



# Free Mount Cylinder

A space-saving air cylinder with multiple surfaces capable of direct mounting. Offered in many variations.

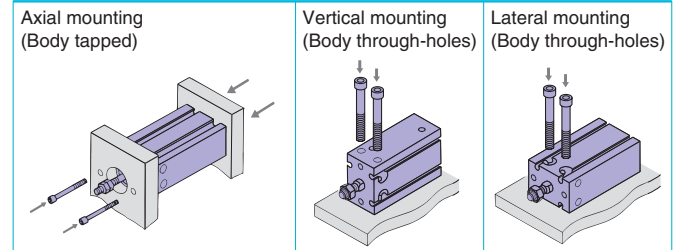


## Space-saving

The multiple surface direct mounted rectangular body with no brackets allows freedom of the mounting surface. This enables space-saving designs for equipment.

## Auto Switch Capable

### Mounting



## Series Variations

Series	Action	Rod	Bore size(mm)	Page	
Standard Series CU	Double acting	Single rod	6, 10, 16, 20, 25, 32	2	
	Single acting	Double rod		8	
Non-rotating Series CUK	Double acting	Single rod (Retracted/Extended)		13	
	Single acting	Single rod (Retracted/Extended)		21	
Long stroke Series CU	Double acting	Double rod		25	
	Double acting	Single rod (Retracted/Extended)		29	
Long stroke, Non-rotating rod Series CUK	Double acting	Single rod		35	
	Double acting	Single rod		39	
With air cushion Series CU-A	Double acting	Single rod		20, 25, 32	46
For vacuum Series ZCUK	Double acting	Single rod		10, 16, 20, 25, 32	55

## Made to Order

- XB6 : Heat resistant (150°C)
- XB7 : Cold resistant (-40°C)
- XB9 : Low speed (10 to 50 mm/s)
- XB13 : Low speed (5 to 50 mm/s)
- XC19 : Intermediate stroke (with a spacer built-in)
- XC22 : Seals made of fluorine rubber
- XC34 : Non-rotating plate  
(No protrusion from the rod end)

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## Related Products

- Copper/Fluorine-free: Series 20-

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- Clean Series: Series 10/11-
- Copper/Fluorine/Silicon-based free  
+ Low particle generation: Series 21/22-
- Low speed: Series CUX

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### Технические характеристики

Среда	Очищенный сжатый воздух с содержанием или без него					
Макс. рабочее давление (МПа)	0.7					
Диапазон рабочих температур (°C)	-10 ~ 60					
Демпфирование	Упругий демпфер					
Допуск по длине хода	-0 / +1.0					
Монтажное положение	Произвольное					

Диаметр цилиндра (мм)	6	10	16	20	25	32
Миним. давление срабатывания (МПа)	0.12	0.06	0.06	0.05	0.05	0.05
Допуск по углу проворота штока *	±0.8°	±0.8°	±0.8°	±0.5°	±0.5°	±0.5°

\* В ненагруженном состоянии, при втянутом поршне.

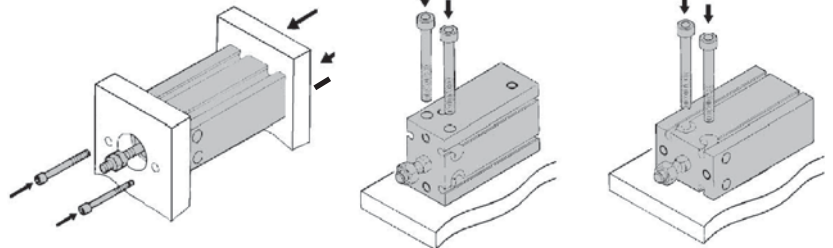


### Технические особенности:

Компактная конструкция, малый вес, монтаж без дополнительных крепежных элементов. Данная серия цилиндров обеспечивает оптимальные условия для работы манипуляторов.

Цилиндры в модульном исполнении могут быть установлены точно на одной прямой на монтажной плоскости. Малый вес и отказ от использования элементов креплений предотвращают динамические потери, например у робота.

### Способы монтажа



### Варианты исполнения

Обозначение	Исполнение цилиндра с возможностью установки датчика сигналов	∅	Длина хода (мм)							
			5	10	15	20	25	30	40	50
<b>Двустороннего действия</b>  	Стандартный CDU	6	●	●	●	●	●	●		
		10	●	●	●	●	●	●		
		16	●	●	●	●	●	●		
		20	●	●	●	●	●	●	●	●
		25	●	●	●	●	●	●	●	●
		32	●	●	●	●	●	●	●	●
<b>Двустороннего действия</b> Защищенный от проворота штока  	Защищенный от проворота штока CDU	6	●	●	●	●	●	●		
		10	●	●	●	●	●	●		
		16	●	●	●	●	●	●		
		20	●	●	●	●	●	●	●	●
		25	●	●	●	●	●	●	●	●
		32	●	●	●	●	●	●	●	●
<b>Одностороннего действия</b>  	Шток втянут без давления	6	●	●	●					
		10	●	●	●					
		16	●	●	●					
		20	●	●	●					
		25	●	●	●					
		32	●	●	●					
<b>Одностороннего действия</b>  	Шток выдвинут без давления	6	●	●	●					
		10	●	●	●					
		16	●	●	●					
		20	●	●	●					
		25	●	●	●					
		32	●	●	●					

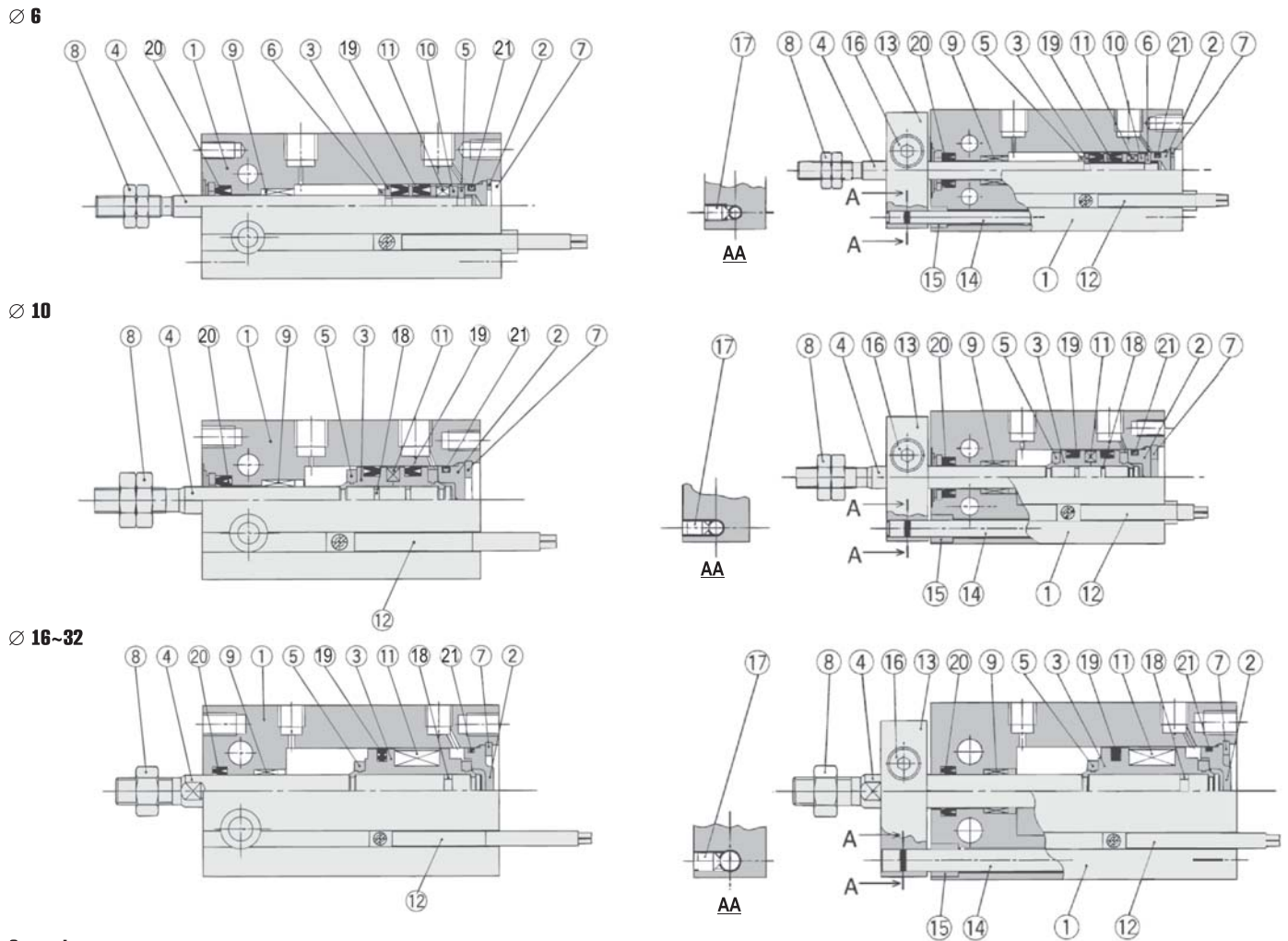
### Примечание:

по запросу поставляется модификация цилиндра с удлиненным ходом ∅6, 10, 16 - до 60 мм; ∅20, 25, 32 - до 100 мм

# Компактный цилиндр для универсального монтажа CDU/CDUK

## Конструкция

Цилиндр CDUK с защитой от проворота штока



### Спецификация

Поз.	Наименование	Материал	Примечание
1	Гильза	Алюминиевый сплав	
2	Крышка цилиндра	Латунь	Ø6~10
		Алюминиевый сплав	Ø16~32
3	Поршень	Латунь	Ø6~10
		Алюминиевый сплав	Ø16~32
4	Шток поршня	Нержавеющая сталь	
5	Демпфер А	Уретан	
6	Демпфер В	Уретан	
7	Стопорное кольцо	Инструментальная сталь	
8	Гайка поршневого штока	Углеродистая сталь	
9	Направляющая штока	Спеченный металлический порошок, пропитанный маслом	
10	Держатель магнита	Латунь	Ø6
11	Магнит	-	
12	Датчик положения	-	
13	Стопорная пластина	Алюминиевый сплав	Исполнение CDUK (с защитой от проворота штока)
14	Направляющий стержень	Нержавеющая сталь	
15	Втулка	Спеченный металлический порошок, пропитанный маслом	
16, 17	Винт с внутр. шестигранником	Углеродистая сталь	
18	Уплотнение поршня	NBR	
19*	Уплотнение поршня		
20*	Уплотнение штока		
21*	Прокладка		

\* Входит в состав ремкомплекта

**Ремкомплект**  
Комплект уплотнений,  
включает поз. 19, 20, 21 и 10 г смазки

Ø поршня	Номер для заказа
10	CU10D-PS
16	CU16D-PS
20	CU20D-PS
25	CU25D-PS
32	CU32D-PS

## Данные по заказу

### Теоретические усилия (Н)

Двустороннего действия				
Ø поршня	Направление движения	Рабочее давление (МПа)		
		0,3	0,5	0,7
6	На втягивание	6	10	14
	На выдвигание	8	14	19
10	На втягивание	19	33	46
	На выдвигание	23	39	55
16	На втягивание	51	86	121
	На выдвигание	60	100	140
20	На втягивание	79	131	184
	На выдвигание	94	157	219
25	На втягивание	123	206	288
	На выдвигание	147	245	343
32	На втягивание	207	345	483
	На выдвигание	241	402	562

### Вес (г)

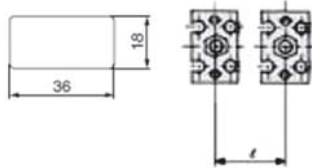
CDU в базовом исполнении						
Ø поршня	Длина хода (мм)					
	5	10	20	30	40	50
6	22	25	31	37	...	...
10	36	40	48	56	...	...
16	50	56	68	80	...	...
20	95	106	128	150	172	194
25	176	193	227	261	295	329
32	262	286	334	382	430	478

CDUK с защищённым от проворота штоком						
Ø поршня	Длина хода (мм)					
	5	10	20	30	40	50
6	28	31	37	43	...	...
10	43	47	55	63	...	...
16	60	66	78	90	...	...
20	113	124	148	172	195	219
25	212	229	263	297	335	370
32	331	357	409	461	513	565

### Применение защитной пластины

Если несколько цилиндров, оснащённых датчиками, расположены близко друг от друга (см. расстояние *l* в таблице), возможны сбои в работе датчиков, вызванные интерференцией магнитных полей.

При необходимости более плотного монтажа цилиндров, используйте защитные пластины.



