HD-2008S Position Controller

(Rigour II VerQ6.36)

Operation Instruction

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Passed ISO9001: 2,000 quality control system authentication

1 Introduction of the system

1.1 About the product

HD2008 Position Controller is an improved model of XC2001. Taking compatibility and user's habit into account, the product preserves all the functions and input/output interfaces of the original model with the same appearance and dimension. The added parts include an interface for servo motor, the second color mark sensor input, and several long-distance button inputs. The arrangement of interface panel is almost the same as the original model.

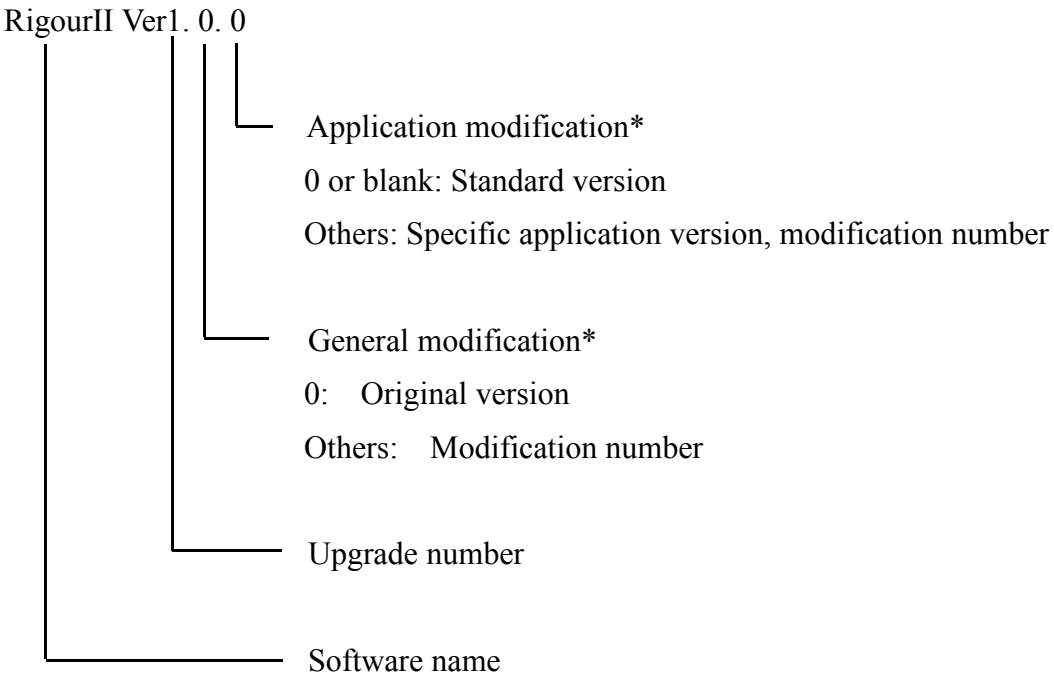
Parameter setting is simplified. Only 13 system parameters in common use are reserved, while the rest parameters are merged into system constants that need no modification or can be assigned by the system. Dynamic modification of system parameters is permitted, and the parameters can be executed immediately after quitting from the modification process. To modify the parameters, just input the number directly other than add and subtract by shifting bit in original manner.

The controller adopts an isolated digital pulse module, which improves the frequency precision. Therefore the pull motor (spindle motor) runs more steadily with higher speed. It is also suitable for double-spindle machinery (double step motor or double servo motor), and the control manner of double color mark plus float roller can be adopted.

The controller is suitable for plentiful type of machine, and can be expanded (not modified). Now the system inside has integrated with 7 basic models and 4 options of machine type, which can be assembled to multiple kind of machine type.

1.2 About RigourII

RigourII is the software name of the HD2008 Series Position Controller. RigourII will be modified and expanded in application, which is a general rule of software. To make these modifications retrievable, different names, i.e. software version numbers must be used for modified software. The naming rule is as follows:



Note about " * ":

General modification: Modifications aiming at some errors and illogicalities. Control functions do not change.

Application modification: Modifications aiming at a specific application. Control functions change.

Version confirmation: When order, users should designate the software version number, otherwise we will supply with standard version. The Version number of the application modification will display on the operation interface once confirmed by the user.

