

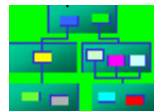
ControlDraw

Sample Document

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Take a Look!



A Demonstration of ControlDraw Documentation Output.

This document has been generated to illustrate the documentation output possible using ControlDraw. This is static output, ie printable, but remember that ControlDraw has dynamic functions too, so you cannot judge it on this alone. But please send comments if you have any - what would you like to add to the document?

It includes:

- Example diagrams
- Test sheets for Units, equipment modules, phases etc.
- An IO List and a equipment and recipe parameter lists

The document is generated from the new ControlDraw S88 Professional Start model. This is a template that can be provided to licensed ControlDraw users. Base your model on this template and then all the classes, test sheets, standard words etc come with it, along with guidance notes on what to do to change the template into your real model.

With 69 pages, this demo is small. However ControlDraw can cope with models with the hundreds of diagrams and matrices and the thousands of IO and parameters required by a real process control system. Real project prints can run to thousands of pages, but who can read that? Remember - the data can be viewed in ControlDraw, the Reviewer or Access. In ControlDraw and the Reviewer you can rapidly navigate and search the model.

Note - the model uses the Unit State concept in which an entire unit is commanded to states by the running phase. Equipment modules are used to group the control modules into related functions, but the EM's do not have their own phases.

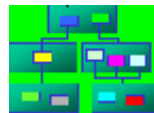
That is not the only way a ControlDraw model can be organised, it is equally possible to have phases in equipment module, in the 'classic' S88 way.

The model is a skeleton, which means that it does not contain the complete definition of a particular process. However it does contain a lot of generic data that can be used to help to define the standard objects in your application.

This Document has been produced entirely with ControlDraw. The PDF was generated with the ControlDraw Print and Review program.

Everything can be configured, for example only certain classes of diagrams have associated text sheets, as defined in the Classes of the model. Similarly, on test sheets only chosen classes and chosen fields are listed after the diagram.

For Procedural Steps and transitions are listed specially, the lines in the step or transtion text are expanded to one table line each, and the table rows are increased in height by a percentage you define. Transitions that are more complex than one condition are given an additional line for logic checked.



Project Description

Project Details

This model describes

It includes the definitions of the required functional objects, consistently with the S88 standard. Test specifications can be generated from the model.

Delete when complete

Tip Set the ControlDraw fields for the project name and number in Project Properties, you do not need to repeat them here.

Implementation Notes

Describe Implementation details may differ from the model structure, for example

The model uses matrices extensively but the system code does not.

This is because the [control system] [user standards] [user policies] do not support state matrix control.

The tag names used in the model differ from those in the implementation in the following respects

Instrument tagnames are ...

The model contains lookup references to the implemented tagnames view the External Tagname field This is only completed for :

Units

Equipment Modules

Valves. Motors

Inputs and Outputs of class Control System

Testing Principles

Overview

This section describes the general principles of testing. The Class Test Method for each type of object contains details for each class of object in the model.

visual code checks should be included in each test, this document does not list these, since this is likely to be system specific.

Generic Testing

Generic mechanisms should be tested in detail.

- Test each type of Control Module.

- Test the Equipment module framework code

- Test the Unit framework code

- Test the Phase Logic Interface

Basic Control Testing

Testing should be performed 'bottom up'.

This means that the lower levels of the model should be tested first, working up to the higher levels.

It is also suggested that the physical modules be tested before the procedural

- Test each Control Module instance is correctly connected to it's IO.

- Test each Equipment module, confirm they correctly set their subordinate control modules.

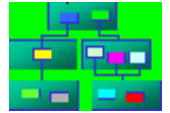
- Test each Unit, confirm they contain the correct EM's and CM's

Procedural/Physical Integration Testing

This is the where the functions of the equipment model are tested against the procedural model to ensure that they work together correctly including:

- Checking that the all phases send the correct states to the units they control.

- Checking that the Operations drive the phases correctly



Project Information

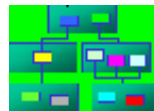
Project Information

Item	Value
Project Name:	S88 Start Template for Professionals
Client:	Your Client
Last Author:	Francis Lovering
Date Edited:	05/08/02 14:21:42
Issue	1B
Version:	102
Version:	Minor Issue - 1B Rev 99 - Substantial development of classes, test sheet generation, simple test protocols and diagram descriptions. New Weighing class and diagram, and filling phase. Published as Documentation Output example.

Issue History

Date	Issue	Version	Author	Details
05/08/02	Minor Issue - 1B	99	Francis Lovering	Substantial development of classes, test sheet generation, simple test protocols and diagram descriptions. New Weighing class and diagram, and filling phase. Published as Documentation Output example.
11/06/02	Major Issue - 1A	21	Francis Lovering	Published for use as reference model
01/02/02	Issue Reset	0	Francis Lovering	Cleared Model History

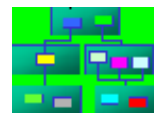
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List of Diagrams

List of Included Diagrams

Page	Class	PageID	Vers	LastAuthor	Date
1 - Site	Site	36	87	Francis Lovering	05/08/02
2 - Process Cell	Process Cell	5	97	Francis Lovering	05/08/02
3 - Process Cell	Cell Common Resource	40	84	Francis Lovering	04/08/02
4 - CIP System	Common Resource	46	99	Francis Lovering	05/08/02
5 - un01 Mixing Unit	Unit	6	99	Francis Lovering	05/08/02
6 - em01 Equipment module	Equipment Module	7	102	Francis Lovering	05/08/02
7 - em02 Equipment module	Equipment Module	8	102	Francis Lovering	05/08/02
8 - cr01 Common Resource 1	Common Resource	9	98	Francis Lovering	05/08/02
9 - rcp01 Recipe 1	Recipe	25	101	Francis Lovering	05/08/02
10 - rp01 Recipe Procedure	Recipe Procedure	26	2	Francis Lovering	01/02/02
11 - Unit Procedure	Unit Procedure	35	2	Francis Lovering	01/02/02
12 - op01 Operation 1	Operation	15	2	Francis Lovering	01/02/02
13 - phs01 Prompt and Wait till done	SubPhase	19	2	Francis Lovering	01/02/02
14 - Filling Phase	Phase	45	98	Francis Lovering	05/08/02
15 - ph03 EM2 Phase1	Phase	24	74	Francis Lovering	03/08/02
16 - phe01 Phase 1	Phase	28	4	F Lovering	12/02/02
17 - phe02 Phase 2	Phase	22	12	F Lovering	22/05/02
18 - On Off Valve	Valve	21	32	Francis Lovering	13/06/02
19 - Fixed Speed Motor	Motor	31	99	Francis Lovering	05/08/02
20 - VSD Motor driver	Motor	32	99	Francis Lovering	05/08/02
23 - Unit Interface	UnitInterface	39	82	Francis Lovering	03/08/02
24 - Standard 4-20mA PID Loop	PID Control Loop	11	72	Francis Lovering	03/08/02
25 - Control Valve	Effector Analog	14	72	Francis Lovering	03/08/02
26 - Analog Input from Transmitter	Measurement Analog	13	57	F Lovering	06/07/02
27 - Derived Analog Alarms	Measurement Analog	33	70	Francis Lovering	04/08/02
30 - S88 Procedure Flowchart	Recipe Procedure	41	99	Francis Lovering	05/08/02
31 - Weight measurement	Measurement Analog	44	97	Francis Lovering	04/08/02



Diagrams

Diagram Description 1 - Site

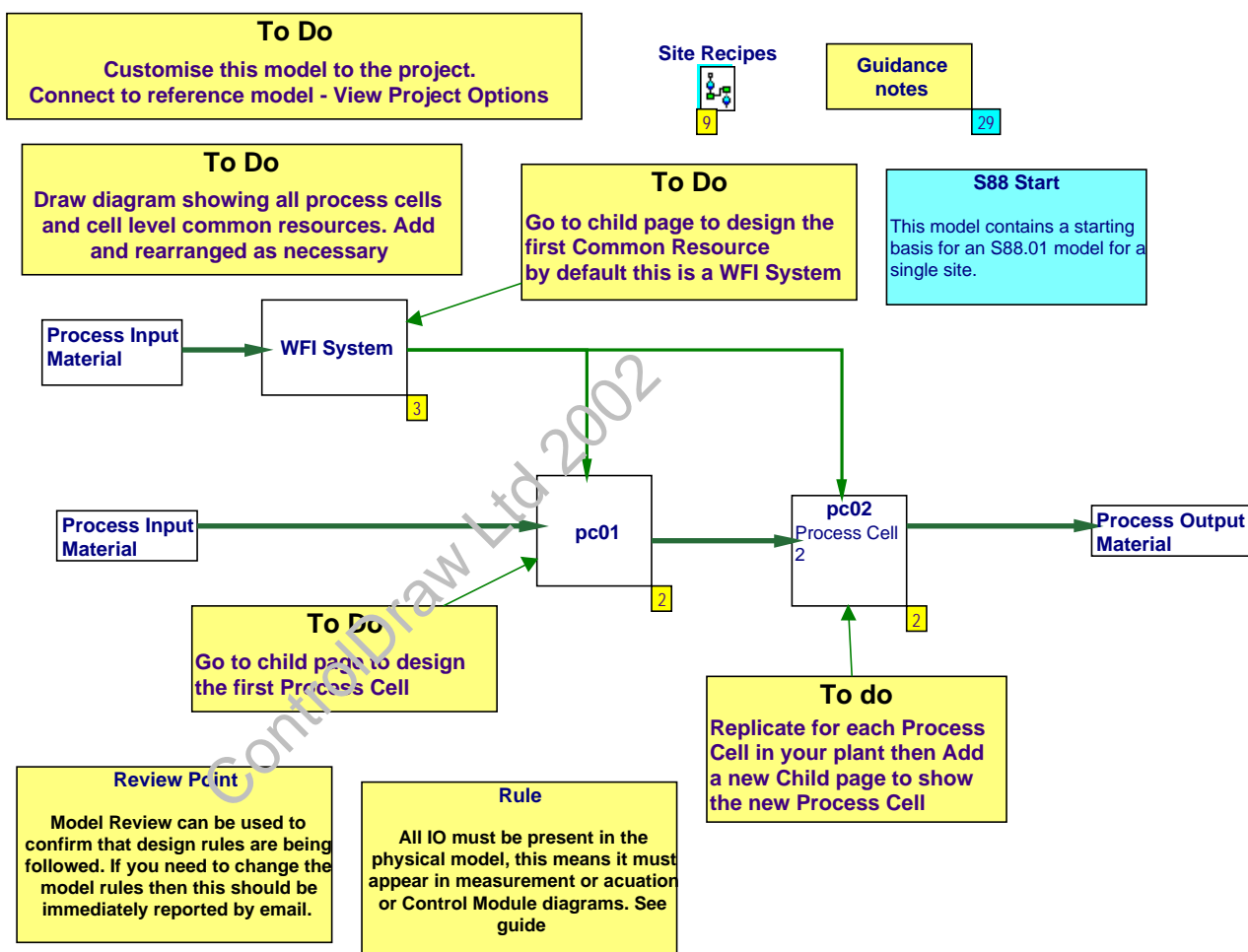
Site Description

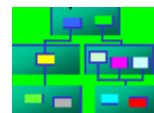
Customise to your plant!

In the completed model there should be a short description of the overall activities at the site. Often you will be able to obtain a process description from the process designer and paste it into the diagram description. If you do so ensure that you include the version number of the document. Not, due to limitation in the RTF format that the word parts of ControlDraw uses not all the feature of full word processors such as MS Word are supported. In particular tables. A quick way to ensure compatibility is to paste into WordPad, then copy from WordPad to ControlDraw.

In this start templates the site diagram shows a very simple plant with a couple of process cells and a Site level common resource.

Class: Site Diagram Version: 87 Edited: 05/08/02 14:18:43





Diagrams

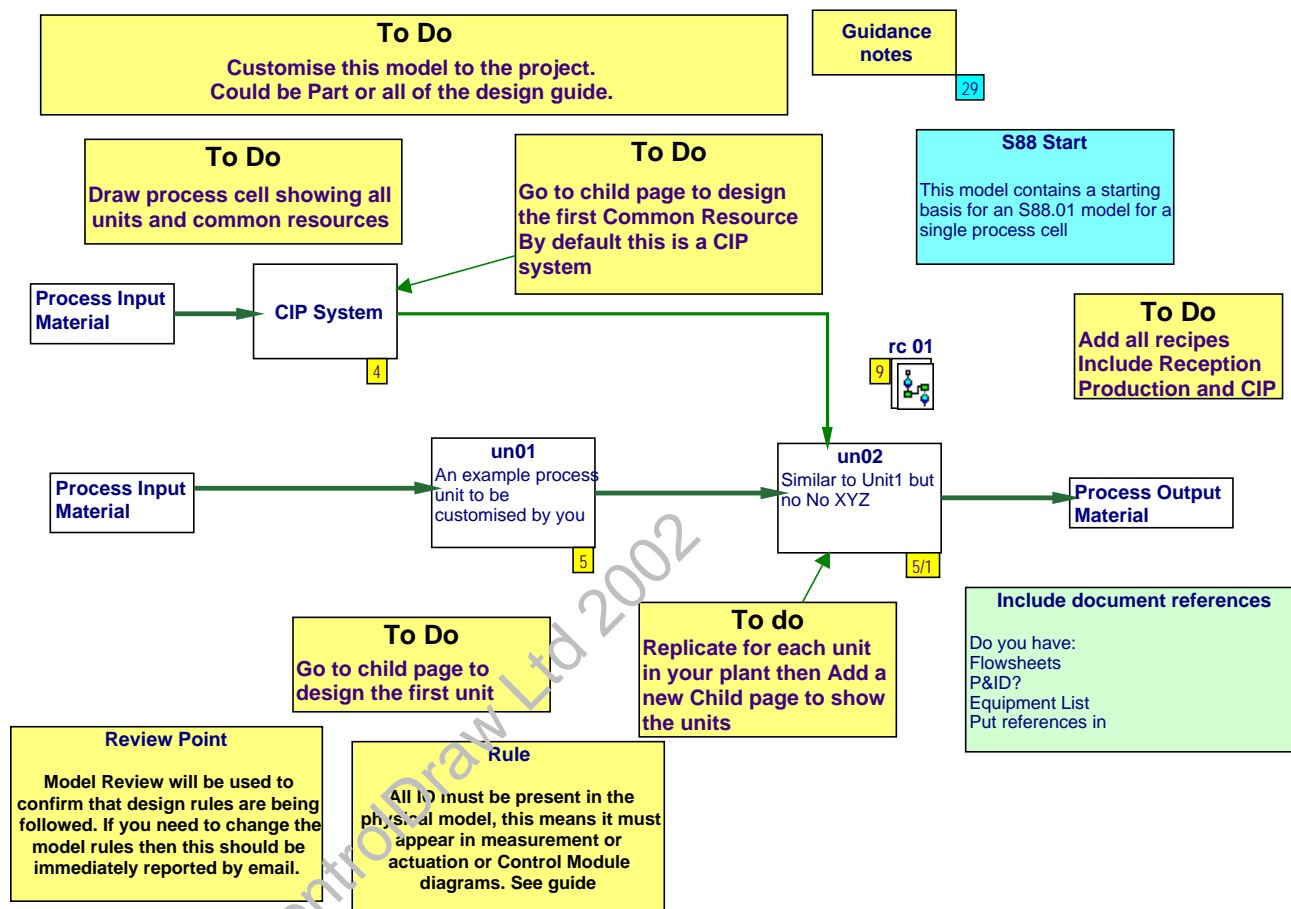
Diagram Description 2 - Process Cell

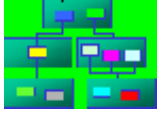
Process Cell Description

Sample text, customise to your plant

This process cell covers the production of the stuff in the stuff making equipment.
 The equipment is located in 2 rooms indoors
 The are up to two batches in production at any one time.
 The area is operated from local workstations in each room.

