# Document
# for
# User Requirements
# and
# Design Specification

# Index

## 1 Background and Process

In order to strengthen and expand the Spinning Process, it is necessary to strengthen the cost competitiveness of the integrated yarn and fabric and to meet the customer's demand for quality.

PTA/MEG slurry (Pasta) is a mixture of PTA (Para Terephthalic Acid) with Mono Ethylene Glycol which is the main raw material for the Polyester manufacturing process. Poly plant processes raw material into slurry/ polymer.

Further the polymer goes into spin beam in which specially designed, distribution piping system, which guarantees same dwell time and same pressure drop for the polymer to reach each spinning position.

The polymer becomes small stream after being extruded from micro-holes of spinneret and are cooled and solidified by air flow after passing through a low-damping quenching. The melt stream sprayed from spinneret become monofilament in very short time and the structure is changed. This changing is mainly influenced by velocity evenness of air flow from quenching. Air temperature and velocity, control of air blowing gap and air flow steady under high velocity affect the direct factor of yarn quality. Therefore, it requires air flow from quenching with stability, uniformity, and adjustability.

The cooled and solidified filaments are oiled and damped by oiling device to increase the cohesion of the yarn, to improve the antistatic property of the yarn, to reduce the friction between the yarn and the yarn, and to reduce the friction between the yarn and equipment, and to improve the after-treatment property of the yarn

After passing through quenching system, the yarn from every position is guided by free roller to the end of take up unit and is entered into godet roller, then is feed into Tow Can by sunflower rollers.

When tow can reach certain weight by time, the programmable-control time counter gives off a signal, and then reciprocating mechanism automatically moves laden can to the centre of the unit and delivering mechanism moves laden can out, in meanwhile, to move in empty can for continuous tow collection. This completes the spinning.

In second step these cans are taken to Creel area where many cans combined to make tow and stretched several times in a chemical hot bath to make fiber. These fibers are then dried and relaxed in a relaxer and cut in various cut length before bale packing.

**About current project -**

- Total Number of Spinning Lines are Three
- Each Spinning Line has five Beams
- Each Beam has eight positions
- Production capacity of each Spinning Line is 225 tons per day

## 2 Purpose of this Document

This document is a key deliverable required as part of the functional design phase of the project. The purpose of this document is to provide detailed functional design specifications for SG Project. The functional design of the solution is based on the current understanding of the functional requirements with IPCI by Smart Controls in December 2022.

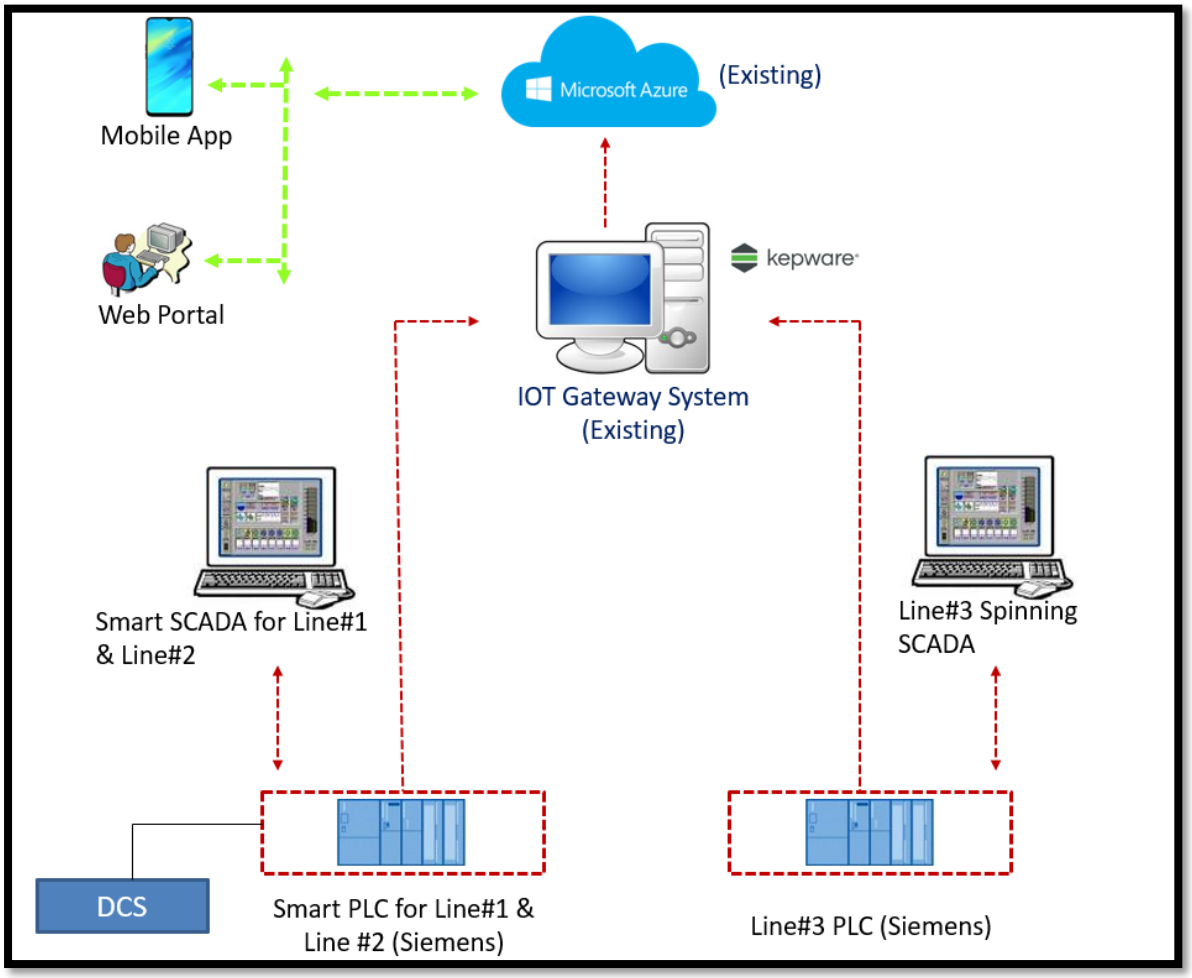
The Functional Specification Document is a document that provides detailed information on how the system solution will function and the requested behavior. This document is created based on the high-level requirements identified during requirement discussions with IPCI. and provides traceability on the functional specifications back to the business requirements.

