

DETROIT AIR

SCREW COMPRESSOR CONTROLLER OPERATING MANUAL

MAM SERIES AIR SCREW CONTROLLER AND PROTECTION SYSTEMS

 **NOTICE**

Please read instruction manual before use



Installation of MAM—8** can be performed only by professional technician



Installation of the MAM controller needs to take into consideration heat dissipation and electromagnetic interference.



Wiring must be installed according to regulation for high and low current to reduce electromagnetic interference



Surge arrestor must be used with inductive loads, such as AC contactors, on the output control of relay



Output wiring must be inspected carefully before powering the machine up



In order for the unit to resist signal noise, it is imperative that the MAM controller be earthed correctly



The motors rated current – MAM overload auto stop current - must be set according to the rated current indicated on motor's name plate \times overload current multiplication factor of motor/ 1.2

Features:

- LCD with Chinese / English display
- With control functions of: Starting, stopping and operational control of motor.
- Protection function preventing reverse rotation of air compressor.
- Temperature measurement and control.
- Automatic adjustment of rate of load and control of pressure balance.
- Selections of remote and local control.
- Selections of interlocking and independent system.
- Function of RS485 communication as an option.

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1. Basic Operation

1. Button Explanation

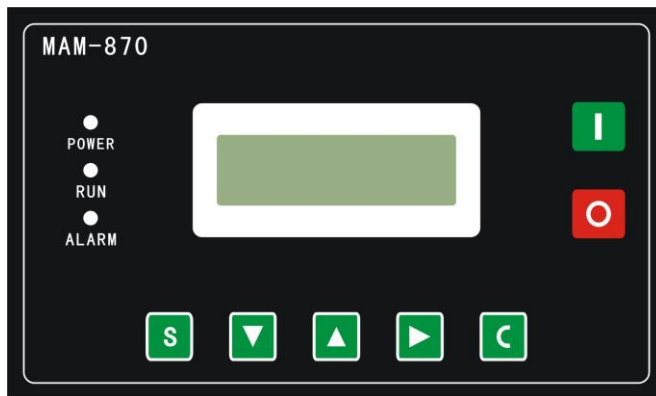


Figure 1.1.1

- I** —Start Button: Press this button to start the compressor.
- O** —Stop button: Press this button to stop the compressor.
- S** —Set Button / loading / unloading Button: After modification, press this to confirm and save modified data; When the compressor is running, press this button to load or unload under a certain pressure.
- ▲** —Scroll up button / increase button: Data at current position is increased by pressing this button when data is modified; Menu is scrolled upwards when Menu is selected.
- ▼** —Scroll down button / descending button: Data at current position is decreased by pressing this button when data is modified; menu scrolls downwards when Menu is selected.
- ▶** —Shift button / enter button: This button serves as the shift button when data is modified and serves as the enter button when in the menu.
- ◀** —Back button / reset button: This button serves as back button when operating in the menu functions. It can also be used to reset a fault by holding down.

2. Indicator instructions

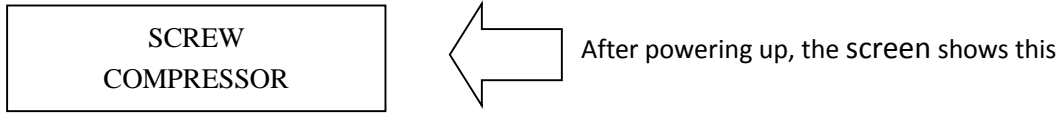
Power: After the controller powers on, power LED illuminates.

Run: During compressor operation, run LED illuminates.

Alarm: Early warning, the fault light flashes; fault shutdown, fault lights lit, clear fault, reset off.

3. Display of status and operations

The display screen will show as follow when the unit is powered on:



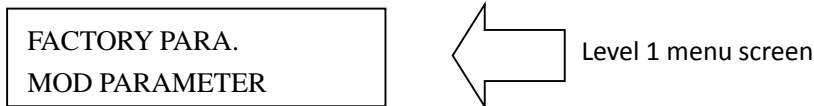
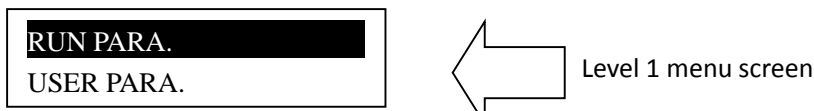
After 5 seconds, the main page will show up as:



Press shift button, the main page will show up as:

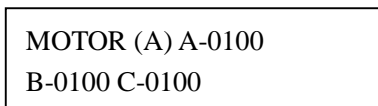


Press “Move down button” to enter into Menu Selection Interface:



4. Operating parameters

Press “Move down button” or “Move up button” to move the black cursor to “RUN PARA.”, press enter button to pop up submenu:

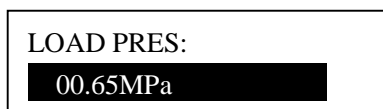


Continuously press “Move down button” you can see run parameters and run state parameters as follows:

Fan current, Total run time, Total load time, This run time, This load time,
Oil filter time, O-a filter time, Air filter time, Lube time, Grease time, Belt time.....etc.

