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# 1. Specifications

## PAC10DM Press Controller

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>DC24V±10%, 1A</td>
</tr>
<tr>
<td>EMC</td>
<td>Up to GB/T17626, GB/T18268 standard</td>
</tr>
<tr>
<td>Shock and vibration</td>
<td>Up to JB/T8832-2001 standard</td>
</tr>
<tr>
<td>Temperature</td>
<td>Up to GB/T2423.3-93 standard</td>
</tr>
<tr>
<td>Working temperature</td>
<td>0~50℃</td>
</tr>
<tr>
<td>Humidity</td>
<td>30~85%</td>
</tr>
<tr>
<td>Display</td>
<td>Angle display: 0<del>359°; Stroke speed: 0</del>1000 SPM.</td>
</tr>
<tr>
<td>PLS settings</td>
<td>0~359°</td>
</tr>
</tbody>
</table>

## PM03 Module

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input channel</td>
<td>24 points photo couplers separate input; input voltage: DC24V±10%; maximum input electrical current: 20mA</td>
</tr>
<tr>
<td>Output channel</td>
<td>16 points transistor output: supplied voltage: +24V; output voltage: +24V; maximum output electrical current: 0.5A</td>
</tr>
</tbody>
</table>

## Resolver

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply voltage/frequency</td>
<td>7Vrms 10KHz</td>
</tr>
<tr>
<td>Change rate</td>
<td>0.5±5%</td>
</tr>
<tr>
<td>Angle deviation</td>
<td>±10’</td>
</tr>
<tr>
<td>Drive coil input resistance</td>
<td>100±140j</td>
</tr>
</tbody>
</table>

## Increment encoder
<table>
<thead>
<tr>
<th>Specification</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply voltage</td>
<td>12V DC</td>
</tr>
<tr>
<td>Consumed electric current</td>
<td>≤80mA</td>
</tr>
<tr>
<td>Output type</td>
<td>Voltage output</td>
</tr>
<tr>
<td>Response frequency</td>
<td>0~100KHz</td>
</tr>
<tr>
<td>Pulse quantity per cycle</td>
<td>100~300 lines</td>
</tr>
</tbody>
</table>
2. Installation
<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module</td>
<td>PM03</td>
<td>IO module</td>
</tr>
<tr>
<td>PAC cable</td>
<td>PACL44 -</td>
<td>Cable for connection of mainframe and modules 07 - 7 m, 10 - 10 m, 15 - 15 m</td>
</tr>
<tr>
<td>Power supply</td>
<td>MSTB2,5/3-STF-5.08</td>
<td>24V system power supply interface</td>
</tr>
<tr>
<td>interface</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resolver</td>
<td>●RES70 ●RES70B</td>
<td>Slide position/crankshaft angle feedback C - Common, F - Flange. Refer to the dimension chart.</td>
</tr>
<tr>
<td>Resolver cable</td>
<td>RL70</td>
<td>07 - 7m, 10 - 10m, 15 - 15m</td>
</tr>
<tr>
<td>Resolver axis</td>
<td>PAC-CON02</td>
<td>CON02 : both apertures are 10mm</td>
</tr>
<tr>
<td>connector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increment encoder</td>
<td>CHA-1-10BM-G12□E</td>
<td>Die height feedback</td>
</tr>
<tr>
<td>Encoder cable</td>
<td>EL70</td>
<td>□□ : 07 - 7m, 10 - 10m, 15 - 15m</td>
</tr>
<tr>
<td>Encoder axis</td>
<td>PAC-CON01</td>
<td>CON01 : aperture of End 1: 6mm aperture of End 2: 10mm</td>
</tr>
<tr>
<td>connector</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.1 PAC10DM Dimensions

CUT OUT DIMENSIONS
FRONT VIEW

CUT OUT DIMENSIONS
REAR

Page 9 of 45
2.2 PM03 Module Installation Dimension (DIN rail mounting)

2.3 Resolver Installation Dimension

- Type: RES70 - C, RES70 - F and RES70B
2.4 Increment Encoder Installation Dimension

- Type: CHA-1-10BM-G12□E

![Encoder Diagram]

