Discontinue

CU

Converter unit

63 / 100 dia.

Related products

Overview

Constant speed feed, braking and two-speeds are flexibly achieved with pneumatics. Converter and hydraulic controlling are integrated.

Features

Piping not required.

Converter and valve unit, etc. each components are compactly integrated. Piping man-hours and foot print are reduced.

High controllability

Easy and exact flow control due to superior flow characteristics.

Wide working pressure range

Wide working pressure range up to 1.0MPa max.

Enabling separation use.

Separation use per component is enabled according to applications. Connection of control unit to installed converter is also possible.

CONTENTS

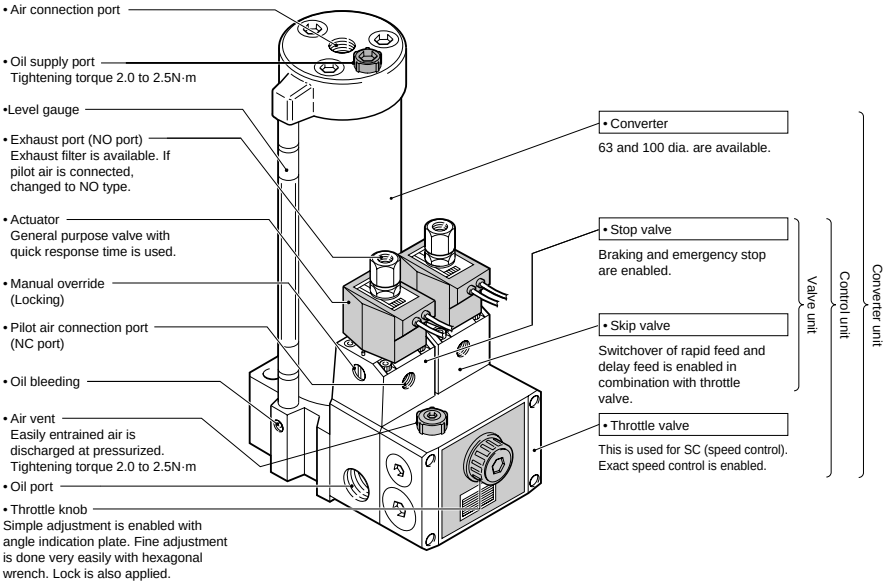
●: Standard, ■: Not available

Model No.		Bore size (mm)	Stroke length (mm) 50	100	200	315	400	500	630	Page
Converter unit	CU	63 dia.	●	●	●	●	●	●	●	442
		100 dia.	■	■	●	●	●	●	●	
Converter	CUT	63 dia.	●	●	●	●	●	●	●	
		100 dia.	■	■	●	●	●	●	●	

Discontinue

Product introduction

Low speed stability and excellent stoppage accuracy



Discontinue

Safety Precautions

Always read before starting use.
Refer to Intro 45 for general details on the cylinder, and to Intro 52 for details on the cylinder switch.

Converter CU Series

⚠ WARNING — Design & Selection

1 Do not use this product near fire or in devices or machines having an ambient temperature exceeding 50°C.
• Flammable hydraulic fluid used in the low hydraulic cylinder poses the risk of fire.

2 This product cannot be used in cleanrooms.

⚠ CAUTION — Design & Selection

1 Do not use this product in an environment, device, or machine vulnerable to mist.
The low hydraulic cylinder generates oil mist during operation and may adversely affect the environment.

2 Install an exhaust cleaner on the directional control valve for the low hydraulic cylinder.
The low hydraulic cylinder may discharge a fine amount of hydraulic fluid from the exhaust port of the directional control valve, and may contaminate the periphery.

3 Install the converter where it is easily maintained.
The converter requires maintenance such because renewal of hydraulic fluid and air vents. Provide sufficient space for maintenance.

4 Select the low hydraulic cylinder with the converter.
Combining the low hydraulic cylinder with a converter optimizes operation. Select an adequate converter.

5 Keep the low hydraulic cylinder load to 50% or less of the theoretical output.
To attain performance similar to the hydraulic cylinder in constant-speed operation and stoppage accuracy, the low hydraulic cylinder load must be 50% or less.

6 Use petroleum-based turbine oil for the hydraulic fluid. Problems occur if noncombustible hydraulic fluid is used.
The adequate viscosity is 40 to 100 mm^2/s at the working temperature. The temperature range is 15 to 35°C at ISO VG32. When using in a range exceeding ISO VG32, use ISO VG46 (25 to 45°C).

