KEYENCE

KV-X COM General Catalogue

KV-X COM

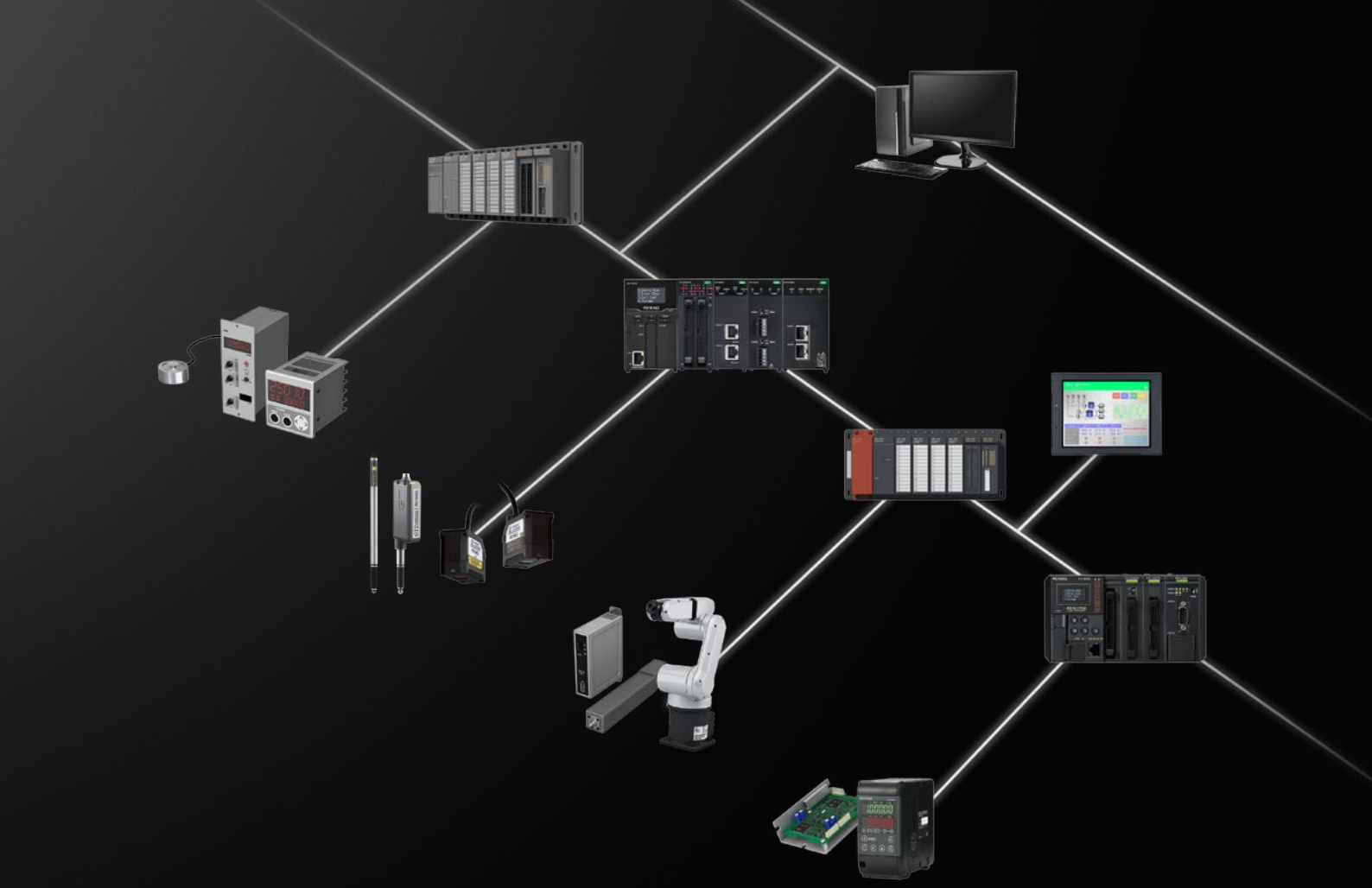
Connect instantly!

Introducing the next generation of communication units

Communication: The new way to select PLCs

Conventionally, PLCs have been selected based on
the maintenance personnel's familiarity and experience in programming.
Nowadays, as the Internet-of-Things is gaining momentum,
PLCs are expected to communicate with all levels of devices—from host systems to sensors—
and communication functions have become an important selection factor.
This catalogue addresses the questions of what the future of production sites will look like and
what kind of products can best help customers.

KV-X COM



Current Challenges

Successive development of networks and ever-changing interfaces

Today, networks are influenced by industry trends and PLC manufacturers, while Ethernet is increasingly being adopted as the communication device interface. In these situations, PLCs must be selected taking networks and interfaces into account.

Complicated communication programs and considerable effort required to establish communication

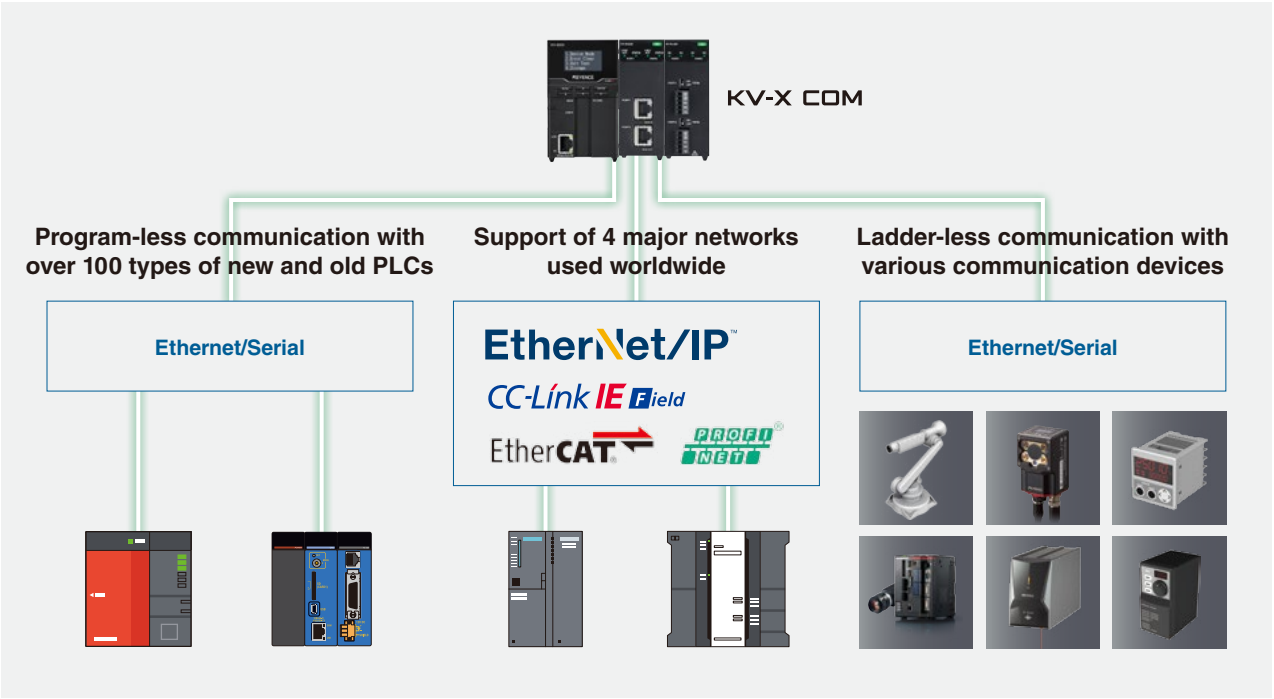
Communication programs not only contain complicated string handling and handshaking but also are hard to monitor. In addition, trial and error are often repeated before communication with devices is established, resulting in a significant number of hours spent on labour.

Connect to any device instantly

Communicate with various devices from sensors and measurement systems to PLCs

Connectible to various PLCs and FA devices from all over the world

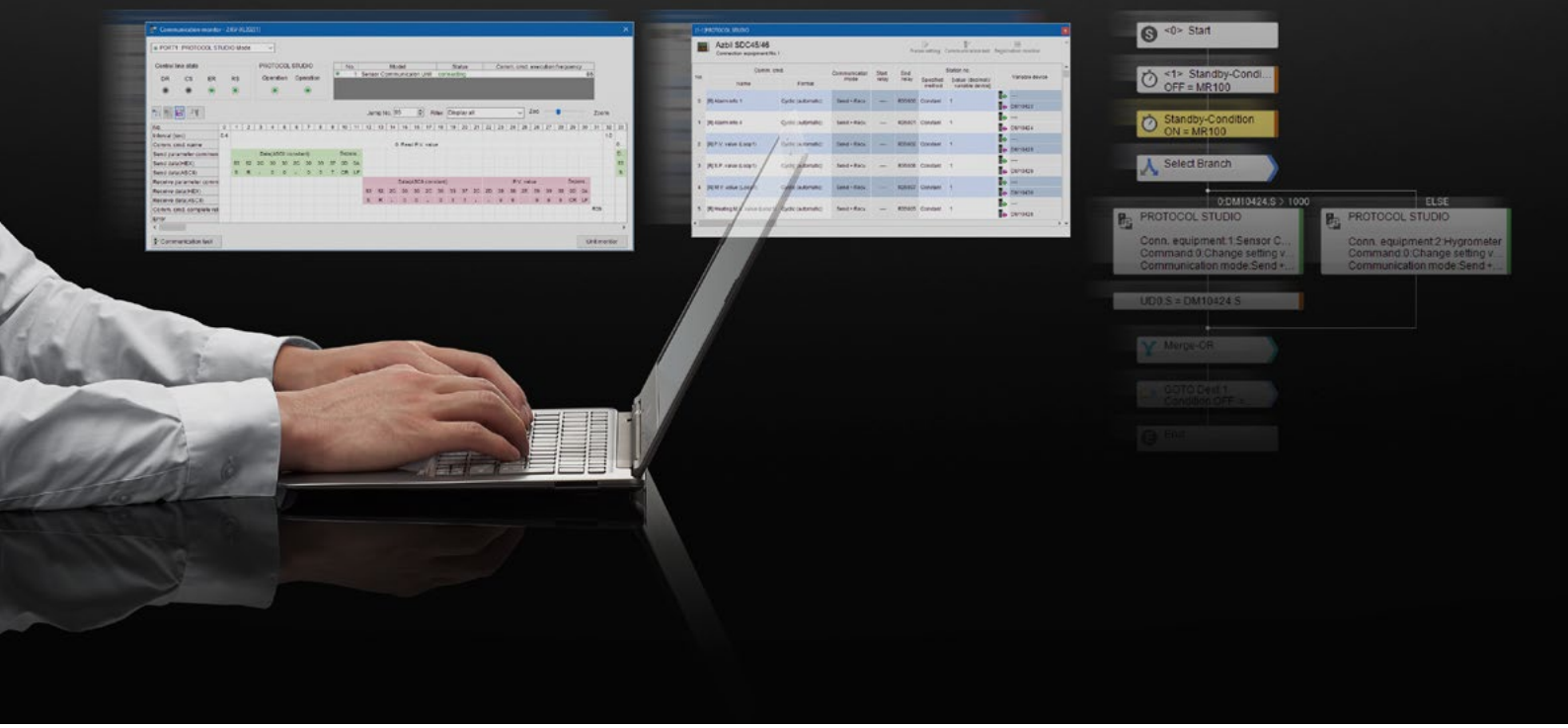
PLC links can be established with PLCs from each vendor without the need for programming. A wide range of industrial Ethernet networks, which depend heavily on PLC manufacturers, are also supported. In addition, KV-X COM can communicate with KEYENCE sensors and other various communication devices, both via Ethernet and serial communication, without using a ladder. This allows for connectability to any device.



EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

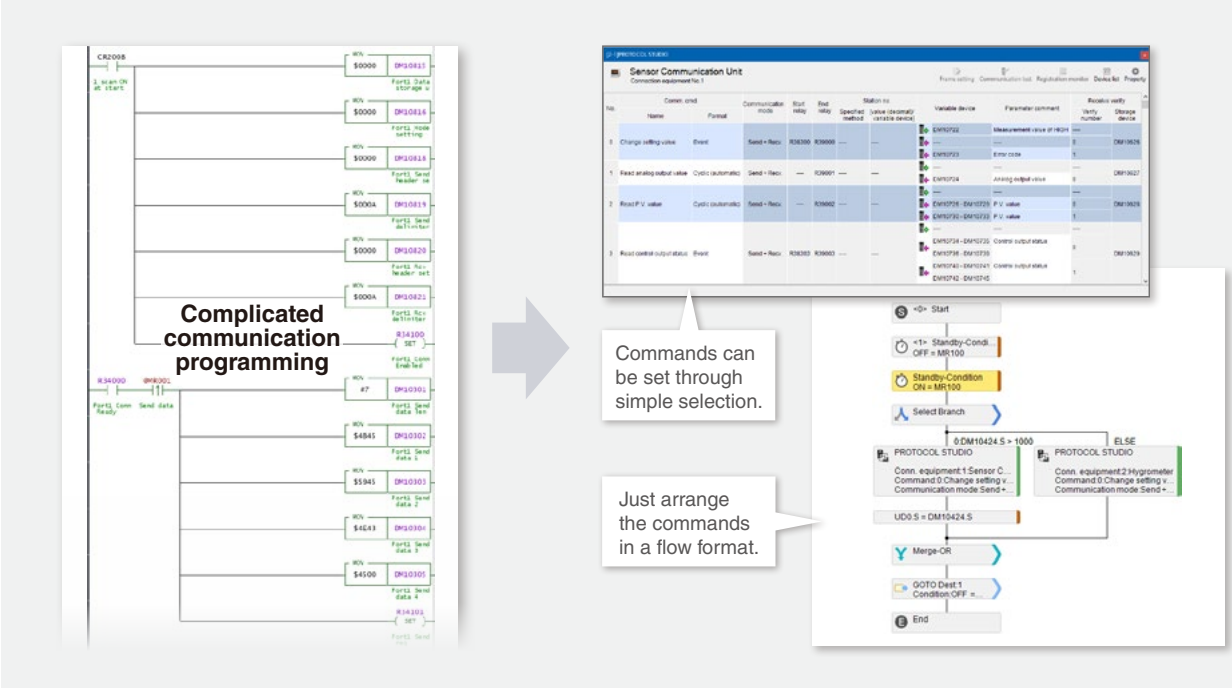
Instant communication

Drastic reduction of communication-related work hours, from programming to debugging



No programming required for communication

Formatting/command definition and processing during command transmission/reception can be performed on communication programs without using a ladder. In addition, various debugging functions are available to drastically reduce trial and error, the conventional method used repeatedly to identify the cause of a problem. These functions dramatically decrease complexity in communication programs.



KV-X COM LINE-UP

X-Unit

Ethernet Unit
KV-XLE02

EtherNet/IP™
EtherCAT®
CC-Link IE Field
PROFINET®

Hardware	Functions					Software
Ethernet	EtherNet/IP™	PROFINET*3	Sensor application	KV socket	E-mail sending/ receiving	Ladder program
Communication speed: 1 Gbps	EtherCAT®*1	PLC link	Modbus/TCP client/server	Host link	Unit interrupt	Flow
2 ports	CC-Link IE Field*2	PROTOCOL STUDIO	FTP client FTP server	MC protocol/ SLMP	Inter-unit synchronisation	

*1 Slave *2 Intelligent device station *3 Device

CPU Lineup

CPU Unit with
Built-In EtherNet/IP™ Port
KV-8000

EtherNet/IP™

Basic performance	Hardware	Functions	
Program capacity: 1500k steps max.	Ethernet	Machine Operation Recorder function	Host link
CPU memory capacity: 64 MB	Communication speed: 100 Mbps	EtherNet/IP™	MC protocol
LD/OUT instruction: 0.96 ns	USB2.0	Sensor application	E-mail sending/ receiving
		FTP client FTP server	Unit interrupt
		KV socket	Inter-unit synchronisation

EtherNet/IP™ Compatible Communication Unit

EtherNet/IP™ Compatible
Communication Unit
KV-EP02

EtherNet/IP™

Basic performance	Hardware	Functions
2 ports (built-in switching hub function)	Ethernet	EtherNet/IP™
Maximum number of connectable units: 15*	Transmission speed: 100 Mbps	

*The maximum number of units is 7 for analogue units.

