TOYOTA

Ring Spinning Frame

RX 300

Taking energy efficiency to new heights. Introducing the RX300.

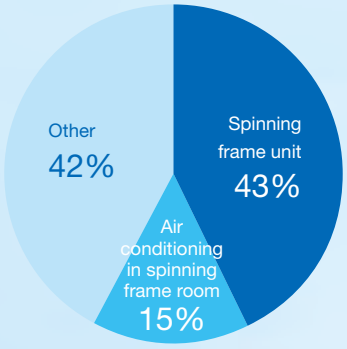
Toyota's RX Series of high-performance ring spinning frames—counting over 20 million spindles*1 in operation around the world—now now enters a new generation. The all-new RX300 was developed in response to many customer requests for saving energy in spinning mills.

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.

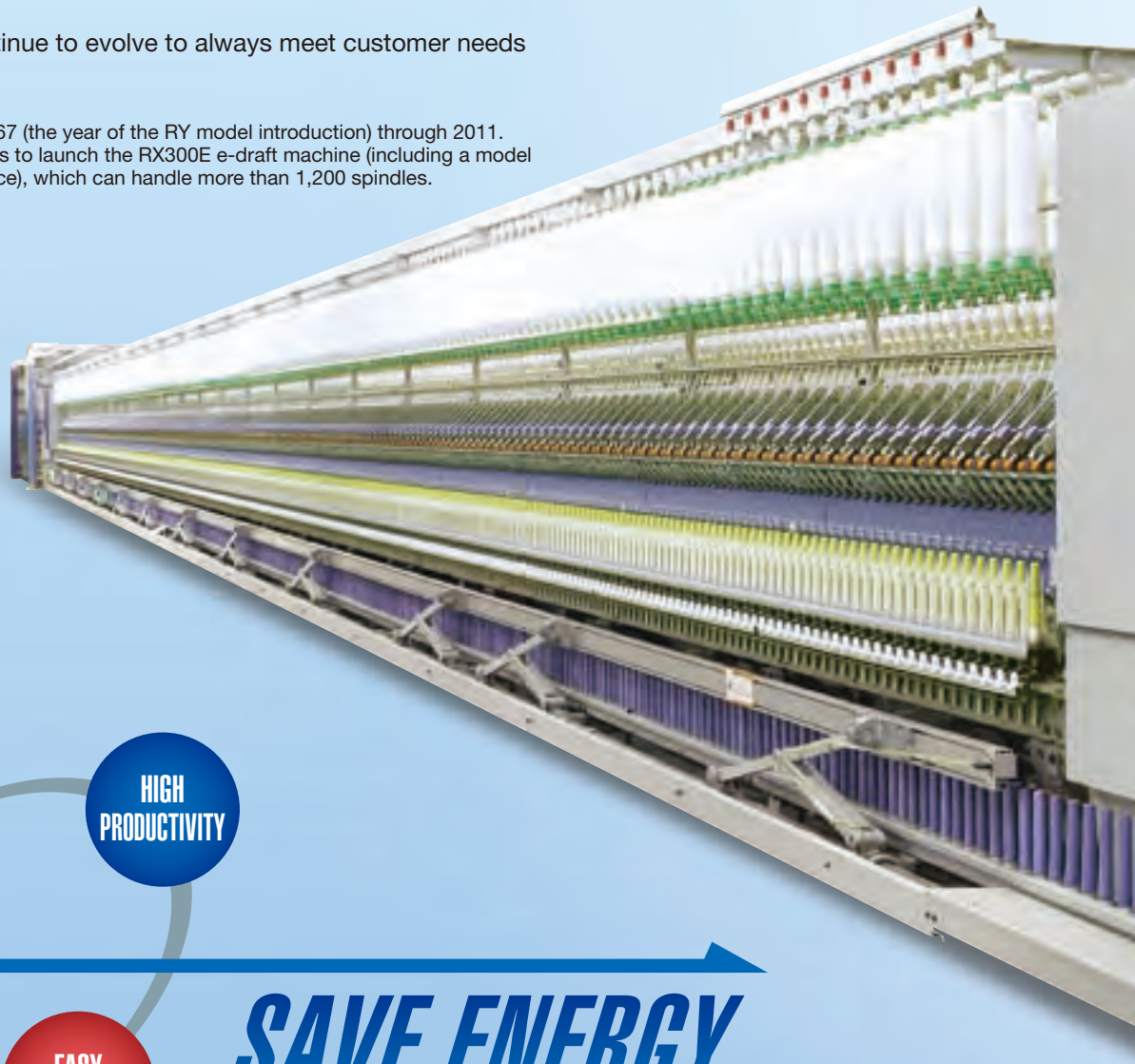
In addition, the RX300 also comes with options such as a compact yarn spinning device and a fancy yarn spinning device, which can be used with any number of spindles*2 on the long frame.

