Can help service:

24PR125
15PR28
18PR28
24PR46
VT-OUTDOORREF
VT-FZR24OI
VT-50FDHT
vt-outdoor15gd
vt-outdoor24gd

Wine Cabinets
Service Manual

(Code Rev. B V20140828)

CONTENT

WARNING

- **Before servicing, make sure to unplug the appliance.**
- **Replace all parts before operating the appliance after service.**
- **Failure to do so could result in death, electrical shock or personal injury.**
- **All servicing must be carried out by the qualified technicians. Repairs undertaken incorrectly may cause the considerable risk to the user.**
- **For the units with R600a as the coolant please make sure to release all of refrigerant before servicing the cooling system otherwise fires or explosion will be resulted.**
- **Personal Injury Hazard - To prevent unnecessary risk of fire, electrical shock or personal injury, all wiring and grounding must be done in accordance with National Electrical Code and local codes and ordinances.**

1. SAFETY PRECAUTIONS

Please read the following instructions before servicing your products.

1. Check if an electric leakage occurs in the unit.
2. Unplug prior to servicing to prevent electric shock.
3. Whenever testing with power on, wear rubber gloves to prevent electric shock.
4. If you use any kind of appliance, check regular current, voltage and capacity.
5. Don't touch the evaporator with wet hands. This may cause frostbite.
6. Prevent water from following onto electric elements in the mechanical parts.
7. When you stand up during observing the lower part with the upper door open, move with care to prevent head wound which may happen by hitting the upper door.
8. When tilting the unit, remove any materials in the unit.
9. When servicing the evaporator, wear cotton gloves. This is to prevent injuries from the sharp evaporator fins.
10. Leave the disassembly of the refrigerating cycle to a specialized service center. The gas inside the circuit may pollute the environment.
11. When you discharge the refrigerant, wear the protective safety glasses or goggle for eye safety.
12. When you repair the refrigerating cycle system, the work area is well ventilated. Especially if the refrigerant is R600a, there are no fire or heat sources. (No smoking)

2. SPECIFICATIONS

Model No.		VC7S			
Type		Built-in or Free Standing Installation			
Capacity					
Total Storage Volume - L		20			
Wine Storage Bottles	Zone One	7			
	Zone Two	N.A			
	Zone Three	N.A			
Performance & Features					
Ambient Temp. Range	°C/°F	16 ~ 38 / 60 ~100			
Setting Temp. Range	°C/°F	5 ~ 22 / 40 ~ 72			
Power Source	V/Hz	100/50,60	220-240/50		
Energy Consumption	KWh/24h	0.51			
Rated Input	W	60			
Rated Current	A	1.0	0.4		
Heater	W	40	N.A		
Noise Level	(dB(A) re 1 pW)	44			
Defrost Type		Automatic			
Temp. Control		Electronic			
Blowing Agent		Cyclopentane			
Refrigerating System					
Cooling System		Air Forced Convection Type			
Compressor	Model No.	VY35R00A	B35C		
	Type	Hermetic Type			
	LRA				
	RLA	0.85/0.75			
	Overload Protector	DRB21N61 A1	BR B 1 0 K 6 1 A 1 1 0 9		
	PTC Starter	QP2-4R7	Q P 2 - 1 5		
	Oil		Mineral Oil (MO)		
Condenser Fan Motor	Model No.	TD8020LB/YM1208PKB3			
	Rating	12 V DC, 0.08 A/0.09A			
Evaporator Fan Motor	Model No.	TD8020LS/YM1208PKS3			
	Rating	12 V DC, 0.08 A/0.09A			
Expansion device		Capillary (Ø0.7 x 1200 mm)			
Refrigerant / Charged Volume		R600a/0.50 Oz	R600a/14g		
Dimensions & Weights					
Net Dimensions	Width – mm / in	148/5⅞"			
	Height – mm / in	820/32¼"			
	Depth – mm / in	570/22½"			
Packing Dimensions	Width – mm / in	190/7½"			
	Height – mm / in	865/34¼"			
	Depth – mm / in	570/22½"			
Weight	Net / Gross – KG / Lbs	18/40 / 19/42			

***** *Specifications are subject to change without prior notice.*

Model No.		VC20S		VC20D	
Type		Built-in or Free Standing Installation			
Capacity					
Total Storage Volume - L		60		57	
Wine Storage Bottles	Zone One	20		6	
	Zone Two	N.A		11	
	Zone Three	N.A		N.A	
Performance & Features					
Ambient Temp. Range	°C/°F	16 ~ 38 / 60 ~100		0 ~ 38 / 32 ~100	
Setting Temp. Range	°C/°F	5 ~ 22 / 40 ~ 72		5 ~ 22 / 40 ~ 72	
Power Source	V/Hz	115/60	220-240/50	115/60	220-240/50
Energy Consumption	KWh/24h	0.50	0.45	0.50	0.52
Rated Input	W	100	85	100	85
Rated Current	A	1.0	0.6	1.0	0.6
Heater	W	N.A		80	
Noise Level	dB(A)	44		44	
Defrost Type		Automatic		Automatic	
Temp. Control		Electronic		Electronic	
Blowing Agent		Cyclopentane		Cyclopentane	
Refrigerating System					
Cooling System		Air Forced Convection Type		Air Forced Convection Type	
Compressor	Model No.	JK1111HY	D53CY	JK1111HY	D53CY
	Type	Hermetic Type		Hermetic Type	
	LRA	12.5	8.1	12.5	8.1
	RLA	0.80	0.55	0.80	0.55
	Overload Protector	4TM232VHBYY	B35—120	4TM232VHBYY	B35—120
	PTC Starter	QP2-4.7/B3	QP2—15	QP2-4.7/B3	QP2—15
	Oil	ISO8/ISO10 175ml	S8P 150ml (MO)	ISO8/ISO10 175ml	S8P 150ml (MO)
Condenser Fan Motor	Model No.	TD8020LB/YM1208PKB3		TD8020LB/YM1208PKB3	
	Rating	12 V DC, 0.08 A/0.09A		12 V DC, 0.08 A/0.09A	
Evaporator Fan Motor	Model No.	TD8020LS/YM1208PKS3		TD8020LS/YM1208PKS3	
	Rating	12 V DC, 0.08 A/0.09A		12 V DC, 0.08 A/0.09A	
Expansion device		Capillary (Ø0.7x1200mm)		Capillary (Ø0.7x1200mm)	
Refrigerant / Charged Volume		R600a/0.64 Oz	R600a/18g	R600a/0.64Oz	R600a/18g
Dimensions & Weights					
Net Dimensions	Width – mm / in	295/11⅝"		295/11⅝"	
	Height – mm / in	820/32¼"		820/32¼"	
	Depth – mm / in	615/24¼"		615/24¼"	
Packing Dimensions	Width – mm / in	326/12¾"		326/12¾"	
	Height – mm / in	865/34¼"		865/34¼"	
	Depth – mm / in	628/24¾"		628/24¾"	
Weight	Net / Gross – KG / Lb	25/55 / 27/59.5		26/57 / 28/62	

****** Specifications are subject to change without prior notice.*

Model No.		VC33S		VC33D	
Type		Built-in or Free Standing Installation			
Capacity					
Total Storage Volume - L		95		92	
Wine Storage Bottles	Zone One	33		12	
	Zone Two	N.A		16	
	Zone Three	N.A		N.A	
Performance & Features					
Ambient Temp. Range	°C/°F	16 ~ 38 / 60 ~100		0 ~ 38 / 32 ~100	
Setting Temp. Range	°C/°F	5 ~ 22 / 40 ~ 72		5 ~ 22 / 40 ~ 72	
Power Source	V/Hz	115/60	220-240/50	115/60	220-240/50
Energy Consumption	KWh/24h	0.53	0.60	0.64	0.66
Rated Input	W	100	85	100	85
Rated Current	A	1.0	0.6	1.0	0.6
Heater	W	N.A		80	
Noise Level	dB(A)	45		45	
Defrost Type		Automatic		Automatic	
Temp. Control		Electronic		Electronic	
Blowing Agent		Cyclopentane		Cyclopentane	
Refrigerating System					
Cooling System		Air Forced Convection Type		Air Forced Convection Type	
Compressor	Model No.	JK1111HY	D53CY	JK1111HY	D53CY
	Type	Hermetic Type		Hermetic Type	
	LRA	12.5	8.1	12.5	8.1
	RLA	0.80	0.55	0.80	0.55
	Overload Protector	4TM232VH BYY	B35—120	4TM232V HBYY	B35—120
	PTC Starter	QP2-4.7/B 3	QP2—15	QP2-4.7/B 3	QP2—15
	Oil	ISO8/ISO1 0 175ml	S8P 150ml (MO)	ISO8/ISO 10 175ml	S8P 150ml (MO)
Condenser Fan Motor	Model No.	TD1225LB/YM1212PTB3		TD1225LB/YM1212PTB 3	
	Rating	12 V DC, 0.18 A/0.11A		12 V DC, 0.18 A/0.11A	
Evaporator Fan Motor	Model No.	TD8020LS/YM1208PKS3		TD8020LS/YM1208PKS 3	
	Rating	12 V DC, 0.08 A/0.09A		12 V DC, 0.08 A/0.09A	
Expansion device		Capillary (Ø0.7x1200mm)		Capillary (Ø0.7x1200mm)	
Refrigerant / Charged Volume		R600a/0.81 Oz	R600a/18g	R600a/0.8 1Oz	R600a/18g
Dimensions & Weights					
Net Dimensions	Width – mm / in	375/14¾"		375/14¾"	
	Height – mm / in	864/34"		864/34"	
	Depth – mm / in	615/24¼"		615/24¼"	
Packing Dimensions	Width – mm / in	415/16⅜"		415/16⅜"	
	Height – mm / in	910/35⅞"		910/35⅞"	
	Depth – mm / in	628/24¾"		628/24¾"	
Weight	Net / Gross – KG / Lb	32/70.5 / 35/77.0		32/70.5 / 35/77.0	

****** Specifications are subject to change without prior notice.*

Model No.		VC54S		VC54D	
Type		Built-in or Free Standing Installation			
Capacity					
Total Storage Volume - L		145		135	
Wine Storage Bottles	Zone One	54		16	
	Zone Two	N.A		38	
	Zone Three	N.A		N.A	
Performance & Features					
Ambient Temp. Range	°C/°F	0 ~ 38 / 32 ~100		0 ~ 38 / 32 ~100	
Setting Temp. Range	°C/°F	5 ~ 22 / 40 ~ 72		5 ~ 22 / 40 ~ 72	
Power Source	V/Hz	115/60	220-240/50	115/60	220-240/50
Energy Consumption	KWh/24h	0.64	0.54	0.64	0.54
Rated Input	W	100	100	100	100
Rated Current	A	1.0	1.2	1.0	1.2
Heater	W	120		120	
Noise Level	dB(A)	45		45	
Defrost Type		Automatic		Automatic	
Temp. Control		Electronic		Electronic	
Blowing Agent		Cyclopentane		Cyclopentane	
Refrigerating System					
Cooling System		Air Forced Convection Type		Air Forced Convection Type	
Compressor	Model No.	JK1111HY	JM1110Y	JK1111HY	JM1110Y
	Type	Hermetic Type		Hermetic Type	
	LRA	12.5	8.7	12.5	8.7
	RLA	0.80	0.65	0.80	0.65
	Overload Protector	4TM232VHBYY	B40-120/B	4TM232VHBYY	B40-120/B
	PTC Starter	QP2-4.7/B3	QP2-12/B	QP2-4.7/B3	QP2-12/B
	Oil	ISO8/ISO10 175ml	ISO8/ISO10 175ml	ISO8/ISO10 175ml	ISO8/ISO10 175ml
Condenser Fan Motor	Model No.	TD1225LB/YM1212PTB3		TD1225LB/YM1212PTB3	
	Rating	12 V DC, 0.18 A/0.11A		12 V DC, 0.18 A/0.11A	
Evaporator Fan Motor	Model No.	TD1225LS/YM1212PTS3		TD1225LS/YM1212PTS3	
	Rating	12 V DC, 0.18 A/0.11A		12 V DC, 0.18 A/0.11A	
Expansion device		Capillary (Ø0.7x1600mm)		Capillary (Ø0.7x1600mm)	
Refrigerant / Charged Volume		R600a/0.99 Oz	R600a/28g	R600a/0.99Oz	R600a/28g
Dimensions & Weights					
Net Dimensions	Width – mm / in	595/23½"		595/23½"	
	Height – mm / in	820/32¼"		820/32¼"	
	Depth – mm / in	615/24¼"		615/24¼"	
Packing Dimensions	Width – mm / in	660/26.0"		660/26.0"	
	Height – mm / in	880/34⅝"		880/34⅝"	
	Depth – mm / in	628/24¾"		628/24¾"	
Weight	Net / Gross – KG / Lb	43/95 / 47/104		43/95 / 47/104	

****** Specifications are subject to change without prior notice.*

Model No.		VC54SB		VC54DB	
Type		Built-in or Free Standing Installation			
Capacity					
Total Storage Volume - L		140		130	
Wine Storage Bottles	Zone One	54		16	
	Zone Two	N.A		38	
	Zone Three	N.A		N.A	
Performance & Features					
Ambient Temp. Range	°C/°F	0 ~ 38 / 32 ~100		0 ~ 38 / 32 ~100	
Setting Temp. Range	°C/°F	5 ~ 22 / 40 ~ 72		5 ~ 22 / 40 ~ 72	
Power Source	V/Hz	115/60	220-240/50	115/60	220-240/50
Energy Consumption	KWh/24h	0.52	0.64	0.52	0.64
Rated Input	W	80	100	80	100
Rated Current	A	0.80	1.2	0.80	1.2
Heater	W	120		120	
Noise Level	dB(A)	45		45	
Defrost Type		Automatic		Automatic	
Temp. Control		Electronic		Electronic	
Blowing Agent		Cyclopentane		Cyclopentane	
Refrigerating System					
Cooling System		Air Forced Convection Type		Air Forced Convection Type	
Compressor	Model No.	JK1111HY	JM1110Y	JK1111HY	JM1110Y
	Type	Hermetic Type		Hermetic Type	
	LRA	12.5	8.7	12.5	8.7
	RLA	0.80	0.65	0.80	0.65
	Overload Protector	4TM232VHBYY	B40-120/B	4TM232VHBYY	B40-120/B
	PTC Starter	QP2-4.7/B3	QP2-12/B	QP2-4.7/B3	QP2-12/B
	Oil	ISO8/ISO10 175ml	ISO8/ISO10 175ml	ISO8/ISO10 175ml	ISO8/ISO10 175ml
Condenser Fan Motor	Model No.	TD1225LB/YM1212PTB3		TD1225LB/YM1212PTB3	
	Rating	12 V DC, 0.18 A/0.11A		12 V DC, 0.18 A/0.11A	
Evaporator Fan Motor	Model No.	TD1225LS/YM1212PTS3		TD1225LS/YM1212PTS3	
	Rating	12 V DC, 0.18 A/0.11A		12 V DC, 0.18 A/0.11A	
Expansion device		Capillary (Ø0.7x1600mm)		Capillary (Ø0.7x1600mm)	
Refrigerant / Charged Volume		R600a/0.99 Oz	R600a/28g	R600a/0.99Oz	R600a/28g
Dimensions & Weights					
Net Dimensions	Width – mm / in	595/23½"		595/23½"	
	Height – mm / in	864/34"		864/34"	
	Depth – mm / in	643/25⅜"		643/25⅜"	
Packing Dimensions	Width – mm / in	660/26.0"		660/26.0"	
	Height – mm / in	925/36½"		925/36½"	
	Depth – mm / in	660/26.0"		660/26.0"	
Weight	Net / Gross – KG / Lb	44.5/98 / 49/108		44.5/98 / 49/108	

****** Specifications are subject to change without prior notice.*

Model No.		VC100S		VC100D	
Type		Built-in or Free Standing Installation			
Capacity					
Total Storage Volume - L		290		280	
Wine Storage Bottles	Zone One	102		48	
	Zone Two	N.A		54	
	Zone Three	N.A		N.A	
Performance & Features					
Ambient Temp. Range	°C/°F	0 ~ 38 / 32 ~100		0 ~ 38 / 32 ~100	
Setting Temp. Range	°C/°F	5 ~ 22 / 40 ~ 72		5 ~ 22 / 40 ~ 72	
Power Source	V/Hz	115/60	220-240/50	115/60	220-240/50
Energy Consumption	KWh/24h	0.9	0.8	1.0	0.8
Rated Input	W	180	160	180	160
Rated Current	A	1.7	1.4	1.7	1.4
Heater	W	120		120	
Noise Level	dB(A)	48		48	
Defrost Type		Automatic		Automatic	
Temp. Control		Electronic		Electronic	
Blowing Agent		Cyclopentane		Cyclopentane	
Refrigerating System					
Cooling System		Air Forced Convection Type		Air Forced Convection Type	
Compressor	Model No.	NU1118HY	NT1117Y	NU1118HY	NT1117Y
	Type	Hermetic Type		Hermetic Type	
	LRA	20.5	10.2	20.5	10.2
	RLA	1.28	0.7	1.28	0.7
	Overload Protector	4TM319LFBZZ	B60-120/B	4TM319LFBZZ	B60-120/B
	PTC Starter	QP2-4.7/B3	QP2-12/B3	QP2-4.7/B3	QP2-12/B3
	Oil	SH-5(WF7A) 180ml	ISO10(HC-10) 180ml	SH-5(WF7A) 180ml	ISO10(HC-10) 180ml
Condenser Fan Motor	Model No.	TD1225LB/YM1212PTB3		TD1225LB/YM1212PTB3	
	Rating	12 V DC, 0.18 A/0.11A		12 V DC, 0.18 A/0.11A	
Evaporator Fan Motor	Model No.	TD1225LS/YM1212PTS3		TD1225LS/YM1212PTS3	
	Rating	12 V DC, 0.18 A/0.11A		12 V DC, 0.18 A/0.11A	
Expansion device		Capillary (Ø0.7x1800mm)		Capillary (Ø0.7x1800mm)	
Refrigerant / Charged Volume		R600a/1.66Ozg	R600a/47g	R600a/1.66Oz	R600a/47g
Dimensions & Weights					
Net Dimensions	Width – mm / in	595/23½"		595/23½"	
	Height – mm / in	1476/58⅛"		1476/58⅛"	
	Depth – mm / in	615/24¼"		615/24¼"	
Packing Dimensions	Width – mm / in	660/26.0"		660/26.0"	
	Height – mm / in	1556/61¼"		1556/61¼"	
	Depth – mm / in	628/24¾"		628/24¾"	
Weight	Net / Gross – KG / Lb	71/157 / 77/170		71/157 / 77/170	

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Model No.		VC125S		VC125D	
Type		Built-in or Free Standing Installation			
Capacity					
Total Storage Volume - L		365		355	
Wine Storage Bottles	Zone One	126		64	
	Zone Two	N.A		62	
	Zone Three	N.A		N.A	
Performance & Features					
Ambient Temp. Range	°C/°F	0 ~ 38 / 32 ~100		0 ~ 38 / 32 ~100	
Setting Temp. Range	°C/°F	5 ~ 22 / 40 ~ 72		5 ~ 22 / 40 ~ 72	
Power Source	V/Hz	115/60	220-240/50	115/60	220-240/50
Energy Consumption	KWh/24h	0.9	0.9	1.0	0.9
Rated Input	W	180	160	180	160
Rated Current	A	1.7	1.4	1.7	1.4
Heater	W				
Noise Level	dB(A)	48		48	
Defrost Type		Automatic		Automatic	
Temp. Control		Electronic		Electronic	
Blowing Agent		Cyclopentane		Cyclopentane	
Refrigerating System					
Cooling System		Air Forced Convection Type		Air Forced Convection Type	
Compressor	Model No.	NU1118HY	NT1117Y	NU1118HY	NT1117Y
	Type	Hermetic Type		Hermetic Type	
	LRA	20.5	10.2	20.5	10.2
	RLA	1.28	0.7	1.28	0.7
	Overload Protector	4TM319LFBZZ	B60-120/B	4TM319LFBZZ	B60-120/B
	PTC Starter	QP2-4.7/B3	QP2-12/B3	QP2-4.7/B3	QP2-12/B3
	Oil	SH-5(WF7A) 180ml	ISO10(HC-10) 180ml	SH-5(WF7A) 180ml	ISO10(HC-10) 180ml
Condenser Fan Motor	Model No.	TD1225LB/YM1212PTB3		TD1225LB/YM1212PTB3	
	Rating	12 V DC, 0.18 A/0.11A		12 V DC, 0.18 A/0.11A	
Evaporator Fan Motor	Model No.	TD1225LS/YM1212PTS3		TD1225LS/YM1212PTS3	
	Rating	12 V DC, 0.18 A/0.11A		12 V DC, 0.18 A/0.11A	
Expansion device		Capillary (Ø0.7x1800mm)		Capillary (Ø0.7x1800mm)	
Refrigerant / Charged Volume		R600a/1.66 Oz	R600a/47g	R600a/1.66Oz	R600a/47g
Dimensions & Weights					
Net Dimensions	Width – mm / in	595/23½"		595/23½"	
	Height – mm / in	1768/69⅝"		1768/69⅝"	
	Depth – mm / in	615/24¼"		615/24¼"	
Packing Dimensions	Width – mm / in	660/26.0"		660/26.0"	
	Height – mm / in	1960/77⅛"		1960/77⅛"	
	Depth – mm / in	628/24¾"		628/24¾"	
Weight	Net / Gross – KG / Lb				

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Model No.		VC170S		VC170D	
Type		Built-in or Free Standing Installation			
Capacity					
Total Storage Volume - L		430		418	
Wine Storage Bottles	Zone One	171		88	
	Zone Two	N.A		83	
	Zone Three	N.A		N.A	
Performance & Features					
Ambient Temp. Range	°C/°F	0 ~ 38 / 32 ~100		0 ~ 38 / 32 ~100	
Setting Temp. Range	°C/°F	5 ~ 22 / 40 ~ 72		5 ~ 22 / 40 ~ 72	
Power Source	V/Hz	115/60	220-240/50	115/60	220-240/50
Energy Consumption	KWh/24h	0.9	0.9	1.0	0.9
Rated Input	W	180	160	180	160
Rated Current	A	1.7	1.4	1.7	1.4
Heater	W				
Noise Level	dB(A)	48		48	
Defrost Type		Automatic		Automatic	
Temp. Control		Electronic		Electronic	
Blowing Agent		Cyclopentane		Cyclopentane	
Refrigerating System					
Cooling System		Air Forced Convection Type		Air Forced Convection Type	
Compressor	Model No.	NU1118HY	NT1117Y	NU1118HY	NT1117Y
	Type	Hermetic Type		Hermetic Type	
	LRA	20.5	10.2	20.5	10.2
	RLA	1.28	0.7	1.28	0.7
	Overload Protector	4TM319LFBZZ	B60-120/B	4TM319LFBZZ	B60-120/B
	PTC Starter	QP2-4.7/B3	QP2-12/B3	QP2-4.7/B3	QP2-12/B3
	Oil	SH-5(WF7A) 180ml	ISO10(HC-10) 180ml	SH-5(WF7A) 180ml	ISO10(HC-10) 180ml
Condenser Fan Motor	Model No.	TD1225LB/YM1212PTB3		TD1225LB/YM1212PTB3	
	Rating	12 V DC, 0.18 A/0.11A		12 V DC, 0.18 A/0.11A	
Evaporator Fan Motor	Model No.	TD1225LS/YM1212PTS3		TD1225LS/YM1212PTS3	
	Rating	12 V DC, 0.18 A/0.11A		12 V DC, 0.18 A/0.11A	
Expansion device		Capillary (Ø0.7x1800mm)		Capillary (Ø0.7x1800mm)	
Refrigerant / Charged Volume		R600a/1.91 Oz	R600a/54g	R600a/1.91Oz	R600a/54g
Dimensions & Weights					
Net Dimensions	Width – mm / in	595/23½"		595/23½"	
	Height – mm / in	1768/69⅝"		1768/69⅝"	
	Depth – mm / in	720/28⅜"		720/28⅜"	
Packing Dimensions	Width – mm / in	660/26.0"		660/26.0"	
	Height – mm / in	1960/77⅛"		1960/77⅛"	
	Depth – mm / in	760/30"		760/30"	
Weight	Net / Gross – KG / Lb	94/207 / 109/240		94/207 / 109/240	

