



Metropolitan Police Service Ruislip Police Station Design Access Statement

10 November 2023

Quality Information

Document Name	Ref	Prepared For	Prepared By	Date	Reviewed By
Ruislip Police Station Design Access Statement		MPS	Hamilton Architects		Peter Carr

Revision History

Revision	Revision Date	Details	Authorised	Name	Position



Contents

- 1. Background
- 2. Proposals
- 3. Planning Implications

Appendix A: Product Brochures



1. Background

The original building for Ruislip Police Station was constructed in the 1950's and the fabric is generally original with single glazed timber framed windows and a form of curtain walling. The walls are generally the original clay brick. There is a copper clad pitched roof to the main block and flat roofs to ancillary parts of the building.

As part of separate works it is intended to replace the windows and cladding in the main block with anodised aluminium double glazed windows.

Details of Met Zero Carbon and why the programme is important & Policies / legislation being complied with

The Mayor of London has introduced a new policy...to make London Net Zero Carbon (NZC) by 2030 (from the legal requirement of 2050). In the 2018 GLA Environment Strategy, the MPS is shown to emit 80% of all GLA family members' carbon (noting that TFL exclude trains and buses from this calculation). The major MPS emitters are fleet (40%), property (60%).

As a result of the policy, all carbon related lifecycle works (such as boiler and window replacements, fabric improvement etc.) would need to accelerate from a 30 year plan to delivery within the next [eight] seven years. MPS has identified sites where (a) lifecycle works are due, and (b) there are opportunities for additional interventions that will enable NZC (such as gas boilers being replaced with heat pumps).

2. Proposals

2.1 Proposed Works

It is proposed to install new air source heat pumps, with the external units mounted at low ground level to the rear of the building and new PV panels to the rear flat roof.

The specification of the two new units shall be:

- VRF OUTDOOR UNIT 1
- (PURY-M250YNW-A1)
- DIMS: 920W x 740D x 1858H mm
- WEIGHT: 227 KG
- VRF OUTDOOR UNIT 2
- (PURY-M200YNW-A1)
- DIMS: 920W X 740D X 1858H MM
- WEIGHT: 227 KG
- VRF OUTDOOR UNIT 3
- (PURY-M200YNW-A1)
- DIMS: 920W X 740D X 1858H MM
- WEIGHT: 227 KG

Decarbonising Ruislip Police Station with the use of a VRF system to replace the existing gas-fired heating system and the the use of renewable energy sources, could save approximately 39 tonnes of carbon dioxide per annum based on current carbon emissions.

2.2 Programme of Works

Existing plant is located within a boiler room and is further supplemented with wall mounted condensers to the rear. The new units will replace existing wall mounted units in the same location.

It is proposed that the existing boiler is kept operational during the works. The new heat pumps can be installed without any impact on the existing boiler. There will be an ongoing requirement for a site compound and some craneage, but these aspects can be limited both in terms of working hours (craneage being carried out at weekends) and by limiting the size of compound being utilised by the contractor with materials arriving on a 'just in time' basis.

Final connections (and associated shutdown to allow this to occur) needs to be carefully planned and will be weather dependant.



3. Planning Implications

3.1 How Visual Impact have been Minimised

The proposed units shall replace the existing units and are positioned within the rear yard. They cannot be viewed from a public location at ground level which has been demonstrated through 3D visuals. Attached product brochures indicate materials and appearance of the units

The proposed PV panels located on the rear roof are not visible from street level which has been demonstrated through 3D visuals. Attached product brochures indicate materials and appearance of the panels

3.2 Details of Any Parking Spaces Lost

No carparking spaces are lost as a result of the proposal and there is no impact of the existing parking provision of the site.

3.3 Floor Space

No floor space will be created as a result of the proposal



Existing View from Google Earth showing flat roof and yard to rear of building.



Proposed View 1 showing new PV panels located on flat roof and low level air source heat pumps to the rear of building.



Proposed View 2 showing the view from street level at the rear of the building.

Appendix A: Product Brochures



Air Conditioning

Product Information

R32 HVRF R2 Series Standard (22.4-56kW)
Simultaneous Heating and Cooling
with Heat Recovery Outdoor Unit

Making a
World of
Difference

CITY MULTI



Throughout the year, many buildings require cooling in some areas and heating in others - even in adjacent rooms. The outstanding City Multi R2 system meets these requirements by distributing surplus heat from cooling operations (and vice versa) to rooms where it is needed. This efficiency can result in energy savings up to 30% over conventional systems.

Key Features

- Highest specification, highest efficiency heat recovery system available
- Delivers the highest levels of comfort, both thermally and acoustically
- Flexible design, installation and maintenance

R32 | HybridVRF



Cooling | Heating | Ventilation | Controls

Air Conditioning

R32

Product Information

R32 HVRF R2 Series Standard (22.4-56kW)
Simultaneous Heating and Cooling
with Heat Recovery Outdoor Unit

Making a
World of
Difference



OUTDOOR UNITS		PURY-M200YNW-A1	PURY-M250YNW-A1	PURY-M300YNW-A1	PURY-M300YNW-A1 X 2HBC	PURY-M350YNW-A1	PURY-M350YNW-A1 X 2HBC	PURY-M400YNW-A1	PURY-M450YNW-A1	PURY-M500YNW-A1
CAPACITY (kW)	Heating (nominal)	25.0	31.5	37.5	37.5	45.0	45.0	45.0	56.0	58.0
	Cooling (nominal)	22.4	28.0	33.5	33.5	40.0	40.0	40.0	50.0	56.0
	High Performance Heating (UK)	25.0	31.5	37.5	37.5	42.8	42.8	42.8	50.4	52.2
	COP Priority Heating (UK)	22.8	28.7	32.3	32.3	38.7	38.7	38.7	49.3	51.0
	Cooling (UK)	20.1	25.1	30.0	30.0	35.8	35.8	40.3	44.8	50.1
POWER INPUT (kW)	Heating (nominal)	6.39	9.15	11.00	10.33	13.14	12.16	14.08	16.18	18.26
	Cooling (nominal)	5.53	8.40	11.65	9.88	14.93	12.15	15.15	15.47	22.25
	High Performance Heating (UK)	7.73	11.07	15.07	14.15	18.00	16.66	16.33	18.77	21.18
	COP Priority Heating (UK)	6.39	9.15	11.00	10.33	13.14	12.16	13.66	15.69	17.71
	Cooling (UK)	3.21	4.87	6.76	5.73	8.66	7.05	9.85	10.06	14.46
COP / EER (nominal)		3.91 / 4.05	3.44 / 3.33	3.40 / 2.87	3.63 / 3.39	3.42 / 2.67	3.70 / 3.29	3.55 / 2.97	3.46 / 3.23	3.45 / 2.51
SCOP / SEER ¹		-	-	-	-	-	-	-	-	-
MAX No. OF CONNECTABLE INDOOR UNITS		30	37	45	45	35	35	40	45	50
MAX CONNECTABLE CAPACITY		50-150% OU Capacity	50-150% OU Capacity	50-150% OU Capacity	50-150% OU Capacity	50-150% OU Capacity	50-150% OU Capacity	50-150% OU Capacity	50-150% OU Capacity	50-150% OU Capacity
AIRFLOW (m³/min)	High	170	185	240	240	250	250	315	315	295
	Liquid	19.05 (3/4")	22.2 (7/8")	22.2 (7/8")	22.2 (7/8")	28.58 (1-1/8")	28.58 (1-1/8")	28.58 (1-1/8")	28.58 (1-1/8")	28.58 (1-1/8")
SOUND PRESSURE LEVEL (dBA)	Heating / Cooling	59.0 / 59.0	61.0 / 60.5	67.0 / 61.0	67.0 / 61.0	64.0 / 62.5	64.0 / 62.5	69.0 / 65.0	70.0 / 65.5	64.5 / 63.5
	Heating / Cooling	78.0 / 76.0	80.0 / 78.5	86.5 / 80.0	86.5 / 80.0	83.0 / 81.0	83.0 / 81.0	88.0 / 83.0	89.0 / 83.0	84.0 / 82.0
WEIGHT (kg)		227	227	227	227	270	270	273	293	337
	Width	920	920	920	920	1240	1240	1240	1240	1750
	Height	1858	1858	1858	1858	1858	1858	1858	1858	1858
ELECTRICAL SUPPLY ¹		380-415v, 50Hz	380-415v, 50Hz	380-415v, 50Hz	380-415v, 50Hz	380-415v, 50Hz	380-415v, 50Hz	380-415v, 50Hz	380-415v, 50Hz	380-415v, 50Hz
PHASE ¹		Three	Three	Three	Three	Three	Three	Three	Three	Three
STARTING CURRENT (A) ¹		8	8	8	8	8	8	8	8	8
NOMINAL SYSTEM RUNNING CURRENT (A) ¹ Heating / Cooling [MAX]		10.2 / 8.8 [16.1]	14.6 / 13.4 [22.5]	17.6 / 18.6 [25.6]	16.5 / 15.8 [25.6]	21.0 / 23.9 [31.6]	19.5 / 19.4 [31.6]	22.5 / 24.2 [39.3]	25.9 / 24.8 [40.2]	29.2 / 35.6 [56.6]
GUARANTEED OPERATING RANGE (°C) Heating / Cooling		-20~-15.5 / -5~-52	-20~-15.5 / -5~-52	-20~-15.5 / -5~-52	-20~-15.5 / -5~-52	-20~-15.5 / -5~-52	-20~-15.5 / -5~-52	-20~-15.5 / -5~-52	-20~-15.5 / -5~-52	-20~-15.5 / -5~-52
FUSE RATING (MCB sizes BS EN 60947-2) - (A) ¹		1 x 20	1 x 25	1 x 32	1 x 32	1 x 32	1 x 32	1 x 40	1 x 50	1 x 63
MAINS CABLE No. Cores ¹		4	4	4	4	4	4	4	4	4
CHARGE REFRIGERANT (kg) / CO ₂ EQUIVALENT (t)		5.2 / 3.5	5.2 / 3.5	5.2 / 3.5	5.2 / 3.5	8 / 5.4	8 / 5.4	8 / 5.4	10.8 / 7.3	10.8 / 7.3
MAX ADDITIONAL REFRIGERANT (kg) / CO ₂ EQUIVALENT (t)		13.5 / 9.1	13.5 / 9.1	15.5 / 10.5	15.5 / 10.5	15.5 / 10.5	15.5 / 10.5	19.5 / 13.2	19.5 / 13.2	19.5 / 13.2

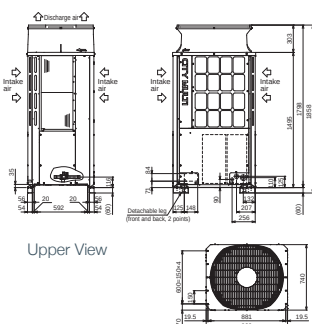
Notes: ¹SEER/SCOP available separately in the 'City Multi VRF Seasonal Efficiency' document. Based on Ecodesign Lot 21/6 to EN14825 standard. ¹A separate power supply is required for each module. Where more than one figure is quoted there are multiple modules. Specification subject to change. R410A equivalent systems are also available - please contact your local sales office for further information.

PRODUCT DIMENSIONS

PURY-EM200/250/300YNW-A1

Side View

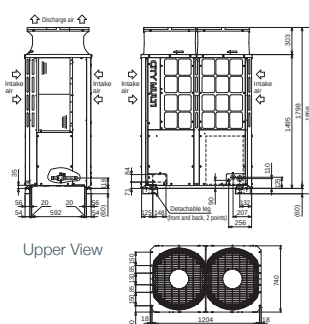
Front View



PURY-EM350/400/450YNW-A1

Side View

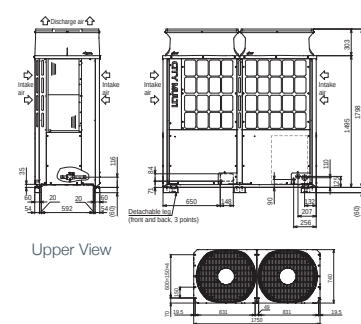
Front View



PURY-EM500YNW-A1

Side View

Front View



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Note: The fuse rating is for guidance only. Please refer to the relevant databook for detailed specification. It is the responsibility of a qualified electrician/electrical engineer to select the correct cable size and fuse rating based on current regulation and site specific conditions. Mitsubishi Electric's air conditioning equipment and heat pump systems contain a fluorinated greenhouse gas, R410A (GWP:2088), R32 (GWP:675), R407C (GWP:1774) or R134a (GWP:1430). *These GWP values are based on Regulation (EU) No 517/2014 from IPCC 4th edition. In case of Regulation (EU) No.626/2011 from IPCC 3rd edition, these are as follows: R410A (GWP:1975), R32 (GWP: 550), R407C (GWP:1650) or R134a (GWP:1300).



