Calculation and Selection Result

A.Project Overview

Project Name	USC Płock
Country	Poland
City	Gdańsk
Address	
Client Name	
Client Address	
Reference	
Revision	
Project Date	9 / 18 / 2019
Altitude	m
Cooling Condition: Indoor Dry-bulb	27.0 °C
Cooling Condition: Indoor Wet-bulb	19.0 °C
Cooling Condition: Outdoor Dry-bulb	28.0 °C
Cooling condition: Outdoor wet bulb	25.0 °C
Heating Condition: Indoor Dry-bulb	20.0 °C
Heating Condition: Outdoor Dry-bulb	-16.0 °C
Heating Condition: Outdoor Wet-bulb	-16.3 °C

B.Material List

Model	Quantity	Description
MDV-V120W/DRN1	1	All DC Inverter Mini VRF (380V)
MI2-36GDN1	6	Wall_mounted (2nd DC IDU)
MI2-56GDN1	7	Wall_mounted (2nd DC IDU)
MDV-V260W/DRN1	2	DC Inverter Individual VRF (380V 20-45kW)
FQZHN-01D	8	Branch Joint
FQZHN-02D	2	Branch Joint
Ø22.2	25.0 m	Copper Pipe
Ø19.1	6.0 m	Copper Pipe
Ø15.9	48.5 m	Copper Pipe
Ø12.7	18.5 m	Copper Pipe
Ø9.53	79.5 m	Copper Pipe

Model	Quantity	Description
Ø6.35	18.5 m	Copper Pipe
WDC-86E/KD	13	2nd generation wired controller

System1

1.1 Material List

Model	Quantity	Description
MDV-V120W/DRN1	1	All DC Inverter Mini VRF (380V)
MI2-36GDN1	2	Wall_mounted (2nd DC IDU)
MI2-56GDN1	1	Wall_mounted (2nd DC IDU)
FQZHN-01D	2	Branch Joint
WDC-86E/KD	3	2nd generation wired controller
Ø15.9	24.5 m	Copper Pipe
Ø12.7	9.5 m	Copper Pipe
Ø9.53	24.5 m	Copper Pipe
Ø6.35	9.5 m	Copper Pipe

1.2 Indoor Unit Specifications

IDU Name	Model	Sound (dB(A))	Weight(kg)	Dimension(mm) W x H x D	Power Supply	Rated Power(W)	MCA(A)	MFA(A)
0-24	MI2-36GDN1	33(SSH)	11.40	990*315*223	220-240,50,1	30	N/A	N/A
0-27	MI2-56GDN1	38(SSH)	12.80	990*315*223	220-240,50,1	45	N/A	N/A
0-28	MI2-36GDN1	33(SSH)	11.40	990*315*223	220-240,50,1	30	N/A	N/A

IDU Name	Model	Cooling AT (°C)	Req.TC (kW)	TC (kW)	Req.SC (kW)	SC (kW)	Heating AT (°C)	Req.HC (kW)	HC (kW)	Air flow (m^3/h)	ESP (Pa)
0-24	MI2-36GDN1	27.0/19.0	0.00	3.49	0.00	2.32	20.0	0.00	2.49	656(SSH)	N/A
0-27	MI2-56GDN1	27.0/19.0	0.00	5.43	0.00	3.30	20.0	0.00	3.92	747(SSH)	N/A
0-28	MI2-36GDN1	27.0/19.0	0.00	3.49	0.00	2.32	20.0	0.00	2.49	656(SSH)	N/A

1.3 Outdoor Unit Specifications

Name	Model	Module	Dimension(mm)	Weight(kg)	Base refr(kg)	Add refr(kg)	Power Supply	MCA(A)	MFA(A)
ODU1	MDV-V120W/DRN1	MDV-V120W/DRN1	900*1327*400	95.00	3.30	1.81	380~415V~50Hz~3ph	N/A	N/A

Name	Model	CR%	Temp(°C)	CC(kW)	Req CC(kW)	Temp(H/RH)(°C)	HC(kW)	Req HC(kW)
ODU1	MDV-V120W/DRN1	104.07	28.0	12.43	0.00	-16.0/86%	8.91	0.00

Name	Model	EER	COP	Cooling Power(kW)	Heating Power(kW)
ODU1	MDV-V120W/DRN1	4.68	2.58	2.71	3.48

