

# KEELO SOFT

by JPT

## 1.Disclaimer

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## 2.Introduction

KELLO SOFT by J P Techatronics is a soft tool for control and automation of different construction equipment machine like batch plant, mixers, concrete sprayers, tunnelling machine etc. Where in a data acquisition system is provided with user interface guided by automated process flow.

### 2.1 Application

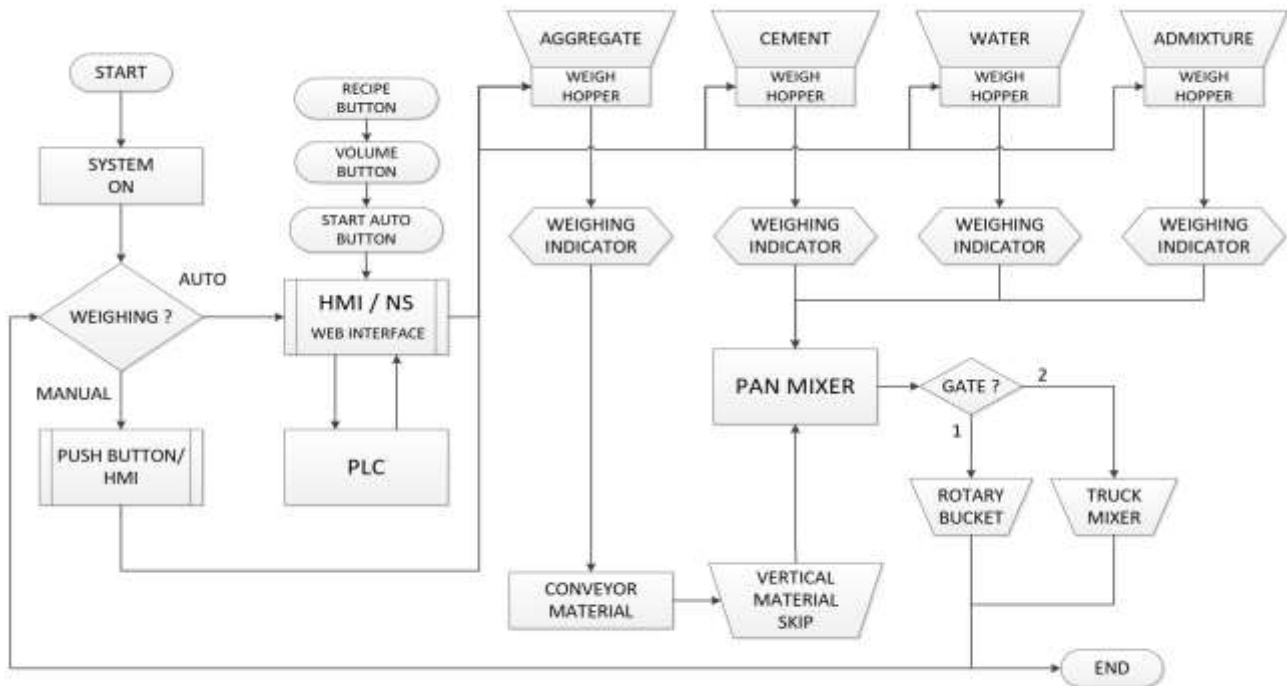
Used for different construction equipment machine like batch plant, mixers, etc illustration below



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### 3. Technical details:

#### 3.1 Flow Chart



#### 3.2 Configurable Sensor Parameter Control

##### ➤ Alarms Sensors

- Aggregate Filling Fault Alarm
- Cement Dead Weight Fault Alarm
- Additives Dead Weight Fault Alarm
- Water Filling Fault Alarm
- Additives Filling Fault Alarm
- Aggregate Discharge Fault Alarm
- Cement Discharge Fault Alarm
- Water Discharge Fault Alarm
- Additives Discharge Fault Alarm
- Skip Waiting Position Fault Alarm

