YCY-115B LAMINATOR

USER'S MANUAL

(2006)

BEIJING YC DIGITTECH LTD.

JUNE 2006

WITH gratitude:

We thank you for your choice of YCY-115B Laminator and you are our client who will achieve all round and good service from us.

Attention:

Before you carry out installing, adjusting and operating, please take some time to read the user's manual carefully. It will let you feel more easer and also to be sure that machine runs normally.

YCY-115B Laminator control system

BYCD ® YCY-115B V1.00, 2003

Contents

1 Safety directions

1.1 Safety prompt

Design of the machine is in accord with safety rules for factory, the safety units installed are in a position to protect the operators of machine and prevent any danger by accident from machine itself. The operators should not just count on these safety units and also have to read and understand the safety preventive measures mentioned in the safety chapters of manual, then can start to run machine.

Note: unsuitable operation might harm to people and other equipments around the machine.

1.2 Safety points before machine in operation

1.2.1 Confirmation before turn on power supply

a. Make sure to do routine inspection well as required in the safety chapters of manual.

b. Make sure that all safety doors of machine have been closed completely.

c. Make sure that all operating switches of machine are at correct operating position.

1.2.2 Turn on power supply

a. Make sure that the rotation of the motor of oil pump is in a correct direction. Look into it from the rear of the motor, a direction of counter clockwise rotation is correct.

b. Make sure that the indicate lights are normal.

c. Make sure that all safety units of machine as the protectors, a switch of safety door, an emergency stop button and grounding wires, all are set correctly.

1. 3 Safety points for operating machine

The machine contains some heating parts, hydraulic press parts and high voltage, therefore if the operator does not follow the safety points below, the machine might have some potential dangerous situations.

1.3.1 Operators have to be trained and carefully read the safety points below as well as make sure to be acquainted with all means of operation.

a. The operator has to know about means of operation of the machine well.

b. Do not take off the safety units, protectors, emergency stop button and grounding wires of the machine.

c. Must know how to stop machine in an emergency.

d. Do not try to stop the running machine with an article or your hands, in particular heating parts.

e. More than 2 people together run the machine at the same time to be definitely prohibited.

1.3.2 Only the qualified technician can do maintenance of electric system, hydraulic system and mechanical system

a. Turn off the power supply before opening the door of electric cabinet.

b. Make sure that all of power sources are off, before taking off and changing the electric parts.

c. Use the insulation tools in working.

d. Neither use a fuse that is beyond signed limit or other metal wires.

e. When changing any wire, be sure to use as the same specification and color as original.

f. Be sure that nobody runs the machine, before turn on the power supply.

g. Do not put anything on the control box or operating place, for example, water and food.

h. Do not touch the switches of machine or any electric parts with wet hands.

1.4 Prevent from seriously harm to body

a. Face to the machine to operate the panel in regular procedure.

b. Do not let your hand or any parts of body stretching into the running machine when you bend down.

c. When the motor is rotating, don’t let other people be close to the machine from behind or beside.

d. When the motor is rotating, don’t let your hand or any parts of body reach into the domain of moving mould plate.

e. Follow the instruction to operate and maintain machines.

f. Do not examine and repair the mould plate when the motor is rotating.

g. Whenever leaving or having any adjustment of machine, be sure to turn off the power supply.

h. If the machine is in un-normal condition, please inform to your chief or instructor so that doing repair.

2 Specification

2.1 Appearance of machine

2.2 Major technical parameter

Applicable material:	PVC or other plastics material
Laminate layout:	3×8or 5×5
The number of mould plates:	3 each of cool and heat
Dimension of mould plates:	420×520 mm
Interval between mould plates:	50mm
Material layers (Max.):	15
Working pressure:	0.8~15Mpa adjustable
Pressure precision:	±0.3MPa
Heat temperature:	≤160°C
Temp. control:	±0.5°C
Cylinder travel:	240mm
Hydraulic tank volume:	300 liter
Power supply:	AC380V 50Hz 5 wires in 3-phase
Power:	13.0kW
Productivity (cards):	750 cards per cycle (at 3x8)2000cards per hour
Dimension:	L1260×B1000×H1800mm
Weight:	Appr.2000 kg

3 Installation

3.1 Environment of install

3.1.1 Install place The place should be far away from inflammables, there is no combustible air in workshop, do not stack any goods behind the machine.

