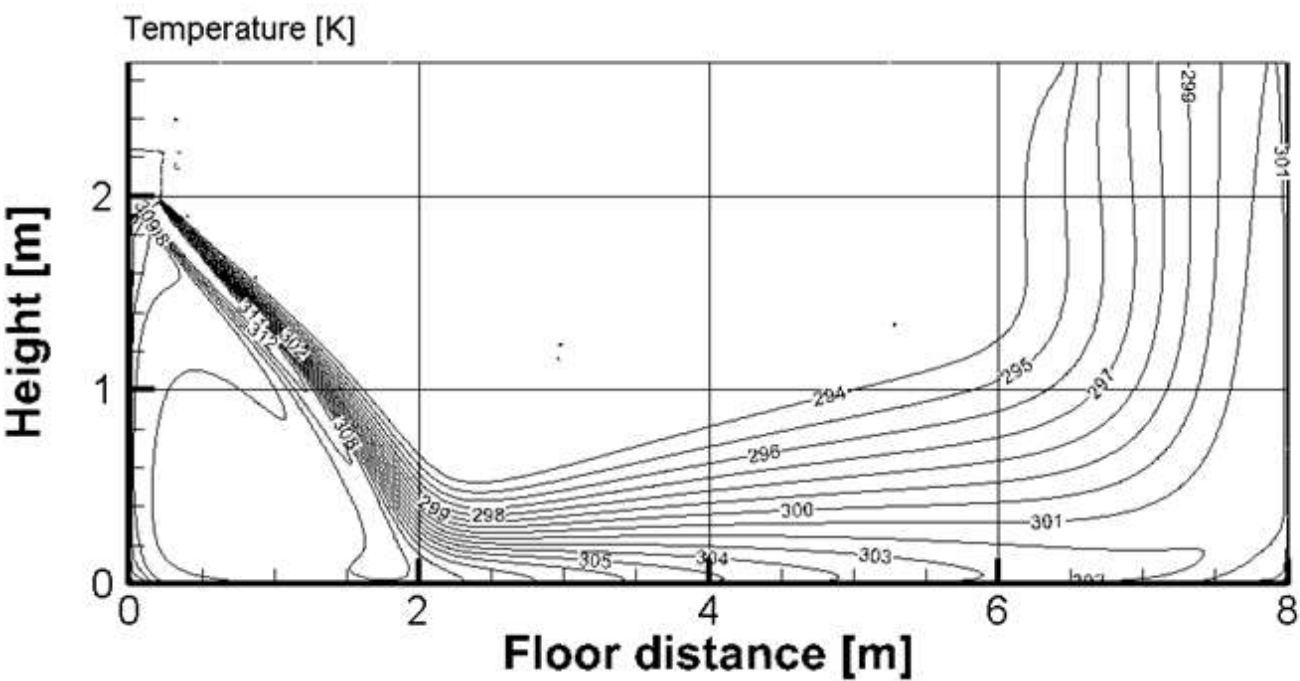
AURORA-24k

Discharge Angle 67°

Heating airflow velocity distributions



Heating temperature distributions

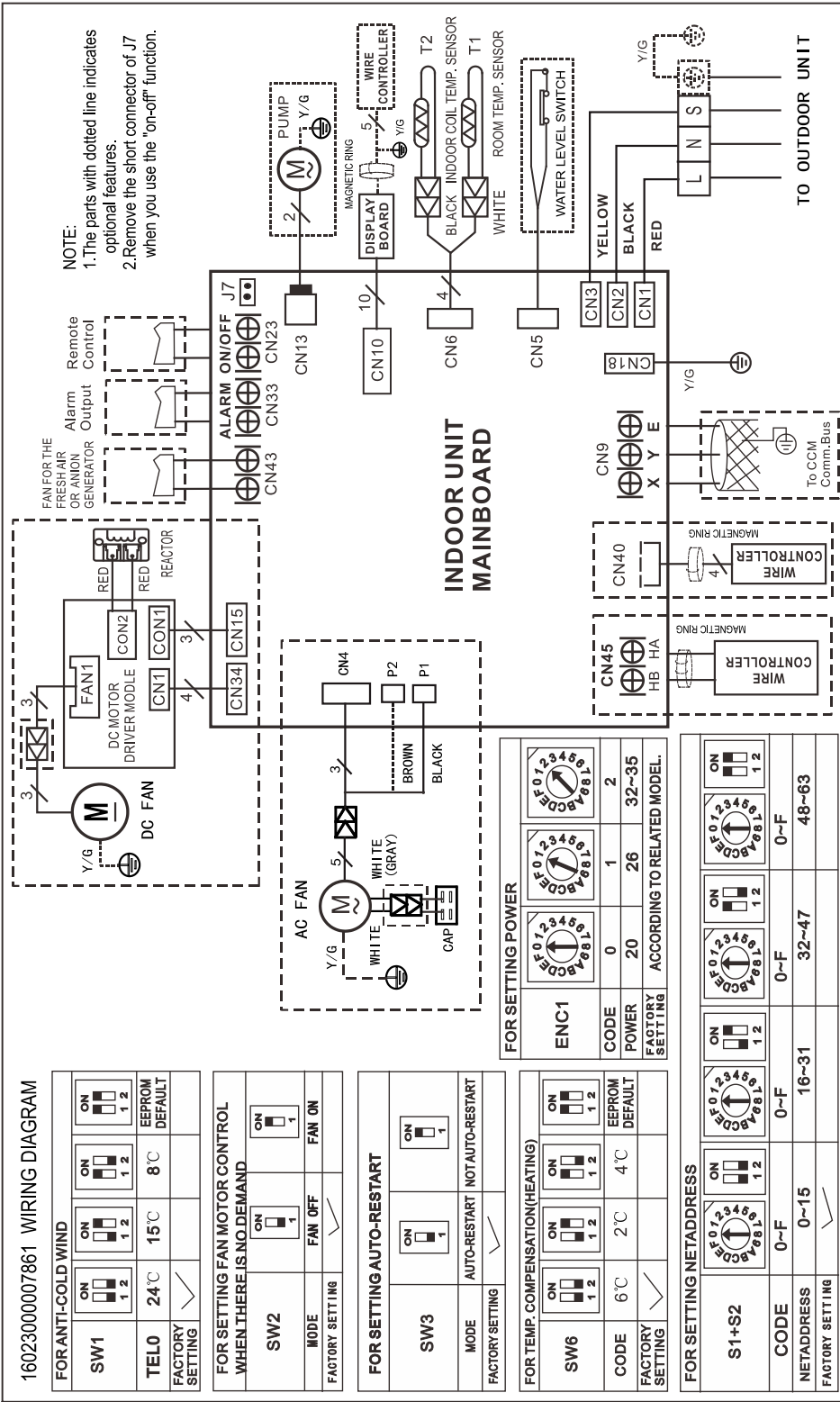


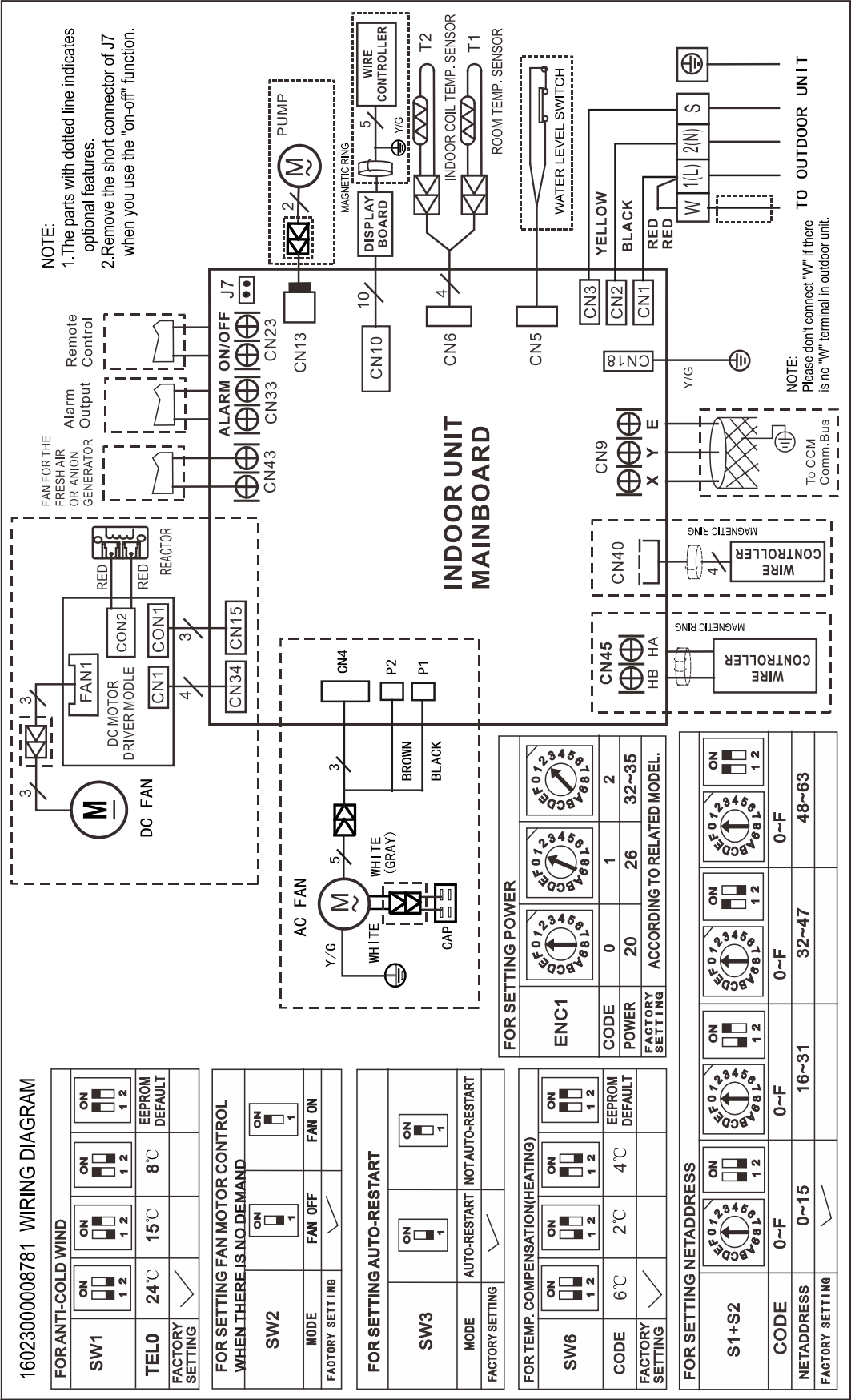
7. Electrical Wiring Diagrams

8.1 Indoor unit

A6 Duct type

MTIU-07HWFNX-QRD0W, MTIU-09HWFNX-QRD0W

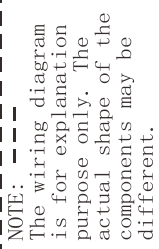


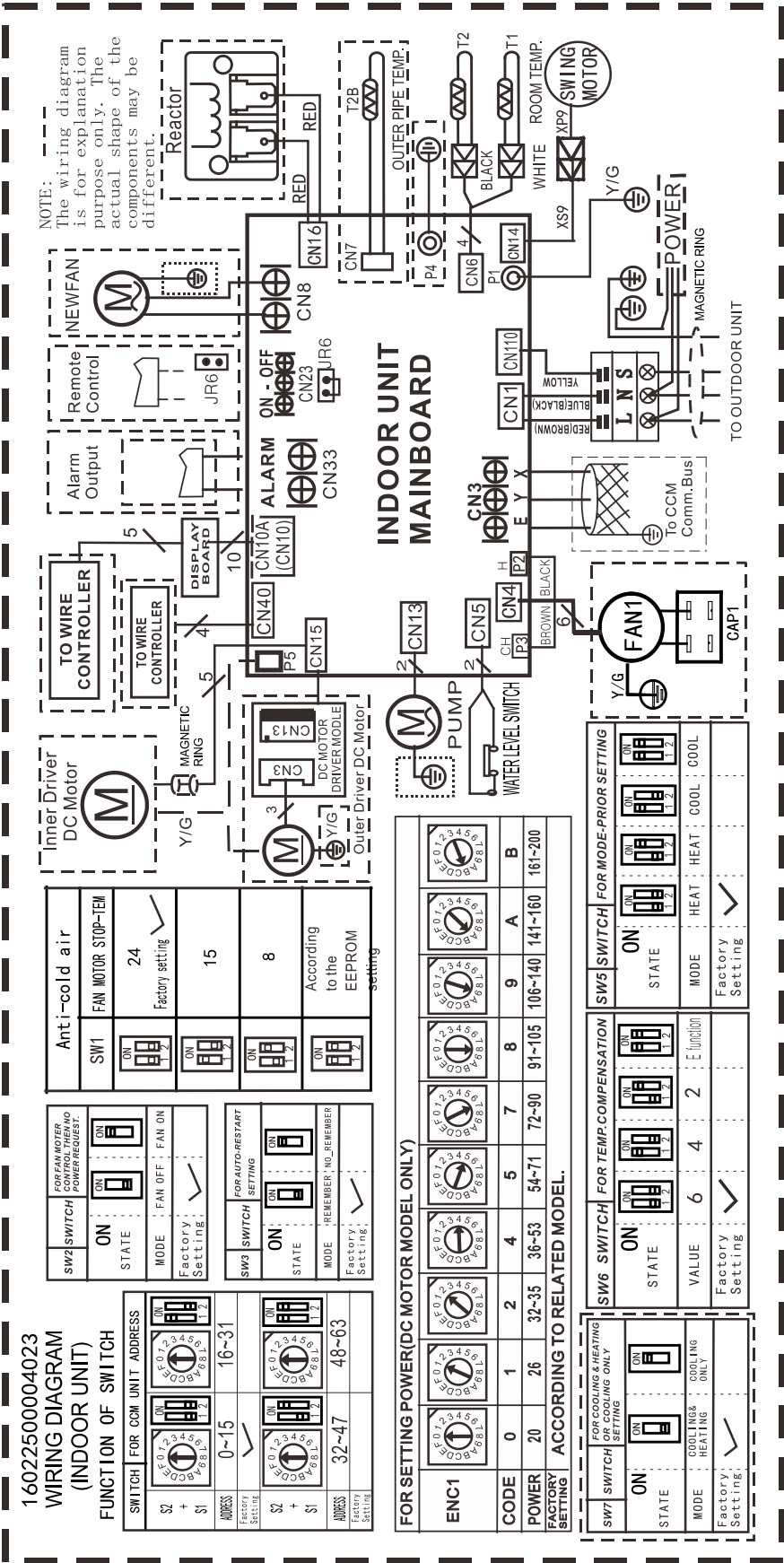




MCA3I-07HRFNX-QRD0, MCA3I-09HRFN8-QRD0

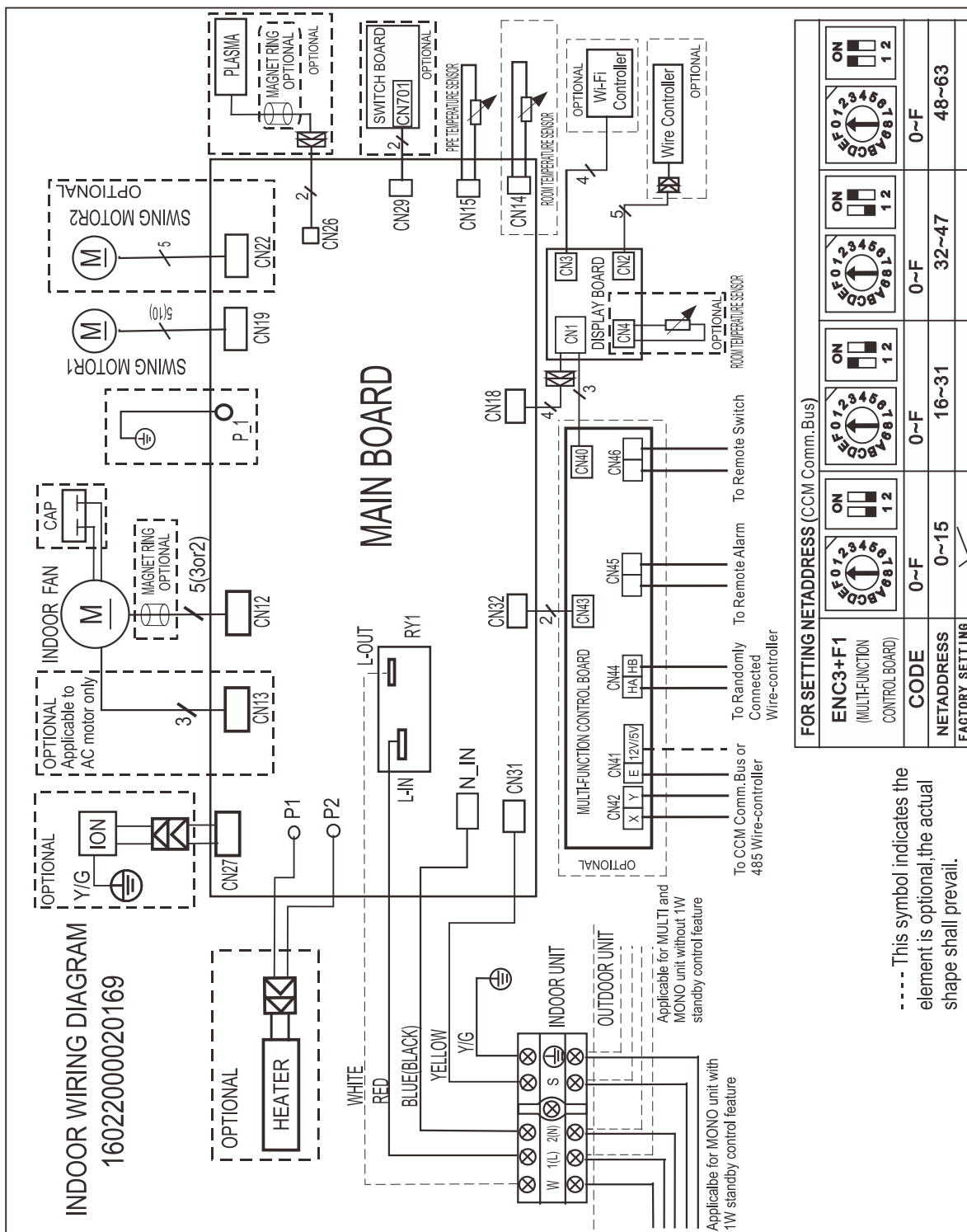




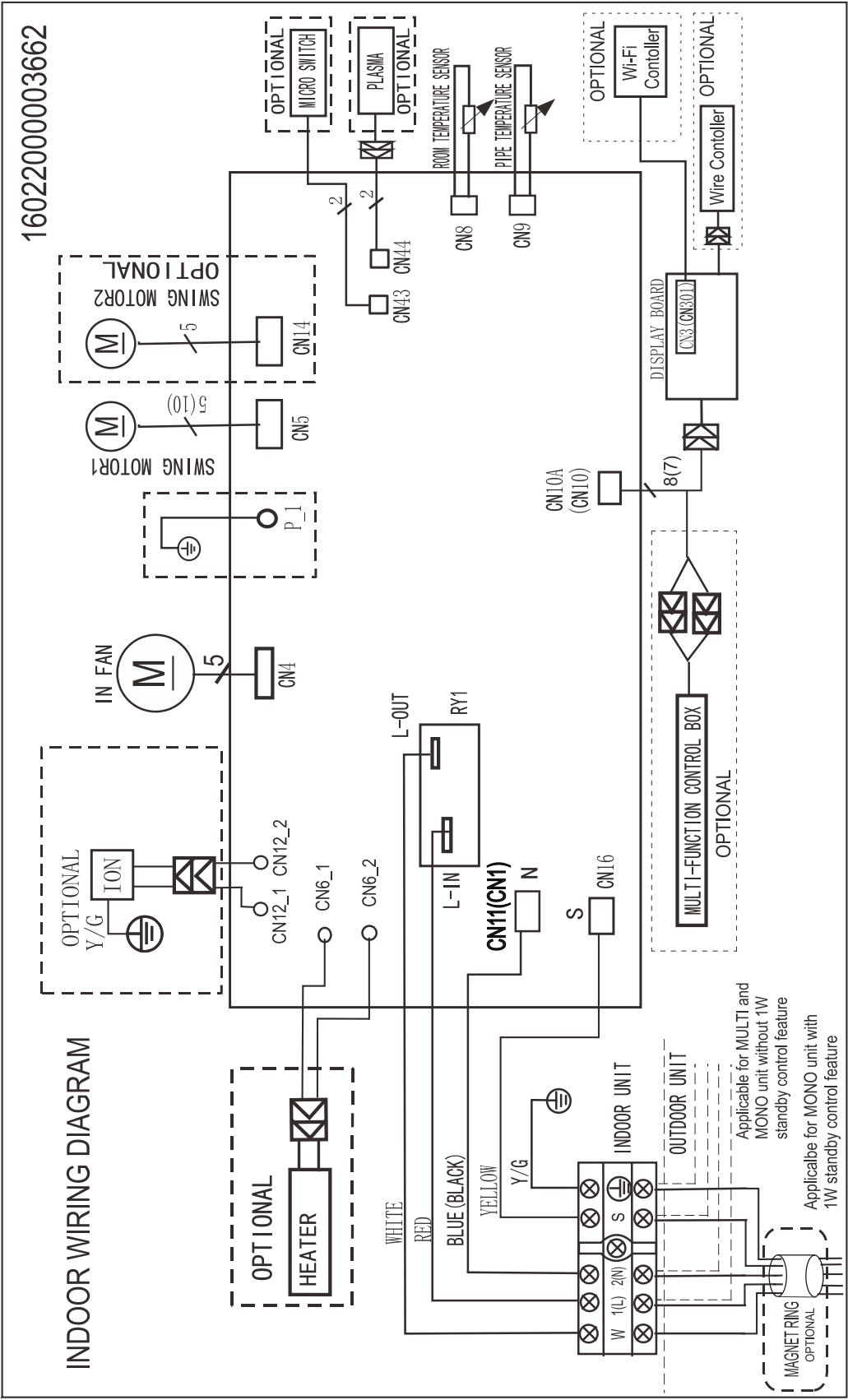


Wall mounted type

MSAFBU-07HRDNX-QRD0GW, MSAFBU-09HRDN8-QRD0GW, MSAFBU-12HRDN8-QRD0GW,
MSAFBU-18HRFN8-QRD0GW, MSAFBU-24HRFNX-QRD0GW, MSAFBU-09HRFN8-QRD6GW
MSAFBU-12HRFN8-QRD0GW, MSAFBU-18HRFN8-QRD0GW, MSAFBU-24HRFN8-QRD0GW
MSAGAU-09HRFNX-QRD0GW, MSAGBU-09HRFN8-QRD1GW(GA), MSAGBU-12HRFN8-QRD1GW(GA),
MSAGBU-12HRFNX-QRD0GW, MSAGCU-18HRFNX-QRD0GW

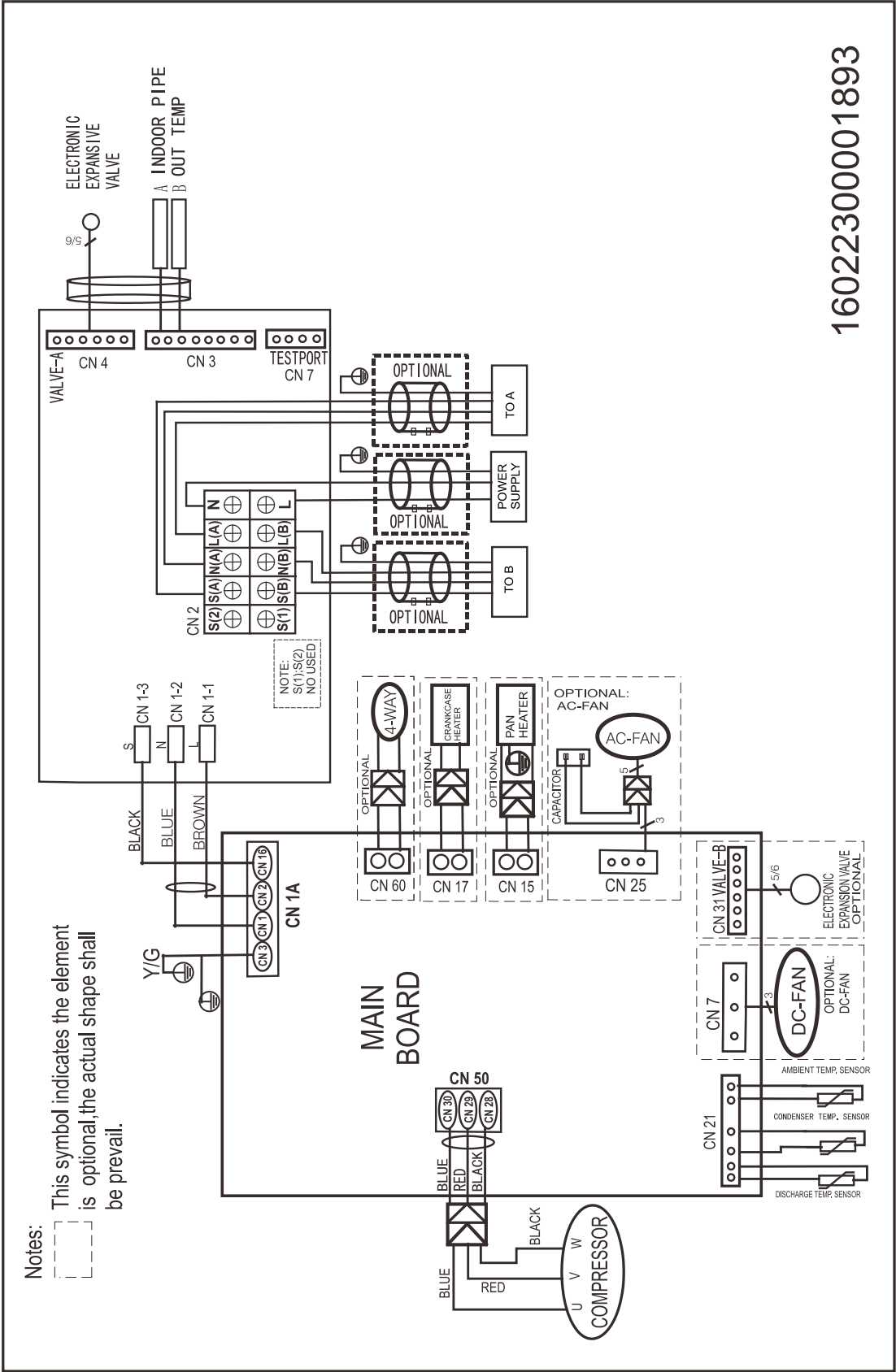


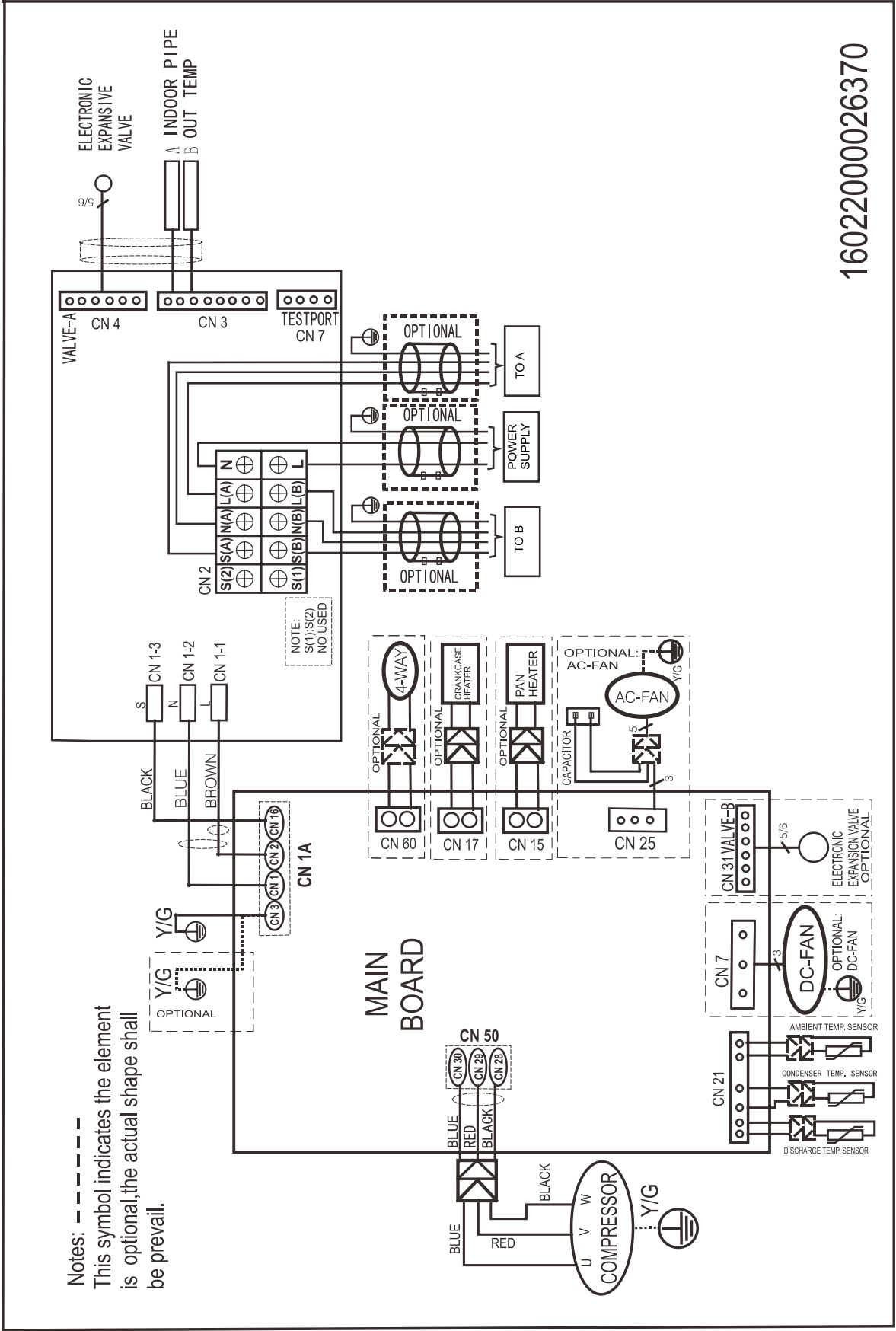
MSABAU-09HRFN8-QRD0GW, MSABBU-12HRFN8-QRD0GW, MSABDU-18HRFN8-QRD0GW,
MSABEU-24HRFN8-QRD0GW, MSAGDU-24HRFN8-QRD0GW