Req.TC: Required Total Cooling Capacity

Req.SC: Required Sensible Cooling Capacity

Req.HC: Required Total Heating Capacity

TC: Available Total Cooling Capacity

SC: Available Sensible Cooling Capacity

HC: Available Total Heating Capacity

AT: Ambient Temperature

ESP: External Static Pressure

Req.CC: Required Cooling Capacity

CC: Available Cooling Capacity

1.4 Piping and Mode Selection Devices

IDU Quantity	3/6
Combination Ratio	104.07%
Additional refrigerant charge	1.81 kg = 9.50(6.35) * 0.022 + 24.50(9.53) * 0.057 + 2 * 0.1
Factory refrigerant charge	3.30 kg
Total refrigerant charge	5.11 kg
Total Pipe Length	35 m / 100 m
Furthest Actual	28 m / 60 m
Furthest Equivalent	29 m / 70 m
Furthest Equivalent from First Branch to IDU	8.5 m / 20 m
Drop Height between IDU and IDU	0 m / 8 m
Drop height between IDU and ODU(Below ODU)	3 m / 30 m
Available Capacity Cooling	12.43 kW
Available Capacity Heating	8.91 kW

Note:

1.The equivalent length of each branch joint is 0.5m.

Pipe

No.	Length	Gas Pipe	Liquid Pipe
(1)	20.0 m	Ø15.9	Ø9.53
(2)	2.0 m	Ø12.7	Ø6.35
(3)	0.5 m	Ø15.9	Ø9.53
(4)	4.0 m	Ø15.9	Ø9.53
(5)	7.5 m	Ø12.7	Ø6.35