## 3 Abbreviations

| **Glossary** | |
|---|---|
| **Definition** | **Acronyms** |
| SmartGate | SG |
| Transmission Control Protocol/Internet Protocol | TCP/IP |
| Open Platform Communication | OPC |
| Can Traversing System | CTS |
| Spinning | SPG |
| Position | Pos |
| Microsoft Azure | MS Azure |
| Rotation Per Minutes | RPM |

## 4. System Architecture

Following is the architecture for SmartGate Spinning and Fiber –




**A. Data Sources:**

a. Siemens PLC common for Line#1 and Line#2

b. Siemens PLC for Line#3

**B. Protocol:** TCP/IP

**C. Data Integration:** By Kepware OPC Server

**D. IOT Gateway:** Edge Server

**E. Cloud:** MS Azure

**F. Visualization:**

a. Web Portal

b. Android App

c. iOS App

## 5. User Requirements and Business Logics

Following are the requirements from user with detailed business logic which need to be implemented in SG -

### 1. Efficiency Calculation (%)

Spinning Lines (1,2 and 3) efficiency need to be calculated using following formula -

$$Efficiency = \frac{Actual\ run\ time}{Available\ run\ time} x100\%$$

Actual runtime = No of SPG pumps on x Actual run hour pumps (Minute)

Available runtime = No of SPG pumps x run hour pumps (Minute)

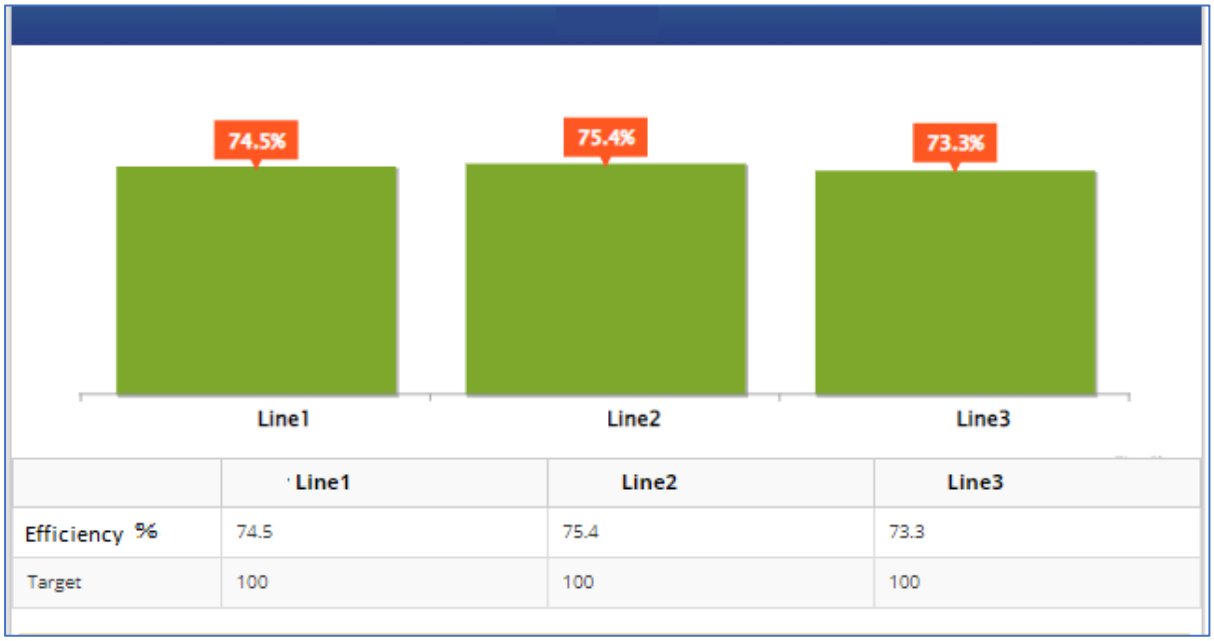
Note:

a. No of SPG Pumps (40 unit) per line
b. Run hour pumps 1 unit (1440 minute)
c. Efficiency calculation for all three Spinning Lines
d. Efficiency is day wise, month wise and year wise
e. Actual run over pumps value will be calculated by SmartGate

Tag Required:

a. SPG Pump ON/OFF

Sample:




| | Line1 | Line2 | Line3 |
|---|---|---|---|
| Efficiency % | 74.5 | 75.4 | 73.3 |
| Target | 100 | 100 | 100 |

| Type | Jan. | Feb. | Mar. | Apr. | May | Jun. | Jul. | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Efficiency | 82 | 89 ↑ | 92 ↑ | 84 ↓ | | | | | | | | |
| Target | 100% | 100% | 100% | 100% | | | | | | | | |
| Deviation | 18% | 11% ↑ | 8% ↑ | 16% ↓ | | | | | | | | |

## 2. Production Calculation (Tons/Day)

Production for Position (1 to 40) for every Spinning Line need to be calculated using following formula -

