General Specifications

Model NTPA210
fitOMS BLEND
Blend Ratio Control Module

GS 36J07E10-01E

■ GENERAL

BLENDING is the last step in the refinery process chain leading from crude oil to finished products such as gasoline, gasoil and fuel oil. Quality control of the finished product is one of the most important steps in the refining process and contributes to business profitability. The fitOMS (Future Integration Technology for Oil Movement System) is a module series which offers solutions in the oil movement process.

BLEND, one of the fitOMS series, offers functions related to in-line blend ratio control. Introduction of blend ratio control leads to significant improvement in operation efficiency, and to enormous profits based on accurate ratio control.

This GS is to highlight the features, functionality and software/hardware requirements for realizing and implementing a blending solution.

BLEND contributes to improving safety, quality, inventory scheduling, throughput execution safety and accurate ratio control.

■ FEATURES

● Reliability

Control function, which requires the foremost reliability, is executed in reliable FCS and is not dependent on the performance of PCs.

● Easy and Effective Engineering and Operation

- Based on simple architecture, it is very simple to configure the system.
- Combined with the CENTUM CS 3000 HIS/FCS simulator function, a test system can be easily configured on a PC.
- Minimizing complicated master data preparation and management enables blend operation simpler.
- The data of the field equipment specified and used in the operation is stored automatically and can be utilized in other operations easily.
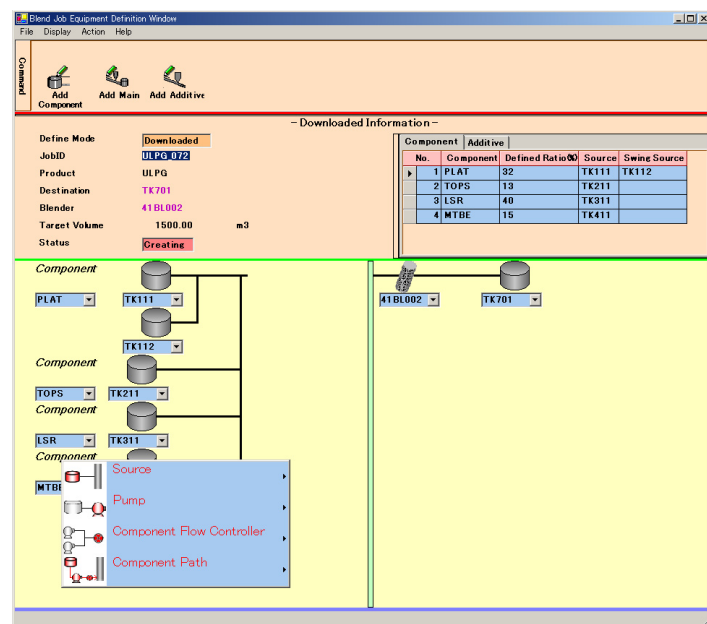- GUI screens enable user-friendly operation.

● Powerful Solutions

- Precise ratio control is carried out with the use of the offsite function blocks developed through Yokogawa's years of experience in oil movement processing.

  The function blocks have the capability of realizing the following:
  - Temperature compensation
  - Blend profile
  - Specifying ramping speed
  - Monitoring deviation error
  - Monitoring batch end
  - Accumulated capacity deviation control, etc.
- BPC function can be configured easily through Exaopc.

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■ FUNCTION SPECIFICATIONS

● Recipe Definition

The recipe definition screen is prepared for easy and prompt setting of required data using GUI.

● Controller and Pump Selection

Controllers and pumps can be selected to reduce manual input, thereby realizing efficient operation and avoiding human error.

● Automatic Sequence Control Function of Pumps

Automatic or manual mode can be selected for starting and stopping the pumps.

● Equipment Monitoring

The equipment used in operation is monitored for deviation errors, and warnings are either issued or the operation is interrupted automatically when an error is detected. Pacing sequences are easily prepared to eliminate flowrate deviation and to maintain accurate ratio control.

● Finish Time Estimation Function

Estimated finish time is calculated by target volume and flowrate. Messages can be issued before operation is completed.

● Operation Change Function

The following operation changes can be executed:
• Target volume
• Control ratio
• Pump addition/deletion
• Flowrate change
• Flow controller (meter) addition/deletion
• Additive stop quantity
• Additive ratio
• Tank swing
• Interrupt(re-start)

● Component Ratio Control

Accurate batch end detection and precise ratio control is realized by the offsite control block.

● Additive Control (Early Stop)

In order to avoid expensive additives remaining in the pipelines, it is possible to specify the volume to be stopped prior to operation completion. Control ratio can be re-calculated, taking into consideration the additive ratio or stop volume.

● Component Late Start

It is possible to execute a late start, up to the specific time when the blending flowrate approaches the predefined rate. This is useful when applying the component which can be easily gasified as butane.

● Booster Pump Control

In conjunction with a simple sequence, starting, stopping and monitoring of the booster pump is realized.

● Control Mode Selection

Accumulated volume ratio control or instantaneous ratio control can be selected as the ratio control mode. Instantaneous deviation control mode or cumulative deviation control mode can be specified at the instrument level.

