Sodick

eV-LINE Electric Injection Molding Machine

MS series

MS50 MS100 MS200

eV-LINE

eV-LINE MS

Further realized high cycle molding based on high

V-LINE® injection molding machine which has received high evaluation in the fields of precision and complicated plastic molding. This series consists of superior features, such as high accuracy and stability.
The "MS Series" is Sodick's latest injection molding 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 mold clamping unit realizes further improvement of high cycle molding and productivity, and energy saving effect.
Since advanced high precision and complicated plastic molded products are reguired, a wide range of application ability has been demanded for injection molding machines.
One solution is the "eV-LINE Electric Injection Molding Machine MS Series."

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

Clamping Unit

MS50

■Screw diameter 22mm 25mm 28mm
■Plunger diameter 22mm 28mm

series

accuracy and stability

MS200

- Screw diameter 40mm 50mm
- Plunger diameter 40mm 50mm

V-LINE®

Dedicated Operation Panel

MS100

- Screw diameter 28mm 32mm 40mm
- Plunger diameter 28mm 40mm

■Mechanism of each Unit

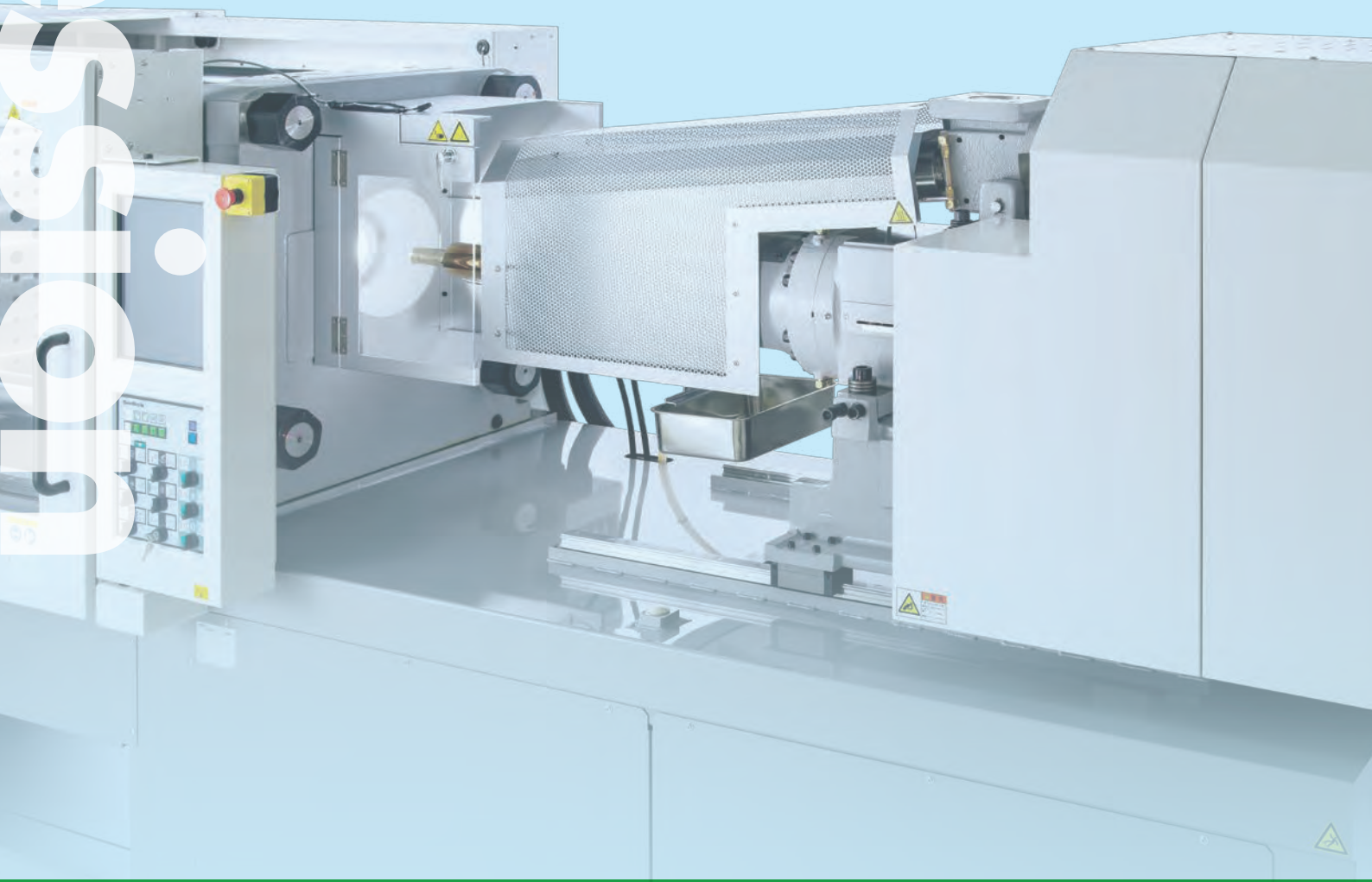
Unit	Mechanism & Method	Drive Method	Features
Injection	Plunger	Electric + ball screw	Accurate filling performance
Plasticization	Screw Pre-plasticizing	Electric	Stable plasticization performance
Mold clamping	Double toggle	Electric + ball screw	High cycle & energy saving
Ejection	Ball screw	Electric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

injection

V-LINE®

Plasticization & injection units which realize stable and high accuracy molding

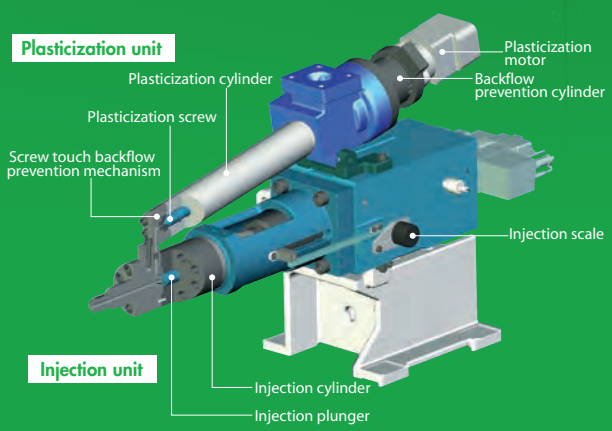
Accurate injection performance with high repeatability was realized by the in-house developed servo motor control technology to the V-LINE® method. It consists of a plasticization unit that only performs plasticization, and an injection unit that performs measurement and injection.
The improved accuracy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

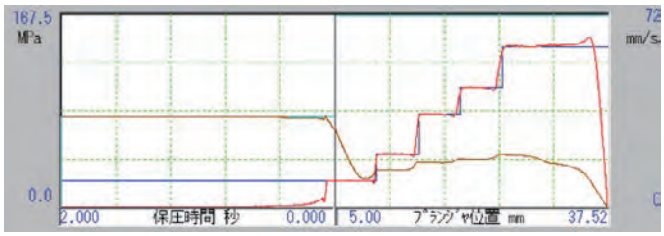
Measurement → **Backflow prevention** → **Suck back** → **Injection** → **Hold pressure**

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 molding condition, which makes it easier to specify the cause of poor molding
- ●Improves the process capability of the molding, 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 molded 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 molded 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^{-1}	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 mold 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 molding environment which suppresses variations.

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 mold clamping performance)

Molding cycle
Compared to conventional machine
Reduced by 20%

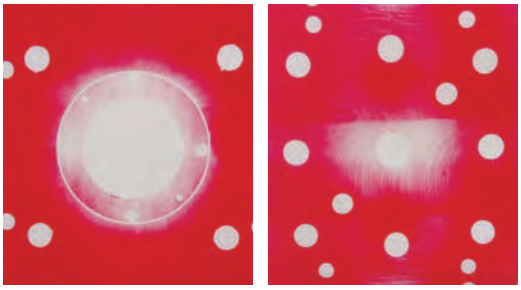
Excellent Uniform Mold Clamping Force

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 mold clamping force when the mold is clamped in the MS100.
Excellent uniformity of the mold 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 mold reduces the occurrence of burrs

■MS100 evaluation by pressure sensitive paper



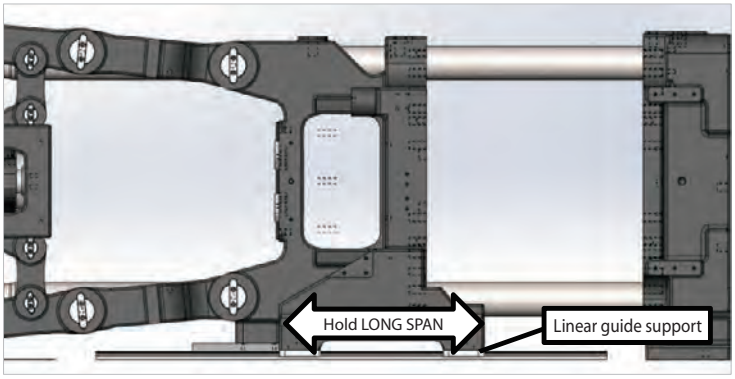
Fixed platen　　Movable platen

High Accuracy Mold Open/Close Operation

In opening and closing the mold, 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 mold 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 mold-clamping unit, which realizes high cycle molding 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

