MECAPION
Total Solution
Encoder / SERVO Motor / SERVO Driver / Motion Controller / HMI

http://www.mecapion.com
Automation market with rapid change

Now, new technology of MECAPION will supply the new paradigm for electric injection molding machine
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For various **Needs** of changeable injection molding machine market

**MECAPION** will be a new leader

**Total Solution!!**
With low cost, high performance
Trend of market

Change of injection molding machine market
- Change from hydraulic system to electric system
- Need various and mass production
- Need low cost & high performance for price competition
- Need high precision control

Technology innovation of MECAPION
- Flexible R&D and Production system to meet various customer needs
- Design Encoder, Secure know-how
- Design SERVO motor, SERVO driver, Secure know-how
- Total Solution for Motion control
- Various network
- Control with low cost & high performance
Proposal

Proposal I. : Electric System
- Using high control based on PC
- Secure easy system by Network control platform
- Secure high speed master function and confidence, realize cost down by EtherCAT
- High capacity electric injection molding control by synchronized control

Proposal II. : Hybrid System
- Cost deduction with Energy saving
- Easy and precisely Control with Servo system
- Compact design with removing hydraulic system
- High quality injection molding controlled by high resolution servo system

Constant technology innovation!!
MECAPION will be a partner for injection molding control market
The contents may be changed for improvement of function.
System feature (PCNC)

- Realized synchronized control by using EtherCAT® (100Mbps)
- High-capacity control system by using high speed communication servo
- Optimum environment by applying PC program
- Reduction system component cost for little additional cost
- Strong DATA management (Based on windows XP / PC hardware spec)
Specifications (PC-NC Platform)

<table>
<thead>
<tr>
<th>Technical Data</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motion Block/sec (ISO)</td>
<td>2000</td>
</tr>
<tr>
<td>Max. feedrate along path at 1 um resolution</td>
<td>240m/min</td>
</tr>
<tr>
<td>No. of axes, max</td>
<td>72 (Max Motor Channel 64)</td>
</tr>
<tr>
<td>Display</td>
<td>10.4&quot; (640-480), 12&quot; (800-600)</td>
</tr>
<tr>
<td>CNC stations, max</td>
<td>8 channel (9 Axis per channel)</td>
</tr>
<tr>
<td>Axis interfaces</td>
<td>EtherCAT</td>
</tr>
<tr>
<td>NC program memory (RAM/HDD), max.</td>
<td>1MB/2GB</td>
</tr>
<tr>
<td>Look ahead buffering</td>
<td>256</td>
</tr>
<tr>
<td>PLC performance (1131-3) per 1000 instr.</td>
<td>40us</td>
</tr>
<tr>
<td>PLS-tasks</td>
<td>3 (start, low, high)</td>
</tr>
<tr>
<td>DIO</td>
<td>1024/1024</td>
</tr>
<tr>
<td>OS</td>
<td>XP + RTX</td>
</tr>
<tr>
<td>Target application</td>
<td>Injection machine, Router, Spring</td>
</tr>
</tbody>
</table>

※ The contents may be changed for improvement of function
Specifications-H/W Parts

Remote I/O
- Board size: 280 X 210 X 2t (4layer)
- Input connector: Terminal form 20Pin
- Output connector: Terminal form 24Pin
- Remote I/O connector: DeviceNet type
- Input point: Total 32point
  16/connector, 8 Common (Source Type: +Common)
- Output point: Total 32
  16/connector, 8 Common (Sink Type: -Common)

Temperature controller
- Input power: DC24V, 300mA
- Input Type: J,K Thermo-couple
- Control temperature: 0~800℃
- Input channel: 4CH
- Temperature control: ±0.1%
- Input current detect: 0~50A, Heater disconnect detect
- Rated output: 4Ch- Open Collector NPN output
- Output voltage: 0/24VDC
- Output load(max): 600 Ω
- Output form: PWM (Resolution: 1msec, Cycle: 1sec)
- Status output: LED/CH,
- Support control: ON/OFF, NN (Auto Tuning)
- Device-Net: UCMM connector system
Specifications - H/W Parts

**SERVO Driver**
- Input power: AC 220V
- Communication port: EtherCat port
- Communication protocol: EtherCat
- Window: 7-segment LED – Show servo operation
  - 4 LED – Communication state
  - 2 LED – Servo state
- Analogue input (2CH) – Load cell feedback & General
- Internal position control function included
- Direct pressure control function
- Programmable up to 8 user motion program
- 0.03kW~37kW / AC 220V (3phase)

**SERVO Motor**
- Rated output
  - Low pressure: 11kW/7.5kW/3.5kW/11kW
  - High pressure: 15kW/7.5kW/3.5kW/11kW
- Rated rpm: 1500~2000rpm
- Encoder: 4096 pulse/rev absolute
- 0.03kW~37kW / AC 220V 3phase
  (For more spec, refer to the manual)
System architecture

Proposal. II

- Replaced Hydraulic Pump and Motor to Servo Motor and Pump
- Replaced to Servo Motor for Clamping Axis
System architecture

- Servo Motor type pump for Energy saving
- Applied Motor specification for Injection molding machine
  - 80Ton: 11KW with Pump
  - 110 & 130Ton: 15KW with Pump
  - 170Ton: 22KW with Pump
- Rated rpm: 1500~2000rpm
- Encoder: 3,000 pulse/rev
- 50% of Energy saving compare with Hydraulic pump Sys.

