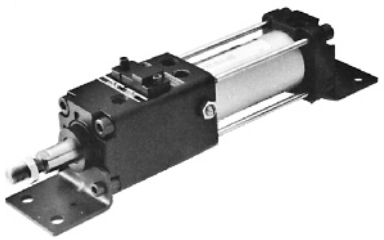
Пневмоцилиндр с прецизионным стопором

C92LA

□40~100

Цилиндры с прецизионным стопором используются в случаях, когда необходима точная остановка штока в нескольких позициях, например подача заготовок, в штабелеукладчиках и т.п.

- Два варианта исполнения стопора: пневматический и пневматический с пружиной
- Стопор с пружиной предотвращает перемещение груза при падении давления
- Точность остановки до ±0,2 мм
- Регулируемое воздушное демпфирование в конце хода
- Исполнение с датчиками положения поршня



Технические характеристики

Диаметр поршня (мм)	40	50	63	80	100
Диаметр поршневого штока (мм)	16	20	20	25	30
Резьба поршневого штока	M12x1.25	M16x1.5	M16x1.5	M20x1.5	M20x1.5
Подсоединит. резьба	G1/4	G1/4	G3/8	G3/8	G1/2
Путь демпфирования (мм)	12.3	14.3	16.3	19.3	21.3
Монтажное положение	произвольное				
Стандартные значения длины хода* (DIN ISO 4394) (мм)	25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500 расширение ряда R10 согласно ISO 497				
Допуски по длине хода (мм)	до 250 +1.0/-0, до 1000 мм +1.4/-0				
Направление блокировки	прямой, обратный ход				
Макс. рабочая скорость (мм/сек)	500				
Диапазон рабочих давлений (МПа)	0.08 ~ 1.0				
Температура окружающей среды (°C)	5 ~ 60				
Среда	очищенный сжатый воздух с содержанием масла или без него				

* Более длинный ход - по запросу. Заказ блока стопора отдельно - по запросу.

Номер для заказа

C 92 LA [D] [B] [80] — [100] [P] [ ]

Исполнение

LA	Цилиндр со стопором

–	Без магнитного кольца
D	С магнитным кольцом

Способ крепления

B	Стандарт
T	Крепление на поворотной цапфе

□ поршня, мм

40
50
63
80
100

Длина хода (мм)

Исполнение стопора

P	Пневматическое
D	Пневматическое с пружиной

Исполнение поршневого штока

–	Стандарт.
W	Сквозной шток
E+..	Удлиненный шток

Датчики положения D-A54 и крепления датчиков заказываются отдельно (см. Серию C95, стр 432, 433)

Крепежные элементы (заказываются отдельно)

Диаметр поршня		40	50	63	80	100
Одинарная задняя опора	C	**C40**	**C50**	**C63**	**C80**	**C100**
Двойная задняя опора	D	**D40**	**D50**	**D63**	**D80**	**D100**
Фланец	F	**F40**	**F50**	**F63**	**F80**	**F100**
Лапы	L	**L40**	**L50**	**L63**	**L80**	**L100**
Центральная поворотная цапфа	T	**T40**	**T50**	**T63**	**T80**	**T100**

Вес цилиндров (кг)

Вес для нулевого хода, кг, исполнение P						
Диаметр поршня (мм)		40	50	63	80	100
Способ крепления	B	1.815	2.71	4.45	7.17	10.35
	L	1.99	2.91	4.75	7.97	11.29
	F	2.22	3.31	5.41	9.01	12.67
	C	2.09	3.16	5.21	8.55	12.66
	D	2.08	3.14	5.23	8.55	12.68
	T	2.42	3.46	5.80	9.51	13.88
Дополнительный вес на каждые 50мм хода		0.22	0.28	0.36	0.52	0.64

