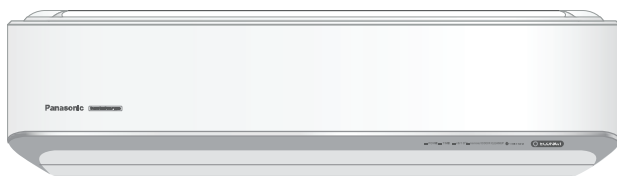


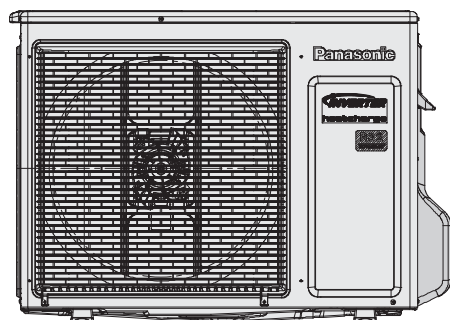
Service Manual

Air Conditioner



Indoor Unit
CS-VZ9SKE
CS-VZ12SKE

Outdoor Unit
CU-VZ9SKE
CU-VZ12SKE



Destination
Europe

WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are marked by  in the Schematic Diagrams, Circuit Board Diagrams, Exploded Views and Replacement Parts List. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire or other hazards. Do not modify the original design without permission of manufacturer.

CAUTION

R32 REFRIGERANT – This Air Conditioner contains and operates with refrigerant R32.
THIS PRODUCT MUST ONLY BE INSTALLED OR SERVICED BY QUALIFIED PERSONNEL.

Refer to Commonwealth, State, Territory and local legislation, regulations, codes, installation & operation manuals, before the installation, maintenance and/or service of this product.

3. Specification

Model			Indoor	CS-VZ9SKE		
			Outdoor	CU-VZ9SKE		
Performance Test Condition			JIS, ErP			
Power Supply			Phase, Hz	Single, 50		
			V	230		
			Min.	Mid.	Max.	
Cooling	Capacity		kW	0.60	2.50	3.00
	Running Current		A	—	2.05	—
	Input Power		W	140	430	660
	Annual Consumption		W	—	215k	—
	EER		W/W	—	5.81	—
	ErP	Pdsign	kW	—	2.5	—
		SEER	(W/W)	—	10.5	—
		Annual Consumption	kWh	—	83	—
		Class		—	A+++	—
	Power Factor		%	—	91	—
	Indoor Noise (H / L / QLo)		dB-A	44 / 27 / 18		
			Power Level dB	59 / - / -		
	Outdoor Noise (H / L)		dB-A	49		
			Power Level dB	64		
Heating	Capacity		kW	0.60	3.60	7.90
	Running Current		A	—	3.10	—
	Input Power		W	140	640	2.72k
	COP		W/W	—	5.63	—
	ErP warm/ ave./ cold	Pdsign	kW	3.6		
		Tbivalent	°C	-10		
		SCOP	(W/W)	6.2		
		Annual Consumption	kWh	812		
		Class		A+++		
	Power Factor		%	—	91	—
	Indoor Noise (H / L / QLo)		dB-A	44 / 26 / 18		
			Power Level dB	59 / - / -		
	Outdoor Noise (H / L)		dB-A	49		
			Power Level dB	64		
Max Current (A) / Max Input Power (W)			15.0 / 3.45k			
Starting Current (A)			3.1			
Compressor		Type	Hermetic Motor (Rotary)			
		Motor Type	Brushless (6-poles)			
		Output Power	W	900		

Model				Indoor	CS-VZ9SKE
				Outdoor	CU-VZ9SKE
Indoor Fan	Type				Cross-flow fan
	Material				AS+GF Resin
	Motor Type				DC, Transistor (8-poles)
	Input Power			W	40.4
	Output Power			W	40
	Speed	QLo	Cool	rpm	530
			Heat	rpm	500
		Lo	Cool	rpm	600
			Heat	rpm	650
		Me	Cool	rpm	880
			Heat	rpm	950
		Hi	Cool	rpm	1010
			Heat	rpm	1110
		Shi	Cool	rpm	1070
			Heat	rpm	—
Outdoor Fan	Type				Propeller Fan + Flat piece
	Material				PP
	Motor Type				DC Brushless (8-poles)
	Input Power			W	46.00
	Output Power			W	40
	Speed	Hi	Cool	rpm	900
			Heat	rpm	—
Moisture Removal			L/h	1.5 (3.2)	
Indoor Airflow	QLo	Cool	m³/min (ft³/m)	4.7 (166)	
		Heat	m³/min (ft³/m)	5.5 (194)	
	Lo	Cool	m³/min (ft³/m)	5.8 (205)	
		Heat	m³/min (ft³/m)	8.0 (283)	
	Me	Cool	m³/min (ft³/m)	10.4 (367)	
		Heat	m³/min (ft³/m)	12.9 (456)	
	Hi	Cool	m³/min (ft³/m)	12.5 (441)	
		Heat	m³/min (ft³/m)	15.5 (547)	
	Shi	Cool	m³/min (ft³/m)	13.5 (477)	
		Heat	m³/min (ft³/m)	—	
Outdoor Airflow	Hi	Cool	m³/min (ft³/m)	33.1 (1169)	
		Heat	m³/min (ft³/m)	33.1 (1169)	
Refrigeration Cycle	Control Device			Expansion Valve	
	Refrigerant Oil		cm³	FW50S (450)	
	Refrigerant Type			R32	
	Pre charged / Maximum charge		g (oz)	1.05k (37.0) / 1.20k (42.3)	
F-gas	Pre charged / Maximum charge		ton	0.709 / 0.810	
	GWP			675	
Dimension	Height (I/D / O/D)		mm (inch)	295 (11-39/64) / 630 (24-51/64)	
	Width (I/D / O/D)		mm (inch)	798 (31-27/64) / 799 (31-29/64)	
	Depth (I/D / O/D)		mm (inch)	375 (14-49/64) / 299 (11-49/64)	
Weight	Net (I/D / O/D)		kg (lb)	14.5 (32) / 39.5 (87)	

Model		Indoor	CS-VZ9SKE	
		Outdoor	CU-VZ9SKE	
Piping	Pipe Diameter (Liquid / Gas)	mm (inch)	6.35 (1/4) / 9.52 (3/8)	
	Standard length	m (ft)	5.0 (16.4)	
	Length range (min – max)	m (ft)	3 (9.8) ~ 15 (49.2)	
	I/D & O/D Height different	m (ft)	5.0 (16.4)	
	Additional Gas Amount	g/m (oz/ft)	20 (0.2)	
	Length for Additional Gas	m (ft)	7.5 (24.6)	
Drain Hose	Inner Diameter	mm	16.2	
	Length	mm	650	
Indoor Heat Exchanger	Fin Material		Aluminium (Pre Coat)	
	FPI		20.5	
Outdoor Heat Exchanger	Fin Material		Aluminium (Pre Coat)	
	Fin Type		Corrugated Fin (2LT-C6S-L)	
	Row × Stage × FPI		2 × 32 × 19	
	Size (W × H × D)	mm	809.5:789.7 × 586.24 × 25.2	
Power Supply			Indoor Power Supply	
Power Supply Cord		A	Nil	
Thermostat			Electronic Control	
Protection Device			Electronic Control	
			DRY BULB	WET BULB
Indoor Operation Range	Cooling	Maximum	32	23
		Minimum	16	11
	Heating	Maximum	30	—
		Minimum	16	—
	+8/10°C HEAT	Maximum	10	—
		Minimum	16	—
Outdoor Operation Range	Cooling	Maximum	43	26
		Minimum	-10	—
	Heating	Maximum	24	18
		Minimum	-30	—
	+8/10°C HEAT	Maximum	—	—
		Minimum	-30	—

- Cooling capacities are based on indoor temperature of 27°C Dry Bulb (80.6°F Dry Bulb), 19.0°C Wet Bulb (66.2°F Wet Bulb) and outdoor air temperature of 35°C Dry Bulb (95°F Dry Bulb), 24°C Wet Bulb (75.2°F Wet Bulb).
- Heating capacities are based on indoor temperature of 20°C Dry Bulb (68°F Dry Bulb) and outdoor air temperature of 7°C Dry Bulb (44.6°F Dry Bulb), 6°C Wet Bulb (42.8°F Wet Bulb).
- Specifications are subjected to change without prior notice for further improvement.