ISO VG32 turbine oil
Example : [Nonadditive]

Idemitsu	: Turbine Oil P32
Nisseki	: Turbine Oil 32
Maruzen	: Turbine Oil 32
Mitsubishi	: Mitsubishi Turbine Oil 32
[Additive]	
Idemitsu	: Daphne Turbine Oil 32
Nisseki	: FBK Turbine 32
Maruzen	: Turbine Super 32
Mitsubishi	: Diamond Turbine Oil 32

7 Avoid inching feed.
Avoid feeding the low hydraulic cylinder with inching, because the oil surface may exceed the converter's upper oil level limit and overflow.

Safety Precautions

Always read before starting use.
Refer to Intro 45 for general details on the cylinder, and to Intro 52 for details on the cylinder switch.

Converter CU Series

⚠ WARNING — Installation & Adjustment

1 Supply hydraulic fluid to the converter after exhausting all compressed air from the system.

Before supplying hydraulic fluid to the converter, check safety measures to prevent the driven object from dropping and the clamped object from falling off, etc. Then, shut off the air supply and equipment power and exhaust all compressed air from the system. If the converter's supply port is opened while there is compressed air in the low hydraulic system, hydraulic fluid may spray out.

⚠ CAUTION — Installation & Adjustment

1 Installation

- Install the converter unit and converter vertically.
- Install the converter unit and converter so the lower limit of the converter's oil surface is higher than the upper limit of the oil in the actuator.

2 Piping

- If there is a marked difference in bore sizes at piping sections, stable speed is not attained.
- The specified speed is not attained if the joint section is restricted or if there are too many 90-degree bends.
- Pipe the converter or controller in the direction of the actuator control (meter-out control).
- After piping, check that there is no leakage from connection sections.

3 Lubrication

The best way to lubricate is to use the converter's air connection and oil supply ports after piping to the cylinder. Vacuum from one port with a vacuum pump, and lubricate from the other port. The oil is supplied with minimal air. If a stop valve is provided, conduct step 3 below before operating the vacuum pump.
If a vacuum pump is not provided, use the following steps:
A: When the converter is higher than cylinder. (Fig. 1)

1. Move the cylinder position to the stroke end of the lubrication side.
2. Loosen the air vent plug on the throttle valve. (Fig. 2)
3. If a stop valve is provided, supply 0.3 MPa pressure to the pilot air supply port on the stop valve and, using a manualoverride, keep the stop valve open. (Table 1)
4. Open the lubrication plug on the converter, and supply oil.
5. Close the air vent plug when air and oil are no longer discharged from the air vent plug on the throttle valve.
6. Supply oil to the converter's upper oil level limit.
7. When supplying to the other side of the cylinder, repeat steps 1 to 6.

Fig. 1

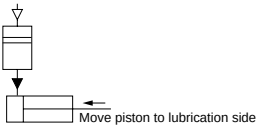
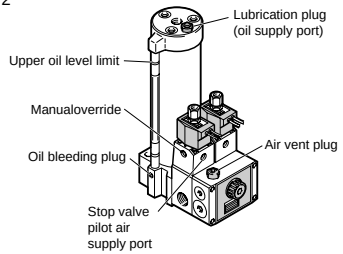


Table 1

		140°	Origin	140°
Valve state	NC type	Open	Close	Open
	NO type	Close	Open	Close

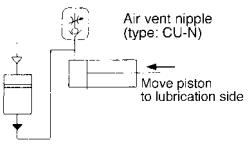
Fig. 2



B: When the converter is lower than the cylinder (Fig. 3)
Avoid using this method because it will be difficult to bleed entrained air.

1. Lubrication is the same as (A), but an air vent nipple (type: CU-N) must be installed on the highest position of the cylinder oil section so entrained air is bled.
2. In step 4 of (A), supply 0.05 MPa pressure to the converter's air supply port, and feed oil into the cylinder.

Fig. 3



CAUTION Installation & Adjustment

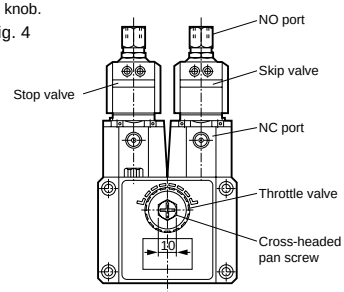
4 Manual operation (Table 1)

1. Using the stop valve or skip valve's manual override is handy during trial run and lubrication. (Fig. 2)
2. When the manual override is turned clockwise or counter-clockwise (140°) from the origin, the NC valve opens. The valve closes when the device is returned to the origin. With the NO, the valve's opening and closing states are reversed.