Class: Process Cell Diagram Version: 97 Edited: 05/08/02 14:19:02





Diagrams

Diagram Description 3 - Process Cell

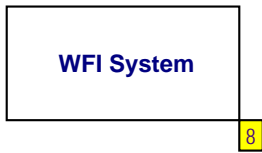
Process Cell Description

Customise to your plant

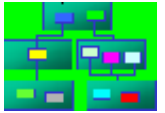
This process cell

Class: Cell Common Resource

Diagram Version: 84 Edited: 04/08/02 17:02:38



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Diagrams

Diagram Description 4 - CIP System

Description

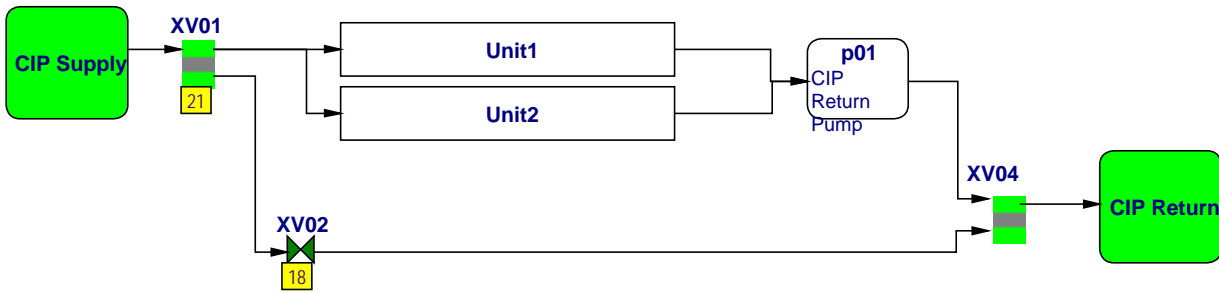
Customise to your plant

This diagram shows the routes that the CIP system cleans.

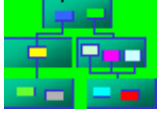
Class: Common Resource Diagram Version: 99 Edited: 05/08/02 01:47:15

Parent Symbols:
2 - Process Cell
.... , CIP System

P&ID reference
Put the P&ID number and version here



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Unit Test Sheet

For Diagram 5 - un01 Mixing Unit

Diagram Version: 99

List of applicable instances

1 - pc01.un02

2 - pc01.un01

3 - pc02.un02

4 - pc02.un01

Test Method:

Test protocol for Units

Each type of unit must be fully tested

If the control system uses a program module for each instance of a type of unit then each instance must be fully tested, although the options of using Comparison tools to compare the code in each similar module should be investigated.

Typically unit testing includes

Equipment modules and Control modules in the unit to be checked that they are present and that they have been previously tested in isolation.

State Matrix testing:

The unit should be set manually to each of it's possible states using the Unit Faceplate. The states to be visually confirmed on the relevant graphic display.

Diagram Variants:

1-No XYZ

Page Parents:

Page 2 Process Cell Tagname un02 Variant 1-No XYZ

Page 2 Process Cell Tagname un01 Master

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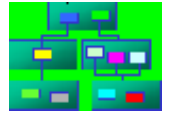


Diagram Description 5 - un01 Mixing Unit

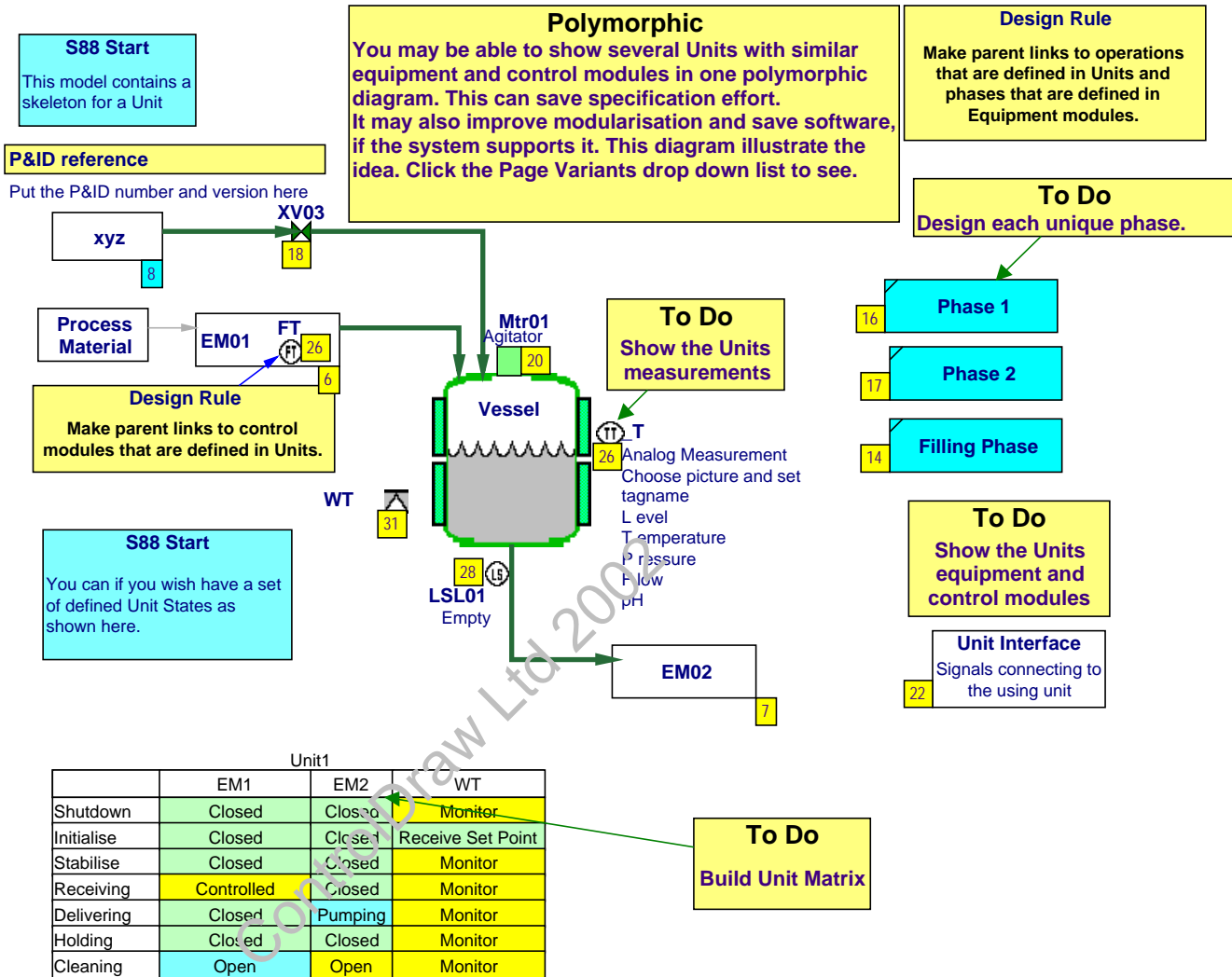
Unit 01 Description

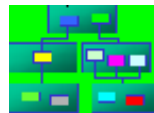
Customise to your plant

This unit processes.....

This unit has fixed boundaries and the equipment and control modules are owned permanently by the Unit.

Class: Unit Diagram Version: 99 Edited: 05/08/02 14:19:32





Unit Test Sheet

For Diagram 5 - un01 Mixing Unit

Diagram Version: 99

Equipment Module Objects

Tagname	ObjectTag	Present on Graphic
EM01	em	
EM02	em	
Vessel	em	

Measurement Analog Objects

Tagname	ObjectTag	ScaleMax	ScaleMin	Present on Graphic
_T	me_T	100	0	
FT	meFT	100	0	
WT	meWT	100	0	

Measurement Switch Objects

Tagname	ObjectTag	Present on Graphic
LSL01	msLSL	

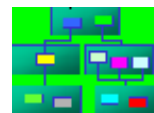
Motor Objects

Tagname	ObjectTag	Present on Graphic
Mtr01	cmMtr	

Phase Objects

Step	Line	Action	Pass/Fail
Filling Phase			
Phase 1			
Phase 2			

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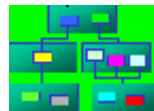


Valve Objects

Tagname	ObjectTag	Present on Graphic	Type	Serial number
XV03	vvXV			

Module Test Signatures	
Notes and References	
Signatures	
Date	Signature
Name	
Position	
Date	Signature
Name	
Position	
Date	Signature
Name	
Position	

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Equipment Module Test Sheet

For Diagram 6 - em01 Equipment module

Diagram Version: 102

List of applicable instances

1 - pc01.un02.EM01

2 - pc01.un01.EM01

3 - pc02.un02.EM01

4 - pc02.un01.EM01

Test Method:

Test Protocol for Equipment Modules

The testing of Equipment modules includes

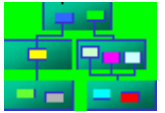
Graphic Review

Is all the content of the module on a graphic, correctly named?

State Matrix testing:

The equipment should be set manually to each of it's possible states using the Equipment Module Faceplate. The states to be visually confirmed on the relevant graphic display.

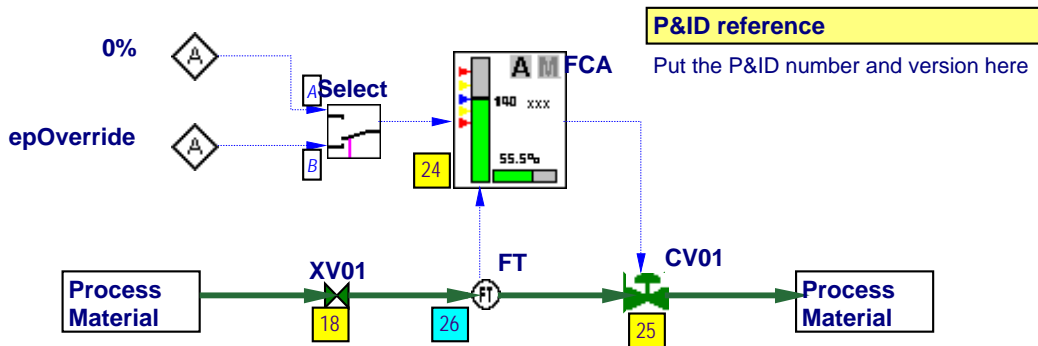
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Diagrams

Diagram 6 - em01 Equipment module

Class: Equipment Module Diagram Version: 102 Edited: 05/08/02 14:23:13



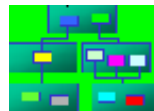
To Do
 Show the all control modules
 Show all the states
 Design Equipment Phases if model structure requires it



em01 Equipment module

	FCA	FT	Select	XV01
Closed	Out OR	Alarms	Select A	Close
Controlled	Remote	Alarms	Select A	Open
Open	Out OR	Alarms	Select B	Close

Enabled



Diagrams

Equipment Module Test Sheet

For Diagram 6 - em01 Equipment module
 Diagram Version: 102

Effector Analog Objects

Tagname	ObjectTag	On Graphic	Comment	Spec Checked
CV01	eeCV			

Equipment Parameter Objects

Tagname	ObjectTag	Normal	Min	Max	Test Note	Signed	Eng Units
epOverride	epOverride						%

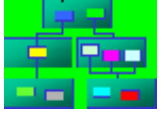
PID Control Loop Objects

Tagname	ObjectTag	Pass / Fail
FCA	pidFCA	

Valve Objects

Tagname	ObjectTag	Present on Graphic	Type	Serial number
XV01	vvXV			

Module Test Signatures	
Notes and References	
Signatures	
Date	
Name	Signature
Position	
Date	
Name	Signature
Position	
Date	
Name	Signature
Position	



Equipment Module Test Sheet

For Diagram 7 - em02 Equipment module
Diagram Version: 102

List of applicable instances

- 1 - pc01.un02.EM02
- 2 - pc01.un01.EM02
- 3 - pc02.un02.EM02
- 4 - pc02.un01.EM02

Test Method:

Test Protocol for Equipment Modules

The testing of Equipment modules includes

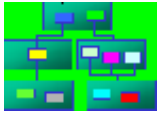
Graphic Review

Is all the content of the module on a graphic, correctly named?

State Matrix testing:

The equipment should be set manually to each of it's possible states using the Equipment Module Faceplate. The states to be visually confirmed on the relevant graphic display.

