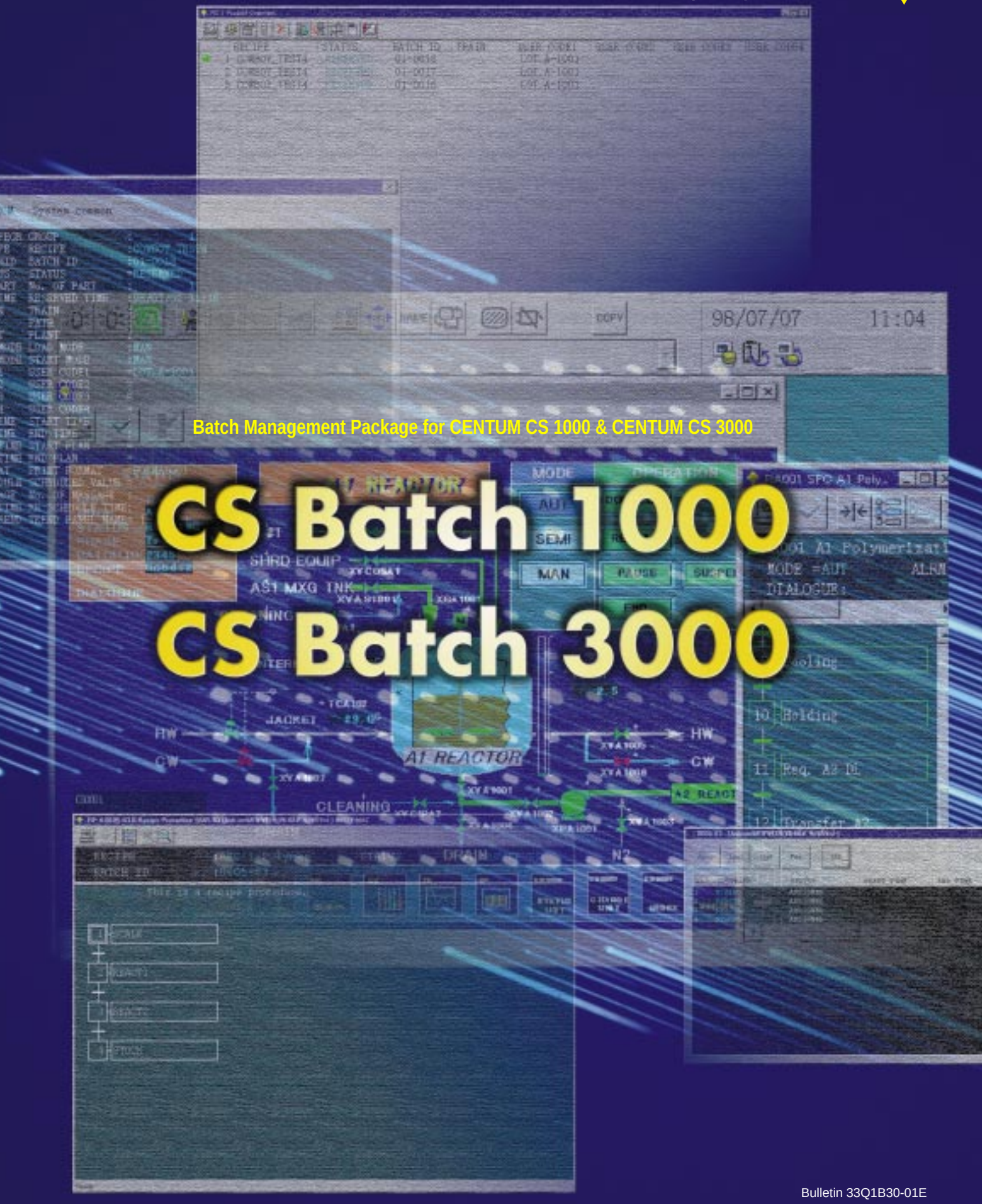
YOKOGAWA



Batch Management Package for CENTUM CS 1000 & CENTUM CS 3000

CS Batch 1000

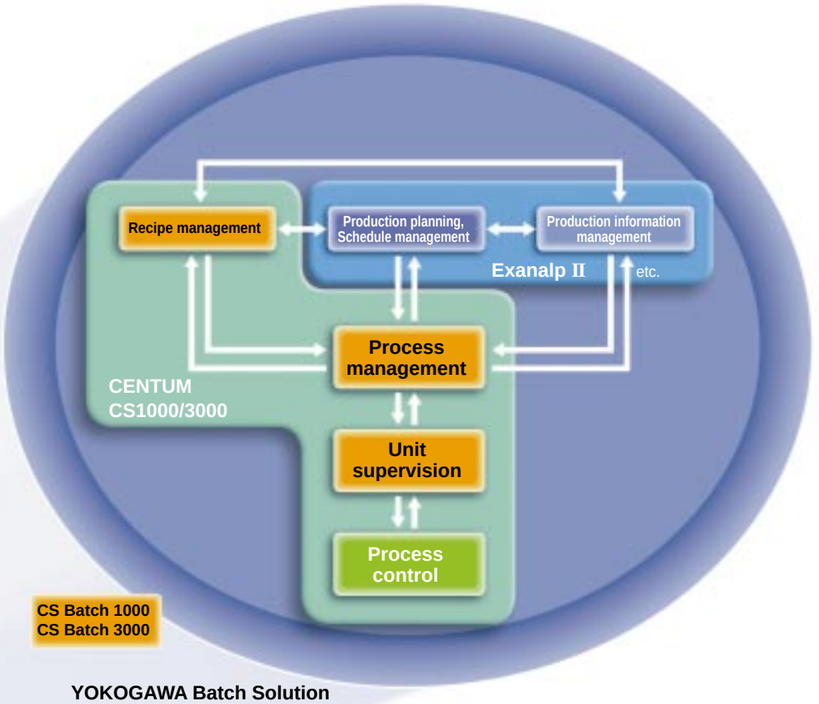
CS Batch 3000

Bulletin 33Q1B30-01E

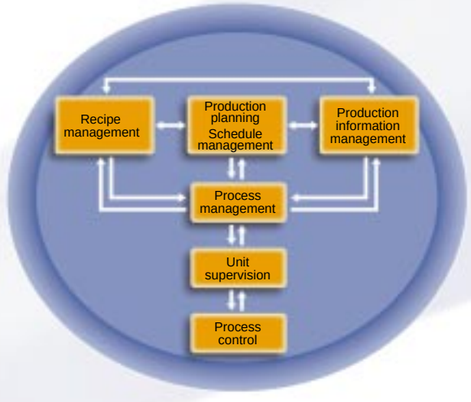
Batch Process Problems?
Enterprise-Strength Solutions from YOKOGAWA

Enterprise-Strength Batch Control Systems

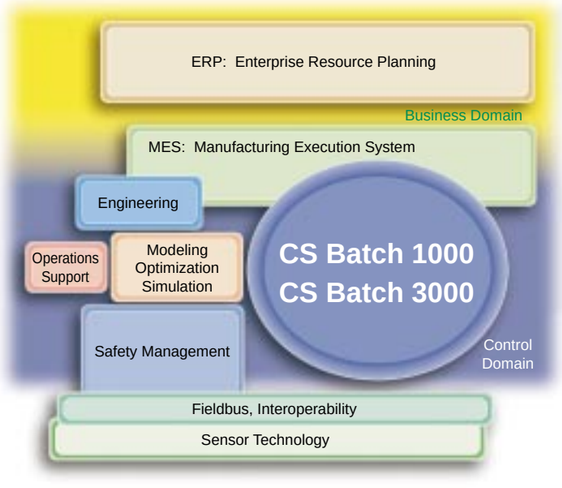
YOKOGAWA can provide Enterprise Technology Solutions: enterprise-strength total production management solutions, capable of integrating the control and business domains. YOKOGAWA batch systems offer recipe management, scheduling, and production information management functions – based on years of field experience.



YOKOGAWA Batch Solution



ISA S88.01 Control Activity Model



What are the benefits of ISA S88.01?

