MB-E Series

多缸直壓式
伺服節能射出成型機

Multiple Cylinders Energy Saving
Injection Molding Machine

SHINEWELL
Partners in Progress

At a Glance

概述

Unique design of two platens injection molding machine with latest servo energy saving technology.

Extremely long opening stroke

Suitable for production of long article and can be extended by special molding requirements.

超長開模行程

適用深長產品生產並可依模具特殊條件作修改

Spilt nut design of locking device

Works for instant and precise locking force on tie bar.

夾持機構採半螺母設計

夾持壓力建立精準且迅速

Patented two platens design featuring of force built-up by direct cylinders

Clamping force is built at center of platen, no issue to platen deformation.

獨家專利二板式多缸直壓鎖模設計

鎖模力完全集中建立於動模板中

Austrian KEBA I series control

Intelligent HMI plus high durability hardware, user friendly.

KEBA 控制器

智慧化人機介面

1050MBE - 2300MBE

- logic valves hydraulic design to various units
- twin sets of injection cylinder
- compression injection function available
- the modes of clamping force release
- easy access to maintenance
- fast clamping force release to reduce dry cycle time

- 全邏輯閥油路系統
- 雙組射出油壓缸
- 標準射出壓縮功能
- 鎖模力卸載模式設定
- 保養簡單 維修容易
- 快速鎖模力卸載減少循環時間

Rx & ASE series servo energy saving unit

Saving energy waste and upgrading precision of hydraulics.

Rx 及 ASE 系列 伺服節能系統

節省能源消耗
提升油壓系統精準度

Machine total length is shorter than toggle machine, space saving to workshop.

機台總長度較曲手機短
節省廠房佔地空間

Fortified low machine frame design.

強化低身機架設計

Selection of injection modules for single clamping unit

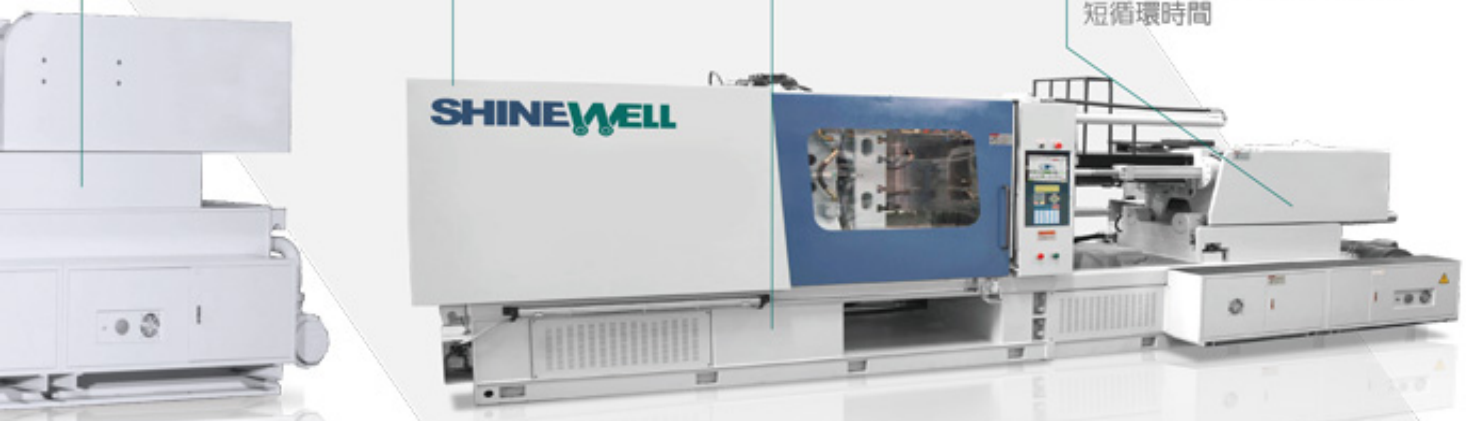
Injection unit is upgraded as per specific molding term needed.

Electric screw drive as optional feature to save total cycle time.

模組化射出單元

依特殊成型條件選擇適合的射出單元

選配伺服電動儲料雙迴路縮短循環時間



400MBE - 850MBE

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Clamping Feature Concept
鎖模單元特徵

The device of clamping pressure is used to install either on fixed platen or tie bar of conventional two platens IMM; the design of MBE model is by four sets of traveling cylinder inside movable platen to close mould and build up clamping force at center area of platen. The force thus distributes evenly on the platen and zero deflection as injection force activates.

