

# Sugar Process Automation



# YUTECH

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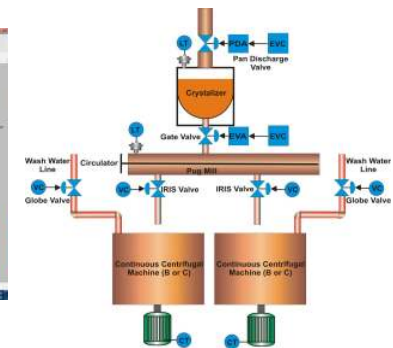
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## Servicing the Sugar Industry since 1978

# Agenda



- Need for Automation
- Automation Approach
- Automation Examples
- Why choose **YUTECH**
- Case Study and Value Analysis
- Concluding Remarks

# Need for Automation



Energy savings by improved throughput, gain in performance and efficiency



Achieve the minimum cost of operations by streamlining operations and increasing Throughput



Save costs and money by optimising the resources like Steam, Fuel, Power and water.

# The Purpose of Sugar Process Automation



- Sustained Increase in Productivity **with Better Quality**
- Sustained Increase in Throughput **thus Maximum Equipment Utilization**
- Save Energy and Steam **thus Save Fuel**
- Increase Work Efficiency **thus Reduce Expenses**
- Reduce Human Errors **thus Reduce Downtime**
- Reduce Production Costs **thus Increase Profitability**

# Automation Effects on Process Parameters



- Maintain Optimum Juice Temperatures **thus improve Efficiency**
- Maintain Juice-Lime Mix Ratio & pH **thus improve Juice Quality**
- Maintain Juice Brix at the Evaporator Station **thus improve Efficiency**
- Maintain the Brix by proper Feeding to Pans, CVPs, Melters **thus improve Efficiency and reduce Cycle Time**
- Ensure constant ratio of Magma and Molasses **thus improve Efficiency and reduce Cycle Time**
- Maintain Flows, Levels, Temperatures and Pressures in different vessels and Pipelines to Facilitate Consistent Operation **thus improve Efficiency and reduce Cycle Time**
- Eliminate overflows, Reduce and Possibly Eliminate Stoppages due to Human Errors **thus reduce Cycle Time and Avoid Wastage thus improve Profitability**
- Early indications of Faults **thus reduce Maintenance Costs**

# Automation Approach



Common Industrial Activities like Steam Generation or Process Plants share common engineering parameters like Pressure, Temperature, Flow and pH etc.

Sugar Process is completely different from normal Process Plant activities because we deal with Variables and almost everything is non standard.

Here a great stress is put on the abilities of a few technicians. Therefore the Automation approach also differs greatly from other common processes.

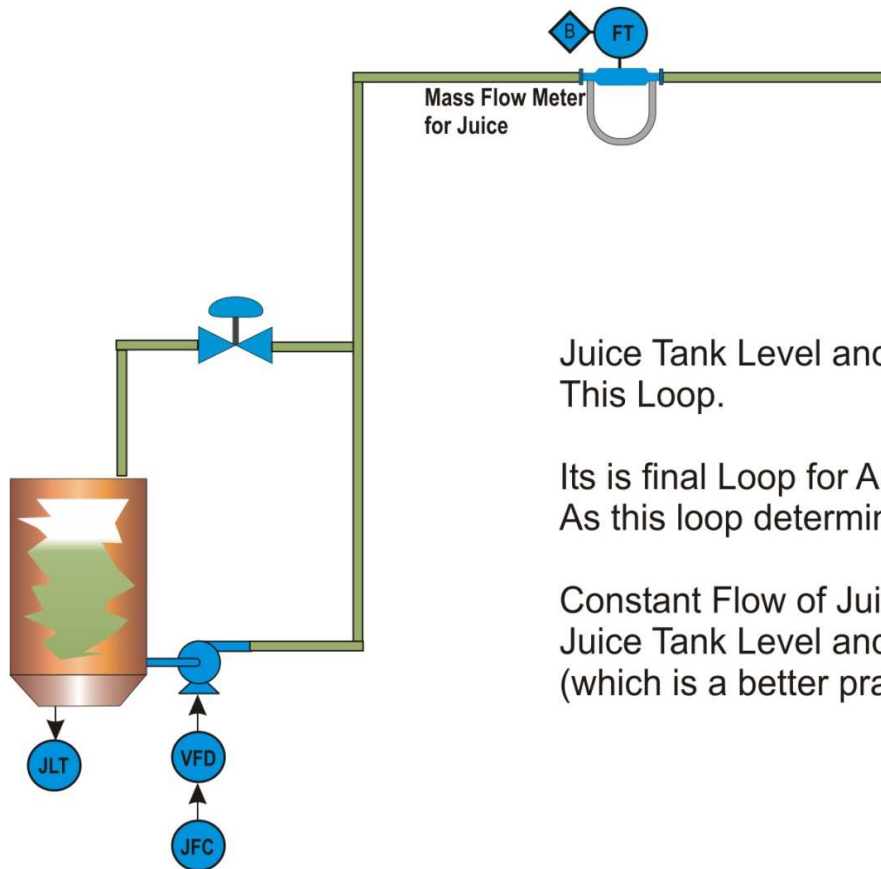
# Automatic Sugar Process Control Systems:



- **Juice Flow Stabilization and Control System**
- **pH and Lime Dosing Automation**
- **Clarifier Automation**
- **Rising and Falling Film Evaporator Automation**
- **Batch and Continuous Pans Automation**
- **Continuous Centrifugal Machine Automation**
- **Vertical Crystallizer Automation**
- **Sugar Melter Automation**
- **Molasses Conditioner Automation**
- **Superheated Wash Water System**
- **Pressure Reducing and De-Superheating Station Automation**
- **Condenser Automation**
- **Steam and Vapour Balancing System**

# Juice Flow Control and Stabilization:

## Juice Flow Automation



Juice Tank Level and Juice Flow Sensing is the means of Automating This Loop.

It is the final loop for Automation of the Mill. The essence of Mill Automation. As this loop determines the Mill Tandem's Output.

Constant Flow of Juice is maintained by this Automation with respect to Juice Tank Level and Flow Rate. By Controlling either the Juice Pump VFD (which is a better practice) or by regulating the Juice Bypass Valve.



# Juice Flow Control and Stabilization:



- This Automation Loop is Basically a Function of Mill Automation but sometimes also taken in the Boiling House or Process Automation Side.
- Stable and Constant Juice Flow is very essential for over Sugar Process to Function Smoothly
- Constant Juice Flow and Constant Heating Steam Ensure (Both have to work in tandem with Good Mill Automation) Efficient Boiling House or Process Operation

# Juice Flow Stabilization and Control Systems

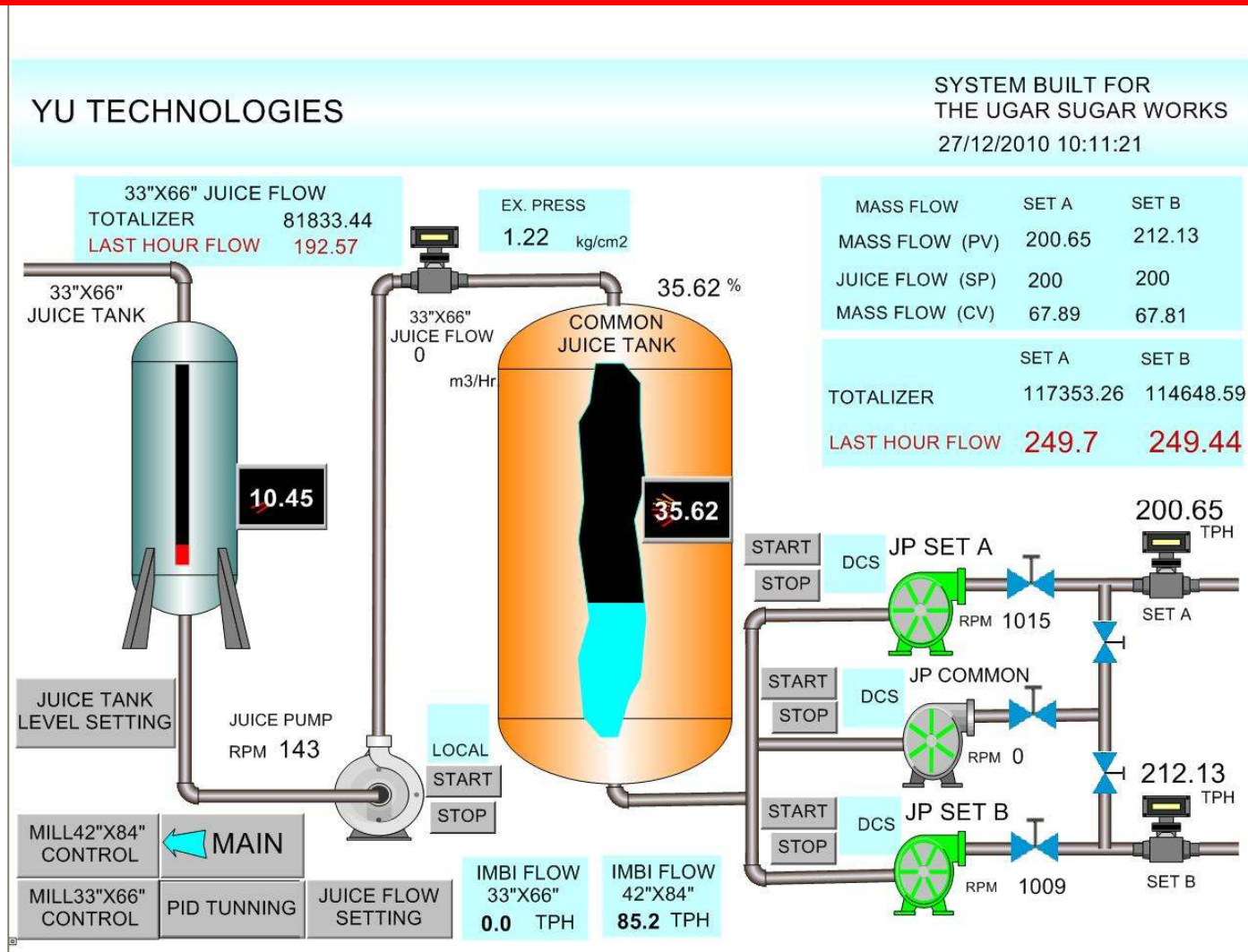


## Automatic Juice Flow Control System

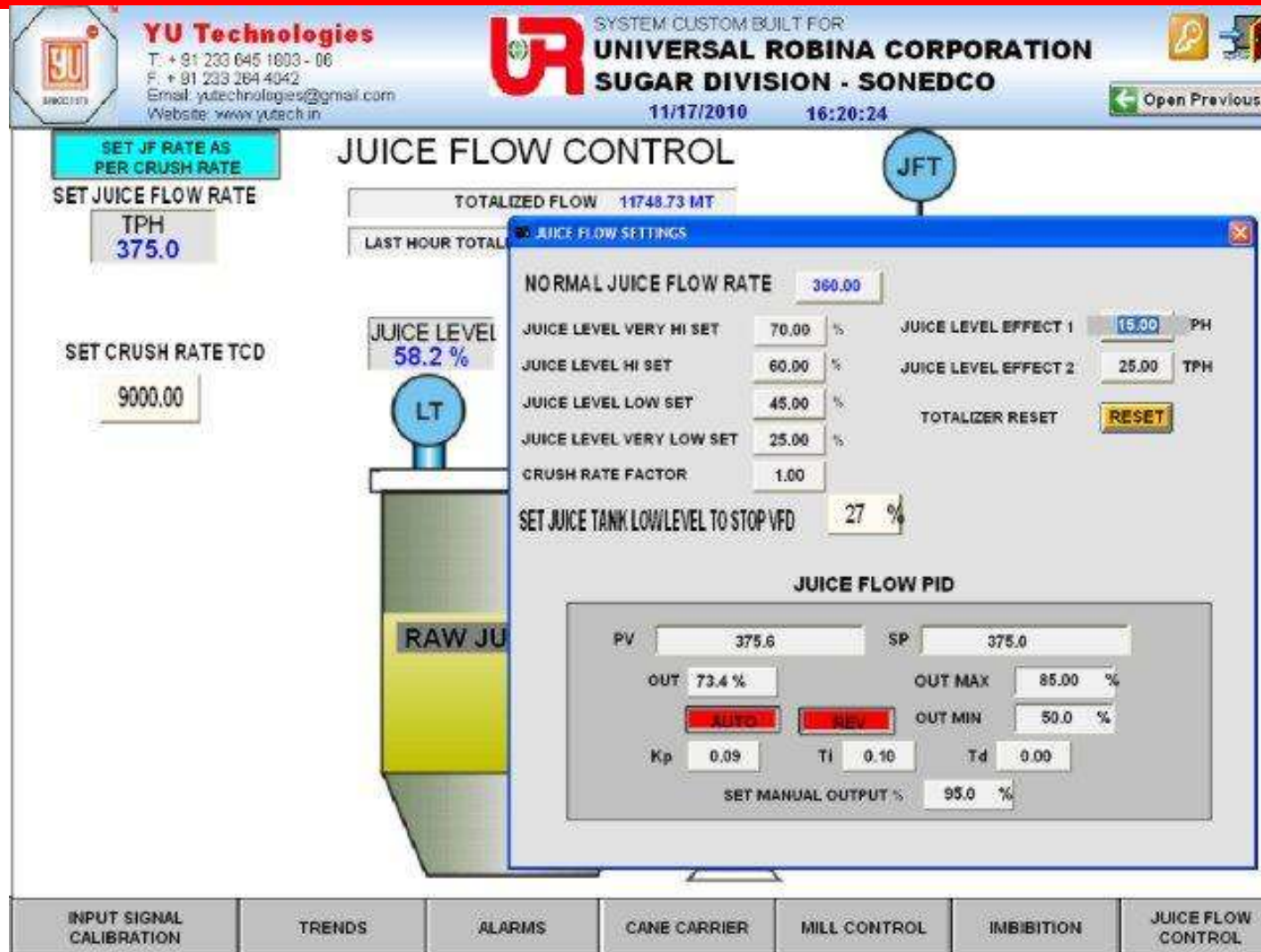
### Features:

- **Level Transmitters for Sensing Juice Tank Level**
- **Maintain Constant Juice Flow to Process in a PID Loop with Respect to Tank Level**
- **Tank Level also has Over-Riding Control on Cane Carrier Speeds as a Feedback Control**
- **Juice Tank Level Sensing and Controls avoid Juice Overflow and Pump Dry Run**
- **Juice Flow Control by Controlling Juice Pump VFD or Juice Bypass Valve**