5 Adjusting flow

1. Loosen the cross-headed pan screw (M5) for the lock, and release the lock. (Fig. 4)
2. Adjust to the required flow with the throttle knob. (The piston speed increases when turned counterclockwise.) Fine adjustment is made by inserting a hexagonal wrench into the hexagon hole (width 10).
3. Tighten the cross-headed pan screw and lock the throttle knob.

Fig. 4



6 Intermediate stop and two speeds - rapid and delay

1. Both the stop and skip valves are pilot-operated poppet valves. The coil is turned ON and OFF to control pilot air and switch the valve.
2. When both the stop and skip valves are piped to the NC port, they are normal closed types. When piped to the NO port, they are normal open types.
3. When the normal closed type is not energized or when the pilot air drops to 0.3 MPa or less, the valve closes. At the stop valve, the cylinder piston stops and the piston position is held.
   At the skip valve, the cylinder speed is controlled from rapid speed to delay feed following the throttle opening. When using the normal open type, valve opening/closing are reversed and cylinder operational status changes.

7 Do not use a push-in joint to pipe the low hydraulic cylinder.

Otherwise, oil leakage may occur.

8 Use steel pipe or copper tube when piping the low hydraulic cylinder.

With the hydraulic circuit, higher surge than working pressure may be generated in the low hydraulic cylinder piping, requiring safe piping materials.

CAUTION During use & Maintenance

1 Regularly vent air from the low hydraulic cylinder.

Air may accumulate in the low hydraulic cylinder, so vent air before starting operations, etc. Vent air with the air vent valve provided on piping.

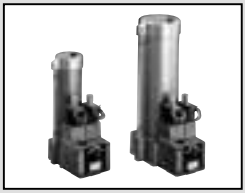
2 Regularly check oil capacity in the low hydraulic cylinder.

A very small amount of hydraulic fluid is gradually discharged from the low hydraulic cylinder of a converter, and oil capacity gradually drops. Check oil capacity and refill hydraulic fluid if low.

Oil capacity is checked with the oil gauge on the converter.

3 If drainage enters the hydraulic fluid, or if hydraulic fluid becomes cloudy or discolored, replace it with new oil.
Use the same brand of oil when replacing.

4 When draining oil, completely remove pressure (internal pressure caused by compressed air or load) from the converter. Drain converter oil from the oil drain plug shown in Fig. 2 (page 440).



Discontinue

Converter unit

CU Series

• Bore size: 63, 100mm

Specifications

Descriptions				C U	
Bore size			mm	63 dia.	100 dia.
Working fluid Note 1				Compressed air and hydraulic fluid 20 to 100mm2/s	
Working pressure	Converter unit Note 2		MPa	0. 3 to 1.0 (use converter and valve unit with same pressure.)	
	Converter		MPa	0 to 1.0	
	Valve unit		MPa	0.3 to 1.0	
	Throttle valve		MPa	0.07 to 1.0	
Withstanding pressure			MPa	1.5	
Ambient temperature			°C	5 to 50	
Use air temperature			°C	-10 to 60 (to be unfrozen)	
Use hydraulic fluid temperature			°C	5 to 50	
Ambient humidity				70% or less	
Stroke length			mm	50, 100, 200, 315, 400, 500	200, 315, 400, 500, 630
Installation attitude				Vertical	
Lubrication				Not required (use turbine oil Class 1 ISOVG32 for lubrication.)	
Oil capacity CV value	Stop valve and skip valve			2.2	
	Throttle valve Note 3			0. 1 (flow control range 0.06 ± 10% to 3.5 ℓ/min) -option	
				0. 8 (flow control range 0.10 ± 10% to 28 ℓ/min) -standard	
Electrical specifications	Rated voltage			AC100V 50/60Hz, AC110V 60Hz, AC200V 50/60Hz, AC220V 60Hz, DC12V, 24V, 48V, 100V	
	Apparent power	At starting	VA	35.0/27.0(50/60Hz)	
		At holding	VA	22.0/17.0(50/60Hz)	
	Power consumption	AC	W	8.3/6.2(50/60Hz)	
		DC	W	11.0	

Note 1: Hydraulic fluid with viscosity 40mm^2/s and working oil temperature is recommended. Use oil Fuji-kosan / Fukkol hydrol X22 or equivalent oil such as MITSUBISHI / Diamond power fluid 18, Showa-Shell / SHELL Tellus oil 22, Esso / Univis J26, Mobil / Mobil DTE22, Cosmohydro HV22, Nippon oil corp. / highland-wide 22 and Idemitsu / Daphne super hydro 22WR.

