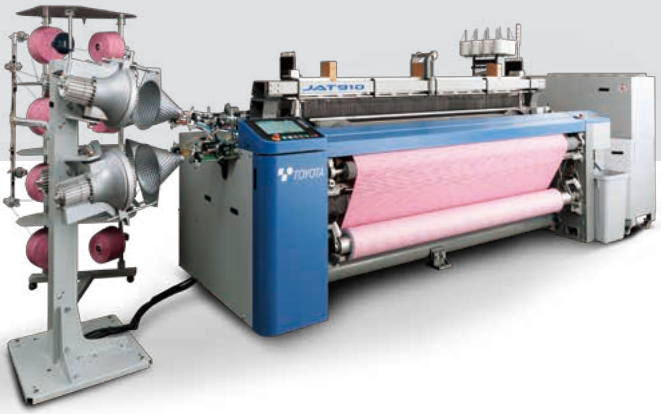
# WEAVING MACHINERY

# JAT910

## Air Jet Loom




TOYOTA INDUSTRIES CORPORATION

TOYOTA

# Eco-friendly Air Jet Loom to Create a Prosperous Future

Air Jet Loom **JAT910**

As the best-selling air jet loom, the JAT series looms are used by customers all around the world. Based on the JAT concept "Weaving the highest quaility fabric at the lowest possible cost", Toyota has embodied the desire to continue developing together with our customers while grasping the needs that change with time.  We will continue to contribute to the realization of sustainable society and the creation of a prosperous future through our air jet looms.

JAT910


## High Level of Basic Performance

Inherited DNA of the JAT series

Advanced technology that achieves high-speed stable operation

Equipped with ultra-high-speed data processing system

## Evolution of Environmental Performance

Aiming for the realization of sustainable society

Further reduction of air pressure and consumption

Reduced power consumption by renewing the drive systems

## Proposal of Automation Technology

Aiming for a eco-friendly loom

Weaving setting optimization by i-SENSOR

Advanced weft automatic pick operator

## Improving the Efficiency of Entire Factory

Production management support by IoT technology

Air pressure optimization of entire factory

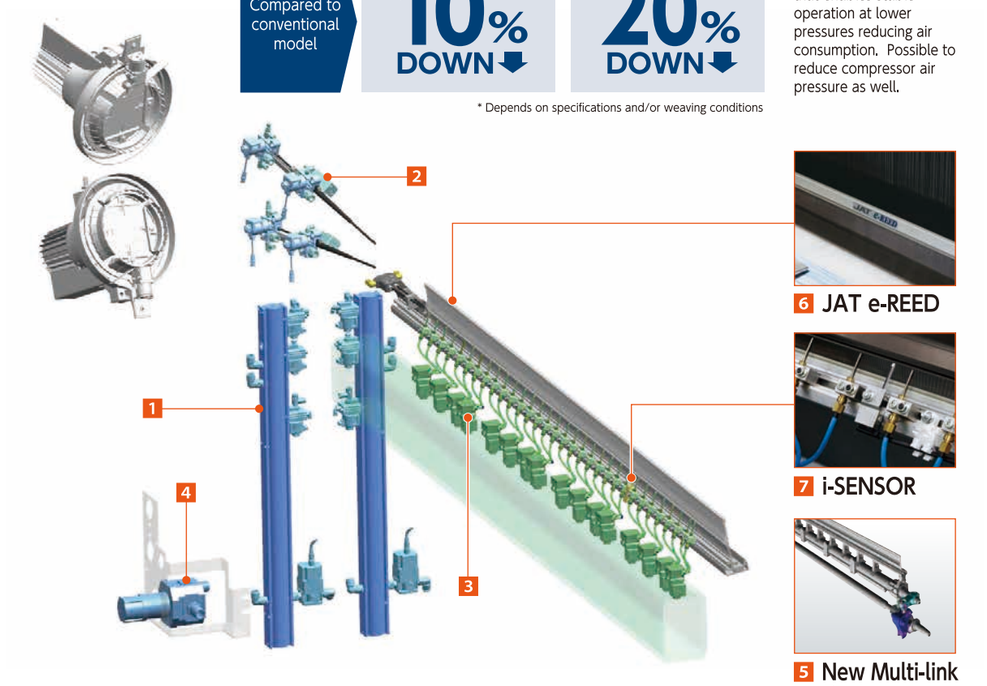
Support for improving efficiency of entire factory

# Newly Designed Weft Insertion System Achieves Further Ene rgy Saving Performance

Air Jet Loom **JAT910**

The JAT series, which has been a world leader in energy saving performance, has evolved to further reduce air pressure and consumption. Toyota introduces the "i-SENSOR" weft insertion system. The world's first (*) weft sensing technology that detects weft insertion timing as the yarn is passing in REALTIME. The system then recommends proper adjustments of insertion timings to improve overall loom performance. (*)Based on Toyota research

## JAT910 weft insertion system




| | Air Pressure | Air Consumption |
|---|---|---|
| Compared to conventional model | 10% DOWN * | 20% DOWN * |

* Depends on specifications and/or weaving conditions

Coordinated and inclusive weft insertion technology that enables stable operation at lower pressures reducing air consumption. Possible to reduce compressor air pressure as well.



**6 JAT e-REED**



**7 i-SENSOR**



**5 New Multi-link Beating**

### 1 New Main Air Tank NEW

Direct main air tank connection of valves/regulators greatly improves pressure responsiveness. As a result, weft yarn insertion becomes more efficient at lower pressures.

### 2 New Direct Tandem and Assist Nozzle NEW

Direct connection of the air valves to the tandem and assist nozzles improve the stability and propulsion power of the yarn injection process.

