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INTRODUCTION

TO OUR VALUE CUSTOMER

Alminco (Almin Enterprise Co., Ltd.) manufacturing company product you have recently purchased has been engineering and manufactured to the highest standards. Caring and trustworthy individuals, whom have your best interest in mind, have assembled this unit.

Each Alminco unit has been 100% quality control inspected to assure efficient and safe protecting of your commodity along with optimum dependability for you and your operation. with the proper operation and maintenance according to this manual, we can assure you many years of using without trouble. Thank you for your confidence when purchasing an Alminco product.

Your Alminco Grain Cooler is designed for safe reliable operation when properly installed.

WARNING! THE GRAIN COOLER REQUIRES ELECTRICITY AND HAS FANS AND COMPRESSORS, WHEN INSTALLED OR OPERATED IMPROPERLY CAN BEPOTENTIALLY DANGEROUS.

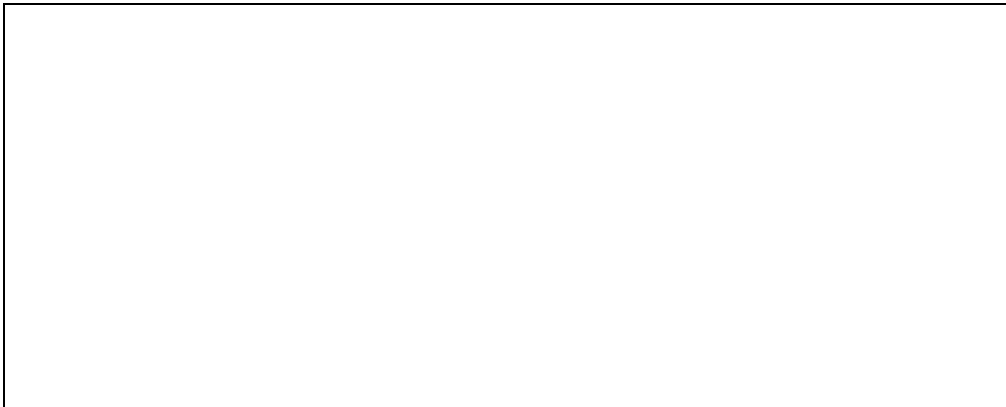
Any individual who will operate this unit should read this manual before proceeding with installation or operation of the unit.

WARNING! THE SAFETY AND PERFORMANCE OF THIS GRAIN COOLER, INSTALLED AND READIED FOR OPERATION, WILL BE AFFECTED BY THE INSTALLATION OR OPERATION PERSONNEL. CAREFUL CONSIDERATION MUST BE GIVEN, WE HIGHLY RECOMMEND THE USE OF A SKILLED ERECTION COMPANY WITH A QUALIFIED ENGINEER. ALMINCO CANNOT BE RESPONSIBLE FOR THE INSTALLATION AT SITE BY UNSKILLED PEOPLE. THE INFORMATION CONTAINED IN THIS MANUAL IS OFFERED ONLY AS A CONVENIENCE TO THE INSTALLER AND OPERATOR. NO LIABILITY IS EXPRESSED OR IMPLIED TOWARD THE INSTALLER OR OPERATOR.

SPECIAL SERVICE NOTICE

If you are unable to remedy any service problem after consulting manual, your first line of service is the Dealer whom you purchased the unit from. If the Dealer is unable to correct the problem then contact the manufacturer for factory service and provided record information above along with explanation of problem.

Your Local Dealer Information



Manufacturer Information

ALMIN ENTERPRISE CO., LTD.

NO. 21, Ho-Hou Village, Hsin-Fong Hsiang,

Hsinchu Hsien, 304 Taiwan

Tel +886-3-5680587

Fax +886-3-5680587

info@alminco.com

<http://www.alminco.com>

STANDARD LIMITED WARRANTY

Alminco warrants to the purchaser for use that if any part of the product is proven to be defective in material or workmanship within 1 year from the date of original invoice from the factory, and Alminco is notified within 15 days after such defect is discovered, Alminco will (at company option) either replace or repair said part. This standard limited warranty does not apply to damage resulting from misuse, neglect, material wear, accident or improper installation or maintenance. Said part will not be considered defective if it substantially fulfills performance specifications. **The foregoing limited warranty is exclusive and in lieu of all other warranties of merchantability, fitness for purpose and of any other type, whether expressed or implied.** Alminco neither assumes nor authorizes anyone to assume for it any other obligation or liability in connection with said part and will not be liable for incidental or consequential damages. **The remedies stated herein shall be the exclusive remedies available under this standard limited warranty. Claims under this standard limited warranty shall be handle under the standard service policy.** Alminco will not be responsible for any charges incurred in repairing or servicing any Alminco products excepts as such repairs are made at Alminco or by Alminco Field Service Personnel or as approved in writing from Alminco Customer Service.

IN WARRANTY REPLACEMENT: The Alminco Standard Limited Warranty Policy will cover any defective part of the product covered by the Standard Limited Warranty. Equipment involved in a warranty claim under the above Standard Limited Warranty shall have the ORIGINAL INVOICE and have been properly installed, maintained and operated according to the instructions provided by Alminco Company.

WARRANTY CLAIM PROCEDURES: When a part failure occurs, that in your judgment meets the conditions of the above Standard Limited Warranty; contact Alminco to make arrangements for the shipment of a replacement item and the return of the defective equipment.

