Realizing dreams with a new fusion. The future is here.

We Deliver World Class Performance

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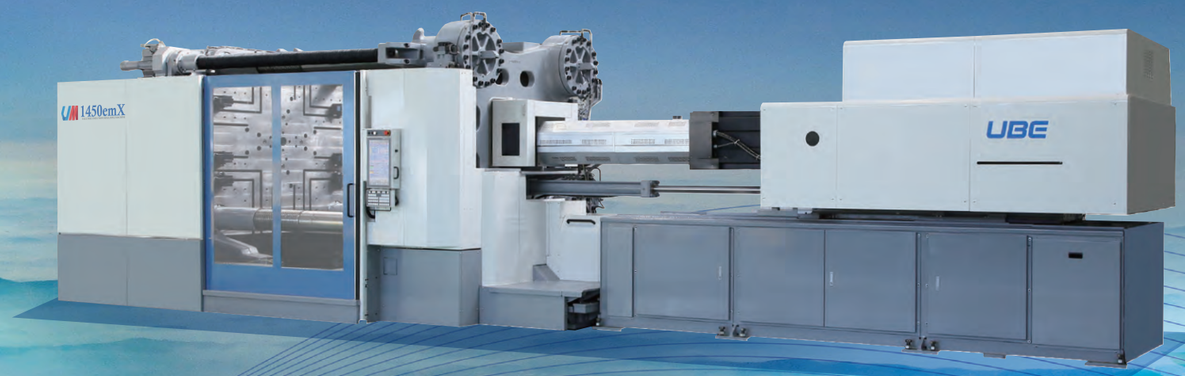
ELECTRIC INJECTION MOULDING MACHINE

emX SERIES

The Foremost Two-Platen Injection Moulding Machines

—— The emX Series offers improved "Space-saving", "Energy-saving" and "Higher speed".

The two-platen clamping mechanism has become increasingly popular in the large-sized injection moulding market and has gained numerous delivery records and reliability since our company .
first introduced the emX series ahead of our competitors.
The "new emX series" utilizes all the resources of the pioneering two-platen clamping mechanism to improve the high-end "emX series" machines, thus meeting the needs of carbon neutrality and our valued customers.



1450emX

※The pictures shown in this brochure include optional equipment

Two-Platen clamping mechanism

- Small footprint
- 4-axis equal clamping mechanism

Carbon neutrality

- Clamping block with High sealing boost cylinder allows futher energy savings.
- Shorting of Dry cycle allows further energy savings.

Lower floor allows easier access and operability

- Operations and maintenance functions are significantly improved

Direct Drive injection mechanism

- Highly responsive and high power injection by exclusive DD (Direct Drive) motors
- Suitable for both thin and thick wall moulding

A variety of screw sizes and designs are available

- For high-cycle, high-mixing and lower material costs

Multistage clamping function

- Servo motors allow highly accurate and responsive control for hydraulic clamping force
- Helps to vent gas generated during the moulding process

New and improved MAX-IXIXcontroller

- IoT advanced function capable
- Wide screen allows for easy operation

emX SERIES
ELECTRIC INJECTION MOULDING MACHINE

Machine line-up of emX series

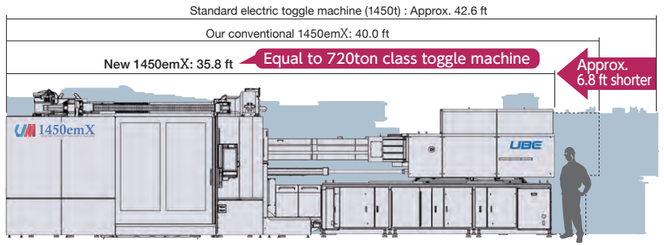
Clamping Unit	Injection Unit	Screw Diameter	Machine Length
1200emX	100	ϕ3.55 in	31.8 ft
	160	ϕ4.14 in	31.8 ft
1450emX	160	ϕ4.14 in	33.6 ft
	240	ϕ4.73 in	35.7 ft
1800emX	160	ϕ4.14 in	36.3 ft
	240	ϕ4.73 in	38.4 ft
2200emX	240	ϕ4.73 in	38.9 ft
	340	ϕ5.32 in	40.5 ft

Two-platen clamping mechanism allows for energy-saving and high cycle with a significantly reduced footprint

Small footprint

● **By comparison, the new emX can replace toggle machines having clamp force 2 to 3 classes lower.**

- The new emX length is even shorter than the previous emX model.
- The length of new emX (1450t) is the same as that of a toggle machine (720 t).
- Allows better use of floorspace and easier factory layout.



High-cycle

● **Motion of mould release is driven fast by ball screw for mould open/close.(Servo driven mould release mode)**

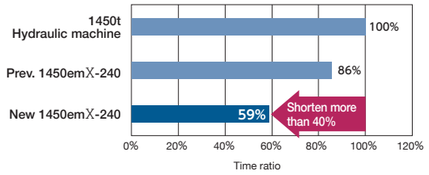
Dry cycle is 40% shorter compared to a hydraulic toggle machine.