3.1.2 Ground requirement the machine should be installed into a standard industry factory building. The installed ground should be smooth and solid. A depth of concrete pad will not be less than 200mm. If an installation is at second floor or above, have to be sure that the bearing of floor meets requirements.

3.1.3 Environment of install The workshop should be airtight, dustless and have the ventilation installation.

3.1.4 The requirement of Power source Power supply is as AC380V/50Hz, 5 wires in 3-phase, ground wire is grounded reliably. Ground resistance < 0.1 ohm. Ground wire > 4 mm^2,

3.2 Load and unload machine

Select lifting place based on the mark of gravity center. Keep the machine in equilibrium throughout lifting. When using a crane to lift, need to select the suitable sling rope. The rope should be pulled straight and try first to slide down. Do not let the rope damage the outside and any parts of the machine.

3.3 Unpack and lay down machine

3.3.1 Check on the outer package of machine, if there is any damage, please inform supplier. Otherwise unpack the package.

3.3.2 Level off body of machine with a level. If a floor is not smooth, try to put some pads until making the machine level.

3.3.3 Open a cap of oil tank then fully pouring oil. Using ISO VG46 Anti-Wear Hydraulic Fluid.

Note: *Hydraulic oil must be accorded with the standards and make sure that the oil is clean. An improper use or unclean oil could speed up the wear of oil tank and hydraulic system.*

3.4 Connection between machine and main power supply

Caution: *Only qualified technician can make a connection of main power supply. A voltage of power supply for machine is as AC380V, if get an electric shock, it would cause some damages of machine or might lead to injuries and deaths on people.*

3.4.1 Must be in accordance to a circuit diagram to connect a power supply of machine on an assigned wiring position. The machine must be in safety grounding.

Ground wire	U (red)	V (red)	W (red)	Zero N (blue)
Electrical board	1	2	3	N

Caution: *never share a single grounding wire by two machines or more.*

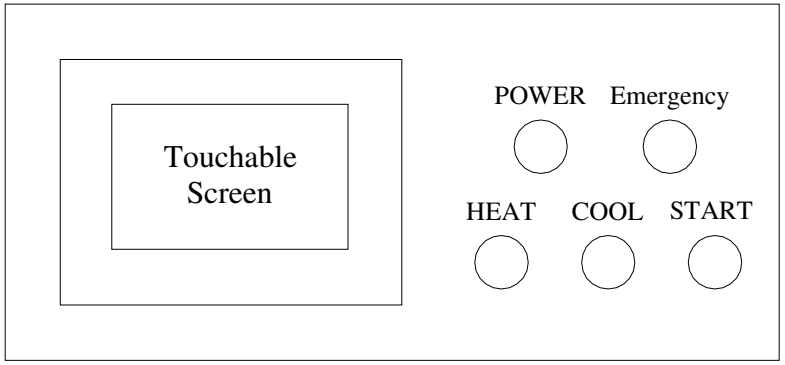
3.4.2 After connecting the power, check a rotation of motor of oil pump, the rotary direction should be as the same direction as the arrow point. The way to check the rotary direction of motor: Press the start button of pump, then pressing the stop button at once. See if the rotary direction is correct, if it is not, swap the places of 2 input power wires of AC380V. Repeat doing as indicated above. Make sure that the rotary direction of motor is correct.

Caution: *Be sure never let the motor rotate on incorrect direction more than one minute.*

4 Operation

4.1 Directions of operation panel

4.1.1 Illustration of operation panel



4.1.2 Function of push buttons

（1）**Power switch** (self-lock button) After pressing down the button, power supply is connected through, the system is power on and the power indictor lights; press again to reset and cut off power, the indicator off.

a. When power is on, all of electrical equipments and hydraulic system are in a state of stand-by.

b. When need to stop the machine, usually just reset the button; if no work for a long time, pull off the power plug.

c. Only this button is at 1 position, all of electrical equipment and hydraulic system are able to work.

（2）**Heating button**(self-lock button) Press the button, the heat press plates start heating and the heating indictor is lighting; press again (reset) to stop heating and the heating indictor light is off. Auto/manual all are effective.