### 3 New Sub Valve System NEW

Newly developed sub valve system with advanced flow path design achieves shorter injection time and increased weft insertion stability.

### 4 New Regulator for Sub Pressure NEW

High efficiency regulator minimizes the loss of sub pressure from the compressor.

### 5 New Multi-link Beating NEW OPT

By obtaining a longer weft insertion time, further reductions of air pressure and consumption can be reached.

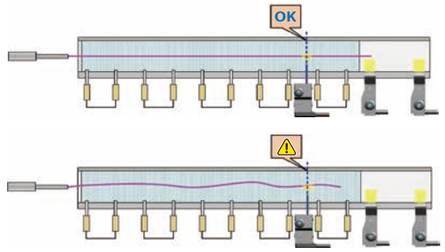
### 6 JAT e-REED OPT

Toyota's original technology since the JAT810, the e-REED allows weft insertion at low pressure.

## i-SENSOR Automatically Optimizes Weft Insertion Settings

**7 i-SENSOR NEW OPT**

i-SENSOR detects weft yarn insertion timing as the yarn is passing inside the warp yarn. Each pick is analyzed and the system provides weft insertion setting recommendations for optimum weaving.




**Weft yarn passes at the set timing**
Proper weft insertion strength

**Weft yarn passes behind the set timing**
Weft insertion strength is not sufficient

### i-SENSOR Functions

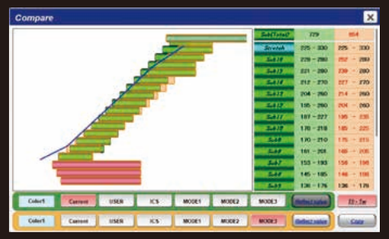
#### Adjustment support system for sub air pressure and valve open/close timing

Unique algorithm designed by Toyota many years ago allows the visualization of the optimum sub air pressure and valve timings that provide the required weft insertion pressure.

Sub air pressure analysis screen

Automatically searching for optimum sub air pressure

Valve open/close analysis screen



Guiding optimum sub valve open/close timing
(Green area is the original, and the semi-transparent area is the result after analysis)

#### Automatic stratification of weft mispick

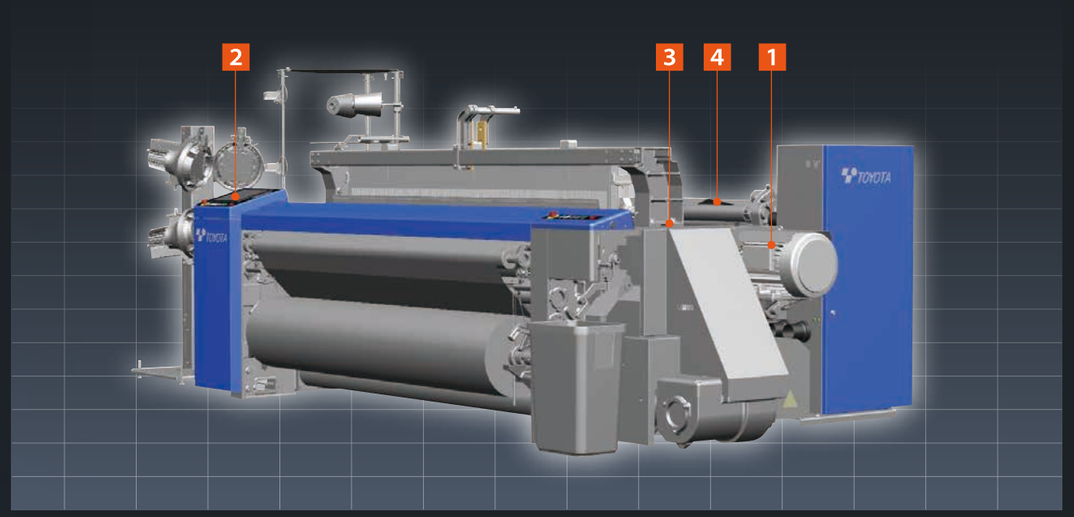
Weft mispick stratification and adjustment support screen

Displays each sensor that controls weft insertion including the i-SENSOR that enables to stratify the type of mispick per nozzle. Furthermore, provides guidance on adjustment points after input mispick conditions to improve production performance.

# Toyota Innovation that Pursues the Highest Quality and Relia bility to the Utmost Extent

Air Jet Loom **JAT910**

The JAT series boasts a high level of performance factors for basic operations. Inheriting that gene, the JAT910 has further evolved achieving remarkable power reduction, improved speeds, while lowering vibration levels. This was accomplished by improving the performance of the main motor and optimizing the loom design. Advancements were also made in the stop mark prevention system to provide customers with the highest reliability.


## 1 New Main Motor NEW

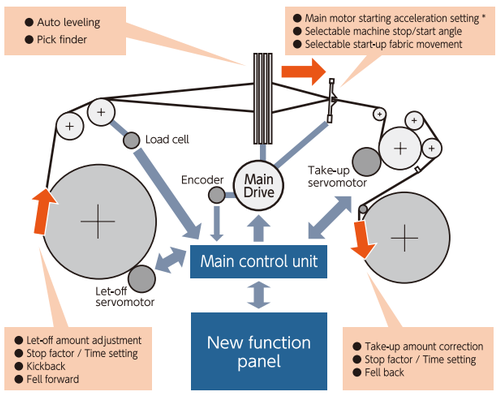
By adopting a high-efficiency motor and renewing the control method, further power reduction and strengthening of the stop mark prevention function can be accomplished.

## 2 New Function Panel NEW

Performance response has improved by increasing the function panel CPU processing speed. This improvement collaborating with FACT, has expanded further technological possiblities.