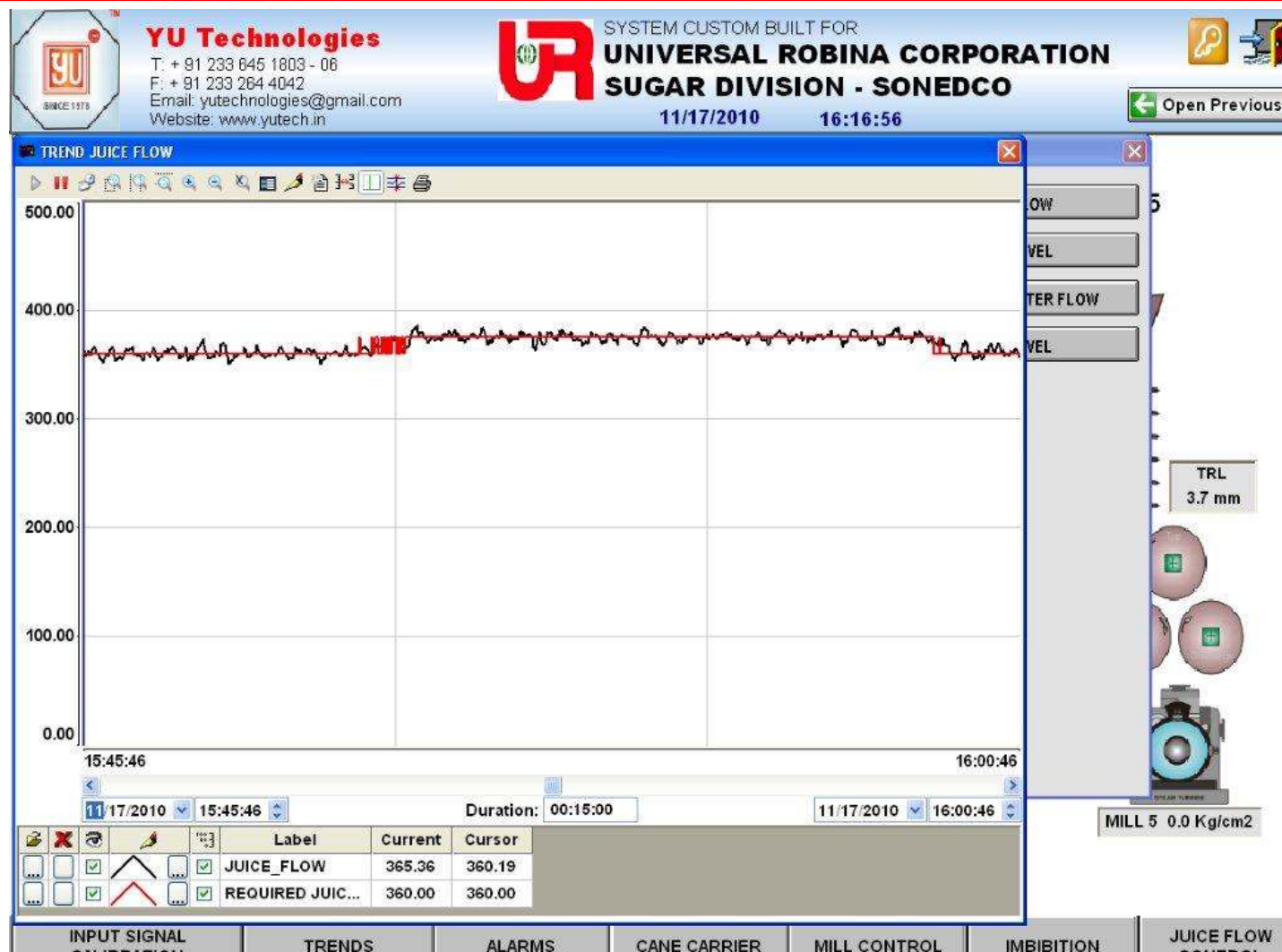
# Juice Flow Control Screen Shot:



# Juice Flow Control Screen Shot:



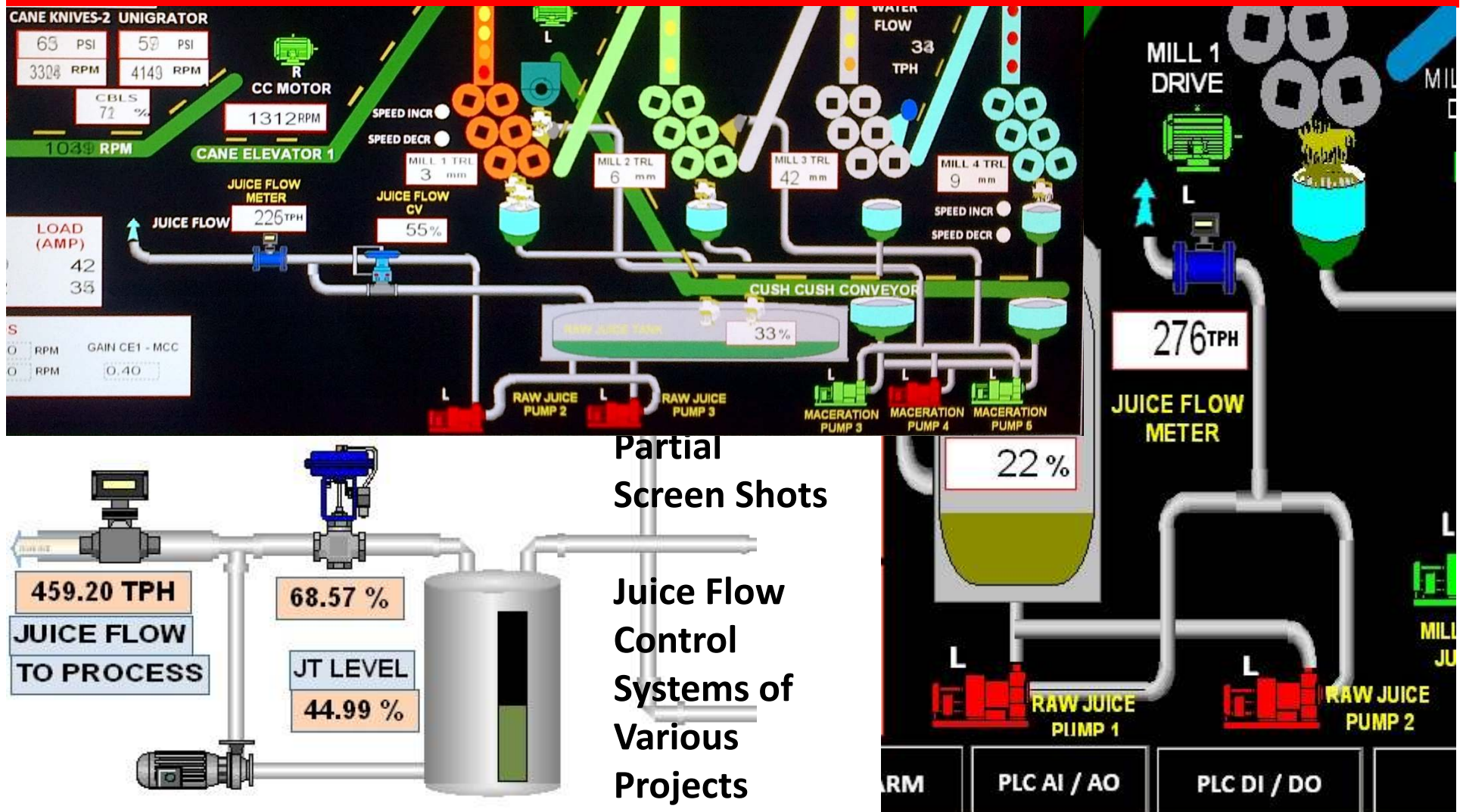
# Juice Flow Control Actual Trend Screenshot:



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# Juice Flow Control Screen Shot:



# Challenges in Juice Liming Automation:



- If Juice Flow Variation is beyond a certain limit then Controlling Lime Dose becomes almost impossible.
- Variation in Lime Baume makes it difficult to control as a ratio controller (Lime Flow with respect to Juice Flow).
- Lime has settling properties and hence a normal Butterfly or Globe Type Control Valve cannot be used.
- pH Sensing becomes difficult because of Scale deposition on the Electrodes.

# Challenges in Juice Liming Automation:



## **YUTECH Solutions:**

- Accurate Juice Flow Control: Controlled Juice Flow from the Mills to the Process.
- Quantitative and Qualitative Controls: Lime Flow Control with respect to Juice Flow as a Coarse Control and Shock Lime pH Sensing as a Fine Control to micro adjust the Juice pH.
- Specially Designed Lime Proportionator Unit with recycle outlet which prevents choking due settled lime.

## Advantages:

- Constant Juice pH
- Maintained Dorr pH
- Better Sugar Colour



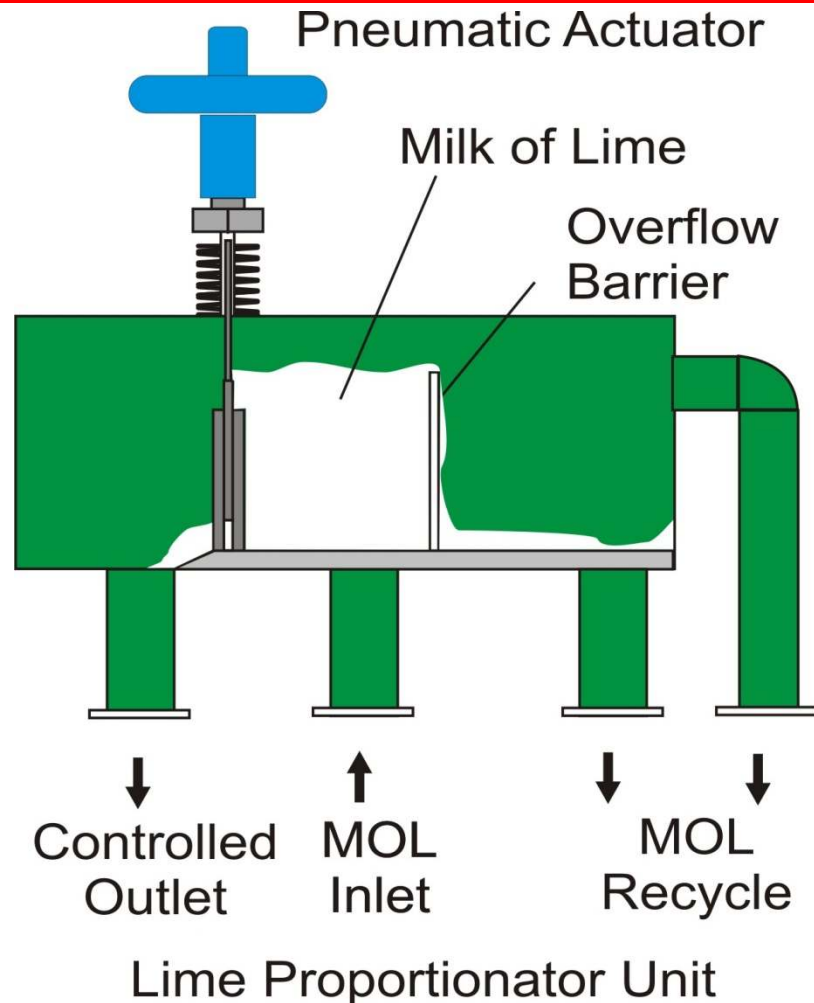
# Challenges in Juice Liming Automation:



## **YUTECH Solutions:**

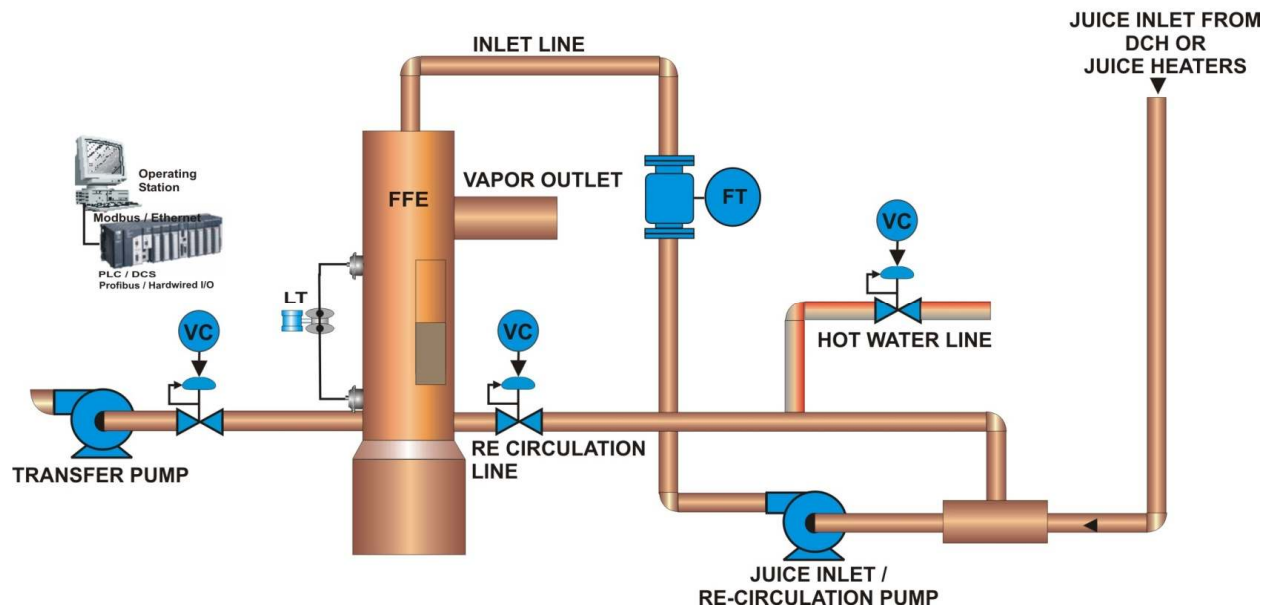
- pH Electrode Maintenance is a very Contentious but Important Issue
- We suggest 2 Electrodes be maintained at a time one in sensing position and other in a 0.1 Molar HCL Solution
- These Electrodes be swapped every 24 Hours
- pH Signal Standardization in pH Analyzer Standardization is a must when Electrodes are Swapped or Changed
- These Electrodes be Cleaned by 0.1 Molar HCL Solution at the beginning of every Shift
- This Practice will ensure Correct pH Readings

# Pneumatic Lime Proportionator Unit:



- Specially designed Lime Proportionator Unit to avoid Lime Overflow, Choking and Lime Settling.
- Accurate Control on Milk of Lime Flow.
- Better pH Control.
- Highly accurate and Error Free pH Sensing.
- Trouble free and intelligent operation.