1.3 Main technical specifications

1) Power supply: 220V(AC)±10%; 50Hz/60Hz;
2) Dimension: 240mm(Width)×122mm(High)×110mm(Depth);or
   304mm(Width)×138mm(High)×120mm(Depth);
3) Pulse frequency: 2100~9500Hz;
4) Display: LED, four windows;
5) Drive support: Two shafts;
6) Software: RigourII VerQ6.36.

2 Operation

Operation panel

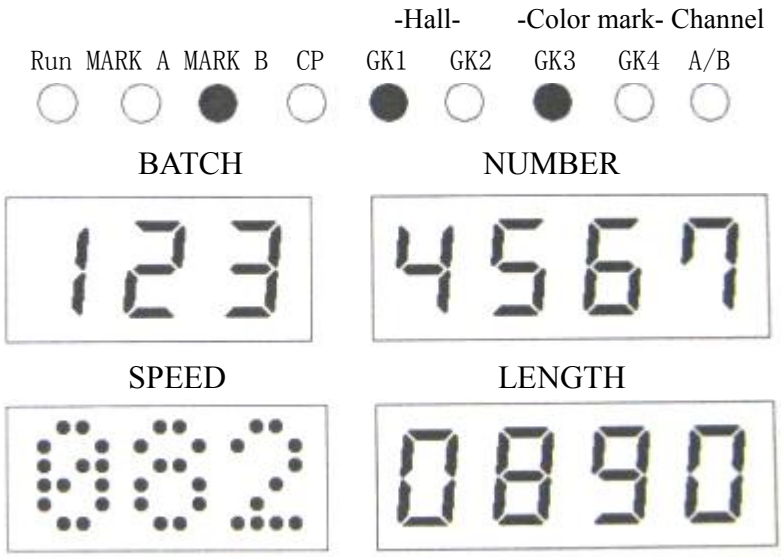


Figure 1 Display when running

2.1.1 Electrify/Run and Display

To distinguish with the setting state, it is called the running state whether the main motor runs or not. In the running state, the panel displays like Figure 1. The indicators and the windows show the work status and progress of the system as follows:

Run: The main motor run/stop, blink: the main motor over-speed.

Mark A: Bright A channel color printing opening, the system flushes the bag. Extinguishes a channel color printing closure, the manufacture blank bag. Twinkle: The self-checking function opens, the key may open or close this function according to [self-checking。

Mark B: Bright B channel color printing opening, the system flushes the bag. Extinguishes the B channel color printing closure, the manufacture blank bag. Twinkle: The self-checking function opens, the key may open or close this function according to [self-checking。

Pulse: Displacement pulse CP1 and CP2 output indicator, under click moving or pulling。

GK1: Hall 1 input indicator. Bright---alnico position (position A/C). Extinguish---empty position (position B/D)。

GK2: Hall 2 input indicator. Bright---alnico position (position E). Extinguish---empty position (position F)。

GK3: A channel electro-optic signal input instruction. After opening self-checking function, the key revises the input polarity according to [polar A], passes brightly or passes darkly。

GK4: B channel electro-optic signal input instruction. After opening self-checking function, the key revises the input polarity according to [polar B], passes brightly or passes darkly。

Channel: The examination current demonstration channel status, extinguishes the demonstration is a channel; The bright demonstration is the B channel. When earnest machine type effective, other type default is the single channel, namely the indicating lamp does not change。

<Count number>: Bag-making quantity. Bag-making quantity = Material-pulling times÷Sending multiple。

<Batch number>: When the count number reaches the whole bundle number, the counter will be cleared to zero, and the batch number will add one。

<Length>: Bag-making length. Material-pulling length=Bag-making length÷Sending multiple。

<Speed>: Material-pulling times per minute, which is also the actuating times per minute of the main machine。

2.2 Keyboard

To reduce the quantity of press keys, most of the press keys on the panel are designed to have double functions, that is, in different conditions they have different functions. See Table 1 for keys' definition。

Table 1 Keys' definition

Key name	In running state	In setting state
[启动] Run	Start the main motor	No use
[停止] Stop	Stop the main motor	Abandon all modifications, turn back to running state
[设置] Set	Turn into setting state	Save parameters, turn back to running state