Model			Indoor	CS-VZ12SKE		
			Outdoor	CU-VZ12SKE		
Performance Test Condition				JIS, ErP		
Power Supply			Phase, Hz	Single, 50		
			V	230		
				Min.	Mid.	Max.
Cooling	Capacity		kW	0.60	3.50	4.00
	Running Current		A	—	3.7	—
	Input Power		W	140	800	980
	Annual Consumption		W	—	400k	—
	EER		W/W	—	4.38	—
	ErP	Pdsign	kW	—	3.50	—
		SEER	(W/W)	—	10.0	—
		Annual Consumption	kWh	—	122	—
		Class		—	A+++	—
	Power Factor		%	—	95	—
	Indoor Noise (H / L / QLo)		dB-A	45 / 33 / 18		
			Power Level dB	60 / - / -		
	Outdoor Noise (H / L)		dB-A	50		
			Power Level dB	65		
Heating	Capacity		kW	0.63	4.20	9.20
	Running Current		A	—	3.80	—
	Input Power		W	140	830	3.16k
	COP		W/W	—	5.06	—
	ErP warm/ ave./ cold	Pdsign	kW	4.2		
		Tbivalent	°C	-10		
		SCOP	(W/W)	5.9		
		Annual Consumption	kWh	995		
		Class		A+++		
	Power Factor		%	—	95	—
	Indoor Noise (H / L / QLo)		dB-A	45 / 29 / 18		
			Power Level dB	60 / - / -		
	Outdoor Noise (H / L)		dB-A	50		
			Power Level dB	65		
Max Current (A) / Max Input Power (W)				15.0 / 3.45k		
Starting Current (A)				3.8		
Compressor		Type		Hermetic Motor (Rotary)		
		Motor Type		Brushless (6-poles)		
		Output Power	W	900		

Model				Indoor	CS-VZ12SKE
				Outdoor	CU-VZ12SKE
Indoor Fan	Type				Cross-flow fan
	Material				AS+GF Resin
	Motor Type				DC, Transistor (8-poles)
	Input Power			W	44.1
	Output Power			W	40
	Speed	QLo	Cool	rpm	590
			Heat	rpm	500
		Lo	Cool	rpm	600
			Heat	rpm	650
		Me	Cool	rpm	950
			Heat	rpm	1000
		Hi	Cool	rpm	1040
			Heat	rpm	1140
		Shi	Cool	rpm	1100
			Heat	rpm	—
Outdoor Fan	Type				Propeller Fan + Flat piece
	Material				PP
	Motor Type				DC Brushless (8-poles)
	Input Power			W	48.68
	Output Power			W	40
	Speed	Hi	Cool	rpm	960
			Heat	rpm	—
Moisture Removal			L/h	2.0 (4.2)	
Indoor Airflow	QLo	Cool	m³/min (ft³/m)	5.6 (198)	
		Heat	m³/min (ft³/m)	5.5 (194)	
	Lo	Cool	m³/min (ft³/m)	8.2 (290)	
		Heat	m³/min (ft³/m)	9.0 (318)	
	Me	Cool	m³/min (ft³/m)	11.5 (406)	
		Heat	m³/min (ft³/m)	13.6 (480)	
	Hi	Cool	m³/min (ft³/m)	12.9 (456)	
		Heat	m³/min (ft³/m)	15.9 (562)	
	Shi	Cool	m³/min (ft³/m)	13.9 (491)	
		Heat	m³/min (ft³/m)	—	
Outdoor Airflow	Hi	Cool	m³/min (ft³/m)	35.4 (1250)	
		Heat	m³/min (ft³/m)	33.9 (1197)	
Refrigeration Cycle	Control Device			Expansion Valve	
	Refrigerant Oil		cm³	FW50S (450)	
	Refrigerant Type			R32	
	Pre charged / Maximum charge		g (oz)	1.10k (38.8) / 1.25k (44.1)	
F-gas	Pre charged / Maximum charge		ton	0.743 / 0.844	
	GWP			675	
Dimension	Height (I/D / O/D)		mm (inch)	295 (11-39/64) / 630 (24-51/64)	
	Width (I/D / O/D)		mm (inch)	798 (31-27/64) / 799 (31-29/64)	
	Depth (I/D / O/D)		mm (inch)	375 (14-49/64) / 299 (11-49/64)	
Weight	Net (I/D / O/D)		kg (lb)	14.5 (32) / 39.5 (87)	

Model		Indoor	CS-VZ12SKE	
		Outdoor	CU-VZ12SKE	
Piping	Pipe Diameter (Liquid / Gas)	mm (inch)	6.35 (1/4) / 9.52 (3/8)	
	Standard length	m (ft)	5.0 (16.4)	
	Length range (min – max)	m (ft)	3 (9.8) ~ 15 (49.2)	
	I/D & O/D Height different	m (ft)	5.0 (16.4)	
	Additional Gas Amount	g/m (oz/ft)	20 (0.2)	
	Length for Additional Gas	m (ft)	7.5 (24.6)	
Drain Hose	Inner Diameter	mm	16.2	
	Length	mm	650	
Indoor Heat Exchanger	Fin Material		Aluminium (Pre Coat)	
	FPI		20.5	
Outdoor Heat Exchanger	Fin Material		Aluminium (Pre Coat)	
	Fin Type		Corrugated Fin (2LT-C6S-L)	
	Row × Stage × FPI		2 × 32 × 19	
	Size (W × H × D)	mm	809.5:789.7 × 586.24 × 25.2	
Power Supply			Indoor Power Supply	
Power Supply Cord		A	Nil	
Thermostat			Electronic Control	
Protection Device			Electronic Control	
			DRY BULB	WET BULB
Indoor Operation Range	Cooling	Maximum	32	23
		Minimum	16	11
	Heating	Maximum	30	—
		Minimum	16	—
	+8/10°C HEAT	Maximum	10	—
		Minimum	16	—
Outdoor Operation Range	Cooling	Maximum	43	26
		Minimum	-10	—
	Heating	Maximum	24	18
		Minimum	-30	—
	+8/10°C HEAT	Maximum	—	—
		Minimum	-30	—

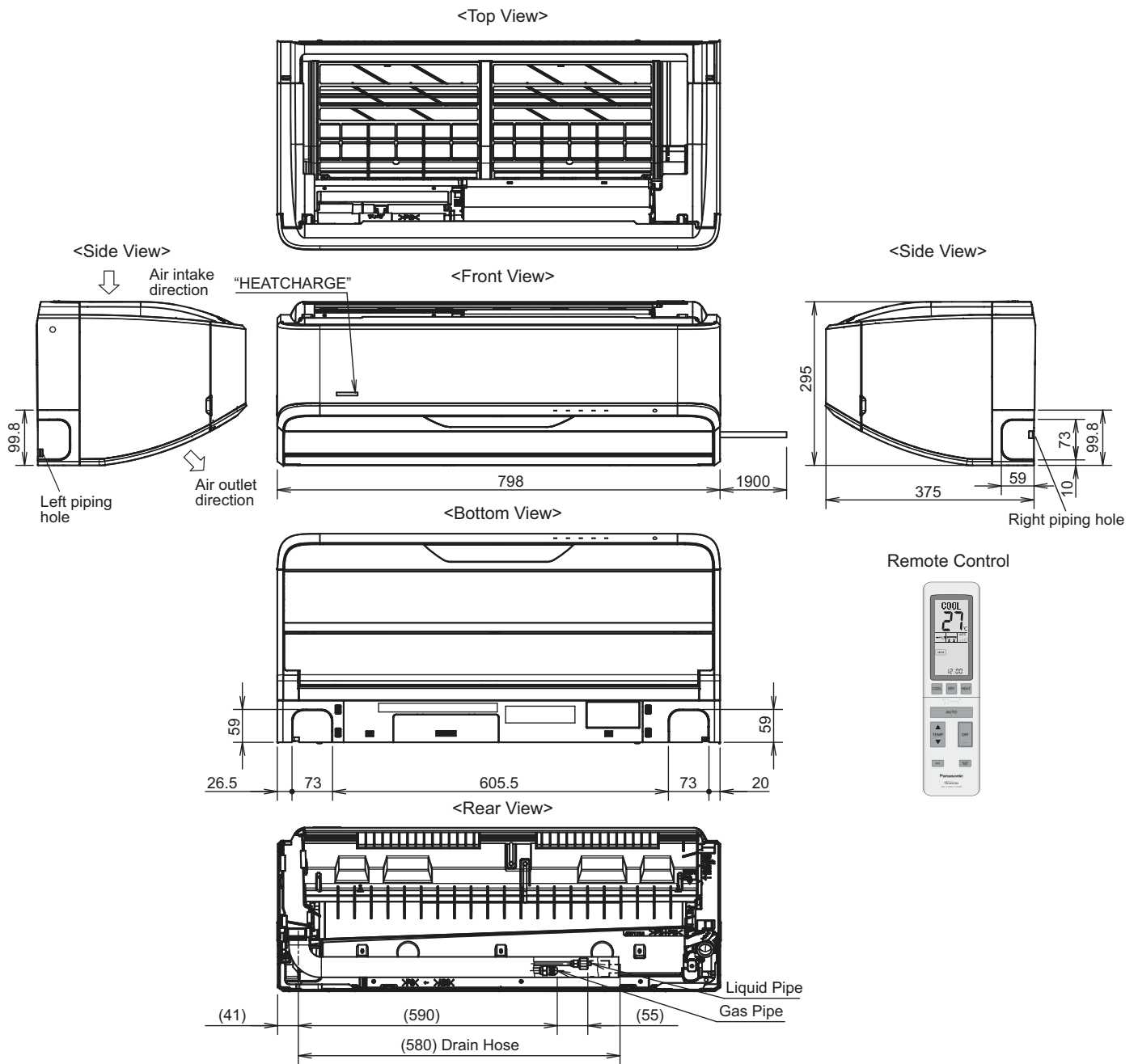
1. Cooling capacities are based on indoor temperature of 27°C Dry Bulb (80.6°F Dry Bulb), 19.0°C Wet Bulb (66.2°F Wet Bulb) and outdoor air temperature of 35°C Dry Bulb (95°F Dry Bulb), 24°C Wet Bulb (75.2°F Wet Bulb).
2. Heating capacities are based on indoor temperature of 20°C Dry Bulb (68°F Dry Bulb) and outdoor air temperature of 7°C Dry Bulb (44.6°F Dry Bulb), 6°C Wet Bulb (42.8°F Wet Bulb).
3. Specifications are subjected to change without prior notice for further improvement.

