

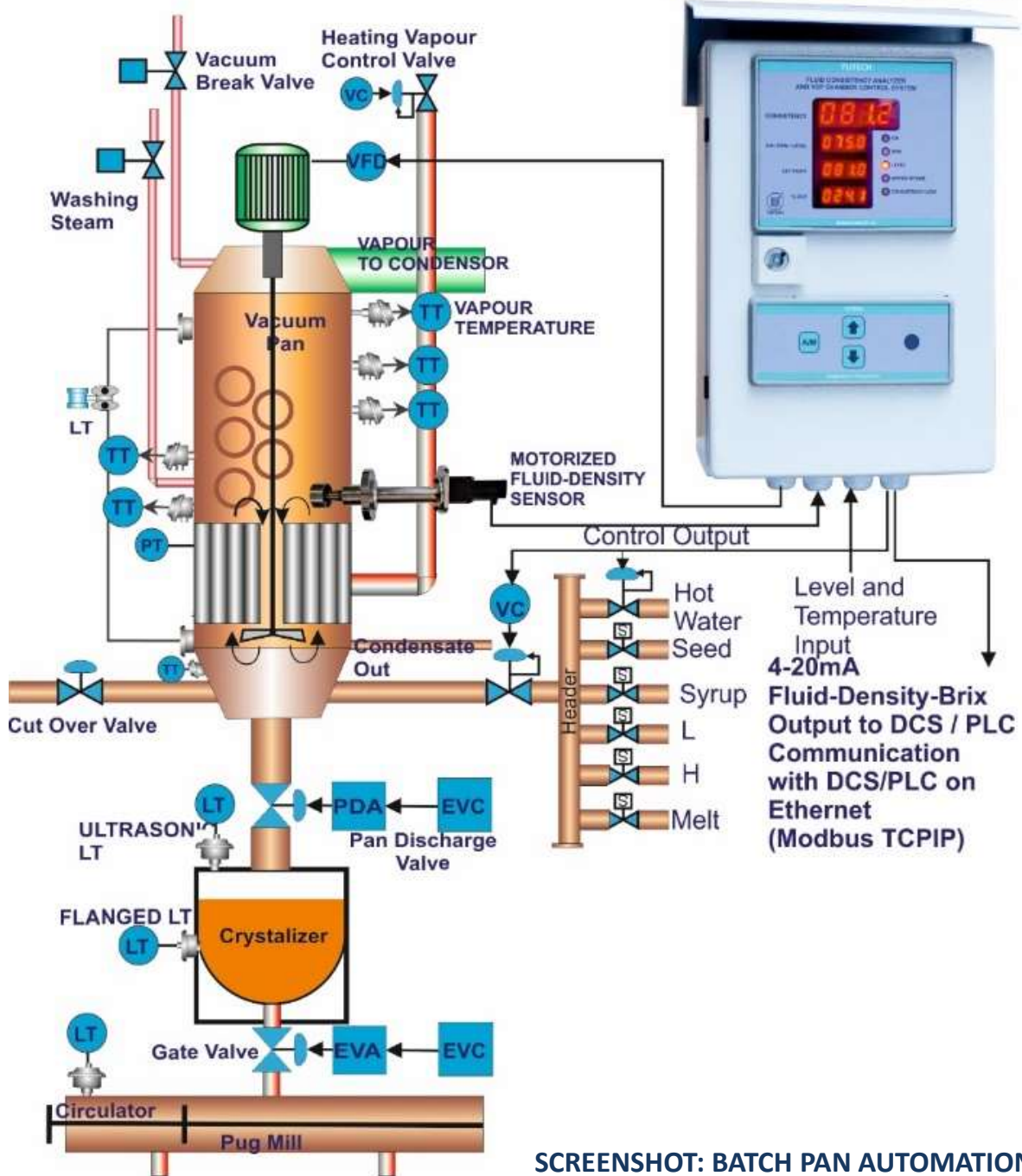
# BATCH PAN AUTOMATION

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

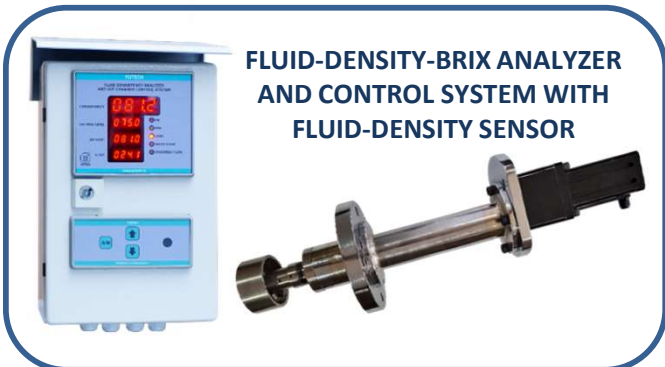
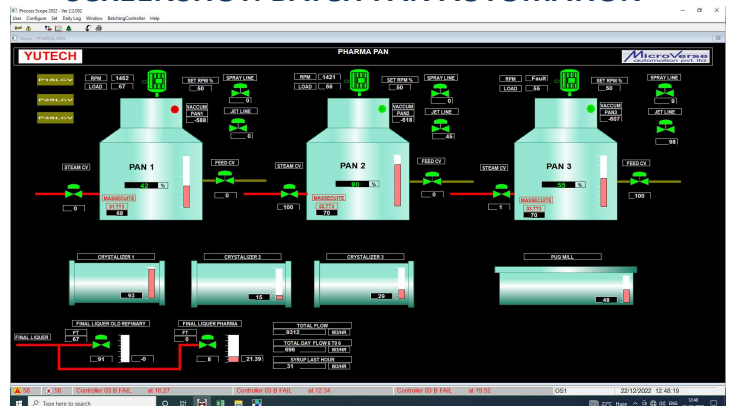


