



2016

# Distributed control systems for the sugar industry Every. Thing. Controlled.

# We understand your challenges in the sugar industry



- Raw materials vary and orders are unpredictable
- Rising costs of pollution control and energy consumption
- Changing consumer preferences and the rise of competitive brands emphasize the need for variety, and the highest of quality standards
- Changes in consumer tastes, and the demand for new product varieties require flexibility in production planning.
- Ever-changing food safety standards emphasize the need for better raw material traceability, laboratory sampling, and product control
- Every process, every kilo, every dollar.
- **Every. Thing. Controlled.**



# ABB's commitment to food and beverage industry

## Delivering on our promises to meet everyday needs



- Competitiveness in the food and beverage industry is highly dependent on the efficiency of the entire value chain, with the primary focus being on the performance of the production.
- Examples of today's increasing challenges are high process uptime, permanent traceability, uncompromised hygiene, unbroken cold chain and lowering energy consumption.

**We are continuously expanding high value-adding solutions and services to help you to be more profitable**

# ABB selected food & beverage references

## Global partner with local presence



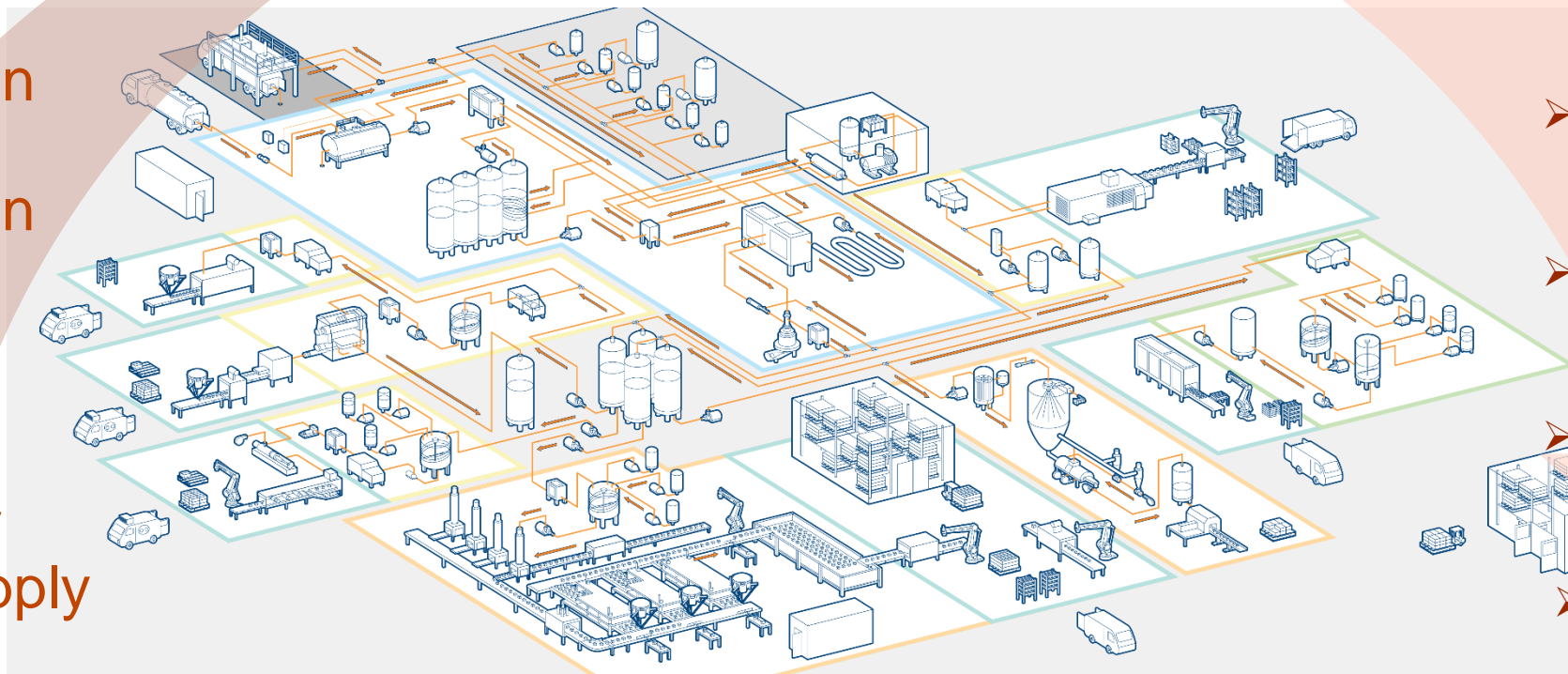
# ABB's commitment to the food & beverage industry

## Benefits from A to Z

- Factory Automation
- Building Automation
- HVAC
- Water
- Generator
- Power supply
- UPS

### ➤ Primary / Process Automation

### ➤ Secondary / Packaging Automation



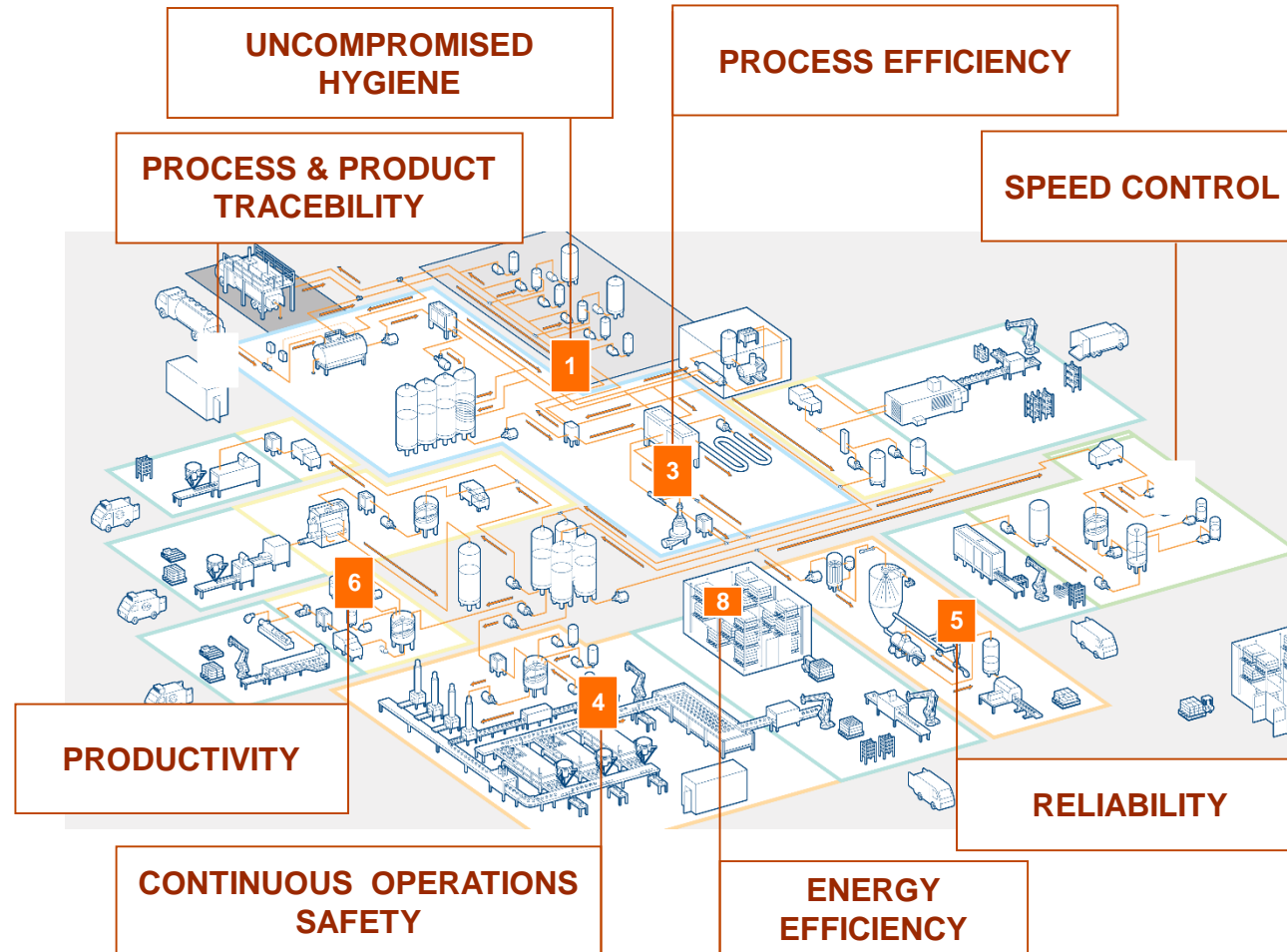
- Robotic
- Transport
- Waste Water
- Service

# Benefits in every process step

## Improve safety, reliability, efficiency, capacity

### Applications

- 1 Dosing, pumping
- 2 Mixing
- 3 Heating, Pasteurization Separation
- 4 Conveying, Material handling
- 5 Drying
- 6 Picking, Packing, Palletizing
- 7 Process control
- 8 Utility