Actual Production = Actual throughput of position – Waste from position

Actual Throughput kg/min = SPG pump RPM x K factor

Waste = (Available Run time – Actual run time) X Speed SPG pump (RPM) X K factor

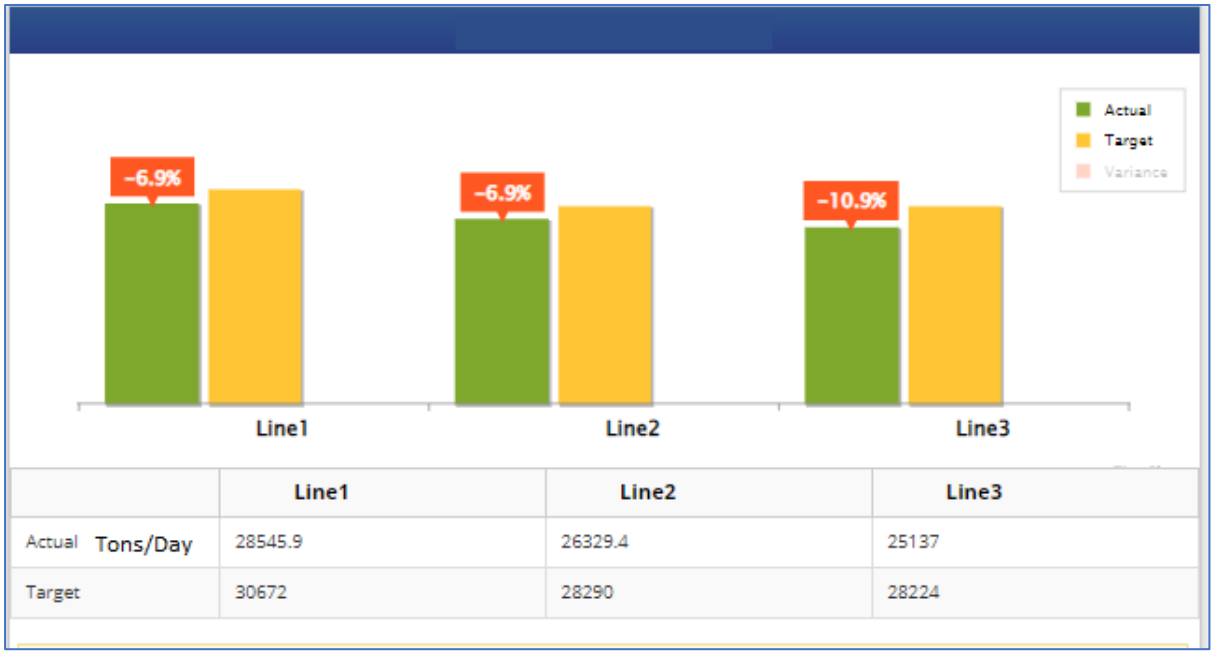
Note:

a. K factor (Spinning Line 1 and 2) = 0.19257
b. K factor (Spinning Line 3) = 0.20059
c. Individual Spinning Line Production would be the sum of all 40 positions
d. Production Day wise, month wise and year wise

Tag Required:

a. SPG Pump RPM

Sample:




| | Line1 | Line2 | Line3 |
|---|---|---|---|
| Actual Tons/Day | 28545.9 | 26329.4 | 25137 |
| Target | 30672 | 28290 | 28224 |

### 3. Waste Calculation (Tons/Day)

Waste for Position (1 to 40) for every Spinning Line need to be calculated using following formulas and Conditions –

**Spinning Line1 and 2**

Waste1: If SPG pump run and sensor freezing sensor not active
Waste1 = Total run time of position SPG Pump when sensor not active (minute) X speed of position SPG pump (RPM) X K Factor

Waste2 If SPG pump run and Digital output channel active (Sucker)
Waste2 = Total run time of position SPG Pump when Digital output channel active (Sucker) (minute) X speed position SPG pump (RPM) X K Factor

Tag Required:

a. Spinning pump sensor active not active bit
b. Spinning pump digital output channel active (Sucker) bit

**Spinning Line3**

Waste1: If SPG pump run and sensor candle cylinder active
Waste1 = Total run time of SPG Pump when sensor active (minute) X speed SPG pump (RPM) X K Factor

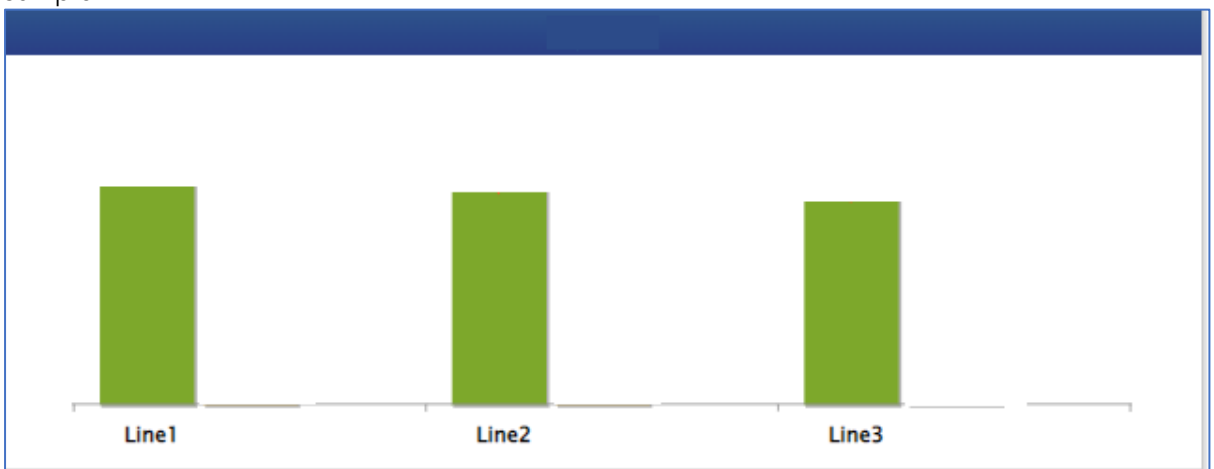
Waste2: If SPG pump run than Digital output channel active (Sucker)
Waste2 = Total run time of position SPG Pump when Digital output channel active (Sucker) (minute) X speed position SPG pump (RPM) X K Factor

Tag Required:

a. Spinning pump sensor active not active bit
b. Spinning pump digital channel active (Sucker) bit

Total Waste = Waste1 + Waste2

Sample:




| | Line1 | Line2 | Line3 |
|---|---|---|---|
| Waste (Tons/Day) | 0.54 | 0.52 | 0.50 |

## 4. Stoppages Count (No.s)

Stoppages for Position (1 to 40) for every Spinning Line need to be calculated using following Conditions –
If Spinning pump is ON then machine is running, If Off then stop.
Stoppage reasons will be selected manually in SG system. There will be master form to put new stoppage reason in system.