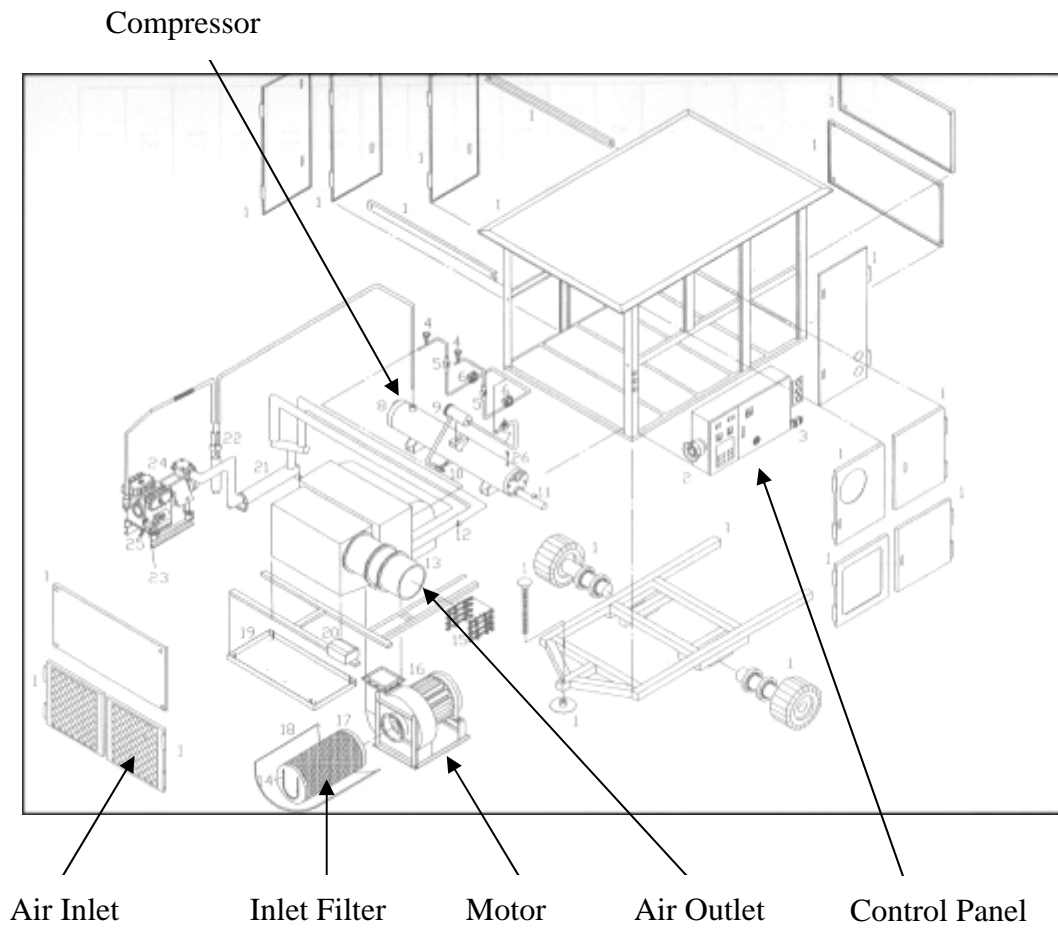
ELECTRIC MOTOR, COMPRESSOR AND WATER TOWER WARRANTY: The Manufacturers of all electric motors, compressors or water towers used by Alminco carry a warranty for these items. If the motor, compressor or water tower fails under the conditions of Alminco Standard Limited Warranty Policy, and provided it was protected by the proper protective device, the original manufacturer's nearest authorized service center will repair it. Any in warranty replacement not satisfactorily handle by original manufacturer service centers and within the Standard Limited Warranty period and policy will be covered by Alminco. Contact Alminco if you have any problems or questions.

OUT OF WARRANTY SERVICE: Products requiring Alminco repair work will be repaired at the standard repair charge plus hourly charges after the first hour. Field service work will require a field service charge plus travel expenses. The repair part will carry a 30 day limited warranty.

MAIN COMPONENT

The design may be different due to different specification.

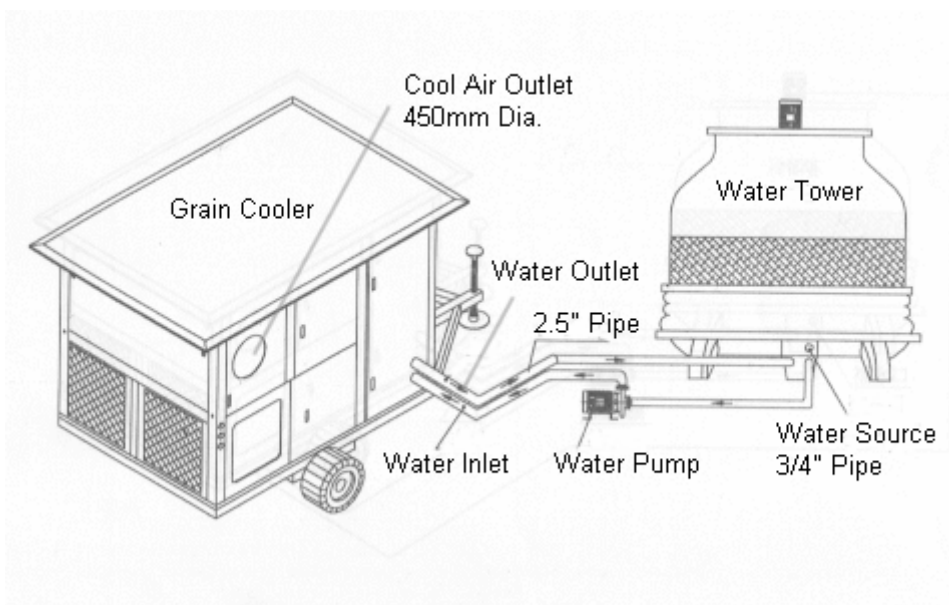
The design is subject to change without notice.