● Key Valve Control

For hazard prevention purposes, the key valve can be specified to close automatically at emergency stops.

● Report

Blend reports can be issued in CSV or XML formats.

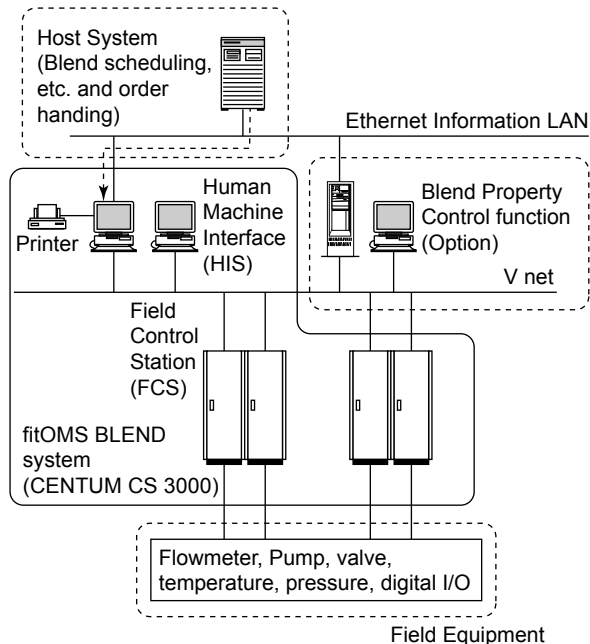## ● Flexible Collaboration with DCS Sequence

Operation Tags for operation and control can be assigned separately without concern about control sequences related to individual pieces of equipment.

Examples of collaborative sequence:
• Pressure control in pump vicinity (return line control)
• Sampling loop and analyzer sequence
• Emergency stop factor monitoring sequence

■ SYSTEM CONFIGURATION

A typical system configuration is shown as follows:

Note: [ ] section is not included as a component of BLEND

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■ STANDARD SPECIFICATIONS

BLEND has been designed as outlined below.

Custom applications can be developed if additional custom requirements are required.

Blender Facility
Maximum number of blenders: 4/FCS
(For maximum number of blenders for FCS to which special software can be installed, consult YOKOGAWA.)

Note: A user license is required for each unit of 4 blenders.

Controlled/monitored Streams
(i.e. flow controller for blending operation)
Maximum number of controllers: 76/FCS
Maximum number of controllers (including for additives) that can be simultaneously controlled: 14/blender

Component Tanks
Maximum number of component tanks: 14/Blending operation
(according to the number of controllers)

Note: Depending on the number of multiple controllers assigned to the same tank and the number of additives to be used, the number of tanks is decided.
There is no limitation to the number of swing tanks and data for the 10 latest swing operations is stored.

■ OPERATION ENVIRONMENT

BLEND is to be implemented in FCS and HIS on a CENTUM CS 3000 system.

HIS
Hardware
Conforms to the operating environment of LHS1100 Standard Operation and Monitoring Function.

Software
• LHS1100 Standard Operation and Monitoring Function
• LHS2411 Exaopc OPC Interface Package (for HIS)

The following packages are necessary if a test system is required.

<Test system by stand-alone PC>
• LHS5420 Test Function
<Test system using several PCs on an Ethernet >
• LHS5420 Test Function
• LHS5425 Expanded Test Function
• LHS5426 FCS Simulator Package
• LHS5427 HIS Simulator Package

FCS
Hardware
PFCS-H, PFCD-H, AFS10S, AFS10D, AFS20S, AFS20D, AFS30S, AFS30D, AFS40S, AFS40D,AFG10S, AFG10D, AFG20S, AFG20D, AFG30S,AFG30D, AFG40S or AFG40D

Software
• LFS8620 Off-site Block Package
• LFS1120 Control Function for Compact Field Control Station (R3.03 or later),
LFS1100 Control Function for Standard Field Control Station for RIO (R3.03 or later),
LFS1300 Control Function for Standard Field Control Station for FIO (R3.03 or later),
LFS1130 Control Function for Enhanced Field Control Station for RIO (R3.03 or later), or LFS1330 Control Function for Enhanced Field Control Station for FIO (R3.03 or later)

IOs of component flowcontrollers and function blocks must be assigned in the FCS where BLEND is installed.

Engineering requirements
LHS5100 Standard Builder Function (R3.03 or later)

■ MODEL AND SUFFIX CODES

			Description
Model	NTPA210		fitOMS BLEND (Blend Ratio Control Module)
Suffix Codes		-S	Basic Software License
		1	Number of blenders: 1 to 4
		2	Number of blenders: 5 to 8
		3	Number of blenders: 9 to 12
		1	English version

NOTES
• One of these modules is required for each CENTUM CS 3000 system which is configured for one project.
• This module is divided into two applications. One is the screen system application which is executed on an HIS, and the other is the control system application which is executed on the FCS. There is no limitation to the number of HISs to which the screen system application can be installed.

■ ORDERING INSTRUCTION

Specify model and suffix codes.

■ TRADEMARKS

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