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- Skip Up Position Fault Alarm
- Skip Down Position Fault Alarm
- Mixer Gate Open Fault Alarm
- Mixer Gate Close Fault Alarm
- Aggregate Hopper Gate Close Alarm
- Cement Hopper Gate Close Fault Alarm
- Additives Discharge Valve Alarm
- Mixer Not Running Alarm
- System in Manual Mode Alarm
- PLC is On Hold Condition Alarm
- Aggregate out of Tolerance Alarm
- Cement out of Tolerance Alarm
- Water out of Tolerance Alarm
- Additives out of Tolerance Alarm

➤ **Transfer Belt Sensor Operations:**

- Belt Operation: Select Belt Operation Auto/Manual. If manual is selected, then the user needs to manually Switch On & Off the belt.
- Belt Control: Select Belt operation between “Intermittent” or “Continuous”. If ‘Intermittent’ is selected, then the transfer belt starts & stops after discharging each aggregate batch. If selection is ‘Continuous’, then the belt stops after completion of last batch of a full load.
- Belt Sequence: Select Belt to be started in Time based or Sequence based. If selected, time based, then the belt starts immediately once the load is started.
- Belt Transfer Time: Enter the time taken by an aggregate materials to reach waiting hopper / mixer after discharging from the aggregate / weighing conveyor.
- Belt Pre-Run Time: It is the time for which the belt will run for 75% of belt transfer time defined so that the partial aggregate materials from the aggregate conveyor discharges. This shall increase the plant productivity by reducing the total cycle time. (Note: Please check the mechanical arrangements before enabling this feature.)
- Belt Delta Delay: Here, define the delay time to switch on the Transfer Belt motor from Star to Delta.
- Belt On Delay: This is the time delay to start the transfer belt motor after on command is received.
- Belt Off Delay: This is the time delay to stop the transfer belt motor after discharging the aggregate materials.

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- Belt Hooter Time: The system shall buzzer for the defined time before starting the belt

➤ **Waiting / Preload Hopper Operations:**

- Waiting Hopper Sensor: User can select the presence of Level Sensors by “Yes / No”.
- Hopper Discharge Time: Enter the time taken by the waiting hopper to discharge all aggregate materials into the mixer.
- Hopper Discharge Half Time: Enter the time to discharge aggregate materials from waiting hopper in to mixer.
- Hopper Full Open Time: Enter the time taken by the hopper gate to reach its fully opened position.
- Hopper Close Time: Enter the time taken by the hopper gate to reach its fully open to closed position.
- Hopper Half Open Time: Enter the time taken by the hopper gate to reach its mid position.

➤ **Input Signals :**

- Put ON the mixer and confirm proper star to delta transition.
- Ensure the mixer ON feedback input is indicated in the PLC.
- Similarly operate other moving equipment and check for following feedback indications on PLC.
- Transfer belt ON feedback ( True when ON).
- Skip Ascending and Skip Descending feedback (True when ON).
- Aggregate Extractor belt (False when ON) or Aggregate hopper gate close feedback (True when Closed).
- Cement Weigher gate close feedback ( True when Closed).
- Water Weigher gate close feedback (True when Closed).
- Additive Weigher gate close feedback ( True when Closed or False when Discharge Motor ON)

➤ **Output Signals :**

- Additive Weigher gate close feedback ( True when Closed or False when Discharge Motor ON)
- In Case of Skip it is advisable to simulate sensor / limit s/w operation and confirm proper skip operation & signal.

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- Put ON each Aggregate bin and physically check for respective bin gate operation.
- Repeat above step for each ingredient of Cement, Water Additive etc.

## 4. Interfaces:

### 4.1 Production Screen



In this screen user shall be able to access Today's Order, Delivery Order, Tickets for Docket Queue along with the Auto Batching Cycle.

