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# iM18E

## Hybrid Small-sized Injection Molding Machine



www.shi.co.jp/plastics/

The machines in this series have acquired

JIS B 6711:2021 (equivalent to ISO 20430:2020) certification.

We support the enhancement of our customers' corporate value through providing high performance, high quality, and safe injection molding machines.



 Photographs of machines and details may differ from actual products.
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## Getting the best quality and space-savings in small parts precision molding



## Smallest machine in 18 tf class Reduces the footprint of molding lines

The iM18E allows users to greatly shrink the amount of space occupied by equipment because it has the smallest footprint of any 18 tf class molding machine, comes with an injection unit that does not require turning and is designed so that peripheral units can be housed in the underbelly of the machine frame. Because it recoups space, it allows users to build molding lines with more molding machines.

- Footprint comparison -←-21% **iM18E** SE18DUZ<sup>2</sup>



## Greatly reduces running costs A hybrid power drive and dramatic improvements in power-saving

technology greatly reduce power consumption. The energy reductions will help businesses realize sustainability goals.

0.15 kWh ←-52% **iM18E** iM18 0.31 kWh (Our same-class hydraulic machine

Data was measured using an external watt-hour meter during stable continuous molding

## Achieves high-precision mold clamping in a compact manner Hydraulic direct-pressure mold clamping unit

The hydraulic direct-pressure mold clamping unit improves gas purging, shortens setup time and makes the machine that much smaller.





Shot-to-shot mass variation in molded parts

was reduced to 1/3.

The coefficients of mass variation in molded parts were obtained by stability evaluation tests we conducted with molded parts



## **Higher accuracy at lower costs** Screw assembly for connector

1/3

It stabilizes resin dosing and shot consistency, which greatly reduces the fluctuations in dosing time. The dosing movement keeps to be stable even if crushed materials rate rises, which improves yield and reduces the material cost. Connector spec B supports molding of environment-friendly resins such as halogen-free resin.

## **Cost-down and better productivity** FTC III nozzle



It prevents stringing and clogging by evenly distributing temperature using 2-zone temperature control. In addition, its long protrusions reduce the resin consumption of the sprue and shorten the mold opening stroke, which shorten cycle time. Moreover, heaters can be detached or attached simultaneously, which facilitates maintenance and shortens machine downtime.

02

#### - Comparison of maximum injection speed -



#### - Resin cost comparison -



The stable molding is kept even if crushed materials rate is increased by 10%, so the usage rate of virgin materials can be decreased.

#### - Maintenance cost comparison -



Less time is required to detach and reattach the nozzle heater, which means less risk of damage and much lower maintenance costs.

## Standard Equipment

Plasticizing and injection unit
1. Injection program control (multi-stage control)
2. Holding pressure program control (multi-stage control)
3. Screw pull back (after holding/after dosing)
4. Digital display of screw position (0.01 mm setting)
5. Holding time 0.01 seconds setting
6. V/P switchover function (pressure/position)
7. Holding time 0.01 seconds setting
8. Automatic pursing device with interlock (when the interlock function is unused/when the injection unit backward end)
9. Heating cylinder temperature control 5 zones *2
10. Heating cylinder temperature switching function (molding/lowered temperature/pursing)
11. Zone 1 high capacity heater
12. Screw cold start prevention function (with interlock variable timer)
13. Remote setting function for sprue break stroke (reverse timing selection with delay timer, nozzle contact detection, movement time setting)
14. Digital display of screw rotation speed
15. Purging cover device (With limit switch)
16. Remaining cooling time display
17. Dosing start delay timer
18. Speed rise time selection during injection/holding pressure (10 modes)
19. Speed setting during holding pressure
20. Screw pull back delay control function
21. Synchro dosing function
22. Screw reverse rotation control function
23. Independent temperature control device of nozzle
24. Standard energy saving heating cylinder cover (two-layer structure)
25. Water cooling jacket temperature control device
26. Nozzle core adjustment device
27. Filling pressure multi-stage control function
28. Resin retention prevention function
29. One-touch manual dosing
30. High-precision, high-pressure nozzle contact device (nozzle contact force 2-step variable)

Control unit
1. 12.1-inch TFT color LCD screen
2. Touch panel type setting input device
3. Molding condition storage function (200 conditions)
4. Operation support function
5. Molding support function
6. Waveform display function (Waveform memory function, Display value reading function, Data storage by trigger, etc.)
7. Screen hard copy function
8. Take-out robot connection circuit *1
9. Screen switching function in 3 languages
10. Maintenance management function (inspection time, grease greasing time, item, operation method display)
11. Automatic start/stop function (lowered temperature/heater start/molding machine stop) *1
12. Process display function
13. SSR heater drive circuit
14. Industrial unit input function (speed, position, pressure, rotation speed)
15. Molding machine status output signal (5 CH) *1
16. USB connection circuit (memory)
17. Molding conditions protection
18. Abnormal processing selection function
19. Initial reject/short stop reject function