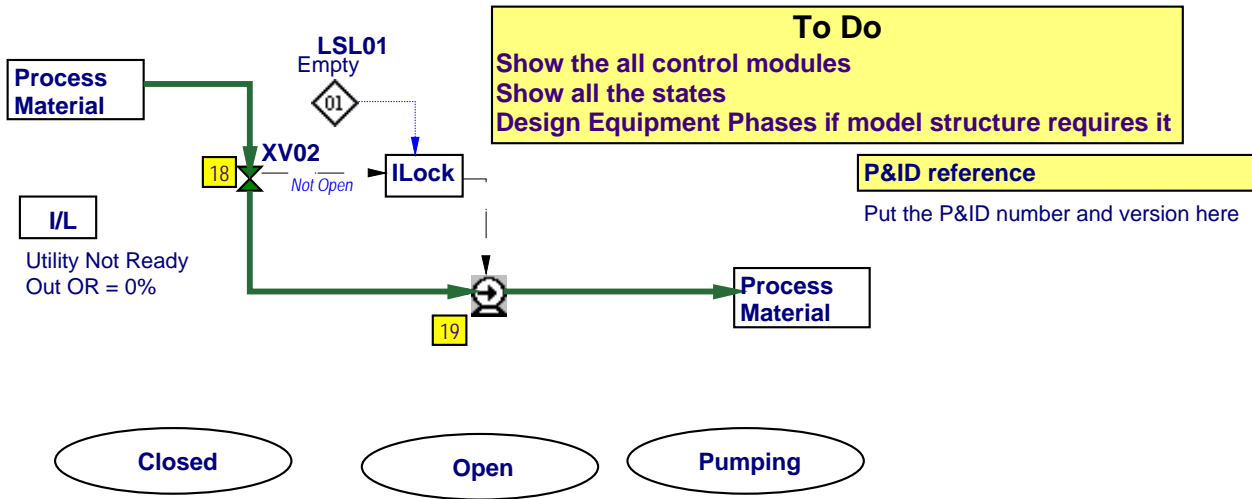
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Diagrams

Diagram 7 - em02 Equipment module

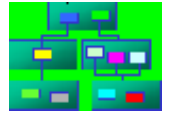
Class: Equipment Module Diagram Version: 102 Edited: 05/08/02 14:23:58



EM2		
	Pump	XV02
Closed	Stop	Close
Open	Stop	Open
Pumping	Run	Open

15 phEM2 Phase1
 Example of an Equipment phase

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Diagrams

Equipment Module Test Sheet

For Diagram 7 - em02 Equipment module
Diagram Version: 102

Motor Objects

Tagname	ObjectTag	Present on Graphic
Pump	mrPump	

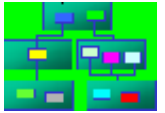
Phase Objects

Step	Line	Action	Pass/Fail
phEM2 Phase1		Example of an Equipment phase	

Valve Objects

Tagname	ObjectTag	Present on Graphic	Type	Serial number
XV02	vvXV			

Module Test Signatures	
Notes and References	
Signatures	
Date	
Name	Signature
Position	
Date	
Name	Signature
Position	
Date	
Name	Signature
Position	



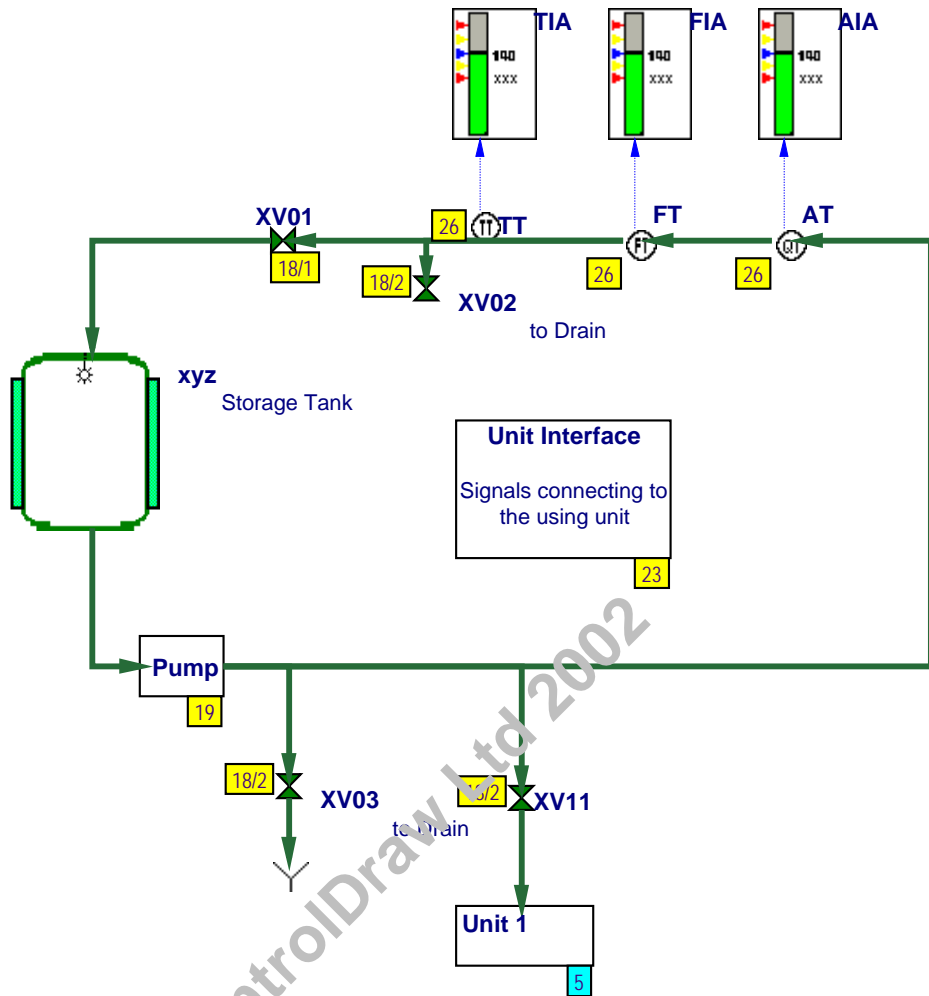
Diagrams

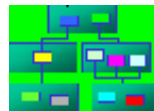
Diagram 8 - cr01 Common Resource 1

Class: Common Resource Diagram Version: 98 Edited: 05/08/02 00:54:46

To Do
Show the control modules and the users.
Make an interface object linking to the user.

P&ID reference
Put the P&ID number and version here





Diagrams

Diagram 9 - rcp01 Recipe 1

Class: Recipe Diagram Version: 101 Edited: 05/08/02 14:20:37

Recipe Header
Based on Process Description Rev Draft 2

To Do
Show the document sources
Build the Recipe Procedure

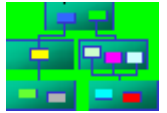
rcp01

S88 Start
This shows contains a starting
basis for an S88.01 recipe

No data

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Recipe Procedure Test Sheet For Diagram 10 - rp01 Recipe Procedure Version: 2
Project : S88 Start Template for Professionals
Diagrams



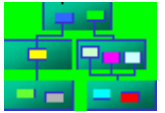
Recipe Procedure Test Sheet

For Diagram 10 - rp01 Recipe Procedure
Diagram Version: 2

List of applicable instances

- 1 - fp00003
- 2 - fp00002
- 3 - fp00004

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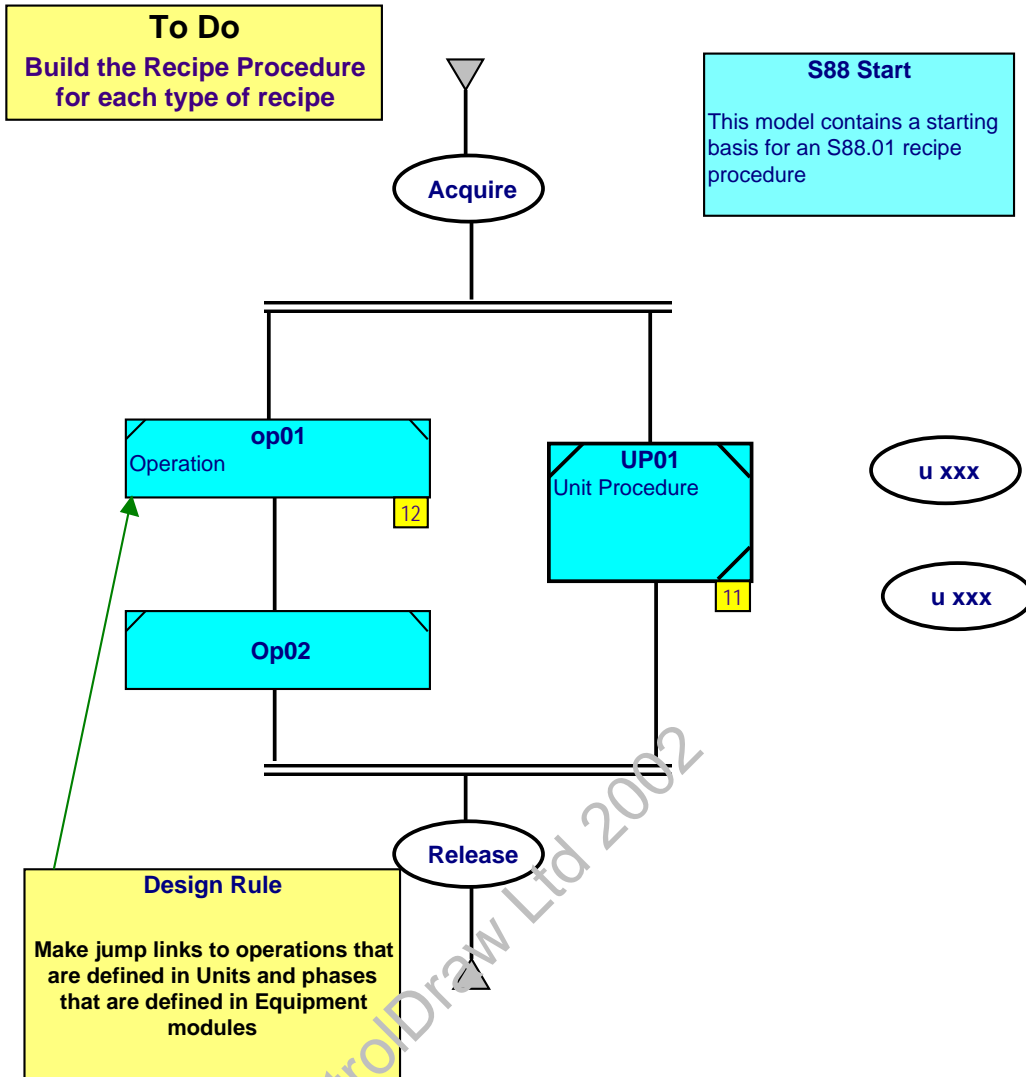
Diagrams

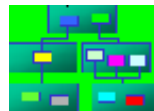
Diagram 10 - rp01 Recipe Procedure

Class: Recipe Procedure

Diagram Version: 2

Edited: 01/02/02 01:17:26





Recipe Procedure Test Sheet

For Diagram 10 - rp01 Recipe Procedure
 Diagram Version: 2

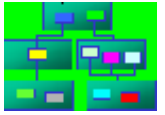
Operation Objects

Step	Line	Action	Pass/Fail
op01		Operation	
Op02			

Module Test Signatures	
Notes and References	
Signatures	
Date	Signature
Name	
Position	
Date	Signature
Name	
Position	
Date	Signature
Name	
Position	

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Unit Procedure Test Sheet For Diagram 11 - Unit Procedure Version: 2
Project : S88 Start Template for Professionals
Diagrams



Unit Procedure Test Sheet
For Diagram 11 - Unit Procedure
Diagram Version: 2

List of applicable instances
1 - pc01.rc 0.rcp01.UP01
2 - pc02.rc 0.rcp01.UP01
3 - Site.rcp01.UP01

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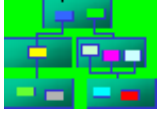
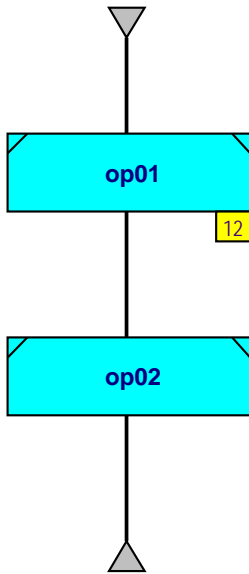


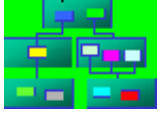
Diagram 11 - Unit Procedure
Class: Unit Procedure

Diagram Version: 2 Edited: 01/02/02 01:17:26



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Unit Procedure Test Sheet For Diagram 11 - Unit Procedure Version: 2
Project : S88 Start Template for Professionals
Diagrams



Unit Procedure Test Sheet
 For Diagram 11 - Unit Procedure
 Diagram Version: 2

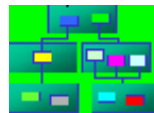
Operation Objects

Step	Line	Action	Pass/Fail
op01			
op02			

Module Test Signatures	
Notes and References	
Signatures	
Date	Signature
Name	
Position	
Date	Signature
Name	
Position	
Date	Signature
Name	
Position	

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Operation Test Sheet For Diagram 12 - op01 Operation 1 Version: 2
Project : S88 Start Template for Professionals
Diagrams



Operation Test Sheet
For Diagram 12 - op01 Operation 1
Diagram Version: 2

List of applicable instances

- 1 - pc01.rc 0.rcp01.op01
- 2 - pc01.rc 0.rcp01.UP01.op01
- 3 - pc02.rc 0.rcp01.op01
- 4 - pc02.rc 0.rcp01.UP01.op01
- 5 - Site.rcp01.op01
- 6 - Site.rcp01.UP01.op01

