NISSEI®

CATALOG 1012

Development Concept Focusing on Production Site

TNX

Intelligent Hybrid

HYBRID TYPE VERTICAL INJECTION MOLDING MACHINE

TNX ***SERIES***

TNX50R
TNX75R
TNX100R
TNX150R
TNX220R

Electric Servo Drive Eco-Friendly Injection Molding Machine (Hybrid Type)

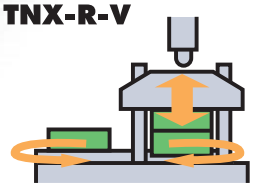
TNX Series

New!!

Evolving NISSEI vertical injection molding machines... Offering a new line of well-balanced hybrid machines with further improved basic functions and excellent cost advantages!

★Outstanding injection performance by the "X-Pump"
★Long-lasting stable operation by the direct pressure type clamping mechanism
★Hybrid machine with optimal structual configuration (combination)
★The ultimate level of energy-efficiency materialized
★Offering versatile vertical injection molding systems

Lineup of hybrid type vertical injection molding machines

	Clamping unit	Injection unit
TNX-R-V		
 Center (vertical) injection Turntable type	**TNX50R**	**5V/9V**
	TNX75R	**9V/12V**
	TNX100R	**12V/18V**
	TNX150R	**18V/25V**
	TNX220R	**25V**
TNX-R-A Made-to-order		
 Parting (horizontal) injection Turntable type	**TNX50R**	**9A/12A**
	TNX75R	**9A/12A**
	TNX100R	**18A/25A**
	TNX150R	**25A/36A**
	TNX220R	**36A/50A**

* Injection units written in blue indicate standard combination.
* For parting injection type (TNX-R-A), contact us for more details.

P.5

Long-lasting stable operation by the direct pressure type clamping mechanism

- Mold-friendly direct pressure clamping
- Stable clamping force always corresponding to what is on the setting
- Simple mechanism that sustains machine precision for a long time
- Clean mechanism
- Easy mold change & excellent maintainability
- High-rigidity die plate...Optimized die plate shape & tie bar diameter designed through structural analysis

Wide turntable by "3-tie bar"

- Larger maximum mold size
- Improved workability for mold installation
- Larger work area & its automation capability
- Installing core pull and cooling pipes on the turntable possible
- Servomotor driven "smooth & fast-rotation" turntable

Outstanding injection performance materialized by its simple & compact injection mechanism

P.4

- Wide-ranging injection from ultra-low to high speed
- Outstanding controllability & stability in ultra-low speed range (below 1mm/s)
- Quick injection response
- "High-pressure & long-sustained" injection holding pressure performance
- High-quality molding materialized by the feedback control
- Newly designed simple & compact injection unit
- Optimal screw & nozzle selections for different molding purposes
- Capable for LIM molding, such as liquid silicone rubber

Best Technology Award
(The Japan Society of Polymer Processing)
Energy-Conserving Machinery Award
(The Japan Machinery Federation)

Multi-functional controller TACT

P.7・P.8

- 90-degree swing type operation panel
- 12.1 inch color LCD touch panel screen
- Selector switch for excellent operability
- Screen tilt mechanism
- 6-language display in Japanese, English, Chinese, Spanish, Korean, and Thai provided as standard.
- Enriched product quality management function
- Loaded with practical molding support software
- Ladder programming function open to the users (effective for interfacing with peripherals & robots)

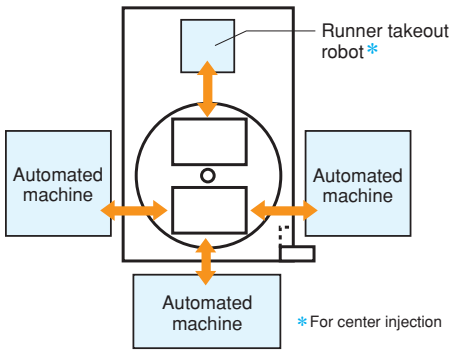
TNX50R5V
Turntable type/center injection
(Equipped with options)
* The machines shown in this catalog are made to the Japanese specifications.

Excellent workability & safety

- Front (operator side): phototube type safety device equipped as standard (full-open)
- Side safety cover: frameless full-open type ...easy access to the mold & its automation capability
- Low-floor mold mounting face (turntable) ...Lowering peripherals (automation robot) possible, improving maintainability

Compact design

- High-rigidity frame
- Compact bed without protruded object
- Arranging automated machines on three sides possible
- Entry of a runner takeout robot from non-operator side possible (a pedestal for takeout robot equipped as standard) *



Innovative hybrid pump system "X-Pump" equipped

P.3

- Outstanding injection performance
- Lower initial & running costs

The fusion of hydraulic control and servomotor drive technology

"X-Pump" Equipped Intelligent Hybrid

Hybrid type machines equipped with NISSEI original "X-Pump" offer well-balanced performance with its high-rigidity direct pressure clamping system, outstanding injection performance, durable & easy maintainability, and electric machine level of energy efficiency. NISSEI hybrid type machines will break throgh the concept of injection molding machines.

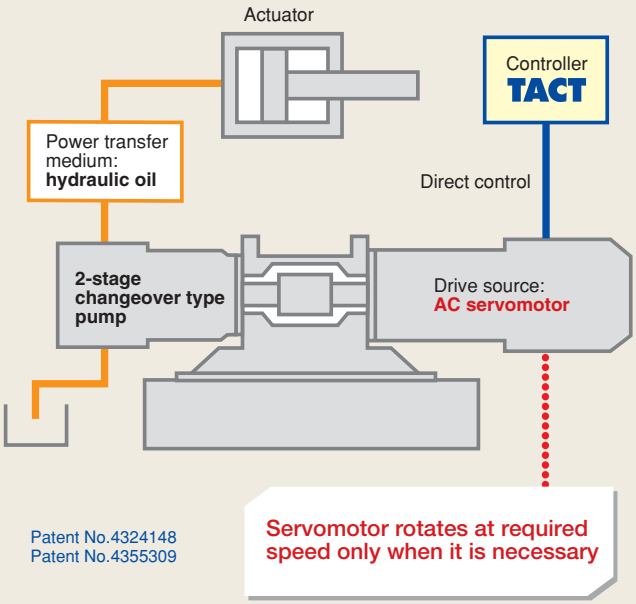
Illustration of "X-Pump" system

Hybrid pump system "X-Pump" is a combination of 2-stage type hydraulic pump and AC servomotor. The servomotor rotates at required speed only when it is necessary to control output volume and pressure of the hydraulic oil.

◎Substantial energy-saving is possible since the motor is at rest during unloading.

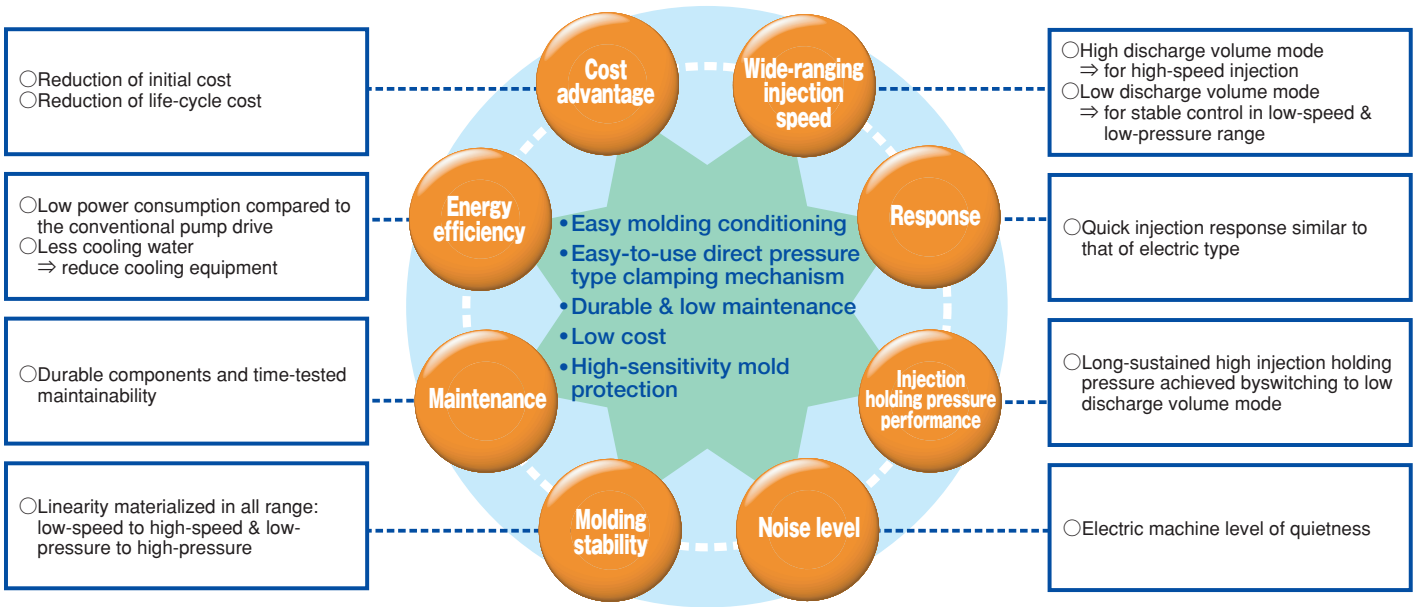
◎Injection control mode changeover permits wide-ranging injection from ultra low-speed to high-speed.

◎Injection holding pressure state can be sustained longer with higher pressure than that of electric machines.



Patent No.4324148
Patent No.4355309

Advantages of "X-Pump" equipped machines



Promoting High-Precision Stable Molding

Wide-ranging injection

By switching the discharge volume of a hydraulic pump whenever necessary to correspond to the molding conditions, it materializes outstanding controllability in wide-range of injection speed and pressure.

- It requires no special hydraulic circuit, such as accumulator, and high-speed injection can be achieved with a standard system.
- It is up to 2.5 times faster than that of conventional machines

  >>> excellent for products with large fluidity length and thin-wall products.

