

*Heartful Technology*  
**Yushin**

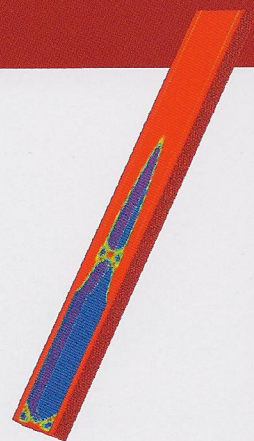
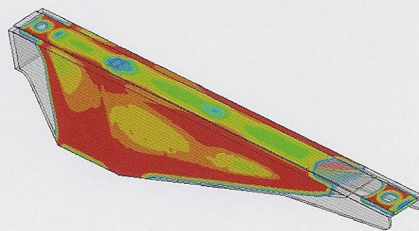
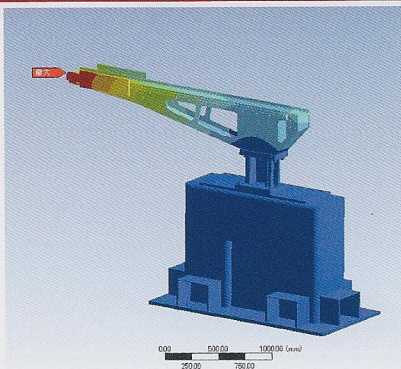
0.32-second take out :  
The fastest robot in its class



**Yushin Precision Equipment Co., Ltd.**



Why is a massive, several hundred kilogram robot needed to take-out a molded part that weighs just a few hundred grams?



CAE (Computer-Aided Engineering)



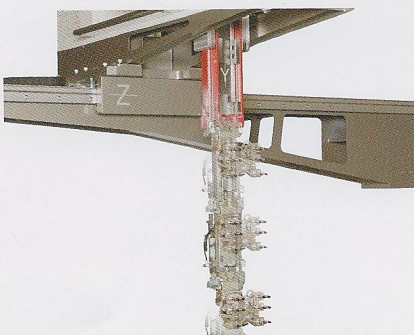
Introducing the *HSA Series*  
of High-Speed Take-Out Robots



To answer this riddle, Yushin employed the process of *Design Optimization* to determine the ideal robot design. Design Optimization is what Yushin calls the practice of applying CAE (Computer-Aided Engineering) to seek the most theoretically optimal form for a robot based on its mechanism and motions, rather than relying solely on designer experience and its inherent tendencies. Recently, this new approach has been used in order to design lighter weight and higher reliability into cars and aircraft. It is remarkable to see that in many cases, optimized designs resemble natural structures such as trees and plants. The HSA robot delivers speed and stability at levels beyond those of its traditionally-designed predecessors, and we at Yushin believe it will herald in a whole new generation of take-out robots.



The Pursuit of World-Class Speed demanded Lighter Weight, a Slimmer Frame, and Smoother Motion.



## Speedy

Lightweight, Optimized Design for High-Speed Operation

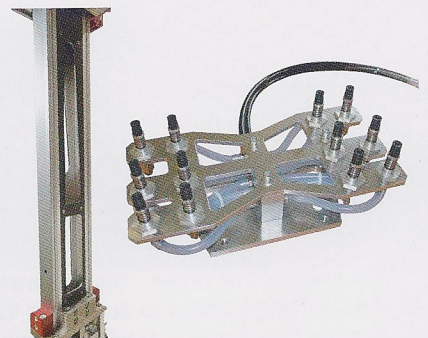
By employing the Design Optimization process, Yushin reduced robot weight by 13%\* and the HSA performed at the world-class take-out time of 0.32 sec during live molding. That speed is 11% faster than previous models.



## Slim

Slimmer, Optimally-Designed Arm Fits Through Narrower Mold Openings

Yushin applied design optimization to the robot arm's wrist flip unit (the arm end which enters the mold) to make it 38%\* slimmer. The thinner arm allows operators to shorten mold openings by up to 41mm, which helps accelerate the molding cycle.

