



# Sugar Library

Advanced ABB Ability™ System 800xA application library  
for the sugar industry



- Reduction of total cost of ownership
- Optimize energy consumption
- Engineering and operator efficiency





# Sugar Industry needs

Today's Sugar processing industries are experiencing increased demands to reduce costs, while maintaining more stringent food safety and higher productivity standards. The immediate need is to deploy a solution that offers a reduced total cost of ownership and at the same time ensuring highest reliability and product quality. The trend towards consolidation of the process control, shutdown, electrical control and maintenance management systems into a single unified platform continues, with increasing demands for access to additional relevant and up to date information.

ABB's Sugar Library is built from knowledge attained through experiences in numerous projects done with sugar manufacturers and latest process control philosophies are incorporated within the library.



# Challenges and needs for the sugar Industry

Sugar processing is an energy intensive industry that requires precise control and continuous reliability, especially during seasonal production cycles. ABB can help you maintain quality and food safety while improving operational efficiency and satisfying customer demands such as flexibility with variants and challenges such as product quality and time to market. Our control solution helps improve your operations while using less energy.

The Sugar Library comprises components for control and supervision. Each are complete functional units, ready for use and which can be adapted to specific user needs or process requirements. They provide specific advantages for various functional areas that help achieve the targeted

outcomes and benefits. For instance, a significant benefit of the library is that it helps manufacturers increase operational efficiency and release manpower to focus on other important plant activities, while safeguarding product quality.

## Sugar industry challenges

### External:

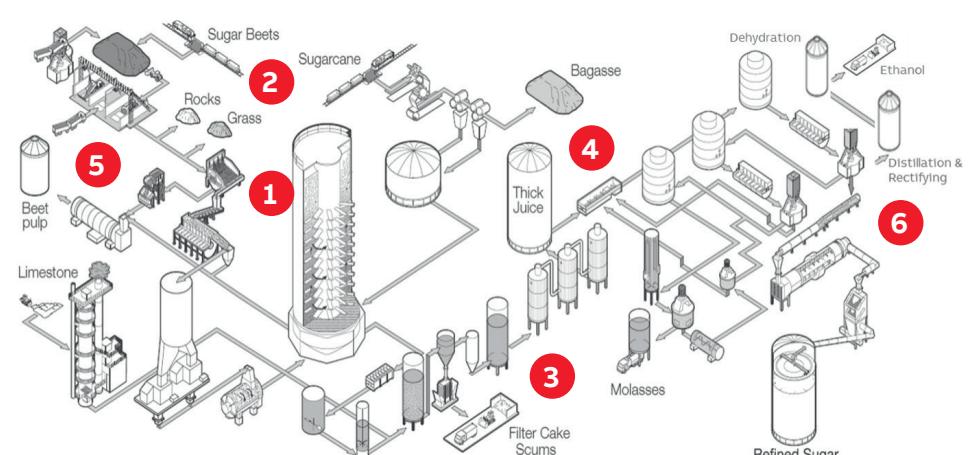
- Fluctuating production
- Low yield from crops
- Short crushing cycles
- Small capacity mills
- Controls on exports
- Seasonal industry, cannot afford processing delays

### Internal:

- Old and obsolete technologies
- Low recovery from plant
- High production costs
- High recurring costs
- High energy consumption
- Poor KPI management and adherence
- Rigid and inflexible control and visualization schemes

## ABB's Sugar Library solution addressing sugar industry challenges

- 1** Lowering energy and greenhouse gas emissions
- 2** Reducing inventory costs
- 3** Increasing asset utilization and throughput
- 4** Improving quality, reducing variations and errors
- 5** Maximizing raw material traceability
- 6** Enabling lean and agile manufacturing