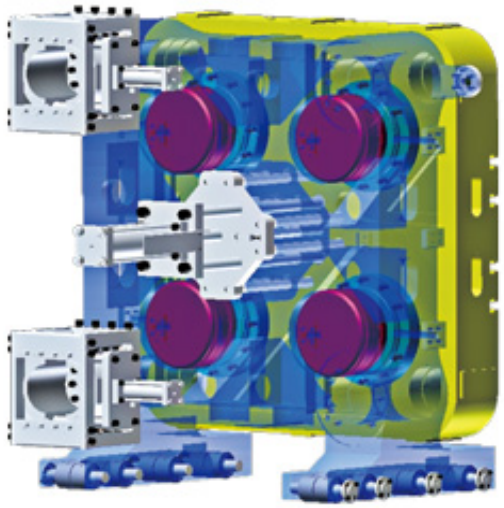
Clamping force is fully released before mould open, so there is no issue of failed opening due to mechanical deformation of toggle by long cycle time.

Standard feature of fast proportional valve with LVDT feedback for flow control achieves precision of open end position.

使用四組增壓缸建立鎖模力。不同於傳統兩板機鎖模高壓機構設計於固定模板或夾模大柱上力量較分散，MBE 系列增壓缸設置於模板中間，使鎖模力可以完全集中分布於模板上。

鎖模力在開模前已完全卸載，無曲手機因鎖模力建立過久機構產生變形而可能無法開模的問題。

標準選用高速流量方向比例閥，使開模完成位置更精準。

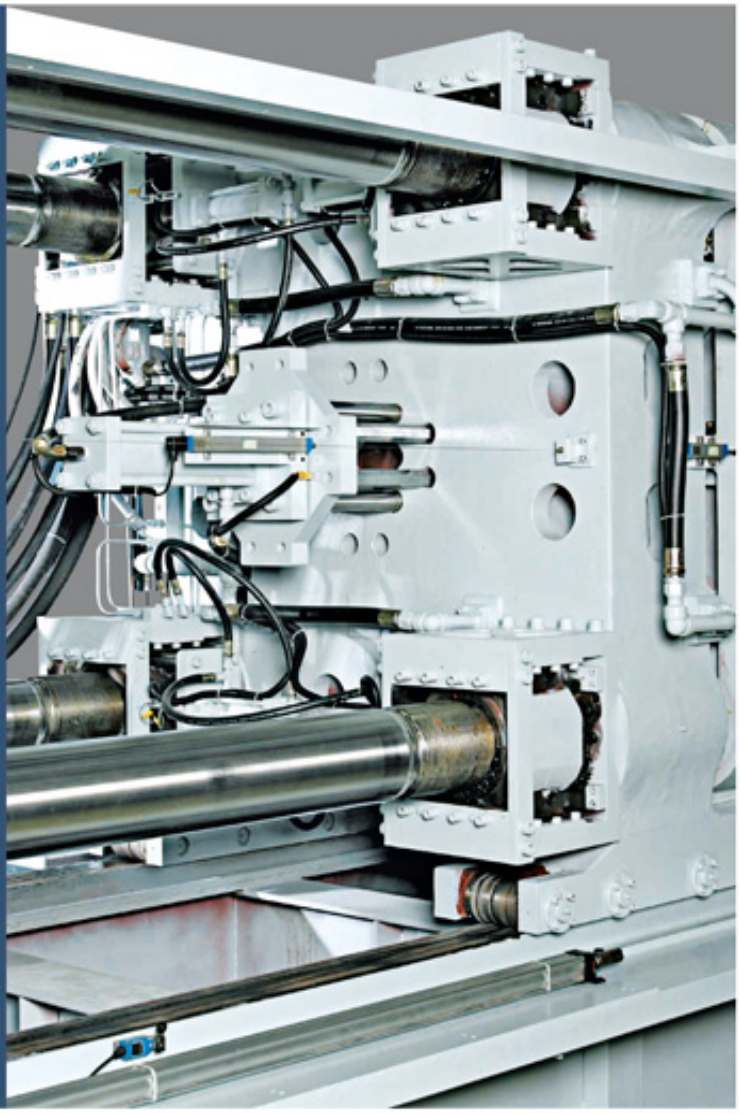


Clamping force is well distributed at center of platen to keep perfect parallel of two platens. Tie bars are forced averagely to each piece that avoids the issue of break.

Easy to maintenance, only oil seals may be changed by commissioning in a long time.

