

# TMEF Series

## SKOPE Vertical Freezer



TMEF Series  
SKOPE Vertical Freezer  
Type: (CAREL ir32 Controller)  
User Manual

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# 1 Installation

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**Safety First** Always observe safety precautions when using any electrical appliance. Read these instructions carefully and retain them for future reference.

- When the appliance is used by or near young children or infirm persons, close supervision is necessary, especially to ensure children do not play with it.
- Do **not** use this appliance for other than its intended use.
- Do **not** cover the grilles or block the entry or exhaust of airflow by placing objects up against the refrigeration freezer unit.
- Do **not** probe any opening.
- Only use this appliance with the voltage specified on the cabinet rating label affixed to the refrigeration unit.
- Ensure the freezer has adequate ventilation as this is essential to economical, high performance.
- Be careful not to touch moving parts and hot surfaces.
- For your own safety and that of others, ensure that all electrical work is done by authorised personnel.
- If the power supply flexible cord becomes damaged, it must be replaced by an authorised service agent or similarly qualified person in order to avoid a hazard.
- Ensure all necessary safety precautions are observed during installation or removal of the refrigeration unit.
- The freezer is not designed to be stable while in motion. Use extreme caution when moving or transporting the freezer.

**WARNING**

The TMEF1500 (3 door) freezer has two separate power supplies.

**CAUTION**

**Always** isolate the cabinet from the power supply before attempting any maintenance.

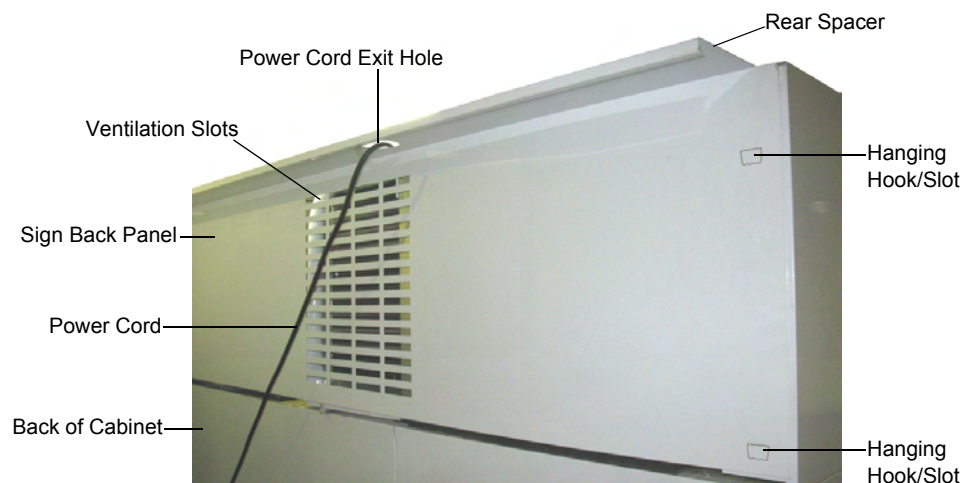
**CAUTION**

**Never** overload the power supply, which could damage the chiller and product. See the rating label inside the cabinet for the safe power supply and current draw.

## Positioning the Cabinet

**Before Operating** Follow the below steps to ensure the back sign panel is reversed and the rear spacer is protruding from the back of the cabinet (TMEF1500 3 door cabinet only). This will provide the necessary air gap at the rear of the cabinet for correct operation.

1. Cut the cable ties securing the sign back panel to the sign side panels.
2. Reverse the sign back panel so that the rear spacer protrudes from the rear of the cabinet, and attach the sign back panel to the cabinet by hooking into the slots on the sign side panel ends.
3. Retrieve and unravel the power cords and fit through the exit holes on top of the rear spacer.



**Power Cord** The freezer has a flexible power cord fitted with a 3-pin plug, which exits from the top rear of the cabinet. Pull the power cord around so that it's not trapped before you position the cabinet.