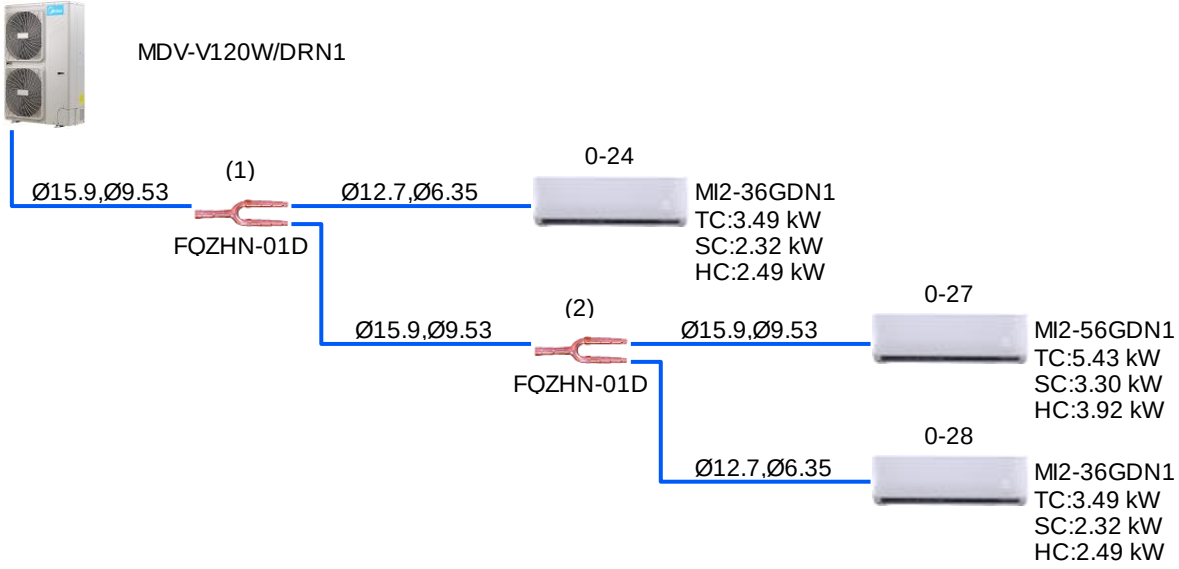
Branch Joint

No.	Load kW	Model
(1)	12.80	FQZHN-01D
(2)	9.20	FQZHN-01D

1.5 Piping Diagram

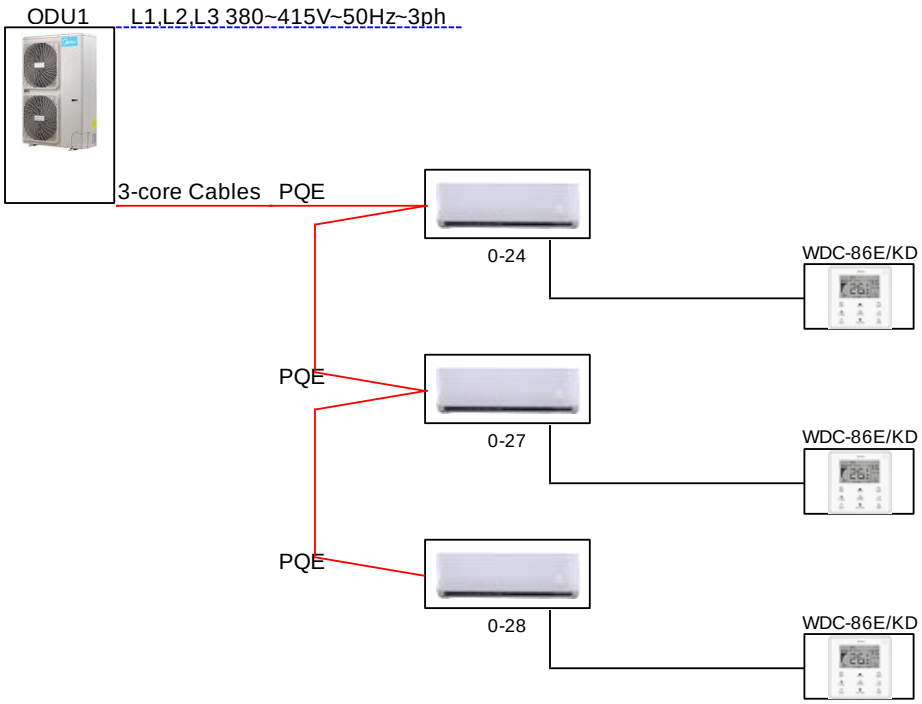
VRF 50Hz R410A

ODU:12.43/8.91 kW IDU Total:12.41/7.94/8.90 kW



The piping size may be different with the actual situation because of the software's illustration limitation, please confirm the piping size according to the installation manual before installation.

1.6 Wiring Diagram



The wiring diagram may be different with the actual situation because of software's illustration limitation, please confirm the wiring diagram according to the installation manual before installation.

System2

2.1 Material List

Model	Quantity	Description
MDV-V260W/DRN1	1	DC Inverter Individual VRF (380V 20-45kW)
MI2-56GDN1	3	Wall_mounted (2nd DC IDU)
MI2-36GDN1	2	Wall_mounted (2nd DC IDU)
FQZHN-02D	1	Branch Joint
FQZHN-01D	3	Branch Joint
WDC-86E/KD	5	2nd generation wired controller
Ø22.2	6.0 m	Copper Pipe
Ø19.1	3.0 m	Copper Pipe
Ø15.9	12.0 m	Copper Pipe
Ø12.7	4.5 m	Copper Pipe
Ø9.53	21.0 m	Copper Pipe
Ø6.35	4.5 m	Copper Pipe

2.2 Indoor Unit Specifications

IDU Name	Model	Sound (dB(A))	Weight(kg)	Dimension(mm) W x H x D	Power Supply	Rated Power(W)	MCA(A)	MFA(A)
1-16	MI2-56GDN1	38(SSH)	12.80	990*315*223	220-240,50,1	45	N/A	N/A
1-16	MI2-56GDN1	38(SSH)	12.80	990*315*223	220-240,50,1	45	N/A	N/A
1-17	MI2-56GDN1	38(SSH)	12.80	990*315*223	220-240,50,1	45	N/A	N/A
1-18	MI2-36GDN1	33(SSH)	11.40	990*315*223	220-240,50,1	30	N/A	N/A
1-19	MI2-36GDN1	33(SSH)	11.40	990*315*223	220-240,50,1	30	N/A	N/A

IDU Name	Model	Cooling AT (°C)	Req.TC (kW)	TC (kW)	Req.SC (kW)	SC (kW)	Heating AT (°C)	Req.HC (kW)	HC (kW)	Air flow (m^3/h)	ESP (Pa)
1-16	MI2-56GDN1	27.0/19.0	0.00	5.50	0.00	3.34	20.0	0.00	4.60	747(SSH)	N/A
1-16	MI2-56GDN1	27.0/19.0	0.00	5.50	0.00	3.34	20.0	0.00	4.60	747(SSH)	N/A
1-17	MI2-56GDN1	27.0/19.0	0.00	5.48	0.00	3.33	20.0	0.00	4.57	747(SSH)	N/A
1-18	MI2-36GDN1	27.0/19.0	0.00	3.51	0.00	2.34	20.0	0.00	2.88	656(SSH)	N/A
1-19	MI2-36GDN1	27.0/19.0	0.00	3.49	0.00	2.32	20.0	0.00	2.87	656(SSH)	N/A

