Service Manual

Ultra-Low Temperature Freezer

MDF-C8V1

PHC Corporation
Biomedical Div.

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SMBM00021

Effective models

This service manual is effective following models.

Model name	Product code	Voltage and Frequency	
MDF-C8V1	823 012 51	115V	60Hz
	823 012 52	220V	50Hz
	823 012 53	220V	60Hz
	823 012 54	220/230/240V	50Hz
	823 012 55	220V	50Hz
	823 012 56	110V	60Hz

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- Pull-up & Pull-down temperature	
- Pull-down temperature	
- Pull-down pressure	
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- Temperature uniformity (15points measured)	

Upon unit repair:

- Be sure to collect refrigerant thoroughly and pull vacuum for 5 minutes at least, before you repair the unit. It may be caused fire in welding process by using 'R-600'.
- You should use 'MU-N49' for servicing.

Procedures for trial operation:

1. Turn all the switches (Power SW and Battery SW) off beforehand.
2. Connect the plug to outlet then turn Power SW on.
3. Turn Battery SW on.

   (Note) If you turn battery switch on prior to turn power switch on, buzzer should be emitted until the unit is reached to setting temperature.

Specifications

■Structural specifications

Item	Specifications
External dimensions	W 550 × D 685 (+83)*　× H 945（mm）
Internal dimensions	W 405 × D 490 × H 425　(mm)
Effective capacity	84 L
Exterior	Painted steel
Interior	Painted steel
Door	Painted steel
Insulation	Cabinet; Rigid polyurethane foamed-in place and VIP(vacuum insulation panel) Door; Rigid polyurethane foamed-in place
Door lock	1pc (also used as a latch)
Caster	4pc,（2 leveling foot）
Access port	ϕ 17mm, back side, bottom
Refrigeration circuit	Primary cooling system
Compressor	Hermetic rotary type, 400W
Evaporator	Tube on sheet type (also used as a inner cabinet)
Condenser	Finless tube type
Refrigerant	HFC mixed refrigerant (R245fa/R600/R23/R14)
Refrigerant oil	Ze-NIUSL22SA
Power supply	Local voltage
Weight	67 kg
Accessory	1 set of key, 1 scraper
Optional component	Automatic temperature recorder (MTR-85H, MTR-G85) Mounting kit for MTR-85H (MDF-S3085) Recorder sensor cover (MTR-C8) Back-up system (CVK-UB4) Back-up mounting plate (MDF-UBK) Inventory rack (IR-207C, IR-305C)

* means the dimension of projected area.

■Control specifications

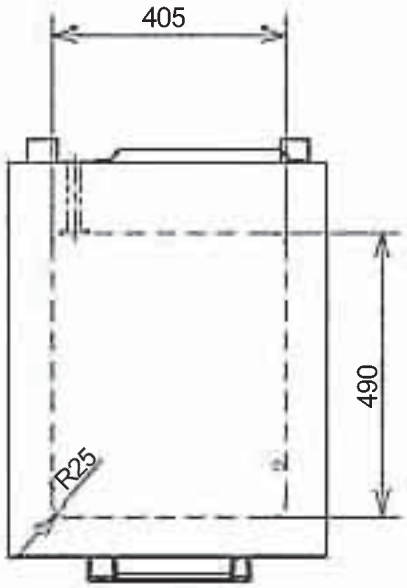
Item		Specifications
Cooling performance		-80℃ (1/2H temp, AT 30℃, no load)
Temperature control range		-60℃~-80℃(AT5~30℃, no load)
Temperature controller		Microprocessor controlled system: Key-pad input Temperature set range: -55℃~-85℃ (1℃ increment) Set value kept in non-volatile memory
Temperature sensor		Pt.1000Ω
Temperature display		LED digital display（1℃ increment）
Alarms	High temp.	Selectable +5℃~+20℃ for high temp. alarm (Initial; +10℃) ALARM lamp blinks and intermittent buzzer sounds with 15min.of delay Remote alarm contact: Normal Open, rating 30VDC, 2A Temperature alarm turns on during power failure (not linked with buzzer)
	Low temp.	Selectable -5℃~-20℃ for low temp. alarm (Initial; -10℃) ALARM lamp blinks and intermittent buzzer sounds with 15min.of delay Remote alarm contact: Normal Open, rating 30VDC, 2A Temperature alarm turns on during power failure (not linked with buzzer)
	Power failure	ALARM lamp blinks with intermittent buzzer sounds, remote alarm outputs.
	Remote alarm	3P remote alarm terminal: Maximum 30VDC, 2A NC-COM、NO-COM Outputs during temperature alarm and power failure alarm.
	Battery check	BATTERY lamp is lit when accumulation time is about 3 yrs
	Fan motor check	BATTERY lamp blinks when accumulation time is about 6 yrs
Control panel		Lamp: ALARM, BATTERY BUZZER: Buzzer key ALARM TEST: Alarm test key SET: To switch SV and PV ＞: To shift the digit Λ: To change the digit
Key lock function		With ＞ key is pressed for 5 seconds; L0: Unlocked L1: Locked
Self diagnosis function		Temp. control sensor abnormality ● Error code and chamber temp. are alternately displayed. ● Remote alarm contact is ON and the buzzer sounds.
		Fan motor malfunction ● Error code and chamber temp. are alternately displayed. ● ALARM lamp blinks and buzzer sounds.
Power switch		Breaker switch
Compressor protection		Internal thermostat and comp. sensor

■**Performance specifications**

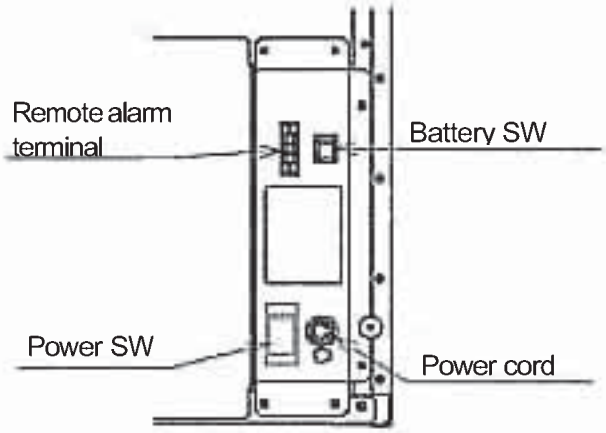
Cooling performance	-80℃(ambient temperature; 30℃, no load)					
Temp. control range	-60℃ to -80℃(ambient temperature; 30℃, no load)					
Rated voltage	AC110V	AC115V	AC220V	AC230V	AC240V	AC220V
Rated frequency	60Hz	60Hz	50Hz	50Hz	50Hz	60Hz
Rated power consumption	330W	340W	310W	330W	365W	350W
Noise level	47 dB [A] (background noise; 20dB)					
Maximum pressure	3.5MPa					

Note) Specifications will be subject to change without notice.

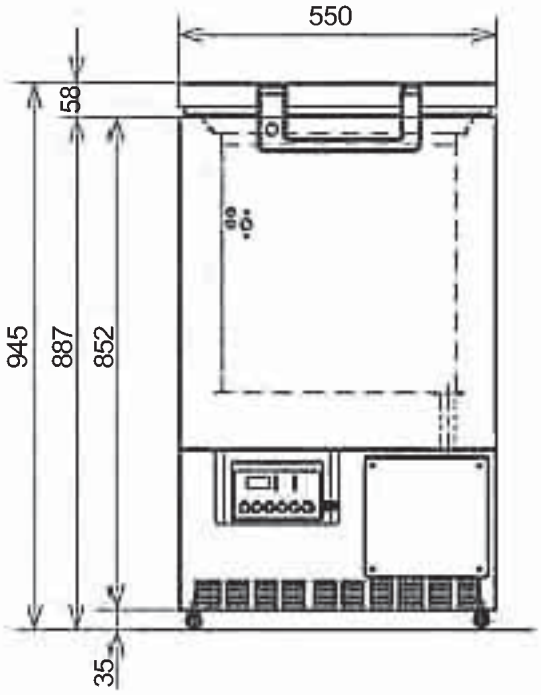
Dimensions



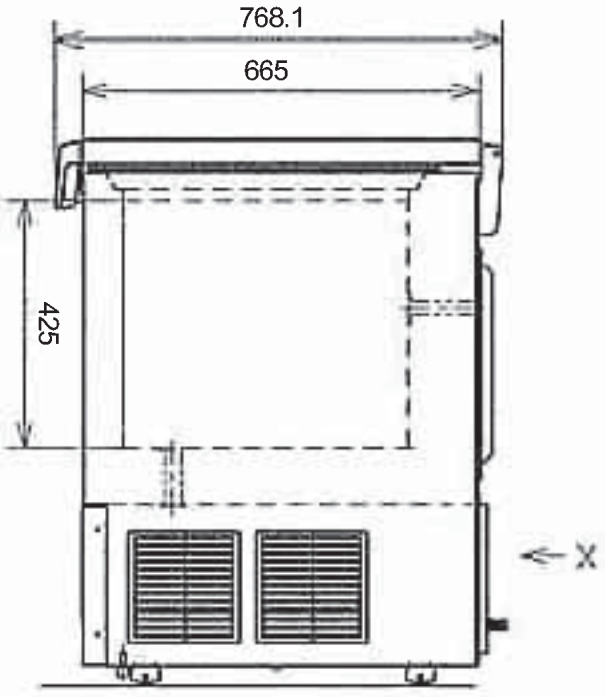
Top



Back-right side



Front



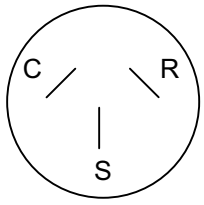
Side

Cooling unit parts

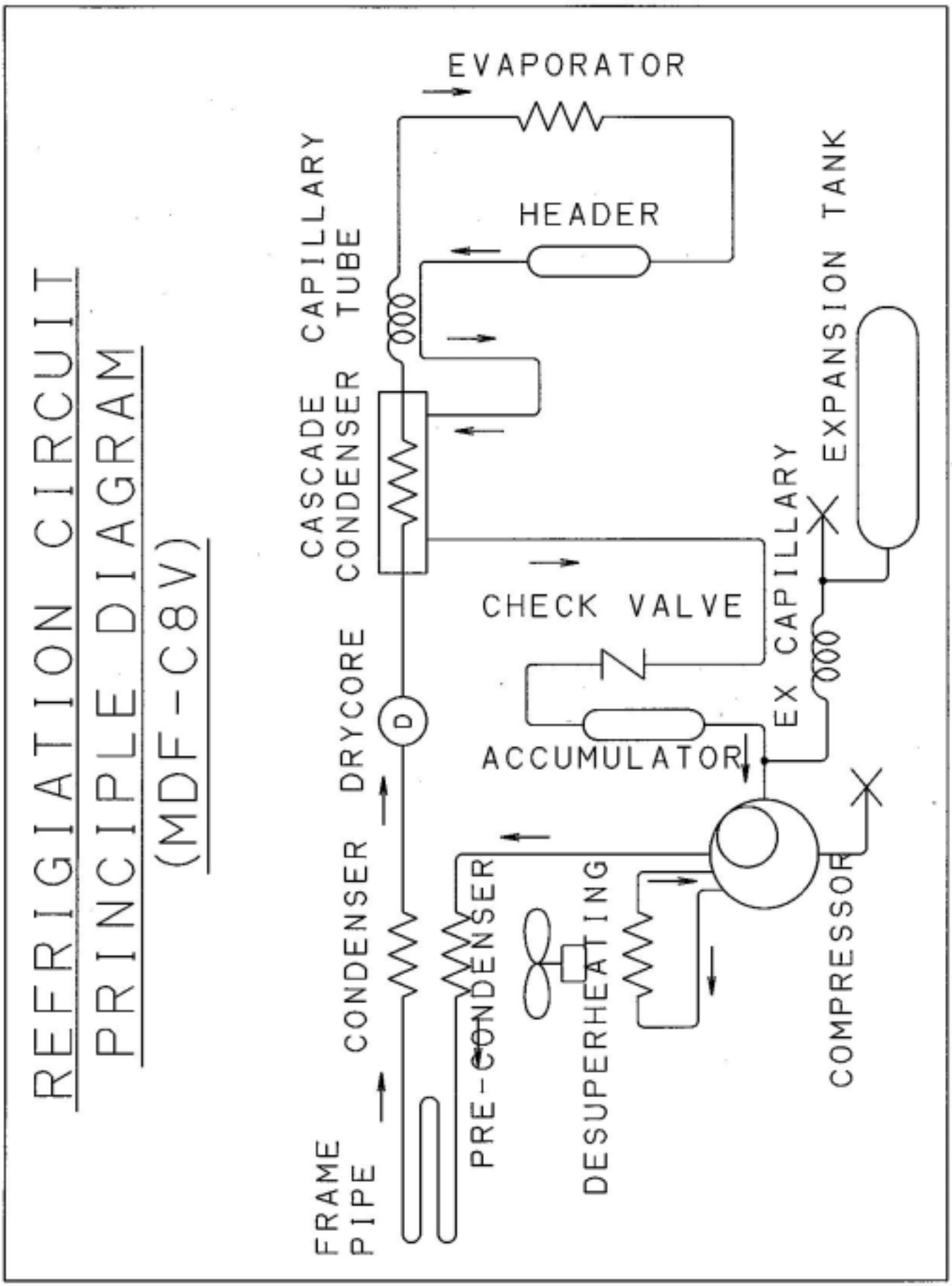
<MDF-C8V>

Item	Specifications	
Compressor		
115V, 60Hz	Type: C-2SN400L2W Compressor code: 807 780 22	
220/230/240V,50Hz	Type: C-2SN400L5W Compressor code: 807 780 25	
Refrigerant oil	Ze-NIUSL22SA Charged q'ty: 280cc	
Cooling system	Forced air cooling	
Condenser		
Type	Finless tube	Cascade condenser
Condenser	8 columns x 2 lines	Coil pipe W200 mm x 8 columns
Pre-condenser	7 columns x 1 line P290 mm	——
Frame pipe	ϕ4.76 x T0.7 mm	——
Evaporator Type	ϕ7.94 x T0.7 mm Tube on sheet (also used as interior)	
Capillary tube	ϕ1.2	
Resistance (PSI kg/cm^2)	0.59 MpaG	
Length (mm)	2000	
Outer diameter (mm)	ϕ1.8	
Refrigerant	HFC mixed refrigerant: MU-N48(EU)/(DOT) Charged q'ty: 375+/-8 g	
Dryer	Dry core: D-SM032T Charged q'ty: 35g	
Condensing fan	ϕ196 mm, 4 blades Material: ABS	
Condensing fan motor	(115V, 60Hz) SE4-D041N1P Output: 4W	
	(220/230/240V, 50Hz) SE4-D041N5P Output: 4W	

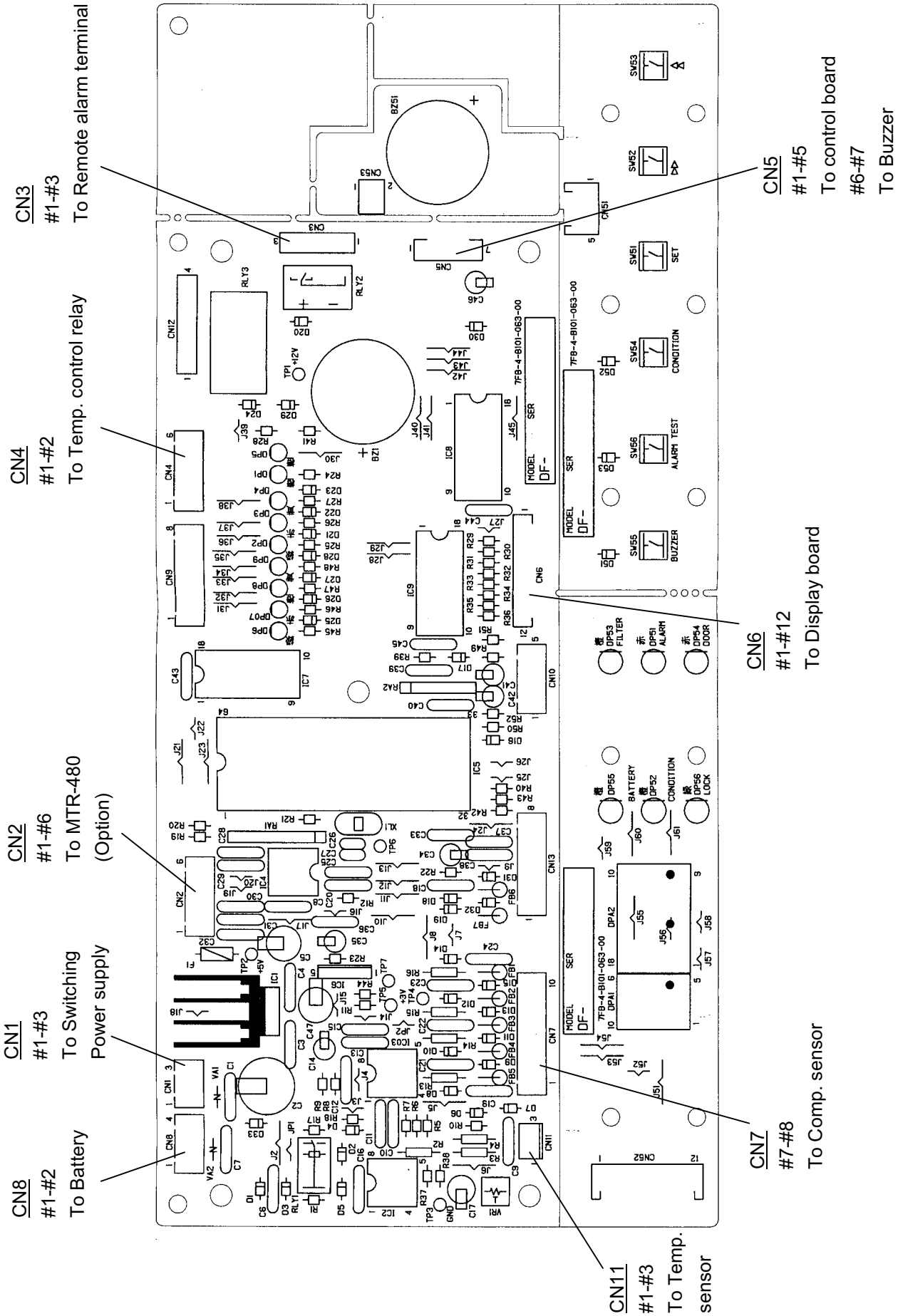
<Compressor terminals layout>



Cooling circuits



Components on PCB



Electric Parts

MDF-C8V1		AC115V, 60Hz	AC220V, 60Hz	AC220/230/240V, 50Hz
Compressor	Type	C-2SN400L2W	C-1RN40L6A	C-1RN4L5C
	Compressor code	802 012 11	802 012 16	802 012 15
	Rated voltage (50/60Hz)	ϕ1, 110~115V, 60Hz	ϕ1, 200V, 60Hz	φ1, 220~240V, 50Hz
	Winding resistance C-R(Main)	1.674Ω(25℃)	5.34Ω(25℃)	7.37Ω(25℃)
	C-S(Aux)	3.419Ω(25℃)	8.88Ω(25℃)	15.76Ω(25℃)
Starting relay	Type	AMVL-165A	AMVL-300A	AMVL-300A
	Pick up voltage	95~115VAC	215~247VAC	215~247VAC
	Drop out voltage	25~60VAC	69~132VAC	69~132VAC
Starting capacitor	Rating	100μF, 160VAC	40μF, 300VAC	40μF, 300VAC
Running capacitor	Rating	35μF, 220VAC	10μF, 400VAC	12μF, 370VAC
Condensing fan motor	Type	SE4-D041N1P	SE4-D041N5P	SE4-D041N5P
	Rating	115V, 4P	220~240V, 4P	220~240V, 4P
Temp. control relay	Type	G4F-11123T	G4F-11123T	G4F-11123T
	Contact capacity	20A, 12VDC	20A, 12VDC	20A, 12VDC
Switching power supply	Type	ZWS10-12/J	ZWS10-12/J	ZWS10-12/J
	Rated output	12VDC, 0.85A	12VDC, 0.85A	12VDC, 0.85A
Breaker switch	Type	BAM215131	BAM215131	BAM215131
	Rating	250V, 15A	250V, 15A	250V, 15A
Temperature sensor	Type	PT1000	PT1000	PT1000
	Rating	1000Ω(0℃)	1000Ω(0℃)	1000Ω(0℃)
Compressor sensor	Type	502AT-1	502AT-1	502AT-1
	Rating	5kΩ, 25℃	5kΩ, 25℃	5kΩ, 25℃
Battery switch	Type	SLE6A2-5	SLE6A2-5	SLE6A2-5
	Rating	4A, 250VAC	4A, 250VAC	4A, 250VAC
Battery	Type	5HR-AAC	5HR-AAC	5HR-AAC
	Rating	6V, 1100mAH	6V, 1100mAH	6V, 1100mAH

Specifications of sensor

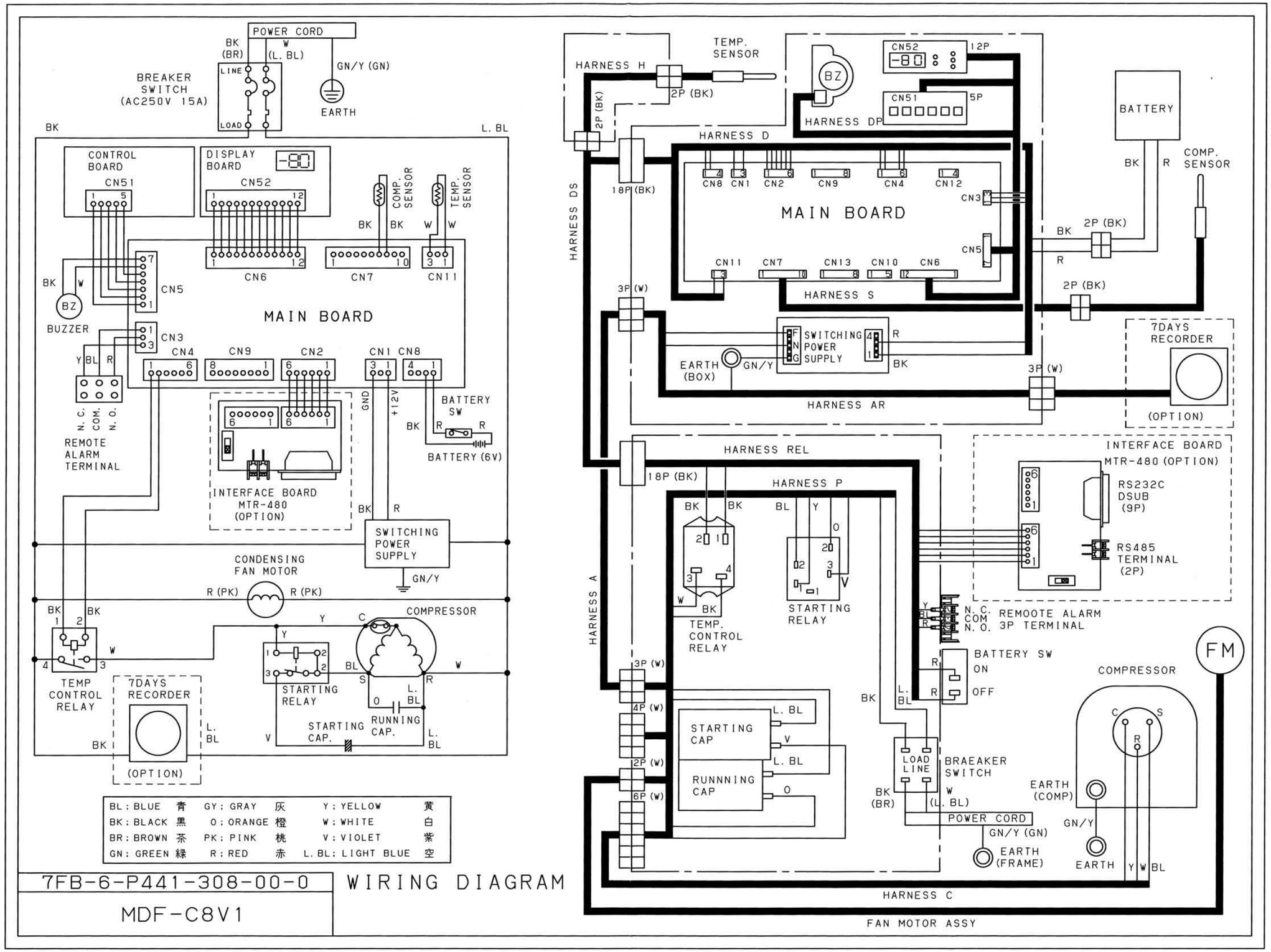
<502AT-1>

Temp. (C)	Resistance Value (kΩ)	Temp. (C)	Resistance Value (kΩ)	Temp. (C)	Resistance Value (kΩ)	Temp. (C)	Resistance Value (kΩ)
−50	154.5	−36	71.80	−22	35.65	0	13.29
−49	145.9	−35	68.15	−21	33.99	5	10.80
−48	137.8	−34	64.71	−20	32.43	10	8.84
−47	130.2	−33	61.48	−19	30.92	15	7.20
−46	123.1	−32	58.43	−18	29.50	20	6.01
−45	116.5	−31	55.55	−17	28.14	25	5.00
−44	110.2	−30	52.84	−16	26.87	30	4.17
−43	104.4	−29	50.23	−15	25.65	35	3.50
−42	98.87	−28	47.77	−14	24.51	40	2.96
−41	93.70	−27	45.45	−13	23.42	45	2.51
−40	88.85	−26	43.26	−12	22.39	50	2.13
−39	84.18	−25	41.19	−11	21.41	55	1.82
−38	79.80	−24	39.24	−10	20.48	60	1.56
−37	75.67	−23	37.39	−5	16.43	65	1.35

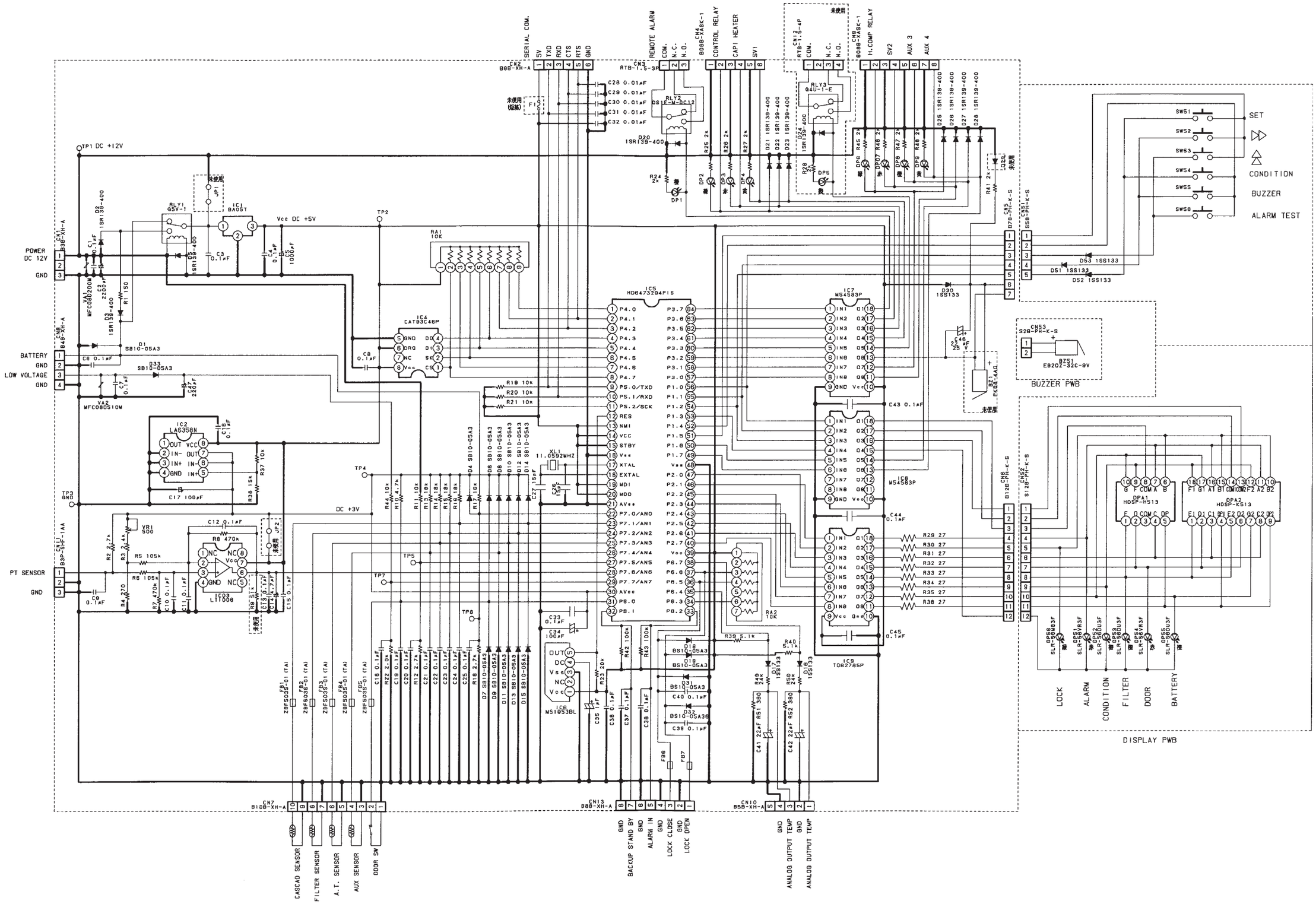
<PT-1000Ω>

Temperature (℃)	Resistance (Ω)	Temperature (℃)	Resistance (Ω)
-170	326.92	-30	885.13
-160	368.57	-20	923.55
-150	409.87	-10	961.84
-140	450.83	0	1000.0
-130	491.47	10	1038.0
-120	531.83	20	1076.0
-110	571.92	30	1113.8
-100	611.76	40	1151.4
-90	651.38	50	1189.0
-80	690.78	60	1226.4
-70	729.99	70	1263.8
-60	769.02	80	1301.0
-50	807.87	90	1338.0
-40	846.58	100	1375.0

Wiring Diagram



Circuit Diagram



Connections on PCB

Following is the explanation of connections on Main PCB.

Connector	Connects to	Usage	Voltage
CN1	Switching power supply	To supply the power to PCB	#1:12V
CN2	MTR-480（Option）	To connect with interface	
CN3	Remote alarm terminal #1: COM. #2: N.O. #3: N.C.	Output for remote alarm contact	
CN4	#1-#2: Temp. control relay	To control chamber temperature	
CN5	#1-#5: Control PCB (CN51) #6-#7: Buzzer	To control with each switches	
CN6	#1-#12: Display PCB (CN52)	To connect with each LED	
CN7	#7-#8: Comp. sensor	To detect compressor temperature	
CN8	#1-#2: Battery	To supply the power to Main PCB during power failure	#2:6V
CN9	Unused		
CN11	#1-#3: Temp. sensor	To detect chamber temperature	

Control specifications

1. Key and Switch

BUZZER : In alarm condition, buzzer stops sounding with this key pressed.
Remote alarm output and alarm message would not be off.
During the power failure (battery back-up), press the key to show chamber temperature.

ALARM TEST : With this key pressed to activate alarm test mode to be forcibly step into alarm condition (ALARM lamp blinks, intermittent buzzer sounds, digital LED goes off and remote alarm inputs).
After approx. 90seconds then, normal condition retrieves with Auto Return activates.
With the battery switch turns off, “E09” blinks on the display.

SET : Press this key once to activate set mode (2nd digit in LED blinks), press the key again to store the value to be changed.
With Key Lock setting mode (“L 0” or “L 1” is displayed), press the key to store the value to be changed.

▶▶ During setting mode, the blinking digit shifts among the 1st digit or the 2nd digit or 3rd digit.
In chamber temperature display, press this key over 5 seconds to be Key Lock mode available with ‘L_0’ displayed.

▲▲ During setting mode, count the blinking digit up. In chamber temperature display, press the key over 5 seconds to be function mode available with ‘F00’ displayed.
Set your desire value with this key and ▶▶ key, you can use function mode.