# ABB Sugar Library Offerings

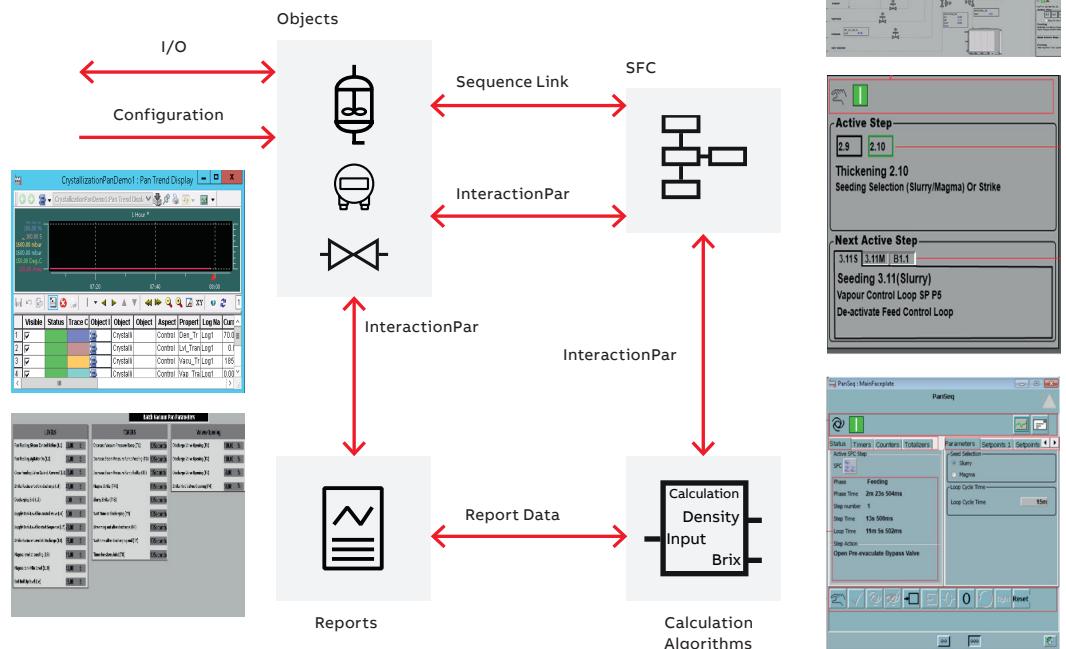
Built from knowledge attained through experiences in numerous projects done with sugar manufacturers



- Comprehensive application library, part of ABB Ability™ System 800xA offerings for the Sugar Industry
- Leverages global ABB Sugar industry expertise to ensure optimum operational and engineering efficiency and services
- Library solution ready to deploy with quick customization and commissioning
- Standards based, yet flexible and customizable
- Adaptable to specific user needs and process requirements
- Process templates designed for control and monitoring of different process areas/equipment in Sugar plants like Batch Vacuum pan, Centrifuge, Continuous crystallizers, Evaporators, Candle Filters etc.
- Modular architecture to customize for any OEM equipment used in Sugar plant
- Can be extended for brown field and green field requirements
- Extensive user documentations and online help

## Library structure and deployment

- Modular architecture
- Easy to deploy custom algorithms
- Flexible report generation
- Support for reconfiguration for High Performance HMI visualizations in process graphics

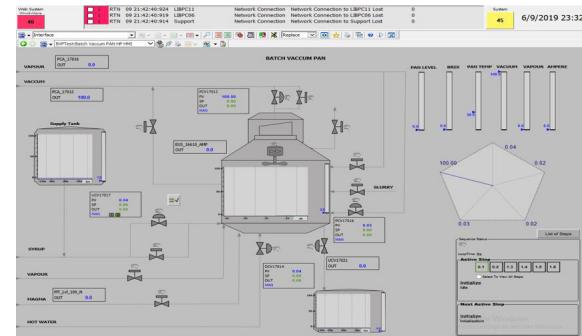


## Ready-made control schemes and High Performance HMI visualizations for Sugar Process Areas

1

### Crystallization: Batch Vacuum Pans

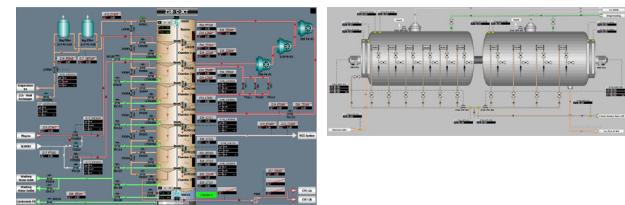
- Customizable templates with control schemes for Vacuum, Vapor, Fresh water, Density, Level and Brix control
- Efficient monitoring of boil up curves with customizable algorithms
- Strike hold operations with alerts for operator
- Data logging for analysis for better Sugar recovery and for overall process and equipment efficiency
- Better control for steam economy, better shape & homogeneity for crystals



2

### Crystallization: Continuous crystallizers

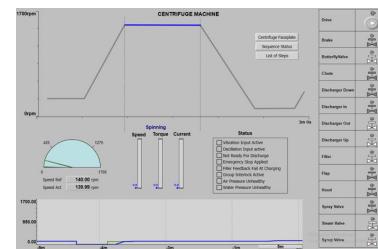
- Customizable templates with control schemes for Vacuum, Vapor, Flow, Level and Agitation control.
- Optimal Brix control
- Efficient monitoring of process to optimize the resource and energy usage
- Data logging for analysis for better Sugar recovery and for overall process and equipment efficiency



