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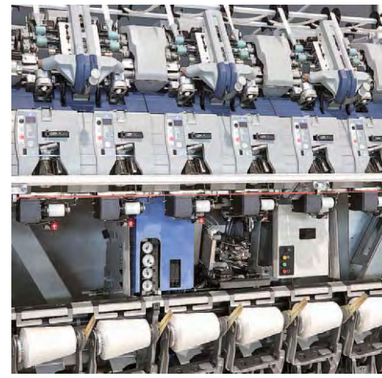
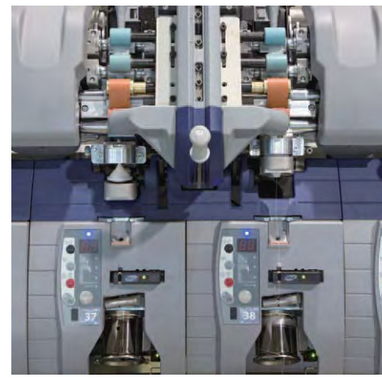
muratec



Spinning System

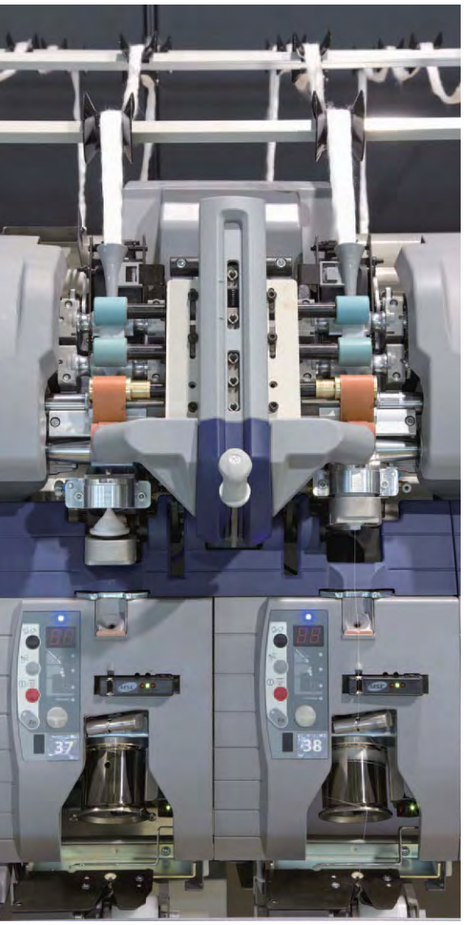
VORTEX Ⅲ 870



We reserve our right to modify them at any time, to be confirmed by authorized specification.

CAT. NO. 21P4G2 11-09-5(NS)

MURATA MACHINERY



Spinning System

VORTEX Ⅲ 870

VORTEX Enters its 3rd Generation in Search of even Greater Development!

The superior pilling resistance, external appearance, printability and other characteristics of VORTEX yarns and fabrics have been recognized all over the world and have greatly expanded the product development possibilities in the fashion world. At present the yarn is used by some of the largest apparel businesses in the world. The VORTEX spinning system is the source of VORTEX yarn and has continually evolved since its explosive debut in 1997.

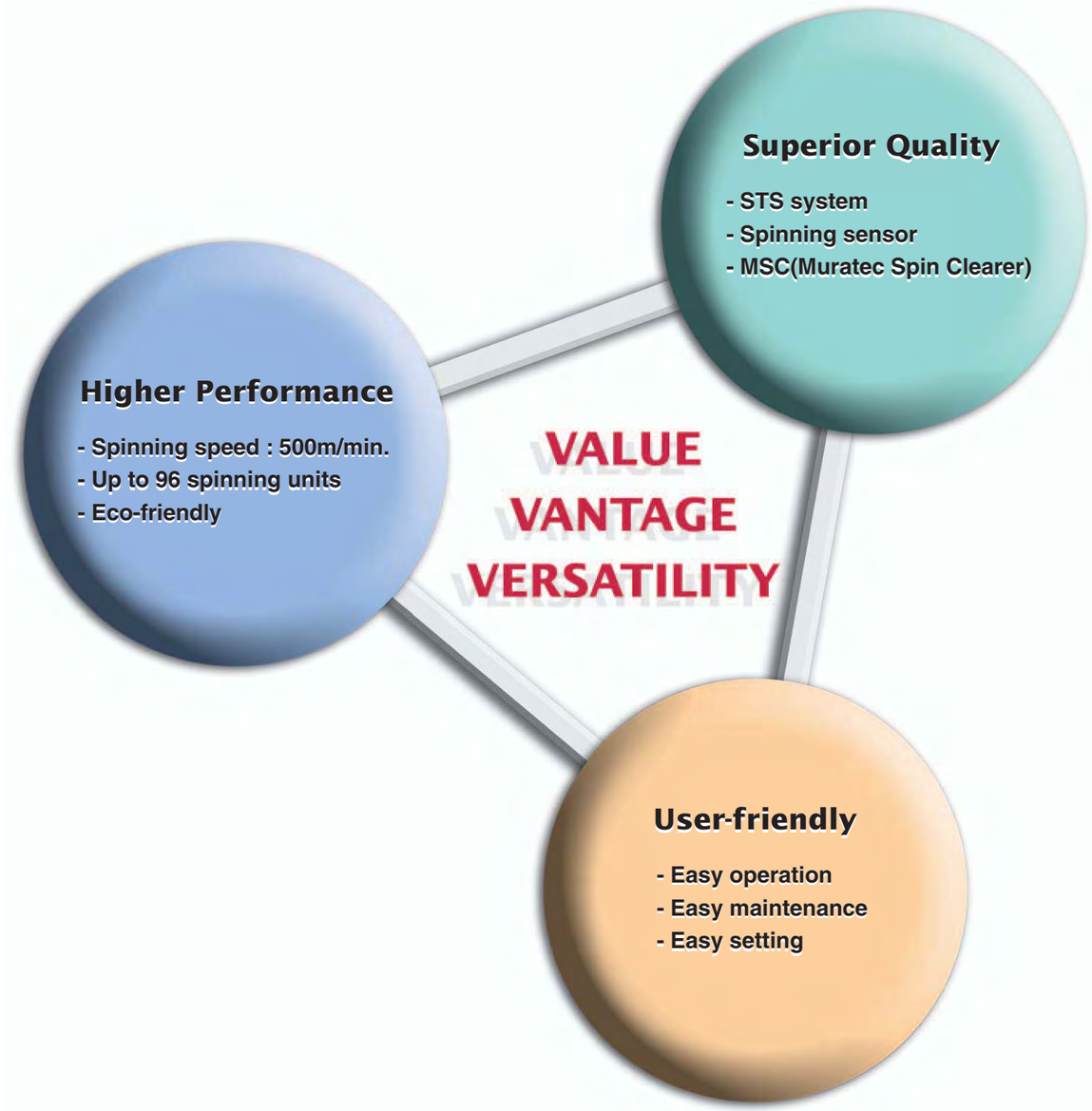
The automatic yarn piecer for continuous spinning of VORTEX yarn and the name spread throughout the world in the 1st generation. In the 2nd generation, self-spinning technologies and splicers, which are currently the standard in the spinning world, were added allowing for more stable and improved joint for all types of yarn.

