IAI COMPATIBLE GEAR

Equipment that can be Connected to IAI Products

www.intelligentactuator.com

Equipment that can be connected to IAI products

IAI products are connectable with various FA devices easily.
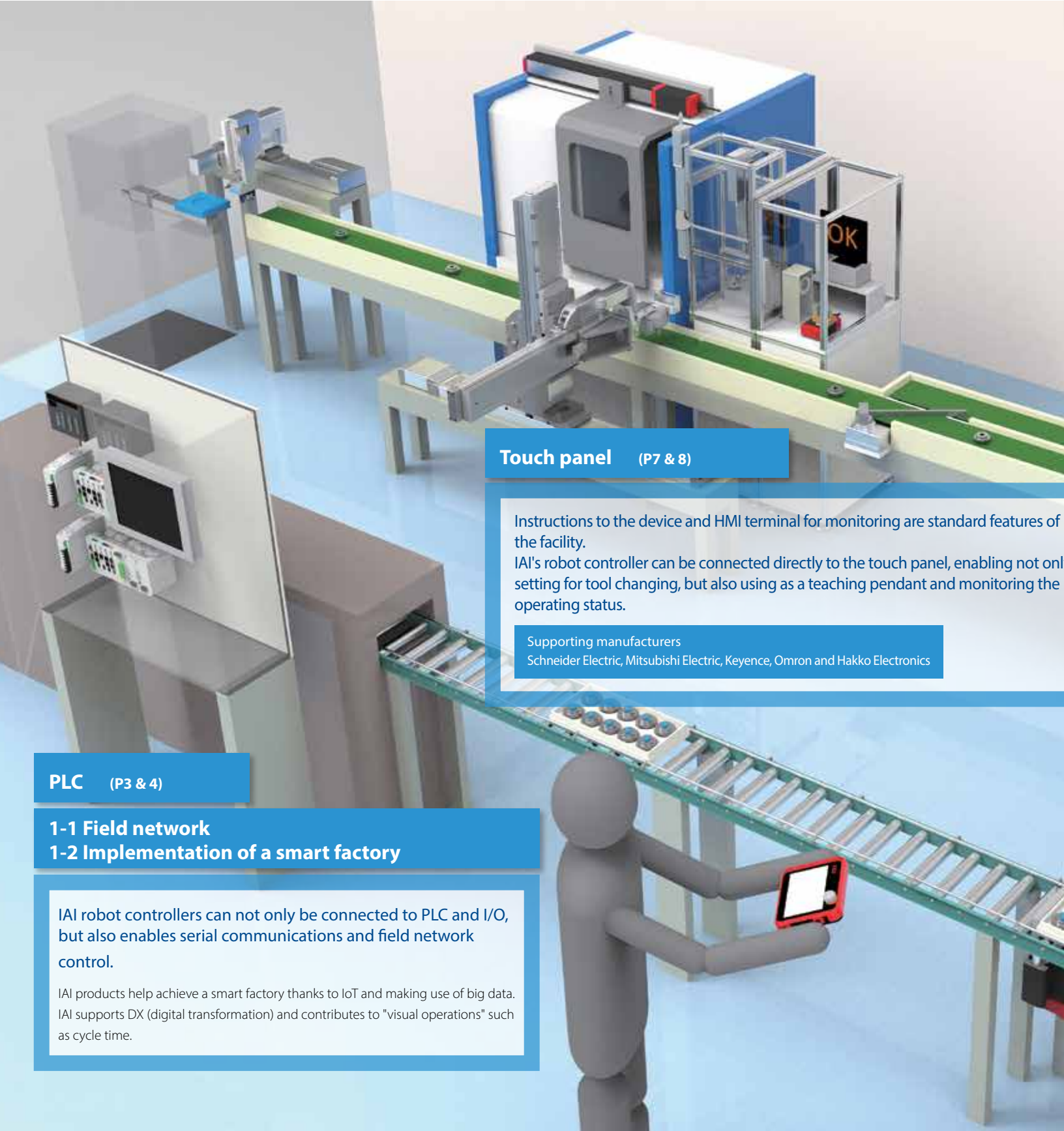
Touch panel (P7 & 8)

Instructions to the device and HMI terminal for monitoring are standard features of the facility.
IAI's robot controller can be connected directly to the touch panel, enabling not only setting for tool changing, but also using as a teaching pendant and monitoring the operating status.

Supporting manufacturers
Schneider Electric, Mitsubishi Electric, Keyence, Omron and Hakko Electronics

PLC (P3 & 4)

1-1 Field network
1-2 Implementation of a smart factory

IAI robot controllers can not only be connected to PLC and I/O, but also enables serial communications and field network control.

IAI products help achieve a smart factory thanks to IoT and making use of big data. IAI supports DX (digital transformation) and contributes to "visual operations" such as cycle time.

1

Motion network   (P5 & 6)

Together with the suppliers' motor drivers, IAI products can achieve motion control such as synchronized motion, interpolation motion and cam motion.

EtherCAT

SSCNET III/H
SERVO SYSTEM CONTROLLER NETWORK

MECHATROLINK

Connection between the ELECYLINDER and devices   (P10)

The ELECYLINDER can easily replace air cylinders. Various devices can be connected to the ELECYLINDER, taking advantage of its electric-driven benefits.
It supports wireless teaching and touch panel teaching, etc.