2.5 Coupler Installation Dimension

- Type: PAC-CON01

![Coupler Diagram]
- Type: PAC-CON02
2.7 Die Monitoring Channels DM1~DM8

Die/Automation Monitor software is used to monitor sensors that report correct part movement relative to the crankshaft angle of a stamping press, and to detect a variety of deviant conditions. Use die monitoring inputs to detect the absence, mis-alignment, or the unwanted presence of parts moving through an automated stamping process. When the software detects a fault, it responds according to what you selected as the fault response:

Following options are available when an error happens:
- Alarm
- Top stop
- Emergency stop
- Bypass

DM1~DM8 may be one of the following modes:
- Static (STC)
- Cyclic (CYC)
- Intermittent Cyclic (ICYC)
- In-position (POS)
- Intermittent In-position (IPOS)

Definition of Window
Input signals for these modes are synchronized with the rotation of the crankshaft and must be detected within a zone of crankshaft rotation. We call this zone of crankshaft rotation a window.

For example, a part-detect signal would be expected within a window of 80-110° to indicate that a part was inside a die before the press stroke.

When the input signals detected differ from those expected, the software generates a fault signal. We graphically define these (window) inputs as follows:
Static mode
This mode is used for monitoring the extraneous events which have nothing to do with the press strokes. When a static-mode input turns Off, the programmed output is turned On. For example, use it to detect end of stock.

Cyclic (CYC)
Use this mode to verify that a pulse from the sensor (OFF-ON-OFF) occurred within the window once each stroke. For example, use it to detect that a part moved past a monitor.

Intermittent Cyclic (ICYC)
Use this mode to verify that a pulse from the sensor (OFF-ON-OFF) occurred within the window once after a preset number of press cycles.

In-position (POS)
Use this mode to verify that the sensor signal remained OFF within the entire window once each stroke. Use it to detect if an ejector and other automation parts are retracted to home position.

Intermittent In-position (IPOS)
Use this mode to verify that the sensor signal remained OFF within the entire window once after a preset number of press cycles.
Notes:
The voltage of external signal may be defined as “Signal Type”. Signal which is defined as “Normal On” shows On is of high level. Signal which is defined as “Normal Off” shows On is of low level.

The following diagram helps you to select DM channel mode according to applications:

<table>
<thead>
<tr>
<th>When Input Signals Are:</th>
<th>Mode:</th>
<th>Used For Example To:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synchronized with crankshaft rotation, and detected within a zone or rotation (window)</td>
<td>Cyclic or In-position</td>
<td>Detect parts in position, or parts ejected.</td>
</tr>
<tr>
<td>Synchronized with crankshaft rotation, and detected within a zone or rotation (window) after a specified number of machine cycles</td>
<td>Intermittent Cyclic or Intermittent In-position</td>
<td></td>
</tr>
<tr>
<td>Independent of press stroke</td>
<td>Static</td>
<td>Detect the end of stock, oil level, external buttons such as emergency stop and unconventional photoelectric signal.</td>
</tr>
</tbody>
</table>

2.8.2 Clutch Signal

Use to detect the clutch status. When a high level of the clutch signal is detected, it means the clutch is in the Closed position.

- When clutch signal is of high level, the key is inactive.
- When clutch signal is of low level, the key is active.
2.8.3 Alarm Bypass

When alarm bypass input is of low level, the alarm signal is ignored. No matter whether there is an alarm signal of die protection or not, there is no output of emergency stop, top stop and alarm signal. When alarm bypass input is of low level, it shows the alarm bypass is in effect.

2.8.4 Top Stop

When top stop input is of low level, the system uses the internal top stop calculation function. When the top stop input is of high level, top stop out will fire immediately and maintain until reset.

2.8.5 Running Signal

An external device gives the run command. A signal of high level shows the press is ready for running, and when the signal changes to low level, the press needs a stop.

2.8.6 Single/Continuous

There is some difference on the stop angle calculation between single and continuous running. When the calculation function for top stop is selected, the single mode and continuous mode are differentiated. A high level of signal means the press is in continuous mode, and a low level of signal means the press is in single mode.

2.8.7 Alarm Reset

Alarm reset input must be of high level. When opened, alarm will reset.