Note: it can heat only in selecting work, otherwise PLC alarms. If PLC alarms, cut off power then restarting.

（3） **Cool button**(self-lock button) Press the button, the cooling pump starts, the cool indictor is lighting; press again(reset) to stop the pump and the cool indictor light is off. Auto/man all are effective.

（4） **Start button** (reset button) In automatic mode, after press this button for **1 second**, the hydraulic oil pump starts, the system begins automatic cycle.

（5）**Emergency Stop button** In an emergency situation, can press the button to cut off heating and the motor of oil pump.

a. If there is any abnormal status in works, press this button immediately to stop the machine, so that find out the reason caused the abnormal status.

b. After eliminating fault, turn the button in clockwise. When the spring clicks springing back, stop turning and release the button. It is relieved of emergency stop, self-lock resets.

c. After terminating an emergency stop, press the start button to restart operating.

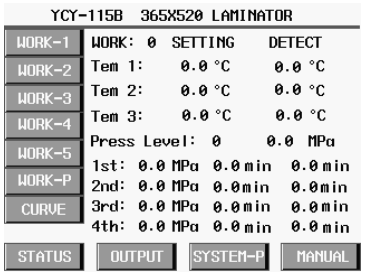
4.2 Touch screen display and function select

4.2.1 Initial display

Press the power button, after power supply is on, a display is showed as below:

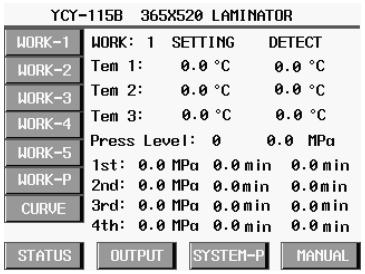
Touch Operation , the machine goes into a work status and gets a work display.

4.2.2 Work display



Touch Work 1 , goes into work 1 display

Work 1 display:

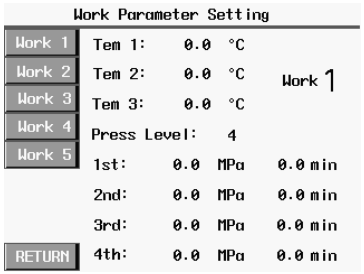


Note: When power is on, PLC default is Work 0, ***must select a Work number first****, then being able to operate as below.*

Display time at right column is counted time, a work goes at which pressure level, which one begins to count down time. Above display shows the second level remains 0.4 minute before it finishes.

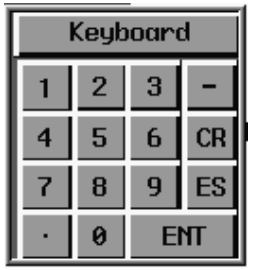
4.2.3 Amend work parameter

Work parameters include heat temperature, the number of pressure level, pressure and holding time of each pressure level. Touch Work-P , enter into the display of amend work parameter:



At first select work No. when amending parameters, work 1 is selected as above display, then doing as below procedure:

a. To amend temperature setting: touch temperature value(100.0), a number key board is bounced as below:



Touch relevant number, then touching ENT to confirm input, the number key board is closed.

Note: temperature range is as 0.0 – 175.0

Operation of number key board:

Amend: CR, touch CR to delete number inputted.

Cancel: ES, touch ES to close the number key board

Confirm: ENT, touch ENT to confirm number inputted, the key board is closed.

Move key board: at first touch top of board then touch a position moved to, the key board is going to be moved to the position second touched.

b. To amend the number of pressure level: touch value(4) of pressure level to bounce number key board, then touch relevant number, last touch ENT to confirm input, the key board is closed.

Note: the number of pressure level range is among 1 – 4.

c. To amend pressure setting: touch value (1.0) of pressure setting to bounce the number key board, then touch relevant number, last touch ENT to confirm input meanwhile the key board is closed.

Note: pressure setting range is: 0.0 – 15.0 as well as 1st pressure level < 2nd pressure level < 3rd pressure level < 4th pressure level; 1st pressure level > pressure precision +0.3.

d. To amend time setting: touch value (1.0) of time setting to bounce number key board, next touch relevant number, then touching ENT to confirm input, the key board is closed.