X-Unit

Serial Communication Unit

KV-XL202
KV-XL402

Hardware		Functions				Software
RS-232C*1	Communication speed: 230 kbps	PLC link	Modbus RTU master/slave	Host link	Inter-unit synchronisation	Ladder program
RS-422A/ RS-485*2	2 ports	PROTOCOL STUDIO	Non-procedure	Unit interrupt		Flow

*1 KV-XL202 *2 KV-XL402

Open Network-Compatible Expansion Units

FL-net Unit

KV-FL20V

FL-net

Hardware	Functions
Ethernet	FL-net Ver. 2.0
Communication speed: 100 Mbps	

CC-Link Unit

KV-CL20

CC-Link V2

Hardware	Functions
RS-485	CC-Link Ver. 2.0
Communication speed: 10 Mbps	

DeviceNet™ Unit

KV-DN20

DeviceNet™

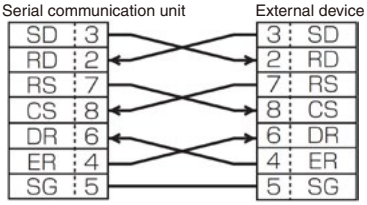
Hardware	Functions
RS-485	DeviceNet™
Communication speed: 500 kbps	

Dramatically Reducing the Time Required for Establishing Communication

Conventional models **Time and effort are required for trial and error before communication is established.**

❶ Wiring and communication settings

1. Wiring: Install wiring by referring to the instruction manual.



2. Communication settings: Adjust the settings of both the unit and the external device.

- Baud rate
- Station number
- Data bit length
- Start bit
- Stop bit
- Parity

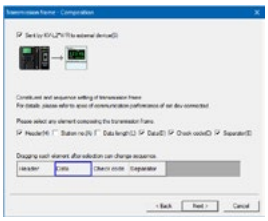
Flow before communication is established

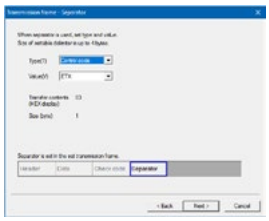
Improper wiring and communication settings as well as failures to apply communication settings are not detected.

❷ Communication format settings

▮ Using a ladder program

▮ Using support functions





Improper programming, format settings, and ASCII code inputs are not detected.

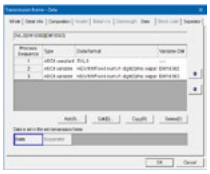
❸ Transmission and reception processing

▮ Using a ladder program

Reception processing

Transmission data setting/ transmission processing

▮ Using support functions



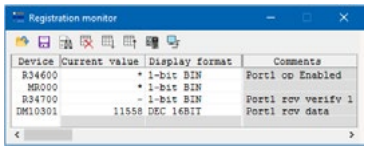
Transmission data/ reception data setting

Transmission/ reception processing

Improper transmission/ reception data entry and ASCII-binary conversions are not detected.

❹ Debugging

▮ Device monitor



▮ Using a protocol analyser or support monitor

Although it is possible to check the details of transmission commands and whether they have been completed, it is difficult to identify the cause of a failure to establish communication.

Although it is possible to understand if communication could not be established, it is difficult to identify the cause.

The cause of a problem is identified through trial and error (going back and reviewing each setting).

KV-X COM

KV-X COM

Communication is established faster because the causes of problems can be isolated during the establishment process

1 Wiring and communication settings

1. Wiring
Install wiring by referring to the instruction manual.

2. Communication settings
Adjust the settings of both the unit and the external device.

3. Communication test
Check communication by directly inputting transmission commands.

Communication test function

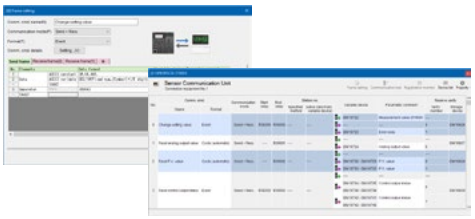
Flow before communication is established

Wiring and communication settings can be checked through communication test.

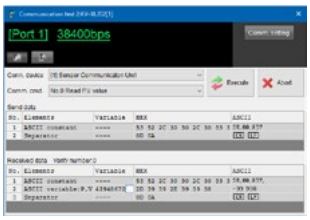
Wiring/setting check completed

2 Communication format and transmission/reception command settings

PROTOCOL STUDIO



Communication test function: PROTOCOL STUDIO mode



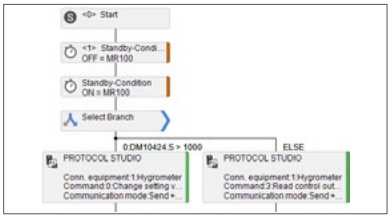
Commands can be set interactively without the need for programming.

Set commands can be checked as they are using communication test.

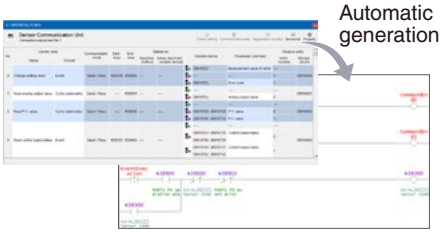
Command check completed

3 Transmission and reception processing

Using a flow



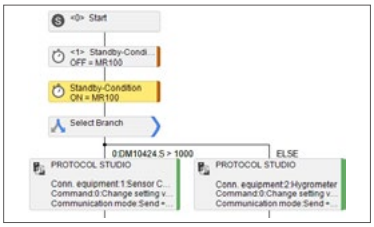
Using a ladder program



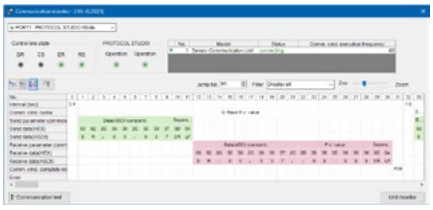
Can be set by creating a flow without taking into account handshaking and exclusive command control.

Automatic generation even when using and writing a ladder program.

4 Debugging



The execution status can be checked in a flow format.



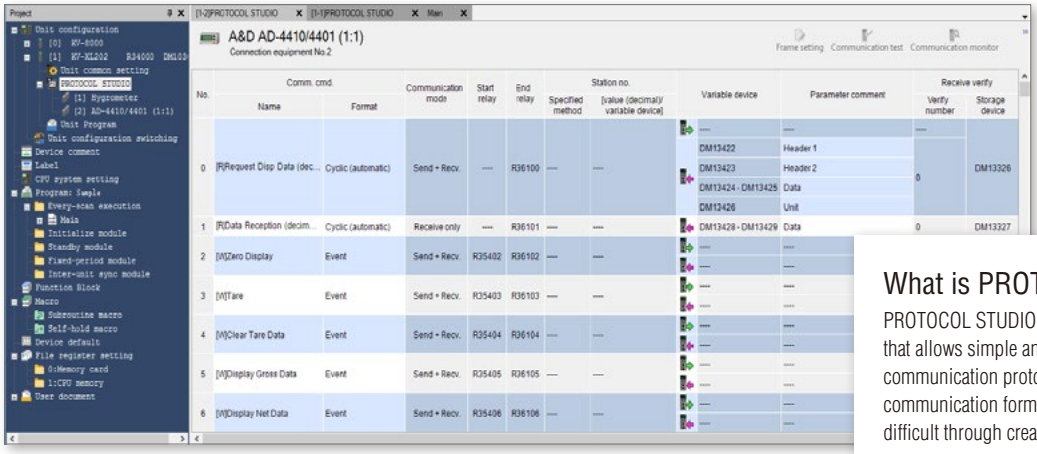
Commands and responses can be checked in real time.

Communication debugging is possible, including checking the transmission/reception processing programs.

Trial and error for identifying the cause of a problem is minimised because causes can be isolated during setting configuration and programming.

Support for creating communication protocols for a wide variety of devices

PROTOCOL STUDIO for Ethernet/Serial



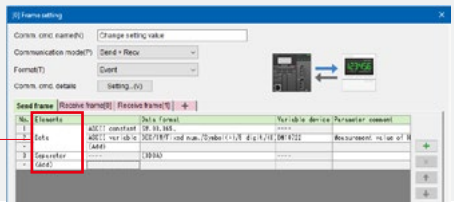
What is PROTOCOL STUDIO?

PROTOCOL STUDIO is a tool built into KV STUDIO that allows simple and interactive setting of communication protocols, including definition of communication formats and commands, which is difficult through creation of a ladder program.

Ladder-less communication using PROTOCOL STUDIO

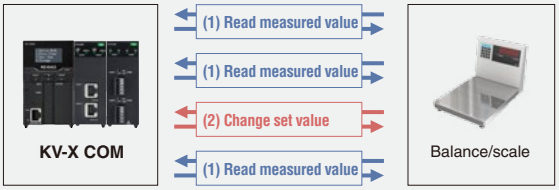
Defining communication formats and creating communication commands are possible simply by configuring the settings of a dedicated tool instead of conventional methods requiring a ladder program to be written. Such ladder-less communication leads to reduced work hours.

Simply set the communication formats on the tool.



Automatic adjustment of communication schedules

The transmission timing of multiple commands is automatically adjusted within the unit. This is ideal when changing communication device settings during cyclic communication as there is no need to worry about conflicting commands.



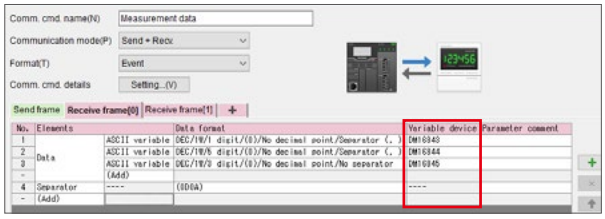
Ethernet communication support

Ethernet communication is supported. Socket communication-specific open and close operations are also executed automatically, reducing time spent on programming.

Ethernet communication　　Serial communication

Easy reception processing of multiple datasets

Even when multiple datasets are received, the datasets can be automatically stored into devices simply through specification using variables. No manual data segmentation is required.



Over 100 types of preset commands

Various communication commands have been preset for typical communication devices. Communication can be established immediately without having to check the device's manual.

Buffer memories configurable for device assignment

Data memories (DMs) or buffer memories (UGs) can be specified for each communication command. This is effective in reducing the number of used data memories.

Automatic program generation using drag and drop

A ladder program or flow can be generated automatically using drag and drop from preset communication commands. This prevents programming errors.

Automatic conversion from ASCII to binary

Received ASCII data is automatically stored in the device after conversion to binary. Additional data conversion is not required for use in programs.

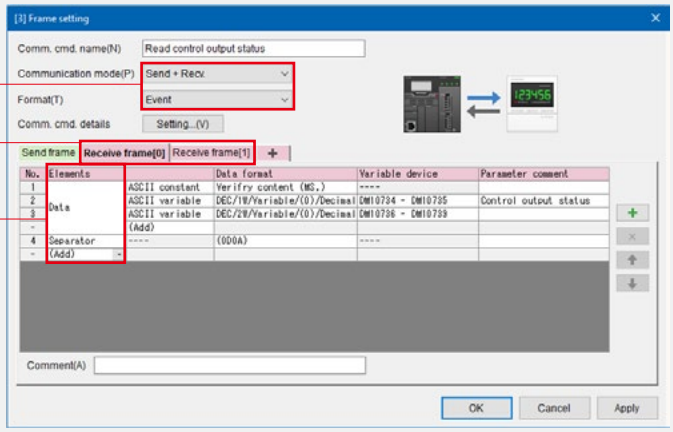
Simple 3 step setting configuration

STEP 1 Communication format settings

Select the communication pattern and form (event/cyclic).

Up to 16 receive frames (responses) can be set for each command.

Set the frames according to the communication format of the connected device.

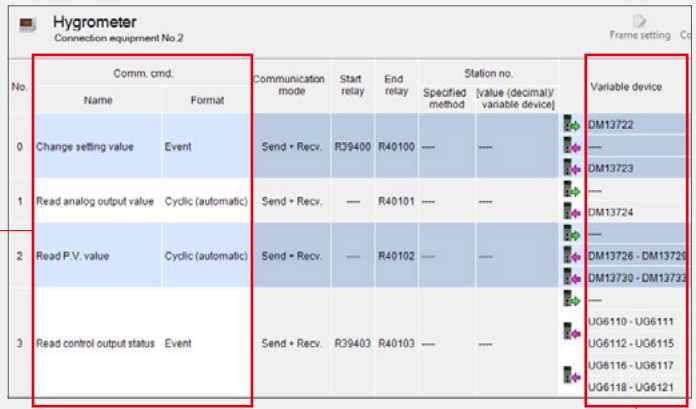


STEP 2 Command/ response settings

Up to 320* communication commands can be created.

* For KV-XLE02. Up to 96 commands for KV-XL202/XL402.

Device assignments can be selected from data memories (DMs) and buffer memories (UGs).



STEP 3 Automatic program generation

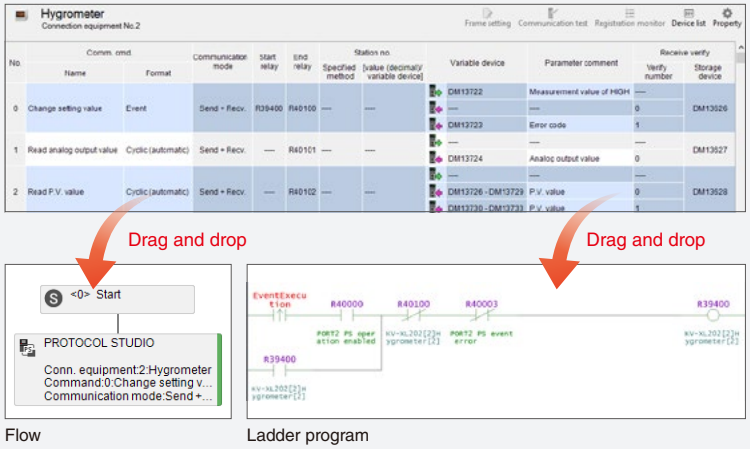
Flow:

Flow blocks with pre-registered settings are generated automatically (PROTOCOL STUDIO).

Ladder program:

A ladder program is automatically generated using only drag and drop from each communication command.

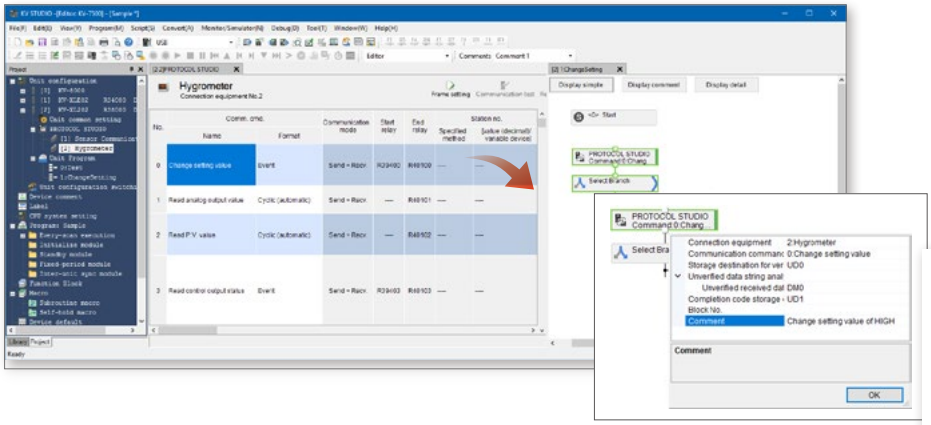
▮ Enable operation ▮ Execute event
▮ Obtain execution result ▮ Clear error
▮ Obtain error details



Flow

Ladder program

Flow



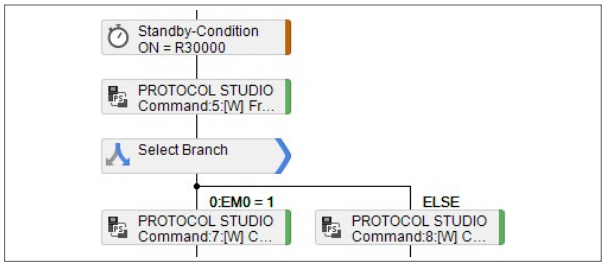
What is a flow?

A flow is a function that allows programming simply by arranging blocks exactly according to an operation flow and then setting the properties

→ Refer to page 18 for details on flow blocks.