Table 1(Continue)　Keys' definition

Key name	In running state	In setting state
[参数] SETUP	Turn into setting state	Select the next parameter circularly
[0　A/B]	Channel cut key	Number '0'
[1/自检] 1/CHECK	Turn on/off the self-test function	Number '1'
[2/点进 B] 2/INCH B	Shaft motor B click forward	Number '2'
[3/点进 A] 3/ INCH A	Shaft motor A click forward	Number '3'
[4/色选 A] 4/MARK　A	A port select blank or printing function	Number '4'
[5/点退 B] 5/ INCH B	The B channel spot draws back; (XC2005A, S. The B channel counting reduces)	Number '5'
[6/点退 A] 6/ INCH A	A channel spot draws back; (XC2005A, S. A channel counting reduces)	Number '6'
[7/色选 B] 7/MARK　B	B port select blank or printing function	Number '7'
[8/极性 B] 8/ POLE　B	Revises the B channel polarity; B channel reset	Number '8'
[9/极性 A] 9/ POLE　A	Revises a channel polarity; A channel reset	Number '9'

2.2.1　**Operation of click keys**

The functions of click keys vary corresponding to different machine types.　See Table 2 for details.

Color mark searching:　When make color bags, after [Click for] key is released, the shaft motor starts searching color mark, until a color mark is pitched on or the key is pressed again to stop searching.

Length measuring:　Set the color mark in effect and turn on the self-test function. Press [Click for A](or [Click for B]) key to search color mark twice, then the bag-making length is obtained.

2.2.2 Operation of polarity keys

To modify polarity, the self-test function must be turned on beforehand. The polarity is properly set when the color mark is pitched on and the indicator lights.

3 Parameter adjustment

3.1 Parameter display

Panel in setting state is as Figure 2. Indicator 'Channel' shows unlock/lock state. When locking, only the six parameters ahead (P00~P05) can be modified. The original value of password is not displayed.

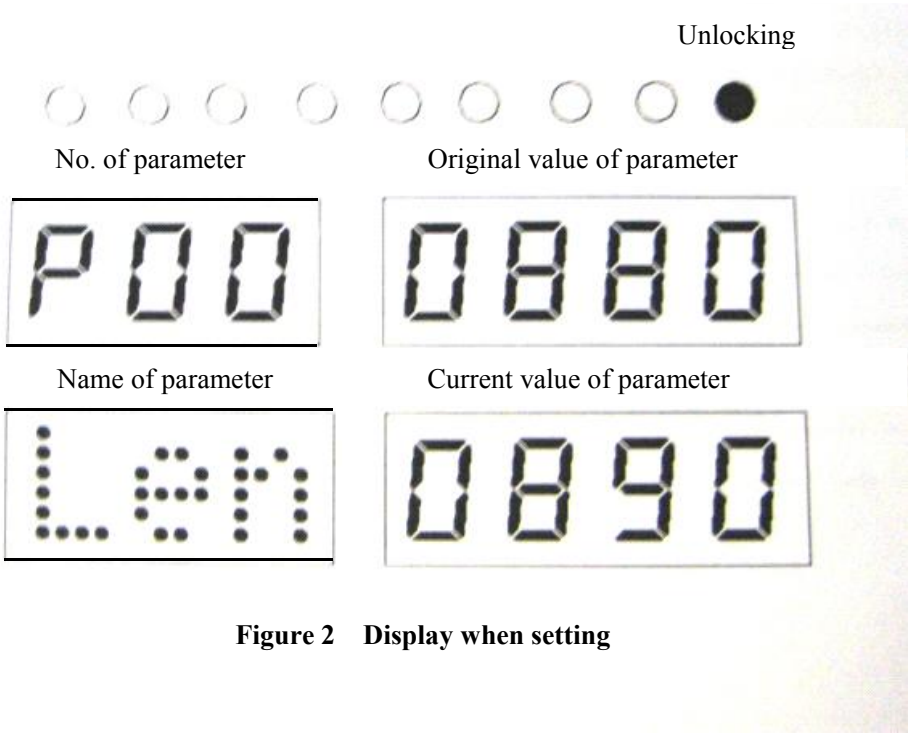


Figure 2 Display when setting

3.2 Parameter definition

Parameter definition as shown in Table 2. P00~P16 is the system parameters. C00~C13 is the system constant, the system constant very little needs to revise in the use. And P06~P16, C00~C13 password protection。

