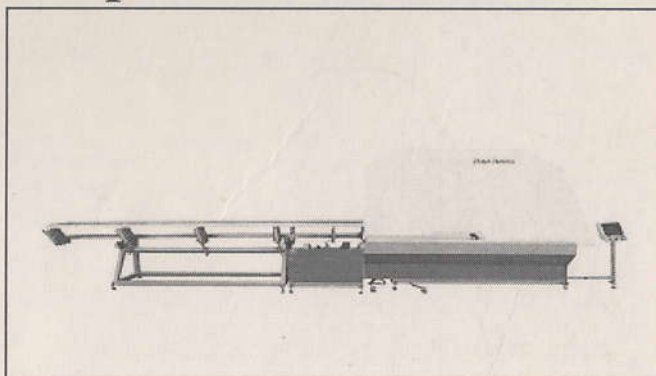




**HJ-ASBM-2008 II B&R Control system
Automatic Spacer Bending Machine**

Operation Instruction



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HJ-ASBM-2008 II Automatic Spacer Bending Machine

Operation Instruction

Chapter One Technical Features of Bending Machine

Section One Technical Features

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Section Two Main Interfaces

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Section Three Adjustment for Supply motor bracket and roller pressure

Section Four Adjustment for guide component bracket and pressure

Section Five Adjustment for supply clamp bracket and pressure

Section Six Connecting adjustment between magazine and bending mechanism.

Chapter Five Equipment Troubles and Relative Measures

Section One Actual spacer frame size not check with fixed value

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Section Four Clamp for Supply Fail to Work

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Section One Shut off the power in Control Box after Operation

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Chapter One Technical Features of Bending Machine

Section One Technical Features

- 1. Apply Σ TECH control system.**
- 2. Apply servo motor feeding and bending system by numerical control. The error of spacer frame is within 0.3mm/min and angle bending accuracy within 0.5° .**
- 3. There are four profile magazines for 4 different varieties of spacer specifications. Set up size data of three specifications for continuous processing.**
- 4. Spacer feeds and connects each other automatically.**
- 5. All the processing work is completed automatically except to fill the profile and move away frame manually.**
- 6. The equipment is designed rationally to make trouble shooting and maintenance a convenient thing.**
- 7. Automatically avoid the connector between spacer during processing and cut after bending a frame.**
- 8. All the steps could be operated manually to make equipment debugging and trouble shooting convenient.**
- 9. Spacer with width from 6mm to 24mm is available. Frame size: min 250×250mm; max2000×2000mm.**

10. The max conveying speed is 120m/min. (Adjustable)

11. Air source: 0.6MPa; Power: 3P 415V/1P+N 240V 4KW.

Chart for Imported Parts of Bending Machine

No.	Description	Brand	Place of Origin
1	Control system	B&R	Austria
2	Servo Motor	B&R	Austria
3	Relay	SCHNEIDER	France
4	Pneumatic Valve	AIR TAC	Taiwan
5	Regulator	AIR TAC	Taiwan
6	Sensor	AUTONICS	Korea
7	Pneumatic cylinder	AIR TAC	Taiwan
8	Cutting motor	DKM	Korea
9	Cutting saw blade	JULIA	Italy

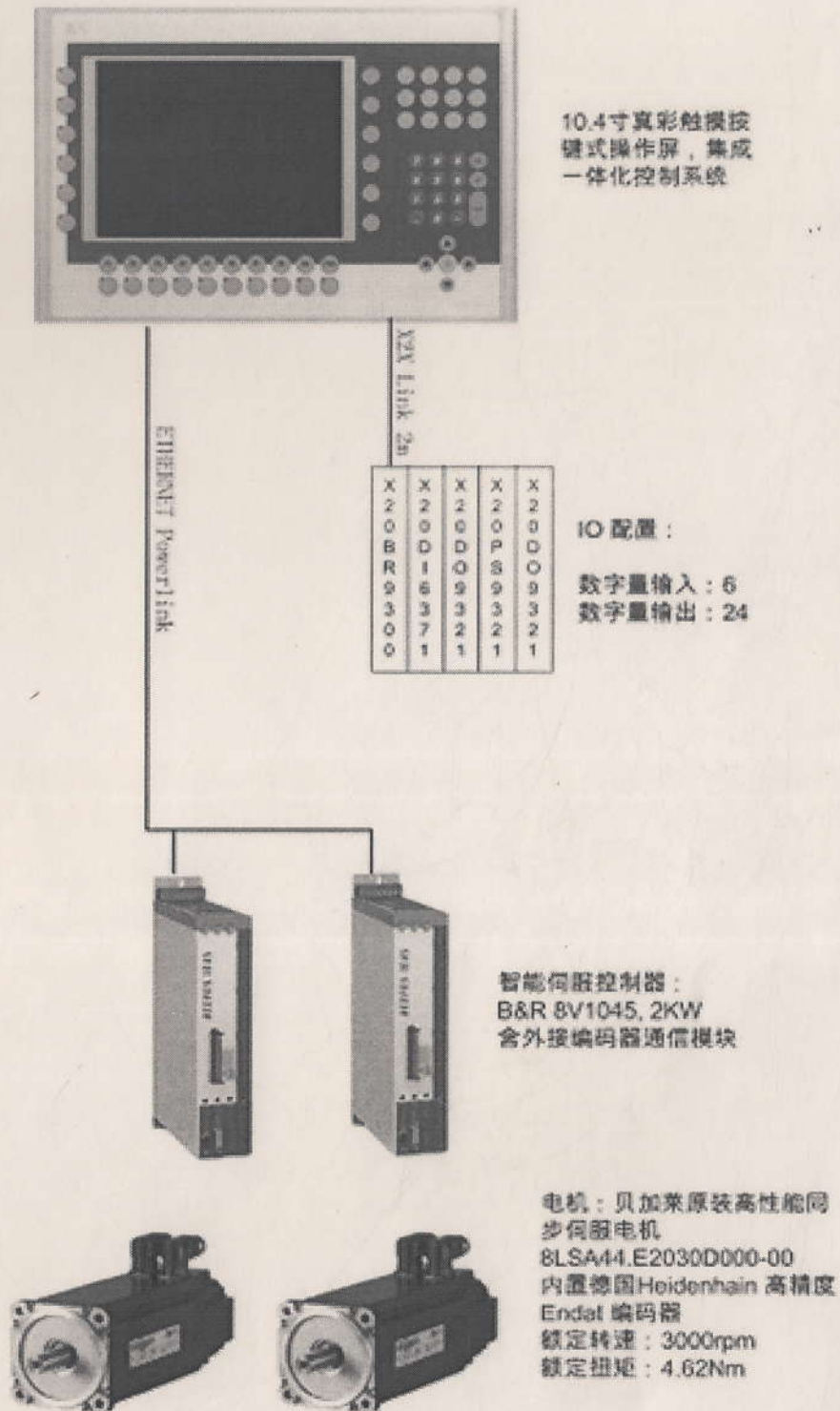
Section Two Caution

- 1. Non-operator (never received technical training) must not use the equipment.**
- 2. Make sure the equipment grounding.**
- 3. Air source requirement: no less than 0.6 MPa.**
- 4. Power: 3P 415V/1P+N 240V 50Hz.**
- 5. Do not adjust the air pressure without our permission.**
- 6. Do not change the circuit in the control box and driver parameter of servo motor, do not modify or download control program without our permission. Otherwise the result is for your account.**
- 7. Maintain the equipment and lubricate bearing and straight orbit regularly.**

8. Before operation, Make sure there is no trouble with the equipment and reading on each gauge showing normally.
Then the machine could be started.

