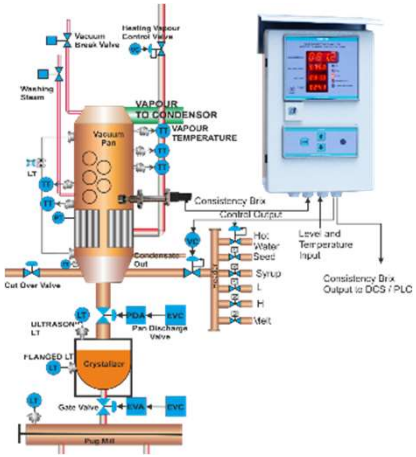
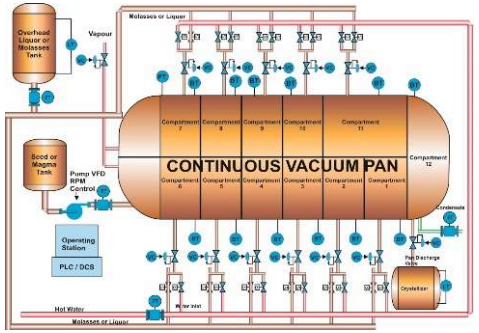
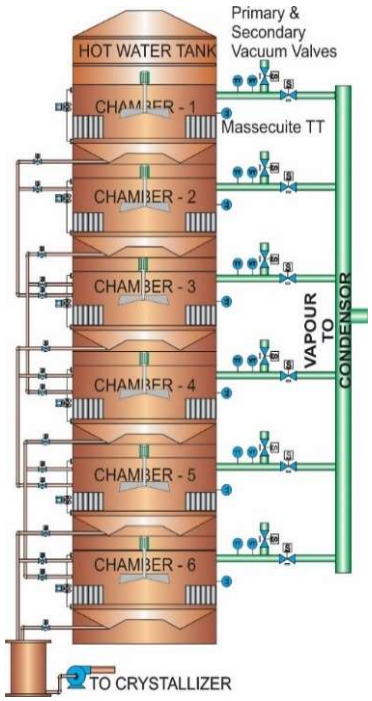
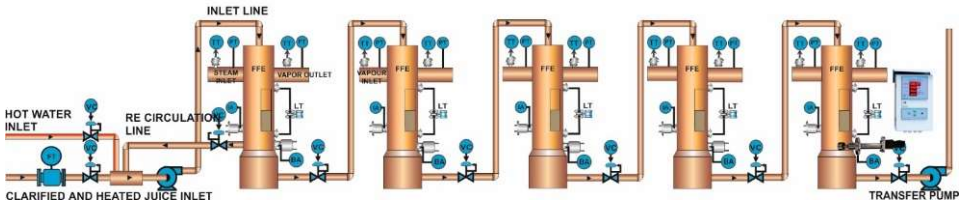
YUTECH SUGAR PROCESS, PHARMA GRADE SUGAR PROCESS AND REFINERY AUTOMATION









Servicing the Sugar Industry since 1978

YU Technologies Pvt. Ltd.

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REDUCED POWER CONSUMPTION

INCREASE IN QUALITY AND PRODUCTIVITY
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YUTECH Advantage: All Automation and Instrument Solutions under One Roof:

YUTECH SUGAR MILL PROCESS INSTRUMENTS

Measuring Sugars Brix By Brix

SUGAR MILL AND PROCESS INSTRUMENTS, ANALYZERS, SENSORS

YUTECH AUTOMATION

THE SWEETENER TO SUCCESS

TURNKEY AUTOMATION & INSTRUMENTATION SOLUTIONS FOR PROCESS AND POWER INDUSTRIES

YUTECH FLOW CONTROLS

CONTROL SAVE EARN

CSD OR IRIS VALVES, 3-WAY VALVES, SPECIAL GATE VALVE FOR LIME CONTROL

YUTECH

ALL SOLUTIONS UNDER ONE ROOF

YUTECH AUTOMATION

THE SWEETENER TO SUCCESS

AFTER SALE SERVICES, MAINTENANCE SERVICES & MAINTENANCE CONTRACTS

YUTECH MACHINES

GENERATE CONSISTENT REVENUE

SPECIAL PURPOSE MACHINES AND HIGHEST QUALITY MACHINED MECHANICAL SPARES

YUTECH INSTRUMENTS

ANALYZE TRANSMIT CONTROL COMMUNICATE

CONTROLLERS, COMMUNICATIONS, I/O CARDS, SENSORS, TRANSMITTERS, ISOLATION BARRIERS

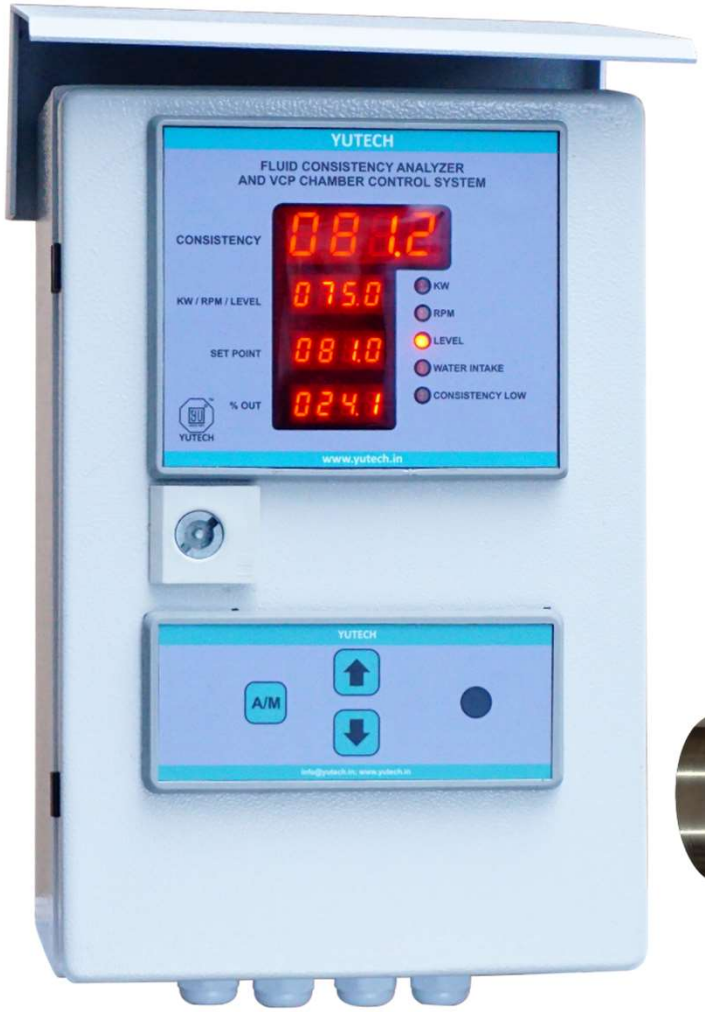
YUTECH undertakes Turnkey Automation and Instrumentation Projects:

DCS or PLC Based Turnkey Automations or Standalone Control Systems:

- Complete Sugar Mill Automation with all Loops like Cane Feeding, Mill Speed Controls, Imbibition and Juice Flow Controls etc
- Complete Sugar Process Automation with Loops like Evaporator, Pans, Continuous Pans, Melters Conditioners, Direct Contact Heaters, Condensers etc
- Complete Sugar Refinery / Pharma Grade Sugar Plant Automation with Loops like Pans, Continuous Pans, Melters, Melt Clarifier, Melt Filtration Systems, Direct Contact Heaters, Condensers etc
- Complete Boiler and Power Plant Automation
- Complete Sugar Plant Automation and Instrumentation
- Complete Distillery Automation and Instrumentation
- Complete Process Plant (Pharma / Food Processing / Cement / Steel) Automation and Instrumentation
- VCP / CVP / Batch Pan Automation
- Condenser Automation
- Continuous Centrifugal Machine Automation based on CSD or Iris Valve
- Evaporator and FFE Automation
- Direct Contact Heater Automation
- Vertical Crystallizer
- pH Control System

YUTECH FLUID-DENSITY-BRIX ANALYZER CUM CONTROL SYSTEM AND MOTORIZED FLUID-DENSITY SENSOR

BASED ON YUTECH'S A15 INTELLIGENT ANALYZERS AND SYSTEMS PLATFORM



YUTECH FLUID-DENSITY-BRIX ANALYZER CUM CONTROL SYSTEM

PRODUCT CODE:
ANALYZER MODEL: A15FDAACSCTRC1D4R4FM,
ANALYZER AND CONTROLLER MODEL: A15FDAACSCTRC2D4R4FMC
ANALYZER AND CONTROLLER WITH ETHERNET MODEL: A15FDAACSCTRC2D4R4FMCEM (Modbus TCPIP)

MOTORIZED FLUID-DENSITY SENSOR

PRODUCT CODE: ASDMFDS24DCC01

FLUID-DENSITY-BRIX ANALYZER AND CONTROL SYSTEM

MOTORIZED FLUID-DENSITY SENSOR

INTRODUCTION

BASIC SCIENCE BEHIND FLUID-DENSITY-BRIX:

- **Fluid-Density:** the Density of a particular Fluid.
- **Density:** is defined as "**Mass per unit volume**", which means, Density is the Mass contained in a fixed volume. It is denoted by "**ρ**" which is a Greek Letter called "Rho".
- **Density** can be derived using the formula "**ρ = m/v**" where ρ is the Fuild-Density, m is the Mass and V is Volume. The unit to measure Fluid-Density is **kg/m^3** (Kilogram per cubic meter).
- **Brix:** the measurement in percentage by weight of sucrose in pure water solution.
- Online Direct measurement of Brix in a Process Fluid is difficult, so indirect methods are used.
- **The most popular ways of measuring Brix are:**
  - **Hygrometric and Refractometric (Lab Methods)**
  - **High-Frequency or Radio-Frequency Conductivity type Brix Sensing**
  - **Microwave Type Brix Sensing**
  - **Fluid-Density Type Brix Sensing**
- While Conductivity or Microwave methods are very successful in measuring Brix of "B and C" Massecuite in CVP, Brix of Sugar Melt, and Brix in a Molasses Conditioner unit, they cannot measure Brix of "A" Massecuite as we measure the Fluid's electrical quality which is variable.
- Fluid-Density Measurement using a Motorized Stirring Sensor proves very successful as it directly measures the Fluid's mechanical quality of Fluid irrespective of its electrical characteristics. Thus, measured Fluid-Density Value is further processed in the **Fluid-Density-Brix Equation,** to derive **Fluid-Density-Brix.**

SALIENT FEATURES

- Fluid-Density Type Brix Analyzer System targets sensing the Fluid-Density of Liquids, Slurries, or Syrups like Sugar Massecuite, Sugar Syrup, Sugar Melt, Liquors, and Molasses.
- The Motorized Fluid-Density Sensor is specially designed to be inserted in a vessel to stir the Fluid Media and Measure its Fluid-Density which can be expressed in simple terms as the Tightness or Thinness of a Fluid Media. It can also be informally referred to as the Consistency of the Fluid and is a Mechanical Property of a Fluid which in Liquids is directly proportional to its Viscosity.
- Motorized Sensor's torque and power which is required to stir the Fluid varies with varying Fluid-Density.
- The Motorized Fluid-Density Sensor's Power Consumption is directly proportional to the Fluid's Density.
- The variation in the Motorized Fluid-Density Sensor's Power Consumption is sensed by the Fluid-Density Type Brix Analyzer's highly accurate Sensing Circuitry, this deviation is further processed to Derive the Raw Fluid-Density Value.

SALIENT FEATURES

- The Raw Fluid-Density Value is Linearized in the YUTECH Fluid-Density-Brix Equation.
- The **YUTECH** Fluid-Density-Brix Equation is a complex Algorithm with Built-in Fuzzy Logic that Accurately Analyzes, Calculates, and Derives the Fluid-Density-Brix Value from the Raw Fluid-Density Value.
- This derived Fluid-Density-Brix Value is further analyzed and processed to compensate for Massecuite / Syrup Level variation within the Vessel.
- Fully Compensated and Accurate Fluid-Density-Brix Value is Displayed and Transmitted for Controls.
- Very Easy Calibration and Online Fluid-Density-Brix Compensation Recalibration
- 4-20 mA Output, Separate Modbus and Ethernet Communications.
- On-line Calibration Software “YUTECH-AccessApp” provides Remote Access to Consistency-Brix Analyzer for Calibration, Compensation, and Trouble Shooting.

APPLICATIONS

APPLICATION IN SUGAR PROCESS OR SUGAR REFINERY FOR MEASURING FLUID-DENSITY-BRIX OF MASSECUITE / SYRUP / MELT / LIQUOR / MAGMA / SEED IN:

- Vertical Continuous Vacuum Pan (VCVP or VKT) Chambers
- Batch Type Vacuum Pans and Continuous Vacuum Pans
- Sugar Melters and Molasses Conditioners
- Evaporators
- Open Pans in Khandsaris or Mini Sugar Plants / Jaggery or Muscovado Plants
- Boiling Vessels in Jaggery or Muscovado Production

FLUID-DENSITY MEASUREMENT APPLICATION IN OTHER PROCESS INDUSTRIES:

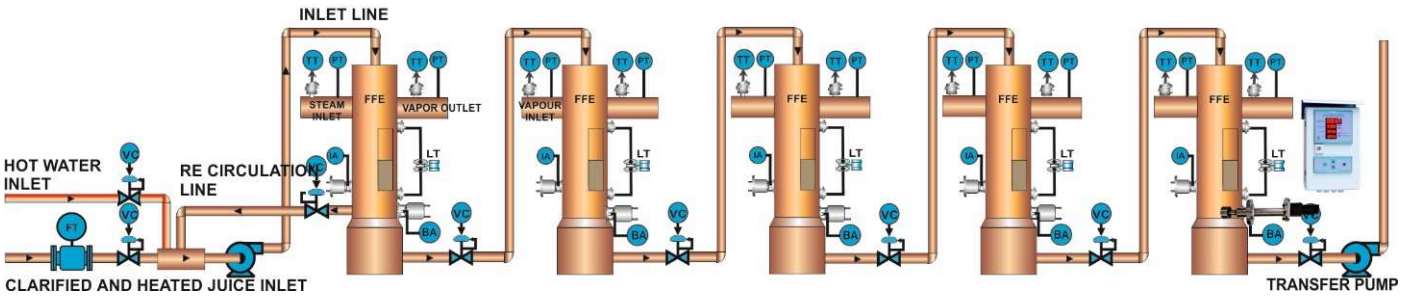
- **FOOD & BEVERAGES:** In Vessels or Pans for Monitoring the Consistency of Sauces / Slurries / Pastes etc.
- **CHEMICAL / PHARMA:** In Thickening / Thinning Vessels or Pans for Monitoring the Consistency of Chemical Slurries / Pastes
- **DISTILLERIES:** In Fermentation / Maturation Vessels and Spent-Wash Evaporators for Monitoring Brix
- **BREWERIES:** In Fermentation Vessels for Monitoring Brix Fermentation Vessels, Maturation Tanks