Note 2: To be 0.3 to 0.7MPa, if rated voltage is direct-current.

Note 3: Throttle valve varies ±10 % of flow rate in min. flow control zone.

Converter unit mass table

kg

	Stroke length						
Diameter (mm)	50	100	200	315	400	500	630
63 dia.	3.7	3.8	4.1	4.5	4.7	5	—
100 dia.	—	—	5.6	6.3	6.9	7.5	8.4

Table above shows mass with stop valve, skip valve and throttle valve. Other combined mass of control unit requires additional mass on converter mass table and control unit mass table.

Converter mass table

kg

	Stroke length						
Diameter (mm)	50	100	200	315	400	500	630
63 dia.	1.4	1.5	1.8	2.2	2.4	2.7	—
100 dia.	—	—	3.3	4.0	4.6	5.2	6.1

Control unit mass table

kg

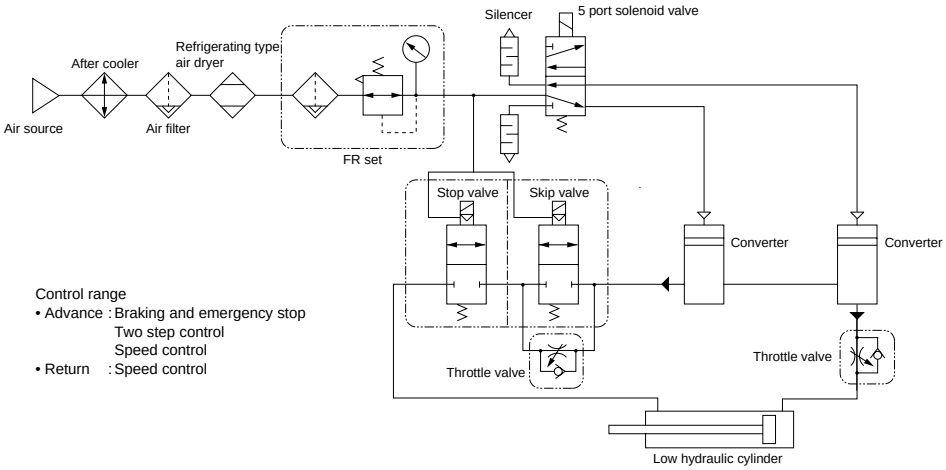
Throttle valve / Valve unit	Without throttle valve	With throttle valve
Without stop valve Without skip valve	—	1.2
With stop valve	1.3	1.7
With skip valve	—	1.7
With stop valve With skip valve	—	2.3

Converter capacity (oil capacity)

(cm^3)

Converter Diameter (mm)	Converter C cross-section areas (cm^2)	Converter stroke length (mm)						
		50	100	200	315	400	500	630
63 dia.	30.6	300	450	750	1,100	1,350	1,650	—
100 dia.	76.1	—	—	1,750	2,600	3,250	4,000	5,000

Example of basic circuit



Control range
- Advance : Braking and emergency stop
  Two step control
  Speed control
- Return : Speed control

Discontinue

How to order

Converter unit

CU - 63 - 50 - 0 1 - 1 2G 1

Converter

CUT - 63 - 50

Control unit

CUC — 0 1 - 1 2G 1

Model

Ⓐ Bore size

Ⓑ Stroke length

Ⓒ Valve unit Note 1

Ⓓ Throttle valve Note 1

Ⓔ Voltage

Ⓕ Coil option Note 2

Ⓖ Exhaust filter

Symbol	Descriptions
Ⓐ Bore size (mm)	
63	63 dia.
100	100 dia.

Ⓑ Stroke length (mm)			
Symbol	Stroke length (mm)	63 dia.	100 dia.
50	50	●	
100	100	●	
200	200	●	●
315	315	●	●
400	400	●	●
500	500	●	●
630	630		●

Ⓒ Valve unit	
0	Without stop valve and without skip valve
1	With stop valve
2	With skip valve
3	With stop valve With skip valve

Ⓓ Throttle valve (flow control range)	
0	Without throttle valve
1	0. 06 to 3.5 ℓ/min (option)
2	0. 10 to 28 ℓ/min (standard)

