

eV-LINE Electric Injection Moulding Machine

# ***MS series***

***MS50 MS100 MS200***



# eV-LINE MS series

Further realized high cycle moulding based on high accuracy and stability



V-LINE® injection moulding machine which has received high evaluation in the fields of precision and complicated plastic moulding. This series consists of superior features, such as high accuracy and stability.

The "MS Series" is Sodick's latest injection moulding machine based on this excellent performance which has adopted the "eV-LINE" system integrated with the independently developed servo motor control technology in the drive portion of the plasticization & injection units.

The drive portion of the newly developed mould clamping unit realizes further improvement of high cycle moulding and productivity, and energy saving effect.

Since advanced high precision and complicated plastic moulded products are required, a wide range of application ability has been demanded for injection moulding machines.

One solution is the "eV-LINE Electric Injection Moulding Machine MS Series."

\*V-LINE® is a registered trademark of Sodick Co., Ltd.

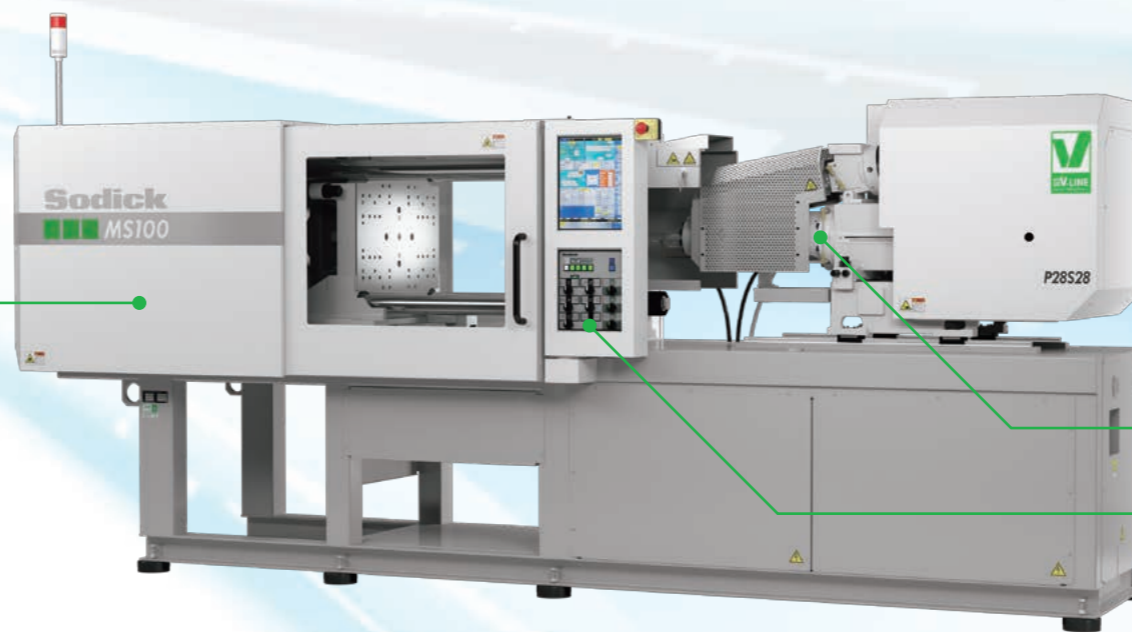


## MS200

- Screw Diameter 40mm 50mm
- Plunger Diameter 40mm 50mm



Clamping Unit



V-LINE®

Dedicated Operation Panel

## MS100

- Screw Diameter 28mm 32mm 40mm
- Plunger Diameter 28mm 40mm



## MS50

- Screw Diameter 22mm 25mm 28mm
- Plunger Diameter 22mm 28mm

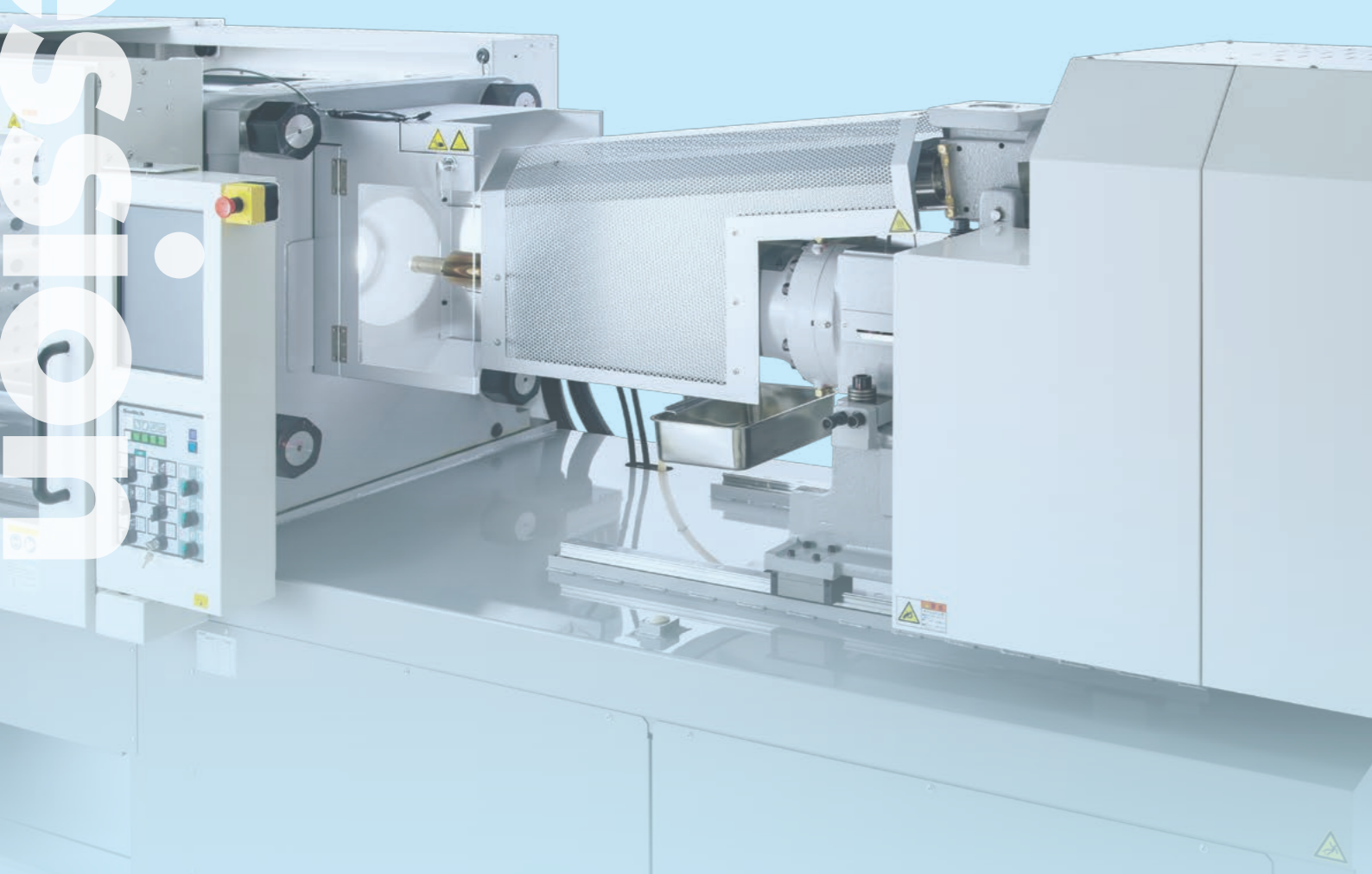
### ■ Mechanism of each Unit

Unit	Mechanism & Method	Drive Method	Features
Injection	Plunger	Electric + Ball Screw	Accurate filling performance
Plasticization	Screw Pre-plasticizing	Electric	Stable plasticization performance
Mould Clamping	Double toggle	Electric + Ball Screw	High cycle & energy saving
Ejection	Ball Screw	Electric + Ball Screw	Accurate position accuracy

## Plasticization & injection units which realize stable and high accuracy moulding

Accurate injection performance with high repeatability was realized by the in-house developed servo motor control technology to the V-LINE® method. It consists of a plasticization unit that only performs plasticization, and an injection unit that performs measurement and injection.

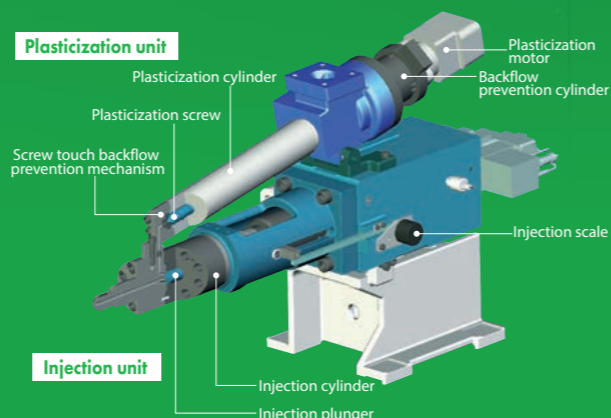
The improved accuracy of each position by controlling the measurement and injection position information by a closed loop, realizes high precision repeated stability of the plasticization, measurement and injection.



## V-LINE® Technologies

- Long-time stable moulding
- Stable control of plasticization & melting
- Low shearing plasticization control
- Accurate plunger position control
- Low speed injection speed control
- High speed & high pressure injection control
- Fill volume control
- Holding pressure control

The V-LINE® is filled with Sodick's unique technology.

