



자동화 운영 제어 통합 솔루션

최적화된 공장자동화 구축을 위한 다양한 패키지 형태 솔루션을 스마트팩토리 플랫폼 제공을 통해 설치에서 운영까지 편리하고 안정적인 서비스를 제공합니다.

설비 및 설비 간의 데이터를 활용하여 생산운영부터 설비보전,모니터링까지 통합된 운영 관리/즉각적인 처리가 가능한 서비스로 고객이 자원을 보다 효과적으로 활용하고 운영 효율성을 극대화할 수 있게 해줍니다.



rSPC

Real-Time Statistical Process Control

Field-oriented Optimized service



역할의 정의

nexbe+ rSPC는 On,Off-line rSPC (Real-Time Statistical Process Control) 시스템으로, 생산 및 계측 데이터를 실시간으로 수집하며, 통계적 자료와 분석기법을 활용하여이상 점을 조기 발견하고 경고 하는 기능을 수행합니다.

With nexbe+ rSPC, You Can "Real-Time Statistical Process Control"

기준정보관리

- Control Rule, Control Chart, rSPC Spec modeling

Real-time rule check

- Control 대상 별 통계 data / control parameter 계산
- Rule violation check 및 Rule violation result 보관
- OCAP interface (Corrective action은 MES service에서 수행)

Analysis

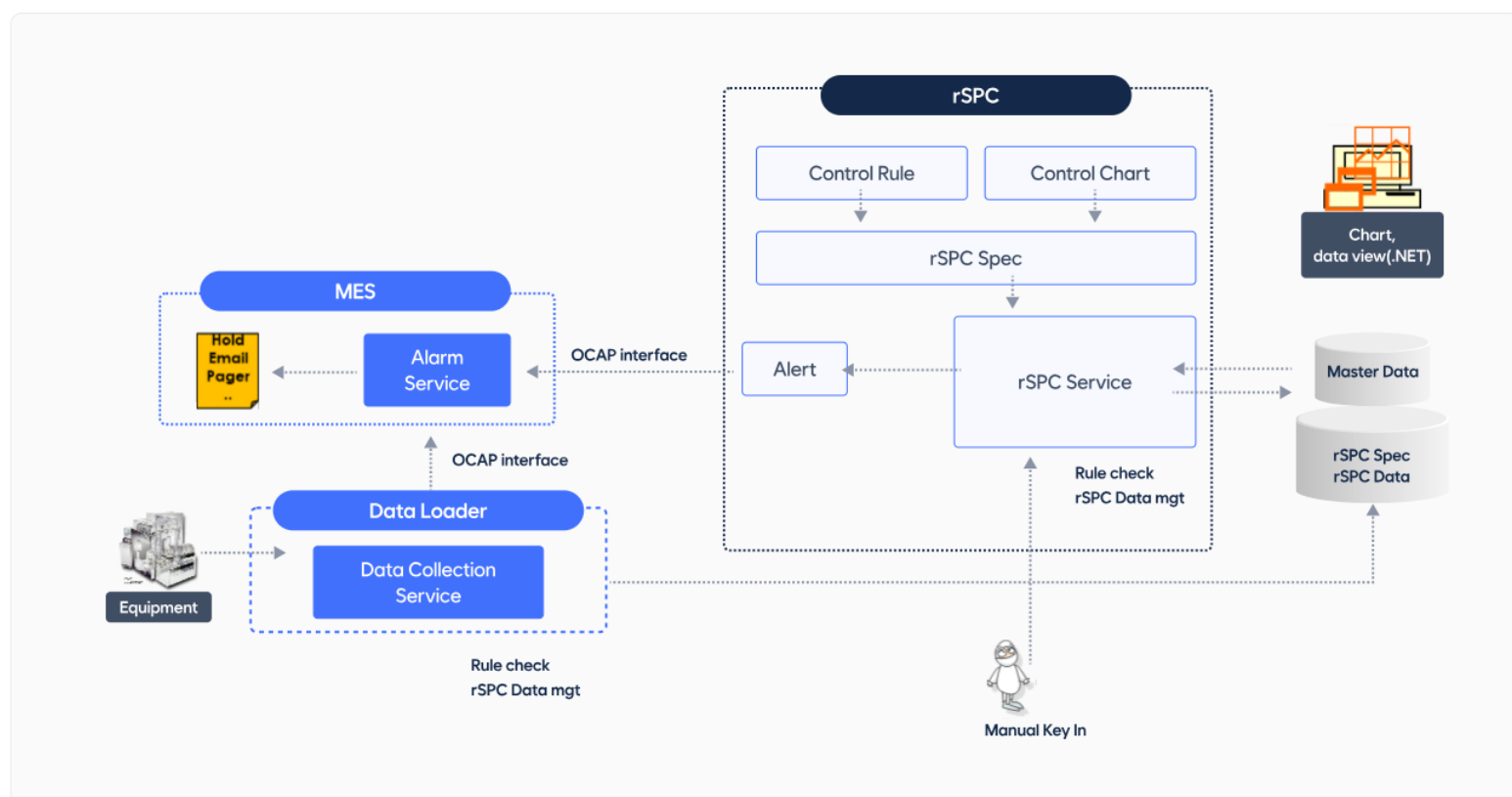
- Cp/Cpk Report, Simulation
(Spec and Control Limit estimate), Index Report(Alarm, Cp/Cpk)