Monitor unit
1. Actual value display function
2. Heater breakage monitoring device
3. Peripheral equipment monitoring function (3 ch) *1
4. Abnormality monitoring function (maximum cushion, minimum cushion, filling pressure, mold protection, cycle time, dosing tim
5. Abnormality monitoring condition automatic setting function
6. Abnormal history display function (Abnormal item/Occurrence time display)
7. Quality control function (actual value statistics, various graphs, 100,000 shots saved data confirmatio
8. Production number management function (molded product discrimination function, automatic production completion, stocker feed signal, data logging, production counter with res
9. Auto start function (heater, external output signal)
10. Heating cylinder temperature monitoring function (all zones)
11. Self diagnosis function
12. Abnormal alarm buzzer
13. Shot counter
14. Processing function when cycle monitoring is abnormal (heater processing mode change)
15. Overall Screen
16. Prevent forgetting to set monitoring
17. Ejector protrusion torque monitoring function
18. Cycle analysis function

#### 1. Mold opening/closing position and speed program control function (5-stage switching) 2. Low pressure mold clamping function (35% max. of rated value) 3. Mold opening/closing pause function 4. Ejector setting (2-speed control, pressure, stroke, delay timer, multiple time protrusions) 5. Current value input function (ejector protrusion position) 6. Current value input function (mold open limit position)

Aold clamping u

7.	Ejector ejection interlock (only possible at mold opening end position in manual mode)
8.	Ejector ejection during mold opening
9.	Ejector ejection during mold closing
0.	Ejector plate return signal (input signal to molding machine, metal outlet connection) * 1
1.	Mold opening/closing signal (spear control signal) *1
2.	Valve gate drive circuit device (control circuit only) *1
3.	Mold installation standby mode (low-speed mold opening/closing)
4.	Emergency stop button (operation side/non-operation side)
5.	Safety door with clear PMMA window
6.	Screw holes for mounting the take-out robot
7.	Grease centralized greasing device for injection unit
8.	Clamping safety system (electrical/mechanical)
9.	Mold opening/closing low vibration or high speed mode selection function
0.	Product drop confirmation connection circuit *1
1.	Ejector unit with brake
2.	Dust-proof cover on top of toggle (fixed type)

1.	Auto grease supply unit (only for injection unit) (cartridge grease type)
2.	3-way take-out frame
3.	Mold cooling water block device (2 systems) (Flow meter and valve are options.)

4. Standard tool (ring spanner for nozzle) 5. Standard spare parts (fuses, air filters)

#### 1. Zero-molding main screen: Simple process setting 17. Zero-molding: Molding condition support monitor function (peak clamping force, pack pressure, status display 2. Zero-molding main screen : Production monitor (production number/process/abnormality/actual results) 18. Actual value monitor switching function (actual/process/power/waveform/temperature graph) 3. Specifications/function confirmation screen (standard functions/optional functions/abnormality handling/specification list/monitoring device) 19. Monitoring setting: Function to automatically set all at once 4. Setup support: Mold installation screen (mold height, mold contact, clamping force, mold open/close in preparations, ejector setting) 20. Molding condition access restriction function (condition range, screen display, password function) 5. Setup support: Mold condition setting screen (open/close, ejector multi-stage setting) 21. Automatic condition change function for molding start (by short shot method) 6. Setup support: Mold opening limit/ejector protrusion position teaching function (current value input) 22. Protection: Screw protection function 7. Setup support: Protection setting screen (mold protection, ejector protection) 23. Process temperature control: Nozzle 8. Setup support: Multi-purging function (gate purging, resin replacement purging, slight time stop purging, low-viscosity resin purging, resin viscosity measurement) 24. Energy saving mode function of holding pressure 9. Setup support: Temperature condition reference/calling function 25. Waveform display function: Simple display by process (injection, holding pressure, dosing, mold opening, mold closing, ejector, mold height) 10. Setup support: Resin residence alarm/monitoring function 26. Waveform display function: Waveform save completion message 11. Setup support: Nozzle/heating cylinder temperature rise mode function (step/nozzle delay/process temperature control) 27. Waveform display function: Automatic waveform save function (always/trigger/abnormal) 12. Zero-molding Molding condition setting screen: Z-Screen (filling, holding pressure, dosing, time, temperature, mold clamping force) 28. Quality control function: Waveform monitoring function 13. Zero-molding: FFC control function 29. Quality control function: Molding process monitor logging function (temperature, temperature control output, peak clamping force, pack pressure 14. Zero-molding: FFC control, mode setting function 30. Production control function: Function to set the number of cavities and manage the number of products 15. Zero-molding: Function to check the filling position and short shot position by flow front check 31. Production control function: Operation status management function (operating time, motor load factor, power consumption display 16. Screw reversal decompression control function

\*1 All input and output signals are no-voltage contact signals. Power is not supplied with output signals.
\*2 The number of zone varies depending on the screw diameter and screw type.
\*3 The overall machine length and minimum mold height are increased by 40 mm.
• Specifications are subject to change without notice for performance improvement.

