



Ring Spinning Frame

**RX
3000**



Taking energy efficiency and flexibility to new heights.

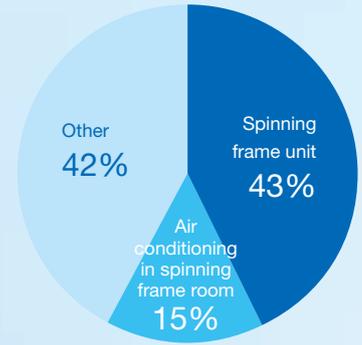
Toyota's RX Series of high-performance ring spinning frames—counting over 22 million spindles* in operation around the world—now enters a new generation. The all-new RX300 was developed in response to many customer requests for saving energy and spinning original yarn.

The adoption of new high-efficiency motors and new pneumatic equipment ensures excellent energy-saving performance. The new long-frame design—which supports up to 1,824 spindles—employs Toyota's proprietary technology to ensure high reliability and high performance, as well as space-saving and cost-saving effects.

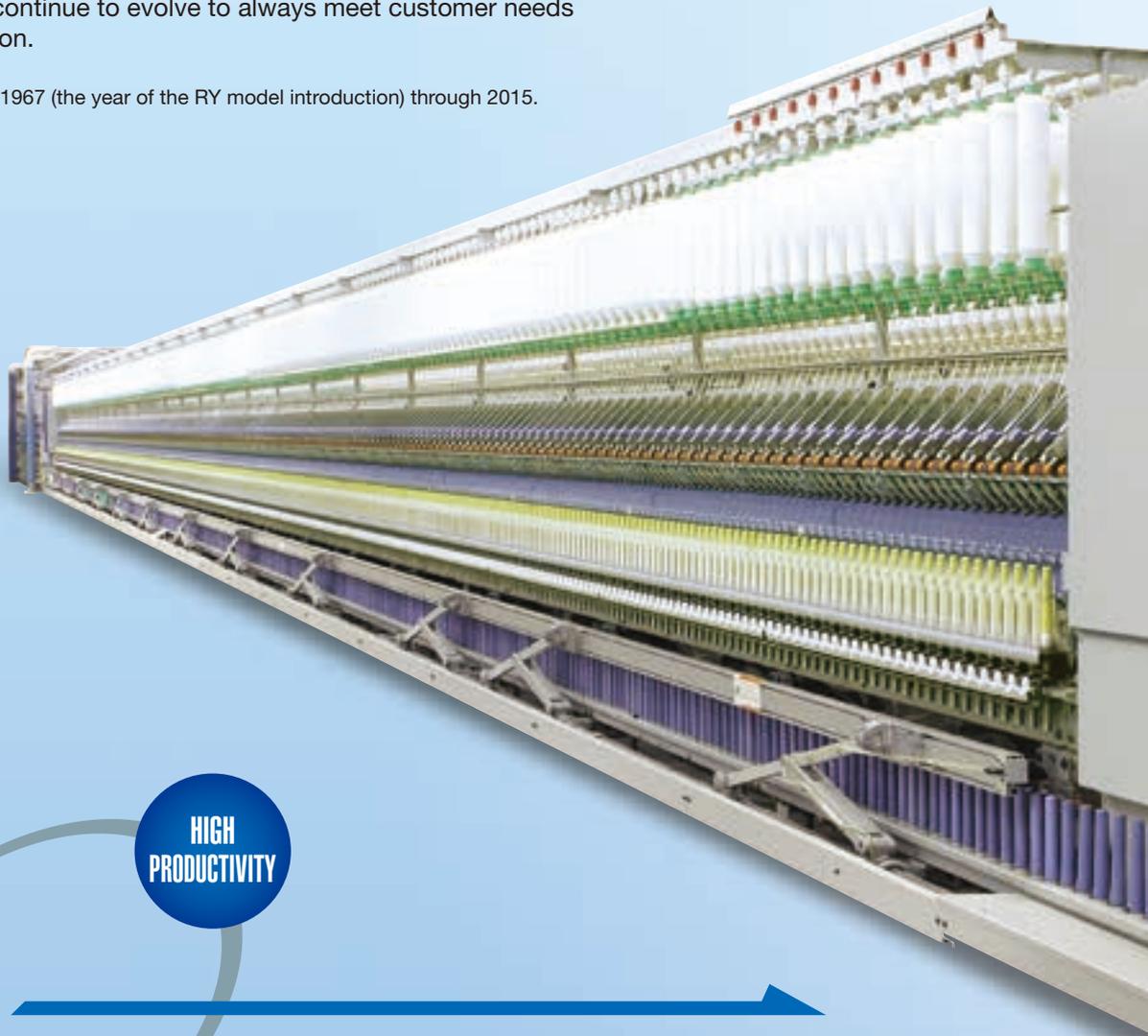
In addition, the RX300 comes with options such as a compact yarn spinning device, a fancy yarn spinning device, and the MOSAIC® yarn spinning device, which can be used with any number of spindles on the long frame.

