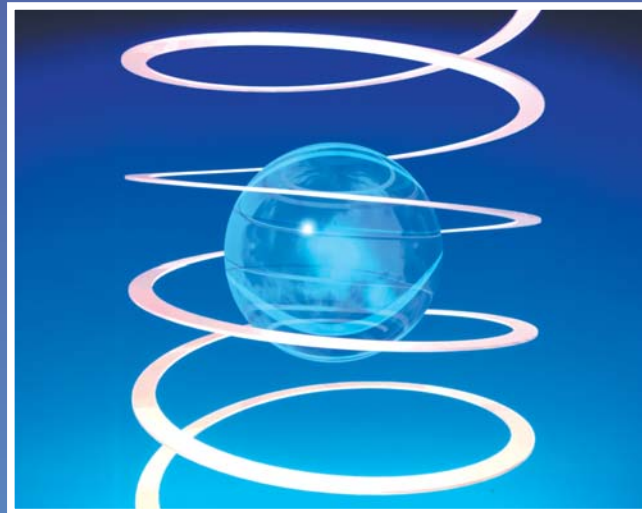


# JT-ELM SERIES



Vertical Type Electric Servo Drive  
Injection Molding Machine



JSW Hiroshima Plant

# JSW



JSW Injection Molding  
Machinery Division

# Harmonizing Ecology and Technology JSW Builds The Most Advanced Vertical Type Electric Servo Drive Injection Molding Machine

Friendly to Earth Environment is now needed.

Here's the response by JSW. All the technologies cultured and build-up for many years by JSW are concentrated on the vertical type electric Servo Motor driven injection molding machine. In addition a shorter molding cycle time and improved precision molding have performed.

Also by taking advantages of the space saving design, adaptability to automatic system and characteristics of vertical clamp machine, this is equipped with the unique JSW electric servo-driven system exclusive for molding operation and new high performance APC pressure control system. A bell crank toggle mechanism is applied for compact design to feature a fast, low costing and stable molding operation.



# A Wide Selection

## Block Systems

Our JT-ELIII series has various modules ready for use. The size, shape, production quantity and mode of a molding part will select the most opportune specification and viable performance of an injection machine currently available, resulting in a precise, steady and enhanced molding production.

### Single acting type

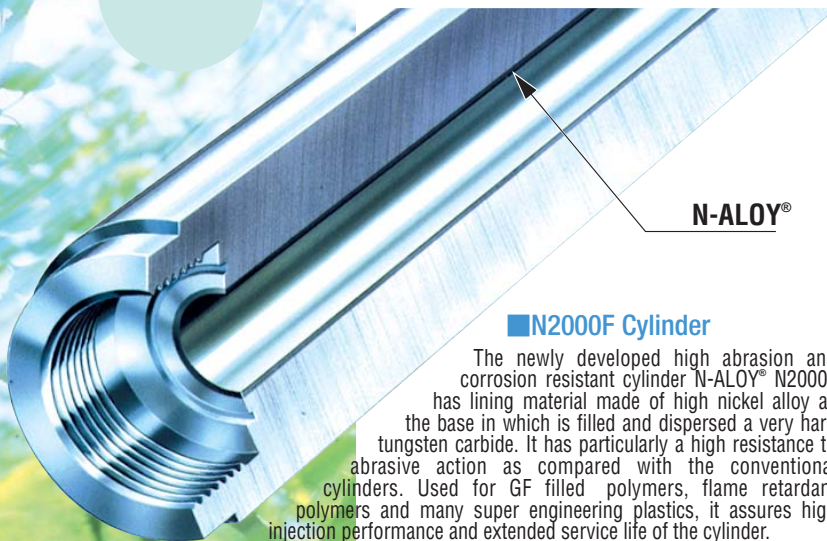
	Single acting type			Clamping module
	M40	M70	M100	
20V				
55V				
110V				
230V				
Injection module				

### Rotary type

	Rotary type					Clamping module
	M20R	M40R	M70R	M100R	M150R	
20V						
55V						
110V						
230V						
Injection module						

※Sliding type will be optional.