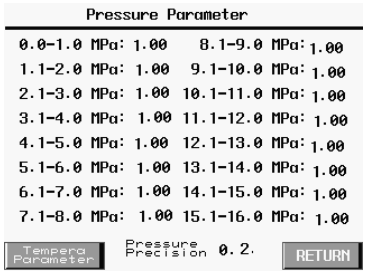
Note: time setting range is as 0.0 – 99.0.

e. After finishing amend and confirm it is correct then touching RETURN to go back the work display.

Note: the work parameters are only effective at this work.

4.2.4 Amend system parameters

The system parameters include pressure parameter, pressure precision and temperature control parameter. Touch System-P to go into the display of amending system parameter.



a. To amend pressure parameter: eliminate an appearance of pressure overdoing by amending pressure parameter, normally set this parameter among 0.80 – 1.00, the increasing or decreasing value of each amending is not bigger than 0.02. This value is already set at factory and do not change it rashly. If the value is bigger, pressure may overdo, otherwise if smaller, pressure may not reach to the setting value. It is ordinary better to adjust pressure by 0.3MPa higher than setting.

Note: pressure parameter range is 0.80 – 1.00.

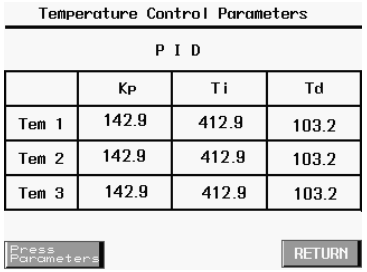
b. To amend pressure precision: to determine the pressure at starting compensating pressure by amend pressure precision, ordinary set the value as 0.3 – 0.5. For example, set pressure to 5.0MPa and pressure precision as 0.3, when pressure is down to 4.7MPa, the hydraulic system will automatically concentrate pressure to 5.0MPa. The hydraulic system will be easy to vibrate at this value smaller than 0.3. Recommend to set the value as 0.3.

Note: pressure precision range as: 0.3 – 0.5.

c. To amend temperature control parameter: to change rising speed and control precision of temperature by amending temperature control parameter. Touch Tempera parameter to enter into the display of amending temperature control parameter.

Temperature control parameters have Kp, Ti and Td. Kp affect speed of temperature rising, Ti affect temperature precision and Td affect time of taking by temperature curve approaching setting value. Increase Kp, decrease Ti and Td will quicken response, otherwise decrease Kp, increase Ti and Td will slow down response. It should be around 10% by each adjusting, then making amendment according to curve variation. Kp, Ti, Td have been set at factory, do not amend it without PID experience. Maintenance person must take Kp, Ti and Td on record.

Note: do not amend temperature control parameters rashly.

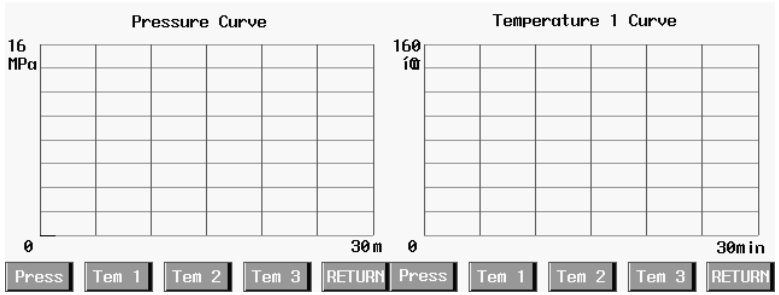


e. After amending and confirm it is correct then touching RETURN to go back the work display.

Note: system parameters are effective on all of works.

4.2.5 Curve

Touch [Curve] to show the immediate pressure and temperature system detected in the form of curve.

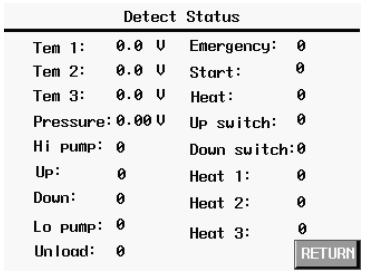


Abscissas show time, ordinates show pressure or temperature, data in last 30 minutes are held.

Touch [RETUR] to return to work display.