Chapter two Control System

The structure of the control system if shown as follow:



There are mainly ten pages for the controlling tasks, corresponding to the keys F1 to F10 on the panel.

F1: Init-page, copyright information.

F2: Main Page

F3: Manual Operation Page

F4: Shape Select Page

F5: System Parameter Page

F6: Order Management Page

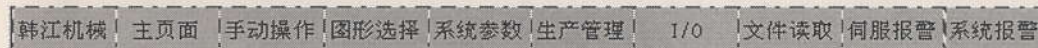
F7: I/O Page

F8: DXF File Read Page

F9: Servo Drive Error

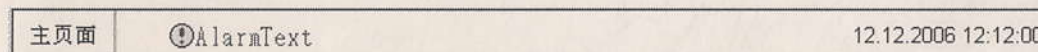
F10: System Error

These pages can be selected by the Keys F1-F10 or by the touch keys at the bottom of the page.



The detail information of these pages is shown in the following section.

On the top of every page, the page name, current system alarm and current date and time are shown.



The middle part shows Current Alarm, the latest active alarm is displayed here. Current Alarms can be acknowledged and deactivated by press the key "Tab".

F1- Init-page

This page is the default page of the system. Every time the system is rebooted, this page will be automatically shown.

韩江机械	!AlarmText	12.12.2006 12:12:00
铝条框自动折弯机 Automatic Aluminum Spacer Bending Machine 北京韩江自动化玻璃机械设备有限公司 BEIJING HANJIANG AUTOMATIC GLASS MACHINE CO., LTD. 请输入密码 ***** 0  		
韩江机械	主页面	手动操作
图形选择	系统参数	生产管理
I/O	文件读取	伺服报警
系统报警		

In this page, users can type in passwords.

There are two level of the user right, corresponding to two different passwords.

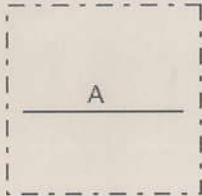
In normal using situation, users do not need to type in password, only after the system parameter was modified and need to be stored, the user level is then check to fulfill the parameter save request.

The Commission password is only used to modify some mechanical parameters. Normally, these parameters should not be changed.

(Commission password: 654321, System password: 123456)

At the left side, there are some flags according to corresponding languages. The current system language can be changed by touching this flags.

F2-Main Page:

MAIN		! AlarmText		12.12.2006 12:12:00	
Line	0	Name	Beijing	Save	Load
	A	0 mm	a1	0 °	R1 100.0 mm
	B	0 mm	a2	0 °	R2 100.0 mm
	C	0 mm	a3	0 °	R3 100.0 mm
	D	0 mm	a4	0 °	R4 100.0 mm
	E	0 mm	a5	0 °	Line 0
PasternDeepth		0 mm	Calculate		Preview
Feed V	300.00 mm/s	ConnPos	100.00 mm	SemiAuto	
Bend V	60.00 °/s	StickLen	100 mm	Order Auto	
Feed S	300000.00 mm	Quantity	100	Start	
Bend S	0.60 °	Complete	80 Reset		
HanJiang Mainpage Manual Shape SysPara Manage I/O DXF File ServoInfo SysAlarm					

In the main page, the top part shown below is used to store and load the alumni frame parameter.

Line	0	Name	Beijing	Save	Load
------	--------------------------------	------	--------------------------------------	------	------

To read parameter, firstly type in no. of the frame parameter, then press load .

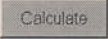
To save parameter, firstly type in no. of the frame parameter, then you can also type in a name of the frame in English. After that, press save button to store the parameter.

Frame parameter is stored on CF Card after saving, do not depend on Battery power. So it can be reserved for permanently.

Notice: the No. of frame parameter is predefined. From 0 to 499 is only used for system predefined shapes. From 500-599 is used to save self-defined shape and the shapes imported by DXF File.

To select a predefined frame shape, touch the shape picture, then shape select page will be shown. After select a frame shape, the main page will be shown

again, then shape parameters can be inputted.

Notice: After input the parameters of a frame, you need to press the calculate button  to generate bending actions.

In the bottom left part of the page, some of current parameters are shown, including feed speed, bend speed, feed position, bend position. All of these parameters cannot be modified.

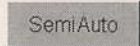
In the bottom right part, there are another four parameters.

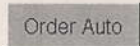
Connector position shows the distance between the front end of current aluminum bar and next connector. This parameter is automatically calculated during the run time. As a very important parameter to avoid connector cutting or bending, this parameter can be modified by operator. Only if this parameter is precisely same to the distance, the connector can be avoided.

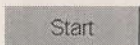
Bar length means the length of raw aluminum bar. This parameter is directly loaded from system parameter during the start up of the system.

Planned number shows how many frames are planned to be produced. Finished number shows how many have been produced. When finished number reach planned number, the producing is then stopped.

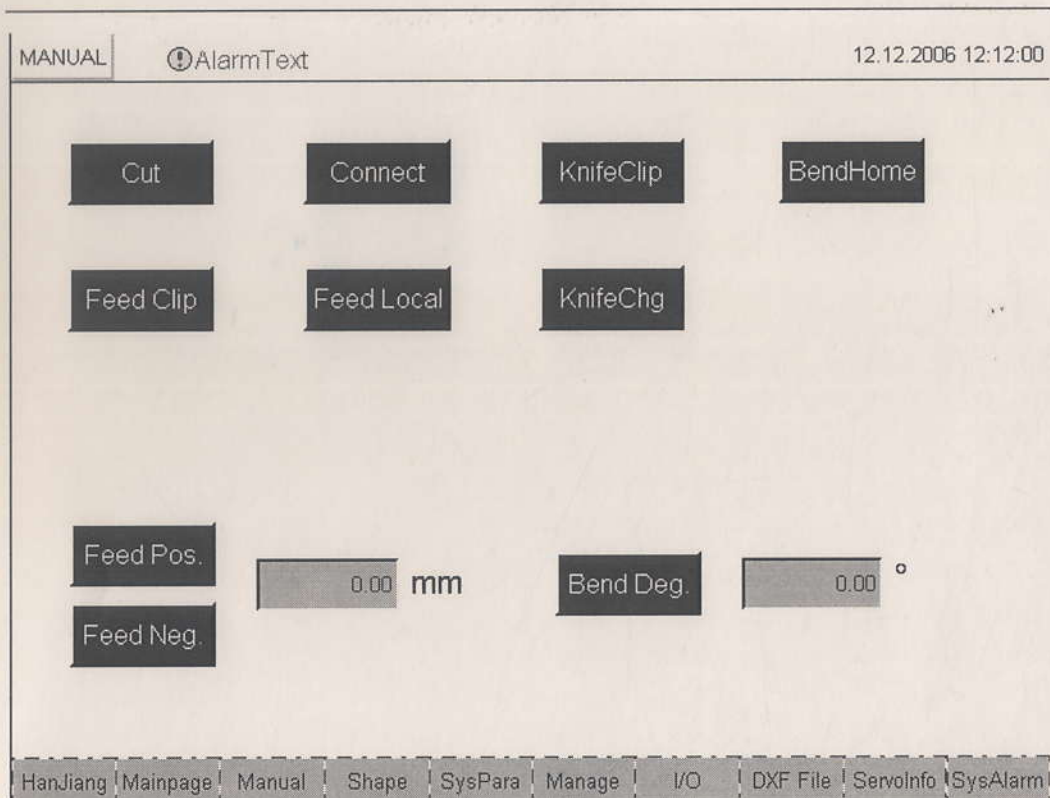
There are also some buttons.