# Falling Film Evaporator Automation:



**Sense Evaporator Body Level**

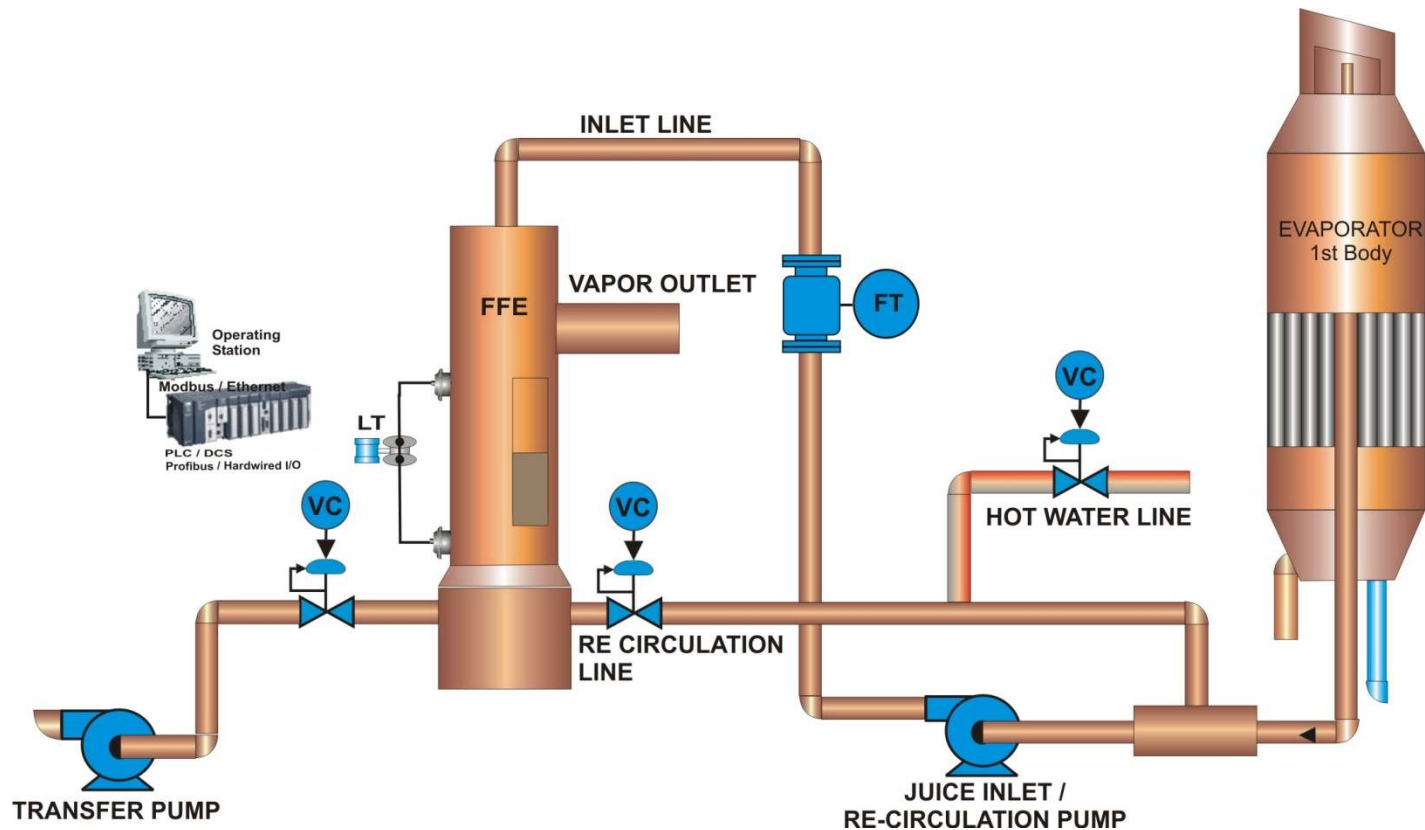
**Sense Juice Inlet Flow**

**Evaporator Level has to be maintained for proper Evaporation and Vapor Generation**

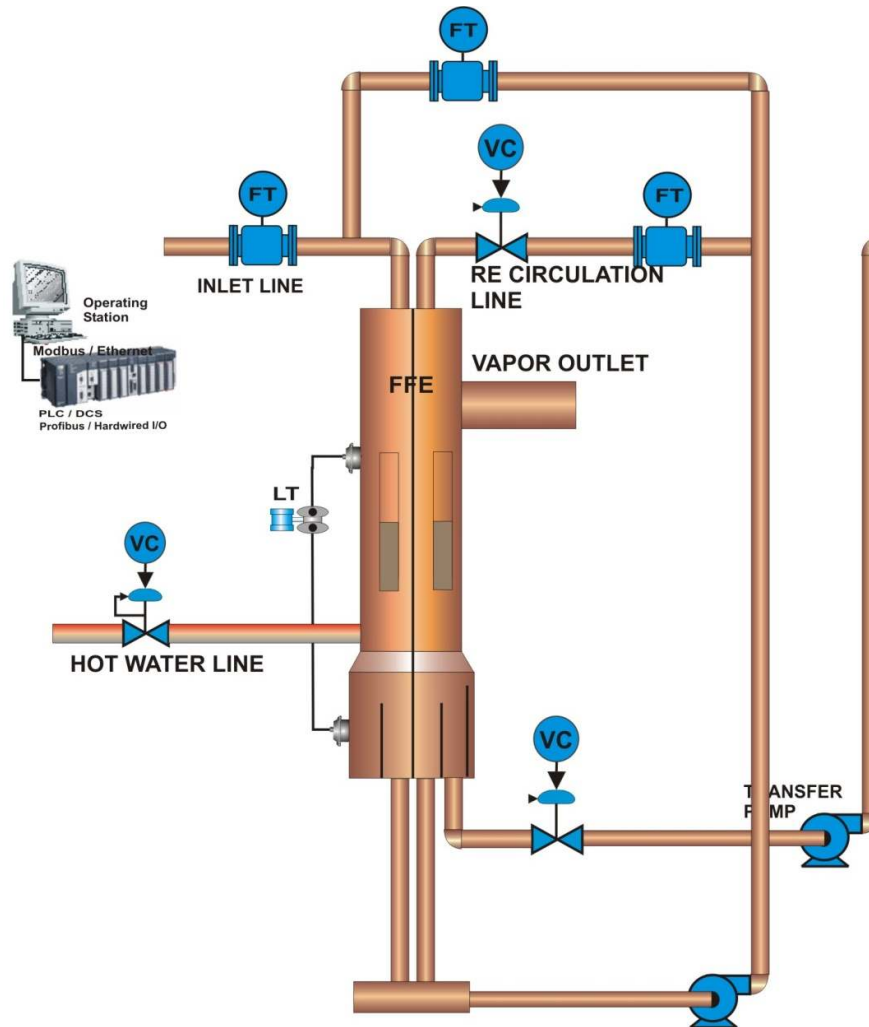
**FFE Level is maintained by:**

- 1. Controlling the Transfer Control Valve.**
- 2. By increasing Recirculation.**
- 3. If there is shortage of Inlet Juice due to some emergency then Hot Water is added.**

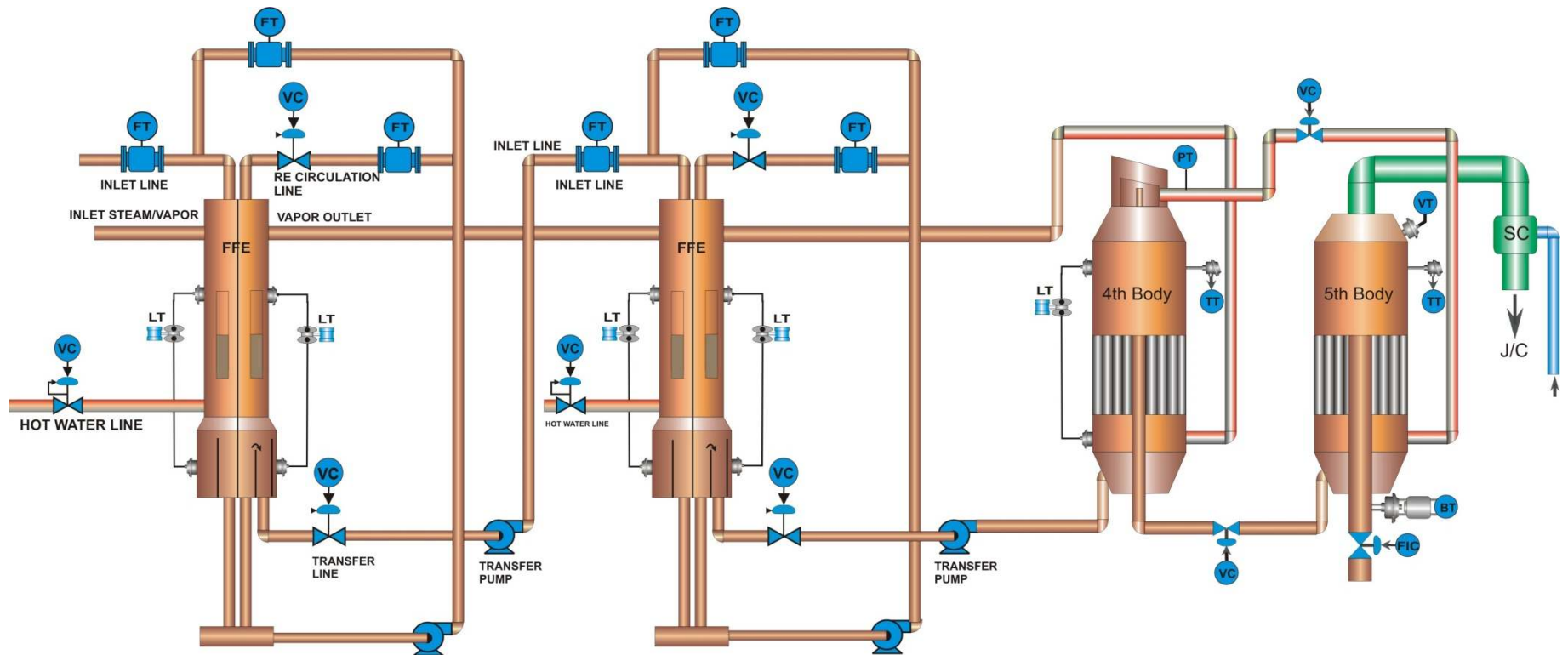
# Falling Film Evaporator Automation: Inlet to FFE is from Evaporator 1<sup>st</sup> Body



# Falling Film Evaporator Automation: FFE having a Partition



# Evaporator Automation: FFE for 1<sup>st</sup> & 2<sup>nd</sup> Body and Conventional Rising Film type 3<sup>rd</sup> & 4<sup>th</sup> Body



FFE has a Vertical Partition.

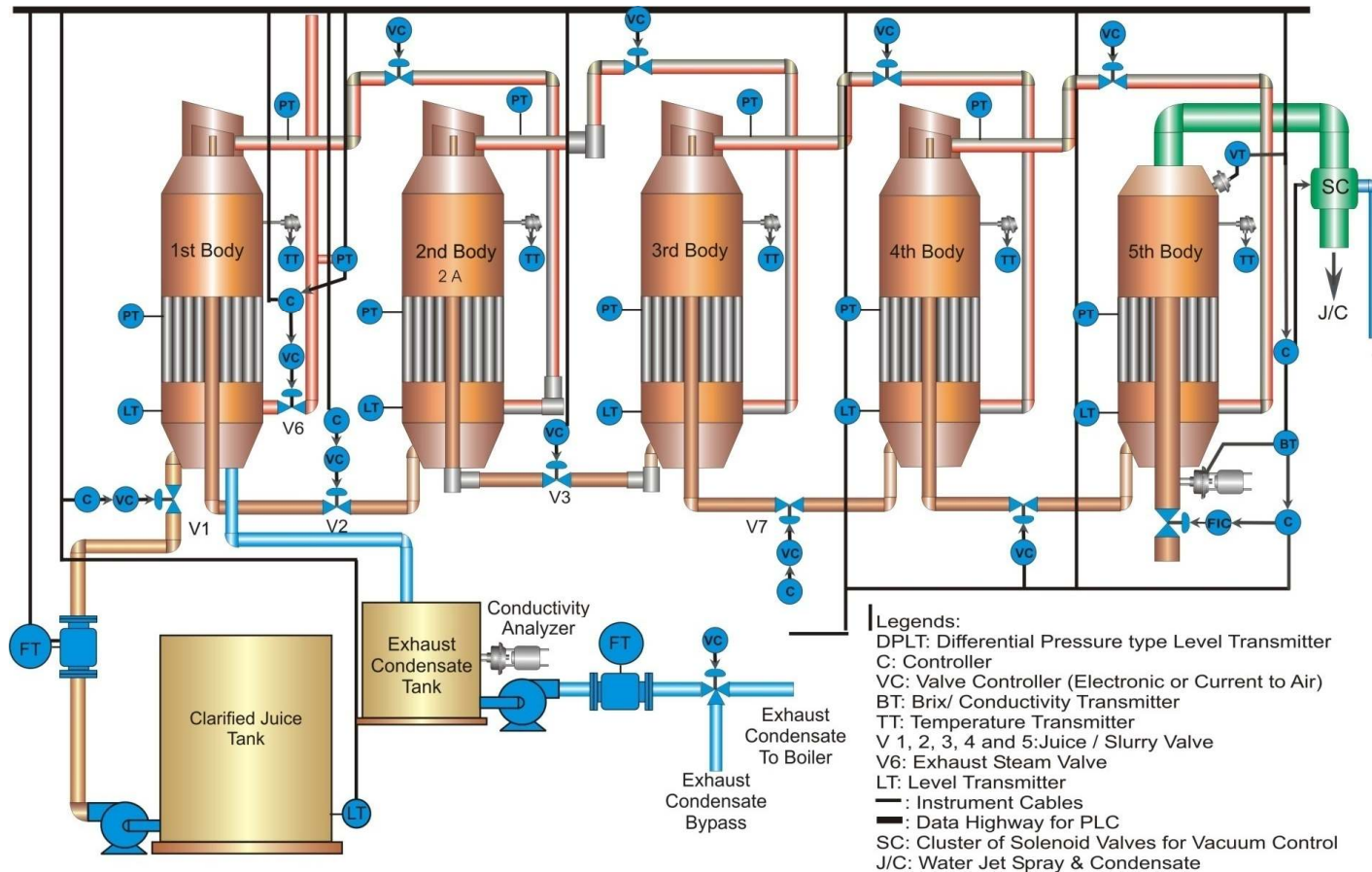
Inlet, Recirculation and Bypass Flows are Measured and Controlled

## Evaporator Automation: FFE for 1<sup>st</sup> & 2<sup>nd</sup> Body and Conventional Rising Film type 3<sup>rd</sup> & 4<sup>th</sup> Body



- Evaporator Level has to be maintained for proper Evaporation and Vapor Generation.
- Inlet Flow to the FFE Body and Recirculation have to be equal or in Preset Proportion.
- Logic is written to Maintain this Condition.
- Inlet, Recirculation and Bypass Flows are measured and maintained as per requirement by using Control Valves.
- Brix of Final Body Measured and Maintained

