



Welcome to System 1

Version 20.2 [Nov 2020]











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Before you Begin

! Installation !

Before installing System 1 20.2, you <u>must uninstall</u> your previous version of System 1.

! Change to Program ID impacting OPC Data Collection !

As part of the Baker Hughes separation from General Electric (GE), OPC DA import settings have been renamed. In order to **maintain data collection from OPC connections**, please take the following actions:

Property	Prior Versions	Version 20.2	Required Action
Program ID	GE.BentlyNevada.Sys1OPCServer.2	System10PCServer.1	Change Program ID in client to "System10PCserver.1"
DCOM Config Name	System 1 OPC Server	System 1 OPC DA Service	 Before Uninstalling System 1 1. Take a screenshot of DCOM setting for "System 1 OPC Server" for the following tabs: General Security (Launch and Activation/Access/Configuration permissions) Identity After Installing System 1 v20.2 Reapply the DCOM settings to "System 1 OPC DA Service"

For Bently Performance (BP) installations, open the BP template key and change the Program ID from "Input OPC Server" to "System10PCServer.1" (as shown in below image).

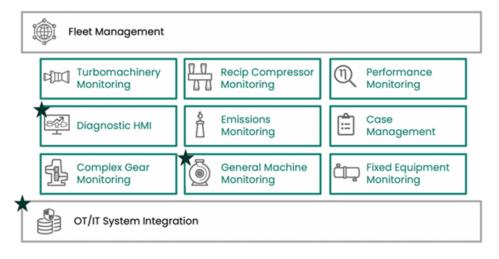
Bently Performance	Performance 0.6.0
Input OPC Server	System10PCServer.1
Auto Start	TRUE
Cycle Time	30000
Status	Ok
Input Cell Range	A10:A200
Output Cell Range	V11:V200

For more details, please refer to System 1 Help.



Welcome

Bently Nevada is pleased to present System 1 v20.2. This release delivers major new capabilities to the OT/IT System Integration, Diagnostic HMI, and General Machinery Monitoring use cases provided by System 1.



OT/IT System Integration

Setpoint Configuration on Rx Databases - Users can now configure Condition Monitoring Setpoints on Rx databases, allowing for more convenient asset management from the Business Network. Setpoints that have already been configured on Tx databases will remain read-only. Database configuration within Rx databases will continue to be expanded upon in future releases.

OPC UA Export – System 1 OPC UA Export has been extended to support instrument hierarchy export from System 1 to OPC UA Clients. In addition, System Health Event export has also been added. OPC UA Export is supported on both Tx and Rx Servers, as well as for Portables Databases. This extension of OPC UA capabilities enables customers to interface the rich dataset of System 1 with external data stores for further analytics and enhanced asset insights.

Diagnostic HMI

HMI View Saving & Export/Import – HMI views can be saved as templates and exported for use in other databases, allowing for more efficient and consistent HMI displays across the asset fleet.

Modbus Enhancements – System 1 v20.2 enhances Modbus connectivity with many new capabilities, including support for 200 Modbus devices per database (compared to 20 devices in System 1 v20.1) and the ability to synchronize setpoints between the Control System and System 1 via Modbus.

General Machinery Monitoring

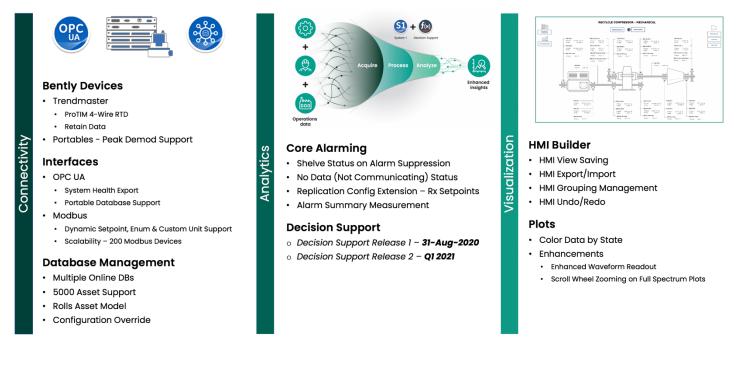
Roll Section Asset Model – Utilizing the new Roll Section asset model, users can configure Paper Machines, Conveyors, and Rolling Mills. Many different roll types are available, allowing the configuration to be customized for varying industrial applications.

5000 Machines per Database – Users can now add up to 5000 machine cases within a System 1 database (previous limit was 2000 machine cases), allowing users to configure, monitor, and compare more machines across their facility.



Complete New Capability List

Users upgrading to System 1 v20.2 will also benefit from several other improvements to the platform, as outlined below:



Bently Nevada remains focused on delivering the world's premier plant-wide machinery management software through bi-annual product releases. For a detailed overview of the System 1 platform, please visit the <u>System 1 Website</u>.

Thank you,

11m

Chris Kramm System 1 Product Manager, On behalf of your System 1 Leadership and Development Teams Bently Nevada, a Baker Hughes business



Table of Contents

1. SYS	STEM 1 V20.2 FEATURE OVERVIEW	6
2. VER	SION SUPPORT & OPERATING SYSTEM COMPATIBILITY	8
3. COI	NNECTIVITY	9
3.1	Bently Devices	9
3.1.1	ProTIM 4-Wire RTD Support	9
3.1.2	2 Retain Data on TIM Replacement (Only for Trendmaster Devices)	
3.1.3	8 Portables Peak Demod Support	11
3.1.4	Bently Performance Migration & Custom Unit support	
3.2	Interfaces	14
3.2.1	I OPC UA System Health Export	14
3.2.2	2 OPC UA Portable Data Export	14
3.2.3	3 Modbus Dynamic Setpoint Support	
3.2.4	4 Modbus Enum & Custom Unit Support	
3.2.5	5 Modbus Device Scalability	
3.3	Database Management	17
3.3.1	1 Multiple Online Databases	17
3.3.2	2 5000 Machine Case Support	17
3.3.3	3 Roll Section Asset Model	
3.3.4	4 Configuration Overwrite	
3.3.5	5 User Template Upgrade	
4. AN/	ALYTICS	21
4.1	Core Alarming	21
4.1.1	Shelve Status on Alarm Suppression	
4.1.2	2 No Data Status	
4.1.3	3 Setpoint Configuration on Rx Databases	
4.1.4	Alarm Summary Enhancements	
5. VIS	UALIZATION	23
5.1	HMI Builder	
5.1.1	HMI View Saving	
5.1.2	2 HMI Export/Import	
5.1.3	3 HMI Grouping	
5.1.4	1 HMI Enhancements	
5.2	Plots	27
5.2.1	1 Color Data by State	
5.2.2	2 Enhanced Waveform Readout	



1. SYSTEM 1 V20.2 FEATURE OVERVIEW

	Connectivity				
	Bently Devices				
ProTIM 4-Wire RTD Support	System 1 now supports all ProTIM channel types, with the addition of the ProTIM 4 wire RTD channel.	3.1.1			
Retain Data on TIM Replacement	When replacing a TIM with another TIM and the channel type and channel numbers match, historical data is now retained.	3.1.2			
Portables Peak Demod Support	System 1 now supports PeakDemod measurements, which can be sent to SCOUT200 devices as part of a route.				
6.x API Custom Unit Support	Migrated System 1 Classic API tags (via 6.x connector) with unknown unit can be assigned a custom unit or replaced with a Bently unit.	3.1.4			
	Interfaces				
OPC UA Instrument Hierarchy & System Health Export	System 1 OPC UA Export has been extended to support instrument hierarchy export from System 1 to OPC UA Clients. In addition, System Health Event export has also been added.	3.2.1			
OPC UA Portables Database Support	System 1 now supports OPC UA export of data and events from Portables databases that have Data Collection Enabled.	3.2.2			
Modbus Dynamic Setpoints [<u>PostgreSQL]</u>	Synchronize setpoints between the Control System and SI via Modbus.	3.2.3			
Modbus Enum & Custom Unit Support	Support for Enum points and custom units has been extended to tags from Modbus devices.	3.2.4			
Modbus Device Scalability [<u>PostgreSQL]</u>	Add up to 200 Modbus devices to a System 1 Database (previous limit was 20).	3.2.5			
	Data Management				
Multiple Online DBs [<u>PostgreSQL]</u>	Customers can now enable data collection on up to 5 databases on a single System 1 server, based on the system specification.	3.3.1			
5000 Machine Case Support [<u>PostgreSQL]</u>	Add up to 5000 machine cases within a single System 1 database (previous limit was 2000 machine cases).	3.3.2			
Roll Section Asset Model	A new asset type, Roll Section, has been added to the Configuration Library, allowing users to build Paper machines, Conveyors, Rolling Mills, and more.	3.3.3			
Configuration Overwrite [<u>PostgreSQL]</u>	A Configuration-Only Backup can be restored onto a database, allowing for configuration to be modified on a separate machine, while preserving all collected data	3.3.4			
User Template Upgrades	System 1 now supports upgrading user defined templates that were exported from a previous version of System 1.	3.3.5			