****** Specifications are subject to change without prior notice.*

Model No.		VC118D		VC118T	
Type		Built-in or Free Standing Installation			
Capacity					
Total Storage Volume - L		355		345	
Wine Storage Bottles	Zone One	56		24	
	Zone Two	62		32	
	Zone Three	N.A		62	
Performance & Features					
Ambient Temp. Range	°C/°F	0 ~ 38 / 32 ~100		0 ~ 38 / 32 ~100	
Setting Temp. Range	°C/°F	5 ~ 22 / 40 ~ 72		5 ~ 22 / 40 ~ 72	
Power Source	V/Hz	115/60	220-240/50	115/60	220-240/50
Energy Consumption	KWh/24h	1.25	0.9	1.5	0.9
Rated Input	W	180	160	180	160
Rated Current	A	1.7	1.4	1.7	1.4
Heater	W	120		80+120	
Noise Level	dB(A)	48		48	
Defrost Type		Automatic		Automatic	
Temp. Control		Electronic		Electronic	
Blowing Agent		Cyclopentane		Cyclopentane	
Refrigerating System					
Cooling System		Air Forced Convection Type		Air Forced Convection Type	
Compressor	Model No.	NU1118HY	NT1117Y	NU1118HY	NT1117Y
	Type	Hermetic Type		Hermetic Type	
	LRA	20.5	10.2	20.5	10.2
	RLA	1.28	0.7	1.28	0.7
	Overload Protector	4TM319LFBZZ	B60-120/B	4TM319LFBZZ	B60-120/B
	PTC Starter	QP2-4.7/B3	QP2-12/B3	QP2-4.7/B3	QP2-12/B3
	Oil	SH-5(WF7A) 180ml	ISO10(HC-10) 180ml	SH-5(WF7A) 180ml	ISO10(HC-10) 180ml
Condenser Fan Motor	Model No.	TD1225LB/YM1212PTB3		TD1225LB/YM1212PTB3	
	Rating	12 V DC, 0.18 A/0.11A		12 V DC, 0.18 A/0.11A	
Evaporator Fan Motor	Model No.	TD1225LS/YM1212PTS3		TD1225LS/YM1212PTS3	
	Rating	12 V DC, 0.18 A/0.11A		12 V DC, 0.18 A/0.11A	
Expansion device		Capillary (Ø0.7x1800mm)		Capillary (Ø0.7x1800mm)	
Refrigerant / Charged Volume		R600a/1.66 Oz	R600a/47g	R600a/1.66Oz	R600a/47g
Dimensions & Weights					
Net Dimensions	Width – mm / in	595/23½"		595/23½"	
	Height – mm / in	1768/69⅝"		1768/69⅝"	
	Depth – mm / in	615/24¼"		615/24¼"	
Packing Dimensions	Width – mm / in	660/26.0"		660/26.0"	
	Height – mm / in	1960/77⅛"		1960/77⅛"	
	Depth – mm / in	628/24¾"		628/24¾"	
Weight	Net / Gross – KG / Lb			94/207 / 109/240	

****** Specifications are subject to change without prior notice.*

Model No.		VC28S			
Type		Built-in in-column Installation (Fully Integrated)			
Capacity					
Total Storage Volume - L		65			
Wine Storage Bottles	Zone One	24			
	Zone Two	N.A			
	Zone Three	N.A			
Performance & Features					
Ambient Temp. Range	°C/°F	16 ~ 33 / 60 ~90			
Setting Temp. Range	°C/°F	5 ~ 22 / 40 ~ 72			
Power Source	V/Hz	115/60	220-240/50		
Energy Consumption	KWh/24h		0.52		
Rated Input	W	100	85		
Rated Current	A	1.0	0.6		
Heater	W	N.A			
Noise Level	dB(A)	44			
Defrost Type		Automatic			
Temp. Control		Electronic			
Blowing Agent		Cyclopentane			
Refrigerating System					
Cooling System		Air Forced Convection Type			
Compressor	Model No.	JK1111HY	D53CY		
	Type	Hermetic Type			
	LRA	12.5	8.1		
	RLA	0.80	0.55		
	Overload Protector	4TM232VH BYY	B35—120		
	PTC Starter	QP2-4.7/B 3	QP2—15		
	Oil	ISO8/ISO10 175ml	S8P 150ml (MO)		
Condenser Fan Motor	Model No.	N.A			
	Rating	N.A			
Evaporator Fan Motor	Model No.	TD8020LS/YM1208PKS3			
	Rating	12 V DC, 0.08 A/0.09A			
Expansion device		Capillary (Ø0.7x1200mm)			
Refrigerant / Charged Volume		R600a/0.57 Oz	R600a/18g		
Dimensions & Weights					
Net Dimensions	Width – mm / in	590/23¼"			
	Height – mm / in	455/17⅞"			
	Depth – mm / in	608/24"			
Packing Dimensions	Width – mm / in	650/25⅝"			
	Height – mm / in	515/20¼"			
	Depth – mm / in	650/25⅝"			
Weight	Net / Gross – KG / Lb	29/64 / 32/71			

****** Specifications are subject to change without prior notice.*

Model No.		VC55S		VC55D	
Type		Built-in in-column Installation (Fully Integrated)			
Capacity					
Total Storage Volume - L		155		146	
Wine Storage Bottles	Zone One	55		28	
	Zone Two	N.A		27	
	Zone Three	N.A		N.A	
Performance & Features					
Ambient Temp. Range	°C/°F	0 ~ 38 / 32 ~100		0 ~ 38 / 32 ~100	
Setting Temp. Range	°C/°F	5 ~ 22 / 40 ~ 72		5 ~ 22 / 40 ~ 72	
Power Source	V/Hz	115/60	220-240/50	115/60	220-240/50
Energy Consumption	KWh/24h		0.53		0.53
Rated Input	W	100	100	100	100
Rated Current	A	1.0	1.2	1.0	1.2
Heater	W	120		120	
Noise Level	dB(A)	44		44	
Defrost Type		Automatic		Automatic	
Temp. Control		Electronic		Electronic	
Blowing Agent		Cyclopentane		Cyclopentane	
Refrigerating System					
Cooling System		Air Forced Convection Type		Air Forced Convection Type	
Compressor	Model No.	JK1111HY	JM1110Y	JK1111HY	JM1110Y
	Type	Hermetic Type		Hermetic Type	
	LRA	12.5	8.7	12.5	8.7
	RLA	0.80	0.65	0.80	0.65
	Overload Protector	4TM232VHBYY	B40-120/B	4TM232VHBYY	B40-120/B
	PTC Starter	QP2-4.7/B3	QP2-12/B	QP2-4.7/B3	QP2-12/B
	Oil	ISO8/ISO10 175ml	ISO8/ISO10 175ml	ISO8/ISO 10 175ml	ISO8/ISO10 175ml
Condenser Fan Motor	Model No.	N.A		N.A	
	Rating	N.A		N.A	
Evaporator Fan Motor	Model No.	TD1225LS/YM1212PTS3		TD1225LS/YM1212PTS3	
	Rating	12 V DC, 0.18 A/0.11A		12 V DC, 0.18 A/0.11A	
Expansion device		Capillary (Ø0.7x1600mm)		Capillary (Ø0.7x1600mm)	
Refrigerant / Charged Volume		R600a/0.92 Oz	R600a/26g	R600a/0.92Oz	R600a/26g
Dimensions & Weights					
Net Dimensions	Width – mm / in	590/23¼"		590/23¼"	
	Height – mm / in	885/34⅞"		885/34⅞"	
	Depth – mm / in	608/24"		608/24"	
Packing Dimensions	Width – mm / in	650/25⅝"		650/25⅝"	
	Height – mm / in	945/37¼"		945/37¼"	
	Depth – mm / in	650/25⅝"		650/25⅝"	
Weight	Net / Gross – KG / Lb	47/103 / 51/112		47/103 / 51/112	

****** Specifications are subject to change without prior notice.*

Model No.		VC90S		VC90D	
Type		Built-in in-column Installation (Fully Integrated)			
Capacity					
Total Storage Volume - L		223		215	
Wine Storage Bottles	Zone One	89		40	
	Zone Two	N.A		49	
	Zone Three	N.A		N.A	
Performance & Features					
Ambient Temp. Range	°C/°F	0 ~ 38 / 32 ~100		0 ~ 38 / 32 ~100	
Setting Temp. Range	°C/°F	5 ~ 22 / 40 ~ 72		5 ~ 22 / 40 ~ 72	
Power Source	V/Hz	115/60	220-240/50	115/60	220-240/50
Energy Consumption	KWh/24h		0.72		0.72
Rated Input	W	120	100	120	100
Rated Current	A	1.1	1.2	1.1	1.2
Heater	W	120		120	
Noise Level	dB(A)	44		44	
Defrost Type		Automatic		Automatic	
Temp. Control		Electronic		Electronic	
Blowing Agent		Cyclopentane		Cyclopentane	
Refrigerating System					
Cooling System		Air Forced Convection Type		Air Forced Convection Type	
Compressor	Model No.	JK1111HY	JM1110Y	JK1111HY	JM1110Y
	Type	Hermetic Type		Hermetic Type	
	LRA	12.5	8.7	12.5	8.7
	RLA	0.80	0.65	0.80	0.65
	Overload Protector	4TM232VHBYY	B40-120/B	4TM232VHBYY	B40-120/B
	PTC Starter	QP2-4.7/B3	QP2-12/B	QP2-4.7/B3	QP2-12/B
	Oil	ISO8/ISO10 175ml	ISO8/ISO10 175ml	ISO8/ISO10 175ml	ISO8/ISO10 175ml
Condenser Fan Motor	Model No.	N.A		N.A	
	Rating	N.A		N.A	
Evaporator Fan Motor	Model No.	TD1225LS/YM1212PTS3		TD1225LS/YM1212PTS3	
	Rating	12 V DC, 0.18 A/0.11A		12 V DC, 0.18 A/0.11A	
Expansion device		Capillary (Ø0.7x1600mm)		Capillary (Ø0.7x1600mm)	
Refrigerant / Charged Volume		R600a/1.41 Oz	R600a/42g	R600a/1.41Oz	R600a/42g
Dimensions & Weights					
Net Dimensions	Width – mm / in	590/23¼"		590/23¼"	
	Height – mm / in	1234/48⅝"		1234/48⅝"	
	Depth – mm / in	608/24"		608/24"	
Packing Dimensions	Width – mm / in	650/25⅝"		650/25⅝"	
	Height – mm / in	1295/51"		1295/51"	
	Depth – mm / in	650/25⅝"		650/25⅝"	
Weight	Net / Gross – KG / Lb	59/130 / 64/141		59/130 / 64/141	

****** Specifications are subject to change without prior notice.*

Model No.		VC80T			
Type		Built-in in-column Installation (Fully Integrated)			
Capacity					
Total Storage Volume - L		206			
Wine Storage Bottles	Zone One	16			
	Zone Two	16			
	Zone Three	49			
Performance & Features					
Ambient Temp. Range	°C/°F	0 ~ 38 / 32 ~100			
Setting Temp. Range	°C/°F	5 ~ 22 / 40 ~ 72			
Power Source	V/Hz	115/60	220-240/50		
Energy Consumption	KWh/24h		0.95		
Rated Input	W	120	100		
Rated Current	A	1.1	1.2		
Heater	W	80+120			
Noise Level	dB(A)	44			
Defrost Type		Automatic			
Temp. Control		Electronic			
Blowing Agent		Cyclopentane			
Refrigerating System					
Cooling System		Air Forced Convection Type			
Compressor	Model No.	JK1111HY	JM1110Y		
	Type	Hermetic Type			
	LRA	12.5	8.7		
	RLA	0.80	0.65		
	Overload Protector	4TM232VH BYY	B40-120/B		
	PTC Starter	QP2-4.7/B 3	QP2-12/B		
	Oil	ISO8/ISO1 0 175ml	ISO8/ISO10 175ml		
Condenser Fan Motor	Model No.	N.A			
	Rating	N.A			
Evaporator Fan Motor	Model No.	TD1225LS/YM1212PTS3			
	Rating	12 V DC, 0.18 A/0.11A			
Expansion device		Capillary (Ø0.7x1600mm)			
Refrigerant / Charged Volume		R600a/1.13 Oz	R600a/42g		
Dimensions & Weights					
Net Dimensions	Width – mm / in	590/23¼"			
	Height – mm / in	1234/48⅝"			
	Depth – mm / in	608/24"			
Packing Dimensions	Width – mm / in	650/25⅝"			
	Height – mm / in	1295/51"			
	Depth – mm / in	650/25⅝"			
Weight	Net / Gross – KG / Lb				

****** Specifications are subject to change without prior notice.*

Model No.		VC20DA	VC54DA
Type		Built-in or Free Standing Installation	
Capacity			
Total Storage Volume - L		57	135
Wine Storage Bottles	Zone One	6	16
	Zone Two	11	38
	Zone Three	N.A	N.A
Performance & Features			
Ambient Temp. Range	°C/°F	0 ~ 38 / 32 ~100	0 ~ 38 / 32 ~100
Setting Temp. Range	°C/°F	5 ~ 22 / 40 ~ 72	5 ~ 22 / 40 ~ 72
Power Source	V/Hz	100, 50/60	100, 50/60
Energy Consumption	KWh/24h	0.52	0.68
Rated Input	W	80	90
Rated Current	A	1.8	2.2
Heater	W	80	120
Noise Level	dB(A)	44	44
Defrost Type		Automatic	Automatic
Temp. Control		Electronic	Electronic
Blowing Agent		Cyclopentane	Cyclopentane
Refrigerating System			
Cooling System		Air Forced Convection Type	Air Forced Convection Type
Compressor	Model No.	JM1080FY	JM1080FY
	Type	Hermetic Type	Hermetic Type
	LRA	12.8	12.8
	RLA	1.25/1.20	1.25/1.20
	Overload Protector	B86-120/B	B86-120/B
	PTC Starter	QP2-4.7/B	QP2-4.7/B
	Oil	ISO8/ISO10 175ml	ISO8/ISO10 175ml
Condenser Fan Motor	Model No.	TD8020LB/YM1208PKB3	TD1225LB/YM1212PTB 3
	Rating	12 V DC, 0.08 A/0.09A	12 V DC, 0.18 A/0.11A
Evaporator Fan Motor	Model No.	TD8020LS/YM1208PKS3	TD1225LS/YM1212PTS 3
	Rating	12 V DC, 0.08 A/0.09A	12 V DC, 0.18 A/0.11A
Expansion device		Capillary (Ø0.7x1200mm)	Capillary (Ø0.7x1600mm)
Refrigerant / Charged Volume		R600a/22g	R600a/28g
Dimensions & Weights			
Net Dimensions	Width – mm / in	295/11⅝"	595/23½"
	Height – mm / in	863/34"	863/34"
	Depth – mm / in	615/24¼"	615/24¼"
Packing Dimensions	Width – mm / in	326/12¾"	660/26.0"
	Height – mm / in	910/35⅞"	925/36½"
	Depth – mm / in	628/24¾"	628/24¾"
Weight	Net / Gross – KG / Lb	29/64 / 31/68	52/115 / 56/123

****** Specifications are subject to change without prior notice.*

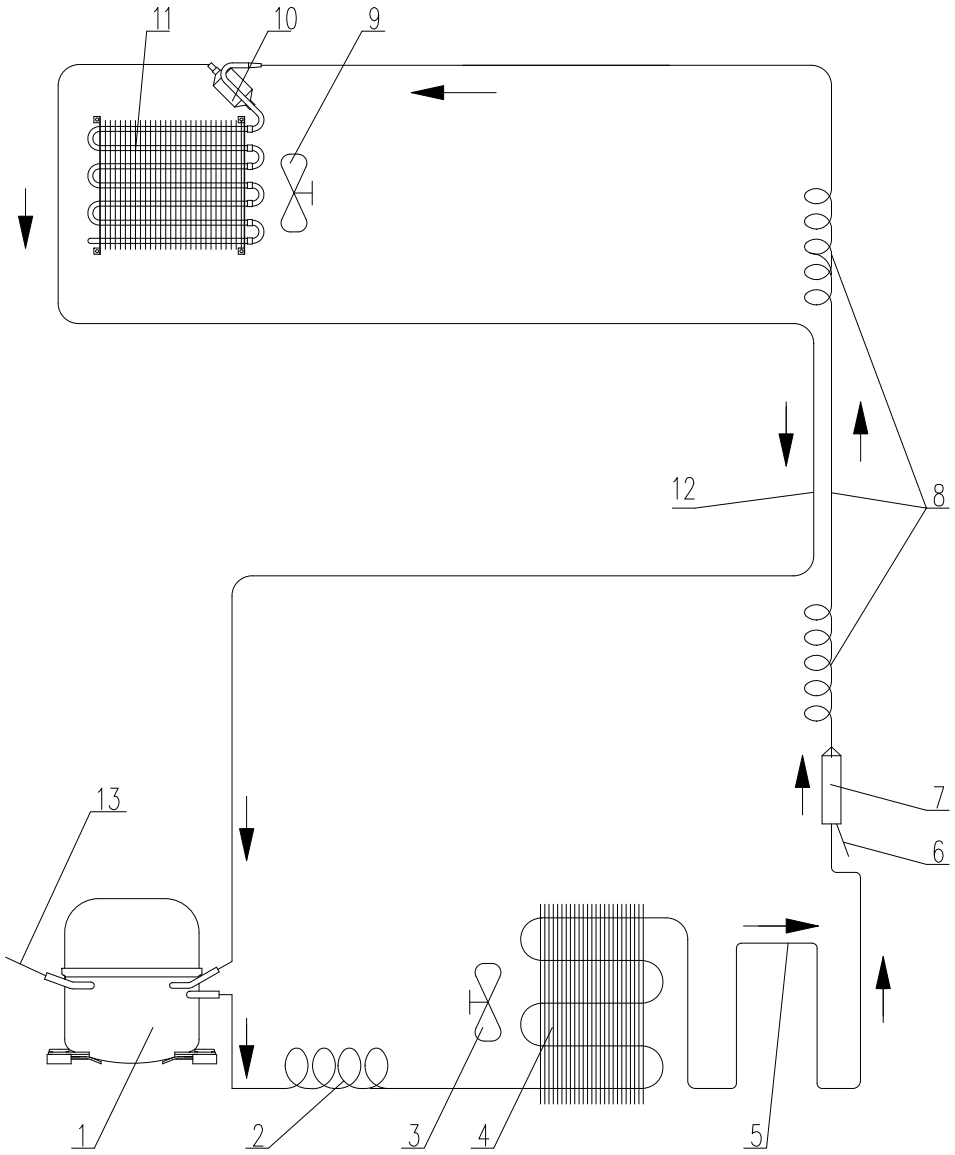
Model No.		VC100DA	
Type		Built-in or Free Standing Installation	
Capacity			
Total Storage Volume - L		280	
Wine Storage Bottles	Zone One	48	
	Zone Two	54	
	Zone Three	N.A	
Performance & Features			
Ambient Temp. Range	°C/°F	0 ~ 38 / 32 ~100	
Setting Temp. Range	°C/°F	5 ~ 22 / 40 ~ 72	
Power Source	V/Hz	100, 50/60	
Energy Consumption	KWh/24h	0.71	
Rated Input	W	140	
Rated Current	A	2.2	
Heater	W	120	
Noise Level	dB(A)	48	
Defrost Type		Automatic	
Temp. Control		Electronic	
Blowing Agent		Cyclopentane	
Refrigerating System			
Cooling System		Air Forced Convection Type	
Compressor	Model No.	NU1112FY	
	Type	Hermetic Type	
	LRA	13.3	
	RLA	1.28/1.15	
	Overload Protector	5TM283PFBZZ	
	PTC Starter	QP2-4.7/B3	
	Oil	ISO7(WF-7A) 180ml	
Condenser Fan Motor	Model No.	TD1225LB/YM1212PTB3	
	Rating	12 V DC, 0.18 A/0.11A	
Evaporator Fan Motor	Model No.	TD1225LS/YM1212PTS3	
	Rating	12 V DC, 0.18 A/0.11A	
Expansion device		Capillary (Ø0.7x1800mm)	
Refrigerant / Charged Volume		R600a/47g	
Dimensions & Weights			
Net Dimensions	Width – mm / in	595/23½"	
	Height – mm / in	1546/60⅞"	
	Depth – mm / in	615/24¼"	
Packing Dimensions	Width – mm / in	660/26.0"	
	Height – mm / in	1598/62⅞"	
	Depth – mm / in	628/24¾"	
Weight	Net / Gross – KG / Lb	83/183 / 89/196	

****** Specifications are subject to change without prior notice.*

3. REFRIGERATING COOLING SYSTEM

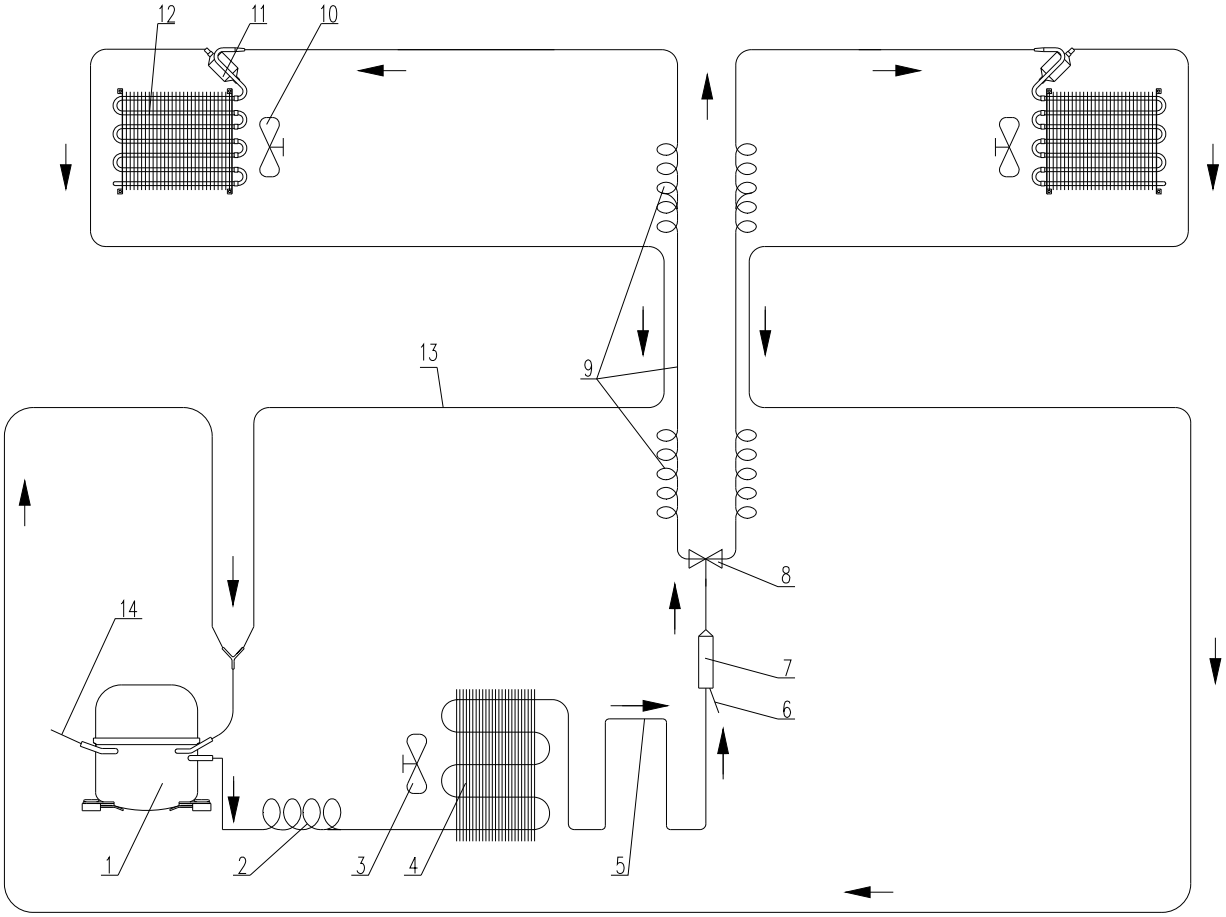
3.1 REFRIGERANT CYCLE DIAGRAM

3.1.1 For models with Without Solenoid Valve



1. Compressor
2. Spiral Tube (Not available for some models)
3. Condenser Fan (Not available for some models)
4. Condenser
5. Hot Pipe
6. Process Tube
7. Filter Drier
8. Capillary
9. Evaporator Fan
10. Accumulator
11. Evaporator
12. Suction Tube
13. Process Tube

3.1.2 For models with Solenoid Valve



1. **Compressor**
2. **Spiral Tube**
3. **Condenser Fan**
4. **Condenser**
5. **Hot Pipe**
6. **Process Tube**
7. **Filter Drier**
8. **Solenoid Valve**
9. **Capillary**
10. **Evaporator Fan**
11. **Accumulator**
12. **Evaporator**
13. **Suction Tube**
14. **Process Tube**

3.2 REFRIGERATION SYSTEM

All refrigeration units cool by removing heat from the cabinet rather than pumping in cool air. In a conventional refrigeration unit, liquid refrigerant enters the evaporator and vaporizes (boils) due to the low pressure, creating a very cold surface which removes heat from inside the cabinet. This causes the refrigerant to boil (evaporate) into a vapor state and be drawn into the compressor. The compressor pressurizes the vapor and pumps it into the condenser. The hot vapor in the condenser gives off the heat into the room. As the vapor cools, it condenses back into a liquid and returns to the evaporator to start the process over again. The system continually soaks up the heat inside the refrigerator and deposits the heat back into the room.

- The compressor of the refrigeration system serves two purposes: it ensures movement of the refrigerant throughout the system and it increases the pressure and temperature of the vapor received from the suction line and pumps the refrigerant into the discharge line. The condenser receives this high temperature, high pressure refrigerant and allows the heat to be released into the cooler surroundings. This heat removal "condenses" the refrigerant vapor into a liquid.

- The hot pipe is the first part of the condenser routed around the cabinet to help prevent moisture formation.

- The filter dryer is installed at the end of the condenser to capture moisture which may be present in the system.

- The capillary tube meters the flow of refrigerant and creates a pressure drop. Size and length of the capillary is critical to the efficiency of the system.

- As the refrigerant leaves the capillary tube and enters the larger tubing of the evaporator, the sudden increase in tubing diameter, and the pumping action of the compressor, form a low pressure area. The temperature of the refrigerant drops rapidly as it changes to a mixture of liquid and vapor. In the process of passing through the evaporator, the refrigerant absorbs heat from the storage area and is gradually changed from a liquid and vapor mixture (saturated refrigerant) into a vapor.