4. Features

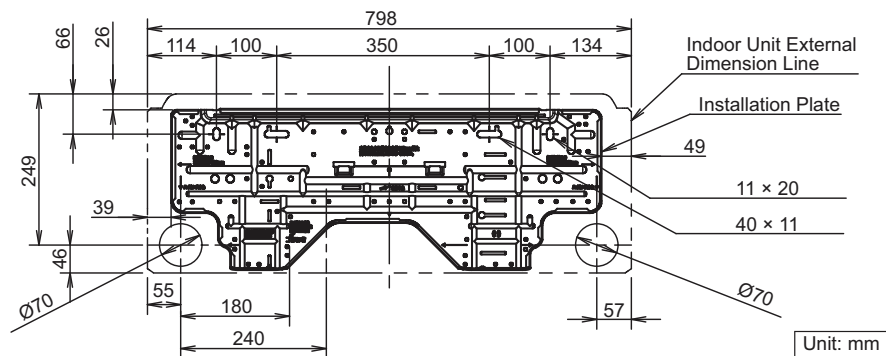
- **Inverter Technology**
 - Wider output power range
 - Energy saving
 - Quick Cooling
 - Quick Heating
 - More precise temperature control
- **Environment Protection**
 - Econavi
- **Long Installation Piping**
 - Long piping up to 15 meters during single split connection only
- **Easy to use remote control**
 - Press Individual operation mode button to ON
 - Press OFF button to OFF
- **Quality Improvement**
 - Random auto restart after power failure for safety restart operation
 - Gas leakage protection
 - Prevent compressor reverse cycle
 - Inner protector to protect compressor
 - Noise prevention during dry operation
- **Operation Improvement**
 - Quiet mode to reduce the indoor unit operating sound
 - Powerful mode to reach the desired room temperature quickly
 - 24-hour timer setting
 - Dual timer setting (Timer 1, Timer 2)
 - Pre Heating operation
 - Air purifying operation (nanoe)
 - High heating performance (Non Stop (Heating) Deicing)
 - Aluminium electric heater and base pan electric heater
 - +8/10°C HEAT operation is designed to provide heating at low temperature settings. It is used in houses unoccupied during winter, for the purpose of protecting equipment or housing appliances which may be destroyed by extreme cold weather
- **Serviceability Improvement**
 - Breakdown Self Diagnosis function
 - Demo mode
 - Service check mode

6. Dimensions

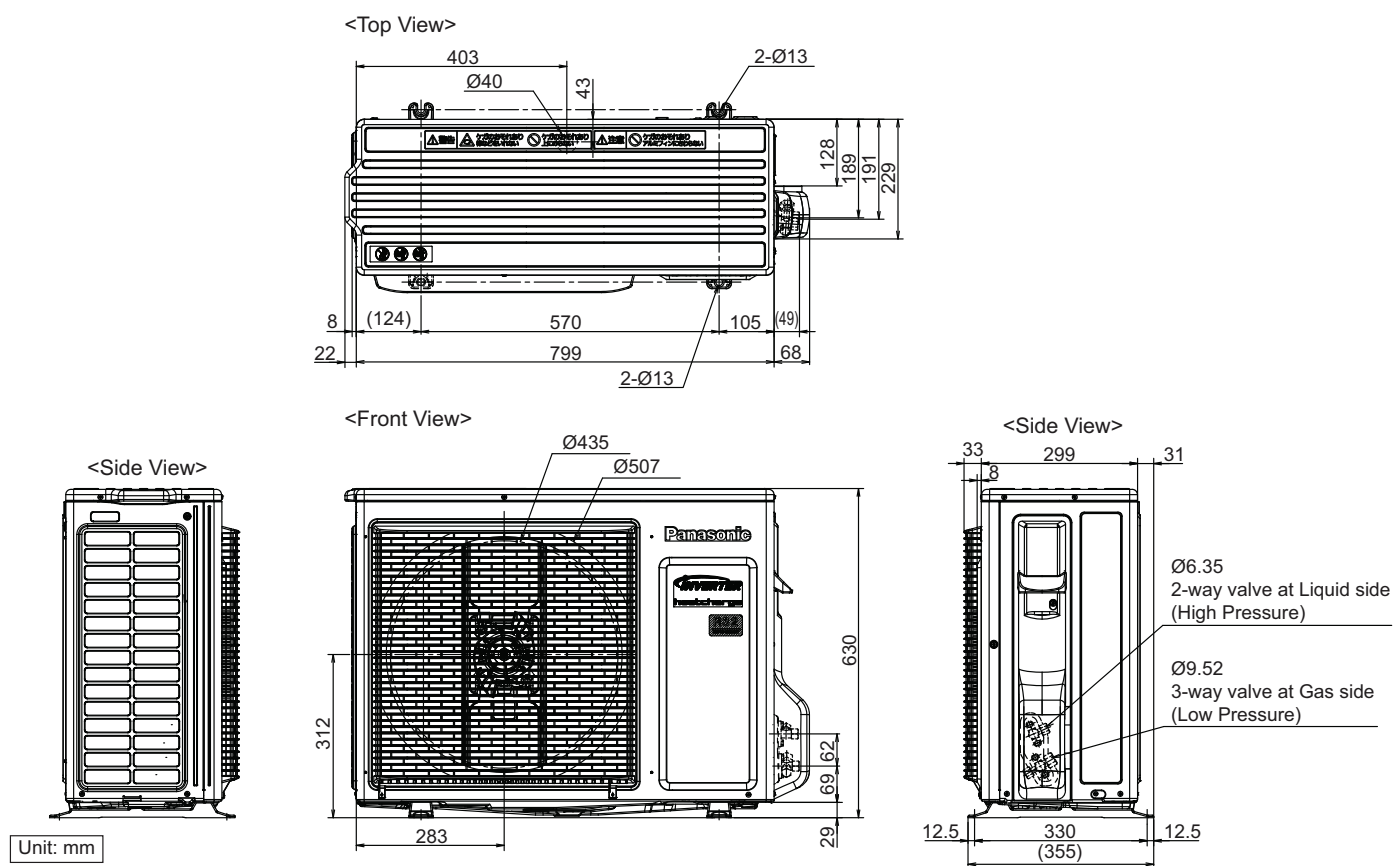
6.1 Indoor Unit and Remote Control



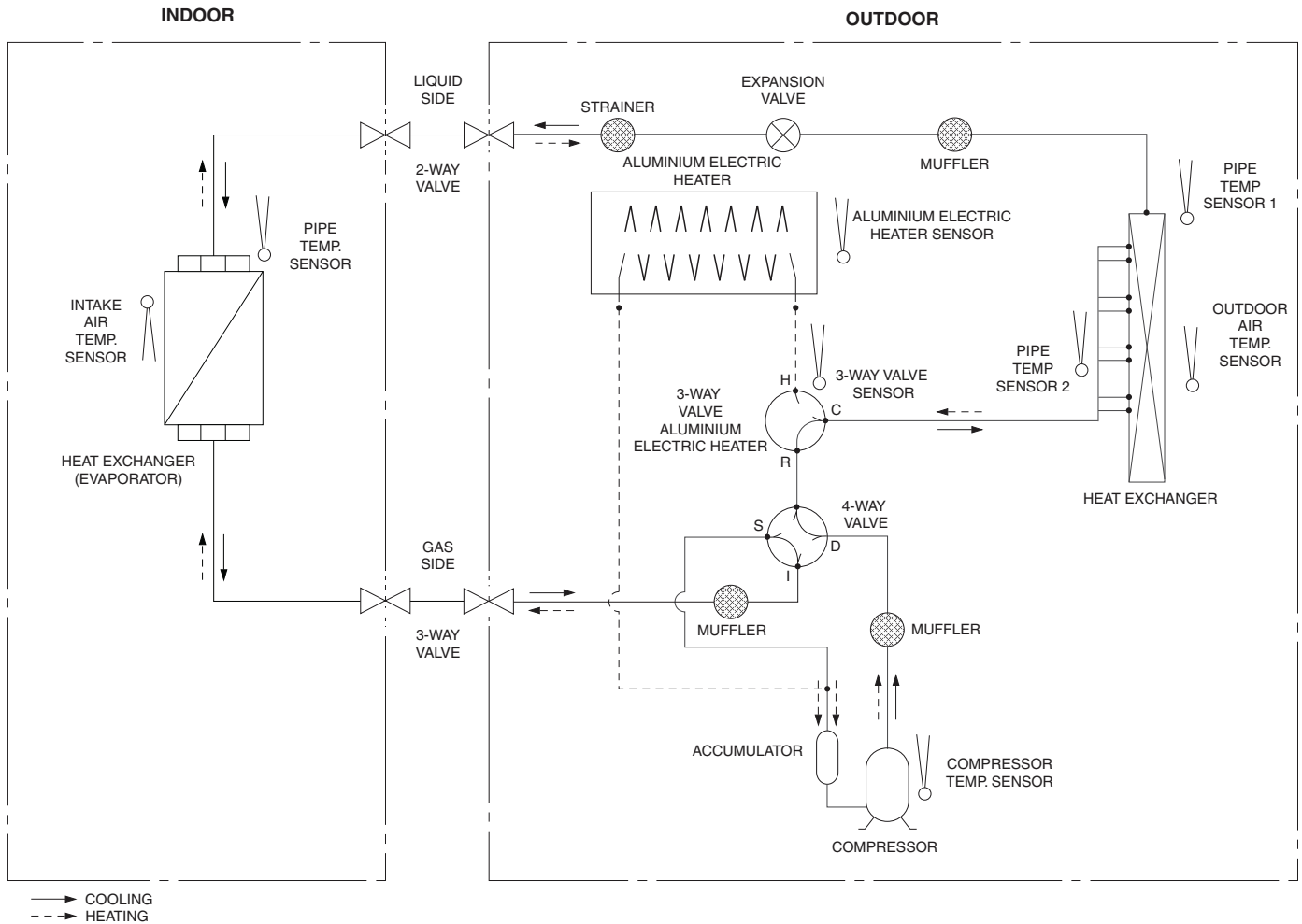
Relative position between the indoor unit and the installation plate
<Front View>