Batch 관리에 의한 통계 값 관리

- CL (Raw Data 기반 CL 자동 생성)

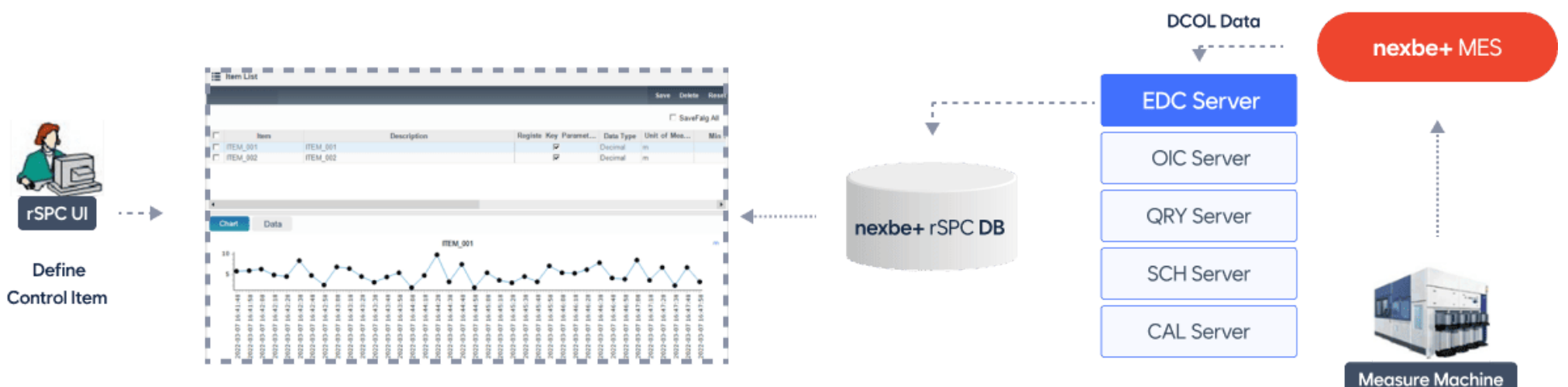
제품구성

- rSPC는 사용자가 정의한 데이터를 수집, Rule검사를 수행하고 결과를 저장
- Rule Out 발생시 OCAP 정의에 따라, MES 와 Interface 하거나 기타 이벤트 처리를 함