 is used to switch between auto and semi-auto mode of producing. In semi-auto mode, system will stop after it finishes one piece of frame. Then, after press foot switch, the producing continues. In Auto mode, system will not stop until finish all the planned work.

 is used to produce according to the sequence of a list of orders. To get detailed information, look at F6-Order Management page.

 is used to produce current active frame(after calculate).

F3-Manual operation page



In Manual Operation page, there are ten buttons.

Cut Manual Cut: This will generate a series of operation: Cut Clip->Cut Motor run->Cut

Connect Manual Connect: Connect Local and Connect Clip -> Push Clip -> Push

KnifeClip Knife Clip: Knife Clip, press again -> Knife Clip Release

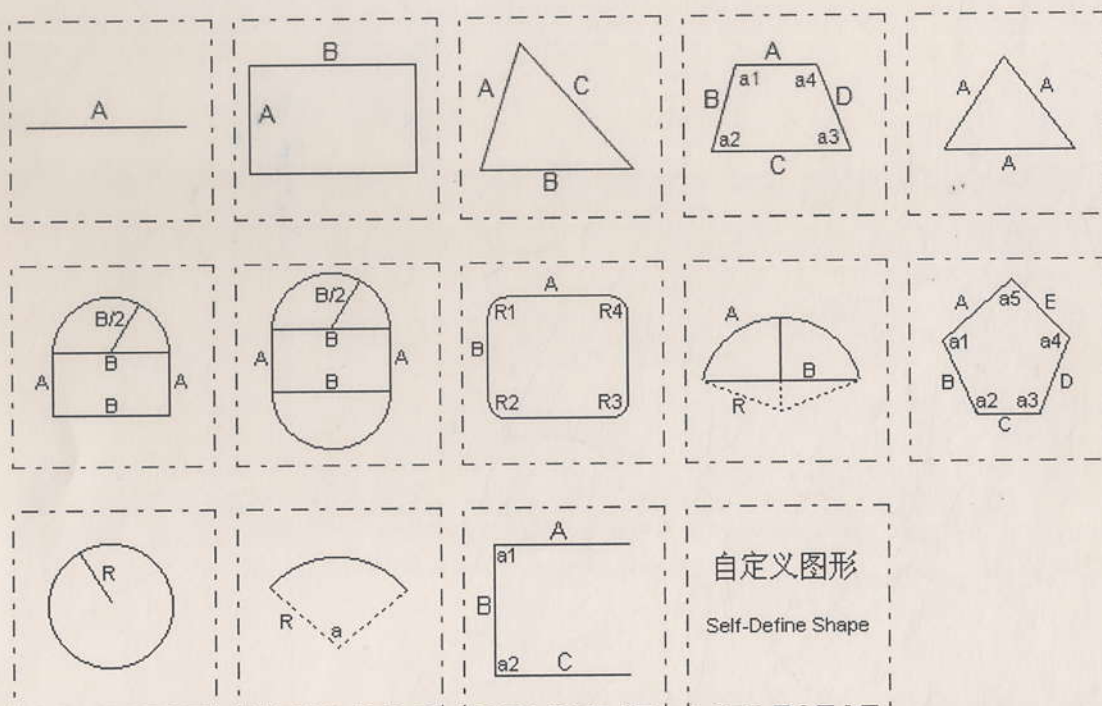
Feed Pos. **Feed Neg.** Feed Forward, Feed Reverse

Bend Deg. After press Bend Button with parameter Bend Angle inputted, a series of actions will be performed:

Cut Clip->Knife Clip ->Knife Up -> Knife Go ->Knife1 -> Knife2 -> Bend Servo Act

F4-Shape select

Shape	! AlarmText	12.12.2006 12:12:00
-------	-------------	---------------------



HanJiang	Mainpage	Manual	Shape	SysPara	Manage	I/O	DXF File	ServInfo	SysAlarm
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In this page, there are 13 types of standard shapes and self define shape can be selected. Touch each area of shape will select corresponding shape and then direct you to the main page. In main page, all parameters of the shape can be inputted.

Touch Self-Defined Shape area will direct you to Self Define Shape page, as following picture.

Firstly, the shape should be separated to several actions, including feed, bend and arc. Then, these actions should be separately inputted, including actions no. , action type (by selecting from 3 types), action parameters. After type in parameters, press button “Add” to Add this action. After “add” a action, the ActNo. will be automatically increased. After input all actions, press “Finish” button to finish the input and do the calculation.

After finished input and calculation, the shape can be saved or previewed.

F5-System Parameters

ReadFile		!AlarmText		12.12.2006 12:12:00	
			Action Time	SAVE	READ
RackStand	0	ms	CutClip	0	ms
RackClip	0	ms	Cut	0	ms
PushClip	0	ms	KnifeUp1	0	ms
Push	0	ms	KnifeUp2	0	ms
ConnectLocal	0	ms	KnifeGo	0	ms
ConnectClip	0	ms	KnifeClip	0	ms
FeedClip	0	ms	KnifeGo1	0	ms
FeedLocal	0	ms	KnifeGo2	0	ms
Bend Min Length	0	mm	Bend REF Comp	0.00	deg
Bar Length	0	mm	BendAngleComp	0.00	deg
Bar Thick	0.00	mm	ArcAngleComp	0.00	deg
☐ AutoConn			☐ Ex-Encoder		
☐ Auto Adjust			More..		

HanJiang	Mainpage	Manual	Shape	SysPara	Manage	I/O	DXF File	ServInfo	SysAlarm
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In this page, the top part shows acting time of a lot of Air component actions. This parameters can be modified online to improve the efficiency of the machine.