3.2.1 Password (P05)

The password when has not unlocked only allows to revise the P00~P05 parameter. If changes the password `1111 ' (leaving the plant establishment), the system will be forever in the unblanking; C00~C13 is the system constant, holds down above parameter key for 2 seconds under the unlocking position also to be possible to enter directly. After the password opens, will maintain to the close-down or the replacement, and to password any revision thought that effective and takes the new password

preservation. If the password loses, please to electricity this company。

Table 3 Parameter definition

No.	Name	Range	Explanation
P00	LenA	10~9999	First system bag length, unit: mm. See 3.2.2 for details.
P01	LenB	10~9999	The second system bag length, the tandem-drive is effective, unit: mm. See 3.2.2 for details.
P02	PilA	1~9999	The whole number of A.
P13	PilB	1~9999	The whole number of B (single-channel does not display).
P03	Flw	0~60	Color tracking, unit: pulse-step. Color target the largest number of search steps, 0: Unlimited search color until the speeding. See § 3.2.3.
P04	Pek	2100~9500	The Max. frequency, unit: Hz. See 3.2.4. for details.
P05	Cod	Four digit	Password. See 3.2.1. for details.
P06	Dof	0.2~9.9	Bag take-off delay, unit: 0.1s. The executing time of bag taking- off.
P07	Dub	1~4	Sending multiple. 1: no sending multiple. 2~4: sending multiple. See Table 6 for the action of output port.
P08	Nep	200~2000	Initial frequency, unit: Hz. See 3.2.4 for details.
P09	Nep	200~2000	Click frequency, unit: Hz. See 3.2.4 for details.
P10	Jm1	0~19.9	Sealing a delay, unit: 0.1 seconds 0: No detection of sealing.
P11	Jm2	0~19.9	Sealing two delay, unit: 0.1 seconds 0: No detection of sealing.
P12	Pnh	0.20～0.99	Punching time, unit: 0.01 seconds.
P16	Fur	1～9	Folds the number establishment, after folding the number the vane escapes the material。
P20	Ver	6.36	The software version number.
C00	Typ	0~7	Models, see § 3.2.5.
C01	Opt	0000~1111	Model options, see § 3.2.5.
C02	DmA	30.0~299.9	Roller diameter of A, unit: 0.1 mm.

Table 3(Continue) Parameter definition

No.	Name	Range	Explanation
C07	DmB	30.0~299.9	Roller diameter of B, unit: 0.1 mm.
C03	Drw	1~99	After a few setbacks, unit: pulse-step. Earnest machine whole numbers, a few setbacks.
C04	Rpa	0~99	Color compensation, unit: pulse-step. See § 3.2.3.
C05	Saf	0.1~9.9	Startup delay, unit: 0.1 seconds. Start alarm time.
C06	Alm	1～20	Escapes the bag warning. Before arriving at the entire this number, advanced warning integer。
C08	Dra	0～99	After the hot pressing step backward number: Unit: pulse-step. To send material back eagerly machine back a few steps.
C09	Dlp	0～0.199	Punching lag, unit: 0.001 seconds.
C10	Enz	0.50～0.99	Feed angle coefficient (in the automatic speed state of the effective)
C11	Lui	1～999	Refueling interval. After the export unit value 1000 refueling B4 signal.
C12	Lut	0.1～9.9	Refueling time, unit: 0.1 seconds. Output refueling time.
C13	Pln	0～50	Folds the extension, the unit: Step. In folds under the number condition the first material extension length。

3.2.2 Length (P00/P01) / Count number（P02/P13） / Sending multiple (P07)

P00/P01 to establish a channel and the B channel's system bag length separately, corresponds the entire this number hypothesis is P02/P13; P07 establishes the number of times which each bag is redundant presses very hot. the system bag length already may establish also the available self-checking actual survey artificially.

Material-pulling length = Bag-making length ÷ Sending multiple

Count number = Material-pulling times ÷ Sending multiple

To other machine types, the system set sending multiple =1 internally.