Following are the stoppage reasons for Line1,2 and 3 –

1. DO Wrap godet no1
2. DO Wrap godet no2
3. DO Wrap godet no3
4. DO Wrap godet no4
5. DO Wrap godet no5
6. DO Wrap godet no6
7. DO Wrap godet no7
8. DO Wrap sunflower wheel
9. DO inverter fault
10. Spinning pump inverter fault
11. Spinning pump faulty
12. Spinning gear box problem
13. Flow quenching abnormal
14. Return pressure quenching abnormal
15. Cylinder quenching leakage
16. Selenoid cylinder quenching fault
17. Instrument
18. Schedule wipping
19. PPC
20. CTR
21. Electric Power fail
22. Emergency push button Active
23.Other

Sample:

| Stoppage | Time | Start | End | Reason |
|---|---|---|---|---|
| Stoppage 1 | 02Hr. 11Min. | 12/12/2022 3:44:18 AM | 12/12/2022 5:55:20 AM | Reason - XYZ |
| Stoppage 2 | 03 Min. | 12/12/2022 6:31:20 AM | 12/12/2022 6:34:20 AM | Reason - XYZ |
| Stoppage 3 | 09 Min. | 12/12/2022 7:28:20 AM | 12/12/2022 7:37:20 AM | Reason - XYZ |
| Stoppage 4 | 01Hr. 31Min. | 12/12/2022 12:40:23 PM | 12/12/2022 2:11:24 PM | Reason - XYZ |

## 5. Consumption Calculation:

A. Power (KWH) - Power Consumption value will pe put manually in SG system on daily basis.

B. Spin Finish Oil (M3) – Total Finish Oil Consumption will be calculated based on tags' values received from PLC.

Total No.s of Finish oil tanks are 5
All tanks are not same size and volume capacity.
K factor we will provide by team IPCI during calibration the tank.
Level tank unit is Percent (%)

Daily consumption finish oil = Actual level 06.00 today –Actual level 05.59 tomorrow X K factor

Tag Required:

a. Tank1 Level
b. Tank2 Level
c. Tank3 Level
d. Tank4 Level
e. Tank5 Level

Sample:

**6. Can Tracking:**

SG will log the following parameters against the Can ID, for how much time Can is travelling on Can Traversing System. Total No.s of Cans are 200.

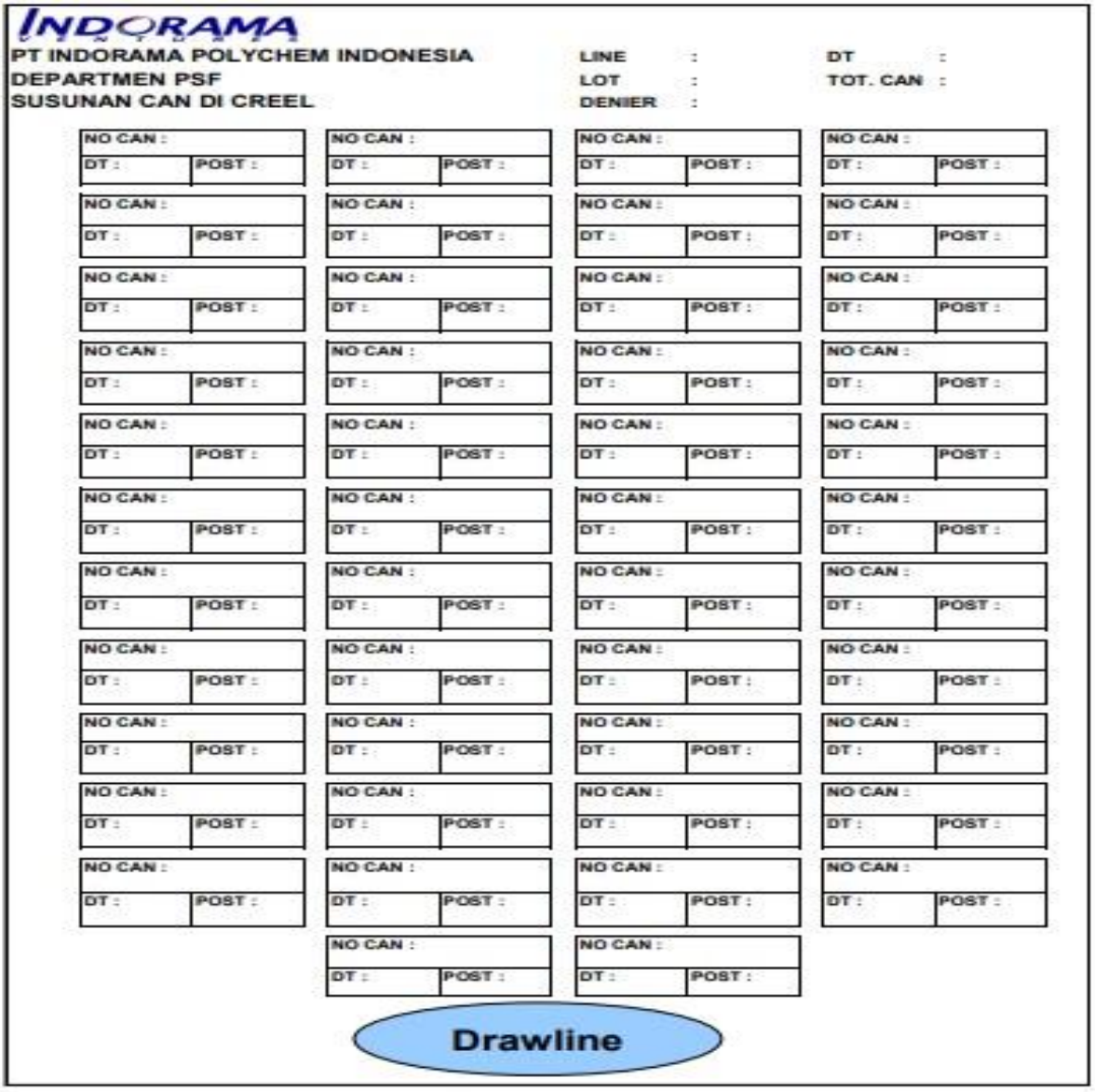
A. Doping time: How much time Can is travelling on CTS.
B. Post: Number of SPG Pumps are running at that Time
C. Quench flow indication and trend (QTY 40 Position of actual running)
D. Return Air pressure from quenching (QTY 40 Position of actual running)
E. Temperature main AHU
F. Temperature Beam 1 to beam 5
G. Temperature SXD manifold
H. Temperature SXD Beam
I. Detail Drip counting for each position of SPG post
J. SPG pump stop and start report

Process Flow:

A. There will be a unique identification number of every Can
B. User will put manually, the detail of Can along with Date and time when individual Can is shifting on CTS.
C. System will log certain parameters against the Can, For how long time Can will travel on CTS.
D. User can visualize the historical data of Can Travel along with all connected parameters while putting the Can ID in SG.