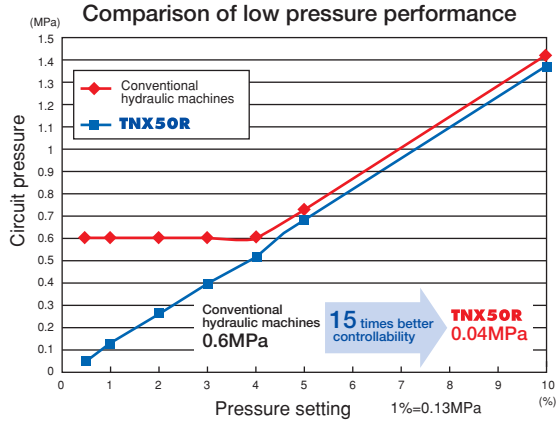
Comparison of injection velocities: center injection

Injection type	Conventional hydraulic machine	TNX Series
5V	117mm/s (4.6 in/s)	300mm/s (11.8 in/s)
9V	107mm/s (4.2 in/s)	200mm/s (7.9 in/s)
12V	88mm/s (3.5 in/s)	160mm/s (6.3 in/s)
18V	99mm/s (3.9 in/s)	160mm/s (6.3 in/s)
25V	86mm/s (3.4 in/s)	110mm/s (4.3 in/s)

Outstanding stability in ultra-low speed and low pressure range

Its servomotor-driven pump permits low-flow volume control, and the feedback control is capable in precisely controlling the "velocity setting below 1mm/s," which is impossible to achieve with the conventional hydraulic machines. In addition, controllability in ultra-low pressure range has been improved significantly.

>>> This is also ideal for thick-wall product and hot melt (low-pressure encapsulation) moldings.



Improved injection response

Quicker injection response time (injection rise time to reach the maximum velocity) is materialized by the X-Pump.
Its mechanism possesses simplicity and compactness of hydraulic machines and achieves high response.

For TNX50R5V...

Max. injection velocity **300mm/s (11.8 in/s)**

▼

Rise time **60ms**

Twice as fast as conventional machines

Long-sustainable injection pressure

X-Pump equipped machines can perform "holding of high injection pressure for a long time," which is difficult to achieve with the electric machines.

>>> excellent for quality improvement of thick-wall products.

Long-Lasting Stable Operation of Direct Pressure Clamping

Long-lasting stable operation of "direct pressure type" clamping mechanism

★Direct pressure type clamping mechanism has the following advantages over the toggle types:

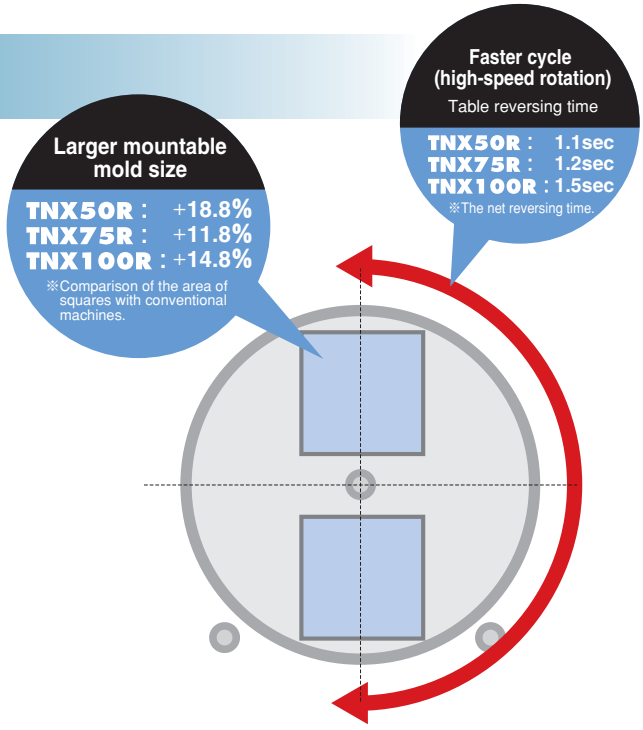
- Even distribution of clamping force to the mold.
- Resistant to temperature change of the mold and clamping mechanism, generating consistent clamping force according to the setting.
- Easy to set optimal (low) clamping force friendly to the mold & machine.
- Simple mechanism that maintains machine precision for a long time.
- Clean mechanism.
- Easy maintainability.
- Simple mold thickness adjustment and easy mold change.

Wide turntable by "3-Tie Bar"

●Mountable maximum mold dimensions became larger, accommodating larger mold due to intricate shape of the products or mold with a slide core. Please consider the possibility of using machine with one-class smaller clamping force, but be able to fit a larger mold.

●Wider work area around the turntable is secured. It excels in workability for mold setup/change and flexibly accommodates automated systems, such as a robot.

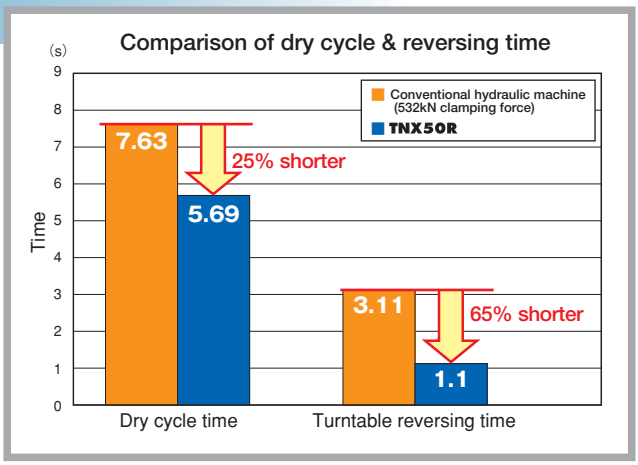
●Its low-height turntable (mold mounting face) offers better workability and operability. In addition, the installation height of automated devices will be lowered, permitting better maintainability.



Faster cycle by the servomotor drive

●Turntable rotation and ejector motion are driven by servomotor. Faster-yet-smooth (low-vibration) rotation and simultaneous motion of injection/metering & ejection are possible, achieving faster cycle.

●High-precision rotational positioning mechanism is equipped. Insert positioning error by a robot and product takeout error can be solved.



Reduction of Initial & Running Costs

●Reduction of power consumption

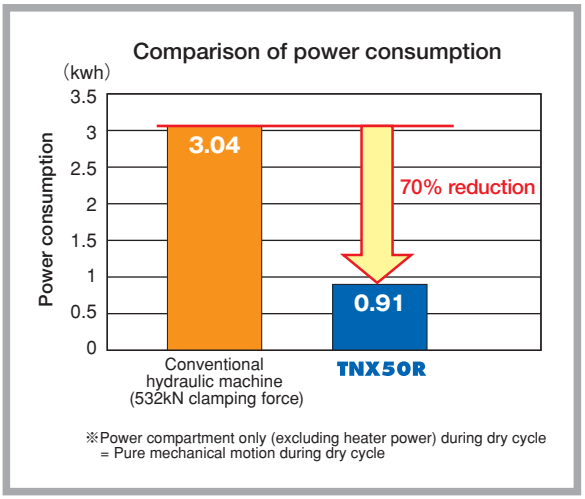
Since the X-Pump's servomotor rotates at required speed only when it is necessary, it is extremely efficient. According to the comparison of dry cycle in power compartments, TNX50R achieves 70% of significant energy efficiency compared to the conventional hydraulic types.

●Reduction of hydraulic oil and cooling water

For highly energy-efficient X-Pump, rise in oil temperature is minimum, and reducing amounts of cooling water for oil cooler and hydraulic oil are possible. The amount of hydraulic oil required is up to 25% less than that of conventional machines.

●Durable components

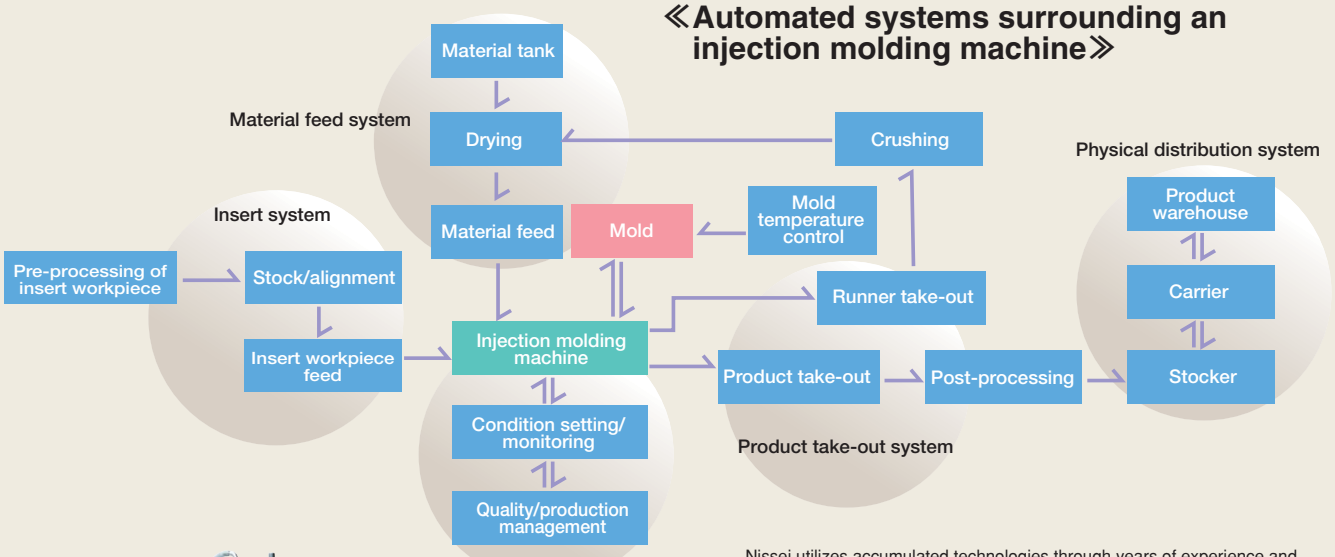
NISSEI has abundant experience in time-tested hydraulic machines.



※Power compartment only (excluding heater power) during dry cycle
= Pure mechanical motion during dry cycle

Suggesting Optimization of Vertical Injection Molding System

≪Automated systems surrounding an injection molding machine≫



Nissei utilizes accumulated technologies through years of experience and numerous achievements in the field of injection molding to offer optimal systems of higher values. Nissei will satisfy diverse needs in rationalizing production process and pioneering new fields.

〈Example of automated molding system〉

≪Capability in liquid silicone rubber molding≫

It is possible to install liquid silicone rubber (LSR) injection unit on to TNX machines. TNX Series, which excels in low-velocity & low-pressure injection control, demonstrates its power in a variety of LIM moldings.
Please contact us for more details.

NISSEI Electronic Controller

TACT

Human-machine interface

- Bright and easy-to-see 12.1 inch color LCD.
- Setting via high-response & high-resolution touch panel.
- Tilt mechanism that allows the adjustment of screen angle according to the operator's height.
- Selector switch method carried over from its predecessor to reduce operation errors and ensure excellent operability.

90-degree swingable operation box

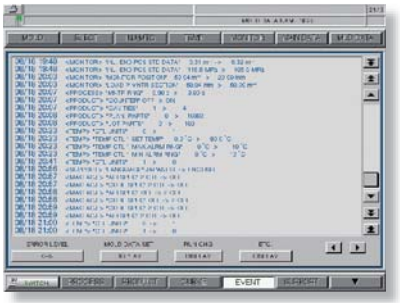
Reinforced quality management functions (improved product quality judgement function)

- A maximum of 8 items can be selected arbitrarily from 38 molding monitor items.
- The statistics of molding monitoring data can be set as the product quality judgement condition.
- Scatter diagram automatic analysis & DLA-lite (wave analysis) functions support to quantize the molding condition.