6.2 Outdoor Unit



7. Refrigeration Cycle Diagram

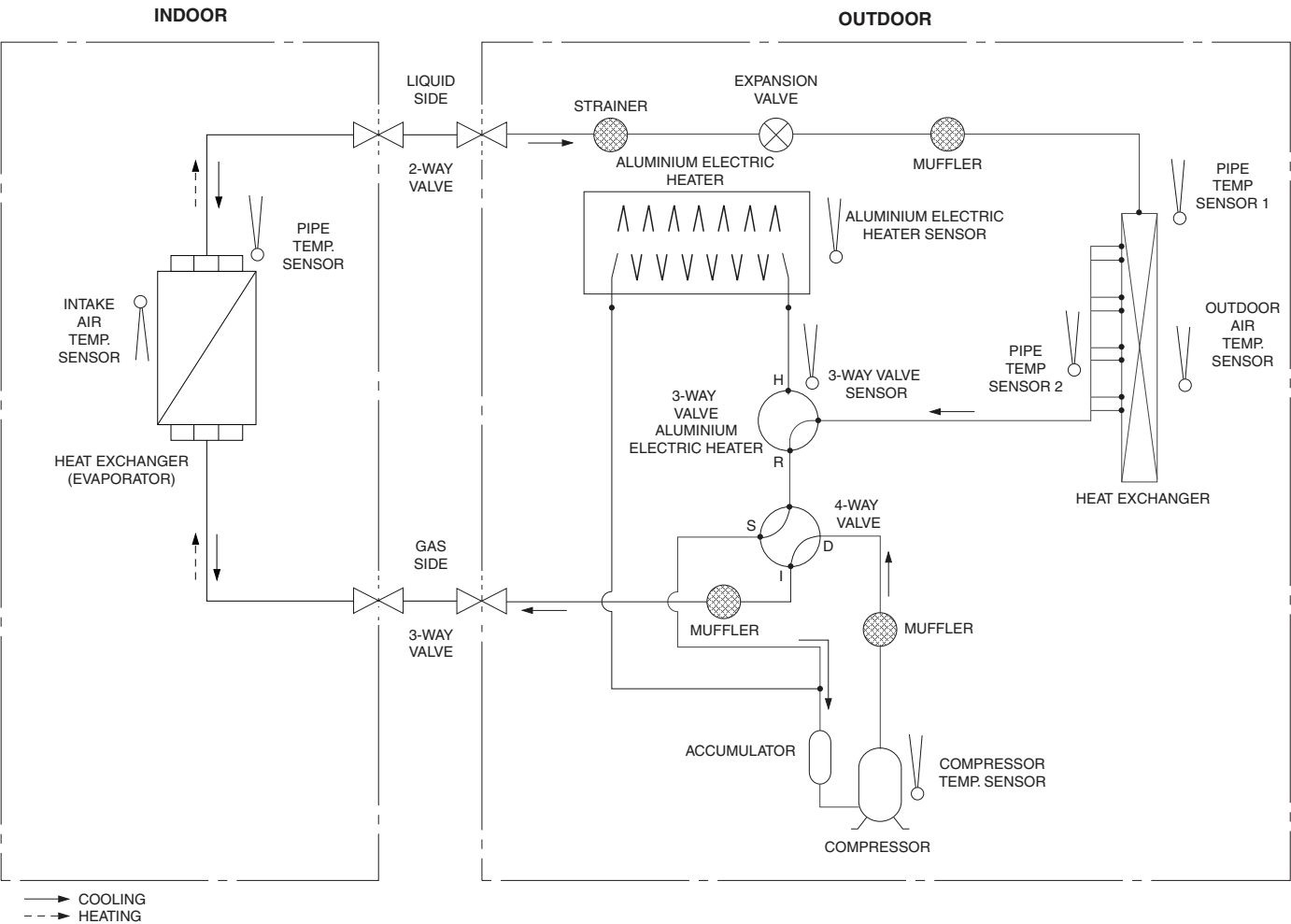


OPERATION MODE \ VALVES	REFRIGERANT FLOW	
	at 4-WAY VALVE REVERSING	at 3-WAY VALVE HEATER
COOLING	$D \rightarrow R$ $I \rightarrow S$	$R \rightarrow C$
HEATING	$D \rightarrow I$ $R \rightarrow S$	$C \rightarrow R$
NON STOP (HEATING) DEICE	$D \rightarrow I$ $-$	$C \rightarrow H$
DEICE by REVERSING VALVE	$D \rightarrow R$ $I \rightarrow S$	$R \rightarrow C$

