



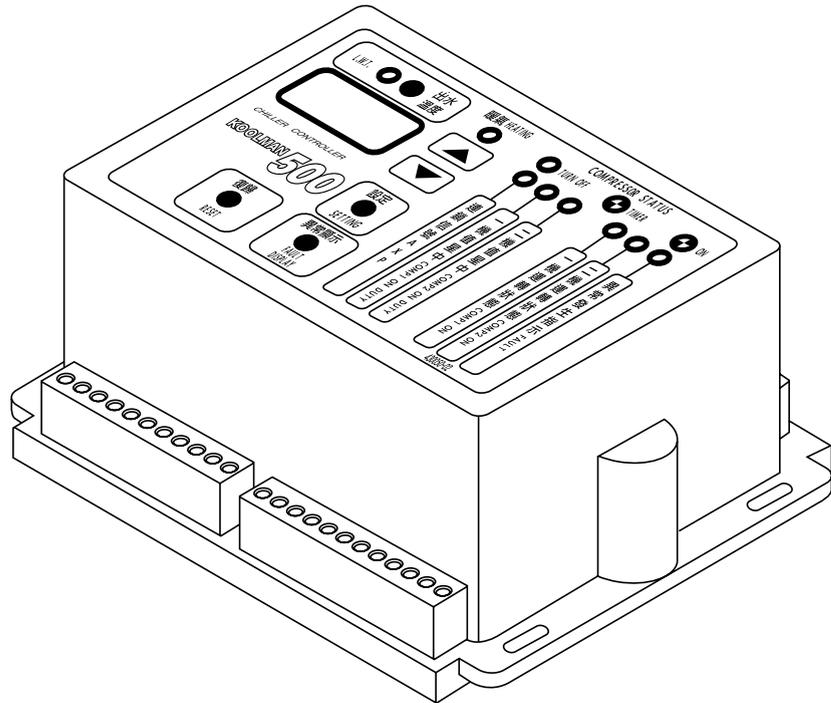
**INSTRUCTION  
OPERATION  
MAINTENANCE  
MICROPROCESSOR CONTROLLER**

**(TT) CGA-MP-1**

Library	Service Literature
Product Section	Refrigeration
Product	Air-Cooled Cold Generator®
Model	000
Literature Type	Instruction / Operation / Maintenance
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Supersedes	New

# KOOLMAN 500

**Air-Cooled Cold Generator®  
Air-Cooled Cold Generator®  
With Heat Pump Option**



Since American Standard Inc. has a policy of continuous product improvement, it reserves the right to change specifications and design without notice. The installation and servicing of the equipment referred in this booklet should be done by qualified, experienced technicians.

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# DESCRIPTION OF PANEL

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## 1. Digital Display:

This display serves to show returning water temperature, leaving water temperature, all default setting points or fault codes.

## 2. AXP Indicating Signal:

- a) If AXP Indicating Signal is off, it indicates that the power supply has not been connected yet.
- b) If AXP Indicating Signal is on, it indicates that the power supply has been connected already.

## 3. Indicating Light On Duty: (On Duty means the compressor which is started first)

- a) When the first compressor is on duty, the first compressor on duty indicating light is on.
- b) When the second compressor is on duty, the second compressor on duty indicating light is on. (*For dual compressors model only*)

## 4. First Compressor Status Indicating Signal:

- a) If the first compressor status indicating light is off, it indicates that the first compressor stops running.
- b) If the first compressor status indicating light flashes, it indicates that the timing the first compressor timer begins.
- c) If the first compressor status indicating light is on, it indicates that the first compressor is running.

### **Second Compressor Status Indicating Light:** (*For dual compressors model only*)

- a) If the second compressor status indicating light is off, it indicates that the second compressor stops running.
- b) If the second compressor status indicating light flashes, it indicates that the timing of the second compressor timer begins.
- c) If the second compressor status indicating light is on, it shall indicate that the second compressor is running.

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**5. Fault Display:**

- a) If the fault display is off, it indicates that there is no abnormal condition.
- b) If the fault display flashes, it indicates that there is abnormal trip.
- c) If the fault display is on, it indicates there was abnormal condition, but the condition has become normal.

**6. Leaving Water Temperature Indicating Signal Light:**

- a) If leaving water temperature signal light is off, it shows returning water temperature.
- b) If leaving water temperature signal light is on, it shows returning water temperature.

**7. Temperature Display Switch Key:**

With this key, you may select to indicate returning water temperature or leaving water temperature.

**8. Heating Mode Display:**

- a) If heating mode display is off, it indicates that heating mode is off.
- b) If heating mode display is on, it indicates that system is under heating mode.