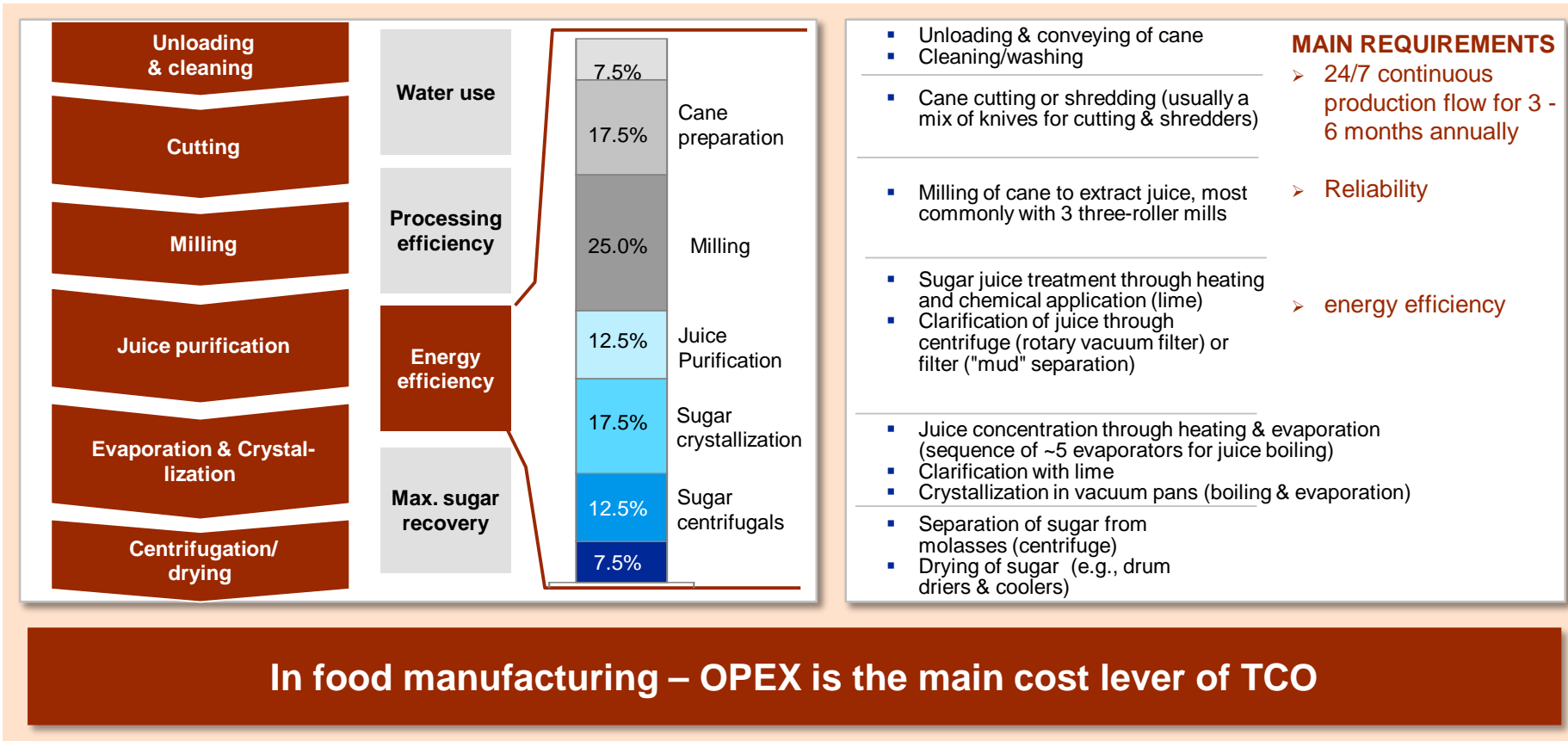
### Key Offering

- 1
  - Motors, Drives, PLC,
  - HMI, Instrumentation,
  - Contactors, Starters, Switches
- 2
  - Motors, Drives, PLC,
  - HMI, Instrumentation;
  - Softstarters, MCB, RCD,
  - Pilot devices
- 3
  - Motors, Drives, PLC,
  - HMI, Instrumentation,
  - Contactors, MMS,
  - EPR, Overload Relay
- 4
  - Gear Reducers,
  - Drives, Bearings
  - Motion control, Servo motors/drives;
  - Starter, UMC, Safety
- 5
  - Motors, Drives,
  - Bearings; Starters,
  - EPR, Conduit,
  - Connectors, Enclosures
- 6
  - Robots
  - PLC, HMI, Safety
  - Motion control,
  - Servo motors/drives
- 7
  - Control system,
  - MES, EAM
- 8
  - Motors, Drives, Power
  - Distribution



# Sugar process steps

## High power applications along the whole process



# The benefits

## Engineering level benefits



- Providing solutions for the engineering process as single/sequence loop, complete stages or phases with ready-made pre-engineered objects and validated solution. Proven in the field and easy to configure without code change. This improves efficiency in engineering time, leading to better competitiveness technically and financially.
- Flexible, scalable and easy to upgrade to match, maintain and synchronize with the latest releases of control system versions (life cycle management). Ease of use was the one of our main goals when developing this library.
- Standard documentation about library design, function, time analyses and parameter properties and it's connection types makes commissioning easier for any qualified team



# The benefits

## Operation level benefits



- Consistent, easy, user friendly and logical functionality operator workplace interface improves operator intuitive actions and hence the productivity
- Pre-determination of the required KPI's and relative measurements in order to improve the efficiency of the cycle
- Measure loops performance and quality by extracting this output information collected from library elements to a report to help the management to easily rectify faults and errors in the field or in the process control physical elements, to achieve savings in loop time, cost reduction in fuel consumption, vapor generation, etc.
- Less time to troubleshoot problems through accurate and easy diagnosis about where, who and when problems happen, raising the efficiency of the whole plant

# Reference case

## Dakhalia Sugar, Egypt



- **Client:** Dakhalia Sugar
- **Site:** Belkas sugar mill, Egypt
  - One of the largest and most advanced in EG
- **Application:** Upgrading project of process control
  - Sugar mill capacity: 120,000 tons annually
- **Automation from ABB:** System 800xA 5.0 with
  - 5 operator workplaces
  - 3 redundant AC 800M and 2,280 S800 I/O channels
  - 1 engineering station

# Dakhalia Sugar Baramati Agro, India



- **Client:** Baramati Agro
  - Channel partner Sibella Technologies
- **Site:** Baramati, India
- **Application:** Sugar project including control system for sugar mill and power generation.
- **Automation from ABB:** System 800xA with
  - 6 operator workstations
  - 6 redundant AC 800M
  - Information management
  - Redundant servers
  - I/O connection through Profibus and ASi
- **Benefits:** Increased plant availability by 15% and saving power consumption with up to 10%



# Reference case

## BSO Polska, Poland



- **Client:** British Sugar Overseas (BSO)
  - Sugar producer in Poland
  - Channel partner: Pro-Control
- **Site:** Gliniojeck Poland
- **Application:** Sugar plant, beet processing, packaging, juice diffusion and steam boilers
- **ABB automation:** Freelance
  - 22 operator workstations
  - 22 AC800 F controlleres
  - Information management, PGIM
  - 10,500 I/O signals
- **Why ABB:** Scalable system, covers all of the applications from processing to packaging

# Reference case

## Rayong Sugar, Thailand



- **Client:** Rayong Sugar Co., Ltd.
- **Site:** Chonburi, Thailand
- **Application:**
  - Control Vacuum Machine (2012)
  - Expansion Control PH Loop Boiler Machine (2013)
  - Expansion Control Milling Machine (2013)
- **ABB automation:**
  - Freelance system AC700F + S800 (2012)
  - Expansion more AC700F + S800 (2013)
  - 500 I/Os
  - 3 operator stations; 1 engineering station

# COFCO Chongzuo Sugar Factory, China



- **Customer:** COFCO Chongzuo Sugar Factory
- **Site:** Chongzuo, China
- **Application:** 1,000 ton/day refined sugar boiler
- **ABB automation:**
  - Freelance Distributed Control System (Version 9.2)
  - 4 AC 800F controllers,
  - Profibus I/O module, total 1,500 I/O points
  - OPC communications



# Why do we need the sugar control library?

## Standard solutions help to **reduce engineering effort and cost**



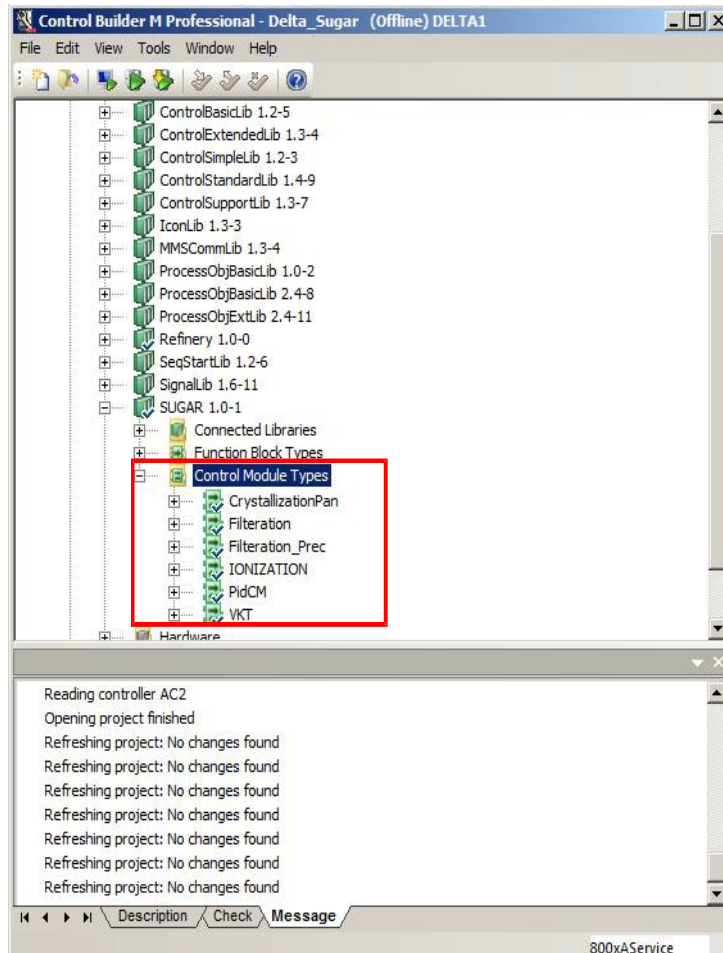
- In a resource-hungry business like sugar manufacturing or refining, costs need to be tightly controlled. But changing consumer preferences and the rise of competitive brands emphasize the need for variety, and the highest of quality standards.
- For example, vapor consumption can be calculated, monitored and controlled to match the actual demand of individual parts of the plant, which have direct impact on overall power consumption, resulting in a reduction of up to 20%.
- For this ABB developed it's standard solution for sugar, a new library type was created in 2005 according to process demands and descriptions provided to the customers from major industry consultants like BMA, Ibro, Fcb etc.

# What is the sugar control library?



- A complete, consistent and comprehensive library for sugar process applications
  - A library with components for control and supervision
- Based on more than 20 years of experience in sugar control applications
- Standard, yet flexible
  - Complete functional units, ready for use
  - Adaptable to specific user needs and/or process requirements

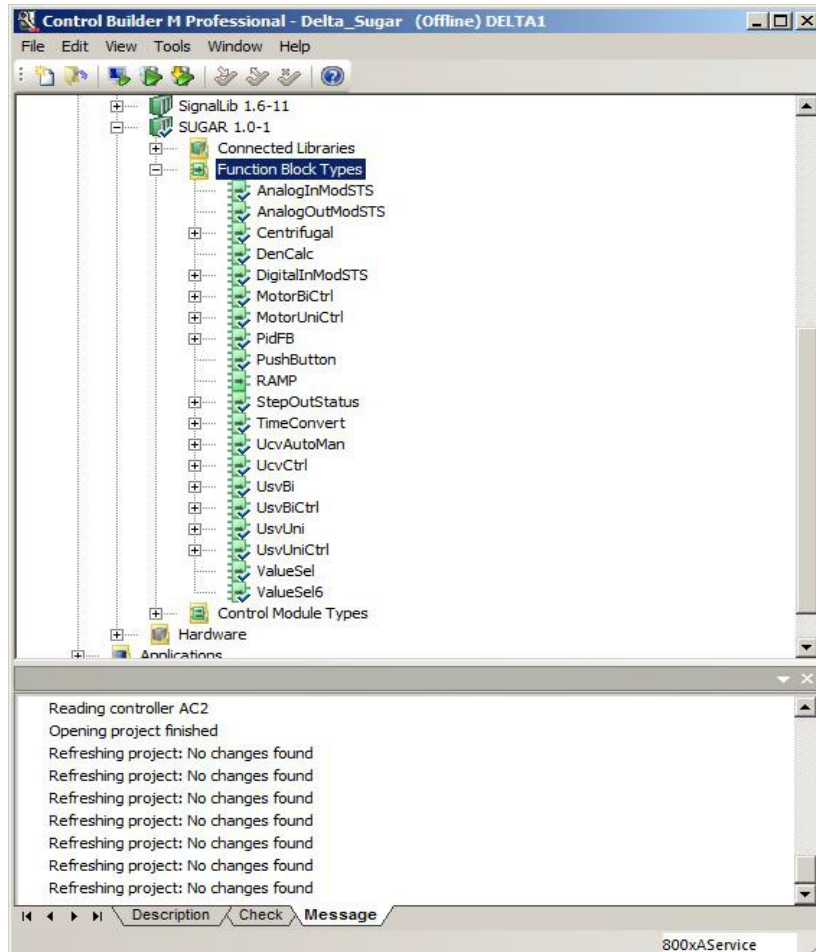
# Library content



- Process control object, for example pump, valve, measurement, indicators, flow control, pressure control:
  - UsvUni, UsvBi
  - UsvUniCtrl, UsvBiCtrl
  - MotorUniCtrl, MotorBiCtrl
  - PidFB (provided also as control Module Model for a special operation requirements PidCM).
- A functional unit which can also provide functions for group sequence/batch control like vacuum pans via specific control modules:
  - Ionization
  - Filtration
  - FiltrationPrec
  - CrystallizationPan
  - VKT (continuous crystallization )



