

General Specifications

GS 33Q01B10-31E

Integrated Production Control System CENTUM CS 3000 System Overview



■ GENERAL

This GS covers the system, component and network specifications of the CENTUM CS 3000 integrated production control system.

■ COMPONENTS AND SOFTWARE

The CENTUM CS 3000 Production Control System for real-time control consists of components such as HIS Human Interface Stations and FCS Field Control Stations interconnected by the Vnet token-bus. Software running on HIS and FCS stations implements operation/monitoring and control functions respectively. Ethernet may also be used to interconnect HIS stations.

1. Human Interface Station (HIS)

An HIS serves as a human interface for operation, monitoring, and engineering. The software packages listed below which are installed in an IBM PC/AT-compatible computer (hereinafter referred to as a general-purpose PC), or in a console HIS (*6) consisting of a general-purpose PC and Open Display Style Console Assembly, implement the respective functions. The user can install and run the operation and monitoring functions together with the engineering functions in the same HIS or in different HISs as necessary. For HIS hardware specifications, see GS 33Q06B40-31E and GS 33Q06B50-31E. For function specifications, see GS 33Q02C10-31E.

Operation and Monitoring Software

LHS1100	Standard Operation and Monitoring Function
LHS1120	Console HIS Support Package for Enclosed Display Style (*6)
LHS1130	Console HIS Support Package for Open Display Style (*6)
LHS2410	Open Data Interface Package for DDE
LHS2411	Exaopc OPC Interface Package (for HIS) (*3)
LHS2412	CENTUM Data Access Library
LHS4000	Million Tag Handling Package (*7)
LHS4150	Recorder Output Package (*2)
LHS4190	Line Printer Support Package (*2)
LHS4410	Control Drawing Status Display Package
LHS4420	Logic Chart Status Display Package (*1)
LHS4450	Multi Projects Connection Package (*4)
LHS4510	Expert Trend Viewer Package (*5)
LHS4600	Multi-monitor Package (*6)
LHS4700	Advanced Alarm Filter Package (*7)
LHS6510	Long-term Data Archive Package
LHS6530	Report Package
LHS6600	CS Batch 3000 Process Management Package
LHS6710	FCS Data Setting/Acquisition Package (PICOT)
LHS7110	Web Monitoring Package (*1)
SSS7710	Plant Resource Management Client (*6)

- *1: Supported by R2.05 or later versions
- *2: Supported by R2.06 or later versions
- *3: Product name changed in R2.06
- *4: Supported by R2.10 or later versions
- *5: Supported by R2.20 or later versions
- *6: Supported by R3.01 or later versions
- *7: Supported by R3.02 or later versions

For details of the above functions, see the respective GSeS. The operating system of the HIS is Windows 2000 (Professional). If you want to run other third-party software on the HIS, contact our sales people in case there are compatibility issues.

Engineering Software

- LHS5100 Standard Builder Function
- LHS5110 Access Control Package (*4)
- LHS5150 Graphic Builder
- LHS5160 CS Batch 3000 Builder
- LHS5161 CS Batch 3000 Recipe Management Package
- LHS5170 Access Administrator Package (FDA: 21 CFR Part 11 compliant)(*4)
- LHS5420 Test Function
- LHS5425 Expanded Test Function (*2)
- LHS5426 FCS Simulator Package (*2)
- LHS5427 HIS Simulator Package (*2)
- LHS5450 Multi Projects Connection Builder (*2)
- LHS5490 Self-documentation Package
- SSS5700 Foundation Fieldbus Engineering Tool (*1)
- SSS6700 Foundation Fieldbus Device Management Tool (*1)
- SSS7700 Plant Resource Management Server (*3)
- SSS7710 Plant Resource Management Client (*3)
- SSS7720 Field Communications Server (*3)
- *1: Supported by R2.05 or later versions
- *2: Supported by R2.10 or later versions
- *3: Supported by R3.01 or later versions
- *4: Supported by R3.02 or later versions

For details of the above functions, see the respective GSeS.

Documentation Software

- LHS5495 Electronic Documentation

For details of the above function, see GS 33Q04N30-31E.

Operation Support Software

(for general-purpose PC worked as HIS)

- NTPS100 Exaplog Event Analysis Package
- NTPS200 Exapilot Operation Efficiency Improvement Package

*1: Supported by R2.10 or later versions.

For details of the above functions, see GS 36J06A10-01E “NTPS100 Exaplog Event Analysis Package” and GS 36J06B20-01E “Exapilot Operation Efficiency Improvement Package”.

2. Field Control Station (FCS)

The FCS performs process control, and manages communication with subsystems such as PLCs. Standard, compact and migration FCSes are available. Migration type FCSes are those for CENTUM CS 3000 upgraded from FCSes for CENTUM V and CENTUM-XL.

There are two types of standard FCS models: the one in which input/output modules installed in Remote I/O (RIOs) are connected via RIO bus, and the one in which input/output modules installed in Fieldnetwork I/Os (FIOs) are connected via ESB bus and ER bus. A compact FCS model connects to RIOs directly, not via RIO bus. A migration type FCS model is based on a standard FCS model and includes the SI bus for connections to the inputs and outputs of a field control station of the CENTUM V or CENTUM-XL.

Standard FCS

- Field Control Station (for RIO, 19" rack mountable type) (FCU Model: AFS10S)
- Duplexed Field Control Station (for RIO, 19" rack mountable type) (FCU Model: AFS10D)
- Field Control Station (for RIO, with cabinet) (FCU Model: AFS20S)
- Duplexed Field Control Station (for RIO, with cabinet) (FCU Model: AFS20D)
- Field Control Station (for FIO, 19" rack mountable type) (FCU Model: AFS30S)
- Duplexed Field Control Station (for FIO, 19" rack mountable type) (FCU Model: AFS30D)
- Field Control Station (for FIO, with cabinet) (FCU Model: AFS40S)
- Duplexed Field Control Station (for FIO, with cabinet) (FCU Model: AFS40D)

For details of the above hardware, see the respective GSeS.

Enhanced FCS

- Field Control Station (for RIO, 19" rack mountable type) (FCU Model: AFG10S)
- Duplexed Field Control Station (for RIO, 19" rack mountable type) (FCU Model: AFG10D)
- Field Control Station (for RIO, with Cabinet) (FCU Model: AFG20S)
- Duplexed Field Control Station (for RIO, with Cabinet) (FCU Model: AFG20D)
- Field Control Station (for FIO, 19" rack mountable type) (FCU Model: AFG30S)
- Duplexed Field Control Station (for FIO, 19" rack mountable type) (FCU Model: AFG30D)
- Field Control Station (for FIO, with Cabinet) (FCU Model: AFG40S)
- Duplexed Field Control Station (for FIO, with Cabinet) (FCU Model: AFG40D)

For details of the above hardware, see the respective GSeS.

Compact FCS

- Field Control Station (19" rack mountable type) (FCU Model: PFCS-H)
- Duplexed Field Control Station (19" rack mountable type) (FCU Model: PFCD-H)

For details of the above hardware, see the respective GSeS.

Migration Type FCS (Standard Type : Main Memory 16M byte)

- Control Station Upgrade Kit for CENTUM V (for SIO/FIO) (FCU Model: AFS81S)
- Duplexed Control Station Upgrade Kit for CENTUM V (for SIO/FIO) (FCU Model: AFS81D)
- Control Station Upgrade Kit for CENTUM-XL (for SIO/FIO) (FCU Model: AFS82S)
- Duplexed Control Station Upgrade Kit for CENTUM-XL (for SIO/FIO) (FCU Model: AFS82D)
- Control Station Upgrade Kit for CENTUM V (for FIO) (FCU Model: AFS83S)
- Duplexed Control Station Upgrade Kit for CENTUM V (for FIO) (FCU Model: AFS83D)
- Control Station Upgrade Kit for CENTUM-XL (for FIO) (FCU Model: AFS84S)
- Duplexed Control Station Upgrade Kit for CENTUM-XL (for FIO) (FCU Model: AFS84D)

Migration Type FCS (Enhanced Type : Main Memory 32M byte)

- Control Station Upgrade Kit for CENTUM V (for SIO/FIO) (FCU Model: AFG81S)
- Duplexed Control Station Upgrade Kit for CENTUM V (for SIO/FIO) (FCU Model: AFG81D)
- Control Station Upgrade Kit for CENTUM-XL (for SIO/FIO) (FCU Model: AFG82S)
- Duplexed Control Station Upgrade Kit for CENTUM-XL (for SIO/FIO) (FCU Model: AFG82D)
- Control Station Upgrade Kit for CENTUM V (for FIO) (FCU Model: AFG83S)
- Duplexed Control Station Upgrade Kit for CENTUM V (for FIO) (FCU Model: AFG83D)
- Control Station Upgrade Kit for CENTUM-XL (for FIO) (FCU Model: AFG84S)
- Duplexed Control Station Upgrade Kit for CENTUM-XL (for FIO) (FCU Model: AFG84D)

Basic Software

- LFS1100 Control Function for Standard Field Control Station (for RIO)
- LFS1120 Control Function for Compact Field Control Station
- LFS1300 Control Functions for Standard Field Control Station (for FIO) (*1)
- LFS1130 Control Function for Enhanced Field Control Station (for RIO) (*2)
- LFS1330 Control Function for Enhanced Field Control Station (for FIO) (*2)

For details of the above functions, see the respective GSeS.

- *1: Supported by R3.01 and later versions.
- *2: Supported by R3.02 and later versions.

Optional Software

- LFS3132 Valve Pattern Monitor Package
- LFS8620 Off-site Block Package

For details of the above functions, see the respective GSeS.

Subsystem Communication Software

- LFS2210 FA-M3 Communication Package (for ACM11, ACM12) (*1)
- LFS2211 DARWIN Communication Package (for ACM11) (*1)
- LFS2212 Gas Chromatography Communication Package (for ACM21) (*1)
- LFS2220 YS Instruments Communication Package (for ACM12) (*2)
- LFS2230 MELSEC-A Communication Package (for ACM71) (*2)
- LFS2231 FA-M3 Communication Package (for ACM71) (*3)
- LFS2232 DARWIN/DAQSTATION Communication Package (for ACM71) (*4)
- LFS2410 FA-M3 Communication Package (for ALR111, ALR121) (*3)
- LFS2420 YS Communication Package (for ALR121) (*4)
- LFS2430 MELSEC Communication Package (for ALE111) (*4)
- LFS2431 FA-M3 Communication Package (for ALE111) (*4)
- LFS2433 PLC-5/SLC 500 Communication Package (for ALE111) (*4)
- LFS2510 Foundation Fieldbus Communication Package
- LFS2540 PROFIBUS Communication Package (*2)
- LFS2610 Foundation Fieldbus Communication Package (for ALF111) (*3)
- LFS2710 HART Communication Package (for AA□□□□-H)
- LFS9053 Modbus Communication Package (for ACM11, ACM12) (*1)
- LFS9054 A-B Communication Package (for ACM11, ACM12) (*1)
- LFS9055 Siemens Communication Package (for ACM11, ACM12) (*1)
- LFS9056 SLC 500 Communication Package (for ACM11) (*4)
- LFS9062 MELSEC-A Communication Package (for ACM11, ACM12) (*1)
- LFS9063 SYSMAC Communication Package (for ACM11, ACM12) (*1)
- LFS9074 PLC-5/SLC 500 Communication Package (for ACM71) (*4)
- LFS9153 Modbus Communication Package (for ALR111, ALR121) (*3)
- LFS9162 MELSEC-A Communication Package (for ALR111, ALR121) (*3)

- *1: LFS2211 DARWIN Communication Package supports ACM11 Communication Module, LFS2212 Gas Chromatography Communication Package supports ACM21 Communication Module, and other packages support both ACM11/ACM12.
- *2: Supported by R2.10 or later versions.
- *3: Supported by R3.01 or later versions.
- *4: Supported by R3.02 or later versions.

For each subsystem, optional communication software is available. For details, see the respective GSeS.

3. Bus Converter (BCV)

The BCV is used to link CENTUM CS 3000, CENTUM CS, CENTUM-XL, CENTUM-V, CENTUM CS 1000 and μ XL.

Hardware

- ABC11S Bus Converter
- ABC11D Dual-Redundant Bus Converter

Software

- LBC1210 Standard Bus Converter Function (for HF bus-Vnet) (*1)
- LBC1220 Standard Bus Converter Function (for RL bus-Vnet) (*1)
- LBC1230 Standard Bus Converter Function (for Vnet-Vnet)
- LBC1260 Standard Bus Converter Function (for VLnet-Vnet) (*1)

*1: Supported by R2.10 or later versions.

For details, see GS 33Q06H20-31E.

4. Communication Gateway Unit (CGW)

The CGW communication gateway unit connects an Ethernet network to a VLnet bus.

Hardware

- ACG10S Communication Gateway Unit

Software

- LGW1240 Text Mode Communication Gateway Unit Function
- LGW1250 Frame Mode Communication Gateway Unit Function (Wide Area Communication) (*1)

*1: Supported by R2.06 or later versions.

For details, see GS 33Q06H10-31E.

5. Advanced Process Control Station (APCS)

An APCS advanced process control station, which is a server computer running the following software, serves as a station to carry out advanced control for plant efficiency improvement.

LFS1200 APCS Functions

Note: Supported by R3.01 or later versions.

For details, see GS 33Q03M10-31E.

6. Peripherals

YNT511S, YNT511D, YNT521S, and YNT521D Fiber-optic Bus Repeaters (for Vnet or RIO bus)
YNT512S and YNT512D Bus Repeaters (for Vnet or RIO bus)

ACB21 and ACB41 I/O Expansion Cabinets

ANS□□ and AND□□ Node Interface Units

I/O Module Nests

ANB10S, ANB10D, ANR10S, and ANR10D Node Units

I/O Modules and Communication Modules

Bus Cables for Vnet, RIO bus, ESB bus, or ER bus

Since an HIS runs the Microsoft Windows 2000 operating system, Windows 2000-compatible peripherals, such as a printer, can be used; however, for peripherals usable for an HIS, consult YOKOGAWA.

SYSTEM SPECIFICATIONS

HIS Operation/Monitoring Tags

Maximum of 100,000 (When using LHS4000, up to 1,000,000 per system)

Minimum System

A minimum system consists of one HIS and one FCS.

Maximum System

In CENTUM CS 3000, a system separated by BCV is called a domain. The system configuration for one domain is shown below.

Stations	Max. No. Connectable
HIS FCS BCV CGW	The total number of stations can be up to 64, including up to 16 HISes.

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Expanded System

By using a BCV to connect multiple domains in a hierarchy, you can create a system that is larger than the single-domain limits given above. You can also integrate multiple systems in a hierarchy, with a CENTUM CS 3000 system at its center.