Toyota's RX Series will continue to evolve to always meet customer needs and offer the best solution.

* Based on sales results from 1967 (the year of the RY model introduction) through 2015.



Example: Power consumption of spinning frames in a typical spinning mill





Main Specifications

RX300G (Gear-Driven Draft System) RX300E (E-Draft System) Common Specifications

Spindle gage:
70 mm 75 mm

Bobbin length (lift):
180 (155) mm 210 (185) mm
230 (205) mm

Spindle driving system:
4 spindles by spindle belt

Fiber length:
Max. 51 mm

Yarn count to be spun:
Ne1–300 (settings)

Max. number of spindles:
1,824

Ring diameter:
36–53 mm

Drafting system:
3-line 2-zone

Lifting motion:
Screw shaft-type positive lifting

Dimension of roving bobbin:
146 x 406 mm

Function panel:
Large color graphic panel

Spindle speed control:
Arbitrary speed control inverter

Automatic doffer:
SCD (automatic stationary
cop doffer) with automatic
restarting mechanism,
winder link, or automatic
bobbin changer

Main Options

Fancy Yarn Spinning Device (RX300E only)

Front roller deceleration and
back roller acceleration
Slub thickness 30% to 500%
Comes with special software

Compact Yarn Spinning Device

Perforated apron suction method
Perforated apron positive drive

Design and specifications are current
as of August 2016.

Superior Economy Achieved with New Technologies

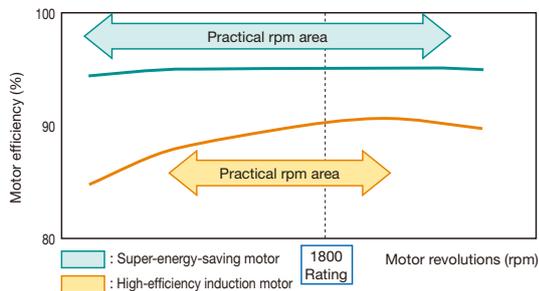
Increased Energy Efficiency

The spindle and draft drives use motors and inverters with high-performance, high-efficiency, energy-saving features **OPTION**



In addition to the high-efficiency induction motors used in conventional models, the RX300 can be fitted with an optional super-energy-saving motor and a special inverter. These two options employ new technologies that enable energy-saving operation with even greater efficiency.

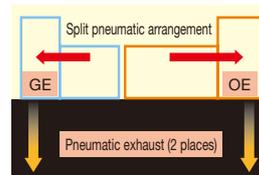
Comparison of Motor Efficiency



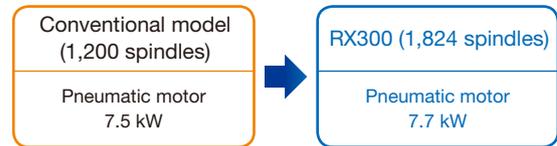
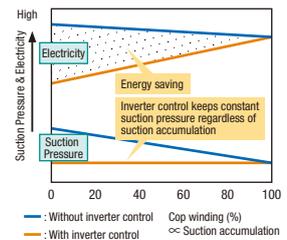
The super-energy-saving motor makes it possible to reduce power consumption by approximately 5%

Improved configuration of the pneumatic system and adoption of an inverter for the pneumatic motor ensures the ideal suction capacity that matches the number of spindles **OPTION**

1) Pneumatic motor's two-piece arrangement



2) Inverter control of the pneumatic motor



Pneumatic motor capacity per spindle
32% reduction

Reducing Energy Consumption by About 7% per Spindle

Conventional model (1,200 spindles)	Capacity of each motor
	1) Main motor: 60 kW (high-efficiency induction motor) 2) Pneumatic motor: 7.5 kW 3) Lifting motor: 1.6 kW

Power consumption per spindle
7% reduction

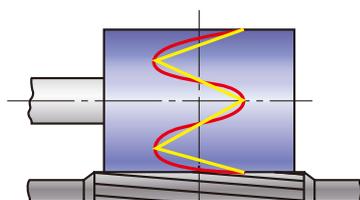
RX300 (1,824 spindles)	Capacity of each motor
	1) Main motor: 85 kW (super-energy-saving motor) 2) Pneumatic motor: 7.7 kW (with inverter control) 3) Lifting motor: 2.5 kW

Spinning conditions • Cotton 100% Ne30
Mechanical conditions • 185 mm lift x 38 mm ring • Spindle rpm: 20,000 rpm

Note: Actual power consumption will depend on factors such as machine configurations and spinning conditions.

Reduced Maintenance Costs

Quick Traverse Mechanism



— Conventional traverse
 — Quick-turn traverse

In the pursuit of extending the grinding intervals—and eventually the life—of critical consumables such as cots and aprons, Toyota introduces a “Quick Traverse Mechanism.” Unlike with the conventional single traverse or the more accomplished twin traverse mechanisms, the dwell time at traverse reversal is eliminated; thus there is no uneven wear on the cot surface. This traverse mechanism is linked to the gearing through a cam system and hence does not need an independent drive source.

Efficient Plant Operation Brought About by Long-Frame Design

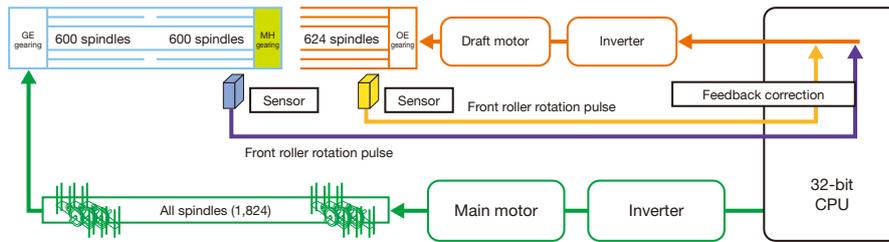
The RX300 includes a model with 1,824 spindles. Increasing the number of spindles per unit means that various expenses relating to spinning equipment—such as factory construction costs or air conditioning costs—can be reduced. This helps reduce the fixed expenses that are included in total production costs.

Highly Reliable Long-Frame Design

Proprietary Technology Enables the Commercialization of 1,824-Spindle Machines

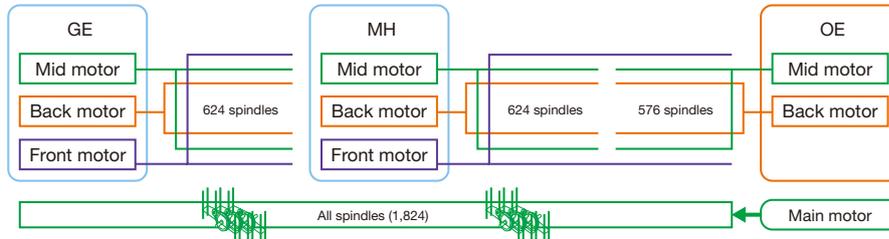
Bottom Roller Split Drive

For the RX300G



The draft motor that shares part of the bottom-roller drive is driven by the vector control system, so there is little slip during rotation. And the main control CPU conducts feedback correction with the rotation pulses from the main motor and draft motor, so that the twists are uniform on all sections of the machine.

For the RX300E



The bottom roller drive in the MH to OE sections uses the same configuration as that used in two-head machines. Adding another set of motors to the GE side enables on-board changes without any change gears, even on a 1,824-spindle machine. Each roller is driven by a servomotor to ensure precise synchronization.

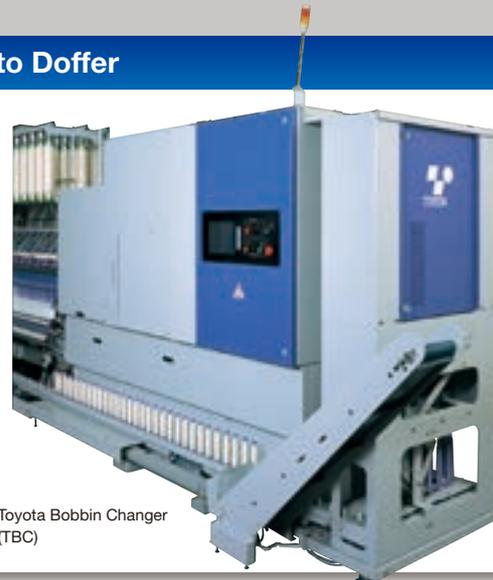
Fully Equipped Long Frame

High-Speed Auto Doffer

Full and empty bobbins can now be handled at high speed accompanying the increase in the number of spindles. It has become possible to transfer 40 bobbins per minute, and coarse yarn counts can also be handled.