**YUTECH**

## SCHEMATIC DIAGRAM: AUTOMATION OF BATCH PAN WITH MECHANICAL CIRCULATOR FLUID-DENSITY-BRIX ANALYZER



### SCREENSHOT: BATCH PAN AUTOMATION



**FLUID-DENSITY-BRIX ANALYZER  
AND CONTROL SYSTEM WITH  
FLUID-DENSITY SENSOR**

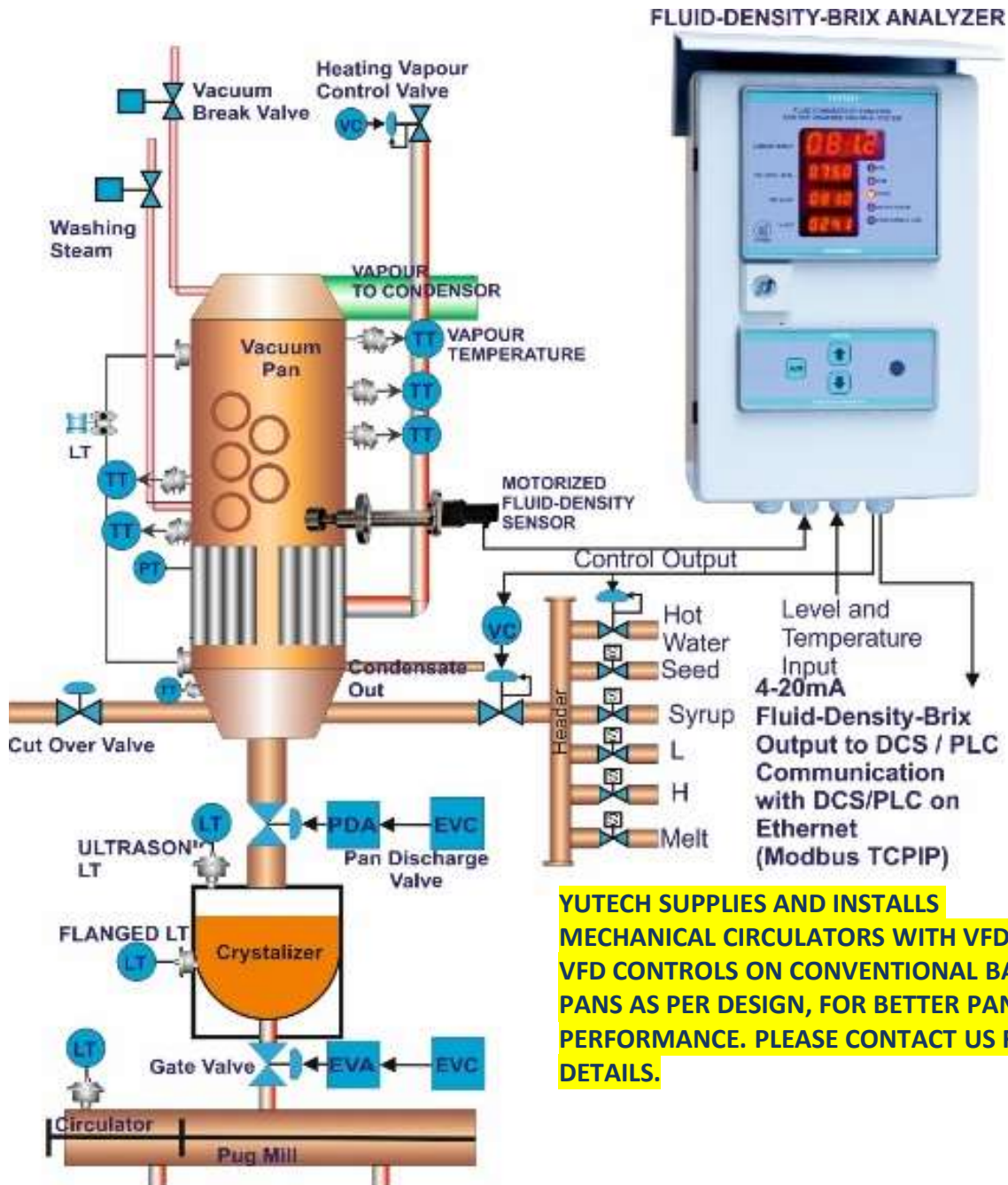
# BATCH PAN AUTOMATION

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



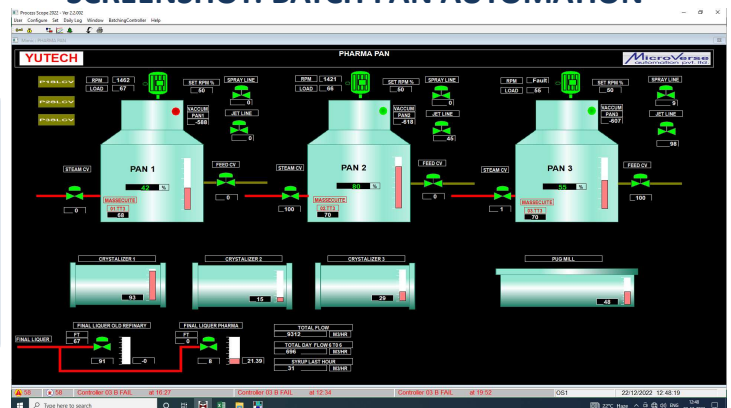
**YUTECH**

## SCHEMATIC DIAGRAM: AUTOMATION OF BATCH PAN WITHOUT MECHANICAL CIRCULATOR



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

## SCREENSHOT: BATCH PAN AUTOMATION



**FLUID-DENSITY-BRIX ANALYZER AND CONTROL SYSTEM WITH FLUID-DENSITY SENSOR**

## BATCH PAN AUTOMATION

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



**YUTECH** approaches Batch Pan Automation from the Process Point of View, and 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 a Control Valve is installed otherwise 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 THE 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 if a Control Valve is installed otherwise the Local Indicator will prompt the Pan Attendant to adjust the Vacuum to a pre-determined value.
- Steam / Heating Vapour Valves Open Signal and/or Indication generated automatically. Valves will open Automatically if the Control Valve is installed otherwise 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.
- The Pan Attendant / Pan-man can intervene and perform Cut-Over operation whenever required by pressing the Cut-Over Key and taking controls to assisted manual mode.
- 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 the max level is reached and Fluid-Density-Brix grows to a preset value, an Indication with an Audio-Visual Alarm is given to charge the slurry, after seeing this Alarm and confirming the process conditions and parameters, the Operator will charge the slurry and then initiate the Pan Drop.
