OMRON


1 Product Overview

2 IP Address Setting and Resetting

3 Monitoring and Setting with the EtherNet/IP

4 Monitoring and Setting with the Modbus TCP


# Switch-mode Power Supplies

## Communications Manual

## S8VK-X

T213-E1-03

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# Preface

Thank you for purchasing S8VK-X Switch-mode Power Supplies.

This communications manual describes how to use the communications functions of the S8VK-X. Read this manual thoroughly and be sure you understand it before attempting to use the S8VK-X correctly according to the information provided. Keep this manual in a safe place for easy reference.

PDF version of this manual can be downloaded from the OMRON website.

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Be sure to observe the following precautions.

## Communications

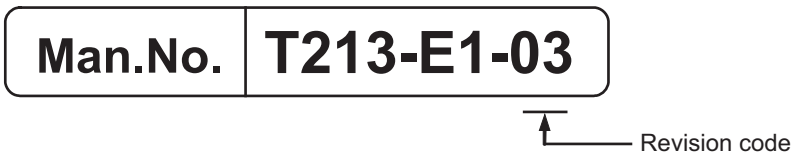
- Communications setup is necessary for installation and replacement. Make communication settings according to this manual.
- Follow the instructions in this manual for connection method and cables to be used with the EtherNet/IP or the Modbus TCP. Otherwise, communication failure may occur.
- Do not exceed the communications distance that is given in the specifications.
- If EtherNet/IP tag data links (cyclic communications) are used with a repeating hub, the communications load on the network will increase. This will increase collisions and may prevent stable communications.

## Communications Cables

- Do not pull on the communications cables or bend the cables beyond their natural limit. Do not place heavy objects on top of the communications cables or other wiring lines. Doing so may cause the wire to break.
- To avoid inductive noise, keep the communications cables away from power cables carry high voltages or large currents. Also, do not wire power lines together with or parallel to product wiring.
- If no communication cable is connected, attach a dust cover.
- Depending on the ambient temperature or the load ratio, the product itself may have a high temperature. In that case, do not insert or remove the communications cable. Otherwise, minor burns may occasionally occur.

# Revision History

A manual revision code appears as a suffix to the catalog number on the front cover of the manual.




| Revision code | Date | Revised content |
|---|---|---|
| 01 | December 2017 | Original production |
| 02 | November 2018 | Made changes accompanying the following corrections.<br>Page 2: Correction of *Terms and Conditions Agreement*<br>Page 2-2: Added descriptions on IP address settings<br>Page 3-2: Added descriptions on the multicast communications of tag data link |
| 03 | January 2019 | Page 3-2: Changed descriptions on multicast communications of tag data link. |

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# 1



# Product Overview

This section describes the overview of the S8VK-X.


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# 1-1 List of Models

This section shows the model list of the S8VK-X.

The S8VK-X has a type with display monitor and a type without display monitor.

## ● With Indication Monitor

| Power rating | Rated input voltage | Rated output voltage (DC) | Rated output current | Maximum boost current | Model number |
|---|---|---|---|---|---|
| 90 W | 100 to 240 VAC (allowable range: 85 to 264 VAC, 90 to 350 VDC) | 24 V | 3.75 A | --- | S8VK-X09024A-EIP |
| 120 W | | 24 V | 5 A | 6 A | S8VK-X12024A-EIP |
| 240 W | | 24 V | 10 A | 15 A | S8VK-X24024A-EIP |
| 480 W | | 24 V | 20 A | 30 A | S8VK-X48024A-EIP |

## ● Without Indication Monitor

| Power rating | Rated input voltage | Rated output voltage (DC) | Rated output current | Maximum boost current | Model number |
|---|---|---|---|---|---|
| 30 W | 100 to 240 VAC (allowable range: 85 to 264 VAC, 90 to 350 VDC) | 5 V | 5 A *1 | 6 A | S8VK-X03005-EIP |
| 60 W | | 12 V | 4.5 A *2 | 5.4 A | S8VK-X06012-EIP |
| | | 24 V | 2.5 A | 3 A | S8VK-X06024-EIP |
| 90 W | | 24 V | 3.75 A | --- | S8VK-X09024-EIP |
| 120 W | | 24 V | 5 A | 6 A | S8VK-X12024-EIP |
| 240 W | | 24 V | 10 A | 15 A | S8VK-X24024-EIP |
| 480 W | | 24 V | 20 A | 30 A | S8VK-X48024-EIP |

*1. Output power is 25 W at rated output current.

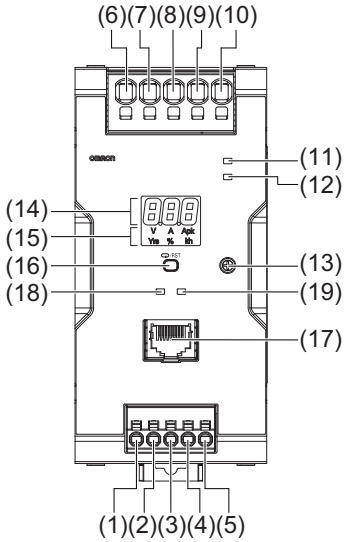
*2. Output power is 54 W at rated output current.

# 1-2 Nomenclature and Functions

This section describes the nomenclature and functions of the S8VK-X.

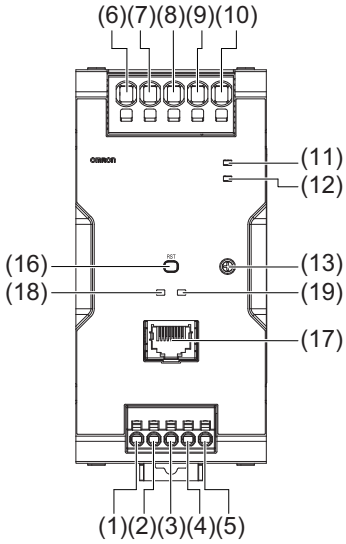
In the following, the position of each part is indicated by number, and its contents are shown in a list.

● **With Indication Monitor**




* The above figure shows S8VK-X48024A-EIP.

● **Without Indication Monitor**




* The above figure shows S8VK-X48024-EIP.

## Nomenclature and Functions

| No. | Terminal name | Name | Function |
|---|---|---|---|
| (1) | L1 | Input terminals | Connect the input lines to these terminals. *1 |
| (2) | L2 | | |
| (3) | N1 | | |
| (4) | N2 | | |
| (5) | PE | Protective Earth terminal (PE) | Connect the ground line to this terminal. *2 |
| (6) | +V1 | DC Output terminals | Connect the load lines to these terminals. |
| (7) | +V2 | | |
| (8) | -V1 | | |
| (9) | -V2 | | |
| (10) | -V3 | | |
| (11) | --- | Output indicator (DC ON: Green) | The green indicator indicates when a DC voltage is being output. |
| (12) | --- | Alarm indicator (ALM: Red) | Lights up in red when a Power Supply abnormality occurs. Refer to *1-6 Self-Diagnosis Information* on page 1-8 for details. |
| (13) | --- | Output voltage adjuster (V. ADJ) | Use to adjust the output voltage. |
| (14) | --- | Main display (white) | Displays measured values. |

| No. | Terminal name | Name | | Function |
|---|---|---|---|---|
| (15) | --- | Operation indicator (white) | V | Lights up when the output voltage is indicated. |
| | --- | | A | Lights up during indication of output current. |
| | --- | | Apk | Lights up during indication of peak hold current. |
| | --- | | Yrs | Lights up during replacement time calculation year indication. |
| | --- | | % | Lights up during years until replacement time indication. |
| | --- | | kh | Lights up during percentage until replacement time indication. |
| (16) | --- | Indication switching/reset key (types with indication monitor)<br>Reset key (types without indication monitor) | | Used to change the indicated parameter.<br>Used to reset the peak hold current or communication settings.<br>For reset methods, refer to *2-2 Communications Reset Function* on page 2-5. |
| (17) | --- | EtherNet/IP port | | Connects to EtherNet cables. |
| (18) | --- | Module status indicator (MS) | | Refer to *Module Status and Network Status Indicators* on page 1-4 for details. |
| (19) | --- | Network status indicator (NS) | | |

*1. The fuse is located on the (L) side. For a DC input, connect the positive voltage to the L terminal.

*2. This is the protective

## Module Status and Network Status Indicators

| Name | Color | Status | Operating status |
|---|---|---|---|
| Module status Indicator (MS) | Green | Lit | Normal |
| | | Flashing | --- |
| | Red | Lit | RAM abnormality, EEPROM abnormality |
| | | Flashing | Voltage measurement abnormality, current measurement abnormality |
| | --- | Not lit | No power supply |
| | Green/Red | Flashing | When power is turned ON |
| Network status Indicator (NS) | Green | Lit | Connection established |
| | | Flashing | Connection not established |
| | Red | Lit | Multiple IP addresses |
| | | Flashing | Connection timeout<br>BOOTP server connection abnormality |
| | --- | Not lit | No power supply |
| | Green/Red | Flashing | When power is turned ON |

# 1-3 Communications Specifications

This section shows the communications specifications of the S8VK-X.

| Item | | Specification |
|---|---|---|
| **Communications protocol** | | EtherNet/IP, Modbus TCP |
| **Physical layer** | | 100 BASE-TX |
| **Media access method** | | CSMA/CD |
| **Modulation system** | | Baseband |
| **Topology** | | Star configuration |
| **Transmission speed** | | 100 Mbps |
| **Transmission medium** | | Twisted pair cable (with shield: STP): Category 5, 5e or above |
| **Maximum transmission distance (distance between hub and node)** | | 100 m |
| **Tag data Link** | **Class1** | Possible |
| | **Connection source** | 1 |
| | **No. of connected nodes** | 1 |
| | **No. of tag sets** | 1 |
| | **Packet interval (RPI)** | 100 to 10,000 ms |
| | **Time-out value** | Multiple of RPI |
| | **Connection type** | Point To Point Connection (fixed) |
| **Explicit Message** | **Class3** | Possible |
| | **UCMM** | Possible |
| | **Connection source** | 2 (Class3 server) |
| | **No. of clients for which simultaneous UCMM communication is possible** | 2 |
| **Modbus TCP** | **Number of clients that can be connected simultaneously** | 2 |
| **Factory default values** | **IP address** | 192.168.250.20 |
| | **Subnet mask** | 255.255.255.0 |
| | **Default gateway** | 0.0.0.0 |
| | **IP address setting method** | Static IP address |

# 1-4 Communications Methods and Types of Data To Be Communicated

This section shows the communications methods of the S8VK-X and the types of data to be communicated.

You can read or write the communications target data of the S8VK-X using one of the following methods.