Ⓔ Voltage	
1	AC100V 50/60Hz AC110V 60Hz
2	AC200V 50/60Hz AC220V 60Hz
3	DC24V
4	DC12V
5	DC48V
6	DC100V
9	Air supply block type (custom order)

Ⓕ Coil option		
	Coil system	Rated voltage
Blank	Grommet coil lead wire (AC only)	AC100V, AC200V, DC12V, DC24V, DC48V, DC100V
2E	Grommet coil DIN terminal box (G1/2)	
2G	Grommet coil DIN terminal box (Pg11)	
2H	Grommet coil DIN terminal box with small light (Pg11)	
3A	Open frame, lead wire	
3K	Open frame, square terminal box (G1/2)	
3H	Open frame, square terminal box with light (G1/2)	AC100V, AC200V, DC24V, DC100V
4A	Open frame, lead wire (H class coil)	AC100V, AC200V
4K	Open frame, square terminal box (H class coil G1/2)	
4H	Open frame, square terminal box with light (H class coil G1/2)	
5A	Open frame, diode integrated lead wire	
5K	Open frame, diode integrated square terminal box (G1/2)	
5H	Open frame, diode integrated square terminal box + light (G1/2)	

Ⓖ Exhaust filter	
Blank	Without filter
1	Port for NC
2	Port for NO

⚠ Note on model No. selection

Note 1: Refer to Page 445 "Control unit combination table".

Note 2: Refer to Page 445 "Coil option selection guide".

[Example of model number]

Converter unit model No.

CU-63-100-32-1

Model: Converter unit

Ⓐ Bore size : 63mm

Ⓑ Stroke length : 100mm

Ⓒ Valve unit : With stop valve and skip valve

Ⓓ Throttle valve : Flow rate adjusting range 0.1 to 28 ℓ/min

Ⓔ Voltage : AC100V50/60Hz, AC110V60Hz

Converter model No.

CUT-100-200

Ⓐ Bore size : 100mm

Ⓑ Stroke length : 200mm

Control unit model No.

CUC-10-22E1

Ⓒ Valve unit : With stop valve

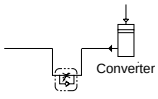
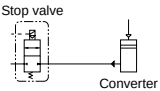
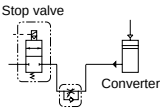
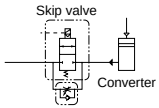
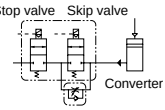
Ⓓ Throttle valve : None

Ⓔ Voltage : AC200V50/60Hz, AC220V60Hz

Ⓕ Coil option : Grommet coil DIN terminal box (G1/2)

Ⓖ Exhaust filter : Port for NC

*Control unit combination table (Ⓒ Ⓓ) table

Symbol Ⓒ	Symbol Ⓓ Throttle valve / Valve unit	0 Without throttle valve	1, 2 With throttle valve With check valve	Control purpose	
0	Without stop valve Without skip valve	Not available	ⓒⓓ: 01, 02 	01, 02 • Speed control only	
1	With stop valve	ⓒⓓ: 10 	ⓒⓓ: 11, 12 	10 • Braking • Emergency stop • NC, NO	11, 12 • Speed control • Braking • Emergency stop • NC, NO
2	With skip valve	Not available	ⓒⓓ: 21, 22 	21, 22 • Two step speed change is possible. (Rapid feed, Delay feed) • NC, NO	
3	With stop valve With skip valve	Not available	ⓒⓓ: 31, 32 	31, 32 • Braking • Emergency stop • Two step speed feeding • NC, NO	

Coil option selection guide

Grommet coil lead wire

- Most compact molded coil in shape / dimension.
- Moisture proof / drip proof is available.
- Insulation class B (heat proof temperature 130 °C)
- Direct-current coil is not available (if direct-current specified, select open frame type.)
- Lead wire length 300mm

Grommet coil DIN terminal box

- Compact DIN terminal box molded coil. If cabtire cable is used, water proof is improved.
- Moisture proof / drip proof is available.
- Insulation class B (heat proof temperature 130 °C)
- Direct-current coil is not available (if direct-current specified, select open frame type.)
- Manufacturing available for indicator light (AC100V and AC200V only)

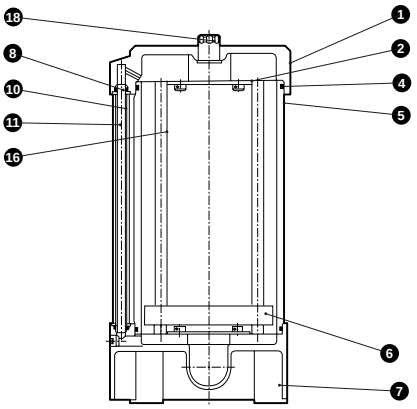
Square terminal box (open frame + square terminal box)

- Square terminal box is attached to open frame type as option. If square terminal box is used, easy wiring is achieved.