# Evaporator Automations:

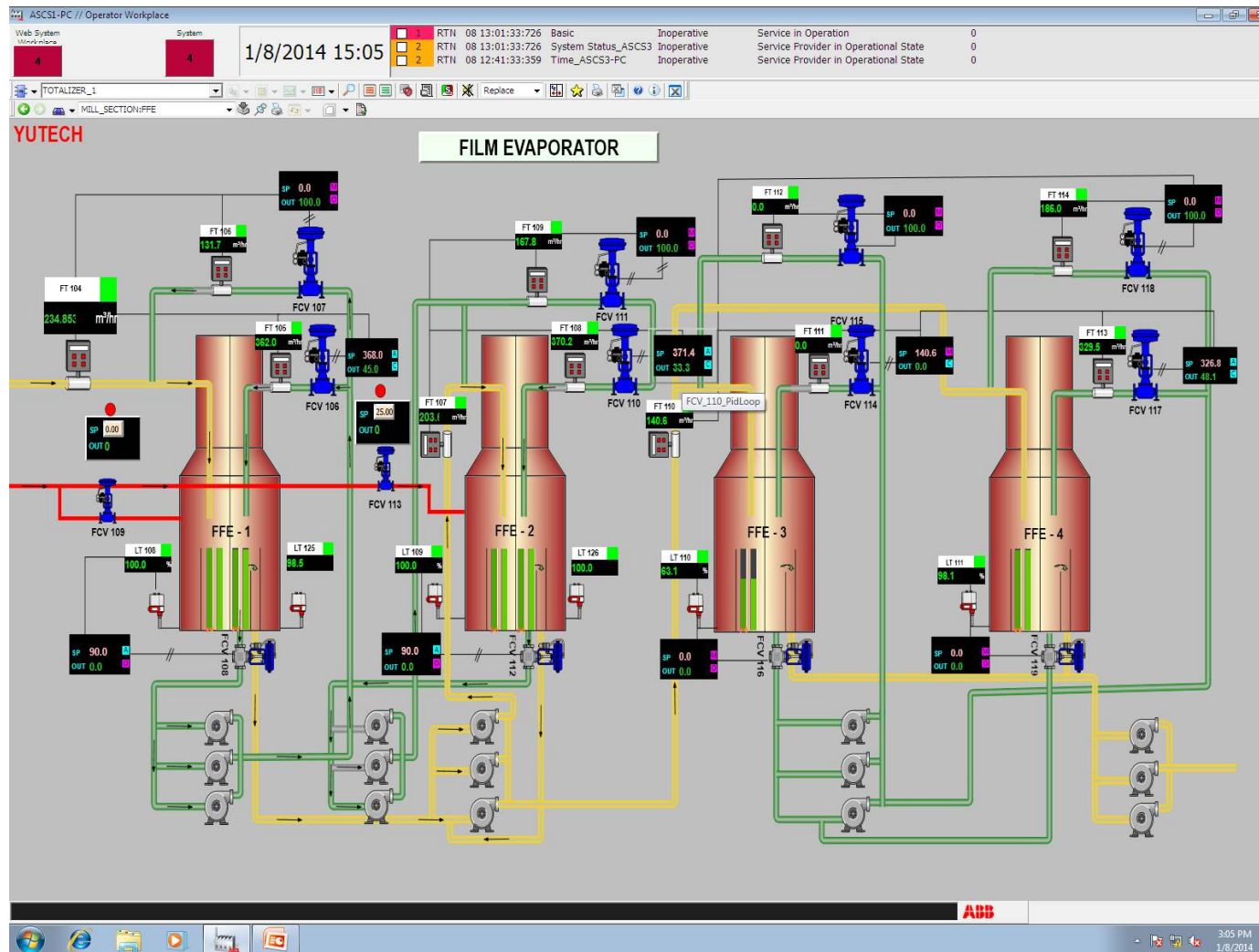


**Evaporator Control System**



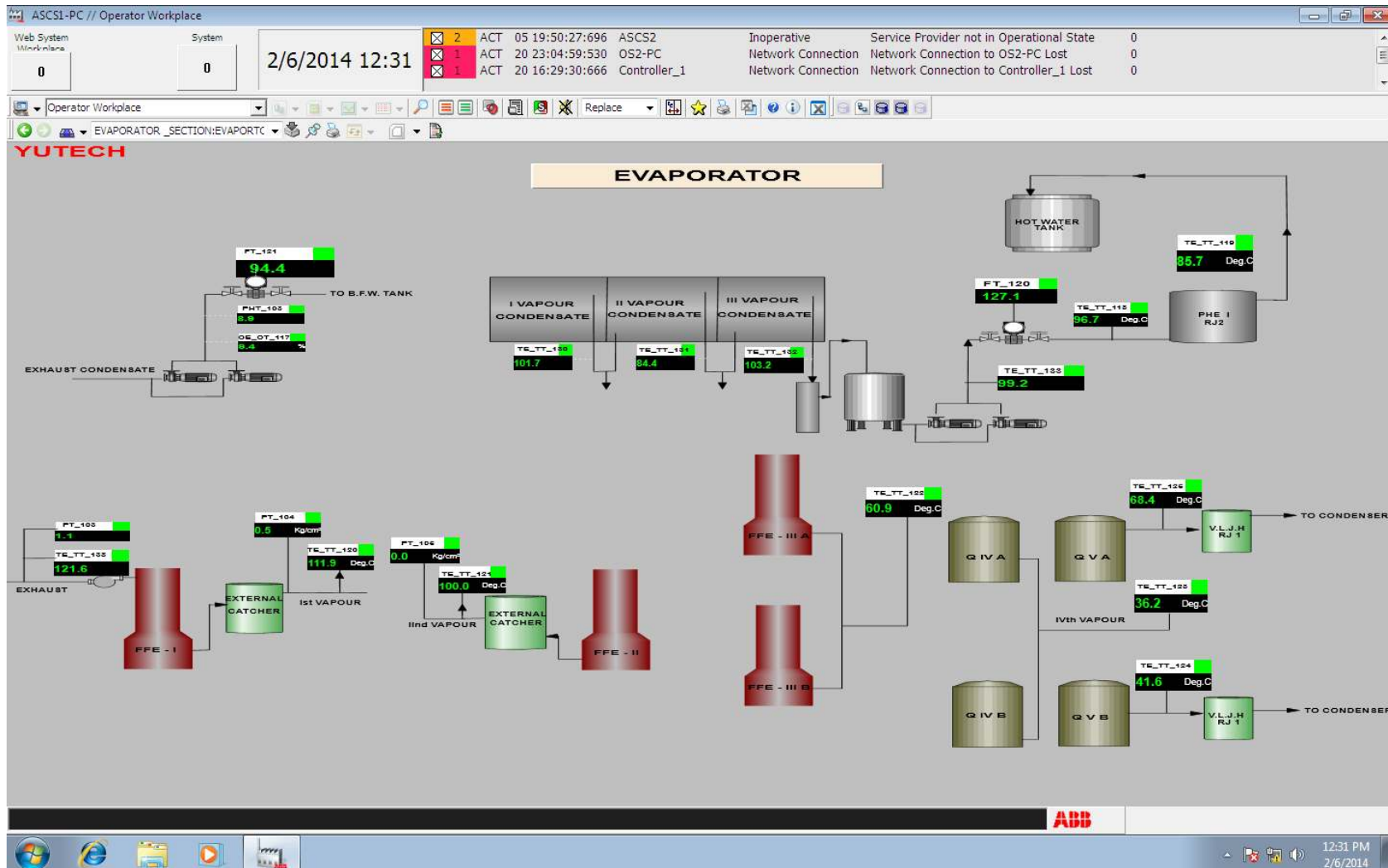


# Falling Film Evaporator Automation: Screen Shot



# Evaporator Automations:

## Lokmangal Mouli Sugar Factory Screen Shot





# Process Automations:

## Field Instruments and Sensor Installations



# Evaporator Automations:



- **Evaporator Level Control**
  - **Calendria Steam Pressure Control**
  - **Evaporator Brix Control**
- 
- **Condensate Contamination Monitoring and Bypass using YUTECH 3 Way Valve**

# Evaporator Automations Results

Lokmangal Mauli Industries Ltd., Khed, Tal: Lohara, Dt: Osmanabad.



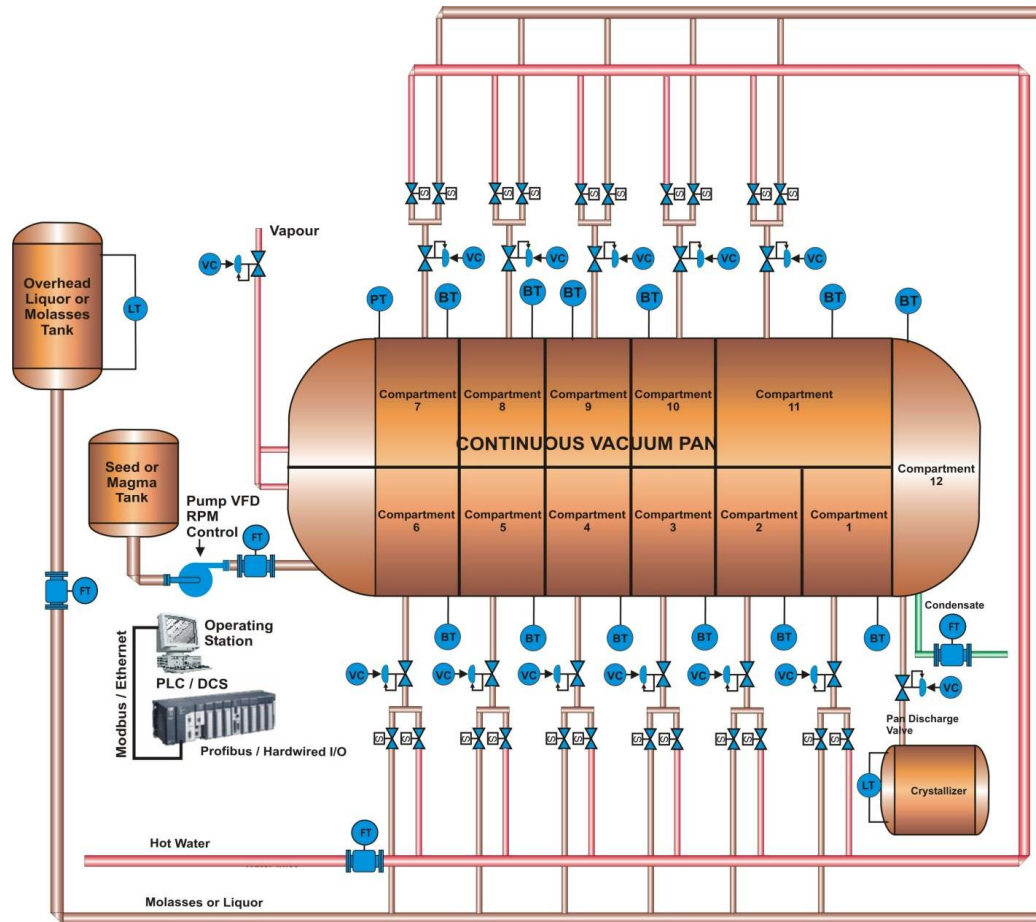
**Evaporator Automation System included in Plant DCS: Quintuple with first 3 Effects being Falling Film type**

## **Achievements after Automation:**

- **Constant Outlet Brix**
- **Level is maintained hence Entrainment through Vapour is eliminated**
- **Constant Evaporation results in Constant Vapour Generation**
- **Steam % Cane: 36 at Imbibition % Fibre 210**

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# Continuous Vacuum Pan Automation:



Schematic Diagram - Continuous Vacuum Pan Automation

- Auto Feeding of Molasses
- Auto Selection of Feed wrt Feed Tank Levels
- Calendria Vapour Pressure Control
- Individual Compartment Brix Control
- Seed Flow Control with respect to Molasses Flow

# Continuous Vacuum Pan Automation:



- **Seed / Magma Flow Control with respect to Molasses / Liquor Flow**
  - Molasses and Seed Flowmeters sense Flow.
  - Ratio Controller delivers exact Flow of Seed wrt Molasses Quantity by Controlling Magma Pump VFD.
- **Individual Compartment Brix Control by Auto Feeding of Molasses / Water into each Compartment**
  - Brix Sensing of each Compartment by YUTECH Brix Analyzer for exact Brix Measurement
  - Control of Molasses Intake Valve wrt Brix Set Point and Sensed Value in a PID Mode
  - Addition of Water if Brix are higher than Set Point. This Logic is Built in the PLC / DCS.

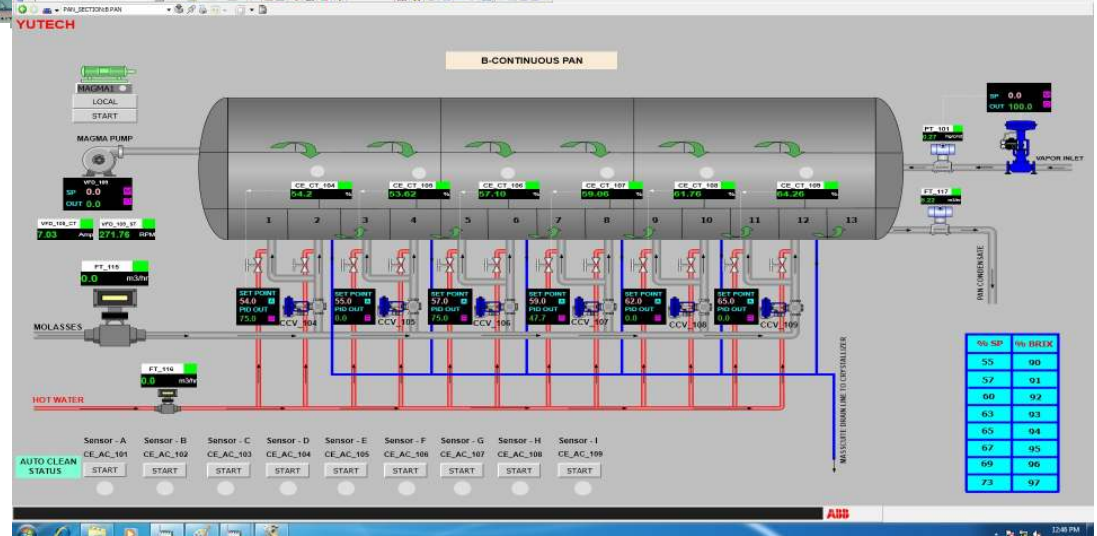
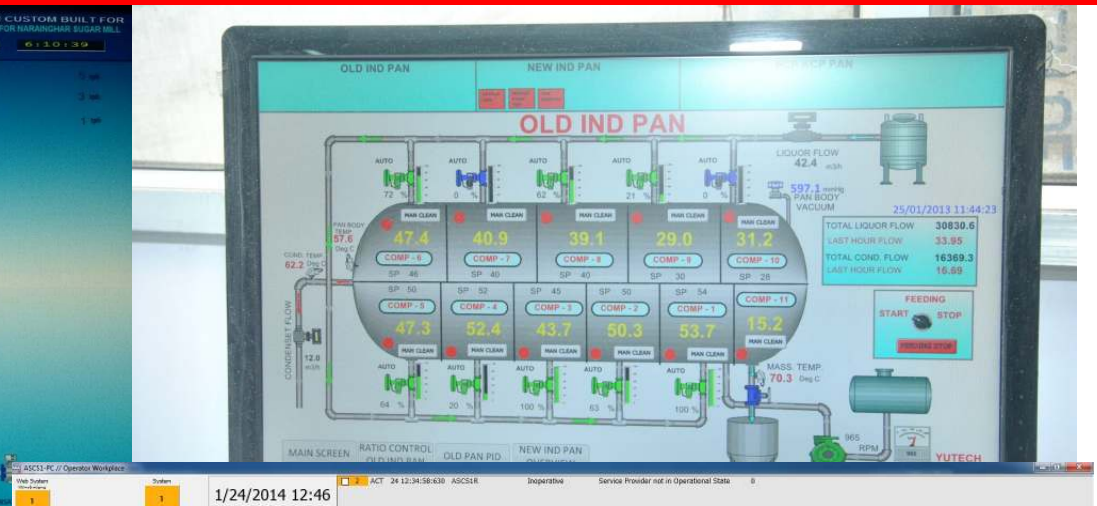


# Continuous Vacuum Pan Automation:



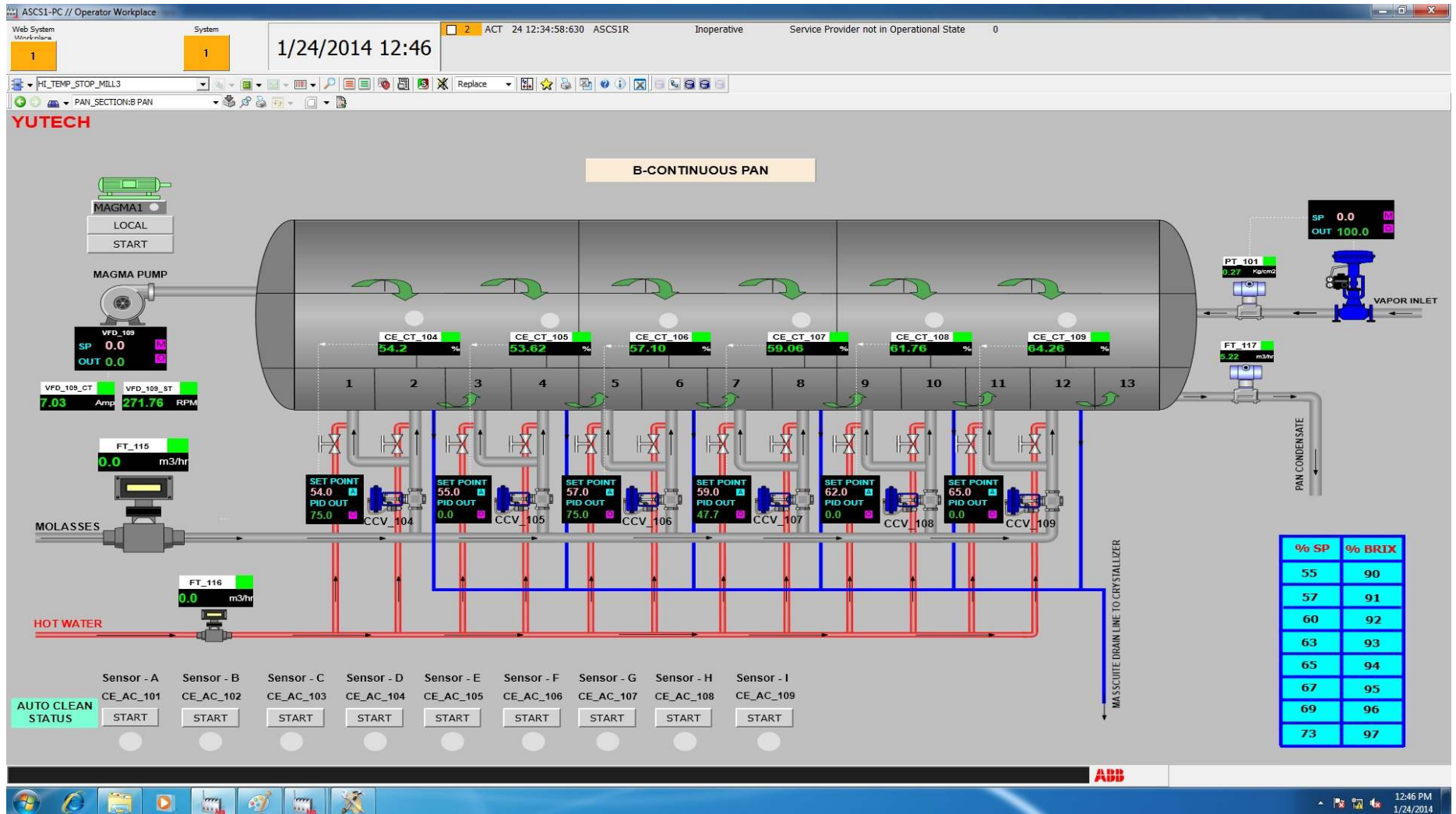
- **Auto Selection of Feed wrt Feed Tank Levels (This Process is mostly Controlled by Panman / Chemist)**
  - Level Transmitters are installed in each Feed Tank for the Pans
  - Semi Automatic Feed Selection depending on Feeder Tank Levels with Manual Bypass Option.
  - Feed Selection is also done Automatically by the PLC itself if Factory Conditions permit.
- **Calendria Vapour Pressure Control**
  - Calendria Vapour Pressure is Measured by a Pressure Transmitter
  - Vapour Control Valve Controls the Vapour intake and thus Pressure to maintain Set Pressure in a PID Loop.





