

Ocean Data Systems Ltd. The Art of Industrial Intelligence

User Documentation

Dream Report 4+

Setpoint Analysis Tool

http://www.dreamreport.net

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Table of Contents

Introduction	
Setpoint Analysis Tool (Overview)	
Setpoint Analysis Configuration (Setpoint Definition)	
1. Setpoint Data	
1.1. Setpoint Data Definition	
1.2. Setpoint Data Dynamic Values	6
2. Data Items Selection	7
3. Rate of Change (ROC)	
3.1. Rate of Change (ROC) Definition	
3.2. ROC Dynamic Values	
4. Process Success Criteria	
Setpoint Analysis Result in Dream Report Data Objects	
1. Setpoint Analysis Result in Statistical Functions	
1.1. General Overview	
1.2. Setpoint Selection	
1.3. "Setpoint Analysis Functions" Performance	
2. Setpoint Analysis Result in Charts	
1 T	



Introduction

This document will assist you in using Setpoint Analysis Tool in Dream Report projects and different project object types.

Setpoint Analysis Tool (Overview)

Setpoint Analysis Tool is a special module, which allows smart analyzing of thermal and other processes, where the process is based on the setpoint stability analysis. It allows automatic detection of the stability periods, entry and exit points of those stability periods.

Setpoint Analysis Configuration (Setpoint Definition)

To use **Setpoint Analysis Tool**, user, first, has to create setpoint definitions for the project report(s). Then, the setpoint analysis results can be used in charts and in statistical functions.

You can create setpoint definitions in the **Setpoint analysis configuration** window. To open it, click on the command button *Setpoint analysis configuration* on the *Tools* ribbon icon on the horizontal toolbar either in the Dream Report Logger Studio or Dream Report Designer Studio menu (see pic. below):





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The following dialog window will be opened:

Contraction of the second of t						Get data from	
Varie:		Value		Band	width	Dream Report History	
		-		Oppe	* Tolecarice		
Consider Stable	Period IF Values Are	Stable Fo	r at Least:	Lowe	r Tolerance	C External History Server	
0	minute(s) 🐱					Select Data items	
						Or	
tate of change	before setpoint		Rate of ch	ange after sel	point	Copy from	
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+	minute(s)	14		*	minute(s) •	Data Items	
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Start of per	boi		• End of	period			
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Exclude Falu Ignore Rate	re from Calculated 5 of Change Before 5k of Change After Sta	tability ability bility	eriod	_	_		14.
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199201021						Delete	
(Marro)							
1991001							
There's							



1. Setpoint Data

1.1. Setpoint Data Definition

To define a setpoint, in the **Setpoint data** section enter the following data (please see the picture below):

Oven 1 700 Consider Stable Period If Values Are Stable	for at Least	er Tolerance	Dream Report History External History Server Select Data Items	
40 [minute(s) M			a	
Reof change before serpoint nits per	Rate of change after se Units	per .	Copy from	•
* minute(s) *		minuce(s) *	Data Items	
 Start of period Start of changes Specific value 	End of period End of value change Specific value	8		
All Values Are Within Defined Bandwidth Rate of Change Is Not Less Than Expect Rate of Change Is Not More Than Expect Exclude Failure from Calculated Stability Ignore Rate of Change Before Stability Ignore Rate of Change After Stability Ignore out of the range items	During Stability Period ad ted Period From	To		3
			A44	
st of defined setpoints	Aalue Upper Toler	Lower Toler		

A - Setpoint Name (logical name is unique and can't be the same for different setpoints);

B - Setpoint Value;

C - Setpoint **Bandwidth**, which defines high ("**Upper Tolerance**") and low ("**Lower Tolerance**") levels for the stability. It enables to resolve the task when high and low tolerance values are different.

D - **Consider Stable Period if Values are Stable for at Least**: - to define the stability period by setting the time period when the values will remain stable.



1.2. Setpoint Data Dynamic Values

Such parameters as Setpoint Value, Upper Tolerance, Lower Tolerance can be set as a static number (e.g. 10), or can be set as a **real-time** tag value. Double-click on the needed edit box corresponding to one of these parameters and the *Select Data Item* window will be opened (please see the picture below):