YUTECH FLUID-DENSITY-BRIX ANALYZER CUM CONTROL SYSTEM AND MOTORIZED FLUID-DENSITY SENSOR

EVAPORATOR AUTOMATION - EVAPORATOR CONTROLS SCHEMATIC AND SCREENSHOT

YUTECH SINCE 1978

FFE AUTOMATION

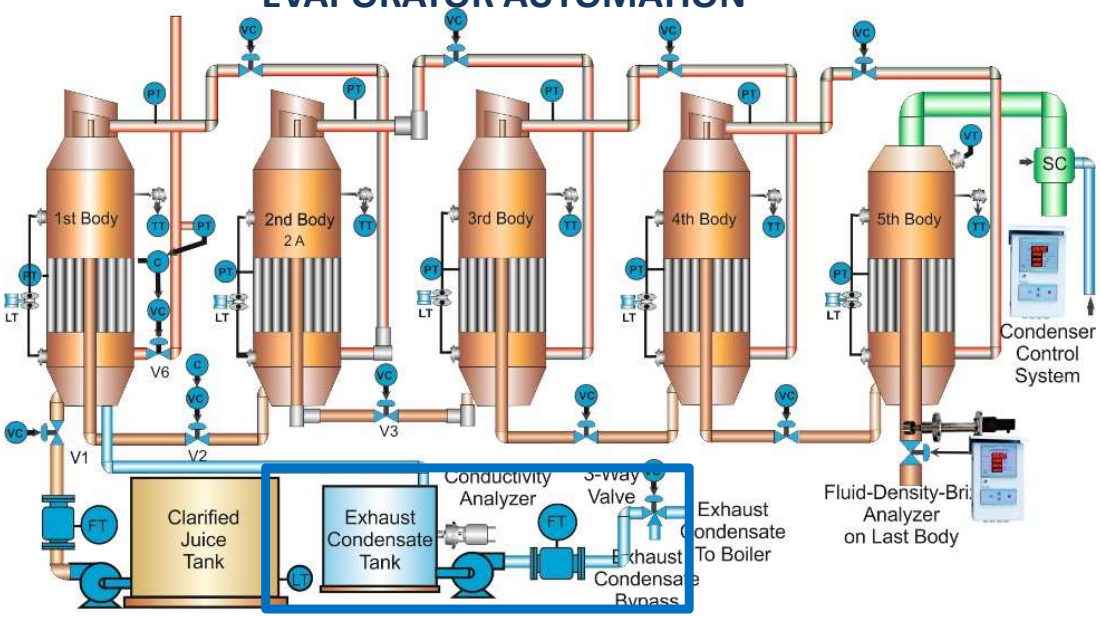


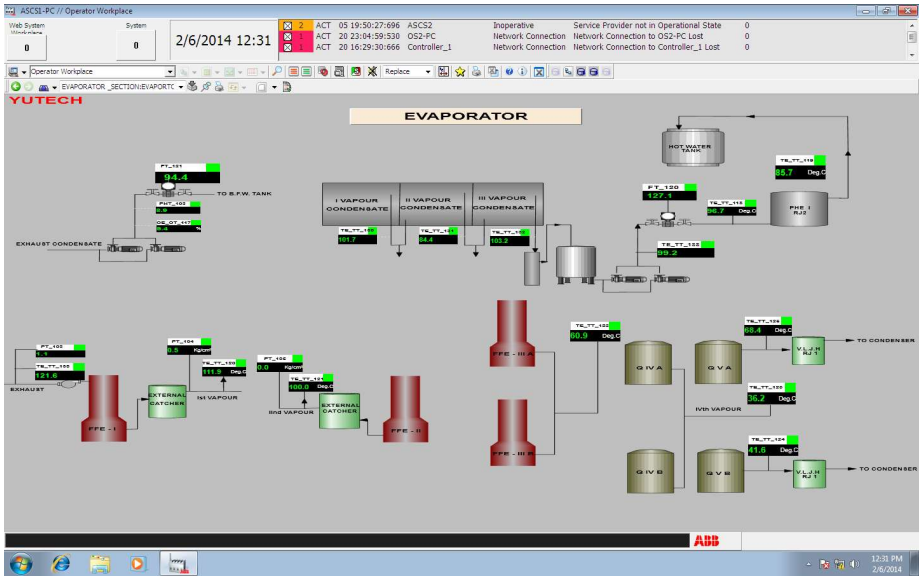
FLUID-DENSITY-BRIX ANALYZER FOR LAST BODY BRIX SENSING

EVPORATOR AUTOMATION:

- FLUID-DENSITY-BRIX, LEVEL AND TEMPERATURE SENSING OF EACH BODY
- HEATING STEAM / VAPOUR TEMPERATURE AND PRESSURE SENSING
- LEVEL AND BRIX MAINTAINED IN EACH BODY
- PRECEDING BODY LEVEL SYNCHRONIZATION FOR ALL BODIES INCLUDING JUICE TANKS AND CANE CARRIERS
- INTELLIGENT DATA ANALYSIS WITH MAINTENANCE AND CLEANING ALARMING SYSTEM

EVAPORATOR AUTOMATION





EXHAUST CONDENSATE BYPASS CONTROL:
EXHAUST CONDENSATE CONDUCTIVITY SENSING AND BYPASS USING 3-WAY VALVE

YUTECH FLUID-DENSITY-BRIX ANALYZER CUM CONTROL SYSTEM AND MOTORIZED FLUID-DENSITY SENSOR

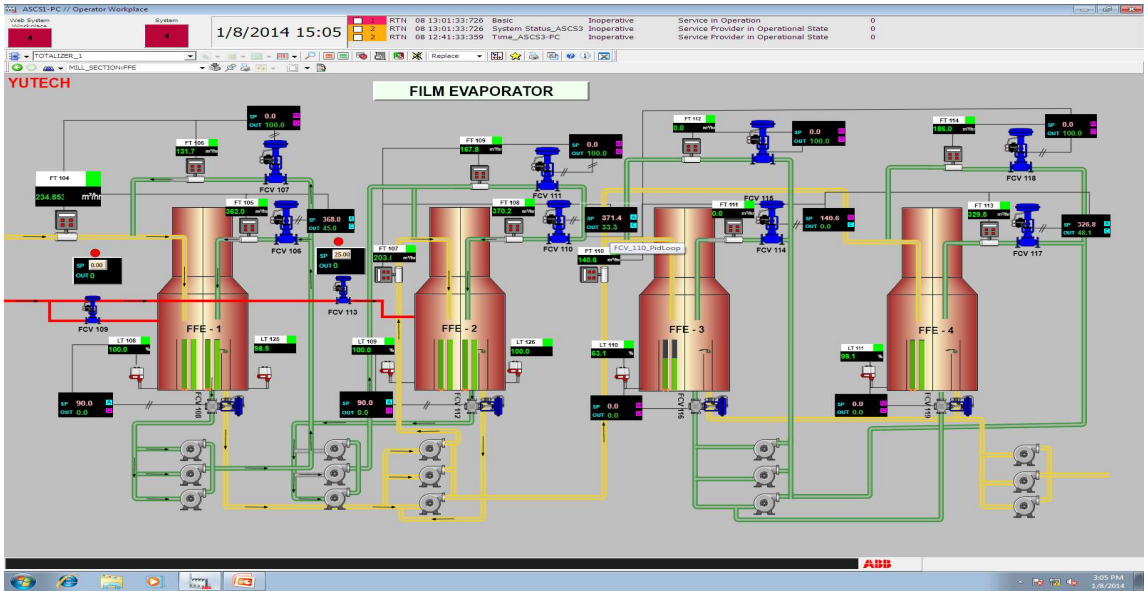
FFE AUTOMATION - EVAPORATOR CONTROLS SCHEMATIC AND SCREENSHOT

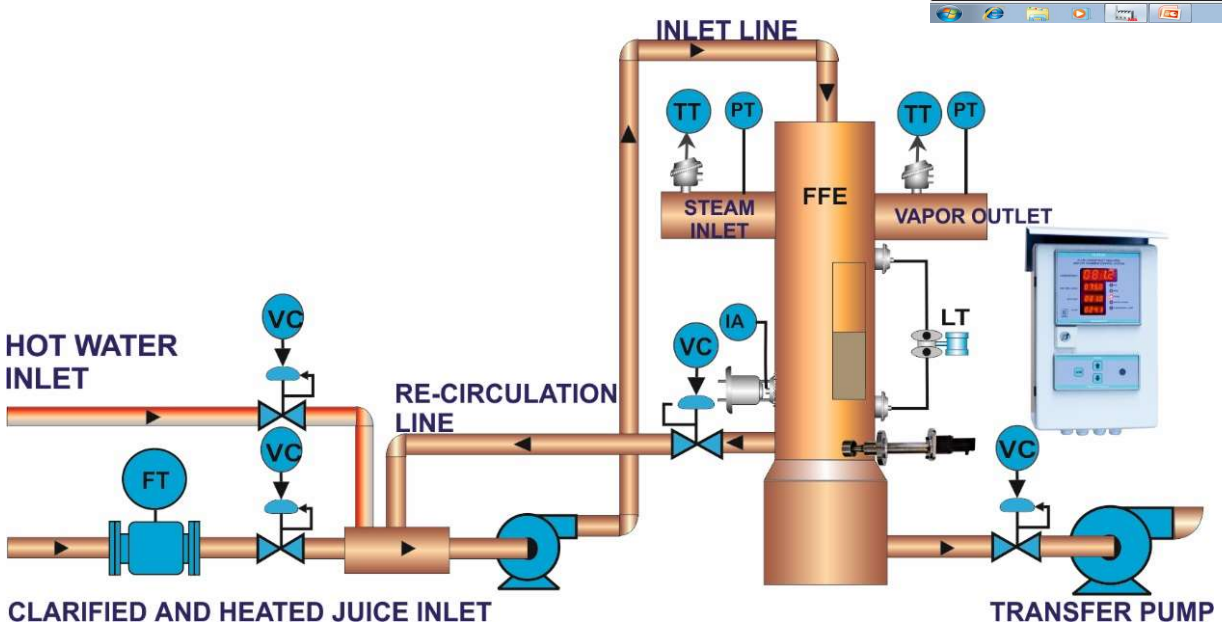
SINCE 1978

YUTECH

FALLING FILM EVPORATOR (FFE) AUTOMATION:

- EVAPORATOR LEVEL MAINTAINED FOR PROPER EVAPORATION AND VAPOR GENERATION.
- AUTOMATIC WATER INTAKE IF REQUIRED.
- INLET FLOW TO THE FFE BODY AND RECIRCULATION IN EQUAL OR IN PRESET PROPORTION.
- OPTIONAL INLET, RECIRCULATION AND BYPASS FLOWS MEASUREMENT AND CONTROL.





- FLUID-DENSITY-BRIX OF FINAL BODY MEASURED AND MAINTAINED
- INTELLIGENT DATA ANALYSIS WITH MAINTENANCE AND CLEANING ALARMING SYSTEM
- PRECEDING BODY LEVEL SYNCHRONIZATION FOR ALL BODIES INCLUDING JUICE TANKS AND CANE CARRIERS

YUTECH EVAPORATOR / FFE AUTOMATION USING FLUID CONSISTENCY-BRIX ANALYZER

SINCE 1978

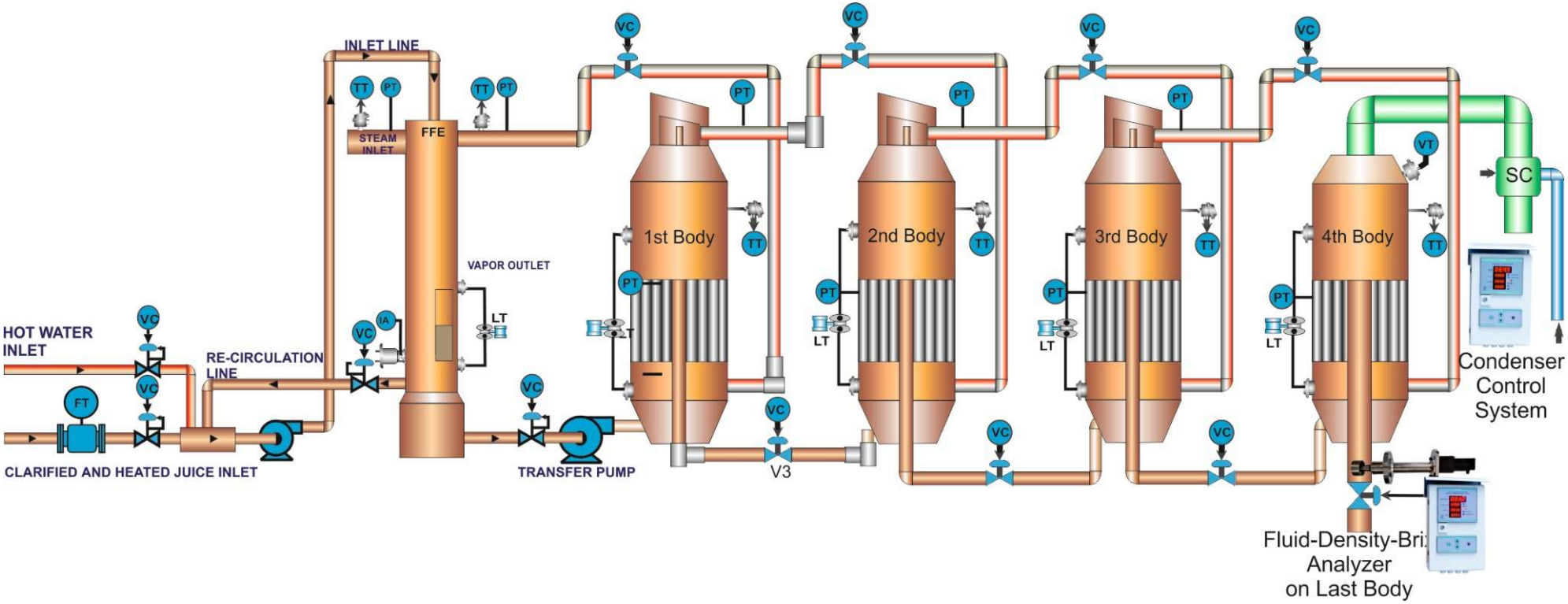
YUTECH

OLD ROBERTS OR SEMI-KESTNER BODY AND NEW FFE COMBINATIONS HAVE BEEN AUTOMATED USING COMBINATION OF BOTH LOGICS

New installations for expansion often have FFE installed instead of the Conventional Rising Film Evaporators. In such cases, our Hybrid Solution works very well.