2.3 Outdoor Unit Specifications

Name	Model	Module	Dimension(mm)	Weight(kg)	Base refr(kg)	Add refr(kg)	Power Supply	MCA(A)	MFA(A)
ODU2	MDV-V260W/DRN1	MDV-V260W/DRN1	1120*1558*528	147.00	6.20	1.41	380-415V-3ph-50Hz	N/A	N/A

Name	Model	CR%	Temp(°C)	CC(kW)	Req CC(kW)	Temp(H/RH)(°C)	HC(kW)	Req HC(kW)
ODU2	MDV-V260W/DRN1	92.31	28.0	25.58	0.00	-16.0/86%	19.69	0.00

Name	Model	EER	COP	Cooling Power(kW)	Heating Power(kW)
ODU2	MDV-V260W/DRN1	4.45	2.68	5.39	7.38

Req.TC: Required Total Cooling Capacity

Req.SC: Required Sensible Cooling Capacity

Req.HC: Required Total Heating Capacity

TC: Available Total Cooling Capacity

SC: Available Sensible Cooling Capacity

HC: Available Total Heating Capacity

AT: Ambient Temperature

ESP: External Static Pressure

Req.CC: Required Cooling Capacity

CC: Available Cooling Capacity

2.4 Piping and Mode Selection Devices

IDU Quantity	5/12
Combination Ratio	92.31%
Additional refrigerant charge	1.41 kg = 4.50(6.35) * 0.022 + 23.00(9.53) * 0.057
Factory refrigerant charge	6.20 kg
Total refrigerant charge	7.61 kg
Total Pipe Length	27.5 m / 120 m
Furthest Actual	23.5 m / 60 m
Furthest Equivalent	25.5 m / 70 m
Furthest Equivalent from First Branch to IDU	19 m / 20(40) m
Drop Height between IDU and IDU	0 m / 8 m
Drop height between IDU and ODU(Below ODU)	3 m / 30 m
Available Capacity Cooling	23.61 kW
Available Capacity Heating	19.66 kW

Note:

1.The equivalent length of each branch joint is 0.5m.

Pipe

No.	Length	Gas Pipe	Liquid Pipe
(1)	6.0 m	Ø22.2	Ø9.53
(2)	3.0 m	Ø19.1	Ø9.53
(3)	8.0 m	Ø15.9	Ø9.53
(4)	2.5 m	Ø15.9	Ø9.53
(5)	0.5 m	Ø15.9	Ø9.53
(6)	0.5 m	Ø15.9	Ø9.53
(7)	0.5 m	Ø15.9	Ø9.53
(8)	0.5 m	Ø12.7	Ø6.35
(9)	4.0 m	Ø12.7	Ø6.35