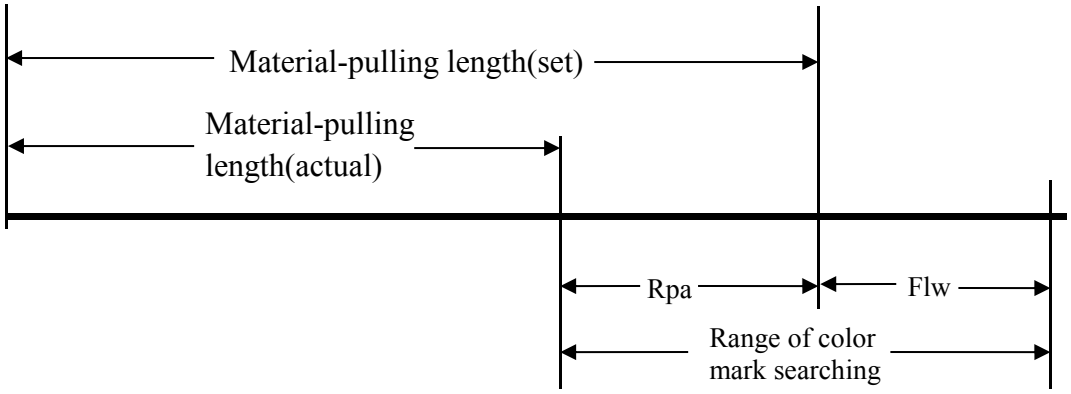
For double shaft driving machine, there are 2 bag-making lengths. P01 is the second bag-making length. In principle, P01 = P00. If P00 is modified, P01 will also be modified at the same time. Similarly, measuring P00 by searching color mark will overwrite P01. But modifying P01 (include measuring) does not affect P00. For other machine type, parameter P01 is of no effect.

Bag-making length can either be set manually or measured by searching color

mark. The way is: set color mark in effect and turn on self-test function, press [click for A] (or [click for B]) to search color mark twice continuously, P00 (or P01) will be measured out.

3.2.3 Color mark tracking (P03)/ color mark compensation (C04)

When Flw = 0, the system will search color mark unboundedly until overspeed position. Otherwise the system will search color mark in the set range. Upon going beyond the set range, take record as a failure. If 3 continuous failures are accumulated, stop the machine. When Rpa = 0, the compensation value is assigned by the system automatically, generally twice of the color mark tracking value. Specially, when Flw = 0, Rpa will adopt the Max. value: 99. If Flw and Rpa is not 0 at the same time, the two parameters will have the following relationship:



Suggestion: Color mark compensation(Rpa)≥2 ×Color mark tracking(Flw)

Figure 3 Color mark searching principle

3.2.4 The Max. frequency (P04)/ Initial frequency (P08) / Click frequency (P09)

The frequency of shaft motor when starting / ending is called initial frequency (P08). The lower the initial frequency is, the smaller the initial acceleration will be. By choosing a low initial frequency (≤500Hz) a speedup curve with downy shape of "S" will be obtained.

Premising enough length, the maximum frequency the shaft motor can reach is called the Max. frequency. Otherwise the shaft motor will stop speeding up before reaching the midpoint. The higher the Max. frequency is, the bigger the acceleration will be. Therefore the back section of acceleration line is mainly determined by the Max. frequency.

When search color mark / withdraw material / click move, use the click frequency (P09).

§3.2.4.1 When the double entire this function, pressed key "9" for cut

demonstration channel A and channel B quick key. on after electricity or replacement, the default is “channel A”, after pressing cuts the key, demonstrates “channel B”;

In the standby circumstances to "state 1" LED display on the row number of A, the whole batch number and count; the next row of LED display the number of B, the whole batch number and count;

In the "Status 2", the last row of LED display efficiency and the length of A; the next row of LED display of speed and length of the B. 2 o'clock in the state to wait for 24 seconds, automatically loaded into the status of a change.