Note: Button contact must be normally closed.
2.8.8 PLS1~PLS13 Output

How a PLS output works
The Programmable Limit Switch software is designed to turn outputs ON and OFF at precise crankshaft positions synchronized with crankshaft rotation monitored with a resolver. You can preset up to 16 ON/OFF settings at angles from 0-359°. You can also turn the output OFF with a timer. Timer settings are 0.01 to 10.0 seconds.

PLS outputs can be one of the following modes:
- timer
- angle
- intermittent time
- intermittent angle

Timer
Output signal starts at ON Angle and will not close until the ON Time arrives.

Angle
Output signal starts to make the output at Angle On and will not close until the Angle OFF arrives.

Intermittent time
After passing the intermittent cycle (a preset number of press strokes), output signal starts to make the output at Angle On and will not close until the ON Time arrives.

Intermittent angle
After passing the intermittent cycles, that is, after a specified number of press strokes, output signal starts to make the output at Angle On and won’t shut until the Angle off arrives.
### 2.8.9 Top Stop Output

When DM input signal defines the top stop output:
- If the top stop calculation function is selected, the top stop signal will not make an output until the calculated angle arrives.
- If the top stop calculation function is not selected, the output of the top stop signal is given immediately once the DM alarm occurs.

### 2.8.10 Connection Signal Time Sequence of PLC and PAC10DM

The following description is applicable when top stop calculation function is selected.

1. The top stop input interface receives input signal of high level, the internal calculation of PAC10DM is used for the top stop calculation.
2. PLC gives PAC10DM a reset signal, the output of PAC10DM’s top stop signal is cleared.
3. When the run signal of PAC10DM is changing from high to low level, PAC10DM starts to calculate the stop angle.
4. When the stop angle arrives, PAC10DM makes the output signal of top stop. The PLC deactivates the clutch immediately when it receives the output signal.
Notes: The above diagram is for reference only, please refer to the manufacturer’s electrical cabinet drawings before connection and wiring.
3 Operation and Settings

3.1 Operation Panel

3.1.1 Angle Indication

Each indicator light represents 10°.

3.1.2 Status Indicators

When an alarm occurs, the corresponding indicator light is on to indicate alarm status. After the alarm condition is cleared, press “Reset alarm” or “Reset” button.
### Status Name | Description
--- | ---
DM Channel 1 | There are 8 die monitoring channels (DM1 to DM8). The indicator light is on while the signal detected by DM input channel is not consistent with the preset parameter.
Brake Monitor | The light is on while braking stroke exceeds preset brake stroke or braking time exceeds preset time.
Tonnage | The light is on when the electric level at the interface of the tonnage detection input is low.
Batch Counter | The light is on when preset batch count is reached.
Part Counter | The light is on when preset part count is reached.
Light Curtain | The light is on when the electric level at the interface of the safety light curtain input is low.

### 3.1.3 Menu Shortcut Keys

Press a shortcut key to enter the setup parameters.

<table>
<thead>
<tr>
<th>Key name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status Monitor</td>
<td>Check angle display at main interface, stroke speed display, counters status of input interface.</td>
</tr>
<tr>
<td>Counter Set</td>
<td>Set part counter and batch counter presets.</td>
</tr>
<tr>
<td>PLS Set</td>
<td>Set output mode of PLS, Angle On/Off, time, intermittent time and intermittent angle parameters.</td>
</tr>
</tbody>
</table>
### 3.1.4 Function Keys

<table>
<thead>
<tr>
<th>Key name</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Batch Counter On</strong></td>
<td>Press to enable or disable Batch Counter. Light is on when batch counter is enabled.</td>
</tr>
<tr>
<td><strong>Part Counter On</strong></td>
<td>Press to enable or disable Part Counter. Light is on when batch counter is enabled.</td>
</tr>
<tr>
<td><strong>Clear Batch Counter</strong></td>
<td>Reset batch counter to zero.</td>
</tr>
<tr>
<td>Clear Part Counter</td>
<td>Reset part counter to zero.</td>
</tr>
<tr>
<td>--------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>Alarm Reset</td>
<td>Indicates an alarm when lit, press to clear alarm indication.</td>
</tr>
<tr>
<td>DM View</td>
<td>When lit, which means the status indicating lamp is displaying the status of signal electric level at input port. Light is off, which means the status indicating lamp is displaying the alarm status.</td>
</tr>
</tbody>
</table>