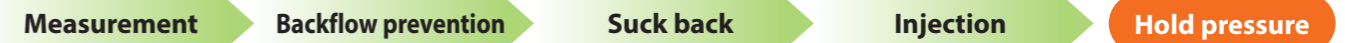


### ■ V-LINE® Injection Method

V-LINE®

- Screw only performs plasticization >>> Constant heat history of resin during plasticization
- Sequentially controls each process of plasticization and injection >>> Also controls behavior of the resin
- No portion slides or shears the resin >>> No excessive shearing heat or over shearing applied to resin

### ■ V-LINE® Moulding Process

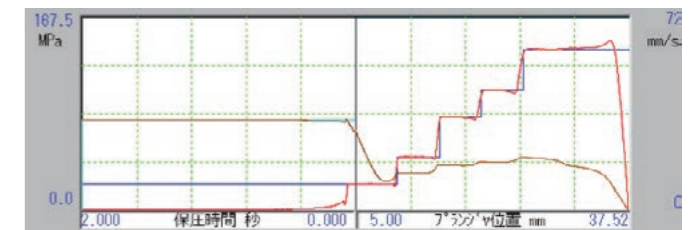


The V-LINE® realizes "3 stabilities," (1) melting condition of resin, (2) density of weighed resin, and (3) actual filling volume by independently controlling the entire process of the plasticization and injection.

- Three stabilities >
- Easy to maintain a stable moulding condition, which makes it easier to specify the cause of poor moulding
  - Improves the process capability of the moulding, which makes it easier to identify good conditions and poor conditions

### Excellent Repeatability of Injection Process (Waveform)

The figure on the right shows a 30-shot overlapping waveform of the injection speed and injection pressure of the electric MS100. The waveform indicates high repeatability with less variation width.



MS100 (P28S28)

### Abundant plasticization and injection units standardly equipped with wear resistance and anti-corrosion performance

The MS Series allows for the selection of a screw diameter and plunger diameter suitable for the injection volume of moulded products, and the plasticization and injection units in consideration of the speed and pressure, so that the machine can respond to a wide range of moulded products.

#### ■ Plasticization Unit Specification List

Plasticizer Diameter mm	22		25		28		32		40		50
Main Feature	Rotation Speed	Torque	Rotation Speed	Torque	Rotation Speed	Torque	Rotation Speed	Torque	Rotation Speed	Torque	Common
Plasticizing Capacity kg/h	16	9	23	13	42	24	53	30	96	62	100
Torque N·m	100	130	100	130	150	210	150	210	221	315	700
Rotation Speed min <sup>-1</sup>	400	200	400	200	400	200	400	200	400	200	200

#### ■ Injection Unit Specification List

Injector diameter mm	22		28(MS50)		28(MS100)		40(MS100)		40(MS200)		50
Main Feature	Speed	Pressure	Speed	Pressure	Speed	Pressure	Speed	Pressure	Speed	Pressure	Common
Speed mm/sec	450	350	350	250	400	300	270	200	300	200	200
Injection Pressure MPa	220	285	175	235	215	285	160	215	200	275	200

# Clamping Unit

## Newly developed clamping unit in pursuit of high cycle, high accuracy and uniformity

A new clamping unit which reduces the mould opening/closing cycle was developed to promote electrification of the clamping operation by adopting the unique servo motor drive technology.

This also improves energy savings and noise reduction, as well as contributes to high cycling.

Also, the movable platen is supported by a linear guide to ensure a moulding environment which suppresses variations.

Coexist



**Structural features of new clamping unit**

- Adoption of toggle mechanism ..... In pursuit of high cycling
- Linear motion guide supports long spans ..... In pursuit of position stability (High accuracy and uniform mould clamping performance)

Moulding cycle  
Compared to  
conventional machine  
**Reduced by 20%**

## Excellent Uniform Mould Clamping Force

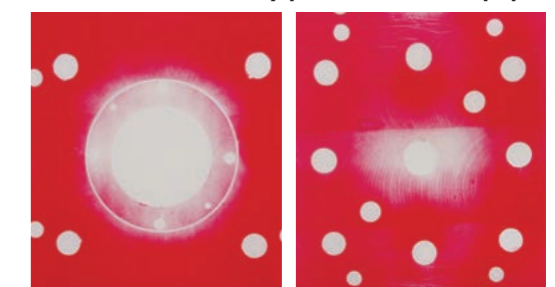
The figure on the right shows the pressure sensitivity results, where pressure sensitive paper was inserted between the platens and test block to confirm the distribution of the mould clamping force when the mould is clamped in the MS100.

Excellent uniformity of the mould clamping force equivalent to a conventional machine could also be confirmed in the "MS Series Machine" which adopted the toggle method.

**Merit**

- Strong contact in the center of the mould reduces the occurrence of burrs

**MS100 evaluation by pressure sensitive paper**



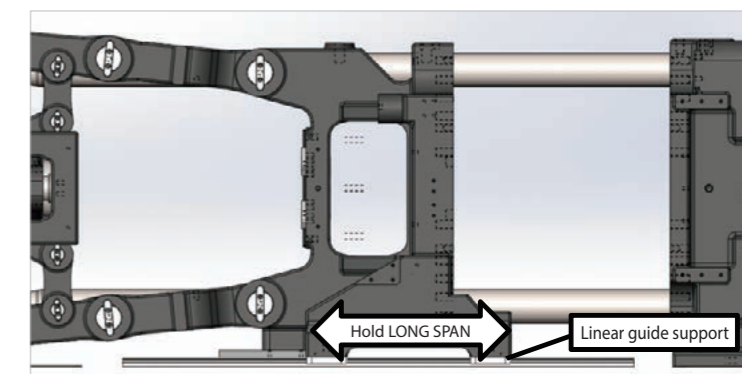
Fixed platen      Movable platen

## High Accuracy Mould Open/Close Operation

In opening and closing the mould, it is important to keep the straight advancement accuracy of motion, and parallelism and by keeping the movable platen as a linear motion guide support instead of a turber guide, we maintain their accuracy.

**Merit**

- No stress is applied to mould components
- No position change of movable platen



## eV-LINE System

In pursuit of high cycle performance and eco-performance The "eV-LINE" system integrated with the independently developed servo motor control technology has been adopted for the drive portion of the plasticization and injection units, and the drive portion of the newly developed mould-clamping unit, which realizes high cycle moulding and energy savings.



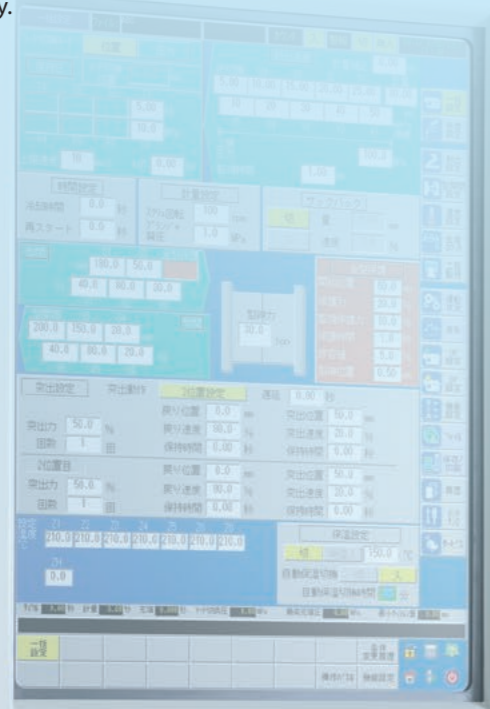
# Utility

## From manufacturing to maintenance. In pursuit of ease of use for all needs

The newly developed operation panel only for the "MS Series" is equipped with selector type switches.

Each unit operates by changing the switch in the direction to be moved, which provides a more intuitive and simple operation.

The adoption of the independently developed advanced control and communication system improved the high speed digital processing ability.



## Realized Intuitive Operation

The newly developed operation panel only for the "MS Series" is equipped with selector type switches. Each unit operates by changing the switch in the direction to be moved, which provides a more intuitive and simple operation.

In order to avoid complicated operation of the switches on the operation panel, a new soft keyboard which displays the input values on a screen was developed.



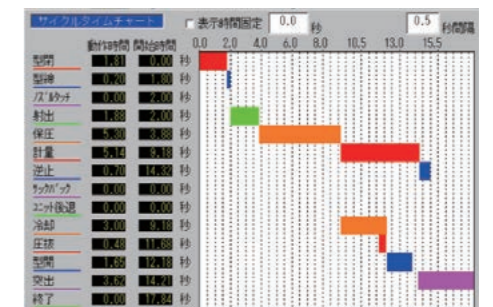
Operation panel dedicated to "MS Series"



Soft keyboard

## Improved Productivity by Visualization of Moulding Cycle

The adoption of a cycle time chart screen which enables the overall moulding cycle to be checked at once, realized visualization of the cycle. Accordingly, a moulding operation that can be shortened can now be visualized at once, which reduces time loss. The cycle setting of each process operation can be customized easily, which contributes to time reduction of the moulding cycle, and improves productivity.

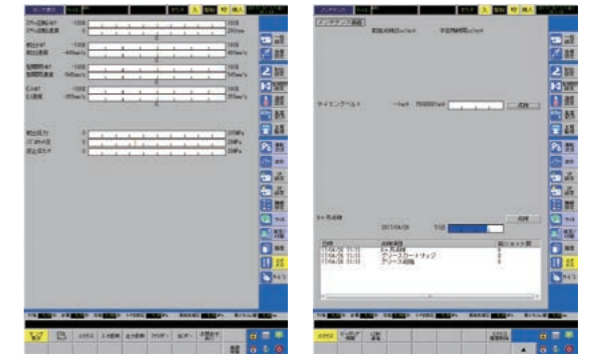


Cycle chart screen

## Substantial Support Functions

The operation method of the moulding machine, error contents of the moulding machine, and troubleshooting can now be checked in front of the moulding machine with the newly added various sensors and maintenance screen, etc.

As a Help function, the operation manual can be displayed so that quick action can be taken when moulding trouble occurs.



Various support screens

## Complies with Safety Standards of each Country which Satisfies Global Production

This series complies with the safety standards of each country, including the Japan Society of Industrial Machinery Manufacturers Standards (JIMS), Korean KC Safety Certification (KC-S), and the Chinese National Standards (GB), and is standardly equipped with double limit switches for the safety doors (enhancement of safety door closed monitoring function), double plasticization cylinder covers (reduces surface temperature of cover), large sized purge cover (prevents contact with high temperature heater), and upper cover on mould open/close portion and undercover on mould open/close portion (prevents contact with the mould). This series can be introduced smoothly as a safe and secure global machine.

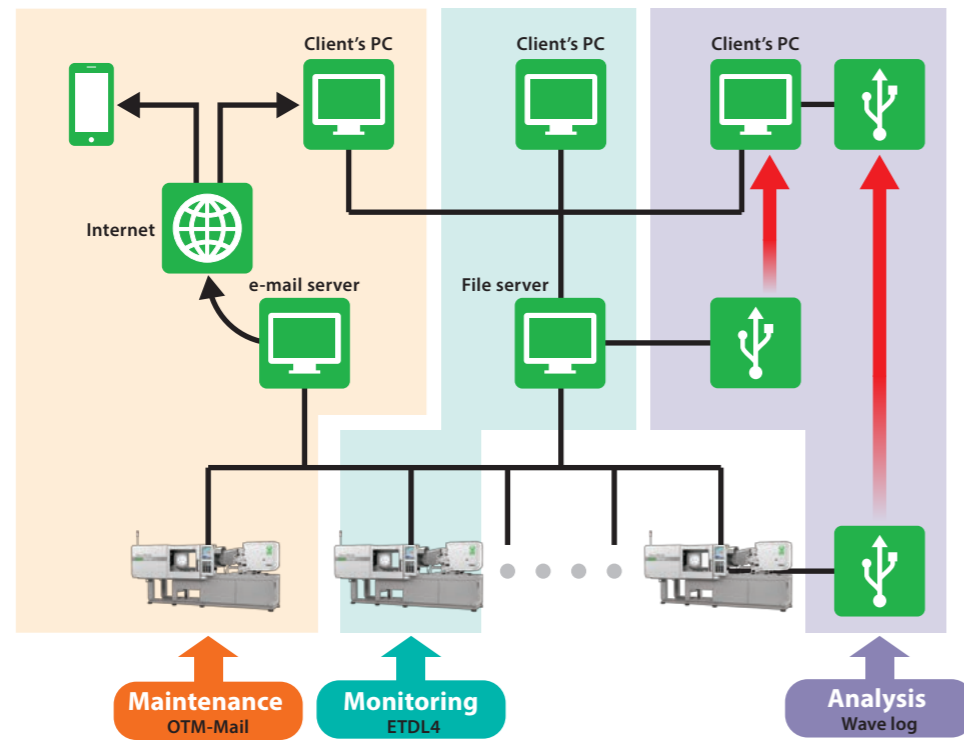


Example of safety standard compliance: Purge cover, plasticization cylinder cover

# Sodick IoT-IMM

Sodick quickly responded to Internet technology. Sodick promptly responded to Internet technology where multiple machines are connected to a network environment, and various information and data collected from machines is utilized to provide IoT (Internet of Things), including (1) monitoring, (2) maintenance, (3) control and (4) analysis.

## ■ Sodick IoT-IMM System Concept Figure



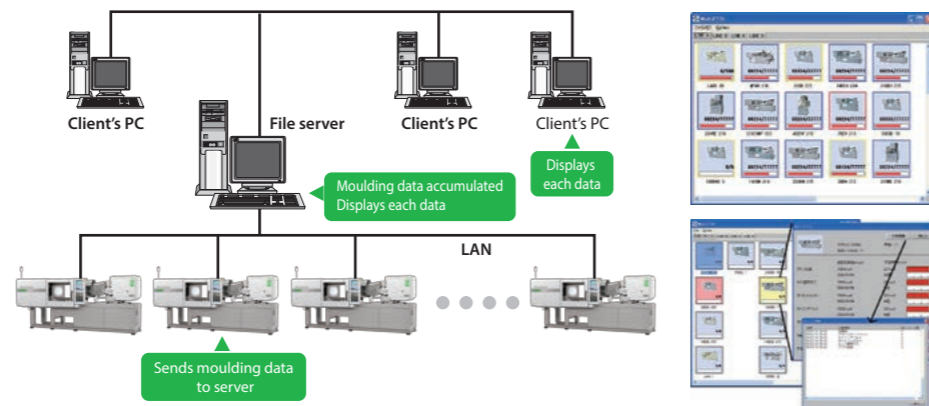
## Online Function

### ETDL4

Option

The ETDL4 is installed in the client's PC, and the moulding machine is connected online. This function is for displaying the following data of connected moulding machines on the client's PC.

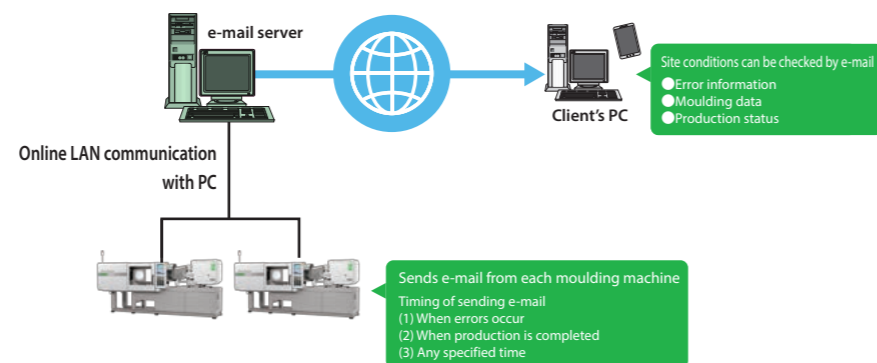
- Operating condition
- Shot data
- Waveform data
- Moulding conditions
- Moulding conditions change history / error history



### OTM-Mail

Option

The e-mail server is connected to the moulding machine via online. This function is for transmitting Internet e-mail to terminals, such as smart phones and each PC from the moulding machines via this e-mail server.