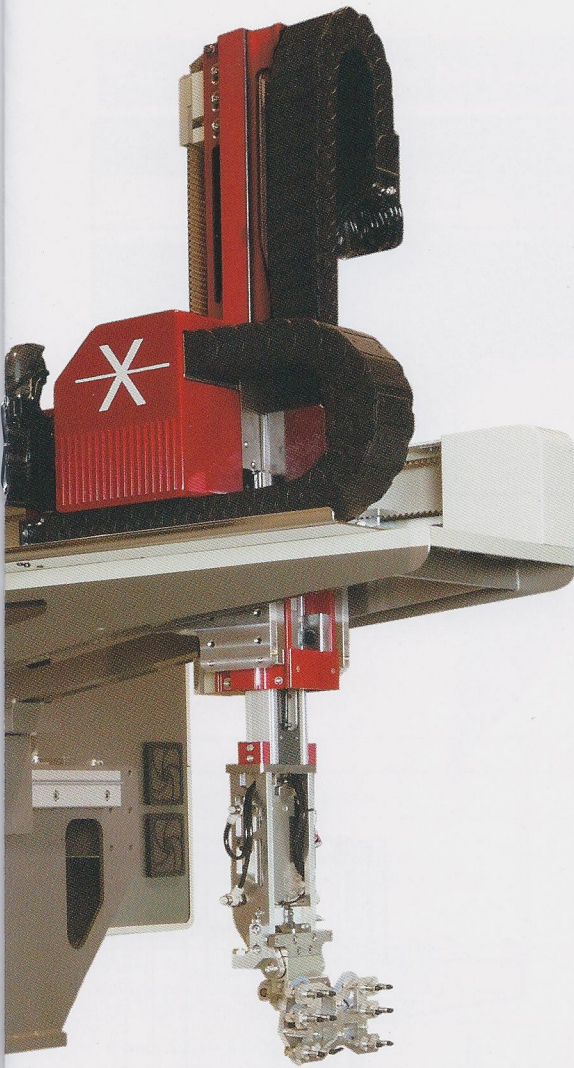


## Stable

Arm Flutter Tamed by Vibration Control Technology

Yushin engineers integrated vibration-proofing technology throughout the robot, reinforced the arm with CFRP (carbon fiber reinforced plastic) for superior vibration-damping properties, and employed design optimization on the end-of-arm tool.





The HSA debuted as Yushin's newest high-speed take-out robot at the K2010 tradeshow.



Show Daily

MODERN PLASTICS  
WORLDWIDE

30-31 OCTOBER 2010 | WEEKEND EDITION

## 0.32-second take-out: Is this K's fastest robot?

By Stephen Moore

"WHY IS A MASSIVE, several-hundred-pound robot needed to take out a molded part that weighs just a few hundred grams?" Yushin Precision Equipment (Stand 12E51) asked itself this question and decided to employ the process of design optimization—often used to maximize lightweighting in aircraft components—to rid its latest robot of as much mass as possible. Net result? A 13% lighter robot boasts an 11% faster take-out and a 14% faster full cycle.

Additional benefits from removing metal where it is not required for rigidity include a 38% slimmer wrist that allows mold opening to be narrowed by 41 mm.

At K, the lightweight robot was operating with a Sumitomo (SHI) Demag injection molding machine molding a Nokia cellphone housing with a take-out time as fast as 0.32 second. Hollowing out the main arm and reinforcing it with carbon fiber-reinforced plastic also contributes to faster speeds.

Yushin initially applied design optimization to end-of-arm tooling in a joint research project with Kyoto University. "Mass optimization of EOAT reduces settling time



Yushin: Robot takes the part out at a zippy 0.32 second.

[the time required for tool extremities to cease any flutter after a tool comes to rest] enabling shorter, smoother, steadier take-outs," says Takayo Kotani, senior manager of R&D at Yushin. In a medical product application, EOAT mass was reduced by 40% compared with a conventional tool, and cycle time was reduced by 10%.

Stephen Moore, MODERN PLASTICS K Show Daily WEEKEND EDITION, 30-31 October 2010, pp 11-12

The Kshow, one of the world's largest plastics and rubber tradeshows, is held every 3 years in Germany. The 2010 show took place Oct 27 -- Nov 3 in Dusseldorf.