Middle-peg system accommodates large-diameter cop packages



Toyota Bobbin Changer (TBC)

Robust Frame Structure Ensures Precise Operation over Long Periods of Use of the Long Frame

Spring pieces made of cast iron (3 pieces used for each block [48 spindles])

Integrated right-left roller stand made from die-cast aluminum

- Stable long-term operation with extra spring piece
- Easy centering of the bottom roller

Various types of yarn such as compact yarn, fancy yarn, and siro yarn can be spun on this long-frame machine that can accommodate up to 1,824 spindles.

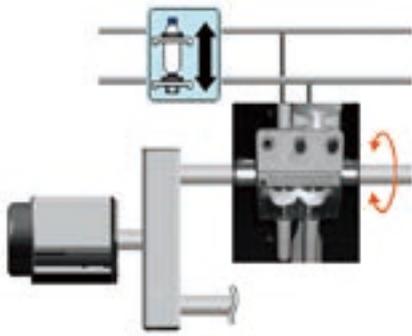


Positive Lifting Mechanism Displays Its Worth in Many Ways

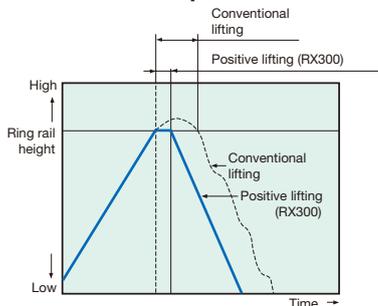
Servo Motor-Driven Positive Lifting

Toyota's Proprietary Positive Lifting Mechanism

Instead of belts, the RX300 incorporates a screw shaft positive lifting mechanism. This eliminates disparity in the ring rail motion during long periods of continuous operation. The RX300's smooth lifting motion also eliminates many of the problems associated with conventional lifting systems. Disruptions, such as stoppages that often occur during ring rail inversion and annoyances like chattering during descent, become things of the past.



Ring Rail Inversion Comparison



The Perfect Solution for Fly Accumulation

The screw shafts are covered, and their pillars are completely sealed to prevent fly accumulation.



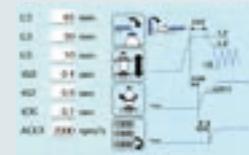
Sealed lifting pillar



Screw shaft

Adjustable Lifting Motion Reduces Yarn Breakage when Restarting

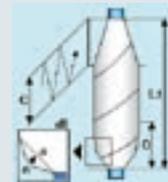
The RX300 reduces the occurrence of yarn breakage by allowing free setting of the lifting rate.



Automatic ring rail lifting

Optimal Cop Formation at Your Fingertips

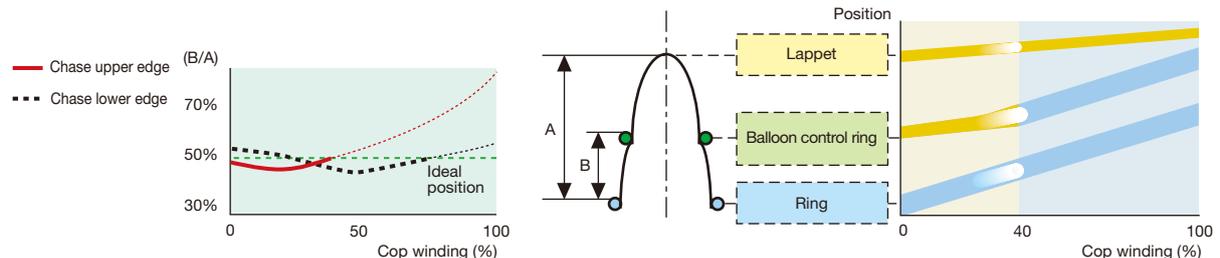
With easy key operation, it becomes very simple to find an optimal setting for cop formation to match various spinning conditions.



Ideal Balloon Control

Two-Step Motion of the Balloon Control Ring

The RX300 uses a balloon control ring that moves together with the lappet at the start of winding and then with the ring from about 40% cop winding. Because the balloon control ring is always working effectively, balloon form is stable and there's less yarn breakage.



Provides Outstanding Control and Operability

Control System Using the Latest Electronics Technology

High-Performance CPU Control

High-precision control is achieved through a 32-bit CPU combined with our latest inverter and servo amplifier. A high level of dependability is assured for both spindle speed and servo-lifting control.

Large Color Function Panel

A 12-inch color function panel equipped with a Web browser improves interface ability. Connection to an internal or external network is possible for exchange of information or data.