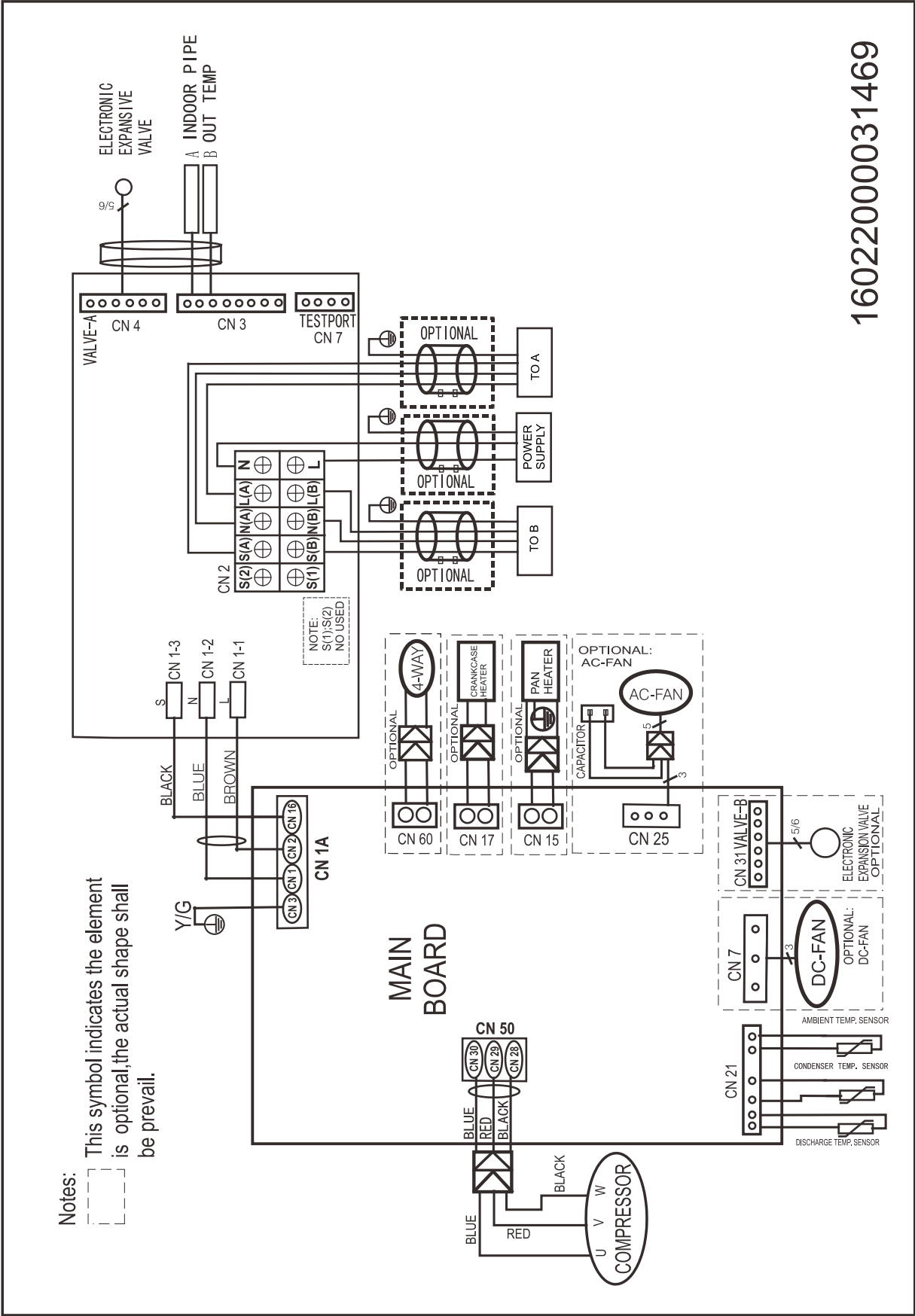


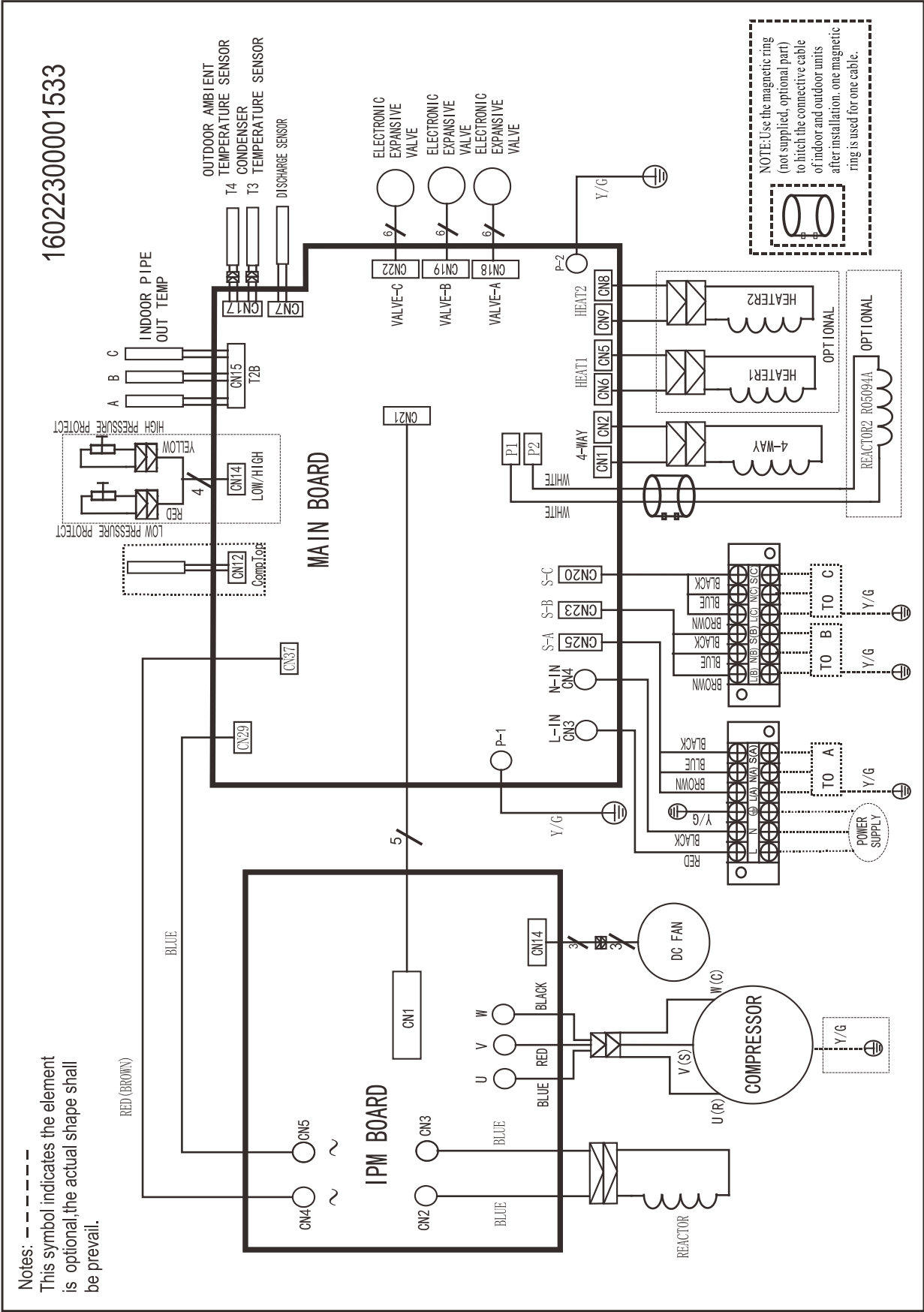
8.2 Outdoor Unit

M2OG-14HFN8-Q





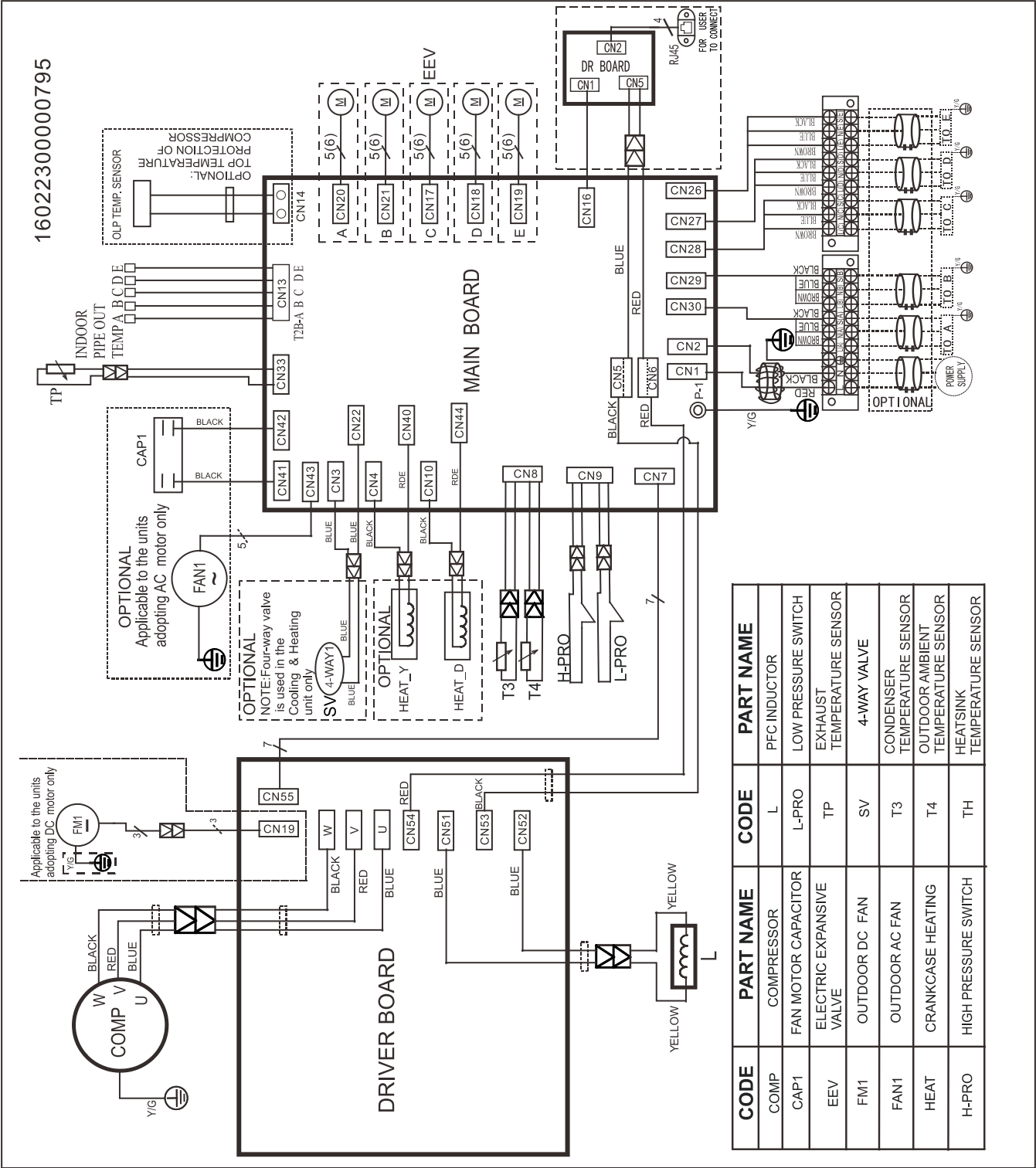




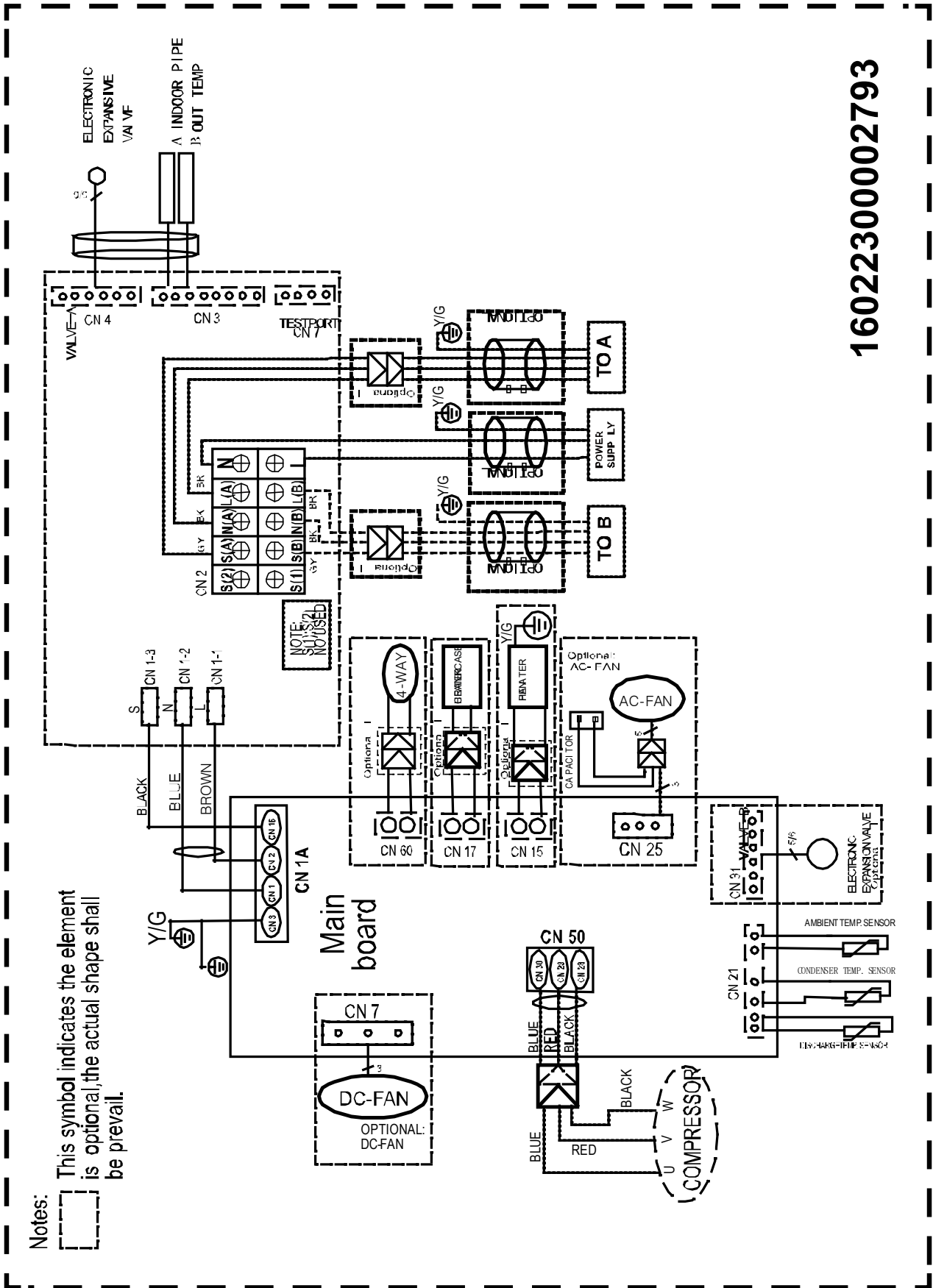




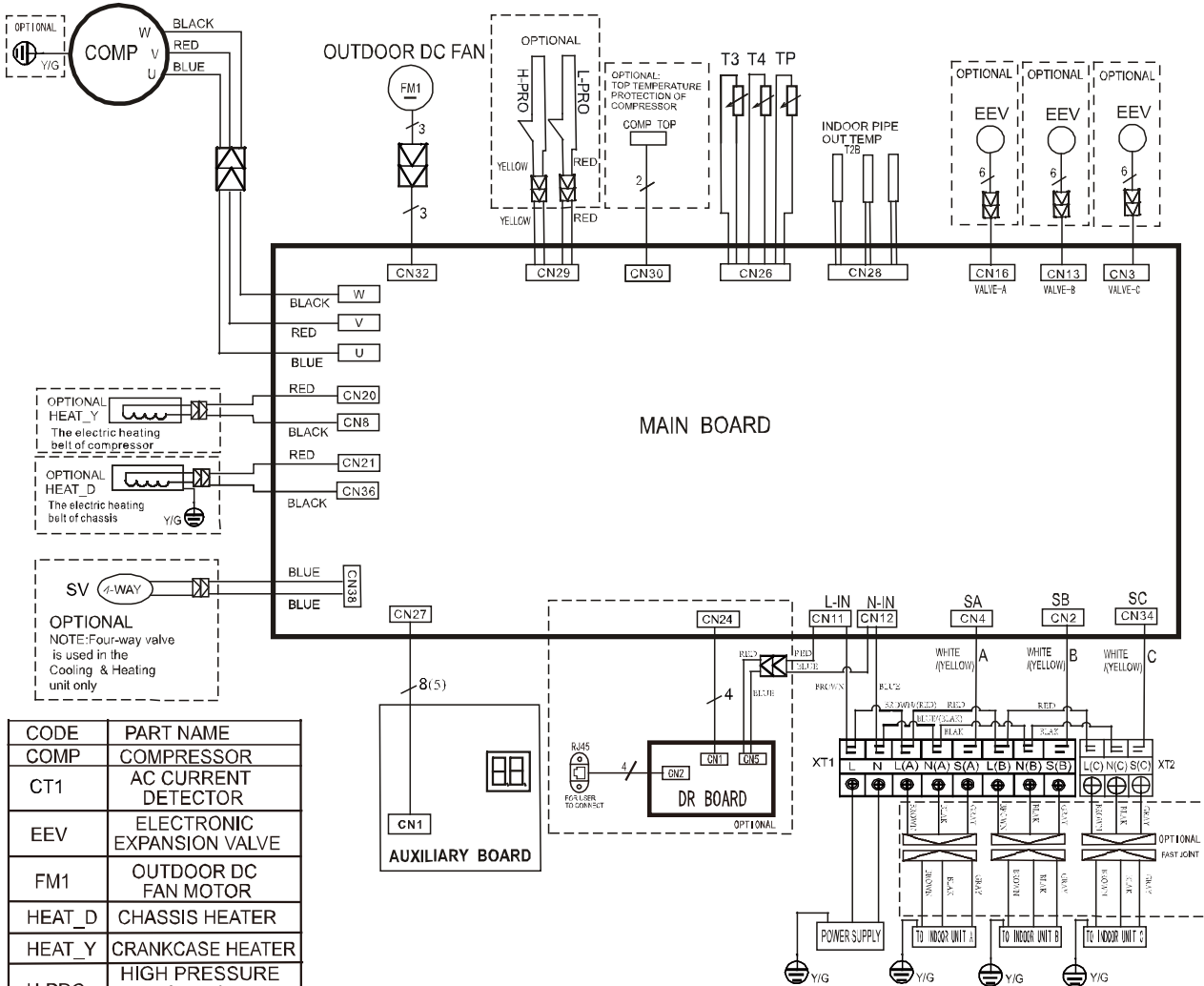




M2OH-14HFN8-Q, M2OE-18HFN8-Q



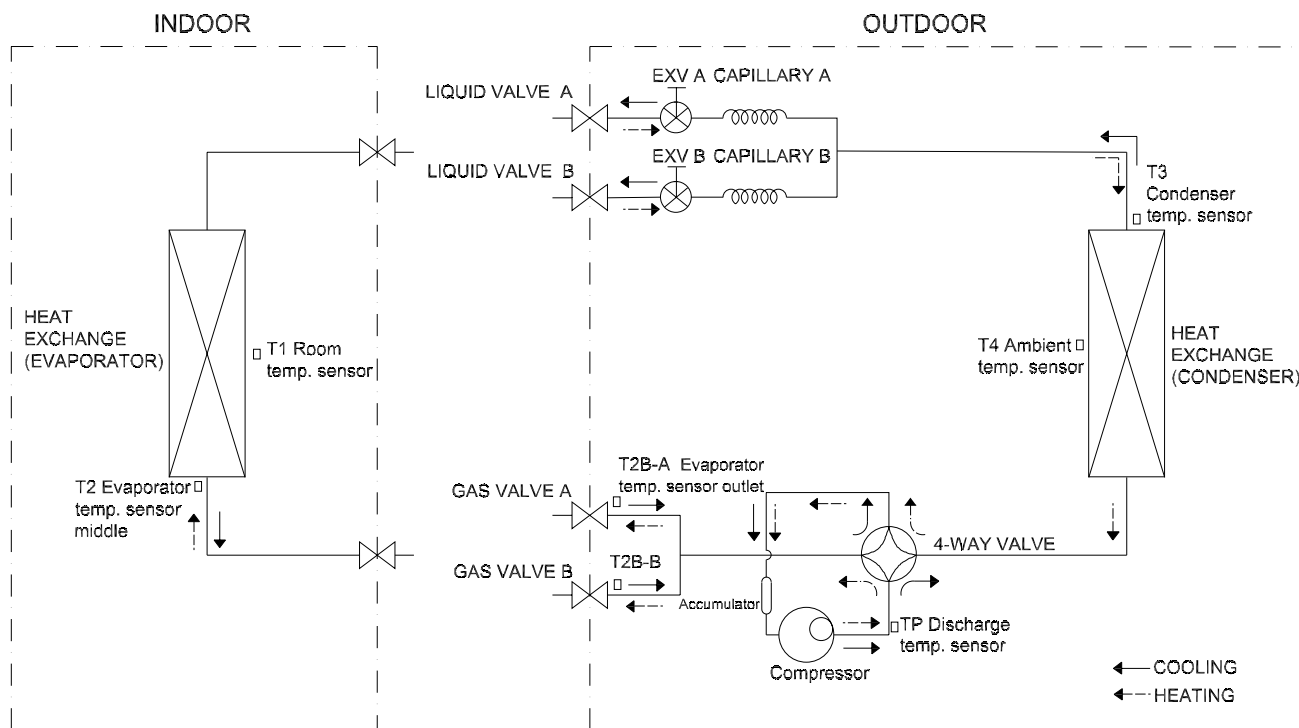
CODE: 16022000035910



| CODE | PART NAME |
|----------|------------------------------|
| COMP | COMPRESSOR |
| CT1 | AC CURRENT DETECTOR |
| EEV | ELECTRONIC EXPANSION VALVE |
| FM1 | OUTDOOR DC FAN MOTOR |
| HEAT_D | CHASSIS HEATER |
| HEAT_Y | CRANKCASE HEATER |
| H-PRO | HIGH PRESSURE SWITCH |
| L-PRO | LOW PRESSURE SWITCH |
| SV | REVERSE VALVE |
| TP | COMP. DISCHARGE TEMP. SENSOR |
| T3 | COIL TEMP. SENSOR |
| T4 | OUTDOOR AMBIENT TEMP. SENSOR |
| COMP TOP | COMP. TOP OLP TEMP. SENSOR |

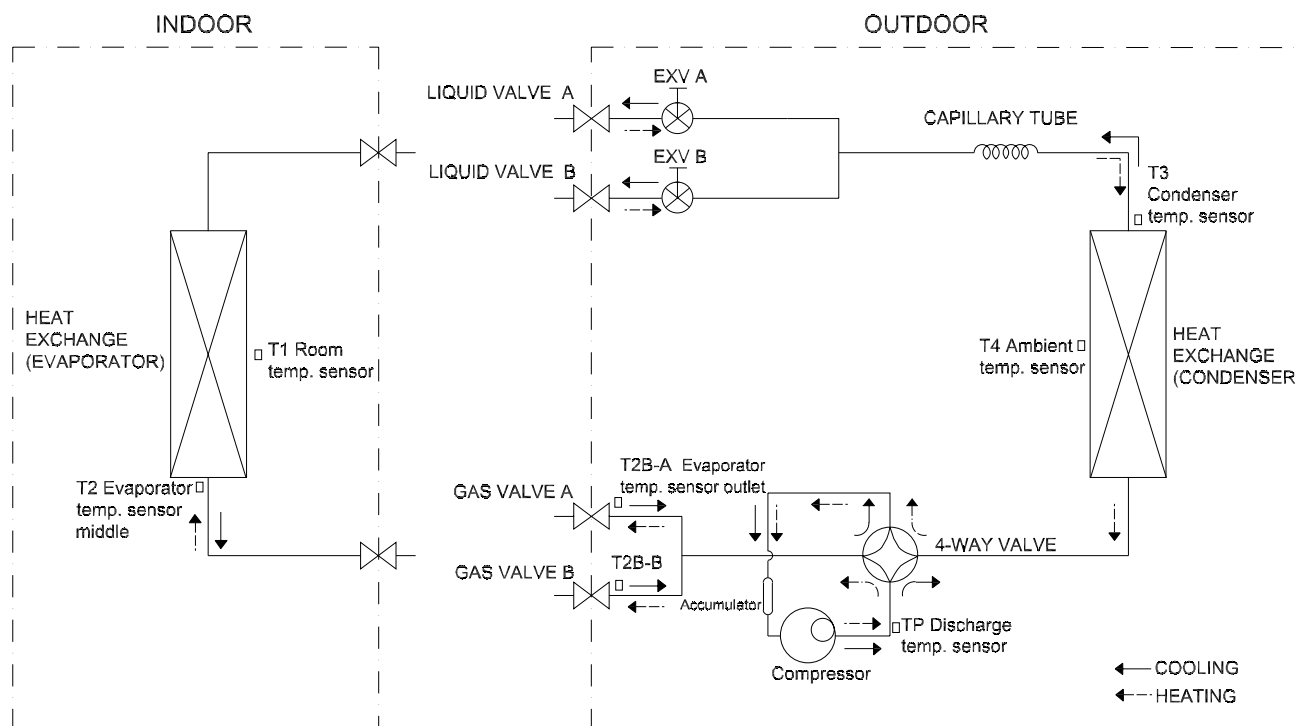
Notes:
 This symbol indicates the element is optional, the actual shape shall be prevail.

8. Refrigerant Cycle Diagrams

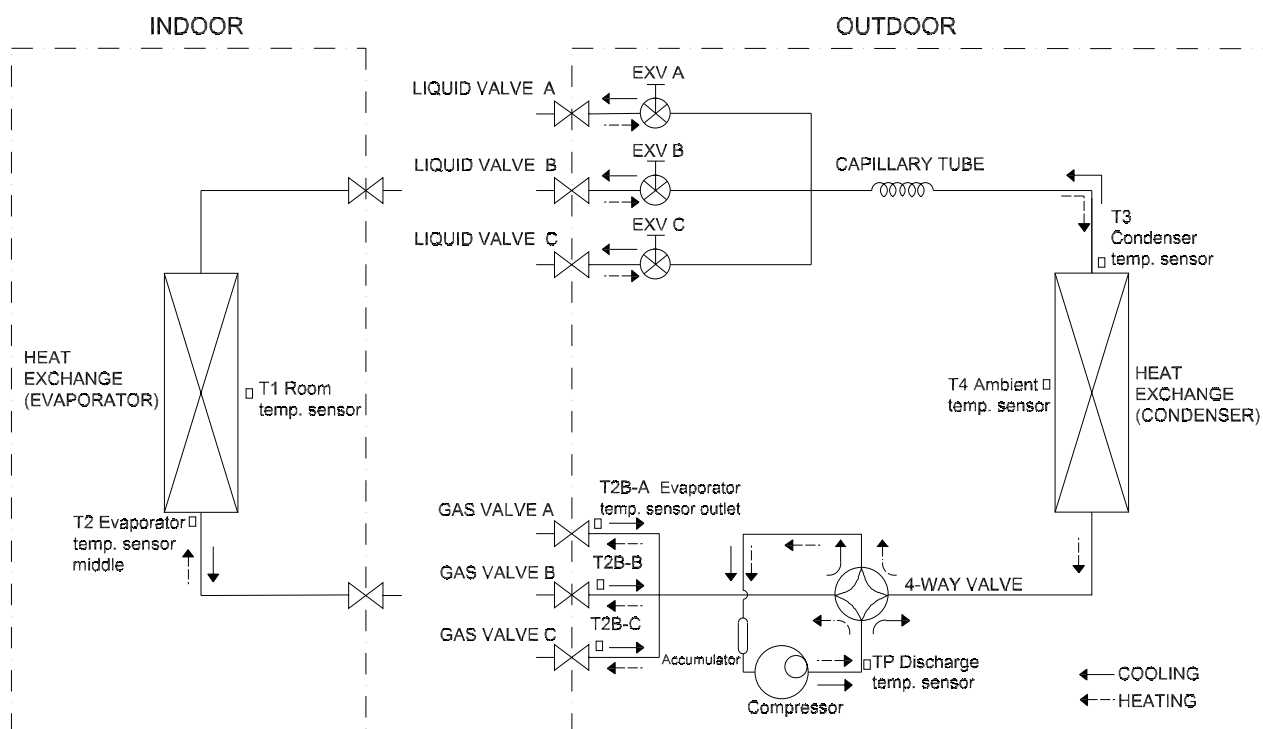


| Model | Pipe Size (Diameter:ø) | | Piping length (m) | | | Elevation (m) | | Additional Refrigerant |
|---------------|---------------------------|--------|-------------------|-----|--------|---------------|----------------|---------------------------|
| | | | Rated | Max | | | | |
| | Gas | Liquid | | | Single | Total | IDU and ODU | |
| M2OG-14HFN8-Q | 2x9.52 | 2x6.35 | 15 | 25 | 40 | 15 | 10 | 12g/m |
| M2OC-18HFN8-Q | | | | | | | | |
| M2OD-18HFN8-Q | | | | | | | | |

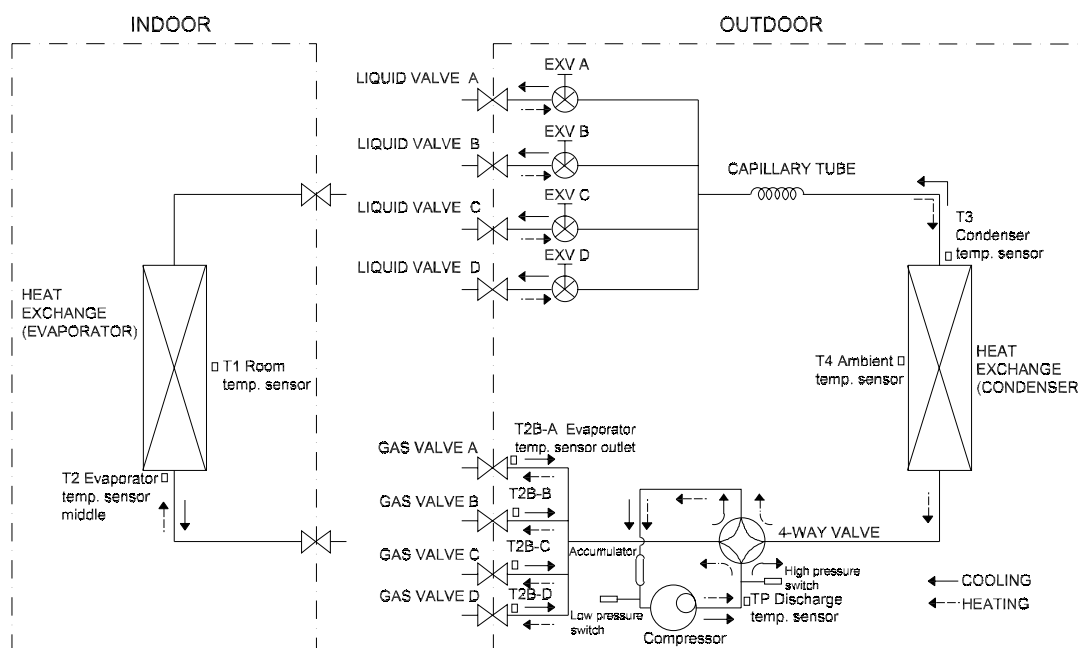
Note: For M2OC-18HFN8-Q, there is no Accumulator.



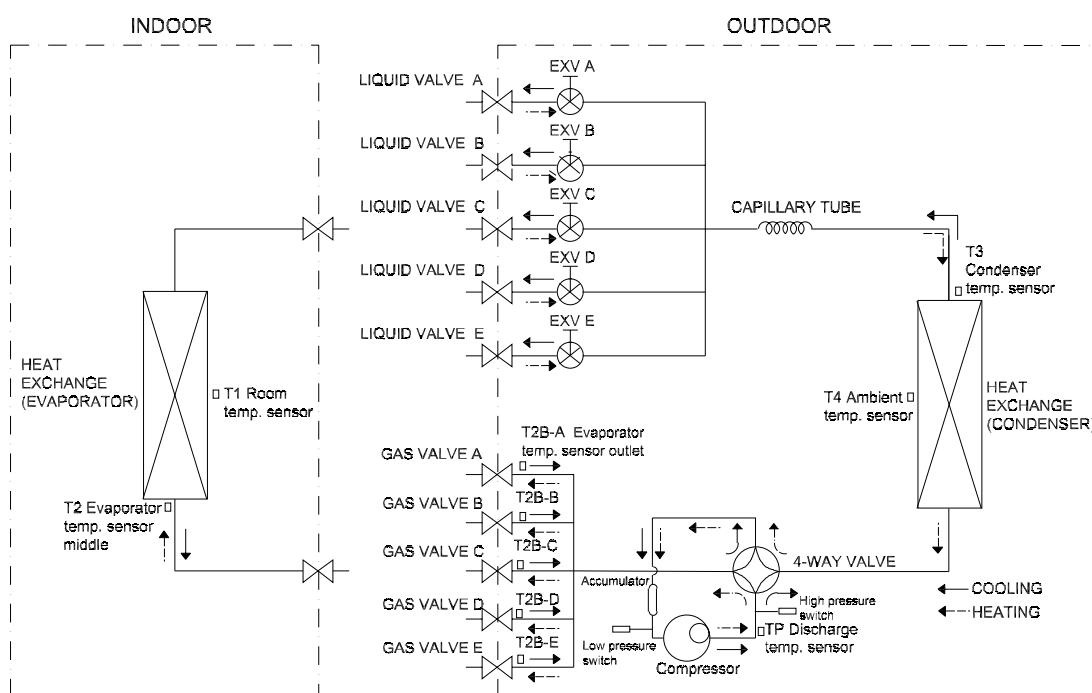
| Model | Pipe Size (Diameter:ø) | | Piping length (m) | | | Elevation (m) | | Additional Refrigerant |
|---------------|---------------------------|--------|-------------------|-----|--------|---------------|----------------|---------------------------|
| | | | Rated | Max | | | | |
| | Gas | Liquid | | | Single | Total | IDU and ODU | |
| M2OH-14HFN8-Q | 2x9.52 | 2x6.35 | 15 | 25 | 40 | 15 | 10 | 12g/m |
| M2OE-18HFN8-Q | | | | | | | | |



| Model | Pipe Size (Diameter:ø) | | Piping length (m) | | | Elevation (m) | | Additional Refrigerant |
|---------------|---------------------------|--------|-------------------|-----|--------|---------------|----------------|---------------------------|
| | | | Rated | Max | | | | |
| | Gas | Liquid | | | Single | Total | IDU and ODU | |
| M3OF-21HFN8-Q | 3x9.52 | 3x6.35 | 22.5 | 30 | 60 | 15 | 10 | 12g/m |
| M3OE-27HFN8-Q | | | | | | | | |
| M3OF-27HFN8-Q | | | | | | | | |



| Model | Pipe Size (Diameter:ø) | | Piping length (m) | | | Elevation (m) | | Additional Refrigerant |
|---------------|------------------------|--------|-------------------|--------|-------|---------------|--------------|------------------------|
| | | | Rated | Max | | | | |
| | Gas | Liquid | | Single | Total | IDU and ODU | Between IDUs | |
| M4OE-28HFN8-Q | 3x9.52+1x12.7 | 4x6.35 | 30 | 35 | 80 | 15 | 10 | 12g/m |
| M4OB-36HFN8-Q | 3x9.52+1x12.7 | 4x6.35 | 30 | 35 | 80 | 15 | 10 | 12g/m |

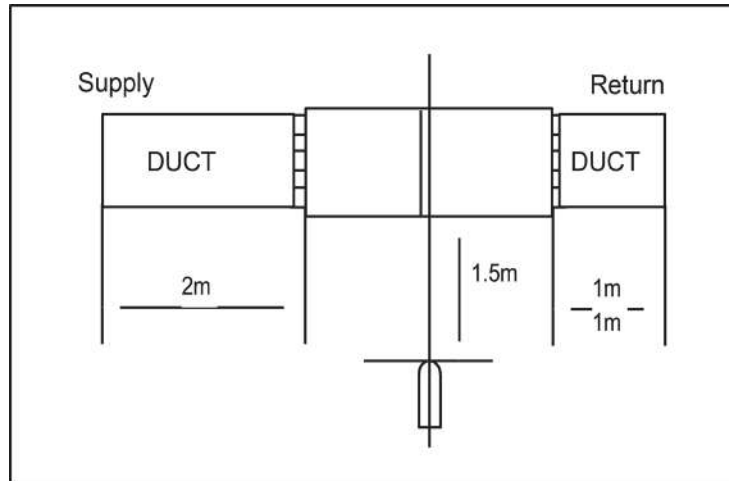


| Model | Pipe Size (Diameter:ø) | | Piping length (m) | | | Elevation (m) | | Additional Refrigerant |
|---------------|------------------------|--------|-------------------|--------|-------|---------------|--------------|------------------------|
| | | | Rated | Max | | | | |
| | Gas | Liquid | | Single | Total | IDU and ODU | Between IDUs | |
| M5OD-42HFN8-Q | 4x9.52+1x12.7 | 5x6.35 | 37.5 | 35 | 80 | 15 | 10 | 12g/m |
| M5OE-42HFN8-Q | 4x9.52+1x12.7 | 5x6.35 | 37.5 | 35 | 80 | 15 | 10 | 12g/m |

9. Noise Criterion Curves

10.1 Indoor Unit

A6 Duct type



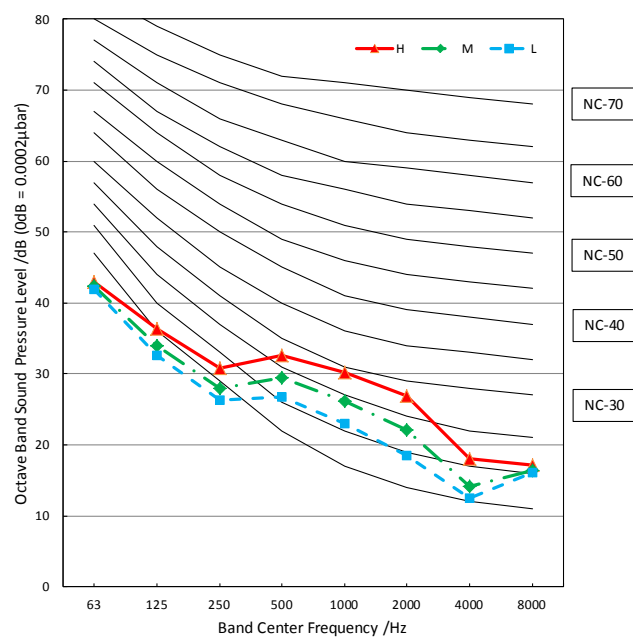
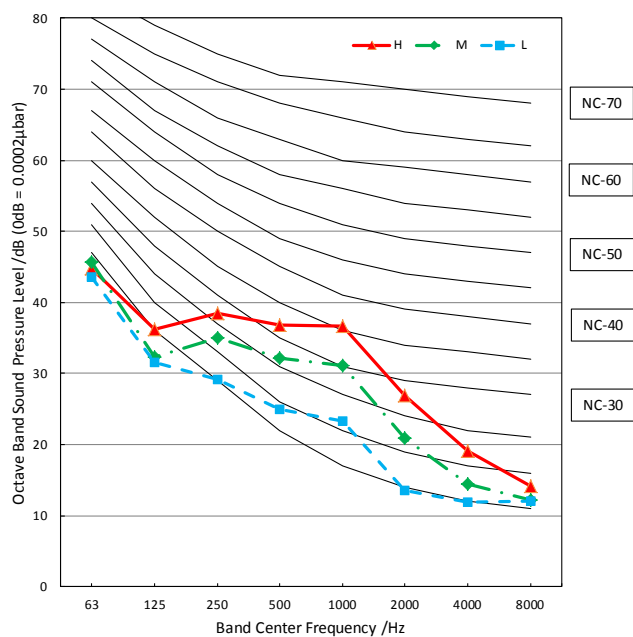
Notes:

- Sound measured at 1.5m away from the center of the unit.
- Data is valid at free field condition
- Data is valid at nominal operation condition
- Reference acoustic pressure $OdB = 20\mu Pa$
- Sound level will vary depending on a range of factors such as the construction -(acoustic absorption coefficient) of particular room in which the equipment is installed.
- The operating conditions are assumed to be standard.

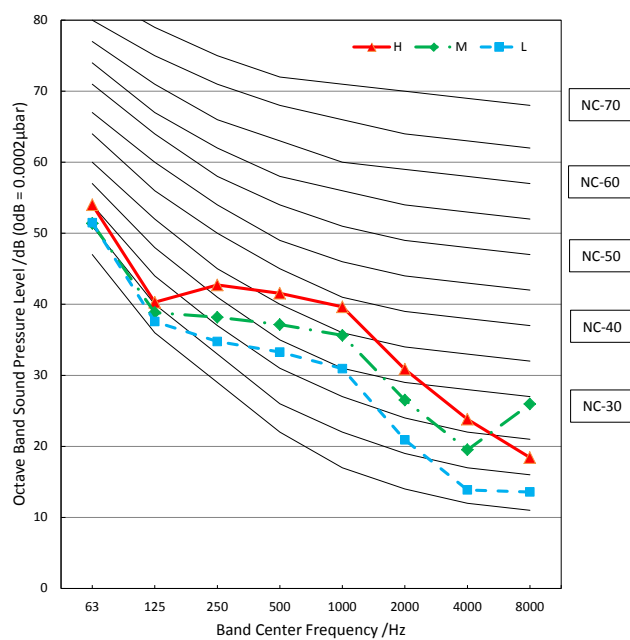
MTIU-07HWFNX-QRD0W/MTIU-07HWFNX-QRD0W(GA)

MTIU-09HWFNX-QRD0W/MTIU-09HWFNX-QRD0W(GA)

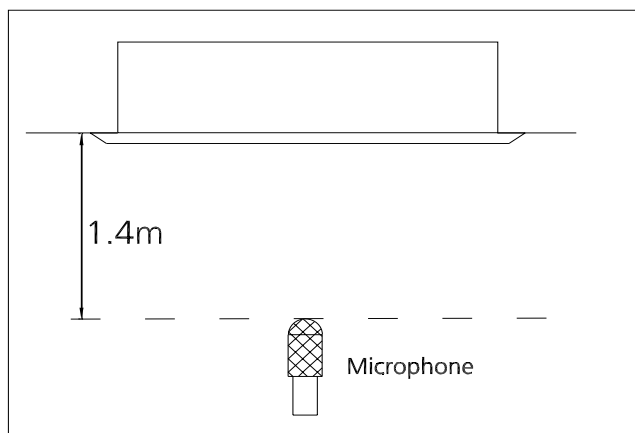
MTIU-12HWFNX-QRD0W



MTIU-18HWFNX-QRD0W



Compact Cassette type



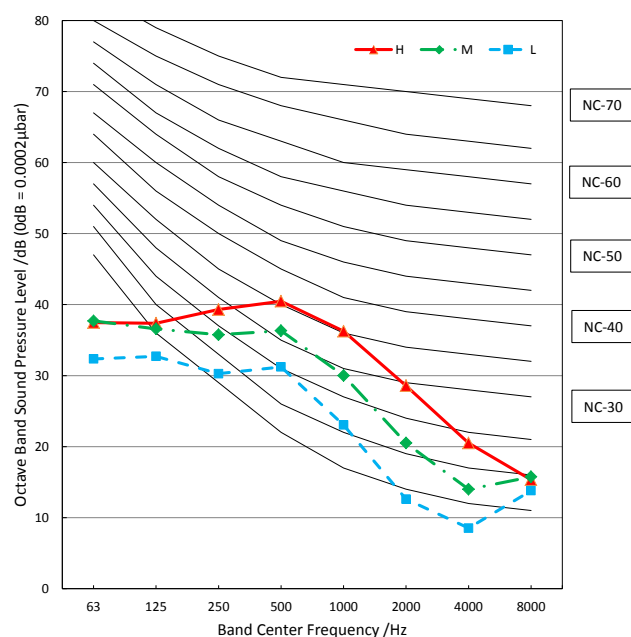
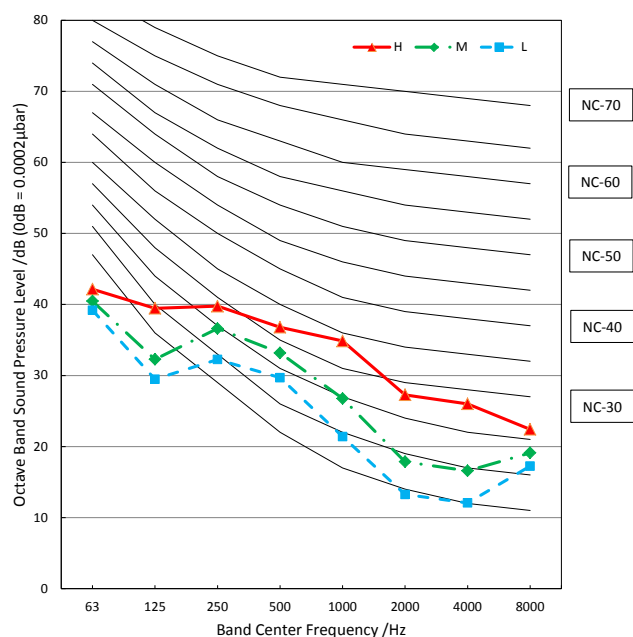
Notes:

- Sound measured at 1.4m away from the noisiest location of the unit.
- Data is valid at free field condition
- Data is valid at nominal operation condition
- Reference acoustic pressure $OdB = 20\mu Pa$
- Sound level will vary depending on a range of factors such as the construction -(acoustic absorption coefficient) of particular room in which the equipment is installed.
- The operating conditions are assumed to be standard.

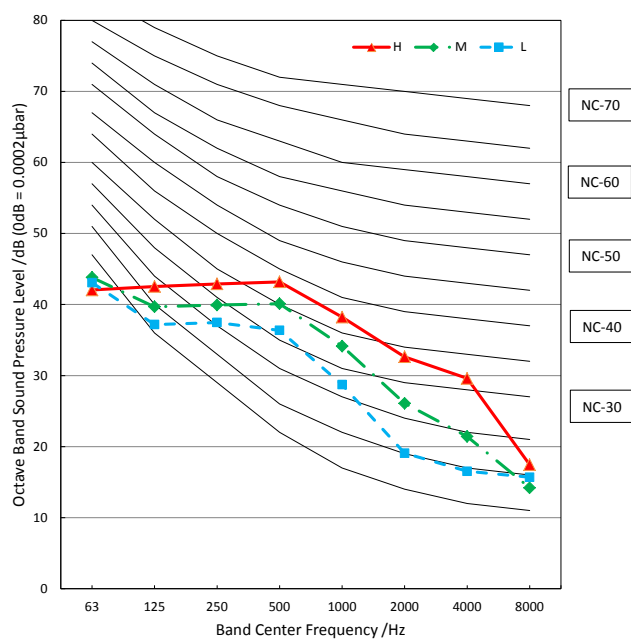
MCA3I-07HRFNX-QRD0/MCA3U-07HRFNX-QRD0W(GA)

MCA3I-09HRFN8-QRD0/MCA3U-09HRFNX-QRD0W(GA)

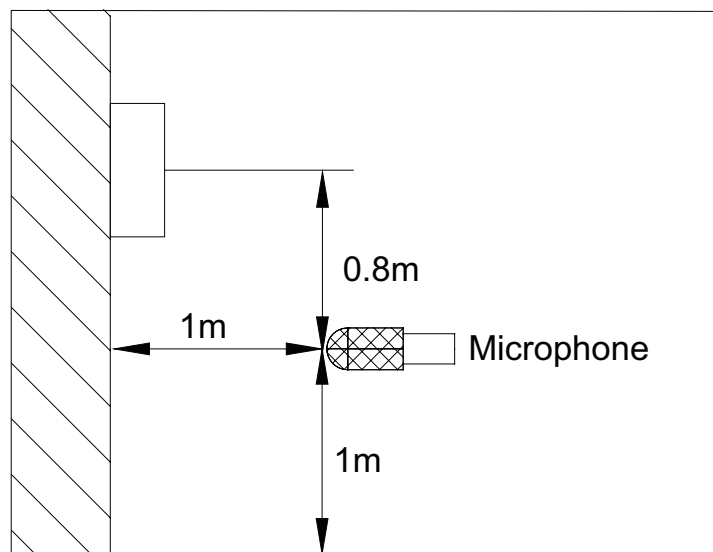
MCA3U-12HRFNX-QRD0W



MCA3U-18HRFNX-QRD0W



Wall mounted type

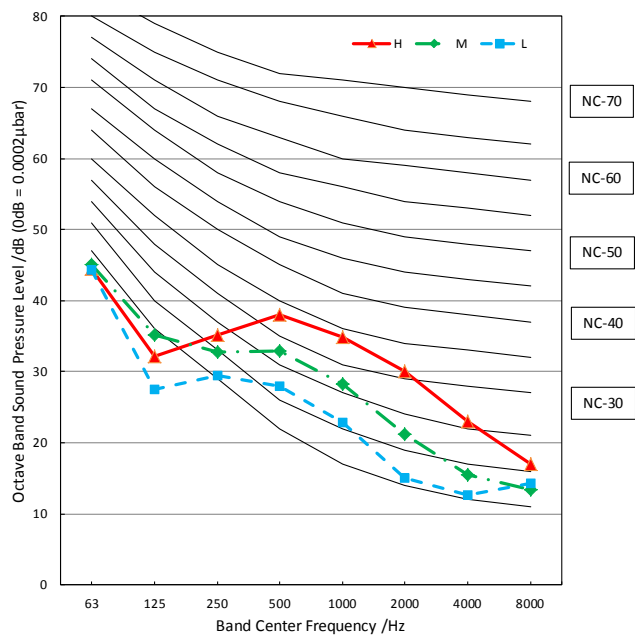


Notes:

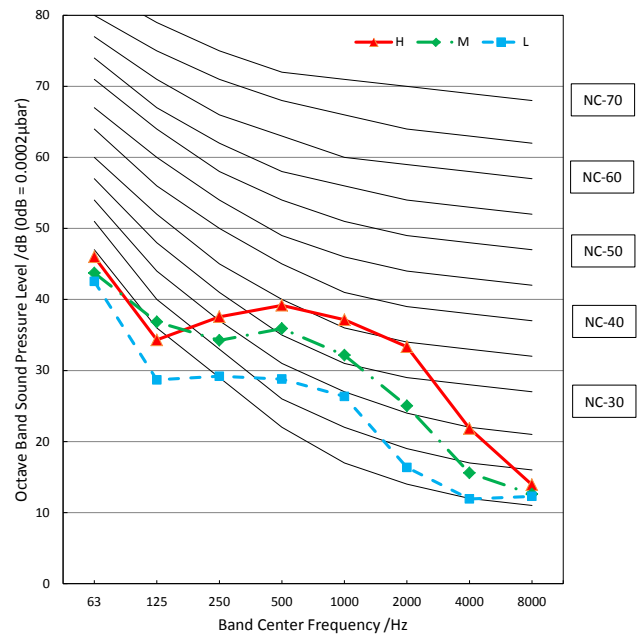
- Sound measured at 1.0m away from the center of the unit.
- Data is valid at free field condition
- Data is valid at nominal operation condition
- Reference acoustic pressure $OdB = 20\mu Pa$
- Sound level will vary depending on a range of factors such as the construction -(acoustic absorption coefficient) of particular room in which the equipment is installed.
- The operating conditions are assumed to be standard.

MSAFBU-07HRDNX-QRD0GW

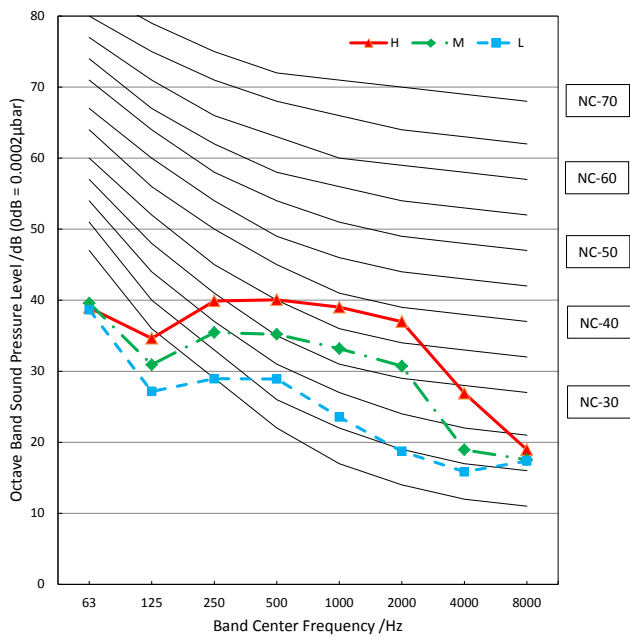
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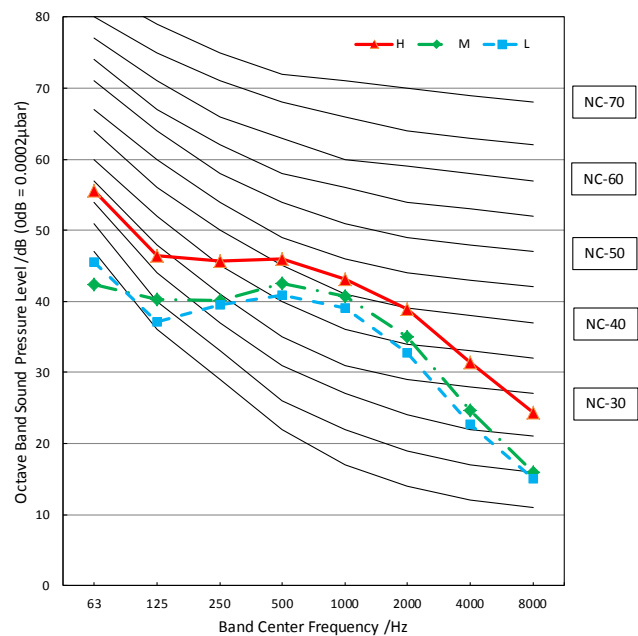
MSAFBU-12HRDN8-QRD0GW