● **Acceleration and deceleration setting during mould open/close is selectable among sharp, standard or soft.**

The drive mode is now selectable to target dry cycle time reduction, energy saving operation, or vibration reducing.

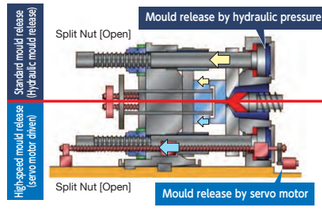
Motion time comparison graph

Mould stroke : 59.1 inch Clamping force : 1450t
Servo mould release function is used in new emX

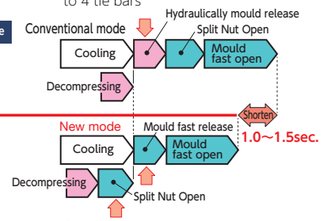


❶ Standard mould release mode

for products requiring strong force of mould release (ex. deep products, slide core mould)



Mould release by pressing hydraulically to 4 tie bars



Split nuts open while cooling
Servo motors force release, open and close mould quickly

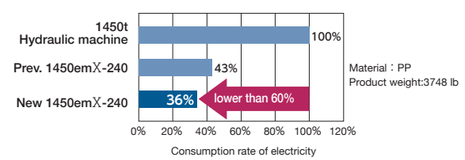
❷ High-speed mould release mode

for products not requiring strong force of mould release (ex. shallow products, vehicle trim)

Energy saving

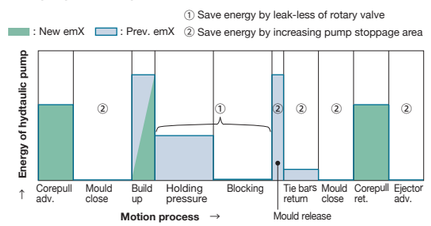
● **Innovative hydraulic system**

Improved holding pressure performance, increases the complete stop time of the pump system.
Reduced energy consumption during build up, holding pressure and decompressing.



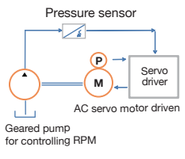
Material : PP
Product weight:3748 lb

Pump operation pattern



System outline

Save energy by minimizing flow amount with pressure feedback control

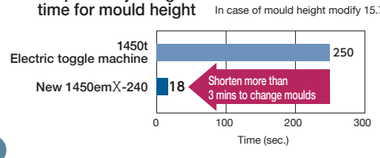


● **Overwhelmingly short adjusting time for mould height**

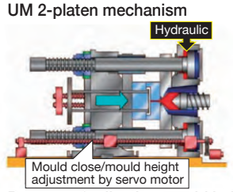
Adjusting time for mould height can be shortened significantly compared to toggle machines.

Graph of adjusting time for mould height

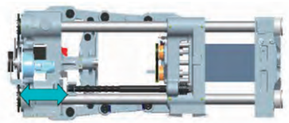
In case of mould height modify 15.7 inch



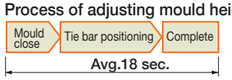
UM 2-platen mechanism



Standard toggle mechanism



Process of adjusting mould height



Process of adjusting mould height

The lower base improves operation and maintenance functions

Operability

● **Safe and secure operation**

- The operation panel is accessible directly from floor without the need for platforms.
- Improved accessibility to the purge cover allows for easier removal of purge resin.
- Improved accessibility to platen area facilitates changing moulds and product removal.

1450emX

Access to control panel

Access to purge cover

Access to inside mould area

Maintainability

● **Optimal design for improved maintainability**

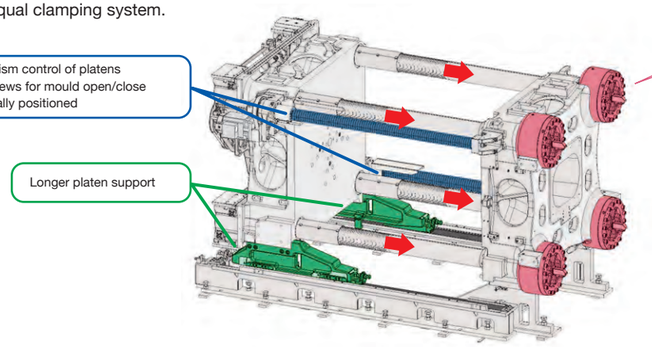
- Downsizing and making cylinders high pressure contribute to cost savings by reducing operation oil by 60% and grease by 15%.
- The machine is equipped with automatic measuring for platen parallelism and it allows for daily checking by the push of a single button.
- Tie bar bushings are eliminated, so it is now unnecessary to change.
- Detection of servo motor insulation deterioration is also equipped and automatically detects abnormal conditions.