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# Continuous Vacuum Pan Automation:



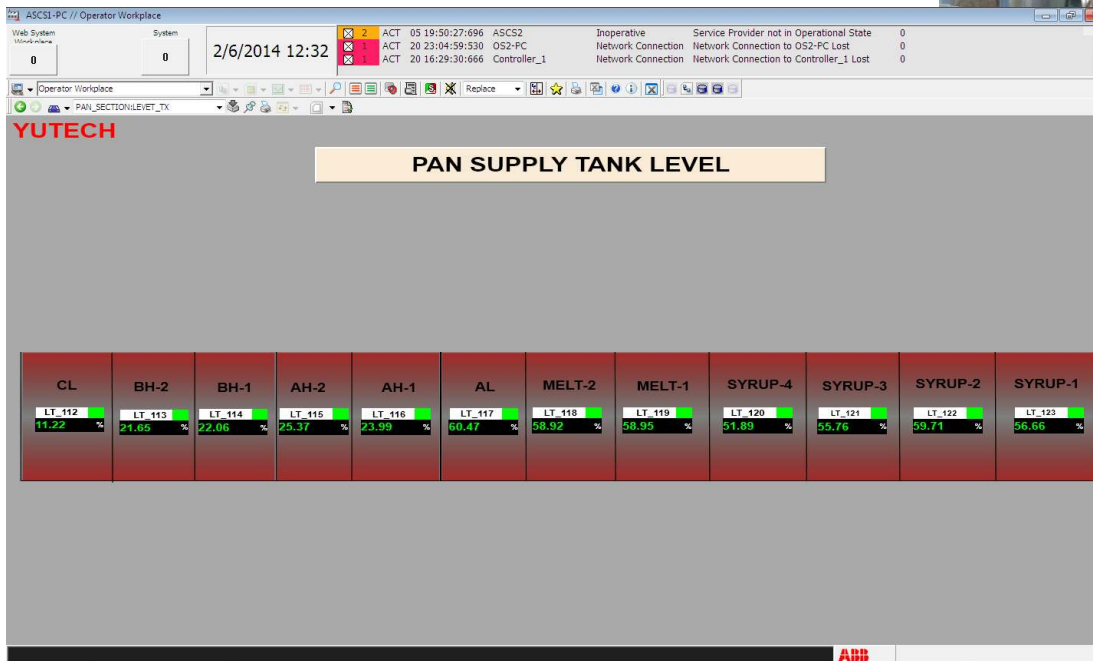
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# Field Instrument Installation and Cable Routing



# Continuous Vacuum Pan Automation: Feed Tank Levels:





# YUTECH Brix Analyzer

## YUTECH Auto Cleaning Self Retractable Brix Sensor:



Cleaning Position - Sensor Shaft Retracted



Sensing Position – Sensor Shaft Pushed Out



**Auto Retractable Self Cleaning Brix Sensor**  
**Product Code: ASD-BS-SCW-1E-V02**

**Brix Analyzer with  
Auto Purity Compensation**  
**Product Code:**  
**YU-ASD-BA-1005-CO-V02**  
**For Continuous Operation**  
**YU-ASD-BA-1005-BO-V02**  
**For Batch Operation**

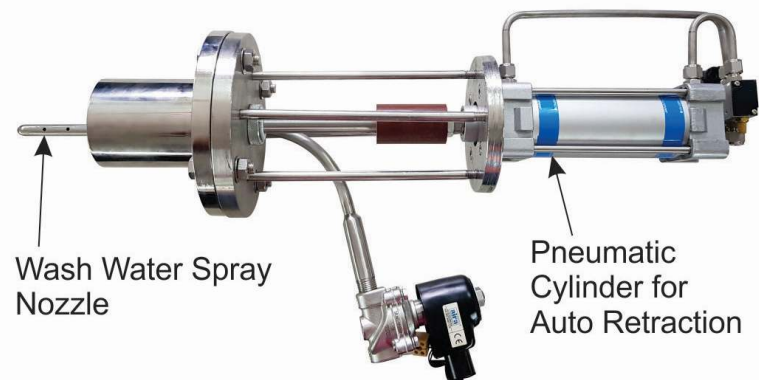
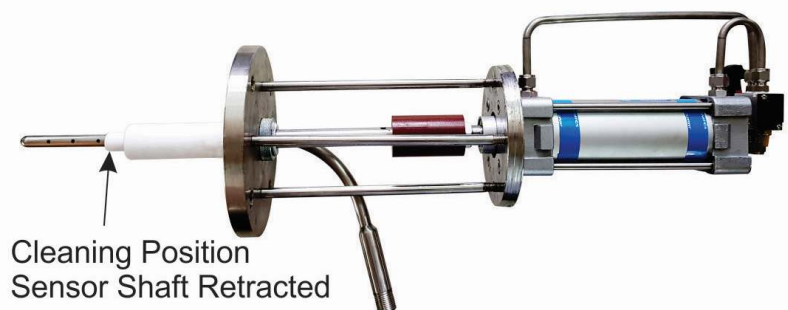
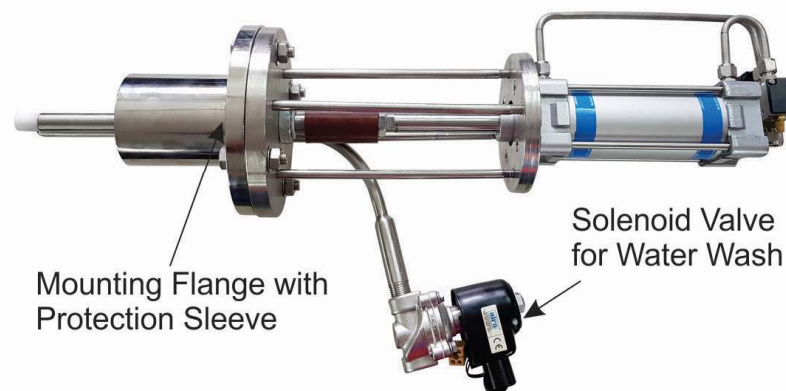


# YUTECH Brix Analyzer

## YUTECH Auto Cleaning Self Retractable Brix Sensor:



**Brix Sensor Pictures with and without Mounting Flanges and in Sensing and Cleaning Positions**



**Auto Retractable Self Cleaning Brix Sensor Product Code: ASD-BS-SCW-1E-V02**

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# YUTECH Brix Sensor

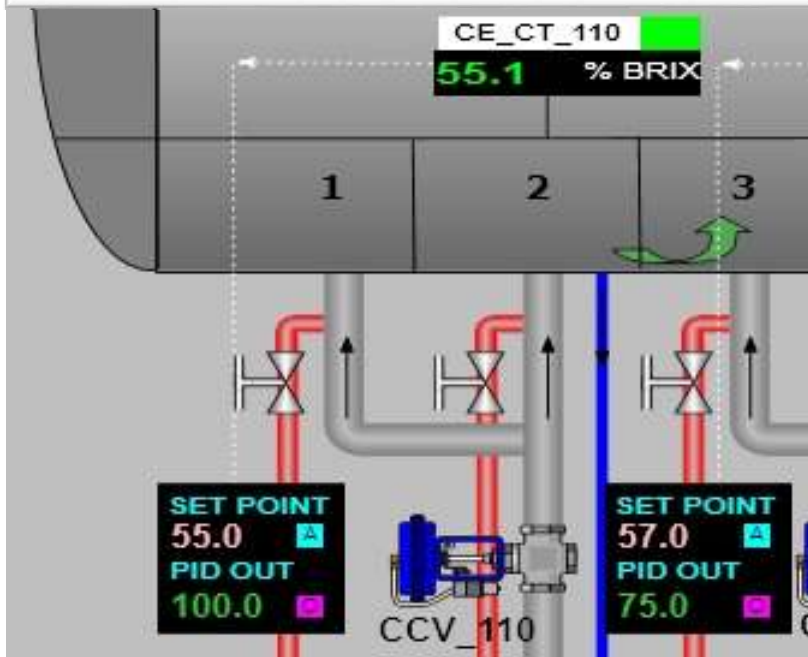
## Self Cleaning Auto Retractable Brix Sensor in Operation



**Auto Retracting Self Cleaning Brix Sensor  
installed on Continuous Vacuum Pan & Sugar  
Melter in Picture below**



**Partial Screen Shot of Brix Reading  
on SCADA**



**Auto Retracting Self  
Cleaning Brix Sensor  
installed on Batch Type  
Vacuum Pan**

# Auto Retractable Self Cleaning Brix Sensor:

Product Code: **ASD-BS-SCW-1E-V02**



**Brix Sensor Detects Signal variation with respect to change in Brix.**

**PT 100 RTD provided for Massequite Temperature Sensing**

**Auto Retraction and Self Cleaning using Pneumatic Cylinder**

**Sensor is sheathed in PTFE Bar with Leak Proofing cum Cleaning Arrangement**

**Sensor Material: Stainless Steel**

**Sensor Washing Arrangement provided with ½" Solenoid Valve for Hot Water Spraying**

**Wash Water Spray Tube Material: Stainless Steel**



# Salient Features of YUTECH Brix Analyzer cum Transmitter with On-line Calibration Software “YUTECH-AccessApp-BA”:



- Brix Sensor Detects Signal Deviation with respect to Solution Brix
- This Signal Deviation is then Processed in Analyzer to obtain Brix Reading
- YUTECH Brix Analyzer is equipped with Intelligent Auto Purity Compensation Algorithm to derive the Brix accurately in Masseccutes of varying Purity
- Very Easy Calibration and Online Brix Compensation Recalibration
- In-Built Automatic Temperature Compensation
- In-Built Self Cleaning and Washing of Sensor with pre-adjustable timing cycle
- 4-20 mA Output, Separate Modbus and Ethernet Communications
- On-line Calibration Software “YUTECH-AccessApp-BA” provides Remote Access to Brix Analyzer for Calibration, Compensation and Trouble Shooting.

# Brix Analyzer:

## Batch and Continuous Vacuum Pans:



### **Brix Analyzers for Batch Type Vacuum Pan:**

Brix Analyzers for Batch Type Vacuum Pans come with different Purity Compensation Algorithm and as Batch Pans undergo periodic washings, there is Wash and Pan Drop Compensation Algorithm, with Alarms for Pan Drop.

### **A, B and C Type:**

Accuracy for Brix Sensing of Continuous and Batch Type Pans of B and C Type is 0.5 – 1.5 Brix, mostly working within +/-1 Brix.

Brix of A Type Masseccuite can be Measured if material intake is restricted to Only One Type of Material in that particular Pan. The purity of Syrup, AL, AH and Melt is drastically different from each other, so sensing Brix in a Pan with an uncertain mix of these materials is not possible. Reading Accuracy decreases in Pan Cutting Practice.

### **Brix Analyzers for Horizontal and Vertical Continuous Type Vacuum Pan:**

Brix Analyzers for Continuous Type Vacuum come with Algorithm developed for Sensing Brix in a Continuous Process, it is similar to other Continuous Processes like Evaporators, Sugar Melters etc., with different calibrations.

# **Brix Analyzer:** Applications in Sugar, Liquor, Food & Beverages making Industries



Brix Calibration Varies for different applications.

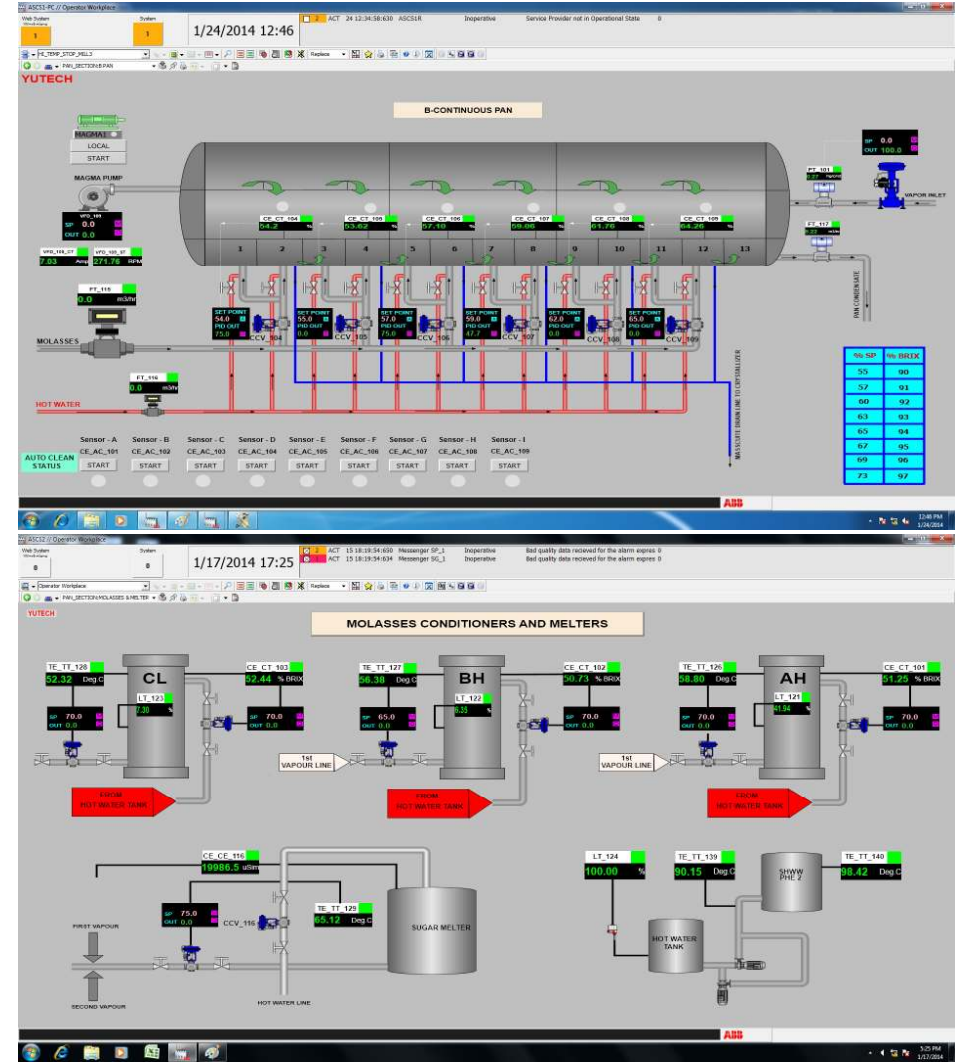
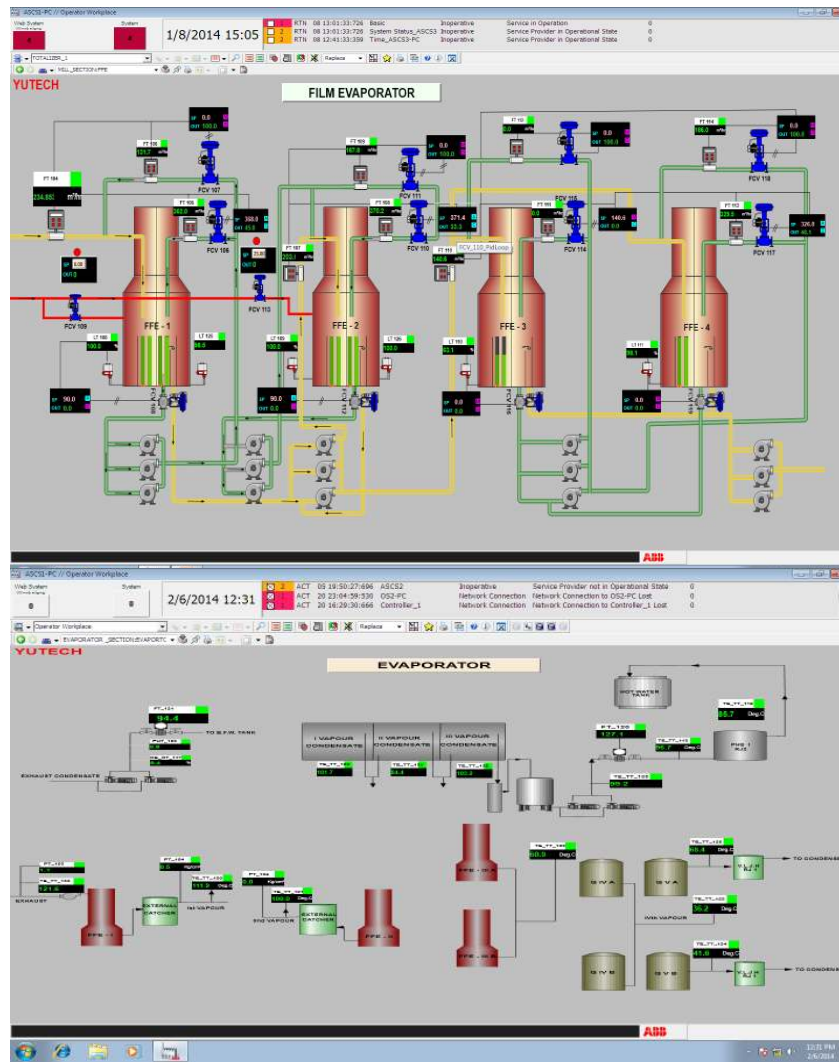
## **Brix Measurement in following Sugar Process Applications:**

