

General Specifications

GS 33J20C20-01EN

VP6B1600, VP6B1601
Unified Gateway Station (UGS2)
Standard Function
Dual-redundant Package (for UGS2)

CENTUM VP

[Release 6]

OVERVIEW

Unified Gateway Station (UGS2) is a Vnet/IP station that unifies subsystem controllers such as STARDOM controllers (FCN/FCJ) and third party PLCs to CENTUM VP system.

With the existence of UGS2, operation and monitoring of the subsystem controllers can be performed on HIS in the same way as the CENTUM VP's field control station (FCS).

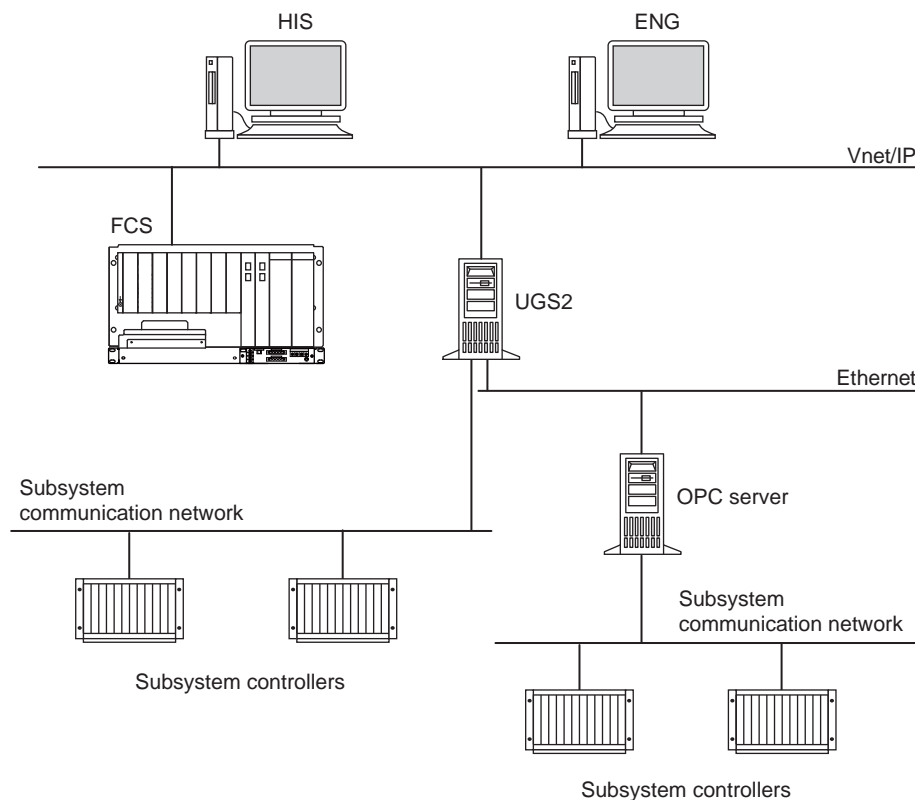
UGS2 can take a redundant configuration by using Dual-redundant Platform for Computer. It is called "computer switchover type UGS."

Compared with conventional UGS (VP6B1500), UGS2 has the following features.

- In the dual-redundant configuration, switching between the active side and the stand-by side of the UGS2 is performed in high speed. The dedicated L2SWs are not required.
- Vnet/IP cables are connected directly to the Ethernet ports of the UGS2 computer without using a Vnet/IP interface card (VI702).

SYSTEM CONFIGURATION

The UGS2 works as a gateway between CENTUM VP and subsystem controllers. UGS2 connects with CENTUM VP via a control network (Vnet/IP) in the same way as HIS and FCS, and it connects directly with subsystem controllers or via an OPC server.



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Figure System configuration

The UGS2 takes single or dual-redundant configuration and "dual-redundant platform for computers" are required for either case. The VP6B1601 dual-redundant package (for UGS2) is required only for configuring the dual-redundant configuration.

■ UNIFIED GATEWAY STATION (UGS2) STANDARD FUNCTIONS

● Connection with subsystem controllers

The UGS2 connects with STARDOM controllers by its standard functions. With the optional packages, the UGS2 also connects with other controllers compliant with the following protocols. UGS complies with all types of communications such as single and dual-redundant communication networks for STARDOM, Modbus, EtherNet/IP, and IEC 61850.

- Modbus (Modbus TCP and Modbus RTU)
- EtherNet/IP
- OPC DA/A&E (*1)
- IEC 61850

*1: A solution provided by an OPC server vendor is required to configure an OPC server in dual-redundant configuration, since the OPC DA/A&E protocol is not equipped with the dual-redundant network mechanism.