What will be expected of the 3rd generation VORTEX?

We have concentrated the answer to these expectations in the 3 concepts of “Value”, “Vantage” and “Versatility”. We began work on the 3rd generation VORTEX after thoroughly investigating what would be necessary in order to apply these concepts to performance. The VORTEX Ⅲ 870 which was born as a result of this development has realized greater yarn quality, ease of use and performance than ever before.

The STS(Spinning Tension Stabilizing) System is the key technology for VORTEX.

In the mechanism which draws the yarn from the spinning nozzle a friction roller is adopted instead of the nip roller. This system and newly developed spinning sensor realize stable yarn structures as well as consistent and reliable yarn qualities. This epoch-making technological innovation was possible because of Muratec’s intimate familiarity with VORTEX spinning and the yarn clearing method. We firmly believe the 3rd generation VORTEX Ⅲ 870 will contribute to the development of the fashion world.



VORTEX Yarn

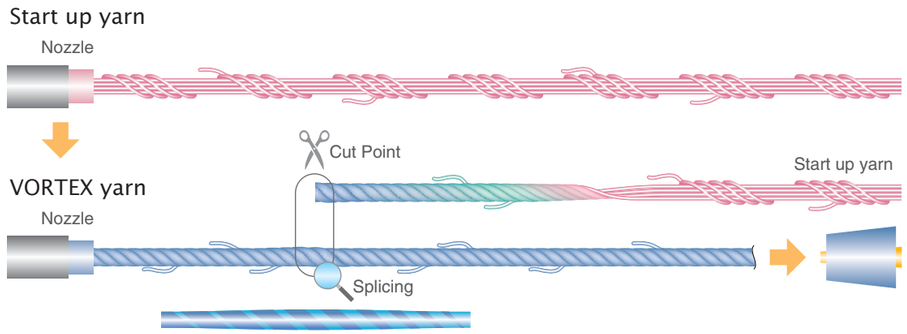
VORTEX yarn superior quality

During spinning, the longer fibers converge to the core and short fibers diverge to the outer layer by the air. The unique yarn construction gives VORTEX yarn the following advantages.

- Less Hairiness & Clear Appearance
- Water Absorption & Wash Resistance
- Resistance to Pilling & Abrasion
- Stability against Deformation

Self-spinning Technology

The self-spinning system developed by Muratec has allowed for the mounting of the splicer which is standard for joining the yarn. To initiate spinning, 'Start-up' yarn is created first, soon after the 'Start-up' yarn is switched to the VORTEX yarn. Then the splicer works for joining the VORTEX yarns and removing the 'Start-up' yarn. 'Start-up' yarn is cut and removed during splicing.



VORTEX YARN GUIDE BOOK

The VORTEX YARN GUIDE BOOK provides photos and graphs of the characteristics of VORTEX yarn.

WEBSITE www.muratec-vortex.com

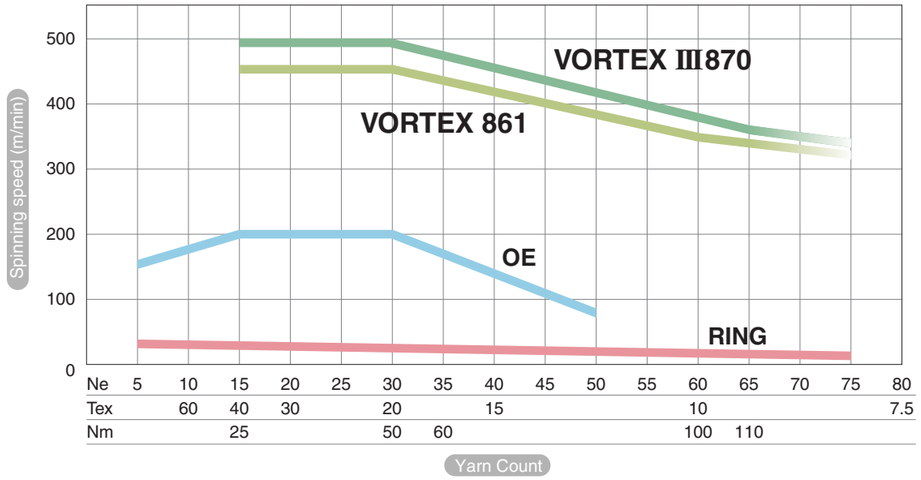
The VORTEX website continually provides all of the latest VORTEX information, as well as information on VORTEX partners who can provide VORTEX yarn.

