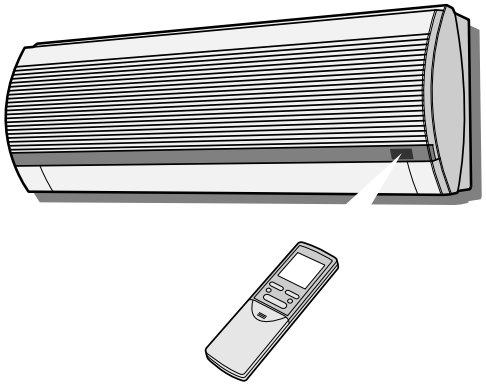
SHARP SERVICE MANUAL

S3214AYX13CR/



SPLIT TYPE
ROOM AIR CONDITIONERS

INDOOR UNIT
AH-X08CR/10CR/13CR
AY-X08CR/10CR/13CR

OUTDOOR UNIT
AU-X08CR/10CR/13CR

MODELS **AE-X08CR/10CR/13CR**

In the interests of user-safety (Required by safety regulations in some countries) the set should be restored to its original condition and only parts identical to those specified should be used.

New Refrigerant : R-410A

TABLE OF CONTENTS

SHARP CORPORATION

SPECIFICATIONS

ITEMS \ MODEL			INDOOR UNIT AH-X08CR	OUTDOOR UNIT AU-X08CR	INDOOR UNIT AH-X10CR	OUTDOOR UNIT AU-X10CR	INDOOR UNIT AH-X13CR	OUTDOOR UNIT AU-X13CR
Cooling capacity(Min. ~ Max.)		kW	2.2(0.9 – 2.7)		2.8(0.9 – 3.3)		3.6(0.9 – 4.0)	
Moisture removal		Liters/h	0.6		0.7		1.3	

Electrical data

Phase			Single					
Rated frequency		Hz	50					
Rated voltage range		V	198 to 264					
Rated voltage		V	220 - 240					
Rated current ★		A	3.4 – 3.1		4.3 – 4.0		5.5 – 5.1	
Rated input ★		W	730		930		1200	
Power factor ★		%	98 – 98		98 – 97		99 – 98	
Compressor	Type		Hermetically sealed rotary type					
	Model		DA89X1F-20F					
	Oil charge		Ester oil VG68 370ml					
Refrigerant system	Evaporator		Bare tube type		Grooved tube type		Grooved tube type	
	Condenser		Louver Fin and Grooved tube type					
	Control		Capillary tube					
	Refrigerant volume (R-410A)		640g		690g		660g	
Noise level (at cooling)	High	dB(A)	33	43	36	43	38	48
	Med.	dB(A)	29	–	32	–	33	-
	Low	dB(A)	27	–	27	–	29	-

Fan system

Drive			Direct drive					
Air flow quantity (at cooling)	High	m^3/min.	7.5	28	8.7	28	9.3	30
	Med.	m^3/min.	6.8	–	7.8	–	8.1	–
	Low	m^3/min.	6.0	–	6.0	–	6.6	–
Fan			Cross flow fan	Propeller fan	Cross flow fan	Propeller fan	Cross flow fan	Propeller fan

Connections

Refrigerant coupling	Flare type
Refrigerant tube size Gas, Liquid	3/8", 1/4"
Drain piping mm	O.D ø 18

Others

Safety device			Compressor: Compressor thermistor					
			Fan motors: Thermal fuse					
			Fuse, Micro computer control					
Air filters			Polypropylene net (Washable)					
Net dimensions	Width	mm	815	780	815	780	815	780
	Height	mm	278	540	278	540	278	540
	Depth	mm	198	269	198	269	198	269
Net weight		kg	9	30	9	30	10	33

Note: The condition of star "★" marked item are 'ISO5151' : 1994(E), condition T1.

ITEMS \ MODEL			INDOOR UNIT AY-X08CR	OUTDOOR UNIT AE-X08CR	INDOOR UNIT AY-X10CR	OUTDOOR UNIT AE-X10CR	INDOOR UNIT AY-X13CR	OUTDOOR UNIT AE-X13CR
Cooling capacity(Min. ~ Max.)		kW	2.2(0.9 – 2.7)		2.8(0.9 – 3.3)		3.6(0.9 – 4.0)	
Heating capacity(Min. ~ Max.)		kW	3.2(0.9 – 3.6)		3.7(0.9 – 5.0)		4.8(1.0 – 6.2)	
Moisture removal(at cooling)		Liters/h	0.7		0.8		1.3	

Electrical data

Phase			Single					
Rated frequency		Hz	50					
Rated voltage range		V	198 to 264					
Rated voltage		V	220 - 240					
Rated current ★	Cool	A	3.4 – 3.1		4.3 – 4.0		5.5 – 5.1	
	Heat	A	4.2 – 3.9		4.9 – 4.5		6.8 – 6.2	
Rated input ★	Cool	W	730		930		1200	
	Heat	W	910		1050		1480	
Power factor ★	Cool	%	98 – 98		98 – 97		99 – 98	
	Heat	%	98 – 97		97 – 97		99 – 99	
Compressor	Type		Hermetically sealed rotary type					
	Model		DA89X1F-20F					
	Oil charge		Ester oil VG68 370ml					
Refrigerant system	Evaporator		Louver Fin and Groovec tube type					
	Condenser		Corrugate Fin and Grooved tube type					
	Control		Capillary tube					
	Refrigerant volume (R-410A)		750g		770g		870g	
	De-Ice system		Micro computer controled reversed systems					
Noise level (at cooling)	High	dB(A)	33	43	36	43	38	48
	Med.	dB(A)	29	–	32	–	33	-
	Low	dB(A)	27	–	27	–	29	-

Fan system

Drive			Direct drive					
Air flow quantity (at cooling)	High	m^3/min.	7.5	28	9.8	27.7	9.3	30
	Med.	m^3/min.	6.8	–	8.2	–	8.1	–
	Low	m^3/min.	6.0	–	6.1	–	6.6	–
Fan			Cross flow fan	Propeller fan	Cross flow fan	Propeller fan	Cross flow fan	Propeller fan

Connections

Refrigerant coupling	Flare type
Refrigerant tube size Gas, Liquid	3/8", 1/4"
Drain piping mm	O.D ø 18

Others

Safety device			Compressor: Compressor thermistor					
			Fan motors: Thermal fuse					
			Fuse, Micro computer control					
Air filters			Polypropylene net (Washable)					
Net dimensions	Width	mm	815	780	815	780	815	780
	Height	mm	278	540	278	540	278	540
	Depth	mm	198	269	198	269	198	269
Net weight		kg	9	33	10	33	10	37

Note: The condition of star " ★" marked item are 'ISO5151' : 1994(E), condition T1.