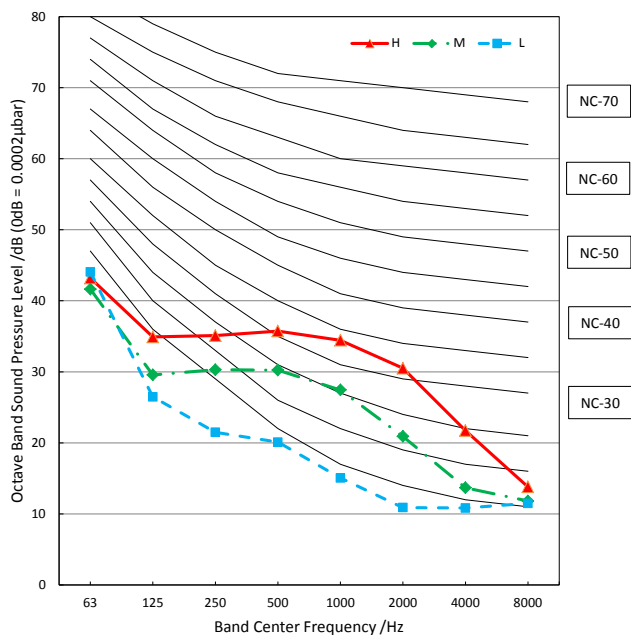
MSAFBU-18HRFN8-QRD0GW



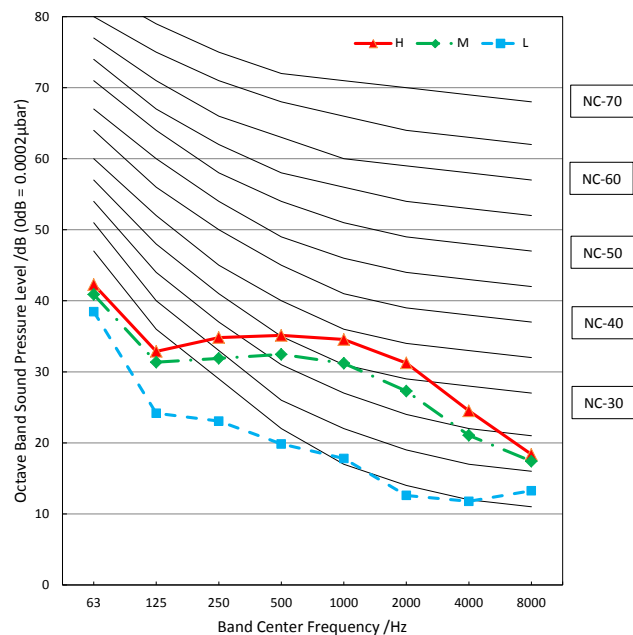
MSAFDU-24HRFNX-QRD0GW



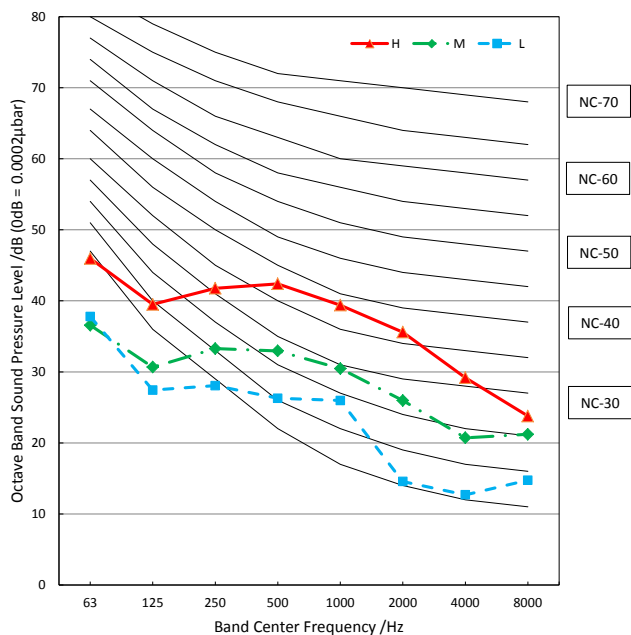
MSABAU-09HFRN8-QRD0GW



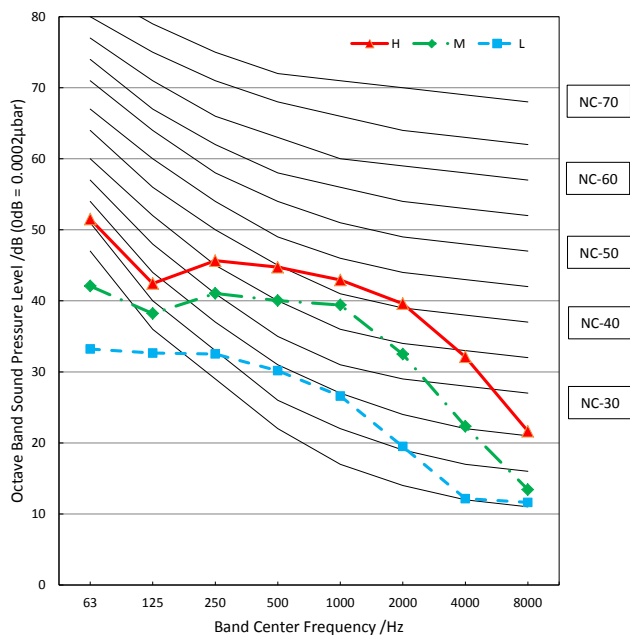
MSABBU-12HFRN8-QRD0GW



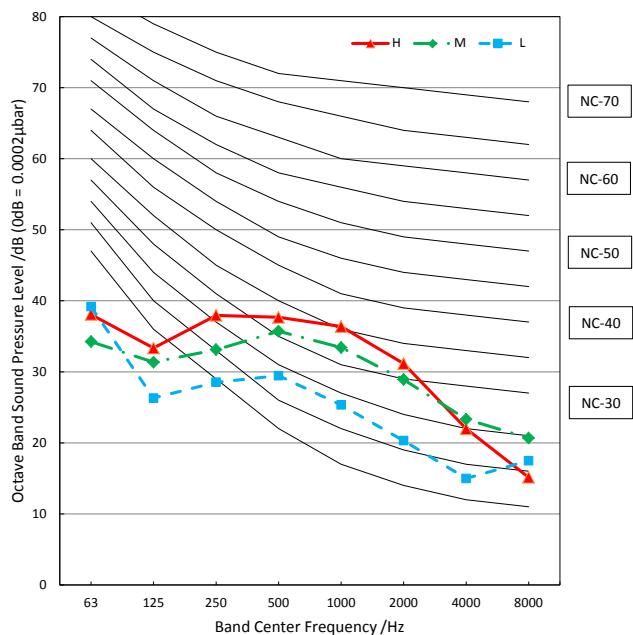
MSABDU-18HFRN8-QRD0GW



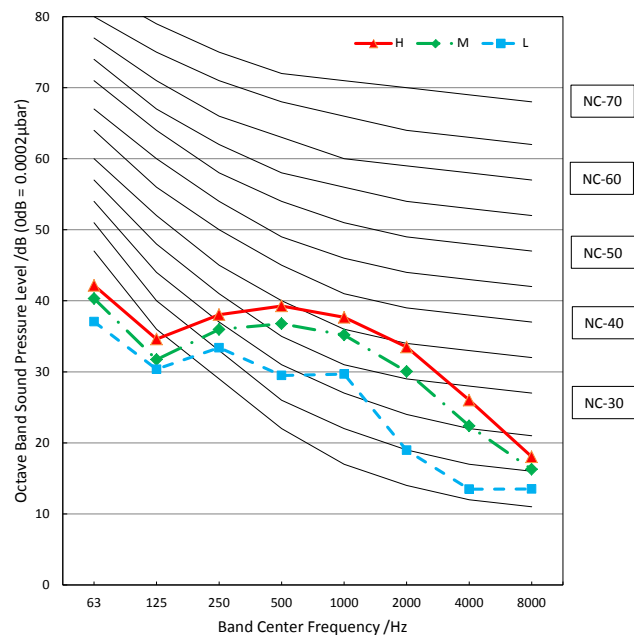
MSABEU-24HFRN8-QRD0GW



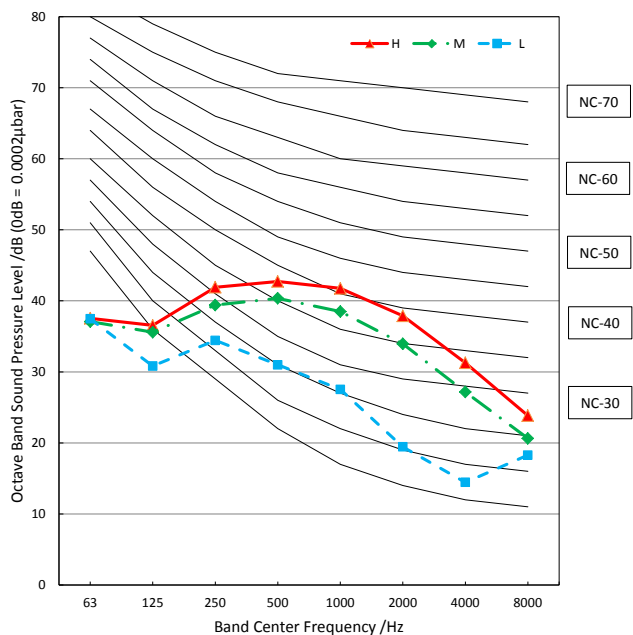
MSAEBU-09HRFN8-QRD6GW



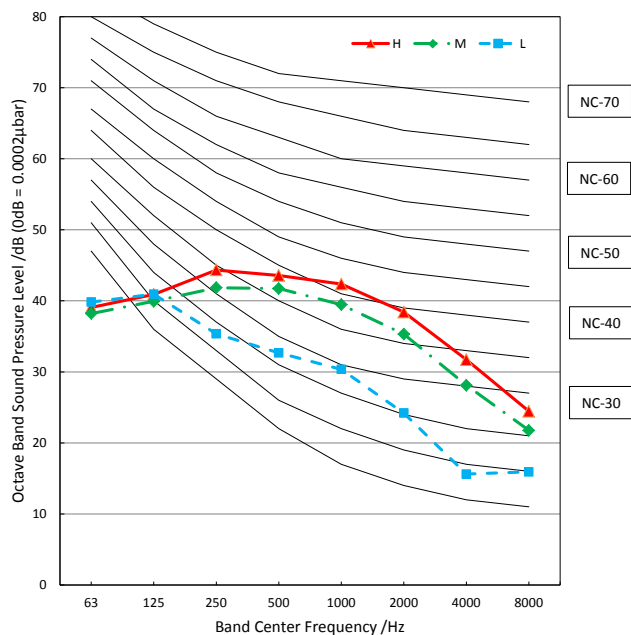
MSAEBU-12HRFN8-QRD0GW



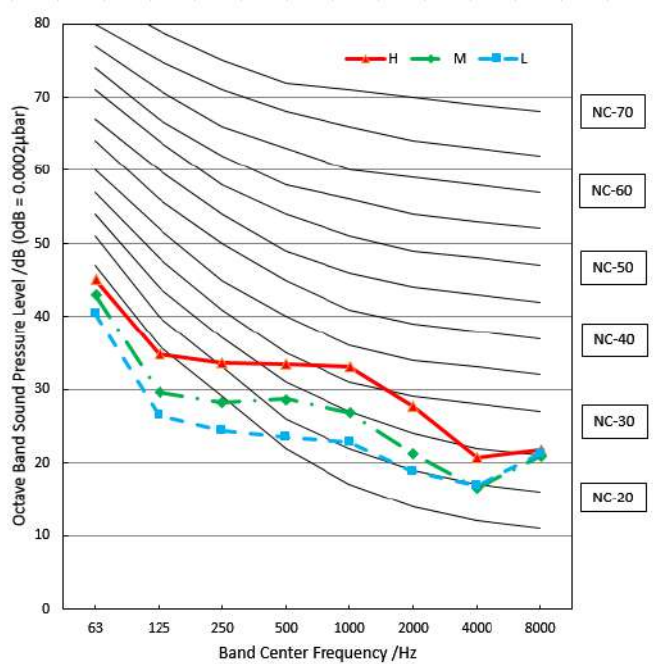
MSAECU-18HRFN8-QRD0GW



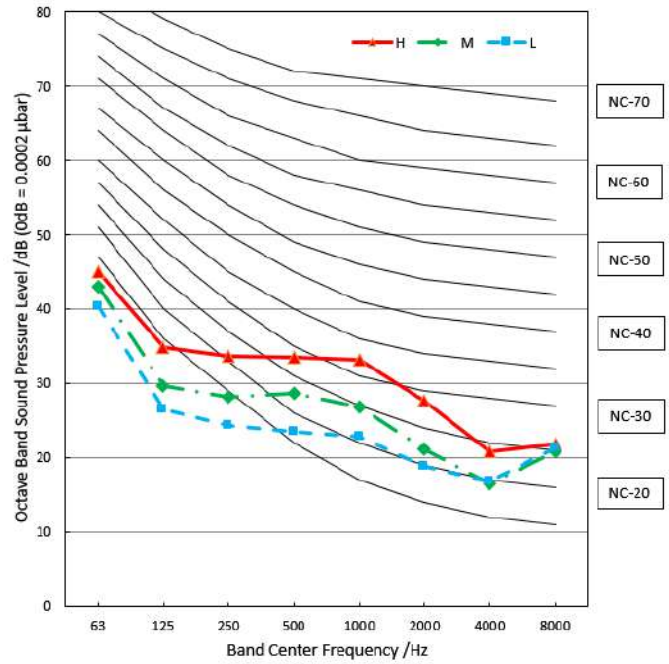
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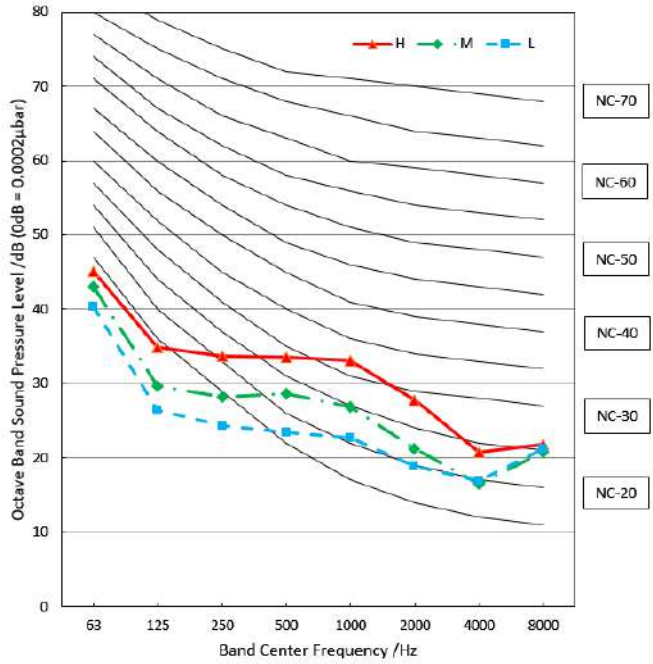
MSAGAU-09HRFNX-QRD0GW



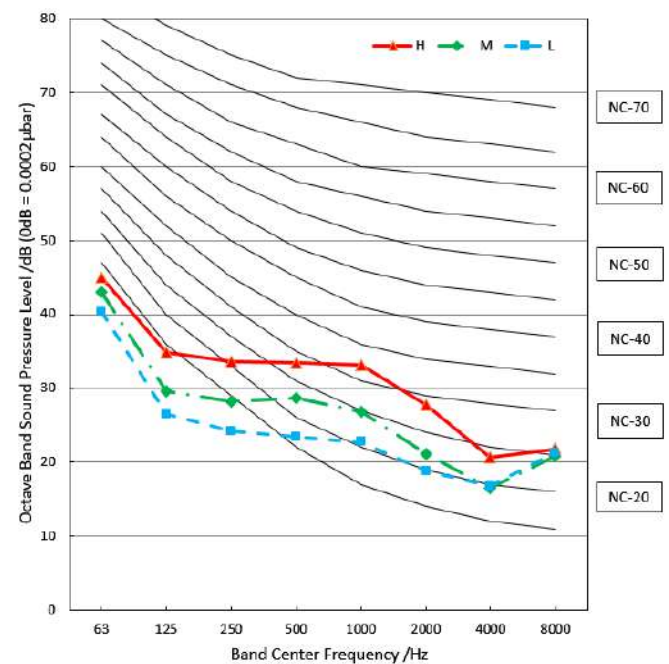
MSAGBU-09HRFN8-QRD1GW(GA)



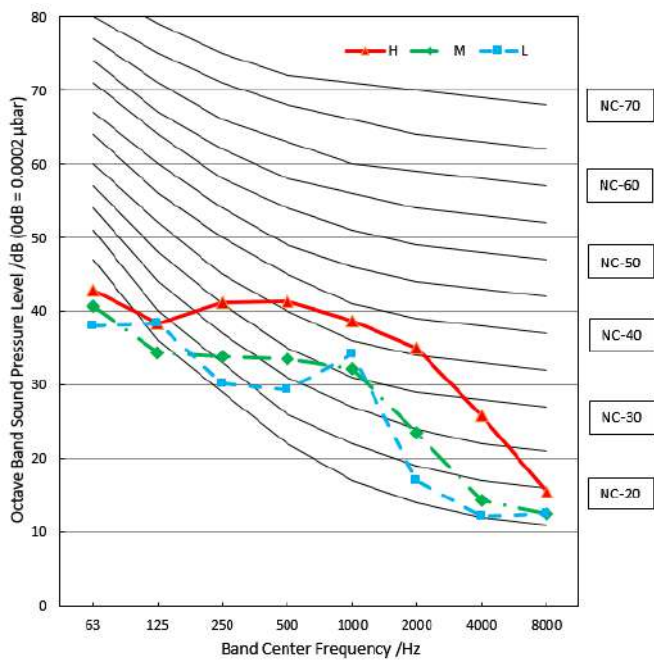
MSAGBU-12HRFN8-QRD1GW(GA)



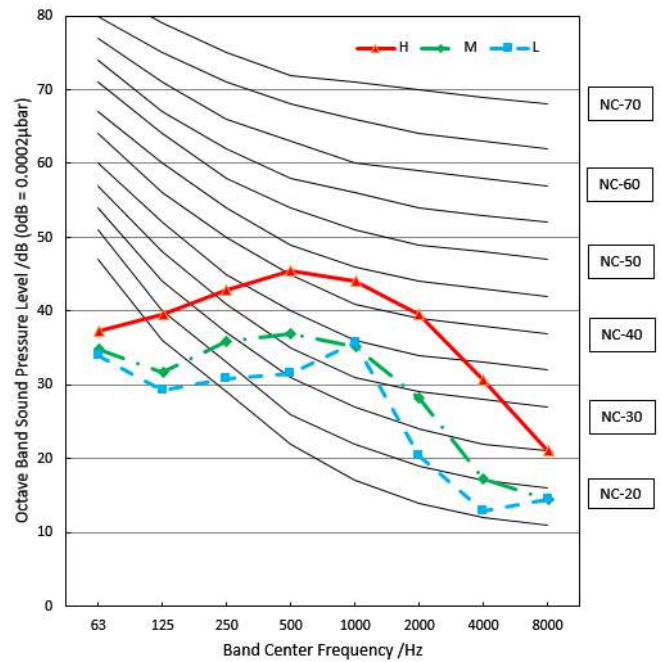
MSAGBU-12HRFNX-QRD0GW



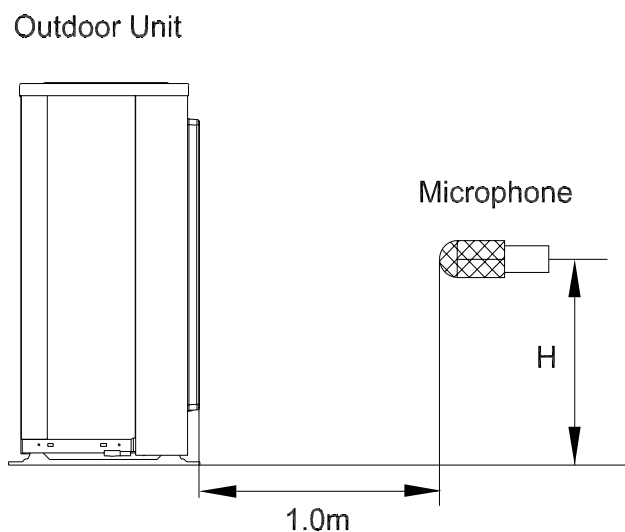
MSAGCU-18HRFNX-QRD0GW



MSAGDU-24HRFN8-QRD0GW



9.2 Outdoor Unit

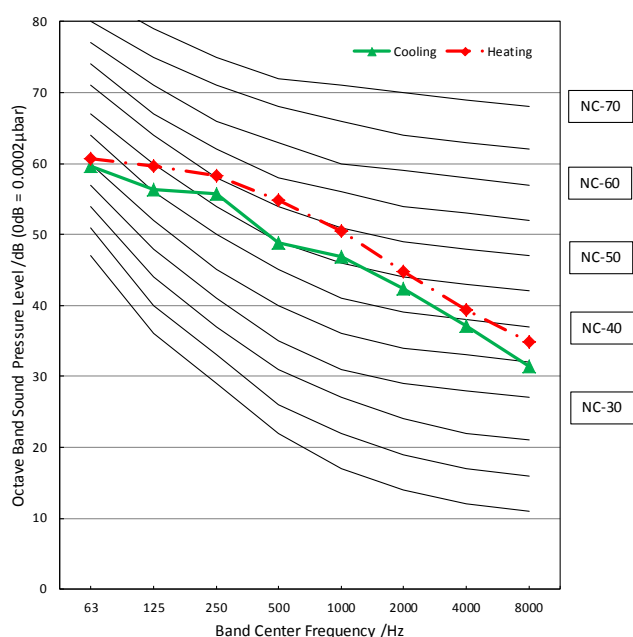


Note: $H = 0.5 \times \text{height of outdoor unit}$

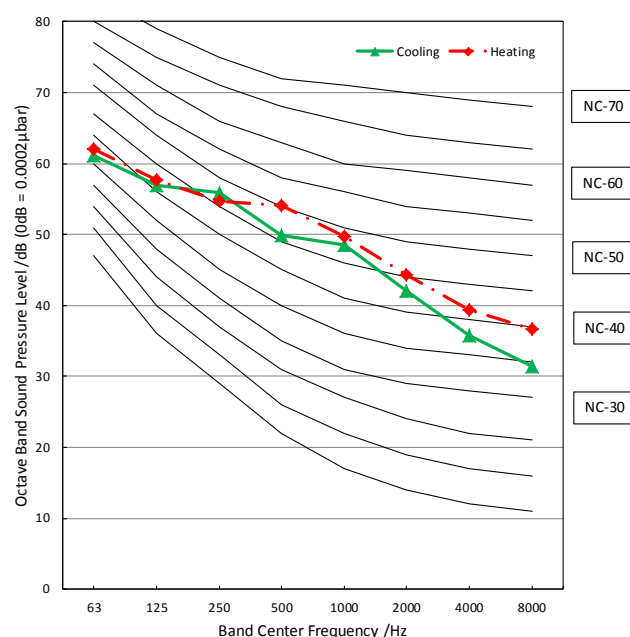
Notes:

- Sound measured at 1.0m away from the center of the unit.
- Data is valid at free field condition
- Data is valid at nominal operation condition
- Reference acoustic pressure $OdB=20\mu Pa$
- Sound level will vary depending on arrangement of factors such as the construction (acoustic absorption coefficient) of particular room in which the equipment is installed.
- The operating conditions are assumed to be standard.

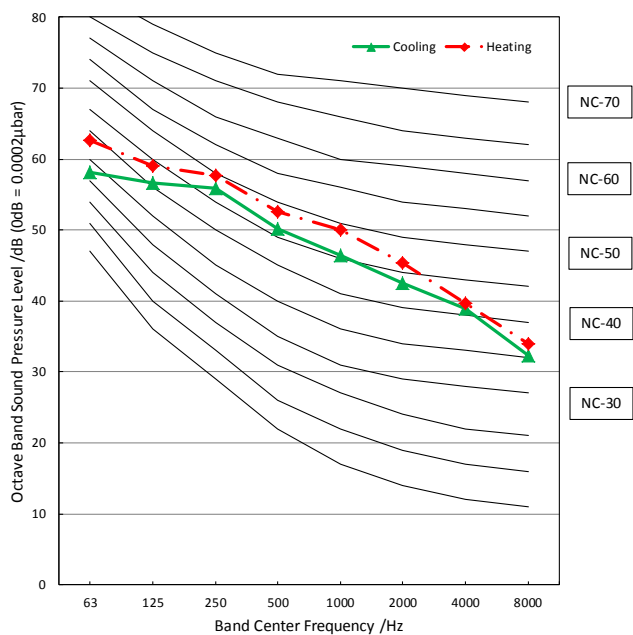
M2OG-14HFN8-Q



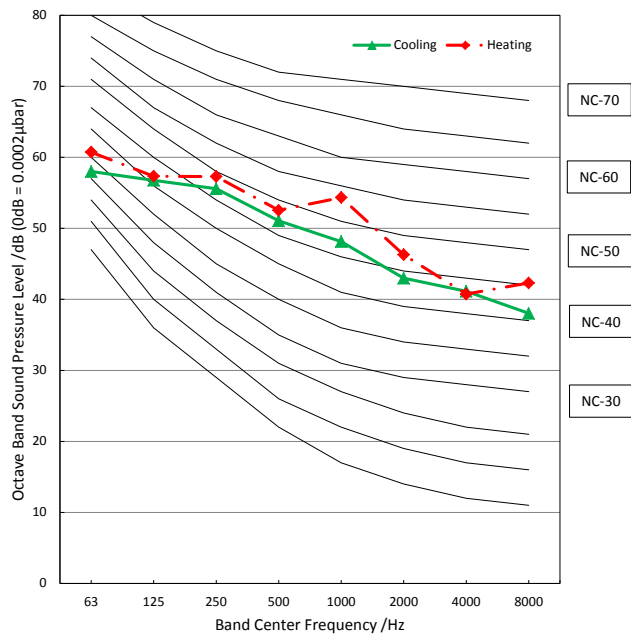
M2OC-18HFN8-Q



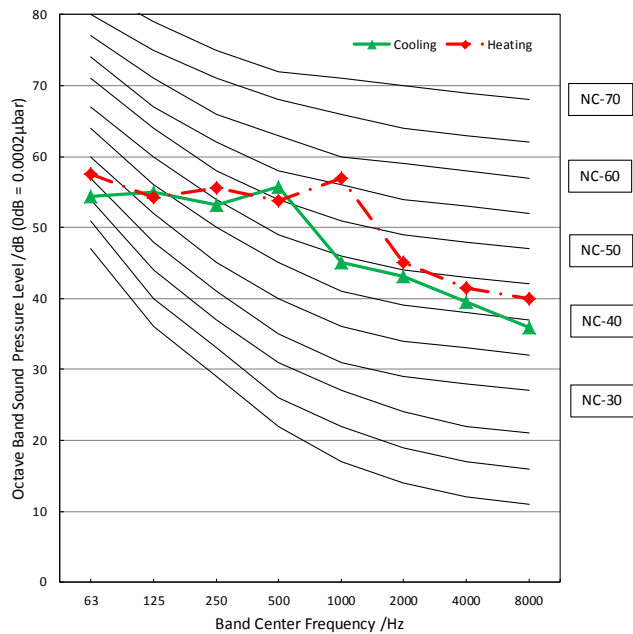
M2OD-18HFN8-Q



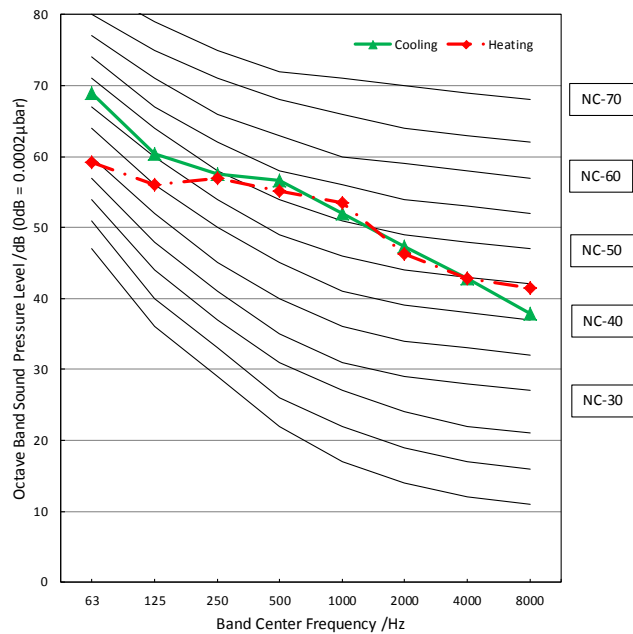
M3OF-27HFN8-Q



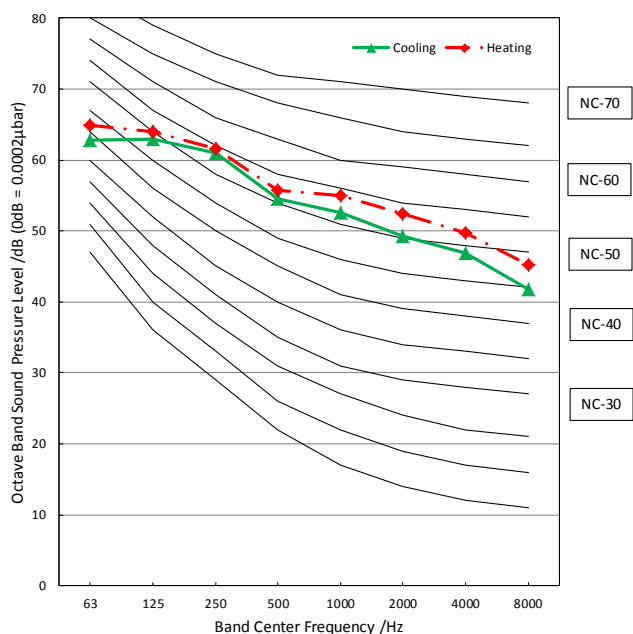
M3OF-21HFN8-Q



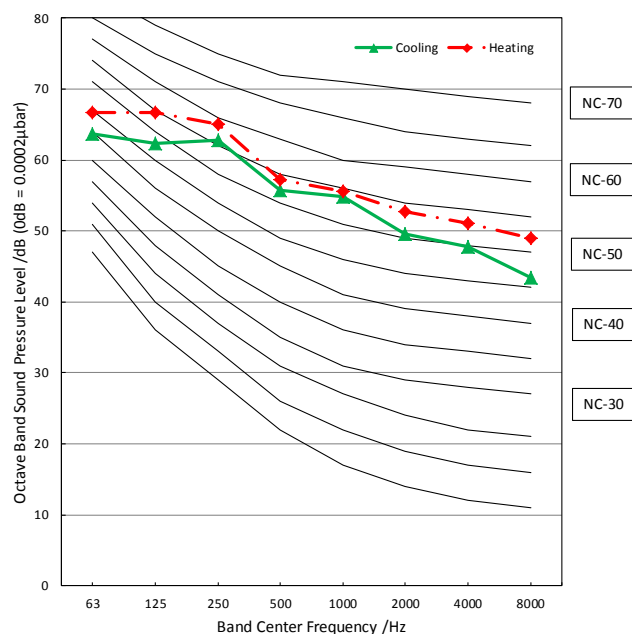
M3OE-27HFN8-Q



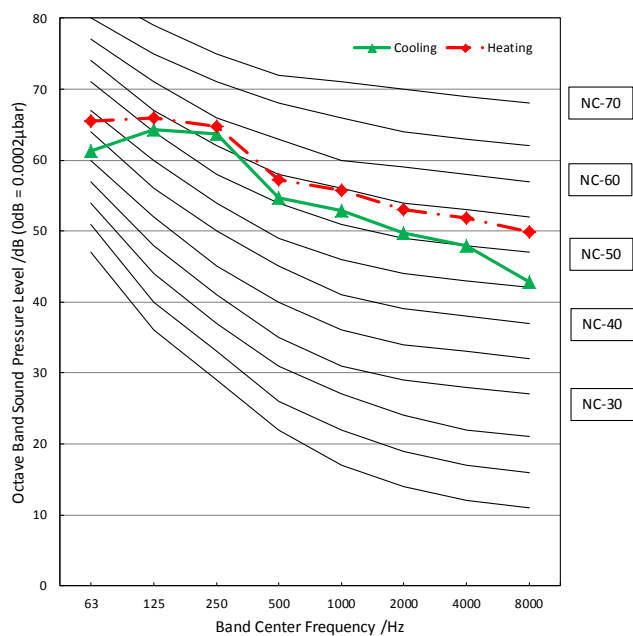
M4OE-28HFN8-Q



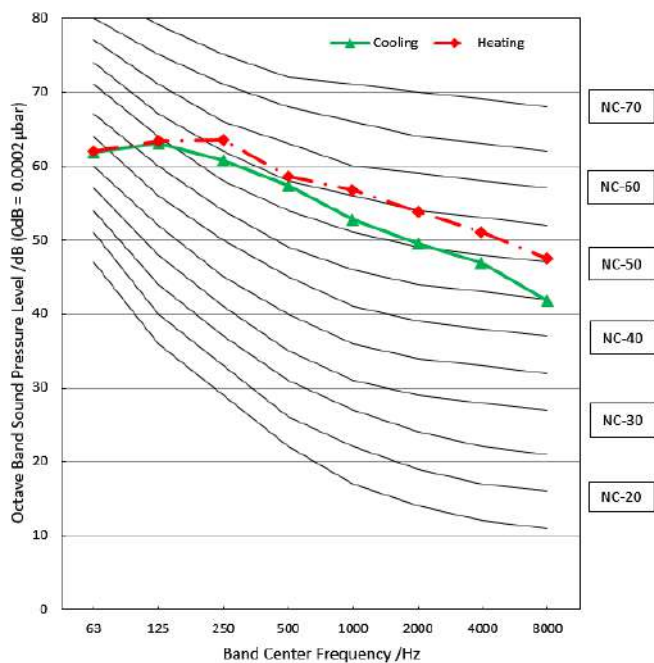
M4OB-36HFN8-Q



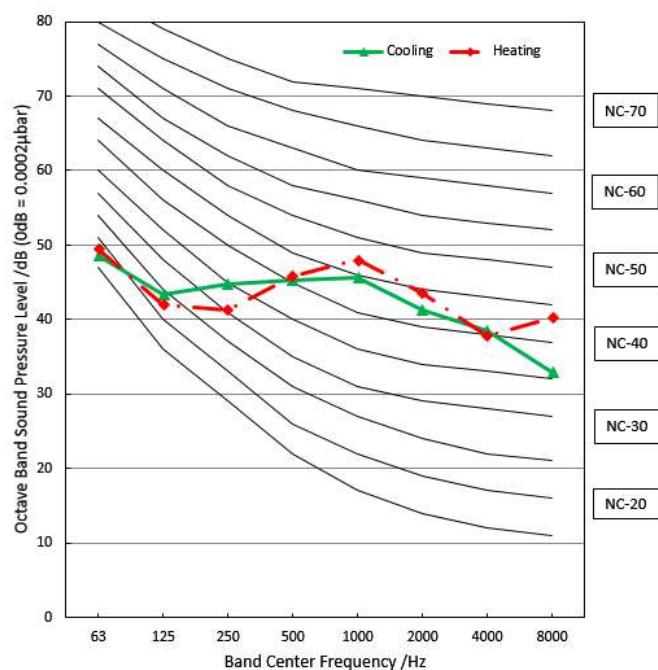
M5OD-42HFN8-Q



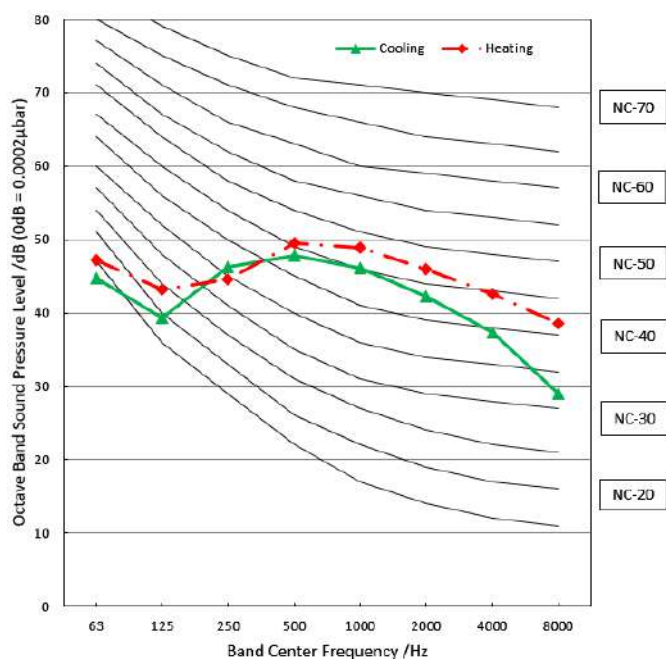
M5OE-42HFN8-Q



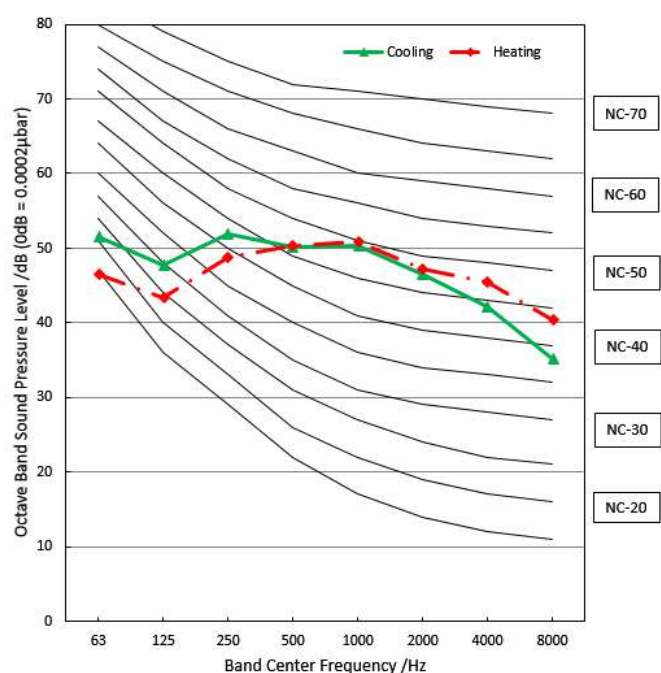
M2OH-14HFN8-Q



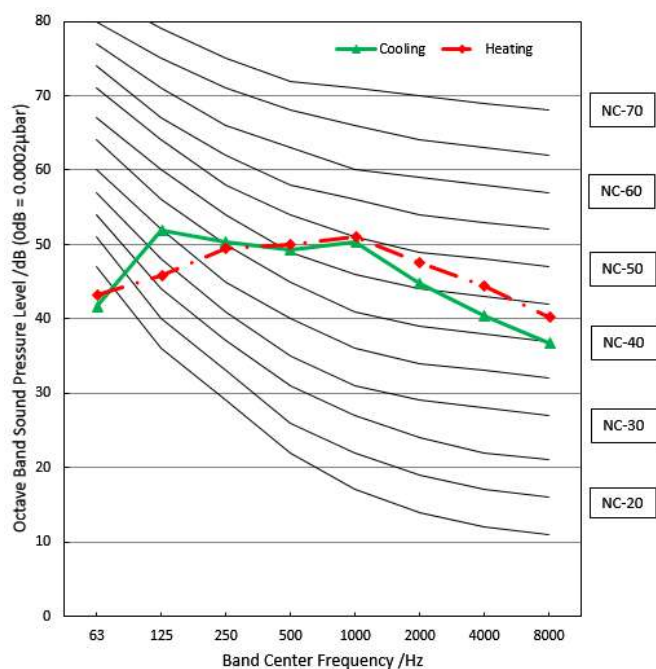
M2OE-18HFN8-Q



M3OG-21HFN8-Q



M3OA-27HFN8-Q



10. Electrical Characteristics

| Model | Indoor Unit | | | Power Supply | | | IFM | |
|---------------------------|-------------|----|---------|--------------|-----|-----|-------|-------|
| | Phase | Hz | Voltage | MCA | MOP | MFA | kW | FLA |
| MTIU-07HWFNX-QRD0W | 1 | 50 | 220-240 | / | / | / | 0.055 | 1.11 |
| MTIU-07HWFNX-QRD0W(GA) | | | | / | / | / | 0.055 | 1.11 |
| MTIU-09HWFNX-QRD0W(GA) | | | | / | / | / | 0.055 | 1.11 |
| MTIU-09HWFNX-QRD0W | | | | / | / | / | 0.055 | 1.11 |
| MTIU-12HWFNX-QRD0W | | | | / | / | / | 0.055 | 1.11 |
| MTIU-18HWFNX-QRD0W | | | | / | / | / | 0.16 | 1.48 |
| MCA3I-07HRFNX-QRDO | | | | / | / | / | 0.046 | 0.146 |
| MCA3U-07HRFNX-QRD0W(GA) | | | | / | / | / | 0.046 | 0.146 |
| MCA3U-09HRFNX-QRD0W(GA) | | | | / | / | / | 0.046 | 0.146 |
| MCA3I-09HRFN8-QRDO | | | | / | / | / | 0.046 | 0.146 |
| MCA3U-12HRFNX-QRD0W | | | | / | / | / | 0.046 | 0.146 |
| MCA3U-18HRFNX-QRD0W | | | | / | / | / | 0.046 | 0.146 |
| MSAFBU-07HRDNX-QRD0GW | | | | / | / | / | 0.013 | 0.17 |
| MSAFBU-09HRDN8-QRD0GW | | | | / | / | / | 0.013 | 0.17 |
| MSAFBU-12HRDN8-QRD0GW | | | | / | / | / | 0.013 | 0.17 |
| MSAFBU-18HRFN8-QRD0GW | | | | / | / | / | 0.03 | 0.148 |
| MSAFDU-24HRFNX-QRD0GW | | | | / | / | / | 0.058 | 0.4 |
| MSABAU-09HRFN8-QRD0GW | | | | / | / | / | 0.02 | 0.16 |
| MSABBU-12HRFN8-QRD0GW | | | | / | / | / | 0.02 | 0.16 |
| MSABDU-18HRFN8-QRD0GW | | | | / | / | / | 0.03 | 0.275 |
| MSABEU-24HRFN8-QRD0GW | | | | / | / | / | 0.058 | 0.4 |
| MSAEBU-09HRFN8-QRD6GW | | | | / | / | / | 0.02 | 0.16 |
| MSAEBU-12HRFN8-QRD0GW | | | | / | / | / | 0.02 | 0.16 |
| MSAECU-18HRFN8-QRD0GW | | | | / | / | / | 0.03 | 0.27 |
| MSAEDU-24HRFN8-QRD0GW | | | | / | / | / | 0.058 | 0.4 |
| MSAGAU-09HRFNX-QRD0GW | | | | / | / | / | 0.02 | 0.16 |
| MSAGBU-09HRFN8-QRD1GW(GA) | | | | / | / | / | 0.013 | 0.047 |
| MSAGBU-12HRFNX-QRD0GW | | | | / | / | / | 0.013 | 0.047 |
| MSAGBU-12HRFN8-QRD1GW(GA) | | | | / | / | / | 0.013 | 0.047 |
| MSAGCU-18HRFNX-QRD0GW | | | | / | / | / | 0.03 | 0.275 |
| MSAGDU-24HRFN8-QRD0GW | | | | / | / | / | 0.058 | 0.4 |

| Model | Outdoor Unit | | | Power Supply | | Compressor | | OFM | | |
|---------------|--------------|----|---------|--------------|-----|------------|------|-----|-------|------|
| | Phase | Hz | Voltage | MCA | MFA | MSC | RLA | Qty | kW | FLA |
| M2OG-14HFN8-Q | 1 | 50 | 220-240 | 11.5 | 20 | - | 7.5 | 1 | 0.034 | 0.39 |
| M2OC-18HFN8-Q | | | | 12 | 20 | - | 7.1 | 1 | 0.04 | 0.7 |
| M2OD-18HFN8-Q | | | | 13 | 20 | - | 7.5 | 1 | 0.058 | 0.39 |
| M3OF-21HFN8-Q | | | | 15.5 | 20 | - | 7.5 | 1 | 0.05 | 0.55 |
| M3OE-27HFN8-Q | | | | 15 | 30 | - | 9.4 | 1 | 0.05 | 0.55 |
| M3OF-27HFN8-Q | | | | 17.5 | 22 | - | 9.45 | 1 | 0.05 | 0.55 |
| M4OE-28HFN8-Q | | | | 19 | 30 | - | 9.45 | 1 | 0.12 | 1.21 |
| M4OB-36HFN8-Q | | | | 21.5 | 30 | - | 5.38 | 1 | 0.12 | 1.39 |
| M5OD-42HFN8-Q | | | | 22 | 30 | - | 5.38 | 1 | 0.12 | 1.39 |
| M5OE-42HFN8-Q | | | | 22 | 30 | - | 5.38 | 1 | 0.12 | 1.39 |
| M2OH-14HFN8-Q | | | | 12 | 20 | - | 7.15 | 1 | 0.034 | 0.89 |
| M2OE-18HFN8-Q | | | | 13 | 20 | - | 7.15 | 1 | 0.034 | 0.89 |
| M3OG-21HFN8-Q | | | | 17 | 20 | - | 7.15 | 1 | 0.08 | 0.88 |
| M3OA-27HFN8-Q | | | | 18 | 30 | - | 9.45 | 1 | 0.08 | 0.88 |

Notes:

MCA: Minimum Circuit Amperes (A)

MFA: Maximum Fuse Amperes (A)

MSC: Maximum Starting Current

RLA: Rated Load Amperes (A)

IFM: Indoor Fan Motor

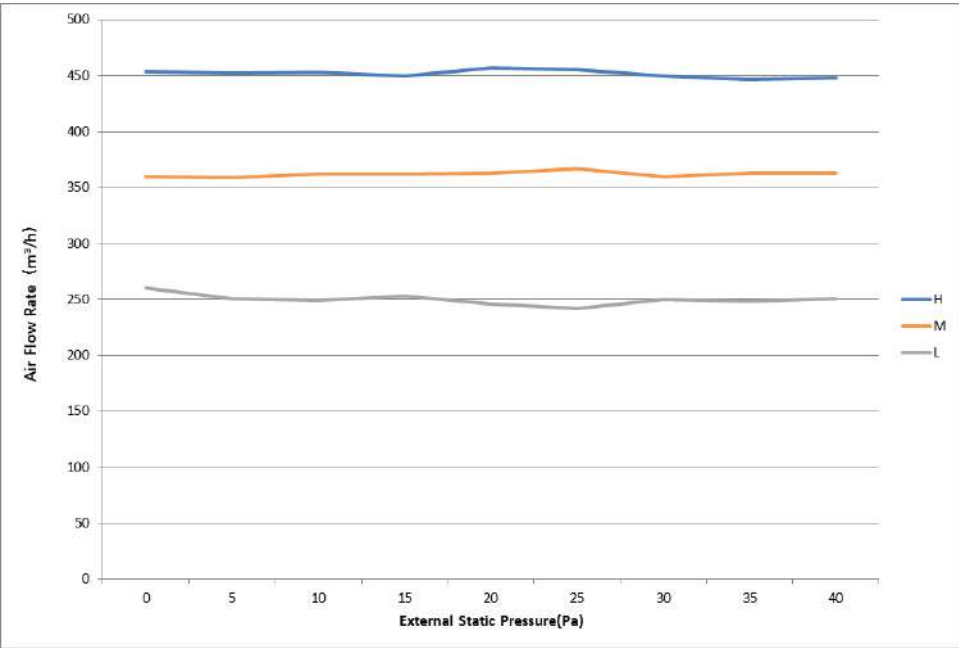
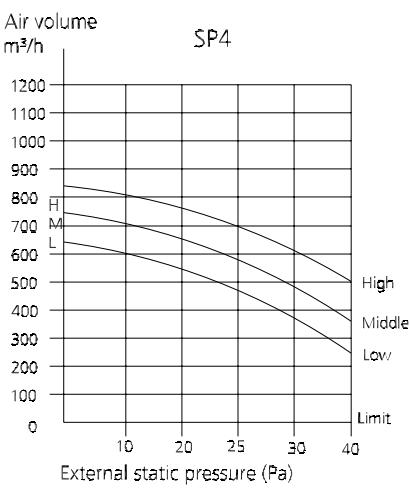
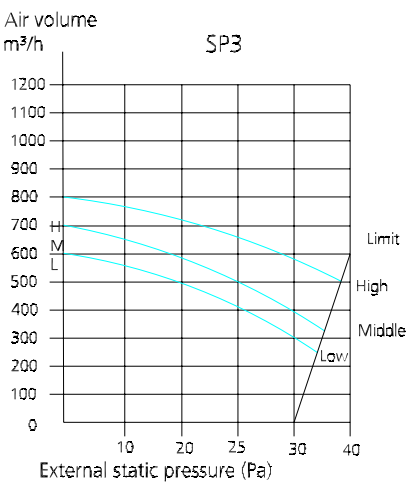
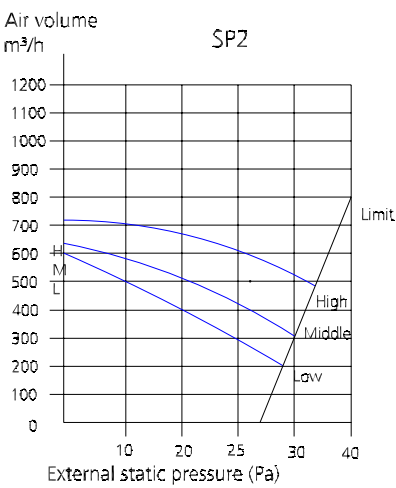
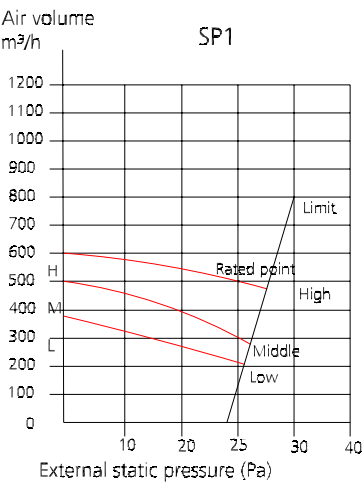
OFM: Outdoor Fan Motor

FLA: Full Load Amperes (A)