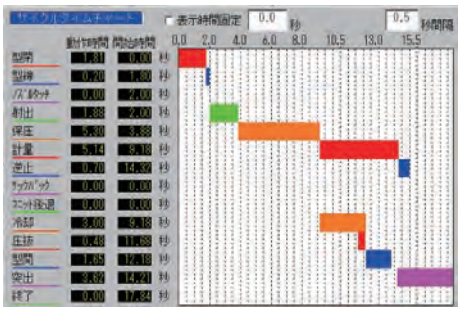
The newly developed operation panel only for the "MS Series" is equipped with selector type switchesEach unit operates by changing the switch in the direction to be moved, which provides a more intuitive and simple operation.
In order to avoid complicated operation of the switches on the operation panel, 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 Molding Cycle

The adoption of a cycle time chart screen which enables the overall molding cycle to be checked at once, realized visualization of the cycle. Accordingly, a molding 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 molding cycle, and improves productivity.



Cycle chart screen

Substantial Support Functions

The operation method of the molding machine, error contents of the molding machine, and troubleshooting can now be checked in front of the molding 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 molding trouble occurs.

Various support screens

Complies with Safety Standards of each Country which Satisfies Global Production

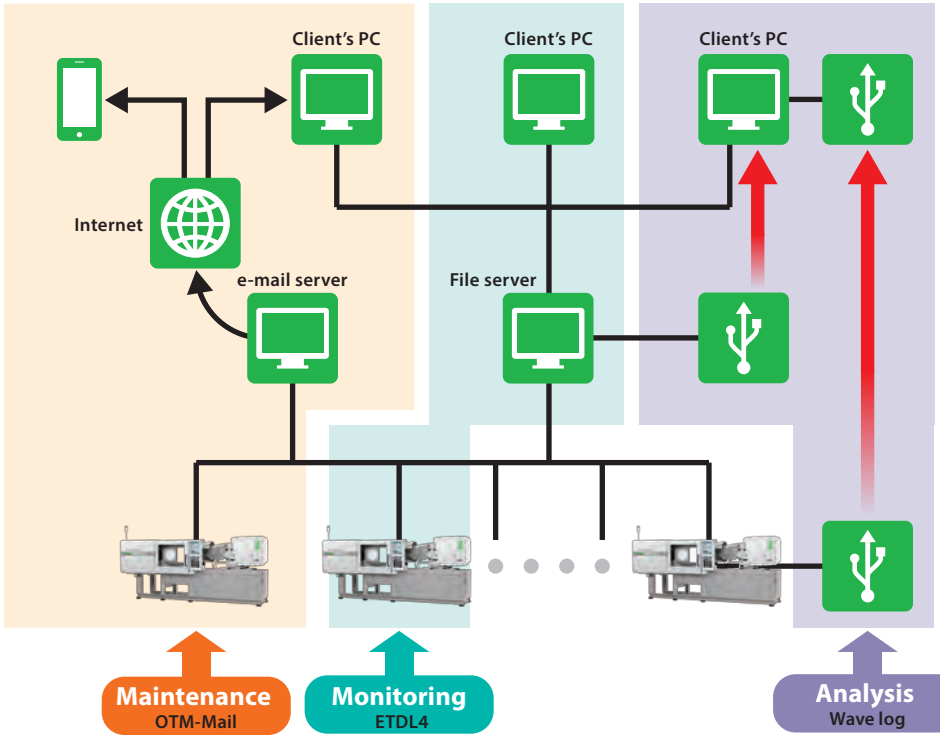
This series complies with the safety standards of each country, including the Japan Society of Industrial Machinery Manufacturers Standards (JIMS), Korean KC Safety Certification (KC-S), and the Chinese National Standards (GB), and is standardly equipped with double limit switches for the safety doors (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 mold open/close portion and undercover on mold open/close portion (prevents contact with the mold). 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



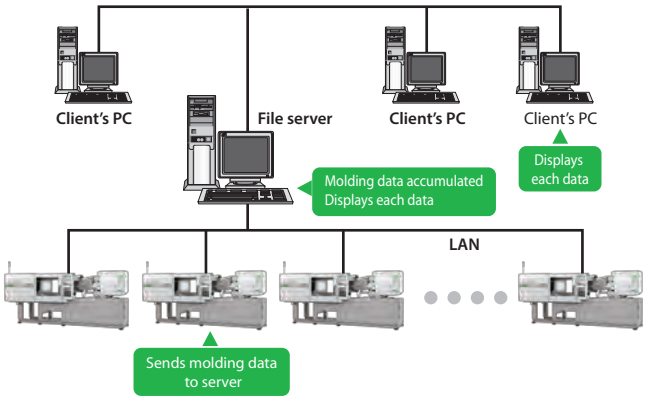
Online Function

ETDL4

Option

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

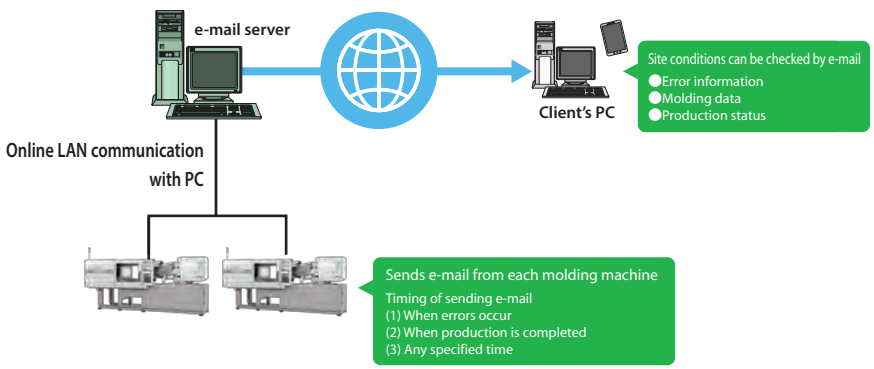
- Operating condition
- Shot data
- Waveform data
- Molding conditions
- Molding conditions change history / error history



OTM-Mail

Option

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



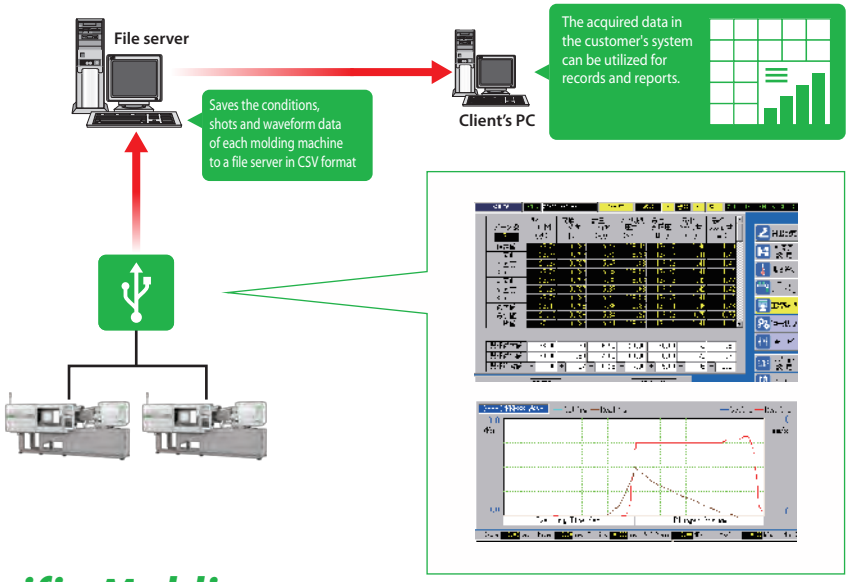
Offline Function

Wave Log

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

- Shot data
- Waveform data
- Molding conditions

Standardly, the USB memory is directly connected to the molding 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 Molding

Option

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

- Setting of optimal molding conditions
- Automatic sorting of defective products
- Quality control
- Mold evaluation

Molding machine (Mold internal pressure control system)

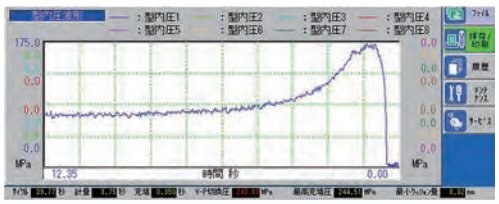
Pressure, temperature sensor & amplifier