EXTERNAL DIMENSIONS

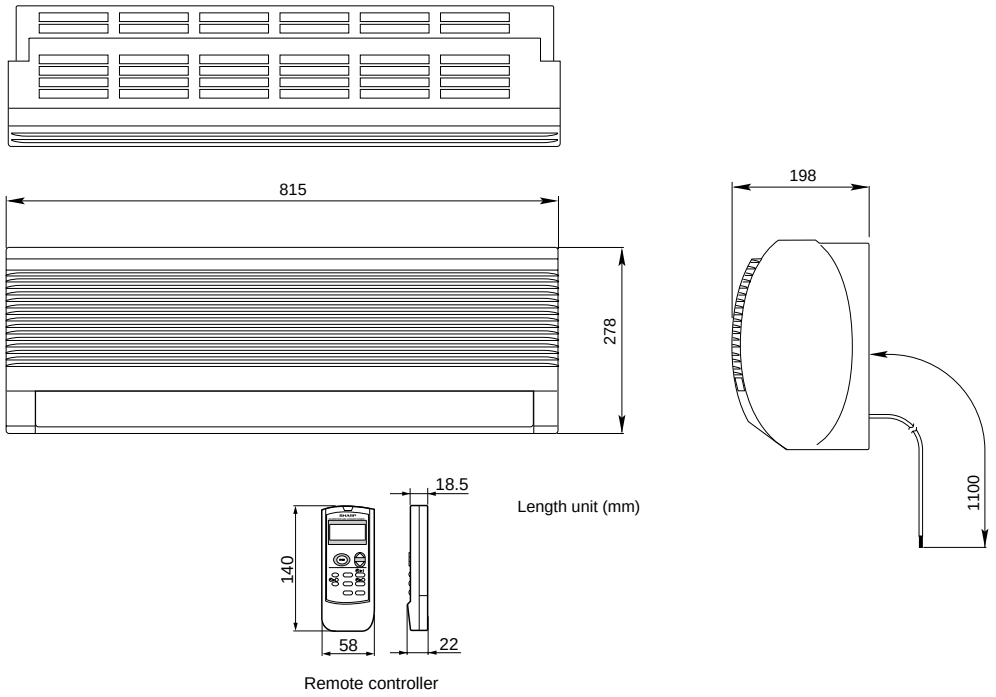


Figure E-1. INDOOR UNIT

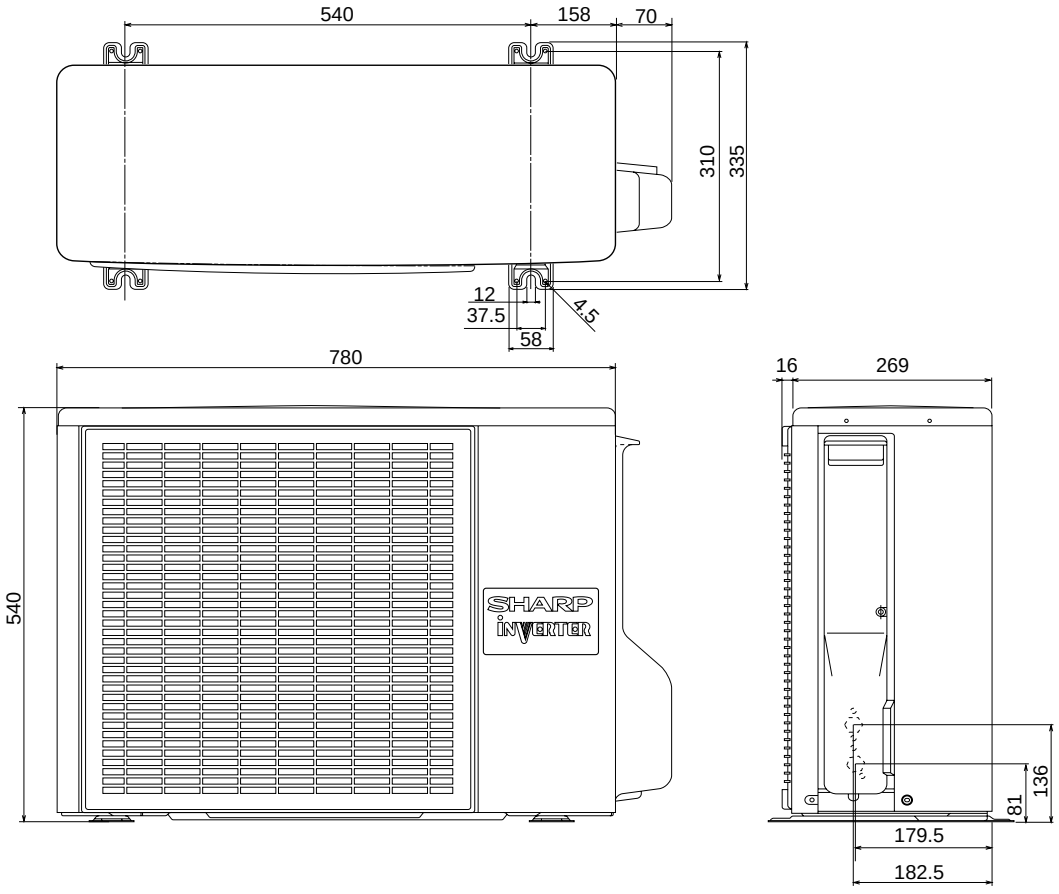


Figure E-2. OUTDOOR UNIT

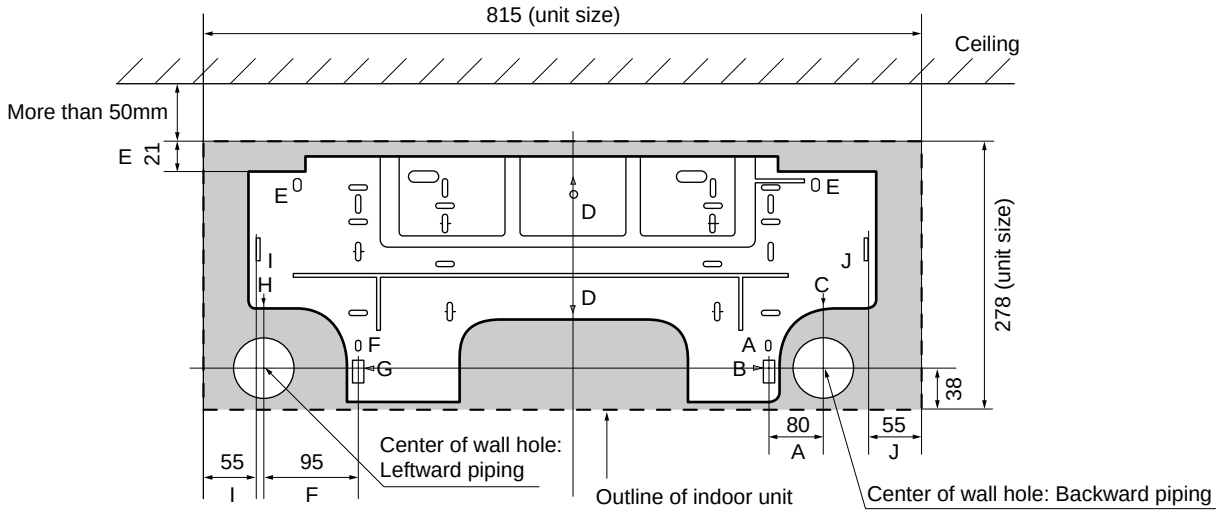
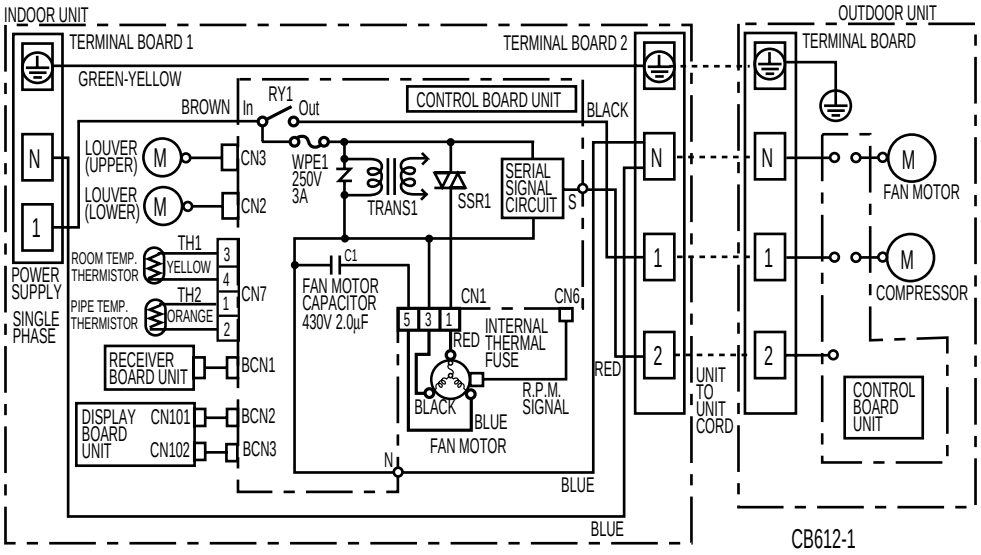


Figure E-3. INSTALLATION DIMENSIONS

WIRING DIAGRAMS



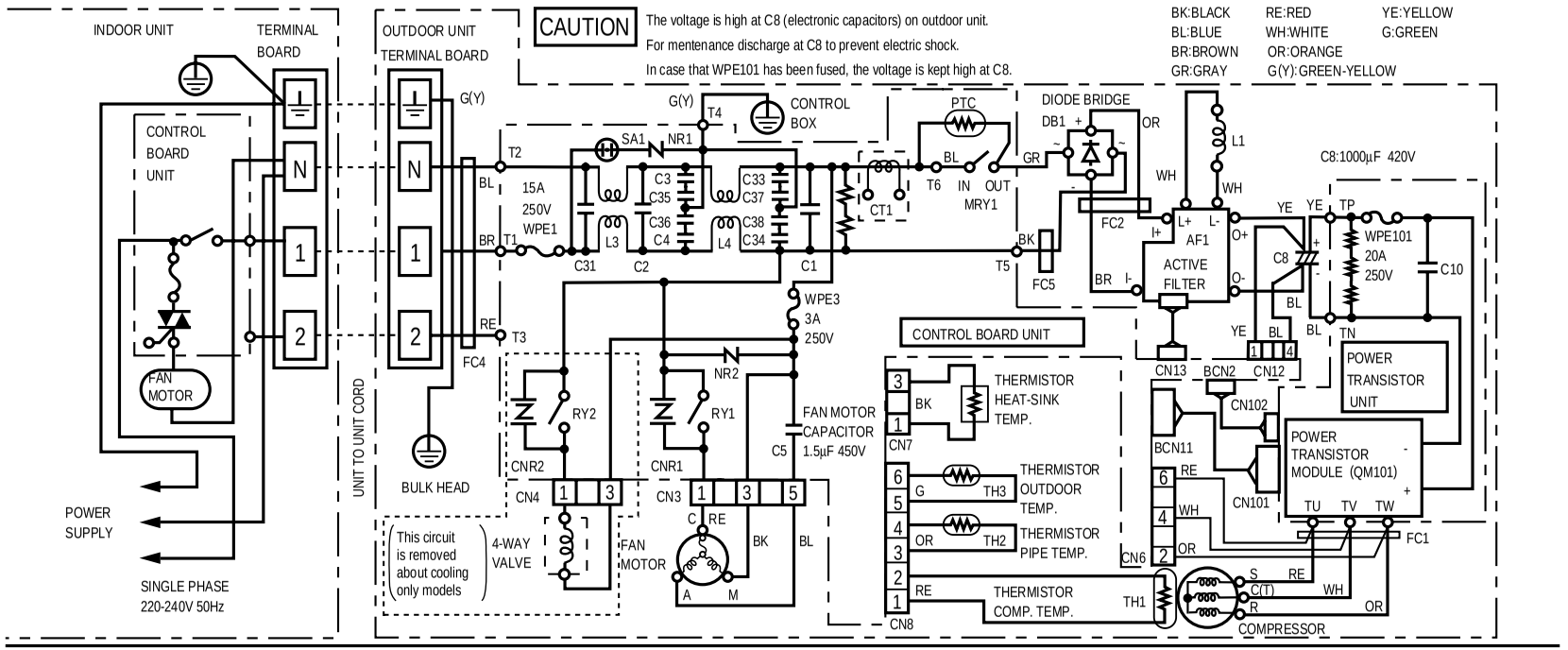
LED INDICATION FOR SELF-DIAGNOSIS

Temperature Indicator Blinking No.	Abnormal contents
1	Short circuit of the outdoor thermistor
2	Overheat of the compressor
3	Abnormal AC current
5	Open circuit of the outdoor thermistor
6	Power module(IPM) abnormality
7	AC overcurrent
8	Open circuit of the power module(IPM) heat-sink thermistor
10	Overheat of the power module(IPM) or short circuit of the power module(IPM) heat-sink thermistor
13	Rotation error of the compressor
14	Power factor module(AF1) error
17	Open circuit of serial signal line
18	Short circuit of serial signal line
19	Abnormal fan motor of indoor unit

<Indication of the abnormal condition>
LED indicator will blink,if the set is in abnormal condition.

