Total Solution of Press Control & Functional units
ESTUN Automation focuses on technology development, R&D, manufacturing and sales of high-end intelligent equipment and its core components. Currently ESTUN Automation has four categories of products which are metal forming CNC control system (Stamping, Forging, Shear and Bending industry), electro-hydraulic servo system, AC servo system and motion control system, Industrial Robots and complete equipment. ESTUN Automation is a leader in the industry who has gain good reputation and high influence. Now ESTUN has been certified as National High-Tech Enterprises and Innovative enterprises of Jiangsu Province. ESTUN has its own Enterprise Postdoctoral Workstation and Graduate Workstation of Jiangsu Province, and owned the R&D center of national recognition such as AC Servo System Engineering Research Center of Jiangsu Province, Forging machinery CNC System Engineering Research Center of Jiangsu Province, Hydraulic Control Systems Engineering Technology Research Center of Jiangsu Province.

Targets the Mechanical presses equipment, ESTUN provides the products includes PAC series Electronic Cam Controller and Press Control system, Electric control cabinet, HELM’s tonnage monitoring system, SAFE100 Security control module, Security CAM box, Pneumatic Double Safety Valve, Hydraulically Actuated Clutch/Brake Combinations, Hydraulic Damping Unit, Hydraulic Overload Protection unit, Hydraulic Cushion and many other products. With the one-stop total solution service, ESTUN make press manufactures easy to have high quality electric Control, Functional units and total solution, removes the press manufactures’ worries in automatic control.
Control product class

PAC10 Electronic Cam Controller Special for Mechanical Press

PAC30 Electronic Cam Controller Special for Mechanical Press

PAC300 Special controller for mechanical press

SAFE100 Safe module

Electric total solution can meet the Mechanical press national standard GB27607-2011

Electric control cabinet

Load monitor product class

RLG Series Load Monitors

PTM Series Load Monitors

HELM Tonnage Module

HELM Loadgard system networking solution

HELM Calibration System

Accessories&Dimension

Hydraulic product class

HERION Hydraulic Damping Unit

HERION Hydraulically Actuated Clutch/Brake Combinations

HERION Hydraulic Overload Protection unit

ESTUN Simple multi cylinder hydraulic cushions

ESTUN Multi cylinder synchronous numerical control hydraulic cushions
PAC10 is a special electronic cam controller dedicated to mechanical presses. It’s so easy to be installed and used that it’s taking the place of mechanical cams and various counters. Clutch control is available which makes slide stop exactly at top dead center. PAC10/F provides fast response for cam channel output, which is able to meet customers’ different needs of producing high quality products. With the clutch monitoring function of PAC10/F, machine safety is greatly enhanced. In addition, cam setting is done safely and conveniently on the panel.

**Features**

- Strokes or Angle display: When rotation speed >10 SPM, SPM is displayed. When rotation speed ≤10 SPM, angle is displayed.
- Workpieces Counter and Setting
- Twelve groups of outputs, including:
  - Ten groups of electronic cams and two groups of controlling clutch
- Multi-groups shearing (Cut-Off)
- Bottom dead center setting
- Auxiliary angle setting
- Automatic positioning compensation at Top dead center
- Automatic and accurate stop at top dead center
- Automatic computation of braking angle
- Forward / Reverse rotation is programmable with parameters
- High / low SPM limiting
- Real time monitoring of braking inertia
- Braking counter
- All kinds of alarm
- IO Monitoring
- Self correction of shaft position
# Technical Specification

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>DC24V±10%, 1A</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-20~70°C</td>
</tr>
<tr>
<td>Humidity</td>
<td>30~85%</td>
</tr>
<tr>
<td>Angle display</td>
<td>0~359°</td>
</tr>
<tr>
<td>Angle setting</td>
<td>0~359°</td>
</tr>
<tr>
<td>Strokes per minute</td>
<td>0~2000 SPM (360P/R)</td>
</tr>
<tr>
<td>Angle sensor</td>
<td>360 lines incremental encoder (5V, differential type voltage output, with reference input) or resolver</td>
</tr>
<tr>
<td>Angle resolution</td>
<td>0.25 degree</td>
</tr>
<tr>
<td>Indicator Lamps</td>
<td>32 indicators to show shaft position</td>
</tr>
<tr>
<td>Keys</td>
<td>Stroke/Angle (4 digits numeral tubes) Workpiece counter (6 digits numeral tubes)</td>
</tr>
<tr>
<td>CAM output</td>
<td>Four(4) jogging switch-switch keys</td>
</tr>
<tr>
<td>Input</td>
<td>0~359° Ten (10) groups</td>
</tr>
<tr>
<td>Output</td>
<td>5 channels (photocoupler isolation) DC24V±10%, maximum input current: 20mA</td>
</tr>
<tr>
<td></td>
<td>12 channels (photocoupler isolation) DC24V±10%, maximum output current: 50mA</td>
</tr>
</tbody>
</table>

# Dimension

![Dimension Diagram]

Unit: mm

# Customized Integrated Panel

![Customized Integrated Panel Diagram]
As an Electronic-CAM controller, the PAC30 consists of an HMI with the Control-Module. The HMI is ESTUN's elaborated human-machine interface products (the size of the touch-screen is optional), which provides you with the well interfaces, such as control parameters page, monitoring page. The Control-Module consists of a control-center module with the IO-modules, and it is responsible for the control functions, such as PLS, DM, count, stop at TDC, Tonnage monitoring. In order to adapt to the future Industrial 4.0 requirement for intelligent factory, the controller can be customized to realize network data management, remote monitoring the production process, remote maintenance.

To ensure the precision signal sampling and the reliability communication, the data transfer between the Control-Module and the HMI is by the high-speed serial communication. The Control-Module is using the modularization design, so that you can select the type and the number of the modules according to your actual requirement. In any combination of modules can bring the most excellent cost performance.

**Features**

- According to the actual requirement, the number of the IO channels can be added optionally, maximum support 40 number of logic inputs and logic outputs
- Touch-screen terminal with the customization pages, providing the well Man-Machine interface
- Maximum support 34 channels PLS, and maximum support 33 channels DM
- Automatically compensates the TDC
- Memory 20 job data
- Workpiece Counter
- Self detection when power on, and self-storage when power off
- Double-channels tonnage monitoring
- Multilevel password protection
- Support inverter control
- The ports of IO can be configured
- Alarm when the brake is abnormal
- Encoder monitoring
- Using the rotary transformer as the angle-detection to improve the reliability, such as anti-vibration, anti-impact, high-precision
- Optional function: remote management.
As a press control system, PAC300 consists of an HMI with the Control-Module (There is an optional angle indicator). The HMI is ESTUN’s elaborated human-machine interface products, which provides you with the well interfaces, such as control parameters page, monitoring page. The Control-Module consists of a control-center module with the IO-modules, and it is responsible for the control functions, such as PLS, DM, count, stop at TDC, Tonnage monitoring. The angle indicator is used to display the speed and angle of the crankshaft movement. In order to adapt to the future industrial 4.0 requirement for intelligent factory, the controller can be customized to realize network data management, remote monitoring the production process, remote maintenance.

To ensure the precision signal sampling and the communication reliability, the data transfer between the Control-Module and the HMI is by the high-speed serial communication. The Control-Module is using the modularization design, so that you can select the type and the number of the modules according to your actual requirement. With freely combination of modules can bring the most excellent cost performance.

**Features**

- According to the actual requirement, the number of the IO channels can be added optionally, and the maximum number of the logic inputs and logic outputs are 40
- Touch-screen terminal with the customization pages, providing the well Man-Machine interface
- Maximum support 20 channels PLS and DM
- Automatically compensate the TDC
- Memory 10 job data
- Workpiece Counter
- Multiple lubrication control
- Double-channels tonnage monitoring
- Two overload approach is compatible with most domestic machine tool overload safety valve
- The speed of transducer is controllable
- The ports of IO can be configured
- Brake monitoring and alarm
- Software and hardware dual protect TDC overtravel
- Using the rotary transformer as the angle-detection to improve the reliability, such as anti-vibration, anti-impact, high-precision
- Optional function: remote management
## Technical Specification

<table>
<thead>
<tr>
<th>Interface</th>
<th>Items</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>Input Voltage</td>
<td>24VDC±10%, 1A</td>
</tr>
<tr>
<td>Resolver</td>
<td>Specification</td>
<td>7Vrms/10KHz, Ratio: 0.5, Excitation current: 200mA</td>
</tr>
<tr>
<td>Analog</td>
<td>Range</td>
<td>0V~10V</td>
</tr>
<tr>
<td></td>
<td>Resolution</td>
<td>12bit</td>
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<tr>
<td></td>
<td>Number of Channels</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Sampling Frequency</td>
<td>100KHz</td>
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<tr>
<td>RS485</td>
<td>Baud Rate</td>
<td>9600bps</td>
</tr>
<tr>
<td>RS232</td>
<td>Baud Rate</td>
<td>256000bps</td>
</tr>
<tr>
<td></td>
<td>Angle Sensor</td>
<td>Resolver</td>
</tr>
<tr>
<td></td>
<td>Angular Resolution</td>
<td>±0.1°</td>
</tr>
</tbody>
</table>