3

### Crystallization: Centrifuge

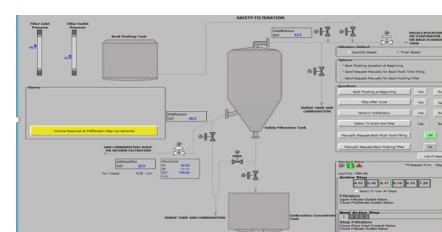
- Phase based control for centrifuge with customizable templates
- Interaction command window which can be used for control and monitoring of the centrifugal machine from control builder.
- Speed curves for operator for better monitoring of process



4

### Filtration: Candle Filters

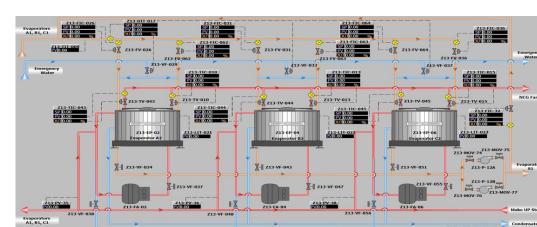
- Multistage filtration support
- Backwash sequence support
- Filter cleaning support to avoid scaling
- Intuitive alerts for operators about process conditions and optimal recirculation based on process conditions



5

### Evaporation: Falling Film Evaporators

- Easily customizable templates for the OEM evaporator equipment used
- Flexible controls for managing steam economy and optimal density control with the OEM evaporator equipment used
- Data logging for analysis



## Dynamic High Performance HMI Visualizations

Configurable SFC (Sequential Function Chart) design leads to operator efficiency

- The visualization is operator friendly unlike SFC viewer and auto generated. The description for steps actions can be modified as per user needs via Native Language Support
- The visualization supports any SFC with unlimited steps and unlimited phase configurations
- The code is protected and not exposed like in SFC viewer still allowing the user to configure the SFC as per needs. Leads to higher operator efficiency, offers engineering flexibility

1

### Device list & device object initialization

Name	Data Type	Initial Value	Parameter	Attributes	Direction	Description
1	string(30)		AgitatorName		in	IN Object Name of the object.
2	Desc	string(40)	AgitatorDesc		in	IN Object Description.
3	IO	MotorBIMIO	IO_Agitator		in_out	InOut Process Value from device
4	Command	MotorInterfaceCmd	default	SeqPar.Cmd_Agitator	in	IN Command to the Object
5	Feedback	MotorInterfaceFB	default	SeqPar.FB_Agitator	out	OUT Feedback from the Object
6	GroupConfig	GroupConfigFB	default	SeqPar.Group		
7	EventConfig	dint	4	4	in	IN Feedback config 0:FB1'FB2'FB0-1:FB1'FB2'2:FB1'FB2'3:FB1'FB2'
8	FailSafe	dint	0	0	in	IN Initialize object state _0=Deactivate, 1=Activate1, 2=Activate2
9	AECfg	dint	1		in	IN AEConfig 0=None, 1=Alarm, 2=Event, 3=Event1, 4=Indication, else A
10	AEClass	dint	1	AEClass	in	IN Class for AVE. Range 1-9999

2

### Device list & device configuration

DeviceStatus	ALL
PredValveBypass	0
FeedSolInletValve	0
AgitatorName	0
VentName	0
SlurryInletValve	0
MagmaInletValve	0
SteamOpenFeed	0
SteamOpenPump	0
SteamChillLoop	0
Name	100.00
Status	DeviceStatus
DeviceStatus	ReportData
DeviceStatus	Motors
EUS_16610_N1	
Device Config	Faceplate

Device	BPV1 - MainFaceplate	BPV1
Status	DeviceStatus	Values
PredValveBypass	0	0
FeedSolInletValve	0	0
AgitatorName	0	0
VentName	0	0
SlurryInletValve	0	0
MagmaInletValve	0	0
SteamOpenFeed	0	0
SteamOpenPump	0	0
SteamChillLoop	0	0
Name	100.00	100.00

3

### List of steps

List of Steps		Transition Configuration	
Step Name	Step Description	Step Timer	Transition Status
S1_Start	Idle	1d 1h 45m 11s	
S2_Init	Initialization	5s	
S3_Feeding	Open Pre Evaluate Bypass valve	0s	
S4_Feeding	Activate and Ramp Vacuum control loop	0s	
S5_Feeding	Open Feed sol Inlet valve	0s	
S6_Feeding	Activate and Ramp Vacuum control loop	0s	
S7_Feeding	Start Agitator Fast Speed	0s	
S8_Feeding	Close Feed sol Inlet valve	0s	
S9_Thickening	Open Feed Control valve	0s	
S10_Thickening	Seed Selection (Slurry/Magma) Or Strike	0s	
S11_Seeding_Slurry	Vapour Control loop SP PS	0s	
S12_Seeding_Slurry	Open Slurry Inlet valve and Start Timer 9	0s	