無曲手機關模時施力點於模板上下側可能造成鎖模力不平均的問題，模板變形量最小，大柱受力平均，避免大柱斷裂的問題。

維修容易，鎖模單元長期只需更換油封，機構零件不需更換。



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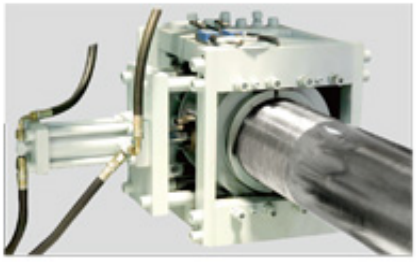
Clamping Feature Concept
鎖模單元特徵

Clamping force release can be worked before mould open or before charging, for reducing time of pressure release.

鎖模力可選擇在開模前或儲料前洩壓，縮短洩壓時間。

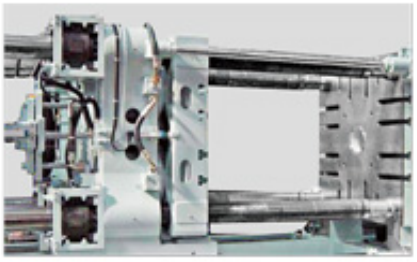
Very easy and fast mould height adjustment. Only move platen back by regular speed to the thickness that allows to loading mould and start the auto function after installing mould properly.

非傳統調模方式以齒輪結構調整容模厚度，只要開模至可容模厚度並安裝模具後即可進行自動調模，大幅減少調模時間。



Split nut design of locking device works for instant and precise locking force on tie bar. Four sets of split nut lock/unlock separately and are monitored simultaneously by sensors; once the motion is confirmed, mould is able to open or close.

夾持機構採半螺母設計，夾持壓力建立迅速且確實；四組半螺母獨立進退且系統同步監控，動作完成後才可進行開模或鎖模。

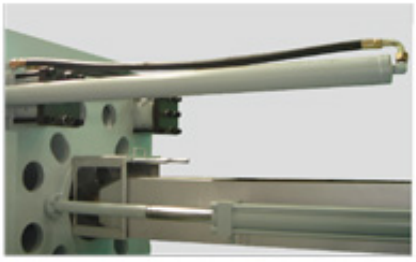


Long opening stroke is available to provide flexibility for longer mould size and can extend by special demand.

Max mould height, daylight, ejector stroke and force can be revised by special request.

開模行程長，適合生產較深長的產品，並可依特殊要求增加行程。

機台容模厚度、托模行程及托模力亦可根據特殊需求做修改。



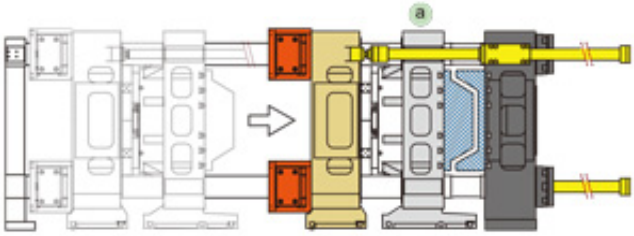
Dual traverse cylinders installing at opposite corner of fixed platen acting to shorten dry cycle and easy access to purge area and nozzle remove.

High quality oil seals fixed on traveling cylinders aim to have long service life and minimize internal leakage after long term production.

使用兩組快速油壓缸作開關模動作，增加開合模速度；油壓缸設置於操作面上側，方便射出洗料或移除射嘴。

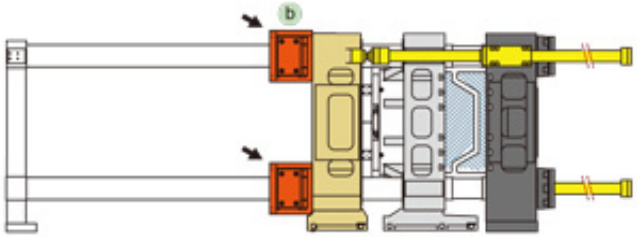
鎖模增壓缸搭配高品質油封件，油缸作動時內洩量少，鎖模力準確建立。

Description of Clamping Force Built-up
鎖模單元動作敘述



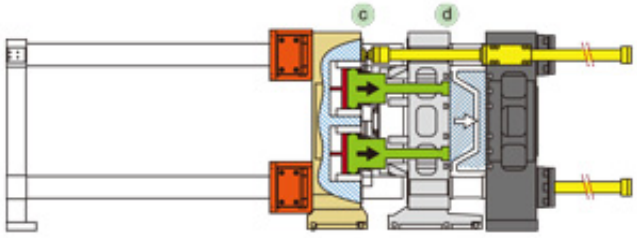
Close: 2 sets of traverse cylinder pull movable and clamping platens forward to close mould properly. (a)

關模：二組快速油壓缸拉動活動及鎖模模板向前關模至定位 (a)