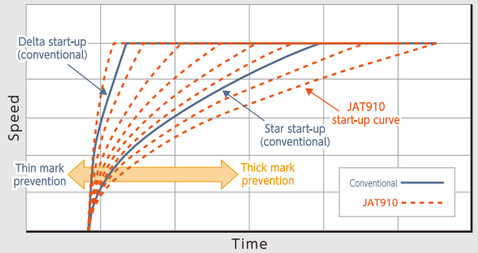
## Evolved Stop Mark Prevention System

The main control CPU provides synchronous controls of various devices including the let-off and take-up systems. With these improvements, various cases of stop marks can be prevented.



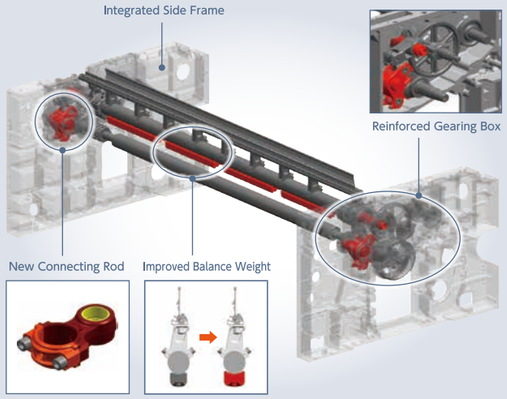

### * Multi-step setting of main motor starting acceleration NEW

The new main motor allows multi-step setting of starting acceleration. It greatly contributes to the prevention of stop marks such as thick or thin marks.



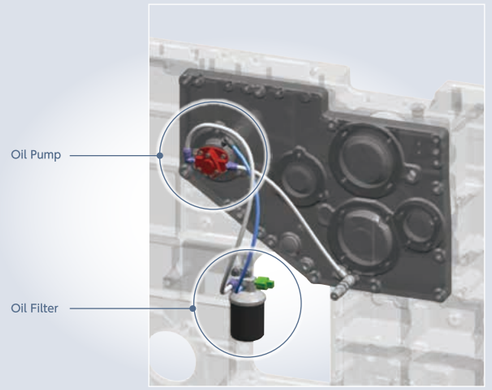

## 3 Evolved High-speed, Low-vibration Technology NEW

By strengthening the gearing/beating mechanisms and optimizing the loom side frame design, higher speeds and lower vibration can be achieved.




## 4 Oil Filter NEW OPT

The oil pump and filters are integrated with the gearing box to remove contaminants, helping extend the life of the bearings and other internal components.



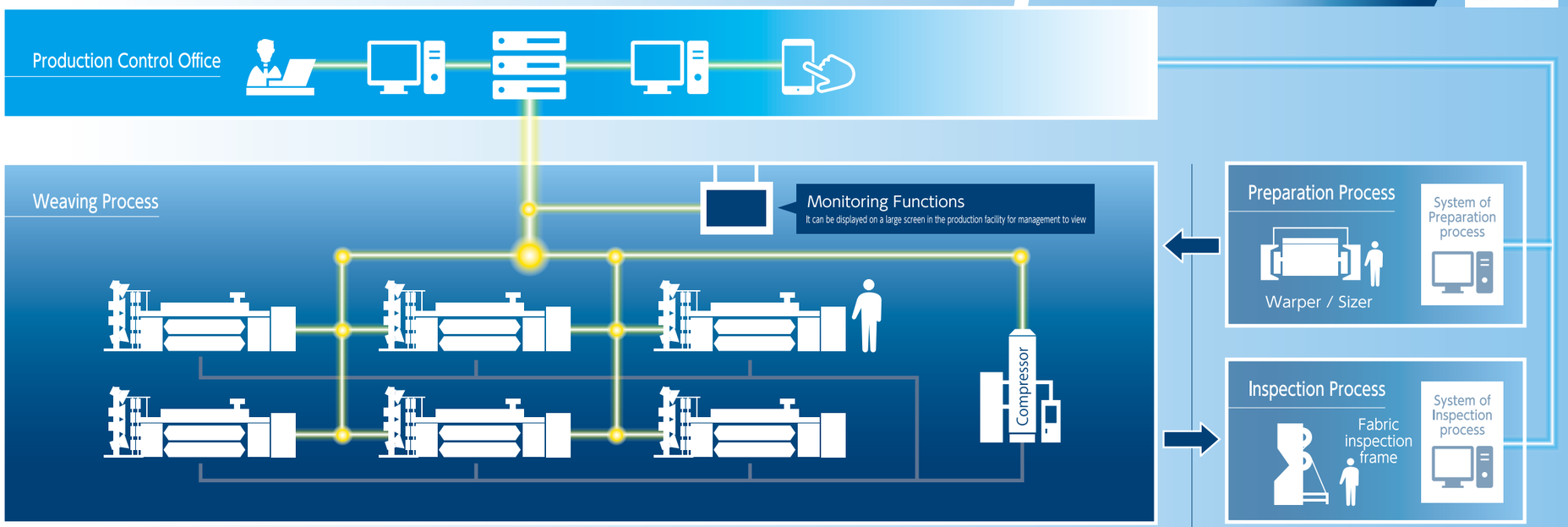
# Advanced Weaving Management System That Fulfills a Smart Factory

Air Jet Loom **JAT910**

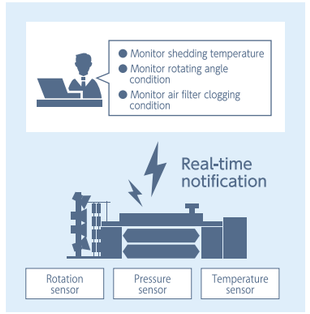
Toyota's FACT (FACTory Management System) is a factory management support system that was introduced with the JAT810 model to maximize the efficiency of the weaving process. This system has evolved with the JAT910 into "FACT-plus" with improved factory automation functions. FACT-plus support the smooth factory operation by making optimal proposals to "Machines" and "Operators", and facilitating cooperation with existing factory management systems.


