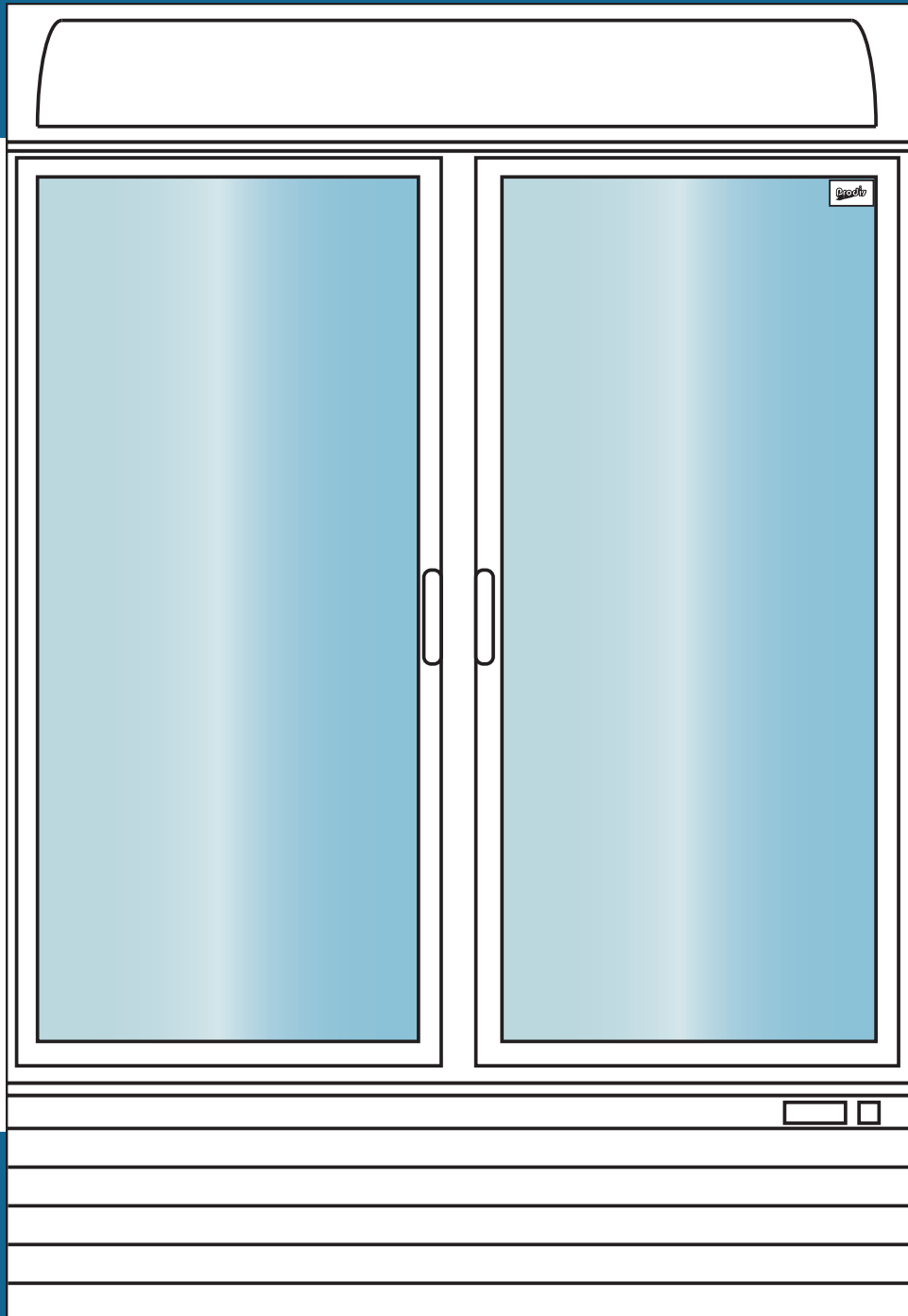


XD SERIES REFRIGERATION COLDER BY NATURE



SERVICE MANUL

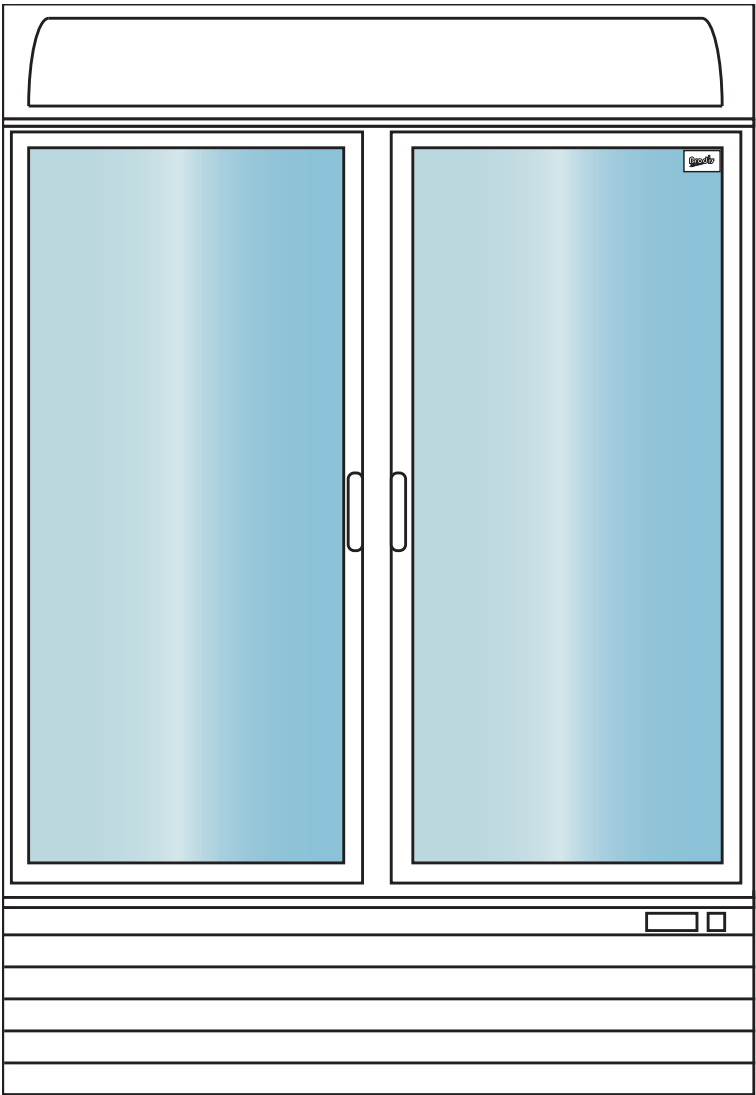
Prodis

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PART I - DIGITAL CONTROLLER PARAMETERS

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PART III - TROUBLE SHOOTING



ir33 smart - IR3357HROE Electronic controller for normal and high temperature static refrigeration units

LEGGI E CONSERVA
QUESTE ISTRUZIONI
READ AND SAVE
THESE INSTRUCTIONS

PART I

CAREL



- Electronic controller for normal and high temperature static refrigeration units
- 115/230 Vac switching power supply
- 16 A compressor relay
- Management of NTC (-50 to +90°C) and PTC (-50 to +150°C) sensors
- Simple and intuitive installation and configuration
- 4 pre-loaded configurations for the most common refrigeration applications

READ ME NOW!!!

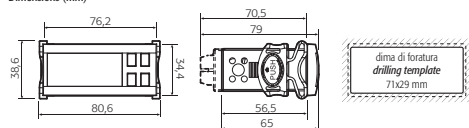
With reference to the label on the rear of the instrument and the required application

- Check that power supply, probes and loads (compressor, heaters, etc.) are suitable for the instrument.
- Fasten the instrument to the panel as shown in the following figure.
- Make all the required electrical connections.
- Power up the unit.
- After around 2 seconds, if the instrument displays the temperature read by the probes connected to the device, go directly to point 7. If nothing is displayed or an alarm is signalled (alarm codes on the display), power down, check the connections and the power supply and go to point 6.
- Power the unit up again. If the instrument now correctly displays the temperature, go to point 7. If, on the other hand, the problem described in point 5 is repeated, see the table "Alarms and signals: ir33 smart is now ready to be configured. For correct configuration based on the required application, see the section "How to select and load a configuration".

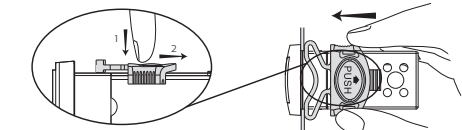


IMPORTANT: separate the probe and digital input cables from the cables to inductive loads and power cables to avoid electromagnetic disturbance. Never run power cables (including electrical panel cables) and signal cables in the same conduits.

Dimensions (mm)

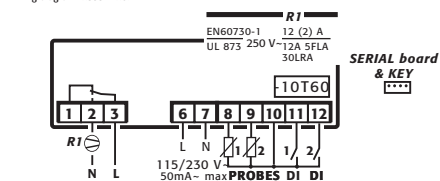


Wall mounting ir33

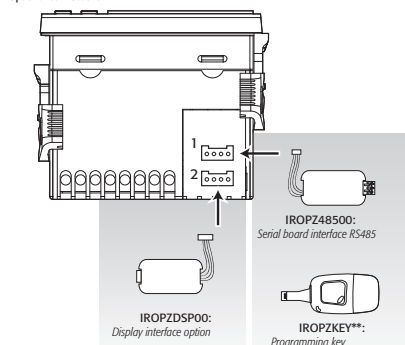


Wall mounting by two plastic brackets sliding in from side

Wiring diagram IR3357HROE



Optional connections



How to select and load a user configuration

Step	Action	Effect	Meaning
1	Switch the instrument on while holding Prgr for more than 5 s.	After 2 seconds the display shows the message "bn0".	bn0 is the current configuration. (Standard Carel when first switched on or other user configuration, if loaded)
2	Press ▲ or ▼ to select the desired configuration.	The display shows the messages "bn1", "bn2", "bn3", "bn4".	Select the required configuration (refer to the previous table)
3	Press Set for 1 sec.	The display shows "Std" for 1 sec.	The user configuration selected in point 2 will be loaded

This procedure can only be performed once: the most suitable configuration for the application, once loaded, will remain active the next time the instrument is started. When switching on the first time, bn0 corresponds to the Carel standard (default configuration). The procedure for loading one of the user configurations involves copying one of the sets of parameters (bn1...bn4) to bn0. bn0 therefore always corresponds to the last configuration loaded.

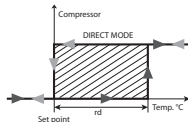
Configurations

ir33 SMART is loaded with 4 default configurations (sets of parameters). Each configuration identifies a specific refrigeration application, and can be identified simply by the index (bn*) when switching the instrument on.

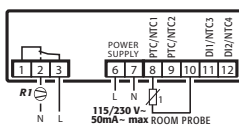
Ind.	Application	Op. temp. range	Inputs	Relay output
bn1	Normal temperature static refrigeration units (no defrost)	2T10°C	NTC room	Compressor
bn2	Normal temperature static refrigeration units with defrost (timed) by stopping the compressor	2T10°C	NTC room	Compressor
bn3	High temperature thermostat	20T150°C	PTC room	Heater / Alarm
bn4	Standard CAREL (default configuration)	-50T90°C	Configurable	Configurable

bn1: normal temperature (2T10 °C) static refrigeration units

(no defrost)
Temperature range: 2T10 °C
Temperature control



Connection diagram

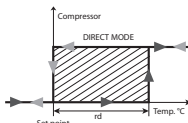


Inputs	Room probe		NTC 1	
Outputs	Compressor		RT: 16 A relay	
	Name	Type	Description	Default value
Main parameters (type F)	St	CIL	Set point	4 °C
	rd	CIL	Control differential (hysteresis)	2 °C
	AL (*)		Minimum temperature alarm	30 °C
	AH (*)		Maximum temperature alarm	30 °C
	Ad	ALM	Temperature alarm delay	30 min

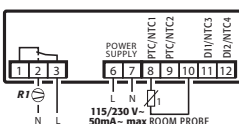
(*) absolute alarm thresholds







bn2: normal temperature (2T10 °C) static refrigeration units with defrost (timed) by stopping the compressor

Temperature range: 2T10 °C
Temperature control



Connection diagram

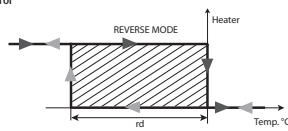


Inputs	Room probe	NTC 1		
Outputs	Compressor	RT: 16 A relay		
	Name	Type	Description	Default value
Main parameters (type F)	St	CIL 	Set point	2 °C
	rd	CIL	Control differential (hysteresis)	2 °C
	di	DEF 	Interval between defrosts	8 hours
	dP1	DEF 	Max evaporator defrost duration	30 min
	Al (*)	ALM 	Minimum temperature alarm	30 °C
	Ad (*)	ALM 	Maximum temperature alarm	50 °C
	AH	ALM 	Temperature alarm delay	30 min

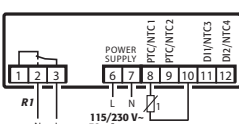
(*) absolute alarm thresholds



bn3: high temperature (20T150 °C) thermostat (reverse mode)

Temperature range: 20T150 °C
Temperature control



Connection diagram

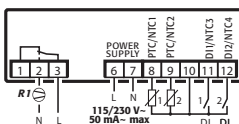


Inputs	Room probe		PTC 1	
Outputs	Heater/Alarm		RT: 16 A relay	
Main parameters (type F)	Name	Type	Description	Default value
	St	CIL 	Set point	40 °C
	rd	CIL	Control differential (hysteresis)	2 °C
	di1 (*)	ALM	Minimum temperature alarm	5 °C
	di2 (*)	ALM 	Maximum temperature alarm	150 °C
	Ad	ALM	Temperature alarm delay	30 min

(*) absolute alarm thresholds

bn4: standard CAREL (default configuration)

Connection diagram



Name	Type	Description	Default value
St	CIL	Set point	0 °C
rd	CIL	Control differential (hysteresis)	2 °C
di1	CIL	Temperature monitoring interval	-
di2	CIL	Maximum temperature read	-
di3	CIL	Minimum temperature read	-
di4	CIL	Interval between defrosts	8 hours
di5	CIL	Evaporator end defrost temperature	4 °C
di6	CIL	AUX evaporator end defrost temp.	4 °C
di7	CIL	Maximum evaporator defrost duration	30 min
di8	CIL	Maximum AUX evaporator defrost duration	30 min
di9	CIL	Crushing time	2 min
di10	CIL	Alarm bypass time after defrost and/or door open	1 hour
di11	CIL	Defrost probe 1 reading	-
di12	CIL	Defrost probe 2 reading	-
di13	CIL	Minimum temperature alarm	0 °C
di14	CIL	Maximum temperature alarm	0 °C
Ad	CIL	Temperature alarm delay	120 min

Indications on the display

When flashing, the signals on the display indicate a request that cannot be implemented until the delay timers have expired.

Icon	Function	ON	OFF	Flashing
COMPRESS.	compressor on	compressor on	compress. off	compress. call
DEFROST	defrost in progress	no defrost call	no defrost call	defrost call
ALARM	delayed external alarm (before the time "A7" has elapsed)	no alarm present	no alarm present	alarms in norm. operation (e.g. high/low temp.) or immediate or delayed external alarm from digital input
SERVICE		no malfunction	no malfunction	malfunction (e.g. EEPROM error or faulty probes)
CONT. CYCLE	function activated	function not activated	function not activated	function called

Buttons on the keypad

But-ton	Pressing the button alone	Pressing together with other buttons
Prgr	• If pressed for more than 5 s, accesses the menu for setting the type F parameters (FREQUENT) • In the event of alarms: mutes the audible alarm (buzzer) and deactivates the alarm relay	• If pressed with SET for more than 5 s, accesses the menu for setting type C parameters (CONFIGURATION) or downloading parameters • If pressed for more than 5 s with UP/AUX resets any alarms with manual reset • If pressed for more than 5 s together with DOWN/DEF, activates/deactivates the continuous cycle • If pressed for more than 5 s together with SET starts the report printing procedure (function available but to be implemented) • If pressed for more than 5 s together with PRG/MUTE, resets any alarms with manual reset
▲	if pressed for more than 1 s, displays and/or sets the set point	• If pressed for more than 5 s together with UP/AUX activates/deactivates the continuous cycle • If pressed for more than 5 s together with PRG/MUTE, accesses the menu for setting the type C parameters (CONFIGURATION) or downloading the parameters • If pressed for more than 5 s with UP/AUX starts the report printing procedure (function available but to be implemented)
▼		
Set		

How to set the set point

Step	Action	Effect	Meaning
1	Press Set for 2 seconds	After 2 seconds the display shows the current set point	This is the currently active control set point
2	Press ▲ or ▼	The value on the display will increase or decrease	Set the desired value
3	Press Set	The controller will display the temperature read by the probes again	The set point is modified and saved

Another way of changing the set point is to set parameter "St" (see the tables below)

How to access and set type "F" parameters (FREQUENT, not protected by password)

Step	Action	Effect	Meaning
1	Press Prgr for 5 seconds	After 5 seconds the display will show the first parameter: "St" (set point)	Access to type "F" parameters is direct
2	Press ▲ or ▼	The display will scroll the list of type "F" parameters (FREQUENT) (depends on the configuration loaded)	Select the desired parameter
3	Press Set	The display will show the value of the selected parameter	This is the current value of the parameter
4	Press ▲ or ▼	The value on the display will increase or decrease	Set the desired value
5	Press Set	The display will show the parameter name again	IMPORTANT: parameters not yet saved
6	Repeat steps 2, 3, 4 & 5 for all parameters required		
7	Press Prgr for 5 seconds	The controller will display the temperature read by the probes again	IMPORTANT: only now have all the parameters been updated

How to access and set type "C" parameters (CONFIGURATION, password protected)

Step	Action	Effect	Meaning
1	Press Prgr & Set for 5 seconds	After 5 seconds the display will show "0"	Access to type "C" parameters requires the password
2	Press ▲ or ▼	The value on the display will increase or decrease	Enter the password "22"
3	Press Set	The display will show the first parameter in the list (depends on the configuration loaded)	The type "C" parameters also include type "F"
4	Press ▲ or ▼	The display will scroll the list of type "C" parameters (CONFIGURATION)	Select the desired parameter
5	Press Set	The display will show the value of the selected parameter	This is the current value of the parameter
6	Press ▲ or ▼	The value on the display will increase or decrease	Set the desired value
7	Press Set	The display will show the parameter name again	IMPORTANT: parameters not yet saved
8	Repeat steps 4, 5, 6 & 7 for all parameters required		
9	Press Prgr for 5 seconds	The controller will display the temperature read by the probes again	IMPORTANT: only now have all the parameters been updated

For both types of access (type "F" and type "C") there is a timeout (no button on the keypad pressed for 1 min), the procedure is ended without saving the parameters.