## Offline Function

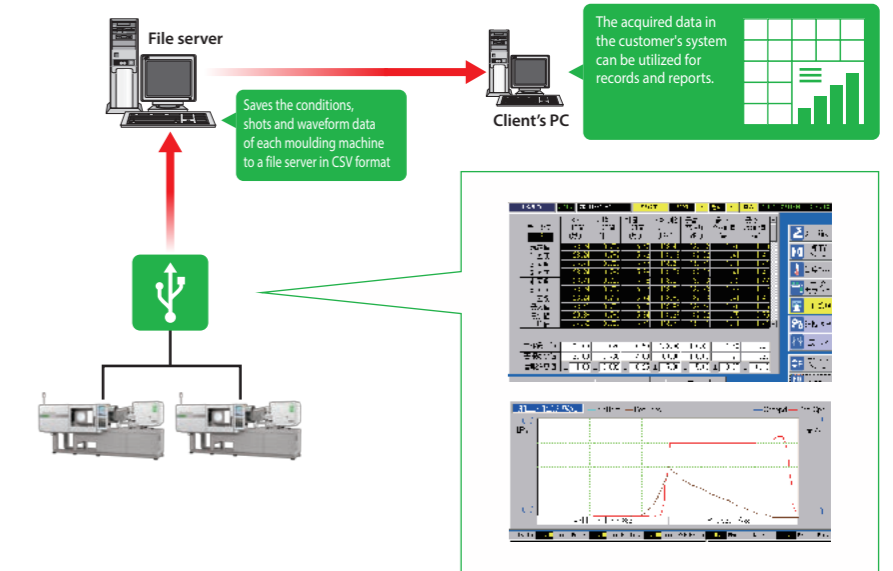
### Wave Log

This function is for collecting the following various data as CSV data.

- Shot data
- Waveform data
- Moulding conditions

Standardly, the USB memory is directly connected to the moulding machine to collect the data.

The data can be controlled by connecting the USB memory to the client's PC and downloading the data into common spreadsheet software (Excel, Access, etc.).

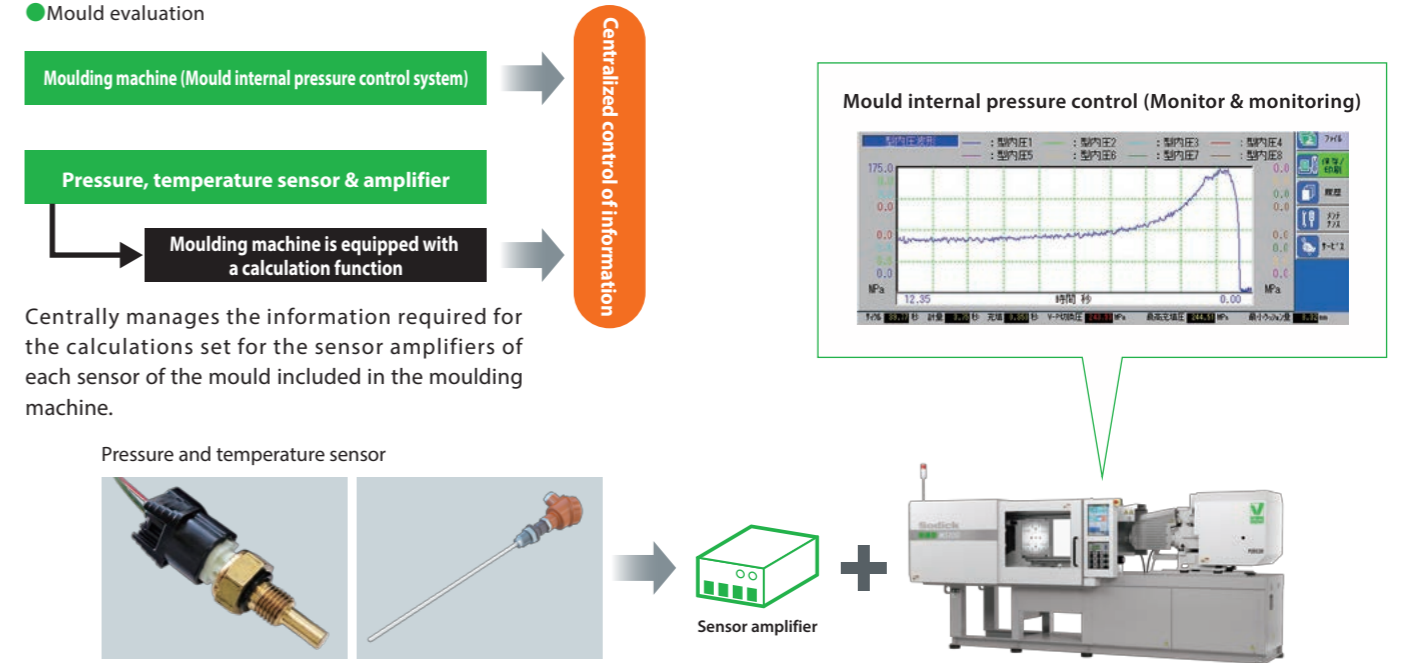


## SSM Sodick Scientific Moulding

Option


Numericalizes the behavior of the resin in the mould, and is used for the following applications.

- Setting of optimal moulding conditions
- Automatic sorting of defective products
- Quality control
- Mould evaluation



## ■ Waveform display of 8 ch analog input, process monitoring and alarm setting are possible



Model	MS50		MS100		MS200											
Product																
<b>Clamping Unit</b>																
Mould Open / Close System	AC Servo Motor Control		AC Servo Motor Control		AC Servo Motor Control											
Clamping System	Double Toggle		Double Toggle		Double Toggle											
Max. Clamping Force	kN	490		980		1,960										
Tie Bar Distance	mm	360 × 360		460 × 420		560 × 560										
Platen Dimension	mm	500 × 500		640 × 610		720 × 720										
Open Daylight	mm	600		800		1,000										
Mould Opening / Closing Stroke	mm	250		350		450										
Min./Max. Mould Thickness	mm	150 / 350		200 / 450		250 / 550										
Ejecting System	AC Servo Motor Control		AC Servo Motor Control		AC Servo Motor Control											
Ejecting Force / Ejection Retention Force	kN	20 / 9.3		20 / 9.3		37.0 / 18.5										
Ejector Stroke	mm	80		80		120										
<b>Plasticization Unit</b>																
Plasticization & Injection System	Screw Pre-plasticizing		Screw Pre-plasticizing		Screw Pre-plasticizing											
Screw Diameter	mm	22	25	28	28	32	40	40	50							
Plasticizing Capacity GP-PS	kg/h	16	9	23	13	42	24	42	24	53	30	96	62	96	62	100
Rated Screw Torque <sup>*1</sup>	N-m	100	130	100	130	150	210	150	210	150	210	221	315	221	315	700
Max. Screw Revolution <sup>*1</sup>	rpm	400	200	400	200	400	200	400	200	400	200	400	200	400	200	200
<b>Injection Unit</b>																
Plunger Diameter	mm	22		28		28		40		40		50				
Max. Injection Speed	mm/s	450	350	350	250	400	300	270	200	300	200	200				
Max. Injection Pressure <sup>*2&amp;3</sup>	MPa	220	285	175	235	215	285	160	215	200	275	200				
Max. Holding Pressure <sup>*2&amp;3</sup>	MPa	176	228	140	188	172	228	128	172	160	220	160				
Injection Rate	cm <sup>3</sup> /s	171	133	216	154	246	185	339	251	377	251	393				
Theoretical Injection Volume	cm <sup>3</sup>	53.2		98.5		98.5		251.3		251.3		392.7				
Plunger Stroke	mm	140		160		160		200		200		200				
Number of Temperature Control Zone		6		7		7		7		7		7				
Heater Capacity	kW	6.2	6.2	7.1	9.1	9.1	9.6	12.1	15.0	15.0	16.8	19.1				
Nozzle Pressing Force	kN	6.8		15.7		15.7		19.6		19.6		25.4				
Unit traveling Stroke	mm	280		320		320		365		365						
<b>Machine Dimensions / Weight</b>																
Machine Dimensions (L x W x H) <sup>*4</sup>	mm	3725×1155×1647		4240×1215×1688		4240×1215×1748	4474×1215×1765	5353×1445×1918		5428×1445×1918						
Machine Weight	kg	2900		3000		4000	4100	4300	8000	8200	8400					

