General Specifications

VP6E5450, VP6H4450
Multiple Project Connection Package

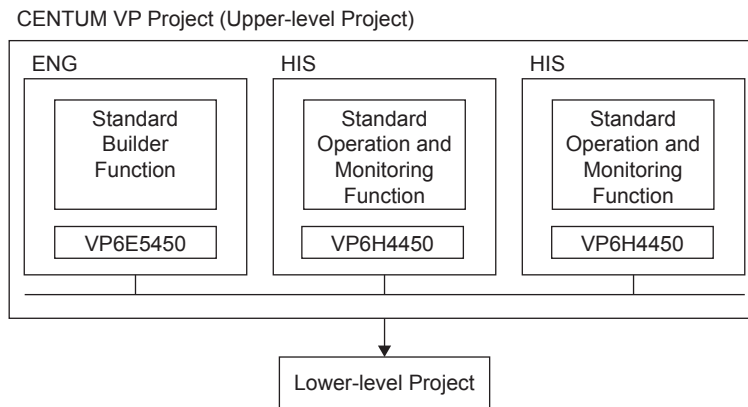**CENTUM VP**

GS 33J05K20-01EN

[Release 6]

■ GENERAL

CENTUM VP manages Field Control Station (FCS) and Human Interface Station (HIS) engineering data created in System Generation Function on a project basis. Multiple Project Connection is a function to perform integrated operation and monitoring of multiple projects. This function allows the Operation and Monitoring Function of the CENTUM VP HIS to integratively monitor multiple CENTUM VP, CS 3000, and CS projects without having to modify the names of the tags, projects, and plant hierarchies, as well as the common resources (e.g. engineering unit symbols and operation marks) that are duplicated in different projects.

Multiple Project Connection can be used in the following cases:

- To perform distributed engineering for each project on a large-scale plant, and yet operate and monitor the projects integratively.
- To operate and monitor multiple existing projects integratively.

VP6E5450 Multiple Project Connection Builder is an optional software package used on the engineering computer (ENG) where Standard Builder Function is installed. VP6H4450 Multiple Project Connection Package is an optional software package used on the HIS computer where Standard Operation and Monitoring Function is installed.

CENTUM VP Project (Upper-level Project)

ENG	HIS	HIS
Standard Builder Function	Standard Operation and Monitoring Function	Standard Operation and Monitoring Function
VP6E5450	VP6H4450	VP6H4450

Lower-level Project

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When using UACS in the system in which multiple projects are connected, VP6A2580 UACS Multiple Project Connection Package is required. For details, refer to the GS "VP6A2500 Unified Alarms and Conditions Server (UACS), VP6A2505 UACS Simulator Package, VP6A2510 UACS Advanced Suppression Function, VP6A2580 UACS Multiple Project Connection Package, VP6A2700 UACS Client License" (GS GS 33J05D30-01EN).

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■ FUNCTIONAL SPECIFICATIONS

By defining the CENTUM VP projects as upper-level projects, project defined as lower-level project can be operated and monitored from the Standard Operation and Monitoring Function (HIS) that is defined as an upper-level project.

Project of the following systems can be defined as a lower-level project.
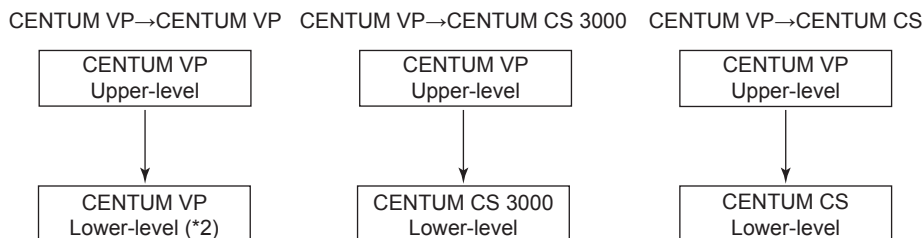- CENTUM VP
- CENTUM CS 3000
- CENTUM CS

The following shows the project connection patterns and main functions using the Multiple Project Connection.