4.2.6 Detect status

Touch [Status] to display the status and data of input and output detected by system.



Correspondence relation between voltage and temperature:

Voltage (v)	0	1	2	2.8	3	3.1	3.3	3.6	3.9	4	4.2	5
Temp.(℃)	0	36	72	100	108	110	120	130	140	144	150	180

Correspondence relation between voltage and pressure:

Voltage (v)	0	0.25	0.50	0.75	1.00	1.25	1.50	2.00	2.50	3.75	5
Pressure (MPa)	0	1	2	3	4	5	6	8	10	15	20

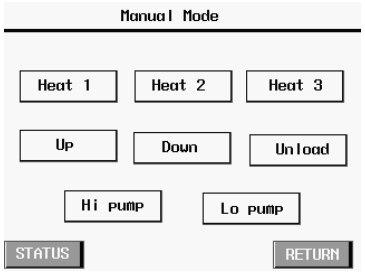
Input and output status:

	Emergency	Start	Heat	Upper limit	Lower limit	Hi Pump	Up	Down	Lo Pump	Heat 1	Heat 2	Heat 3
0	Emergency	Stop	Stop	Running	Stop	Stop	Off	Off	Stop	Off	Off	Off
1	Run	Running	Heat	Stop	Running	Running	Up	Down	Running	Heat	Heat	Heat

Touch [RETURN], system return to work display

4.2.7 Manual

Touch [Manual], system goes to manual mode and displays as below:



a. It will stop automatic circulation that shift running to manual mode, it is necessary to press the start button again for doing work if back to running from manual mode,

b. Touching keys are holding keys, touch once to work, touch once more to stop.

c. To move mould plates up fast by manual operation, need to touch Hi pump and Up simultaneously. It is same at down move.

d. Touch Hi pump and Lo pump and Up the plates move slowly.

e. Touch Status to shift system into select status, so that observe about input information. At this time from the display of select status return back, it still go back to manual display, not work display.

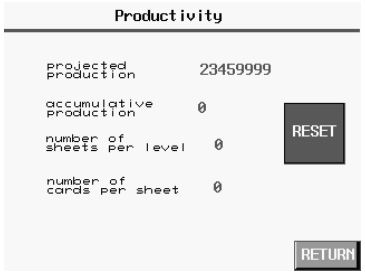
f. Touch RETUR , the system return to work display.

4.2.8 Productivity

Touch OUTPUT , the system goes into display of production statistics. The display helps operator to count up output. Touch a relevant number area to call in the number keyboard, input relevant number. Accumulative production is obtained by system counting.

Note: system counts accumulative production by the same number of sheets on two levels.

Touch RETURN system back to work display.



4.3 Operate machine

4.3.1 Automatic operation

a. Push down “Power” button, power indicator is on, system is electrified and initial display showed.

b. Touch “Operation” to enter work display.

c. Touch “Work parameter” key to enter parameter setting display, separately set temperature, pressure and time then touching “Back” key to return to work display.

d. Select work number, check parameter and see if correct.

e. Push down “Heat” button, heating indicator is on and start to heat.

Note: to shorten heat, can move up plates to heat.

f. Heat pressure: when temperature reaches at setting, place materials, push down “Start” button, the plates move up, pressing and compensating. Setting time is up, the plates automatically move down, a single cycle of heat pressure is finished. If the technical parameters for cool pressure are as the same as ones for heat pressure, then cool and heat pressure can be done at the same time. When cool pressing, should press down “Cool” button. If the technical parameters for cool pressure are not as the same as ones for heat pressure, then should do cool pressure independently.

Note: cooling system is not controlled by PLC. At any status, press down “Cool” button that can start the pump of cooling water.

g. Cool pressure: select work number, check whether the parameters are correct. Place materials, press down “start” button and “cool” button, the mould plates move up, pressing and compensating; Setting time is up, the plates automatically move down. A single cycle of cool pressure is finished.

h. If on accident, press “Emergency stop” button to exit.

Note: Before starting lamination, should adjust a position of upper limit switch. When mould plates push down the upper limit switch, the motion will be slowed down to ensure slow pressing. It is better to normally adjust a gap between material on top layer and plate above it to 5 mm. The upper limit switch is behind plate right side. After adjusting, need to lock it up. If materials’ depth is changed, need to readjust the position of upper limit switch.