2. Temperature control

Setting range : -55℃~-85℃
Display range : -180℃~+50℃
Setting procedure : Press SET key and set the required value with ▲▲ key and ▶▶ key. Press SET key to store the set value.
Unacceptable setting: If you try to set value which is out of temperature setting range, the buzzer sounds for 1 second to inform the value is unacceptable.

3. Key Lock mode and Function mode

A) Key Lock mode
Setting range : 0, 1
Setting procedure: In chamber temperature display, press ▶▶ key over 5 seconds to enter into Key Lock mode. (“L_0” or “L_1” is displayed. initial: L_0) with “0” or “1” blinks.
Change the value with ▲▲ key and press SET key to store the value in the non-volatile memory.

B) Function mode
Setting range : 00~50
Display range : 00~59
00, 04, 08, 13, 15, 16, 18~20, 26~29, 31, 33~49 are unavailable codes.
Setting procedure : In chamber temperature display, press ▲▲ key over 5 seconds to enter into function mode with F00 is displayed. Change the blinking 1st digit to desired function code with ▲▲ key and ▶▶ key.
Press SET key to be function code available.

Unacceptable setting: If you try to input F51~F59 and press SET key, the buzzer sounds to inform the value is unacceptable.

4. Error codes

E01: Temp. sensor is disconnected
E02: Temp. sensor is short-circuited
E05: Comp. sensor is disconnected
E06: Comp. sensor is short-circuited
E09: Battery switch is OFF
E10: Compressor temperature abnormality
E15: Fan motor malfunction

(1) Temp. sensor abnormality

Disconnection: E01 and 50℃ are displayed alternately, the buzzer sounds intermittently and remote alarm contact outputs.
The compressor is continuous running.
Press BUZZER key to stop the buzzer sounding.

Short circuit: E02 and -170℃~-180℃ are displayed alternately, the buzzer sounds intermittently and remote alarm contact outputs.
The compressor is continuous running.
Press BUZZER key to stop the buzzer sounding.

(2) Comp. sensor abnormality

Disconnection: E05 and chamber temperature are displayed alternately, the buzzer sounds intermittently and remote alarm contact outputs.
Press BUZZER key to stop the buzzer sounding.

Short circuit: E06 and chamber temperature are displayed alternately, the buzzer sounds intermittently and remote alarm contact outputs.
Press BUZZER key to stop the buzzer sounding.

(3) Battery switch is OFF Press ALARM TEST key to display E09.

(4) Comp. temperature abnormality E10 and chamber temperature are displayed alternately and compressor stops running.
Press BUZZER key to stop the buzzer sounding.

(5) Fan motor malfunction E15 and chamber temperature are displayed alternately.
Press BUZZER key to stop the buzzer sounding.

(6) Error code priority

No.1: Temp. sensor abnormality (E01 or E02)
No.2: Comp. sensor abnormality (E05 or E06)
No.3: Comp. temperature abnormality (E10)
No.4: Fan motor malfunction (E15)

5. Warning functions

High temp. alarm : When chamber temperature is equal or higher than setting temperature + high temp. alarm setting temperature + 1, ALARM lamp and digits are blinking, intermittent buzzer sounds with about 15 minutes of delay, and remote alarm output turns on.
When chamber temperature is equal or lower than setting temperature ALARM lamp and digits go off, buzzer stops sounding and remote alarm output turns off.
If you press BUZZER key, the buzzer stops sounding instead remote alarm output does not turn off.

Low temp. alarm : When chamber temperature is equal or lower than setting temperature + low temp. alarm setting temperature - 1, ALARM lamp and digits are blinking, intermittent buzzer sounds with about 15 minutes of delay, and remote alarm output turns on.
When chamber temperature is equal or higher than setting temperature, ALARM lamp and digits go off, buzzer stops sounding, and remote alarm output turns off.
If you press BUZZER key, the buzzer stops sounding instead remote alarm output does not turn off.

Power failure alarm : When the power switch is OFF with battery switch is ON or the power to the unit is disconnected or in case of power failure, ALARM lamp is blinking, intermittent buzzer sounds and remote alarm output turns on.
If the power retrieves within 3 seconds, the unit starts to run with initial settings. Remote alarm output turns off.
In case of power failure alarm, press BUZZER key to show chamber temperature for 5 seconds.

6. Self diagnosis and safety functions

Auto Return : If there is not any key operation for 90 seconds in each setting mode, Key Lock mode and Function mode, the display automatically reverts to chamber temperature.

Ring back : Buzzer forcibly sounds again after setting time elapses even if anyone press BUZZER key to stop buzzer sounding in alarming condition.
Ring back time is settable in F25.

Sensor temp. display F12: Temperature in temp. sensor is displayed
(Ex. -80.2℃ → displayed as '80.2')
F14: Temperature of comp. sensor is displayed.
(Ex. +23℃ → displayed as '023')

Battery lifespan check: F03: Notice of battery accumulation time
(Ex. 2years and 6months accumulated → Displayed as '02.5')
BATTERY lamp is lit if '02.8' is displayed.
<Reset of accumulation time>
Step into F06. Input '**409**' and press SET key to reset non-volatile memory to '00.0' with BATTERY lamp goes off.

Fan motor lifespan check: F32: Notice of fan motor accumulation time
(Ex. 5years and 8monts accumulated → Displayed as '05.6')
Battery lamp is blinking when about 6years has passed.
<Reset of accumulation time>
Step into F06. Input '**419**' and press SET key to reset non-volatile memory to '00.0'. The display reverts to chamber temperature only.

ROM version : F30: ROM version is displayed (Ex. Ver. 1.00 → displayed as "1.00")

7. Function modes

F00	Automatically revert to chamber temperature display
F01	High temp. alarm setting
F02	Low temp. alarm setting
F03	Battery lifespan check
F04	Automatically revert to chamber temperature display
F05	Compressor delay time setting
F06	Service code input (code: 384)
F07 *	Temp. sensor Zero Adjustment
F08 *	Automatically revert to chamber temperature display
F09 *	Factory test mode …… Unavailable
F10 *	Factory test mode …… Unavailable
F11 *	Factory test mode …… Unavailable
F12 *	Display of temperature in temp. sensor
F13 *	Automatically revert to chamber temperature display
F14 *	Display of temperature in Comp. sensor
F15 *	Automatically revert to chamber temperature display
F16 *	Automatically revert to chamber temperature display
F17 *	Model code setting (Initialization of non-volatile ROM and memory)
F18 *	Automatically revert to chamber temperature display
F19 *	Automatically revert to chamber temperature display
F20 *	Automatically revert to chamber temperature display
F21	Communication ID setting
F22	Communication mode setting
F23 *	Automatically revert to chamber temperature display
F24	Linkage between Remote alarm terminal and buzzer
F25	Ring back time setting
F26 *	Display of actual operation rate
F27 *	Automatically revert to chamber temperature display
F28	Factory test mode …… Unavailable
F29	Factory test mode …… Unavailable
F30 *	Display of ROM version
F31 *	Automatically revert to chamber temperature display
F32 *	Fan motor lifespan check
F33~F49	Automatically revert to chamber temperature display
F50 *	Temp. alarm delay time setting

Setting procedure: In chamber temperature display, press ▲▲ key over 5seconds to display “F00”.
Input the desired function code with ▲▲ key and ▶▶ key.
Press SET key to be function mode available.
* … You should input service code (384) in F06 beforehand.
To cancel service code, input “000” in F06 or turn the power off.

F01: <Function> High temp. alarm setting
<Operation> Input F01 and press SET key to display “010” (initial value). Set the value in the range “005”~“020” with ▲▲ key. Press SET key to store the value and revert to chamber temperature display.

F02: <Function> Low temp. alarm setting
<Operation> Input F02 and press SET key to display “-10” (initial value). Set the value in the range “-05”~“-20” with ▲▲ key. Press SET key to store the value and revert to chamber temperature display.

F03: <Function> Battery lifespan check
<Operation> Input F03 and press SET key to display alternately F03 with “00.0” (in case battery used for 36 days or less). Press SET key to revert to chamber temperature display.
<Reset> Step into F06. Input ‘**409**’ and press SET key to reset non-volatile memory to ’00.0’ with BATTERY lamp goes off.

F05: <Function> Compressor is turned on with forcibly delayed (by minute increment) when the power retrieves from the power failure.

<Operation> Input “F05” and press SET key to display “003” (initial).
Change the value in the range “003”~”015” with ▲▲ key and ▶▶ key.
Press SET key to store the value and revert to chamber temperature display.

F06: <Function> Service code input and initialization of accumulation time

<Operation> Input F06 and press SET key to display “000” (initial value).
Set to “384” with ▲▲ key and ▶▶ key. Press SET key to store the value and revert to chamber temperature display.

<Cancel> Input F06 and press SET key to display “384”.
Change to “000” with ▲▲ key and ▶▶ key. Press SET key to store the value and revert to chamber temperature display.
Service code is cancelled when the power is ON and OFF, or accumulation time is reset.

F07: <Function> To match temperature of temp. sensor with temperature of center at the chamber.

<Operation> Input service code in F06 prior to use this mode.
Input F07 and press SET key to display “00.0” (initial value).
Change to the desired value with ▲▲ key and ▶▶ key in the range of “-4.9”~”04.9”. Press SET key to store the value and revert to chamber temperature display.

F12: <Function> To display the temperature of temp. sensor

<Operation> Input service code in F06 prior to use this mode.
Input F12 and press SET key to display alternately F12 and “XX.X” (chamber temperature). Press SET key to revert to chamber temperature display. 3 digits indication. Minus “-“ is not displayed.
Ex) “-79.5℃” → indicated as “79.5”

F14: <Function> To display the temperature in comp. sensor

<Operation> Input service code in F06 prior to use this mode.
Input F14 and press SET key to display alternately F14 and “XX.X” (present temperature in comp. sensor). Press SET key to revert to chamber temperature display.

F17: <Function> Non-volatile memory initialization, model code change

<Operation> Service code should be input in F06 prior to use this mode.
Input F17 and press SET key to display “001”. Change the value with ▲▲ key and ▶▶ key. Press SET key to store and revert to chamber temperature display.
Model code ‘003’: MDF-C8V1

<Initial values in non-volatile memory>

Zero adjustment for temp. sensor	: 0℃
Compressor forcibly OFF	: 8 min.
Ring back time	: 30 min.
Setting temperature	: -80℃
High temp. alarm setting temp.	: +10℃
Low temp. alarm setting temp.	: -10℃
Linkage between remote alarm and buzzer	: OFF
Compressor delay time	: 3 min.
Communication ID	: 000
Communication mode	: 000
Temp. alarm delay time	: 15 min.
Key lock	: OFF

F21: <Function> Serial communication ID setting
<Operation> Input F21 and press SET key to display “000” (initial).
Change the value in the range “001”~”255” with ▲▲ key and ▶▶ key.

F22: <Function> Serial communication mode setting
<Operation> input F22 and press SET key to display “000” (initial value)
Change the value with ▲▲ key and ▶▶ key.
Press SET key to store the value and revert to chamber temperature display.
Control mode (the 3rd digit)
0: Local (initial)
1: Remote
Baud rate (the 2nd digit)
0: 2400bps (initial)
1: 4800bps
2: 9600bps
Note) You cannot be changed SV if control mode is set in “Remote”.

F24: <Function> Linkage between remote alarm and buzzer
<Operation> Input F24 and Press SET key to display “000” (initial).
Change to the desired value with ▲▲ key and ▶▶ key.
Press SET key to store the value and revert to chamber temperature display.
000: Remote alarm is outputted simultaneously with buzzer
001: Remote alarm is not outputted simultaneously with buzzer

F25: <Function> Ring back time setting
<Operation> Input F25 and press SET key to display “030” (initial).
Change to the desired value with ▲▲ key and ▶▶ key.
Press SET key to store the value and revert to chamber temperature display.

000: Auto recovery OFF
010: Recovers after 10min. passed
020: Recovers after 20min. passed
030: Recovers after 30min. passed (initial)
040: Recovers after 40min. passed
050: Recovers after 50min. passed
060: Recovers after 60min. passed

F26: <Function> Actual running rate is displayed (unit: %)
<Operation> Service code should be input in F06 prior to use this mode.
Input F26 and press SET key to display alternately F26 with “XXX” (present actual running rate).
Press SET key to revert to chamber temperature display.

F30: <Function> ROM version is displayed
<Operation> Service code should be input in F06 prior to use this mode.
Input F30 and press SET key to display alternately F30 with “X.XX” (present ROM version).
Press SET key to revert to chamber temperature display.

F32: <Function> Fan motor lifespan check
<Operation> Service code should be input in F06 prior to use this mode.
Input F32 and press SET key to display ’00.0’ (accumulation time is 36days or less).
Set your desired setting with ▲▲ key and ▶▶ key pressed.
Press SET key to store the value and revert to chamber temperature display.
<Reset> Step into F06. Input ‘**419**’ and press SET key to reset non-volatile memory to ’00.0’. The display reverts to chamber temperature only.

F50 <Function> Temp. alarm delay time setting
<Operation> Service code should be input in F06 prior to use this mode.
Input F50 and press SET key to display ‘015’ (initial).
Set your desired value with ▲▲ key and ▶▶ key pressed.
(Range:000~015)
Press SET key again to store the value and revert to chamber temperature display.

‘000’ = Not delayed

8. Control of compressor

(1) Compressor turns ON when chamber temperature is equal to setting temperature + 0.4℃.
(2) Compressor turns OFF when chamber temperature is equal to setting temperature – 0.4℃.

9. Compressor protection

When fan motor is locked, compressor stops running to prevent compressor temperature from going higher if the temperature in comp. sensor is equal or higher than 65℃.
Compressor restarts running when the temperature in comp. sensor is equal or lower than 50℃.

10. Delay time

Compressor delay time: (Initial: 3 min.)
Compressor starts running with delay after the power is supplied.
You can set delay time in F05.
When compressor stops running during cycle, compressor is forcibly stop running the next 3 min.

Temp. alarm delay time: (Initial: 10min.)
In high/low temp. alarm condition, buzzer and remote alarm are emitted with delay time.
You can set delay time in F50.
ALARM lamp and display blink without delay.

Power failure alarm delay time: (3 sec. fixed)
Power failure alarm is emitted with 3 sec. of delay after the power has failed.

11. Prevention for oil logging in capillary tube

Compressor is forcibly stop operation to prevent oil from being logged in capillary tube.

Interval : Once every 12 hrs.
Period : 8 min.
Timing : 1) About 9 sec. of delay after compressor stops operation during cycle after 12 hrs has passed since the unit had started operation.
2) Compressor is forcibly stop operation when compressor keeps running for 60 min. even if it should be stopped.

12. Temp. sensor offset

Temp. sensor offset is done to correct the gap between the temperature in temp. sensor and the actual temperature.

Temp. sensor offset: +4.0℃

13. Remote alarm terminal

Condition	No-voltage output from CN3	
	1 – 2 (N.O.)	1 – 3 (N.C.)
Normal	Open	Close
In alarm	Close	Open

14. Settings after power retrieves (Power-on reset)

Alarms	: OFF
Compressor	: OFF
Remote alarm	: OFF
Ring-back time	: 30 min.
Timers	: Reset
2H, 8H timer	: 0 (Reset)
Warming-up operation	: ON
Counting the time of compressor stops	: Reset
Setting data	: Read by non-volatile memory

15. Other specifications

(1) Lamp specifications:

<Control PCB>

DP1: Orange lamp
Goes off: High/low temp. alarm, sensor error, power failure
Lit : Normal condition

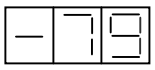
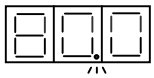
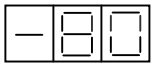
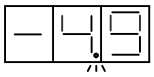
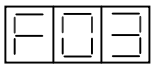
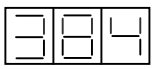
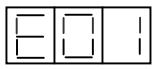
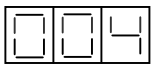
DP2: Green lamp
Goes off: Compressor OFF (normal condition)
Lit : Compressor ON

<Display PCB>

DP51: Red lamp
Blinks : Alarm condition

DP52: Orange lamp
Lit : Battery lifespan is expired. (About 3 yrs)
Blinks : Notice of fan motor lifespan is expired (About 6 yrs)

(2) Examples of display

Chamber temp.	-79.5℃		Decimal point of chamber temp.	-80.0	
Set temp.	-80.0℃		Sensor offset	-4.9	
Function	F03		Operation monitoring	Con	
Service code	384		Error	E01	
Set value	004		Accumulation time	8H timer 135	
Key Lock	L_0				

(3) Buzzer specifications:

Key operation:	A click emitted if available
Unacceptable input:	Alarming tone emitted for 1 second

Parts layout

〈Temp. sensor PT-1000>





<Control panel>



<Opposite side of control panel>



Main PCB

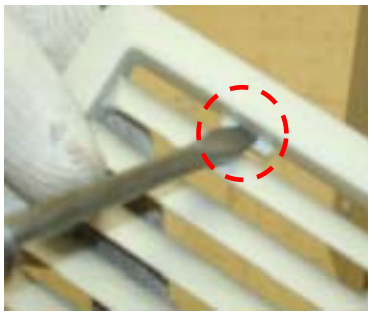
Switching
power supply

Control PCB

Display PCB

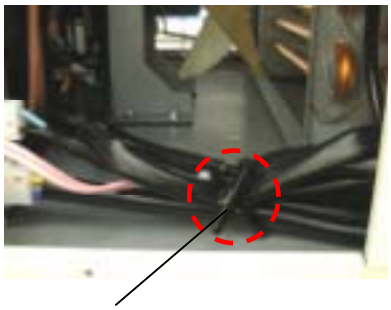
<How to access the Main PCB>

1. Catch the pick by screwdriver and pull the panel out.





2. Loosen tie band to set cables free. Pull Electric BOX out carefully.



Tie band





<Lower back side>



<Remote alarm>

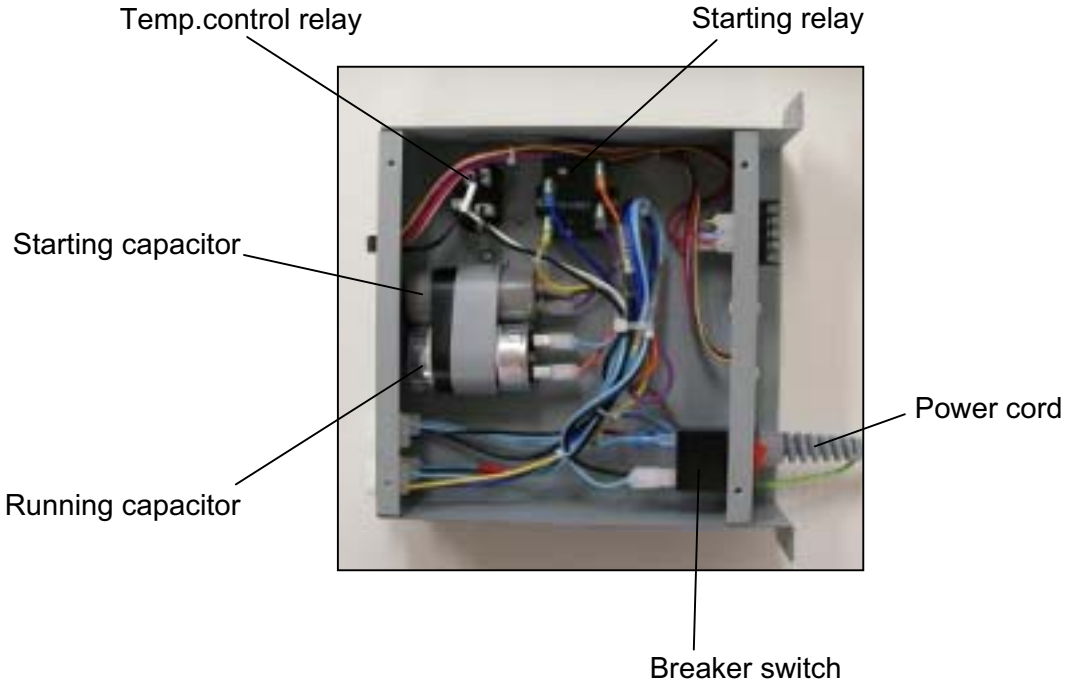


<Lower left side>



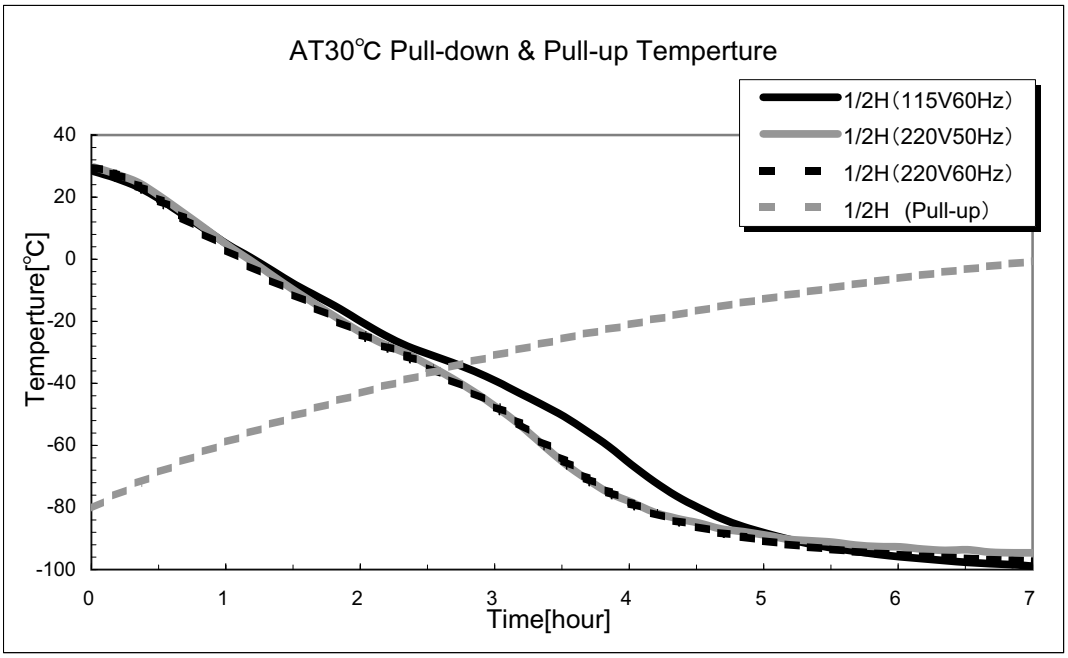
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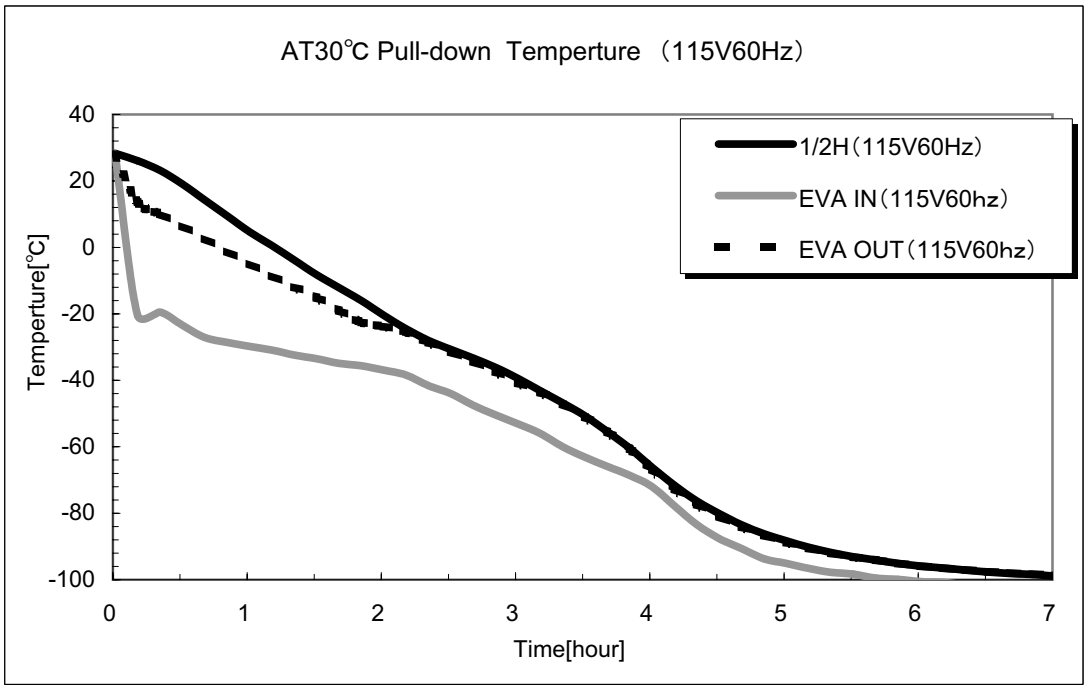


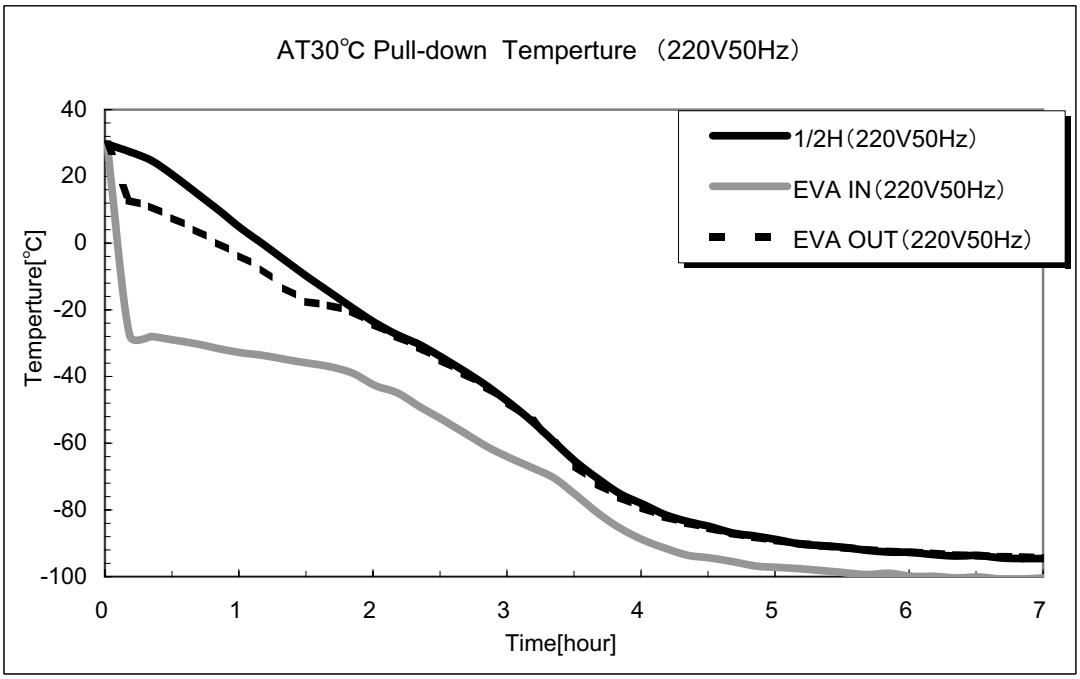


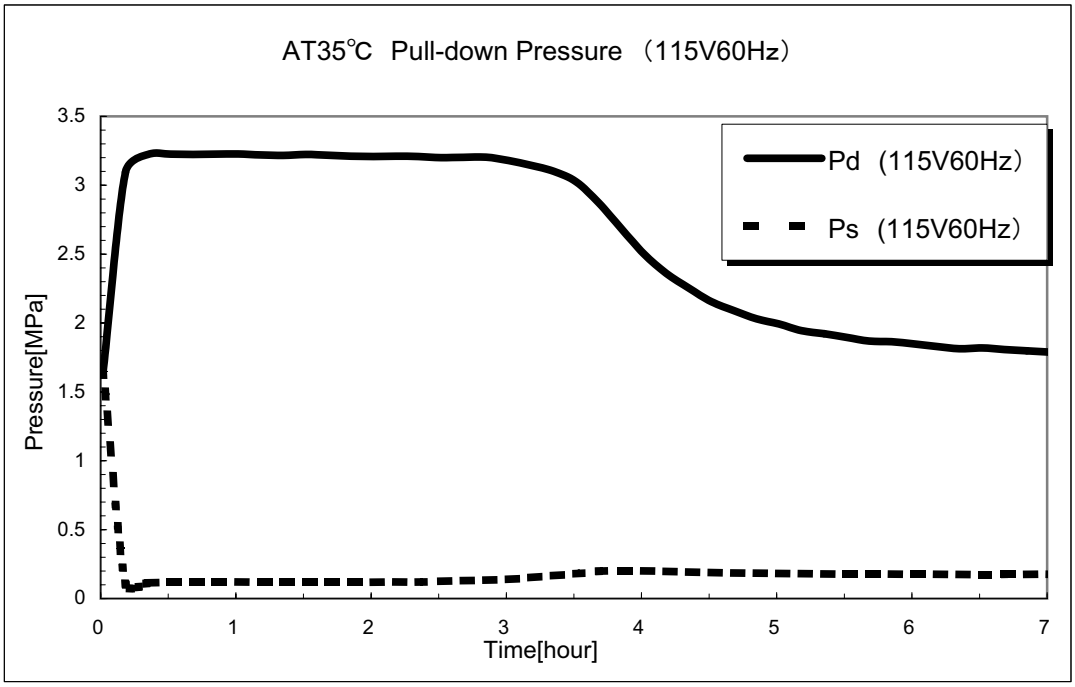
Test data

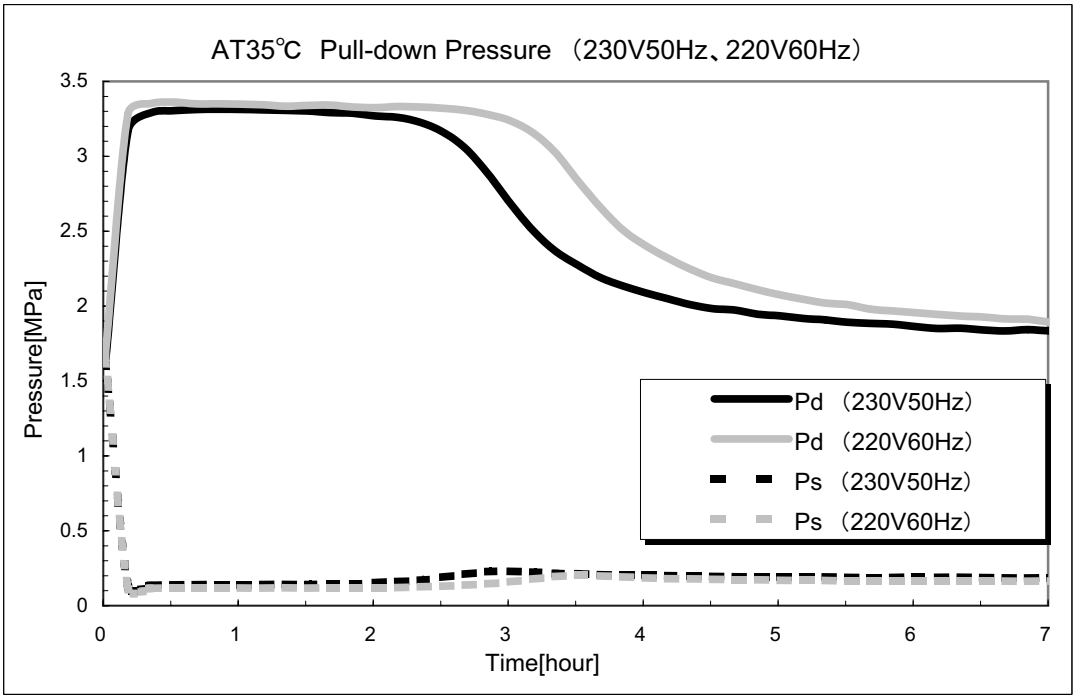
Note) These data are the reference only.