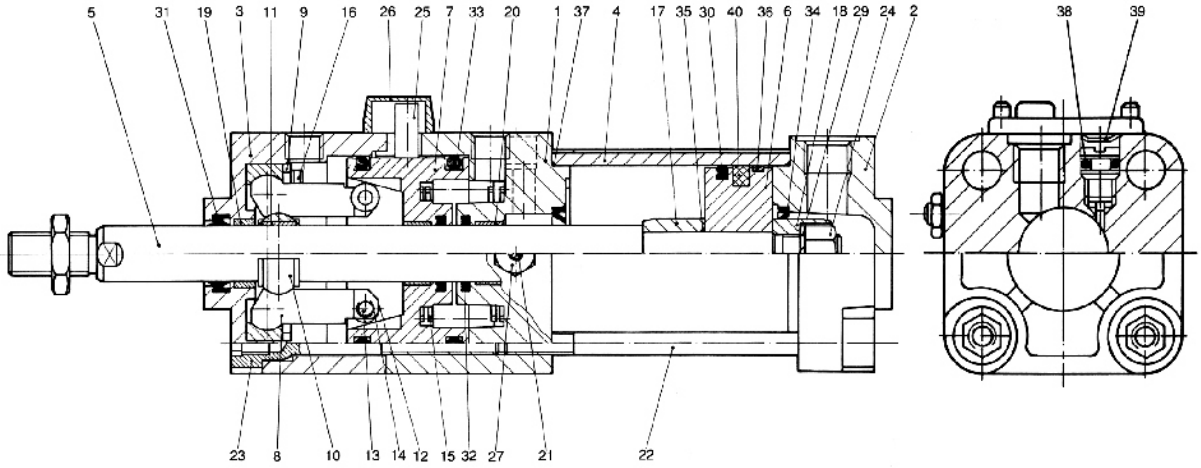
Дополнит. вес на каждые 50 мм хода, исполнение D (стопор с пружиной)					
Диаметр поршня (мм)	40	50	63	80	100
	0.065	0.100	0.160	0.240	0.310

Указание

Стопор поставляется в заблокированном состоянии. Перед использованием его необходимо разблокировать поворотом стопорного диска (поз. 39).

Пневмоцилиндр с прецизионным стопором
C92LA

Конструкция



Спецификация

Поз.	Наименование	Материал
1	Передняя крышка	Алюминиевый сплав
2	Задняя крышка	Алюминиевый сплав
3	Корпус	Алюминиевый сплав
4	Гильза цилиндра	Алюминий анодированный
5	Шток	Сталь твердохромированная
6	Поршень	Алюминий
7	Стопорный поршень	Специальная сталь
8	Стопорная рукоятка	Специальная сталь
9	Держатель рукоятки	Специальная сталь
10	Державка зажимного башмака	Специальная сталь
11	Зажимный башмак	Специальный сплав
12	Ролик	Специальная сталь
13	Штифт	Сталь улучшенная
14	Стопорное кольцо	Сталь
15	Пружина	Пружинная сталь
16	Направляющая рукоятки	Сталь
17	Демпфирующая гильза A	Сталь
18	Демпфирующая гильза B	Сталь
19	Направляющая корпуса	Подшипниковый сплав
20	Направляющая головки цил.	Подшипниковый сплав
21	Амортиз. винт	Сталь

Поз.	Наименование	Материал
22	Стяжка	Сталь оцинкованная и хромирован.
23	Установ. винт	Сталь оцинкованная и хромирован.
24	Гайка поршня	Сталь оцинкованная и хромирован.
25	Контрольный штифт	Сталь закаленная
26	Направляющ. контрольн. штифта	Специальная сталь
27	Контргайка	Сталь никелированная
28	Винт	Сталь
29	Пружинящее кольцо	Пружинная ст., оцинков. и хромир
30	Уплотнение поршня	NBR
31	Уплотнение/скребок	NBR
32	Уплотнение штока	NBR
33	Уплотнение стопорного поршня	NBR
34	Уплотнение демпфера	NBR
35	Уплотнение штока	NBR
36	Направляющая	Полиацеталь
37	О-образное кольцо трубки цил.	NBR
38	О-образн. кольцо амортиз. винта	NBR
39	Стопорный диск	Сталь
40	Магнитное кольцо (по выбору)	

Поз. 15: только в сочетании с исполнением "D" двустороннего действия с пружинным стопором.

Ремкомплект

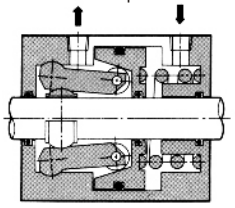
Состоит из позиций 30 - 39

Диаметр	Номер для заказа
40	**CLA 92-40**
50	**CLA 92-50**
63	**CLA 92-63**
80	**CLA 92-80**
100	**CLA 92-100**

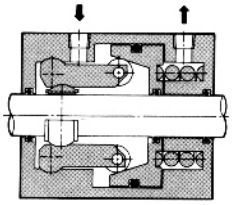
Принцип действия

Исполнение D (с пружиной)