7.1 Refrigerant Flow

7.1.1 Heating: 4-WAY VALVE (Reversing Valve) Activate

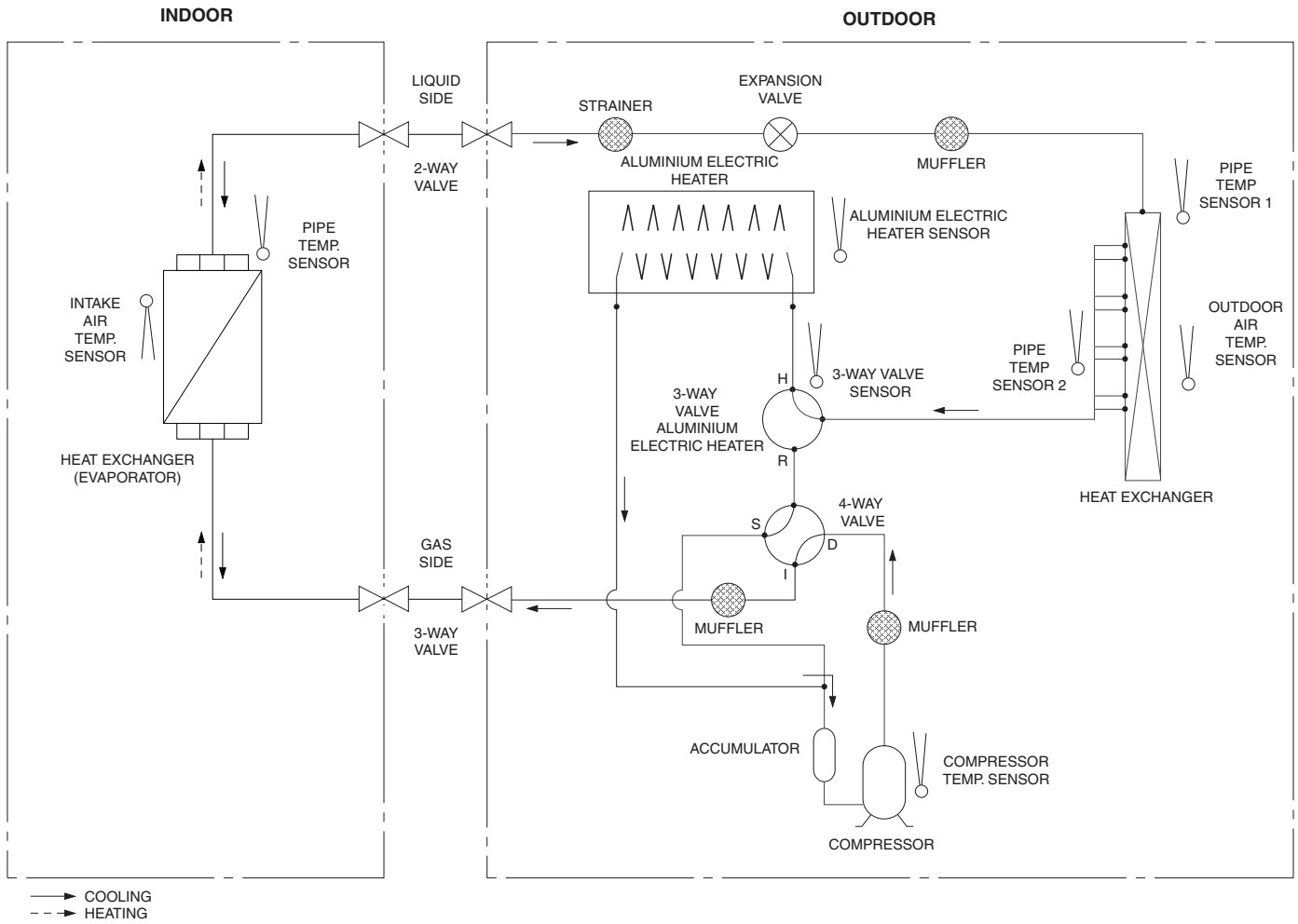
※ Normal heating operation



7.2 Deice Operation Flow

7.2.1 Non Stop (Heating) Deice

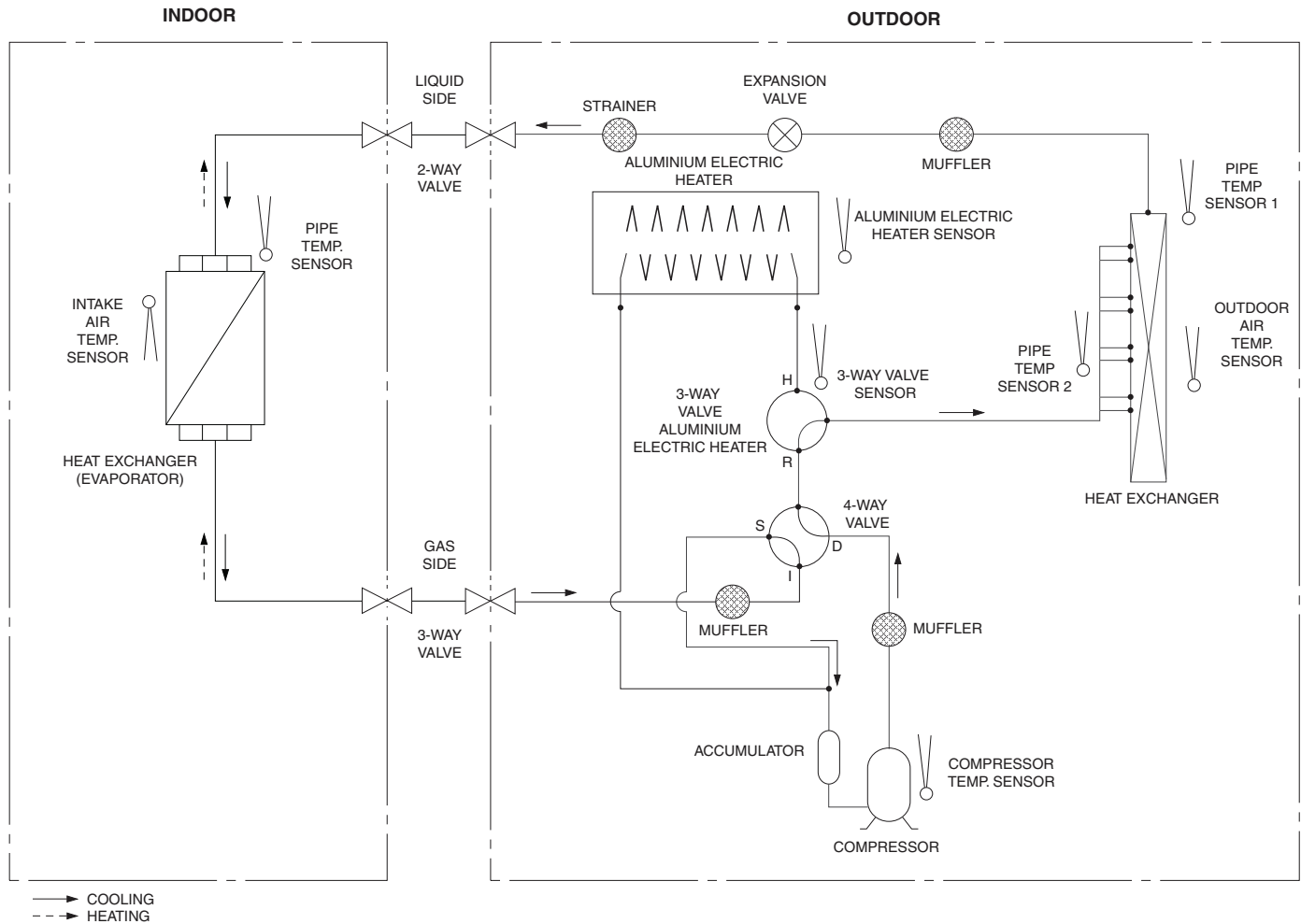
※ Aluminium Electric Heater Activate



* The Aluminium Electric Heater heats the Refrigerant from Outdoor Heat Exchanger up for continuous operation.

7.2.2 De-icing by 4-Way Valve Activate

※ Cooling Cycle Operation



* De-icing will be completed in around 11 minutes or the Pipe Temperature Sensor senses 26°C and above.

7.2.3 Programed Deice Operation at Heating Operation OFF

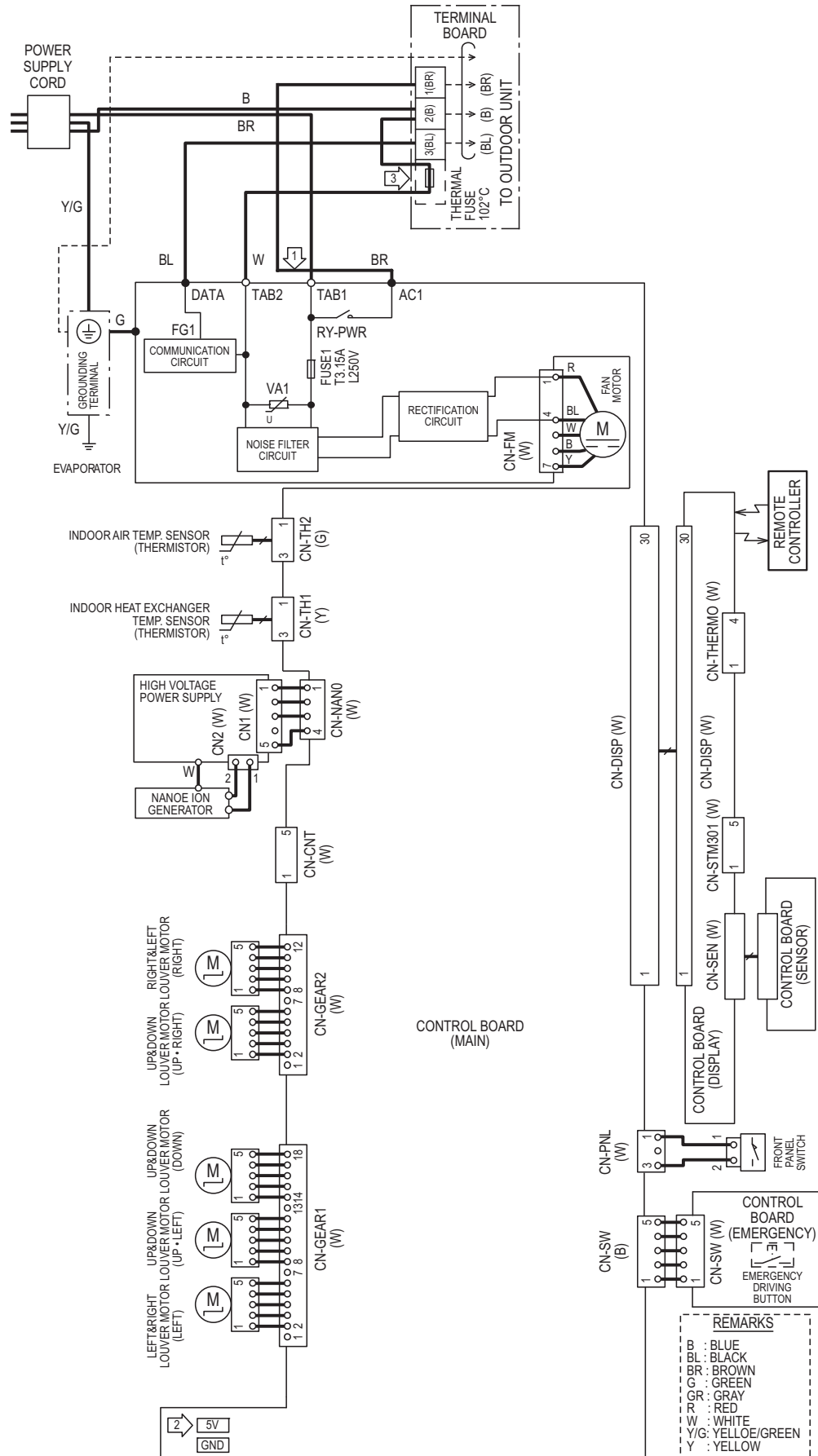
When the Sensors sense the Outdoor and Pipe Temperature below 0°C, Non Stop (Heating) Deice will be activated automatically.