Molding machine is equipped with a calculation function

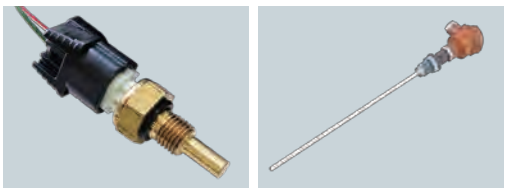
Centralized control of information

Centrally manages the information required for the calculations set for the sensor amplifiers of each sensor of the mold included in the molding machine.

Mold internal pressure control (Monitor & monitoring)

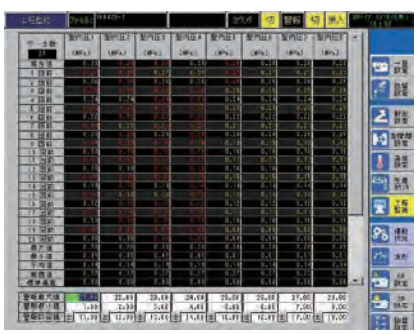


Pressure and temperature sensor



Sensor amplifier

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



eV-LINE MS Series Specifications

Model		MS50						MS100						MS200		
Product																
Clamping Unit																
Mold 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 (Min. mold thickness + Max. stroke)	mm	600						800						1,000		
Mold opening / closing stroke	mm	250						350						450		
Min./Max. mold 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		
Plasticization unit																
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*1	N·m	100	130	100	130	150	210	150	210	150	210	221	315	221	315	700
Max. screw revolution*1	rpm	400	200	400	200	400	200	400	200	400	200	400	200	400	200	200
Injection unit																
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*2 & 3	MPa	220	285	175	235			215	285	160	215			200	275	200
Max. holding pressure *2 & 3	MPa	176	228	140	188			172	228	128	172			160	220	160
Injection rate	cm³/s	171	133	216	154			246	185	339	251			377	251	393
Theoretical injection volume	cm³	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						365		
Machine dimensions / Weight																
Machine dimensions (L x W x H) *4	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.

eV-LINE MS Series Accessory List

Main Standard Accessories

Plasticization & Injection Unit

- Wear and Corrosion Resistance (type-N)
- High temperature heater (plasticization, injection), nozzle temperature control heater (60 to 420 ºC)
- 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 Molding
- Measurement and Mold 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

Mold Clamping Ejection Unit

- Vibration-isolating Level Pads
- Ejector Ejecting synchronized Function While the Mold is Open
- CR Setting Function (mold clamping depressurization after pressure retention)
- Automatic Lubrication Unit

Control Units and Others

- 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)

Options

Plasticization & Injection Unit

- Injection Unit Forward/Backward Speed Variable Specification
- Cylinder Heat Retention Cover
- ZJ Heater and ZH Heater Temperature Control Unit
- 450 ºC heater (injection & plasticization units)

Mold Clamping Ejection Unit

- Insulating Plate Thickness Options (5 or 10 mm)
  Heat Resistance Options (200 or 400 °C)
- Mold Ejector Plate Return Confirmation Connection Circuit & Metal Connector *1
- Mold Slide Return Confirmation Connection Circuit & Metal Connector *1
- Falling Sensor & Camera Monitoring System Connection Circuit (Terminal Block)
- Platen Adaptor (Movable Platen) / 40mm Extendable Ejector Rod
- Pickup During Mold Opening (During Mold Opening, Mold Opening Limit Signal Output)
- Vacuum Draw Connection Circuit, Vacuum Draw Drive Unit, Vacuum Draw System
- Specification with Motor Brake for Mold Open/Close
- Locating Ring Adapter
- Increased mold open/close motor capacity for high cycle (MS100 / MS200)
- Mold clamping tie-bar sensor

Control Units and Others

- Tricolor Signal Light
- External Receptacles*2A 200V30A①/200V20A③/100V10A②
- External Receptacles*2ES (-B*3) 200V30A①/200V20A④
- External Receptacles*2EL (-B*3) 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
- Mold Internal Pressure Control Function (8 Channels)