Setpoint data		and a state of the	Get data from	
Nome: Val	ue	Linner Tolerance	Onean Report History	
Oven 1 7	00	10		
Consider Stable Period If Values Are Stab	le for at Least:	Lower Tolerapce	C External History Server	
minute(s) 🐱	alast Data Bar		Select Data Items	
	Select Data frem			
Rate of change before setpoint	Select Data Source	Simulation real-time	•	
units per	Dan Elbar			
minute(s)	10010 1 9101			
Measure from:	Path			
Start of period	Them Manua			
⊖ Start of changes	actern rearrie			
O Specific value	Z Ana_1			
	2 Ana_10			
Process Success Oriteria	2 Ana_11			
All Values Are Within Defined Bandwid	22 Ana_12			
Rate of Change Is Not Less Than Esp	B Ana_2			
Rate of Change Is Not More Than Ex	Z Ana, 4			
Exclude Failure from Cakulated State	Z Ana_5			
Ignore Rate of Change Before Stable	2 Ana_6			
Imore Bate of Change After Stability	Z Ana_7			
Improve out of the ratios items	Ana_e		the second se	5
	Z Digt			
List of defined setpoints	2 Dig2		n	
Nome:	2 Dig3		<u>e</u>	
	OK	Cancel		

Select any available **REAL-TIME** driver and a tag (required item). Then, in the runtime, when the report is generated, the setpoint module will read the current real-time value of the defined tag, and use its value as a value for that parameter for this specific report generation.

Please see below an example of the setpoint tolerance values defined as tags:

Setpoint data		Randwidth
Name:	Value	Upper Tolerance
Oven 1	700	[i#Analytics.Report1:
Consider Stable Period If Values Are	Stable for at Least:	Lower Tolerance [i#Simulation real-time



2. Data Items Selection

In the right-hand part of the dialog window select one of the sources to obtain data from: *Dream Report History* or *External History Server*. Select data source and data items, which will be used as a source for the data for setpoint analysis (please see the picture below):

Contraction and a second					Bandwidth		Get data from
Name:		Value			Upper Tolerance		O Dream Report History
Oven 1		700			10		© External History Server
Consider Stable Period I	Values Are	Stable fr	or at Least:		Lower Tolerance		
40 min	ste(s) 🛩				5		Select Data Items
Rate of change before a	etpoint		-Rate of c	change aft	er setpoint		B
Inits	per		Units		per		Copy from
±	minute(s)	•	1.00	±	minute(s)		Data Items
Measure From:			Measu	ne to:			Data Ben
Start of period			⊙ End	of period			
O Start of changes			OEnd	of value ch	anges		
O Specific value			Ospec	fic value			
Process Success Oriteria			-arestar				
All Values Are Within	Defined Ban	dwidth D	uring Stabili	ty Period			
Rate of Change Is N	ot Less Than	Expecte	d				
Rate of Change Is N	ot More Than	Expects	sd				
Exclude Failure from	Calculated S	tability P	eriod				
_ Ignore Rate of Chan	ge before Sc	abarry					
Ignore Rate of Chan	ge After Stal	pincy.	1415	1	1.1	-	
] Ignore out of the ran	ge items		Pro	e	10	_	
ist of defined setpoints						-	Add
Nome:		W	alue	Upper Tole	t Lower To	ler	
							Delete
						_	

- A Click on the button "Select Data Items".
- 1. The Select Data Items dialog window will be opened (please see the picture below):



- 2. Select items/tags which will be used for this setpoint analysis. **NOTE:**
 - If "*Dream Report History*" radio button is enabled, then, the combo box "Select Data Source" will contain a list of data access drivers defined in the project;
 - If "*External History Server*" option is selected, the "Select Data Source" combo box will contain a list of external history access drivers defined in the project.

In Select Data Source and Available Data Items, select the source and item from which Dream Report will calculate values.

 Click on the button "Add" and in the List of defined setpoints section a new setpoint definition will be added to the project. Its Name, Value, Upper Tolerance and Lower Tolerance will appear in the table in this section (please see the picture below):



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etpoint data			Batcheck	h		Get data from	
lame:	Value		Upper To	lerance		O Dream Report History	
Oven 1	700		10			C External Metrory Server	
Consider Stable Period If Values	Are Stable f	or at Least:	Lower To	lerance		S Exterior recory server	
40 minute(s)	~		5			Select Data Ress	
ate of change before setuppt		Rate of chappe	after cettoric	,		Or	
ints a	-	Links	a col sectros	ner		Copy from	
4 minut	e(s) •	4	m	nute(s)		Data Bens	
Measure from:		Measure to -				Data Rem	
Start of period		End of period	d			Batch Data Temp1	
O Start of changes		O End of value	dianges			Batch_Data Temp2	
C Search under		Oscartheurt				Batch_Data Temp3	
C specific value		Copeciti, van	~				
rocess Success Orberia							
All Values Are Within Defined	Barybeith I	arise Stability Devic	4				
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st of defined setpoints	1.0					Add	
Open 1		Tool Upper		and I of		Data a	
OVERT	_	/00	v 1		-	Delete	
					_		
			_				

B - If setpoint configuration has already got any setpoint definition with required data source and tags, select such a setpoint from the combo box next to the button "**Copy from**" and click on that button. This new setpoint definition will copy all defined items from the selected setpoint.



3. Rate of Change (ROC)

If you are interested in measuring the rate of change of your values before entering the stability zone and after exiting it, you can set the criteria for the rate of change measurement.