● Project Connection Patterns

Hierarchical Connection

A lower-level project can be operated and monitored from the upper-level CENTUM VP project HIS. The Multiple Project Connection Package (*1) is only required for the upper-level CENTUM VP project. The upper-level CENTUM VP project cannot be operated and monitored from the lower-level project. A number of upper-level projects cannot connect with an identical lower-level project.

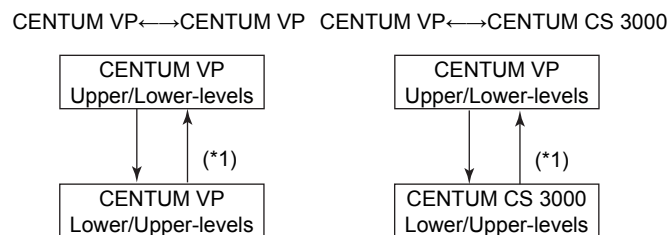The following shows the available hierarchical connections.

CENTUM VP→CENTUM VP   CENTUM VP→CENTUM CS 3000   CENTUM VP→CENTUM CS

CENTUM VP Upper-level	CENTUM VP Upper-level	CENTUM VP Upper-level
↓	↓	↓
CENTUM VP Lower-level (*2)	CENTUM CS 3000 Lower-level	CENTUM CS Lower-level

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- *1: This document describes the Multiple Project Connection Package which can be used with CENTUM VP R6 when the CENTUM VP R6 project is defined as an upper-level project. To define the CENTUM VP R5 or CENTUM VP R4 project as an upper-level project, see each general specification of the Multiple Project Connection Package: "Models LHS5450, LHS4450 Multiple Project Connection Package".
- *2: The lower-level project is the CENTUM VP R6, CENTUM VP R5 or CENTUM VP R4 project.

Bi-directional Connection

Connected upper- and lower-level projects can operate and monitor each other. Bi-directional Connection can only be applied to the connection between CENTUM VP projects or between CENTUM VP and CENTUM CS 3000 projects. To enable Bi-directional Connection, the Multiple Connection Package (*1) is required for both projects.

CENTUM VP←→CENTUM VP   CENTUM VP←→CENTUM CS 3000

CENTUM VP Upper/Lower-levels	CENTUM VP Upper/Lower-levels
↓ ↑ (*1)	↓ ↑ (*1)
CENTUM VP Lower/Upper-levels	CENTUM CS 3000 Lower/Upper-levels

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- *1: This document describes the Multiple Project Connection Package which can be used with CENTUM VP R6 when the CENTUM VP R6 project is defined as an upper-level project. To define the CENTUM VP R5 or CENTUM VP R4 project as an upper-level project, see each general specification of the Multiple Project Connection Package: "Models LHS5450, LHS4450 Multiple Project Connection Package". To define the CENTUM CS 3000 project as an upper-level project, see the general specifications of the Multiple Project Connection Package of CENTUM CS 3000: "Models LHS5450, LHS4450 Multiple Project Connection Package" (GS 33Q02S10-31E).

Functional Differences between Projects

There are functional differences among CENTUM VP R6, CENTUM VP R5, CENTUM VP R4, CENTUM CS 3000, and CENTUM CS. When multiple projects are connected, only functions supported by both projects will be available.

For example, if the CENTUM VP R5 project is defined as an upper-level project and the CENTUM VP R6 project as a lower-level project in Bi-direction Connection, the lower-level CENTUM VP R6 project can be operated and monitored in the functional range of CENTUM VP R5.

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● **Main Functions**

Multiple Project Operation and Monitoring
Multiple Project Operation and Monitoring allows a project to operate and monitor the other project that was connected using the Multiple Project Connection. When multiple projects are connected in the bi-directional ways the projects can operate and monitor each other. When multiple projects are connected in the hierarchically, the upper-level project can operate and monitor the lower-level project, but the lower-level project cannot operate and monitor the upper-level project.

Multiple Project Operation and Monitoring can also display the Sequence Table, SEBOL, SFC, Control Drawing, and Logic Chart status of the other project.

> Note: FCS maintenance operations (FCS Start, FCS Stop, IOM Download, and Tuning Parameter Save) of the other project cannot be performed.

Accessing Data of Other Project
Data of the lower-level project can be accessed from the upper-level project.