To experience the HSA's world-class take-out times, please visit

<http://www.ype.co.jp/HSA/>



## Smart

Large 10.4in Touchscreen Controller Designed for Ease-of-Use

Custom-designed for the HSA robot, the E-Touch II-K controller offers easy, icon-based touch controls. Standard-equipped *Lead Through Teaching* function allows operators to add and modify positions and timers with ease. The smaller E-touch Compact II controller is also available as an alternate.



## Sturdy

Handle with Confidence: Controller Stands Up to Harsh Conditions

Rubber shock guards encase each side to protect the controller. The E-Touch II-K controller received an IP44\*\* international rating for moisture resistance.



## Saving

Compressed Air Usage Cut by Up to 75%\* for Greener Operation

The HSA comes standard-equipped with one Eco-Vacuum® (pat.p) part suction circuit, which greatly reduces air usage for lower electricity bills, lower equipment expenses, and greater conservation of resources.

\* Measurements above are relative to previous comparable Yushin model.

\*\* Only E-touch II-K controller



## Specifications

Power source	Driving method	Control method	Air pressure	Maximum air pressure	Wrist flip angle
3 Phase AC200V 50/60Hz	Digital servo motor 3-axis	Micro computer control	0.49MPa	0.79MPa	90°

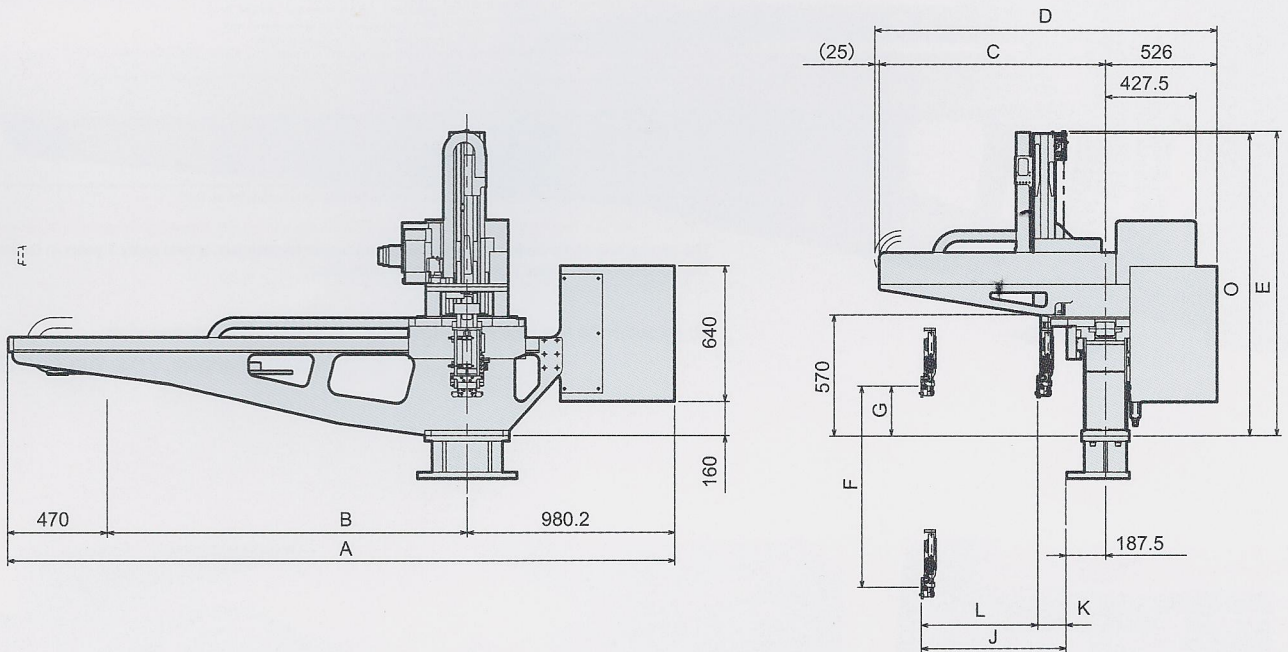
  

Model	Maximum power consumption	Traverse stroke (mm)		Kick stroke (mm)	Vertical stroke (mm)		Air consumption L(Normal)/cycle	Maximum payload (kg)	Main Unit Weight (kg)	Clamping Force (tf)
				Main arm	Main arm					
HSA-150S	3 Phase AC200V 17.4A Max.	1700	[1900]	550	850	<850>	5.6	3	565	100 ~ 220
HSA-250S			[2200] [2500]	760	950	<950> <1100> <1300>		5	571	180 ~ 300

[ ] = extended traverse model < > = extended vertical stroke model

Support stanchion comes standard with models 2200mm or longer.