Ø поршня (мм)	Мин. допустимое расстояние между цилиндрами <i>l</i> (мм)
6	18
10	20
16	33
20	40
25	46
32	56

Номер для заказа защитной пластины - **MU-S025**

Толщина пластины 0,3 мм, материал - ферритная нержавеющая сталь

### Номер для заказа цилиндров CDU в базовом исполнении

Ø поршня	Длина хода (мм)							
	5	10	15	20	25	30	40	50
6	CDU6-5D	CDU6-10D	CDU6-15D	CDU6-20D	CDU6-25D	CDU6-30D	—	—
10	CDU10-5D	CDU10-10D	CDU10-15D	CDU10-20D	CDU10-25D	CDU10-30D	—	—
16	CDU16-5D	CDU16-10D	CDU16-15D	CDU16-20D	CDU16-25D	CDU16-30D	—	—
20	CDU20-5D	CDU20-10D	CDU20-15D	CDU20-20D	CDU20-25D	CDU20-30D	CDU20-40D	CDU20-50D
25	CDU25-5D	CDU25-10D	CDU25-15D	CDU25-20D	CDU25-25D	CDU25-30D	CDU25-40D	CDU25-50D
32	CDU32TF-5D	CDU32TF-10D	CDU32TF-15D	CDU32TF-20D	CDU32TF-25D	CDU32TF-30D	CDU32TF-40D	CDU32TF-50D

### Номер для заказа цилиндров CDUK с защищённым от проворота поршневым штоком

Ø поршня	Длина хода (мм)							
	5	10	15	20	25	30	40	50
6	CDUK6-5D	CDUK6-10D	CDUK6-15D	CDUK6-20D	CDUK6-25D	CDUK6-30D	—	—
10	CDUK10-5D	CDUK10-10D	CDUK10-15D	CDUK10-20D	CDUK10-25D	CDUK10-30D	—	—
16	CDUK16-5D	CDUK16-10D	CDUK16-15D	CDUK16-20D	CDUK16-25D	CDUK16-30D	—	—
20	CDUK20-5D	CDUK20-10D	CDUK20-15D	CDUK20-20D	CDUK20-25D	CDUK20-30D	CDUK20-40D	CDUK20-50D
25	CDUK25-5D	CDUK25-10D	CDUK25-15D	CDUK25-20D	CDUK25-25D	CDUK25-30D	CDUK25-40D	CDUK25-50D
32	CDUK32TF-5D	CDUK32TF-10D	CDUK32TF-15D	CDUK32TF-20D	CDUK32TF-25D	CDUK32TF-30D	CDUK32TF-40D	CDUK32TF-50D

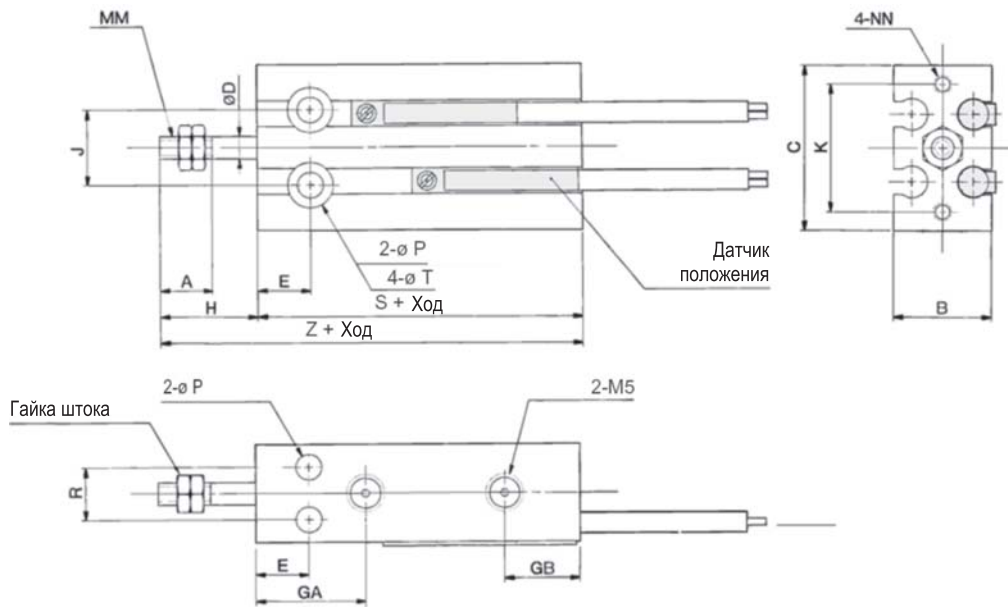
### Номер для заказа цилиндров CDU одностороннего действия

Ø поршня	Шток втянут без давления			Шток выдвинут без давления		
	Длина хода (мм)					
	5	10	15	5	10	15
6	CDU6-5S	CDU6-10S	CDU6-15S	CDU6-5T	CDU6-10T	CDU6-15T
10	CDU10-5S	CDU10-10S	CDU10-15S	CDU10-5T	CDU10-10T	CDU10-15T
16	CDU16-5S	CDU16-10S	CDU16-15S	CDU16-5T	CDU16-10T	CDU16-15T
20	CDU20-5S	CDU20-10S	CDU20-15S	CDU20-5T	CDU20-10T	CDU20-15T
25	CDU25-5S	CDU25-10S	CDU25-15S	CDU25-5T	CDU25-10T	CDU25-15T
32	CDU32TF-5S	CDU32TF-10S	CDU32TF-15S	CDU32TF-5T	CDU32TF-10T	CDU32TF-15T

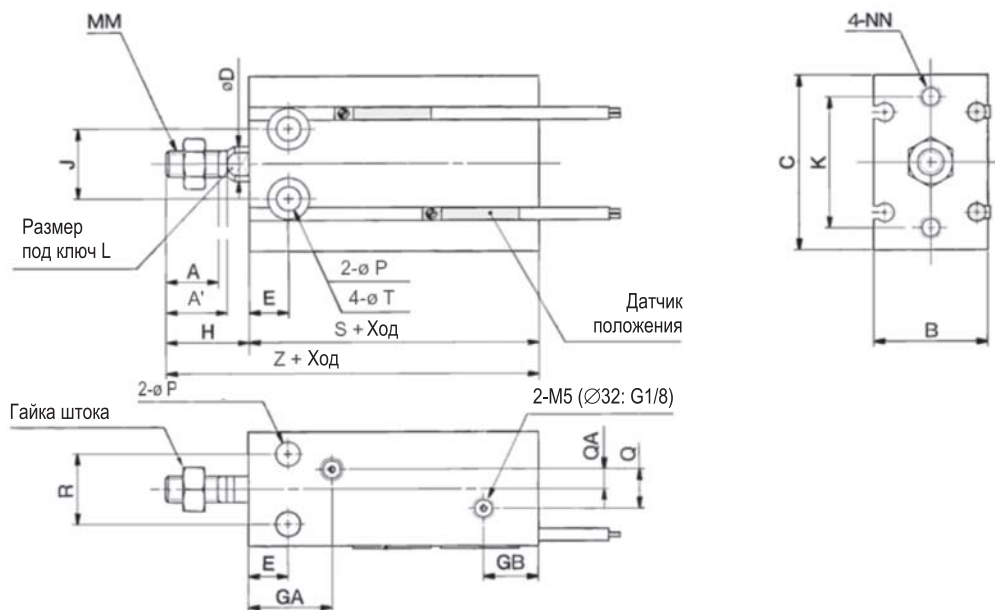
# Компактный цилиндр для универсального монтажа CDU

## Размеры (базовое исполнение)

∅ 6, 10



∅ 16~32

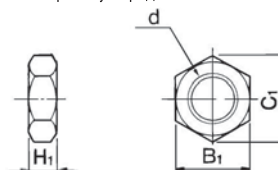


∅ поршня	Ход	A	A'	B	C	∅D	E	GA	GB	H	J	K	L	MM	NN	∅P
6	5 ~ 30	7	-	13	22	3	7	15	10	13	10	17	-	M3	M3 x 5	3.4
10	5 ~ 30	10	-	15	24	4	7	16.5	10	16	11	18	-	M4	M3 x 5	3.4
16	5 ~ 30	11	12.5	20	32	6	7	16.5 <sup>1)</sup>	11.5	16	14	25	5	M5	M4 x 6	4.5
20	5 ~ 50	12	14	26	40	8	9	19	12.5	19	16	30	6	M6	M5 x 8	5.5
25	5 ~ 50	15.5	18	32	50	10	10	21.5	13	23	20	38	8	M8	M5 x 8	5.5
32	5 ~ 50	19.5	22	40	62	12	11	23	13	27	24	48	10	M10 x 1.25	M6 x 9	6.6

∅ поршня	Q	QA	R	T	S <sup>2)</sup>	Z <sup>2)</sup>
6	-	-	7	6 x 4,8	33	46
10	-	-	9	6 x 5	36	52
16	4	2	12	7,6 x 6,5	40	56
20	9	4,5	16	9,3 x 8	46	65
25	9	4,5	20	9,3 x 9	50	73
32	13,5	4,5	24	11 x 11,5	52	79

### Гайка поршневого штока

Материал: углеродная сталь



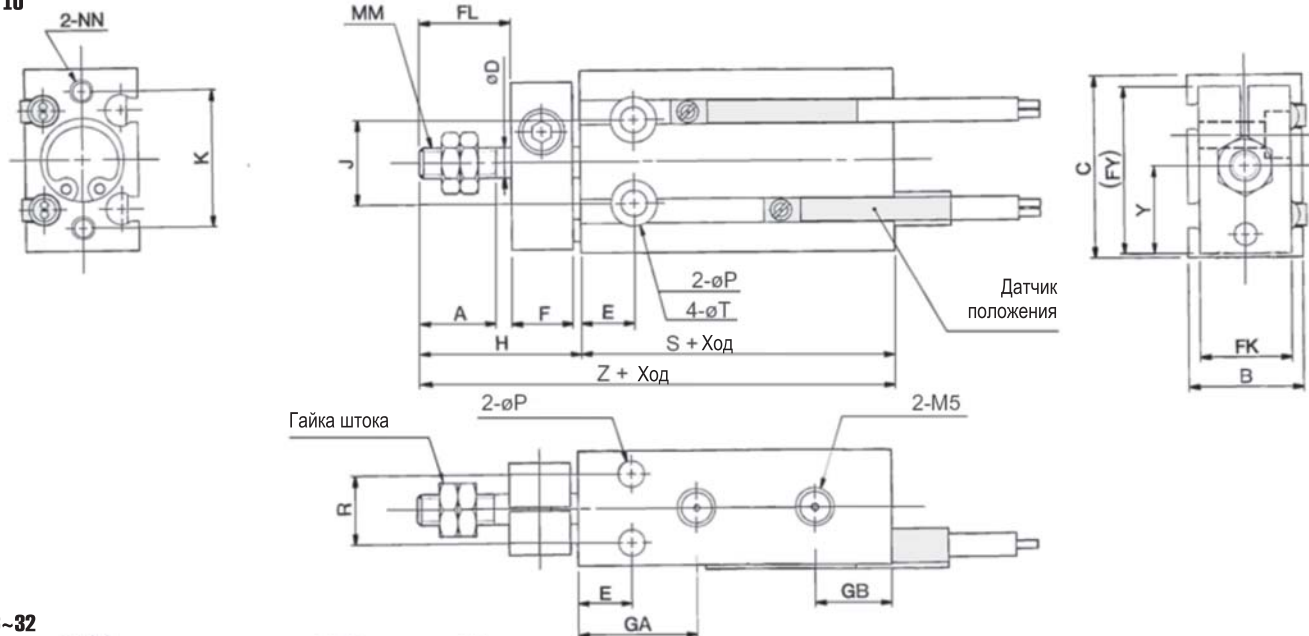
Номер для заказа	∅	d	H1	B1	C1
NTP-006	6	M3	1.8	5.5	6.4
NTP-010	10	M4	2.4	7	8.1
NTJ-015A	16	M5	4	8	9.2
NT-015A	20	M6	5	10	11.5
NT-02	25	M8	5	13	15.0
NT-03	32	M10 x 1,25	6	17	19.6

1) 14.5 для CU16-5D

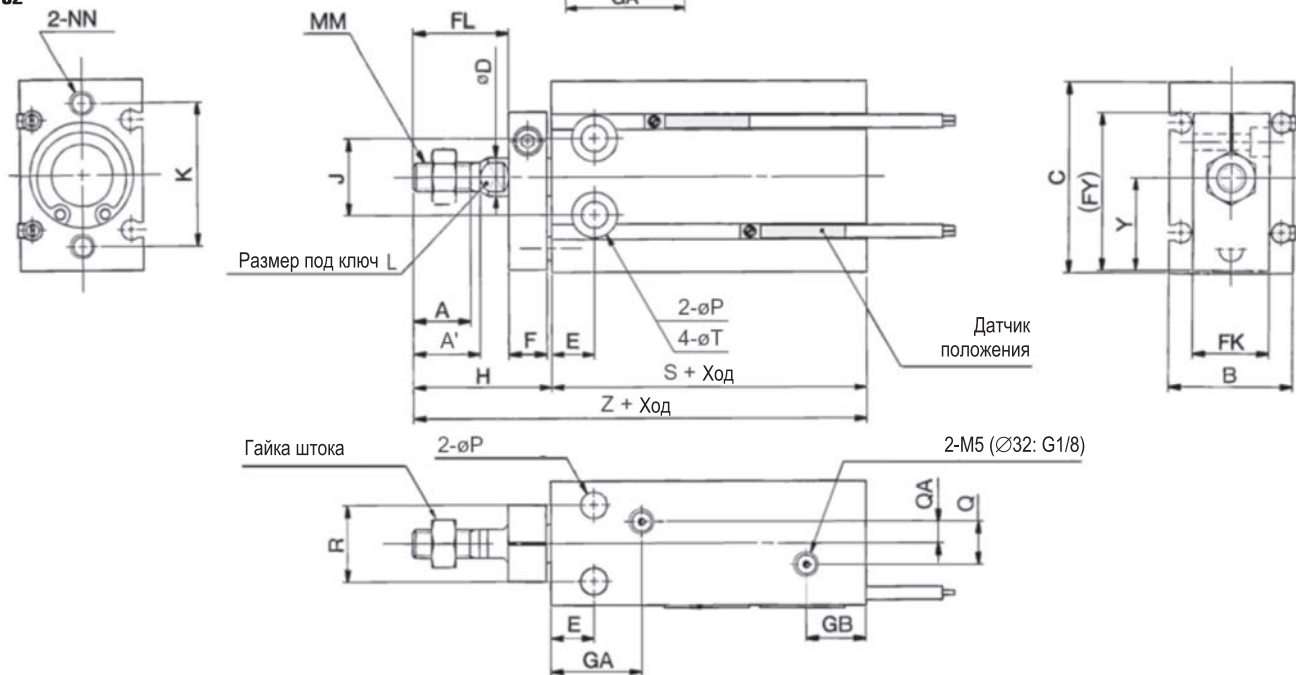
2) Размер в сборе с датчиками положения

## Размеры (с защищенным от проворота поршневым штоком)

∅ 6, 10



∅ 16~32



Компания SMC сохраняет за собой право на внесение технических и размерных изменений

∅ поршня	Ход	A	A'	B	C	∅D	E	F	FL	FK	FY	GA	GB	H	J	K	L
6	5 ~ 30	7	—	13	22	3	7	8	9	11	20,5	15	10	18	10	17	—
10	5 ~ 30	10	—	15	24	4	7	8	12	12	22	16,5	10	21	11	18	—
16	5 ~ 30	11	12,5	20	32	6	7	8	17	13	28	16,5 <sup>1)</sup>	11,5	26	14	25	5
20	5 ~ 50	12	14	26	40	8	9	8	20	16	33	19	12,5	29	16	30	6
25	5 ~ 50	15,5	18	32	50	10	10	10	22	20	43,5	21,5	13	33	20	38	8
32	5 ~ 50	19,5	22	40	62	12	11	12	29	24	51,5	23	13	42	24	48	10

∅ поршня	MM	NN	∅P	Q	QA	R	T	Y	S	Z
6	M3	M3 x 5	3,2	—	—	7	6 x 4,8	10,5	33	51
10	M4	M3 x 5	3,2	—	—	9	6 x 5	11,5	36	57
16	M5	M4 x 6	4,5	4	2	12	7,6 x 6,5	15,5	40	66
20	M6	M5 x 8	5,5	9	4,5	16	9,3 x 8	19,5	46	75
25	M8	M5 x 8	5,5	9	4,5	20	9,3 x 9	24,5	50	83
32	M10x1,25	M6 x 9	6,6	—	4,5	24	11 x 11,5	30,5	52	94

