Pneumatic Equipment

To Use This Product Safely

Be sure to read this before use. For general cylinder information, see Intro 41, and for Cylinder Switches, see P. 1512.

Individual Precautions: Mechanical power cylinder MCP Series

Design / Selection

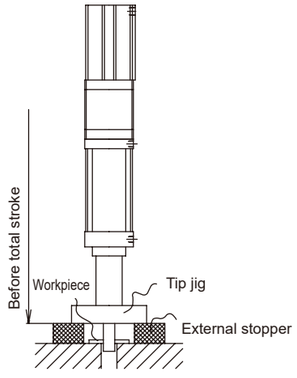
Danger

■ Before starting, be sure to supply air to the travel section's retract side to apply back pressure. The Piston Rod will fly out, which is very dangerous.

CAUTION

■ If an external force in the direction of cylinder retraction is applied to the Piston Rod when the cylinder retracts after the boost, operate within the following value limits (maximum) to prevent the risk of coupling release failure or booster failure.
MCP-W-2: 1000 N or less
MCP-W-5: 3000 N or less

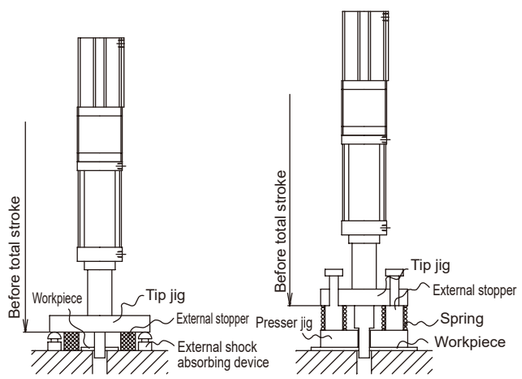
■ When using the product for punching out or cutting workpieces, the Piston rod may extend suddenly. If the Piston Rod flies out, it will hit the rod cover (W) of the fast feed section cylinder, which may cause impact noise or damage to the cylinder due to impact, so be sure to provide an external stopper or shock absorbing device, etc. before the total stroke.



■ Do not apply lateral load or eccentric load to the Piston Rod. Note that when the cylinder operates in a direction other than vertical, the tip load acts as a load on the cylinder, so please install a guide so that no load is applied to the cylinder.

■ Use the cylinder in a mechanism in which the Piston Rod does not rotate so that no torque is applied to the rod. Otherwise, there is a risk of coupling release failure or booster failure.

■ Do not use multiple cylinders synchronized.



When the cylinder retracts, if an external force is applied in the cylinder retraction direction by a spring, external shock absorbing device, etc., set the external force to the value below or less.
MCP-W-2: 1000 N or less
MCP-W-5: 3000 N or less

■ After boosting, provide a time lag of 0.5 seconds or more between booster section retraction and rapid feed section retraction. If the fast feed section retracts before the intensifier section retracts, the intensifier section may fly out when the connection is released, causing cylinder damage.

■ Do not use the booster while in the meter-out position. The intensifier section may fly out when the connection is released, causing cylinder damage.

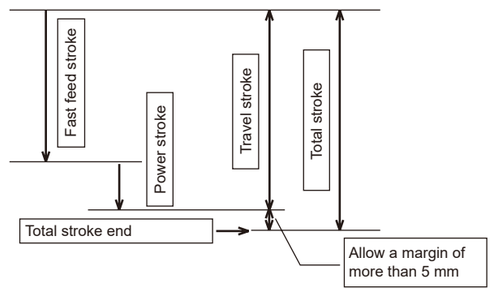
■ Use discrete solenoid valves for booster and rapid feed sections. Or when using a manifold, take measures such as using an individual exhaust spacer.

■ Do not advance the booster at the same time that the rapid feed section reaches the end of its travel. This will cause connection failure. After the fast feed section advances and stops until it hits the workpiece, provide a time lag of 1 second or more before the intensifier section advances.

■ Using the product near a welder, etc., can magnetize the product, which may cause the cylinder switch to malfunction. Please use in an environment where no magnetic field is generated.

■ Because MCP-S is a Single Acting cylinder, the applied load (jig weight) on the Piston Rod End should be 20 kg or less for 2t and 50 kg or less for 5t.