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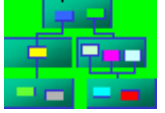
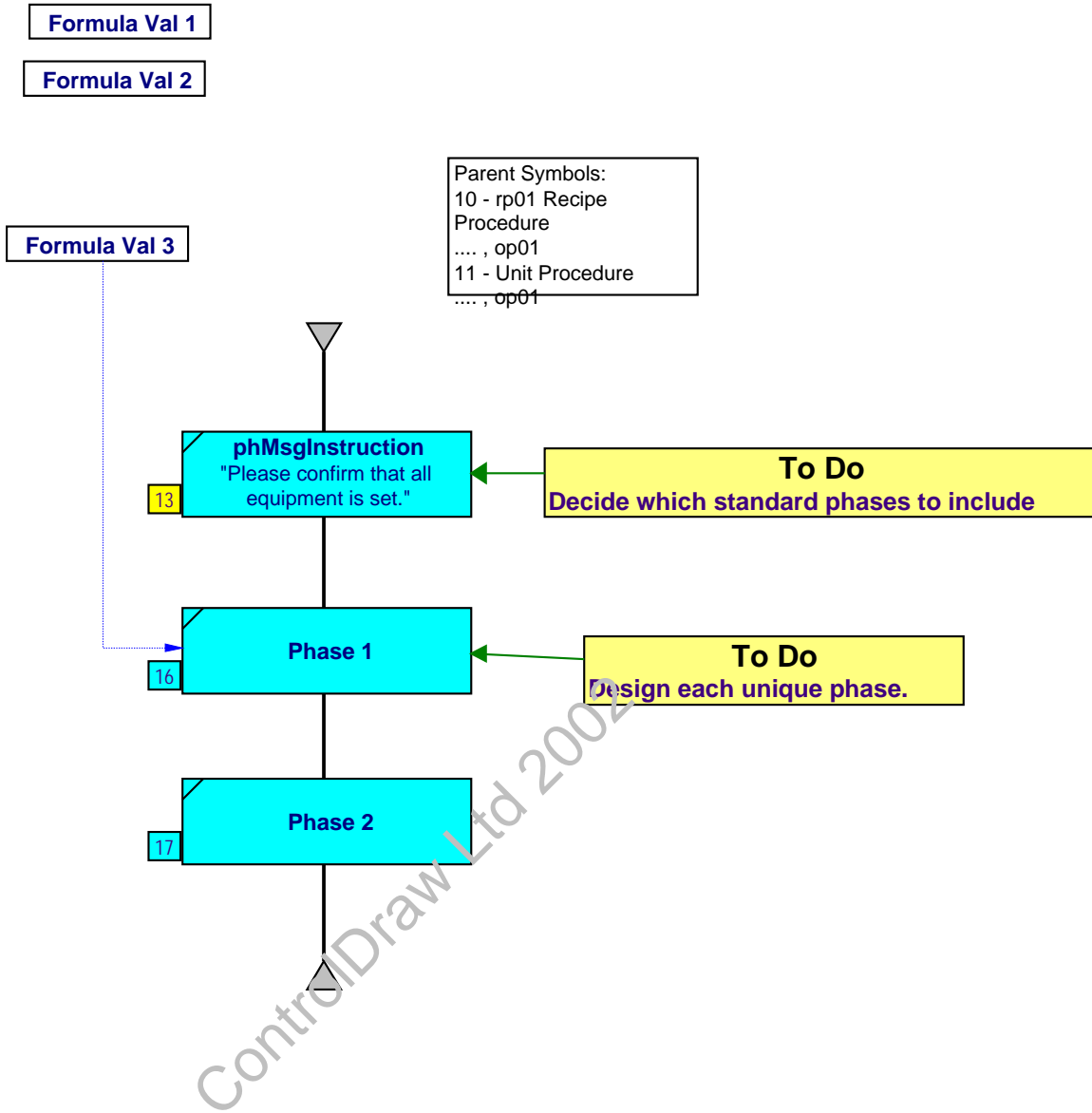
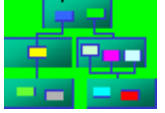


Diagram 12 - op01 Operation 1
 Class: Operation Diagram Version: 2 Edited: 01/02/02 01:17:26



Operation Test Sheet For Diagram 12 - op01 Operation 1 Version: 2
Project : S88 Start Template for Professionals
Diagrams



Operation Test Sheet
 For Diagram 12 - op01 Operation 1
 Diagram Version: 2

Phase Objects

Step	Line	Action	Pass/Fail
Phase 1			
Phase 2			

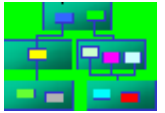
Recipe Formula Value Objects

Step	Line	Action	Pass/Fail
Formula Val 1			
Formula Val 2			
Formula Val 3			

SubPhase Objects

Step	Line	Action	Pass/Fail
phMsgInstruction	1	"Please confirm that all equipment is set "	

Module Test Signatures	
Notes and References	
Signatures	
Date	Signature
Name	
Position	
Date	Signature
Name	
Position	
Date	Signature
Name	
Position	



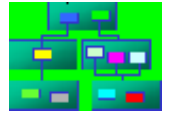
SubPhase Test Sheet

For Diagram 13 - phs01 Prompt and Wait till done
Diagram Version: 2

List of applicable instances

- 1 - pc01.rc 0.rcp01.op01.phMsgInstruction
- 2 - pc01.rc 0.rcp01.UP01.op01.phMsgInstruction
- 3 - pc02.rc 0.rcp01.op01.phMsgInstruction
- 4 - pc02.rc 0.rcp01.UP01.op01.phMsgInstruction
- 5 - Site.rcp01.op01.phMsgInstruction
- 6 - Site.rcp01.UP01.op01.phMsgInstruction

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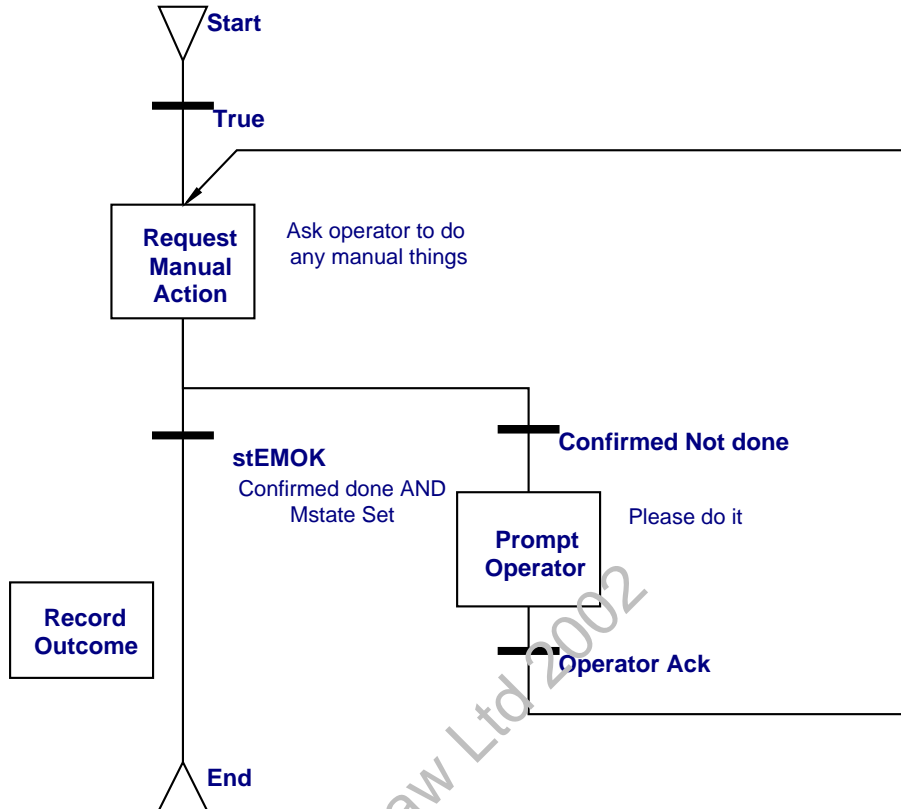
Diagrams

Diagram 13 - phs01 Prompt and Wait till done

Class: SubPhase Diagram Version: 2 Edited: 01/02/02 01:17:26

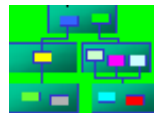
To Do
Customise messages, in the parent symbols

Parent Symbols:
12 - op01 Operation 1
.... , phMsgInstruction



Note
This operation checks that the unit is in auto (ie all it's modules are in Auto) and prompts the operator to set them if they are not. It continues to prompt until all the devices are in auto, so the operator MUST put all devices in auto in order to complete the operation.

Consider when designing your model if this operation should exist in All units. If so then put it in the methodology.



SubPhase Test Sheet

For Diagram 13 - phs01 Prompt and Wait till done
 Diagram Version: 2

Batch Journal Entry Objects

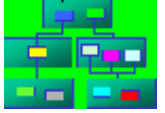
Tagname	ObjectTag	Comment1	Logged	Checked
Record Outcome	bjRecord Outcome	p	False	

Phase/Op Step Objects

Step	Line	Action	Pass/Fail
Prompt Operator		Please do it	
Request Manual Action	1	Ask operator to do	
	2	any manual things	

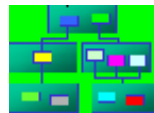
Transitions

Tran	Line	Condition	Value Before	Value After	Step Text	Pass / Fail
Confirmed Not done						
Operator Ack						
stEMOK	1	Confirmed done				
	2	AND Mstate Set				
		Transition logic checked				
True						



Module Test Signatures		
Notes and References		
Signatures		
Date		Signature
Name		
Position		
Date		Signature
Name		
Position		
Date		Signature
Name		
Position		

ControlDraw Ltd 2002



Phase Test Sheet

For Diagram 14 - Filling Phase

Diagram Version: 98

List of applicable instances

1 - pc01.un02.Filling Phase

2 - pc01.un01.Filling Phase

3 - pc02.un02.Filling Phase

4 - pc02.un01.Filling Phase

Test Method:

Test Protocol for Phases

The testing of Phases includes :

Checking that the phases send the correct states to the units they control

That the phase logic interface is correct

ControlDraw Ltd 2002

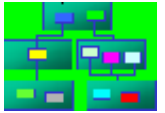
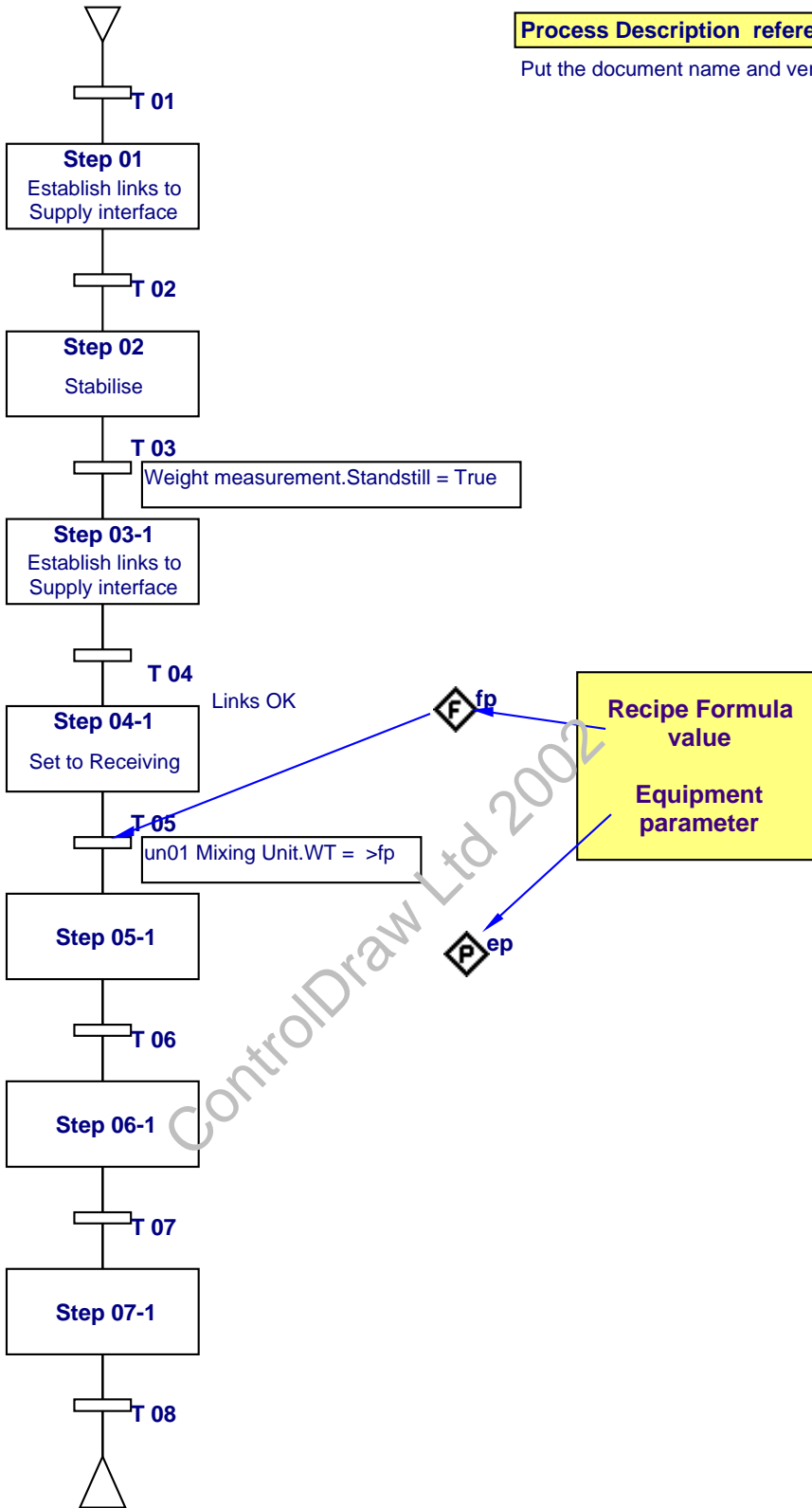


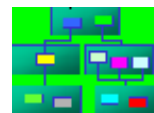
Diagram 14 - Filling Phase

Class: Phase Diagram Version: 98 Edited: 05/08/02 00:59:25

Process Description reference

Put the document name and version here





Phase Test Sheet

For Diagram 14 - Filling Phase

Diagram Version: 98

Equipment Parameter Objects

Tagname	ObjectTag	Normal	Min	Max	Test Note	Signed	Eng Units
ep	ep						%

Phase/Op Step Objects

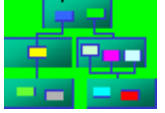
Step	Line	Action	Pass/Fail
Step 01		Establish links to Supply interface	
Step 02		Stabilise	
Step 03-1		Establish links to Supply interface	
Step 04-1		Set to Receiving	
Step 05-1			
Step 06-1			
Step 07-1			

Recipe Formula Value Objects

Step	Line	Action	Pass/Fail
fp			

Transitions

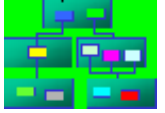
Tran	Line	Condition	Value Before	Value After	Step Text	Pass / Fail
T 01						
T 02						
T 03	1	Weight measurement.Standstill = True				
		Transition logic checked				
T 04		Links OK				
T 05	1	un01 Mixing Unit.WT = >fp				
		Transition logic checked				



T 06						
T 07						
T 08						

Module Test Signatures	
Notes and References	
Signatures	
Date	Signature
Name	
Position	
Date	Signature
Name	
Position	
Date	Signature
Name	
Position	

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Phase Test Sheet

For Diagram 15 - ph03 EM2 Phase1

Diagram Version: 74

List of applicable instances

1 - pc01.un02.EM02.phEM2 Phase1

2 - pc01.un01.EM02.phEM2 Phase1

3 - pc02.un02.EM02.phEM2 Phase1

4 - pc02.un01.EM02.phEM2 Phase1

Test Method:

Test Protocol for Phases

The testing of Phases includes :