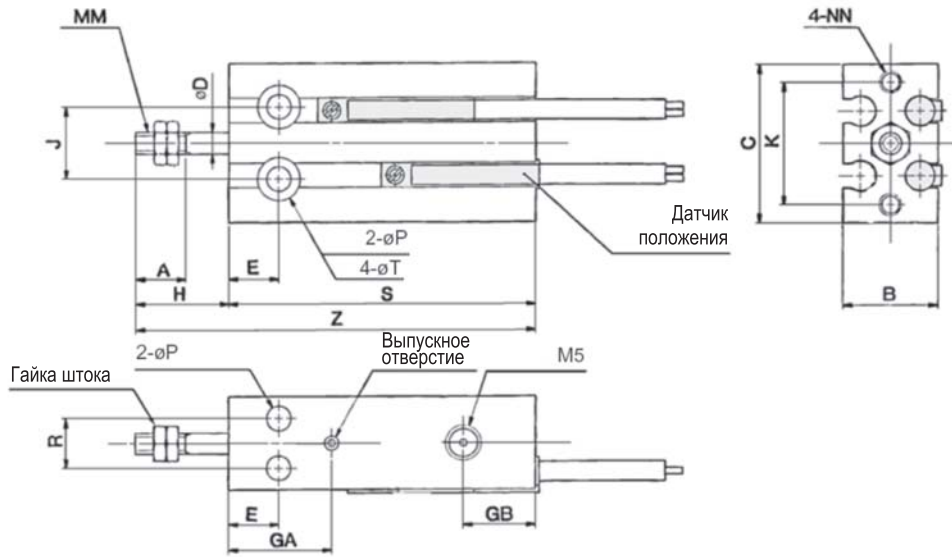
1) 14,5 для CDUK16-5D

2) Размер в сборе с датчиками положения

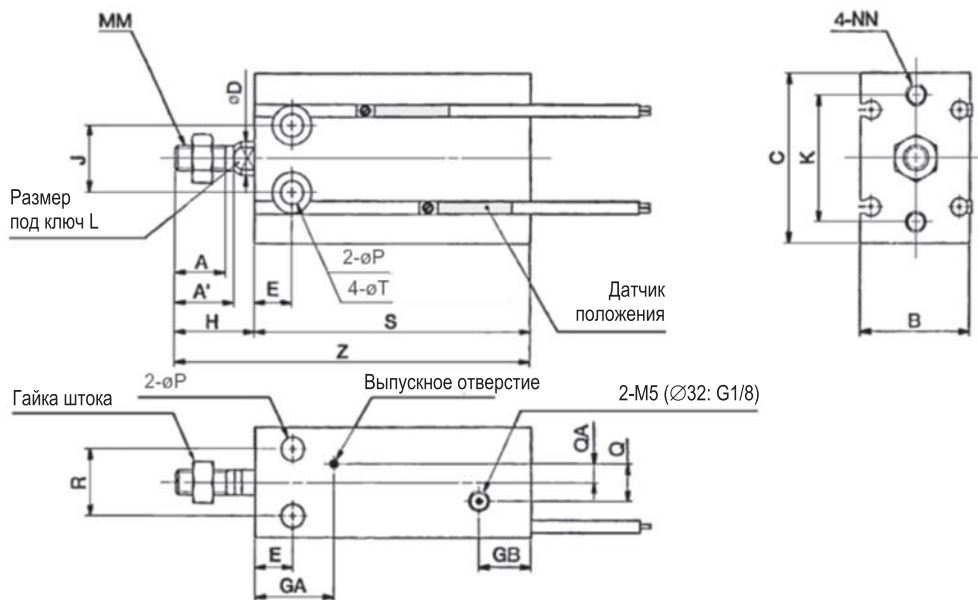
# Компактный цилиндр для универсального монтажа CDU

## Размеры (одностороннего действия/шток втянут без давления)

∅ 6, 10



∅ 16~32



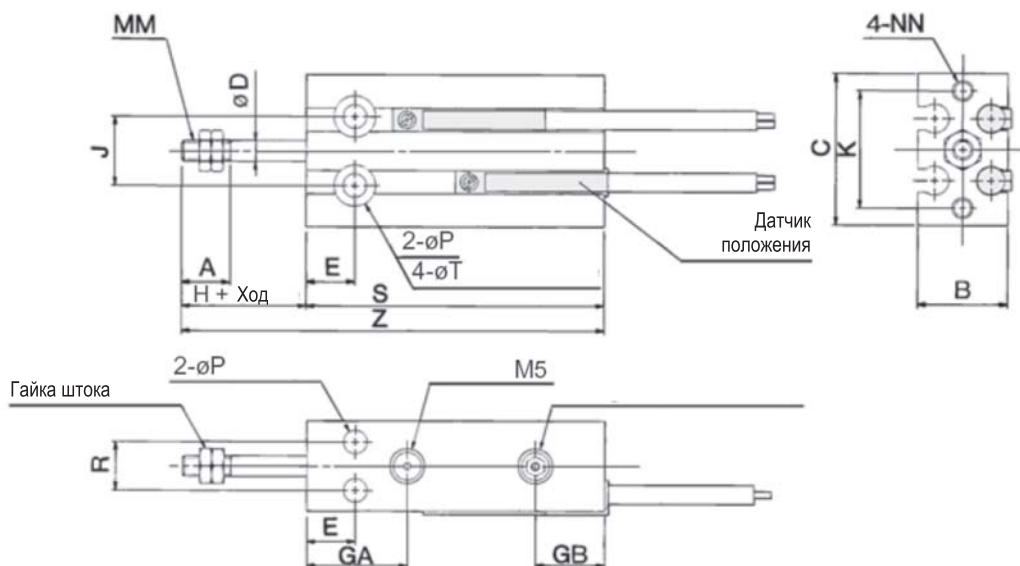
∅	A	A'	B	C	D	E	GA	GB	H	J	K	L	MM	NN	P	Q	QA	R	T
6	7	-	13	22	3	7	15	10	13	10	17	-	M3	M3 x 5	3,2	-	-	7	6 x 4,8
10	10	-	15	24	4	7	16,5	10	16	11	18	-	M4	M3 x 5	3,2	-	-	9	6 x 5
16	11	12,5	20	32	6	7	16,5	11,5	16	14	25	5	M5	M4 x 6	4,5	4	2	12	7,6 x 6,5
20	12	14	26	40	8	9	19	12,5	19	16	30	6	M6	M5 x 8	5,5	9	4,5	16	9,3 x 8
25	15,5	18	32	50	10	10	21,5	13	23	20	38	8	M8	M5 x 8	5,5	9	4,5	20	9,3 x 9
32	19,5	22	40	62	12	11	23	12,5	27	24	48	10	M10 x 1,25	M6 x 9	6,6	13,5	4,5	24	11 x 11,5

∅	S <sup>1)</sup>			Z <sup>1)</sup>		
	5	10	15	5	10	15
6	38	43	48	51	56	61
10	41	46	56	57	62	72
16	45	50	60	61	66	76
20	51	56	66	70	75	85
25	55	60	70	78	83	93
32	57	62	72	84	89	99

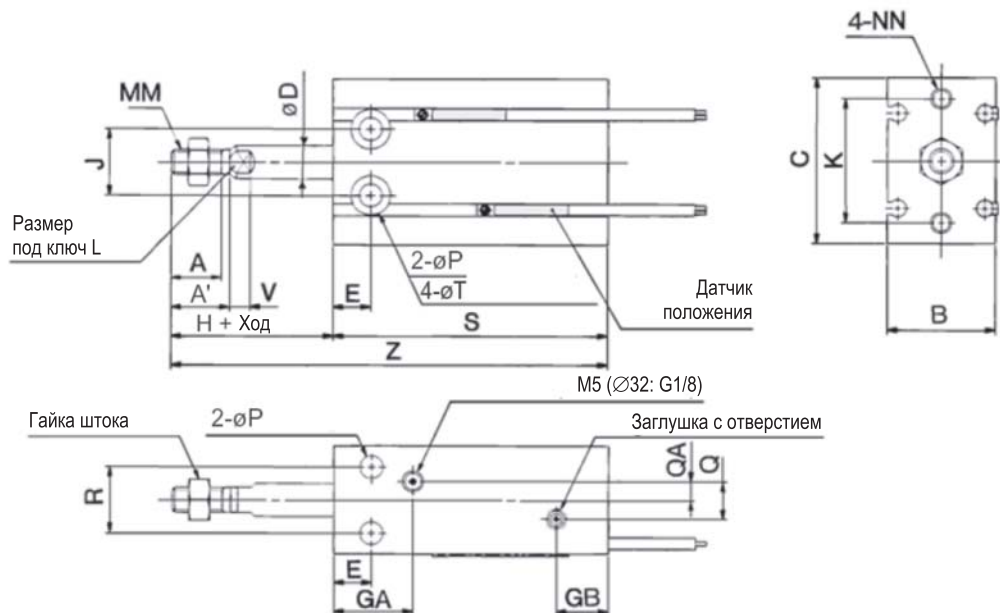
1) Размер в сборе с датчиками положения

### Размеры (одностороннего действия/шток выдвинут без давления)

∅ 6, 10



∅ 16~32



∅	A	A'	B	C	D	E	GA	GB	H	J	K	L	MM	NN	P	Q	QA	R	T
6	7	-	13	22	3	7	15	10	13	10	17	-	M3	M3 x 5	3,2	-	-	7	6 x 4,8
10	10	-	15	24	4	7	16,5	10	16	11	18	-	M4	M3 x 5	3,2	-	-	9	6 x 5
16	11	12,5	20	32	6	7	16,5	11,5	16	14	25	5	M5	M4 x 6	4,5	4	2	12	7,6 x 6,5
20	12	14	26	40	8	9	19	12,5	19	16	30	6	M6	M5 x 8	5,5	9	4,5	16	9,3 x 8
25	15,5	18	32	50	10	10	21,5	13	23	20	38	8	M8	M5 x 8	5,5	9	4,5	20	9,3 x 9
32	19,5	22	40	62	12	11	23	12,5	27	24	48	10	M10 x 1,25	M6 x 9	6,6	13,5	4,5	24	11 x 11,5

∅ поршня	S <sup>1)</sup>			Z <sup>1)</sup>		
	5	10	15	5	10	15
6	38	43	48	56	66	76
10	41	46	56	62	72	87
16	45	50	60	66	76	91
20	51	56	66	75	85	100
25	55	60	70	83	93	108
32	57	62	72	89	99	114

1)Размер в сборе с датчиками положения



# Компактный цилиндр для универсального монтажа

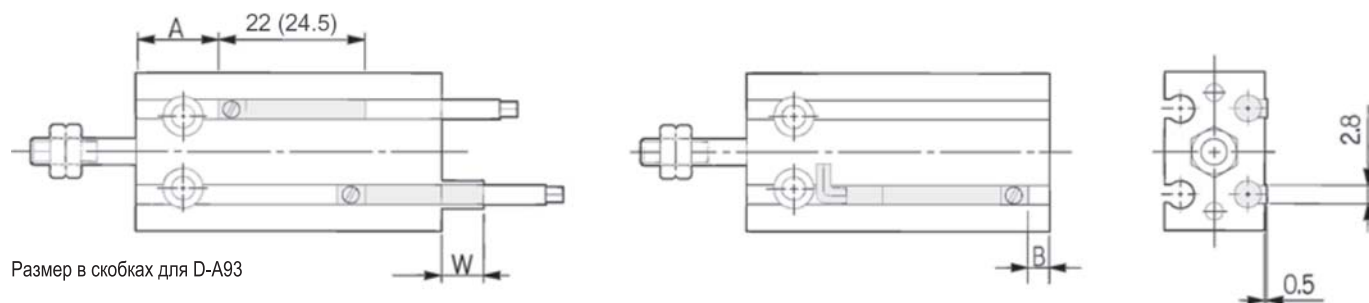
## Датчики положения

Электронные датчики положения M9N(V)L, M9P(V)L, M9B(V)L и герконовые датчики положения A90(V)L, A93(V)L, A96(V)L устанавливаются в профильных пазах цилиндра.

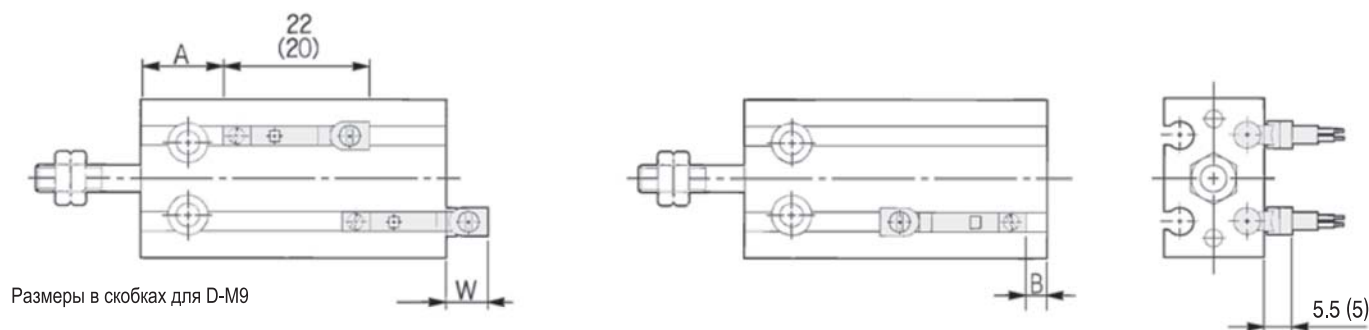
Характеристики датчиков приведены в разделе «Универсальные датчики положения»

### Оптимальное положение датчиков

#### Прямые датчики



#### Угловые датчики



#### Цилиндр двустороннего действия

Диаметр поршня (мм)	D-A9□(V)L			D-M9□L			D-M9□VL		
	A	B	W	A	B	W	A	B	W
6	13.5	-0.5	2.5 (5)	17.5	3.5	6.5	17.5	3.5	4.5
10	12.5	3.5	-1.5 (1)	16.5	7.5	2.5	16.5	7.5	0.5
16	16	4	-2 (0.5)	20	8	1.5	20	8	-0.5
20	20	6	-4 (-1.5)	24	10	0	24	10	-2
25	22.5	7	-5.5 (-3)	26.5	11	-1.5	26.5	11	-3.5
32	23.5	8.5	-6.5 (-4)	27.5	12.5	-2.5	27.5	12.5	-4.5

