

AUTOMATION IN TEXTILE INDUSTRY

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GM Mktg, KTTM

Automation in Ring Spinning



An ISO 14001 Company

KTTM Company Profile

Basic Policy

“ Touch the Heart, People First ”

Operational Policy

“ Speed up !

Change & Challenge !

Zero defect ! ”

KTTM'S BUSINESS ACTIVITIES

CAPITAL GOODS
TEXTILE MACHINERY

**RING FRAME &
COMPONENTS**



**AUTOMOBILE
PARTS**

**TRANSMISSION
COMPONENTS
FOR
TOYOTA'S "IMV"**



JOB WORK

**SURFACE
TREATMENT
FOR VOLVO, GE**

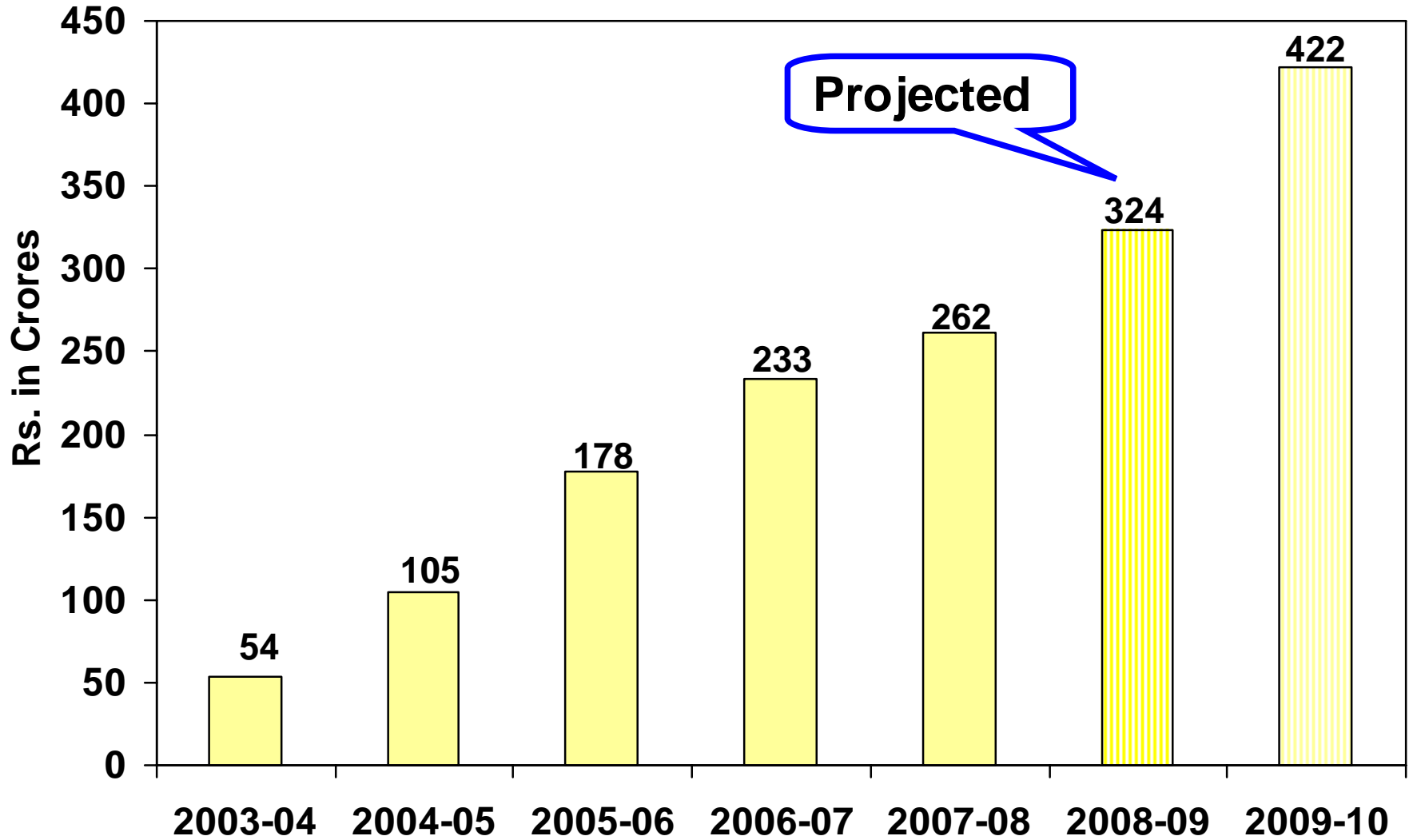


**MATERIAL
HANDLING**

**SALE &
SERVICE OF
TOYOTA
MATERIAL
HANDLING
EQUIPMENTS**



CONSOLIDATED SALES TURNOVER



KTTM Ring Frame RXI240e



Automation

in

Ring Spinning Machines

***Innovations are carried out by Spinning
Machine Manufacturers across the globe.***

***This presentation is intended to focus and
sharing of information in perspective of
Toyota Industries corporation and KTMM.***

- **Man Power & Increasing Man Power Cost.**

- Spinning Mills are located in remote areas.
- Difficult to get manpower.
- Job other than actual production should be transferred to machine.
- Example – Auto Doffer on Ring Frames.