Field-oriented Optimized service

01 Modeling - Define Control Item



02 Modeling – Virtual Item



Define Virtual Item

Item Properties

Add Modify Delete Copy Save Reset

Item Name

V-ITEM-02

Description

Data Type

Decimal

Unit of Measure

m

Lower Limit of filtering

Upper Limit of filtering

Virtual Item Type

Concurrent

Formula

a-b

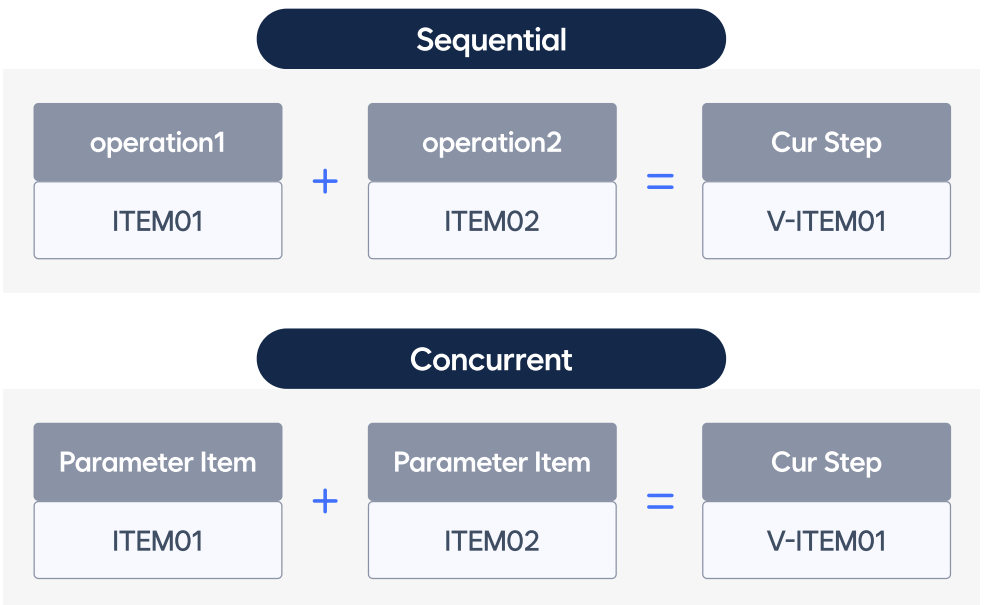
Apply

Site Count

1

Parameter List

Site Name	Parameter	Parameter Item	DC Type	Parameter Site Name
X	a	ITEM01	Inspection	S01
	b	ITEM02	Inspection	S02



03 Control Chart – Chart Spec



Define Virtual Item

Control Chart

Chart Type

Mean

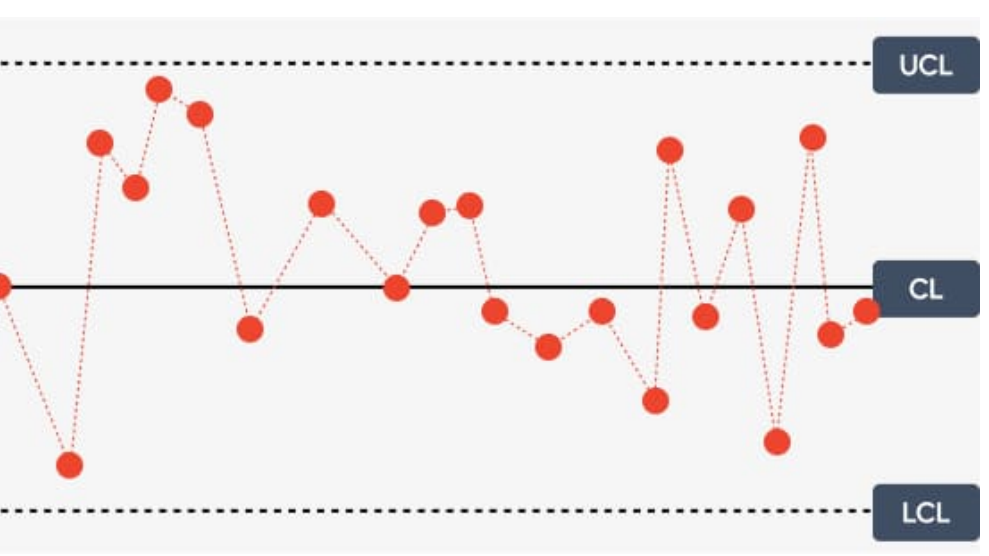
☒ XBar ☒ S ☒ R ☐ Uni ☐ mR

Spec Limit

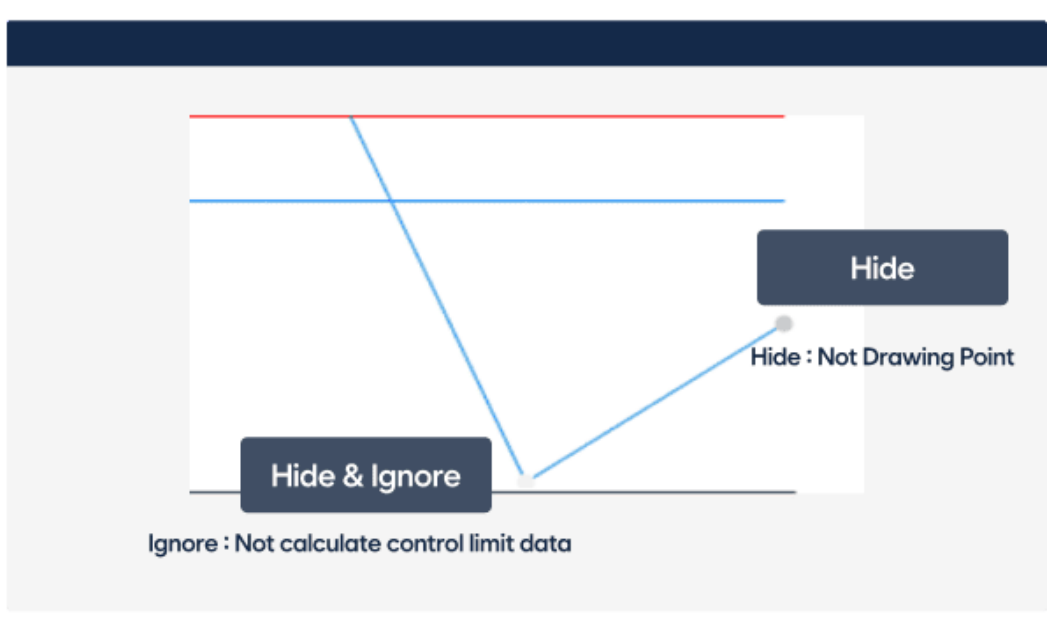
ChartName	Target	LSL	USL	Alarm
Xbar	0	-1.2	1.2	SPC_OOS04
Raw				
S				
R				

Control Limit

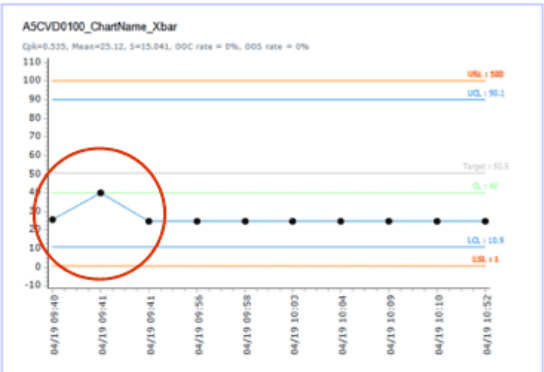
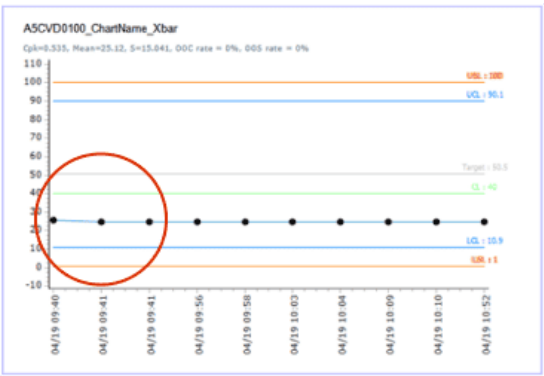
ChartName	CL	LCL	UCL	Alarm
Xbar	0	-0.96	0.96	SPC_OOC02
Raw				
S				
R				