### 3.1.5 Edit Keys

<table>
<thead>
<tr>
<th>Page Up</th>
<th>Go to the previous page.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Page Down</td>
<td>Go to the next page.</td>
</tr>
<tr>
<td></td>
<td>1 : select previous parameter</td>
</tr>
<tr>
<td></td>
<td>2 : parameter value increases by 1</td>
</tr>
<tr>
<td></td>
<td>1 : select next parameter</td>
</tr>
<tr>
<td></td>
<td>2 : parameter value decreases by 1</td>
</tr>
<tr>
<td></td>
<td>1 : select the left parameter</td>
</tr>
<tr>
<td></td>
<td>2 : parameter moves left by 1 digit</td>
</tr>
</tbody>
</table>
3.1.6 Key application examples

1) Press [Counter Set] to enter Counter Setting menu:

<table>
<thead>
<tr>
<th>Counters</th>
<th>Accu. Parts:</th>
<th>Preset Parts:</th>
<th>Curr. Parts:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>40</td>
<td>100</td>
<td>20</td>
</tr>
</tbody>
</table>

Page 1/2

2) Press [select Preset Parts]
### Counters

<table>
<thead>
<tr>
<th></th>
<th>Acc. Parts:</th>
<th>Preset Parts:</th>
<th>Curr. Parts:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>40</td>
<td>100</td>
<td>20</td>
</tr>
</tbody>
</table>

Page 1/2

3) Press to change counter.

### Counters

<table>
<thead>
<tr>
<th></th>
<th>Acc. Parts:</th>
<th>Preset Parts:</th>
<th>Curr. Parts:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>40</td>
<td>100</td>
<td>20</td>
</tr>
</tbody>
</table>

Page 1/2

4) Press to modify the values.
5) Press _______ to confirm the modifications

<table>
<thead>
<tr>
<th>Counters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accu. Parts : 40</td>
</tr>
<tr>
<td>Preset Parts : 200</td>
</tr>
<tr>
<td>Curr. Parts : 20</td>
</tr>
<tr>
<td>Page 1/2</td>
</tr>
</tbody>
</table>

**3.2 LCD screen**

The menu screen is shown on power up

---

<table>
<thead>
<tr>
<th>SPM : 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>275</td>
</tr>
<tr>
<td>Parts : 198</td>
</tr>
<tr>
<td>Batches : 3</td>
</tr>
<tr>
<td>Job # : 1</td>
</tr>
</tbody>
</table>

---

On this screen, press _______ to display the status of I/O signals.
The above diagram shows top stop input signal is in effect, that is, the calculating function for top stop is selected.

4. Programming parameters

4.1 Counting

4.1.1 Accumulative Parts

Refers to the accumulative number of processed parts.
The accumulative parts = processed batches × preset parts per batch + processed parts of current batch.

Range: 0~999999999
Default: 0
### 4.1.2 Preset parts

Refers to preset number of parts to be processed per batch.

- **Range:** 0–99999
- **Default:** 0

### 4.1.3 Current parts

It means number of processed parts.

- **Range:** 0–99999
- **Default:** 0

### 4.1.4 Preset batches

It means preset batches to be processed.

- **Range:** 0–99999
- **Default:** 0
4.1.5 Current batch

It means processed batches. When preset number of batches arrive, system will generate a signal to declutch.
Range: 0~99999
Default 0

4.2 PLS Settings

There are totally 13 PLS outputs in PLS settings.