Analytics							
Core Alarming							
Shelve Alarm on Suppression	When suppressing an alarm, users can choose to shelve the alarm and its associated status propagation throughout Display.	4.1.1					
No Data Status	When System 1 stops receiving data from an instrument (e.g., Device Not Communicating, Config Out-of-Date), a No Data state occurs, which is propagated in Display as an Instrumentation Level 3 Alarm.	4.1.2					
Setpoint Configuration on Rx Databases	Users can now configure Condition Monitoring Setpoints on Rx databases, allowing for more convenient asset management from the Business Network	4.1.3					
Alarm Summary Enhancements	Enhancements to the Alarm Summary Measurement, including ability to configure setpoints on status measurements (e.g., Have New Alarm).	4.1.4					

	Visualization	
	HMI	
HMI View Saving	Save created HMI views. When adding new views, select from one or more saved tabs to quickly build out HMI view suites per asset.	5.1.1
HMI Export/Import	Export saved HMI views to a file. This file can be imported into other databases, allowing for consistent and efficient HMI view building.	5.1.2
HMI Grouping	Advanced grouping control is now available, allowing users to group any selected content within the view. Groups can have labels and titles, enhancing content organization and readability.	5.1.3
HMI Enhancements	Other enhancements to the HMI builder include undo/redo, component navigation, and new symbols. See video for more details.	5.1.4
	Plots	
Color Data by State (PostgreSQL*)	Users can color code data from different machine operating states within the Plots workspace, enabling deeper analysis of machine condition and its change over time.	5.2.1
Enhanced Waveform Readout	 Display Cursor difference in Frequency unit in Timebase plot Display Crest factor and Waveform O/All (in rms) values in cursor readout in Timebase and Orbit Timebase plot 	5.2.2
Scroll Wheel Zooming on Full Spectrum Plots	When scroll-wheel zooming, Full Mode plots (Spectrum, Waterfall, Cascade) are zoomed symmetrically around the X-axis mid-point.	_



2. VERSION SUPPORT & OPERATING SYSTEM COMPATIBILITY

System 1 follows a semi-annual release cadence with targeted releases in May and November of each year. Versions are fully supported for a minimum of two years from the published date of availability (Table 1).

New Versions of System 1 benefit from:

- Compatibility with the latest Microsoft Client & Server Operating Systems
- Client backwards compatibility to previous versions under support (20.2 Client to 19.1 Server DB)
- Database upgrade from previous versions released within last 3 years ($18.2 \rightarrow 20.2$)
- Security patch & update testing for the latest available version
- Bug fixes included in the latest available version
- Standard technical support with escalation to engineering as required

Versions no longer supported:

• Standard support is provided for common FAQ inquiries, but users are encouraged to update software to the latest version to benefit from new features, OS compatibility, and bug fixes.

Syst	em 1 Version	s & Support		Win	dows Serv	Windows Client OS (64bit)				
Version	Available	End of Support	2019	2016	2012 R2	2012	2008 R2	10**	8.1 U1	7 SP1
20.2	Nov 2020	Nov 2022	~	~	✓			~	~	
20.1	May 2020	May 2022	<	~	1	1		~	~	
19.2	Nov 2019	Nov 2021	×	~	1	~	~	~	~	~
19.1	May 2019	May 2021	<	~	1	1	~	1	~	~
18.2	Dec 2018	Dec 2020		~	✓	1	~	~	~	~
18.1	Jul 2018	Jul 2020		~	✓	~	✓	~	~	×

Table I: System I Version Support & OS Compatibility Matrix

**Windows 10 version compatibility will track Microsoft's published release and support model. The latest version of System 1 will be tested and supported on all versions of Windows 10 under support as published on their website based on the System 1 version's published date of availability.

System 1 v20.2 (Windows 10 v1903, 1909, 2004)

System 1 v20.1 (Windows 10 v1903, 1809, 1803)

System 1 v19.2 (Windows 10 v1903, 1809, 1803)

System 1 v19.1 (Windows 10 v1809, 1803) System 1 v18.2 (Windows 10 v1803, 1709)



3. CONNECTIVITY

3.1 Bently Devices

3.1.1 ProTIM 4-Wire RTD Support

Trendmaster DSM video located in Bently Nevada Tech Support Training Library Valid M&S Agreement Required

System 1 v20.2 adds support for the 4-Wire RTD channel type from the ProTIM (Programmable Transducer Input Module) family. With this addition, all ProTIM channel types are supported within System 1.

A complete list of supported channel types is captured in Table 2. Customers can migrate configuration and data for supported channel types, including spectral band configuration, setpoints, and data.

TIM	19.2	20.1	20.2
ProTIM	 Accel to Velocity Point Low Frequency Accel to Velocity Point Rack Buffer Output point Temperature Point: 2-3 wire Platinum RTD Temperature Point: TC K Type Speed Input: Keyphasor 	 Displacement Point Pressure Point Process Points Accel to Velocity with AE (Acceleration Enveloping) 	o 4 wire RTD Point
FlexiTIM	 Accel to Velocity FlexiTIM 100 Ohm Platinum RTD FlexiTIM J Type TC FlexiTIM K Type TC FlexiTIM 		
TIM		 Displacement Point Keyphasor Point Process Points Rack Buffered Keyphasor Point Rack Buffered Output Point Accel to Velocity Point Velocity Point Type J Thermocouple Temperature Point Type K Thermocouple Temperature Point 	
1900 Monitors		 1900/25 Velocity Monitor 1900/55 Fan Monitor 	

Table 2: Supported Trendmaster Channel Types (see Data Sheet for HW P/N)



3.1.2 Retain Data on TIM Replacement (Only for Trendmaster Devices)

In System 1 v20.2, historical data is retained when a customer replaces a TIM with new/spare TIM. This feature enables customers to view historical data collected with old hardware, while continuing to fetch live data from new hardware, without data loss.

The following conditions summarize when data will be retained:

- If a TIM is replaced with another TIM of the same TIM type and channel type, then historical data and configuration will be retained. Examples are captured in Table 3.
- If the above conditions are not met, then historical data and configuration will not be retained in System 1. Examples are captured in Table 4.

NOTE: Retained configuration includes: Channel & measurement properties, spectrum & waveform configuration, software trended variables, setpoints, Keyphasor association, point mapping, and state trigger definitions.

To retain historical data for non-supported replacement scenarios, users may choose to retain old TIMs (and their historical data) within the hierarchy and then add new TIMs as part of a new configuration. Alternately, users can create audit files to retain historical data before replacing TIMs.

	Original TIM	New (Replacement) TIM
✓	FlexiTIM Accel to Velocity	ProTIM Accel to Velocity
✓	TIM Accel to Velocity	1900/25 Velocity Monitor
✓	FlexiTIM 100 Ohm Platinum RTD	FlexiTIM / ProTIM any other supported Temperature Type
✓	FlexiTIM J Type TC	FlexiTIM / ProTIM any other supported Temperature Type
✓	FlexiTIM K Type TC	FlexiTIM / ProTIM any other supported Temperature Type
✓	ТІМ Ј Туре ТС	ТІМ К Туре ТС
✓	ProTIM 2-3 wire Platinum RTD	ProTIM / FlexiTIM any other supported Temperature Type
✓	ProTIM 4 wire RTD	ProTIM / FlexiTIM any other supported Temperature Type
✓	ProTIM K Type TC	ProTIM / FlexiTIM any other supported Temperature Type

Table 3: TIM Replacement Examples where Historical Data & Configuration are Retained

Table 4: TIM Replacement Scenarios where Historical Data & Configuration are Not Retained

	Original TIM	New (Replacement) TIM					
x	Single channel Legacy TIM	1900 Monitor/FlexiTIM/ProTIM with same channel type					
×	LEEXILIM Accel to Velocity	ProTIM Accel to Velocity w/ Enveloping Or ProTIM Low Freq. Accel to Velocity					
x	Pro LIM Accel to Velocity	ProTIM Accel to Velocity w/ Enveloping Or ProTIM Low Freq. Accel to Velocity					



3.1.3 Portables Peak Demod Support

System 1 now supports PeakDemod measurements, which can be sent to SCOUT200 devices as part of a route. PeakDemod uses a peak-based algorithm to detect full amplitude of low frequency machinery impacts in a high-frequency carrier (up to 40kHz) (Figure 1). It retains the true amplitude of short duration pulses.