Accessing the parameters divided by functional blocks (allows the user to scroll the list of parameters in blocks)

Once having accessed the type "F" or "C" parameters (see tables above)

Step	Action	Effect	Meaning
1	Press Prgr	The display will show the name of the functional block that the parameter belongs to	Example "CMP" for the compressor parameters, "DEF" for the defrost parameters
2	Press ▲ or ▼	The display will show the name of the other functional blocks	Example "DEF" for the defrost parameters
3	Press Prgr	The display will show the name of the first parameter in the functional block selected	Example "di" for "def"

PART I

Technical specifications

	Voltage	Power
Power supply	115-230 V~, 50/60 Hz	6 VA, 50 mA ~ max.
Insulation guaranteed by the power supply	insulation from very low voltage parts	reinforced 6 mm in air, 8 mm on surface, 3750 V insulation
Inputs	insulation from relay outputs	basic 3 mm in air, 4 mm on surface, 1250 V insulation
S1 (probe 1)	NTC & PTC	
S2 (probe 2)	NTC & PTC	
D11	voltage-free contact, contact resistance <10 Ohm, dosing current 6 mA	
S3	NTC or NTC & PTC	
Maximum distance of probes and digital inputs less than 10 m		
Note: in the installation keep power supply and load connections separate from probe, digital input, repeater display and supervisor cables.		
Type of probe		
Std. CAREL NTC	10 kOhm at 25 °C, range -50/190 °C	
	meas. error	1 °C in range -50/150 °C 1 °C in range 50/190 °C
High temperature NTC	50 kOhm at 25 °C, range -40/150 °C	
	meas. error	1 °C in range -20/115 °C 1 °C in range outside of -20/115 °C
Std. CAREL PTC	985 Ohm at 25 °C, range -50/150 °C	
	meas. error	2 °C in range -50/150 °C 4 °C in range 50/150 °C
Relay outputs		
	EN60730-1	UL873
Relay	250 V~	operating cycles
R1 (*)	12 (2) A N.O./N.C.	100,000
	12 A resistive 5 FLA	30,000
	30 LRA C300	
	reinforced 6 mm in air, 8 mm on surface.	
	3750 V insulation	
	insulation from very low voltage parts	
	basic 3 mm in air, 4 mm on surface.	
	1250 V insulation	
	insulation between independent relay outputs	

(*) Relays not suitable for fluorescent loads (neon lights, etc.) that use starters (ballasts) with phase shifting capacitors. Fluorescent lamps with electronic controllers or without phase shifting capacitors can be used, depending on the operation limits specified for each type of relay.

Connections Screw terminals for cables from 0.5 to 2.5 mm² max current 12 A

The correct sizing of the power and connection cables between the instrument and the loads is the installer's responsibility. In max. load and max. operating temp. conditions, the cables used must be suitable for operation at least up to 105 °C.

Case Plastic 34.4 x 76.2 x 79 mm (mounting depth 70.5 mm)

Assembly smooth, hard and indeformable panel using side fastening brackets to press in fully

Display digits 3 digit LED

Keypad infrared receiver available

Buzzer 1010 Hz

Operating temperature <50% RH non-condensing

Storage temperature <50% RH non-condensing

Storage humidity assembly on smooth and indeformable panel with IP65 gasket

Front panel index of protection 2 (normal situation)

Environmental pollution printed circuits 250, plastic and insulating materials 175

P11 of insulating materials long category D and category B (UL 94-V0)

Period of electrical stress across the insulating parts category II

Category of resistance to heat and fire 18 relay contacts (microswitching)

Class of protection against voltage surges built-in, electronic

Type of action/disconnection Class 2 when appropriately integrated

Construction of the control device no

Classification according to protection against electric shock class A

Device designed to be hand-held or integrated into equipment class A

Software class and structure only use neutral detergents and water

Cleaning the front panel of the instrument external

Serial interface for CAREL network 10 m

Maximum distance between interface and display available

Programming key

The IR33 range fitted with the standard CAREL NTC sensor is compliant with standard EN 13485 on thermometers for measuring the air and product temperature for the transport, storage and distribution of chilled, frozen, deep-frozen/quick-frozen food and ice cream. Designation of the instrument: EN13485, air, S, A, 1, -50/190°C. The standard CAREL NTC sensor is identifiable by the printed laser code on "WP" models, or the code "103AT-11" on "HP" models, both visible on the sensor part.

Safety standards: compliant with the relevant European standards.

Installation warnings:

- the connection cables must guarantee insulation up to 90 °C, and, if necessary, up to 105 °C
- adequately secure the connection cables to the outputs so as to avoid contact with very low voltage components.

Option codes

IRTRRES000 small infrared remote control

IROPZKEY00 parameter programming key, extended memory with 12 V batteries

IROPZ48550 RS485 serial card with automatic polarity recognition (+/-)

PSOPZPRG00 programming key kit

PSOPZKEY00 parameter programming key with 12 V batteries

PSOPZKEYA0 parameter programming key, extended memory, with external 230 Vac power supply

Display

ir33 smart comes with a three digit LED display for the temperature and icons to indicate operating status. It can also be connected, via a special interface, to a further display, used for example to read the third probe.

Reset alarms with manual reset

The alarms with manual reset can be reset by pressing "  " for more than 5 s.

Manual defrost

As well as automatic defrost, a manual defrost can be activated, if the temperature conditions are right, by pressing "  " for 5 s.

Continuous cycle

To activate the continuous cycle function press "  " for more than 5 s. During operation in continuous cycle, the compressor will continue running and will stop at the timeout of the cycle or when reaching the minimum temperature (AL = minimum temperature alarm threshold).

Continuous cycle setting: parameter 'cc' (continuous cycle duration): 'cc=0' never active; parameter 'cs' (alarm bypass after continuous cycle): excludes or delays the low temperature alarm at the end of the continuous cycle.

Automatic serial address assignment

This is a special procedure that, by using an application installed on a PC, sets and manages the addresses of all the instruments (that include this feature) connected to the CAREL network in a simple way.

The procedure is very simple:

1: Using the remote application, start the "Network definition" procedure; the application begins to send a special message (<ADR>) across the CAREL network, containing the network address;

2: Press the button on the instrument connected to the network, the instrument recognises the message sent by the remote application, automatically setting the address to the required value and sending a confirmation message to the application, containing the unit code and firmware revision (message 'V'). When the message sent by the remote application is recognised, the instrument displays the message 'Ad' for 1 second, followed by the value of the serial address assigned;

3: The application, on receiving the confirmation message from the units connected to the network, saves the information received in its database, increases the serial address and resumes sending the message '<ADR>';

4: The procedure can be repeated starting from point 2 on another unit connected to the network, until all network addresses are defined.

Note: when the operation for assigning an address to an instrument has finished, for reasons of safety, the operation is inhibited for 1 minute on that instrument. Consequently, a different address cannot be re-assigned to the instrument during that time.

Operating parameters

Complete list of parameters for each configuration



















Required parameters 'F'		psw protected parameters 'P'		masked parameters (hidden)			
Cd.	Parameter	Description	Configuration				
			bn1	bn2	bn3	bn4	
/2	Measurement stability	1 to 15	0	4	4	4	
/3	Probe display response	Temperature display refresh speed (0 to 15)	0	0	0	0	
/4	Virtual probe	Weight % of temp. control probe 2 (0 to 100%)	0	0	0	0	
/5	Select °C or °F	0: °C; 1: °F	0	0	0	0	
/6	Decimal point	0: enabled; 1: disabled	0	0	0	0	
Pro	/t1	Probe reading displayed 1: virtual probe 2: probe 1 3: probe 2 4: probe 3 5: probe 4 6: probe 5 7: set point	2	2	2	1	
	/P	0: NTC -50/190 °C 1: NTC -40/150 °C 2: PTC -50/150 °C 0: no probe	0	0	2	0	
	/A2	1: product probe 2: defrost probe 3: condenser probe 4: antifreeze probe	0	0	0	0	
	/A3	Probe 3 configuration As for probe 2	0	0	0	0	
	/C1	Probe 1 calibration or offset Correction to reading of probe 1 (-20/20 °C)	0	0	0	0	
	/C2	Probe 2 calibration or offset Correction to reading of probe 2 (-20/20 °C)	0	0	0	0	
	/C3	Probe 3 calibration or offset Correction to reading of probe 3 (-20/20 °C)	0	0	0	0	
	/S1	Set point r1/2 °C	4	2	40	0	
	/r1	Control delta Value of the temperature control differential or hysteresis (0.1/20 °C)	2	2	2	2	
	/r2	Minimum set point Minimum value settable for the set point (-50/12 °C)	-30	-30	0	-50	
ct	/r2	Maximum set point Maximum value settable for the set point (0/120 °C)	30	30	150	60	
	/r3	Operating mode 0: direct thermostat with defrost control (cool) 1: direct thermostat (cool) 2: reverse thermostat (heat)	1	0	2	0	
	/r4	Automatic night-time set point variation Value added to the set point in night-time operation (see A4*) (-20/20 °C)	3.0	3.0	3.0	3.0	
	/r5	Temperature monitoring probe 0: monitoring disabled 1: monitoring enabled	0	0	0	0	
	/rT	Temperature monitoring interval temperature recording hours (0 to 999)	-	-	-	-	
	/rH	Maximum temperature acquired in the session	-	-	-	-	
	/rL	Minimum temperature acquired in the session	-	-	-	-	
	/c0	Fan start delay (if relay fitted) on power-up 0 to 15 min	0	0	0	0	
	/c1	Minimum time between consecutive starts of the compressor 0 to 15 min	0	0	0	0	
	/c2	Minimum compressor off time 0 to 15 min	0	0	0	0	
amp	/c3	Minimum compressor on time 0 to 15 min	0	0	0	0	
	/c4	Duty setting or safety relay Compressor operating time in the event of control probe fault (fixed off time 15 min) (0 to 100 min)	15	15	0	0	
	/cc	Running time in continuous cycle Compressor operating time even when the temperature is below the set point (0 to 15 hours)	0	0	0	0	
	/c6	Low temp. alarm bypass time after continuous cycle 0 to 250 hours	2	2	2	2	
	/d0	Type of defrost 0: heater by temperature; 1: hot gas by temperature; 2: heater by time; 3: hot gas by time; 4: heater by time with temperature control	0	2	0	0	
	/d1	Maximum interval between consecutive defrosts 0 to 250 hours	8	8	8	8	
	/d2	Evaporator end defrost temperature -50/200 °C	4	4	4	4	
	/dP1	Maximum evaporator defrost duration 1 to 250 min	30	30	30	30	
	/dP2	Maximum AUX evaporator defrost duration 1 to 250 min	30	30	30	30	
	/d3	Defrost activation delay interval between defrost call and effective activation of the relay	0	0	0	0	
dEF	/d4	Defrost on start-up 0: disabled; 1: enabled	0	0	0	0	
	/d5	Defrost delay on start-up or multifunction input 0 to 250 min	0	0	0	0	
	/d6	Display during defrost 0: temperature alternating with 'dEF' 1: display frozen on last temperature before defrost 2: 'dEF'	1	1	1	1	
	/d8	Dripping time after defrosting Waiting time before reactivating compressor and fans at the end of a defrost (0 to 15 min)	2	0	2	2	
	/d8d	Alarm bypass time after defrost and/or door open See A4* (0 to 250 hours)	1	1	1	1	
	/d9	Door open alarm delay See A4* (0 to 250 hours)	0	0	0	0	
	/d9	Defrost priority over compressor protection times 0: protection times respected; 1: protection times not respected; the defrost has higher priority.	0	0	0	0	
	/d1	Display defrost probe 1	-	-	-	-	
	/d2	Display defrost probe 2	-	-	-	-	
	/dC	Time base for defrost 0: 'd1' in hours, 'dP1' and 'dP2' in minutes 1: 'd1' in minutes, 'dP1' and 'dP2' in seconds	0	0	0	0	
dEF	/d10	Defrost time in "Running time" mode Compressor operating time with evaporator temperature less than 'd11', after which a defrost is called (0 to 250 hours)	0	0	0	0	
	/d11	Evaporation temperature below which the compressor must continue operating for the time 'd10' to generate a defrost call (-20/20 °C)	1	1	1	1	
	/d12	Advanced defrosts 0: skip defrost and automatic variation in d1 disabled 1: skip defrost disabled and automatic variation in d1 enabled 2: skip defrost enabled and automatic variation in d1 disabled 3: skip defrost and automatic variation in d1 enabled	0	0	0	0	
	/d1	Nominal defrost duration 0 to 100%	65	65	65	65	
	/dH	Proportional factor for variation in 'd1' 0 to 100%	50	50	50	50	
	/A0	Alarm and fan differential 0.1/20 °C	2.0	2.0	2.0	2.0	
	A1	Alarm thresholds (AL, AH) relative to the set point (S0) or absolute 0: relative; 1: absolute	1	1	1	0	
	AL	Low temp. alarm threshold -50/200 °C	-30	-30	0	0	
	AH	High temp. alarm threshold -50/200 °C	+30	+30	150	0	
	Ad	Delay time for high and low temperature alarms 0 to 250 min	30	30	30	120	
ALM		0: input not active 1: immediate external alarm 2: delayed external alarm (delay time A7) 3: enable defrost 4: start defrost from external contact 5: door switch with compressor and evaporator fans OFF 6: remote on/off 7: curtain switch 8: low pressure switch input for pump down 9: door switch with fans OFF only 10: direct/reverse operation 11: light sensor 12: AUX output activation 13: door switch with compressor and fans OFF (light not managed) 14: door switch with fans OFF (light not managed)	0	0	0	0	
	A4	Function of digital input DI1					
	A6	Stop compressor from external alarm	forced compressor operating time in the event of external alarms (0 to 100 min)	0	0	0	0
	A7	Delay time for delayed external alarm If A4* = 2 (0 to 250 min)	0	0	0	0	
	A8	Enable alarms Ed1 and Ed2 0: signal 'Ed1' and 'Ed2' on the display (end defrost due to maximum duration dP1/dP2) disabled 1: signal 'Ed1' and 'Ed2' enabled	0	0	0	0	
	Ac	High condenser temperature alarm 0/200 °C	70	70	70	70	

AE	High condenser temperature alarm differential	Differential or hysteresis for the activation/deactivation of the high condenser temperature pre-alarm (0.1/20 °C)	10	10	10	10
AcD	High condenser temperature alarm delay	0 to 250 min	0	0	0	0
ALM						
AF	Off time with light sensor	0: sensor in the door jamb (the inside light is switched on when the sensor detects light and off when it detects darkness) >0: internal sensor (the inside light is switched on when the sensor detects light. After the time AF in seconds the light is switched off for 3 sec. In the event of darkness the inside light remains off, while in the event of light it is switched on again and a cycle starts with a minimum time of 3 sec. (0 to 250 sec.)	0	0	0	0
AlF	Antifreeze alarm threshold	Active if /A2 or /A3=4 (-50/200 °C)	-5	-5	-5	-5
AdF	Antifreeze alarm delay	0 to 15 min	1	1	1	1
H0	Serial address	0 to 207	1	1	1	1
		0: setting of type F parameters and set point disabled				
		1: all settings are possible				
		2: setting of type F parameters, settings from remote control and set point disabled				
		3: settings from remote control disabled				
		4: continuous cycle, defrost, setting of type F parameters and ON/OFF disabled				
		5: continuous cycle, defrost, setting of type F parameters, set point and ON/OFF disabled				
		6: continuous cycle, defrost, setting of type F parameters and set point disabled				
H15	Remote control enable code	0 to 255	0	0	0	0
H16	Terminal buzzer	0: enabled; 1: disabled	0	0	0	0
AUX						
H6	Terminal keypad lock configuration	1 (bit 0): enable/disable print report 2 (bit 1): enable/disable defrost 4 (bit 2): enable/disable continuous cycle 8 (bit 3): enable/disable mute 16 (bit 4): not associated 32 (bit 5): not associated 64 (bit 6): enable/disable ON/OFF	0	0	0	0
H8	Select output activated by time band	0: time band linked to the light output 1: time band linked to the AUX output (see 'H1' or 'H5')	0	0	0	0
H9	Enable set point variation with time bands	0: set point variation with time band disabled 1: set point variation with time band enabled AUX output configured as light or AUX ('H1' = 2, 3, 8 or 9) remains deactivated until the control temperature is less than 'SC'+Hd' when switching the instrument on for the first time or when resetting alarms. (-0/200 °C)	0	0	0	0
HdH	Anti-sweat heater offset		0	0	0	0

IMPORTANT WARNING: for the set times to become immediately operational, the instrument needs to be turned off and on again. If this operation is not carried out, timing resumes operation the next time it is used, when the internal timers are reset.

Alarms and signals: display, buzzer and relay

Below is a table that describes the alarms and control signals, with the corresponding description, status of the buzzer, alarm relay and type of reset.

Code	Description	Icon flashing	Buz- zer	Reset
rE	Virtual control probe fault		ON	AUTO
E0	Room probe S1 fault		OFF	AUTO
E1	Defrost probe S2 fault		OFF	AUTO
E2	Probe S3 fault		OFF	AUTO
LO	Probe not enabled		OFF	AUTO
LO	low temperature alarm		ON	AUTO
HI	high temperature alarm		ON	AUTO
IA	immediate alarm from external contact		ON	AUTO
dA	delayed alarm from external contact		ON	AUTO
dEF	defrost running	 always on	OFF	AUTO
Ed1	defrost on evaporator 1 ended by timeout		OFF	AUTO
Ed2	defrost on evaporator 2 ended by timeout		OFF	AUTO
Pd	maximum pump down time alarm		ON	AUTO/MAN
LP	low pressure alarm		ON	AUTO/MAN
Aut	autostart in pump down		ON	AUTO
cht	high condenser temperature pre-alarm		OFF	AUTO/MAN
CHT	high condenser temperature alarm		ON	MAN
EE	Unit parameter EEPROM error		OFF	AUTO
Er	Operating parameter EEPROM error		OFF	AUTO
RF	Connection with IR remote control active			
Add	Automatic address assignment procedure in progress		-	-
PrI	Report printing in progress		-	-
Lrh	Low relative humidity procedure activation		-	-
HRH	High relative humidity procedure activation		-	-
ccB	Start continuous cycle call		-	-
ccE	End continuous cycle call		-	-
dFB	Start defrost call		-	-
dFE	End defrost call		-	-
On	Switched ON		-	-
Off	Switched OFF		-	-
rES	Reset alarms with MAN reset, reset temperature monitoring		-	-
n1-n6	Alarm on unit 1-6 in the network		ON	AUTO
dnl	Download procedure in progress			
d1-d6	Download procedure with errors on unit 1-6		OFF	-

ECS-16 Temperature Controller User Manual

1. General

The temperature controller is specially designed for beverage cabinet. It has user menu and administrator menu. Control temperature could be set through user menu; and for administrator menu, it has password protection to avoid misoperation. It can switch between heating and refrigeration mode, and the relay capacity is 30A, which could directly drive a single phase 1.5HP compressor. Defrost output is optional and defrost mode could be either natural defrost or in electric defrost (defrost relay needs to be selected). Colorful LED display, and work status is displayed in symbols. It adopts plug-in quick connection terminal, which highly simplify the processing for manufacturers.