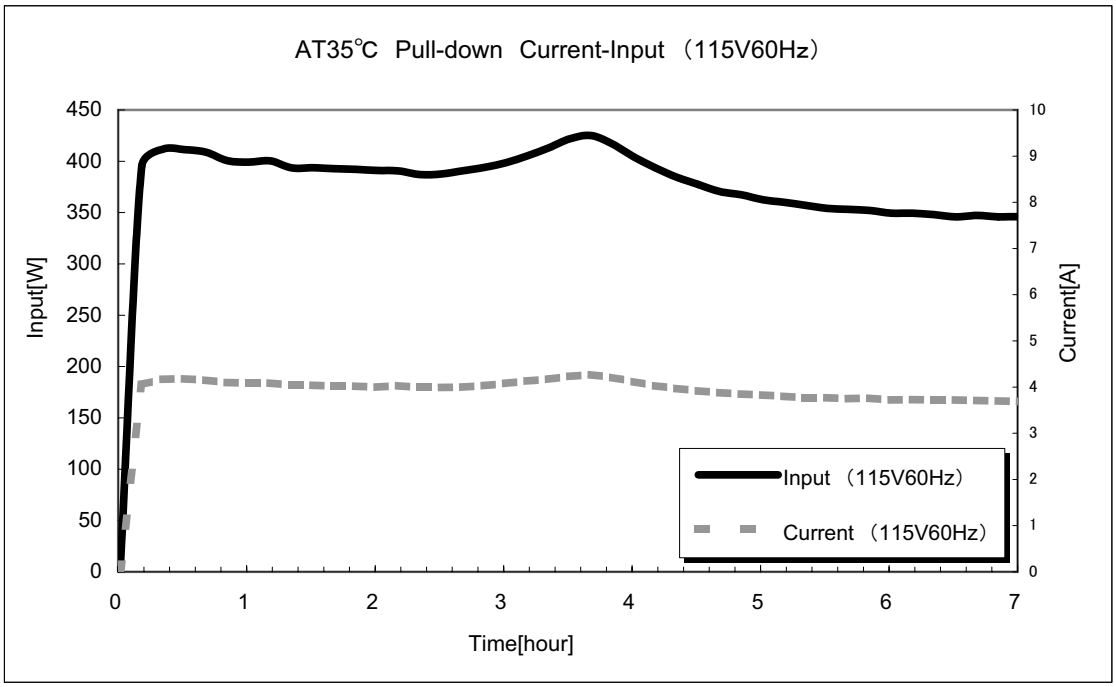


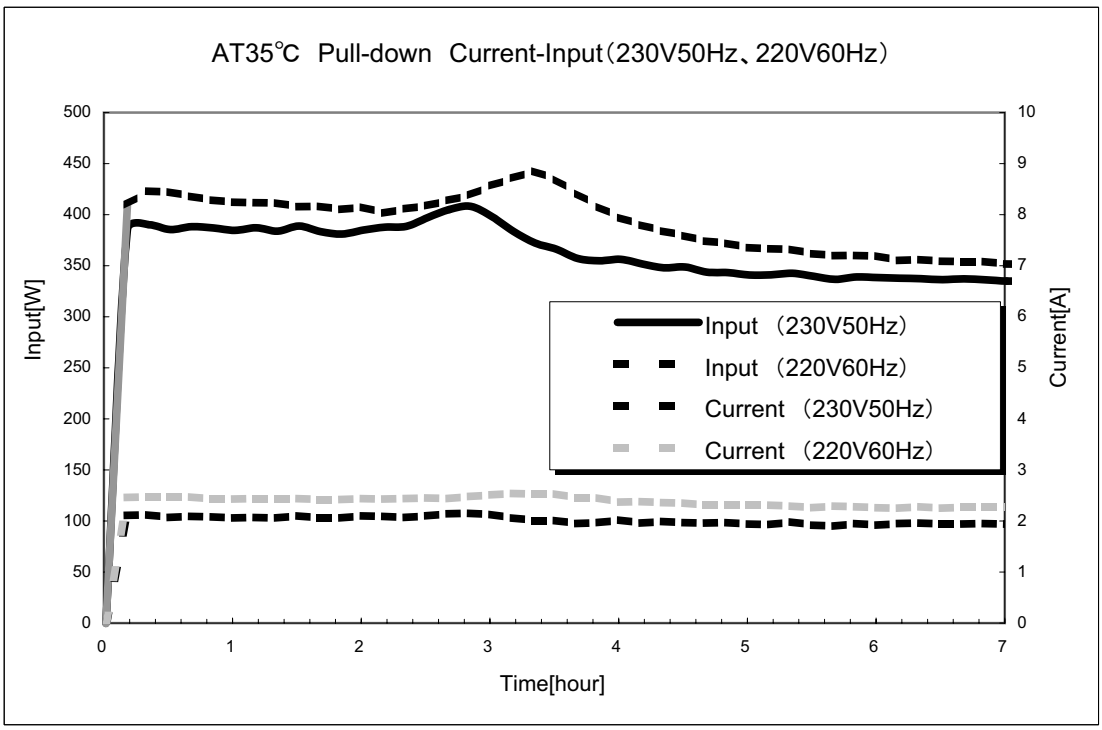

AT30℃ Pull-down Temperture （115V60Hz）
Temperture[℃]
Time[hour]
1/2H（115V60Hz）
EVA IN（115V60hz）
EVA OUT（115V60hz）
40
20
0
-20
-40
-60
-80
-100
0
1
2
3
4
5
6
7


AT30℃ Pull-down Temperture （220V50Hz）
Temperture[℃]
Time[hour]
1/2H（220V50Hz）
EVA IN（220V50Hz）
EVA OUT（220V50Hz）
40
20
0
-20
-40
-60
-80
-100
0
1
2
3
4
5
6
7

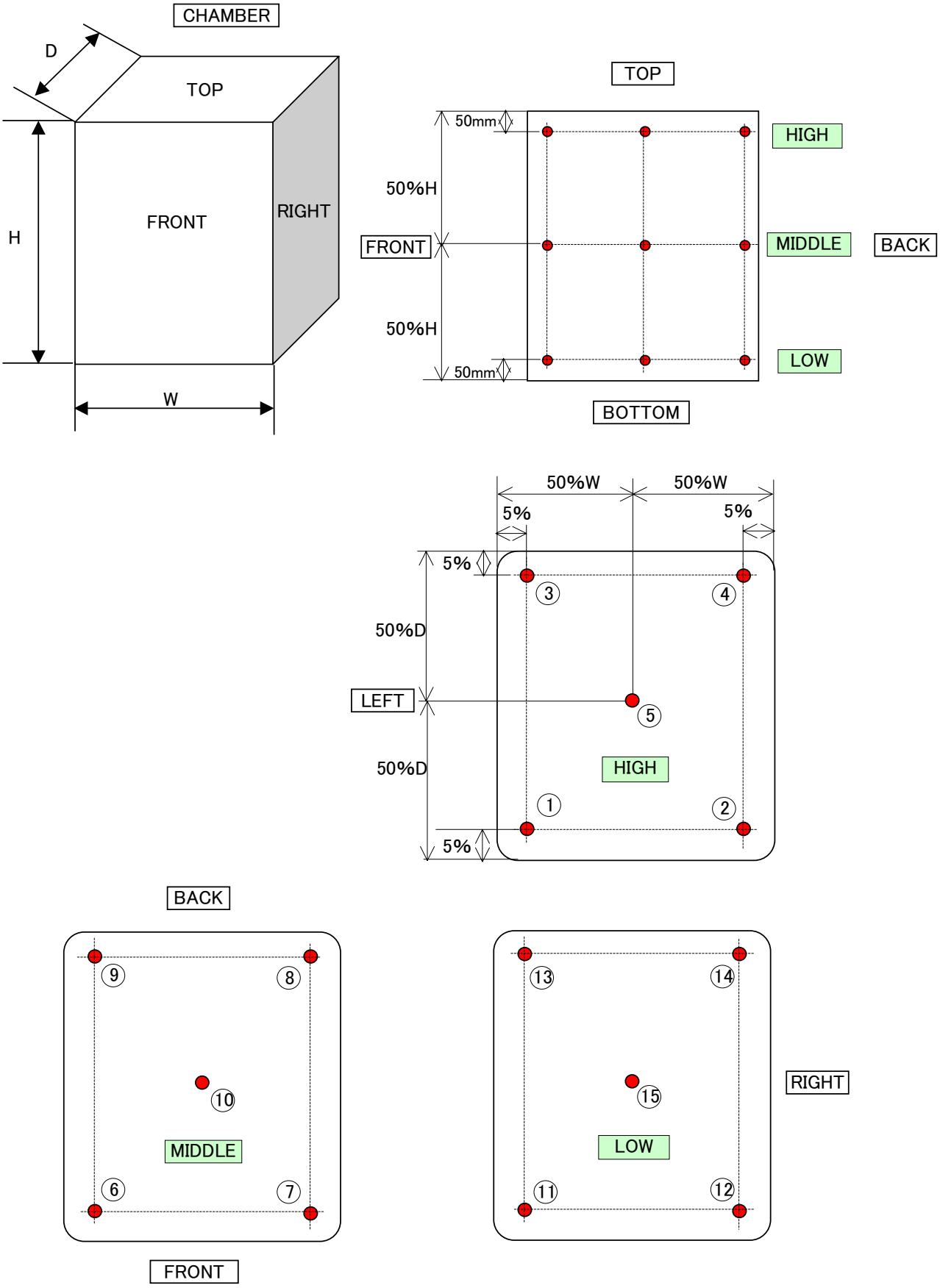

AT35℃ Pull-down Pressure （115V60Hz）
Pressure[MPa]
Time[hour]
Pd （115V60Hz）
Ps （115V60Hz）
0
0.5
1
1.5
2
2.5
3
3.5
0
1
2
3
4
5
6
7


AT35℃ Pull-down Pressure （230V50Hz、220V60Hz）
Pressure[MPa]
Time[hour]
Pd （230V50Hz）
Pd （220V60Hz）
Ps （230V50Hz）
Ps （220V60Hz）
0
0.5
1
1.5
2
2.5
3
3.5
0
1
2
3
4
5
6
7


AT35℃ Pull-down Current-Input （115V60Hz）
Input[W]
Current[A]
Time[hour]
Input （115V60Hz）
Current （115V60Hz）


AT35℃ Pull-down Current-Input（230V50Hz、220V60Hz）
Input[W]
Current[A]
Time[hour]
Input （230V50Hz）
Input （220V60Hz）
Current （230V50Hz）
Current （220V60Hz）

MDF-C8V1 Temperature Uniformity - 15points measured (Reference Data)



＜Conditions＞
Ambient temperature: 20/30℃ Note:This data does not represent a guarantee of product performance.
Load: Unloaded

＜Distribution data＞
Temperature of the cycle in each area (SV=-80℃、air temperature)

Unit:℃

	Ambient temperature 20℃							
	50Hz				60Hz			
	Maximum	Minimum	Middle of cycle	Differential	Maximum	Minimum	Middle of cycle	Differential
①	-78.8	-84.7	-82.0	±3.0	-78.8	-84.7	-82.0	±3.0
②	-79.5	-84.8	-82.2	±2.7	-79.5	-84.8	-82.2	±2.7
③	-78.0	-84.9	-81.5	±3.5	-78.0	-84.9	-81.5	±3.5
④	-79.7	-84.5	-82.1	±2.4	-79.7	-84.5	-82.1	±2.4
⑤	-78.1	-81.4	-79.8	±1.7	-78.1	-81.4	-79.8	±1.7
⑥	-80.4	-83.4	-81.9	±1.5	-80.4	-83.4	-81.9	±1.5
⑦	-80.4	-83.3	-81.9	±1.5	-80.4	-83.3	-81.9	±1.5
⑧	-80.1	-83.2	-81.7	±1.6	-80.1	-83.2	-81.7	±1.6
⑨	-79.8	-82.9	-81.4	±1.6	-79.8	-82.9	-81.4	±1.6
⑩	-78.8	-81.3	-80.1	±1.3	-78.8	-81.3	-80.1	±1.3
⑪	-79.8	-82.8	-81.3	±1.5	-79.8	-82.8	-81.3	±1.5
⑫	-79.6	-82.5	-81.1	±1.5	-79.6	-82.5	-81.1	±1.5
⑬	-78.8	-81.1	-80.0	±1.2	-78.8	-81.1	-80.0	±1.2
⑭	-79.4	-82.0	-80.7	±1.3	-79.4	-82.0	-80.7	±1.3
⑮	-78.8	-81.1	-80.0	±1.2	-78.8	-81.1	-80.0	±1.2
Average	-	-	-81.1	-	-	-	-81.1	-

Unit:℃

	Ambient temperature 30℃							
	50Hz				60Hz			
	Maximum	Minimum	Middle of cycle	Differential	Maximum	Minimum	Middle of cycle	Differential
①	-78.5	-84.4	-82.1	±3.0	-79.2	-84.9	-82.4	±2.9
②	-79.1	-84.5	-81.8	±2.7	-79.8	-85.0	-82.4	±2.6
③	-78.1	-84.6	-81.4	±3.3	-78.6	-85.1	-81.9	±3.3
④	-79.3	-84.4	-81.9	±2.6	-80.0	-84.7	-82.4	±2.4
⑤	-77.7	-81.3	-79.5	±1.8	-78.4	-81.6	-80.0	±1.6
⑥	-79.7	-83.4	-81.6	±1.9	-80.5	-83.7	-82.1	±1.6
⑦	-79.7	-83.3	-81.5	±1.8	-80.6	-83.6	-82.1	±1.5
⑧	-79.5	-83.2	-81.4	±1.9	-80.3	-83.5	-81.9	±1.6
⑨	-79.3	-82.9	-81.1	±1.8	-80.1	-83.2	-81.7	±1.6
⑩	-78.3	-81.2	-79.8	±1.5	-79.0	-81.5	-80.3	±1.3
⑪	-79.3	-82.7	-81.0	±1.7	-80.2	-83.1	-81.7	±1.5
⑫	-79.2	-82.5	-80.9	±1.7	-80.0	-82.9	-81.5	±1.5
⑬	-78.1	-81.1	-79.6	±1.5	-78.9	-81.4	-80.2	±1.3
⑭	-79.0	-81.9	-80.5	±1.5	-79.7	-82.3	-81.0	±1.3
⑮	-78.2	-80.9	-79.6	±1.4	-78.9	-81.3	-80.1	±1.2
Average	-	-	-80.9	-	-	-	-81.4	-

＜Amount of power consumption＞
Amount of power consumption when driving at cycle
(SV=-80℃)

Unit：kWh/day

	Ambient temperature 20℃		Ambient temperature 30℃	
	50Hz	60Hz	50Hz	60Hz
115V	-	4.07	-	4.89
220V	-	4.27	-	5.11
230V	4.21	-	5.04	-

Note:This data does not represent a guarantee of product performance.

＜Conditions＞
Ambient temperature: 20/30℃ Note:This data does not represent a guarantee of product performance.
Load: Unloaded

＜Distribution data＞
Temperature of the cycle in each area (SV=-70℃、air temperature)

Unit:℃

	Ambient temperature 20℃							
	50Hz				60Hz			
	Maximum	Minimum	Middle of cycle	Differential	Maximum	Minimum	Middle of cycle	Differential
①	-67.6	-75.4	-71.6	±3.9	-67.2	-75.6	-71.4	±4.2
②	-68.8	-75.5	-72.2	±3.4	-68.4	-75.8	-72.1	±3.7
③	-66.6	-75.5	-71.1	±4.5	-66.0	-75.7	-70.9	±4.9
④	-69.0	-75.3	-72.2	±3.2	-68.7	-75.6	-72.2	±3.5
⑤	-67.6	-72.1	-69.9	±2.3	-67.3	-72.4	-69.9	±2.6
⑥	-70.6	-74.1	-72.4	±1.8	-70.6	-74.3	-72.5	±1.9
⑦	-70.7	-74.0	-72.4	±1.7	-70.7	-74.2	-72.5	±1.8
⑧	-70.4	-73.9	-72.2	±1.8	-70.4	-74.1	-72.3	±1.8
⑨	-70.2	-73.6	-71.9	±1.7	-70.3	-73.8	-72.1	±1.8
⑩	-69.1	-72.1	-70.6	±1.5	-69.2	-72.3	-70.8	±1.6
⑪	-70.3	-73.4	-71.9	±1.6	-70.4	-73.6	-72.0	±1.6
⑫	-70.1	-73.2	-71.7	±1.6	-70.2	-73.3	-71.8	±1.6
⑬	-69.2	-71.9	-70.6	±1.4	-69.3	-72.1	-70.7	±1.4
⑭	-69.8	-72.6	-71.2	±1.4	-69.9	-72.9	-71.4	±1.5
⑮	-69.2	-71.9	-70.6	±1.4	-69.3	-72.0	-70.7	±1.4
Average	-	-	-71.5	-	-	-	-71.5	-

Unit:℃

	Ambient temperature 30℃							
	50Hz				60Hz			
	Maximum	Minimum	Middle of cycle	Differential	Maximum	Minimum	Middle of cycle	Differential
①	-68.5	-75.6	-72.2	±3.6	-68.2	-76.0	-72.3	±3.9
②	-69.4	-75.8	-72.6	±3.2	-69.2	-76.2	-72.7	±3.5
③	-67.7	-75.8	-71.8	±4.1	-67.1	-76.2	-71.7	±4.6
④	-69.6	-75.6	-72.6	±3.0	-69.4	-75.9	-72.7	±3.3
⑤	-68.0	-72.4	-70.2	±2.2	-68.1	-72.8	-70.5	±2.4
⑥	-70.6	-74.5	-72.6	±2.0	-70.9	-74.9	-72.9	±2.0
⑦	-70.7	-74.4	-72.6	±1.9	-71.0	-74.8	-72.9	±1.9
⑧	-70.3	-74.3	-72.3	±2.0	-70.6	-74.7	-72.7	±2.1
⑨	-70.2	-74.0	-72.1	±1.9	-70.6	-74.4	-72.5	±1.9
⑩	-69.1	-72.4	-70.8	±1.7	-69.5	-72.7	-71.1	±1.6
⑪	-70.3	-73.9	-72.1	±1.8	-70.7	-74.3	-72.5	±1.8
⑫	-70.1	-73.6	-71.9	±1.8	-70.6	-73.9	-72.3	±1.7
⑬	-69.1	-72.4	-70.8	±1.7	-69.5	-72.6	-71.1	±1.6
⑭	-69.8	-73.1	-71.5	±1.7	-70.2	-73.4	-71.8	±1.6
⑮	-70.6	-72.1	-69.1	±0.8	-69.5	-72.6	-71.1	±1.6
Average	-	-	-71.7	-	-	-	-72.0	-

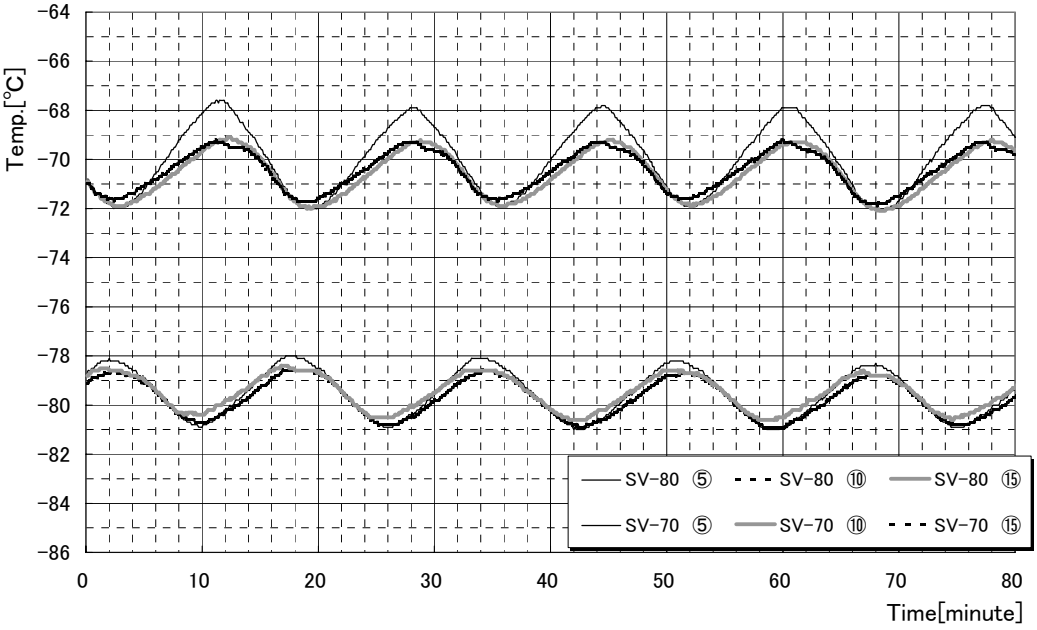
＜Amount of power consumption＞
Amount of power consumption when driving at cycle (SV=-70℃)

Unit：kWh/day

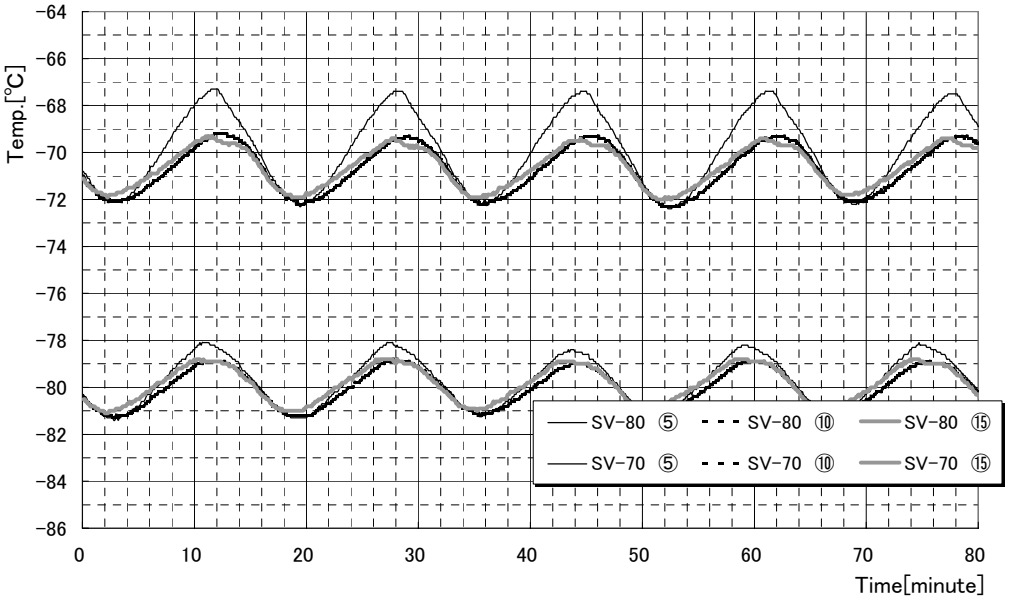
	Ambient temperature 20℃		Ambient temperature 30℃	
	50Hz	60Hz	50Hz	60Hz
115V	-	4.06	-	4.26
220V	-	3.82	-	4.30
230V	3.89	-	4.17	-

Note:This data does not represent a guarantee of product performance.

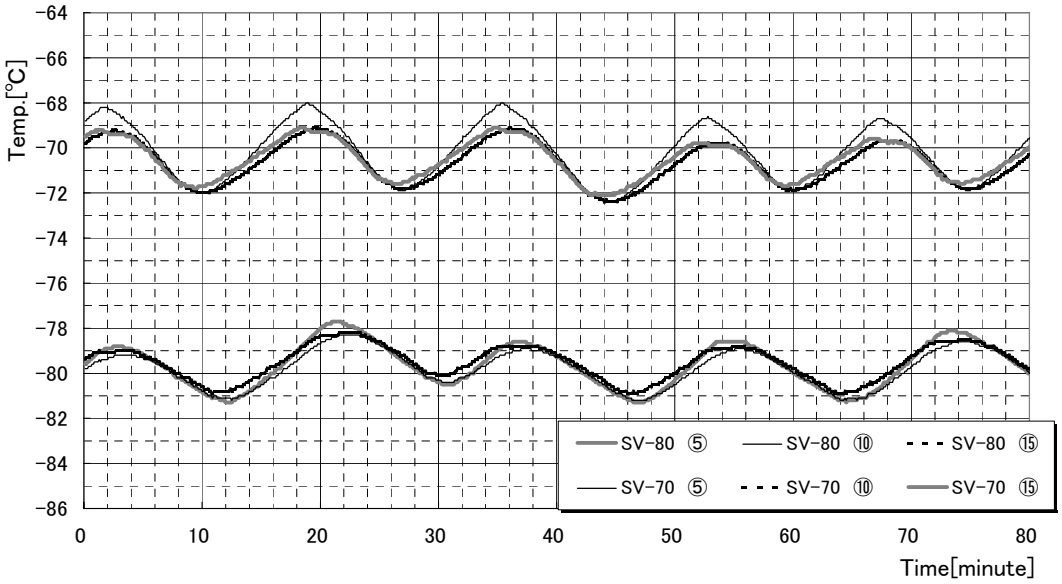
Condition: AT20℃ 50Hz



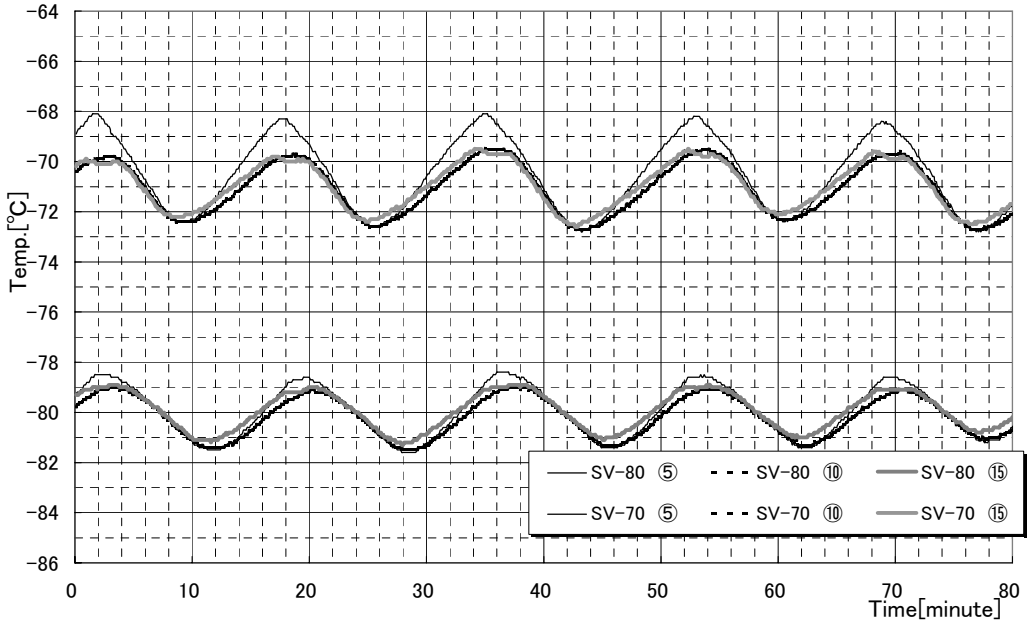
Condition: AT20℃ 60Hz



Condition: AT30℃ 50Hz



Condition: AT30℃ 60Hz



Notice

■ CORRECTION	☐ PRODUCTION CHANGE	FILE NO.
☐ SERVICE	☐ ADD INFORMATION	
☐	☐ FOR RoHs	

Please add this notice to the Manuals listed below.

Category : FREEZER Date : 17 February 2009

Model : MDF-C8V1 Effective from :

Destination : ALL REF : No. SM9910171 Issue Number : 1

Description of 'Function mode' in the chapter, Control specifications is misprinted. Correction is done as follow.

Control specifications

P.17 'Function mode'

<Old>
Model code '003': MDF-C8V1

⇩

<New>
Model code '001': MDF-C8V1

RoHS
This product does not contain any hazardous substances prohibited by the RoHS Directive.
(You will find 'RSF' mark near the rating plate on the RoHS compliant product.)

⚠ WARNING
* You are requested to use RoHS compliant parts for maintenance or repair.
* You are requested to use lead-free solder.

Product Code: 823-012-51/53/54/55/56

REFERENCE NO. **SM9910171-01**

A95100 printed in Japan

Notice

■ CORRECTION
□ SERVICE
□

□ PRODUCTION CHANGE
□ ADD INFORMATION
□ FOR RoHs

FILE NO.

Please add this notice to the Manuals listed below.

Category : ULTRA-LOW TEMP. FREEZER Date : 12 Nov. 2009

Model : MDF-C8V1 Effective from :

Destination : ALL REF : No. SM9910171 Issue Number : 1

1) Descriptions of the chapter, Cooling unit parts, in page 5 are partially wrong.
Correct descriptions are follow.

Cooling unit parts

Compressor	Specifications
115V, 60Hz	Type:C-1RN40L1A Compressor code:802-012-11
220V, 60Hz	Type:C-1RN40L6A Compressor code:802-012-16
220~240V, 50Hz	Type:C-1RN40L5A Compressor code:802-012-15
Refrigerant oil	Ze-NIUSL22SA Charged q'ty:230cc
Refrigerant	MU-N48(EU)/(DOT) Charged q'ty:395+/-8g

2) Decription of the chapter, Electric Parts, in page 8 are partially wrong.
Correct descriptions are follow.

Electric Parts

		AC115V, 60Hz	AC220V, 60Hz	AC220~240V,50Hz
Compressor	Type	C-1RN40L1A	C-1RN40L6A	C-1RN40L5A

RoHS
This product does not contain any hazardous substances prohibited by the RoHS Directive.
(You will find 'RSF' mark near the rating plate on the RoHS compliant product.)

⚠ WARNING
* You are requested to use RoHS compliant parts for maintenance or repair.
* You are requested to use lead-free solder.

Product Code: 823-012-51/52/53/54/56

A95100 printed in Japan

REFERENCE NO. SM9910171-02

Notice

☐ CORRECTION
☐ SERVICE
◉ PRODUCT IMPROVEMET
☐ PRODUCTION CHANGE
☐ ADD INFORMATION

FILE NO.

Please add the following NOTICE to the Manuals listed below.

Category: **ULTRA-LOW TEMP. FREEZER** Date: **Feb.20, 2013**

Model: **MDF-C8V1** Destination: **ALL**

Ref No: **SM9910171** Issued No. **M-13-003-E188**

NOTICE

Please charge regulated amount of n-Pentane before charging mixing refrigerant (refer to below list)

Model	Type of mix gas	Parts No.	Cylinder	Required n-Pentane to be charged
MDF-192	MU-N519	624 219 8659	J	28g
MDF-U281/U2086S	MU-N528	624 224 7838	J	43g
MDF-2136	MU-N621	624 224 7807	J	—
MDF-1155	MU-N711	624 223 2643	J	—
MDF-1156AT	MU-N711A	624 224 7869	J	—
MDF-C2156VAN	MU-N721	624 227 4056	J	9g
MDF-C8V	MU-N48	624 224 7890	J	—
MDF-C8V1/193	MU-N49	624 231 8408	J	—
MDF-U500VX	MU-N500	624 234 4711	J	25g
MDF-U700VX	MU-N701	624 234 6302	J	25g
MDF-192	MU-N519	624 224 7760	DOT	28g
MDF-U281/U2086S	MU-N528	624 224 7845	DOT	43g
MDF-2136	MU-N621	624 224 7814	DOT	—
MDF-1155	MU-N711	624 224 7784	DOT	—
MDF-1156AT	MU-N711A	624 224 7876	DOT	—
MDF-C2156VAN	MU-N721	624 227 4063	DOT	9g
MDF-C8V	MU-N48	624 224 7906	DOT	—
MDF-C8V1/193	MU-N49	624 231 8415	DOT	—
MDF-U500VX	MU-N500	624 234 4698	DOT	25g
MDF-U700VX	MU-N701	624 234 6289	DOT	25g

Note) For the model that is mentioned "—" in above list, no need to charge n-Pentane.

Notice

☑ CORRECTION ☐ PRODUCTION CHANGE
☐ SERVICE ☐ ADD INFORMATION
☐ PRODUCT IMPROVEMET ☐ FOR RoHs

FILE NO.

Please add the following NOTICE to the original manual, SM9910171.

Category: **ULTRA-LOW TEMP. FREEZER** Date: **Jun.8, 2015**

Model: **MDF-C8V1** Destination: **ALL**

Ref No: **SM9910171** Issued No. **E230**

NOTICE

This is the correction for the incorrect descriptions about "Reset of accumulation time" of fan motor in the page15 and 19 of Service Manual, SM9910171.