ISA S88.01 standardizes batch control terminology, for better user-vendor communication, and defines the implementation framework as a hierarchy of interconnected batch control and management function modules. This approach can expedite engineering and cut costs.

Support for ISA S88.01 in YOKOGAWA's CS Batch 1000 and CS Batch 3000.

The CENTUM CS Batch 1000 and CS Batch 3000 packages for CENTUM CS 1000 and CENTUM CS 3000 support the reusable unit definitions and the complete control-to-enterprise-level hierarchy of activities (process control – unit supervision – process management – recipe management) described in the ISA S88.01 standard. CENTUM CS Batch 1000 supports small to medium-sized systems, and CS Batch 3000 supports large systems. The Exanalp II package adds schedule management functions.

Reliability - 1

Worry-free

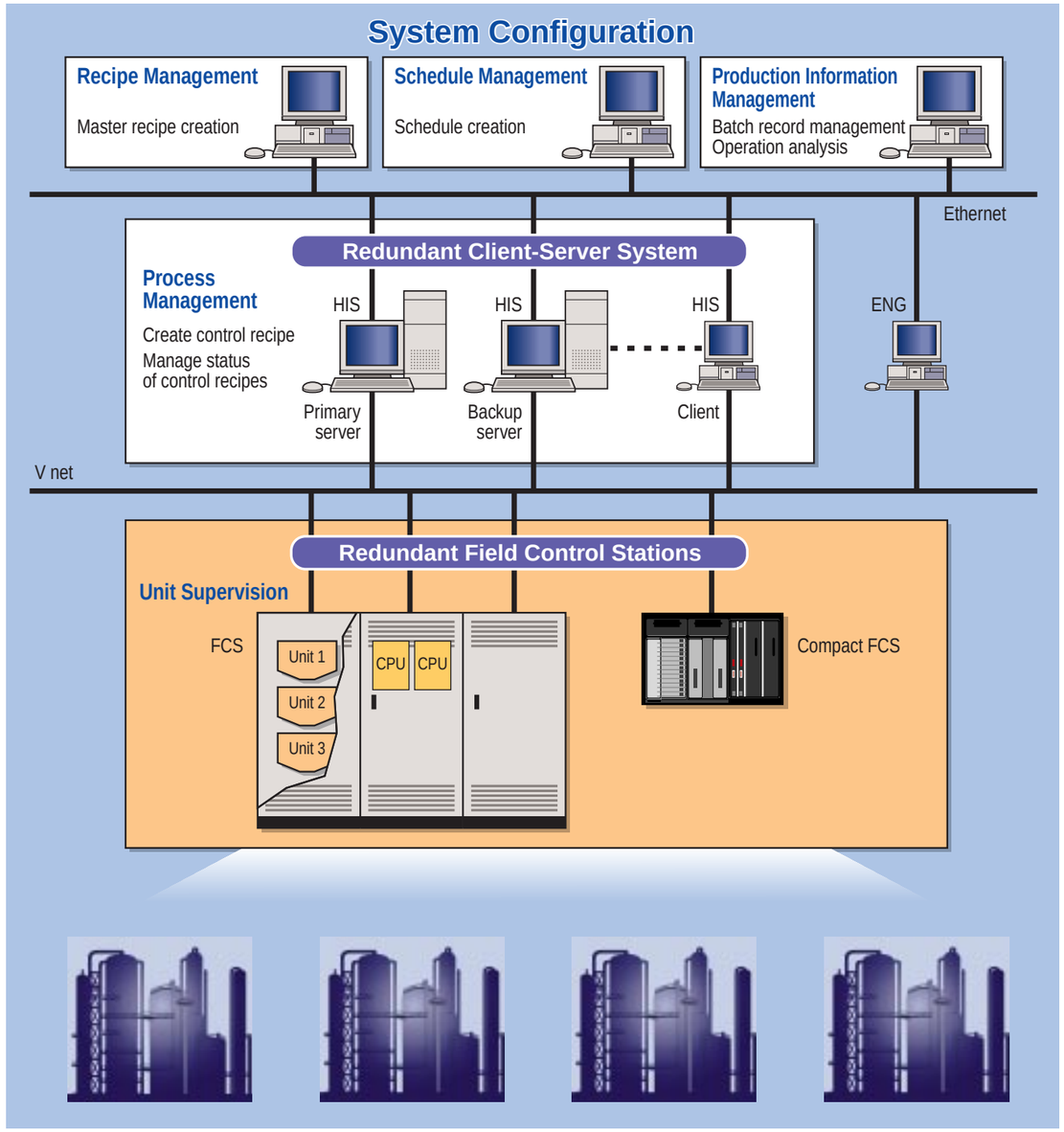
**Complex batch processes require high-reliability control systems.
The CS Batch 1000/3000 packages run on the reliable CENTUM CS 1000/3000 platforms.
These platforms have the flexibility to handle everything from small and medium-sized to large plants, and offer redundancy options for high-reliability operation.**