2. Operation and display panel



3. Specification:

Mounting size: 71x29 (mm)
Product size: 78.5 x 34.5 x 82 (mm)

4. Technical parameters

- 1) Measuring range: -50℃ ~ +90℃ ;
- 2) Resolution: 1℃ ;
- 3) Accuracy: -50℃ ~ -50℃, ±1℃, others, ±2℃ ;
- 4) Cabinet temperature control range: -50℃ ~ 85℃ ;
- 5) Power supply: 220VAC±10% 50/60Hz;
- 6) Power consumption: <3W
- 7) Output capacity:
 - Refrigeration: 30A/240VAC, directly drive a single phase 1.5HP compressor;
 - Defrost: 5A/250VAC (optional)
- 8) Front panel protection level: IP65
- 9) Ambient temperature: 0℃ ~ 55℃
- 10) Storage condition: temperature -25℃ ~ 75℃
- 11) Storage humidity: 20% ~ 85%(non condensing)

5. Indicator light status description

Indicator light	Symbol	Status	Meaning
Setting	set	ON	Parameter setting
		OFF	Status of temperature measuring and controlling
Control load	out	ON	Control load works
		OFF	Control load stops
Heating mode	H	ON	Control load in time delay
Refrigeration mode	C	ON	Start heating mode
Defrost	def	ON	Start refrigeration mode
		ON	Start defrosting

6. Parameter list

Menu	Menu function	Setting range	H1	H2	Unit
User Menu					
St	Set temperature	Min.set temperature C3~Max.set temperature C4	4	3	℃
Po	Menu password	0~99(password is 55, irreversible)	0	0	/
Administrator Menu					
rd	Temperature hysteresis	1~15	3	6	℃
C1	Temperature sensor calibration	-10~-10	-1	-3	℃
C2	Control load start delay	0~60	3	2	min
C3	Min.set temperature	-50~-St	2	0	℃
C4	Max.set temperature	St~85	10	6	℃
A1	Periodical open time after sensor failure	1~60	15	45	min
A2	Periodical close time after sensor failure	0~60	10	15	min
d1	Defrost cycle	0~90	6	12	hour
d2	Defrost time	1~90	20	20	min
d3	Display during defrost	0:Display cabinet temperature 1:Display dF during defrost 2:Display defrost start temperature during defrost	2	2	/
HC	Refrigeration/heating switch	0:Refrigeration 1:Heating	0	0	/

7. Keys function

7.1 Key description

Keys	Function
Set	Enter the status of parameter setting
☀	Switch between menu and parameter
☀	Adjust menu and parameters
↶	Adjust menu and parameters;
↷	Press 10s to execute parameter one-key recovery
☀	Exit from parameter setting status
☀	Exit from one-key recovery status
☀	Force to start defrost

7.2 Key operation

1) User parameter setting

In the status of temperature measuring and controlling, press **Set** key for three seconds to enter user parameter setting state, it displays menu St in the digital tube. At this time, press **Set** key to display the corresponding parameter value, and press **☀** or **☀** to adjust the set temperature, and then press **Set** key to return to menu St.

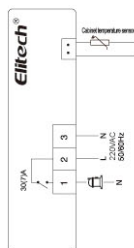
2) Enter to the administrator menu setting

In the state of user menu setting, when it displays menu item St in the digital tube, press **☀** to switch to the menu item Po, press **Set** key to display 00, and press **☀** and **☀** to adjust it to 55, then press **Set** key again to return to menu item Po. At this time, press **☀** key to display rd, indicating that it has entered to the administrator parameter setting status.

3) Code information

Code	Reason	Run/stop control output in a proportional time	Remark
E1	sensor failure		**
dF	Defrost	With defrost relay: output defrost Without defrost relay: off cycle defrost	**
dr	Parameter recovery	The original parameters will be overwritten by the selected parameters.	Factory operation mode

9. Wiring diagram



10. Safety rules:

★ Danger:

- 1) Strictly distinguish the power wire, relay output, sensor down-lead and data line, and the relay could not be overloaded.
- 2) Prohibit connecting the wire terminals without electricity cut-off.

★ Warning:

Prohibit using this unit under the environment of over damp, high temp., strong electromagnetic interference or strong corrosion.

★ Notice:

- 1) The power supply should conform to the voltage value indicated in the instruction, and make sure a steady power supply.
- 2) To avoid the possible interference, the sensor down-lead/data line and power wire should be kept in a proper distance.

If it doesn't adjust to 55, press **Set** key to return to menu time Po, then press the key \rightarrow , it will exit from user parameter setting status and return to the temperature measuring and control status.

3) Administrator parameter setting

After enter to the administrator parameter setting, press \rightarrow and \rightarrow to select menu items (St. Po. rd.....); After select the item, press **Set** key to enter to the current parameter setting, press \rightarrow and \rightarrow to adjust parameters, and then press **Set** key to return to the menu item.

4) Exit from parameter setting

Under the status of parameter setting, press \rightarrow key or no key operation within 30s, or if Po is not set as 55, press \rightarrow key when it displays menu item Po (i.e. password input error), it will save the current parameter value and exit from parameter setting.

5) Manual defrost

In the status of temperature measuring and controlling, Press \rightarrow for three seconds to force the open or close of defrost{ d1 is not 0, i.e. defrost is not forbidden).

6) Parameter recovery

In the status of temperature measuring and controlling, press key \rightarrow for 10S, display H0 in the digital tube, it will execute one key recovery operation. It could continue to select the parameter recovery items by pressing key \rightarrow , and the selection range is H0~H7, press key \rightarrow to execute the parameter recovery and then exit, if there is no parameter recovery operation within 30S, it will automatically exit from the mode without recovery of parameters.

Note: During the operation of one key recovery, it needs a stable power supply. if the power supply is not stable, please electrify the controller again then execute one key recovery.

H0	Give up parameter recovery, no change of each parameter, no display of parameter recovery success code dr
H1	Recovery parameter H1, recovery success display dr
H2	Recovery parameter H2, recovery success display dr
H3	Reserved
H4	Reserved
H5	Reserved
H6	Reserved
H7	Reserved

8. Control output

1) Refrigeration/heating:

Normal status:

HC=0, refrigeration mode:

When the cabinet temperature is higher than the set temperature+ hysteresis temperature, and finish the control load start delay time, the refrigeration will start; When the cabinet temperature is lower than the set temperature, the refrigeration will close.

HC=1, heating mode:

When the cabinet temperature is lower than the set temperature, and finish the control load start delay time, the heating will start; When the cabinet temperature is higher than the set temperature + hysteresis temperature, the heating will close.

Note: For the initial use of controller, the control output start delay time is calculated as 3s, and in the future, it is calculated as C2(Control load start delay).In heating model, it needs to set d1 to 0(Defrost forbidden)

Sensor failure:

A2=0, the function of "Run/stop in a proportional time" is canceled, the control output closes;

A2≠0, the function of "Run/stop in a proportional time" opens, the control output will run and stop periodically according to the set time after the sensor fails.

2) Defrost

If the defrost cycle is not 0, the controller will start defrost when it finishes defrost cycle or it can be manually started. Defrost stops when finish defrost time or it could be manually stopped.

Display during defrost:

d3=0: Display real time cabinet temperature

d3=1: Display dF during defrost

d3=2: Display defrost start temperature during defrost

ECS-180 Temperature Controller User Manual

1. Product General

1.1 product configuration description

Serial code	Relay		Sensor			Buzzer		Off Power detection
	Refrige ration	Defr ost	Fan	Light/ alarm	Cabinet temp	Evapor ator/S2	Conden sor/S3	
A(30.05.00)S234.B	30	5/●	5/●	×	✓	●	●	×
A(05.10.10.05)S234.B.V	5	10/●	10/●	5/●	✓	●	●	●

Note: ● represents optional, × represents no such configuration, ✓ represents fixed configuration. The number represents the relay contact capacity.

For example: 30 represents the relay contact capacity is 30A, 5/● represents the relay contact capacity is 5A and the one is optional

1.2 Product application description

- ECS-180 temperature controller could be used in the middle and low temperature medicine cabinet, kitchen cabinet, supermarket split cabinet, air curtain cabinet, island counter, wine cabinet, etc.
- The controller adopts building block design concept and users could select defrost, fan, light/external alarm according to their demand.
- The function of evaporator sensor, condenser sensor, door switch, buzzer and off power detection is optional.
- Refrigeration relay output could reach to 30A/240VAC, which could directly drive single-phase 1.5Hp compressor.
- Large panel of color digital tube, work status symbol display, temperature display resolution is 0.1, the front panel waterproof level IP65.
- It has temperature sensor self-test function, and once test the failures, it has multiple protection and alarm methods.
- It has the function of one-key recovery, and the rear adopts the plug-in connection method to effectively simplify processing for equipment manufacturers.
- Temperature measuring unit could switch between Celsius and Fahrenheit.
- With the function of Synchronous defrost switch signal detection, and it could form the network of real-time clock Synchronous defrost.
- Cabinet temperature over limit alarm has two modes: absolute value and relative value.
- Light/external alarm relay could be selected by the software, and when select the function of external alarm relay, it could connect the remote alarm bell.
- If select to install standby power supply access unit, it could realize the function of off-power detection and alarm.
- With the complete control logic of hot-gas defrost start without the pressure difference in the refrigerant pipe, to prevent starting with the pressure, for the purpose of a longer compressor life.

2. Operation and display panel



3. Specification

- 1) Mounting size: (71mm) × (29mm) (max)
- 2) Product size: (78.5mm) × (34.5mm) × (82mm)

4. Technical parameters

- 1) Measuring range: -50°C ~ 90°C or -58°F ~ 194°F (only when sensor calibration is set as 0)
- 2) Resolution: 0.1°C or 1°F
- 3) Accuracy: -40°C ~ 50°C, ±1°C, 51°C ~ 70°C, ±2°C, others, ±3°C or -40°F ~ 122°F, ±2°F, 123°F ~ 158°F, ±4°F, others, ±6°F
- 4) Controlling range: -50°C ~ 85°C or -58°F ~ 185°F
- 5) Power supply: 220±10 % (VAC)
- 6) Power consumption: <3W
- 7) External standby power voltage: 7.0VDC ~ 13.5VDC
- 8) Input: Cabinet sensor, evaporator sensor, condenser sensor, door switch (When door is open, sensor signal: normal open)
- 9) Output capacity:

Serial code	A(30.05.00)S234.B	A(05.10.10.05)S234.B.V
Refrigeration	30A/240VAC, directly drive 1.5HP compressor	5A/250VAC
Defrost	5A/250VAC	10A/250VAC
Fan	5A/250VAC	5A/250VAC
Light/external alarm	None	10A/250VAC

- 10) Front panel waterproof level: IP65
- 11) Work ambient temperature: 0°C ~ 55°C
- 12) Storage temperature: -25°C ~ 75°C
- 13) Relative humidity: 20% ~ 85% (non condensing)

5. Indicator light status description

Indicator light	Symbol	Status	Meaning
Setting	Set	ON	Parameter setting
		OFF	Status of temperature measuring and controlling
Refrigeration	❄	ON	Refrigeration work
		OFF	Refrigeration stop
		FLASH	Refrigeration time delay
Defrost	❄	ON	Defrost work
		OFF	Defrost stop
Fan	🌀	ON	Fan work
		OFF	Fan stop
Defrost dripping	drip	ON	Start defrost dripping
		OFF	Stop defrost dripping
Door switch	🚪	ON	Cabinet door open
		OFF	Cabinet door close
Off power detection	🔌	ON	Controller power off

6. Parameter list

Menu	Functions	Setting range	Default		℃/°F
			H1	H7	
User menu					
St	Temperature set value	Lower limit ~ Upper limit	4℃	40°F	℃/°F
Po	Administrator menu Password	00 ~ 99 (password is 55 unmodified)	00		/
		Administrator menu			
C1	Hysteresis value	0.5℃ ~ 9.0℃	4.0℃	8°F	℃/°F
C2		1°F ~ 20°F			
C3					
C2	Compressor start Min. interval	0 ~ 60	5	5	min
C3	Compressor initial start Min. interval	0 ~ 90	5	5	min
C4	Cabinet sensor calibration	-10.0℃ ~ 10.0℃	0.0℃	0°F	℃/°F
		-20°F ~ 20°F			

Menu	Functions	Setting range	Default	
			H1	H7
A5	Cabinet temperature lower limit alarm value	-50℃~Cabinet temperature upper limit alarm value -58℉~Cabinet temperature upper limit alarm value	-10℃	14℉
A6	Cabinet temperature upper limit alarm value	Cabinet temperature lower limit alarm value~85℃ Cabinet temperature lower limit alarm value~185℉	24℃	75℉
A7	Cabinet over temperature alarm time delay	0~60	20	20
A8	The initial cabinet over temperature alarm time delay after electrified	0~60	40	40
A9	Over temperature alarm upper deviation	1℃~30℃ 1℉~60℉	10℃	20℉
A10	Over temperature alarm lower deviation	1℃~30℃ 1℉~60℉	5℃	10℉
A11	Over temperature alarm mode	0: Absolute temperature point 1: set value+ over temperature alarm deviation	0	0
A12	Light/Alarm relay selection	0: Light output 1: Alarm output	0	0
d01	Control output of door switch	0: Doorswitch is canceled 1: Close fan during door open 2: Turn on the light when door open, turn off the light when door closed 3: Close fan and turn on the light when door open, Turn off the light when door closed 4: When door is open, it is the synchronous signal input of defrost, defrost will start.	0	0
d02	Buzzer response when door open	0: NO 1: YES	0	0
cd1	Condenser sensor selection	0: Disabled 1: Enabled	1	1
cd2	Condenser high temperature alarm start value	30℃~90℃ 86℉~194℉	55℃	131℉
cd3	Lower hysteresis of condenser high temperature alarm	1℃~15℃ 2℉~30℉	5℃	10℉
hidden menu	Celsius /Fahrenheit selection (note②)	Fahrenheit Celsius	Celsius	Fahrenheit

Note①: Only valid when the cabinet sensor is in proper working.
Note②: After switch between Celsius /Fahrenheit, users need to adjust all related parameters themselves to make sure the correct parameter setting. Celsius /Fahrenheit switch could only be achieved by one-key recovery operation.

7. Keys Function

7.1 Keys description

Keys	Function
Set	Enter the status of parameter setting; Switch between menu and parameters;
	Adjust menu and parameters; Open/close light(only valid for the model with light control) View condenser sensor temperature
	Adjust menu and parameters; Press more than 10s to execute parameter one-key recovery View evaporator sensor temperature
	Exit from parameter setting; Exit from one key recovery status Press 3s to forced switch between refrigeration, defrost/defrost delay, defrost dripping

Menu	Functions	Setting range	Default	
			H1	H7
C5	Temperature set lower limit	-50℃~temperature set value -58℉~temperature set value	-2℃	28℉
C6	Temperature set upper limit	temperature set value~85℃ temperature set value~185℉	22℃	72℉
C7	Max.standby time after finishing compressor start Min. interval (note①)	0~90 0~90	9	9
C8	Refrigeration Min. running time	0: Refrigeration Min.running time calculation is forbidden	0	0
d1	Evaporator sensor selection	0: Disabled 1: Enabled	1	1
d2	Evaporator sensor calibration	-10.0℃~10.0℃ -20℉~20℉	0.0℃	0℉
d3	Defrost cycle calculation	0: accumulated refrigeration time 1: natural time	1	1
d4	Defrost cycle	0~90 0: Defrost forbidden	2	2
d5	Defrost status display	0: Display cabinet temperature 1: Display dEF during defrost and defrost time delay, display cabinet temperature after finishing defrost time delay. 2: Always display dEF during defrost and defrost dripping 3: Always display start-defrost cabinet temperature during defrost and defrost dripping	2	2
d6	The maximum time of defrost	1~90 0℃~50℃ 32℉~122℉	25	25
d7	Defrost termination temperature		12℃	54℉
d8	Dripping time after defrost	0~60 0: Defrost dripping time forbidden	2	2
d9	Cabinet temperature display time delay after defrost	0~90	10	10
d10	Time delay after defrost start	0~30 0: Defrost start time delay is canceled	10	10
d11	Defrost type	0: Electric heating defrost 1: Hot gas defrost	0	0
F1	Fan running mode	0: Fan and compressor run or stop synchronously 1: Fan runs continuously, stops during defrost 2: Fan runs continuously, stops during defrost and defrost dripping 3: Fan runs continuously, stops during defrost, fan time delay after defrost	3	3
F2	Fan initial start time delay after electrified	0~60	4	4
F3	Fan start time delay after defrost	0~60 0: Fan time delay canceled	2	2
A1	Compressor run and stop in a proportional time after cabinet sensor failure	0: Cancel the mode of "Run/stop in a proportional time" 1: Start the mode of "Run/stop in a proportional time"	1	1
A2	Compressor stop time in the mode of "Run/stop in a proportional time"	1~60	5	5
A3	Compressor running time in the mode of "Run/stop in a proportional time"	1~60	30	30
A4	Buzzer alarm output switch	0: Buzzer output disabled 1: Buzzer output enabled	1	1

7.2 Keys operation

1) In the status of temperature measuring and controlling, press Set key for three seconds to enter user menu, it displays the code St, then press Set key again, display the value of St. It could be modified by pressing the key \leftarrow or \rightarrow .

When it displays the code St, press the key \leftarrow : display the code Po, then press Set key, display 00, at this time, press \leftarrow or \rightarrow to input the password of administrator menu.

Press Set key again to confirm the password input, and the controller will automatically verify the correctness of password. When it passes, it could select parameter items St, Po, C1, C2.....Cd3 (that is, any parameter items both in the administrator menu and user manuals) by pressing the key \leftarrow or \rightarrow . Or else, only the parameters items St and Po available, others could not be displayed.

When the parameter item is selected, press Set key to enter to the setting of the current item, press \leftarrow or \rightarrow to modify the value, and then press Set key to return to the menu.

Under the status of parameter setting, press \leftarrow key or no key operation within 30s, it will exit from parameter setting and automatically save the current parameter value.

Note: The password input of administrator menu only is valid for single entering. After exit from the parameter setting by pressing \leftarrow , it needs to input the correct password again for next parameter adjustment.

2) Temperature viewing

In the status of temperature measuring and controlling, press \leftarrow to view the current evaporator sensor measured temperature value (note: evaporator sensor is enabled and works properly). Press \rightarrow to view the current condenser sensor measured temperature value (note: condenser sensor is enabled and works properly).

3) Manually forced operation

In the status of temperature measuring and controlling, press \leftarrow for three seconds to force the switch between refrigeration, defrost/defrost delay, defrost dripping. Press \leftarrow to open or close the light (Only valid when Light/alarm relay is used as light and there is no linkage between light control and door switch.)