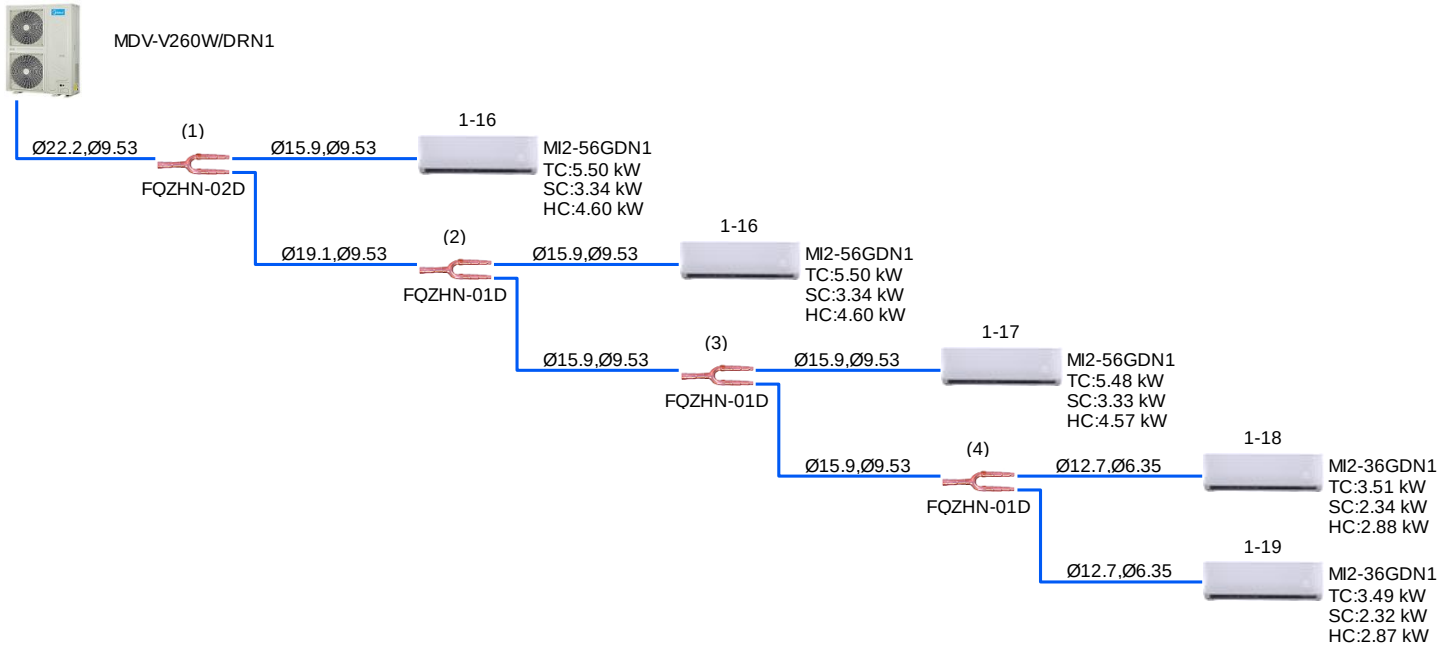
Branch Joint

No.	Load kW	Model
(1)	24.00	FQZHN-02D
(2)	18.40	FQZHN-01D
(3)	12.80	FQZHN-01D
(4)	7.20	FQZHN-01D