FACT plus

*Read here for new functions of FACT-plus*

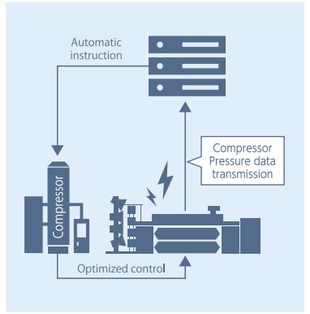



## "Machine" Management




### Planned Maintenance (Sensing)

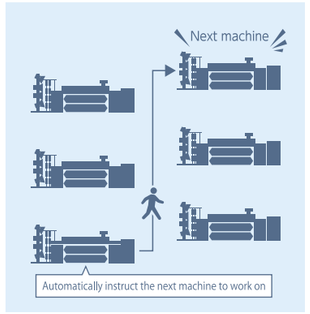
Various sensors collect data from machines in real time, visualizes changes in machine condition, and uses this information to plan maintenance.




### Pressure Control (Optimal control of compressor)

Real-time monitoring of the air pressure requirements at the machine and automatic optimal control of the compressor pressure settings will reduce power consumption.

## "Operator" Management




### Instruction of Next Machine to Work On

By monitoring the factory operation status in real time and automatically instructing the next machine using Toyota's original algorithm, we aim to further improve the efficiency of the entire factory.


### Stop Analysis

By further analyzing and visualizing the "waiting time" and "repair time" of the machine stand stop time, we aim to improve proficiency and optimally allocate factory personnel.

## Management of the Entire Factory

### Linking with Existing Factory Management System

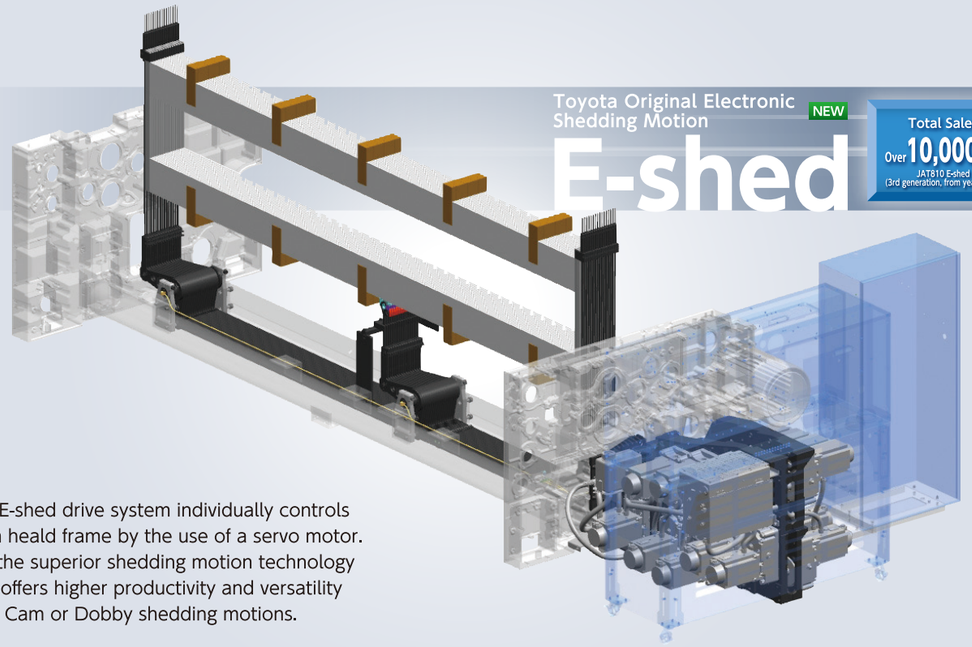
By linking with the preparation-process data (fabric style, beam details, machine table, etc.) in the existing factory management system, the machine settings can be set efficiently and weaving conditions can be optimized. In addition, the data can also be used as cloth data used for tracing in the customer's inspection-process.

*Read here for basic functions of FACT*

# Enhanced Original Electronic Shedding Technology


Air Jet Loom **JAT910**

Toyota's original E-shed technology has evolved since its launch in 2000. The 4th generation E-shed model offers further energy savings by optimizing the shedding control movement and introduces a new function that allows the customer to weave challenging fabrics at high speed.




The E-shed drive system individually controls each heald frame by the use of a servo motor. It is the superior shedding motion technology that offers higher productivity and versatility than Cam or Dobby shedding motions.

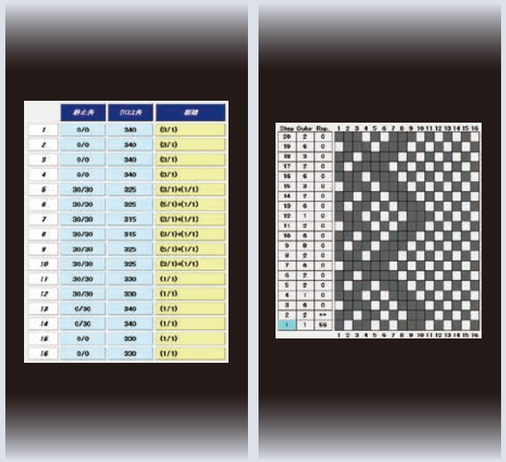
## E-shed Function and Features

| Contents | E-shed | Electronic Dobby | Cam |
|---|---|---|---|
| Pattern settings can be changed at will from the function panel | ● | ● | × |
| Vertically variable dwell angles can be set for each frame | ● | × | × |
| Variable cross-timing can be set for each shedding frame | ● | × | ▲ (cam staggering required) |
| No limit on unbalanced fabric design (no limit on difference in number of upper/lower frames), even when using 16 shedding shafts | ● | × | – |
| Pick finding with shedding motion only | ● | × | × |
| Machine setting using WAS (makes it easy to perform optimum settings as recommended by Toyota) | ● | ▲ | ▲ |
| Smooth shedding curve (improves the service life of heald frames and accessories) | ● | × | ▲ |
| No limit on RPMs due to number of harness shaft drives | ● | × | × |