Checking that the phases send the correct states to the units they control

That the phase logic interface is correct

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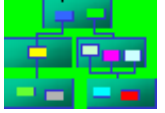
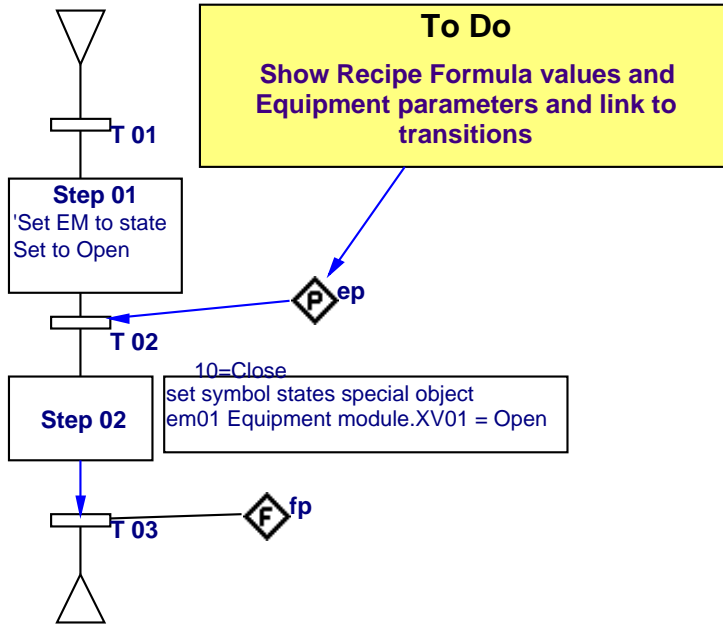
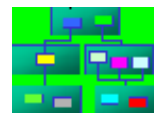


Diagram 15 - ph03 EM2 Phase1

Class: Phase Diagram Version: 74 Edited: 03/08/02 16:38:06



ControlDraw Ltd 2002



Phase Test Sheet

For Diagram 15 - ph03 EM2 Phase1

Diagram Version: 74

Equipment Parameter Objects

Tagname	ObjectTag	Normal	Min	Max	Test Note	Signed	Eng Units
ep	ep						%

Phase/Op Step Objects

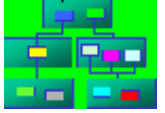
Step	Line	Action	Pass/Fail
Step 01	1	'Set EM to state	
	2	Set to Open	
Step 02	1	'set symbol states special object	
	2	10=Open	

Recipe Formula Value Objects

Step	Line	Action	Pass/Fail
fp			

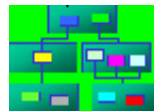
Transitions

Tran	Line	Condition	Value Before	Value After	Step Text	Pass / Fail
T 01						
T 02		10=Close				
T 03						



Module Test Signatures		
Notes and References		
Signatures		
Date		Signature
Name		
Position		
Date		Signature
Name		
Position		
Date		Signature
Name		
Position		

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Phase Test Sheet

For Diagram 16 - phe01 Phase 1

Diagram Version: 4

List of applicable instances

1 - pc01.un02.ph001

2 - pc01.un01.Phase 1

3 - pc02.un02.ph001

4 - pc02.un01.Phase 1

Test Method:

Test Protocol for Phases

The testing of Phases includes :

Checking that the phases send the correct states to the units they control

That the phase logic interface is correct

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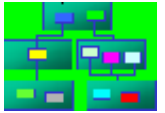
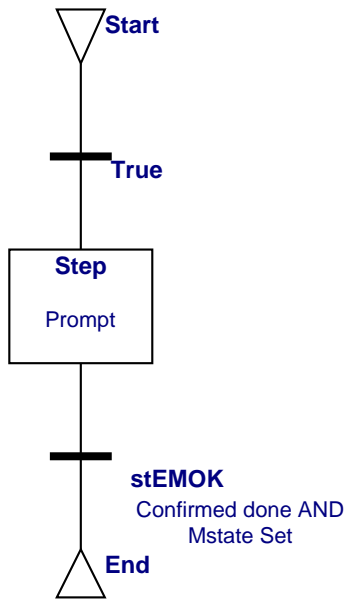


Diagram 16 - phe01 Phase 1

Class: Phase Diagram Version: 4 Edited: 12/02/02 19:54:54

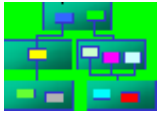
To Do
Customise messages, in the parent symbol

Parent Symbols:
4 - un01 Mixing Unit
..., Phase 1



Note
This operation checks that the unit is in auto (ie all it's modules are in Auto) and prompts the operator to set them if they are not. It continues to prompt until all the devices are in auto, so the operator MUST put all devices in auto in order to complete the operation.
Consider when designing your model if this operation should exist in All units. If so then put it in the methodology.

Phase Test Sheet For Diagram 16 - phe01 Phase 1 Version: 4
Project : S88 Start Template for Professionals
Diagrams



Phase Test Sheet

For Diagram 16 - phe01 Phase 1
 Diagram Version: 4

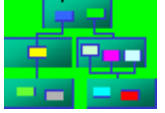
Phase/Op Step Objects

Step	Line	Action	Pass/Fail
Step		Prompt	

Transitions

Tran	Line	Condition	Value Before	Value After	Step Text	Pass / Fail
stEMOK	1	Confirmed done				
	2	AND Mstate Set				
		Transition logic checked				
True						

Module Test Signatures	
Notes and References	
Signatures	
Date	Signature
Name	
Position	
Date	Signature
Name	
Position	
Date	Signature
Name	
Position	



Phase Test Sheet

For Diagram 17 - phe02 Phase 2
Diagram Version: 12

List of applicable instances

- 1 - pc01.un02.Phase 2
- 2 - pc01.un01.Phase 2
- 3 - pc02.un02.Phase 2
- 4 - pc02.un01.Phase 2

Test Method:

Test Protocol for Phases

The testing of Phases includes :

- Checking that the phases send the correct states to the units they control
- That the phase logic interface is correct

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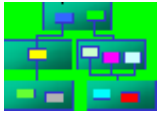


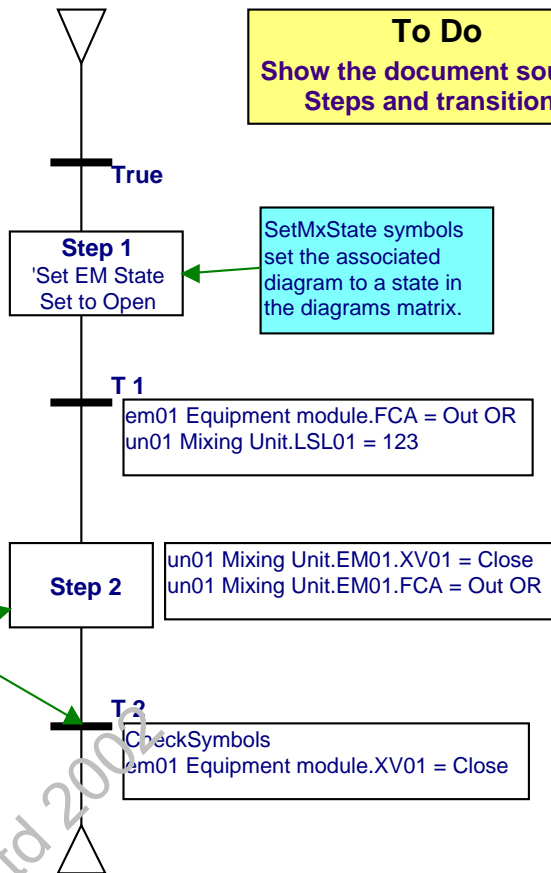
Diagram 17 - phe02 Phase 2

Class: Phase Diagram Version: 12 Edited: 22/05/02 18:52:35

Phase Example
 This phase contains a starting basis for an S88.01 phase illustrating two of the 'smart' symbols that are available. SetMxState symbols set the associated diagram to a state in the diagrams matrix. SetSymbols and CheckSymbols type both list the setting of other symbols anywhere in the model. The support 'Dot Extensions' to refer to symbols on a page and on a child page. This then allows you to define a list of settings in a step or check settings in a transition. And they track tagname changes. Double click to show a form where you can edit the list.

To Do
 Show the document sources Steps and transitions

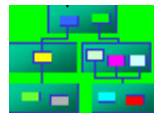
SetMxState symbols set the associated diagram to a state in the diagrams matrix.



Phase Example
 SetSymbols and CheckSymbols type both list the setting of other symbols anywhere in the model. The support 'Dot Extensions' to refer to symbols on a page and on a child page. This then allows you to define a list of settings in a step or check settings in a transition. And they track tagname changes. Double click to show a form where you can edit the list.

Note
 These will appear 'empty' unless using the latest version of ControlDraw.

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Phase Test Sheet

For Diagram 17 - phe02 Phase 2

Diagram Version: 12

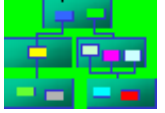
Phase/Op Step Objects

Step	Line	Action	Pass/Fail
Step 1	1	'Set EM State	
	2	Set to Open	
Step 2	1	5.10=Close	
	2	5.278=Out OR	

Transitions

Tran	Line	Condition	Value Before	Value After	Step Text	Pass / Fail
T 1	1	em01 Equipment module.FCA = Out OR				
	2	un01 Mixing Unit.LSL01 = 123				
		Transition logic checked				
T 2	1	CheckSymbols				
	2	em01 Equipment module.XV01 = Close				
		Transition logic checked				
True						

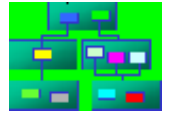
ControlDraw Ltd 2002



Diagrams

Module Test Signatures		
Notes and References		
Signatures		
Date		Signature
Name		
Position		
Date		Signature
Name		
Position		
Date		Signature
Name		
Position		