P.15 Fan motor lifespan check:
<Reset of accumulation time>
Step into F06. Input '**419**' and press SET key to reset non-volatile memory to '00.0'. The display reverts to chamber temperature only.

P.19 F32
<Reset>
Step into F06. Input '**419**' and press SET key to reset non-volatile memory to '00.0'. The display reverts to chamber temperature only.

Corrected as follow

P.15 Fan motor lifespan check:
<Reset of accumulation time>
Step into F06. Input '**410**' and press SET key to reset non-volatile memory to '00.0'. The display reverts to chamber temperature only.

P.19 F32
<Reset>
Step into F06. Input '**410**' and press SET key to reset non-volatile memory to '00.0'. The display reverts to chamber temperature only.

REFERENCE NO. **SM9910171-05**

Notice

☒ CORRECTION ☐ PRODUCTION CHANGE
☐ SERVICE ☐ ADD INFORMATION
☐ PRODUCT IMPROVEMET ☐ FOR RoHS

FILE NO.

Please add the following NOTICE to the Manuals listed below.

Category: **Ultra Low Temperature Freezer** Date: **Jan. 6, 2016**

Model: **MDF-C8V1**

Ref No: **SM9910171** Issued No. **E299**

NOTICE

This is the correction for the incorrect descriptions about "Refrigerant" in the page 5 and "Model number" in the page 5 and 6 of Service Manual, SM9910171.

P.5 Cooling unit parts

<MDF-C8V>

Item	Specifications
Refrigerant	HFC mixed refrigerant: MU-N48(EU)/(DOT) Charged q'ty: 395+/-8g

Corrected as follow

<MDF-C8V1>

Item	Specifications
Refrigerant	HFC mixed refrigerant: **MU-N49**(EU)/(DOT) Charged q'ty: **390g**

P.6 Cooling circuits

REFRIGIATION CIRCUIT
PRINCIPLE DIAGRAM
(MDF-C8V)

Corrected as follow

REFRIGERATION CIRCUIT
PRINCIPLE DIAGRAM
(MDF-C8V1)

REFERENCE NO. **SM9910171-06**

Notice

☐ CORRECTION ◉ PRODUCTION CHANGE
☐ SERVICE ☐ ADD INFORMATION
☐ PRODUCT IMPROVEMET ☐ FOR RoHS

FILE NO.

Please add the following NOTICE to the Manuals listed below.

Category: **Ultra Low Temperature Freezer** Date: **Jan. 7, 2016**

Model: **MDF-C8V1**

Ref No: **SM9910171** Issued No. **E301**

NOTICE

Because of parts discontinuance, below parts have been changed of Service Manual

1. Effective Models and Production

MDF-C8V1-PK, PR S/N: 15100227~

2. Change Description

Contents

	OLD	NEW
Upon unit repair:	- You should use 'MU-N49' for servicing.	- You shoud use 'MU-N49 or MU-N48' for servicing.

P.1 The descriptions about "Structural specifications" is changed as follow;
P.72 The descriptions about "SPECIFICATIONS" is changed as follow;

Item	Specifications	OLD	NEW
Compressor		Hermetic rotary type, 400W	Hermetic rotary type, 400W / 450W (220V, 60Hz)

P.3 The descriptions about "Performance specifications" is changed as follow;
P.73 The descriptions about "PERFORMANCE" is changed as follow;

Item	Specifications	OLD	NEW
Rated Power consumption	220V, 60Hz	350W	360W

P.5 The descriptions about "Cooling unit parts" is changed as follow;

Item	Specifications	OLD	NEW
Compressor	<For 220V, 60Hz>		
	Type	C-1RN40L6A	C-1RN45L6A
	Compressor cord	802 012 16	802 021 162
Refrigerant	Type	MU-N49	MU-N49
			MU-N48 (only for 220V, 60Hz)
	Charged q'ty	390g	390g
			375g (only for 220V, 60Hz)

P.8 The descriptions about "Electric Parts" is changed as follow;

MDF-C8V1	AC 220V, 60Hz	OLD	NEW
Compressor	Type	C-1RN40L6A	C-1RN45L6A
	Compressor code	802 012 16	802 021 162
	Winding resistance C-R(Main)	5.34Ω(25℃)	4.77Ω(25℃)
	C-S(Aux)	8.88Ω(25℃)	8.36Ω(25℃)
Running capacitor	Rating	10 μF 400VAC	12 μF 370VAC

REFERENCE NO. **SM9910171-07**

Notice

☐ CORRECTION ◉ PRODUCTION CHANGE
☐ SERVICE ☐ ADD INFORMATION
☐ PRODUCT IMPROVEMENT ☐ FOR RoHS

FILE NO.

Please add the following NOTICE to the Service Manuals listed below.

Category: **Ultra Low Temperature Freezer** Date: **May 30, 2016**

Model: **MDF-C8V1**

Ref No: **SM9910171** Issued No. **E323**

NOTICE

Because of parts discontinuance, below parts have been changed.

1. Effective Units

MDF-C8V1-Px S/N: 16020036~

2. Change Description

Changed power switch from Panasonic to ETA.
The new power switch (ETA) as service part is compatible with the old one (Panasonic).

	OLD	NEW
Parts Name	Power switch	Power switch
Manufacturer	Panasonic	ETA
Parts Code	624 215 4235	624 236 3682
		

P.8 The descriptions about "Electric Parts" is changed as follow;

		AC115V, 60Hz	AC220V, 60Hz	AC220/230/240V, 50Hz
Breaker switch	Type	BAM215131	BAM215131	BAM215131
	Rating	250V, 15A	250V, 15A	250V, 15A

⇩

		AC115V, 60Hz	AC220V, 60Hz	AC220/230/240V, 50Hz
Breaker switch	Type	**3120-F521-P7T1-W04J-15A**	**3120-F521-P7T1-W04J-15A**	**3120-F521-P7T1-W04J-15A**
	Rating	**AC240V, 15A**	**AC240V, 15A**	**AC240V, 15A**

REFERENCE NO. **SM9910171-08**

Notice

☐ CORRECTION ◉ PRODUCTION CHANGE
☐ SERVICE ☐ ADD INFORMATION
☐ PRODUCT IMPROVEMENT ☐ FOR RoHS

FILE NO.

Please add the following NOTICE to the Service Manuals listed below.

Category: **Ultra Low Temperature Freezer** Date: **Jan. 31, 2017**

Model: **MDF-C8V1**

Ref No: **SM9910171** Issued No. **E418**

NOTICE

Because of parts discontinuance, below parts have been changed.

1. Effective Models and Production

MDF-C8V1-xx S/N: 16100284~

* where 'xx' denotes all model variants, except PC model.

2. Change description

(1) Change cooling circuit from SANYO compressor to HITACHI compressor.

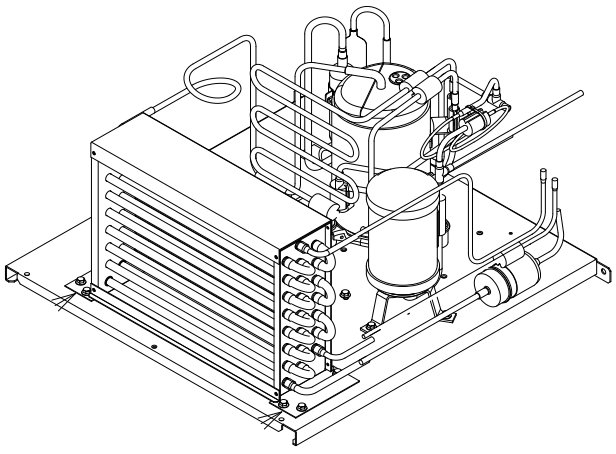
Important : (1) This change is NOT compatible with unit before change, because unit base is different between SANYO comp. and HITACHI comp. SANYO comp. is used for current parts list. HITACHI comp. is used for new parts list, will be issued.

(2) Model code of function code F17 in service mode should be set by specified compressor.

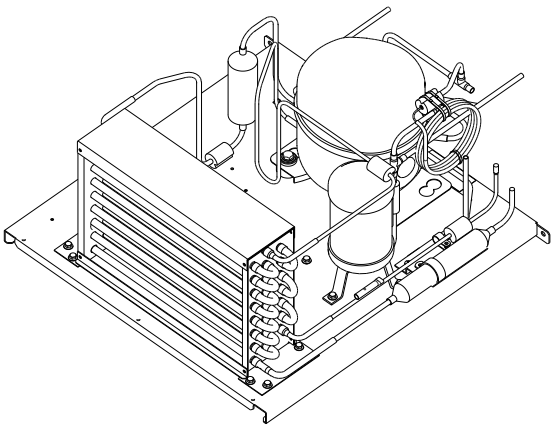
Table Function code F17

Model code	Compressor	Destination
001	SANYO	All model, except PC
003	SANYO	PC model
005	HITACHI	All model, except PC
007	HITACHI	PC model

(Note : Product of Model code 007 is still not exist in the market, as of issue date.)



(a) SANYO comp.



(b) HITACHI comp.

Fig. Image of part of cooling circuit

(2) Service manual

P. 5 The "Cooling unit parts" is added the contents to the sheet "Page 2 of 27".
P. 6 The "Cooling circuits" is added the contents to the sheet "Page 3 of 27".
P. 8 The "Electrical Parts" is added the contents to the sheet "Page 4 of 27".
P. 10 The "Wiring Diagram" is added the contents to the sheet "Page 5 of 27".
P. 25 The "Test data" is added the contents to the sheet "Page 6 of 27".

REFERENCE NO. **SM9910171-09**

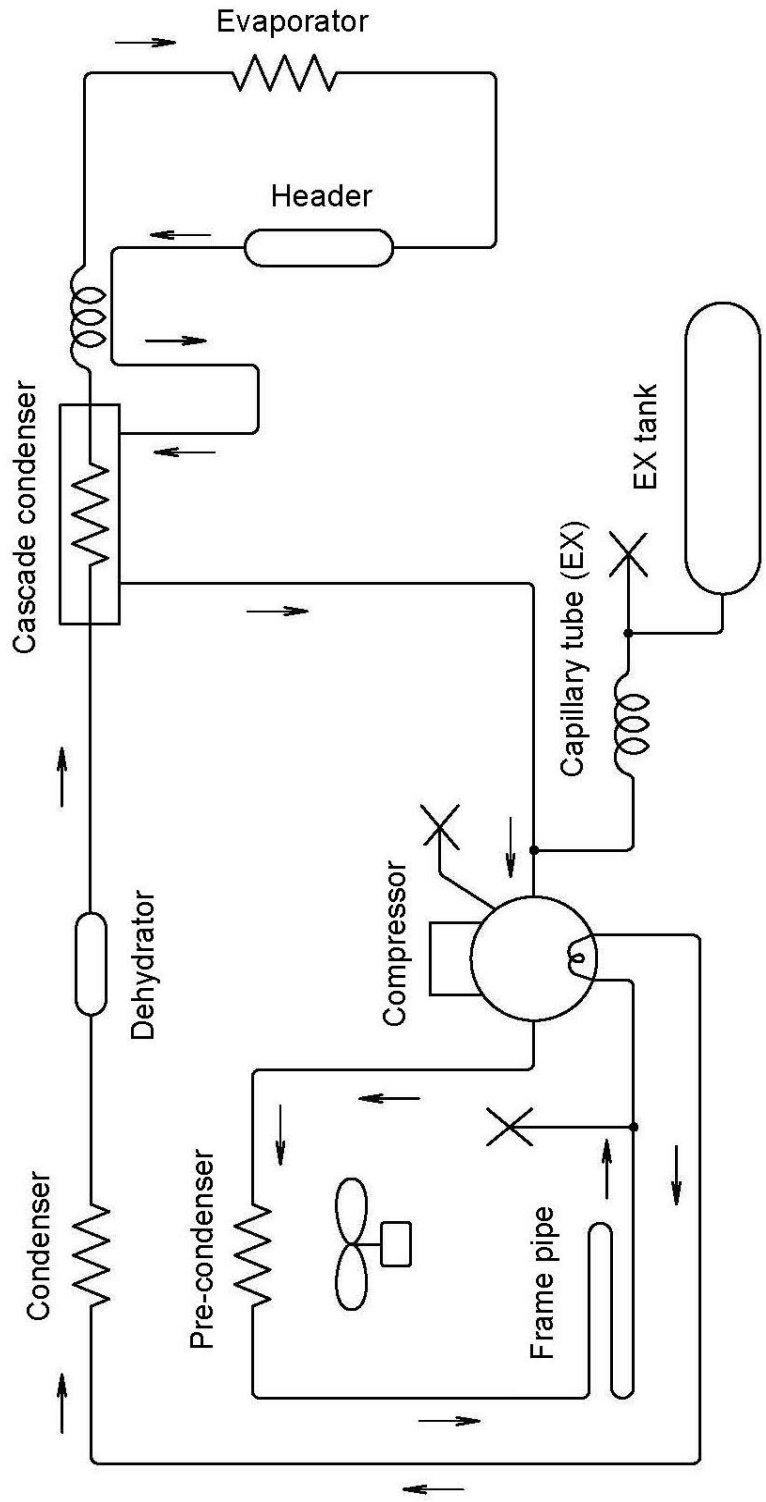
Cooling unit parts

<MDF-C8V1> for HITACHI compressor

Item	Specifications	
Compressor		
110/115V, 60Hz	Type: RL4588-P1 Compressor code: 7FB-0-M101-020-02	
220V, 60Hz	Type: RL4588-R1 Compressor code: 7FB-0-M101-020-04	
220/230/240V, 50Hz	Type: RL4588-S1 Compressor code: 7FB-0-M101-020-03	
Refrigerant oil	Ze-NIUSL22SA Charged q'ty: 280cc	
Cooling system	Forced air cooling	
Condenser		
Type	Finless tube	Cascade condenser
Condenser	8 columns x 2 lines	Coil pipe W200 mm x 12 columns
Pre-condenser	7 columns x 1 line P290 mm	——
Frame pipe	ϕ4.76 x T0.7 mm	——
Evaporator Type	ϕ7.94 x T0.7 mm Tube on sheet (also used as interior)	
Capillary tube		
Resistance (PSI kg/cm^2)	6 kg/cm^2	
Length (mm)	2000	
Outer diameter (mm)	ϕ1.8	
Refrigerant	HFC mixed refrigerant: MU-N49A(DOT) Charged q'ty : 315 g	
Oil additive	n-Pentane Charged-q'ty : 10 g	
Dryer	4A-XH-6 Charged q'ty : 58 g	
Condensing fan	ϕ196 mm, 4 blades Material: ABS	
Condensing fan motor	(110/115V, 60Hz) SE4-D041N1P Output: 4W	
	(220/230/240V, 50Hz) SE4-D041N5P Output: 4W	

Cooling circuits

Refrigeration circuit principle diagram (for HITACHI comp.)

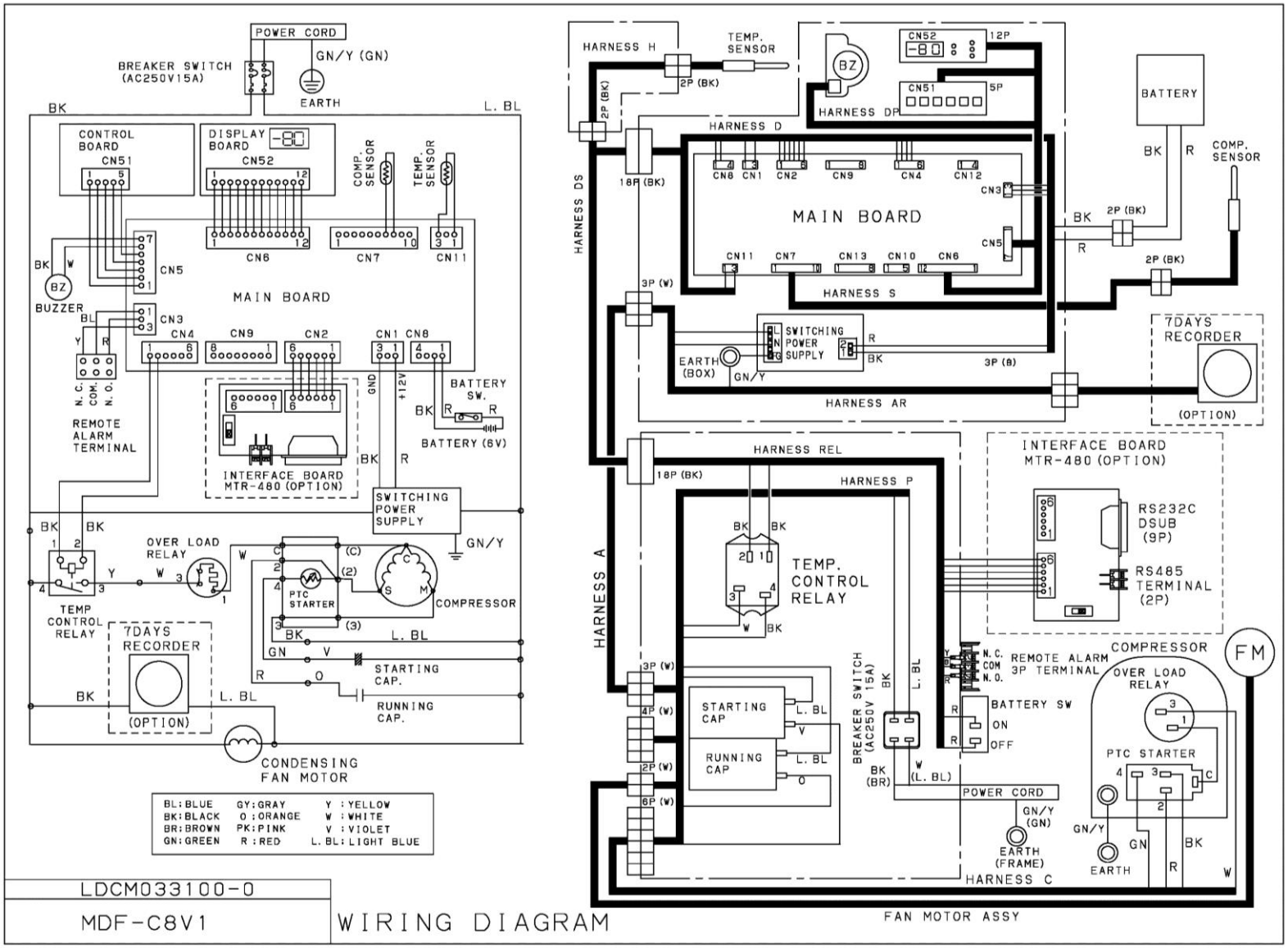


Electrical Parts

For HITACHI compressor

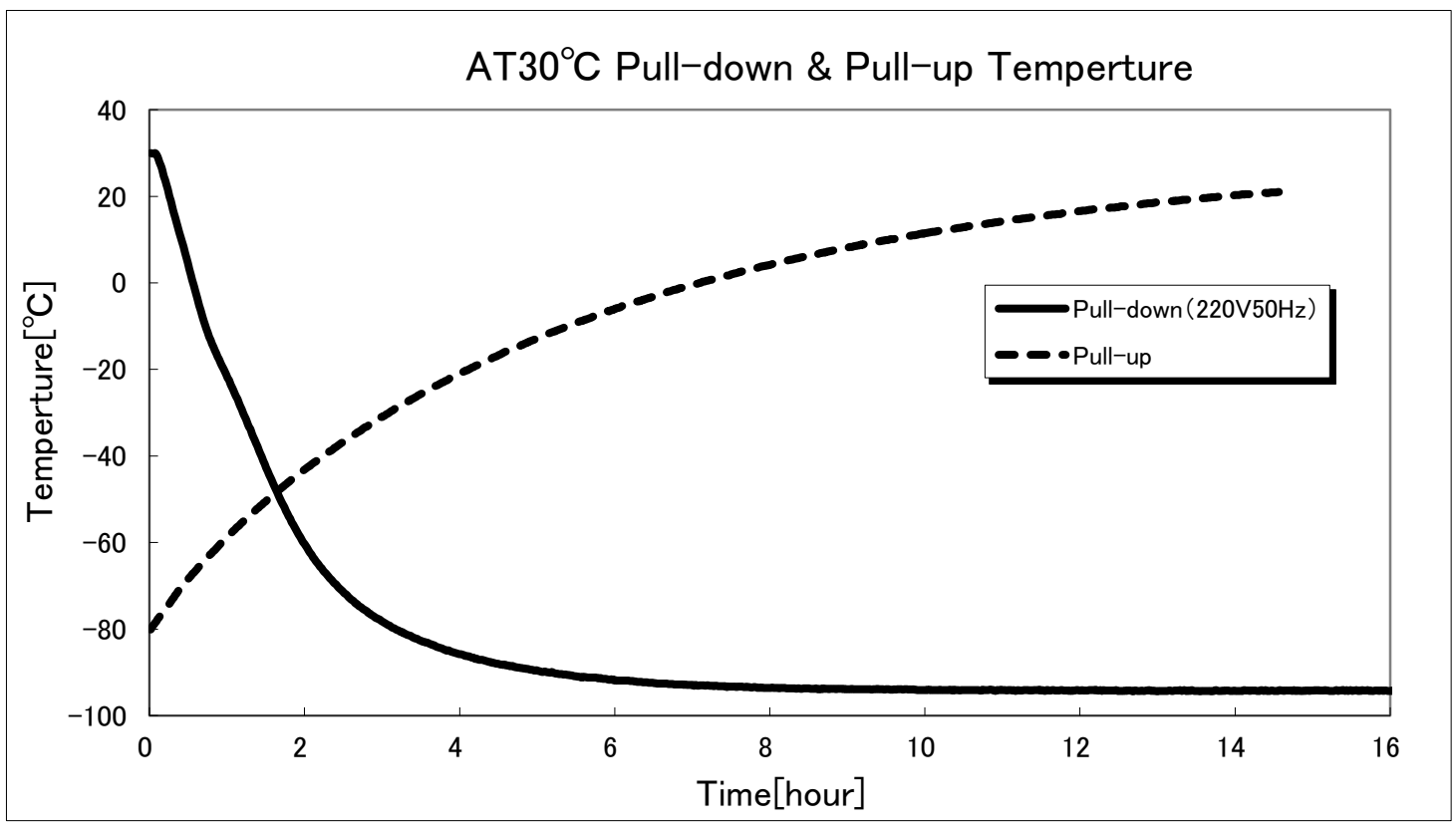
		AC110/115V, 60Hz	AC220V, 60Hz	AC220/230/240V, 50Hz
Compressor	Type	RL4588-P1	RL4588-R1	RL4588-S1
	Compressor code	7FB-0-M101-020-02	7FB-0-M101-020-04	7FB-0-M101-020-03
	Rated voltage (50/60Hz)	ϕ1, 110~115V, 60Hz	ϕ1, 220V, 60Hz	ϕ1, 220~240V, 50Hz
	Winding resistance C-R(Main)	0.89Ω(25℃)	3.52Ω(25℃)	5.23Ω(25℃)
	C-S(Aux)	4.19Ω(25℃)	10.90Ω(25℃)	9.56Ω(25℃)
Starting relay	Type	P6R0SAT	PGR0SAT	PGR0SAT
Starting capacitor	Rating	100μF, 160VAC	60μF, 300VAC	60μF, 300VAC
Running capacitor	Rating	35μF, 260VAC	6μF, 400VAC	6μF, 400VAC
Condensing fan motor	Type	SE4-D041N1P	SE4-D041N5P	SE4-D041N5P
	Rating	110~115V, 4W	220~240V, 4W	220~240V, 4W