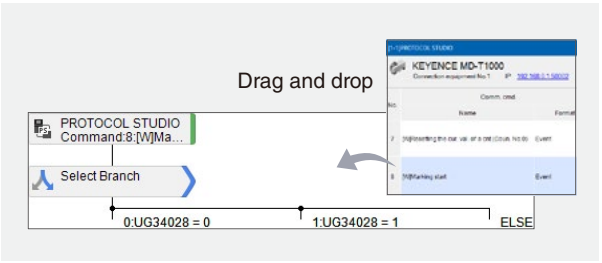
Flow that can be executed exactly according to an operation flow

Communication tends to become complicated with many conditional branches and handshakes. Using a flow allows for intuitive creation of a program without taking handshaking into account and instead by simply arranging blocks according to an operation flow.



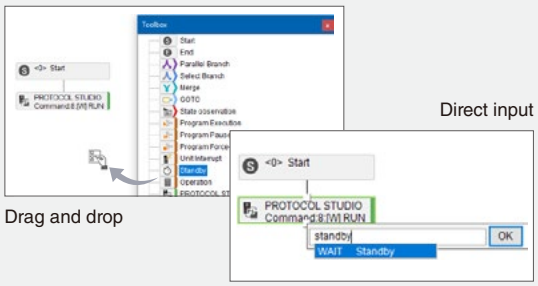
Link with PROTOCOL STUDIO

Set command execution blocks can be arranged using only drag and drop from PROTOCOL STUDIO. Because data is linked, selection branches are also arranged automatically according to the number of responses, allowing for smooth configuration of settings.



Improved efficiency with RT (Real Time) editing

In addition to dragging and dropping from the toolbox, blocks can also be arranged by directly inputting the block name. There is no need to use a mouse, making programming more efficient.



▮ Intuitive and useful shortcuts

Connect blocks	Ctrl + ↑↓		Switch block display	Ctrl + G	
Insert block	Insert		Display properties	Enter	

Easy access to the CPU device

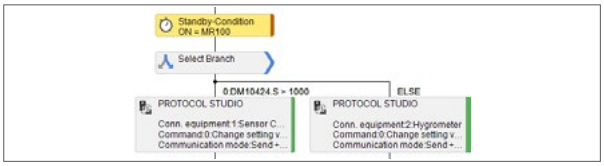
The CPU device is accessible from a flow. In addition to unit devices (UGs/UDs), the CPU device can also be used freely within a flow.

Automatic execution of cyclic communication

Blocks do not need to be arranged for communication commands set to cyclic with PROTOCOL STUDIO because the commands are executed automatically by the unit.

Highly visible flow monitor

The progress of a program can be more easily understood because the active (running) block can be checked visually. Debugging efficiency is also improved because step execution and break are possible for each block.



Flow programming in 2 steps

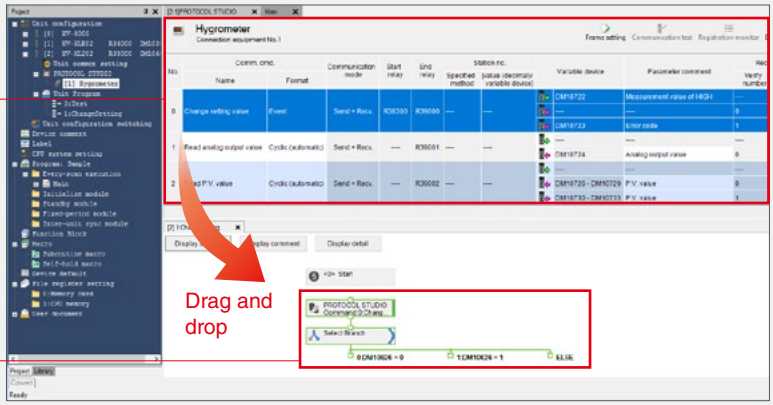
STEP 1

Flow block arrangement

Blocks can be arranged using only drag and drop from communication commands created with PROTOCOL STUDIO.

Sidebar docking enables smooth flow creation.

A selection branch block is also arranged simultaneously according to the number of set responses.



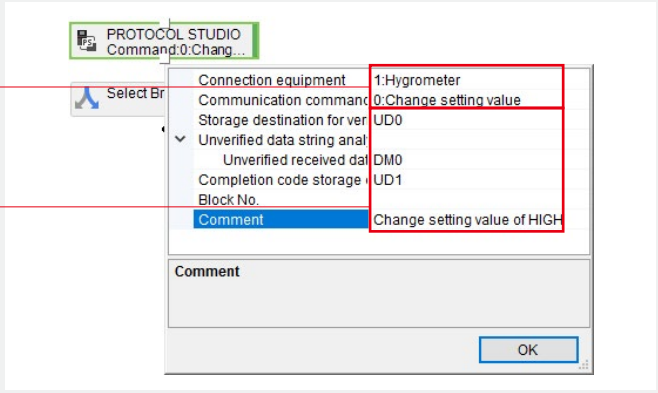
STEP 2

Property settings

Settings configuration is completed simply by double-clicking the created block and inputting the required settings.

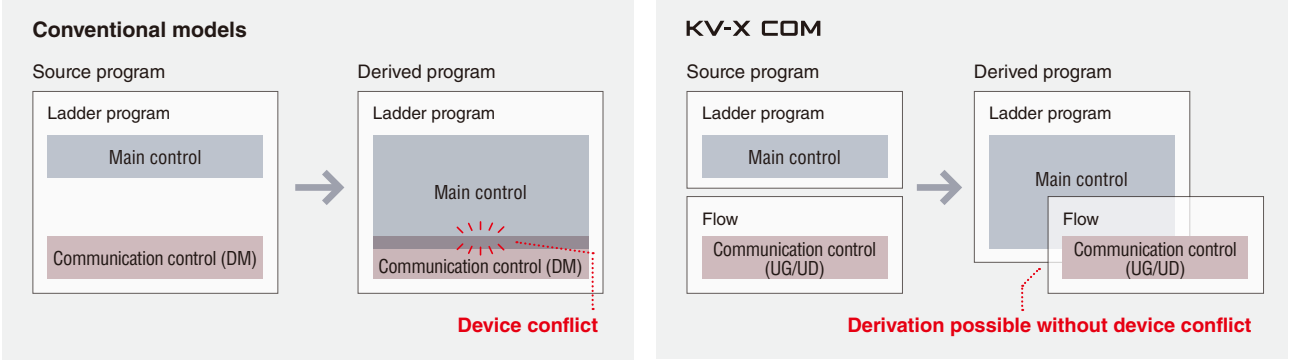
Connected devices and communication commands are set automatically.

Input the location to store received data and completion codes. Specify unit devices (UGs/UDs) and the CPU device.



Efficient derivation through capitalisation of flows

KV-X COM has buffer memories (UGs) and unit internal data memories (UDs) within the unit. Use of UGs/UDs in flow-based programming enables efficient derivation because it eliminates device conflict in a derived program.



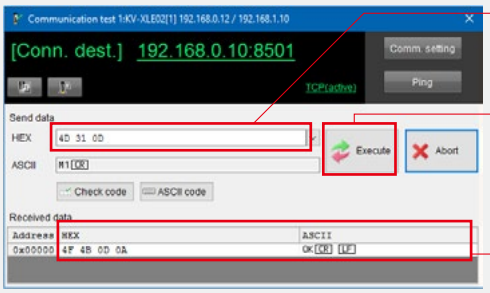
Drastically improved debugging efficiency

Debugging Function that Visualises the Communication Status

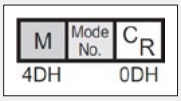
Communication test function

Ethernet | Serial

This function makes it possible to check the connection status and the received data simply by inputting a communication command of the connected device as it is. There is no need to create a communication program only for debugging, thereby improving the efficiency of debugging. Testing a command created with PROTOCOL STUDIO is also possible.

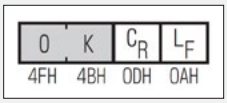


(1) Input a command
Directly input a transmission command referring to the communication device's manual.



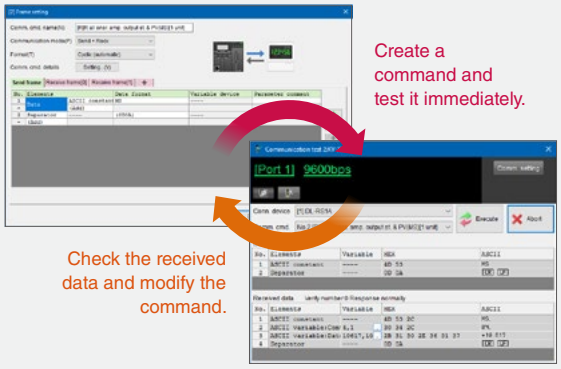
(2) Execute
Send the command with a single execute button.

(3) Check the response
The received data can be checked in two formats, HEX and ASCII.



Smooth debugging linked with PROTOCOL STUDIO

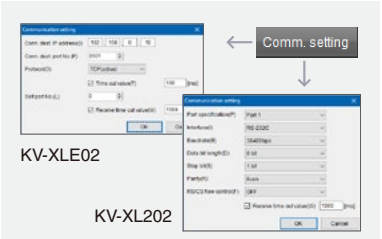
Send a created command as is without using a ladder. This makes it possible to check the response and modify the command immediately, thereby improving debugging efficiency.



Efficient trial and error while changing settings

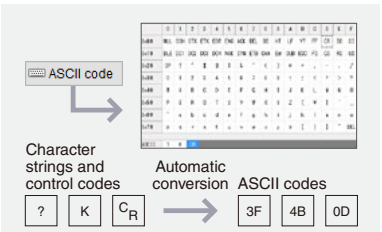
Trial and error possible without rewriting the program

With conventional models, the communication settings require that the program be rewritten and the settings transferred. Now, communication settings can be changed smoothly, thereby increasing the efficiency of processes before establishing communication.



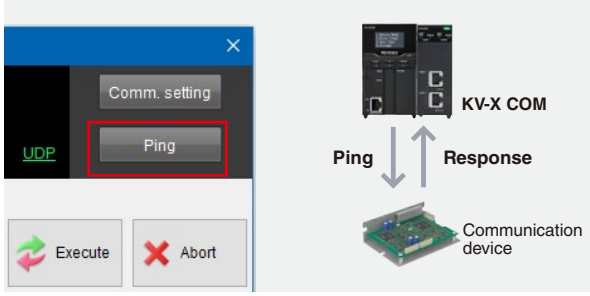
Easy input of ASCII codes using a keypad

Previously difficult input of ASCII codes corresponding to control codes is now possible simply by selecting the codes on a keypad.



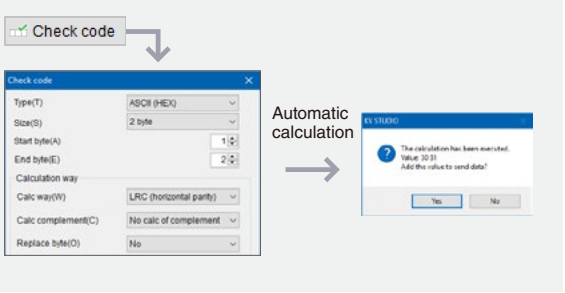
Single-button ping transmission

A single click of the Ping button allows users to check if the network is connected properly.



No check code calculation program required

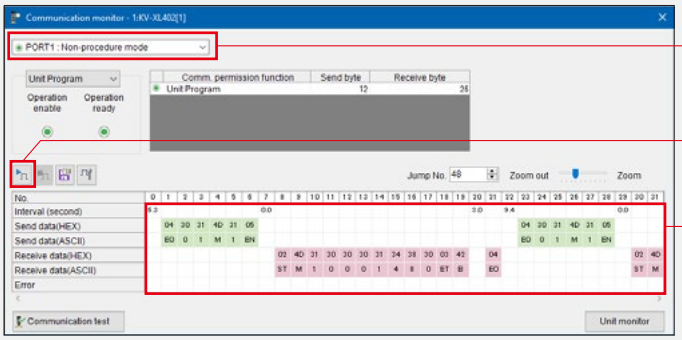
A check code can be automatically calculated and applied simply by using the check code button to enter the required settings. No complicated calculation is required.



Communication monitor function

Ethernet | Serial

This function makes it possible to monitor transmission and reception statuses while running a program without using special equipment such as a protocol analyser.
This function can be utilised in various scenarios such as debugging at start-up, including communication program check, and analysis when an unexpected communication error occurs.



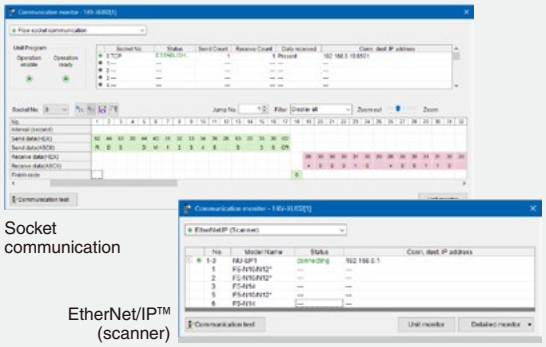
(1) Select a function
Select a function to monitor from the pull-down menu.

(2) Start monitoring
Monitor sent/received data in real time with a single click.

(3) Check the communication status
Check sent/received data and comparison/ error statuses.

Multiple built-in monitoring functions

Multiple monitoring functions are available for checking detailed information, including socket communication and industrial Ethernet. These functions can be utilised for wide variety of applications, allowing for more efficient debugging.

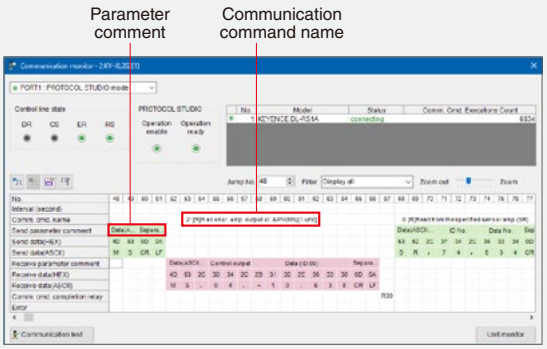


Socket communication

EtherNet/IP™ (scanner)

Automatic application of settings by linking with PROTOCOL STUDIO

Linking with PROTOCOL STUDIO makes it possible to check format information and set comments, allowing for more intuitive monitoring.



Highly flexible communication trace

Monitoring can be stopped at any timing using a built-in trace function. In addition to triggers based on error occurrences and a specific number of commands, stop triggers can also be written on a ladder program, allowing for flexible use according to the problem at hand.

Stop trigger executed from a ladder program

Can be utilised for analysing an error that occurs only under a specific condition

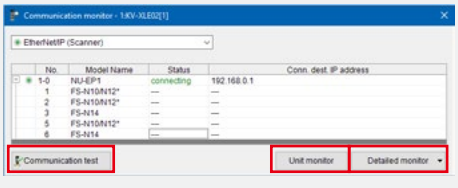
Set stop conditions

Communication data output in CSV format

Sent and received data being monitored can be output to a CSV file. This is useful for analysing a problem at a remote site.

Smooth start of function-related monitoring

Monitoring related to a selected function can be started from the communication monitor window. This is useful for monitoring changes in device values.