## Optional Equipment

Plasticizing selection		
1. Ion-nitride screw assembly		
2. Wear and corrosion resistant A screw assembly		
3. Wear and corrosion resistant B screw assembly		
4. High-temperature screw assembly		
5. Connector-use grade A screw assembly		
6. Connector-use grade B screw assembly		
7. SD Screw		
8. Connector-use screw		
9. SL Screw		
10. Screw tip set - rotation type		
11. Screw tip - corrosion and wear resistant A - non-rotation type		
12. Screw tip - corrosion and wear resistant B - non-rotation type		
13. Screw tip - corrosion and wear resistant C - non-rotation type		
14. Screw tip set SK		
15. Screw tip set SK+MK		
16. Screw tip set - connector-use A		
17. Screw tip set - connector-use B		
18. Zone 0 high capacity heater (Only for connector-use screw assembly)		
19. Zone 1 high capacity heater		
20. High capacity heater		
21. Extension nozzle		
22. High insulated cylinder cover		
Plasticizing and injection unit		
1. Standard type hopper (6 L)		
2. V/P switchover by mold cavity pressure		

2. V/P switchover by mold cavity pressure
3. FTC Nozzle electric control circuit (built-in)
<ol> <li>High temperature heater control circuit (up to 499 °C)</li> </ol>
5. Connecting parts for ø14 mm screw assembly
6. Plating resin inlet of cooling water jacket
7. High efficiency nozzle control (depression of nozzle contact force)
8. GS Loader control circuit

Mold clamping unit
1. Pneumatic ejector
2. Cavity ventilator
3. Product chute
4. High precision heat insulating plate (t5 mm, cross type)
5. High precision heat insulating plate (t5 mm, cross type, compatible with ø60 mm locating ring)
6. Valve gate drive circuit (control circuit and pneumatic circuit)
7. ø60 mm attachment metal fitting correspondence
8. Tie bar plating
9. Mold height extension 40 mm *3

#### Screw Assembly

Specifications		Nitrided	Wear and Corrosion resistant A	Wear and Corrosion resistant B	High temperature	Connector spec A	Connector spec B
Material	Screw	Nitride Coating	Wear and Corrosion resistant A	Wear and Corrosion resistant B	Wear and Corrosion resistant A	Wear and Corrosion resistant B	Wear and Corrosion resistant B
	Cylinder	Nitride Coating	Wear and Corrosion resistant A	Wear and Corrosion resistant B	Wear and Corrosion resistant A	Wear and Corrosion resistant C	Advanced corrosion and wear resistant B
	Screw tip (set)	Rotating type	Wear and Corrosion resistant A Non-rotating type headset	Wear and Corrosion resistant B Non-rotating type headset	Wear and Corrosion resistant A Non-rotating type headset	Wear and Corrosion resistant B Non-rotating type headset	Wear and Corrosion resistant C Non-rotating type headset
Туре	SD Screw	0	0	0	0	0	0
[	SL Screw	-	0	-	-	—	-
Wear resi	stance	*	**	***	**	***	***
Corrosion	resistance	*	**	**	**	**	***
Suitable resins		Non-abrasive (wear) and corrosive resins	Resins with less than 30% GF, flame retardant resins	Resin with 30% - 40% GF, resins with large amount of filler (GB, CF, MR)	Resin with high melting temperatures	Fire-retardant resin (Excluding strong anti-corrosive grades)	Strong anti-corrosive, halogen-free fire-retardantresin