7.2.4 Forced Deice Operation by Remote-controller

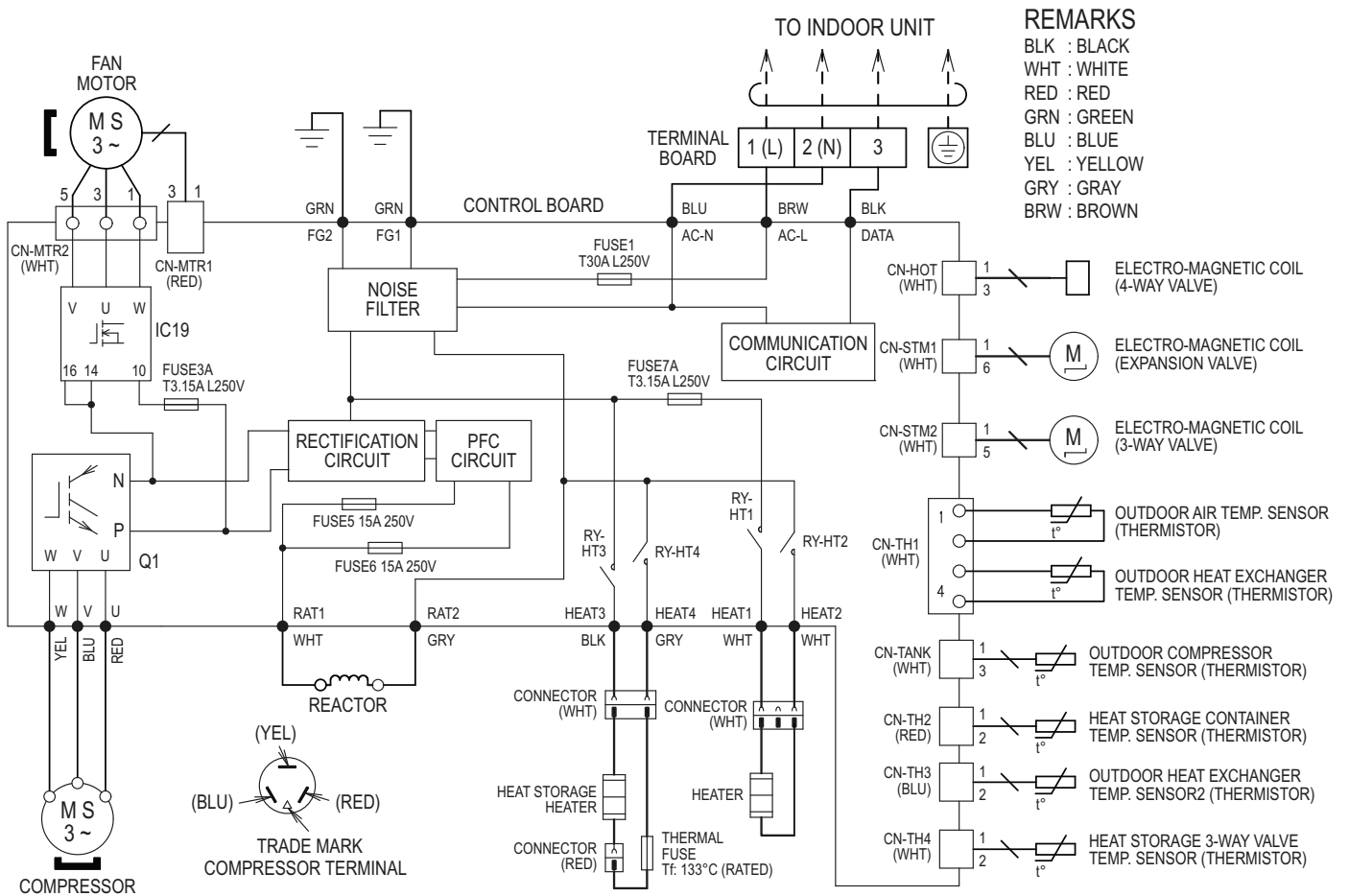
Press  (Pre Heating) button for 10 sec, Non Stop (Heating) Deice will be activated manually.
To stop operation press Stop button.

9. Wiring Connection Diagram

9.1 Indoor Unit



9.2 Outdoor Unit



Resistance of Compressor Windings

CONNECTION	9RD138ZAA21
U-V	2.215 Ω
U-W	2.208 Ω
V-W	2.194 Ω

Winding resistance at 20°C.

19. Technical Data

Technical data provided are based on the air conditioner running under free frequency.

19.1 Cool Mode Performance Data

Unit setting: Standard piping length, Hi Fan, Cool mode at 16°C

Voltage: 230V

19.1.1 CS-VZ9SKE CU-VZ9SKE

Indoor (°C)		Outdoor DB (°C)								
DB	WB	16			25			35		
		TC	SHC	IP	TC	SHC	IP	TC	SHC	IP
27	19.0	2.99	2.66	0.24	2.81	2.53	0.33	2.50	2.40	0.43
	22.0	3.40	2.07	0.23	3.16	1.96	0.32	2.78	1.81	0.43
23	15.7	2.70	2.57	0.24	2.63	2.47	0.32	2.35	2.30	0.43
	18.4	3.05	2.04	0.22	2.80	1.93	0.31	2.59	1.78	0.42
20	13.3	2.18	2.14	0.23	2.11	2.07	0.32	1.85	1.81	0.42
	15.8	2.40	1.73	0.20	2.30	1.68	0.29	2.09	1.61	0.40

19.1.2 CS-VZ12SKE CU-VZ12SKE

Indoor (°C)		Outdoor DB (°C)								
DB	WB	16			25			35		
		TC	SHC	IP	TC	SHC	IP	TC	SHC	IP
27	19.0	4.186	3.726	0.446	3.93	3.54	0.606	3.50	3.36	0.800
	22.0	4.76	2.904	0.422	4.43	2.75	0.595	3.89	2.53	0.792
23	15.7	3.784	3.594	0.442	3.68	3.46	0.600	3.29	3.22	0.792
	18.4	4.271	2.862	0.412	3.92	2.70	0.582	3.62	2.50	0.780
20	13.3	3.056	2.995	0.433	2.95	2.89	0.588	2.59	2.54	0.776
	15.8	3.357	2.417	0.372	3.23	2.35	0.536	2.92	2.25	0.745

TC - Total Cooling Capacity (kW)

SHC - Sensible Heat Capacity (kW)

IP - Input Power (kW)

19.2 Heat Mode Performance Data

Unit setting: Standard piping length, Hi Fan, Heat mode at 30°C
Voltage: 230V

19.2.1 CS-VZ9SKE CU-VZ9SKE

Indoor (°C)	Outdoor DB (°C)					
DB	-20		2		7	
	TC	IP	TC	IP	TC	IP
24	4.63	2.41	5.56	2.48	7.86	2.72
20	4.70	2.36	5.70	2.41	7.90	2.72
16	4.84	2.24	5.93	2.28	8.06	2.72

19.2.2 CS-VZ12SKE CU-VZ12SKE

Indoor (°C)	Outdoor DB (°C)					
DB	-20		2		7	
	TC	IP	TC	IP	TC	IP
24	4.93	2.69	6.53	2.88	9.15	3.16
20	5.00	2.63	6.70	2.80	9.20	3.16
16	5.15	2.49	6.97	2.65	9.38	3.16

TC - Total Capacity (kW)

IP - Input Power (kW)

20. Service Data

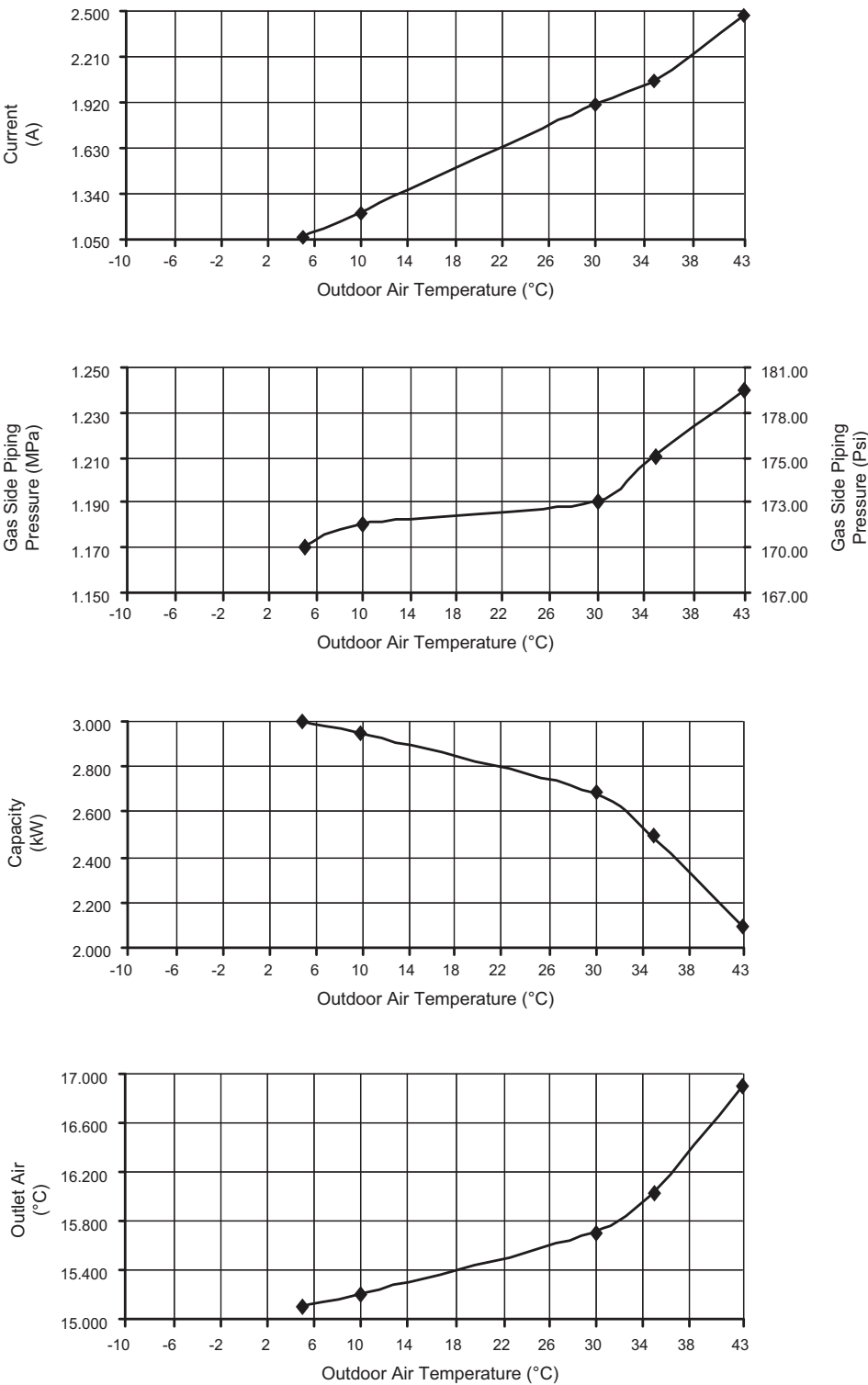
Service data provided are based on the air conditioner running under rated frequency during forced cooling / forced heating mode.