#### Цилиндр одностороннего действия, шток втянут без давления

Диаметр поршня (мм)	Длина хода	D-A9□(V)L			D-M9□(V)L			
		A	B	W	A	B	W	
							D-M9□L	D-M9□VL
6	5, 10, 15	13.5	0	2.5 (5)	17.5	4	6.5	4.5
	5, 10						12.5	3.5
10	15	17.5			21.5			
	5, 10	16	4	-2 (0.5)	20	8	2	-0.5
16	15	21			25			
	5, 10	20	6	-4 (-1.5)	24	10	0	-2
20	15	25			29			
	5, 10	22.5	7	-5.5 (-3)	26.5	11	-1.5	-3.5
25	15	27.5			31.5			
	5, 10	23.5	8.5	-6.5 (-4)	27.5	12.5	-2.5	-4.5
32	15	28.5			32.5			

\*Размеры в скобках для D-A93

### Цилиндр одностороннего действия, шток выдвинут без давления

Диаметр поршня (мм)	Длина хода	D-A9□(V)L			D-M9□(V)L			
		A	B	W	A	B	W	
							D-M9□L	D-M9□VL
6	5, 10, 15	10.5	1.5	0.5 (3)	14.5	5.5	4.5	2.5
10	5, 10	12.5	3.5	-1.5 (1)	16.5	7.5	2.5	0.5
	15		8.5	-6.5 (-4)		12.5	-2.5	-4.5
16	5, 10	16	4	-2 (0.5)	20	8	2	0
	15		9	-7 (-4.5)		13	-3	-5
20	5, 10	20	6	-4 (-1.5)	24	10	0	-2
	15		11	-9 (-6.5)		15	-5	-7
25	5, 10	22.5	7	-5.5 (-3)	26.5	11	-1.5	-3.5
	15		12	-10.5 (-8)		16	-6.5	-8.5
32	5, 10	23.5	8.5	-6.5 (-4)	27.5	12.5	-2.5	-4.5
	15		13.5	-11.5 (-9)		17.5	-7.5	-9.5

\*Размеры в скобках для D-A93

### Минимальная длина хода при использовании датчиков положения

Кол-во датчиков	D-A9□(V)L	D-M9□L	D-M9□VL
1	5	5	5
2	10	5	10

### Зона переключения

Диаметр поршня (мм)	D-A9□(V)L	D-M9□(V)L
6	5	3
10	6	4
16	9	5.5
20	11	7
25	12.5	7
32	14	7.5

# Free Mount Cylinder: Long Stroke Type Double Acting, Single Rod Series CU



ø6, ø10, ø16, ø20, ø25, ø32

## How to Order

**Without auto switch** CU 6 [ ] 60 D

**With auto switch** CDU 6 [ ] 60 D - M9B [ ]

**Built-in magnet**

**Bore size**

6	6 mm
10	10 mm
16	16 mm
20	20 mm
25	25 mm
32	32 mm

**Port thread type**

Symbol	Type	Bore size
-	M5	ø6, ø10, ø16, ø20, ø25
-	Rc1/8	ø32
TN	NPT1/8	ø32
TF	G1/8	ø32

**Long stroke (mm)**

ø6, ø10, ø16	40, 50, 60
ø20, ø25, ø32	60, 70, 80, 90, 100

**Number of auto switches**

-	2 pcs.
S	1 pc.

**Auto switch**

-	Without auto switch
---	---------------------

\* Refer to the table below for applicable auto switches.  
\* Auto switches are shipped together but not assembled.

**Action**

D	Double acting
---	---------------

### Applicable Auto Switches/Refer to page 68 to 72 for further information on auto switches.

Type	Special function	Electrical entry	Indicator/light	Wiring (Output)	Load voltage			Auto switch model		Lead wire length (m)*			Pre-wired connector	Applicable load	
					DC	AC	Perpendicular	In-line	0.5 (Nil)	3 (L)	5 (Z)	Applicable load			
												IC circuit		Relay, PLC	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	A96V	A96	●	●	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	A93V	A93	●	●	—	—	—	—
Solid state switch	Diagnostic indication (2-colour indication)	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NV	M9N	●	●	○	○	—	IC circuit
				3-wire (PNP)				M9PV	M9P	●	●	○	○	—	IC circuit
				2-wire	12 V	M9BV	M9B	●	●	○	○	—	Relay, PLC		
				3-wire (NPN)	5 V, 12 V	M9NWV	M9NW	●	●	○	○	—	IC circuit		
				3-wire (PNP)	5 V, 12 V	M9PWV	M9PW	●	●	○	○	—	IC circuit		
				2-wire	12 V	M9BWV	M9BW	●	●	○	○	—	—		

\* Lead wire length symbols: 0.5 m.....Nil (Example) M9N  
3 m.....L (Example) M9NL  
5 m.....Z (Example) M9NZ

\* Solid state switches marked with "O" are produced upon receipt of order.

\* Normally closed (NC=b contact), solid states switches (Model D-F9G, F9H) are also available. For detail, refer to Best Pneumatics catalogue.

\* For detail about auto switches with pre-wired connector, refer to Best Pneumatics catalogue.



### Specifications

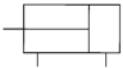
Bore size (mm)	6	10	16	20	25	32
Fluid	Air					
Proof pressure	1.05 MPa					
Maximum operating pressure	0.7 MPa					
Minimum operating pressure	0.12 MPa	0.06 MPa	0.05 MPa			
Ambient and fluid temperature	Without auto switch: -10 to 70°C (No freezing) With auto switch: -10 to 60°C (No freezing)					
Lubrication	Non-lube					
Piston speed	50 to 500 mm/s					
Cushion	Rubber bumper					
Rod end thread	Male thread					
Thread tolerance	JIS Class 2					
Stroke length tolerance	+1.0 0 mm					

### Standard Stroke

Bore size (mm)	Standard stroke (mm)
6, 10, 16	40, 50, 60
20, 25, 32	60, 70, 80, 90, 100

### JIS Symbol

Double acting,  
Spring rod



### Made to Order Specifications (For details, refer to P.43.)

Symbol	Specifications
-XB6	Heat resistant (150°C)
-XB7	Cold resistant (-40°C)
-XB9	Low speed (10 to 50 mm/s)
-XB13	Low speed (5 to 50 mm/s)
-XC19	Intermediate stroke (with a spacer built-in)
-XC22	Seals made of fluorine rubber

**Weight**/( ): Denotes the values with D-A93.

(g)

Model	Stroke (mm)						
	40	50	60	70	80	90	100
C(D)U6-□D	43 (53)	49 (59)	50 (65)	—	—	—	—
C(D)U10-□D	64 (74)	72 (82)	80 (90)	—	—	—	—
C(D)U16-□D	92 (122)	104 (134)	116 (146)	—	—	—	—
C(D)U20-□D	—	—	216 (253)	238 (275)	260 (297)	282 (319)	304 (341)
C(D)U25-□D	—	—	363 (422)	397 (456)	431 (490)	465 (524)	499 (558)
C(D)U32-□D	—	—	526 (604)	574 (652)	622 (700)	670 (748)	718 (796)

\* For the auto switch weight, refer to page 68 to 72.

### Auto Switch Mounting Position

For the auto switch mounting position of CDU long stroke series, refer to page 6, since specifications are the same as standard type, double acting, single rod type.

### Tightening Torque

Refer to page 3 for mounting a long stroke type.

### Theoretical Output

Specifications are the same as CU series double acting, single rod. Refer to page 3.

# Series CU

## Copper-free

### 20-CU Bore size — Stroke D

#### •Copper-free

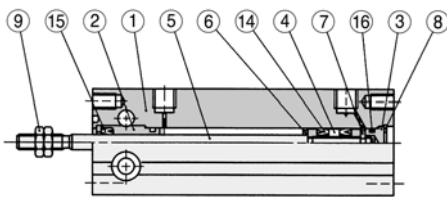
The type which prevents copper based ions from generating by changing the copper based materials into electroless nickel plated treatment or non-copper materials in order to eliminate the effects by copper based ions or fluororesins over the colour cathode ray tube.

#### Minimum Operating Pressure (MPa)

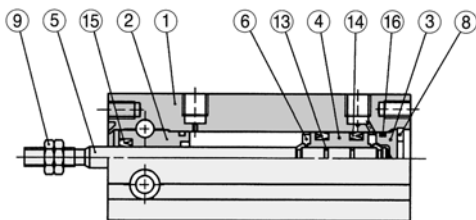
Bore size (mm)	6	10, 16	20, 25, 32
Minimum operating pressure	0.12	0.12	0.05

## Construction

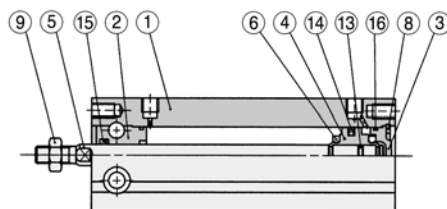
ø6



ø10



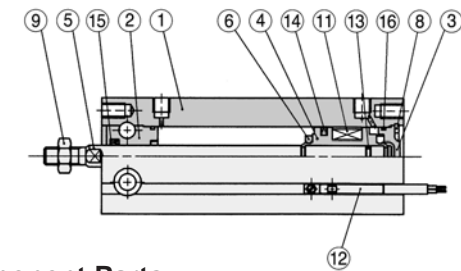
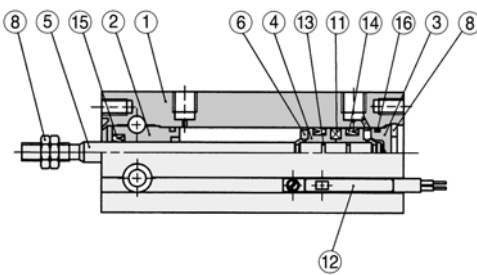
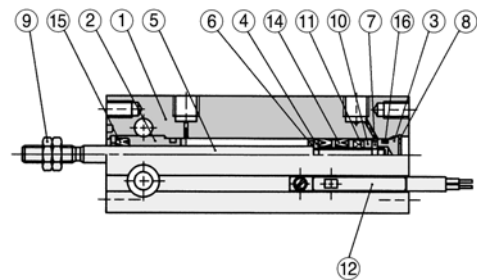
ø16 to ø32



## Specifications

Action	Double acting, Single rod
Bore size (mm)	6, 10, 16, 20, 25, 32
Maximum operating pressure	1.05 MPa
Cushion	Rubber bumper
Stroke	Same as standard type (Refer to page 3.)
Auto switch	Mountable

### With auto switch



## Component Parts

No.	Description	Material	Note
1	Cylinder tube	Aluminum alloy	Hard anodized
2	Rod cover	Aluminum bearing alloy	Hard anodized
3	Head cover	Brass	ø6 to ø10, Electroless nickel plated
		Aluminum alloy	ø16 to ø32, Clear chromated
4	Piston	Brass	ø6 to ø10
		Aluminum alloy	ø16 to ø32, Chromated
5	Piston rod	Stainless steel	
6	Bumper A	Urethane	
7	Bumper B	Urethane	

## Component Parts

No.	Description	Material	Note
8	Snap ring	Carbon tool steel	Phosphate coated
9	Rod end nut	Carbon steel	Nickel plated
10	Magnet holder	Brass	ø6
11	Magnet	Magnetic material	
12	Auto switch	—	
13	Piston gasket	NBR	
14	Piston seal		
15	Rod seal		
16	Gasket		

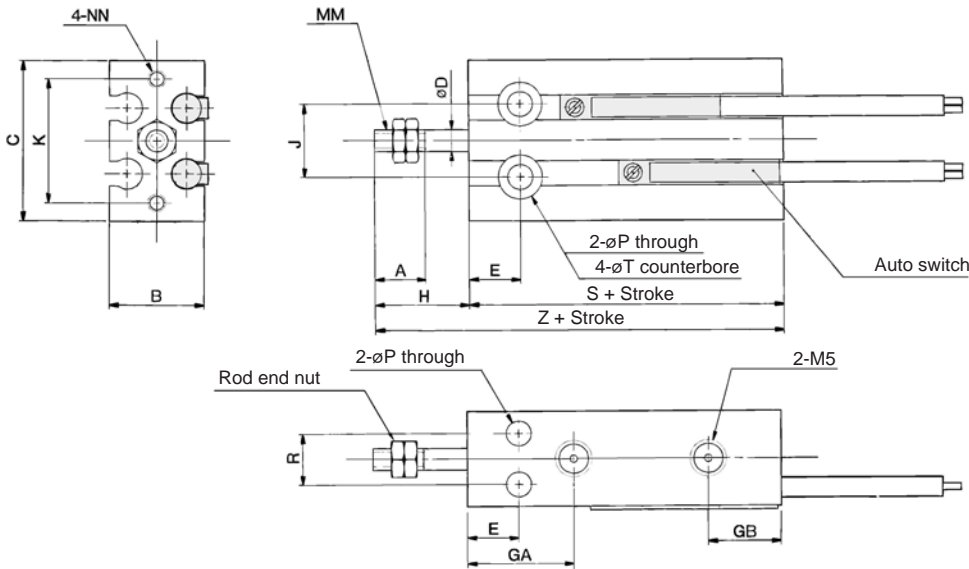
## Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
10	CU10D-PS	Set of nos. above 14, 15, 16.
16	CU16D-PS	
20	CU20D-PS	
25	CU25D-PS	
32	CU32D-PS	

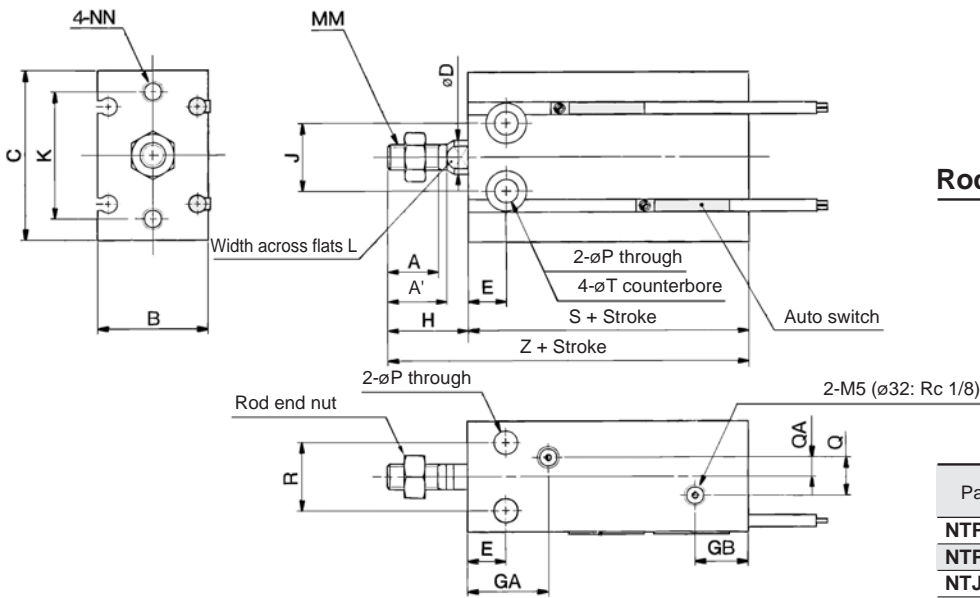
\* Seal kit includes 14, 15, 16. Order the seal kit, based on each bore size.