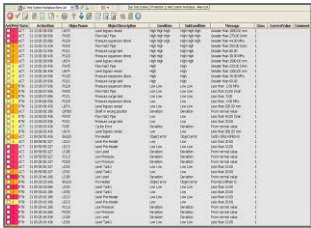
# Library contents



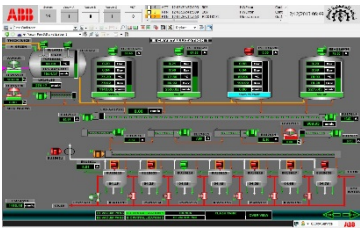
- Process control object for machines and other process stations which all need a special sequence; for example:
  - Centrifuges
  - Crushers
  - Lime kiln
  - Extraction towers , pulp press and pulp dryer
  - Water waste treatment ,etc.
- Element library:
  - Process control object for machines and/or mathematical part but no alarms
  - Presentation and dialog functions:
    - Ramp , ValueSel
    - DensityCalc.
    - UcvAutoMan.
    - StepOutStatus, and more

# Library content - views and format

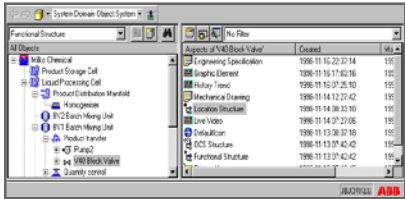
Alarm Lists



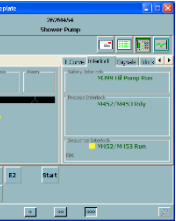
Process Graphics



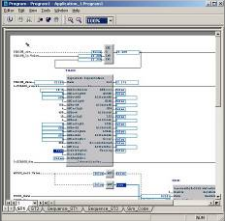
Functional Structure




Control Dialogs



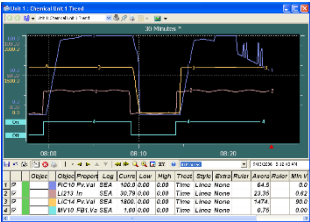
Control Configuration



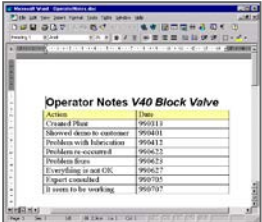
Control Structure



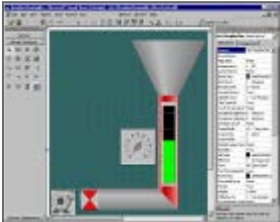
Trends



Operator Notes

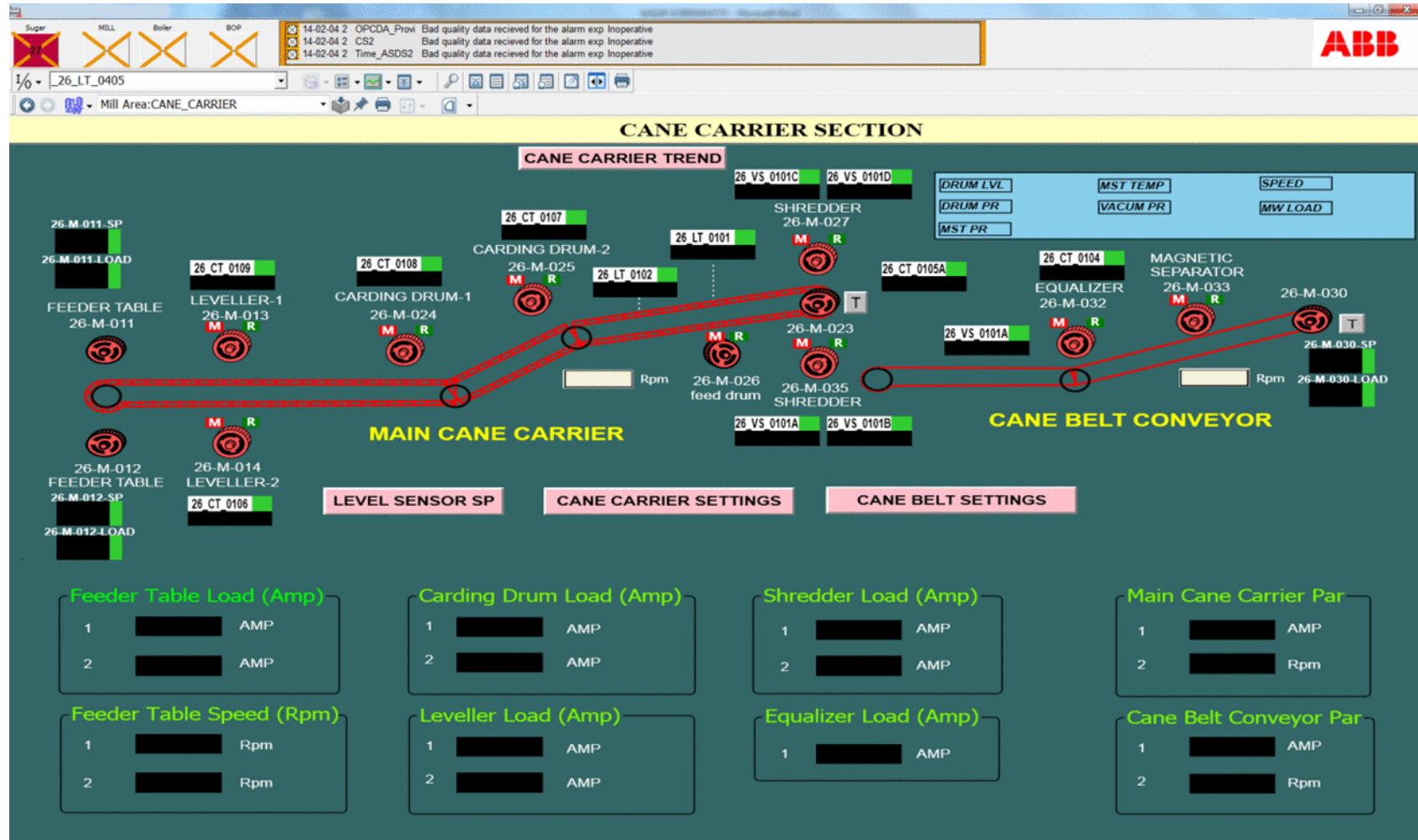


Process Graphics Builder





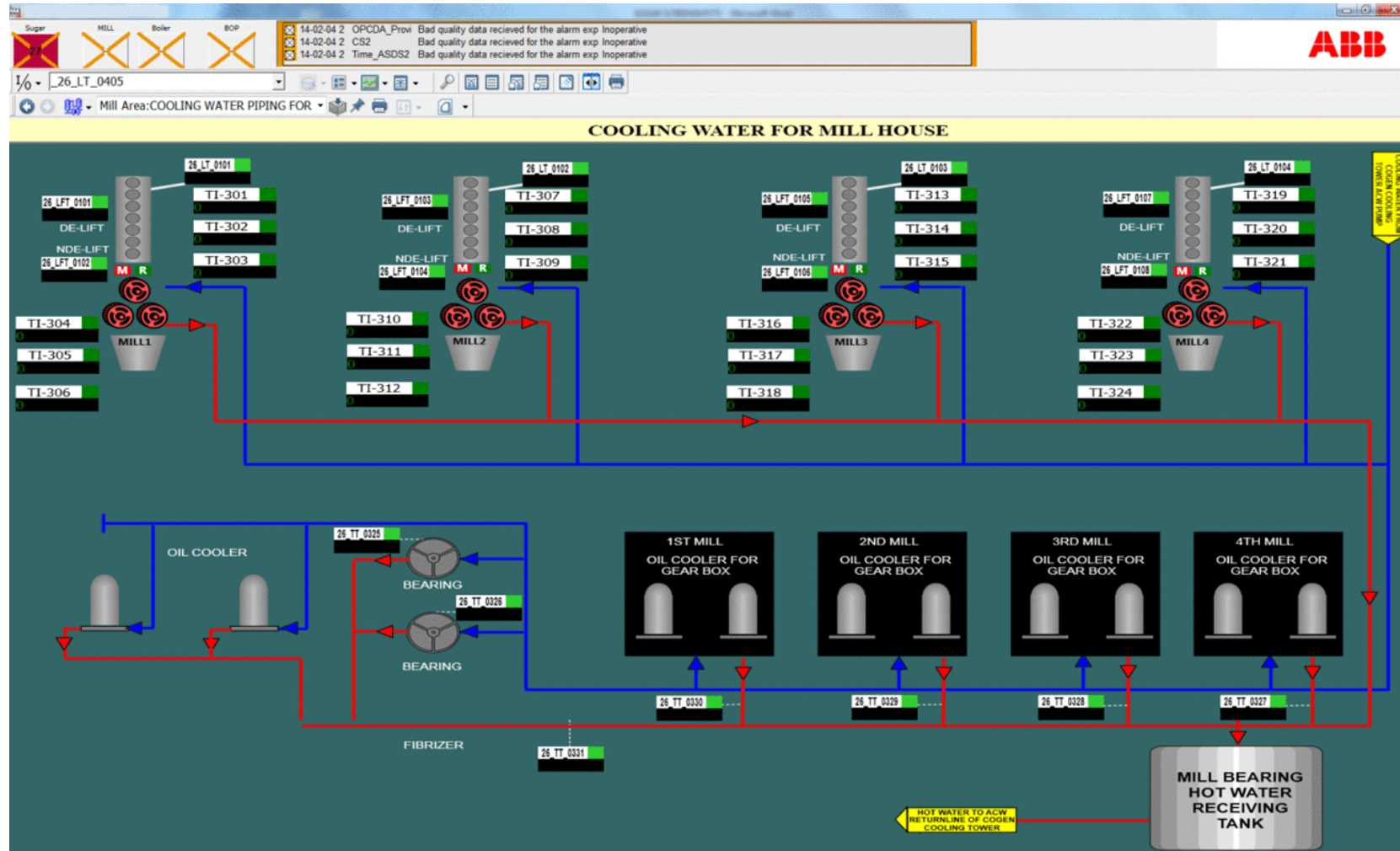
# Example of sugar graphic Unloading and cleaning – (System 800xA)