5. User Parameter (Customer Parameter):

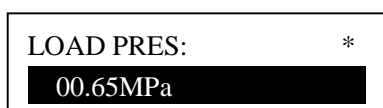
Press the move button to move the black cursor to the "USER PARA." menu, press the shift button to switch to the following menu:



In this menu, Press the shift button. Switch to the following interface to enter the user password.



In this screen, the first data field or password will start flashing, press "increase button" or "decrease button" to modify the flashing data equal to the first digit of password. Press the shift button, move the cursor to the next data field, modify the current data to the second digit of the password and so on. Modify the third and fourth fields. Finally, press the "Set button" to confirm the input, the system verifies that the password is correct, and switches to the following interface:



The "*" indicates that the passcode has been accepted.

In the above interface, press "enter button", then the loading pressure data will blink. The user can press "increase button" or "decrease button" to modify the present data. When complete, press "Set Button" to confirm and save. The controller will beep to confirm the data has been accepted and saved.

6. Customer Parameters and Functions

Parameters	Preset Value	Functions
LOAD PRES.	*.**MPa	LOADING PRESSURE VALUE
UNLOAD PRES.	*.**Mpa	UNLOADING PRESSURE VALUE
FAN START TEMP	***°C	Controls the fan operation. This value will be set as "120°C" if there is no fan present or if the fan is not required to be controlled.
FAN STOP TEMP	***°C	Control the stop temperature of the fan
MOTOR DELAY T	0008S	When using the controller to protect the motor, it is required that the time set here will not meet the impulse starting current of the motor, the value here must be longer than the STAR DELAY TIME plus LOAD DELAY TIME
FAN DELAY T	0006S	When using the controller to protect the motor, it is required that the time set here will not meet the impulse starting current of the motor.
STAR DELAY TIME	0006S	Star pressure countdown start delay time.
LOAD DELAY TIME	0002S	The loading delay time after star countdown.
EMPTY DELAY T	0020M	Load free continuous running time, the machine will automatically stop after this time
STOP DELAY TIME	0010S	The machine will not stop until the load free running status reaches this time.

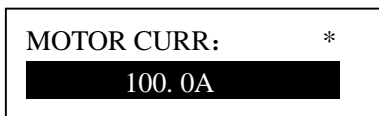
START DELAY T	0100S	Machine cannot be restarted before this set time after stopped or over time operation at load free state.
START MODE	LOCAL/FAR	When the remote mode is set, both the button on the controller and the remote control button can turn the machine on and off; When the near mode is set, only the button on the controller can be used to turn the machine on and off.
LOAD MODE	AUTO/MANU	When the manual mode is set, the Load/Unload function can only be executed by pressing the load/unload button.
COM MODE	BAN/COMP./BLOCK	When this is set as "BAN" the communication function is not available. When this is set as "COMP." the controller is a slave, in accordance with MODBUS protocol communications with external devices. When this is set to block, block control is active.
COM ADDRESS	0255	Communication address.
SEQ STATE	SLAVE	Operation as master or slave air compressor during interlocking operation. The MASTER controls the SLAVE.
TOGGLES TIME	9999 Hours	During interlocking operation, the machines will take turns running according to the toggle set time. One machine operates, while the other is put into stand-by and vice-versa.
SEQ NUMER	0016	Number of air compressors in interlocking network during interlocking operation.
SEQ LOAD PRES.	*.**MPa	The main air compressor searches for one device in the interlocking network for loading or starting when main air compressor's air supply pressure is less than the value set here during interlocking operation.
SEQ U.L. PRES.	*.**MPa	The main air compressor searches for one device in the interlocking network for unloading or stopping when main air compressor's air supply pressure is more than the value set here during interlocking operation.
SEQ DELAY	0030S	The least waiting time that the main air compressor needs to continuously send control commands.
OIL FILTER	0000H	Reset time for the duration of oil filter change.
O/A FILTER	0000H	Reset time for separator change.
AIR FILTER	0000H	Reset time for air filter change.
LUBE	0000H	Reset time oil change.
GREASE	0000H	Reset time for bearing re-grease of electric motor.
BELT	0000H	Reset time for belt change.
OIL FILTER	9999H	Setting this value to "0" will disable the oil filter alarm function.
O/A SEPARATOR	9999H	Setting this value to "0" will disable the separator alarm function.
AIR FILTER	9999H	Setting this value to "0" will disable the air filter alarm function.
LUB	9999H	Setting this value to "0" will disable the oil change alarm.
GREASE	9999H	Setting this value to "0" will disable the re-grease alarm.
BELT	9999H	Setting this value to "0" to disable the belt-change alarm.
LANGUAGE SEL	ENGLISH/CHINESE	Set this value to "EN" to display text in English. Set this value to "CH" to display text in Chinese.
USER PASSWORD	****	Customer modification of the user password.

7. Factory Parameters

The factory parameters can be looked over and modified with the manufacturer password, the operation method is the same as that of user parameters. Please refer to the following table for main functions and purposes.



Insert the manufacturers' password, press the set button, and switch to the factory parameter interface as follows:



Continuously press "Move down button". You will see factory parameters as follows: FAN CURR, PRE-ALARM TEM, STOP TEMP, STOP PRESS, MAX U.L. PRESS, TOTAL RUN TIME, TOTAL LOAD TIME, RESET FAULT.....etc.

Factory parameters "run time", "phase sequence protection," "Frequency Selection" and the time all need a supervisor password to make changes.

8. Manufacturers Parameters and Functions

PARAMETER	Initial Value	Functions
MOTOR CURR	MAXIMUM OVERLOAD VAULE OF THE MOTOR /1.2	After the starting delay time, when the motor current is greater than 1.2 times of the set value and less than 4 times of the set value, the unit will engage the overload feature.
FAN CURR	Maximum allowable fan motor overload value/1.2	Same as above.
ALARM T.	105°C	Pre-alarm when the temperature reaches this set value.
STOP T.	110°C	Alarm when the air exhaust temperature reaches this set value.
STOP P.	1.00MPa	Alarm, and shut down when the air supply pressure reaches this set value.
MAX U.L.	0.80MPa	The Unload Limit Pressure in the Customer Parameter must be set lower than this value.
RUN TIME	****Hours	The manufacturer can modify the total run time.
LOAD TIME	****Hours	The manufacturer can modify the load run time.
CLR FAULT	****	Input the history failure password to clear all the history failures.
CUR UN.BAL.	0006	When (the max. phase current / min. phase current) is less than (1+set value), the unbalance protection will stop the machine. If the set value is greater than 15, the unbalance protection will be unavailable.
LACK PAHSE	005.0	If the set time of phase failure is ≥20 seconds, phase failure does not function; If unbalance protection is activated, it will stop operation.
DATA	****.***	The manufacturer inputs the product date of the unit.
SERIAL	*****	The manufacturer inputs the product No. of the unit
PHASE PRO.	ON/OFF	ON: Activates phase sequence protection. OFF: Deactivates phase sequence protection

POWER FREQ	50H	Set the power supply frequency.
HIGH VOL.	****V	If the controller detects voltage higher than the set value, shutdown protection initiates. Set this value to 0000 to disable high-voltage protection.
LOW VOL.	****V	If the controller detects voltage lower than the set value, shutdown protection initiates. Set this value to 0000 to disable low-voltage protection.
LOW T PRO-	-48°C	If the controller detects temperature lower than the set value, shutdown protection initiates. Set this value to 0000 to disable low-temperature protection.
TIME LIM	0000H	When the compressor run time is greater than TIME LIM setting, the controller will stop the compressor and alarm. Set this value to 0000 to disable the function.
ALM STOP	0010H	Warning time duration is set here. Once the warning time is exceeded, the machine will shut-down.
COM SET PARA	ON/	
PARA1	****	

9. Calibration parameters

Calibration parameters are used to set the control data. Only authorized persons are permitted to change or view these settings.



View calibration parameters as follows, Press the “Move down button”, Move the cursor to the “MOD PARAMETE” menu, then press “Enter button”. Input the password to view the calibration parameters. The calibration parameters and functions appear as below:

PARAMETER		Initial Value	Functions
M O T O R A	TARGET CUR	0000	Enter the current value, the controller will detect user input value divided by the current to the current value and calculate the current coefficient.
	COEF	1.000	Calibration current, input the coefficients. The controller displays the current value = sample value × COEF.
	CUR	***.*A	Displays the current controller sampling current values. This value is the real value cannot be set.
M O T O R B	TARGET CUR	0000	Enter the current value, the controller will detect user input value divided by the current to the current value, calculate the current coefficient.
	COEF	1.000	Calibration current, input the coefficients. The controller displays the current value = sample value × COEF.
	CUR	***.*A	Displays the current controller sampling current values. This value is the real value cannot be set.
M O T O R C	TARGET CUR	0000	Enter the current value, the controller will detect user input value divided by the current to the current value, calculate the current coefficient.
	COEF	1.000	Calibration current, input the coefficients. The controller displays the current value = sample value × COEF.
	CUR	***.*A	Displays the current controller sampling current values. This value is the real value cannot be set.

F A N A	TARGET CUR	0000	Enter the current value, the controller will detect user input value divided by the current to the current value, calculate the current coefficient.
	COEF	1.000	Calibration current, input the coefficients. The controller displays the current value = sample value × COEF.
	CUR	***.*A	Displays the current controller sampling current values. This value is the real value cannot be set.
F A N B	TARGET CUR	0000	Enter the current value, the controller will detect user input value divided by the current to the current value, calculate the current coefficient.
	COEF	1.000	Calibration current, input the coefficients. The controller displays the current value = sample value × COEF.
	CUR	***.*A	Displays the current controller sampling current values. This value is the real value cannot be set.
F A N C	TARGET CUR	0000	Enter the current value, the controller will detect user input value divided by the current to the current value, calculate the current coefficient.
	COEF	1.000	Calibration current, input the coefficients. The controller displays the current value = sample value × COEF.
	CUR	***.*A	Displays the current controller sampling current values. This value is the real value cannot be set.