4.3.2 Manual operation

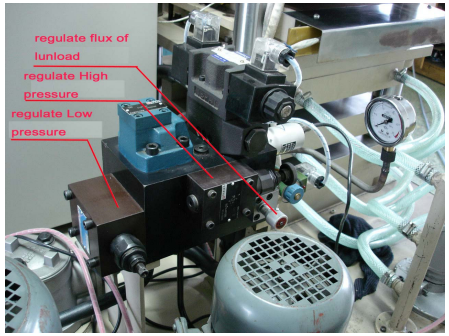
When doing machine adjustment, all of start/stop of motor of oil pump, mould plates up, mould plates down, start/stop of motor of water pump and heating of plate of each level are able to operate independently. Above actions can be done through “Manual” interface

5 Adjust, maintenance and eliminate faults on machine

5.1 Adjusting of system pressure

Note: adjusting work of system pressure done by hydraulic engineer.

Adjusting of system pressure is to be done by adjusting the pressure-regulating valve. It has been done well before shipment, no touch in an ordinary situation. Regulate value of Hight pressure system pressure is 15MPa and value of Low pressure system pressure is 3MPa. If need to adjust, do it with reference to below figure.



(1) Loose the protective nut of pressure regulating valve;
(2) Loose the lock nut of pressure regulating valve;
(3) Turn screw clockwise to increase pressure, turn counter clockwise to reduce pressure;
(4) to be suspended for a moment on every adjustment of rising by 2 –3 MPa, when pressure is stable, go on to adjust;
(5) Adjusting to 15 MPa then tightening the lock nut and the protective nut, adjusting is completed.

5.2 Maintenance of machine

Item	Substance and manner of maintenance	Period
1	Machine must keep clean and dry, regularly clear and clean various positions of mechanism,	1/wk
2	It is necessary to clear and lubricate various movable parts (various guide pillars) regularly.	1/wk
3	Check various screws and nuts of connecting and tight to see if loosed, in the light of conditions to tighten or change.	1/month
4	Check various connection of wires to see if loosen or cracked, then reconnecting or changing wires.	1/month
5	Measure resistance of electrothermal tubes to see if values of 3 levels are identical, change damaged electrothermal tube.	1/month
6	Check connection wires of tubes to see if loosed, tighten or change.	1/month
7	Environment around the machine must be clean, dry and no pollution.	Long term
8	Often observe the altitude of surface of hydraulic oil, when lower than 3/4, fill up promptly.	Often
9	Observe the temperature of hydraulic oil, it should not be higher than 60℃	Often
10	After the machine runs for 1 year, should change hydraulic fluid, which grade is as ISO VG46 Anti-Wear Hydraulic Fluid.	1/year

5.3 Eliminate faults

Appearance of faults	Elimination ways
Can not hold pressure	1.Check various positions of oil pipes and connectors of pipes between hydraulic cylinder and integrated unit, if there is any oil leakage, then changing pipes, combined gaskets or “O” sealing washers that are damaged. 2.Change hydraulic lock. 3.Check the position between pressure gauge and integrated unit, if there is any oil leakage, make a correspondent treatment.3. If there is no problem on what above mentioned, check inner sealing washers of cylinder to see if damaged and make a correspondent treatment.
Very low or no pressure	1. It is as the same as above appearance. 2.Check the conjunctions of various valves and integrated unit, if there is any leakage, treat correspondently. 3.Check the pipe and joint between the outage of oil cylinder and integrated unit, if there is any leakage, treat correspondently. 4. See if an oil in the tank is enough and treat it correspondently. 5.If no trouble on the appearances above mentioned, then changing hydraulic pump.
Temperature rising of heat plates is too slow or can not reach at setting temp.	1.Check electrothermal tubes to see if there is short or broken circuit, treat correspondently. 2.Check temp. sensor to see if work correctly. 3.Check solid-state relay and circuit, treat correspondently. 4.Check fuse if blown, find out reason first then changing.
Detected temp. by PLC are abnormal.	1.Under indoor temp. show minus or drifted off, check connectors of temp. sensor and temp. transmitter if damaged or loose, change or reconnect. 2. Indicate 180℃, there is a short or thermal resistor damaged. Check and change. 3. Check resistance of thermal resistor. Should be little more than 100Ω under indoor temp..
Detected pressure by PLC abnormal.	Indicate negative or invariable, check connector of pressure sensor if damaged or loose, change or reconnect.