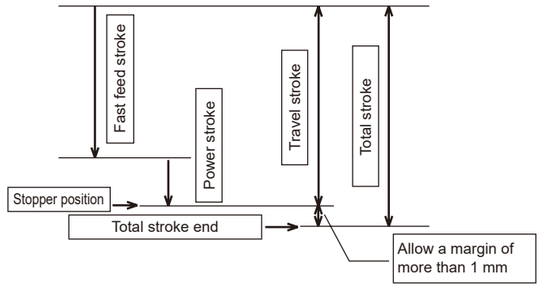
■ When using the booster stroke, the total stroke should be well within the stroke end.
1. When there is no external stopper etc. (When using the power stroke to the end)



Set the total stroke so that Total stroke > Moving stroke+5 mm. Note that Moving stroke = Fast feed stroke+Intensifier stroke.

Usage Example
· Press fitting, bending (press), etc.

2. When providing an external stopper etc.
(When not using the intensifier stroke to the end)



Set the external stopper, etc. so that Total stroke > Moving stroke+1 mm. Note that Moving stroke = Fast feed stroke+Press-fitting amount.

Usage Example
· Punch, cutting, etc.

■ The retraction end of the booster section can be detected by installing a cylinder switch on the booster section.
When attaching a cylinder switch, please purchase only the switch body.

■ In the state where the booster section has not been allowed to completely return, if the booster is made to move forward repeatedly, damage to the booster section cylinder could result. If the cycle time is short, detect with a cylinder switch that the intensifier section cylinder has retracted to the stroke end.

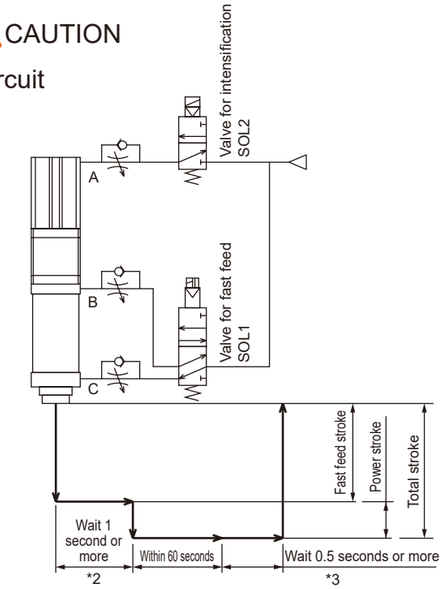
■ Because there is a possibility of a failed release of connection or a run-out of the Piston Rod, do not use the quick exhaust valve on the head side of the rapid feed section.

■ MCP-W cannot be held in the booster state for long periods. Retract within approximately 60 seconds after starting intensification.

Design / Selection

⚠CAUTION

Circuit



Solenoid Valve / Operating state	Travel stroke SOL1	Power stroke SOL2
Fast feed section advance	ON	OFF
Fast feed stroke end	ON	OFF
Wait 1 second or more *2	ON	OFF
Intensifier section advance	ON	ON
Intensifier section retract *1	ON	OFF
Wait 0.5 second or more *3	ON	OFF
Fast feed section retract	OFF	OFF

*1: The Piston Rod does not retract when the intensifier section retracts.
*2: Time until the air on the rod side of the fast feed section is exhausted and the fast feed section and intensifier section are connected.
*3: Time until the air on the head side of the intensifier section is exhausted and the connection between the fast feed section and intensifier section is released.

■ Due to the time required to couple the rapid feed section and booster section, a 1-second wait is necessary before the booster cylinder starts to advance from the rapid feed stroke end (after the rapid feed cylinder advances and stops).

Note that if the exhaust on the fast feed section rod side is throttled as shown below, 1 second or more may be required. Please set the waiting time with a margin.

- When solenoid valve flow rate is low
- When the rod side speed controller (C in the figure above) of the fast feed section cylinder is restricted
- When piping length of the fast approach section is long
- When piping diameter of the fast approach section is small

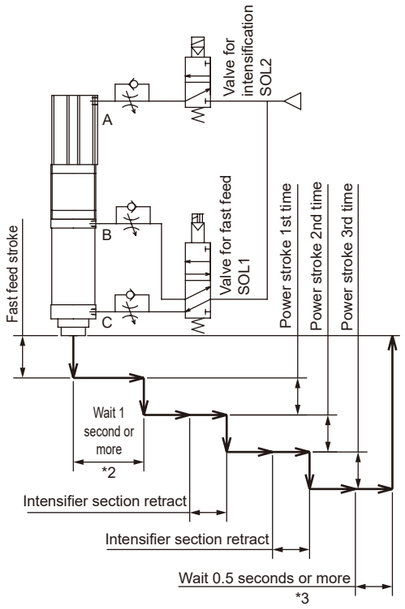
■ Because the booster section is retracted before the rapid feed section, a 0.3 to 0.5-second wait is necessary from the start of booster cylinder retraction to the start of rapid feed cylinder retraction.