● : Possible ▲ : Conditionally possible × : Not possible

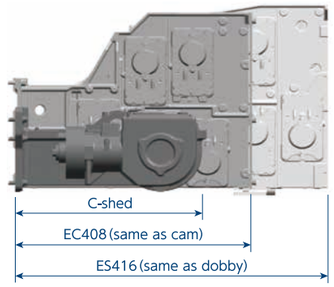
## Cross-timing Selection Screen (Dwell angle)

Easy adjustment of dwell angles and cross-timings for each frame via the function panel. New multi-control system allows to set dwell angle and cross-timing on each pick for higher weavability.



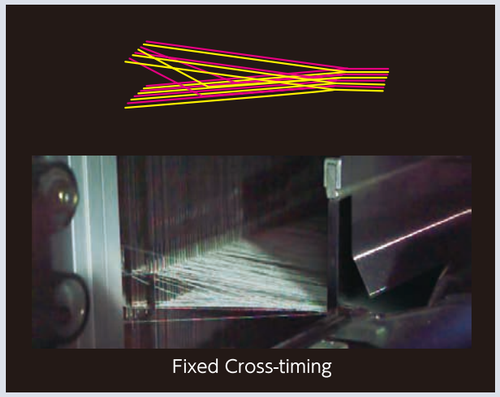
## Installation Space Comparison

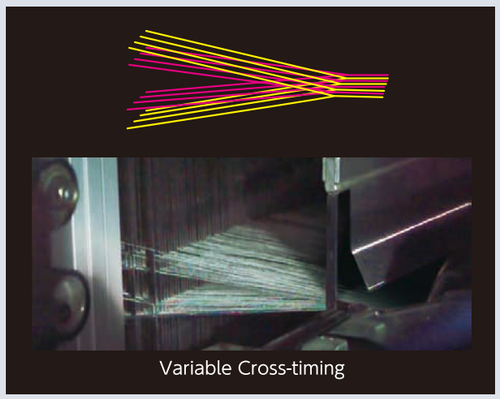
ES416 (Max 16 shafts)
EC408 (Max 8 shafts)
C-shed (Simple-link : Max 8 shafts, Multi-link : Max 6 shafts)




## Benefit of Changing Cross-timing

Individual cross-timing setting make shedding clear.

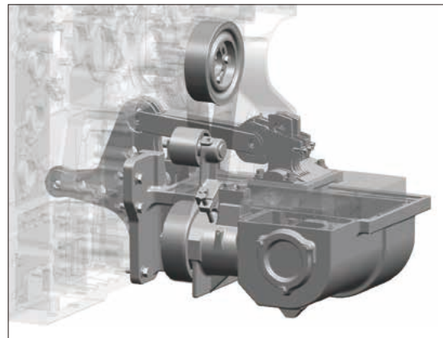



## Toyota Original Crank Shedding NEW

# C-shed

The newly developed Multi-link and Simple-link crank shedding systems with E-shed technology provide improved productivity, enhanced weavability, and reduced maintenance requirements.



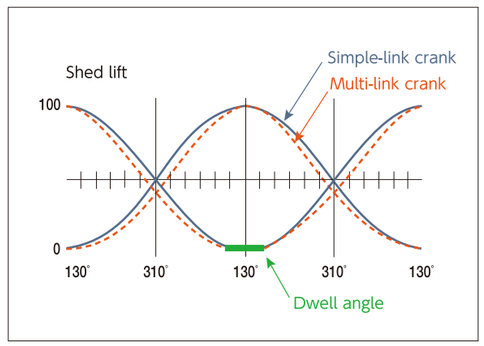
Shedding box for C-shed

## C-shed Function and Features

| Contents | NEW | Conventional |
|---|---|---|
| Variable cross-timing can be set for each shedding frame | ● | × |
| Individual shed lift adjustment for each frame (Staggering) | ● | × |
| Interchangability with E-shed heald frame | ● | × |
| 3 point heald frame lifting (Above R/S280) | ● | × |

● : Possible × : Not possible

## Shedding Curve (Simple-link crank vs Multi-link crank)



# Terry Model That Achieves High Productivity and Superior Quality with a Variety of Products

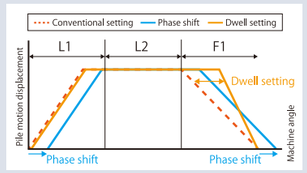
Air Jet Loom **JAT910**

Based on the basic principles and performance of the JAT810, the newly designed pile motion and tension control mechanism achieve high productivity and superior quality with a varieties of styling from gauze towels to bath mats that will satisfy all customer needs.


## New Pile Motion for High Production and High Quality NEW

### 1 New Pile Motion

Newly improved linkage mechanism and pile motion control system including pile motion motor which allows a wider variety of styling at higher speeds.