### ER-1411 Expansion Input Module

**Parameter Description**
- Input Voltage: 24VDC±10%
- Input Channels: 20 Channels
- Input Filtering Time: 5ms
- Anti-vibration performance: EN60068-2-6
- Electromagnetic Immunity: EN61000-6-2
- Working Temperature: 0°C~55°C
- Dimension: 112mm×112.5mm×22.6mm
- Installation: On the 35 mm U-Shaped track

### ER-2411 Expansion Output Module

**Parameter Description**
- Output Type: Open collector output (OC)
- The Max. Channel Drive Current: 70mA
- Output Channels: 20 Channels
- Output Delay Time: Typ. 0.5ms
- Anti-vibration performance: EN60068-2-6
- Electromagnetic Immunity: EN61000-6-2
- Working Temperature: 0°C~55°C
- Dimension: 112mm×112.5mm×22.6mm
- Installation: On the 35 mm U-Shaped track

### Dimension

[Diagram of ER-1411 Expansion Input Module]
[Diagram of ER-2411 Expansion Output Module]
SAFE100

Safety Control Module for Mechanical Presses

Meet the standard: GB5226.1-2008, GB27607-2011, GB/T16885.1, EN954-1, EN60204-1, Q/S20115ES06-2011, SAFE100 mainly used to connect: E-STOP button, safety light curtains, safety door limit switches, hand switches, foot switches, and other digital signals.

- Redundant loop, double CPU
- Wiring fault detection at start
- Input switch fault detect
  Detect the two redundant signal of each input of IO1-IO8, if the redundant signal's state changing time exceed 0.5s, SAFE100 judge the input signal occur fault and enter into alarm mode
- With the auto testing pulse, real-time monitoring input and output channel fault critical data backup and testing
- Important data backup and testing
- Auto and manual reset operation mode
- EDM detection: Monitoring external device by connect the feedback signal
- Alarm clear: Once the system detects alarm, the module should be powered off and re-up electricity to clear alarm

Technical Specification

- Power Port: 24V, 0V(System); 24VO, 0VO(IO Ports); FG(Sheld)
- Safety Input: IO1~IO20(20mA)
- Test Output: T1~T4(PNP 0.5A)
- Auxiliary Output: OA(PNP 0.5A)
- Transistor Safety Output: O1~O4(PNP 2A)
- Relay Safety Output: R1A, R1B; R2A, R2B(capability: 24VDC/3A; 220VAC/3A)
- Extension IO: CO+, CO-, CI+, CI- (reserved)
- CAN port: CN3 (reserved)
- RS232 Port: CN6
GB27607-2011

Electric total solution can meet the Mechanical press national standard GB27607-2011

**Double Safety Valve**
- Inherently fail-safe
- Dynamic self monitoring
- Double valve control system
- For use with pneumatic clutch and brake systems and other 3-way safety functions
- Poppet design with feedback signal ports
- Fast exhaust capability
- Conforms to DIN EN ISO 13849-1 and 892 (performance level e, category IV), CE approval
- Improves safety and reduces downtime

**Security CAM Box**
- Built-in high performance resolver
- Built-in three mechanical switch for mandatory on-off
Electric control cabinet

- ISO9001 approved
- Adopt well-know brand components
- Can be customized according to user requirements
Founded in 1982, Helm Instrument Company is the leading designer and manufacturer of process control systems, load monitoring, force transducers and software for the metal forming industries. Helm holds numerous patents on press load monitoring and signature analysis, sensor designs, instrumentation and applications. Helm’s products is used on Metal Stamping, Forging, Die Casting, Injection Molding, Cold Forming and Welding operations.

ESTUN automation is the only strategic partner of HELM, and is handling Helm’s products business in China. ESTUN provides all customers with total solution including project design, sales, technical supports and after-sales service, etc.