For details on the communications methods and target data, refer to the sections shown in the table below.

| Communications protocol | Communications methods | Types of data to be communicated | | Reference |
|---|---|---|---|---|
| | | • Measurement and calculation data *1<br>• Self-diagnosis Information *2 | • Product information and communications setting data *3 | |
| EtherNet/IP | Tag data links | Can read | Can not write | *3-2 List of Monitoring Contents Using the Tag Data Link Communications* on page 3-6 |
| | CIP message communications | | Can write and can read | *3-3 List of Monitoring and Setting Contents Using the CIP Message Communications* on page 3-8 |
| Modbus TCP | Modbus TCP message communications | | | Section 4 Monitoring and Setting with the Modbus TCP |

*1. Refer to *1-5 Measurement and Calculation Data* on page 1-7 below.

*2. Refer to *1-6 Self-Diagnosis Information* on page 1-8 below.

*3. Refer to *1-7 Product Information and Communications Setting Data* on page 1-9 below.

# 1-5 Measurement and Calculation Data

This section shows measurement and calculation data that can be read using communications with the S8VK-X.

The following measurement and calculation data can be read using the EtherNet/IP or the Modbus TCP.

| Measurement and calculation data | | Measurement | | | EtherNet/IP | | Modbus TCP |
|---|---|---|---|---|---|---|---|
| | | Resolution | Data update cycle | Details | Tag data link | CIP message | |
| Output voltage measured | | 0.1 V | 5 ms | Measurement accuracy: ±2% (percentage of output voltage value) ±1 digit | Read | Read | Read |
| Output current measured | | 0.1 A | 5 ms | Measurement accuracy: ±5% (percentage of rated output current) ±1 digit | Read | Read | Read |
| Peak hold current measured *1 | | 0.1 A | 5 ms | Measurement accuracy: ±5% (percentage of rated output current) ±1 digit | Read | Read | Read |
| Years until replacement | | 0.1 years | 1 min | Range: 0.0 to 15.0 years | Read | Read | Read |
| | FUL *2 | --- | 1 min | 1: FUL (FUL displayed at the main display.)<br>0: other than FUL | Read | Read | Read |
| | HLF *2 | --- | 1 min | 1: HLF (HLF displayed at the main display.)<br>0: other than FUL | Read | Read | Read |
| Percentage until replacement | | 0.1% | 1 min | Range: 0.0 to 100% | Read | Read | Read |
| Total run time | | 1 h | 1 min | Range: 0 to 262,800 h | Read | Read | Read |
| Continuous run time | | 1 min | 1 min | Range: 0 to 15,768,000 min | Read | Read | Read |

*1. Peak hold current measured can be reset. It can be reset by operating the "Peak hold current reset" bit.

*2. It can be checked with "S8VK-X status".

# 1-6 Self-Diagnosis Information

This section shows status information that can be confirmed by the self-diagnosis of the S8VK-X.

The following self-diagnosis status can be checked with the "S8VK-X status" using the EtherNet/IP or the Modbus TCP.

| Status name | | Details | Restoration method | Main display | Alarm indicator | EtherNet/IP | | Modbus TCP |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Tag data link | CIP message | |
| Measurement abnormality | Current measurement error | Output voltage, output current, etc., cannot be measured normally due to noise. | Automatic restoration | - - - | Lit | Read | Read | Read |
| | Voltage measurement error | | | | | Read | Read | Read |
| Overheating alarm | | Overheated status has continued for 1 to 180 minutes. | Automatic restoration | Hot (Flashing) | Lit | Read | Read | Read |
| Product overheat abnormality | | Overheated status has continued for more than 180 minutes. | Replace the S8VK-X, as internal parts may be deteriorated. | E06 (Flashing) | Lit | Read | Read | Read |
| Memory error | | An error has occurred in the internal memory and data damage has occurred. | Turn the AC input OFF then ON again.<br>If the S8VK-X is not reset, contact the dealer. | E03 | Lit | Read | Read | Read |

Note 1. The cause of the "- - -" and "E03" display may be the noise from outside.

2. When "E03" is displayed, the display can not be switched.

3. The causes of "Hot" and "E06" display may include use in conditions exceeding the derating curve, ventilation error, or an error in the installation direction.

4. When you press the Indication switching/reset key with "Hot" or "E06" displayed, the display will return to the normal display.

5. When "E06" is displayed, the display of the number of years and percentages until the replacement time will be 0.0 years and 0.0%, respectively.

# 1-7 Product Information and Communications Setting Data

This section shows product information and communications setting data that can be read or written using communications with the S8VK-X.

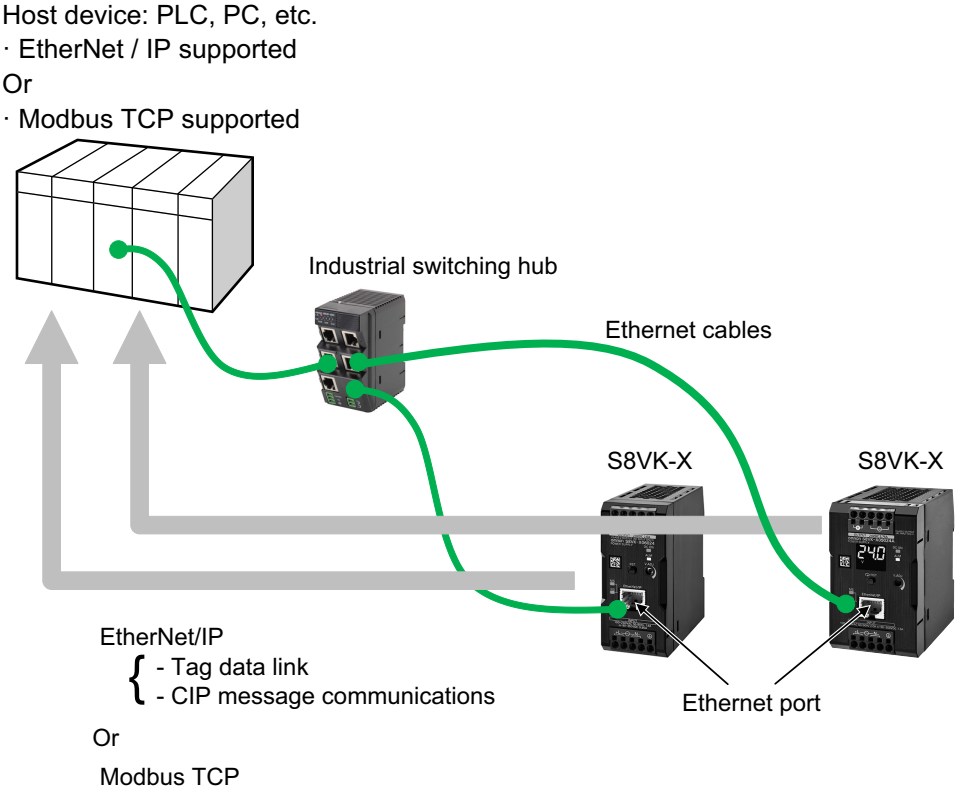
The following product information and communications setting data can be read or written using the EtherNet/IP or the Modbus TCP.

| Name | Factory default | EtherNet/IP | | Modbus TCP |
|---|---|---|---|---|
| | | Tag data link | CIP message | |
| Product model | --- | None | Read | Read |
| Serial number | --- | None | Read | Read |
| Firmware version | --- | None | Read | Read |
| MAC address | --- | None | Read | Read |
| IP address | 192.168.250.20 | None | Read/Write | Read/Write |
| Subnet mask | 255.255.255.0 | None | Read/Write | Read/Write |
| Default gateway | 0.0.0.0 | None | Read/Write | Read/Write |

# 1-8 Communications Wiring

This section describes the communications wiring of the S8VK-X.

Connect the S8VK-X with the host devices such as PLC or PC via the industrial switching hub with the Ethernet cables. For the communications cables and industrial switching hubs, use the recommended items shown on the next page.



## Recommended EtherNet/IP Communication Cables (Order Separately)

Use an STP cable (shielded twisted pair cable) of Category 5 or above.

| Part name | Manufacturer | Model number | Contact Information |
|---|---|---|---|
| Cable | Hitachi Metals, Ltd. | NETSTAR-C5E SA 0.5×4P *1 | Kanetsu Co., Ltd., Planning Department<br>TEL: +81 (0)75-662-0996 |
| RJ45 connector | Panduit Corp. | MPS588-C *1 | Panduit Corp.<br>Japan Branch, Osaka Office |

*1. We recommend use of these cables and connectors in the above combinations.

## Recommended Industrial Switching Hubs (Order Separately)

| Name | Shape | Specification | | | Model number |
|---|---|---|---|---|---|
| | | Functions | No. of ports | Failure detection function | |
| Industrial switching hub | | Priority control (QoS): EtherNet/IP control data priority<br>Failure detection: Broadcast storm/ LSI abnormality detection 10/100BASE-TX, Auto-Negotiation | 3 | No | W4S1-03B |
| | | | 5 | No | W4S1-05B |
| | | | 5 | Yes | W4S1-05C |

# 1-9 Procedure

The S8VK-X can be used in the following procedure.

| Step | Procedures | Reference |
|---|---|---|
| **1. Installation and Wiring** | Install.<br>↓<br>Wire. | *1-2 Nomenclature and Functions* on page 1-3<br>--- |
| **2. IP address setting of S8VK-X** | Install the Network Configurator<br>↓<br>Start the Network Configurator<br>↓<br>Connect the PC to the S8VK-X via Ethernet cable. / Turn on the input power to the S8VK-X — Either order is acceptable.<br>↓<br>From the Network Configurator, set the IP address of the S8VK-X | Section 2 IP Address Setting and Resetting |
| **3. Monitoring from the host** | Connect from the host (PLC, PC, etc.) to the S8VK-X<br>↓<br>Set up communications for host (PLC, PC, etc.) or create and download a communications program.<br>↓<br>The host (PLC, PC, etc.) reads the state of the S8VK-X using EtherNet/IP (tag data link or CIP message communications) or Modbus TCP.<br>↓<br>Monitoring the S8VK-X | Section 3 Monitoring and Setting with the EtherNet/IP<br>or<br>Section 4 Monitoring and Setting with the Modbus TCP |
| **4. Operation** | • Obtain and periodically manage the S8VK-X's replace time, output voltage, output current, etc. via communications.<br>• Check the abnormal state of the S8VK-X with the self-diagnosis functions, and then take action. | --- |

# 2



# IP Address Setting and Resetting

This section describes the setting and resetting of the IP address of the S8VK-X.