4) Parameter recovery

In the status of temperature measuring and controlling, press the key \rightarrow for 10S, it displays the code H0 and enter to the operation of one-key recovery. It could continue to select the parameter recovery items by pressing \rightarrow key, and the selection range is H0~H7, and press key \leftarrow to execute the parameter recovery and then exit. If there is no parameter recovery operation within 30S, it will automatically exit from the mode without recovery of parameters.

Note: This operation needs a stable power supply. If the power supply is abnormal, it needs to re-electrify the controller with stable power supply and execute the one-key recovery again.)

H0	Give up parameter recovery, no change of each parameter, no display of parameter recovery success code dr
H1	Recovery the parameter H1, recovery success display dr
H2	Recovery the parameter H2, recovery success display dr
H3	Recovery the parameter H3, recovery success display dr
H4	Recovery the parameter H4, recovery success display dr
H5	Recovery the parameter H5, recovery success display dr
H6	Recovery the parameter H6, recovery success display dr
H7	Recovery the parameter H7, recovery success display dr, Celsius switches to Fahrenheit
Note: After switch, users need to adjust the related parameter values to make sure the correct parameter setting.	

8. Control output

8.1 Compressor:

Normal status: When the cabinet temperature is higher than the set temperature(St) +hysteresis(C1), and finish the compressor start Min. interval, the compress will start:

When the cabinet temperature is lower than the set temperature (St), and the continuous refrigeration running time is larger than C8, the compressor will close.

When the cabinet temperature is between the set temperature(St) and the temperature of the set temperature(St) +hysteresis(C1), if the refrigeration is closed, then after finishing compressor start Min. interval and Max.standby time after finishing compressor start Min. interval (C7), the refrigeration will start.

Note: Compressor start Min.interval is calculated by Compressor initial start Min. interval (C3) after it is electrified for the first time, and it will be calculated by Compressor start Min. interval (C2) in the future.

Cabinet temperature sensor failure:

A1=0, cancel the function of "Run/stop in a proportional time", the compressor closes;

A1=1, open the function of "Run/stop in a proportional time", the compressor will run in cycle according to the proportion (Refrigeration running time A3 and refrigeration stop time A2).

8.2 Defrost

1) d4 = 0. Defrost is forbidden.

2) d4 \neq 0. when it is not in the state of defrost nor defrost dripping:

① Evaporator sensor is enabled (d1 = 1), and evaporator sensor temperature is higher than Defrost termination temperature (d7), then defrost could not be started.

② Evaporator sensor is enabled (d1 = 1) and evaporator sensor temperature is lower than Defrost termination temperature (d7) or evaporator sensor is disabled (d1 = 0) (Any of the following conditions could start defrost) :

a. When defrost cycle (d4) finishes running, defrost is started;

Note: Defrost cycle is calculated according to the selected natural time (d3 = 1) or accumulated refrigeration time(d3 = 0) :

b. Hold and press \leftarrow for three seconds, start defrost;

c. If the door switch is as synchronous signal input of defrost (d01 = 4) ,the door open is the external synchronous defrost signal, the defrost is started.

Note: When finish time delay after defrost start (d10) , there will be an output of defrost.

3) In the state of defrost (Any of the following condition could close defrost) :

① Evaporator sensor is enabled (d1 = 1) , and evaporator sensor temperature is higher than defrost termination temperature (d7) , defrost is closed;

② When finish running the maximum time of defrost (d6) , defrost is closed;

③ Hold and press \leftarrow for three seconds, defrost is closed;

4) After defrost, it enters the state of defrost dripping, and within dripping time after defrost(d8), refrigeration output is forbidden. The dripping will be discharged during this time period. After finishing dripping time after defrost, it enters to the status of refrigeration cycle.

Note: Defrost status display

d5=0: Display cabinet temperature

d5=1: Display dEF during defrost and defrost time delay, display cabinet temperature after finishing defrost time delay.

d5=2: Always display dEF during defrost and defrost dripping

d5=3: Always display start-defrost cabinet temperature during defrost and defrost dripping

Defrost type:

d11=0: Electric heating defrost

d11=1: Hot gas defrost

8.3 Fan:

Fan running mode:

1) Fan and compressor run or stop synchronically;

2) Fan runs continuously, stops during defrost;

3) Fan runs continuously, stops during defrost and defrost dripping;

4) Fan runs continuously, stops during defrost, fan starts when finish time delay after defrost(F3);

When the door switch parameter is selected as 1 or 3, when the cabinet door is open, fan will be close. And when the door is closed, fan will recover to the working state before door open.

Note: Fan will not be permitted to run until finish Fan initial start time delay after electrified (F2) .

8.4 Light

do1=0 or 1: press \leftarrow to open the light, and press \rightarrow again to close the light.

do1=2 or 3: When door open, the light will be opened, and when close the door, light will be closed. Note: A12 = 0. Light/Alarm relay will be used as light relay, and light relay will pick-up when the light opens, disconnect when the light closes.

A(30.05.05.00)S234.B No configuration of light relay.

8.5 Internal Alarm

Temperature sensor failure alarm:

When cabinet sensor fails, the digital tube display E1:

When evaporator sensor fails, the digital tube display E2;
When condenser sensor fails, the digital tube display E3;

Condenser high temperature alarm: If the condenser sensor is selected, when the condenser temperature is higher than the condenser high temperature alarm start value, it will alarm and display CH. While it will not have an effect on the control output. When the temperature falls back to (the condenser high temperature alarm value-condenser high temperature alarm lower hysteresis), the alarm is released.

Cabinet over temperature alarm: When the cabinet temperature is higher than the cabinet temperature upper limit alarm value(A11=0) or higher than (set value+ over temperature alarm upper deviation: A11=1), and cabinet over temperature alarm time delay or the initial cabinet over temperature alarm time delay after electrified has been finished, the digital tube will display RH, and the alarm will not be released until the temperature is lower than the cabinet temperature upper limit alarm value(A11=0) or lower than (set value+ over temperature alarm upper deviation: A11=1); When the cabinet temperature is lower than the cabinet temperature lower limit alarm value(A11=0) or lower than (set value- over temperature alarm lower deviation: A11=1), and cabinet over temperature alarm time delay or the initial cabinet over temperature alarm time delay after electrified has been finished, the digital tube will display RL, and the alarm will not be released until the temperature is higher than the cabinet temperature lower limit alarm value or (set value- over temperature alarm lower deviation: A11=1).

If the buzzer is selected as 1, when there is alarm, door open(do2 is set as 1) or power supply is disconnected(now it is powered by standby power supply, A(30.05.05.00)S234.B has no such configuration), the buzzer beeps: When all alarm is released, door is closed(do2 is set as 1) and there is normal power supply, the buzzer mutes, or press any key to mute the alarm.

Alarm code	Alarm reason
E1	Cabinet temperature sensor failure
E2	Evaporator sensor failure
E3	Condenser sensor failure
CH	Condenser high temperature alarm
RH	Cabinet high temperature alarm
RL	Cabinet low temperature alarm

8.6 External alarm output (A12=1)

The external alarm relay will pick up when there is alarm or door is open (do2 is set as 1), and it will disconnect when all alarm is released and the door is closed (do2 is set as 1).

Note: **A (30.05.05.00) S234.B has no configuration of external alarm relay.**

8.7 Standby power supply

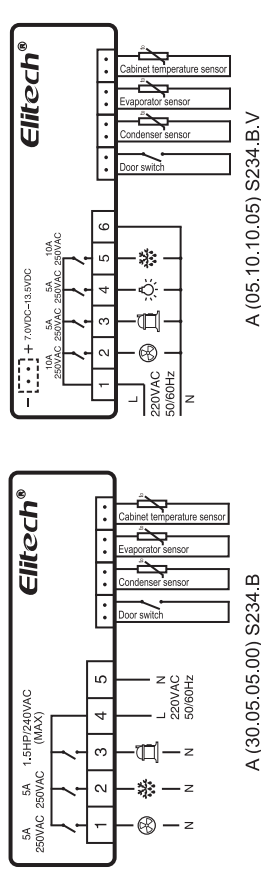
When it is supplied by standby power, it will close the control output of compressor, fan, defroster and light/external alarm, but the controller will display the sensor measured temperature normally, and normally keep all alarm status. If the controller is electrified again, the compressor, defroster, fan and light will work according to the mode of initial electrification.

Note: the voltage range of external power supply is 7.0~13.5VDC, and the controller will be damaged if it is connected with the standby power supply beyond the range. Please do not exceed this range!
A (30.05.05.00) S234.B has no such configuration of standby power supply.

8.8 The table of controller output status

Defrost type	Electric heating defrost	Hot gas defrost
System status		
	Refrigeration output	Compressor start
Defrost time delay	Compressor start	Four-valves close
	Compressor stop	Compressor stop
Defrost output	Electric heating close	Four-valves open
	Compressor stop	Compressor start
Defrost dripping	Electric heating open	Four-valves open
	Compressor stop	Compressor stop
	Electric heating close	Four-valves open

9. Wiring diagram



A (30.05.05.00) S234.B

A (05.10.10.05) S234.B.V

10. Safety rules:

★ Danger:

- 1) Strictly distinguish the power wire, relay output, sensor down-lead and data line, and the relay could not be overloaded.
- 2) Prohibit connecting the wire terminals without electricity cut-off.
- 3) When connect the standby power supply, it should connect the isolation safety power supply. Before connection, it is necessary to check whether the standby power voltage range meets the requirement of the controller, or else, it might cause the accident of insulation level drop of controller, the parts burning, or the electric shock, etc.

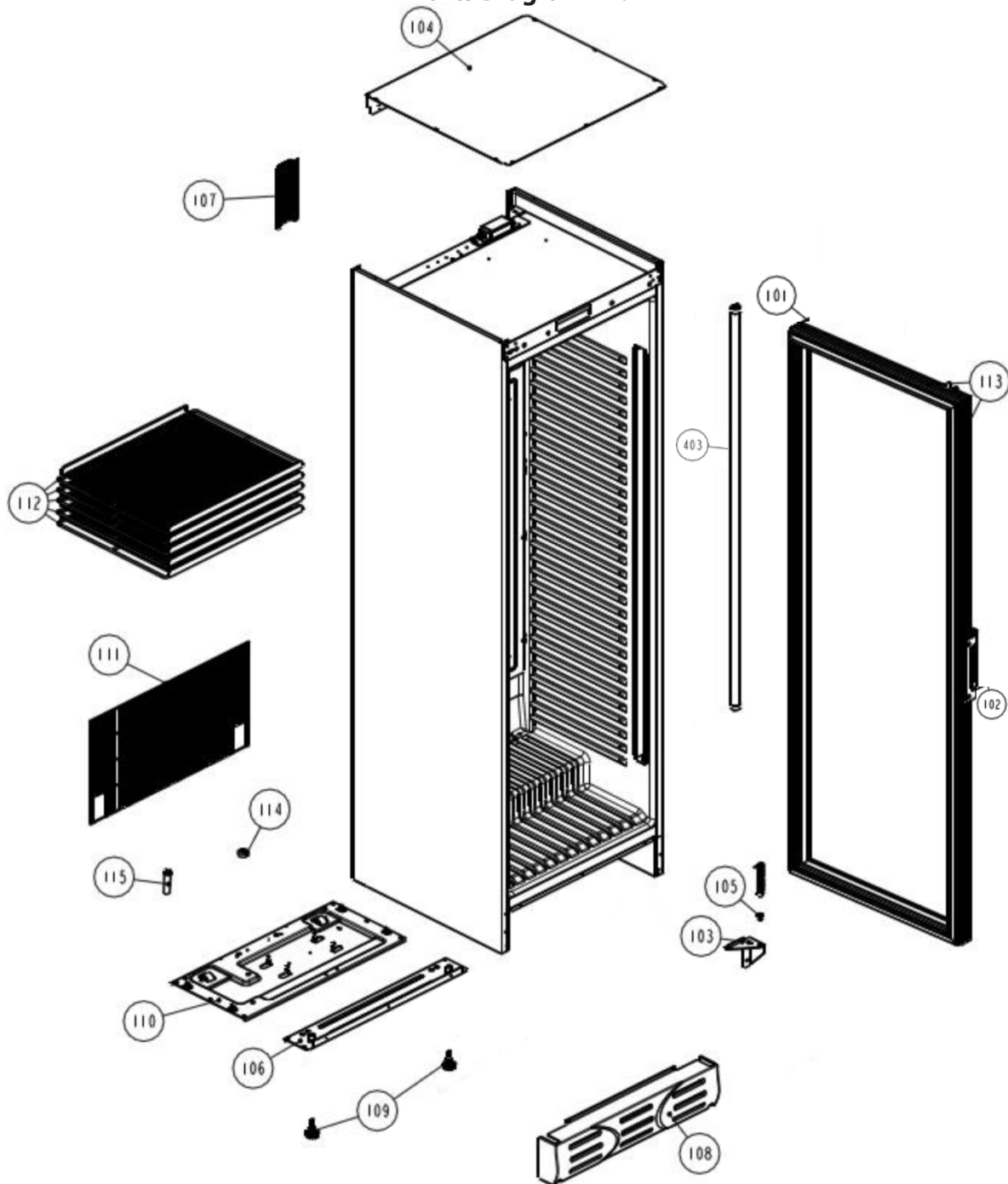
★ Warning:

Prohibit using this unit under the environment of over damp, high temp., strong electromagnetism interference or strong corrosion.

★ Notice:

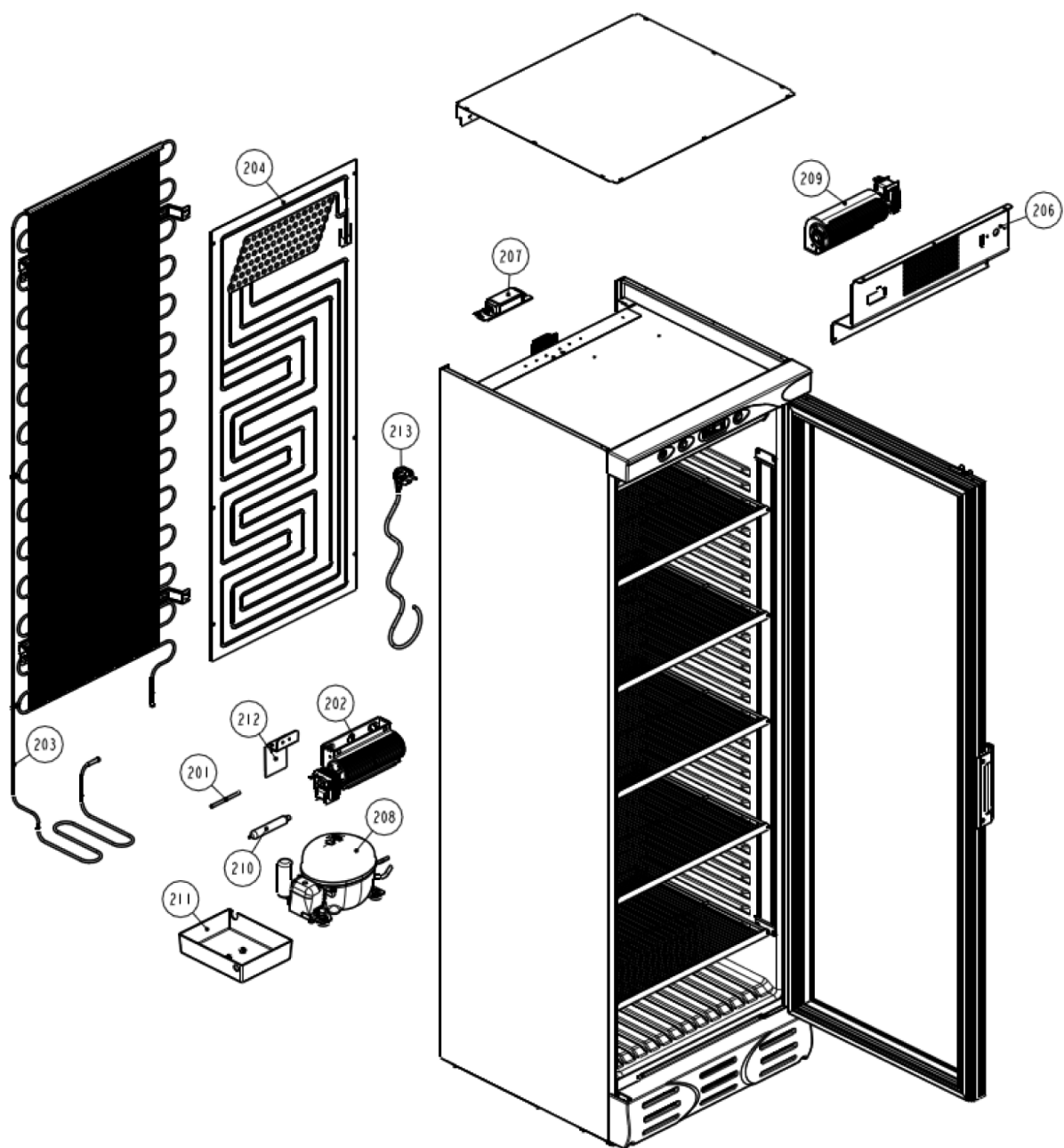
- 1) The power supply should conform to the voltage value indicated in the instruction, and make sure a steady power supply.
- 2) To avoid the possible interference, the sensor down-lead/data line and power wire should be kept in a proper distance.
- 3) When evaporator sensor is installed, the sensor should be well connected with the copper tube which is 5cm away from evaporator inlet.