## Screw and Cylinder with Ultimate Precision Design and High Rigidity Are Standard Specifications



### N2000F Cylinder

The newly developed high abrasion and corrosion resistant cylinder N-ALOY® N2000F has lining material made of high nickel alloy as the base in which is filled and dispersed a very hard tungsten carbide. It has particularly a high resistance to abrasive action as compared with the conventional cylinders. Used for GF filled polymers, flame retardant polymers and many super engineering plastics, it assures high injection performance and extended service life of the cylinder.

### S50 Screw

JSW's own high-hardness alloy. Having an outstanding high wear resistance, a single flight S50 screw is a new development realizing a fast cycle molding.



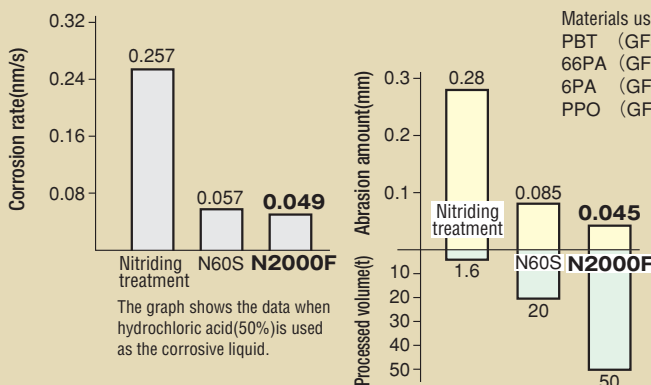
### HT Screw Head

This HT screw head is useful for stabilizing parts weight. As compared with the conventional screw heads, the clearance between the cylinder and check ring is decreased to the minimum, so that the back flowing resin is decreased to the minimum.



### Tip Nozzle

In contrast to the conventional open nozzle structure, this new type consists of a tip nozzle and an adaptor. The advantages are: an easy replacement of the tip nozzle and an enlargement of molding conditions.



# Safety, Easy Operation with Energy Conservation and Space Saving



## Rotary Table

The table turning mechanism driven by the electric servo motor needs no positioning pin for the table. Shortening of the revolving time, noiseless rotation, stable stopping point and stopping accuracy have been improved. (180 deg. turning reciprocated)

The rotary type has a photoelectric safety device equipped as a standard specification on both sides of operator's position for safety improvement.



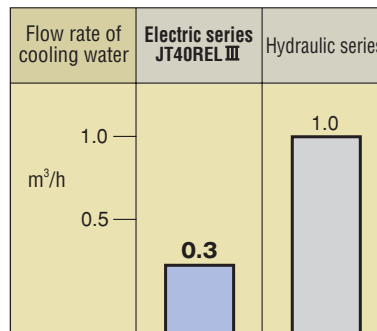
## Mold Access in Three Directions

A three-piece safety door is designed. By shortening each door, opening and closing are getting easy, operation has been improved and the machine installation is more easy. A mold can be accessed in three directions, from either of the machine sides or front, therefore connection to auxiliary equipment is more flexible.