**2-1 IP Address Settings** . . . . . 2-2
**2-2 Communications Reset Function** . . . . . 2-5

# 2-1 IP Address Settings

Set the IP address of the S8VK-X using the Network Configurator.

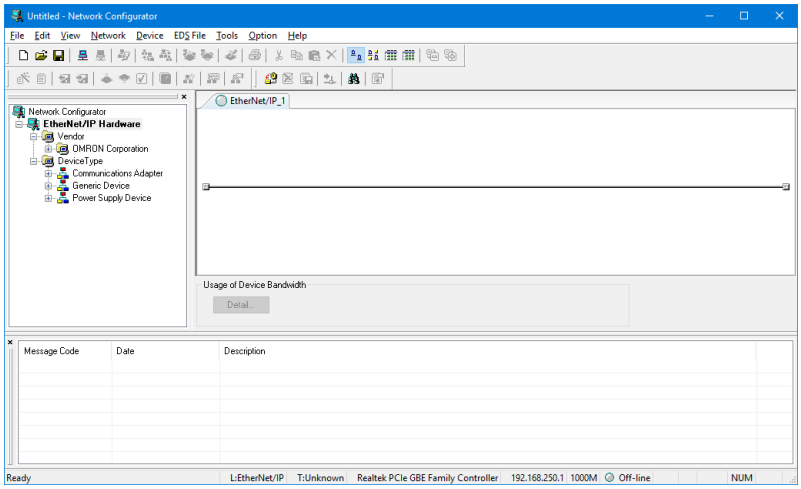
Alternatively, you can set the IP address using the Power Supply Monitoring Tool, which can be downloaded from our website. For details, refer to the *Power Supply Monitoring Tool Operation Manual* (Cat No. T215).

## Setting the IP Address of the S8VK-X from the Network Configurator

**1** Start the Network Configurator.

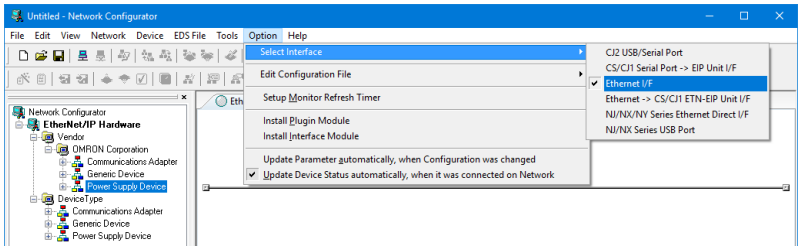
Select the [Network Configurator] from the [Start] - [All Programs] - [OMRON] - [Sysmac Studio] - [Network Configurator for EtherNetIP] to start the Network Configurator.

The following window will be displayed when the Network Configurator starts.

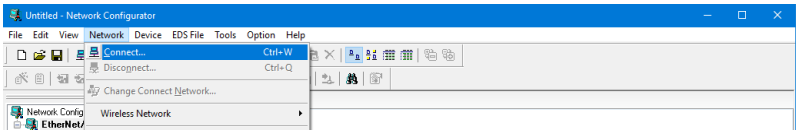



**2** Connect the Network Confiurator via Ethernet.

(1) Select the [Ethernet I/F] from [Option] - [Select Interface].

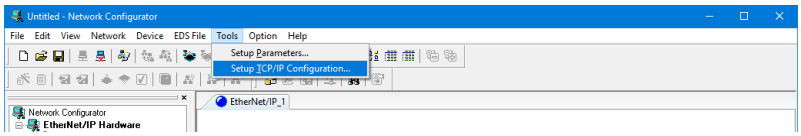



(2) Select the [Connect] from [Network].

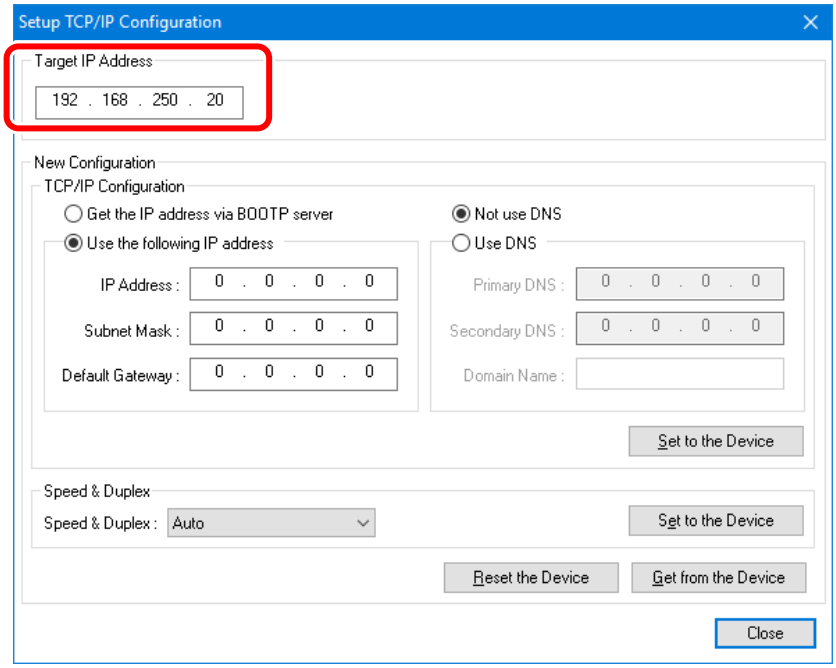


**3** Set the IP address of the S8VK-X.

Select the [Setup TCP/IP Configuration] from the [Tools] to open the [Setup TCP/IP Configuration] Dialog Box.

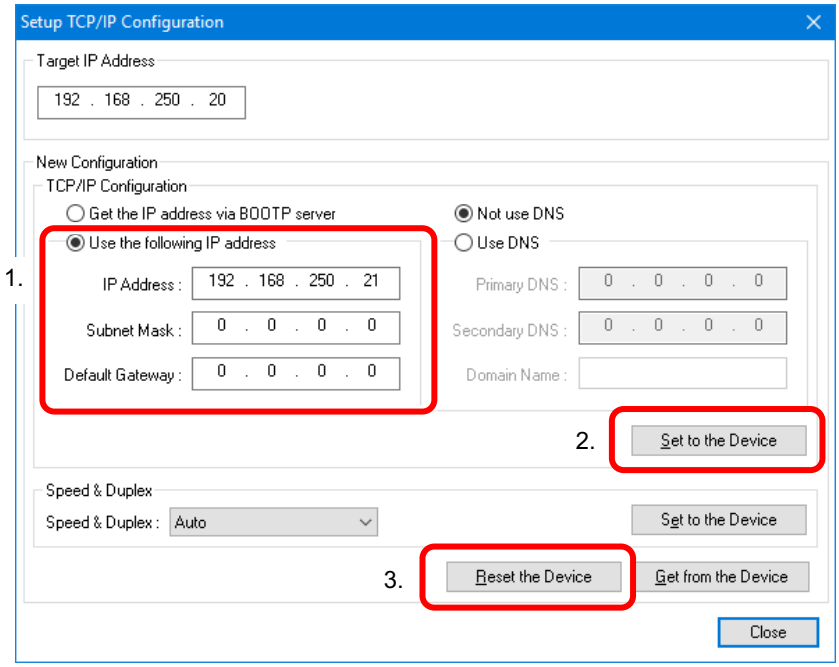



Enter "192.168.250.20", which is the default IP address of the S8VK-X, in the [Target IP Address] Box.



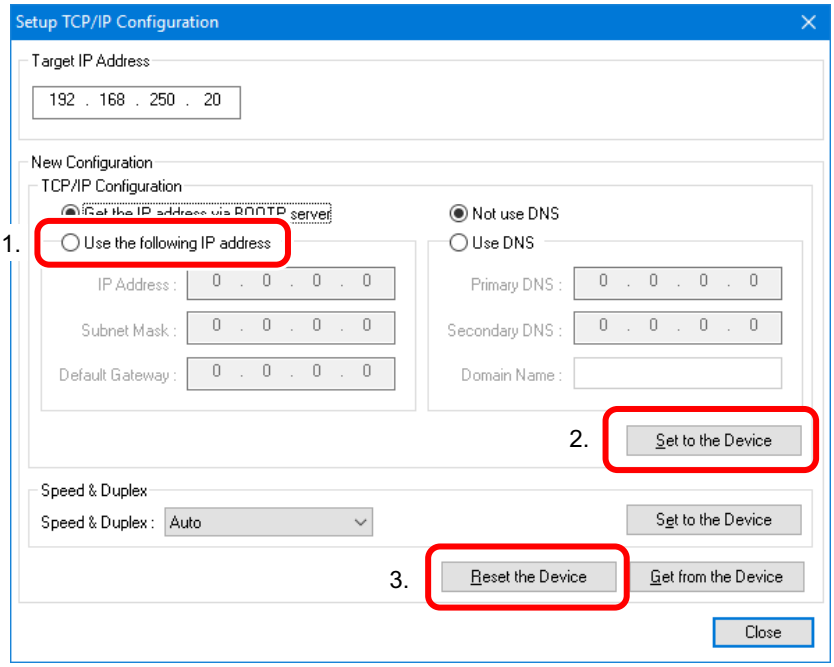
## ● Setting a Fixed IP Address

1. Enter the IP address, subnet mask, and default gateway.
2. Click the [Set to the Device] Button.
3. Click the [Reset the Device] Button to apply the IP address setting in the S8VK-X.




## ● Getting an IP Address from a BOOTP Server

1. Select the [Get the IP Address via BOOTP server] Option.
2. Click the [Set to the Device] Button.
3. Click the [Reset the Device] Button to apply the IP address setting in the S8VK-X.



# 2-2 Communications Reset Function

This section describes the communications reset function of the S8VK-X.

This function temporarily resets the communications settings to their factory default values. Use this function when the IP address previously set is no longer known and communication is not possible.

The setting method is as follows.

1. With the reset key pressed, turn ON the power supply.
2. Continue to hold the reset key for 10 seconds. While pressed, an alarm indicator will flash in 0.5-second intervals. (For models with an indication monitor, the main display and operation indicator will also repeatedly turn all indicators on and off in 0.5-second intervals.)
3. After 10 seconds have elapsed, the system shifts into the communication reset state, and the communications setting values temporarily reset to their factory default values. In the communications reset state, the alarm indicator will flash in 1-second intervals. (For models with an indication monitor, the main display and operation indicator will return to normal operation.)
4. In the communications reset state, reset the communications settings from the host device.
5. After setting, turn ON the power supply once again, and confirm that the set values have been changed.