**9.  $\Delta$   $\nabla$  Keys:**

- a) With these keys, the user can input the password.
- b) When using with set key, they can be used to check or change the default setting values.

**10. Setting Key:**

When using with  $\Delta$   $\nabla$  keys, it can be used to check or change default setting value.

**11. Fault Display Key:**

Last three sets of fault codes can be checked with this key.

**12. Reset Key:**

With this key, the user can reset the unit.

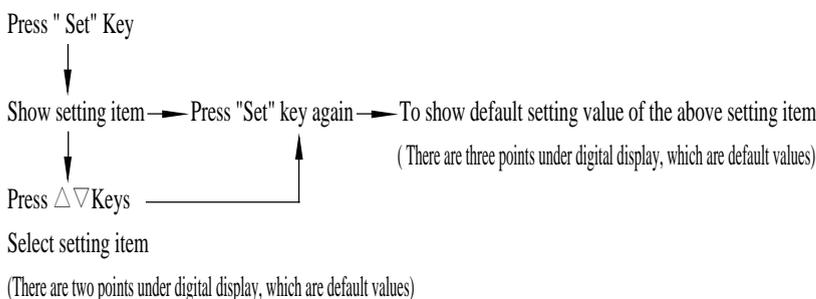
# OPERATING INSTRUCTIONS

## 1. Switching for Returning/Leaving Temperature Indication:

- When returning temperature indicating light is off, press returning water temperature key. Returning water temperature indicating light will be on immediately, and the display will show leaving water temperature at the same time.
- When leaving water temperature indicating light is on, press leaving water temperature key. Returning water temperature indicating light will be off, and the display will show returning water temperature at the same time.

## 2. Check of Default Value:

Steps: (If the key is not pressed again in 6 seconds after the key is pressed, display will shortly re-indicate returning water or leaving water temperature.)



- If set key is pressed, when indicating returning water or leaving water temperature, the display will show the value of setting item and start timing for 6 second.
- If Δ ▽ keys or set key is not pressed again in 6 seconds after the setting item is indicated, it will re-indicate returning water or leaving water temperature 6 seconds later.
- If set key is pressed in 6 seconds after setting item is selected, the default value of the setting item will be indicated shortly for the purpose of check. Moreover, a timing for 6 seconds will start again.
- If Δ ▽ keys or set key is not pressed again in 6 seconds after the default value is indicated, it will shortly re-indicate default value 6 seconds later. Moreover, a timing for 6 seconds will start again.
- If Δ or ▽ key is pressed again in 6 seconds after the setting item is indicated, the default value can be changed to the expected value. Moreover, a timing for 6 seconds will start again. In case of locking status of password, "LOC" will be indicated for 6 seconds after pressing Δ or ▽ key.
- If set key is pressed in 6 seconds after the default value is indicated, the value of setting item of the set default value will be indicated shortly. Moreover, a timing for 6 seconds will start again.
- Returning water temperature key and fault display key are ineffective in 6 seconds after value of setting item or default value is indicated.

### 3. List of Setting Items:

Item	Description	Default Value	Setting Scope	Remarks
1.	Setting returning water temperature of chilled water for the first compressor	10°C	-30~20°C	No password locking
2.	Setting temperature differential for the first compressor	3°C	0~6°C	password locking
3.	Setting protection time for the first compressor	120 S	0~200S	password locking
4.	Setting temperature differential between the second compressor and the first compressor	1°C	0~10°C	password locking
5.	Setting temperature differential for the second compressor	3°C	0~6°C	password locking
6.	Setting protection time for the second compressor	180 S	0~200 S	password locking
7.	Setting antifreezing (outlet waterside)	2°C	-30~6°C	password locking
8.	Setting temperature for resetting antifreezing	7°C	-30~10°C	password locking
9.	Setting returning water temperature for heating mode of the first compressor	43°C	30~50°C	No password locking
10.	Re-setting adjusting leaving water temperature	0°C	10~-10°C	password locking
11.	Setting defrosting period of heating mode	30 min	0~60 min	password locking
12.	Setting defrosting time of heating mode	3 min	0~20 min	password locking

### 4. Fault Display:

- a) When the value of returning or leaving temperature is indicated, press fault display key in order to indicate the first abnormal memory and to start a timing for 6 seconds. The value of returning water or leaving water temperature will be reindicated 6 seconds later.
- b) After the fault display key is pressed again in 6 seconds for indicating the first fault memory, the next fault memory will be indicated and to start a timing for 6 seconds. The value of returning water or leaving water temperature will be reindicated 6 seconds later.
- c) Fault Codes:

Description	Code	Description	Code
Failure of leaving water sensor	A0	Leaving water temperature too low	AL
Low-pressure trip of the first compressor	A1	Low-pressure trip of the second compressor	B1
High-pressure trip of the first compressor	A2	High-pressure trip of the second compressor	B2
Antifreezer (suction line) of the first compressor	A3	Antifreezer (suction line) trip	B3
Fan motor internal protector trip or abnormal water flow	A4	Temperature sensor breaking	LO
Failure of returning water sensor	Ai	Temperature sensor circuit short	HI

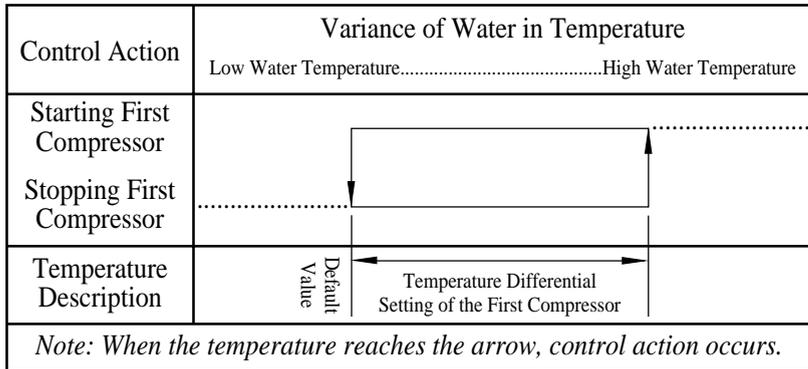
### 5. Cooling mode/Heating mode Switch:

- a) No signal is input at the cooling/heating input terminal (OPEN), it indicates that the cooling mode is working and the heating mode signal light, is off.
- b) The signal is input at the cooling/heating input terminal (CLOSE), it indicates that the heating mode is working and the heating mode signal light, is on.

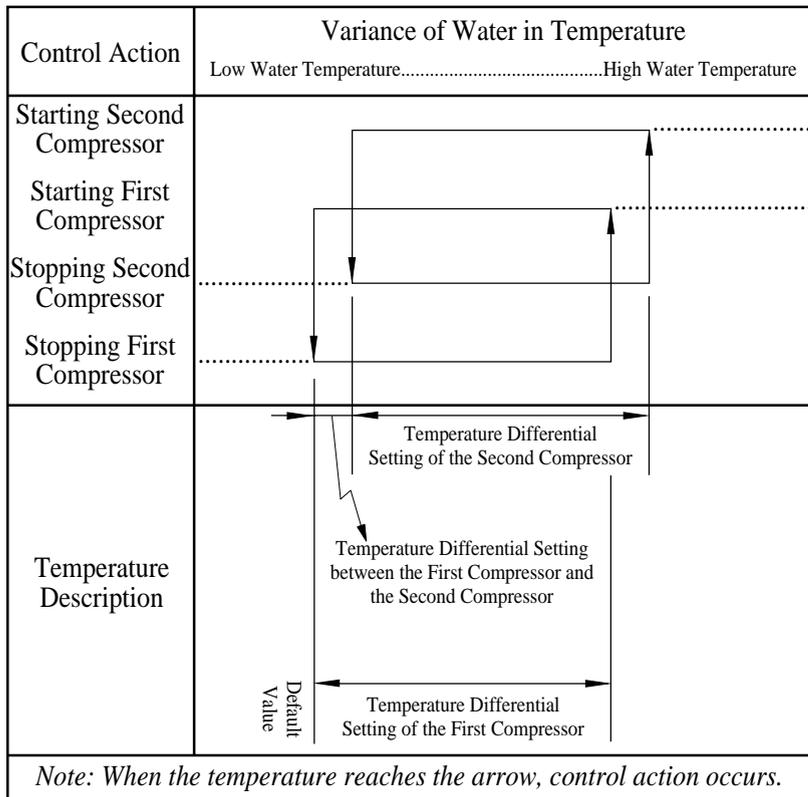
# OPERATION

## 1. Cooling mode Control:

### a) Single Compressor Control:



### b) Duplex System Control



**2. Heating Mode Control:**

a) Single Compressor Control:

Control Action	Variance of Water in Temperature	
	Low Water Temperature.....	High Water Temperature
Starting First Compressor		
Stopping First Compressor		
Temperature Description		Default Value
<p><i>Note: When the temperature reaches the arrow, control action occurs.</i></p>		

b) Duplex Compressors Control

Control Action	Variance of Water in Temperature			
	Low Water Temperature.....	High Water Temperature		
Starting First Compressor				
Starting Second Compressor				
Stopping First Compressor				
Stopping Second Compressor				
Temperature Description				Default Value
<p><i>Note: When the temperature reaches the arrow, control action occurs.</i></p>				

**3. Protection Time Delay for Compressor:**

When the starting of compressor is required, the compressor shall be starting after the protection time is delayed by item 3 or 6.