Can this package provide integrated management of multiple batch processes, and high reliability even in very large systems?

Solution 1

CENTUM CS 1000/3000 support everything from small and medium-sized plants to large plants

CS 1000 scales to about 8,000 tags, CS 3000 to about 100,000 tags.
The CS 1000/3000 batch packages are available in three types (capacities) A, B or C: For CS 1000, these scale to about 4, 10 or 999 active recipes respectively; for CS 3000, they scale to about 10, 50 or 999 active recipes.
For large plants with multiple batch processes, you can manage multiple recipe groups / trains.



Reliability - 2

Worry-free

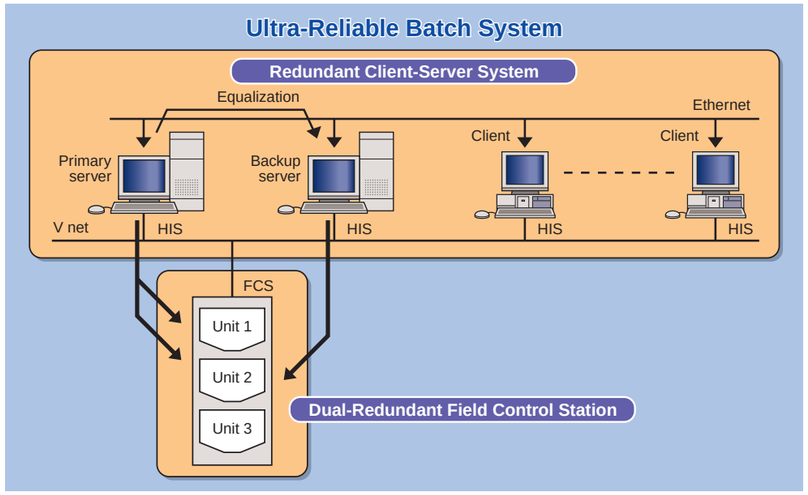
Customers demand open systems –
but with personal computers,
can reliability and safety be assured?

Recipe author and plant operators
are different people,
so can we assign them
different security levels
and separate machines?

Solution 2

The functions that require absolute reliability include unit supervision and lower-level logic functions. In the CENTUM CS series, these are executed on reliable Field Control Stations.

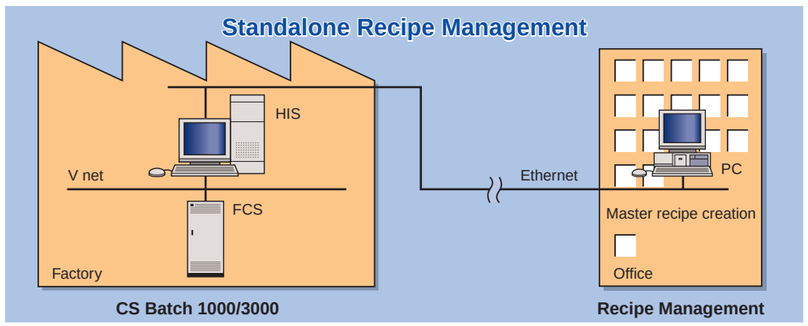
CS Batch 1000/3000 uses a redundant client-server system to ensure system reliability. Even if a primary server fails, the backup server has a copy of the batch operation information. There is no break in control when switching to the backup server. Unit supervision and lower-level logic functions are executed on our ultra-reliable controllers, field-proven in CENTUM CS.
This system is a synthesis of open, PC-based operator stations and our field-proven ultra-reliable controllers, linked by the reliable V net / VL net.



