FUJIKURA FIBER OPTICS VIETNAM LTD.

TECHNICAL REPORT

Form: 4-Pr-007-4-Fo-0006	Version: 02	Page: 1/5	‖‖‖‖‖‖‖‖‖‖‖‖‖‖
			4-Pr-007-4-Fo-0006/2

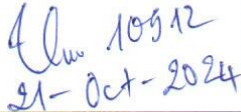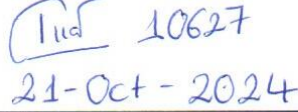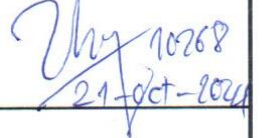| Record No (get by EIC program): 4-Pr-007-4-Fo-0006-5-RC-0014	Date: 18-Oct-2024

Report title: Technical report for new rewinding string machine

Prepared by: VuiNV	Checked by: TuanHT	Reviewed by Technical Advisor (if any)	Approved by: ThongHN
(signature) 10912 21-Oct-2024	*(signature)* 10627 21-Oct-2024		*(signature)* 10268 21-Oct-2024

I. Background:

In order to increase demand of rewinding string process in Cleaner line.
--> PTE test and apply Multiplex string to machine: N24MPM0528

II. Conclusion:

- Machine specification:
  + Material: STR0002
  + Speed of machine: 3000 rpm
  + Length: 6500 ± 200 mm and 8500 ± 200 mm
  + Tolerance:± 200 mm, check by measuring length after rewinding by calibrated ruler.
  + Material: THR0018
  + Speed of machine: 850 rpm
  + Length: 7400 ± 100 mm
  + Tolerance:± 100 mm, check by measuring length after rewinding by calibrated ruler.
  + Visual checking: String no tangle, string clean follow 4-QC-221-9-PS-012-0008
-> After test with actual product and all products meet the product requirement .
We can this machine to mass production.

III. Analysis (Yield ratio, Productivity, Cpk, Process Reliability, product's reliability...):

1. Machine requirement

Input:
Application scope: for material THR0018
Voltage: Auto volt (110/220 VAC)
Output:
Length: 6500 ± 200 mm, 8500 ± 200 mm, and 7400 ± 100 mm
Visual checking: String no tangle, string clean follow 4-QC-221-9-PS-012-0008
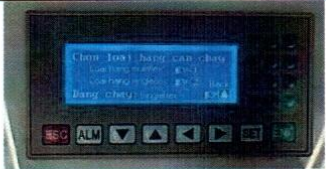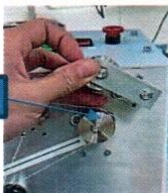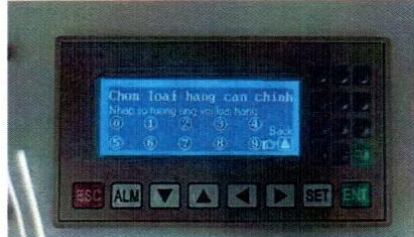
2. Design concept

Cretia	Image	Content
Overall image		
HMI monitor		Use HMI to improve user experience, faster setup, and display more information
Length determine	Encoder	Use encoder to determine length of string
Tension of string	Magnetic brake	Use magnetic brake to maintain the tension of string
Multi-channels		Add separate channels for each range of length of products --> When change product, OP just need to choose on HMI
Length check function		Add length check function to HMI to alarm OP when Non-comfirming event occur.

4. Test result

a. Initial setting

Material: STR0002

Speed: 3000 (rpm)

Value of magnetic brake: 1N

Setting for specification: 6500 ± 200 (mm), 8500 ± 200 (mm)

Material: THR0018

Speed: 850 (rpm)

Value of magnetic brake: 2N ⚠2

Setting for specification: 7400 ± 100 (mm)

b. Data

No.	Actual length (mm)	Evalution
Length: 6500 ± 200 (mm)		
1	6600	Pass
2	6600	Pass
3	6640	Pass
4	6620	Pass
5	6570	Pass
Min	6570	
Max	6640	
Average	6606	
SD	26.08	
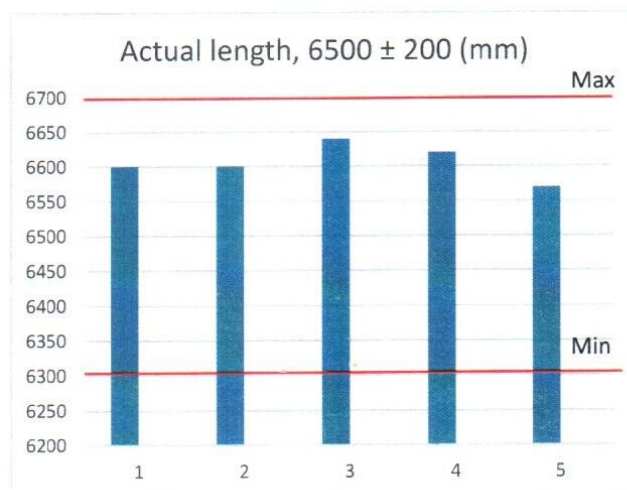
Actual length, 6500 ± 200 (mm)