3.2.5 **Machine type**

Table 4 Definition of machine type

C00	Machine type	Explanation of machine type
0	Ordinary machine	Count to P02 after the bag off. During the off bags kept the host and continue to pull material. If it is location B off bags, there will be an empty cut. Bag off the signal half the width of P06.
1	Stop to take off bags, delay and start	Count to P02, after next week, A-axis motor position is not expected to pull in the B position to stop the main motor, and de-bag, delay P06 seconds to resume operation. (This model unparalleled entire function)
2	Stop to take off bags, no starting	Count to P02, after next week, A-axis motor position is not expected to pull in the B position to stop the main motor, and de-bag, and does not resume operation. (This model unparalleled entire function)
3	Hot cutting machine	Count to P02 after the motor shaft position at next week's A retreat C03 step is to cease during the pull-off bags of material (air cutting), P06 of the integer part of the said cutting the number of empty. Restore pull material, the high-frequency compensation for C03 step.
4	First withdraw then send hot cutting machine	In every cycle, retreat 15 paces at position E, and compensate 15 paces when pull material in the high frequency segment. Operation of bag taking off and stop is the same as hot cutting machine.
5	Three edge sealing machine	The shaft motor starts synchronously at position A. Shaft motor A searches color mark GK3. Shaft motor B stop at the low position of the floating roller. Operation of bag taking off is the same as ordinary machine.
6	Joint winding	When stop machine or take off bags, pull material once at the last

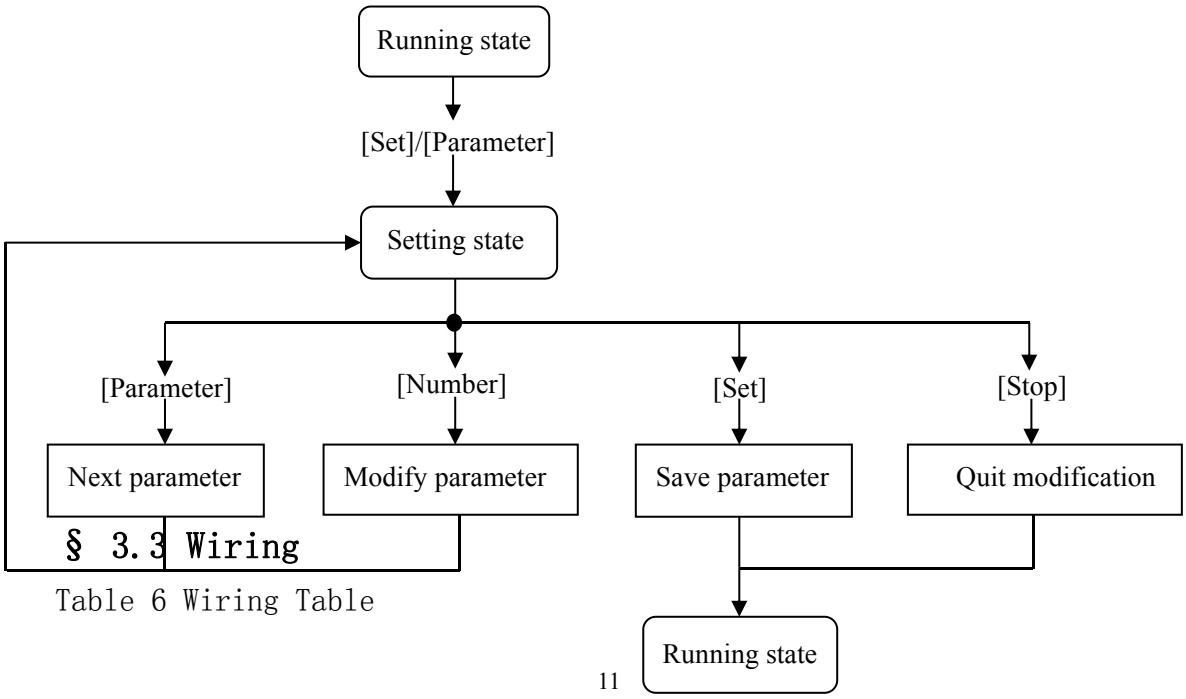
	machine	position A. Other operations are the same as "0002---Stop to take off bags, no starting".
7	Draws back deliversearnestly machine escapes the bag time delay start	Every week the E position retrocedes 10 steps, pulls when the material the high frequency band compensates 10 steps. After the entire this number escapes the bag engine off time delay start.