04 Control Chart – Chart Point Hide & Ignore



05 Handle Control Data – Edit, Delete Control Data



Control Data List									
Marking	MaterialName	Process Time	XBar	Product	Flow	Operation	Machine	Unit	
N	AE6501ACMPA	2021-04-19 09:40:26	25.84	AE6501ACMPA	AP650A01	A2200	ASCVD0100		
N	AE6501ACMPA	2021-04-19 09:41:16	40	AE6501ACMPA	AP650A01	A2200	ASCVD0100		
N	AE6501ACMPA	2021-04-19 09:41:47	25.04	AE6501ACMPA	AP650A01	A2200	ASCVD0100		
N	AE6501ACMPA	2021-04-19 09:56:08	25.04	AE6501ACMPA	AP650A01	A2200	ASCVD0100		
N	AE6501ACMPA	2021-04-19 09:58:41	25.04	AE6501ACMPA	AP650A01	A2200	ASCVD0100		
N	AE6501ACMPA	2021-04-19 10:03:34	25.04	AE6501ACMPA	AP650A01	A2200	ASCVD0100		
N	AE6501ACMPA	2021-04-19				A2200	ASCVD0100		
N	AE6501ACMPA	2021-04-19				A2200	ASCVD0100		
N	AE6501ACMPA	2021-04-19				A2200	ASCVD0100		
N	AE6501ACMPA	2021-04-19				A2200	ASCVD0100		

Date/Time2021-04-19 09:41:16.517122

MaterialNameAE6501ACMPA

Value40

CommentEdit Point

SaveClose

06 Industry-common Default Rule 및 Custom rule 제공

Basic Western Electric Rule 기본 제공

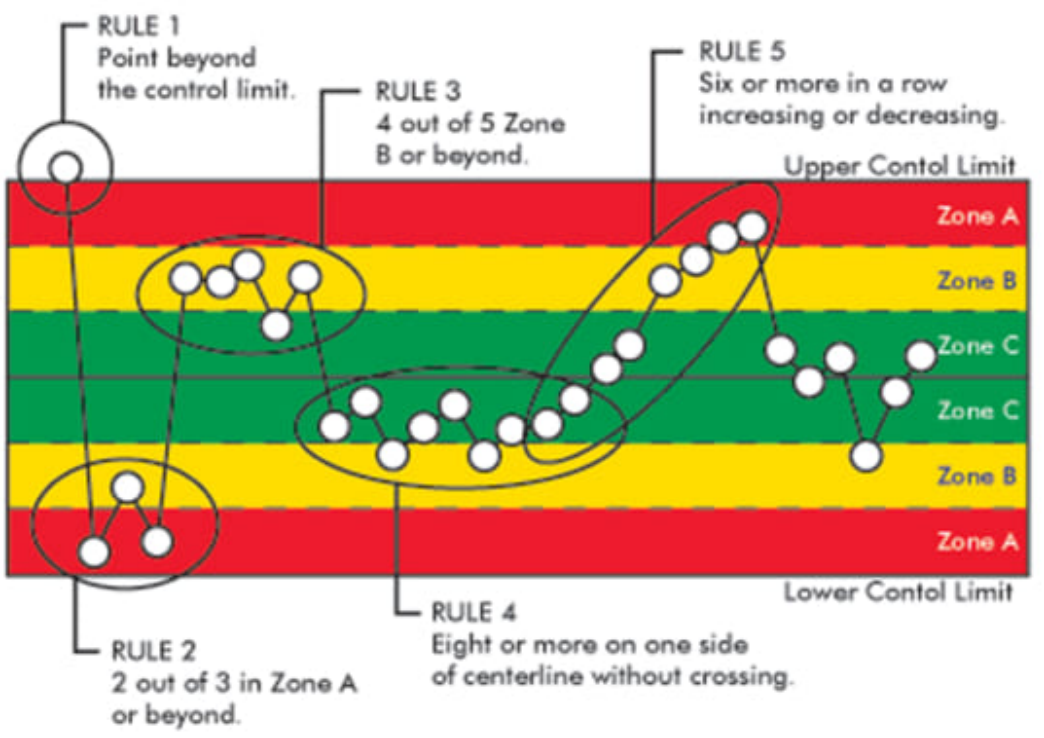
- Zone rules for symmetric data (4 types)
- Trend rules (2 types)