**4. Abnormal Control:**

With the exception of abnormal sensor and abnormal flow rate, the other fault conditions all shall be reset manually.

# OPERATION FOR CHANGING DEFAULT VALUE

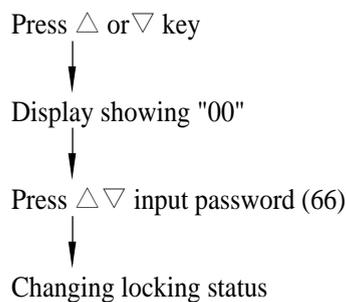
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## 1. Precautions:

- a) The default value of chiller has been set before shipping. When the reset becomes necessary, it shall be carried out by a professional.
- b) The password locking status shall, after the default value has been modified, be restored in order to avoid the damage of machine due to the wrongful operation by any non-professional.
- c) No password locking device is provided for returning water temperature setting at the first item and the heating mode returning water temperature setting at the ninth item, so the user can modify their default values directly. Password lock device is arranged for the other items.

## 2. Password Entry:

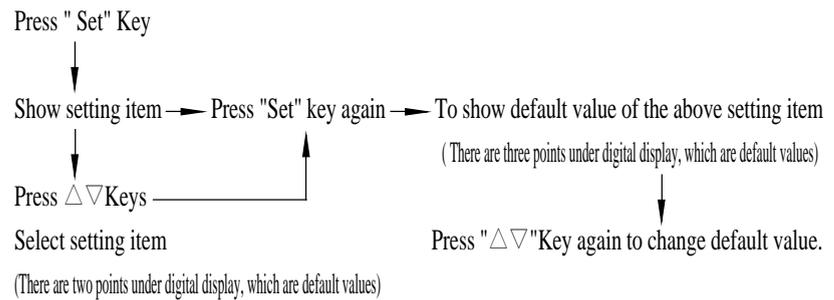
Steps: (If the key is not pressed again in 6 seconds after pressing the key, the display will shortly re-indicate returning water or leaving water temperature.)



- a) The modified setting function is locked and cannot be used after the power is connected, so the password must be entered in order to unlock such function. If the user desires to return locking status after unlocking, the password must be reentered in order to lock such function.
- b) If  $\Delta$  or  $\nabla$  key is pressed when returning temperature or leaving temperature is indicated, the display will show password "00" and start the timing for 6 seconds.
- c) If  $\Delta$  or  $\nabla$  key is not pressed again in 6 seconds after the password is indicated, it will re-indicate returning or leaving temperature 6 seconds later.
- d) If  $\Delta$  or  $\nabla$  key is pressed in 6 seconds, a timing for seconds will be restarting and the password shall be changed.
- e)  $\Delta$  key is used for changing the first digit of password while  $\nabla$  key is used for changing the second digit of password.
- f) If any of other keys is pressed prior to conclusion of 6 seconds, the timing for 6 seconds will be concluded forthwith.
- g) The controller will if the password is "66" 6 seconds later. If so, it will change the locking status. (Note: Locking status is changed as unlocking status.)

### 3. Modification of Default Value:

Steps: ( If the key is not pressed again in 6 seconds after pressing the key, the display will shortly re-indicate returning or leaving temperature.)



- a) If set key is pressed, when indicating returning water or leaving water temperature, the display will show the value of setting item and start the timing for 6 second.
- b) If  $\triangle$   $\nabla$  key or set key is not pressed again in 6 seconds after the setting item is indicated, it will re-indicate returning or leaving temperature 6 seconds later.
- c) If set key is pressed in 6 seconds after setting item is selected, the default value of the setting item will be indicated shortly for the purpose of check. Moreover, a timing for 6 seconds will start again.
- d) If  $\triangle$   $\nabla$  key or set key is not pressed again in 6 seconds after the default value is indicated, it will shortly re-indicate default value 6 seconds later. Moreover, a timing for 6 seconds will start again.
- e) If  $\triangle$  or  $\nabla$  key is pressed again in 6 seconds after the setting item is indicated, the default value can be changed to the expected value. Moreover, a timing for 6 seconds will start again. In case of locking status of password, "LOC" will be indicated for 6 seconds shortly after pressing  $\triangle$  or  $\nabla$  key.
- f) If set key is pressed in 6 seconds after the default value is indicated, the value of setting item of the said default value will be indicated shortly. Moreover, a timing for 6 seconds will start again.
- g) Returning temperature key and fault display key are ineffective in 6 seconds after the value of setting item or default value is indicated.

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