3D simulator   (P9)

Simulators are increasingly used because they enable debugging in advance without manufacturing of actual devices.
IAI also enables device-less debugging through OPC servers.

TAKEBISHI

DxpSERVER

OK
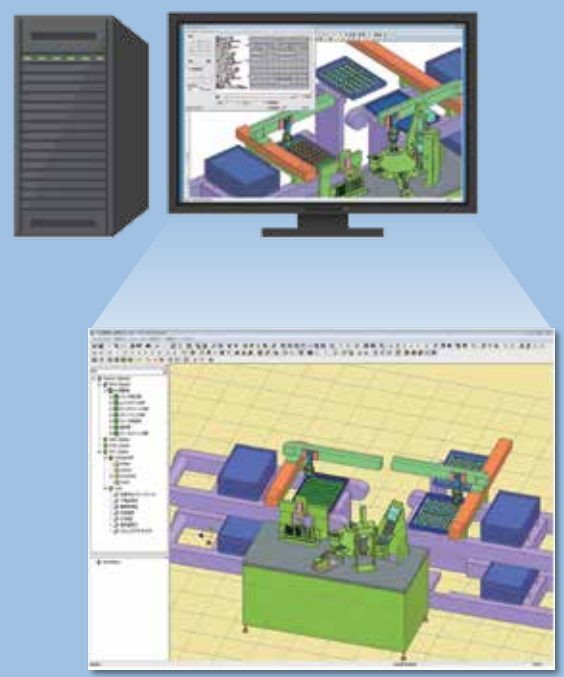
1 ▶ Fieldbus networks

IAI supports networks of all layers for information control, device and sensor systems.

Information control system to manage **the whole production line.**

Device system to manage **devices.**

Sensor system for small volume/multiple branches **sensors such as I/O.**

CC-Link IE Field   EtherCAT®

EtherNet/IP™   PROFINET®   MECHATROLINK

CC-Link   DeviceNet™   PROFIBUS®

CompoNet®

▌ Controllers compatible with field networks

RCON   PCON   ACON   DCON   SCON

▌ Field network operating modes

Operations are performed by writing necessary data (target position, velocity, acceleration/deceleration, push force current, etc.) from PLC to the designated address.
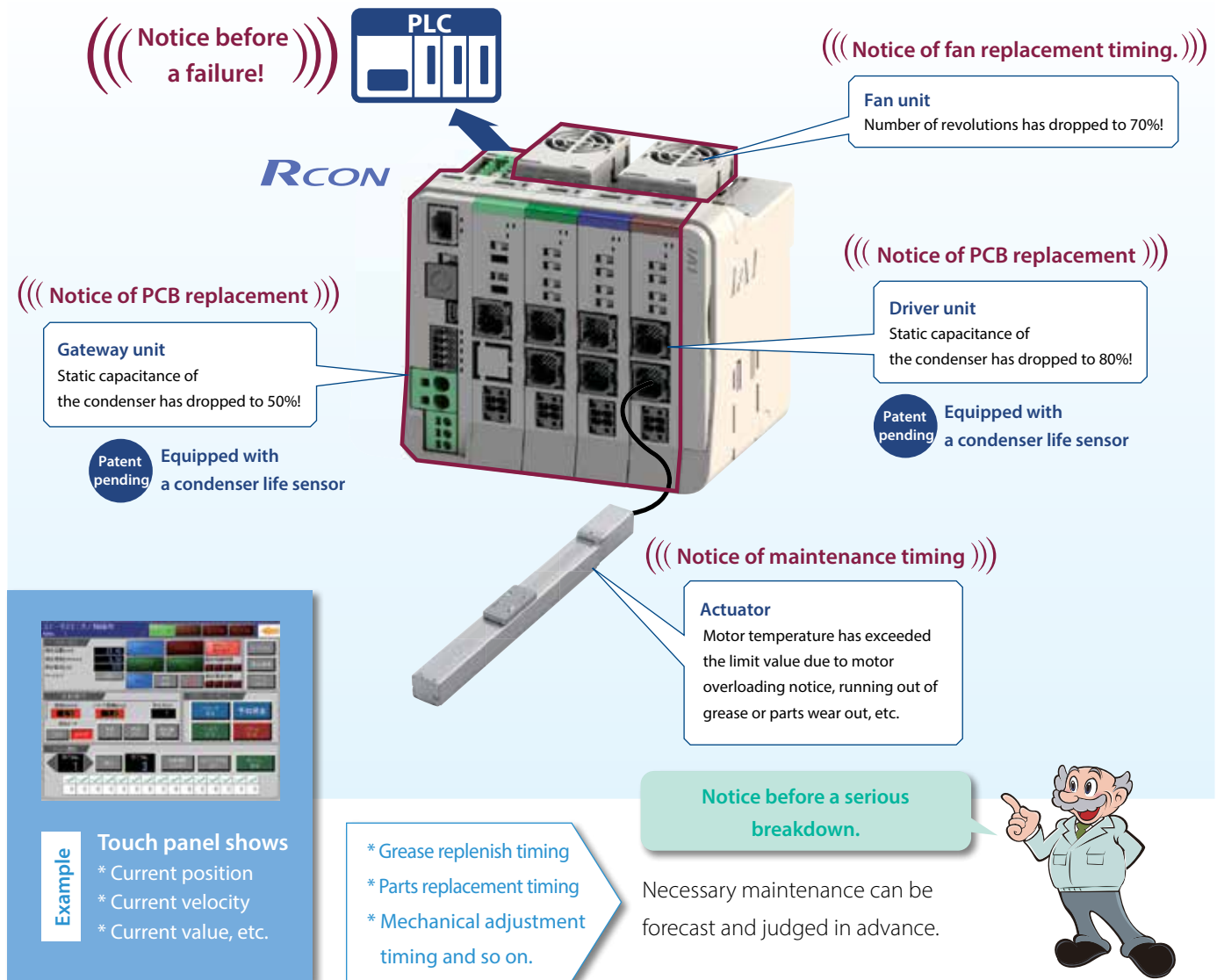
Operation mode.	Content	Description	
Direct numerical control	Target position, velocity, acceleration/deceleration and push current limit can be specified numerically. Current velocity and command current value can also be monitored.	PLC → Target position, Positioning width, Velocity, Acceleration, Push %, Control signal ← Current position, Current value (command), Current velocity (command), Alarm code, Status signal	
Position / Simple direct value	The target position can directly be specified numerically. Other operating conditions (velocity, acceleration/deceleration, etc.) are to be input in the position data and used by specifying the position No.	PLC → Target position, Target position No., Control signal ← Current position, Complete position No., Status signal	
Remote I/O mode	This mode controls the ON/OFF bit via network for operation like the PIO specification.	PLC → Target position No., Control signal ← Complete position No., Status signal	