- From Today's Order, Load can be given directly or from ticket section, ticket can be created by drag & drop at the Ticket Section.
- Delivery Order is given in this Production section, where user can access the delivery order & can schedule the DO from the same screen.
- Per Load Qty. – Enter quantity in m3 which you wish to take a load.
- Batch size – The batch size shall be calculated by the mixer maximum capacity. If user wishes to change the batch size, the same can be changed by the user. This batch size should be between mixer maximum & minimum capacity.
- Batches – Enter the number of batches
- Note: At a time Per load qty or Batches can be entered both cannot be entered.
- User can start the load by clicking on Set Load button.

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## 4.2 Production / Mimic Screen



## 4.3 Reports



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The above screen facilitates to generate offline reports.

- Enter Docket Title & Address along with the GST/PAN/CIN Nos. User can print all these details on all data reports.
- Select Printer Selection for Docket Challan & Technical Batch Report.
- One can select Local Printer or through Local Area Network for printing of each reports.
- Docket Format Type – Docket or Combined
- Docket Challan – Print, Show Only, Print & Show, None.
- Batch Format Type – Detailed, Cumulative, Family Code Detailed, Family Code Cumulative.
- Batch Report – Print, Show Only, Print & Show, None
- Invoice (Optional) - Print, Show Only, Print & Show, None.
- Report Display Sequence – Based on the selection, the products shall be arranged & displayed in the Batch Reports.

## 5. Systems Safety Precaution

- Only qualified and trained Employees may work on or near Exposed Energized Electrical Parts or Electrical Equipment.
- Stand on Insulated safety mat /Install safety mat on Floor where you stand
- Safety glasses must be used in jobs like cutting, drilling & while using air blower.
- Hand protection in the form of suitable gloves should be used for handling hot objects, glass, or sharp-edged items.
- When using an interlock as a safety device, ensure that it of a fail-safe design.
- De-energize electrical circuits before repairs are made. Use a LOCK on main switch. Take out a electrical panel key after locking the electrical panel and during Mixer maintenance.
- Isolate equipment controlled by the automation systems from the control system.
- Safety Shoes must be worn in shop area compulsorily.
- Do not stand directly in front of an electric panel when operating the disconnecting means or operator switch.
- Before connecting the power supply ensure that no individual is working on the panel/machine.
- While working / testing on connected Motors, Keep the motors locally earthed.
- Ensure or remove loose clothing or jewelry (watches, rings etc) before working on a machine or panel.

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- Watch out for sparks, burning smell, smoke or short circuits in the workshop
- To avoid damage of multi-meter, do not use Multi-meter in Current mode/ series current mode to check Voltages.
- Ensure emergency contacts are available to you, e.g. First Aid, Vehicle, Driver, Phone contacts, person to aid you.

## 6.DO'S AND DONT'S – Safety

### ➤ Safety Test:

- Check direction of mixer motors one by one. For inclined belt remove V-belts and take trial for direction of the motor. Then connect the belts to gearbox.
- Keep the Mixer Area Emergency S/w in depressed position and put ON the mixer MCCB / MCB.
- Ensure mixer to be empty and the gate to be closed.
- Operate Mixer through manual PB and confirm that mixer does get ON.
- Now release the Emergency S/w, Open the mixer Hatch and repeat the above step.
- Close mixer hatch, and start mixer and stop, confirm the mixer shaft rotation to be proper through inspection window.
- After confirming the direction run the mixer for some time and observe.
- Confirm mixer no load current to be as per manufacturers specifications.
- Press Emergency S/w and confirm that the mixer stops.
- Run the mixer again and with due care open mixer hatch to ensure that the mixer stops.
- Carryout similar activities for Skip/Belt, Silo area etc. and ensure proper safety operation and direction of rotation of each equipment.
- In Case of Skip it is advisable to simulate sensor / limit s/w operation and confirm proper skip operation & signal.

### ➤ Interlocks:

- Ensure following operational interlocks, as configured in the software.
- Skip/Belt operation with respect to Mixer and Mixer gate status.
- All weigher gate operations with respect to Mixer and Mixer gate status.
- Aggregate discharge operation with respect to Belt status / Skip position.
- Feeding of each material with respect to weigher gate position

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