**Note:** The TMEF1500 (3 door) freezer has two power cords, one for each refrigeration unit.

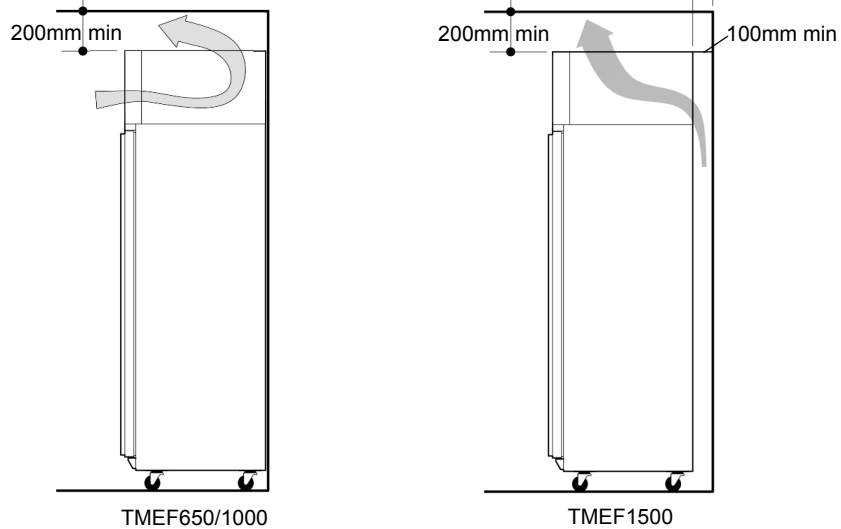
**Cabinet Location** The location of the freezer may be the single most important decision that will extend its life and ensure economical, high performance. We recommend that you put the freezer in the coolest place possible because it will use less power and last longer.

Avoid direct sunlight, warm draughts etc. Allow adequate space for doors to open and close properly. Self-closing doors have internal torsion bars pretensioned at the factory, and must be unobstructed. Ensure the cabinet sits on a level surface so that the doors shut and correctly seal. Level footing also prevents the condensate tray from overflowing.

**Ventilation** Adequate ventilation is essential:

- Ensure there is a minimum of 200mm of space above the cabinet and 100mm behind the cabinet.
- Air onto the refrigeration unit should not exceed 25°C.
- Do not cover any ventilation holes on the front and back of the freezer.

Ensure there is always at least a 200mm gap above the cabinet, and when installing a TMEF1500 (3 door) cabinet a 100mm gap behind the cabinet (see below). Keep the ventilation slots at the top of the cabinet clear at all times, **never** store cardboard cartons or other objects on top of the freezer.



## Shelves

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Shelves may be positioned at different heights to suit various products. Always ensure that the shelf clips are securely engaged in each of the shelf support strips. Support strips are marked '+' for easy location of shelf clips.

## 2 Operation

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### Automatic Start-Up

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After the cabinet has been positioned in a suitable place, plug it in and check the following activity.

Item	Activity
Condenser Fan	The condenser fan runs continuously throughout all operations of the machine.
Lighting	The sign and interior lights turn on and stabilise after a few flickers.
Electronic Controller	An electronic controller runs the chiller and is visible behind the front panel. The display panel first shows - - - before stabilising on the cabinet temperature.
Compressor	The compressor starts about one minute after the lights go on. The compressor should switch off when the cabinet internal air reaches the preset 'set point' temperature.
Evaporator Fan	The evaporator fan which circulates the cabinet air will not operate until the defrost probe senses a temperature of -8°C. On initial start up the fan should come on after a delay of approximately four minutes (verified by air blowing out of the bottom duct and the green LED).

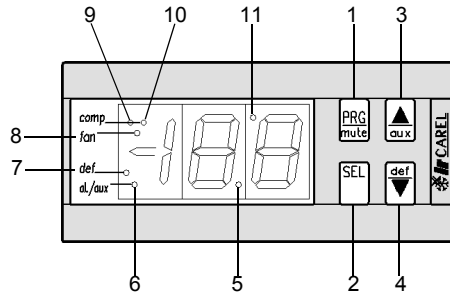
### Loading Product





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- Let the freezer run 30 minutes before loading it with product the first time.
- Allow adequate air space around each item to ensure even cooling and efficient operation of the chiller.
- Do not exceed a maximum load of 20kg per shelf.
- Leave airspace of at least 75mm (3") above the product on the top shelf.
- Do not cover air outlet at the bottom of the cabinet with product as this may cause spot freezing of products and other products to be warm.
- Remove some product if the shelves are flexing.
- Do not let anything overhang the shelves because this might stop the doors from shutting or even break something.