Displays a flow on a function-related monitor

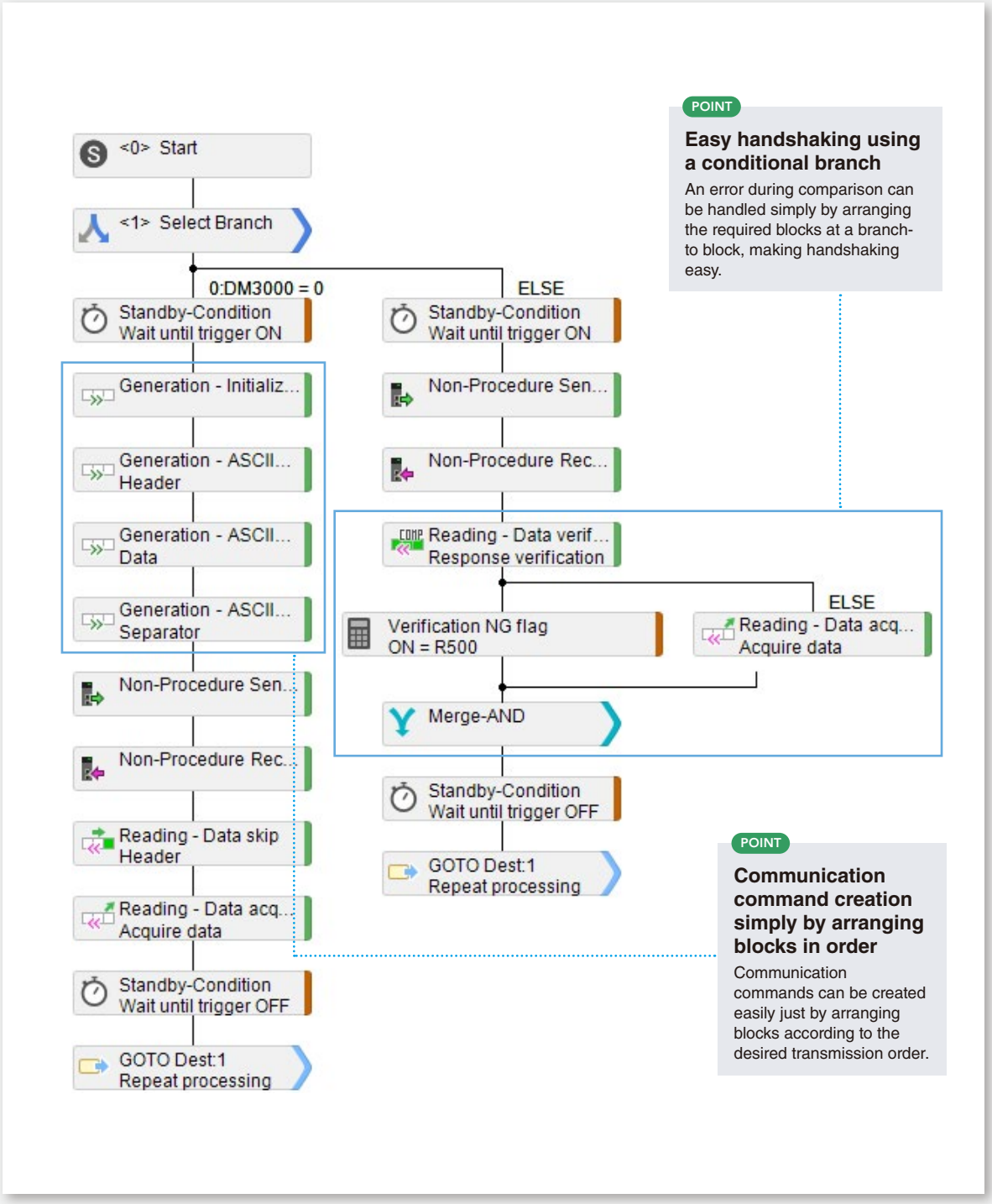
Improved efficiency even in advanced communication processing

Flow Programming

Highly flexible programming

Because flow blocks have been prepared separately for socket communication and non-procedure communication, communication processing is possible only using flows without the use of PROTOCOL STUDIO. This allows flexible operations of sent and received commands such as handshaking and comparison.

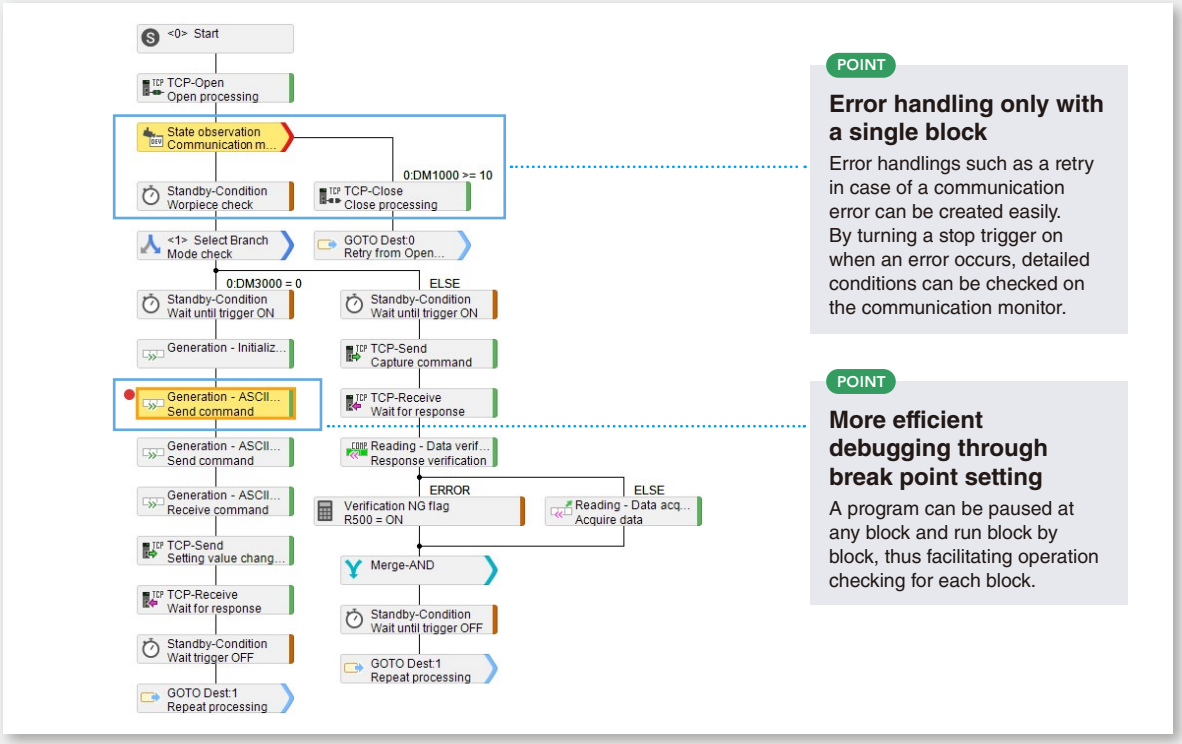
Example of a non-procedure communication program using a flow:



Efficient debugging using the flow monitor

The active block is highlighted on the flow monitor, making it easy to understand the flow progress intuitively.
In addition, break and step executions are possible at a desired block, improving debugging efficiency significantly.

Example of a socket communication program using a flow:



POINT

Error handling only with a single block

Error handlings such as a retry in case of a communication error can be created easily. By turning a stop trigger on when an error occurs, detailed conditions can be checked on the communication monitor.

POINT

More efficient debugging through break point setting

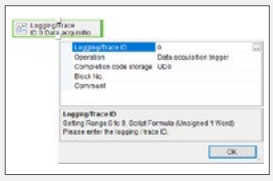
A program can be paused at any block and run block by block, thus facilitating operation checking for each block.

Easy logging and FTP transfer of acquired data

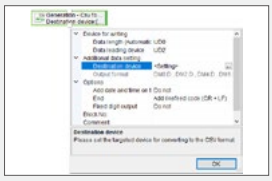
Flow blocks specifically designed for storage functions are available. The entire procedure from logging data captured through communication at a desired timing to uploading the data to the host system via FTP can be carried out without using a ladder, facilitating information accumulation and traceability on production sites.

Flexible logging blocks

Various logging blocks are available, including blocks linked to logging settings and blocks that create data in CSV and other formats, making it possible to accumulate data in the desired format.



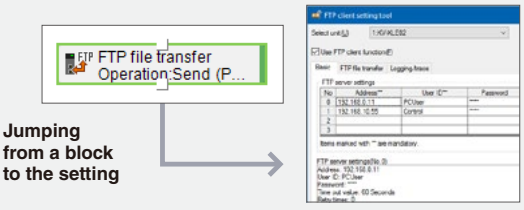
Logging/Trace



Generation - CSV format

FTP file transfer block

Files in the CPU memory or on a SD card can be uploaded to a PC at any time via FTP. The FTP setup tool can be easily accessed by right-click, allowing for smooth configuration of settings.



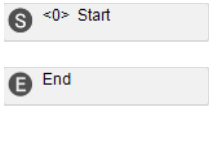
49 block types with support for a wide variety of applications

Flow Blocks that Make Complicated Communication Programs Simple

Common

Ethernet | Serial

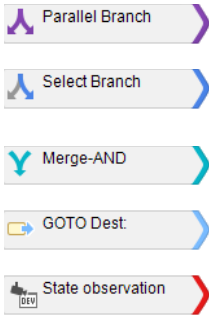
Start/end blocks



Starts a flow and activates a connect-to block. Be sure to set one start block for each flow.

Stops the processing. An end block is required for each branch. It can also be omitted.

Connection blocks



Activates all blocks connected to the branch-to block when activated.

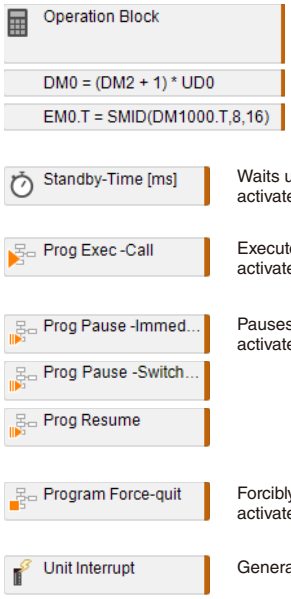
Activates blocks connected to the branch-to block that satisfy the branch condition when activated.

Activates the merge-to block if the merge condition is satisfied when activated.

Activates the block with the specified number when activated.

Deactivates all active blocks in the relevant flow and in the flow called from that flow when the condition is satisfied. After the process is completed, the flow proceeds to the block to be activated when the condition is met.

Control blocks



Executes the set script expression when activated.

Waits until the set condition is met when activated.

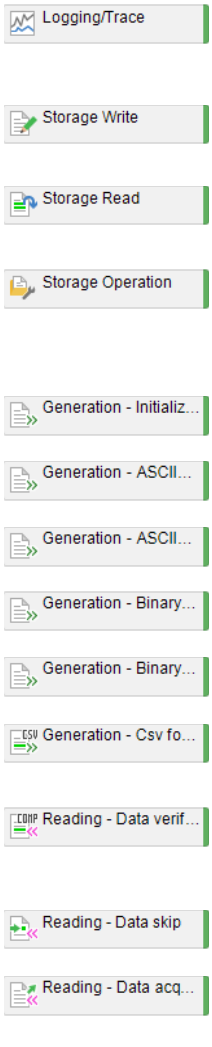
Executes another unit program when activated.

Pauses and resumes the flow when activated.

Forcibly stops the unit program when activated.

Generates a unit interrupt when activated.

Storage blocks



Links with the logging/trace functions of the CPU unit to run the enable, disable, and collect data triggers for logging/trace from the flow.

Writes a data column to the specified file.
* The data to write is created through a combination of "Generation - * " blocks.

Reads the data of the specified file to the device.* The read data is interpreted through a combination of "Reading - * " blocks.

Executes various file operations for the specified file or folder path.
(Create folder / Delete folder / Delete file / Copy / Move / Rename file / Obtain free space information / Obtain file status / Request CPU memory saving)

Initialises device values for generating data to be written to the storage.

Converts the device value to an ASCII string and adds it to the data column.

Adds a fixed ASCII string to the data column.

Adds the binary column stored in the device to the data column.

Adds fixed binary data to the data column.

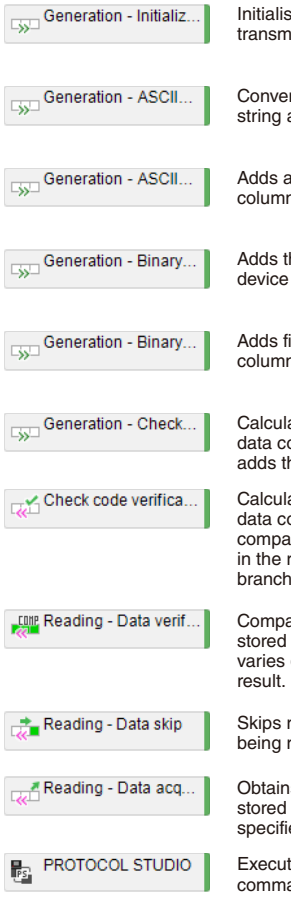
Converts multiple device values into a comma-separated format and adds the values to the data column.

Compares data against the data column stored in the device. The branch-to block varies depending on the comparison result.

Skips reading when read data is being read.

Obtains a value from the data column stored in the device according to the specified format.

Communication blocks



Initialises the device for generating transmission data.

Converts the device value to an ASCII string and adds it to the data column.

Adds a fixed ASCII string to the data column.

Adds the binary column stored in the device to the data column.

Adds fixed binary data to the data column.

Calculates the check code against the data column stored in the device and adds the result to the data column.

Calculates the check code against the data column stored in the device and compares the result with the check code in the received data to perform branching.

Compares data against the data column stored in the device. The branch-to block varies depending on the comparison result.

Skips reading when received data is being read.

Obtains a value from the data column stored in the device according to the specified format.

Executes the set communication command using PROTOCOL STUDIO.

KV-XLE02

Ethernet

Communication blocks

TCP TCP-Open	Opens a TCP socket for flow socket communication.
TCP TCP-Close	Closes the TCP socket for flow socket communication.
TCP TCP-Send	Transmits data via TCP.
TCP TCP-Receive	Receives data via TCP.
UDP UDP-Open	Opens a UDP socket for flow socket communication.
UDP UDP-Close	Closes the UDP socket for flow socket communication.
UDP UDP-Send	Transmits data via UDP.
UDP UDP-Receive	Receives data via UDP.
FTP FTP file transfer	Transfers a file via FTP.

KV-XL202/XL402

Serial

Communication blocks

Non-Procedure Sen...	Transmits data for non-procedure serial communication.
Non-Procedure Rec...	Receives data for non-procedure serial communication.
Non-Procedure Con...	Transmits a break and clears the buffer for non-procedure serial communication.

Advanced programming flow functions

Complicated processing and large-scale systems also supported

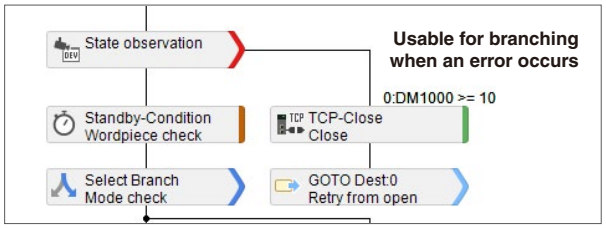
Large-scale systems and complicated programs are also supported thanks to the ability to use up to 20000 flow blocks as well as unit devices (UDs) of 512k words.

Easy access to the CPU device

The CPU device is freely accessible from within a flow. It is also easy to use inputs to the I/O unit as triggers for controlling communication.

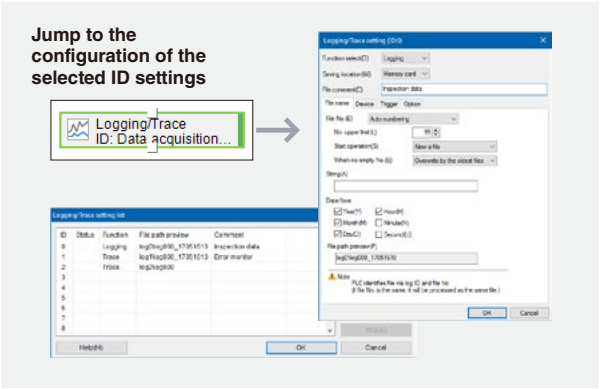
Error handling using status monitor blocks

Blocks in a flow can be deactivated when an error occurs, such as when intended data is not returned. Retry processes and similar programs can be integrated thanks to the ability to detect error occurrences collectively.



Logging using storage blocks

Logging/trace functions can be executed for storing the results into a memory card or the CPU memory. It is also possible to jump from a logging/trace block to the setup tool with a right-click, allowing for smooth configuration of settings.



Significantly increased script functions

Over 50 types of functions are newly available, including data conversion and string handling functions required for communication processing.

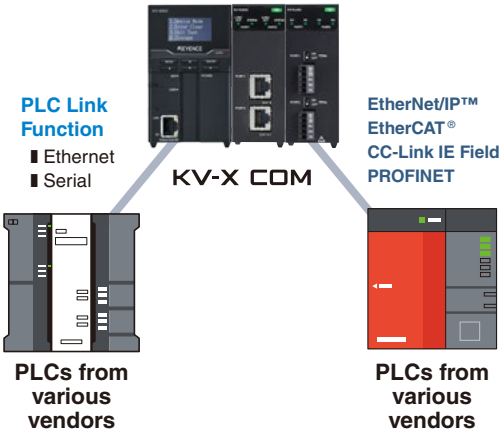
Data conversion functions	String handling functions	Data transfer functions
16 types, including TBCD, TBIN, and SWAP	37 types, including ASC, CHR, and MID	5 types, including BMOV and FMOV

Calculation function with character input support

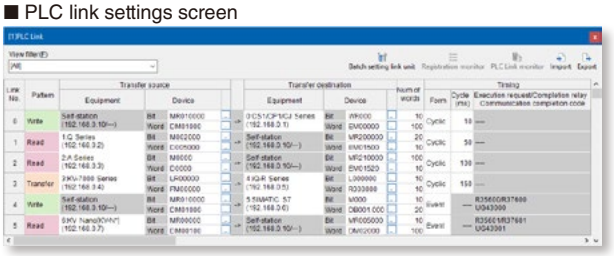
Strings can be handled on a block. Just as with a ladder program, devices can be handled as strings simply by adding a ".T" suffix.

