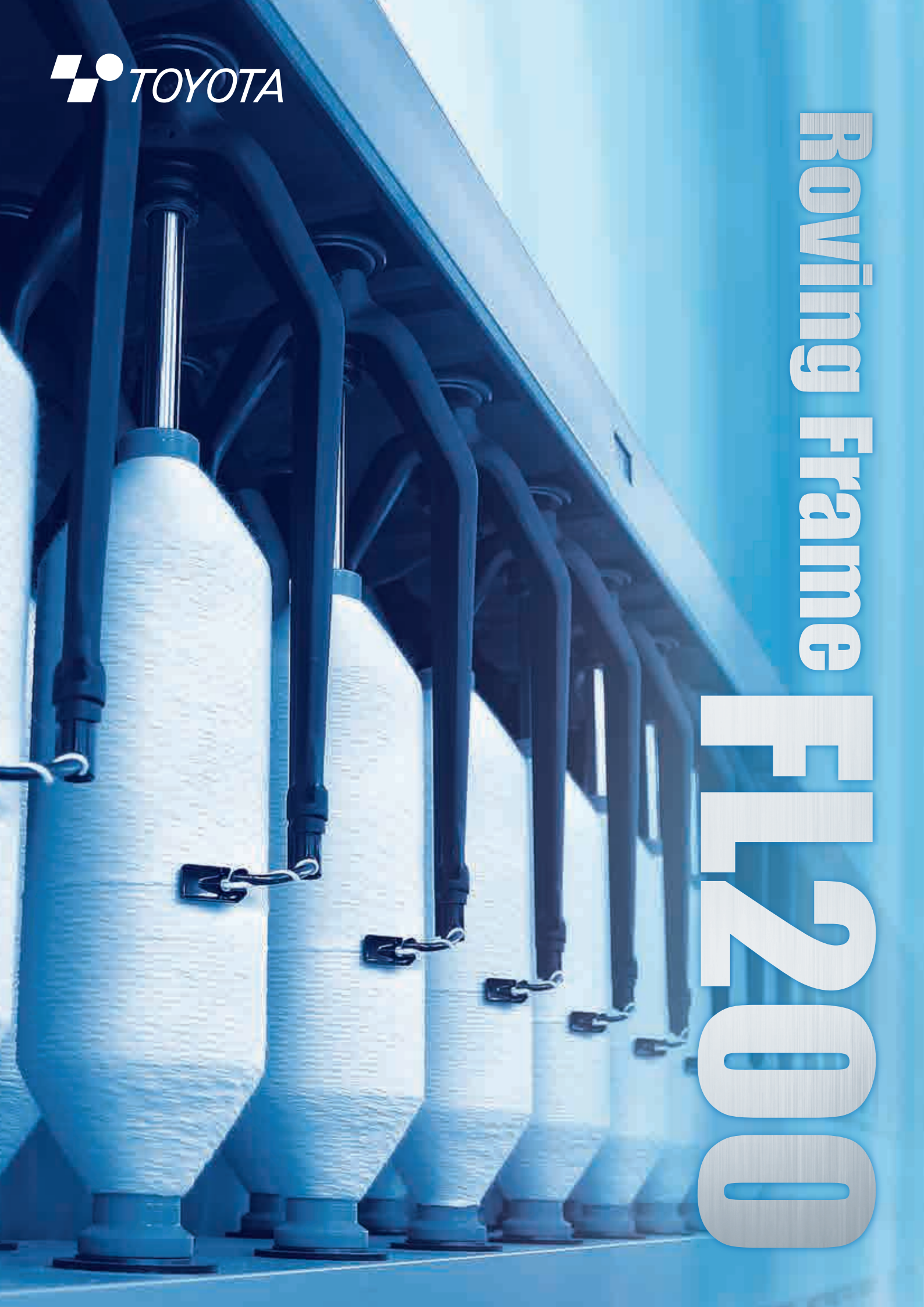
TOYOTA

Roving Frame FL200



The Convergence of Advanced Technology and Tradition

The new FL200 was born out of Toyota's unending pursuit of the ideal roving frame, one that enables anyone to spin high-quality roving at high speeds, the aim of the original FL100. The three-motor drive established in the FL100 has evolved and developed into a four-motor drive, and the latest in servo technology and dramatically improved CPU performance provides even greater accuracy and control. New intelligent features have been added to the FL200, enabling the machine to "think for itself" and become a detail-oriented assistant facilitating the customer's operations. Combined with the synergy of a high-performance tension controller, the FL200 guarantees our customers a roving process one rank above all others in every aspect of performance, including productivity, operability, and roving quality.