Solution 3

Recipe Builder is independent of Control System software

The recipe builder runs on Windows NT; you can create recipes and download them from an HIS, networked office PC, or remote laptop. Recipe author and control system operators can have different security profiles.



Batch System Configuration - 1

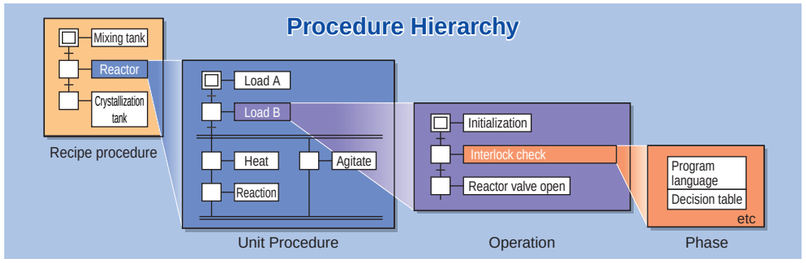
Stress-free

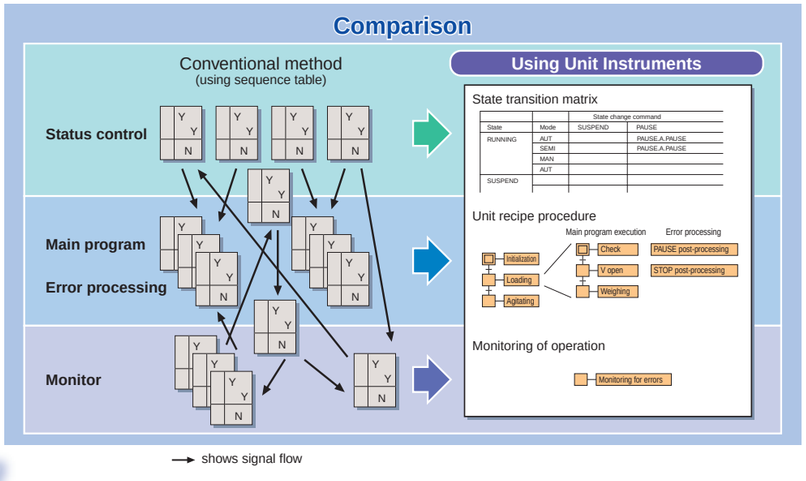
Yokogawa batch system experience is evident in the CS Batch 1000/3000 packages, which are based on ISA S88.01. These modular, hierarchical packages support reusable components and templates – so they simplify engineering – and you can test configurations using Field Control Station simulation in a PC.

Batch processes are frequently modified; can I reduce the cost of such changes?

Solution 4

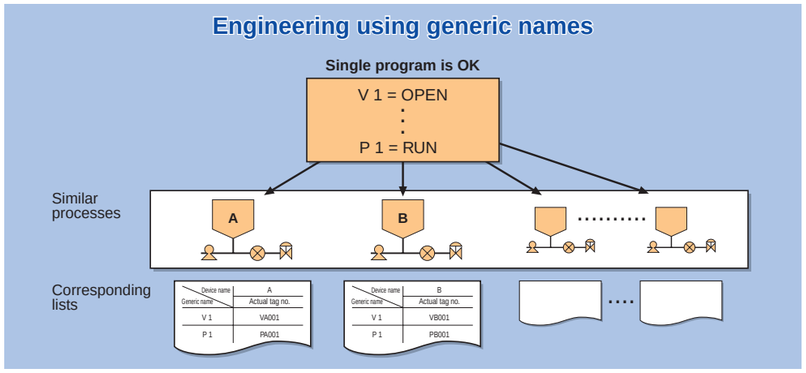
Unit Instruments with hierarchical, modular Sequential Function Charts (SFC) are easy for the user to copy and modify. Functions are clearly separated into unit procedures, operations and phases.