Satisfying maintenance functions

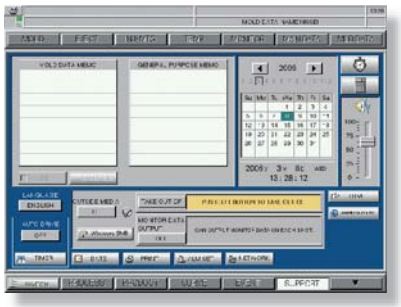
- 1,000 items of operation history can be displayed and is useful for maintenance and quality management (operation mode change, condition
- It comes with various enriched automatic purging motion.
- Alert (notification) function displays optional messages, such as mold and screw maintenance, on a specified day (shot).
- TACT screen can remotely be controlled by a PC via LAN or phone line.

Monitor screen

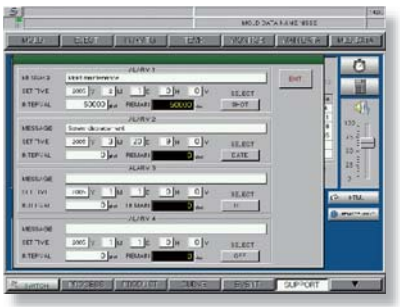


Event

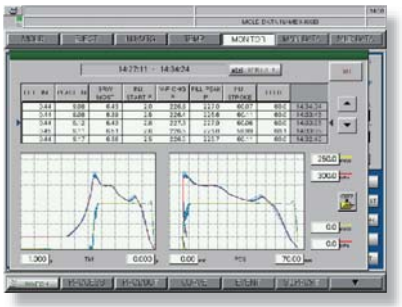
Scatter diagram (monitor data correlation check)



Support functions (calculator, timer, calendar, remote maintenance, etc.)



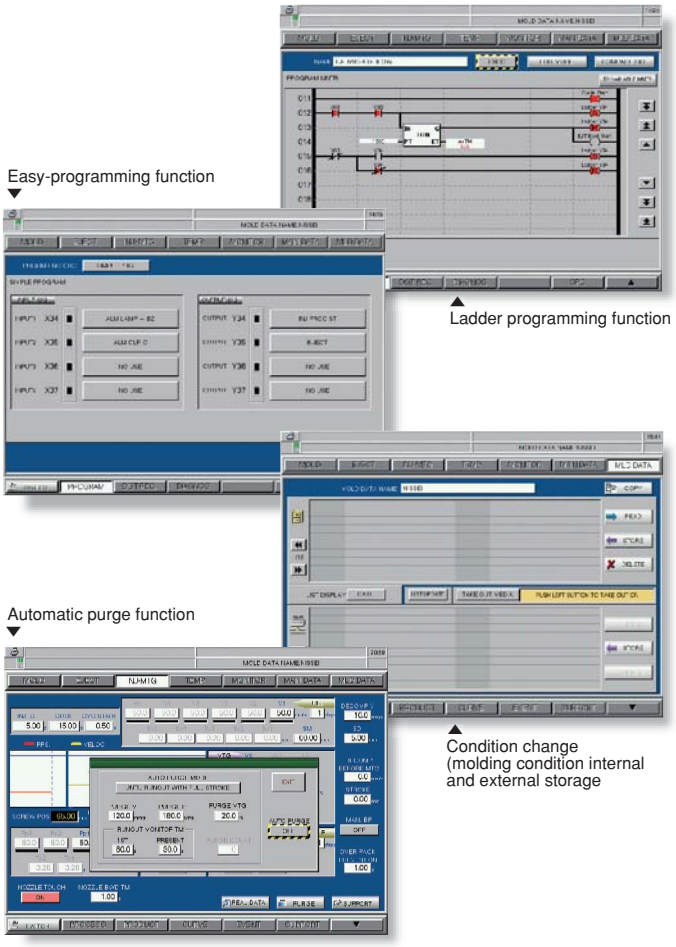
Alert (notification) function
Optional message can be entered



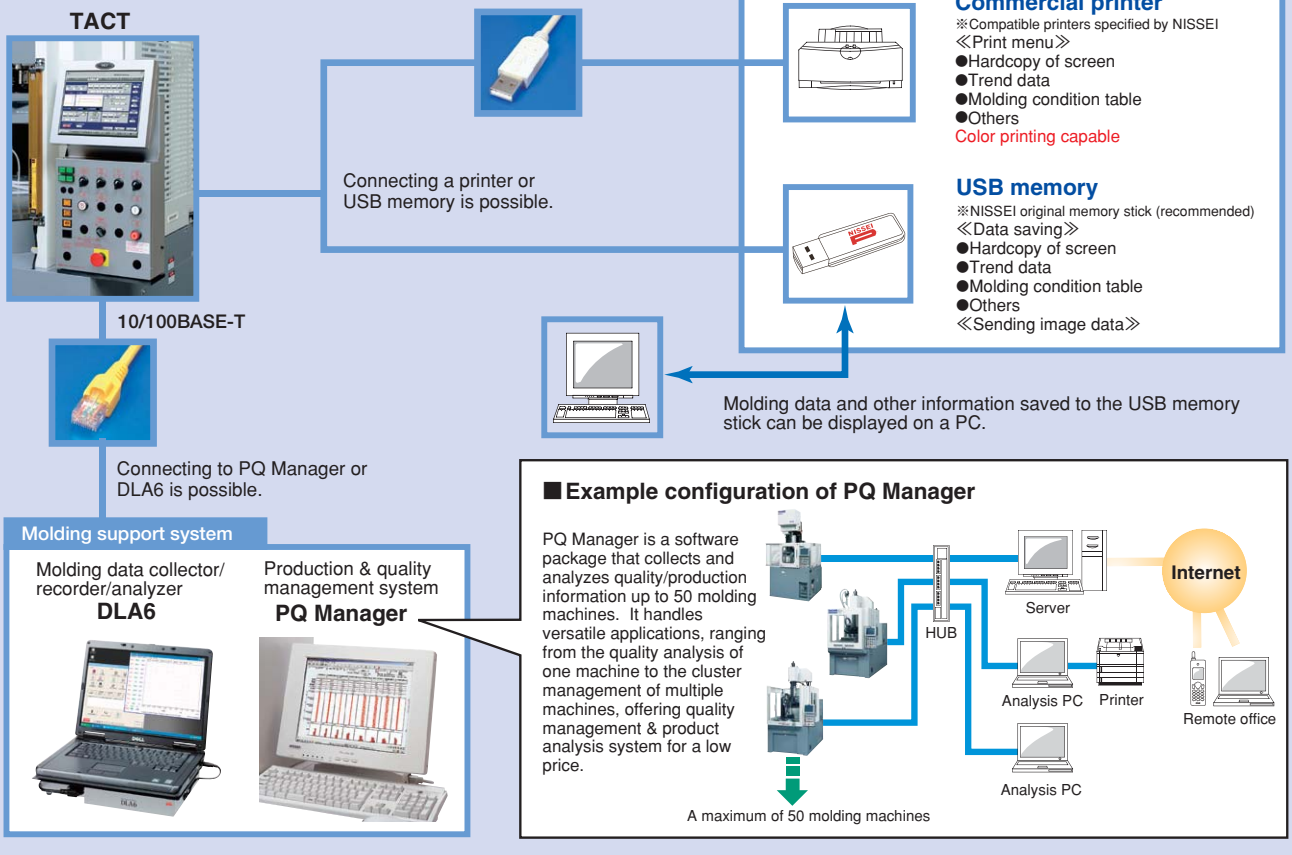
Wave analysis (DLA-lite function)

Satisfying functions and equipments ... loaded with "useful software"

- Ladder programming function and easy-programming function available to the users.
  - ⇒ Simple interface programs can freely be created by the ladder programming function.
  - ⇒ Easy-programming function (4-channel I/O) assigns error processing input and signal output.
- 6-language display in Japanese, English, Chinese, Spanish, Korean, and Thai provided as standard.
- Internal storage of maximum 300 molding conditions.
- USB memory (optional) used as an external memory device.
  - ⇒ It can store molding conditions (max. 300) and waveform data as well as transferring image data, permitting the management of molding condition with a corresponding image of molded product.
- Simultaneous heating of the nozzle and barrel that prevents carbonization and deterioration of resin in the nozzle.
- USB port provided as standard.
  - ⇒ Connecting a commercial printer (type specified) or external memory device (USB memory) is possible.
- LAN port provided as standard.
  - ⇒ It allows the connection to quality/production management system PQ Manager, molding data recorder/analyzer DLA6, and PC.



TACT interface



Models			TNX50R						TNX75R					
Specification item		Unit	5V			9V			9V			12V		
Injection	Screw diameter	inch mm	0.87 22	1.02 26	1.18 30	1.10 28	1.26 32	1.42 36	1.10 28	1.26 32	1.42 36	1.26 32	1.42 36	1.57 40
	Injection capacity	inch³ cm³ oz	2.1 35 1.2	3.0 49 1.6	4.0 65 2.2	4.2 69 2.3	5.5 90 3.0	7.0 114 3.8	4.2 69 2.3	5.5 90 3.0	7.0 114 3.8	6.1 100 3.4	7.7 127 4.3	9.6 157 5.3
	Plasticizing capacity [PS]	lbs/h kg/h	30.9 14	44.1 20	66.1 30	39.7 18	59.5 27	79.4 36	39.7 18	59.5 27	79.4 36	50.7 23	70.5 32	97.0 44
	Injection pressure	psi MPa (kgf/cm²)	37120 256 (2610)	26590 183 (1870)	19980 138 (1405)	35410 244 (2490)	27020 187 (1900)	21330 147 (1500)	35410 244 (2490)	27020 187 (1900)	21330 147 (1500)	32850 226 (2310)	25950 179 (1825)	21050 145 (1480)
	Injection rate	inch³/s cm³/s	7.0 114	9.7 159	12.9 212	7.5 123	9.8 161	12.4 203	7.5 123	9.8 161	12.4 203	7.9 129	9.9 163	12.3 201
	Injection velocity	inch/s mm/s	11.8 300			7.9 200			7.9 200			6.3 160		
	Screw speeds	rpm	0～300			0～200			0～200			0～170		
	Nozzle touch force	US tons kN (tf)	2.0 18(1.8)			2.7 24(2.4)			2.7 24(2.4)			2.7 24(2.4)		
	Hopper capacity [optional]	Gal L	2.6 10			4.0 15			4.0 15			4.0 15		
Clamping	**Clamping force**	**US tons kN (tf)**	**59 523(53)**			**59 523(53)**			**85 754(77)**			**85 754(77)**		
	Clamping stroke	inch mm	9.8 250			9.8 250			9.8 250			9.8 250		
	Min. mold thickness	inch mm	6.7 170			6.7 170			7.9 200			7.9 200		
	Max. daylight opening	inch mm	16.5 420			16.5 420			17.7 450			17.7 450		
	Die plate dimensions [H×V]	inch mm	21.7×15.7 550×400			21.7×15.7 550×400			23.6×18.1 600×460			23.6×18.1 600×460		
	Min. mold dimensions [H×V]	inch mm	9.3×9.3 235×235			9.3×9.3 235×235			11.0×11.0 280×280			11.0×11.0 280×280		
	Max. mold dimensions [H×V]	inch mm	14.3×14.3 364×364			14.3×14.3 364×364			16.7×16.7 423×423			16.7×16.7 423×423		
	Ejector stroke	inch mm	2.0 50			2.0 50			2.0 50			2.0 50		
	Ejector force	US tons kN (tf)	2.2 20(2.0)			2.2 20(2.0)			2.2 20(2.0)			2.2 20(2.0)		
	Turntable diameter	inch mm	40.6 1030			40.6 1030			47.6 1210			47.6 1210		
	Max. mold weight [bottom mold]	lbs kg	551×2 250×2 (2 mold halves)			551×2 250×2 (2 mold halves)			551×2 250×2 (2 mold halves)			551×2 250×2 (2 mold halves)		
Electrical & others	Pump motor	kW	11			15			15			15		
	Heater band capacity	kW	3.77	4.22		6.23			6.23			7.43		
	Main breaker capacity	A	60			60			60			60		
	Hydraulic oil quantity	Gal L	40 150			40 150			50 170			50 170		
	Machine dimensions [L×W×H]	inch m	105.7×62.8×115.7 2.68×1.59×2.94	105.7×62.8×117.7 2.68×1.59×2.99		105.7×62.8×133.5 2.68×1.59×3.39			109.6×66.7×135.2 2.78×1.69×3.43			109.6×66.7×141.1 2.78×1.69×3.58		
	Floor dimensions [L×W]	inch m	100.4×48.8 2.55×1.24			100.4×48.8 2.55×1.24			104.3×52.8 2.65×1.34			104.3×52.8 2.65×1.34		
	Machine weight	lbs t	8378 3.8			8818 4.0			9700 4.4			9921 4.5		

- Weight per shot is 95% of theoretical value. (GPPS)
- Actual plasticization capacity may vary, depending on material used and molding conditions.
- Main breaker capacity includes standard extra electrical outlet (20A).
- Machine dimensions, floor dimensions, and machine wights are approximate values.
- Specifications are subject to change without notice due to performance upgrade.
- For parting injection type (TNX-R-A), contact us for details.

※1MPa=10.2kgf/cm²≒10kgf/cm², 1kN=0.102tf≒0.1tf

	TNX100R						TNX150R						TNX220R		
	12V			18V			18V			25V			25V		
	1.26 32	1.42 36	1.57 40	1.42 36	1.57 40	1.77 45	1.42 36	1.57 40	1.77 45	1.57 40	1.77 45	1.97 50	1.57 40	1.77 45	1.97 50
	6.1 100 3.4	7.7 127 4.3	9.6 157 5.3	9.0 147 4.9	11.1 182 6.1	14.1 231 7.7	9.0 147 4.9	11.1 182 6.1	14.1 231 7.7	12.3 201 6.7	15.5 254 8.5	19.2 314 10.5	12.3 201 6.7	15.5 254 8.5	19.2 314 10.5
	50.7 23	70.5 32	97.0 44	94.8 43	130 59	176 80	94.8 43	130 59	176 80	97.0 44	132 60	176 80	97.0 44	132 60	176 80
	32850 226 (2310)	25950 179 (1825)	21050 145 (1480)	32280 222 (2270)	26170 180 (1840)	20690 142 (1455)	32280 222 (2270)	26170 180 (1840)	20690 142 (1455)	34520 238 (2430)	27270 188 (1920)	22050 152 (1550)	34520 238 (2430)	27270 188 (1920)	22050 152 (1550)
	7.9 129	9.9 163	12.3 201	9.9 163	12.3 201	15.5 254	9.9 163	12.3 201	15.5 254	8.4 138	10.7 175	13.2 216	8.4 138	10.7 175	13.2 216
	6.3 160			6.3 160			6.3 160			4.3 110			4.3 110		
	0～170			0～240			0～240			0～170			0～170		
	2.7 24(2.4)			3.1 27(2.8)			3.1 27(2.8)			3.4 30(3.1)			3.4 30(3.1)		
	4.0 15			4.0 15			4.0 15			5.3 20			5.3 20		
	115 1026(105)			115 1026(105)			165 1469(150)			165 1469(150)			242 2156(220)		
	9.8 250			9.8 250			9.8 250			9.8 250			14.6 370		
	11.8 300			11.8 300			13.8 350			13.8 350			13.8 350		
	21.7 550			21.7 550			23.6 600			23.6 600			28.3 720		
	27.6×20.1 700×510			27.6×20.1 700×510			30.7×23.6 780×600			30.7×23.6 780×600			33.5×26.4 850×670		
	12.0×12.0 305×305			12.0×12.0 305×305			13.4×13.4 340×340			13.4×13.4 340×340			15.4×15.4 390×390		
	18.3×18.3 465×465			18.3×18.3 465×465			19.2×19.2 488×488			19.2×19.2 488×488			22.0×22.0 559×559		
	2.0 50			2.0 50			3.1 80			3.1 80			3.1 80		
	2.2 20(2.0)			2.2 20(2.0)			2.2 20(2.0)			2.2 20(2.0)			3.9 35(3.6)		
	52.0 1320			52.0 1320			59.1 1500			59.1 1500			63.0 1600		
	882×2 400×2 (2 mold halves)			882×2 400×2 (2 mold halves)			992×2 450×2 (2 mold halves)			992×2 450×2 (2 mold halves)			1764×2 800×2 (2 mold halves)		
	15			15			20			20			20		
	7.43			8.78			8.78			11.3			11.3		
	60			60			75			100			100		
	53 200			53 200			63 240			63 240			132 500		
	115.6×70.3×147.2 2.93×1.79×3.74			115.6×70.3×156.7 2.93×1.79×3.98			129.7×77.0×161.0 3.29×1.95×4.09			129.7×77.0×157.1 3.29×1.95×3.99			141.5×84.8×175.2 3.59×2.15×4.45		
	110.2×56.3 2.80×1.43			110.2×56.3 2.80×1.43			125.6×63.0 3.19×1.60			125.6×63.0 3.19×1.60			137.4×77.2 3.49×1.96		
	12125 5.5			12787 5.8			18739 8.5			21605 9.8			24251 11.0		

Environment for Operating Injection Molding Machines

In order to protect the controller and electronic components, please DO NOT operate the machine under these conditions listed below:

- Ambient temperature range other than between 0~40℃ (20~30℃ recommended)
- A place with humidity above 85%RH or where condensation occurs due to rapid change in ambient temperature
- A place filled with fine particles and dust
- Oil mist floating environment
- Under direct sunlight
- High-electric and high-magnetic field environment
- A place filled with caustic, explosive, or combustible gasses
- Outdoor or near outdoor environment

＊The values in the table may differ, depending on the molding conditions, ancillary equipments, and other environmental factors.

Model	TNX50R5V	TNX50R9V	TNX75R9V	TNX75R12V
Power supply	3-phase AC230V 60Hz		3-phase AC230V 60Hz	
Main power breaker capacity	60A		60A	
Size of primary-side power cable	14mm^2		14mm^2	
Size of primary-side power terminal screw	M8		M8	
Size of grounding cable	22mm^2 or more		22mm^2 or more	
Size of grounding terminal screw	M8		M8	
Heater band capacity	3.77kW(φ22) 4.22kW(φ26・30)	6.23kW	6.23kW	7.43kW
Required amount of cooling water for hopper throat	0.8L/min	1.2L/min	1.2L/min	
Required amount of cooling water for hydraulic oil	10L/min		15L/min	
Standard amount of cooling water for mold	5L/min	10L/min	10L/min	
Air consumption	0.5 × number of shots per minutes L/min (ANR)		0.5 × number of shots per minutes L/min (ANR)	

Model	TNX100R12V	TNX100R18V	TNX150R18V	TNX150R25V
Power supply	3-phase AC230V 60Hz		3-phase AC230V 60Hz	
Main power breaker capacity	60A		75A	100A
Size of primary-side power cable	14mm^2		22mm^2	38mm^2
Size of primary-side power terminal screw	M8		M8	
Size of grounding cable	22mm^2 or more		22mm^2 or more	
Size of grounding terminal screw	M8		M8	
Heater band capacity	7.43kW	8.78kW	8.78kW	11.3kW
Required amount of cooling water for hopper throat	1.2L/min	1.8L/min	1.8L/min	
Required amount of cooling water for hydraulic oil	15L/min		15L/min	
Standard amount of cooling water for mold	10L/min		10L/min	
Air consumption	0.5 × number of shots per minutes L/min (ANR)		0.5 × number of shots per minutes L/min (ANR)	

Model	TNX220R25V
Power supply	3-phase AC230V 60Hz
Main power breaker capacity	100A
Size of primary-side power cable	38mm^2
Size of primary-side power terminal screw	M8
Size of grounding cable	22mm^2 or more
Size of grounding terminal screw	M8
Heater band capacity	11.3kW
Required amount of cooling water for hopper throat	1.8L/min
Required amount of cooling water for hydraulic oil	15L/min
Standard amount of cooling water for mold	10L/min
Air consumption	0.5 × number of shots per minutes L/min (ANR)

＊ Power breaker and power supply sizes are for standard specifications, including extra AC200V outlet. It is based on the allowable current when triple core cable or electrical conduit is used in the ambient temperature of 30℃.

＊ Supply pressure for cooling water should be 0.2～1.0MPa.

＊ Amount of cooling water for mold is a standard value and may vary depending on the usage and mold temperature.

＊ Air is for a mechanical type clamping safety device. Please supply the pressure of 0.5MPa. ANR of consumption amount indicates the standard atmospheric condition (temperature 20℃, absolute pressure 0.1MPa, relative humidity 65%).

