INSTRUCTION MANUAL

DE CO VALVE (FLOW DIVIDING & COLLECTING)

●TYPE TDCV5

●TYPE TDCV3

TAKAMI SEIKI CO., LTD.

PRODUCT PROFILE

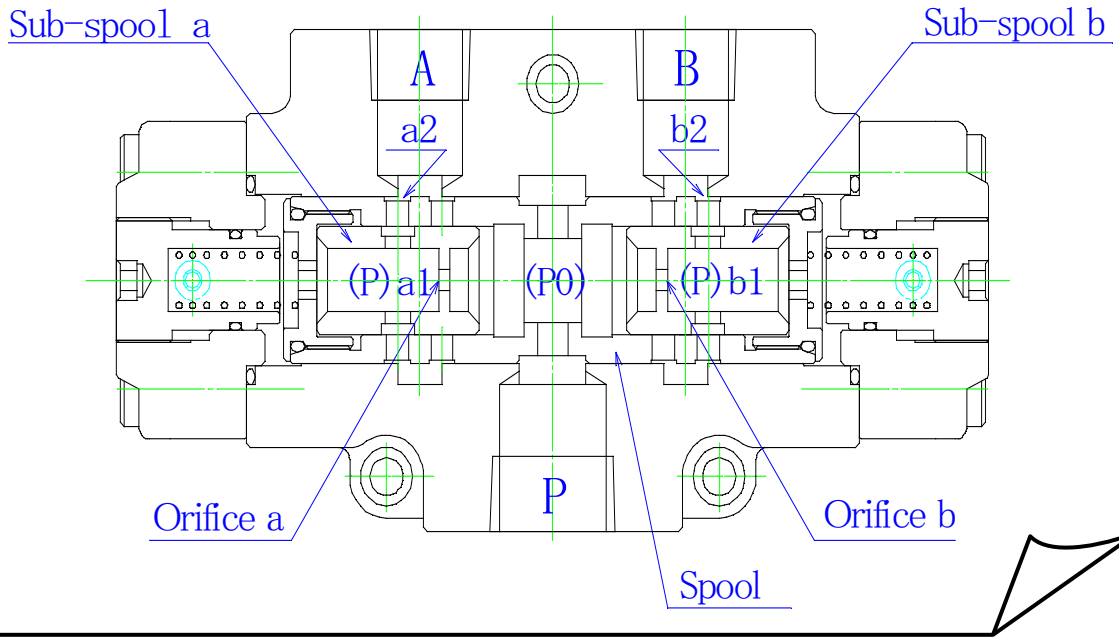
DECO valve is a two-way synchronization valve that controls (synchronizes) forward and reverse flow.

1. EXPLANATION ON PERFORMANCE

(1) At the flow dividing

Each sub-spool move outside by the oil from P port, then oil flows into a-a1-a2-A Port and b-b1-b2-B port. If the pressure difference between outlets A Port and B Port is same (Pa1=Pb1) at this point, the pressure difference between right and left fixation orifices will be the same (PO-Pa1=P0-Pb1) as well. The spool is positioned at center, and same quantity of oil flows into each outlets port. In case the resistance at A port is increased, the pressure at Pa1 will be increased more than Pb1 (Pa1>Pb1). Then the pressure difference between P0-Pa1<P0-Pb1 and B side orifice becomes bigger, and oil flows more into B port. However, spool moves to the right due to Pa1>Pb1, and adjusting part b2 is restricted until Pa1=Pb1. Therefore pressure difference between right and left orifice becomes P0-Pa1=P0-Pb1. Consequently, same quantity of oil flows into A port and B port equally.

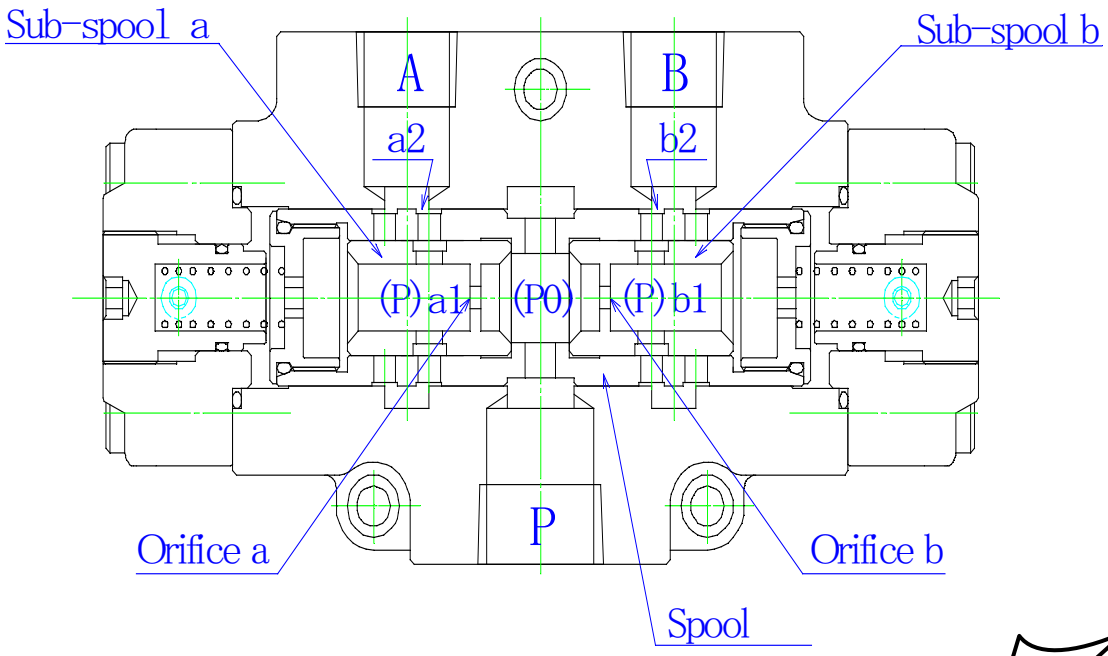
Internal Structure (simplified schematic)
Under flow dividing



(2) At the flow collecting

Each sub-spool moves inside by the oil from A and B port, then oil from a2-a1-a and b2-b1-b flows into P Port. If pressure difference between outlets A Port and B Port is same (Pa1=Pb1) at this point, pressure difference between right and left fixation orifices will be same (PO-Pa1=P0-Pb1) as well. The spool is positioned at center and same quantity of oil flows into each outlets port. In case the resistance at A port is increased, the pressure at Pa1 will be increased more than Pb1 (Pa1>Pb1). Then the difference in the pressure between Pa1-P0>Pb1-P0 and A side orifice become bigger and oil flows more into A port. However, spool moves to the right due to Pa1<Pb1, and adjusting part a2 is squeezed until Pa1=Pb1. Therefore, the difference between right and left orifice becomes Pa1-P0=Pb1-P0. Consequently, same quantity of oil flows into A and B port equally.

Internal Structure (simplified schematic)
Under flow collecting



2. ADVANTAGES

(1) Can simply be installed by connecting it between popes. No adjustment is required.
(2) Synchronization is possible even under large concentrated loads (pressure difference).
(3) The division or collection rate (set rate) may be changed, depending on the type, up to a ratio of 1:3.
(4) Viscosity has little effect on the valve function.
(5) Can be used with high pressure of 29.4Mpa.

3. CAUTION

(1) Keep the internal spool horizontal when mounting the valve.
(2) Make sure the flatness of the part which valve will be connected.
(3) Hexagonal bolts are not attached.

★ ***Recommended*** ★

Type of body	Type of bolt	Qty.	Remarks
TDCV5	PT SCREW	3	M6X35
	Gasket mounting	4	M8X35
TDCV3-03, 04	PT SCREW	3	M8X50
	Gasket mounting	4	M8X50
TDCV3-08	PT SCREW & Flange connection	3	M8X55
	PF SCREW	4	M12X65
TDCV3-12	PT SCREW & Flange connection	3	M8X65
	Gasket mounting	4	M14X80

(4) Mixing of dust and foreign matter into the operation oil shall be avoided when pipes are connected. It may cause some errors.
- Mixing of a piece of thread-sealing tape, painting, sand or dust into the operation oil shall be avoided when assembling in windy.
- Please make sure that operation oil shall be clean and non-degraded.

(5) Please expel air properly when trial operations after pipes are connected. It may cause some errors in some cases.
(6) Flow rate shall be kept within standard range.
(7) If one of either port A or B is closed, the other port is automatically closed and the flow of oil will stop. (This may cause a leak.)
(8) Please expel air completely from pipes and other part.
(9) In the case of cylinder synchronization, the adjustment of errors is made at the stroke end, and air pressure should be applied normally.
(10) In the case of cylinder synchronization, switching during a stroke could cause an accumulation of errors.
(11) Both left and right pipes from the valve to the actuator should be the same length.
(12) Use the adjusting screw in the cover of TDCV3-08・12 when decreasing pressure compensation, shorten the corrected time at cylinder end, shorten the switching time and expelling air in the operation.
(13) Appropriate tightening torque of pipe taper thread

Size	Appropriate torque	Size	Appropriate torque
Rc 1/4"	25~35 N·m	Rc 1"	160~180N·m
Rc 3/8"	45~55 N·m	Rc 1·1/4"	220~250N·m
Rc 1/2"	25~37 N·m	Rc 1·1/2"	290~320N·m
Rc 3/4"	25~38 N·m		

★ Please wind thread-sealing tape on the screw two or three times with leaving one or two groove of tip.

5. INSPECTIONS AND REPAIRE

●Causes and remedies for trouble

In starting up and operation

(1) Actuator does not start working.
(2) Large measurement errors.
(3) Only one side of the valve functions.
(4) Fails to reach the specified speed.
(5) Pressure goes down excessively.
(6) The valve makes abnormal noise.

Pleases check below items when having above trouble.

(a) Is pump output normal?
(b) Is pressure normal? Is the relationship between pressure and weight normal?
(c) Is the oil viscosity and temperature normal?
(d) Is there any bubble in oil?
(e) Are the attachments functioning properly?
(f) Is the specified amount of oil flowing into the valve?

If a failure in the valve is found, that may be caused by lack of spring and o-ring, spool slide, or mixing of dusts and foreign matters. In that case, please disassemble and inspect each part.

●Points to be noted when disassembling

(1) Do not damage a part.
(2) Do not contaminate the parts (clean the surface where the parts are put on).
(3) Put a cover on openings in the removed parts to prevent foreign matters from entering through them.
(4) Prepare clean oil for washing (kerosene or light oil).

See the illustration carefully and disassemble the valve in the order.

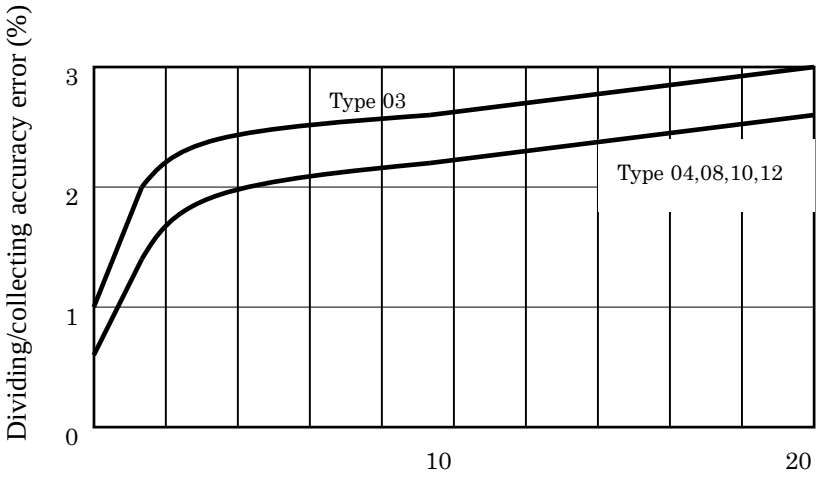
●Inspection point

Part	Inspection
Body	**Check for scratches or burrs on rotation section and wearing.**
Sub-spool	**Check for working in the body or spool. If it doesn't work well, clean with washing oil properly and check again.**
Spool	**Same as above**
Spring	**Check elasticity of the spring.**
O-ring	**Check elasticity of stop ring and scratches.**

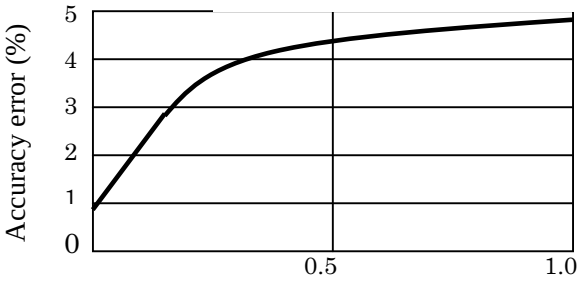
Please remove foreign matters and burrs in other parts, if any.

6. FLOW DIVIDING AND COLLECTING ACCURACY

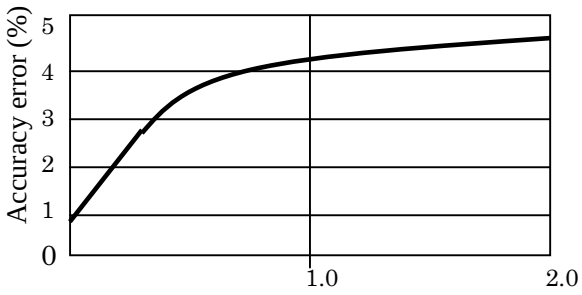
Synchronization takes place accurately even when the pressure difference (concentrated load) between ports A and B is as high as 19.6MPa (200kgf/cm2). *(Refer to 'Accuracy Table' as below)*
All units have been tested.



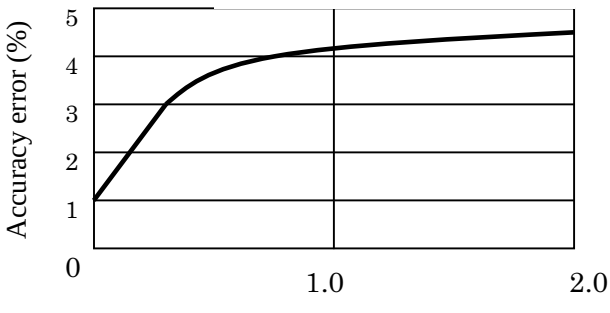
Type TDCV5-02



Type TDCV5-03



Type TDCV5-04



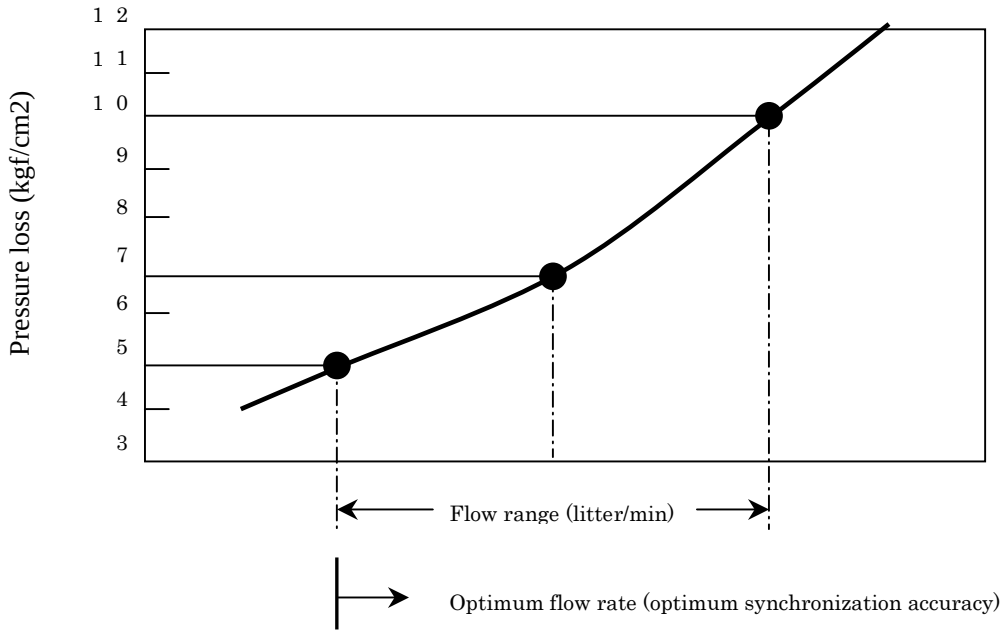
7. PRESSURE LOSS

Pressure loss calculation is below.

$$\triangle P = \left(\frac{\text{Flow rate}}{\text{Port P standard flow rate}} \right)^2 \text{X } 0.7\text{MPa (7kgf/cm2)}$$

At port P standard flow rate $\triangle P \Rightarrow$ 0.7MPa (7kg/cm2)

Pressure loss diagram



■Please contact us if you have any questions or need further information.

****** TAKAMI SEIKI CO., LTD. ******

1-103-19 Yoshinodai, Kawagoe city, Saitama 350-0833, JAPAN

TEL:(+81) 49-224-4030

FAX:(+81) 49- 224-4018

E-mail: info@takami-seiki.com