Блокировка

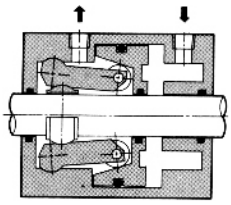


Разблокировка

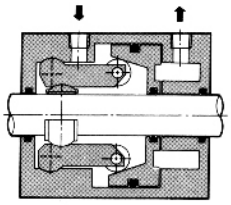


Исполнение P

Блокировка



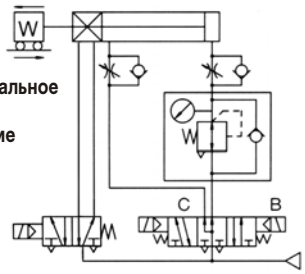
Разблокировка



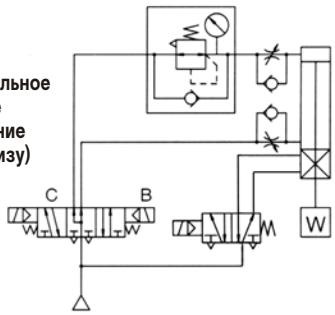
Рекомендуемая схема включения

Соленоид A	Соленоид B	Соленоид C	Действие
ВКЛ	ВКЛ	ВЫКЛ	Прямой ход
ВЫКЛ	ВЫКЛ	ВЫКЛ	Заблокирован
ВКЛ	ВЫКЛ	ВЫКЛ	Разблокирован
ВКЛ	ВКЛ	ВЫКЛ	Прямой ход
ВКЛ	ВЫКЛ	ВКЛ	Разблокирован
ВЫКЛ	ВЫКЛ	ВЫКЛ	Заблокирован
ВКЛ	ВЫКЛ	ВЫКЛ	Разблокирован
ВКЛ	ВЫКЛ	ВКЛ	Обратный ход

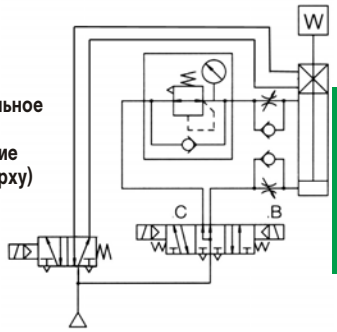
Горизонтальное рабочее положение



Вертикальное рабочее положение (груз снизу)



Вертикальное рабочее положение (груз сверху)



Характеристики

Исполнение		Пневматическое с пружиной "D"	Пневматическое "P"
Макс. рабочее давление (МПа)		0.5	0.5
Давление разблокировки (МПа)		0.3 мин.	0.1 мин.
Давление блокировки		0.25 макс.	0.05 мин.
Удерживающая сила (макс. стат. груз), Н	□40	800 +удерживающая сила [3]	см. рис. 1
	□50	1250 + удерживающая сила	
	□63	1750 + удерживающая сила	
	□80	2800 + удерживающая сила	
	□100	4400 + удерживающая сила	
Допуск блокировки [2]	50 мм/сек	±0.2 мм	
	100 мм/сек	±0.3 мм	
	300 мм/сек	±0.5 мм	
	500 мм/сек	±1.5 мм	

1) Соотношение между скоростью поршня и грузом - см. рис. 2.
2) Значения действительны при следующих условиях: груз = 25% от допускаемого усилия поршя при 5 бар. Распределитель расположен в непосредственной близи от стопора.
3) Значения усилия удержания - см. рис.1.

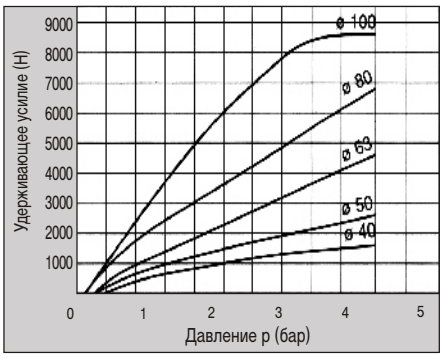


Рис. 1: Удерживающее усилие при макс. давлении блокировки 0,25 МПа.