20.1 Cool Mode Outdoor Air Temperature Characteristic

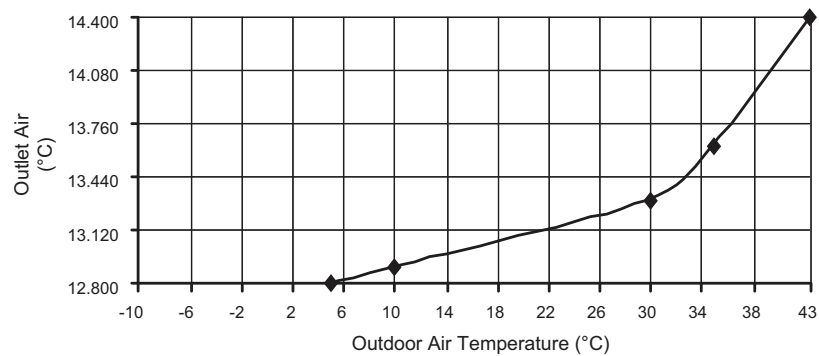
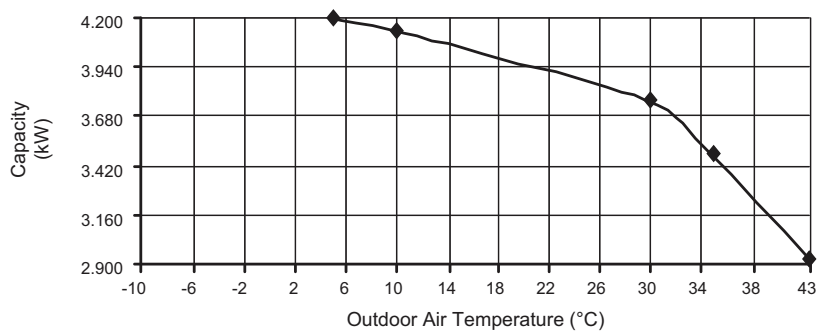
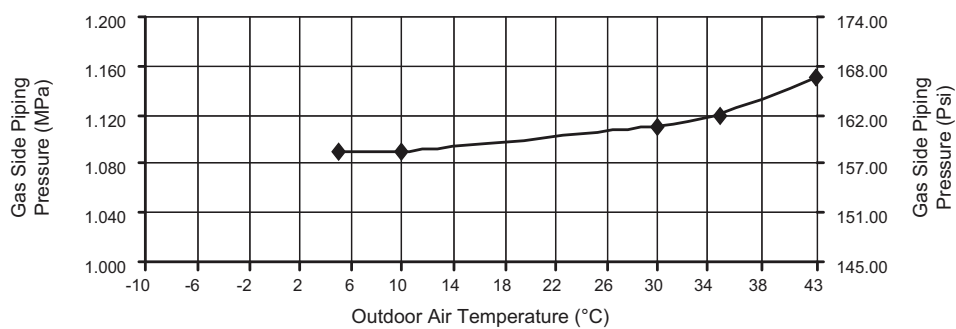
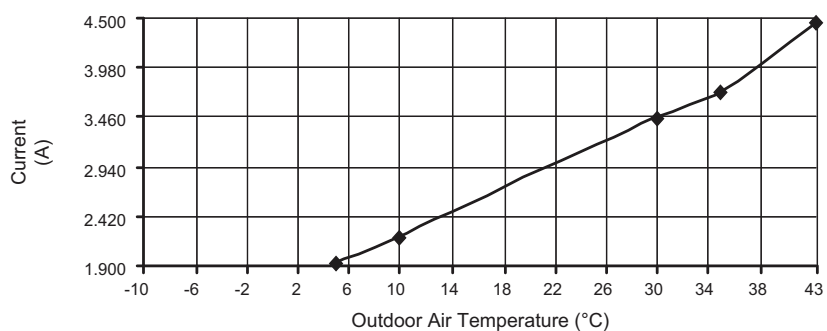
Condition

- Room Temperature: 27/19°C, Cooling Characteristic
- Fan: High
- Piping Length: 5.0 m
- Freq: Rated Fc