Discontinue

Internal structure and parts list

• Converter section

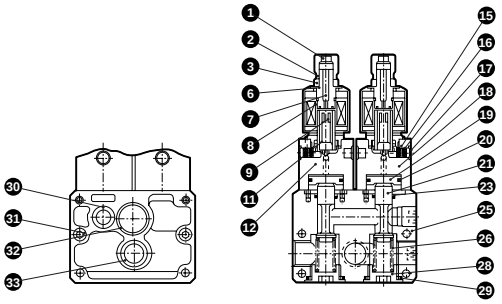


No.	Part name	Material
1	Head cover	Aluminum alloy die casting
2	Shield plate	Aluminum alloy
4	Gasket for cylinder	Nitrile rubber
5	Tube	Aluminum alloy
6	Float	Independent foaming nitrile rubber
7	Cap	Aluminum alloy die casting
8	Gasket for oil gauge	Nitrile rubber
10	Oil gauge (2)	Polycarbonate
11	Oil gauge (1)	Polycarbonate
16	Tie rod	Steel
18	Filling plug	Acetar resin

Repair parts list

Bore size (mm)	Kit number	Repair parts number
63 dia.	CUT-63K	4 8
100 dia.	CUT-100K	

• Valve unit section



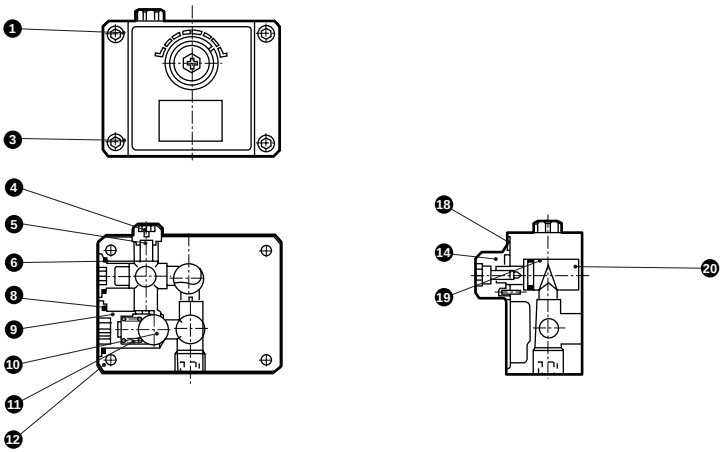
No.	Part name	Material	No.	Part name	Material
1	Socket	Copper alloy	19	Piston	Copper alloy
2	O ring	Nitrile rubber	20	Piston packing seal	Nitrile rubber
3	Nut	Copper alloy	21	Valve stem	Steel
6	O ring	Nitrile rubber	23	Packing seal for valve stem	Nitrile rubber
7	Core assembly	—	25	Valve body	Aluminum alloy die casting
8	Coil assembly	—	26	Cylinder spring	Steel
9	Plunger assembly	—	28	Spring holder	Zinc alloy die-casting
11	Outer spring	Stainless steel	29	Gasket for spring holder	Nitrile rubber
12	Cylinder block (1)	Aluminum alloy die casting	30	Gasket for valve body	Nitrile rubber
15	O ring	Nitrile rubber	31	Hexagon socket head cap screw	Alloy steel
16	O ring	Nitrile rubber	32	Gasket for valve body	Nitrile rubber
17	Manual rod	Stainless steel	33	Gasket for valve body	Nitrile rubber
18	Cylinder block (2)	Aluminum alloy die casting			

Repair parts list

Model	Kit number	Repair parts number
With stop valve / skip valve	CUC-3XK	2 6 9 11
With stop valve	CUC-2XK	15 16 20 23
With skip valve	CUC-1XK	29 30 32 33

Internal structure and parts list

• Throttle valve section



No.	Part name	Material	No.	Part name	Material
1	Hexagon socket head cap screw	Alloy steel	10	Steel ball	Steel
3	Hexagon socket head cap screw	Alloy steel	11	Cylinder spring	Steel
4	Filling plug	Acetar resin	12	Throttle main body	Aluminum alloy die casting
5	Gasket for filling plug	Nitrile rubber	14	Throttle knob	Zinc alloy die-casting
6	Gasket for plug	Nitrile rubber	18	Angle indication plate	ABS resin
8	Gasket for spring holder	Nitrile rubber	19	Gasket for throttle	Nitrile rubber
9	Spring holder	Zinc alloy die-casting	20	Throttle	Copper alloy