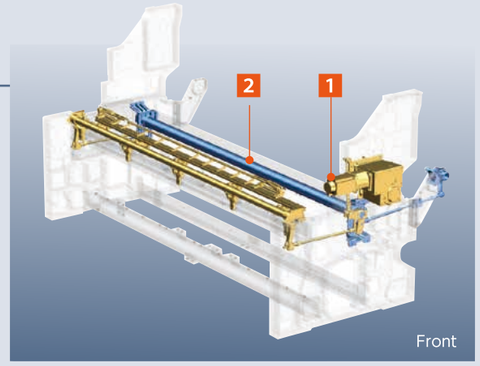


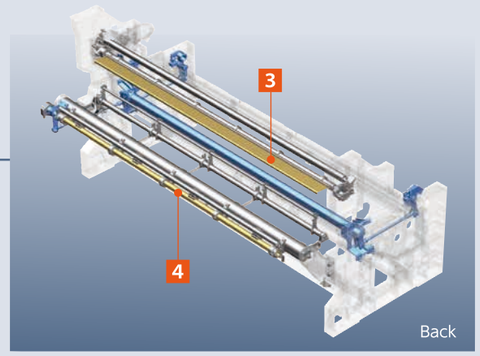

### i-PILE Control

The newly desiged pile motion control allows for more detailed and flexible movement. Detailed parameters for a variety of styles improve pile alignment and prevent pile pulling.

### 2 Two-sided Main Shaft Drive System

The cloth fell movement system which is supported by the high rigidity main shafts prevent horizontal twisting and provide uniform high-quality pile motion.




## Reliable Tension Control Mechanism

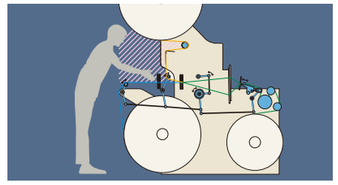
### 3 Continuous Leaf Spring Easing (Pile)

Use of continuous leaf spring easing eliminates pile yarn rolling for high-speed operation with consistent high quality.

### 4 Torsion-bar Back System (Ground)

A torsion-bar system makes high-speed operation possible by improving tracking characteristics for ground let-off.

## Excellent Operability With a Variety of Options



**Consideration for warp-handling**

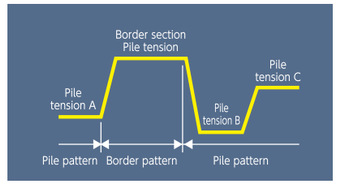
An optimized configuration based on ergonomic design significantly improves warp-handling efficiency.

**Worker-friendly forward/reverse switch box position**

The position of the switch box has been improved for workability when connecting warp yarn.

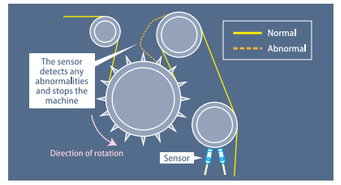
**LED lights linked to the machine's operation** OPT

LED lights linked to the machine's operation improve the visibility of various operations.



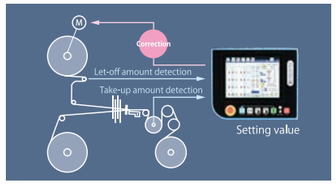

**Tension switching for pile**

The tension switching function contributes to quality improvement of a wide range of products.




**Miswinding prevention system** OPT

Detects loosening of the cloth and prevents it from being wound incorrectly on the surface roller.




**Pile ratio monitor** OPT

By setting the pile magnification, it improves the weaving of uniform towels.

## Toyota Original Electronic Shedding Motion "E-shed"

The combination of E-shed and terry motion achieves a higher level of productivity and versatility.

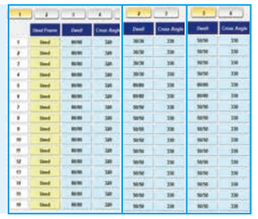
### ■ Improved productivity

Since each frame is controlled individually by a servo motor, the E-shed can further improve productivity even with a large number of heald frames being used.

### ■ Improved versatility

With E-shed, the dwell and cross timing can be set for each pick which allows optimal fabric settings.

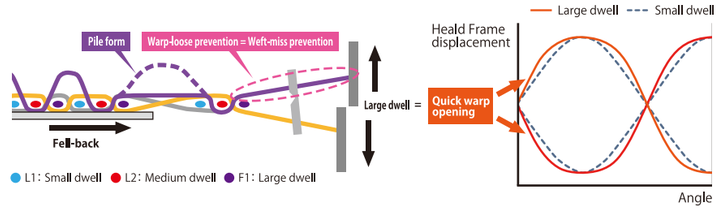
Multi-control system settings screen



**Example** Multi-control system

F pick

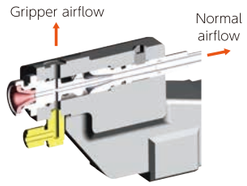
Take large dwell to prevent warp-loose ends and reduce weft-miss.



# Various Options for Diverse Applications

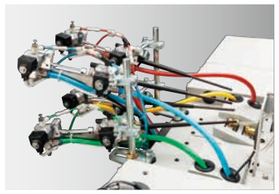
## Versatility

### Air Gripper System (AGS)



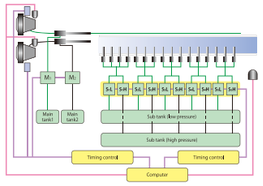

This system eliminates dropped picks of stretch yarn, while preventing damage to covered yarns.

### Multi-tandem Nozzle



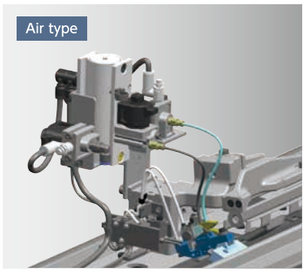
Unifying the tandem nozzle, ABS, and assist nozzle makes it possible to reduce the main tanks pressure. The increase in propulsion power allows for high-speed applications.