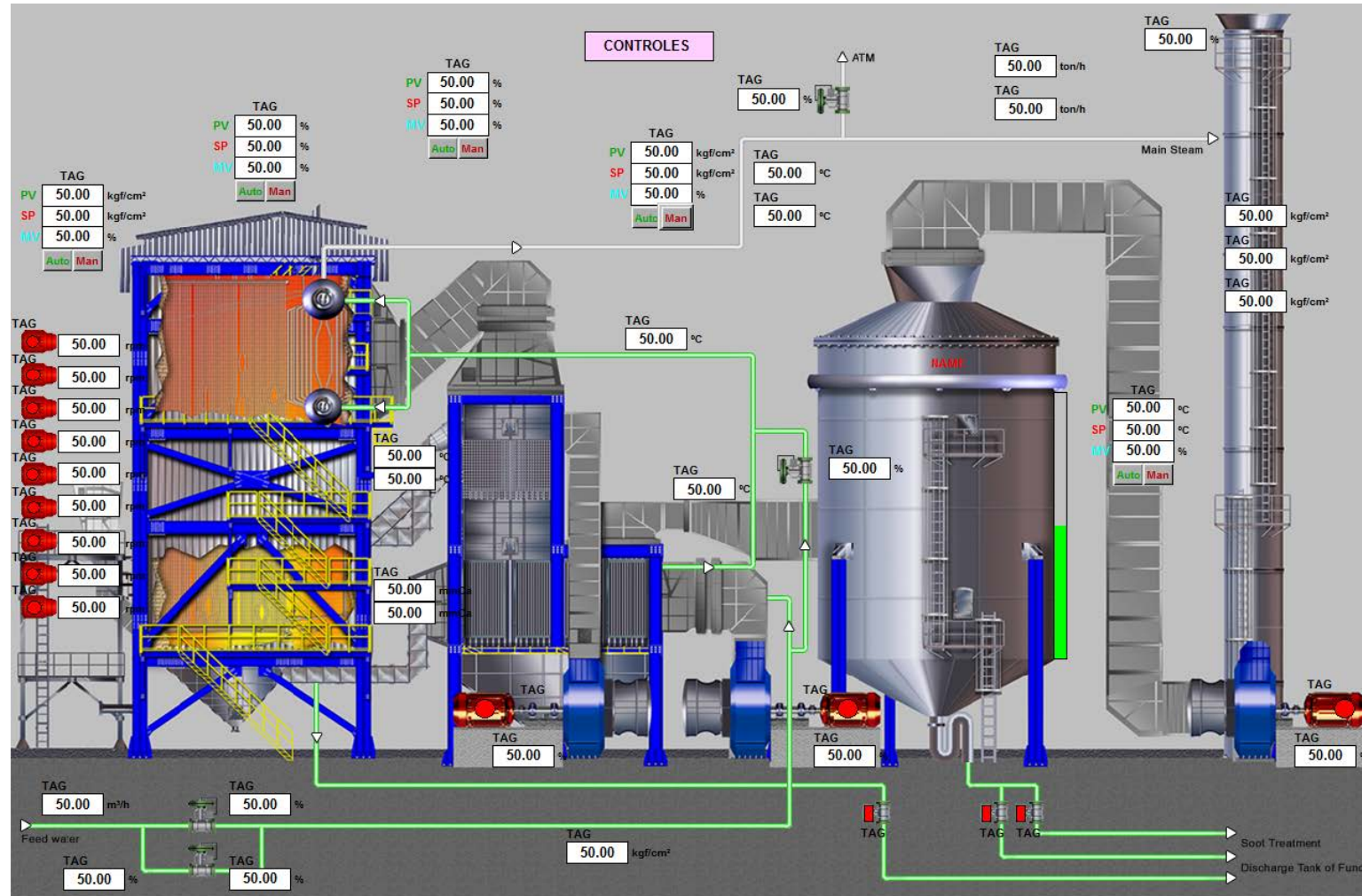
# Example of sugar graphic

## Cooling water – (System 800xA)

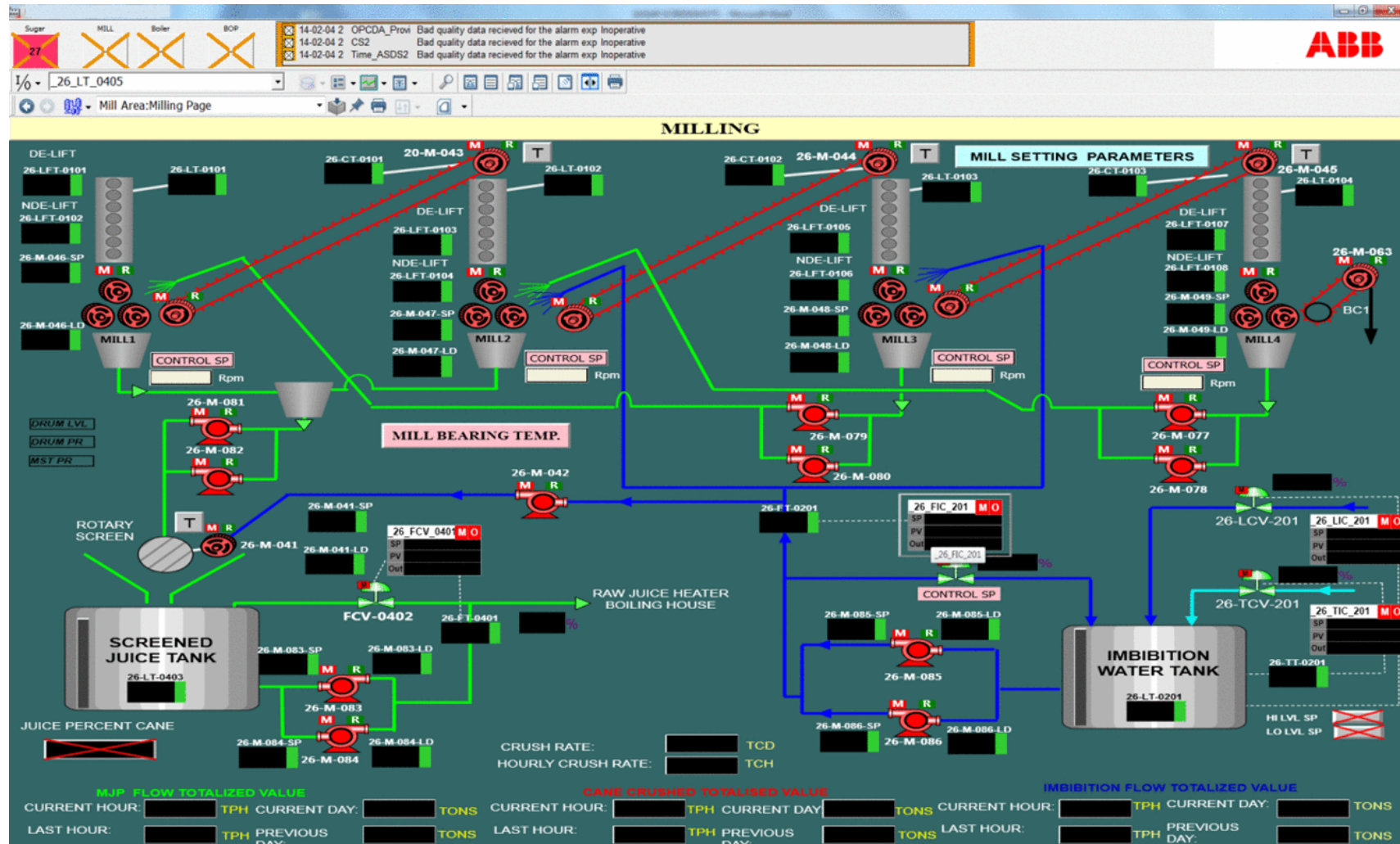


# Example of sugar graphic

## Boiler steam and power - Freelance



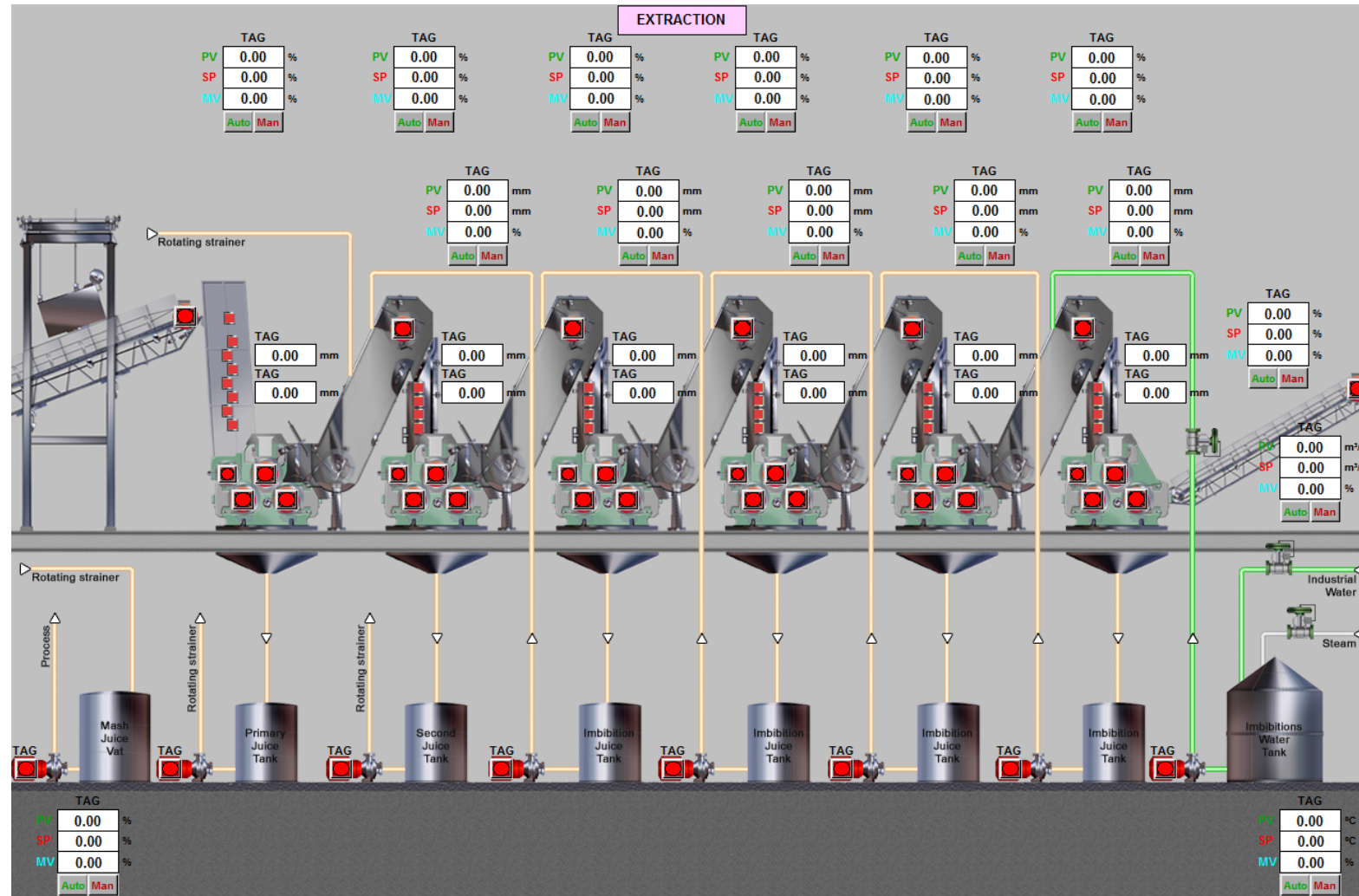
# Example of sugar graphic Milling – (System 800xA)