ASSEMBLY

The unit you receive may have different dimensions. The dimensions are subject to change without notice.

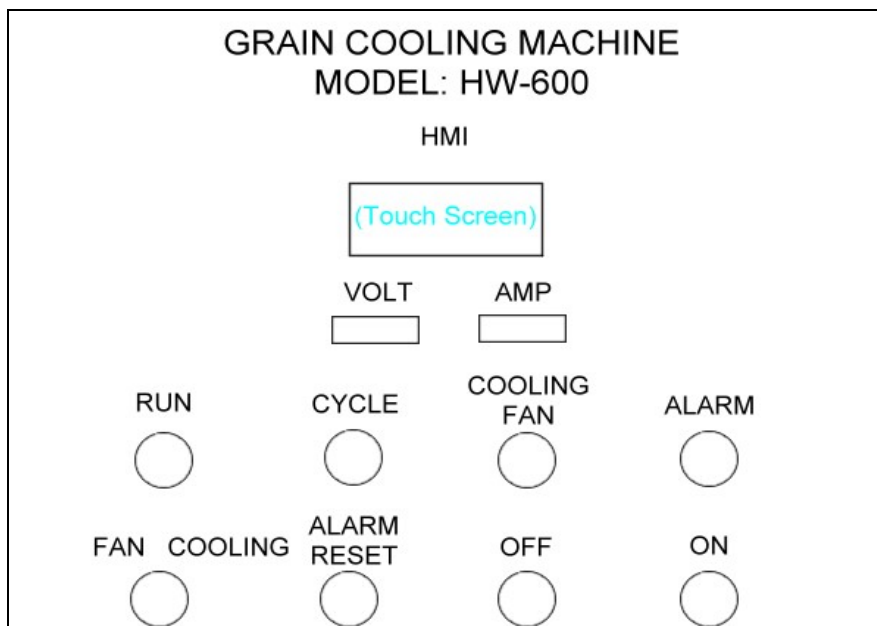
- 1) The grain cooler that you receive is already assembled, but the water tower is perhaps not yet assembled. If the water tower needs to be assembled at site, please read the instruction manual of water tower.
- 2) The grain cooler installation is simple, only air duct and water pipe need to be connecting at site.
- 3) The air duct normally has diameter 450mm; however, in some case we supply 500mm diameter, please measure first before you apply the air duct to the silos. For the ducting from grain to silos, you may need a local constructor who has skill to do it.
- 4) There is one water inlet and water outlet under grain cooler, the diameter is normally 2.5"; however, we do supply different size of pipes sometimes, please measure first before you connect the pipes.
- 5) Connect the pipe between water inlet and water tower, remember to install the water pump between water inlet and water tower, so the pump can suck the water from water tower into grain cooler.
- 6) Connect the water outlet with water tower, make sure you read the instruction of water tower and connect the right place, so the water can be recycled.
- 7) You will need the water source for the water tower, please read the instruction manual of water tower.



START UP AND OPERATION

A step by step procedure for initial start-up and operation is provided below and should be followed.

- Connect electrical power and double check the power supply and connection is correct, check R. S. T of grain cooler.
- Check if the water inside the cooling tower is in full position.
- Check the water tower motor and ensure it's working.
- The grain cooler requires very clean water; highly recommend installing a filter from water source.
- Make sure nothing blocks the air inlet and air outlet, especially check the filter of air inlet.
- Check and clean away all obstacles on or around the cooling tower.
- You can choose FAN or COOLING before you start, if you choose FAN, there is no cooling function and only natural air will be blowing. If you wish to give cooling to grains, please choose COOLING function.
- Press ON button, the COOLING FAN light on, wait around 2 minutes, the machine will automatically warm up by itself and you will see RUN light on.
- On start running, check to make sure if machine functions normally. (If not, shut down the machine immediately by press OFF button, and change any two electric powers from the 3 phase powers.)
- If the machine functions normally, check the setting thru touch screen.



GRAIN COOLER CONTROL PANEL

ADDITIONAL INFORMATION

- The grain cooler is controlled by a micro computer and a well design software has built in, when you turn ON or OFF, everything runs automatically, this can avoid manual operation failure; however, check the setting of temperature, humidity, and compressor carefully, improper setting may cause bad performance or machine damage.
- The grain cooler and water tower requires good quality of water, it's recommended to filter the using water.
- If you see the water is dirty inside the water tower, shut down the grain cooler and water tower for cleaning.
- There are 4 tubes on the water tower, it should rotate like clock direction, make sure the rotation is correct.
- **Make sure the 4 tubes of water tower are clean and do not block, this is important.**
- The setting of grain cooler is based on local environment and using purpose, the operator must have good knowledge about the effect between grains, temperature and moisture content.
- The following shows the functions in the touch screen and we have some recommendation for normal operation; however, we do not guarantee the recommendation fits your needs; the operator or end user should manage and change the setting that you desire.