Newly Developed **Four-Motor** Drive

- Main Motor Drives Flyers
- Draft Motor Drives Bottom Rollers
- Winding Motor Drives Bobbins
- Lifting Motor Drives Bobbin Rail

Outstanding Productivity

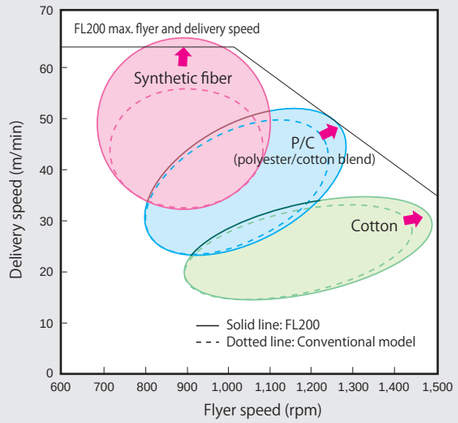
High-speed Flyer

To maintain optimum output quality in high-speed operation, the FL200 uses a flyer designed especially for high-speed performance. An internal stainless steel tubular roving guide connecting directly to the presser protects against the adverse effects of air turbulence, dust, and fly in high-speed production. As a result, the FL200 operates dependably at speeds up to 1,500 rpm.

Automatic Flyer Speed Control Device with Inverter

By simply inputting the average flyer speed and basic roving conditions such as fiber length and roving count, the computer automatically establishes the correct speed progression pattern and adjusts flyer speed via inverter to maintain a constant centrifugal force on the roving. This results in reduced roving breakage for improved efficiency and ease of operation.

Productivity

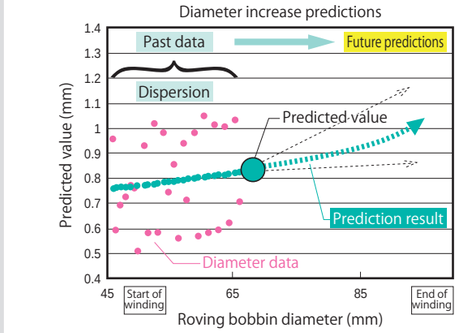


Advanced Control System Ensures Simple, Easy Production of Optimal Packages

A test run is normally required when roving new yarn types and yarn counts to determine the amount of increase in the bobbin diameter and input to the roving frame. The FL200 has completely eliminated this troublesome operation: in addition to an automatic calculation function for bobbin diameter increase based on the database inherited from the conventional model, we have added a new control feature that successively predicts and corrects the actual amount of increase in bobbin diameter based on continuously accumulated operational data. As a result, actual conditions can be determined with greater accuracy, consistently providing the optimum package size with the optimal tension without the need to do a roving test. In addition, the database itself is automatically updated based on actual operation. The more this learning function is used, the greater the consistency in the roving packages.

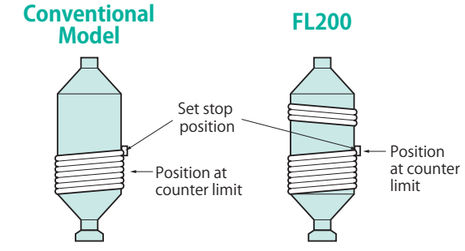
(CD250gr/30yd NF:1,100rpm)

Bobbin Diameter Increase Predictions & Actual Results



Automatic Stop at Fixed Roving Length and Position

The FL200's microcomputer control makes it possible to stop roving at both a fixed position and a specified length. The FL200 automatically returns to the set position once the length limit has been reached. Production yield improves because the length of the roving actually wound falls within 1 meter of the specified length.