2.5 Piping Diagram

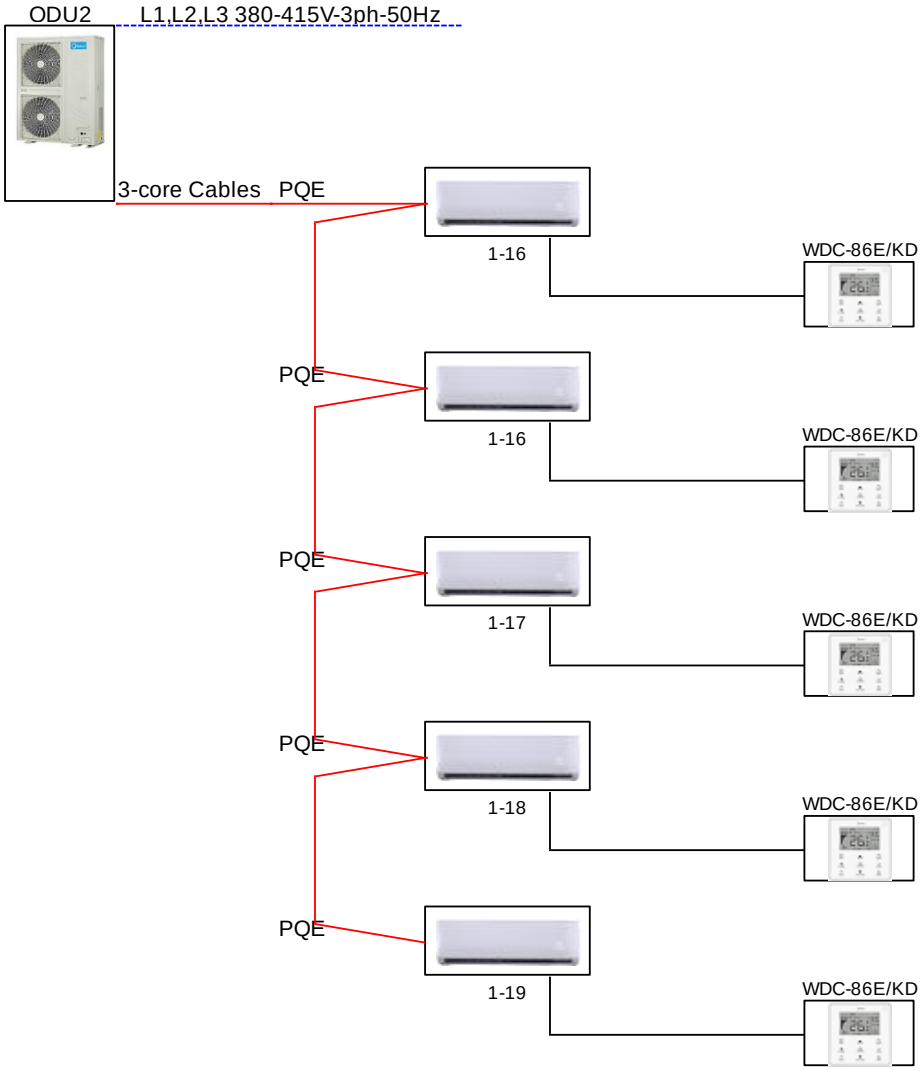
VRF 50Hz R410A

ODU:25.58/19.69 kW IDU Total:23.58/14.74/19.64 kW



The piping size may be different with the actual situation because of the software's illustration limitation, please confirm the piping size according to the installation manual before installation.

2.6 Wiring Diagram



The wiring diagram may be different with the actual situation because of software's illustration limitation, please confirm the wiring diagram according to the installation manual before installation.

System3

3.1 Material List

Model	Quantity	Description
MDV-V260W/DRN1	1	DC Inverter Individual VRF (380V 20-45kW)
MI2-36GDN1	2	Wall_mounted (2nd DC IDU)
MI2-56GDN1	3	Wall_mounted (2nd DC IDU)
FQZHN-02D	1	Branch Joint
FQZHN-01D	3	Branch Joint
WDC-86E/KD	5	2nd generation wired controller
Ø22.2	19.0 m	Copper Pipe
Ø19.1	3.0 m	Copper Pipe
Ø15.9	12.0 m	Copper Pipe
Ø12.7	4.5 m	Copper Pipe
Ø9.53	34.0 m	Copper Pipe
Ø6.35	4.5 m	Copper Pipe

3.2 Indoor Unit Specifications

IDU Name	Model	Sound (dB(A))	Weight(kg)	Dimension(mm) W x H x D	Power Supply	Rated Power(W)	MCA(A)	MFA(A)
2-19	MI2-36GDN1	33(SSH)	11.40	990*315*223	220-240,50,1	30	N/A	N/A
2-18	MI2-36GDN1	33(SSH)	11.40	990*315*223	220-240,50,1	30	N/A	N/A
2-17	MI2-56GDN1	38(SSH)	12.80	990*315*223	220-240,50,1	45	N/A	N/A
2-16	MI2-56GDN1	38(SSH)	12.80	990*315*223	220-240,50,1	45	N/A	N/A
2-16	MI2-56GDN1	38(SSH)	12.80	990*315*223	220-240,50,1	45	N/A	N/A

IDU Name	Model	Cooling AT (°C)	Req.TC (kW)	TC (kW)	Req.SC (kW)	SC (kW)	Heating AT (°C)	Req.HC (kW)	HC (kW)	Air flow (m^3/h)	ESP (Pa)
2-19	MI2-36GDN1	27.0/19.0	0.00	3.44	0.00	2.29	20.0	0.00	2.85	656(SSH)	N/A
2-18	MI2-36GDN1	27.0/19.0	0.00	3.46	0.00	2.31	20.0	0.00	2.86	656(SSH)	N/A
2-17	MI2-56GDN1	27.0/19.0	0.00	5.42	0.00	3.29	20.0	0.00	4.55	747(SSH)	N/A
2-16	MI2-56GDN1	27.0/19.0	0.00	5.44	0.00	3.30	20.0	0.00	4.58	747(SSH)	N/A
2-16	MI2-56GDN1	27.0/19.0	0.00	5.44	0.00	3.30	20.0	0.00	4.58	747(SSH)	N/A

3.3 Outdoor Unit Specifications

Name	Model	Module	Dimension(mm)	Weight(kg)	Base refr(kg)	Add refr(kg)	Power Supply	MCA(A)	MFA(A)
ODU3	MDV-V260W/DRN1	MDV-V260W/DRN1	1120*1558*528	147.00	6.20	2.15	380-415V-3ph-50Hz	N/A	N/A

Name	Model	CR%	Temp(°C)	CC(kW)	Req CC(kW)	Temp(H/RH)(°C)	HC(kW)	Req HC(kW)
ODU3	MDV-V260W/DRN1	92.31	28.0	25.26	0.00	-16.0/86%	19.58	0.00