# CAREL Electronic Controller

## Faceplate



No.	Item	Description
1		<p>Silences alarm buzzer.</p> <p>Allows entry to frequent parameters section, if pressed for 5 seconds.</p> <p>Allows entry to configuration parameters section, if pressed simultaneously with 'SEL' for 5 seconds.</p> <p>Locks in new parameters, and exits parameter sections.</p> <p>Activates reset procedure.</p>
2		<p>Displays setpoint in run mode.</p> <p>Displays selected parameter in parameter mode.</p> <p>Allows entry to configuration parameters section if pressed simultaneously with 'PRG' for 5 seconds.</p>
3		<p>Adjustment locked out</p> <p>Alters parameters in parameter mode.</p> <p>Activates and deactivates continuous refrigeration mode with 'def' key.</p>
4		<p>Adjustment locked out</p> <p>Activates manual defrost cycle.</p> <p>Alters parameters in parameter mode.</p> <p>Activates and deactivates continuous refrigeration mode with 'aux' key.</p>
5		Decimal point indicator.
6		Unused.
7		Defrost cycle on indicator
8		Evaporator fan on indicator.
9		Continuous refrigeration mode on indicator (fast freeze).
10		Compressor on indicator.
11		Remote controller indicator.



**Operation** The operation of this cabinet is controlled by a pre-programmed microprocessor. The Microprocessor display indicates the temperature of the cabinet ambient probe, except during a defrost where the temperature of the cabinet probe is locked in, and during an alarm condition.

The display also has LED indicators showing the activation of the compressor, the fan and the defrost. At alarm activation, the display indicates the type of alarm signal; and an audible alarm sounds. The alarm can be muted at the controller.

## Controller Components

Component	Description
Microprocessor:	Located behind ventilated unit front cover.
Controller Relay Module:	Located in control box. Performs processor switching.
Module Connector Cable:	Flat black cable connecting module to microprocessor.
Probes:	2 x NTC probes are used.

- A controlling probe located in a thermal mass inside the evaporator box, called a 'Cabinet Ambient Probe'.
- An evaporator probe located within the evaporator coil, referred to as a 'Defrost Probe'.

**Defrost** The first defrost will occur in 6 hours. During a defrost cycle (indicated by the green defrost LED on the control panel) the compressor and the evaporator fan will switch off. Four elements inside the evaporator box will then melt away any ice build up. The duration of a defrost cycle depends on the quantity of ice build up (usually about 10 minutes). A maximum of 22 minutes is preset. Defrost cycles are pre-programmed at 6 hour intervals.

During and after each defrost, the display will read the temperature detected before the defrost cycle. The display will then show the return air temperatures as the machine cycles during normal operation.

Defrosts should occur during off-peak periods to maximise the efficiency of the machine. This can be achieved by switching the power off, then on again, so that the subsequent 6 hourly cycle defrosts will not coincide with peak periods.

### Note:

- A power cut would reset the defrost cycles.
- This freezer has an over temperature cut-out inside the refrigeration unit evaporator box. This is to safe guard the possibility of the defrost elements remaining on under fault conditions (set at 55°C).
- The light which illuminates the cabinet interior is permanently on, where applicable.
- Ensure the door gaskets form a good seal with the cabinet.

## Alarms and Signals

Signal	Description
<b>EO</b> on	Indicates faulty ambient probe.
<b>EI</b> blinking	Indicates faulty defrost probe.
<b>IA</b> blinking	Indicates unit has high pressure fault. Note: At alarm initiation, check condenser radiator for blockage, and clean if necessary. To reset alarm, cabinet must be replugged into power supply.
<b>LO</b> blinking	Indicates low temperature alarm.
<b>HI</b> blinking	Indicates high temperature alarm.
<b>EA, EB or EE</b> blinking	Indicates data acquisition failure. The controller requires re-programming.
<b>Ed</b> blinking	Indicates defrost timed out.