Solution 5

You can associate generic names with phases and graphics, and reuse them for similar processes.



Can I reuse a batch process design, copying and modifying the data?

In many systems, the development of unit supervision logic, phase logic and process control functions can be complex and time consuming. In CS Batch 1000/3000 this is simplified by using a unit instrument to represent all the devices and instruments that make up a process unit. A unit instrument may represent a reactor, for example, and (as shown in the figure above) can consist of a modular, hierarchical unit procedure (expressed by an SFC). The hierarchical and modular configuration makes it clear where different functions are located, so it's quite easy to modify the corresponding phases. Phases and graphics used in an operation can use generic names – such as "VI" for example – rather than actual tag names. Such phases and graphics can be created once and reused in many similar processes – rather than creating new phases and graphics for each. To use such phases and graphics with generic names, simply specify the actual tag name (to be used in place of the generic name) in a conversion list.

Batch System Configuration - 2

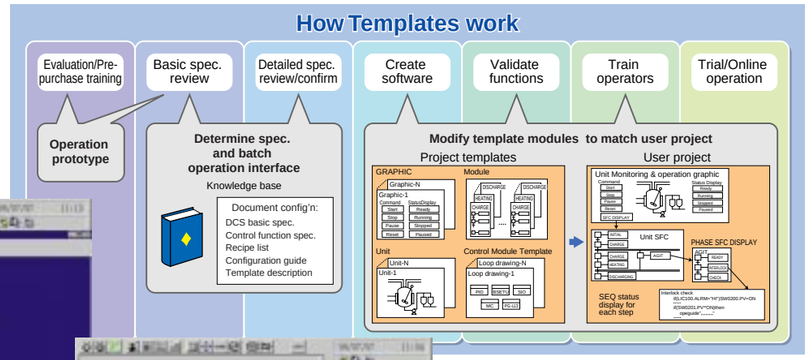
Stress-free

Isn't it very difficult to create complex batch systems from zero?

Solution 6

CS Batch 1000/3000 configuration templates reduce the amount of configuration required.

CS Batch 1000/3000 allows users to effectively modify and reuse templates. Representative plant configuration templates – which embody Yokogawa application engineering experience, and greatly reduce the batch system configuration work required – are available.



Polymerization tank template process overview

Polymerization tank template operation window

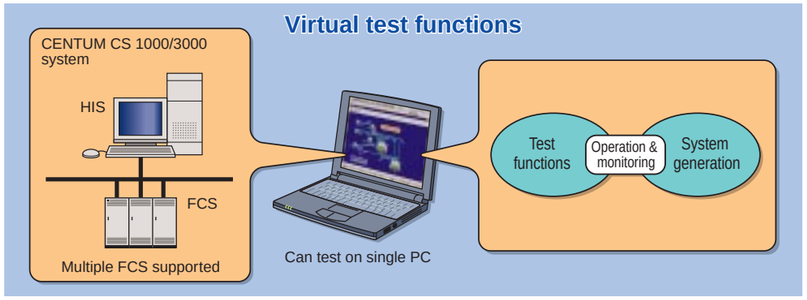
Can I do the engineering and testing without special hardware?

Solution 7

Virtual test functions support off-line testing – no (control/process) equipment required.

You don't need (control/process) hardware to create and test batch system configuration, including operation and phase logic.

You can configure a Windows NT PC to simulate field control stations and run recipe management, unit supervision, and process control tasks – so you can engineer and test batch applications virtually anywhere.



Recipes

Hassle-free

**Since master recipes contain all the product-specific information required to produce a batch, you can simply edit the recipe to change the formulation/product.
In multi-product variable-volume production, this allows you to quickly respond to market needs – and to add new products to the product mix.**

When adding a new product, new recipe data is needed; Can we easily create new production procedures?

Solution 8

Since the procedure is part of the recipe, sequence changes are not required.