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Mitsubishi Electric UK's commitment to the environment

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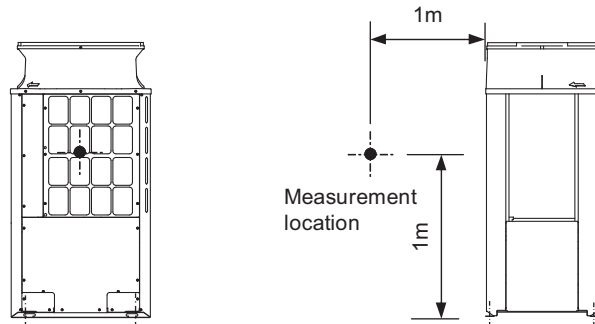
Mitsubishi Electric
Living Environmental Systems UK

[mitsubishielectric2](https://www.youtube.com/channel/UCm9t8v8v8v8v8v8v8v8v8v8)

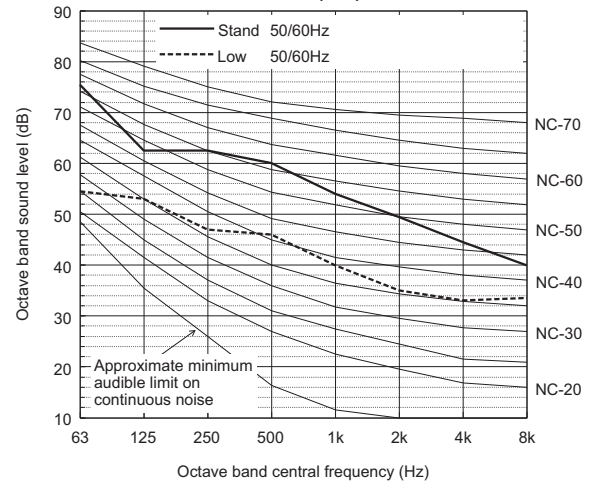
thehub.mitsubishielectric.co.uk

Effective as of February 2019

5-1. Sound levels in cooling mode

Measurement condition
PURY-M200, 250, 300YNW-A1(-BS)

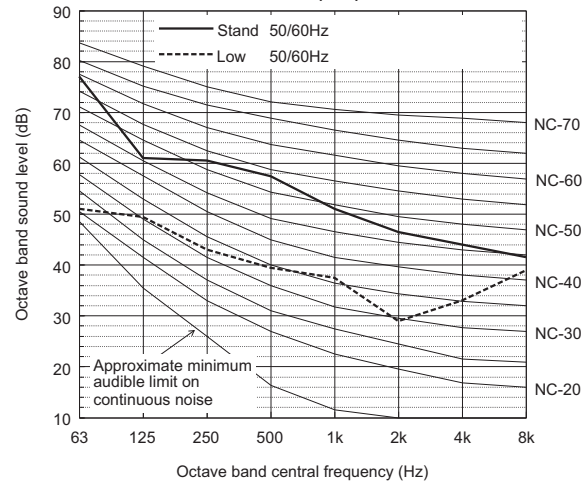
Sound level of PURY-M300YNW-A1(-BS)



		63	125	250	500	1k	2k	4k	8k	dB(A)
Standard	50/60Hz	75.5	62.5	62.5	60.0	54.0	49.5	44.5	40.0	61.0
Low noise mode	50/60Hz	54.5	53.0	47.0	46.0	40.0	35.0	33.0	33.5	47.0

When Low noise mode is set, the A/C system's capacity is limited. The system could return to normal operation from Low noise mode automatically in the case that the operation condition is severe.

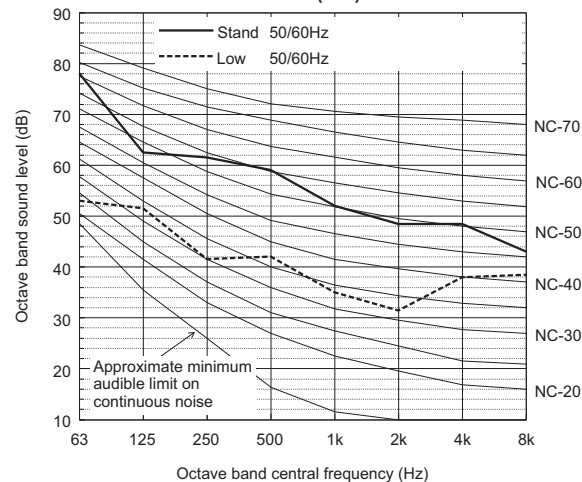
Sound level of PURY-M200YNW-A1(-BS)



		63	125	250	500	1k	2k	4k	8k	dB(A)
Standard Cooling	50/60Hz	77.0	61.0	60.5	57.5	51.0	46.5	44.0	41.5	59.0
Low noise mode	50/60Hz	51.0	49.5	43.0	39.5	37.5	29.0	33.0	39.0	44.0

When Low noise mode is set, the A/C system's capacity is limited. The system could return to normal operation from Low noise mode automatically in the case that the operation condition is severe.

Sound level of PURY-M250YNW-A1(-BS)

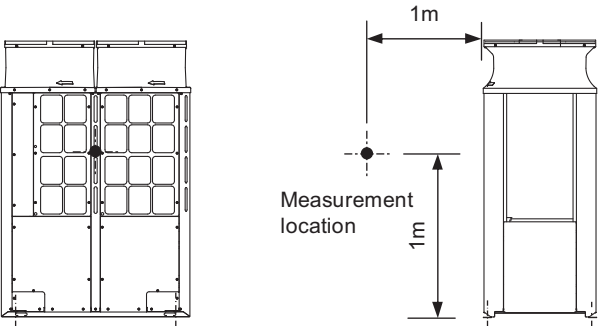


		63	125	250	500	1k	2k	4k	8k	dB(A)
Standard Cooling	50/60Hz	78.0	62.5	61.5	59.0	52.0	48.5	48.5	43.0	60.5
Low noise mode	50/60Hz	53.0	51.5	41.5	42.0	35.0	31.5	38.0	38.5	45.0

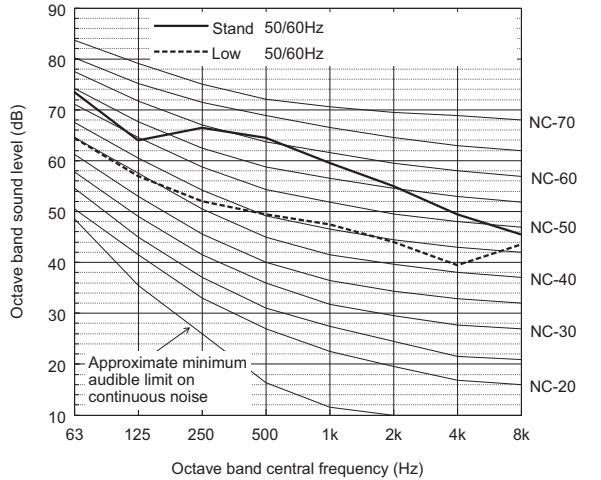
When Low noise mode is set, the A/C system's capacity is limited. The system could return to normal operation from Low noise mode automatically in the case that the operation condition is severe.

- Depending on the operation conditions, the unit generates noise caused by valve actuation, refrigerant flow, and pressure changes when operating normally. Please consider to avoid location where quietness is required.
- For HBC controller, it is recommended to be installed in places such as ceilings of corridor, rest rooms and plant rooms.

Measurement condition
PURY-M350, 400, 450YNW-A1(-BS)



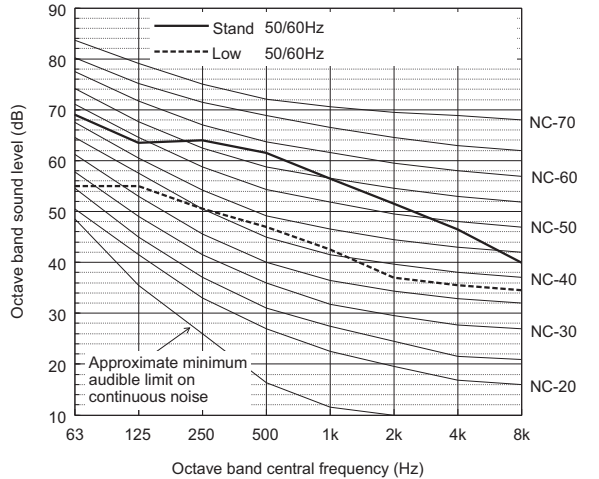
Sound level of PURY-M450YNW-A1(-BS)



		63	125	250	500	1k	2k	4k	8k	dB(A)
Standard	50/60Hz	73.5	64.0	66.5	64.5	59.5	55.0	49.5	45.5	65.5
Low noise mode	50/60Hz	64.5	57.0	52.0	49.5	47.5	44.0	39.5	43.5	53.0

When Low noise mode is set, the A/C system's capacity is limited. The system could return to normal operation from Low noise mode automatically in the case that the operation condition is severe.

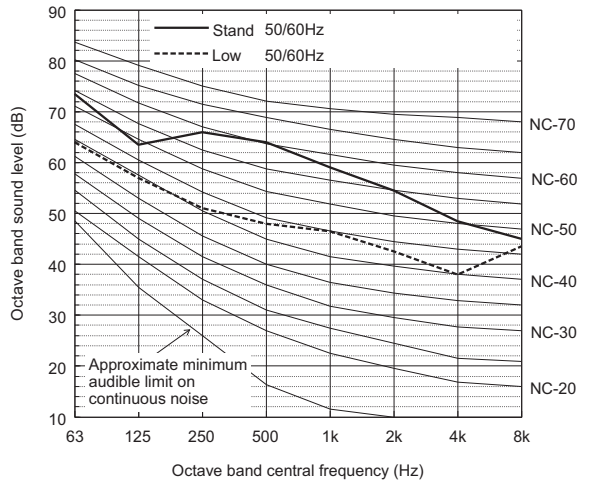
Sound level of PURY-M350YNW-A1(-BS)



		63	125	250	500	1k	2k	4k	8k	dB(A)
Standard	50/60Hz	69.0	63.5	64.0	61.5	56.5	51.5	46.5	40.0	62.5
Low noise mode	50/60Hz	55.0	55.0	50.5	47.0	42.5	37.0	35.5	34.5	49.0

When Low noise mode is set, the A/C system's capacity is limited. The system could return to normal operation from Low noise mode automatically in the case that the operation condition is severe.

Sound level of PURY-M400YNW-A1(-BS)

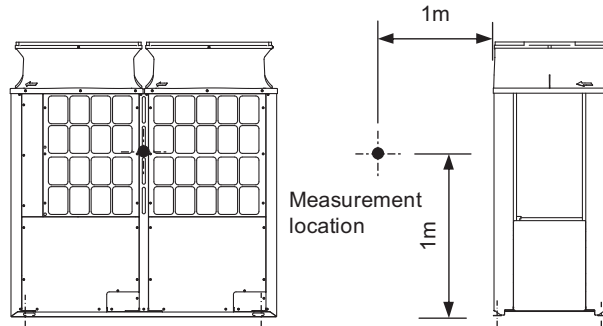


		63	125	250	500	1k	2k	4k	8k	dB(A)
Standard	50/60Hz	73.5	63.5	66.0	64.0	59.0	54.5	48.5	45.0	65.0
Low noise mode	50/60Hz	64.0	57.0	51.0	48.0	46.5	42.5	38.0	43.5	52.0

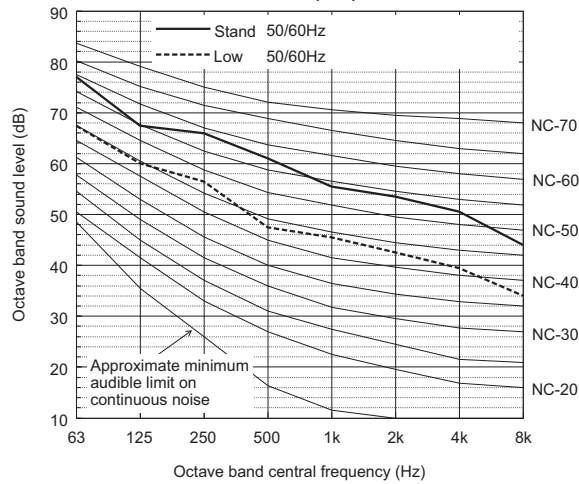
When Low noise mode is set, the A/C system's capacity is limited. The system could return to normal operation from Low noise mode automatically in the case that the operation condition is severe.

- Depending on the operation conditions, the unit generates noise caused by valve actuation, refrigerant flow, and pressure changes when operating normally. Please consider to avoid location where quietness is required. For HBC controller, it is recommended to be installed in places such as ceilings of corridor, rest rooms and plant rooms.