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

*1 Based on sales results from 1967 (the year of the RY model introduction) through 2011.
*2 At the end of 2012, Toyota plans to launch the RX300E e-draft machine (including a model with a fancy yarn spinning device), which can handle more than 1,200 spindles.



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　250 (225) mm

Spindle driving system:
4 spindles by spindle belt

Fiber length:
Max. 64 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
with memory card

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 +500% to -30%
Comes with special software

Compact Yarn Spinning Device
Perforated apron suction method
Perforated apron positive drive
Dedicated suction fan for each
of the 48 spindles
Pressure sensors monitor the
static pressure in each block

Design and specifications are current
as of September 2011.

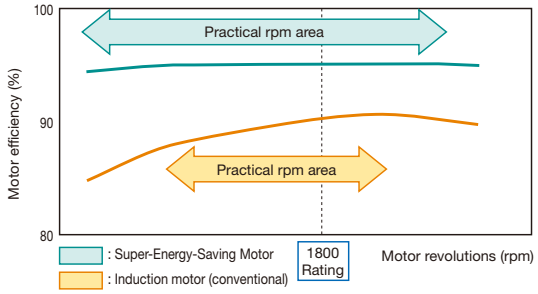
Superior Economy Achieved with New Technologies

Increased Energy Efficiency

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

Instead of the induction motors used in conventional models, the RX300 employs new Super-Energy-Saving Motor and Special Inverter technologies. These enable highly efficient, energy-saving operation.

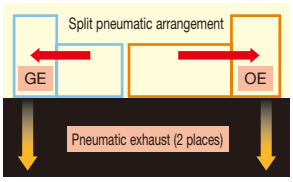
Comparison of Motor Efficiency



Improved motor efficiency makes it possible to reduce power consumption by approximately 5%

Improved configuration of the pneumatic system ensures efficient suction capacity for small drives

1) Pneumatic motor's two-piece arrangement



2) Single nozzle shape

Conventional model (1,200 spindles)	RX300 (1,824 spindles)
Pneumatic motor 7.5 kW	Pneumatic motor 7.7 kW

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 (induction motor)
	2) Pneumatic motor: 7.5 kW
	3) Lifting motor: 1.6 kW

Power consumption per spindle 7% reduction

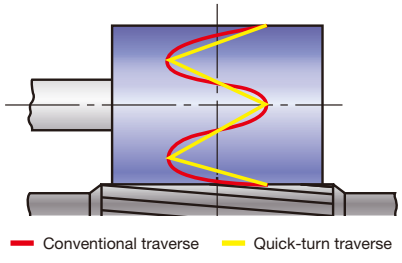
RX300 (1,824 spindles)	Capacity of each motor
	1) Main motor: 85 kW (Super-Energy-Saving Motor)
	2) Pneumatic motor: 7.7 kW
	3) Lifting motor: 2.5 kW

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-turn traverse



By eliminating the time when the machine is stopped at both ends of the traverse, it is possible to prevent uneven wear to the cot and extend the grinding cycle. The RX300 uses a cam system linked to gearing, and so does not require another drive source such as a dedicated motor.