# Reply the Ecological Requirements

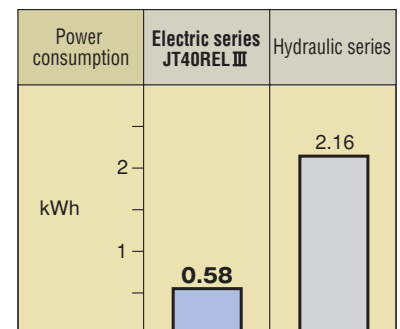
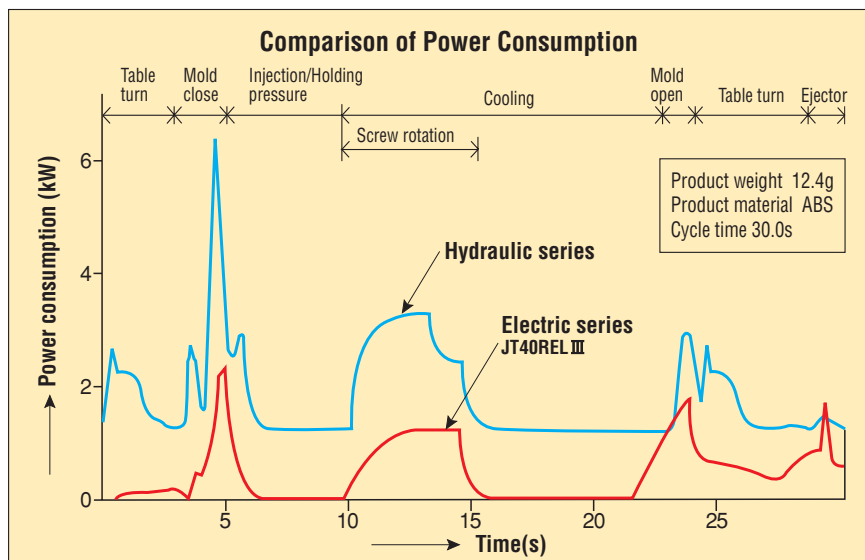
Not only the running cost, but also the primary equipment cost in plant for power and water can be reduced.

## Consumption of Cooling Water (line-company comparison)



In the hydraulic machines, the cooling water is mostly consumed by the oil cooler, but in electric machines, there is no oil cooler, so water consumption is greatly saved.

## Energy Consumption (line-company comparison)



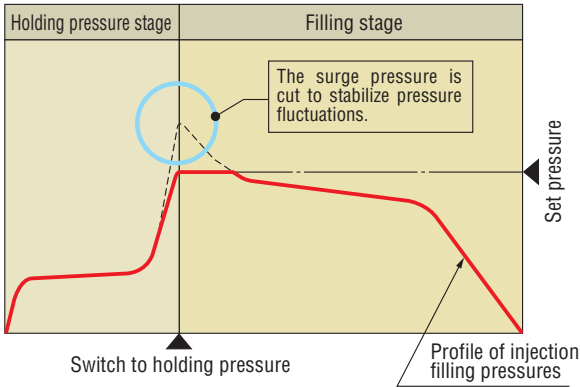
(Note: Cylinder heater energy is not included.)

Power consumption is reduced by one third to one quarter, compared to hydraulic powered machines.

# Our Unique Control System Pursuits Ultimate Stable Molding

## Soft-Pack Servo Unit for Setting Injection Pressures

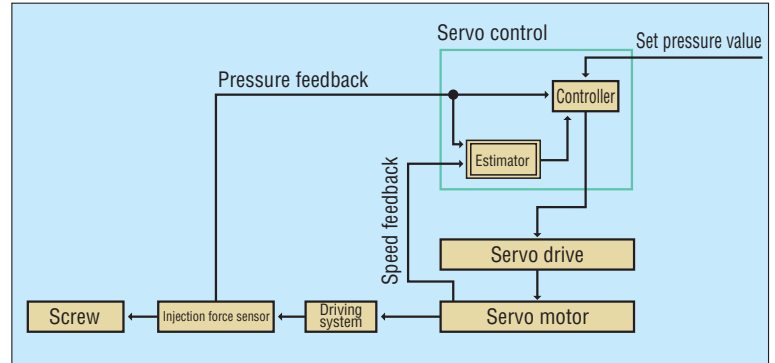
The optimum pressure molding (soft-pack servo) known for its performance in the hydraulic operated machines has been adopted for this electrically driven machine. Eliminating the peak pressure immediately before switching to the holding pressure is effective for reducing flash and warp problems.