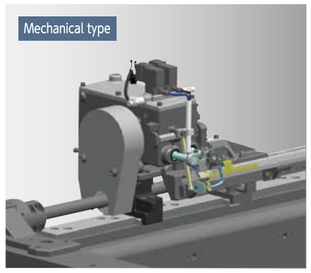
### Flexible Insertion System (FIS)



Main nozzle pressure can be set independently for each pick according to the weft insertion pattern. Additionally, the sub nozzle's pressure can be switched between high and low pressure for each pick. The FIS can handle a maximum of 75-times difference in weft yarn count.
(Example: Chenille yarn 1500d, 20d)

### Tuck-in Selvage




Both Air (Non cut reed type) and Mechanical types are available according to fabric requirements.

### Independent Selvage Motion (ISM)

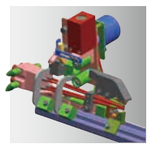
A diverse range of selvage constructions can be formed easily based on function panel settings. More complex designs are possible by increasing the number of frames in the ground construction.

### Selvage Jacquard Machine-Ready

The JAT910 can be manufactured ready to install under a selvage jacquard machine for customizing selvages with names, logos, etc.

## Labor Savings / Automation

### Toyota Automatic Pick Operator (TAPO)



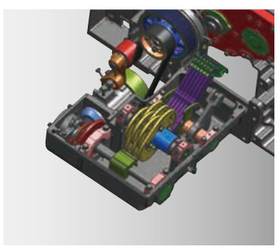
If a mispick occurs, this feature automatically removes the mispick and restarts the loom. A variable-speed motor makes it possible to adjust the speed of the mispick removal.

### Automatic Insertion Command (AIC)

When a yarn supply fault occurs, AIC continues weft insertion by automatically switching to another drum without stopping the loom.

## Shedding

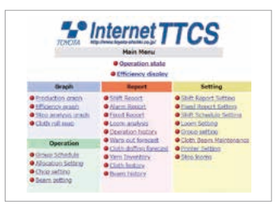
### New Negative Cam Shedding



Proprietary Toyota shedding technology provides higher productivity.

## Factory Management

### Internet-TTCS

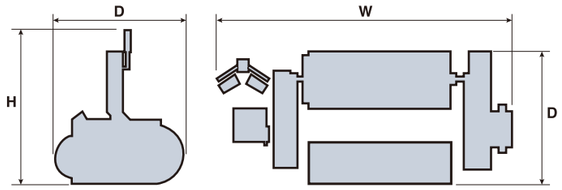



Operators can instantly check the production status of their mill from anywhere in the world via the internet. The advanced system enables total production management including monitoring machines, obtaining maintenance records, and keeping track of the entire weaving process.





## JAT910 Dimensions




(Unit:mm)

| | | Negative cam | Positive cam | Crank | C-shed | Dobby | E-shed ES416 | E-shed EC408 |
|---|---|---|---|---|---|---|---|---|
| Machine width (W) | 2-color Weft Insertion | R/S+2290 | R/S+2587 | R/S+2278 | R/S+2330 | R/S+2702 | R/S+2746 | R/S+2575 |
| | 4-color Weft Insertion | R/S+2395 | R/S+2692 | R/S+2383 | R/S+2435 | R/S+2807 | R/S+2851 | R/S+2680 |
| | 6-color Weft Insertion | R/S+3205 | R/S+3502 | R/S+3193 | R/S+3245 | R/S+3617 | R/S+3661 | R/S+3490 |
| | 8-color Weft Insertion | R/S+3205 | R/S+3502 | R/S+3193 | R/S+3245 | R/S+3617 | R/S+3661 | R/S+3490 |
| Depth (D) | | 2018 | 2018 | 1978 | 2018 | 2018 | 2018 | ← |
| Height (H) | | 2017 | 1681 | 1681 | 1681 | 1681 | 1681 | ← |

Notes:
1) Dimensions shown in the table at left apply to the case of a model with the following specifications.
1. R/S 150 to 300 cm
2. Single beam
3. Yarn beam flange diameter of 800 mm
4. Maximum take-up roll diameter of 600 mm (520 mm diameter for crank shedding)
5. With tandem nozzles and ABS, standard package stand
6. Floor-mounted dobby: Model S3060 (Add 70 mm to the machine width [W] for model S3220, 3260)
Positive cam: Models 1691 and 1692, 1792

2) When yarn beam flange diameters are 930, 1000 and 1100 mm, the following specifications apply.
1. 930mm diameter: height: +130mm
2. 1000 mm diameter: Depth: + 20 mm, height: + 200 mm
3. 1100 mm diameter: Depth: + 151 mm, height: + 300 mm

3) When R/S is greater than 340 cm, add 50 mm to the machine width (W).

4) Machine depth (D) will differ according to the location of the let-off rear parts.

5) Dimensions vary depending on the specifications. Please check the exact dimensions with Toyota.