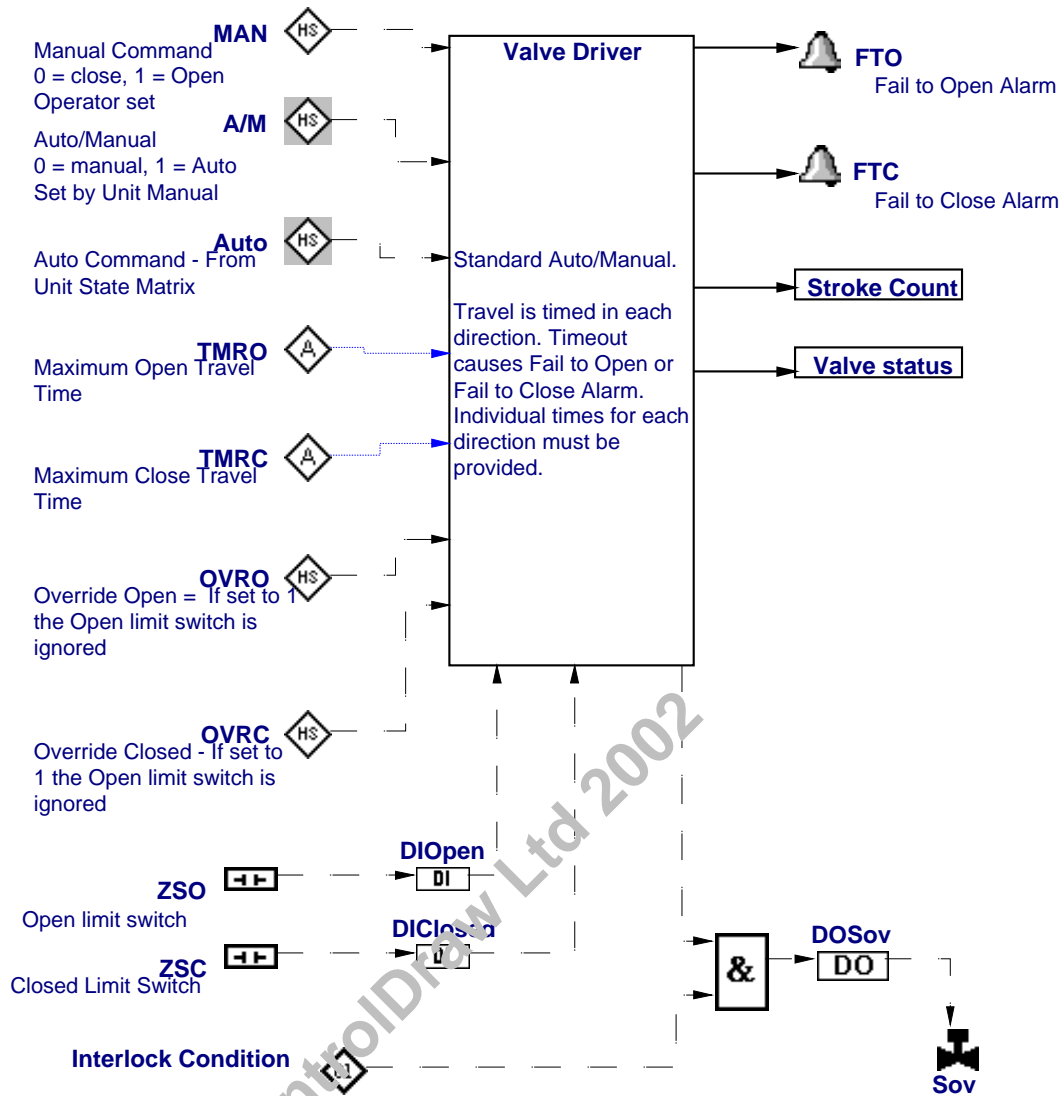
ControlDraw Ltd 2002

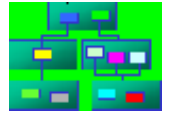


Diagrams

Diagram 18 - On Off Valve

Class: Valve Diagram Version: 32 Edited: 13/06/02 19:30:09

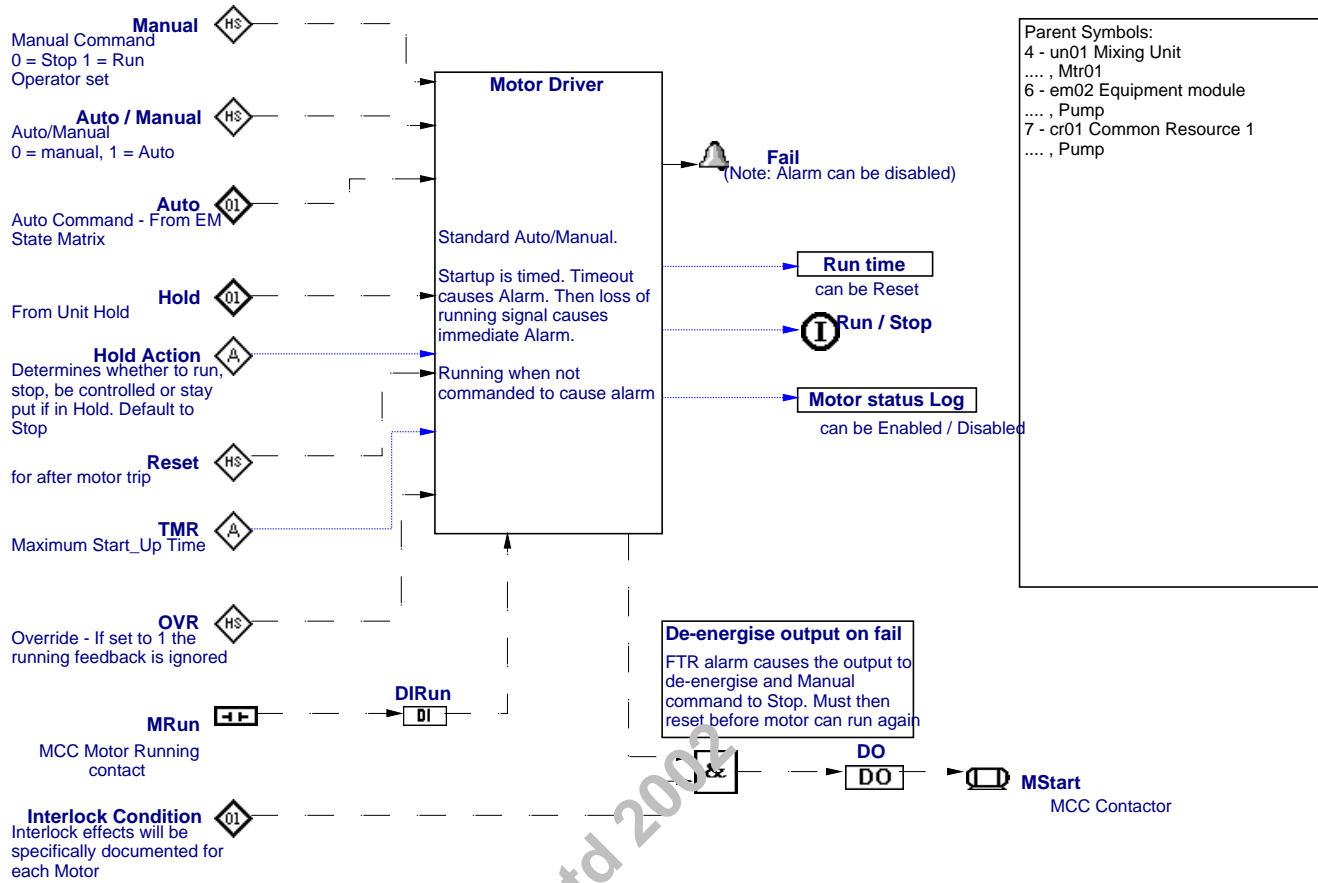




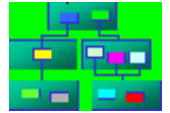
Diagrams

Diagram 19 - Fixed Speed Motor

Class: Motor Diagram Version: 99 Edited: 05/08/02 01:54:32



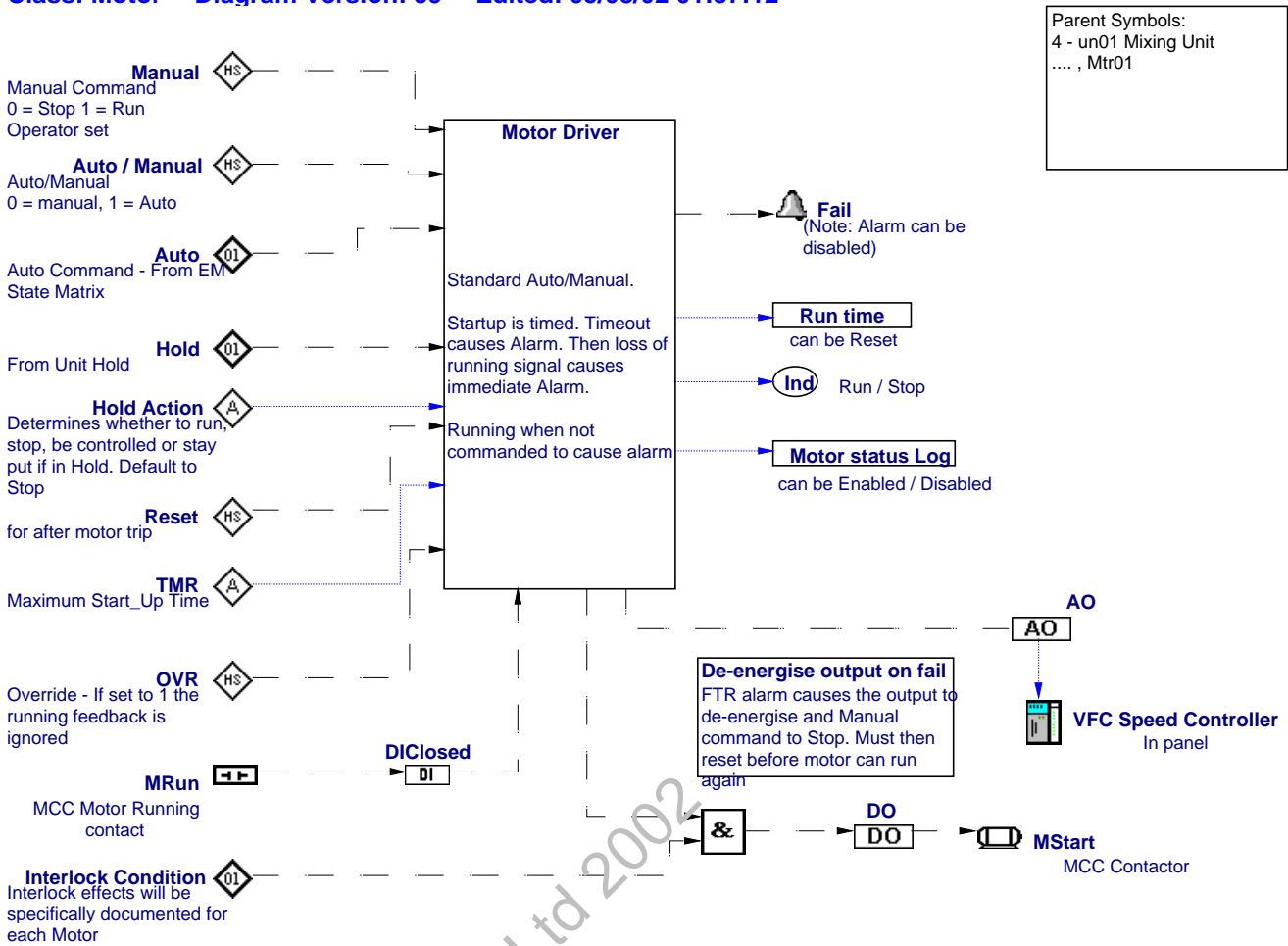
ControlDraw Ltd 2002

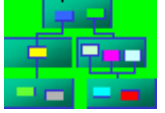


Diagrams

Diagram 20 - VSD Motor driver

Class: Motor Diagram Version: 99 Edited: 05/08/02 01:57:12





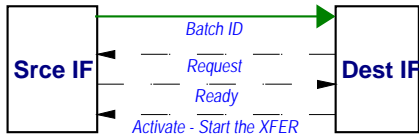
Diagrams

Diagram Description 23 - Unit Interface

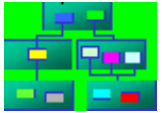
Signals connecting to the using unit

Class: UnitInterface **Diagram Version: 82** **Edited: 03/08/02 20:42:35**

Parent Symbols:
7 - cr01 Common
Resource 1
.... , Unit Interface



ControlDraw Ltd 2002



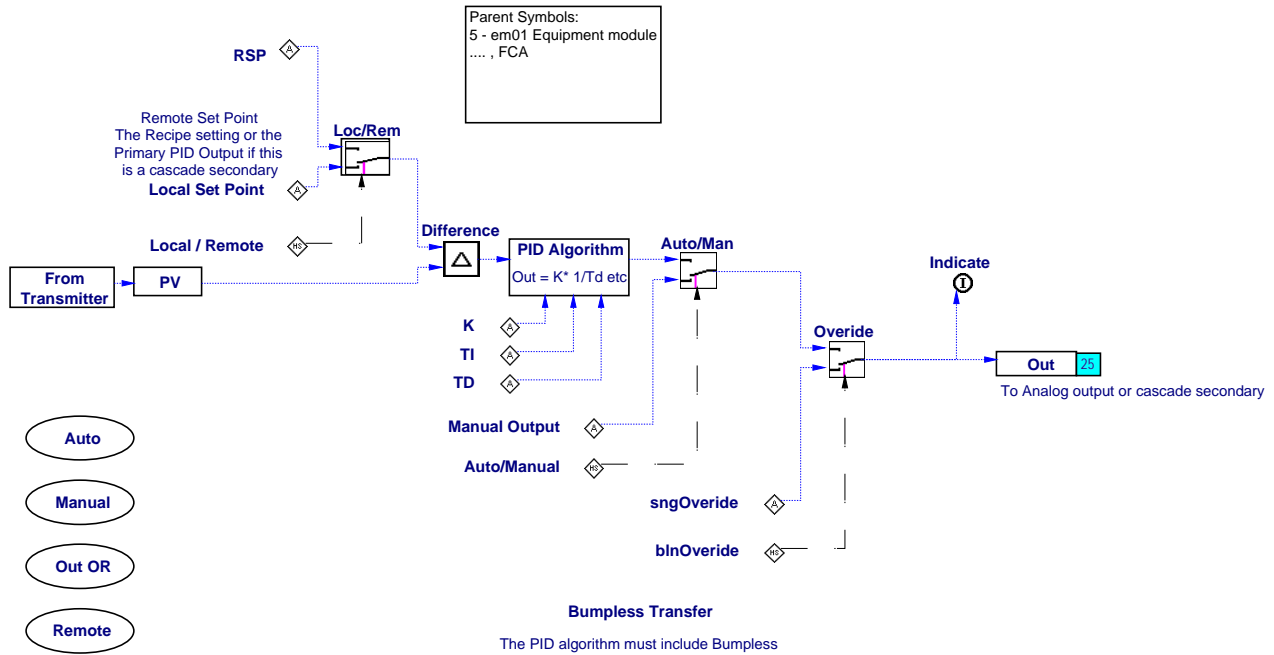
Diagrams

Diagram 24 - Standard 4-20mA PID Loop

Class: PID Control Loop

Diagram Version: 72

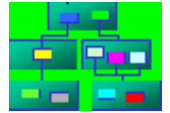
Edited: 03/08/02 16:04:40



Bumpless Transfer

The PID algorithm must include Bumpless Transfer between Auto and Manual
 Optionally the SP will adopt the value of the PV at the time of switching to Auto

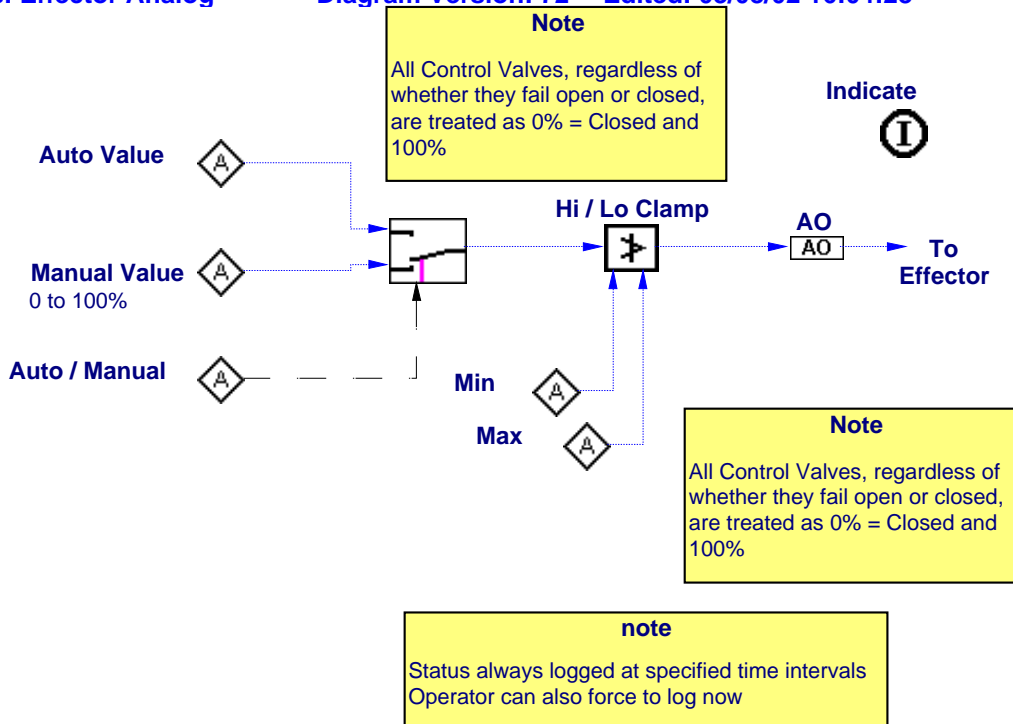
ControlDraw Ltd 2002



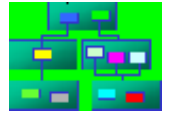
Diagrams

Diagram 25 - Control Valve
Class: Effector Analog

Diagram Version: 72 Edited: 03/08/02 16:04:28



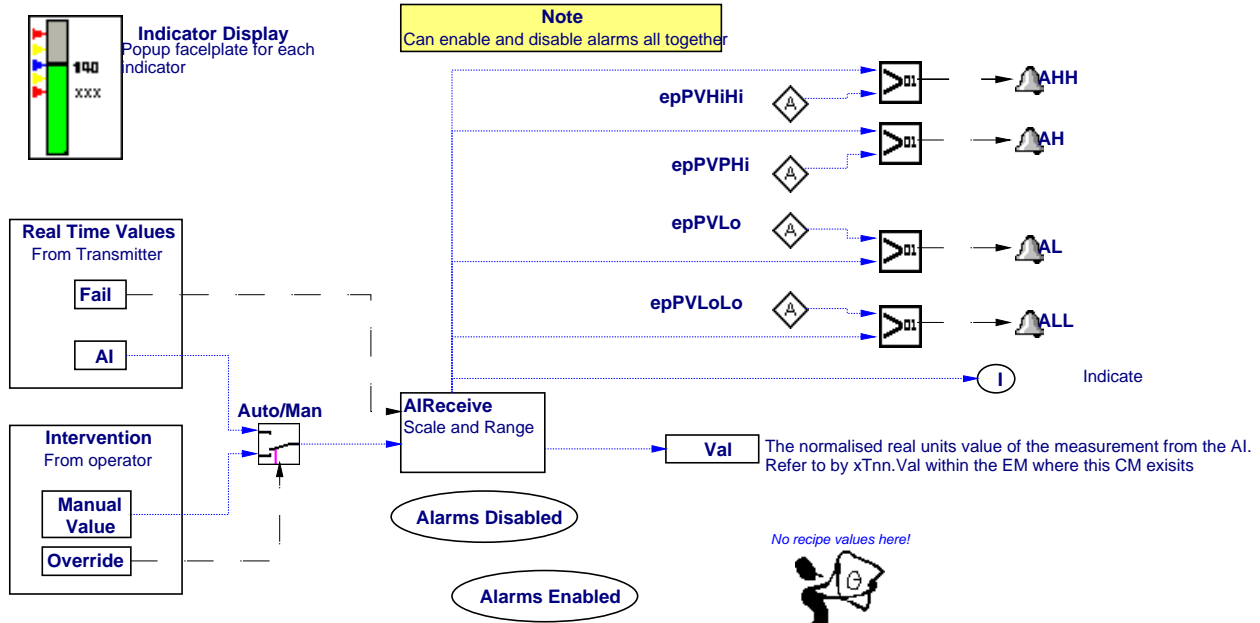
ControlDraw Ltd 2002



Diagrams

Diagram 26 - Analog Input from Transmitter

Class: Measurement Analog Diagram Version: 57 Edited: 06/07/02 02:02:25



Class Instance Fields

Field Name	Default Value
AHSetting	1E+12
AHSetting	Undefined
ALLSetting	0
ALSetting	Undefined
Comment	Undefined
Eng Units	Undefined
Present on Graphic	Undefined
ScaleMax	100
ScaleMin	0
Serial number	Undefined

Configuration Values
 Values for these can be stored in the CD database.