Note 1. After confirming that the product output indicator has turned off, turn ON the power supply once again.
2. The only way to exit the communications reset state is to restart the power supply.
3. If you do not change the communications settings during step 4, settings will return to their prior values once the communications reset is ended.

# 3

# Monitoring and Setting with the EtherNet/IP



This section describes how to monitor and configure the S8VK-X using the EtherNet/IP.


**3-1 Overview . . . . . 3-2**

3-1-1 What is Monitoring Using EtherNet/IP? . . . . . 3-2

3-1-2 Tag Data Link . . . . . 3-3

3-1-3 CIP Message Communications . . . . . 3-5

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3-2-2 Data to be Tag Data Link Target in the S8VK-X . . . . . 3-6

**3-3 List of Monitoring and Setting Contents Using the CIP Message Communications . . . . . 3-8**

3-3-1 Services Supported by Objects in the S8VK-X . . . . . 3-8

3-3-2 Monitor Object of the S8VK-X (Class ID: 372 hex) . . . . . 3-8

3-3-3 Setting Object of the S8VK-X (Class ID: 373 hex) . . . . . 3-10

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# 3-1 Overview

This section describes how to monitor the S8VK-X using the EtherNet/IP.

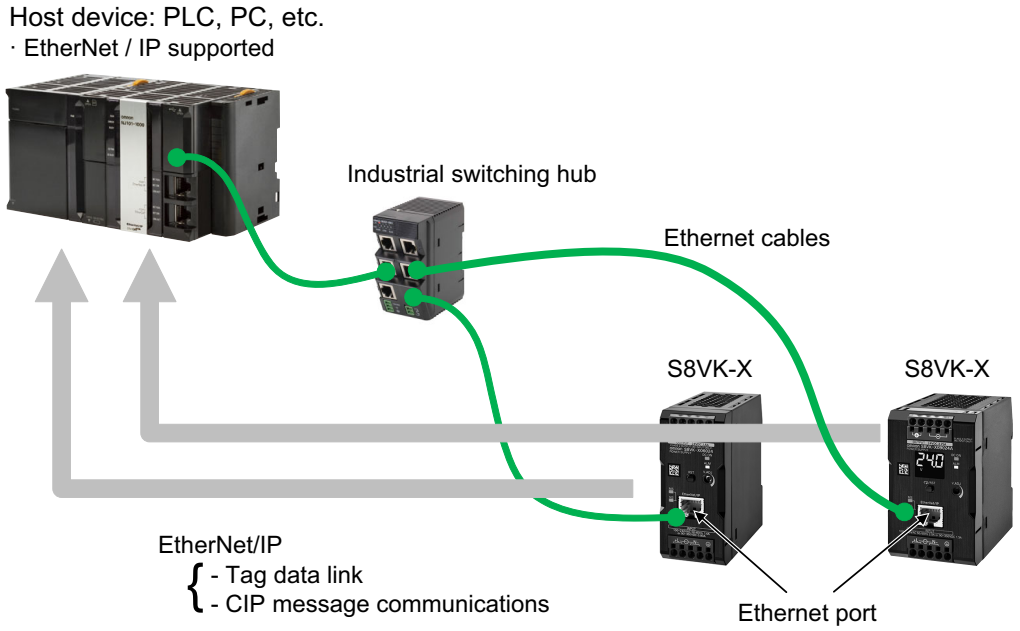
## 3-1-1 What is Monitoring Using EtherNet/IP?

The S8VK-X can be monitored from host devices such as PC and PLC via EtherNet/IP.

The following two communications methods can be used.

| Communications method | Outline | For the S8VK-X | |
|---|---|---|---|
| | | Monitoring | Settings |
| Tag data link | This is a method of exchanging data in preset areas cyclically (at regular intervals).<br>Communication instructions are not used. | Supported | Not supported |
| CIP message communications | This is a method of accessing specified data when necessary.<br>Use the communications instructions. | Supported | Supported |

Note that EtherNet/IP enables simultaneous execution of these two types of communication methods.




A tag data link timeout may occur over a network system including nodes set for multicast communications. Use a switching hub with multicast blocking function to block multicast packets so that they do not reach the S8VK-X.
The OMRON W4S1 series does not provide the multicast block function.

## 3-1-2 Tag Data Link

The current values of S8VK-X are sent cyclically to the specified area of the PLC.

- The PLC assigns I/O memory address or variables to the input tag set. The size must be the same as the internal data size of the S8VK-X.
- The S8VK-X assigns an identification number (instance ID) of a predetermined tag data link internal data to the output tag set. The data size is fixed to 20 bytes (common to models).

### ● Configuration tool

When configuring with OMRON controllers, the following setting tools for the tag data link should be used.

| Configurations | Tag data link setting tool (configuration tool) to be used |
|---|---|
| When tag data link is made between CJ-series PLCs or other company PLCs and the S8VK-X | Network Configurator |
| When tag data link is made between NJ/NX-series Controller and the S8VK-X | Network Configurator or Sysmac Studio |

### ● Connection to be created

- Network Configurator

**1** Install and start

(1) Install Network Configurator.

(2) Start Network Configurator.

(3) Download the S8VK-X EDS file from our I-Web and install it on the Network Configurator.

**2** Configuration

(1) Register PLC and S8VK-X in the network configuration and set the IP address.

(2) Configure settings to add a connection between devices (i.e., "make a connection").

Note. Things to check beforehand:

- Which memory area (I/O memory or variables) in the PLC should be used for the tag data link.
- The size of the internal data (parameter) of the S8VK-X is 20 bytes for all models

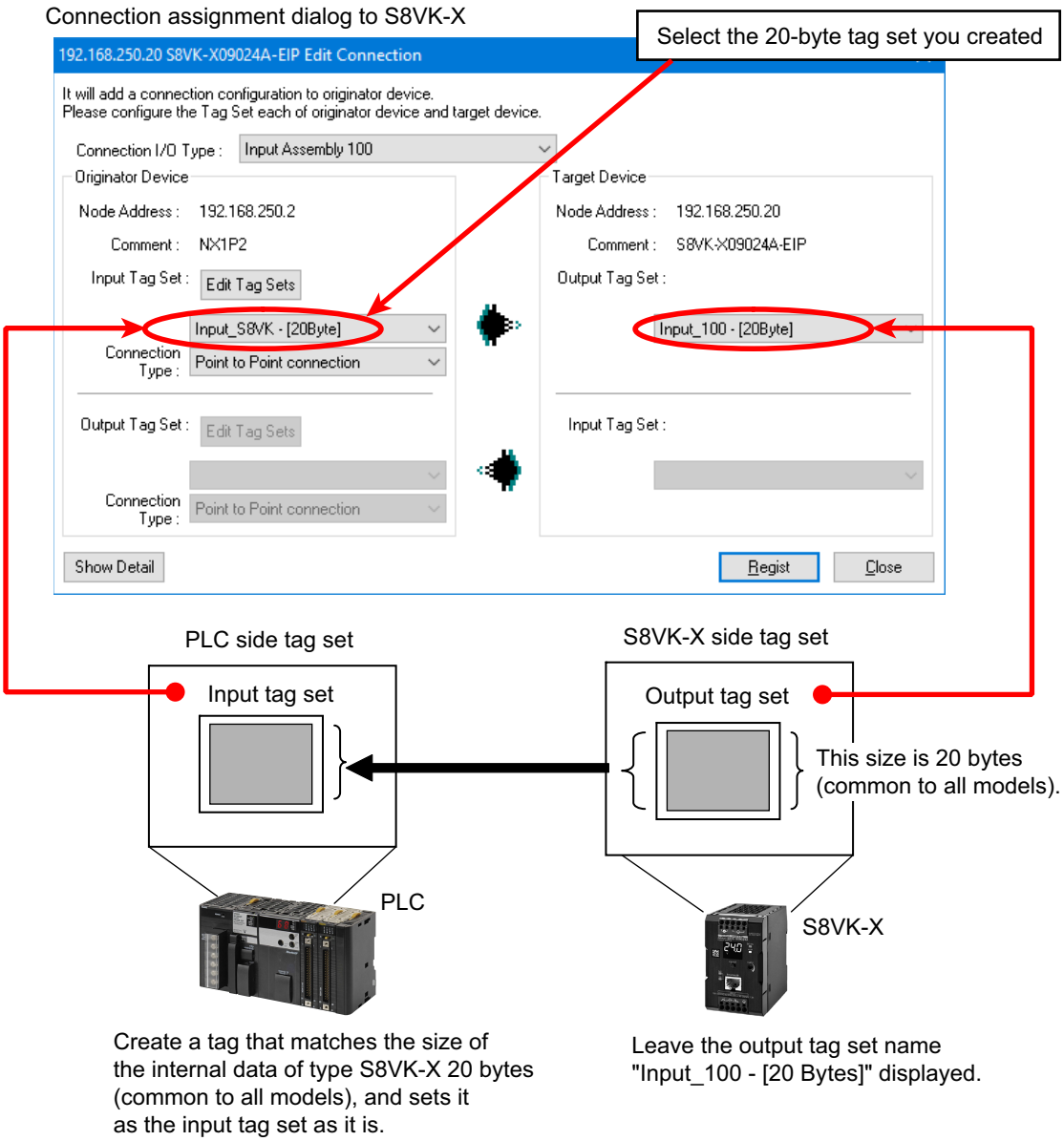
2) -1 Drag a S8VK-X to the PLC and register it.

2) -2 Click the [Edit Tag Sets] Button to create input tags with the above sizes.

2) -3 Register the input tag as it is as input tag set.

2) -4 Select the input tag set created in 2) -3 above from the pull-down list.

2) -5 Register the connection.




**3** Download the connections that were set to the PLC.

Tag data link communications are automatically started.

**4** Confirm each LED of the PLC and the S8VK-X, and status information in the [Device Monitor] Dialog Box of the Network Configurator.

- Sysmac Studio

**1** Select [EtherNet/IP connection settings] from the [Tools] menu.

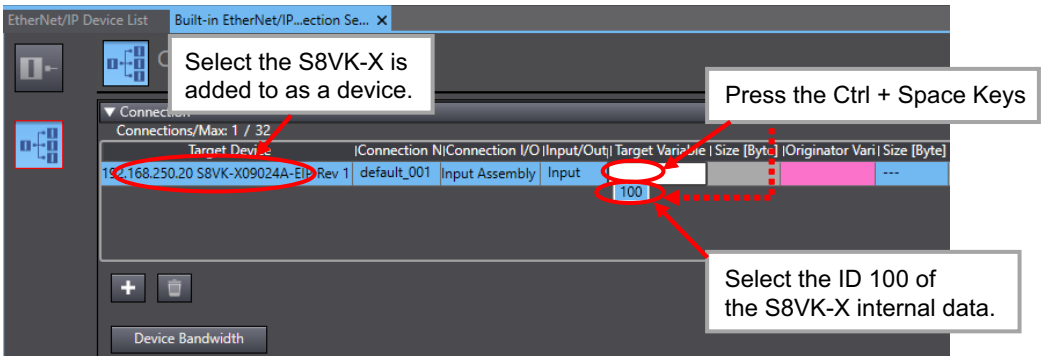
**2** Right-click on the target device list in the tool box on the EtherNet/IP connection settings Tab page and select the [Display EDS Library] menu.