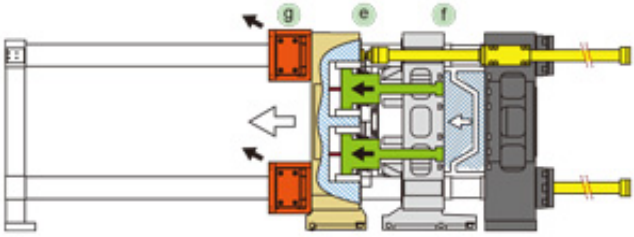
Locking: as movable platen is at preset position, 4 sets of spilt nut close over the grooves of tie bar to lock quickly. (b)

夾持：活動模板關模至定位後，由四組夾持機構半螺母閉合並鎖緊於大柱上 (b)



Force built-up: the traveling pistons (c) inside movable platen move forward to advance clamping platen (d) for closing mould completely; clamping force is built up.

鎖模力建立：活動模板內增壓缸入油帶動活塞軸 (c) 及鎖模模板 (d) 前進閉合模具並建立鎖模力。



Open:: after injection-related performance, clamping force is released by moving pistons (e) and clamping platen (f) back, split nuts unlock (g) and traversing cylinders push movable platen backward to open mould to end position.

開模：射出動作完成，增壓缸活塞軸 (e) 及鎖模模板 (f) 退後，鎖模力完全卸載，夾持半螺母鬆開 (g)，快速油壓缸推動活動模板退後做開模動作。

Injection Feature Concept
射出單元特徵

The movement of double injection cylinders is supported by linear guide ways to achieve perfect positional precision and smooth move at injection performance.

Quick-removed adapter of carriage cylinder makes simple separation of injection unit. By swiveling 60 degree onwards to operation side, screw or barrel is easily taken apart and changed by hanger or crane.

Dual carriage cylinders support sufficient nozzle contact force and ensure no melt leakage from mould gate.

Barrier type or mixing screw design with multi-notch screw tip are available (optional), at least 18 times of effective L/D ratio assures good plasticizing capacity, avoids the issue of short-filling under short cycle and stabilizes shot weight of finished part.

Multiple barrel temperature zones with PID control practically carry out stability of barrel heating and quality of melt.

Modularized injection unit commissions as per high pressure, high speed, shot weight, etc. specifically for various molding terms. Three sizes of screw selected in basic and may revise on request.

射出座及馬達座採用線性滑軌移動，增加精準度且降低射出作動及射座移動之阻力。

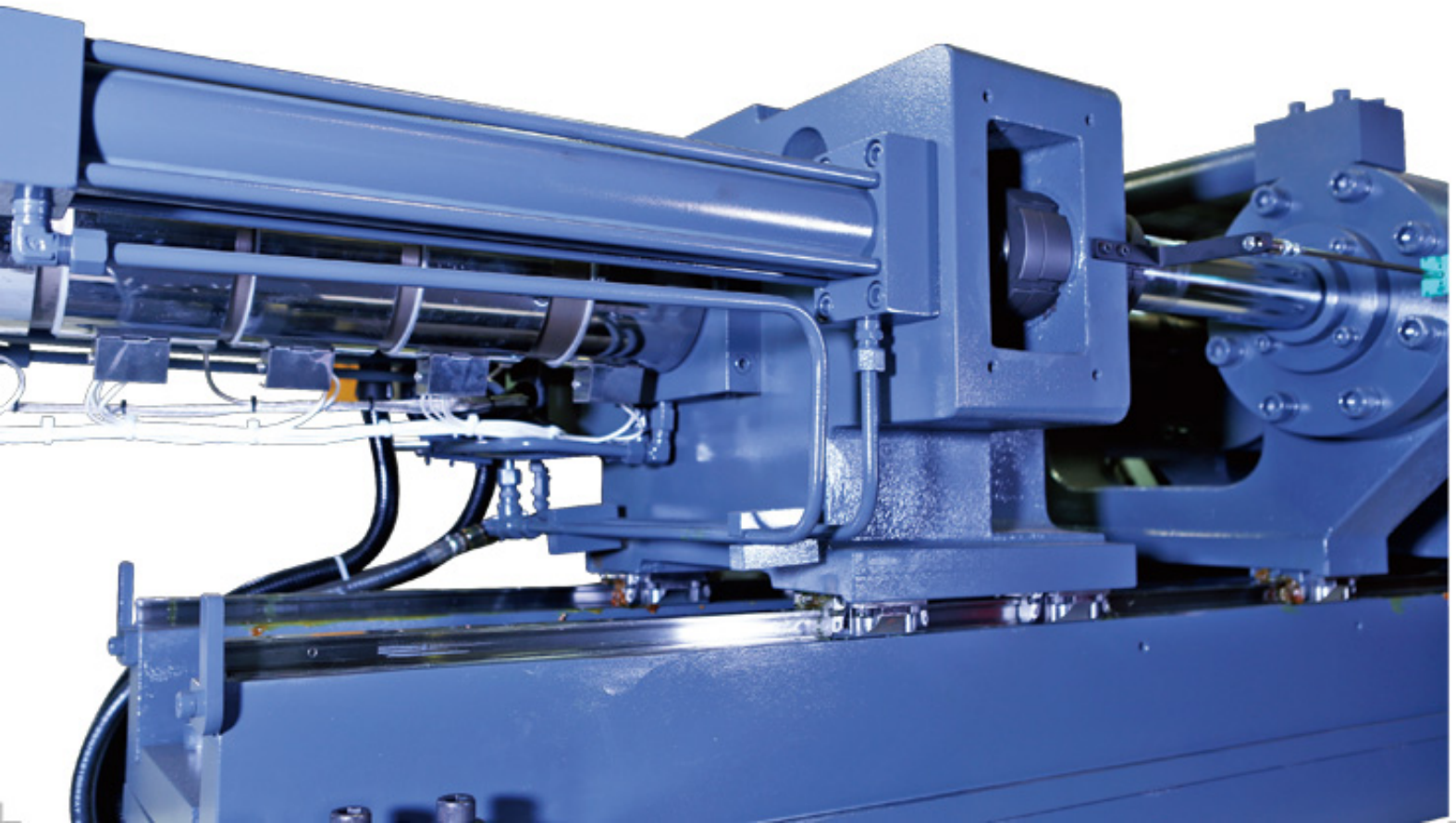
雙射座油壓缸接頭採快拆式設計，底座向操作側旋轉約 60 度即可輕鬆更換螺桿或料管組，減少維修及停機時間。