**Note:** Alarm **HI** may activate during cabinets initial pull down cycle, after being first powered up. Alarm may be muted; and will automatically reset when cabinet passes alarm setpoint.

### Programming To access the controller

1. Press and hold PRG and SEL simultaneously for more than 5 seconds until **00** is displayed.
2. Press aux (up) until **22** is displayed.
3. Press SEL to confirm selection. The first parameter **/C** is displayed.

#### To turn the controller keypad on

1. Follow Access / Entry above, until the first parameter **/C** is displayed.
2. Press def (down) two times, until **H2** is displayed.
3. Press SEL to display the 'value' of the parameter.
4. Press aux (up) to increase or def (down) to decrease, until **01** is displayed.
5. Press SEL to accept the 'value'.
6. Press PRG to lock in new value and to exit program.

**Setpoint** Press SEL key for 1 second and the 'Setpoint' will be displayed. On releasing the key, the display will flash. To alter the 'Setpoint', press aux (up) or def (down). Press SEL to lock in the value and return to cabinet temperature.

Factory setting:	-21°C
Maximum:	-18°C
Minimum:	-21°C

**Manual Defrost** Follow steps above to access the controller, and press def (down) key for more than 5 seconds to manually initiate a defrost.

**Continuous Refrigeration** Press aux (up) and def (down) together, (down key first) to initiate a 'Continuous Refrigeration' mode. The compressor will run without interruption to the parameter 'cc' (6 hours: SKOPE programme). Its purpose is to achieve a fast product pull-down.

**Display Function** During run mode, the display shows the value measured by the 'Cabinet Ambient Probe'. In alarm status, the display indicates the relative alarm code.

**Buzzer Off** Press mute key to silence the buzzer. The alarm display remains while the alarm condition exists.

**Parameters** The following table describes SKOPE settings for CAREL controller IR32POLBRO.

**WARNING**

- ▣ The following parameters (Table 1: pp.10,11) are set exclusively for the SKOPE freezer program, with its dedicated CAREL controller.
- ▣ Any alteration from this program may adversely effect the operation of the freezer.
- ▣ For full specifications, a detailed CAREL controller manual is available.

SKOPE Settings		Type	Min	Max	Def	Parameter	
PA	22	C	00	199	22	Password	
<b>Probe Parameters</b>							
/0	0	NTC probe	n.a.	0	1	0	Type of probe used (NTC or PTC). Available after 'Reset Procedure'
/C	2.0	2°C	F	-20	20	0	Calibration offset for cabinet temperature display
/2	04	-	C	1	15	4	Probe reading stability (lower the number, faster the response)
/3	08	-	C	1	15	8	Probe reading speed (lower the number, slower the response)
/4	00	probe	C	0	100	0	Designation as controlling probe
/5	00	°C	C	0	1	0	Units of temperature measurement
/6	00	Yes	C	0	1	0	Decimal point display
<b>Cycle Parameters</b>							
rd	3.0	3°C	F	0.1	20	2	Refrigeration differential
r1	-26	-26°C	C	-40	r2	-40	Minimum allowable setpoint
r2	-16	-16°C	C	r1	199	90	Maximum allowable setpoint
r3	01	Yes	C	0	1	0	Enabling of ED alarm (defrost interrupted because maximum duration has been reached, parameter dP) 0=No, 1=Yes
r4	3.0	3	C	0	20	3	Not used. Must be 3
r5	01	Yes	C	0	1	0	Enabling of minimum / maximum temperature monitoring
rt	-	-	F	0	199	-	Actual interval in maximum / minimum temperature reading
rH	-	-	F	-50	+90	-	Maximum temperature reading in the 'rt' interval
rL	-	-	F	-50	+90	-	Minimum temperature reading in the 'rt' interval
<b>Compressor Parameters</b>							
c0	01	1 minute	C	0	15	0	Compressor and evaporator fan start delay at power on
c1	03	3 minutes	C	0	15	0	Minimum time between compressor starts
c2	03	3 minutes	C	0	15	0	Minimum compressor OFF time
c3	00	0	C	0	15	0	Minimum compressor ON time
c4	99	99 minutes	C	0	100	0	Compressor backup for 'Ambient' probe failure (On for c4, off for 15 min)
cc	04	4 hours	C	0	15	4	Duration of 'Continuous Refrigeration Mode'
c6	02	2 hours	C	0	15	2	Duration of alarm override after 'Continuous Refrigeration Mode'
<b>Defrost Parameters</b>							
d0	00	Electric	C	0	1	0	Type of defrost
dl	06	6 hours	F	0	199	8	Time interval between defrosts
dt	6	12°C	F	-40	199	4	Defrost termination temperature
dP	22	22 minutes	F	1	199	30	Maximum defrost time