Parent Symbols:
 4 - un01 Unit1
 ... , T, FT
 7 - r01 Common Resource 1
 ... , AT, FT, TT

Class Object Fields

Field Name	Default Value
Order No	Undefined
SigMax	Undefined
SigMin	Undefined
Signal	Undefined
SigType	Undefined
Vendor	Undefined

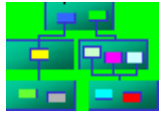


Diagram Description 27 - Derived Analog Alarms

Analog Inputs:

The following text should be modified to explain how the standard alarms are used in the model.

The menace of the four standard alarms!

Typically DCS input processing provides four standard alarm settings. Each is a nuisance in batch.

In a continuous plant it is fine, just right. Provided they are only switched on during production.

In batch the alarms change according to the process step. And there are many other setting from analog inputs that can trigger events or transitions.

The four standard alarms were based on the limitations of expensive panel instruments. You do not need them.

The problem is that people try to use the alarms (which often come with Enable property) as Events (Boolean control values) in their batch process. These alarms were designed originally for monitoring only in continuous processes.

ControlDraw highly recommends that you do not do spend much time configuring the system to derive all the batch events from standard alarms. Instead, have one Boolean object for each event, and give it an Enable property. Switch it off when not relevant. Make a class and child page for this. The start template/reference model for this model includes an Event class.

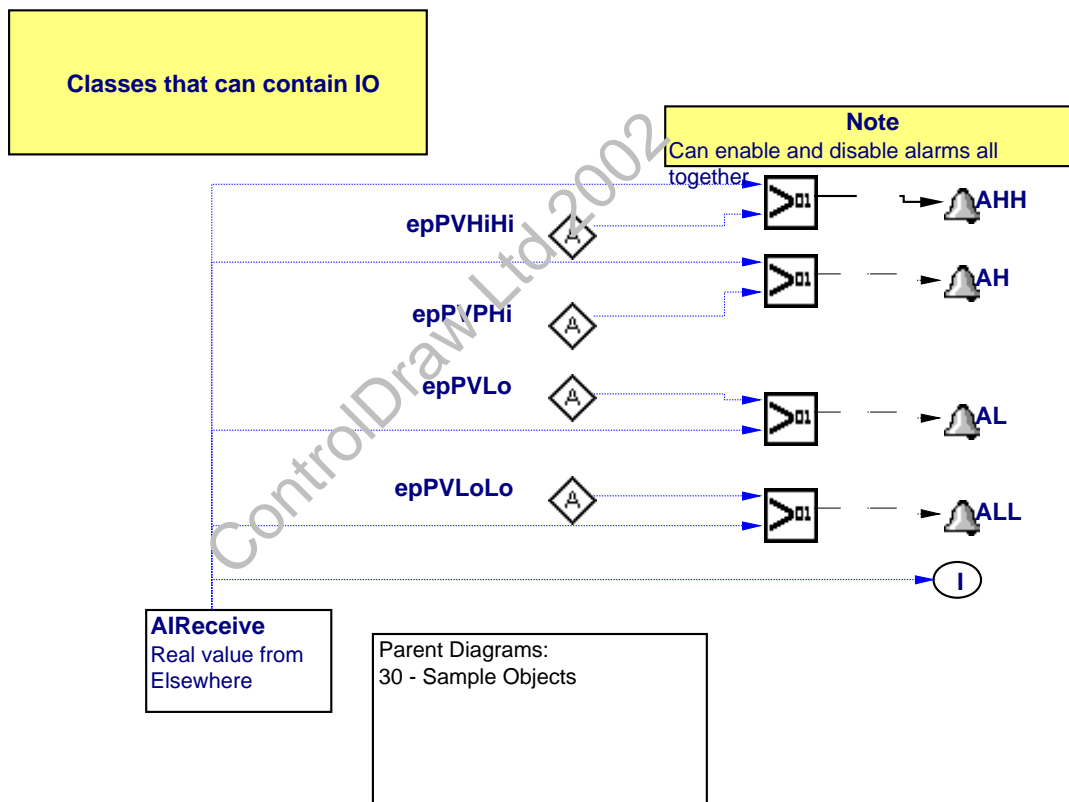
Either

Reprogram the 4 alarms every time you change the set points for the controlled variable

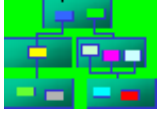
Or

Use the the standard alarms for physical settings that do not change, disabling them as required

:
Class: Measurement Analog Diagram Version: 70 Edited: 04/08/02 17:03:05



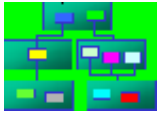
Recipe Procedure Test Sheet For Diagram 30 - S88 Procedure Flowchart Version: 99
Project : S88 Start Template for Professionals
Diagrams



Recipe Procedure Test Sheet
For Diagram 30 - S88 Procedure Flowchart
Diagram Version: 99

List of applicable instances

ControlDraw Ltd 2002



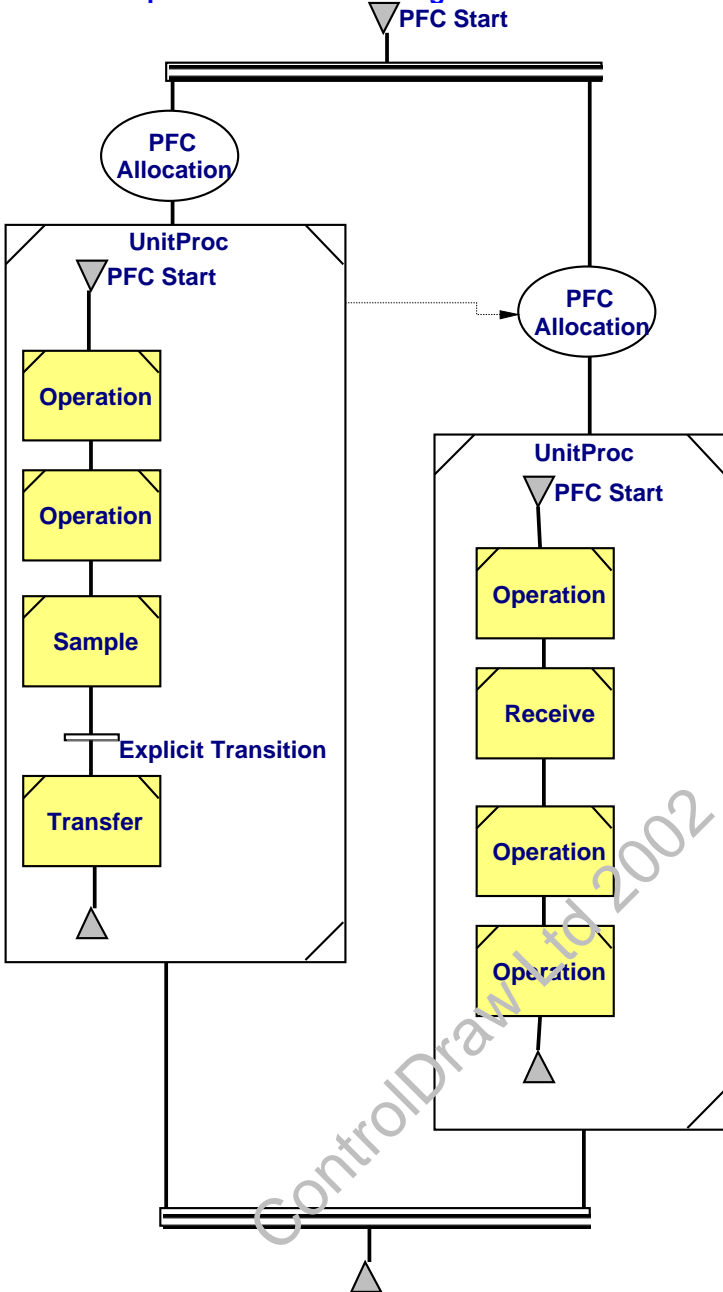
Diagrams

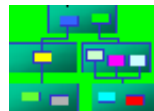
Diagram 30 - S88 Procedure Flowchart

Class: Recipe Procedure

Diagram Version: 99

Edited: 05/08/02 01:43:37





Recipe Procedure Test Sheet

For Diagram 30 - S88 Procedure Flowchart
 Diagram Version: 99

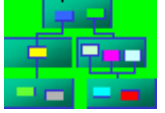
Operation Objects

Step	Line	Action	Pass/Fail
Operation			
Operation			
Operation			
Operation			
Operation			
Operation			
Receive			
Sample			
Transfer			

Transitions

Tran	Line	Condition	Value Before	Value After	Step Text	Pass / Fail
Explicit Transition						

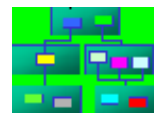
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Diagrams

Module Test Signatures		
Notes and References		
Signatures		
Date		Signature
Name		
Position		
Date		Signature
Name		
Position		
Date		Signature
Name		
Position		

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Diagrams

Diagram Description 31 - Weight measurement

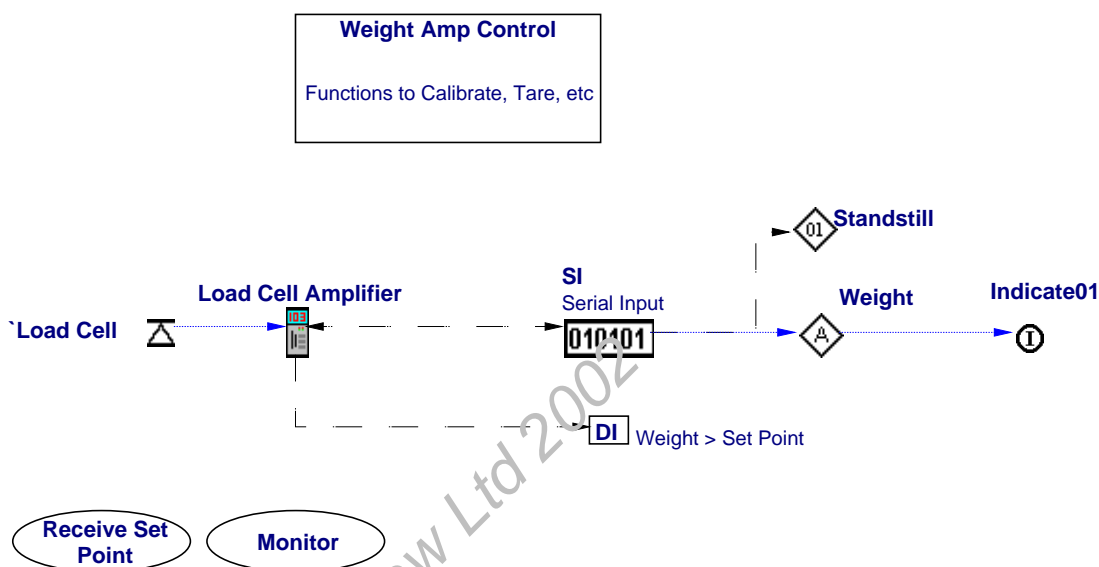
Weight Measurement

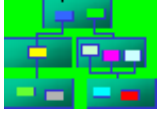
This module uses serial communications and a Boolean input to communicate with the Weight Transmitter. The serial connection is used to

- Monitor the status of the weighing instrument
- Download Set points
- Upload weight reading

The digital input is connected to the weighing instrument to receive the Weight > Set Point Boolean signal. It is better to use the weighing instrument to do the comparison between actual weight and set point because it is faster and more accurate than using an analog connection and doing the comparison in the PCS. In addition the Standstill signal indicates that the weight is stable within some limits, this should be checked in a phase.

Class: Measurement Analog Diagram Version: 97 Edited: 04/08/02 23:25:48





Data Report: IO Count

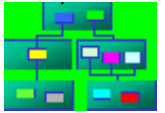
A demonstration of ControlDraw Counts

This illustrates how objects in the model can be counted. This example covers control system objects, but any class can be similarly counted.

Very useful for planning and estimating.