In bottom part,

“Bend Min Length”: the minimum length from the knife position to the front end of the bar which can make it bendable. This parameter will be used as first feed length of every fram.

“Bar Length”: the length of the bar currently using. If this parameter is not correct, the connector avoiding mechanism will not work properly.

“Bar Thick”: the thickness of the aluminum bar.

“Bend REF Comp”: this parameter is used to compensate the Reference position of the bender. Input a positive value here will make the angle greater.

“Bend Angle Comp”: this parameter is used to compensate the bend angle.

“Arc Angle Comp”: this parameter is used to compensate the raise angle of the bender when bending an arc.

The button ☐ AutoConn can be selected to active the automatically connect of aluminum bars.

Active ☐ Ex-Encoder will tell the system to use external encoder as position feedback. Otherwise use motor encoder. This can be switched online.

Notice: do not change Encoder selection during producing.

After modified parameters, press "save" button can store these parameters to the system.

Press "read" button will read out them from memory.

Notice: Parameters are saved in CF card, not battery buffered.

Press button to reach advanced setting page. This need password level 1.

System parameters page 2

System2		!AlarmText		12.12.2006 12:12:00	
SAVE	Feed V	1000.00	mm/s	SAVE	READ
READ	Bend V	50.00	%s	R(mm)	Angle(°)
	BendV for Large	50	%	50.00	45.00
	Large Length	1000	mm	100.00	33.00
	Arc R Comp	0	mm	200.00	23.00
	Feed Length Comp	0.00	%	0.00	0.00
	FeedREV V	0	%	0.00	0.00
	Frame Line Comp	0.00	mm	0.00	0.00
	Arc Sych Start	13.00	°	0.00	0.00
	Arc Sych End	18.00	°	0.00	0.00
	Feed V1	100.00	mm/s	0.00	0.00
	Bend V1	0.45	%s	0.00	0.00
	Feed V2	5.00	mm/s	0.00	0.00
	Bend V2	0.90	%s	0.00	0.00
HanJiang	Mainpage	Manual	Shape	SysPara	Manage
I/O	DXF File	ServoInfo	SysAlarm		

In this page, Feed velocity and bend velocity can be modified.

"BendV for Large" specifies a feed speed ratio. When the frame is really large (single line longer than "Large Length"), the feed speed need to be slow down to make the frame stable.

"Arc R Comp" specifies the radius compensation for the arc bending.

"Feed Length Comp" specifies the feed length compensation. When the feed length is not correct, this parameter can be used to compensate. i.e. Feed 1000 mm, actually you got 1002 mm, this parameter can be set to -0.2% to make the feed length right.

"Feed REV V": This parameter specifies the feed speed ratio to slow down the speed when feeding in negative direction.

“Frame Line Comp” this parameter is used to compensate the length each line of the frame.

The bottom left part and right part have all the parameters concerning bending an arc or circle. Normally these parameters do not need to be modified after machine commission.

F6-Management

Manage		! AlarmText		12.12.2006 12:12:00	
A	B	Glue	Plan	Done	
8000.0	4000.0	5	2000	0	CANCEL
8000.0	4000.0	5	2000	0	CANCEL
8000.0	4000.0	5	2000	0	CANCEL
8000.0	4000.0	5	2000	0	CANCEL
8000.0	4000.0	5	2000	0	CANCEL
8000.0	4000.0	5	2000	0	CANCEL
8000.0	4000.0	5	2000	0	CANCEL
8000.0	4000.0	5	2000	0	CANCEL
8000.0	4000.0	5	2000	0	CANCEL
8000.0	4000.0	5	2000	0	CANCEL
8000.0	4000.0	5	2000	0	CANCEL
8000.0	4000.0	5	2000	0	CANCEL
8000.0	4000.0	5	2000	0	CANCEL
8000.0	4000.0	5	2000	0	CANCEL

READ

Order Num

8000

Order Auto

HanJiang
Mainpage
Manual
Shape
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Manage
I/O
DXF File
ServInfo
SysAlarm

In this page, several rectangle frames can be defined previously. After press “Order Auto”, these orders will be automatically produced one by one.

The “Read” button is used to read a .csv file which have order information from USB disk. The USB disk must be inserted in to USB1 port and the name of the .csv file must be “order.csv”

“Order Num” shows how many orders are defined in the .csv file, the maximum is 200.

Only the first 10 unfinished orders will be displayed.

F7 I/O (Input/Output)

I/O		!AlarmText		12.12.2006 12:12:00					
DI6371 ☐ Work ☐ Change ☐ E-STOP ☐ Connect1 ☐ Connect2 ☐ ☐ Manul Set		DO9321 ☐ RackStand ☐ PushClip ☐ ConnLocal ☐ BarClip ☐ FeedLocal ☐ Cut ☐		DO9321 ☐ RackLocal ☐ Push ☐ ConnClip ☐ FeedClip ☐ CutClip ☐ KnifeUp ☐		DO9321 ☐ KnifeUp2 ☐ KnifeClip ☐ KnifeGo1 ☐ WorkLamp ☐ FeedEnable ☐ CutMotor ☐		KnifeGo ☐ KnifeRelease ☐ KnifeGo2 ☐ AlarmLamp ☐ BendEnable ☐ KnifeClipLow ☐	

[HanJiang](#)
[Mainpage](#)
[Manual](#)
[Shape](#)
[SysPara](#)
[Manage](#)
[I/O](#)
[DXF File](#)
[ServoInfo](#)
[SysAlarm](#)

In this page, the I/O status can be checked. If needed, this I/O can also be forced after select "Manual Set".

Notice: Do Not forget to cancel the "Manual Set" selection after forced IO.

The light on the top of each module show the status of corresponding module (present or not).

F8-DXF File Read Page

ReadFile	! AlarmText	12.12.2006 12:12:00
abcdefghijklmno... abcdefghijklmno... abcdefghijklmno... abcdefghijklmno... abcdefghijklmno... abcdefghijklmno... abcdefghijklmno... Refresh ZoomOut ZoomIn Accept Line 0 Name Beijing Save		
HanJiang Mainpage Manual Shape SysPara Manage I/O DXF File ServoInfo SysAlarm		

In this page, .dxf files (AutoCAD format) can be loaded from USB disk to the system.

Firstly, insert USB disk to USB1 port. Press "refresh" button, all the files on the disk will be shown in the listbox.

abcdefghijklmno...
 abcdefghijklmno...
 abcdefghijklmno...
 abcdefghijklmno...
 abcdefghijklmno...
 abcdefghijklmno...
 abcdefghijklmno...

After having selected .dxf file in the listbox, the preview area at the right side will show the preview of the shape. Then, press "accept", system will calculate automatically and generate a series of actions.

After that, this shape can be saved with a parameter number and a name by press the button "save" or change to main page, then start producing directly.