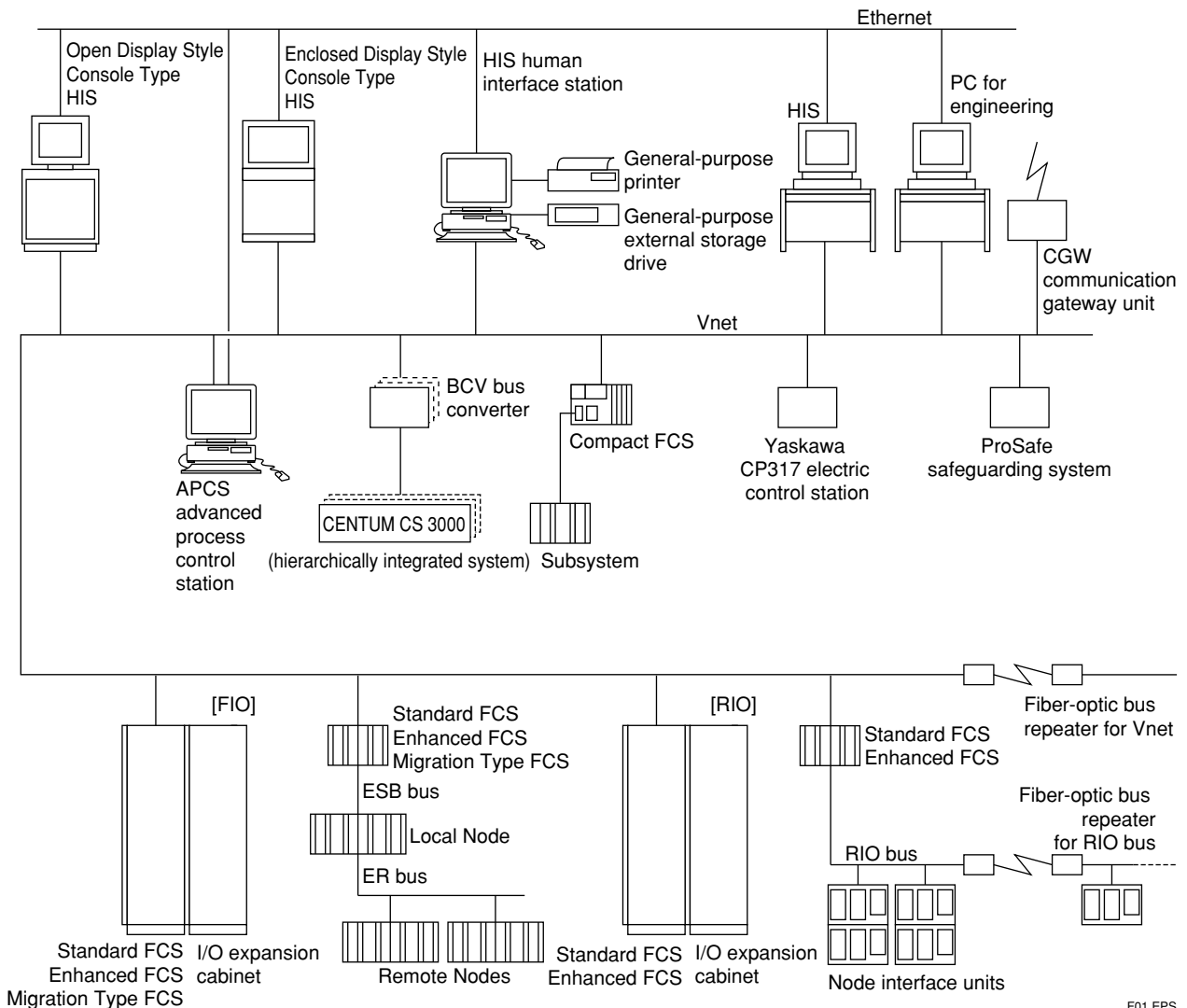
Total no. of interconnected domains: up to 16

Total no. of stations in multi-domain system: up to 256

Hierarchy: three-level control-bus hierarchy, i.e. three control-bus levels, linked by two bus converters

No. of tag names: Max. 100,000 (When using LHS4000, up to 1,000,000 per system)

Connecting device: Bus Converter



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System Configuration

Note for System Configuration

A Windows 2000 server is required to store project data in some system configurations.

Count total number of connected PCs using an equation shown below. If the number is more than eight, consult our sales staff for further examination. If the number is eight or smaller, a server PC is not required.

When NOT using Foundation Fieldbus Engineering Tool (SSS5700):

$HIS + \{(Engineering - 1) \times 2\} + Exaopc$

When using Foundation Fieldbus Engineering Tool (SSS5700):

$HIS + \{(Engineering - 1) \times 2\} + Exaopc + 2$

When using Expanded Test Functions (LHS5425):

Running LHS5425 on three PCs requires a server computer; consult YOKOGAWA.

When using Multiple Project Connection Package (LHS4450):

See the specifications for Multiple Project Connection Package (GS 33Q02S10-31E) for details.

Parameters in Equations

HIS: Number of PCs, including console HISs, in which Standard Operation and Monitoring Function (LHS1100) is installed.

Count the total number of the packages in the project.

Engineering:

Number of PCs, including console HISs, in which Standard Builder Function (LHS5100) is installed.

Count independently from above "HIS" regardless of whether Standard Operation and Monitoring Function is also installed in one or more of those PCs.

Exaopc: Number of PCs with Exaopc OPC Interface Package (NTPF100)

Do not count Exaopc OPC Interface Package for HIS (LHS2411).

■ MULTI PROJECTS CONNECTION

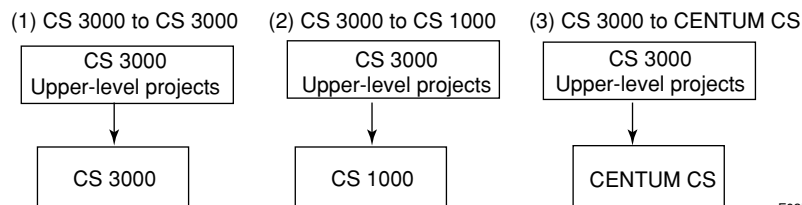
General

These functions allow multiple projects involving CENTUM CS, CENTUM CS 1000, and CENTUM CS 3000 with duplicated names (duplicated tag names, project names etc. in different projects) and common resources (engineering unit codes, plant hierarchy names) to be monitored without making any changes.

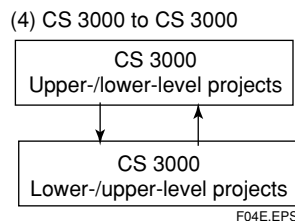
A CS 3000 project is defined as the upper-level project, by which you can operate and monitor the lower-level projects in CENTUM CS, CENTUM CS 1000, or CENTUM CS 3000.

The following interconnections are possible:

Hierarchical connection



Bidirectional connection



Format of Project Interconnection

Previous CENTUM systems supported inter-project "gateway" functions between projects. The upper-level system (project) was connected by BCV bus converter to lower-level system (project) and could view tags in the lower-level system (project). The Multi Projects Connection Package has several new functions as well as the inter-project gateway functions. The three different versions of the project interconnection functions are called Inter-Project Gateway functions, Project Integration functions, and Project Consolidation functions. The Multi Projects Connection Package is described in Section (2) "Project Integration" below.

(1) Inter-Project Gateway (Previous Version of Interconnection Function)

This is the previous version of the interconnection function. The upper-level system (project) is CENTUM CS or CENTUM CS 3000, and the lower-level system (project) is CENTUM-XL or μ XL. From the upper-level system (project), lower-level tag names can be viewed and manipulated, but not vice versa.