CB612-2

Figure W-1. Wiring Diagram for AH-X08CR/X10CR/X13CR and AY-X08CR/X10CR/X13CR



LED INDICATION OF SELF-DIAGNOSIS

ON OUTDOOR UNIT

	LED BLINKING
●	LED turns on
○	Slow flashing (1 time for 2 seconds)
◑	Quick flashing (3 times for 2 seconds)

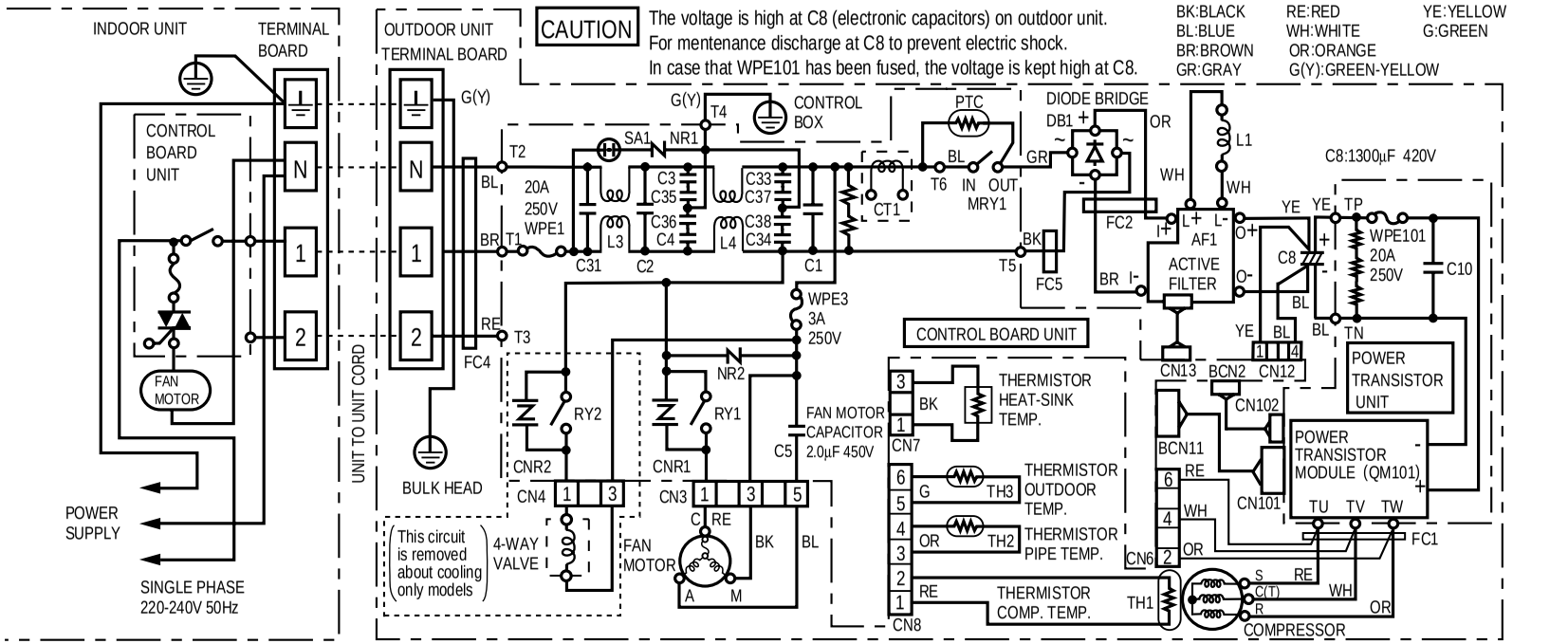
NO.	LED indication pattern	Mulfunction part or abnormal condition
	○	Normal
1	●	Abnormal signal line
2	◑ x 2times	Overheat of the compressor
3	◑ x 3times	DC overcurrent of the power module (QM101)
4	◑ x 4times	Short circuit of the thermistor
5	◑ x 5times	Open circuit of the thermistor

NO.	LED indication pattern	Mulfunction part or abnormal condition
6	◑ x 6times	AC abnormal current
7	◑ x 7times	AC overcurrent
8	◑ x 9times	Rotation error of the compressor
9	◑ x 11times	Power factor module(AF1) error
10	◑ x 13times	Overheat of the power module or short circuit of the heat-sink thermistor
11	◑ x 14times	Open circuit of the heat-sink thermistor

Example: NO.2 Overheat of the compressor

NO.3 DC overcurrent of the power module (QM101)

Figure W-2. Wiring Diagram for AE-X08CR/X10CR



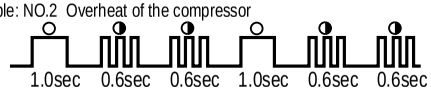
LED INDICATION OF SELF-DIAGNOSIS ON OUTDOOR UNIT

	LED BLINKING
●	LED turns on
○	Slow flashing (1 time for 2 seconds)
◑	Quick flashing (3 times for 2 seconds)

NO.	LED indication pattern	Mulfunction part or abnormal condition
	○	Normal
1	●	Abnormal signal line
2	◑ x 2times	Overheat of the compressor
3	◑ x 3times	DC overcurrent of the power module (QM101)
4	◑ x 4times	Short circuit of the thermistor
5	◑ x 5times	Open circuit of the thermistor

NO.	LED indication pattern	Mulfunction part or abnormal condition
6	◑ x 6times	AC abnormal current
7	◑ x 7times	AC overcurrent
8	◑ x 9times	Rotation error of the compressor
9	◑ x 11times	Power factor module(AF1) error
10	◑ x 13times	Overheat of the power module or short circuit of the heat-sink thermistor
11	◑ x 14times	Open circuit of the heat-sink thermistor

Example: NO.2 Overheat of the compressor



NO.3 DC overcurrent of the power module (QM101)