Function Panel

Setting functions

- Spinning conditions • Cop formation (one-touch setting for the number of bunch windings and back windings)
- Spindle speed control (easy pattern setting function, speed control pattern graph display) • Ring plate movement
- Doffing conditions

Monitoring functions

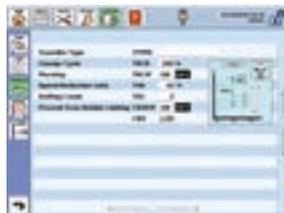
- Production volume (shift counter) • Transition of efficiency for each shift • History of running conditions for the last 24 hours • Spindle speed, delivery speed, twists, and time to full bobbin • Inverter/servo amplifier monitor
- Troubleshooting

Management functions

- Setting condition memory function • USB flash drive • Maintenance schedule management function



Top menu



Settings for traveler pre-conditioning operating mode



Efficiency transition graph



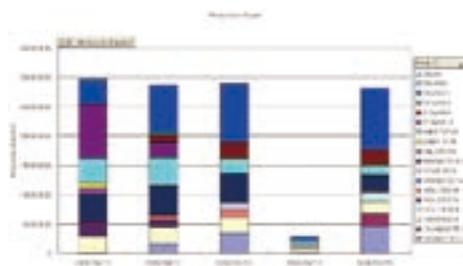
Troubleshooting

TMS (Toyota Monitoring System) OPTION

- By using Toyota's original monitoring software, the operator can easily obtain various information such as shift reports, simply by connecting multiple frames.
- The operator can view the RX300's function panel directly from the office PC and check various machine conditions such as spinning settings.
- Data can be exchanged between spinning frames without using memory cards.



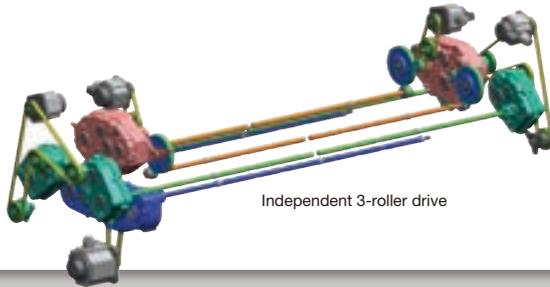
Top menu



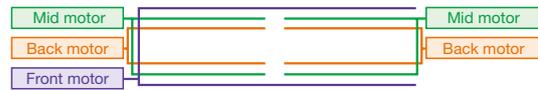
Production volume

World's Only Fully Change-Gearless Ring Spinning Frame (RX300E)

The RX300E e-draft model is the world's only ring spinning frame to eliminate all change gears. The twist and total draft gears need no replacing, and neither do the back draft gears. All spinning conditions, including settings for the servo motor-controlled ring rail lifting system, can be set on the function panel.



Spinning condition settings



Fancy Yarn Spinning Device OPTION

Many types of fancy yarns can be handled such as slub, multi-count, and multi-twist ones. High-response servo motors drive all three bottom rollers. This makes it possible to not only slow down the front roller, but also speed up the back roller. In addition, the supplied software makes it easy to record and manage pattern simulation and settings data.



Types of Yarn Handled * Cross-section ratio of normal thread to fancy yarn

Positive slub yarn (up to 500%*)



- 1) Front roller deceleration control (with change to twist)
- 2) Back roller acceleration control (with no change to twist)
- 3) Combined control of 1 and 2 above (degree of twist change can be adjusted)

Multi-count yarn



- 1) Fixed number of twisted threads (2-6)
- 2) Fixed number of twists (1-70 twists per inch)
- 3) Any number of twists (1-70 twists per inch)

Negative slub yarn (up to 30%*)



Back roller acceleration control

Multi-twist yarn



Number of twisted threads: 1.5-10

Multi-count + multi-slub



Slub on slub



Natural slub like

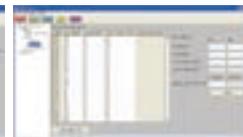


Settings Data Creator for Fancy Yarns (special software)

- Pattern settings 1,000 x 1,000-line
- Available patterns Single, Multiple, Stepped, Random
- Simulation Part of the pattern data can be corrected
- Data transfer Memory card, ethernet communication



Common Settings screen:
Select pattern implementation mode or roller control mode



Pattern Table screen:
Automatically generate patterns



Slub Simulation screen

Toyota Original EST III Compact Yarn Spinning System with Perforated Apron Suction

Key Features

■ **Bottom delivery rollers allow positive drive of the perforated apron**

- Slip-free rotation increases service life of the perforated apron
- Easy to maintain regardless of top roller diameter