- Engineering must be performed for each project individually.
- FCS data can be read/written by tag name.
- The connection "key" is a "taglist". In addition to the original upper-level project taglist, you need to use a special lower-level taglist generation tool to create an additional project taglist for the lower-level project. (For example, use the CENTUM-XL taglist generation tool on CENTUM CS).

(2) Project Integration (Multi Projects Connection Package)

The Multi Projects Connection Package has several new functions as well as the above connection functions:

- System Activity Status Display
- Sequence Table, SFC, SEBOL Status Displays
- Taglist Auto-Equalization functions (from lower-level to upper-level projects)
When lower-level project tags are added or deleted, the upper-level project taglist is automatically equalized.
- Bidirectional Connection (see Fig.(4) above, but only applies between CENTUM CS 3000 systems)
- Duplicate tag numbers (in lower-level and higher-level) resolved.

(3) Project Consolidation

Multiple projects can be consolidated into a single project. This is quite computing-intensive work.

■ NETWORK SPECIFICATIONS

CENTUM CS 3000 uses Vnet, Ethernet, RIO bus, ESB bus and ER bus for communication with the configured stations.

Vnet

- Application

The Vnet is a real-time process control network used to connect system components.

- Communication Specifications

Max. Number of Stations Connectable: 64 per domain
Communication Method: Read/Write communication, message communication, link transmission

Link Transmission Period: 100 m sec

Line Access Control: Token passing method

- Transmission Path Specifications

Network Topology: Bus type

Transmission Path Redundancy: Available

Transmission Speed: 10 megabits per sec

Transmission Cable:

YCB111/YCB141 coaxial cables: HISes are connected by YCB141, other stations by YCB111.
Use YCB147/YCB149 Bus Adapter Unit, or YNT512 Bus Repeater to connect a YCB141 cable to a YCB111 cable.

Optical fiber cable: Use YNT5□1D Optical Bus Repeater

Transmission Distance:

YCB111/YCB141 coaxial cable:

Max. transmission distance: 500 m (for YCB111),
185 m (for YCB141)

When mixing YCB111 and YCB141: Length of
YCB141 + 0.4 x Length of YCB111 ≤
185

Number of Bus Adapter Units: Max. 4 per segment
(*1)

Number of devices connectable when using Bus
Adapter Unit: 30 - (number of bus
adapter units per segment) (*1)

Extension with Bus Repeater: Available
Refer to GS 33Y06H60-31E.

Optical fiber cable: There are Optical Bus Repeaters for 4 and 15 km. Use 2 repeaters as a set. Up to 4 sets (8 optical repeaters) can be used. The total transmission distance is restricted in consideration of signal transmission delay time. In table below (series connection), the asterisk "*" shows the restricted distance. When combining 4 km and 15 km types, the total transmission distance is restricted as well.

*1: When a Vnet is connected with an optical repeater, one segment means the area between repeaters.

Ethernet

- Application

The Ethernet is an information network used to interconnect HISes within the system.

- Communication Specifications

Connectable Devices: HIS (max. 16) and PC for builder
IEEE 802.3 Compliant

RIO bus (Standard FCS for RIO)

- Application

The RIO bus is a remote I/O communication bus which connects the FCS processor and the remote I/O portion (node).

- Communication Specifications

Max. No. of Connectable Devices: 8 nodes

- Transmission Path Specifications

Network Topology: Bus type

Transmission Path Redundancy: Available

Transmission Speed: 2 megabits per sec

Transmission Cable:

Twisted pair cable

Optical fiber cable (Use YNT5□1□ Optical Bus Repeater)

Transmission Distance:

Twisted pair cable:

Max. transmission distance: 750 m

Extension distance with Bus Repeater : Max. 750 m per repeater. Max. 4 repeaters may be used. Total transmission distance must be 3.75 km or shorter.

Optical fiber cable: There is Optical Repeater for 4 km.

Use 2 repeaters as a set. Up to 4 sets (8 optical repeaters) can be used. The total transmission distance is restricted in consideration of signal transmission delay time. In table below (series connection), the asterisk "*" shows the restricted distance. When combining optical repeaters for 4 km, the maximum transmission distance is restricted by the number of units as well.

Vnet total Transmission Distance	Total Transmission Distance Depending on Number of Repeaters			
	1 set (2 repeaters)	2 sets (4 repeaters)	3 sets (6 repeaters)	4 sets (8 repeaters)
Optical repeater for 4 km	Max. 5 km	Max. 9.5 km	Max. 14 km	Max. 16 km(*)
Optical repeater for 15 km	Max. 16 km	Max. 20 km(*)	Max. 18 km(*)	Max. 16 km(*)

RIO bus total Transmission Distance	Total Transmission Distance Depending on Number of Repeaters			
	1 set (2 repeaters)	2 sets (4 repeaters)	3 sets (6 repeaters)	4 sets (8 repeaters)
Optical repeater for 4 km	Max. 5.5 km	Max. 10.25 km	Max. 15 km	Max. 10 km(*)

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ESB bus (standard FCS for FIO)

• Application

An input/output communication bus used in a standard FCS for FIO. The ESB bus connects the processing unit of an FCS to node units, which are thus called Local Node units.

• Communication Specifications

Max. Number of Nodes That Can Be Connected: 10

Note: Only Models ANB10S and ANB10D can be connected. The total number of Remote Nodes and Local Nodes is also limited to 10 per FCS.

• Transmission Path Specifications

Network Topology: Bus type

Transmission Path Redundancy: Available

Transmission Speed: 128 megabits per second

Transmission Cable: Dedicated cable (YCB301)

Transmission Distance: Max. 10 m

ER bus (standard FCS for FIO)

• Application

An input/output communication bus used in a standard FCS for FIO. The ER bus connects a node unit that is directly connected to an FCS's processing unit via ESB bus, to remote node units.

• Communication Specifications

Max. Number of Remote Nodes That Can Be Connected: 10

Note: Only Models ANR10S and ANR10D can be connected. The total number of Remote Nodes and Local Nodes is also limited to 10 per FCS.

• Transmission Path Specifications

Network Topology: Bus type

Transmission Path Redundancy: Available

Transmission Speed: 10 megabits per second

Transmission Cable: Coaxial cable (YCB141, YCB311). Use YCB147/YCB149 Bus Adapter Unit to connect a YCB141 cable to a YCB311 cable.

Transmission Distance:

Max. 185m (for YCB141):

Extendable to 2 km when using Ethernet repeaters (total transmission distance must be 2370 m or shorter).

Can use 2 (a set of) Ethernet repeaters per ER bus train.