**Dimensions: Double Acting, Single Rod**

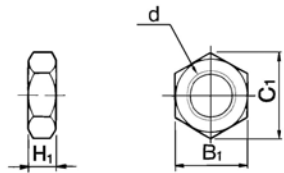
**ø6, ø10**



**ø16 to ø32**



**Rod End Nut/Accessory**



Material: Carbon steel

Part no.	Applicable bore (mm)	d	H <sub>1</sub>	B <sub>1</sub>	C <sub>1</sub>
<b>NTP-006</b>	<b>6</b>	M3	1.8	5.5	6.4
<b>NTP-010</b>	<b>10</b>	M4	2.4	7	8.1
<b>NTJ-015A</b>	<b>16</b>	M5	4	8	9.2
<b>NT-015A</b>	<b>20</b>	M6	5	10	11.5
<b>NT-02</b>	<b>25</b>	M8	5	13	15.0
<b>NT-03</b>	<b>32</b>	M10 x 1.25	6	17	19.6

Bore size (mm)	A	A'	B	C	D	E	GA	GB	H	J	K	L	MM	NN	P	Q	QA
<b>6</b>	7	—	13	22	3	7	15	10	13	10	17	—	M3	M3 depth 5	3.2	—	—
<b>10</b>	10	—	15	24	4	7	16.5	10	16	11	18	—	M4	M3 depth 5	3.2	—	—
<b>16</b>	11	12.5	20	32	6	7	16.5	11.5	16	14	25	5	M5	M4 depth 6	4.5	4	2
<b>20</b>	12	14	26	40	8	9	19	12.5	19	16	30	6	M6	M5 depth 8	5.5	9	4.5
<b>25</b>	15.5	18	32	50	10	10	21.5	13	23	20	38	8	M8	M5 depth 8	5.5	9	4.5
<b>32</b>	19.5	22	40	62	12	11	23	12.5	27	24	48	10	M10 x 1.25	M6 depth 9	6.6	13.5	4.5

Bore size (mm)	R	T	Without auto switch		With auto switch	
			S	Z	S	Z
<b>6</b>	7	6 depth 4.8	33	46	33	46
<b>10</b>	9	6 depth 5	36	52	36	52
<b>16</b>	12	7.6 depth 6.5	30	46	40	56
<b>20</b>	16	9.3 depth 8	36	55	46	65
<b>25</b>	20	9.3 depth 9	40	63	50	73
<b>32</b>	24	11 depth 11.5	42	69	52	79

# Free Mount Cylinder: Long Stroke Type Non-rotating Rod, Double Acting, Single Rod

## Series *CUK*

ø6, ø10, ø16, ø20, ø25, ø32



### How to Order

Without auto switch

**CUK** **6** **60** **D**

With auto switch

**CDUK** **6** **60** **D** **M9B**

Built-in magnet

Non-rotating rod type

Bore size

6	6 mm
10	10 mm
16	16 mm
20	20 mm
25	25 mm
32	32 mm

Port thread type

Symbol	Type	Bore size
-	M5	ø6, ø10, ø16, ø20, ø25
	Rc1/8	ø32
TN	NPT1/8	ø32
TF	G1/8	ø32

Number of auto switches

-	2 pcs.
S	1 pc.

Auto switch

-	Without auto switch
---	---------------------

\* Refer to the table below for applicable auto switches.  
\* Auto switches are shipped together but not assembled.

Action

D	Double acting
---	---------------

Cylinder stroke (mm)

ø6, ø10, ø16	40, 50, 60
ø20, ø25, ø32	60, 70, 80, 90, 100

### Applicable Auto Switches/Refer to page 68 to 72 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage			Auto switch model		Lead wire length (m)*			Pre-wired connector	Applicable load	
					DC	AC	Perpendicular	In-line	0.5 (Nil)	3 (L)	5 (Z)	Applicable load			
												IC circuit		Relay, PLC	
Reed switch	-	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	A96V	A96	●	●	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	A93V	A93	●	●	—	—	IC circuit	Relay, PLC
Solid state switch	Diagnostic indication (2-colour indication)	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NV	M9N	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				M9PV	M9P	●	●	○	○	IC circuit	
				2-wire				M9BV	M9B	●	●	○	○	—	
				3-wire (NPN)				M9NVV	M9NV	●	●	○	○	IC circuit	
				3-wire (PNP)				M9PVV	M9PV	●	●	○	○	IC circuit	
				2-wire				M9BVV	M9BV	●	●	○	○	—	

\* Lead wire length symbols: 0.5 m.....Nil (Example) M9N  
3 m.....L (Example) M9NL  
5 m.....Z (Example) M9NZ

\* Solid state switches marked with "O" are produced upon receipt of order.

\* Normally closed (NC=b contact), solid states switches (Model D-F9G, F9H) are also available. For detail, refer to Best Pneumatics catalogue.

\* For detail about auto switches with pre-wired connector, refer to Best Pneumatics catalogue.

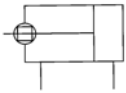


### Specifications

Bore size (mm)	6	10	16	20	25	32
Fluid	Air					
Proof pressure	1.05 MPa					
Maximum operating pressure	0.7 MPa					
Minimum operating pressure	0.15 MPa	0.10 MPa	0.08 MPa			
Ambient and fluid temperature	Without auto switch: -10 to 70°C (No freezing) With auto switch: -10 to 60°C (No freezing)					
Lubrication	Non-lube					
Piston speed	50 to 500 mm/s					
Cushion	Rubber bumper					
Rod end thread	Male thread					
Thread tolerance	JIS Class 2					
Stroke length tolerance	$^{+1.0}_0$ mm					
Rod non-rotating accuracy <small>Note)</small>	$\pm 0.8^\circ$			$\pm 0.5^\circ$		

Note) No load: Rod retracted

**JIS Symbol**  
Double acting,  
Single rod



### Standard Stroke

(mm)

Bore size (mm)	Standard stroke (mm)
6, 10, 16	40, 50, 60
20, 25, 32	60, 70, 80, 90, 100

**Made to Order**  
**Made to Order Specifications**  
(For details, refer to page 43.)

Symbol	Specifications
-XB9	Low speed (10 to 50 mm/s)
-XB13	Low speed (5 to 50 mm/s)
-XC19	Intermediate stroke (with a spacer built-in)

**Weight**/( ): Denotes the values with D-A93.

(g)

Model	Stroke (mm)						
	40	50	60	70	80	90	100
<b>C(D)UK6-□D</b>	49 (59)	55 (65)	61 (71)	—	—	—	—
<b>C(D)UK10-□D</b>	71 (81)	79 (89)	87 (97)	—	—	—	—
<b>C(D)UK16-□D</b>	102 (132)	114 (144)	126 (156)	—	—	—	—
<b>C(D)UK20-□D</b>	—	—	243 (284)	267 (308)	291 (332)	315 (356)	339 (380)
<b>C(D)UK25-□D</b>	—	—	405 (460)	440 (495)	475 (530)	510 (565)	545 (600)
<b>C(D)UK32-□D</b>	—	—	617 (695)	669 (747)	721 (799)	773 (851)	825 (903)

\* For the auto switch weight, refer to page 68 to 72.

### Allowable Rotational Torque

Make sure that rotational torque is not applied to the piston rod of a long stroke type cylinder. If the rotation torque were applied unavoidably, refer to page 22 for details.

### Tightening Torque

When mounting a CUK long stroke series, refer to page 3.

### Theoretical Output

Specifications are the same as CU series double acting, single rod. Refer to page 3.

### Auto Switch Mounting Position

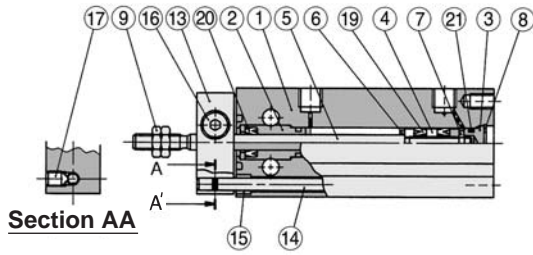
For the auto switch mounting position of CDUK long stroke series, refer to page 6, since specifications are the same as standard type, double acting, single rod type.



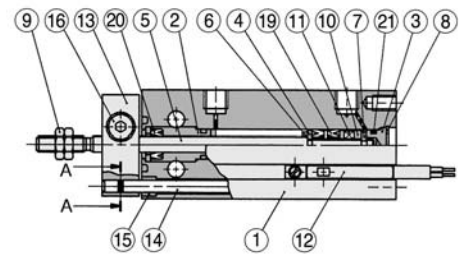
# Series CUK

## Construction

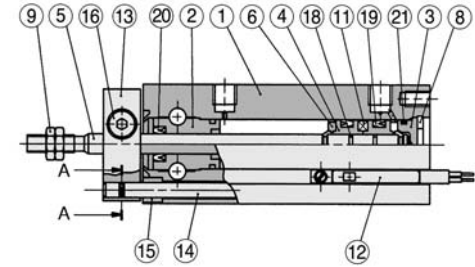
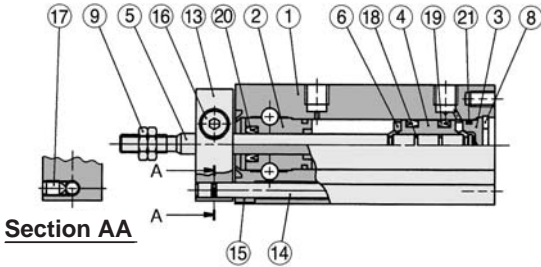
ø6



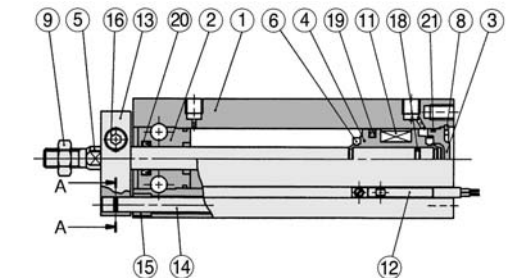
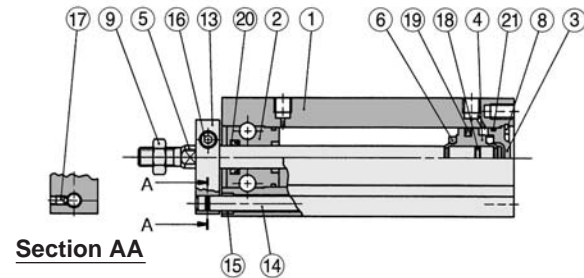
With auto switch



ø10



ø16 to ø32



### Component Parts

No.	Description	Material	Note
1	Cylinder tube	Aluminum alloy	Hard anodized
2	Rod cover	Aluminum bearing alloy	Hard anodized
3	Head cover	Brass	ø6 to ø10, Electroless nickel plated
		Aluminum alloy	ø16 to ø32, Clear chromated
4	Piston	Brass	ø6 to ø10
		Aluminum alloy	ø16 to ø32, Chromated
5	Piston rod	Stainless steel	
6	Bumper A	Urethane	
7	Bumper B	Urethane	
8	Snap ring	Carbon tool steel	Phosphate coated
9	Rod end nut	Carbon steel	Nickel plated
10	Magnet holder	Brass	ø6

### Component Parts

No.	Description	Material	Note
11	Magnet	Magnetic material	
12	Auto switch	—	
13	Non-rotating plate	Aluminum alloy	Nickel plated
14	Guide rod	Stainless steel	
15	Bushing	Oil-impregnated sintered alloy	Black zinc chromated
16	Hexagon socket head cap screw	Carbon steel	Black zinc chromated
17	Hexagon socket head set screw	Carbon steel	
18	Piston gasket	NBR	
19	Piston seal		
20	Rod seal		
21	Gasket		

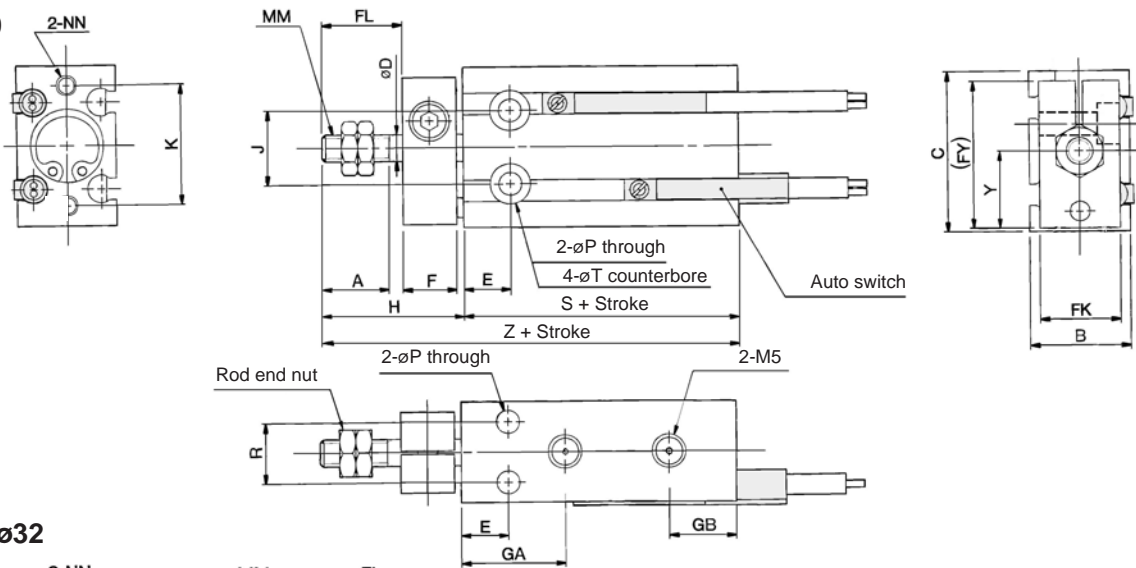
### Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
10	CU10D-PS	Set of nos. above ⑱, ⑳, ㉑.
16	CU16D-PS	
20	CU20D-PS	
25	CU25D-PS	
32	CU32D-PS	