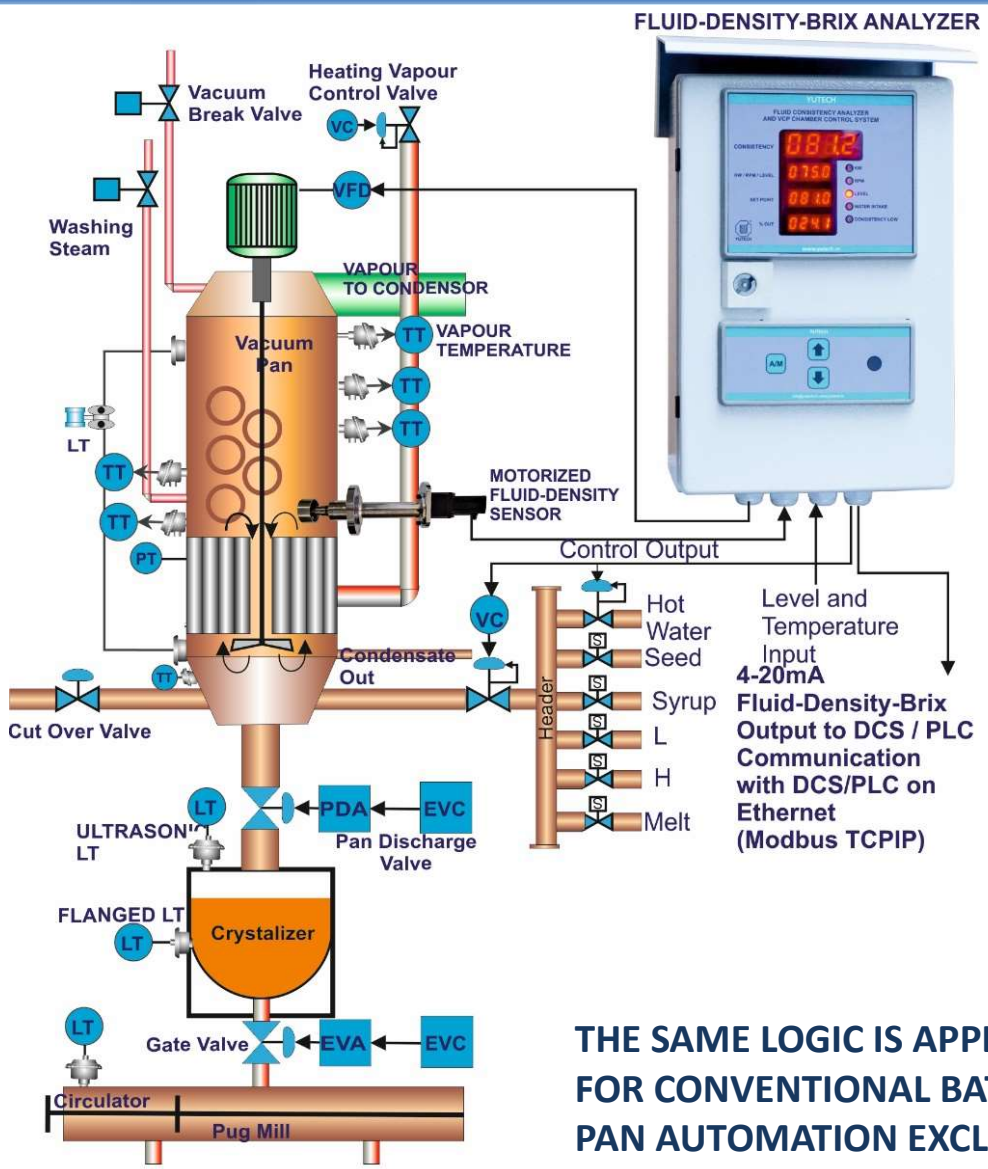
The following Schematic Diagram shows that a Falling Film Evaporator is installed before the Quad Set of Conventional Rising Film Evaporators. In such cases, FFE Logic will be applied to FFE and Evaporator Logic to the following Evaporator Bodies.

There can be different combinations as per the factory conditions. Sometimes there are 2 FFEs followed by 2 or 3 Semi-Kestner or Roberts Body or a combination of Semi-Kestner and Roberts. All combinations can be easily addressed, and Logic developed accordingly.

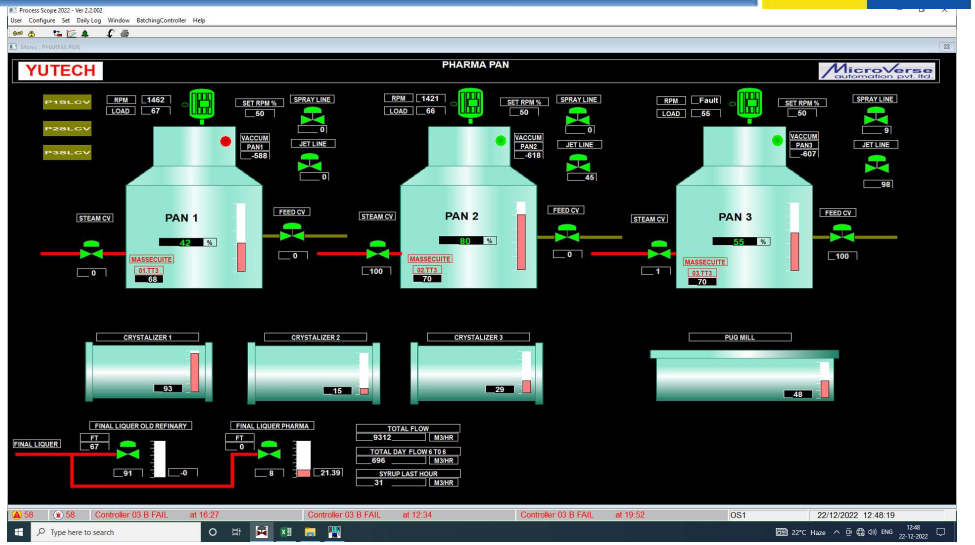


YUTECH FLUID-DENSITY-BRIX ANALYZER CUM CONTROL SYSTEM AND MOTORIZED FLUID-DENSITY SENSOR

BATCH PAN AUTOMATION- BATCH PAN CONTROLS SCHEMATIC AND SCREENSHOT



BATCH PAN WITH STIRRER



SCREEN SHOT: BATCH PAN AUTOMATION

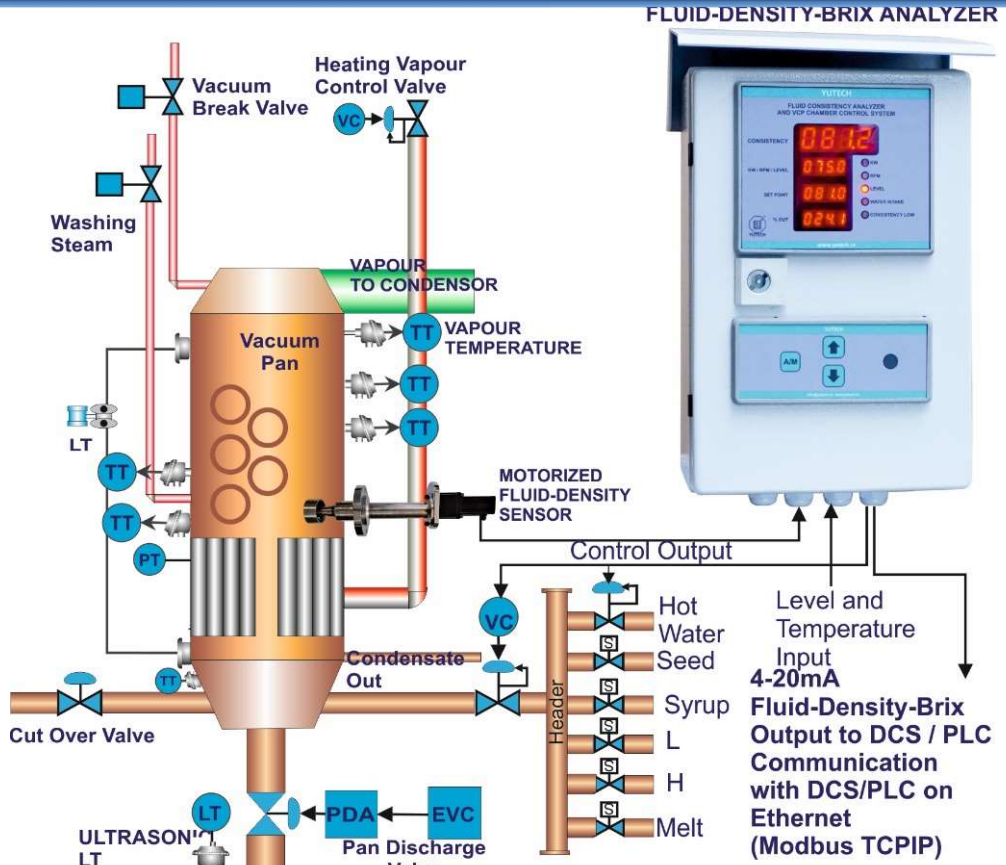
THE SAME LOGIC IS APPLICABLE FOR CONVENTIONAL BATCH PAN AUTOMATION EXCLUDING THE CIRCULATOR AUTOMATION

BATCH PAN AUTOMATION:

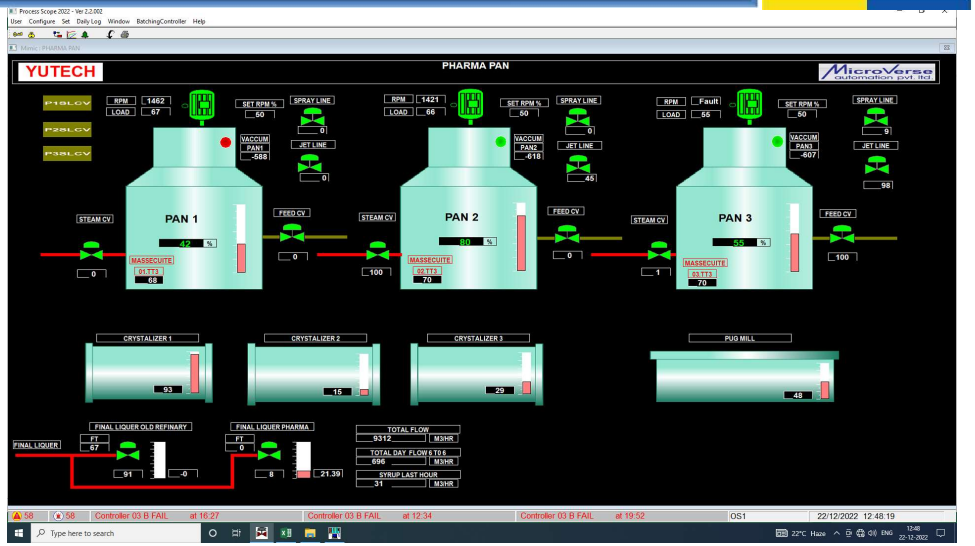
- FLUID-DENSITY-BRIX SENSING AND MATERIAL / WATER INTAKE CONTROL
- VARIABLE BRIX SET-POINT AS PER PAN LEVEL
- VFD SPEED CONTROL AS PER PAN LEVEL
- TEMPERATURE SENSING THROUGHOUT THE PAN TO ENSURE UNIFORM TEMPERATURE INSIDE PAN BODY
- BATCH COMPLETE INDICATION AND DROP SUGGESTION
- STANDALONE SYSTEM OR PLC / DCS BASED SYSTEM

YUTECH FLUID-DENSITY-BRIX ANALYZER CUM CONTROL SYSTEM AND MOTORIZED FLUID-DENSITY SENSOR

BATCH PAN AUTOMATION- BATCH PAN CONTROLS SCHEMATIC AND SCREENSHOT



BATCH PAN WITHOUT STIRRER



SCREEN SHOT: BATCH PAN AUTOMATION

YUTECH SUPPLIES AND INSTALLS MECHANICAL CIRCULATOR WITH VFD AND VFD CONTROLS ON CONVENTIONAL BATCH PANS AS PER DESIGN, FOR BETTR PAN PERFORMANCE. PLEASE CONTACT US FOR DETAILS.

BATCH PAN AUTOMATION:

- FLUID-DENSITY-BRIX SENSING AND MATERIAL / WATER INTAKE CONTROL
- VARIABLE BRIX SET-POINT AS PER PAN LEVEL
- VFD SPEED CONTROL AS PER PAN LEVEL
- TEMPERATURE SENSING THROUGHOUT THE PAN TO ENSURE UNIFORM TEMPERATURE INSIDE PAN BODY
- BATCH COMPLETE INDICATION AND DROP SUGGESTION
- STANDALONE SYSTEM OR PLC / DCS BASED SYSTEM

YUTECH FLUID-DENSITY TYPE BRIX ANALYZER AND CONTROL SYSTEM

BATCH PAN AUTOMATION

YUTECH approaches Batch Pan Automation from the Process Point of View, not a typical Automation Perspective.

We aim to achieve maximum throughput in the same Batch Time by properly controlling process parameters to improve process dynamics, resulting in consistent maximum capacity production, with the best possible grain size and sugar quality. The following Procedures are performed in a Controlled Manner:

- Completely or Partially Automated Batch Operations starting with the START Button press.
- Vacuum Valves Open Signal and/or Indication generated automatically. Valves will open Automatically if Control Valve is installed else Pan Attendant will open the Valve Manually after seeing the Vacuum Valve OPEN Indication / Alarm.
- Automatic Intake of Molasses / Syrup / Water as per Level and Fluid-Density-Brix Set Point.
- Stirrer or Mechanical Circulator (If installed) will start automatically on achieving a pre-set level. Stirrer Speed is varied as per pre-set Pan Level (WE RECOMMEND CIRCULATOR BE FITTED WITH VFD FOR HIGHER THROUGHPUT AND EXCELLENT RESULTS ESPECIALLY FOR A MASSECUITE PANS).
- Controls will automatically switch to CONCENTRATING Mode on achieving pre-set level and the Vacuum will be adjusted accordingly to the pre-set value.
- Steam / Heating Vapour Valves Open Signal and/or Indication generated automatically. Valves will open Automatically if Control Valve is installed else Pan Attendant will open the Valve Manually after seeing the Steam/Vapour Valve OPEN Indication.
- Fluid-Density-Brix Analyzer senses the Brix and YUTECH Fluid-Density-Brix Logic takes over at this point to Control Seed / Syrup / Magma / Molasses Intake and achieve Grain Stabilization.

YUTECH Batch Pan Automation Routine Continued……

- This intake is with respect to Fluid-Density-Brix and Concentration Time.
- Fluid-Density is sensed by YUTECH Motorized Fluid-Density Sensor and YUTECH Fluid-Density-Brix Analyzer combination. Massecuite Density-Brix Control with respect to Level is a part of Consistency Logic which is in effect throughout the Build-up process.
- When Max level is reached and Fluid-Density-Brix grows to the preset value, an Indication with an Audio-Visual Alarm is given, after seeing this Alarm and confirming the process conditions and parameters, the Operator will initiate the Pan Drop / Cut-Over operation.
- Automatic or Informed-Manual Vacuum and Steam Closure and Transfer of Material to Other Pan / Seed Tank / Crystallizer can be made, as per Pan Type and Requirement.
- Wash Routine if needed is initiated.
- Next Batch or Second Build-up started.
- YUTECH Batch Pan Automation is available with any PLC / DCS Platform of the customer's choice.
- YUTECH also offers a Local Standalone Batch Pan Controller.
- Accurate Fluid-Density-Brix reading ensures better Process Control and helps to maintain constant Massecuite / Melt / Molasses / Syrup Quality and Steam / Vapour Requirement thus results in Higher Sugar Production Efficiency and Minimum Process Losses.