**Measurement condition
PURY-M500YNW-A1(-BS)**



Sound level of PURY-M500YNW-A1(-BS)

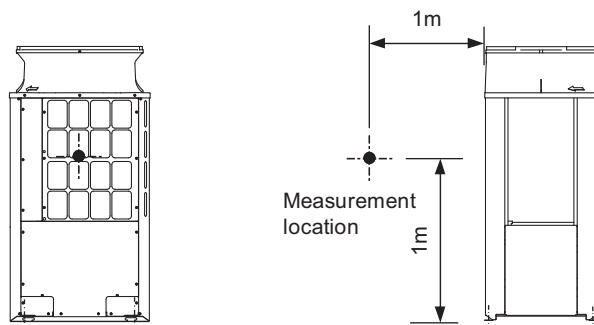


		63	125	250	500	1k	2k	4k	8k	dB(A)
Standard	50/60Hz	77.0	67.5	66.0	61.0	55.5	53.5	50.5	44.0	63.5
Low noise mode	50/60Hz	67.5	60.0	56.5	47.5	45.5	42.5	39.5	34.0	53.0

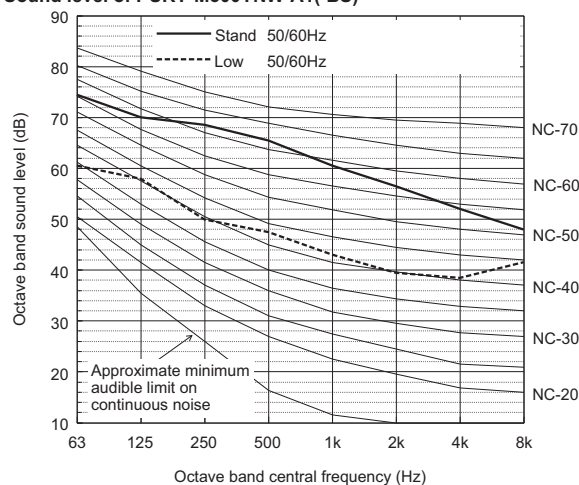
When Low noise mode is set, the A/C system's capacity is limited. The system could return to normal operation from Low noise mode automatically in the case that the operation condition is severe.

- Depending on the operation conditions, the unit generates noise caused by valve actuation, refrigerant flow, and pressure changes when operating normally. Please consider to avoid location where quietness is required. For HBC controller, it is recommended to be installed in places such as ceilings of corridor, rest rooms and plant rooms.

5-2. Sound levels in heating mode

Measurement condition
PURY-M200, 250, 300YNW-A1(-BS)

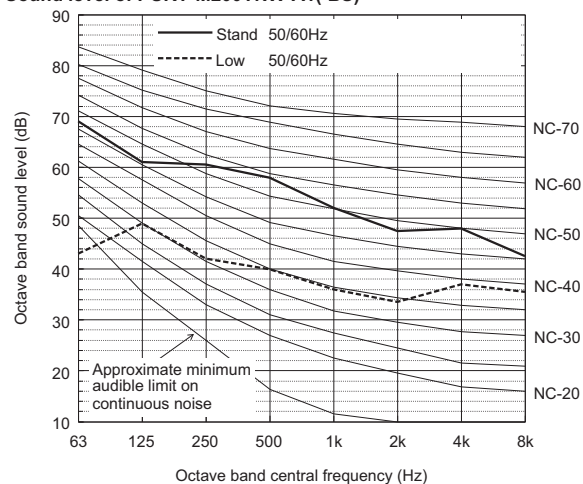
Sound level of PURY-M300YNW-A1(-BS)



		63	125	250	500	1k	2k	4k	8k	dB(A)
Standard Heating	50/60Hz	74.5	70.0	68.5	65.5	60.5	56.5	52.0	48.0	67.0
Low noise mode	50/60Hz	60.5	58.0	50.0	47.5	43.0	39.5	38.5	41.5	50.5

When Low noise mode is set, the A/C system's capacity is limited. The system could return to normal operation from Low noise mode automatically in the case that the operation condition is severe.

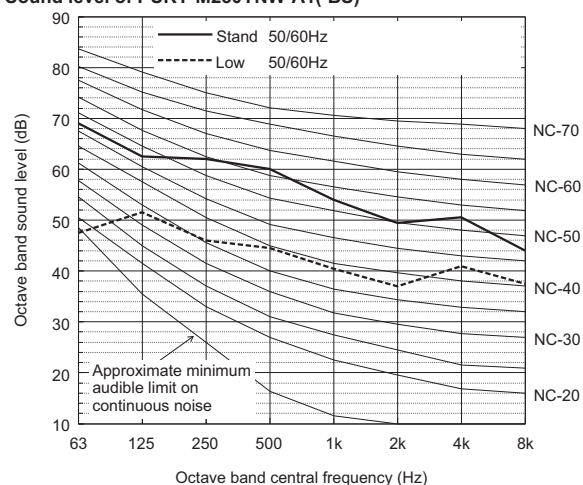
Sound level of PURY-M200YNW-A1(-BS)



		63	125	250	500	1k	2k	4k	8k	dB(A)
Standard Heating	50/60Hz	69.0	61.0	60.5	58.0	52.0	47.5	48.0	42.5	59.0
Low noise mode	50/60Hz	43.0	49.0	42.0	40.0	36.0	33.5	37.0	35.5	44.0

When Low noise mode is set, the A/C system's capacity is limited. The system could return to normal operation from Low noise mode automatically in the case that the operation condition is severe.

Sound level of PURY-M250YNW-A1(-BS)

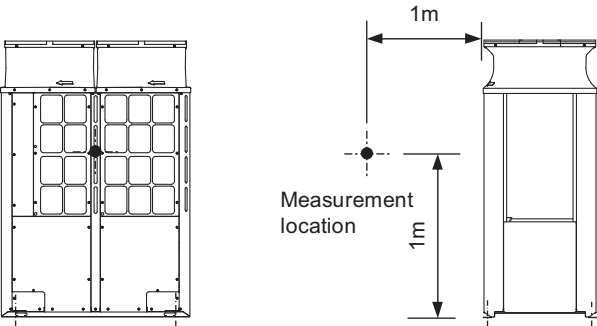


		63	125	250	500	1k	2k	4k	8k	dB(A)
Standard Heating	50/60Hz	69.0	62.5	62.0	60.0	54.0	49.5	50.5	44.0	61.0
Low noise mode	50/60Hz	47.5	51.5	46.0	44.5	40.5	37.0	41.0	37.5	48.0

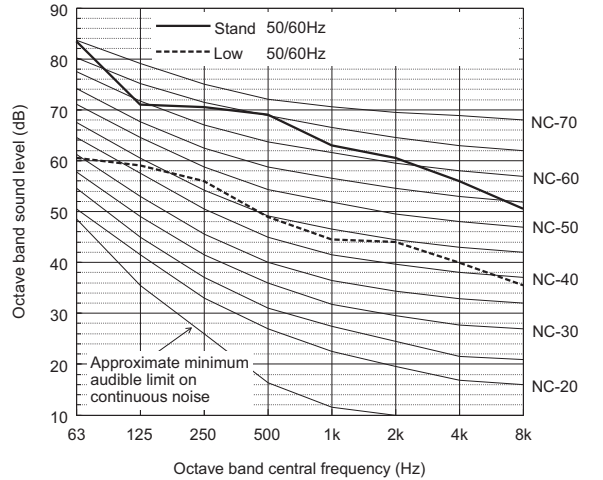
When Low noise mode is set, the A/C system's capacity is limited. The system could return to normal operation from Low noise mode automatically in the case that the operation condition is severe.

- Depending on the operation conditions, the unit generates noise caused by valve actuation, refrigerant flow, and pressure changes when operating normally. Please consider to avoid location where quietness is required.
- For HBC controller, it is recommended to be installed in places such as ceilings of corridor, rest rooms and plant rooms.

Measurement condition
PURY-M350, 400, 450YNW-A1(-BS)



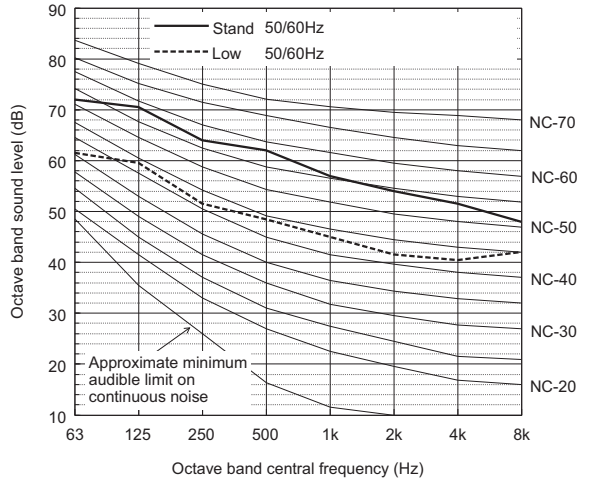
Sound level of PURY-M450YNW-A1(-BS)



		63	125	250	500	1k	2k	4k	8k	dB(A)
Standard Heating	50/60Hz	83.5	71.0	70.5	69.0	63.0	60.5	56.0	50.5	70.0
Low noise mode	50/60Hz	60.5	59.0	56.0	49.0	44.5	44.0	40.0	35.5	53.0

When Low noise mode is set, the A/C system's capacity is limited. The system could return to normal operation from Low noise mode automatically in the case that the operation condition is severe.

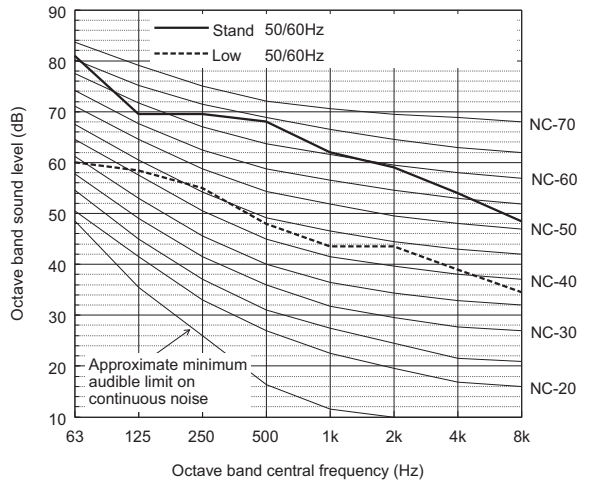
Sound level of PURY-M350YNW-A1(-BS)



		63	125	250	500	1k	2k	4k	8k	dB(A)
Standard Heating	50/60Hz	72.0	70.5	64.0	62.0	57.0	54.0	51.5	48.0	64.0
Low noise mode	50/60Hz	61.5	59.5	51.5	48.5	45.0	41.5	40.5	42.0	52.0

When Low noise mode is set, the A/C system's capacity is limited. The system could return to normal operation from Low noise mode automatically in the case that the operation condition is severe.

Sound level of PURY-M400YNW-A1(-BS)

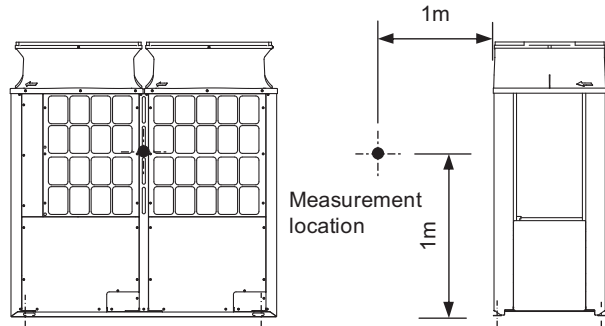


		63	125	250	500	1k	2k	4k	8k	dB(A)
Standard Heating	50/60Hz	81.0	69.5	69.5	68.0	62.0	59.0	54.0	48.5	69.0
Low noise mode	50/60Hz	60.0	58.5	55.0	48.0	43.5	43.5	39.0	34.5	52.0

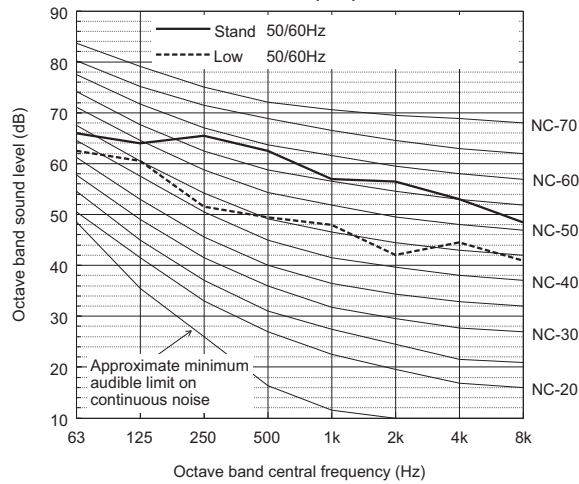
When Low noise mode is set, the A/C system's capacity is limited. The system could return to normal operation from Low noise mode automatically in the case that the operation condition is severe.