- **Changing job preferences.**

- Qualified Textile Technologists prefer to take white collar job like Marketing, Fashion Designing, Garmenting etc.
- Not keen to work in production.
- It should be possible to run production plant with few supervisory staff.
- Example – Ring Data System, on line machine monitoring system, on line quality monitoring .

Need for Automation

- **Material Transportation**

- Material Transportation, within a spinning plant is a necessity.
- It does not add any value.
- Hence Link Winder System, Automatic Roving Transfer Systems.

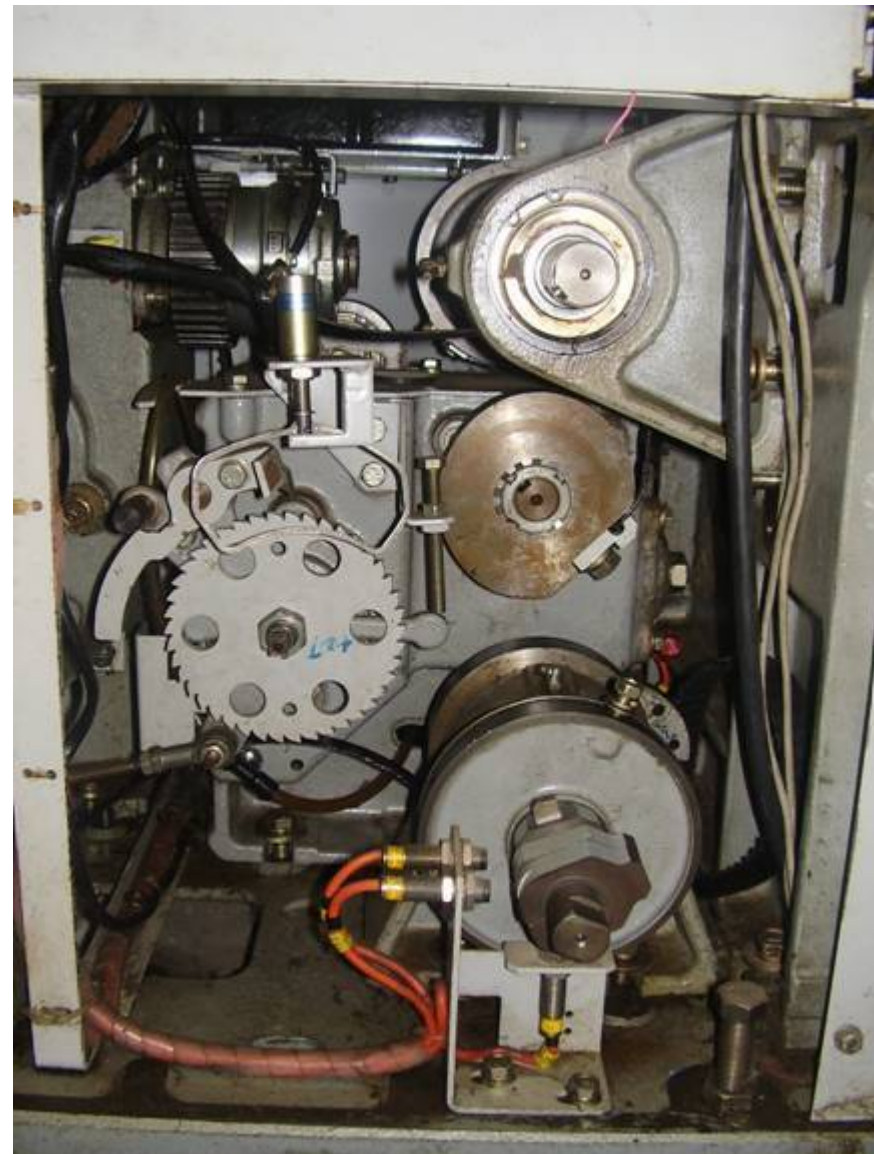
- **Increasing fashion consciousness resulting in smaller lot size.**

- This results in frequent changes in machine settings.
- Therefore, Servo Drive system, which allow machine setting by touch of button.

- **Ease of Machinery Maintenance.**

- Machines equipped with self guided informentor, automatic lubrication, automatic waste removal.