The Fastest Spinning

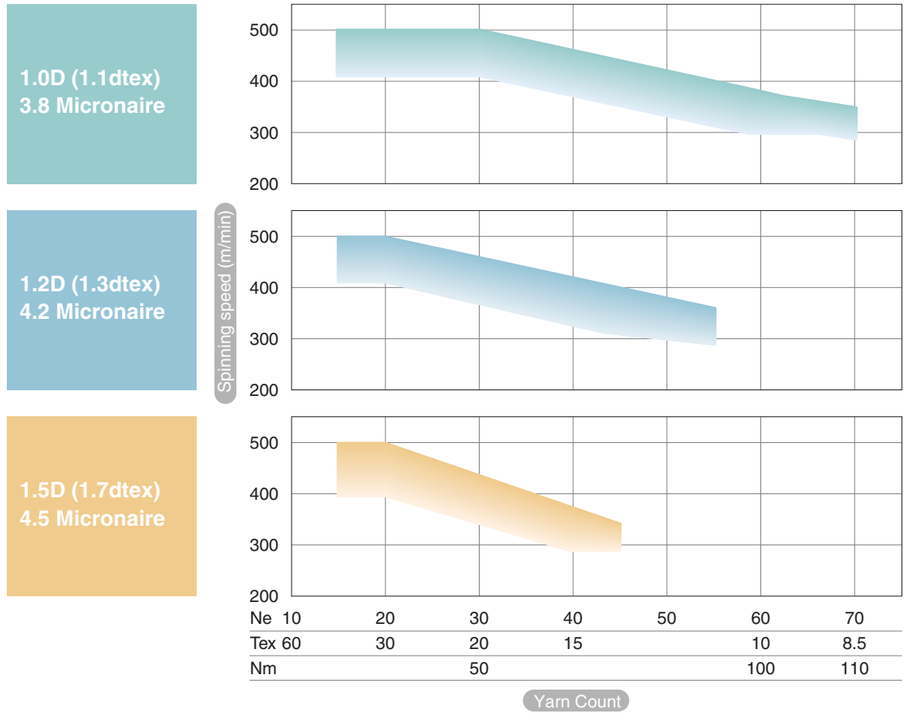
500m/min – World's Fastest Spinning

The VORTEX III 870 boasts the world's fastest spinning of staple yarns at 500m/min. This provides 20 times the production of ring spinning. The VORTEX provides 3 times the productivity even against OE spinning.

Comparison of Spinning Speed by Model/Yarn Count



Relationship of yarn count and spinning speed by Fiber Fineness.



Smart Layout

1 Sliver

2 Relax Zone

Twist concentration is relaxed for stable drafting.

3 Draft Zone

The independent drive of 3rd - 4th lines and the wide range of drafting allow for flexible spinning parameters and variation of materials.

4 Spinning Zone

Highly functional VORTEX yarn is created with VORTEX spinning method.
Newly developed nozzles allow for even faster spinning.

5 Monitoring Zone

MSC and the spinning sensor are installed in the spinning zone.
These sensors also provide real time monitoring of spinning conditions.

6 Winding Zone

Building of yarn packages from parallel up to 5° 57' under high speed winding conditions.

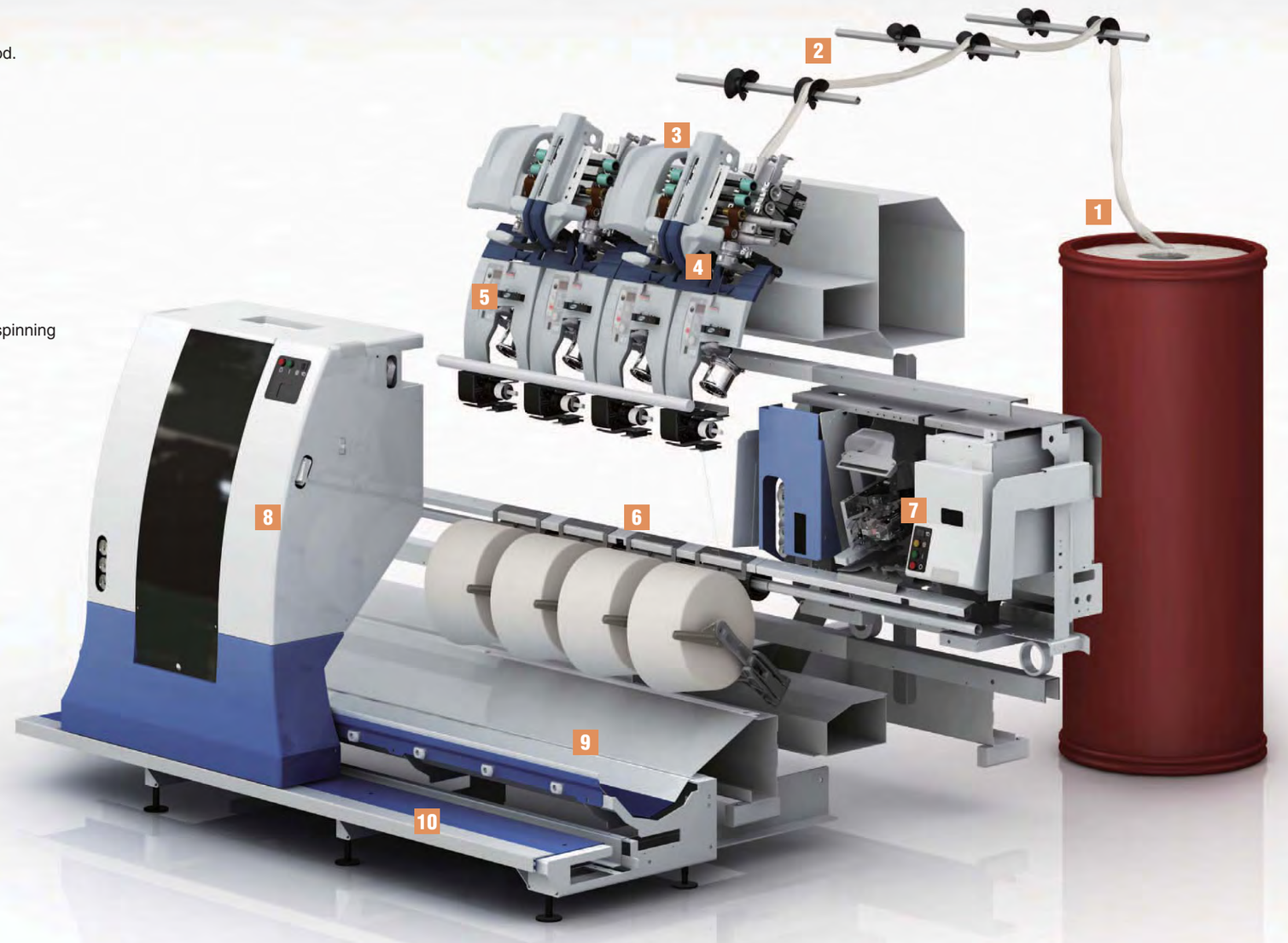
7 Splicer

A global standard splicer is mounted. This is made possible by the self-spinning technology.