10. Operating authority and password

The controller provides multiple passwords and access management, according to different levels of supervisor control, providing different levels of operating authority. Different levels of passwords and permissions as follows:

1. User's password: fixed as : _____
Permissions: allows user to modify the load and unload pressure, fan start temperature, fan stop temperature, start and stop mode, loading method, communication mode, communication address and linkage parameters.
2. User Password: set as: _____
3. Permissions: Allows to modify all user parameters.
4. Manufacturers sales password: this password can be modified, set to : _____
Permissions: Allows users to modify all the parameters, the user password, and the various factory parameters and passwords.
5. Manufacturers Password: factory fixed: _____
Permissions: Allows users to modify all the parameters, the user password, and the various factory parameters and passwords.
6. Calibration Password: set as: _____
Permissions: allows you to modify the current parameters of the calibration parameters
7. Super Password: set as: _____
Permissions: Allows users to modify "run-time", "phase-sequence protection" "power frequency", "max run time".

2. Technical parameters and functions

1. Digital input: Digital input of 3# circuit; digital output of relay of 5# circuit.
2. Simulation quantity: Pt100 temperature input of 1# circuit; 4~20mA input of transducer of 1# circuit; two groups of three phase current input (CT provided).
3. Input voltage of phase sequence: three phase 380V/220V.
4. Controller's power supply: AC20V, 50Hz, 10VA.
5. Measurement range displayed as follows:
 - ① Oil temperature:-50~150°C, precision: ±1°C.
 - ② Air temperature:-50~150°C, precision: ±1°C.
 - ③ Operation time: 0~999999 hours.
 - ④ Measurement range displayed for current: 0~999.9A.
 - ⑤ Pressure: 0~1.60MPa. Precision: 0.01Mpa.
6. Phase-sequence protection: response time ≤2s (optional)
7. Protection of motor: this controller has five basic protection functions for main motor and fan's motor
 - ① Block protection: Activated when working current reaches from 4 times to 8 times of set current after completing the starting cycle, response time ≤0.2s.
 - ② Short circuit protection: Activated when test current reaches above 8 times of set current, response time ≤0.2s.
 - ③ Phase failure protection: Activated when a phase drops, operation time equals setup time.
 - ④ Unbalance phase protection: Activated when current of any two phases differs by 60~75%, operation time equals set time.
 - ⑤ Protection characteristics of reverse time limit of overload (time unit: second) please see the following table (table 2.1.1) $\text{multiple} = I_{\text{actual}} / I_{\text{set}}$

The motor operates with a delay time according to overload factors and operation time shown in following table (table 2.1.1). When the motor's working current is larger or equal to 1.2 times and 3.0 times of set current.

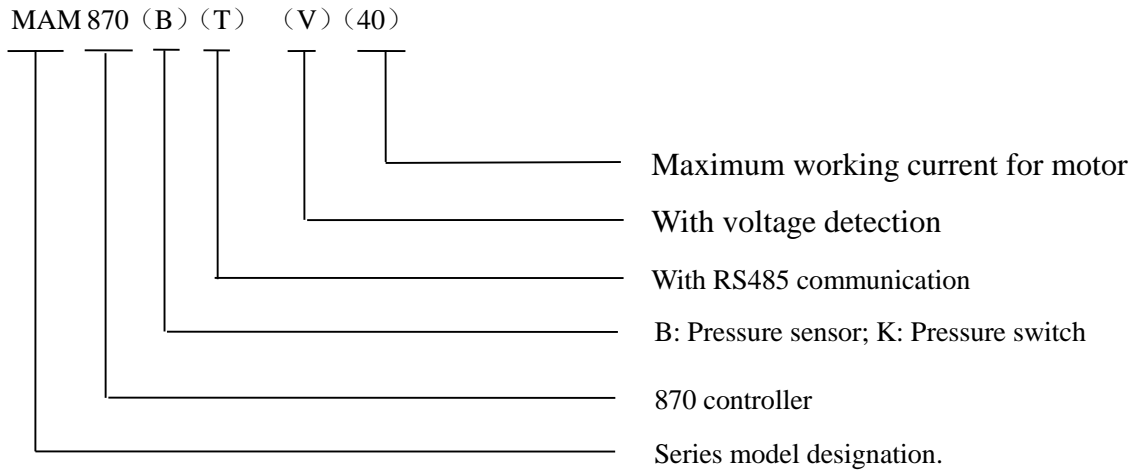
$I_{\text{actual}}/I_{\text{set}}$	≥1.2	≥1.3	≥1.5	≥1.6	≥2.0	≥3.0
Time parameters						
Operation time (S)	60	48	24	8	5	1

Table 2.1.1 curve table of reverse time limit for protection of motor

8. Temperature protection: when actual temperature measured is larger than temperature set; response time ≤2s;
9. Contact capacity of output relay: 250V, 5A, Contactor expected life – 500000 activations.
10. Error of displayed current is less than 1.0%.
11. RS485 communication.