## APC (High performance injection force feedback control) Delivers High Precision Control

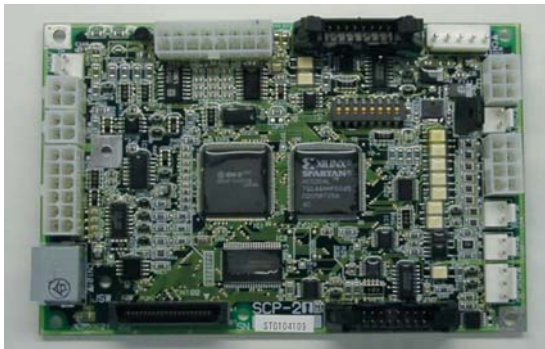
The injection force sensor combined with JSW's high performance feedback control has realized a truly reliable pressure follow-up and shockless pressure control.

### Theory of Control

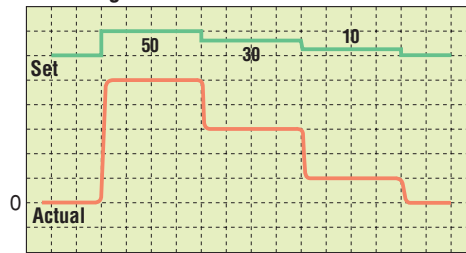


## Original Servo-Amplifier Developed by JSW

A result of JSW's Research & Development designed to be operated under severe conditions, the servo driving system is built exclusively for molding machines. A 32 bit RISC chip delivers high speed processing, with a high degree of accuracy.



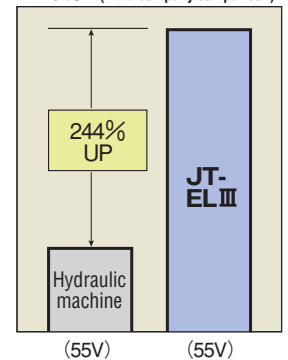
## Holding Pressure Characteristics



## SSR Control for Cylinder Heater

PID temperature controllers regulated by SSR (solid state control) for all zones, including nozzle section.

## Comparison of Injection Rate (Intra-company comparison)

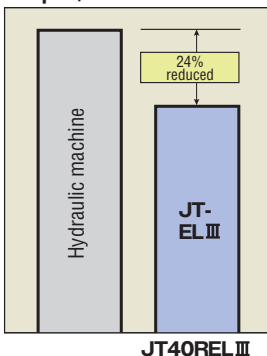


# Smooth Operation and High Cycle Molding

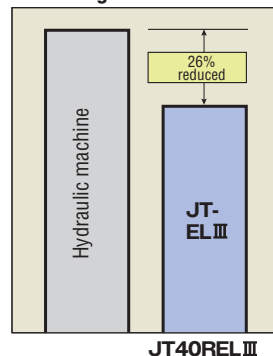
## Shorter Cycle Time

A high response function and speed provided by simple designed drive unit, increases a shorter operation time of mold open / close and table turning. (Intra-company comparison)

### Comparison of Mold Open/close Time



### Comparison of Table Turning Time



## Automatic Central Lubrication

Automatic central lubrication of all moving parts, clamp, injection carriage and ball screws is standard spec. Any grease malfunctions cause an audible alarm.

## Compound Actions

Reliable compound movements by the single driving inherent to the electric servo driven machine further reduce the cycle time and expand the adaptability range of the gate cutting function and others.



Automatic grease supplying unit

# Reliable Controller of Easy Handling and High Function



## ■SYSCOM2000T (Standard specification)

A clear and friendly to operator screen has been realized by adoption a large TFT color LC display screen (10.4 inches). Also interactive operation enables easy setting of the conditions. just by touching the setting place.

## ■High-touch Keyboard

Friendly to operator and easy-to-handle design with the mode selection keys arranged on the machine illustrated on the display screen. Easy setting to totally eliminate erroneous handling. (The internal memory has a storing capacity of the molding conditions of 40 molds and a data card has the same for 40 molds.)

## ■Built-in Controller

The display section (large LC display screen) and operational keyboard are housed in the operator's control panel at stationary platen. This eliminates wasteful space around the machine. The operator is able to command all machine operation while standing by the panel.