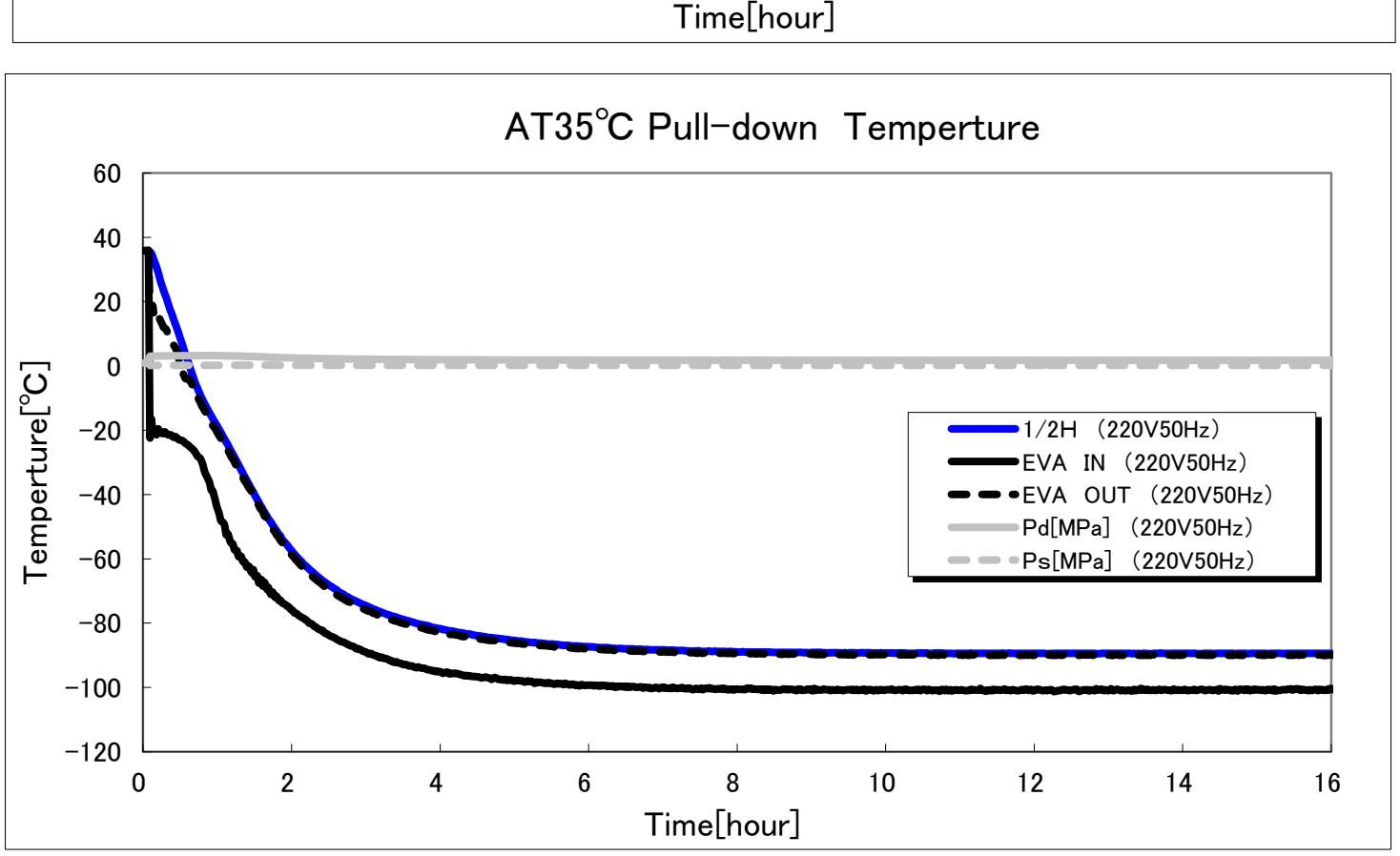
Wiring diagram

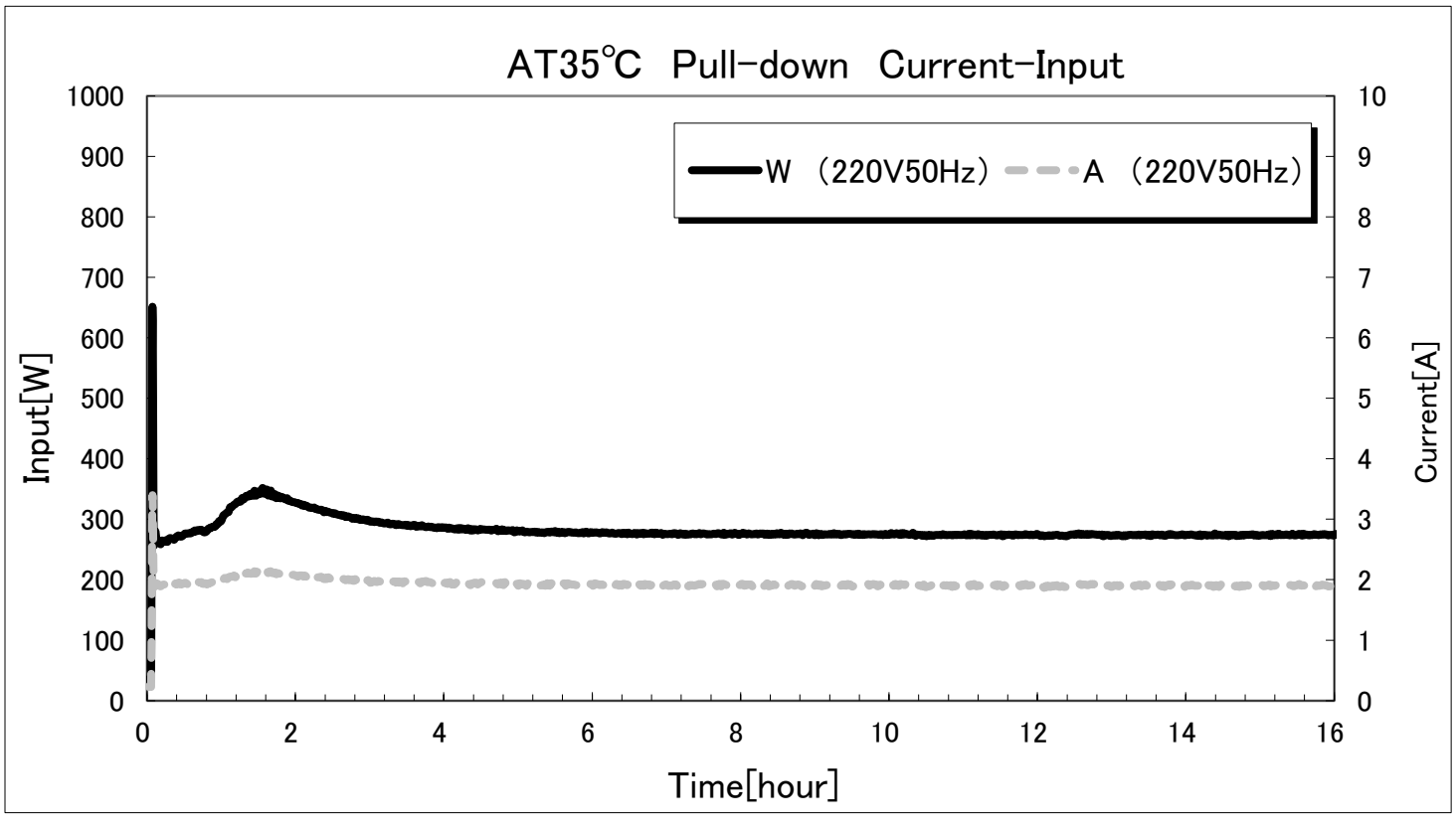


LDCM033100-0	
MDF-C8V1	WIRING DIAGRAM

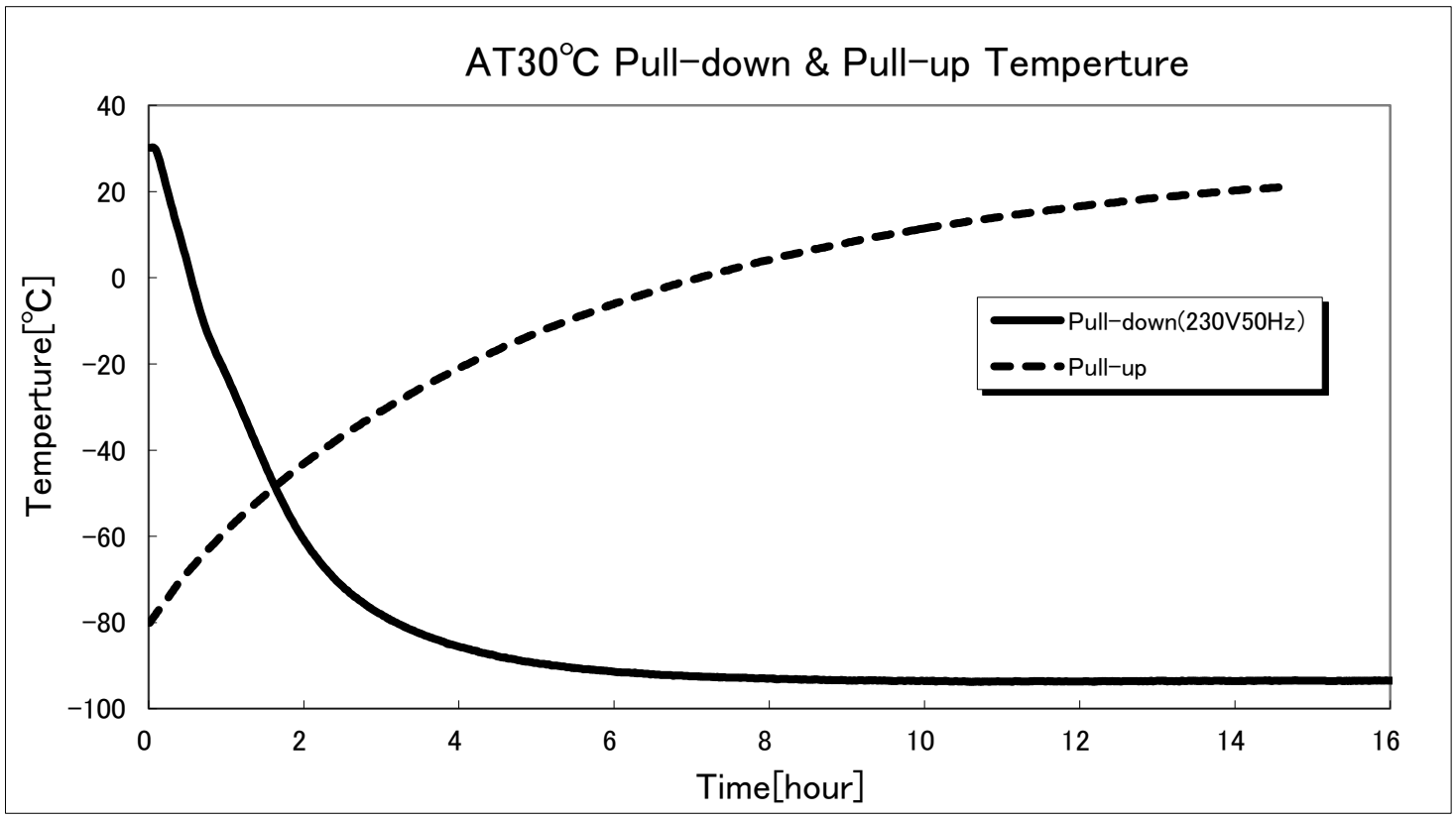
MDF-C8V1 （1φ220V50Hz）

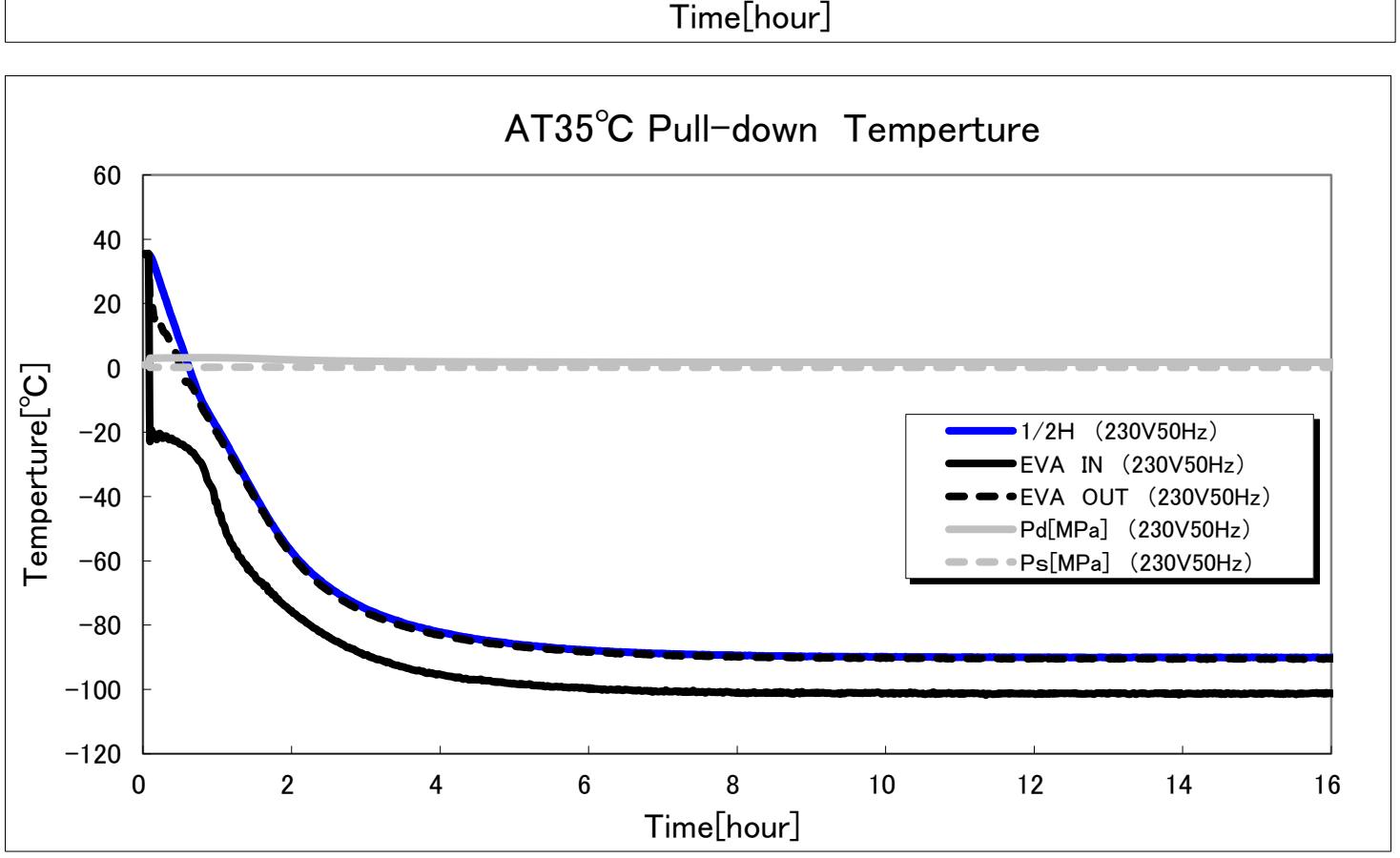


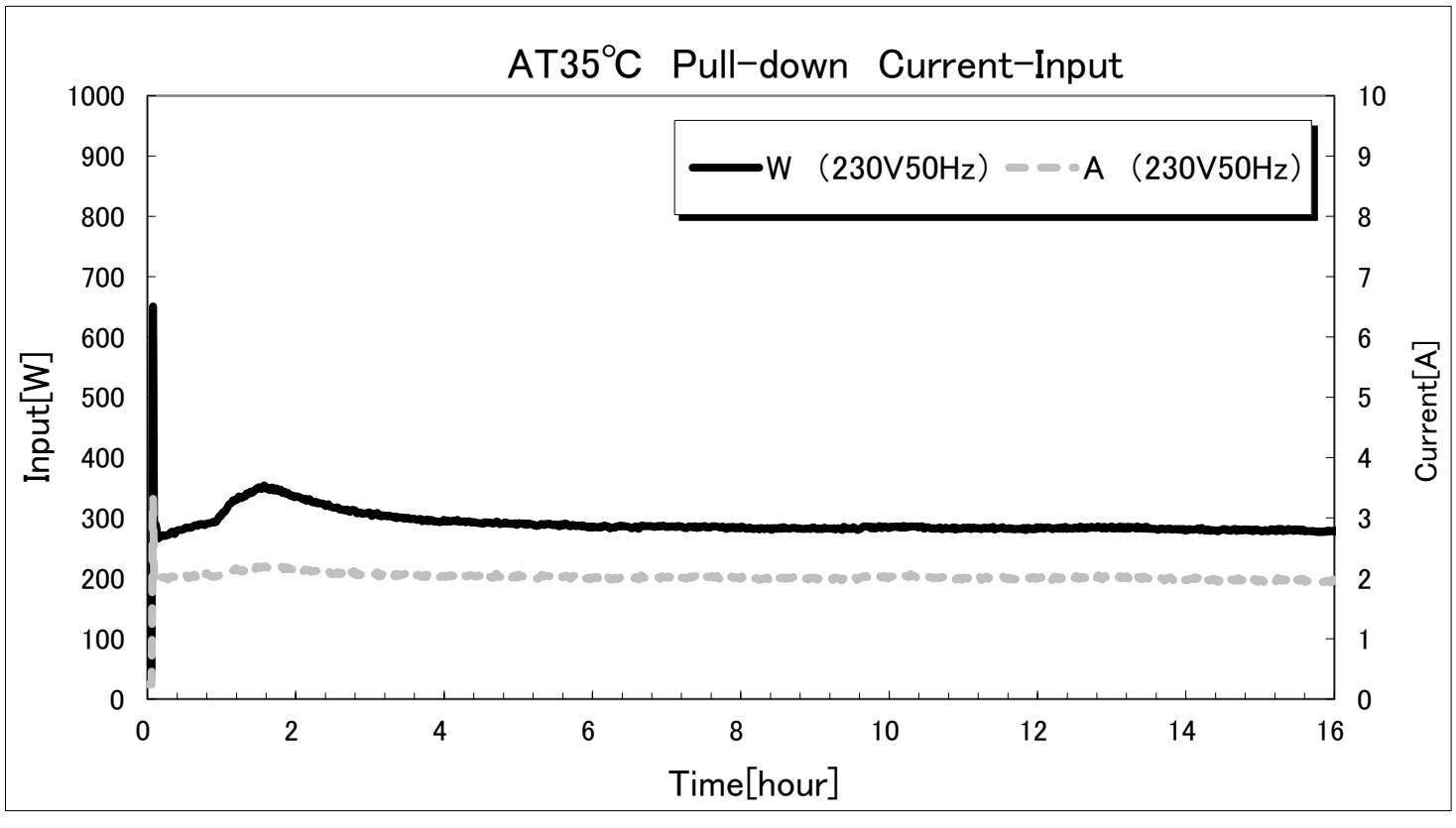




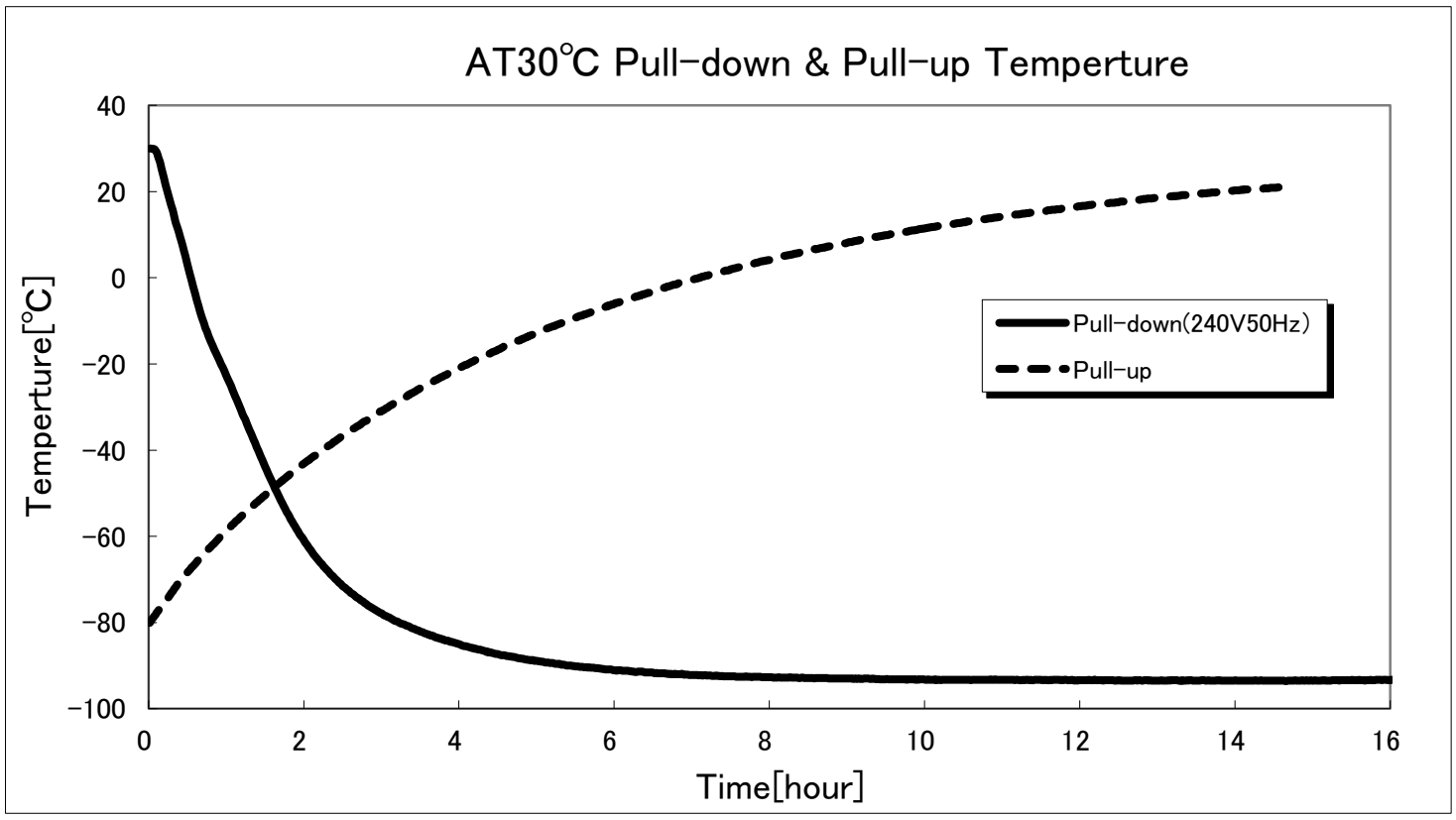
MDF-C8V1 （1φ230V 50Hz）

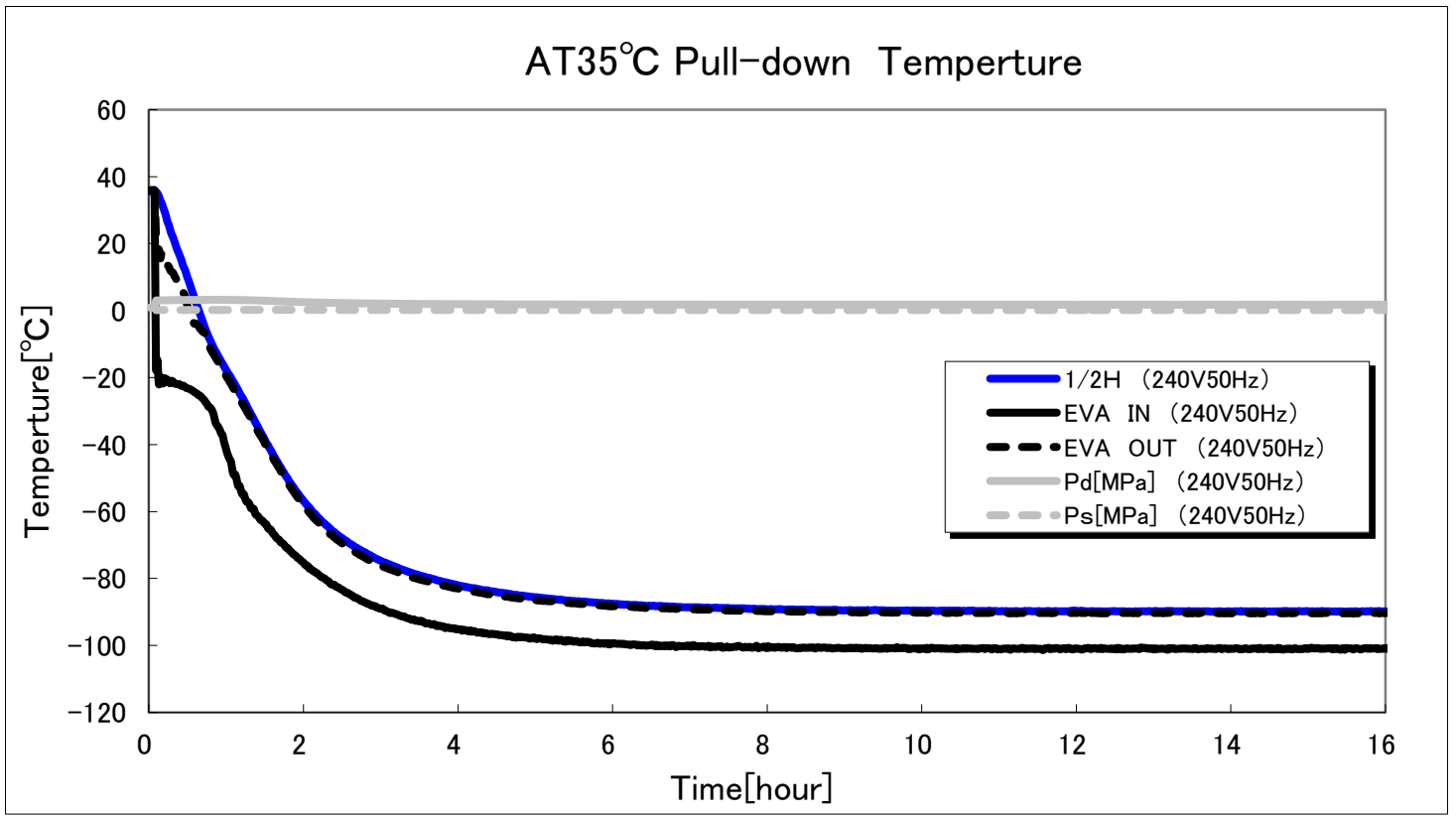


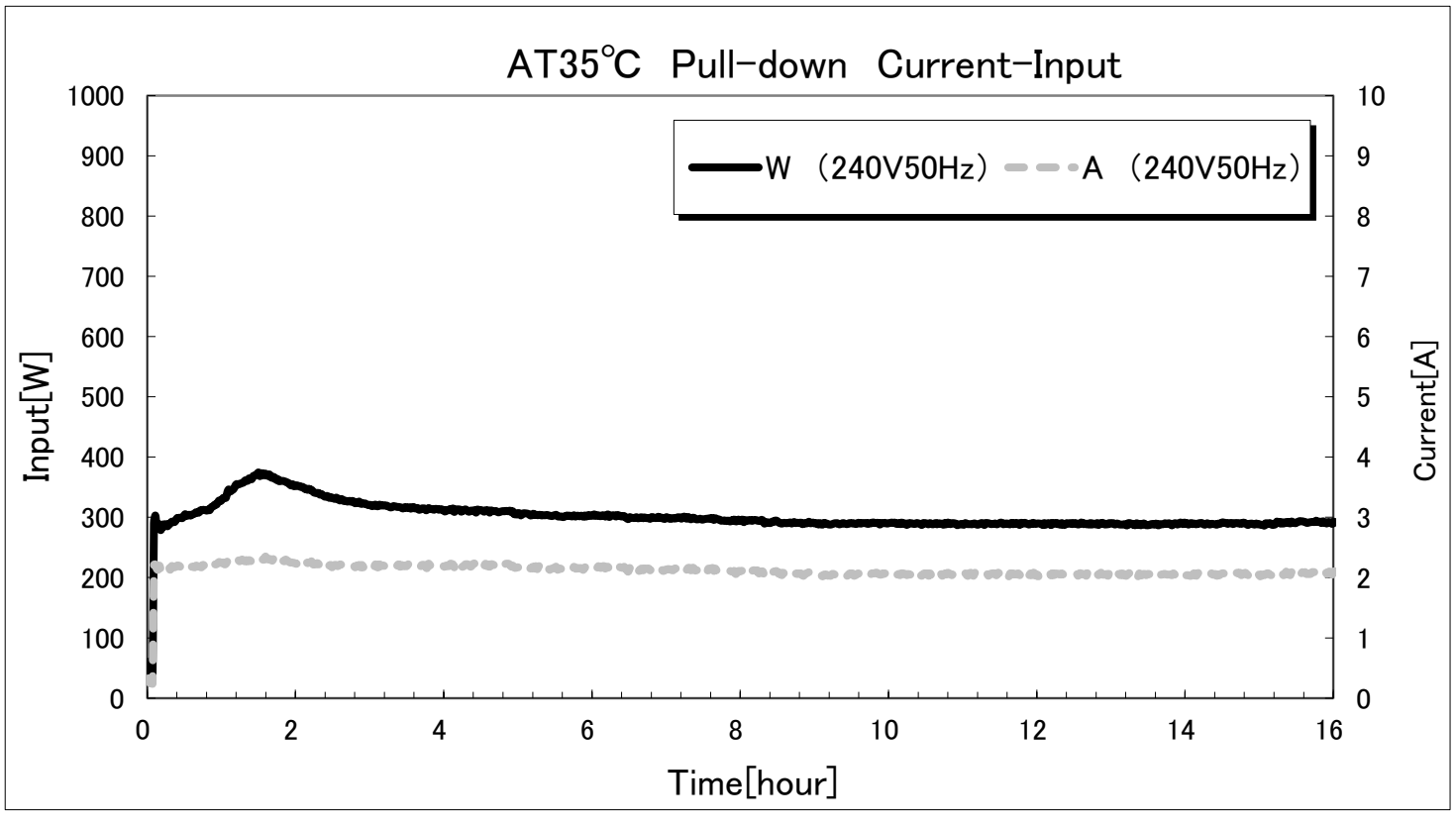




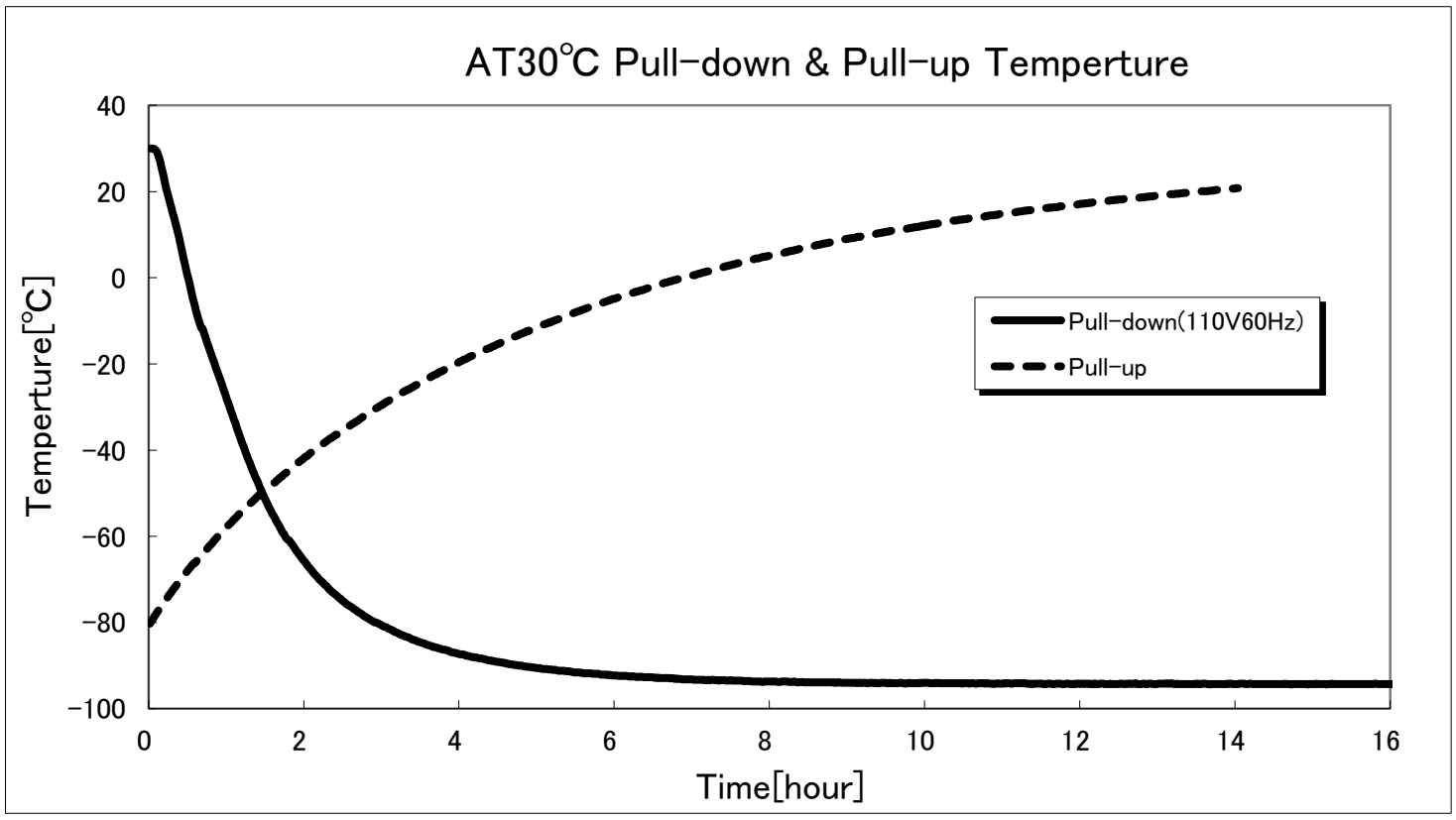
MDF-C8V1 （1φ240V 50Hz）

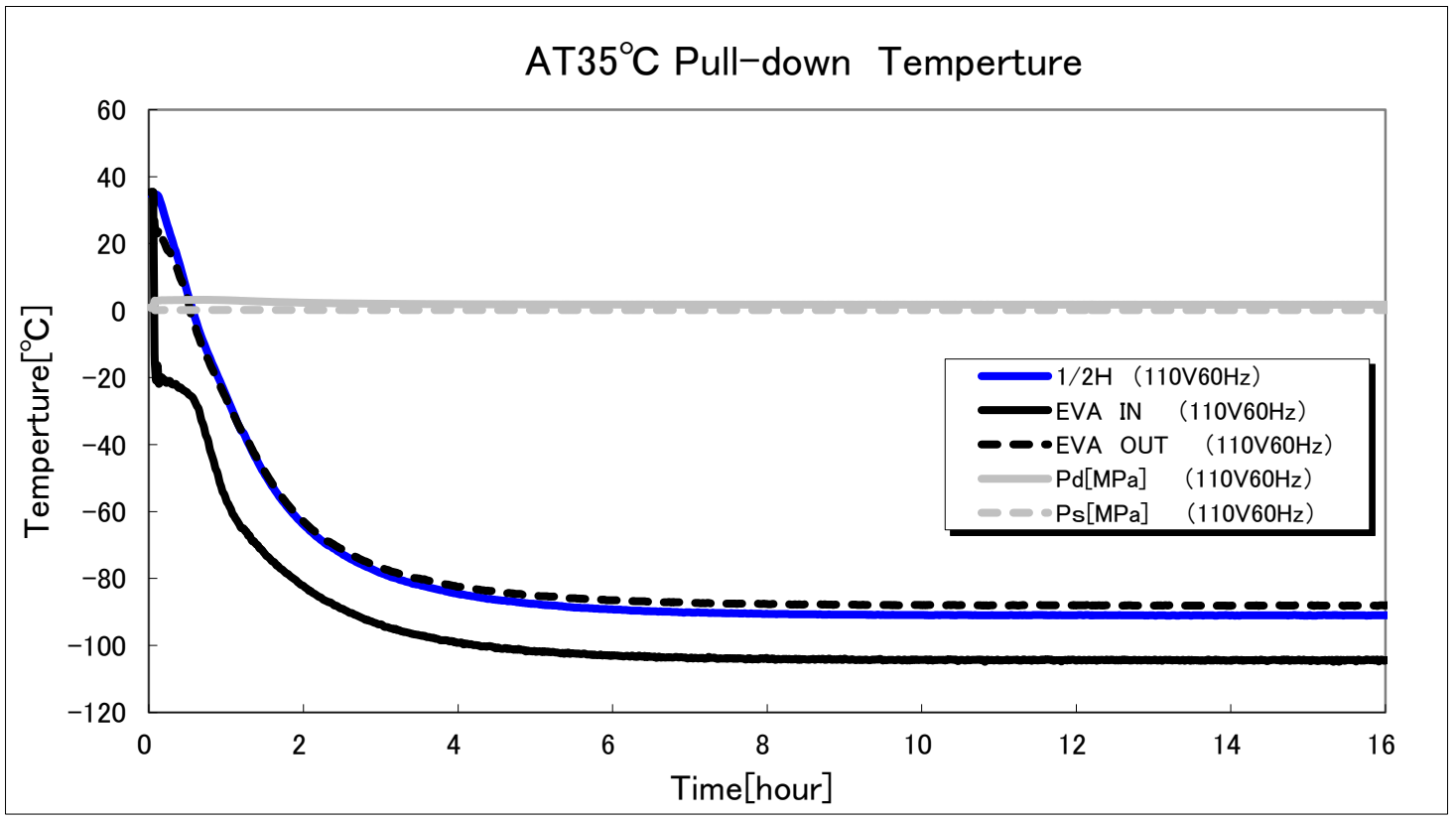


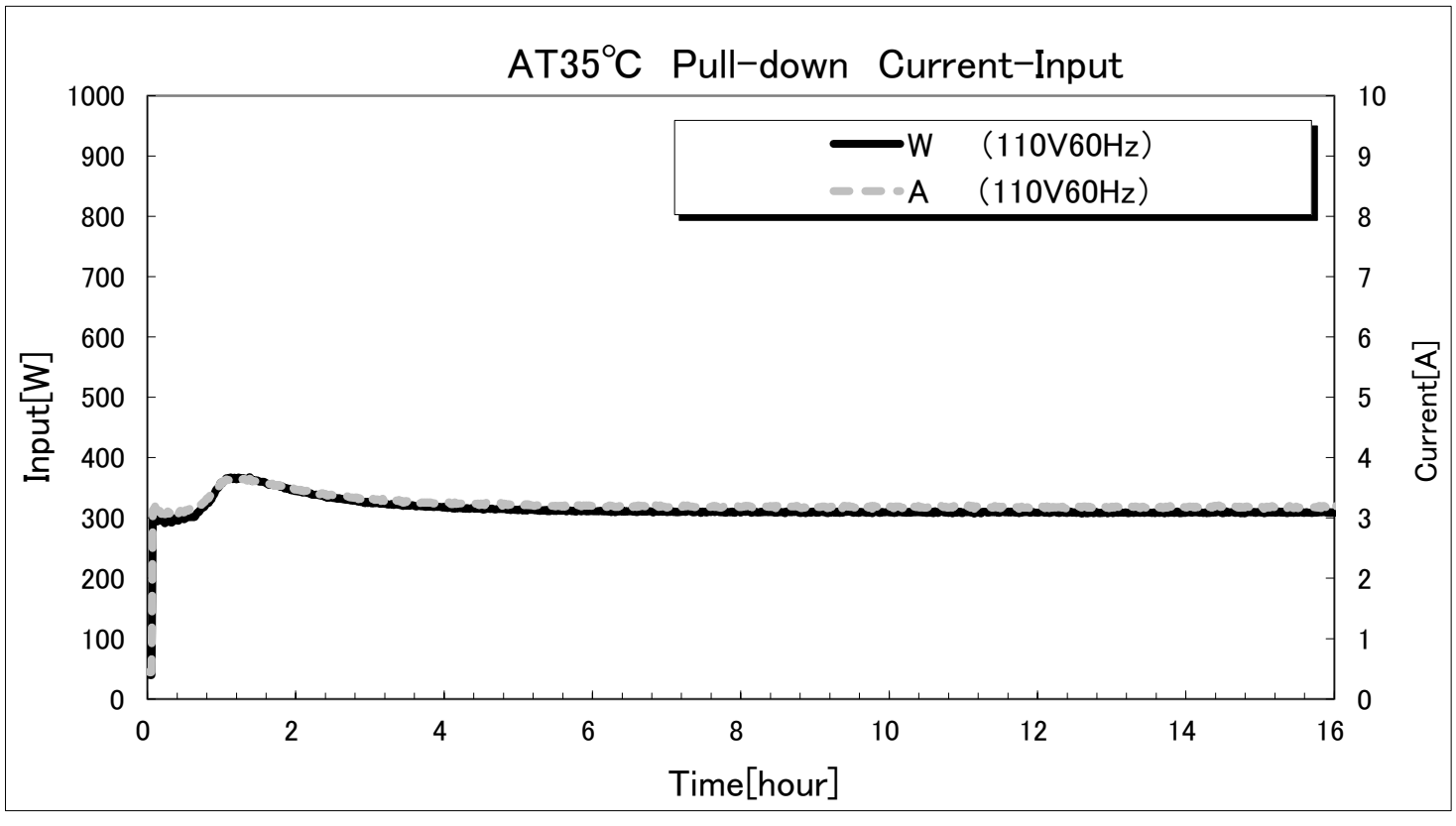




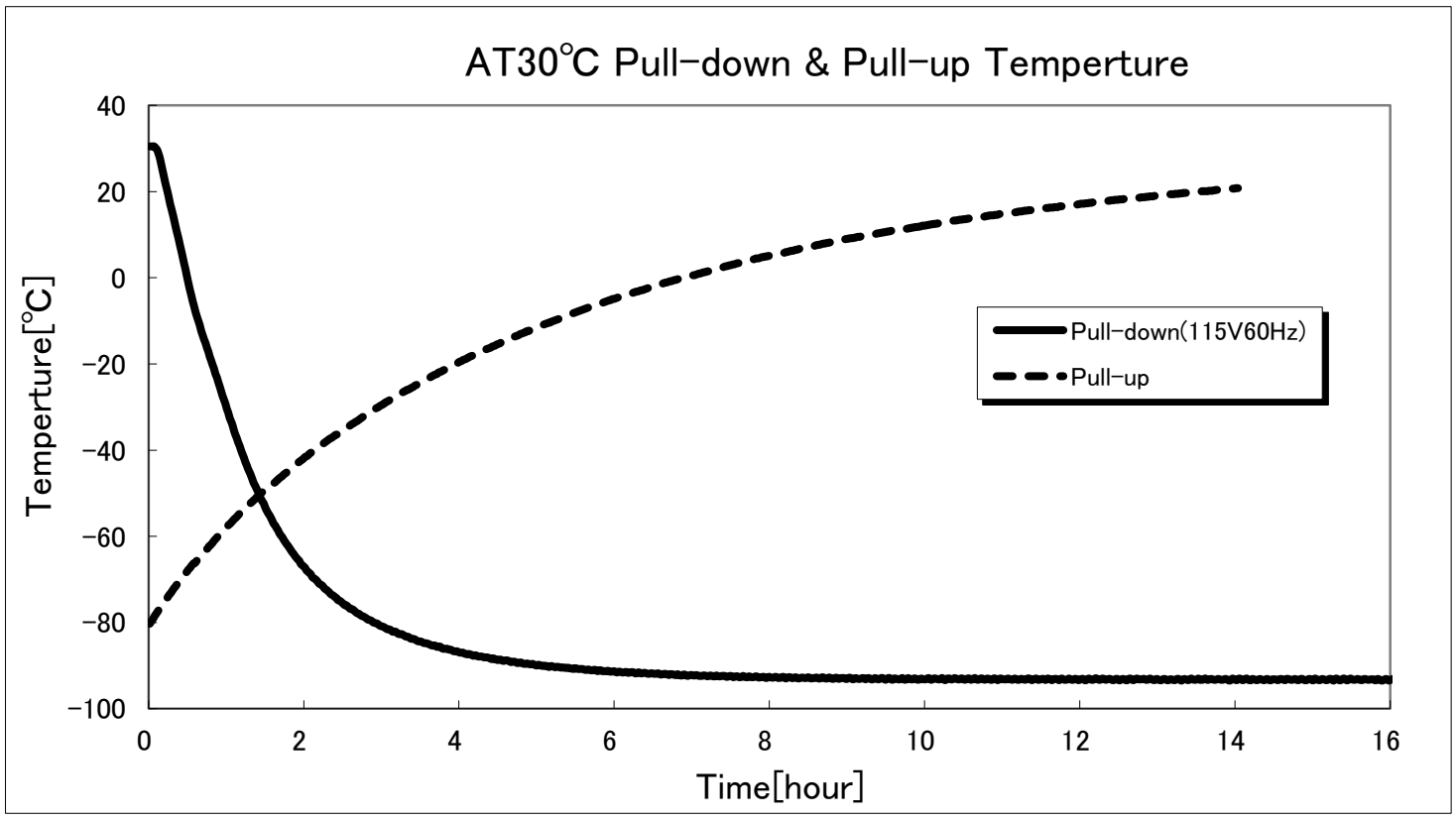
MDF-C8V1 （1φ110V 60Hz）

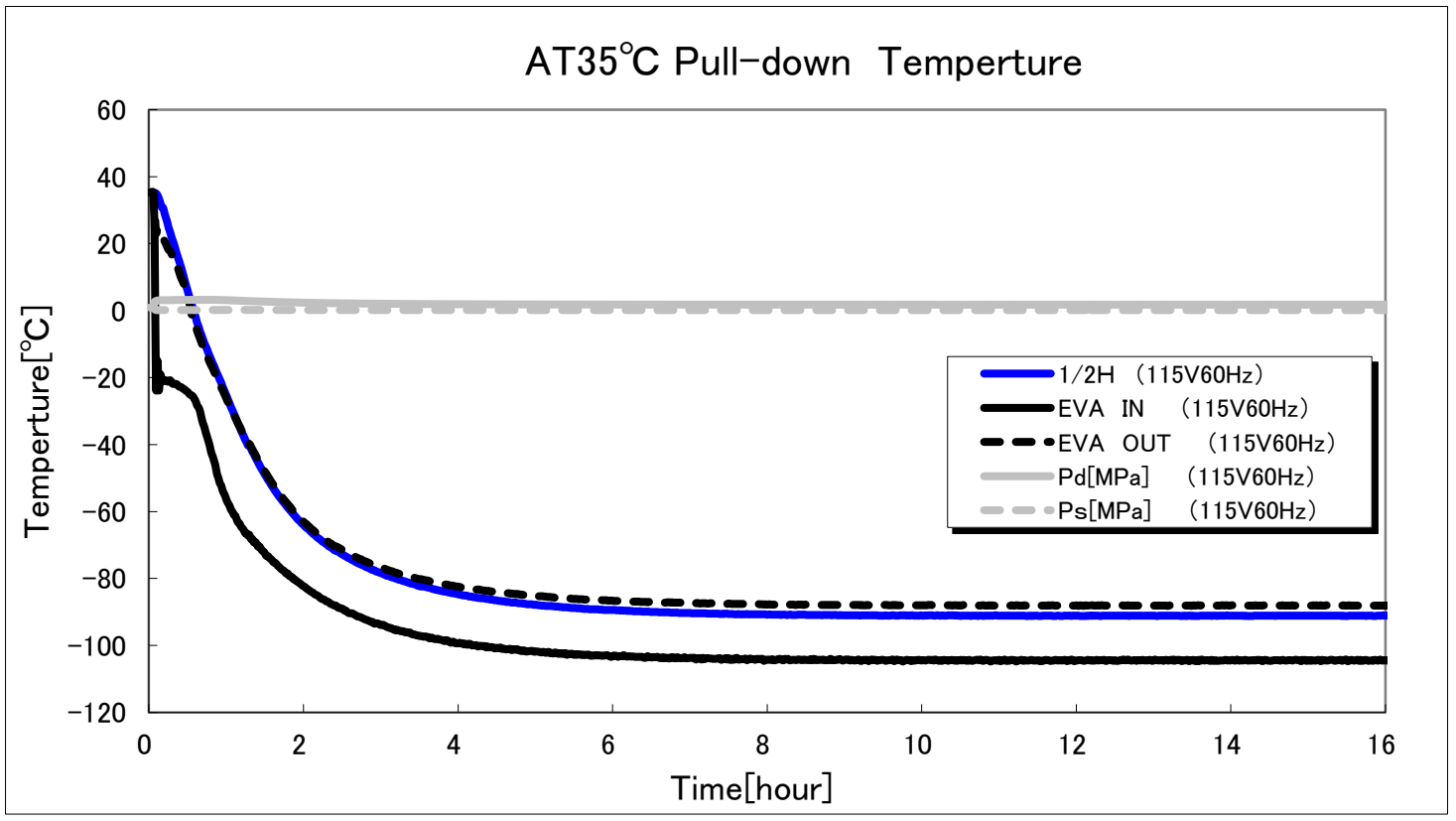


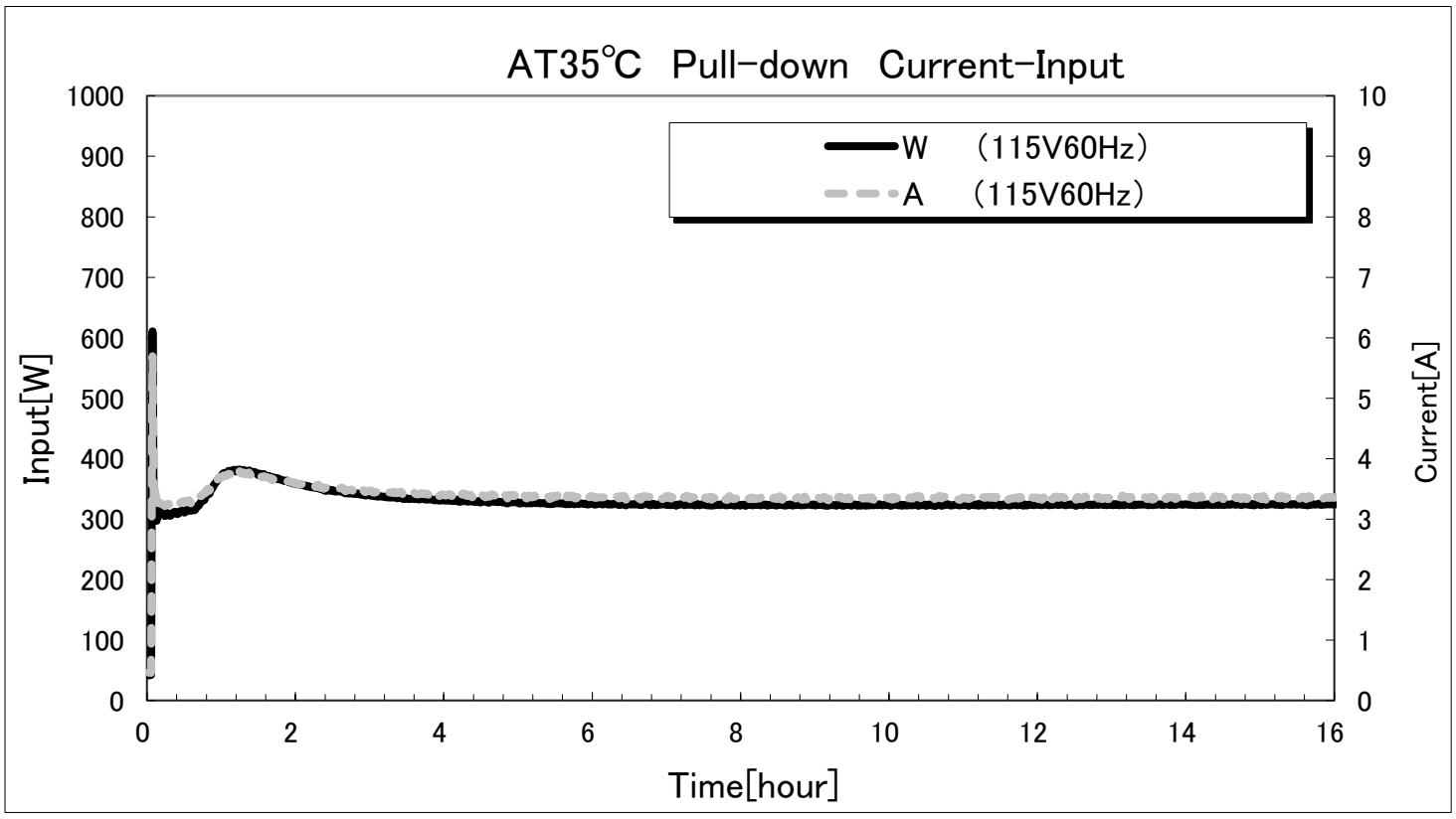




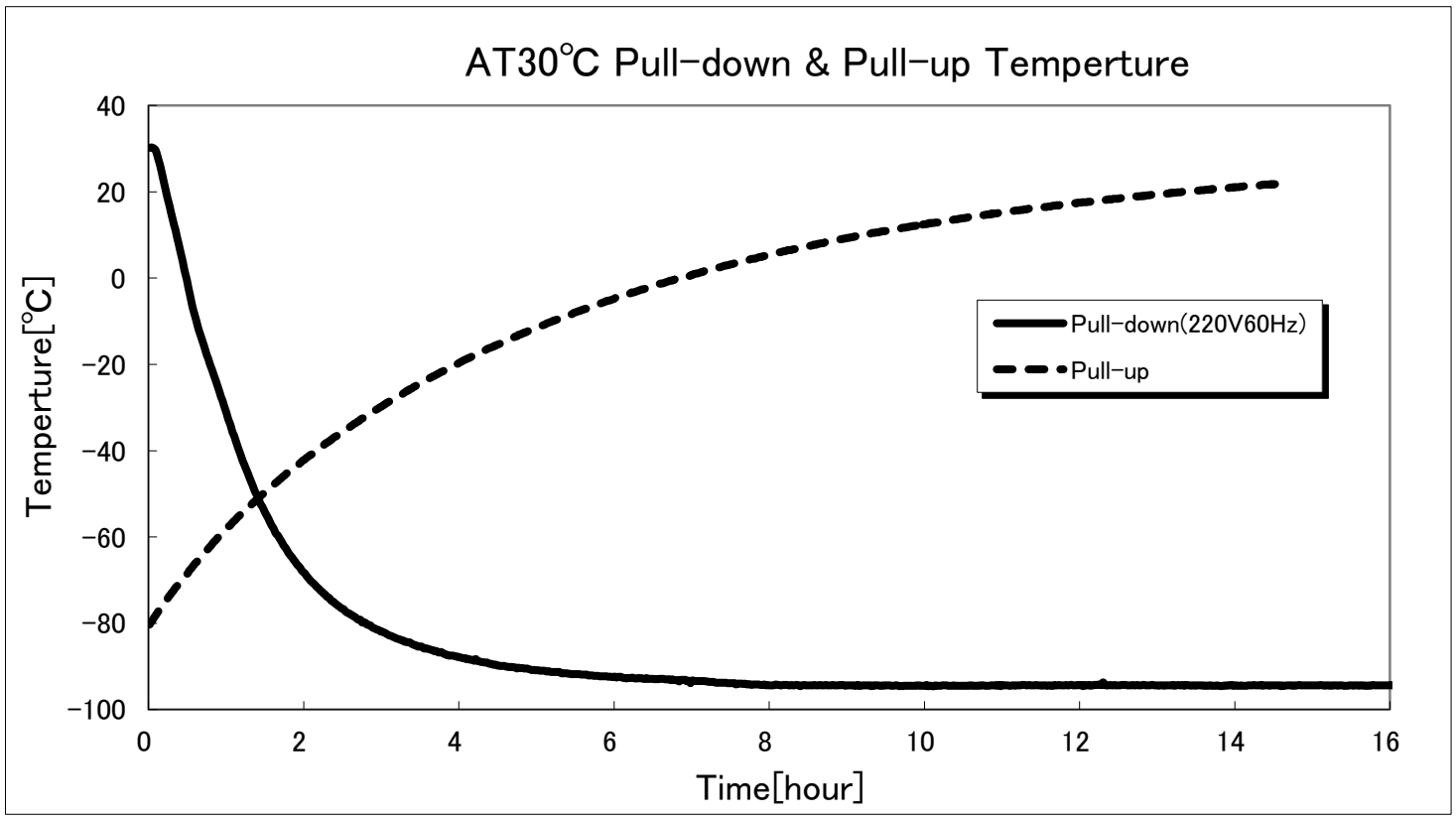
MDF-C8V1 （1φ115V 60Hz）

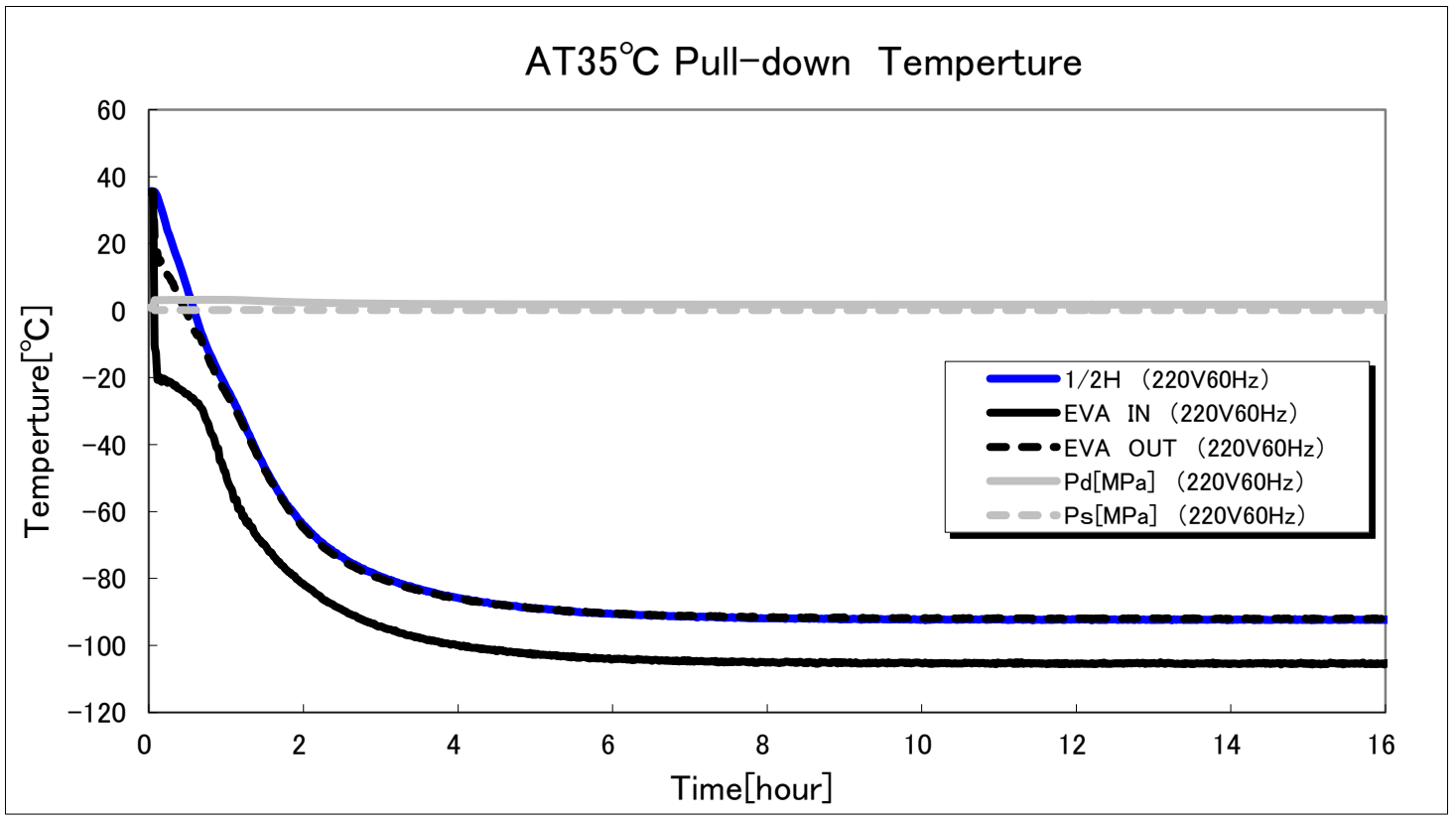


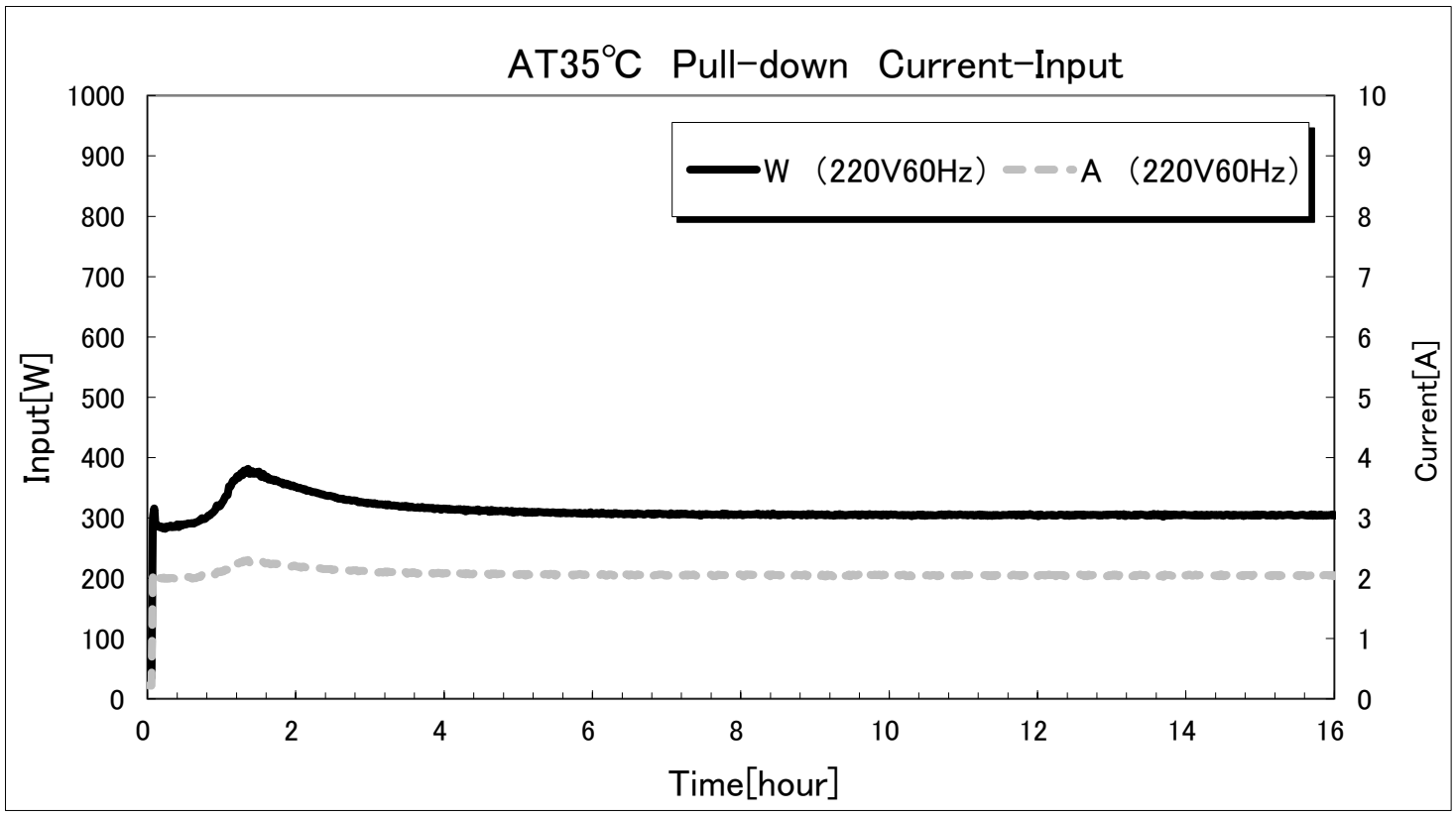




MDF-C8V1 （1φ220V 60Hz）

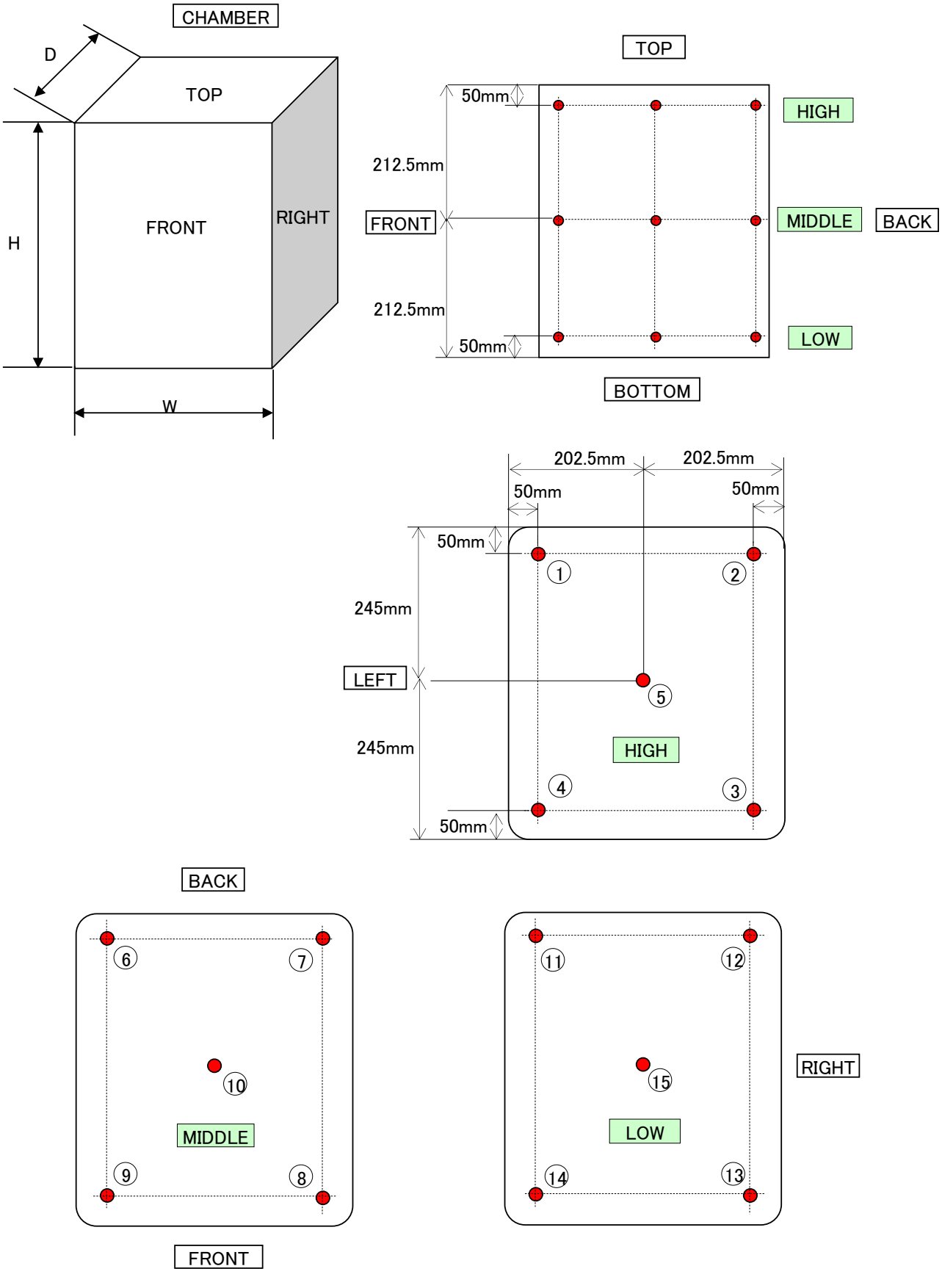






MDF-C8V1 Temperature Uniformity - 15points measured (Reference Data)

※TOP in the figure is that of the top surface of the inner lid



MDF-C8V1(-PT) Internal Temperature Uniformity (Reference Data)

＜Conditions＞

Ambient temperature: 23/30℃
Load: Unloaded

＜Distribution data＞
Temperature of the cycle in each area (SV=-80℃、air temperature)

Unit:℃

			Ambient temperature 23℃ 110V 60Hz			
			Maximum	Minimum	Middle of cycle	Differential
①	Upper area	Left back	−77.6	−81.2	−79.4	±1.8
②		Right back	−78.0	−81.1	−79.6	±1.6
③		Right front	−78.1	−81.4	−79.8	±1.7
④		Left front	−78.3	−81.6	−80.0	±1.7
⑤		Center	−78.3	−80.5	−79.4	±1.1
⑥	Middle area	Left back	−78.8	−81.6	−80.2	±1.4
⑦		Right back	−78.7	−81.4	−80.1	±1.4
⑧		Right front	−78.5	−81.4	−80.0	±1.5
⑨		Left front	−78.8	−81.4	−80.1	±1.3
⑩		Center	−78.9	−80.9	−79.9	±1.0
⑪	Bottom area	Left back	−78.3	−80.7	−79.5	±1.2
⑫		Right back	−78.0	−80.9	−79.5	±1.5
⑬		Right front	−78.1	−81.0	−79.6	±1.5
⑭		Left front	−78.3	−81.0	−79.7	±1.3
⑮		Center	−78.5	−80.7	−79.6	±1.1
Average			−	−	−79.7	−

Unit:℃

			Ambient temperature 30℃ 110V 60Hz			
			Maximum	Minimum	Middle of cycle	Differential
①	Upper area	Left back	−77.5	−81.0	−79.3	±1.8
②		Right back	−77.9	−81.0	−79.5	±1.6
③		Right front	−78.2	−81.2	−79.7	±1.5
④		Left front	−78.2	−81.4	−79.8	±1.6