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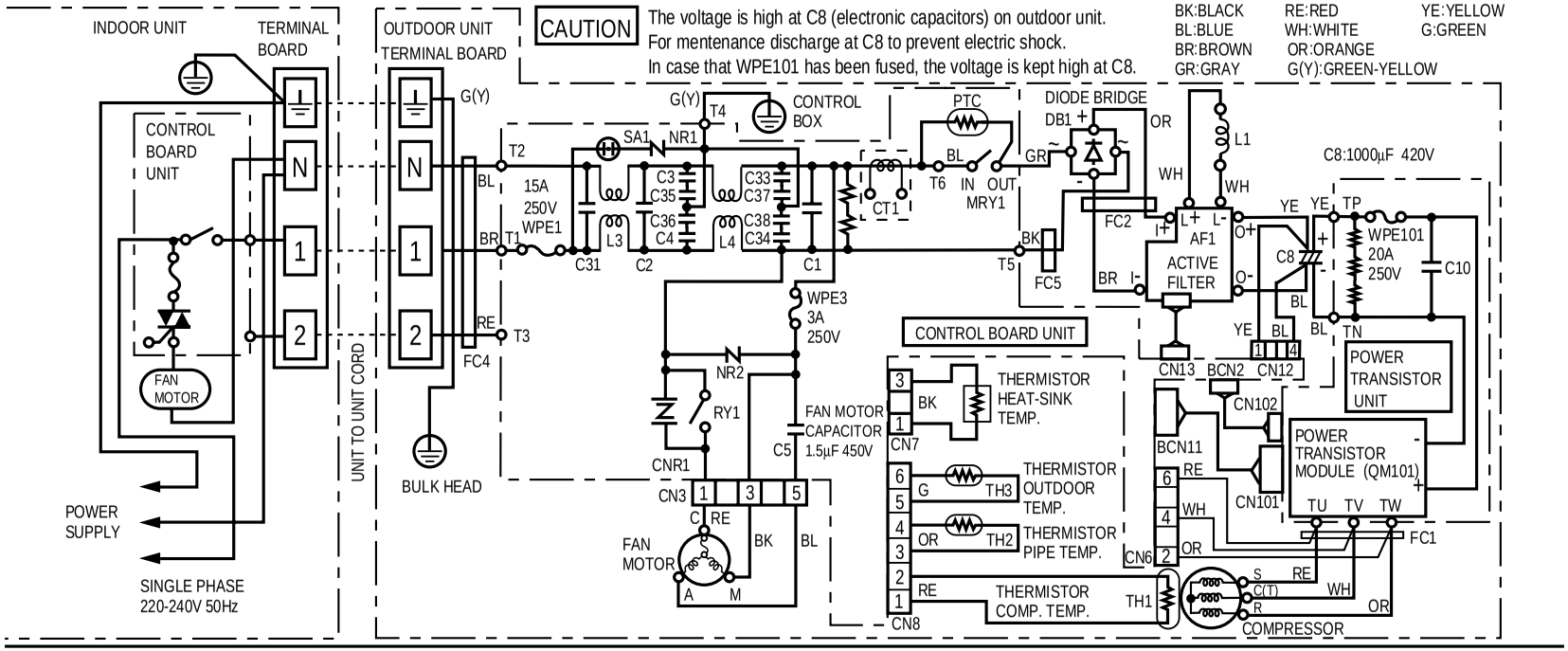
Figure W-3. Wiring Diagram for AE-X13CR



LED INDICATION OF SELF-DIAGNOSIS ON OUTDOOR UNIT

	LED BLINKING
●	LED turns on
○	Slow flashing (1 time for 2 seconds)
◑	Quick flashing (3 times for 2 seconds)

NO.	LED indication pattern	Mulfunction part or abnormal condition
	○	Normal
1	●	Abnormal signal line
2	◑ x 2times	Overheat of the compressor
3	◑ x 3times	DC overcurrent of the power module (QM101)
4	◑ x 4times	Short circuit of the thermistor
5	◑ x 5times	Open circuit of the thermistor

NO.	LED indication pattern	Mulfunction part or abnormal condition
6	◑ x 6times	AC abnormal current
7	◑ x 7times	AC overcurrent
8	◑ x 9times	Rotation error of the compressor
9	◑ x 11times	Power factor module(AF1) error
10	◑ x 13times	Overheat of the power module or short circuit of the heat-sink thermistor
11	◑ x 14times	Open circuit of the heat-sink thermistor

Example: NO.2 Overheat of the compressor

NO.3 DC overcurrent of the power module (QM101)

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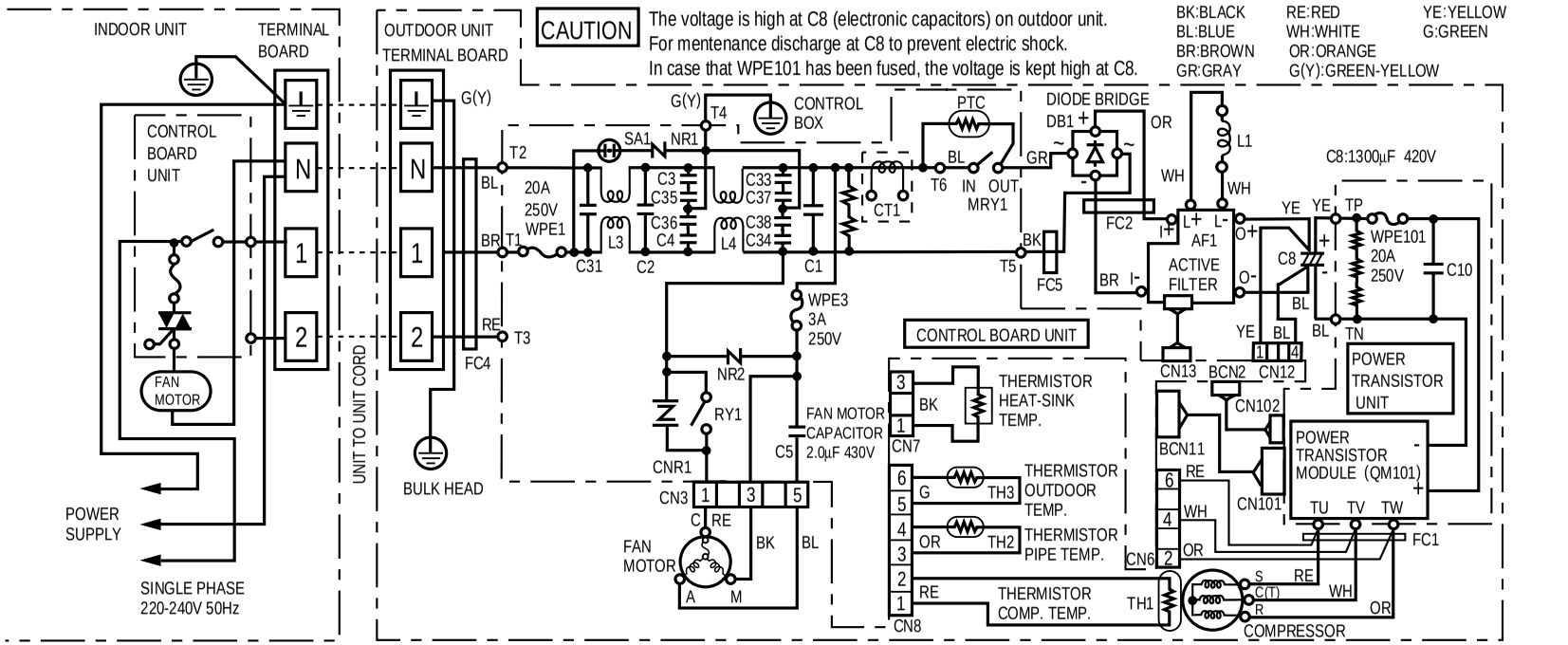
Figure W-4. Wiring Diagram for AU-X08CR/X10CR