TNX SERIES | Main Equipment List

[Standard Equipment]

Clamping unit/mold

1	High-sensitivity mold protection (monitoring of low-pressure clamping time)
2	Mold close halfway slowdown (three-plate & angular pin mold possible)
3	Clamping pressure fill-closed control
4	Mold open/close prediction control (for improving precision of mold open stop & low-pressure mold close changeover positions)
5	High-pressure clamping force setting unit: kN (display in tonf and % optionally available)
6	Ejector plate return confirmation (terminal output of bottom mold 1 & 2 input signals)
7	Multi-functional ejector (ejector start timer, pause, halfway change of velocity, 2-stage forward speed, and variable forward/backward stroke)
⑧	Switching of one-piece mold and two-piece mold molding (selection of the bottom mold type: one-piece or two-piece bottom mold)
⑨	Simultaneous mold close & ejection (simultaneous motion of mold close & ejection for two-piece mold)

Injection unit

1	Injection process control: 6-speed/3-pressure
2	V-P changeover: 4 modes (position, injection pressure, injection velocity, and external input signals)
3	Injection start timer (hot runner capable)
4	Injection/metering full-closed control (injection velocity, pressure, metering rotation speed, and back pressure
5	Injection control changeover (control mode: standard & high-speed)
6	Holding pressure response changeover: 3 modes (fast, normal, and slow)
7	Over packing prevention circuit
8	Decompression / decompression before metering
9	Back pressure & metering speed: 3-speed
10	Nozzle backward start timer / metering start timer
11	Injection position setting unit: mm (display in inch and cm^3 optionally available)
12	Injection velocity setting unit: mm/s (display in %, cm^3/s, and inch/s optionally available)
13	Injection pressure and back pressure setting unit: MPa (display in kgf/cm^2, psi, and % optionally available)
14	Metering velocity setting unit: rpm (display in % and g/s optionally available)
15	Automatic purge unit
16	Purging cover (with interlock)
17	Screw cold-start prevention (time difference system in all zones)
18	Nozzle & barrel temperature upper limit alarm
19	Nozzle & barrel temperature PID control / nozzle and barrel simultaneous heating
20	Screen display of hopper throat temperature
21	Nozzle & barrel heater circuit: SSR control (barrels up to 36A and 36V provided as standard)
22	Nozzle & barrel heat retention circuit (forced and emergency heating)
23	Pre-compression
24	Screw change mode / screw forward safety circuit

Molding system control/production management

1	Shot counter / free shot counter
2	Production management counter / production lot management counter (signal output optional) / defective category counter
3	Monitor display / statistical processing function / scatter diagram display / waveform analysis
4	Product discrimination function / batch entry of acceptance level conditions
5	Product take-out robot interface
6	Calendar timer (hydraulic oil and barrel heating)
7	Molding condition internal memory (up to 300 conditions) / image file management of molding conditions
8	Built-in LAN port (10/100BASE-TX) / connection to PC
9	USB port / date saving in an external memory (USB drive)
10	Printer function
11	Display of injection velocity & pressure waveform
12	Operation history display: 1,000 items
13	Molding support message
14	Six-language multilingual display: Japanese, English, Chinese, Spanish, Korean, and Thai
15	SPC function
16	Hour meter / clock function / calculator
17	Ladder programming function / I/O function assignment
18	Alert (informing) function (effective for mold & screw maintenances)
19	Signal recorder / servomotor load monitor
20	Error display function / emergency power shut off / cycle alarm
21	Material accumulation prevention function
22	Remote maintenance

Cooling/hydraulic oil

1	Cooling water manifold
2	Cooling water filter
3	Cooling water circuit (with a return stop valve)
4	Cooling water circuit (with a flow checker)
5	Oil temperature stabilizer
6	Hydraulic oil heating
7	Hydraulic oil upper & lower limit alarm / low oil level alarm

Operation safety

1	Alarm lamp / alarm bell
2	Emergency stop button
3	Mold clamping safety device (mechanical & electric types)
④	Safety light curtain (photoelectric safety device)
⑤	Side door type safety cover (with interlock)
⑥	Next cycle activation circuit
⑦	Mold area access permission lamp
8	Password protected molding data

Power

1	Main power breaker

Maintenance, installation, and miscellaneous

1	Manual centralized lubricating unit (for clamping slide) / manual centralized greasing unit (rotating parts and elector ball screw)
2	SAT clamp
3	Tools

[Optional Specifications]

Clamping unit/mold

①	Daylight extension*
2	Locating ring attachment (non-fixed type) or locating ring assembly (fixed type)* (center injection only)
3	Locating ring diameter change* (center injection only)
④	Insulation plate
⑤	Additional mold mounting bolt hole*
6	Mold close pause
7	Mold open pause
⑧	Downward ejector (installed on both sides of the top of movable platen for upper mold)
⑨	Ejector plate return confirmation (for metal interface box)
⑩	Mold temperature control or mold temperature indicator (display on the screen)
11	Mold temperature upper & lower limit alarm
12	Mold heater disconnection alarm

Injection unit

1	Nozzle & barrel heater disconnection alarm
2	Hopper throat temperature control
③	2-point nozzle temperature control
4	Barrel insulation cover
5	High-temperature resistant barrel (pre-arrangement necessary)*
⑥	Abrasion & corrosion proof barrel and screw*
7	Special-purpose barrel and screw*
8	Hydraulic shut off nozzle* or spring shut off nozzle*
⑨	Extended nozzle (length to be specified)
⑩	Heat retaining nozzle
11	Nozzle for connectors (low-volume LCP, etc.)
12	Hopper
13	Hopper slider / hopper magnet

Molding system control/production management

1	Unscrewing
2	Air blow
3	Hydraulic core pull
④	Runner discharge conveyer
⑤	I/O signal for automated machine
6	Calendar timer (additional electrical outlet activation)
7	USB memory
8	Printer (commercial printers can be connected. Models are specified.)
9	Water alarm / air alarm
⑩	Two injection condition capability (low-pressure clamping (position & pressure), VP changeover position, injection holding pressure/individual setting of injection conditions for mold 1 & 2 possible)

Cooling/hydraulic oil

1	Additional cooling water circuit
2	Temperature control hosing for high temperature mold
3	Water temperature gauge
4	Hydraulic oil purifier

Operation safety

1	Alarm lamp with a stand
②	Rotating beacon (Patlite) or layered indicator lamp (signal tower)
③	Side-opening type safety door
④	Automatic side-opening type safety door
⑤	Both-hand push start button switch

Power

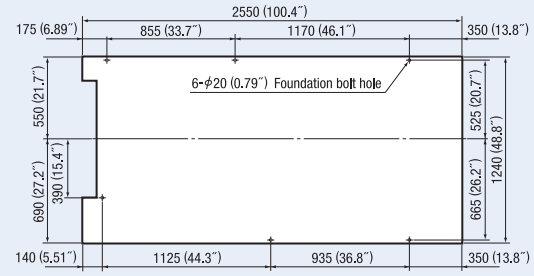
1	Main power leakage breaker
②	Built-in electrical outlet
3	Outlet circuit power shut-down

Maintenance, installation, and miscellaneous

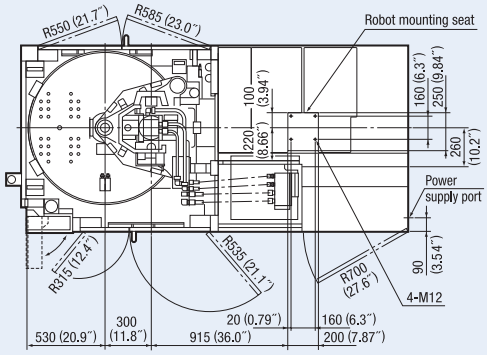
1	Automatic centralized lubricating unit (for clamping slide) / automatic centralized greasing unit (rotating parts and elector ball screw)
2	Easy clamp
3	Automatic mold clamp*
4	Mold positioning pin & block*
⑤	Mold mounting step
⑥	Custom color paint (contact us for the painting area)*
7	Mounting pad

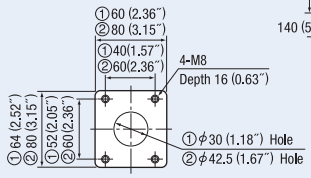
Please check encircled numbers since these are peculiar to vertical molding machines.
The delivery time for * specifications may take longer. Contact us for more details.

EXTERNAL VIEW



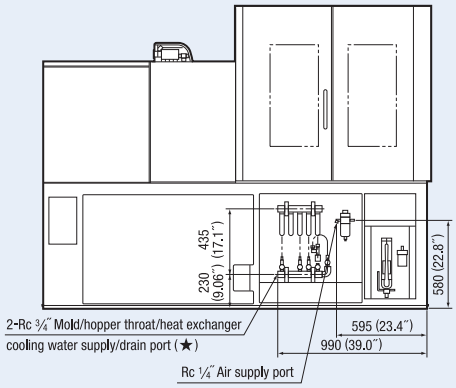
Foundation diagram

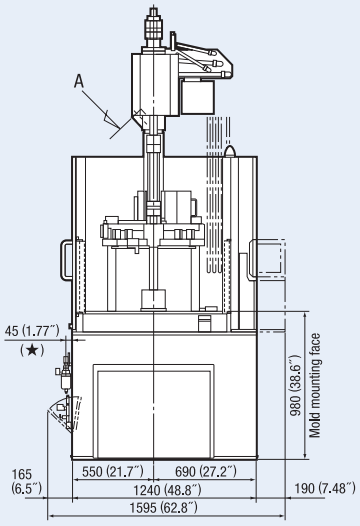


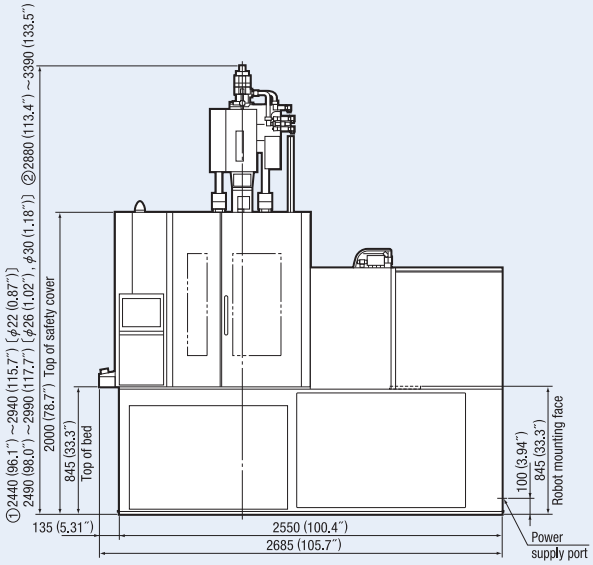


Hopper fixation diagram (View A)

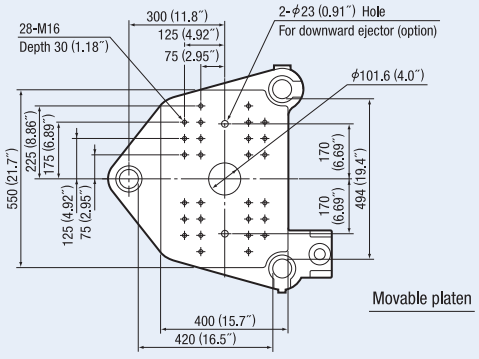
* In order to prevent material clogging and ensure stable plasticization, please use the shortest possible pipe to the hopper mounting section when a glass tube hopper (auxiliary equipment) is being used.