- 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.



# BATCH PAN AUTOMATION

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



### BASIC SCIENCE BEHIND FLUID-DENSITY-BRIX:

- **Fluid-Density:** the Density of a particular Fluid.
- **Density:** is defined as “**Mass per unit volume**”, which means it 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 Fluid-Density, m is the Mass and V is Volume. The unit to measure Fluid-Density is **kg/m<sup>3</sup>** (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” Masecuite in CVP, Brix of Sugar Melt, and Brix in a Molasses Conditioner unit, they cannot measure Brix of “A” Masecuite 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 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 OF FLUID-DENSITY-BRIX ANALYZER:

- Fluid-Density Type Brix Analyzer System targets sensing the Fluid-Density of Liquids, Slurries, or Syrups like Sugar Masecuite, 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.



### FLUID CONSISTENCY-BRIX ANALYZER AND CONTROL SYSTEM WITH FLUID-DENSITY SENSOR

FOR MORE DETAILS, PLEASE SEE THE PRESENTATION ON OUR WEBSITE [www.yutechautomation.com](http://www.yutechautomation.com).

CHANNEL PARTNER:

## YU Technologies Pvt. Ltd.

HO & Works: B 8/5, MIDC, Miraj, 416 410, Distt: Sangli, Maharashtra, India.

T: +91 233 2644042, +91 916 832 4851, +91 916 832 5127 / 8.

E: [info@yutech.in](mailto:info@yutech.in); [sale@yutech.in](mailto:sale@yutech.in) W: [www.yutech.in](http://www.yutech.in); [www.yutechautomation.com](http://www.yutechautomation.com)