LED INDICATION OF SELF-DIAGNOSIS ON OUTDOOR UNIT

	LED BLINKING
●	LED turns on
○	Slow flashing (1 time for 2 seconds)
◑	Quick flashing (3 times for 2 seconds)

NO.	LED indication pattern	Mulfunction part or abnormal condition
	○	Normal
1	●	Abnormal signal line
2	◑ x 2times	Overheat of the compressor
3	◑ x 3times	DC overcurrent of the power module (QM101)
4	◑ x 4times	Short circuit of the thermistor
5	◑ x 5times	Open circuit of the thermistor

NO.	LED indication pattern	Mulfunction part or abnormal condition
6	◑ x 6times	AC abnormal current
7	◑ x 7times	AC overcurrent
8	◑ x 9times	Rotation error of the compressor
9	◑ x 11times	Power factor module(AF1) error
10	◑ x 13times	Overheat of the power module or short circuit of the heat-sink thermistor
11	◑ x 14times	Open circuit of the heat-sink thermistor

Example: NO.2 Overheat of the compressor

NO.3 DC overcurrent of the power module (QM101)

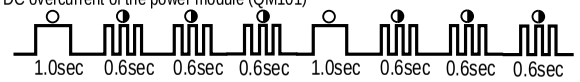


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Figure W-5. Wiring Diagram for AU-X13CR

BREAK DOWN DIAGNOSIS PROCEDURE

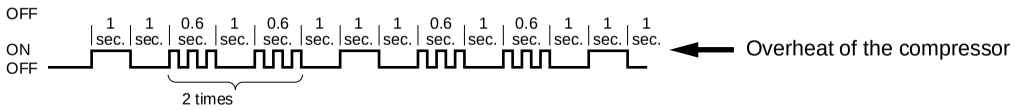
Self-diagnostic procedure using display mode
If the timer lamp blinks during operation, the problem can be diagnosed using the following table.

● : Blinks at 2-second intervals　× : OFF　○ : ON　◎ : Blinks 3 times at 0.2-second intervals

Condition of indoor and outdoor unit	Display by indoor unit operation lamp Displayed in a pattern which comes on at the same time as the timer lamp →○ × ○ × ○ × ○ × ○→ 4 seconds off						Display by outdoor unit lamp LED 1	Diagnosis	What to check, procedure	Solution
Normal	×	×	×	×	×	8	●	Normal	———	———
The error of outdoor unit	×	×	×	○	×	2	◎ Twice	Overheat of the compressor error (protector operating) or outdoor compressor thermistor TH1 short	1. Is the discharge outlet of the outdoor unit clogged ? 2. Is the power supply voltage at least 198 V at full power operation ? 3. Check for refrigerant leaks at the tubing connections. 4. Measure the resistance of compressor thermistor TH1 on the outdoor unit (see Figure 3). 5. Measure the resistance of heat exchanger pipe thermistor TH2 on the indoor unit (see Figure 1).	1. Clear the discharge outlet. 2. Assure power supply voltage. 3. Refill to rated amount. 4. Replace the outdoor ther-mistor assembly. 5. Replace the indoor control board assembly or only TH2.
	×	×	○	○	×	6	◎ 3 times	DC overcurrent error	1. Check the circuit in the power transistor module. 2. Is the outdoor fan revolving ?	1. Replace power transistor module
	×	×	×	×	○	1	◎ 4 times	Short circuit of the outdoor thermistor error	1. Measure the resistance of thermistor TH2 on the outdoor unit (see Figure 3).	1. Replace the outdoor thermistor assembly.
	×	×	○	×	○	5	◎ 5 times	Open circuit of the outdoor thermistor error	1. Is the connector of the outdoor unit thermistors well attached ? (see Figure 3). 2. Measure the resistance of thermistors TH1 and TH2 on the outdoor unit (see Figure 3).	1. Reattach. 2. Replace the outdoor thermistor assembly.
	×	×	×	○	○	3	◎ 6 times	AC abnormal current error	1. Can voltage be detected at the current transformer on the outdoor unit control board?	1. Replace the outdoor control board assembly (Current transformer wire break.)
	×	×	○	○	○	7	◎ 7 times	AC overcurrent error	1. Is the discharge outlet of the outdoor unit clogged ?	1. Clear the discharge outlet.
	×	○	○	○	×	14	◎ 11 times	Power factor module error	1. CHeck wiring of power factor module.	1. Replace the power factor module.
	×	○	○	○ ×	×	13	◎ 9 times	Rotation errot of the compressor	1. Has not if escaped from the compressor CN6 ? 2. Is the power supplied of 15V and 6V supplied to the IPM PWB.	1. Reattach. 2. Reattach CN101 and CN102, otherwise replace power transistor module assembly or outdoor control board assembly.
	×	○	×	×	×	9	◎ 14 times	Open circuit of the heatsink thermistor.	1. Are the connectors of the heatsink thermistor in outdoor unit well attached ? 2. Measure the resistance of thermistor TH6 on the heatsink. (See Figure 3).	1. Reattach. 2. Replace the heatsink thermistor.
	×	○	×	○	×	10	◎ 13 times	Overheat of the power module or short circuit of the heatsink thermistor.	1. Measure the resistance of heatsink thermistor TH6 on the heatsink in outdoor unit. 2. Check rotation of the fan motor in outdoor unit. 3. Is the power supply voltage at least 198V at full power operation ?	1. Replace the heatsink thermistor. 2. Reattach CN3, otherwise replace the fan motor of outdoor unit. 3. Assure power supply voltage.