• Graphic View
  The tag name of the lower-level project can be specified from the upper-level project.
• Station Interconnection
  Stations in the upper-level and lower-level project function blocks can be interconnected from the upper-level project function block.
• SEBOL
  Data of the lower-level project function block can be accessed from the upper-level project SEBOL.
• Other Station Trend Collection
  The HIS of the other project can be registered as the reference destination of the other station trend collection.
• Global Switch
  The upper-level project FCS can refer to the global switch value of the lower-level project FCS.

Avoiding Duplicate Names
When multiple projects are connected, some "names" such as tag and station names may be duplicated. Duplication in names can be solved as follows.

• Duplicate Project Names
  Duplication in project names can be solved by defining on the upper-level project side the alias for the project name and the project ID for the lower-level project.

• Duplicate Station Names (Only applicable when connecting to a CENTUM CS project)
  Duplication in station names can be solved by defining the alias for the station name in the upper-level project.

• Duplicate Tag Names
  Duplication in tag names in the connected projects can be solved by adding the project ID to the tag name as a suffix.
  "Tag Name" + "@" + "Project ID"
  (Example) FIC100@P1

  > Note: When there are duplicate tag names, display tag name hierarchies and sheet-link can not be used.

• Plant Hierarchy Name
  When multiple projects are connected, add a project ID as the suffix of the plant hierarchy name.
  "Plant Hierarchy Name" + "@" + "Project ID"
  (Example) CELL-1@P1

• CENTUM CS Plant Name
  To call a function block/element located in the station with a plant name attached to it in the lower-level project from the upper-level project, add a tag name suffix in place of the plant name. If there are stations with a plant name attached to them in the lower-level CENTUM CS project, create new stations as the other project's stations that replace all the stations with a plant name attached to them. Also define the tag name suffix that replaces the plant name.
  "Tag Name" + "@" + "Tag name suffix"
  (Example) FIC100@S1

Handling of Common Resources
Common resources (engineering unit symbols, plant hierarchy, switch position labels, operation marks, alarm processing tables, alarm priority, alarm status character string, block status character string, status change command character string, and state transition matrix) are handled not as common resources for all the projects but as project-specific resources.

Operation Group
As with the operation and monitoring in the same project, operation and monitoring can be performed across the multiple connected projects on an operation group basis.

• Function to enable operation and monitoring on an operation group basis
  It is possible to link operation messages, acknowledge and delete operator guide messages and system alarms, and call up the panel set (*1) and remote window on an operation group basis.
  > *1: The panel set name is handled as a common resource for all projects with the same operation group ID attached to them.

Stopping Alarm Buzzer
As with the operation and monitoring in the same project, acknowledging and resetting the buzzer on the HIS in one of the connected projects resets the buzzer on the HIS in the other project where the same buzzer ACK ID is set.

Equalization of CAMS for HIS Engineering Information
It is possible to equalize the engineering information of the lower-level and upper-level projects.

> Note: Some system generation functions cannot equalize engineering data automatically. In that case, engineering tasks must be performed in the upper-level project according to the information of the lower-level project.

Time Synchronization among Projects
Time can be synchronized even in a system in which multiple projects are connected.

Importing/Exporting Definition Content
The content defined in Multiple Project Connection Builder can be imported and exported. This function is useful for bi-directional connections where the definition content must be identical in the two projects.

● **Relation between Multiple Project Connection and Other Functions**

Batch Function
If Batch Management is present in each of the connected projects, the recipe in the lower-level project can be monitored from the upper-level project.

Test Functions
All test functions are carried out within the project.

Fieldbus
It is possible to operate and monitor the FCS of the other project.

Both the field bus engineering and the operation of device management tools are performed on a project basis.

Exaopc OPC Interface Package (for HIS)
The other project can be accessed by installing the Multiple Project Connection Package on an HIS with an Exaopc OPC Interface Package (for HIS).

ProSafe-RS/ProSafe-PLC/ProSafe-SLS
The ProSafe-RS/ProSafe-PLC/ProSafe-SLS connected to the other CENTUM VP or CENTUM CS 3000 project can be operated and monitored from the CENTUM VP HIS.

● **Restrictions on Communication between Stations**

For communication between stations (FCSs) in different projects, the following restrictions apply:

- A tag name with suffix cannot be used for a tag generic name in Unit Block.
- A tag name with suffix cannot be used to describe the transition condition for a unit procedure.