● Data access to subsystem controllers

Data of the subsystem controllers are assigned to and accessed via the UGS2 function blocks. Five types of function blocks are available.

- Data faceplate block: For operating and monitoring a single data of subsystem controllers
- User-defined faceplate block: For operating and monitoring multiple data of subsystem controllers. A single function block handles multiple data in the same way as an FCS does. Data types of 16-bit signed integer, 32-bit signed integer, 32-bit single-precision floating point data, 64-bit double-precision floating point data and 2 to 16 byte characters are available.
- Annunciator faceplate block: For operating and monitoring single bit data of subsystem controllers.
- Bit array faceplate block: Reads bit information of subsystem controllers data and assigns data item to each bit.
- FCN/FCJ faceplate block: Dedicated for STARDOM FCN/FCJ controllers and supports NPAS POU, as shown below, used in the FCN/FCJ's process control.

Regulatory control POU

NPAS_PVI, NPAS_PID, NPAS_PI_HLD, NPAS_ONOFF, NPAS_ONOFF_G, NPAS_MLD, NPAS_MLD_PB, NPAS_MLD_BT, NPAS_RATIO, NPAS_RATIO_RT, NPAS_PG_L30, NPAS_PG_L30_BP, NPAS_VELLIM, NPAS_VELLIM_PB, NPAS_AS_H/M/L, NPAS_FOUT, NPAS_FFSUM, NPAS_FFSUM_BL, NPAS_XLMT_S, and NPAS_XLMT_D

Arithmetic calculation POU

NPAS_LDLAG, NPAS_DLAY, NPAS_AVE_M, NPAS_AVE_C, NPAS_FUNC_VAR, NPAS_TP_CFL, NPAS_T_CFL, NPAS_P_CFL, NPAS_ASTM1, NPAS_ASTM2, NPAS_SW13 (SW31), NPAS_SW19 (SW91), NPAS_BDBUF_R, and NPAS_BDBUF_T

Sequence POU

NPAS_SIO, NPAS_TM, and NPAS_CT

● Alarms

The UGS2 can generate subsystem controllers' alarms as the CENTUM VP alarms. As for STARDOM FCN/FCJ, the UGS2 generates alarms status detected by the FCN/FCJ as the CENTUM VP alarms. For other controllers, the UGS2 itself detects controller alarm status and generates them as the CENTUM VP alarms.

Process alarm

For FCN/FCJ: Process alarms generated by the FCN/FCJ are converted and treated in the same way as the FCS alarms.

Other than FCN/FCJ: The UGS2 detects and generates alarms, of which alarm thresholds (HH, HI, LO, and LL) are determined by the UGS2 function blocks, from the subsystem controllers data.

Annunciator

The UGS2 broadcasts annunciator messages in accordance with the subsystem controllers bit status.

System alarm

The UGS2 detects and generates alarms when the UGS2 itself is failed or connections with subsystem controllers are failed. The UGS2 also converts system alarms generated by the FCN/FCJ and broadcasts them as the FCS system alarms.

● HIS operation and monitoring functions available for subsystem controllers

- Graphic view
- Trend view
- Trend point view
- Tuning view
- Faceplate view
- Custom faceplate view
- System alarm view
- Process alarm view
- CAMS for HIS message monitor view
- Process report view
- Message monitor window
- Historical message report window

● Time synchronization function

The UGS2 synchronizes the time of subsystem controllers with its own time as a master.

● Application capacity

Number of tags:	Max. 100,000	Number of data items that can be defined:
		Max. 600,000 data (*1)
Number of data items for communication with controllers:		
	Max. 450,000 data (*1) (*2)	(The sum of the data items of the following controllers)
Number of subsystem controllers:		
	Max. 256	(The sum of the following controllers)
FCN/FCJ:	Max. 256	
OPC DA server:	Max. 16	
OPC A&E server:	Max. 16	
Modbus RTU:	Max. 256	
Modbus TCP:	Max. 256	
Ethernet/IP:	Max. 256	
IEC 61850 IED:	Max. 256	
Data access		
Data acquisition:	Max. 6,400 data/sec (*1)	(Number of data acquired from subsystem controllers)
Data setting:	Max. 640 data/sec (*1)	(Number of data set on UGS2 from HIS and FCS)
Data throughput:	Max. 6,400 data/sec (*1)	(Number of data collected from HIS and FCS)
Number of alarms:	Max. 44 alarms/sec (*1)	(Number of system and process alarms generated by UGS2)
1 second trend points:	Max. 2,048	

*1: The number of data items depends on the application conditions.