- Depending on the operation conditions, the unit generates noise caused by valve actuation, refrigerant flow, and pressure changes when operating normally. Please consider to avoid location where quietness is required. For HBC controller, it is recommended to be installed in places such as ceilings of corridor, rest rooms and plant rooms.

**Measurement condition
PURY-M500YNW-A1(-BS)**



Sound level of PURY-M500YNW-A1(-BS)



		63	125	250	500	1k	2k	4k	8k	dB(A)
Standard Heating	50/60Hz	66.0	64.0	65.5	62.5	57.0	56.5	53.0	48.5	64.5
Low noise mode	50/60Hz	62.5	60.5	51.5	49.5	48.0	42.0	44.5	41.0	53.5

When Low noise mode is set, the A/C system's capacity is limited. The system could return to normal operation from Low noise mode automatically in the case that the operation condition is severe.

- Depending on the operation conditions, the unit generates noise caused by valve actuation, refrigerant flow, and pressure changes when operating normally. Please consider to avoid location where quietness is required. For HBC controller, it is recommended to be installed in places such as ceilings of corridor, rest rooms and plant rooms.

PURY-M200, 250, 300YNW-A1(-BS)

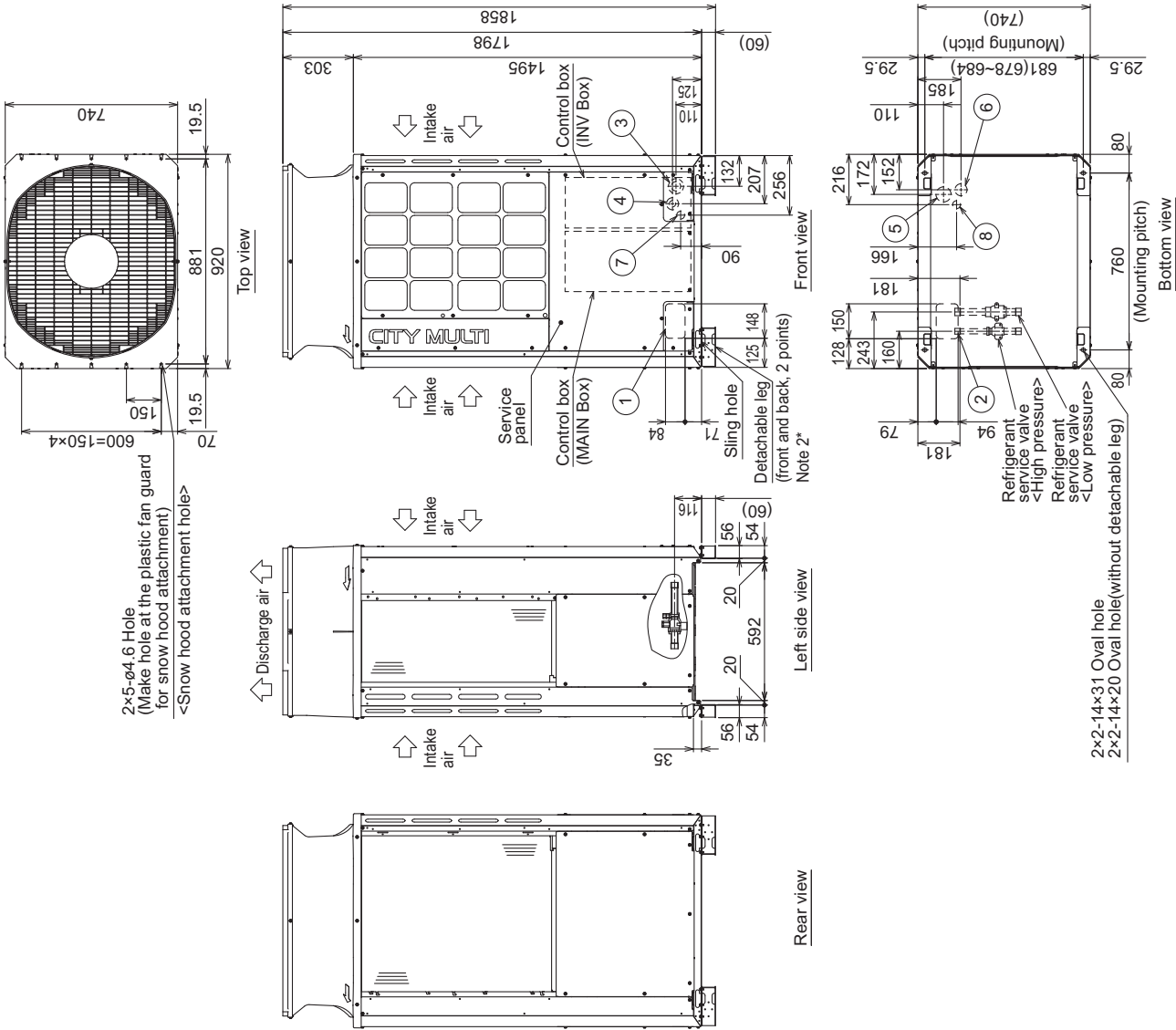
Unit: mm

- Note 1. Please refer to the next page for information regarding necessary spacing around the unit and foundation work.
2. The detachable leg can be removed at site.
3. At brazing of pipes, wrap the refrigerant service valve with wet cloth and keep the temperature of refrigerant service valve under 120°C.
4. This unit has restrictions for the safety, so refer to SAFETY HANDLING FOR R32 or the Installation Manual.

Model	Connecting pipe specifications			
	Refrigerant pipe		Service valve	
	High pressure	Low pressure	High pressure	Low pressure
M200	ø19.05 Braze ^{*1}		ø28.58	
M250	ø15.88 Braze ^{*1}		ø22.2	
M300	ø22.2 Braze ^{*1}		ø28.58	

^{*1} Connect the refrigerant pipe to the service valve according to the Installation Manual.

NO.	Usage		Specifications
	For pipes	For wires	
①	Front through hole		148 x 84 Knockout hole
②	Bottom through hole		150 x 94 Knockout hole
③	Front through hole		ø65 or ø40 Knockout hole
④	Front through hole		ø52 or ø27 Knockout hole
⑤	Bottom through hole		ø65 Knockout hole
⑥	Bottom through hole		ø52 Knockout hole
⑦	Front through hole		ø34 Knockout hole
⑧	Bottom through hole		ø34 Knockout hole



PURY-M200, 250, 300YNW-A1(-BS)

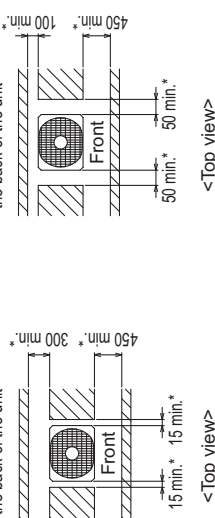
Unit: mm

1. Required space around the unit

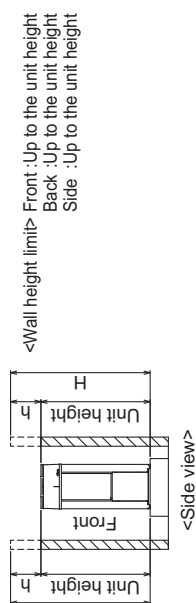
● In case of single installation

- ① Secure enough space around the unit as shown in the figure below.

- With a space of at least 300mm to the wall on the back of the unit



- ② When the height of the walls on the front, back or on the sides<H> exceeds the wall height limit as defined below add the height that exceeds the height limit <h> to the figures that are marked with an asterisk.



2. Foundation work

- ① Take into consideration the surface strength, water drainage route, piping route, and wiring route when preparing the installation site.
<Note that the drain water comes out of the unit during operation.>
- ② Build the foundation in such way that the corner of the installation leg is securely supported as shown in the right figure. (Fig.A,B)
When using a rubber isolating cushion, please ensure it is large enough to cover the entire width of each of the unit's legs.
- ③ The protrusion length of the anchor bolt must not exceed 30mm. (Fig.A,B)
- ④ Use four fixing plates as shown in the right figure <field supply required> when using post-installed anchor bolts. (Fig. C,D)
- ⑤ To prevent small animals and water and snow from entering the unit and damaging its parts, close the gap around the edges of through holes for pipes and wires with filler plates <field supply required>.
- ⑥ When the pipes or cables are routed at the bottom of the unit, make sure that the through hole at the base of the unit does not get blocked with the installation base.
- ⑦ Refer to the Installation Manual when installing units on an installation base.

● In case of collective installation

- ① When multiple units are installed adjacent to each other, secure enough space to allow for air circulation and walkway between groups of units as shown in the figures below.
- ② At least two sides must be left open.
- ③ As with the single installation, add the height that exceeds the height limit<h> to the figures that are marked with an asterisk.
- ④ If there is a wall at both the front and the rear of the unit, install up to six units consecutively in the side direction and provide a space of 1000mm or more as inlet space/ passage space for each six units.

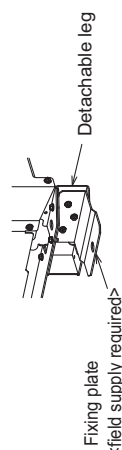
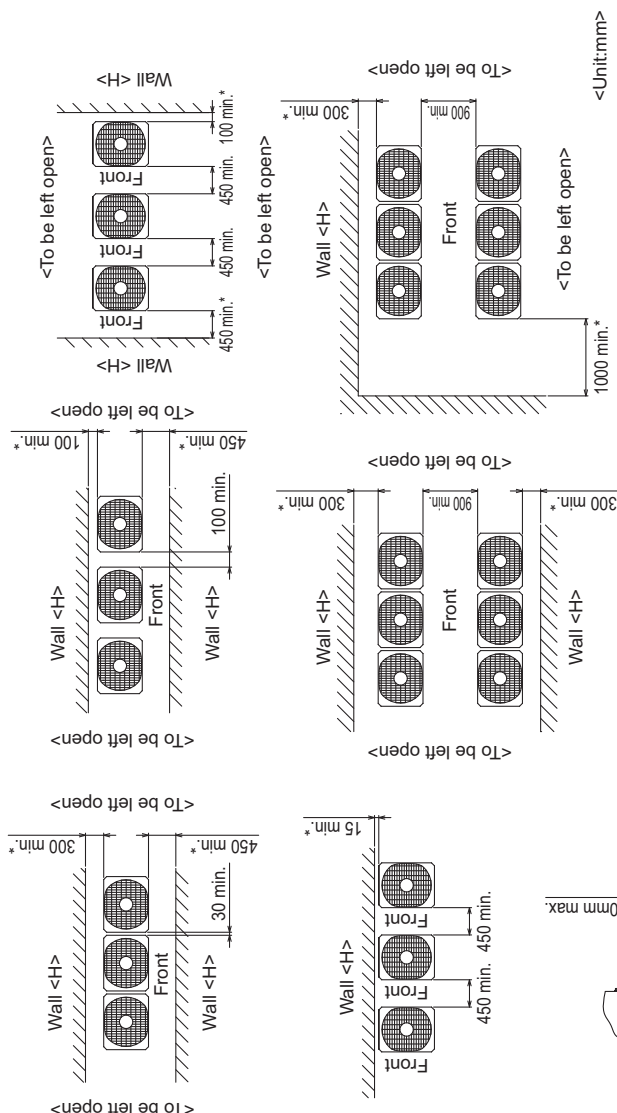


Fig.D (with detachable legs)

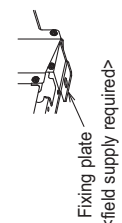


Fig.C (without detachable legs)

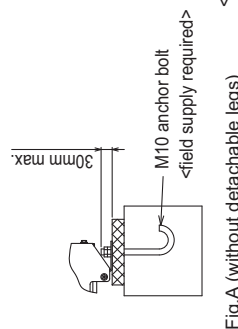


Fig.A (without detachable legs)

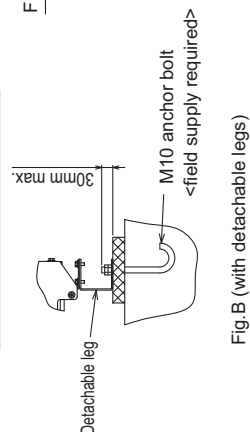


Fig.B (with detachable legs)

PURY-M-YNW-A1, EM-YNW-A1

PURY-M350,400,450YNW-A1(-BS)