When mixing YCB141 and YCB311:

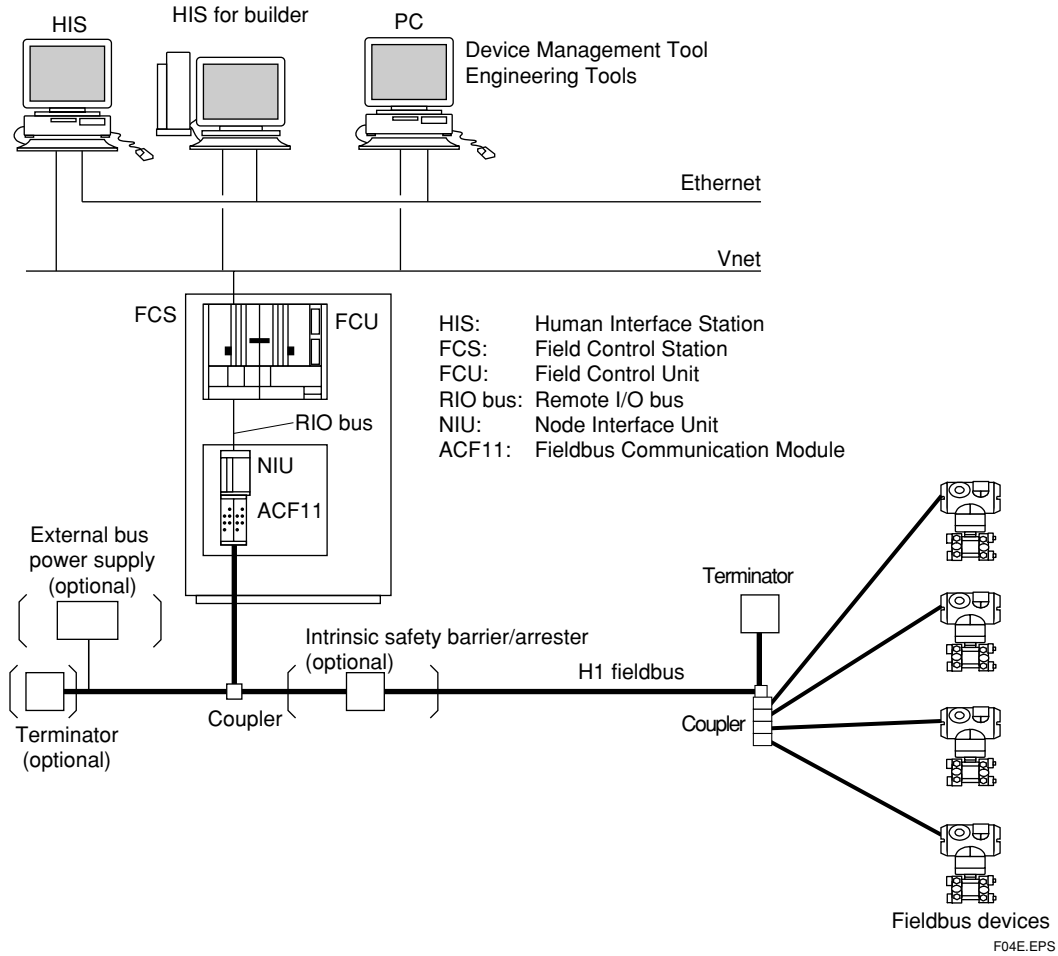
Length of YCB141 + (185/500) x Length of YCB311 ≤ 185

Number of Bus Adapter Units: Max. 4 per segment (*2)

Note: When an ER bus is connected with a repeater, one segment means the area between repeaters.

FIELDBUS SPECIFICATIONS

An Example of Fieldbus Connection under RIO

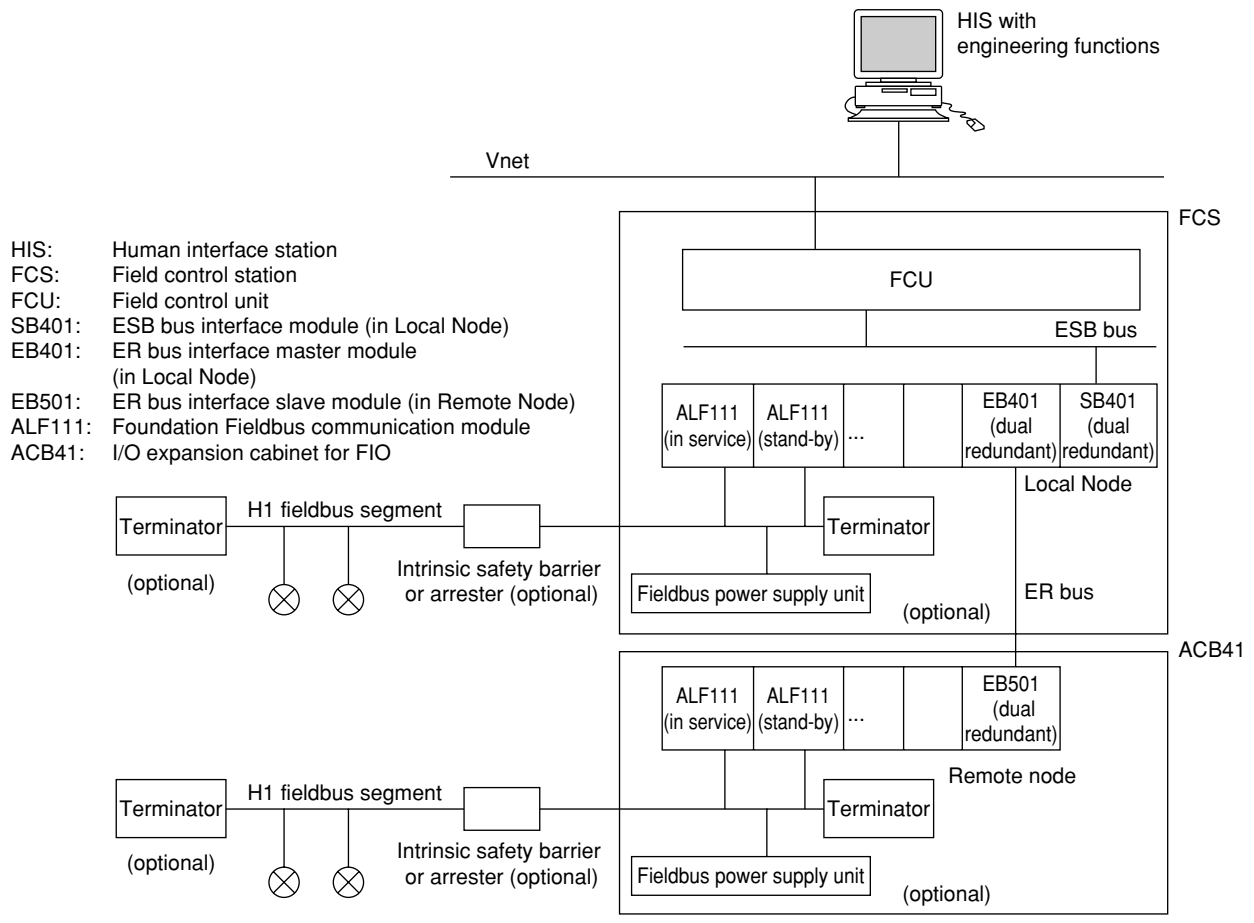


Fieldbus System Configuration (Tree Type)

Fieldbus Specifications

Follow FOUNDATION Fieldbus. For transmission specifications, see General Specifications for Foundation Fieldbus Communication Package (for ACF11), GS 33Q03L50-31E.

● An Example of Fieldbus Connection under FIO



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Fieldbus System Configuration (Bus with Spurs)

Fieldbus Specifications

Compliant to FOUNDATION Fieldbus. For transmission specifications, see General Specifications for Foundation Fieldbus Communication Package (for ALF111), GS 33Q03L60-31E.