Efficient Plant Operation Brought About by Long-Frame Design

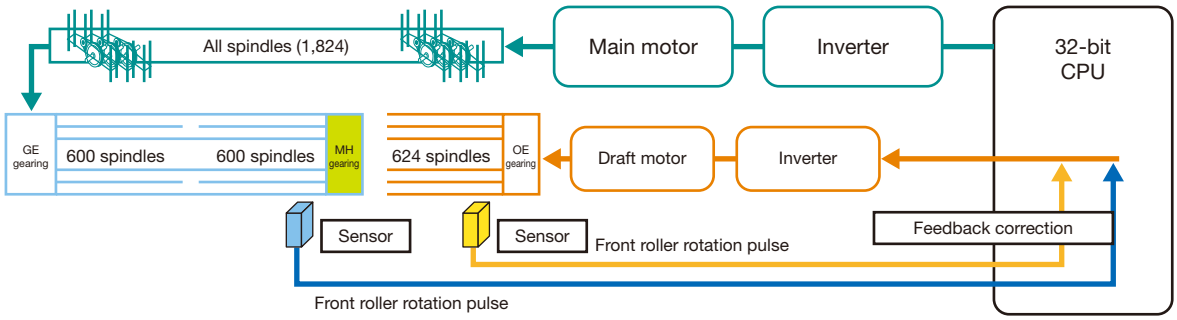
The RX300 includes a model with 1,824 spindles. Increasing the number of spindles per unit means that various expenses relating to spinning equipment—such as factory construction costs or air conditioning costs—can be reduced. This helps reduce the fixed expenses that are included in total production 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. In addition, the rotation pulses of the front rollers, which are driven by the main motor and the draft motor, are detected. And the main control CPU conducts feedback correction so that the twists are uniform on each section of the machine.

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 bobbins

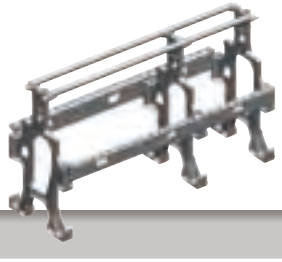
Toyota automatic bobbin changer (TBC)

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

- Easy centering of the bottom roller
- Surface is smooth making it difficult for fly to adhere



Various Types of Yarn Can Be Spun on the Long Frame

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.

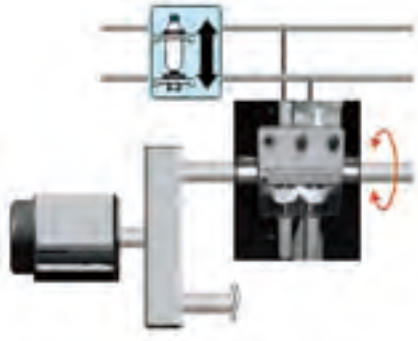
Note: At the end of 2012, Toyota plans to launch an e-draft model, which can handle more than 1,200 spindles.

Positive Lifting Mechanism Displays Its Worth in Many Ways

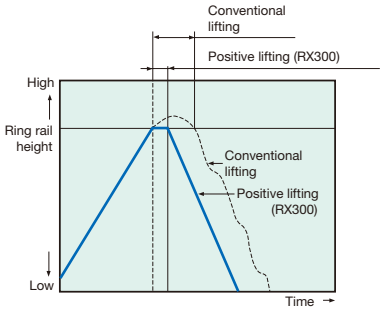
Servo Motor-Driven Positive Lifting

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

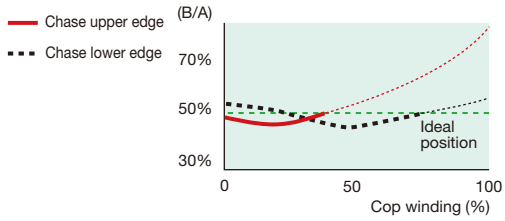
Optimal cop formation at your fingertips

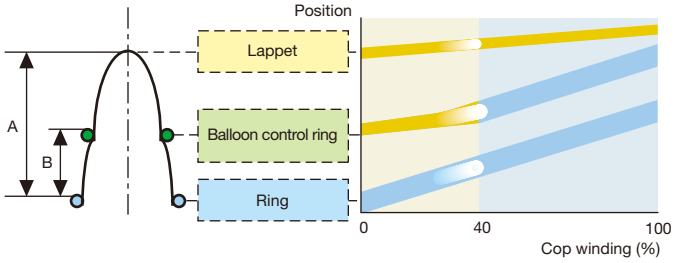
With easy key operation, it becomes very simple to find an optimal setting for cop formation to match various spinning conditions.