Previously, to change procedures required controller program changes. Now you can simply change data (parameters, load amounts, and temperature settings) and unit procedures : no controller program change is required.

Recipe configuration

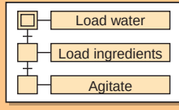
Header

Recipe name	: Pharmaceutical ABC
Author	: Smith
Created	: 01/07/98
Description	: Recipe for ABC

Equipment Requirements

This recipe requires reactor A

Procedure



Formula

Water	=	0.5 L
Ingredient A	=	80 KG
Agitate for	=	1 H

Header : Recipe name, recipe comment, version, management info.
Procedure : Procedure for creating product
Equipment requirements : Equipment required at recipe run time
Formula : Settings required to create product

Batch reports

Hassle-free

CS Batch 1000/3000 allows you to use your favorite Windows applications to create documents and reports with batch data.

Can I use my favorite Windows applications to create batch reports quickly and easily from batch data?

Solution 9

Yokogawa provides an MS Excel-based report package. This makes it easy to import batch data and modify the report format as you wish.

The MS Excel-based report package allows you to capture and report data for any stage of the production process. You can easily produce batch reports based on Tag no., or modify existing templates. You can also export data in MS Excel file format.

Batch information

ABC Production Information Report

2 July 1998 16 : 00

Product name	Pharmaceutical ABC
Recipe name	ABC No.1
Batch no.	ABC1234
Start time	1 July 8 : 00
End time	2 July 15 : 30

Manager	Asst.	Created

Memo

Ingredients

	Amount	Remainder
Ingredient A	123kg	1.5TON

Human Interface

Stress-free

**CS Batch 1000/3000 provides a standardized, open interface, based on ISA S88.01.
It seamlessly integrates with the supervisory information system.
It can also interface with an existing CS Batch system (see below).**

Can batch data be passed to an ERP (*1) / MES (*2) system?

Solution 10

Open data interfaces make it easy to exchange data with information systems.

Support for the OPC(*3) standard makes it easy to exchange data with Factory Automation and Process Automation systems.
No special program is required to pass batch data and process data seamlessly to a management information system.

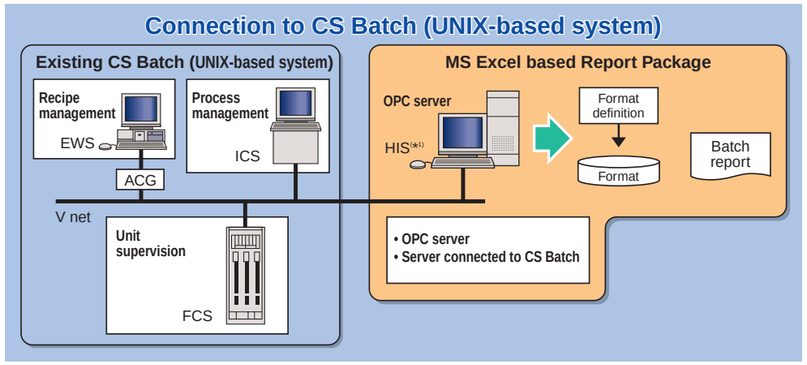
(*1) ERP: Enterprise Resource Planning, (*2) MES: Manufacturing Execution System (*3) OPC: OLE for Process Control

Can I import data from an existing CS Batch system to MS Excel, and exchange such data with ERP/MES systems?

Solution 11

Use a Human Interface Station (HIS) to access CS Batch data.

You can connect (*1) a Windows NT-based HIS directly to an existing UNIX-based CS Batch system, and use the report package to read data into MS Excel. You can also use OPC to transfer data smoothly to an ERP / MES supervisory system.



(*1) Using the "CS Plus" CENTUM CS series NT-UNIX connectivity package

Schedule Creation

Hassle-free

**This makes it easy to create production schedules for complex batch plants, using the Exanalp II scheduler package for batch control.
It shortens turnaround, and provides the flexibility to handle urgent orders.
You can view results data, and quickly make necessary changes in the schedule.**

Can scheduling work be further simplified?

Solution 12

The Exanalp II dedicated scheduler for batch control provides powerful support.