■ CONTROL NETWORK CONNECTION (Vnet/IP)

Stations within a Vnet/IP domain are connected using layer 2 switches (L2SWs). Vnet/IP domains are connected using layer 3 switches (L3SWs). Also, a system using Vnet/IP can be connected to another system using V net or VL net using a V net router.
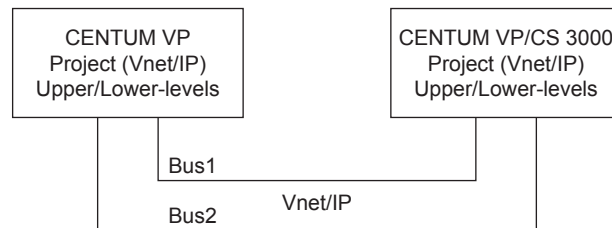
The available connections are shown below.

● Connecting CENTUM VP (Vnet/IP) and CENTUM VP/CS 3000 (Vnet/IP)

Connection in Same Vnet/IP Domain without Using Layer 3 Switch
The Vnet/IP domain number should be the same in both projects.
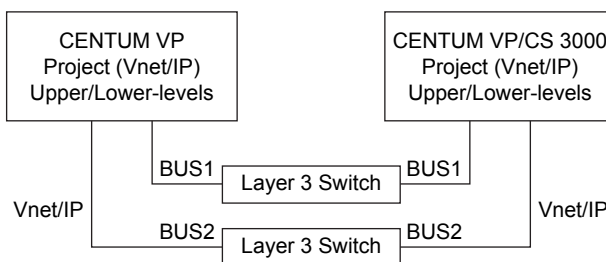
Station numbers on the Vnet/IP must be unique.

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Connection Using Layer 3 Switches
The Vnet/IP domain numbers must be unique.

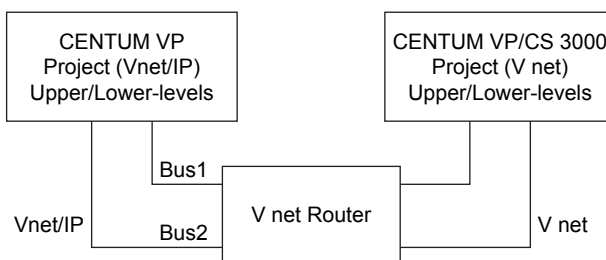Station numbers on the Vnet/IP must be unique in the domain.

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● Connecting CENTUM VP (Vnet/IP) and CENTUM VP/CS 3000 (V net)

Connection Using V net Router

A Vnet/IP system and a V net system can be connected using a V net router.

The Vnet/IP domain number must be different from the V net domain number.

Station numbers on the Vnet/IP and station numbers on the V net must be unique in the domain.

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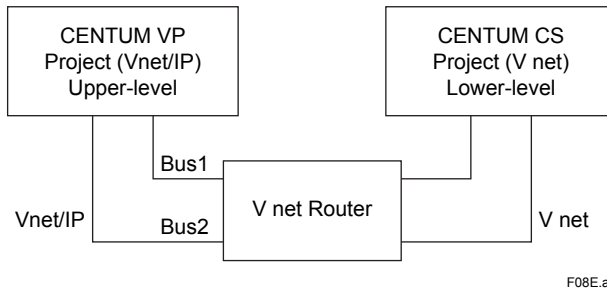● **Connecting CENTUM VP (Vnet/IP) and CENTUM CS (V net)**

Connection Using V net Router

A CENTUM VP Vnet/IP system and a CENTUM CS V net system can be connected using a V net router.

The Vnet/IP domain number must be different from the V net domain number.

Station numbers on the Vnet/IP and station numbers on the V net must be unique in the domain.

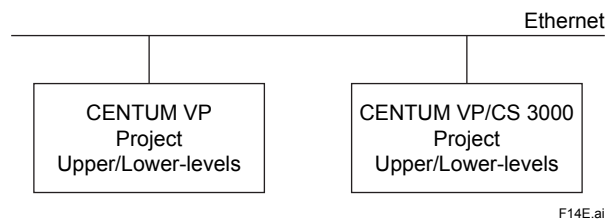The V net router must be engineered in the upper-level CENTUM VP project.