3. Model and specification

1. Model number explanation.



2. Specification table for power of suitable host motor

Parameter / Specification	Current range (A)	Suited main motor power (KW)	Description
MAM870 (20)	8~20	4~10	Fan has three levels of current, 0.2-2.5A, 1-5A and 4-10A, determined according to fan's current requirements
MAM870 (40)	16~40	8~20	
MAM870 (100)	30~100	15~50	
MAM870 (200)	80~200	40~100	
MAM870 (400)	160~400	80~200	
MAM870 (600/5)	100~600	50~300	

4. Installation

1. Installation of transducer

The transducer must be installed at place where the motor's line current (rated current) can be measured, thus the controller can be set according to details on the motor's name plate. Detailed dimensions as follows:

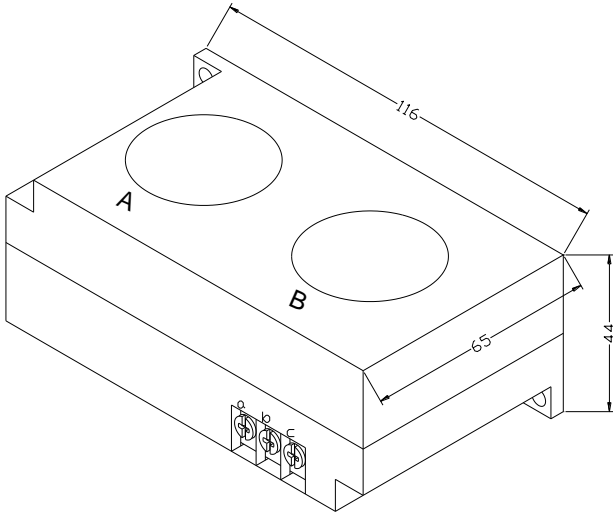


Figure 4.1.1. Structural dimensions of CT1 (φ36 through hole)

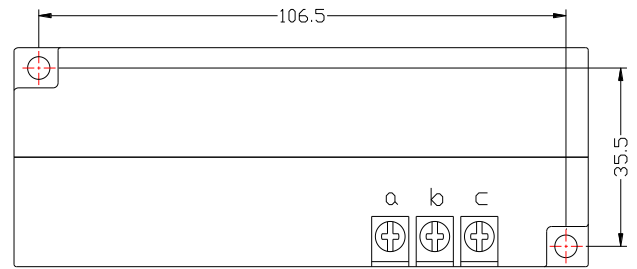


Figure 4.1.2. Install dimensions of CT1

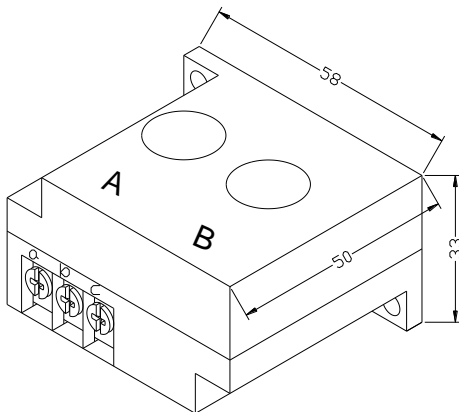


Figure 4.1.3. Structural dimensions of CT2 (φ10 through hole)

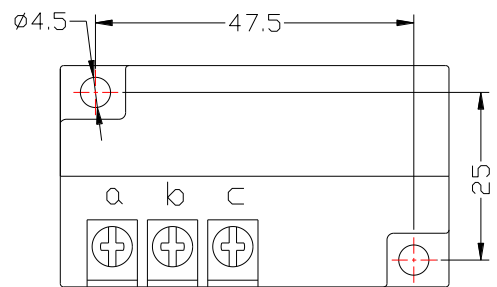


Figure 4.1.4. Install dimensions of CT2

2. Controller Installation

The controller is installed as a plate. Room should be left around controller for wiring purposes. The specific dimensions are as follows:

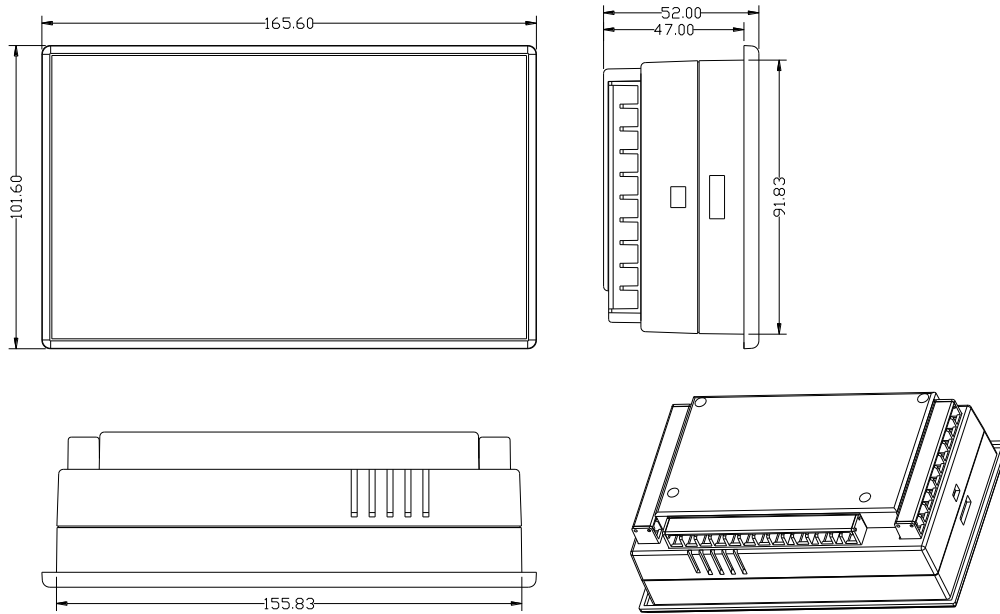


Figure 4.1.5 Controller structure dimensions

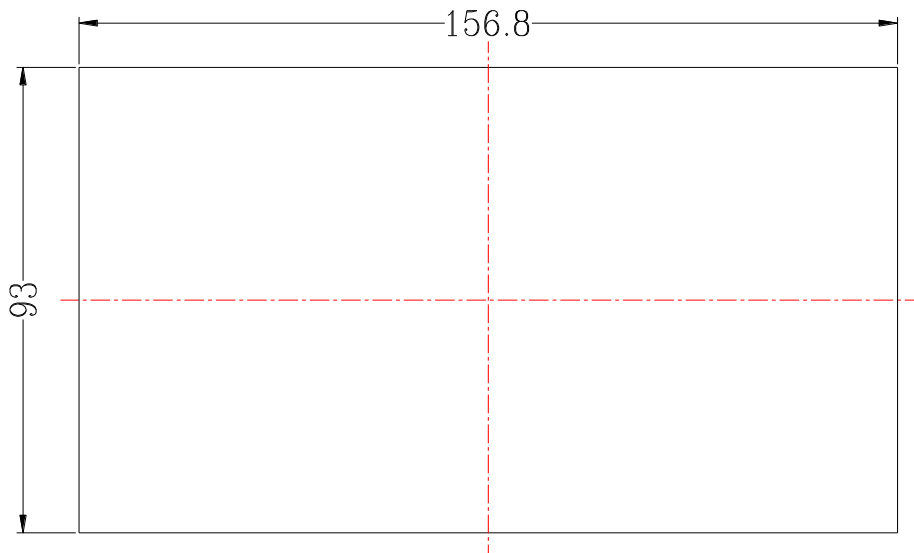


Figure 4.1.6. Hole size

3. Terminal arrangement diagram

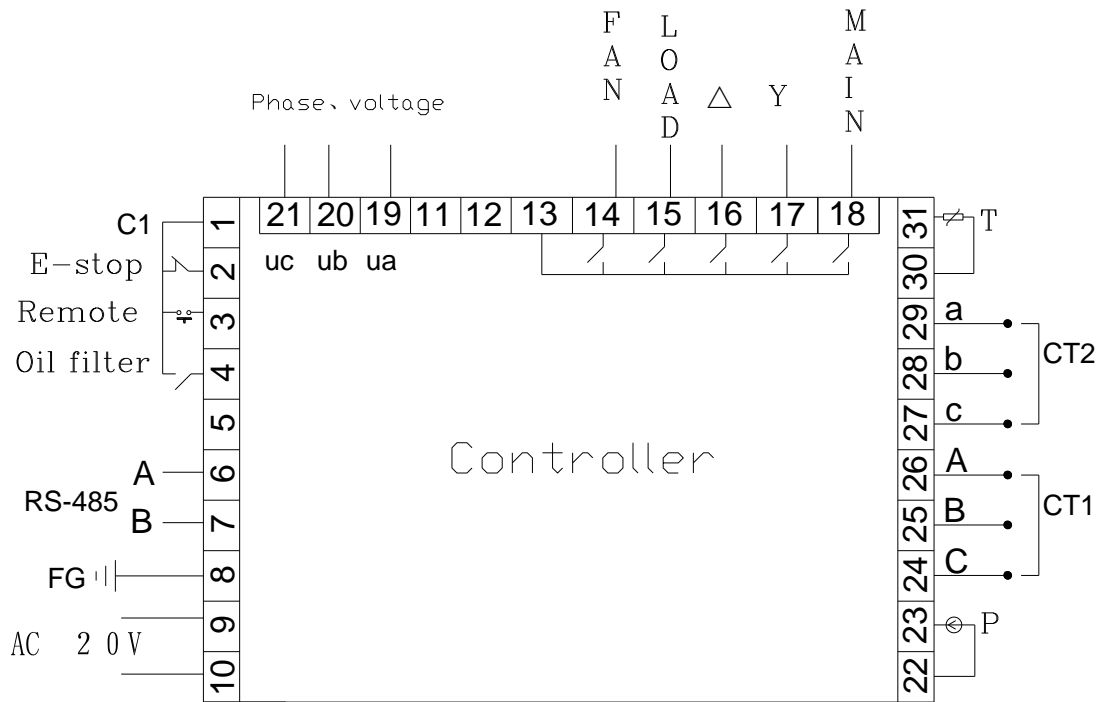


Figure 4.2.1 Terminal arrangement diagram

Wiring diagram of the MAM controller:

- | | |
|--|--|
| 1 Common terminal COM1 | 2 Input terminal for emergent stop signal |
| 3 Remotely controlled on/off signal input terminal | 4 Terminal is used to detect oil filter blockage |
| 6 Is RS485 A; 7 is RS485 B | 8 Simulated ground (Earth) |
| 17 and 18 are the AC20V power source | 22, 23 terminals are pressure sensor input |
| 24, 25, 26 terminals are motor inductor CT1 input | 27, 28, 2 terminals are Fan inductor CT2 input |
| 30, 31 Terminals are temperature sensor input | |
| 19, 20, 21 Terminals are used to detect the phase sequence and voltage | |
| 13 Terminal is common terminal of the output relay | 14 Terminal controls the fan |
| 15 Terminals controls the intake valve | 16 Terminal controls the delta contactor |
| 17 Terminals controls star contactor | 18 Terminals controls the main contactor |

NOTE: Electromagnetic coil must be connected with surge absorber during wiring. Dotted lines are extendable functions.

5. Control principles

1. Local Automatic control

① Press the start button to initiate starting procedure: (Y- Δ start)

There are five self-test steps after the controller is energized, once the self-diagnosis is complete, the air compressor will start up, and self-diagnosis cannot be skipped. The start-up sequence of the compressor will initiate as follows: KM3 and KM2 are energized (Y-contactors engaged) → pre-set delay time is reached (Y- Δ change-over time); KM3 is de-energized (KM1 and KM3 are interlocked) and KM1 is energized → the motor is not operating in Δ and the motor start-up procedure is complete. During the start procedure, all electromagnetic valves are de-energized to achieve a no load start.

② Automatic operation control:

When the motor is running in Δ status, all electromagnetic valves will be energized after a pre-set period. The air compressor will then load and begin to compress air. Once the line pressure meets the preset limit pressure, the control solenoid for the air intake valve is de-energized. The intake valve will close and the machine will run in a vacuum (unloaded-state). Should air pressure decrease to the lower limit of preset pressure (loading pressure), the loading solenoid will be re-energized. Should the unload run-time exceed the pre-set delay time, the system will automatically shut down. Only once the lower limit pressure preset has been reached, will the system automatically restart. This cycle will automatically repeat.

③ Manual loading/unloading while under automatic control:

When the compressor is running in an unloaded state, press the load or unload button. The intake valve solenoid will be energized or de-energized depending on the current pressure and state of load or unload. Should the current pressure be below the upper limit setting and be in a loaded state, the machine will unload. Should the machine be in an unloaded state, the machine will load. The machine will not load should it have already reached the upper limit of the pressure setting. This function only works within the operating pressure preset limits.

④ Normal shutdown:

Press the stop button, the machine will unload and the shutdown procedure will begin. The air intake valve loading solenoid will be de-energized. The unloading control solenoid will be energized. After running in an unloaded state for a preset time (stop delay), the contactors will be de-energized and the fan motor and host motor will shut down. Only by pressing the start button can the system be restarted.

⑤ Safe-starting system.

Press stop button to initiate the shut-down procedure. Once stopped the machine cannot be restarted instantly, the shut-down timer must complete its count-down. This is a safety feature and prevents damage to the machine after a failure shut-down (fail to stop) or after the machine has been stopped while running unloaded (normal or abnormal stop).

2. Remote automatic control

Remote automatic control and local automatic control are basically same, the difference is that starting up or stopping of the system devices can be achieved by means of a remote switch wired into the correct terminal on the MAM controller.

3. Local manual control

Control of starting and stopping the system are the same as with automatic control. However, the machine will start-up into an unloaded status and remain unloaded until such time as the unload/load button is pressed. The machine will run loaded until the upper limit of preset pressure is reached, at which time the machine will unload. Should the machine remain in the unloaded state for the pre-set time, the system will automatically shut down until the load button is once again pressed. During the loaded state, press the unload button to load and during the unloaded state, press the load button to unload.

4. Remote Manual Control

The remote automatic control is almost the same as the local manual control, the only difference is that the start and stop of the unit is controlled by remote control.

5. Network control

- ① When the communication method is set “computer”, network control between computer and controllers can be achieved.
- ② When the communication method is set “interlocking”, network control between controllers can be achieved .The main air compressor will serve as the master control system.