\*1 The screw torque and maximum screw rotational speed are the output calculated values of the plasticization unit. The actual value may change depending on the resin and temperature.  
 \*2 The maximum injection pressure and maximum holding pressure are theoretical values (calculated values) of the unit, and are not the actual pressure of the resin.  
 \*3 The maximum injection pressure and maximum holding pressure may not be generated repeatedly depending on the duty of the injection motor.  
 \*4 These machine dimensions exclude the projecting portions and the signal light.  
 \* The above specification may change without prior notice.

■ Main Standard Accessories

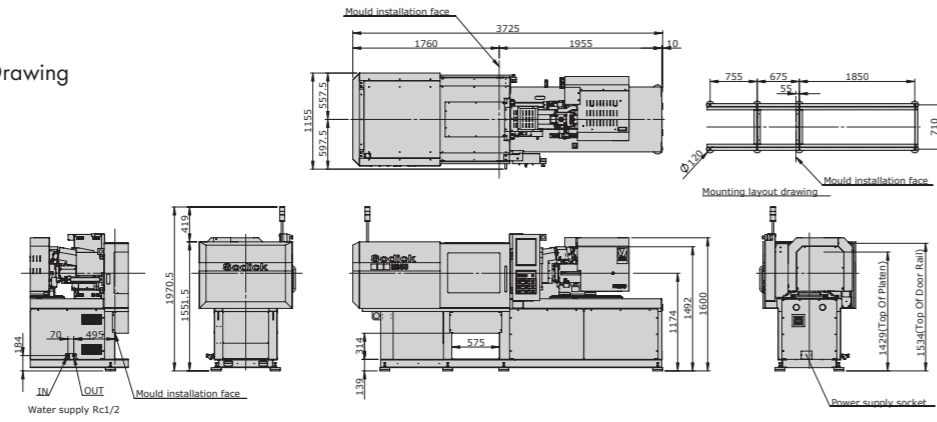
<b>Plasticization &amp; Injection Unit</b>
Wear and Corrosion Resistance (type-N)
High temperature heater (plasticization, injection), nozzle temperature control heater (60 to 420 °C)
Purge Cover (with Interlock)
Synchronous Heater TEMP Increase Function & Faulty Heater TEMP Increase (Heater Disconnection) Alarm Package
Under-hopper Independent Temperature Control Unit
Injection Setting Unit Selection Package (% or SI)
Pressure Retention Unit Selection Package (0.1s, 0.01s or 0.001s)
Injection Ejection Synchronized Multiple Tasks Package (gate cut system)
Injection Response Change (Injection 5, pressure retention 4)
PDT Setting (Pressure Drop Time)
IPPUK Moulding
Measurement and Mould Open Synchronous Multi-function (When valve gate used)
Plunger Retention Function after Measurement
Check Valve for Holding Nozzle Touch Pressure
Load cell for injection pressure detection
Injection specifications (pressure/speed) selection
Plasticization specifications (torque/rotation) selection
<b>Mould Clamping Ejection Unit</b>
Vibration-isolating Level Pads
Ejector Ejecting synchronized Function While the Mould is Open
CR Setting Function (mould clamping depressurization after pressure retention)
Automatic Lubrication Unit
<b>Control Units and Others</b>
Ground-fault Interrupter (200mA)
Carbide Generation Prevention Function (alarm & automatic heat retention switching)
Traverse Pick-up Unit Connection Circuit
Wave Log
Condition Change Disable Password
Case Counter (Signal Output is Optional)
Resin Stagnation Alarm (Compulsive Purge Operation Function)
<b>Options</b>
<b>Plasticization &amp; Injection Unit</b>
Injection Unit Forward/Backward Speed Variable Specification
Cylinder Heat Retention Cover
ZJ Heater and ZH Heater Temperature Control Unit
450 °C heater (injection & plasticization units)
<b>Mould Clamping Ejection Unit</b>
Insulating Plate Thickness Options (5 or 10 mm)
Heat Resistance Options (200 or 400 °C)
Mould Ejector Plate Return Confirmation Connection Circuit & Metal Connector <sup>*1</sup>
Mould Slide Return Confirmation Connection Circuit & Metal Connector <sup>*1</sup>
Falling Sensor & Camera Monitoring System Connection Circuit (Terminal Block)
Platen Adaptor (Movable Platen) / 40mm Extendable Ejector Rod
Pickup During Mould Opening (During Mould Opening, Mould Opening Limit Signal Output)
Vacuum Draw Connection Circuit, Vacuum Draw Drive Unit, Vacuum Draw System
Specification with Motor Brake for Mould Open/Close
Locating Ring Adapter
Increased mould open/close motor capacity for high cycle (MS100 / MS200)
Mould clamping tie-bar sensor