■ **Long perforated apron fitted with a tension device**

- Prevents accumulation of fly, and thus allows longer intervals between periodic maintenance

■ **Condensing unit is easy to detach and disassemble**

- Periodic cleaning is possible in a short time
- Easy to switch between conventional yarn and compact yarn

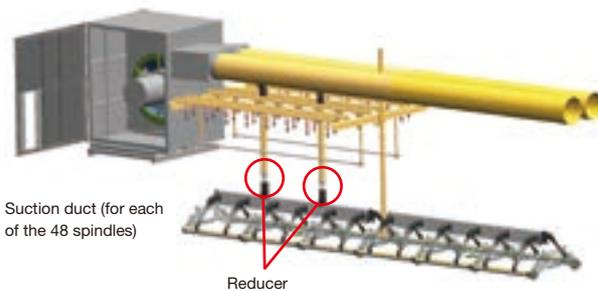
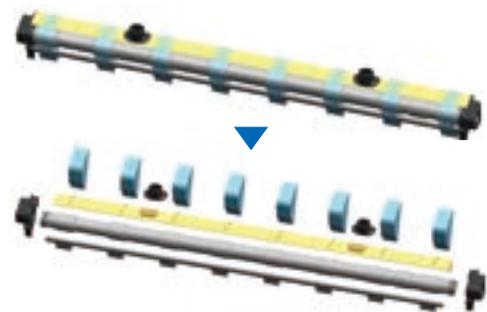
■ **Fan motors are inverter-controlled (Suction pressure can be freely adjusted)**

- Achieves optimal suction pressure according to yarn count
- Reducers on each block ensure uniform suction pressure across all blocks

Cross-section of drafting part



New condensing unit (8-spindle)



Suction duct (for each of the 48 spindles)

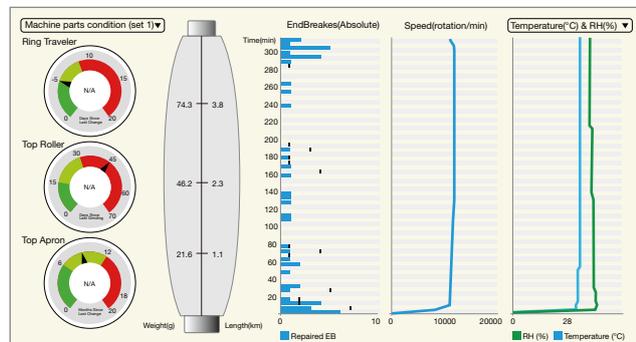
Reducer

Advanced Factory Management

USTER® SENTINEL Ring Monitoring System



End-break sensor



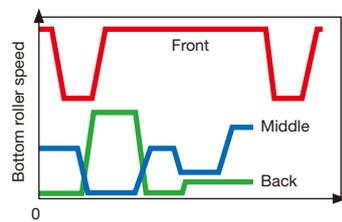
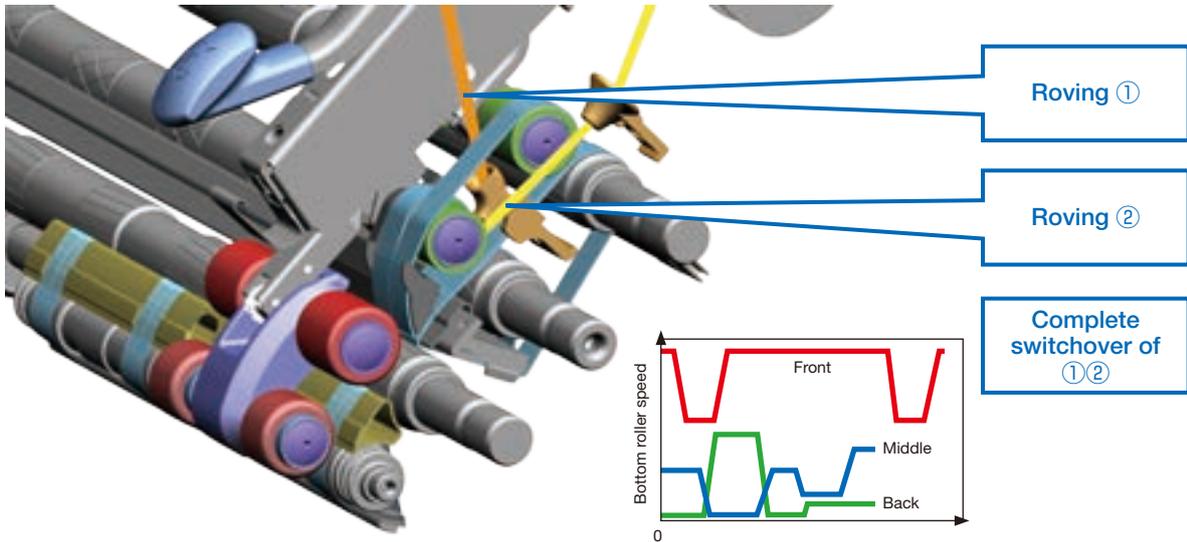
Bobbin build-up report