Type	Count
csAI	11
csAO	8
csDI	8
csDIClosed	21
csDIOpen	13
csDIRun	5
csDO	9
csDOSov	16
csFail	11
csLoad Cell Amplifier	4
csSI	4
csSov	2
csSovL	2
csSovU	2

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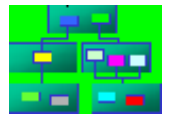
Data Report: Control System IOList

Data Report: Control System IOList

Control System IO List

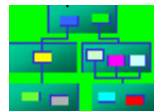
This IO list includes all the analog, discrete and serial inputs and outputs, and the other control system objects

ObjectTag	RealTag	External Tag	Address	ControllerNode
csDI	pc01.un02.LSL0.DI			cn
csDI	pc01.un01.LSL0.DI			cn
csDI	pc02.un02.LSL0.DI			cn
csDI	pc02.un01.LSL0.DI			cn
csAI	pc01.un02._T.AI			cn
csAI	pc01.un02.FT.AI			cn
csAI	pc01.un01._T.AI			cn
csAI	pc01.un01.FT.AI			cn
csAI	pc02.un02._T.AI			cn
csAI	pc02.un02.FT.AI			cn
csAI	pc02.un01._T.AI			cn
csAI	pc02.un01.FT.AI			cn
csAI	WFI .WFI .TT.AI			cn
csAI	WFI .WFI .FT.AI			cn
csAI	WFI .WFI .AT.AI			cn
csFail	pc01.un02._T.Fail			cn
csFail	pc01.un02.FT.Fail			cn
csFail	pc01.un01._T.Fail			cn
csFail	pc01.un01.FT.Fail			cn
csFail	pc02.un02._T.Fail			cn
csFail	pc02.un02.FT.Fail			cn
csFail	pc02.un01._T.Fail			cn
csFail	pc02.un01.FT.Fail			cn
csFail	WFI .WFI .TT.Fail			cn
csFail	WFI .WFI .FT.Fail			cn
csFail	WFI .WFI .AT.Fail			cn
csDOSov	pc01.un02.EM01.XV01.DOSov			cn
csDOSov	pc01.un02.EM02.XV02.DOSov			cn
csDOSov	pc01.CIP .XV02.DOSov			cn
csDOSov	pc01.un01.EM01.XV01.DOSov			cn
csDOSov	pc01.un01.EM02.XV02.DOSov			cn
csDOSov	pc01.un01.XV03.DOSov			cn
csDOSov	pc02.un02.EM01.XV01.DOSov			cn
csDOSov	pc02.un02.EM02.XV02.DOSov			cn
csDOSov	pc02.CIP .XV02.DOSov			cn
csDOSov	pc02.un01.EM01.XV01.DOSov			cn
csDOSov	pc02.un01.EM02.XV02.DOSov			cn
csDOSov	pc02.un01.XV03.DOSov			cn
csDOSov	WFI .WFI .XV03.DOSov			cn
csDOSov	WFI .WFI .XV01.DOSov			cn
csDOSov	WFI .WFI .XV02.DOSov			cn
csDOSov	WFI .WFI .XV11.DOSov			cn
csDIClosed	pc01.un02.EM01.XV01.DIClosed			cn
csDIClosed	pc01.un02.EM02.XV02.DIClosed			cn
csDIClosed	pc01.CIP .XV02.DIClosed			cn
csDIClosed	pc01.un01.EM01.XV01.DIClosed			cn
csDIClosed	pc01.un01.EM02.XV02.DIClosed			cn
csDIClosed	pc01.un01.XV03.DIClosed			cn
csDIClosed	pc02.un02.EM01.XV01.DIClosed			cn



Data Report: Control System IOList

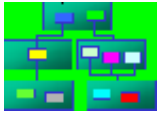
ObjectTag	RealTag	External Tag	Address	ControllerNode
csDIClosed	pc02.un02.EM02.XV02.DIClosed			cn
csDIClosed	pc02.CIP .XV02.DIClosed			cn
csDIClosed	pc02.un01.EM01.XV01.DIClosed			cn
csDIClosed	pc02.un01.EM02.XV02.DIClosed			cn
csDIClosed	pc02.un01.XV03.DIClosed			cn
csDIClosed	WFI .WFI .XV03.DIClosed			cn
csDIClosed	WFI .WFI .XV02.DIClosed			cn
csDIClosed	WFI .WFI .XV11.DIClosed			cn
csDIOpen	pc01.un02.EM01.XV01.DIOpen			cn
csDIOpen	pc01.un02.EM02.XV02.DIOpen			cn
csDIOpen	pc01.CIP .XV02.DIOpen			cn
csDIOpen	pc01.un01.EM01.XV01.DIOpen			cn
csDIOpen	pc01.un01.EM02.XV02.DIOpen			cn
csDIOpen	pc01.un01.XV03.DIOpen			cn
csDIOpen	pc02.un02.EM01.XV01.DIOpen			cn
csDIOpen	pc02.un02.EM02.XV02.DIOpen			cn
csDIOpen	pc02.CIP .XV02.DIOpen			cn
csDIOpen	pc02.un01.EM01.XV01.DIOpen			cn
csDIOpen	pc02.un01.EM02.XV02.DIOpen			cn
csDIOpen	pc02.un01.XV03.DIOpen			cn
csDIOpen	WFI .WFI .XV01.DIOpen			cn
csSovU	pc01.CIP .XV01.SovU			cn
csSovU	pc02.CIP .XV01.SovU			cn
csSovL	pc01.CIP .XV01.SovL			cn
csSovL	pc02.CIP .XV01.SovL			cn
csSov	pc01.CIP .XV01.Sov			cn
csSov	pc02.CIP .XV01.Sov			cn
csDIClosed	pc01.CIP .XV01.DIClosed			cn
csDIClosed	pc02.CIP .XV01.DIClosed			cn
csDO	pc01.un02.EM02.Pump.DO			cn
csDO	pc01.un01.EM02.Pump.DO			cn
csDO	pc02.un02.EM02.Pump.DO			cn
csDO	pc02.un01.EM02.Pump.DO			cn
csDO	WFI .WFI .Pump.DO			cn
csDIRun	pc01.un02.EM02.Pump.DIRun			cn
csDIRun	pc01.un01.EM02.Pump.DIRun			cn
csDIRun	pc02.un02.EM02.Pump.DIRun			cn
csDIRun	pc02.un01.EM02.Pump.DIRun			cn
csDIRun	WFI .WFI .Pump.DIRun			cn
csAO	pc01.un02.Mtr0.AO			cn
csAO	pc01.un01.Mtr0.AO			cn
csAO	pc02.un02.Mtr0.AO			cn
csAO	pc02.un01.Mtr0.AO			cn
csDO	pc01.un02.Mtr0.DO			cn
csDO	pc01.un01.Mtr0.DO			cn
csDO	pc02.un02.Mtr0.DO			cn
csDO	pc02.un01.Mtr0.DO			cn
csDIClosed	pc01.un02.Mtr0.DIClosed			cn
csDIClosed	pc01.un01.Mtr0.DIClosed			cn
csDIClosed	pc02.un02.Mtr0.DIClosed			cn
csDIClosed	pc02.un01.Mtr0.DIClosed			cn
csAO	pc01.un02.EM01.CV01.AO			cn
csAO	pc01.un01.EM01.CV01.AO			cn
csAO	pc02.un02.EM01.CV01.AO			cn



Data Report: Control System IOList

ObjectTag	RealTag	External Tag	Address	ControllerNode
csAO	pc02.un01.EM01.CV01.AO			cn
csSI	pc01.un02.WT.SI			cn
csSI	pc01.un01.WT.SI			cn
csSI	pc02.un02.WT.SI			cn
csSI	pc02.un01.WT.SI			cn
csLoad Cell Amplifier	pc01.un02.WT.Load Cell Amplifier			cn
csLoad Cell Amplifier	pc01.un01.WT.Load Cell Amplifier			cn
csLoad Cell Amplifier	pc02.un02.WT.Load Cell Amplifier			cn
csLoad Cell Amplifier	pc02.un01.WT.Load Cell Amplifier			cn
csDI	pc01.un02.WT.DI			cn
csDI	pc01.un01.WT.DI			cn
csDI	pc02.un02.WT.DI			cn
csDI	pc02.un01.WT.DI			cn

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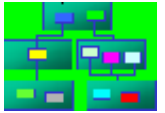
Data Report: Equipment Parameters

Data Report: Equipment Parameters

Equipment Parameter Listing

This shows each equipment parameter and its associated data.

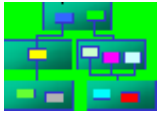
ObjectTag	page	RealTag	Comment	Eng Units	Max	Min	Normal
epPVHiHi	26	pc01.un01._T.epPVHiHi		%			
epPVLo	26	pc01.un01._T.epPVLo		%			
epPVLoLo	26	pc01.un01._T.epPVLoLo		%			
epPVPHi	26	pc01.un01._T.epPVPHi		%			
epOverride	6	pc01.un01.EM01.epOverride		%			
K	24	pc01.un01.EM01.FCA.K		%			
sngOverride	24	pc01.un01.EM01.FCA.sngOverride		%			
TD	24	pc01.un01.EM01.FCA.TD		%			
TI	24	pc01.un01.EM01.FCA.TI		%			
ep	15	pc01.un01.EM02.phEM2		%			
ep	14	pc01.un01.Filling Phase.ep		%			
epPVHiHi	26	pc01.un01.FT.epPVHiHi		%			
epPVLo	26	pc01.un01.FT.epPVLo		%			
epPVLoLo	26	pc01.un01.FT.epPVLoLo		%			
epPVPHi	26	pc01.un01.FT.epPVPHi		%			
epPVHiHi	26	pc01.un02._T.epPVHiHi		%			
epPVLo	26	pc01.un02._T.epPVLo		%			
epPVLoLo	26	pc01.un02._T.epPVLoLo		%			
epPVPHi	26	pc01.un02._T.epPVPHi		%			
epOverride	6	pc01.un02.EM01.epOverride		%			
K	24	pc01.un02.EM01.FCA.K		%			
sngOverride	24	pc01.un02.EM01.FCA.sngOverride		%			
TD	24	pc01.un02.EM01.FCA.TD		%			
TI	24	pc01.un02.EM01.FCA.TI		%			
ep	15	pc01.un02.EM02.phEM2		%			
ep	14	pc01.un02.Filling Phase.ep		%			
epPVHiHi	26	pc01.un02.FT.epPVHiHi		%			
epPVLo	26	pc01.un02.FT.epPVLo		%			
epPVLoLo	26	pc01.un02.FT.epPVLoLo		%			
epPVPHi	26	pc01.un02.FT.epPVPHi		%			
epPVHiHi	26	pc02.un01._T.epPVHiHi		%			
epPVLo	26	pc02.un01._T.epPVLo		%			
epPVLoLo	26	pc02.un01._T.epPVLoLo		%			
epPVPHi	26	pc02.un01._T.epPVPHi		%			
epOverride	6	pc02.un01.EM01.epOverride		%			
K	24	pc02.un01.EM01.FCA.K		%			
sngOverride	24	pc02.un01.EM01.FCA.sngOverride		%			
TD	24	pc02.un01.EM01.FCA.TD		%			
TI	24	pc02.un01.EM01.FCA.TI		%			
ep	15	pc02.un01.EM02.phEM2		%			
ep	14	pc02.un01.Filling Phase.ep		%			
epPVHiHi	26	pc02.un01.FT.epPVHiHi		%			
epPVLo	26	pc02.un01.FT.epPVLo		%			
epPVLoLo	26	pc02.un01.FT.epPVLoLo		%			
epPVPHi	26	pc02.un01.FT.epPVPHi		%			
epPVHiHi	26	pc02.un02._T.epPVHiHi		%			
epPVLo	26	pc02.un02._T.epPVLo		%			
epPVLoLo	26	pc02.un02._T.epPVLoLo		%			



Data Report: Equipment Parameters

ObjectTag	page	RealTag	Comment	Eng Units	Max	Min	Normal
epPVPHi	26	pc02.un02_.T.epPVPHi		%			
epOverride	6	pc02.un02.EM01.epOverride		%			
K	24	pc02.un02.EM01.FCA.K		%			
sngOverride	24	pc02.un02.EM01.FCA.sngOverride		%			
TD	24	pc02.un02.EM01.FCA.TD		%			
TI	24	pc02.un02.EM01.FCA.TI		%			
ep	15	pc02.un02.EM02.phEM2		%			
ep	14	pc02.un02.Filling Phase.ep		%			
epPVHiHi	26	pc02.un02.FT.epPVHiHi		%			
epPVLo	26	pc02.un02.FT.epPVLo		%			
epPVLoLo	26	pc02.un02.FT.epPVLoLo		%			
epPVPHi	26	pc02.un02.FT.epPVPHi		%			
epPVHiHi	26	WFI .WFI .AT.epPVHiHi		%			
epPVLo	26	WFI .WFI .AT.epPVLo		%			
epPVLoLo	26	WFI .WFI .AT.epPVLoLo		%			
epPVPHi	26	WFI .WFI .AT.epPVPHi		%			
epPVHiHi	26	WFI .WFI .FT.epPVHiHi		%			
epPVLo	26	WFI .WFI .FT.epPVLo		%			
epPVLoLo	26	WFI .WFI .FT.epPVLoLo		%			
epPVPHi	26	WFI .WFI .FT.epPVPHi		%			
epPVHiHi	26	WFI .WFI .TT.epPVHiHi		%			
epPVLo	26	WFI .WFI .TT.epPVLo		%			
epPVLoLo	26	WFI .WFI .TT.epPVLoLo		%			
epPVPHi	26	WFI .WFI .TT.epPVPHi		%			

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Data Report: Recipe Formula Values

Data Report: Recipe Formula Values

Recipe Parameter Listing

This shows each recipe parameter and its associated data.

ObjectTag	page	RealTag	Eng Units	Max SP	Min SP	Set Point
rfFormula Val	12	pc01.rc 0.rcp01.op01.Formula Val 1				
rfFormula Val	12	pc01.rc 0.rcp01.op01.Formula Val 2				
rfFormula Val	12	pc01.rc 0.rcp01.op01.Formula Val 3				
rfFormula Val	12	pc01.rc 0.rcp01.OP01.op01.Formula Val 1				
rfFormula Val	12	pc01.rc 0.rcp01.OP01.op01.Formula Val 2				
rfFormula Val	12	pc01.rc 0.rcp01.OP01.op01.Formula Val 3				
rffp	15	pc01.un01.EM02.phEM2 Phase1.fp				
rffp	14	pc01.un01.Filling Phase.fp				
rffp	15	pc01.un02.EM02.phEM2 Phase1.fp				
rffp	14	pc01.un02.Filling Phase.fp				
rfFormula Val	12	pc02.rc 0.rcp01.op01.Formula Val 1				
rfFormula Val	12	pc02.rc 0.rcp01.op01.Formula Val 2				
rfFormula Val	12	pc02.rc 0.rcp01.op01.Formula Val 3				
rfFormula Val	12	pc02.rc 0.rcp01.OP01.op01.Formula Val 1				
rfFormula Val	12	pc02.rc 0.rcp01.OP01.op01.Formula Val 2				
rfFormula Val	12	pc02.rc 0.rcp01.OP01.op01.Formula Val 3				
rffp	15	pc02.un01.EM02.phEM2 Phase1.fp				
rffp	14	pc02.un01.Filling Phase.fp				
rffp	15	pc02.un02.EM02.phEM2 Phase1.fp				
rffp	14	pc02.un02.Filling Phase.fp				
rfFormula Val	12	Site.rcp01.op01.Formula Val 1				
rfFormula Val	12	Site.rcp01.op01.Formula Val 2				
rfFormula Val	12	Site.rcp01.op01.Formula Val 3				
rfFormula Val	12	Site.rcp01.OP01.op01.Formula Val 1				
rfFormula Val	12	Site.rcp01.OP01.op01.Formula Val 2				
rfFormula Val	12	Site.rcp01.OP01.op01.Formula Val 3				

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