5.4 List of sealing parts of hydraulic system

5.4.1 Sealing of hydraulic pressure

No.	Name	Code	Material	Specification	Qty.
1	Support ring	Yb metallurgy standard guide ring	poly-formaldehyde	D=220×30×5	1
2.	Piston sealing	Q/ZB 248-77		D220	2
3	0 Sealing washer	GB1235-76	Rubber I-4	100×5.1	1
4	0 Sealing	GB1235-76	Rubber I-4	220×5.7	1
5	Piston rod sealing	Q/ZB 248-77		d160	1
6	Dust ring	Q/ZB 336-77	polyurethane	d160	1
7	Support ring	Yb metallurgy standard guide ring	poly-formaldehyde	d160 15×2.5	1

5.4.2 Sealing of hydraulic valve

No.	Name	Code	Material	Specification	Qty.
1	O Sealing washer	GB1235-76	Rubber I-4	10×1.9	32

5.4.3 Sealing of valve unit

No.	Name	Code	Material	Specification	Qty.
1	Combined sealing gasket	JB982-77	Combined part	Gasket 14	3
2	Combined sealing gasket	JB982-77	Combined part	Gasket22	3
3	Combined sealing gasket	JB982-77	Combined part	Gasket 33	1

5.4.4 Sealing of pipe

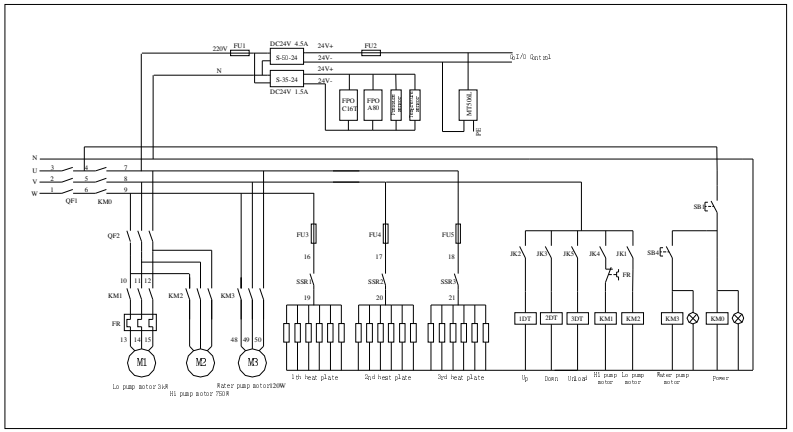
No.	Name	Code	Material	Specification	Qty.
1	0 Sealing washer	GB1235-76	Rubber I-4	16×2.4	4

5.4.5 Sealing of meter pipe

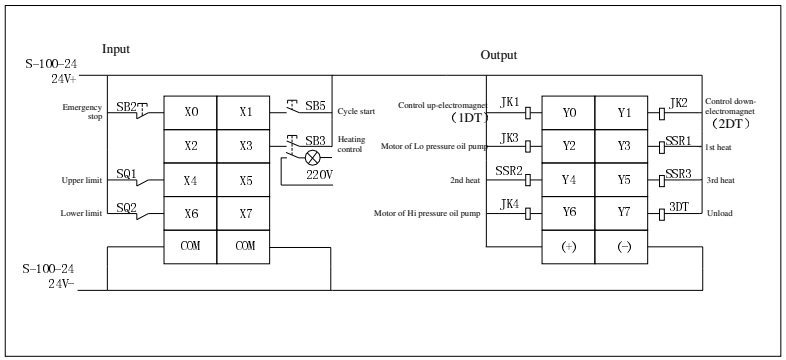
No.	Name	Code	Material	Specification	Qty.
1	O Sealing washer	GB1235-76	Rubber I-4	6×1.9	2