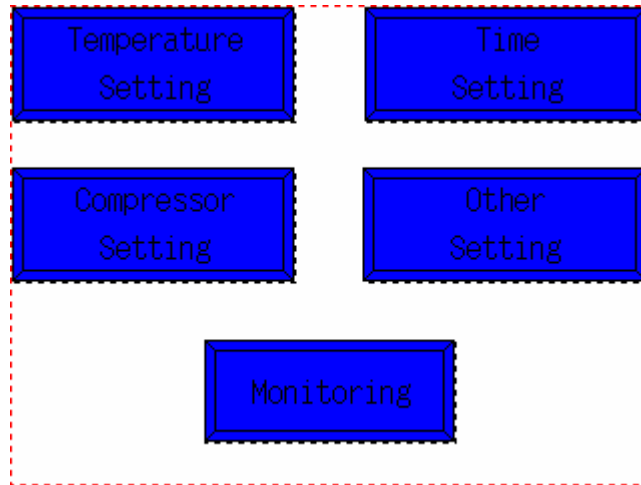
TOUCH SCREEN INFORMATION

When the machine is ON, you will first see manufacturer information.



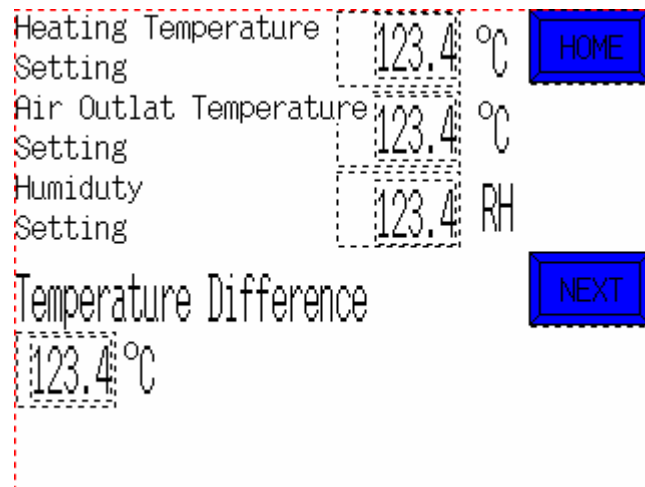
Then the screen shows the page below and ready for setting or monitoring.

There are 5 main functions as shown below.



Temperature Setting

When you press Temperature Setting, it shows the Heating Temperature Setting, Air Outlet Temperature Setting, Humidity Setting, and Temperature Difference.



Heating Temperature Setting

The Heating Temperature is to control the humidity of air and make sure the humidity is stable, for example if you set the humidity at 80% RH, once the micro computer defects the air humidity is higher than 80%, then the heating temperature will function automatically to reduce the humidity, but high heating temperature may damage the machine, so we recommended maximum at 25°C .

Air Outlet Temperature Setting

Air Outlet Temperature is the temperature you desire for cooling, and if you have long air pipes from grain cooler to silos, we recommend that you set lower temperature because there is energy waste when cool air transfer thru the pipes and the actual temperature to the silos are always higher than air outlet temperature. We recommended the air outlet temperature at 6°C - 12°C.

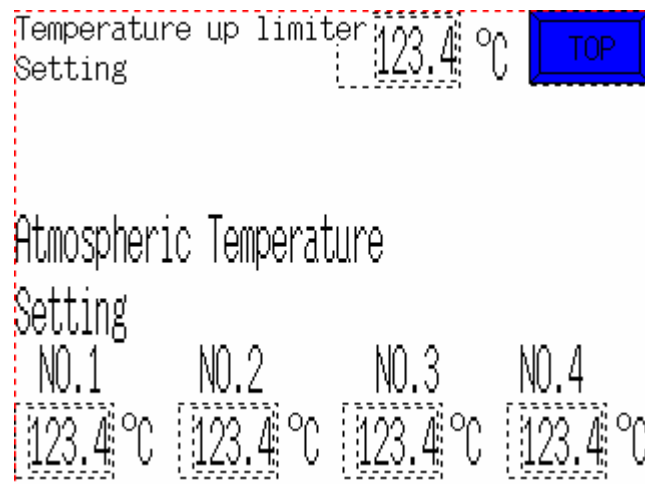
Humidity Setting

This controls the air humidity from the grain cooler, you can set the humidity you desire and we recommended at 60% - 80% RH.

Temperature Difference

This shows the temperature difference between air outlet and atmospheric temperature.

If you press NEXT at right side of screen, it will show the following page.



Temperature up limiter Setting

This function is ideally designed to protect the grains. The machine has cycling function to protect the compressors for being over working. However, if the operator sets wrong cycling time and makes the compressors not working, the grains may increase the temperature during cycling time. The Temperature Up Limiter Setting can force the compressor to run again during the cycling time, so the machines can supply cool air to grains and avoid hot spot happening. We recommend this setting at 15°C.