- The suction line returns this low pres-sure vapor from the evaporator back to the compressor, and the cycle starts again.

- Part of the capillary tube is soldered to the suction line which forms a heat exchanger. Heat from the capillary tube is thus transferred to the suction line to superheat the refrigerant there and at the same time this further cools the liquid in the capillary tube. This cools the refrigerant before it enters the evaporator and also heats the refrigerant before it enters the compressor to ensure a vapor state.

3.3 REFRIGERATION SYSTEM COMPONENTS

Compressor

The compressor is the "heart" of the refrigeration unit, consisting of an electrical motor and a "pump" sealed inside a steel case. The compressor used on R134A refrigerant systems is virtually the same in external appearance as the compressor used with R600a refrigerants. However, due to changes in lubricants and other internal differences, the compressors are not to be interchanged, otherwise system failure will result. If a new compressor is to be installed, pull one of the plugs to ensure that it is properly pressurized. If no pressure is observed, do not use the compressor. If unit is pressurized, reinstall the plug and keep the compressor sealed until it is installed and ready for solder connections. Whenever the compressor is replaced, the sealed system must be flushed especially for R134a system.

Condenser

The condenser is a long folded tube with steel wires which receives the hot, high pressure vapor from the compressor. While the most common problem is keeping the condenser clean from lint and dirt buildup which prevents proper airflow and the required transfer of the heat to the surroundings, it is possible that due to an un-repairable leak or a non-removable restriction, the condenser could require replacement. As with any R134A sealed system repair, the key to success is the limiting of the time of atmospheric exposure. Do not remove the plugs on the condenser inlet and outlet tubes until the new condenser is mounted in place and made ready for brazing. The inlet side will connect to the hot pipe and the outlet to the filter dryer for built-in models and for built-in models the condenser can be replaceable. But for free-standing models the inlet side will connect to the discharge pipe of compressor and the outlet to filter dryer, it is non-replaceable.

Evaporator

The evaporator is a fin tube type within the rear side of cabinet and can be replaceable. If a leak is present in the evaporator, it is not repairable and must be replaced. After mounting the evaporator in place, connect the capillary tube to the replacement filter drier. Again, whenever the evaporator assembly is replaced on R134A units, recommended that the compressor must also replaced and the sealed system flushed.

Filter Drier

Whenever the sealed system is entered, the filter drier must and can be replaced. For R134A refrigerant systems, use the designated filter drier from our company. This filter drier has the proper desiccant suitable for the refrigerant. The filter drier is stamped with an arrow which indicates the direction of refrigerant flow. The drier inlet has two lines -one connects to the condenser and the other will be used as a process tube through which the system sweep and final charge will be made. The drier outlet will be connected to the capillary tube. Care should be taken to ensure that the capillary is not inserted too far into the filter drier to make contact with its internal screen, yet in far enough to prevent restricting the small diameter capillary tube opening with the solder alloy.

Hot Pipe

The hot pipe is a **non-replaceable** component of the sealed system routed within the walls of the cabinet. To diagnose the hot pipe, the tubing must be isolated from the sealed system. If the hot pipe fails to hold the vacuum, a heater repair assembly is to be installed and the hot pipe bypassed by connecting the condenser outlet tube directly to the inlet of filter drier.

Capillary

The capillary tube meters the flow of refrigerant and creates a pressure drop. Size and length of the capillary is critical to the efficiency of the system.

3.4 SERVICE PRECAUTIONS FOR R600A SYSTEM

Features of refrigerant (R600a)

- Achromatic and odor less gas.
- Flammable gas and the ignition (explosion) at 494°C.
- Upper/lower explosion limit: 1.8%~8.4%/Vol.

Features of the R600a refrigeration unit

- Charging of around 60% refrigerant compared with a R134a model
- The suction pressure is below 1bar (abs) during the operation.
- Because of its low suction pressure, the external air may flow in the cycle system when the refrigerant leaks, and it causes malfunction in the compressor.
- The displacement of compressor using R600a must be at least 1.7 times larger than that of R134a.
- Any type of dryer is applicable (XH-5, 7, 9).
- The EVAPORATOR or any other cycle part that has welding joint is hidden in the foam. (If not hidden inside, the whole electric parts must be tested with the LEAKAGE TEST according to the IEC Standard.)
- The compressor has label of the refrigerant R600a.
- Only the SVC man must have an access to the system.

Installation place

- Must be well ventilated.
- Must be 20 m3 or larger.
- Must be no-smoking area.
- No ignitable factors must be present.

Utilities

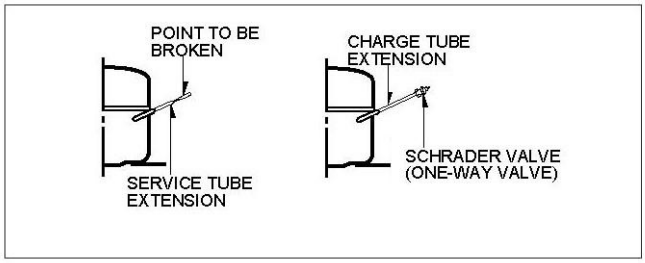
- Refrigerant cylinder (MAX NET 300g)
- Manometer
- Vacuum pump (600L/min)
- Piercing Clamp
- Quick coupler • Hoses (5m-1EA, 1m-3EA)
- LOKRING
- Portable Leakage detector (3g/year)
- Nitrogen cylinder (for leakage test)
- Concentration gauge

Make sure before Servicing

- Refrigerant Confirm: the refrigerant by checking Name Plate and the label on the compressor, after opening the COVER ASSY, BACK-M/C.
- If the refrigerant is R600a, you must not weld or apply a heat source.

Air Recharging in Compressor

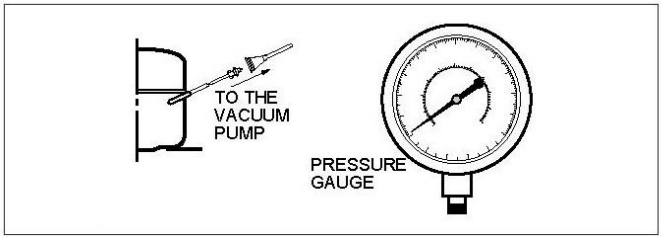
Before refilling the refrigerant, you must perform the test according to “TROUBLESHOOTING GUIDE”. When the defects are found, you must discharge the residual refrigerant (R600a) in the outdoor. For discharging the refrigerant R600a, break the narrow portion of tube extension by hand or with a pipe cutter. Leave it for 30min in outside to stabilize the pressure with ambient. Then, check the pressure by piercing the filter dryer part with piercing pliers. If the refrigerant is not completely discharged, let the refrigerator alone for more 30min in outside.



Attach the service tube installed with a Schrader valve (one-way valve). Then, connect the Schrader valve (one-way valve) to the pump

that is connected to the discharging hose leading to the outside. When discharging the residual refrigerant, repeat 3 cycles that includes 3min of the pump running->pump off->30sec of the compressor running.

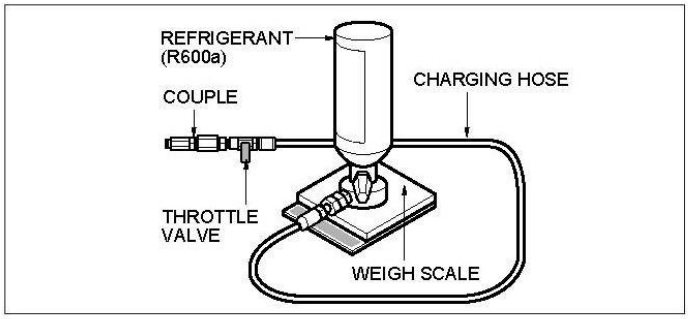
After the refrigerant (R600a) is completely discharged, repair any defective parts and replace the filter dryer. Connect the Schrader valve to pump with the coupler. And then turn the pump on for vacuum state. Let the pump run until the low-pressure gauge indicates the vacuum (gauge pressure 0, absolute pressure -1atm or -760mmHg). Recommended vacuum time is 30 min. Charge the N2 gas in order to check for leakage from welding points. If leakages are found, repair the defects and repeat the vacuum process.

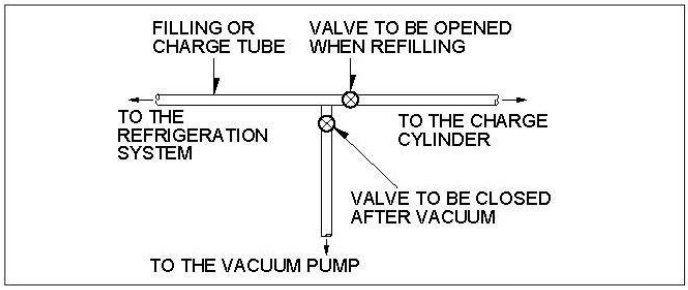


After the system is completely vacuumed, fill it with the refrigerant R600a up to what has been specified at your unit Rating Label. The amount of refrigerant (R600a) must be precisely measured within the error of ±2g by an electron scale.

If you use the manifold connected with both the refrigerant (R600a) cylinder and the vacuum pump simultaneously, make sure the pump valve is closed.

Connect the charging hose (that is connected to the refrigerant (R600a) cylinder) to the Schrader valve installed on the service tube. Then, charge the refrigerant (R600a) by controlling the Throttle valve. When you do so, do not fully open the Throttle valve because it may make damage to the compressor. Gradually charge the refrigerant (R600a) by changing open and close the Throttle Valve (5g at each time). The charging hose must use a one-way valve to prevent the refrigerant refluence. Close the Schrader valve cap after the refrigerant (R600a) is completely recharged.





After you completely recharge the refrigerant (R600a), perform the leakage test by using a portable leakage detector or soapy water. Test the low pressure (suction) parts in compressor off time and high pressure parts in compressor on time. If the leakages are found, restart from the refrigerant (R600a) discharging process and repairs defects of leaks.

After the leakage test, check the temperature of each parts of the cycle. Check with hands if the CONDENSER and the case (Hot Pipe) that is contacted to the door gasket are warm. Confirm that frost is uniform distributed on the surface of the EVAPORATOR.

3.5 SERVICE PRECAUTIONS FOR R134A SYSTEM

LIMIT TIME OF EXPOSURE TO THE ATMOSPHERE

Whenever a sealed system is repaired, do not expose an open line to the atmosphere for more than 15 minutes. Replacement components will come sealed by either brazing (filter drier) or plugs (compressor). Do not open the new filter drier to the atmosphere until you are ready to braze it into place. Before installing a new compressor, pull a plug to be sure the unit is still pressurized. If no pressure exists, do not use the compressor. If pressure exists, reinstall the plug to ensure non-contamination during the service procedure.

PLUGGED CAPILLARY TUBE

Moisture or other contaminants in the R134A system can cause the formation of gel-like or salt-type deposits within the system. This causes capillary tube restrictions which may not be removed by the flush procedure detailed later. If the restriction cannot be removed from the capillary tube, evaporator assembly and compressor must be replaced.

SYSTEM FLUSH

Before accessing the sealed system, it is necessary to determine that the problem is actually a sealed system problem by utilizing a wattmeter, thermometer, visual and touch indicators. Once it has been determined that the problem is in the sealed system, and diagnosis indicates a low side leak, plugged capillary tube, or a defective compressor, in addition to the normal repair, the system must be flushed.

SEALED SYSTEM SUMMARY

A. Recover the refrigerant in the system, if any.
B. Repair the low side leak or replace the evaporator, whichever applies. If the complete low side is replaced, do not braze the suction line to the compressor until the completion of System Flush Procedure.
C. Proceed with the following flush procedure.
D. After flushing procedure is completed, continue with the normal sweep and final charging procedure.

SYSTEM FLUSH PROCEDURE

1. Isolate and flush the condenser
Score and break the discharge line at a convenient location to which the compressor tubing can be connected later. Attach a process tube adapter to the condenser side of this break. Connect a quick coupler hand valve to the process adapter. Connect the hose from the charging cylinder to this valve. This connection will remain in place throughout the flush procedure.

Next, score and break the tube at the outlet of condenser to the input side of the filter drier. Attach a process tube adapter to the condenser side of this break. Connect a quick coupler hand valve to this process adapter. Connect the hose from the recovery equipment to this valve. Use the heater on the charging cylinder to ensure the cylinder pressure to be approximately 30 pounds above room ambient temperature. For example, if room temperature is 70F degrees, cylinder pressure should be 100 p.s.i.g. Start the recovery system and open the valve at the process adapter attached to condenser. Open the valve from the charging cylinder and allow 4 ounces of R134A to flow through the condenser and into the recovery system. This process should take about two minutes. Keep the process adapters and hoses attached at this time.

2. Replace the Filter Drier
Score and break either one of the two inlet lines on the new drier (the other line will remain sealed until the sweep charge, at which time it will be the process tube). Prepare the drier outlet side for connection to the capillary tube. The capillary tube should be inserted about 3/4 inch into the drier to prevent solder alloy from plugging the capillary tube or the capillary tube extending

too far into the drier and contacting the screen. To facilitate the installation, place a slight bend in the capillary tube about 3/4inch from the end and insert into the drier. Remove the process tube adapter from the condenser outlet and prepare the tube for connection to the drier inlet. The drier inlet joint will be the only copper-to-steel connection which will require the silver solder and flux. To help prevent flux from entering the system, first insert the line from the condenser into the drier inlet, then apply the flux. Braze both the inlet and the outlet joints of the re-placement drier.

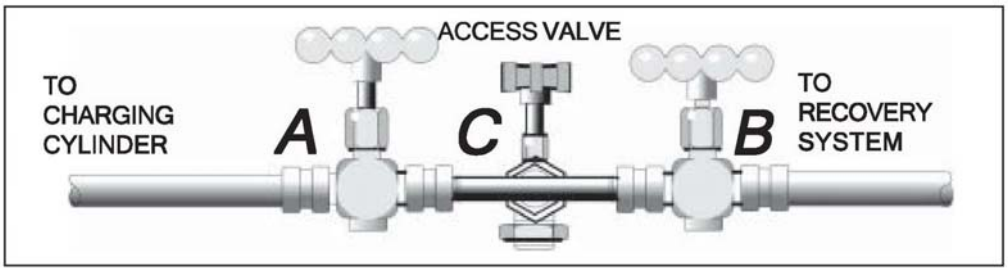
3. Isolate and flush the remainder of the system
Score and break the suction line close enough to the old compressor to be able to reconnect it to the replacement compressor later. Attach a process tube adapter to the evaporator side of the suction line. Connect the hand valve and hose from the recovery equipment to this adapter. Be certain that the pressure in the charging cylinder is about 30 p.s.i.g. above ambient temperature. Start the recovery unit and open the hand valve to the suction line. Release four (4) ounces of R134a from the charging cylinder into the system. It will take about 15 minutes for the refrigerant to pass through the condenser, hot pipe, filter drier, capillary tube, evaporator, suction line and into the recovery system. This 15 minutes time can be utilized to remove the old compressor and prepare the new compressor by mounting into place and wiring electrically. Remember to leave the plugs in place until brazing.

4. Complete compressor replacement
Close valves to the recovery system. Re-move process tube adapters from both the suction and discharge lines. During final flush, remove old compressor, and install replacement compressor leave plugs in place until brazing. Connect and braze suction and discharge lines to the replacement compressor. You are now ready to add the temporary piercing valve to the drier process line and proceed with the sweep and final charging of the system.

CAUTION: In order to prevent sealed contamination, the time of atmospheric exposure must be limited to 15 minutes. Do not pull the plugs from the new compressor until you are ready to make the connections.

5. Sweep and Final Charge
The sweep charge is a method of purging the sealed system of moisture, air and potential contaminants. Also during this procedure, the system may be checked for leaks before the final charge. If this procedure is followed as outlined, it will allow for the capture of 90-95 percent of the available refrigerant, thereby ensuring that the system will operate as designed. The sweep procedure for R134a refrigerant systems is made after the system has been repaired and/or flushed. Three (3) ounces of refrigerant R134a is added to the system, circulated by the compressor for 5 minutes and recovered. Since a new filter drier has already been installed, a high side process tube is available. Install a temporary access valve to this process tube close enough to the end of the tube so that the tube can be pinched closed behind the valve and the opening sealed shut after the valve is removed. Remember, no access valve is to be left on the sealed system. Connect a 1/4 inch flare tee to the access valve. Connect a quick coupler hand valve to each side of the tee. To one hand valve, connect the hose from the charging cylinder. To the other valve, connect the hose to the recovery system. The following steps take you through the sweep and final charge.

Step 1. Set up of valves: temporary access valve (C) piercing drier process tube, connected to flare tee, hand valve (A) to charging cylinder, hand valve (B) to recovery system.

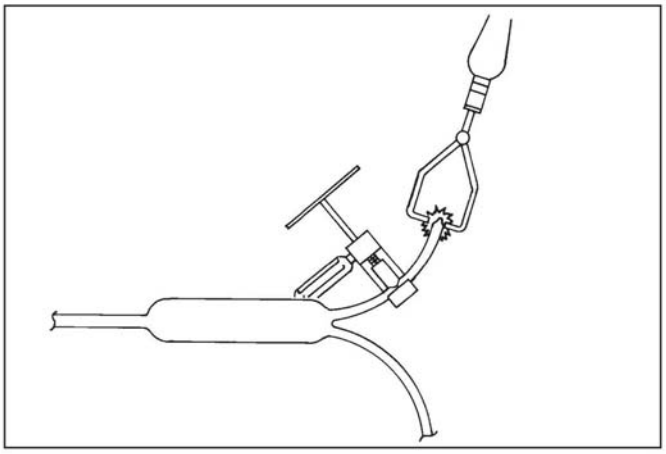


Step 2. With liquid refrigerant present to valve A, valve B closed and valve C open(C will

remain open throughout sweep procedure), open valve A to allow three (3) ounces of refrigerant into the system. Close valve A. Check low side for leaks. After system has equalized (about 3 to 5 minutes), start system compressor, check for high side leaks and allow refrigerant to circulate in the system about 5 minutes.

Step 3. Leave valve A closed and valve C open. System compressor still running, open valve B to allow refrigerant to flow into the recovery system. After vacuum has been held, turn off system compressor.

Step 4. Close valve B. Liquid refrigerant still present to valve A and charging cylinder pressure is 30 p.s.i.g. above room ambient. Open valve A to slowly allow the proper refrigerant charge into the system. Close valve A. If needed, valve C can be closed and valves A and B opened to recover refrigerant in the hoses and charging cylinder.



Step 5. Use pinch-off tool to seal the process tube between the drier and the access valve. Remove the access valve and braze the opening. After the required five minute equalization time, start the system compressor.

3.6 CHECKING OPERATION

The following general information explains several methods for checking operation of the refrigeration system. The correct operation of a refrigeration system is dependent upon the proper function of each of the parts comprising the system.

If the system does not operate properly (long run periods, warmer than normal temperatures), the trouble may be caused by one of the following conditions:

(1) - Restricted Capillary Tube
The opening of a capillary tube is about the same diameter as the period at the end of this sentence. Because of this, it is easy to restrict the tube. Extra precautions should be taken when any service procedure involves moving or touching the capillary tube. The slightest kink can cause a complete tube restriction.

Restrictions of the capillary tube may be caused by: (1) moisture freeze-up (R134a system), (2) foreign particles lodged in the tube, or (3) a bend or kink.

If the capillary tube is restricted, there will be a noticeable lack of frost on all cooling surfaces; the compressor may operate for a short period of time and cycle on the overload. When moisture freeze-up causes a restriction, it usually occurs at the outlet end of the capillary tube. Normally, frost buildup can be detected in this area.

At the discharge end of the capillary, apply heat by using the hairdryer. If there is enough head pressure, and if the restriction is caused by moisture freeze-up, you will be able to hear a gurgling noise as the heat releases the refrigerant through the tubing.

It is possible that this moisture will be absorbed by the filter drier and remedy the trouble. However, if the freeze-up reoccurs, you must replace the filter drier.

A kink in the capillary tube will reveal the same symptom as a moisture freeze-up, except for the

accumulation of frost. Where possible, check the capillary tube and straighten any kinks to relieve the restrictions. Check the unit operation. If the condition persists, replace the defective part. If the freeze-up condition does not exist and there is not a kink, you can assume that a foreign particle is causing the restrictions. The only remedy in this case is to replace the restricted part.

(2) - Partial Restriction In Low Side Tubing
Bent tubing, foreign matter, or moisture in the system may cause a partial restriction in the low side tubing. This is usually indicated by frost-free tubing between the restriction and the capillary tube and by frost-covered tubing between the restriction and the suction line. The restriction acts like a second capillary tube, increasing the pressure ahead of it (warming) and decreasing the pressure beyond it (cooling). To confirm the existence of a restriction in the low side tubing, perform operational pressure checks.

(3) - Slow Leak In System
On forced air models, long run time will be noticed during the early stages of a leak. As the refrigerant continues to escape, the compartment will gradually warm up and the compressor will run continuously.

(4) - Incorrect Refrigerant Charge
The sealed unit may have too much refrigerant (overcharged system) or too little refrigerant (undercharged system). The troubleshooting guide will inform you on how to recognize a system with these defects.

An overcharged system may have a frost back condition appearing on the suction line. When the compressor stops, the frost melts and drips on the floor. A heat exchanger separation will also cause this symptom.

An undercharged system, depending on the degree of undercharge, will operate with temperatures above normal and the compressor run time will be increased. The greater the undercharge, the higher the temperature will be and the longer the run time. An undercharged system must be purged, evacuated, and recharged with the proper amount of refrigerant. Before recharging, test for refrigerant leaks.

3.7 LEAK TESTING

Once it has been determined through proper diagnosis that a leak is present in the sealed system, attempt to find the leak before opening the system if possible. To check the high side for leaks, be sure that the compressor is running. During run time the high side pressure is greater. To increase the pressure slightly, stop the condenser fan blade or block the air flow through the condenser. To check the low side for leaks, stop the compressor. During off times, the low side pressure will increase to equalize with the high side. By warming the evaporator, this pressure will increase. If too much refrigerant has leaked out to create enough pressure to locate the leak, add 2 ounces of the proper refrigerant to the system and proceed with the test procedure.

The presence of oil around a tubing joint usually indicates a leak. Care must still be taken to pinpoint the exact location. Remember that a leak detector compatible with R134A refrigerant must be used. A sealed system component, such as the evaporator or hot pipe, should not be condemned unless a non-repairable leak is confirmed. This should be determined by either locating the actual leak or by isolating the component from the rest of the system and determining if it holds pressurization or a vacuum - whichever method is chosen.

4. ELECTRICAL AND CONTROL SYSTEM

4.1 CONTROL DESCRIPTION

4.1.1 FUNCTIONS

Cooling mode:
When the set temperature is lower than the storage temperature, the unit operates in cooling mode.

Heating mode:
When the set temperature is higher than the storage temperature, the unit operates in heating mode.

Dynamic Climate/Silent modes:
In the Dynamic Climate mode, the interior fan cycles on 20 seconds and off 30 seconds to circulate the inside air evenly even the set temperature is reached. Dynamic Climate mode is **NOT** the factory preset mode because of creating noises and more energy consumption. To change to Dynamic Climate mode, touch and hold the **DOWN** key for approximately five seconds. The wine cellar will beep five times to confirm Dynamic Climate mode is on. To change back to default (Silent) mode (Also named as energy saving mode), touch and hold the **UP** key for approximately five seconds. The wine cellar will beep three times to confirm default (Silent) mode is on.

Eco Demo mode:
By pressing and holding the "**UP**"&"**DOWN**" (The controls of lower zone for dual zone & three zone models) and "**LIGHT**" keys at the same time for at least 5 seconds, the indicator light will flash five times to confirm the input and the unit will operate in Eco Demo mode. The indicators for Fahrenheit and Celsius degree will be ON.
In Eco Demo mode, the compressor and all fan motors are OFF.

NOTE: To perform the multi-key function, press and hold the first key, then press the rest key the required number of times and then release all the keys.

SABBATH Mode:
Sabbath mode is available for the observance of certain religious holidays. This mode turns off the displays, interior light and audible alarms and prevents them from turning on again. Normal cooling operations will still take place.

To initiate Sabbath mode, press the **POWER** and **LIGHT** keys at the same time for at least 5 seconds. The indicator light will flash four times and confirm the Sabbath mode is ON.
Sabbath mode can be exited by repeating the above process. The Sabbath Mode will automatically exit after 96 hours.

4.1.2 ALARM SYSTEM

Temperature Display
During normal operation, the temperature displays on the control panel show the temperatures inside the appliance. The temperature display will flash if

- A different temperature is being set,
- The temperature in one of the zones deviates by more than 5°C from the set temperature.

The temperature display flashing ensures that the temperature can not rise or fall un-noticed and impair the wine.

To view the "set" temperature at any time, touch the "**UP**" or "**DOWN**" mark, the "set" temperature will temporarily flash in the LED display for 5 seconds.
If the LED readouts display the icon "**--**" and flash, that means the display temperature is out of

the range from -9 to 37ºC for Celsius degree and from 16 to 99ºF for Fahrenheit degree. That is normal.

Temperature Alarm
An alarm will sound if the temperature in one of the zones rises or falls outside the temperature range. The relevant temperature display will flash at the same time.

The temperature the appliance is set at determines the temperature the appliance recognises as being too warm or too cool.

The alarm will sound and the temperature display will flash:
- When you switch the appliance on, if the temperature inside the appliance is very different from the temperature set.