**3** Click the [Install] Button and import the EDS file of each S8VK-X in the [EDS Library] Dialog Box.

**4** Click [Add device] Button in [Toolbox] and select the S8VK-X in the [Built-in EtherNet/IP Port Settings Connection] Tab page.

**5** Select the S8VK-X that has been added from the pull-down list in the [Target Device] column in "▼Connection" list in the Connection Tab Page of PLC side (i.e., originator side).

**6** In the [Target Variable] column, press the [Ctrl] and [Space] keys at the same time and the available identification numbers are displayed on the pull down list, so select the identification number to use.




When you select an identification number, the size is automatically entered synchronously.

**7** In the [Originator Variable] column, select the global variable of the NJ/NX-series CPU Unit. (Beforehand, it is necessary to register global variables whose network publish attribute is "Input" or "Output" in the global variable table.)

## 3-1-3 CIP Message Communications

Any CIP command can be issued to the S8VK-X on the EtherNet/IP network from CIP clients such as PC (supporting the EtherNet /IP) or NJ/NX-series Controller using the Explicit messages. This allows you to perform various processing such as data reading and writing of the S8VK-X.

### ● Communications Instructions

When sending a CIP command with Explicit messages from OMRON PLCs or Controllers, use the following communications Instruction.

| Controller | Communications Instruction |
|---|---|
| CJ-series PLC | Explicit message send commands (2810 hex) for CIP routing are issued by CMND instructions |
| NJ/NX-series Controller | CIPSend (Send Explicit Message Class 3) instruction<br>Or<br>CIPUCMMSend (Send Explicit Message UCMM) instruction |

# 3-2 List of Monitoring Contents Using the Tag Data Link Communications

This section describes contents to be monitored using tag data link communication.

## 3-2-1 Connection setting

| Setting items | | | Setting contents |
|---|---|---|---|
| Originator device (PLC) | Input tag set | | Specify the tag set on the PLC side of 20 bytes |
| | | Connection type | Specify "Point to Point connection". |
| Target device (S8VK-X) | Output tag set | | Instance ID: 100, size is fixed to 20 bytes. |
| | | Connection type | Specify "Point to Point connection". |
| Packet interval (RPI) | | | Any (default: 100 ms) |
| Timeout value | | | User specified (default: Packet interval (RPI) × 4) |

**Precautions for Correct Use**

If memory addresses are specified for the communications areas, the information in the communications areas will be cleared when the operating mode of the PLC changes unless addresses in the Area, which are maintained, are specified.

## 3-2-2 Data to be Tag Data Link Target in the S8VK-X

### Identification Number and Size of Internal Data to be Tag Data Link

The identification number (the instance ID of the Assembly object) and the size of internal data (Assembly object) to be tag data link target in the S8VK-X are as follows.

| Identification number (Instance ID of Assembly object) | Size | Direction of data |
|---|---|---|
| 100 | 20 bytes common to all models | Target (S8VK-X) → Originator (such as PLC) |

### List of Internal Data to be Tag Data Link

The tag data link target data in the S8VK-X is shown below.

#### ● Memory allocation

| Word \ Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| +0 | S8VK-X status | | | | | | | | | | | | | | | |
| +1 | Output voltage measured | | | | | | | | | | | | | | | |
| +2 | Output current measured | | | | | | | | | | | | | | | |
| +3 | Peak hold current measured | | | | | | | | | | | | | | | |
| +4 | Years until replacement | | | | | | | | | | | | | | | |
| +5 | Percentage until replacement | | | | | | | | | | | | | | | |
| +6 | Total run time (lower) | | | | | | | | | | | | | | | |

| Word \ Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| +7 | Total run time (upper) | | | | | | | | | | | | | | | |
| +8 | Continuous run time (lower) | | | | | | | | | | | | | | | |
| +9 | Continuous run time (upper) | | | | | | | | | | | | | | | |

## ● Data contents

| Starting Word Address | Parameter name | Data range | Meaning of the value | Size |
|---|---|---|---|---|
| +0 | S8VK-X status | 0000 to 000F hex | Status of S8VK-X *1 | 1 word |
| +1 | Output voltage measured | 0000 to 2706 hex (Decimal 0 to 9990) | 0.00 to 99.90 V (0.10 V increments) *2 | 1 word |
| +2 | Output current measured | 0000 to 2706 hex (Decimal 0 to 9990) | 0.00 to 99.90 A (0.10 A increments) *2 | 1 word |
| +3 | Peak hold current measured | 0000 to 2706 hex (Decimal 0 to 9990) | 0.00 to 99.90 A (0.10 A increments) *2 | 1 word |
| +4 | Years until replacement | 0000 to 5DC0 hex (Decimal 0 to 1500) | 0 to 150.0 years (0.1 year increments) | 1 word |
| +5 | Percentage until replacement | 0000 to 3E8 hex (Decimal 0 to 1000) | 0.0 to 100.0% (0.1% increments) | 1 word |
| +6 | Total run time | 0000 to 40290 hex (Decimal 0 to 262800) | 0 to 262,800 hours (1 hour increments) | 2 word |
| +8 | Continuous run time | 0000 to F099C0 hex (Decimal 0 to 15768000) | 0 to 15,768,000 minutes (1 minute increments) | 2 word |

*1. S8VK-X status

| Bit position | Status | Bit contents | |
|---|---|---|---|
| | | 0 | 1 |
| 0 | Memory error | Not occurred | Occurrence |
| 1 | Product overheat abnormality | Not occurred | Occurrence |
| 2 | Current measurement error | Not occurred | Occurrence |
| 3 | Voltage measurement error | Not occurred | Occurrence |
| 4 | Overheating alarm | Not occurred | Occurrence |
| 5 | Reserved | - | - |
| 6 | Reserved | - | - |
| 7 | Reserved | - | - |
| 8 | Years until the replacement reached FUL | Other than FUL | FUL |
| 9 | Years until the replacement reached HLF | Other than HLF | HLF |
| 10 | Reserved | - | - |
| 11 | Reserved | - | - |
| 12 | Reserved | - | - |
| 13 | Reserved | - | - |
| 14 | Reserved | - | - |
| 15 | Reserved | - | - |

*2. · The maximum value depends on the model type.
· The least significant digit of the value regarded as a decimal number is fixed to 0.

# 3-3 List of Monitoring and Setting Contents Using the CIP Message Communications

This section shows the contents of monitoring and setting using the CIP message communications and examples of communications instructions.

## 3-3-1 Services Supported by Objects in the S8VK-X

The services supported by the objects in the S8VK-X are as follows.

| Object name | Class ID | Function |
|---|---|---|
| Monitor object of the S8VK-X | 372 hex | Reads the measurement value of the S8VK-X and other current values. |
| Setting object of the S8VK-X | 373 hex | Instructs operation to the S8VK-X. |

## 3-3-2 Monitor Object of the S8VK-X (Class ID: 372 hex)

This object reads the current values of the S8VK-X.

### Service Codes

| Service Codes | Service name | Description | Supported services | |
|---|---|---|---|---|
| | | | Classes | Instances |
| 01 hex | Get_Attributes_All | Reads the values of all attributes. | Not supported. | Supported. |
| 0E hex | Get_Attribute_Single | Reads the value of the specified attribute. | Not supported. | Supported. |

### Class ID

Specify 372 hex.

### Instance ID

Specify 01 hex.

## Attribute ID

| Attribute ID | Parameter name | Data range | Meaning of the value | Attri-bute | Read data | |
|---|---|---|---|---|---|---|
| | | | | | Data type | Default value |
| 64 hex | S8VK-X status | 0000 to 000F hex | Status of S8VK-X *1 | Read | UINT | 0 |
| 65 hex | Output voltage measured | 0000 to 2706 hex (Decimal 0 to 9990) | 0.00 to 99.90 V (0.10 V increments) *2 | Read | UINT | 0 |
| 66 hex | Output current measured | 0000 to 2706 hex (Decimal 0 to 9990) | 0.00 to 99.90 A (0.10 A increments) *2 | Read | UINT | 0 |
| 67 hex | Peak hold current measured | 0000 to 2706 hex (Decimal 0 to 9990) | 0.00 to 99.90 A (0.10 A increments) *2 | Read | UINT | 0 |
| 68 hex | Years until replacement | 0000 to 5DC0 hex (Decimal 0 to 1500) | 0 to 150.0 years (0.1 year increments) | Read | UINT | 0 |
| 69 hex | Percentage until replacement | 0000 to 3E8 hex (Decimal 0 to 1000) | 0.0 to 100.0% (0.1% increments) | Read | UINT | 0 |
| 6A hex | Total run time | 0000 to 40290 hex (Decimal 0 to 262800) | 0 to 262,800 hours (1 hour increments) | Read | DWORD | 0 |
| 6B hex | Continuous run time | 0000 to F099C0 hex (Decimal 0 to 15768000) | 0 to 15,768,000 minutes (1 minute increments) | Read | DWORD | 0 |

*1. S8VK-X status

| Bit position | Status | Bit contents | |
|---|---|---|---|
| | | 0 | 1 |
| 0 | Memory error | Not occurred | Occurrence |
| 1 | Product overheat abnormality | Not occurred | Occurrence |
| 2 | Current measurement error | Not occurred | Occurrence |
| 3 | Voltage measurement error | Not occurred | Occurrence |
| 4 | Overheating alarm | Not occurred | Occurrence |
| 5 | Reserved | - | - |
| 6 | Reserved | - | - |
| 7 | Reserved | - | - |
| 8 | Years until the replacement reached FUL | Other than FUL | FUL |
| 9 | Years until the replacement reached HLF | Other than HLF | HLF |
| 10 | Reserved | - | - |
| 11 | Reserved | - | - |
| 12 | Reserved | - | - |
| 13 | Reserved | - | - |
| 14 | Reserved | - | - |
| 15 | Reserved | - | - |

*2. · The maximum value depends on the model type.
· The least significant digit of the value regarded as a decimal number is fixed to 0.