Parts Diagram TA.1



#	Description	Part Number
104	Top Panel	
107	Conduit Channel	
112	Shelf	XD380SHELF01
111	Rear Grill	
114	N/A	
115	Water Discharge Tube	
110	Compressor Mounting Panel	
106	Front Mounting Panel	
109	Foot	XD380FOOT01
108	Front Grill	XD380GRILL01
103	Bottom Hinge	XD380HINGE01
105	Lower Hinge Bush	XD380BUSH01
113	Complete Door	XD380DOOR01
403	LED Strip Light	XD380LED01

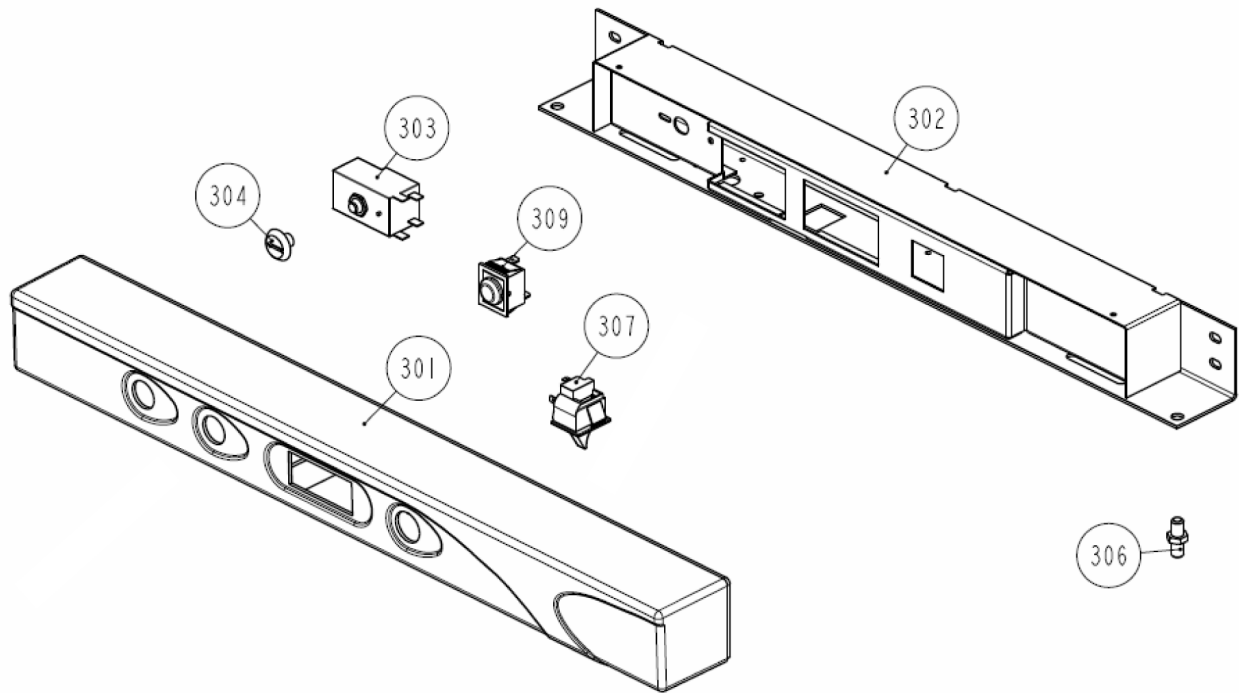
XD380 **Parts Diagram TA.2**



#	Description	Part Number
209	Evaporator Fan	XD380MOTOR01
206	Evaporator Fan Panel	
207	LED Driver	XD380DRIVER01
204	Evaporator	XD380EVAP01
213	Power Cable	
202	Condenser Fan Motor	XD380MOTOR02
212	Condenser Fan Motor Bracket	
201	Compressor Service Pipe	
210	Filter Drier	
203	Condenser	XD380COND01
211	Condensate Tray	
208	Compressor	XD380COMPRESSOR01

XD380
Parts Diagram TA.3

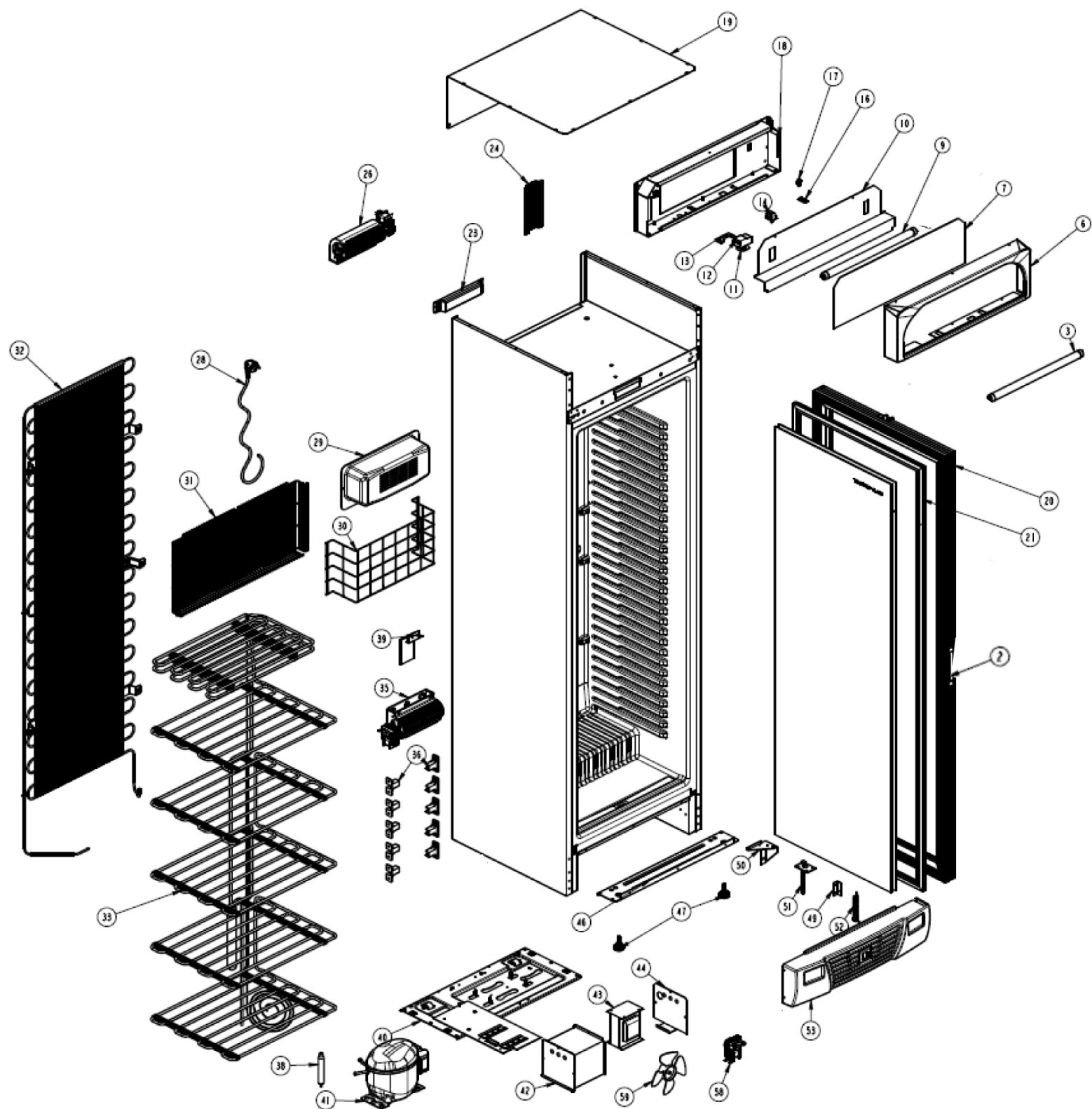
PART II






#	Description	Part Number
302	Control Panel Housing	XD380PANEL02
303	Thermostat	XD380STAT01
309	Light Switch	XD380SWITCH01
307	Door Switch	XD380SWITCH02
304	Thermostat Knob	XD380STAT02
301	Control Panel Black	XD380PANEL01
306	Top Hinge Pin	XD380HINGE02

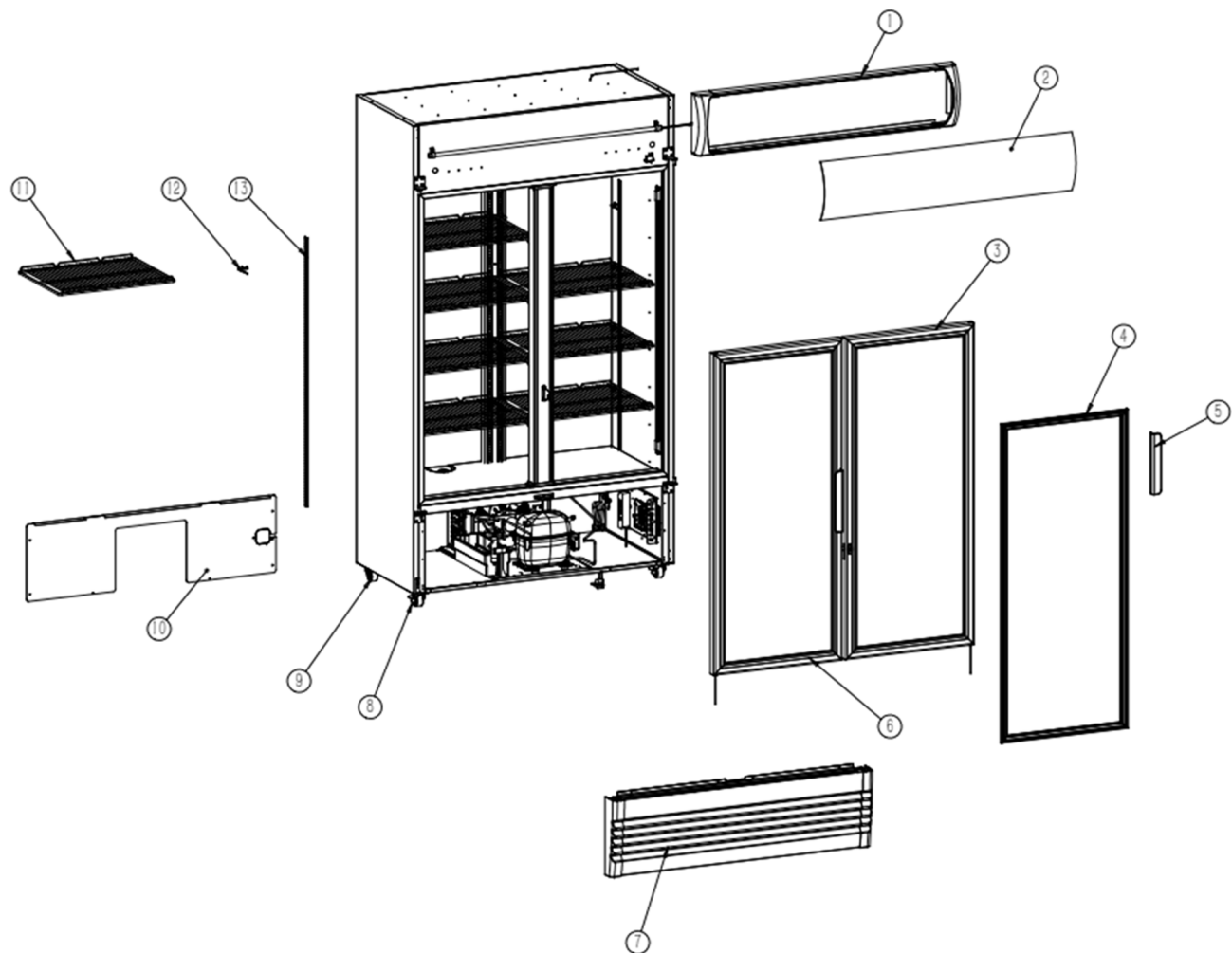
XD380N

Parts Diagram TA.1



#	Description	Part Number
2	Door Handle	
3	LED Strip	XD380LED02
6	Canopy	XD380CANOPY01
7	Canopy Insert	XD380CANOPY02
9	LED Strip	XD380LED01
10	Canopy Support	
11	Thermostat Button	
12	Thermostat Mechanical	
13	Thermostat Bracket	
14	Door Switch	XD380SWITCH02
15	Tap with rubber slot	
16	Tap of switch lid	
17	Door Pin Hole	
18	Canopy Sheet	
19	Top Sheet	
20	Door	XD380DOOR02
21	Door Gasket	XD380GASKET02
23	LED Driver	XD380DRIVER02
24	Conduit	
26	Evaporator Fan	XD380MOTOR03
28	Power Cable	
29	Fan Guard	
30	Load Stopper	
31	Rear Grill	
32	Condenser	
33	Evaporator	
35	Condenser Fan	XD380MOTOR04
36	Shelf Stop	
38	Filter Drier	
39	Rear Fan Protector	
40	Compressor Mounting Plate	
41	Compressor	
42	Transformer Cover	
43	Transformer	
44	Transformer Cover	
46	Front Foot Panel	
47	Adjustable Foot	XD380FOOT01
50	Bottom Hinge	XD380HINGE05
51	Self Closing Pin	XD380HINGE03
52	Self Closing Spring	XD380HINGE04
53	Front Grill	XD380GRILL02
58	Fan	
59	Fan Blade	
49	Thermometer	

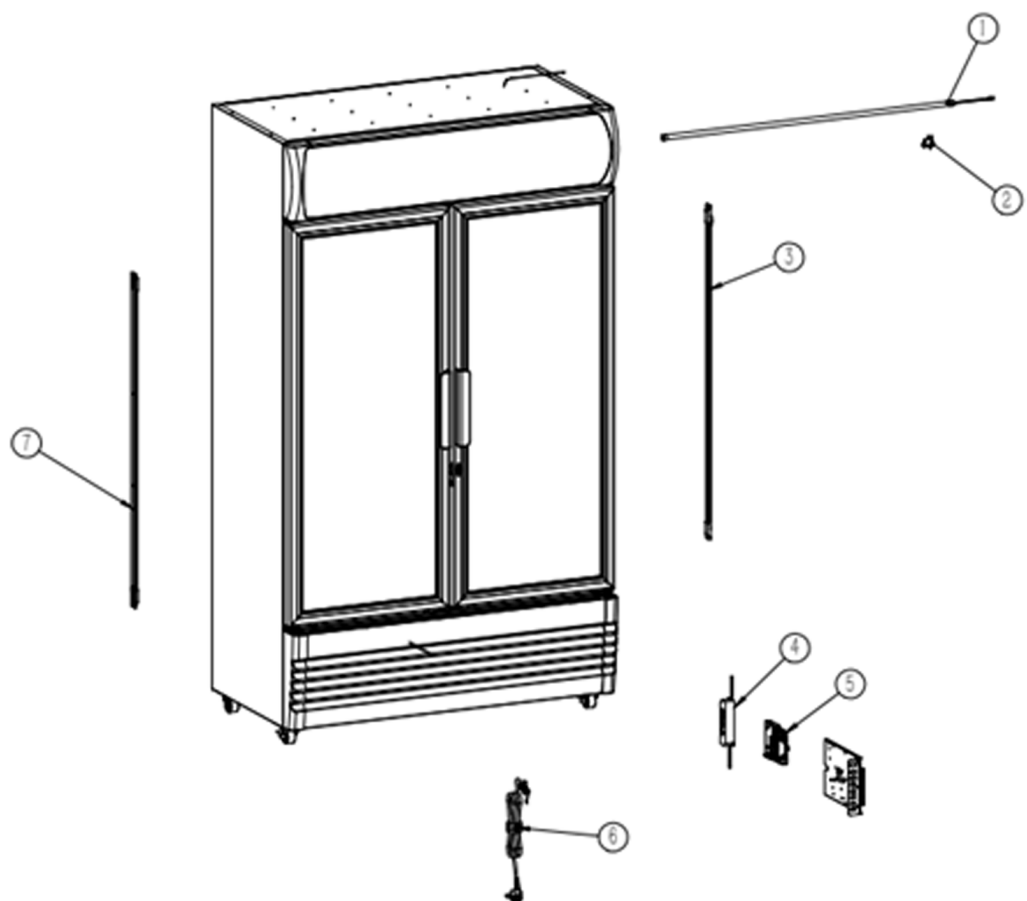
XD701 **Parts Diagram TA.1**



#	Description	Part Number
1	Canopy	XD701CANOPY01
2	Canopy Perspex Insert	XD701CANOPY02
3	Glass Door Right (Incl Gasket & Handle)	XD701DOOR01
4	Door Gasket	XD701GASKET01
5	Door Handle	XDHANDLE01
6	Glass Door Left (Incl Gasket & Handle)	XD701DOOR02
7	Metal Front Grill	XD701GRILL04
8	Braked Castor	XDCASTOR01
9	Unbraked Castor	XDCASTOR02
10	Rear Grill	☎
11	Shelf Left & Right	XD701SHELF01
12	Shelf Strip	☎
13	Shelf Clip	XDCLIP01

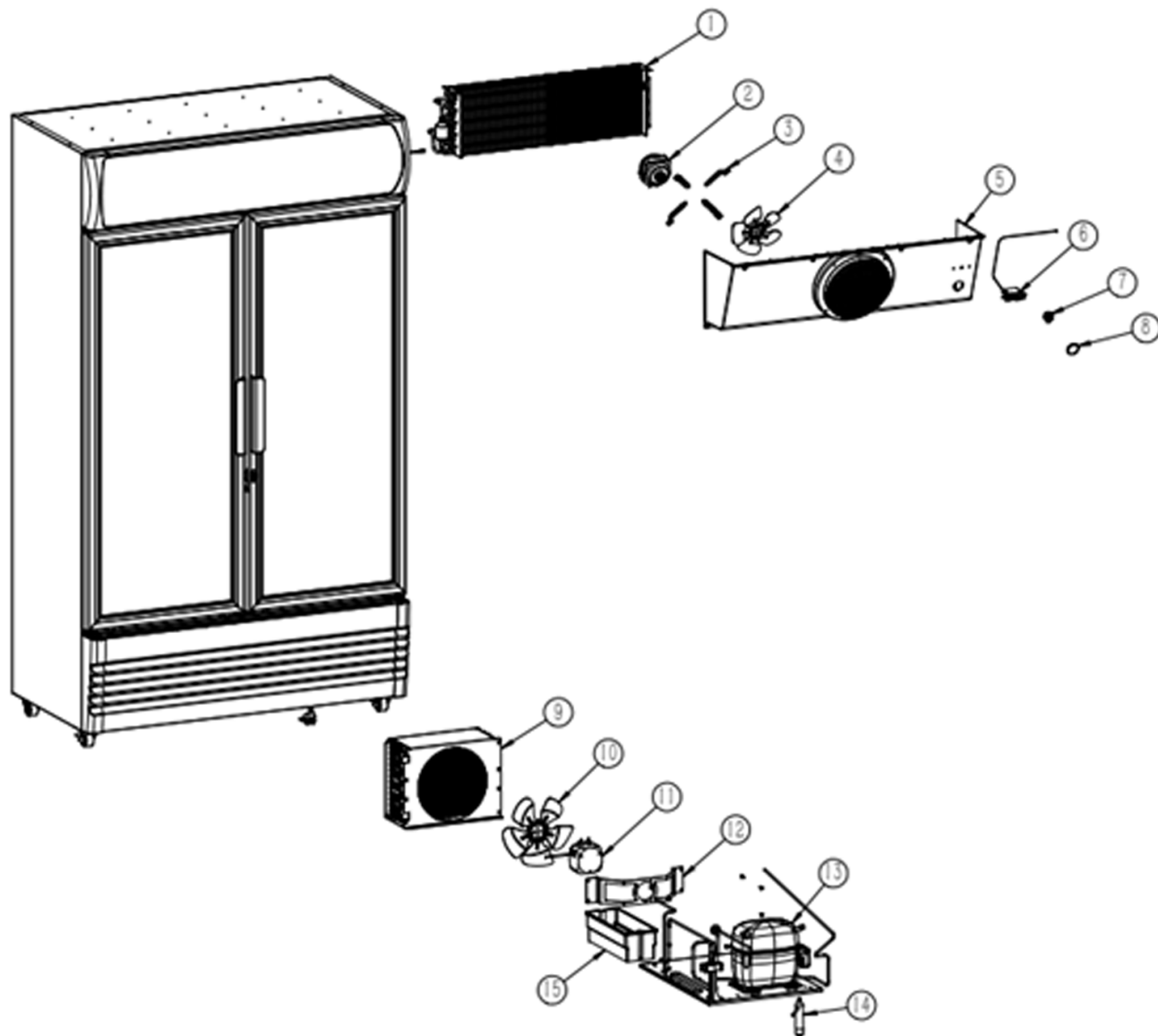
XD701
Parts Diagram TA.2

PART II



#	Description	Part Number
1	Canopy LED Light	XD701LED01
2	Light Switch	XDSWITCH03
3	Left Hand LED Light	XDLED06
4	LED Drive	XDDRIVE01
5	Terminal Box	☎
6	Power Cable	☎
7	Right Hand LED Light	XDLED05
8	Digital Controller	XD701CONTROL01