Tag Required:

A. Bit for Can releasing from CTS
B. Quench Flow Indication (for Line or all 40 positions)
C. Return Air Pressure (for Line or all 40 positions)
D. Temp Main AHU
E. Temp Beam1
F. Temp Beam2
G. Temp Beam3
H. Temp Beam4
I. Temp Beam5
J. Temp SXD manifold
K. Temp SXD Beam

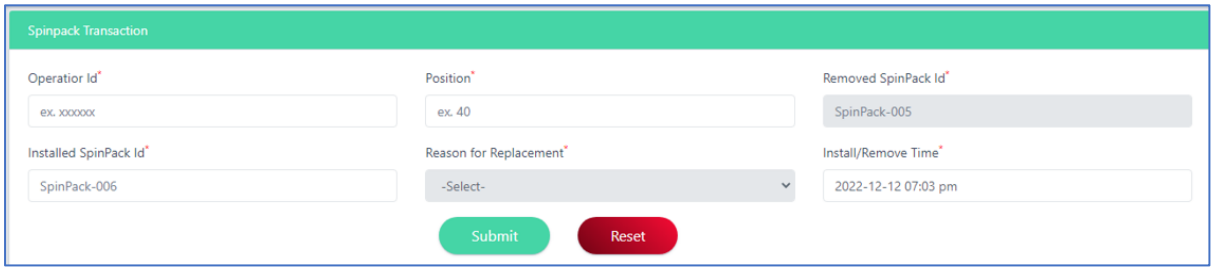

INDORAMA
PT INDORAMA POLYCHEM INDONESIA
DEPARTMEN PSF
SUSUNAN CAN DI CREEL
LINE :
LOT :
DENIER :
DT :
TOT. CAN :
NO CAN :
DT :
POST :
Drawline

## 7. Spin Pack Traceability

Spin Pack traceability is nothing, it is to put Spin Pack details in System while exchanging from Position. i.e. Remove SpinPack No, New Spin Pack No, Position ID, Date, Time, Reason for replacement etc.

In future, If user put the details of SpinPack in system and same time he can get the current location and travel history of SpinPack.

Sample:




## 8. Important Critical Alarms

List will be shared by IPCI later (While developing the software)

## 9. Dashboard Monitoring

Following status/values can be displayed on Live Dashboard –

a. Running/stop status
b. Drip/Stop Counter
c. Waste
d. Production
e. Efficiency
f. Consumptions
g. Very Critical Alarms
h. Important Process Parameters

## 10. Drip Counter Recording (No.s)

**Spinning Line1, line 2**
**Record condition If** SPG pump run and freezing sensor active and sucker off and DO (Draw off) run High speed that Drip is counting.

**Spinning line3**
**Record condition If** SPG pump run and Candle sensor not active and sucker off and DO (Draw off) run High speed that Drip is counting.

## 11. Reports

Following reports are available on historical data –

a. Production
b. Consumptions
c. Waste
d. Position Run/Stop
e. Alarms
f. Spin Pack Traceability
g. Can Tracking

## 12. Others Features

Following other features are available -

a. Data moves on Cloud
b. Historical data export into MS Excel
c. User Management
d. Data Visualization using Web and Mobile App

6. Tag Details

## 1. Efficiency Calculation

| Sno. | Spinning Line | Tag Name | Tad Address |
|---|---|---|---|
| 1 | SPG1 | Pos 1 SPG Pump ON/OFF | |
| 2 | SPG1 | Pos 2 SPG Pump ON/OFF | |
| 3 | SPG1 | Pos 3 SPG Pump ON/OFF | |
| 4 | SPG1 | Pos 4 SPG Pump ON/OFF | |
| 5 | SPG1 | Pos 5 SPG Pump ON/OFF | |
| 6 | SPG1 | Pos 6 SPG Pump ON/OFF | |
| 7 | SPG1 | Pos 7 SPG Pump ON/OFF | |
| 8 | SPG1 | Pos 8 SPG Pump ON/OFF | |
| 9 | SPG1 | Pos 9 SPG Pump ON/OFF | |
| 10 | SPG1 | Pos 10 SPG Pump ON/OFF | |
| 11 | SPG1 | Pos 11 SPG Pump ON/OFF | |
| 12 | SPG1 | Pos 12 SPG Pump ON/OFF | |
| 13 | SPG1 | Pos 13 SPG Pump ON/OFF | |
| 14 | SPG1 | Pos 14 SPG Pump ON/OFF | |
| 15 | SPG1 | Pos 15 SPG Pump ON/OFF | |
| 16 | SPG1 | Pos 16 SPG Pump ON/OFF | |
| 17 | SPG1 | Pos 17 SPG Pump ON/OFF | |
| 18 | SPG1 | Pos 18 SPG Pump ON/OFF | |
| 19 | SPG1 | Pos 19 SPG Pump ON/OFF | |
| 20 | SPG1 | Pos 20 SPG Pump ON/OFF | |
| 21 | SPG1 | Pos 21 SPG Pump ON/OFF | |
| 22 | SPG1 | Pos 22 SPG Pump ON/OFF | |
| 23 | SPG1 | Pos 23 SPG Pump ON/OFF | |
| 24 | SPG1 | Pos 24 SPG Pump ON/OFF | |
| 25 | SPG1 | Pos 25 SPG Pump ON/OFF | |
| 26 | SPG1 | Pos 26 SPG Pump ON/OFF | |
| 27 | SPG1 | Pos 27 SPG Pump ON/OFF | |
| 28 | SPG1 | Pos 28 SPG Pump ON/OFF | |
| 29 | SPG1 | Pos 29 SPG Pump ON/OFF | |
| 30 | SPG1 | Pos 30 SPG Pump ON/OFF | |
| 31 | SPG1 | Pos 31 SPG Pump ON/OFF | |
| 32 | SPG1 | Pos 32 SPG Pump ON/OFF | |
| 33 | SPG1 | Pos 33 SPG Pump ON/OFF | |
| 34 | SPG1 | Pos 34 SPG Pump ON/OFF | |
| 35 | SPG1 | Pos 35 SPG Pump ON/OFF | |
| 36 | SPG1 | Pos 36 SPG Pump ON/OFF | |
| 37 | SPG1 | Pos 37 SPG Pump ON/OFF | |
| 38 | SPG1 | Pos 38 SPG Pump ON/OFF | |
| 39 | SPG1 | Pos 39 SPG Pump ON/OFF | |