8 Auto Doffer

9 Package conveyor

10 Maintenance Step



VORTEX Technology

1 Cradle

New designed cradle simplifies lot changes. Cradle pressure can be set in 2 ways without replacement of the parts.

2 Draft Section

High draft is realized through a 4 line draft. Muratec original shaped cots are adopted in the front top roller to stabilize yarn quality in high speed spinning. Independent drive of the back rollers (3 line, 4 line) allows for setting of all draft ratios by VOS. In addition, independent control of 3 line and 4 line draft allows for setting of optimal yarn count during self-spinning, improving splicing success ratio.

3 Roller Keeper

Newly developed Roller Keeper allow for reliable prevention of defective yarn production due to lapping fiber on the bottom rollers.

4 Spinning Chamber

The airflow in the spinning chamber has been optimized. The use of cassette type nozzle and spindles has greatly reduced the time required for changeovers.
(80 units conversion, formerly 450 minutes ->180 minutes)

5 Indicator

Unit status is displayed individually on the indicator. On stopping spinning its cause and location are also informed.

6 MSC(Muratec Spin Clearer)

The MSC in combination with the VOS-visual on-demand system allows for quality control and simple, precise centralized management. Installation of the optional MSC-F also allows for detection of foreign fiber.

7 Spinning Sensor

Newly developed Spinning Sensor installed in the spinning zone, allows for more precise clearing in combination with the MSC.

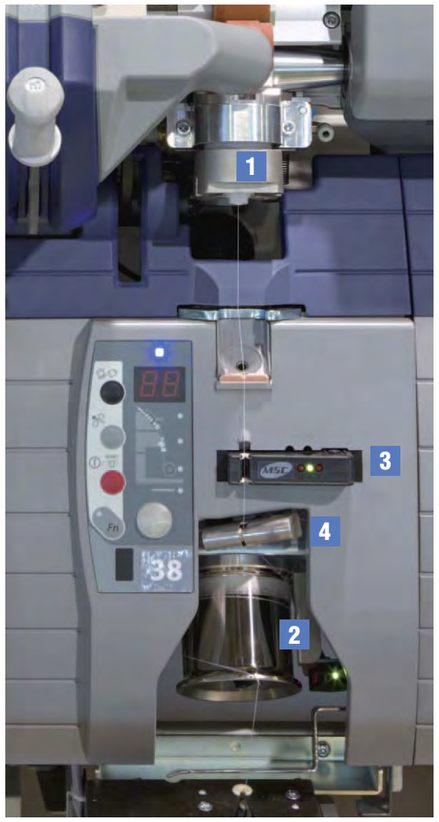
8 Friction Roller

This roller draws the yarn from the nozzle. During splicing the yarn is accumulated on it. Compared to the previous nip roller, this allows for more stable drawing and a great reduction of stress on yarn. In addition, the built-in flyer provides optimal winding tension and equipped minimizing tension fluctuations.

9 Waxing Device

Up to 45mm wax can be supplied. No tools are required to adjust the add-on %.

STS System



The STS(Spinning Tension Stabilizing)System is a unique and landmark spinning system first used on the VORTEX Ⅲ 870. Newly developed Friction Roller is equipped in stead of nip roller. More precise control of the drawing of yarn from the spinning. Integrating the clearing zone into the spinning zone results in the optimum spinning monitoring.

1 Spinning Chamber

2 Friction Roller

Frictional force is generated between yarn and roller by winding a preset amount of yarn onto the friction roller. This frictional force contributes to draw the yarn from the spinning chamber with the roller rotating.

3 MSC

Clearing is more precise due to the stable tension provided by the STS system.

4 Spinning Sensor

Located between the spinning chamber and the friction roller, the spinning sensor directly monitors spinning conditions. This sensor allows for detection of any irregular conditions which may occur during spinning.

Precise Detection & Feedback by MSC - Muratec Spin Clearer

MSC - Muratec Spin Clearer is a digital clearer for precise monitoring of yarn quality. It includes a wider tolerance setting and improved defect detection. In addition, it supplies spinning performance data to the VOS. Foreign fiber detection is also possible when equipped with the MSC-F (optional).