The USTER® SENTINEL ring monitoring system, designed by our group company USTER, detects end-breaks and uses LEDs to notify the operator, thereby improving productivity. Multifunctional management software enables real-time monitoring of various parameters, and early detection of problems contributes to optimized quality and cost.

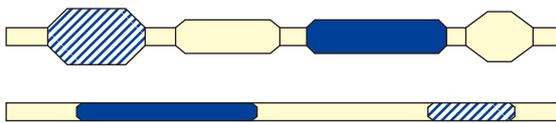
Toyota's New Innovation – MOSAIC® Yarn



MOSAIC YARN



The new MOSAIC® e-draft spinning device, which is capable of spinning injection slub yarn mixed with colored roving sliver, has the ability to produce yarns with a variety of fabric densities, yarn shapes, and slub size. This process is accomplished by combining different types of raw cotton and roving materials. Unlike conventional spinning technology that twists and drafts, this new technology “detaches and attaches” roving sliver. This concept is a totally new innovation that has never been introduced in the spinning industry.



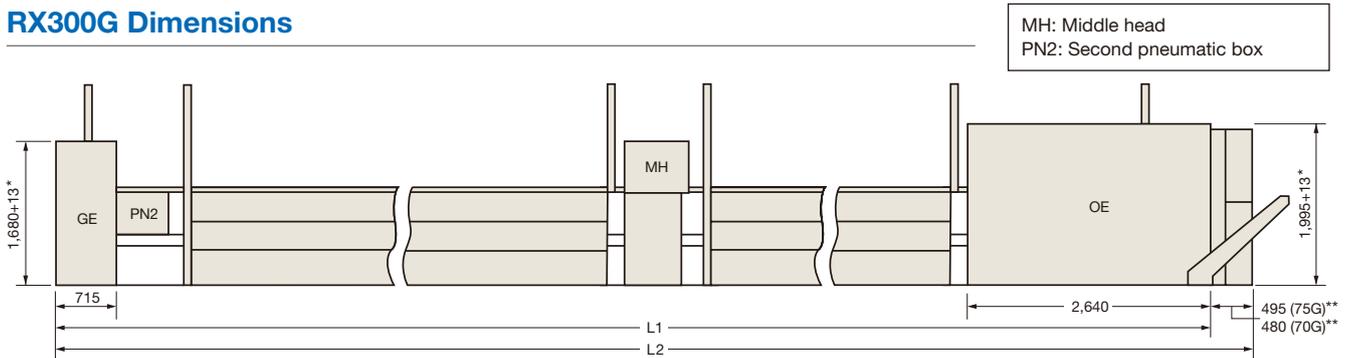
- Complete switchover of two types of roving
- Gradation function can switch two colors gradually

■ MOSAIC®



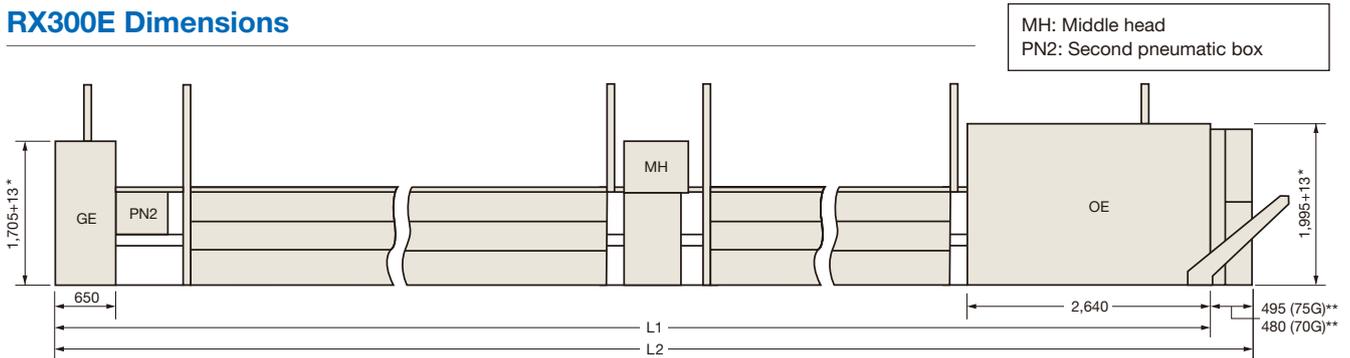
SPECIFICATIONS

RX300G Dimensions



* Machine heights increase by 70 mm when fitted with a compact yarn spinning device (EST III) or TBC (Toyota automatic bobbin changer) for 250 mm (9-inch) bobbin.
** No TBC (Toyota automatic bobbin changer) is included when using the winder link.