Nelson Rule 기본 제공

- 8 types of symmetric & asymmetric rules

Custom Rule 정의 지원

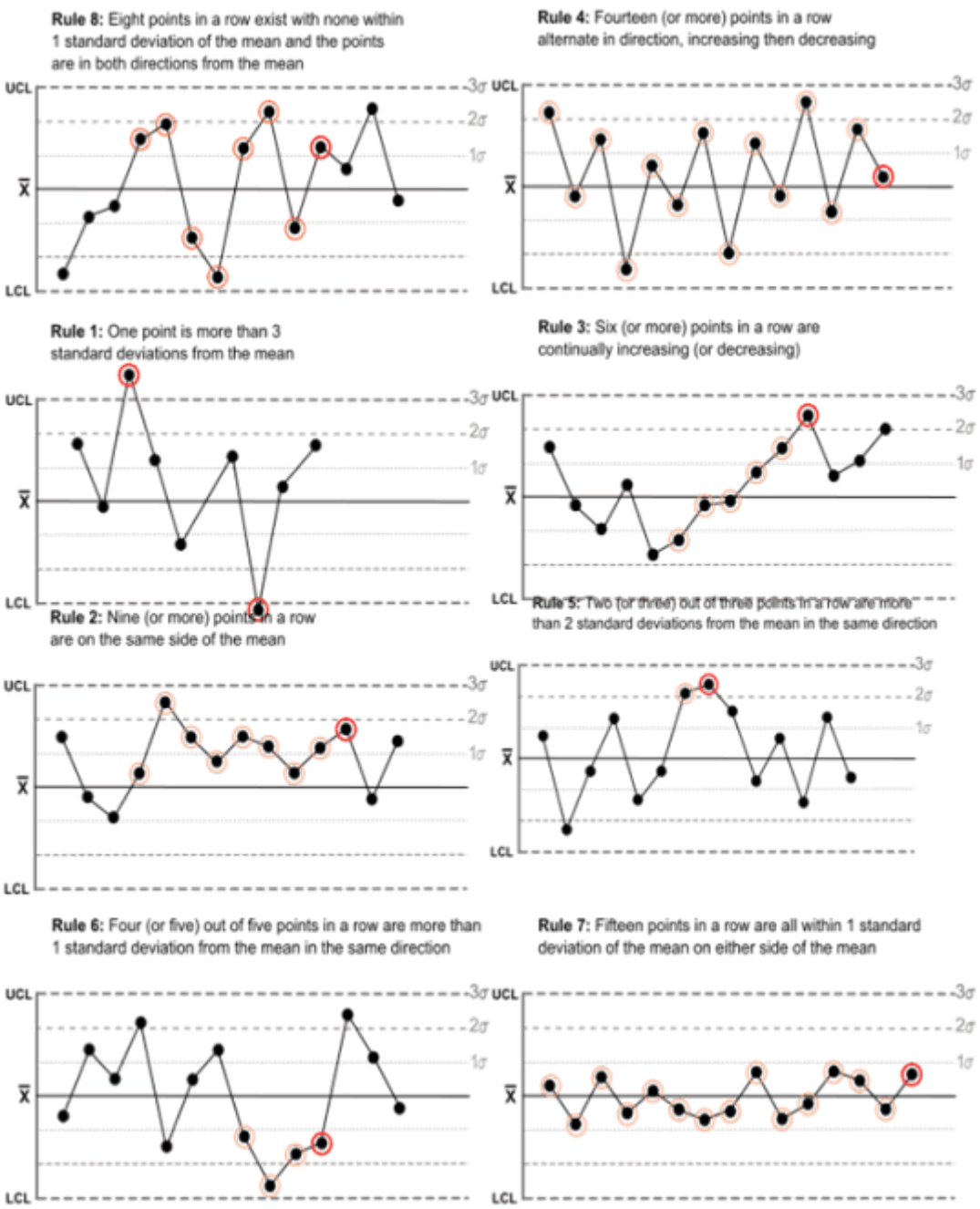
- Limit out type
- Bias type
- Trend type
- Oscillation type
- Type 별 관리 limit의 사용자 정의 및 런타임 적용