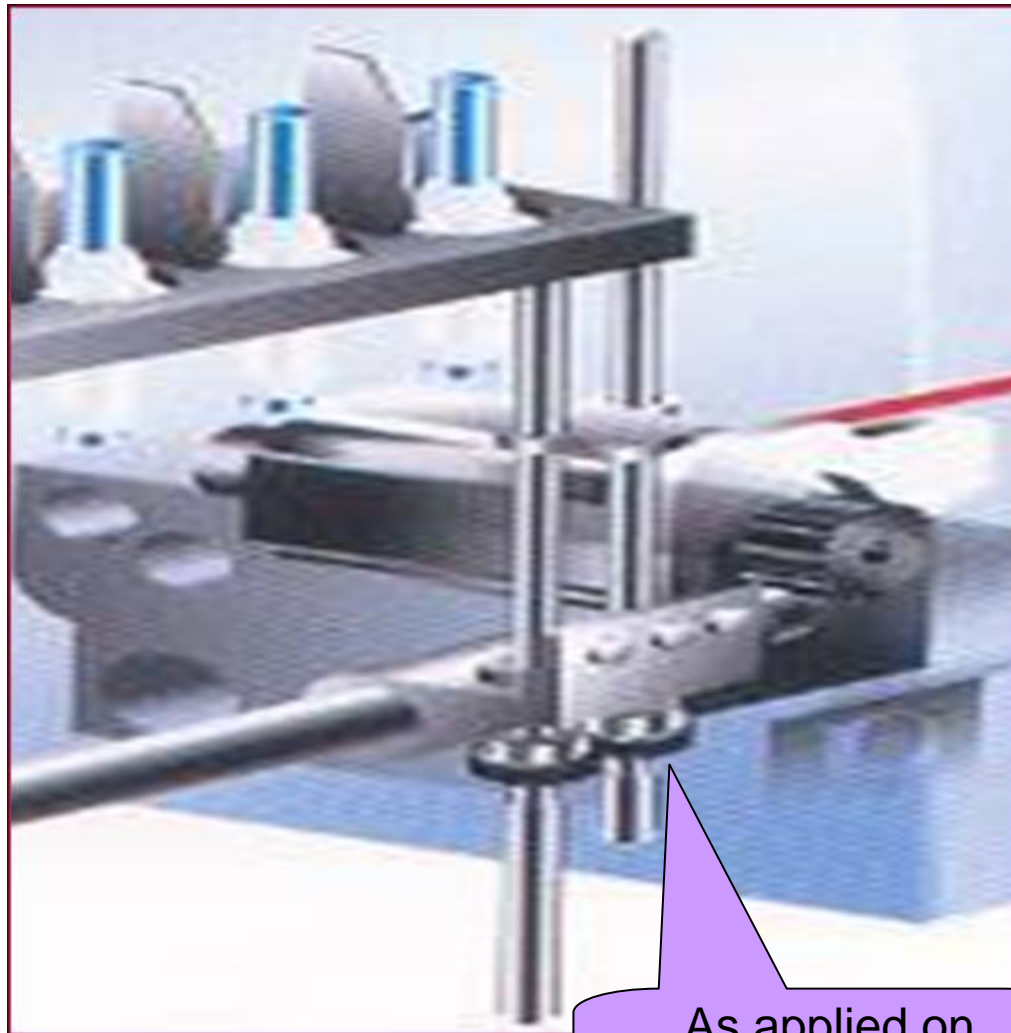
1. Ring Rail Movement – Conventional CAM Lift System



- Till recently most manufacturers use this mechanism.
- Cost effective & proven design.
- Involves too many components and mechanisms.
- Setting depends on human skills and require more time
- More space required
- More inventory needed of all parts
- Wear and tear of parts
- Fine adjustment difficult