For very low speed machines, PeakDemod has the advantage that its peak-widening retains the full amplitude of the impacting events in the waveform, so these impact spikes stay well above the noise floor (Figure 2).

	Points Spectrums & Waveforms Trended Variables Setpoints										୭ ⊕•∣					
ne	Name	Channel Type	Measurement	Sampling Type	Unit	Active	Tach Ref	Fmin	Fmax	Revs	Spectral Lines	Number of	Spectral Resol	Duration	Demod Bandwidth	Algorithm Type
·g, H)	мов_н	Acceleration	Vel Spec(1600 Hz/1600 lines)	Async	in/s rms	\checkmark	None	1.0 Hz	1,600 Hz	-	1600	4096	1.0	-	-	-
·g, H)	мов_н	Acceleration	PeakDemod Spec/Wf(800 Hz/800 lines)	Async	gpk	\checkmark	None	1.0 Hz	800.0 Hz	25	800	2048	1.0	1.0 s	2-40 kHz 🗸	Peak
·g, H)	мов_н	Acceleration	Accl Wf(3000 Hz)	Async	g	\checkmark	None	-	3,000 Hz	7	800	2048	3.75	0.267 s	0.5-40 kHz	-
·g, H)	MOB_H	Acceleration	Vel Spec(6000 Hz/1600 lines)	Async	in/s rms	\checkmark	None	3.75 Hz	6,000 Hz	-	1600	4096	3.75	-	1-40 kHz	-
·g, Н)	MOB_V	Acceleration	Vel Spec(1600 Hz/1600 lines)	Async	in/s rms	\checkmark	None	1.0 Hz	1,600 Hz	-	1600	4096	1.0	-	2-40 kHz 5-40 kHz	-
·g, H)	MOB_V	Acceleration	Accl Wf(3000 Hz)	Async	g	\checkmark	None	-	3,000 Hz	7	800	2048	3.75	0.267 s	5-40 KHZ	-
·g, H)	MOB_A	Acceleration	Vel Spec(1600 Hz/1600 lines)	Async	in/s rms	\checkmark	None	1.0 Hz	1,600 Hz	-	1600	4096	1.0	-	-	-

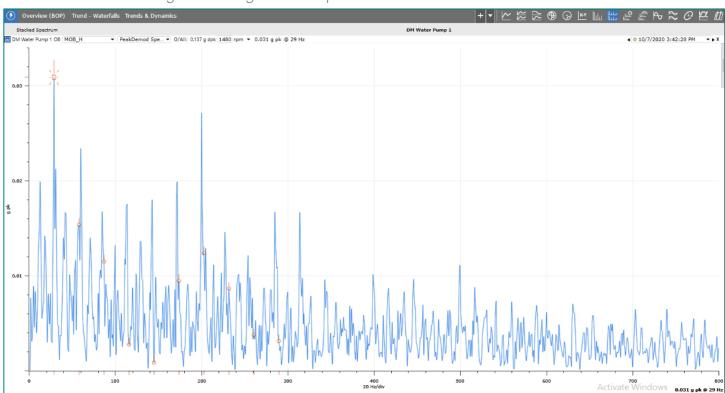


Figure 1: Configuration Properties of PeakDemod Measurement

Figure 2: PeakDemod Measurement on Spectrum Plot



3.1.4 Bently Performance Migration & Custom Unit support

With System 1 v20.2, users can migrate Bently Performance data from System 1 Classic to System 1 Evo. The historical data for these API tags (System 1 Classic Bently Performance Outputs) and new OPC tags (System 1 Evo Bently Performance Outputs) can be overlaid and compared in the Plots Workspace. <u>NOTE</u>: Data from Classic will not be "stitched together" at the same tag level.

To migrate Bently Performance tags into System 1:

1. Migrate Data for API tags via 6.x connector (Figure 3)

Data Migra	tion – 6.x C	onnector							Data Migration – Select API
	Data Migration	? ×							Data Migration ?
General	olarigradon							Select data sour	urces for migration to the System 1 database.
								Data Sources	
System 1 Destination Database:	System1Demo	Browse							OPC Servers Group
Data Source:	S1 6.x Connector	v							API Data Collector Group
Import Options:	✔ All								
	Configuration						、 I		3500 Group
1	✓ Historical Data								MODBUS Group
Source Database									
Database Location:	10.7.1.183						r		
SQL Account User Name:									
Password:	•••••								
Database Name:	BP-EXTERNAL-TRAINING	Browse						Data Range	e: All
Windows Account User Name:	Administrator							Start Time	e: 07/02/2019 08/08/47 PM
Berryord		Test Connection							
Password:		Test connection						End Time	e: 07/02/2020 08:08:47 PM
1									
1									
									Previous Next Cancel
	Previ	ous Next Cancel							Previous Next Cancel
			RD Ou	tputs mig	irat	ed _			
			BP Ou	icputs mile	παι	eu			
		Machines 💣 Devices	General Data Collection Measurement	3					
		System 1Demo 3500 Devices	Points Spectrums & Waveforms Trender	d Variables Setpoints					
	• [OPC Servers	Name	Channel Type Measurement	Active Active	Top Scale	Bottom Scale Unit	Associated A	Associated
		fix Devices fill GenerictivDevice	Actual Discharge Temperature	Generic 6x Channel Temperature	~ m	200.0 *C	0.0 °C °C	Not Associated No.	WI/Spec
		GenerictixDevice	Corrected Expected Discharge Temperature	Generic 6x Channel Temperature	×	200.0 °C	0.0 °C °C	Not Associated No	
		BP-EXTERNAL-TRAINING	Design Suction Temperature (01-K-001A)	Generic 6x Channel Temperature	×	100.0 °C	0.0 °C °C	Not Associated No	
		 API Data Collector Group 	Actual Suction Temperature (01-K-001A)	Generic 6x Channel Temperature	×	100.0 °C	0.0 °C °C	Not Associated No	
		API Data Collector	Actual Discharge Pressure	Generic 6x Channel Custom			0.0 Unknown Unknown		
		O1-K-001A MP Compressor Performance	Corrected Expected Discharge Pressure	Generic 6x Channel Custom	~ ~		0.0 Unknown Unknow	n Not Associated No n Not Associated No	
		 Actual Discharge Pressure Actual Pressure Ratio 	Actual Nolar Mass Standard Suction Volume Flow	Generic 6x Channel Custom Generic 6x Channel Custom	M	60.0 Unknown 100,000 Unknown	0.0 Unknown Unknown 0.0 Unknown Unknown		
		Actual Pressure Katio Actual Discharge Temperature	Standard Suction Volume Flow Normal Suction Volume Flow	Generic 6x Channel Custom Generic 6x Channel Custom	×		0.0 Unknown Unknown		
		Actual Discharge remperature Actual Temperature Ratio	Default Value Flag	Generic 6x Channel Custom			0.0 Unknown Usknown		
			Contrast Contrast Contrast	Custom		are erectown	ore another Olivertown		