Program-less communication with a PLC

PLC Link Function / Support of 4 Major Networks



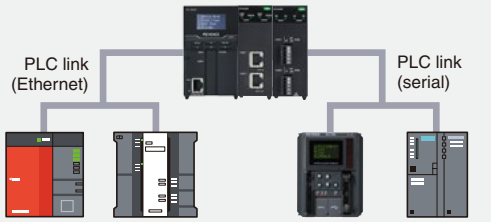
■ PLC link settings screen



PLC Link Function

Program-less communication with over 100 PLC models

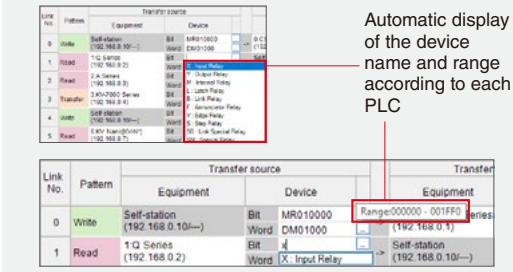
Because PLC links can be established without programs for both Ethernet and serial communication, it is possible, for example, to visualise data links and existing equipment in a previous or following process easily according to the interface of the target PLC.



→ Refer to page 28 for information on connectable models.

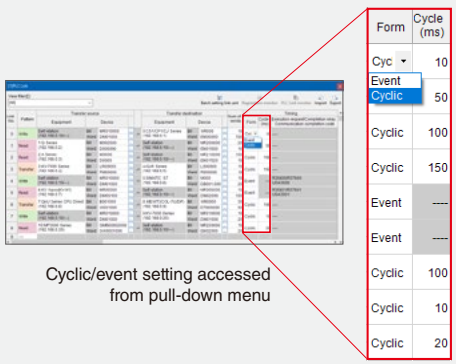
PLC device setting configuration with no need for manuals

PLC devices can be configured without reading the manual because the name and range are automatically displayed according to each PLC. Setting configuration is also made easier thanks to the search capabilities of RT (Real Time) Edit.



Not only cyclic but also event communication supported

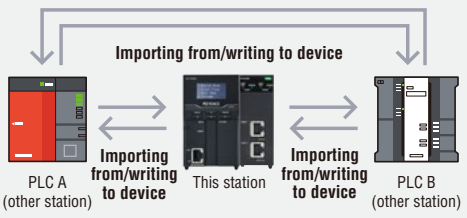
Selecting event communication allows communication to be stopped and resumed at any time such as with tooling changes. In addition, the communication status can be checked in a list using a dedicated monitor for both cyclic and event communication.



Cyclic/event setting accessed from pull-down menu

Large capacity PLC link of 720k words

A large-capacity PLC link that includes up to 16 models and 64 units is supported. A large capacity PLC link can be established easily thanks to the ability to read and write between PLCs on the same network simply by configuring the settings on KV-X COM.



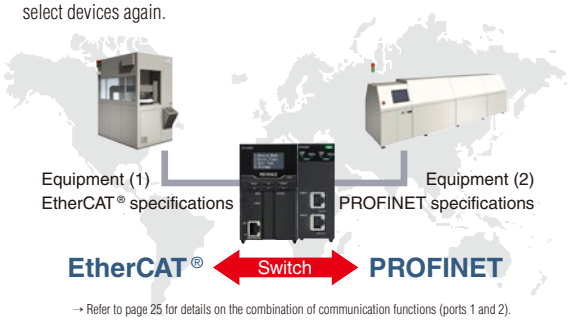
- Up to 16 models of 64 units supported in a total of 2 ports
- Up to 1440 words per setting
- Up to 737280 words (512 settings max.)

* For KV-XLE02

Industrial Ethernet —Support of 4 major networks—

Networks can be switched in a single unit

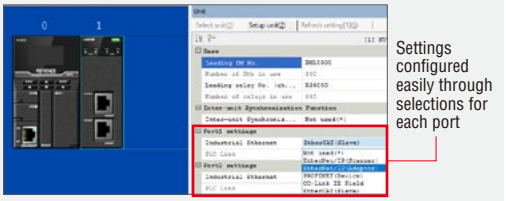
Because a single unit is able to support a variety of networks, there's no need to change the system configuration even if the network to connect to changes. This eliminates the hassle of having to configure settings and select devices again.



→ Refer to page 25 for details on the combination of communication functions (ports 1 and 2).

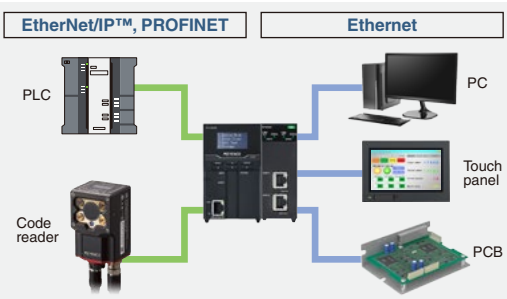
Easy configuration simply by making selections from pull-down menus

To switch between industrial Ethernet options, just select the network to use in the Unit Editor. This can be performed easily without any complicated programs or settings.



Different Ethernet networks can be used at the same time (EtherNet/IP™, PROFINET)

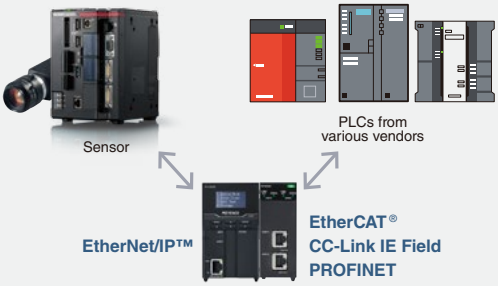
EtherNet/IP™ and PROFINET can use Ethernet communication functions such as socket communication, FTP, and PLC link within the same network. This makes it possible to construct seamless systems that include the host PC.



Gateway between different networks

Application

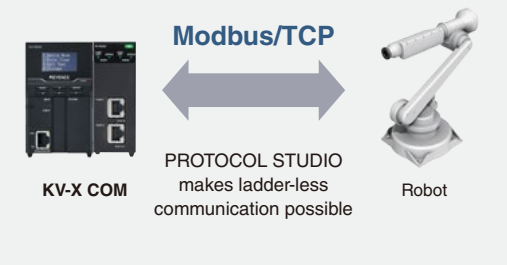
KV-X COM supports multiple networks, which makes it possible to use KV-X COM as a gateway controller in applications such as transmitting sensor information to PLCs from various vendors and to PLCs in the previous and next processes.



Increasingly expanding networks

Modbus/TCP support

Modbus/TCP servers can be supported by configuring settings on the Unit Editor, and Modbus/TCP clients can be supported using PROTOCOL STUDIO. Typical commands are also provided as standard, reducing time and effort before use.



Access to existing networks via SLMP

SLMP—used for communication with PLCs made by manufacturers such as Mitsubishi Electric—is also supported. Preconfigured SLMP commands are also standardly included with PROTOCOL STUDIO for easier establishment of communication.

Over 200 types of sensors can be connected with no program

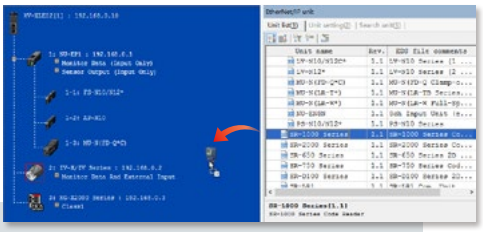
KV Sensor Network

This system allows program-free communication simply by selecting a sensor. The system can be used for various applications, including status monitoring, backing up of setting information, and batch changing of parameters.

KV-X COM

Current value

Setting change



Over 200 types of KEYENCE sensors

→ Refer to page 29 for information on connectable models.

Sensor applications

Sensor monitor function

Read the current sensor value in real time. For a code reader, for example, this facilitates preventative maintenance for printing quality.

KV-X COM

Current value

Printing quality can be checked by monitoring the matching level.

Code reader

Sensor setting backup function

Backup/restoring sensor setting information can reduce the work hours required for adjustments in cases such as when sensors are replaced or when problems occur.

KV-X COM

Set value | Response time

Backup

Restore

Flow sensor

Batch transmission function for sensor settings

Sensors can be changed over remotely because the settings of a registered sensor can be changed in batch at any time.

Sensor setting information

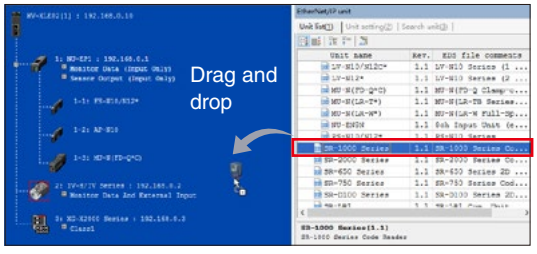
	Product A	Product B
Set value	250	150
Power mode	FINE	MEGA
Timer function	—	OFF delay

Batch writing of product data

Fibreoptic sensor

Easy configuration simply by making selections

Communication is possible simply by selecting and placing a sensor. Non-registered sensors can also be supported by adding EDS files.



System screens provided as standard —VT5—

KEYENCE Touch Panel Display VT5 is provided with setting/monitor screens as standard. Sensor monitoring and other functions are available without drafting.

Sensor setting restore

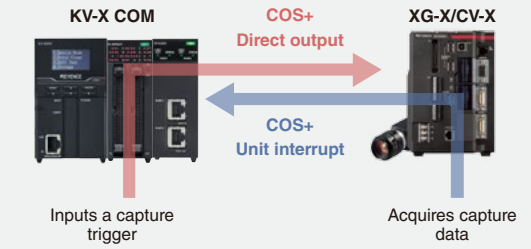
Sensor monitor

Applications that make use of the high speed and large capacity

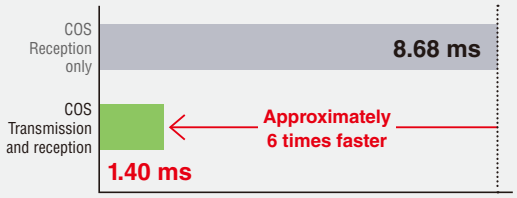
Vision system and high-speed alignment control — EtherNet/IP™ —

Support of transmission and reception by the COS (Change Of State) function enables high-speed data communication with KEYENCE XG-X/CV-X Series vision systems. Processing times can be reduced through faster alignment control with repeated image capturing.

▮ COS transmission and reception



▮ Transfer time comparison

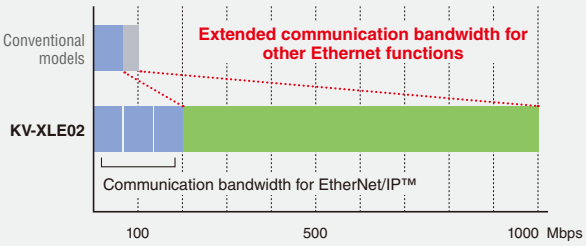


* When 100 bytes are transmitted/received using XG-X2000 and 10-ms RPI (using unit interrupts)

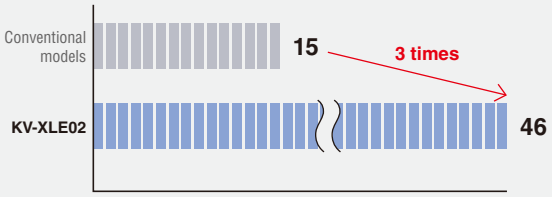
High-speed and large-capacity communication via Gigabit Ethernet

Gigabit support enables high-speed and large-capacity communication. This support not only makes it possible to triple the communication bandwidth for EtherNet/IP™ but also secures sufficient communication bandwidth for other Ethernet functions. This allows simultaneous parallel processing, achieving faster communication.

▮ Comparison of available communication bandwidths



▮ Number of connectable NU-EP1 units

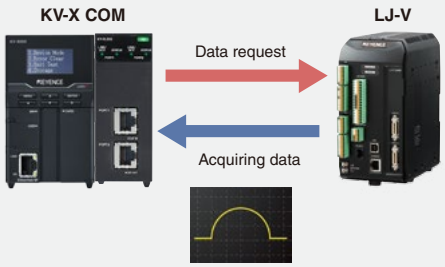


* With the NU-EP1 default settings (monitor data: 10 ms, high-speed output: 2 ms)

Further integration with the LJ-V — PROTOCOL STUDIO —

Diverse data, such as profiles and storage data, can be acquired from KEYENCE's LJ-V Series of 2D laser displacement sensors. The registered presets greatly reduce the amount of time and effort that is required to write programs.

▮ Receiving data from the LJ-V



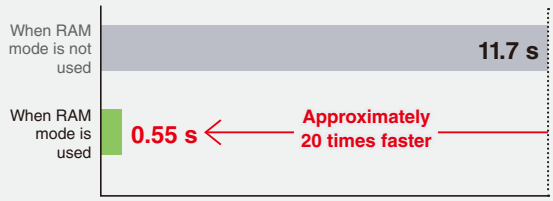
▮ Main preconfigured commands in PROTOCOL STUDIO

Acquiring the current OUT value	Acquiring the batch profile
Acquiring the storage data of the OUT value	Acquiring the storage data of the profile
Acquiring the current profile	Batch reading/writing of programs

High-speed transmission in RAM mode — FTP client/server—

If data is written to the CPU memory, the transfer time can be reduced by using RAM mode, which skips saving to a nonvolatile memory. This is effective when using the CPU memory as temporary storage for collected files.

▮ File write speed



* During write (PUT) of a 1 MB file

Multi-language support —FTP client/server—

File paths can be specified using Unicode (UTF-8). This allows file names in Chinese and other foreign languages to be transferred with no corruption of characters. File names can also now be set on a program, allowing for higher flexibility.

General specifications

Item	Specifications	
System configuration	KV-5000/3000 Series System configuration using an expansion unit	KV-8000/7000 Series System configuration with only an expansion unit
Supply voltage	24 VDC (±10%)*3	24 VDC (-15%/+20%)*3
Operating ambient temperature	0 to +50°C (No freezing)*1*2	0 to +55°C (No freezing)*1*2
Operating ambient humidity	10 to 95% RH (No condensation)*1	5 to 95% RH (No condensation)*1
Storage ambient temperature	-20 to 70°C*1	-25 to 75°C*1
Storage ambient humidity	10 to 95% RH (No condensation)*1	5 to 95% RH (No condensation)*1
Operating atmosphere	No dust or corrosive gas	
Operating altitude	2000 m or less	
Pollution degree	2	
Noise immunity	1500 Vp-p or more, Pulse width: 1 µs, 50 ns (based on noise simulator) IEC standard-compliant (IEC61000-4-2/3/4/6)	
Withstand voltage	1500 VAC for 1 minute (between the power terminals and the I/O terminals, and between the external terminals and the housing)	
Insulation resistance	50 MΩ or more (between the power terminals and the I/O terminals, and between the external terminals and the housing, with 500 VDC megohmmeter)	
Vibration resistance	Compliant with JIS B 3502 and IEC61131-2 Intermittent vibration: Frequency / Acceleration / Half amplitude 5 to 9 Hz — 3.5 mm 9 to 150 Hz 9.8 m/s² — Continuous vibration: Frequency / Acceleration / Half amplitude 5 to 9 Hz — 1.75 mm 9 to 150 Hz 4.9 m/s² —	No. of scans 10 times in each of the X, Y, and Z directions (for 100 min.)
Shock resistance	Acceleration: 150 m/s², Operation time: 11 ms, 2 times in each of the X, Y, and Z directions	
Internal current consumption	200 mA or less	
Weight	Approx. 190 g	

*1 Guaranteed range in which the system can be used.
*2 Specified according to the temperature in the control panel on the lower side of the unit.
*3 Supplied via the CPU or expansion unit.