Unit: mm

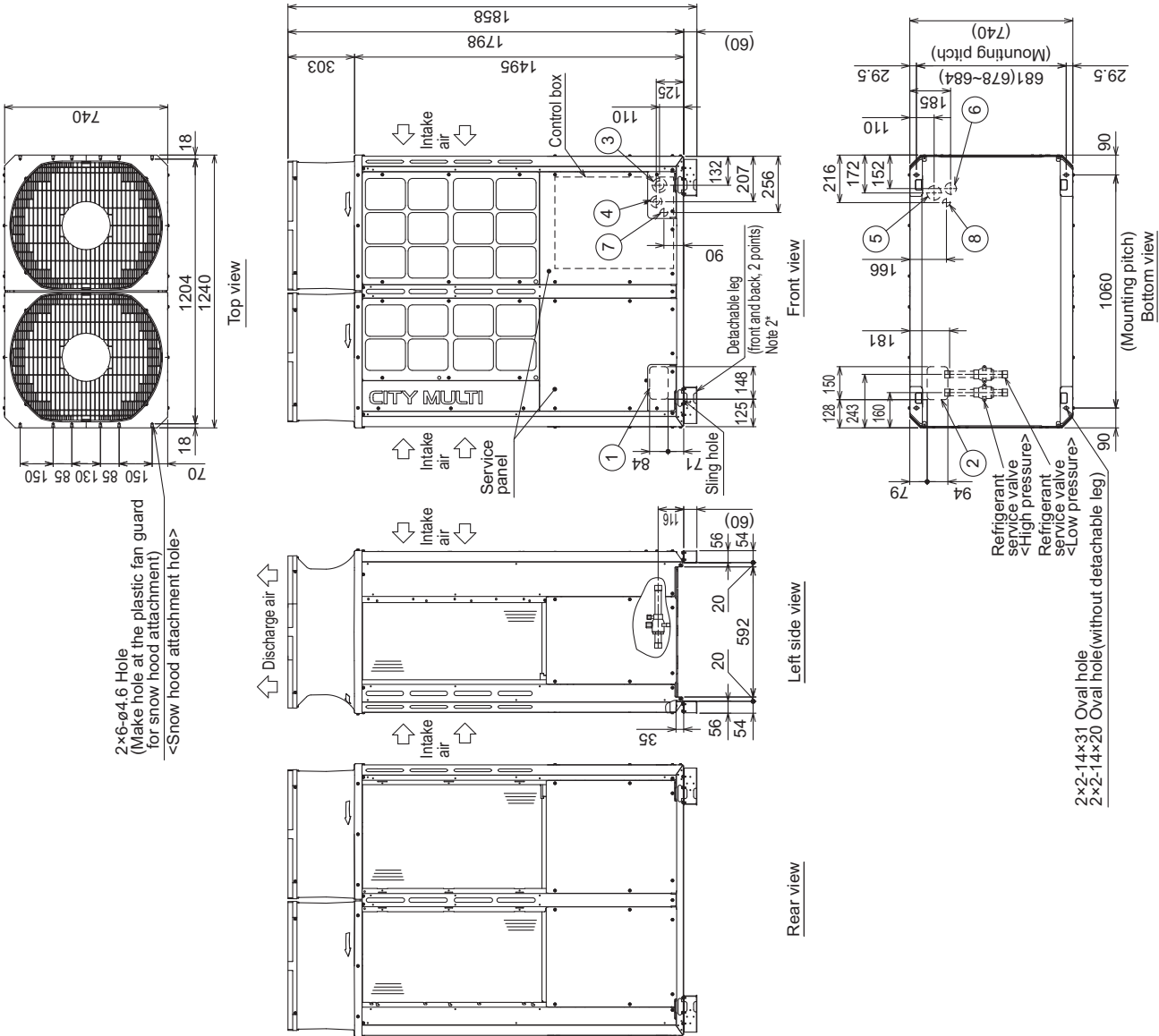
- Note 1. Please refer to the next page for information regarding necessary spacing around the unit and foundation work.
2. The detachable leg can be removed at site.
3. At brazing of pipes, wrap the refrigerant service valve with wet cloth and keep the temperature of refrigerant service valve under 120°C.
4. This unit has restrictions for the safety, so refer to SAFETY HANDLING FOR R32 or the Installation Manual.

Connecting pipe specifications

Model	Diameter		
	Refrigerant pipe	Service valve	
	High pressure	Low pressure	High pressure
M350	ø15.88 Brazed *1		Low pressure
M400		ø28.58 Brazed	ø28.58
M450	ø19.05 Brazed *1		ø28.58

*1 Connect the refrigerant pipe to the service valve according to the Installation Manual.

NO.	Usage		Specifications
	For pipes	Front through hole Bottom through hole	
①		148 x 84 Knockout hole	
②		150 x 94 Knockout hole	
③		ø65 or ø40 Knockout hole	
④		Front through hole	ø65 or ø27 Knockout hole
⑤		Bottom through hole	ø65 Knockout hole
⑥		Front through hole	ø52 Knockout hole
⑦		Bottom through hole	ø52 Knockout hole
⑧		For transmission cables	Front through hole ø34 Knockout hole Bottom through hole ø34 Knockout hole



Unit: mm

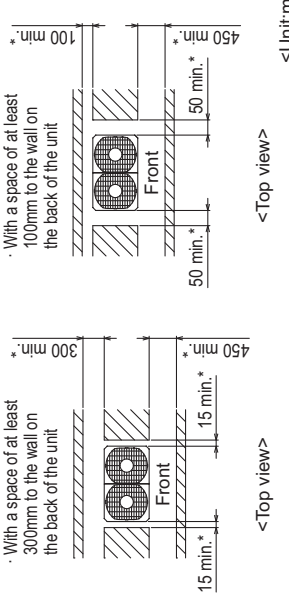
PURY-M350,400,450YNW-A1(-BS)

1. Required space around the unit

● In case of single installation

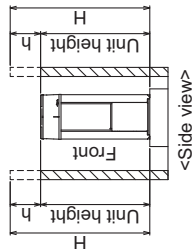
- ① Secure enough space around the unit as shown in the figure below.

· With a space of at least 300mm to the wall on the back of the unit



<Top view> <Unit:mm>

- ② When the height of the walls on the front, back or on the sides<H> exceeds the wall height limit as defined below add the height that exceeds the height limit <h> to the figures that are marked with an asterisk.



<Wall height limit> Front :Up to the unit height
Back :Up to the unit height
Side :Up to the unit height

2. Foundation work

- ① Take into consideration the surface strength, water drainage route, piping route, and wiring route when preparing the installation site.
<Note that the drain water comes out of the unit during operation.>
- ② Build the foundation in such way that the corner of the installation leg is securely supported as shown in the right figure. (Fig.A,B)
When using a rubber isolating cushion, please ensure it is large enough to cover the entire width of each of the unit's legs.
- ③ The protrusion length of the anchor bolt must not exceed 30mm. (Fig.A,B)
- ④ Use four fixing plates as shown in the right figure <field supply required> when using post-installed anchor bolts. (Fig. C,D)
- ⑤ To prevent small animals and water and snow from entering the unit and damaging its parts, close the gap around the edges of through holes for pipes and wires with filler plates <field supply required>.
- ⑥ When the pipes or cables are routed at the bottom of the unit, make sure that the through hole at the base of the unit does not get blocked with the installation base.
- ⑦ Refer to the Installation Manual when installing units on an installation base.

● In case of collective installation

- ① When multiple units are installed adjacent to each other, secure enough space to allow for air circulation and walkway between groups of units as shown in the figures below.
- ② At least two sides must be left open.
- ③ As with the single installation, add the height that exceeds the height limit<h> to the figures that are marked with an asterisk.
- ④ If there is a wall at both the front and the rear of the unit, install up to six units consecutively in the side direction and provide a space of 1000mm or more as inlet space/ passage space for each six units.

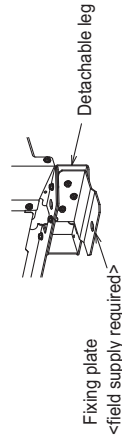
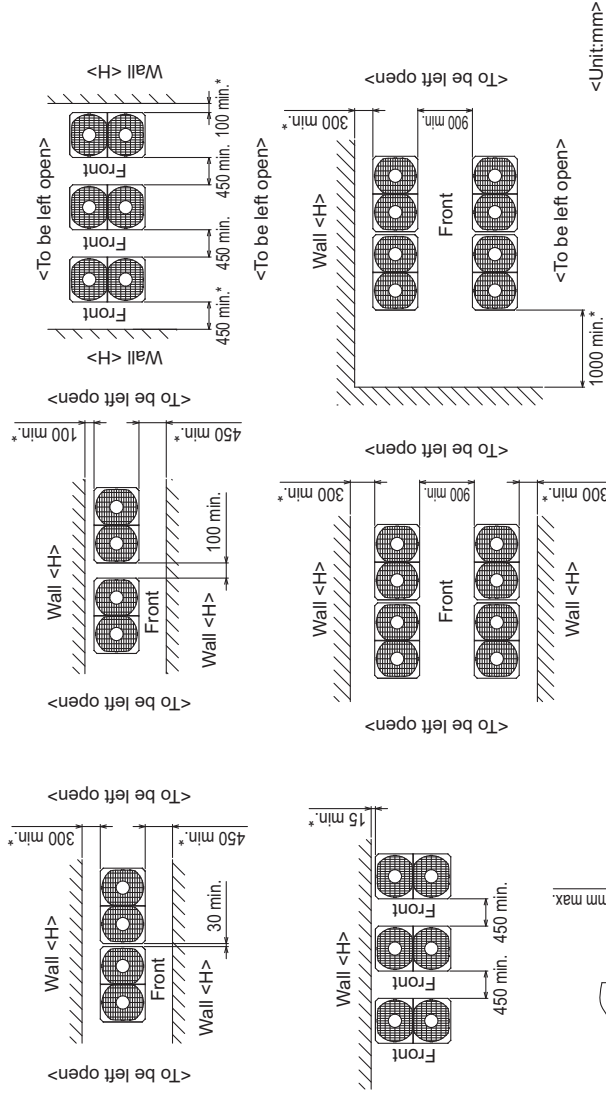


Fig.D (with detachable legs)



Fig.C (without detachable legs)

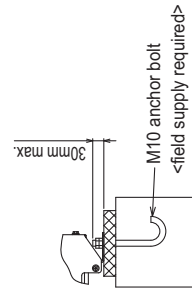


Fig.A (without detachable legs)

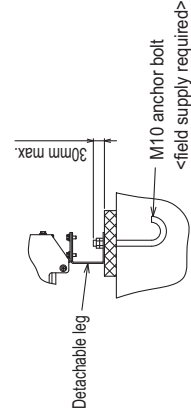


Fig.B (with detachable legs)