There are 2 sections for ROC measurement settings:

- **1 Rate of change before setpoint** contains the criteria for the rate of change measurement before entering the stability zone.
- **2** Rate of change after setpoint contains the criteria after exiting the stability zone.

Both sections have the same configuration parameters and controls (please see the picture below):.





3.1. Rate of Change (ROC) Definition

1 - Rate Of Change (ROC) has 2 sections to be defined (please see the picture below):

Jetpoint data		Band	weeks.	Get data from	
Name:	Value	Uppe	er Tolerance	O Dream Report History	
Oven 1	700	10		Octometer to an	
Consider Stable Period If Values	s Are Stable for	t: Lowe	er Tolerance	C External History Server	
40 minute(s)	v 7	5		Select Data Items	
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late of change before setupint	Eater	of change after set	triont		
Ints	per Units		per	Lopy from	
70 ± 1 hour	(s) • 60	+ 1	hour(s) B	Data Bens	
Asure from:	Mea	sure to:		Data Item	
Start of period	() E	nd of period	X	Batch Data Temp1	
Cont of damage	00	ad off unker change	. 1	Batch Data:Temp2	
Scart or thanges	00	tu or value change	·)	Batch_Data:Temp3	
Specific value	09	pecific value			
			-		
Rate of Change Is Not More	Than Expected				
Rate of Change Is Not More Exclude Failure from Calculat Ignore Rate of Change Befo Ignore Rate of Change Afte	r Than Expected ted Stability Period yre Stability yr Stability				
Rate of Change Is Not More Exclude Failure from Calculal Ignore Rate of Change Befo Ignore Rate of Change Afte Ignore out of the range item	Than Expected ted Stability Period xre Stability rr Stability is /	from	То		0
Rate of Change Is Not More Exclude Failure from Calcular Ignore Rate of Change Befo Ignore Rate of Change Afte Ignore out of the range ten ist of defined setpoints	Than Expected ted Stability Period xe Stability ir Stability is /	'rom	To		3
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Rate of Change Is Not More Exclude Failure from Calcula Ignore Rate of Change Befo Ignore Rate of Change Afte Ignore out of the range item ist of defined setpoints Name: Oven 1	Than Expected ted Stability Period are Stability or Stability is y Value 700	from	To	Add Delete	3
Rate of Change Is Not More Exclude Failure from Calcula Ignore Rate of Change Befo Ignore Rate of Change Afte Ignore out of the range item ist of defined setpoints Name: Overn1	Than Expected ted Stability Period xe Stability r Stability is y Value 700	Upper Toler	To	Add Delete	ţ
Rate of Change Is Not More Exclude Failure from Calcula Ignore Rate of Change Befo Ignore Rate of Change Afte Ignore out of the range item at of defined setpoints Name: Overs1	Than Expected ted Stability Period xe Stability r Stability is y Value 700	Upper Toler	To	Add Delete	6
Rate of Change Is Not More Exclude Failure from Calculal Ignore Rate of Change Befo Ignore Rate of Change Afte Ignore out of the range item ist of defined setpoints Name: Overb1	Than Expected ted Stability Period we Stability or Stability is y Value 700	Upper Tolet	To	Add Delete	3
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Rate of Change Is Not More Exclude Failure from Calcula I gnore Rate of Change Befo I gnore Rate of Change Afte I gnore out of the range item Ist of defined setpoints Name: Overs1	Than Expected ted Stability Period we Stability or Stability is // Value 700	Upper Toler	To	Add Delete	
Rate of Change Is Not More Exclude Failure from Calcula Ignore Rate of Change Befo Ignore Rate of Change Afte Ignore out of the range item Ist of defined setpoints Name: Clyon1	Than Expected ted Stability Period we Stability is Value 700	Upper Toler	To	Add Delete	

A - Value - you have to specify the expected rate of change (units (e.g. degrees C) per time unit (e.g. per hour, per minute)).

B - Criteria - to start/stop measurement of the rate of change (Measure from/ Measure to sections). For the measurement criteria there are 3 options available:

 Start of period/End of period - the start time (for Rate of change before setpoint) or the end time (for Rate of change after setpoint) will be either start or end (correspondingly) of the calculation period defined in the statistical object (for details please see <u>1.1.Setpoint Analysis Result in Statistical Functions</u> of the <u>Setpoint Analysis Result in Dream Report Data Objects</u> section of this manual) (please see the picture below):