Auxiliary Units

- Mold 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
- Mold Heater Temperature Control Connection Circuit (2/4 kW x 2/3/4 circuit) Selection with Current Detection and Disconnection Alarm
- Mold (Hot Runner) Temperature Monitoring Thermocouple Connection Circuit
- Hot Runner Temperature Control Connection Circuit (2 kW/2 circuits)
- Mold Thermocouple (non-grounded type)
  Select from ϕ2.3/4.8 x 2,000/3,000 mm
- Mold 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)

Special Support

- High Wear and Corrosion Resistance (type-S)
- Optical Lens Specifications (Type 5)
- Specification for Safety Standards of All Countries*4 (GB (China / KCS (Korea) / USA)

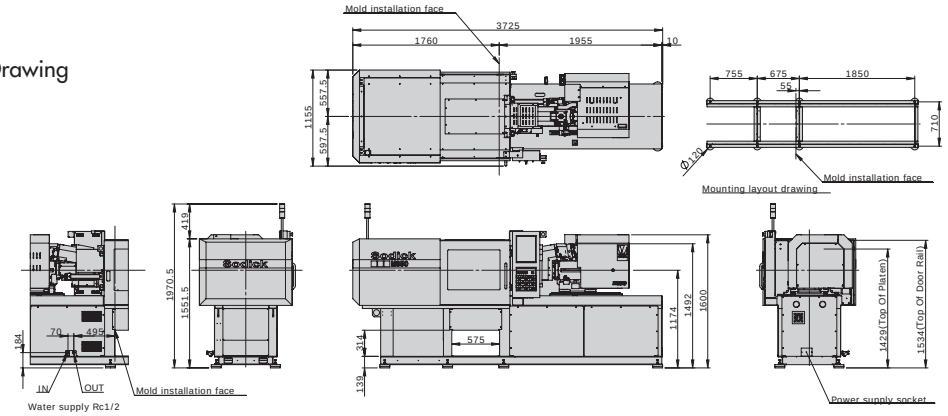
Procurement Items from Other Venders

- Mold 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

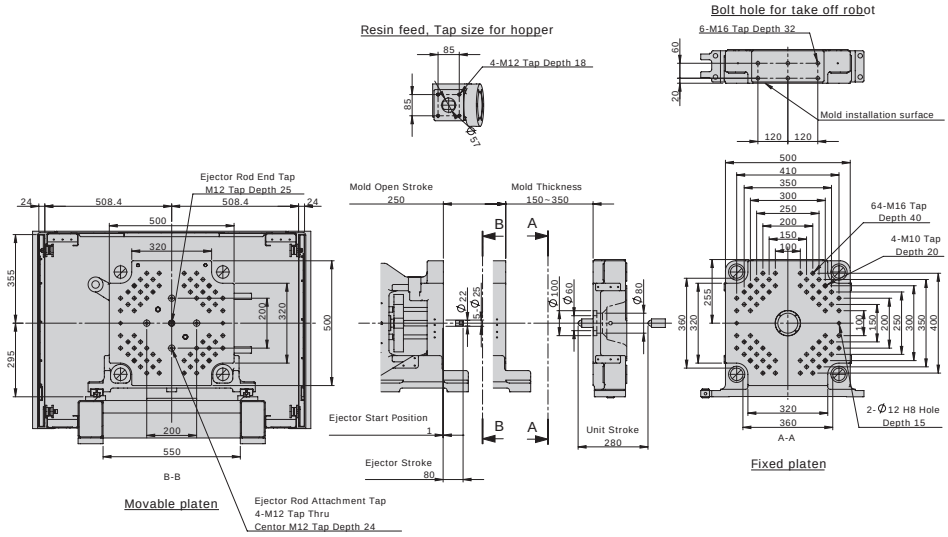
Machine Dimensions & Installation Drawing