- Juice Filtrate, Clarified Juice
- All Bodies of Rising or Falling Film Evaporators
- Batch and Continuous Vacuum Pans, Vertical Continuous Pans
- Molasses Conditioners, Sugar Melters
- Open Pans in Jaggery / Muscovado / Jaggery Powder / Khandsari Units

## **Brix Measurement in following Liquor, Food & Beverages Plant Applications:**

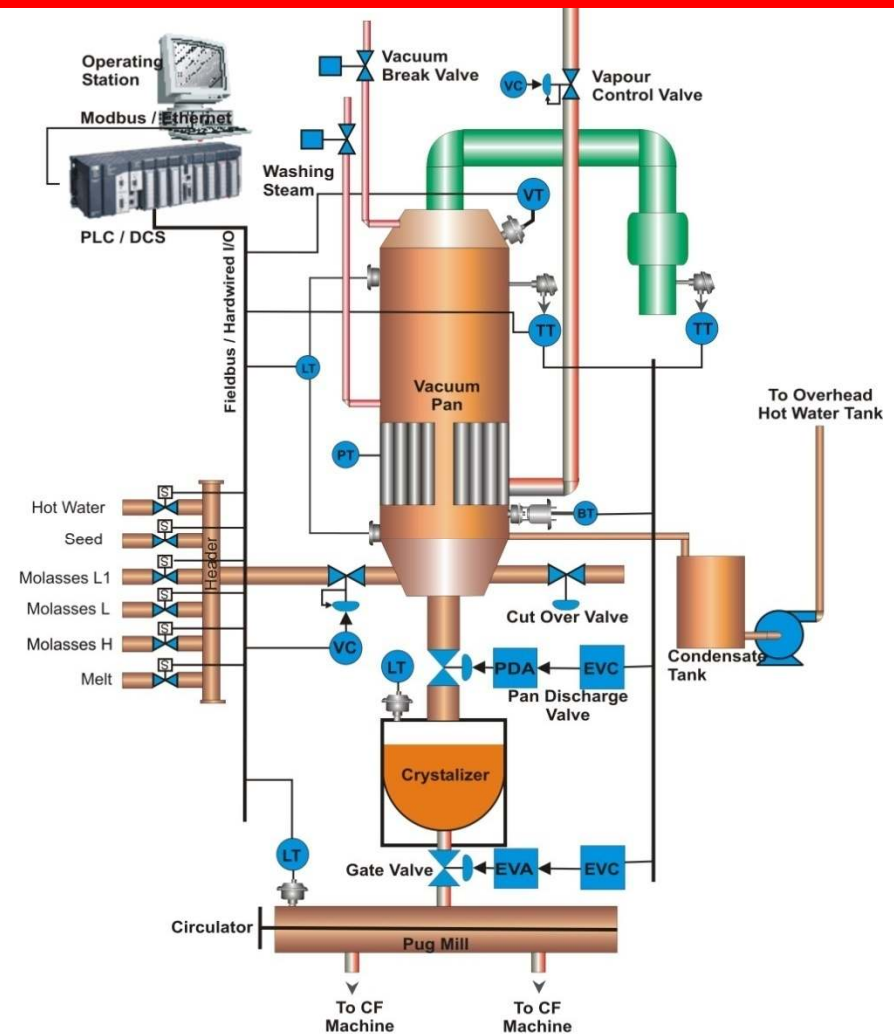
- Molasses or Liquor Fermentation Vessels
- Maturation Tanks
- Thickening Vessels

# Automation Screen Shots:



# Batch Pan Automation:

- Brix Sensing of B, C Type Pans
- Pan Level Sensing by Remote Seal Type Differential Pressure Transmitter.
- Variable Brix Set Point wrt Level.
- Crystallizer Level Sensing.
- Pug Mill Level Sensing.
- Vapor Inlet Control wrt Calendria Pressure.
- Semi Automatic Pan Drop wrt Pan Brix and Level in Crystallizer and Pug Mill with Automatic Vacuum Break with Manual Bypass Option.
- Automatic Steam Wash.
- Semi Automatic Feed Selection depending on Feeder Tank Levels with Manual Bypass Option.



# Advantages and Challenges of Batch Pan Automation:



## Advantages

- Steam Savings
- Optimum Capacity Utilization through Continuous Operations

## Challenges:

- B and C Type Batch Pans pose relatively lesser Challenges.
- Very Large variation in Purity of Material especially in A Type because Syrup, Melt, A Heavy, A Light, Water all materials are used and sometimes in different mixes.
- Panman's mindset is used to age old technique of feeling the Massecuite by hand and spreading it over a glass for visual inspection. This technique by experience becomes fairly accurate backed with Lab readings. And it is difficult to get them to rely on Automation.

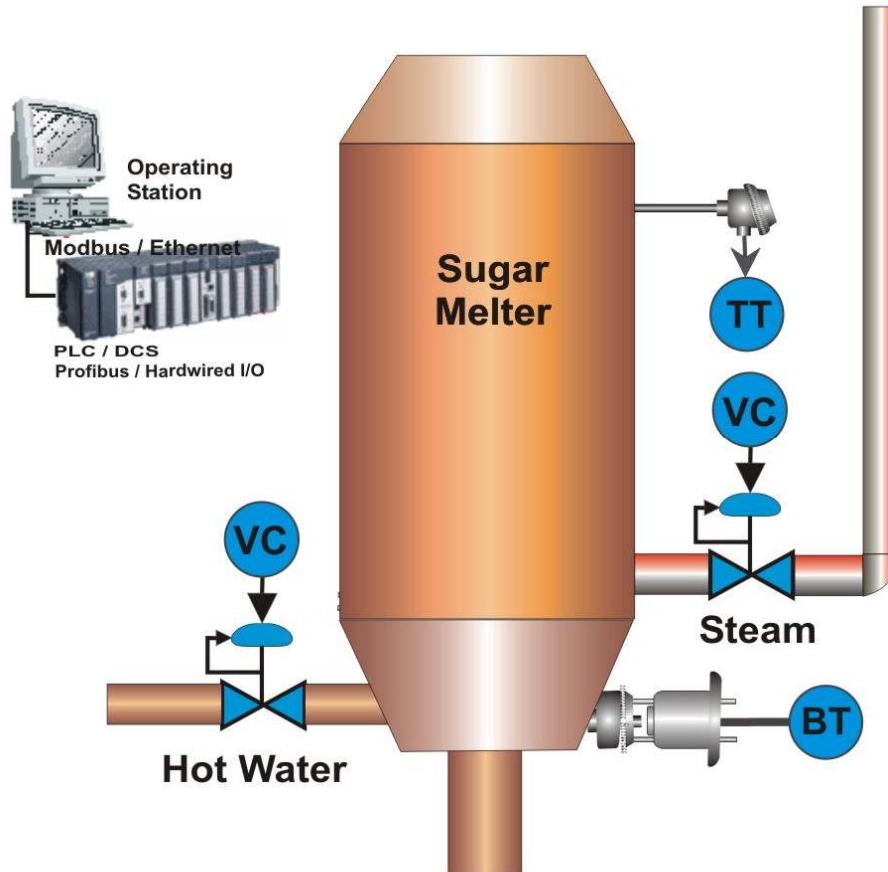


# YUTECH Solutions for Batch Pan Automation:



- Simple Operating Philosophy helps operators understand the Automation and use it.
- Easy to understand and User Friendly Screens remove the apprehensions of Panman about operating the Automation System.
- Drawing Inference from the Panman's experience and knowledge we set the Brix Value wrt Sensor output to suit the Panman's interpretation with repeat accuracy.
- Proper Training to Factory Staff.
- Customization to suit factory requirements.
- In A Type avoid mixing materials and use different Pans for different materials as far as possible.

# Sugar Melter Automation:

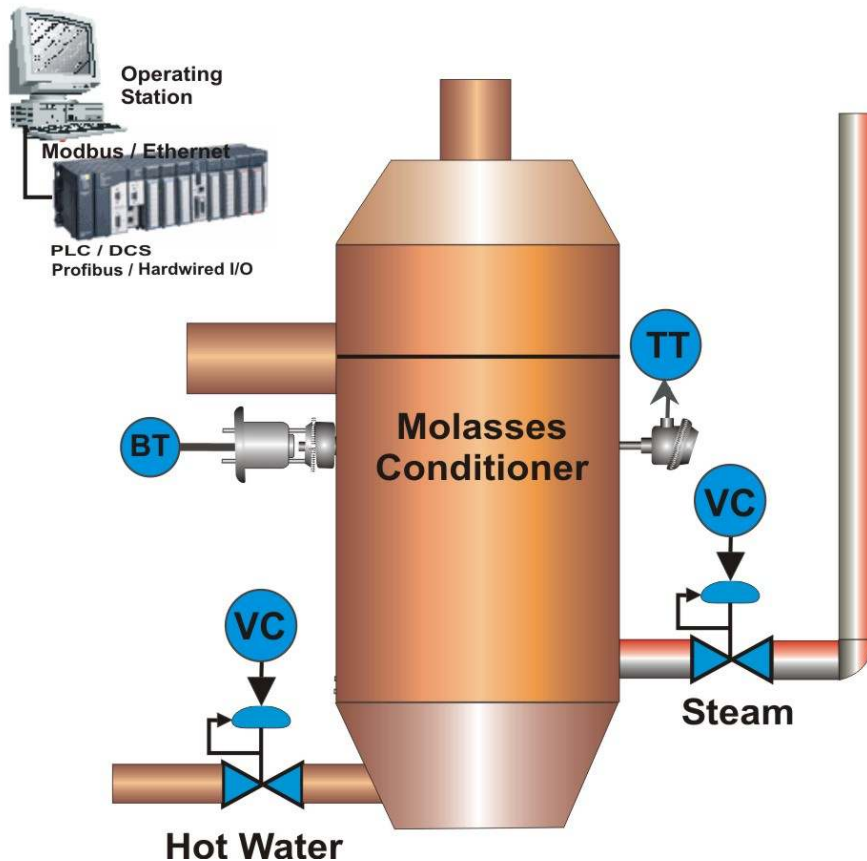


- Maintain Constant Melt Brix.
- Maintain Constant Melt Temperature.
- Save Steam.
- Save Water.



Schematic Diagram: Sugar Melter Automation

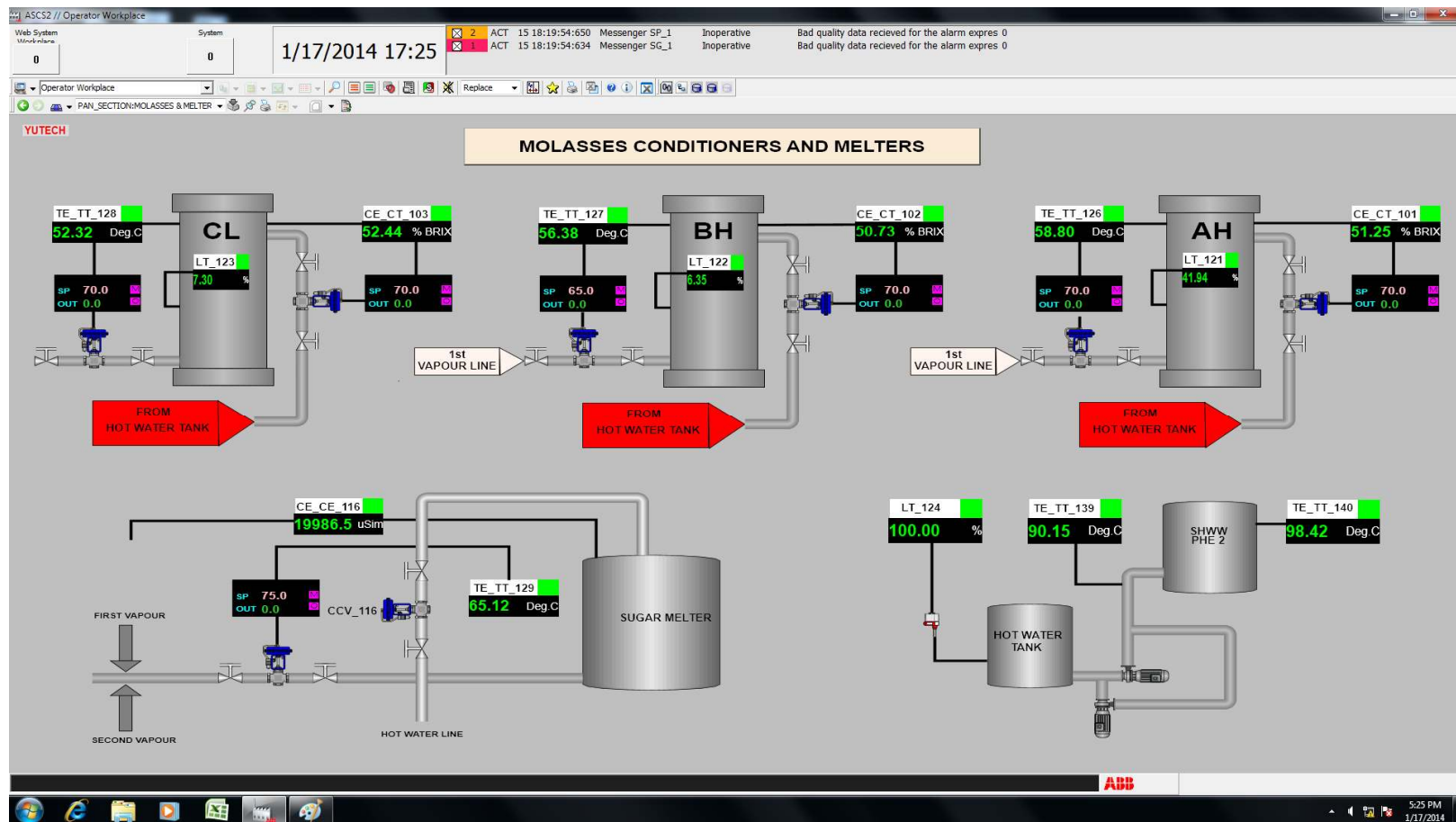
# Molasses Conditioner Automation:



- Maintain Constant Molasses Brix.
- Maintain Constant Molasses Temperature.
- Save Steam.
- Save Water.
- Ensure Constant Quality Feed to Pans.



# Molasses Conditioner and Sugar Melter Automation:



# Molasses Conditioner and Sugar Melter Automation:



- Though these two Systems serve different Purposes, the Control Philosophy for both is the Same.
- Advantages of Automating these equipments also remain similar as listed below.

## Advantages:

- Streamlined Process Applications due to Constant and Maintained Outlet Brix and Temperature.
- Increased Efficiency.