Unit: mm

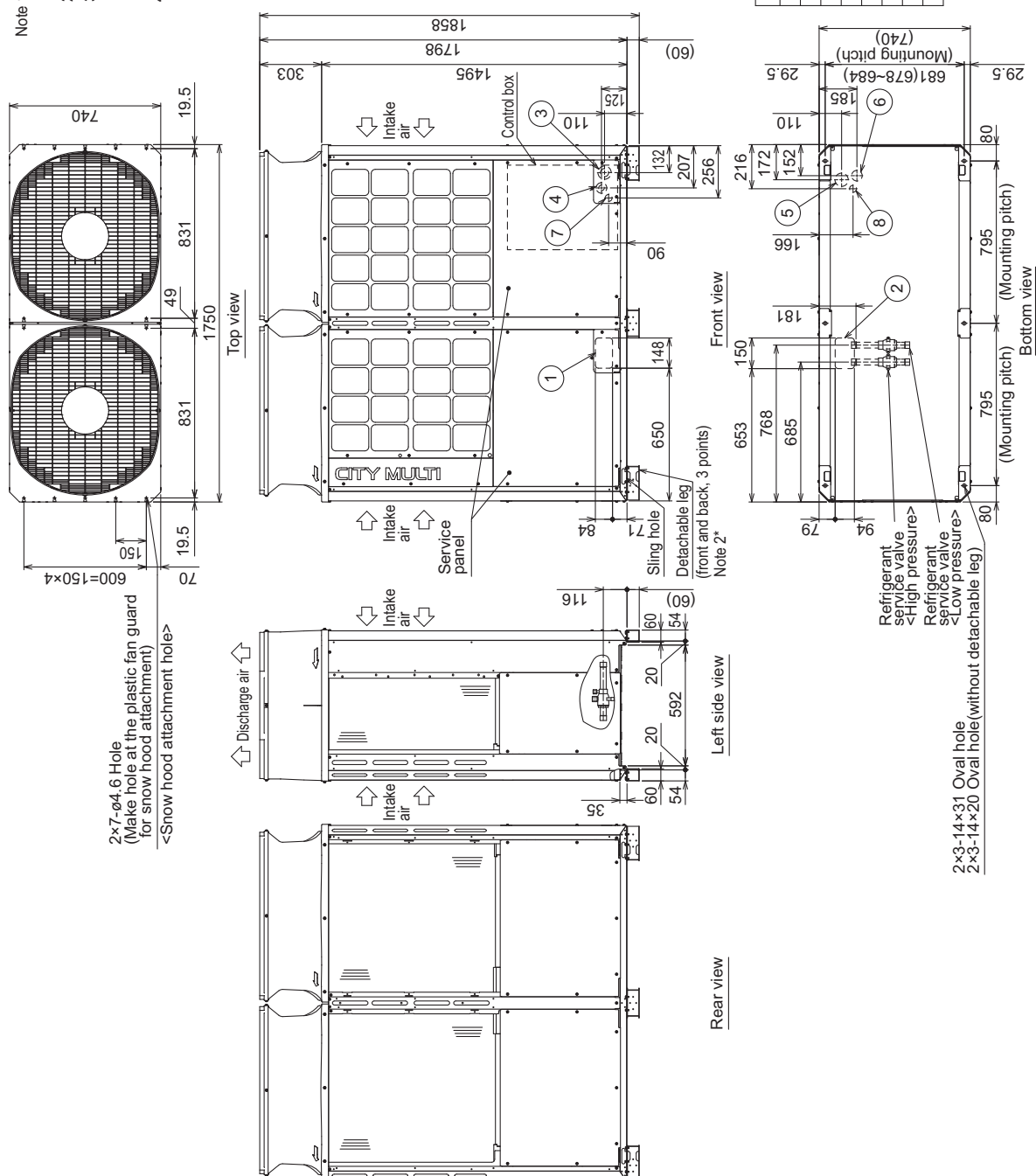
PURY-M-YNW-A1, EM-YNW-A1

1. Please refer to the next page for information regarding necessary spacing around the unit and foundation work.
2. The detachable leg can be removed at site.
3. At brazing of pipes, wrap the refrigerant service valve with wet cloth and keep the temperature of refrigerant service valve under 120°C.
4. This unit has restrictions for the safety, so refer to **SAFETY HANDLING FOR R32** or the Installation Manual.

Model		Refrigerant pipe		Service valve	
		High pressure	Low pressure	High pressure	Low pressure
M500	ø 19.05 Braze ^{*)}	ø 28.58	Braze ^{*)}	ø 28.58	ø 28.58

*1 Connect the refrigerant pipe to the service valve according to the Installation Manual.

NO.	Usage	Specifications
①	For pipes	Front through hole 148 x 84 Knockout hole
②		Bottom through hole 150 x 94 Knockout hole
③		Front through hole ø65 or ø40 Knockout hole
④	For wires	Front through hole ø62 or ø27 Knockout hole
⑤		Bottom through hole ø65 Knockout hole
⑥		Bottom through hole ø62 Knockout hole
⑦	For transmission cables	Front through hole ø34 Knockout hole
⑧		Bottom through hole ø34 Knockout hole



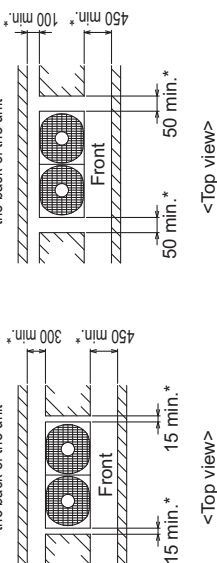
PURY-M500YNW-A1(-BS)

1. Required space around the unit

● In case of single installation

- ① Secure enough space around the unit as shown in the figure below.

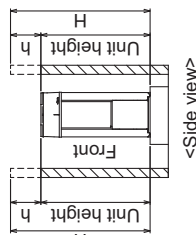
- With a space of at least 300mm to the wall on the back of the unit



<Top view>

<Top view>

- ② When the height of the walls on the front, back or on the sides<H> exceeds the wall height limit as defined below add the height that exceeds the height limit <h> to the figures that are marked with an asterisk.



<Side view>

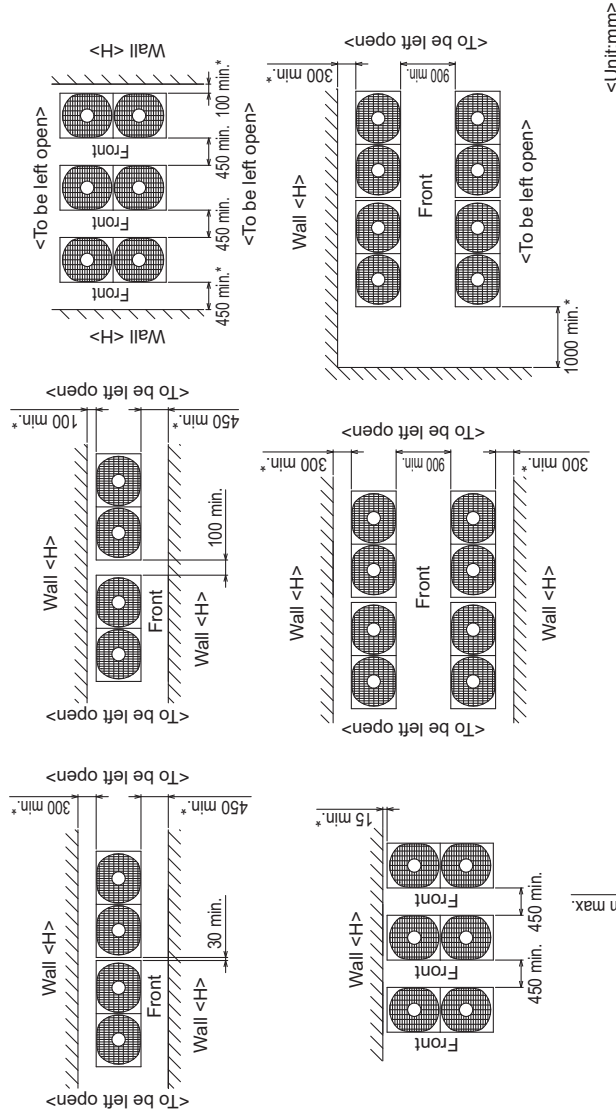
<Wall height limit> Front :Up to the unit height
Back :Up to the unit height
Side :Up to the unit height

2. Foundation work

- Take into consideration the surface strength, water drainage route, piping route, and wiring route when preparing the installation site.
<Note that the drain water comes out of the unit during operation.>
- Build the foundation in such way that the corner of the installation leg is securely supported as shown in the right figure. (Fig.A,B)
When using a rubber isolating cushion, please ensure it is large enough to cover the entire width of each of the unit's legs.
- The protrusion length of the anchor bolt must not exceed 30mm. (Fig.A,B)
- Use four fixing plates as shown in the right figure <field supply required> when using post-installed anchor bolts. (Fig. C,D)
- To prevent small animals and water and snow from entering the unit and damaging its parts, close the gap around the edges of through holes for pipes and wires with filler plates <field supply required>.
- When the pipes or cables are routed at the bottom of the unit, make sure that the through hole at the base of the unit does not get blocked with the installation base.
- Refer to the Installation Manual when installing units on an installation base.

● In case of collective installation

- When multiple units are installed adjacent to each other, secure enough space to allow for air circulation and walkway between groups of units as shown in the figures below.
- At least two sides must be left open.
- As with the single installation, add the height that exceeds the height limit<h> to the figures that are marked with an asterisk.
- If there is a wall at both the front and the rear of the unit, install up to three units consecutively in the side direction and provide a space of 1000mm or more as inlet space/ passage space for each three units.



<Unit:mm>



Fig.C (without detachable legs)

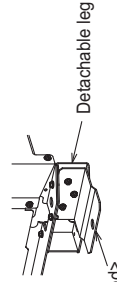


Fig.D (with detachable legs)

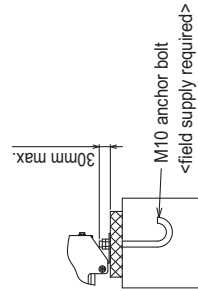


Fig.A (without detachable legs)

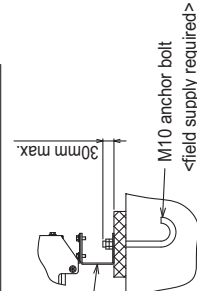


Fig.B (with detachable legs)

11-2. Piping Design

11-2-1. Restrictions on pipe length

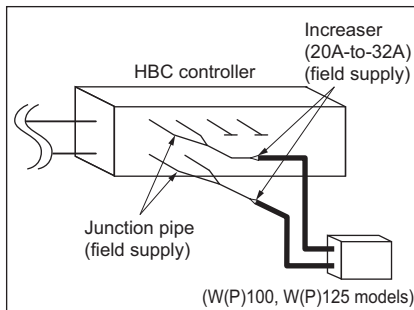
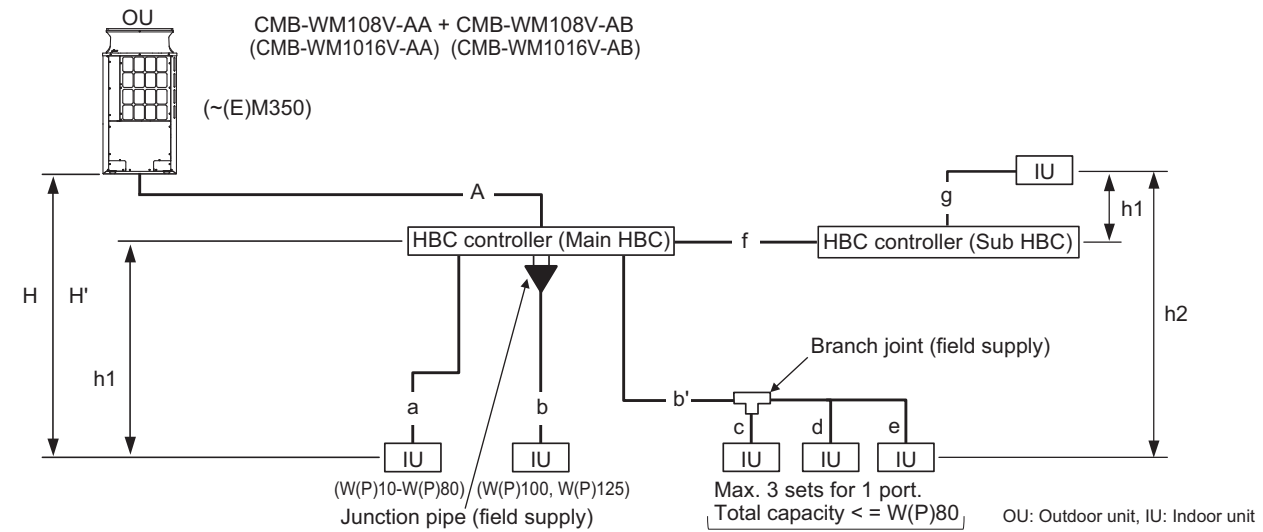


Fig. 11-2-1A

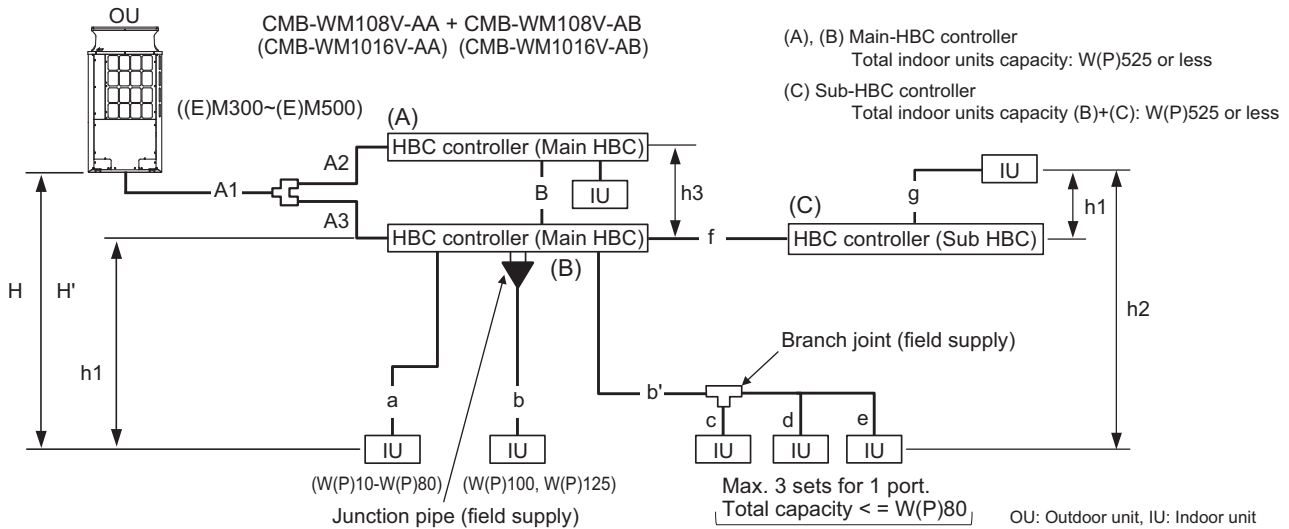
(Unit: m)

Item	Piping portion	Allowable value
Between outdoor unit and HBC controller (refrigerant pipework)	A	110 or less
Water pipework between indoor units and HBC controller	f + g	60 or less
Between HBC and outdoor units	Outdoor unit above HBC	H
	Outdoor unit below HBC	H'
Between indoor units and HBC controller	h1	15(10) or less*3
Between indoor units	h2	15(10) or less*3

*1. 90 m is available depending on the model and installation conditions. For more detailed information, contact your local distributor.