1. Ring Rail Movement – Alternative System

a) Servo Drive with Screw Lifting System

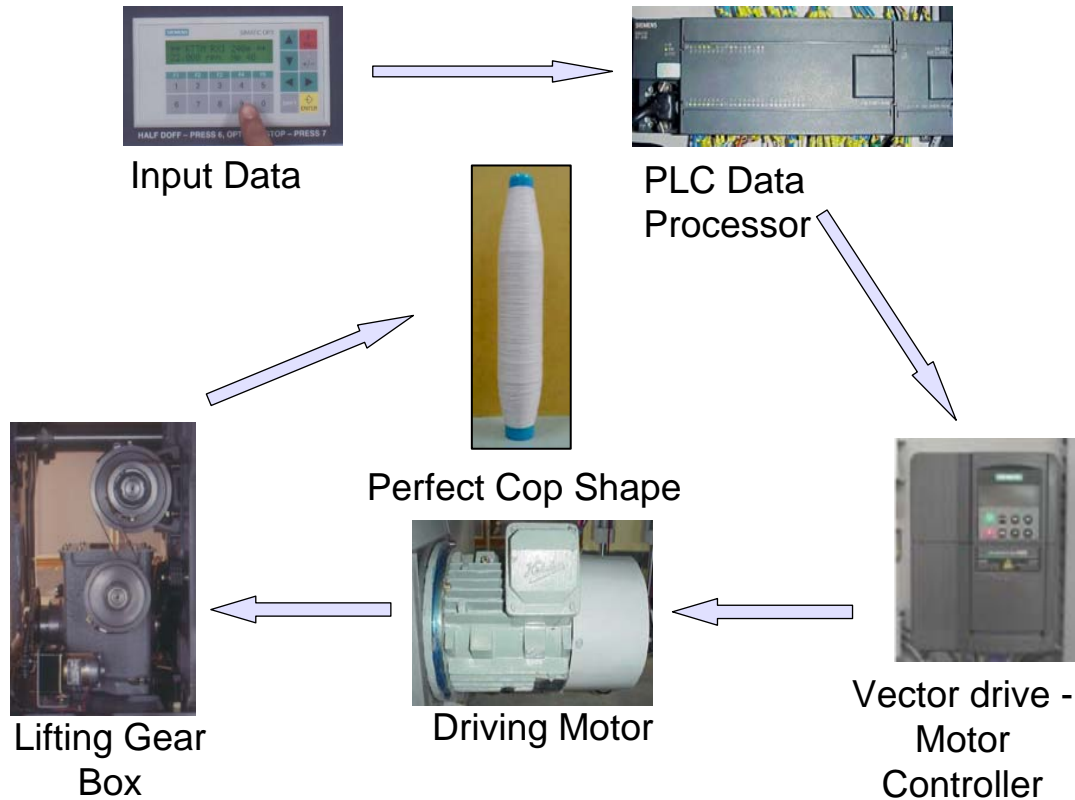


As applied on
Toyoda Ring Frame.

- Very reliable system.
- Controlled by servomotor and servo drive.
- Setting alteration by key pad data entry.
- No special skill needed for setting
- This system is still little expensive to implement
- Paticularly in Indian context.
- Assy time reduces enhancing manufacturing capacities.

1. Ring Rail Movement – Alternative System

b) Electro Lift System – Innovative idea



- Setting done at the press of a button.
- No special skill needed for setting
- Combines the advantages of the servo drive system and at the same time is cost effective.

1. Ring Rail Movement – Alternative System

- This system was possible to implement because of –
 - ✓ Thanks to companies like Siemens, Danfoss, ABB, Mitsubishi etc.. for bringing in advancement in motion & control electronics.

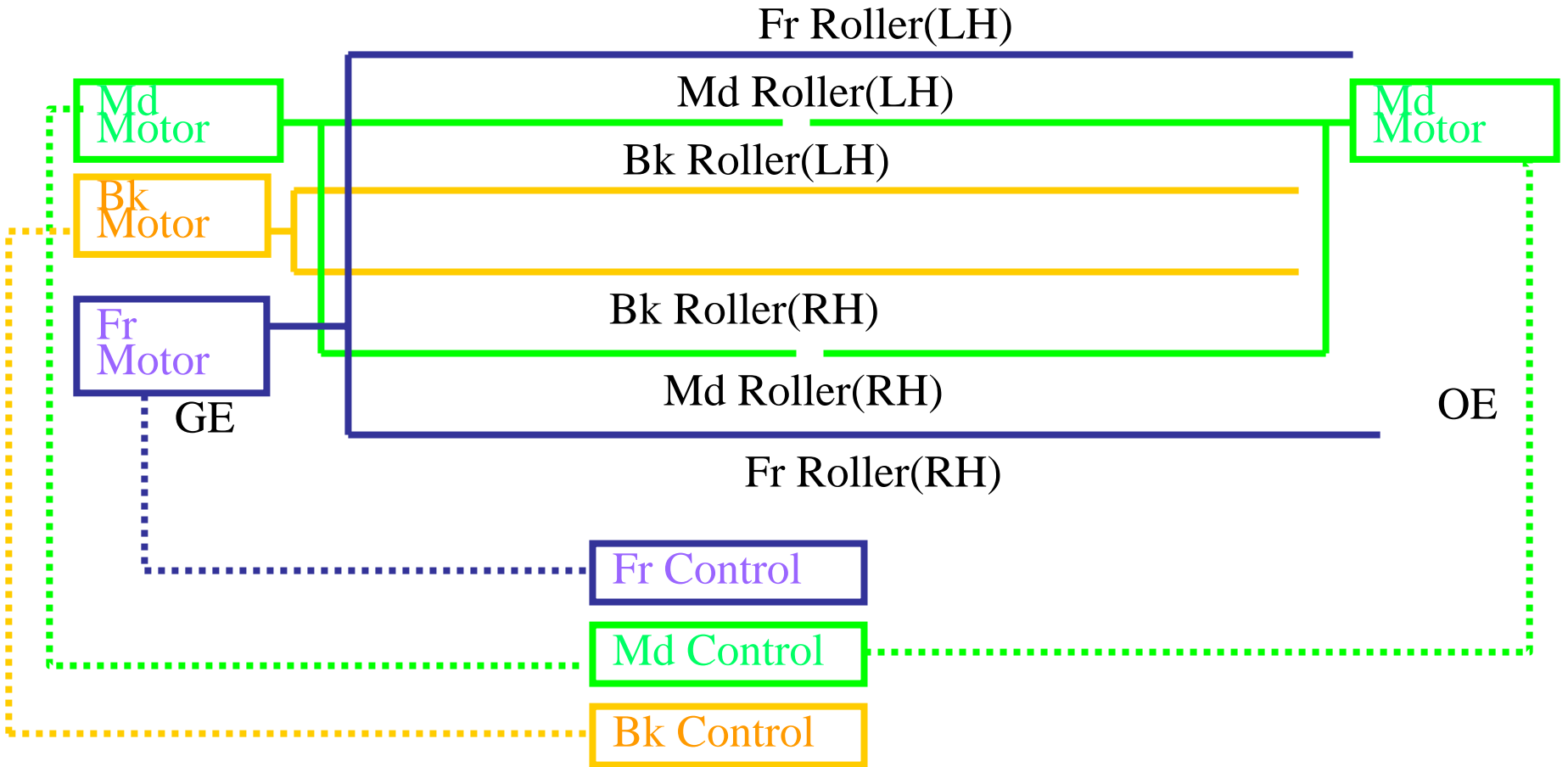
2. Drive to Drafting Rollers – Conventional System