Mold Installation Dimensions

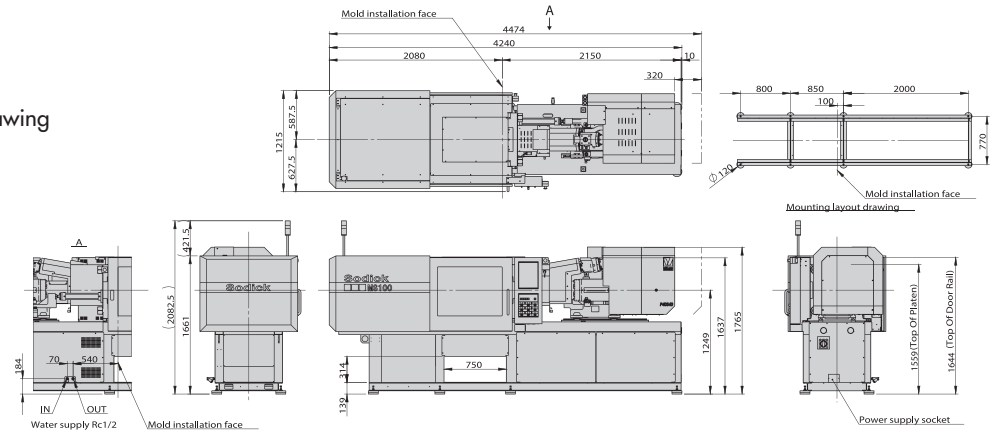
Main spec of nozzle (P22)			
Diameter of nozzle gate	Extension	Sphere R	Outside diameter of cover
ϕ1.5	60	10	ϕ30.4
ϕ2.0	60	10	ϕ30.4
ϕ2.5	60	10	ϕ30.4
ϕ3.0	60	10	ϕ30.4

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



MS100

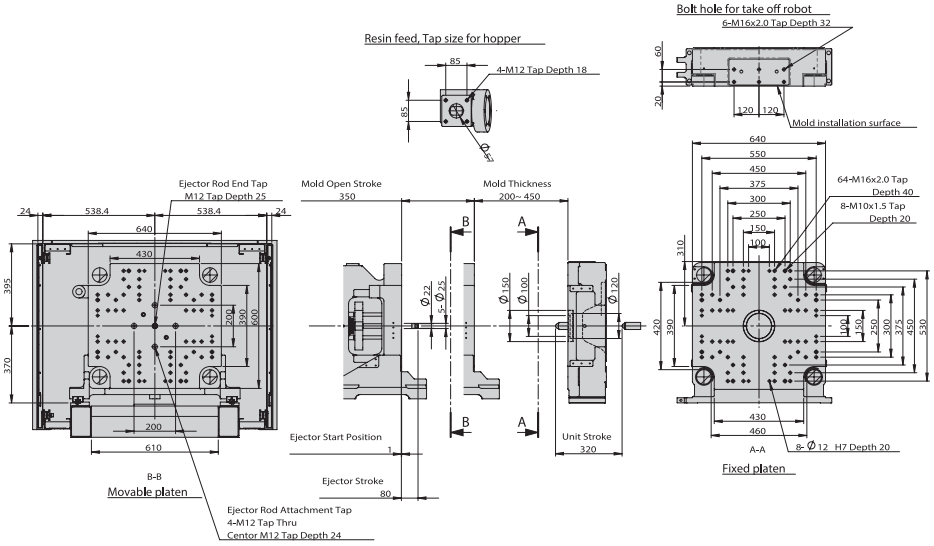
Machine Dimensions & Installation Drawing