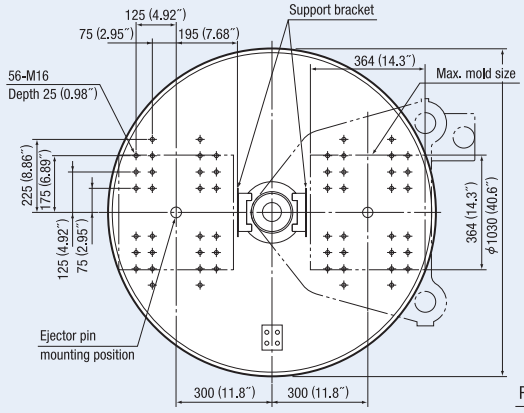




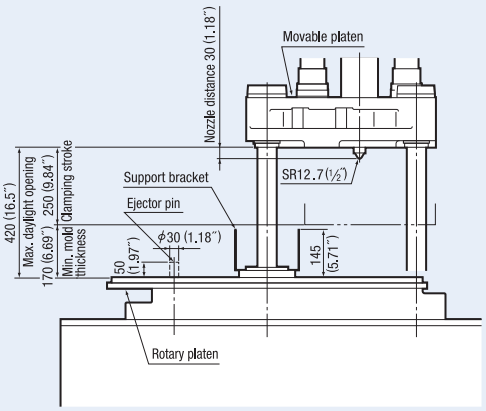
MOLD ATTACHMENT DIAGRAM



Movable platen

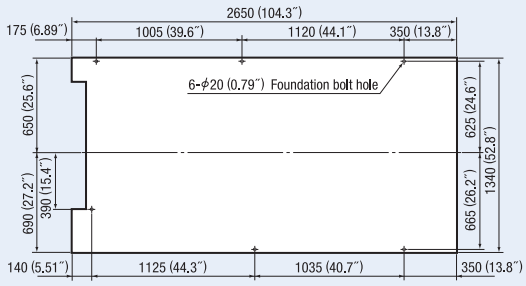


Rotary platen

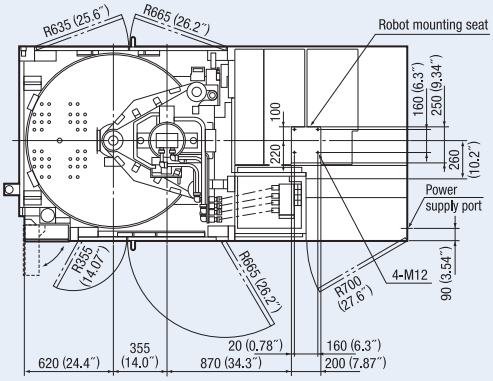


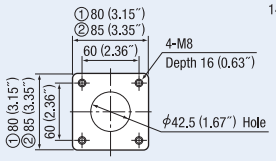
* The maximum weight for the bottom mold is 250kg (551 lbs) × 2 mold halves.
* The minimum mold dimensions of 235 (9.3") × 235 (9.3") are required in order to endure the maximum clamping force.

EXTERNAL VIEW



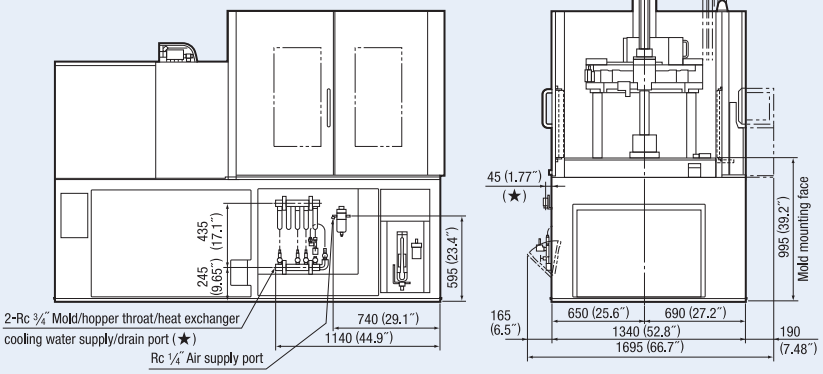
Foundation diagram

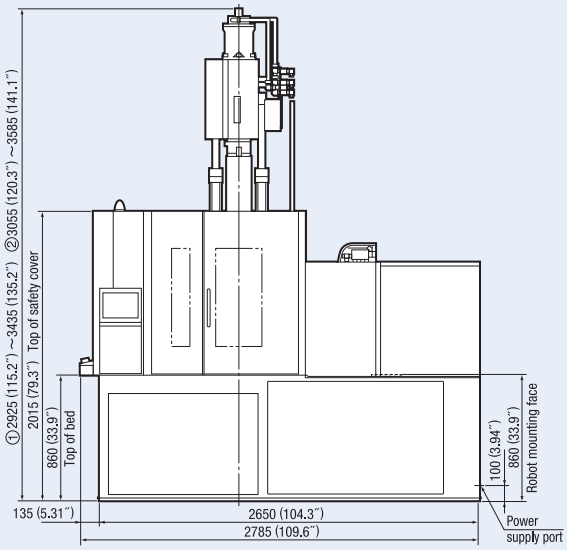




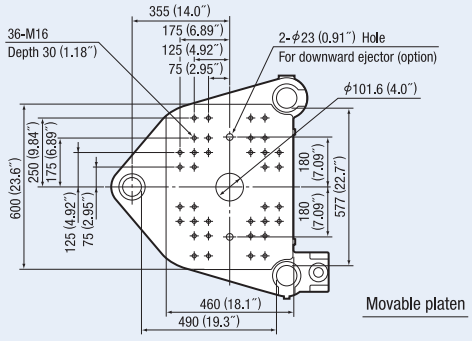
Hopper fixation diagram (View A)

* In order to prevent material clogging and ensure stable plasticization, please use the shortest possible pipe to the hopper mounting section when a glass tube hopper (auxiliary equipment) is being used.

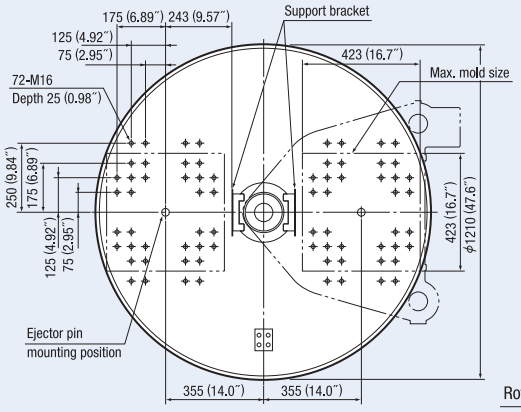




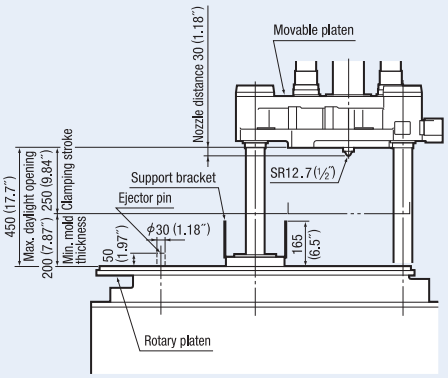
MOLD ATTACHMENT DIAGRAM



Movable platen

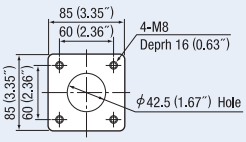


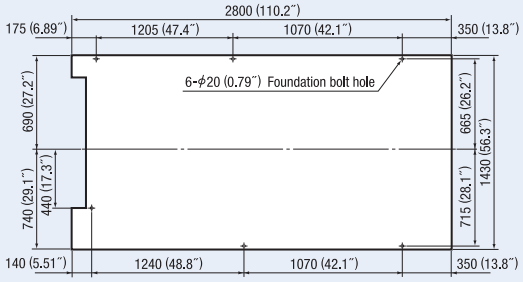
Rotary platen

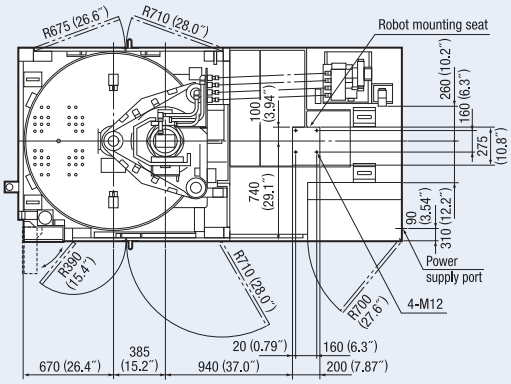


* The maximum weight for the bottom mold is 250kg (551 lbs) × 2 mold halves.
* The minimum mold dimensions of 280 (11.0") × 280 (11.0") are required in order to endure the maximum clamping force.

EXTERNAL VIEW



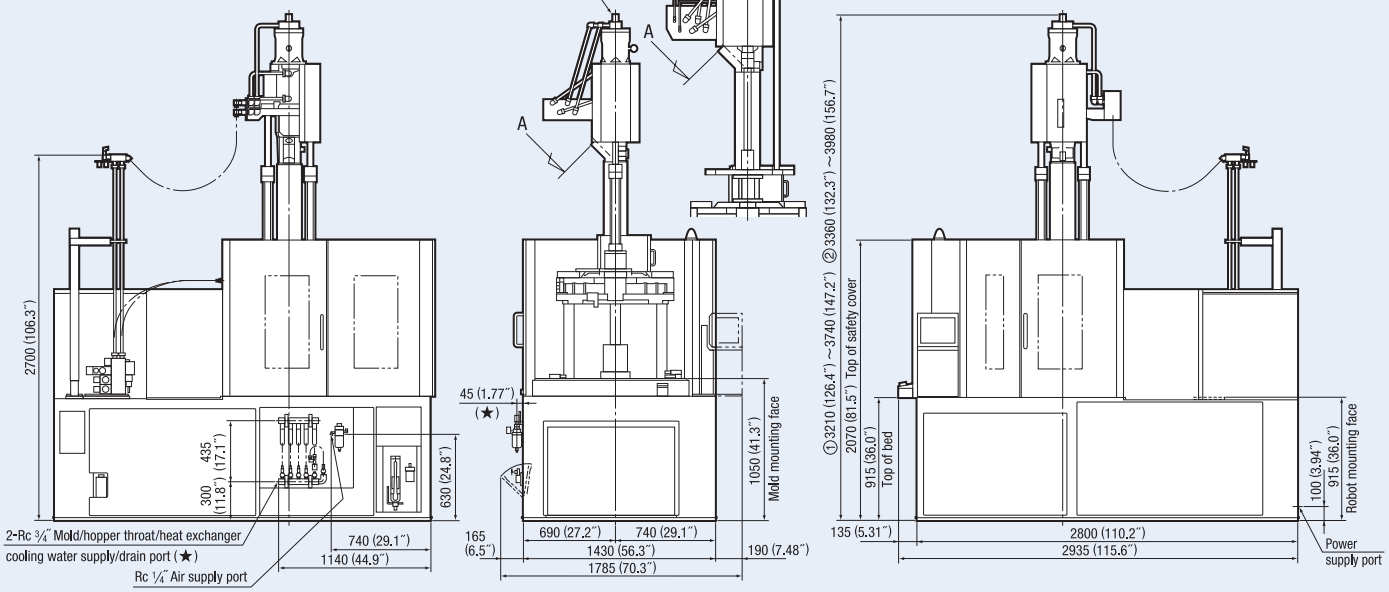




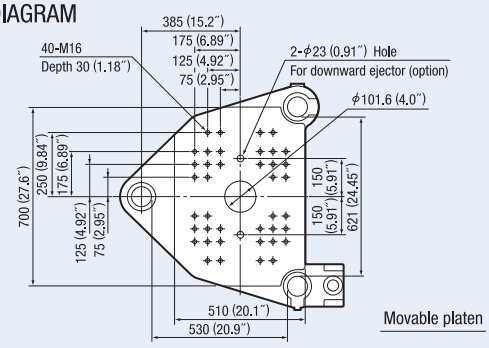
Hopper fixation diagram (View A)