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tpoint analysis configuration							
Setpoint data	Value		Bandwidth		Get data from	Hilton:	
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40 minute(s)		codsci	5		Select Dat	a liem:	
			1		Or		
Rate of change before setpoint - Units pe	r	ate of change nits	after se		Copy from		•
70 # t nour(s)	10	*	in the second		Data Items		
Measure from:		Measure to:	2		Data Item		
Start of period		End of period	d		Batch_DataTem	p1	
Start of changes		C End of value	changes	4.	Batch Data Tem	p2 p3	
O Specific value		Specific value	e				
Rate of Change Is Not More T Exclude Hallure from Cakulate Signore Rate of Change Before Signore Rate of Change Alter S Signore out of the range Rems	han Expected d Stability Perior Stability Rability	From	То		•		2
Ust of defined setpoints		20100					
Name:	Value	Upper 1	foler Lower	Toler	Add	J	
Oven 1	700		0	5	Delete	1	

2. Start of changes/End of value changes - the rate of change measurement will be calculated not from the start (for Rate of change before setpoint) or until the end (for Rate of change after setpoint) of an object calculation period, but only from the point of time when values started to change (for Rate of change before setpoint) or until values are changing (for Rate of change after setpoint). If Start of changes/End of value changes measurement criteria option is selected, the edit box will appear, where a user can enter the minimum change of value (Min change) from/until which ROC will be calculated (please see the picture below):



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errorer mara				Gap risks troom		
	Value	Ban	dwidth	Charles India		
ane	Volue	Upp	er Tolerance	O Dream Report 1	History	
Uven 1	700	10	<u> </u>	External Histor	y Server	
onsider Stable Period If Values Are	Stable for at Least:	Low	er Tolerance			
40 minute(s) 🐱		5		Select Dat	alten:	
ate of chance before seturant	Sate of d	hange after se	enort	a		
nts nir	Links	in the second second	Thir .	Copy hom		
t 1 hour(s)	- 60	+ 1	baris -			
The Contraction of the Contracti			Z	Data items		
Measure from:	Measure	etoi	T	Data Item	-	
Chart of paried Manaharg	C) End a	- parried	Hindungo	Batch_Date Tem	-7	
Start of changes 77	End o	of value chang	es 75	Batch_Date Tem	p2 p3	
Scecific value	() Speci	Fic value		Bach_Data ren	pu	
Deser Success Griteria]All Values Are Within Defined Bar]Rate of Change Is Not Less Thar]Rate of Change Is Not More Tha]Exclude Failure from Calculated S	dwidth During Stabilit Expected h Expected Rability Period	y Period				
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A service of the serv	dwidth During Stabilit Expected n Expected tability bility From Value: 1	n	To	Add		3
Al Values Are Within Defined Bar Rate of Change Is Not Less Thar Rate of Change Is Not More Tha Exclude Failure from Calculated S Ignore Rate of Change Before S Ignore Rate of Change After Sta Ignore out of the range tens t of defined sepoints Name: Over1	dwidth During Stabilit Expected n Expected tability Period tability bility From Value 1 700	n To	To	Add Delete]	2
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Al Values Are Within Defined Bar Rate of Change Is Not Less Thar Rate of Change Is Not More Tha Exclude Failure from Calculated S Ignore Rate of Change Before St Ignore Rate of Change After Sta Ignore out of the range items at of defined setpoints Name:	dwidth During Stabilit Expected n Expected tability Period ability bility From Value 1 700	n 10	To Lower Toler	Add Delete]	,
All Values Are Within Defined Bar Rate of Change Is Not Less Than Rate of Change Is Not More Tha Exclude Failure from Calculated S Ignore Rate of Change Before St Ignore Rate of Change After Sta Ignore out of the range items at of defined setpoints Name:	dwidth During Stabilit Expected hExpected ability bility Pron Value 1 700	n Upper Toler	To Lower Toler	Add Delete]	•
All Values Are Within Defined Bar Rate of Change Is Not Less Than Rate of Change Is Not More Than Exclude Failure from Calculated S Ignore Rate of Change Before St Ignore Rate of Change After Sta Ignore out of the range Rems at of defined setpoints Name:	dwidth During Stabilit Expected h Expected tability Period ability Pron Value: 1 700	y Period	To Lower Toler	Add Delete]	•

Example: If the minimum change of values for the **Start of changes** option is set as "77" (as in the picture above), then, the rate of change measurement will be calculated from the point of time when values started to change after having reached the value of 77.