4.2.1 Mode selection

There are 4 kinds of different output modes.
Range: 0~3
0: angle
1: time
2: intermittent time
3: intermittent angle
Default: 0

4.2.2 Angle On

It's active in any of the modes, and it means the output signal goes to high level when the crankshaft arrives this angle.
Range: 0~359 degree
Default: 100 degree
4.2.3 Angle Off

It's only active in Angle mode and Intermittent Angle mode, and it means the output signal goes to low level when the crankshaft arrives this angle.
Range: 0~359 degree
Default: 200 degree

4.2.4 Keep On Time

It's only active in time mode and intermittent time mode, and it means the turn on time of signal.
Range: 0~99999ms
Default: 1000ms

4.2.5 Intermittent cycle

It is only active in intermittent time mode and intermittent angle mode, and it means for every how many stroke times the signal output is made.
Range: 0~999
Default: 3

4.3 Die monitoring settings

There are 8 monitoring channels (DM1~DM8).

4.3.1 Mode selection

It refers to the ways of signal input.
Range: 0~4
0: Static (STC)
1: Cyclic (CYC)
2: Intermittent Cyclic (ICYC)
3: In-position (POS)
4: Intermittent In-position (IPOS)
Default is 3 (POS)

4.3.2 Signal types

This refers to the definition of the status while signal is ON. Please see the Connection section for reference.

Range: 0~1
0: Normal OFF, signal being defined as Normal OFF means ON is of low level;
1: Normal ON, signal being defined as Normal ON means ON is of high level;
Default: 1

4.3.3 Angle On

It’s active in any mode, and it means when the crankshaft arrives this angle, PAC10DM starts to detect DM input signal.

Range: 0~359 degree
Default: 100 degree

4.3.4 Angle Off

It’s only active in angle mode and intermittent angle mode, and it means when the crankshaft arrives this angle, PAC10DM stops the detection of DM input signal.

Range: 0~359 degree
Default: 200 degree
4.3.5 Output options

It refers to the controller’s reaction upon receipt of unconventional DM signals.
Range: 0~3
0: Emergency stop
1: Top stop
2: Alarm
3: Ignore
Default: 3

4.3.6 Intermittent cycle

For every how many cycles there is a signal.
Range: 0~999
Default: 3

4.4 Die height

The display of current die height.
Position increment of die height = 4× pulse number of Encoder per cycle × Factor 2/Factor 1

4.4.1 Current position

It shows the current die height.
Range: 0.00~999.99
Default: 0

4.4.2 Position setting

This refers to the right position of die height adjustment. This parameter is saved into the programs,
when a different program is loaded, the corresponding die height settings is loaded at the same time.

Range: 0~999.99

Default: -

### 4.5 Program operations

There are 100 programs in total. Each program contains 8 DM channel settings, 13 PLS settings and the die height setting. Each program is one-to-one correspondence with a set of die, which makes it easily to change the die quickly.

#### 4.5.1 Corresponding operations

Range: 0~3

0: select the program as current processing program;
1: save the current parameter settings to a program;
2: delete the saved program;
3: return, without doing anything.

Default value: -

### 4.6 Brake monitor

Press “Brake monitor” key to view the accumulative movement times of clutch, and alarm records for the last machine stop.

<table>
<thead>
<tr>
<th>Items</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>accumulative movement times of clutch</td>
<td>This cannot be reset</td>
</tr>
<tr>
<td>last braking angle</td>
<td></td>
</tr>
<tr>
<td>last braking time</td>
<td></td>
</tr>
<tr>
<td>Input Channel from 1 to 8</td>
<td>Alarm status of DM1~DM8</td>
</tr>
<tr>
<td>Tonnage monitoring</td>
<td>Tonnage fault is detected</td>
</tr>
<tr>
<td>Safety light curtain</td>
<td>Light curtain fault is detected</td>
</tr>
<tr>
<td>Overrun</td>
<td>Slide doesn’t stop within the range of overrun setting</td>
</tr>
</tbody>
</table>
### 5. Machine Tool Parameters

#### 5.1 Enter into parameter settings

1) Press 

2) Press by turns the following keys : 、  、  and then press  to enter into parameter setting menu.

#### 5.2 Parameter instructions

##### 5.2.1 Maximum braking angle

It refers to the allowed maximum braking angle of clutch. If the braking angle exceeds this angle limit, system will alarm for brake fault. When setting this parameter, you may do the 90° test at the actual stroke speed to work out the actual braking angle and braking time, and then, you may set the maximum braking angle and braking time with reference to the actual angle and time.