Atmospheric Temperature Setting

The code NO 1, NO 2, NO 3, NO 4 meaning compressor 1 to 4, each compressor can stop by setting different atmospheric temperatures. This is to prevent the compressors or inside pipes being frozen and blocked, when atmospheric temperature changes too much from daytime to nighttime. We recommend:

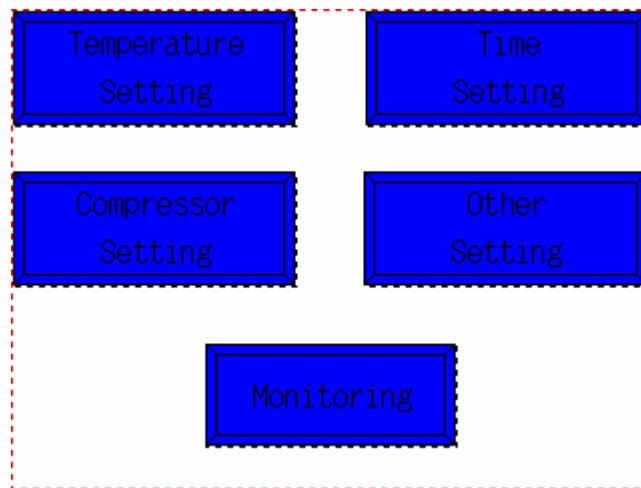
NO 1 at 8°C

NO 2 at 13°C

NO 3 at 18°C

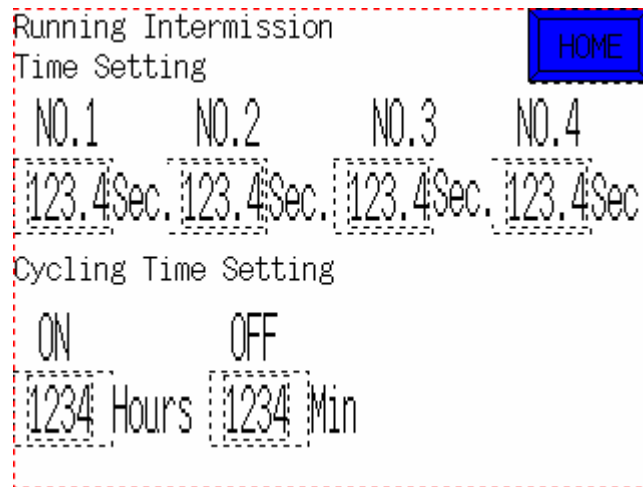
NO 4 at 23°C

Press TOP then press HOME at right side of screen, you can go back to Main Page



Time Setting

If you press Time Setting and it shows as following page.



Running Intermission Time Setting

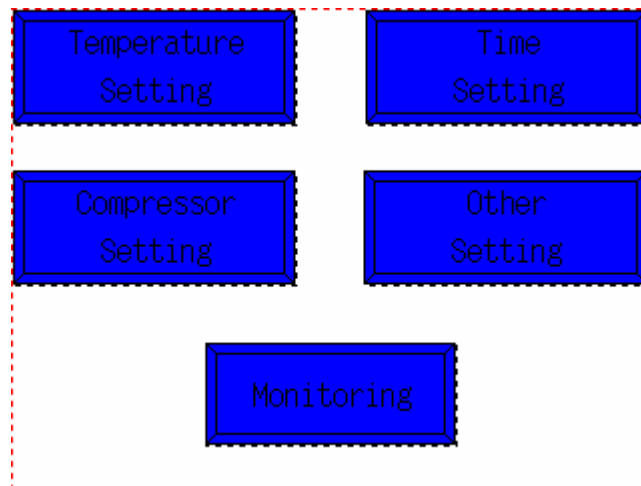
This means the warming up time of each compressor during start-up. It's recommended to give enough warming up time to each compressor, too short of timing is not good to compressor's life. We recommend the following timings:

- NO 1: 2 minutes
- NO 2: 2 minutes
- NO 3: 2 minutes
- NO 4: 2 minutes

Cycling Time Setting

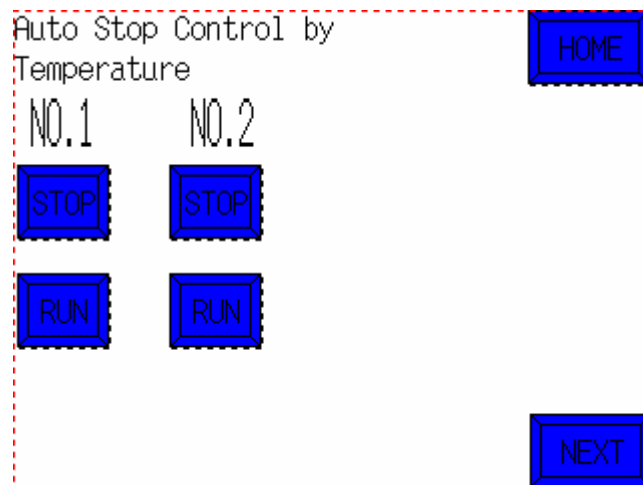
This is cycling time is to control how long you wish the compressors working and stopping. If you set ON at 2 Hours and OFF at 5 Minutes, the compressors stop every 2 hours for resting, then run again after 5 minutes.

Press HOME at right side of screen then go back to main page.



Compressor Setting

The picture below is the page of Compressor Setting.