| | | | |
|---|---|---|---|
| 40 | SPG1 | Pos 40 SPG Pump ON/OFF | |
| 41 | SPG2 | Pos 1 SPG Pump ON/OFF | |
| 42 | SPG2 | Pos 2 SPG Pump ON/OFF | |
| 43 | SPG2 | Pos 3 SPG Pump ON/OFF | |
| 44 | SPG2 | Pos 4 SPG Pump ON/OFF | |
| 45 | SPG2 | Pos 5 SPG Pump ON/OFF | |
| 46 | SPG2 | Pos 6 SPG Pump ON/OFF | |
| 47 | SPG2 | Pos 7 SPG Pump ON/OFF | |
| 48 | SPG2 | Pos 8 SPG Pump ON/OFF | |
| 49 | SPG2 | Pos 9 SPG Pump ON/OFF | |
| 50 | SPG2 | Pos 10 SPG Pump ON/OFF | |
| 51 | SPG2 | Pos 11 SPG Pump ON/OFF | |
| 52 | SPG2 | Pos 12 SPG Pump ON/OFF | |
| 53 | SPG2 | Pos 13 SPG Pump ON/OFF | |
| 54 | SPG2 | Pos 14 SPG Pump ON/OFF | |
| 55 | SPG2 | Pos 15 SPG Pump ON/OFF | |
| 56 | SPG2 | Pos 16 SPG Pump ON/OFF | |
| 57 | SPG2 | Pos 17 SPG Pump ON/OFF | |
| 58 | SPG2 | Pos 18 SPG Pump ON/OFF | |
| 59 | SPG2 | Pos 19 SPG Pump ON/OFF | |
| 60 | SPG2 | Pos 20 SPG Pump ON/OFF | |
| 61 | SPG2 | Pos 21 SPG Pump ON/OFF | |
| 62 | SPG2 | Pos 22 SPG Pump ON/OFF | |
| 63 | SPG2 | Pos 23 SPG Pump ON/OFF | |
| 64 | SPG2 | Pos 24 SPG Pump ON/OFF | |
| 65 | SPG2 | Pos 25 SPG Pump ON/OFF | |
| 66 | SPG2 | Pos 26 SPG Pump ON/OFF | |
| 67 | SPG2 | Pos 27 SPG Pump ON/OFF | |
| 68 | SPG2 | Pos 28 SPG Pump ON/OFF | |
| 69 | SPG2 | Pos 29 SPG Pump ON/OFF | |
| 70 | SPG2 | Pos 30 SPG Pump ON/OFF | |
| 71 | SPG2 | Pos 31 SPG Pump ON/OFF | |
| 72 | SPG2 | Pos 32 SPG Pump ON/OFF | |
| 73 | SPG2 | Pos 33 SPG Pump ON/OFF | |
| 74 | SPG2 | Pos 34 SPG Pump ON/OFF | |
| 75 | SPG2 | Pos 35 SPG Pump ON/OFF | |
| 76 | SPG2 | Pos 36 SPG Pump ON/OFF | |
| 77 | SPG2 | Pos 37 SPG Pump ON/OFF | |
| 78 | SPG2 | Pos 38 SPG Pump ON/OFF | |
| 79 | SPG2 | Pos 39 SPG Pump ON/OFF | |
| 80 | SPG2 | Pos 40 SPG Pump ON/OFF | |
| 81 | SPG3 | Pos 1 SPG Pump ON/OFF | |
| 82 | SPG3 | Pos 2 SPG Pump ON/OFF | |
| 83 | SPG3 | Pos 3 SPG Pump ON/OFF | |

| | | | |
|---|---|---|---|
| 84 | SPG3 | Pos 4 SPG Pump ON/OFF | |
| 85 | SPG3 | Pos 5 SPG Pump ON/OFF | |
| 86 | SPG3 | Pos 6 SPG Pump ON/OFF | |
| 87 | SPG3 | Pos 7 SPG Pump ON/OFF | |
| 88 | SPG3 | Pos 8 SPG Pump ON/OFF | |
| 89 | SPG3 | Pos 9 SPG Pump ON/OFF | |
| 90 | SPG3 | Pos 10 SPG Pump ON/OFF | |
| 91 | SPG3 | Pos 11 SPG Pump ON/OFF | |
| 92 | SPG3 | Pos 12 SPG Pump ON/OFF | |
| 93 | SPG3 | Pos 13 SPG Pump ON/OFF | |
| 94 | SPG3 | Pos 14 SPG Pump ON/OFF | |
| 95 | SPG3 | Pos 15 SPG Pump ON/OFF | |
| 96 | SPG3 | Pos 16 SPG Pump ON/OFF | |
| 97 | SPG3 | Pos 17 SPG Pump ON/OFF | |
| 98 | SPG3 | Pos 18 SPG Pump ON/OFF | |
| 99 | SPG3 | Pos 19 SPG Pump ON/OFF | |
| 100 | SPG3 | Pos 20 SPG Pump ON/OFF | |
| 101 | SPG3 | Pos 21 SPG Pump ON/OFF | |
| 102 | SPG3 | Pos 22 SPG Pump ON/OFF | |
| 103 | SPG3 | Pos 23 SPG Pump ON/OFF | |
| 104 | SPG3 | Pos 24 SPG Pump ON/OFF | |
| 105 | SPG3 | Pos 25 SPG Pump ON/OFF | |
| 106 | SPG3 | Pos 26 SPG Pump ON/OFF | |
| 107 | SPG3 | Pos 27 SPG Pump ON/OFF | |
| 108 | SPG3 | Pos 28 SPG Pump ON/OFF | |
| 109 | SPG3 | Pos 29 SPG Pump ON/OFF | |
| 110 | SPG3 | Pos 30 SPG Pump ON/OFF | |
| 111 | SPG3 | Pos 31 SPG Pump ON/OFF | |
| 112 | SPG3 | Pos 32 SPG Pump ON/OFF | |
| 113 | SPG3 | Pos 33 SPG Pump ON/OFF | |
| 114 | SPG3 | Pos 34 SPG Pump ON/OFF | |
| 115 | SPG3 | Pos 35 SPG Pump ON/OFF | |
| 116 | SPG3 | Pos 36 SPG Pump ON/OFF | |
| 117 | SPG3 | Pos 37 SPG Pump ON/OFF | |
| 118 | SPG3 | Pos 38 SPG Pump ON/OFF | |
| 119 | SPG3 | Pos 39 SPG Pump ON/OFF | |
| 120 | SPG3 | Pos 40 SPG Pump ON/OFF | |

