SQ-I INTELLIGENT CONTROLLER

FOR

PERMANENT ELECTROMAGNET

OPERATION MANUAL

SHENG QIANG ENERGY-SAVING EQUIPMMENT CO.,LTD .

1. General Introduction

SQ-Ⅰ Series of Intelligent Controller for Permanent Electromagnet has the features as follows:

1. 8 level of adjustable magnetizing intensity.
2. Powerful output drive capability, when input with 380VAC, it can produce the max magnetizing and demagnetizing capability of 80A.
3. Complete safety features, spindle linkage function by input contact signal under unlock state or output contact signal under magnetization state. Equipped with adjustable alarm function for the case of magnetizing (demagnetizing) current over-current (or short circuit), less flow (or open circuit). The chuck is only connected with the power at the moment of magnetizing and demagnetizing.
4. Reliable and simple operation. All parameters settings and operating status can be monitored through the implementation of the host panel.
5. Flexible configuration, easy to use. It can build up 1-4 magnetizing and demagnetizing channels and can control 1-4 Permanent Electromagnets (or 1-4 Permanent Electromagnet Groups). Every channel can be set as open or closed, and can eliminate the residual magnetism of the surface of work-piece by demagnetizing or degaussing.
6. Equipped with a variety of optional control interface to meet a variety of on-line control requirements, it has the optional remote control or PLC interface.
7. Through the optional data communication function, 64 controllers can work simultaneously to operate as many as 512 Permanent Electromagnets under Matrix control or coordinated control. So it can meet the requirements on chucks of large, extra large mechanical processing equipments or machinery production lines.

Remarks: Magnetizing and Demagnetizing (Hereinafter referred to as M/DM)
Permanent Electromagnet (Hereinafter referred to as PMES)

2. Products Information

2.1 Type Definition (Product Order number code)

SQ-□-□-/□□ □ □

- H for Air Plug
- PL：PLC Interface for Different M/DM Intensity
- N：Remote Data Interface + PLC Interface
- 80：Output Rated M/DM pulse current 80A
- Numbers of Channels: Ⅰ:1~4 , Ⅱ:1~8
- Ⅰ(Ⅱ)：Product serial number
- Controller for Permanent Electromagnet

2.2 Technology Specifications

1. Input Supply Voltage: phase voltage AC $380V^{+10\%}_{-10\%}$

2. Output M/DM Current : ≤80A

3. Maximum wiring distance of the remote control: 4core× 0.5mm² shielded cable≥100m

4. Passive switch inputs: Unlock (unlock) control signal
Magnetization control signal (optional PLC interface)
Demagnetization control signal (optional PLC interface)
Selection signals of Magnetization intensity (4, optional PLC interface)

5. Passive switch outputs: Alarm of abnormal state
Magnetization state signal (optional PLC interface)
Demagnetization state signal (optional PLC interface)

Passive switch output contact capacity: 2A/125V AC 或 2A/30V DC

6. Range of M/DM intensity:1~8 (1as the min , 8 as the max , 0 stands for Prohibition of M/DM)

7. Switching interval for multi-channels: ≤0.25 Second

3 Installation, Wiring, and Use

3.1 Work Environment

(1) Don't install in the place contains too much conductive dust, metal powder, corrosive, explosive gas, and the vibration shall be less than 0.5G.

(2) Work Temperature : -10～45℃ .

(3) Humidity: 20% ~ 90% RH, no condensation droplets.

3.2 Install

This controller can be installed on the external of the machine and operate through the host panel directly. It can also be installed in the machine electrical control box, and operate by the remote controller or PLC. When install the controller on the external or use the remote, do please choose the sheathed cables that meet the safety requirements.

3.3 Electrical wiring

(1) Install an air Isolators with a tuning current of 63A between the power supply and the controller terminals, for the isolation between the power supply and the controller.

(2) Copper wire of 2.5～4mm² can be used as the power input wire to connect to the L1, L2, power input interface of the controller . According to the rated M/DM current of the PMES , and the wiring length , copper wire of 1.5～4mm² can be used between the controller and the chuck . The wires from the power supply to the controller, and from the controller to the PMES shall not be too long, So as to avoid excessive line losses and affect M/DM effects.

(3) Grounding the "PE" point (protection point) of the controller safely and firmly.

(4) Remote Controller (remote) selects using 0.2 ~ 0.5 5-core shielded cable (or stranded wire) to connect to the remote terminal of the controller , Cable shield proximal (near the end of the controller) should be connected to the controller's ground terminal . Control cables should be fully away from the main circuit and strong electrical circuit (including power lines, electric lines, relays, contactors cable, etc.), and cannot be placed in parallel with it (can use vertical wiring), to avoid interference.

(5) If the control panel relay output contacts is used for driving inductive loads (such as contact relays, contactors) , and absorb surge voltage circuit should be added , Such as: RC absorbing circuit.

3.4 Requirements to the magnet

(1) Electrical parameters and controller parameters matched

(2) No short circuit or open circuit in the coils ;

(3) Disk-to-ground insulation resistance shall not be less than 1MΩ

4 Operation

4.1 Operation panel

You can use the operation panel to set the parameters of the controller and monitoring status. The controller panel is divided into two parts: upper part is the digital display panel and lower part is operation keyboard, shown in Figure 4.1 and Figure 4.2. Their operation process is shown in Attached Figure 1 and 2.

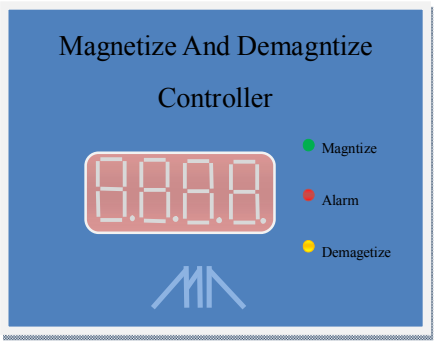

Figure 4.1 Digital Display Panel

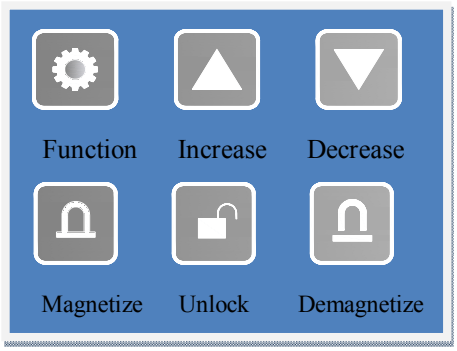

Figure 4.2 Operation Keyboard

Function of the panel items shown in the following table：

Item	Name	Function Description
Function	Function	Channel current query, the menu entry, parameter save
Increase	Increase	Sub-menu switching, data modification
Decrease	Decrease	Sub-menu switching, data modification
Magnetize	Magnetize	Magnetization Operation
Unlock	Unlock	Channel status query, menu, exit, M/DM operation
Demagnetize	Demagnetization	Demagnetization Operation
	Digital display	Working status, operating data and system information

○ Magntize ○ Alarm ○ Demagetize	LED Indicator	Indicate the working status of the controller

Magnetize（green light）: Indicator of Magnetization Status. Maintain On: Controller has finish Magnetization Operation；Flashing: Magnetization Abnormality.

Alarm（red light）: Abnormality Indicator. Maintain on: M/DM Abnormality.

Demagnetize（yellow light）: Indicator of Demagnetization Status. Maintain On: Controller has finish Demagnetization Operation；Flashing: Demagnetization Abnormality.

4.2 Controller parameter settings, and working status

(1) Standby state： High (Left) side of the digital display window does not shine, bottom (right) side shows a number between 0-8. If it shows 0 means to stop M/DM operation; IF it shows a number between 1-8, it means the intensity control value of M/DM. 1 corresponds to the min. limit and 8 corresponds to the max. limit. Controller can only magnetize or Demagnetize under the state of standby or work status display. Under normal circumstances, the controller is in standby mode after the power is turned , and the controller shows as 8888.

(2) State of Channel working status display：Press 🔓 for 1Swill enter this state ，the 4 upper digital tube in the digital display window, form right to left shows the working status of channel 1-4 . Not shine : the channel does not work ; Maintain On： M/DM operation in the channel works well . ；Quick flash (flashing period is less than 0.6S) ：M/DM operation in the channel is over-current .（Now please notice：a. Check whether the max. limit setting of the magnetization current is too small；b. Check the setting of Magnetization intensity is too large；c. Cable insulation is normal ；d. Is there any partial short-circuit within the winding in the chuck ）；Slow flash(Flashing period is more than 0.8S)：M/DM operation in the channel is under-current（Now please notice：a. Check whether the min. limit setting of the magnetization current is too large；b. Check the setting of Magnetization intensity is too small；c. Cables in good contact ；d. Is there any open-circuit within the winding in the chuck）。For example: Digital Window Displays: 8888From right to left, 4 upper digital tube maintains on , it means channel 1-4 works well , and the other channels don't work .Press ⚙ or🔓 back to standby state.

(3) State of channel M/DM pulse current display :when in standby state, press ⚙ to enter ，the far left number on the digital display window shows the number of the channel ，The right two numbers show the M/DM pulse current of the channel . For example: Digital Window Displays: 2=48 , It means the current of the PMES controlled by channel 2 is 48A. Press▲or

▼ to choose the displayed channel ; press or back to standby state .

(4) M/DM Parameters setting ：In the standby state , press and together for 3S to enter the state of parameters setting .Now the digital displays PASS ; press to display setting command ,press ▲ or ▼ to modify the value ,press to choose the modify position of ▲ or▼(when the far right decimal point of the digital display shines, it is the digits, when the middle decimal point shines , it is the 100digits) . The command to make the digital display parameter setting is 8088, press again to enter the state of M/DM parameter settings.

NOTICE: The parameter of M/DM has been set in the best program in the factory, Non-professionals do not freely modified, so as not to affect the control effect.

(5) Exit and Storage of Parameter Setting State：In the state of parameter settings , press 3 seconds , the modified date will be stored into the EEROM Memory of the controller permanently and it will go back to standby state .

4.3 M/DM Operation

(1) PLC interface operation : When you choose PLC interface to operate M/DM , the controller must be in the state standby or channel working status display . The detailed operations are as follows:

a. Magnetization：Unlock input signal and magnetization control input signal, and keep the connected time>1S , and the controller has no completed magnetization operation last time (When the control instruction method of implementation is to maintain state). In normal magnetization operation, the magnetization LED indicator maintains on and the magnetization state relay contact is closed; otherwise, the magnetization LED flashes, the Alarm LED maintains on and the Alarm state relay contact is closed.

b. Demagnetization :Unlock input signal and demagnetization control input signal, and keep the connected time>1S, and the controller has no completed demagnetization operation last time (When the control instruction method of implementation is to maintain state). In normal demagnetization operation, the demagnetization LED indicator maintains on and the demagnetization state relay contact is closed; otherwise, the demagnetization LED flashes, the Alarm LED maintains on and the Alarm state relay contact is closed.

(2) Controller Panel Operation：When you choose Remote to operate M/DM, you must meet the condition that : **a.** the controller must be in the state standby or channel working status display .**b.** The controller is self-controlled or doesn't connected with Remote and the unlock input signal keeps connected on .The detailed operations are as follows:

a. Magnetization：Set the controller in standby state , press ▲ or ▼ to modify the control value of M/DM intensity to the required value . , then press and on the controller

panel together>1S , and the controller has no completed magnetization operation last time(When the control instruction method of implementation is to maintain state) .In normal magnetization operation , the magnetization LED indicator maintains on and the magnetization state relay contact is closed ; Otherwise , the magnetization LED flashes , the Alarm LED maintains on and the Alarm state relay contact is closed .

b. Demagnetization：Set the controller in standby state , press ▲ or ▼ to modify the control value of M/DM intensity to the required value . , then press and on the controller panel together>1S , and the controller has no completed demagnetization operation last time(When the control instruction method of implementation is to maintain state) .In normal demagnetization operation , the demagnetization LED indicator maintains on and the demagnetization state relay contact is closed ; Otherwise , the demagnetization LED flashes , the Alarm LED maintains on and the Alarm state relay contact is closed .

(3) Notes：During the M/DM operation, if the controller quick flashes 8.8.8.8. , now human body cannot carry magnetic materials nor touch work pieces. And we should keep a certain safe distance from the PMES.

5 Frequently asked questions and treatment methods

Common Faults and Treatments

Common faults and treatments are shown in the following table：

Faults Appearance	Treatment
The panel has no display when the power is on , and there is no sound of relay reset	Check the input voltage of the power and the whether the connection is firm
M/DM action contrary	Polarity of the PMES is connected reversely , adjust the connection after you turn off the power
No reaction for M/DM operation when the controller is in the standby state	1.Disconnect the remote and set the controller in the state of self-controlled 2. If the way of command is maintenance , check the LED indicator of M/DM ,whether to repeat the last operation .
Alarm LED shines After M/DM operation	Check M/DM current in the channels, If the current is in normal state , then modify the parameter setting of max and min limit of

	M/DM current ; If the current is in abnormal state , check the connection cable between the controller and the PMES and the Winding of the PMES , If there is no problem , then modify the max and min limit settings of the M/DM intensity .
Some part of several groups of PMES don't work	Check the connection cables from these group to the controller , if the connection is all right , check the switch of the channels
The effects of M/DM operation is not as good as expectation	Modify the max and min limit settings of the M/DM intensity and modify parameter settings of the M/DM pulse .

6 Warranty and Service

1、The warranty period is 12 months , if the product is normally used in the warranty period , our company will be responsible for free repair of any fault or damage .

2、The warranty period starts from the manufacturing date of the product .

3、In any of the following cases ,we will charge a maintenance fee , even when it is in warranty period :

①Any fault or damage caused by operation which doesn't follow the Manual .

②Any fault or damage caused by fire , soaking and abnormal voltage .

③Any fault or damage caused by abnormal usage .

4、Service costs are based on actual cost basis , in case of another contract , the contract has priority .

SHENG QIANG ENERGY-SAVING EQUIPMMENT CO.,LTD .

Address : No.70 , Three Floor Home Appliances Center,43 Xinning Road Daliang,Shunde,Foshan

Tel : 0757-22301299

Fax : 0757-22231868

QQ : 1072671693

E-mail : info@sq-epplc.com

Http://www.sq-epplc.com