Name	Model	EER	COP	Cooling Power(kW)	Heating Power(kW)
ODU3	MDV-V260W/DRN1	4.45	2.68	5.39	7.38

Req.TC: Required Total Cooling Capacity

Req.SC: Required Sensible Cooling Capacity

Req.HC: Required Total Heating Capacity

TC: Available Total Cooling Capacity

SC: Available Sensible Cooling Capacity

HC: Available Total Heating Capacity

AT: Ambient Temperature

ESP: External Static Pressure

Req.CC: Required Cooling Capacity

CC: Available Cooling Capacity

3.4 Piping and Mode Selection Devices

IDU Quantity	5/12
Combination Ratio	92.31%
Additional refrigerant charge	2.15 kg = 4.50(6.35) * 0.022 + 36.00(9.53) * 0.057
Factory refrigerant charge	6.20 kg
Total refrigerant charge	8.35 kg
Total Pipe Length	40.5 m / 120 m
Furthest Actual	36.5 m / 60 m
Furthest Equivalent	38.5 m / 70 m
Furthest Equivalent from First Branch to IDU	19 m / 20(40) m
Drop Height between IDU and IDU	0 m / 8 m
Drop height between IDU and ODU(Below ODU)	3 m / 30 m
Available Capacity Cooling	23.32 kW
Available Capacity Heating	19.56 kW

Note:

1.The equivalent length of each branch joint is 0.5m.

Pipe

No.	Length	Gas Pipe	Liquid Pipe
(1)	19.0 m	Ø22.2	Ø9.53
(2)	3.0 m	Ø19.1	Ø9.53
(3)	8.0 m	Ø15.9	Ø9.53
(4)	2.5 m	Ø15.9	Ø9.53
(5)	4.0 m	Ø12.7	Ø6.35
(6)	0.5 m	Ø12.7	Ø6.35
(7)	0.5 m	Ø15.9	Ø9.53
(8)	0.5 m	Ø15.9	Ø9.53
(9)	0.5 m	Ø15.9	Ø9.53