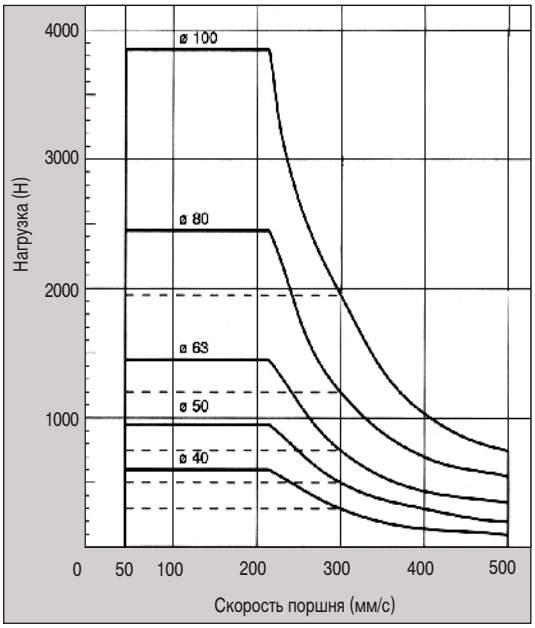


Рис. 2: Допустимая динамическая нагрузка

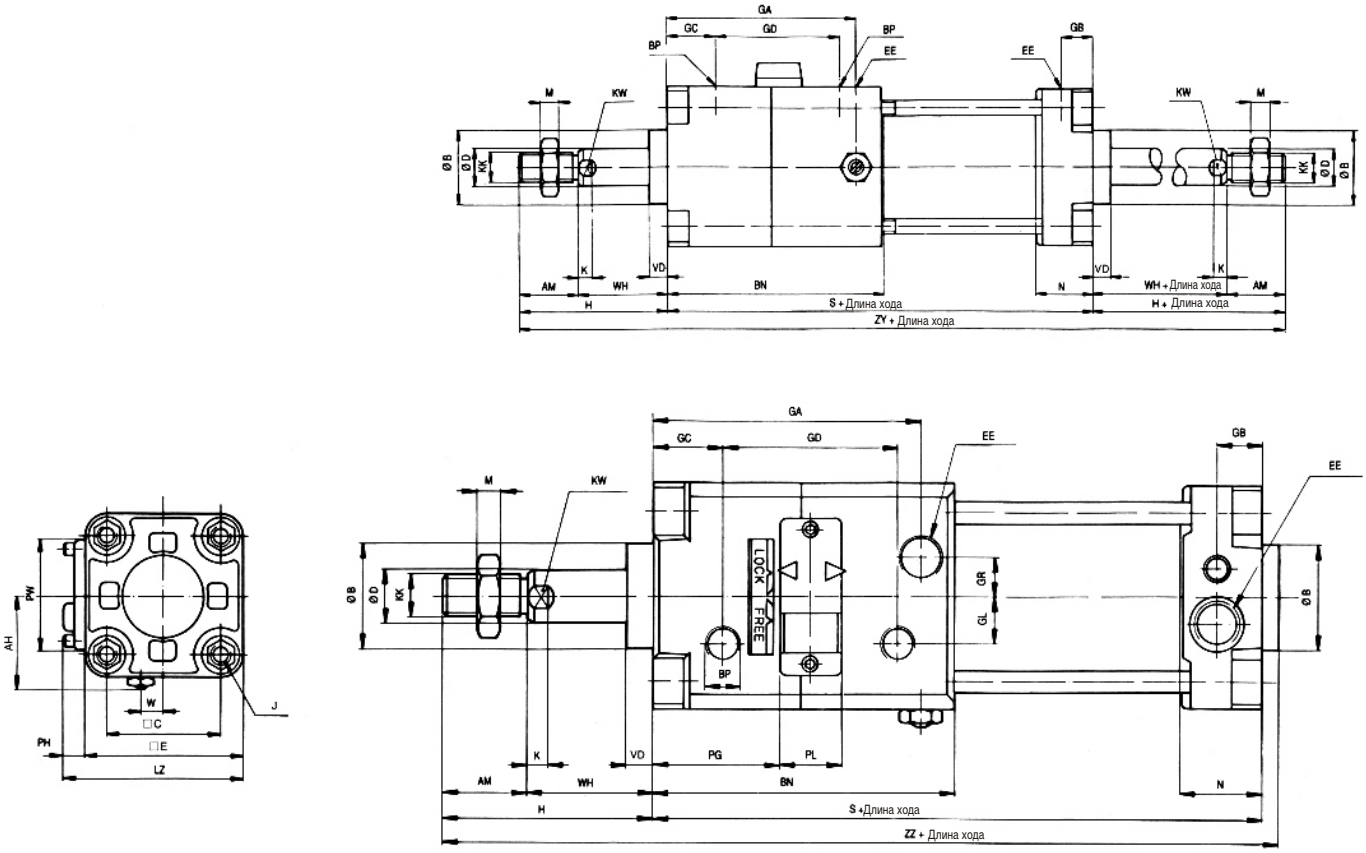
На рис.2 показана максимальная динамическая нагрузка в различных рабочих положениях.

1) Непрерывная линия показывает максимальную нагрузку при горизонтальном положении цилиндра.
2) Пунктирная линия показывает максимальную нагрузку при вертикальном положении цилиндра.