3. Specific value - sets a specific value, so that the rate of change will start (for Rate of change before setpoint) or stop (for Rate of change after setpoint) its calculation only when the item value reaches this value. If the Specific value option is selected, the edit box will appear, where a user can enter the control value for start/stop of ROC calculation (please see the picture below):



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tpoint analysis configuration				
Setpoint data Narre: Oven 1 Consider Stable Period IF Values 40 minute(s)	Value 700 Are Stable For at Least:	Bendwith Upper Tolerance 10 Lower Tolerance 5	Get data from O Dream Report History O External History Server Select Data Items	
20 ± 1 hour 70 ± 1 hour Measure from: O Start of period O Start of changes Image: Specific value 75	s) - GO Measure O End of O End of O End of O Specifi	ange after setpoint per t 1 hour(s) + to: period value changes c value 77	Or Copy from Data Items Data Item Batch_Data Temp1 Batch_Data Temp2 Batch_Data Temp3	
All Values Are Within Defined Rate of Change Is Not Less Rate of Change Is Not More Exclude Failure from Calculat Sprore Rate of Change Befo Sprore Rate of Change After Sprore out of the range Rem	Bandwidth During Stability Ihan Expected Ed Stability Period es Stability Stability Stability s Prom	Period		3
List of defined setpoints	Vokas Lir	oper Toler Lower Toler	Add	
Oven 1	700	10 5	Delete	
Save Cancel				

Example: If a user sets this option with a specific value of 75 (**ROC before setpoint**), then, the rate of change before setpoint will start its calculation only when the item value (for setpoint) has reached value 75, and will calculate it until the start of the setpoint stability zone (as in the picture above).



3.2. ROC Dynamic Values

Such parameters as **Specific value**, *Min change (Start of Changes)*, *Min change (End of value changes)* can be set as a static number (e.g. 10), or can be set as a **real-time** tag value. Double-click on the needed edit box corresponding to one of these parameters and the *Select Data Item* window will be opened. Select the required item and then, in the runtime, when the report is generated, the setpoint module will read the current real-time value of the defined tag, and use its value as a value for that parameter for this specific report generation (please see the picture below):

etpont data Vane:	Value	Bandwidth Unner Tolerance	O Dream Report History	
Oven 1	700	10	October 1	
Consider Stable Period If Values Are	Stable for at Least:	Lower Tolerance	C External History Server	
40 minute(s) 💌	Felect Data Item	16	Sector Dista Items	
Late of change before setpoint	Select Data Source	Analytics	• •	
hits per				8
70 ± 1 hour(s)	Rem hiter			
Measure from:	Path	Reporti		
Start of period Min chang	e Bern Name		1	
Start of changes	- B.		3	
O Specific value	energy1			
1	Z energy2			
Tocess Success Criteria	a energy3			
All Values Are Within Defined Ban	dvid			
Rate of Change Is Not Less Than	Exp			
Rate of Change Is Not More That	n Exp			
Exclude Failure from Calculated 5	tabil			
Ignore Rate of Change Before St	abit			
Ignore Rate of Change After Sta	bility			
Ignore out of the range items				113
ist of defined setpoints			-	
Name:			-	
Oven 1				
	OK	Cancel		
	100			



4. Process Success Criteria

This section contains the set of options which will be used to define automatic process validation (please see the picture below):

VISION TO MINDA					Get data from	
Marrier	Value		Ban	dwidth	One have been a letter of	
Oven 1	700		Upp	er Tolerance	O bream Report History	
Over 1	100	125.75	10		External History Server	
Consider Stable Period IF Values A	ve Stable fo	vr at Least:	LOW	er Tolerance	Salart Data lines	
40 minute(s)	*		10		Seeci Deta liena	
Rate of change before setpoint		Rate of chan	ige after s	stoont	Or	
Units pe	2	Units		Der	Copy from	
70 # 1 hour(s)		60	+ 1	hour(s) ·	Posta Bassa	
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Start of period		Contra de pe	undu .		Batch Data Temp?	
◯ Start of changes		O End of w	alue chang	65	Batch_Data Temp3	
Specific value		Specific value				
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Ignore Rate of Change Before Ignore Rate of Change After S Ignore Rate of Change After S	Stability Rability	From	650	To 770	e	,
Ignore Rate of Change Before Ignore Rate of Change Alter S Ignore cut of the range items	Scabety Rabéty	From	650	To 770	*	>
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Granere Rate of Change Before I Ignore Rate of Change After S Ignore out of the range items of defined setports Name:	Scabelky Rabelky Va Z	From Upp	650 er Toler	To 770 Lower Toler	Add Delete	3
Ignore Rate of Change Before Ignore Rate of Change After S Ignore Rate of Change After S Ignore out of the range items tof defined setzonts Name: Over1	Scabeloy Rability Va 7	From Upp	650 er Toler	To 770 Lower Toler	C Add	2
Ignore Rate of Change Before Ignore Rate of Change After 5 Ignore cut of the range items tof defined setpoints Name: Overn1	Scabeloy Rability Va	From Upp	er Toler	To 770 Lower Toler	4dd Delete	2
Ignore Rate of Change Before Ignore Rate of Change After 5 Ignore cut of the range items Action of the range items Name: Over 1	Scabelty Rability Va	From Upp	650 er Toler	To 770 Lower Toler	4dd Delete	2
Ignore Rate of Change Before Ignore Rate of Change After 5 Ignore out of the range tens to defined setpoints Name: Overal	Scabelty Rability Va	From [650 er Toler	To 770 Lower Toler	Add Delete	2
Ignore Rate of Change Before Ignore Rate of Change After 5 Ignore out of the range tens to defined setpoints Name: Overn1	Stability Rability Va	From [er Toler	To 770 Lower Toler	Add Delete	•