# The Principle and Purpose of Condenser Automation



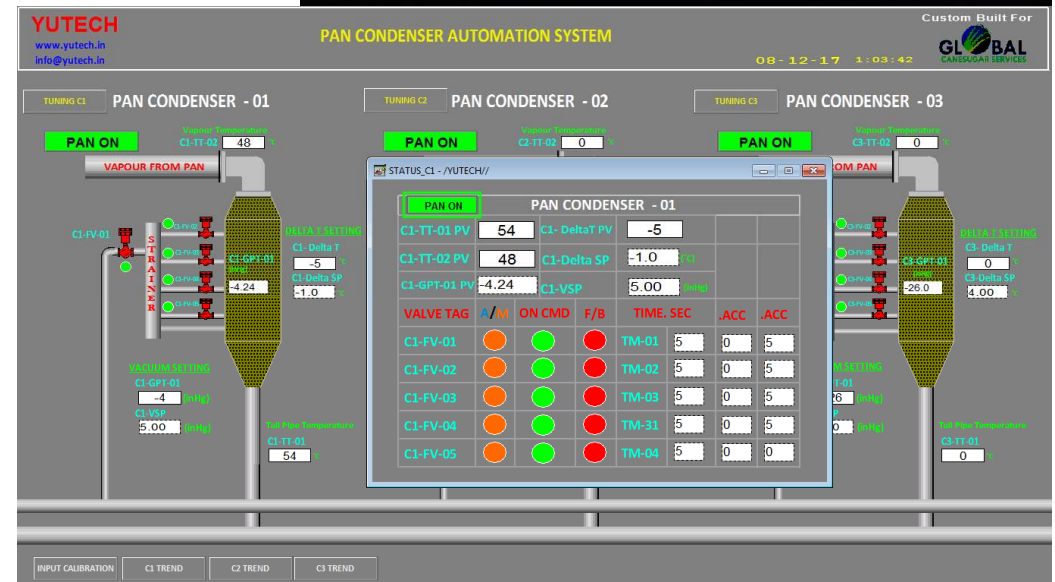
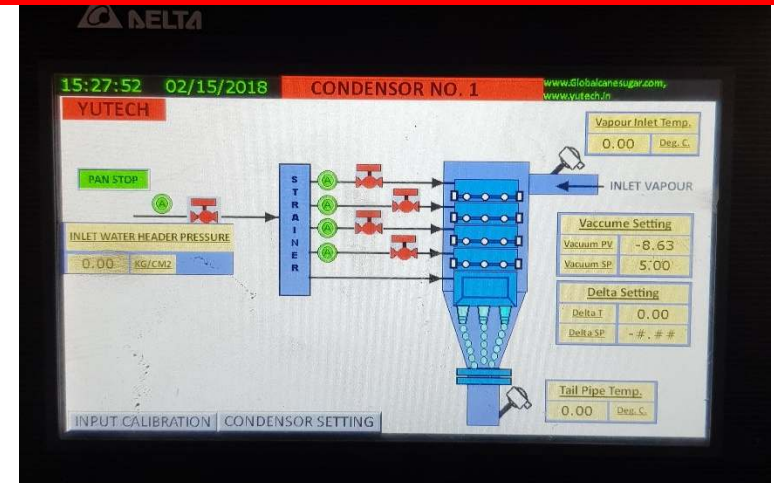
## Principle:

- As Massecuite Level in Pan rises, Rate of Evaporation Reduces and therefore Water Quantity required to create Vacuum also reduces. Thus any Extra Water used after this point is a Wastage.
- Condenser Automation facilitates Required Vacuum Generation using just Optimum Water and Power, thus reducing Wastage of Excess Energy and Water.
- Temperature difference between Vapour and Vapour-Condensate also affects Vacuum Generation and so does the Injection Water Temperature which varies as per Ambient.

## Purpose:

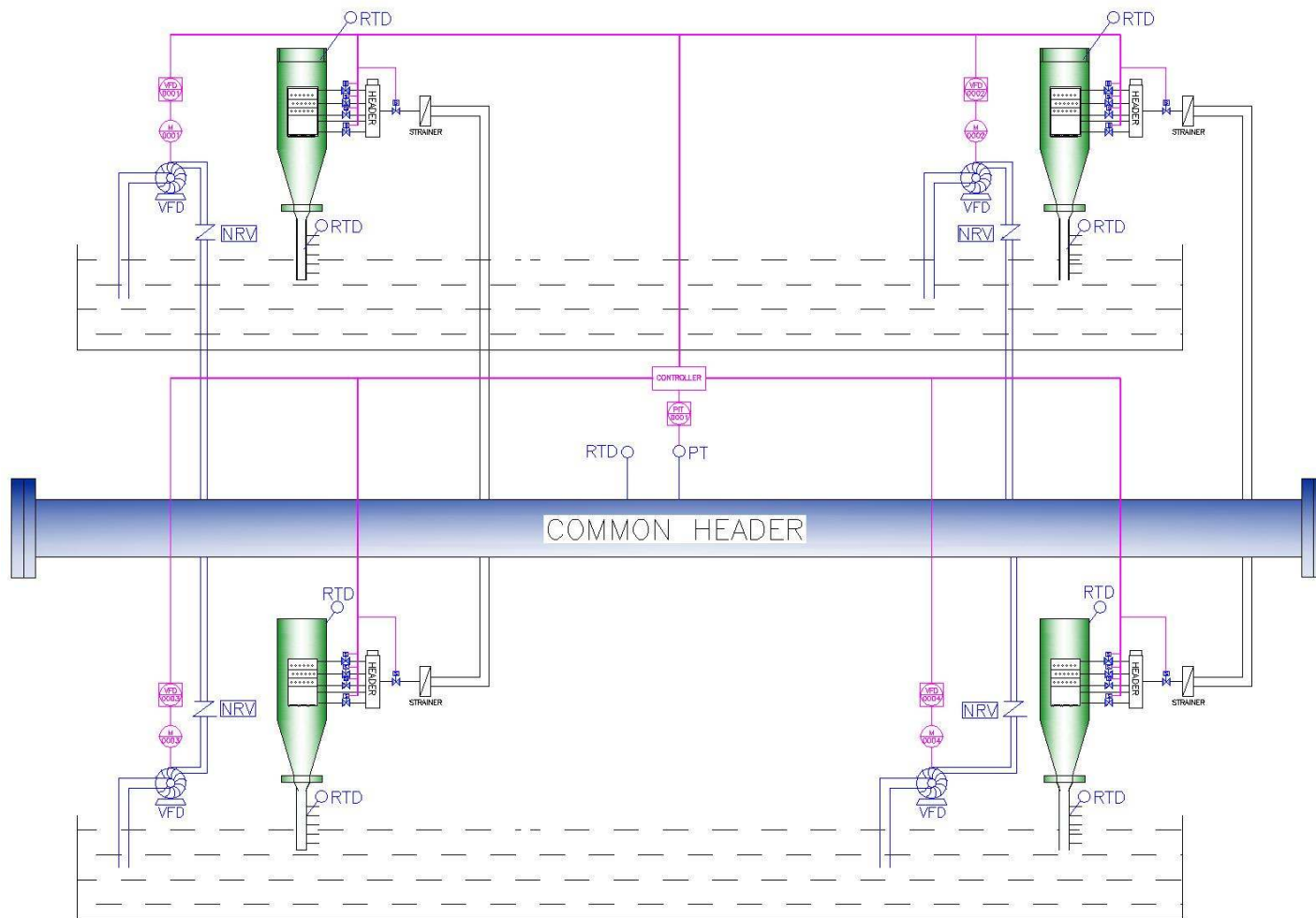
- Huge Power and Water Saving due to Controlled intake of Water.
- Facilitate Optimum Capacity Utilization.





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# Condenser Automation Overall Schematic

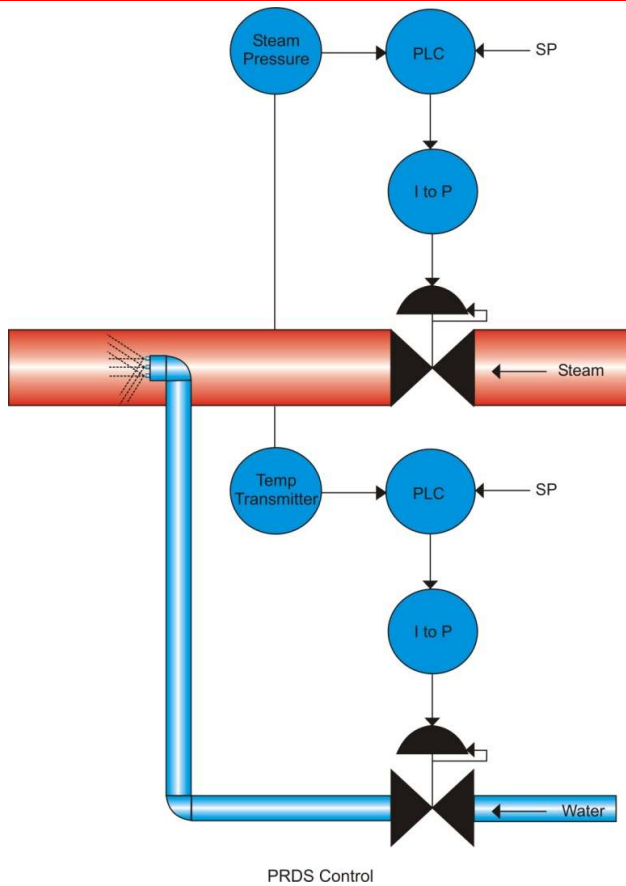


# Condenser Box and it's Automation

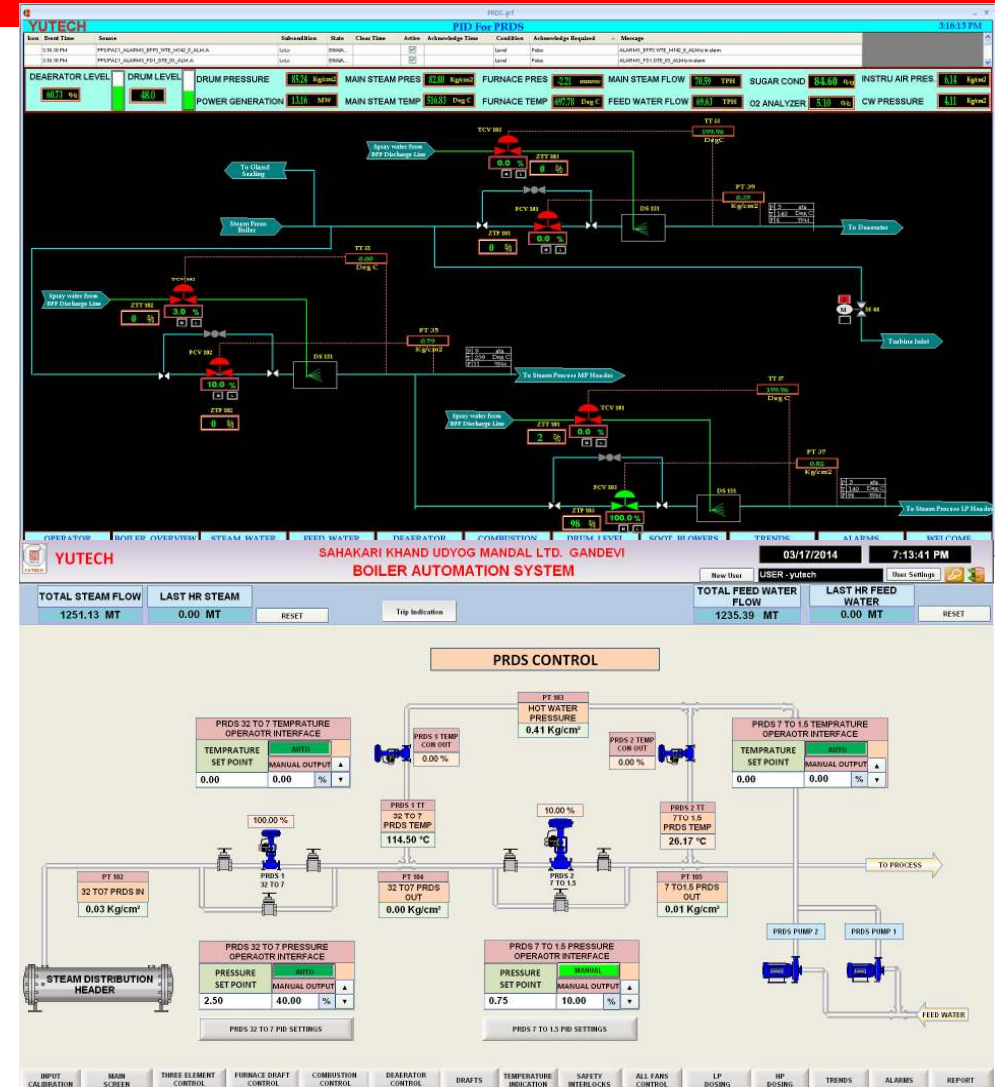


- Multiple Entry Condenser Box.
- Separate Water Entry for Different Sets of Spray Nozzles and Spray Jet and Water Quantity is Automatically Controlled to by Respective Nozzle Set Valve wrt Vacuum.
- Number of Jets & Nozzles and Jet & Nozzle Diameters designed as per Condenser Capacity.
- Complete Stainless Steel Construction, Strainer provided for each Condenser Header.
- Water Pressure in the Common Injection Header maintained by Controlling Injection Pump VFD.
- Jet Compartment Controlled by Separate Valve.
- Vapour and Tail Pipe Temperature Measured.

# Pressure Reducing and De-Superheating Control Station (PRDS)



- Maintain Preset Pressure
- Maintain Preset Temperature whilst De-Super-heating



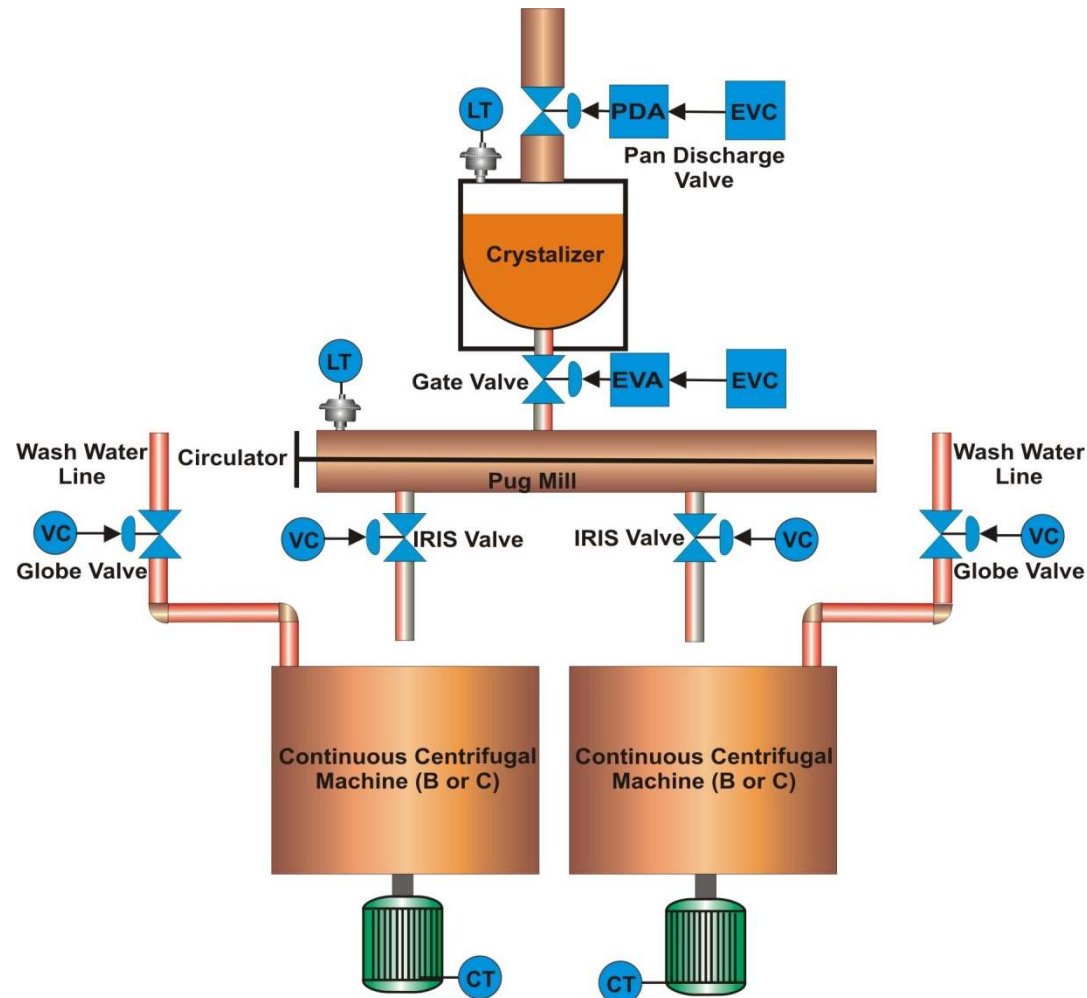
# Continuous Centrifugal Machine Automation

## Advantages:



- Constant Load on the Machine Basket results in Constant Machine Operation at Optimum Current Consumption of the Drive Motor thus **Saving Power.**
- Constant Load on the Machine Basket results in **Improved Purity as well as Increased Throughput at the same time.**
- **Water and Steam saving is also a result of uniform flow of Massecuite.**
- Higher Capacity Utilization of Continuous Centrifugal Machines and Operational life improvement and Reduced Cost of Ownership.
- Eliminate Human Errors, Overflows and Stoppages thus acting as a STOP LOSS
- **Power Saving of 20% for total Massecuite Curing. Very Attractive pay back.**

# Continuous Centrifugal Machine Automation





# Concentric Split Diaphragm Control Valve for Continuous Centrifugal Machine Automation:



Controlled Constant Sugar Massecuite Intake into the Continuous Centrifugal Machine with respect to Drive Motor Load.