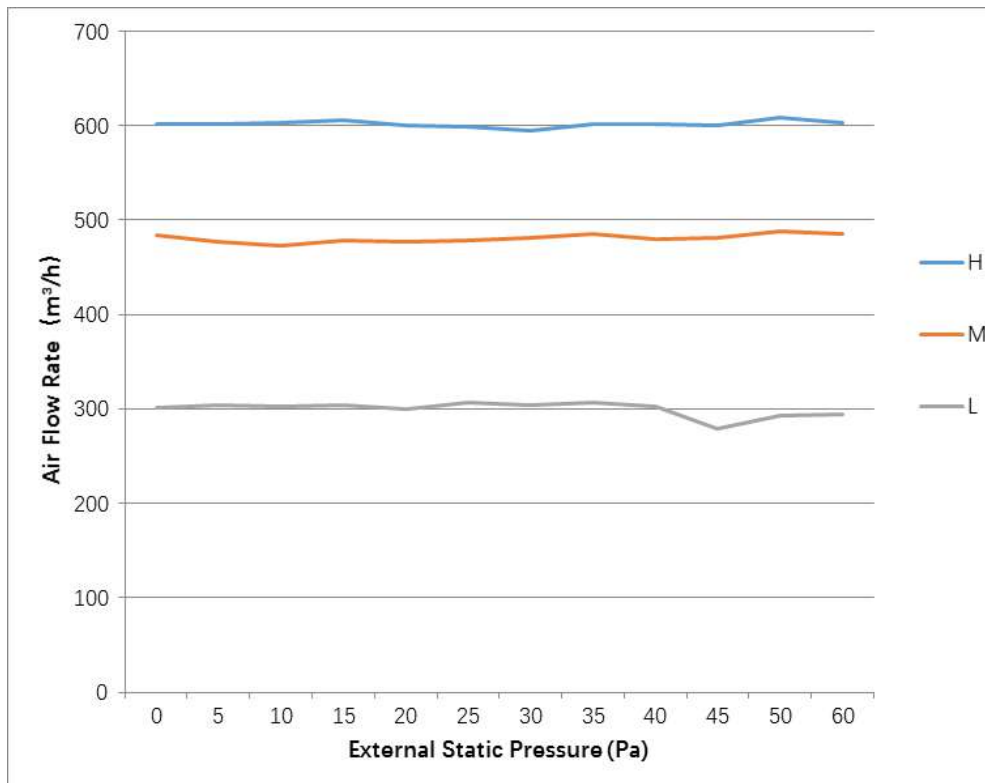
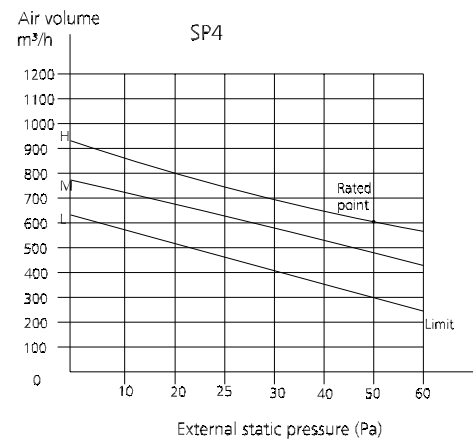
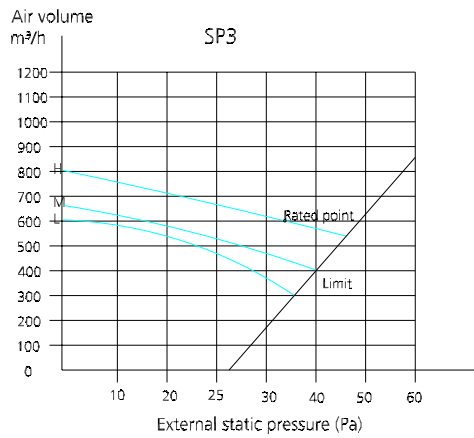
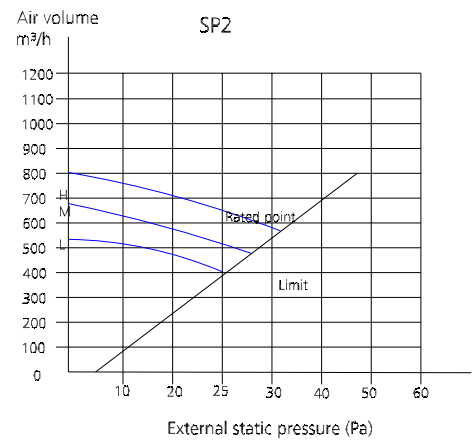
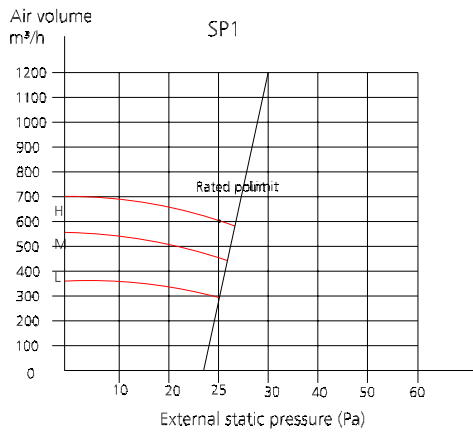
kW: Fan motor rated output(kW)

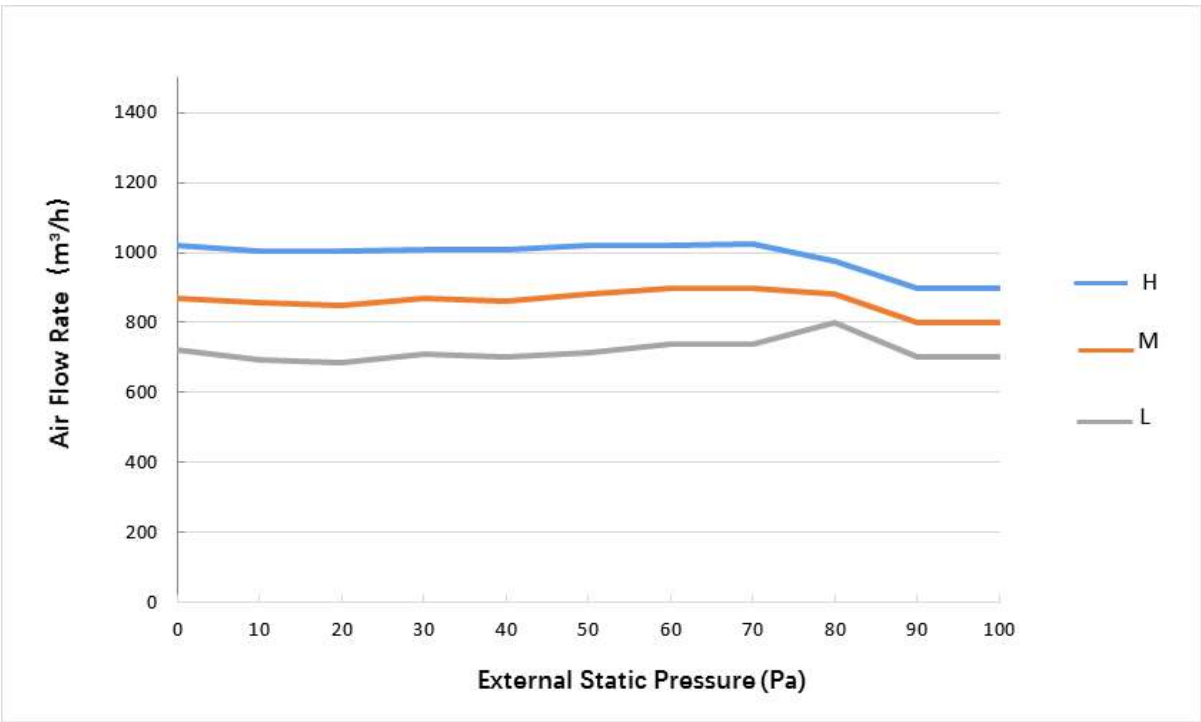
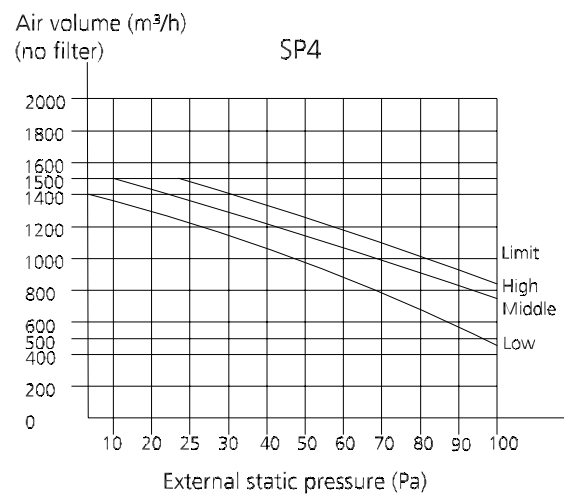
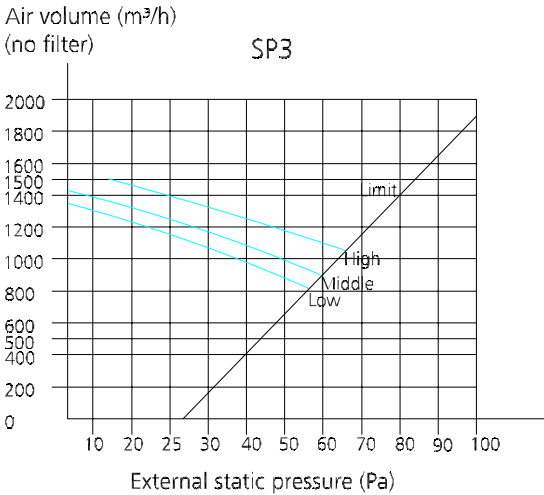
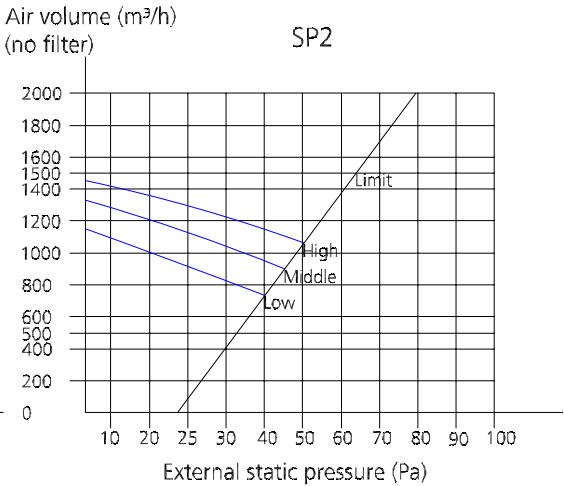
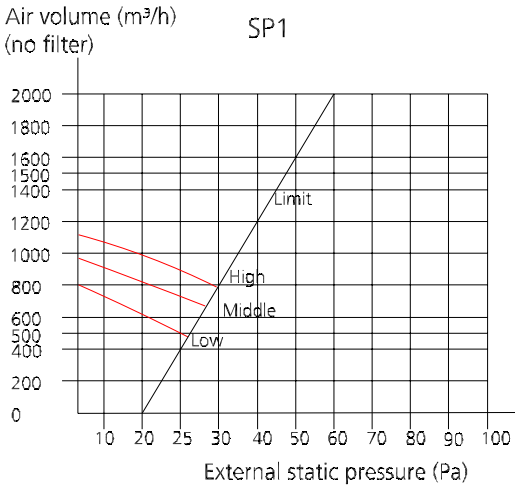
11. Static Pressure

7K/9K



12K





Product Features

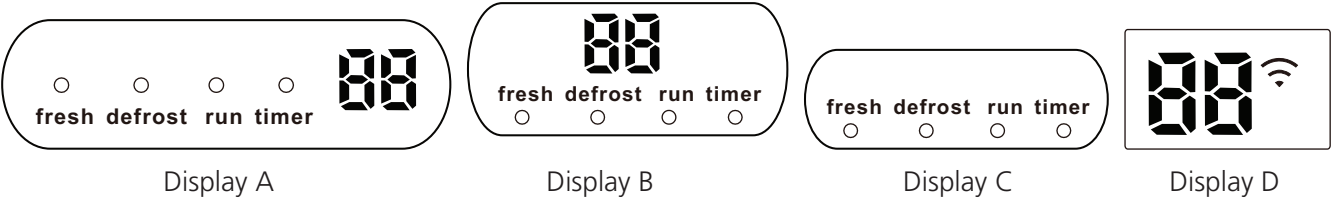
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1. Display Function

Unit display functions

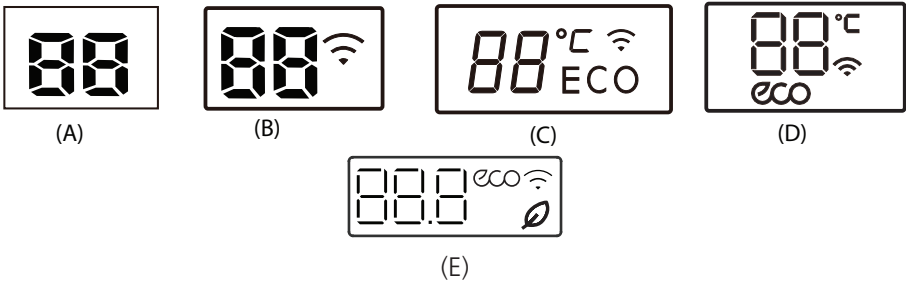
Wall mounted type-Foreset:



| Display | | Function |
|------------|---|---|
| fresh or | | Fresh(available on select units only) |
| defrost or | | Defrost |
| run or | | When the unit is on |
| timer or | | When TIMER is on |
| | | WiFi control (available on select units only) |
| | Temperature value | Temperature |
| | (3s) | Activation of Timer ON, Fresh, Swing, Turbo, or Silent |
| | (3s) | Cancellation of Timer OFF, Fresh, Swing, Turbo, or Silent |
| | | Defrost |
| | | Warming in heating mode |
| | | Self-clean (available on select units only) |
| | | Heating in room temperature under 8°C |
| | gradually illuminates to in one second intervals | ECO function (available on select units only) |

Note: Please select the display function according to your purchase product.

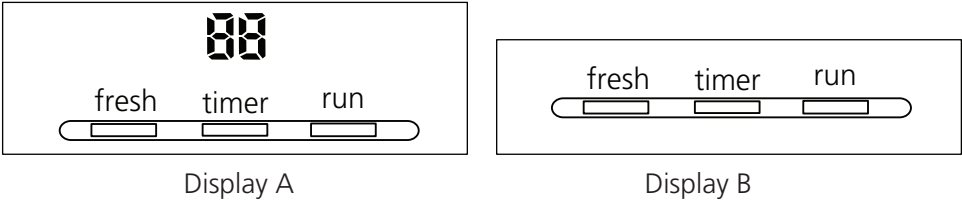
Wall mounted type-Aurora:



| Display | | Function |
|---------|-------------------|--|
| | | Fresh(available on select units only) |
| ECO | | ECO function (available on select units only) |
| °C | | Lights up in different colour according to the operation mode(some units): Under COOL and DRY mode, it displays as cool colour.Under HEAT mode, it displays as warm colour. |
| | | when Wireless Control feature is activated(some units) |
| | Temperature value | Temperature |
| | ON (3s) | Activation of Timer ON, Fresh, Swing, Turbo, or Silent |
| | OF (3s) | Cancellation of Timer OFF, Fresh, Swing, Turbo, or Silent |
| | dF | Defrost |
| | cF | Warming in heating mode |
| | SC | Self-clean (available on select units only) |
| | FP | Heating in room temperature under 8°C |

Note: Please select the display function according to your purchase product.

Wall mounted type-All Easy:



| Display | | Function |
|---------|---|---|
| fresh | | When Fresh feature is activated(some units) |
| timer | | When TIMER is set |
| run | | When the unit is on |
| | | WiFi control (available on select units only) |
| 88 | Set temperature value | Temperature |
| | Room temperature | Temperature (fan and Drying mode) |
| | 00 (3s) | Activation of Timer ON, Fresh, Swing, Turbo, or Silent |
| | 0F (3s) | Activation of Timer OFF or cancellation of Fresh, Swing, Turbo, or Silent |
| | dF | Defrost(Heat pump units) |
| | cF | Activation of anti-cold wind in heating mode |
| | SC | Self-clean (available on select units only) |
| | FP | Heating in room temperature under 8°C |
| | set temperature gradually illuminates to in one second interval | ECO function (available on select units only) |

Note: Please select the display function according to your purchase product.

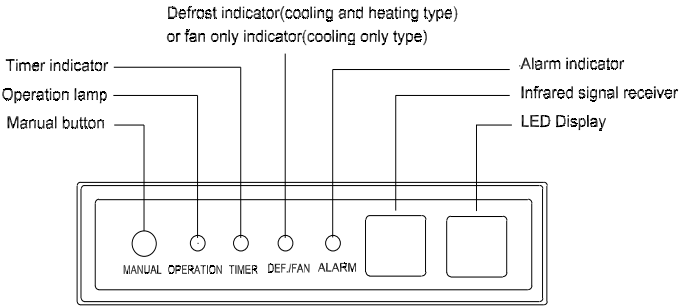
Wall mounted type-XTREME



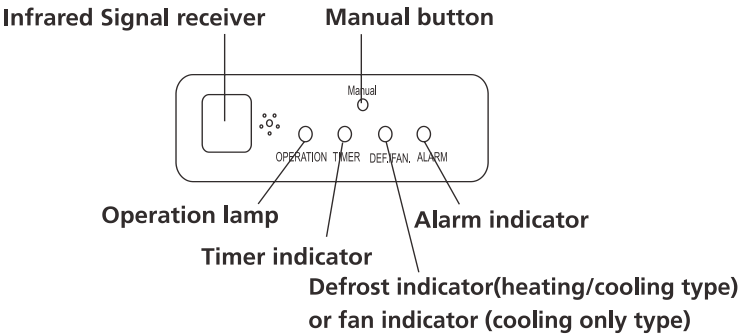
| Display | | Function |
|---------|-------------------|--|
| fresh | | Fresh(available on select units only) |
| defrost | | Defrost |
| run | | When the unit is on |
| timer | | When TIMER is on |
| | | WiFi control (available on select units only) |
| | Temperature value | Temperature |
| | (3s) | Activation of Timer ON, Fresh, Swing, Turbo, or Silent |
| | (3s) | Cancellation of Timer OFF, Fresh, Swing, Turbo, or Silent |
| | | Defrost |
| | | Active Clean(For Inverter split type) or self-cleaning(For Fixed-speed type) |
| | | Heating in room temperature under 8°C |

Note: Please select the display function according to your purchase product.

A6 Duct type:



Compact Cassette type:



2. Operation Modes and Functions

2.1 Abbreviation

Unit element abbreviations

| Abbreviation | Element |
|--------------|--|
| T1 | Indoor room temperature |
| T2 | Coil temperature of evaporator middle |
| T2B | Coil temperature of evaporator outlet(It is located in outdoor unit) |
| T3 | Coil temperature of condenser |
| T4 | Outdoor ambient temperature |
| T5 | Compressor discharge temperature |
| TS | Setting temperature |
| Tsc | Adjusted setting temperature |

2.2 Safety Features

Open Circuit/Disconnection Sensor Protection

Automatic shutoff based on fan speed

For A6 Duct type,

If a fault occurs on the air volume regulator or the regulator enters protection mode, it sends the error message CF and an instruction to reduce fan speed to the master. The message and the instruction can be inquired with the remote controller or the wired controller. (Fault and protection information are displayed for one minute). After a fault occurs, the master unit shows the error code E3 and the fault count for one minute.

If the fault occurs three times, then the fan is unable to resolve the problem independently. External shutdown by a remote controller, wired controller, or central controller must be used to clear the fan fault and fault count. The fan runs normally for 5 minutes while clearing fault count.

For other types,

If the indoor fan speed registers below 300RPM for an extended period of time, it shuts off and restarts in 30 seconds. If this happens 3 times, the unit ceases operation and the corresponding error code is displayed on the indoor unit.

If outdoor fan speed registers below 100RPM or higher than 2400RPM for an extended period of time, the unit ceases operation and the corresponding error code is displayed on the indoor unit and outdoor unit.

Indoor fan delayed operation

- When the unit starts, the louver is automatically activated and the indoor fan will operate after a period of 7 seconds.
- If the unit is in heating mode, the indoor fan is regulated by the anti-cold wind function.

Zero crossing detection error protection(For Forest series)

If AC can not detect zero crossing signal for 4 minutes or the zero crossing signal time interval is not correct, the unit will stop and the LED will display the failure. The correct zero crossing signal time interval should be between 6-13ms.

Compressor three-minute delay at restart

Compressor functions are delayed for up to one minute upon the first startup of the unit, and are delayed for up to three minutes upon subsequent unit restarts.

Inverter module protection

The inverter module has an automatic shutoff mechanism based on the unit's current, voltage, and temperature. If automatic shutoff is initiated, the corresponding error code is displayed on the indoor unit and the unit ceases operation.

Automatic shutoff based on discharge temperature

If the compressor discharge temperature exceeds a certain level for a period of time, the compressor ceases operation.

Oil return

Running rules:

1. If the compressor frequency keeps lower than setting frequency for setting time, the AC will rise the frequency to setting frequency for setting time and then resume to former frequency.
2. The EXV will keep 300p while the indoor units will keep the current running mode.

If the outdoor ambient is higher than setting frequency during the oil return, the AC quit oil return.

2.3 Fan Mode

When fan mode is activated:

- The outdoor fan and compressor cease operation.
- Temperature control is disabled and no temperature setting is displayed.
- The indoor fan speed can be set to high, medium, low, , auto or 1%-100%.
- The louver operations are identical to those in cooling mode.
- Auto fan in fan-only mode, AC operates the same as auto fan in cooling mode with the temperature set at 24°C.

2.4 Cooling Mode

2.4.1 Indoor Fan Control

- In cooling mode, the indoor fan operates continuously. The fan speed can be set to high, medium, low, auto or 1%-100%.
- The auto fan acts according to the value of T1-Ts.

For MCA3U-18HRFNX-QRD0W, MCA3U-07HRFNX-QRD0W(GA), MCA3U-09HRFNX-QRD0W(GA), MTIU-07HWFNX-QRD0W(GA), MTIU-09HWFNX-QRD0W(GA), the auto fan acts according to the value of T1-Tsc.

2.4.2 Outdoor Fan Control

- The outdoor fan is controlled by T4.

2.4.3 Evaporator Temperature Protection

When $T_2 < 4^\circ\text{C}$ for 250 seconds or $T_2 < 0^\circ\text{C}$, the compressor and outdoor fan cease operation and resume to normal when $T_2 > 8^\circ\text{C}$ and the time of protection is no less than 3 minutes.

2.4.4 Condenser Temperature Protection

When condenser temperature is more than setting value, the compressor ceases operations.

2.5 Heating Mode(Heat pump models)

2.5.1 Indoor Fan Control

- When the compressor is on, the fan speed can be set to high, medium, low, or auto. And the anti-cold wind function has the priority.
- The auto fan acts according to the value of T1-Ts.

For MCA3U-18HRFNX-QRD0W, MCA3U-07HRFNX-QRD0W(GA), MCA3U-09HRFNX-QRD0W(GA), MTIU-07HWFNX-QRD0W(GA), MTIU-09HWFNX-QRD0W(GA), the auto fan acts according to the value of T1-Tsc.

2.5.2 Outdoor Fan Control

- The outdoor fan is controlled by T4.

2.5.3 Defrosting mode

- The unit enters defrosting mode according to the value of temperature of T3 and the value range of temperature change of T3 and also the compressor running time.
- If any one of the following items is satisfied, the defrosting will finish and the machine will turn to normal heating mode.
 - T3 rises to be higher than TCDE1°C.
 - T3 keeps to be higher than TCDE2°C for 80 seconds.
- The machine has run for 10 minutes in defrosting mode.

2.5.4 Evaporator Temperature Protection

When the evaporator temperature exceeds a preset protection value, the compressor and outdoor fan cease operations, the outdoor fan motor ceases operation 30 seconds later.

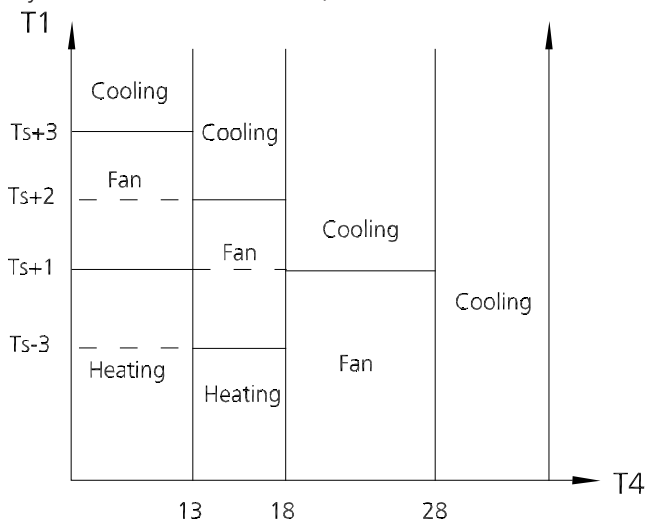
2.5.5 Prevent Over-Heating

In heating mode, when the indoor unit has no capacity requirement due to indoor room temperature increased, the Indoor fan will run in super breeze. (Anti-cold wind function has the priority)

2.6 Auto Mode

- This mode can be selected with the remote controller and the temperature setting can be adjusted between $17^\circ\text{C} \sim 30^\circ\text{C}$
- For MCA3U-07HRFNX-QRD0W(GA), MCA3U-09HRFNX-QRD0W(GA):

In auto mode, the machine selects cooling, heating or fan-only mode on the basis of T1, Ts and T4.



In auto mode, the machine selects cooling, heating, or fan-only mode on the basis of ΔT ($\Delta T = T_1 - T_s$).

For MCA3U-18HRFNX-QRD0W, MTIU-07HWFNX-QRD0W(GA), MTIU-09HWFNX-QRD0W(GA):

| ΔT | Running mode |
|---|--------------|
| $\Delta T > 3^\circ\text{C}$ | Cooling |
| $-3^\circ\text{C} \leq \Delta T \leq 3^\circ\text{C}$ | Fan-only |
| $\Delta T < -3^\circ\text{C}$ | Heating* |

For other models:

| ΔT | Running mode |
|---|--------------|
| $\Delta T > 2^\circ\text{C}$ | Cooling |
| $-2^\circ\text{C} \leq \Delta T \leq 2^\circ\text{C}$ | Fan-only |
| $\Delta T < -2^\circ\text{C}$ | Heating* |

Heating*: In auto mode, cooling only models run the fan.

- Indoor fans run at the auto fan speed of the relevant mode.
- The louver operates the same as in relevant mode.
- If the machine switches mode between heating and cooling, the compressor pauses for a certain period of time intermittently and then selects a mode based on $T_1 - T_s$.
- If the setting temperature is modified, the machine selects a new running function.

2.7 Drying Mode

- Indoor fan speed is fixed at low and cannot be changed.
- Low indoor room temperature protection
- In drying mode, if room temperature is lower than 10°C , the indoor fan will stop and not resume until room temperature exceeds 12°C .
- All protections are activated and operate the same as they do in cooling mode.
- The louver operates the same as in cooling mode.

2.8 Timer Function

- The timing range is 24 hours.
- Timer On. The machine turns on automatically at the preset time.
- Timer Off. The machine turns off automatically at the preset time.
- Timer On/Off. The machine turns on automatically at the preset On Time, and then turns off automatically at the preset Off Time.

- Timer Off/On. The machine turns on automatically at the preset Off Time and then turns off automatically at the preset On Time.
- The timer does not change the unit operation mode. If the unit is off now, it does not start up immediately after the "timer off" function is set. When the setting time is reached, the timer LED switches off and the unit running mode remains unchanged.
- The timer uses relative time, not clock time

2.9 Sleep Function

- The sleep function is available in cooling, heating, or auto mode.
- The operational process for sleep mode is as follows:
- When cooling, the temperature rises 1°C (to not higher than 30°C) every hour. After 2 hours, the temperature stops rising and the indoor fan is fixed to auto speed.
- When heating, the temperature decreases 1°C (to not lower than 17°C) every hour. After 2 hours, the temperature stops decreasing and the indoor fan is fixed at auto speed. Anti-cold wind function takes priority.

2.10 Forced operation function

- Forced cooling mode:

The compressor and outdoor fan continue to run and the indoor fan runs at rated speed. After running for 30 minutes, the AC will switch to auto mode with a preset temperature of 24°C .

- Forced auto mode:

Forced auto mode operates the same as normal auto mode with a preset temperature of 24°C .

- When any one of indoor units runs in forced cooling, it is designated as the master forced cooling unit. Other indoor units act as the slave forced cooling units. The slave forced cooling units cannot exit forced cooling mode until the master forced cooling unit does so. They then switch to cooling mode in low fan with the temperature set at 24°C .
- Forced defrosting mode:
 - In the forced cooling mode (single heat engine for forced auto mode), press and hold the forced key for 5 seconds after release, immediately enter the forced frosting mode.
 - When any one of indoor units runs in forced defrosting mode, the indoor fan is off and other indoor fans are off. The outdoor unit

operates forced defrosting.

2.11 Auto-Restart

- The indoor unit has an auto-restart module that allows the unit to restart automatically. The module automatically stores the current settings (not including sleep mode) and, in the case of a sudden power failure, will restore those settings automatically within 3 minutes after power returns.
- If the unit was in forced cooling mode, it will run in this mode for 30 minutes and turn to auto mode with temperature set to 24°C.
- If there is a power failure while the unit is running, the compressor starts 3 minutes after the unit restarts. If the unit was already off before the power failure, the compressor starts 1 minute after the unit restarts.

2.12 Follow Me (Optional)

- If you press "Follow Me" on the remote, the indoor unit will beep. This indicates the follow me function is active.
- Once active, the remote control will send a signal every 3 minutes, with no beeps. The unit automatically sets the temperature according to the measurements from the remote control.
- The unit will only change modes if the information from the remote control makes it necessary, not from the unit's temperature setting.

2.13 Drain Pump Control (Optional)

- Use the water-level switch to control drain pump.
- The system checks the water level every 5 seconds.
 - When the A/C operates in cooling (including auto cooling) or forced cooling mode, the pump begins running immediately and continuously until cooling stops.
 - If the water level increases up to the control point, the LED displays an alarm code and the drain pump opens and continually monitors the water level. If the water level falls and LED alarm code is no longer displayed (drain pump close delay is 1 minute), the unit goes back into its last mode. Otherwise, the entire system (including the pump) stops and the LED displays an alarm again after 3 minutes.

2.14 Mode Conflict

- The indoor units can not work cooling mode and heating at same time.
- Heating mode has a priority.

(1) Definition

| | Cooling mode | Heating Mode | Fan | Off |
|--------------|--------------|--------------|-----|-----|
| Cooling mode | No | Yes | No | No |
| Heating Mode | Yes | No | Yes | No |
| Fan | No | Yes | No | No |
| Off | No | No | No | No |

No: No mode conflict;

Yes: Mode conflict

(2) Unit action

- In case of one Indoor unit working in cooling mode or fan mode, and another indoor unit is set to heating mode, the indoor unit working in cooling mode or fan mode will change to off. The outdoor unit will change to heating mode after compressor stop 3 minutes. .
- In case of one Indoor unit working in heating mode, and another indoor unit is set to cooling mode or fan mode, the indoor unit setting to cooling mode or fan mode will change to stand by. The outdoor unit will continue working in heating mode.
- If heating mode stops (not including the indoor unit in heating mode reaching the set temperature), 3 minutes after the outdoor unit restarts and works in cooling mode or fan-only mode.

3. Remote Controller Functions

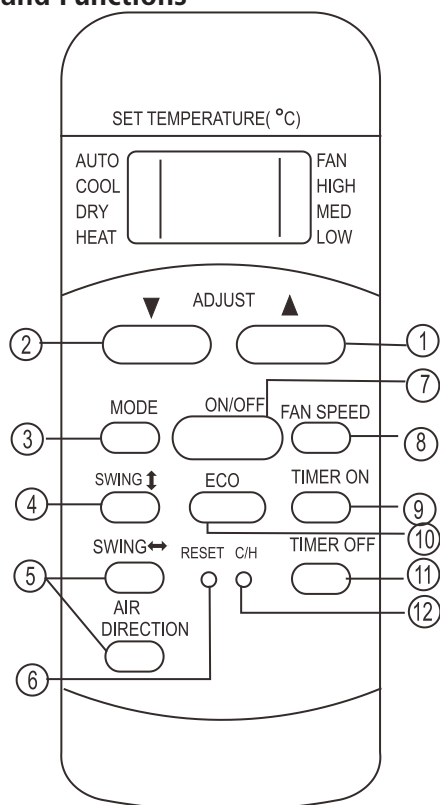
3.1 Infrared Wireless Remote Controller

3.1.1 RG51Q1/BGE(Standard for cassette)

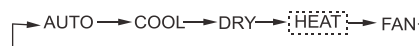
Remote Controller Specifications

| | |
|-------------------------------|---------------------------------|
| Model | RG51Q1/BGE |
| Rated Voltage | 3.0V (Dry batteries R03/LR03×2) |
| Reaching Distance | 8m |
| Environment Temperature Range | -5℃~60℃ (23℉~140℉) |


Buttons and Functions



1. TEMP UP ▲ Button: Push this button to increase the indoor temperature setting in 1℃ increments to 30℃
2. TEMP DOWN ▼ Button : Push this button to decrease the indoor temperature setting in 1℃ increments to 17℃.
3. MODE Button: Once pressing, running mode will be selected in the following sequence:



NOTE: No heating mode for cool only type unit.

4. SWING Button: Used to stop or start horizontal louver movement. The louver will swing up and down automatically if push this button.
 5. SWING Button: Used to stop or start vertical louver movement.
 - AIR DIRECTION Button: Used to set the desired up/down air flow direction. The louver changes 6 degree in angle for each press.
 6. RESET Button(inner located): Once the recessed RESET button is pressed, all of the current settings will be cancelled and the controller will return to the initial settings.
 7. ON/OFF Button: For turning on or turning off the air conditioner.
 8. FAN SPEED Button: Fan speed will be selected in following sequence once pressing this button:
- 
- ```

graph LR
 AUTO --> LOW
 LOW --> MED
 MED --> HIGH

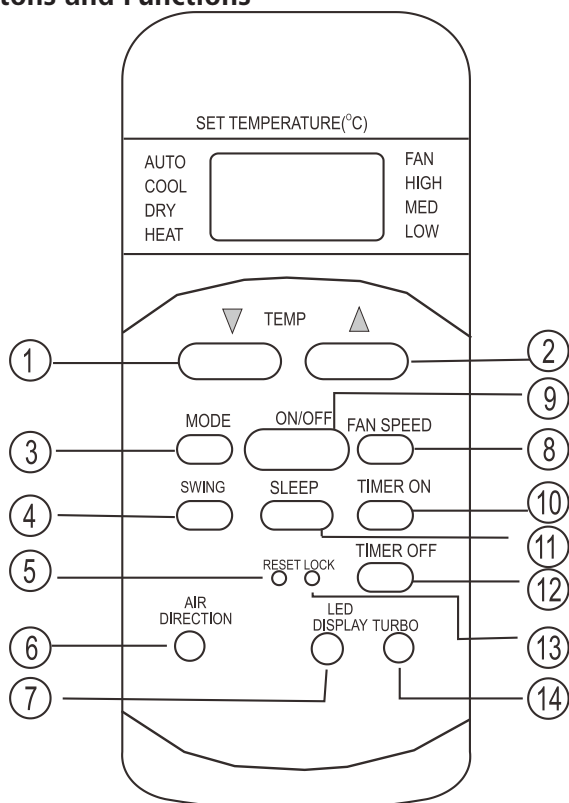
```
9. TIME ON Button: For time ON setting. Press this button to activate the Auto-on time setting. Each press will increase the time setting in 30 minutes increments, up to 10 hours, then at 1 hour increments up to 24 hours. To cancel the Auto-on time setting, just press the button until the time setting is 0.0.
  10. ECO Button: Select this function during the sleeping time. It can maintain the most comfortable temperature and save energy. This function is available on COOL, HEAT or AUTO mode only .
  - NOTE: While the unit is running under Energy-saving mode, it would be cancelled if press MODE, FAN SPEED or ON/OFF button.
  11. TIME OFF Button: For time OFF setting. Press this button to activate the Auto-off time setting. Each press will increase the time setting in 30 minutes increments, up to 10 hours, then at 1 hour increments up to 24 hours. To cancel the Auto-off time setting, just press the button until the time setting is 0.0.
  12. CH Button(inner located): Press this recessed button to shift the mode between Cooling only and Cooling & Heating according to the feature of the machine. The factory default setting mode is Cooling & Heating. For example, the unit you purchased is Cooling only models, please press this recessed button with a needle of 1mm to shift the operation mode.

##### 3.1.2 R51M/E(Standard for Forest series)

## Remote Controller Specifications

|                               |                                 |
|-------------------------------|---------------------------------|
| Model                         | R51M/E                          |
| Rated Voltage                 | 3.0V (Dry batteries R03/LR03×2) |
| Reaching Distance             | 8m                              |
| Environment Temperature Range | -5 °C ~60 °C (23 °F ~140 °F )   |

## Buttons and Functions



1. TEMP DOWN ▼ Button : Push this button to decrease the indoor temperature setting in 1 °C increments to 17 °C.

2. TEMP UP ▲ Button: Push this button to increase the indoor temperature setting in 1 °C increments to 30 °C

3. MODE Button: Once pressing, running mode will be selected in the following sequence:



NOTE: No heating mode for cool only type unit.

4. SWING Button: Push this switch button to activate auto swing feature of the horizontal louver. Push it again to stop.

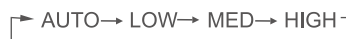
5. RESET Button (inner located): Once the recessed

RESET button is pressed, all of the current settings will be cancelled and the controller will return to the initial settings.

6. AIR DIRECTION Button: Press this button to change the swing angle of the louver. The swing angle of the louver is 6 degree for each press. When the louver swing at a certain angle which would affect the cooling and heating effect of the air conditioner, it would automatically change the swing direction . No symbol will appear in the display area when press this button. (Not applicable to units without this function).

7. LED DISPLAY Button: Press this button to clear the digit display in the air conditioner, press it again to activate it (Not available for the units without LED display window).

8. FAN SPEED Button: Fan speed will be selected in following sequence once pressing this button:



9. ON/OFF Button: For turning on or turning off the air conditioner.

10. TIME ON Button: For time ON setting. Press this button to activate the Auto-on time setting. Each press will increase the time setting in 30 minutes increments, up to 10 hours, then at 1 hour increments up to 24 hours. To cancel the Auto-on time setting, just press the button until the time setting is 0.0.

11. SLEEP Button: Press this button to go into the Energy-Saving operation mode. Press it again to cancel. This function is only can be used on COOL, HEAT and AUTO mode and maintain the most comfortable temperature for you.

12. TIME OFF Button: For time OFF setting. Press this button to activate the Auto-off time setting. Each press will increase the time setting in 30 minutes increments, up to 10 hours, then at 1 hour increments up to 24 hours. To cancel the Auto-off time setting, just press the button until the time setting is 0.0.

13. LOCK Button(inner located): When you press the recessed LOCK button, all current settings are locked in and the remote controller does not accept any operation except that of the LOCK. Press again to cancel the LOCK mode.

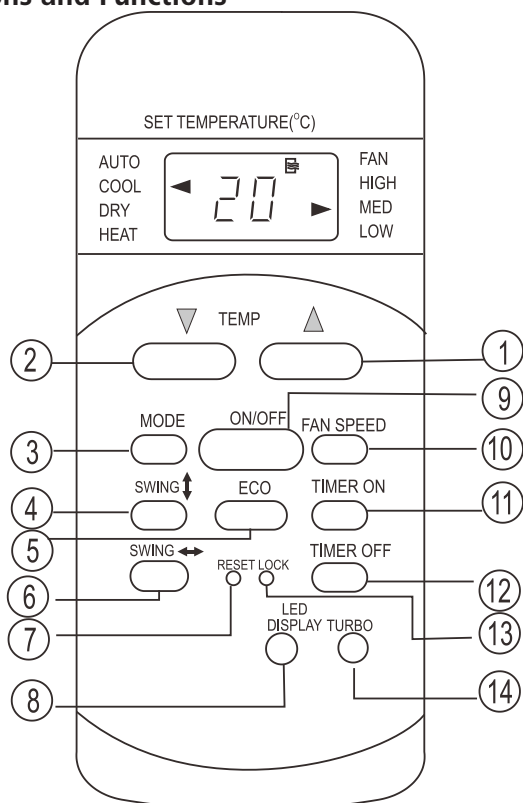
14. TURBO Button: Active/Disable Turbo function. Turbo function enables the unit to reach the preset temperature at cooling or heating operation in the shortest time(if the indoor unit does not support this function, there is no corresponding operation happened when pressing this button.)

### 3.1.3 RG51F1/E(Standard for Aurora series)

## Remote Controller Specifications

|                               |                                 |
|-------------------------------|---------------------------------|
| Model                         | RG51F1/E                        |
| Rated Voltage                 | 3.0V (Dry batteries R03/LR03×2) |
| Reaching Distance             | 8m                              |
| Environment Temperature Range | -5℃~60℃ (23℉~140℉)              |

## Buttons and Functions



1. TEMP UP ▲ Button: Push this button to increase the indoor temperature setting in 1℃ increments to 30℃

2. TEMP DOWN ▼ Button : Push this button to decrease the indoor temperature setting in 1℃ increments to 17℃.

3. MODE Button: Once pressing, running mode will be selected in the following sequence:



NOTE: No heating mode for cool only type unit.

4. SWING ↑ Button: Used to stop or start horizontal louver movement or set the desired up/down air flow direction. The louver changes 6 degree in angle for each press. If keep pushing more than 2 seconds, the louver will swing up and down automatically.

5. ECO Button: Used to enter the energy efficient mode. Under cooling mode, press this button, the remote

controller will adjust the temperature automatically to 24℃, fan speed of Auto to save energy(but only if the set temperature is less than 24℃). If the set temperature is between 24℃ and 30℃, press the ECO button, the fan speed will change to Auto, the set temperature will remain unchanged.

NOTE: Pressing the TURBO and SLEEP button, modifying the mode or adjusting the set temperature to less than 24℃ will stop ECO operation.

Under ECO operation, the set temperature should be 24℃ or more. it may result in insufficient cooling. If you feel uncomfortable, just press the ECO button again to stop it.

6. SWING ↔ Button: Used to stop or start vertical louver movement and set the desired left/right air flow direction. The vertical louver changes 6 degree in angle for each press.

7. RESET Button (inner located): Once the recessed RESET button is pressed, all of the current settings will be cancelled and the controller will return to the initial settings.

8. LED DISPLAY Button: Disable/Active indoor screen Display. When pushing the button, the indoor screen display is cleared, press it again to light the display.

9. ON/OFF Button: Operation starts when this button is pressed and stops when the button is pressed again.

10. FAN SPEED Button: Fan speed will be selected in following sequence once pressing this button:



11. TIME ON Button: For time ON setting. Press this button to activate the Auto-on time setting. Each press will increase the time setting in 30 minutes increments, up to 10 hours, then at 1 hour increments up to 24 hours. To cancel the Auto-on time setting, just press the button until the time setting is 0.0.

12. TIME OFF Button: For time OFF setting. Press this button to activate the Auto-off time setting. Each press will increase the time setting in 30 minutes increments, up to 10 hours, then at 1 hour increments up to 24 hours. To cancel the Auto-off time setting, just press the button until the time setting is 0.0.

13. LOCK Button(inner located): When you press the recessed LOCK button, all current settings are locked in and the remote controller does not accept any operation except that of the LOCK. Press again to cancel the LOCK mode.

14. TURBO Button: Active/Disable Turbo function. Turbo function enables the unit to reach the preset temperature at cooling or heating operation in the shortest time(if the

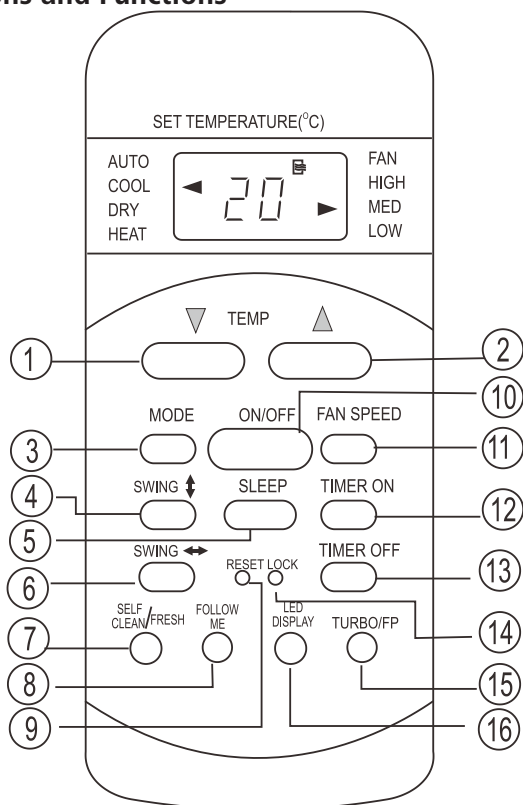
indoor unit does not support this function, there is no corresponding operation happened when pressing this button.)

### 3.1.4 RG51I55/BGEF(Standard for All Easy series)

#### Remote Controller Specifications

|                               |                                 |
|-------------------------------|---------------------------------|
| Model                         | RG51I55/BGEF                    |
| Rated Voltage                 | 3.0V (Dry batteries R03/LR03×2) |
| Reaching Distance             | 8m                              |
| Environment Temperature Range | -5℃~60℃ (23℉~140℉)              |

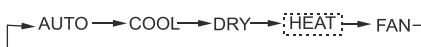
#### Buttons and Functions



1. TEMP DOWN ▼ Button : Push this button to decrease the indoor temperature setting in 1℃ increments to 17℃.

2. TEMP UP ▲ Button: Push this button to increase the indoor temperature setting in 1℃ increments to 30℃

3. MODE Button: Once pressing, running mode will be selected in the following sequence:



NOTE: No heating mode for cool only type unit.

4. SWING ↑ Button: Used to stop or start horizontal louver

movement or set the desired up/down air flow direction. The louver changes 6 degree in angle for each press. If keep pushing more than 2 seconds, the louver will swing up and down automatically.

5. SLEEP Button: Press this button to go into the Energy-Saving operation mode. Press it again to cancel. This function is only can be used on COOL, HEAT and AUTO mode and maintain the most comfortable temperature for you.