- Conventional System, all gear drive
- Many gears to be changed for changing the count / twist. Time consuming process.
- Multiple types of yarns can be produced but needs additional mechanisms attached.
- Increased need for regular maintenance & repairs.
- Inventory of parts.

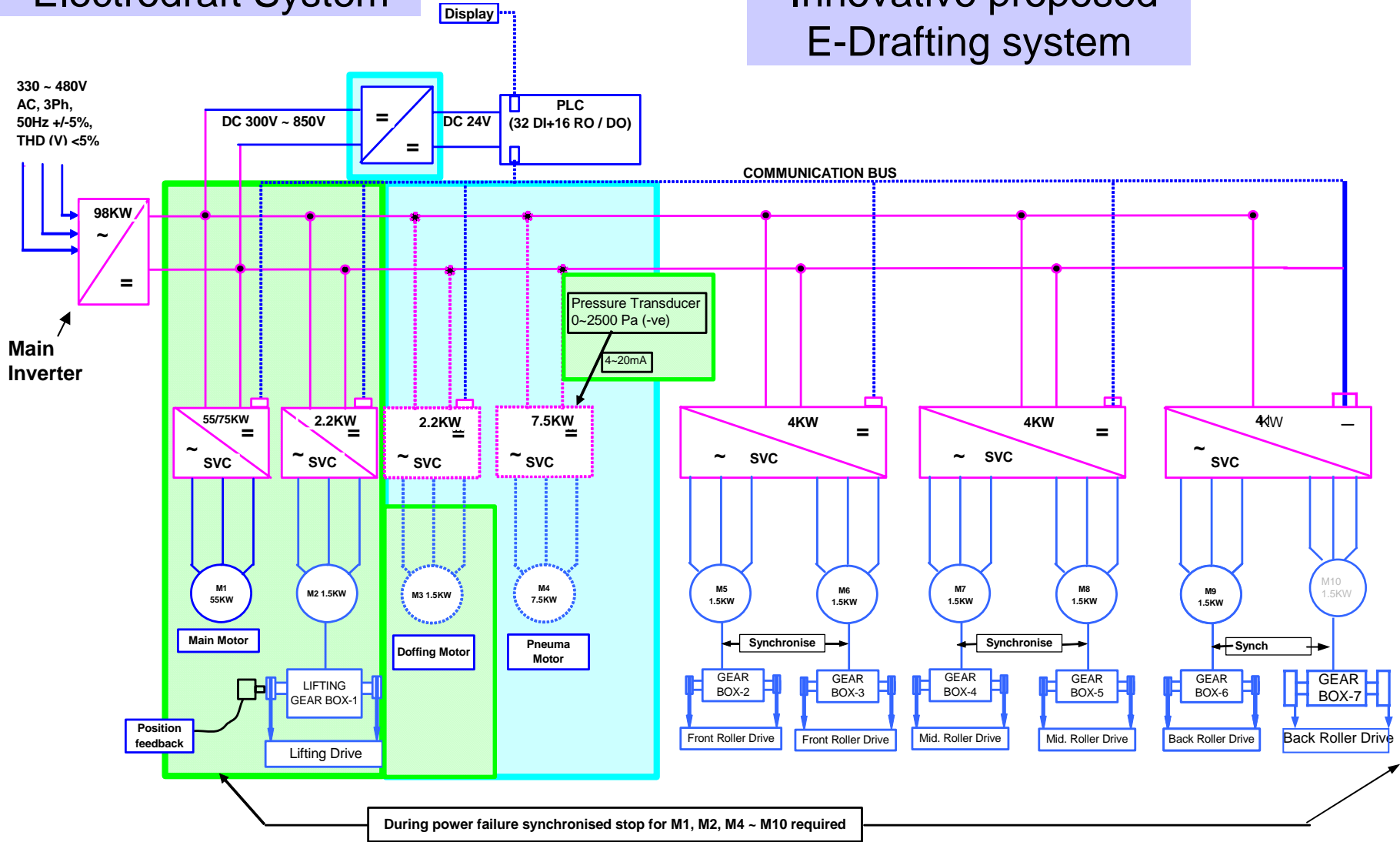
2. Drive to Drafting Rollers – Alternative System