For high-quality products

Further improvement of platen parallelism

● **For better parallelism control of the platens, the two ball screws for mould open/close are diagonally positioned and longer platen supports are installed.**

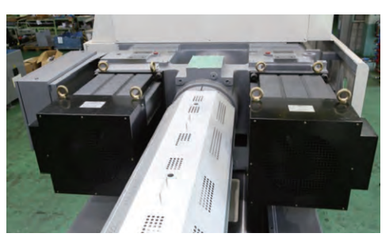
This clamping mechanism prevents platens from tilting and also enables longer mould life and contributes higher-quality products with the 4-axis equal clamping system.



High-response, high-powered injection, dedicated DD motor

● **Featuring high-powered AC servo motors developed with our unique power electronic technology specifically for injection moulding applications**

The DD (Direct Drive) mechanism directly connects the injection drive ball screw and the motor, making thin-wall moulding possible by low-inertia, highly responsive, and high acceleration/deceleration performance.
Maintenance costs are reduced by beltless mechanism, and thick-wall moulding, which needs longer holdng pressure times is also possible.
The benefits of the DD system are useful for a broad range of process conditions.



The new and improved MAX-IX controller

- Exceptional operability with two screens combined on one large screen
- An upgraded security function that utilizes ID card authentication is equipped as standard
- Stable moulding by high-speed control that is six times faster than a conventional system

Upgraded Operability

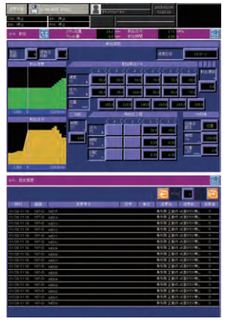
- **Swing and tilt mechanism**
  Easier operation with control panel swing and tilt.
- **Injection waveform memory**
  An ideal process, waveform can be saved and displayed on-screen for checking shot-to-shot repeatability.
  This feature helps ensure consistent production.
- **Vertically long screen**
  Long, vertical screens can display twice the trend data compared to a conventional system.

High-speed, high-accuracy control

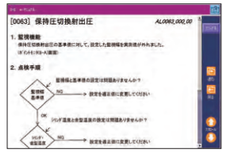
- **Reduced scan time**
  Scan time is shortened to 1/6 of a conventional system by using EtherCAT® high-speed communication which provides for stable weight of the moulded product.

※EtherCAT® is a registered trademark of Beckhoff Automation GmbH.

Control panel with two independent screens
Swing and tilt function



Injection setting can be changed while checking setting records



Alarm guidance screen

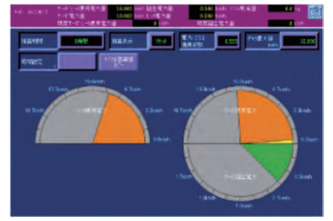
e-manual screen

Upgraded security function

- **Security ID card system**
  Login by ID card which can be assigned to an operator; automatic change of languages and units.
  Prevention of password loss.
- **Traceability management**
  Operator's information is added to the operational/setting records
- **Control over operator access**
  Capable of setting 4 levels of access for each operator.

User support function

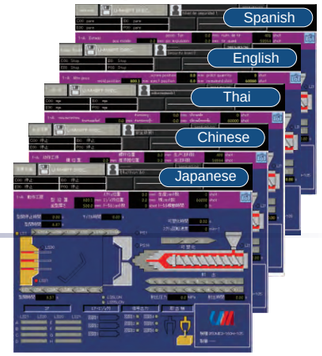
- **Alarm guidance**
  Actions for alarm resolution by using a flow chart which can be restered easily.
  Easy identification of faults by improved alarm messages.
- **e-manual**
  The machine manual can be reviewed on screen.
- **Screenshot**
  Screenshot data can be saved to USB for ease of printing documents.
- **Automatic mould setup memory**
  Mould setup data can be saved to internal memory (480 moulds) and external memory (1008 moulds).
- **ECO monitor**
  Displays power consumption of servo motors and heater, and support management.



ECO monitor screen

Global reliability

- **An uninterruptable power supply(UPS) is standard equipment**
  Prevents trouble resulting from voltage drops or brownouts, even in areas with unstable electric power supply.
  Data can be safely backed-up in case of a power outage.
- **A surge suppressor is standard equipment**
  Protect the control system from lightening strikes.
- **Multi-language selection**
  Standard languages available are Japanese, English, Chinese, Spanish and Thai (new addition).
  Eight other languages are available as an option.
  A maximum of three languages is selectable from a total of 13 languages.
- **Pictographic switches (ISO-compliant)**
  Easy to operate by pictographic switches.
- **Variety of international standard compliances**
  Complies with JIMS, ANSI, EN, GB and KCS standards.
  Will comply with ISO20430 soon.
- **IEC 61131-3-compliant ladder**
  The operation sequence is created by global standard ladder language.