- When there has been a lengthy interruption to the power supply.

- When too many items have been put into the unit at one time.

- When the door is not been closed tightly.

Door Alarm
If the door has been left open for more than 60 seconds, the alarm will sound.

Once the set temperature has been reached in the appliance, the alarm stops and the relevant temperature display stops flashing. However, if the noise disturbs you, you can switch the alarm off before this if you wish by pressing the **POWER** key once. The alarm will stop. The relevant temperature display continues to flash until the set temperature has been reached. The display then lights up constantly, and the alarm system is fully active again.

4.1.3 OTHER FUNCTIONS

Temperature Memory Function
In the event of a power interruption (power surge, breaker switch, etc.), the unit can remember the previous temperature settings, and when the power is recovery, the unit will operate with the last temperature set-point and the cabinet temperature will go back the same setting temperature as power off.

Interior Light
The interior light makes it easy to view your wine labels and enhances the display of your collection. Touching the LIGHT mark toggles between 2 modes of operation for the internal lights: functional (default) mode and showcase mode. If you are in functional (default) mode, the lights will turn on only when the door is open. If you are in showcase mode, the lights will be on whether or not the door is open.

Defrosting
1. The defrosting is performed each time when the total running time of the compressor reaches 10 hours.
2. During the defrosting cycle, the compressor is OFF and the fans will operate continuously.
3. After 30 minutes, the defrosting cycle will end.
4. **During the defrosting cycle, the storage temperature may vary by 3 or 4 degrees. That is normal.**
5. **However, the frost may be accumulated on the evaporator if the unit is repeatedly opened in a high heat or high humidity location. If this frost pattern does not clear within 24 hours, your unit will require manual defrosting.**

Key Lock
Key Lock function is only available for models with outside control. If in 2 minutes or longer

without pressing any key, the key lock will be activated automatically. To remove the lock, press the **UP** and **DOWN** keys at the same time for at least 5 seconds and the indicator light will flash three times to confirm the input.

ºF/ºC Selector
Select the temperature display setting in Fahrenheit or Celsius degree. To change the temperature from Fahrenheit to Celsius or from Celsius to Fahrenheit, press and hold the **LIGHT** key for 5 seconds.

4.1.4 CONTROL OF FANS

Fan F1C & F1H:

- For single zone models, F1C & F1H are the evaporator fan motors positioned in the cabinet inside. For dual zone models, F1C & F1H are the fan motors positioned in the upper zone. For three zone models, F1C & F1H are the fan motors positioned in the middle zone.
- When the set temperature of upper zone is lower than the storage temperature, Fan 1C & F1H will operate. At the rest time Fan F1C & F1H will cycle on 20 seconds and off 30 seconds to circulate air inside the cabinet.
- For single zone models with heating function, Fan 1C & F1H will operate when the heater is ON.

Fan F2C:

- Only available in the models of dual zone or three zone. For dual zone model, F2C is the fan motor positioned in the middle divider. For three zone models, F2C is the fan motor positioned in the bottom divider.
- When the set temperature of the lower zone is lower than the storage temperature, Fan F2C will operate.
- When the set temperature of upper zone for dual zone or middle zone for three zone is higher than the storage temperature, Fan F2C will operate.
- At the rest time Fan F2C will be OFF.

Fan F2H:

- Only available in the models of dual zone or three zone. For dual zone model, F2H is the fan motor positioned in the bottom zone. For three zone models, F2C is the fan motor positioned in the bottom zone.
- When the set temperature of lower zone is higher than the storage temperature, Fan F2H will operate. At the rest time Fan F2H will cycle on 20 seconds and off 30 seconds to circulate air inside the cabinet.

Fan F3C:

- Only available in the models of three zone. F3C is the fan motor positioned in the top divider.
- When the set temperature of the top zone is lower than the storage temperature, Fan F3C will operate.
- At the rest time Fan F3C will be OFF.

Fan F3H:

- Only available in the models of three zone. F3H is the fan motor positioned in the top zone.
- When the set temperature of the top zone is higher than the storage temperature, Fan F3H will operate. At the rest time Fan F3H will cycle on 20 seconds and off 30 seconds to circulate air inside the cabinet.

Fan F0:

- Only available in built-in models. When the compressor is ON, Fan F0 will be ON. At the rest time Fan F0 will be OFF.

4.1.5 SELF-CHECK OF CONTROL SYSTEM

The Display/Control PCB has the self-check function. Press and hold the "**LIGHT**" and "**DOWN**" keys at the same time for 5 seconds, the indicator light will flash once to confirm the input and the unit will activate the self-check program. Below symptoms can be seen, otherwise replace the PCBs:

- LED indicators will be ON one by one.
- LED light will be ON.
- Temperature reader LED will display from 00 to 99.
- Fan motor, compressor and heater will be ON.

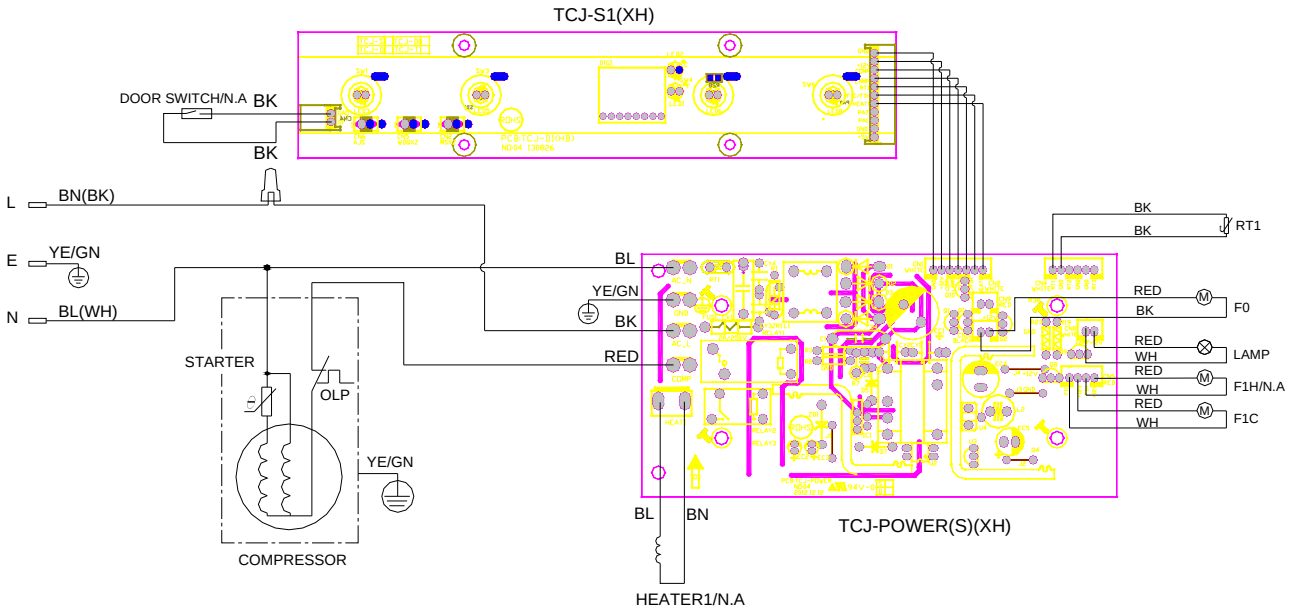
After the self-check program has been finished the unit will automatically go into the normal operation program.

4.1.6 TEST MODE

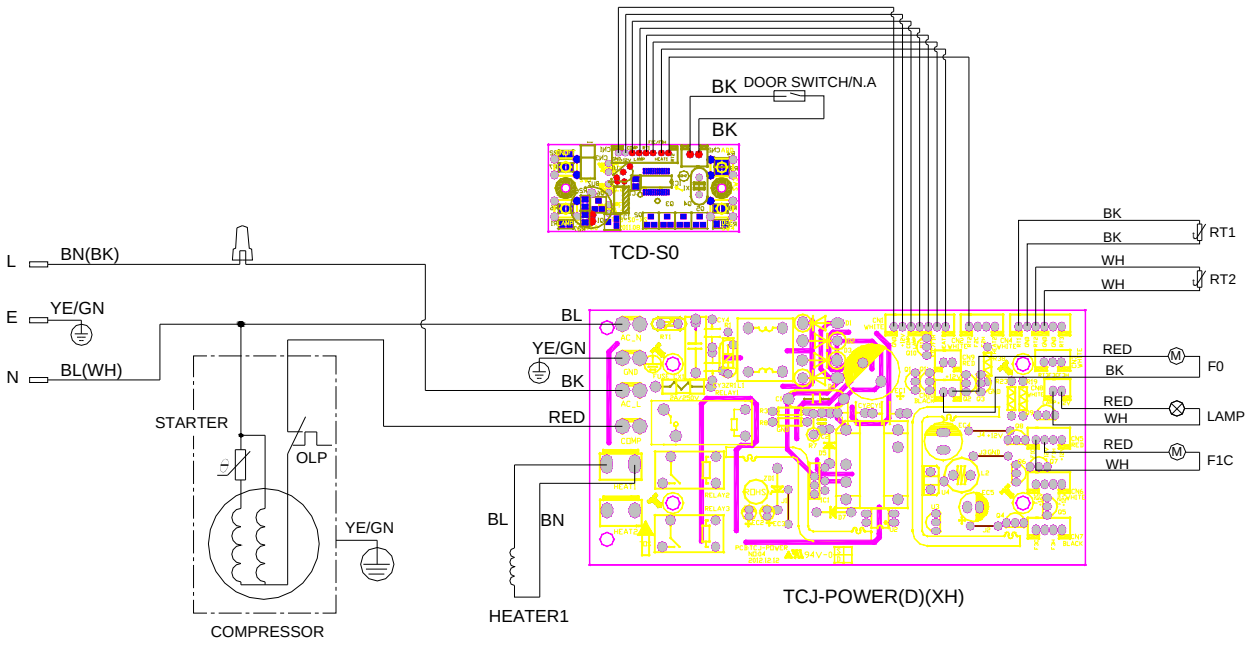
Press and hold the "**LIGHT**" and "**UP**" (the controls of upper zone for dual zone models & the controls of lower zone for three zone models) keys at the same time for 5 seconds with power ON, the indicator light will flash twice to confirm the input and the unit will run in the TEST MODE. The compressor and all fan motors will operate continuously & independent from the SET temperature. At the same time the display shows the icon "**--**". The TEST Mode will automatically exit after 30 minutes or you can stop the TEST mode by disconnect the unit from power source.

4.2 SCHEMATIC DIAGRAM

4.2.1 For single zone models

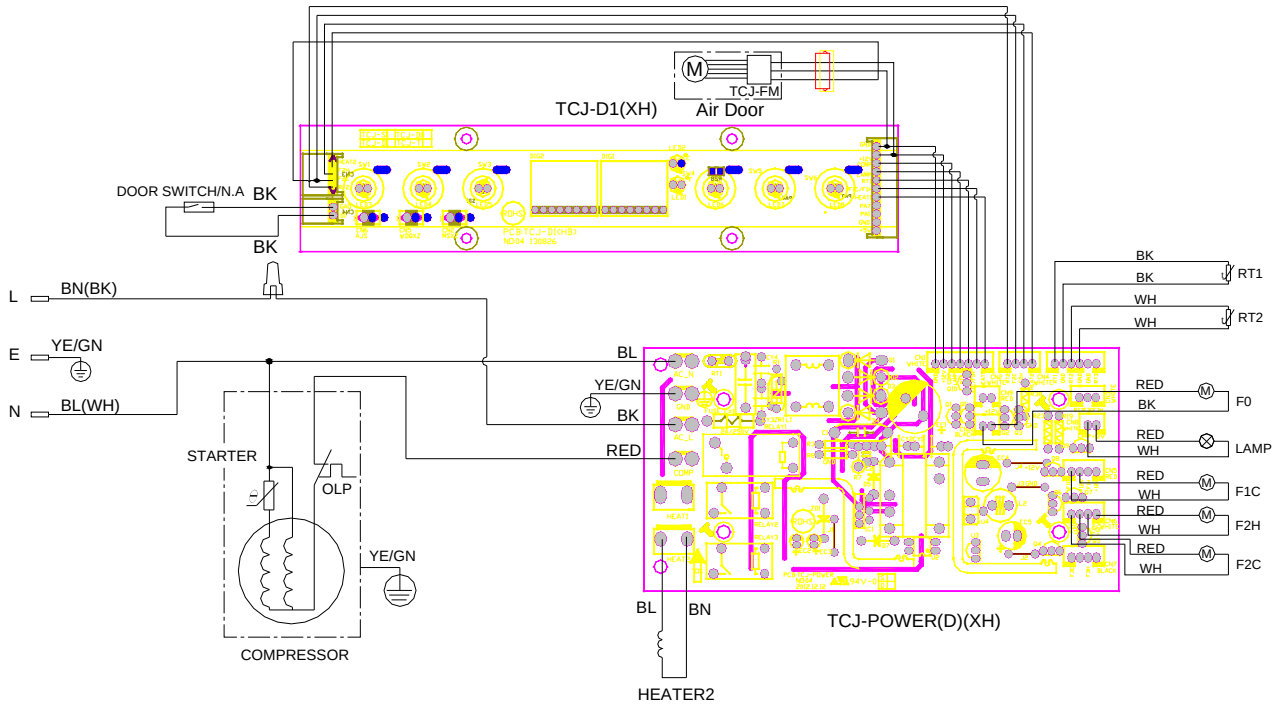


4.2.2 For freezer models

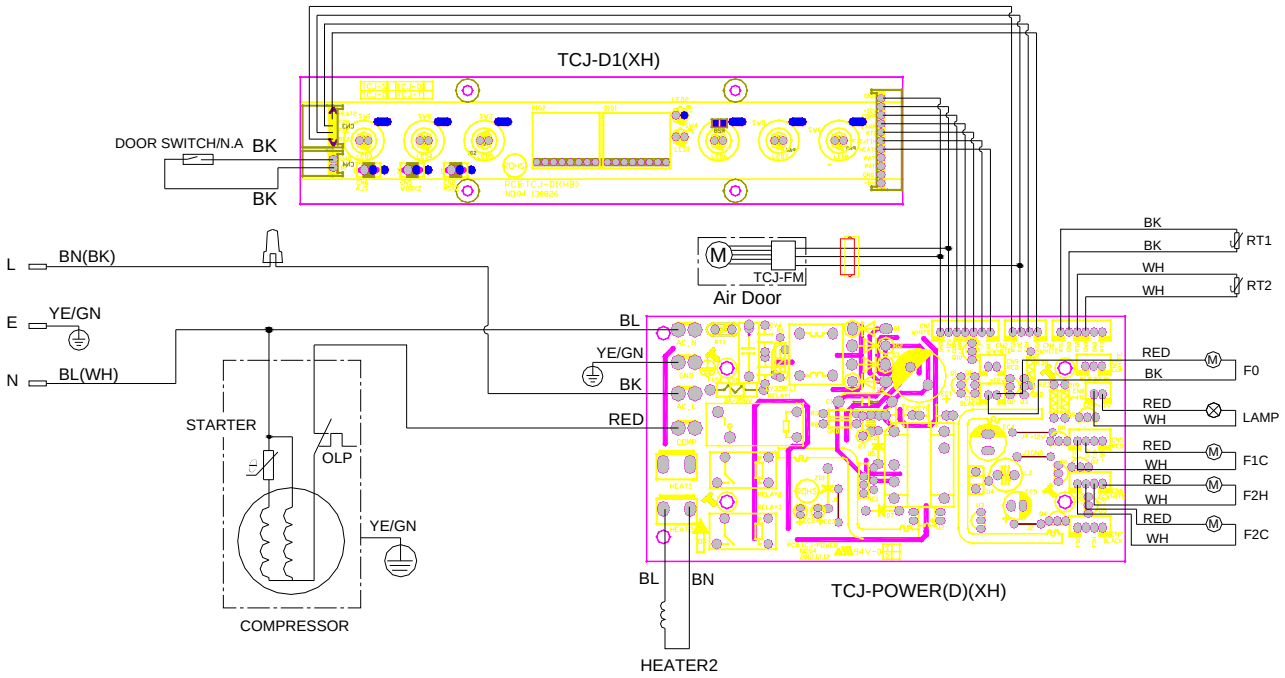


4.2.3 For dual zone models without solenoid valve

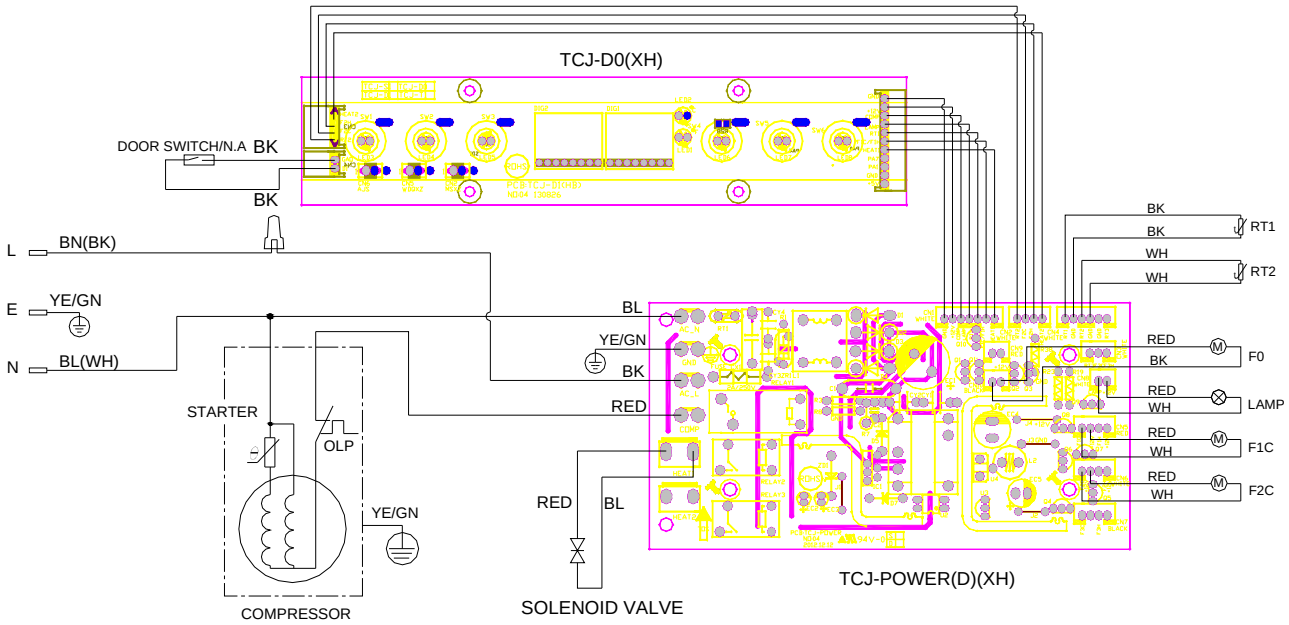
For control panel inside the cabinet



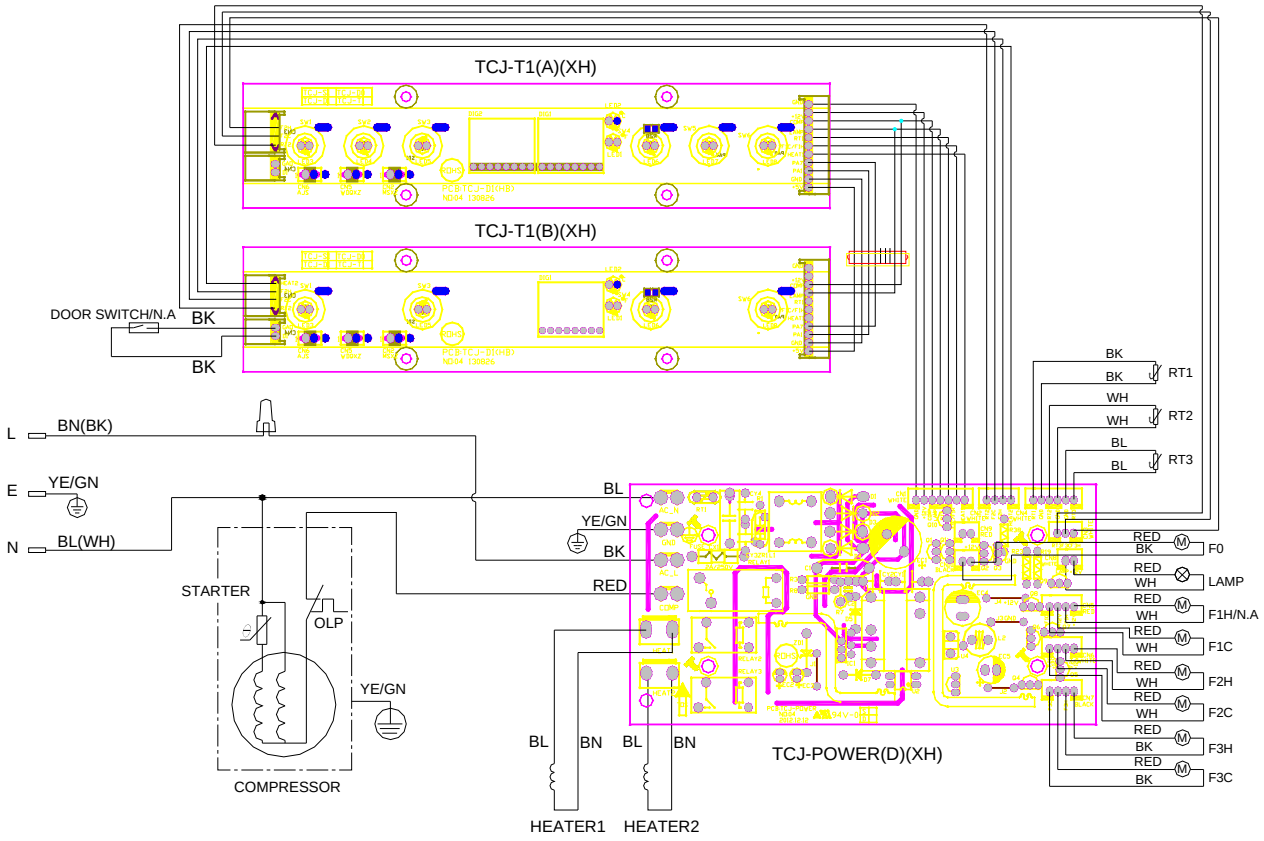
For control panel on the top of cabinet



4.2.4 For dual zone models with solenoid valve

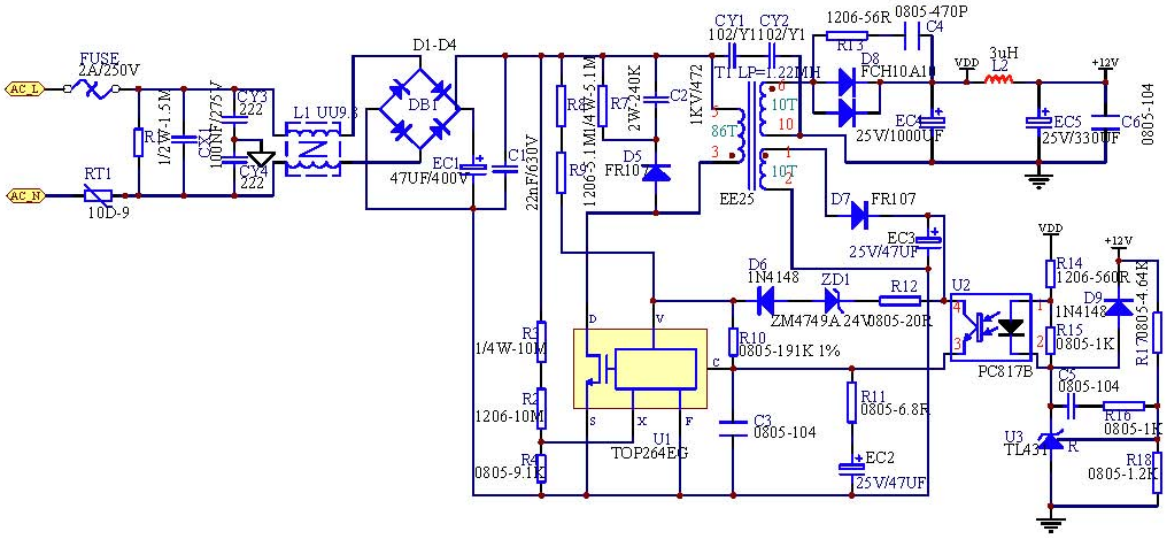


4.2.5 For three zone models



4.3 SCHEMATIC DIAGRAM FOR PCB

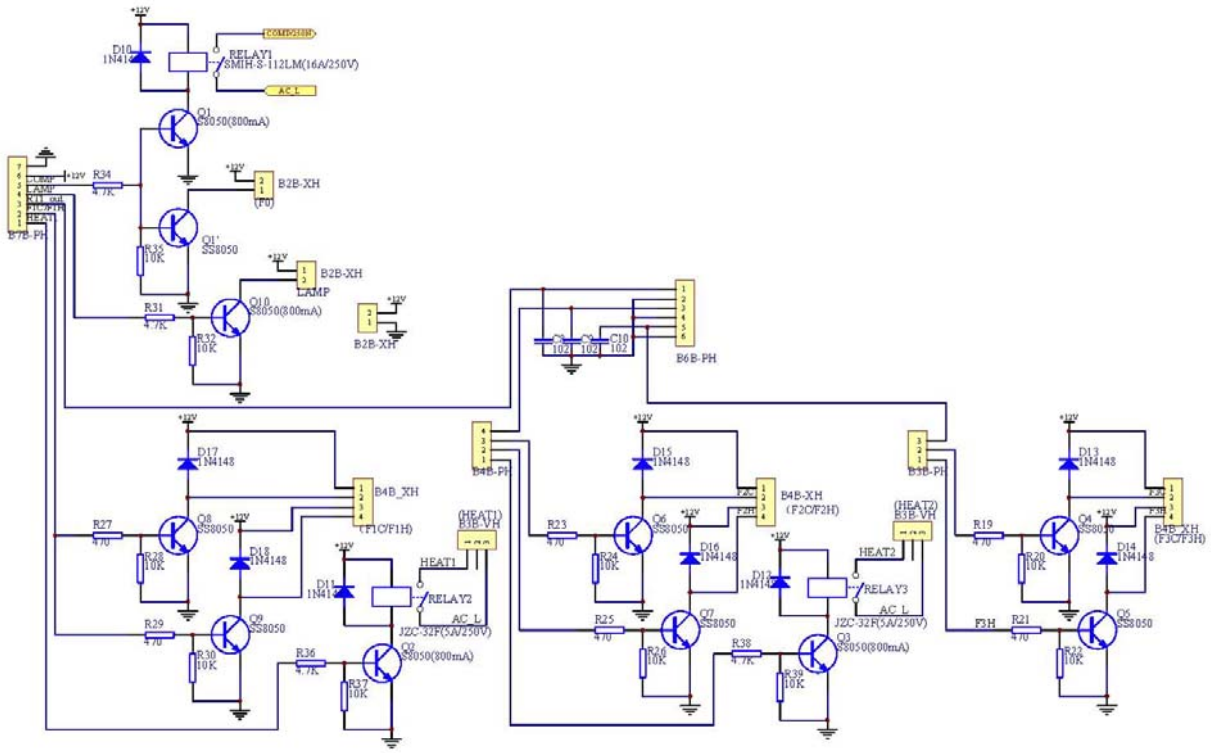
4.3.1 Power PCB



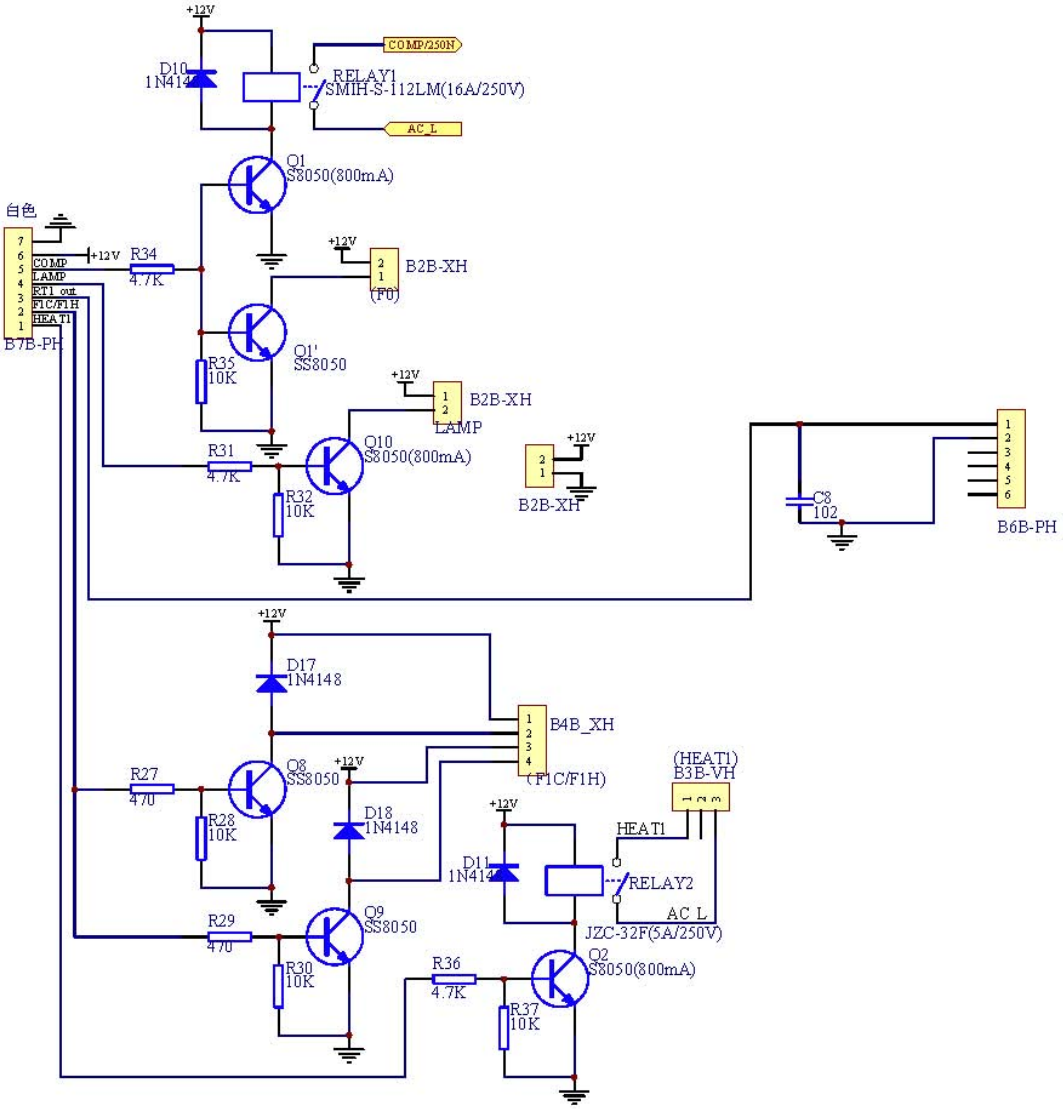
4.3 SCHEMATIC DIAGRAM FOR PCB

4.3.1 Power PCB

4.3.2 Control PCB for Dual Zone & Upper Control Unit of Three Zone



4.3.3 Control PCB for Single Zone & Lower Control Unit of Three Zone

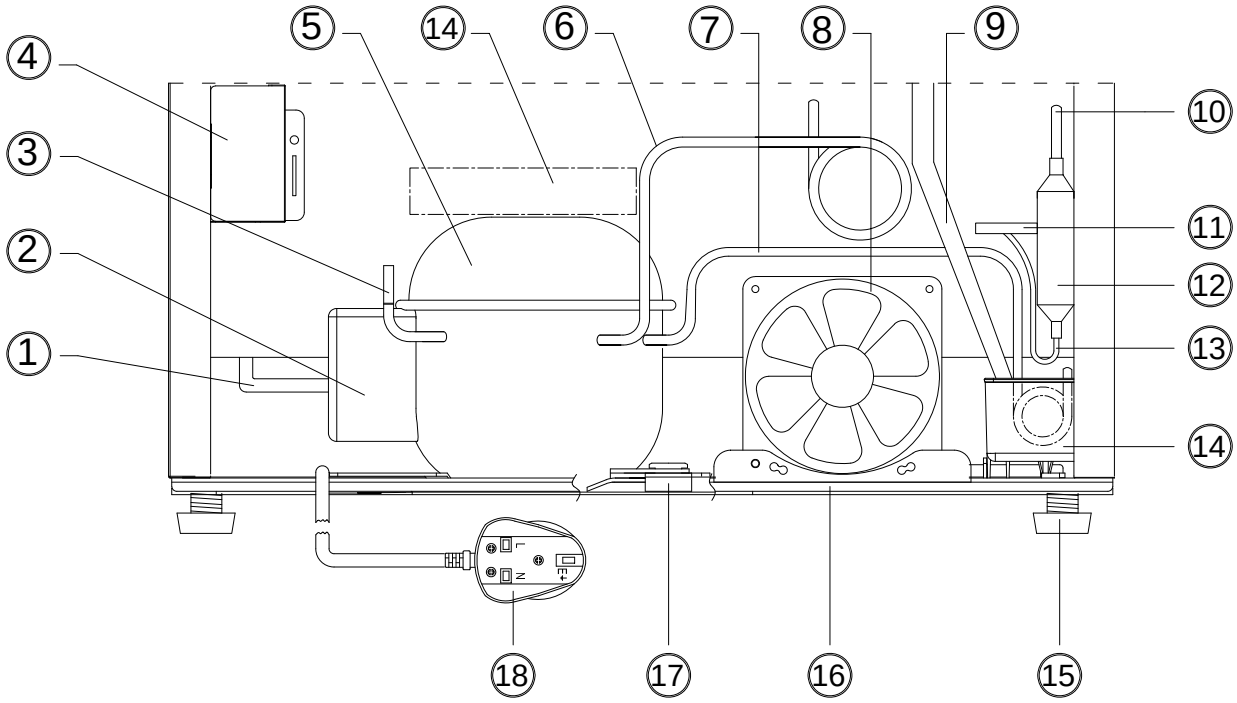


4.4 SENSOR RESISTANCE CHARACTERISTICS TABLE

No.	MEASURED TEMPERATURE (°C)	RESISTANCE OF SENSOR (kΩ)
1	**-30**	**116.55**
2	**-28**	**104.97**
3	**-26**	**94.67**
4	**-24**	**85.49**
5	**-22**	**77.30**
6	**-20**	**69.99**
7	**-18**	**63.44**
8	**-16**	**57.58**
9	**-14**	**53.32**
10	**-12**	**47.60**
11	**-10**	**43.35**
12	**-8**	**39.53**
13	**-6**	**36.08**
14	**-4**	**32.97**
15	**-2**	**30.16**
16	**0**	**27.62**
17	**2**	**25.32**
18	**4**	**23.24**
19	**6**	**21.35**
20	**8**	**19.63**
21	**10**	**18.07**
22	**12**	**16.65**
23	**14**	**15.35**
24	**16**	**14.17**
25	**18**	**13.10**
26	**20**	**12.11**
27	**22**	**11.21**
28	**24**	**10.39**
29	**25**	**10.00**
30	**26**	**9.63**
31	**28**	**8.94**
32	**30**	**8.30**
33	**32**	**7.72**
34	**34**	**7.18**
35	**36**	**6.69**
36	**38**	**6.23**
37	**40**	**5.81**
38	**42**	**5.42**
39	**44**	**5.06**
40	**46**	**4.73**
41	**48**	**4.43**
42	**50**	**4.15**

• The tolerance of sensor resistance is ±5%
• Be sure to measure the sensor resistance after keeping the sensor more than 3 minutes at a measuring temperature. (It needs delay due to sensor speed.)

5. COMPRESSOR ROOM VIEW AND PARTS LIST



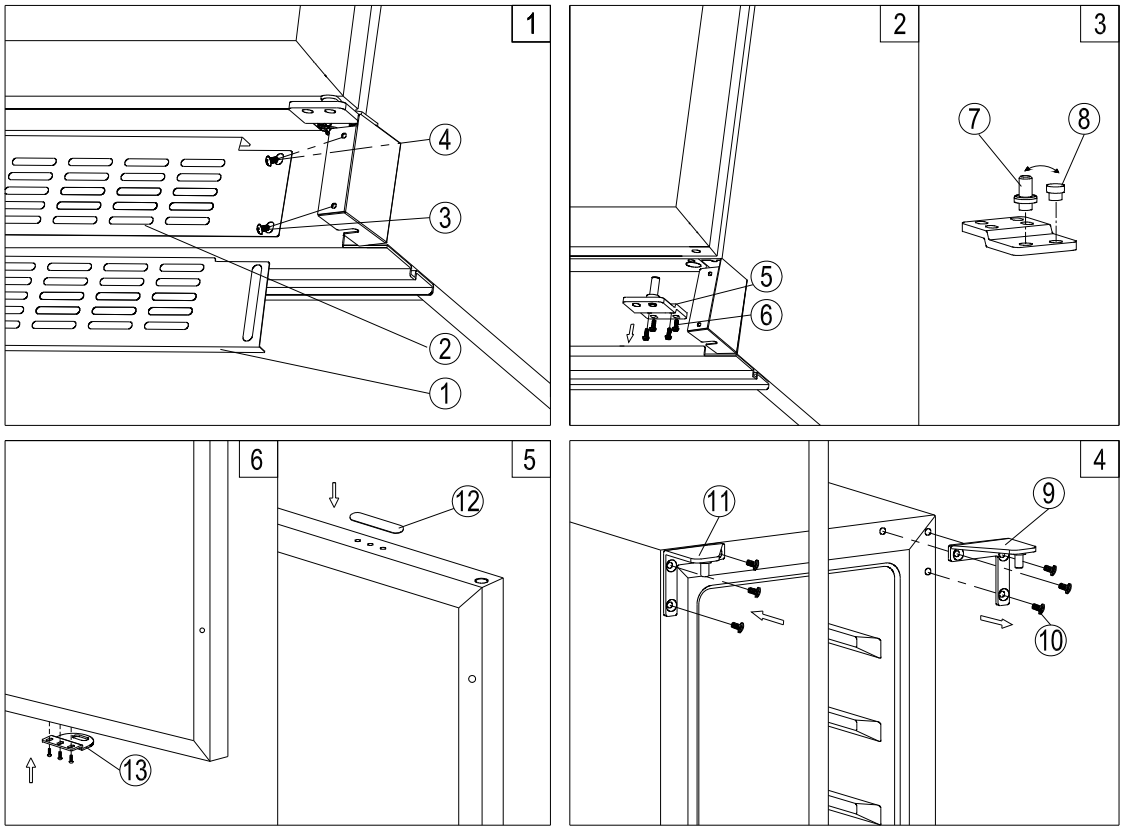
1. **Joint of condenser outlet tubing and hot pipe inlet tubing**
2. **Electrical Box of Compressor**
3. **Process Pipe**
4. **Electrical Box (Power PCB inside)**
5. **Compressor**
6. **Suction Pipe**
7. **Discharge Pipe**
8. **Condenser Fan Motor (Not available for some models)**
9. **Drainage Hose**
10. **Outlet Tubing of Hot Pipe**
11. **Process Pipe**
12. **Filter Drier**
13. **Capillary**
14. **Water Drip Tray**
15. **Leveling Leg**
16. **Compressor Base**
17. **Compressor Leg**
18. **Power Supply Cord with Plug**

6. HOW TO REVERSE THE DOOR SWING

This wine cellar has the capability of the door opening from either the left or right side. The unit is delivered to you with the door opening from the left side. Should you desire to reverse the opening direction, please follow the following reversal instructions:

Note: All parts removed must be saved to do the reinstallation of door.

6.1 DESIGN 1 – For built-under models



1. Remove the ventilation grille ② and the adjustable ventilation grille ① by unscrewing the screws ③ & ④. (Fig. 1)
   NOTE: For some models without adjustable ventilation grille, the step is not needed.

2. Remove the bottom hinge ⑤ by unscrewing the four lock screws ⑥. Be careful to hold the glass door firmly after removing the screws. (Fig. 2)

3. Gently pull down to remove the glass door from the right top hinge and place it on a padded surface to avoid the risk of damage. Then remove the right top hinge ⑨. (Fig. 4)

4. Unscrew and transfer hinge pin ⑦ and/or door stopper ⑧ of the bottom hinge to the opposite side. (Fig. 3)

5. Pop out the cover caps on the left side of cabinet and use them to cover the screw holes on the right hand side.

6. Screw the alternative left top hinge ⑪, included in the fittings, on the left hand side of

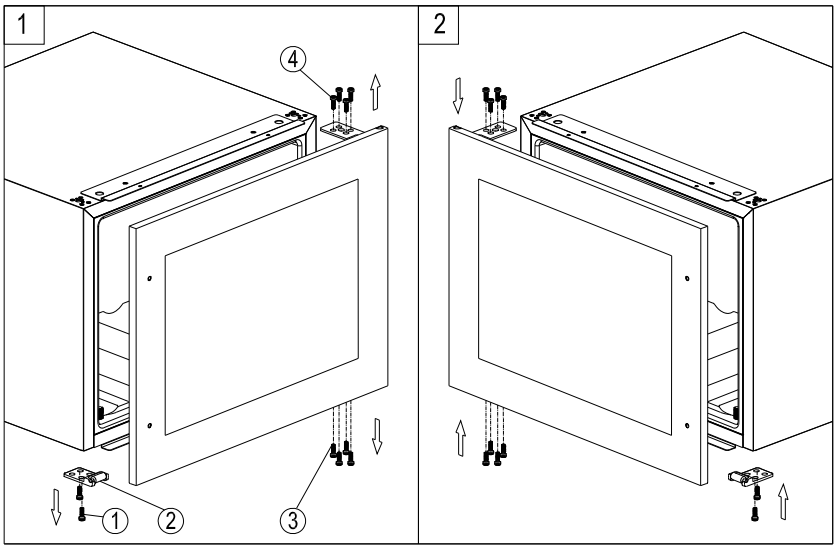
cabinet. (Fig. 4)

7. Unscrew and transfer the lock bracket ⑬ to the opposite side of glass door. Then use the crystal cover ⑫ included in the fittings to cover the three holes left after unscrewing the lock bracket.(Only for models with lock on the ventilation grille) (Fig. 5)

8. Rotate the door 180° (No need for models with lock on the door) and relocate the door to the designated position. Then screw the bottom hinge assembly on the left designated position and tighten it after the door is leveled.

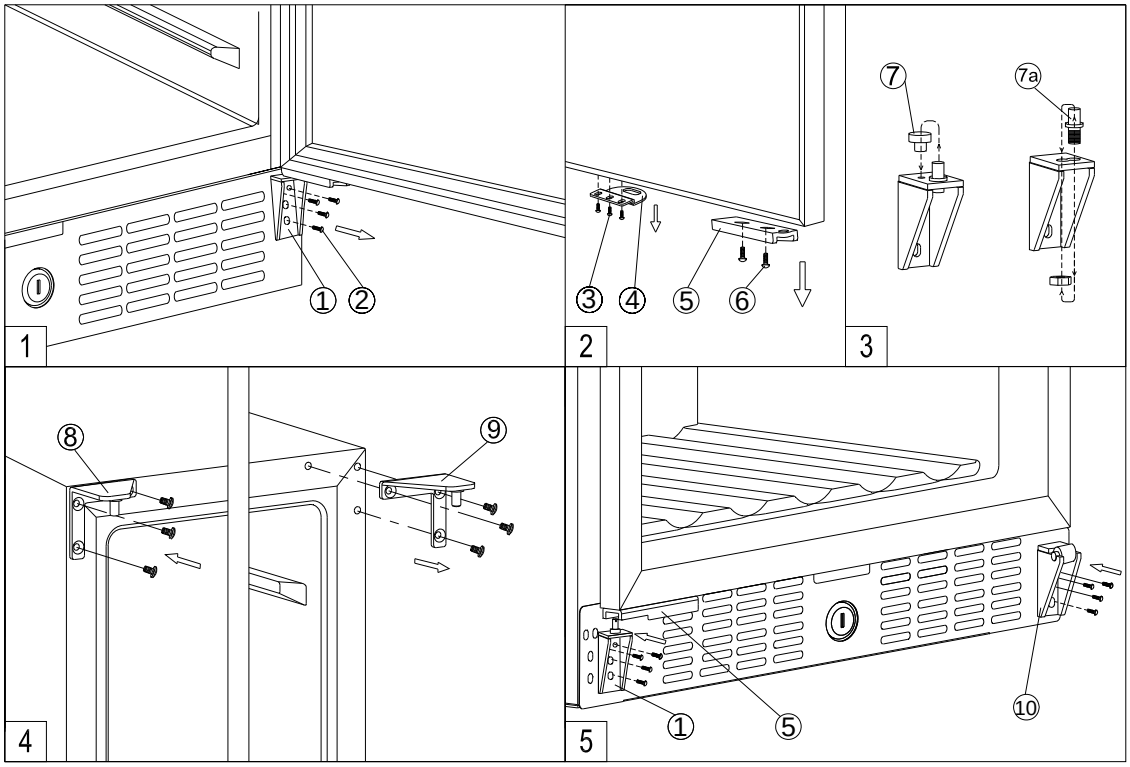
9. Transfer the handles & plugs to the opposite positions and then reassembly the ventilation grilles if need.

6.2 DESIGN 2 – For fully integrated models



1. Remove the glass door by unscrewing the eight lock screws ③ and ④. Be careful to hold the glass door firmly after removing the screws and place it on a padded surface to avoid the risk of damage.
2. Unscrew and transfer the door supporter ② to the opposite side.
3. Rotate the glass door 180°and refit the glass door to the opposite side. Then screw and tighten it after the door is leveled.

6.3 DESIGN 3 – For tall models



1. Remove the bottom hinge ① by unscrewing the four lock screws ②. Be careful to hold the glass door firmly after removing the screws. (Fig. 1)

2. Gently pull down to remove the glass door from the right top hinge and place it on a padded surface to avoid the risk of damage. Then remove the right top hinge ⑨. (Fig. 4)

3. Pop out the cover caps on the left side of cabinet and use them to cover the screw holes on the right hand side.

4. Screw the alternative left top hinge ⑧, included in the fittings, on the left hand side of cabinet. (Fig. 4)

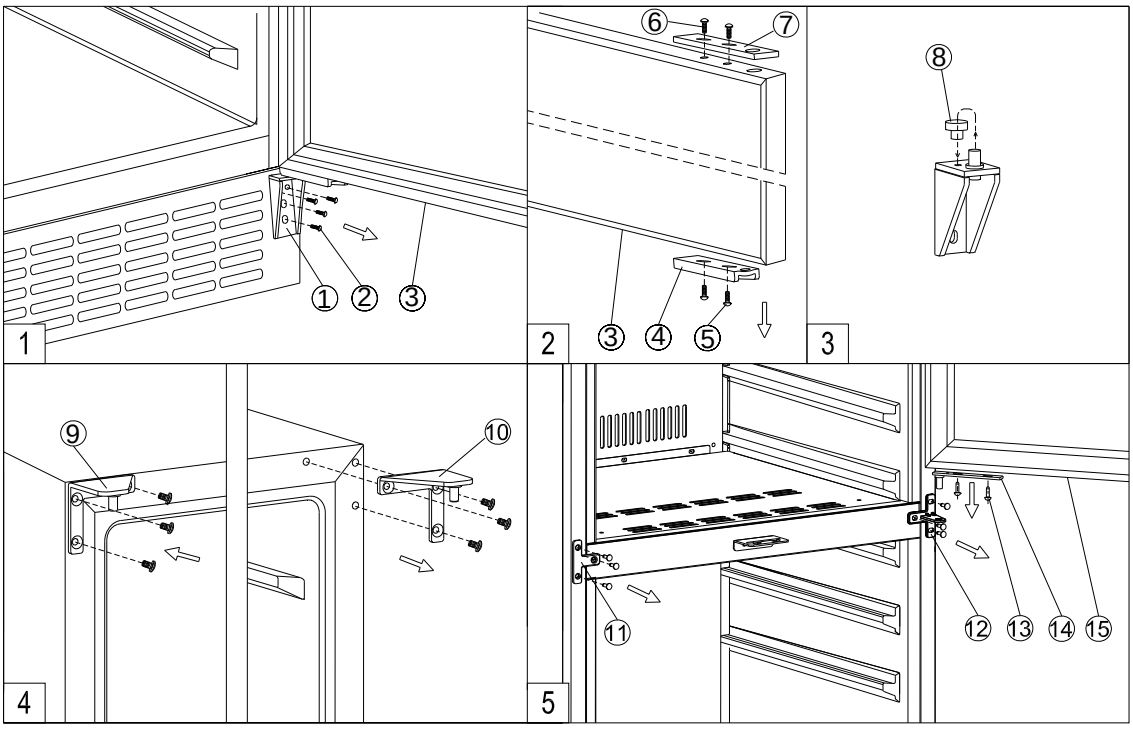
5. Unscrew and transfer door supporter ⑩ to the opposite side. At the same time remove the stopper pin ⑦ of bottom hinge to the opposite designated position or unscrew and transfer the hinge pin 7a of bottom hinge to the opposite designated position. (Fig. 5 & 3)

6. Unscrew and transfer the door adapter ⑤ and lock bracket ④ to the top designated position of glass door. (Fig. 2)

7. Rotate the door 180° and relocate the glass door to the designated position. Then screw the bottom hinge on the left designated position and tighten it. (Fig. 5)

8. Recheck and adjust the door alignment by loosening the screws ⑥ and moving the door adapter ⑤. Tighten the screws ⑥ after the door is levelled. (Fig. 5)

6.4 DESIGN 4 – For double door models



1. Remove the bottom hinge ① by unscrewing the four screws ②. Be careful to hold the lower glass door ③ firmly after removing the screws. And then gently pull down to remove the lower glass door from the middle hinge and place it on a padded surface to avoid the risk of damage. (Fig. 1)

2. Unscrew and transfer the door adapter ④ and ⑦ to the designated opposite position of lower glass door. (Fig. 2)

3. Remove the door adapter ⑭ by unscrewing the two lock screws ⑬. Be careful to hold the upper glass door firmly after removing the screws. And then gently pull down to remove the upper glass door ⑮ from the top hinge and place it on a padded surface to avoid the risk of damage. Then remove the right top hinge ⑩. (Fig. 5 & 4)

4. Unscrew and transfer the middle hinge ⑫ and the middle fixing plate ⑪ to the opposite position. (Fig. 5)

5. Pop out the cover caps on the left side of cabinet and use them to cover the screw holes on the right hand side.

6. Screw the alternative left top hinge ⑨, included in the fittings, on the left hand side of cabinet. (Fig. 4)

7. Relocate the door adapter ⑭ on the middle hinge ⑫.

8. Set the upper glass door to the designated position and install the two lock screws to connect the door adapter ⑭ with the upper glass door and tighten them before the door is leveled.

9. Set the lower glass door to the designated position and reassemble the bottom hinge.

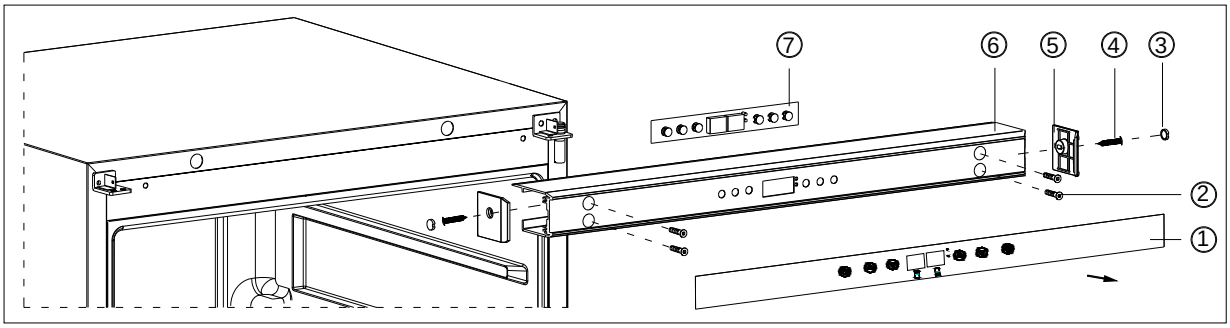
10. Recheck and adjust the lower door alignment by loosening the screws ⑤& ⑥ and moving the door adapter ④&⑦. Tighten the screws ⑤& ⑥ after the door is levelled. (Fig. 5)

11. Transfer the handles and plugs to the opposite positions.

7. HOW TO REPLACE THE MAIN PARTS

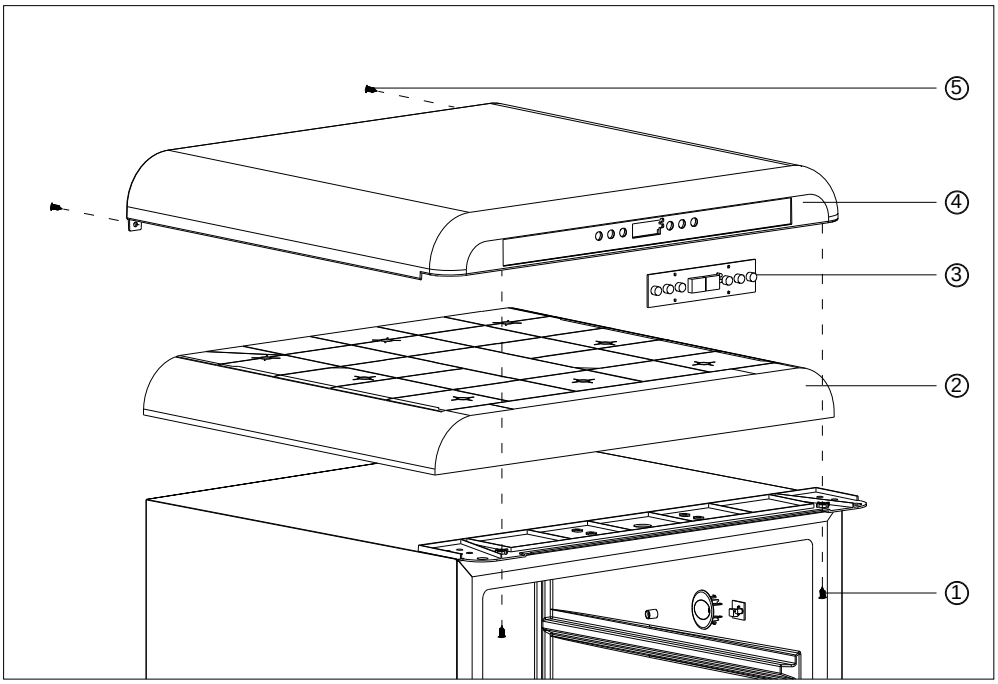
7.1 REPLACING THE TOP INSERT AND CONTROL PCB (FOR MODELS WITH CONTROL PANEL ON THE TOP & OUTSIDE)

1. Use a needle to remove the two plugs ③ softly. Remove the plastic ends ⑤ of the top insert by unscrewing the screws ④. Carefully remove the control panel film ①.
2. Unscrew the four bolts ② that secure the top insert to the cabinet.
3. Remove the top insert ⑥.
4. Disconnect the cable from the control PCB ⑦.
5. Remove the screws that are used to secure the control PCB to the top insert. Now you can replace the control PCB.



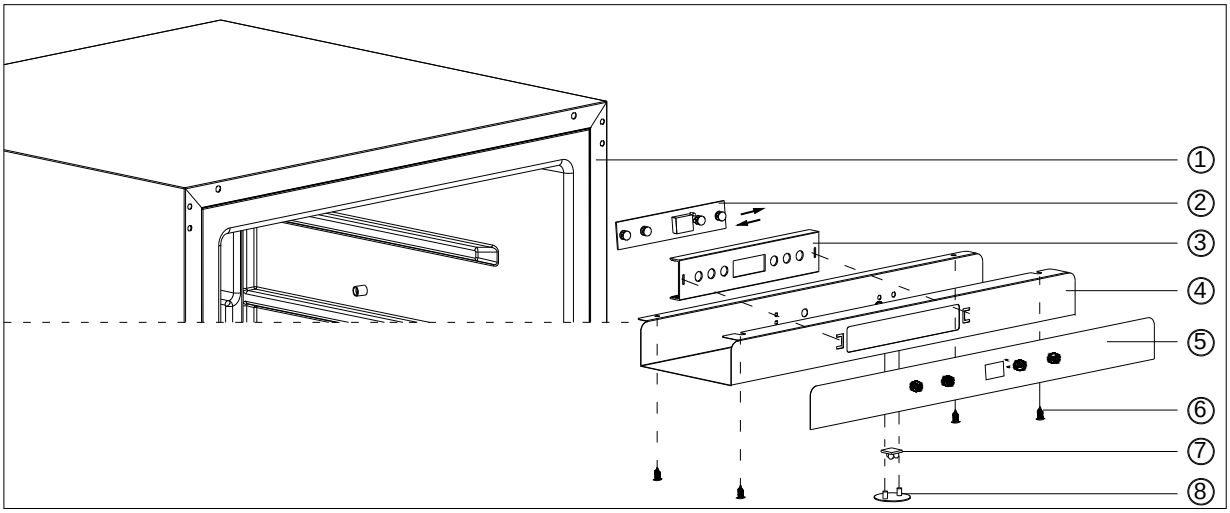
7.1A REPLACING THE TOP COVER AND CONTROL PCB (FOR MODELS VC100DA & VC100SA)

1. Unscrew the two screws ① that connect the top cover ④ to top bracket.
2. Unscrew the two screws ⑤ that secure the top cover to the cabinet.
3. Softly raise the top cover and disconnect the cable from the control PCB ③.
4. Remove the screws to fix the control PCB to top cover. Now you can replace the control PCB.



7.1B REPLACING THE CONTROL PCB (ONLY FOR SINGLE ZONE MODELS WITH CONTROL PCB AFTER THE DOOR)

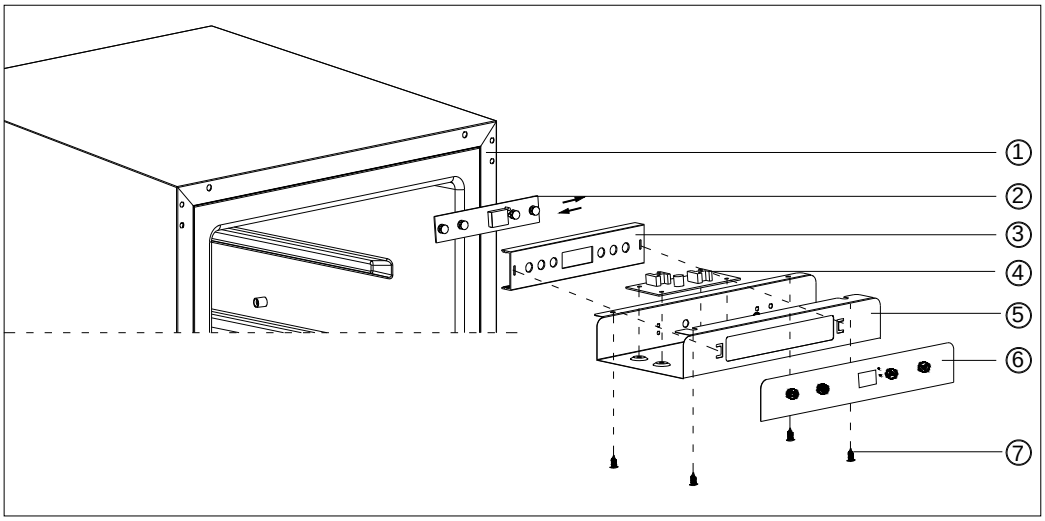
1. Remove all shelves.
2. Unscrew the four screws ⑥ that secure the PCB box ④ to the top of cabinet ①.
3. Pull down to remove the PCB box carefully.
4. Disconnect the cable from the control PCB ②.
5. Dismantle the PCB supporter ③ from the PCB box.
6. Then carefully remove the control PCB from the PCB supporter. Now you can replace the control PCB.



7.1C REPLACING THE CONTROL PCB AND POWER PCB (ONLY FOR VC20S, VC33S & VC40D)

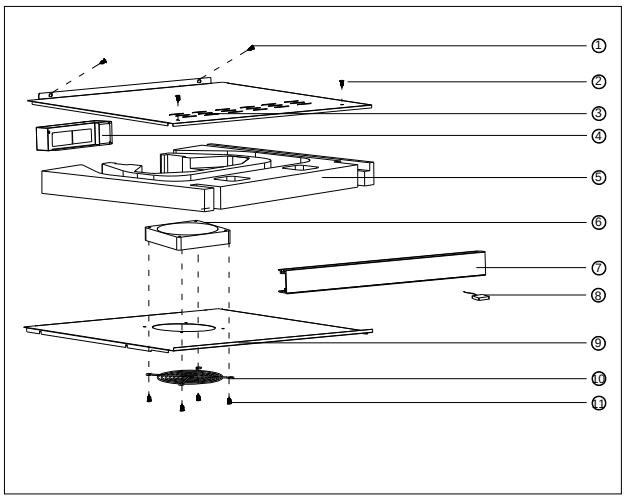
1. Remove all shelves.
2. Unscrew the four screws ⑦ that secure the PCB box ⑤ to the top of cabinet ①.
3. Pull down to remove the PCB box carefully.
4. Disconnect the cable/wires from the Power PCB ④.
5. Dismantle the PCB supporter ③ from the PCB box.

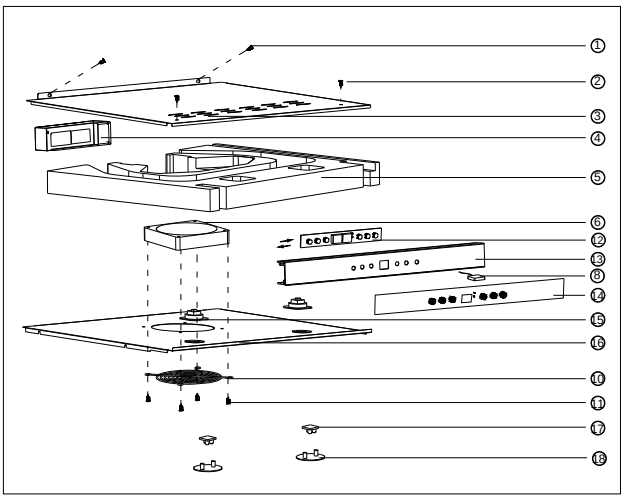
6. Then carefully remove the control PCB ② from the PCB supporter. Now you can replace the control PCB and Power PCB.



7.2 REPLACING THE CONTROL PCB, FAN MOTOR, AIR DOOR ASSEMBLY AND LED LIGHT IN THE MIDDLE DIVIDER (EXCEPT OF VC20D & VC33D)

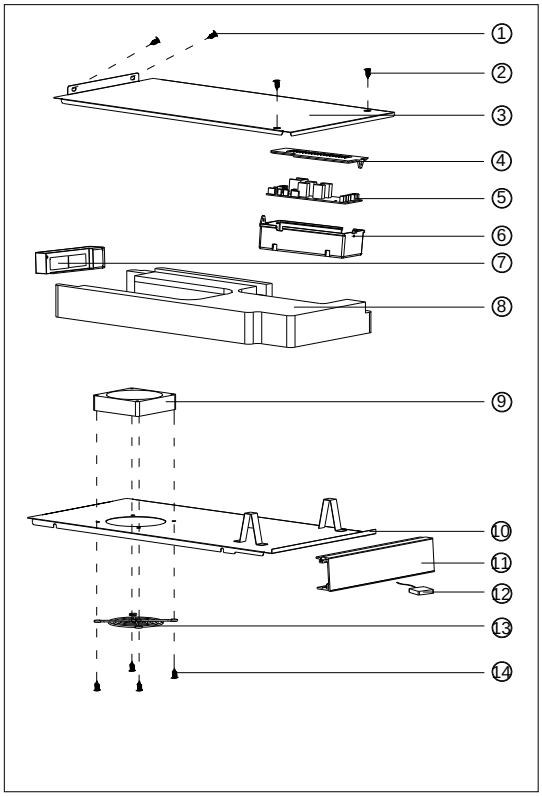
1. Remove all shelves.
2. Remove the two screws ② that connect the bottom plate and top plate of middle divider.
3. Softly remove the PCB supporter ⑦ and then remove the control panel film.
4. Disconnect the cable from the control PCB ⑥ and remove the fixing glue. Sliding out and replace the control PCB.
5. Remove the two screws ① that secure the top plate ③ of middle divider to the upper air channel cover. And then remove the top plate of middle partition.
6. Disconnect the wires to fan motor F2C ⑥.
7. Remove the four screws that fix the fan motor F2c to the bottom plate ⑨ of middle divider. Now you can replace the fan motor F2C.
8. Disconnect the wires to air door assembly ④ and now you can replace the air door assembly.
9. In order to remove the middle divider, remove all screws that fix the top plate and bottom plate of middle partition to the air channel covers and cabinet.

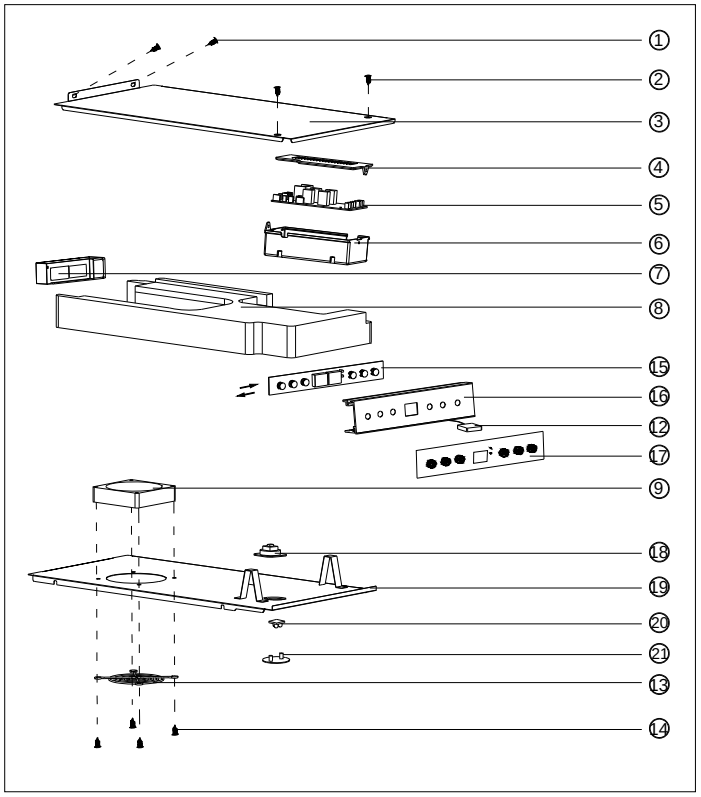




7.2A REPLACING THE CONTROL PCB, FAN MOTOR, AIR DOOR ASSEMBLY AND LED LIGHT IN THE MIDDLE DIVIDER (ONLY FOR VC20D & VC33D)

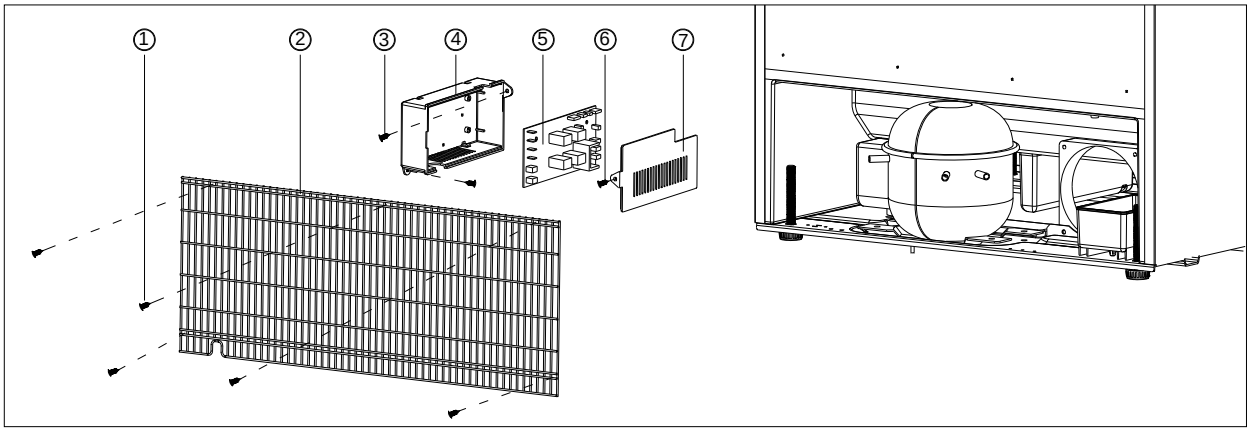
1. Remove all shelves.
2. Remove the two screws ② that connect the bottom plate and top plate of middle divider.
3. Softly remove the PCB supporter ⑪ and then remove the control panel film.
4. Disconnect the cable from the control PCB ⑥ and remove the fixing glue. Sliding out and replace the control PCB.
5. Remove the two screws ① that secure the top plate ③ of middle divider to the upper air channel cover. And then remove the top plate of middle divider.
6. Disconnect the wires to fan motor F2C ⑨.
7. Remove the four screws that fix the fan motor F2C to the bottom plate of middle divider. Now you can replace the fan motor F2C.
8. Disconnect the wires to air door assembly ⑦ and now you can replace the air door assembly.
9. In order to remove the middle divider, remove all screws that fix the top plate and bottom plate of middle divider to the air channel covers and cabinet.





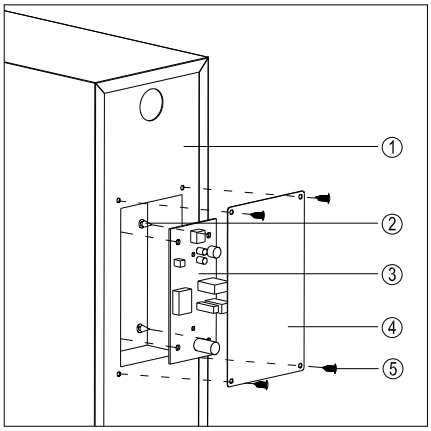
7.3 REPLACING THE POWER PCB (EXCEPT OF VC7S, VC20 AND VC33)

1. Remove the five screws ① that fix the rear grille to the cabinet.
2. Remove the screws ③ and ⑥.
3. Pull out the electrical box base ④ & electrical box cover ⑦and Power PCB ⑤.
4. Disconnect the cables from the Power PCB and then you can replace the Power PCB.



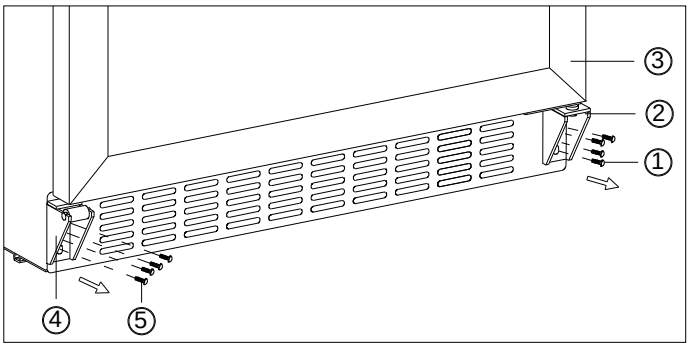
7.3a REPLACING THE POWER PCB FOR VC7S

1. Remove the four screws ① that fix the electrical box cover ④ to the cabinet.
2. Disconnect the cables from the Power PCB ③ and then you can replace the Power PCB.

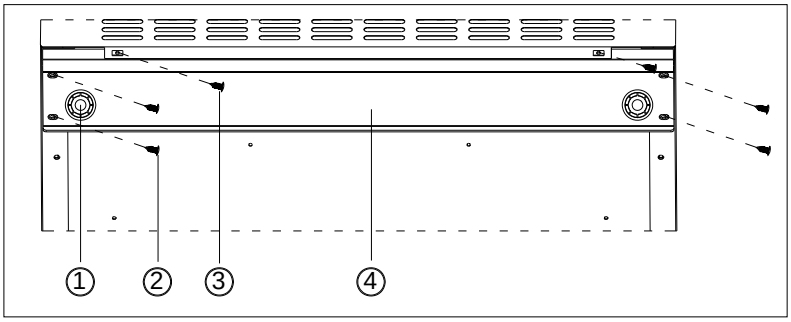


7.4 REPLACING THE VENTILATION GRILLE / LOCK ASSEMBLY (FOR VC100, VC125 & VC170 SERIES)

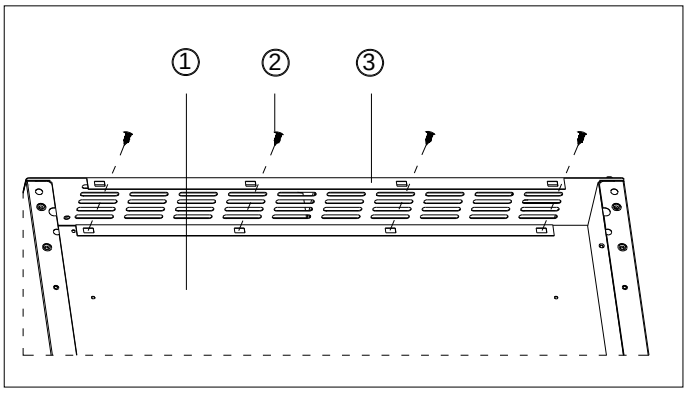
1. With assistance, tilt the unit back and remove the lock screws ①&⑤ holding the bottom hinge ② and door supporter assembly ④ to the cabinet. Be careful to hold the glass door firmly after removing the screws. Pull down to remove the glass door and place it on a padded surface to prevent scratching it.



2. Remove the two screws ③ that secure the ventilation grille to the reinforced bracket. At the same time remove the four bolts ② that fix the reinforced bracket ④ to the cabinet.



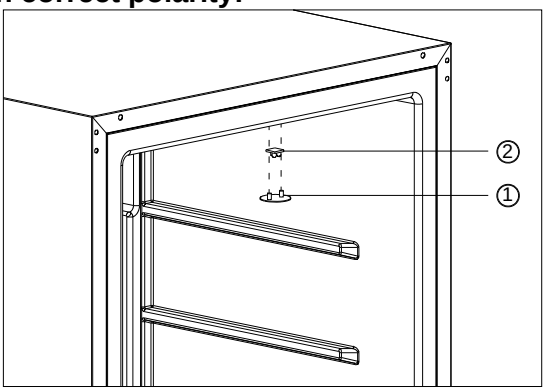
3. Remove the four screws ② that secure the bottom grille ③ to the cabinet bottom. Now you can replace the ventilation grille and lock.



7.5 REPLACING THE LED LIGHT

1. Remove all shelves.
2. Remove the LED light cover ① by fingernail.
3. Pull down to remove the LED light PCB and replace it with a new one.

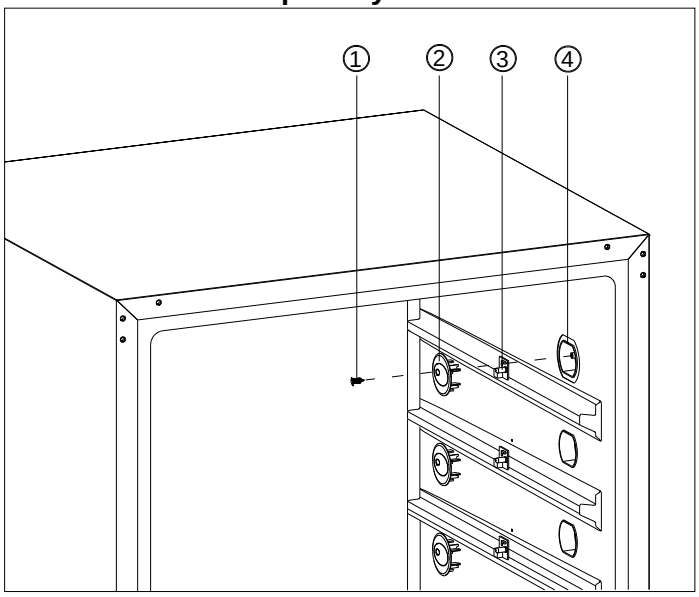
IMPORTANT: Pls insert the new LED light PCB with correct polarity!