安裝雙組射座油壓缸提供足夠噴嘴接觸力，確保射出時塑料不洩漏。

特殊螺桿設計，螺桿有效長徑比達 18 倍以上，提升可塑化能力，在快速生產情況下避免短射問題，同時保持成型品重量穩定度。

料管溫度採多段 PID 控制，具體實現溫度穩定度。

射出單元模組化。根據成型品或塑料特性所需之高射出壓力、高射速或重量等條件，安裝適合的射出單元，滿足各式成型需求。



ACC injection with servo closed-loop circuit for performing high injection speed and positional accuracy (optional).

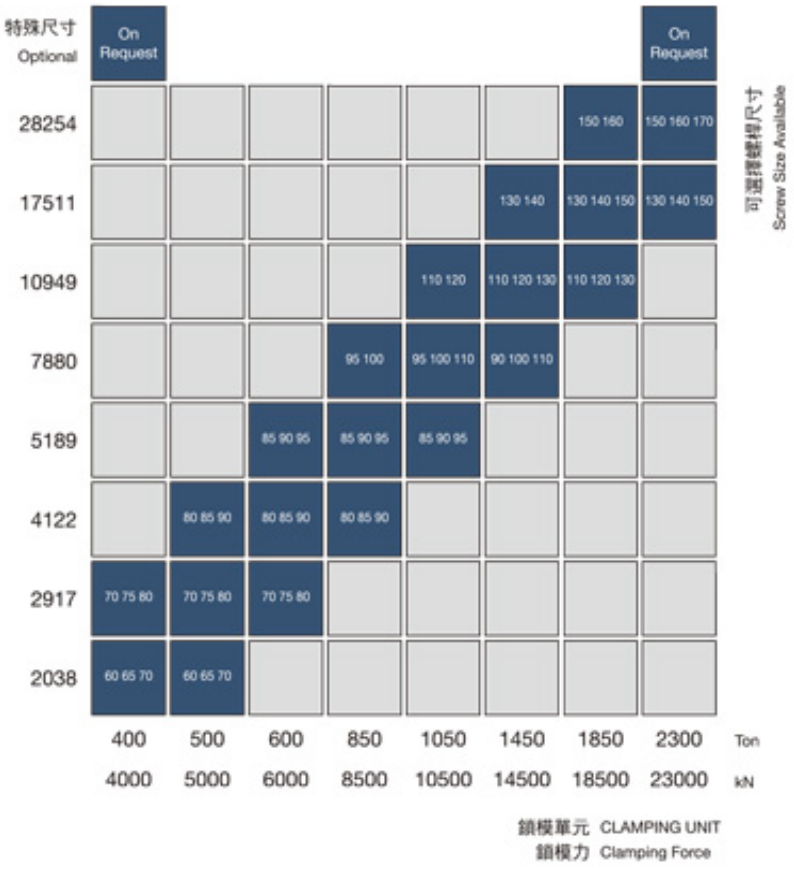
Charge on fly by means of servo electro-driven for shortening cycle time and increasing productivity (optional). Shut-off nozzle is available option for simultaneous motions.