- Servo System for Charging Axis for Precision & High Speed
- Applied Motor specification for Injection molding machine
  - 125 & 150Ton: 11KW servo system
  - 200Ton: 15KW servo system
  - 300Ton: 37KW servo system
- Rated rpm: 1500~2000rpm
- Encoder: 3,000 pulse/rev
- High precision and Fast cycle time
## R&D Plan for new items

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>PCNC Based on EtherCAT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Including Field Test period</td>
</tr>
<tr>
<td>EtherCAT AC220V/AC380V SERVO DRIVER</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Full Line-up</td>
</tr>
<tr>
<td>DeviceNet AC 220V/AC 380V SERVO DRIVER</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Full Line-up</td>
</tr>
<tr>
<td>EtherCAT based Remote I/O</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Same I/O Point No. I: 32point O: 32point</td>
</tr>
<tr>
<td>EtherCAT based Temperature Module</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AC 380V SERVO DRIVER</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Full Line-up // RS323 &amp; RS485</td>
</tr>
<tr>
<td>AC 380V SERVO Motor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Full Line-up // Parallel Type</td>
</tr>
<tr>
<td>Hybrid Pump System</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pump and Servo system</td>
</tr>
</tbody>
</table>

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LSC HISTORY

- Start Electric Injection Molding Machine system development
  - 2nd half of 2003: System development based on Yaskawa system
  - 1st half of 2004: Start test with initial sample of 50Ton application
  - 2nd half of 2004: Apply mass production
  - 2nd half of 2005: Start developing for controller
  - 1st half of 2007: Start developing for 380V
  - 2nd half of 2007: On field test after completing controller

- Electric Injection Molding Machine present condition
  - Develop total control system for example Controller, Servo system, OP panel, Temperature controller by cost deduction and mass production

  - Composition Injection Molding Machine for 4 axes
    ➔ CLAMPING, EXTRUSION, INJECTOR, CHARGING
    ➔ Servo system: 1.0KW~37KW / Application: 30TON~300TON

  - 2nd half of 2006: Increased volume by secure servo and control system and reasonable price competition
  - 2007: Supplied about 270 set to LSC
DHC HISTORY

- Start system development for cost down and secure technology
  - 1st half of 2007: Apply Mecapion servo system for 2 colors injection molding Machine
    ➨ 85TON, 130TON, 180TON
  - 2nd half of 2007: Apply Mecapion servo system for Hybrid injection molding machine
    ➨ Display in K-2007
  - 2nd half of 2007: Having system development for cost down and secure technology

Electric Injection Molding Machine for 2 colors / 2 material

- 2 colors Machine (85ton, 130ton, 200ton)
- Circumference deviation: 0.01mm
- Servo drive for high precision position control

Hybrid Electric Injection Molding Machine

- Ultra high speed and precision (170ton)
- High precision compared with Vector motor
- Improve productivity by improved cycle time
- Competitive price
### Commercial Information

**Application**  
Position sensing

**Item**  
Rotary Encoder

**Model name**  
S40-6-XXXXVL

**Specification**  
Line driver type(5VDC)

**PRICE (FOB Korea)**  
USD 50.0 ~ USD 55.0

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### Machine Specifications

<table>
<thead>
<tr>
<th>Machine</th>
<th>Clamping</th>
<th>Extrusion</th>
<th>Injection</th>
<th>Charging</th>
<th>Total Price (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 Ton</td>
<td>SF30G/VS35</td>
<td>SE09G/VS10</td>
<td>SF60G/VS110</td>
<td>SF30M/VS35</td>
<td>USD 5,106.6</td>
</tr>
<tr>
<td>50 Ton</td>
<td>SF44G/VS50</td>
<td>SF20G/VS20</td>
<td>SF60G/VS110</td>
<td>SF44M/VS50</td>
<td>USD 6,639.5</td>
</tr>
<tr>
<td>80 Ton</td>
<td>SF44G/VS50</td>
<td>SF20G/VS20</td>
<td>SG75G/VS110</td>
<td>SF44M/VS50</td>
<td>USD 7,025.0</td>
</tr>
<tr>
<td>110 Ton</td>
<td>SF75G/VS110</td>
<td>SF30G/VS35</td>
<td>SG75G/VS110</td>
<td>SF60M/VS75</td>
<td>USD 8,031.9</td>
</tr>
<tr>
<td>150 Ton</td>
<td>SG110G/VS150</td>
<td>SF44M/VS50</td>
<td>SG150/VS150</td>
<td>SF110G/VS150G</td>
<td>USD 11,746.7</td>
</tr>
</tbody>
</table>

- **Input Power:** 3Phase AC 220V
- **Option (Cable, Connector and Braking Resistor) is not included in above price**
- **Encoder:** 3000ppr / rev. of Incremental encoder  
  (If customer request different specification of encoder such as absolute or serial encoder, there will be additional cost...)
- **Above specification is our standard specification. So, After getting inquiry from customer’s side, we can submit actual offer. So just keep above price as your reference**

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1. Head office & Main Factory

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- Oversea Business Office
  Manager: Mr. K.K. Lee
  Tel: 82-53-580-9104
  E-mail: kklee@mecapion.com

2. Subsidiary company (China Factory)

- Name: WUXI MECAPION MACHINERY & ELECTRICAL CO., LTD.
- Address: 240-1, Xida Road, Maicun Industrial Center Xingu, Wuxi, Jiansu, China.