* The above shows typical operating modes for IAI controllers.

* Refer to the controller chapter of the General Catalog or the Operating Manual for details.
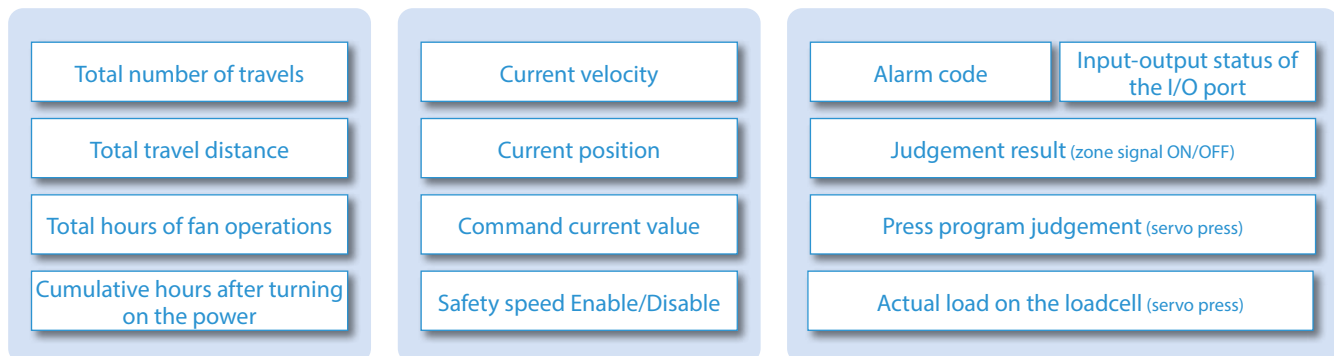
2 ▶ Implementation of a Smart Factory

Corresponding to IoT by "visualization."

PLC

(((**Notice before a failure!**)))

RCON

(((**Notice of fan replacement timing.**)))

Fan unit
Number of revolutions has dropped to 70%!

(((**Notice of PCB replacement**)))

Gateway unit
Static capacitance of
the condenser has dropped to 50%!

Patent pending **Equipped with a condenser life sensor**

(((**Notice of PCB replacement**)))

Driver unit
Static capacitance of
the condenser has dropped to 80%!

Patent pending **Equipped with a condenser life sensor**

(((**Notice of maintenance timing**)))

Actuator
Motor temperature has exceeded
the limit value due to motor
overloading notice, running out of
grease or parts wear out, etc.

Example

Touch panel shows
* Current position
* Current velocity
* Current value, etc.

* Grease replenish timing
* Parts replacement timing
* Mechanical adjustment
  timing and so on.

Notice before a serious breakdown.

Necessary maintenance can be
forecast and judged in advance.

Information that can be uploaded to host computer.

The following information can be acquired from the IAI controller via network communications and Modbus.
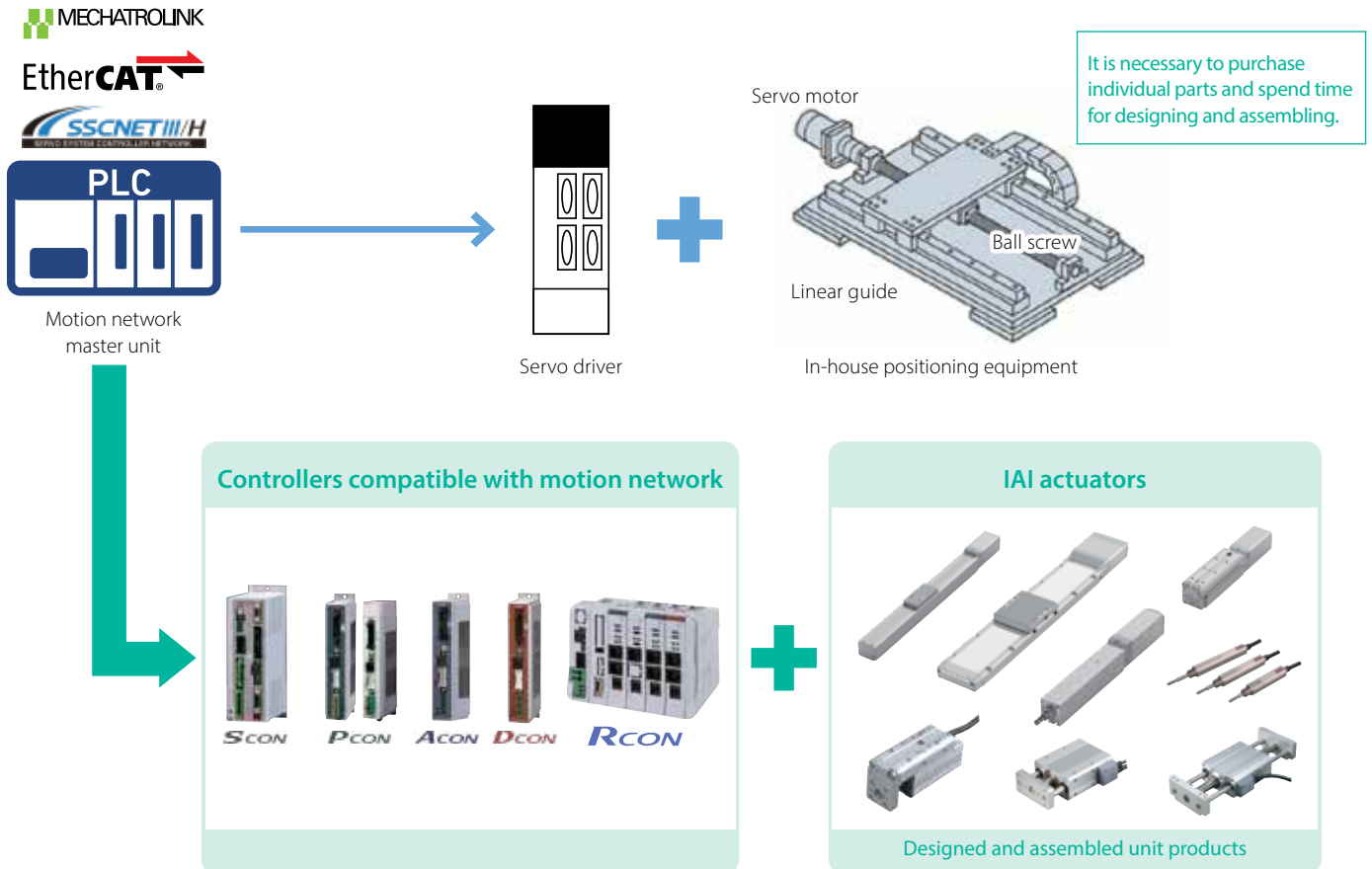
Total number of travels	Current velocity	Alarm code / Input-output status of the I/O port
Total travel distance	Current position	Judgement result (zone signal ON/OFF)
Total hours of fan operations	Command current value	Press program judgement (servo press)
Cumulative hours after turning on the power	Safety speed Enable/Disable	Actual load on the loadcell (servo press)

4

A wide variety of controllers support motion network.

RCON   **PCON**   **ACON**   **DCON**   **SCON**

Motion network

MECHATROLINK   EtherCAT   SSCNETIII/H
SERVO SYSTEM CONTROLLER NETWORK

Cost reduction for designing and assembling

Costs for designing and assembling can be reduce without changing the existing control method if the in-house positioning equipment that uses a motor, a ball screw and a linear guide is replaced with IAI products of wide variety.

MECHATROLINK
EtherCAT
SSCNETIII/H
SERVO SYSTEM CONTROLLER NETWORK

PLC

Motion network master unit

Servo driver

Servo motor

It is necessary to purchase individual parts and spend time for designing and assembling.

Ball screw

Linear guide

In-house positioning equipment

Controllers compatible with motion network

SCON   PCON   ACON   DCON   RCON

IAI actuators

Designed and assembled unit products

Controllers compatible with motion network

Motion network \ Controller	RCON	SCON	PCON	ACON	DCON
MECHATROLINK (supports III only)	◎	◎	◎		
EtherCAT®	◎	◎			
SSCNET III/H	◎				

About each controller

RCON
Network controller for the driver-linkage type
Different types of drivers including stepper motor and AC servo motor can be used together.
The controller can be compact when connecting multiple axes.

SCON
Single-axis controller for a 200V AC servo motor.

PCON・ACON・DCON
Single-axis controller for a 24V motor.
PCON is for a stepper motor, ACON for an AC servo motor and DCON for a brushless DC motor.

Note Indexing operations are not possible when controlling a rotary actuator by using MECHATROLINK III, EtherCAT motion or SSCNET III/H.

Connection image

Operation panel

PLC
Master unit
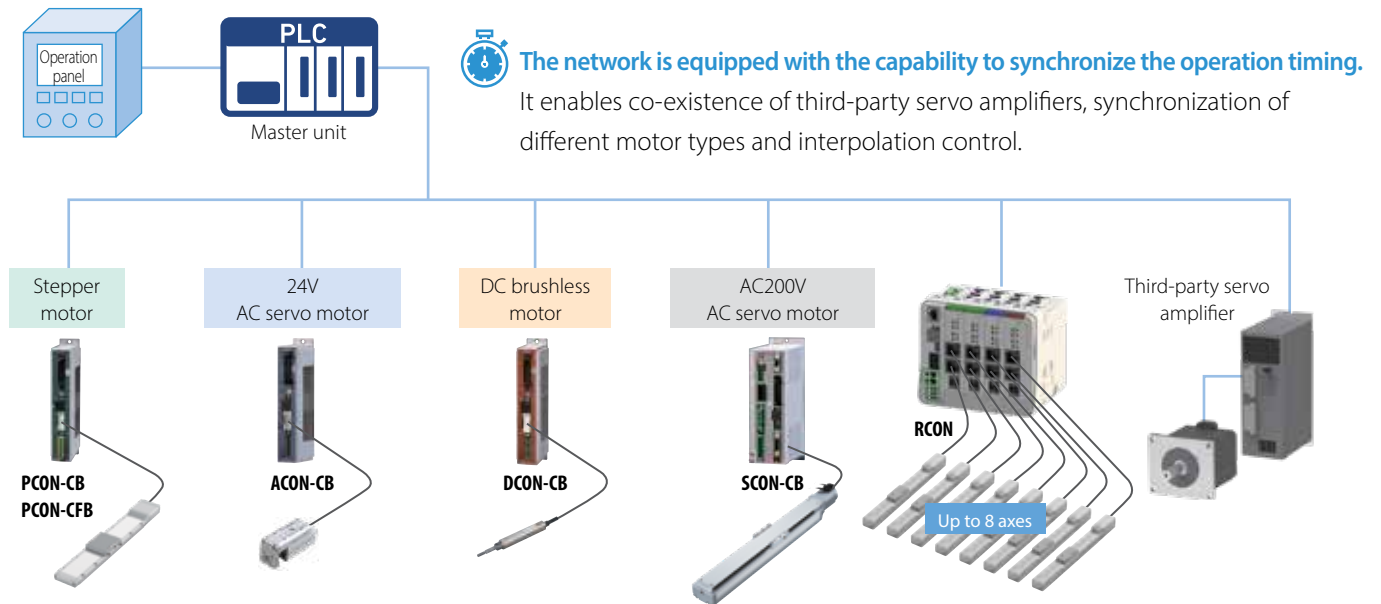
The network is equipped with the capability to synchronize the operation timing.
It enables co-existence of third-party servo amplifiers, synchronization of different motor types and interpolation control.

| Stepper motor | 24V AC servo motor | DC brushless motor | AC200V AC servo motor | | Third-party servo amplifier |

PCON-CB
PCON-CFB

ACON-CB

DCON-CB

SCON-CB

RCON
Up to 8 axes

A variety of monitoring from the PLC

IAI products can be monitored from the motion network master unit.

| Position | Velocity | Current value, number of revolutions |

It is also possible to set up various parameters.

Program resources of the control system can also be reutilized.
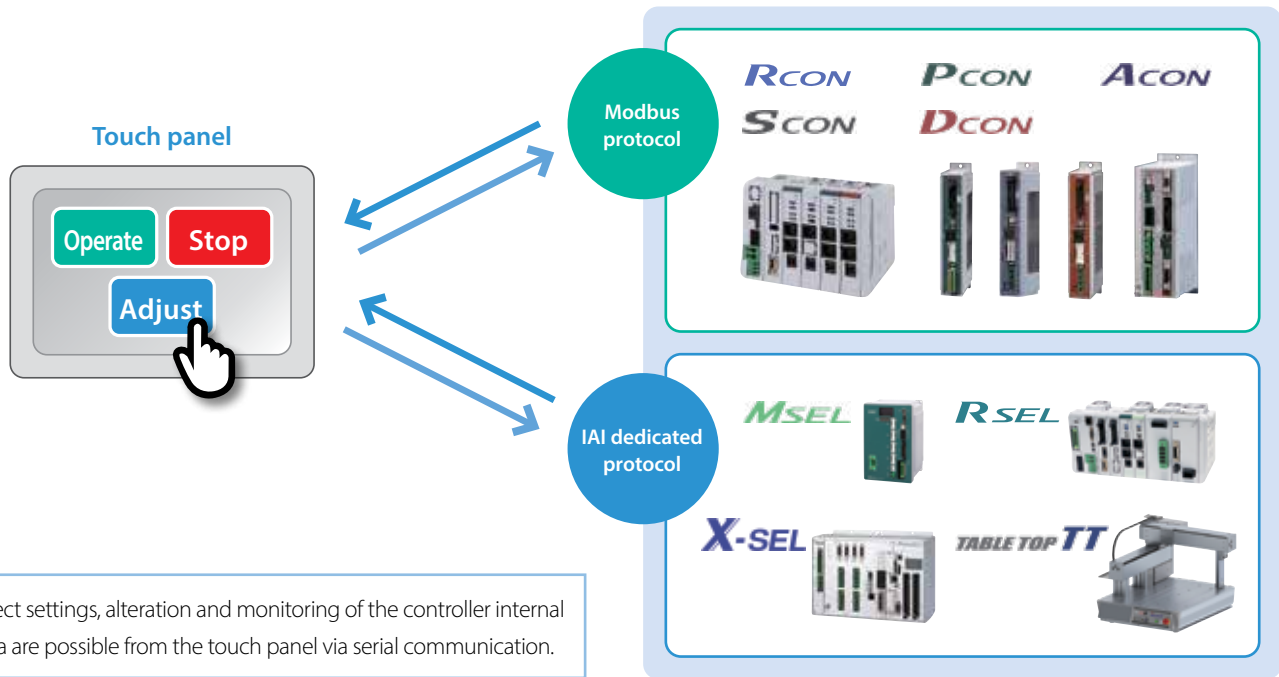In addition to designing and assembling costs, programing costs can be reduced, too.
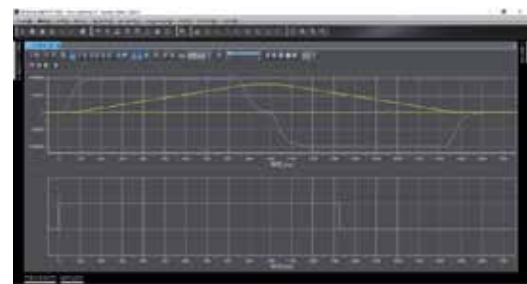
Example) Position, velocity and current value monitoring by SysmacStudio (made by OMRON).

6

1 ▶ Connection method

Direct connection with the touch panel

Touch panel

Operate Stop
Adjust

Modbus protocol

RCON PCON ACON
SCON DCON

IAI dedicated protocol

MSEL RSEL
X-SEL TABLE TOP TT

Direct settings, alteration and monitoring of the controller internal data are possible from the touch panel via serial communication.

●Refer to third-party's websites for connectable products.

Specific example

Example

Testing equipment

Pro-face
by Schneider Electric

Display and control are integrated into one.

LT4000M series

A simple configuration is possible thanks to the built-in I/Os in the monitor that enables connections with various devices.

Status monitor

Preventive maintenance

Alarm monitor

2 ▶ Compatible manufacturers (direct connection with the touch panel)

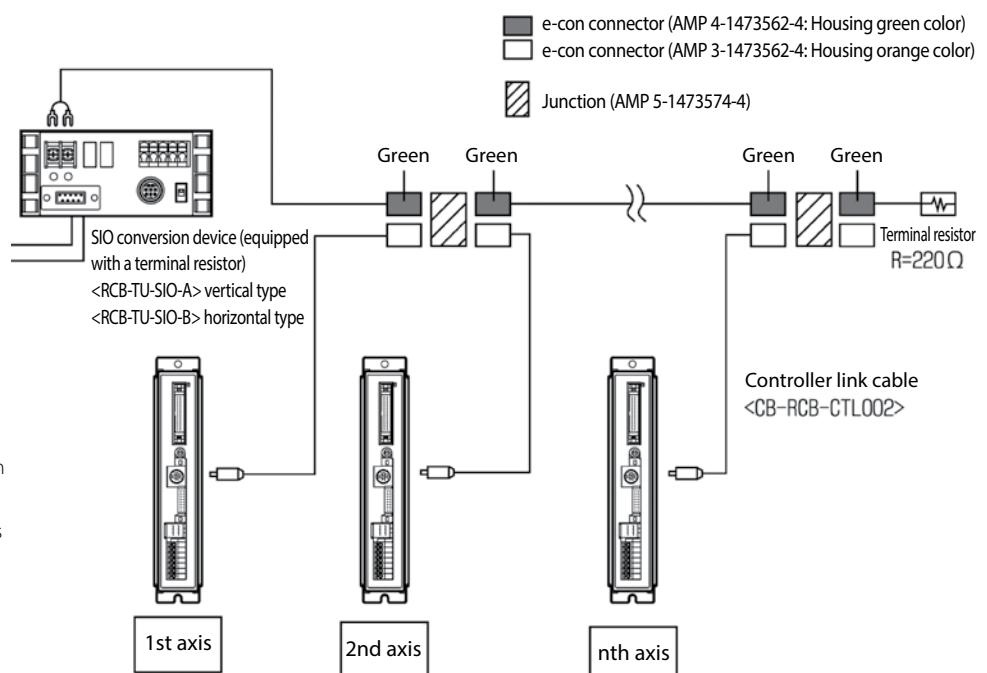| Manufacturer	Supporting touch panel series name	Compatible controller	Template screen
Schneider Electric	SP5000 GP4000 LT4000M LT3000	RCON, PCON, ACON, SCON RSEL, XSEL, ASEL, PSEL, SSEL, TTA EC	
Omron	NS	PCON, ACON, SCON	
Mitsubishi Electric	GOT2000 GOT1000	PCON, ACON, SCON XSEL, ASEL, PSEL, SSEL	
	GOT2000 GT27/25	EC	
Keyence	VT5 VT3	PCON, ACON, SCON XSEL, ASEL, PSEL, SSEL, TTA	
Hakko Elecronics	V9 TS2060	PCON, ACON, SCON XSEL, ASEL, PSEL, SSEL	

● Template screen examples can be downloaded from manufacturers' websites.

● Refer to each manufacturer's website for connectable models.

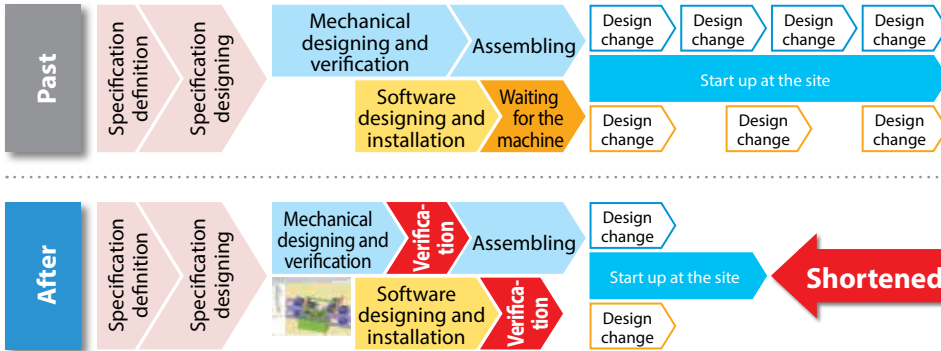## ▌ Basic connection example (for multiple axis connection)

Manufacturer's touch panel

Operate   Stop

Adjust
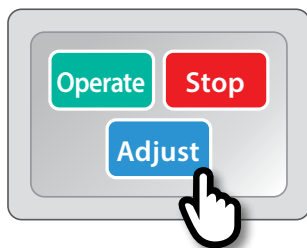
● Follow the connection method of each manufacturer.
There are connection methods such as RS-232C and RS-485.

■ e-con connector (AMP 4-1473562-4: Housing green color)
□ e-con connector (AMP 3-1473562-4: Housing orange color)

▨ Junction (AMP 5-1473574-4)

SIO conversion device (equipped with a terminal resistor)
<RCB-TU-SIO-A> vertical type
<RCB-TU-SIO-B> horizontal type

Green   Green   Green   Green

Terminal resistor
$R=220\,\Omega$

Controller link cable
<CB-RCB-CTL002>
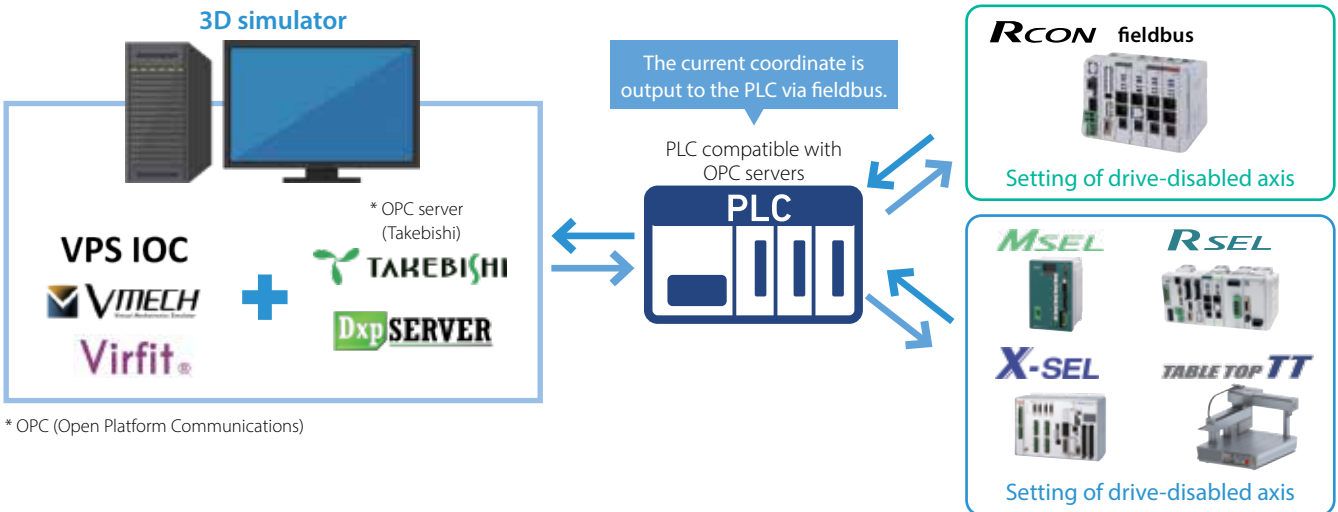
1st axis   2nd axis   nth axis

Reduced work for control software developers.

■ In-advance verification using the virtual mechanism made of a 3D CAD model is possible.

■ It is possible to shorten the lead time for manufacturing and to reduce man-hour for reworking.
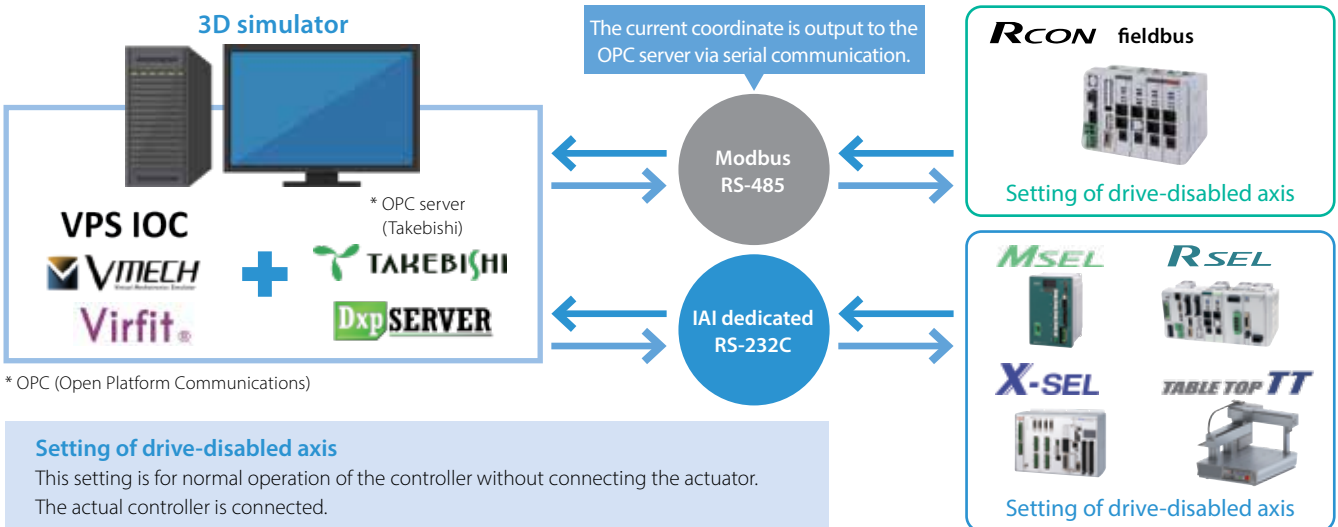
Past

Specification definition → Specification designing → Mechanical designing and verification → Assembling → Design change → Design change → Design change → Design change

Start up at the site

Software designing and installation → Waiting for the machine → Design change → Design change → Design change

After

Specification definition → Specification designing → Mechanical designing and verification → Verification → Assembling → Design change

Start up at the site → **Shortened**

Software designing and installation → Verification → Design change

It supports the 3D simulator via Takebishi's OPC server.

The 3D simulator shortens adjustment time for the actual machine.

Connection using field network

3D simulator

VPS IOC
VMECH
Virfit®
+ TAKEBISHI
Dxp SERVER

* OPC server (Takebishi)

* OPC (Open Platform Communications)

The current coordinate is output to the PLC via fieldbus.

PLC compatible with OPC servers

PLC

RCON fieldbus
Setting of drive-disabled axis

MSEL   RSEL
X-SEL   TABLE TOP TT
Setting of drive-disabled axis

Connection via serial communication

3D simulator

VPS IOC
VMECH
Virfit®
+ TAKEBISHI
Dxp SERVER

* OPC server (Takebishi)

* OPC (Open Platform Communications)

The current coordinate is output to the OPC server via serial communication.

Modbus RS-485

IAI dedicated RS-232C

RCON fieldbus
Setting of drive-disabled axis

MSEL   RSEL
X-SEL   TABLE TOP TT
Setting of drive-disabled axis

Setting of drive-disabled axis
This setting is for normal operation of the controller without connecting the actuator.
The actual controller is connected.

IAI
Quality and Innovation

Connection with field networks

Connectable with up to **16** axes

REC

I/O signals can be transmitted via network to operate the ELECYLINDER.

Wireless teaching

Wireless setting is possible. It is possible to set up and adjust the ELECYLINDER that is installed in high or narrow places.

Status monitor screen

Display of axis names
It can arbitrarily be set up (or changed) according to the customer's use.

Status monitor screen
Monitoring of the axis status can be used to plan the timing of maintenance.

D1CB07	Current	Number of travels	7031	Alarm group D
S/N A70458479	position of servo	Distance of travels	182 m	Abnormal alarm between controller and encoder.
Selection / Selectable (axis operation possible)	0. 00 mm	Overload level	0 %	

Error status monitor
It shows when an alarm or a warning is activated.
It also supports troubleshooting.

Troubleshooting screen

Direct connection between touch panel and ELECYLINDER

Pro-face
by **Schneider** Electric

Mitsubishi Electric

Simple data setting screen

Simple data setting screen   EC-R6S-100

Adjustments can be performed using the same screen as the genuine teaching pendant.

SIO conversion device

●Refer to each manufacturer's website for connectable models.