Feed throat temperature control is to against irregular material supply due to overheating. (Optional)

可加裝蓄壓器及精密控制閥件作閉迴路射出，提升射速及成型位置切換精準度。

選配伺服電動儲料系統，可搭配閉式射嘴設計，縮短生產循環時間、提升產能。

料斗下料口溫度控制，避免塑料進入料管時的溫度已過高而造成儲料動作不正常。（選配功能）



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Servo System
伺服系統

SVP Servo Pump Energy Saving Unit

More than 60% energy saving
beneficial for medium and large sizes IMM

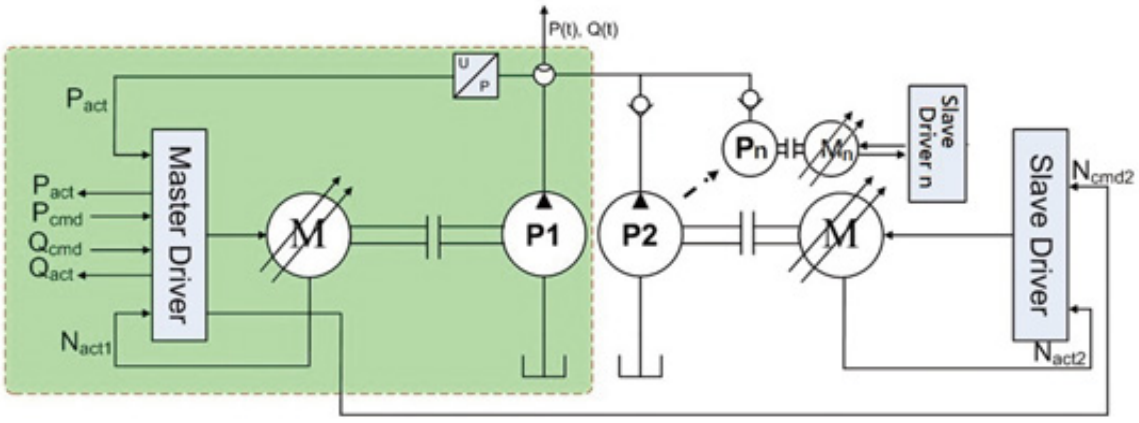
The SVP system is developed by German Rexroth that consists of synchronous rotary speed controlled servo motor with driver of control section and internal gear pump. System software is inclusive of a set of closed loop pressure and flow controller. The switch over from flow to pressure control and backwards is done automatically by the software. The controller has been optimized to avoid pressure overshoot during switch over from flow to pressure control.

There are two command values of pressure and flow from a PLC required. The medium of transmission is according to the model ordered (i.e. analogue, bus system). Meanwhile, on the same way actual values of both signals are sent back to the PLC. Pressure command is compared with the actual value of pressure measured by the transducer and revised tolerance within 50ms. The control error is processed in a special tailored PID controller and output signal of pressure controller is rotary speed. For the machines of higher flow capacity or with simultaneous functions, the Master-Slave system is applied by one master servo unit combining one or multiple slave servo units that can supply sufficient flow for single machine.

Another cost-effective utilization is by ASE energy saving system. It consists of control driver of ABB brand, synchronous servo motor by Taiwanese brand and German made internal gear pump. Pressure is controlled by fast proportional valve on a basis of closed-loop process, while flow is supplied by rotary speed of servo motor timing displacement of gear pump. Motor rpm is tuned by the detection of encoder to have correct speed so as to have exact system flow. ASE servo system is beneficial for economic users.

SVP 伺服系統為德國 Rexroth 品牌，包含同步式伺服馬達、伺服驅動器及高壓內齒輪泵浦。系統壓力及流量採全閉迴路控制：壓力設定命令值和感測器演算出實際值之間的誤差由驅動器於 50 毫秒內作動態修正，反饋輸出訊號並立即調整轉速，以消除誤差值。而流量由伺服馬達轉速乘以泵浦吐出量作速度控制，無傳統機依設定速度大小需作洩油動作而耗費多餘能源。流量較大或有複合式動作之機台，可應用主－從伺服模式 (Master-Slave) 以提供機台足夠流量。

MBE 機種另提供 ASE 型節能伺服系統，選用 ABB 品牌驅動器，搭配德製高壓內齒輪泵浦及台製伺服馬達，節能效果媲美 SVP 系統，提供經濟型客戶另一項選擇。



SVP Master-Slave System

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Servo System
伺服系統

Features

Effective Energy Saving
By various setups of molding terms, machine consumes energy 40% less than the machine with variable displacement pump or inverter, and averagely 60% less comparing to the machine with fixed displacement pump.