Note that if the exhaust of the intensifier section is throttled as shown below, 0.5 seconds or more may be required. Please set the waiting time with a margin.

- When solenoid valve flow rate is low
- When piping length of the boost section is long
- When piping diameter of the boost section is small

■ By repeating pressurizing and exhaust of only the booster section after rapid feed, a 10-mm boost can be obtained per repeat. (If 30 mm intensification is required, repeat intensification 3 times)

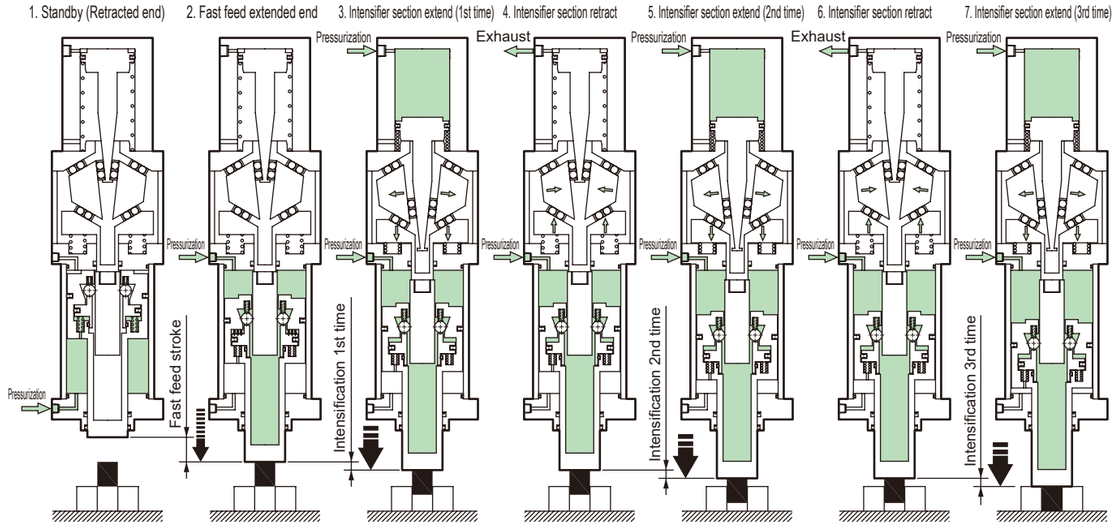
[Circuit example for 30 mm press fitting]



Solenoid Valve / Operating state	Fast feed stroke SOL1	Power stroke SOL2
Fast feed section advance	ON	OFF
Fast feed stroke end	ON	OFF
Wait 1 second or more *2	ON	OFF
Intensifier section advance 1st time	ON	ON
Intensifier section retract *1	ON	OFF
Intensifier section advance 2nd time	ON	ON
Intensifier section retract *1	ON	OFF
Intensifier section advance 3rd time	ON	ON
Intensifier section retract *1	ON	OFF
Wait 0.5 second or more *3	ON	OFF
Fast feed section retract	OFF	OFF

*1: The Piston Rod does not retract when the intensifier section retracts.
*2: Time until the air on the rod side of the fast feed section is exhausted and the fast feed section and intensifier section are connected.
*3: Time until the air on the head side of the intensifier section is exhausted and the connection between the fast feed section and intensifier section is released.

[Operation diagram for 30 mm press fitting]



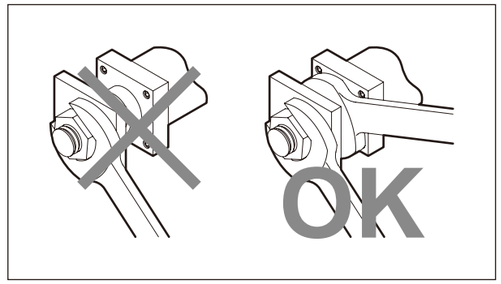
During Use

⚠CAUTION

■ Do not grease the cylinder. Additional grease can cause a malfunctions.

■ While the mounting direction is unrestricted, if the cylinder is operating in a direction other than the vertical direction, the tip load will be applied to the cylinder. In this case, use a guide that prevents the load from being applied to the cylinder.

■ Tighten so that torque is not applied to the cylinder. When fixing a workpiece to the Piston Rod tip, fix and attach it with a wrench.



For precautions during mounting, installation, adjustment, use, and maintenance, please see "Precautions for Use" in this catalog and the CKD Components product site (https://www.ckd.co.jp/kiki/en/) → "Model No." → Instruction Manual.