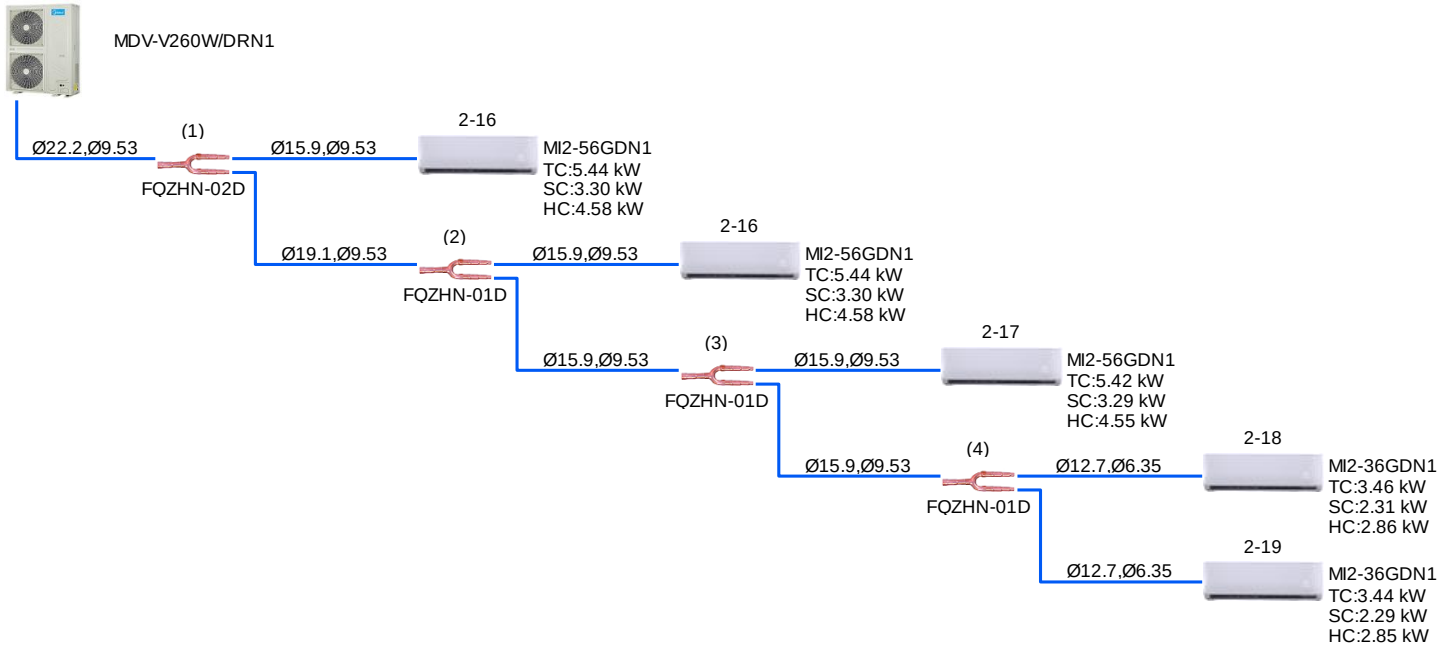
Branch Joint

No.	Load kW	Model
(1)	24.00	FQZHN-02D
(2)	18.40	FQZHN-01D
(3)	12.80	FQZHN-01D
(4)	7.20	FQZHN-01D

3.5 Piping Diagram

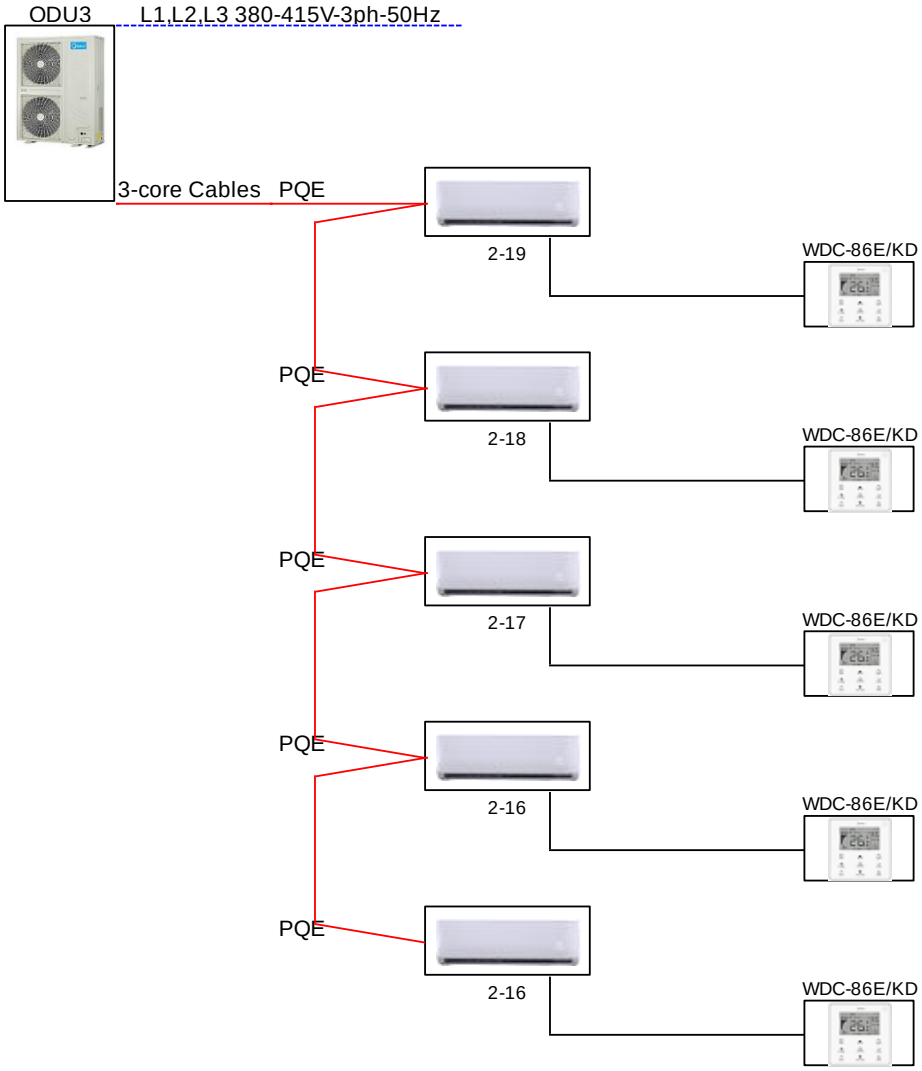
VRF 50Hz R410A

ODU:25.26/19.58 kW IDU Total:23.30/14.56/19.54 kW



The piping size may be different with the actual situation because of the software's illustration limitation, please confirm the piping size according to the installation manual before installation.

3.6 Wiring Diagram



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