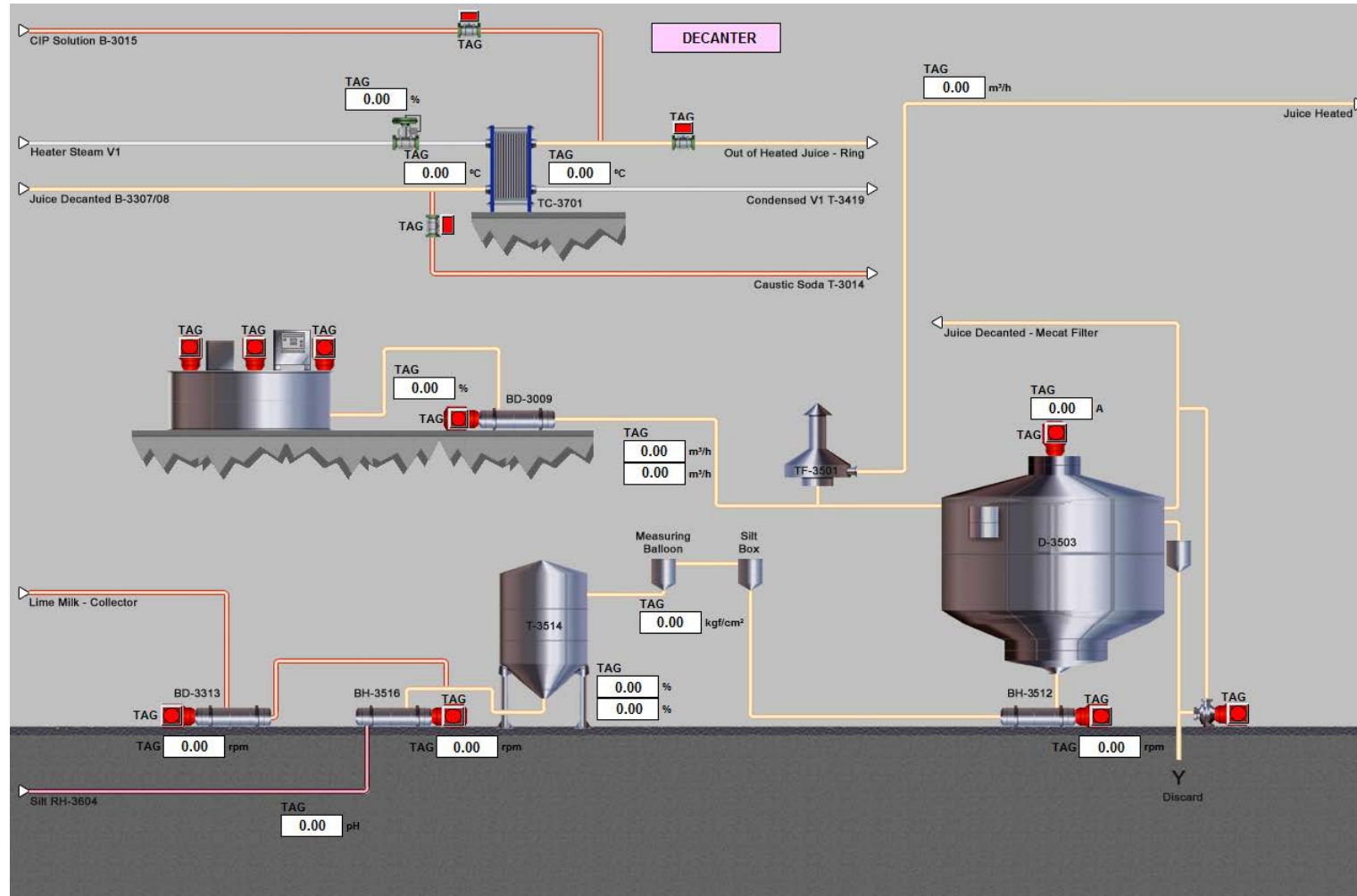
# Example of sugar graphic

## Cane crushing process to extract juice - Freelance



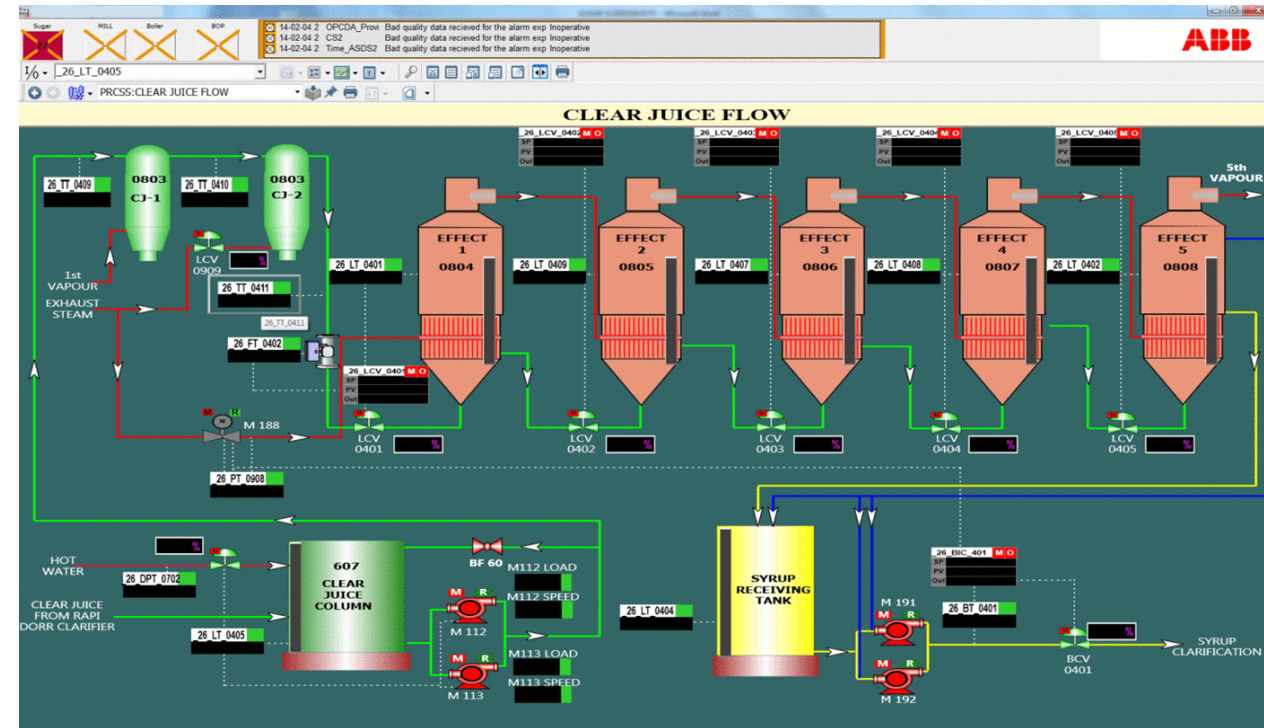
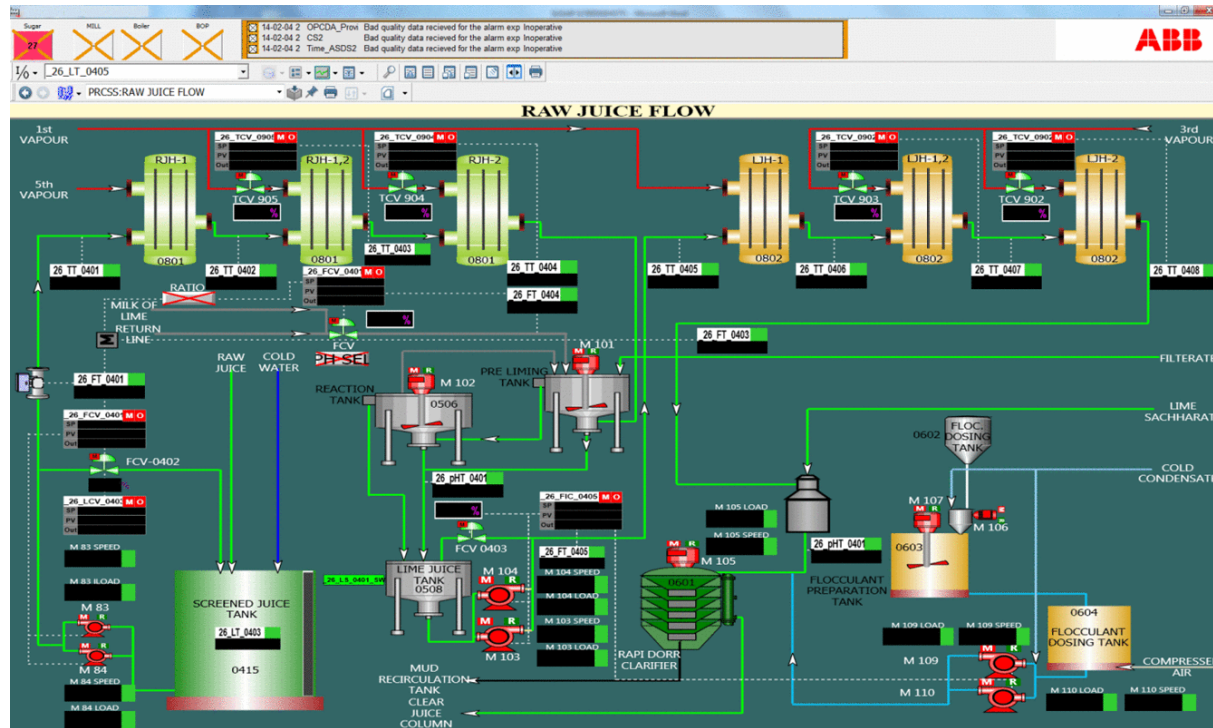
# Example of sugar graphic

## Extracted juice storage and filtration process - Freelance



# Example of sugar graphic

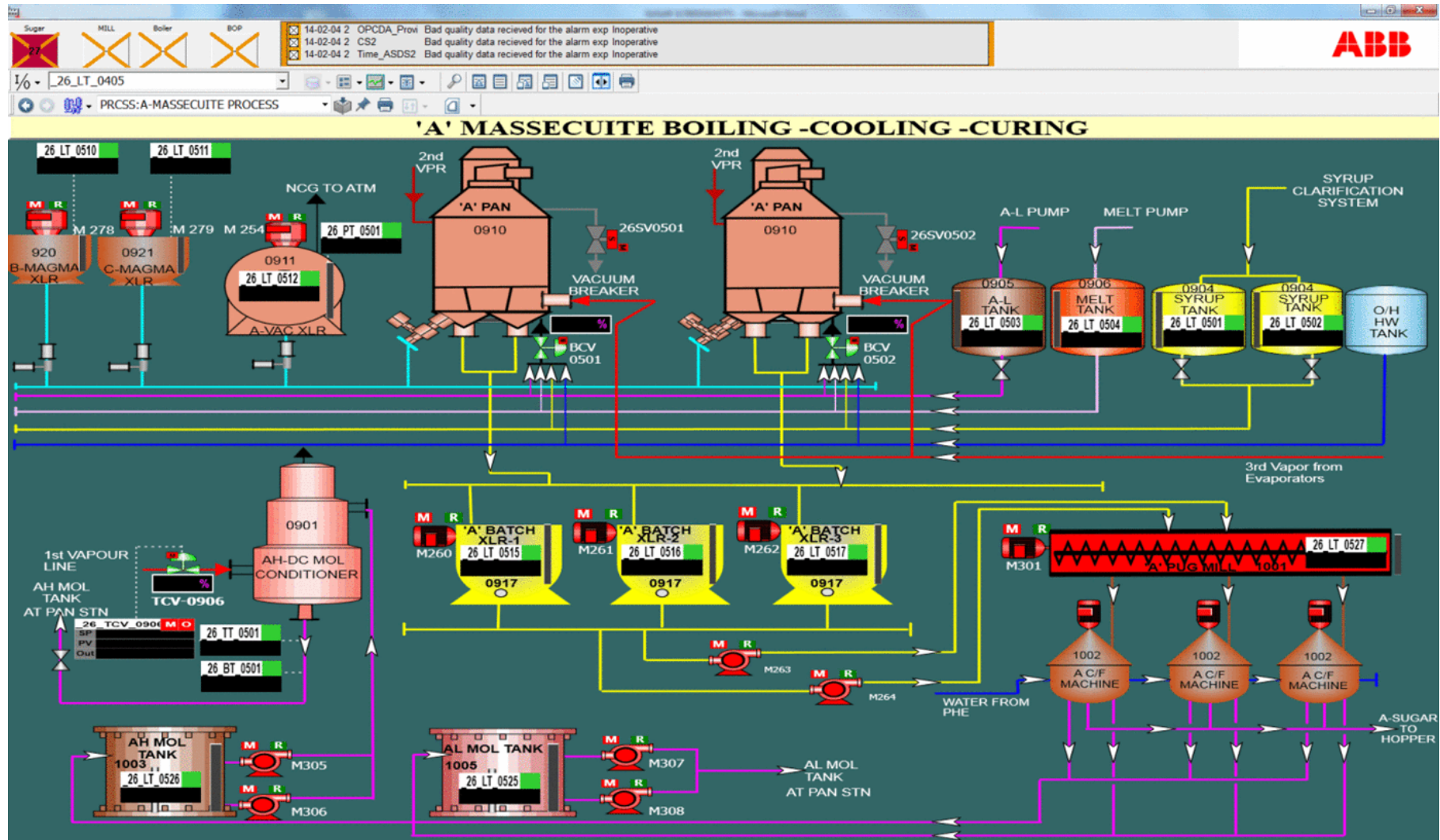
## Extracted juice storage and filtration process – (System 800xA)