- All values are within defined bandwidth during stability period option controls the situation when one or multiple values will fall out of stability bandwidth. If this option is enabled, the process result will be "*Failed*". If this option is disabled, then the process result will be "*Succeeded*".
- Rate of change is not less than expected option controls how rate of change influences the result, i.e., if rate of change is less than expected and the option "Rate of change is not less than expected" is enabled - the process will fail. If this option is unchecked, the process will succeed.
- Rate of change is not more than expected option controls how rate of change influences the result, i.e.if rate of change is more (faster) than expected and the option "Rate of change is not more than expected" is enabled – the process will fail. If this option is unchecked, the process will succeed.
- Exclude failure from calculated stability period option influences only calculation of the duration of a stability period. This option controls the situation when, during the stability period, one or multiple points will exit from the stability bandwidth and will then return back



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into the stability corridor. If this option is enabled, then the time period, when one or multiple values will be out of range, will be excluded from the calculated duration of the stability. If this option is not checked, the full stability period will be taken for duration calculation.

Example: The stability period started at 10:00 and finished at 11:00. During this period one data item exited from the stability bandwidth at 10:10 and then returned back into the stability corridor at 10:30. If this option is enabled, the duration will be 40 min (from 10:00 to10:10 and from 10:30 to 11:00). If it will be unchecked, the duration will be 1 hour. (from 10:00 to 11:00).

- Ignore rate of change before stability/Ignore rate of change after stability options define if rate of change should be considered for the process validation ("Stability result" function). If any of those check boxes will be checked, the rate of change will be ignored during calculation of the "Stability result" function.
- **Ignore out of the range item(s)** option enables to discard from the setpoint calculation the items with the values, which are either higher or lower than the ones defined in the setpoint.

When this option is selected, a user will be able to set Low (**From**) and High (**To**) limits for the setpoint definition.

NOTE: Any calculated statistical function or a chart, where the setpoint with such definition is used, will check if the entry value of every item, defined in the setpoint for the specified/selected time period, is in the range. If the item is out of the range, it will be excluded from the calculation. If the item, which is used in the setpoint, has no value available for the specified period, it will also be considered as an item, which is out of the range.

By default this option will be unchecked. If this option is checked, but no working range has been set, a user will get the warning message asking to define the range.

NOTE: <u>Setpoint stability zone</u> is defined as a time period where all values of all items, defined for that setpoint, are within the corridor of a **setpoint value +/- tolerance**.



Setpoint Analysis Result in Dream Report Data Objects

After setpoint definitions for the project report(s) have been defined (created), the setpoint analysis results can be used in charts and in statistical functions.

1. Setpoint Analysis Result in Statistical Functions

1.1. General Overview

The list of statistical functions in Dream Report data representation objects (**Single Data Objects** and **Automatic Statistical Tables**) has a special group of statistical functions – "**Setpoint Analysis Functions**" - based on setpoint analysis. They are (please see the picture below):

- Start time of stable period
- End time of stable period
- Duration of stable period
- Setpoint stability result
- Counter of stable periods
- Rate of change before entering stability zone
- Rate of change after exiting stability zone

⊕ General Functions	
Advanced Functions	
Performance Analysis Functions	
- Energy Management Functions	
Batch Functions	
Setpoint Analysis Functions	-
Start time of stable period	
End time of stable period	
 Duration of stable period 	
Setpoint stability result	
- Counter of stable periods	
Rate of change before entering stability	zone
Rate of change after exiting stability zor	ne
- Alarm Analysis Functions	
Direct SQL Query	
Dulas Analysis Euschises	
Pulse Analysis Functions	
Pulse Analysis Functions Manual Input	
 Pulse Analysis Functions Manual Input 	
Pulse Analysis Functions Manual Input	
Pulse Analysis Functions Manual Input	
Pulse Analysis Functions Manual Input	
Pulse Analysis Functions → Manual Input	
⊖ Pulse Analysis Functions Manual Input	
⊖ Pulse Analysis Functions Manual Input	
Pulse Analysis Functions Manual Input	
Pulse Analysis Functions Manual Input	
Pulse Analysis Functions Manual Input	
Pulse Analysis Functions	
Pulse Analysis Functions	Expand All



1.2. Setpoint Selection

If any of these statistical functions is selected, the button "*Select setpoints*" will appear next to the statistical function combo box (please see the picture below):