## ■Printer Output

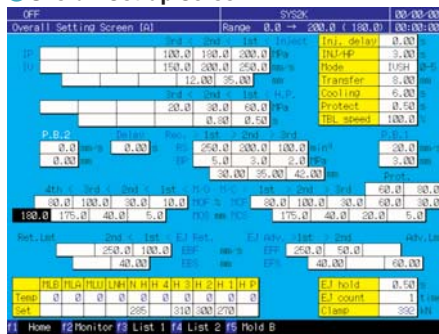
With a printer connection, it is possible to keep records of molding conditions, measured data of various sorts and injection profiles.

## ■Molding Condition Change (Rotary type specification)

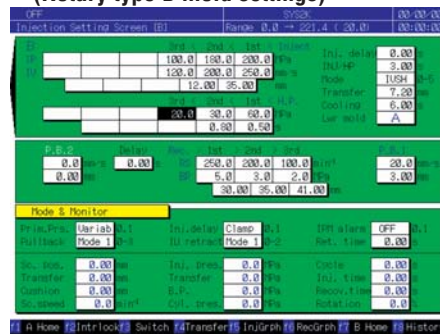
Two lower dies, delicately differs from each other in terms of their molding requirements. To conform, the requirements for either die (INJECTION, HOLDING PRESSURE, SCREW ROTATION) are made settable, independently.

## SYSCOM2000T(Color LC Display)

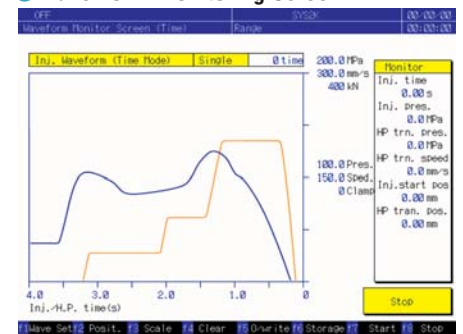
### ● Overall Set-up Screen



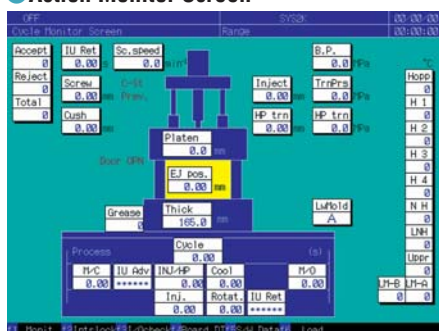
### ● Injection Parameters Set Screen (Rotary type B mold settings)



### ● Wave Form Monitoring Screen



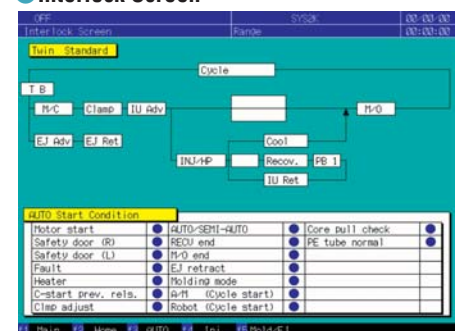
### ● Action Monitor Screen



### ● Mode List Set Screen



### ● Interlock Screen



# Standard Equipment / Optional Equipment

## Standard Equipment

Unit Item	
Injection and Plasticizing	Open nozzle (tip type)
	Wear and corrosion-resistant cylinder Note 1)
	Wear and corrosion-resistant screw Note 1)
	HT screw head
	Screw cylinder exchanger
	Cold start-up prevention
	Mold-pause changeover function
	Automatic purging circuit
	Nozzle touch force remote setting
	Nozzle back timing select
	Injection/rotation program control Inj.speed/press,Holding press.: 1~6 steps(adjust.) Screw speed/back press.: 1~6 steps(adjust.)
	Transfer to holding pressure by sensing injection speed(IVS)
	Cylinder temp.remote setting
	Cylinder temp. control (SSR)
	Soft-pack servo control
	Mold Clamping
Automatic greasing	
Mold open/close and ejector program control Mold open/close:1~4 steps(fixed) ejector:1~3 steps(adjust.)	
Automatic mold clamping force setting	
Automatic mold height adjuster	
Remote setting mold height	
Mold protection device	
Safety devices (electrical, and mechanical)Note 2)	
Photocell type safety device(for rotary type only)	
Remote setting of table rotation speed	