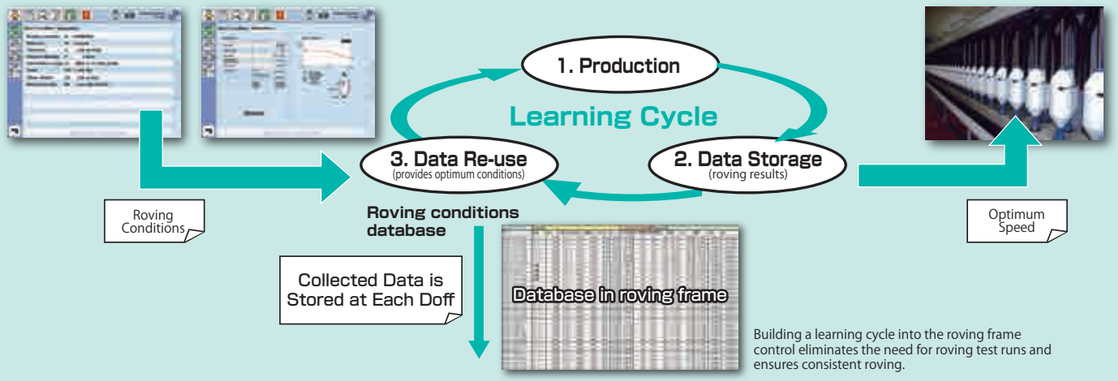
Machine stops at expected roving end position by limit switch after full roving length pre-set by counter is wound.

Machine stops at expected roving end position and roving length by controlling bobbin rail traverse position.

Model \ Sliver type	Wasted roving	
	Carded Ne20	Combed Ne40
FL200	0.068%	0.056%
Conventional model	1.35%	1.34%

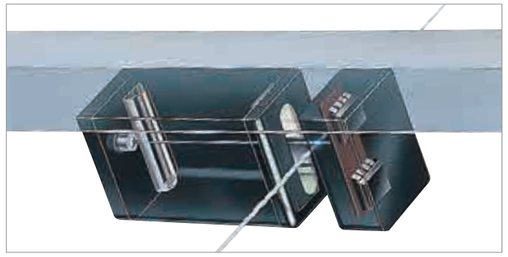
Package Formation Learning Function

Learning function eliminates roving test runs and ensures consistent roving packages.



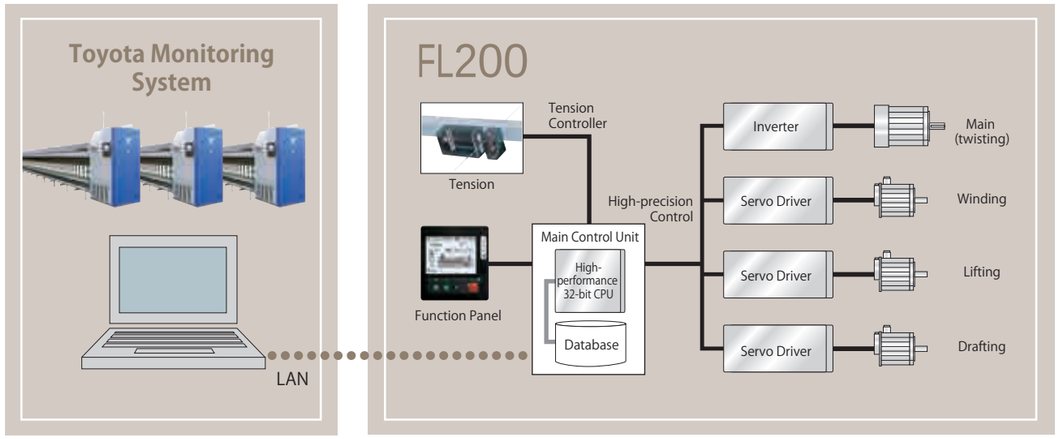
Building a learning cycle into the roving frame control eliminates the need for roving test runs and ensures consistent roving.