*2: The UGS2 accesses the controllers' data by assigning each of the controller's data into the data items in the UGS2's function block(s). Among all the definable data items with no communication with controllers can be used as a data buffer for the data set by other sources such as an FCS. The formula below for a quick glance.

Number of definable data items

= Number of data items for communication with controllers + Number of data items used as a data buffer

● Data update period

An update cycle of fast, medium or slow, within the ranges of 100 ms to 1 hours, can be set by the controller. The update cycle of fast, medium or slow can be selected by the data item of function blocks.

● Optional software packages

The following optional software packages are available to use with the Unified Gateway Station (UGS2) standard function.

- VP6B1601 Dual-redundant Package (for UGS2)
- VP6B1650 OPC Communication Package (for UGS2)
- VP6B1653 Modbus Communication Package (for UGS2)
- VP6B1670 IEC 61850 IED Communication Package (for UGS2)
- VP6B1691 EtherNet/IP Communication Package (for UGS2)

In subsystem communication except for OPC communication (*1) write and read to a device are performed sequentially. When a large volume of data is written in one time, starting of read is delayed.

*1: STARDOM communication, Modbus communication, Ethernet/IP communication, and IEC 61850 IED communication are among the subsystem communication.

■ DUAL-REDUNDANT PACKAGE (FOR UGS2)

● Functional overview

The UGS2 dual-redundant function consists of two computers (UGS2) which are regarded as a unit of “logical UGS2” to archive a gateway function to the subsystems.

In order to perform high-speed switch over in the dual-redundant configuration, a dual-redundant platform for computer is used for the UGS2. It is required for the single configuration too.

Those two units of the UGS2 share an identical Vnet/IP address (domain and station numbers), which provides other Vnet/IP stations transparent accesses to the UGS2 tag data without considering which one of the redundant UGS2 is active or not. In the UGS2 dual-redundant configuration, one of the two UGS2 is active to communicate with subsystem controllers and the other UGS2 is on stand-by. For redundancy, two units of the UGS2 are connected via a dual-redundant control network. Only the active UGS2 downloads the engineering data and equalizes them to the stand-by UGS2 via the dual-redundant control network.

When the active UGS2 fails by the hardware fault, the active side automatically switches (i.e. fails over) to the stand-by UGS2. Manual “switch over” is also available. The fail/switch over takes place in less than a second, thus the components (e.g. Vnet/IP stations and subsystem controllers) are not influenced. (*1)

The UGS2 can take either single or dual-redundant network configurations of the subsystem controllers. (*2)

- *1: The UGS2 does not support direct serial connection. When connecting the UGS2 with Modbus-RTU device, connect it to Ethernet via a Serial/Ethernet converter. Note that when the fail/switch over occurs, communication may be delayed if not disturbed.
- *2: In case of configuring dual-redundant OPC server, a solution provided by the OPC server vendor because the OPC DA/A&E protocol has no mechanism for dual-redundant network.