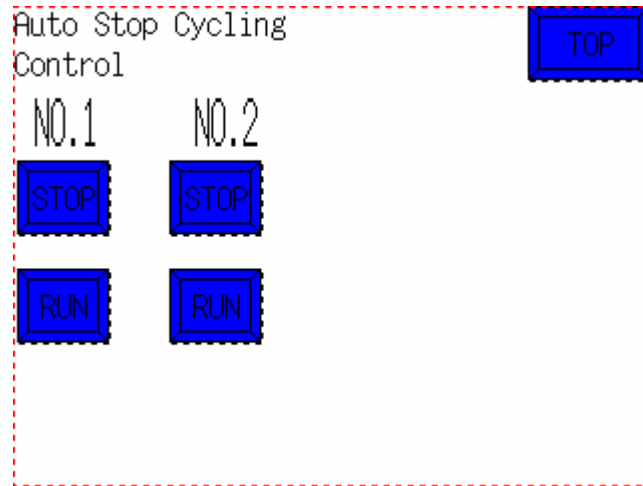


Auto Stop Control by Temperature

The compressors can be stopped by desired temperature, the temperature determines from your Air Outlet Temperature Setting. When the Air Outlet Temperature reaches your desire setting, it's recommended to stop the compressors to prevent frozen and blocking. We recommend to set STOP for NO. 1 and NO. 2 compressors; however, the NO. 3 and NO. 4 compressors are programmed to stop automatically by microcomputer; therefore, the operator can't control from the screen. This is to prevent that if operator sets NO. 1 and NO. 2 keep running for some special purposes, then at least the inside pipes will not be frozen and blocked as long as the NO. 3 and NO. 4 are stopped.

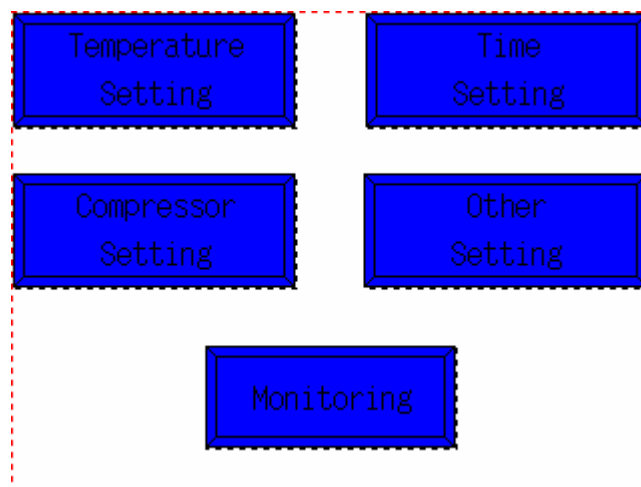
Auto Stop Cycling Control

Press NEXT at right side of Auto Stop Control by Temperature page, then it comes to the following page below.



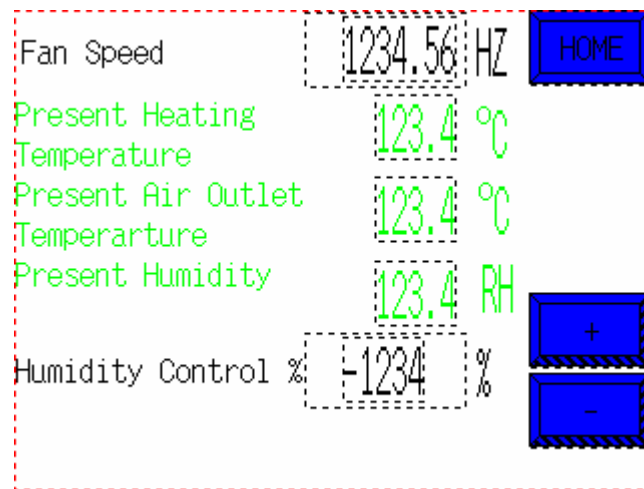
The compressors stop for resting by the setting of Cycling Time (Please refer to the Time Setting Page). If you set the compressors ON for 2 hours and OFF for 5 minutes, then the compressors run for 2 hours, then stop 5 mins, and start to run again for another 2 hours and so on. It allows the compressors to rest for being over working or frozen problems. Again, NO. 3 and NO. 4 are also programming to be stopped by microcomputer, but we leave NO. 1 and NO. 2 for options if you need to keep compressor working for special purpose; however, we still recommend that you choose STOP for NO. 1 and NO. 2 for every cycle.

Press TOP then press HOME to return main page as below.



Other Setting

The following page shows the Other Setting Page.



FAN SPEED

The fan speed of grain cooler can be smartly adjusted by frequency, we recommend to set between 40HZ and 50HZ, but don't go beyond 50HZ.

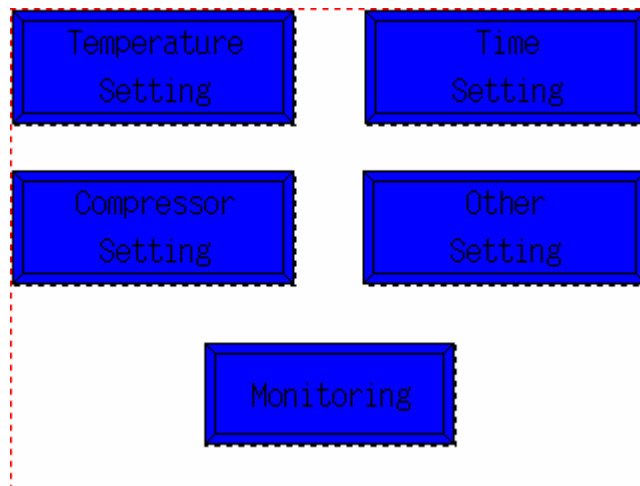
Present Heating Temperature & Present Air Outlet Temperature & Present Humidity

These 3 functions are the same as in the Temperature Setting Page; you can either change your settings here at Other Setting Page or at Temperature Setting Page.