F9-Servo Drive Alarms

ServInfo	! AlarmText	12.12.2006 12:12:00
Feed Servo Info	12345	Acknowledge
aabbccdd		
aabbccdd		
aabbccdd		
aabbccdd		
Bend Servo Info	12345	Acknowledge
aabbccdd		
aabbccdd		
aabbccdd		
aabbccdd		

HanJiang	Mainpage	Manual	Shape	SysPara	Manage	I/O	DXF File	ServInfo	SysAlarm
----------	----------	--------	-------	---------	--------	-----	----------	----------	----------

In this page, current latest alarm numbers and alarm text from both servo drives will be displayed.

Press button "acknowledge" to acknowledge the alarm and show the next one.

Notice: In case of servo drive report any alarms, all the alarm numbers should be recorded by the operator. These information will help to find what had happened.

Notice: Normally, there will be more than one alarms, you need to acknowledge them all and recorded them.

The list of system alarms are shown below.

20

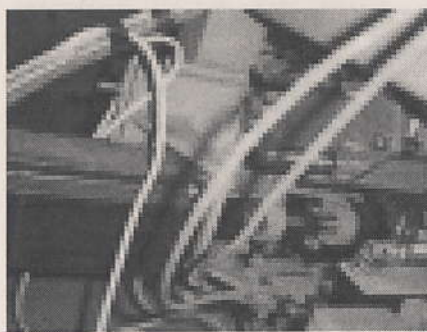
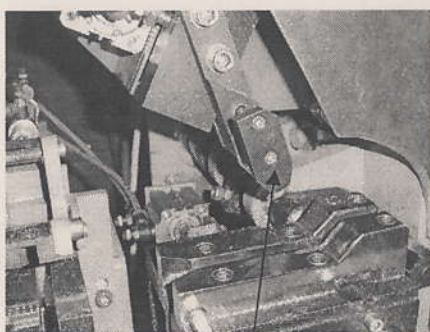
Arc radius mm	Bending angle°	Bending speed °/s	Conveying speed for arc bending m/s	
50	45	50	0.15	
60	39	60	0.15	
80	31	70	0.2	
100	27	80	0.2	
150	21	85	0.2	
200	17	90	0.2	
250	16	90	0.3	
300	15	90	0.3	
350	14	90	0.3	
400	13	90	0.3	
450	12.5	90	0.3	
500	12	90	0.3	
550	11.5	90	0.3	
600	11	90	0.3	
1000	9	90	0.3	

Bending servo motor angle for Arc bending reference value (only for reference)

Chapter Four Equipment Adjustment

Adjusting principle: The on-processing spacer must be straight. The spacer conveying tube is clear and smooth. Make sure there is no clogging, deviation, obstruction and deforming phenomenon.

Section One Bit Press Distance、Pressure and Air Volume Adjustments



Bending head

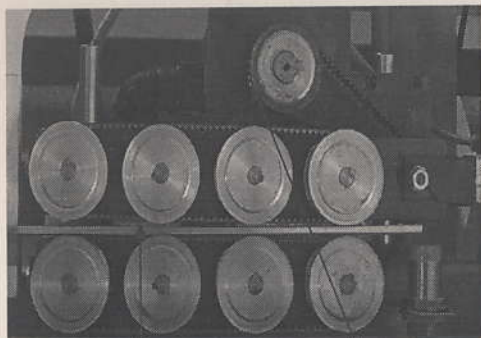
1. Do not adjust bit press distance、pressure and air volume without our permission.
2. Spacer press pressure for square angle is no less than 0.6 MPa.

Section Two Angle Compensation

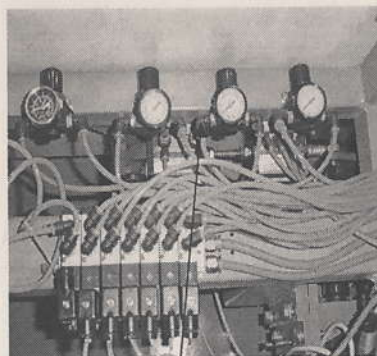
1. Loosen the bolt on the limit switch, then tighten it after adjustment.

Section Three Adjustment for Supply Motor

Bracket and Roller Pressure



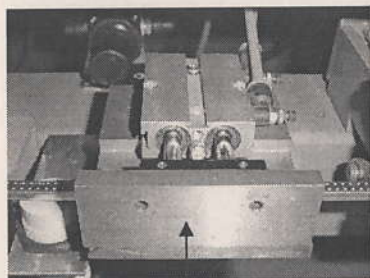
Conveying Roller Motor Bracket



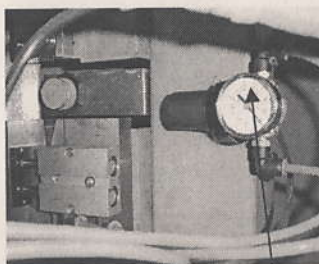
Air Regulator

1. Loosen blot on motor bracket, then tighten it after adjustment.
2. Roller pressure is 0.4-0.5MPa.

Section Four Adjustment for Guide Component Bracket and Pressure



Guide Roller Clipper

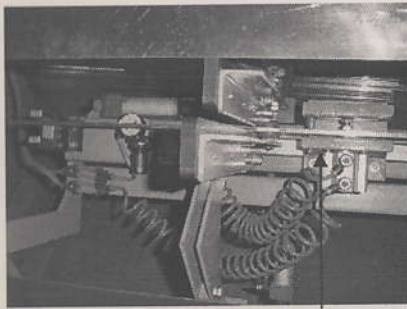


Guide Roller Cylinder Air Regulator

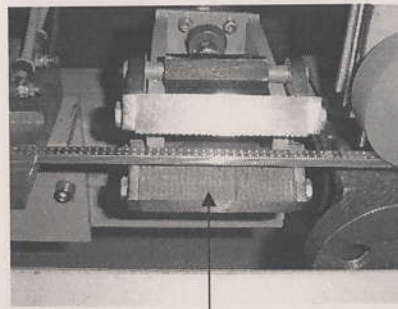
1. Loosen bolt for connecting clamp bracket, then tighten it after adjustment.
2. Pressure for connecting clamp is 0.3 MPa.

Section Five Adjustment for Supply Clamp

Bracket and Pressure



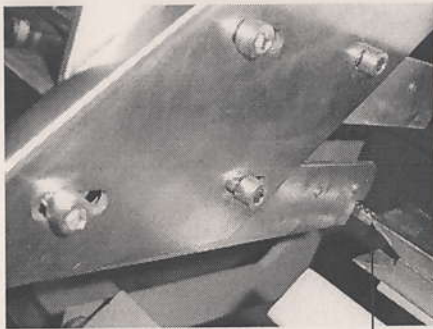
Spacer Moving Cylinder Clipper



Spacer Connection Cylinder Clipper

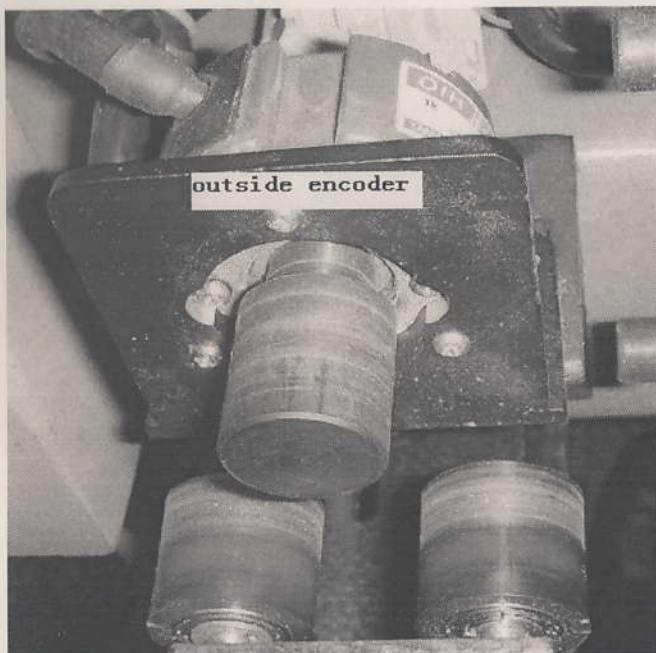
1. Loosen bolts on the supply clamp bracket, then tighten it after adjusting.
2. Pressure for supply clamp in 0.13 MPa.
3. Pressure for subsequent spacer clamp demands more than 0.5 MPa.

Section Six Connecting Adjustment between Magazine and Bending Mechanism.



Spacer

1. Adjust the ground bolt for the magazine bracket.
2. Step foot-switch corresponding feed, move the magazine racket to fit the processing spacer to input vent about the bending mechanism. Release the foot-switch to lock the magazine in one line with spacer route on the bending mechanism.



Outside encoder

Chapter Five Equipment Troubles and Relative Measures

Section One Actual Spacer Frame Size not Check with Fixed Value

1. Check if the press roller regarding supply is loose.
2. Check if connection between two spacers is normal.

Section Two Spacer Fail to Connect Each Other

The following elements will cause connection failure: distorted spacer, deformed spacer end, connecting distance differing from set value and guiding mechanism in wrong place. The solution is correcting and recovering machine to original condition.

Section Three Connector Fail to Avoid the Bit

Both distance from connecting position to bit is fixed inappropriately and mal-operation will cause evading failure. The solution is correcting and recovering machine to original condition.

Section Four Clamp for Supply Fail to Work

Spacer distort and feed vend for bending mechanism may cause clamp device for supply fail

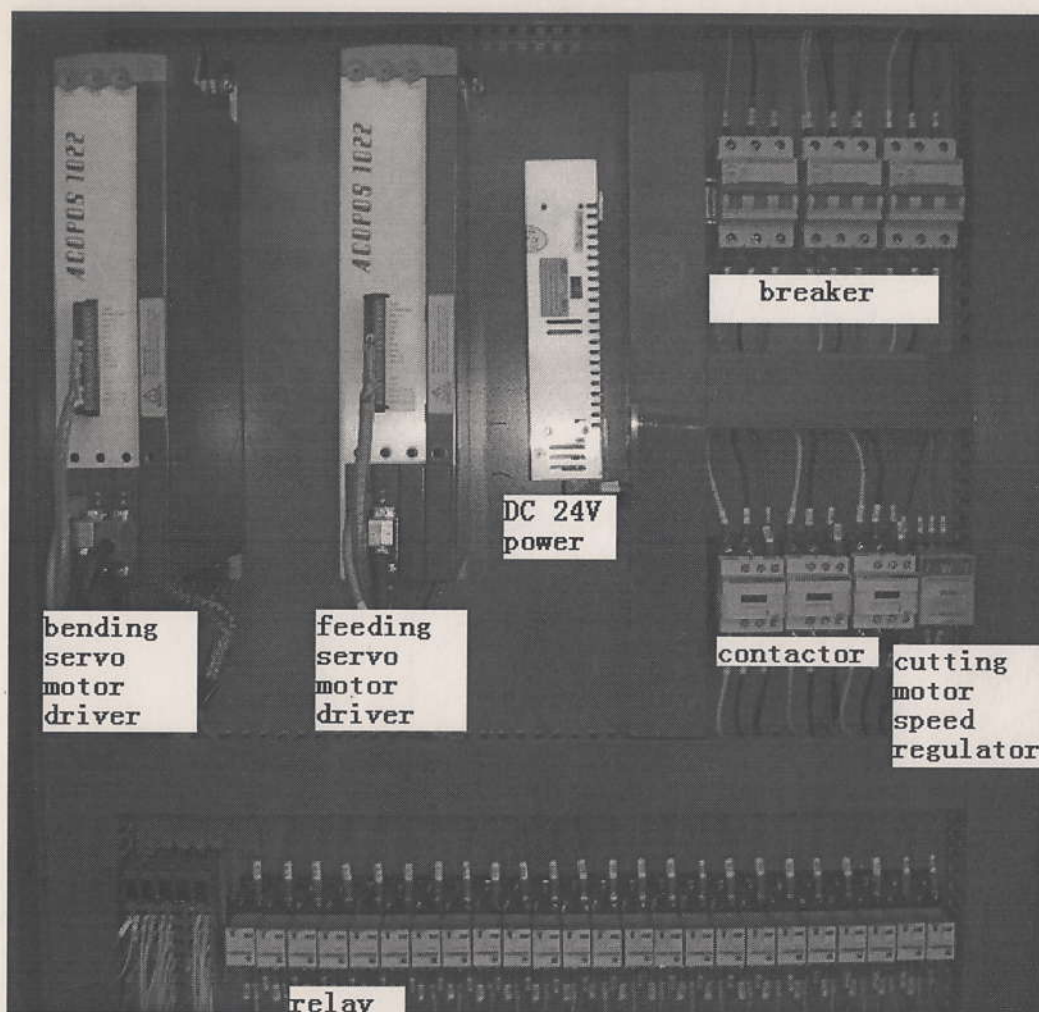
to work. Correcting measure is to adjust machine to original state.

Chapter Six Safety Cautions

Section One Shut off the power in Control Box after Operation

Chapter Seven Electrical Schema

Bending Machine Console



7. Controlling system



Transformer 3P 380V/3P 220V



X20BR9300

X20 Bus Receiver X2X Link,
supply for power bus,
X2X Link bus supply,
X20 locking plates left and right
X20AC0SL1/X20AC0SR1 enclosed

X20DI6371

X20 Digital input module,
6 inputs, 24 VDC, sink,
configurable input filter,
2 wire technology

X20DO9321

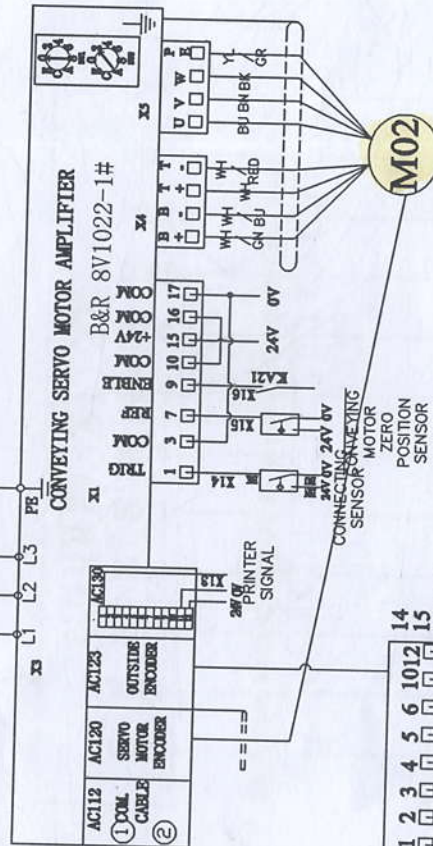
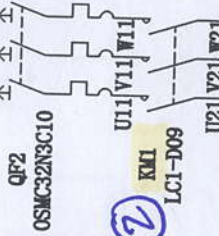
X20 digital output module,
12 outputs, 24 VDC, 0.5 A, sink,
1 wire technology

X20PS2100

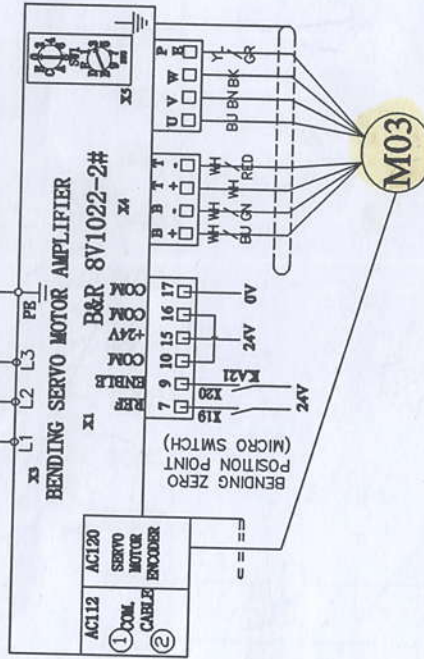
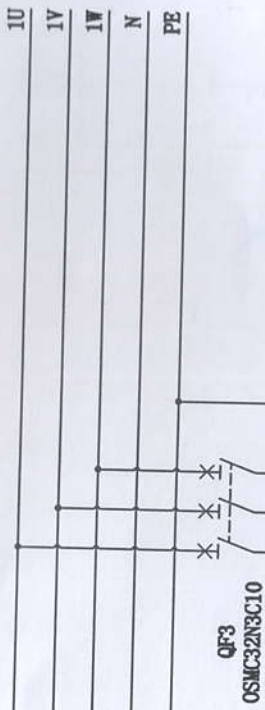
X20 supply module for power bus

Bending Machine Pneumatic valve arranging list

- 097 After quantitative feeding positioning (4V-210)
- 081 Quantitative feeding fore positioning (4V-210)
- 075 Connecting position valve (4V-210)
- 076 Connecting clipper (4V-210)
- 071 Feeding stand holding valve (4V-210)
- 073 Feeding Clipper (4V-210)
- 074 Feeding Valve (4V-210)
- 072 Magazine Positioning (4V-210)
- 096 Arc/square exchanging electromagnetism (4V-230-08C)
- 077 Head up-down course1 (4V-230-08C)
- 084 Head up-down course1 (4V-210)
- 085 Tip main course (4V-210)
- 088 Head course 1 (4V-210)
- 091 Head course 2 (4V-210)
- 083 Cutting feeding (4V-210)
- 082 Cutting clamp (4V-210)
- 078 Feeding press clip (4V-210)
- 086 Pressing spacer (4V-230-08C)
- 087 Pressing spacer reset(4V-230-08C)



CONVEYING SERVO MOTOR



BENDING SERVO MOTOR

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USER: INDIA HINDUSTAN GLASS

PROJECT: AUTOMATIC SPACER BENDING MACHINE

MODEL: HJ-ASBM-2008 1 (BENDING STAINLESS SPACER)