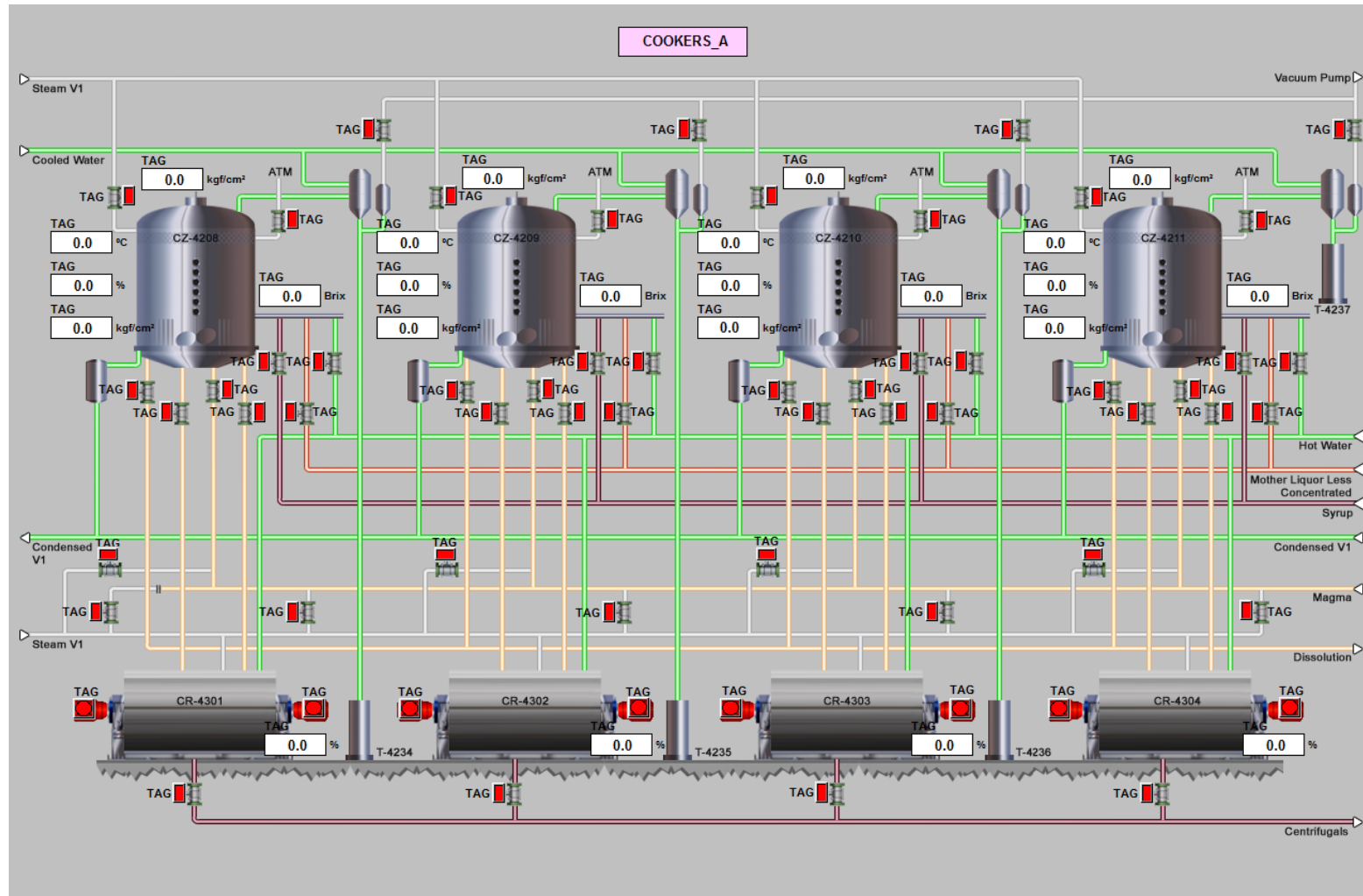
# Example of sugar graphic

## Evaporation process – (System 800xA)



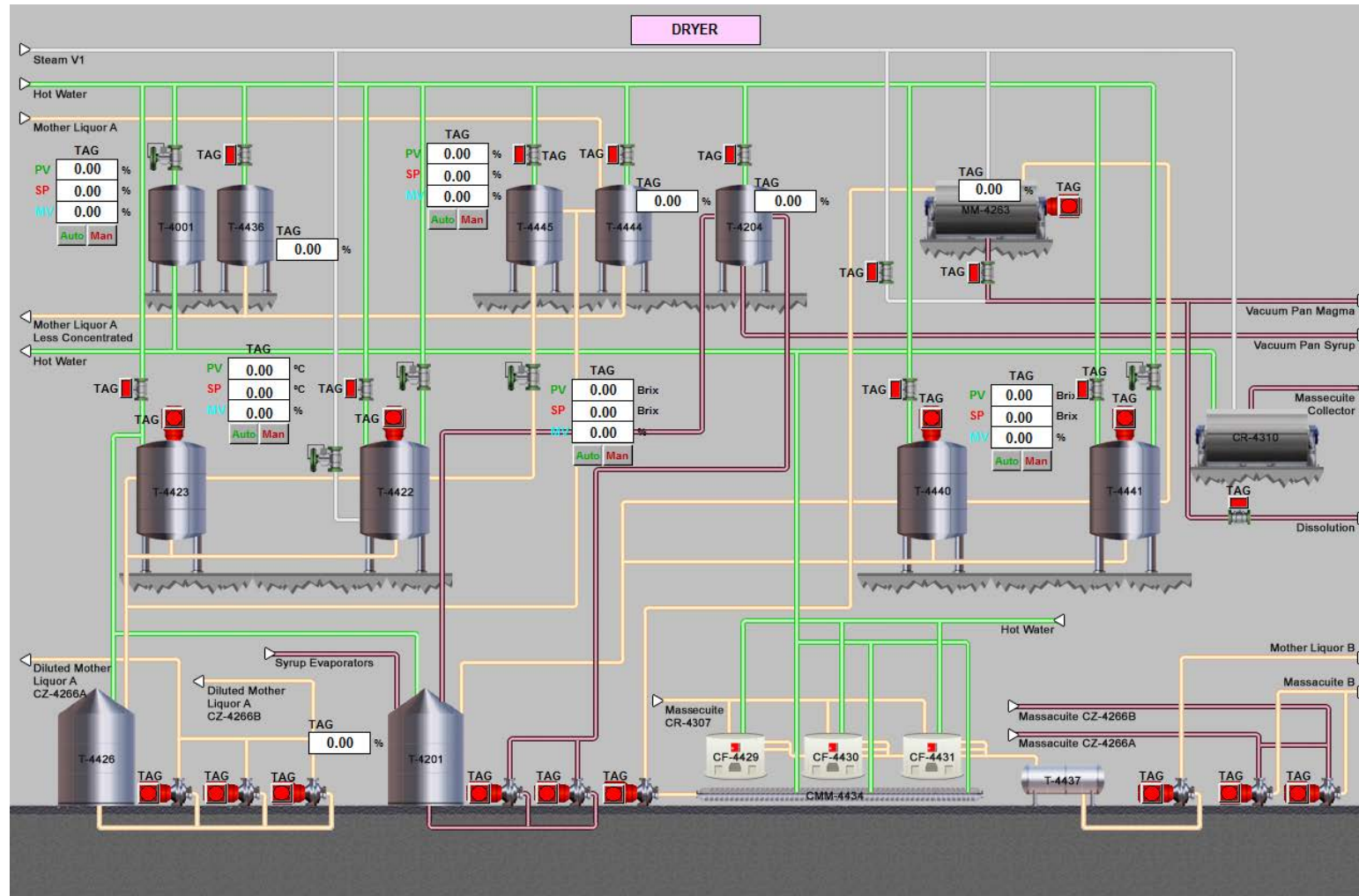
# Example of sugar graphic

## Evaporation process - Freelance



# Example of sugar graphic

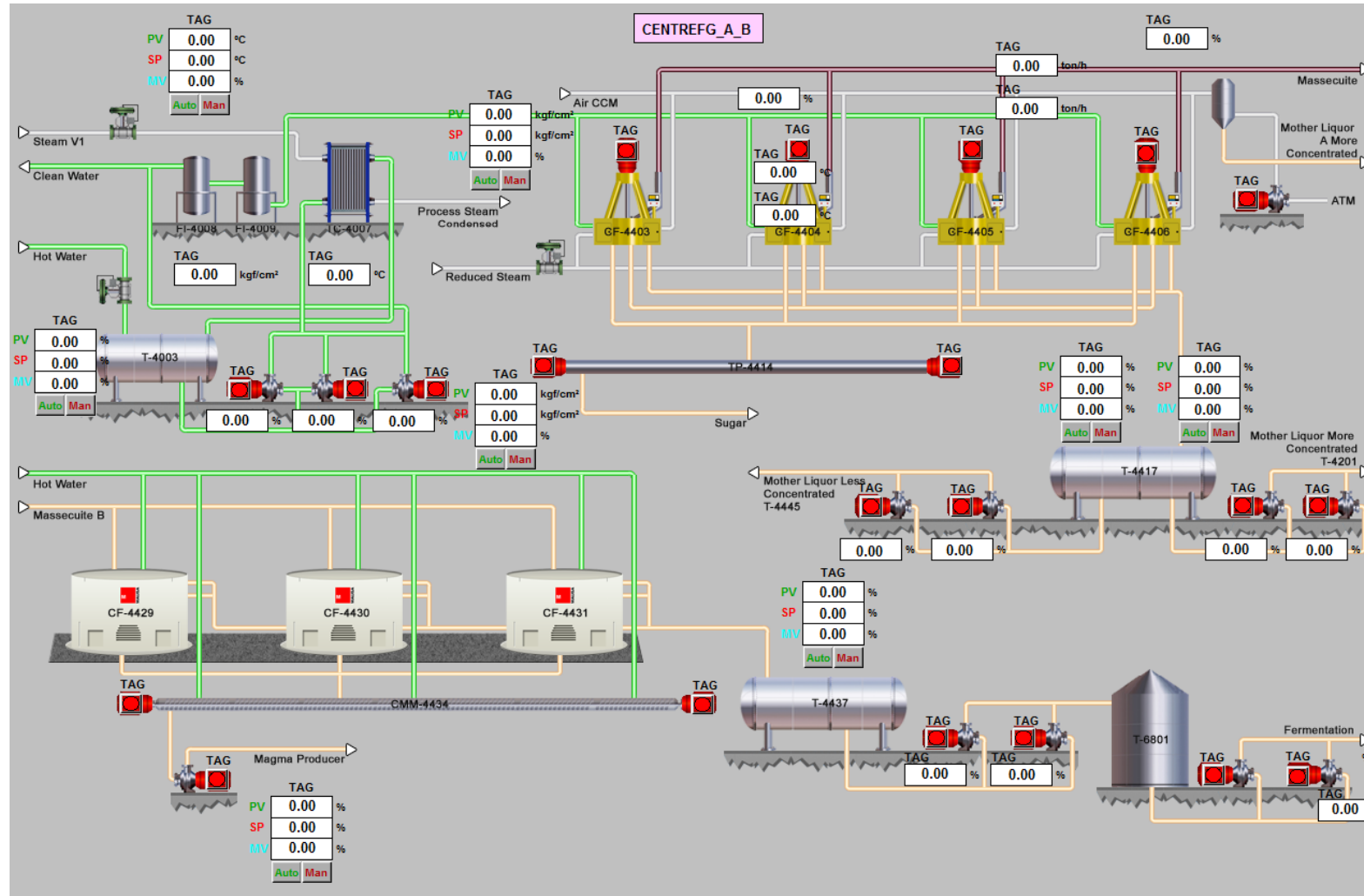
## Evaporation process - Freelance





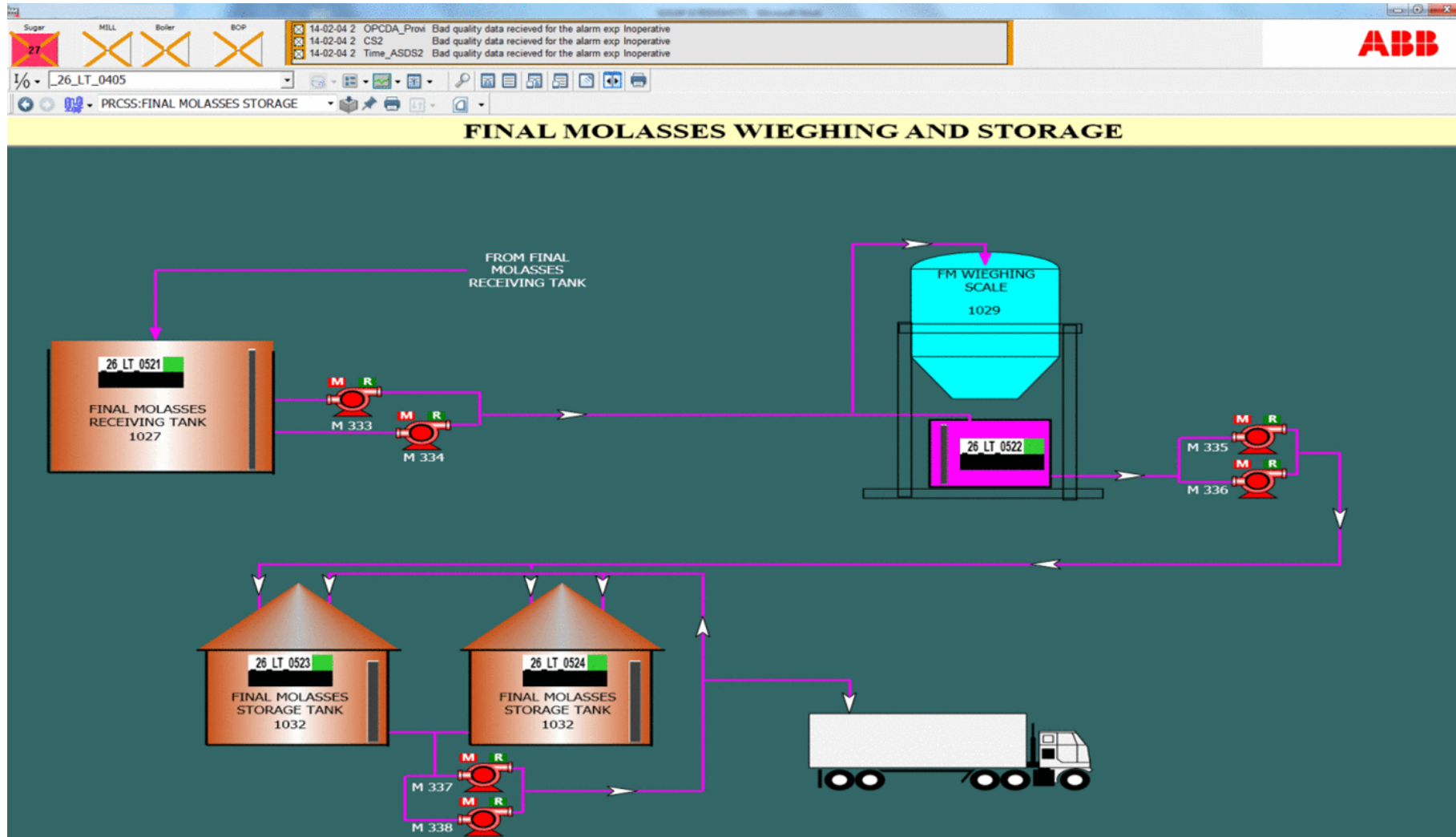
# Example of sugar graphic

## Crystallization process - Freelance



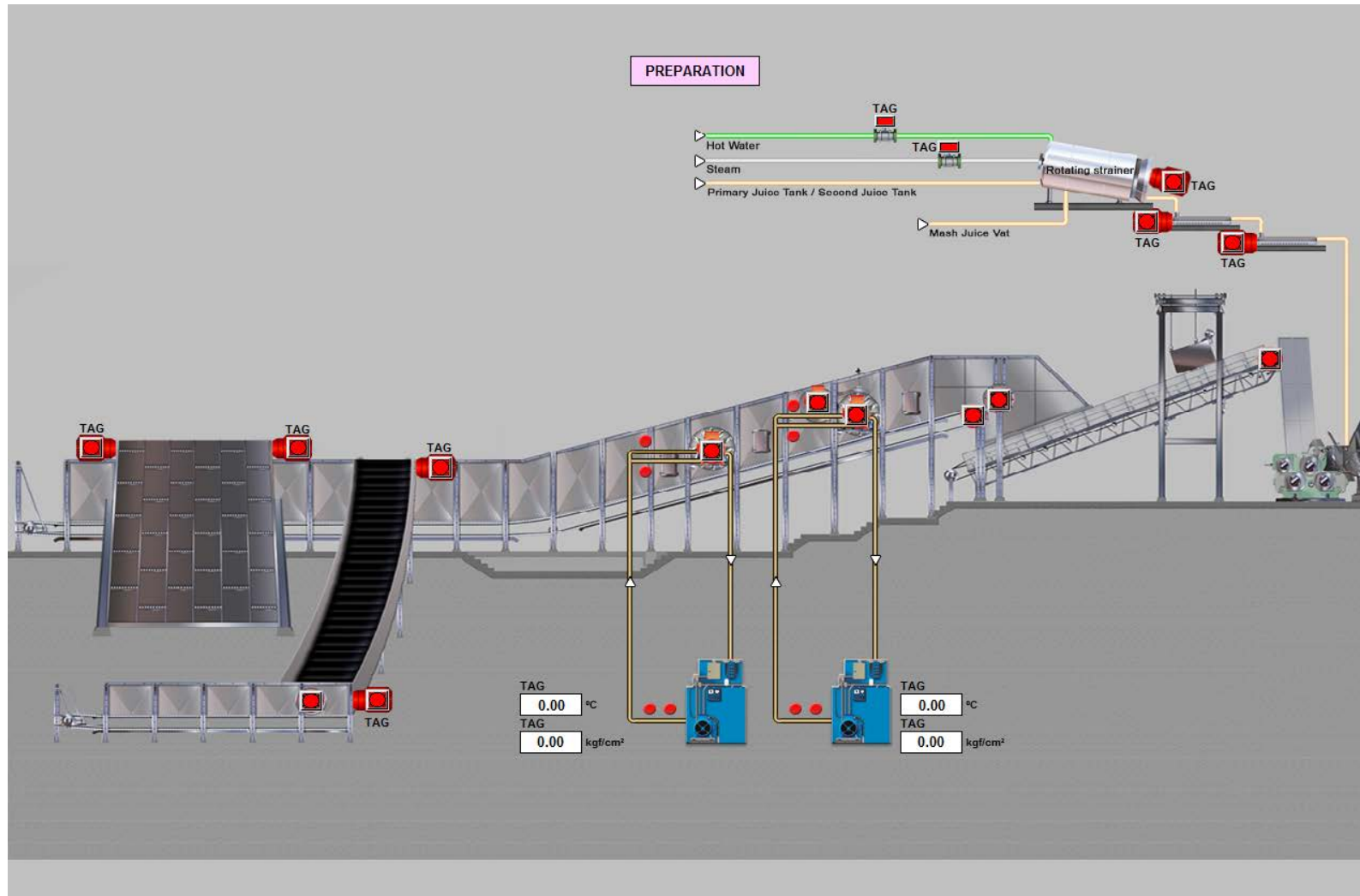
# Example of sugar graphic

## Weighing and storage – (System 800xA)



# Example of sugar graphic

## Weighing and storage - Freelance



# Control Technologies

## Facts and figures



- About 2,000 employees in 30 countries
- Market leader in DCS technology with >20% market share
- We have delivered automation systems to more than 100 countries serving a variety of process industries
- System 800xA: over 10,000 systems sold since 2004
- Freelance: thousands of systems installed globally since 1994
- ABB's most R&D intensive business



# Process control solutions

## Offering overview



- We offer automation platforms for:
  - Process control
  - Electrical control
  - Safety systems
  - Information management
  - Asset management
  - Batch and recipe management
  - Enterprise integration

# ABB's flagship control system

## Extended Automation with System 800xA



### Operator Effectiveness

- Full scope and features set includes High Performance HMI and control room design based on human factor design best practices

### Integrated Safety

- Integrates process control with high-integrity safety applications enabling synergies in engineering and operations

### Automation and Power Integration

- Promotes collaboration by combining process automation and power automation in a common infrastructure

### Enterprise Asset Management

- Full-scope asset monitoring and manufacturing operations management

# Process automation made easy

## Freelance Distributed Control System (DCS)



A full-fledged, easy-to-use distributed control system

- **Easy to use:** Easy to install, engineer, commission, backup, maintain and expand and available in many languages
- **Scalable:** Can start as small as 25 I/Os<sup>1</sup> and grow to as large as 25,000 I/Os
- **Reliable:** Proven system with high reliability and availability
- **Value for your money:** The small footprint and ability to run on any standard computer helps to save investments. Together with its ease of use, this results in savings in installation, engineering, commissioning and life cycle costs