Table 5 Definition of Optional Items for Machine Type

C01	Optional item	Explanation
_ _ _ X	Preparation for start	X=0: Start the main motor directly; X=1: First pull material, then start the main motor.
_ _ X _	Automatic frequency adjustment	X=0: The feeding does not have along with the main engine speed automatic transformation feeding speed. X=1: The feeding has along with the main engine speed automatic transformation feeding speed.
_ X _ _	Numberofshaft	X=0: Single shaft; X=1: Double shafts.
X _ _ _	Null cutting when start	X=0: After a delay of C05s, start the main motor. Pull material when reaching position A. X=1: After a delay of C05s, start the main motor. Delay 1.5s again. Pull material when reaching position A.

Note: Only type HD2008S;A support three edge sealing or double shaft machine type. Type HD2008D;B don't. If force-set, the result is single shaft/ordinary machine.

3.3 Modification of parameters



§ 3.3 Wiring

Table 6 Wiring Table

Figure 4 Process of parameter modification

Terminal	Explanation
A1	Normally open contact of the main motor
A2	Normally open contact of the main motor
A3	AC220V, L
A4	AC220V, N
A5	Ground. If the machine frame is not earthed, hang it in the air.
A6	+24V
A7	0V
A8	0V
A9	+12V
A10	+12V
B1	Output signal of the buzzer, connect to the oppositive end of the buzzer, while the positive end of the buzzer connects to +12V.
B2	Reserved
B3	Punch output, electric current ≤1A.
B4	Sending multiple 2 **(or refuels signal)** output, electric current ≤1A.
B5	Sending multiple 1**(escapes bag B)** output, electric current ≤1A.
B6	Escapes the bag A signal output, electric current ≤1A.
B7	Deflection-ridding pulse output of servo motor 2.
B8	Deflection-ridding pulse output of servo motor 1.
B9	CCW, Direction output of step/servo motor.
B10	CP2, Displacement pulse output of step/servo motor 2.
B11	CP1, Displacement pulse output of step/servo motor 1.
C1	Stops up the material electro-optic to input one.
C2	Stops up the material electro-optic to input two.
C3	Far distance “click back” input, whose function is equivalent to [Click back A]+[Click B].
C4	Far distance “click forward” input, whose function is equivalent to [Click for A]+[Click for B].
C5	Far distance “run” input
C6	Far distance “stop” input

C7	GK4, color 2 photoelectric input
C8	GK3, color 1 photoelectric input
C9	GK2, Hall 2 input
C10	GK1, Hall 1 input
D1	+24V
D2	0V
D3	empty
D4	empty
D5	empty
D6	empty

4 Installation and debugging

4.1 Installation of sensors

4.1.1 Sensor of Hall

Hall is important in harmonizing the main motor and the shaft motor. It reflects period, phase, and other information of working machinery. It is indeed a time divider. Distorting of these information will affect cooperating between the machinery and the electricity unit, and induce bad work status and low efficiency. Installation requirements will be given according to Figure 5 as follows.

Position A: Departure position of the cutting blade, which is also the start position of material pulling. Material pulling must be finished before reaching position C, otherwise the machine will be stopped because of overspeeding.

Position B: Stop position of all kinds of stop operation. Because of inertia, the machine actually stops behind position B, meanwhile, the cutting blade is at the highest position. The front edge of bag take-off pulse (for some machine type). The take-off pulse ends after a delay, whose back edge is unrelated to position.

Position C Getting down position of the cutting blade. The limit position of material pulling. The front edge of punching pulse. Machinery permitting, move position C backward as far as possible, thus a longer time of material pulling window and a higher efficiency can be obtained.

Position D The front edge of bag take-off pulse (for some machine type). The bag take-off pulse ends after a delay, whose back edge is unrelated to position.