Electrodraft System



2. Drive to Drafting Rollers – Alternative System Electrodraft System

Innovative proposed E-Drafting system



To achieve synchronized stopping of lifting and drafting Motors along with Main Motor by using Kinetic Energy available in the machine.

2. Drive to Drafting Rollers – Alternative System

Electrodraft System

- All rollers driven by individual motors, controlled by individual drives.
- Possible to alter draft and twist from the key pad. Fine tuning of twist & draft adjustments possible.
- Possible to manufacture fashion yarn like multi twist , multi count , slub yarn.
- Interfacing & drive communication through Profibus and other types of protocols makes controls simple and very accurate.

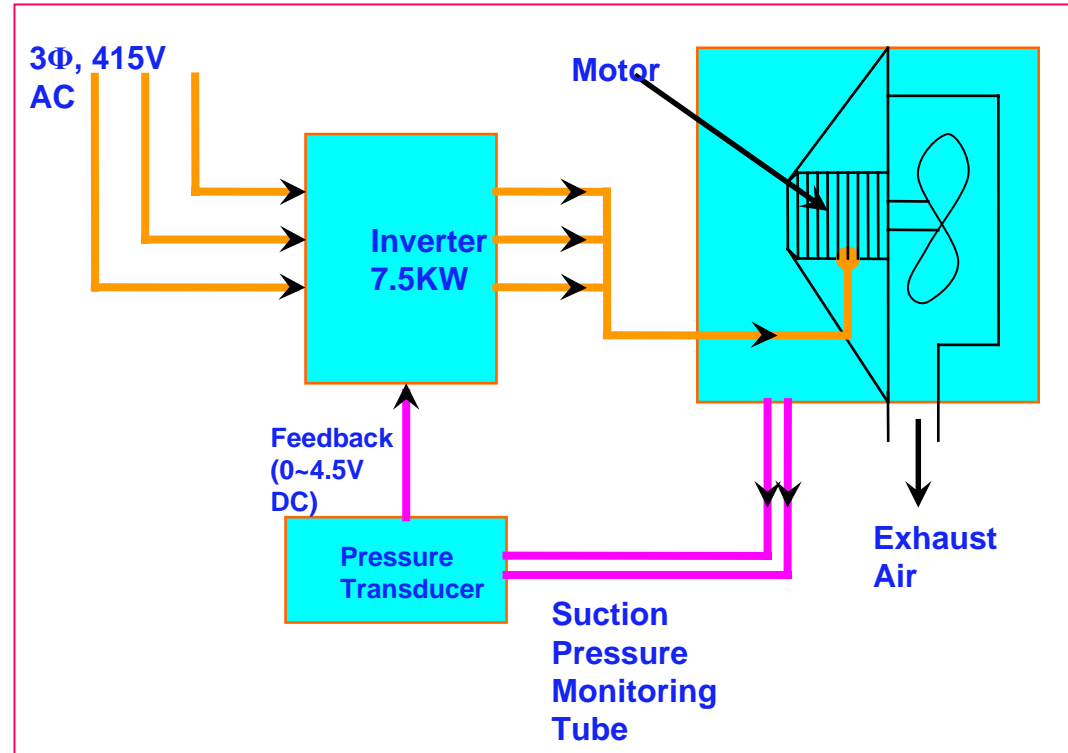
3. Pneumafil - Suction Pressure Monitoring System

Present System :

- Pneuma motor works at fixed rpm.
- Suction values achieved is fixed and has no relation to the material or count being processed.