Range : 0~9999 degree  
Default : 80  degree
5.2.2 Maximum braking time

It refers to the allowed maximum braking time of clutch.
Range: 0~9999 ms
Default value: 900ms

5.2.3 Resolver direction

It means the counting direction of the resolver. You can select increase by clockwise or decrease by counterclockwise.
Range: 0~1
Default: 0
5.2.4 Bottom dead center setting

This is to set the position of B.D.C.
Range: 180 degree
Default: 180 degree

5.2.5 Detection angle range of photoelectric signals

It refers to detect angle range of photoelectric signals and to see if the light curtain signal is normal or not.
Range: 0~359 degree
Default: 0~0 degree

5.2.6 Overrun angle setting

Use resolver angle to set the range of Top dead center.
Range: 0~359—0~359 degree
Default: 0—0 degree

5.2.7 Encoder direction

It means the counting direction of the encoder, and it is used to decide the displayed value is changing towards the increasing direction or decreasing direction when the encoder is rotating clockwise.
Range: 0~1
0: Clockwise
1: counterclockwise
Default: 1
5.2.8 Current position setting

This refers to set current die height.
Range: 0~99999
Default value: 0

5.2.9 Factor 1

It is a factor which is used to calculate the pulse number and the die height.
Range: 1~9999
Default: 1

5.2.10 Factor 2

It is a factor which is used to calculate the pulse number and the die height.
Range: 1~9999
Default: 1

5.2.11 Upper limit

It refers to the upper position limit of die height adjustment.
Range: 0~999999
Default: 99999

5.2.12 Lower limit

It refers to the lower position limit of die height adjustment.
Range: 0~999999
Default: 1
5.2.13 Restore to factory settings

All parameters restore to factory settings.
Range: 0~1
0: no change
1: restore
Default: 0

5.2.14 Language options

It means to select the menu language.
Range: 0~1
0: Chinese
1: English
Default: 0
6. Commissioning

6.1 Preparation and checking before running

6.1.1 Check electrical connections

Warning:

Before using, please check the machine according to operation instructions from the machine tool manufacturer, and make sure the operation is safe.

Refer to Appendix 1 and use I/O diagnostic program to check connections. Once system connections are verified, cycle power off and on.

6.2 Quick Start

- Set direction of resolver
- Set B.D.C.
- Set parameters of the machine tool
- Set PLS output
- Set DM input channel
- Set shut-height (optional)
- Save the job (program)

6.3 Commissioning of T.D.C. Stop for machine tools with speed adjustment

PAC controllers can be applied to make the speed adjustment to the machine tools. After adjustment, different working strokes can stop in the range of top dead center.

Adjustment:

1. Enter into parameter menu, and set overrun angle as from 190 degree to 170 degree.
2. From the lowest working speed to the highest working speed, every 8 SPM is an interval. Let the system run in Single mode and Continuous Mode and let it make an automatic compensation until it stops at top dead center.
3. Set overrun angle as from 330 degree to 30 degree.
7. Trouble Shooting

7.1 Description
When an alarm occurs, the indicator lights on the controller and LCD screen will display alarm events. If the machine stops, you can view the alarm records in the Brake Monitor menu page.

Once alarm conditions are resolved, press or the Reset button on the panel to release the alarm.