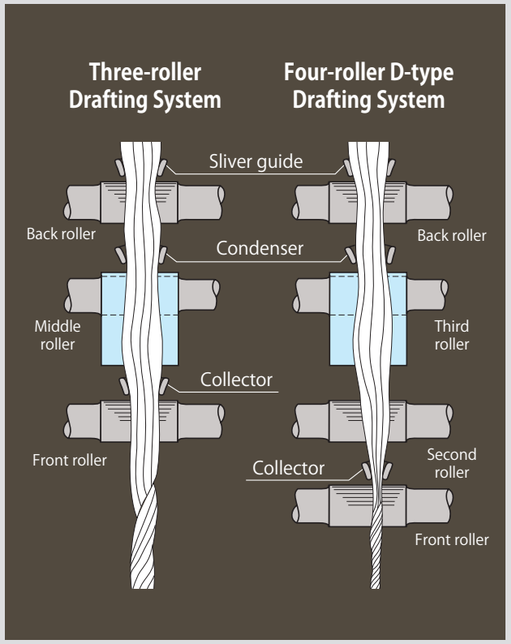
High Quality Roving



High-performance Sensors, a Newly Developed CPU, and the Latest in Servo Technology Deliver the Ultimate in Winding Tension Control

The combination of a microcomputer and CCD 'electronic eye' sensors accurate to the 0.1-mm level maintains ideal winding tension for even the finest count. This system also ensures uniform tension between all frames in a production group, a difficult feat with conventional manual adjustments. In addition, the computer stores settings according to various criteria – flyer speed, fiber type, etc. – and automatically sets the appropriate tension, eliminating the need for frequent setup adjustments. The merging of servo technology providing optimal control functions and the newly developed four-motor drive system into this high-performance tension controller delivers the ultimate in winding tension control.





Four-roller Drafting System for Smooth, Soft Roving

The FL200 is equipped with the four-roller drafting system proven effective and favorably evaluated by customers. This system places a collector between the front and second rollers, separating drafting and collecting zones for superior roving softness and smoothness.

OPTION

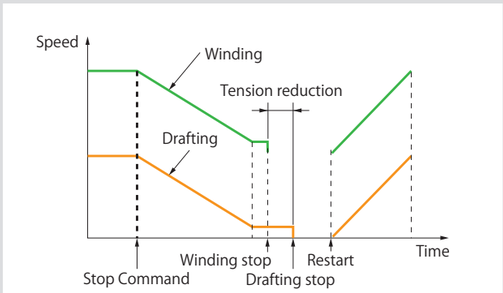
Creel Tension Fine Adjustment Mechanism

When roving combed cotton, sliver is stretched slightly in feeding from can to drafting section. The degree of elongation and thus the evenness of the roving can vary somewhat depending on the relative can position.
To overcome this variance, the FL200 offers an optional creel tension fine adjustment mechanism. By allowing operators to precisely control sliver tension at the feed rollers, this maintains uniform roving and a balanced rate of sliver draw from the feed cans.

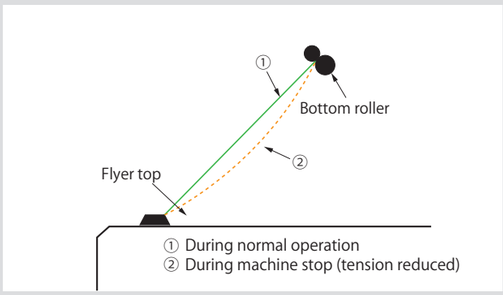
Unique Mechanism Minimizes Roving Irregularities

Two separate motors are used to drive drafting and winding operations. This allows winding to be stopped slightly before drafting to provide some slack between front rollers and the flyer top. Thus, by preventing excessive tension at restart, there is no irregularity in roving even for synthetic fibers or coarse count.

Winding and Drafting Speed



Roving Path Between Front Roller and Flyer Top



Simple Operation, High Reliability, and Easy Main tainability

Large Color Function Panel

A 12.1-inch, 7-language 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, thereby expanding the capability of today's spinning mills.