<b>Control Units and Others</b>
Tricolor Signal Light
External Receptacles <sup>*2</sup> A 200V30A①/200V20A③/100V10A②
External Receptacles <sup>*2</sup> ES (-B <sup>*3</sup> ) 200V30A①/200V20A④
External Receptacles <sup>*2</sup> EL (-B <sup>*3</sup> ) 200V30A①/200V20A④
External Receptacles N 100V10A①
Power Strip Type Receptacle (3m) 200V 30A (2) /200V 20A (2) Note: Connect to 30A receptacle
Ground-fault Interrupter for External Receptacles (30mA)
Case Counter Package (case changing signal & production complete signal terminals)
Automatic Alarm & Counter ON Package
Stop Timer Unit dedicated for Hydraulic Motor after Error Stop
Color (overall/for safety door only) Selection
Auxiliary Units 1.2.3 Abnormal tri-input stop signal
Water Unavailable, Air Unavailable Alarms
ETDL4-SMDL (USB Flight Recorder)
Logic I/O
Mould Internal Pressure Control Function (8 Channels)
<b>Auxiliary Units</b>
Mould Cooling Water Manifold (Select from 4/8 Channels)
Reverse Chute Connection Circuit
Conveyor Start Position Contact Signal Connection Circuit (forward and reverse rotation commands)
Product Falling Chute
Core Rotation Signal Terminal Block
Core Rotation Power Unit
Pick-up Unit Base
Mould Heater Temperature Control Connection Circuit (2/4 kW x 2/3/4 circuit) Selection with Current Detection and Disconnection Alarm
Mould (Hot Runner) Temperature Monitoring Thermocouple Connection Circuit
Hot Runner Temperature Control Connection Circuit (2 kW/2 circuits)
Mould Thermocouple (non-grounded type) Select from φ2.3/4.8 x 2,000/3,000 mm
Mould Thermocouple Holder (Select from φ2.3/φ4.8)
Hot Runner Valve Gate Signal (1 Contact Output)
Air Ejector Connection Circuit (Select from 1/2 Channels) (Terminal Block)
Hydraulic Core Tractor Connection Circuit & Drive Unit (Solenoid Valve) (Select from 1/2 Channels)
Pneumatic Core Tractor Connection Circuit & Drive Unit (Solenoid Valve) (Select from 1/2 Channels)
Machine Body Height Increase (100mm)
<b>Special Support</b>
High Wear and Corrosion Resistance (type-S)
Optical Lens Specifications (Type 5)
Specification for Safety Standards of All Countries <sup>*4</sup> (GB (China) / KCS (Korea) / USA)
<b>Procurement Items from Other Vendors</b>
Mould Clamp (8 pieces/set)
Hopper (select from 7/20/40ℓ) (rotary)
Additional ejector rod
Cable for data logging
Grease cartridge LHL-X100-7 (700 cc)

\*1: Terminal block is selectable \*2: Receptacles made by American Denki Co., Ltd. are selectable  
 \*3: (-B) (interlocking/non-interlocking batch switching type) \*4: Standardly equipped for JIMS (Japan) specification

# MS50

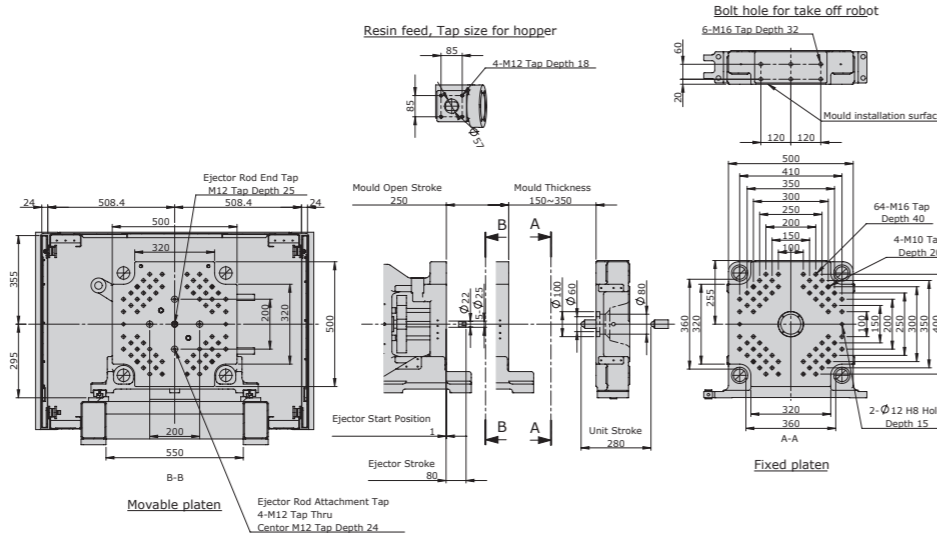
## Machine Dimensions & Installation Drawing



## Mould Installation Dimensions

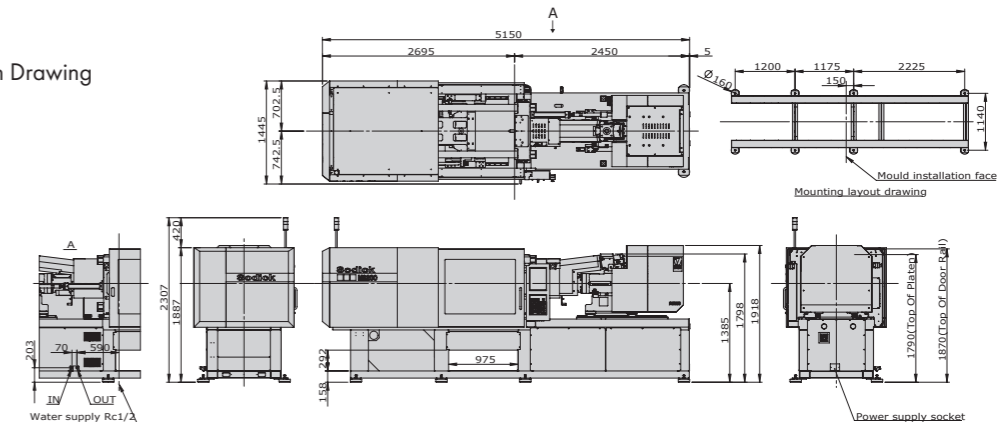
Main Spec of Nozzle (P22)			
Diameter of Nozzle Gate	Extension	Sphere R	Outside Diameter of Cover
φ1.5	60	10	φ30.4
φ2.0	60	10	φ30.4
φ2.5	60	10	φ30.4
φ3.0	60	10	φ30.4

Main Spec of Nozzle (P28)			
Diameter of Nozzle Gate	Extension	Sphere R	Outside Diameter of Cover
φ1.5	60	10	φ34.4
φ2.0	60	10	φ34.4
φ2.5	60	10	φ34.4
φ3.0	60	10	φ34.4