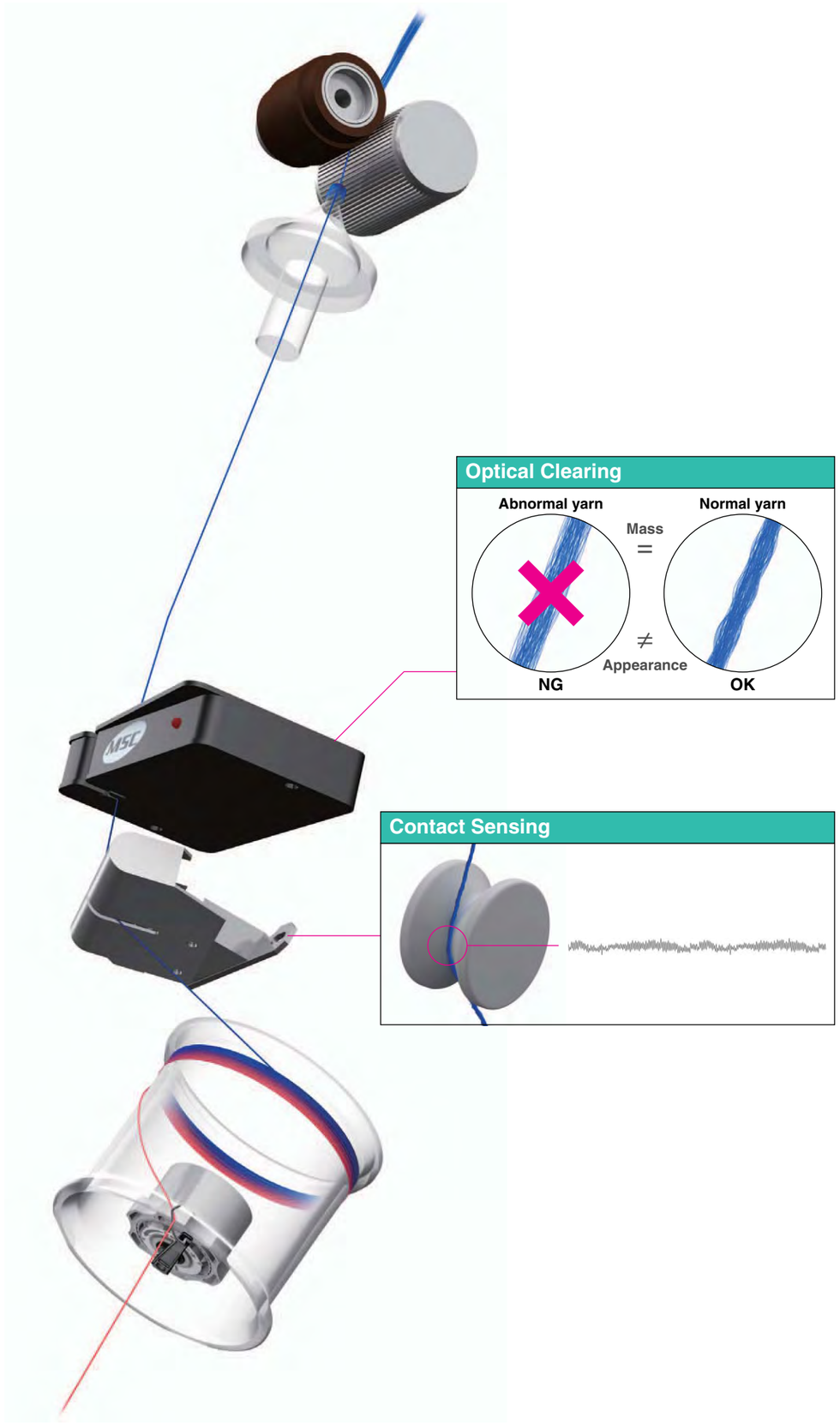
The Function of MSC

Yarn defect detection

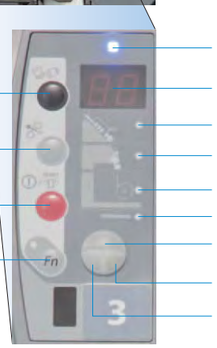
S(Slub), L(Thick), T(Thin)-channel
TT(Long Thin)-channel
LL (Long Thick)-channel
Nep channel
Yarn diameter index detection channel
Foreign Fiber Detector (FFD) as option (MSC-F)
Trash Filter (MSC-F) *option

Quality control

Continuous CV% measuring
Precision Classification Data
Periodic defects (short and long)
IPI Data
Hairiness (yarn structure change) Data



User-Friendly Equipments



Back roller / Friction roller Manual ON switch

Nozzle Nanual ON / Drum Contact Manual ON switch

ON/OFF switch

Function switch

Multi indicator

7-segment indicator

Alarm status indication (upper unit)

Alarm status indication (middle unit)

Alarm status indication (lower unit)

Alarm status indication (quality)

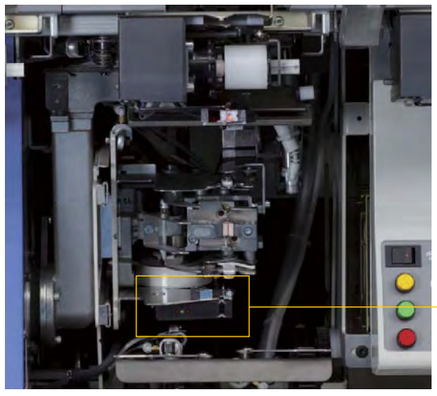
Stop alarm (Red)

WAX shortage alarm (Orange)

Full package Signal (Blue)

Unit indicator

Indicates the operational condition of each spindle to the operator. When the unit stops, the indicator shows the problem in the 7-segment code and the location in red lamps. The indicators for a full package, wax shortage and yarn stoppage are easily visible. Also, the each device function can be checked by maintenance mode.



Splicer Carriage

A maximum of 6 carriages (for 96 units) can be mounted. The Splice Monitor is also available as option. To achieve a quality splice, splicing is fulfilled at the ordinal yarn path by relocating the splicer head. The splicing cycle begins and the end down is restarted.

Cycle Time	10seconds
Traveling speed	35m/min
Frequency of splicing	100 times/h/unit

Splice Monitor (Option)

Checks yarn splice quality.

AD (Auto Doffer)

Travels in front of the spinning units. After full package is doffed, a empty tube is set on the cradle and a transfer tail is formed first, then starts winding. Doffed packages are automatically placed on the package conveyer.

Cycle Time	15seconds
Traveling speed	25m/min
Package dia.	Max. ø300mm

Automatic Waste Fiber Extracting System

An automatic waste fiber extraction system is equipped as standard. With re-engineering of blower design, optimum blower motors are adapted. The system eliminates frequent manual cleaning of the filter box, making the system both user and environmentally friendly.

Package conveyor

Reduces the operator's work load by transporting full packages to a pickup point at the machine end. A speed adjusting function, automatically slows the conveyor when the packages approach to the machine end and stop when a package reaches the pickup point.

Package Lifter (option)

A package lifter is available which helps operators to collect packages and contributes to working efficiency.

Easy Operational Layout

A front bar is installed along the entire length of the machine to allow for safe and reliable operation. In addition, a maintenance step is set at the front of the machine for easy operation without damaging packages.