## 3-3-3 Setting Object of the S8VK-X (Class ID: 373 hex)

### Service Codes

| Service Codes | Service name | Description | Supported services | |
|---|---|---|---|---|
| | | | Classes | Instances |
| 10 hex | Set_Attribute_Single | Write the value of the specified attribute. | Not supported. | Supported. |
| 01 hex | Get_Attributes_All | Reads the values of all attributes. | Not supported. | Supported. |
| 0E hex | Get _Attribute_Single | Reads the value of the specified attribute. | Not supported. | Supported. |

### Class ID

Specify 373 hex.

### Instance ID

Specify 01 hex.

### Attribute ID

| Attribute ID | Parameter name | Description | Attribute | Read data | |
|---|---|---|---|---|---|
| | | | | Data type | Default value |
| 64 hex | Peak hold current reset bit | Resets peak hold current to 0.<br>Rising from 0 to 1: Reset | Write | UINT | 0 |

## 3-3-4 Identity Object (Class ID: 01 hex)

This object reads the identification information of the S8VK-X, reads the state of the built-in EtherNet/IP port.

### Service Codes

| Service Codes | Service name | Description | Supported services | |
|---|---|---|---|---|
| | | | Classes | Instances |
| 01 hex | Get_Attributes_All | Reads the values of all attributes. | Supported. | Supported. |
| 0E hex | Get_Attribute_Single | Reads the value of the specified attribute. | Supported. | Supported. |

### Class ID

Specify 01 hex.

### Instance ID

Specify 01 hex.

### Attribute ID

The attribute ID specifies the information to read.

#### ● Class Attribute ID

The class attribute ID specifies the attribute of the object class.

| Attribute ID | Parameter name | Description | Attribute | Data | |
|---|---|---|---|---|---|
| | | | | Data type | Default value |
| 01 hex | Revision | Revision of the object | Read | UINT | 0001 hex |

#### ● Instance Attribute ID

The instance attribute ID specifies the per-instance attribute.

| Attribute ID | Parameter name | Description | Attribute | Data | |
|---|---|---|---|---|---|
| | | | | Data type | Default value |
| 01 hex | Vendor ID | Vendor ID | Read | UINT | 002F hex |
| 02 hex | Device Type | Device type | Read | UINT | 0302 hex |
| 03 hex | Product Code | Product Codes | Read | UINT | For details, refer to "*1 Product Codes". |
| 04 hex | Revision | Device revision<br>(Match with EIP soft version) | Read | Struct of | - |
| | Major Revision | Major revision | Read | USINT | 1 |
| | Minor Revision | Minor revision | Read | USINT | 1 |
| 05 hex | Status | Status of the EtherNet/IP Port<br>For details, refer to "*2. Status of the EtherNet/IP Port". | Read | WORD | - |

| Attribute ID | Parameter name | Description | Attribute | Data | |
|---|---|---|---|---|---|
| | | | | Data type | Default value |
| 06 hex | Serial Number | Serial number | Read | UDINT | Product specific |
| 07 hex | Product Name | Product name | Read | SHORT_STRING | Product specific |

*1. Product Codes

| Model | Product Codes |
|---|---|
| S8VK-X09024A-EIP | 068F hex |
| S8VK-X12024A-EIP | 0690 hex |
| S8VK-X24024A-EIP | 0691 hex |
| S8VK-X48024A-EIP | 0692 hex |
| S8VK-X03005-EIP | 0693 hex |
| S8VK-X06012-EIP | 0694 hex |
| S8VK-X06024-EIP | 0695 hex |
| S8VK-X09024-EIP | 0696 hex |
| S8VK-X12024-EIP | 0697 hex |
| S8VK-X24024-EIP | 0698 hex |
| S8VK-X48024-EIP | 0699 hex |

*2. Status of the EtherNet/IP Port

| Bit | Name | Description |
|---|---|---|
| 0 | Owned | Indicates when the built-in EtherNet/IP port has an open connection as the target of a tag data link. |
| 1 | Reserved | Always FALSE. |
| 2 | Configured | Tag data link settings exist. |
| 3 | Reserved | Always FALSE. |
| 4 to 7 | Extended Device Status | Indicates the status of the built-in EtherNet/IP port.<br>0: Not used<br>1: Not used<br>2: One or more I/O connection failures<br>3: I/O connection is not established<br>4: Not used<br>5: Serious defect occurred (MS Criticality)<br>6: One or more I/O connections are established and one or more are in the RUN state<br>7: One or more I/O connections are established and all are idle<br>8 to 15: Unused |
| 8 | Minor Recoverable Fault | Always FALSE. |
| 9 | Minor Unrecoverable Fault | Always FALSE. |
| 10 | Major Recoverable Fault | When the MS indicator matches conditions of the flashing red: True |
| 11 | Major Unrecoverable Fault | When the MS indicator matches conditions of the flashing red: True |
| 12 to 15 | Reserved | Always FALSE. |

## 3-3-5 TCP/IP Interface Object (Class ID: F5 hex)

This object is used to read and write settings such as the IP address, subnet mask, and default gateway.

### Service Codes

| Service Codes | Service name | Description | Supported services | |
|---|---|---|---|---|
| | | | Classes | Instances |
| 01 hex | Get_Attribute_All | Reads the values of all attributes. | Not supported. | Supported. |
| 0E hex | Get_Attribute_Single | Reads the value of the specified attribute. | Supported. | Supported. |
| 10 hex | Set_Attribute_Single | Write the value of the specified attribute. | Not supported. | Supported. |

### Class ID

Specify F5 hex.

### Instance ID

Specify 01 hex.

### Attribute ID

The attribute ID specifies the information to read.

#### ● Class Attribute ID

The class attribute ID specifies the attribute of the object class.

| Attribute ID | Parameter name | Description | Attribute | Data | |
|---|---|---|---|---|---|
| | | | | Data type | Value |
| 01 hex | Revision | Revision of the object | Read | UINT | 0004 hex |

#### ● Instance Attribute ID

The instance attribute ID specifies the per-instance attribute.

| Attribute ID | Parameter name | Description | Attribute | Data | |
|---|---|---|---|---|---|
| | | | | Data type | Default value |
| 01 hex | Interface Configuration Status | Indicates the IP address settings status of the interface. | Read | DWORD | Bits 0 to 3: Interface Configuration Status:<br>0 = IP address is not set. (This includes when BOOTP is starting.)<br>1 = IP address is set.<br>Bits 4 to 31: Reserved (always FALSE) |

| Attribute ID | Parameter name | Description | Attri-bute | Data | |
|---|---|---|---|---|---|
| | | | | Data type | Default value |
| 02 hex | Configuration Capability | Indicates a Setup that can be set to the built-in interface. | Read | DWORD | Bit 0: BOOTP Client: Always TRUE.<br>Bit 1: DNS Client: Always FALSE.<br>Bit 2: DHCP Client: Always FALSE.<br>Bit 3: DHCP-DNS Update: Always FALSE.<br>Bit 4: Configuration Settable: Always TRUE.<br>Bit 5: Hardware Configurable: Always FALSE.<br>Bit 6: Interface Configuration Change Requires Reset: Always TRUE.<br>Bit 7: ACD Capable:*1 Always FALSE.<br>Bits 8 to 31: Reserved (always FALSE). |
| 03 hex | Configuration Control | Sets the method used to set the IP address when the interface starts. | Write | DWORD | 00000000 hex: Static IP address.<br>00000001 hex: Set by BOOTP. |
| 04 hex | Physical Link Object | The path to the link object in the physical layer. | Read | Struct of | - |
| | Path size | Path size (WORD size) | | UINT | 0002 hex |
| | Path | The path to the link object in the physical layer (static). | | EPATH | 20F6 2401 hex |
| 05 hex | Interface Cofiguration | The built-in EtherNet/IP port settings. | Write | Struct of | - |
| | IP Address | IP Address | | UDINT | Set value (Factory default: 192.168.250.20) |
| | Network Mask | Subnet mask. | | UDINT | Set value |
| | Gateway Address | The default gateway. | | UDINT | Set value |
| | Nama Server | The primary name server. | | UDINT | Set value |
| | Nama Server2 | The secondary name server. | | UDINT | Set value |
| | Domain Name | The domain name. | | STRING | Set value |
| 06 hex | Host Name | The host name (reserved). | Write | STRING | Always 0000 hex. |
| 0D hex | Encapsulation Inactivity Timeout | Encapsulation session timeout time | Write | UINT | 0001 to 0E10 hex: 1 to 3600 seconds<br>(0: Disabled)<br>Default 0078 hex (120 seconds) |

## 3-3-6 Example of the CIP Message Communications Instruction

The following shows an example of reading data in the S8VK-X from the NJ/NX-series Controller using the CIP message communications instruction.

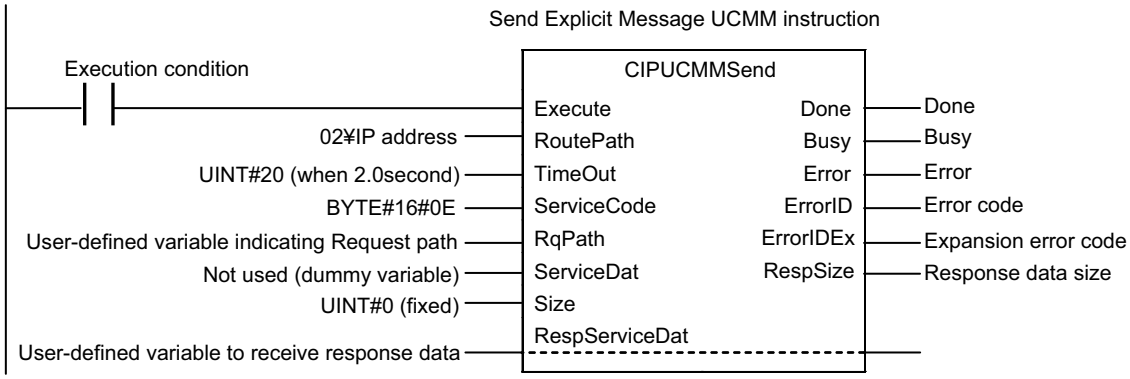
Example: Reading of output voltage measured

Send the following CIP message.

- Service code: 16#0E (Get_Attribute_Single: read the value of the specified attribute)
- Class ID: 372 hex
- Instance ID: 01 hex
- Attribute ID: 65 hex (Output voltage measured)

The CIPUCMMSend instruction sends the command data "ServiceDat" as a UCMM message corresponding to the service specified by the "ServiceCode".

The destination is specified by the route path "RoutePath". The request path is specified by "RqPath".