Figure 3: API Tag Migration Process

2. Add a custom unit for migrated API tags with unknown units (Figure 4)

API Data Collector Group				_	_			_	Actual Suction Volume Flow Generic 6	v Channel	Custom	1	1	20,000 Unknown	0.0 Unknown	
API Data Collector	Name	Channel Type	Measurement	Active	Active	Ton Scale	Bottom Scale	Unit					v			-
 Performance Calcs for Recompressor 1st stage 									Standard Suction Volume Flow Generic 6	x Channel	Custom	\checkmark	\checkmark	30,000 Unknown	0.0 Unknown	A1
. I renormance cards for recompressor as soage	Actual Discharge Pressure	Generic 6x Channel		~		40.0 bar (a)	0.0 bar (a)	bar (a)		_						
. D. on combourger, raying on other family		Generic 6x Channel		~				unitless			-					
 Performance Calcs for Recompressor 3rd Stage - 1st Tr 	Actual Discharge Temperature	Generic 6x Channel	Temperature	~	\checkmark	200.0 °C	-32.0 °C	*C								
	Actual Temperature Ratio	Generic 6x Channel	Custom	~	×	2.0 unitless	0.0 unitless	unitless			stom Unit	ſ	? ×			
Actual Pressure Ratio	Actual Polytropic Head	Generic 6x Channel	Head	1	1	196.1 kJ/kg	0.0 k3/kg	kJ/kg		Add Cu	stom Unit	l	<u>? ×</u>			
Actual Discharge Temperature	Actual Polytropic Efficiency	Generic 6x Channel	Efficiency	~	1	100.0 %	0.0 %	16		am3/h						
 Actual Temperature Ratio 	Actual Shaft Power	Generic 6x Channel	Power	1	~	3,000 kW	0.0 kW	kW	Name:	am3/jn						
 Actual Polytropic Head 	Corrected Expected Discharge Pressure	Generic 6x Channel	Pressure	~	1	40.0 bar (a)	0.0 bar (a)	bar (a)	Description:							
 Actual Polytropic Efficiency 	Corrected Expected Pressure Ratio	Generic 6x Channel	Custom	~	~	7.0 unitless	0.0 unitiess	unitiess								
Actual Shaft Power	Corrected Expected Discharge Temperature	Generic 6x Channel	Temperature	~	~	200.0 °C	-32.0 °C	°C								
Corrected Expected Discharge Pressure	Corrected Expected Temperature Ratio	Generic 6x Channel	Custom	~	V	2.5 unitless	0.0 unitless	unitless								
Corrected Expected Pressure Ratio	Corrected Expected Polytropic Head	Generic 6x Channel	Head	~	1	200.0 k3/kg	0.0 k3/kg	k1/kg								
Corrected Expected Discharge Temperature		Generic 6x Channel		V		100.0 %	0.0 %	46								
Corrected Expected Temperature Ratio Corrected Expected Polytropic Head	Corrected Expected Shaft Power	Generic 6x Channel	Power	V	~	3,000 kW	0.0 kW	kW		_						
	Actual Total Gas Composition	Generic 6x Channel	Custom	~	2	100.0 %	0.0 %	46		- 1	Add	Cano	el			
	Actual Molar Nass	Generic 6x Channel	Custom	~	1	100.0 Unknown	0.0 Unknown	Unknown					_			
	Actual Mass Flow	Generic 6x Channel	Custom	V	~	100.0 Unknown	0.0 Unknown	Unknown								
Actual Molar Mass	Actual Suction Volume Flow	Generic 6x Channel	Custom	V	2	20.000 Unknown	0.0 Unknown	Unknown								
Actual Mass Flow	Standard Suction Volume Flow	Generic 6x Channel	Custom	V	2	30.000 Unknown	0.0 Unknown	Unknown			·					
Actual Suction Volume Flow		Generic 6x Channel		12		30.000 Unknown										_

Figure 4: Add Custom Unit for Tags with Unknown Units



3. Replace custom unit with Bently unit (if desired) within the Units tab of the Custom Component Manager (Figure 5)

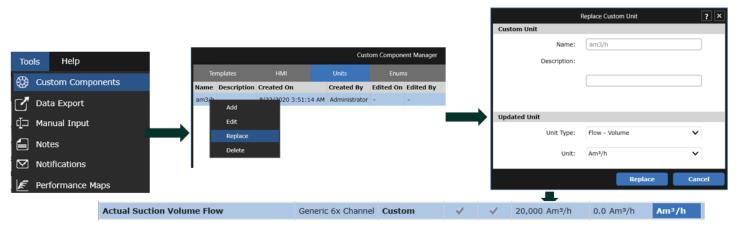


Figure 5: Assign Bently Unit to Custom Units in Custom Component Manager

4. View migrated System 1 Classic and System 1 Evo performance data within the Plots workspace (Figure 6)

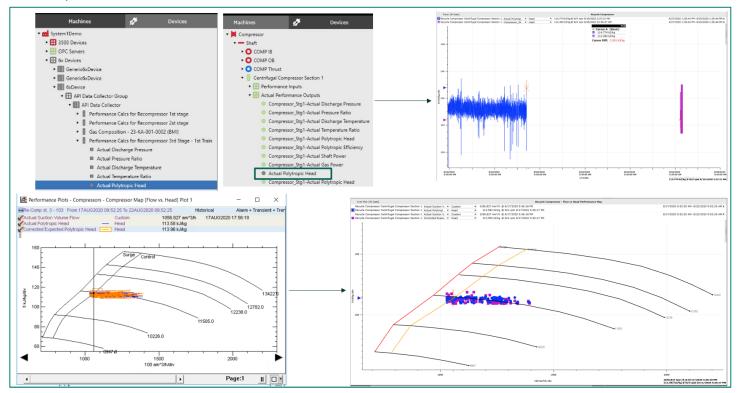


Figure 6: System 1 Classic and Evo Performance Data in Plots Workspace



3.2 Interfaces

3.2.1 OPC UA System Health Export

OPC UA Enhancements video located in Bently Nevada Tech Support Training Library Valid M&S Agreement Required

System 1 v20.2 extends OPC UA Alarm Event Export to System Health Events. This export includes all System Health Events classified under Instrumentation, Transient, System, and User Initiated. In addition, the OPC UA address space now displays the Devices Hierarchy alongside the Machines Hierarchy. Users can subscribe to any hierarchy node, including the root node, and from any OPC UA Compliant Client (Figure 7).

Address Space	Data Access	View Event Vie	w				
😏 No Highlight	Configuratio						
D Root	Configuratio	Π					
🛩 🚞 Objects	Events						
> 齃 Server	Durate						
Z84-37_WIN2016/Generic Refinery	Events	Alarms Event H	listory				
> 🖧 Generic Refinery (Machines)	× 😏 📑						
Y 뤚 Generic Refinery (Devices)	A C	Time	Severity	Server/Object	SourceName	Message	EventType
Y 🖂 3500 Devices		5:38:43.281 PM	950	System10PCU	Rack3500-31.3500/61 Temperature Mo	Exited: System Probable open transducer	SystemHealthEventType
> 臱 3500 Simulator		5:38:43.281 PM				Exited: System Probable open transducer	SystemHealthEventType
> 💑 Rack3500-31		5:38:43.281 PM				Exited: System Probable open transducer	SystemHealthEventType
Types		4:52:46.695 AM			Rack3500-31.3500/42M Proximitor/Seis		SystemHealthEventType
Views		4:52:46.695 AM			Rack3500-31.3500/42M Proximitor/Seis		SystemHealthEventType
		4:52:46.695 AM			Rack3500-31.3500/42M Proximitor/Seis		SystemHealthEventType
		4:52:46.695 AM			Rack3500-31.3500/42M Proximitor/Seis		SystemHealthEventType
		4:52:46.695 AM			Rack3500-31.3500/44M Aeroderivative		SystemHealthEventType
		4:52:46.695 AM	445		Rack3500-31.3500/44M Aeroderivative		SystemHealthEventType
		4:52:46.695 AM			Rack3500-31.3500/44M Aeroderivative		SystemHealthEventType
		4:52:46.695 AM			Rack3500-31.3500/44M Aeroderivative		SystemHealthEventType
		4:52:46.695 AM			Rack3500-31.3500/44M Aeroderivative		SystemHealthEventType
		4:52:46.695 AM			Rack3500-31.3500/44M Aeroderivative		SystemHealthEventType
		4:52:46.695 AM			Rack3500-31.3500/44M Aeroderivative		SystemHealthEventType
		4:52:46.695 AM			Rack3500-31.3500/44M Aeroderivative		SystemHealthEventType
		4:52:46.695 AM			Rack3500-31.3500/44W Aeroderivative Rack3500-31.3500/42M Proximitor/Seis		SystemHealthEventType
		4:52:46.695 AM			Rack3500-31.3500/42M Proximitor/Seis		SystemHealthEventType
		4:52:46.695 AM					
		4:52:46.695 AM			Rack3500-31.3500/42M Proximitor/Seis		SystemHealthEventType
					Rack3500-31.3500/42M Proximitor/Seis		SystemHealthEventType
		9:28:44.734 PM	445	System1OPCU		Entered: System Management system halted	SystemHealthEventType
		5:40:35.172 AM	-		Rack3500-31.TDI Collection Group 3	Entered: Transient Collection group entered transient	TransientEventType
		5:40:35.172 AM	1		Rack3500-31.TDI Collection Group 3	Exited: Transient Collection group entered transient	TransientEventType
		6:54:13.539 AM	1		Rack3500-31.TDI Collection Group 4	Entered: Transient Collection group entered transient	TransientEventType
		6:54:13.539 AM	1		Rack3500-31.TDI Collection Group 4	Exited: Transient Collection group entered transient	TransientEventType
		3:42:50.594 AM	1		Rack3500-31.TDI Collection Group 3	Exited: Transient Collection group entered transient	TransientEventType
		9:28:44.703 PM	1	System1OPCU		Management configured	SystemHealthEventType
		7:27:47.867 AM	1	System1OPCU		Config token released	UserEventType
		7:27:20.891 AM	1		Rack3500-31.3500/44M Aeroderivative		UserEventType
		7:26:50.680 AM	1		Rack3500-31.3500/44M Aeroderivative		UserEventType
		7:20:24.813 AM	1	System1OPCU		Config token acquired	UserEventType
		4:52:46.695 AM			Rack3500-31.3500/42M Proximitor/Seis		SystemHealthEventType
		4:52:46.695 AM		1 A A A A A A A A A A A A A A A A A A A	Rack3500-31.3500/42M Proximitor/Seis		SystemHealthEventType
		4:52:46.695 AM	4 45	System1OPCU	Rack3500-31.3500/42M Proximitor/Seis	Switch to primary Kph	SystemHealthEventType