Mold Installation Dimensions

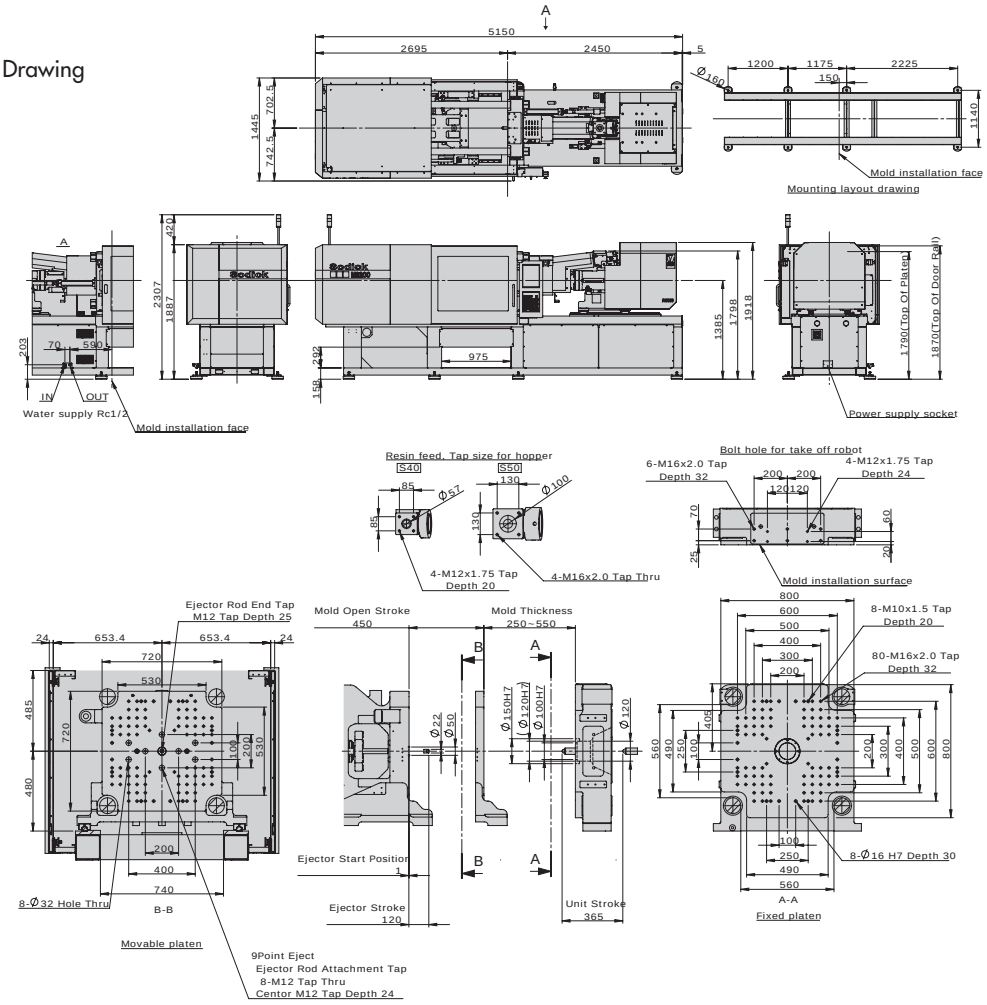
Main spec of nozzle (P28)			
Diameter of nozzle gate	Extension	Sphere R	Outside diameter of cover
ϕ1.5	60	10	ϕ34.4
ϕ2.0	60	10	ϕ34.4
ϕ2.5	60	10	ϕ34.4
ϕ3.0	60	10	ϕ34.4

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



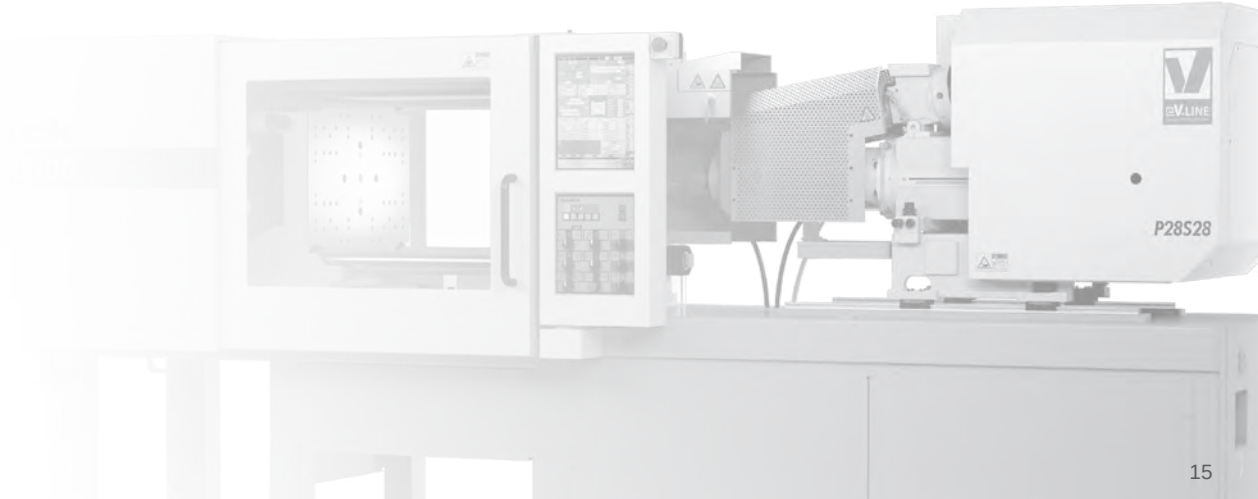
MS200

Machine Dimensions & Installation Drawing



Mold 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



eV-LINE Electric Injection Molding Machine

MS series

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

Sodick

create your future

Sodick Europe Ltd.

Agincourt Road
Warwick, CV34 6XZ
United Kingdom

Sodick Contact

Phone +44 (0) 19 2669 8888
email europe@sodick.eu.com
online www.sodick.org