Alternate System

- Pneumafil motor is controlled by inverter.
- Suction pressure can be set in inverter. This is constantly monitored by pressure transducer.
- Suction pressure can be set in relation to spindleage of the machine, count, and raw material being processed.
- Reduces power consumption



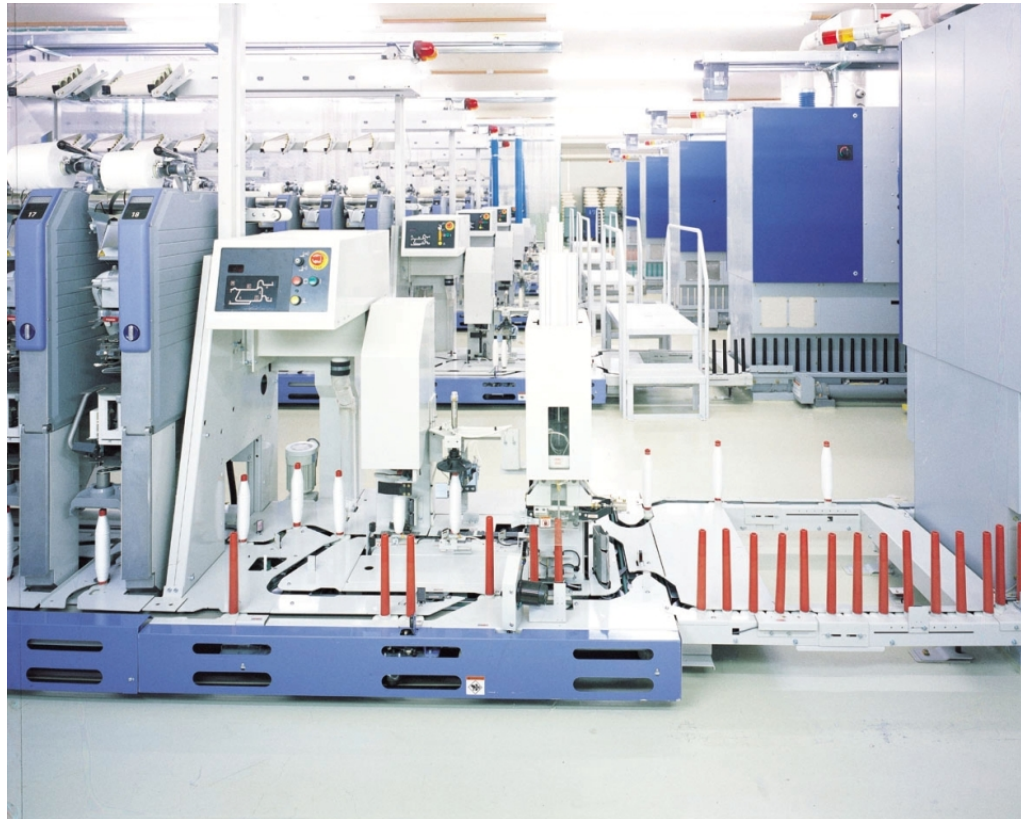
Case Study : Saving of about 1.2 units per hour

4. Automatic Doffer



- Automatic Doffer system is now gaining customer acceptance.
- Reduced manpower requirement.
- Increase machine productivity.
- Reduce need for supervision.
- Increase life of components and accessories like spindle & bobbins.

5. Link Coner System



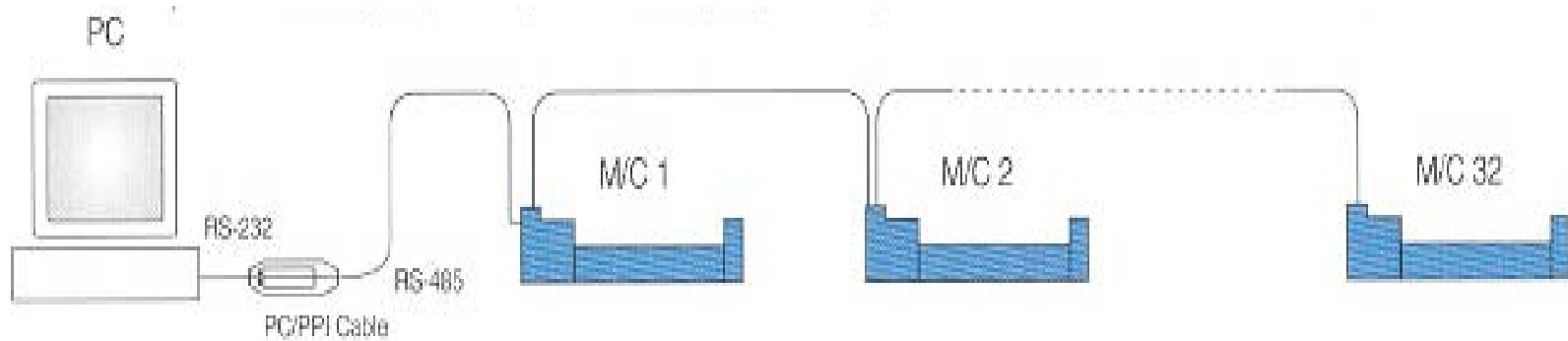
- Automatic Cop Transfer from Ring Frame to Winder.
- Possible to implement spin identification system. (on line quality monitoring & identifying the spindle producing inferior quality yarn).
- No mix up of different counts.
- No deterioration of yarn quality due to manual handling.