6. Temperature control of fan

When the exhaust temperature is higher than fan’s starting temperature, the fan will operate; when the exhaust temperature is lower than fan’s stop temperature, the fan stops operation.

7. Failure shutdown and emergency shutdown

When electrical failure or high exhaust temperature occurs during operation, the MAM controller shuts the motors operation down immediately. The air compressor can only be restarted after the cause of failure is eliminated. In case of emergency, press the emergency stop button to cut off power to the controller and contactors.

6. Early-warning and prompts

1. Indication of early warning for oil filter

- ① Early warning for oil filter blockage.
The controller can display a warning and sound an alarm to inform the operator of a blockage in the oil system by monitoring the pressure differences in the oil system.
- ② Set the running time alarm of the oil filter.
The LCD displays “OIL FILTER LIFE END” when the use time of the oil filter has been exceeded.

2. Indication of early warning for air filter

The LCD displays “AIR FILTER LIFE END” when the use time of the air filter has been exceeded.

3. Indication of early warning for oil separator

The LCD displays “O/A FILTER LIFE END” when the use time of the separator has been exceeded.

4. Indication of early warning for lubricating oil

The LCD displays “LUB LIFE END” when the use time of the oil has been exceeded.

5. Indication of early warning for grease

The LCD displays “GREASE LIFE END” when the use time of the bearing grease has been exceeded.

6. Indication of early warning for belt

The LCD displays “BELT LIFE END” when the use time of the drive belts have been exceeded.

7. High air temperature warning

The LCD displays “HIGH TEMPERATURE” when the air temperature is too high.

7. Controller protection

1. Motor Protection

MAM air compressor controllers provide all-round protection functions for short-circuit, rotor locking, phase failure, overload and imbalanced voltage and current of motor inputs.

Electronic failure	Failure Display	Reason
Short circuit	Display failure “HOST/FAN SHORT”	Short circuit or rated current is set incorrectly
Blocked	Display failure “HOST/FAN BLOCK”	Too large a load, bearing wear and other mechanical failure
Overload	Display failure “HOST/FAN OVER CARRY”	Too large a load, bearing wear and other mechanical failure
Phase failure	Display failure “HOST/FAN LACK PHASE”	Power supply, contactor and phase failure of motor
Unbalance	Display failure “HOST/FAN UNBLANCE”	Poor contact of contactor, inside open-loop of motor

2. Exhaust Gas Over-temperature Protection

When the air exhaust temperature is higher than the upper limit of the set temperature, the controller will shut the system down. The LCD will show “**HIGHT T**”.

3. Reverse Rotation Protection

When the three-phase supply sequence connected to the air compressor power inputs is not the same as that set for the controller, the LCD displays “**PHASE REVERSAL**”. The controller will not start the motor. Change the orientation of any two phase inputs to remedy the problem.

4. Overpressure Protection of Pressure Supply

When the gas exhaust pressure is higher than the upper limit of set pressure, the controller would be stopped for warning, the on-site failure is displayed as “**HIGH P**”.

5. Sensor malfunction protection

When pressure sensor or temperature sensor is disconnected, the controller would be stopped for warning. The failure is displayed as “**SENSOR FAULT”.

8. Remedy Common Failures

1. Failures Review

When a fault occurs, the controller interface displays the current fault content. For example, when the pressure sensor fails, it displays the following:

STOP:
P SENSOR FAULT

2. Common Failures and Causes

Failure	Reason	Disposal method
Air Exhaust Temperature too high	Insufficient ventilation, Oil low etc.	Check the cooler condition and oil level etc.
Temperature Sensor Failure	Cable or PT100 damaged	Checking the wiring and PT100
Over Pressure	The pressure is too high or the pressure sensor has failed	Check the pressure and the pressure sensor
Pressure Sensor Failure	Cable off/damaged, sensor damaged or cable connection reversed	Check the wiring and sensor transformer
Lack Phase	Power phase lacking or the contactor terminal damaged	Check the power supply and contactors
Overloaded	Voltage too low, tubes blocked, bearing wear or other mechanical failure. incorrectly set data etc.	Check the set data, voltage, bearings, tubes and other mechanical systems
Unbalance	Power input unbalanced, contactors damaged or open circuit in the motor	Check the power, contactors and the motor
Rotor Lock	Voltage too low, tubes blocked, bearing wear or other mechanical failure. Incorrectly set data etc.	Check the set data, voltage, bearings, tubes and other mechanical systems
Short Circuit	Incorrect wiring, incorrect data settings etc.	Checking the wiring and set the data correctly
Wrong Phase Sequence	Reversed phase sequence or phase lack	Check wiring and phase supply
Overload or Rotor locking during starting process	Host start time set to a value less than the star-delta time delay	Increase the host starting time to longer than star delta delay + load time delay
Main contactor activates time to time	The emergency button is loose	Check the wiring and button for failure

9. Electrical diagram