Set the following value to the input variable of the above communications instruction.

| Input variable of the communications instruction | Specification | Value to pass to input variable | Meaning |
|---|---|---|---|
| RoutePath | Route path specification | 02¥IPaddress | "02" specifies the output from the NJ-series built-in EtherNet/IP port or the NX-series ibuilt-in EtherNet/IP port 1.<br>The IP address specifies the IP address of the S8VK-X. |
| TimeOut | Timeout time specification | UINT#20 | Timeout time is specified.<br>The integer "20" specifies 2.0 s as the timeout time. It is 0.1s unit. |
| ServiceCode | Service codes | BYTE#16#0E | 0E hex specifies "Service_Attribute_Single" as a service code which reads the value of the specified attribute. |

| Input variable of the communications instruction | Specification | Value to pass to input variable | Meaning |
|---|---|---|---|
| RqPath | Request path specification | Specified by user variable indicating the Request path | Specify a user-defined variable.<br>Use the data type "_sREQUEST_PATH" corresponding to the input variable "RqPath". You can use any variable name.<br>Specify the following.<br>Class ID, Instance ID, Attribute ID<br>Example) Deterioration degree (current value): Specify the following.<br>• ClassID: = 372 hex (meaning "Monitor Object of the S8VK-X")<br>• InstanceID: = 01 hex (fixed)<br>• IsAttributeID: = TRUE (meaning to use an attribute ID)<br>• AttributeID: = 65 hex (meaning Output voltage measured) |
| ServiceDat | Data to send | Not used (dummy variable) | Since the service code is "read", specify a dummy variable. |
| Size | Number of elements to send | UINT#0 | Since the service code is "read", specify integer 0 (fixed). |
| RespServiceDat | Response data specification | Specified by user variable r variable to receive response data | Specify a user-defined variable.<br>Use the data type "ARRAY [0..10] OF BYTE" corresponding to the input/output variable "RespServiceDat". You can use any variable name. |

# 4

# Monitoring and Setting with the Modbus TCP

This section describes how to monitor and configure the S8VK-X using the Modbus TCP.



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**4-2 Function Codes . . . . . 4-3**

4-2-1 Function Code List . . . . . 4-3

4-2-2 03 hex: Reading of multiple registers . . . . . 4-3

4-2-3 06 hex: Operation command (Resets the peak hold current) . . . . . 4-5

4-2-4 10 hex: Writing of multiple registers . . . . . 4-6

4-2-5 Exception Code List . . . . . 4-7

**4-3 Register Address Lists . . . . . 4-8**

4-3-1 Measurement/calculation data and Self-diagnostic information . . . . . 4-8

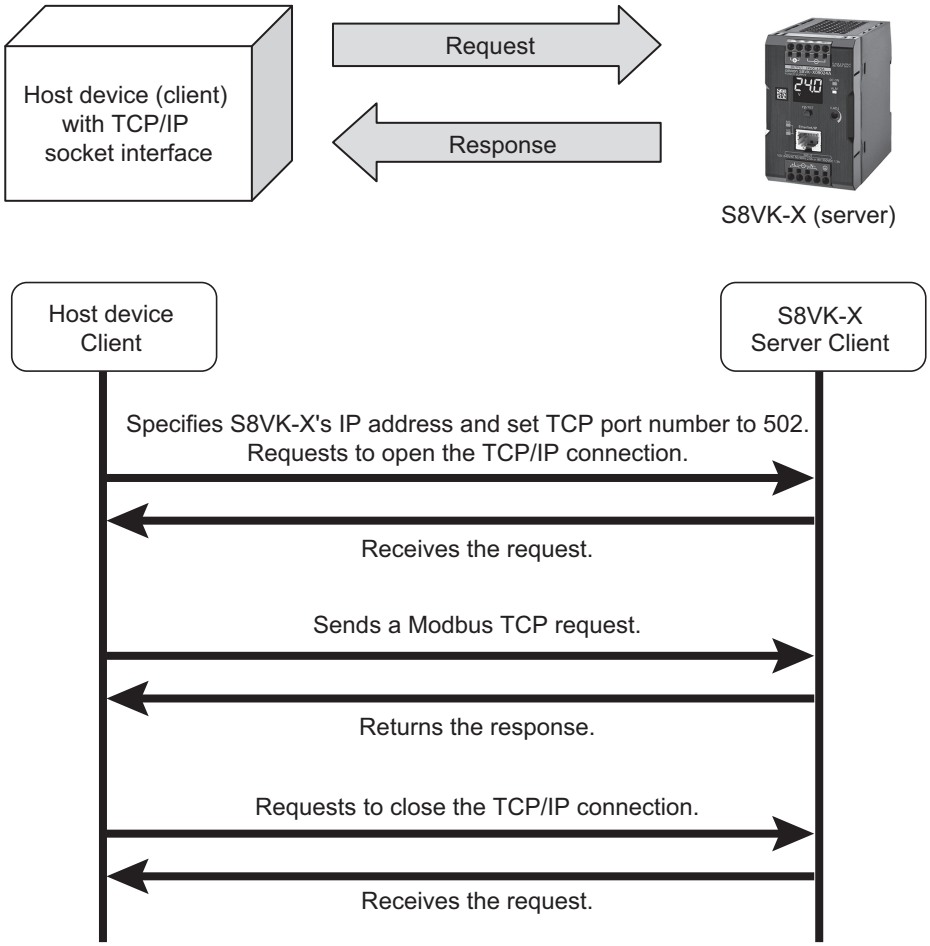
4-3-2 Product Information and Communications Setting Data . . . . . 4-9

# 4-1 Overview

This section provides an overview of how to monitor the S8VK-X using the Modbus TCP.

ModbusTCP is a communications protocol that uses TCP/IP to communicate with host devices such as PLCs.

This communications protocol allows host devices with a TCP/IP socket interface to read and write the internal data of the S8VK-X.




Note The socket is an interface for using TCP directly from the user program.
The host device specifies the IP address of S8VK-X and TCP port number of 502 (01F6 hex) and opens the socket in Active. After that, it sends Modbus TCP request and reads and writes the internal data of the S8VK-X.
In addition, Modbus TCP can be connected to up to two clients simultaneously.

# 4-2 Function Codes

This section describes function codes that can be used with Modbus TCP.

## 4-2-1 Function Code List

The function codes that can be used are as follows.

| Function code | Function name | Usages |
|---|---|---|
| 03 hex | Reading of multiple registers | Used to read output voltage, IP address, etc. |
| 06 hex | Operation command | Used to reset the peak hold current. |
| 10 hex | Writing of multiple registers | Used to set the IP address, etc. |

## 4-2-2 03 hex: Reading of multiple registers

This function can read the contents of multiple registers starting from the specified address.

### Frame configurations

The frame configurations of ModbusTCP are as follows.

#### ● Request

| (1) | | (2) | | (3) | | (4) | (5) | (6) | (7) | |
|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00 | 00 | 00 | 00 | 06 | FF | 03 | | | ← Hex |
| 2 | | 2 | | 2 | | 1 | 1 | 2 | 2 | ← Bytes |

(1): Transaction ID : Specify any value. For example, 0000 hex is used in this explanation.
(2): Protocol ID : Specify 0000 hex.
(3): Number of bytes transferred : Specify the total number of bytes of (4) and the successor.In the above case, it is from (4) to (7), so it is 0006 hex.
(4): Unit ID : Specify FF hex.
(5): Function code : Specify 03 hex (Reading of multiple registers).
(6): Start address : Specify the address to start reading.
Refer to *4-3 Register Address Lists* on page 4-8.
(7): Number of words to read : Specify the number of words of the register to be read. The maximum value is 32 (0020 hex).

### ● Normal response

| (1) | | (2) | | (3) | | (4) | (5) | (8) | (9) | | (9) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00 | 00 | 00 | 00 | | FF | 03 | | | | |
| 2 | | 2 | | 2 | | 1 | 1 | 1 | 2 | | 2 |

### ● Error response

| (1) | | (2) | | (3) | | (4) | (5) | (10) |
|---|---|---|---|---|---|---|---|---|
| 00 | 00 | 00 | 00 | 00 | 03 | FF | 83 | |
| 2 | | 2 | | 2 | | 1 | 1 | 1 |

(3): Number of bytes transferred : The total number of bytes of (4) and the successor is set.
(8): Byte count : The total number of bytes of (9) is set.
(9): Register contents : Register contents from the start address to the number of read words are set.
(10): Exception code : Error information is set. Refer to *4-2-5 Exception Code List* on page 4-7.

Note 1. The elements shaded in the above figures are set to the value specified in the request.
2. The function code of (5) at error response is 83 hex.

## Example: Read all the Measurement/Calculation Data and Self-diagnostic Information

### ● Request

| (1) | | (2) | | (3) | | (4) | (5) | (6) | | (7) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00 | 00 | 00 | 00 | 06 | FF | 03 | 00 | 00 | 00 | 0A |

(6): Start address : Specify the address of the S8VK-X status.
(7): Number of words to read : The total number of the measurement/calculation data and self-diagnostic information is 10 words (20 bytes), so specify 000A hex

### ● Normal response

| (1) | | (2) | | (3) | | (4) | (5) | (8) | S8VK-X status | | Continuous run time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00 | 00 | 00 | 00 | 17 | FF | 03 | 14 | | | |

(3): Number of bytes transferred : The total number of bytes of (4) and the successor are 23, so 0017 hex is set.
(8): Byte count : The measurement/calculation data and self-diagnostic information is 20 bytes in total, so 14hex is set.

## 4-2-3 06 hex: Operation command (Resets the peak hold current)

This function resets the peak hold current.

### Frame configurations

The frame configurations of ModbusTCP are as follows.

#### ● Request

| (1) | | (2) | | (3) | | (4) | (5) | (6) | | (7) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00 | 00 | 00 | 00 | 06 | FF | 06 | 10 | 00 | 00 | 01 | ← Hex |
| 2 | | 2 | | 2 | | 1 | 1 | 2 | | 2 | | ← Bytes |

| | | |
|---|---|---|
| (1): Transaction ID | : | Specify any value. For example, 0000 hex is used in this explanation. |
| (2): Protocol ID | : | Specify 0000 hex. |
| (3): Number of bytes transferred | : | Specify the total number of bytes of (4) and the successor. In the above case, it is from (4) to (7), so it is 0006 hex. |
| (4): Unit ID | : | Specify FF hex. |
| (5): Function code | : | Specify 06 hex (Operation command). |
| (6): Start address | : | Specify 1000 hex (Resets the peak hold current). |
| (7): Number of words to read | : | Specify 0001 hex (Reset). |

#### ● Normal response

It is the same as the request.