Continued over page

SKOPE Settings			Type	Min	Max	Def	Parameter
d4	00	No	C	0	1	0	Defrost at cabinet plug in
d5	00	No	C	0	199	0	Defrost delay at cabinet plug in
d6	01	Yes	C	0	1	1	Lock in temperature display during defrost
dd	03	3 minutes	F	0	15	2	Defrost drip time, before compressor and evaporator fan start
d8	01	1 hour	F	0	15	1	Continuation of d6 at defrost end (until setpoint or d8 elapses)
d9	00	No	C	0	1	0	Compressor protection times observed at defrost (c1, c2, c3)
d/	-	-	F	n.a	n.a	n.a	Evaporator temperature (via defrost probe) is displayed
dC	00	hrs / mins	C	0	1	0	Time basis for parameter 'dl' and 'dp'

**Alarm Parameters**

AO	1.0	1.0°C	C	0.1	20	0.2	Alarm and fan differential
AL	10	-32°C / -31°C	F	0	199	10	Low temp alarm (On=Setpoint -AL-A0) (Off=Setpoint -AL)
AH	09	-11°C / -12°C	F	0	199	10	High temp alarm (On=Setpoint +AH+A0) (Off=Setpoint +AH)
Ad	60	60 minutes	C	0	199	120	Alarm delay time
A4	01	On	C	0	5	0	Immediate external alarm i.e. High pressure switch trip*
A5	00	-	C	0	5	0	Not used. must be 0
A6	99	99 minutes	C	0	100	0	Compressor run lock time due to A4 function. Compressor will still cycle with HP switch
A7	00	-	C	0	199	0	Not used. must be 0

**Fan Parameters**

F0	02	On	C	0	1	0	Evaporator fan control type (controlled by Evaporator Defrost Probe). Must be 2
F1	14.0	-8°C / -7°C	F	0	20	5	Evaporator fan start temperature (On=Setpoint +F1 -A0) (Off=Setpoint +F1)
F2	00	No	C	0	1	1	Evaporator fan off while compressor is off
F3	01	Yes	C	0	1	1	Evaporator fan off during defrost
Fd	01	1 minute	F	0	15	1	Evaporator Fan delay after defrost

**Other Selections**

H0	00	-	C	0	15	0	Serial address
H1	00	-	C	0	1	1	Not used. Must be 0
H2	00	No	C	0	3	1	Enable keypad & remote control (must be '01' to enable)
H3	00	00	C	0	199	0	Password for remote control

\* High Pressure trip is maintained as alarm status by latching relay. To reset, the freezer must be unplugged and then replugged into the power supply.

**Parameter Modification (if keypad is enabled)**

1. Press aux (up) or def (down) to show the code of the parameter that has to be changed.
2. Press SEL to display the selected parameter value.
3. Press aux (up) or def (down) to increase or decrease the value.
4. Press SEL to temporarily confirm the new value, and display its code.
5. Repeat above procedures to alter further parameters.

Press PRG to lock in the new parameters and exit parameter modification procedure.

## 3 Servicing

### Cleaning

**Cabinet** Periodically wipe the inside and outside of the cabinet with a damp cloth, taking care to keep moisture away from electrical parts. As with any maintenance, ensure the cabinet is disconnected from the power supply before cleaning.

**Condenser Coil** To ensure trouble-free performance, we strongly urge monthly cleaning with a soft brush to remove dust and fluff. A more thorough cleaning is recommended every six months by qualified service personnel. The condenser coil **must** be kept clean for efficient and reliable operation.

#### CAUTION

Disconnect the cabinet from the power supply before cleaning the condenser coil.