Пневмоцилиндр с прецизионным стопором
C92LA

Размеры

Способ крепления B

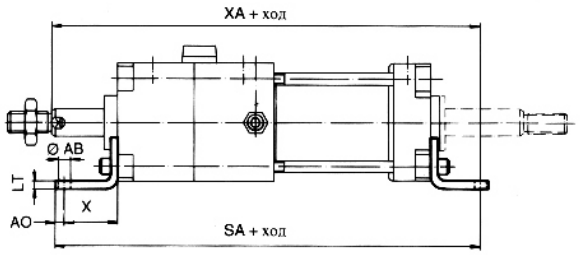


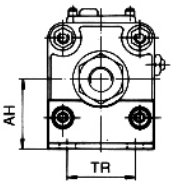
□ поршня	AM	□B	BP	BN	□C	□D	□E	EE	GA	GB	GC	GD	GL	GR	H	J	K
40	24	32	G1/4	96	44	16	60	G1/4	85	15	26	54	10	10	64.5	M6	6
50	32	40	G1/4	108	52	20	70	G1/4	95	15.5	27	59	13	12	77	M8	7
63	32	40	G1/4	115	64	20	85	G3/8	102	17	26	67	18	15	80.5	M8	7
80	40	52	G1/4	129	78	25	102	G3/8	113	22	30	72	23	17	92	M10	11
100	40	52	G1/4	140	92	30	116	G1/2	124	19.5	31	76	25	19	97	M10	11

□ поршня	AH	KK	KW	LZ	M	N	PG	PH	PL	PW	S	VD	W	WH	ZZ	ZY
40	39	M12x1.25	14	71	6	27	42	11	20	45	153	10	8	40.5	222.5	282
50	45	M16x1.5	18	80	8	30	46	10	21	50	168	10	0	45	251	322
63	53	M16x1.5	18	99	8	31	48.5	13	23	60	182	10	0	48.5	268.5	343
80	61	M20x1.5	22	117	10	37	55	15	23	70	208	14	0	52	307	392
100	71	M20x1.5	26	131	10	40	56.5	15	25	80	226	14	0	57	331	420

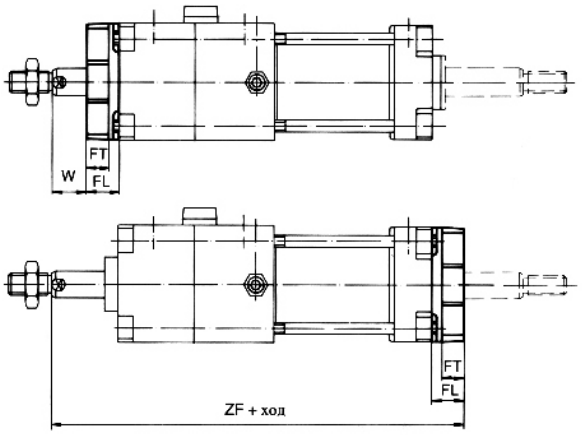
Размеры

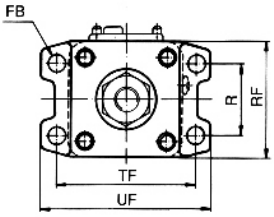
Крепление на лапах L



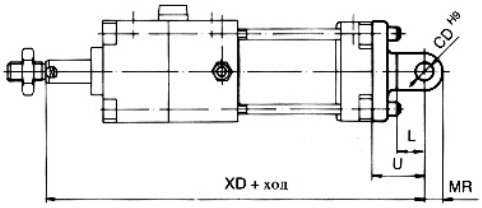


Крепление при помощи фланца F

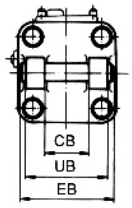




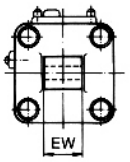
Задняя опора



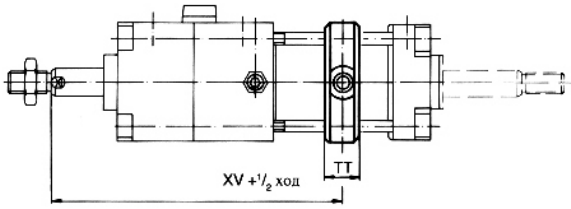
Двойная задняя опора D

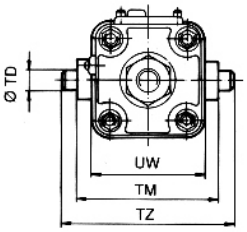


Одинарная задняя опора D



Центральная поворотная цапфа T





□ поршня	AB	AH	AO	CB	CD	EB	EW	FB	FL	FT	L	LT	MR	R	RF	SA
40	9	36	11.5	28	12	75	28	9	20.5	12	18	3.2	12	36	58	230
50	9	45	12	32	12	80	32	9	20	15	18	3.2	12	45	68	248
63	9	50	13.5	40	16	90	40	9	23.5	16	23	3.2	16	50	83	269
80	12	63	15	50	16	110	50	12	22	20.5	23	4.5	16	63	100	302
100	14	71	18	60	20	140	60	14	22	20.5	28	6	20	75	114	320