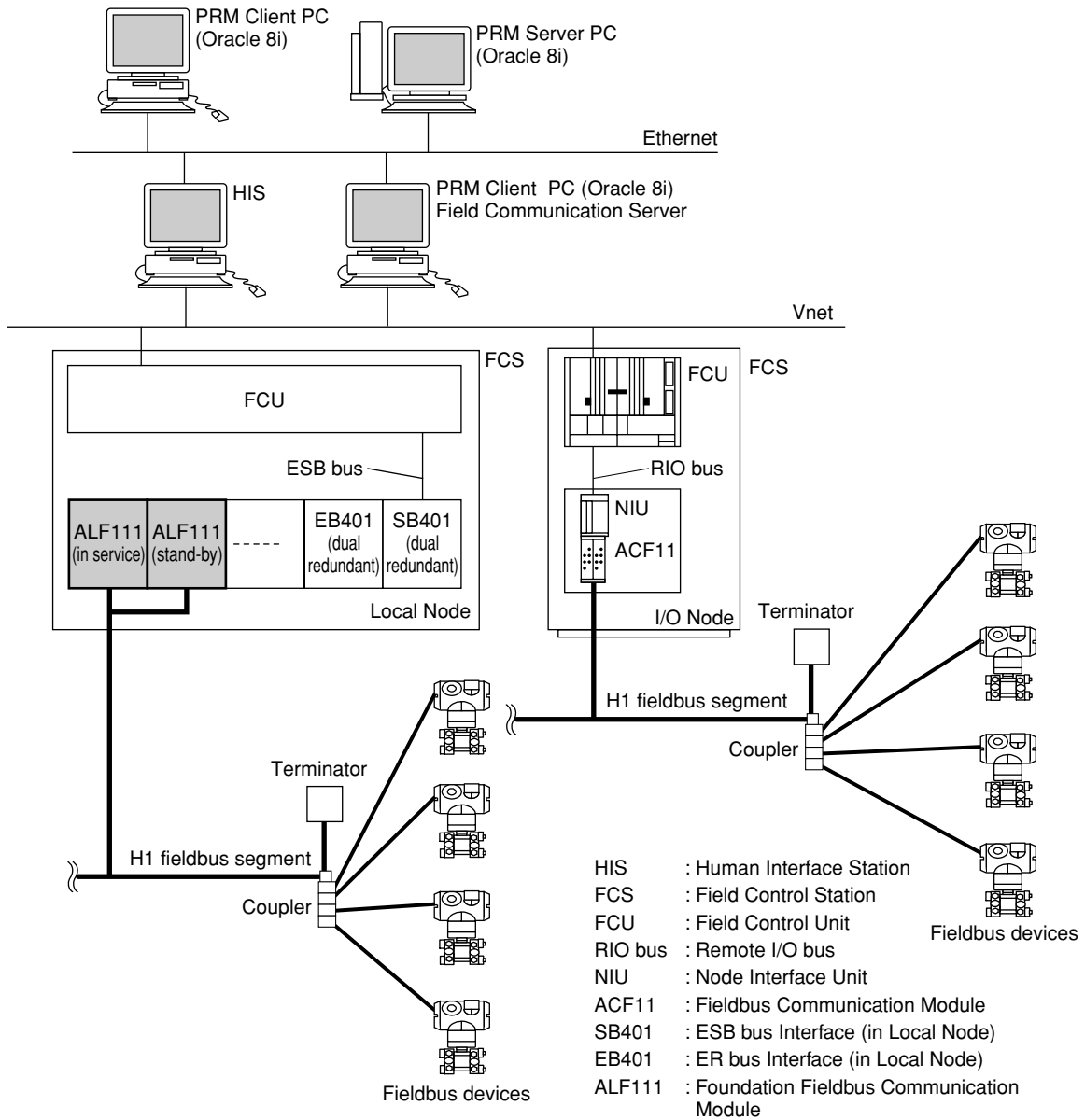
■ PLANT RESOURCE MANAGER (PRM) SPECIFICATIONS

Plant Resource Manager (hereinafter referred to as PRM) consists of three components: PRM Server, PRM Client, and Field Communications Server.

PRM supports the conventional 4 to 20 mA analog devices, FOUNDATION Fieldbus devices (FF devices), and HART devices. The following indicates the system configuration for FOUNDATION Fieldbus and HART.

● System Configuration When Connecting FOUNDATION Fieldbus

PRM Configuration



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Figure System Configuration

PRM Specifications

For details, see GS 33Y05Q10-01E.

● System Configuration When Connecting HART

Two system configurations are available for managing HART devices as below:

- Vnet connection via HART Modules
- Serial port connection via Multiplexer

V net connection via HART Modules (FCS for FIO)

Field communication server communicates with HART devices via HART modules by using the on-demand communication functions of FCS.

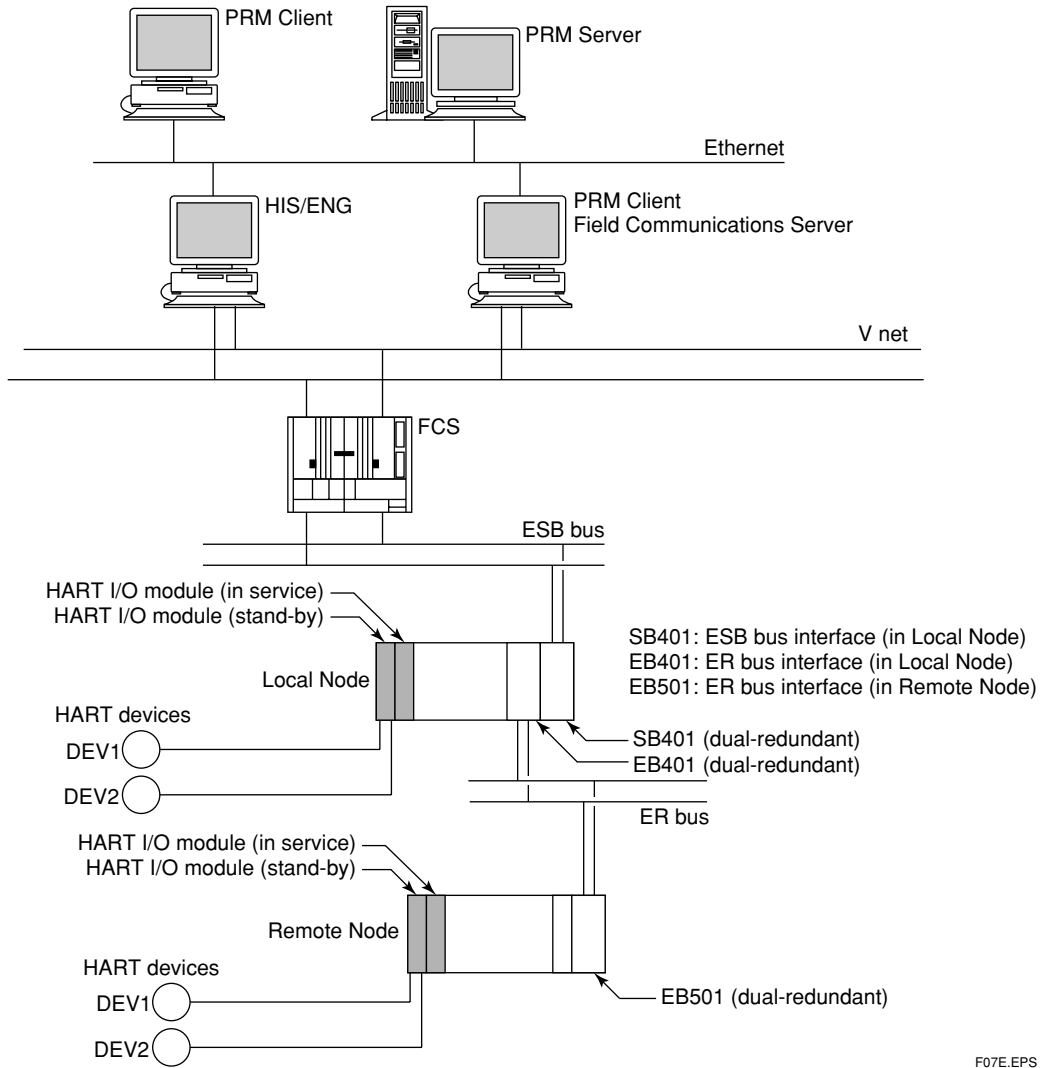


Figure V net Connection via HART Modules (FCS for FIO)

Note: PRM server, PRM client, and Field communication server can perform on the same PC.