6 Electrical material

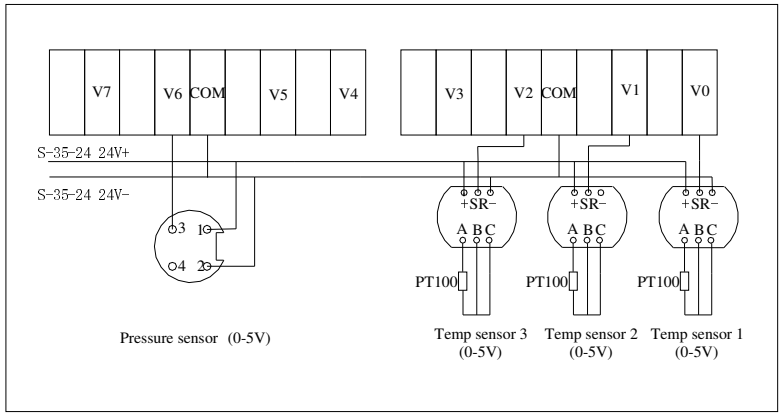
6.1 Main circuit diagram



6.2 I/O control diagram



6.3 Data collect



6.4 List of electric detail

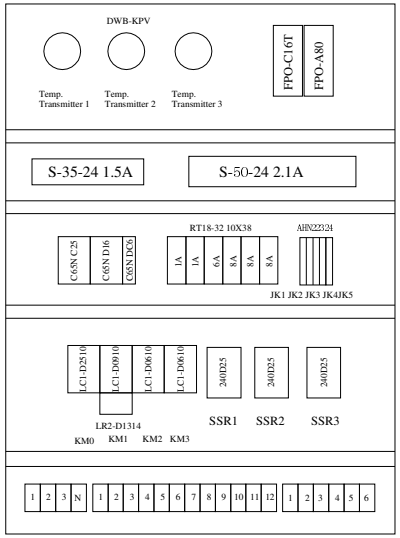
Code	Name	Use		Code	Name	Use
M1	Motor	Motor of Low pressure pump		SSR2	Solid-state relay	Second level heating 220V25A
M2	Motor	Motor of High pressure pump		SSR3	Solid-state relay	Third level heating 220V25A
M3	Motor	Motor of water pump		JK1	Relay	Control start of Low pressure pump motor
QF1	Air switch	Control main power		JK2	Relay	Control up-electromagnet
QF2	Air switch	Control power of oil pump motor		JK3	Relay	Control down-electromagnet
QF3	Air switch	Control power of 220V		JK4	Relay	Control start of High pressure pump motor
KM0	Contactor	Control main power		JK5	Relay	Control of unload
KM1	Contactor	Control start of Low pressure pump motor		1DT	Electromagnet	Up-electromagnet
KM2	Contactor	Control start of High pressure pump motor		2DT	Electromagnet	Down-electromagnet
KM3	Contactor	Control start of water pump motor		3DT	Electromagnet	Unload-electromagnet
RF	Thermal relay	Control oil pump motor		SQ1	Limit switch	Upper limit
FU1	Fuse	Control and detect circuit 220V6A		SQ2	Limit seitch	Lower limit
FU2	Fuse	Detect circuit 24V3A		SB1	Self lock button	Power switch
FU3	Fuse	Fist level heating 220V20A		SB2	Emergency stop button	Emergency stop
FU4	Fuse	Second level heating 220V20A		SB3	Reset button	Heating control
FU5	Fuse	Third level heating 220V20A		SB4	Self lock button	Start of water pump motor
SSR1	Solid-state relay	First level heating 220V25A		SB5	Reset button	Cycle start

6.5 Table of tips definition

Tips No.	1	2	3	4	1	2	3	4	5	6	7	8
Line No.												
Definition	U	V	W	N	Motor of Low pressure pump			Motor of High pressure pump				

Tips No	9	10	11	12	1	2	3	4	5	6
Line No.										
Definition	Upper limit	Lower limit	24V+	24V-	Heat 1	Heat 2	Heat 3	N		

6.6 Position diagram of electric parts



7 Spares, tools and material along with machine

7.1 Spares and tools along with machine

Electrothermal tube:	6 pcs.
Sealing washer:	1 set
Wrench:	1pc.

7.2 Material along with machine

User's manual	1

Note, added cool water machine