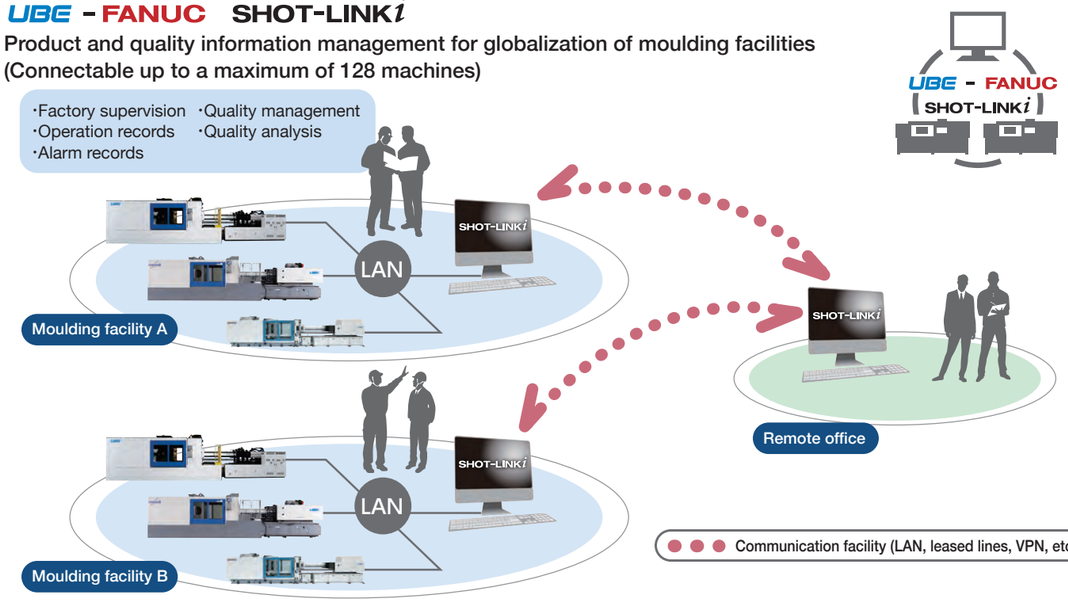


UM IoT Solutions

■ UBE - FANUC SHOT-LINKi

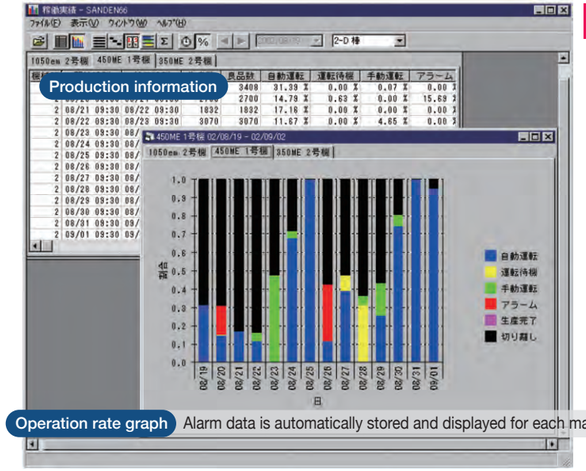
Product and quality information management for globalization of moulding facilities
(Connectable up to a maximum of 128 machines)

- ·Factory supervision ·Quality management
- ·Operation records ·Quality analysis
- ·Alarm records



■ Production information for each machine is displayed

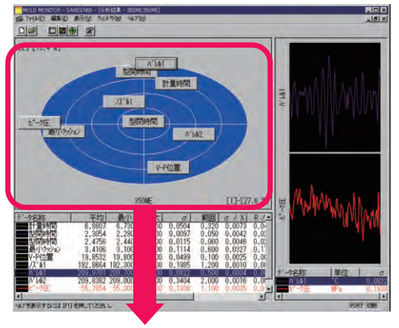
Ability to classify and summarize alarm data from each machine for each occurrence



Based on EUROMAP63, Middleware compliant

Analysis

Quality radar
Displays the correlation of the data

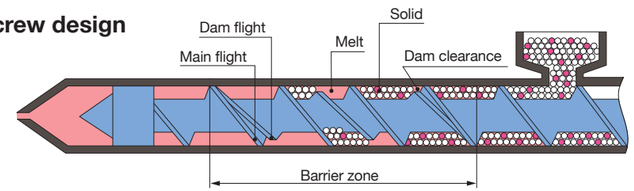


- Same place: Same correlation data
- Symmetrical to center point: Reversal correlation data
- Distance from center point: Variation impact is great

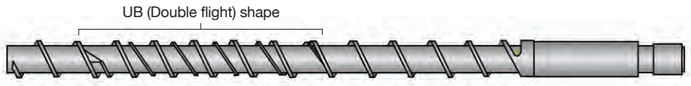
Wide variety of screw sizes and designs available

The highly regarded UB screw, with outstanding mixing and plasticizing capacity properties, is standard equipment.
Various screw designs tailored to the wide-ranging needs of the industry are also available.