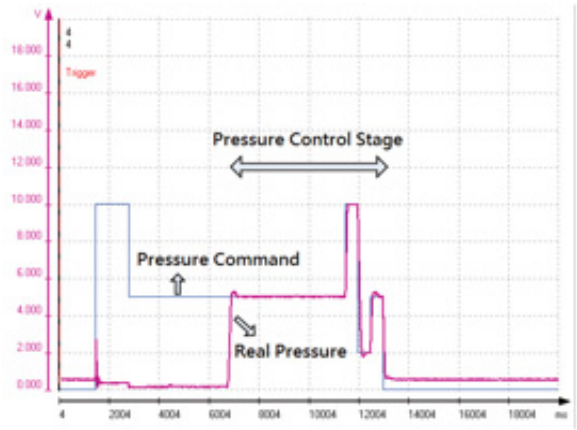
Higher Precision
Closed-loop pressure and flow controller perfectly transmits commands and real values of different functions. The controller receives command from PLC, inspects real value of working devices (pressure sensor and encoder), then giving feedback signal to PLC for micro tuning. The tolerance of linearity and hysteresis for pressure and flow is less than 1% that substantially improves molding precision.

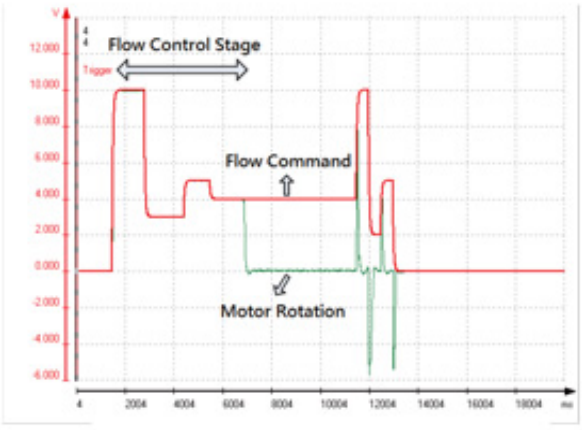
Better Dynamics
The response time of pressure and flow between servo drive and motor is less than 50 ms, instantly switching over of pressure/flow to rise or decrease tolerance. As specific pressure or speed is required, servo motor runs proper rotary speed to reduce energy waste.

Outstanding Efficiency
No issues of heat generation of hydraulic oil causing from relief valves of fixed displacement pump and drain of variable displacement pump, so a smaller capacity of heat exchanger and less volume of cooling water are required. The capacity of oil tank is cut to half that reduces oil storage and cost of refilling. A standard hydraulic design of logic circuit is to shorten response moment of hydraulics and achieve pressure/speed control precisely.

Stable Operation
Perfect integration of mechanical, hydraulic and control sections upgrades machine performance and molding reliability.

Sufficient Motor Torque
Even under max rotary speed, servo motor is steadily producing enough torque force to avoid pressure overshoot at transferring from injection to hold-pressure stage.





特性

節能效果佳

在不同成型條件下，伺服節能機台較搭配變量泵或變頻器之機台節能達 40% 以上，與傳統固定泵機台比較更可節能 60% 以上。

高精準度

機械動作採閉環迴路控制，壓力及速度實際值經由壓力傳感器或編碼器傳送至 PLC 做誤差偵測，並回授馬達做調整，以消除誤差值。整體系統直線性及再現性誤差在 1% 以下，改善成型精密度。

高應答性

壓力及速度在驅動器與伺服馬達間之應答時間小於 50 毫秒，立即調整誤差值；驅動器根據所設定之壓力或速度，回饋信號於伺服馬達提供適當的轉速，減少能源浪費。

油壓系統最佳化

無傳統機搭配固定泵作動時需做洩壓，及變量泵作動時需迴油而產生油溫上升的問題，熱交換器可選用較小規格且冷卻水使用量有效減少。油溫不會因長時間生產大幅上升，油箱散熱面積及容量可減少一半以上，油品不易變質，延長換油頻率及降低換油成本。全機種採用邏輯式油路設計，動作反應時間短且精確作動所需壓力及速度。