#### ● Error response

| (1) | | (2) | | (3) | | (4) | (5) | (10) |
|---|---|---|---|---|---|---|---|---|
| 00 | 00 | 00 | 00 | 00 | 03 | FF | 86 | |
| 2 | | 2 | | 2 | | 1 | 1 | 1 |

| | | |
|---|---|---|
| (3): Number of bytes transferred | : | The total number of bytes of (4) and the successor is set. |
| (5): Function code | : | 86 hex is set. |
| (10): Exception code | : | The error information is set. Refer to *4-2-5 Exception Code List* on page 4-7. |

Note The elements shaded in the above figures are set to the value specified in the request.

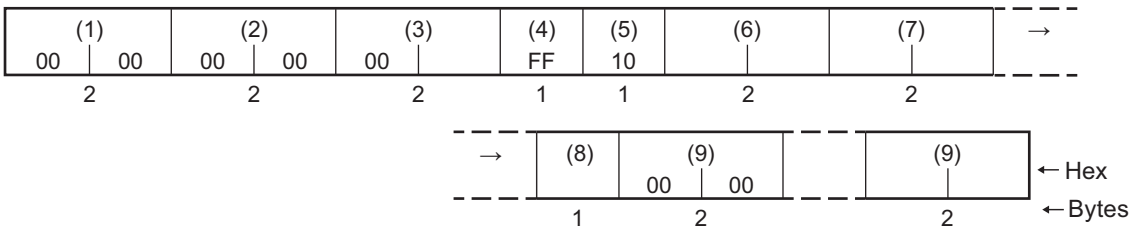
## 4-2-4 10 hex: Writing of multiple registers

This function can write data to multiple registers with the specified address as the start address.

### Frame configurations

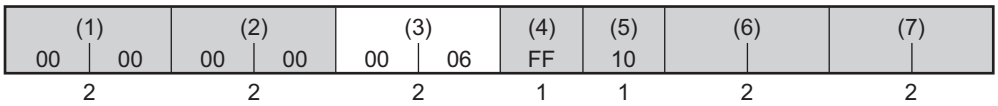
The frame configurations of ModbusTCP are as follows.

#### ● Request

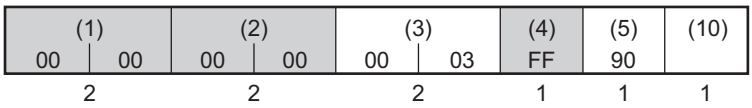



| | | |
|---|---|---|
| (1): Transaction ID | : | Specify any value. For example, 0000 hex is used in this explanation. |
| (2): Protocol ID | : | Specify 0000 hex. |
| (3): Number of bytes transferred | : | Specify the total number of bytes of (4) and the successor. |
| (4): Unit ID | : | Specify FF hex. |
| (5): Function code | : | 10 hex (Writing of multiple registers) is specified. |
| (6): Start address | : | Specify the address to start writing. Refer to *4-3 Register Address Lists* on page 4-8. |
| (7): Number of words to read | : | Specify the number of words of the register to be write. The maximum value is 8 (0008 hex). |
| (8): Byte count | : | Specify the total number of bytes of (9). |
| (9): Data | : | Register contents from the start address to the number of write words are set. |

#### ● Normal response




#### ● Error response




| | | |
|---|---|---|
| (3): Number of bytes transferred | : | The total number of bytes after (4) is set. |
| (10): Exception code | : | Error information is set. Refer to *4-2-5 Exception Code List* on page 4-7. |

Note 1. The elements shaded in the above figures are set to the value specified in the request.

2. The function code of (5) at error response is 90 hex.

## Example: Change IP Address

### ● Request

| (1) | | (2) | | (3) | | (4) | (5) | (6) | | (7) | | → |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00 | 00 | 00 | 00 | 0B | FF | 10 | 00 | 11 | 00 | 02 | |

| → | (8) | (9) | | | |
|---|---|---|---|---|---|
| | 04 | C0 | A8 | FA | 14 |

| | | |
|---|---|---|
| (1): Transaction ID | : | Specify any value. For example, 0000 hex is used in this explanation. |
| (2): Protocol ID | : | Specify 0000 hex. |
| (3): Number of bytes transferred | : | The total number of bytes of (4) and the successor are 11, so specify 000B hex. |
| (4): Unit ID | : | Specify FF hex. |
| (5): Function code | : | 10 hex (Writing of multiple registers) is specified. |
| (6): Start address | : | Specify the register address of the IP address. |
| (7): Number of words to read | : | The IP address is 2 words (4 bytes), so specify 0002 hex. |
| (8): Byte count | : | The total number of bytes of (9) is 4 bytes, so specify 004 hex. |
| (9): Data | : | Specify 192.168.250.20 (C 0 A 8 FA 14 Hex) as the IP address. |

### ● Normal response

| (1) | | (2) | | (3) | | (4) | (5) | (6) | | (7) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 00 | 00 | 00 | 00 | 06 | FF | 10 | 00 | 11 | 00 | 02 |

| | | |
|---|---|---|
| (3): Number of bytes transferred | : | The total number of bytes of (4) and the successor are 6 bytes, so 0006 hex is set. |

Note The elements shaded in the above figures are set to the value specified in the request.

## 4-2-5 Exception Code List

The following is the exception codes when an error response occurs. Confirm this content and review the request.

| Exception code | Types of error | Description |
|---|---|---|
| 01 hex | Illegal function codes | Unsupported function code is specified. |
| 02 hex | Illegal data address | One or more addresses that can not be read or written are included. |
| 03 hex | Illegal data value | The parameter value is invalid. |
| 04 hex | Failure in associated device | It is in a state where normal value can not be returned. |
| 06 hex | Busy | It can not be processed within the time. Wait a while and send the request again. |

# 4-3 Register Address Lists

Registers that can be read and written using ModbusTCP are as follows.

## 4-3-1 Measurement/calculation data and Self-diagnostic information

| Address | Parameter name | Data range | Meaning of the value | Number of bytes | R/W *1 |
|---|---|---|---|---|---|
| 0000 hex | S8VK-X status | 0000 to 000F hex | Status of S8VK-X *2 | 2 | R |
| 0001 hex | Output voltage measured | 0000 to 2706 hex (Decimal 0 to 9990) | 0.00 to 99.90 V (0.10 V increments) *3 | 2 | R |
| 0002 hex | Output current measured | 0000 to 2706 hex (Decimal 0 to 9990) | 0.00 to 99.90 A (0.10 A increments) *3 | 2 | R |
| 0003 hex | Peak hold current measured | 0000 to 2706 hex (Decimal 0 to 9990) | 0.00 to 99.90 A (0.10 A increments) *3 | 2 | R |
| 0004 hex | Years until replacement | 0000 to 5DC0 hex (Decimal 0 to 1500) | 0 to 150.0 years (0.1 year increments) | 2 | R |
| 0005 hex | Percentage until replacement | 0000 to 3E8 hex (Decimal 0 to 1000) | 0.0 to 100.0% (0.1% increments) | 2 | R |
| 0006 hex | Total run time | 0000 to 40290 hex (Decimal 0 to 262800) | 0 to 262,800 hours (1 hour increments) | 4 | R |
| 0008 hex | Continuous run time | 0000 to F099C0 hex (Decimal 0 to 15768000) | 0 to 15,768,000 minutes (1 hour increments) | 4 | R |

*1. R: Read using Reading of multiple registers (03 hex).
W: Write using Writing of multiple registers (10 hex).

*2. The contents of the S8VK-X status are as follows.

| Bit position | Status | Bit contents | |
|---|---|---|---|
| | | 0 | 1 |
| 0 | Memory error | Not occurred | Occurrence |
| 1 | Product overheat abnormality | Not occurred | Occurrence |
| 2 | Current measurement error | Not occurred | Occurrence |
| 3 | Voltage measurement error | Not occurred | Occurrence |
| 4 | Overheating alarm | Not occurred | Occurrence |
| 5 | Reserved | - | - |
| 6 | Reserved | - | - |
| 7 | Reserved | - | - |
| 8 | Years until the replacement reached FUL | Other than FUL | FUL |
| 9 | Years until the replacement reached HLF | Other than HLF | HLF |
| 10 | Reserved | - | - |
| 11 | Reserved | - | - |
| 12 | Reserved | - | - |
| 13 | Reserved | - | - |
| 14 | Reserved | - | - |
| 15 | Reserved | - | - |

*3. · The maximum value depends on the model type.
· The least significant digit of the value regarded as a decimal number is fixed to 0.

## 4-3-2 Product Information and Communications Setting Data

| Address | Data name | Data Range | Number of bytes | R/W *1 |
|---|---|---|---|---|
| 000A hex | Vendor ID | Always 002F hex. | 2 | R |
| 000B hex | Device type | Always 0302 hex. | 2 | R |
| 000C hex | Product code | *2 | 2 | R |
| 000D hex | Device major revision | *3 | 2 | R |
| 000E hex | Device minor revision | *3 | 2 | R |
| 000F hex | Serial number | 00000000 to FFFFFFFF hex | 4 | R |
| 0011 hex | IP address | *4 | 4 | R/W |
| 0013 hex | Subnet mask | *4 | 4 | R/W |
| 0015 hex | Default gateway | *4 | 4 | R/W |
| 0017 hex | IP address setting method | 00000000 hex: Static IP address<br>00000001 hex: BOOTP Always | 4 | R/W |
| 0019 hex | MAC address | 000000000000 to FFFFFFFFFFFF hex | 6 | R |
| 001C hex | Product name | *5 | 32 | R |

*1. R: Read using Reading of multiple registers (03 hex).
W: Write using Writing of multiple registers (10 hex).

*2. The contents of the product codes are as follows.

| Product Code | Model |
|---|---|
| 068F hex | S8VK-X09024A-EIP |
| 0690 hex | S8VK-X12024A-EIP |
| 0691 hex | S8VK-X24024A-EIP |
| 0692 hex | S8VK-X48024A-EIP |
| 0693 hex | S8VK-X03005-EIP |
| 0694 hex | S8VK-X06012-EIP |
| 0695 hex | S8VK-X06024-EIP |
| 0696 hex | S8VK-X09024-EIP |
| 0697 hex | S8VK-X12024-EIP |
| 0698 hex | S8VK-X24024-EIP |
| 0699 hex | S8VK-X48024-EIP |

*3. The device revision is as follows.
Example: In the case of version 1.23
Major: 0001 hex
Minor: 0023 hex

*4. IP address, subnet mask, default gateway are as follows.
Example: C0 A8 FA 14 hex (192.168.250.20)

*5. Product name is in ASCII notation.
Example: 53 38 56 4B ... hex (S8VK ...)

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