VERTICAL CONTINUOUS PAN AUTOMATION ADVANTAGES:

- MAINTAINED SEED-TO-SYRUP RATIO AT ALL TIMES, ENSURES CONSTANT GOOD QUALITY PRODUCT
- ACCURATE FLUID-DENSITY-BRIX SENSING IN EACH COMPARTMENT ENSURES MAINTAINED BRIX THROUGHOUT THE CHAMBER AT ALL TIMES
- MAINTAINED BRIX ENSURES VERY LITTLE OR NO ADDITION OF WATER THUS INCREASING EFFICIENCY
- STEPWISE INCREASE IN BRIX OF THE MATERIAL IN EACH CHAMBER IS ACHIEVED EFFICIENTLY TILL THE FINAL DISCHARGE
- VACUUM CONTROL AND MAINTAINED VALUE WITH TEMPERATURES MAINTAIN EQUILIBRIUM IN THE ENTIRE PROCESS
- VFD SPEED CONTROL AS PER PAN CHAMBER LEVEL ENSURES PROPER MIXING OF MATERIAL THROUGHOUT THE CHAMBER
- SYNCHRONIZATION BETWEEN THE PRECEDING AND NEXT CHAMBER IS MAINTAINED
- SEMI-AUTOMIC / AUTOMATIC DROP CONTROL IN ABNORMAL CONDITIONS IS CONTROLLED AND THERE IS NO LOSS OF MATERIAL OR TIME
- ENSURED LOWER LOSSES AND VERY HIGH PROFITABILTY

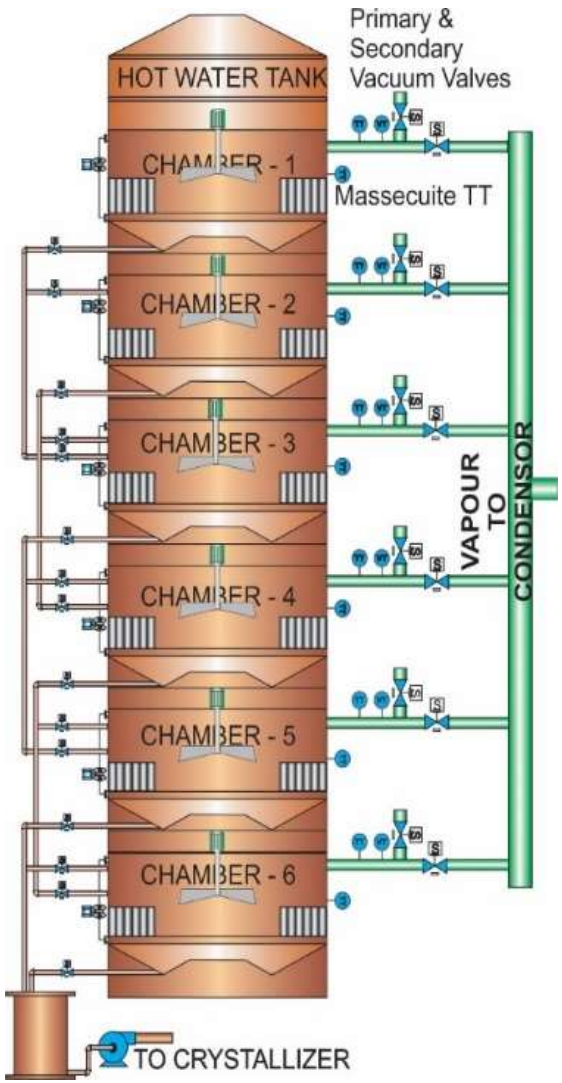
YUTECH FLUID-DENSITY-BRIX ANALYZER CUM CONTROL SYSTEM AND MOTORIZED FLUID-DENSITY SENSOR

VERTICAL CONTINUOUS PAN AUTOMATION

PAN CHAMBER CONTROL SCHEMATIC AND SCREENSHOT

VERTICAL CONTINUOUS PAN AUTOMATION:

- SEED / MAGMA AND SYRUP / MOLASSES FLOW SENSING
- SEED OR MAGMA FLOW CONTROL WITH RESPECT TO MOLASSES OR LIQUOR FLOW ENSURES MAINTAINED MOLASSES-TO-SEED RATIO
- FLUID-DENSITY-BRIX SENSING AND SYRUP / MOLASSES INTAKE CONTROL
- AUTO WATER INTAKE IN THE CHAMBER IF PROCESS CONDITIONS DEMAND IT WITH RESPECT TO FLUID-DENSITY-BRIX
- HEATING STEAM / VAPOUR CONTROL WITH RESPECT TO FLUID-DENSITY-BRIX
- VFD SPEED CONTROL AS PER PAN CHAMBER LEVEL
- TEMPERATURE SENSING THROUGHOUT THE PAN CHAMBER TO ENSURE UNIFORM TEMPERATURE INSIDE THE CHAMBER
- SEMI-AUTOMIC / AUTOMATIC DROP CONTROL IN ABNORMAL CONDITIONS
- STANDALONE SYSTEM FOR PAN CHAMBER FLUID-DENSITY-BRIX CONTROL AND COMMUNICATION WITH MAIN VCP PLC / DCS SYSTEM



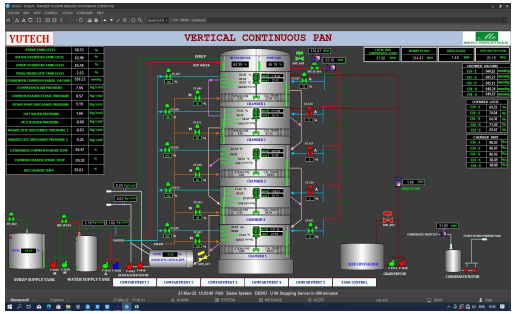
YUTECH FLUID-DENSITY-BRIX ANALYZER CUM CONTROL SYSTEM AND MOTORIZED FLUID-DENSITY SENSOR

VERTICAL CONTINUOUS PAN AUTOMATION

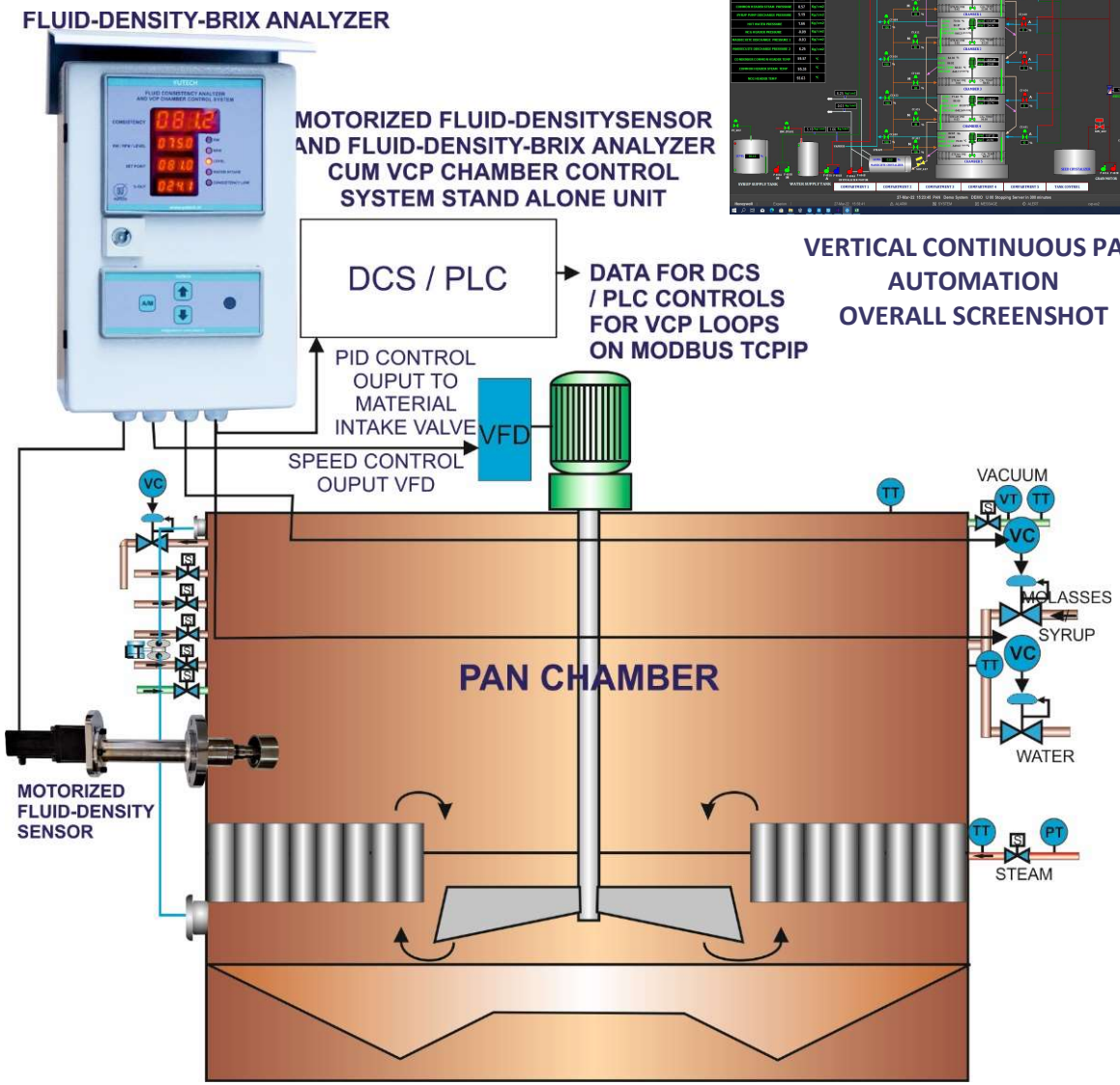
PAN CHAMBER CONTROL SCHEMATIC AND SCREENSHOT

SINCE 1978

YUTECH

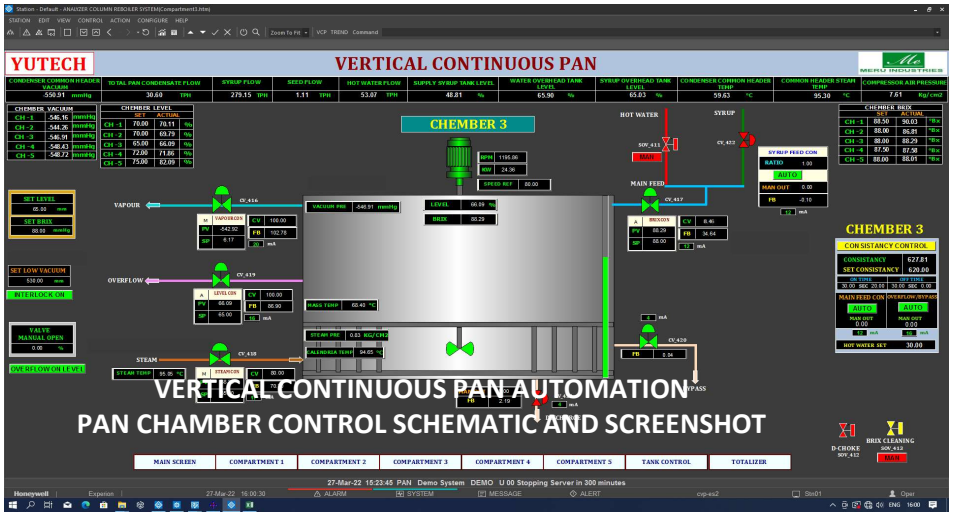


VERTICAL CONTINUOUS PAN AUTOMATION OVERALL SCREENSHOT



VERTICAL CONTINUOUS PAN AUTOMATION:

- ACCURATE FLUID-DENSITY-BRIX SENSING IN EACH COMPARTMENT ENSURES MAINTAINED BRIX THROUGHOUT THE CHAMBER AT ALL TIMES
- MAINTAINED BRIX ENSURES VERY LITTLE OR NO ADDITION OF WATER THUS INCREASING EFFICIENCY



VERTICAL CONTINUOUS PAN AUTOMATION
PAN CHAMBER CONTROL SCHEMATIC AND SCREENSHOT

VERTICAL CONTINUOUS PAN AUTOMATION

BASED ON YUTECH FLUID-DENSITY-BRIX ANALYZER CUM CONTROL SYSTEM AND MOTORIZED FLUID-DENSITY SENSOR

YUTECH approaches Vertical Continuous Pan Automation from the Process Point of View, not a typical Automation Perspective.

We aim to achieve maximum throughput in the same Batch Time by properly controlling process parameters to improve process dynamics, resulting in consistent maximum capacity production, with the best possible grain size and sugar quality. The following Procedures are performed in a Controlled Manner:

- Seed / Magma Flow Control with respect to Syrup / Molasses Flow as a Ratio Control.
- Auto Feeding of Syrup to each Compartment based on Fluid-Density-Brix Sensing to maintain/build Preset Brix.
- Auto Selection of Syrup (or Molasses) or Water depending on Density-Brix.
- Steam Control having Density-Brix as the Process Variable for PID Loop.
- Calandria Vapour / Heating Steam Pressure Control.
- Overall, Pan Vacuum Control by Condenser Automation.
    - Please check our Condenser Automation Presentation
- Massecuite Overflow Control with respect to Compartment Density-Brix.
- Massecuite Bottom Drain Control with respect to Density-Brix into next Compartment or Abnormal Conditions
- Bypass next Compartment and send material to another compartment with respect to Level / other abnormal condition of next Compartment
- Wash Water and Wash Steam Intake after Material Discharge
- Intake of Fresh Material from Previous or Earlier Compartment and repeat procedure

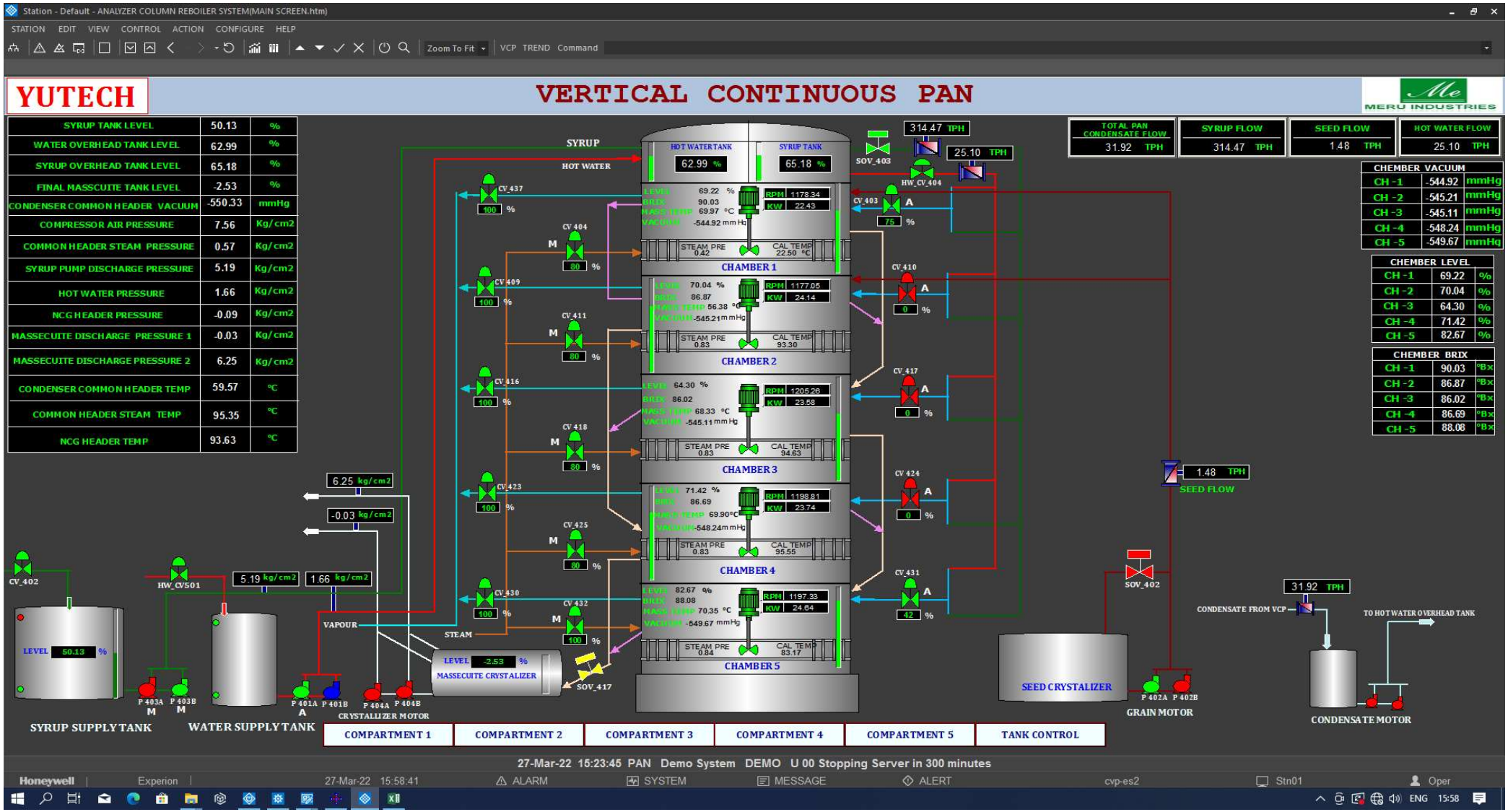
YUTECH Vertical Continuous Pan Automation Routine Continued……