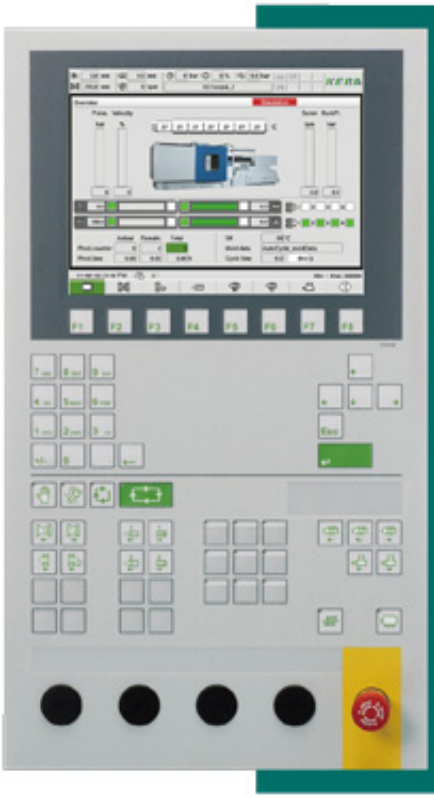
機台性能穩定

機械結構、油路設計及控制電路完美整合，提升機械性能及成型的穩定度。

馬達功率充足

在額定最高轉數運轉時，伺服馬達仍可持續且穩定提供足夠的扭力，而無射出完成轉保壓之過程中馬達過載的問題。

Control Unit
控制系統



Hardware / Interfaces

- By means of maximum integration density, the high-performance, single-board computer furnishes all defined I/Os required for the operation of IMM.
- Machine and molding data are stored to compact flash card for easy and swift data transferring from machine to machine and reduce halt time.
- Several kinds of interface can be configured, including: graphics, CAN bus, serial port, terminal temperature sensor, USB Port and Ethernet.
- Optimized 2A digital outputs with minimum switching times for hydraulic valves

硬體 / 介面

- 採用高性能單板控制器並高度整合了所有射出機所需標準 I/O 模組，減少空間使用。
- 機台及模具參數儲存於 CF 卡內，可輕易且迅速將資料移轉至其他機台上，減少停機故障時間。
- 多種標準硬體介面可供連接，包含：圖像式介面、CAN 通訊、序列埠、溫度模組、USB 埠及 Ethernet 等。
- 高度優化 2A 數位輸出可直接驅動油壓閥，縮短反應時間。

Function

Euromap 12 or 67 robot interface available, or by defined I/O of robot connection configured in PLC.

Injection process diagram displays for easy tuning of molding parameters.

Integrating mould hot runner system under control mask for simplifying at same interface (optional).

Service masks: configuring time setup of service items for reminding operator a regular machine maintenance work.

Modular application software quickly delivers tailor-made solutions for various molding requirements and special machine features.

Regulated injection process with automatic tuning.

SPC (statistic process control) package.

Operation

Standard 10.4" display with 256,000 colors and resolution of 800x600 pixels for easy operation and monitoring.

Operation by membrane keypad with well layout of pre-defined motion buttons and tactile feedback for comfortable control by user.

Ethernet connection EasyNet program offers users a simple, user-friendly control station for operating by identical surface, managing machine and quality data centrally and monitoring real status all the time to commissioning machines and therefore increases working efficiency (optional).

The operator or manager can key-in password to enter different operation tiers and observe the masks or machine status accordingly.

The parameters of each machine motion are set by specific mask; monitoring mask displays by graphic bars and real values.

功能

歐規 12 或 67 機械手連結或控制器定義機械手連接 IO 點介面。

射出過程曲線監視使成形條件調整更容易。

可整合模具熱澆道系統於控制頁面下便於監控及調整（選配功能）。

提供多種機台定期保養項目之時間設定（根據週期或運轉時間），提醒使用者定時執行維護工作。

多種模組化軟體應用提供安裝以因應各種特殊成型條件或機械動作，做即時客製化修改，達到最佳機台工作效率。

射出過程閉迴路自動調校。

成型統計資料頁面。

操控

標準 10.4 吋 TFT-LCD、256,000 色全彩高解析度螢幕，讓使用者更容易操作及監控。

使用薄膜式鍵盤並將各機械動作按鍵完整配置，讓使用者操控機械更友善且輕易上手。

EasyNet 遠端監視功能提供使用者一個淺顯易懂的控制平台；透過與成型機相同操控介面的平台，使用者可輕易整合所有機台的機械及成型資料，紀錄參數並監控機台狀態，大幅提升整廠工作效率。

操作者或管理者可依不同密碼設定進入獨立監控層級，以檢視機台頁面或狀態。

機械各動作頁面獨立設定，監視頁面動作狀態圖像及數據顯示，清楚且容易操作。

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