Sugar Massecuite is a very thick Slurry formed of Sugar Crystals and Molasses and is very Sticky and Viscous Mass.

CSD or IRIS Type Valve's Concentric Opening provides perfect solution for dropping Sugar Massecuite into Centrifugal Machine. Spilling and splattering is avoided, as Massecuite falls in the center of the Basket, and so facilitating a perfect Machine Operation.

# Concentric Split Diaphragm Pneumatic Control Valve for Continuous Centrifugal Machine Automation:



Controlled Quantity of Masecuite drops  
from the Concentric Opening (Split  
opening from the Centre of the Valve)  
Hence No Spilling or Splattering

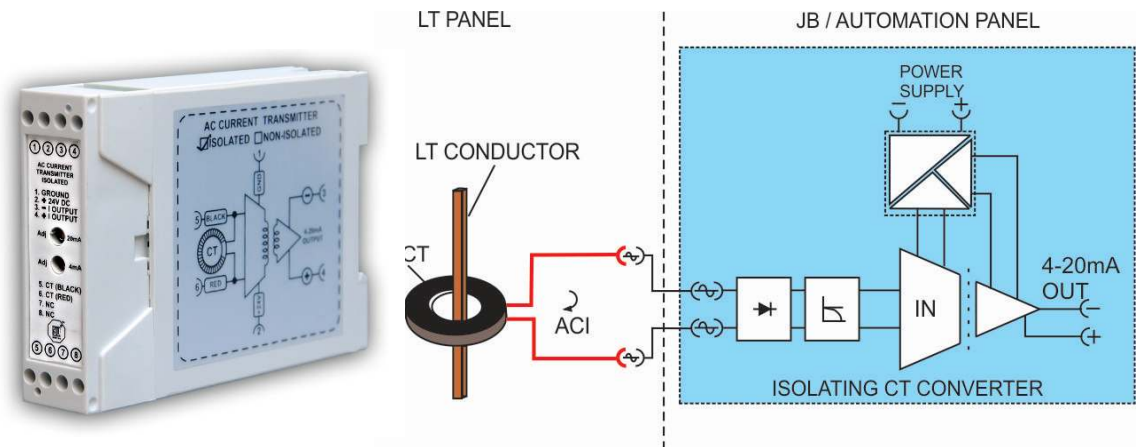
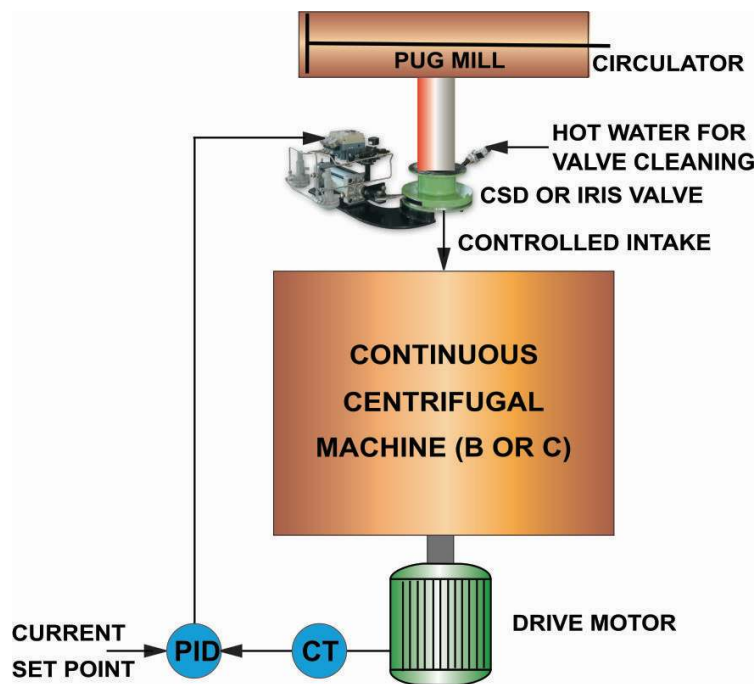
Typical Concentric Opening Split  
Diaphragm  
Pneumatic Control Valve  
Installation



# Concentric Split Diaphragm Pneumatic Control Valve for Continuous Centrifugal Machine Automation:

Continuous Centrifugal Machine's Drive Motor Current Load is sensed.

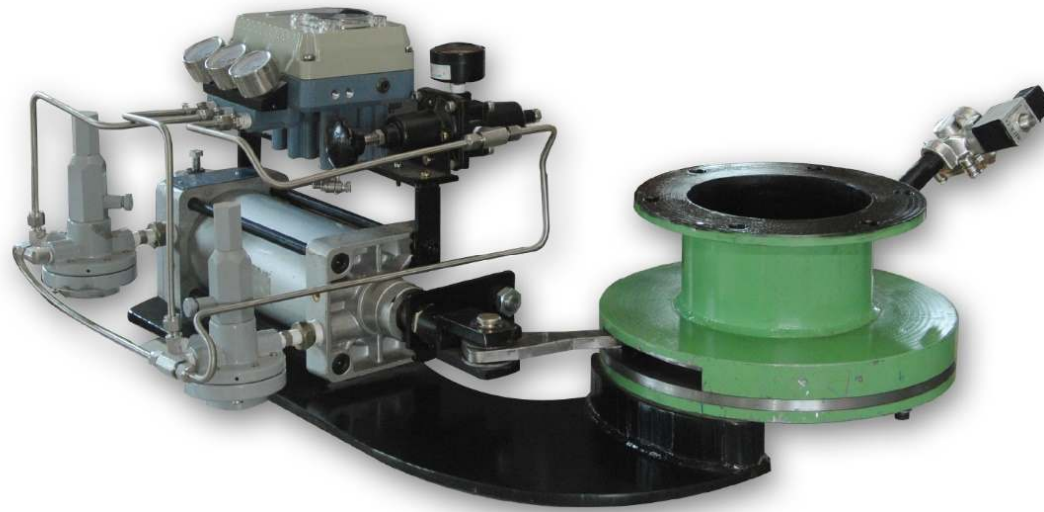
The Current is maintained by taking exact amount of Feed by Controlling the CSD Valve opening in a PID Loop.



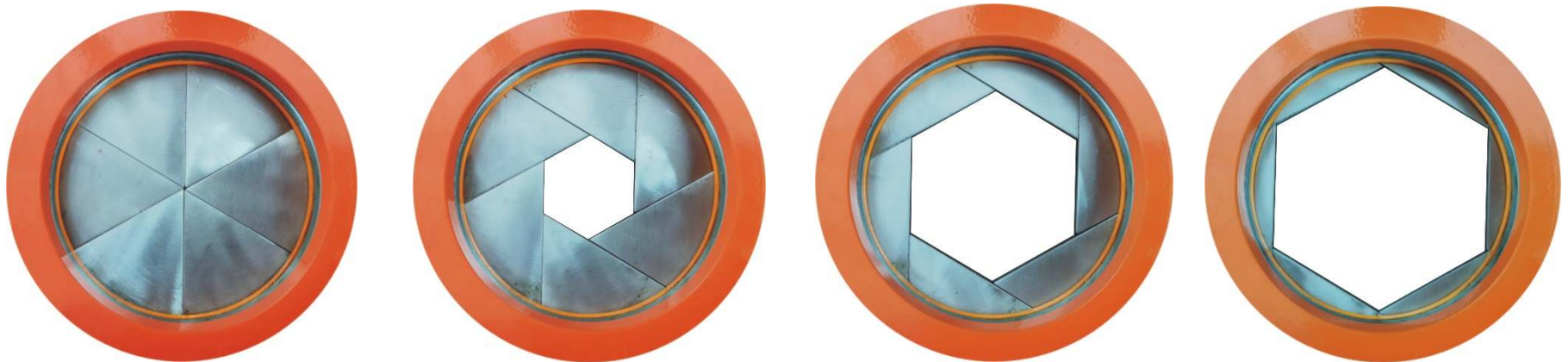
YUTECH's Precision CT Converters Sense the CT Load and Convert the Signal to Isolated 4-20mA Signal which is given to PID Controller which gives a very finely tuned Output to the CSD Valve thus linearly controlling the Massecuite Intake to Centrifuge.



# Concentric Split Diaphragm Control Valve also called Iris Type Valve: Product Code: CV-IR-1005-6-EP



**Concentric Opening of Split Diaphragm Controlled by Electro-Pneumatic Positioner**



# Concentric Split Diaphragm Control Valve Latest Installations with new Improved Design :



[www.yutech.in](http://www.yutech.in); [sale@yutech.in](mailto:sale@yutech.in)



# Concentric Split Diaphragm Control Valve Latest Installations with new Improved Design:



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# Concentric Split Diaphragm Control Valve

## Earlier Installations:



# Concentric Split Diaphragm Control Valve

## FACTS:



- Rugged Build Quality for Long Life.
- Heavy Duty Rugged Valve Construction absorbs all shocks and Vibrations.
- Valve Internals are of Heavy Gauge SS Construction and designed to operate under heavy Massecuite loads without bending or deformation.
- Precise Flow Control due to Concentric Opening of Split Diaphragm (similar to a camera aperture).
- Energy saving whilst Flow Control due to Free Passage through Concentric Opening
- Low-noise due to Easy Passage
- Maintenance free
- Pneumatic Actuation with Electro-Pneumatic Positioner for smooth Linear Control Action
- Operating Air Pressure 2 – 7 Kg/cm<sup>2</sup>
- Input 4-20mA from any external source

# Concentric Split Diaphragm Control Valve

## Specifications:



Valve Type	: Concentric Split Diaphragm Type Central Opening Valve with Camera Aperture like Action
Sizes	: 2" (50mm) 3" (75mm) / 4" (100mm) / 6" (150mm) / 8" (200mm) / 10" (250mm)
Body material	: MS Fabricated / Other Material on Request
Valve Internals	: SS 410 / 304 / 316L - On request
Bearings and wedges material	: SS
Sheathing	: PTFE / PU
Actuation	: Pneumatic Linear (2 -7 Kg/cm <sup>2</sup> Air Pressure) / Electric - Motorized / Hand - Wheel
Actuator Stroke	: As per Valve Size
Positioner	: Electro-Pneumatic / Electronic
Position Feedback (Optional)	: 4 – 20 mA / 0 – 5 VDC
Input (for Actuated Valves only)	: 4 – 20 mA from any external source Or Push Buttons for Open and Close



# Centralized Sugar Plant Automation Control Rooms:





# Centralized Sugar Plant Automation Control Rooms:



# **Superior Quality Norms and Protection for Automation Systems:**



- ✓ **UPS System**
- ✓ **Built-In Panel Isolation Transformer for Mains Power Supply**
- ✓ **RCD for Mains Power Supply**
- ✓ **MCB for Each Power Distribution Head**
- ✓ **EMI / RFI Filter for Mains Power Supply**
- ✓ **Switching Surge Arrestor for Controller Power Supply Head**
- ✓ **Isolation Barrier for all Analogue I/Os**
- ✓ **Potential Free Relay for all Digital I/Os**
- ✓ **Fuse TBs for all Digital I/Os**

# Advantages of Sugar Process Automation:



## Operational Advantages:

- ✓ **Stabilized Shock Lime and Final pH hence ensured Improvement in Juice Clarity, Stabilized Dorr pH.**
- ✓ **Steam, Power and Water Savings thus Fuel Saving.**
- ✓ **Optimum Capacity Utilization.**
- ✓ **Increased Throughput.**
- ✓ **Maintained Grain Size thus better Sugar Quality.**
- ✓ **Better Sugar Colour.**
- ✓ **Higher Sugar Price.**
- ✓ **All this results in Substantial Economic Gains.**

# Why invest in **YUTECH** Products



- **Experience of over 39 years with Expertise of a very highly qualified Engineering Team.**
- **In-house Control System Design, Engineering, Manufacturing and Software Development.**
- **In-house Sensor and Instruments Design and Manufacture.**
- **Superior Technical Support.**
- **Excellent Quality Workmanship.**
- **Extensive Warranty Coverage**
- **Highly accurate calibration facilities with traceability certifications.**
- **Feature Rich State of the Art Technology developed and matured in the Sugar Environment.**

# YUTECH Technical Advantage:



- **Highly Competent Engineering Team.**
- **In-house System Engineering.**
- **In-house Design and Development of Systems and Controls.**
- **In-house Design and Development of Industrial Electronic and Instrumentation Equipments.**
- **In-house Manufacturing of Industrial Electronic and Instrumentation Equipments.**
- **In-house Software Development from Micro Controller Programming to SCADA, PLC, DCS Programming to Visual Basic etc.**



# Conclusion - Juice Flow and Liming Automatio:



Well Engineered and Good Automation Systems in Juice Stabilization and Liming:

- Stable and Constant Juice Flow increases Juice Heating Efficiency
- Reduces Overheating and Caramalization
- Improves Overall Boiling House and Plant Efficiency
- Improves Sugar Colour and hence price
- Improves and Stabilises Dorr pH

# Conclusion - Continuous Centrifugal Machines Automation:



Well Engineered and Good Automation Systems in Continuous Centrifugal Machines:

- Reduce Cycle Time and Increase Throughput
- Maximize Machine Capacity Utilization
- Eliminate Stoppages due to Human Errors
- Eliminate Wastage through Basket Overflows
- Reduce Power, Steam and Water Consumption
- In some cases it is observed that One or Two Machines have been kept spare as total load is taken care of by 4 Machines instead of 6
- Thus we can Conclude that Automation can get more Work Done from the Same Mechanical Equipment and:
  - Increase Profitability
  - Reduce Cost of Ownership
  - Increase Return on Investment

# Conclusion Evaporation and Pan Automations:



Well Engineered and Good Automation Systems in Evaporators, Pans and Melters:

- Improve Process Efficiency
- Reduce Cycle Time
- Increase Throughput
- Maximize Capacity Utilization
- Eliminate Stoppages due to Human Errors
- Eliminate Wastage through Overflows
- Reduce Power Consumption
- Reduce Steam Consumption
- Reduce Water Consumption
- Increase Profitability

# Automations Result



**ThyssenKrupp India Project Lokmangal Mauli Industries Ltd., Khed,  
Tal: Lohara, Dt: Osmanabad**

**Evaporator Automation System included in Plant DCS: Quintuple  
with first 3 Effects being Falling Film type**

## **Achievements after Automation:**

- **Constant Outlet Brix**
- **Level is maintained hence Entrainment through Vapour is eliminated**
- **Constant Evaporation results in Constant Vapour Generation**
- **Steam % Cane: 36 at Imbibition % Fibre 210**

**THANK YOU!**  
**For your Time and Presence**



**SAVE FUEL**  
**REDUCE CARBON FOOTPRINT**  
**MAKE THE WORLD GREENER**  
  
**AND YET, MAKE MONEY**

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