⑤		Center	−78.3	−80.4	−79.4	±1.1
⑥	Middle area	Left back	−78.8	−81.5	−80.2	±1.3
⑦		Right back	−78.6	−81.4	−80.0	±1.4
⑧		Right front	−78.6	−81.3	−80.0	±1.4
⑨		Left front	−78.8	−81.3	−80.1	±1.3
⑩		Center	−79.0	−80.9	−80.0	±1.0
⑪	Bottom area	Left back	−78.2	−80.7	−79.5	±1.3
⑫		Right back	−78.0	−80.8	−79.4	±1.4
⑬		Right front	−78.0	−80.9	−79.5	±1.5
⑭		Left front	−78.3	−80.9	−79.6	±1.3
⑮		Center	−78.5	−80.6	−79.6	±1.1
Average			−	−	−79.7	−

Note:This data does not represent a guarantee of product performance.

＜Amount of power consumption＞
Amount of power consumption when driving at cycle (SV=-80℃)

1φ110V Unit:kWh/day

	50Hz	60Hz
AT23℃		4.50
AT30℃		5.08

Note:This data does not represent a guarantee of product performance.

＜Distribution data＞

Temperature of the cycle in each area（**SV=−70℃**、air temperature）

Unit:℃

			Ambient temperature 23℃ 110V 60Hz			
			Maximum	Minimum	Middle of cycle	Differential
①	Upper area	Left back	−67.5	−71.6	−69.6	±2.1
②		Right back	−68.0	−71.5	−69.8	±1.8
③		Right front	−68.0	−71.9	−70.0	±2.0
④		Left front	−68.2	−72.1	−70.2	±2.0
⑤		Center	−68.4	−70.8	−69.6	±1.2
⑥	Middle area	Left back	−68.8	−72.0	−70.4	±1.6
⑦		Right back	−68.6	−71.8	−70.2	±1.6
⑧		Right front	−68.6	−71.8	−70.2	±1.6
⑨		Left front	−68.9	−71.8	−70.4	±1.5
⑩		Center	−69.1	−71.2	−70.2	±1.1
⑪	Bottom area	Left back	−68.3	−71.0	−69.7	±1.4
⑫		Right back	−68.1	−71.2	−69.7	±1.6
⑬		Right front	−68.0	−71.3	−69.7	±1.7
⑭		Left front	−68.4	−71.4	−69.9	±1.5
⑮		Center	−68.6	−70.9	−69.8	±1.2
Average			−	−	−69.9	−

Unit:℃

			Ambient temperature 30℃ 110V 60Hz			
			Maximum	Minimum	Middle of cycle	Differential
①	Upper area	Left back	−67.5	−71.6	−69.6	±2.1
②		Right back	−67.9	−71.5	−69.7	±1.8
③		Right front	−68.1	−71.8	−70.0	±1.8
④		Left front	−68.2	−72.0	−70.1	±1.9
⑤		Center	−68.4	−70.7	−69.6	±1.2
⑥	Middle area	Left back	−68.8	−72.0	−70.4	±1.6
⑦		Right back	−68.6	−71.8	−70.2	±1.6
⑧		Right front	−68.5	−71.6	−70.1	±1.6
⑨		Left front	−68.7	−71.6	−70.2	±1.5
⑩		Center	−68.9	−71.1	−70.0	±1.1
⑪	Bottom area	Left back	−68.4	−71.2	−69.8	±1.4
⑫		Right back	−68.1	−71.4	−69.8	±1.7
⑬		Right front	−68.0	−71.4	−69.7	±1.7
⑭		Left front	−68.4	−71.4	−69.9	±1.5
⑮		Center	−68.5	−71.0	−69.8	±1.3
Average			−	−	−69.9	−

Note:This data does not represent a guarantee of product performance.

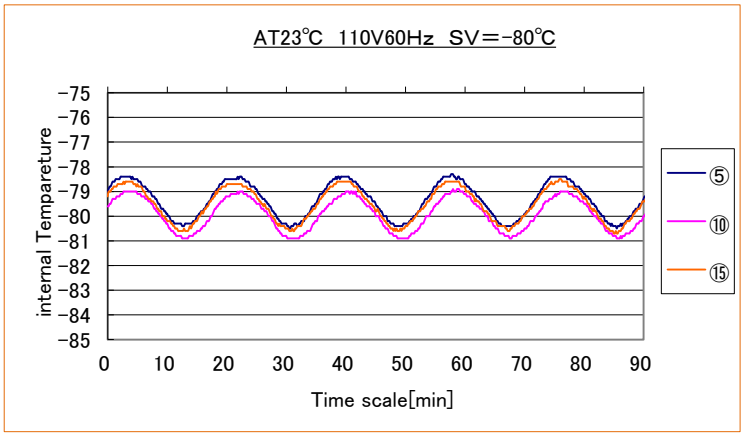
＜Amount of power consumption＞

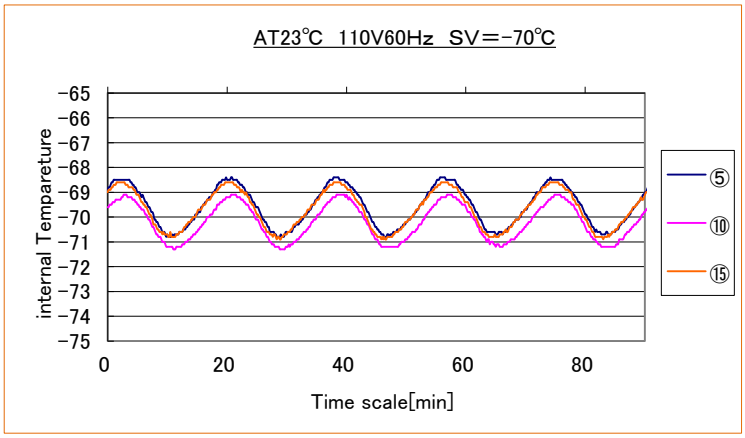
Amount of power consumption when driving at cycle (SV=−70℃)

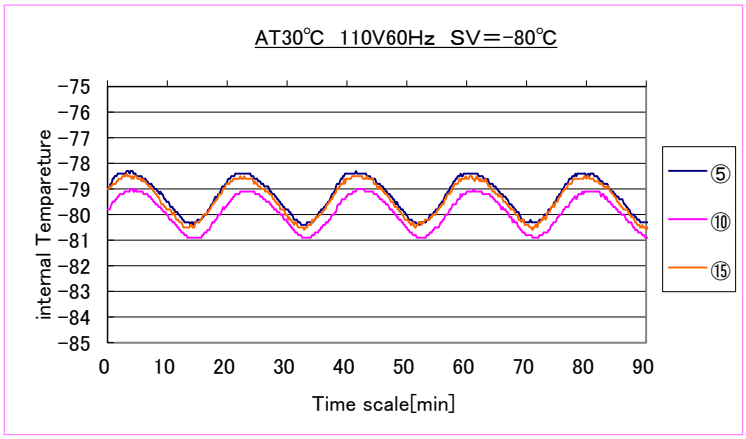
1φ110V Unit：kWh/day

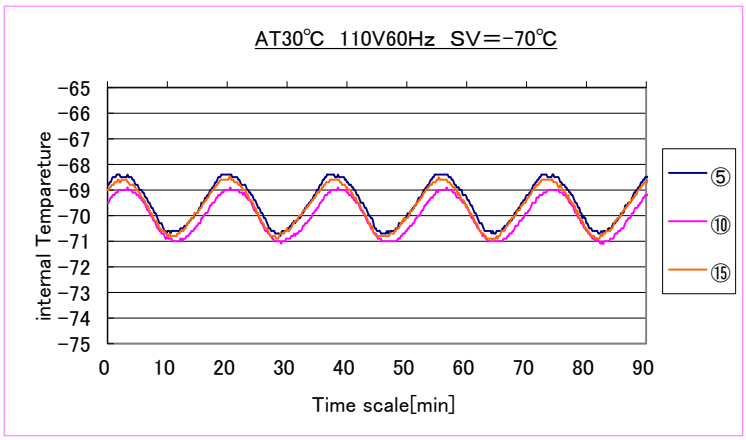
	~~50Hz~~	60Hz
AT23℃		3.71
AT30℃		4.04

Note:This data does not represent a guarantee of product performance.


AT23℃ 110V60Hz SV=-80℃
internal Tempareture
-75
-76
-77
-78
-79
-80
-81
-82
-83
-84
-85
0
10
20
30
40
50
60
70
80
90
Time scale[min]
⑤
⑩
⑮


AT23℃ 110V60Hz SV=-70℃
internal Tempareture
-65
-66
-67
-68
-69
-70
-71
-72
-73
-74
-75
0
20
40
60
80
Time scale[min]
⑤
⑩
⑮


AT30℃ 110V60Hz SV=-80℃
internal Tempareture
-75
-76
-77
-78
-79
-80
-81
-82
-83
-84
-85
0
10
20
30
40
50
60
70
80
90
Time scale[min]
⑤
⑩
⑮


AT30℃ 110V60Hz SV=-70℃
internal Tempareture
-65
-66
-67
-68
-69
-70
-71
-72
-73
-74
-75
0
10
20
30
40
50
60
70
80
90
Time scale[min]
⑤
⑩
⑮

MDF-C8V1(-PA) Internal Temperature Uniformity (Reference Data)

＜Conditions＞

Ambient temperature: 23/30℃
Load: Unloaded

＜Distribution data＞
Temperature of the cycle in each area (**SV=-80℃**、air temperature)

Unit:℃

			Ambient temperature 23℃ 115V 60Hz			
			Maximum	Minimum	Middle of cycle	Differential
①	Upper area	Left back	-77.7	-81.3	-79.5	±1.8
②		Right back	-78.1	-81.2	-79.7	±1.6
③		Right front	-78.3	-81.5	-79.9	±1.6
④		Left front	-78.3	-81.6	-80.0	±1.7
⑤		Center	-78.4	-80.5	-79.5	±1.1
⑥	Middle area	Left back	-78.8	-81.6	-80.2	±1.4
⑦		Right back	-78.6	-81.4	-80.0	±1.4
⑧		Right front	-78.5	-81.3	-79.9	±1.4
⑨		Left front	-78.6	-81.3	-80.0	±1.4
⑩		Center	-78.9	-80.8	-79.9	±1.0
⑪	Bottom area	Left back	-78.5	-80.9	-79.7	±1.2
⑫		Right back	-78.2	-81.0	-79.6	±1.4
⑬		Right front	-78.2	-81.1	-79.7	±1.5
⑭		Left front	-78.4	-81.1	-79.8	±1.4
⑮		Center	-78.6	-80.7	-79.7	±1.1
Average			-	-	-79.8	-

Unit:℃

			Ambient temperature 30℃ 115V 60Hz			
			Maximum	Minimum	Middle of cycle	Differential
①	Upper area	Left back	-77.6	-81.1	-79.4	±1.8
②		Right back	-78.0	-81.1	-79.6	±1.6
③		Right front	-78.3	-81.4	-79.9	±1.6
④		Left front	-78.2	-81.6	-79.9	±1.7
⑤		Center	-78.4	-80.5	-79.5	±1.1
⑥	Middle area	Left back	-78.8	-81.6	-80.2	±1.4
⑦		Right back	-78.7	-81.4	-80.1	±1.4
⑧		Right front	-78.5	-81.4	-80.0	±1.5
⑨		Left front	-78.7	-81.3	-80.0	±1.3
⑩		Center	-78.9	-80.9	-79.9	±1.0
⑪	Bottom area	Left back	-78.3	-80.8	-79.6	±1.3
⑫		Right back	-78.1	-80.9	-79.5	±1.4
⑬		Right front	-78.0	-80.9	-79.5	±1.5
⑭		Left front	-78.3	-81.0	-79.7	±1.3
⑮		Center	-78.5	-80.6	-79.6	±1.1
Average			-	-	-79.7	-

Note:This data does not represent a guarantee of product performance.

＜Amount of power consumption＞
Amount of power consumption when driving at cycle (SV=-80℃)

1φ115V Unit:kWh/day

	50Hz	60Hz
AT23℃		4.75
AT30℃		5.18

Note:This data does not represent a guarantee of product performance.

＜Distribution data＞
Temperature of the cycle in each area（**SV=−70℃**、air temperature）

Unit:℃

			Ambient temperature 23℃ 115V 60Hz			
			Maximum	Minimum	Middle of cycle	Differential
①	Upper area	Left back	−67.5	−71.6	−69.6	±2.1
②		Right back	−68.0	−71.5	−69.8	±1.8
③		Right front	−68.1	−71.8	−70.0	±1.8
④		Left front	−68.3	−72.1	−70.2	±1.9
⑤		Center	−68.4	−70.8	−69.6	±1.2
⑥	Middle area	Left back	−68.8	−71.9	−70.4	±1.6
⑦		Right back	−68.7	−71.7	−70.2	±1.5
⑧		Right front	−68.6	−71.8	−70.2	±1.6
⑨		Left front	−68.9	−71.8	−70.4	±1.5
⑩		Center	−69.1	−71.2	−70.2	±1.1
⑪	Bottom area	Left back	−68.3	−71.1	−69.7	±1.4
⑫		Right back	−68.1	−71.2	−69.7	±1.6
⑬		Right front	−68.1	−71.3	−69.7	±1.6
⑭		Left front	−68.4	−71.4	−69.9	±1.5
⑮		Center	−68.6	−71.0	−69.8	±1.2
Average			−	−	−69.9	−

Unit:℃

			Ambient temperature 30℃ 115V 60Hz			
			Maximum	Minimum	Middle of cycle	Differential
①	Upper area	Left back	−67.5	−71.5	−69.5	±2.0
②		Right back	−68.0	−71.5	−69.8	±1.8
③		Right front	−68.2	−71.8	−70.0	±1.8
④		Left front	−68.2	−72.0	−70.1	±1.9
⑤		Center	−68.4	−70.8	−69.6	±1.2
⑥	Middle area	Left back	−68.8	−72.0	−70.4	±1.6
⑦		Right back	−68.6	−71.7	−70.2	±1.6
⑧		Right front	−68.5	−71.6	−70.1	±1.6
⑨		Left front	−68.7	−71.7	−70.2	±1.5
⑩		Center	−69.0	−71.0	−70.0	±1.0
⑪	Bottom area	Left back	−68.4	−71.2	−69.8	±1.4
⑫		Right back	−68.1	−71.3	−69.7	±1.6
⑬		Right front	−68.1	−71.3	−69.7	±1.6
⑭		Left front	−68.4	−71.4	−69.9	±1.5
⑮		Center	−68.6	−70.9	−69.8	±1.2
Average			−	−	−69.9	−

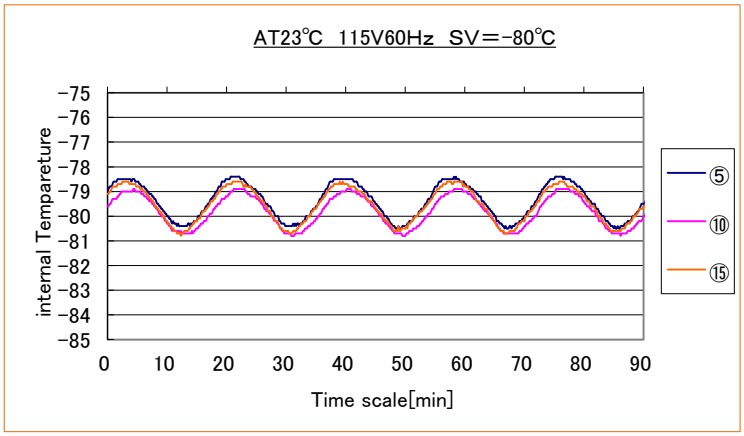
Note:This data does not represent a guarantee of product performance.

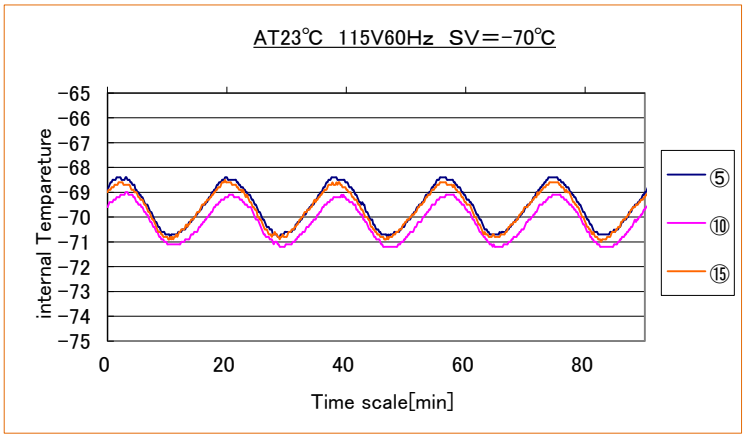
＜Amount of power consumption＞
Amount of power consumption when driving at cycle (SV=−70℃)

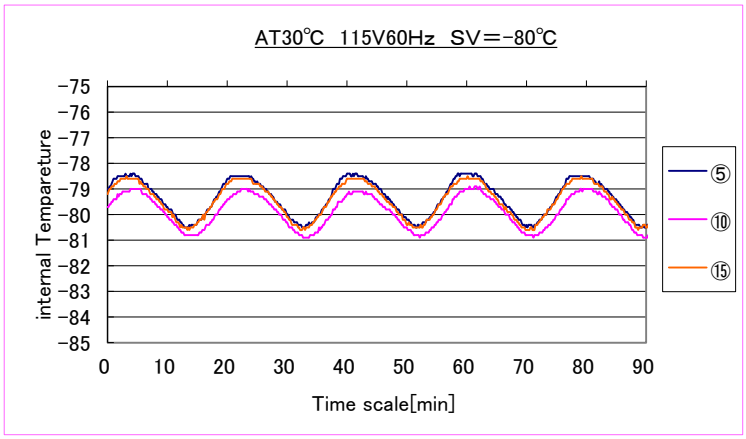
1φ115V Unit：kWh/day

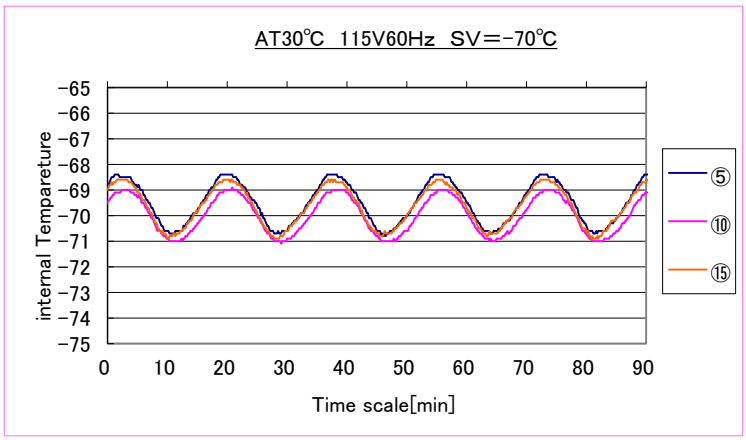
	~~50Hz~~	60Hz
AT23℃		3.81
AT30℃		4.24

Note:This data does not represent a guarantee of product performance.


AT23℃ 115V60Hz SV=-80℃
internal Tempareture
-75
-76
-77
-78
-79
-80
-81
-82
-83
-84
-85
0
10
20
30
40
50
60
70
80
90
Time scale[min]
⑤
⑩
⑮


AT23℃ 115V60Hz SV=-70℃
internal Tempareture
-65
-66
-67
-68
-69
-70
-71
-72
-73
-74
-75
0
20
40
60
80
Time scale[min]
⑤
⑩
⑮


AT30℃ 115V60Hz SV=-80℃
internal Tempareture
-75
-76
-77
-78
-79
-80
-81
-82
-83
-84
-85
0
10
20
30
40
50
60
70
80
90
Time scale[min]
⑤
⑩
⑮


AT30℃ 115V60Hz SV=-70℃
internal Tempareture
-65
-66
-67
-68
-69
-70
-71
-72
-73
-74
-75
0
10
20
30
40
50
60
70
80
90
Time scale[min]
⑤
⑩
⑮

MDF-C8V1(-PK/-PR) Internal Temperature Uniformity (Reference Data)

＜Conditions＞

Ambient temperature: 23/30℃
Load: Unloaded

＜Distribution data＞
Temperature of the cycle in each area (SV=-80℃、air temperature)

Unit:℃

			Ambient temperature 23℃ 220V 60Hz			
			Maximum	Minimum	Middle of cycle	Differential
①	Upper area	Left back	−77.4	−81.2	−79.3	±1.9
②		Right back	−77.3	−80.9	−79.1	±1.8
③		Right front	−77.6	−81.1	−79.4	±1.8
④		Left front	−77.6	−81.3	−79.5	±1.9
⑤		Center	−77.7	−80.3	−79.0	±1.3
⑥	Middle area	Left back	−78.2	−81.1	−79.7	±1.5
⑦		Right back	−78.0	−81.0	−79.5	±1.5
⑧		Right front	−77.9	−81.1	−79.5	±1.6
⑨		Left front	−78.1	−81.1	−79.6	±1.5
⑩		Center	−78.3	−80.6	−79.5	±1.2
⑪	Bottom area	Left back	−77.7	−80.2	−79.0	±1.3
⑫		Right back	−77.5	−80.2	−78.9	±1.4
⑬		Right front	−77.5	−80.6	−79.1	±1.6
⑭		Left front	−77.8	−80.7	−79.3	±1.5
⑮		Center	−77.9	−80.1	−79.0	±1.1
Average			−	−	−79.3	−

Unit:℃

			Ambient temperature 30℃ 220V 60Hz			
			Maximum	Minimum	Middle of cycle	Differential
①	Upper area	Left back	−77.3	−81.0	−79.2	±1.8
②		Right back	−77.2	−80.8	−79.0	±1.8
③		Right front	−77.5	−81.0	−79.3	±1.8
④		Left front	−77.5	−81.2	−79.4	±1.9
⑤		Center	−77.6	−80.2	−78.9	±1.3
⑥	Middle area	Left back	−77.9	−81.0	−79.5	±1.6
⑦		Right back	−77.9	−81.0	−79.5	±1.6
⑧		Right front	−77.8	−81.0	−79.4	±1.6
⑨		Left front	−77.9	−81.1	−79.5	±1.6
⑩		Center	−78.1	−80.5	−79.3	±1.2
⑪	Bottom area	Left back	−77.6	−80.0	−78.8	±1.2
⑫		Right back	−77.3	−80.0	−78.7	±1.3
⑬		Right front	−77.3	−80.4	−78.9	±1.6
⑭		Left front	−77.7	−80.5	−79.1	±1.4
⑮		Center	−77.7	−80.0	−78.9	±1.2
Average			−	−	−79.1	−

Note:This data does not represent a guarantee of product performance.

＜Amount of power consumption＞
Amount of power consumption when driving at cycle (SV=-80℃)

1φ220V Unit:kWh/day

	50Hz	60Hz
AT23℃		4.53
AT30℃		4.97

Note:This data does not represent a guarantee of product performance.

＜Distribution data＞
Temperature of the cycle in each area（**SV=−70℃**、air temperature）

Unit:℃

			Ambient temperature 23℃ 220V 60Hz			
			Maximum	Minimum	Middle of cycle	Differential
①	Upper area	Left back	−67.1	−71.5	−69.3	±2.2
②		Right back	−67.1	−71.3	−69.2	±2.1
③		Right front	−67.4	−71.5	−69.5	±2.1
④		Left front	−67.3	−71.7	−69.5	±2.2
⑤		Center	−67.4	−70.4	−68.9	±1.5
⑥	Middle area	Left back	−67.9	−71.4	−69.7	±1.8
⑦		Right back	−67.6	−71.4	−69.5	±1.9
⑧		Right front	−67.6	−71.4	−69.5	±1.9
⑨		Left front	−67.9	−71.4	−69.7	±1.8
⑩		Center	−68.1	−70.7	−69.4	±1.3
⑪	Bottom area	Left back	−67.5	−70.4	−69.0	±1.5
⑫		Right back	−67.3	−70.6	−69.0	±1.7
⑬		Right front	−67.2	−70.8	−69.0	±1.8
⑭		Left front	−67.5	−70.9	−69.2	±1.7
⑮		Center	−67.6	−70.3	−69.0	±1.3
Average			−	−	−69.3	−

Unit:℃

			Ambient temperature 30℃ 220V 60Hz			
			Maximum	Minimum	Middle of cycle	Differential
①	Upper area	Left back	−67.1	−71.2	−69.2	±2.1
②		Right back	−67.1	−71.2	−69.2	±2.1
③		Right front	−67.4	−71.3	−69.4	±2.0
④		Left front	−67.4	−71.5	−69.5	±2.1
⑤		Center	−67.5	−70.3	−68.9	±1.4
⑥	Middle area	Left back	−68.0	−71.2	−69.6	±1.6
⑦		Right back	−67.7	−71.2	−69.5	±1.8
⑧		Right front	−67.7	−71.2	−69.5	±1.8
⑨		Left front	−67.9	−71.2	−69.6	±1.7
⑩		Center	−68.1	−70.6	−69.4	±1.3
⑪	Bottom area	Left back	−67.4	−70.3	−68.9	±1.5
⑫		Right back	−67.1	−70.3	−68.7	±1.6
⑬		Right front	−67.0	−70.7	−68.9	±1.9
⑭		Left front	−67.4	−70.7	−69.1	±1.7
⑮		Center	−67.5	−70.2	−68.9	±1.4
Average			−	−	−69.2	−

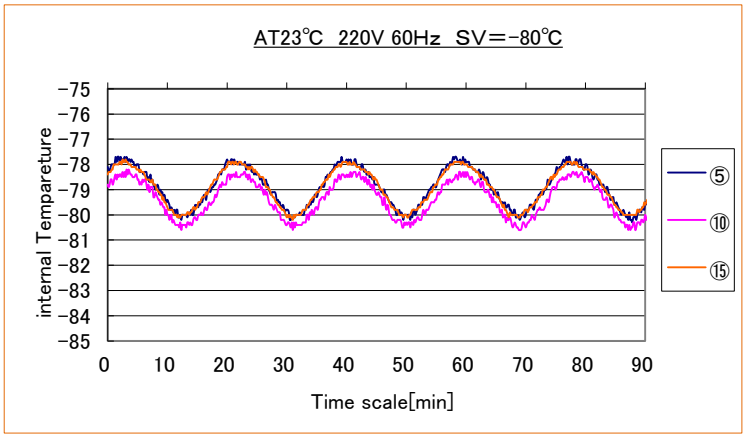
Note:This data does not represent a guarantee of product performance.

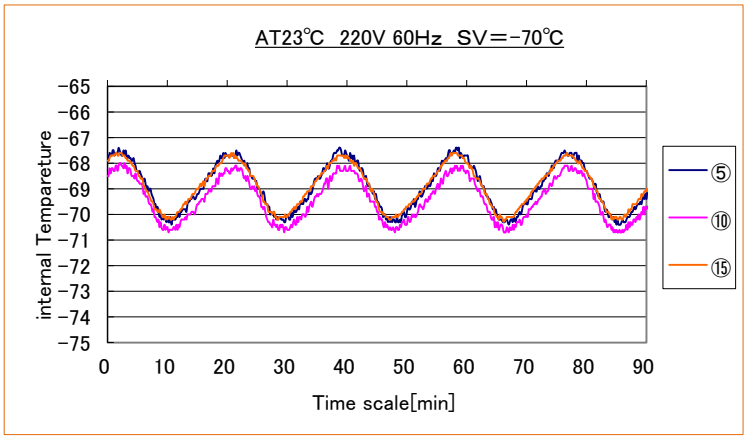
＜Amount of power consumption＞
Amount of power consumption when driving at cycle (SV=−70℃)

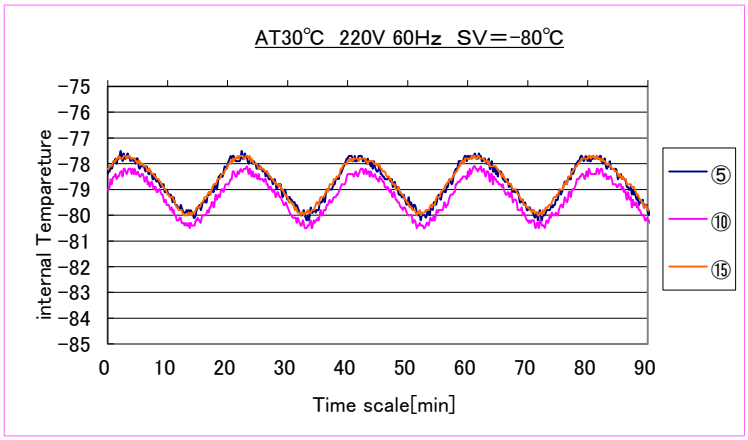
1φ220V Unit：kWh/day

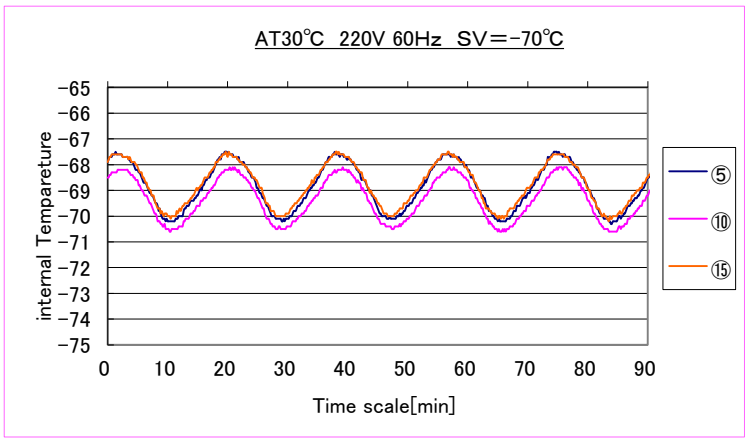
	~~50Hz~~	60Hz
AT23℃		3.67
AT30℃		4.04

Note:This data does not represent a guarantee of product performance.


AT23℃ 220V 60Hz SV=-80℃
internal Tempareture
-75
-76
-77
-78
-79
-80
-81
-82
-83
-84
-85
0
10
20
30
40
50
60
70
80
90
Time scale[min]
⑤
⑩
⑮


AT23℃ 220V 60Hz SV=-70℃
internal Tempareture
-65
-66
-67
-68
-69
-70
-71
-72
-73
-74
-75
0
10
20
30
40
50
60
70
80
90
Time scale[min]
⑤
⑩
⑮


AT30℃ 220V 60Hz SV=-80℃
internal Tempareture
-75
-76
-77
-78
-79
-80
-81
-82
-83
-84
-85
0
10
20
30
40
50
60
70
80
90
Time scale[min]
⑤
⑩
⑮


AT30℃ 220V 60Hz SV=-70℃
internal Tempareture
-65
-66
-67
-68
-69
-70
-71
-72
-73
-74
-75
0
10
20
30
40
50
60
70
80
90
Time scale[min]
⑤
⑩
⑮

MDF-C8V1(-PE) Internal Temperature Uniformity (Reference Data)

＜Conditions＞

Ambient temperature: 23/30℃
Load: Unloaded

＜Distribution data＞
Temperature of the cycle in each area (**SV=-80℃**、air temperature)

Unit:℃

			Ambient temperature 23℃											
			220V 50Hz				230V 50Hz				240V 50Hz			
			Maximum	Minimum	Middle of cycle	Differential	Maximum	Minimum	Middle of cycle	Differential	Maximum	Minimum	Middle of cycle	Differential
①	Upper area	Left back	−78.2	−81.8	−80.0	±1.8	−78.0	−81.7	−79.9	±1.9	−78.2	−81.8	−80.0	±1.8
②		Right back	−78.4	−81.6	−80.0	±1.6	−78.3	−81.6	−80.0	±1.7	−78.4	−81.6	−80.0	±1.6
③		Right front	−78.6	−81.8	−80.2	±1.6	−78.5	−81.7	−80.1	±1.6	−78.6	−81.8	−80.2	±1.6
④		Left front	−78.5	−81.8	−80.2	±1.7	−78.4	−81.8	−80.1	±1.7	−78.6	−82.0	−80.3	±1.7
⑤		Center	−78.5	−81.1	−79.8	±1.3	−78.4	−81.0	−79.7	±1.3	−78.5	−81.1	−79.8	±1.3
⑥	Middle area	Left back	−79.0	−81.8	−80.4	±1.4	−78.9	−81.9	−80.4	±1.5	−79.0	−81.8	−80.4	±1.4
⑦		Right back	−78.8	−81.6	−80.2	±1.4	−78.8	−81.6	−80.2	±1.4	−78.8	−81.6	−80.2	±1.4
⑧		Right front	−78.8	−81.8	−80.3	±1.5	−78.8	−81.8	−80.3	±1.5	−78.8	−81.8	−80.3	±1.5
⑨		Left front	−78.9	−81.6	−80.3	±1.4	−78.9	−81.6	−80.3	±1.4	−78.9	−81.6	−80.3	±1.4
⑩		Center	−79.3	−81.4	−80.4	±1.1	−79.3	−81.4	−80.4	±1.1	−79.3	−81.4	−80.4	±1.1
⑪	Bottom area	Left back	−78.9	−81.6	−80.3	±1.4	−78.8	−81.6	−80.2	±1.4	−78.9	−81.6	−80.3	±1.4
⑫		Right back	−78.6	−81.4	−80.0	±1.4	−78.6	−81.4	−80.0	±1.4	−78.6	−81.4	−80.0	±1.4
⑬		Right front	−78.5	−81.3	−79.9	±1.4	−78.4	−81.2	−79.8	±1.4	−78.5	−81.3	−79.9	±1.4
⑭		Left front	−78.9	−81.8	−80.4	±1.5	−78.8	−81.6	−80.2	±1.4	−78.9	−81.7	−80.3	±1.4
⑮		Center	−78.9	−81.1	−80.0	±1.1	−78.9	−81.1	−80.0	±1.1	−78.9	−81.0	−80.0	±1.1
Average			−	−	−80.1	−	−	−	−80.1	−	−	−	−80.1	−

Unit:℃

			Ambient temperature 30℃											
			220V 50Hz				230V 50Hz				240V 50Hz			
			Maximum	Minimum	Middle of cycle	Differential	Maximum	Minimum	Middle of cycle	Differential	Maximum	Minimum	Middle of cycle	Differential
①	Upper area	Left back	−78.2	−81.6	−79.9	±1.7	−78.1	−81.7	−79.9	±1.8	−78.3	−81.8	−80.1	±1.8
②		Right back	−78.4	−81.5	−80.0	±1.6	−78.4	−81.5	−80.0	±1.6	−78.4	−81.6	−80.0	±1.6
③		Right front	−78.6	−81.7	−80.2	±1.6	−78.6	−81.7	−80.2	±1.6	−78.7	−81.7	−80.2	±1.5
④		Left front	−78.5	−81.8	−80.2	±1.7	−78.5	−81.8	−80.2	±1.7	−78.5	−81.8	−80.2	±1.7
⑤		Center	−78.6	−81.1	−79.9	±1.3	−78.5	−81.0	−79.8	±1.3	−78.6	−81.1	−79.9	±1.3
⑥	Middle area	Left back	−79.0	−81.8	−80.4	±1.4	−79.0	−81.8	−80.4	±1.4	−79.0	−81.8	−80.4	±1.4
⑦		Right back	−78.9	−81.6	−80.3	±1.4	−78.8	−81.6	−80.2	±1.4	−78.8	−81.5	−80.2	±1.3
⑧		Right front	−78.9	−81.8	−80.4	±1.5	−78.8	−81.8	−80.3	±1.5	−78.8	−81.8	−80.3	±1.5
⑨		Left front	−79.0	−81.8	−80.4	±1.4	−78.9	−81.7	−80.3	±1.4	−78.9	−81.6	−80.3	±1.4
⑩		Center	−79.4	−81.5	−80.5	±1.1	−79.3	−81.5	−80.4	±1.1	−79.2	−81.4	−80.3	±1.1
⑪	Bottom area	Left back	−78.8	−81.6	−80.2	±1.4	−78.8	−81.6	−80.2	±1.4	−78.8	−81.6	−80.2	±1.4
⑫		Right back	−78.5	−81.4	−80.0	±1.5	−78.5	−81.3	−79.9	±1.4	−78.6	−81.4	−80.0	±1.4
⑬		Right front	−78.5	−81.2	−79.9	±1.4	−78.4	−81.2	−79.8	±1.4	−78.4	−81.2	−79.8	±1.4
⑭		Left front	−78.9	−81.6	−80.3	±1.4	−78.8	−81.6	−80.2	±1.4	−78.9	−81.6	−80.3	±1.4
⑮		Center	−79.0	−81.2	−80.1	±1.1	−78.9	−81.1	−80.0	±1.1	−78.8	−81.1	−80.0	±1.2
Average			−	−	−80.1	−	−	−	−80.1	−	−	−	−80.1	−

Note:This data does not represent a guarantee of product performance.