*2. 60 m is available depending on the model and installation conditions. For more detailed information, contact your local distributor.

*3. Values in () are applied when indoor total capacity exceeds 130% of outdoor unit capacity



(Unit: m)

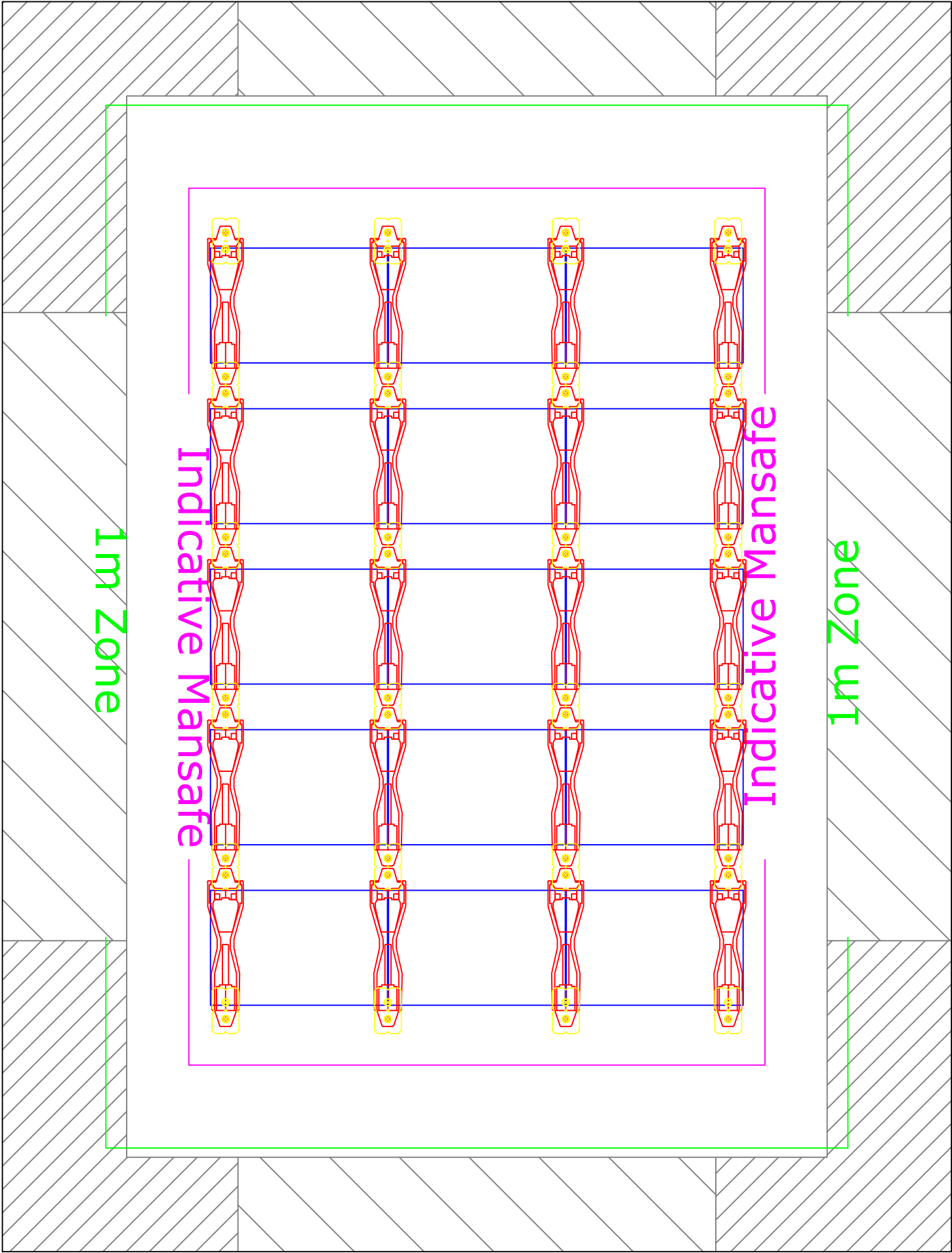
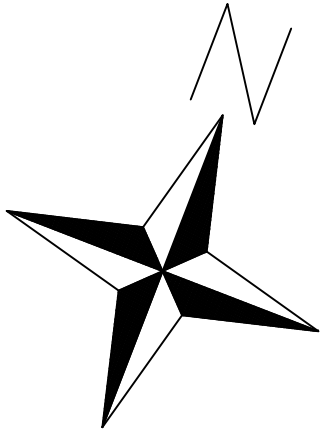
Item	Piping portion	Allowable value
Between outdoor unit and HBC controller (refrigerant pipework)	A1 + A2 + A3	110 or less
Water pipework between indoor units and HBC controller	f + g	60 or less
Between HBC controllers	B	40 or less
Between HBC and outdoor units	Outdoor unit above HBC	H
	Outdoor unit below HBC	H'
Between indoor units and HBC controller	h1	15(10) or less*3
Between indoor units	h2	15(10) or less*3
Between HBC controllers	h3	15(10) or less*3

*1. 90 m is available depending on the model and installation conditions. For more detailed information, contact your local distributor.

*2. 60 m is available depending on the model and installation conditions. For more detailed information, contact your local distributor.

*3. Values in () are applied when indoor total capacity exceeds 130% of outdoor unit capacity

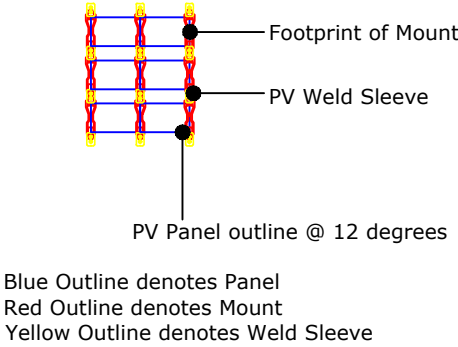
•Indoor units with valves (W-type) and indoor units without valves (WP-type) may not coexist in the same system.



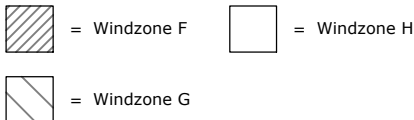
- Wind loading calculations have been carried out based on site specific data and the building dimensions. Where modules have **not** been located within **Zones F & G** this is due to the project specific wind loading calculations.
- The **Green Line** identifies a **1000mm** boundary from the inside of the roof perimeter. This is the minimum distance BauderSOLAR PV panels should be installed from the roof edge.
- The **Magenta Line (where illustrated)** identifies an indicative mansafe system, or handrail, **1800mm** from the roof perimeter. Should this not be required please consult Bauder Ltd.
- Minimum **1000mm** has been allowed for around all roof access hatches, AOV's, upstands, mechanical plant etc. for maintenance purposes/access.
- * Numerous site specific factors can influence inverter specification. Inverters and optimisers specified are for guidance purposes only. MCS Accredited PV Contractor to confirm exact specification prior to installation.

Bauder Solar F XL - Solarwatt module

Key:



Windzones Key:



Important notice: Modules installed in zones F & G will be subject to significantly higher windloads than zone H. Where possible, all modules should be located minimum 1m from any roof plant, upstands or roof openings. Please contact Bauders technical office before re-locating any modules

Design Information

No. Mounts Required:	20
No. Sleeves Required:	24
Type of Optimizer:	N/A
Area of PV Panels:	29.04 m2

General Information

Total power DC:	6.5 kWp
BAUDER System type:	Bauder Solar F XL
Module type:	Classic H 2.0 Pure 30 (410wp)
Module amount:	15 Units
Azimuth:	21 Degrees SE

All Dimensions, positions of Rooflights and Outlets/SVP's/mansafe systems are to be checked on site **by the installing contractor** for clashes BEFORE the PV design is ordered.

Rev	Date	Description	Drawn By



UK OFFICE

Bauder Limited
70 Landseer Road, Ipswich,
Suffolk IP3 0DH,
England.
Tel: +44 (0)1473 257671
Fax: +44 (0)1473 230761
Email: technical@bauder.co.uk
bauder.co.uk

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Carrickmacross, Co. Monaghan,
Ireland.
Tel: +353 (0)42 9692 333
Fax: +353 (0)42 9692 839
Email: technical@bauder.ie
bauder.ie

Installing contractor is responsible for checking this scheme against architects drawings/site requirements and to advise Bauder immediately of any discrepancies. Orders placed against this drawing reference assume approval of this scheme. Any materials required over and above the quantities given, will be charged accordingly.

Contract Name:
Ruislip Police Station, The Oaks, Ruislip, HA4 7LE

Bauder Solar F XL PV Layout Plan

Contract No:	B223397/1		
Drawing No:	B223397PV - 20231106		
Designed to Drawing No:	Google Earth		
Scale:	N.T.S		
Drawn By:	CD	Date:	06.11.23

Roof Area Name:	Roof Height:	Membrane Type:	No. Panels:	No. Mounts:	No. Weld Sleeves:	Inverter Type 1: See Note Above *	Inverter Type 2: See Note Above *
Flat Roof	8m	BTRS	15	20	24	SOL-5.0-S6-DT-DC x1	-
-	-	-	-	-	-	-	-
Total Parts Required:	-	-	15	20	24		

Solar PV Systems

Flat roof solutions



Photo Credit: Ivegata Ltd

A photograph of a green roof installation. In the foreground, there are various green plants, including a tall yellow flower on the left and several purple flowers in the center. The background shows a large array of blue solar panels installed on a flat roof. The sky is blue with some light clouds.

**Noah's Ark Children's Hospice
Barnet**

BUILDING BOARD

Roof Size:	5,100m ²
Roof Systems:	BauderSOLAR G LIGHT with extensive green roof Bauder Total Green Roof System
Specifier:	Squire and Partners
Approved Contractor:	Voland Roofing Limited
Green Roof Contractor:	Bridgeman & Bridgeman
PV Installer:	Joju Solar

Bauder is a leading European manufacturer of flat roof waterproofing membranes and insulation to make buildings watertight and thermally efficient; photovoltaic systems for renewable energy generation; green roofs to support the environment and create better living and working spaces for people; and blue roofs for stormwater attenuation and prevention of localised flooding.

Customers choose us because of the way in which we do business, for our robust advice on the right system, and our approach to delivering projects. We work alongside clients to deliver the best solution for a building from our broad portfolio of systems.

Solar PV

Photovoltaic systems for flat, green, and blue roof applications

Our photovoltaic solutions are innovative, penetration-free, quick to install, and provide a cost effective and highly efficient solution.

Our solar photovoltaic (PV) systems are designed to ensure the Bauder waterproofing beneath remains completely intact and without compromise.

The entire installation process of both of our photovoltaic systems is quick and simple. Through our portfolio, we guarantee the entire Bauder specified roof package rather than a separate element, giving single source point of contact and responsibility to reduce risk.

Specifying a solar PV array

A flat roof is the ideal place for a solar photovoltaic installation to generate site-sourced electricity. Renewable energy generation has a big role to play in the delivery of a net zero carbon building and integrating renewables allows it to meet a proportion of its own energy needs, minimise carbon emissions, and reduce building running costs.

Outline of our solar PV systems

- Two systems for new build and refurbishment projects, BauderSOLAR and BauderSOLAR G LIGHT.
- Penetration-free installation of mounting system to reduce risk.
- Variety of solar PV modules to suit client needs and budget.
- Range of Bauder waterproofing options.
- Comprehensive range of guarantee packages to suit project requirements.

Achieving technical objectives

- Bauder solar PV array designs meet MCS PV Guide requirements and IET Codes of Practice.
- System designs comply with:
 - BSEN 62446 Grid Connected Photovoltaics
 - BSEN 61853-1 Defining Solar Photovoltaic Power
 - BSEN 1991-1-4 Wind Actions on Structures
 - BRE Digest DG 489 rev 2014



BauderSOLAR PV Solutions

Two systems for creating a rooftop solar PV installation

Integrated photovoltaic solutions for flat roofs on both new build construction and retrofit for current buildings.