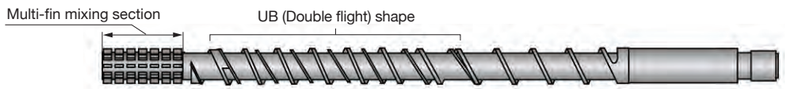
Screw design



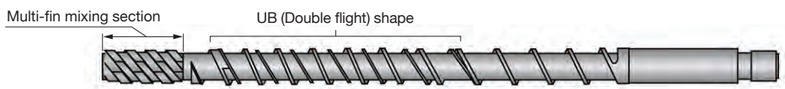
For high-cycle, general-purpose, "UB screw" (standard equipment)



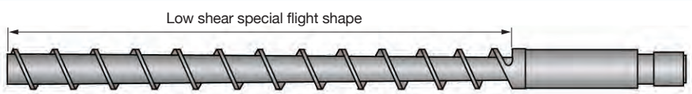
For super-high color mixing, "MF-UB screw" (optional)



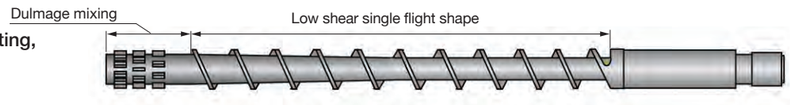
For super-high mixing, "MD-UB screw" (optional)



For Long Fiber Thermoplastics, "LFT screw" (optional)



For low shear, low heat generating, "F screw" (optional)

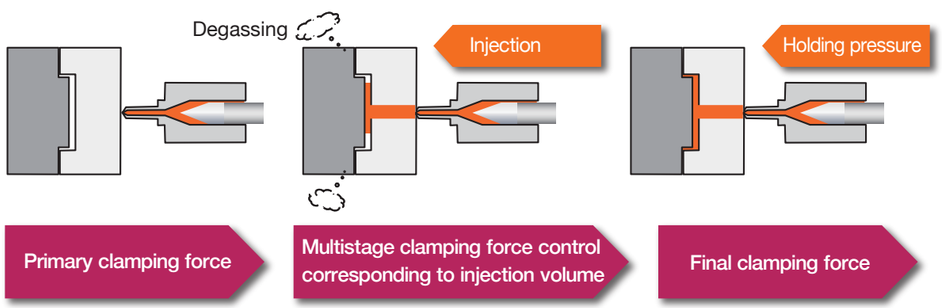


Multi-stage clamping function

Highly accurate and responsive multistage clamping control by pressure feedback with the clamping hydraulic motor is a standard function of the new emX.

Gas generated during moulding is a main factor to cause moulding defects such as gas burning.
Increasing clamping force in stages during injection by using the multistage clamping function is helpful for venting trapped air from the mould cavity.

Image of improvement of gas burning with multistage clamping function

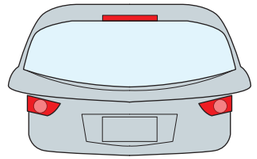


Special moulding technologies

Multi-resin moulding (Long Fiber reinforced Thermoplastics)

Long Fiber reinforced Thermoplastics allows automobile parts to be lighter with more unique design.
An important feature of LFT moulding is to ensure high rigidity and mechanical properties of products. Our LFT screw contributes to high ridigity, high intensity and weight reduction by ensuring the fiber length without breakage.

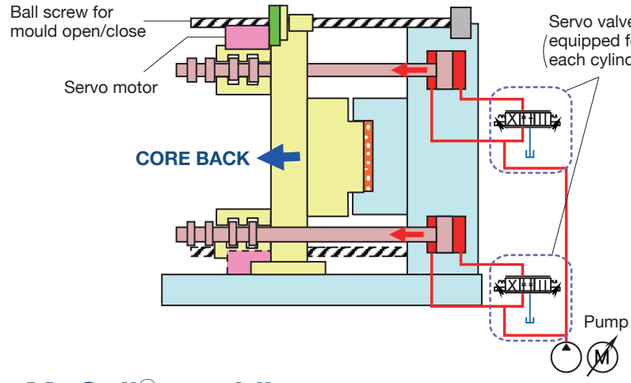
Sample of product (Tale gate)

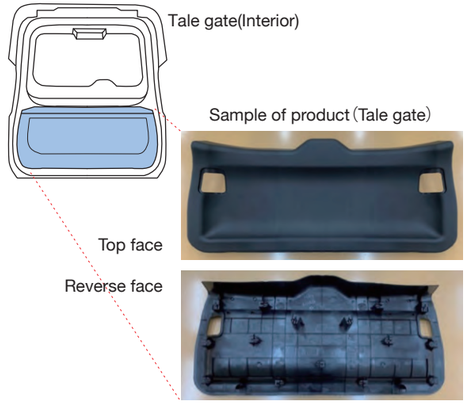


Foaming moulding with 4-axis tie bar core back (Meeting is necessary to install this function)

Superior-quality foamed mould products are possible with the high-speed and high-accurate core back motion (Parallelism of platens, core back speed and positioning) by 4-axis tie bar servo parallel control.

4-axis tie bar servo core back (optional)





MuCell® moulding (Meeting is necessary to install this function)

MuCell® is a registered trademark of TREXEL, INC

MuCell moulding, generates microcell (microscopic bubble) inside of mould products with supercritical gas (SCF); is a moulding method to improve quality of products and shorten cycle time.
With our screw for MuCell moulding and high-speed and high-accuracy motion of 4-axis core back, it is possible to produce higher-quality products.

Uniform internal stress with microcellular foaming pressure

- Improve accuracy in product dimensions
- Significantly improves warpage and sink marks
- Shorten cycle time (skip holding pressure)

MuCell® & 4-axis servo core back

HIghly accurate mould open/close control

Foaming moulding with core back produces light products

High-speed and high-accuracy core back motion by 4-axis servo parallelism control allows high-quality surface texture and microscopic bubble.

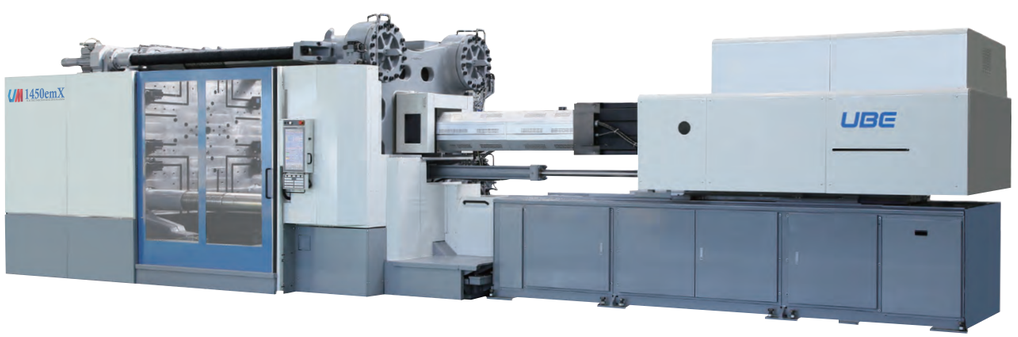
Sample of product
(Automotive engine cover)

Main equipment of MuCell®

Machine Specifications

Model			1200emX		1450emX		1800emX		2200emX	
Injection unit size			100	160	160	240	160	240	240	340
Injection Unit	Screw Diameter	in	3.55	4.14	4.14	4.73	4.14	4.73	4.73	5.32
	Calculated Injection Volume	cu.in	174.6	277.4	277.4	414.0	277.4	414.0	414.0	589.6
	Injection Weight Polystyrene (PS)	oz	92.9	147.5	147.5	220.2	147.5	220.2	220.2	313.5
	Injection Weight Polyethylene (PE)	oz	74.7	118.6	118.6	177.1	118.6	177.1	177.1	252.2
	Max. Injection Pressure	psi	25600	25600	25600	25600	25600	25600	25600	25600
		(MPa)	(177)	(177)	(177)	(177)	(177)	(177)	(177)	(177)
	Max. Holding Pressure	psi	21330	21330	21330	21330	21330	21330	21330	21330
		(MPa)	(147)	(147)	(147)	(147)	(147)	(147)	(147)	(147)
	Injection Rate	cu.in/s	62.1	84.5	84.5	86.3	84.5	86.3	86.3	109.2
	Plasticizing Capacity Polystyrene (PS)	lbs/hr	1036	1388	1388	1785	1388	1785	1785	2226
	Plasticizing Capacity Polypropylene (PP)	lbs/hr	628	837	837	1080	837	1080	1080	1344
	Screw Speed	rpm	160	152	152	143	152	143	143	132
	Injection Power	HP	241	328	328	335	328	335	335	424
	Injection Speed	in/s	6.29	6.29	6.29	4.92	6.29	4.92	4.92	4.92
	Nozzle Touch Force	US tonf	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
	Screw L/D Ratio	---	22	22	22	22	22	22	22	22
Clamp Unit	Max. Mould Clamping Force	US tonf	1157		1432		1763		2204	
	Mould Opening Force	US tonf	68		88		110		154	
	Mould Opening and Closing Speed	ft/min	197		197		213		197	
	Platen Size (H×V)	in	74.80 × 70.86		78.74× 78.74		98.42× 78.74		100.39 × 91.33	
	Distance Between Tie Bars (H×V)	in	51.96 × 51.96		57.08 × 55.11		72.83 × 59.84		72.83 × 64.96	
	Max. Mould Opening Stroke	in	68.89		72.83		94.48		94.48	
	Max. Daylight	in	88.58		98.42		125.98		125.98	
	Mould Height	in	19.68 ～ 43.30		25.59 ～ 51.18		31.49～ 59.05		31.49～ 59.05	
	Ejector Force	US tonf	22		33		33		33	
	Ejector Stroke	in	7.87		9.84		9.84		9.84	
	Ejector Speed	ft/min	55.7		49.2		49.2		49.2	
	Max. Mould Weight	US ton	16		22		33		38	
General	Heater Capacity	kW	33.7	47.5	47.5	53.5	47.5	53.5	53.5	67.2
	Overall Dimensions (L×W×H)	ft	31.8 × 10.4 × 8.6	31.8 × 10.4 × 8.6	33.6 × 11.7 × 9.6	35.7× 11.7 × 9.6	36.3 × 12.9 × 10.3	38.4× 12.9 × 10.2	38.9× 13.2 × 11.0	40.5× 13.2 × 11.0
	Machine Weight	US ton	43	46	55	57	71	73	84	91