□ поршня	TD	TF	TR	TT	TM	TZ	U	UB	UF	UW	W	X	XA	XV	ZF	XD
40	15	72	36	22	85	117	35.5	52	90	62	20	38.5	232	151.5	214	229
50	15	90	45	22	95	127	35	60	110	74	25	40	253	168	233	248
63	18	100	50	28	110	148	43.5	70	120	90	25	43.5	274	181.5	254	274
80	25	126	63	34	140	192	42	90	154	110	30	47	307	202	282	302
100	25	150	75	40	162	214	47	110	180	130	35	47	330	220	305	330

Пневмоцилиндр с позиционером IP200

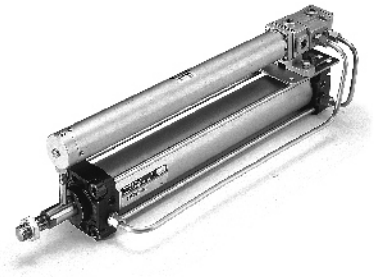
C92P

□40~160

Применение

Позиционер IP 200 позволяет осуществлять пневматическое регулирование хода поршня. Любые положения могут воспроизводиться с высокой точностью, причем ход поршня пропорционален управляющему сигналу (0.02~0.1 МПа). Механизм обратной связи и специальная система регулировки снижают до минимума воздействие внешних сил на положение поршня.

IP 200 применяется преимущественно для дистанционного изменения положения или регулировки запорной арматуры, дозировочных устройств, насосов, приводов и т.д.



- Исполнение позиционера из нержавеющей стали
- Низкотемпературное (-30 ~ 50 °C) и высокотемпературное (-5 ~ 100 °C) исполнения

Технические характеристики

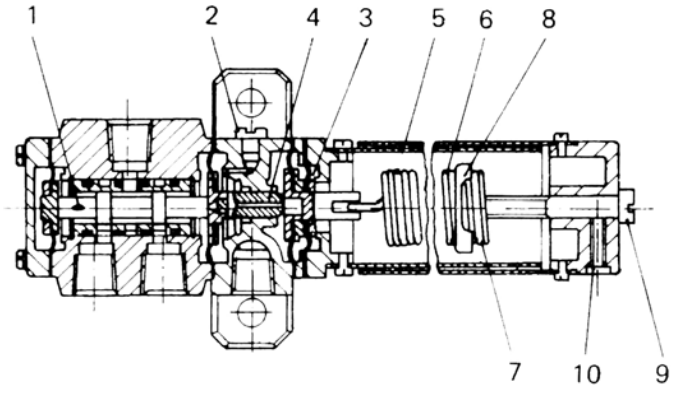
Среда	Очищенный сжатый воздух без масла
Диапазон рабочего давления "SUP" (МПа)	0.3 ~ 0.7
Диапазон сигнальное давления "SIG"	0.02 ~ 0.1
Диапазон рабочих температур (°C)	5 ~ 60
Линейность	± 2% *
Гистерезис	< 1% *
Воспроизводимость	< 1% *
Чувствительность	< 0.5 % (от полного диапазона)
Присоединительная резьба	G1/4
Присоедин. резьба манометра	G1/8
Чувствительность к давлению на входе	< 1 при 0.5 МПа
Расход на собственные нужды	□ 22 л/мин при 0.5 МПа
Диаметр поршня (мм)	40 ~ 160
Ход цилиндра (мм)	25 ~ 300
Стандартные значения длины хода (мм)	50, 100, 160, 200, 250, 300

* от полного хода

Конструкция

Спецификация

Поз.	Наименование
1	Главный распределительный клапан с 2 мембранами
2	Дроссельный винт (устанавливается на заводе-изготовителе)
3	Кольцевая мембранная камера с заслонкой
4	Сопло
5	Направляющая трубка
6	Пружина, рабочие витки
7	Пружина, нерабочие витки
8	Винт настройки диапазона
9	Винт юстировки нулевой точки
10	Стопорный винт