## Main Specifications

| Item | Standard Equipment |
|---|---|
| Drive | ● Super-fast start-up motor<br>● Start, stop, forward/reverse slow motion activated by push-button operation |
| Beating | ● Two-sided crank drive with oil bath |
| Let-Off | ● Electronic let-off motion<br>● Positive easing, double back rollers (adjustable forward/back position) |
| Take-up | ● Electronic take-up motion (Multi pick density) |
| Temple | ● Upper cover temple (lower mounted) |
| Weft Insertion | ● Electric drum pooling (EDP)<br>● Conical tandem nozzle<br>● High-propulsion main nozzle<br>● High-efficiency tapered sub nozzles<br>● New super-responsive solenoid valves<br>● Main and Sub tanks with direct connection to valves<br>● High efficiency air piping and sub regulator<br>● Automatic pick controller for main air pressure (EPCm)<br>● Air pressure and consumption monitor fucntion (P-monitor)<br>● Intelligent Air Saving System (IAS) |
| Selvage | ● Left/right rotary full-leno selvage device |
| Waste Selvage | ● Waste selvage on the right with catch cord |
| Stop Motion | ● Electric warp stop motion<br>● Leno-selvage & waste-selvage break stop motion<br>● Reflecting weft detector (double weft detector) |
| Lubrication | ● Oil bath lubrication system for main parts<br>● Fully automated centralized lubricator |
| Main control | ● 32-bit CPU & real time OS<br>● Optical fiber & Ethernet communication network |
| Function Panel Features | ● Large 12-inch interactive touchscreen color function panel<br>● Instruction manual on function panel by cooperation with FACT<br>● Trouble shooting function<br>● 24-hour & weekly efficiency graphs<br>● Doffing/warp out forecast<br>● Automatic Initial Condition Setting (ICS)<br>● Intelligent Filling Controller (IFC)<br>● Weave Assist System (WAS) |
| Others | ● Four-color LED signal lamp<br>● Stop-Mark Prevention and adjustment support system<br>● Power outage stop function |

### Main Options

- Speed Control Inverter (SC Inverter)
- Multi Link beating
- Oil Filter
- Twin-beam system
- Double-beam system
- Intelligent Take-Up Controller
- Automatic Weft Brake System (ABS)
- Automatic Pick Controller for main/sub air pressure (EPC)
- i-SENSOR
- Air Gripper System (AGS)
- New thread guide for stretch yarn
- Balloon cover
- Electric Drum Pooling with Weft Separation
- Multi-Tandem Nozzle
- Automatic Insertion Command (AIC)
- JAT e-REED (air-saving reed)
- Flexible Insertion System (FIS)
- Toyota Automatic Pick Operator (TAPO)
- Electronic Selvage Motion (ESM)
- 2-Thread Half-Leno Selvage Device
- Tuck-In Selvage Device (left/right and center)
- Center Selvage Device
- Independent Selvage Motion (ISM)
- Warp Breakage Area Indicator (with 6 or 12 divisions)
- Toyota Total Computer System (Internet-TTCS)
- Toyota Factory Management System (FACT-plus)

| Item | Variations |
|---|---|
| Nominal Reed Space (R/S) | 140 cm, 150 cm, 170 cm, 190 cm, 210 cm<br>230 cm, 250 cm, 260 cm, 280 cm, 300 cm<br>340 cm, 360 cm, 390 cm |
| Let-Off | ● Negative easing, double back roller (adjustable up/down position) |
| Yarn Beam Flange Diameter | φ 800、φ 930、φ 1000<br>φ 1100、φ 1250 (pile beam for terry machines) |
| Temple | ● Lower cover temple<br>● Full-width temple |
| Shedding | ● Negative cam shedding (maximum 8 shafts)<br>● Positive cam shedding (maximum 10 shafts)<br>● Crank shedding (maximum 6 shafts)<br>● C-shed (Simple-link : maximum 8 shafts)<br>● C-shed (Multi-link : maximum 6 shafts)<br>● E-shed (maximum 16 shafts)<br>● Dobby shedding (maximum of 16 shafts) Note: Towel loom: maximum 20 shafts<br>● Jacquard shedding |
| Weft Insertion | ● Supports up to 8 colors (2-color, 4-color, 6-color, and 8-color pick-at-will) |
| Stop Motion | ● Penetrating weft detector |

Notes:
1) For further details and information concerning other combinations of options and variations, please contact Toyota or your Toyota representative.
2) Drawings, data, and photographs that appear in this catalog are subject to change without prior notice.

# Best Customer Service World-wide

Toyota provides a full range of services specially tailored to individual customers,
from consultation for pre-installation of looms (Pre-service) to installation and after-sales service.

## Global service base

❶ Japan ❷ Korea ❸ China (Shanghai, Shaoxing, Wujiang, Shandong, Changzhou, Lanxi) ❹ Vietnam ❺ Thailand ❻ Indonesia
❼ Bangladesh ❽ India (Delhi, Coimbatore, Mumbai, Ahmedabad) ❾ Pakistan ❿ Switzerland (Europe) ⓫ USA ⓬ Brazil

### ■ Pre-service

For preparation before delivery of the loom, Toyota supervisor will consult at the customer's factory site upon request.

### ■ Installation

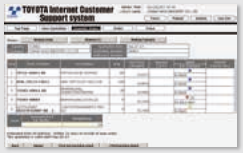
Toyota supervisor will visit customer's factory and provide advice, ranging from loom installation to operational guidance.

### ■ After-sales service

After looms have been delivered, Toyota will actively provide after-sales service, such as providing advice on adjustments for smooth operation and supplying spare parts needed for stable operation.

## Spare Parts

Toyota Internet Customer Support System (TICS) enables all the processes from confirmation of parts inventory and delivery date, quotation, to ordering the spare parts. Toyota supports stable operation by promptly supplying spare parts to customers all over the world.



Price Quotation

## Instruction Manual with Video

Toyota will provide more understandable instruction manual through cloud services, by adding video and direct link function to related pages in manuals. Toyota has devised procedures to help teach customers operations quickly with little to no experience.

Video Instruction Manual Image

## Training

Toyota provides a wide range of training from machine handling to management skills upon request. We are committed to supporting customers by providing experts to teach the best way to use our air jet looms.

## Electronic Board Repair Services

Toyota supports long-term stable operation by providing repair services to prolong the life of electronics incase there are failures.

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