＜Amount of power consumption＞
Amount of power consumption when driving at cycle
(SV=-80℃)
1φ220/230/240V Unit:kWh/day

	220V	230V	240V
AT23℃	4.33	4.47	4.78
AT30℃	4.90	4.98	5.30

Note:This data does not represent a guarantee of product performance.

＜Distribution data＞

Temperature of the cycle in each area（**SV=−70℃**、air temperature）

Unit:℃

			Ambient temperature 23℃											
			220V 50Hz				230V 50Hz				240V 50Hz			
			Maximum	Minimum	Middle of cycle	Differential	Maximum	Minimum	Middle of cycle	Differential	Maximum	Minimum	Middle of cycle	Differential
①	Upper area	Left back	−68.3	−72.3	−70.3	±2.0	−68.2	−72.3	−70.3	±2.1	−68.1	−72.2	−70.2	±2.1
②		Right back	−68.5	−72.1	−70.3	±1.8	−68.5	−72.1	−70.3	±1.8	−68.4	−72.0	−70.2	±1.8
③		Right front	−68.7	−72.2	−70.5	±1.8	−68.6	−72.3	−70.5	±1.8	−68.6	−72.2	−70.4	±1.8
④		Left front	−68.6	−72.3	−70.5	±1.8	−68.5	−72.4	−70.5	±2.0	−68.5	−72.2	−70.4	±1.9
⑤		Center	−68.6	−71.4	−70.0	±1.4	−68.5	−71.5	−70.0	±1.5	−68.5	−71.4	−70.0	±1.5
⑥	Middle area	Left back	−69.1	−72.3	−70.7	±1.6	−69.0	−72.4	−70.7	±1.7	−69.0	−72.3	−70.7	±1.7
⑦		Right back	−68.8	−71.9	−70.4	±1.6	−68.7	−72.0	−70.4	±1.7	−68.7	−71.9	−70.3	±1.6
⑧		Right front	−68.9	−72.2	−70.6	±1.7	−69.0	−72.3	−70.7	±1.7	−68.9	−72.2	−70.6	±1.7
⑨		Left front	−69.0	−72.0	−70.5	±1.5	−69.0	−72.1	−70.6	±1.6	−68.9	−72.0	−70.5	±1.6
⑩		Center	−69.5	−71.6	−70.6	±1.1	−69.4	−71.7	−70.6	±1.2	−69.3	−71.7	−70.5	±1.2
⑪	Bottom area	Left back	−69.1	−72.0	−70.6	±1.5	−69.0	−72.0	−70.5	±1.5	−69.0	−72.0	−70.5	±1.5
⑫		Right back	−68.7	−71.8	−70.3	±1.6	−68.6	−71.8	−70.2	±1.6	−68.7	−71.9	−70.3	±1.6
⑬		Right front	−68.6	−71.8	−70.2	±1.6	−68.6	−71.8	−70.2	±1.6	−68.5	−71.8	−70.2	±1.7
⑭		Left front	−69.0	−72.1	−70.6	±1.6	−69.0	−72.1	−70.6	±1.6	−68.9	−72.1	−70.5	±1.6
⑮		Center	−69.1	−71.3	−70.2	±1.1	−69.0	−71.4	−70.2	±1.2	−68.9	−71.3	−70.1	±1.2
Average			−	−	−70.4	−	−	−	−70.4	−	−	−	−70.3	−

Unit:℃

			Ambient temperature 30℃											
			220V 50Hz				230V 50Hz				240V 50Hz			
			Maximum	Minimum	Middle of cycle	Differential	Maximum	Minimum	Middle of cycle	Differential	Maximum	Minimum	Middle of cycle	Differential
①	Upper area	Left back	−68.2	−72.1	−70.2	±2.0	−68.1	−72.1	−70.1	±2.0	−68.2	−72.1	−70.2	±2.0
②		Right back	−68.4	−71.9	−70.2	±1.8	−68.4	−71.9	−70.2	±1.8	−68.4	−72.0	−70.2	±1.8
③		Right front	−68.7	−72.2	−70.5	±1.8	−68.6	−72.2	−70.4	±1.8	−68.6	−72.2	−70.4	±1.8
④		Left front	−68.5	−72.2	−70.4	±1.9	−68.5	−72.2	−70.4	±1.9	−68.6	−72.3	−70.5	±1.8
⑤		Center	−68.6	−71.5	−70.1	±1.5	−68.6	−71.5	−70.1	±1.5	−68.6	−71.5	−70.1	±1.5
⑥	Middle area	Left back	−69.1	−72.2	−70.7	±1.6	−69.1	−72.2	−70.7	±1.6	−69.1	−72.3	−70.7	±1.6
⑦		Right back	−69.0	−72.1	−70.6	±1.6	−69.0	−72.1	−70.6	±1.6	−69.0	−72.1	−70.6	±1.6
⑧		Right front	−69.1	−72.3	−70.7	±1.6	−69.0	−72.3	−70.7	±1.7	−69.1	−72.4	−70.8	±1.7
⑨		Left front	−69.2	−72.2	−70.7	±1.5	−69.2	−72.2	−70.7	±1.5	−69.2	−72.2	−70.7	±1.5
⑩		Center	−69.6	−71.8	−70.7	±1.1	−69.6	−71.8	−70.7	±1.1	−69.6	−71.8	−70.7	±1.1
⑪	Bottom area	Left back	−69.0	−72.0	−70.5	±1.5	−69.0	−71.9	−70.5	±1.5	−69.0	−72.0	−70.5	±1.5
⑫		Right back	−68.6	−71.8	−70.2	±1.6	−68.7	−71.8	−70.3	±1.6	−68.7	−71.8	−70.3	±1.6
⑬		Right front	−68.6	−71.8	−70.2	±1.6	−68.6	−71.8	−70.2	±1.6	−68.6	−71.7	−70.2	±1.6
⑭		Left front	−69.0	−72.1	−70.6	±1.6	−69.0	−72.1	−70.6	±1.6	−68.9	−72.2	−70.6	±1.7
⑮		Center	−69.1	−71.4	−70.3	±1.2	−69.0	−71.5	−70.3	±1.3	−69.0	−71.4	−70.2	±1.2
Average			−	−	−70.4	−	−	−	−70.4	−	−	−	−70.4	−

Note:This data does not represent a guarantee of product performance.

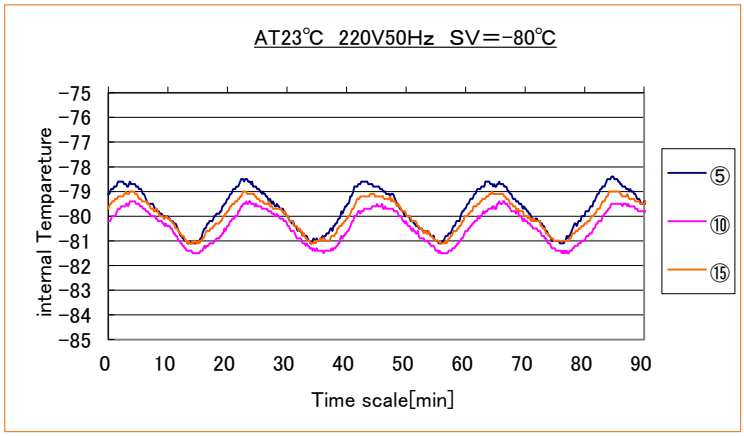
＜Amount of power consumption＞

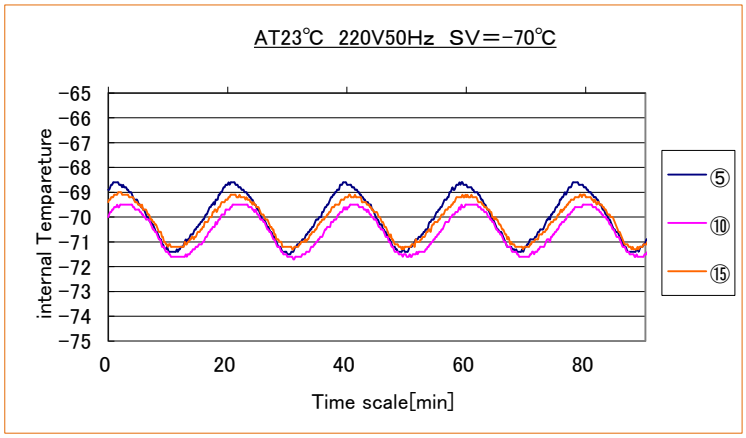
Amount of power consumption when driving at cycle (SV=−70℃)

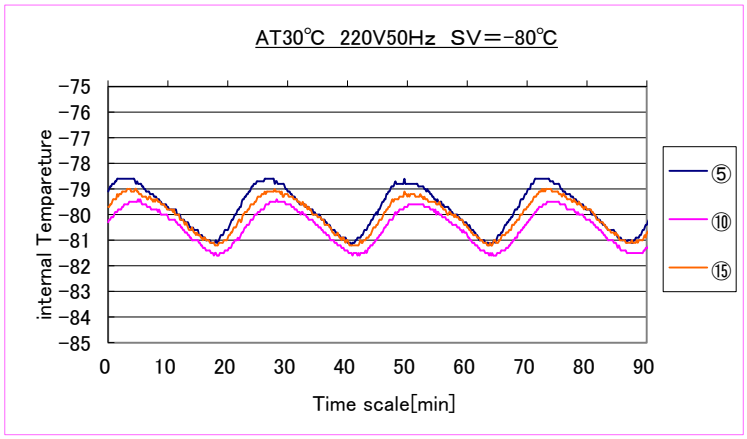
1φ220/230/240V　　Unit:kWh/day

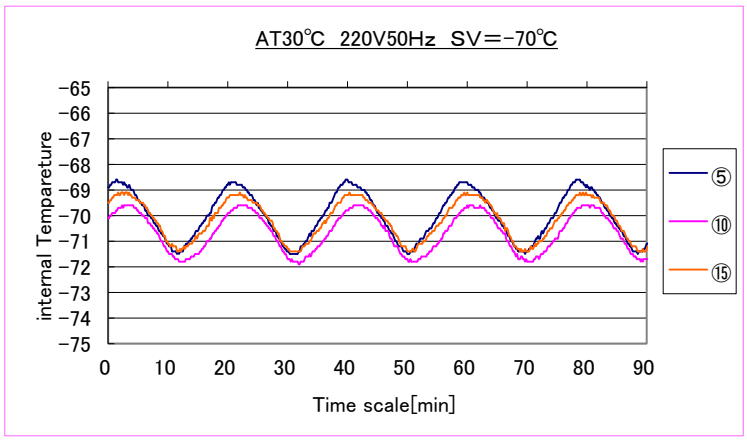
	220V	230V	240V
AT23℃	3.53	3.68	3.89
AT30℃	3.86	4.15	4.26

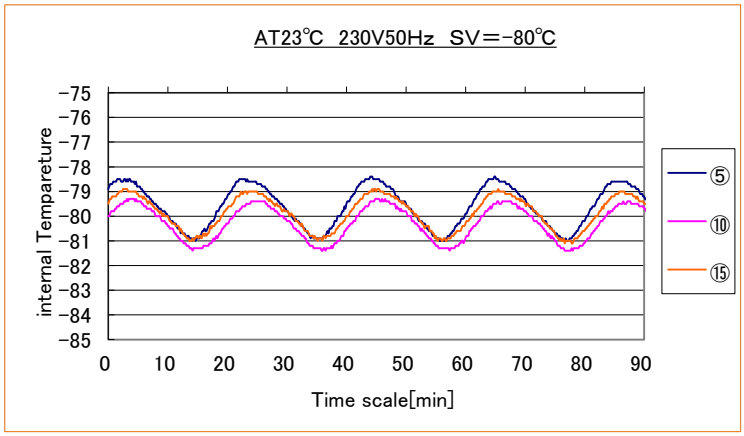
Note:This data does not represent a guarantee of product performance.

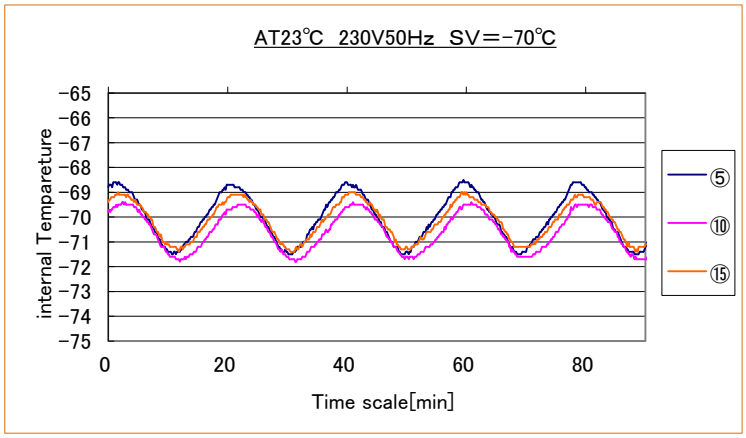

AT23℃ 220V50Hz SV=-80℃
internal Tempareture
-75
-76
-77
-78
-79
-80
-81
-82
-83
-84
-85
0
10
20
30
40
50
60
70
80
90
Time scale[min]
⑤
⑩
⑮

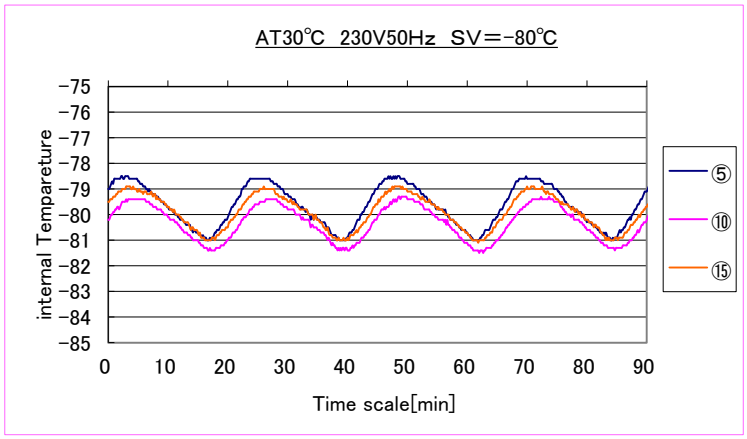

AT23℃ 220V50Hz SV=-70℃
internal Tempareture
-65
-66
-67
-68
-69
-70
-71
-72
-73
-74
-75
0
20
40
60
80
Time scale[min]
⑤
⑩
⑮

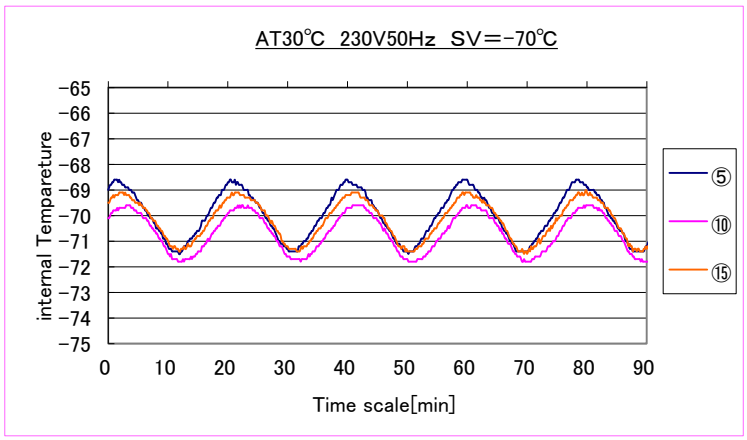

AT30℃ 220V50Hz SV=-80℃
internal Tempareture
-75
-76
-77
-78
-79
-80
-81
-82
-83
-84
-85
0
10
20
30
40
50
60
70
80
90
Time scale[min]
⑤
⑩
⑮

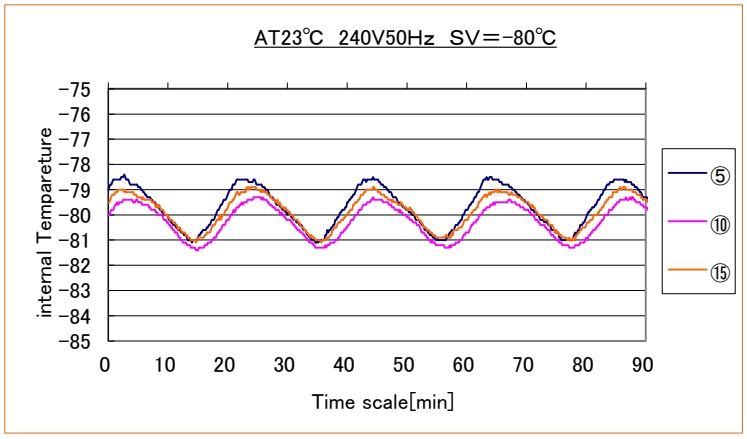

AT30℃ 220V50Hz SV=-70℃
internal Tempareture
-65
-66
-67
-68
-69
-70
-71
-72
-73
-74
-75
0
10
20
30
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50
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70
80
90
Time scale[min]
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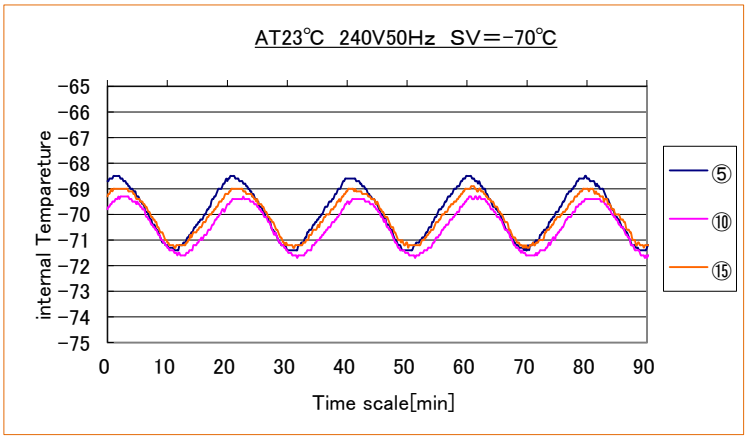

AT23℃ 230V50Hz SV=-80℃
internal Tempareture
-75
-76
-77
-78
-79
-80
-81
-82
-83
-84
-85
0
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30
40
50
60
70
80
90
Time scale[min]
⑤
⑩
⑮

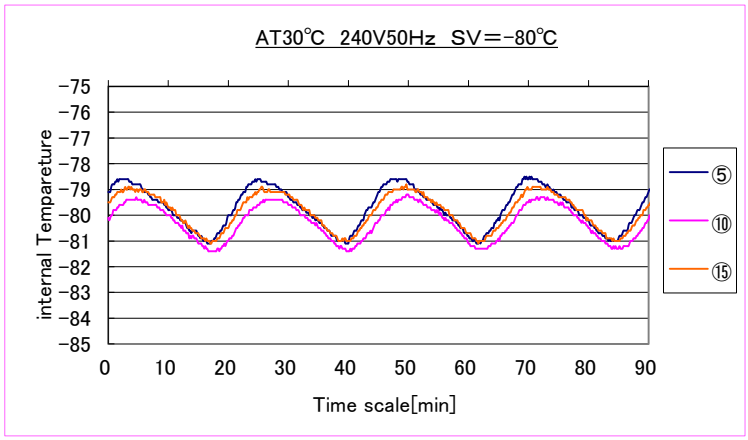

AT23℃ 230V50Hz SV=-70℃
internal Tempareture
-65
-66
-67
-68
-69
-70
-71
-72
-73
-74
-75
0
20
40
60
80
Time scale[min]
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⑩
⑮

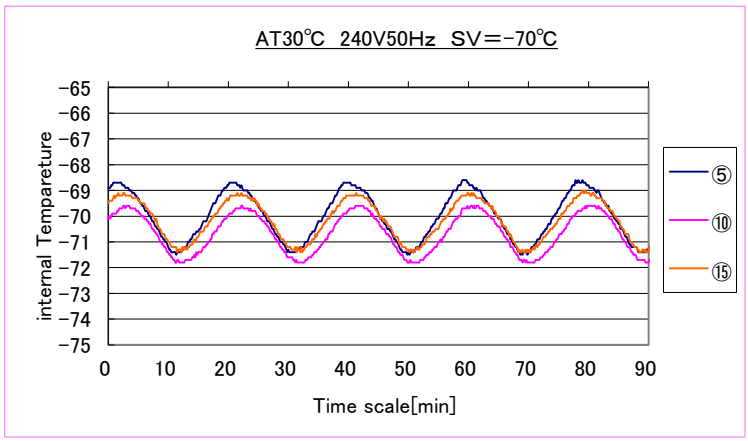

AT30℃ 230V50Hz SV=-80℃
internal Tempareture
-75
-76
-77
-78
-79
-80
-81
-82
-83
-84
-85
0
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70
80
90
Time scale[min]
⑤
⑩
⑮


AT30℃ 230V50Hz SV=-70℃
internal Tempareture
-65
-66
-67
-68
-69
-70
-71
-72
-73
-74
-75
0
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30
40
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60
70
80
90
Time scale[min]
⑤
⑩
⑮


AT23℃ 240V50Hz SV=-80℃
internal Tempareture
-75
-76
-77
-78
-79
-80
-81
-82
-83
-84
-85
0 10 20 30 40 50 60 70 80 90
Time scale[min]
⑤
⑩
⑮


AT23℃ 240V50Hz SV=-70℃
internal Tempareture
-65
-66
-67
-68
-69
-70
-71
-72
-73
-74
-75
0 10 20 30 40 50 60 70 80 90
Time scale[min]
⑤
⑩
⑮


AT30℃ 240V50Hz SV=-80℃
internal Tempareture
-75
-76
-77
-78
-79
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-82
-83
-84
-85
0 10 20 30 40 50 60 70 80 90
Time scale[min]
⑤
⑩
⑮


AT30℃ 240V50Hz SV=-70℃
internal Tempareture
-65
-66
-67
-68
-69
-70
-71
-72
-73
-74
-75
0 10 20 30 40 50 60 70 80 90
Time scale[min]
⑤
⑩
⑮

Notice

☐ CORRECTION ☐ SERVICE ☐ PRODUCT IMPROVEMET
☑ PRODUCTION CHANGE ☐ ADD INFORMATION ☐ FOR RoHS

FILE NO.

Please add the following NOTICE to the Manuals listed below.

Category: **ULTRA-LOW TEMP. FREEZER** Date: **May. 23, 2017**

Model: **MDF-C8V1**

Ref No: **SM9910171** Issued No. **E429**

NOTICE

Because of parts discontinuance, P.C.B. and switching power supply have been changed.

1. Effective Models and Production

MDF-C8V1-PA, PC, PE, PK, PR, PT S/N: 15110233~
MDF-C8V1-SE S/N: 15120009~

2. Change description

1) P.C.B.

New type P.C.B. is NOT compatible with old type P.C.B.
P.C.B. replacement service kit is available for repair. (Replacement procedure is included.)
When replacing old type main P.C.B. with a new type main P.C.B., other P.C.B.s need to be replaced at the same time.
After replacing P.C.B.s, confirm the model code (F17 in service mode).

Model code	Destination
001	All models, except PC
003	PC model





* After S/N: 16100284, model codes have been changed.
For more details, refer to Notice E418 (SM9910171-09).

ROM version V3.01
To make the P.C.B common for other models, ROM version is changed to V3.01.
No effect on the product performance due to this change.

* After S/N: 16100284, ROM version has been upgraded to V3.05.
For more details, refer to Notice E418 (SM9910171-09).

2) Switching power supply

Switching power supply	Old	New
Type	ZWS10-12/J	ZWS10B-12
Input	100-240VAC	100-240VAC
Output	DC12V, 0.85A	DC12V, 0.9A



New type switching power supply is NOT compatible with old type switching power supply.
Switching power supply replacement service kit is available for repair. (Replacement procedure is included.)

REFERENCE NO. SM9910171-10

Notice

☐ CORRECTION ◉ PRODUCTION CHANGE
☐ SERVICE ☐ ADD INFORMATION
☐ PRODUCT IMPROVEMET ☐ FOR RoHS

FILE NO.

Please add the following NOTICE to the Manuals listed below.

Category: **Products charged Fluorinated gas** Date: **Jul. 12, 2017**

Model: **Refer to separate sheet** Destination: **PE model**

Ref No: Issued No. **E432**

NOTICE

Change labeling information,
based on REGULATION (EU) No 517/2014 on Certain Fluorinated Greenhouse Gases.

1. Effective models and production
Production from September 22, 2016.
Refer to separate sheet.

2. Change descriptions
Change labeling information.
(1) Add "Contains fluorinated greenhouse gases".
(2) Change Refrigerant name with industry designation.
ex.) R134a to HFC-134a
(3) Change Charge (net) to kg.
(4) Add Weight of CO_2 equivalent.
(5) Add GWP.
(6) Add "Foam blown with fluorinated greenhouse gasses".
Note : foam blown with HFC-245fa for products made by Mexico factory.

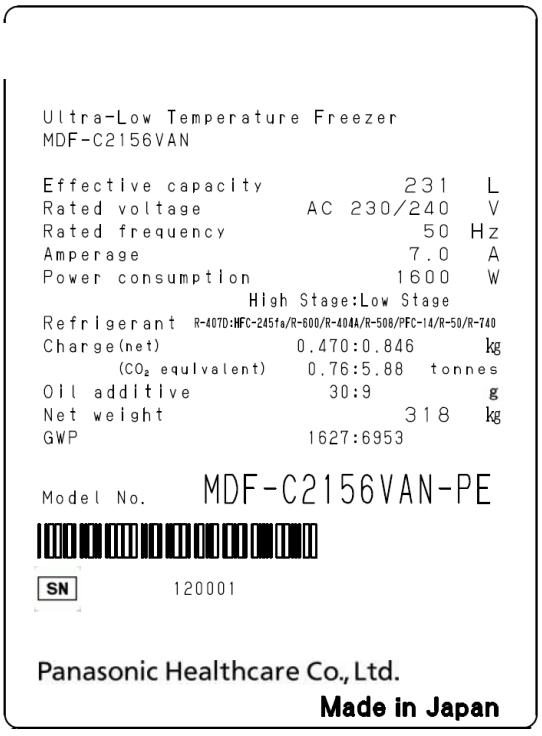


Fig. 1 Sample of new Label

REFERENCE NO. **Weblist_SM002**

Effective models and production

No.	Ref. No.	Models	Serial No.
1	SM9910293-05	MPR-S163-PE	16110652～
		MPR-S313-PE	16100995～
2	SM9910153-07	MPR-514-PE	16090413～
		MPR-514R-PE	16090087～
3	SM9910182-06	MPR-1014-PE	16100170～
		MPR-1014R-PE	16100049～
4	SM9910162-10	MPR-721-PE	16100690～
		MPR-721R-PE	16110218～
5	SM9910216-09	MPR-1411-PE	16090604～
		MPR-1411R-PE	16090174～
6	SM9910247-05	MPR-215F-PE	16100846～
7	SM9910022-06	MPR-414F-PE	16091780～
		MPR-414FS-PE	16100010～
8	SS7210149-03	MBR-107DH-PE	16120363～
9	SS7210150-02	MBR-506DH-PE	17010001～
10	SM9910226-04	MBR-305GR-PE	16100122～
11	SM9910288-06	MBR-705GR-PE	16100121～
12	SM9910230-07	MBR-1405GR-PE	16100070～
13	SM9910168-06	MIR-154-PE	16100520～
		MIR-254-PE	16100356～
14	SM9910224-05	MIR-554-PE	16090248～
15	SM9910266-06	MLR-352-PE	16100148～
		MLR-352H-PE	16100287～
16	SM9910202-06	MDF-137-PE	16100040～
17	SM9910209-06	MDF-237-PE	16100017～
18	SM9910279-03	MDF-437-PE	16100036～
19	SM9910273-10	MDF-U334-PE	16110486～
20	SM9910241-10	MDF-U5312-PE	16110581～
21	SM9910214-14	MDF-U5412-PE	16100355～
22	SM9910169-07	MDF-U443-PE	16100188～
23	SM9910171-11	MDF-C8V1-PE	16100300～
24	SM9910107-05	MDF-594-PE	16110075～
25	SM9910121-04	MDF-794-PE	*
26	SM9910319-04	MDF-DC500VX-PE	16100011～
		MDF-DC700VX-PE	16090008～
27	SM9910145-06	MDF-U3386S-PE	*
28	SM9910065-03	MDF-U5386S-PE	16100108～
29	SM9910061-03	MDF-U7386S-PE	16100036～
30	SM9910135-08	MDF-U33V-PE	16100309～
31	SM9910253-03	MDF-U55V-PE	16090192 16090193 16100214～
32	SM9910225-10	MDF-U74V-PE	17040072
33	SM9910331-01	MDF-DU900V-PE	16100011～
34	SM9910229-18	MDF-U500VX-PE	16100399～
35	SM9910255-15	MDF-U700VX-PE	16100556～
36	SM9910068-08	MDF-1156-PE	16100030～
		MDF-1156ATN-PE	16120013～
37	SM9910079-07	MDF-C2156VAN-PE	16100136～
38	SM9910261-03	MDF-U731M-PE	16109362～
39	SM9910264-04	MPR-715F-PE	*
40	SM9910267-04	MDF-U76V-PE	*

* Forced change from September 22, 2016

***Revision history**

Revision #	Date of revision	Reason of revision
SM9910171-01	Feb.17, 2009	Correct misprint in P17 "Function mode".
SM9910171-02	Nov.12, 2009	Correct descriptions in P5 "Cooling unit parts" and P8 "Electric parts".
SM9910171-03	Feb.20, 2013	Charging amount of n-Pentane before charging mix gas.
SM9910171-04	Jul. 24, 2015	Notice relating to service manual for Panasonic brand products.
SM9910171-05	Jun. 8, 2015	Correct misprint in P15 and P19 "Reset of accumulation time" of fanmotor.
SM9910171-06	Jan. 6, 2016	Correct misprint in P5 "Refrigerant" and "Model number" of Cooling unitparts and in P6 "Model number" of Cooling circuits.
SM9910171-07	Jan. 7, 2016	Because of parts discontinuance, Service Manual has been changed
SM9910171-08	30-May-16	Because of parts discontinuance, power switch has been changed.
SM9910171-09	Jan. 31, 2017	Because of compressor discontinuance, the parts have been changed.
SM9910171-10	May. 23, 2017	Because of parts discontinuance, P.C.B. and switching power supplyhave been changed.
SM9910171-11	Jul. 12, 2017	CSM000001-00 Changed labeling information,based on REGULATION(EU) No 517/2014 on Certain Fluorinated Greenhouse gasses.