## 2. Production Calculation

| | | | |
|---|---|---|---|
| 121 | SPG1 | Pos 1 SPG Pump RPM | |
| 122 | SPG1 | Pos 2 SPG Pump RPM | |
| 123 | SPG1 | Pos 3 SPG Pump RPM | |
| 124 | SPG1 | Pos 4 SPG Pump RPM | |
| 125 | SPG1 | Pos 5 SPG Pump RPM | |
| 126 | SPG1 | Pos 6 SPG Pump RPM | |
| 127 | SPG1 | Pos 7 SPG Pump RPM | |
| 128 | SPG1 | Pos 8 SPG Pump RPM | |
| 129 | SPG1 | Pos 9 SPG Pump RPM | |
| 130 | SPG1 | Pos 10 SPG Pump RPM | |
| 131 | SPG1 | Pos 11 SPG Pump RPM | |
| 132 | SPG1 | Pos 12 SPG Pump RPM | |
| 133 | SPG1 | Pos 13 SPG Pump RPM | |
| 134 | SPG1 | Pos 14 SPG Pump RPM | |
| 135 | SPG1 | Pos 15 SPG Pump RPM | |
| 136 | SPG1 | Pos 16 SPG Pump RPM | |
| 137 | SPG1 | Pos 17 SPG Pump RPM | |
| 138 | SPG1 | Pos 18 SPG Pump RPM | |
| 139 | SPG1 | Pos 19 SPG Pump RPM | |
| 140 | SPG1 | Pos 20 SPG Pump RPM | |
| 141 | SPG1 | Pos 21 SPG Pump RPM | |
| 142 | SPG1 | Pos 22 SPG Pump RPM | |
| 143 | SPG1 | Pos 23 SPG Pump RPM | |
| 144 | SPG1 | Pos 24 SPG Pump RPM | |
| 145 | SPG1 | Pos 25 SPG Pump RPM | |
| 146 | SPG1 | Pos 26 SPG Pump RPM | |
| 147 | SPG1 | Pos 27 SPG Pump RPM | |
| 148 | SPG1 | Pos 28 SPG Pump RPM | |
| 149 | SPG1 | Pos 29 SPG Pump RPM | |
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| 152 | SPG1 | Pos 32 SPG Pump RPM | |
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| 154 | SPG1 | Pos 34 SPG Pump RPM | |
| 155 | SPG1 | Pos 35 SPG Pump RPM | |
| 156 | SPG1 | Pos 36 SPG Pump RPM | |
| 157 | SPG1 | Pos 37 SPG Pump RPM | |
| 158 | SPG1 | Pos 38 SPG Pump RPM | |
| 159 | SPG1 | Pos 39 SPG Pump RPM | |
| 160 | SPG1 | Pos 40 SPG Pump RPM | |
| 161 | SPG2 | Pos 1 SPG Pump RPM | |
| 162 | SPG2 | Pos 2 SPG Pump RPM | |

| | | | |
|---|---|---|---|
| 163 | SPG2 | Pos 3 SPG Pump RPM | |
| 164 | SPG2 | Pos 4 SPG Pump RPM | |
| 165 | SPG2 | Pos 5 SPG Pump RPM | |
| 166 | SPG2 | Pos 6 SPG Pump RPM | |
| 167 | SPG2 | Pos 7 SPG Pump RPM | |
| 168 | SPG2 | Pos 8 SPG Pump RPM | |
| 169 | SPG2 | Pos 9 SPG Pump RPM | |
| 170 | SPG2 | Pos 10 SPG Pump RPM | |
| 171 | SPG2 | Pos 11 SPG Pump RPM | |
| 172 | SPG2 | Pos 12 SPG Pump RPM | |
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| 175 | SPG2 | Pos 15 SPG Pump RPM | |
| 176 | SPG2 | Pos 16 SPG Pump RPM | |
| 177 | SPG2 | Pos 17 SPG Pump RPM | |
| 178 | SPG2 | Pos 18 SPG Pump RPM | |
| 179 | SPG2 | Pos 19 SPG Pump RPM | |
| 180 | SPG2 | Pos 20 SPG Pump RPM | |
| 181 | SPG2 | Pos 21 SPG Pump RPM | |
| 182 | SPG2 | Pos 22 SPG Pump RPM | |
| 183 | SPG2 | Pos 23 SPG Pump RPM | |
| 184 | SPG2 | Pos 24 SPG Pump RPM | |
| 185 | SPG2 | Pos 25 SPG Pump RPM | |
| 186 | SPG2 | Pos 26 SPG Pump RPM | |
| 187 | SPG2 | Pos 27 SPG Pump RPM | |
| 188 | SPG2 | Pos 28 SPG Pump RPM | |
| 189 | SPG2 | Pos 29 SPG Pump RPM | |
| 190 | SPG2 | Pos 30 SPG Pump RPM | |
| 191 | SPG2 | Pos 31 SPG Pump RPM | |
| 192 | SPG2 | Pos 32 SPG Pump RPM | |
| 193 | SPG2 | Pos 33 SPG Pump RPM | |
| 194 | SPG2 | Pos 34 SPG Pump RPM | |
| 195 | SPG2 | Pos 35 SPG Pump RPM | |
| 196 | SPG2 | Pos 36 SPG Pump RPM | |
| 197 | SPG2 | Pos 37 SPG Pump RPM | |
| 198 | SPG2 | Pos 38 SPG Pump RPM | |
| 199 | SPG2 | Pos 39 SPG Pump RPM | |
| 200 | SPG2 | Pos 40 SPG Pump RPM | |
| 201 | SPG3 | Pos 1 SPG Pump RPM | |
| 202 | SPG3 | Pos 2 SPG Pump RPM | |
| 203 | SPG3 | Pos 3 SPG Pump RPM | |
| 204 | SPG3 | Pos 4 SPG Pump RPM | |
| 205 | SPG3 | Pos 5 SPG Pump RPM | |
| 206 | SPG3 | Pos 6 SPG Pump RPM | |