Note : 1. Values above are subject to change due to modification without prior notice.
2. The value of plasticizing capacity are the result of standard testing conditions.
3. Injection weight, injection rate and plasticizing capacity are dependant on resin and moulding conditions.



Specification

Standard Specification

[Injection Unit]

1. Injection system
2. UB screw
3. Check ring
4. Barrel
5. Nozzle
6. Heater/Control
   - ·Band heater
   - ·SSR control
   - ·Temperature monitoring function
   - ·Rapid convergent temperature control
   - ·Temperature sensor
7. Injection control
   - ·Inj. speed and pressure programmed control (1 - 16 stages)
   - ·Holding pressure programmed control (1 - 4 stages)
   - ·Holding pressure switching control (position, time or pressure)
   - ·Holding pressure slope control
8. Screw rotation speed programmed control (3 stages)
9. Screw back pressure control (3 stages)
10. Melt decompression circuit (after injection, after plasticizing)
    - ·Automatic
    - ·Manual
11. Nozzle advance/retract control
    - ·Nozzle touch confirmation
    - ·Injection unit swivel device
    - ·Sprue break circuit (timer system)
12. Feed throat cooling water circuit
13. Trial moulding circuit (manual injection circuit)
14. Auto color change circuit (Jet purge circuit)
15. Screw cold start prevention circuit
16. Shot step circuit
17. Plasticizing mould opening and closing lap circuit
18. Screw indicator
19. Automatic lubrication device (injection side)
20. Barrel cover
21. Purge cover

[Clamp Unit]

1. Clamp system
2. Ejector device
3. Automatic mould height adjusting device
4. Mould close-open control
   - ·Mould setting operation circuit
   - ·Mould close-open speed programmed control (5 stages for opening, 4 stages for closing and 3 selective modes of mould close-open speed)
   - ·Mould close-open automatic deceleration circuit
   - ·Mould protection circuit
   - ·Link motion of ejector and core pull with mould motion
5. Ejector control
   - ·Ejector programmed control (2 stages, Max. 8 times ejection)
   - ·Ejector block circuit (w/motor break)
   - ·Ejector on fly (at any mould opening position)
   - ·Ejector retract wait motion
6. Take-out robot circuit (EUROMAP 67)
7. Mounting holes for take-out robot (Based on EUROMAP)
8. Mounting mould
   - ·Locating ring
   - ·Holes for mounting mould
9. Automatic lubrication device (Clamp side)
10. Front safety door
    - ·Power-operated door (Air cylinder)
    - ·Safety circuit
11. Rear door
    - ·Manual-operated door
12. Safety device for mould area
    - ·Safety platform
    - ·Safety confirmation switch in mould area
    - ·Emergency stop button in mould area
13. Mechanical safety device (For delivering to Japan only)

[Hydraulic Unit]

1. Pump system (Energy saving type)
2. Hydraulic oil filtration device
3. Solenoid valve with indicator
4. Hyd. oil temperature display
5. Hyd. oil level decreasing alarm unit
6. Hyd. oil heat up circuit
7. Hyd. oil temperature controller
8. Magnetic filter

[Electric Unit]