Repair parts list

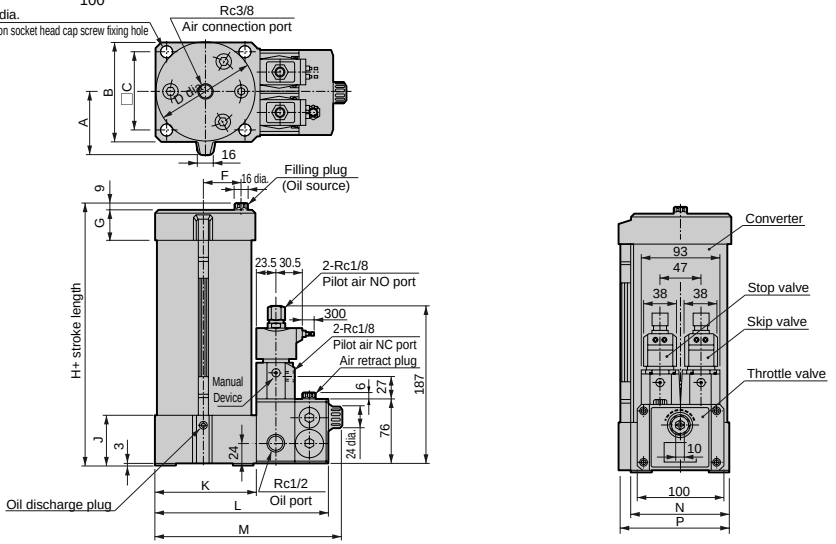
Model	Kit number	Repair parts number
Converter unit, Control unit	CUC-X2K	5 6 8 19
Throttle valve discrete	CUC-O2K	

Discontinue

Dimensions

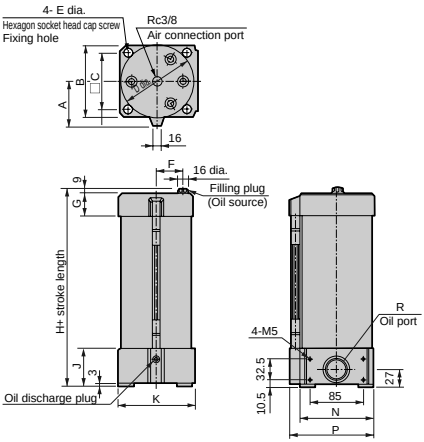
Note 1: This drawing shows grommet coil lead wire type.
Note 2: If combination of control unit section varies, holding plate is attached, but not stop valve, skip valve nor throttle valve section.

• Converter unit CU $\frac{63}{100}$-*-32



Symbol	Converter unit basic dimensions													
Bore size (mm)	A	B	C	D	E	F	G	H	J	K	L	M	N	P
63	54	86	64	76	11	24	30	193	54	86	171	187.5	100	104
100	74	116	92	118	13	42	35	184	60	122	207	223.5	116	132

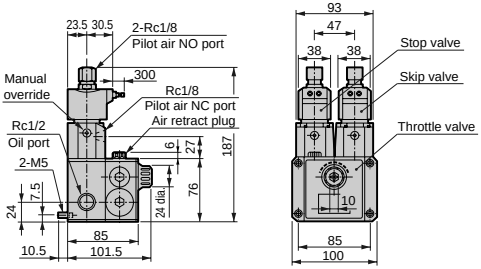
• Converter CUT $\frac{63}{100}$-*



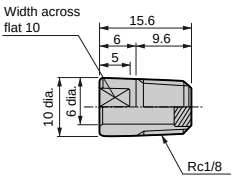
Symbol	Converter basic dimensions						
Bore size (mm)	A	B	C	D	E	F	G
63	54	86	64	76	11	24	30
100	74	116	92	118	13	42	35

Symbol						
Bore size (mm)	H	J	K	N	P	R
63	193	54	86	100	104	Rc$^3/_4$
100	184	60	122	116	132	Rc1

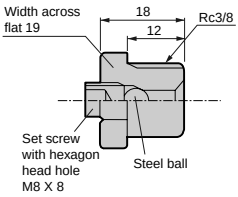
• Control unit (valve unit + throttle valve)
CUC32-*



• Exhaust filter CUC-F



• Air discharge nipple CU-N



Selection guide of converter unit

Step 1 Selection guide of low hydraulic cylinder

Decide cylinder bore size, stroke length and mounting style according to cylinder theoretical thrust table and applications. In this case, select cylinder bore size to obtain double theoretical thrust to load.