6. Automatic Roving Transfer



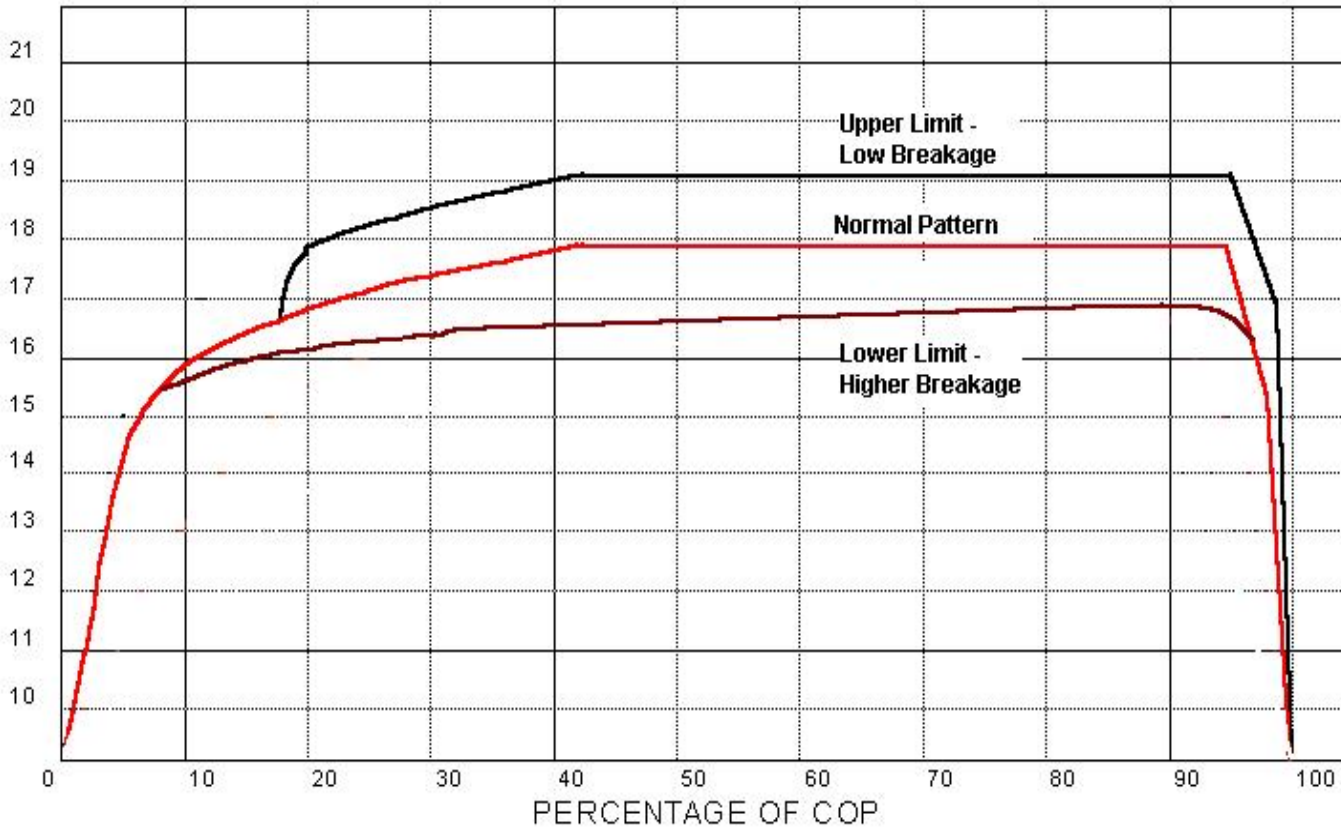
- Automatic Transfer of Roving Bobbins from Roving Frame to Ring Frame.
- No deterioration in Roving quality due to storage and handling.
- Better yarn quality.

7. Automatic Data Acquisition :



- All machines are connected to a Central Computer.
- Two way communication between the Computer and Machine can be established.
- Possible to change the speed parameters from the Computer.
- On line monitoring of the machine status.
- Data acquired can be converted to production report. No need to manually record the production information from the machine.

8. Automatic Breakage Control



- Machine can be interfaced with the Ring Data System.
- Spindle speed can be automatically increased / reduced depending on the yarn breakage level

9. Machine Brake



- Brake is required on Ring Frame to prevent snarl formation while stopping the machine.
- Conventional system uses electro magnetic or mechanical brakes.
- Alternate system
- DC Injection brake from main inverter.
- Optimum braking time by varying the parameters.
- Elimination of all mechanical parts which require frequent resetting.

Dream of all Machinery Manufacturers

**AUTOMATIC YARN PIECING
AT
RING FRAMES**

Thank you for your attention