# Process automation made easy

## DCS and standalone solutions for the process industries



### Freelance Control System

- For small to medium size DCS applications
- Pre-engineered alternative to PLC + HMI bundles
- Fieldbus management
- Information management
- Batch and recipe management

### Controller: AC 700F

- Compact DCS at PLC price
- Small applications, process packaging units
- Integrated with Freelance
- Comprehensive diagnostics

### Compact Product Suite: Standalone PLC

- Flexible process control products and HMI's for reliable stand alone automation
- Includes: Compact HMI, Control Builder, AC 800M, S800 I/O, Process Panel



# A comprehensive suite of best-in-class control components

## Compact Product Suite



- **It's your choice:** Process controllers, field interfaces, Human Machine Interfaces (HMIs), process recorders and Safety solutions
- **Works seamlessly:** a range of products that integrate seamlessly with each other and 3rd-party solutions

# System 800xA HI Integrity Safety

## The power of integration



Integrated process control and safety brings flexibility in implementation as well as all of the benefits of integration

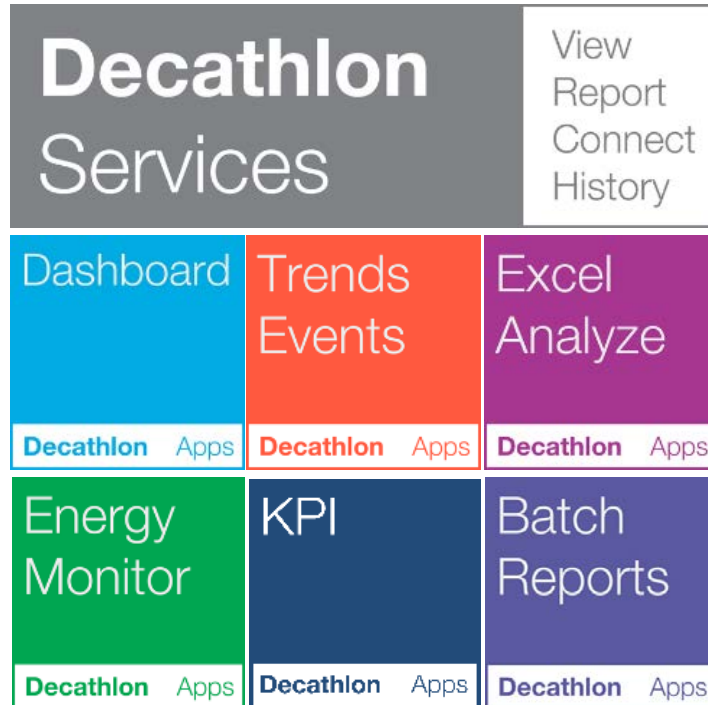
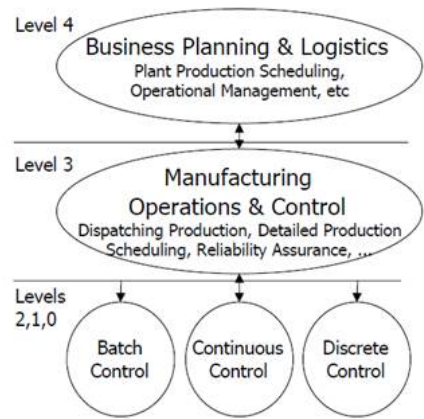
- Same operator interface and engineering tool
- Plant wide SOE for consolidated root cause analysis
- Centralized historian and data archiving
- Common hardware with reduced spares, training etc.
- Common, integrated asset management strategy



Also stand-alone available as Independent HI

TÜV Product Service has certified all product components on the 800xA Safety offering

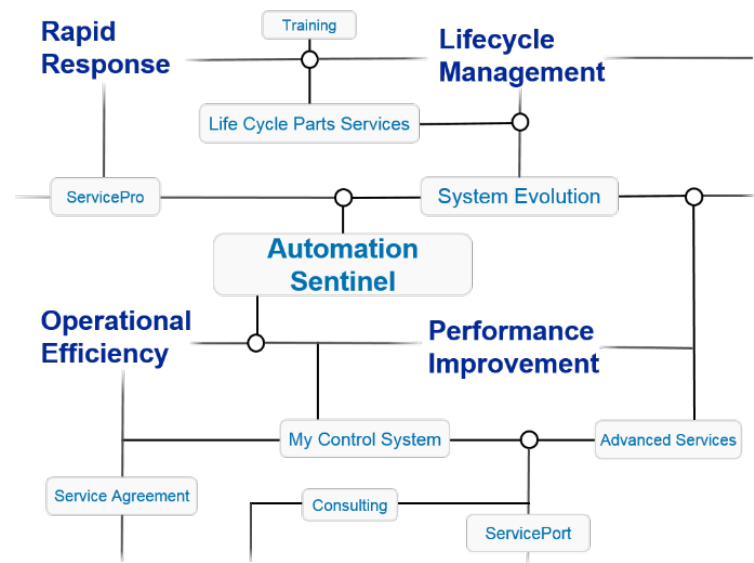
# Decathlon Software Services and apps



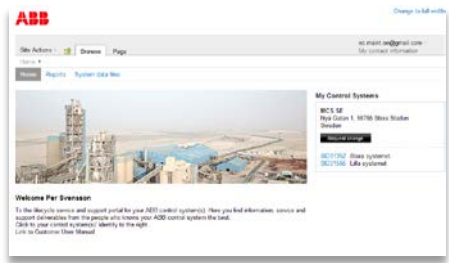
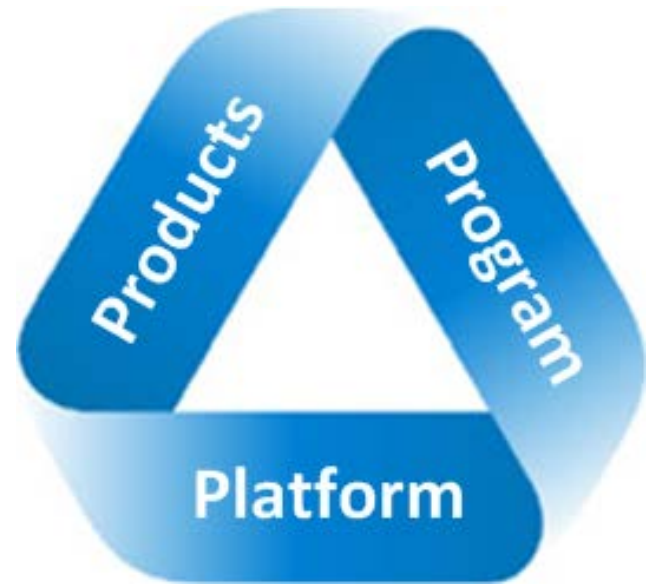
- Software products for Manufacturing, operations and control (ISA-95 Level 3)
- Decathlon Services
  - High capacity, redundant cyber secure connects to level 2 in a control systems
  - Level 3 Historian for data storage
  - Report and View applications for desktop users
  - Platform for software applications (Apps) and integration to Level 4
- Software applications (Apps)
  - Cross ABB software solution hosted by Decathlon™ Services

# Three components

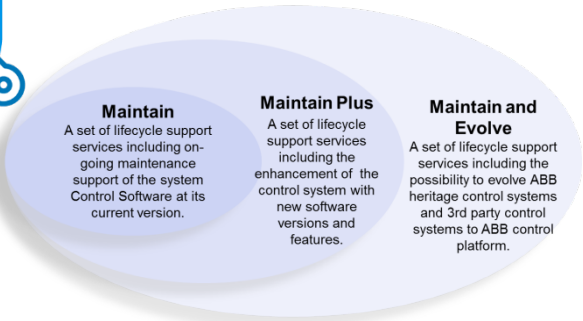
## Life Cycle services



Service Offering



My Control System



Automation Sentinel





For more information:  
<http://bit.ly/1QveleO>

Power and productivity  
for a better world™