6. SWING ↔ Button: Used to stop or start vertical louver movement and set the desired left/right air flow direction. The vertical louver changes 6 degree in angle for each press.

7. SELF CLEAN/FRESH Button: Press this button under COOL or DRY mode, the self clean function is activated. Under SELF CLEAN mode, the air conditioner will automatically clean and dry the evaporator and keep it as fresh for the next operation.

Hold down this button for at least 2 seconds to activate/cancel FRESH feature. When the FRESH function is initiated, the Ionizer/Plasma Dust Collector (depending on models) is energized and will help to remove pollen and impurities from the air.

8. FOLLOW ME Button: Push this button to initiate the Follow Me feature, the remote display is actual temperature at its location. The remote control will send this signal to the air conditioner every 3 minutes interval until press the Follow Me button again. The air conditioner will beep to indicate the Follow Me feature has ended if it does not receive the signal during any 7 minute interval.

9. RESET Button (inner located): Once the recessed RESET button is pressed, all of the current settings will be cancelled and the controller will return to the initial settings.

10. ON/OFF Button: Operation starts when this button is pressed and stops when the button is pressed again..

11. FAN SPEED Button: Fan speed will be selected in following sequence once pressing this button:



12. TIME ON Button: For time ON setting. Press this button to activate the Auto-on time setting. Each press will increase the time setting in 30 minutes increments, up to 10 hours, then at 1 hour increments up to 24 hours. To cancel the Auto-on time setting, just press the button until the time setting is 0.0.

13. TIME OFF Button: For time OFF setting. Press this button to activate the Auto-off time setting. Each press will increase the time setting in 30 minutes increments, up to 10 hours, then at 1 hour increments up to 24 hours. To

---

cancel the Auto-off time setting, just press the button until the time setting is 0.0.

14. LOCK Button(inner located): When you press the recessed LOCK button, all current settings are locked in and the remote controller does not accept any operation except that of the LOCK. Press again to cancel the LOCK mode.

15. TURBO/FP Button: Active/Disable Turbo function. Turbo function enables the unit to reach the preset temperature at cooling or heating operation in the shortest time(if the indoor unit does not support this function, there is no corresponding operation happened when pressing this button.)

Hold down this button for more than 2 seconds during heating operation(only when the setting mode is HEAT) will activate 8°C heating operation mode. The unit will operate at high fan speed with the temperature automatically set to 8°C.

16. LED DISPLAY Button: Press this button to clear the digit display in the air conditioner, press it again to activate it (Not available for the units without LED display window).

### 3.1.5 RG10A(B2S)/BGEF(Standard for XTREME series &MCA3U-07HRFNX-QRD0W(GA), MCA3U-09HRFNX-QRD0W(GA))

#### Remote Controller Specifications

|                               |                                 |
|-------------------------------|---------------------------------|
| Model                         | RG10A(B2S)/BGEF                 |
| Rated Voltage                 | 3.0V (Dry batteries R03/LR03×2) |
| Reaching Distance             | 8m                              |
| Environment Temperature Range | -5℃~60℃ (23℉~140℉)              |

#### Buttons and Functions

**ON/OFF**  
Turns the unit on or off.

**TEMP ^**  
Increases temperature in 1°C (1°F) increments. Max. temperature is 30°C (86°F).  
NOTE: Press together √& ^ buttons at the same time for 3 seconds will alternate the temperature display between the °C & °F.

**SET**  
Scrolls through operation functions as follows:  
Fresh( ) → Sleep( ) → Follow Me( ) → AP mode( ) → Fresh...  
The selected symbol will flash on the display area, press the OK button to confirm.

**TEMP √**  
Decreases temperature in 1°C(1°F) increments. Min. temperature is 16°C(60°F).

**FAN SPEED**  
Selects fan speeds in the following order: AU→20%→40%→60%→80%→100%.  
Press the TEMP^ or √ button to increase/decrease the fan speed in 1% increments.

**SWING**  
Starts and stops the horizontal louver movement. Hold down for 2 seconds to initiate vertical louver auto swing feature(some units).

**BOOST**  
Enables unit to reach preset temperature in shortest possible time

#### MODE

Scrolls through operation modes as follows: **AUTO** → **COOL** → **DRY** → **HEAT** → **FAN**

#### ECO/GEAR

Press this button to enter the energy efficient mode in a sequence of following:  
ECO → GEAR(75%) → GEAR(50%) → Previous setting mode → ECO .....

#### OK

Used to confirm the selected functions

#### TIMER

Set timer to turn unit on or off

#### BREEZE AWAY

This feature avoids direct air flow blowing on the body and makes you feel indulging in silky coolness.

**NOTE:** This feature is available under cool, Fan and Dry mode only

#### CLEAN

Used to start/stop the Self Clean or Active Clean function.(Model dependent, please refer to the USER'S OPERATION & INSTALLATION MANUAL for details)

#### LED

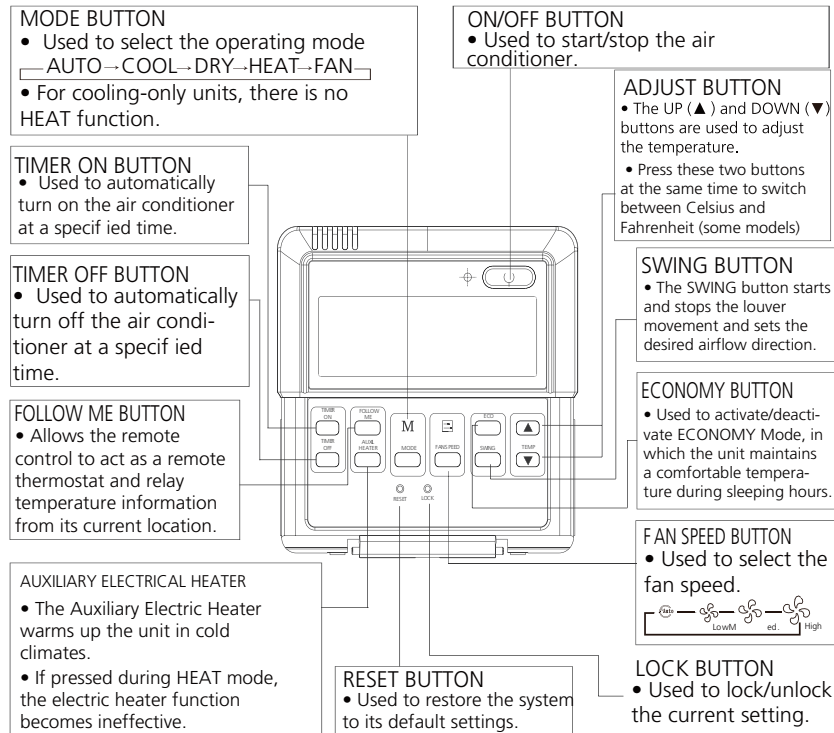
Turns indoor unit's LED display and air conditioner buzzer on and off(model dependent), which create a comfortable and quiet environment.

## 3.2 LCD Wired Remote Controller

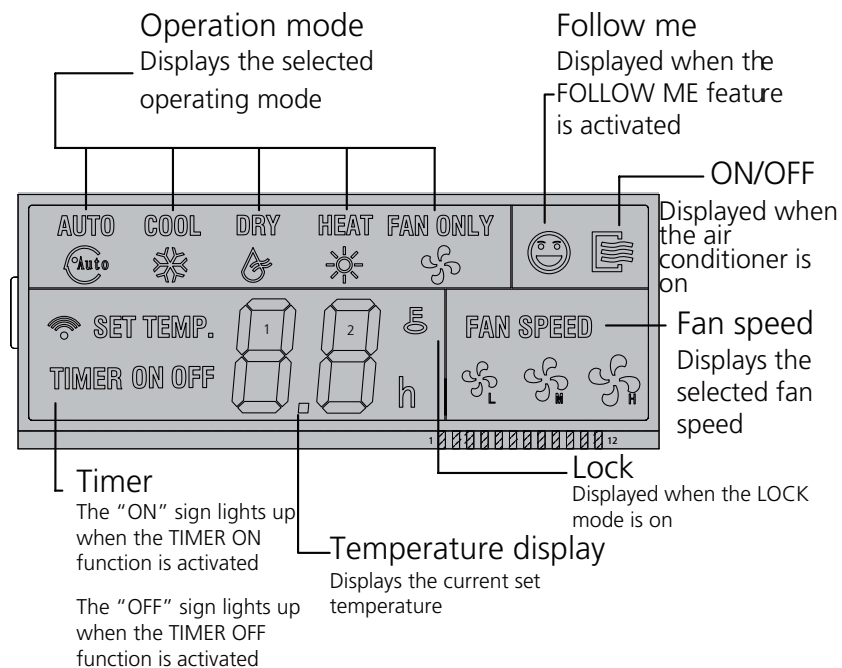
### 3.2.1 LCD Wired Remote Controller KJR-12B/DP(T) (Standard)

The KJR-12B/DP(T) wired remote controller is standard for Duct type.

#### i) Buttons and Functions



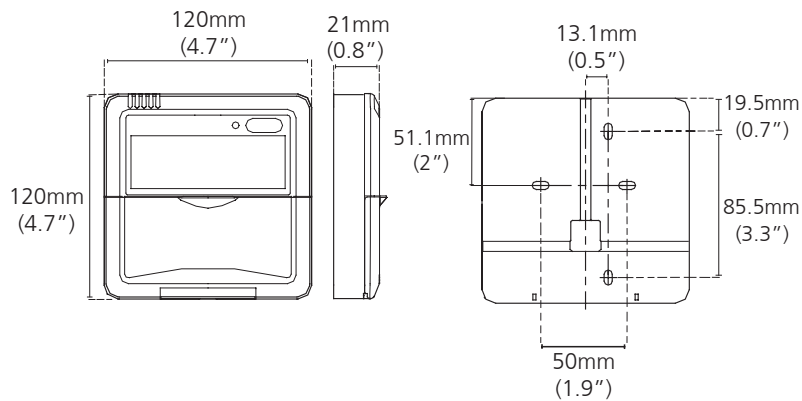
#### ii) LCD Screen





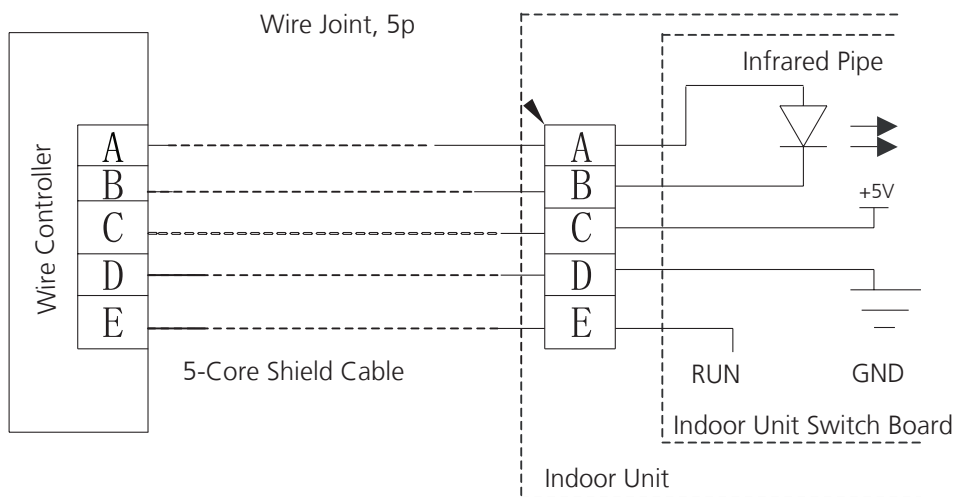
iii) Installation

• Dimensions



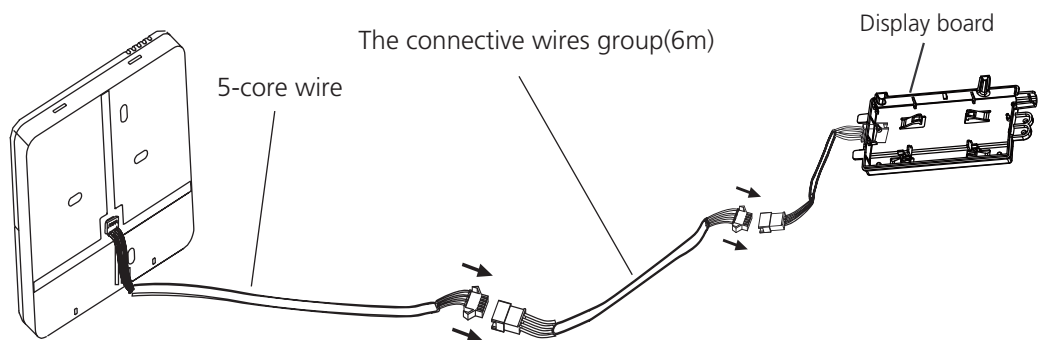
• Wiring diagram

Refer to the following diagram to wire the Wall mounted type remote control to the indoor unit.



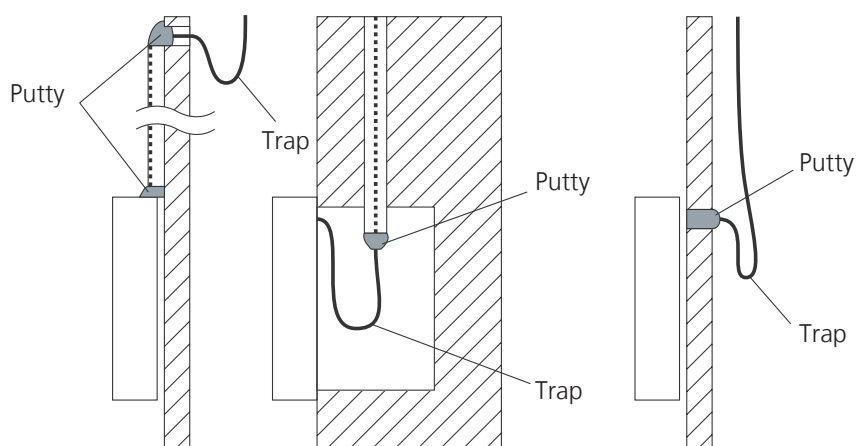
• Installation Diagram

Connect the wire from the display panel of the indoor unit to a connecting cable. Then connect the other side of the connecting cable to the remote control.



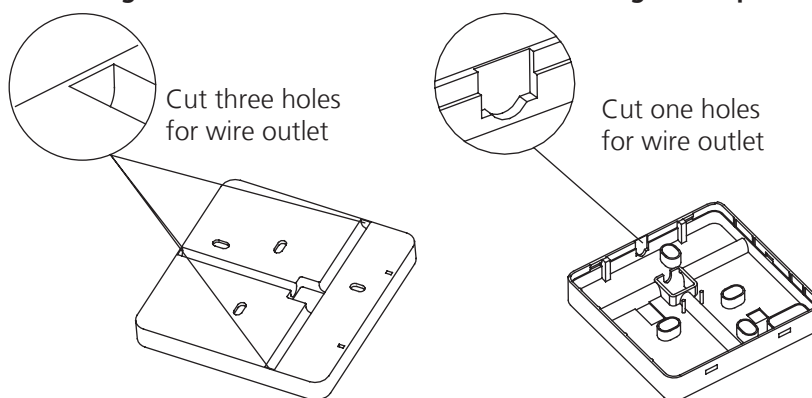
**Note:** Be sure to reserve a length of the connecting wire for periodic maintenance.





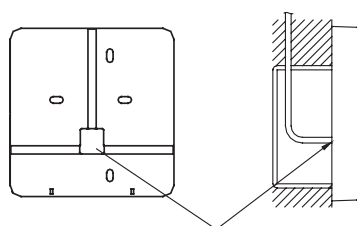
**Note: DO NOT** allow water to enter the remote control. Use the trap and putty to seal the wires.

- For exposed mounting, cut holes on four of the sides according to the picture below.



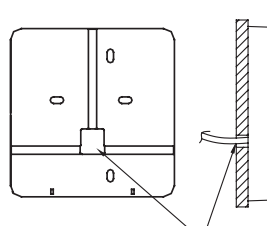
- For shielded wiring, please refer to the picture below.

Embedded switch box wiring



Wiring hole

Wiring through the wall

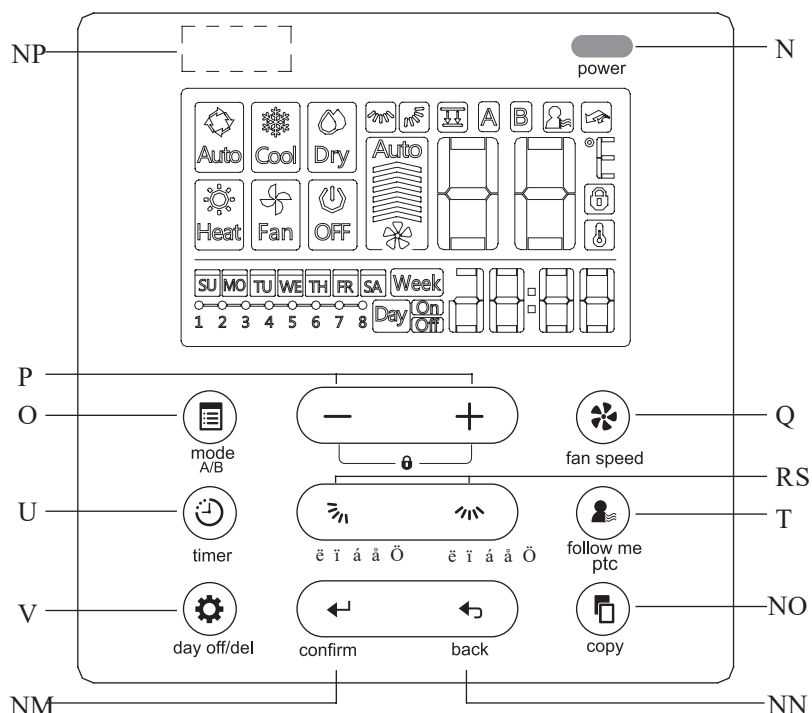


Wall hole and wiring hole  
Diameter of wall hole:  $\Phi$  2cm

### 3.2.2 LCD Wired Remote Controller KJR-120C/TF-E(Optional)

The KJR-120C/TF-E wired remote controller is optional for all types.

### i) Buttons and Functions



1. POWER button

Turn on or turn off the unit.

## 2. MODE(A/B) button

Used to select the operation mode: Auto / Cooling / Drying / Heating / Fan;

Hold to active the operation of auto-lifting panel when off

### 3. Adjust button

To set temperature, time and timer; set up or down the auto-lifting panel

#### 4. FAN SPEED button

Used to select the fan speed.

## 5. Up-down airflow direction and swing Button

Press for adjusting the angel of louver, hold for vertical swing; individual louver control for cassette panel

### 6. Left-right airflow swing Button

Press for activating the horizontal swing

## 7. FOLLOW ME(PTC) button

Allows the remote control to act as a remote thermostat and send temperature information from its current location.

## 8. TIMER button

To set timer on and timer off time of one day

### 9. DELAY/DAY OFF button

To set 1 to 2 hours delay off for each day or a whole day off in a weekly timer schedule

## 10. CONFIRM button

To confirm an setting or call up the menu

## 11. BACK button

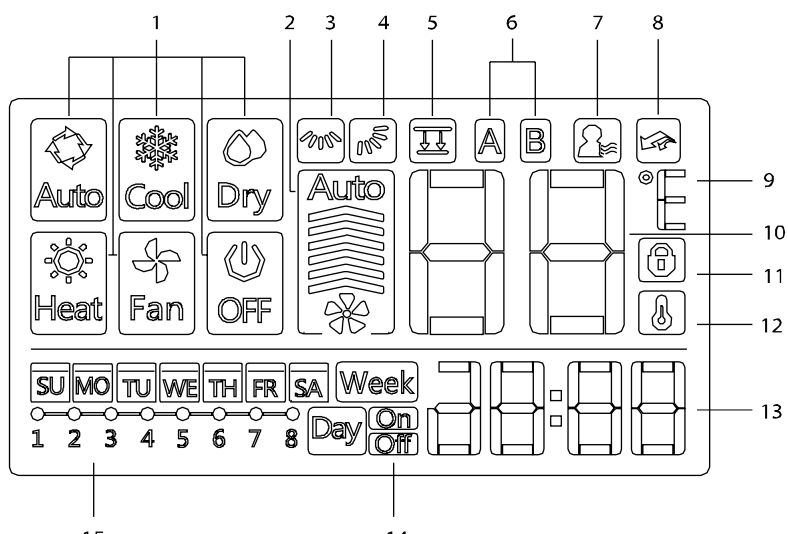
Back to previous operation or superior menu

## 12. COPY button

Copy timer setting of one day to another in weekly schedule setting

13 Infrared remote receiver (on some models)

### ii) LCD Screen



1 Operation mode indication

2 Fan speed indication

3 Left-right swing indication

4 Up-down swing indication

5 Faceplate function indication

6 Main unit and secondary unit indication

7 Follow me function indication

8 PTC function indication

9 C° / F° indication

10 Temperature display

11 Lock indication

12 Room temperature indication

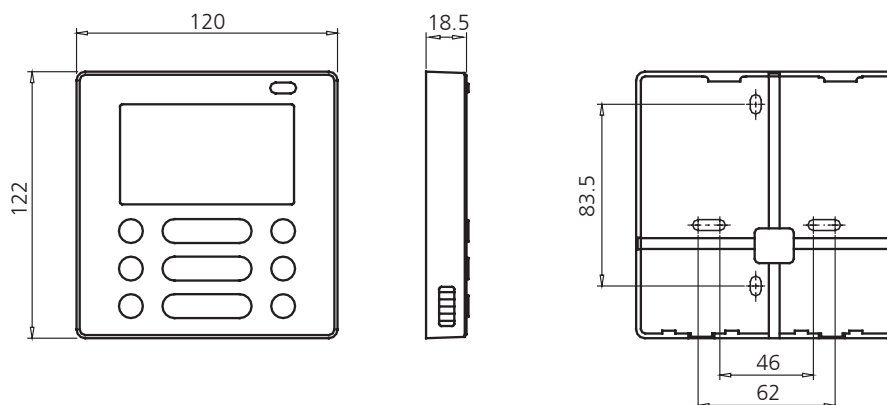
13 Clock display

14 On/Off timer

15 Timer display

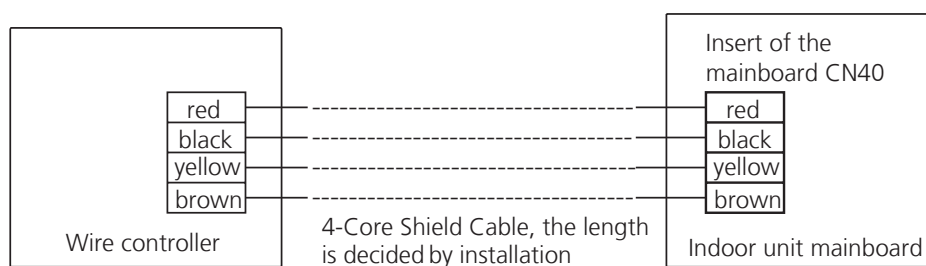
### iii) Installation

#### • Dimensions



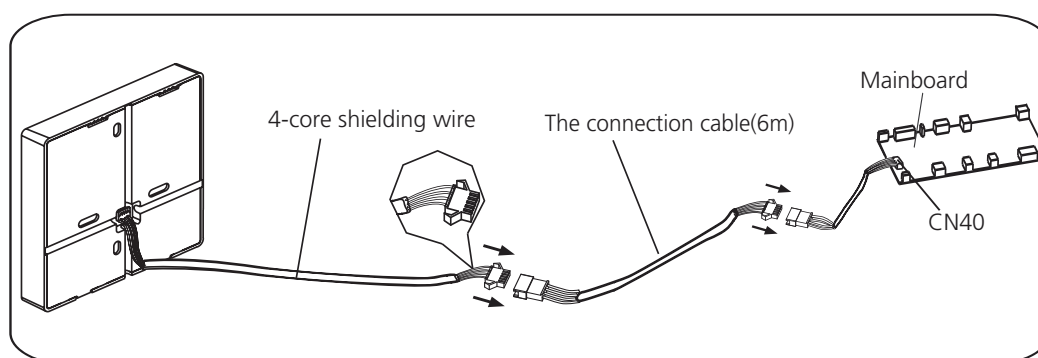
#### • Wiring diagram

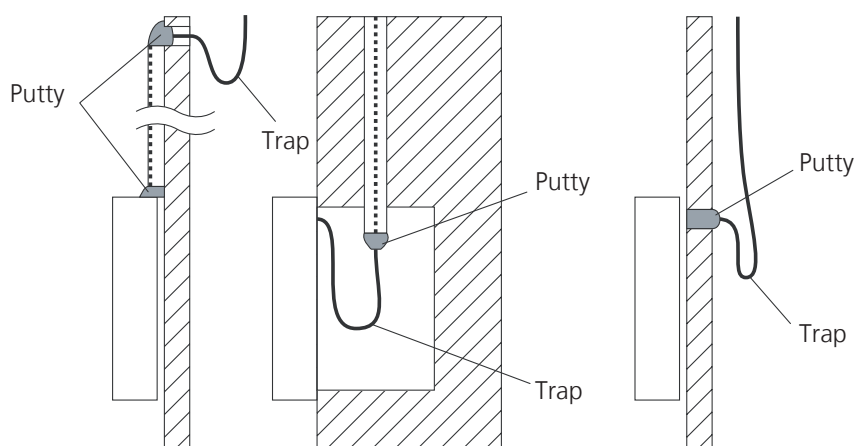
Refer to the following diagram to wire the Wall mounted type remote control to the indoor unit.



#### • Installation Diagram

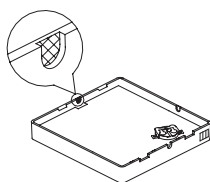
Connect the female joint of wires group from the mainboard with the male joint of connective wires group. Then connect the other side of connective wires group with the male joint of wires group leads from wire controller.



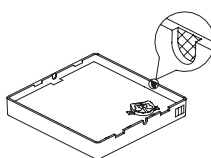


**Note: DO NOT** allow water to enter the remote control. Use the trap and putty to seal the wires.

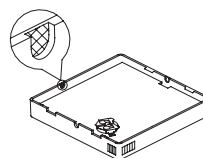
- For exposed mounting, four outletting positions. There are three need cutting.



Cutting place of top side wire outlet



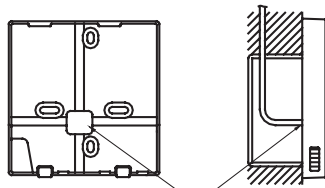
Cutting place of left side wire outlet



Cutting place of right side wire outlet

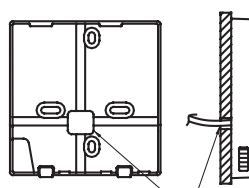
- For shielded wiring, please refer to the picture below.

Embedded switch box wiring



Wiring hole

Wiring through the wall

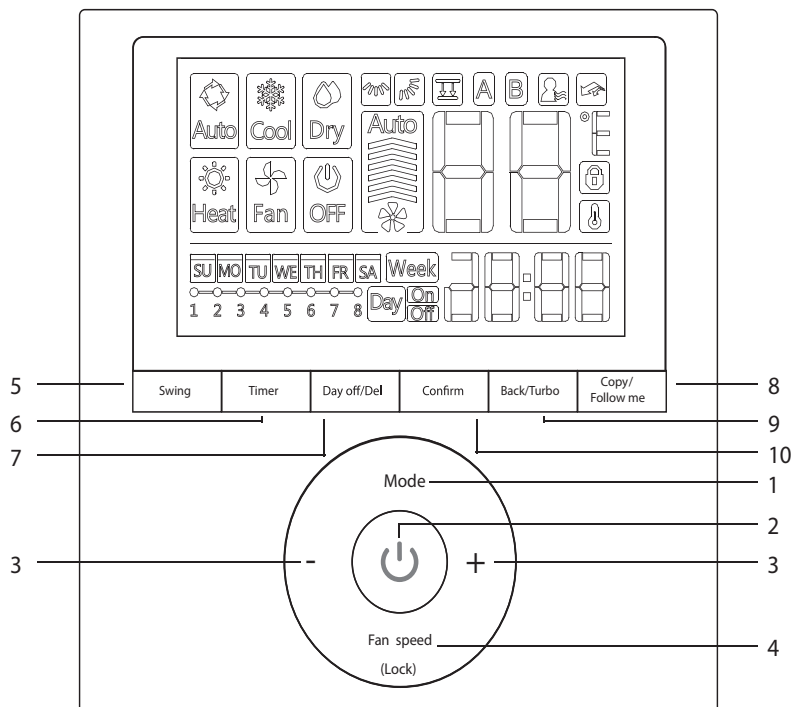


Wall hole and wiring hole  
Diameter of wall hole:  $\Phi 2\text{cm}$

### 3.2.3 LCD Wired Remote Controller KJR-120G/TF-E(Optional)

The KJR-120G/TF-E wired remote controller is optional for all types.

#### i) Buttons and Functions



#### 1. MODE button

Used to select the operation mode: Auto / Cooling / Drying / Heating / Fan;

Hold to active the operation of auto-lifting panel when off

#### 2. POWER button

Turn on of turn off the unit.

#### 3. Adjust button

To set temperature, time and timer; set up or down the auto-lifting panel

#### 4. FAN SPEED button

Used to select the fan speed.

#### 5. Swing Button

Press to active vertical swing, hold for horizontal swing

#### 6. TIMER button

To set timer on and timer off time of one day

#### 7. DELAY/DAY OFF button

To set 1 to 2 hours delay off for each day or a whole day off in a weekly timer schedule

#### 8. COPY/FOLLOW ME button

To copy timer setting of one day to another in weekly schedule setting;

To active the follow me function while in normal operation.

#### 9. BACK/TURBO button

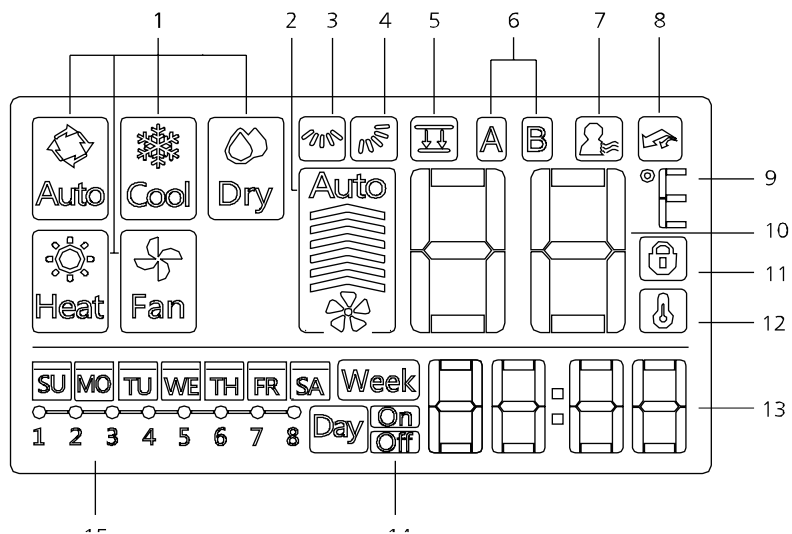
Back to previous operation or superior menu

To active turbo mode while in normal operation

#### 10. CONFIRM button

To confirm an setting or call up the superior menu

#### ii) LCD Screen



1 Operation mode indication

2 Fan speed indication

3 Left-right swing indication

4 Up-down swing indication

5 Faceplate function indication

6 Main unit and secondary unit indication

7 Follow me function indication

8 Turbo/PTC function indication

9 C° / F° indication

10 Temperature display

11 Lock indication

12 Room temperature indication

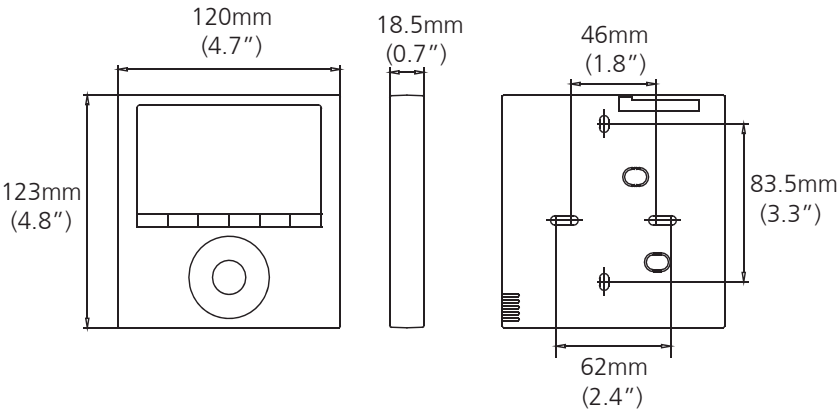
13 Clock display

14 On/Off timer

15 Timer display

iii) Installation

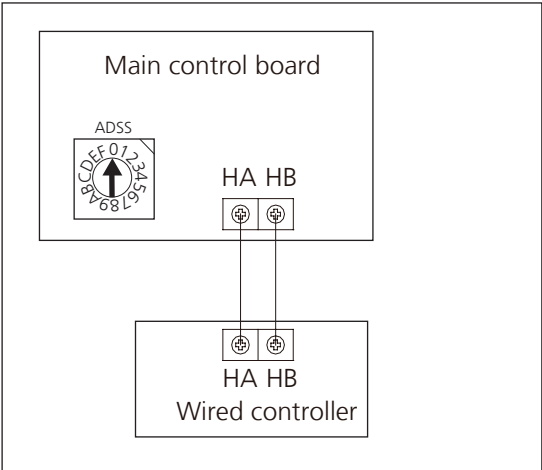
• Dimensions



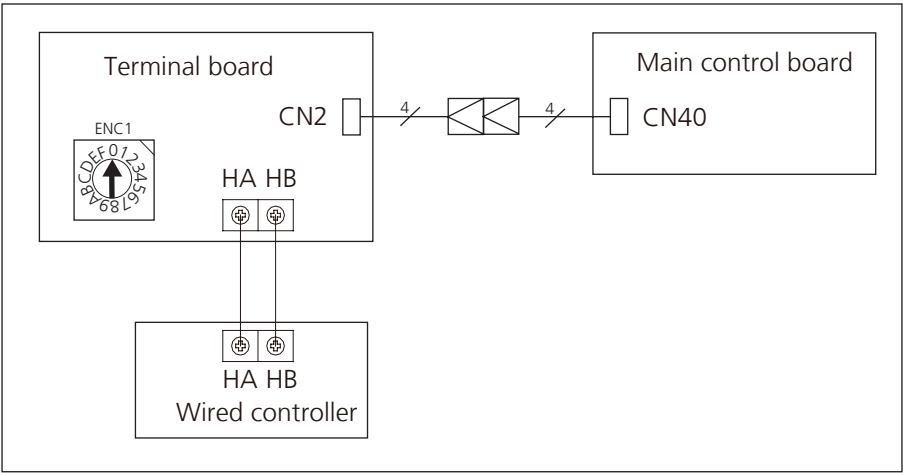
• Wiring diagram

1) Connection

For Cassette type: The wired controller connects to main control board directly.

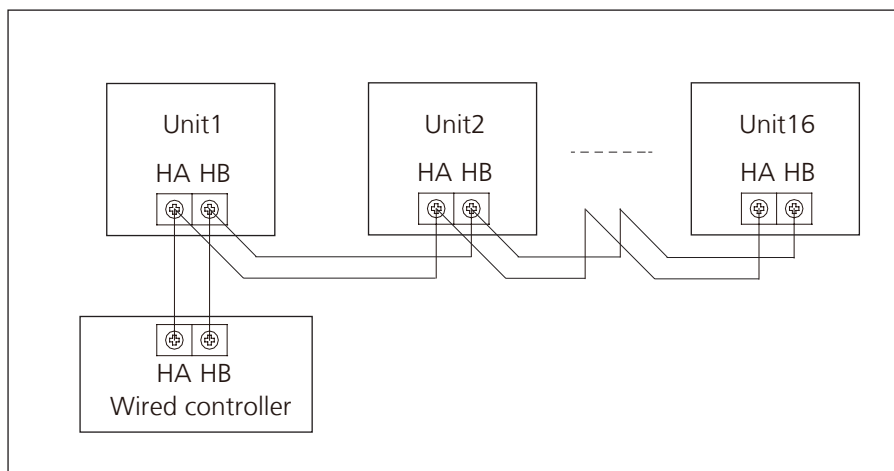


For Duct, Ceiling& floor: The wired controller connects to terminal board, terminal board connects to main control board.

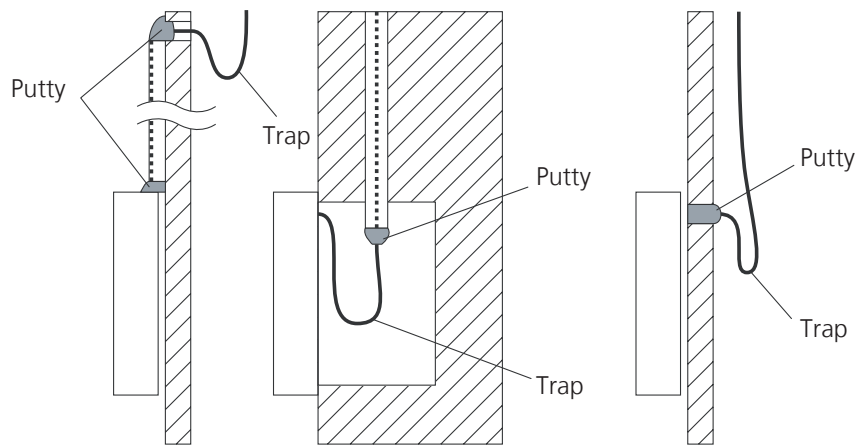




## 2) Address setting



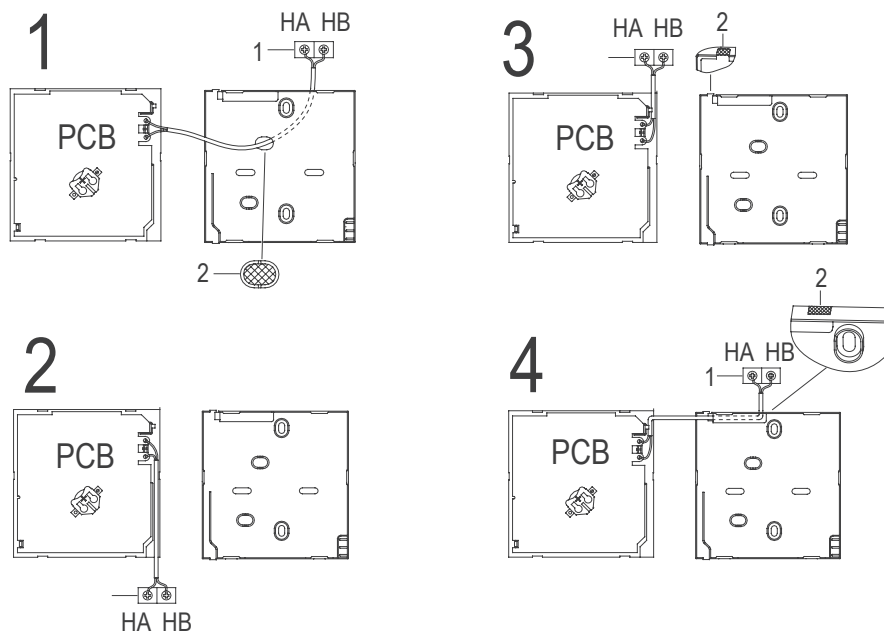
- a. One non-polarity controller can control up to 16 indoor units.
- b. When the non-polarity controller is connected to several units, every air-conditioner in network has only one network address to distinguish each other.
- c. Address code of air-conditioner in LAN is set by code switch ENC1(Duct and Ceiling& Floor) or ADSS(Cassette) of the indoor unit, and the set range is 0-15.
- d. Note: The indoor units are controlled at the same time, not independently. The purpose of setting network address is identify the unit when error occurs.



**Note: DO NOT** allow water to enter the remote control. Use the trap and putty to seal the wires.

• **For wiring the indoor unit, there are three methods:**

- From the rear;
- From the bottom;
- From the top;
- From the top center.

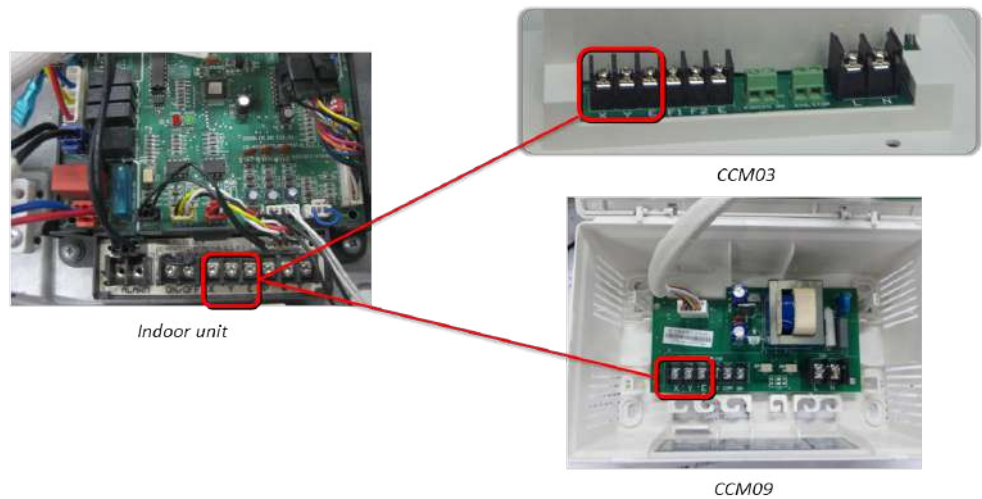


- 1: Indoor Unit.
- 2: Notch the part for the wiring to pass through with a nipper tool.
- Connect the terminals on the remote controller (HA ,HB), and the terminals of the indoor unit. (HA ,HB). (HA and HB do not have polarity.)

### 3.3 Centralized Controller

#### 1) Connection

For Light commercial air conditioner with XYE port, it can be directly connected to Centralized Controller (CCM03, CCM09).



#### 2) Address setting

When setting the address, please make sure the unit is powered off. The address can be set from 0 to 63 by the switch. Turn on the unit, then the address will be effective.

| SWITCH FOR CCM UNIT ADDRESS |       |  |       |
|-----------------------------|-------|--|-------|
| S2 + S1                     |       |  |       |
| ADDRESS                     | 0~15  |  | 16~31 |
| Factory Setting             | ✓     |  |       |
| S2 + S1                     |       |  |       |
| ADDRESS                     | 32~47 |  | 48~63 |
| Factory Setting             |       |  |       |

Note: For light commercial air conditioner with XYE port, it can be also connected to BMS (Building Management System).

If there is any CAC (central air conditioner ) connecting with the central controller at the same time, please set the address from largest (63,62,61...), since the CAC units could obtain address automatically from the smallest (00,01,02...)

### 3.4 Using the wire controller to set external static pressure

- You can use the unit's automatic airflow adjustment function to set external static pressure.
- Automatic airflow adjustment is the volume of blow-off air that has been automatically adjusted to the quantity rated.

1. Make sure the test run is done with a dry coil. If the coil is not dry, run the unit for 2 hours in FAN ONLY mode to dry the coil.

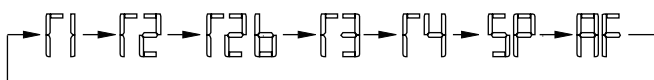
2. Check that both power supply wiring and duct installation have been completed. Check that any closing dampers are open. Check that the air filter is properly attached to the air suction side passage of the unit.

3. If there is more than one air inlet and outlet, adjust the dampers so that the airflow rate of each air inlet and outlet conforms with the designed airflow rate. Make sure the unit is in FAN ONLY mode. Press and set the airflow adjustment button on the remote control to change the airflow rate from H or L.

4. Set the parameters for automatic airflow adjustment. When the air conditioning unit is off, perform the following steps:

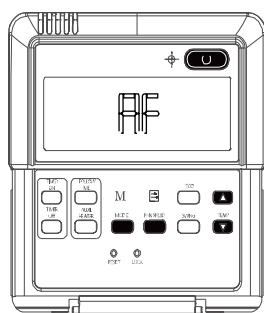
- When the unit is turned off, hold the MODE button and FAN button down together for three seconds. ("AF" indicator flashes for 3 times.)

- Press "Δ" or "∇" to select the AF.



- Press "MODE". The air conditioning unit will then start the fan for airflow automatic adjustment.

After 3 to 6 minutes, the air conditioning unit stops operating once automatic airflow adjustment has finished.



Caution: DO NOT adjust the dampers when automatic airflow adjustment is active.

Caution:

- If there is no change after airflow adjustment in the

ventilation paths, be sure to reset automatic airflow adjustment.

- If there is no change to ventilation paths after airflow adjustment, contact your dealer, especially if this occurs after testing the outdoor unit or if the unit has been moved to a different location.

- Do not use automatic airflow adjustment with remote control, if you are using booster fans, outdoor air processing unit, or a HRV via duct.

- If the ventilation paths have been changed, reset airflow automatic adjustment as described from step 3 onwards.

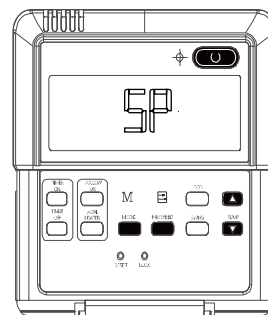
### 3.5 Using the wire controller to set airflow rate

When the air conditioning unit is off, perform the following steps:

1. Press "MODE" and "FAN" for three seconds.

2. Press "Δ" or "∇" to select the SP.

3. Press "MODE" to set the airflow rate in the range of 0~4.



"0": No airflow change

"1" ~ "4": Airflow increase progressively

4. Press "ON/OFF" to finish the airflow setting.

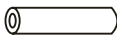

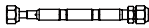





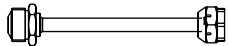
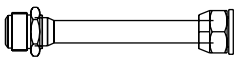


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# Installation

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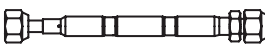

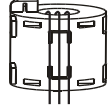
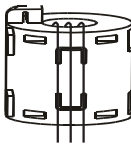
## Accessories-A6 Duct type:

|                                                           | Name                                                                                                                                                                                                                                                                                                              | Shape                                                                                               | Quantity                            |
|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------|
| <b>Tubing &amp; Fittings</b>                              | Soundproof / insulation sheath                                                                                                                                                                                                                                                                                    |                  | 2                                   |
|                                                           | Seal sponge (some models)                                                                                                                                                                                                                                                                                         |                  | 1                                   |
|                                                           | Orifice (some models)                                                                                                                                                                                                                                                                                             |                   | 1                                   |
| <b>Drainpipe Fittings<br/>(for cooling &amp; heating)</b> | Drain joint (some models)                                                                                                                                                                                                                                                                                         |                  | 1                                   |
|                                                           | Seal ring (some models)                                                                                                                                                                                                                                                                                           |                  | 1                                   |
| <b>EMC Magnetic Ring (some models)</b>                    | Magnetic ring(Wrap the electric wires S1 & S2 ( P & Q & E ) around the magnetic ring twice)                                                                                                                                                                                                                       | <br>S1&S2(P&Q&E) | 1                                   |
|                                                           | Magnetic ring(Hitch on the connective cable between the indoor unit and outdoor unit after installation.)                                                                                                                                                                                                         |                  | 1                                   |
| <b>Others</b>                                             | Manual                                                                                                                                                                                                                                                                                                            | -                                                                                                   | 2~4                                 |
|                                                           | Transfer connector( $\phi 12.7$ - $\phi 15.9$ )/( $\phi 0.5$ in- $\phi 0.63$ in)(Packed with the indoor unit )<br><br>NOTE: Pipe size may differ from appliance to appliance. To meet different pipe size requirements, sometimes the pipe connections need a transfer connector installed on the outdoor unit.   |                  | 1<br>(on some models)               |
|                                                           | Transfer connector( $\phi 6.35$ - $\phi 9.52$ )/( $\phi 0.25$ in- $\phi 0.375$ in)(Packed with the indoor unit )<br><br>NOTE: Pipe size may differ from appliance to appliance. To meet different pipe size requirements, sometimes the pipe connections need a transfer connector installed on the outdoor unit. |                 | 1<br>(on some models)               |
|                                                           | Transfer connector( $\phi 9.52$ - $\phi 12.7$ )/( $\phi 0.375$ in- $\phi 0.5$ in)(Packed with the indoor unit )<br><br>NOTE: Pipe size may differ from appliance to appliance. To meet different pipe size requirements, sometimes the pipe connections need a transfer connector installed on the outdoor unit.  |                 | 1<br>(on some models)               |
|                                                           | Connecting wire for display (2m)                                                                                                                                                                                                                                                                                  | -                                                                                                   | 1(on some models)                   |
|                                                           | Cord protection rubber ring                                                                                                                                                                                                                                                                                       |                | 1(on some models)                   |
|                                                           | Display panel<br>*Just for testing purposes only                                                                                                                                                                                                                                                                  |                 | 1(on some models-KJR-120G,KJR-120H) |

Optional accessories:

- There are two types of remote controls: wired and wireless.
- Select a remote controller based on customer preferences and requirements and install in an appropriate place.
- Refer to catalogues and technical literature for guidance on selecting a suitable remote controller.




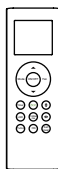

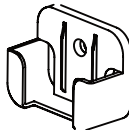


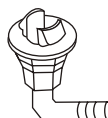
## Accessories-Compact cassette type:

|                                                 | Name                                                                                                            | Shape                                                                                                 | Quantity |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|----------|
| <b>Indoor unit installation</b>                 | Installation paper template<br>(some models)                                                                    |                     | 1        |
| <b>Refrigeration Fittings</b>                   | Soundproof/insulation sheath<br>(some models)                                                                   |                    | 1        |
| <b>Drainpipe Fittings</b>                       | Outlet pipe sheath(some models)                                                                                 |                     | 1        |
|                                                 | Outlet pipe clasp(some models)                                                                                  |                    | 1        |
|                                                 | Drain joint (some models)                                                                                       |                    | 1        |
|                                                 | Seal ring (some models)                                                                                         |                    | 1        |
| <b>Installation Accessory<br/>(some models)</b> | Ceiling hook                                                                                                    |                    | 4        |
|                                                 | Copper nut(some units)<br>Used to make the connective pipes<br>between indoor and outdoor units.                |                  |          |
|                                                 | Suspension bolt                                                                                                 |                   | 4        |
|                                                 | Orifice tube (some units)                                                                                       |                   | 1        |
|                                                 | Anti-shock rubber                                                                                               |                  | 1        |
| <b>EMC Magnetic<br/>Ring (some models)</b>      | Magnetic ring (wrap the electric wires<br>S1 & S2 ( P & Q & E ) around the<br>magnetic ring twice)              | <br>S1&S2(P&Q&E) | 1        |
|                                                 | Magnetic ring (Hitch it on the<br>connective cable between indoor unit<br>and outdoor unit after installation.) |                  | 1        |
| <b>Others</b>                                   | Manual                                                                                                          | -                                                                                                     | 2~4      |

Optional accessories:

- There are two types of remote controls: wired and wireless.
- Select a remote controller based on customer preferences and requirements and install in an appropriate place.
- Refer to catalogues and technical literature for guidance on selecting a suitable remote controller.

## Accessories-wall-mounted type

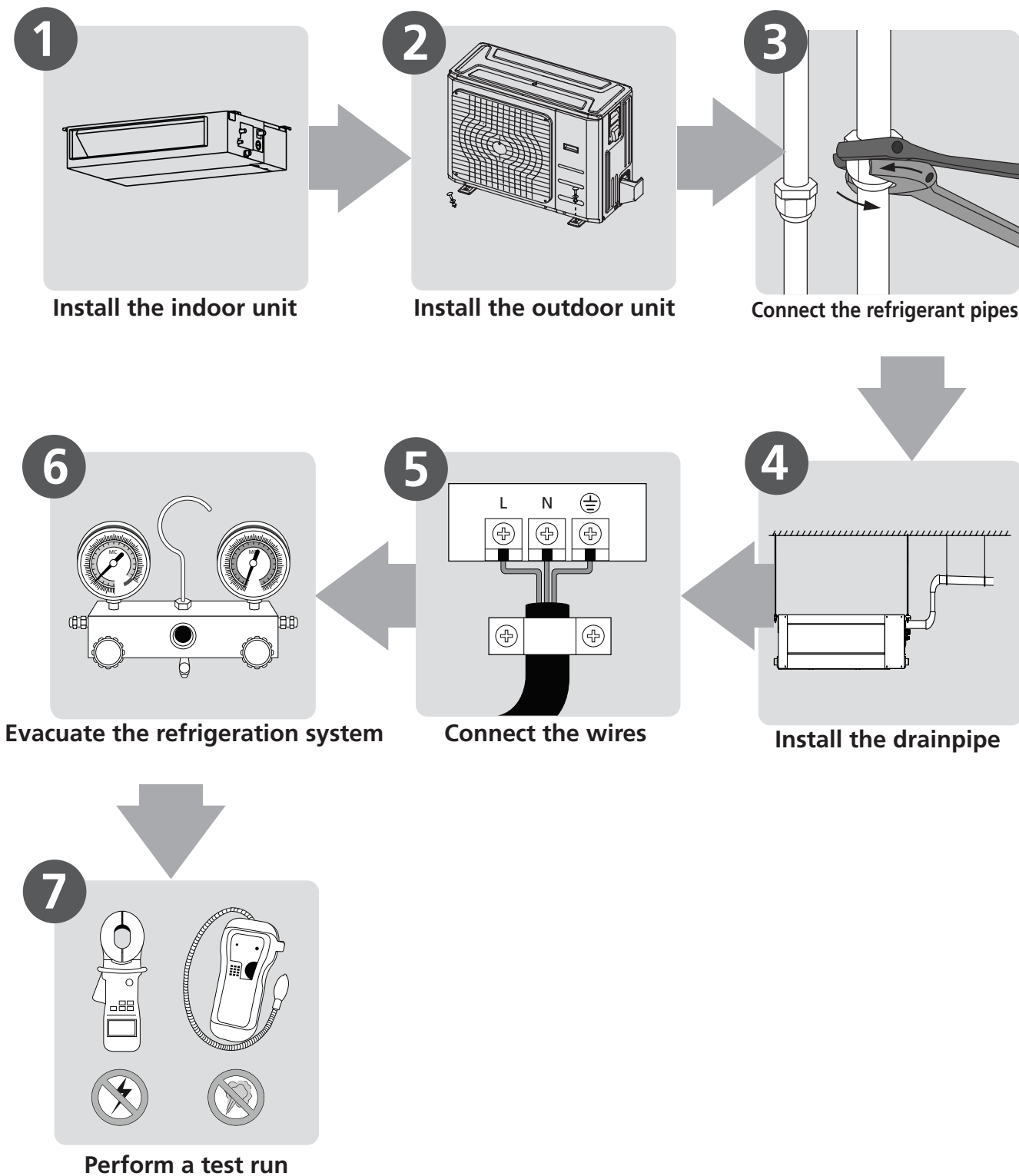
| Name                                                 |  | Shape                                                                               | Quantity                                |                   |
|------------------------------------------------------|--|-------------------------------------------------------------------------------------|-----------------------------------------|-------------------|
| Mounting plate                                       |  |    | 1                                       |                   |
| Clip anchor                                          |  |    | 5                                       |                   |
| Mounting plate fixing screw ST3.9 X 25               |  |    | 5                                       |                   |
| Remote controller                                    |  |    | 1                                       |                   |
| Fixing screw for remote controller holder ST2.9 x 10 |  |    | 2                                       | Optional<br>Parts |
| Remote controller holder                             |  |   | 1                                       |                   |
| Dry battery AAA.LR03                                 |  |  | 2                                       |                   |
| Seal                                                 |  |  | 1(for cooling & heating<br>models only) |                   |
| Drain joint                                          |  |  |                                         |                   |
| Manual                                               |  |                                                                                     | 2~3                                     |                   |

|                          |             |               |                                                                        |
|--------------------------|-------------|---------------|------------------------------------------------------------------------|
| Connecting pipe assembly | Liquid side | Φ6.35 (1/4in) | Parts you must purchase.<br>Consult the dealer about<br>the pipe size. |
|                          |             | Φ9.52 (3/8in) |                                                                        |
|                          | Gas side    | Φ9.52 (3/8in) |                                                                        |
|                          |             | Φ12.7 (1/2in) |                                                                        |
|                          |             | Φ15.9 (5/8in) |                                                                        |

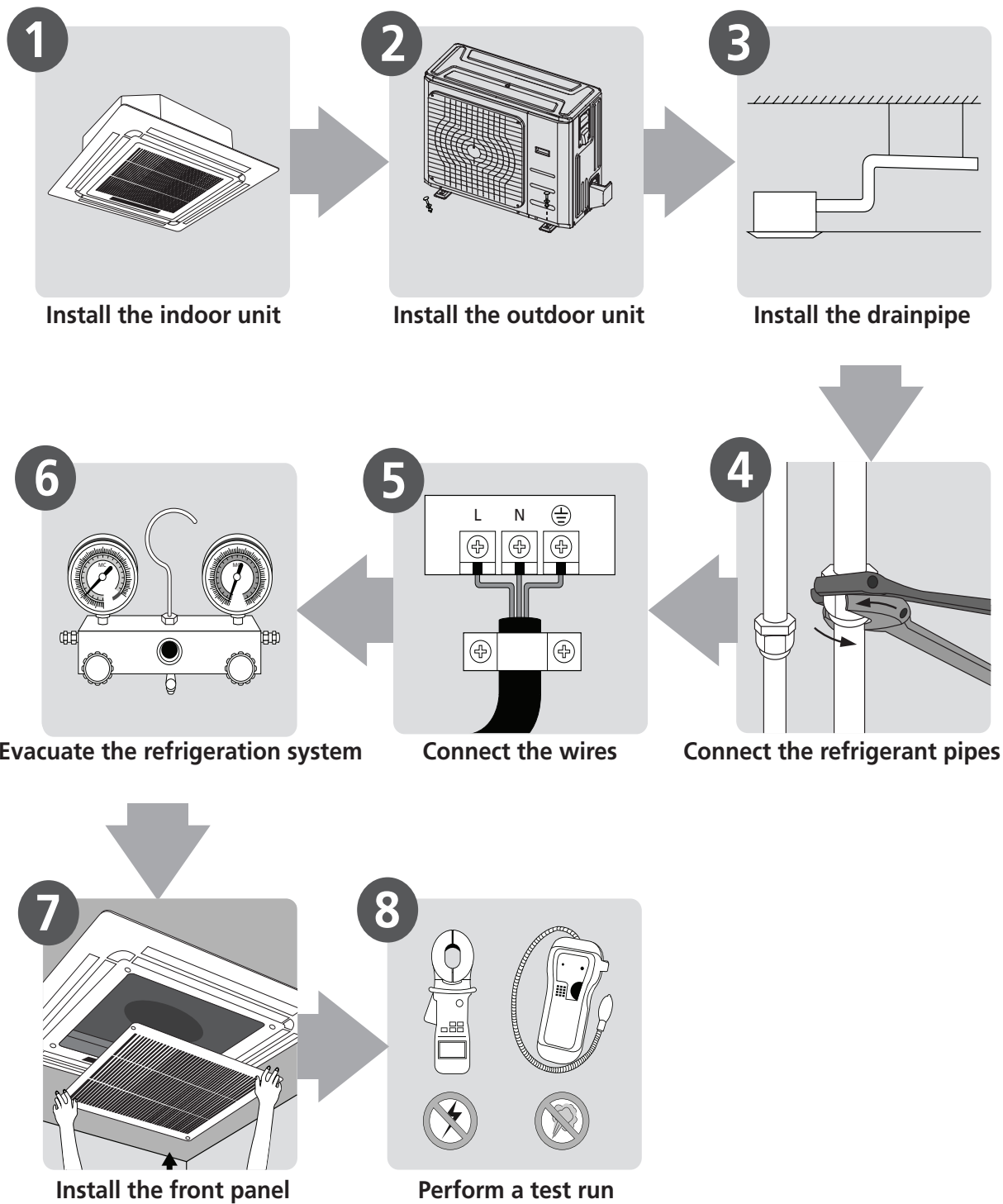


## 1. Installation Overview

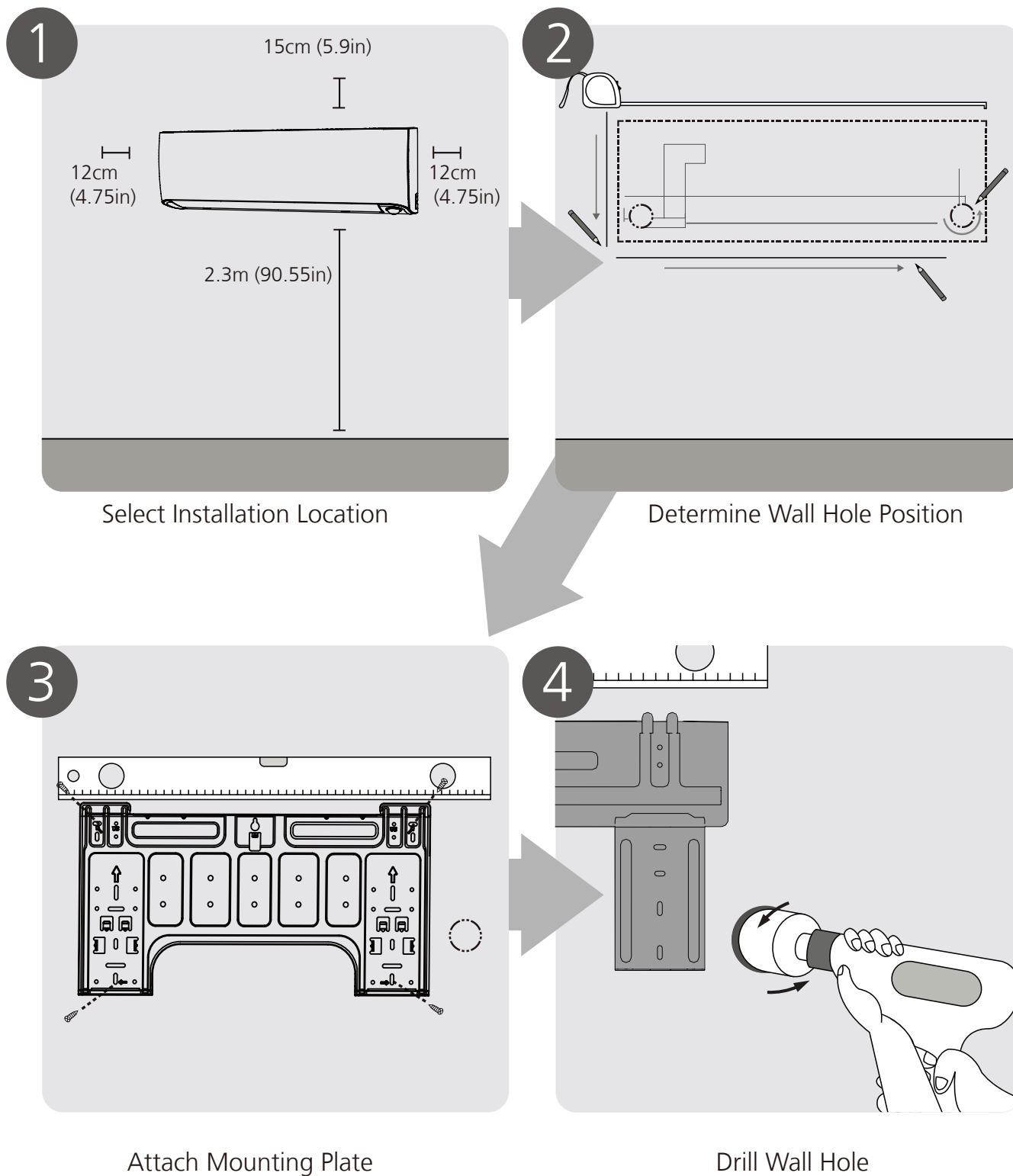
Installation Order-A6 Duct type

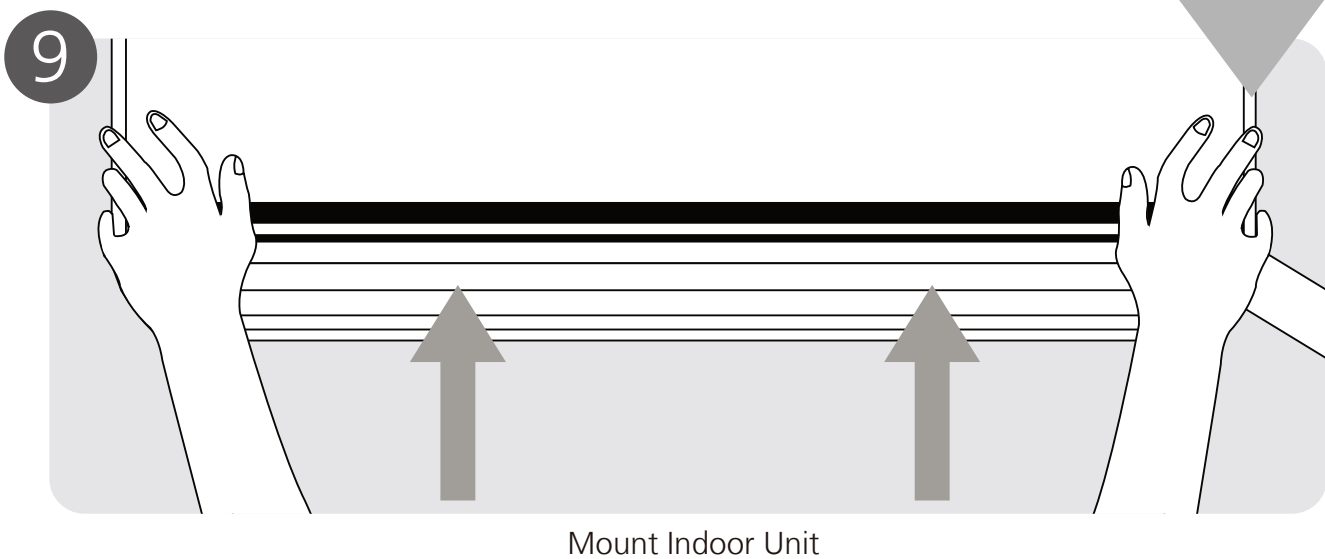
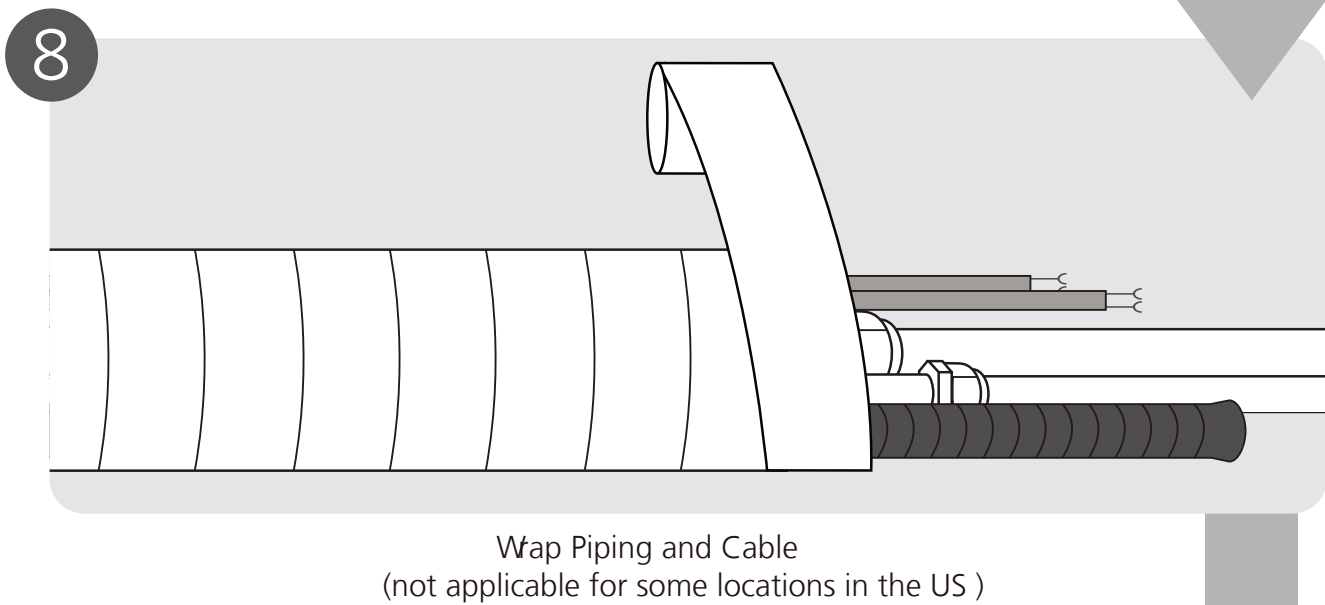
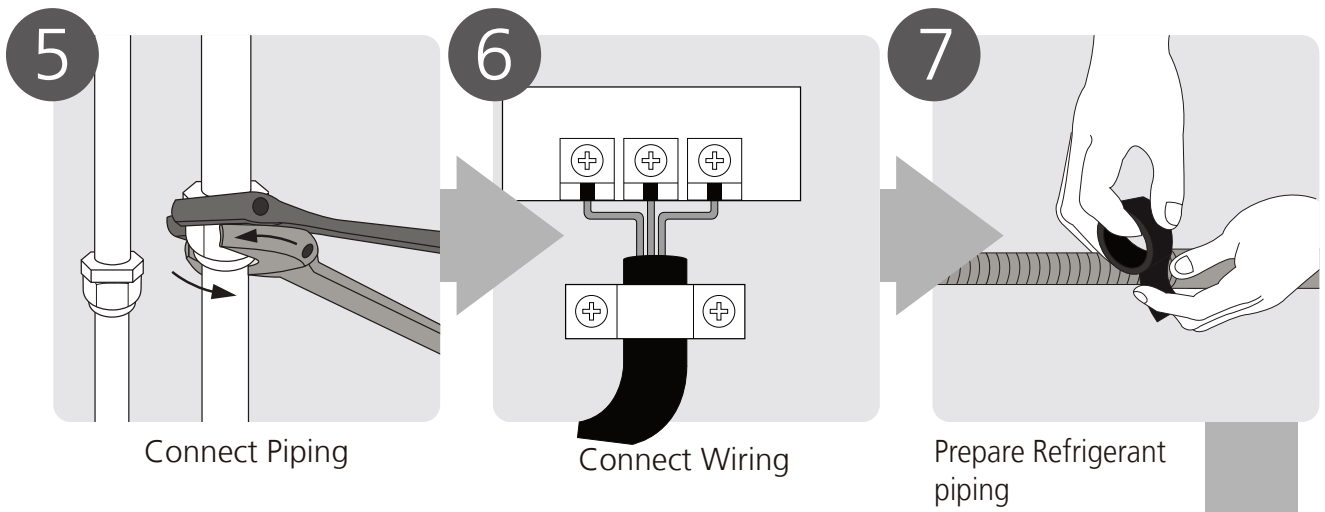


## Installation Order-Compact cassette type



## Installation Order-Wall mounted type





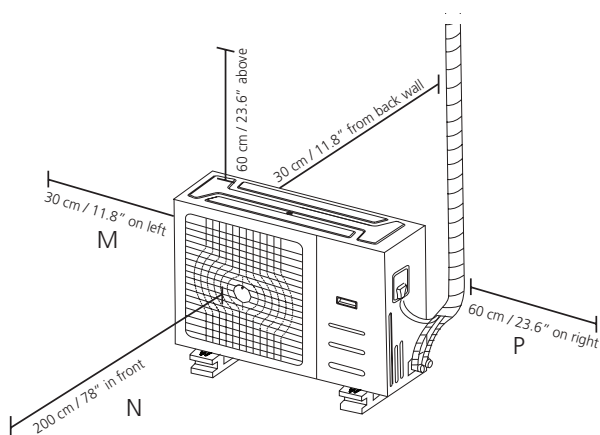
## 2. Location selection

**2.1 Unit location selection can refer to installation manual.**

**2.2 DO NOT install the unit in the following locations:**

- Where oil drilling or fracking is taking place.
- Coastal areas with high salt content in the air.
- Areas with caustic gases in the air, such as near hot springs.
- Areas with power fluctuations, such as factories.
- Enclosed spaces, such as cabinets.
- Areas with strong electromagnetic waves.
- Areas that store flammable materials or gas.
- Rooms with high humidity, such as bathrooms or laundry rooms.
- If possible, DO NOT install the unit where it is exposed to direct sunlight.

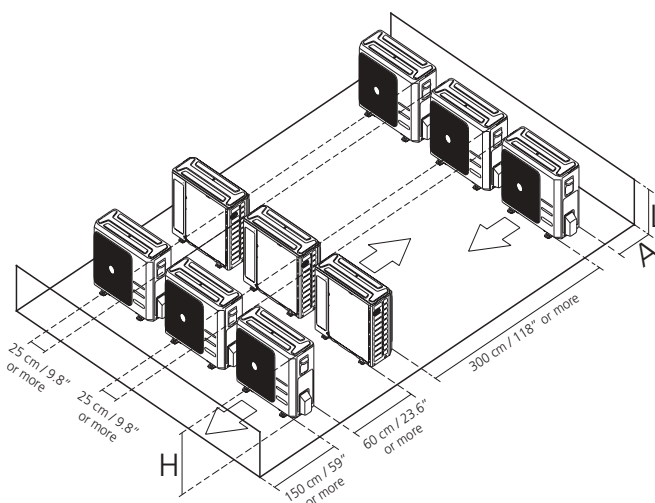
**2.3 The minimum distance between the outdoor unit and walls described in the installation guide does not apply to airtight rooms. Be sure to keep the unit unobstructed in at least two of the three directions (M, N, P)**



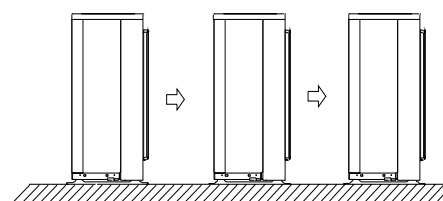
## 2.4 Rows of series installation

The relations between H, A and L are as follows.

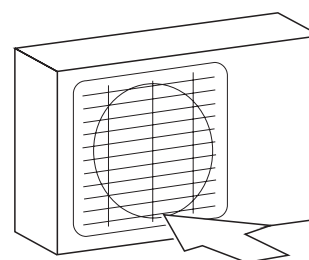
|            | L                    | A                     |
|------------|----------------------|-----------------------|
| $L \leq H$ | $L \leq 1/2H$        | 25 cm / 9.8" or more  |
|            | $1/2H < L \leq H$    | 30 cm / 11.8" or more |
| $L > H$    | Can not be installed |                       |



DO NOT install the rows of series like following figure.



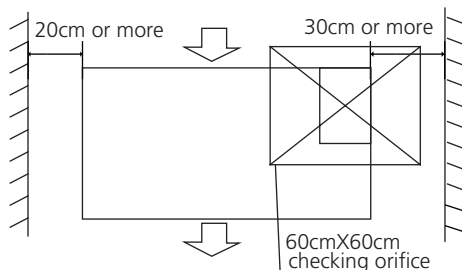
**2.5 If the location is exposed to strong winds (for example: near a seaside), the unit must be placed against the wall to shelter it from the wind. If necessary, use an awning.**



**DO NOT** Strong wind

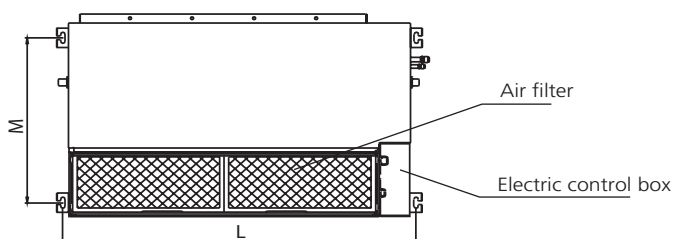
### 3. Indoor Unit Installation(A6 Duct type)

#### 3.1 Service space for indoor unit



#### 3.2 Hang Indoor Unit

1. Please refer to the following diagrams to locate the four positioning screw bolt hole on the ceiling. Be sure to mark the areas where ceiling hook holes will be drilled.



| Capacity(Btu/h) | Size of mounted plug |     |
|-----------------|----------------------|-----|
|                 | L                    | M   |
| 7k/9k/12k       | 741                  | 360 |
| 18k             | 920                  | 508 |

2. Install and fit pipes and wires after you have finished installing the main body. When choosing where to start, determine the direction of the pipes to be drawn out.

Especially in cases where there is a ceiling involved, align the refrigerant pipes, drain pipes, and indoor and outdoor lines with their connection points before mounting the unit..

3. Install hanging screw bolts.

- 1) Cut off the roof beam.
- 2) Strengthen the point at which the cut was made. Consolidate the roof beam..

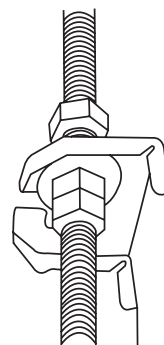
4. After you select an installation location, align the refrigerant pipes, drain pipes, as well as indoor and outdoor wires with their connection points before mounting the unit..

5. Drill 4 holes 10cm (4") deep at the ceiling hook positions in the internal ceiling. Be sure to hold the drill at a 90° angle to the ceiling.

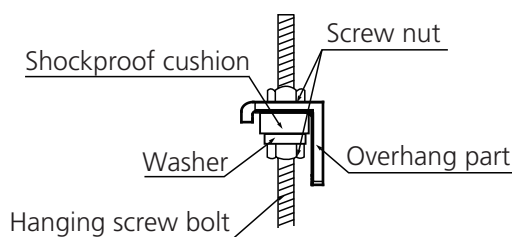
6. Secure the bolt using the included washers and nuts.

7. Install the four suspension bolts.

8. Mount the indoor unit with at least two people to lift and secure it. Insert suspension bolts into the unit's hanging holes. Fasten them using the washers and nuts provided.



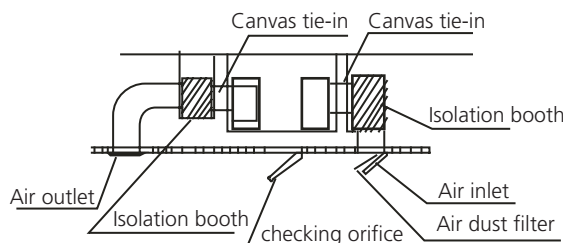
9. Mount the indoor unit onto the hanging screw bolts with a block. Position the indoor unit flat using a level indicator to prevent leaks.



Note: Confirm the minimum drain tilt is 1/100 or more.

#### 3.3 Duct and accessories installation

1. Install the filter(optional) according to air inlet size.
2. Install the canvas tie-in between the body and duct.
3. The air inlet and air outlet duct should be far enough apart enough to avoid air passage short-circuit.
4. Connect the duct according to the following diagram.



5. Refer to the following static pressure guidelines when installing the indoor unit.

| Capacity(Btu/h) | Static Pressure(Pa) |
|-----------------|---------------------|
| 7k/9k           | 0-40                |
| 12k             | 0-60                |
| 18k             | 0-100               |

Change the fan motor static pressure according to external duct static pressure.

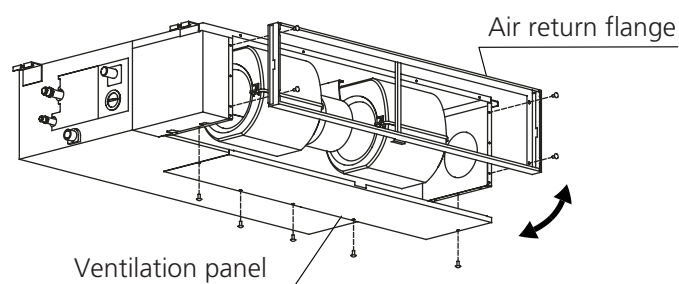
NOTE: 1. Do not put the connecting duct weight on the indoor unit.

2. When connecting duct, use inflammable canvas tie-in to prevent vibrating.

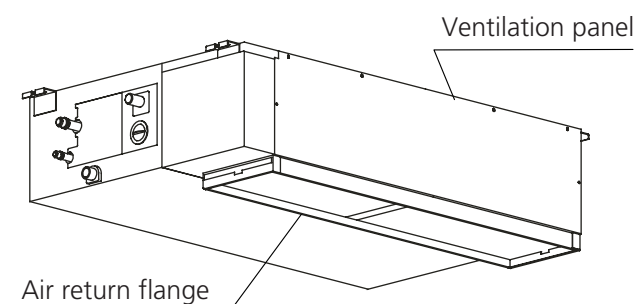
3. Insulation foam must be wrapped outside the duct to avoid condensate. An internal duct underlayer can be added to reduce noise, if the end-user requires.

### 3.4 Adjust the air inlet direction(From rear side to under-side.)

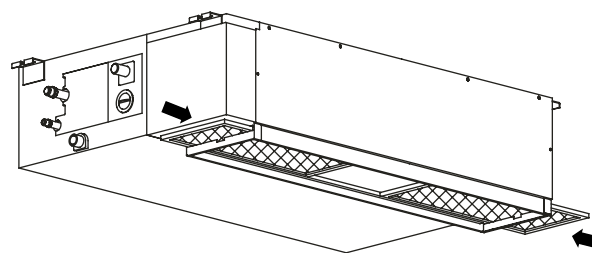
1. Take off ventilation panel and flange,



2. Change the mounting positions of ventilation panel and air return flange .



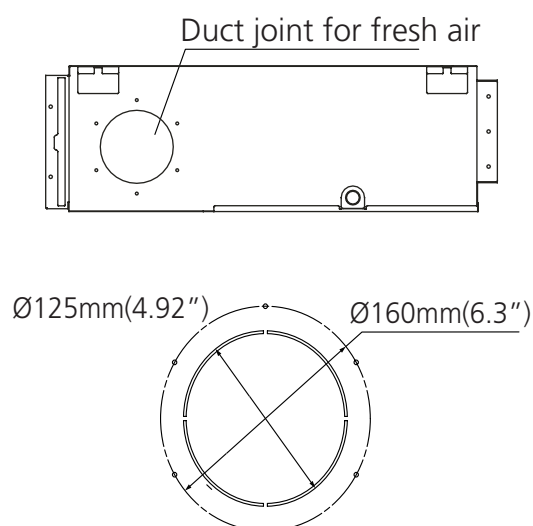
3. When installing the filter mesh, fit it into the flange as illustrated in the following figure.



NOTE: All the figures in this manual are for demonstration purposes only. The air conditioner you have purchased may be slightly different in design, though similar in shape.

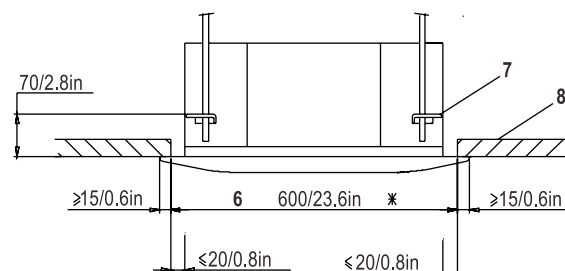
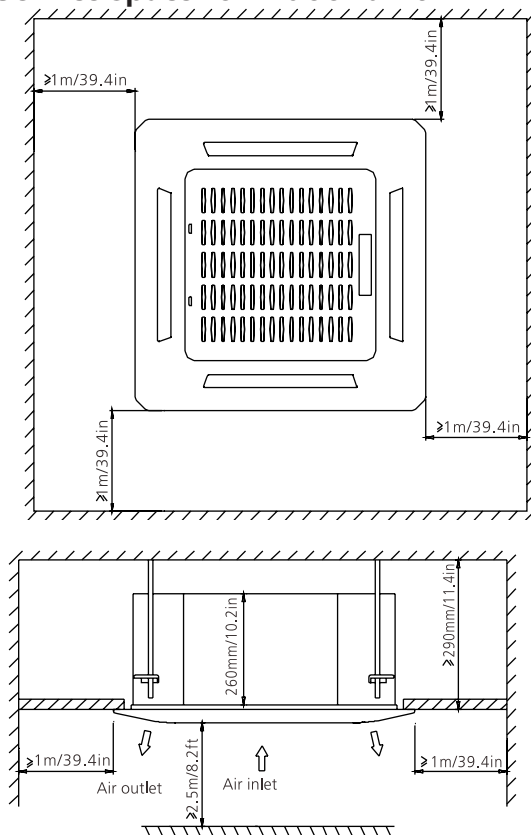
### 3.5 Fresh air duct installation

Dimension :



### 3. Indoor Unit Installation(Compact Cassette Type)

#### 3.1 Service space for indoor unit



- 1 Suspension bolt pitch dimensions
- 2 Body dimensions
- 3 Decoration panel dimensions
- 4 Refrigerant piping
- 5 Suspension bolt (×4)
- 6 Ceiling opening dimensions
- 7 Hanger bracket
- 8 Ceiling board

2. Drill 4 holes 5cm (2") deep at the ceiling hook positions in the internal ceiling. Be sure to hold the drill at a 90° angle to the ceiling.

3. Using a hammer, insert the ceiling hooks into the pre-drilled holes. Secure the bolt using the included washers and nuts.

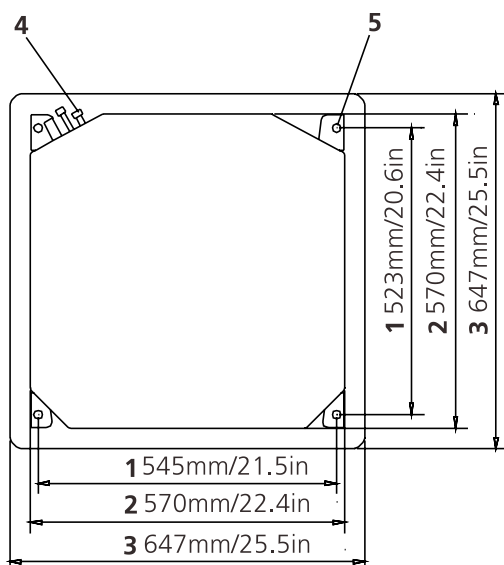
4. Install the four suspension bolts



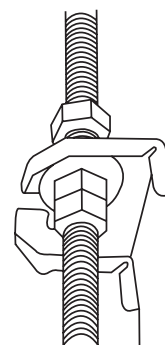
#### 3.2 Hang Indoor Unit

1. Use the included paper template to cut a rectangular hole in the ceiling, leaving at least 1m (39.4") on all sides. The cut hole size should be 4cm(1.6") larger than the body size.

Be sure to mark the areas where ceiling hook holes will be drilled.



5. Mount the indoor unit. You will need two people to lift and secure it. Insert suspension bolts into the unit's hanging holes. Fasten them using the included washers and nuts

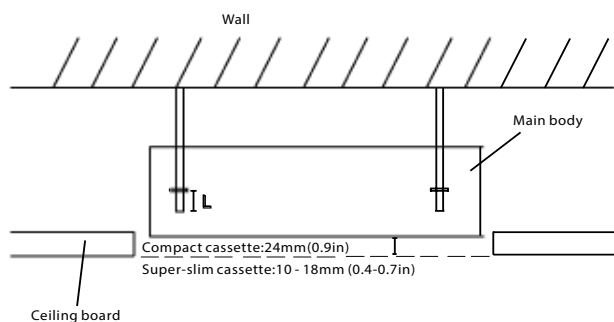


Adjust the position to ensure the gaps between the indoor



unit and the four sides of false ceiling are even. The bottom of the unit should be 24mm / 0.9in higher than ceiling board.

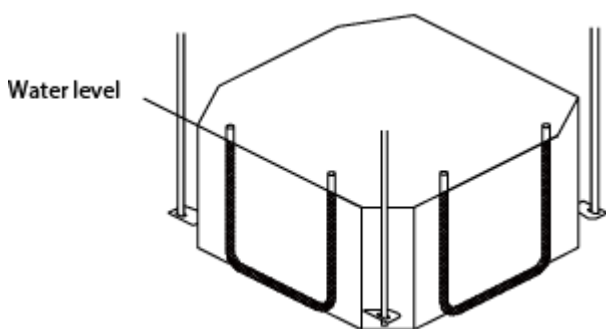
Generally, L should be half the length of the suspension bolt or long enough to prevent the nuts from coming off



#### CAUTION:

Ensure that the unit is completely level.

The unit is equipped with a built-in drain pump and float switch. If the unit is tilted against the direction of condensate flows (the drainpipe side is raised), the float switch may malfunction and cause water to leak.



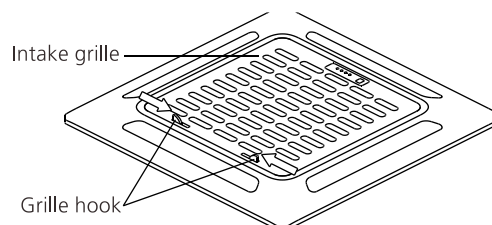
#### NOTE FOR NEW HOME INSTALLATION

When installing the unit in a new home, the ceiling hooks can be embedded in advance. Make sure that the hooks do not come loose due to concrete shrinkage. After installing the indoor unit, fasten the installation paper template onto the unit with bolts (M6X12) to determine in advance the dimension and position of the opening on the ceiling. Follow the instructions above for the remainder of the installation.

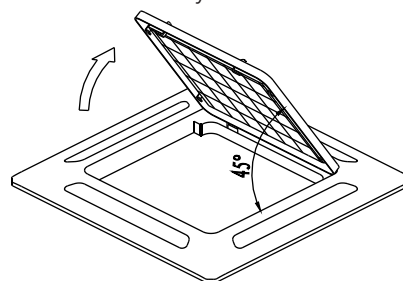
### 3.3 Compact Cassette Panel Installation

#### 3.3.1 Remove the front grille

1. Slide the 2 grille hooks toward the middle of the decoration panel.

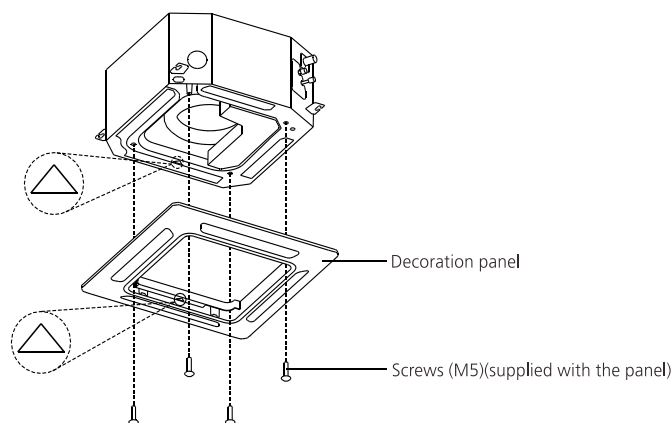


2. Hold the grille at a 45° angle, lift it up slightly and detach it from the main body.

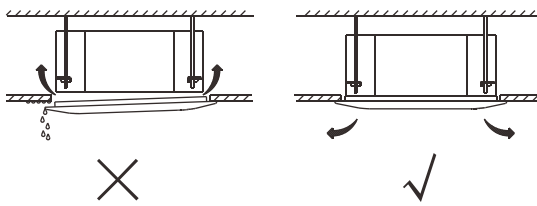


#### 3.3.2 Install the panel

1. Align the indicate "△" on the decoration panel to the indicate "△" on the unit .
2. Attach the decoration panel to the unit with the supplied screws as shown in figure below.