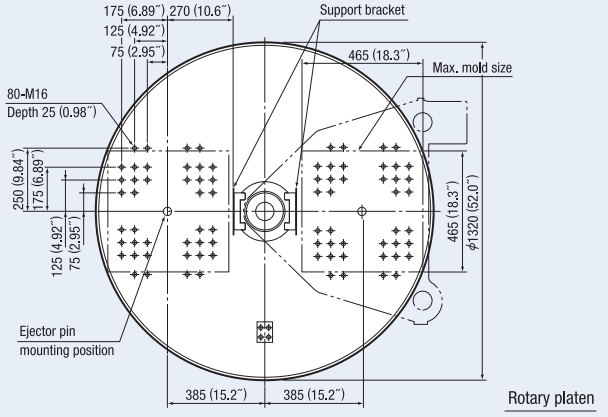
*In order to prevent material clogging and ensure stable plasticization, please use the shortest possible pipe to the hopper mounting section when a glass tube hopper (auxiliary equipment) is being used.

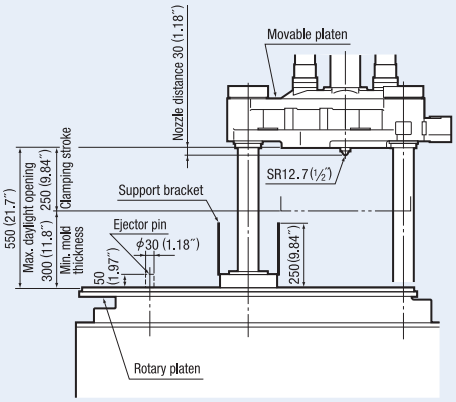
Foundation diagram



MOLD ATTACHMENT DIAGRAM

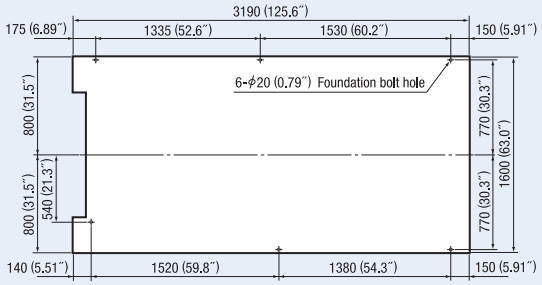




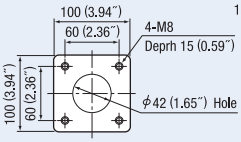


*The maximum weight for the bottom mold is 400kg (882 lbs) × 2 mold halves.
*The minimum mold dimensions of 305 (12.0") × 305 (12.0") are required in order to endure the maximum clamping force.

EXTERNAL VIEW

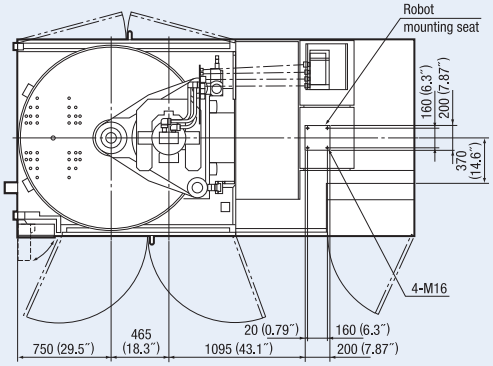


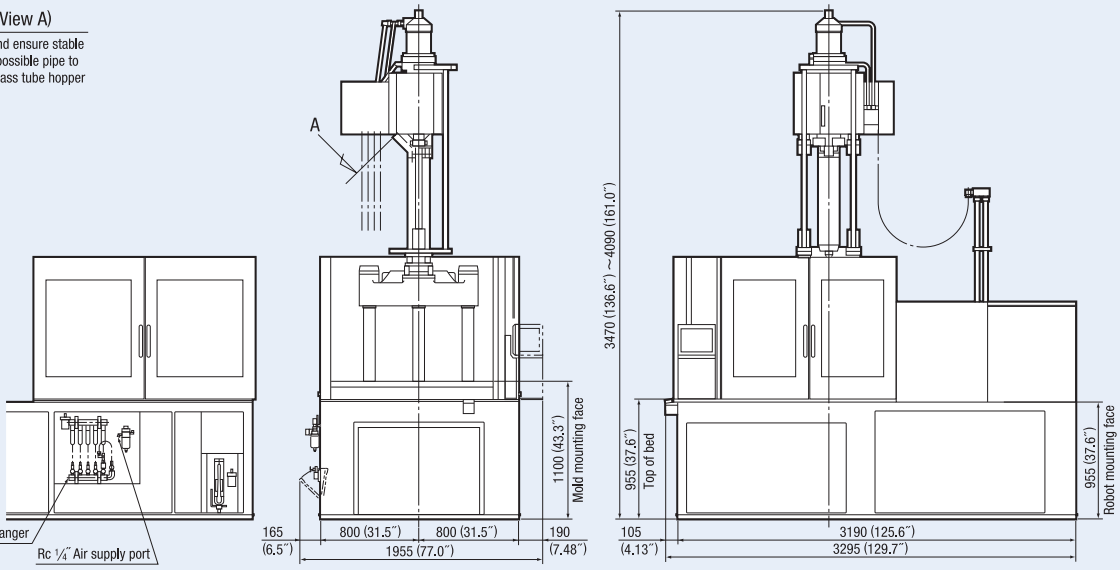
Foundation diagram



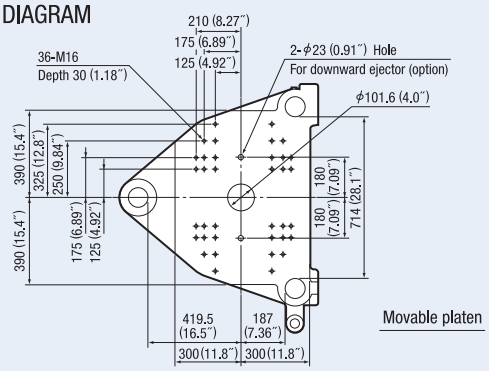
Hopper fixation diagram (View A)

* In order to prevent material clogging and ensure stable plasticization, please use the shortest possible pipe to the hopper mounting section when a glass tube hopper (auxiliary equipment) is being used.

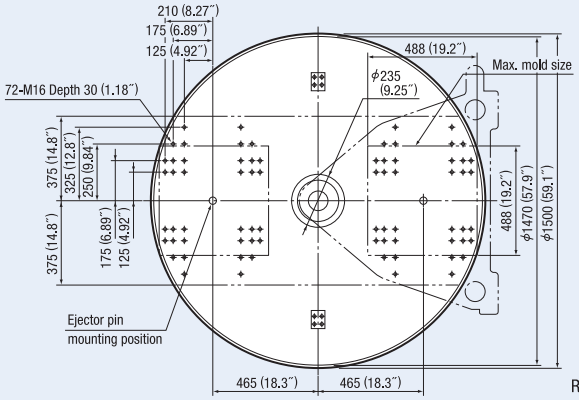




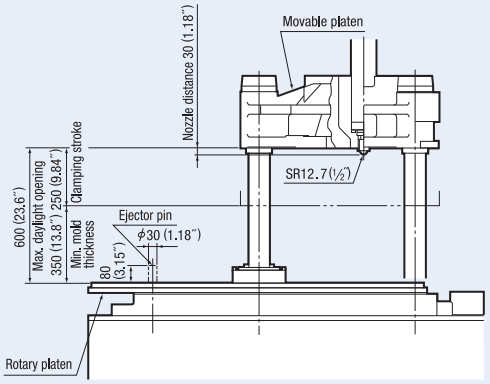
MOLD ATTACHMENT DIAGRAM



Movable platen

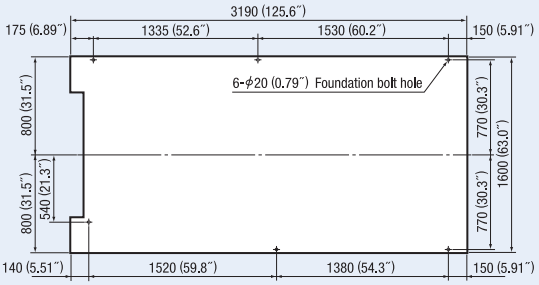


Rotary platen

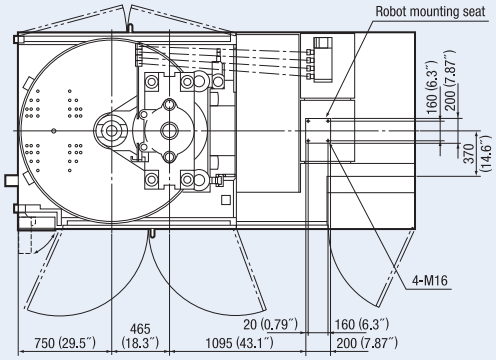


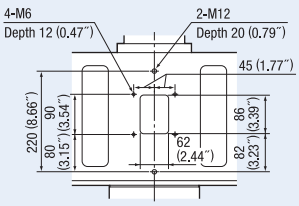
* The maximum weight for the bottom mold is 450kg (992 lbs) × 2 mold halves.
* The minimum mold dimensions of 340 (13.4") × 340 (13.4") are required in order to endure the maximum clamping force.