Function Panel

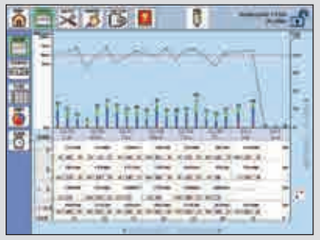
Setting Functions
- Spinning conditions
- Roving bobbin formation
- Flyer speed control
  (automatic optimum pattern calculation, speed control pattern graph display)
- Stop sequence operation, etc.

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

Management Functions
- Setting condition memory function
- USB Memory
- Maintenance schedule management function

Color LCD touch-screen function panel simplifies input and monitoring


Running condition monitor


Shift report

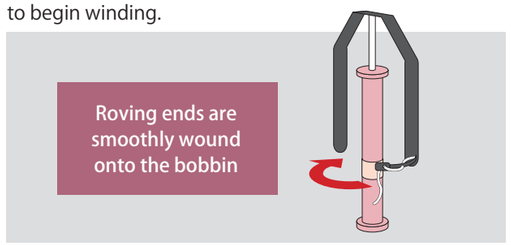

Troubleshooting

TMS (Toyota Monitoring System)

Advanced mill management has never been easier. TMS, Toyota's original monitoring software, allows you to effectively conduct mill management – including maintenance – right from your office. Simply use a LAN cable to connect multiple Toyota machines to any commercially available PC in the office. That PC can then be used to easily access various kinds of information, such as shift reports, and to directly view the function panels of all connected machines for an accurate assessment of how the machines are operating. What's more, machine setting data can be transferred to another machine without using memory cards – a great way to save time and effort when changing yarn types.

Automatic Roving-end Positioning Device for Easy Restarting

The need for manual procedures is further reduced through automatic roving-end attachment. When the bobbin rail is raised to the restart position after doffing and new bobbin insertion, the machine restarts in reverse at low speed for a certain period and then switches to normal rotation. Roving ends are automatically positioned and pressed tightly against the bobbins to begin winding.



Bobbin Collision Prevention Function

In conventional roving frames, an empty bobbin can occasionally be erroneously set at an angle and can thrust the spindle upwards after doffing, leading to damaged components. The FL200 employs an overload detection function on the servo motors used to raise and lower the bobbin rail to automatically sense this bobbin insertion fault and immediately stop lifting of the bobbin rail. This new mechanism prevents these kinds of accidents from happening.

High-twist Roving Cutting Function

An extra twist is applied locally prior to lowering the full bobbin in order to protect the area where the roving is easily cut. This enables the roving to be cut properly between the presser and the wound bobbin regardless of the type of fiber, enabling automatic doffing.

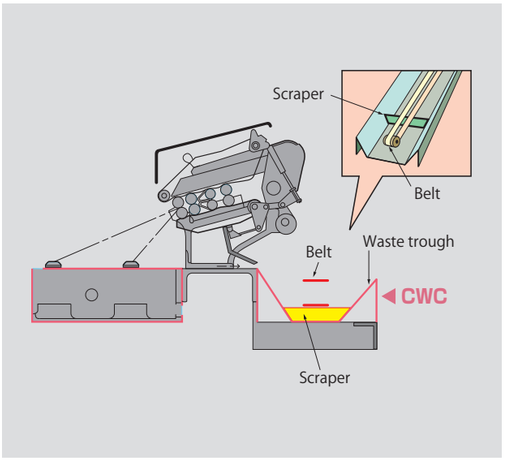
Machine stop motion
↓
Flyers and bobbins rotate at the same speed without delivery (extra twist applied)
↓
Normal roving resumes, feeding extra twist section inside flyer
↓
Bobbin rail lowers (roving is cut between presser and bobbin)
↓
Doffing

Synchronized Back-up System for Power Failure

A back-up power system in the FL200 protects against all kinds of power supply fluctuations, including power failures, enabling the machine to stop while maintaining the synchronization between the spindles and the drafting rollers. In addition, the amount of time back-up power is provided during momentary interruptions to ensure continuous operation has been significantly increased.

Energy-saving Clearer Waste Collector (CWC) Prevents Fly Accumulation (pneuma-less type)

The CWC deposits bottom clearer fly into the waste trough, where a conveyor belt carries it to the waste container at the out end. The pneuma-less suction mechanism uses far less electricity and simplifies maintenance. The elimination of pneumatic noise and microscopic dust improves factory environment.