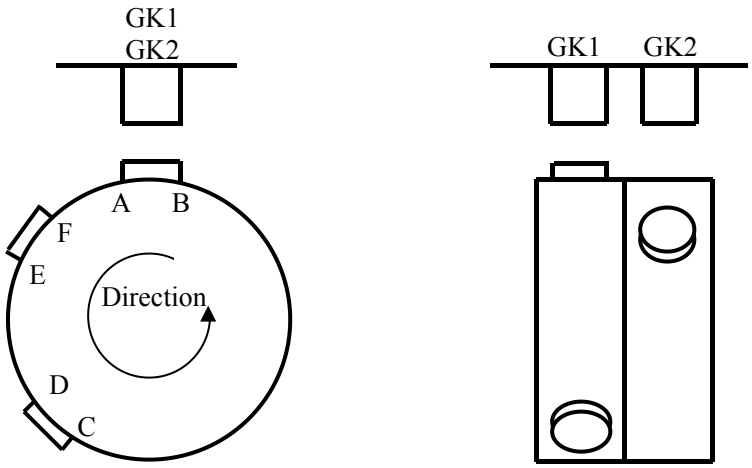


Figure 5 Installation of Hall sensors

Position E The back edge of punching pulse. Initial position of material withdrawing (for the machine type of first withdraw then send). The material withdrawing process must completes before the next position A, otherwise the machine will stop because of overspeeding. The front edge of air blowing pulse(not three edge sealing machine type).

Position F The back edge of air blowing pulse.

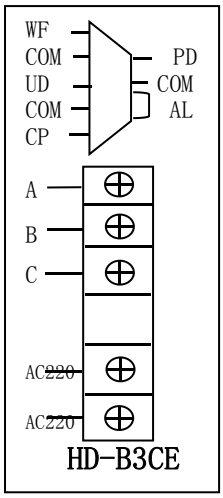
4.1.2 The Jam Photoelectric

When the sealing time of 1, 2 and 0.0 seconds respectively, turn off this feature by default; When the set-up time is greater than 0.0 seconds and less than 9.9 seconds to open when the sealing function, the set time, sealing the signal to be detected in at least one signal, the system will think that the normal; if in this time has been set up signal or has not been the signal system is considered to be sealing or cutting, the system will automatically shut down. Sealing an optical signal, two applications can be set separately.

When the set-up time 1, 2 respectively, 10.0-19.9 seconds to open to non-material features, if the signal is detected and set the time duration equal to, the system is believed that this was not expected, the system automatically shut down; if this Set the time interval the signal changes, and the duration of less than a set time, thought that this signal is invalid, non-implementation of the non-material capabilities. No material photoelectric signal one or two applications can be set separately.

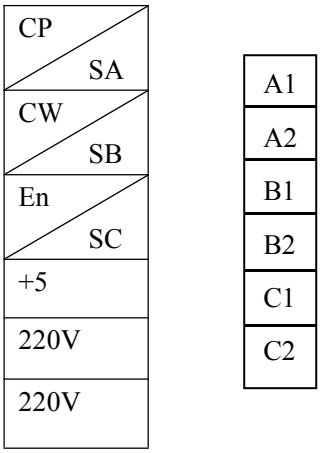
5 Step motor driver wiring

5.1 3-phase compounding mode



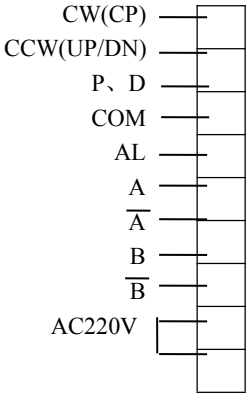
UD	Step direction
COM	+12V
CP	Step inpulse
A	Step motor **1** pin
B	Step motor **3** pin
C	Step motor **5** pin
AC220	Power supply
AC220	Power supply

5.2 3-phase reaction mode II



CP/SA	Step inpulse	A1	Step motor A＋
CW/SB	Step direction	A2	Step motor A－
En/SC	Ground	B1	Step motor B＋
+5	＋12V	B2	Step motor B－
220V	Power supply	C1	Step motor C＋
220V	Power supply	C2	Step motor C－

5.3 2-phase (4-phase) compounding mode



CW(CP)	Step impulse input
CCW(UP/DN)	Step direction
P、D	Reset
COM	＋12V input
AL	Alarming output
A	Step motor A＋（pin 1 of 5 core connector）
$\overline{A}$	Step motor A－（pin 2 of 5 core connector）
B	Step motor B＋（pin 3 of 5 core connector）
$\overline{B}$	Step motor B－（pin 4 of 5 core connector）
AC220V	Power supply