Figure 7: Devices Hierarchy and Associated System Health Events

3.2.2 OPC UA Portable Data Export

In System 1 v20.2, if users enable Online Data Collection within a Portables database, they will be able to configure OPC UA Export of Static, Dynamic, and Alarm Events into any OPC UA compliant client.



3.2.3 Modbus Dynamic Setpoint Support

Modbus Enhancements video located in Bently Nevada Tech Support Training Library Valid M&S Agreement Required

Prior to this release, customers had to manually update setpoint values associated with Modbus tags every time that they were altered in external systems. Inherently, this led to the external system and System 1 becoming out of sync and inconsistent alarm generation. With the release of v20.2, externally configured setpoints for process data can now be dynamically synchronized with System 1 via Modbus. NOTE: This capability was added for OPC DA tags in the v19.2 release.

Within the CSV file, users can now enter the Function Code and Location of the setpoint tag under the desired setpoint severity column (Figure 8). On importing the .csv file, System 1 adds a setpoint group to the Devices Hierarchy and creates a corresponding setpoint tag under that group (Figure 9). In addition, this setpoint tag is associated to the setpoint level of its parent process point (Figure 10).

	A	В	С	D	E	F	G	н	1	J	к	L	M	N	0	P	Q	В	S	т
1	Action 1	Point Name	Tag Name	Group Name	Function Code	Location	New Fun-	New Loc-	Data Type	Hardware Min Scale	Hardware Max Scale	Min Scale	Max Scale	Unit	Enum	Alarm Type	e Level 4 Under	Level 4 Over	Level 3 U	Level 3 (
2	Add	Compressor Status	Compressor Status	C-101-A	1	100			2	0	1	0	1		Running/Stopped					
3	Add	Suction Valve position	Suction Valve position	C-101-A	3	105			2	0	100	0	100		ValvePosition	under	3 106			
4	Add	Suction Pressure	Suction Pressure	C-101-A	3	100			2	0	10	0	10	kgf/cm³(a)						
5	Add	Suction Temperature	Suction Temperature	C-101-A	3	101			2	0	200	0	200	°C		over		3 107		
e	Add	Discharge Pressure	Discharge Pressure	C-101-A	3	102			2	0	10	0	10	kgf/cm³(a)						
7	Add	Discharge temperature	Discharge temperature	C-101-A	3	103			2	0	200	0	200	°C						
8	Add	Suction Flow	Suction Flow	C-101-A	3	104			2	0	500	0	500	m3/s						
8																				

Figure 8: CSV File with Function Code and Locations entered for setpoint levels

Points Spectrums & Waveforms Trended Variables Setpoints										
Name	Tag Name	Туре	Active	Function Code	Location	Data Ty	Decimal Precis			
Suction Valve position_Level 4 Under	Suction Valve position_Level 4 Under	Modbus Setpoint Channel	\checkmark	3	106	2	0			
Suction Temperature_Level 4 Over	Suction Temperature_Level 4 Over	Modbus Setpoint Channel	\checkmark	3	107	2	0			

Points Sp	ectrums & Waveforr	ns Trended Variable	s S	etpoints			
Name	Measurement	Alarm Source	Alarm Type	State	Level 4	Level 4 Under	Level 4 Over
Compressor Status	Running/Stopped	Condition Monitoring	Over	Standard		-	0.0
Suction Valve position	ValvePosition	Condition Monitoring	Under	Standard	~	Suction Valve position_Level 4 Under	-
Suction Pressure	Pressure - Absolute	Condition Monitoring	Over	Standard		-	0.0 kgf/cm² (a)
Suction Temperature	Temperature	Condition Monitoring	Over	Standard	~	-	Suction Temperature_Level 4 Over °C
Discharge Pressure	Pressure - Absolute	Condition Monitoring	Over	Standard		-	0.0 kgf/cm² (a)
Discharge temperature	Temperature	Condition Monitoring	Over	Standard		-	0.0 °C
Suction Flow	Unknown Unit	Condition Monitoring	Over	Standard		-	0.0 m3/s

Figure 9: Setpoint Tag in Configure Workspace

Figure 10: Setpoint Tag Associated to Alarm Level in Setpoints Workspace

All areas of the application that display setpoint values are dynamically updated to reflect setpoint changes in the external system. In addition, alarms are generated when the parent Modbus process point exceeds this setpoint value.



3.2.4 Modbus Enum & Custom Unit Support

In System 1 v20.2, users can import Enum measurements from Modbus devices and display the associated status on HMI Views. Users can leverage existing Enums defined for OPC points or add user-defined Enums within the Custom Component Manager (Figure 11).

In addition, users can now configure custom units for Modbus tags. NOTE: Custom units can be replaced with Bently-defined units within the Units tab of Custom Component Manager.

	Custom	Component Manager	[Read Only]
Templates HMI Views	Units	Enums	C C
Enum	Enumerator Text	Enumerator Value	Source 🗸
ValvePosition	25%Open	25	User defined
ValvePosition	50%Open	50	User defined
ValvePosition	75%Open	75	User defined
ValvePosition	Closed	0	User defined
ValvePosition	Open	100	User defined
Active/Inactive	Active	1	System defined
Active/Inactive	Inactive	0	System defined
Boolean	False	0	System defined
Boolean	True	1	System defined
Communicating/Not Communicating	Communicating	1	System defined
Communicating/Not Communicating	Not Communicating	0	System defined
Direction	Left	0	System defined
Direction	None	99	System defined
Direction	Right	1	System defined
DisabledEnabled	Disabled	0	System defined
DisabledEnabled	Enabled	1	System defined
Energized/De-energized	De-energized	0	System defined
Energized/De-energized	Energized	1	System defined
High/Medium/Low	High	2	System defined
High/Medium/Low	Low	0	System defined
High/Medium/Low	Medium	1	System defined
Hot/Cold	Cold	0	System.defined
			Close

Figure 11: Enums Tab in Custom Component Manager

3.2.5 Modbus Device Scalability

NOTE: This is only supported for databases with PostgreSQL as the data historian

Users can now add up to 200 Modbus devices into a single System 1 database. The increased number of supported devices will address the use case of integrating a large number of third-party Modbus TCP devices having a smaller number of measurement points. The overall limit of Modbus + OPC points remains 15,000 per database.