RX300E Dimensions



* Machine heights increase by 70 mm when fitted with a compact yarn spinning device (EST III) or TBC (Toyota automatic bobbin changer) for 250 mm (9-inch) bobbin.
** No TBC (Toyota automatic bobbin changer) is included when using the winder link.

Frame Length by the Number of Spindles

Design and specifications are current as of August 2016, but are subject to change without notice.

RX300G (Gear-Driven Draft System)

(Unit: mm)

No. of spindles	No. of blocks	With doffer (using a winder link)		With doffer (with TBC)		With or without MH/PN2
		L1		L2		
		70mmG	75mmG	70mmG	75mmG	
1,008	21	39,035	41,555	39,515	42,050	None
1,056	22	40,715	43,355	41,195	43,850	
1,200	25	45,755	48,755	46,235	49,250	
1,632	34	62,485	66,565	62,965	67,060	Yes
1,728	36	65,845	70,165	66,325	70,660	
1,824	38	69,205	73,765	69,685	74,260	

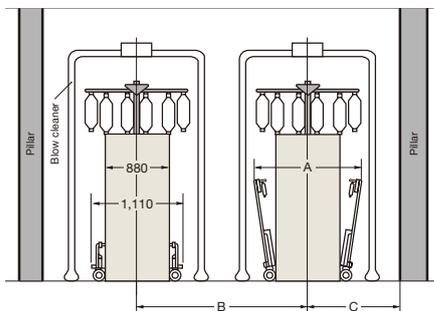
RX300E (E-Draft System)

(Unit: mm)

No. of spindles	No. of blocks	With doffer (using a winder link)		With doffer (with TBC)		With or without MH/PN2
		L1		L2		
		70mmG	75mmG	70mmG	75mmG	
1,008	21	38,970	41,490	39,450	41,985	None
1,056	22	40,650	43,290	41,130	43,785	
1,200	25	45,690	48,690	46,170	49,185	
1,632	34	62,420	66,500	62,900	66,995	Yes
1,728	36	65,780	70,100	66,260	70,595	
1,824	38	69,140	73,700	69,620	74,195	

Required Dimensions for Auto Doffer

Common to RX300G and RX300E



(Unit: mm)

- (A) Max. width of auto doffer (when doffing): 1,540
(B) Min. length between center lines of 2 adjacent frames: 2,100 – 2,300
(C) Min. length between center line of frame and pillar: 1,500

GLOBAL SERVICE NETWORK

Total Customer Support Based on Total Customer Service

Toyota offers a full range of services specifically tailored to individual customers—from design of the mill layout to installation and after-sales service. In addition, at the Toyota Textile Machinery Training Center, we offer a wide range of courses that match the needs of individual customers. Here, technical engineers from around the world get the latest know-how needed for smooth operation of all Toyota textile machinery.



1. Japan 2. Korea 3. China (Shanghai, Shaoxing, Wujiang, Jinan, Changzhou, Lanxi, Tianjin)
4. Vietnam 5. Thailand 6. Indonesia 7. Bangladesh 8. India 9. Pakistan 10. Uzbekistan
11. Turkey 12. Moldova 13. Switzerland 14. Spain 15. United States 16. Brazil

1. Layout

Toyota proposes designs for layout and installation of spinning frames in the mill, and offers plans for the machinery and equipment most suitable for customer mill requirements.

2. Installation

Toyota supervisors will visit the customer's mill and provide advice ranging from loom placement and installation to operational guidance.

3. After-Sales Service

After delivery, Toyota will actively provide after-sales service, including supplying the spare parts needed for smooth machine operation.

4. Training

In response to customer requests, Toyota has set up training courses ranging from how to use the machines to brushing up management skills. Toyota also helps train skilled experts adept in both the hardware and software aspects of its products.

5. Global Service Network

With a number of service centers located around the world, Toyota is able to quickly respond to the needs of local customers.



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