#### To clean the condenser coil (TMEF650 single door & TMEF1000 2 door cabinets)

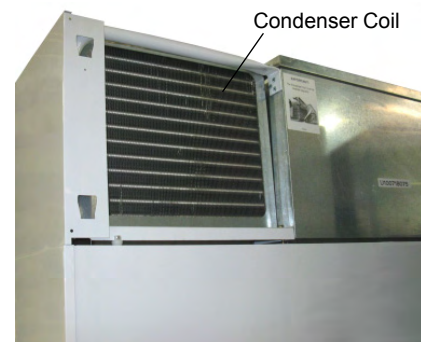
1. Disconnect the cabinet from the mains power supply.
2. Remove the top panel (above the doors) by releasing the sign clips above the panel and unscrewing the 2 fixing screws. Lift up and out from the cabinet.
3. Clean the condenser coil with a soft brush (see image below).
4. Carefully place the top panel back into position by hooking into the slots on the sign side ends, repositioning the sign clips and fix in place with the fixing screws.

#### To clean the condenser coil (TMEF1500 3 door cabinet)

1. Disconnect both power cords from the mains power supply.
2. Remove the sign back panel lifting up and out from the cabinet.
3. Clean the condenser coil with a soft brush (see image below).  
**Note:** The TMEF1500 (3 door) cabinet is fitted with two refrigeration units, each with a condenser coil.
4. Carefully place the top panel back into position by hooking into the slots on the sign side ends.



TMEF650



TMEF150

## Lighting

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### Interior Side Light

TMEF650 (single door) cabinet.

The cabinet interior is lit by one 58 Watt T8 fluorescent tubes (Ø26mm x 1150mm), which can be replaced without moving shelves or removing product.

#### To replace the interior side light

1. Disconnect the cabinet from the power supply.
2. Remove the diffuser by squeezing it until it is released from the aluminium housing, and then push the diffuser out of the way.
3. Rotate the fluorescent tube until the pins on the ends of the tube align with the slots, then slide it out.
4. Fit a new fluorescent tube taking care that the printing on the tube is at the bottom (tube orientation is important).
5. Refit the diffuser by slipping the back section into the housing, then squeezing and snapping the front section of the diffuser into place as you work down the length of the light.

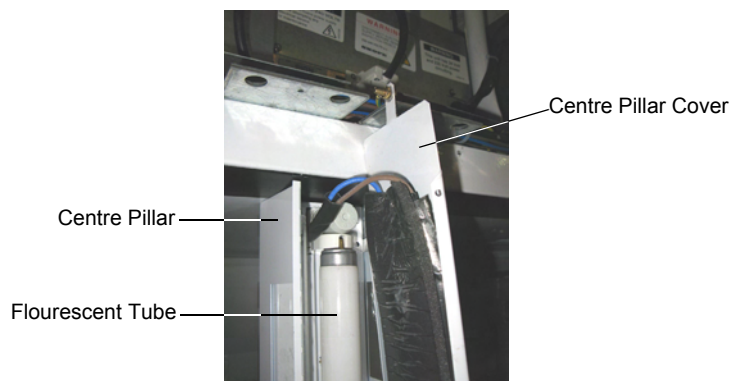
### Centre Pillar Light

TMEF1000 (2 door) and TMEF1500 (3 door) cabinets.

The cabinet interior is lit by one or two 58 Watt T8 fluorescent tubes (Ø26mm x 1150mm), which can be replaced without removing shelves or removing product.

#### To replace the sign light

1. Disconnect the cabinet from the mains power supply.
2. Remove the top panel (above the doors) by unscrewing the fixing screw/s and lifting up and out from the cabinet. Keeping all wires attached, carefully place on top of the cabinet.
3. Unscrew the bottom fixing screw from the centre pillar cover and unclip from the centre pillar.
4. Rotate the tube until the pins on the ends of the tube align with the slots, then slide the tube out.
5. Fit the new fluorescent tube taking care that the printing on the tube is at the bottom (tube orientation is important).
6. Refit the centre pillar cover by clipping back onto the centre pillar and reattach the bottom fixing screw.
7. Carefully place the top panel back into position by hooking into the slots on the sign side ends and reattach the fixing screw.



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