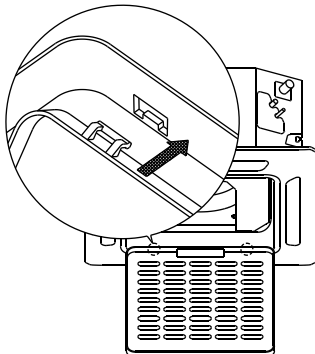


3. After installing the panel, ensure that there is no space between the unit body and decoration panel. Otherwise air may leak through the gap and cause dewdrop.

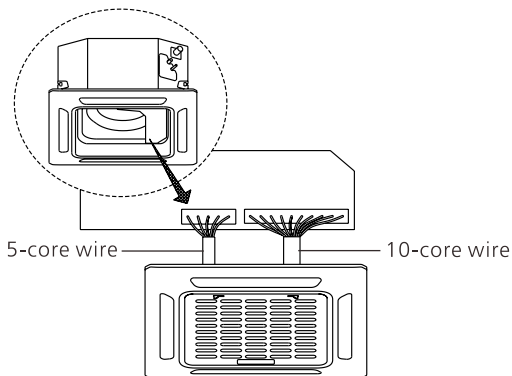


### 3.3.3 Mount the grille

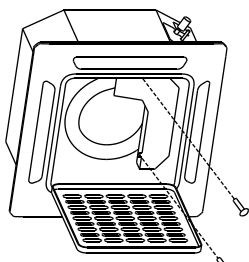
Ensure that the buckles at the back of the grille be properly seated in the groove of the panel.



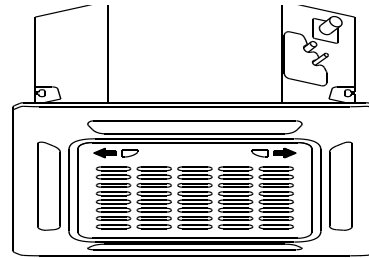
### 3.3.4 Connect the two wires of the panel to the main board of the unit.



### 3.3.5 Fasten the control box lid with two screws .

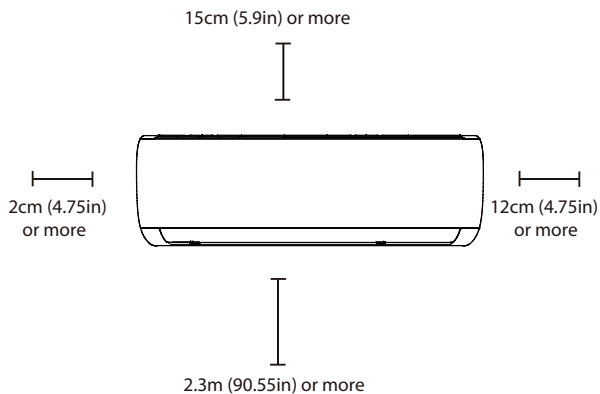


### 3.3.6 Close the front grille, and close the two grille hooks.



### 3. Indoor Unit Installation(wall mounted type)

#### 3.1 Service space for indoor unit



#### 3.2 Attach mounting plate to wall

- **The mounting plate is the device on which you will mount the indoor unit.**

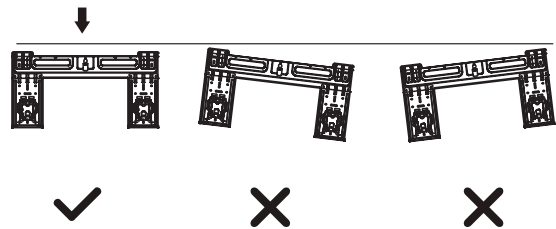
1. Remove the screw that attaches the mounting plate to the back of the indoor unit.
2. Place the mounting plate against the wall in a location that meets the standards in the Select Installation Location step. (See Mounting Plate Dimensions for detailed information on mounting plate sizes.)
3. Drill holes for mounting screws in places that:
  - have studs and can support the weight of the unit.
  - correspond to screw holes in the mounting plate.
4. Secure the mounting plate to the wall with the screws provided.
5. Make sure that mounting plate is flat against the wall.

- **Mounting plate dimensions**

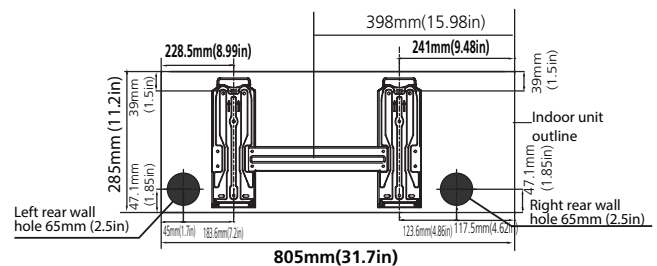
Different models have different mounting plates. In order to ensure that you have ample room to mount the indoor unit, the diagrams to the right show different types of mounting plates along with the following dimensions:

1. Width of mounting plate
2. Height of mounting plate
3. Width of indoor unit relative to plate
4. Height of indoor unit relative to plate
5. Recommended position of wall hole (both to the left and right of mounting plate)
6. Relative distances between screw holes

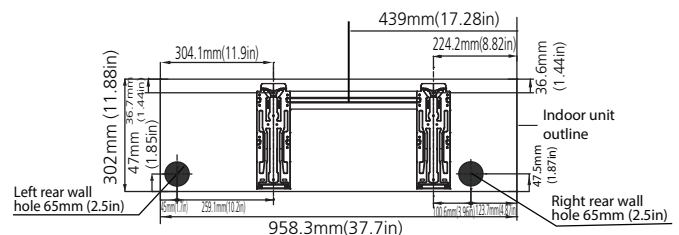
Correct orientation of Mounting Plate



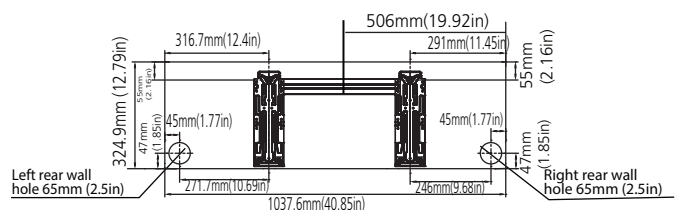
For Forest series:



7K/9K/12K Models

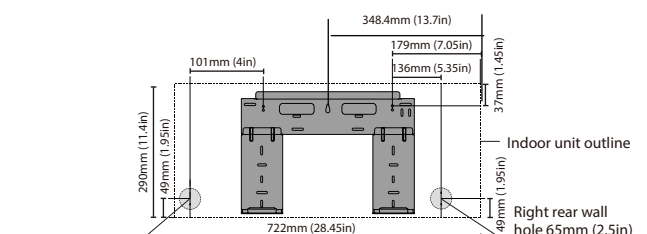


18K Model

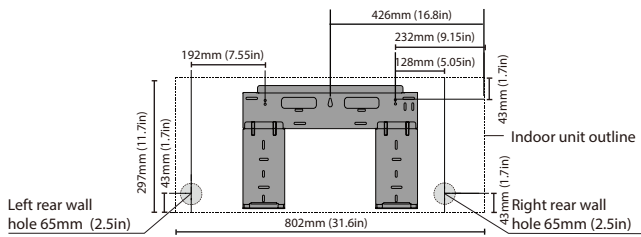


24K Model

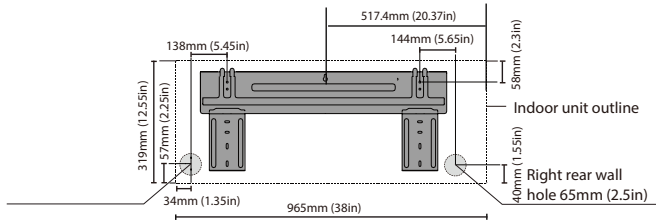
For Aurora series:



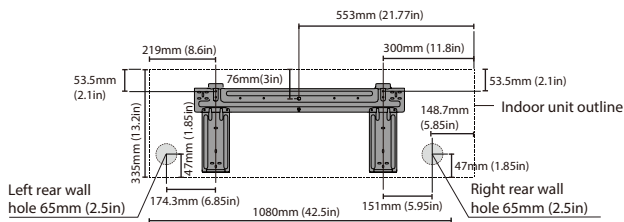
9K Model



12K Model

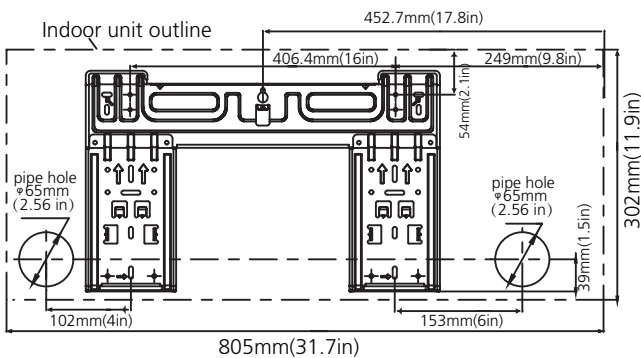


18K Model

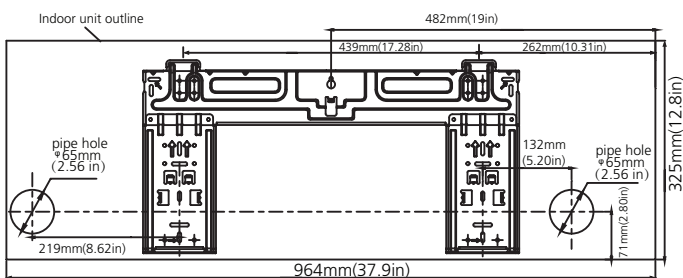


24K Model

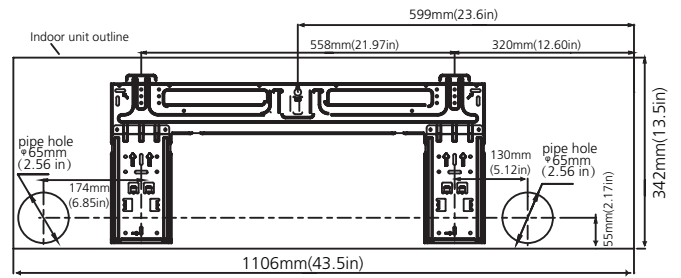
For All Easy series:



9K/12K Model

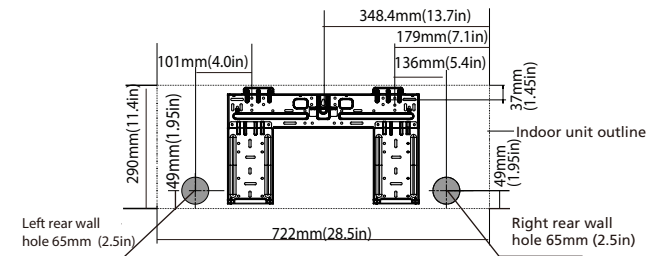


18K Model

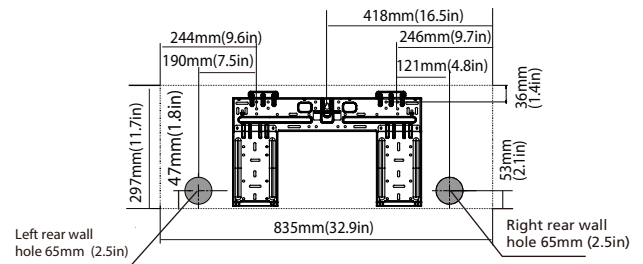


24K Model

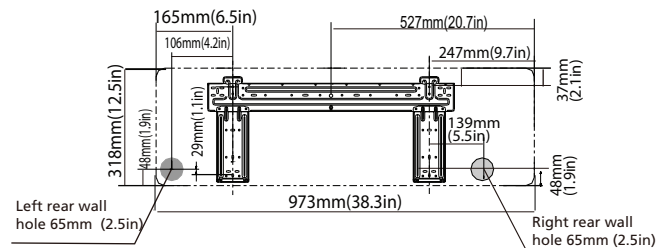
For XTREME series:



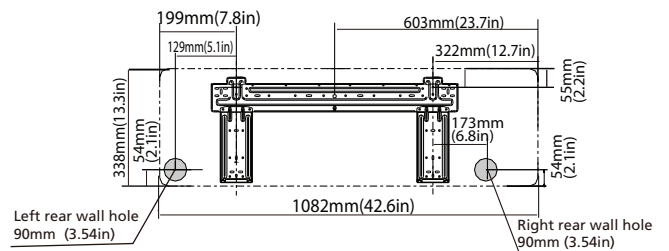
MSAGAU-09



MSAGBU-09&MSAGBU-12



18K Model



24K Model

• **Note for concrete or brick walls:**

If the wall is made of brick, concrete, or similar material, drill 5mm-diameter (0.2in-diameter) holes in the wall

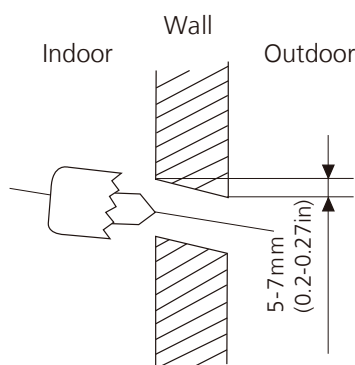
and insert the sleeve anchors provided. Then secure the mounting plate to the wall by tightening the screws directly into the clip anchors.

### 3.3 Drill wall hole for connective piping

You must drill a hole in the wall for refrigerant piping, the drainage pipe, and the signal cable that will connect the indoor and outdoor units.

1. Determine the location of the wall hole based on the position of the mounting plate. Refer to Mounting Plate Dimensions on the next page to help you determine the optimal position. The wall hole should have a 65mm (2.5in) diameter at least, and at a slightly lower angle to facilitate drainage.
2. Using a 65mm (2.5in) or 90mm(3.54in) (depending on models )core drill, drill a hole in the wall. Make sure that the hole is drilled at a slight downward angle, so that the outdoor end of the hole is lower than the indoor end by about 5mm to 7mm (0.2-0.27in). This will ensure proper water drainage.
3. Place the protective wall cuff in the hole. This protects the edges of the hole and will help seal it when you finish the installation process.

**NOTE:** When drilling the wall hole, make sure to avoid wires, plumbing, and other sensitive components.



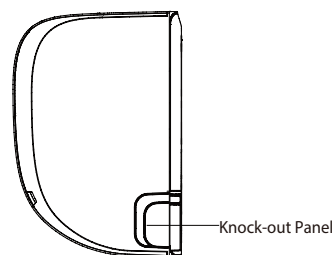
### 3.4 Prepare refrigerant piping

The refrigerant piping is inside an insulating sleeve attached to the back of the unit. You must prepare the piping before passing it through the hole in the wall. Refer to the Refrigerant Piping Connection section of this manual for detailed instructions on pipe flaring and flare torque requirements, technique, etc.

1. Based on the position of the wall hole relative to the mounting plate, choose the side from which the piping will exit the unit.
2. If the wall hole is behind the unit, keep the knock-out panel in place. If the wall hole is to the side of the indoor

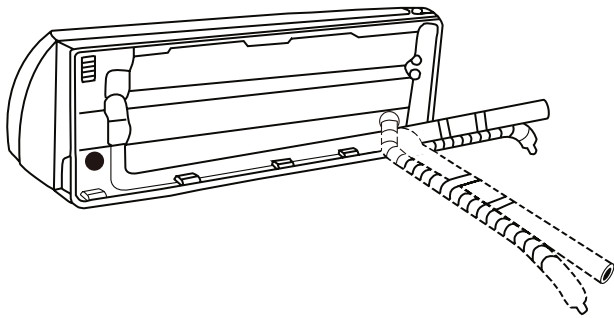
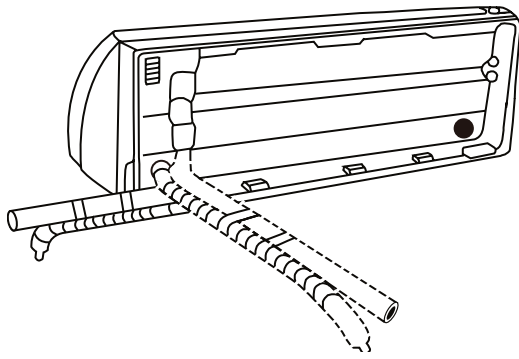
unit, remove the plastic knock-out panel from that side of the unit. This will create a slot through which your piping can exit the unit. Use needle nose pliers if the plastic panel is too difficult to remove by hand.

3. Groove has been made in the knock-out panel in order to cut it conveniently. The size of the slot is determined by the diameter of piping.
4. Use scissors to cut down the length of the insulating sleeve to reveal about 15cm (6in) of the refrigerant piping. This serves two purposes:
  - To facilitate the Refrigerant Piping Connection process.
  - To facilitate Gas Leak Checks and enable you to check for dents.
5. If existing connective piping is already embedded in the wall, proceed directly to the Connect Drain Hose step. If there is no embedded piping, connect the indoor unit's refrigerant piping to the connective piping that will join the indoor and outdoor units. Refer to the Refrigerant Piping Connection section of this manual for detailed instructions.
6. Based on the position of the wall hole relative to the mounting plate, determine the necessary angle of your piping.
7. Grip the refrigerant piping at the base of the bend.
8. Slowly, with even pressure, bend the piping towards the hole. Do not dent or damage the piping during the process.



**NOTE:** Refrigerant piping can exit the indoor unit from four different angles:

- Left-hand side
- Left rear
- Right-hand side
- Right rear



Be extremely careful not to dent or damage the piping while bending them away from the unit. Any dents in the piping will affect the unit's performance.

### 3.5 Connect drain hose

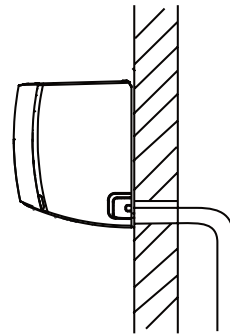
By default, the drain hose is attached to the left hand side of unit (when you're facing the back of the unit). However, it can also be attached to the right-hand side.

1. To ensure proper drainage, attach the drain hose on the same side that your refrigerant piping exits the unit.
2. Attach drain hose extension (purchased separately) to the end of drain hose.
3. Wrap the connection point firmly with Teflon tape to ensure a good seal and to prevent leaks.
4. For the portion of the drain hose that will remain indoors, wrap it with foam pipe insulation to prevent condensation.
5. Remove the air filter and pour a small amount of water into the drain pan to make sure that water flows from the unit smoothly.

#### NOTE ON DRAIN HOSE PLACEMENT:

- DO NOT kink the drain hose.
- DO NOT create a water trap.
- DO NOT put the end of drain hose in water or a

container that will collect water.



Make sure there are no kinks or dent in drain hose to ensure proper drainage.

### 3.6 Connect signal cable

#### 3.6.1 Before performing electrical work, read these regulations

1. All wiring must comply with local and national electrical codes, and must be installed by a licensed electrician.
2. All electrical connections must be made according to the Electrical Connection Diagram located on the panels of the indoor and outdoor units.
3. If there is a serious safety issue with the power supply, stop work immediately. Explain your reasoning to the client, and refuse to install the unit until the safety issue is properly resolved.
4. Power voltage should be within 90-110% of rated voltage. Insufficient power supply can cause malfunction, electrical shock, or fire.
5. If connecting power to fixed wiring, install a surge protector and main power switch with a capacity of 1.5 times the maximum current of the unit.
6. If connecting power to fixed wiring, a switch or circuit breaker that disconnects all poles and has a contact separation of at least 1/8in (3mm) must be incorporated in the fixed wiring. The qualified technician must use an approved circuit breaker or switch.
7. Only connect the unit to an individual branch circuit outlet. Do not connect another appliance to that outlet.
8. Make sure to properly ground the air conditioner.
9. Every wire must be firmly connected. Loose wiring can cause the terminal to overheat, resulting in product malfunction and possible fire.
10. Do not let wires touch or rest against refrigerant tubing, the compressor, or any moving parts within the unit.
11. If the unit has an auxiliary electric heater, it must be installed at least 1 meter (40in) away from any combustible

materials.

12. BEFORE PERFORMING ANY ELECTRICAL OR WIRING WORK, TURN OFF THE MAIN POWER TO THE SYSTEM.

### 3.6.2 Connect signal cable

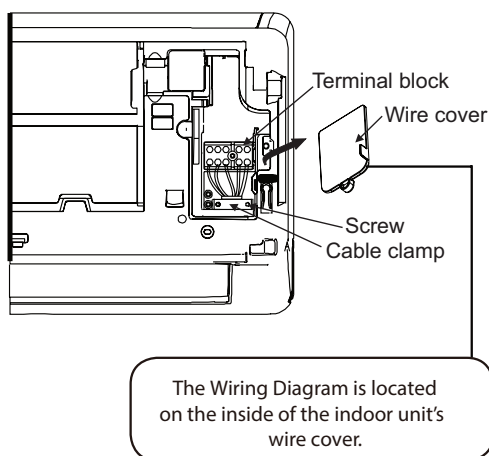
The signal cable enables communication between the indoor and outdoor units. You must first choose the right cable size before preparing it for connection.

Cable Types:

- Indoor Power Cable (if applicable): H05VV-F or H05V2V2-F
- Outdoor Power Cable: H07RN-F
- Signal Cable: H07RN-F

#### For Aurora series & Forest series:

1. Prepare the cable for connection:
  - Using wire strippers, strip the rubber jacket from both ends of signal cable to reveal about 40mm (1.57in) of the wires inside.
  - Strip the insulation from the ends of the wires.
  - Using wire crimper, crimp u-type lugs on the ends of the wires.
2. Open front panel of the indoor unit.
3. Using a screwdriver, open the wire box cover on the right side of the unit. This will reveal the terminal block.



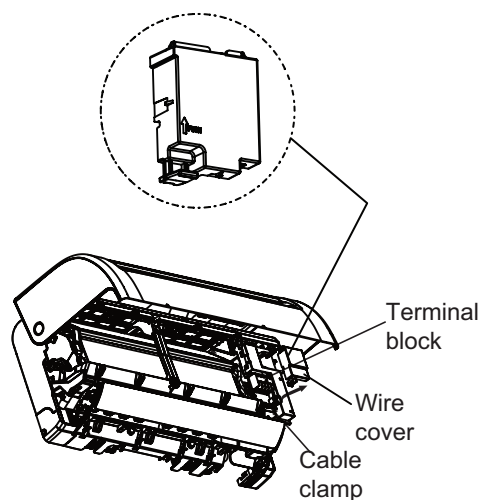
4. Unscrew the cable clamp below the terminal block and place it to the side.
5. Facing the back of the unit, remove the plastic panel on the bottom left-hand side.
6. Feed the signal wire through this slot, from the back of the unit to the front.
7. Facing the front of the unit, match the wire colors with the labels on the terminal block, connect the u-lug and and firmly screw each wire to its corresponding terminal.

8. After checking to make sure every connection is secure, use the cable clamp to fasten the signal cable to the unit. Screw the cable clamp down tightly.

9. Replace the wire cover on the front of the unit, and the plastic panel on the back.

#### For All Easy series:

1. Open front panel of the indoor unit by loosen the screws according to picture below, which provide big space for wiring connection.
2. Open the wire box cover to connect the cable.

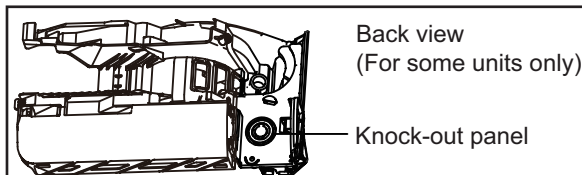
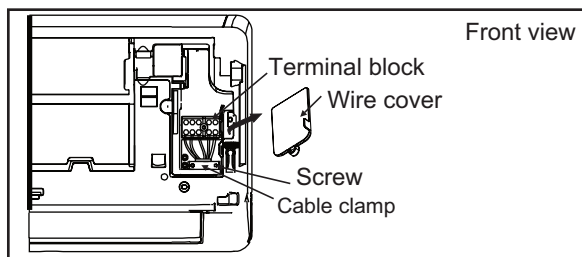


3. Unscrew the cable clamp below the terminal block and place it to the side.
4. Facing the back of the unit, remove the plastic panel on the bottom left-hand side.
5. Feed the signal wire through this slot, from the back of the unit to the front.
6. Facing the front of the unit, connect the wire according to the indoor unit's wiring diagram, connect the u-lug and firmly screw each wire to its corresponding terminal.
7. After checking to make sure every connection is secure, use the cable clamp to fasten the signal cable to the unit. Screw the cable clamp down tightly.
8. Replace the wire cover on the front of the unit, and the plastic panel on the back.

#### For XTREME series:

1. Open front panel of the indoor unit.
2. Using a screwdriver, open the wire box cover on the right side of the unit. This will reveal the terminal block.



**NOTE:**

- For the units with conduit tube to connect the cable, remove the big plastic knock-out panel to create a slot through which the conduit tube can be installed.
- For the units with five-core cable, remove the middle small plastic knock-out panel to create a slot through which the cable can exit.
- Use needle nose pliers if the plastic panel is too difficult to remove by hand.

3. Unscrew the cable clamp below the terminal block and place it to the side.

4. Facing the back of the unit, remove the plastic panel on the bottom left-hand side.

5. Feed the signal wire through this slot, from the back of the unit to the front.

6. Facing the front of the unit, connect the wire according to the indoor unit's wiring diagram, connect the u-lug and firmly screw each wire to its corresponding terminal.

7. After checking to make sure every connection is secure, use the cable clamp to fasten the signal cable to the unit. Screw the cable clamp down tightly.

8. Replace the wire cover on the front of the unit, and the plastic panel on the back.

**NOTE:**

- Choose the right cable size

The size of the power supply cable, signal cable, fuse, and switch needed is determined by the maximum current of the unit. The maximum current is indicated on the nameplate located on the side panel of the unit. Refer to this nameplate to choose the right cable, fuse, or switch.

- Take note of fuse specifications

The air conditioner's circuit board (PCB) is designed with a fuse to provide overcurrent protection. The specifications of the fuse are printed on the circuit board, such as: Indoor

unit: T3.15A/250VAC, T5A/250VAC, T3.15A/250VAC, T5A/250VAC, T20A/250VAC, T30A/250VAC, etc. (The fuse is made of ceramic.)

- Pay attention to live wire

While crimping wires, make sure you clearly distinguish the Live ("L") Wire from other wires.

- All wiring must be performed strictly in accordance with the wiring diagram located on the inside of the indoor unit's wire cover.
- Do not mix up live and null wires.

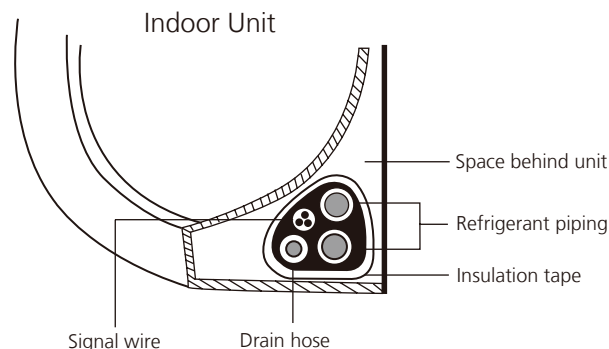
This is dangerous, and can cause the air conditioning unit to malfunction.

- The wiring connection process may differ slightly between units.

### 3.7 Wrap piping and cables

Before passing the piping, drain hose, and the signal cable through the wall hole, you must bundle them together to save space, protect them, and insulate them.

1. Bundle the drain hose, refrigerant pipes, and signal cable according to the picture below:



2. Using adhesive vinyl tape, attach the drain hose to the underside of the refrigerant pipes.

3. Using insulation tape, wrap the signal wire, refrigerant pipes, and drain hose tightly together. Double-check that all items are bundled in accordance with the picture above.

**NOTE:**

- Drain hose must be on bottom

Make sure that the drain hose is at the bottom of the bundle. Putting the drain hose at the top of the bundle can cause the drain pan to overflow, which can lead to fire or water damage.

- Do not intertwine signal cable with other wires

While bundling these items together, do not intertwine or cross the signal cable with any other wiring

- Do not wrap ends of piping

When wrapping the bundle, keep the ends of the piping



unwrapped. You need to access them to test for leaks at the end of the installation process.

### 3.8 Mount indoor unit

#### 3.8.1 If you installed new connective piping to the outdoor unit, do the following:

1. If you have already passed the refrigerant piping through the hole in the wall, proceed to **step 4**.
2. Otherwise, double-check that the ends of the refrigerant pipes are sealed to prevent dirt or foreign materials from entering the pipes.
3. Slowly pass the wrapped bundle of refrigerant pipes, drain hose, and signal wire through the hole in the wall.
4. Hook the top of the indoor unit on the upper hook of the mounting plate.
5. Check that unit is hooked firmly on mounting by applying slight pressure to the left and right-hand sides of the unit. The unit should not jiggle or shift.
6. Using even pressure, push down on the bottom half of the unit. Keep pushing down until the unit snaps onto the hooks along the bottom of the mounting plate.
7. Again, check that the unit is firmly mounted by applying slight pressure to the left and the right-hand sides of the unit.

#### 3.8.2 If refrigerant piping is already embedded in the wall, do the following:

**For Aurora series, Forest series&XTREME series:**

1. Hook the top of the indoor unit on the upper hook of the mounting plate.

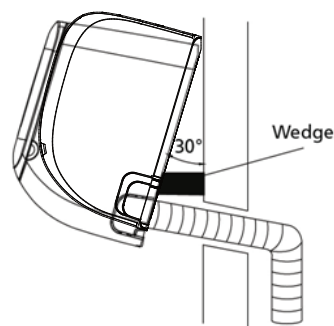
- Unit is adjustable

Keep in mind that the hooks on the mounting plate are smaller than the holes on the back of the unit. If you find that you don't have ample room to connect embedded pipes to the indoor unit, the unit can be adjusted left or right by about 30-50mm (1.25-1.95in), depending on the model.



Move to left or right

2. Use the holder in the mounting plate to prop up the unit, giving you enough room to connect the refrigerant piping, signal cable, and drain hose.



3. Connect drain hose and refrigerant piping (refer to Refrigerant Piping Connection section of this manual for instructions).
4. Keep pipe connection point exposed to perform the leak test (refer to Electrical Checks and Leak Checks section of this manual).
5. After the leak test, wrap the connection point with insulation tape.
6. Remove the bracket or wedge that is propping up the unit.
7. Using even pressure, push down on the bottom half of the unit. Keep pushing down until the unit snaps onto the hooks along the bottom of the mounting plate.

#### For All Easy series:

Step 1: Hook the indoor unit on the mounting plate:

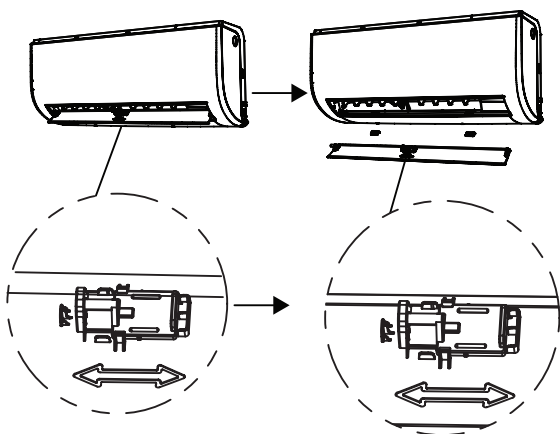
1. Keep in mind that the hooks on the mounting plate are smaller than the holes on the back of the unit. If you find that you don't have ample room to connect embedded pipes to the indoor unit, the unit can be adjusted left or right by about 30-50mm (1.25-1.95in), depending on the model.



Move to left or right

Step 2: Prepare refrigerant piping:

1. Disassemble the louver:



Step 4. Keep pipe connection point exposed to perform the leak test (refer to Electrical Checks and Leak Checks section of this manual).

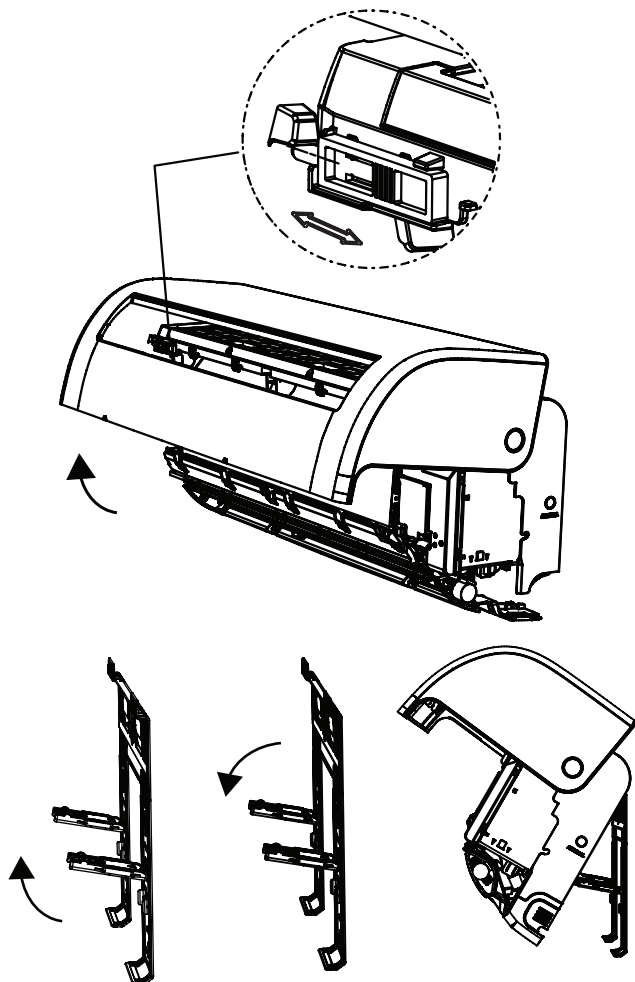
Step 5. After the leak test, wrap the connection point with insulation tape.

Step 6. Remove the bracket or wedge that is propping with insulation tape.

Step 7. Using even pressure, push down on the bottom half of the unit. Keep pushing down until the unit snaps onto the hooks along the bottom of the mounting plate.

## 2. Open and fix the position of the panel

Firstly, unscrew the two screws showed in the picture below, then open the panel, and fix the position of the panel by the latch.

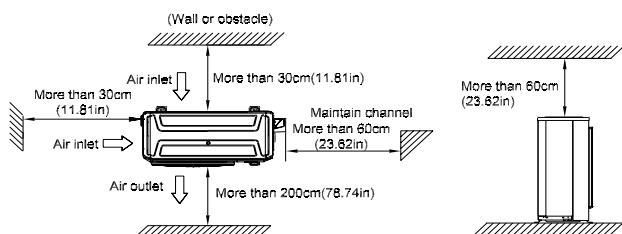


3. Use the holder in the mounting plate to prop up the unit, giving you enough room to connect the refrigerant piping, signal cable, and drain hose.

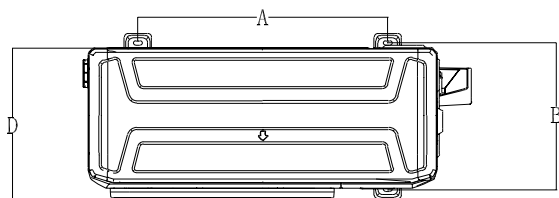
Step 3. Connect drain hose and refrigerant piping (refer to Refrigerant Piping Connection section of this manual for instructions).

## 4. Outdoor unit installation

### 4.1 Service space for outdoor unit



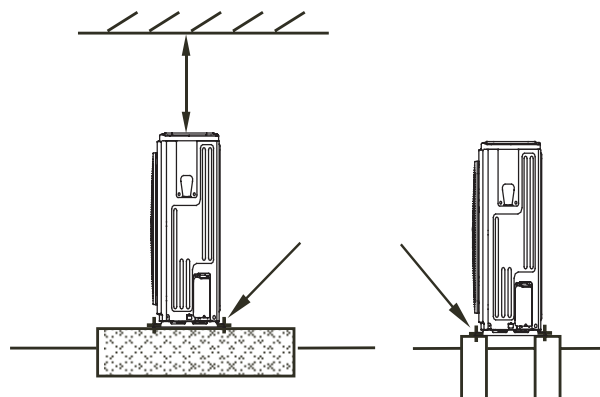
### 4.2 Bolt pitch



| Model         | A   | B   | D   |
|---------------|-----|-----|-----|
| M2OG-14HFN8-Q | 514 | 340 | 333 |
| M2OC-18HFN8-Q |     |     |     |
| M2OD-18HFN8-Q |     |     |     |
| M3OF-21HFN8-Q | 540 | 350 | 363 |
| M3OE-27HFN8-Q |     |     |     |
| M3OF-27HFN8-Q |     |     |     |
| M4OE-28HFN8-Q | 673 | 403 | 410 |
| M4OB-36HFN8-Q |     |     |     |
| M5OD-42HFN8-Q |     |     |     |
| M5OE-42HFN8-Q | 511 | 317 | 554 |
| M2OH-14HFN8-Q |     |     |     |
| M2OE-18HFN8-Q |     |     |     |
| M3OG-21HFN8-Q | 663 | 354 | 673 |
| M3OA-27HFN8-Q |     |     |     |

### 4.3 Install Outdoor Unit

Fix the outdoor unit with anchor bolts(M10)



#### Cation

Since the gravity center of the unit is not at its physical center, so please be careful when lifting it with a sling.

Never hold the inlet of the outdoor unit to prevent it from deforming.

Do not touch the fan with hands or other objects.

Do not lean it more than 45°, and do not lay it sidelong.

Make concrete foundation according to the specifications of the outdoor units.

Fasten the feet of this unit with bolts firmly to prevent it from collapsing in case of earthquake or strong wind.

## 5. Drainage Pipe Installation

Install the drainage pipe as shown below and take measures against condensation. Improperly installation could lead to leakage and eventually wet furniture and belongings.

### 5.1 Installation principle

- Ensure at least 1/100 slope of the drainage pipe
- Adopt suitable pipe diameter
- Adopt nearby condensate water discharge

### 5.2 Key points of drainage water pipe installation

1. Considering the pipeline route and elevation.
  - Before installing condensate water pipeline, determine its route and elevation to avoid intersection with other pipelines and ensure slope is straight.
2. Drainage pipe selection
  - The drainage pipe diameter shall not small than the drain hose of indoor unit
  - According to the water flowrate and drainage pipe slope to choose the suitable pipe, the water flowrate is decided by the capacity of indoor unit.

#### Relationship between water flowrate and capacity of indoor unit

| Capacity (kBtu) | Water flowrate (l/h) |
|-----------------|----------------------|
| 12              | 2.4                  |
| 18              | 4                    |
| 24              | 6                    |
| 30              | 7                    |
| 36              | 8                    |
| 42              | 10                   |
| 48              | 12                   |
| 55              | 14                   |

According to the above table to calculate the total water flowrate for the confluence pipe selection.

**For horizontal drainage pipe** (The following table is for reference)

| PVC pipe | Reference value of inner diameter of pipe (mm) | Allowable maximum water flowrate (l/h) |             | Remark                            |
|----------|------------------------------------------------|----------------------------------------|-------------|-----------------------------------|
|          |                                                | Slope 1/50                             | Slope 1/100 |                                   |
| PVC25    | 20                                             | 39                                     | 27          | For branch pipe                   |
| PVC32    | 25                                             | 70                                     | 50          |                                   |
| PVC40    | 31                                             | 125                                    | 88          | Could be used for confluence pipe |
| PVC50    | 40                                             | 247                                    | 175         |                                   |
| PVC63    | 51                                             | 473                                    | 334         |                                   |

Attention: Adopt PVC40 or bigger pipe to be the main pipe.

**For Vertical drainage pipe** (The following table is for reference)

| PVC pipe | Reference value of inner diameter of pipe (mm) | Allowable maximum water flowrate (l/h) | Remark                            |
|----------|------------------------------------------------|----------------------------------------|-----------------------------------|
| PVC25    | 20                                             | 220                                    | For branch pipe                   |
| PVC32    | 25                                             | 410                                    |                                   |
| PVC40    | 31                                             | 730                                    | Could be used for confluence pipe |
| PVC50    | 40                                             | 1440                                   |                                   |
| PVC63    | 51                                             | 2760                                   |                                   |
| PVC75    | 67                                             | 5710                                   |                                   |
| PVC90    | 77                                             | 8280                                   |                                   |

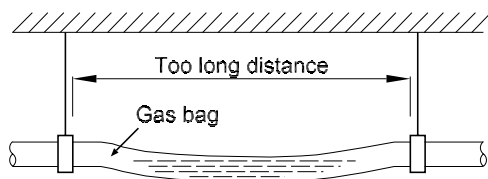
Attention: Adopt PVC40 or bigger pipe to be the main pipe.

#### 3. Individual design of drainage pipe system

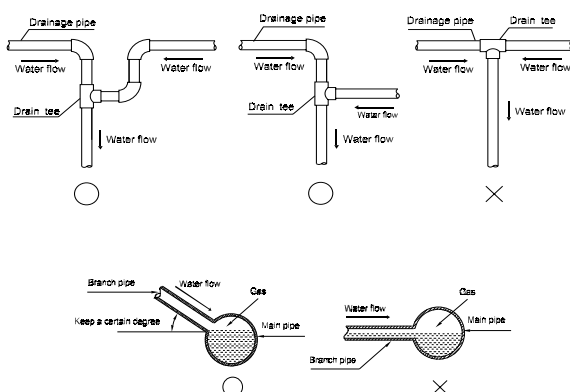
- The drainage pipe of air conditioner shall be installed separately with other sewage pipe, rainwater pipe and drainage pipe in building.
- The drainage pipe of the indoor unit with water pump should be apart from the one without water pump.

#### 4. Supporter gap of drainage pipe

- In general, the supporter gap of the drainage pipe horizontal pipe and vertical pipe is respectively 1m~1.5m and 1.5m~2.0m.
- Each vertical pipe shall be equipped with not less than two hangers.
- Overlarge hanger gap for horizontal pipe shall create bending, thus leading to air block.



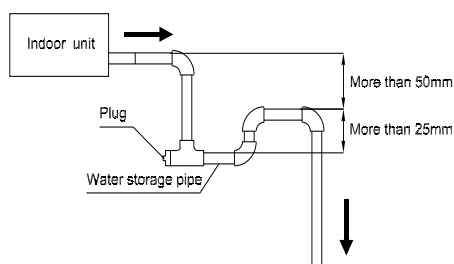
5. The horizontal pipe layout should avoid converse flow or bad flow



- The correct installation will not cause converse water flow and the slope of the branch pipes can be adjusted freely
- The false installation will cause converse water flow and the slope of the branch pipe can not be adjusted.

#### 6. Water storage pipe setting

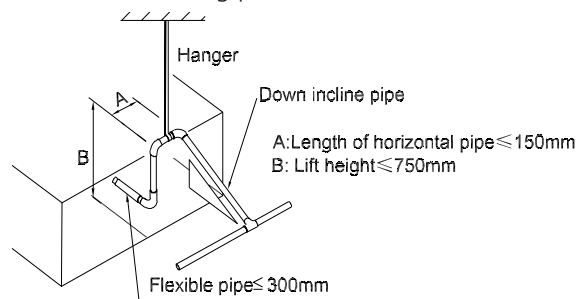
- If the indoor unit has high extra static pressure and without water pump to elevate the condensate water, such as high extra static pressure duct unit, the water storage pipe should be set to avoid converse flow or blow water phenomena.



#### 7. Lifting pipe setting of indoor unit with water pump

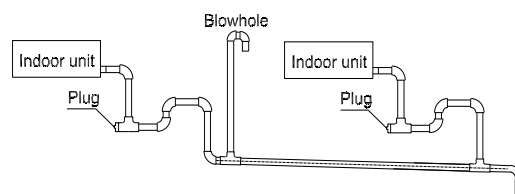
- The length of lifting pipe should not exceed 750mm.
- The drainage pipe should be set down inclined after the lifting pipe immediately to avoid wrong operation of water level switch.

- Refer the following picture for installation reference.



#### 8. Blowhole setting

- For the concentrated drainage pipe system, there should design a blowhole at the highest point of main pipe to ensure the condensate water discharge smoothly.
- The air outlet shall face down to prevent dirt entering pipe.
- Each indoor unit of the system should be installed it.
- The installation should be considering the convenience for future cleaning.



9. The end of drainage pipe shall not contact with ground directly.

### 5.3 Drainage test

#### 1. Water leakage test

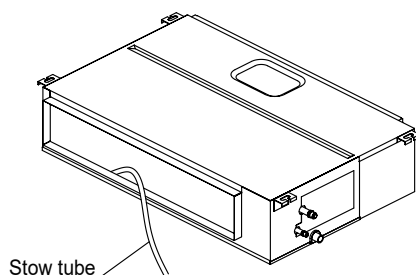
- After finishing the construction of drainage pipe system, fill the pipe with water and keep it for 24 hours to check whether there is leakage at joint section.

#### 2. Water discharge test

Check that the drainpipe is unhindered.

This test should be performed on newly built houses before the ceiling is paved.