Step 2 Selection guide of converter

Select bore size and stroke length of converter according to right converter selection table based on cylinder bore size and stroke length of low hydraulic cylinder selected at 1. In this case, decide combination of converter and low hydraulic cylinder for oil surface speed of converter to be 200mm/s or less.

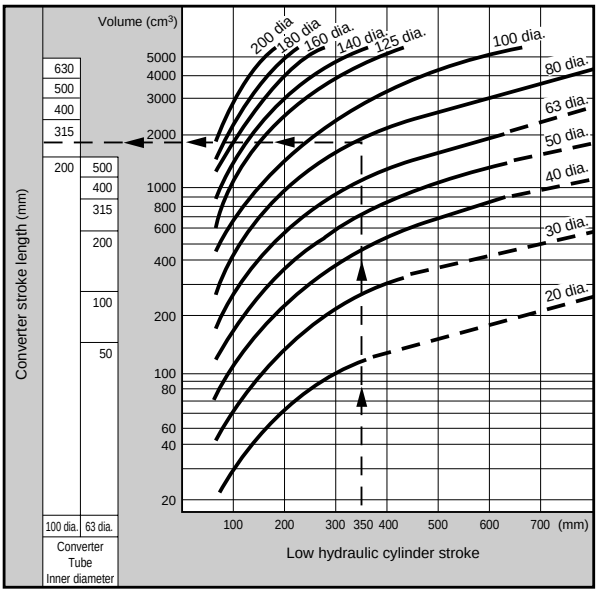
Step 3 Selection guide of control unit

Select combination of stop valve, skip valve and throttle valve according to combination table of control unit to meet your applications. In this case, considering wiring conditions and working environment, review status of coil option and exhaust filter.

Step 4 Selection guide of converter unit

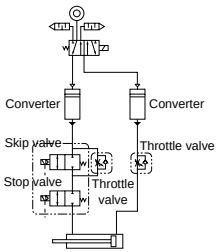
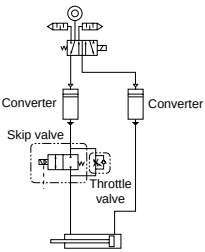
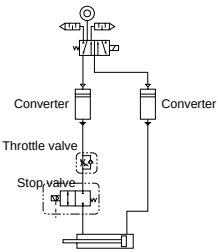
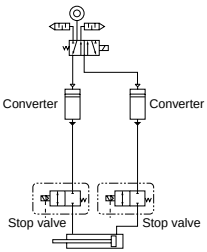
Combine converter and control unit selected at 2 / 3, and decide model No. of converter unit.

Converter (cylinder bore size / stroke length) selection table



• Example of converter selection (low hydraulic cylinder 80 mm bore, stroke length 350) Extend point of intersection between low hydraulic cylinder stroke 350 and inner diameter curve 80 dia. to left, and select converter whose capacity is more than 1800cm³.
Therefore, 100 mm bore and 3.5 mm stroke are attained.

Control unit combination applications and cautions on circuit

	❶ Both sides control circuit	❷ Single control circuit	❸ Single braking circuit	❹ Lock circuit
	Speed control at retracted and advance	Speed control at advance	With speed control braking at advance	With both sides braking
				
At advance	2 step speed change Braking	2 step speed change	Speed control Braking	Braking
At retracted	Speed control	Rapid feed	Rapid feed	Braking
Cautions	If flow is controlled for reciprocating, install converter and throttle valve both on cylinder rod and head sides.	Use control unit with meter out circuit for single control	Use control unit with meter out circuit for single control	Enabling braking certainly at advance or return. Even if air source is disconnected, locked certainly.

Discontinue

Max. speed of cylinder

Conditions
- Working pressure : 0. 5MPa
- Load factor : Loadless, 30% and 50%
- Operational direction : At PUSH (at PULL, 20 to 30% speed is decelerated.)
- Hydraulic fluid : Viscosity 40mm²/s

• Port prepared hole diameter

Bore size	Port prepared hole dia.
40 dia.	11.1 dia.
50, 63 dia.	14.6 dia.
80, 100 dia.	18.2 dia.

Throttle valve / stop valve used	Throttle valve used	Stop valve used