- **Seed or Magma Flow Control with respect to Molasses or Liquor Flow:**
  - **Molasses and Seed Flowmeters sense Flow.**
  - **Ratio Controller delivers exact Flow of Seed with respect to Molasses Quantity by Controlling Seed / Magma Pump VFD.**
- **Individual Compartment Brix Control by Auto Feeding Molasses or Water into each Compartment:**
  - **Fluid-Density-Brix Sensing of each Compartment by YUTECH Fluid-Density-Brix Analyzer**
  - **Control of Molasses Intake Valve with respect to Density-Brix Set Point, and Process Value in a PID Mode**
  - **Addition of Water when required as per Process Dynamics.**

YUTECH FLUID-DENSITY-BRIX ANALYZER CUM CONTROL SYSTEM AND MOTORIZED FLUID-DENSITY SENSOR

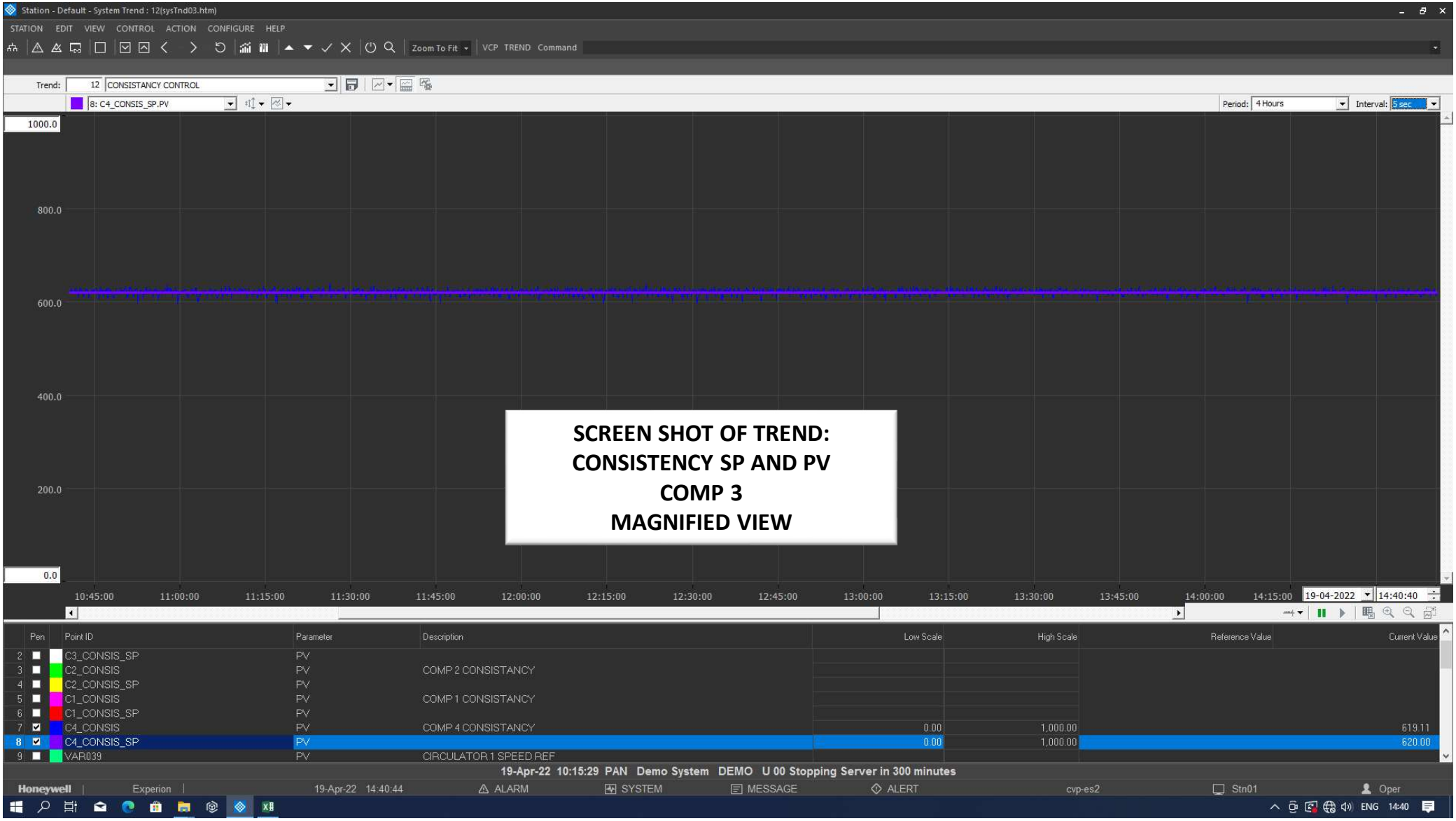
VERTICAL CONTINUOUS PAN AUTOMATION

SCREENSHOT OVERALL VCP OR VKT



YUTECH FLUID-DENSITY-BRIX ANALYZER CUM CONTROL SYSTEM AND MOTORIZED FLUID-DENSITY SENSOR

VERTICAL CONTINUOUS PAN AUTOMATION COMPARTMENT PAN BRIX VS BRIX SETPOINT TREND SCREEN SHOT



YUTECH FLUID-DENSITY-BRIX ANALYZER CUM CONTROL SYSTEM AND MOTORIZED FLUID-DENSITY SENSOR

VERTICAL CONTINUOUS PAN AUTOMATION SCREENSHOTS FOR VARIOUS VCP CHAMBERS OR COMPARTMENTS

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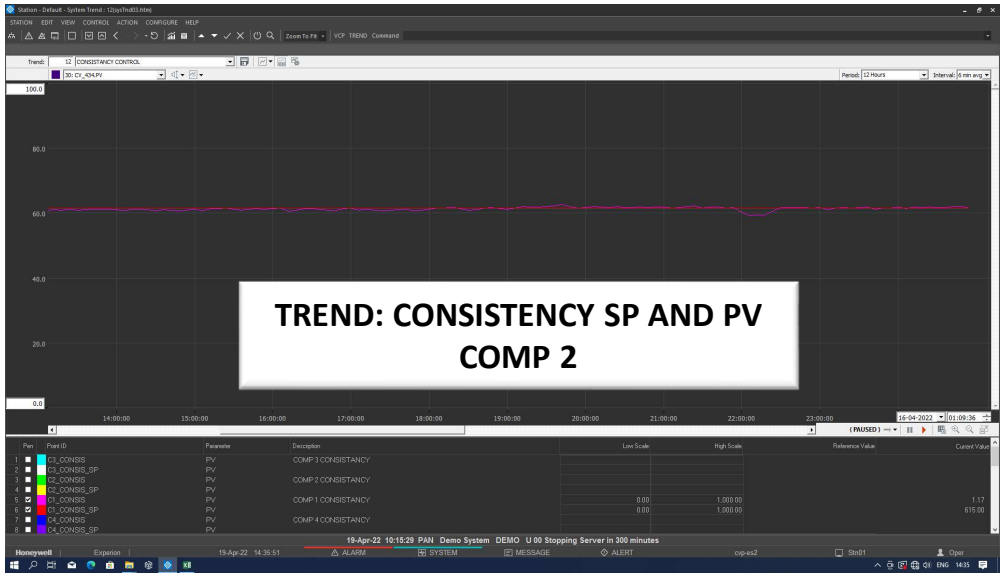
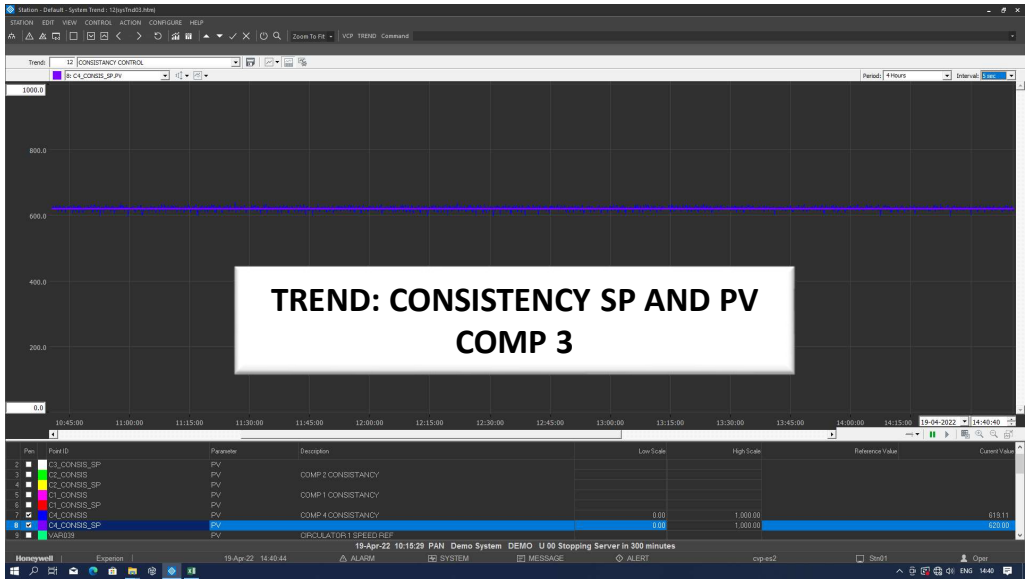
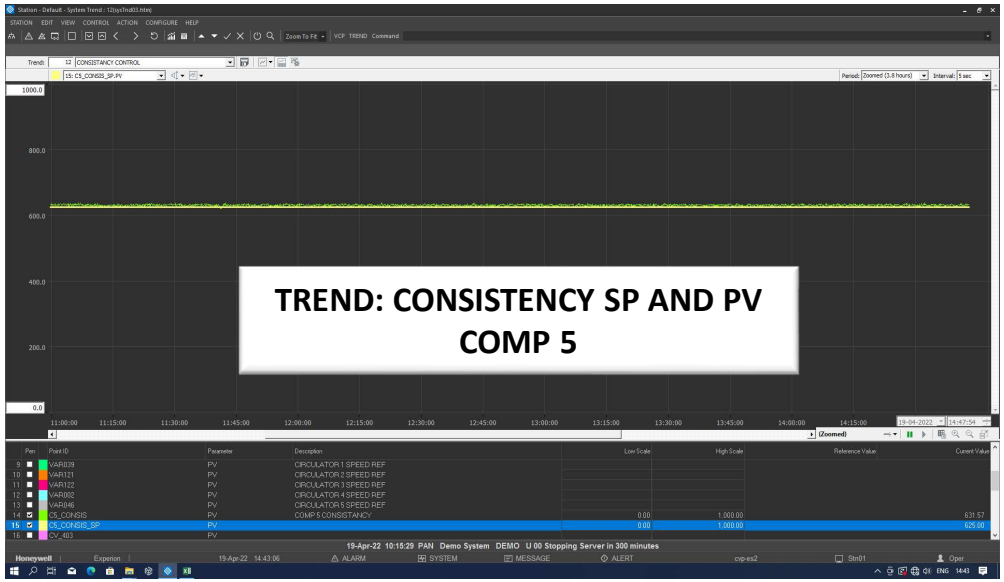
TRENDS OF VARIOUS COMPARTMENTS' BRIX CONTROLS

THE SYSTEM USES YUTECH'S BATCH PAN CONTROL ALGORITHM OR VERTICAL CONTINUOUS PAN CONTROL ALGORITHM WITH FLUID-DENSITY-BRIX AS THE MAIN SENSING PARAMETER.



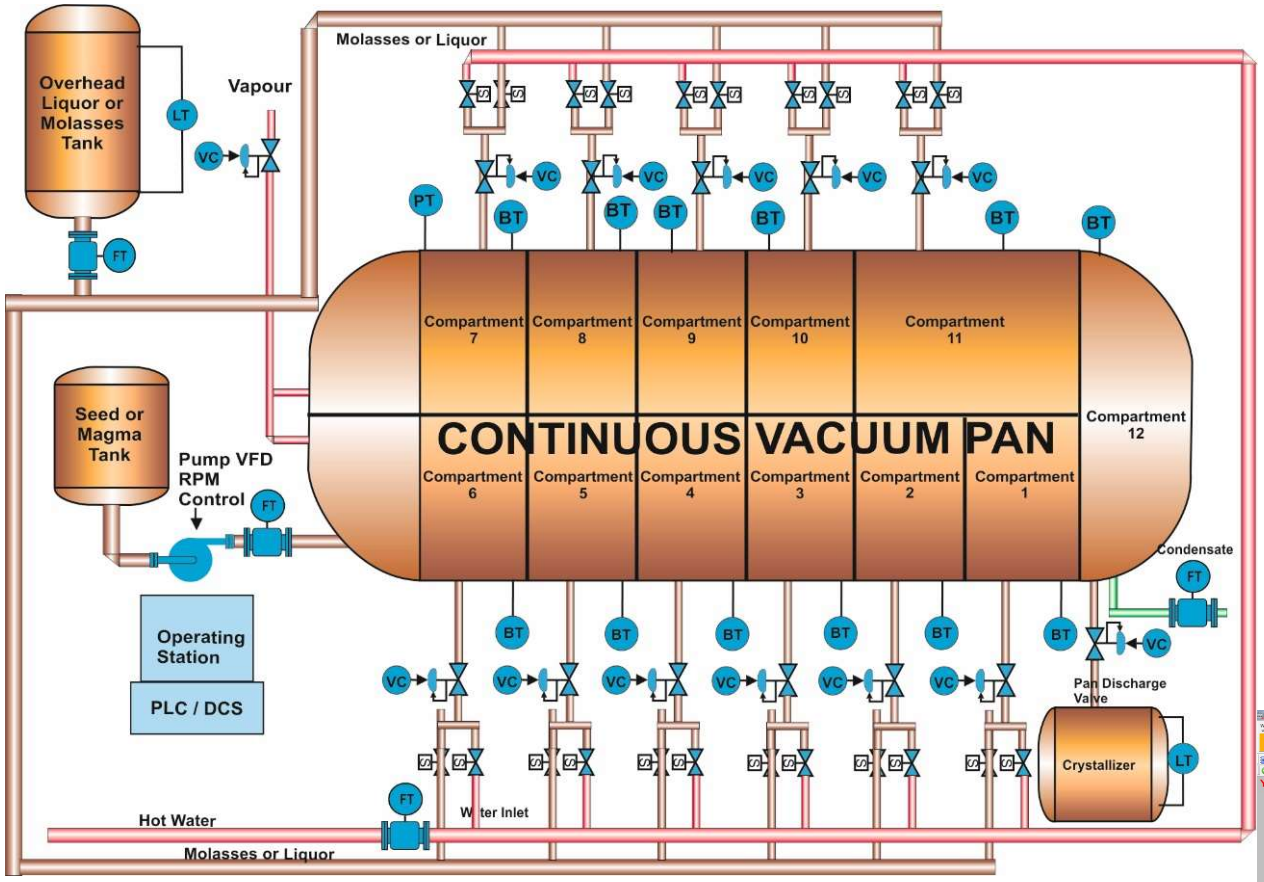




YUTECH FLUID-DENSITY-BRIX-ANALYZER CUM CONTROL SYSTEM AND MOTORIZED FLUID-DENSITY SENSOR

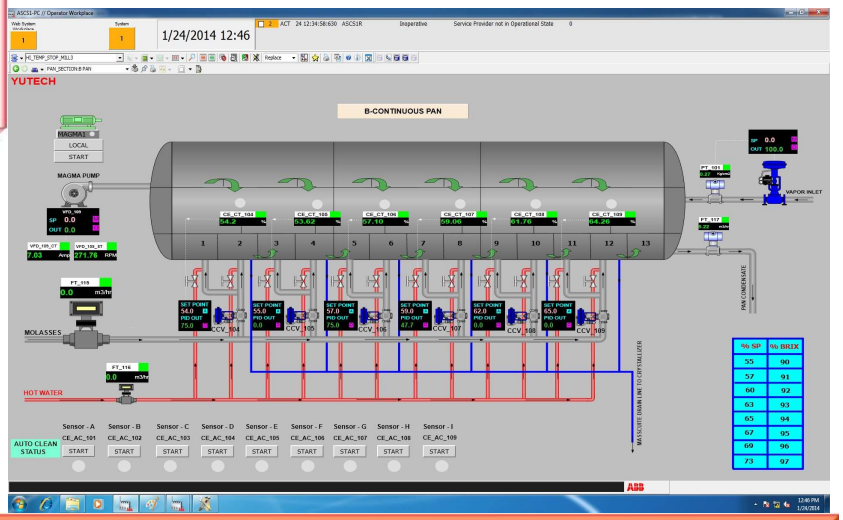
CONTINUOUS VACUUM PAN AUTOMATION

CVP CONTROL SCHEMATIC AND SCREENSHOT



VERTICAL CONTINUOUS PAN AUTOMATION:

- SEED OR MAGMA FLOW CONTROL WITH RESPECT TO MOLASSES OR LIQUOR FLOW ENSURES MAINTAINED MOLASSES-TO-SEED RATIO
- YUTECH FLUID-DENSITY-BRIX OR YUTECH BRIX SENSING AND MOLASSES / WATER INTAKE CONTROL FOR EACH COMPARTMENT
- TEMPERATURE SENSING THROUGHOUT THE CV PAN ENSURES UNIFORM TEMPERATURE INSIDE THE CV PAN BODY



VERTICAL CONTINUOUS PAN AUTOMATION:

- CALENDRIA VAPOUR PRESSURE CONTROL
- STANDALONE SYSTEM FOR CV PAN HAVING COMMUNICATION WITH MAIN PLC / DCS SYSTEM

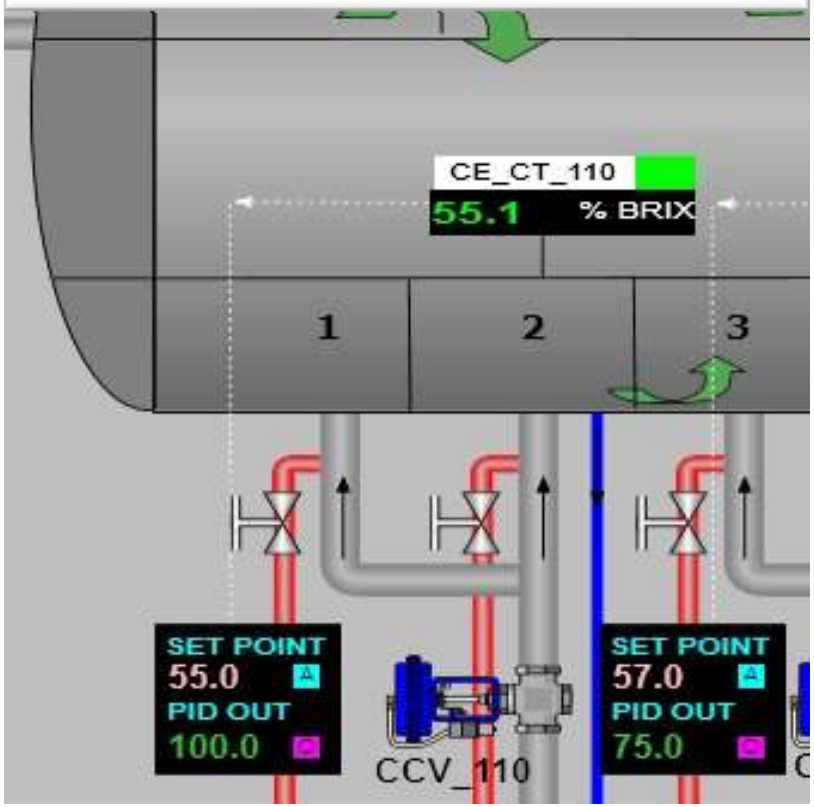
YUTECH FLUID-DENSITY TYPE BRIX ANALYZER AND CONTROL SYSTEM
CONTINUOUS VACUUM PAN AUTOMATION

YUTECH SINCE 1978

ADVANTAGES:

- Ensure Constant Seed To Molasses Ratio thus Feed going to each Compartment will always be of the same quality thus evading Process Disturbances.
- Accurate Brix Sensing in each Compartment and exact Molasses Intake ensures Constant Brix.
- Excess Boiling and Addition of Water is avoided thus leading to Steam and Water Saving.
- Under Boiling is avoided as Material intake is Controlled with Accurate Brix Feedback thus ensuring Better Quality Production.

Partial Screen Shot of Brix Reading on CVP AUTOMATION SCADA



Seed or Magma Flow Control with respect to Molasses or Liquor Flow:

- Molasses and Seed Flowmeters sense Flow.
- Ratio Controller delivers exact Flow of Seed wrt Molasses Quantity by Controlling Seed / Magma Pump VFD.

Individual Compartment Brix Control by Auto Feeding Molasses or Water into each Compartment:

- Consistency-Brix OR Brix Sensing of each Compartment by YUTECH Fluid-Density-Brix Analyzer OR YUTECH Brix Analyzer
- Control of Molasses Intake Valve w.r.t., Brix Set Point, and Process Value in a PID Mode
- Addition of Water only if required as per Process Dynamics.

YUTECH CONDENSER CONTROL SYSTEM FOR PANS AND EVAPORATORS

CONDENSER AUTOMATION USING YUTECH CONDENSER CONTROL SYSTEM

SCREEN SHOT: CONDENSER CONTROL SYSTEM IMPLEMENTED USING DCS / PLC

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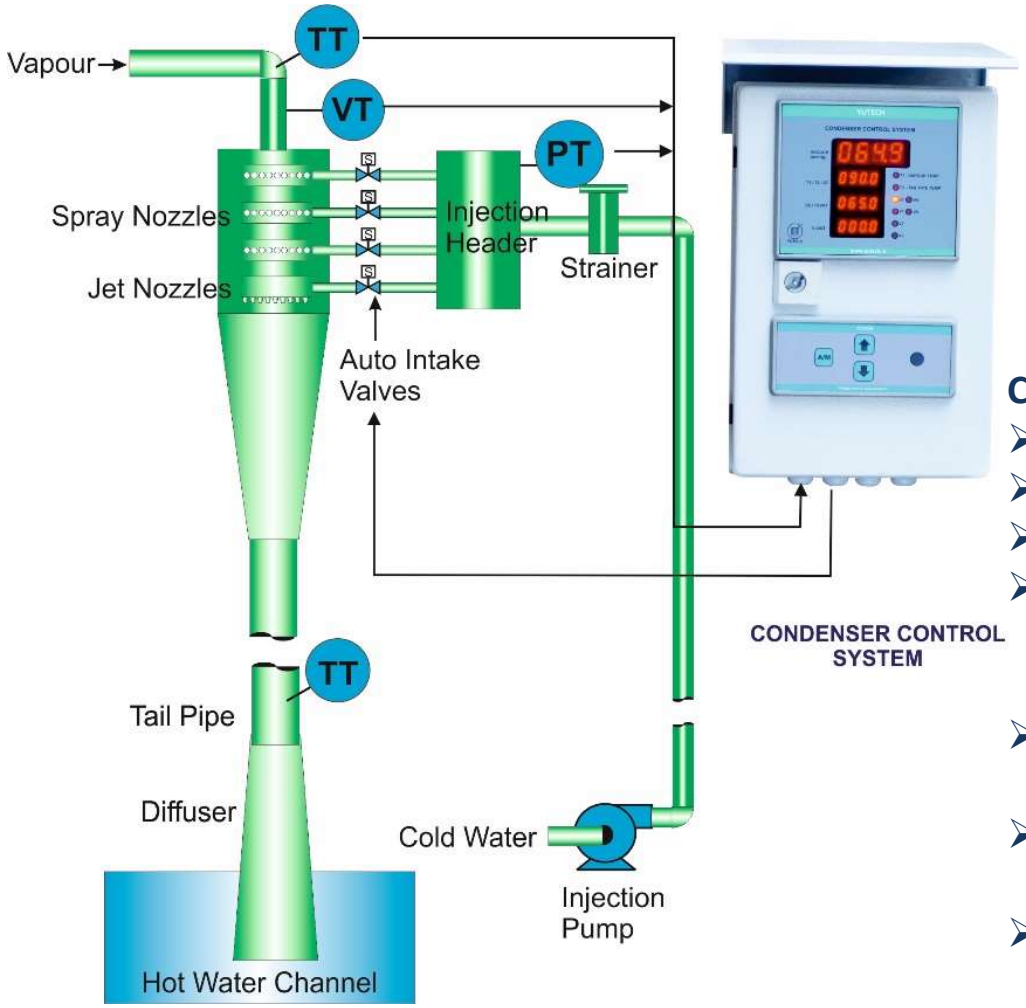
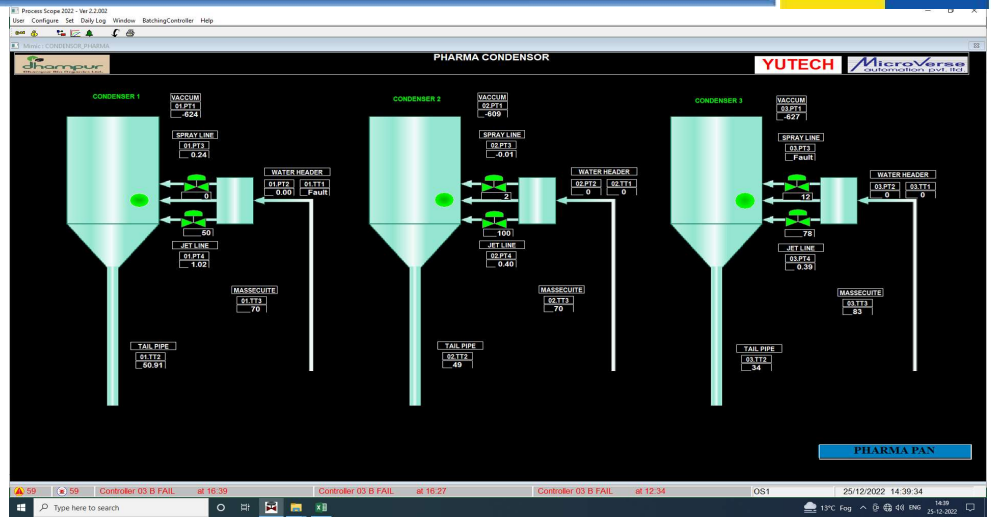
SCHEMATIC DIAGRAM AND SCREENSHOT: CONDENSER CONTROL AS A STANDALONE SYSTEM AND IN DCS





CONDENSER AUTOMATION:

- Vapour Vacuum and Temperature sensed
- Tail Pipe Condensate Temperature Sensed in Tail Pipe
- Temperature Difference Calculated
- Spray Jet Water Quantity is Automatically Controlled wrt Remote Set Point generated by Vacuum and Temperature difference.
- Number of Jets & Nozzles and Jet & Nozzle Diameters designed as per Condenser Capacity
- Control Valve is used to control Spray Jets in case of Single Entry Condenser.
- Water Pressure in the Common Injection Header maintained by Controlling Injection Pump VFD
- Jet Compartment Controlled by Separate Valve

YUTECH FLUID-DENSITY-BRIX ANALYZER CUM CONTROL SYSTEM AND MOTORIZED FLUID-DENSITY SENSOR

SUGAR MELTER AND MOLASSES CONDITIONER AUTOMATION SCREENSHOT, FIELD MOUNTING PICTURE, AND SCHEMATIC

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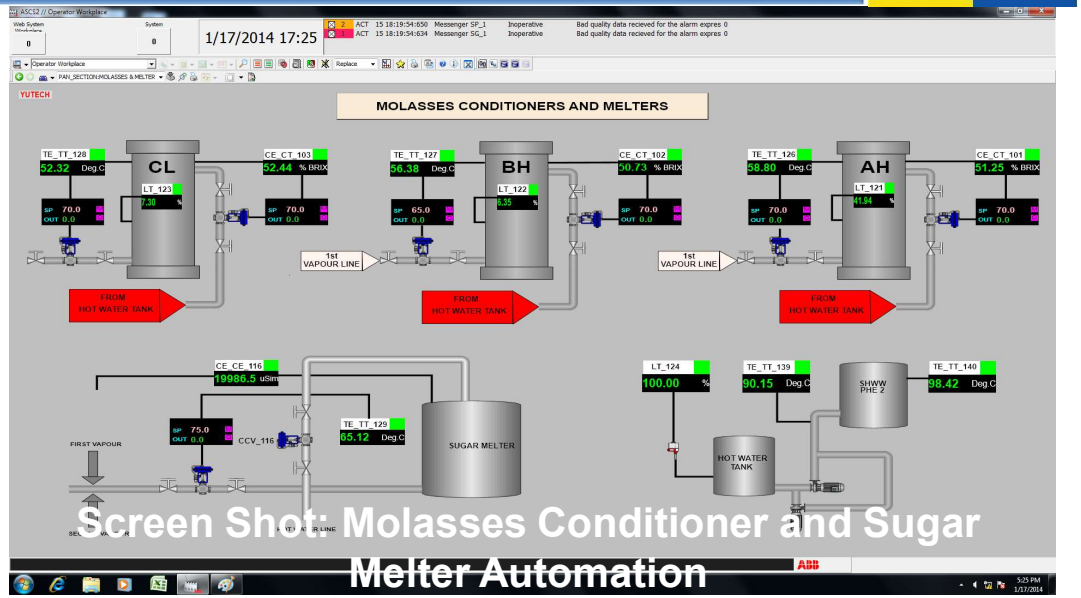
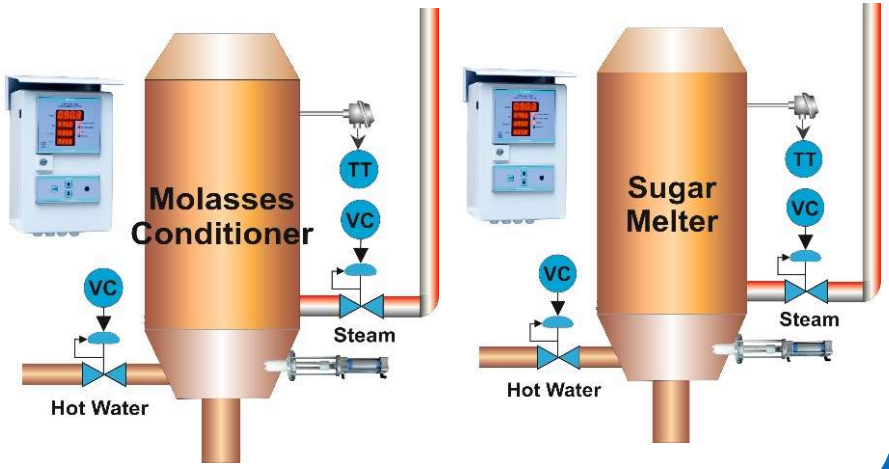
Field Instruments Installation