Unit Item	
Controller	SYSCOM controller display(touch panel TFT color LCD)
	Japanese/English switching function Note 3)
	Interlock display function
	Injection 2 molding conditions change(for rotary type only)
	Memory of Molding conditions (internal memory 40 molds)
	Data card (40 molds/card)
	Printer output terminal Note 4)
	Self-diagnostic function
	Overall set screen
	Compound actions
	Monitor
Heater circuit alarm	
Injection pressure monitor function(IPM)	
Injection wave form monitor	
Injection wave form memory	
Statistical graph function	
Measured value display	
Grease alarm	
Production monitor function Note 5)	
Operating time display function	
Action monitor function	
Molding condition upper/lower limit monitor Note 6)	
Maintenance service Note 7)	
History of alarm	
History of set value	
Servo control fault alarm	
Abnormal alarm buzzer	
Other	Mold cooling water closed circuit
	Auxiliary parts (maintenance tools, ejector rod)

## Optional Equipment

Optional Item	
Injection	B size screw cylinder
	High accurate nozzle temperature control(2 zone control)
	SVO long nozzle
	High-melter M II screw Note 8)
	LCP resin exclusive screw Note 9)
	Cylinder heat insulation cover
	Shut-off nozzle (pneumatic type)
	Hopper
	Friction ring ceramic
	Sylinder module system
Resin dwell fault alarm	
Mold Clamping	Toggle injection compression function Note 10)
	Daylight extension
	Mold platen heat insulating plate
	Air jet
	Pneumatic core puller circuit
	Unscrewing motor control circuit
	Die clamper
	Ejector for upper mold (hydraulic type)
	Ejector 3 points ejection (rotary type only)
	Ejector stroke extension(rotary type only)
	Mold heater circuit
	Mold temp. control piping for high temp.(rotary type only)
	Quick mold change device
Mold positioning device	
Mold temperature display	
Controller	Language switching function Note 11)
	Calendar timer
	Warning light
	Communication function with host computer(Link10)
	Printer (with printer cable)
	Printer cable (IBM compatible type)
	Data card (40 molds/card)
	Robot interface
Spare plug receptacle	
Other	Flow indicator for cooling water
	Cooling water cut-off alarm
	Vibration proof rubbers

Note 1) Either of the A or K size are standard specification. (B size will be optional.)

Note 2) The operating section of the rotary type shall be a photoelectric type.

Note 3) Japanese/English switching function is standard equipment.

Note 4) The printer unit and cable are optional.

Note 5) The production volume and advanced notice of production complete can be set and expected finish time is displayed.

Note 6) Monitoring functions of the following particulars are equipped as standard.  
Cycle time Injection time Rotation time Mold opening/closing time Cushion  
Injection start point Changeover position to holding pressure Changeover pressure to holding Injection pressure Screw back pressure

Note 7) Maintenance service time and areas are displayed.

Note 8) Adaptable for screw diameter over 35mm.

Note 9) Adaptable for screw diameter smaller than 28mm.

Note 10) A and B mode are available for injection compression operation, compression can be adjusted in 1-6 steps.

Note 11) One more language can be added,in addition to Japanese and English.