07 Rules – Western Electric Rule

Cate	No.	Description	适用 Ch
Zone Rule	R1	Any single data point falls outside the 3σ limit from the centerline (i.e., any point that falls outside Zone A, beyond either the upper or lower control limit)	- Symmetricdata 적용 (X-bar chart..)
	R2	Two out of three consecutive points fall beyond the 2σ limit (in zone A or beyond), on the same side of the centerline	
	R3	Four out of five consecutive points fall beyond the 1σ limit (in zone B or beyond), on the same side of the centerline	
	R4	Eight consecutive points fall on the same side of the centerline (in zone C or beyond)	
R-Chart Rule	R5	Any single data point falling above the +3σ limit	- Smallsub-groupsample(<5) - Asymmetricdata적용 - (R-chart,p-chart,..)
	R6	Two consecutive points falling above the +2σ limit (in the upper zone A or above)	
	R7	Three consecutive points falling above the +1σ limit (in the upper zone B or above)	
	R8	Seven consecutive points falling above the centerline (in the upper zone C or above)	
	R9	Ten consecutive points falling below the centerline (in the lower zone C or below)	
	R10	Six consecutive points falling below the -1σ limit (in the lower zone B or below)	
	R11	Four consecutive points falling below the -2σ limit (in the lower zone A)	
Trend	R12	6 in a row trending up or down	-
	R13	14 in a row alternating up and down	

	No.	Description	적용 Chart
Rules	R1	One point is more than 3 standard deviations from the mean.	X-bar, R-chart
	R2	Nine (or more) points in a row are on the same side of the mean	
	R3	Six (or more) points in a row are continually increasing (or decreasing).	
	R4	Fourteen (or more) points in a row alternate in direction, increasing then decreasing.	
	R5	Two (or three) out of three points in a row are more than 2 standard deviations from the mean in the same direction.	X-bar chart 적용
	R6	Four (or five) out of five points in a row are more than 1 standard deviation from the mean in the same direction.	
	R7	Fifteen points in a row are all within 1 standard deviation of the mean on either side of the mean.	
	R8	Eight points in a row exist with none within 1 standard deviation of the mean and the points are in both directions from the mean.	



Category	Attribute	Defect type	Chart type	Sample Siz
Variable (Quality)	Measurable (thickness, temp., pressure,..)		X, mR Chart (Individuals and moving range)	Sub group (point) 별 sample = 1
			Xbar, R Chart (Average and range)	Sub group (point) 별 sample 2~10
			Xbar, S Chart (Average and STdev)	Sub group (point) 별 sample > 10
Attribute (Defects)	Countable (defect, defective product, ..)	Defective Unit	np Chart (number defective)	sample size constants (100 CST당 불량 제품 수)
			p Chart (proportion defective)	sample size varies (CST당 불량 제품 수)
		Defects	c Chart (defects per subgroup)	sample size constants (100 샘플 당 불량 point 수)
			u Chart (defects per unit)	sample size varies (기간별 불량 point 수)