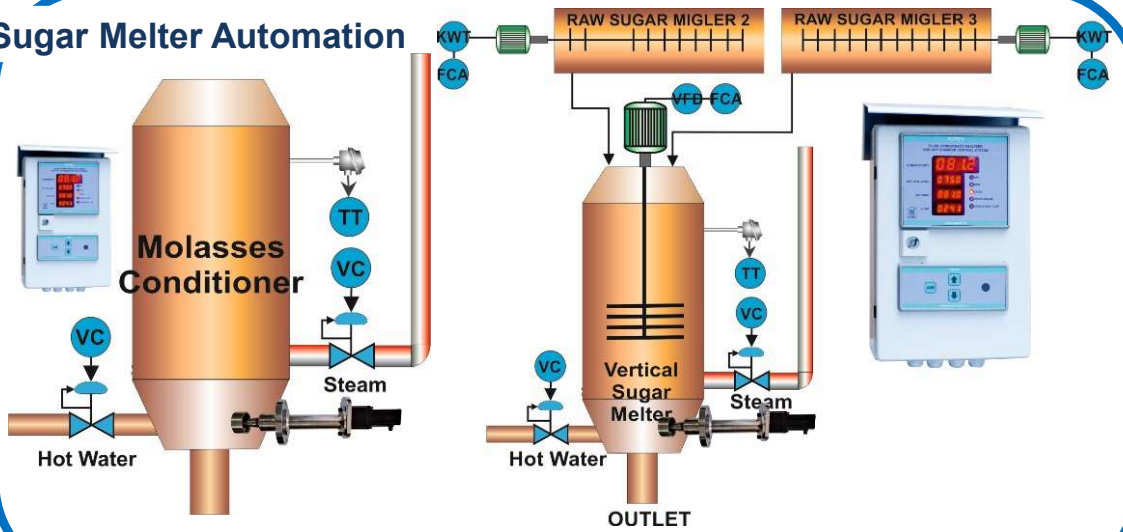


Screen Shot: Molasses Conditioner and Sugar Melter Automation

Schematic Diagrams: Molasses Conditioner and Sugar Melter Automation



Using Brix Analyzer



Using Fluid-Density-Brix Analyzer

Sugar Melter Automation Advantages:

- Streamlined Process due to Constant and Maintained Outlet Brix and Temperature.
- Ensure Constant Quality of Melt Feed to Pans.
- Reduce Heat Waste, due to Overheating or Under Dilution or Over Steaming.
- Reduce Process Time by avoiding Over Dilution.
- Thus Save Time, Steam, and Water and Ensure more throughput in lesser time.
- Increase Profitability.

Control Loops:

Controlled intake of Heating Media (Steam), and Diluting Media (Water) as per Process Dynamics of Raw Sugar Intake.

Brix Control using Brix or Fluid-Density-Brix Analyzer:

- Sugar Melt Brix are maintained by controlled addition of Hot Water using Control Valve in a PID Loop wrt Sugar Melt Fluid-Density-Brix / Brix sensed by Fluid-Density-Brix Analyzer or High Frequency Brix Analyzer.

Temperature Control:

- Sugar Melt / Molasses Temperature is maintained constant by controlled application of Steam using Control Valve in a PID Loop wrt Sugar Melt / Molasses Temperature.

Molasses Conditioner Automation Advantages:

- Streamlined Process due to Constant and Maintained Outlet Brix and Temperature.
- Ensure Constant Quality of Melt Feed to Pans.
- Reduce Heat Waste, due to Overheating or Under Dilution or Over Steaming.
- Reduce Process Time by avoiding Over Dilution.
- Thus Save Time, Steam, and Water and Ensure more throughput in lesser time.
- Increase Profitability.

Control Loops:

Controlled intake of Heating Media (Steam), and Diluting Media (Water) as per Process Dynamics of Raw Molasses Intake.

Brix Control using Brix or Fluid-Density-Brix Analyzer:

- Molasses Brix are maintained by controlled addition of Hot Water using Control Valve in a PID Loop wrt Sugar Melt Fluid-Density-Brix / Brix sensed by Fluid-Density-Brix Analyzer or High Frequency Brix Analyzer.

Temperature Control:

- Sugar Melt / Molasses Temperature is maintained constant by controlled application of Steam using Control Valve in a PID Loop wrt Sugar Melt / Molasses Temperature.

YUTECH BRIX ANALYZER AND AUTO CLEANING SELF RETRACTABLE BRIX SENSOR

BASED ON YUTECH'S A15 INTELLIGENT ANALYZERS AND SYSTEMS PLATFORM

BRIX ANALYZER

BRIX ANALYZER

PRODUCT CODE:
BASE MODELS: A15BAACBSRC1D4R2FM,
CONTROLLER MODEL: A15BAACBSRC2D4R4FMC
CONTROLLER WITH ETHERNET MODEL:
A15BAACBSRC2D4R4FMCEM (Modbus TCPIP)

AUTO-RETRACTABLE SELF-CLEANING BRIX SENSOR

PRODUCT CODE:
ASDBSRSCW1EV03

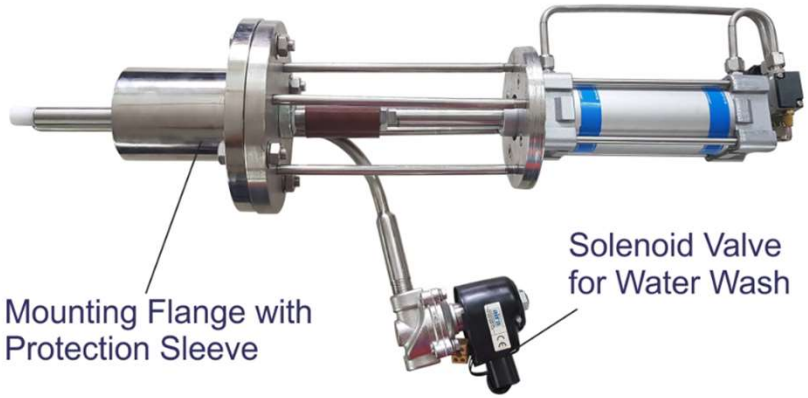
BRIX ANALYZER CONTROLLER

ELECTRODE IN SENSING POSITION

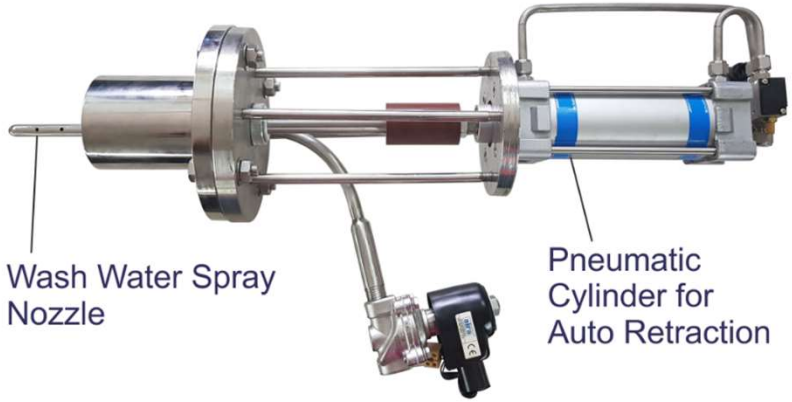
ELECTRODE IN CLEANING POSITION

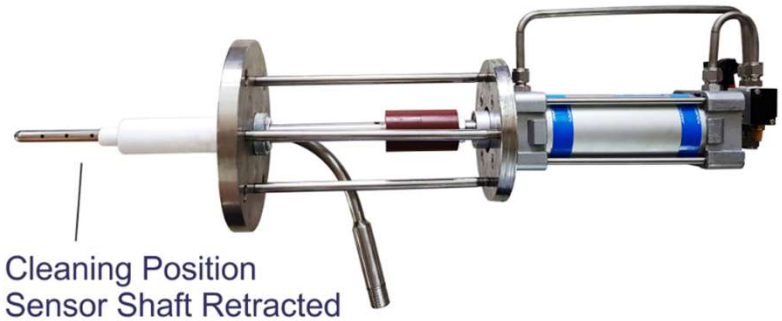
YUTECH BRIX ANALYZER AND AUTO-RETRACTABLE SELF-CLEANING BRIX SENSOR

BASED ON YUTECH'S A15 INTELLIGENT ANALYZERS AND SYSTEMS PLATFORM



Brix Sensor Pictures with and without Mounting Flange and in Sensing and Cleaning Positions





Brix Analyzer and Sensor combination targets sensing of Suspended Solid Content (Brix) in Slurries or Syrups like Sugar Massecuite, Sugar Syrup, Sugar Melt and Molasses. Brix Analyzer plays a crucial role in Sugar Process Automation and helps in Stabilizing the overall Sugar Process.

The YUTECH Intelligent Programmable Brix Analyzer is a State-of-the-Art System having Built-in Fuzzy Logic for Automatic Purity Compensation to Accurately Sense, Analyze, Calculate and Derive Massecuite Brix within a Band of varying Purity with Temperature Compensation. This Logic is called Brix Equation and it results in accurate Brix Sensing.

The YUTECH Brix Sensor is Auto-Retractable Self-Cleaning and Self-Washing Brix Sensor. This technique prevents Media Deposits on Sensor Electrode thus always results in Accurate Readings.

Accurate Brix reading ensures better Process Control and helps to maintain constant Massecuite / Melt / Molasses / Syrup Quality and Steam / Vapour Requirement thus results in Higher Sugar Production Efficiency and Minimum Process Losses.

YUTECH BRIX ANALYZER AND AUTO-RETRACTABLE SELF-CLEANING BRIX SENSOR

BASED ON YUTECH'S A15 INTELLIGENT ANALYZERS AND SYSTEMS PLATFORM

SALIENT FEATURES

- The Brix Sensor Detects Deviation in Electric Signal with respect to changes in the Brix of a Solution whose Brix is to be measured
- This Signal Deviation is then Processed in the Analyzer to obtain a Brix Reading
- YUTECH Brix Analyzer is equipped with Intelligent Auto Purity Compensation Algorithm to derive the Brix accurately in Massecuites 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" provides Remote Access to the Brix Analyzer for Calibration, Compensation, and Trouble Shooting.

YUTECH BRIX ANALYZER AND AUTO CLEANING SELF RETRACTABLE BRIX SENSOR

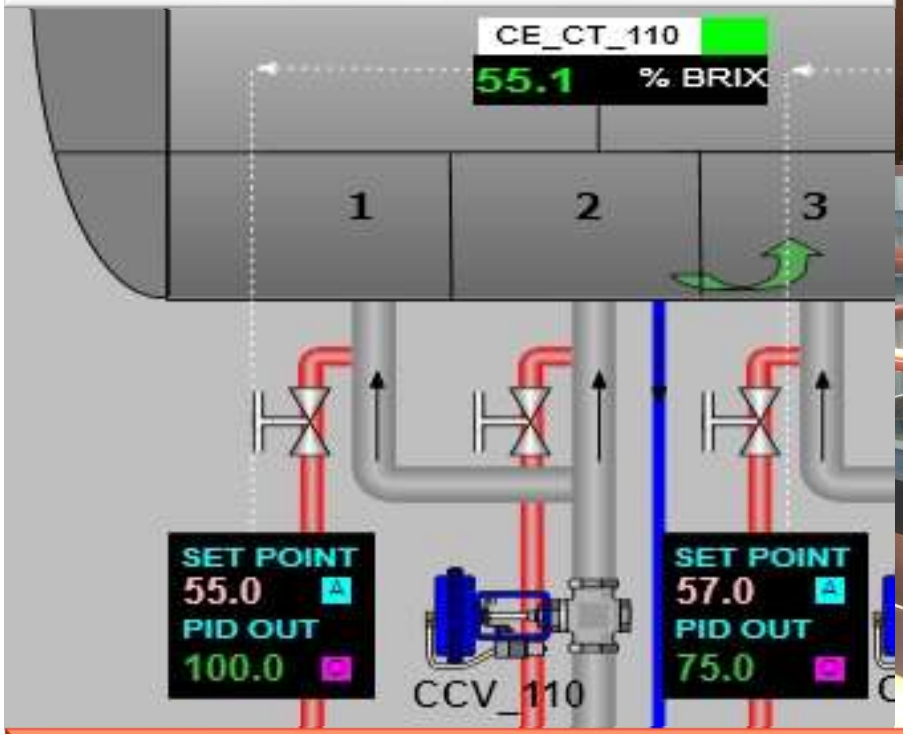
BASED ON YUTECH'S A15 INTELLIGENT ANALYZERS AND SYSTEMS PLATFORM

YUTECH SINCE 1978

INSTALLATION PICTURES

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

Partial Screen Shot of Brix Reading on SCADA



Brix, Capillary DPT Level, and RTD Temperature Sensor installed on Batch Type Vacuum Pan

pH ANALYZER AND pH CONTROL SYSTEM

BASED ON YUTECH'S A15 INTELLIGENT ANALYZERS AND SYSTEMS PLATFORM

pH ANALYZER

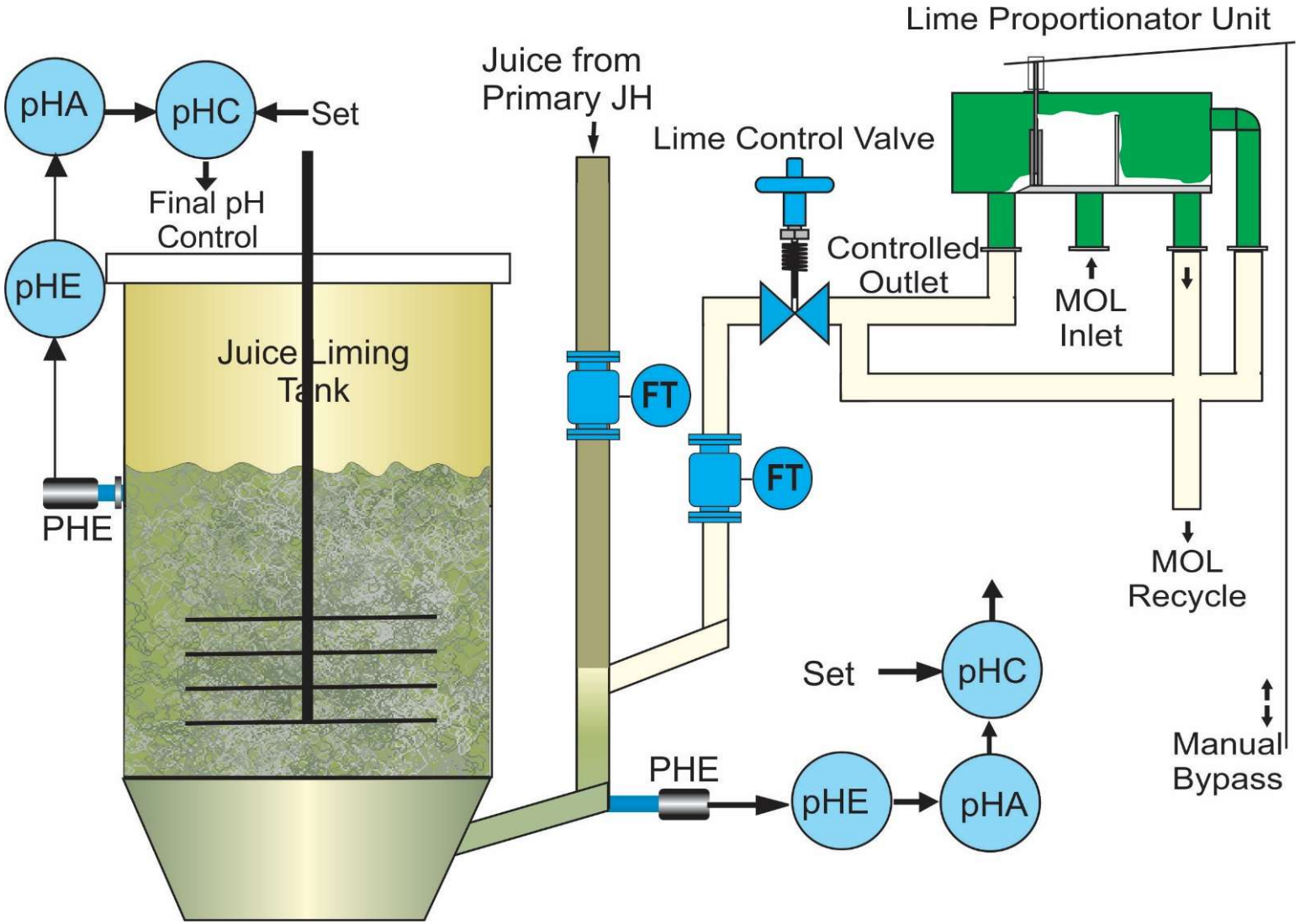
pH ANALYZER AND pH CONTROL SYSTEM

PRODUCT CODE:
ANALYZER MODEL: A15PHAACPETRC1D4R4FM,
ANALYZER AND CONTROLLER MODEL:
A15PHAACPETRC2D4R4FMC
ANALYZER AND CONTROLLER WITH ETHERNET MODEL:
A15PHAACPETRC2D4R4FMC
EM (Modbus TCPIP)