**RLG**

Series Load Monitors

The RLG series provide press overload protection, die protection, and improved part quality, with minimal operator involvement. The RLG unit takes a sample of the forming force of an ideal part, stores this level in memory and compares each subsequent force level against the ideal. In addition to capacity alarms for overload protection, the TREND LOADGARD features high and low tolerance limits, set automatically for each channel based on a pre-established setting. Three different types or modes of TREND ALARMS are included, which are PEAK TREND ALARMS, ADAPTIVE PEAK TREND ALARMS, and ADAPTIVE AREA UNDER CURVE ALARMS. Digital meters on the front panel are used to display updated “Peak” load values and high/low alarm settings. Machine stop is initiated by means of two separate alarm relays, which fire when certain alarm limits are exceeded.

**Features**

- Two / Four Channel, Strain Gage Input
- Built-in Press Capacity Alarms
- Three selectable load alarming methods (Peak trend, Adaptive peak trend, Adaptive area under curve)
- Analog signal output interfaces
- High precision LED indicators
- Automatic zero adjust
- Real time load display for all channels and total
- Bluetooth communication, load date is transmitted from RLG unit to android phone for data backup, signal analysis, alarm records and production management

Load monitor trend alarming allows you to establish the quality window that the process must operate within. Limits are selectable from 5% to 45%, in 5% increments. Once the forming process begins, the Trend alarms are automatically set above and below the sample benchmark value. Machine shutdown is activated if the forming force varies outside the load monitoring range.
Adaptive Peak Trend Alarm

Changes in material thickness, hardness or temper are quickly detected with this load alarming method. Upper and lower limits are continuously adjusted during the production run based on the average load developed over the last 100 machine strokes. Adaptive learn alarming is ideal for high speed forming operations and guarantees precision load control.

Adaptive Area Under Curve Alarm

Utilizing Helm signature analysis techniques, this alarming method continuously monitors the energy curve developed while each part is formed. If any area of the forming load signature changes, machine stop is initiated. Area under the curve load monitoring does not require a resolver or other external timing device. Applications include presses performing deep draw or stretch forming operations and machines using nitrogen die cylinders.

Dimension
PTM Series Load Monitors

Taking advantage of most up-to-date PC technology and in combination with Helm’s load monitoring and signal analysis technologies, the PTM series load monitors including two, four and six channel systems, which provide not only process monitoring of a single press but line supervision for automobile companies.

Features

- Touch screen display, Windows CE Operating System, Ethernet ports and RS422 interface
- Different alarm methods including Capacity / Trend / Tracking Alarm
- Monitoring of pressure curve to find immediately the possible problems like loose tie rod, bearing abrasion, slugs in die, lubrication error, plate thickness, etc.
- Real time generation of SPC charts and graphs (like X-bar, Sigma and Pareto charts) through the whole production course
- Automatic recording of Downtime reports and alarm history
- Reduced time for die change
- Peak History Graph & Export the Data to Microsoft Excel File Format
- Resolver input for Tracking & Press Curve Alarm based on Crank Angle Position

Data charts of measured frequency are provided to show what was wrong during the course of production.

The X-bar/Sigma charts calculate the Mean and Standard deviation for each sample point. The Mean and Standard deviations are then averaged to generate X-bar and Sigma line graphs, which can be used to evaluate distribution range of load diversity directly related to quality level.
PTM-4500S-TSM Loadgard System for Servo-Press

PTM-4500S-TSM model is HELM specially designed for Servo-Press. With the press position information from Resolver, the most powerful Thru-Stroke monitoring of the different working mode like Pendulum Operation for Servo-Press becomes possible. With the sophisticated load tracking and Press Curve tracking alarms provide the absolute protect of Press components, including dies from costly damage, and ensure parts are being made as specified.

**PTM-4500S-TSM Loadgard System for Servo-Press Application**

- **PTM 4500S-TSM**
- **Slide Pendulum Motion Range**
- **PTM Lock window set needs to be inside of pendulum motion**
- **With Resolver Input**
- **Possible to Monitor Pendulum Operation for Trend and Tracking alarm condition for each swing**
- **For Multi Strike Operation**
- **Multi Strike Signature Screen**
- Captures Multiple Stroke load signatures, view & export data for analysis
- Captures up to 7 multi strikes data

**Dimension**

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>374.7 mm</td>
</tr>
<tr>
<td>Left Side</td>
<td>37.9 mm</td>
</tr>
<tr>
<td>Right Side</td>
<td>161.9 mm</td>
</tr>
<tr>
<td>Width</td>
<td>19.38</td>
</tr>
<tr>
<td>Depth</td>
<td>37.31</td>
</tr>
</tbody>
</table>

Unit mm
SCM-EU4 Thru-Stoke Monitoring Module

- Four channels of continuous monitoring signal conditioning circuitry
- Resolver input to perform “Through The Stroke” Alarming Capability
- Patented Auto-Zero automatic Zero balance circuitry
- 0-10V analog output to PLC
- Panel mount card cage for back panel installation in machine control cabinet

HELM Module for Allen-Brody Controllers

- Model HM-604
- Model HM-1520
- Model HM-1756
- Model HM-1734

Supported platforms include dual channel solutions for Point I/O, ControlLogix, CompactLogix, MicroLogix and SLC. The 1746 and 1756 series can integrate with position information, eliminating the need and cost of external monitoring devices.