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| 207 | SPG3 | Pos 7 SPG Pump RPM | |
| 208 | SPG3 | Pos 8 SPG Pump RPM | |
| 209 | SPG3 | Pos 9 SPG Pump RPM | |
| 210 | SPG3 | Pos 10 SPG Pump RPM | |
| 211 | SPG3 | Pos 11 SPG Pump RPM | |
| 212 | SPG3 | Pos 12 SPG Pump RPM | |
| 213 | SPG3 | Pos 13 SPG Pump RPM | |
| 214 | SPG3 | Pos 14 SPG Pump RPM | |
| 215 | SPG3 | Pos 15 SPG Pump RPM | |
| 216 | SPG3 | Pos 16 SPG Pump RPM | |
| 217 | SPG3 | Pos 17 SPG Pump RPM | |
| 218 | SPG3 | Pos 18 SPG Pump RPM | |
| 219 | SPG3 | Pos 19 SPG Pump RPM | |
| 220 | SPG3 | Pos 20 SPG Pump RPM | |
| 221 | SPG3 | Pos 21 SPG Pump RPM | |
| 222 | SPG3 | Pos 22 SPG Pump RPM | |
| 223 | SPG3 | Pos 23 SPG Pump RPM | |
| 224 | SPG3 | Pos 24 SPG Pump RPM | |
| 225 | SPG3 | Pos 25 SPG Pump RPM | |
| 226 | SPG3 | Pos 26 SPG Pump RPM | |
| 227 | SPG3 | Pos 27 SPG Pump RPM | |
| 228 | SPG3 | Pos 28 SPG Pump RPM | |
| 229 | SPG3 | Pos 29 SPG Pump RPM | |
| 230 | SPG3 | Pos 30 SPG Pump RPM | |
| 231 | SPG3 | Pos 31 SPG Pump RPM | |
| 232 | SPG3 | Pos 32 SPG Pump RPM | |
| 233 | SPG3 | Pos 33 SPG Pump RPM | |
| 234 | SPG3 | Pos 34 SPG Pump RPM | |
| 235 | SPG3 | Pos 35 SPG Pump RPM | |
| 236 | SPG3 | Pos 36 SPG Pump RPM | |
| 237 | SPG3 | Pos 37 SPG Pump RPM | |
| 238 | SPG3 | Pos 38 SPG Pump RPM | |
| 239 | SPG3 | Pos 39 SPG Pump RPM | |
| 240 | SPG3 | Pos 40 SPG Pump RPM | |

## 3. Waste Calculation

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| 242 | SPG1 | SPG pump sensor active not active bit | |
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### 4. Spin Finish Oil Consumption

| | | | |
|---|---|---|---|
| 481 | Common | Spin Finish Oil Tank1 Level | |
| 482 | Common | Spin Finish Oil Tank2 Level | |
| 483 | Common | Spin Finish Oil Tank3 Level | |
| 484 | Common | Spin Finish Oil Tank4 Level | |
| 485 | Common | Spin Finish Oil Tank5 Level | |

### 5. Can Tracking System

| | | | |
|---|---|---|---|
| 486 | SPG1 | Can relasing Bit for Spinning | |
| 487 | SPG2 | Can relasing Bit for Spinning | |
| 488 | SPG3 | Can relasing Bit for Spinning | |
| 489 | SPG1 | Quench Flow Indication | |
| 490 | SPG2 | Quench Flow Indication | |
| 491 | SPG3 | Quench Flow Indication | |
| 492 | SPG1 | Return Air Pressure | |
| 493 | SPG2 | Return Air Pressure | |
| 494 | SPG3 | Return Air Pressure | |
| 495 | Common | Temp Main AHU | |
| 496 | Common | Temp Beam1 | |
| 497 | Common | Team Beam2 | |

| | | | |
|---|---|---|---|
| 498 | Common | Temp Beam3 | |
| 499 | Common | Temp Beam4 | |
| 500 | Common | Team Beam5 | |
| 501 | Common | Temp SXD manifold | |
| 502 | Common | Temp SXD Beam | |

## 7. Assumptions

Following are the assumptions –

A. Shift Starts: Shift A – 6AM, Shift B – 2 PM, Shift C – 10 PM
B. Spin Finish and Power Consumption Data is for common all lines

## 8. Project Execution Plan

| Phases | Activities | W1 | W2 | W3 | W4 | W5 | W6 | W7 | W8 | W9 | W10 | W11 | W12 | W13 | W14 | W15 | W16 | W17 | W18 | W19 | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Requirement & System Design (Week 1 - 4) | Input output Finalization | | | | | | | | | | | | | | | | | | | | |
| | Communication Study & Tag Finding | | | | | | | | | | | | | | | | | | | | |
| | Tag Configuration testing | | | | | | | | | | | | | | | | | | | | |
| | Release Requirement and Design Specification Document | | | | | | | | | | | | | | | | | | | | Customer apprval required to Start Development |
| Solution Phase (Week 4 - 8) | Design and Development Spinning Application | | | | | | | | | | | | | | | | | | | | |
| | Release Solution document withh relevant screen shot | | | | | | | | | | | | | | | | | | | | Customer apprval required to Start Integration |
| Integration and Testing (Week 8-12) | Integration of application with Existing SG | | | | | | | | | | | | | | | | | | | | |
| | Application Testing | | | | | | | | | | | | | | | | | | | | |
| Commissioning (Week 13-14) | Project Commissioning and Go-Live | | | | | | | | | | | | | | | | | | | | |
| Post Commisioning (Week 15-19) | Hyper Care | | | | | | | | | | | | | | | | | | | | |
| | Hand Over | | | | | | | | | | | | | | | | | | | | User Manuals |

**THANK YOU**