7.5A REPLACING THE LED LIGHT

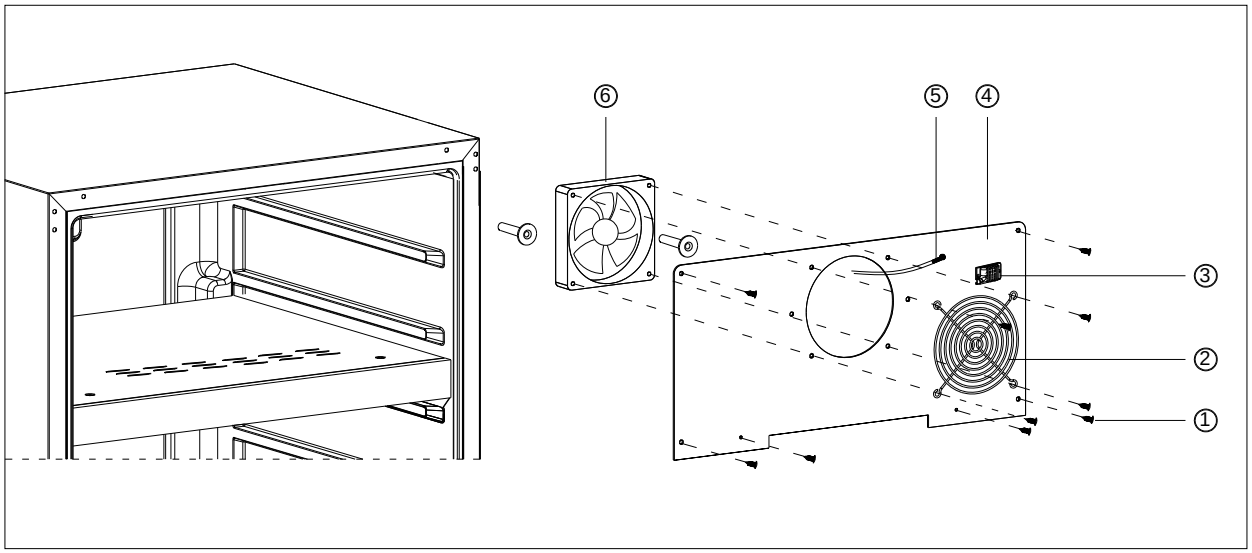
1. Remove all shelves.
2. Remove the screw ① (For the new design the step of removing the screw is not needed).
3. Pull out the light cover ② by fingernail and then you can replace LED light PCB.

IMPORTANT: Pls insert the new LED light PCB with correct polarity!



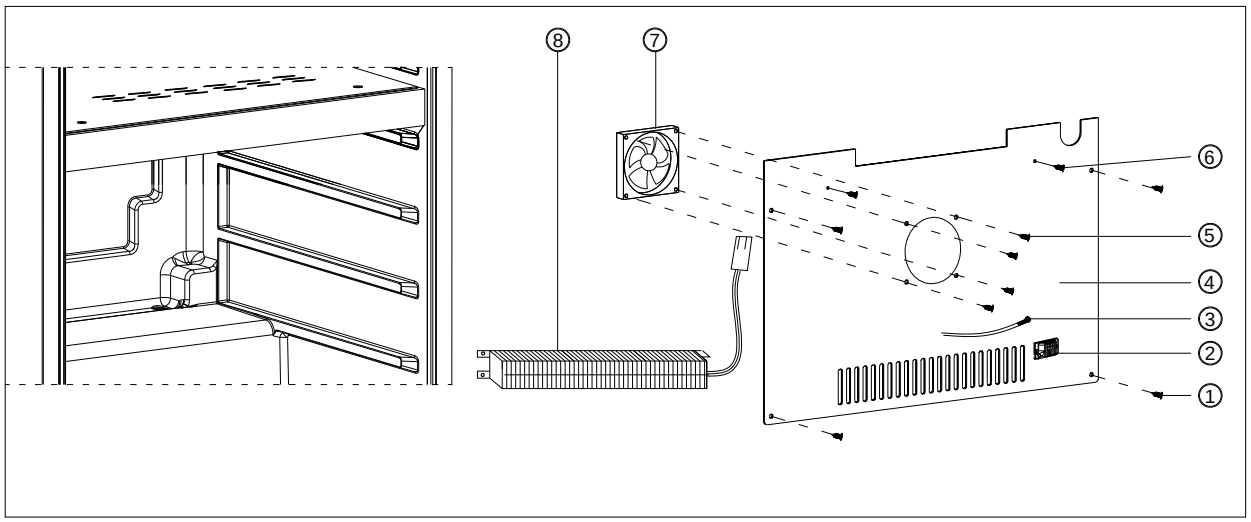
7.6 REPLACING THE EVAPORATOR FAN MOTOR AND TEMPERATURE SENSOR IN THE UPPER ZONE FOR DUAL ZONE MODELS

1. Remove all shelves.
2. Remove the screws ① that secure the upper air channel cover ④ to the cabinet.
3. Disconnect the evaporator fan motor F1C wires. Then pull out the upper air channel cover.
4. Unscrew the thermistor supporter ③ and now you can replace the temperature sensor ⑤ in the upper zone.
5. Remove/Disassemble the four screws that secure the fan motor F1C ⑥ to the upper air channel cover and then you can replace the evaporator fan motor.



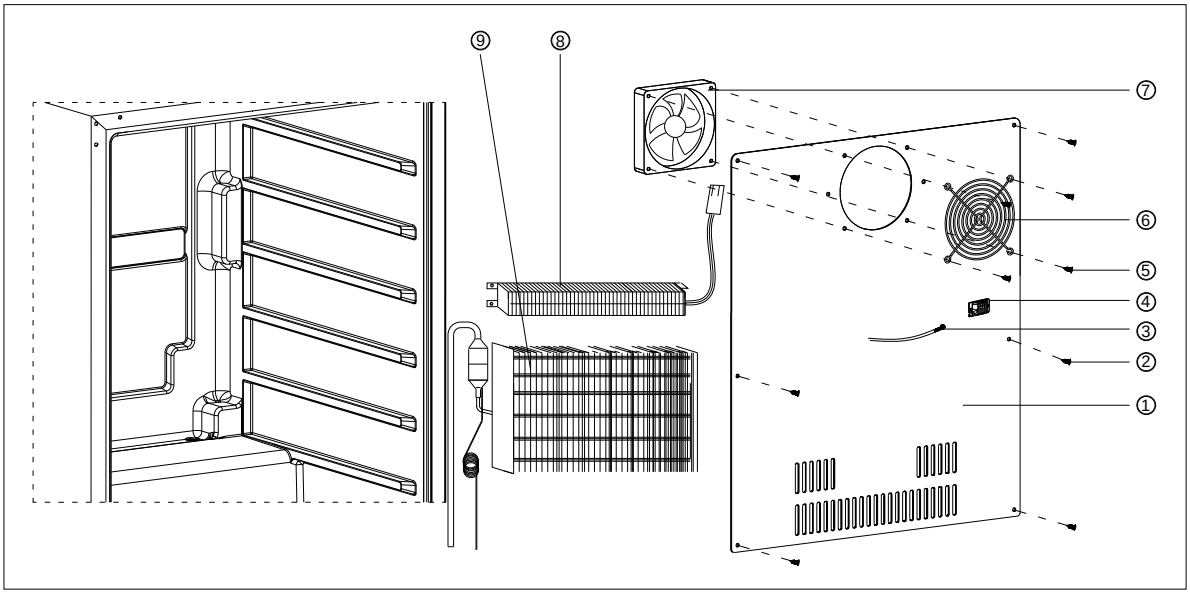
7.7 REPLACING THE PTC HEATER, HEATER FAN MOTOR AND TEMPERATURE SENSOR IN THE LOWER ZONE FOR DUAL ZONE MODELS

1. Remove all shelves.
2. Remove the screws ① that secure the lower air channel cover ④ to the cabinet.
3. Disconnect the fan motor wires. Then pull out the lower air channel cover.
4. Now you can see the PTC heater ⑧ for replacing.
5. Unscrew the thermistor supporter ② and now you can replace the temperature sensor ③ in the lower zone.
6. Remove/disassemble the four screws ⑤ that secure the fan motor F2H ⑦ to the lower air channel cover and then you can replace the evaporator fan motor.



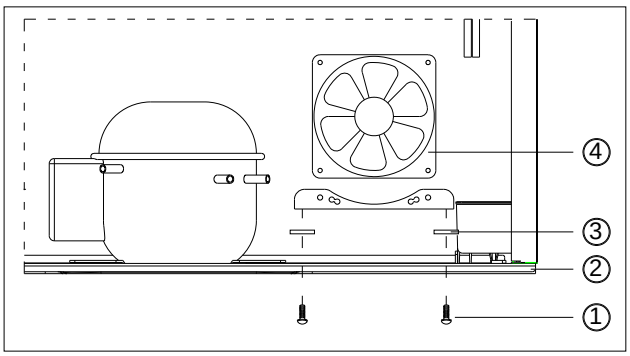
7.8 REPLACING THE EVAPORATOR FAN MOTOR, TEMPERATURE SENSOR AND PTC HEATER FOR SINGLE ZONE MODELS

1. Remove all shelves.
2. Remove the screws ② that secure the air channel cover ① to the cabinet.
3. Disconnect the evaporator fan motor wires. Then pull out the air channel cover.
4. Unscrew the thermistor supporter ④ and now you can replace the temperature sensor③.
5. Now you can see the PTC heater ⑧ and evaporator ⑨ and then you can replace them.
6. Remove the fours screws ⑤ that secure the fan motor F1C ⑦ to the air channel cover and then you can replace the evaporator fan motor.



7.9 EPLACING THE CONDENSER FAN MOTOR

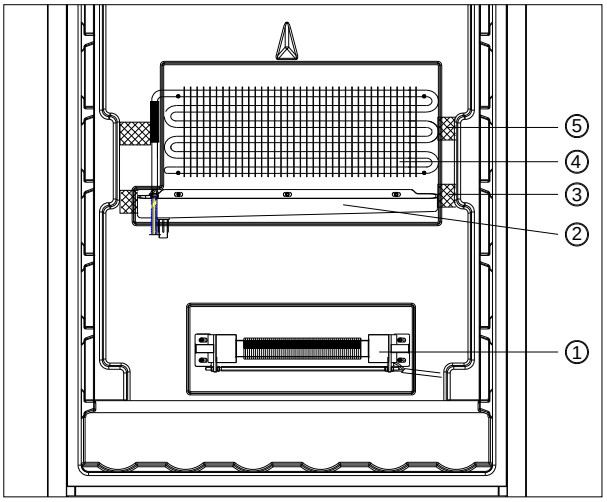
1. Disconnect the condenser fan motor lead connector from the cable or power PCB inside the electrical box.
2. Remove the two screws ① that mount the fan motor F0 ④ to the compressor base ②.
3. Then take out the condenser fan motor and replace it. Make sure to refit the rubber washer ③ at the original designated position and replace it if aging.



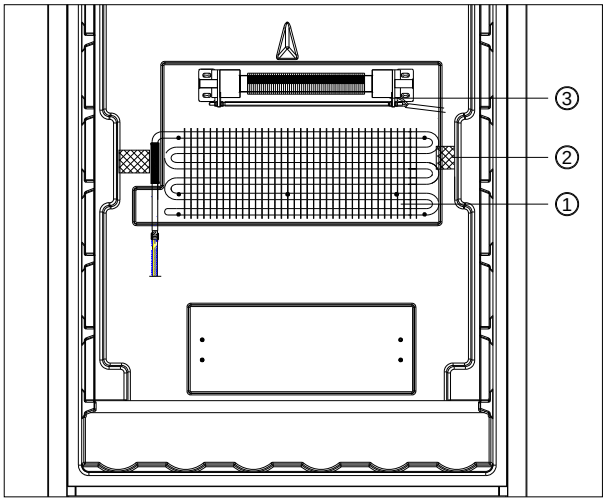
7.10 REPLACING THE EVAPORATOR ASSEMBLY

NOTE: Before replacing any component of the refrigeration system, make sure to read the instructions “Service Precautions for R600A System” or “Service Precautions for R134a System”.

1. Disconnect the unit from the power source.
2. Clean and then solder the capillary from the filter drier.
3. Clean and then solder the suction tube from the compressor.
4. Remove all shelves.
5. Remove the top air channel cover, bottom air channel cover and remove the middle partition for dual zone models.
6. Remove the air channel cover only for single zone models.
7. Remove the two brackets to fix the evaporator assembly to the cabinet.
8. Replace the evaporator assembly and install the new one to the cabinet.
9. After replacing the evaporator assembly, make sure to install back the four seal foam blocks ③ and ⑤ to the original designated positions for dual zone and three zone models. **This is very important.**
10. For single zone models make sure that the seal foam blocks ② are available. **This is very important.**
11. For R134a system, make the system flush and replace the filter drier.
12. Clean then connect the suction tube to the compressor. Clean again and connect the capillary to the filter drier.
13. Solder all joints. Silver solder and proper flux should be used on copper to steel or steel to steel joints. Excess flux should be wiped off all tubing.



(Dual Zone)



(Single Zone)

7.11 REPLACING THE COMPRESSOR, COMPRESSOR PTC STARTER AND OVERLOAD PROTECTOR

NOTE: Before replacing any component of the refrigeration system, make sure to read the instructions “Service Precautions for R600A System” or “Service Precautions for R134a System”.

All replacement compressors are charged with the correct amount of oil and a holding charge of dry nitrogen.

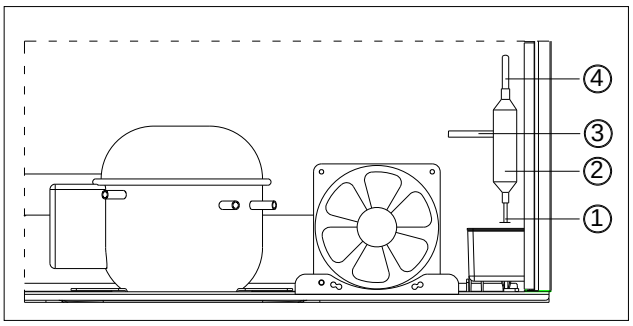
The holding charge is your assurance that the compressor is dry and ready to install. If you receive a replacement compressor that shows no evidence of holding charge when you center the lines or remove the plugs, return it.

1. Disconnect the unit from the source.
2. Locate defective compressor and evacuate the sealed system.
3. Clean and cut the refrigerant lines as close as possible to the compressor stubs, leaving enough length to install the replacement compressor.
4. Disconnect lead wires from compressor terminals.
5. Remove the retaining clips from the compressor mounts. Remove defective compressor from cabinet and install rubber grommets on replacement compressor.
6. Clean the compressor stubs with an abrasive cloth. Do not open the compressor stubs.
7. Install the replacement compressor using the mounting clips previously removed.
8. Connect the compressor leads.
9. Solder a short piece of tubing to the process tube (approximately 150mm / 6 inches long). Connect the refrigerant tubing to the compressor stubs
10. Evacuate, recharge and leak test the system.
11. Test/run the unit to check operation.

7.12 REPLACING THE FILTER DRIER

NOTE: A new filter drier must be installed each time any component of the refrigeration system opened or replaced.

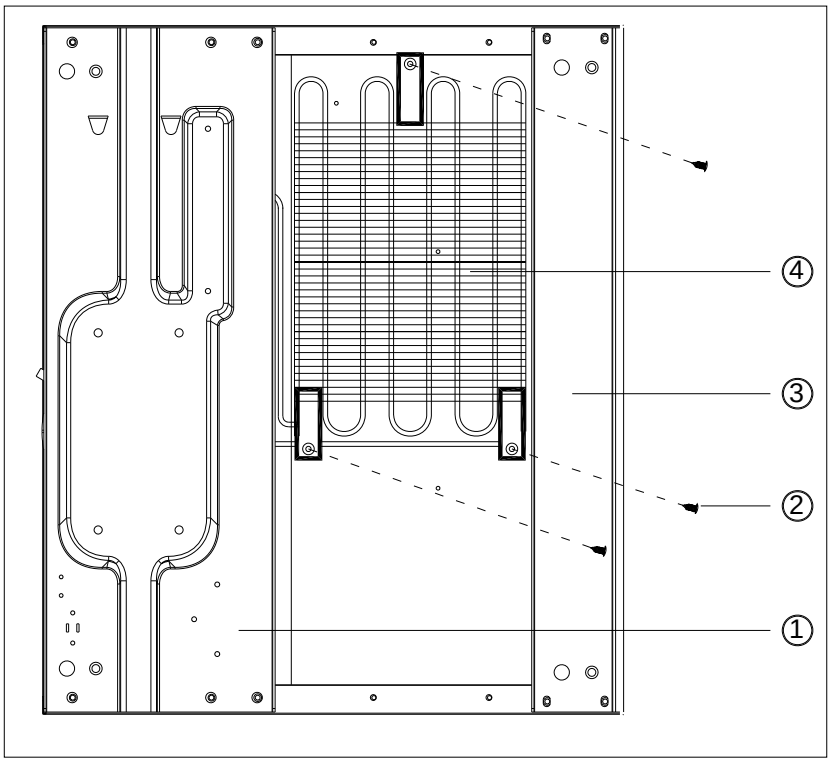
1. Carefully pull the old filter drier ② and tubing out of the compressor room.
2. Use steel wool or fine emery paper to clean the capillary tube ① 3 inches (75mm) from the original joint. Also, clean the input tubing ④ (the condenser outlet tube) to the filter drier of 3 inches from the original joint.
3. Use a knife or file to score the capillary tube and the input tubing to the old filter drier 1 inch (25mm) from the original joints. Then break the connections.
4. Use steel wool or fine emery paper to clean both ends of the new filter drier.
5. Make an offset 1/2" (12mm) from the end of the capillary tube to prevent it from penetrating too far into the drier.
6. Connect the capillary tube to the replacement filter drier.
7. Connect hot pipe inlet tube to the replacement filter drier
8. Solder the new filter drier using silver solder with the proper flux at the hot pipe to filter drier joint. Use silfos at the drier to capillary tube joint.



7.13 REPLACING THE CONDENSER

NOTE: Before replacing any component of the refrigeration system, make sure to read the instructions “Service Precautions for R600A System” or “Service Precautions for R134a System”.

1. Disconnect the unit from the power source.
2. Clean and then solder the inlet and the outlet tube from the old condenser ④.
3. With assistance, tilt the cabinet side and remove the screws ② which secure the condenser to the cabinet bottom.
4. Install the new replacement condenser to the cabinet by screws.
5. Clean then connect the hot pipe to the outlet tubing. Clean again and connect the inlet tubing of the condenser to the spiral pipe.
6. Solder all joints. Silver solder and proper flux should be used on copper to steel or steel to steel joints. Excess flux should be wiped off all tubing.

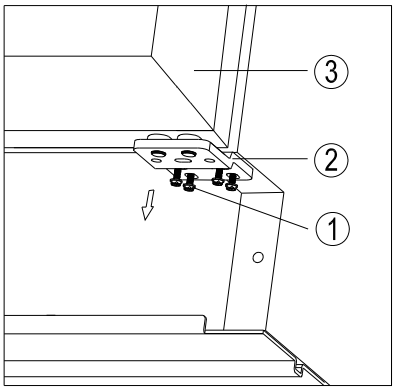


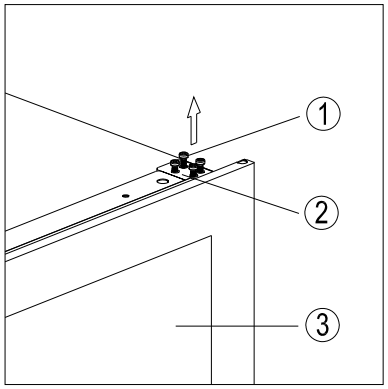
7.14 LEVELING THE DOOR / HINGE ADJUSTMENTS

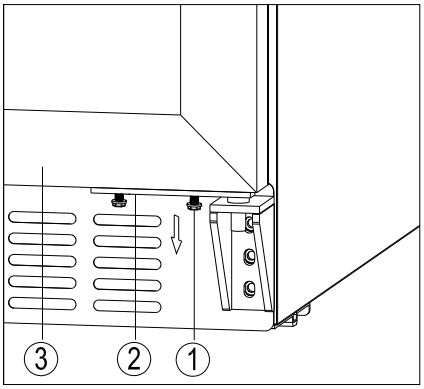
1. With assistance, tilt the unit back and loosen the screws ①.
2. Adjust the glass door to make the door top is parallel with the cabinet top then tighten the screws.
3. Hinge adjustments are necessary when:

- The door gasket is not sealed sufficiently along the hinge side of the door.
- The door gasket is compressed more than 1/16" (1.5mm) on the hinge side (causing a poor seal elsewhere around the top.)
- The distance between the door and cabinet is greater at the top than at the bottom, or vice versa.

4. If one or more of these conditions exist, adjust the hinges to correct the trouble. Raising the hinge side may correct a door sag.

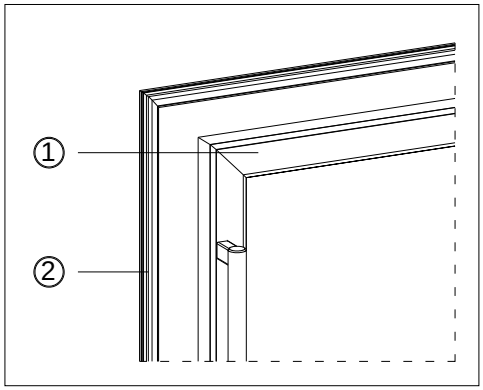






7.15 REPLACING THE DOOR GASKET

1. Open the door and detach the old door gasket ② from the door frame ① by pulling off the gasket.
2. Attach the new door gasket on the door frame. Be careful not to damage the door and the new door gasket.



8. TROUBLESHOOTING

8.1 TROUBLESHOOTING GUIDE

PROBLEM	POSSIBLE CAUSE	REMEDY
Appliance does not operate.	• Appliance is not connected to a power supply. • The appliance is turned off. • The circuit breaker tripped or a blown fuse.	• Connect the appliance. • Switch on the appliance. • Switch on circuit breaker or replace fuse.
Appliance is not cold enough.	• The temperature is not set correctly. • The ambient temperature could require a higher temperature setting. • The door was opened too often. • The door was not closed completely. • Door is not hermetically-sealed. • The condenser is too dirty. • The ventilation opening is blocked or too dusty.	• Check the set temperature. • Set a higher temperature. • Do not open the door more often than necessary. • Close door properly. • Check the door seal and clean or replace. • Clean the condenser when necessary. • Clear the obstructions and clean the dust.
Appliance turns itself on and off frequently.	• The room temperature is higher than average. • A large amount of bottles has been added to the unit. • The door is open too often. • The door is not closed completely. • The door gasket does not seal properly.	• Put the appliance in a cooler place. • Leave the appliance to work for a while until the set temperature has been reached. • Do not open the door more often than necessary. • Close door properly. • Check the door seal and clean or replace.
The light does not work.	• Appliance is not connected to a power supply. • The circuit breaker tripped or a blown fuse. • The light was switched off on the control panel.	• Connect the appliance. • Switch on circuit breaker or replace fuse. • Switch on the light.
Vibrations.	• The appliance is not properly level.	• Level the appliance with the adjustable feet.
The appliance seems to make too much noise.	The rattling noise may come from the flow of the refrigerant, which is normal. As each cycle ends, you may hear gurgling sounds caused by the flow of refrigerant in your appliance. If temperature fluctuations occur, the contraction and expansion of the inner walls may cause popping and cracking noises.	
	• The appliance is not properly level.	• Level the appliance with the adjustable feet.
The door will not close properly.	• The appliance is not properly level. • The door was reversed and not properly installed. • The gasket is dirty. • The shelves are out of position.	• Level the appliance with the adjustable feet. • Check the door hinge and reassemble correctly. • Clean the door gasket. • Check the shelves and refit correctly.
Display “E0”, “E1”, “E2”, “E3”, “E4”, “E5” , “E6” or “E7”.	• “E0” indicates the communication error for 3 zone models. • “E1” indicates that the air temperature sensor is open circuit. • “E2” indicates that the air temperature sensor is short circuit. • “E3” indicates that the defrost sensor	• Call for service.

	in the evaporator is short circuit. • "E4" indicates that the defrost sensor in the evaporator is open circuit. • "E5" indicates the defrost heater failure. • "E6" indicates the solenoid valve failure. • E7" indicates the door switch failure.	
The alarm sounds and the temperature display flashes.	• Has the appliance door been open for longer than 60 seconds? If not, then the temperature has risen higher or fallen lower than the temperature that has been set. This could be due to: • The appliance door being opened too often. • The ventilation opening being covered or too dusty. • A lengthy interruption to the power supply. • A large amount of bottles has been added to the unit.	• If yes, close the door. • Do not open the door more often than necessary. • Clear the obstructions and clean the dust. • Leave the appliance to work for a while until the set temperature has been reached.
The icon "--" is lit up and flashing in the temperature display.	• The display temperature is out of the range.	• Only temperatures within the range 0~99°F/-9~37°C the appliance can display will be shown. If the temperature is not within this range, the icon "--" will be displayed instead. That is normal.