Stop Motion Upon Roving Breakage

A breakage in the middle of the package during operation may cause stray cotton fiber ends to become wound onto adjacent bobbins, causing chain breaks and affecting quality. To prevent this, a phototube with a special circuit detects breakage and immediately stops the machine.

NEW FRD - Built-in Auto Doffer

Toyota's FRD has been completely remodeled. The integrated Auto Doffer is now part of the highly reliable FL200 roving frame, achieving significant reduction in duffing stop time and space saving. Toyota's original transfer station is installed as standard. Reliable doffing on Toyota's roving fame makes the spinning process even more efficient.

Operation Sequence

Access with this QR code the doffing movie

Doffing Time

Less than 2min.

Bobbin rail with full bobbins is driven forward out of the FL

After lifter goes down and grips the full bobbins, loop rail slides half a pitch and the empty bobbins are inserted

Bobbin rail moves backward into the FL, positioning of the empty bobbins is completed

Original TOYOTA Doffing Device

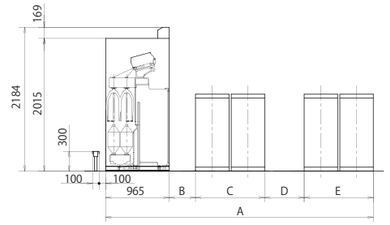
Bobbin transfer station is standard equipment. Performing with highest success rate. Interlinked rigid elements on TOYOTA loop rail secure the pitch. Accurate pitch control enables replacement of full bobbins and empty bobbins.

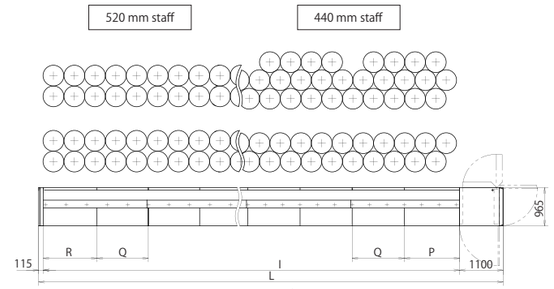
FL200

Floor Plan

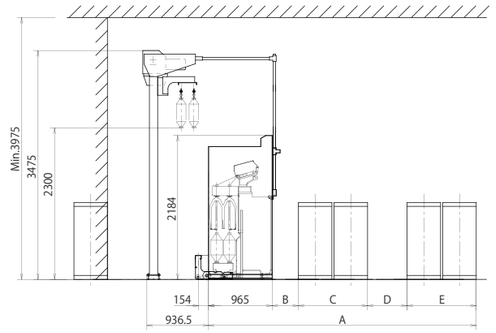
Unit: mm

Model FL200 without FRD





Model FL200 with FRD



Creel dimensions (mm)

	440 mm staff		520 mm staff	
	508 mm cans (20 inch)	610 mm cans (24 inch)	508 mm cans (20 inch)	610 mm cans (24 inch)
A	4,405	5,435	4,065	5,125
B	400	400	400	400
C	990	1,735	1,050	1,270
D	600	600	600	600
E	1,450	1,735	1,050	1,890
Configuration	5 or 6-row staggered		4 or 5-row staggered	

Flyer rail length (mm)

	Staff (mm)	
	440	520
P	1,400	1,380
Q	1,320	1,300
R	1,380	1,360

Total length (mm)

440 mm staff		
Number of spindles	I	L
120	13,340	14,555
144	15,980	17,195
168	18,620	19,835
180	19,940	21,155
192	21,260	22,475

520 mm staff		
Number of spindles	I	L
120	15,740	16,955
140	18,340	19,555
160	20,940	22,155
180	23,540	24,755
200	26,140	27,355

Design and specifications are subject to change without prior notice.