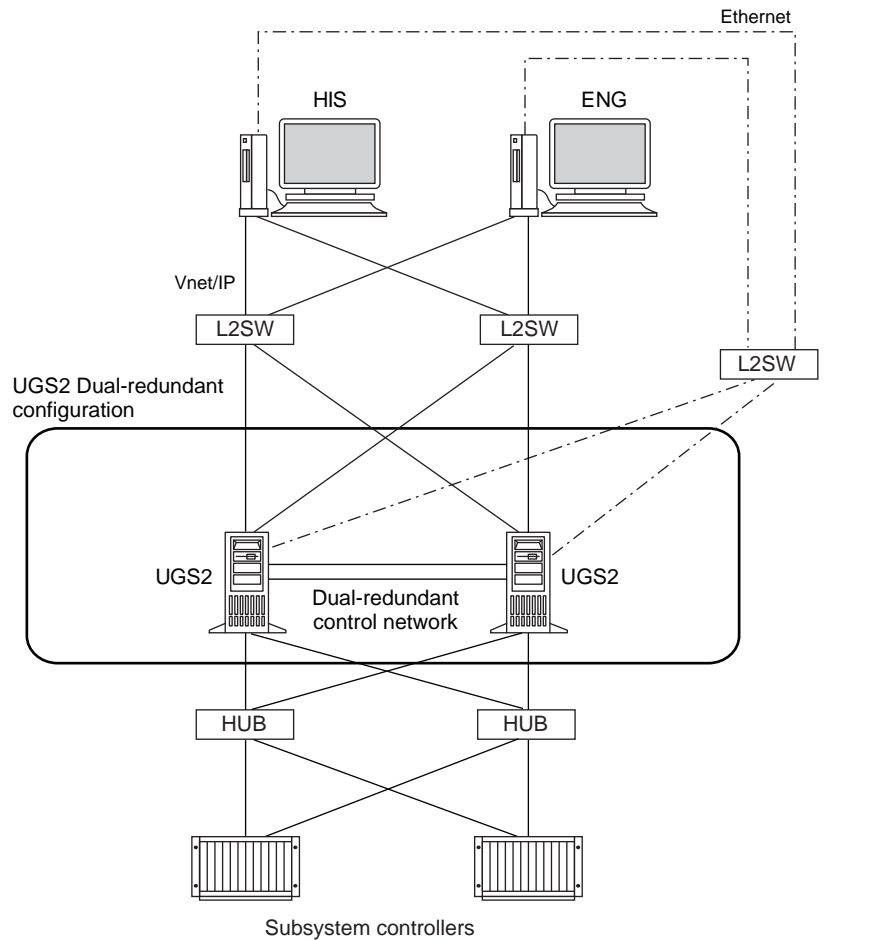
● Network configuration

The UGS2 dual-redundant configuration uses three types of networks - which are Vnet/IP, dual-redundant control network, and general Ethernet communication.

Those UGS2 network cards are directly connected to the Vnet/IP, without using a VI702 Vnet/IP interface card. In the dual-redundant control network, two computers are directly connected to two systems of the dual-redundant 10 G-bit Ethernet to perform data equalization and failure analysis communication in between the active and the stand-by UGS2.

Ethernet communication

Ethernet communication is applied for online and offline downloading of data from an Engineering station (ENG). As shown in the figure below, the Ethernet communication is performed via a general Ethernet card mounted on the UGS2. The Bus 2 of the Vnet/IP cannot be used to perform the Ethernet communication. In the UGS2, the system has to be configured in the way that the Ethernet communication is performed independently from the Vnet/IP.



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Figure UGS2 Dual-redundant network configuration

■ OPERATING ENVIRONMENT

Hardware requirements

Yokogawa has limited the models of computers to be used for the UGS2. Contact Yokogawa for more details.
A VI702 Vnet/IP interface card is not required.

Software requirements

Windows OS:

- Windows Server 2012 R2 Standard (64-bit) (*1)
- Windows Server 2016 Standard (64-bit) (*2)
- Windows Server (IoT) 2019 Standard (64-bit) (*3)
- Windows Server (IoT) 2022 Standard (64-bit) (*4)

*1: Supported by R6.10.00 or earlier.

*2: Supported by R6.06.00 or later.

*3: Supported by R6.09.00 or later and Dual-redundant Platform for Computer R2.02.00 or later.

*4: Supported by R6.11.00 or later and Dual-redundant Platform for Computer R2.03.00 or later.

When using UGS2 in the dual-redundant configuration, two licenses of Windows OS are required.

■ MODELS AND SUFFIX CODES

The number of software media and licenses are required for UGS2, as they are shown in the table below.

	Model	Single configuration	Dual-redundant configuration	Description
Software media	PC2CKM	1	1	One medium for a system
Software licenses	VP6B1600	1	1 (*1)	One license for each UGS2
	VP6B1601	(N/A)	1 (*1)	Only for dual-redundant configuration (*2)

*1: Even when using UGS2 in the dual-redundant configuration, only one license is required for a pair of UGS2.

*2: The FT2SDR01 dual-redundant platform versatile license is not required.

● Software media

Separately from the software media (VP6CKM) for CENTUM VP R6, UGS2 requires another one (PC2CKM) for the dual-redundant platform for computer.

Regardless of whether UGS2 configuration is single or dual-redundant, one medium of PC2CKM is required for a system.

Software Medium for Dual-redundant Platform for Computer

		Description
Model	PC2CKM	Dual-redundant Platform for Computer
Suffix Codes	-C	Supplied medium: DVD
	1	Always 1
	1	English version

● Software licenses

Unified Gateway Station (UGS2) Standard Function

		Description
Model	VP6B1600	Unified Gateway Station (UGS2) Standard Function
Suffix Codes	-V	Software license
	1	Always 1
	1	English version

Note: Regardless of whether UGS2 configuration is single or dual-redundant, one license of VP6B1600 is required.

Dual-redundant Package (for UGS2)

		Description
Model	VP6B1601	Dual-redundant Package (for UGS2)
Suffix Codes	-V	Software license
	1	Always 1
	1	English version

Note: Even when using UGS2 in the dual-redundant configuration, only one license of VP6B1601 is required for a pair of computers.

■ ORDERING INFORMATION

Specify model and suffix codes.

■ TRADEMARK ACKNOWLEDGMENT

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