EXTERNAL VIEW



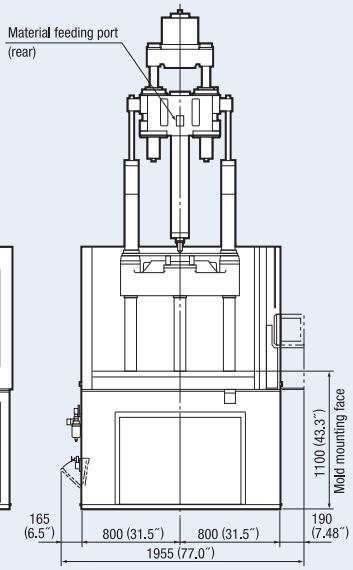
Foundation diagram

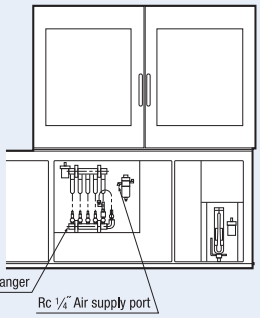


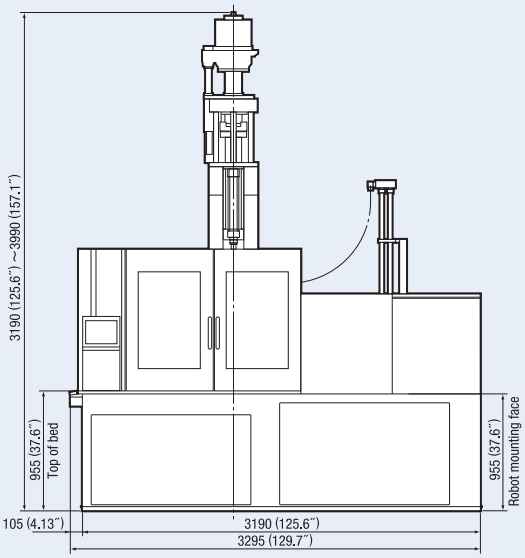


Hopper fixation diagram

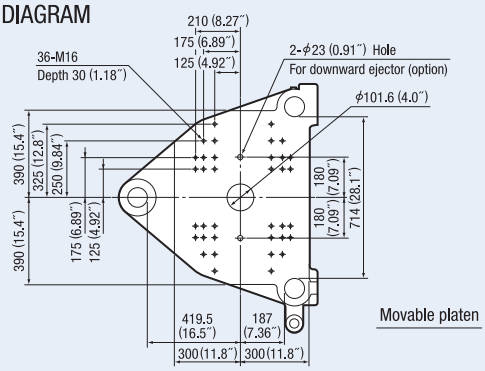
* In order to prevent material clogging and ensure stable plasticization, please use the shortest possible pipe to the hopper mounting section when a glass tube hopper (auxiliary equipment) is being used.

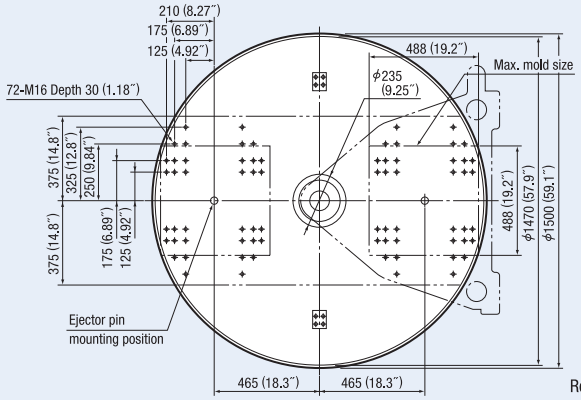


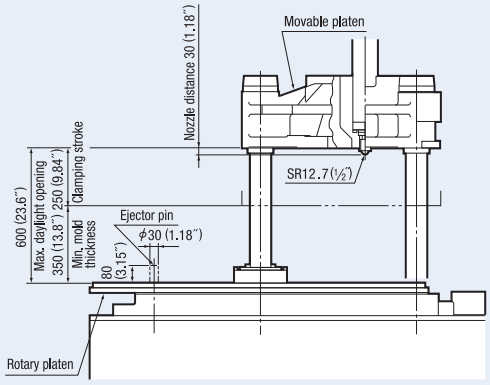




MOLD ATTACHMENT DIAGRAM

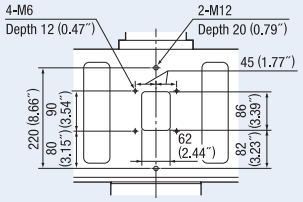






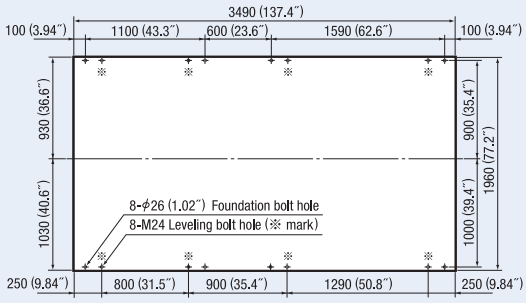
* The maximum weight for the bottom mold is 450kg (992 lbs) × 2 mold halves.
* The minimum mold dimensions of 340 (13.4") × 340 (13.4") are required in order to endure the maximum clamping force.

EXTERNAL VIEW

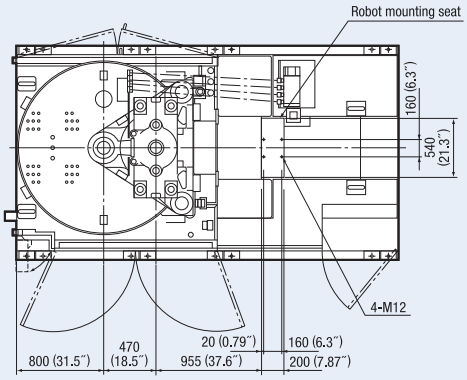


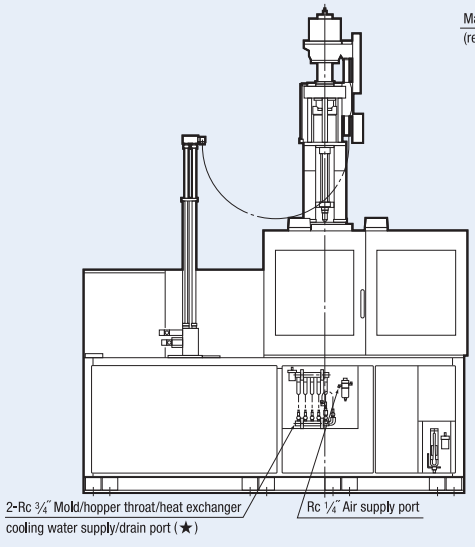
Hopper fixation diagram

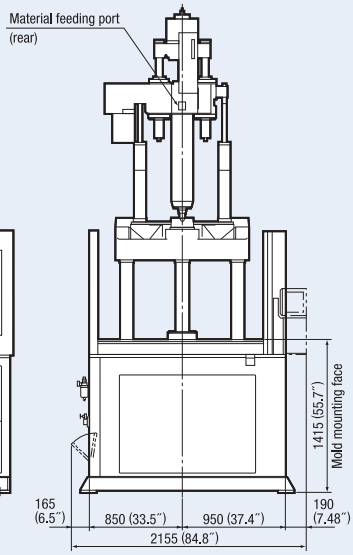
* In order to prevent material clogging and ensure stable plasticization, please use the shortest possible pipe to the hopper mounting section when a glass tube hopper (auxiliary equipment) is being used.

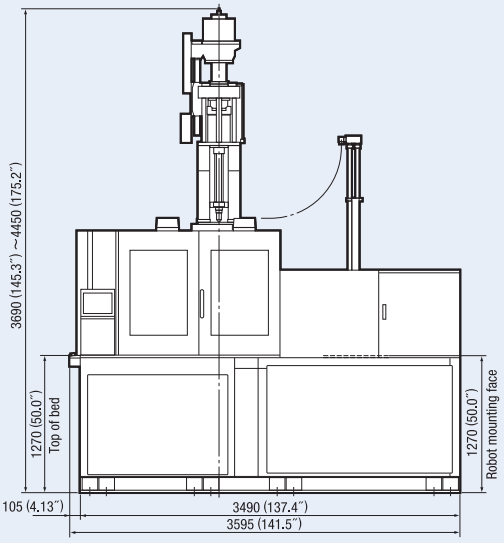


Foundation diagram

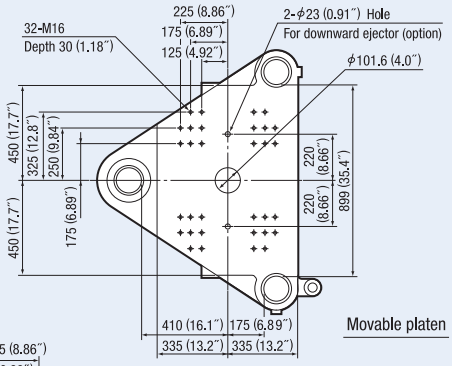


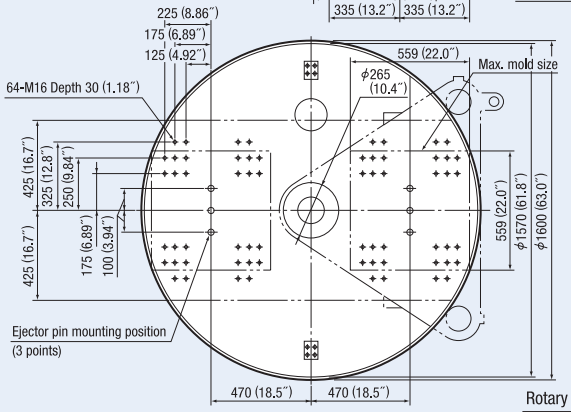


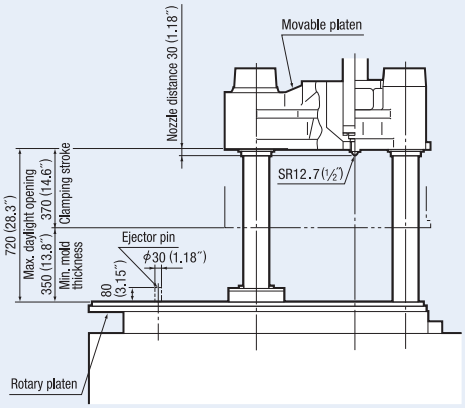




MOLD ATTACHMENT DIAGRAM







* The maximum weight for the bottom mold is 800kg (1764 lbs) × 2 mold halves.
* The minimum mold dimensions of 390 (15.4") × 390 (15.4") are required in order to endure the maximum clamping force.

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VEGETABLE OIL INK

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