PTM-1 Analoge Module

PTM-1 Strain Gage I/O module can be connected to any types of PLC. Cost-effective, compact and multifunctional PTM-1 module offers trend alarm and peak alarm functions.
Solution introduction: All the PTM4500 system connected to the remote control PC via Ethernet, with the most powerful FIRSTMATE WEBVIEW tonnage monitoring and analysis software in PC, you have full control of PTM4500 from setup to monitoring and recalling press load curve and alarm history data, the ADC function is also available.

Solution introduction: The Helm SCM-EU4 is a highly intelligent 4ch strain gage signal conditional module with Sine-Cosine resolver input. With the press position information from Resolver, the most powerful Thru-Stoke monitoring becomes possible to protect your tools and machines. Sophisticated load tracking and Press Curve tracking alarms provide the absolute protect beyond the high capacity and peak trend alarms that ordinary load monitor offers. From Line Supervisor software from PTM4500 on lead press, you have full control of the SCM module from setup to monitoring and recalling load signatures, is a most widely used and high cost-performance solution.
Solution introduction: The lead press Tonnage monitoring system is PTM4500, the other presses are equipped with RLG systems. From Line Supervisor software in PTM4500, all the RLG systems’ load and history information are monitored in PTM4500. As the RLG cannot have the Thru-Strobe monitoring, only the PTM4500 can display the press curve, is a more economic solution.

**Firstmate Webview**

**Firstmate Webview** is an signature analysis and data display software, current and alarm data formed on each LoadGard with Ethernet communication function is transmitted to the Firstmate computer. With the data management and analysis function of the software, can real time remote monitoring the Press current production state, and save the load data into the Firstmate computer.
HELM Calibration System

Helm calibration system consists of Compass PLM-4, load cell and Bluetooth Transmission System.

Compass PLM-4

- Two / Four Channel, Strain Gage Input
- Calibrate the stamping tonnage
- Real time load display for all channels
- Pressure curve to find the possible problems

Load Cell

The Helm Calibration load cell made in USA, to accurately measure compression forces from 100 ton (200,000lbs) to 5000 ton (10,000,000lbs). It is to provide accurate and repeatable loads for testing, Calibration and run-off new and existing machinery.

Bluetooth Transmission System
Accessories & Dimension

PAC Accessories

Dimension of encoder (Model: EL40)

Unit: mm

Dimension of resolver (Model: RES56-A / RES50)

Unit: mm

Dimension of shaft coupling (Model: RL6X10 / RL8X10)

Unit: mm

(Notes) When the accessories is encoder, X=Ø6; when the accessories is resolver, X=Ø8.

HELM Accessories

Sensor / Model: HT400
Model: HT411

Resolver / Model: HR-1101
Germany Herion company has been engaged in the design for many years, produce hydraulic and pneumatic products, and applied to the system mechanical presses with similar machinery and equipment. Herion is a hydraulic clutch / brake and safety valve design and manufacturing leader, has numerous patents. Herion's hydraulic clutch / brake and safety valve in line with the highest European safety standards EN692. Estun Automation Co., Ltd. as the partners of Germany Herion company will be responsible for product design, marketing, technical support and on-site commissioning services.

Herion company main products include: Hydraulically Actuated Clutch/Brake Combinations, Hydraulic Damping Unit, Hydraulic Overload Protection unit and Hydraulic double safety Valve.

**Characteristics**

- Characteristics
- Protection of press drive
- If required, undamped coupling is possible
- Good and easy adjustment to the type of press concerned
Hydraulically Actuated Clutch/Brake Combinations

Series: KB03-KB600

- Torque capacities:
  - Clutch TCL=3000-670000Nm
  - Brake TBK=1000-250000Nm

Technical Features

- Virtually wear-free
- Low operation noise level
- Constant braking angle, short switching times
- High permissible switching frequency
- Low maintenance costs
- No pollution in the form of abraded particles
- Special internal cooling to deal with high thermal loads

Advantages

- Efficient and space-saving because of an integrated solution
- No additional control system required because activation is made by the press safety valve which is already existing
- Slide restraint device is automatically activated after each press stop
- No monitoring required
- Restraint torque can be realized for each type of press by using different numbers of discs and springs
**Application**

Overload protection device for installation in mechanical presses and other similar machines in order to protect machine components and tools against excessive load and damage.