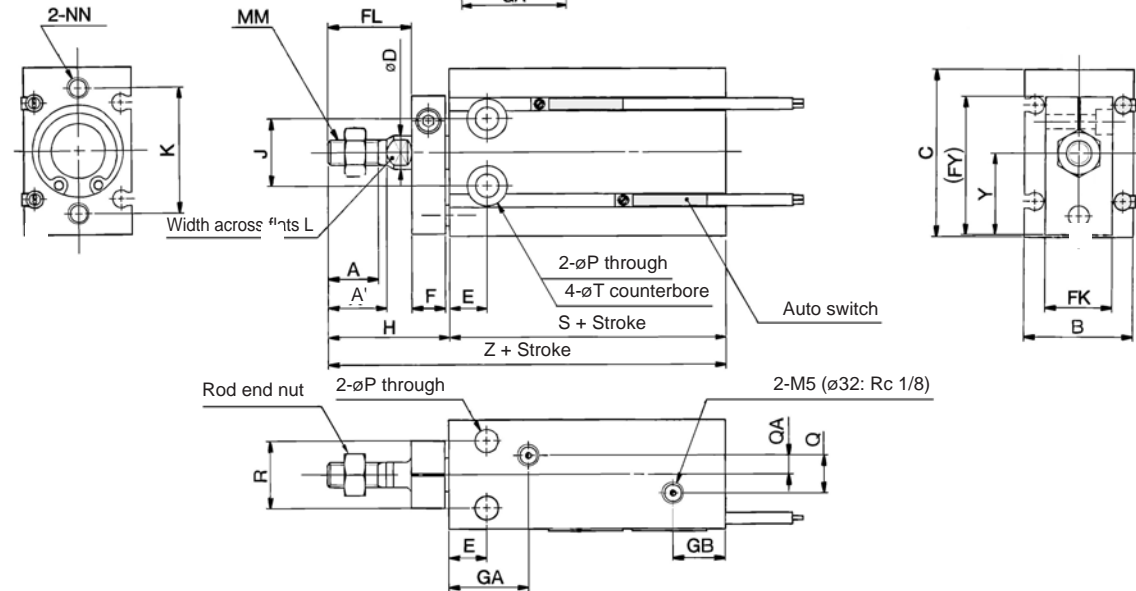
\* Seal kit includes ⑱, ⑳, ㉑. Order the seal kit, based on each bore size.

**Dimensions: Non-rotating Rod Type; Double Acting, Single Rod**

**ø6, ø10**

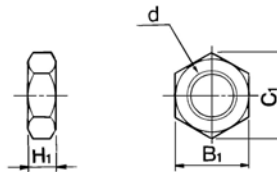


**ø16 to ø32**



**Rod End Nut/Accessory**

Material: Carbon steel



Part no.	Applicable bore size (mm)	d	H <sub>1</sub>	B <sub>1</sub>	C <sub>1</sub>
NTP-006	6	M3	1.8	5.5	6.4
NTP-010	10	M4	2.4	7	8.1
NTJ-015A	16	M5	4	8	9.2
NT-015A	20	M6	5	10	11.5
NT-02	25	M8	5	13	15.0
NT-03	32	M10 x 1.25	6	17	19.6

Bore size (mm)	A	A'	B	C	D	E	F	FL	FK	FY	GA	GB	H	J	K	L	MM
6	7	—	13	22	3	7	8	9	11	20.5	15	10	18	10	17	—	M3
10	10	—	15	24	4	7	8	12	12	22	16.5	10	21	11	18	—	M4
16	11	12.5	20	32	6	7	8	17	13	28	16.5	11.5	26	14	25	5	M5
20	12	14	26	40	8	9	8	20	16	33	19	12.5	29	16	30	6	M6
25	15.5	18	32	50	10	10	10	22	20	43.5	21.5	13	33	20	38	8	M8
32	19.5	22	40	62	12	11	12	29	24	51.5	23	12.5	42	24	48	10	M10 x 1.25

Bore size (mm)	NN	P	Q	QA	R	T	Y	Without auto switch		With auto switch	
								S	Z	S	Z
6	M3 depth 5	3.2	—	—	7	6 depth 4.8	10.5	33	51	33	51
10	M3 depth 5	3.2	—	—	9	6 depth 5	11.5	36	57	36	57
16	M4 depth 6	4.5	4	2	12	7.6 depth 6.5	15.5	30	56	40	66
20	M5 depth 8	5.5	9	4.5	16	9.3 depth 8	19.5	36	65	46	75
25	M5 depth 8	5.5	9	4.5	20	9.3 depth 9	24.5	40	73	50	83
32	M6 depth 9	6.6	13.5	4.5	24	11 depth 11.5	30.5	42	84	52	94



# Series CU

## Made to Order Specification

### -XB6 Heat resistant (150°C)

Enter the applicable model number. —XB6

#### Applicable Model

CU	Standard, Double acting, Single rod
CUK	Non-rotating rod, Double acting, Single rod
CU	Long stroke, Double acting, Single rod
CUK	Non-rotating rod/Long stroke, Double acting, Single rod

#### Specifications

Ambient temperature range	-10 to 150°C
Auto switch	Not mountable
Seal material	Fluorine rubber
Grease in use	Heat resistant grease

Specifications other than described above and dimensions are identical to those of standard products.

### -XB7 Cold resistant (-40°C)

Enter the applicable model number. —XB7

#### Applicable Model

CU	Standard, Double acting, Single rod
CUK	Non-rotating rod, Double acting, Single rod
CU	Long stroke, Double acting, Single rod
CUK	Non-rotating rod/Long stroke, Double acting, Single rod

#### Specifications

Ambient temperature range	-40 to 70°C
Auto switch	Not mountable
Seal material	Low nitrile rubber
Grease in use	Cold resistant grease

Specifications other than described above and dimensions are identical to those of standard products.

### -XB9 Low speed (10 to 50 mm/s)

Enter the applicable model number. —XB9

#### Applicable Model

C(D)U	Standard, Double acting, Single rod
C(D)UK	Non-rotating rod, Double acting, Single rod
C(D)U	Long stroke, Double acting, Single rod
C(D)UK	Non-rotating rod/Long stroke, Double acting, Single rod

### -XB13 Low speed (5 to 50 mm/s)

Enter the applicable model number. —XB13

#### Applicable Model

C(D)U	Standard, Double acting, Single rod
C(D)UK	Non-rotating rod, Double acting, Single rod
C(D)U	Long stroke, Double acting, Single rod
C(D)UK	Non-rotating rod/Long stroke, Double acting, Single rod

### -XC19 Intermediate stroke (with a spacer built-in)

Intermediate strokes are available by installing a spacer with 5 mm in width in the standard stroke cylinder.

Enter the applicable model number. —XC19

#### Applicable Model

C(D)U	Standard, Double acting, Single rod
C(D)UK	Non-rotating rod, Double acting, Single rod
C(D)U	Long stroke, Double acting, Single rod
C(D)UK	Non-rotating rod/Long stroke, Double acting, Single rod

#### Applicable Stroke

Bore size	Stroke (mm)
6, 10, 16	35, 45, 55
20, 25, 32	35, 45, 55, 65, 75, 85, 95

The external dimensions are the same as that of standard products with 5 mm added to strokes above.

Consult with SMC when stroke other than applicable stroke is required.

### -XC22 Seals made of fluorine rubber

Seal materials are changed to the fluorine rubber.

Enter the applicable model number. —XC22

#### Applicable Model

C(D)U	Standard, Double acting, Single rod
	Standard Single acting, Single rod (Retracted/Extended)
C(D)UK	Non-rotating rod, Double acting, Single rod
	Non-rotating rod, Single acting, Single rod (Retracted/Extended)
C(D)U	Long stroke, Double acting, Single rod
C(D)UK	Non-rotating rod/Long stroke, Double acting, Single rod

The other specifications and dimensions are the same as those of standard products.

# Series CU



## Made to Order Specification

### -XC34 Threaded for mounting a work on non-rotating plate (No protrusion from the rod end)

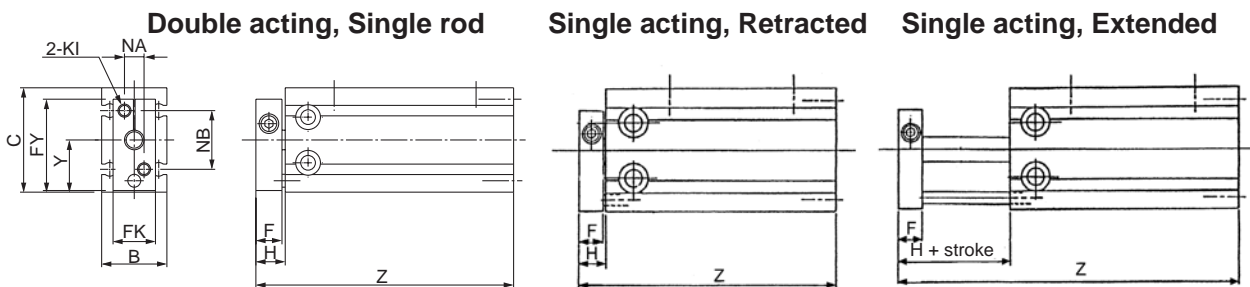
- \* Threaded for mounting a work on the plate.
- \* "FL" dimension across the non-rotating plate and the piston rod end is removed.  
The piston rod does not stick out of the plate.

Enter the applicable model number. —XC34

#### Applicable Model

C(D)UK	Non-rotating rod, Double acting, Single rod
	Non-rotating rod, Single acting, Single rod (Retracted/Extended)
	Non-rotating rod/Long stroke, Double acting, Single rod

#### Dimensions



(mm)

Bore size (mm)	B	C	FK	FY	KI	NA	NB	Y
<b>6</b>	13	22	11	20.5	M3	6	14	10.5
<b>10</b>	15	24	12	22	M3	7	15	11.5
<b>16</b>	20	32	13	28	M4	6	18	15.5
<b>20</b>	26	40	16	33	M4	8	20	19.5
<b>25</b>	32	50	20	43.5	M5	10	28	24.5
<b>32</b>	40	62	24	51.5	M5	12	32	30.5

(mm)

Bore size (mm)	Action		Double acting		Single acting, Retracted						Single acting, Extended					
	F	H	Z		Z						Z					
			Without auto switch	With auto switch	Without auto switch			With auto switch			Without auto switch			With auto switch		
					5	10	15	5	10	15	5	10	15	5	10	15
<b>6</b>	8	9	42	42	47	52	57	47	52	57	52	62	67	52	62	67
<b>10</b>	8	9	45	45	50	55	65	50	55	65	55	65	80	55	65	80
<b>16</b>	8	9	39	49	44	49	59	54	59	69	59	69	84	69	79	94
<b>20</b>	8	9	45	55	50	55	65	60	65	75	55	65	80	65	75	90
<b>25</b>	10	11	51	61	56	61	71	66	71	81	61	71	86	71	81	96
<b>32</b>	12	13	55	65	60	65	75	70	75	85	65	75	90	75	85	100

\* The dimensions other than the table above are the same as those of standard type.

# Related Products

For details, refer to the respective catalogue.

## Clean Series

10-CDU  
11-CDU

Compliant with clean environment



### Specifications

Model	10-CDU (Relief type) 11-CDU (Vacuum type)		
Bore size (mm)	6	10, 16	20, 25
Proof pressure	1.05 MPa		
Max. operating pressure	0.7 MPa		
Min. operating pressure	0.12 MPa	0.06 MPa	0.05 MPa
Ambient and fluid temperature	Without auto switch: -10 to 70°C With auto switch: -10 to 60°C (with no freezing)		
Operating piston speed	50 to 400mm/s		
Allowable margin of stroke length	$+1.0$ 0		
Grease in use	Fluoro grease		
Grade of particle generation amount	10-: Grade 2 11-: Grade 1		

## Copper/Fluorine/Silicon-based free + Low Particle Generation

21-CDU  
22-CDU

Compliant with the environment where no copper, fluorine and silicon are allowed and with clean environment.



### Specifications

Model	21-CDU (Relief type) 22-CDU (Vacuum type)		
Bore size (mm)	6	10, 16	20, 25
Proof pressure	1.05 MPa		
Max. operating pressure	0.7 MPa		
Min. operating pressure	0.12 MPa	0.06 MPa	0.05 MPa
Ambient and fluid temperature	Without auto switch: -10 to 70°C With auto switch: -10 to 60°C (with no freezing)		
Operating piston speed	50 to 400 mm/s		
Allowable margin of stroke length	$+1.0$ 0		
Grease in use	Lithium soap-based grease		
Grade of particle generation amount	21-: Grade3 22-: Grade1		

## Low Speed

C(D)UX

Stable low speed actuation even at 0.5 mm/s (ø16 or less: 1 mm/s)



### Specifications

Proof pressure	1.05MPa		
Max. operating pressure	0.7MPa		
Ambient and fluid temperature	Without auto switch: -10 to 70°C With auto switch: -10 to 60°C (with no freezing)		
Lubrication	Not required (Non-lube)		
Operating piston speed	ø10, ø16: 1 to 300mm/s ø20 to ø32: 0.5 to 300mm/s		
Cushion	Rubber bumper on both ends		
Rod end thread	Male thread		
Thread tolerance	JIS Class 2		
Allowable margin of stroke length	<sup>Note)</sup> $+1.0$ 0		
Mounting	Basic style		

Note) Tolerance  $+1.0$   
0

### Minimum Operating Pressure

Unit: MPa

Bore size (mm)	10	16	20	25	32
Minimum operating pressure (MPa)	0.06	0.06	0.05	0.05	0.05

# Free Mount Cylinder with Air Cushion

## Series CU



### New air cushion mechanism

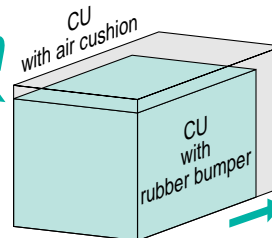


Free mount cylinder *Series CU* now employs an air cushion mechanism.

Extended dimensions (compared to the standard *CU* models) are hardly noticeable.