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■ INFORMATION NETWORK CONNECTION (Common to Vnet/IP and V net)

The available connections are shown below.

● **Connecting CENTUM VP and CENTUM VP/CS 3000**

Connection via Ethernet

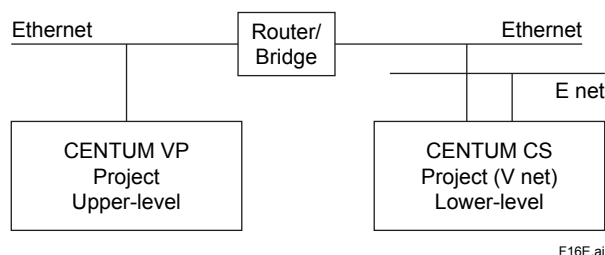IP addresses must be unique for all stations.

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● **Connecting CENTUM VP and CENTUM CS (V net)**

CENTUM CS has two types of information networks: E net and Ethernet.

The information network of CENTUM VP is connected to the information network where the CENTUM CS EWS is connected. In that case, the network must be separated into two segments using a router or bridge to prevent unnecessary traffic to the information network of CENTUM CS.
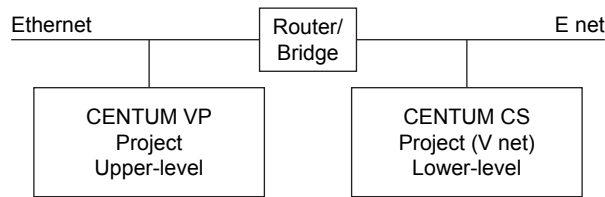
Connection of CENTUM VP Ethernet and CENTUM CS Ethernet via Router/Bridge

IP addresses must be unique for all stations.

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Connection of CENTUM VP Ethernet and CENTUM CS E net via Router/Bridge
IP addresses must be unique for all stations.

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  Ethernet                  ┌──────────┐         E net
                            │ Router/  │
                            │ Bridge   │
            ┌───────────────┤          ├───────────────┐
            │               └──────────┘               │
   ┌────────┴────────┐                      ┌───────────┴────────┐
   │   CENTUM VP      │                      │    CENTUM CS        │
   │    Project       │                      │  Project (V net)    │
   │  Upper-level     │                      │   Lower-level       │
   └──────────────────┘                      └─────────────────────┘
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■ APPLICATION CAPACITY

The other project can be referred to from CENTUM VP within the application capacity of the CENTUM VP Standard Operation and Monitoring Function.

● HIS Operation and Monitoring Capacity

VP6H1100 Standard Operation and Monitoring Function
Standard:

　Max. 100,000 tags per project
　Max. 100,000 tags per HIS
　Max. 256 stations per HIS

When using the LHS4000 Million Tag Handling Package:

　Max. 200,000 tags per project
　Max. 1,000,000 tags per HIS
　Max. 256 stations per HIS

● Number of Projects

Max. 16 projects (including the present project)

● Number of Stations

Max. 256 stations per project

■ OPERATING ENVIRONMENT

● VP6E5450 Multiple Project Connection Builder

Conforms to operating environment of VP6E5100 Standard Engineering Function.
Necessary Software:

　VP6E5100 Standard Engineering Function

● VP6H4450 Multiple Project Connection Package

Conforms to operating environment of VP6H1100 Standard Operation and Monitoring Function.
Necessary Software:

　VP6H1100 Standard Operation and Monitoring Function

■ Other Requirements

● Version/Revision Requirements

There are no restrictions on the control functions.

As long as the Standard Operation and Monitoring Function and Standard Builder Function meet the CENTUM revision requirements below, different CENTUM versions/revisions may be used for different projects. To use functions added by upgrading the CENTUM version/revision, use the CENTUM version/revision that support those functions for the upper-level and lower-level projects. However, this requirement does not apply if the additional functions are not used.

• CENTUM VP R5.01 or later
• CENTUM VP R4.01 or later
• CENTUM CS 3000 R3.01 or later
• CENTUM CS R2.10 or later

● Requirements for Upper-level Project when CENTUM VP Project is Lower-level Project

When a CENTUM VP project is the lower-level project in Bi-directional Connection, the upper-level project must meet the version/revision requirements below.