TITLE: SERVO MOTOR CONTROL WIRE CONNECTION DIAGRAM

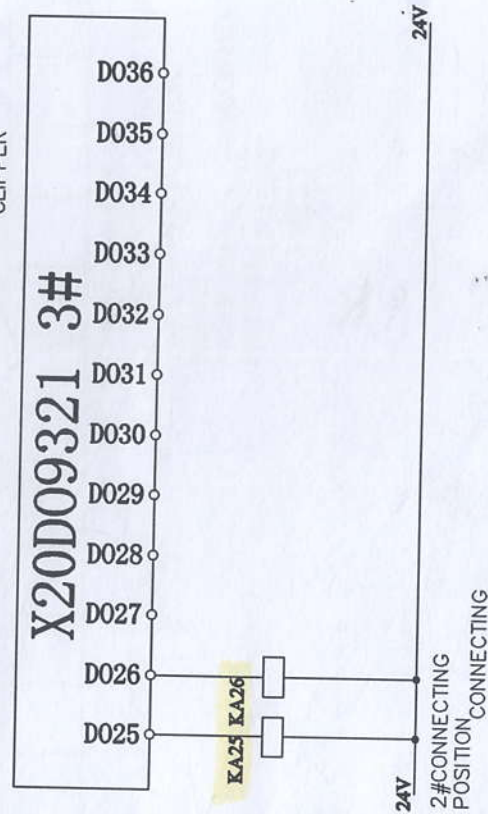
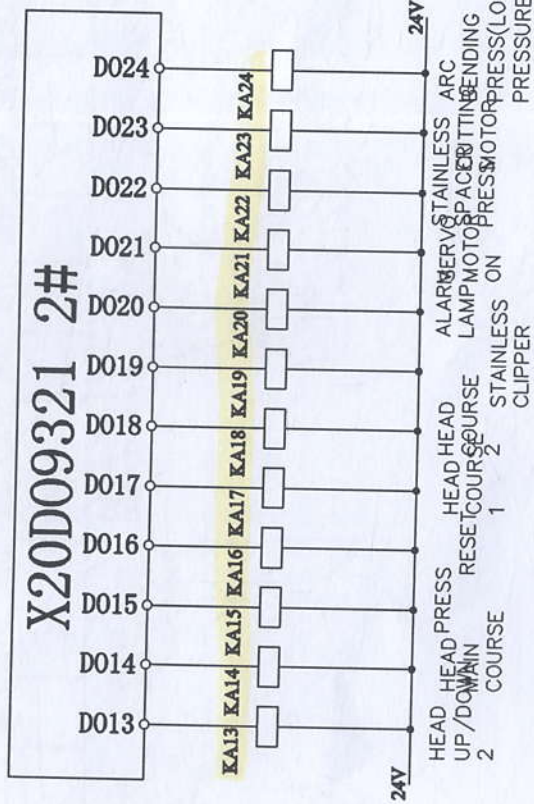
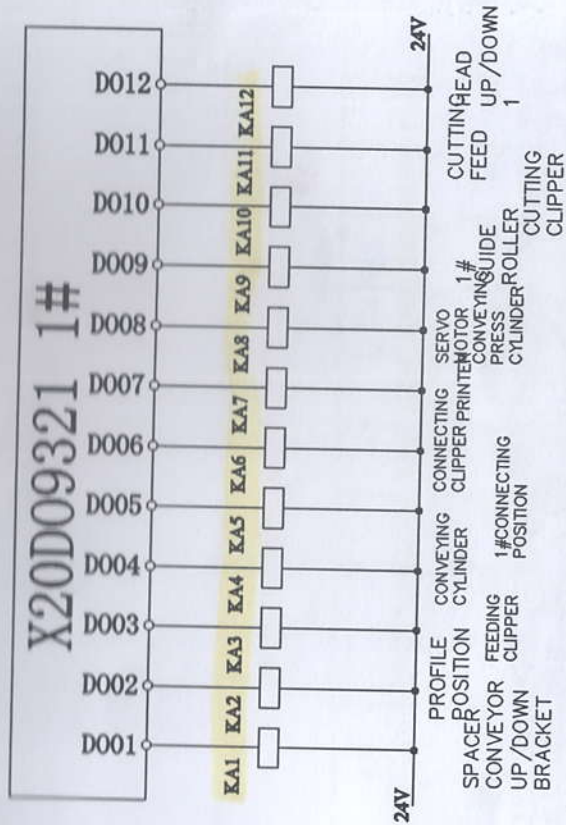
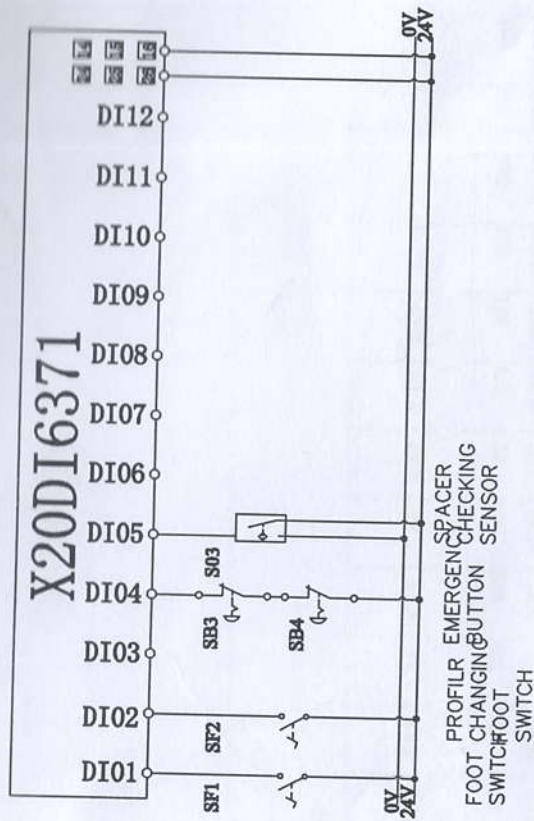
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DATE: 15/09/2009

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PROJECT: AUTOMATIC SPACER BENDING MACHINE

MODEL: HJ-ASBM-2008 I

TITLE: CONTROLLER WIRE CONNECTION DIAGRAM

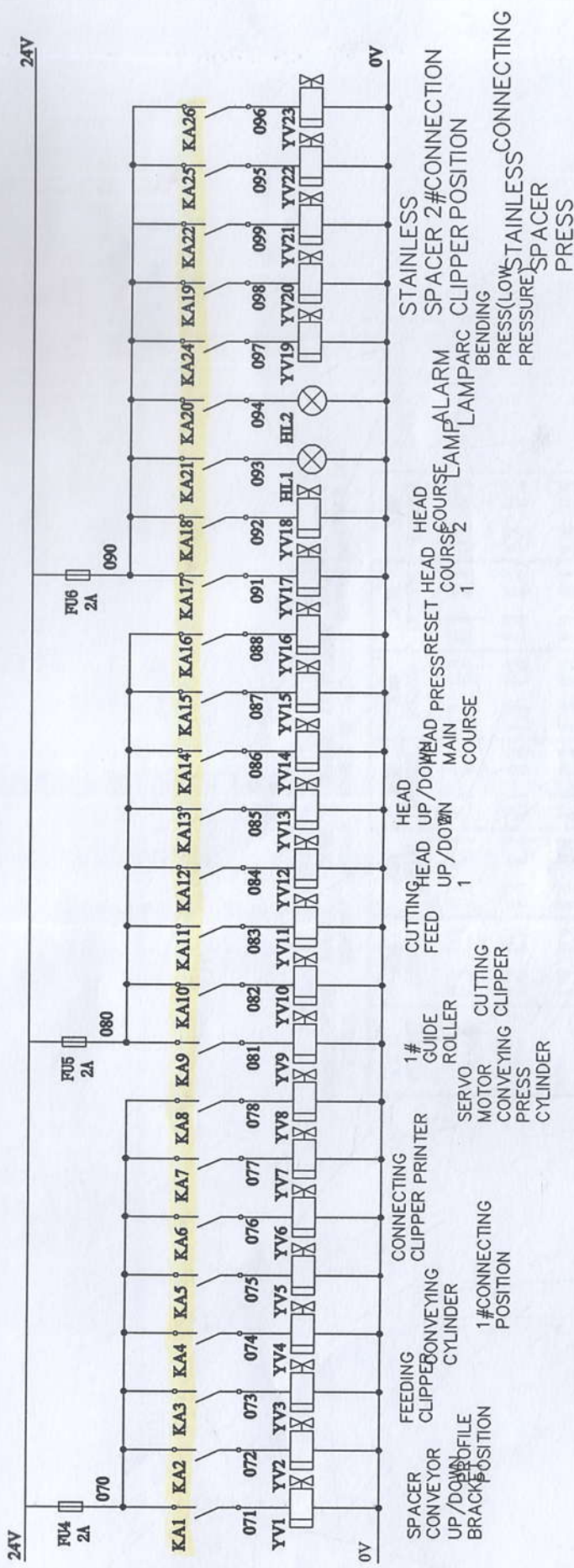
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	MODEL: HJ-ASBM-2008 I		APPROVED BY: HAN HAOJUN	
	TITLE: CONTROLLER WIRE CONNECTION DIAGRAM		DATE: 15/09/2009	

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PROJECT-AUTOMATIC SPACER BENDING MACHINE

MODEL: HJ-ASBM-2008 I

TITLE: MODULE AND VALVE ARRANGEMENT

DESIGNER: CHEN DONG SHENG

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DATE: 15/09/2009