Through our systems we guarantee the entire roof package for single source point of contact and responsibility to reduce risk.

BauderSOLAR F and BauderSOLAR F XL

Flat roof photovoltaic mounting system that is attached to the roof without penetration of the waterproofing system or roof deck. The systems are designed to be used in conjunction with our single ply or bituminous membrane waterproofing solutions and are lightweight at 9-12.5kg/m², depending on the module selected.

As module manufacturers strive to increase the efficiency of solar modules, the industry is moving to larger format cells and module structures.

BauderSOLAR F XL System allows the installation of larger format modules ensuring we can provide our clients with the most efficient solar solutions for their flat roof projects. BauderSOLAR F fits modules up to 1060mm wide to embrace the refurbishment sector where an existing PV array is being replaced.

BauderSOLAR G LIGHT

Our biosolar photovoltaic solution that integrates a Bauder green or blue roof where the substrate and vegetation provide the ballast to secure the array. This system allows for the entire roof area to qualify as a green roof, and if a biodiversity vegetation finish is specified, this can help the building achieve Urban Greening Factor, Biodiversity Net Gain, and BREEAM ecology credits whilst simultaneously maximising solar generation.



BauderSOLAR PV Design Fundamentals

Brief outline of some key considerations

Solar PV is a popular and mature renewable energy technology, and its deployment is rising due to the combined importance of achieving net zero and reducing energy costs.

With recent fluctuations in energy markets and carbon reductions initiatives coming to the fore, the number of solar PV installations on flat roofs will continue to rise as local authorities and businesses look to reduce their carbon footprint and gain energy security for the future.

Sizing of Solar PV systems

The size of the solar PV array will be determined by the overall aim of the scheme, the building's energy consumption, available non-shaded roof space, and client's budget.

On new build developments, the size of the array will usually be determined by either Part L requirements or local planning conditions. This can lead to complications if the size of the output required is not applied to the available roof space to ensure that the system will physically fit on the roof whilst also considering safe access, shading, and fire breaks between the array and other roof items.

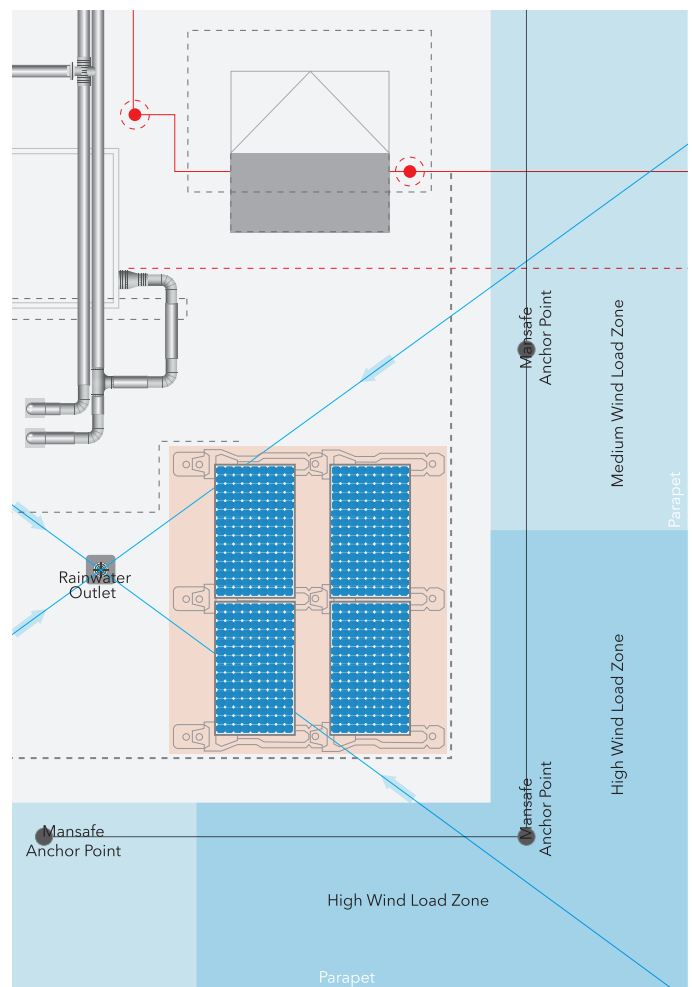
Our photovoltaic solutions are designed for the maximum number of modules to be installed on the identified roof area maximising energy generation from the roof.

Retrofitting PV

Retrofitting photovoltaic panels is possible on many existing buildings and the primary considerations are the additional weight loading, wind uplift factors that the PV array will impose, and what the impact of a retrofitted solar array may have on existing roof warranties.

Durability of the waterproofing system is also a key consideration as its remaining lifespan should, at a minimum, match that of the PV scheme, as well as be able to withstand any additional access requirements for maintenance.

The most popular system installed as a retrofit on refurbishment projects is the BauderSOLAR F system.



BauderSOLAR F and BauderSOLAR F XL Systems

Flat roof PV solutions for new build and retrofit projects

The mounting system is secured to the roof using membrane-to-membrane welding techniques on our bituminous and single ply waterproofing systems.

Our BauderSOLAR PV systems deliver technically advanced solutions through design of the mounting system and efficiency of the solar PV modules for both new build and retrofit projects.

The distinctive element of our lightweight PV mounting system is the prefabricated Bauder membrane sleeves which slip over the mounting plates and are welded into position, anchoring the plates to the surface of the Bauder waterproofing system. Once this is completed, the rest of the solar PV installation is simply locked into place without any requirement for tools or sharp fixings.

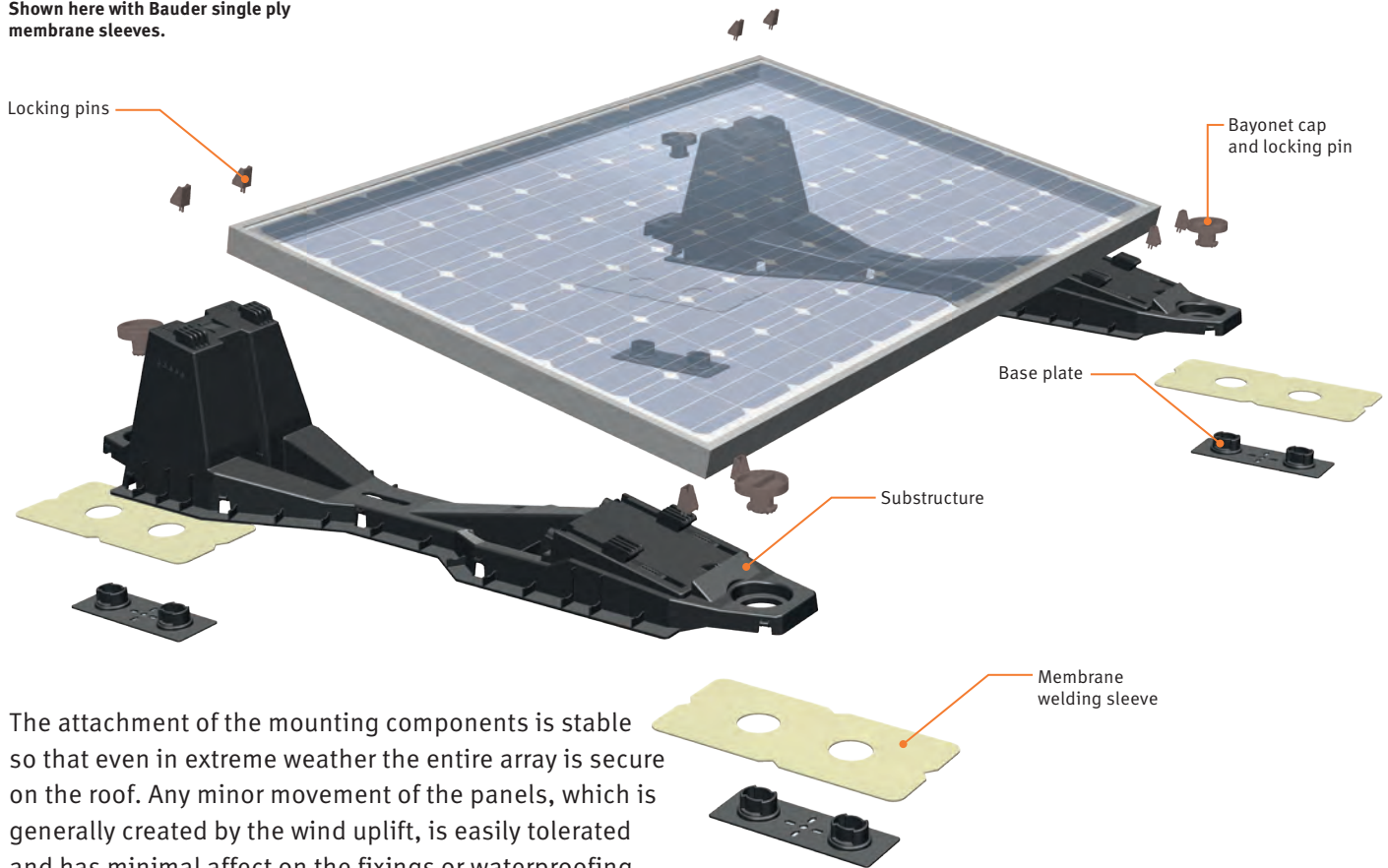
Plus points

- Penetration and ballast free installation method reduces risk.
- High output to roof space ratio.
- Range of solar PV panels to suit client needs and budget.
- Lightweight system 9-12.5kg/m², depending on the module selected.
- Single source for design of waterproofing and solar PV array with clear accountability.
- Comprehensive range of guarantee packages to fulfil cover requirements for the project (dependant on system/product selection). For more information contact our technical dept for a sample guarantee outlining cover level, terms and conditions.



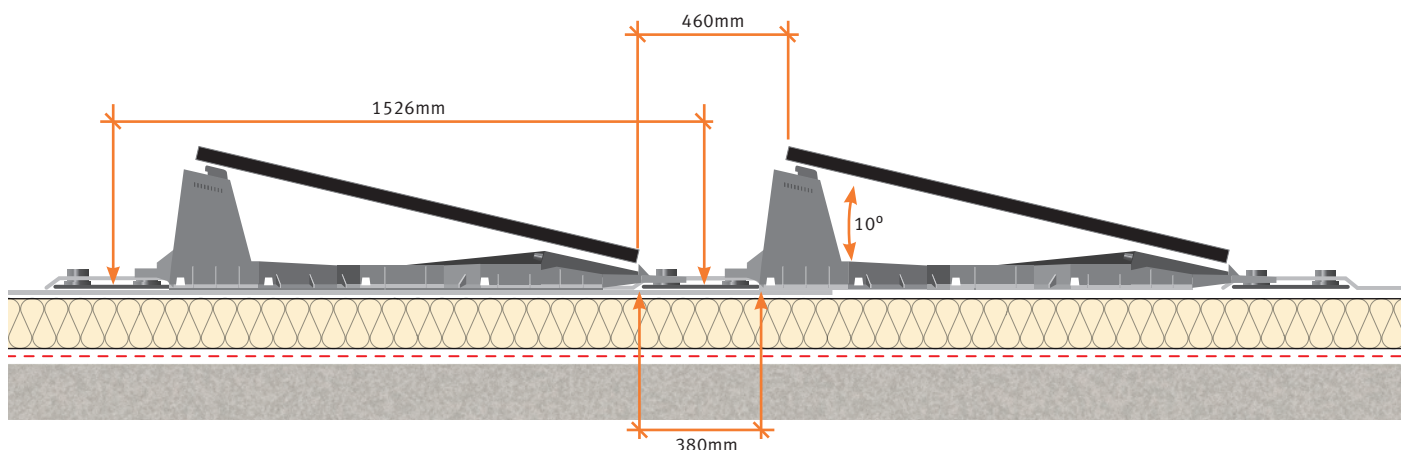
BauderSOLAR F and BauderSOLAR F XL Systems

Shown here with Bauder single ply membrane sleeves.



The attachment of the mounting components is stable so that even in extreme weather the entire array is secure on the roof. Any minor movement of the panels, which is generally created by the wind uplift, is easily tolerated and has minimal affect on the fixings or waterproofing system.

Dimensions shown are for BauderSOLAR F XL mounting system.





Department of Engineering
Cambridge University

BUILDING BOARD

Roof Size:	1,610m ²
Waterproofing:	Bauder Total Green Roof System
Specifier:	R H Partnership Architects
Main Contractor:	SDC Limited
Approved Contractor:	Voland Roofing

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Reducing use of materials



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