7.2 Fault Table

<table>
<thead>
<tr>
<th>Name</th>
<th>Reasons</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error report upon system power up</td>
<td>Mistake occurs when system switches on and begins to verify parameters</td>
<td>Enter into machine tool parameter settings and make the settings again</td>
</tr>
<tr>
<td>DM channel 1~8</td>
<td>Input signal is not consistent with setting</td>
<td></td>
</tr>
<tr>
<td>Tonnage alarm</td>
<td>Tonnage detection signal is of low level</td>
<td></td>
</tr>
<tr>
<td>Safety light curtain</td>
<td>Photoelectric detection signal is of low level</td>
<td></td>
</tr>
<tr>
<td>Overrun</td>
<td>Slide does not stop within the angle range of the overrun setting</td>
<td>Check overrun parameter settings and have the slide stop within the angle range</td>
</tr>
<tr>
<td>Die height exceeds the limit</td>
<td>Die height is not within the range of settings</td>
<td>Check upper and lower limit parameter of die height setting. Adjust the die height until it’s within the range of settings</td>
</tr>
<tr>
<td>Batch Counter Full</td>
<td></td>
<td>Clear and reset one by one</td>
</tr>
<tr>
<td>Part Counter Full</td>
<td></td>
<td>Clear and reset one by one</td>
</tr>
<tr>
<td>T-stop</td>
<td>Last machine stop is top stop</td>
<td></td>
</tr>
<tr>
<td>E-stop</td>
<td>Last machine stop is emergency stop</td>
<td></td>
</tr>
<tr>
<td>Resolver offline</td>
<td></td>
<td>Check resolver connection</td>
</tr>
<tr>
<td>Abnormal braking</td>
<td>Braking angle or time exceeds set values (maximum braking angle, maximum braking time)</td>
<td>1. Check parameter settings; 2. Friction plate may need to be replaced</td>
</tr>
</tbody>
</table>
## 8. Maintenance

<table>
<thead>
<tr>
<th>Items</th>
<th>Repair Schedule</th>
<th>Contents of repair</th>
<th>Treatment for unconventional events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loose or tight bolt</td>
<td>Once 3 months</td>
<td>Panel, resolver and bolts on the</td>
<td>fasten</td>
</tr>
<tr>
<td>installation</td>
<td></td>
<td>encoders</td>
<td></td>
</tr>
<tr>
<td>Cable Connectors</td>
<td>Once 3 months</td>
<td>Cable connections to the</td>
<td>fasten</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sensors, PM module and PAC10DM</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 1: Hardware Diagnosis

- LED diagnosis
  When system is powered on, all LED are lit for 2 seconds.

- LCD diagnosis
  On power up, the software version number and manufacturer info is displayed on the screen.

⚠️ Notes
When making I/O diagnosis, refer to the operation instructions in the machine tool manual, make sure the main motor is stopped and there is no danger.

Diagnosis of Input ports:
- Turn the mode selecting switch to OFF status;
- Press the following keys:
  - Press to confirm and press to enter into output diagnosis menu.

Diagnosis of output ports
In diagnostic menu of input ports, press and enter output ports diagnosis. Select the output interface by pressing or key, then press Enter key once to confirm.

Press or key to select output indicator light in correspondence with 0 on and the indicator on the output board is off.
## Appendix 2 : System Parameter Backup

<table>
<thead>
<tr>
<th>Parameter names</th>
<th>Explanation</th>
<th>Range</th>
<th>User's value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. braking angle</td>
<td>Maximum braking angle</td>
<td>0~9999</td>
<td></td>
<td>degree</td>
</tr>
<tr>
<td>Max. braking time</td>
<td>Maximum braking time</td>
<td>0~9999</td>
<td></td>
<td>ms</td>
</tr>
<tr>
<td>Resolver direction</td>
<td>Counting direction of resolver</td>
<td>0~1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B.D.C. setting</td>
<td>Confirm current crankshaft is at an angle of 180 degree</td>
<td>0~180</td>
<td></td>
<td>Degree</td>
</tr>
<tr>
<td>Photoelectric detection angle range</td>
<td>To detect photoelectric signal within this range</td>
<td>0~359</td>
<td></td>
<td>degree</td>
</tr>
<tr>
<td>Overrun angle setting</td>
<td>Use internal sensors to detect Overrun angle range</td>
<td>0~359</td>
<td></td>
<td>degree</td>
</tr>
<tr>
<td>Encoder direction</td>
<td>Counting direction of die height encoder</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current position</td>
<td>Set current position of die height</td>
<td>0~99999</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factor 1</td>
<td>Factor 1 set by die height encoder</td>
<td>1~9999</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factor 2</td>
<td>Factor 2 set by die height encoder</td>
<td>1~9999</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper limit</td>
<td>Allowed maximum die height when mounting</td>
<td>1000.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower limit</td>
<td>Allowed minimum die height when mounting</td>
<td>0.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restore to factory settings</td>
<td>All parameters are restored to factory settings</td>
<td>0 : no change 1 : restore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language options</td>
<td>To select language of menu</td>
<td>0 : Chinese 1 : English</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>