Number of sockets by function

Function name	Number of sockets TCP	Number of sockets UDP	Port number
PC application*1	8	0	8500 (set within the range of 1 to 65535)
Modbus/TCP server	Total 15	1	502 (set within the range of 1 to 65535)*4
Host link communication*2*3		1	8501 (set within the range of 1 to 65535)
MC protocol communication*2*3		1	5000 (set within the range of 1 to 65535)*4
VT connection	0	1	8502 (set within the range of 1 to 65535)
FTP server	4	—	20, 21
Automatic clock data adjustment	—	1	123
E-mail transmission (SMTP, POP3)	2	—	25,110
DNS	—	1	53
FTP client	2	—	20, 21 (set within the range of 1 to 65535)
EtherNet/IP™ cyclic communication function	Total 320	1	2222
EtherNet/IP™ message communication function		1	44818
PROFINET	0	4	34964, 49152, 49153, 49154
PLC link	Total 64		Any (set within the range of 1 to 65535)
Flow	Total 32		Any (set within the range of 1 to 65535)
KV socket communication	Total 16		Any (set within the range of 1 to 65535)
PROTOCOL STUDIO	Total 16		Any (set within the range of 1 to 65535)

*1 KV STUDIO, KV COM+
*2 TCP socket and UDP socket can be used simultaneously.
*3 Up to 15 TCP sockets can be used.
*4 Port numbers can be set to TCP socket and UDP socket individually.

Performance specifications

Item		Specifications 10BASE-T	100BASE-TX	1000BASE-T
Connection interface		RJ-45 8-position modular connector × 2 ports		
Transmission rate*1		10 Mbps	100 Mbps	1000 Mbps
Transmission media*2		Category 3 or higher UTP or STP (STP is recommended)	Category 5 or higher UTP or STP (STP is recommended)	Category 5e or higher UTP or STP (double-shielded STP is recommended)
Maximum cable length*3		100 m	100 m	100 m
Maximum number of connectable hubs*4		4	2	1
Connectable CPU units		KV-8000/7500/7300		
Maximum number of connected units		6		
Refreshes		Automatic refresh, direct refresh, inter-unit synchronisation refresh		
Ethernet functions		KV socket communication, PLC link, PROTOCOL STUDIO, FTP server/client, e-mail sending/receiving, KV sensor network, Modbus/TCP server*5, MC protocol/SLMP*6, etc.		
Industrial networks*7		EtherNet/IP™, PROFINET, EtherCAT®*8, CC-Link IE Field*9		
Ethernet function execution methods		Ladder program, unit program (flow)		
Unit program capacity		3 MB (max. number of blocks: approx. 20000)		
Flow	Maximum number of flows	256		
	Number of simultaneous activities	Unlimited		
	Internal data memory	524288 words		
PROTOCOL STUDIO	Transmission method	Cyclic communication: Tx + Rx, Tx only, Rx only Event communication: Tx + Rx, Tx only, Rx only, Tx + Continuous Rx		
	Maximum number of connected devices	16		
	Maximum number of communication commands	160/320*10		
	Maximum number of total frames	Rx: 160/320*10 × 16 Tx: 160/320*10 × 1		
	Maximum number of compared and receive frames	16 per command		
	Maximum number of block elements	96 per frame		
	Transmission data length	Standard: 1 to 2048 bytes per frame Extended: 1 to 16384 bytes per frame		
	Received data length	Standard: 1 to 2048 bytes per frame Extended: 1 to 16384 bytes per frame		
PLC link	Communication patterns	Write, read, transfer		
	Number of link settings*11	512 settings max.*11		
	Link data size	1440 words max. per setting (bit: 720 words, word: 720 words) 737280 words max. (total) (1440 words × 512 settings)		
	Data unit	1 word		
	Number of connected models	16 models max.*11		
	Number of connected units	64 max.*11		
	Trigger types	Cyclic/event (64 settings max. for event*11)		
	Update interval	1 to 65535 ms		

*1 10 Mbps / 100 Mbps / 1000 Mbps MDI/MDI-X automatic switching function supported
*2 STP = Shielded twisted pair cable; UTP = Unshielded twisted pair cable
*3 The maximum cable length refers to the distance between the KV-XLE02 and the Ethernet switch.
*4 The maximum number is not limited when an Ethernet switch is used.
*5 Modbus is a trademark or registered trademark of Schneider Electric.
*6 SLMP is a registered trademark or trademark of Mitsubishi Electric Corporation.
*7 Trademarks of each industrial network:
- EtherNet/IP™ is a registered trademark or trademark of ODVA.
- PROFINET is a registered trademark or trademark of PROFIBUS Nutzerorganisation e.V.
- CC-Link IE Field is a registered trademark or trademark of Mitsubishi Electric Corporation.

*8 EtherCAT® is fixed at 100 Mbps. Not usable at different transmission rates.
*9 CC-Link IE Field is fixed at 1000 Mbps. Not usable at different transmission rates.
*10 The max. is 160 when "Standard" is set for the number of communication commands on the Unit Editor and 320 when "Extended" is set.
*11 Total for one KV-XLE02 unit.

EtherNet/IP™ communication specifications (scanner)

Item				Specifications
Supported transmission rates				1000BASE-T, 100BASE-TX, 10BASE-T
CIP service	Cyclic communication	Number of connections		256*1
		RPI (communication cycle)		0.5 to 10000 ms (0.5 ms unit) Can be set by connection. (Refresh data without depending on the number of nodes)
		Transmission trigger	Output to adapter	Cyclic/Change Of State*2
			Input from adapter	Cyclic/Change Of State*2
		Allowable band for cyclic communication*4	(504 bytes)	30000 (pps)*3
			(1444 bytes)	15000 (pps)*3
		Maximum number of refresh words		24k words
		Maximum data size for 1 connection*5		504 bytes or 1444 bytes
		Multicast filtering function*6		Yes (IGMP client function)
	Message communication	Class 3 (connection type)	Server	Number of connections: 256*7
		UCMM (non-connection type)	Client	Number of simultaneous actions: 32
			Server	Number of simultaneous actions: 256
EtherNet/IP™ conformance test				Compliant with CT13

*1 In total, the number of connections used for the message communication function in Class 3 (connection type) should be a maximum of 256.
*2 Can communicate with devices that output data using the Change Of State (Send data when any change occurs) method.
*3 Abbreviation of "packet per second", indicating the number of sent/received packets processed per second.
*4 If the communication bandwidth is more than 100 Mbps, use a 1000 Mbps compatible Ethernet switch.
*5 Data synchronism in a connection is guaranteed. If 505 bytes or more are used, the device used should support Large Forward Open (CIP option specification).
*6 Because the KV-XLE02 has an IGMP client function, unnecessary multicast packets can be filtered by using an Ethernet switch supporting IGMP Snooping.
*7 In total, the number of connections used for the cyclic communication function should be a maximum of 256.

EtherNet/IP™ communication specifications (adapter)

Item				Specifications
Supported transmission rates				1000BASE-T, 100BASE-TX, 10BASE-T
CIP service	Cyclic communication	Number of connections		256*1
		RPI (communication cycle)		0.5 to 10000 ms (0.5 ms unit) Can be set by connection. (Refresh data without depending on the number of nodes)
		Transmission trigger	Output to scanner	Cyclic/Change Of State*2
			Input from scanner	Cyclic/Change Of State*2
		Allowable band for cyclic communication	(504 bytes)	30000 (pps)*3
			(1444 bytes)	15000 (pps)*3
		Maximum number of refresh words		1444 words
		Maximum data size for 1 connection*4		504 bytes or 1444 bytes
		Multicast filtering function		No
	Message communication	Class 3 (connection type)	Server	Number of connections: 256*5
		UCMM (non-connection type)	Client	No
			Server	Number of simultaneous actions: 256
EtherNet/IP™ conformance test				Compliant with CT13

*1 In total, the number of connections used for the message communication function in Class 3 (connection type) should be a maximum of 256.
*2 Can communicate with devices that output data using the Change Of State (Send data when any change occurs) method.
*3 Abbreviation of "packet per second", indicating the number of sent/received packets processed per second.
*4 Data synchronism in a connection is guaranteed. If 505 bytes or more are used, the device used should support Large Forward Open (CIP option specification).
*5 In total, the number of connections used for the cyclic communication function should be a maximum of 256.

EtherCAT® communication specifications*1

Functions		Specifications
Supported transmission rate		100 BASE-TX
Process communication	Size	Rx: 0, 32, 128, 256, 512, 1016 bytes*2
		Tx: 0, 32, 128, 256, 512, 1016 bytes*2
	Supported modes	SyncManager Distributed Clock
Mailbox communication	Size	In: 128 bytes Out: 128 bytes
	Functions	SDO Request, SDO Response, SDO Information, CompleteAccess
Device profile		CoE
Explicit Device IDs		1 to 65535
SyncManagers		4 (0/1: Mailbox communication, 2/3: Process communication)
FMMUs		3
Diagnosis HistoryObject		Not supported

*1 EtherCAT® cannot be used simultaneously with another function because it uses two ports for IN and OUT.
*2 Both Rx and Tx cannot be set to 0 bytes simultaneously.

PROFINET communication specifications

Functions	Specifications
Supported transmission rates	1000BASE-T, 100BASE-TX, 10BASE-T
Supported functions	Cyclic communication (IO communication), record data communication, alarm communication
PROFINET cyclic communication	In: 16, 32, 64, 128, 232 bytes* Out: 16, 32, 64, 128, 232 bytes*
	RPI: 1, 2, 4, 8, 16, 32, 64, 128, 256, 512 ms
	Number of connectable controllers: 1
Applicable protocols	LLDP, DCP
PNIO version	V2.32
Conformance class	Compliant with Conformance Class A

* Sizes for each Slot. Up to 6 Slot can be set with In/Out respectively

CC-Link IE Field communication specifications

Functions		Specifications
Supported transmission rate		1000BASE-T
Supported network topologies		Star/Line/Ring
Operating station		Intelligent device station
Device type ID		1
Cyclic transmission	Max. size	RX: 128 channels RY: 128 channels RWr: 1024 words RWw: 1024 words
Transient transmission (server/client)	Max. size	968 bytes
Device file		CSP+
SLMP		Only diagnostic commands supported

Combination of communication functions (ports 1/2)

Port 2 \ Port 1	EtherNet/IP™ scanner*1	EtherNet/IP™ adapter*1	PROFINET*1	CC-Link IE Field*2	EtherCAT®*2	(Industrial Ethernet) Not used
EtherNet/IP™ scanner*1	X*4	X	✓	✓*6	X*5	✓
EtherNet/IP™ adapter*1	X	X	✓	✓*6	X*5	✓
PROFINET*1	✓	✓	X*4	✓*6	X*5	✓
CC-Link IE Field*2	X*7	X*7	X*7	✓*7	X*5	X*7
EtherCAT®*2	X*5	X*5	X*5	X*5	✓*5	X*5
(Industrial Ethernet) Not used	✓	✓	✓	✓*6	X*5	✓

*1 EtherNet/IP™ and PROFINET can be used together with a general-purpose Ethernet network*3.
*2 When CC-Link IE Field or EtherCAT® is selected, a general-purpose Ethernet network*3 cannot be used at the same time.
*3 A general-purpose Ethernet network refers to KV-XLE02's general Ethernet functions such as FTP and socket communication, which are available without using EtherNet/IP™, PROFINET, CC-Link IE Field, and EtherCAT® open networks.
*4 Both ports cannot be set to EtherNet/IP™ or PROFINET simultaneously.
*5 EtherCAT® uses two ports (IN/OUT).
*6 When the network topology is set to the star type.
*7 CC-Link IE Field can only be used on port 1. However, it occupies both port 1 and port 2 only when the network topology is set to the ring or line type.

General specifications

Item	Specifications	
System configuration	KV-5000/3000 Series System configuration using an expansion unit	KV-8000/7000 Series System configuration with only an expansion unit
Supply voltage	24 VDC (±10%)*3	24 VDC (-15%/+20%)*3
Operating ambient temperature	0 to +50°C (No freezing)*1*2	0 to +55°C (No freezing)*1*2
Operating ambient humidity	10 to 95% RH (No condensation)*1	5 to 95% RH (No condensation)*1
Storage ambient temperature	-20 to 70°C*1	-25 to 75°C*1
Storage ambient humidity	10 to 95% RH (No condensation)*1	5 to 95% RH (No condensation)*1
Operating atmosphere	No dust or corrosive gas	
Operating altitude	2000 m or less	
Pollution degree	2	
Noise immunity	1500 Vp-p or more, Pulse width: 1 µs, 50 ns (based on noise simulator) IEC standard-compliant (IEC61000-4-2/3/4/6)	
Withstand voltage	1500 VAC for 1 minute (between the power terminals and the I/O terminals, and between the external terminals and the housing)	
insulation resistance	50 MΩ or more (between the power terminals and the I/O terminals, and between the external terminals and the housing, with 500 VDC megohmmeter)	
Vibration resistance	Compliant with JIS B 3502 and IEC61131-2 Intermittent vibration: Frequency / Acceleration / Half amplitude 5 to 9 Hz / — / 3.5 mm 9 to 150 Hz / 9.8 m/s² / — Continuous vibration: Frequency / Acceleration / Half amplitude 5 to 9 Hz / — / 1.75 mm 9 to 150 Hz / 4.9 m/s² / —	No. of scans: 10 times in each of the X, Y, and Z directions (for 100 min.)
Shock resistance	Acceleration: 150 m/s², Operation time: 11 ms, 2 times in each of the X, Y, and Z directions	
Internal current consumption	KV-XL202: 140 mA or less; KV-XL402: 150 mA or less	
Weight	KV-XL202: Approx. 200 g; KV-XL402: Approx. 190 g	

*1 Guaranteed range in which the system can be used.
*2 Specified according to the temperature in the control panel on the lower side of the unit.
*3 Supplied via the CPU or expansion unit.

Communication format specifications

Operation mode	Available interfaces		
	KV-XL202	KV-XL402	
	RS-232C	RS-422A RS-485 (4 wires)	RS-422A RS-485 (2 wires)
KV host link mode	✓	✓	X
KV STUDIO mode	✓	✓	X
PROTOCOL STUDIO mode	✓	✓	✓
PLC link mode	✓	✓	✓
Non-procedure mode	✓	✓	✓
Link mode	✓	✓	X
Protocol mode 1	✓	✓	X
Protocol mode 4	✓	✓	X
Modbus RTU slave mode	✓	✓	✓

KV-XL202 wiring example (common to ports 1 and 2)

Pin number	Signal name	Signal direction
1	SD (send data)	Output
2	RD (receive data)	Input
3	RS (request to send)*1	Output
4	CS (clear to send)*2	Input
5	ER (equipment ready)	Output
6	DR (dataset ready)	Input
7	SG	—

*1 Generally High but turns to Low when reception is disabled.
*2 Set this to High in general. Set this to Low when disabling reception.

KV-XL402 wiring example (common to ports 1 and 2)

Pin number	RS-422A/485 (4 wires)		RS-422A/485 (2 wires)	
	Signal name	Signal direction	Signal name	Signal direction
1	SDA-	Output	SR-	Input/Output
2	SDB+	Output	SR+	Input/Output
3	RDA-	Input	—	—
4	RDB+	Input	—	—
5	SG	—	SG	—

Performance specifications

Item			KV-XL202	KV-XL402	
Communication standard			RS-232C	RS-422A RS-485 (4 wires)	RS-422A RS-485 (2 wires)
Connection interface			European terminal block with 7 poles (detachable) × 2 ports	European terminal block with 5 poles (detachable) × 2 ports	
Electrical termination (Terminator)			—	ON/OFF set by the switch on the front face	
Transmission specification	Transmission rate		1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400 bps		
	Transmission method		Full duplex	Full duplex	Half-duplex
	Data format	Start bit	1 bit		
		Data bit	7 or 8 bits		
		Stop bit	1 or 2 bits		
	Error detection	Parity	Even, odd, none		
	RS/CS flow control		ON or OFF	ON or OFF (only in PLC link mode)	
	Transmission distance		15 m	Total extension: 1200 m max.*1*2	
	Number of transmission units		1	32*1	
Connectable CPU units			KV-8000/7500/7300		
Maximum number of connected units			10		
Refreshes			Automatic refresh, direct refresh, inter-unit synchronisation refresh		
Serial communication functions			Non-procedure, PROTOCOL STUDIO, Modbus RTU slave, etc.		
Serial communication function execution methods			Ladder program, unit program (flow)		
Unit program capacity			3 MB (max. number of blocks: approx. 20000)		
Flow	Maximum number of flows		256		
	Number of simultaneous activities		Unlimited		
	Internal data memory		524288 words		
PROTOCOL STUDIO	Transmission method		Cyclic communication: Tx + Rx, Tx only, Rx only Event communication: Tx + Rx, Tx only, Rx only, Tx + Continuous Rx, Break Tx		
	Maximum number of connected devices		2		
	Maximum number of communication commands		48/96*3		
	Maximum number of total frames		Rx: 48/96*3 × 16; Tx: 48/96*3 × 1		
	Maximum number of compared and receive frames		16 per command		
	Maximum number of block elements		96 per frame		
	Transmission data length		1 to 2048 bytes per frame		
	Received data length		1 to 2048 bytes per frame		
PLC link	Communication patterns		Write, read, transfer		
	Number of link settings		512 settings max.*4		
	Link data size		1440 words max. per setting (bit: 720 words, word: 720 words) 737280 words max. (total) (1440 words × 512 settings)		
	Data unit		1 word		
	Number of connected models		2 models max. (1 model × 2 ports)		
	Number of connected units		2 max. (1 unit × 2 ports)		
	Trigger types		Cyclic/event (64 settings max. for event*4)		
	Update interval		10 to 65535 ms		

*1 Depends on the function to be used.
*2 The total extension is 500 m max. at a transmission rate of 230400 bps. The transmission rate and distance vary depending on the device to be connected. Check the values according to the actual device.
*3 The max. is 48 when "Standard" is set for the number of communication commands on the Unit Editor and 96 when "Extended" is set.
*4 Total for one KV-XL202/XL402 unit.