1. MAC-IX control device
2. Automatic termperature storage for barrel
   - ·Automatic temperature controller
   - ·Heater burn-out detector
3. Automatic memory for mould condition
   - ·Internal memory (480 moulds)
   - ·External memory interface (1008 moulds)
4. Data security function
   - ·RFID card
   - ·Data protection by multi-level password
   - ·Setting value change prevention circuit
   - ·Setting value change history display
5. Moulding condition data setting/display function
   - ·Injection speed/pressure waveform display
   - ·Process support function (easy setting condition)
   - ·Entire setting value display
   - ·Preset circuit for next moulding condition
   - ·Unit conversion
   - ·Foreign language (displayed language switching, select 3 languages from Japanese, English, Chinese, Spanish or Thai)
6. Production management function
   - ·Production management data input
   - ·Production monitor
   - ·Process monitor function
   - ·Trend data display
   - ·External signal output circuitⅡ
7. Alarm function
   - ·Operating condition OK monitor
   - ·Alarm indication
   - ·Input and output display
   - ·Alarm buzzer
8. Maintenance information
   - ·Grease supply alarm
   - ·Lubrication oil supply alarm
   - ·Battery exchange alarm
   - ·Alarm history display
   - ·Operation history display
   - ·Running hour meter
9. Screenshot
10. Safety/Energy saving function
    - ·Emergency stop button switch
    - ·Cycle start push button
    - ·Power supply regeneration function
11. Heater subset temperature control
12. Automatic heat-up circuit
13. Automatic cycle stop circuit
14. Material feeding stop signal circuit
15. Production completion pre-notice circuit
16. Data maintenance (UPS, lighting surge suppressor)
17. Setting value direct input (Actual value/percentage (%) input switching)
18. ECO monitor
19. Safety device

[Control Unit]

1. Coining circuit
2. Servo driven mould release
3. Multistage clamping control

[General]

1. Mounting/Foundation bolt
2. Accessories
3. Instruction manuals, drawings (one data CD each)

Option Equipment Specification

[Injection Unit]

1. Screw
   - (1) Material
     - Anti-abrasive & anti-corrosive screw
   - (2) Screw type
     - HC-UB screw
     - MF-UB screw
     - MD-UB screw
     - LFT screw
     - F screw
2. High-responsive check ring (for low viscosity resin)
3. Barrel
   - ·Anti-abrasive barrel (＊US standard)
   - ·Anti-abrasive & anti-corrosive barrel
4. Extension nozzle
5. Shut off valve
   - ·Hydraulic shut off valve (rotary type)
   - ·Hydraulic shut off valve (needle type)
6. Barrel heater
   - ·Ceramic type heater
7. Barrel cover
   - ·Insulated heater cover
   - ·ECO cylinder cover
   - ·Barrel cover with blower
8. Feed throat cooling water circuit
   - ·Flow meter
   - ·Temperature control device (w/flow meter)
   - ·Cooling water outage alarm
9. Melt decompression circuit (after plasticizing, after cooling, both)
10. Hopper stage
    - ·Ladder stage
    - ·Large floor type
11. Hopper
    - ·Steel
    - ·Stainless
12. Screw torque up

[Clamp Unit]

1. Mould ejector retraction confirmation circuit
2. Air blow (2 lines)
3. Hydraulic core (2, 4 lines)
   - ·Mould ejector circuit
   - ·Hydraulic core decompression circuit
   - ·Cylinder block circuit
4. Air core (2 lines)
5. Hydraulic valve gate (2, 4, 6 lines)
6. Air valve gate (2, 4, 6 lines)
7. Ejector/Core link motion inhibition circuit
8. Piping for mould cooling water
   - ·Manifold type
9. Power-operated rear door
10. Locating ring for mould alignment
11. Locating ring for easy alignment of mould
12. T-slotted mould platen
13. Automatic mould clamper interface
14. T-slotted platens
15. One-touch ejector rod
16. Lifting device inside platens
17. Quick Mould Changer interface

[Electric Unit]

1. Main breaker (＊US standard)
2. Earth leakage breaker
3. Outlet circuit
   - ·Single-phase AC 100V
   - ·Single-phase AC 200V
   - ·Three-phase AC 200V
4. Hot runner control device
5. Signal light
   - ·Red color signal light
   - ·Three (3) color signal tower
6. Recording terminal (Injection speed, pressure, position)
7. Acceptance check circuit
8. Memory data communication with take-out robot
9. Ancillary equipment alarm
10. Plug switch (located at operation side and anti-operation side)
11. Unmanned operation circuit
12. Product stocker change circuit
13. Foreign language

[Control Unit]

1. Holding pressure switching control
   - ·External signal (＊US standard)
   - ·Mould cavity pressure
2. Mould temperature monitor
3. Gate cut circuit
4. Packet MAC (LAN/USB)
5. USB memory
6. Production control
   - ·LINKi
7. SCS moulding circuit
8. Insert circuit

[General]

1. Special paint color
2. Spare parts for two (2) years
3. Tools (＊US standard)
4. Instruction manuals, drawings (document file)
5. Name plate in foreign language
6. Oil tank water filling test
7. Spare grease cartridge
8. Mounting
   - ·Leveling pad
9. Boosting transformer
   - ·220V (60Hz), 220V (50Hz)