★★★ Most suitable ★★ Suitable ★ Usable

Coi	ntrol and monitor unit
1.	Leak circuit breaker (AC 200 V/220 V 3ø3W+E) (Asian countries only)
2.	Mold temperature monitor (2 zones, without thermocouple, type K)
3.	Peripheral equipment monitoring function (standard + 2 ch)
4.	Production control (2-directional rejection chute)
5.	Mold temperature controller (2 zones)
6.	Hydraulic oil heating circuit (for hydraulic oil of mold clamping unit)
7.	Automatic starting system (heater, water supply, external output signal) *1
8.	Revolving alarm lamp
9.	Multi function 3-color LED signal tower
10.	4-line closed circuit water connection lines (with flow meter, stop valve, cooling water stop valve, filter)
11.	2-line closed circuit water connection lines (with flow meter, stop valve, cooling water stop valve, filter)
12.	Personal computer connection circuit (ethernet)
13.	Spare power receptacles selection
14.	Power supply receptacles (100V 15A, 2-receptacles on operation side, with transformer)
15.	Key-lock switch for molding setup
16.	Name plate: Blue (name plate of machine model)
17.	Motion07
18.	MotionGB
Spa	are parts and accessories
1.	Spare parts A (mechanical parts: lub. parts)
2.	Spare parts A (electrical parts: thermocouple)
3.	Spare parts for export (encoder, limit switch, inductive proximity sensors)
4.	Leveling pads (for one machine)
5.	Anchor bolts (for one machine)
6.	Mechanical parts and hooks for hosting machine
7.	Tool A
0	

- 8. Ejector rods 1 pc/set (standard: 1 rod is attached.)
- 9. Grease gun
- 10. Grease cartridge for automatic lub (6 pcs)
- 11. Grease cartridge for automatic lub (1 pc)
- 12. Grease cartridge for manual lub (6 pcs)
- 13. Grease cartridge for manual lub (1 pc)
- 14. High precision heat insulating plate (t5 mm, cross type)
- 15. High precision heat insulating plate (t5 mm, cross type, compatible with ø60 mm locating ring)

#### - Connector-use screw assembly (Grade A and Grade B) -



The screw is made of new materials that improve the corrosion-resistance of the entire assembly and consent use with resins of higher crushed material ratios and strongly corrosive connector resins like PA and highly corrosive grade LCP.

## Main Specifications

Item	Unit	iM18E		
Clamping unit				
Clamping system		Hydraulic direct pressure		
Clamping force (max.)	kN	180		
Clearance between tie bars (W x H)	mm	260 x 235		
Platen size (W x H)	mm	340 x 320		
Daylight		360		
(When mold height extension 40 mm is selected)	mm	(400)		
Mold opening stroke	mm	210		
Platen speed (max.)	mm/s	500 (Mold opening) / 340 (Mold closing)		
Minimum mold height		150		
(When mold height extension 40 mm is selected)	mm	(190)		
Locating ring diameter		ø26		
(When the option is selected)		(ø60)		
Ejector system (ejecting points)		Motor driven type (1 point)		
Ejector ejection force kN		7.8		
Ejector speed (max.)	mm/s	333		
Ejector stroke	mm	50		

#### Injection unit

			C	35	
		MN			
Screw diameter	mm	14	16	18	20
Injection pressure (max.) *1,*2	MPa	223	266	210	170
Holding pressure (max.) *1,*2	MPa	223	266	210	170
Theoretical injection capacity	cm <sup>3</sup>	6	11	14	18
Injection mass (GPPS)	g	5.8	11	13	17
Plasticizing rate <sup>*3, *4</sup>	kg/h	5.1	10	13	16
Injection rate	cm <sup>3</sup> /s	92	120	152	188
Screw stroke	mm	40	58	58	58
Injection speed (max.)	mm/s	600			
Screw speed (max.)	min-1	460	430	430	430
Number of temperature control zone		4			
Heater capacity	kW	2.3	2.7	2.7	3.1
Nozzle contact force	kN	2.9			
Injection unit moving stroke	mm	175			
Nozzle protrusion	mm	30			
Hopper capacity (When the standard hopper is selected)	L		(1	6)	

#### Machine dimensions and weight

Machine dimensions (L x W x H) *5			2242 x 772 x 1472	
	(When mold height extension 40 mm is selected)	IIIIII	(2282 x 772 x 1472)	
Mac	nine weight <sup>*6</sup>	t	1.1	

\*1 The max. injection pressure and max. hold pressure are calculated values and represent machine output, not resin pressure. \*2 The max. injection pressure and max. hold pressure are not sustained pressure levels.

\*1 The plasticizing rate is shown for a machine equipped with SD Screw. \*4 50% of the value in the table is the threshold value when the SL Screw is selected.

\*5 The total length of the machine is to the front end of the injection unit when mounting the screw of the smallest diameter. The total height of the machine does not include the dimensions of leveling pads and hopper.

 The machine mass is subject to change depending on mounting optional equipment.
 Recommended hydraulic oil: Wear-resistant hydraulic oil VG46 / Oil quantity: 15 L (14 L for clamping system and 1 L for injection unit) The injection moving unit will be lubricated at the shipment. • Specifications are subject to change without notice for performance improve

### iM18E Dimensions and Foundation Plan • The dimensions of each part are for Japan.



## iM18E Dimensions of Platens • This drawing complies with JIS B 6701.