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Serial port connection via Multiplexer (FCS for RIO)

LFCS (SFCS) communicates with HART devices via Multiplexer connected with serial port of Field communication server.

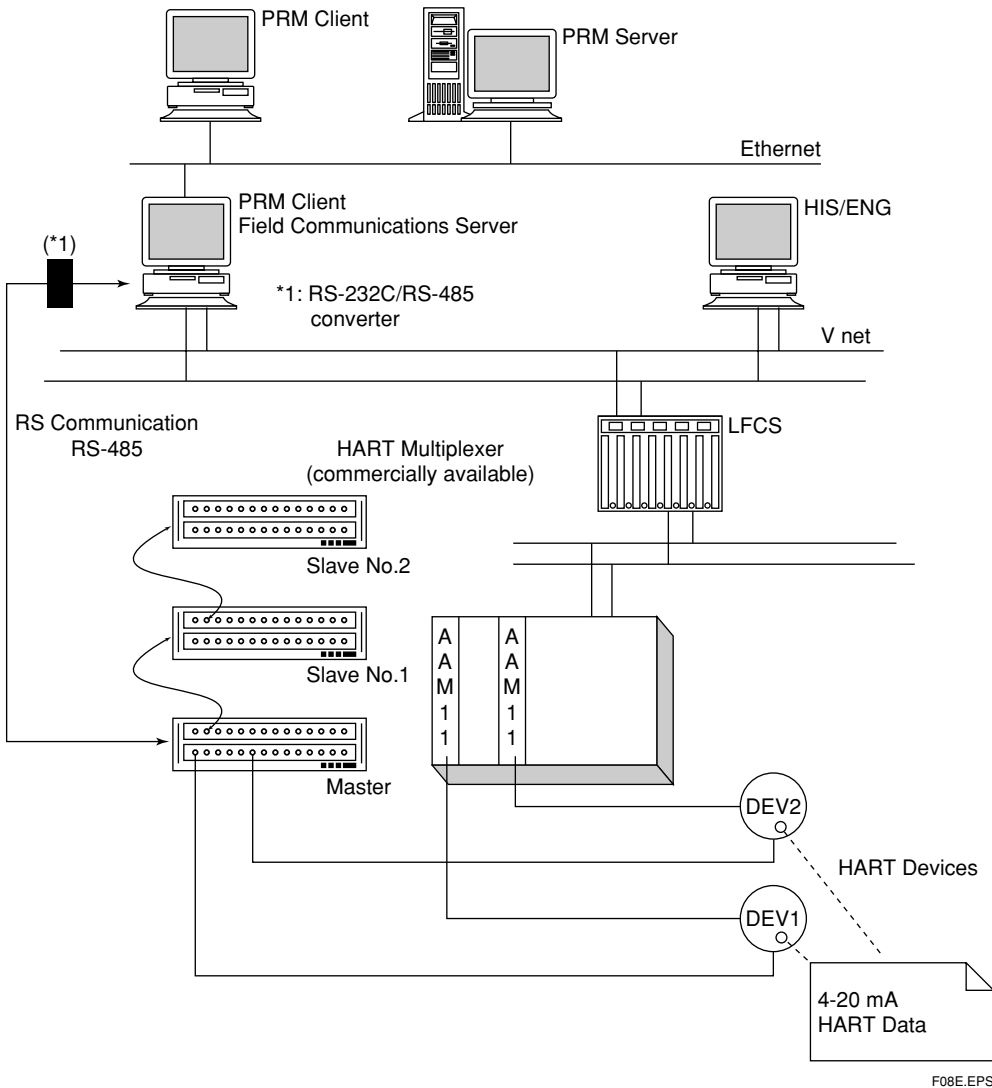
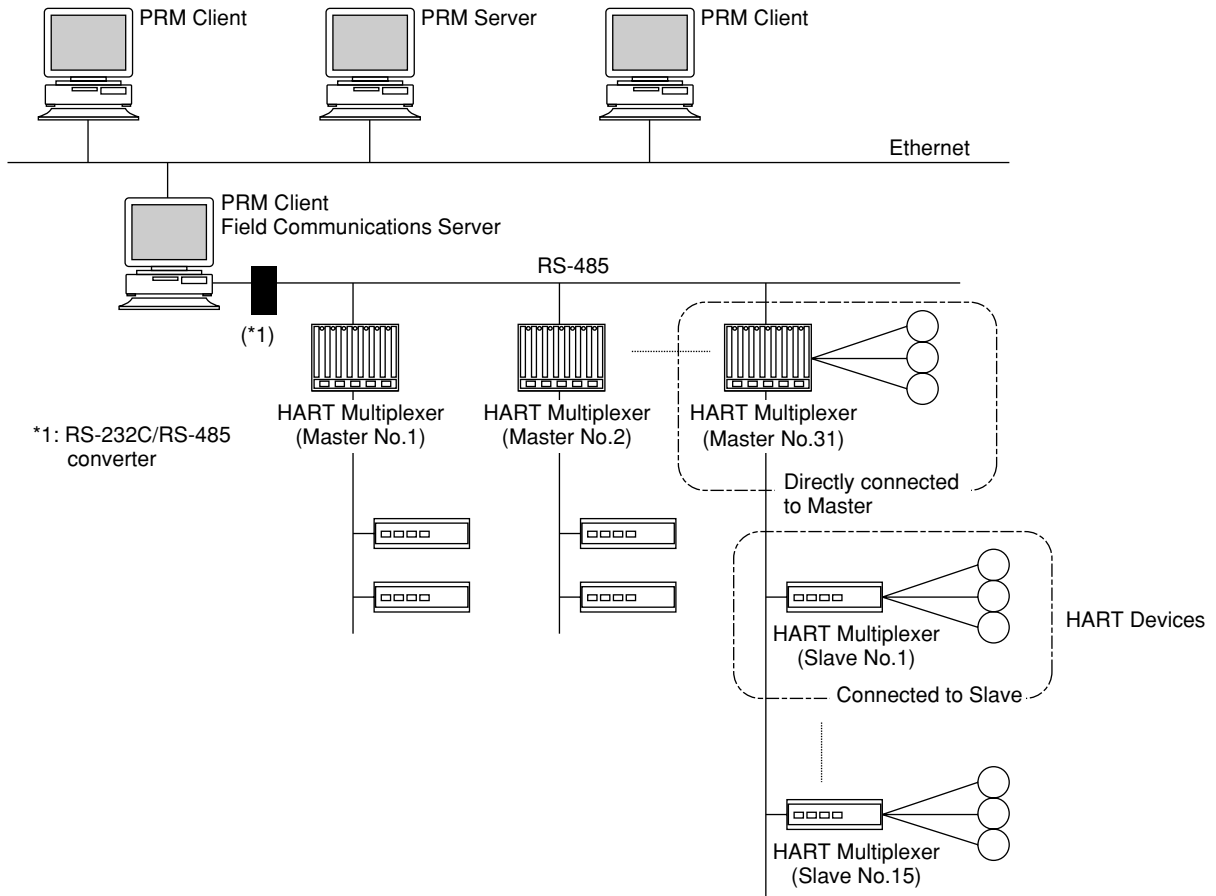


Figure Serial Port Connection via Multiplexer (Parallel Connection and Two Ways Data Flow)

Note: PRM server, PRM client, and Field communication server can perform on the same PC.