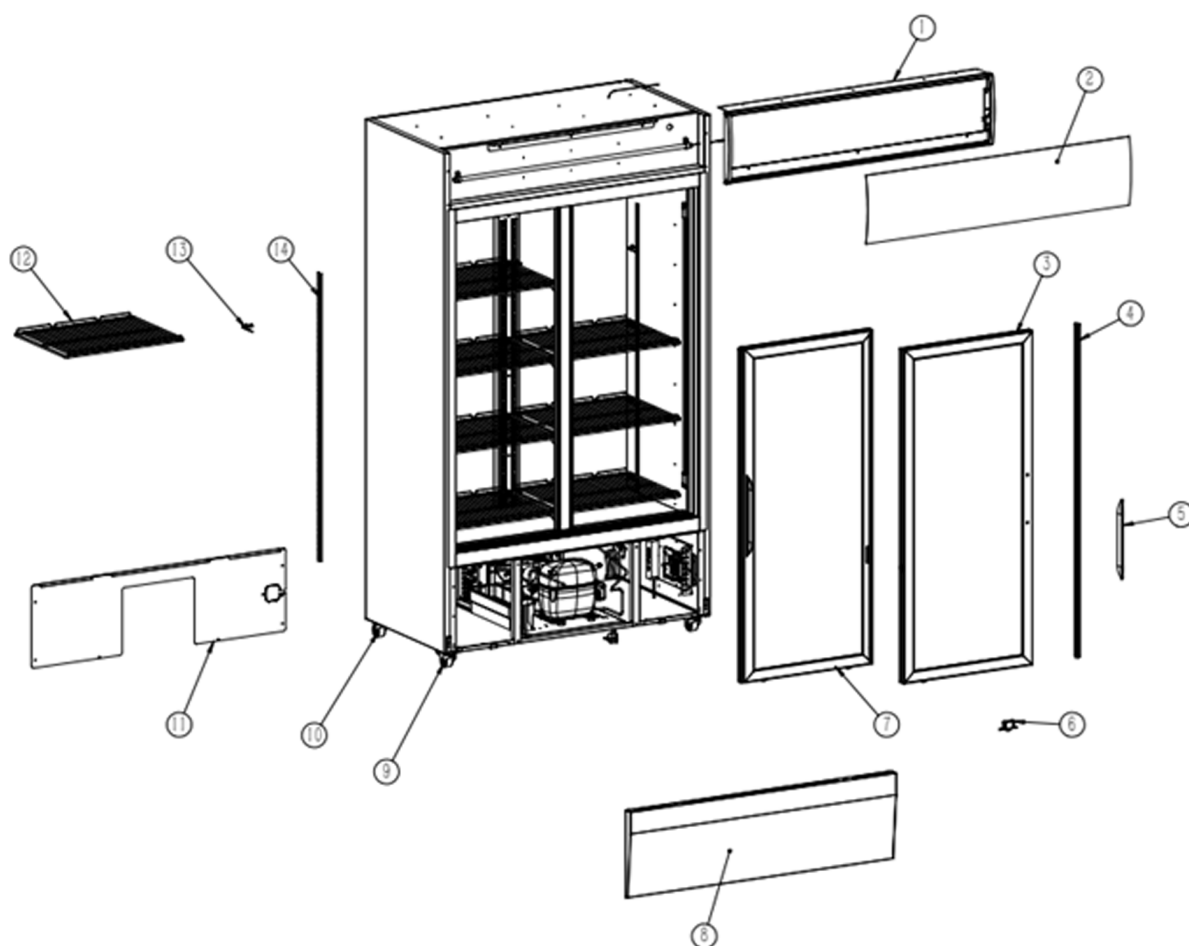
XD701 **Parts Diagram TA.3**



#	Description	Part Number
1	Evaporator	XDEVAP01
2	Evaporator Fan Motor	XDMOTOR01
3	Evaporator Fan Motor Bracket	XD701BRACKET01
4	Evaporator Fan Blade	XD701BLADE01
5	Evaporator Fan Panel	XD701PANEL01
9	Condenser	XD701CONDENSER01
10	Condenser Fan Blade	XDBLADE01
11	Condenser Fan Motor	XDMOTOR02
12	Condenser Fan Motor Bracket	XD701BRACKET02
13	Compressor	XD701COMP01
14	Filter Drier	XD1201DRIER01
15	Water Tray	XDTRAY01

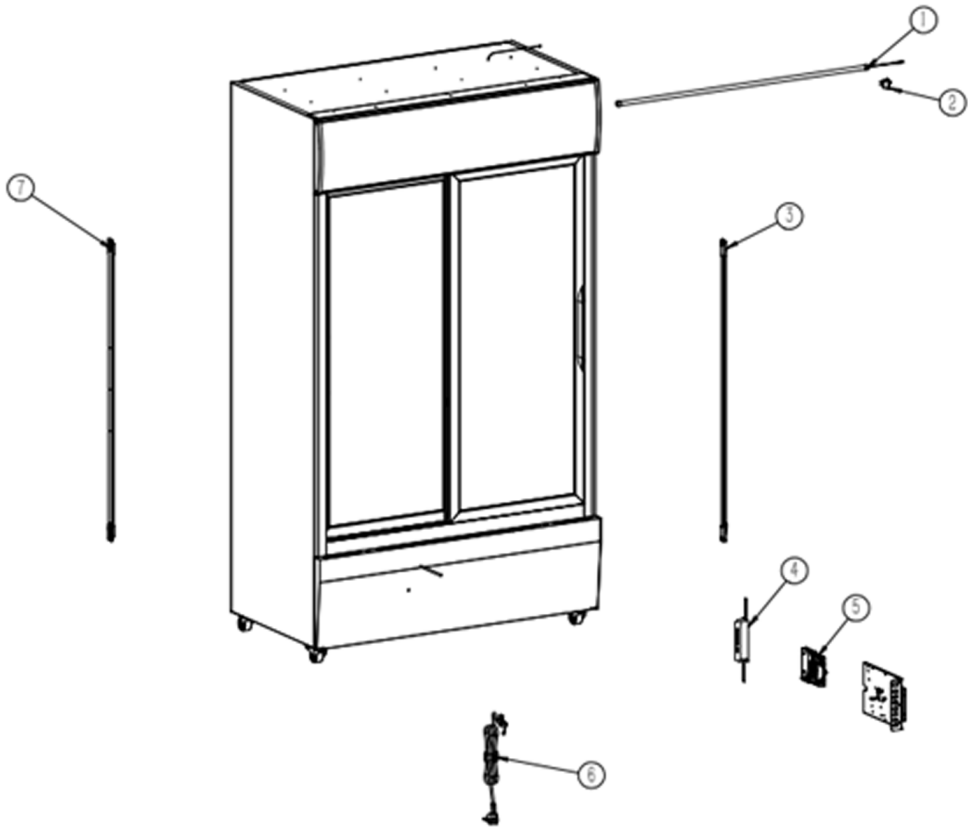
XD701S
Parts Diagram TA.1

PART II



#	Description	Part Number
1	Canopy	☎
2	Canopy Perspex Insert	☎
3	Sliding Glass Door Right	XD701DOOR03
4	Door Gasket	☎
5	Door Handle	☎
6	Glass Door Left (Incl Gasket & Handle)	XD701DOOR04
7	Metal Front Grill	XD701GRILL02
8	Braked Castor	XDCASTOR01
9	Unbraked Castor	XDCASTOR02
10	Rear Grill	☎
11	Shelf Left & Right	XD701SHELF01
12	Shelf Strip	☎
13	Shelf Clip	XDCLIP01

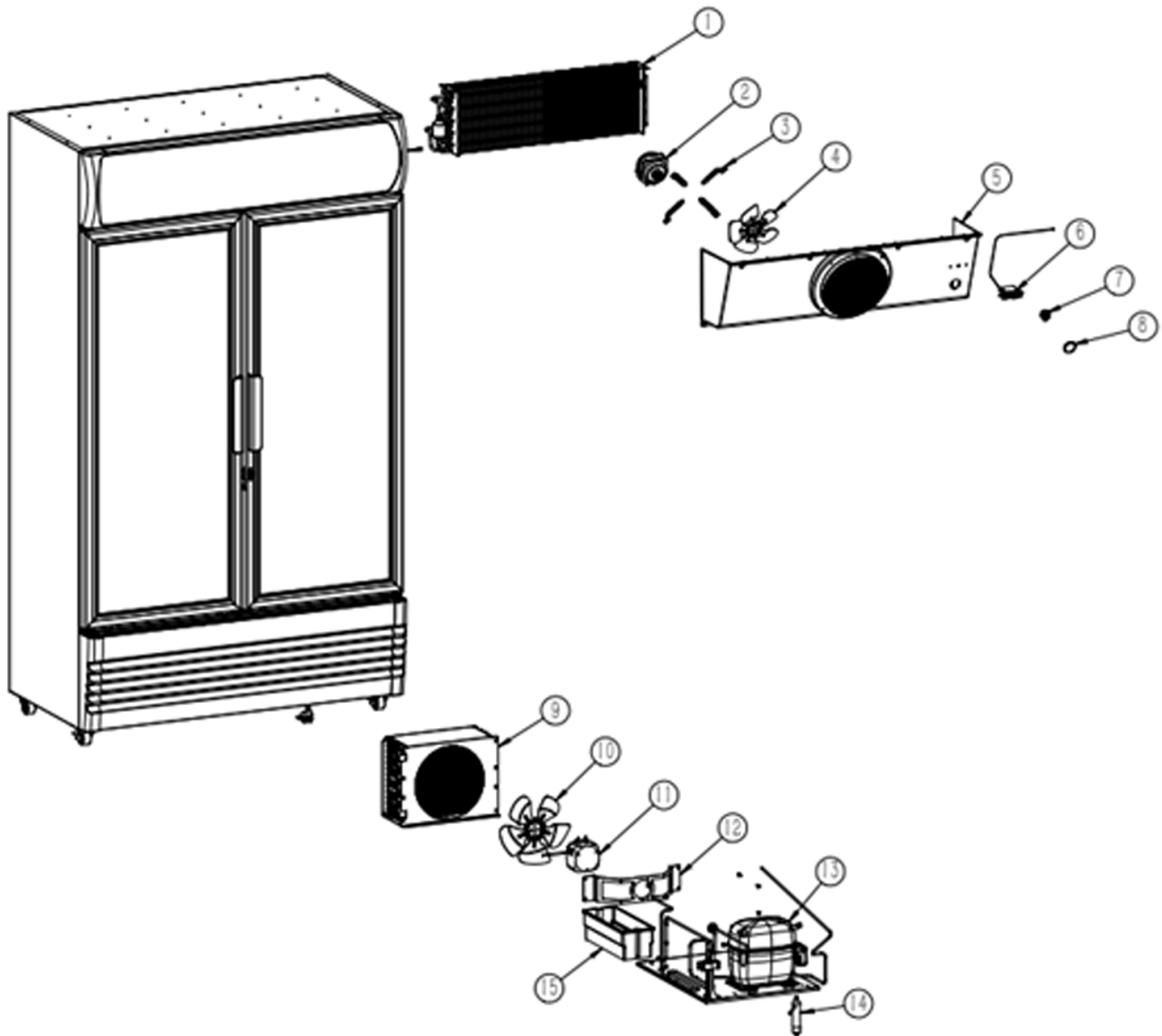
XD701S
Parts Diagram TA.2



#	Description	Part Number
1	Canopy LED Light	XD701LED01
2	Light Switch	XDSWITCH03
3	Left Hand LED Light	XDLED06
4	LED Drive	XDDRIVE01
5	Terminal Box	☎
6	Power Cable	☎
7	Right Hand LED Light	XDLED05
8	Digital Controller	XD701CONTROL01

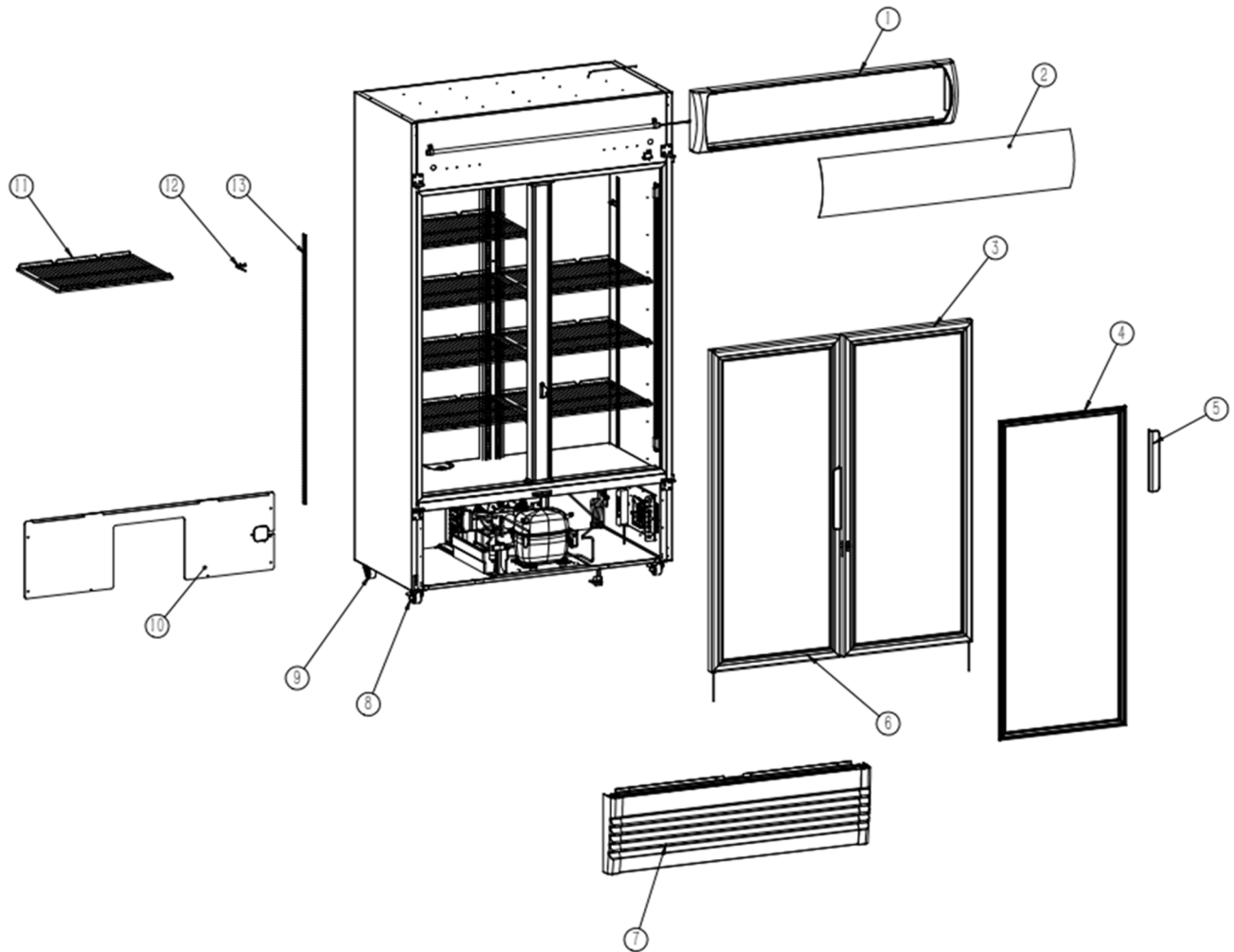
XD701S
Parts Diagram TA.3

PART II



#	Description	Part Number
1	Evaporator	XDEVAP01
2	Evaporator Fan Motor	XDMOTOR01
3	Evaporator Fan Motor Bracket	XD701BRACKET01
4	Evaporator Fan Blade	XD701BLADE01
5	Evaporator Fan Panel	XD701PANEL01
9	Condenser	XD701CONDENSER01
10	Condenser Fan Blade	XDBLADE01
11	Condenser Fan Motor	XDMOTOR02
12	Condenser Fan Motor Bracket	XD701BRACKET02
13	Compressor	XD701COMP01
14	Filter Drier	XD1201DRIER01
15	Water Tray	XDTRAY01

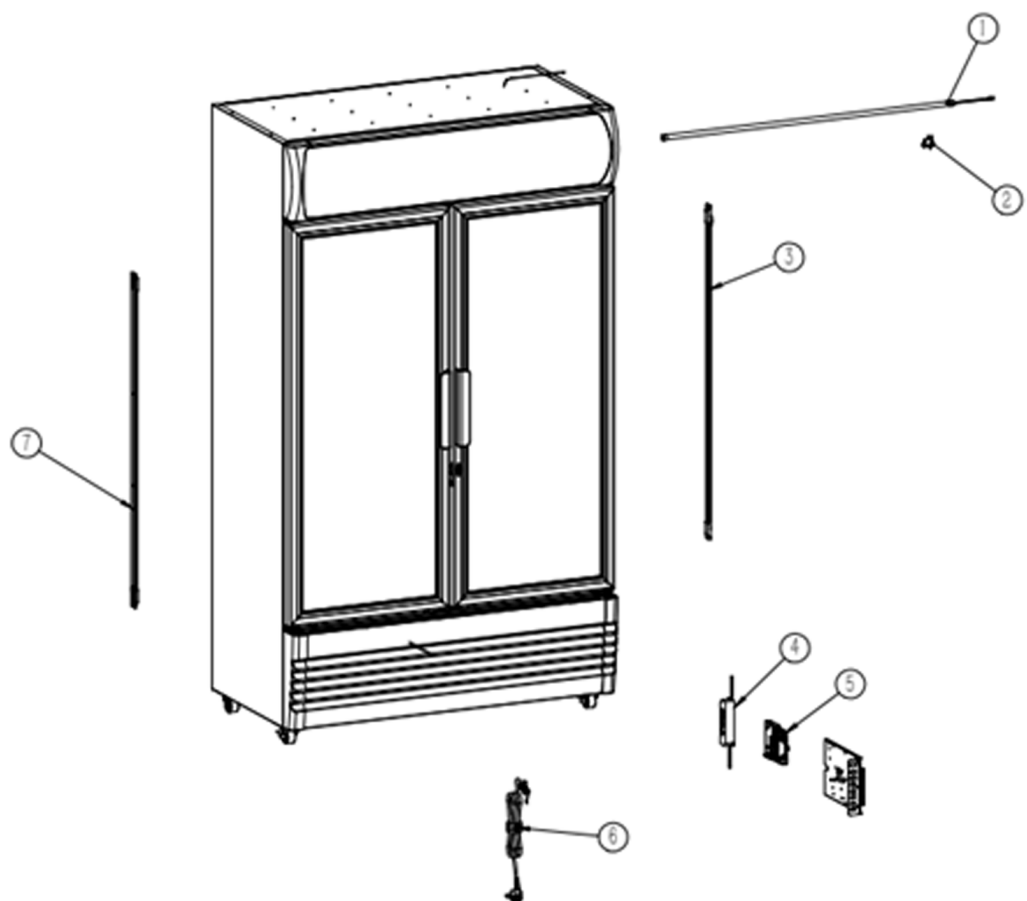
XD1201 **Parts Diagram TA.1**



#	Description	Part Number
1	Canopy	XD1201CANOPY01
2	Canopy Perspex Insert	XD1201CANOPY02
3	Glass Door Right (Incl Gasket & Handle)	XD1201DOOR01
4	Door Gasket	XD1201GASKET01
5	Door Handle	XDHANDLE01
6	Glass Door Left (Incl Gasket & Handle)	XD1201DOOR02
7	Metal Front Grill	XD1201GRILL04
8	Braked Castor	XDCASTOR01
9	Unbraked Castor	XDCASTOR02
10	Rear Grill	☎
11	Shelf Left & Right	XD1201SHELF01
12	Shelf Strip	☎
13	Shelf Clip	XDCLIP01