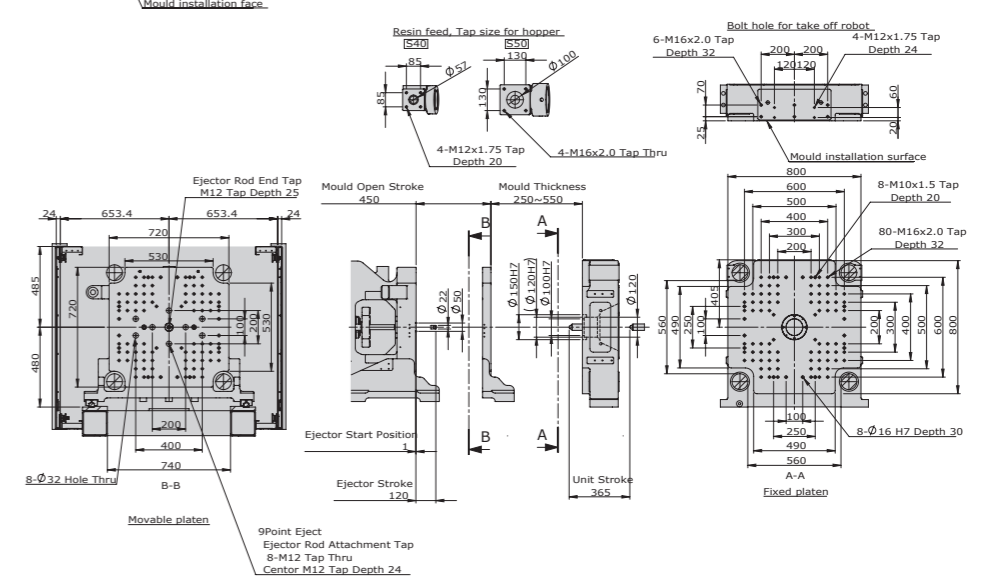
# MS200

## Machine Dimensions & Installation Drawing



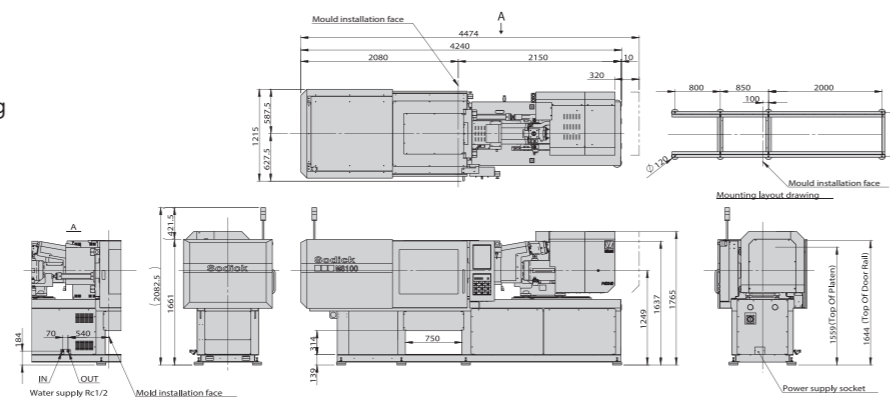
## Mould Installation Dimensions

Main Spec of Nozzle (P40/P50)			
Diameter of Nozzle Gate	Extension	Sphere R	Outside Diameter of Cover
φ1.5	80	10	φ38.6
φ2.0	80	10	φ38.6
φ2.5	80	10	φ38.6
φ3.0	80	10	φ38.6
φ3.5	80	10	φ38.6
φ4.0	80	10	φ38.6



# MS100

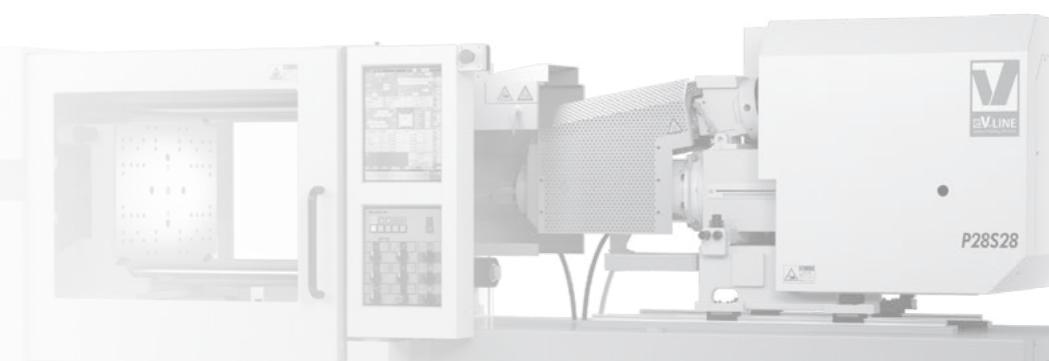
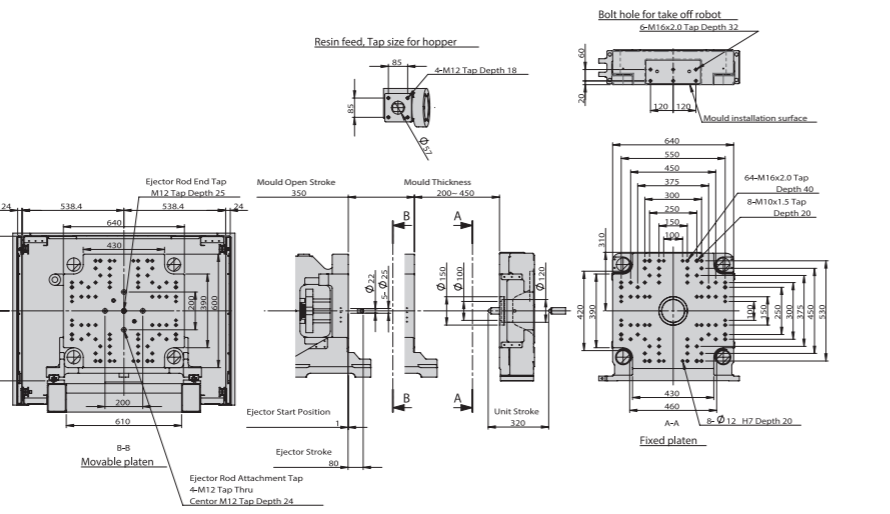
## Machine Dimensions & Installation Drawing



## Mould Installation Dimensions

Main Spec of Nozzle (P28)			
Diameter of Nozzle Gate	Extension	Sphere R	Outside Diameter of Cover
φ1.5	60	10	φ34.4
φ2.0	60	10	φ34.4
φ2.5	60	10	φ34.4
φ3.0	60	10	φ34.4

Main Spec of Nozzle (P40)			
Diameter of Nozzle Gate	Extension	Sphere R	Outside Diameter of Cover
φ2.5	80	10	φ38.6
φ3.0	80	10	φ38.6
φ3.5	80	10	φ38.6
φ4.0	80	10	φ38.6





# MS series



<https://www.sodick.co.jp/en/>

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- Due to ongoing research, specifications are subject to change without prior notice.
- The contents of this catalogue is current as of March, 2020.