Serial port connection via Multiplexer (For using P&F Multiplexer)

When using P&F Multiplexer, can connect as follows without connecting CENTUM system.



F09E.EPS

Figure An Example of P&F Multiplexer Connection

Note: PRM server, PRM client, and Field communication server can perform on the same PC.

■ FDA:21 CFR Part 11 compliant Functions

This section explains the functions that are compliant with 21 CFR Part 11 in the Federal Regulations issued by US FDA (Food and Drug Administration). FDA:21 CFR Part 11 is the regulation regarding “Electronic Records” and “Electronic Signatures”.

This regulation is applied to the pharmaceutical production system exported to US.

The compliant functions, required to control systems, are classified into “Personnel Authentication” and “Audit trail”.

The typical items of regulation are as follows:

21 CFR Part 11 Subpart B ... Electronic Records

11.10 Controls for closed systems.

(d) Limiting system access to authorized individuals.

For above regulation, CENTUM CS 3000 has separate access control functions for operation and monitoring of operators, system maintenance of system engineers, and recipe creation of recipe engineers. Besides the conventional-personnel authentication by user name and password, CENTUM CS 3000 R3.02 (or later version) has the functions: setting the validity of password, setting the number of break-ins (alert when wrong operations for authentication are performed continuously more than the number of times set previously, and so on), and automatic user shut-out function (*1) (automatically shutting user out when keyboard or mouse is not used at the time set previously).

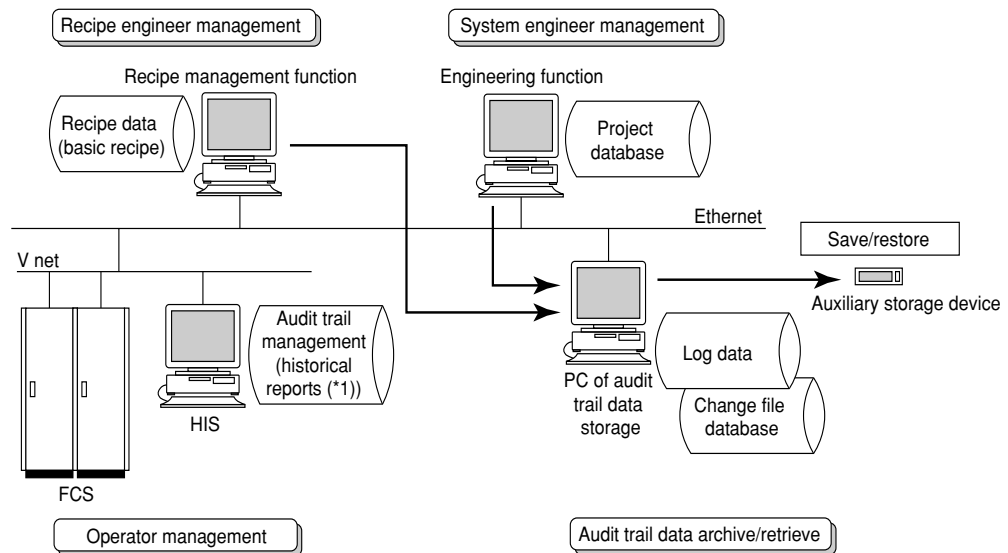
*1: Automatic user shut-out function is available only for HIS operation and monitoring basic functions.

(e) Use of secure, computer-generated, time-stamped audit trails to independently record the date and time of operator entries and actions that create, modify, or delete electronic records. Record changes shall not obscure previously recorded information. Such audit trail documentation shall be retained for a period at least as long as that required for the subject electronic records and shall be available for agency review and copying.

For above regulation, CENTUM CS 3000 has separate audit trail management functions for operation and monitoring performed by operators, system maintenance performed by system engineers, and recipe creation performed by recipe engineers. CENTUM CS 3000 automatically records 5W1H (When, Who, What, Where, Why, How) as the audit trail information.

● System Configuration Example for FDA:21 CFR Part 11 compliant

Recipe management function is available only when using CS Batch 3000 Package.



*1: Audit trail management data of operator's action is stored as historical report in the operated HIS.

F10E.EPS

Figure System Configuration Example for FDA:21 CFR Part 11 compliant

■ INSTALLATION AND ENVIRONMENTAL CONDITIONS

The installation and environment conditions of Yokogawa's devices except for general-purpose PC, Console HISs, Node Units for FIO, I/O Modules are shown as follows. For a general-purpose PC, see its specifications. For an Enclosed Display Style Console Type HIS, an Open Display Style Console Type HIS, a Node Unit for FIO, or an I/O Module, see General Specifications for each devices (GS 33Q06B40-31E, GS 33Q06B50-31E, or GS 33Q06Q01-31E).

Ambient Temperature:

- 5 to 40°C
- 5 to 35°C (YAX801 General-purpose Desk)
- 0 to 50°C (FCS)

Ambient Humidity:

- 20 to 80% RH
- 10 to 90% RH (FCS)
- No condensation

Temperature Change Rate: ±10°C per hour

Power Supply:

- 100-120 V AC Spec: Voltage 100-120 V AC ±10 %;
Frequency 50/60 ±3 Hz
- 220-240 V AC Spec: Voltage 220-240 V AC ±10 %;
Frequency 50/60 ±3 Hz
- 24 V DC Spec: Voltage 24 V DC ±10 %

Withstanding Voltage:

- 100-120 and 220-240 V AC: 1,500 V AC for 1 minute
- 24 V DC: 500 V AC for 1 minute

Insulation Resistance:

- 20 MΩ at 500 V DC
- 10 MΩ at 500 V DC (YAX101, YAX801, YAX211)

Grounding: Independent ground of up to 100 Ω resistance

Noise:

- Electrical Field (excl. CRT):
Up to 3 V/m (26 MHz to 1 GHz)
- Magnetic Field (excl. CRT) :
Up to 30 A/m (AC), 400 A/m (DC)
- Magnetic Field of CRT:
Up to 0.4 A/m (AC), 8 A/m (DC)
- Static: Up to 4 kV (direct discharge)

Continuous Vibration:

- Peak-to-peak: Up to 0.5 mm (1 to 14 Hz)
- Acceleration: Up to 2 m/s² (14 to 100 Hz)

Regulatory Compliance

Specifications of respective devices vary required standards. See the hardware general specifications (GS) of the device for further information.

Safety Standards:

- CSA C22.2 No.1010.1 for 100-120 V AC power supply
- EN 61010-1 for 220-240 V or 24 V DC power supply

EMC Conformity Standards:

- CE MARK (*1)
EN 55011 Group 1 Class A for devices with 220-240 V AC or 24 V DC power supply
- EN 50082-2 for devices with 220-240 V AC or 24 V DC power supply (*1)
- EN 61000-3-2 for devices with 220-240 V AC or 24 V DC power supply (*2)
- EN 61000-3-3 for devices with 220-240 V AC power supply (*3)

C-Tick MARK (*1)

- AS/NZS 2064 for devices with 220-240 V AC or 24 V DC power supply

Standards for Hazardous Location Equipment:

- Class I, Division 2, Groups A, B, C, and D T4
- CSA Standard C22.2 No. 157-92
- CSA Standard C22.2 No. 213-M1987
- ISA Standard ISA-S12.12 1994
- For 100-120 V AC or 24 V DC power supply

- *1: A lightning arrestor or the like is required to meet this surge immunity standard.
- *2: An external device such as a power unit with harmonic current neutralizer and an active harmonics conditioner must be connected to meet this harmonic current emission standard.
- *3: The specified limits of voltage drop across wiring must be satisfied to meet this standard.

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