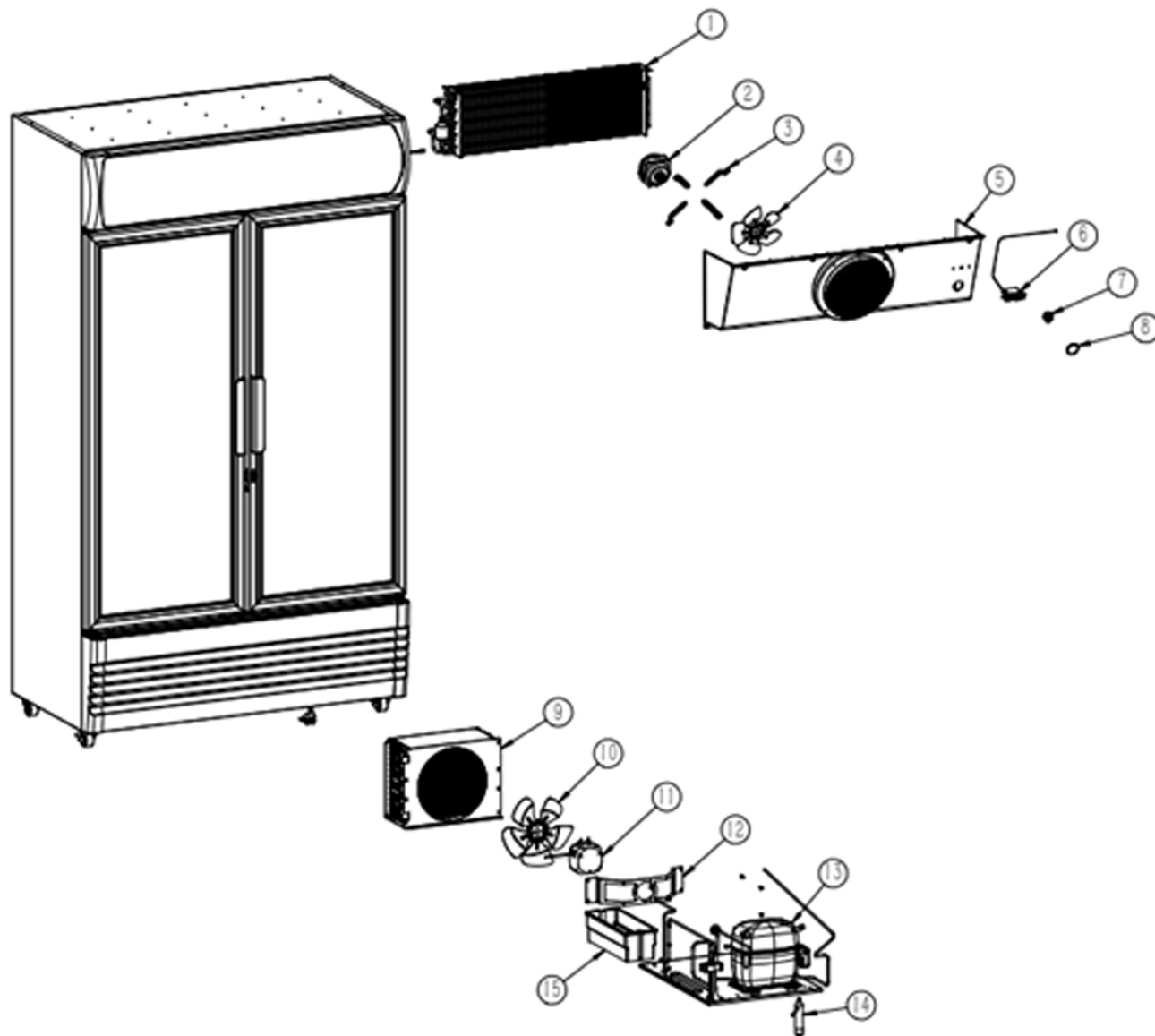
XD1201
Parts Diagram TA.2

PART II



#	Description	Part Number
1	Canopy LED Light	XD1201LED01
2	Light Switch	XDSWITCH03
3	Left Hand LED Light	XDLED06
4	LED Drive	XDDRIVE01
5	Terminal Box	☎
6	Power Cable	☎
7	Right Hand LED Light	XDLED05
8	Digital Controller	XD701CONTROL01

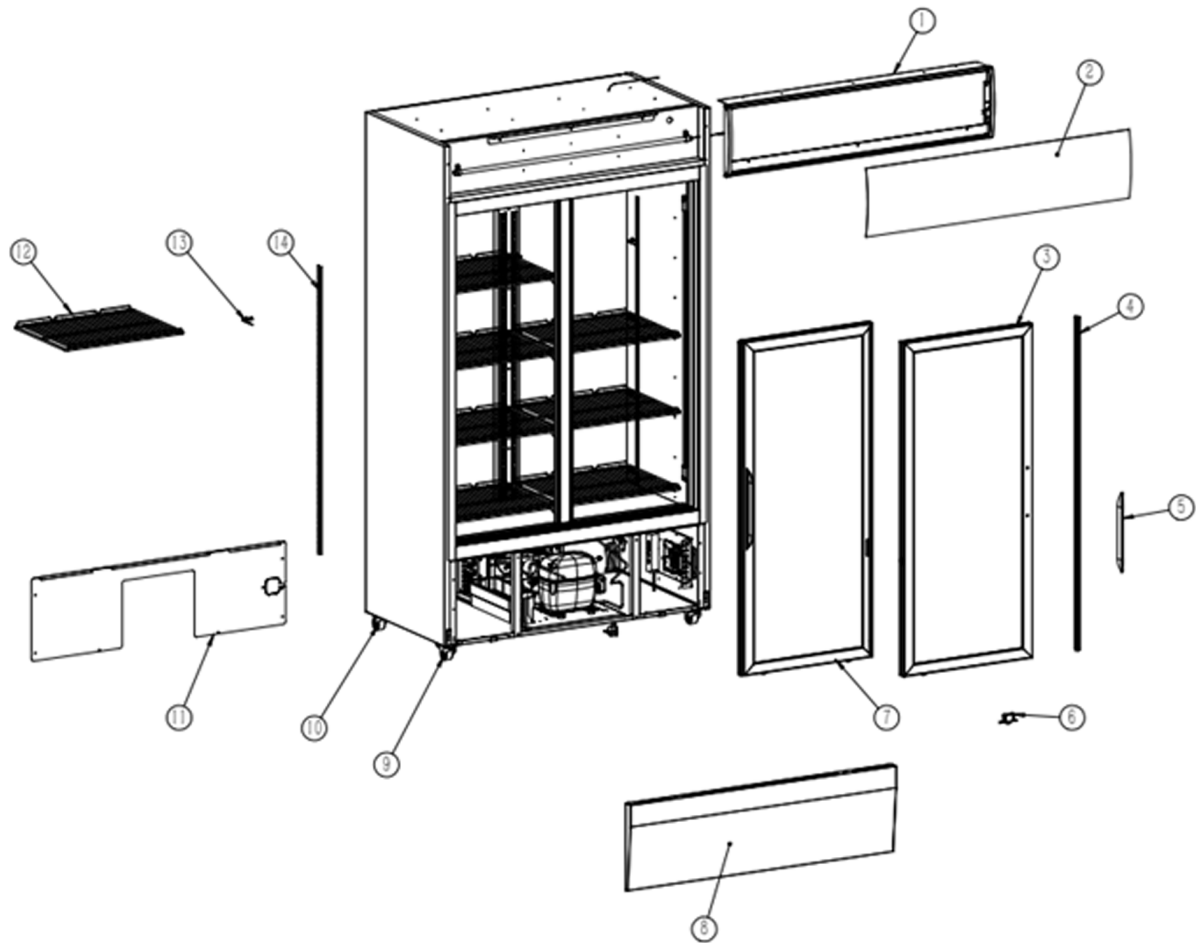
XD1201 **Parts Diagram TA.3**



#	Description	Part Number
1	Evaporator	XDEVAP01
2	Evaporator Fan Motor	XDMOTOR01
3	Evaporator Fan Motor Bracket	XD701BRACKET01
4	Evaporator Fan Blade	XD701BLADE01
5	Evaporator Fan Panel	XD701PANEL01
9	Condenser	XD701CONDENSER01
10	Condenser Fan Blade	XDBLADE01
11	Condenser Fan Motor	XDMOTOR02
12	Condenser Fan Motor Bracket	XD701BRACKET02
13	Compressor	XD701COMP01
14	Filter Drier	XD1201DRIER01
15	Water Tray	XDTRAY01

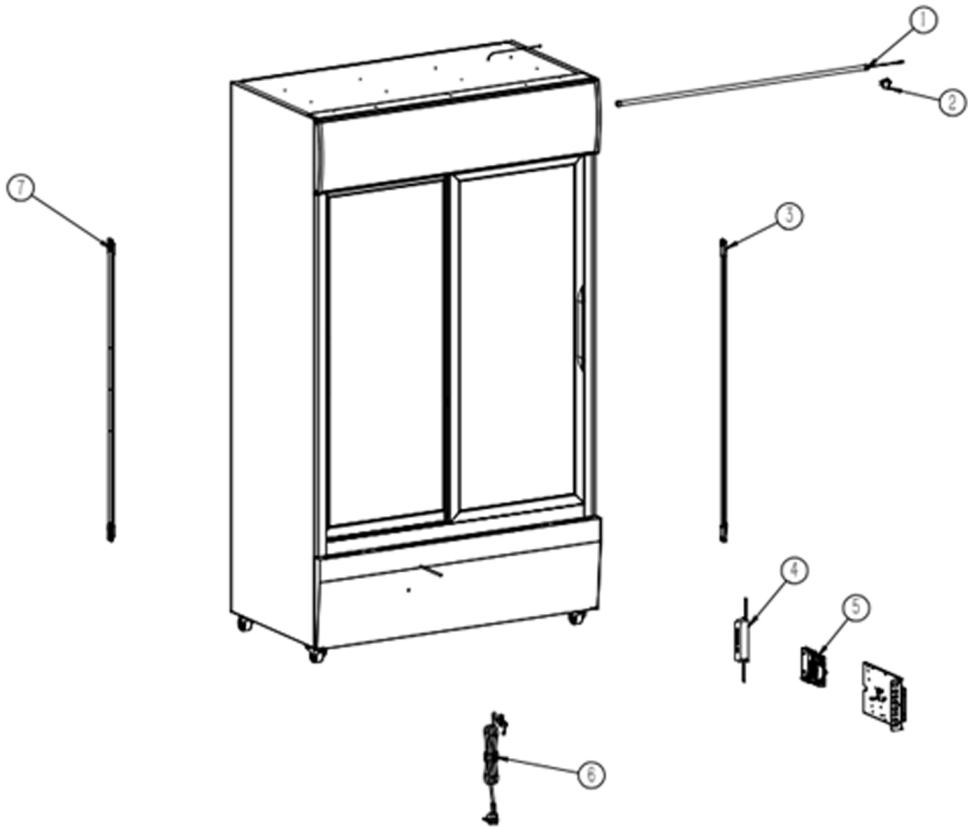
XD1201S
Parts Diagram TA.1

PART II



#	Description	Part Number
1	Canopy	☎
2	Canopy Perspex Insert	☎
3	Sliding Glass Door Right	XD1201DOOR03
4	Door Gasket	☎
5	Door Handle	☎
6	Glass Door Left (Incl Gasket & Handle)	XD1201DOOR04
7	Metal Front Grill	XD1201GRILL02
8	Braked Castor	XDCASTOR01
9	Unbraked Castor	XDCASTOR02
10	Rear Grill	☎
11	Shelf Left & Right	XD1201SHELF01
12	Shelf Strip	☎
13	Shelf Clip	XDCLIP01

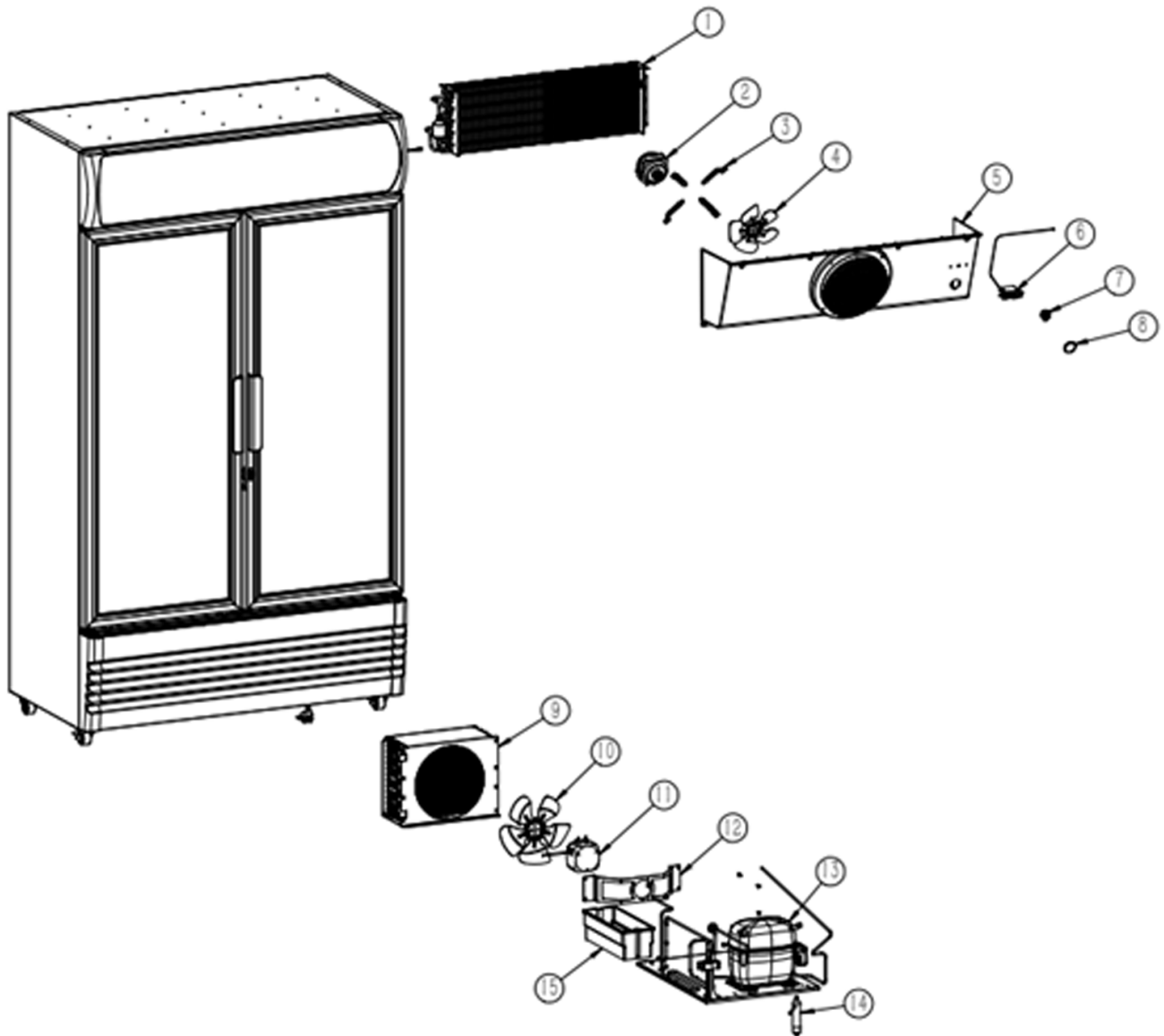
XD1201S
Parts Diagram TA.2



#	Description	Part Number
1	Canopy LED Light	XD1201LED01
2	Light Switch	XDSWITCH03
3	Left Hand LED Light	XDLED06
4	LED Drive	XDDRIVE01
5	Terminal Box	☎
6	Power Cable	☎
7	Right Hand LED Light	XDLED05
8	Digital Controller	XD701CONTROL01