General specifications

Item	Specifications	
System configuration	System configuration using an expansion unit for KV-5000/3000 Series	System configuration using an only expansion unit for KV-8000/7000 Series
Power voltage	24 VDC (±10%)	24 VDC (-15% +20%)
Operating ambient temperature	0 to +50°C*1 *2 (no freezing)	0 to +55°C*1 *2 (no freezing)
Operating ambient humidity	10 to 95% RH*1 (no condensation)	5 to 95% RH*1 (no condensation)
Ambient storage temperature	-20 to +70°C*1	-25 to +75°C*1
Ambient storage humidity	10 to 95% RH*1 (no condensation)	5 to 95% RH*1 (no condensation)
Operating environment	No dust or corrosive gas	
Operating altitude	2000 m or less	
Pollution degree	2	
Overvoltage category	I (II when using KV-PU1)	
Noise immunity	1500 Vp-p or more; pulse duration: 1 µs, 50 ns (based on noise simulator); IEC standard-compliant (IEC61000-4-2/3/4/6)	
Withstand voltage	1500 VAC for one minute (between the power terminals and the I/O terminals, and between the external terminals and the case)	
Insulation resistance	50 MΩ or more (between the power terminals and the I/O terminals and between the external terminals and the case, with 500 VDC megohmmeter)	
Vibration resistance	Compliant with JIS B 3502 and IEC61131-2	Intermittent vibration: Frequency / Acceleration / Half amplitude; 5 to 9 Hz / – / 3.5 mm; 9 to 150 Hz / 9.8 m/s² / –; Continuous vibration: Frequency / Acceleration / Half amplitude; 5 to 9 Hz / – / 1.75 mm; 9 to 150 Hz / 4.9 m/s² / –
		Scan times: 10 times in each of X, Y, and Z directions (for 100 min.)
Shock resistance	Acceleration: 150 m/s², Application time: 11 ms, 2 times in each of the X, Y, and Z directions	
Internal current consumption*3	400 mA or less	
Weight	KV-8000: Approx. 340 g, KV-B1 (battery): Approx. 10 g	

*1 Guaranteed range in which the system can be used.
*2 Specified according to the temperature in the control panel on the lower side of the unit.
*3 The maximum current consumption is 3.2 A when using the expansion unit.

Performance specifications

Model			KV-8000
Calculation control method			Program storage method
I/O control method			Refresh method
Programming language			Expanded ladder, KV Script, mnemonic
Number of commands	Basic instruction		80 classes, 181 instructions
	Application instruction		50 classes, 67 instructions
	Calculation instructions		125 classes, 318 instructions
	Expansion instructions		77 classes, 132 instructions
	Total		332 classes, 698 instructions
Instruction execution speed	Basic instruction		Min. 0.96 ns
	Application instruction		Min. 5.75 ns
	Double precision floating-point instruction		Min. 58 ns
CPU memory capacity			64 MB
Program capacity			Approx. 1500 k steps
Maximum number of units to be installed			16 units (KV-8000/7000 Series expansion unit only), 48 units (KV-8000/7000 Series expansion unit, KV-5000/3000 Series expansion unit (when extension unit (KV-EB1) is used))
Maximum number of I/O points			Maximum 3072 points for expansion (KV-EB1S/KV-EB1R: 2 units used, 64-point unit used)
Bit device	Input relay	R	Total 32000 points 1 bit
	Output relay		
	Internal auxiliary relay		
	Link relay	B	32768 points 1 bit
	Internal auxiliary relay	MR	64000 points 1 bit
	Latch relay	LR	16000 points 1 bit
	Control relay	CR	1280 points 1 bit
Word device	Timer	T	4000 points 32 bits
	Counter	C	4000 points 32 bits
	Data memory	DM	65535 points 16 bits
	Expansion data memory	EM	65535 points 16 bits
	File register: Current bank	FM	524288 points 16 bits
	File register: Dial mode	ZF	
	Link register	W	32768 points 16 bits
	Temporary memory	TM	512 points 16 bits
	Index register	Z	12 points 32 bits
	Control memory	CM	7600 points 16 bits
Number of comments/ labels stored in main unit	Device comment		Approx. 224000
	Label		Approx. 285000
Power off hold function	Program memory		Flash ROM can be written 10000 times
	Device		Nonvolatile RAM
	Calendar clock		Backup capacitor lasts approx. 15 days (at 25°C) (Approx. 5 years with KV-B1 (battery) (at 25°C))
Self-diagnosis function			CPU error, RAM error, and other problems

Functional socket

Model	No. of sockets: TCP	No. of sockets: UDP	Port number
PC application*1	16	0	8500 (set within the range of 1 to 65535)
Upper link communication*2*3	Total 15	1	8501 (set within the range of 1 to 65535)
MC protocol communication*2*3		1	5000 (set within the range of 1 to 65535)*4
VT connection	0	1	8502 (set within the range of 1 to 65535)
FTP server	4	–	20, 21
Automatic clock data adjustment	–	1	123
E-mail transmission (SMTP, POP3)	2	–	25, 110
DNS	–	1	53
FTP client	2	–	20, 21 (set within the range of 1 to 65535)
EtherNet/IP™ cyclic communication function	Total 320	1	2222
EtherNet/IP™ message communication function		1	44818
KV socket communication	Total 16		Arbitrary value (set within the range of 1 to 65535)

*1 Camera monitoring via KV STUDIO, KV COM+, or VT5 *2 TCP socket and UDP socket can be used simultaneously.
*3 Up to 15 TCP sockets can be used. *4 Port numbers can be set to TCP socket and UDP socket individually.

EtherNet/IP™ communication specifications

Item				Specifications
Supported transmission rates				100BASE-TX
CIP service	Cyclic communication	Number of connections		256*1
		RPI (communication cycle)		0.5 to 10000 ms (0.5 ms unit); Can be set by connection. (Refresh line data at a set frequency regardless of the number of nodes)
		Transmission trigger	Output to adapter	Cyclic
			Input from adapter	Cyclic/Change Of State*2
		Allowable band for cyclic communication	(at 504 bytes)	10000 (pps)*3
			(at 1444 bytes)	5000 (pps)*3
		Maximum number of refresh words		16 k words
		Maximum data size for 1 connection*4		504 bytes or 1444 bytes
		Multicast filtering function*5		Provided (IGMP client function)
	Message communication	Class 3 (connection type)	Server	Number of connections: 256*6
		UCMM (non-connection type)	Client	Number of simultaneous actions: 32
			Server	Number of simultaneous actions: 96
EtherNet/IP™ conformance test				Compliant with CT15

*1 In total, the number of connections used for the message communication function in Class 3 (connection type) should be a maximum of 256. *2 Can communicate with devices that output data using the Change Of State (Send data when any change occurs) method. *3 Abbreviation of "packet per second", indicating the number of sent/received packets processed per second. *4 Data synchronism in connections is guaranteed. Also, when using 505 bytes or more, the device used must support Large Forward Open (an optional CIP specification). *5 The included IGMP client function allows the KV-8000 to filter out unnecessary multicast packets by using an Ethernet switch that supports IGMP snooping. *6 In total, the number of connections used for the cyclic communication function should be a maximum of 256. The KV-8000 supports Class 3 (connection type) tag specifications.

List of Supported PLCs

Vendor name	Series name / protocol name	CPU model	PLC Link Function				Industrial Ethernet			
			Ethernet		Serial		EtherNet/IP™	EtherCAT®	PROFINET	CC-Link IE Field
			CPU direct	Expansion unit	CPU direct	Expansion unit				
KEYENCE	KV	KV-8000	✓	✓	—	✓	✓	—	—	—
		KV-7500	✓	✓	—	✓	✓	—	—	—
		KV-7300	—	✓	✓	✓	✓*1	—	—	—
		KV-5500	✓	✓	—	✓	✓	—	—	—
		KV-5000	✓	✓	—	✓	✓*1	—	—	—
		KV-3000	—	✓	✓	✓	✓*1	—	—	—
		KV-1000/700	—	✓	✓	✓	—	—	—	—
		KV Nano	—	✓	✓	✓	✓*1	—	—	—
Mitsubishi	MELSEC iQ-R	RxxCPU	✓	✓	—	—	—	—	—	✓*3
		RxxENCPU	✓	✓	—	—	—	—	—	✓
	MELSEC-Q	QxxJ	—	✓	✓	✓	—	—	—	—
		Qxx(H)	—	✓	✓	✓	—	—	—	—
		QxxUJ	—	✓	✓	✓	—	—	—	✓*3
		QxxU(D)	—	✓	✓	✓	—	—	—	✓*3
		QxxUDH	—	✓	✓	✓	—	—	—	✓*3
		QxxUDE(H)	✓	✓	—	✓	—	—	—	✓*3
		QxxUDV	✓	✓	—	✓	—	—	—	✓*3
		Q02CPU-A, Q02HCPU-A, Q06HCPU-A	—	—	✓	✓	—	—	—	—
	MELSEC-L	LxxCPU(-BT)	✓	—	—	✓	—	—	—	✓*3
	MELSEC iQ-F	FX5U, FX5UC	✓	—	—	—	—	—	—	—
	MELSEC-FX	FX3U(C)/3G(C)/3S	—	✓	✓	✓	—	—	—	—
		FX0, FX0N, FX0S, FX1N(C), FX1S, FX2N(C)	—	—	✓	✓	—	—	—	—
		FX1, FX2(C)	—	—	✓	—	—	—	—	—
	MELSEC-AnS	A2US(H)	—	✓	✓	✓	—	—	—	—
		A1S(H), A1SJ(H), A2S(H), A171S(H), A1SCPUC24-R2	—	✓	✓	✓	—	—	—	—
	MELSEC-A2C	A2CCPUC24(-PRF)	—	—	—	✓	—	—	—	—
	MELSEC-A0J2	A0J2(H)	—	—	✓	✓	—	—	—	—
	MELSEC-AnN	A1N, A2N, A3N	—	—	✓	✓	—	—	—	—
	MELSEC-AnA	A2A, A3A	—	—	✓	✓	—	—	—	—
	MELSEC-AnU	A2U, A3U, A4U	—	—	✓	✓	—	—	—	—
	MELSEC-QnA	Q2A	—	—	✓	✓	—	—	—	—
		Q2A-S1, Q3A, Q4A, Q2AS(-S1), Q2ASH(-S1)	—	—	—	✓	—	—	—	—
OMRON	NJ	NJ501, NJ301, NJ101	—	—	—	—	✓	✓	—	—
	NX1P	NX1P2	—	—	—	—	✓	✓	—	—
	SYSMAC CJ2/CJ1	CJ2H, CJ2M-CPU3x, CJ1M-ETN	✓	✓	✓	✓	✓	—	—	—
		CJ2M-CPU1x, CJ1M-CPU1x, CJ1M-CPU2x, CJ1G, CJ1H	—	✓	✓	✓	✓*1	—	—	—
	SYSMAC CS1	CS1G, CS1H	—	✓	✓	✓	✓*1	—	—	—
	SYSMAC CP1	CP1H, CP1L	—	✓	—	✓	—	—	—	—
		CP1E-N	—	✓	✓	—	—	—	—	—
	SYSMAC SRM1	SRM1-C01, SRM1-C02	—	—	✓	✓	—	—	—	—
	SYSMAC CPM1(A)	CPM1, CPM1A	—	—	—	✓	—	—	—	—
	SYSMAC C	CPM2A, CPM2C,CQM1(H), C200HE, C200HG, C200HX, C200HS	—	—	✓	✓	—	—	—	—
		C20H, C40H, C80H	—	—	✓	—	—	—	—	—
		C120(F), C200H, C500(F), C1000H(F), C2000(H)	—	—	—	✓	—	—	—	—
	SYSMAC CV	CVM1, CV500, CV1000, CV2000-Vx	—	—	✓	✓	—	—	—	—
Panasonic	MEWNET FP		—	—	✓	✓	—	—	—	—
	FP7		✓	✓	✓	✓	✓	—	—	—
Fuji	MICREX-SX		✓	✓	✓	✓	—	—	—	—
HITACHI	HX		—	—	—	—	—	✓	—	—
	EHV		✓	✓	✓	✓	—	—	—	—
	HIDIC-S10α		—	—	✓	✓	—	—	—	—
YASKAWA	MP3000		✓	—	—	—	✓*1	—	—	—
	MP2000		✓	✓	✓	✓	✓*1	—	—	—
JTEKT (TOYODA)	PC2/PC3		—	—	✓	✓	—	—	—	—
	PC10		✓	—	✓	—	—	—	—	—
	TOYOPUC-Plus		✓	✓	—	—	✓*1	✓*3*4	—	—
Yokogawa	FA-M3		✓	✓	✓	✓	—	—	—	—
TOSHIBA	nv type1 light		✓	✓	—	—	—	—	—	—
	V/PROSEC T1/PROSEC T3		—	✓	✓	—	—	—	—	—
	PROSEC T2		—	✓	✓	✓	—	—	—	—
TOSHIBA MACHINE	TCmini α/TC200		—	—	—	✓	—	—	—	—
SHARP	JW300		—	✓	✓	✓	—	—	—	—
	JW-21/22CU, 31/32/33CUS, 50/70/100CUH		—	—	✓	✓	—	—	—	—
	JW10		—	—	✓	—	—	—	—	—
Rockwell (Allen-Bradley)	SLC500		—	—	—	—	✓	—	—	—
	CompactLogix		—	—	—	—	✓	—	—	—
	MicroLogix		—	—	—	—	✓	—	—	—
	ControlLogix		—	—	—	—	✓	—	—	—
Siemens	SIMATIC S7-300		—	—	—	✓	—	—	✓	—
	SIMATIC S7-1200		✓	—	—	—	—	—	✓	—
	SIMATIC S7-1500		✓	—	—	—	—	—	✓	—
LSIS	XGK/XGI		✓	✓	—	—	—	—	—	—

*1 Requires an EtherNet/IP™-compatible communication unit.
*2 Requires an EtherCAT®-compatible communication unit.
*3 Requires a CC-Link IE Field-compatible communication unit.
*4 Contact your sales representative for the detailed connection procedure.