pH ANALYZER AND CONTROL SYSTEM

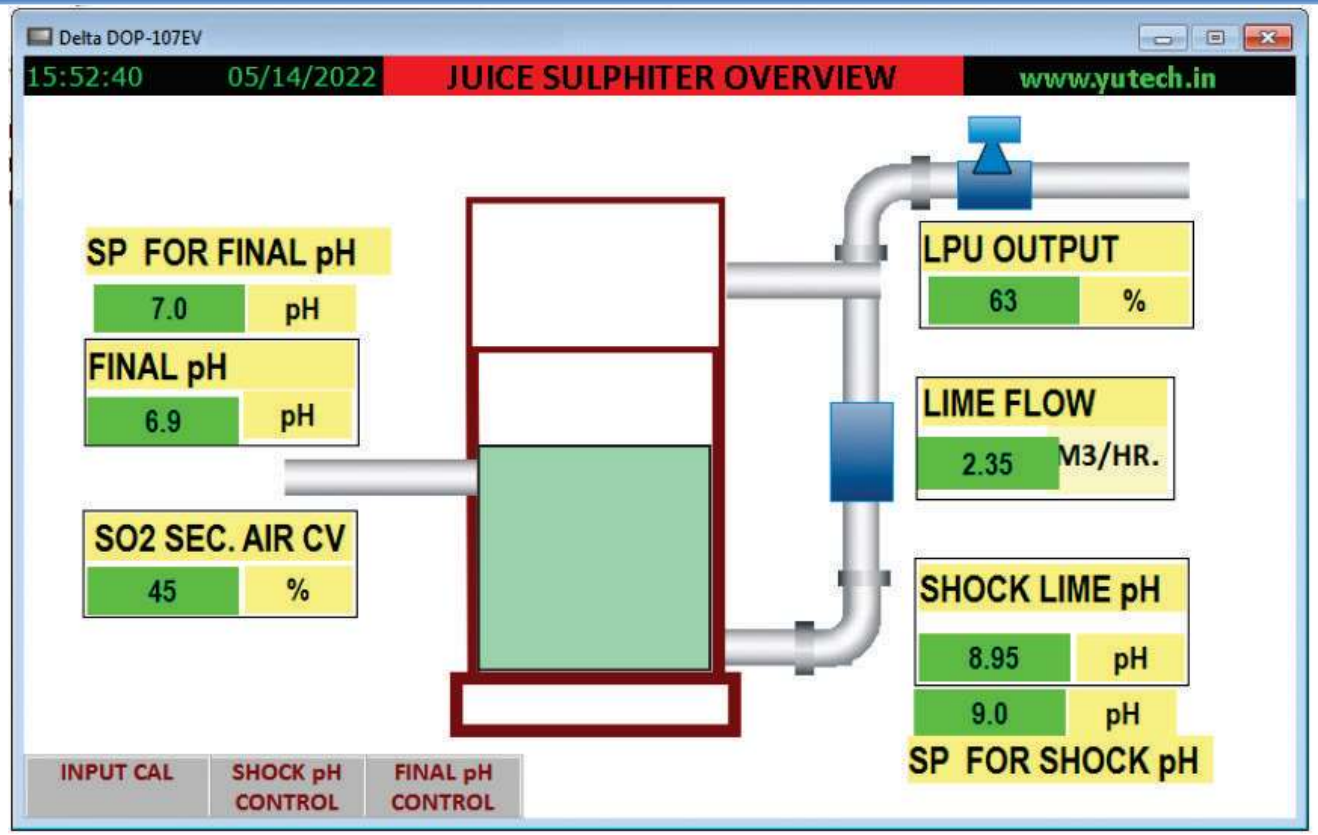
JUICE LIMING AND FINAL JUICE pH CONTROL SYSTEM

SCHEMATIC DIAGRAM



JUICE LIMING AND FINAL JUICE pH CONTROL SYSTEM

SCREENSHOT

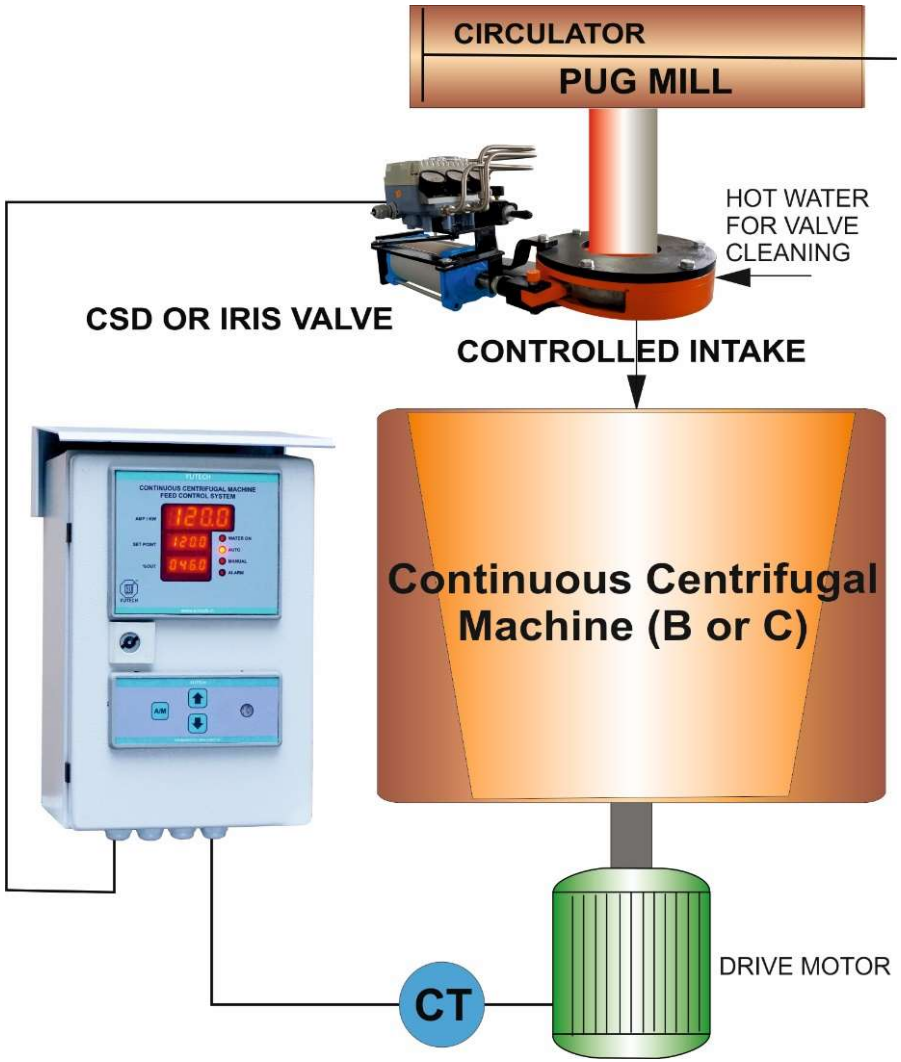


JUICE LIMING AND SULPHITOR AUTOMATION:

- Shock Limed Juice pH Sensing
- Shock Limed Juice Temperature Sensing
- Final Juice pH Sensing
- Final Juice Temperature Sensing
- Lime Proportionator Control with respect to Temperature Compensated Shock Limed Juice pH
- Secondary Air or Molten Sulphur Pump VFD Control with respect to Temperature Compensated Final Juice pH

CSD OR IRIS VALVE BASED CONTINUOUS CENTRIFUGAL MACHINE FEED AUTOMATION SYSTEM

SCHEMATIC DIAGRAM



CSD OR IRIS VALVE BASED CONTINUOUS CENTRIFUGAL MACHINE FEED AUTOMATION SYSTEM:

- MACHINE DRIVE LOAD CURRENT SENSING
- FEED CONTROL WITH RESPECT TO DRIVE LOAD CURRENT

Power Saving of up to 20% for total Massecuite Curing.

CONTINUOUS CENTRIFUGAL MACHINE ATOMATION WORKS LIKE A “MULTIBAGGER”.

REDUCE COST OF OWNERSHIP
INCREASE RETURN ON INVESTMENT
INCREASE PROFITABILTY

CSD OR IRIS VALVE BASED CONTINUOUS CENTRIFUGAL MACHINE FEED AUTOMATION SYSTEM

ADVANTAGES

- Constant Load on the Machine Basket Drive results in Constant Machine Operation and Optimum Current Consumption of the Drive Motor thus Saving Power and Maximizing Capacity Utilization at the Same Time.
- Constant Load on the Machine Basket results in Improved Molasses Purity as well as Increased Throughput at the same time.
- Concentric and Uniform Material Intake Ensures uniform layer of Massecuite over the surface of the Basket thus it results in Excellent Purging, leading to higher efficiency and increased throughput
- Uniform layer of Massecuite over the surface of the Basket also results in Power, Water and Steam Saving. Power Saving of up to 20% for total Massecuite Curing. Very Attractive pay back INFACT CONTINUOUS CENTRIFUGAL MACHINE ATOMATION WORKS LIKE A “MULTIBAGGER”.
- Concentric and Uniform Material Intake also ensures Proper Basket Balance so reduces Wear and Tear.
- Higher Capacity Utilization of Continuous Centrifugal Machines and Operational life improvement and Reduced Cost of Ownership.
- Eliminates Human Errors, Overflows and Stoppages IT ALSO WORKS AS A “STOP LOSS AUTOMATION”.

CSD OR IRIS VALVE BASED CONTINUOUS CENTRIFUGAL MACHINE FEED AUTOMATION SYSTEM

ADVANTAGES

YUTECH Engineered Automation System in Continuous Centrifugal Machines:

- Reduce Process 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
- Proper Basket Balance results in Reduced Wear and Tear
- 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 Continuous Centrifugal Machine Automation can get more Work Done from the Same Mechanical Equipment and:
- REDUCE COST OF OWNERSHIP
- INCREASE RETURN ON INVESTMENT
- INCREASE PROFITABILTY

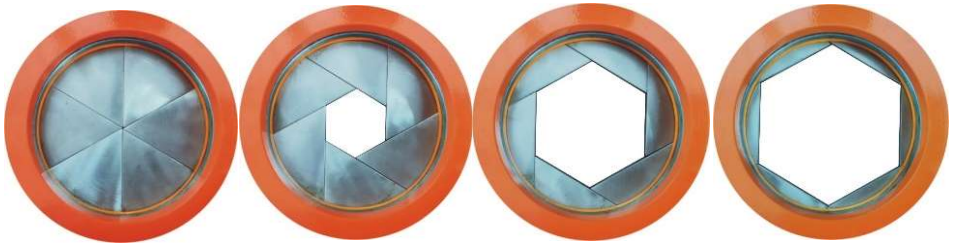
CSD OR IRIS VALVE BASED CONTINUOUS CENTRIFUGAL MACHINE FEED AUTOMATION SYSTEM

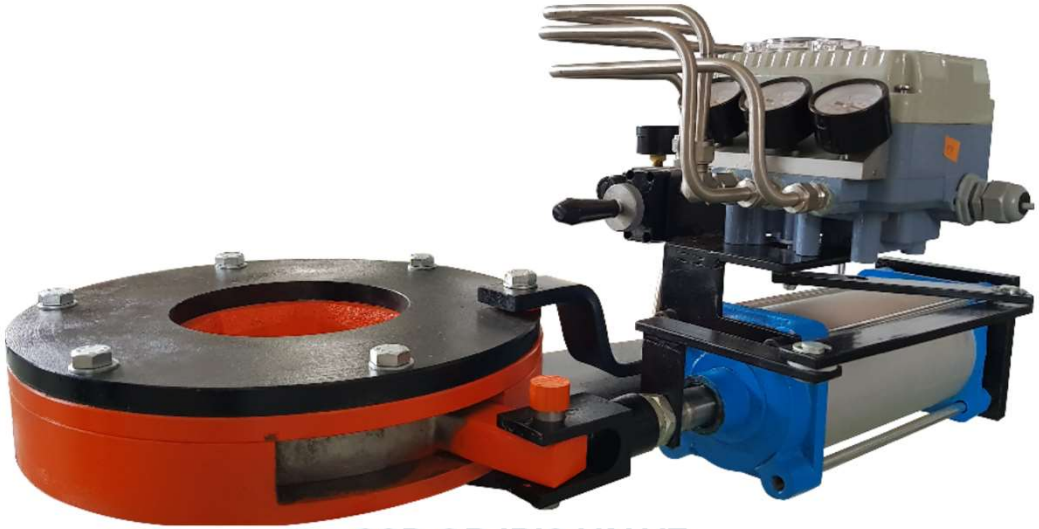
SINCE 1978

YUTECH

CONTINUOUS CENTIFRUGAL MACHINE AUTOMATIC FEED CONTROL SYSTEM

PRODUCT CODE:
CONTROLLER MODEL: A15CCMAACCTC1C2D4R4FMC
CONTROLLER WITH ETHERNET: MODELA15CCMAACCTC1C2D4R4FMCEM (Modbus TCPIP)
CONCENTRIC SPLIT DIAPHRAGM (CSD) CONTROL VALVE ALSO CALLED IRIS TYPE VALVE: PRODUCT CODE: C15CSDV3D6EP





CSD OR IRIS VALVE

CONTINUOUS CENTIFRUGAL MACHINE AUTOMATIC FEED CONTROL SYSTEM

CSD OR IRIS VALVE BASED CONTINUOUS CENTRIFUGAL MACHINE FEED AUTOMATION SYSTEM

INSTALLATION PICTURES

Controlled Quantity of Massecuite drops from the Concentric Opening (Split opening from the Centre of the Valve) Hence No Spilling, No Splattering, No Unbalance, No Overflow, No Underfeeding

Typical Concentric Opening Split Diaphragm
Pneumatic Control Valve Installation

CSD OR IRIS VALVE BASED CONTINUOUS CENTRIFUGAL MACHINE FEED AUTOMATION SYSTEM

INSTALLATION PICTURES

CSD OR IRIS VALVE BASED CONTINUOUS CENTRIFUGAL MACHINE FEED AUTOMATION SYSTEM

INSTALLATION PICTURES

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

THANK YOU