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### Configurable SFC – Design

**Configurable SFC Code Blocks**

```

graph TD
    subgraph "Configurable SFC Sequence"
        CH[Command & FB Handling] 
        SC[SFC Core]
        SS[Steps Status]
        CH --> SC
        SC --> SS
    end
    UserSFC[User SFC] --> SFCSeq[SeqPar FB]
    SFCSeq --> SC
  
```

**Configurable SFC User Interface**

**Steps Display**

Step No.	Action	Time
0	VacuumStartUP	0.00
1	PreHeat	0.00
2	MinHeat	0.00
3	MaxHeat	0.00
4	HoldHeat	0.00
5	DemagInit	0.00
6	DemagRun	0.00
7	DemagCoolInit	0.00
8	DemagCoolRun	0.00
9	DemagStop	0.00

**Transition condition display**

Step	Condition Logic
STEP 0	(SupplyStartUp AND (SupplyTankLevel < Setpoints.Level.LS)) OR (SupplyStartUp AND MinHeatOnHold)

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### Dynamic display of steps

**Sequence Status**

LoopTime: 13s

**Active Step**

1.3 1.4 1.5 1.6 1.7 1.8

Feeding 1.3  
Open Pre-evaluate Bypass Valve

**Next Active Step**

Feeding 1.4  
Activate and Ramp Vacuum Control Loop  
Close Pre-evaluate Bypass Valve

Select To View all Steps 10

Enter No. Of Indicators

**General Properties BNP**

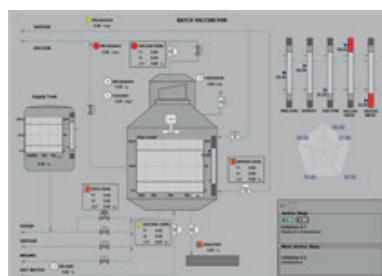
1/11/2019 9:51:1... 4/13/2018 1:29:0...

**BVPSquence: General Properties BNP**

Name	Type	Description	Readable?
PhasedEndingStep	String	5.8.14.19.22.24.3	Yes

6

### High Performance HMI



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### Transition Conditions display

**Step 19**

**Transition Condition Logic**

```
(SupplyStartUp AND (SupplyTankLevel < Setpoints.Level.LS)) OR (SupplyStartUp AND MinHeatOnHold)
```

**Transition Condition Signal and Value**

Signal	Value
SupplyStartUp	0
SupplyTankLevel	0
Setpoints.Level.LS	0
MinHeatOnHold	0

**SeqCore : Steps**

Step
0.2
1.3
1.4
1.5
1.6
1.7
1.8
2.9
2.10
3.11
3.12
3.13
3.14
3.15
3.16
4.17

Select To View All Steps

## Lower total cost of ownership

### Value propositions

- Modular architecture leverages ABB's rich domain experience in commissioning sugar plants
- Template based development leading to savings on engineering time thereby leading to reduction of cost of projects
- Savings on commissioning time leading to reduction of cost of projects
- Scalable architecture – Expansions are easy
- Flexible engineering model – Modifications are easy
- Customizable SFCs enabling seamless changes by plant operators
- Auto reconfiguration of dynamic High Performance HMI visualizations saves of time, efforts, costs and ensures efficiency
- Reduction of total cost of ownership
  - Low engineering & maintenance costs
  - Life cycle maintained
  - Roadmap available
  - Update & Upgrade supported



# Talk to us



## The right approach

You can rely on ABB to unlock the right solution for your sugar plant. We work in direct partnership with you to develop the services, solutions and processes to achieve your business goals.



## The right people

ABB works with a wide range of industry specialists and partners. It means that no matter your challenge, our technology and services can help. Our collaborative philosophy means everything we do is embedded with the experience and knowledge of the best people in your sector.

We can even reach beyond ABB to better meet your needs. We routinely work with technology partners, external machine builders, value providers, integrators, distributors and logistics sites to create integrated solutions that work for you.



## And the right expertise

As a global company, ABB is supported by 7,000 experts in R&D centers around the world. This gives you access to continual innovation and the latest developments in industrial automation.





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## ABB Process Industries

[campaign.abb.com/Sugar-Library](http://campaign.abb.com/Sugar-Library)

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