Single Data Object Definition	
Object Name:	
Energy_Object	
Object Description:	
	-
Select Data Item	
O Dream Report History	story Server
Data Source	
Item Name	
use: + -	• / (e.g. *100
Select Statistical Function Setpoint stability result	* / (e.g. *100
Select Statistical Function Setpoint stability result	* / (e.g. *100 setpoints
Select Statistical Function Setpoint stability result Select Define time period Absolute or relative period definition	* / (e.g. *100 setpoints
Select Statistical Function Setpoint stability result Select Define time period Absolute or relative period definition Start of report period End of report p	* / (e.g. *100 setpoints
Select Statistical Function Setpoint stability result Select Define time period Absolute or relative period definition Start of report period End of report p Absolute Date/Time Absolute Date/Time	* / (e.g. *100 setpoints eriod Time *
Select Statistical Function Setpoint stability result Select Define time period Absolute or relative period definition Start of report period Absolute Date/Time Absolute Date/Time Absolute Date/Time 11/ 1/2011 +	* / (e.g. *100 setpoints eriod Time • Days
Select Statistical Function Setpoint stability result Select Define time period Absolute or relative period definition Start of report period Absolute Date/Time Absolute Date/ 10/ 1/2011 Days 12:00:00 hhmm.ss back	* / (e.g. *100 setpoints eriod Time Days hh:mm:ss bac
Select Statistical Function Setpoint stability result Select Define time period Absolute or relative period definition Start of report period End of report p Absolute Date/Time Absolute Date/ 10/ 1/2011 Days 12:00:00 hh.mm.ss back Result Representation	* / (e.g. *100 setpoints eriod Time Days hh.mm.ss bac
Select Statistical Function Setpoint stability result Select Define time period Absolute or relative period definition Start of report period End of report p Absolute Date/Time + Absolute Date/ 10/ 1/2011 + Days 12:00:00 + hh:mm:ss back 12:00:00 + Result Representation Advanced SQL Condition	* / (e.g. *100 setpoints eriod Time Days hh.mm:ss bac

If you click on the button "Select setpoints", the dialog box with setpoint selection will be opened, where you will be able to select one or several setpoints defined in the Setpoint Analysis Configuration window (for details, please see the Setpoint Analysis Configuration section of this manual):



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You can select one or more setpoints. Then the check box next to each setpoint will become checked.

If no setpoints have been selected, click on ... (browse) button on the right. The **Setpoint Analysis Configuration** dialog window will be opened, where you will be able to define setpoints for your project report(s)(for details on how to create setpoint definitions, please go to the **Setpoint Analysis Configuration** section of this manual).

Group box "Consider items" has a combo box with 6 entries as shown on the picture above:

- All items the function will calculate all items/ tags, which have entered and left the stability period. Then the function will do its main calculation for all the items from that setpoint.
- Fastest entry item the function will calculate the item/ tag, which has first reached the stability period (the one, which has the earliest timestamp of the first value within the stability period). Then the function will do its main calculation only for that item and not for all items from that setpoint.



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- Slowest entry item the function will calculate the item/tag, which has last reached the stability period (the one, which has the latest timestamp of the first value within the stability period). Then the function will do its main calculation only for that item and not for all items from that setpoint.
- Fastest exit item the function will calculate the item/ tag, which has first left the stability period (the one, which has the earliest timestamp of the first value out of the stability range after stability period end time). Then the function will do its main calculation only for that item and not for all items from that setpoint.
- Slowest exit item the function will calculate the item/ tag, which has last left the stability period (the one, which has the latest timestamp of the first value out of the stability range after stability period end time). Then the function will do its main calculation only for that item and not for all items from that setpoint.
- Selected Tag if this option is selected, the "Setpoints Tags" selection box will appear:

Single Data Object Definition	
Object Name:	
Oven_1	
elect setpoints	
Select setpoints	
Setpoint name	
🔽 Oven 1	
Consider items	
Consider Items Selected Tag	-
Consider Items Selected Tag Setpoint Tags	~
Consider items Selected Tag Setpoint Tags Batch_Data:Temp1	~
Consider items Selected Tag Setpoint Tags Batch_Data:Temp1 Batch_Data:Temp1	~
Consider items Selected Tag Setpoint Tags Batch_Data:Temp1 Batch_Data:Temp1 Batch_Data:Temp2 Batch_Data:Temp2	~
Consider items Selected Tag Setpoint Tags Batch_Data:Temp1 Batch_Data:Temp1 Batch_Data:Temp2 Batch_Data:Temp3	
Consider items Selected Tag Setpoint Tags Batch_Data:Temp1 Batch_Data:Temp1 Batch_Data:Temp2 Batch_Data:Temp3	~
Consider Items Selected Tag Setpoint Tags Batch_Data:Temp1 Batch_Data:Temp1 Batch_Data:Temp2 Batch_Data:Temp3	~
Consider Items Selected Tag Setpoint Tags Batch_Data:Temp1 Batch_Data:Temp2 Batch_Data:Temp3 Batch_Data:Temp3	

The dropdown menu will include all the items/tags for the setpoint selected.