조회 조건

- 사용자 정의 기반 조회 조건
- 최대 6개 조회 조건으로 기간별 검색

Cp/Cpk Report

- 임의의 사용자 기간 (매일 / 매주 / 매월) 동안 공정능력지수 통계 데이터를 제공.
- 단건 데이터가 아닌 복수 Item에 대하여 통계 데이터를 제공.
- Cp, Cpk, Pp, Ppk, CA, CPM, Cnpg 지표 제공

Simulation

- 수집 된 데이터를 대상으로 여러 다른 관리도, 제어 한계선, 룰 적용 시뮬레이션 기능 제공
- Spec Limit / Control Limit 값 추정

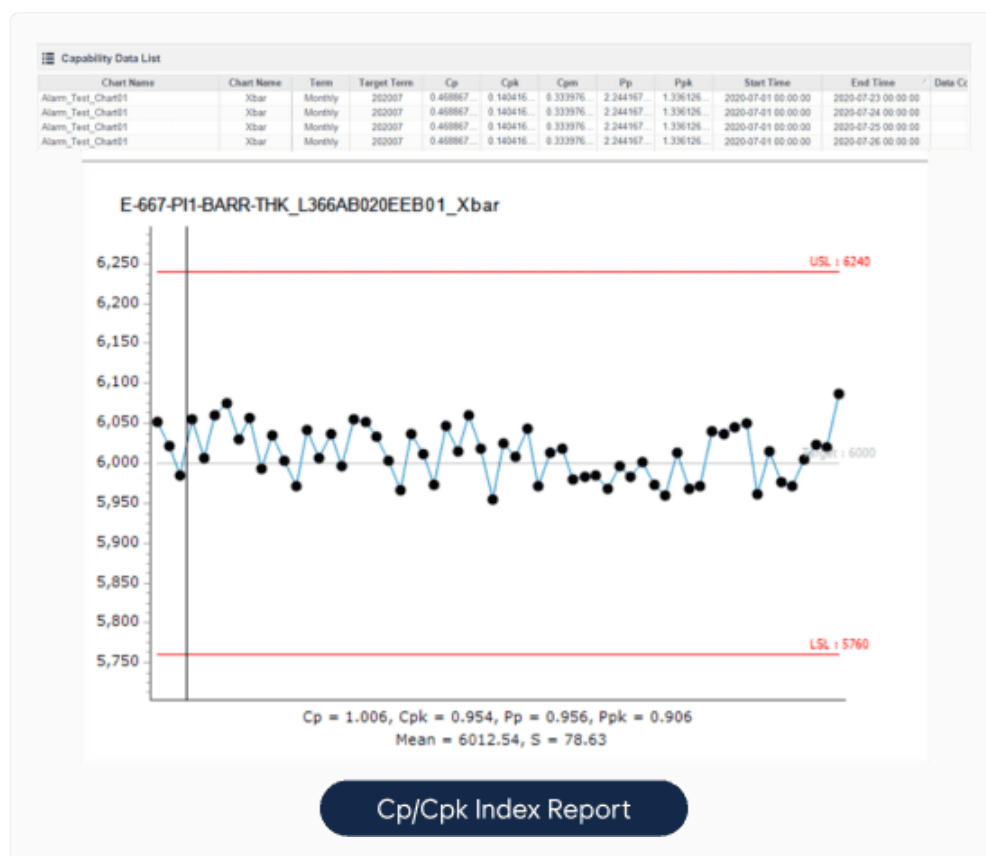
Excel out/print

- Saves raw data, stat. data into Excel file
- Chart print



Cp/Cpk Index Report

- 사용자 정의조건을 Grouping 하여
일간, 주간, 월간 공정능력지수 리포팅 기능 제공



Alarm Index Report

- 사용자 정의 조건을 Grouping 하여
일간, 주간, 월간 Alarm 발생 비율 리포팅 기능 제공