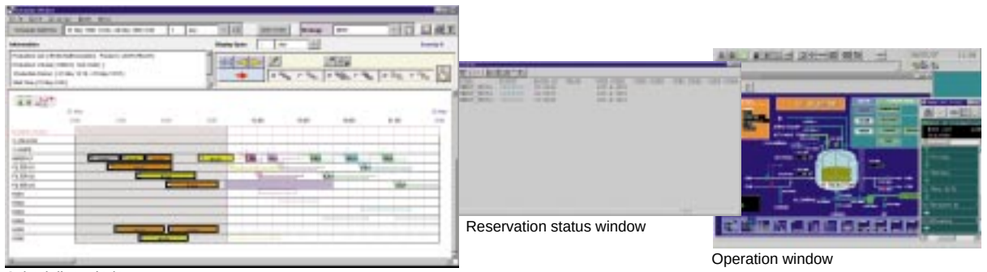
Fast automatic scheduling functions and Gantt chart displays – plus a powerful editor – make it easy to create a variety of scheduling proposals, giving you an optimal choice.

Can the Scheduler link Order Information and Production Results?

Solution 13

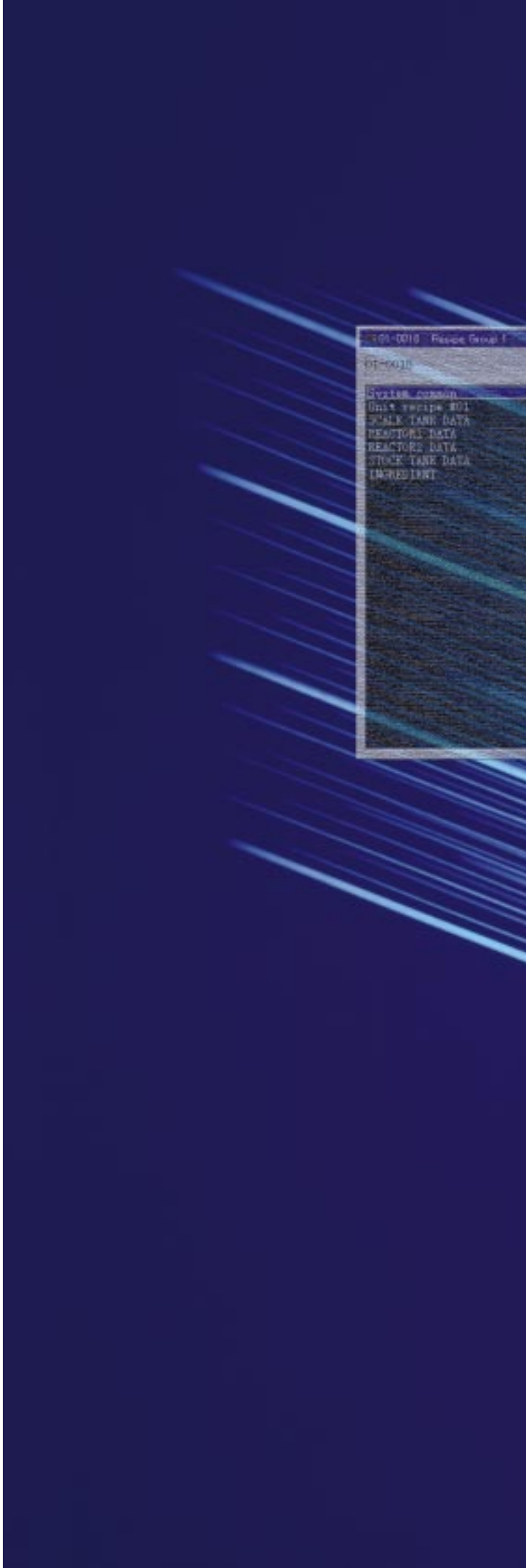
You can Update Schedules based on Production Results.

Feeding batch progress results data back to the scheduling system makes for flexible production management.
This gives you flexibility in responding to urgent batch requests, and rescheduling in real time.



Scheduling window
Reservation status window
Operation window

Integrated operation.



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