# **JSW THE JAPAN STEEL WORKS, LTD.**

URL <http://www.jsw.co.jp/>

Division: J-Tower, 1-1, Nikko-cho, Fuchu-shi, Tokyo 183-8503, Japan  
Head Quarter: Phone: +81-42-330-8008 Fax: +81-42-330-8023  
URL [http://www.jsw.co.jp/inj\\_f/inj\\_index.htm](http://www.jsw.co.jp/inj_f/inj_index.htm)  
Branch Offices: Osaka, Fukuoka, Nagoya, Hiroshima, Sapporo  
Plants: Muroran, Hiroshima, Yokohama  
Düsseldorf Office: Friedrichstr. 19, 40217 Düsseldorf, F.R. Germany  
Phone: +49-211-3116660 Fax: +49-211-31166640  
Teheran Office: Gandi Ave., Corner of Street No. 18, Bldg. No. 72,  
Apartment No. 5, Second Floor, Postal Code 15179, Teheran, I.R. of Iran  
Phone: +98-21-8776685 Fax: +98-21-8791199 Telex: 213057 (JSW IR)  
Singapore Office: 16 Raffles Quay, #27-01C, Hong Leong Bldg., Singapore 048581,  
Republic of Singapore  
Phone: +65-2206227 Fax: +65-2240726  
Beijing Office: 5, Dong Sanhuan Bei-lu, Chaoyang District, Beijing,  
Beijing Fortune Bldg., Room No. 907, People's Republic of China  
Phone: +86-10-6590-8966 Fax: +86-10-6590-8968

## **JSW Plastics Machinery, Inc.**

Head Office: 555 South Promenade Ave., Unit 104, Corona, California 92879, U.S.A.  
Phone: +1-909-898-0934 Fax: +1-909-898-0944  
Detroit Office: 24404 Catherine Industrial Drive Suite 310 NOVI, Michigan 48375, U.S.A.  
Phone: +1-248-449-5422 Fax: +1-248-449-6018  
Atlanta Office: 1700 Cumberland Point Drive, Suite 17, Marietta, Georgia 30067, U.S.A.  
Phone: +1-770-952-0269 Fax: +1-770-956-9058

## **JSW Plastics Machinery (S) Pte Ltd**

Head Office: 17, Gul Lane, Jurong Town, Singapore 629413, Republic of Singapore  
Phone: +65-6-8614511 Fax: +65-6-8623166  
Philippine Office: Chemdis Bldg., Don Jesus Blvd., Alabang Hills Village, Muntinlupa City,  
Philippines  
Phone: +63-2-809-8982 Fax: +63-2-809-6221  
Indonesia Office: Jl. Palatehan Raya No.1-A, Kebayoran Baru, Jakarta 12160, Indonesia  
Phone: +62-21-725-7486 Fax: +62-21-725-7865

## **JSW Plastics Machinery (M) SDN. BHD.**

No.42, Jalan PJS 11/7, Bandar Sunway, 46150 Petaling Jaya,  
Selangor Darul Ehsan, Malaysia  
Phone: +60-3-56356453 Fax: +60-3-56356542

## **JSW Plastics Machinery (T) Co., Ltd.**

496/111-112, Sathupradit Road, Bangpongpan, Yannawa,  
Bangkok 10120 Thailand  
Phone: +66-2-682-2011 Fax: +66-2-682-2015

## **JSW Plastics Machinery (H.K.) Co., Ltd.**

Room 907, Corporation Park, 11 On Lai Street, Shatin N.T., Hong Kong  
Phone: +852-2648-0720 Fax: +852-2686-8204

## **JSW Injection Machine Maintenance (Shenzhen) Co., Ltd.**

Ping An North Rd., Songgan Town, Baoan, Shenzhen, Guangdong,  
People's Republic of China  
Phone: +86-755-2709-7116 Fax: +86-755-2709-7052

## **JSW Plastics Machinery (Shanghai) Corp.**

Room 618, Tomson Commercial Bldg.,  
710, Dongfang Rd., Pudong, Shanghai, 200122, People's Republic of China  
Phone: +86-21-5830-2191 Fax: +86-21-5830-2193

## **JSW Plastics Machinery (TAIWAN) Corp.**

Head Office: 1st. Floor, No.63, Wenhua 3rd. Rd., Gueishan Shiang Taoyuan, Taiwan, R.O.C.  
Phone: +886-3-3962-102 Fax: +886-3-3962-104  
Tainan Office: 15 Fl.-7, No.689-78, Shiao E. Rd., Yungkuang City, Tainan, Taiwan, R.O.C.  
Phone: +886-6-3114192 Fax: +886-6-3114193