3.3 Database Management

3.3.1 Multiple Online Databases

NOTE: This is only supported for databases with PostgreSQL as the data historian

Database scalability video located in Bently Nevada Tech Support Training Library Valid M&S Agreement Required

In System 1 v20.2, users can enable data collection for multiple (up to 5) databases on a single server, with data replication supported for all enabled databases. *Recommendation*: Total load of all enabled databases on a System 1 server should not exceed 100%, as per the Server load calculation tool.

To check the database health of enabled databases, launch Database Manager and connect to the server in the General tab (Figure 12). Select each database to see Storage Settings and Device Rates.

File Tools Help			System 1	Database Mana	ger				_ (×□
General	MTC-G10-8		✓ Connect							
Back Up and Restore	Database									
Upgrade	Database Name	Data Collection	Туре	Description	1		Current Version	Cons Size	Esti Size	Over Health
Clean Up	Ratchet	Enabled	Data Transmitter (*	Tx)			20.2	1.3 T	3.1 T	😣 w
Delete	Ratchet2	Enabled	Data Transmitter (*	Tx)			20.2	217.1	2.5 T	🔔 Ri
Delete	Ratchet1	Enabled	Data Transmitter (*	Tx)			20.2	138.9	2.4 T	🔔 Ri
Rename	Ratchet3	Enabled	Standard				20.2	199 G.	1.9 T	🔔 Ri
Databasa Daaliastiaa	Ratchet4	Enabled	Standard				20.2	-	-	🕜 U
Database Replication										
	Storage Setting	IS								
	Data Store	Span	Consumed Size	Estimated Size	Age	Health				
	Short Term Data	30 day	79.9 GB	79.9 GB	30 day	A Risk				
	Long Term Data	5 yr	421.7 GB	1.7 TB	9.2 mon	A Risk				
	Alarm Data	1006 GB	482.1 GB	-	9.2 mon	A Risk				
	Startup/Shutdown	Data 335 GB	346 GB	-	9.2 mon	🔀 Wrapping				
	Device Rates									
	Туре	Trended Var Storage Rate	iables - Short Terr e	n Spectro Term S	ums and V torage Ra	Naveforms - Short Ite	Spectrums a Term Storag		eforms -	Long
	3500 Devices	15		10 mir	1		3 hr			
	OPC Servers	15		-			-			
	Modbus Devices	200 ms		-			-			

Figure 12: Five "Data Collection" Enabled Online Databases

3.3.2 5000 Machine Case Support

NOTE: This is only supported for databases with PostgreSQL as the data historian

In System 1 v20.2, users can now add up to 5000 machine cases within a single System 1 Database (previous limit was 2000). This increased scalability will allow users to configure, monitor, and compare more machines across their facility within a single database.



3.3.3 Roll Section Asset Model

Roll Section Asset Model video located in Bently Nevada Tech Support Training Library Valid M&S Agreement Required

In System 1 v20.2, users can configure Paper Machines, Conveyors, and Rolling Mills by utilizing the new Roll Section asset model (Figure 13). Many different roll types are available (Serpentine Rolls, Geared Rolls, Combination Rolls, Geared Pinion Couplings, Gear Stages), allowing the configuration to be customized for varying industrial applications.

Machines	Devices	General	Data Collection Me	asurements			Library
▼ 📶 System1				Train		►	Asset Group
▼ [][] Train				·····:	D	►	Compressors
► 🖾 AC Mtr (AF						►	Couplings
► 🗍 Gbx (1 Stg ▼ 📜 Roll Sectio						►	Exciters
 Combinition 							Fans/Blowers
► — Serpen							
► — Serpen		·					Gas Turbines
► — Serpen							Gearboxes
► — Serpen	tine Roll 4					►	Generators
🕨 💳 Serpen	tine Roll 5	Roll Section			7	Þ	Generic Machine
► — Geared	l Roll				2	►	Motors
• — Geared	I Roll 2	Property		Value		►	Pumps
► — Geared		^ጵ General				V	
► — Geared		× Machine Prope	erties			-	
► 💳 Geared	I Roll 5		Linear Speed	5.0 m/s			Roll Section
	l Pinion Coupling	Nur	mber of Combination Rolls	1		►	Steam Turbines
	l Pinion Coupling 2	N	umber of Serpentine Rolls	5		►	Trains
	l Pinion Coupling 3		Number of Geared Rolls	5			
	l Pinion Coupling 4	Number o	of Geared Pinion Couplings	4			User Templates
Gear St			Number of Stages	9			
□ _□ Gear St □ _□ Gear St			Foundation Support	?			
□ Gear St			Machine Orientation	Horizontal			
Gear St		× Combination R	oll				
□ Gear St	-		Name	Combination Roll			
□ Gear St			Tag Name	Combination Roll			
□_ Gear St			Туре	Combination Roll			
Gear St			Rated rpm	?			

Figure 13: Roll Section Configuration and Library

Key features of the Roll Section asset are:

- Flexibility to configure types and counts of the rolls within the roll section
- Speed propagation based on both the linear speed and gear mesh properties
- Async waveform speed tagging from external speed tags
- New components in HMI library to create detailed HMI diagrams (Figure 14)

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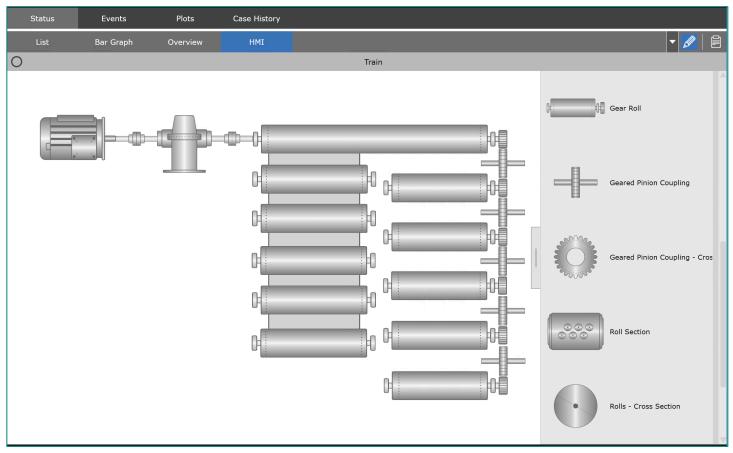


Figure 14: HMI Screen with Roll Section and the HMI Symbol Library

3.3.4 Configuration Overwrite

NOTE: This is only supported for databases with PostgreSQL as the data historian

Configuration Overwrite video located in Bently Nevada Tech Support Training Library Valid M&S Agreement Required

In System 1 v20.2, users can restore a configuration only back up over an existing database. When a Configuration Only (*.S1cfg) file is selected for restore, the user will have the following options in the Restore tab of Database Manager (Figure 15):

- 1. Create New Database: To be used for creating a new database from back up
- 2. Create New Rx Database: To be used to restore a database on an Rx Server when setting up replication
- 3. *[New]* Restore Database: To be used to restore the database on a server to make offline changes
- 4. *[New]* Overwrite Database: To be used to overwrite the configuration of a database. This will enable the user to restore only the configuration database without losing collected data.

Configuration Overwrite will replace all configuration, including machine and device properties, defined plot sets, HMI views, and custom templates. The overwrite option is available on standalone databases, as well as Tx and Rx databases.



🗐 🛄 File Tools Help			System 1 Da	atabase Manager		_ 🗆 ×
General	Back Up	Restore				
Back Up and Restore			Destination Server:	System1Server 🗸		
Upgrade			Back Up File:	C:\Backup\System1Demo(20-01-2020	Browse	
Clean Up			Restore Type:	Restore as New Database		
Delete			itescore type.	Restore as New Database		
Rename				Restore as New Rx Database Restore Config Database		
Database Replication				Overwrite Config Database		
						Restore

Figure 15: "Overwrite Config Database" addition to the Database Manager

3.3.5 User Template Upgrade

User Defined Template Export/Import was added as part of System 1 v20.1, enabling users to manage templates centrally. As part of v20.2, System 1 now supports upgrading user defined templates that were exported from a previous version of System 1.

When a template file ('*SIt') is imported via the Custom Component Manager dialog, System 1 will detect previous versions and ask the user to upgrade the file. If the user continues, the Database Manager will be launched, allowing the user to proceed with template upgrade (Figure 16). Once upgraded, the user can continue with the import process.