Номер для заказа

C 92 P | D | B | 80 — 100 | _

Исполнение

P	Цилиндр с позиционером

–	Без магнитного кольца
D*	С магнитным кольцом

□ поршня (мм)

40
50
63
80
100
125
160

Ход (мм)

50
100
150
200
250
300

Исполнение поршневого штока

–	С хромированием, стандарт.
W	Сквозной шток
R	Нержавеющий шток
K	Кислотоустойчивый шток
E+..	Удлиненный шток

* Датчики положения D-A54 и крепления датчиков заказываются отдельно (см. Серию C95, стр 432, 433)

Крепежные элементы (заказываются отдельно)

Диаметр поршня		40	50	63	80	100
Одинарная задняя опора	C	**C40**	**C50**	**C63**	**C80**	**C100**
Двойнаяная задняя опора	D	**D 40**	**D 50**	**D 63**	**D80**	**D100**
Фланец	F	**F 40**	**F 50**	**F 63**	**F 80**	**F100**
Лапы	L	**L 40**	**L 50**	**L 63**	**L 80**	**L100**

Вес (кг)

Вес для нулевого хода, кг						
Диаметр поршня (мм)		40	50	63	80	100
Способ крепления	B	2.1	2.25	3.27	4.72	6.29
	L	2.27	2.72	3.57	5.52	7.23
	F/FL	2.5	3.12	4.23	6.56	8.61
	C	2.37	2.92	4.03	6.1	8.6
	D	2.36	2.95	4.05	6.1	8.62
Доп. вес на каждые 50 мм хода		0.17	0.31	0.39	0.55	0.67

Пример:
- Цилиндр пневматический C92PB50-200
- Диаметр поршня 50 мм, ход 200 мм
- Способ крепления L

$$2.72 + 0.31 \times \frac{200}{50} = 3.96 \text{ кг}$$

Время срабатывания

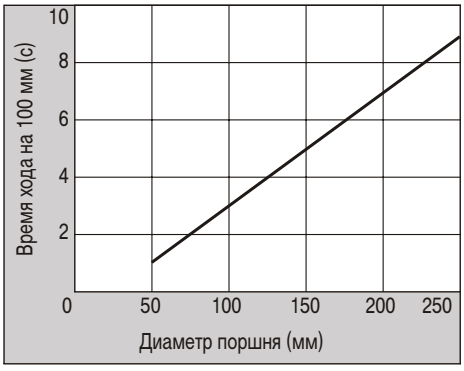
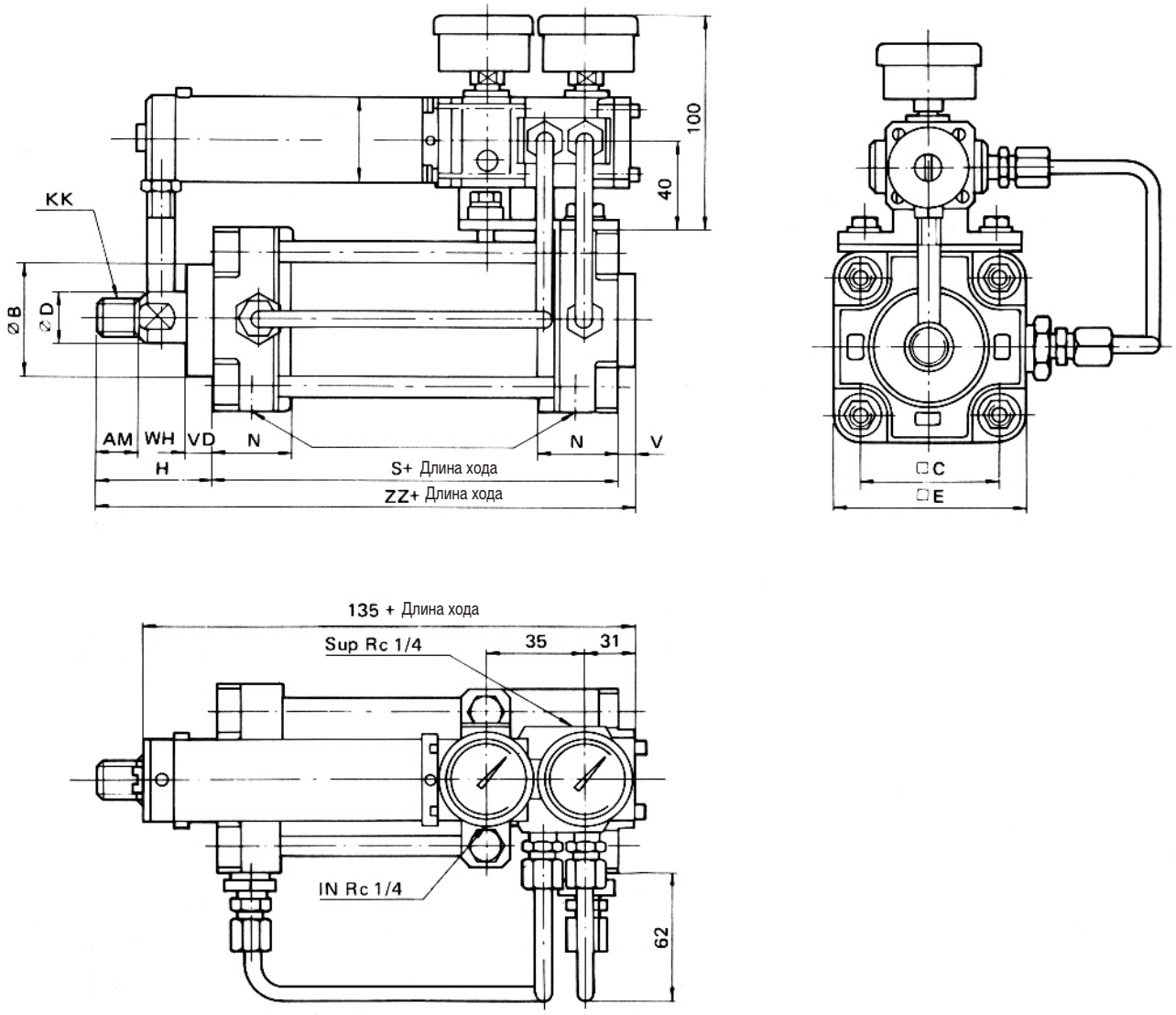