List of Supported External Devices

KEYENCE devices

Category	Series name	Communication unit	KV sensor network	PROTOCOL STUDIO	
				Ethernet	Serial
Fibreoptic sensor / laser sensor / photoelectric sensor	FS-N / LV-N / PS-N	NU-EP1	✓	—	—
	LR-T / LR-W	NU-EP1 (via MU-N)	✓	—	—
Pressure/flow sensor	AP-N	NU-EP1	✓	—	—
	FD-Q	NU-EP1 (via MU-N)	✓	—	—
	FD-S / FD-MH	DL-EP1	✓	—	—
		DL-RS1A	—	—	✓
Displacement sensor	GT2 / GT / IL / IG / IB	DL-EP1	✓	—	—
		DL-RS1A	—	—	✓
Image processing system	XG-X / XG-8000/7000*1	—	✓	✓	✓
	CV-X / CV-5000*2	—	✓	✓	✓
	CV-3000	—	—	✓	✓
Vision sensor	IV-HG / IV-G / IV	—	✓	—	—
2D code / barcode reader / RFID	SR-2000/1000/750	—	✓	✓	✓
	SR-D100	—	✓	—	✓
	SR-650	—	✓	—	—
	SR-700	N-L20	✓	✓	—
		N-410, N-R2/R4, BL-U1/U2, N-42, DV-90	—	—	✓
	SR-G100	SR-LR1	✓	✓	✓
	HR-100	—	—	—	✓
		N-L20	✓	—	—
		N-R2, BL-U1/U2, N-42, DV-90	—	—	✓
	HR-50/40	—	—	—	✓
		N-L20	✓	—	—
		N-R2, BL-U1/U2, N-42, DV-90	—	—	✓
	BL-1300	N-L20	✓	✓	—
		N-410, N-R2/R4, BL-U1/U2, N-42, DV-90	—	—	✓
	BL-700	N-L20	✓	✓	—
		N-410, N-R2, BL-U1/U2, N-42, DV-90	—	—	✓
	BL-600	N-410, BL-U1/U2, N-42, DV-90	—	—	✓
	RF-500	N-410, N-R2/R4, BL-U1/U2, N-42	—	—	✓
Laser marker / inkjet printer	MD-U	—	✓	—	—
	MD-X/MD-F	—	✓	✓	✓
	MD-T/MD-F3000	—	—	✓	✓
	MD-S	—	—	—	✓
	ML-Z/ML-G	—	—	—	✓
	MK-U	—	—	✓	✓
Displacement sensor / measurement system	WI-5000	—	✓	✓	✓
	LJ-V7000/LS-9000	CB-EP100	✓	—	—
		—	—	✓	✓
	LK-G5000	—	✓	✓	✓
	LK-G3000 / LJ-G5000 / LS-7600 / LS-7500 / TM-3000 / LT-9500 / SI-T1000 / SI-F1000	—	—	—	✓
Recorder	TR-H/W	—	—	✓	✓
Static eliminator / electrostatic sensor	SJ-E/H	—	—	—	✓
	SK	DL-EP1	✓	—	—
		DL-RS1A	—	—	✓
Safety sensor	SZ-V	—	✓	—	—

*1 Supported from Ver. 4.0 *2 Second Edition (2.2) supported

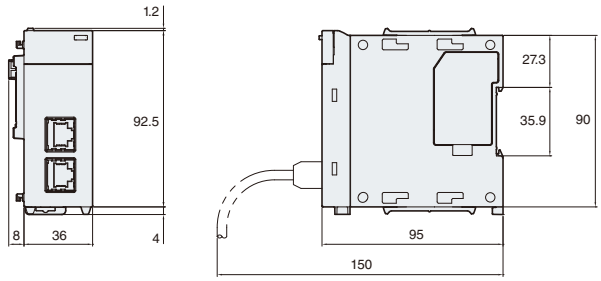
Devices by other manufacturers

Category	Vendor name / protocol name	Series name	Model	PROTOCOL STUDIO	
				Ethernet	Serial
Temperature adjuster	RKC Instrument	RB	RB100, RB400, RB500, RB700, RB900	—	✓
		FB	FB100, FB400, FB900	✓	✓
		CB	CB100, CB400, CB500, CB700, CB900	—	✓
		FAREX SR Mini HG	H-PCP-J	—	✓
		REX-F	REX-F400, REX-F700, REX-F900	—	✓
		SRZ	Z-TIO, Z-DIO	✓	✓
			Z-CT, Z-COM (Z-TIO, Z-DIO, Z-CT)	—	✓
	OMRON	Thermac NEO	E5AC, E5CC, E5EC, E5GC, E5GN, E5CN, E5CN-H, E5CN-U, E5AN, E5AN-H, E5EN, E5EN-H, E5DC	—	✓
	Yokogawa	UT Advanced	UT75A, UT55A, UT35A, UP55A, UP35A	✓	✓
			UT52A, UT32A, UP32A	—	✓
	Azbil	SDC	SDC15, SDC25, SDC26, SDC35, SDC36, SDC45A, SDC46A, SDC45V, SDC46V	—	✓
		NX	NX-D, NX-S, NX-DX, NX-DY	✓	✓
	CHINO	DB600	DB630, DB650, DB670	—	✓
		DB	DB1000, DB2000	—	✓
Weighing indicator	A&D	AD	AD-4410, AD-4407A, AD-4406A, AD-4402, AD-4401, AD-4329, AD-4328	—	✓
Electronic balance	A&D	MC/GX/GF/GP	MC, GX, GX-K, GF, GF-K, GP	—	✓
		FZ/FX	FZ-i, FZ-iWP, FX-i, FX-iWP	—	✓
		AD-4212	AD-4212A, A-4212B, AD-4212C	—	✓
	Shimadzu	UX/UW/UW-V	UX, UW, UW-V	—	✓
Inverter	Mitsubishi	FREQROL	FR-A800, FR-F800	✓	✓
			FR-A700, FR-E700, FR-D700, FR-F700P	—	✓
	YASKAWA	GA700/x1000	A1000, V1000, J1000, U1000, GA700	—	✓
	Fuji	FRENIC	FRENIC-MEGA, FRENIC-Multi, FRENIC-Eco, FRENIC-Mini, FRENIC-Ace, FRENIC-HVAC, FRENIC-VG	—	✓
	OMRON	3G3xx	3G3MX2, 3G3MX2-V1, 3G3RX-V1	—	✓
Electric actuator	IAI	ROBO CYLINDER	PCON, ACON, SCON, DCON, ERC2, ERC3	—	✓
		X-SEL	X-SEL	—	✓
	YAMAHA	TRANSERVO	TS-S2, TS-X, TS-P	—	✓
Power meter	Panasonic	KW	AKW1110, AKW1111, AKW1121, AKW2010G, AKW2020G, AKW5112, AKW5212, AKW7111, AKW8111, AKW8111H, AKW8115	—	✓
RFID	OMRON	V600	V600-CA5D01, V600-CA5D02	—	✓
		V680	V680-CA-5D01-V2, V680-CA-5D02-V2	—	✓
Industrial robot	FANUC	R-30iB	R-30iB, R-30iB Plus, R-30iB Mate, R-30iB Mate Plus	✓	—
	YASKAWA	YRC1000/DX200/FS100	YRC1000, DX200, FS100	✓	—
	EPSON	RC700/RC90	RC700-A, RC90 (RC+7.0)	✓	—
	YAMAHA	RCX340	RCX340	✓	—
	DENSO	RC8	RC8A, RC8	✓	—
General-purpose protocol	Modbus/TCP			✓	—
	Modbus RTU			—	✓
	SLMP			✓	—

Unit: mm

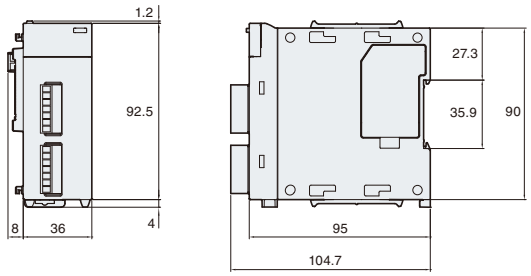
Ethernet unit

KV-XLE02

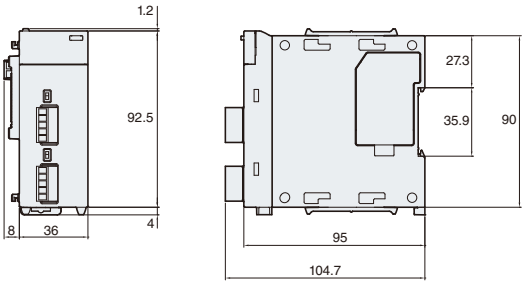


Serial communication unit

KV-XL202

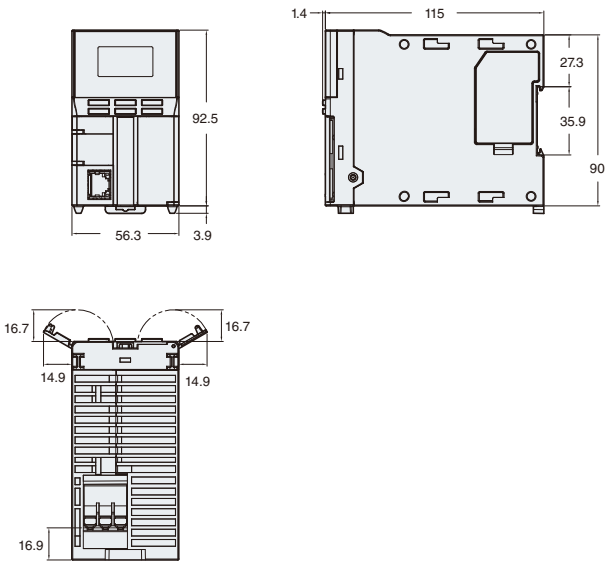


KV-XL402



CPU unit

KV-8000



Autonomous Communication Unit KV-X COM

Category	Item name	Model	Functions/Specifications
Network	Ethernet unit	KV-XLE02	2 ports, support of EtherNet/IP™, EtherCAT® (slave), CC-Link IE Field (slave), and PROFINET (device), 1000BASE-T/100BASE-TX/10BASE-T, PLC Link Function, PROTOCOL STUDIO mode, FTP client/server function, KV sensor network compatible, KV socket communication, unit interrupt, inter-unit synchronisation
	Serial communication unit	KV-XL202	2 ports (RS-232C), PLC Link Function, PROTOCOL STUDIO mode, Modbus RTU master/slave, unit interrupt, inter-unit synchronisation
		KV-XL402	2 ports (RS-422A/485), PLC Link Function, PROTOCOL STUDIO mode, Modbus RTU master/slave, unit interrupt, inter-unit synchronisation

KV-8000 Series

Category	Item name	Model	Functions/Specifications
CPU	CPU unit with built-in EtherNet/IP™ port	KV-8000	Program capacity: 1500 k steps, LD instruction processing speed: 0.96 ns, EtherNet/IP™ port, USB port (USB 2.0), CPU inner bus, Machine Operation Recorder function
I/O	High-speed I/O Unit	KV-SIR32XT	32 inputs + 32 outputs, 24/5 VDC switchable, 40-pin MIL connector ×2 Unit interrupt, inter-unit synchronisation, with overcurrent protection function
Analogue	High-speed analogue input unit	KV-SAD04	Voltage, current input 4 ch; conversion speed: 10 µs/ch; Resolution: 1/20000; conversion precision: 0.1% (at 25°C ±5°C), unit interrupt, inter-unit synchronisation
	High-speed analogue output unit	KV-SDA04	Voltage, current output 4 ch; conversion speed: 10 µs/ch; Resolution: 1/20000; conversion precision: 0.1% (at 25°C ±5°C), unit interrupt, inter-unit synchronisation
Positioning/ Motion	Simplified wiring type Positioning/motion unit	KV-XH16ML	MECHATROLINK-III communication, 16 axes Position control, speed control, torque control, linear interpolation, arc interpolation, helical interpolation, and synchronous control, unit interrupt, inter-unit synchronisation, application package
		KV-XH04ML	MECHATROLINK-III communication, 4 axes Position control, speed control, torque control, linear interpolation, arc interpolation, helical interpolation, and synchronous control, unit interrupt, inter-unit synchronisation, application package
Positioning/ High-speed counter	High-speed positioning unit	KV-SH04PL	Pulse train, 4-axis, position control, linear interpolation, unit interrupt, and inter-unit synchronisation
	High-speed counter unit	KV-SSC02	2 ch, Max. input frequency: 16 MHz (2 phases quadruple), unit interrupt, inter-unit synchronisation
Power supply	AC power supply unit with error output	KV-PU1	Output capacity: 1.8 A; Relay output: rated load of 24 VDC, 0.5 A

Remote I/O systems

Category	Item name	Model	Functions/Specifications
Network	EtherNet/IP™ compatible communication unit	KV-EP02	2 ports, EtherNet/IP™, 100BASE-TX/10BASE-T
Expansion unit (European terminal block/ MIL connector type)	Input	KV-NC16EXE	16 points, 5/24 VDC switchable, European terminal block
		KV-NC16EX	16 points, 5/24 VDC switchable, 20-pin MIL connector × 1
		KV-NC32EX	32 points, 5/24 VDC switchable, 34-pin MIL connector × 1
	Output	KV-NC8ER	8 points, relay output, European terminal block
		KV-NC16ETE	16 points, transistor (sink) output, European terminal block
		KV-NC16ET	16 points, transistor (sink) output, 20-pin MIL connector × 1
		KV-NC16ETPE	16 points, transistor (source) output, European terminal block
		KV-NC16ETP	16 points, transistor (source) output, 20-pin MIL connector × 1
		KV-NC32ET	32 points, transistor (sink) output, 34-pin MIL connector × 1
		KV-NC32ETP	32 points, transistor (source) output, 34-pin MIL connector × 1
	Input/output	KV-NC16EXT	Input 16 points/output 16 points, transistor(sink) output, 34-pin MIL connector × 1
		KV-NC32EXT	Input 32 points/output 32 points, transistor(sink) output, 34-pin MIL connector × 2
	A/D conversion	KV-NC4AD	Voltage, current input 4 ch; conversion speed: 80 µs/ch; resolution: 1/4000; conversion precision: 0.3% (25°C ±5°C); European terminal block
	D/A conversion	KV-NC2DA	Voltage, current output 2 ch; conversion speed: 80 µs/ch; resolution: 1/4000; conversion precision: 0.3% (25°C ±5°C); European terminal block
	Temperature input	KV-NC4TP	Thermocouple and platinum resistance thermometer 4 ch, conversion speed: 125 ms/ch, European terminal block
	Connection conversion unit	KV-NC1	For connecting terminal block type expansion units
Expansion unit (screw terminal block type)	Input	KV-N8EX	8 points, 5/24 VDC switchable, screw terminal block
		KV-N16EX	16 points, 5/24 VDC switchable, screw terminal block
	Output	KV-N8ER	8 points, relay output, screw terminal block
		KV-N8ET	8 points, transistor (sink) output, screw terminal block
		KV-N8ETP	8 points, transistor (source) output, screw terminal block
		KV-N16ER	16 points, relay output, screw terminal block
		KV-N16ET	16 points, transistor (sink) output, screw terminal block
		KV-N16ETP	16 points, transistor (source) output, screw terminal block
	Input/output	KV-N8EXR	Input 8 points/output 8 points, relay output, screw terminal block
		KV-N8EXT	Input 8 points/output 8 points, transistor (sink) output, screw terminal block
	A/D-D/A conversion	KV-N3AM	Voltage, current input 2 ch/voltage, current output 1 ch; conversion speed: 80 µs/ch; resolution: 1/4000; conversion precision: 0.3% (25°C ±5°C); screw terminal block
	Connection conversion unit	KV-N1	For connecting European terminal block/MIL connector type expansion units
	Screw terminal block unit extension cable	OP-87581	Cable length: 1 m, cable width: 2 cm

Software

Category	Item name	Model	Functions/Specifications
Programming support software	KV STUDIO Ver. 10 (Global version)	KV-H10G	DVD-ROM, Windows10/8/7 compatible
	KV STUDIO Ver. 10	KV-H10J	DVD-ROM, Windows10/8/7 compatible

Software operating environment

Software	KV STUDIO
Supported OS	Windows10 / 8 (including 8.1) / 7 (SP1 or higher)
Free space on hard disk	2000 MB or more

Network in a factory

Information network

Ethernet


PC


Server

Controller network


PLC

Ethernet

Socket communication via an open network
(such as EtherNet/IP™, EtherCAT®, and CC-Link IE)


PLC


PLC


Touch panel

Serial

Non-procedure communication via an open network
(such as CC-Link, DeviceNet™, and Modbus RTU)


PLC


PLC


Touch panel

Field network

Ethernet

Open network-compatible device


Various sensors


Servo motor

EtherNet/IP™
MECHATROLINK-III
EtherCAT®
CC-Link IE Field
Modbus/TCP
PROFINET

Ethernet communication device (socket communication)


PCB


Robot


Data terminal

Serial

Open network-compatible device


Various sensors


I/O

CC-Link
DeviceNet™
Modbus RTU

Serial communication device (non-procedure communication)


Temperature controller


Balance/scale


Inverter

KEYENCE

Please visit: www.keyence.com

SAFETY INFORMATION
Please read the instruction manual carefully in order to safely operate any KEYENCE product.

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