No.	Actual length (mm)	Evalution
Length: 8500 ± 200 (mm)		
1	8600	Pass
2	8620	Pass
3	8630	Pass
4	8620	Pass
5	8620	Pass
Min	8600	
Max	8630	
Average	8618	
SD	10.95	

Actual length, 8500 ± 200 (mm)

⚠2
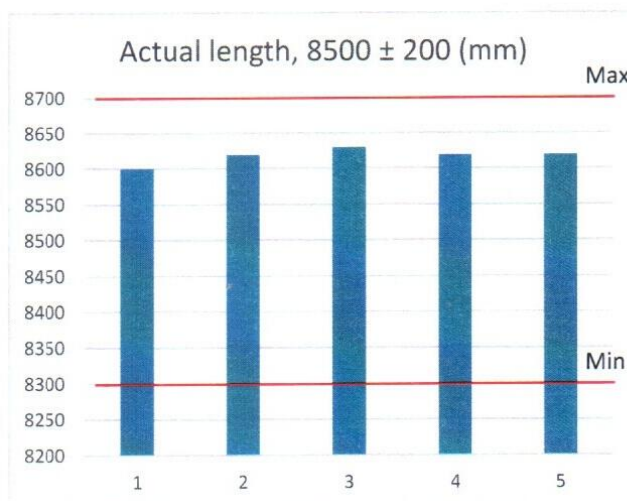
No.	Actual length (mm)	Evalution
Length: 7400 ± 100 (mm)		
1	7400	Pass
2	7400	Pass
3	7420	Pass
4	7390	Pass
5	7410	Pass
Min	7390	
Max	7420	
Average	7404	
SD	11.40	

Actual length, 7400 ± 100 (mm)
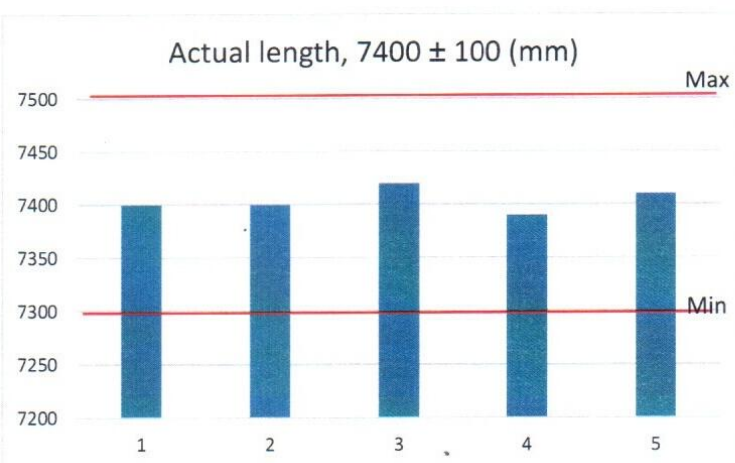
3. Followchart of new machine

```
                          Rewinding machine
                                 │
                                 ▼
                          ◇ Product type? ◇ ──No──► Choose right product type
                                 │ Yes                        │
                                 ▼◄───────────────────────────┘
                    Attach string roll to discharge shaft
                                 │
                                 ▼
                    Guide the string through rollers
                                 │
                                 ▼
              ┌──► Attach string to rewinding bobbin
              │                  │
              │                  ▼
              │     Attach rewinding bobbin to rotary shaft
              │                  │
              │                  ▼
              │            Close the door
              │                  │
              │                  ▼
              │           Press reset button
              │                  │
              │                  ▼
              │           Press start button
              │                  │
              │                  ▼
              │     Motor accelerates for amount of length
              │                  │
              │                  ▼
              │     Motor rotates at peak revolution
              │                  │
              │                  ▼
              │     Compare current value to decelerate ◄──┐
              │          value of encoder                  │
              │                  │                          │
              │                  ▼                          │
              │         ◇ Reach deceleration value? ◇ ──No──┘
              │                  │ Yes
              │                  ▼
              │     Motor decelerates the last amount of
              │                length
              │                  │
              │                  ▼
              │     Motor stops when approach setting
              │                length
              │                  │
              │                  ▼
              │     PLC compares current motor revolution
              │            to setting value
              │                  │
              │                  ▼
              │     ◇ Within setting value range? ◇ ──No──► Display error to HMI
              │                  │ Yes                              │
              │                  ▼                                  ▼
              │        Cut string by scissor          OP check the length by ruler
              │                  │
              │                  ▼
              └──── Open the door and take out product
```

OP

Machine

OP

IV. Appendix standardization (revised quality documentation):

- PTE will make WI and CS for apply.

- PRE will make 4M change and initial control for mass production.

V. Others: