Carbon neutrality comes from reducing CO_2 emissions through long service life products

What "HIGH PRODUCTIVITY" means to CKD

Lower productivity will result in loss. In addition, parts requiring maintenance will be wasted. We believe that achieving high productivity without maintenance leads to carbon neutrality. Our HP Series focuses on the manufacturing principles of such component manufacturers. To improve productivity in places with high usage frequency and high-stress environments, the series serves to create a "production facility with no downtime" and "achieves stable operation" with products that have an unprecedented long service life.

HP

HIGH PRODUCTIVITY

Reduce production loss and waste

Durable

Maintenance cost/time

Rapid replacement possible

Stopping the facility momentarily or for a long time

Early end of life notification

Labor shortage

HP1 Long service life

HP2 Long service life + Predictive maintenance

Carbon neutral

- Reduced exterior leakage
- Energy saving coil option (0.1 W)
- Reclaimed resin used

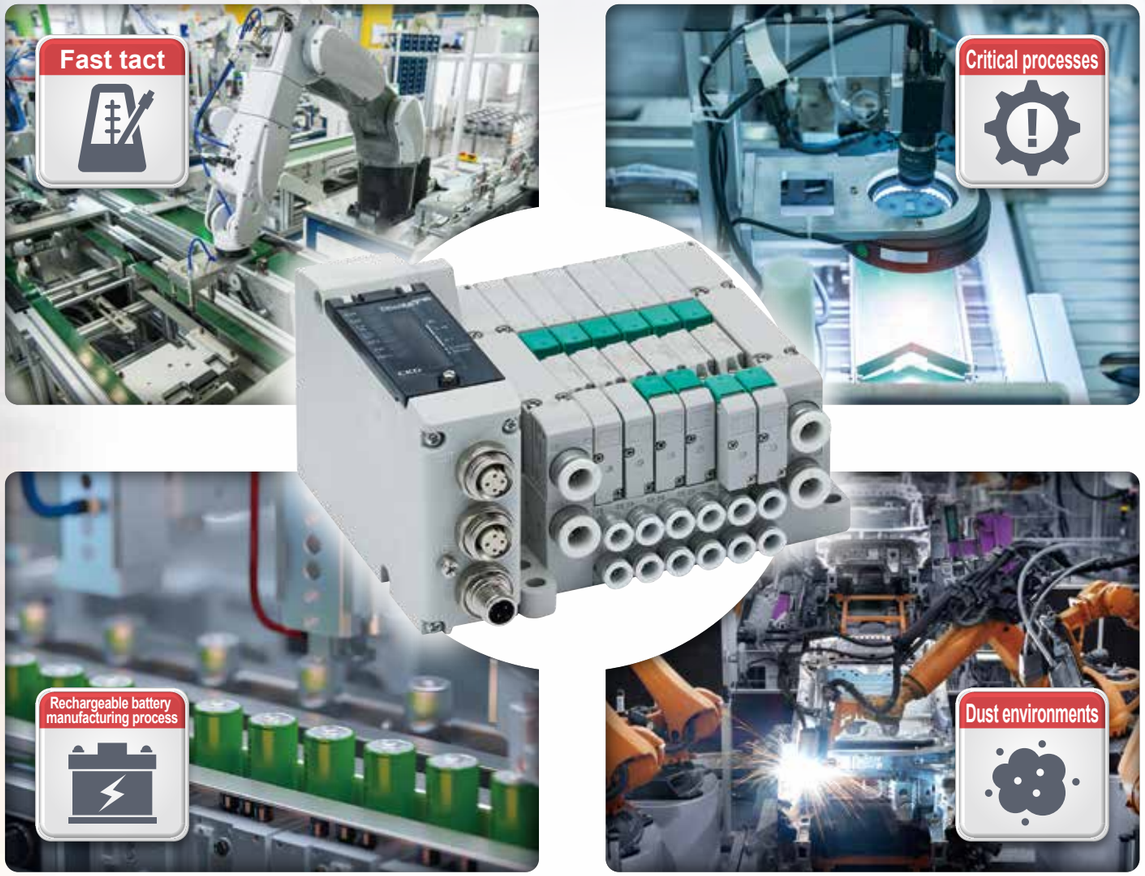
Plug-in valve

Easy to use

- Plug-in structure
- IP65/67
- Improved maintainability (built-in gasket)

High reliability

- Stable operation even with ultra dry air
- High durability of 120 million operations or more (twice that of conventional models)
- No unexplained stoppages



Plugs into various devices

Carbon neutrality and IoT contribute to the visualization of equipment and the elimination of control panels. Waterproof, robust, high-performance, and remote I/O-compatible FA system are key parts of the global model.

Pilot operated 3, 5-port solenoid valve, plug-in block manifold

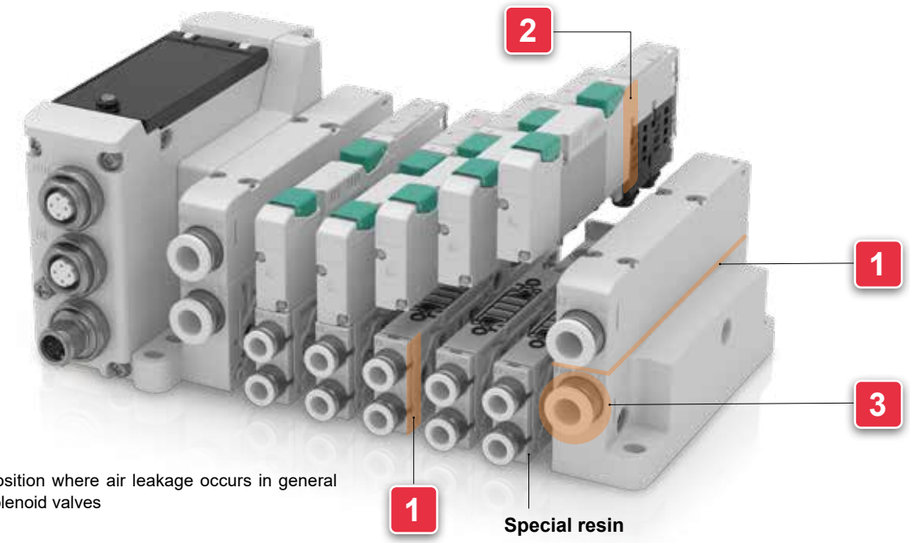
TVG Series

Carbon neutral

Reduces air leakage

Thoroughly improved valve parts that were prone to air leakage.
This plug-in valve is the culmination of CKD's commitment to sustained energy savings even with long-term use.

	Air leakage cause	Commitment to TVG
1	The deterioration of rigidity of resin materials due to moisture in the atmosphere, including during water adhesion, transportation, and storage.	Sealing design to withstand aging and special resin material to reduce air leakage.
2	Coil heating and changes in the ambient temperature cause repeated thermal stress, reducing the rigidity of resin materials.	Coil temperature rise is reduced. Air leakage is reduced with a special resin material and sealing design resistant to aging.
3	Wear of the spool packing causes supply air to run into the exhaust port.	Spool packing and special treatment on the body interior reduce wear.



Position where air leakage occurs in general solenoid valves

Coil performance improved

Continuous energizing possible (low exoergic/energy circuit)

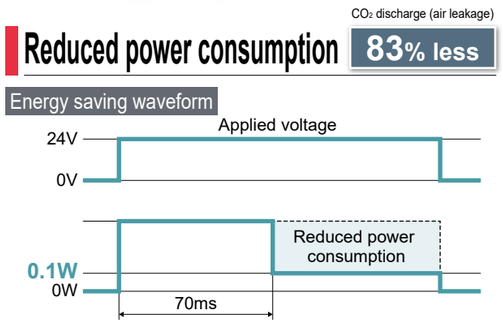
Uses a new coil actuator.

Power consumption

0.1 W (With low exoergic/energy circuit)
0.4 W (Standard products)

Reduced power consumption

CO_2 discharge (air leakage)
83% less



Uses materials with reduced environmental load

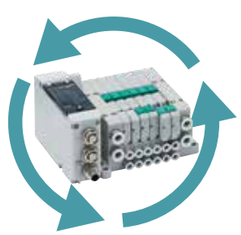
Biomass plastic

Protective cover*1 is made of plant-derived biomass plastic.

*1. The protective cover cannot be closed when manual operation is enabled, making it ideal for preventing forgotten manual operation.

Recycled material resin

The use of recycled resin contributes to reducing the environmental load



High reliability

Strives for stable operation

CO_2 discharge (air leakage)
99.8% less
120 million operation cycles

The TVG Series has been developed to optimize the sliding parts and achieves durability of 120 million cycles or more*. Stable operation due to low friction supports the reliable operation of the actuator, realizing stable operation of equipment and reduction in quality fluctuations.

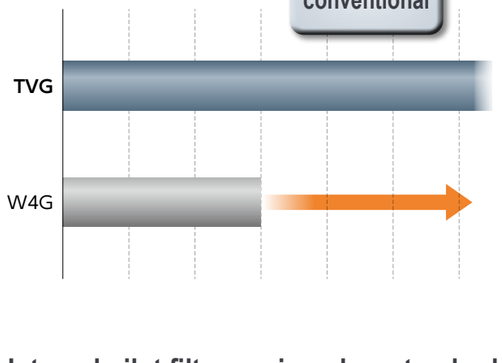
Low friction/Long service life

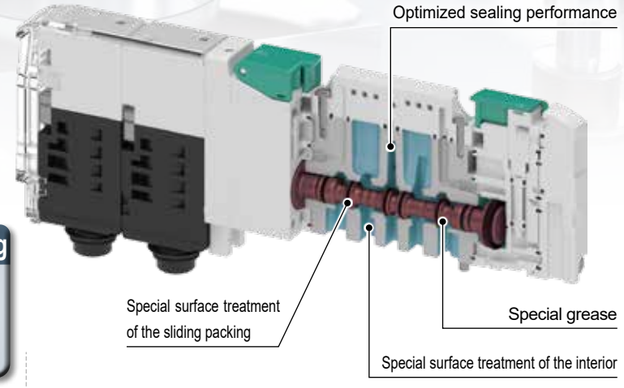
The superb sliding mechanism of the main valve realizes low friction and long service life. The elastic seal withstands 120 million cycles. Achieves both long service life and low air leakage.

Durability count of 120 million operations or more*

*Subject to CKD prescribed conditions.

Elastic sealing
2x conventional





Improved responsivity after startup

Smooth start even after time off. Effective for Monday morning troubles and unexplained stoppages as well.

Special grease used

Lubrication effect continues even with ultra dry air.

Internal pilot filter equipped as standard

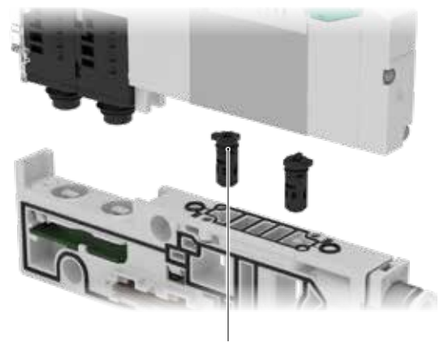
Improved operation stability.

Prevents problems with foreign matter

Port P (air supply) equipped with filter as standard.

Exhaust check valve (option) PAT.P

Retrofitting is possible even after installation.



The outer O-ring prevents small amounts of air from entering. Prevents compact actuators from malfunctioning.

Also compatible with global standards

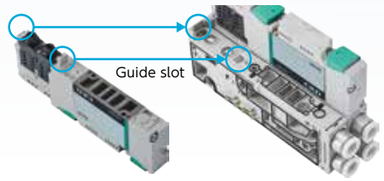
CE UKCA cULus RoHS

Easy to use

Plug-in valve with excellent workability

5 Positioning support as standard PAT.P

A "positioning support" that allows anyone to easily position the valve and base is provided as standard.



6 Easy-to-assemble plug-in connection

PAT.P

Actuator additions are wired complete by plug-ins.

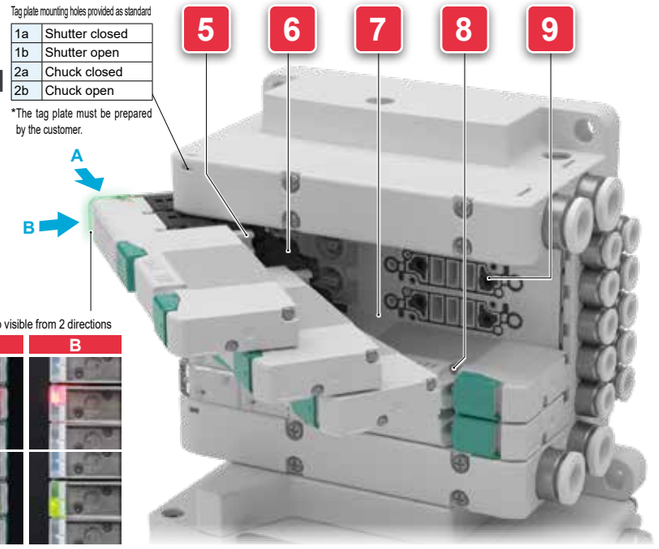
7 Connections that make it easy to adjust the number of stations

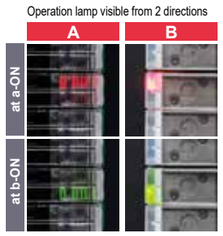
Internal wiring is completed at the same time as the manifold assembly.

8 Screw dropout prevention as standard

9 No parts dropped out

Gasket is built into the base.





Improved environmental performance

IP65/IP67 (dust/water-jet proof) for tough use

IP6*: No inflow of dust
IP*5: No harmful effects by water jets from any direction
IP*7: Prevents water from entering in amounts that would cause harmful effects even if temporarily submerged in water for a specified pressure and time

*TVG can be used in both IP67 and 65 environments. Refer to page 160 for IP performance.

Prevention of coil corrosion

Molded coil specification that is resistant to corrosion. Prevents water from adhering during use and rust due to moisture during transportation and storage.

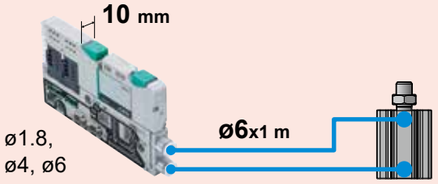
P4 Series for rechargeable battery manufacturing equipment

Restricted specifications for materials and surface treatments inappropriate for rechargeable battery manufacturing processes.

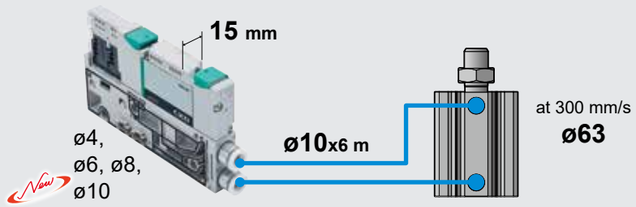
Valve width of 10mm, 15mm are supported

Our first 10 mm wide plug-in valve!

TVG1



TVG2

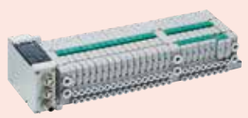


One Point!

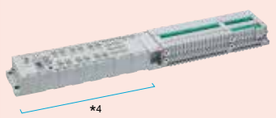
With ø10 fittings, the cylinder can be accelerated even with long-distance piping!

The speed of an air cylinder will decrease if the air piping is long or thin. For applications with long-distance piping where you want the air cylinder to operate at high speed, we recommend using a ø10 fitting, which is one size larger.

Compatible with various communications

Output only	Solenoid valve size	Supported communication	Max. number of points	Max. number of solenoid valves
	TVG1, TVG2	EtherNet/IP*1 DeviceNet, EtherCAT*1, CC-Link IE TSN, CC-Link IE Field*1, CC-Link IE Field Basic*1, CC-LINK, PROFINET*1, IO-Link*1, IO-Link Wireless*1	Solenoid: 32 points	TVG1:24 stations TVG2:24 stations

*1. Solenoid valve ON count function.

With remote I/O	Solenoid valve size	Supported communication	Max. number of points	Max. number of solenoid valves
	TVG1, TVG2	EtherNet/IP, EtherCAT, IO-Link*2 PROFINET	Solenoid: 32 points I/O:4096-point*3	TVG1:24 stations TVG2:24 stations

*2. As a IO-Link master. Solenoid valve communication is EtherNet/IP and EtherCAT.
*3. Solenoid points 32 are included in I/O point count 4096.
*4. Remote I/O must be prepared separately. Refer to Remote I/O RT Series (CC-1557AA) for details.

Easy to use (spacer option)

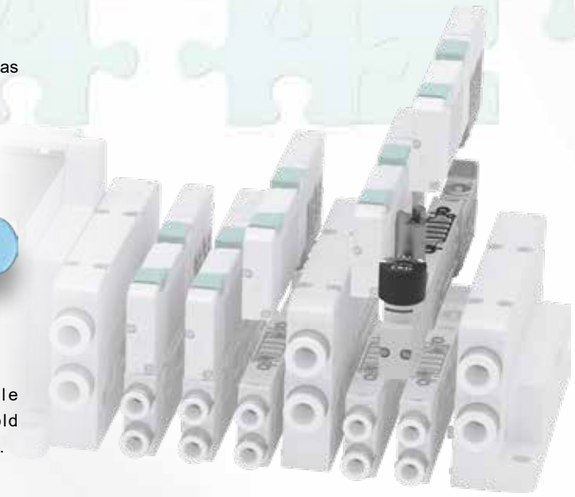
Recommended for situations like these

A Spacer with a Plug-in Structure

We want to handle it by making changes on the valve side.

We want to stock the valves as individual components.

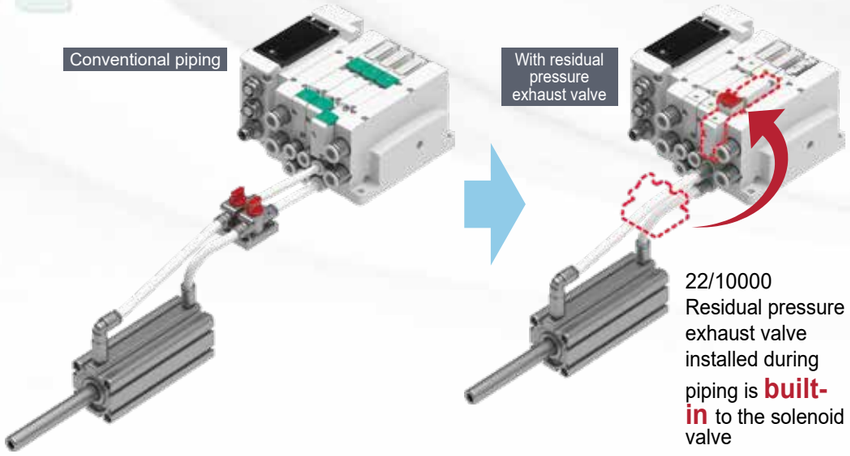
We want to assemble them once the manifold specifications are finalized.



Option

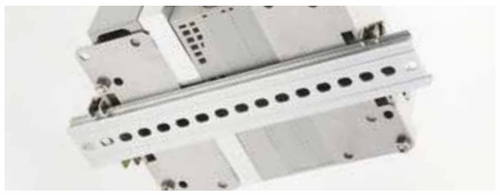
With residual pressure exhaust valve

It is possible to release the residual pressure from ports A and B without dropping the supply pressure.



22/10000 Residual pressure exhaust valve installed during piping is **built-in** to the solenoid valve

DIN rail mount



TAG holder

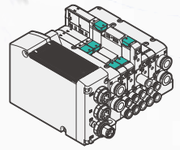
With spacer　　Without spacer

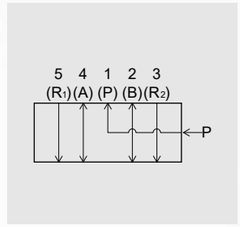
*The same TAG holder with or without spacer

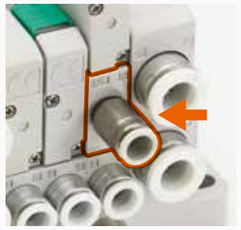
Spacer

Air supply spacer

Air can be supplied at different pressures for each valve. Ideal for adjusting the thrust of cylinders by increasing or decreasing the pressure of individual valves.

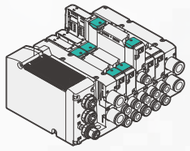


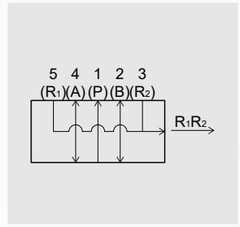




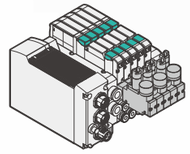
Exhaust spacer

Individual exhaust prevents misoperation of the single acting cylinder to prevent injury to persons and damage to components.





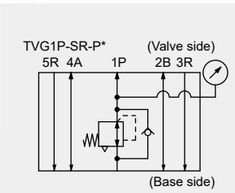
Spacer regulator



Pressure reduction is possible in units of 1 station of valve. P, A, and B can be each reduced in pressure by selecting the model No., enabling detailed cylinder control, etc.

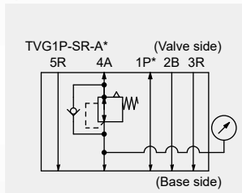
P regulator

Depressurizes both A and B for only one station.



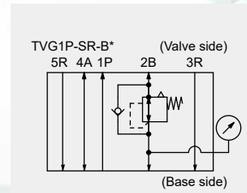
A regulator

Pressure is reduced only for the A side supply pressure of the cylinder connected to the valve.



B regulator

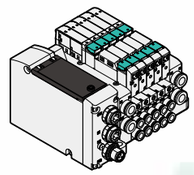
Pressure is reduced only for the B side supply pressure of the cylinder connected to the valve.

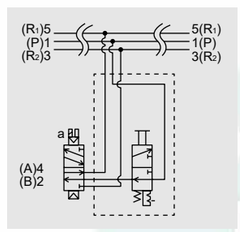


Spacer with in-stop valve

New

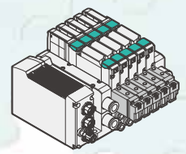
Air can be stopped for each valve. Valves can be replaced individually without stopping production line operation.

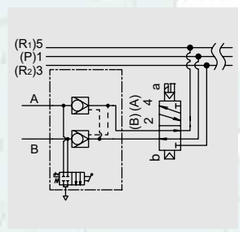


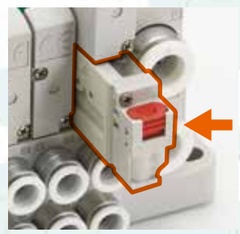


Spacer Pilot Check Valve

Ideal for cylinder position locking and braking over long periods.







Application (IO-Link Wireless)

Industry's first

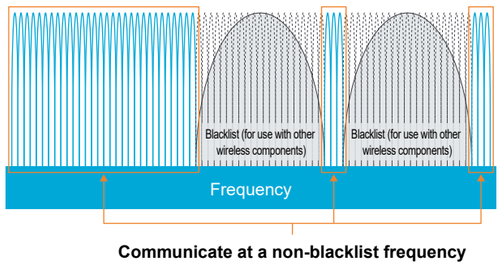
Open network IO-Link Wireless compatible solenoid valve*1

Uninterrupted wireless, usable for control. One billionth error rate. *2 Enables wireless connection of solenoid valve with PLC of various communications via IO-Link Wireless master.

Item	Wireless LAN	Bluetooth	ZigBee	IO-Link Wireless
Standards	IEEE802.11b	IEEE802.15.1	IEEE802.15.4	**IEEE802.15.1**
Frequency	2.4 GHz	2.4 GHz	2.4 GHz	**2.4 GHz**
Communication distance	Up to 100 m	Up to 10 m	Up to 100 m	**Up to 20 m**
Transmission bit rate	11 Mbps	1 Mbps	250 kbps	**21 kbps**
Connection nodes	32	7	128	**40**
Delay time	50 ms	10 to 30 ms	100 ms	**5 ms**
Reliability	Low	Low	Medium	**High**

Blacklist function

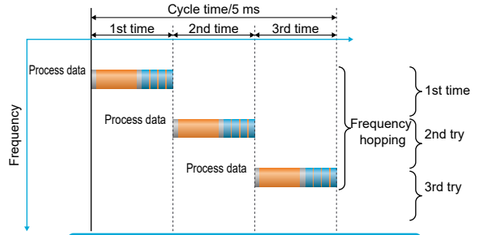
Avoids frequencies used in other wireless components. Coexistence with other wireless components is made possible.



Communicate at a non-blacklist frequency

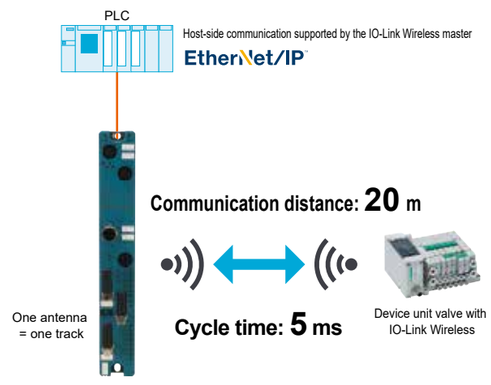
Frequency hopping function

Retries are executed 3 times in one communication cycle by switching frequency bands.



Uninterrupted, low latency

IO-Link Wireless system configuration example



It can also be purchased from CKD. Refer to page 55 for details.

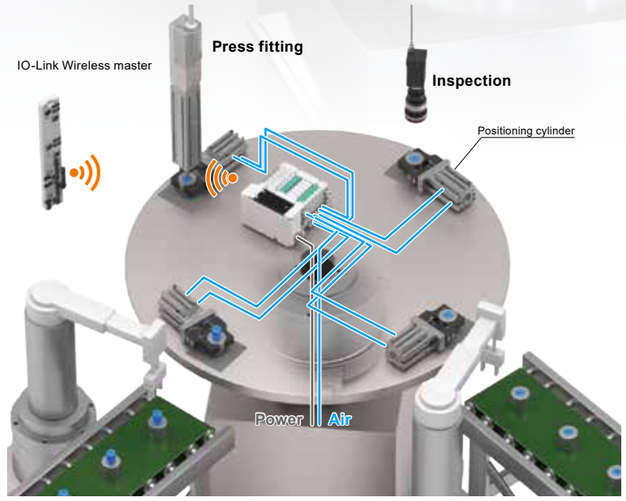
Solenoid valve lineup with IO-Link Wireless device unit

Solenoid valve appearance	IO-Link master (1 track) number of connected units per		Cycle Time
	32 pts Output	1 to 6 units	5 ms
		7 to 8 units	10 ms

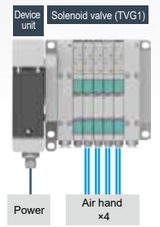
*1. June 2023, CKD research. CKD IO-Link Wireless component compatible regions: Japan and EU, USA.
*2. Blacklist and frequency hopping functions provide wired-like reliability. Wireless quality for use in control.

Assembly / Inspection (rotating table)

The solenoid valve manifold can be installed on the rotary table because the signal line is wireless. Equipment can be designed to improve workpiece positioning accuracy and accommodate a wide variety of workpieces.



Solenoid valve configuration

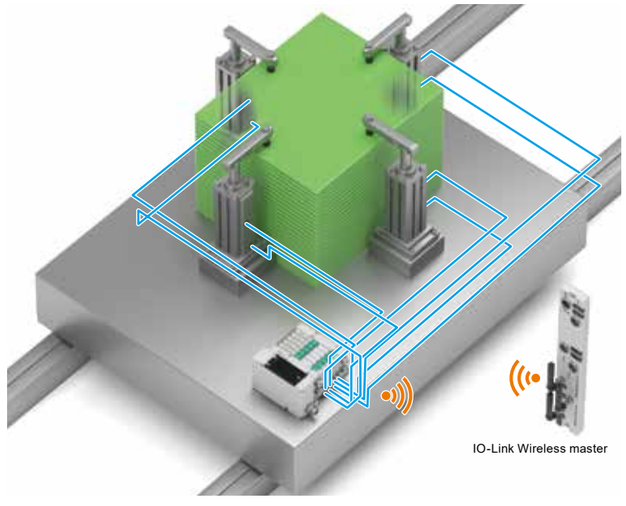


Component configuration

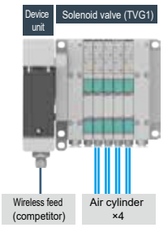
Air hand

Pallet transport

The solenoid valve for cylinder operation in the pallet is made wireless. By combining with a wireless power feed component, it is possible to hold a workpiece for a short time with air sealing even during travel.



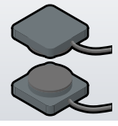
Solenoid valve configuration



Component configuration

Rotary clamp cylinder

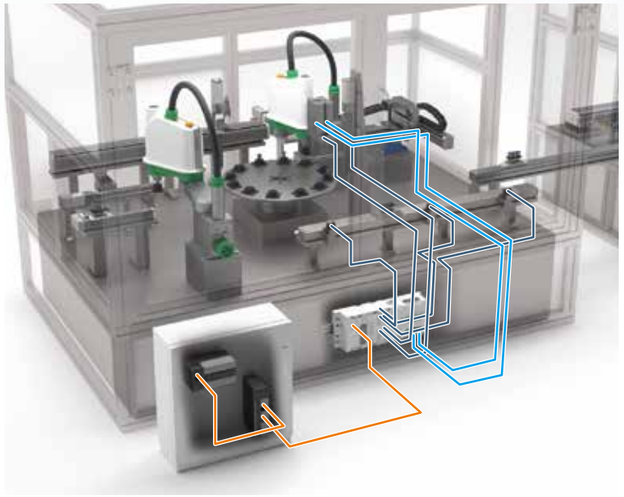
Wireless feed (competitors)



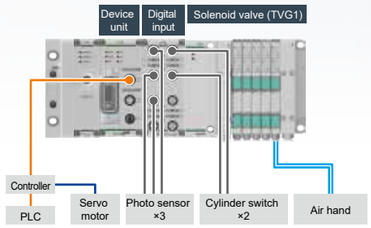
Application

Conveying equipment

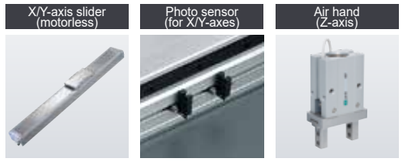
Air piping and electrical wiring can be consolidated in mixed equipment with servomotor-driven actuators and air hands.



Remote I/O configuration



Component configuration

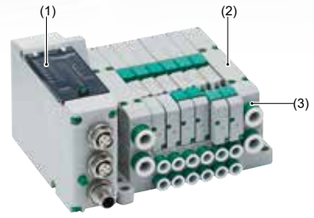


Rechargeable battery manufacturing process

Supports the rechargeable battery manufacturing process from electrode manufacturing to packaging. P4 option compatible with material restrictions and ultra dry air with dew point -80°C available. The long service life of the non-volatile special grease contributes to the stable operation of equipment.

Rechargeable battery option: P4

(1) Electric circuit unit IP65/67
(2) Flow path part Material restrictions
(3) SUS fitting

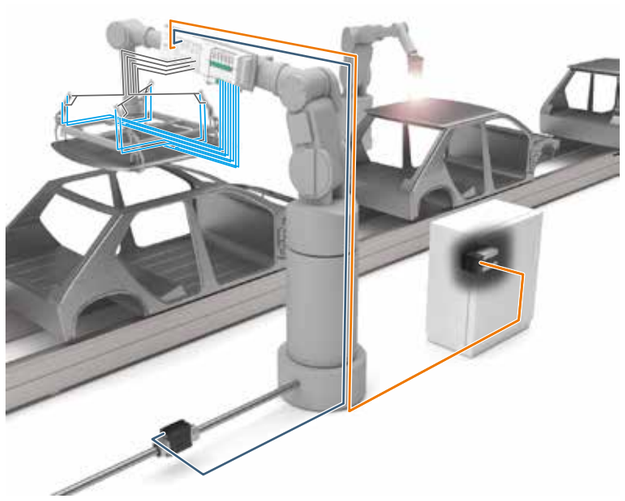


Stable operation even at -80°C dew point is realized by special grease adopted as standard.

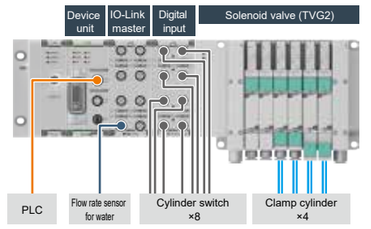
Refer to Rechargeable Battery Compatible Components P4* Series (CC-1226A) for details.

Auto body welding

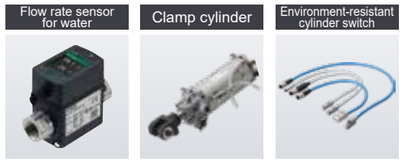
Contributes to reduced wiring of solenoid valves for cylinder drive and cylinder switch input. Only one Ethernet cable is required to complete wiring from the PLC (Programmable Logic Controller), contributing to reduction of installation space and improvement of wiring layout for devices including IO-Link devices.



Remote I/O configuration

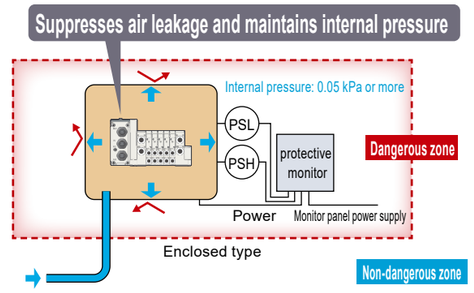


Component configuration



Internal pressure explosion-proof panel

Ideal for applications where solenoid valves are installed in internal explosion-proof control panels. Since there is little air leakage, the influence of pressure control inside the panel is minimized, contributing to stable operation of the equipment.



Supports continuous energization

Energy saving coil (0.1 W) is available as an option, and it supports continuous energization, which is often required for air-operated control.

Special resin

The special resin adopted as standard suppresses secular change and air leakage from the valve for long periods.

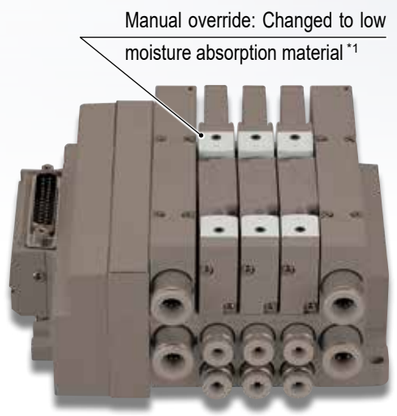
Explosion-proof model certification has not been obtained for discrete solenoid valves. For internal pressure and explosion-proof use, the customer must apply for and obtain a model certification. Observe JNIOSH-TR-46-3 and other standards when performing installation.