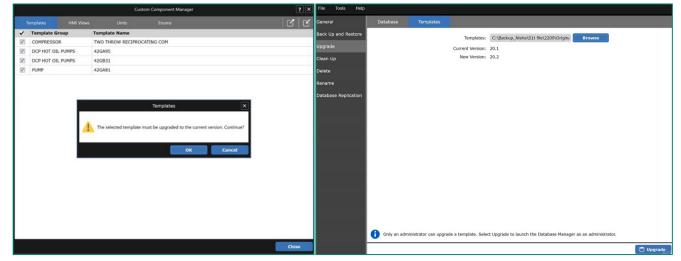


Figure 16: Template Upgrade Process



4.ANALYTICS

4.1 Core Alarming

Alarming video located in Bently Nevada Tech Support Training Library Valid M&S Agreement Required

4.1.1 Shelve Status on Alarm Suppression

Suppression, introduced in System v19.2, allows users to manage nuisance events. However, the active status associated with suppressed alarms remained throughout the Display Workspace, giving the indication that all alarms had not been managed.

In v20.2, the option to Shelve Active Alarms has been added to the Suppress Events dialog and is selected by default (Figure 17). When this option is selected, active alarms will be shelved, and their associated status will no longer be propagated (Figure 18).

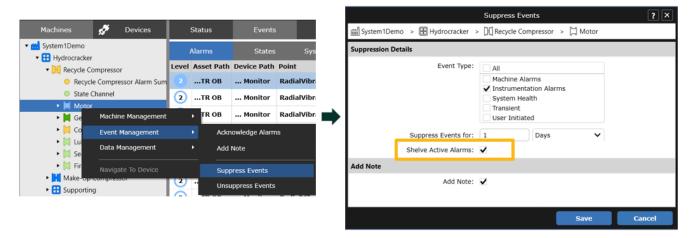


Figure 17: Suppress Events Dialog with Shelve Active Alarms Option

System1Demo Hydrocracker		Alarms	Stat	es System	Health Supp	oressed							
Recycle Compressor	Path	1					Eve	nt Type	Suppressed Type	(s) Suppress Entered	on 🗸	Suppression Duratio	n Suppressed By
 Recycle Compressor Alarm Sun State Channel 	Syste	em1Demo\Hy	vdrocracker\Re	ecycle Compressor\M	otor		Sup	pression	Instrumentation	06-10-202	0 18:27:59	1 days	G7Q32MC2E\Admin
🕨 📙 Motor	Syste	em1Demo\35	00 Devices\R	ack3500-19\3500/42	M Proximitor/Sels	mic Mon	itor\MDE_Y Sup	pression	Instrumentation	25-09-202	0 18:33:51	1 days	GBTNW2G2E\Admin
	-												
🕶 💼 System 1 Demo	-	Alarms	States	System He	alth Suppres	ised	_			-	-	_	<u> 2</u> (1) (2
▼ 💼 System 1Demo ▼ 🔁 Hydrocracker			States Device Path		alth Suppres		Туре	Value	Setpoint Sou	Irce	Activity E	Entered •	Exited
🕶 💼 System 1 Demo	Level	Asset Path					Type Channel Not O			irce strumentation		Entered • 25-09-2020 15:14:29	
System1Demo Hydrocracker Mig Recycle Compressor	Level	Asset Path TR OB	Device Path	Point				к-	Ins	trumentation	Shelved 2	25-09-2020 15:14:29	& ① @ Exited 25-09-2020 15:13:52

Figure 18: Not OK Instrumentation Alarm Suppressed and Shelved

When the Alarm is no longer suppressed, the associated status will begin propagating throughout the display workspace. Events are unsuppressed when:

- The suppression duration has elapsed
- User manually un-suppresses the event(s)



4.1.2 No Data Status

When System 1 stops receiving data from an instrument, a No Data state occurs. This No Data state can be triggered by *Device Not Communicating* or *Configuration Out-of-Date* System Health Events (Figure 19).

No Data Status is propagated throughout the Display workspace as an Instrumentation Level 3 Alarm. In addition, measurements within HMIs and Bar Graphs show a value of N/A (Figure 20).

 Recip A - Temp 	Alarms States	System Health	Suppressed				
 Recip B - VIB 	Description	Entered	- Exited	Activity	Location	Sour	e Source Compu
 Recip B - Temp Recip C - VIB 	Not communicating	10/6/2020 10:27:22 P	м	Active	Rack3500-19	Syste	m GBTNW2G2E
Recip C - Temp	Not communicating	10/6/2020 10:25:42 P	M 10/6/2020 10:25:42 PM	Cleared	Bently Performance	Syste	m GBTNW2G2E
Cold Box	Not communicating	10/6/2020 10:24:21 P	M 10/6/2020 10:26:22 PM	Cleared	Rack3500-19	Syste	m GBTNW2G2E
Rack3500-19	Alarms States	System Health	Suppressed				
	Description	Entered 🔹	Exited #	ctivity I	ocation	Source	Source Computer N
 3500/22 TDI Rack Interface 3500/61 Temperature Monitor) 	Configuration is out-of-date	10/6/2020 11:10:58 PM	,	Active I	Rack3500-19	System	GBTNW2G2E

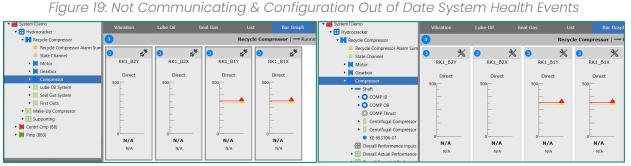


Figure 20: No Data Status in Bar Graphs

4.1.3 Setpoint Configuration on Rx Databases

In System 1 v20.2, users can now configure Condition Monitoring Setpoints on Rx databases. This allows users to better manage their assets and their alarm thresholds from the convenience of the Business Network. NOTE: Only condition monitoring setpoints that are unconfigured within the corresponding Tx database can be entered and adjusted. If a setpoint value is added on the Rx system, and later on, a setpoint value is entered for the same measurement and level on the Tx system, the previously added value on the Rx system will be overridden.

4.1.4 Alarm Summary Enhancements

The Alarm Summary Measurement Point was introduced in System 1 v20.1 release. Based on user feedback, enhancements have been incorporated into v20.2, including:

- Users can configure alarm setpoints on Status measurements (e.g., The "Have New Alarm" status measurement has values of True or False. To alarm when the status = True (1), the user can configure an associated setpoint with a value of 1).
- The alarm summary point considers Instrumentation Level 2 (Not OK) alarms as part of alarm summary measurement count
- When adding alarm summary points under a node (e.g., Machine Train, Group, Database), the hierarchy name will be added as a prefix by default



5. VISUALIZATION

5.1 HMI Builder

HMI Enhancements video located in Bently Nevada Tech Support Training Library Valid M&S Agreement Required

5.1.1 HMI View Saving

Prior to this release, HMI views could be copy/pasted between hierarchy components within the same database or across different databases. With the release of System 1 v20.2, HMI views can be saved, enabling users to easily add them to other components as part of the Add New Tab workflow.

To save an HMI view, right-click on a created tab and select "Save as Template View" (Figure 21). In the Template View dialog, name the view (defaulted to the current view name), add a Description if desired, and Save (Figure 22).

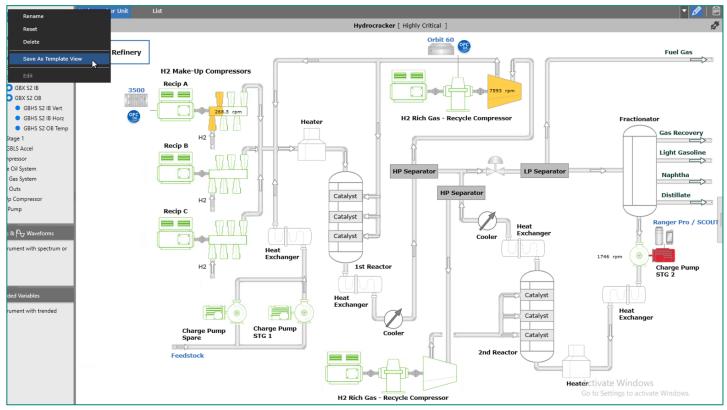


Figure 21: Save As Template View Option



	Template View	? ×
Template Name:	Hydrocracker Unit	
Description:		
	I	
	Save	Cancel

Figure 22: Template View Dialog

When adding new tabs from the dropdown in the top right of the workspace (Figure 23), select your templated view(s) and click Save (Figure 24). The view(s) will be added as new tabs.