● : Blinks at 2-second intervals ✕ : OFF ◯ : ON ◎ : Blinks 3 times at 0.2-second intervals

Condition of indoor and outdoor unit	Display by indoor unit operation lamp Displayed in a pattern which comes on at the same time as the timer lamp →◯ ✕ ◯ ✕ ◯ ✕ ◯ ✕ ◯→ 4 seconds off		Display by outdoor unit lamp LED 1	Diagnosis	What to check, procedure	Solution
The error of indoor unit	◯ ✕ ✕ ◯ ◯	19	✕	Indoor fan out of order	1. Is the fan motor locked ? 2. Is the wiring connector firmly fitted ? 3. Is the speed signal applied to the motor ?	1. Replace fan motor 2. Reattach. 3. Replace the indoor control board assembly.
	◯ ✕ ✕ ◯ ✕	18	◯	Serial short	1. Check the wiring between units.	1. Rewire.
	◯ ✕ ✕ ✕ ◯	17	◯	Serial open	1. Check the wiring between units.	1. Rewire.
			✕	Outdoor power supply does't turn on. Wiring mistake.	1. Check the wiring between units. 2. Check the fuse in the outdoor unit. 3. Indoor control board. 4. Outdoor control board.	1. Rewire. 2. Replace the fuse, replace the outdoor board assembly. 3. Replace the board. 4. Replace the board.



Note: 1. Normal : Only the timer lamp blinks. Error : Displayed by blinking of run lamp (above table).
2. If the power plug is removed from the outlet or the breaker is switched to "OFF", the self-diagnostic memory will be erased.
3. Example of outdoor unit LED 1 blinking :

PERFORMANCE CURVES

NOTE: 1) Indoor fan speed: Hi
2) Vertical adjustment louver "45˚", Horizontal adjustment louver "front"
3) Indoor air temp. : Cooling 27˚C, Heating 20˚C

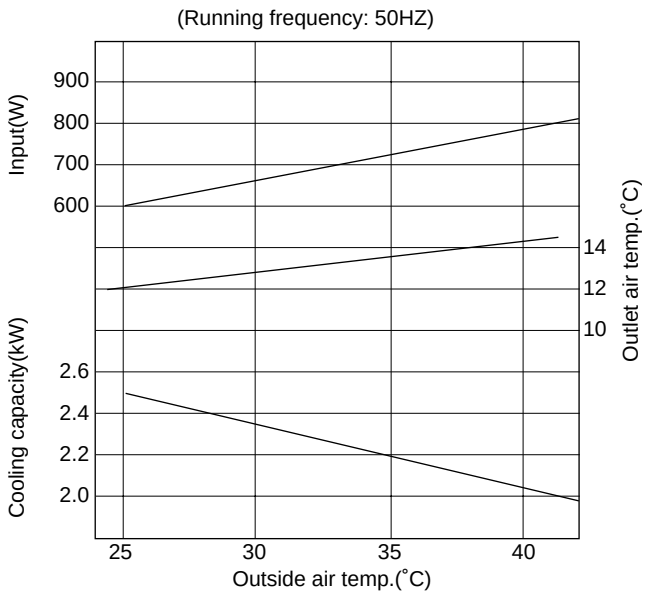


Figure P-1. At Cooling for AH-X08CR

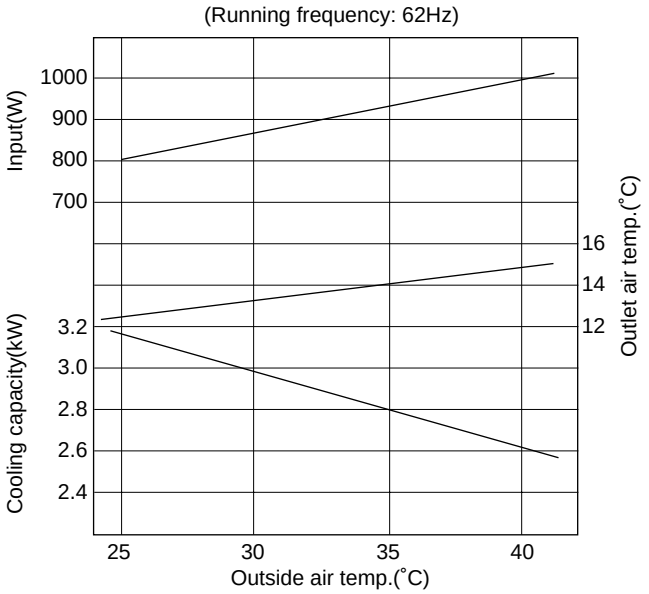


Figure P-2. At Cooling for AH-X10CR

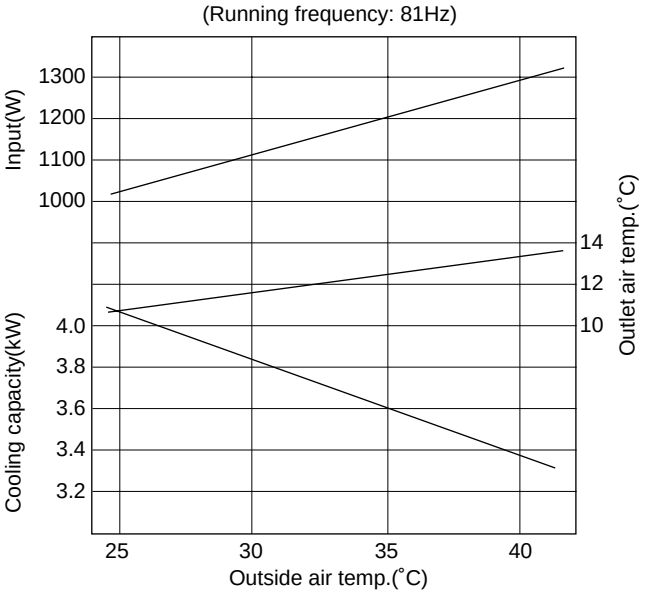


Figure P-3. At Cooling for AH-X13CR

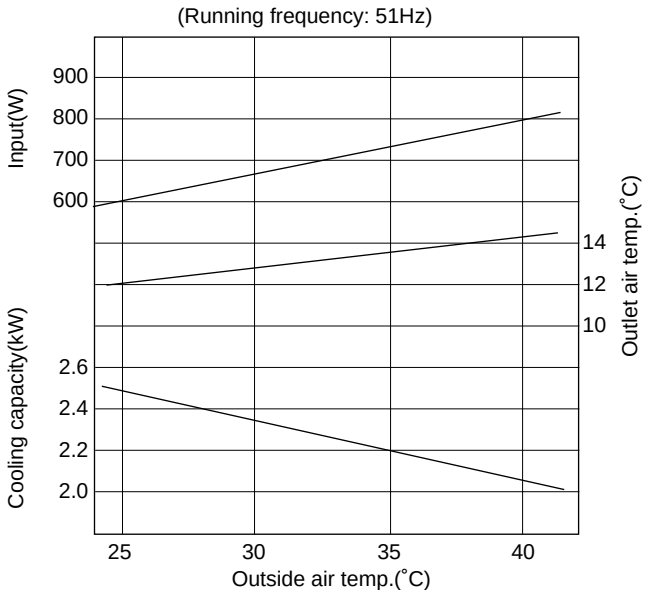


Figure P-4. At Cooling for AY-X08CR

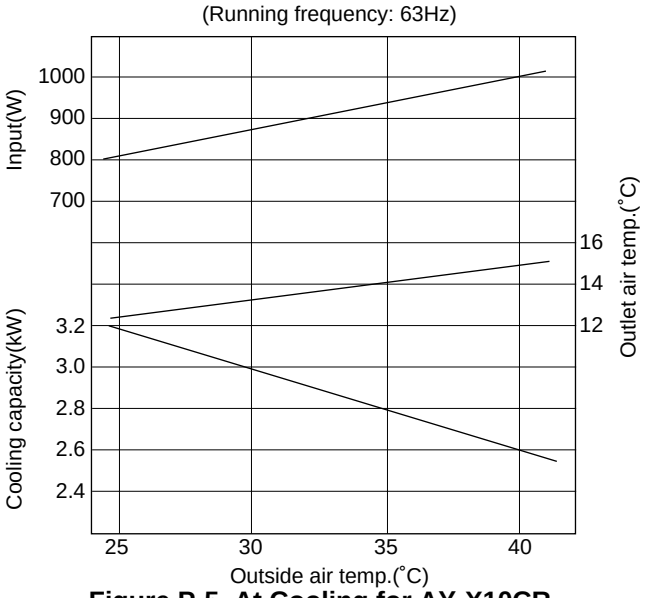


Figure P-5. At Cooling for AY-X10CR

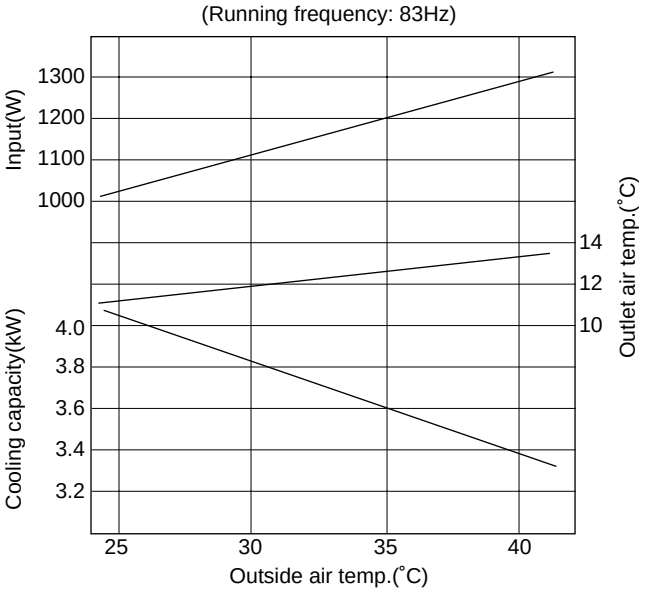


Figure P-6. At Cooling for AY-X13CR

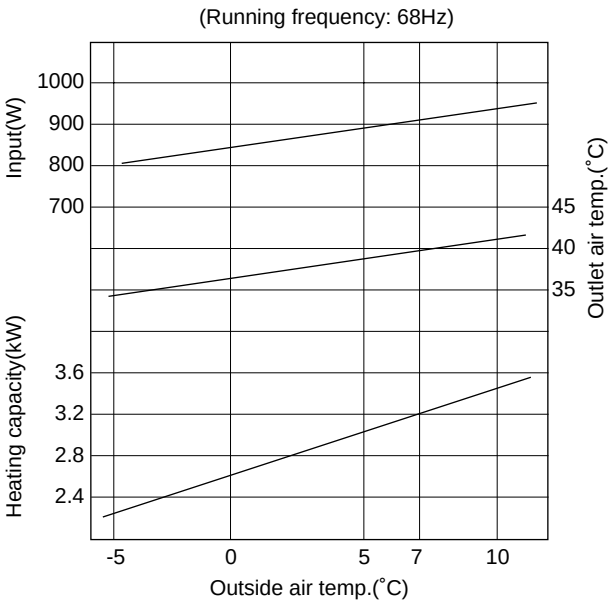


Figure P-7. At Heating for AY-X08CR

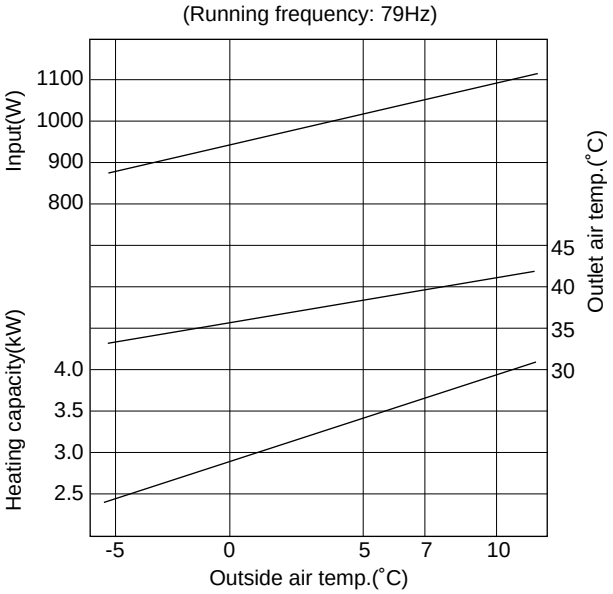


Figure P-8. At Heating for AY-X10CR

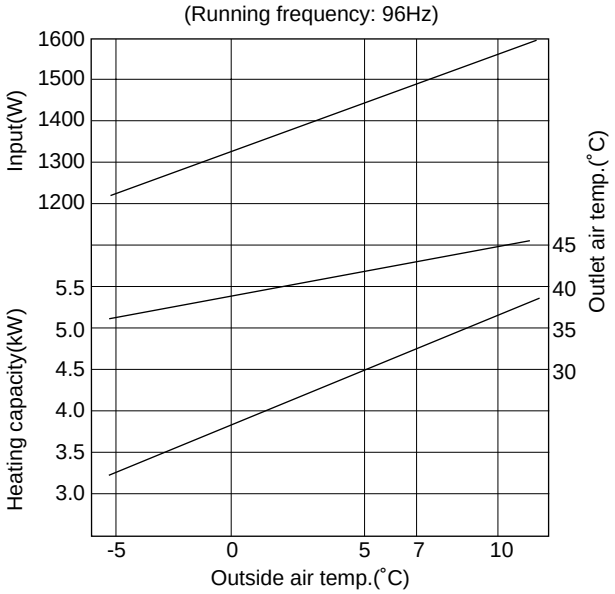


Figure P-9. At Heating for AY-X13CR