Special Specification Product

Compatible with low moisture absorption materials for low dew point environments

Standard Product

Special Specification Product



Features

- Materials with total part moisture absorption rate of 0.25% or less are used
- Ideal for installing solenoid valves in ultra-dry environments

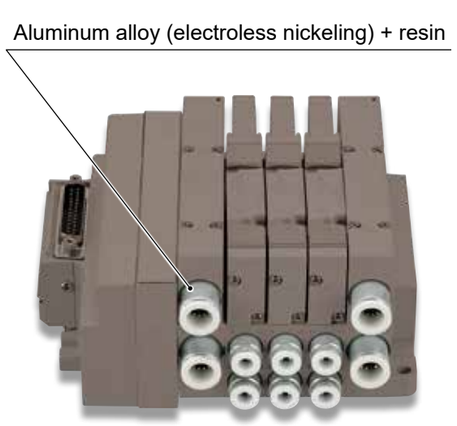
Application

- Rechargeable battery manufacturing

*1. Low moisture absorption material is available only for non-locking, tool operation, without cover (M3).

Fittings All stainless steel tube compatible

Standard Product



Special Specification Product

Features

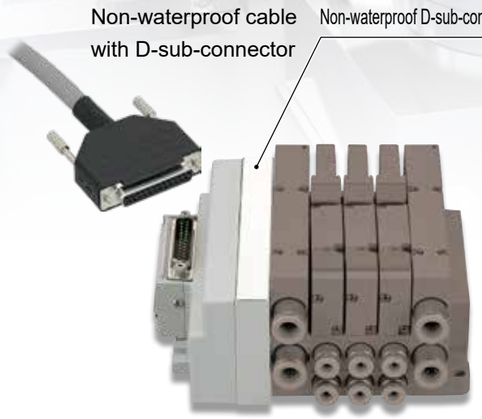
- Improved water resistance
- SUS316L (packing FKM)

Application

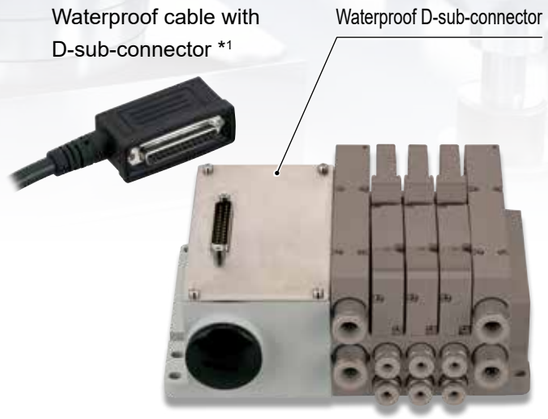
- Rechargeable battery manufacturing
- Food processing machinery

D-sub-connector waterproof specification

Standard Product



Special Specification Product



*1. CKD does not sell these products.

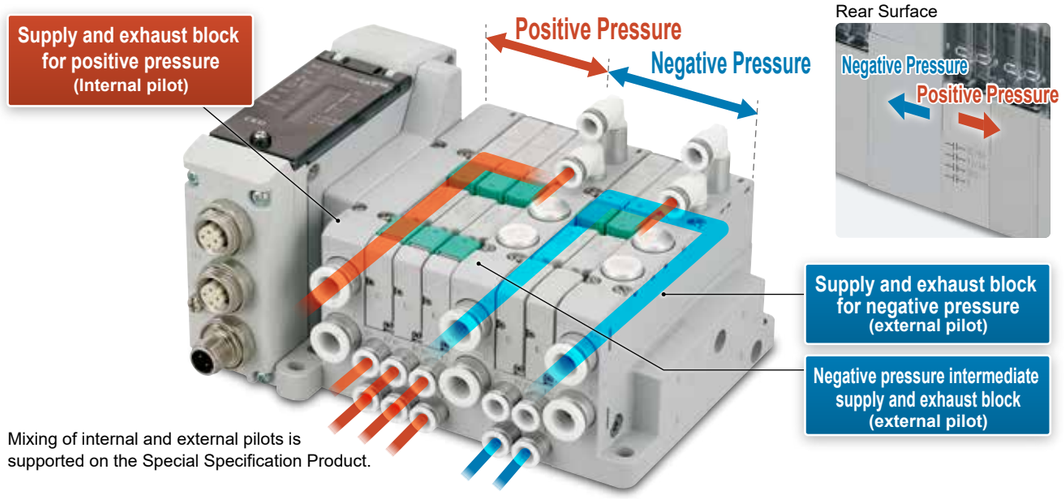
Features

- IP65/IP67 compatible
- 25-pin (max. solenoid number of points: 24)

Application

- Automobile related devices
- Machine tools
- Food processing machinery

Positive pressure/negative pressure mixed



Mixing of internal and external pilots is supported on the Special Specification Product.

Features

- One communication device unit can be used for both positive and negative pressures
- Additional air/vacuum flow rate supply is possible by adding intermediate supply and exhaust blocks
- Vacuum suction/transport of workpieces is supported with a single manifold

[Negative pressure] Vacuum suction [Positive pressure] Air cylinder control

Application

- Automobile related devices
- Food processing machinery
- Electronic parts