When CENTUM VP Project is Lower-level Project

The Standard Operation and Monitoring Function and Standard Builder Function in the upper-level project must be any of the following versions/revisions.

- CENTUM VP R5.01 or later
- CENTUM VP R4.01 or later
- CENTUM CS 3000 R3.01 or later

When Control Network of CENTUM VP (Lower-level) is Vnet/IP

The Standard Operation and Monitoring Function and Standard Builder Function in the upper-level project must be any of the following versions/revisions.

- CENTUM VP R5.01 or later
- CENTUM VP R4.01 or later
- CENTUM CS 3000 R3.05 or later

When CENTUM VP (Lower-level) Integrates ProSafe-RS

The Control Function (*1), Standard Operation and Monitoring Function, and Standard Builder Function in the upper-level project must be any of the following versions/revisions.

- CENTUM VP R5.01 or later
- CENTUM VP R4.01 or later
- CENTUM CS 3000 R3.06 or later
    - *1:   Applicable when accessing the SCS (Safety Control Station) data of ProSafe-RS.

When Equalizing of CAMS for HIS Engineering Information of CENTUM VP (Lower-level)

The Standard Operation and Monitoring Function and Standard Builder Function in the upper-level project must be the following version/revision.

- CENTUM VP R5.01 or later
- CENTUM VP R4.03 or later

● Language Requirement

To connect multiple projects, the language must be identical for all the projects. For example, an English system project cannot be connected with a Japanese system project.

● Operating System (OS) Requirement for Computer to which to Save Project Data

When the total number of computers connected within an CENTUM VP system is 21 or more, use a server (OS: Windows Server) for project data storage.

Calculate the total number of computers to be connected for each upper and lower project using the following conditional equation. If installing servers on both the upper and lower sides, save the project data on separate servers.

However, a server is not required when CENTUM CS is used for the lower-level project, and calculation is applied only for the upper-level project.

For details on problems that may occur in the system, please refer to the "Integrated Production Control System CENTUM VP System Overview" (GS 33J01A10-01EN).

[Conditional equation]: No. of Exaopc + (No. of HIS + α) × 2 + No. of ENG + No. of UACS + β > 20 (*1)

*1:   This is the maximum number of concurrent sessions presented by Microsoft for Windows 7 or later.

No. of Exaopc	No. of computers with NTPF100 Exaopc OPC interface package. VP6H2411 Exaopc OPC Interface Package is excluded
No. of HIS	No. of computers with VP6H1100 Standard Operation and Monitoring Function. Since CS 1000/CS 3000 R2.06, HIS uses two sessions.
No. of ENG	No. of computers with VP6E5100 Standard Engineering Function. If the computer has both VP6H1100 Standard Operation and Monitoring Function. and VP6E5100 Standard Engineering Function add it to the No. of HIS and set the No. of ENG to 0. For an integration system of ProSafe-RS and CENTUM VP, add the SENG to the No. of ENG.
No. of UACS	No. of computers (UACS Stations) with VP6A2500 Unified Alarms and Conditions Server Function. When two UACS Stations are configured as a pair, one connection is used on each UACS Station.
α	When using VP6H4450 Multiple Project Connection Function, add the value of α for lower-level projects. This is the No. of HIS with VP6H4450 Multiple Project Connection Packages on the upper-level project.
β	This is the total number of computers equipped with VP6H1150 Remote Operation and Monitoring Function and the number of HIS-TSE clients. In other words, the maximum value is 9 connections, which is the sum of the HIS-TSE server and the number of clients (maximum 8 connections).

■ MODEL AND SUFFIX CODES

Multiple Project Connection Builder

		Description
Model	VP6E5450	Multiple Project Connection Builder
Suffix Codes	-V	Software license
	1	Always 1
	1	English version

Multiple Project Connection Package

		Description
Model	VP6H4450	Multiple Project Connection Package
Suffix Codes	-V	Software license
	1	Always 1
	1	English version

■ ORDERING INFORMATION

Specify model and suffix codes.

■ TRADEMARK ACKNOWLEDGMENTS

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