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 10.5-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 • Memory card • Maintenance schedule management function


Top menu


Settings for traveler pre-conditioning operating mode

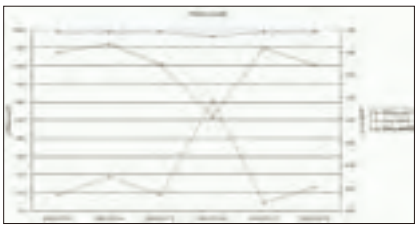

Efficiency transition graph


Troubleshooting

TMS (Toyota Monitoring System) OPTION

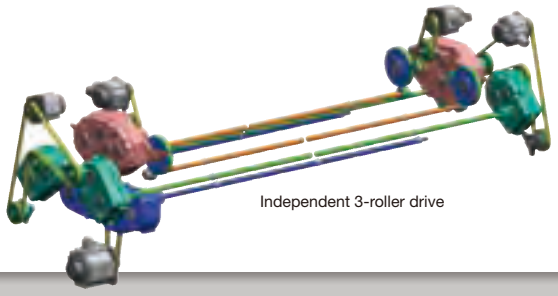
- By using Toyota's original monitoring software, the operator can easily obtain various information such as shift reports, simply by connecting multiple frames.
- The operator can view the RX300's function panel directly from the office PC and check various machine conditions such as spinning settings.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


Top menu


Operating rate graph

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.



Independent 3-roller drive

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

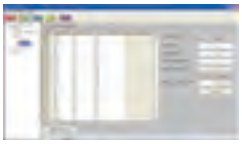
Slub on slub

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 II Compact Yarn Spinning System with Perforated Apron Suction

The EST II uses one suction fan for each of the 48-spindle units. This system ensures uniform suction pressure for all spindles—something that is not possible with other methods.

Exceptionally high-quality compact yarn

Conventional ring spun yarn

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.

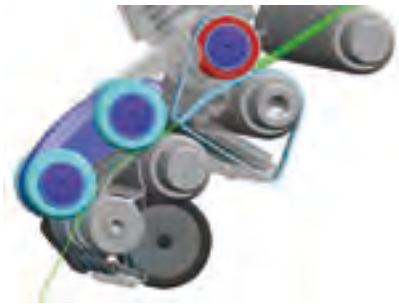
■ Long and narrow perforated apron fitted with a tension device
- Prevents accmulation of fly, and thus allows longer intervals between periodic maintenance.

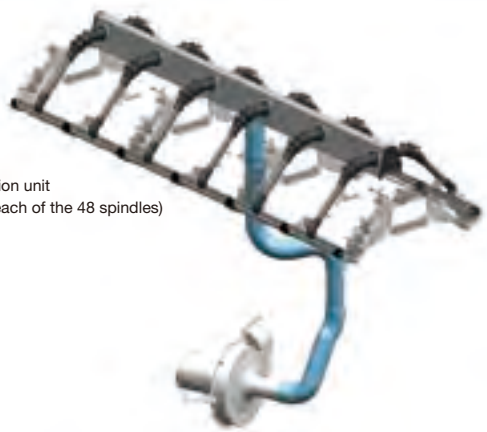
■ Condensing unit is easy to detach and disassemble
- Periodic cleaning is possible in a short time.
- Easy to switch between conventional yarn and compact yarn.

■ One suction fan for each of the 48-spindle units (Suction pressure of each unit is monitored with a sensor)
- Uniform suction pressure even for a long-frame unit.