(with rubber bumper)

- Overall length: **+1.5 to 7 mm**
- Overall height: **+0 to 2 mm** ↑  
No air cushion protrusion!
- Overall width: not affected



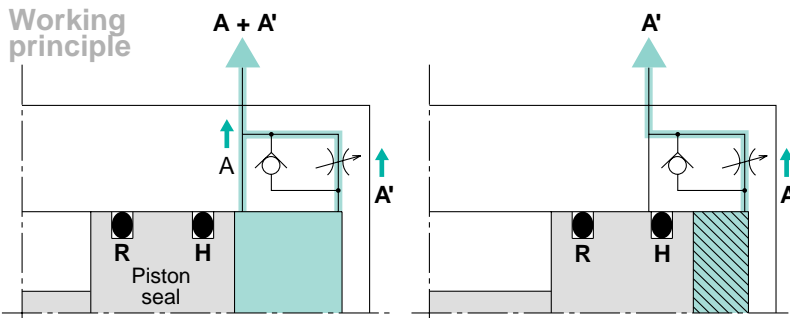
Bore size	Extended dimensions (mm)	
	Length	Height
ø20	7	2
ø25	1.5	0
ø32	4	0



### Unique air cushion construction requires no cushion ring.

Elimination of the cushion ring used in conventional type air cushions has made it possible to reduce the overall length of the cylinder while retaining all the advantages of a compact profile.

Working principle

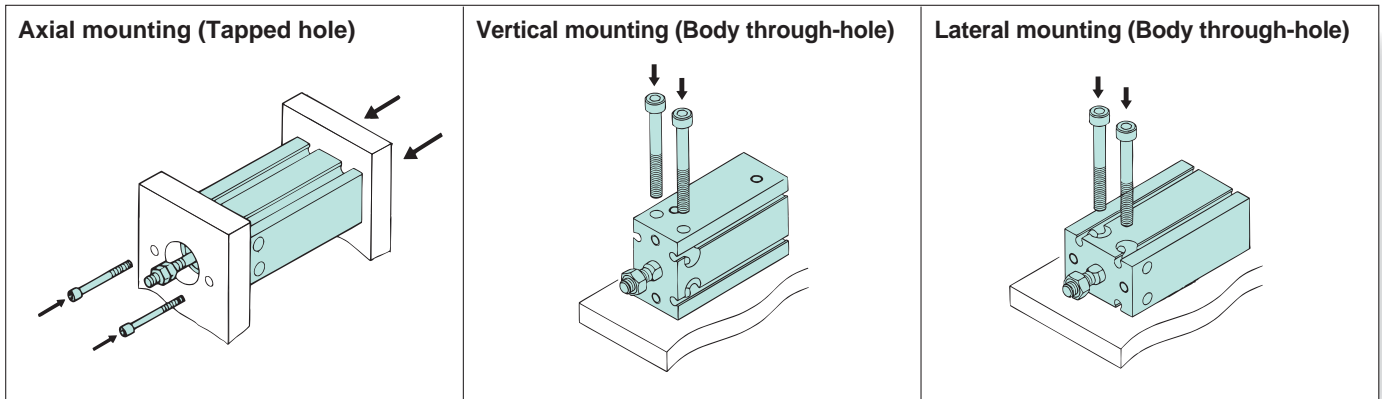


- ① When the piston is retracting, air is exhausted through both A and A' until piston seal H passes air passage A.
- ② After piston seal H has passed air passage A, air is exhausted only through A'. The section marked with slanted lines becomes a cushion chamber, and an air cushion effect is achieved.
- ③ When air is supplied for the piston extension, the check valve opens and the piston extends with no delay.

# Reduced stroke end impact and noise: New standards to meet consumer demand.

## Free mounting

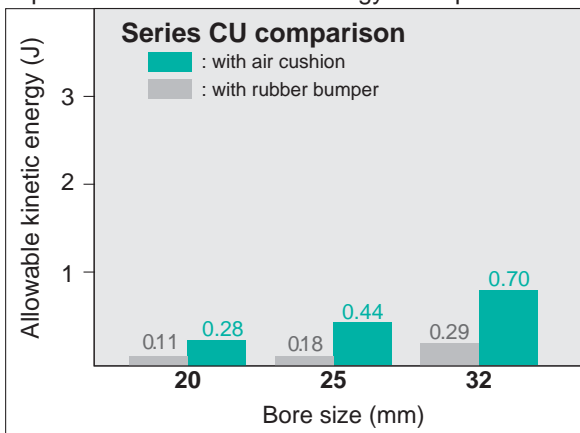
3 types of mounting orientations can be accommodated depending on the installation conditions.



## Approximately 2.4 times of allowable kinetic energy

(Compared to the old Series CU with rubber bumper)

Improved allowable kinetic energy absorption.

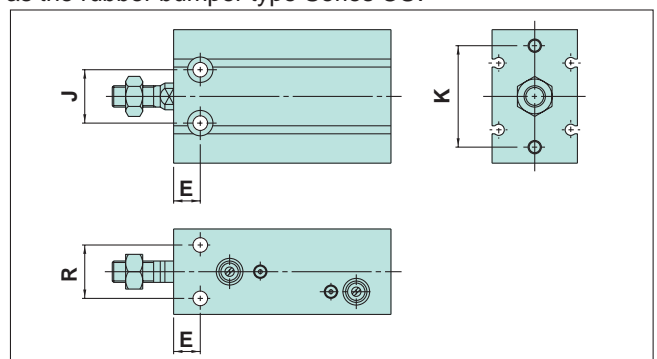


## Improved sound insulation (Reduced impact noise at the stroke end)

- Noise reduction of more than 11dB is possible (compared to Series CU20 with rubber bumper).

## Interchangeable mounting

Mounting dimensions (J, K, R, and E) are the same as the rubber bumper type Series CU.



## Improved repeatability

When compared to rubber bumper type actuators, air cushion type cylinders are less likely to be affected by pressure fluctuations, and therefore better able to achieve a stable and smooth stroke.

## Size Variations

Model	Standard stroke									Auto switch
	20	30	40	50	60	70	80	90	100	
C(D)U20	●	●	●	●	●	●	●	●	●	• $\varnothing 20$ to $\varnothing 32$ Direct mounting style auto switch
C(D)U25	●	●	●	●	●	●	●	●	●	
C(D)U32	●	●	●	●	●	●	●	●	●	

# Free Mount Cylinder with Air Cushion

## Series CU

ø20, ø25, ø32

### How to Order

Without auto switch

CU 32 [ ] 50 A

With auto switch

CDU 32 [ ] 50 A M9B [ ]

Built-in magnet

Bore size

20	20 mm
25	25 mm
32	32 mm

Thread type

Symbol	Type	Bore size
-	M thread	ø20, ø25
	Rc	
TN	NPT	ø32
TF	G	

Number of auto switches

-	2 pcs.
S	1 pc.

Auto switch

-	Without auto switch
---	---------------------

\* Refer to the table below for applicable auto switches.  
\* Auto switches are shipped together but not assembled.

Air cushion

A	With air cushion
---	------------------

Cylinder stroke (mm)

Refer to next page for "Standard Stroke".

### Applicable Auto Switches/Refer to page 68 to 72 for further information on auto switches.

Type	Special function	Electrical entry	Indicator/light	Wiring (output)	Load voltage			Auto switch model		Lead wire length (m)*			Pre-wired connector	Applicable load	
					DC	AC	Perpendicular	In-line	0.5 (Nil)	3 (L)	5 (Z)				
												5 V			12 V
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	A96V	A96	●	●	—	—	IC circuit	—
				2-wire	12 V	100 V	A93V	A93	●	●	—	—	—	Relay	
					5 V, 12 V	100 V or less	A90V	A90	●	●	—	—	—	IC circuit	PLC
Solid state switch	—	Grommet	Yes	3-wire(NPN)	5 V, 12 V	—	—	M9NV	M9N	●	●	○	○	IC circuit	Relay PLC
				3-wire(PNP)				M9PV	M9P	●	●	○	○		
				2-wire	12 V			M9BV	M9B	●	●	○	○	—	
				3-wire(NPN)	5 V, 12 V			M9NWV	M9NW	●	●	○	○	IC circuit	
				3-wire(PNP)	5 V, 12 V			M9PWV	M9PW	●	●	○	○	—	
				2-wire	12 V			M9BWV	M9BW	●	●	○	○	—	
				Diagnostic indication (2-colour indication)	—			—	—	—	—	—	—	—	

\* Lead wire length symbols: 0.5 m.....Nil (Example) M9N  
3 m.....L (Example) M9NL  
5 m.....Z (Example) M9NZ

Note) Solid state switches marked "○" are produced upon receipt of order.

\* Normally closed (NC=b contact), solid state switches (Model D-F9G, F9H) are also available. For detail, refer to Best Pneumatics catalogue.

\* For detail about auto switches with pre-wired connector, refer to Best Pneumatics catalogue.



# Series CU



## Specifications

Type	Pneumatic (Non-lube)
Fluid	Air
Proof pressure	1.0 MPa
Maximum operating pressure	0.7 MPa
Minimum operating pressure	0.08 MPa
Ambient and fluid temperature	Without auto switch: -10°C to 70°C (No freezing) With auto switch: -10°C to 60°C (No freezing)
Rod end thread	Male thread
Rod end thread tolerance	JIS Class 2
Stroke length tolerance	+1.0 0
Piston speed	50 to 500 mm/s

## Effective Cushion Length

Bore size (mm)	<b>20</b>	<b>25</b>	<b>32</b>
Effective cushion length (mm)	6.6	6.7	7.7

## Standard Stroke

Bore size (mm)	Standard stroke (mm)
<b>20, 25, 32</b>	20, 30, 40, 50, 60, 70, 80, 90, 100

\* Intermediate strokes are also available upon receipt of order. Please contact SMC.  
Minimum stroke length is 20 mm.

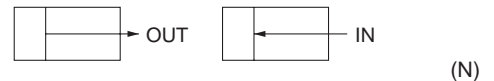
When mounting Series CU refer to the table below.

Bore size (mm)	Hexagon socket head cap screw size (mm)	Proper tightening torque (N·m)
<b>20, 25</b>	M5	5.10 ±10%
<b>32</b>	M6	8.04 ±10%

## Allowable Kinetic Energy

Refer to “Selection” on P.54 regarding allowable kinetic energy.

## Theoretical Output



Bore size (mm)	Operating direction	Operating pressure (MPa)		
		0.3	0.5	0.7
<b>20</b>	OUT	94.2	157	220
	IN	79.2	132	185
<b>25</b>	OUT	147	246	344
	IN	124	206	288
<b>32</b>	OUT	241	402	563
	IN	207	346	454

## Weight

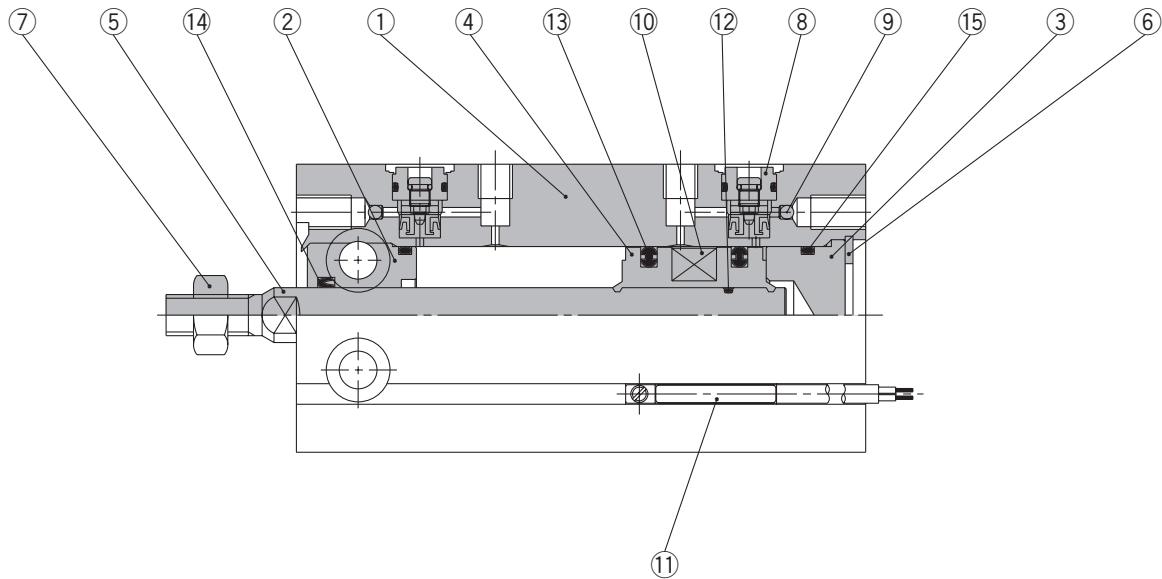
### Basic Weight (g)

Bore size (mm)	Standard stroke (mm)								
	20	30	40	50	60	70	80	90	100
<b>20</b>	186	208	230	252	274	296	318	340	362
<b>25</b>	289	323	357	391	425	459	493	527	561
<b>32</b>	464	512	560	608	656	704	752	800	848

### Additional Weight (g)

Bore size (mm)	Magnet
<b>20</b>	5
<b>25</b>	6
<b>32</b>	11

## Construction



### Component Parts

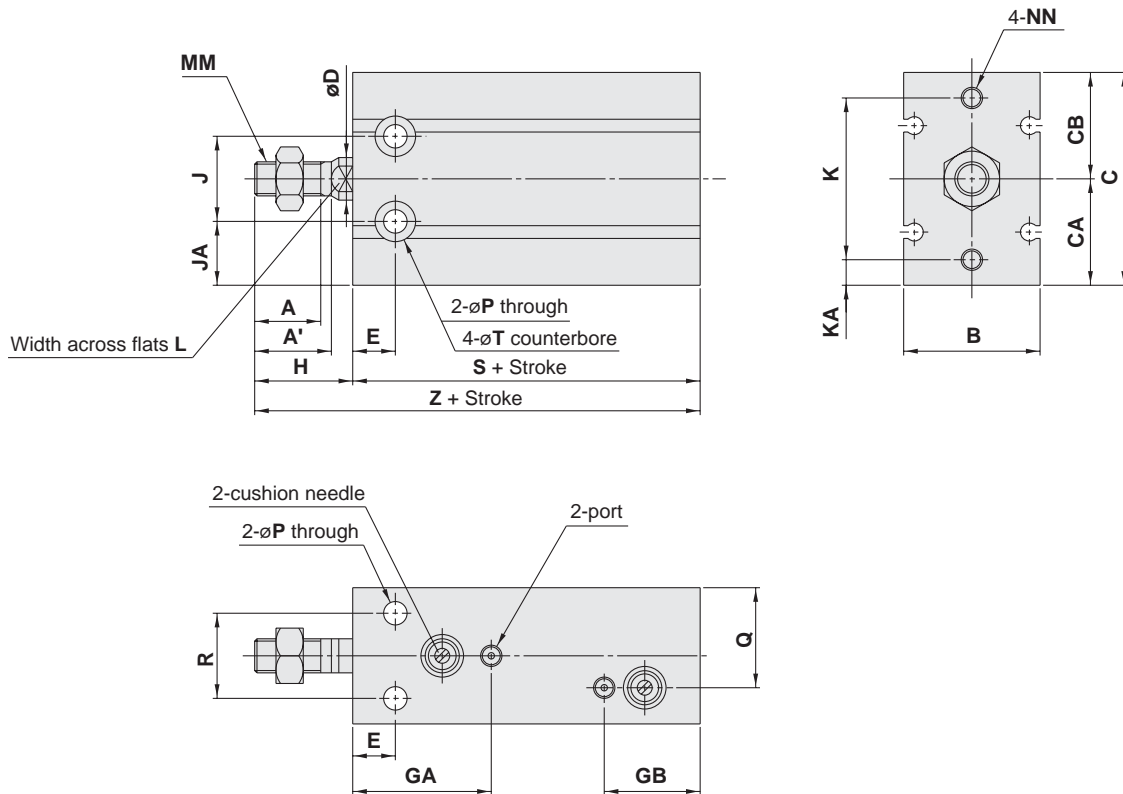
No.	Description	Material	No. of pcs.	Note
1	Cylinder tube	Aluminum alloy	1	Hard anodized
2	Rod cover/Bearing	Aluminum bearing alloy	1	Hard anodized
3	Head cover	Aluminum alloy	1	Clear chromated
4	Piston	Aluminum alloy	1	Chromated
5	Piston rod	Stainless steel	1	
6	Snap ring	Carbon tool steel	1	Phosphate coated
7	Rod end nut	Carbon steel	1	Nickel plated
8	Cushion needle assembly	—	(2)	
9	Steel ball	Carbon steel	2	
10	Magnet	Magnetic material	1	
11	Auto switch	—	(2)	D- $\frac{9}{16}$ type
12	Piston gasket	NBR	1	
13	Piston seal	NBR	2	
14	Rod seal	NBR	1	
15	Gasket	NBR	1	

### Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
$\phi 20$	CU20A-PS	13, 14, and 15
$\phi 25$	CU25A-PS	
$\phi 32$	CU32A-PS	

# Series CU

## Dimensions

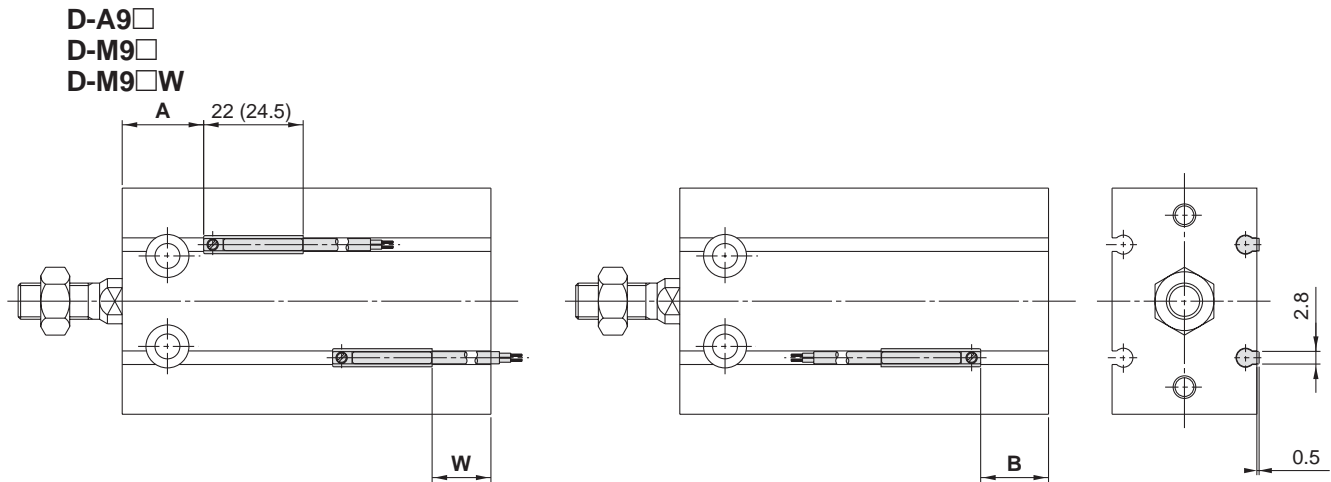


(mm)

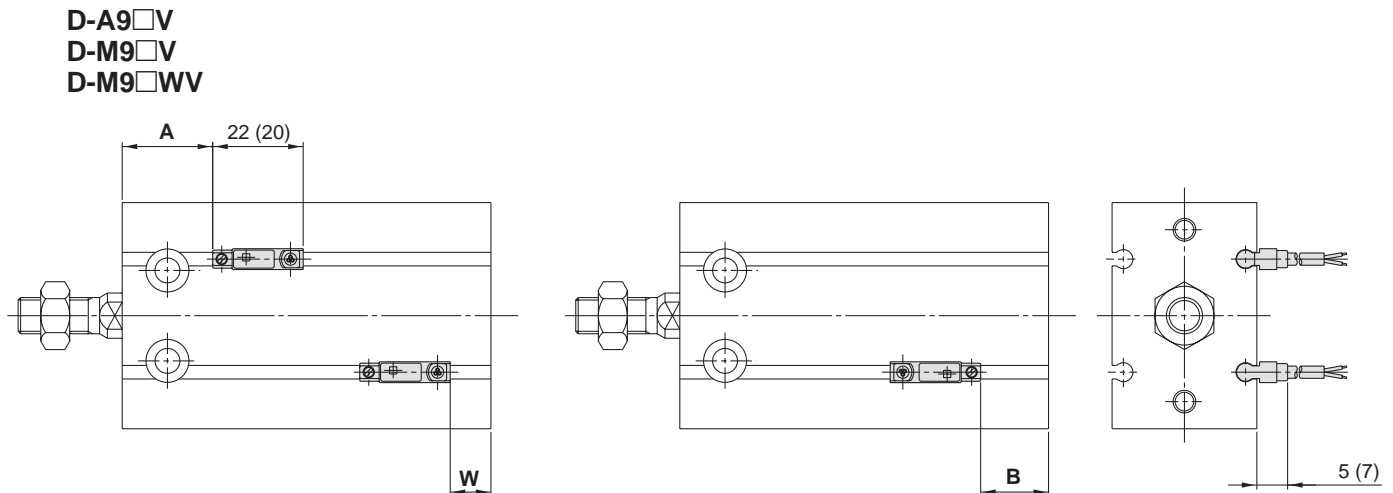
Bore size (mm)	Port size	A	A'	B	C	CA	CB	D	E	GA	GB	H	J	JA
20	M5	12	14	26	42	20	22	8	9	29	27	19	16	12
25	M5	15.5	18	32	50	25	25	10	10	32.5	22.5	23	20	15
32	1/8	19.5	22	40	62	31	31	12	11	35	25	27	24	19

Bore size (mm)	K	KA	L	MM	NN	P	Q	R	T	S	Z	Standard stroke
20	30	5	6	M6	M5 with depth 8	5.5	13	16	9.3 with depth 8	53	72	20, 30, 40, 50, 60, 70, 80, 90, 100
25	38	6	8	M8	M5 with depth 8	5.5	23.5	20	9.3 with depth 9	51.5	74.5	
32	48	7	10	M10 x 1.25	M6 with depth 9	6.6	29	24	11 with depth 11.5	56	83	

## Proper Auto Switch Mounting Position (Detection at stroke end) and Its Mounting Height



( ): Denotes the values of D-A93.



( ): Denotes the values of D-M9□V, D-M9□WV.

(mm)

Bore size (mm)	D-A9□, D-A9□V			D-M9□, D-M9□W			D-M9□V, D-M9□WV		
	A	B	W	A	B	W	A	B	W
20	18	15	13 (10.5)	22	19	9	22	19	11
25	20	11	9 (6.5)	24.5	15	5	24.5	15	7
32	22.5	13.5	11.5 (9)	26.5	17.5	7.5	26.5	17.5	9.5

Note 1) Figures in the table above are used as a reference when mounting the auto switches for stroke end detection. In the case of actually setting the auto switches, adjust them after confirming their operation.

Note 2) Values in ( ) are dimensions for D-A93 type.

## Operating Range

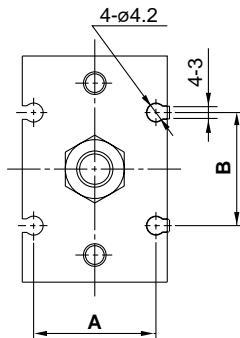
(mm)

Switch model	Bore size (mm)		
	20	25	32
D-A9□, D-A9□V	11	12.5	14
D-M9□, D-M9□V	5	5	5
D-M9□W, D-M9□WV	6.5	7	7

\* Values in this table include hysteresis and are to be used as a guide only. They do not guarantee an actual fixed range (expect approximately ±30% dispersion). Values may vary greatly depending on the operating environment.

# Series CU

## Auto Switch Rail Position

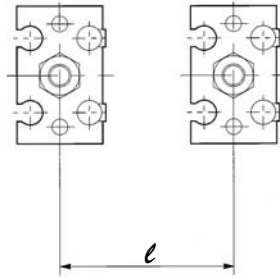


Bore size (mm)	A	B
20	21	23
25	27	25
32	35	27

(mm)

## Caution on Proximity Installation

When free mounting cylinders equipped with auto switches are used, the auto switches could activate unintentionally if the installed distance is less than the dimensions shown in the table. Therefore, make sure to provide a greater clearance. Due to unavoidable circumstances, if they must be used with less distance than the dimensions given in the table, the cylinders must be shielded. Therefore, affix a steel plate or a magnetic shield plate (MU-S025) to the area on the cylinder that corresponds to the adjacent auto switch. (Please contact SMC for details.) Auto switches may malfunction if a shield plate is not used.



Bore size (mm)	Mounting pitch $l$ (mm)
20	40
25	46
32	56



# Series CU

## Specific Product Precautions 1

Be sure to read before handling. Refer to back page 1 through to 6 for Safety Instructions, Actuator Precautions, and Auto Switch Precautions.

### Installation and Removal of Snap Rings

#### ⚠ Caution

1. Use appropriate pliers (Type C snap ring installing tool) for installation and removal of snap rings.
2. Even when using appropriate pliers (Type C snap ring installing tool), proceed with caution as there is a danger of the snap ring flying off the end of the pliers (tool) and causing bodily injury or damage to nearby equipment. After installation, make sure that the snap ring is securely seated into the snap ring groove before supplying air.

### Mounting

#### ⚠ Caution

1. Refer to the below table for mounting cylinders.

#### Tightening Torque

Bore sizes (mm)	Hexagon socket head cap screw (mm)	Proper tightening torque (N·m)
20, 25	M5	5.10 ±10%
32	M6	8.04 ±10%

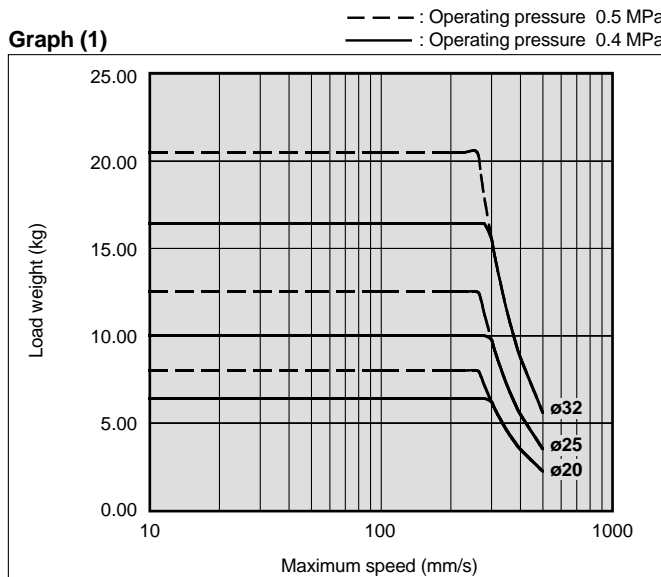
### Selection

#### ⚠ Caution

1. Operate the cylinder to the stroke end.  
When the stroke is restricted by an external stopper or a clamped workpiece, sufficient cushioning and noise reduction may not be achieved.
2. Strictly observe the limiting ranges for load weight and maximum speed (Graph (1)). Also, the limiting ranges provided here are based on the condition that the cylinder is operated to the stroke end with a proper cushion needle adjustment.

If operated beyond the limiting ranges, excessive impact will occur and this may cause damage to equipment.

Graph (1)



### Selection

#### ⚠ Caution

3. Adjust the cushion needle to reduce excessive kinetic energy from the piston impact at the stroke end by allowing it to absorb sufficient kinetic energy during the cushion stroke.

If due to improper adjustment, the piston impacts the stroke end with excessive kinetic energy (values above those given in Table (1)), an excessive impact will occur and this may cause damage to equipment.

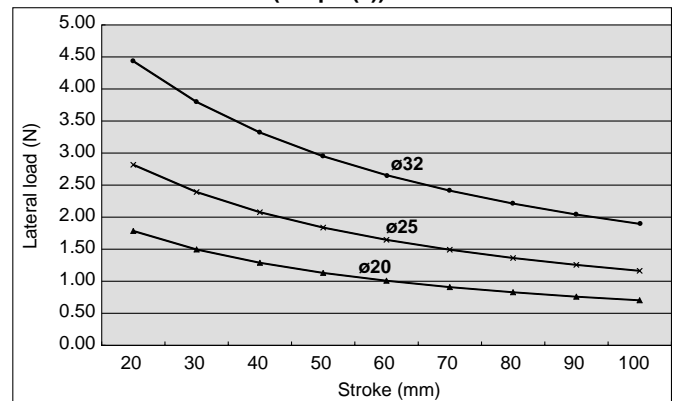
Table (1) Allowable Kinetic Energy at Piston Impact (J)

	20	25	32
Piston speed	50 to 500 mm/s		
Allowable kinetic energy	0.055	0.09	0.15

4. Strictly observe the limiting ranges for the piston rod lateral load (Graph (2)).

If operated beyond the limiting ranges, equipment life may be reduced or damage to equipment may occur.

Piston Rod Lateral Load (Graph (2))



### Cushion Needle Adjustment

#### ⚠ Caution

1. Keep the adjustment range for the cushion needle between the fully closed position and the rotations shown below.

	Rotations
ø20 to ø32	2.5 rotations or less

Use a 3 mm flat head watchmakers' screwdriver to adjust the cushion needle. The adjustment range for the cushion needle must be between the fully closed position and the open position ranges indicated in the above table. A retaining mechanism prevents the cushion needle from slipping out; however, it may spring out during operation if it is rotated beyond the ranges shown above.