## Spec Drawings



Model	A	B	C	D	E	F	G	J	K	L	O
HSA-150S	3150.2 [3350.2]	1700 [1900]	1067.5	1618.5	1386.6 <1434.6>	850 <950>	235	682.5	132.5	550	1377 <1425>
HSA-250S	[3650.2] [3950.2]	[2200] [2500]	1277.5	1828.5	<1514.6> <1610.6>	<1100> <1300>		892.5		760	<1505> <1601>

\* Please contact your Yushin sales representative for details on other robot options not listed in this catalog.

### Safety information

- These products are industrial robots as defined in the labor safety rules. Always take great care when operating any robots.
- To improve visual clarity, these robots may be shown without the safety guards that are identified in the safety rules. Never operate the robots without all safety guards in place.
- Before using any product introduced in this literature, all operators must read and understand the instruction manual and other related documents for proper and safe equipment operation.

### Quality Control

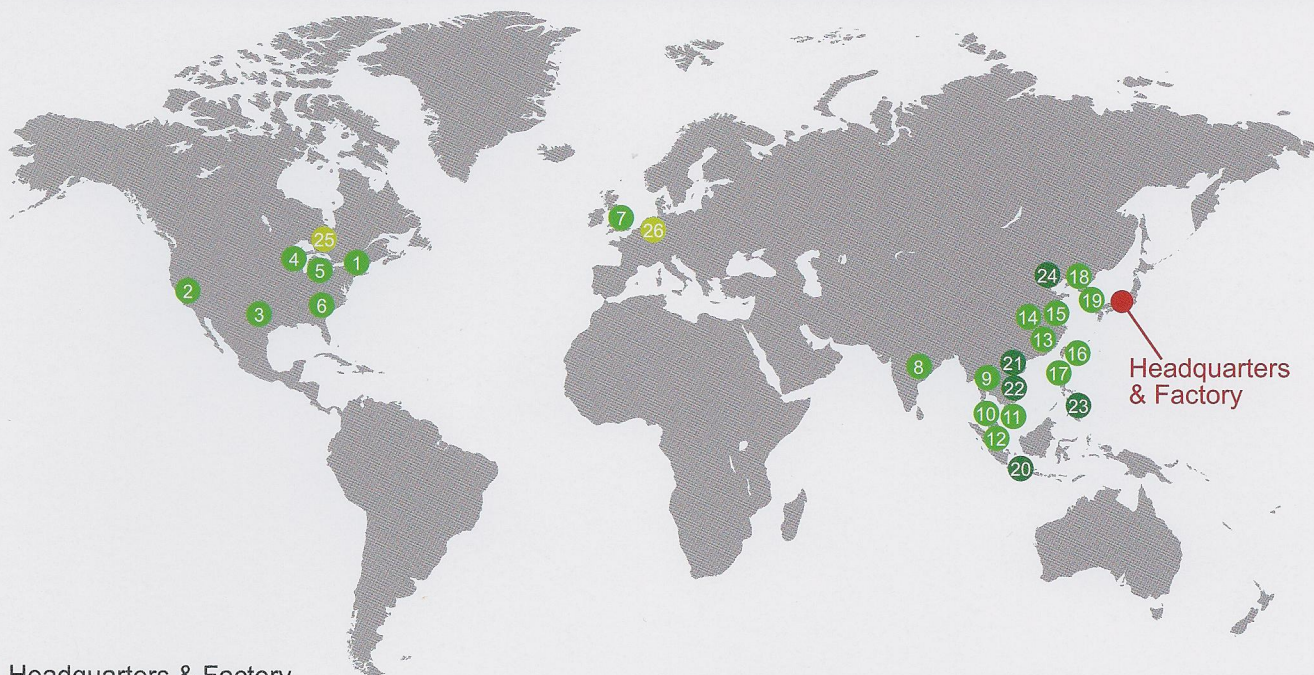


Headquarters & Factory





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