	-	Ø	
Hydrocracker Unit List			s#
Add New Tab	Fuel	_	

Figure 23: Add New Tab Option in HMI Workspace

	Add New T	lab 🛛		?	×
🛗 System1Demo 🔸 🔠 Hydrocracker					
Enabled Views					
Available	Sel	lected			
Bar Graph	> Hyd	drocracker Unit			~
Blank	<				
Hydrocracker Unit					
Tile					
General					
Name:					
Apply To:	Machine Insta	ince	\sim		
			Save	Cancel	

Figure 24: Add New Tab Dialog



5.1.2 HMI Export/Import

Saved HMI diagrams can be viewed in the Tools > Custom Components dialog (Figure 25). Users can select which views to export, then click the export icon in the top right of the dialog. A file browser is launched, allowing the user to select where to store the "*.SIDiagram" file.

	Custom Component Manager							
	Templates	HMI Views	Units	Enums	C C			
~	HMI Name	HMI Description						
V	MECHANICAL	Combined Cycle Po	Combined Cycle Power Train					
V	LUBE OIL	Combined Cycle Lu	Combined Cycle Lube Oil View					

Figure 25: HMI Views in Custom Component Manager

To import views, launch the Custom Component manager in the target database and click on the Import icon. The user is asked to select the templates they would like to import (Figure 26). Once imported, the views will appear in the Add New Tab Dialog (Figure 24).

	Custom Component Manager					? ×	
Templates		HMI Views	Units	Enums			010
HMI Name	•	HMI Descri	ption				
Hydrocrac				HMI Views Import		? ×	
		HMI Name	HMI Description				
		MECHANICAL		wer Train			
		LUBE OIL	Combined Cycle Lub	oe Oil View			
					Import	Cancel	
							Close

Figure 26: View Selection During HMI Import



5.1.3 HMI Grouping

In System v20.2, content can be grouped and ungrouped within the HMI building workspace. Simply select the content to group (by drag-selecting or CTRL+clicking), then use the context menu option Grouping > Group (Figure 27) or the shortcut key Ctrl+G.

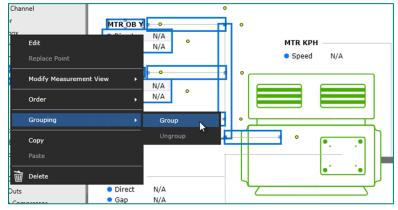


Figure 27: Grouping Options in Right-Click Context Menu

The resulting content is grouped together, with a border and default title "Group" (Figure 28). These settings can be modified by right-clicking and launching the "Edit" dialog, where the user can change or hide the border and replace the name with something more specific (or delete completely). The grouped content can be moved together throughout the view.

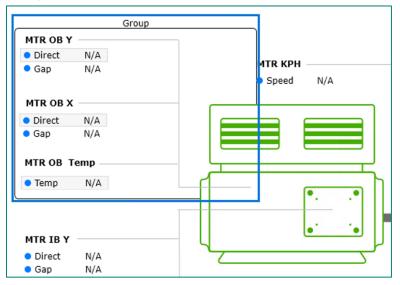


Figure 28: Grouped Content in HMI Workspace

Existing groups can be nested within parent groups by following the same flow as described above. To ungroup content, select a group (or a single component within a group) and use the context menu option Grouping > Ungroup or the shortcut key Ctrl+Shift+G. To ungroup all grouped content, right-click in the open workspace and select "Ungroup All" (Figure 29).



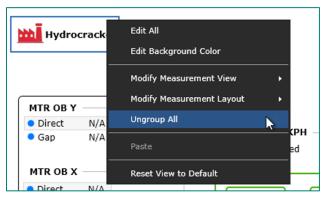


Figure 29: Ungroup All Option

5.1.4 HMI Enhancements

Additional enhancements have been added to the HMI Builder, including Undo/Redo of in-progress edits, navigation capability from any component (not just the navigation button), and new symbols for Rolls (Figure 30) and Gears (Figure 31).

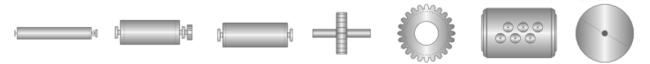


Figure 30: Rolls Symbols in HMI Library



Figure 31: Gears Symbols in HMI Library

5.2 Plots

Plot Enhancements video located in Bently Nevada Tech Support Training Library Valid M&S Agreement Required

5.2.1 Color Data by State

NOTE: This is only supported for databases with PostgreSQL as the data historian

In System 1 v20.2, users can now color code data from different machine operating states within the Plots workspace, enabling deeper analysis of machine condition and its changes over time. To enable, navigate to Plots Preferences and check the Color Data by State option (Figure 32). When Color Data by State is enabled, plot samples are color coded based on the state of the machine when they were stored (Figure 33). Feedback on color mapping is provided in the Cursor Readout Window, as well as the Select States dialog, accessed from the bottom tool area of the Plots workspace (Figure 34)



		Pre	ferences	? X
General	General	Spectrum	Waveforms	
Units	General			
Configure		Plot Environment:	Standard V	
Plots		Color Data By State:	Z	
Instruments	Display m	illiseconds in timestamps:		
Theme	Group M	leasurements by Location:		
		Include Invalid Data:		
	,	Plot Time Synchronization:	Recommended for Recip Only	
			Save	Cancel

Figure 32: Color Data by State Preference

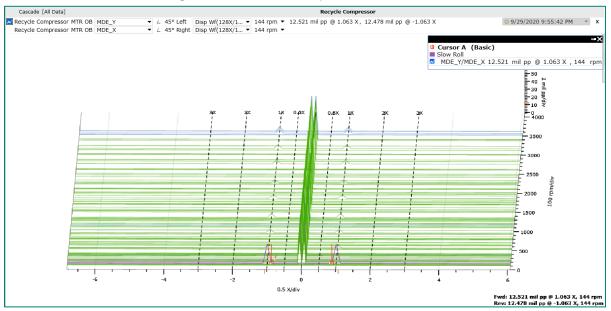


Figure 33: State Coloring on a Cascade Plot

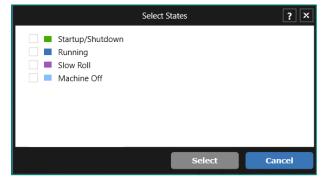


Figure 34: Select States Dialog, with Color Legend



The state color mapping can be customized from the Theme tab of the Preferences dialog (Figure 35).

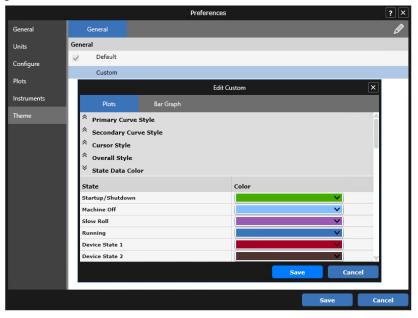


Figure 35: State Data Customization

5.2.2 Enhanced Waveform Readout

With System 1 v20.2, the Cursor Readout for Waveform plots has been enhanced to include (Figure 36):

- 1. Cursor Difference in Frequency unit
- 2. Crest Factor
- 3. Waveform Overall (rms)

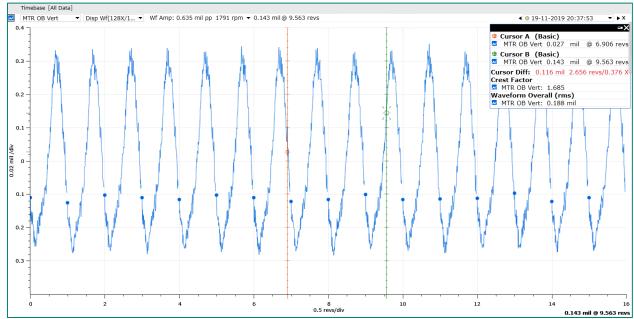


Figure 36: Enhanced Readout on Timebase Plot



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