When you select the item/tag you may need for the calculations, the function will calculate that item/tag which has entered and left the stability period. Then the function will do its main calculation only for this item from that setpoint.

NOTE: The default selection for this combo box is "All items".

1.3. "Setpoint Analysis Functions" Performance

If you select one of the functions from the **Setpoint Analysis Functions** group (please see the list above), then it will perform one of the statistical functions described below:

- Start time of stable period calculates the start time of stability period of the selected setpoint. It takes the selected setpoint and gets values of all items/tags defined for that setpoint for the calculation period, defined in that object. This function detects the time, when values of all tags have entered the "stability zone", i.e. are within **setpoint value +/-** tolerance. If more than one setpoint is selected, the function calculates start time for every defined setpoint and then displays the first one between all of them. If during the object calculation period all tag values have never entered together into the stability zone, the object result will be N/A.
- End time of stable period calculates the end time of stability period of the selected setpoint. End time of stability zone means the timestamp, when last item/tag value has left the stability zone. If it calculates the result for multiple selected setpoints, then it will calculate the result (end time) for each setpoint and then display the last one.
- **Duration of stable period** calculates start and end time for one or several setpoints, and then displays the period (duration) between start and end time.
- Setpoint stability result calculates the result, which is true or false. The function gets all values of each item/tag of the setpoint for the interval between start and end time of every setpoint, and checks if all values of all tags are within the setpoint value +/- tolerance. If multiple setpoints have been selected, this analysis will be executed separately for every setpoint. The result of this function will be TRUE if all values of all tags during a stable period of each zone are within the setpoint value +/ tolerance, and will be FALSE if any value is out of range during the stability periods.
- **Counter of stable periods** calculates and then displays the number of the stable periods for one or several setpoints selected.
- Rate of change before entering stability zone calculates rate of change of item/tag values of the setpoint before entering the stability zone (for details on how to configure the criteria for this statistical function calculations, please see <u>Rate of Change</u> of the <u>Setpoint</u> <u>Analysis Configuration</u> section of this manual).
- Rate of change after exiting stability zone calculates rate of change of item/tag values of the setpoint after exiting stability zone for details on how to configure the criteria for this statistical function calculations, please see <u>Rate of Change</u> of the <u>Setpoint_Analysis</u> <u>Configuration</u> section of this manual).



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2. Setpoint Analysis Result in Charts

The **Process Value** section in **Charts** enables to select the "**Setpoint Analysis**" statistical function for the chart object.

If the "**Setpoint Analysis**" statistical function is selected, then the button "..." (browse) will appear next to the combo box with the statistical function. Click this button and in the "Select setpoints" dialog box (for details, please see <u>1.2. Setpoint Selection</u> paragraph of the "**Setpoint Analysis Result in Statistical Functions**" section of this manual), please select:

- setpoints that sould be analyzed and displayed on the chart;
- data items that should be displayed on the chart.

Item Name	Definition				
Batch_Date:Temp1 Batch_Date:Temp2	Oream Report History Octamal History Octamal History Server	Select Data Item Data Source T80 Select setpoints	160 3		
	Apply correction factor for all item values:	Select setpoints Setpoint name			
	Process Value Setpoint analysis	Diver 18			
AddLine Remove Line	Define time period Absolute or relative period definition Start of report period Relative Date/Time • 1 Dave 00:00:00 humm to back X Avis settings Date and Time Timestamp Format Date and Time Show Absolute time on X axis Show Relative time on X axis	All Rens All Rens Addest entry Ren Blowest entry Ren Blowest exit Ren Blow			
	Legend Line Style	Graph Style:			
	Use samples within period only App	earance			
	Advanced	SQL Condition			

There are the following options available:

- All items the chart will display all items defined for the selected setpoint;
- Fastest entry item the chart will display only one item (out of those defined in the selected setpoint), which was the first to enter the stability zone of the setpoint;
- Slowest entry item the chart will display only one item (out of those defined in the selected setpoint), which was the last to enter the stability zone of the setpoint;
- Fastest exit item the chart will display only one item (out of those defined in the selected setpoint), which was the first to exit from the stability zone of the setpoint



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- Slowest exit item the chart will display only one item (out of those defined in the selected setpoint), which was the first to exit from the stability zone of the setpoint;
- Selected Tag the chart will display only the selected item/tag, which has entered and left the stability zone of the setpoint.

NOTE: When displaying the setpoint analysis results, the chart will display a dash line to display a setpoint value and two horizontal dash lines to display **min** and **max** of tolerance. Stability zones will be marked with two small triangles and also there will be put two vertical dash lines, which will help to detect start and stop of the stability zone.