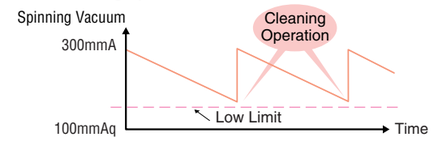
Modular Design

Major parts are modularly designed for easy maintenance. These parts can be attached and dis-attached without difficulty.

Stable Pressure of Vacuum Chamber Reduces Power Consumption

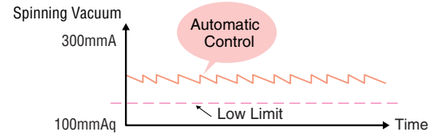
Conventional Vacuum Chamber

Manual Cleaning Operation



VORTEX II 870 Operation Free Vacuum Chamber

Cleaning Operation Free



Total Support

VOS Ⅲ – Visual On Demand System

The VOS Ⅲ visual on-demand system is a data management system which is both flexible and easy to use. It is the product of Muratec's accumulated technology and knowhow.
Operation status, yarn quality management, operation management, maintenance management and a variety of other data are graphically displayed on the easily viewable large screen touch panel. Can also be used for production and quality trend analysis.

Operating summery

An easy-to-see 15" touch panel display provides various data related to operating conditions.

- Setting of package parameters
- Spinning condition
- Clearing condition
- Forced stop condition
- Splicing condition

Spinning Parameters

You can set spinning parameters while simultaneously verifying both the current lot and other lots.

- Yarn speed
- Total draft ratio
- Main draft ratio
- Feed ratio
- Take up ratio
- Winding conditions

Operation management

Determines the efficiency losses for each possible cause and displays which one is most responsible for current losses.

- Production efficiency
- Loss efficiency
- Red light stoppage factors
- Yarn piecing wait time
- Doffing wait time

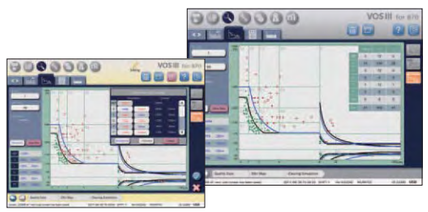
Yarn Quality Control

Allows for verification of all aspects of yarn quality control, with the exception of yarn tenacity, displaying data between unit or trend graphs.

-Slub defect removal
-Thick/thin yarn removal
-Yarn evenness (CV%, IPI value)
-Measuring count changes

Maintenance Control

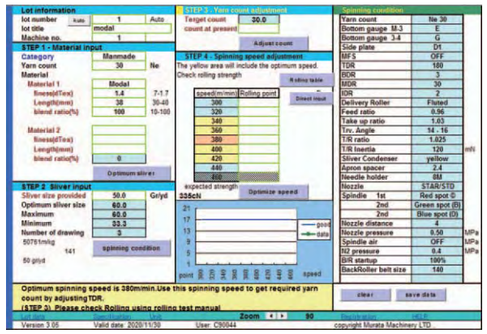
When an alarm is triggered, the system automatically displays both the location and cause of the problem. The system also records incidents of alarms for each log and shift, supporting maintenance analysis.



Clearing Simulator

Automatically compiles clearing data in operations. This data is used to predict yarn breakage when changing the clearing parameter.

Spinning Navigator



To support setting spinning condition. Spinning Navigator is provided on PC-based software that displays recommended optimal equipment settings and spinning conditions for each yarn count and material used, based on Muratec's proven experience and knowhow.

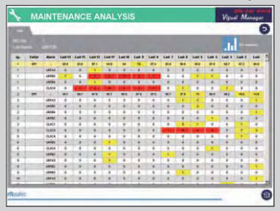
Visual Manager (option)

The visual manager allows for real-time quality and production management, and is an optimal comprehensive management system for VORTEX spinning. It gives a simpler management of operation, production and quality for lots or entire plants rather than for individual frames.

- **Contributes to maintain quality**
- **Improves profits**

Data output

Past maintenance analysis



Data Save
- Production and quality control data : 90 days
- Edited data sheet : 30 days
- Automatic saving of all data

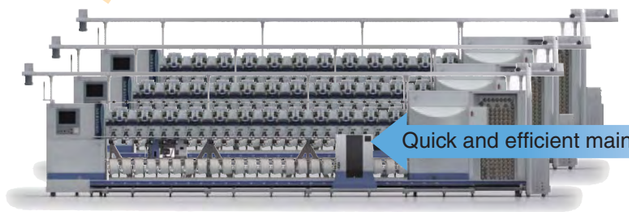
Quality Data Sheet

Quality control
Monitoring of yarn quality in real time

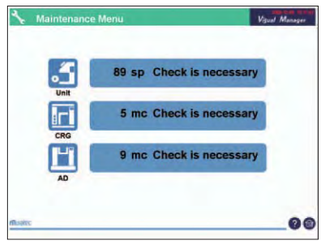
Data collection

Display of analysis results

Visual Manager



Quick and efficient maintenance operation



VORTEX Ⅲ 870

ECO Factory

Space & Labor Saving

The figure shows a comparison of the processes, space, machines, operators and technicians for VORTEX III 870 and Ring spinning under the conditions of:

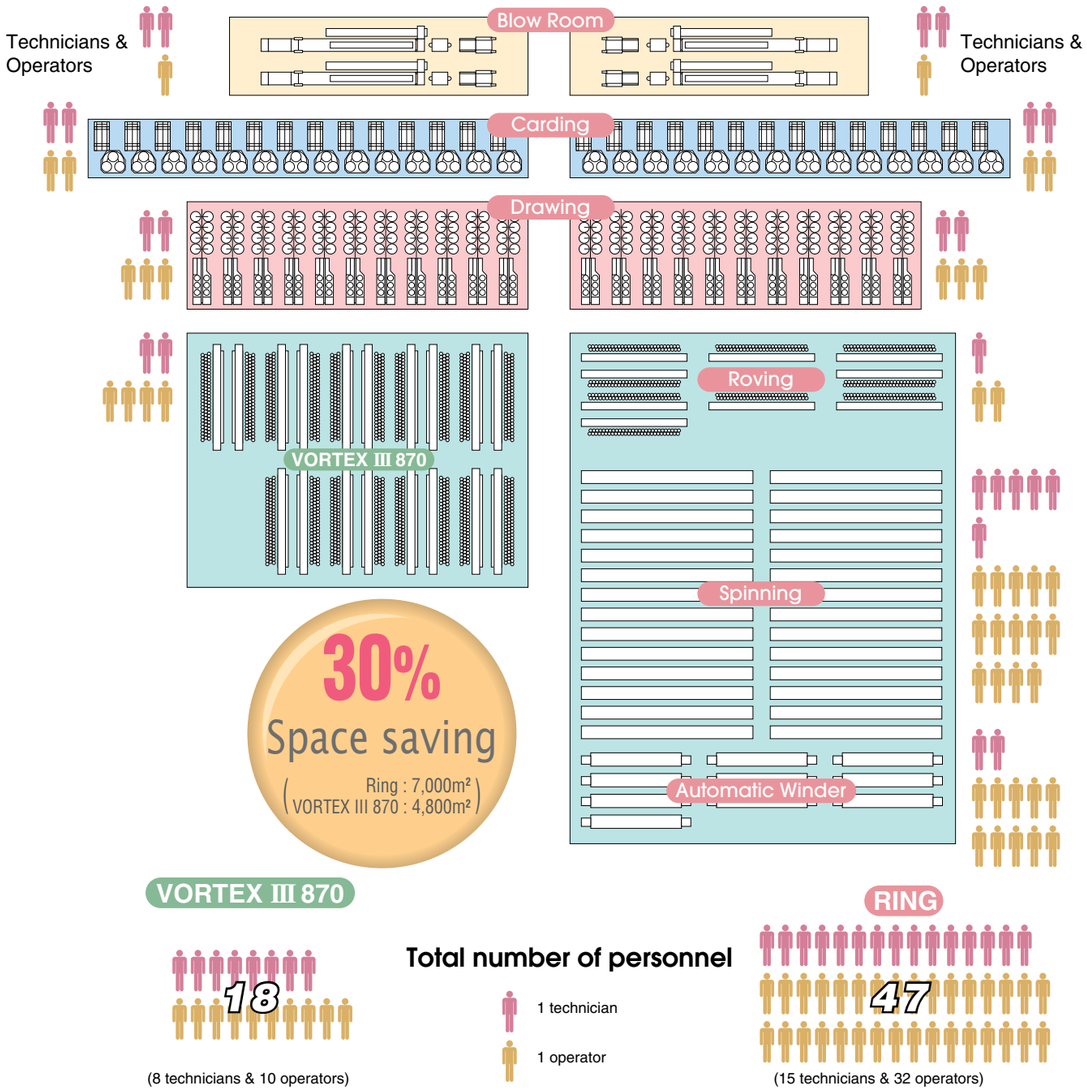
Yarn Count : Ne30 (20/1tex) Viscose 100% for knitting
Production volume : 500t/month (750kg/hr)

VORTEX III 870

Total units 1,728 units
96 units x 18 machines
Spinning speed 400m/min.

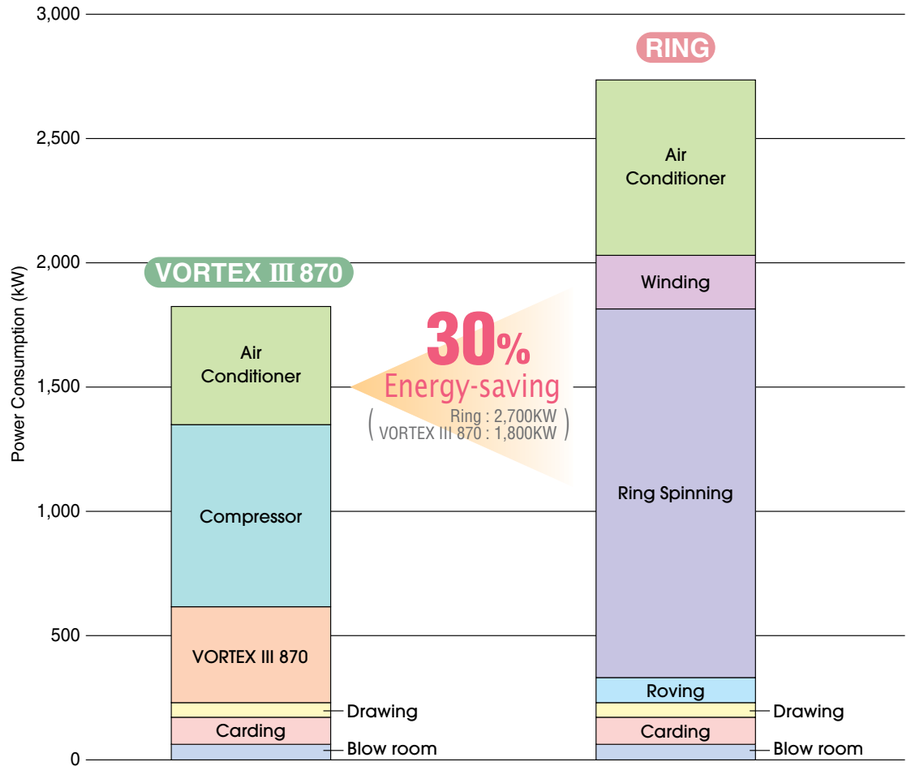
RING

Total spindles : 33,600 spindles
Ring speed : 18,000 rpm
T.M. : 3.4



Energy Saving

The figure shows a comparison of power consumption under the conditions listed on p. 15.



These calculations (p.15-16) are based on the following conditions.