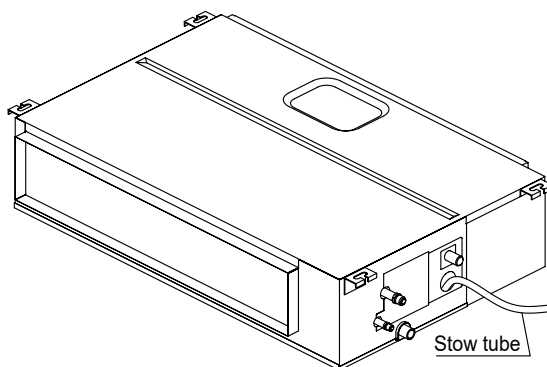
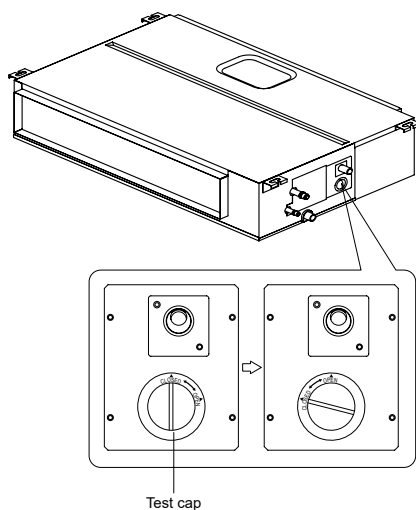
#### 2.1 Units without a pump



- Fill the water pan with 2 liters of water.
- Check that the drainpipe is unhindered

#### 2.2 Units with a pump

1. Remove the test cover.
- Fill the water pan with 2 liters of water.



2. Turn on the unit in COOLING mode. You will hear the drain pump. Check whether the water is discharged properly (a 1-minute lag is possible, depending on the length of the drain pipe). Check whether water leaks from the joints.

3. Turn off the air conditioner and put the cap back on.
  - After turn off the air conditioner 3 minutes, check whether there is anything abnormal. If drainage pipes have not been distributed properly, over back-flow water shall cause the flashing of alarm indicator at remote-controlled receiving board and

even water shall run over the water collector.

- Continuously infusing water until water level alarmed, check whether the drainage pump could discharge water at once. If water level does not decline under warning water level 3 minutes later, it shall cause shutdown of unit. When this situation happens, the normal startup only can be recovered by turning down power supply and eliminating accumulated water.

Note: Drain plug at the main water-containing plate is used for eliminating accumulated water in water-containing plate when maintaining air conditioner fault. During normal operation, the plug shall be filled in to prevent leakage.

## 5.4 Insulation work of drainage pipe

Refer the introduction to the insulation engineering parts.

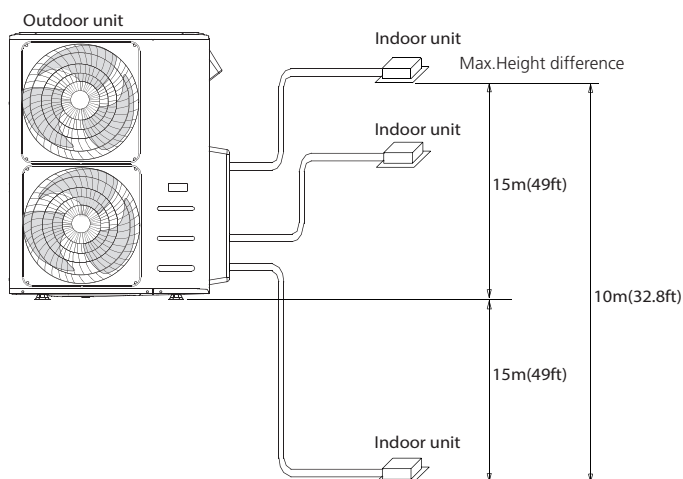
## 6. Refrigerant Pipe Installation

### 6.1 Maximum length and drop height

Ensure that the length of the refrigerant pipe and the drop height between the indoor and outdoor units meets the requirements shown in the following table.

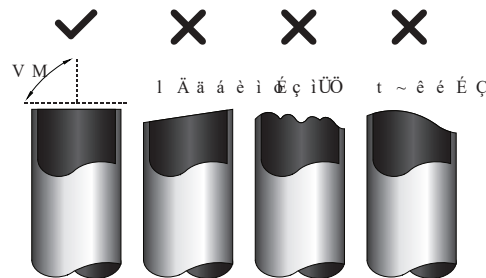
|                                           | M20G-14HFN8-Q<br>M20C-18HFN8-Q<br>M20D-18HFN8-Q<br>M20H-14HFN8-Q<br>M20E-18HFN8-Q | M30E-27HFN8-Q<br>M30F-27HFN8-Q<br>M30F-21HFN8-Q<br>M30G-21HFN8-Q<br>M30A-27HFN8-Q | M40B-36HFN8-Q<br>M40E-28HFN8-Q | M50D-42HFN8-Q<br>M50E-42HFN8-Q |
|-------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------------------|--------------------------------|
| Max. length for all rooms                 | 40                                                                                | 60                                                                                | 80                             | 80                             |
| Max. length for one indoor unit           | 25                                                                                | 30                                                                                | 35                             | 35                             |
| Max. height different between IDU and ODU | 15                                                                                | 15                                                                                | 15                             | 15                             |
| Max. height different between IDUs        | 10                                                                                | 10                                                                                | 10                             | 10                             |

- When installing multiple indoor units with a single outdoor unit, ensure that the length of the refrigerant pipe and the drop height between the indoor and outdoor units meet the requirements illustrated in the following diagram:



### 6.2 The procedure of connecting pipes

- Choose the pipe size according to the specification table.
- Confirm the cross way of the pipes.
- Measure the necessary pipe length.
- Cut the selected pipe with pipe cutter
  - Make the section flat and smooth.



#### 5. Insulate the copper pipe

- Before test operation, the joint parts should not be heat insulated.

#### 6. Flare the pipe

- Insert a flare nut into the pipe before flaring the pipe
- According to the following table to flare the pipe.

| Pipe diameter<br>(inch(mm)) | Flare dimension A (mm/inch) |           | Flare shape |
|-----------------------------|-----------------------------|-----------|-------------|
|                             | Min                         | Max       |             |
| 1/4" (6.35)                 | 8.4/0.33                    | 8.7/0.34  |             |
| 3/8" (9.52)                 | 13.2/0.52                   | 13.5/0.53 |             |
| 1/2" (12.7)                 | 16.2/0.64                   | 16.5/0.65 |             |
| 5/8" (15.9)                 | 19.2/0.76                   | 19.7/0.78 |             |
| 3/4" (19)                   | 23.2/0.91                   | 23.7/0.93 |             |
| 7/8" (22)                   | 26.4/1.04                   | 26.9/1.06 |             |

- After flared the pipe, the opening part must be seal by end cover or adhesive tape to avoid duct or exogenous impurity come into the pipe.

#### 7. Drill holes if the pipes need to pass the wall.

8. According to the field condition to bend the pipes so that it can pass the wall smoothly.

9. Bind and wrap the wire together with the insulated pipe if necessary.

10. Set the wall conduit

11. Set the supporter for the pipe.

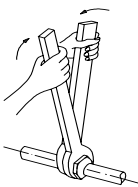
12. Locate the pipe and fix it by supporter

- For horizontal refrigerant pipe, the distance between supporters should not be exceed 1m.
- For vertical refrigerant pipe, the distance between supporters should not be exceed 1.5m.

13. Connect the pipe to indoor unit and outdoor unit by using two spanners.

- Be sure to use two spanners and proper torque to fasten the nut, too large torque will damage the

bellmouthing, and too small torque may cause leakage. Refer the following table for different pipe connection.

| Pipe Diameter | Torque                 | Sketch map                                                                        |
|---------------|------------------------|-----------------------------------------------------------------------------------|
|               | N.m(lb.ft)             |                                                                                   |
| 1/4" (6.35)   | 15~16<br>(11~11.8)     |  |
| 3/8" (9.52)   | 25~26<br>(18.4~19.18)  |                                                                                   |
| 1/2" (12.7)   | 35~36<br>(25.8~26.55)  |                                                                                   |
| 5/8" (15.9)   | 45~47<br>(33.19~34.67) |                                                                                   |
| 3/4" (19)     | 65~67<br>(47.94~49.42) |                                                                                   |
| 7/8" (22)     | 75~85<br>(55.3~62.7)   |                                                                                   |

## 7. Vacuum Drying and Leakage Checking

### 7.1 Purpose of vacuum drying

- Eliminating moisture in system to prevent the phenomena of ice-blockage and copper oxidation. Ice-blockage shall cause abnormal operation of system, while copper oxide shall damage compressor.
- Eliminating the non-condensable gas (air) in system to prevent the components oxidizing, pressure fluctuation and bad heat exchange during the operation of system.

### 7.2 Selection of vacuum pump

- The ultimate vacuum degree of vacuum pump shall be -756mmHg or above.
- Precision of vacuum pump shall reach 0.02mmHg or above.

### 7.3 Operation procedure for vacuum drying

Due to different construction environment, two kinds of vacuum drying ways could be chosen, namely ordinary vacuum drying and special vacuum drying.

#### 7.0.1 Ordinary vacuum drying

- When conduct first vacuum drying, connect pressure gauge to the infusing mouth of gas pipe and liquid pipe, and keep vacuum pump running for 1hour (vacuum degree of vacuum pump shall be reached -755mmHg).
- If the vacuum degree of vacuum pump could not reach

-755mmHg after 1 hour of drying, it indicates that there is moisture or leakage in pipeline system and need to go on with drying for half an hour.

3. If the vacuum degree of vacuum pump still could not reach -755mmHg after 1.5 hours of drying, check whether there is leakage source.

4. Leakage test: After the vacuum degree reaches -755mmHg, stop vacuum drying and keep the pressure for 1 hour. If the indicator of vacuum gauge does not go up, it is qualified. If going up, it indicates that there is moisture or leak source.

#### 7.0.2 Special vacuum drying

The special vacuum drying method shall be adopted when:

- Finding moisture during flushing refrigerant pipe.
- Conducting construction on rainy day, because rain water might penetrated into pipeline.
- Construction period is long, and rain water might penetrated into pipeline.
- Rain water might penetrate into pipeline during construction.

Procedures of special vacuum drying are as follows:

- Vacuum drying for 1 hour.
- Vacuum damage, filling nitrogen to reach 0.5Kgf/cm<sup>2</sup>.

Because nitrogen is dry gas, vacuum damage could achieve the effect of vacuum drying, but this method could not achieve drying thoroughly when there is too much moisture. Therefore, special attention shall be drawn to prevent the entering of water and the formation of condensate water.

- Vacuum drying again for half an hour.

If the pressure reached -755mmHg, start to pressure leakage test. If it cannot reached the value, repeat vacuum damage and vacuum drying again for 1 hour.

4. Leakage test: After the vacuum degree reaches -755mmHg, stop vacuum drying and keep the pressure for 1 hour. If the indicator of vacuum gauge does not go up, it is qualified. If going up, it indicates that there is moisture or leak source.



## 8. Additional Refrigerant Charge

- After the vacuum drying process is carried out, the additional refrigerant charge process need to be performed.
- The outdoor unit is factory charged with refrigerant. The additional refrigerant charge volume is decided by the diameter and length of the liquid pipe between indoor and outdoor unit. Refer the following formula to calculate the charge volume.

| Diameter of liquid pipe (mm) | Formula                                                                                |
|------------------------------|----------------------------------------------------------------------------------------|
| 6.35                         | $V=12g/m \times ((\text{Total pipe length} - \text{pre-charge pipe length} \times N))$ |
| 9.52                         | $V=24g/m \times ((\text{Total pipe length} - \text{pre-charge pipe length} \times N))$ |

The pre-charge pipe length is 7.5m.

Note:

- Refrigerant may only be charged after performed the vacuum drying process.
- Always use gloves and glasses to protect your hands and eyes during the charge work.
- Use electronic scale or fluid infusion apparatus to weight refrigerant to be recharged. Be sure to avoid extra refrigerant charged, it may cause liquid hammer of the compressor or protections.
- Use supplementing flexible pipe to connect refrigerant cylinder, pressure gauge and outdoor unit. And The refrigerant should be charged in liquid state. Before recharging, The air in the flexible pipe and manifold gauge should be exhausted.
- After finished refrigerant recharge process, check whether there is refrigerant leakage at the connection joint part.(Using gas leakage detector or soap water to detect).

## 9. Engineering of Insulation

### 9.1 Insulation of refrigerant pipe

#### 1. Operational procedure of refrigerant pipe insulation

Cut the suitable pipe → insulation (except joint section) → flare the pipe → piping layout and connection → vacuum drying → insulate the joint parts

#### 2. Purpose of refrigerant pipe insulation

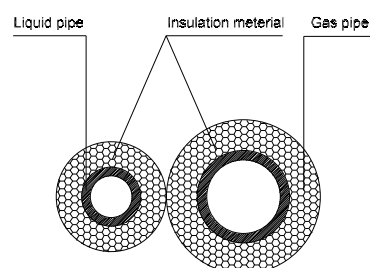
- During operation, temperature of gas pipe and liquid pipe shall be over-heating or over-cooling extremely. Therefore, it is necessary to carry out insulation; otherwise it shall debase the performance of unit and burn compressor.
- Gas pipe temperature is very low during cooling. If insulation is not enough, it shall form dew and cause leakage.
- Temperature of gas pipe is very high (generally 50-100° C) during heating. Insulation work must be carried out to prevent hurt by carelessness touching.

#### 3. Insulation material selection for refrigerant pipe

- The burning performance should over 120° C
- According to the local law to choose insulation materials
- The thickness of insulation layer shall be above 10mm.If in hot or wet environment place, the layer of insulation should be thicker accordingly.

#### 4. Installation highlights of insulation construction

- Gas pipe and liquid pipe shall be insulated separately, if the gas pipe and liquid pipe were insulated together; it will decrease the performance of air conditioner.



- The insulation material at the joint pipe shall be 5~10cm longer than the gap of the insulation material.
- The insulation material at the joint pipe shall be inserted into the gap of the insulation material.
- The insulation material at the joint pipe shall be banded to the gap pipe and liquid pipe tightly.
- The linking part should be use glue to paste together
- Be sure not bind the insulation material over-tight, it may extrude out the air in the material to cause bad

insulation and cause easy aging of the material.

## 9.2 Insulation of drainage pipe

### 1. Operational procedure of refrigerant pipe insulation

Select the suitable pipe → insulation (except joint section) → piping layout and connection → drainage test → insulate the joint parts

### 2. Purpose of drainage pipe insulation

The temperature of condensate drainage water is very low. If insulation is not enough, it shall form dew and cause leakage to damage the house decoration.

### 3. Insulation material selection for drainage pipe

- The insulation material should be flame retardant material, the flame retardancy of the material should be selected according to the local law.
- Thickness of insulation layer is usually above 10mm.
- Use specific glue to paste the seam of insulation material, and then bind with adhesive tape. The width of tape shall not be less than 5cm. Make sure it is firm and avoid dew.

### 4. Installation and highlights of insulation construction

- The single pipe should be insulated before connecting to another pipe, the joint part should be insulated after the drainage test.
- There should be no insulation gap between the insulation material.

## 10. Engineering of Electrical Wiring

### 10.1 Highlights of electrical wiring installation

- All field wiring construction should be finished by qualified electrician.
- Air conditioning equipment should be grounded according to the local electrical regulations.
- Current leakage protection switch should be installed.
- Do not connect the power wire to the terminal of signal wire.
- When power wire is parallel with signal wire, put wires to their own wire tube and remain at least 300mm gap.
- According to table in indoor part named "the specification of the power" to choose the wiring, make sure the selected wiring not small than the date showing in the table.
- Select different colors for different wire according to relevant regulations.
- Do not use metal wire tube at the place with acid or alkali corrosion, adopt plastic wire tube to replace it.
- There must be not wire connect joint in the wire tube If joint is a must, set a connection box at the place.
- The wiring with different voltage should not be in one wire tube.
- Ensure that the color of the wires of outdoor and the terminal No. are same as those of indoor unit respectively.
- You must first choose the right cable size before preparing it for connection. Be sure to use H07RN-F cables.

Table: Minimum Cross-Sectional Area able of Power and Signal Cables

| Rated Current of Appliance (A) | Nominal Cross-Sectional Area(mm <sup>2</sup> ) |
|--------------------------------|------------------------------------------------|
| ≤ 6                            | 0.75                                           |
| 6 - 10                         | 1                                              |
| 10 - 16                        | 1.5                                            |
| 16 - 25                        | 2.5                                            |
| 25 - 32                        | 4                                              |
| 32 - 45                        | 6                                              |

## 11. Test Operation

### 11.1 The test operation must be carried out after the entire installation has been completed.

### 11.2 Please confirm the following points before the test operation.

- The indoor unit and outdoor unit are installed properly.
- Tubing and wiring are correctly completed.
- The refrigerant pipe system is leakage-checked.
- The drainage is unimpeded.
- The ground wiring is connected correctly.
- The length of the tubing and the added stow capacity of the refrigerant have been recorded.
- The power voltage fits the rated voltage of the air conditioner.
- There is no obstacle at the outlet and inlet of the outdoor and indoor units.
- The gas-side and liquid-side stop valves are both opened.
- The air conditioner is pre-heated by turning on the power.

### 11.3 Test operation

1. Open both the liquid and gas stop valves.
2. Turn on the main power switch and allow the unit to warm up.
3. Set the air conditioner to COOL mode, and check the following points.

#### Indoor unit

- Whether the switch on the remote controller works well.
- Whether the buttons on the remote controller works well.
- Whether the air flow louver moves normally.
- Whether the room temperature is adjusted well.
- Whether the indicator lights normally.
- Whether the temporary buttons works well.
- Whether the drainage is normal.
- Whether there is vibration or abnormal noise during operation.

#### Outdoor unit

- Whether there is vibration or abnormal noise during operation.
- Whether the generated wind, noise, or condensed of by the air conditioner have influenced your neighborhood.
- Whether any of the refrigerant is leaked.

#### Drainage Test

- a. Ensure the drainpipe flows smoothly. New buildings should perform this test before finishing the ceiling.
- b. Remove the test cover. Add 2000ml of water to the tank through the attached tube.
- c. Turn on the main power switch and run the air conditioner in COOL mode.
- d. Listen to the sound of the drain pump to see if it makes any unusual noises.
- e. Check to see that the water is discharged. It may take up to one minute before the unit begins to drain depending on the drainpipe.
- f. Make sure that there are no leaks in any of the piping.
- g. Stop the air conditioner. Turn off the main power switch and reinstall the test cover.

#### If ambient temperature is below 17°C (63°F)

You can't use the remote controller to turn on the COOL function when the ambient temperature is below 17°C. In this instance, you can use the MANUAL CONTROL button to test the COOL function.

1. Lift the front panel of the indoor unit, and raise it until it clicks in place.
2. The MANUAL CONTROL button is located on the right-hand side of the display box. Press it two times to select the COOL function.
3. Perform Test Run as normal.

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# Static Pressure Design

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## 1. Introduction

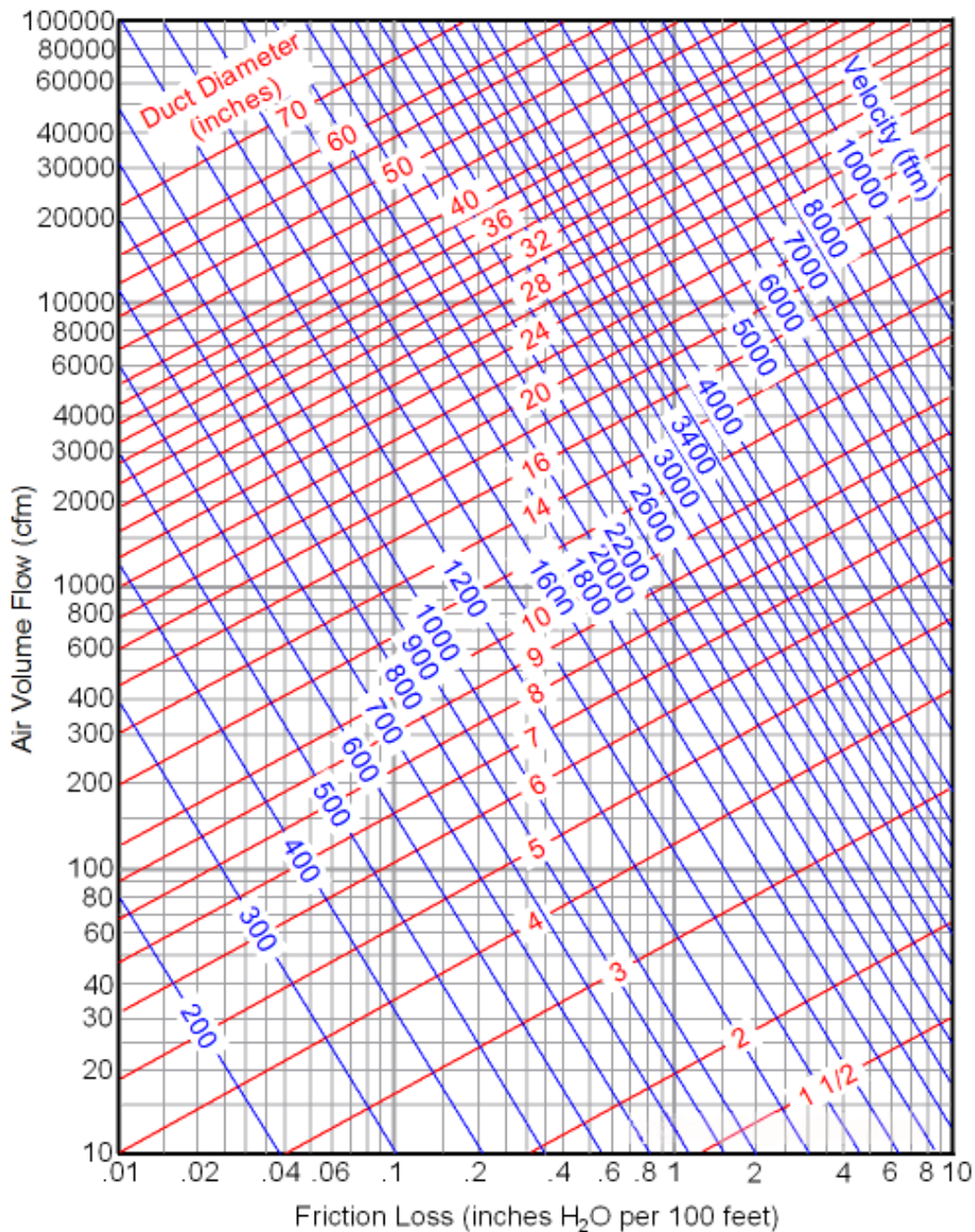
Duct system losses are the irreversible transformation of mechanical energy into heat. The two types of losses are (1) friction losses and (2) dynamic losses.

Friction losses are due to fluid viscosity and result from momentum exchange between molecules (in laminar flow) or between individual particles of adjacent fluid layers moving at different velocities (in turbulent flow). Friction losses occur along the entire duct length.

Dynamic losses result from flow disturbances caused by duct mounted equipment and fittings (e.g., entries, exits, elbows, transitions, and junctions) that change the airflow path's direction or area.

## 2. Charts For Friction Losses In Round Ducts

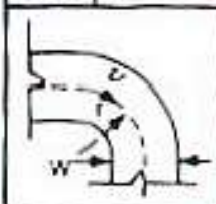
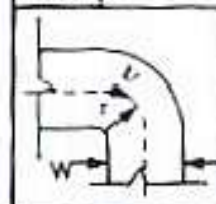


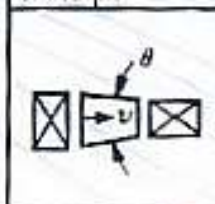
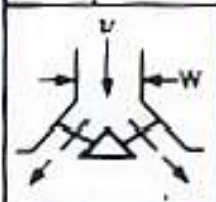
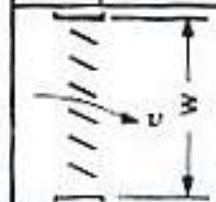
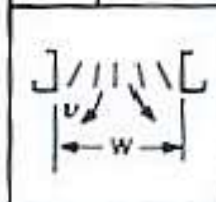
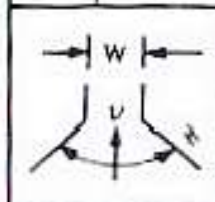
Fluid resistance caused by friction in round ducts can be determined by the friction chart. (based on galvanized sheet)





### 3. Dynamic Losses

For dynamic losses, please refer to below image.

| $H' =$ | <b>Elbow</b><br>( $r/w = 1$ )                                                                                                                                                                                              | +     | <b>Sharp elbow</b><br>( $r/w = 0.5$ )                                               | +     | <b>Branch</b><br><b>Straight-Thru</b>                                               | +   | <b>Branch Thru-Branch</b><br>( $r/w = 1$ )                                           | +   | <b>Reducer</b><br>$\theta \leq 14^\circ$                                            |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------|-----|--------------------------------------------------------------------------------------|-----|-------------------------------------------------------------------------------------|------|---|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------------------------|-------|-----|-----|---|-----|------------------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------------------------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------------------------|-------|-----|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------------------------|-------|-----|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------------------------|-------|-----|-----|-----|-----|------------------|------|---|
|        | <table><tr><th>V m/s</th><th>loss<br/>mm H<sub>2</sub>O</th></tr><tr><td>3.5~5</td><td>0.2</td></tr><tr><td>5~7</td><td>0.4</td></tr><tr><td>7~9</td><td>0.8<sup>x</sup></td></tr><tr><td>9~15</td><td>2</td></tr></table> | V m/s | loss<br>mm H <sub>2</sub> O                                                         | 3.5~5 | 0.2                                                                                 | 5~7 | 0.4                                                                                  | 7~9 | 0.8 <sup>x</sup>                                                                    | 9~15 | 2 |  | <table><tr><th>V m/s</th><th>loss<br/>mm H<sub>2</sub>O</th></tr><tr><td>3.5~5</td><td>1</td></tr><tr><td>5~7</td><td>2</td></tr><tr><td>7~9</td><td>3.5<sup>x</sup></td></tr><tr><td>9~15</td><td>7</td></tr></table> | V m/s | loss<br>mm H <sub>2</sub> O | 3.5~5 | 1   | 5~7 | 2 | 7~9 | 3.5 <sup>x</sup> | 9~15 | 7                                                                                                                                                                          |       | No<br>friction<br>loss      |       | <table><tr><th>V m/s</th><th>loss<br/>mm H<sub>2</sub>O</th></tr><tr><td>3.5~5</td><td>0.4</td></tr><tr><td>5~7</td><td>0.8</td></tr><tr><td>7~9</td><td>1.5<sup>x</sup></td></tr><tr><td>9~15</td><td>3</td></tr></table> | V m/s | loss<br>mm H <sub>2</sub> O | 3.5~5 | 0.4 | 5~7 | 0.8                                                                                                                                                                          | 7~9   | 1.5 <sup>x</sup>            | 9~15  | 3   |     | <table><tr><th>V m/s</th><th>loss<br/>mm H<sub>2</sub>O</th></tr><tr><td>3.5~5</td><td>0.2</td></tr><tr><td>5~7</td><td>0.4</td></tr><tr><td>7~9</td><td>0.8<sup>x</sup></td></tr><tr><td>9~15</td><td>2</td></tr></table> | V m/s | loss<br>mm H <sub>2</sub> O | 3.5~5 | 0.2 | 5~7 | 0.4 | 7~9 | 0.8 <sup>x</sup> | 9~15 | 2 |
| V m/s  | loss<br>mm H <sub>2</sub> O                                                                                                                                                                                                |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 3.5~5  | 0.2                                                                                                                                                                                                                        |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 5~7    | 0.4                                                                                                                                                                                                                        |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 7~9    | 0.8 <sup>x</sup>                                                                                                                                                                                                           |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 9~15   | 2                                                                                                                                                                                                                          |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| V m/s  | loss<br>mm H <sub>2</sub> O                                                                                                                                                                                                |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 3.5~5  | 1                                                                                                                                                                                                                          |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 5~7    | 2                                                                                                                                                                                                                          |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 7~9    | 3.5 <sup>x</sup>                                                                                                                                                                                                           |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 9~15   | 7                                                                                                                                                                                                                          |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| V m/s  | loss<br>mm H <sub>2</sub> O                                                                                                                                                                                                |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 3.5~5  | 0.4                                                                                                                                                                                                                        |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 5~7    | 0.8                                                                                                                                                                                                                        |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 7~9    | 1.5 <sup>x</sup>                                                                                                                                                                                                           |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 9~15   | 3                                                                                                                                                                                                                          |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| V m/s  | loss<br>mm H <sub>2</sub> O                                                                                                                                                                                                |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 3.5~5  | 0.2                                                                                                                                                                                                                        |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 5~7    | 0.4                                                                                                                                                                                                                        |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 7~9    | 0.8 <sup>x</sup>                                                                                                                                                                                                           |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 9~15   | 2                                                                                                                                                                                                                          |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
|        |                                                                                                                                           |       |    |       |    |     |    |     |  |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| +      | <b>Anemostat</b>                                                                                                                                                                                                           | +     | <b>Gallery<br/>or louver</b>                                                        | +     | <b>Register</b>                                                                     | +   | <b>Hopper</b>                                                                        |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
|        | <table><tr><th>V m/s</th><th>loss<br/>mm H<sub>2</sub>O</th></tr><tr><td>3.5~5</td><td>1</td></tr><tr><td>5~7</td><td>2</td></tr><tr><td>7~9</td><td>3.5</td></tr><tr><td>9~15</td><td>6</td></tr></table>                 | V m/s | loss<br>mm H <sub>2</sub> O                                                         | 3.5~5 | 1                                                                                   | 5~7 | 2                                                                                    | 7~9 | 3.5                                                                                 | 9~15 | 6 |  | <table><tr><th>V m/s</th><th>loss<br/>mm H<sub>2</sub>O</th></tr><tr><td>3.5~5</td><td>0.5</td></tr><tr><td>5~7</td><td>1</td></tr><tr><td>7~9</td><td>2</td></tr></table>                                             | V m/s | loss<br>mm H <sub>2</sub> O | 3.5~5 | 0.5 | 5~7 | 1 | 7~9 | 2                |      | <table><tr><th>V m/s</th><th>loss<br/>mm H<sub>2</sub>O</th></tr><tr><td>3.5~5</td><td>1.5</td></tr><tr><td>5~7</td><td>3</td></tr><tr><td>7~9</td><td>6</td></tr></table> | V m/s | loss<br>mm H <sub>2</sub> O | 3.5~5 | 1.5                                                                                                                                                                                                                        | 5~7   | 3                           | 7~9   | 6   |     | <table><tr><th>V m/s</th><th>loss<br/>mm H<sub>2</sub>O</th></tr><tr><td>3.5~5</td><td>0.3</td></tr><tr><td>5~7</td><td>0.6</td></tr><tr><td>7~9</td><td>1</td></tr></table> | V m/s | loss<br>mm H <sub>2</sub> O | 3.5~5 | 0.3 | 5~7 | 0.6                                                                                                                                                                                                                        | 7~9   | 1                           |       |     |     |     |     |                  |      |   |
| V m/s  | loss<br>mm H <sub>2</sub> O                                                                                                                                                                                                |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 3.5~5  | 1                                                                                                                                                                                                                          |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 5~7    | 2                                                                                                                                                                                                                          |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 7~9    | 3.5                                                                                                                                                                                                                        |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 9~15   | 6                                                                                                                                                                                                                          |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| V m/s  | loss<br>mm H <sub>2</sub> O                                                                                                                                                                                                |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 3.5~5  | 0.5                                                                                                                                                                                                                        |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 5~7    | 1                                                                                                                                                                                                                          |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 7~9    | 2                                                                                                                                                                                                                          |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| V m/s  | loss<br>mm H <sub>2</sub> O                                                                                                                                                                                                |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 3.5~5  | 1.5                                                                                                                                                                                                                        |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 5~7    | 3                                                                                                                                                                                                                          |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 7~9    | 6                                                                                                                                                                                                                          |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| V m/s  | loss<br>mm H <sub>2</sub> O                                                                                                                                                                                                |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 3.5~5  | 0.3                                                                                                                                                                                                                        |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 5~7    | 0.6                                                                                                                                                                                                                        |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
| 7~9    | 1                                                                                                                                                                                                                          |       |                                                                                     |       |                                                                                     |     |                                                                                      |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |
|        |                                                                                                                                         |       |  |       |  |     |  |     |                                                                                     |      |   |  |                                                                                                                                                                                                                        |       |                             |       |     |     |   |     |                  |      |                                                                                                                                                                            |       |                             |       |                                                                                                                                                                                                                            |       |                             |       |     |     |                                                                                                                                                                              |       |                             |       |     |     |                                                                                                                                                                                                                            |       |                             |       |     |     |     |     |                  |      |   |

Note: W Shows a diameter of round duct or long side length of the rectangular duct.

#### 4. Corresponding Relation Between Rectangular Duct and Round Duct

| Circular Duct Diameter, in. | Length of One Side of Rectangular Duct, in.   |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |    |    |    |
|-----------------------------|-----------------------------------------------|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|
|                             | 4                                             | 5  | 6  | 7  | 8  | 9  | 10 | 12 | 14  | 16  | 18  | 20  | 22  | 24  | 26  | 28  | 30  | 32 | 34 | 36 |
|                             | Length Adjacent Side of Rectangular Duct, in. |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |    |    |    |
| 5                           | 5                                             |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |    |    |    |
| 5.5                         | 6                                             | 5  |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |    |    |    |
| 6                           | 8                                             | 6  |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |    |    |    |
| 6.5                         | 9                                             | 7  | 6  |    |    |    |    |    |     |     |     |     |     |     |     |     |     |    |    |    |
| 7                           | 11                                            | 8  | 7  |    |    |    |    |    |     |     |     |     |     |     |     |     |     |    |    |    |
| 7.5                         | 13                                            | 10 | 8  | 7  |    |    |    |    |     |     |     |     |     |     |     |     |     |    |    |    |
| 8                           | 15                                            | 11 | 9  | 8  |    |    |    |    |     |     |     |     |     |     |     |     |     |    |    |    |
| 8.5                         | 17                                            | 13 | 10 | 9  |    |    |    |    |     |     |     |     |     |     |     |     |     |    |    |    |
| 9                           | 20                                            | 15 | 12 | 10 | 8  |    |    |    |     |     |     |     |     |     |     |     |     |    |    |    |
| 9.5                         | 22                                            | 17 | 13 | 11 | 9  |    |    |    |     |     |     |     |     |     |     |     |     |    |    |    |
| 10                          | 25                                            | 19 | 15 | 12 | 10 | 9  |    |    |     |     |     |     |     |     |     |     |     |    |    |    |
| 10.5                        | 29                                            | 21 | 16 | 14 | 12 | 10 |    |    |     |     |     |     |     |     |     |     |     |    |    |    |
| 11                          | 32                                            | 23 | 18 | 15 | 13 | 11 | 10 |    |     |     |     |     |     |     |     |     |     |    |    |    |
| 11.5                        |                                               | 26 | 20 | 17 | 14 | 12 | 11 |    |     |     |     |     |     |     |     |     |     |    |    |    |
| 12                          |                                               | 29 | 22 | 18 | 15 | 13 | 12 |    |     |     |     |     |     |     |     |     |     |    |    |    |
| 12.5                        |                                               | 32 | 24 | 20 | 17 | 15 | 13 |    |     |     |     |     |     |     |     |     |     |    |    |    |
| 13                          |                                               | 35 | 27 | 22 | 18 | 16 | 14 | 12 |     |     |     |     |     |     |     |     |     |    |    |    |
| 13.5                        |                                               | 38 | 29 | 24 | 20 | 17 | 15 | 13 |     |     |     |     |     |     |     |     |     |    |    |    |
| 14                          |                                               |    | 32 | 26 | 22 | 19 | 17 | 14 |     |     |     |     |     |     |     |     |     |    |    |    |
| 14.5                        |                                               |    | 35 | 28 | 24 | 20 | 18 | 15 |     |     |     |     |     |     |     |     |     |    |    |    |
| 15                          |                                               |    | 38 | 30 | 25 | 22 | 19 | 16 | 14  |     |     |     |     |     |     |     |     |    |    |    |
| 16                          |                                               |    | 45 | 36 | 30 | 25 | 22 | 18 | 15  |     |     |     |     |     |     |     |     |    |    |    |
| 17                          |                                               |    |    | 41 | 34 | 29 | 25 | 20 | 17  | 16  |     |     |     |     |     |     |     |    |    |    |
| 18                          |                                               |    |    | 47 | 39 | 33 | 29 | 23 | 19  | 17  |     |     |     |     |     |     |     |    |    |    |
| 19                          |                                               |    |    | 54 | 44 | 38 | 33 | 26 | 22  | 19  | 18  |     |     |     |     |     |     |    |    |    |
| 20                          |                                               |    |    |    | 50 | 43 | 37 | 29 | 24  | 21  | 19  |     |     |     |     |     |     |    |    |    |
| 21                          |                                               |    |    |    | 57 | 48 | 41 | 33 | 27  | 23  | 20  |     |     |     |     |     |     |    |    |    |
| 22                          |                                               |    |    |    | 64 | 54 | 46 | 36 | 30  | 26  | 23  | 20  |     |     |     |     |     |    |    |    |
| 23                          |                                               |    |    |    |    | 60 | 51 | 40 | 33  | 28  | 25  | 22  |     |     |     |     |     |    |    |    |
| 24                          |                                               |    |    |    |    | 66 | 57 | 44 | 36  | 31  | 27  | 24  | 22  |     |     |     |     |    |    |    |
| 25                          |                                               |    |    |    |    |    | 63 | 49 | 40  | 34  | 29  | 26  | 24  |     |     |     |     |    |    |    |
| 26                          |                                               |    |    |    |    |    | 69 | 54 | 44  | 37  | 32  | 28  | 26  | 24  |     |     |     |    |    |    |
| 27                          |                                               |    |    |    |    |    | 76 | 59 | 48  | 40  | 35  | 31  | 28  | 25  |     |     |     |    |    |    |
| 28                          |                                               |    |    |    |    |    |    | 64 | 52  | 43  | 38  | 33  | 30  | 27  | 26  |     |     |    |    |    |
| 29                          |                                               |    |    |    |    |    |    | 70 | 56  | 47  | 41  | 36  | 32  | 29  | 27  |     |     |    |    |    |
| 30                          |                                               |    |    |    |    |    |    | 76 | 61  | 51  | 44  | 39  | 35  | 31  | 29  | 28  |     |    |    |    |
| 31                          |                                               |    |    |    |    |    |    | 82 | 66  | 55  | 47  | 41  | 37  | 34  | 31  | 29  |     |    |    |    |
| 32                          |                                               |    |    |    |    |    |    | 89 | 71  | 59  | 51  | 44  | 40  | 36  | 33  | 31  |     |    |    |    |
| 33                          |                                               |    |    |    |    |    |    | 96 | 76  | 64  | 54  | 48  | 42  | 38  | 35  | 33  | 30  |    |    |    |
| 34                          |                                               |    |    |    |    |    |    |    | 82  | 68  | 58  | 51  | 45  | 41  | 37  | 35  | 32  |    |    |    |
| 35                          |                                               |    |    |    |    |    |    |    | 88  | 73  | 62  | 54  | 48  | 44  | 40  | 37  | 34  | 32 |    |    |
| 36                          |                                               |    |    |    |    |    |    |    | 95  | 78  | 67  | 58  | 51  | 46  | 42  | 39  | 36  | 34 |    |    |
| 37                          |                                               |    |    |    |    |    |    |    | 101 | 83  | 71  | 62  | 55  | 49  | 45  | 41  | 38  | 36 | 34 |    |
| 38                          |                                               |    |    |    |    |    |    |    | 108 | 89  | 76  | 66  | 58  | 52  | 47  | 44  | 40  | 38 | 36 |    |
| 39                          |                                               |    |    |    |    |    |    |    |     | 95  | 80  | 70  | 62  | 55  | 50  | 46  | 43  | 40 | 37 | 36 |
| 40                          |                                               |    |    |    |    |    |    |    |     | 101 | 85  | 74  | 65  | 58  | 53  | 49  | 45  | 42 | 39 | 37 |
| 41                          |                                               |    |    |    |    |    |    |    |     | 107 | 91  | 78  | 69  | 62  | 56  | 51  | 47  | 44 | 41 | 39 |
| 42                          |                                               |    |    |    |    |    |    |    |     | 114 | 96  | 83  | 73  | 65  | 59  | 54  | 50  | 46 | 44 | 41 |
| 43                          |                                               |    |    |    |    |    |    |    |     | 120 | 102 | 88  | 77  | 69  | 62  | 57  | 53  | 49 | 46 | 43 |
| 44                          |                                               |    |    |    |    |    |    |    |     | 107 | 93  | 81  | 73  | 66  | 60  | 55  | 51  | 48 | 45 |    |
| 45                          |                                               |    |    |    |    |    |    |    |     | 113 | 98  | 86  | 76  | 69  | 63  | 58  | 54  | 50 | 47 |    |
| 46                          |                                               |    |    |    |    |    |    |    |     | 120 | 103 | 90  | 80  | 72  | 66  | 61  | 56  | 53 | 49 |    |
| 47                          |                                               |    |    |    |    |    |    |    |     | 126 | 108 | 95  | 84  | 76  | 69  | 64  | 59  | 55 | 52 |    |
| 48                          |                                               |    |    |    |    |    |    |    |     | 133 | 114 | 100 | 89  | 80  | 73  | 67  | 62  | 58 | 54 |    |
| 49                          |                                               |    |    |    |    |    |    |    |     | 140 | 120 | 105 | 93  | 84  | 76  | 70  | 65  | 60 | 56 |    |
| 50                          |                                               |    |    |    |    |    |    |    |     | 147 | 126 | 110 | 98  | 88  | 80  | 73  | 68  | 63 | 59 |    |
| 51                          |                                               |    |    |    |    |    |    |    |     |     | 132 | 115 | 102 | 92  | 83  | 76  | 71  | 66 | 61 |    |
| 52                          |                                               |    |    |    |    |    |    |    |     |     | 139 | 121 | 107 | 96  | 87  | 80  | 74  | 69 | 64 |    |
| 53                          |                                               |    |    |    |    |    |    |    |     |     | 145 | 127 | 112 | 100 | 91  | 83  | 77  | 71 | 67 |    |
| 54                          |                                               |    |    |    |    |    |    |    |     |     | 152 | 133 | 117 | 105 | 95  | 87  | 80  | 74 | 70 |    |
| 55                          |                                               |    |    |    |    |    |    |    |     |     |     | 139 | 123 | 110 | 99  | 91  | 84  | 78 | 72 |    |
| 56                          |                                               |    |    |    |    |    |    |    |     |     |     | 145 | 128 | 114 | 104 | 95  | 87  | 81 | 75 |    |
| 57                          |                                               |    |    |    |    |    |    |    |     |     |     | 151 | 134 | 119 | 108 | 98  | 91  | 84 | 78 |    |
| 58                          |                                               |    |    |    |    |    |    |    |     |     |     | 158 | 139 | 124 | 112 | 102 | 94  | 87 | 81 |    |
| 59                          |                                               |    |    |    |    |    |    |    |     |     |     | 165 | 145 | 130 | 117 | 107 | 98  | 91 | 85 |    |
| 60                          |                                               |    |    |    |    |    |    |    |     |     |     | 172 | 151 | 135 | 122 | 111 | 102 | 94 | 88 |    |

## 5. Method For Duct Calculation (equal friction method)

- 1) Draw schematic view of the duct system.
- 1) Make notes for air volume and mark clearly the elbow, the branch parts, the air discharge outlet.
- 1) Select one main ducting route (where the maximum static pressure loss occurs).
- 1) Select the air velocity for the main duct in accordance with the desirable air velocity.

| Main duct | Typical design velocity (m/s) |                 |          |
|-----------|-------------------------------|-----------------|----------|
|           | Residence                     | Public building | Factory  |
|           | 3.5~6.0                       | 5.0~8.0         | 6.0~11.0 |

- 1) Since the velocity and air volume are fixed for main duct, then use the Friction loss chart to find standard friction loss.
- 2) Use air volume and friction loss to find corresponding duct size and velocity for each part of main duct through Frictions loss chart.
- 3) Find the dynamic loss of main ducting route according to the velocity. and type of special fittings (elbows, junctions, regulating flaps, etc.)
- 4) Obtain the duct size and velocity of each branch duct based on the air volume and the same standard friction loss as for the main duct.
- 5) Find the dynamic loss of branch duct.
- 6) Calculate the total pressure loss.

## 6. Unit Conversion

- 1 inch water=248.8 N/m<sup>2</sup> (Pa)=0.0361 lb/in<sup>2</sup> (psi)=25.4 kg/cm<sup>2</sup>=0.0739 in mercury
- 1 ft<sup>3</sup>/min (cfm)=1.7 m<sup>3</sup>/h
- 1 ft/min=5.08\*10<sup>-3</sup> m/s
- 1 inch=2.54 cm=0.0254m=0.08333ft

## 7. Recommended Outlet Velocity For Different Occasion

The permissible sound level and correspondingly maximum air velocity, is determined by the occasion.

| Noise / dB(A) | Occasion                  | Maximum velocity / m/s |
|---------------|---------------------------|------------------------|
| 25            | Studio, recording room    | 2                      |
| 35            | Cinema, hospital, library | 3                      |
| 40            | Office, school, hotel     | 4                      |
| 46            | Bank, public hall         | 5                      |
| 50            | Store, post office        | 6                      |
| 70            | Factory                   | 10                     |