Humidity Control

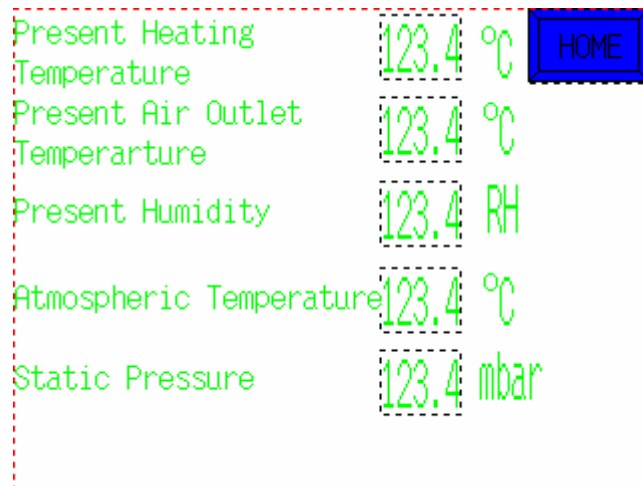
This is a back-up function for humidity control, normally it's set at 0% because you can already have good humidity control from the Temperature Setting Page. However, if the humidity is always high and can't reduce as you desire, you can add the % of heating by press "+", if you add too much heat, the machine will automatically shut down to prevent overheating. We recommend to keep this at 0% and don't use it unless necessary.

Press HOME and return to main page.



Monitoring

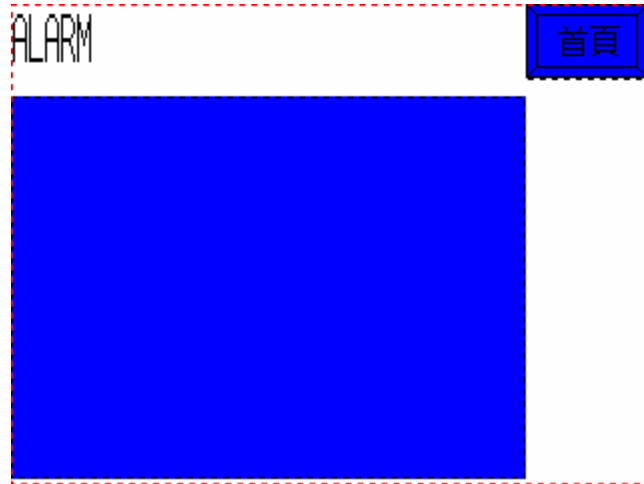
The following shows the Monitoring Page.



If all the setting are correct and you only need to monitor the machine, simply press monitoring after turning on the machine and it will show all the data for you to determine the cooling conditions.

ALARM MESSAGE

If anything goes wrong with the machine, the alarm message will appear and show the necessary information, check carefully by the alarm message to solve the problem, when the problem is solved, press ALARM RESET and continue using. If the alarm shows again and the operator can't solve the problem, record the alarm message and report back to Alminco for help.



MAINTANCE SUGGESTION

Following the maintenance instruction can provide a longer life of machine. Please pay attention with the following information and record down every maintenance time and item for future inspection.

A. GENERAL MAINTENANCE:

| Item | How often | Actions | Remarks |
|--------------|-----------|--|--|
| 1. Noise | Any time | Listening to make sure if there is any usual noise. | Investigating by standing ahead of the machine body by 1M. |
| 2. Vibration | Any time | Investigating the machine while running, make sure if the assembled parts vibrate within normal range. | |

B. Outer casing of the machine:

| Item | How often | Actions | Remarks |
|------------------------|--------------|--|---------|
| 1. clean | Any Time | Keep the machine clean. | |
| 2. Rusty | Any time | Get rid of the rust with a iron brush, and then paint it with anti-rusty painting. | |
| 3. Running steady | Any time | Tight all screws for running steady. | |
| 4. Isolations come off | Any time | Re-stick the isolation. | |
| 5. Water leakage | Once a month | Clean the water collection tray, and take out any of block-up inside the exhaust water pipe. | |

C. Compressor:

| Item | How often | Actions | Remarks |
|---|----------------------|--|---------|
| 1. Noise | Any time | Make sure that no unusual noise happen | |
| 2. Erosion of the anti-vibration rubber | Once a year | Press by finger to find if the rubber remains flexibility | |
| 3. Middle-period investigation | Once per 3000 hours | Pay special attention to check if there is unusual vibration noise, or any leakage. | |
| 4. Middle-period investigation | Once per 6000 hours | Checking the function of the safety and protection facilities. | |
| 5. Investigation by decomposing | Once per 20000 hours | Decomposing by specialized people and check assembly parts piece by piece to decide what to be replaced. | |

D. Condenser:

| Item | How often | Actions | Remarks |
|---|-------------------------------|---|---|
| a. Condensate b. Flow quantity c. Water temperature d. Water quality | Any time or Once per month | Adjust water quantity to keep the pressure within set up level. | |
| 2. Clean | Any time | Keep the high-pressure within set-up standard. | |
| 3. Water exhaust-ing | Any time | Condensate should be exhausted completely, if the machine will not be used for a long time. | Water inside the pipe should be exhausted completely. |