8.2 DIAGNOSIS GUIDE

Remember, before entering the sealed system, all other systems must be tested and properly repaired. These include the electrical system, control operation, and air flow systems: evaporator and condenser motors. Before "turning a screwdriver", many checks can be made simply by using your senses:

LISTEN:
- What is the customer complaint?
- Are the fans operating?
- Is the compressor operating?

LOOK:
- Is the light on/off when the switch is operated?
- What the control panel display?
- Are the controls set properly?
- Do door gaskets seal properly?

TOUCH:
- Is air felt exhausting from the bottom grille?
- Is air circulating in the compartments?
- Is the quarter inch discharge line from the compressor hot?
- Is the condenser hot for free-standing models?
- Is the hot pipe hot?

SYMPTOM	DIAGNOSIS
For models - Single zone with cooling only	
The displayed temperature is higher than the set temperature.	1. Is the ambient temperature too high more than 35°C? 2. Is he ventilation blocked? 3. Is the fan motors failed? 4. Is the temperature sensor failed? 5. Is the cooling system failed?
The displayed temperature is lower than the set temperature.	1. Is the ambient temperature lower than the set temperature? This is normal.
For models - Single zone with cooling and heating	
The displayed temperature is higher than the set temperature.	1. Is the ambient temperature too high more than 35°C? 2. Is he ventilation blocked? 3. Is the fan motors failed? 4. Is the temperature sensor failed? 5. Is the cooling system failed?
The displayed temperature is lower than the set temperature.	1. Is the evaporator fan motor failed? 2. Is the PTC heater failed? 3. Is the temperature sensor failed? 4. Is the Main PCB or Display PCB failed? 5. Is the ambient temperature too low less than 0°C? If so, it is normal.
For models - Dual zone with single door	
The displayed temperature is higher than the set temperature in the upper zone.	1. Is the ambient temperature too high more than 35°C? 2. Is he ventilation blocked? 3. Is the evaporate fan motor in the upper zone failed? 4. Is the condenser fan motor failed? 5. Is the temperature sensor failed? 6. Is the cooling system failed?
The displayed temperature is lower than the set temperature in the upper zone.	1. Is the lower zone temperature normal? Otherwise check the PTC heater and fan motor in the lower zone. 2. Is the fan motor in the middle partition failed? 3. Is the temperature sensor failed? 4. Is the Main PCB or Display PCB failed? 5. Is the ambient temperature too low less than 0°C?
The displayed temperature is higher than the set temperature in the lower zone.	1. Is the upper zone temperature normal? Otherwise check the upper zone problem firstly. 2. Is the fan motors in the middle partition failed? 3. Is the temperature sensor failed? 4. Is the ambient temperature too high more than 35°C?
The displayed temperature is lower than the set temperature in the lower zone.	1. Is fan motor failed? 2. Is the PTC heater failed? 3. Is the temperature sensor failed? 4. Is the Main PCB or Display PCB failed? 5. Is the ambient temperature too low less than 0°C?
The temperature in the upper zone is normal but the displayed	1. Is the fan motor in the lower zone is failed? 2. Is the PTC heater failed?

temperature in the lower zone is lower than the set temperature.	3. Is the isolation between the upper zone and lower zone not good?
For models - Dual zone with two doors	
The displayed temperature is higher than the set temperature.	1. Is the ambient temperature too high more than 35°C? 2. Is he ventilation blocked? 3. Is the fan motors failed? 4. Is the temperature sensor failed? 5. Is the cooling system failed? If the temperature of one zone is normal and the second zone is abnormal, check the solenoid valve.
The displayed temperature is lower than the set temperature.	1. Is the ambient temperature lower than the set temperature? This is normal.

8.3 TROUBLE CHECK FOR REFRIGERANT SYSTEM

Once it has been determined that the other electrical systems are working properly, a probable sealed system problem can be confirmed according to the below table when the unit is no cool or not cold enough.

No.	Symptom	Cause	Action
1	• The evaporator cools down and warms again. • The condenser warms in proportion as the evaporator cools. • The process repeats again.	Moisture in the refrigerant causes the malfunction.	Replace the refrigerant.
2	• The condenser is cold. • The evaporator is not cold. • The temperature of compressor is high.	Foreign substances hamper the cooling system.	Locate the troubled section and make repairs.
3	• No difference in temperature between suction pipe and discharge pipe of compressor. • The temperature of compressor is kept at room temperature level. • The evaporator does not cool down.	Failed compressor.	Replace the compressor.
4	• Frost on the suction pipe. • The condenser is overheated. • The refrigeration of evaporator is not efficient. • The electric current of compressor is much larger than normal.	Overcharge.	• Discharge the refrigerant. • Charge refrigerant to the designated volume. • Check for gas leak.
5	• The condenser is cold. • The compressor surface temperature is high. • The refrigeration is not cold enough.	Short of refrigerant. Find the leaking position. **NOTE: Note:** **If you can find oil on somewhere, it is possible where the leakage point is.**	• Discharge the refrigerant. • Charge refrigerant to the designated volume. • Check for gas leak.

8.4 SPECIAL DETAILED DIAGNOSIS

8.4.1 DETECT THE MAIN PCB & DISPLAY/CONTROL PCB

1. The control system including the MAIN PCB and DISPLAY/CONTROL PCB operates when the unit is powered. If not, the unit is either POWER OFF or Switch OFF. If neither operates, check the control system including the main PCB and Display/Control PCB and connecting wirings.
2. The first step is to check and see if there is any component failed in the PCBs by using your common sense.
3. To Check The Main PCB,
   - Disconnect the unit from the power source.
   - Dismantle the electrical box in the compressor room and take out the main PCB.
   - Disconnect the lead connectors of all fan motors and compressor from the cable.
   - Carefully place the main PCB so that it is insulated from any other part.
   - Connect the unit to the power source.
   - Check the output voltage of all fan motors and compressor connectors on the main PCB. The correct output voltage of all fan motors connectors should be 12V DC. The correct output voltage of compressor connector should be same as the power source. If not, the main PCB must be replaced.
4. Replace the Display/Control PCB for the below symptoms after you confirm that the Main PCB is normal.
   - No LED temperature display or indicator illuminated in the control panel.
   - Some LEDs do not light.
   - No response when touching the control marks. (For this kind of symptom, double check to see if there any response after disconnect the power before replacing the Display/Control PCB.)
   - The unit does not run correctly in the TEST MODE. In order to run in TEST MODE, Touch and hold the “**LIGHT**” and “**UP**” marks at the same time for 5 seconds.
5. If you can’t find the failure from the existed symptoms, replace the Main PCB and Display/Control PCB separately to see which one is failed and then replace the failed PCB.

8.4.2 DETECT THE CONDENSER FAN MOTOR (F0)

1. The condenser fan motor operates in parallel with the compressor. If the compressor runs but the motor doesn't, the motor is either defective or disconnected. If neither operates, check the main PCB and the cabinet wiring.
2. To Check The Condenser Fan Motor,
   - Disconnect the unit from the source.
   - Disconnect the condenser fan motor lead connector from the cable.
   - Connect the condenser motor to a 12V DC power source. If the motor fails to operate, it is defective and must be replaced.

8.4.3 DETECT THE EVAPOARTOR FAN MOTOR (F1C/F1H)

1. The evaporator fan motor operates when the compressor operates and at the rest time it cycles ON and OFF to circulate the interior air. If the compressor runs but the motor doesn't,

the motor is either defective or disconnected. If neither operates, check the main PCB and the cabinet wiring.

2. The evaporator fan motor also operates when the PTC heater operates for single zone models with heat function.
3. To Check The Evaporator Fan Motor,
   - Disconnect the unit from the source.
   - Remove the air duct cover.
   - Disconnect the evaporator fan motor lead connector from the cable.
   - Connect the motor to a 12V DC power source. If the motor fails to operate, it is defective and must be replaced.

8.4.4 DETECT THE FAN MOTOR IN THE MIDDLE DIVIDER FOR DUAL ZONE MODELS (F2C)

1. The fan motor operates independent from the compressor. When the set temperature of lower zone is not met and lower than the actual storage temperature it operates and at the rest time it does not run. If the set temperature of lower zone is not met and lower than the actual storage temperature but the motor doesn't operate, the motor is either defective or disconnected. If neither operates, check the main PCB and the cabinet wiring.
2. To Check The Fan Motor in Middle Partition,
   - Disconnect the unit from the source.
   - Remove the top of middle partition.
   - Disconnect the fan motor lead connector from the cable.
   - Connect the motor to a 12V DC power source. If the motor fails to operate, it is defective and must be replaced.

8.4.5 DETECT THE HEATER FAN MOTOR (F2H)

1. The heater fan motor operates when the PTC heater operates and at the rest time it cycles ON and OFF to circulate the interior air. If the PTC heater runs but the motor doesn't, the motor is either defective or disconnected. If neither operates, check the main PCB and the cabinet wiring.
2. To Check The Heater Fan Motor,
   - Disconnect the unit from the source.
   - Remove the bottom air duct cover.
   - Disconnect the heater fan motor lead connector from the cable.
   - Connect the motor to a 12V DC power source. If the motor fails to operate, it is defective and must be replaced.

8.4.6 DETECT THE PTC HEATER

1. The PTC operates when the set temperature is not met and lower than the actual storage temperature. If not, the PTC heater is either defective or disconnected. If neither operates, check the main PCB and the cabinet wiring.
2. To Check The PTC Heater,
   - Disconnect the unit from the source.

- Remove the air duct cover.
- Disconnect the PTC lead connector from the cable.
- Connect the PTC heater to a rated power source on the rating label. If the PTC heater fails to operate, it is defective and must be replaced.

8.4.7 OVERLOAD PROTECTOR

The overload protector prevents the compressor from burning out its electrical windings in the event the compressor becomes overheated or draws too much current. The overload trips, opening the circuit to the compressor. If it does this repeatedly, the compressor is said to be cycling on the overload. Cycling on the overload may be caused by:

1. Insufficient air circulation around the compressor and condenser.
2. Pull-down on the compressor, caused by a large quantity of warm food placed in the refrigerator.
3. Compressor stalling due to lack of pressure unloading.
4. Low line voltage.
5. Defective start relay.
6. Defective winding in the compressor or shorted windings.

Testing the Overload Protector

Disconnect the unit from the power source.

To test the overload protector, remove the compressor terminal cover. Examine the bottom of the overload for signs of arcing. If signs of arcing are present, either check for continuity or connect a jumper wire across the terminals. If using a jumper wire, plug in the line cord and set the temperature control to a cold setting. If the compressor starts, the overload is defective and must be replaced. If the compressor fails to start, check for a defective start relay or compressor.

1. Remove the PTC and overload from the compressor.
2. Connect one ohmmeter probe to the compressor shell. Make sure the probe makes good contact with bare metal. One at a time, connect the other ohm-meter probe to each of the three compressor terminals.
3. If the meter shows no continuity to ground, install PTC and overload protector to the compressor's terminals. If the meter indicates the compressor terminals are grounded, replace the compressor.
4. Attach a jumper wire across the overload terminals.
5. Make sure the jumper wire does not short to ground.
6. Reconnect the unit to power source. If the compressor starts, the overload protector is defective and must be re-placed.

8.4.8 PTC STARTING DEVICE

The PTC solid state starting device is a push-on component mounted to the start and run terminals of the compressor. This device is connected in parallel with the run capacitor and is in series with the compressor start windings. This will produce a short circuit across the run capacitor during the compressor starting sequence and full current is applied to the start windings as well as the main winding. Since the PTC device is temperature sensitive, a variance in its temperature causes a change in its resistance. When current is first applied to the

compressor, the PTC device's low resistance shorts out the run capacitor; thus producing adequate motor starting torque.

As the compressor motor approaches run-ning speed, the current through the PTC device causes the temperature and resistance of the PTC device to increase to where it appears to be an open circuit. The compressor continues to operate on the run winding in parallel with the series combination of the run capacitor and start winding.

Checking the PTC Device

1. Disconnect the unit from the power source.
2. Discharge the capacitor and remove the wires from the PTC device terminals.
3. Allow the PTC to cool to room temperature.
4. Remove the PTC device.
5. Using an ohmmeter, check the resistance between the PTC device terminals. The ohmmeter should register between 3 and 20 ohms. An extreme variance between 3 and 20ohms indicates a defective PTC device which must be replaced.

8.4.9 RUN CAPACITOR

The run capacitor is mounted adjacent to the compressor. It is electrically connected to the compressor circuit to provide the required phase difference between the start and run windings for running the compressor.

Capacitor Failures May Be Caused By:

(1) A Short Circuit - Will cause the start windings to be energized continuously in the start mode. The compressor could start, but the overload protector will trip, and eventually trip continuously.

(2) An Open Circuit - Should, under normal conditions, allow the compressor to start. Under a heavy running load, however, the compressor will trip on the overload.

(3) A Capacitor Low in Capacitance – A capacitor may lose capacitance by a loss of its electrolytic properties. The compressor would run under a light load, but would trip on the overload in high ambient conditions.

Testing the Capacitor

We recommend using a capacitor analyzer when testing. A solid state unit that measures capacitance and power of any capacitor, and has an automatic means of discharging the capacitor through resistance is preferred.

Alternate Method Ohmmeter

1. Disconnect the unit from the power source.
2. Disconnect the capacitor lead wires.
3. Short across the terminals using a resistor with a minimum resistance of 1,000 ohms. This ensures that no charge remains to damage the ohmmeter.
4. Set the ohmmeter selector switch to the 10,000 ohm scale (R x 10K).
5. Connect the ohmmeter leads to the capacitor terminals and observe the meter point lower end.
    - If the pointer deflects to the lower end and remains there, the capacitor is shorted and must be replaced.
    - If there is no deflection of the pointer, the capacitor is open and must be replaced.
    - If the pointer deflects toward the high end of the scale and then slowly returns to the low end, the capacitor is good.

8.4.10 ABNORMAL NOISE / NORMAL NOISE

- **Compressor Noise**
  - The working of the electrical motor and the pump inside the compressor will cause noise during the run time. The noise should be stable and not exceed 42 dB(A). If the noise is excessive, the compressor is failed and should be replaced.
  - The aging rubber legs or incorrect leg mounting (Too loose or too tight) also generate the abnormal noise. If so, please correct the leg mounting or replace the legs.

- **Fan Noise**
  - The working of fan motor will cause noise during the run time. The noise is stable and not exceeds 40 dB(A). If the noise is excessive, checking the following:
  - If the bearing of fan motor is failed, replace the fan motor.
  - If the fan interferes with the wirings, fix the wirings.

- **Refrigerant Flow Noise**
  - The end of the capillary tube was inserted too far into the inlet pipe of evaporator. Or there are burrs at the end of the capillary tube.
  - The anti-vibration damp wraparound the joint of capillary and inlet tubing of evaporator is lost.
  - The capillary is interfered with the other parts.
  - The compressor oil has been flow to the refrigeration tubing during transportation. Perform the system flush, sweep and recharge.

- **Normal Noise**
  All models incorporate rigid foam insulated cabinets to provide high thermal efficiency and maximum sound reduction for its internal working components. In spite of this technology, your model may make sounds that are unfamiliar.
  Normal operating sounds may be more noticeable because of the unit's environment. Hard surfaces such as cabinets, wood/vinyl/tiled floors and paneled walls have a tendency to reflect normal appliance operating noises.
  Common refrigeration components, and a brief description of the normal operating sounds they make, are listed below:
  - Compressor: The compressor makes a hum or pulsing sound that may be heard when it operates.
  - Evaporator/Capillary: Refrigerant flowing through an evaporator may sound like boiling liquid.
  - Condenser/Evaporator Fan: Air moving through a condenser may be heard.
  - Automatic Defrost/Drain Pan: Water may be heard dripping or running into the drain pan when the unit is in the defrost cycle.
  - At the end of each cycle, you might hear a bubbly noise coming from the fluid circulating in the pipes.
  - The interior walls contracting and expanding may also cause clicking or cracking sounds.

8.4.11 EVAPORATOR FREEZING

The evaporator will be freezing because of the below reasons:

- The interior fan motor is failed. Check the door switch and if it is failed replace the door switch. If the fan motor is failed, replace the fan motor.
- Frequent power outages.
- The door is open too long time.
- Faulty seal between the door gasket and cabinet front. Use the hairdryer to heat the poor position of magnetic strip and then pull the strip to make it attract to the cabinet front. If this can't work, replace the door gasket.

- The foams at the two sides of evaporator are lost or damaged. Replace the foams.
- The temperature sensor is failed.
- **The compressor operates continuously & independent from the set temperature. At the same time the condenser fan motor does not operate. The POWER PCB has been failed and replace the POWER PCB.**
- ***NOTE:*** *Before starting the services as above, please unplug the appliance and open the door for more than 24 hours to let the ice on the evaporator melt completely.*

8.4.12 HOT PIPE DIAGNOSTIC TEST

1. Isolate the hot pipe from remainder of sealed system.
2. Cap or seal one end of the hot pipe (braze or use process adaptor and cap).
3. Attach process adaptor to open end of hot pipe.
4. Attach compound gauge and vacuum pump to the hot pipe.
5. Pull a vacuum and close valve to test for leak in the hot pipe.
6. If unit holds a vacuum, no leak is indicated. Reconnect the hot pipe to the system, replace the drier and recharge the system to specifications.

A VACUUM WILL BE MAINTAINED IF THE SYSTEM IS GOOD.

8.4.13 SOLENOID VALVE

If the left/upper zone of the double door model is too low temperature or freezing instead that the right/lower zone of the model is not cooling, pls check the solenoid valve as below:

- Dismantle the POWER PCB box.
- Connect the solenoid valve directly to the external power.
- Connect the solenoid valve and unit to the power at the same time and separately.
- If the right/lower zone of the unit is cooling, that means the solenoid valve is correct. Pls replace the POWER PCB. Otherwise replace the solenoid valve.

8.4.14 DSIPLAY “E0”

“E0” indicates the communication error between Upper and Lower Control Unit for 3 temperature zone. It may be caused by the following reasons:

- The Control PCB is failed. – Replace the Control PCB.
- The connecting wire is failed such as the screw has made the wires open circuit. – Reroute a new wire.

8.4.15 DSIPLAY “E1”

“E1” indicates the corresponding air temperature sensor is open circuit. It may be caused by the following reasons:

- The temperature sensor is failed. – Replace the thermistor.
- The Power PCB is failed. – Replace the Power PCB.
- The Control PCB is failed. – Replace the Control PCB.
- The temperature sensor wire is loosed out of the terminal on the Power PCB. – Plug in.
- The sensor wire is not connected with the internal wire. – Connect well.
- The connecting wire is failed such as the screw has made the wires open circuit. – Reroute a new wire.

8.4.16 DSIPLAY “E2”

“E1” indicates the corresponding air temperature sensor is short circuit. It may be caused by the following reasons:

- The temperature sensor is failed. – Replace the thermistor.
- The Power PCB is failed. – Replace the Power PCB.
- The Control PCB is failed. – Replace the Control PCB.
- The connecting wire is failed such as the screw has made the wires short circuit. – Reroute a new wire.

8.4.17 DSIPLAY “E3”

“E3” indicates the defrost sensor in the evaporator is open circuit. It may be caused by the following reasons:

- The temperature sensor is failed. – Replace the thermistor.
- The Power PCB is failed. – Replace the Power PCB.
- The Control PCB is failed. – Replace the Control PCB.
- The connecting wire is failed such as the screw has made the wires open circuit. – Reroute a new wire.

8.4.18 DSIPLAY “E4”

“E4” indicates the defrosting sensor in the evaporator is short circuit. It may be caused by the following reasons:

- The temperature sensor is failed. – Replace the thermistor.
- The Power PCB is failed. – Replace the Power PCB.
- The Control PCB is failed. – Replace the Control PCB.
- The connecting wire is failed such as the screw has made the wires short circuit. – Reroute a new wire.

8.4.19 DSIPLAY “E5”

“E5” indicates the defrosting heater failed. It may be caused by the following reasons:

- The defrosting heater is failed. – Replace the defrosting heater.
- The connecting wire from defrosting heater to Power PCB is loosed. – Reconnect the wire.
- The connecting wire (Heater 1) from Control PCB to Power is loosed. – Reconnect the wire.
- The temperature sensor is failed. – Replace the thermistor.
- The Power PCB is failed. – Replace the Power PCB.
- The Control PCB is failed. – Replace the Control PCB.

8.4.19 DSIPLAY “E6”

“E6” indicates the solenoid valve failed. It may be caused by the following reasons:

- The solenoid valve is failed. Pls check the details as point 8.4.13. – Replace the solenoid valve.
- The connecting wire from Solenoid valve to Power PCB is loosed. – Reconnect the wire.
- The connecting wire (Heater 1) from Control PCB to Power PCB is loosed. – Reconnect the wire.
- The Power PCB is failed. – Replace the Power PCB.
- The Control PCB is failed. – Replace the Control PCB.

- Wrong connection of capillary for left/upper zone and right/lower zone.
- Wrong connection of thermistor for left/upper zone and right/lower zone.

8.4.20 DSIPLAY “E7”

“E7” indicates the door switch failure. It may be caused by the following reasons:

- The door is not closed properly. Pls open and close the door with a little more force.
- The door switch is defective.
- The magnetic piece on the door is lost or not in the correct position. Or maybe the magnetic piece lost the magnetic force.
- You can use an extra magnetic piece to touch the door switch to see if the door switch works properly or not (If the door switch works properly, the interior light can be switched ON or OFF by touching the LIGHT key). If the door switch works properly, the possible reason is that the magnetic piece is lost or not in the correct position. You need to move the door switch more close to the magnetic piece if the magnetic is not lost.

8.5 FAQ

8.5.1 What are the storage conditions of concern to collectors and consumers to fine wine?

Light, humidity, temperature and vibration.

8.5.2 What is the ideal temperature for wine?

The ideal temperature to store wines is between 52ºF and 57ºF (11ºC~14ºC). However, any temperature between 41º~72ºF (5º~22ºC) will suffice as long as it remains constant.

8.5.3 What is the ideal humidity for wine?

Humidty between 60%-70% is a superlative range in which to store wine. High humidity levels keep moisture inside the bottle thus preventing evaporation through the cork. Humidity levels that are too high often cause micro-organisms to grow which can age your wine prematurely or even spoil your wine.

8.5.4 The storage temperature seems to vary by 3 or 4 degrees frequently.

This is normal: small differences in temperature are necessary for the unit to work properly. When the cellar starts a defrost cycle, the temperature rises slightly. When the cooling system resumes working, the temperature cools down.

Such changes happen over a short time and their influence is too minimal to affect wine preservation. Liquid tends to keep an average temperature by physical law. For example, if a swimming pool’s temperature is at 25°C and, one night, outside temperature drops to 18°C, the water’s temperature will not drop as much. In the morning, it might only be at 22°C.

8.5.5 Water has accumulated on the floor or appeared in the back of the appliance.

Make sure the drainage hose from inside the unit to the back water drip pan is properly in place. If so, during humid times, you may need to remove excess water with a sponge.

8.5.6 Water has appeared in the inside wall of the appliance.

During highly humid times, especially during summer, this can happen when opening the door too often.

8.5.7 The appliance never seems to stop: the unit is always on.

Make sure the door is closed properly. Add a separate thermometer inside the cellar to see if the cellar thermostat indicates the same temperature. If the results are different, replace the thermistor or Control PCB or Main PCB.

8.5.8 Mist/Condensation has appeared on the glass door.

During highly humid times, especially during summer, this can happen.

8.5.9 Interior fan motors cycle on and off even the set temperature has been reached

In order to circulate the air and maintain the set temperature inside the cabinet the inside fans must cycle on and off when the compressor is off in Dynamic Cooling mode. The fans will cycle ON and OFF approximately every 20 seconds. This cycle is normal and meant both to circulate the air as well as ensure the continued operational status of the fans. If the fan stops completely and does not complete this cycle the fan is non-operational.

Dynamic Cooling is the factory preset mode. If the user feels noise, the user can select the SILENT mode by pressing and holding the UP key for at least 5 seconds and you can hear “B B B” three sounds to confirm silent mode is on.

8.5.10 Cannot get the upper and lower temperatures to set separately - they both adjust at the same rate (if you sets one higher the other goes higher etc).

This is normal. The temperature set for the LOWER ZONE must always be the same or higher than that in the UPPER ZONE. So when the user is adjusting the set temperature for one of the zones, if the above condition can't be met, the set temperature of the second zone will change automatically to meet the condition.

8.5.11 The control panel doesn’t seem to work.

This unit’s control panel has an auto lock feature that prevents tampering with temperature or power settings. This feature activates automatically 2 minutes after the last touch of a key on the control panel. To unlock the control panel, press and hold the UP and DOWN keys for 5 seconds.

8.5.12 The fans are running constantly. Is it normal?

In order to circulate the air and maintain the set temperature inside the cabinet the inside fans must cycle on and off when the compressor is off in Dynamic Cooling mode. The fans will cycle ON and OFF approximately every 20 seconds. This cycle is normal and meant both to circulate the air as well as ensure the continued operational status of the fans. If the fan stops completely and does not complete this cycle the fan is non-operational.

8.5.13 Digital display functions. But the unit does not cool.

Check to see if the unit is in “Eco Demo mode”. Press and hold the “**UP**”, “**DOWN**” and “**LIGHT**” keys at the same time for at least 5 seconds to exit Eco Demo mode.

8.5.14 Digital display, light and sound do not work but the unit is cooling well.

The unit maybe in Sabbath mode.