Main Specifications

Staple length		22 ~ 40 mm			40 ~ 51 mm		40 ~ 51 mm	
Drafting system		4 - roller (D type)			4 - roller (D type)		3 - roller	
Weighting arm	Maker	TEXParts			TEXParts		TEXParts	
	Type	PK1550			PK1550		PK1550	
Weight (kg/2 spindles)	F	9 - 12 - 15			9 - 12 - 15		20 - 25 - 30	
	2	15 - 20 - 25			15 - 20 - 25		10 - 15 - 20	
	3	10 - 15 - 20			10 - 15 - 20		15 - 20 - 25	
	B	10 - 15 - 20			10 - 15 - 20		——	
Cradle type		OH5022			OH5042		OH5042	
Cradle radius x width (mm)		35.0 × 40.4			45.0 × 40.4		45.0 × 40.4	
Bottom roller diameter (mm)	F	28.5			28.5		31.75	
	2	28.5			28.5		28.5 (knurled)	
	3	28.5 (knurled) / 31.75 (knurled)			28.5 (knurled) / 31.75 (knurled)		31.75	
	B	28.5			28.5		——	
Top roller diameter (mm)		28			28		35	
Roller gauge (mm)	F ~ 2	35 ~	Max.193 (total)		42 ~	Max.193 (total)	62 ~	Max.185 (total)
	2 ~ 3	47 ~			60 ~		52 ~	
	3 ~B	45 ~			49 ~		——	
Clearer		Positive intermittent revolving clearer with comb						
Feeding can		Up to 610 mm (24") diameter x 1,220 mm (48") high						
Creel		Positive revolving feed roller with extended creel (single sliver feed system)						
Power required		Main motor : 15 kW, 18.5 kW						
Special devices (included)	High speed	Toyota original flyer	Automatic flyer speed control with inverter					
	Quality		Automatic tension controller, roving irregularity prevention, roving stop at set length/position, package shoulder collapse prevention, optical electronic roving stop motion, optical electronic sliver stop motion, stop motion upon roving breakage at middle part of package					
	Operation and maintenance		12.1-inch color function panel, bobbin misplacement prevention device, automatic grease lubrication for draft gearing, automatic grease supply system for flyer gear, clearer waste collector (pneuma-less type)					
	Automation		Automatic roving-end positioning for machine restart, high-twist roving cutting device					
Options	High speed	Bobbin jumping prevention device						
	Quality	Creel tension fine adjustment mechanism						
	Operation and maintenance	Top and bottom bunch winding						
	Labor saving	NEW FRD - Built in Auto Doffer						

TICS

The Toyota Internet Customer Support system (TICS)* connects Toyota and its textile machinery users through the Internet to provide information such as parts inventory and price, enabling our customers to get information they need when they need it.

* Data of TICS availability differs from region to region.

Part number search

Price estimate

Order status inquiry

TOYOTA INDUSTRIES CORPORATION

Textile Machinery Division
2-1, Toyoda-cho, Kariya-shi, Aichi 448-8671, Japan

Sales Department
Tel: +81-566-27-5328 Fax: +81-566-27-5301
Service Department
Tel: +81-566-27-5325 Fax: +81-566-27-5681

KIRLOSKAR TOYOTA TEXTILE MACHINERY PVT. LTD.

Factory: Plot No. 10–13, Phase II Jigani Industrial Area, Jigani, Bangalore 560 105, India
Tel: 91-8110-419555 Fax: 91-8110-419519 E-mail: mktg@kttml.com

Coimbatore Branch
124-D, Crescent Court, Race Course Road, Coimbatore 641 018
Tel: 91-422-2223183 Fax: 91-422-2220987 E-mail: kttmcbe@kttml.com

Delhi Branch
905-907, Kirti Shikhar, 11 District Center, Janakpuri, New Delhi 110 058
Tel: 91-11-25537620/25513302 Fax: 91-11-25513304 E-mail: kttmdel@kttml.com

Mumbai Branch
402, Dev-Milan Co-op Premises Society, Above Hotel
Woodland Retreat, L.B.S. Road, Near Tip Top Plaza, Teen Hath Naka, Thane (West) 400 604
Tel: 91-22-6798-8863/64 Fax: 91-22-6798-8865 E-mail: kttmbom@kttml.com

https://textile-machinery.toyota-industries.com/

2021.09

English