E. Cooling cycling:

| Item | How often | Actions | Remarks |
|---------------------------|----------------|---|--|
| 1. Leakage of cool medium | Once per month | By leakage inspectors, detecting if any cool medium leakage in connecting area between the machine body and the pipe. After water exhausting from condenser and water cooler, detecting the inlet and outlet of the condenser and water cooler for cool medium leakage. | The electrical type, sprayer type and soap suds type are available for inspecting leakage. |
| Mixed by un-condensed air | Once per month | After collect cool medium into the condenser, input water until the water temperature of the inlet and outlet is the same. If any un-condensed air mix into, then: Gauge pressure > cool medium (water temperature) saturate pressure + 1.03 kg/cm ² . | |

F. Electricity control:

| ITEM | HOW OFTEN | Actions | Remarks |
|-----------------------|----------------|---|---|
| 1. Solenoid connector | Once per month | Trying to switch ON/OFF many times to see if any sparks or buzzes, and the out appearance should be normal. | While switching ON/OFF, please wait for 3 minutes before every switching. |
| Knob switch | Once per month | The action should be smooth. | |
| Back up relay | Once per month | The actions should be normal. | |
| Time limited relay | Once per month | The actions should obey the set-up time. | |
| Thermostat | Once per month | The action temperature of the thermostat should be the same as what is on the scale. | |

GENERAL TROUBLE SHOOTING

The trouble shooting is made to guide you with possible situations and help you to find out the reasons; however, we highly recommend that operators could seek well training technicians for the machine problems. With skilled technicians, this way can avoid being hurt or other potential dangerous. If you still can't solve the problems, please contact Alminco or any local dealer near your location.

| Troubles | Causes | Solution |
|--|--|--|
| 1. Motor of the compressor can not work | <input type="checkbox"/> No power <input type="checkbox"/> The starting switch is break down. <input type="checkbox"/> Some control devices are defect. | <input type="checkbox"/> Check to repair the switch of power source. <input type="checkbox"/> Check the connecting points of the solenoid and repair them. <input type="checkbox"/> Check all control devices and wiring, and repair them. |
| 2. Sudden shut after starting the compressor | <input type="checkbox"/> The electric power is abnormal. <input type="checkbox"/> The hi-low pressure auto shut switch and oil pressure auto protecting switch is working incorrectly. | <input type="checkbox"/> Check and repair the electric power <input type="checkbox"/> Adjust the switches. |
| 3. The pressure is too high | <input type="checkbox"/> The pipe route is not open or semi-open, and causes insufficient water. <input type="checkbox"/> Cooling medium pipe route is blocked up. <input type="checkbox"/> Cooling medium is Fed excessively. <input type="checkbox"/> The temperature of cool water is too high. <input type="checkbox"/> Too much stains deposited on the condenser. <input type="checkbox"/> Air mixed into the cooling medium system. <input type="checkbox"/> The cooling fan does not work. | <input type="checkbox"/> Open the pipe route to help sufficient water supply. <input type="checkbox"/> Clean the drying filter. <input type="checkbox"/> Decrease the cool medium. <input type="checkbox"/> Check heat exhausting status of the cooling tower. Then check and repair cycling water pump. <input type="checkbox"/> Clean the condenser. <input type="checkbox"/> Exhaust air from the cooling medium system. <input type="checkbox"/> Repair the cooling fan. |
| 4. The pressure is too low | <input type="checkbox"/> Leakage happens to in the cool medium system. | <input type="checkbox"/> Check and repair for the cooling medium leakage. |

| | | |
|---------------------------------|---|--|
| | <ul style="list-style-type: none"> <input type="checkbox"/> Insufficient cooling medium. <input type="checkbox"/> Extensive valve is blocked up. <input type="checkbox"/> Insufficient wind capacity. <input type="checkbox"/> Temperature of cooling water is too low. | <ul style="list-style-type: none"> <input type="checkbox"/> Feed proper cooling medium. <input type="checkbox"/> Clean the extensive valve. <input type="checkbox"/> Clean the air filter mush. <input type="checkbox"/> Raise the temperature of the cooling water. |
| 5. The oil pressure is too low | <ul style="list-style-type: none"> <input type="checkbox"/> The grease system is blocked up. <input type="checkbox"/> The oil pump is out of order <input type="checkbox"/> The oil temperature is too low. | <ul style="list-style-type: none"> <input type="checkbox"/> Clean the grease system route. <input type="checkbox"/> Check and repair the oil pump. <input type="checkbox"/> Check and repair the oil heater. |
| 6. The oil pressure is too high | <ul style="list-style-type: none"> <input type="checkbox"/> The low-pressure is too high <input type="checkbox"/> The outlet of oil pump is blocked up. <input type="checkbox"/> The oil pressure adjusting valve does not work. | <ul style="list-style-type: none"> <input type="checkbox"/> Ditto <input type="checkbox"/> Clean the oil pump. <input type="checkbox"/> Check, clean and adjust the oil pressure adjusting valve. |
| 7. The temperature is too high | <ul style="list-style-type: none"> <input type="checkbox"/> The temperature of cooling water is too high. <input type="checkbox"/> The quantity of cooling water is insufficient. <input type="checkbox"/> Improper set of auto control of the temperature. | <ul style="list-style-type: none"> <input type="checkbox"/> Adjust the temperature controller. <input type="checkbox"/> Adjust the quantity of the cooling water. <input type="checkbox"/> Adjust the temperature auto controller. |

WIRING DIAGRAM

Please refer to the following pages for the wiring diagram of grain cooler.