VORTEX III 870	Process		RING
Bale opener + Pre-Cleaner + Blender & Cleaner + Fine cleaner, with foreign material and dust removal function The facility can produce up to 500kg/h.	**Blow room**		Bale opener + Pre-Cleaner + Blender & Cleaner + Fine cleaner, with foreign material and dust removal function The facility can produce up to 500kg/h.
14 frames. Production 60kg/h per frame at 80% efficiency. Cans diameter ø1,000mm	**Carding**		14 frames. Production 60kg/h per frame at 80% efficiency. Cans diameter ø1,000mm
Single head. 11 frames. Delivery speed 500m/min, Cans diameter ø600mm	**Drawing**		Single head. 11 frames. Delivery speed 500m/min, Cans diameter ø600mm
96 units per frame, 18 frames. Spinning speed 400m/min at 95% efficiency.	**VORTEX III 870 spinning**	**Roving**	120 spindles per frame, 10 frames without automatic transportation systems. Spindle 1,200rpm, T.M.1.1 at 85% efficiency. Cans diameter ø600mm
		Ring spinning	1,200 spindles per frame, 28 frames with auto doffer Spindle 18,000rpm, T.M.3.4 (delivery speed 25m/min) at 92% efficiency.
		Winding	60 drums x 10 frames Magazine type. Winding speed 1,300m/min at 85% efficiency

Main Specification

Model	Model	870
	Type	**VORTEX III**
Spinning	Material	Cotton 100%, Synthetic/cotton, Synthetic 100%
	Yarn count range <Note 1>	Ne15 to Ne60 (39tex - 10tex)
	Fiber length	38mm (1.5") max.
	Sliver weight	70 to 35Grain/yd (5 to 2.5ktex)
	Sliver cans	ø400mm x H1200mm (16" x H48") / 2 Lines ø450mm x H1200mm (18" x H48") / 2 Lines ø500mm x H1200mm (20" x H48") / 3 Lines ø600mm x H1200mm (24" x H48") / 3 Lines
Main frame	Number of units	16 / 24 / 32 / 40 / 48 / 56 / 64 / 72 / 80 / 88 / 96
	Unit pitch	235mm
	Total installed power	26.7kW(80 units with 2 units of Splicer Carriages) 27.5kW(96 units with 3 units of Splicer Carriages)
	Blower exhaust	Upward or downward
	Waste yarn storage	Separation from waste fiber
	Automatic waste fiber extracting	Only soft waste
Spinning Condition	Spinning speed	500 m/min (Max.)
	Total draft ratio	65 to 400(In case of yarn speed 300m/min) 100 to 450(In case of yarn speed 500m/min)
	Brake draft ratio	1.5 ~ 5.0
	Intermediate draft ratio	1.1 ~ 5.0
	Main draft ratio	15 to 60(In case of yarn speed 300m/min) 13.5 to 80(In case of yarn speed 500m/min)
	Feed ratio	0.9 to 1.1
	Take-up ratio	0.9 to 1.1
Take-up system	Traverse width	6"
	Winding shape	0' / 4°20' / 5°57'
	Maximum diameter	300mm
	Maximum weight	3.2Kg(Parallel)
Splicer carriage	Type	Splicer
	Max. Number of carriage	6 units
	Cycle time	10sec
Automatic doffer	Doffing cycle time	15sec
	Traveling speed	25m/min
Bobbin stocker	Number of bobbin stock	160
Compressed air requirement	Source air pressure (machine inlet)	0.60MPa (6.1kgf/cm²)
	Dew point	25°C max. (at 0.6MPa)
	Maximum oil contents	0.07g/m³ max.
	Required air volume	Approx. 80l/min(ANR)/nozzle at 0.5MPa <Note 2>

<Note 1> Yarn count range may vary with a fiber denier or other properties.
<Note 2> Required air volume varies with nozzle type.

Standard equipment

VOS III control panel	Splicer
Spinning Sensor	2 Splicer carriage and 1AD
MSC (Muratec Spin Clearer)	Vacuum chamber with automatic waste fiber extracting system
Friction Roller	Package Conveyor
Yarn length measuring device	Air pressure control panel
Individual Inverter drive	

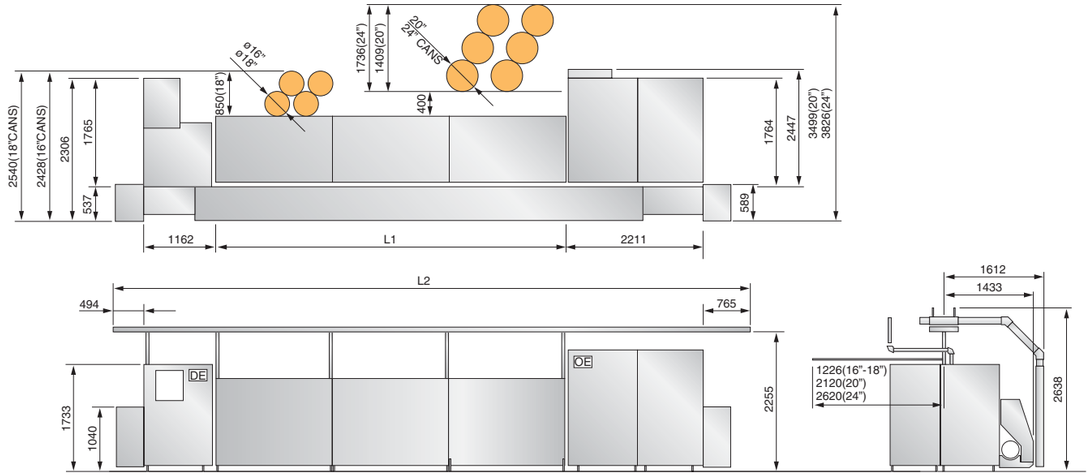
Optional equipment

MSC-F (Foreign Fiber Detector)	Additional splicer carriage
Waxing device	Additional spindle
Package lifter	Splice monitor
Over head blow cleaner	Additional air piping (in case of CROWN spindle)

Power requirement for optional equipment

Waxing device	3W / spindle
Blow Cleaner	0.75kW
Package lifter	5W
Splicer carriage	0.19kW/unit

The entire length of the frame (mm)



Dimensions (mm)

Number of units	24units	32units	40units	48units	56units	64units	72units	80units	88units	96units
L2	10,272	12,152	14,032	15,912	17,792	19,672	21,552	23,432	25,312	27,192
L1	5,640	7,520	9,400	11,280	13,160	15,040	16,920	18,800	20,680	22,560

Minimum installation space between the frames (mm)