**Characteristics**

- Fast response times
- Low pressure peaks
- Excellent repeatability
- Infinitely variable adjustment of press force, set either by manual or electronic control
- Suitable for double crank presses with unbalanced load
- Quick and easy resetting after overload tripping
Simple multi cylinder hydraulic cushions, use the pressure valve for the drawing force, can be controlled accurately and easily.

**Advantages**

- The drawing force is more stable
- The high frequency
- The drawing position can be controlled by the control panel coordinated with the automation devices
- The module design can be used for types of the press machines

**Recommendation Scheme**

<table>
<thead>
<tr>
<th>Pressing machine size</th>
<th>Hydraulic cushion size</th>
<th>Executive module</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–250T</td>
<td>50T</td>
<td>1 hydraulic cylinder</td>
</tr>
<tr>
<td>250–500T</td>
<td>100T</td>
<td>1 hydraulic cylinder, 2 hydraulic cylinders &amp; rigidity connect</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 hydraulic cylinders &amp; flexible connect &amp; numerical control synchronization</td>
</tr>
<tr>
<td>500–1000T</td>
<td>200T</td>
<td>1 hydraulic cylinder, 2 hydraulic cylinders &amp; rigidity connect</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 hydraulic cylinders &amp; flexible connect &amp; numerical control synchronization</td>
</tr>
</tbody>
</table>

We also provide customized service for our customers
Advantages

- Compact structure
- Pre acceleration can avoid shocks among upper die, blank and lower blank holder, improve part quality
- The cushion force can be controlled
- Each force of the cushion module can be changed
- Dynamic locking at BDC
- Pick up stroke
- The draw distance of the cushion can be programmed setted
- The draw force can be controlled accurately, be used for the covering parts
- The frequency can match the press machine line

Module & Technology
Hydraulic cushion is made up of some modules, including the following configurations:

- Dedicated controller
- Hydraulic valve block
- High frequency response proportional valve
- Transducer technology
- High-performance hydraulic cylinder

Hydraulic cylinder is the core of Hydraulic cushion, which consists of double-acting hydraulic cylinder, hydraulic valve block, accumulator, Sensors with position and pressure. All operations that can fulfill the functionality of active open-loop systems and closed-loop systems are done by hydraulic cylinder.

The compact and solid Hydraulic system assures highly dynamic response and avoiding vibration problems.

Hydraulic Cylinder Module Parameter

The hydraulic cylinder have some seating elements which is High-Performance and low-friction, it can achieve a rate of 0-650mm/s. when at low speed
Even in the 0 to 10 mm/s Rate, the hydraulic cylinder can also realize the feed without stick-slip.

Combining the hydraulic cylinder module and high frequency response proportional valve, the whole Hydraulic cushion will perform the process of all the ramming motion.

It can choose hydraulic cylinder and hydraulic cylinder module Upon your requirement for Suitable Hydraulic cushion force. The optional force of Single hydraulic cylinder module is 500 kN and 1000 kN.
Motion Graph

Synchronization Motion Graph

**Questionnaire**

<table>
<thead>
<tr>
<th>Item</th>
<th>parameter</th>
<th>unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>The force of the machine</td>
<td></td>
<td>Ton</td>
</tr>
<tr>
<td>The force of the cushion</td>
<td></td>
<td>Ton</td>
</tr>
<tr>
<td>The force of the cushion for the back up process</td>
<td></td>
<td>Ton</td>
</tr>
<tr>
<td>The stroke distance of the machine</td>
<td></td>
<td>mm</td>
</tr>
<tr>
<td>The moving distance of the machine</td>
<td></td>
<td>mm</td>
</tr>
<tr>
<td>The moving distance of the cushion</td>
<td></td>
<td>mm</td>
</tr>
<tr>
<td>The stroke frequency of the machine</td>
<td></td>
<td>strokes/min</td>
</tr>
<tr>
<td>The moving drawing of the machine</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>The quantity of the cylinders</td>
<td></td>
<td>pcs</td>
</tr>
<tr>
<td>Special requirements</td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>
Mission — We are offering Accuracy & Efficiency!

Vision — Enjoy your life from Automation!

Values — Focus, Integrity, Growing together!

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