20.1.1 CS-VZ9SKE CU-VZ9SKE



20.1.2 CS-VZ12SKE CU-VZ12SKE

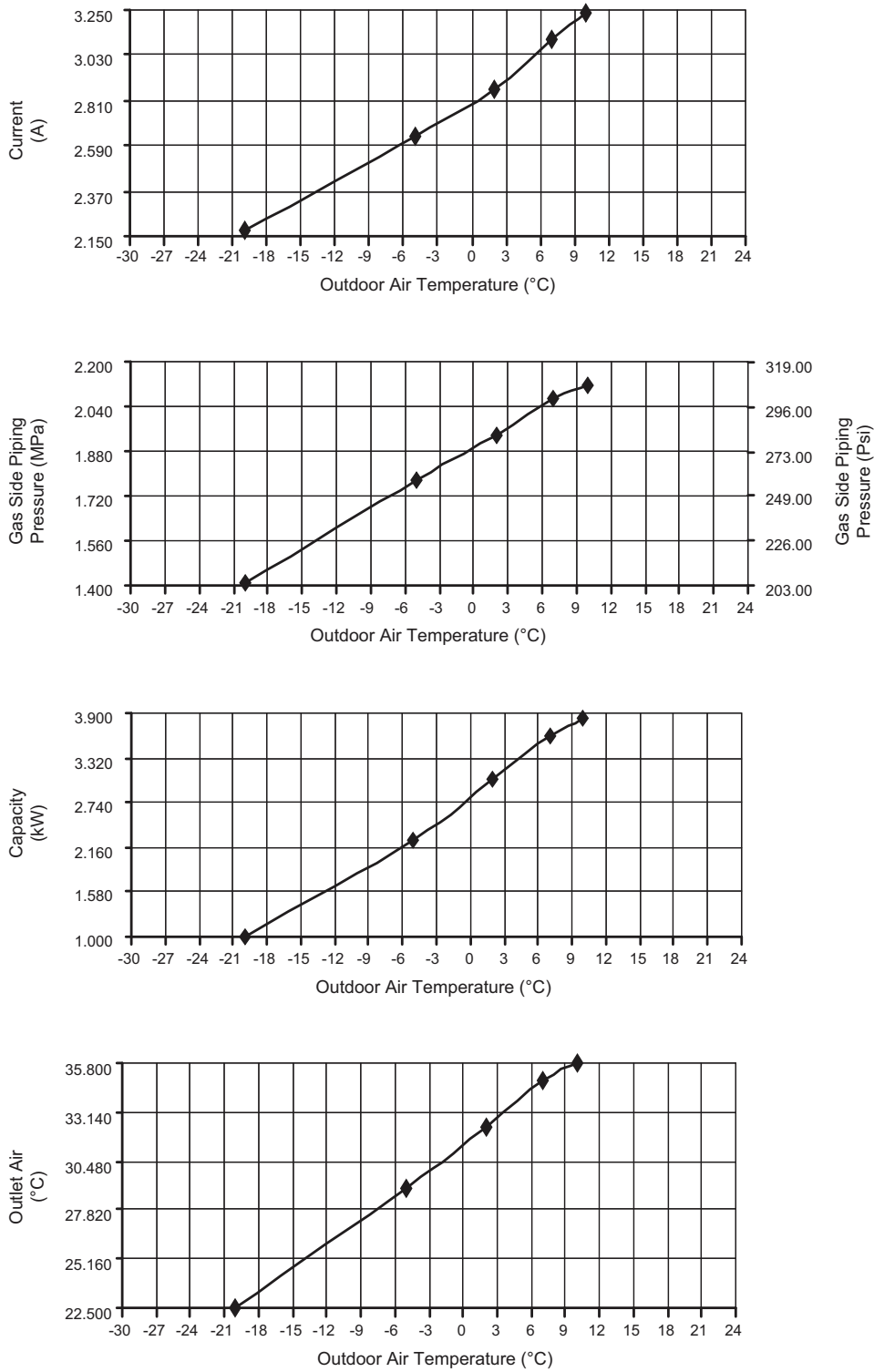


20.2 Heat Mode Outdoor Air Temperature Characteristic

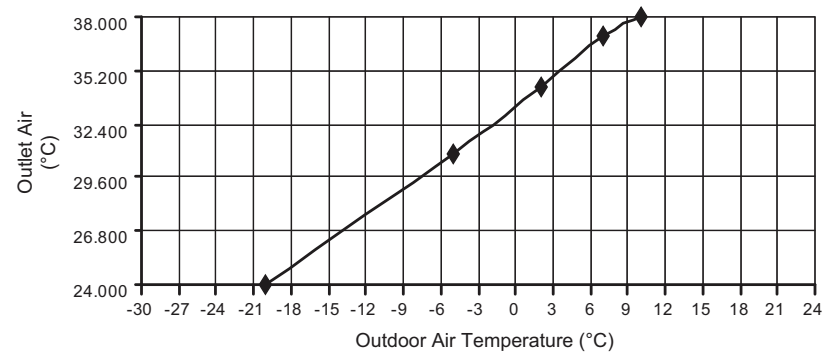
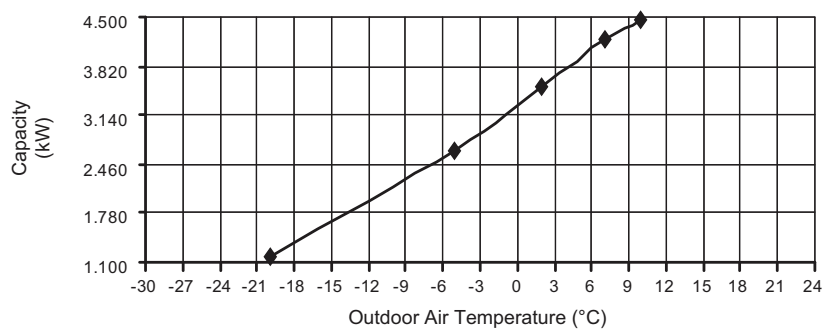
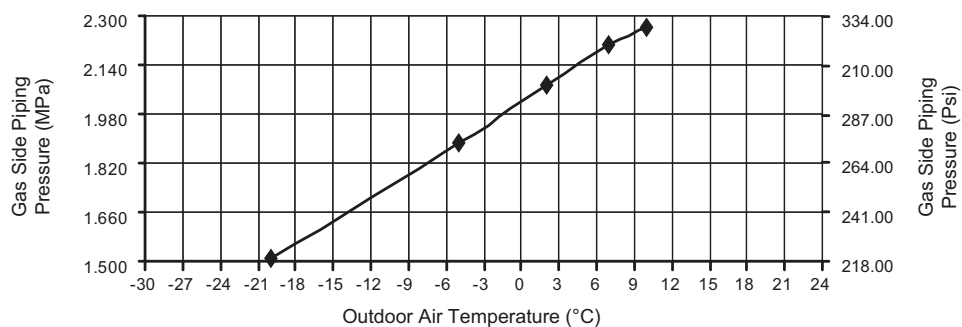
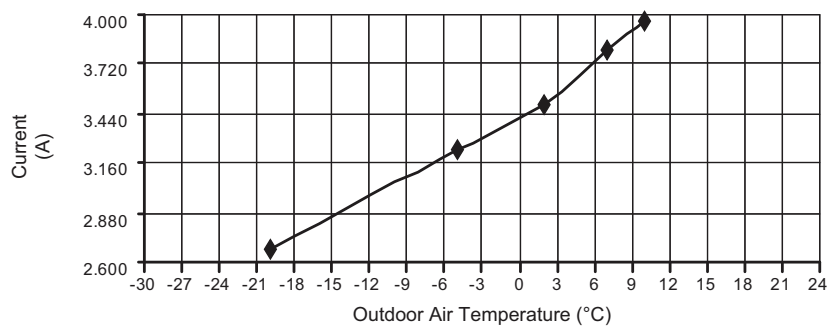
Condition

- Room Temperature: 20°C, Heating Characteristic
- Fan: High
- Piping Length: 5.0 m
- Freq: Rated Fh

20.2.1 CS-VZ9SKE CU-VZ9SKE



20.2.2 CS-VZ12SKE CU-VZ12SKE

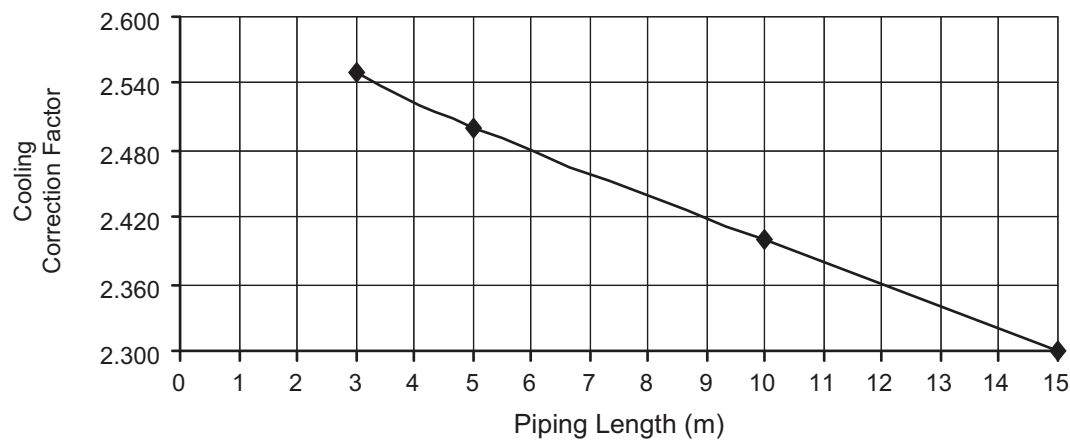


20.3 Piping Length Correction Factor

The characteristic of the unit has to be corrected in accordance with the piping length.

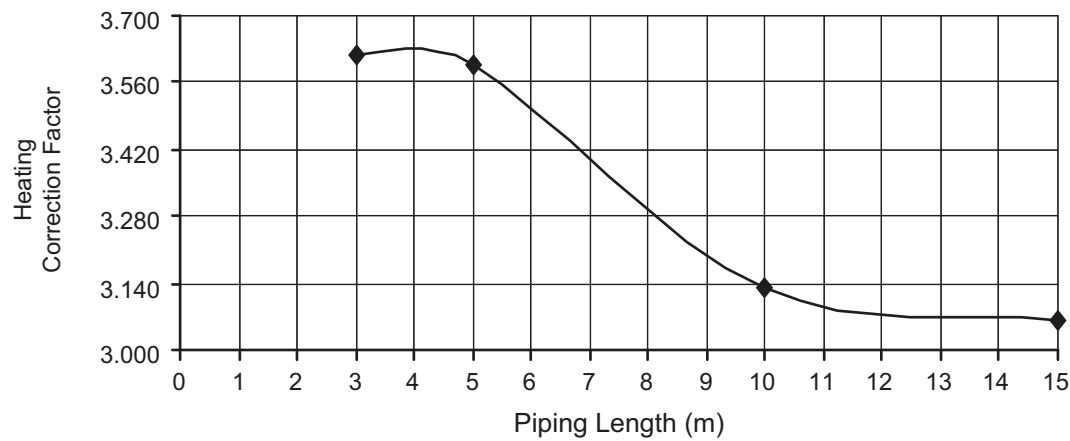
20.3.1 CS-VZ9SKE CU-VZ9SKE

20.3.1.1 Cooling Capacity



Piping length	Capacity (kW)
3	2.55
5	2.50
10	2.40
15	2.30

20.3.1.2 Heating Capacity

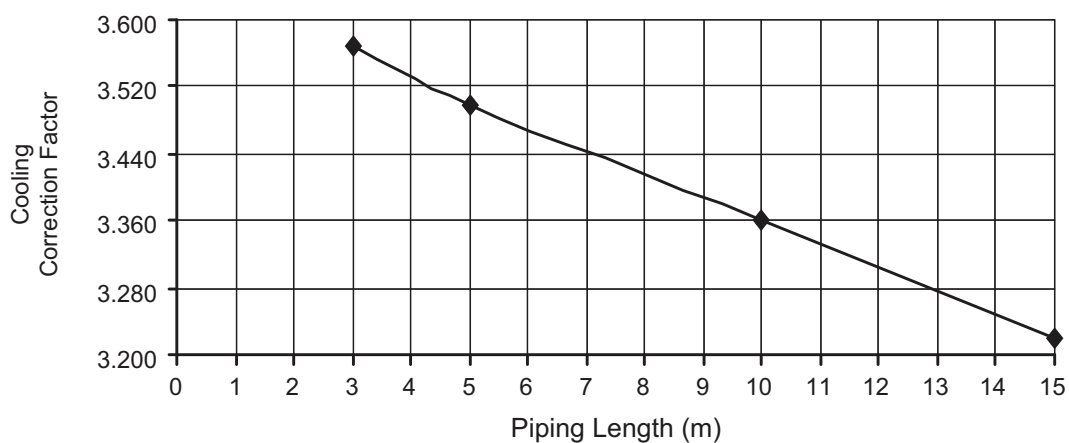


Piping length	Capacity (kW)
3	3.62
5	3.60
10	3.13
15	3.06

Note: The graphs show the factor after added right amount of additional refrigerant.

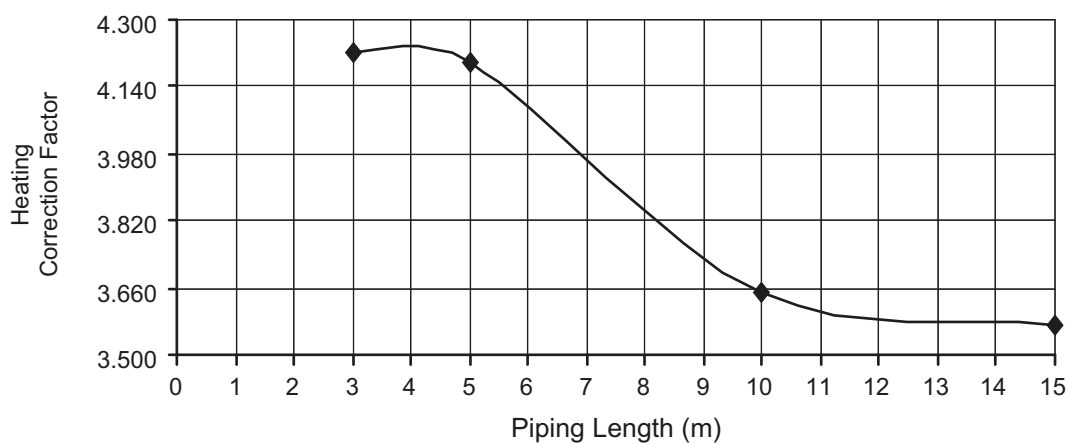
20.3.2 CS-VZ12SKE CU-VZ12SKE

20.3.2.1 Cooling Capacity



Piping length	Capacity (kW)
3	3.57
5	3.50
10	3.36
15	3.22

20.3.2.2 Heating Capacity



Piping length	Capacity (kW)
3	4.22
5	4.20
10	3.65
15	3.57

Note: The graphs show the factor after added right amount of additional refrigerant.