■ All fan motors are inverter-controlled (Suction pressure can be adjusted at will)
- Achieves optimum suction pressure according to yarn count

Cross-section of drafting part





Suction unit
(for each of the 48 spindles)

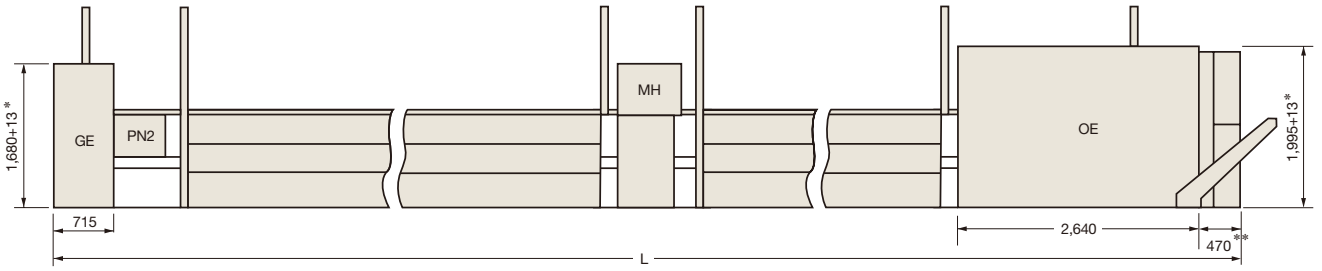
Condensing unit

SPECIFICATIONS

RX300 Dimensions

Common to RX300G and RX300E

MH: Middle head
PN2: Second pneumatic box



* Machine heights increase by 70 mm when fitted with a compact yarn spinning device (EST II) 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 September 2011, 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) L		With doffer (with TBC) L		With or without MH/PN2
		70mmG	75mmG	70mmG	75mmG	
1,008	21	39,035	41,555	39,505	42,025	None
1,056	22	40,715	43,355	41,185	43,825	
1,200	25	45,755	48,755	46,225	49,225	
1,632	34	62,485	66,565	62,955	67,035	Yes
1,728	36	65,845	70,165	66,315	70,635	
1,824	38	69,205	73,765	69,675	74,235	

Includes TBC dimensions.

RX300E (E-Draft System)

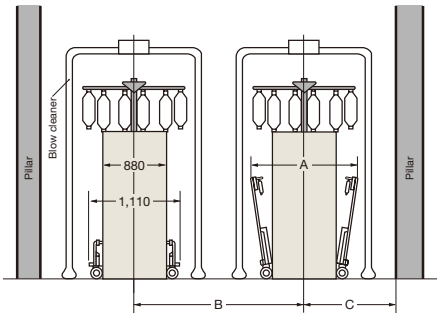
(Unit: mm)

No. of spindles	No. of blocks	With doffer (using a winder link) L		With doffer (with TBC) L		With or without MH/PN2
		70mmG	75mmG	70mmG	75mmG	
1,008	21	39,035	41,555	39,505	42,025	None
1,056	22	40,715	43,355	41,185	43,825	
1,200	25	45,755	48,755	46,225	49,225	

Includes TBC dimensions.

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

Offering Unparalleled Customer Support Through a Total Service Organization

Toyota offers a full range of services, from proposals on plant installation layout to machinery installation and after-sales service by Toyota's supervisors. The Toyota Textile Machinery Training Center also trains engineers from around the world and provides a variety of training courses ranging from how to use the machines to brushing up management skills.

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.

Global Service Centers

1. Korea
2. China
   (Shanghai, Shaoxing, Wujiang, Jinan, Changzhou, Lanxi)
3. Taiwan
4. Thailand
5. Indonesia
6. Bangladesh
7. India
8. Pakistan
9. Turkey
10. Europe
    (Italy, France, Switzerland)
11. United States
12. Brazil

Main Services

1. Plant layout
Before the delivery of machinery, Toyota proposes an installation layout which is designed to optimally suit a customer's plant.

2. Installation
A Toyota expert supervises installation and instructs customers on machine operation.

3. Customer support service
A variety of customer support services are provided, such as supplying spare parts to ensure continuous and smooth operation.

4. Training
Toyota provides a wide range of courses from handling Toyota machinery to management. These substantial courses help customers obtain a level of expertise in both the mechanical knowledge and efficient usage of machinery.

TOYOTA TOYOTA INDUSTRIES CORPORATION

Textile Machinery Division
2-1, Toyoda-cho, Kariya-shi, Aichi 448-8671, Japan
URL: http://www.toyota-industries.com/textile/

Sales Department
Tel: 81-566-27-5317 Fax: 81-566-27-5301

Service Department
Tel: 81-566-27-5325 Fax: 81-566-27-5681

英語
Printed in Japan