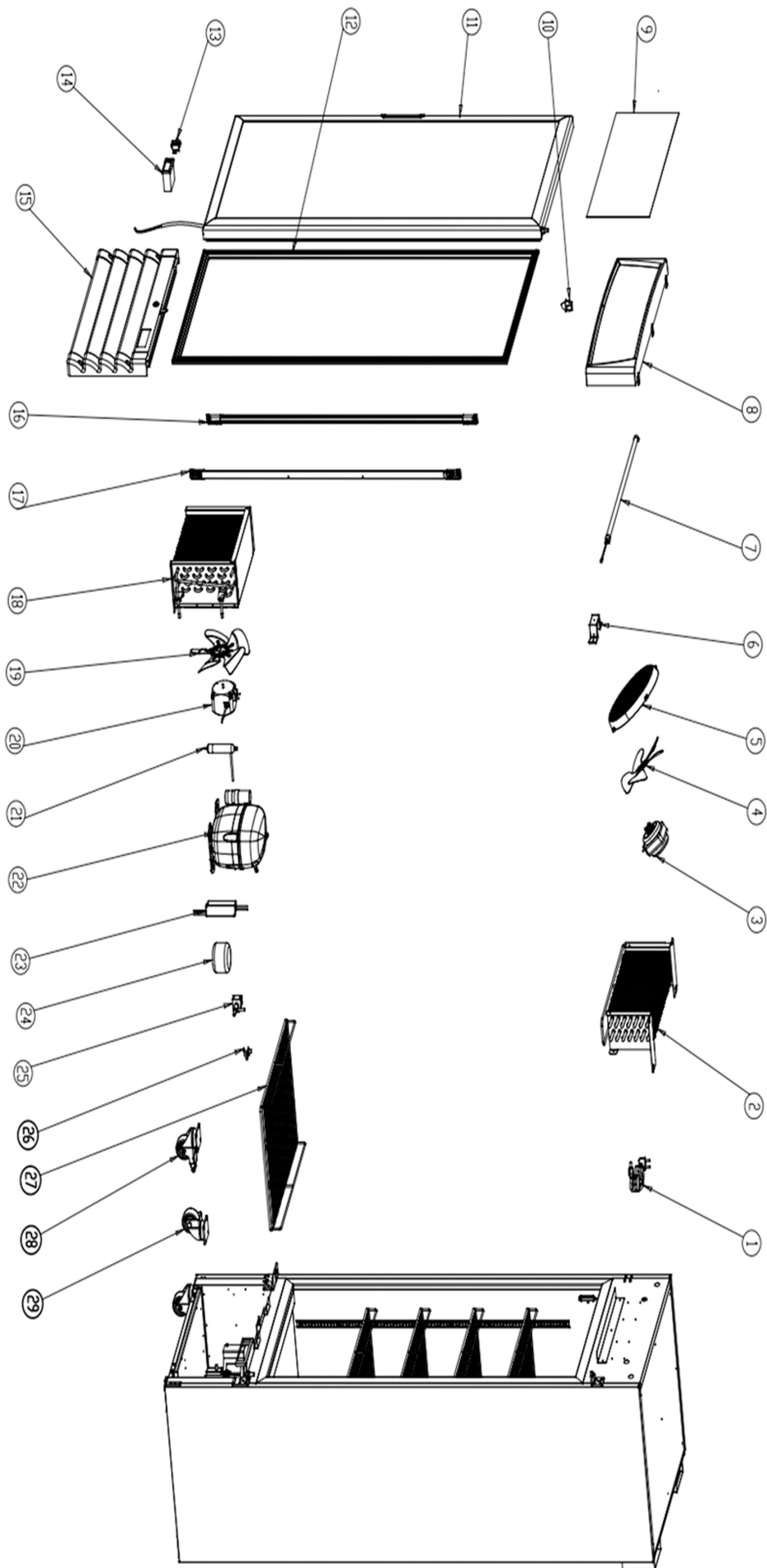
XD1201S
Parts Diagram TA.3


PART II



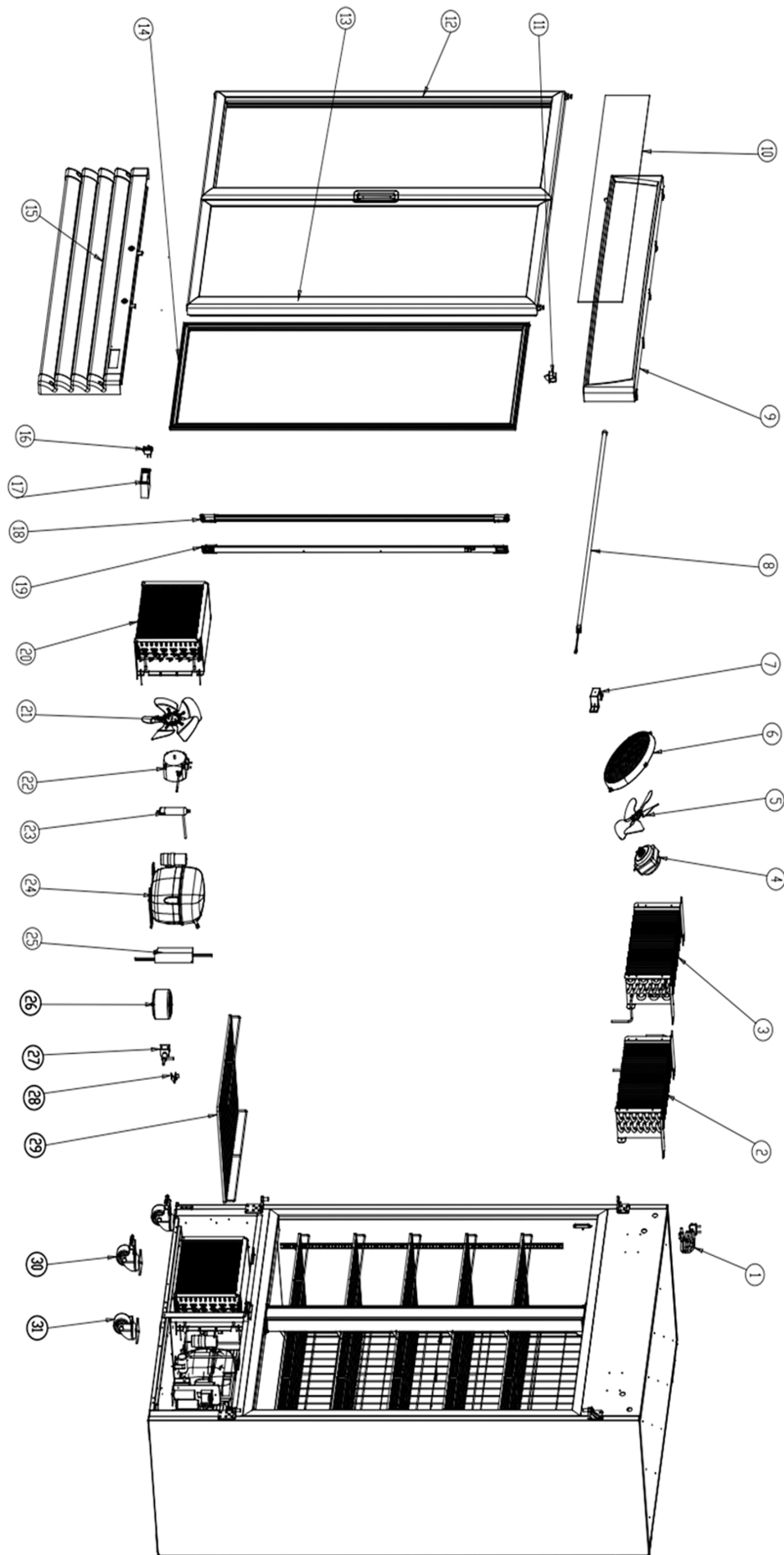
#	Description	Part Number
1	Evaporator	XDEVAP01
2	Evaporator Fan Motor	XDMOTOR01
3	Evaporator Fan Motor Bracket	XD701BRACKET01
4	Evaporator Fan Blade	XD701BLADE01
5	Evaporator Fan Panel	XD701PANEL01
9	Condenser	XD701CONDENSER01
10	Condenser Fan Blade	XDBLADE01
11	Condenser Fan Motor	XDMOTOR02
12	Condenser Fan Motor Bracket	XD701BRACKET02
13	Compressor	XD701COMP01
14	Filter Drier	XD1201DRIER01
15	Water Tray	XDTRAY01

XD1NW PARTS DIAGRAM






#	DESCRIPTION	CODE
1	POWER PLUG	
2	EVAPORATOR	XD2EVAP01
3	EVAPORATOR FAN MOTOR	XD2MOTOR03
4	EVAPORATOR FAN BLADE	
5	EVAPORATOR FAN MOTOR COVER	
6	EVAPORATOR FAN MOTOR COVER SUPPORT	
7	CANOPY LED LIGHT	XDLED04
8	CANOPY UNIT	XD1CANOPY01
9	CANOPY INSERT	
10	DOOR SWITCH	XDSWITCH01
11	GLASS DOOR	XD2DOOR02
12	DOOR GASKET	XD2GASKET01
13	LIGHT SWITCH	XDSWITCH02
14	DIGITAL THERMOSTAT	XDCONTROL01
15	BOTTOM FRONT GRILL	XD1GRILL01
16	LEFT HAND LED LIGHT	XDLED02
17	RIGHT HAND LED LIGHT	XDLED01
18	CONDENSER	XDCOND01
19	CONDENSER FAN BLADE	
20	CONDENSER FAN MOTOR	XD2MOTOR02
21	FILTER DRIER	
22	COMPRESSOR	XD2NWCOMP01
23	LED DRIVER	XD2DRIVE01
24	TRANSFORMER	XD2TRANS01
25	SOLENOID VALVE	XD2VALVE01
26	SHELF CLIP	XDCLIP01
27	SHELF	XDSHELF01
28	BRAKED CASTOR	XDCASTOR01
29	UNBRAKED CASTOR	XDCASTOR02

XD2NW PARTS DIAGRAM



XD2NW PARTS LIST

#	DESCRIPTION	CODE
1	POWER PLUG	
2	EVAPORATOR RIGHT	XD2EVAP02
3	EVAPORATOR LEFT	XD2EVAP03
4	EVAPORATOR FAN MOTOR	XD2MOTOR03
5	EVAPORATOR FAN BLADE	
6	EVAPORATOR FAN MOTOR COVER	
7	EVAPORATOR FAN MOTOR COVER SUPPORT	
8	CANOPY LED LIGHT	XDLED03
9	CANOPY UNIT	XD2CANOPY01
10	CANOPY INSERT	
11	DOOR SWITCH	XDSWITCH01
12	LEFT HAND DOOR	XD2DOOR01
13	RIGHT HAND DOOR	XD2DOOR02
14	DOOR GASKET	XD2GASKET01
15	BOTTOM FRONT GRILL	XD2GRILL01
16	LIGHT SWITCH	XDSWITCH02
17	DIGITAL THERMOSTAT	XDCONTROL01
18	LED LIGHT LEFT	XDLED02
19	LED LIGHT RIGHT	XDLED01
20	CONDENSER	XDCOND01
21	CONDENSER FAN BLADE	
22	CONDENSER FAN MOTOR	XD2MOTOR02
23	FILTER DRIER	
24	COMPRESSOR	XD2NWCOMP01
25	LED DRIVER	XD2DRIVE01
26	TRANSFORMER	XD2TRANS01
27	SOLENOID VALVE	XD2VALVE01
28	K CLIP	XDCLIP01
29	SHELF	XDSHELF01
30	CASTOR WITH BRAKE	XDCASTOR01
31	CASTOR WITHOUT BRAKE	XDCASTOR02

TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE	SUGGESTED SOLUTION
UNIT WILL NOT SWITCH ON	UNIT IS NOT CONNECTED TO MAINS ELECTRICITY CORRECTLY	<ul style="list-style-type: none"> CHECK POWER IS ON AT THE SOCKET CHECK CABLE IS CORRECTLY PLUGGED IN
	MACHINE IS SWITCHED OFF	<ul style="list-style-type: none"> PRESS POWER ON/OFF BUTTON
	FUSE BLOWN OR CIRCUIT BREAKER TRIPPED	<ul style="list-style-type: none"> CHECK FUSE IN MAIN 13AMP PLUG CHECK FUSE OR CIRCUIT BREAKER AT MAIN DISTRIBUTION BOARD
	POWER CABLE IS DAMAGED	<ul style="list-style-type: none"> CHECK FOR DAMAGE ON POWER CABLE, USE A QUALIFIED ENGINEER TO REPLACE IF NECESSARY
	LOOSE CONNECTION OR FAULTY CONTROLLER	<ul style="list-style-type: none"> CHECK FOR LOOSE CONNECTION, REPLACE IF NECESSARY
COMPRESSOR IS RUNNING BUT REFRIGERATOR IS NOT COOLING	REFRIGERANT LEAK	<ul style="list-style-type: none"> CHECK FOR REFRIGERANT LEAK AND REPAIR, RECHARGE SYSTEM AS PER THE DATA PLATE
	SET POINT TOO HIGH	<ul style="list-style-type: none"> CHECK SET POINT OF THE CABINET, CHANGE IF NECESSARY
	BLOCKAGE IN SYSTEM	<ul style="list-style-type: none"> CLEAR BLOCKAGE, REPLACE FILTER DRIER AND RECHARGE SYSTEM AS PER THE DATA PLATE
	COMPRESSOR WIRING LOOSE OR DEFECTIVE	<ul style="list-style-type: none"> CHECK FOR LOOSE CONNECTION, REPLACE IF NECESSARY
	LOOSE CONNECTION OR FAULTY CONTROLLER	<ul style="list-style-type: none"> CHECK FOR LOOSE CONNECTION, REPLACE IF NECESSARY
REFRIGERATOR IS NOISY	UNIT IS NOT PROPERLY LEVEL	<ul style="list-style-type: none"> ENSURE UNIT IS INSTALLED ON A LEVEL AND SUITABLE FLOOR
	CABINET IS TOUCHING ANOTHER CABINET OR A WALL	<ul style="list-style-type: none"> CHECK CORRECT VENTILATION GAP HAS BEEN ADHERED TO - 100MM AROUND ALL SIDES
	OBJECT IS FOULING EVAPORATOR FAN	<ul style="list-style-type: none"> CHECK FOR CORRECT LOADING OF PRODUCT AND ENSURE NOTHING IS IN CONTACT WITH THE EVAPORATOR FAN OR FAN GUARD
REFRIGERATOR IS NOT GETTING COLD ENOUGH	CONDENSER DIRTY	<ul style="list-style-type: none"> CLEAN CONDENSER AS NECESSARY
	INADEQUATE AIR FLOW AROUND REFRIGERATOR	<ul style="list-style-type: none"> CHECK CORRECT VENTILATION GAP HAS BEEN ADHERED TO - 100MM AROUND ALL SIDES
	CONDENSER FAN NOT WORKING	<ul style="list-style-type: none"> CHECK FOR LOOSE CONNECTION, REPLACE IF NECESSARY
	EVAPORATOR FAN NOT WORKING	<ul style="list-style-type: none"> CHECK FOR LOOSE CONNECTION, REPLACE IF NECESSARY
	HIGH AMBIENT TEMPERATURE	<ul style="list-style-type: none"> WAIT UNTIL AMBIENT TEMPERATURE DROPS BELOW 32°C
FROST IS FORMING INSIDE THE UNIT	HUMIDITY ABOVE 55%	<ul style="list-style-type: none"> LOWER HUMIDITY OF THE ENVIRONMENT
	DOOR OPENED TOO OFTEN	<ul style="list-style-type: none"> KEEP DOOR OPENINGS TO A MINIMUM
	DOOR HAS BEEN LEFT OPEN	<ul style="list-style-type: none"> INITIATE MANUAL DEFROST AS LAID OUT IN THIS MANUAL
	DOOR GASKET NOT SEALING CORRECTLY	<ul style="list-style-type: none"> CHECK FOR DAMAGE/CRACKS, REPLACE IF NECESSARY
	DEFROST NOT COMPLETING CORRECTLY	<ul style="list-style-type: none"> CHECK CONTROLLER PARAMETERS FOR DEFROST, ADJUST IF NECESSARY

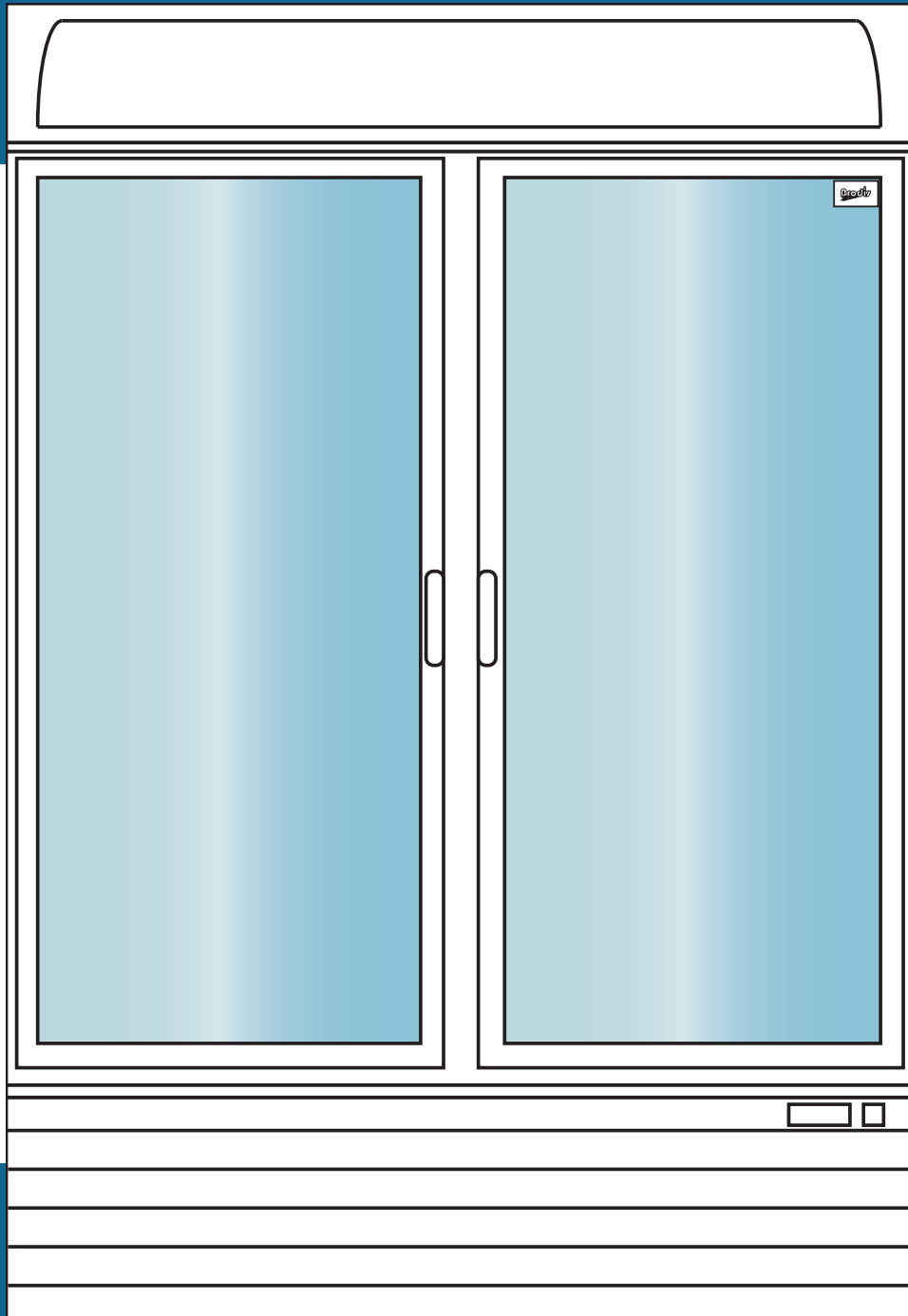
**WARNING**

ALL MAINTENANCE AND SERVICE WORK MUST BE UNDERTAKEN BY A QUALIFIED REFRIGERATION ENGINEER OR AN AUTHORISED SERVICE PARTNER.

NOTES.....

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