Диаграмма сигнальное давление/ход

Пневмоцилиндр с позиционером IP200
C92P

Размеры

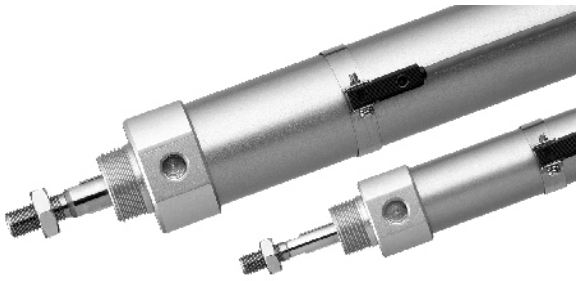


□ поршня	AM	□B	C	□D	E	H	KK	N	S	V	VD	WH	ZZ
40	24	32	44	16	60	64.5	M12x1.25	27	84	5	10	40.5	153.5
50	32	40	52	20	70	77	M16x1.5	30	90	6	10	45	173
63	32	40	64	20	85	80.5	M16x1.5	31	98	6	10	48.5	184.5
80	40	52	78	25	102	92	M20x1.5	37	116	7	14	52	215
100	40	52	92	30	116	97	M20x1.5	40	126	8	14	57	231

REC

□20~40

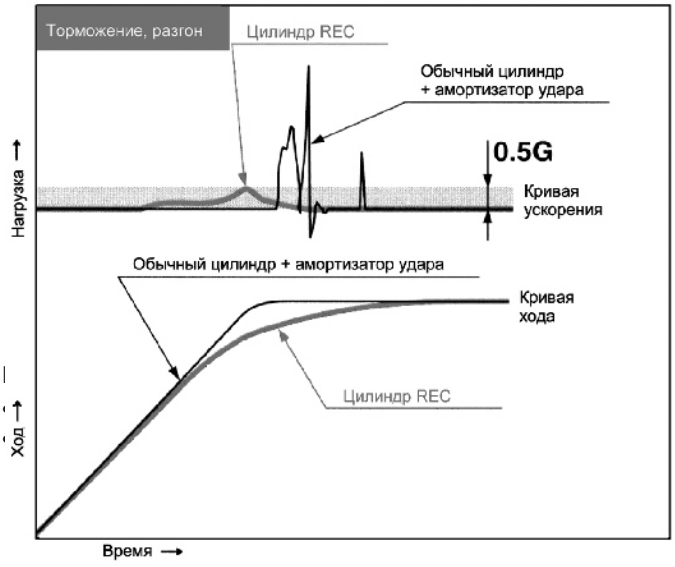
- Плавный разгон и торможение (менее 0,5 G) независимо от нагрузки, скорости и перепадов давления
- Скорость штока до 500 мм/сек
- Стандартный ход поршня до 1000 мм
- Высокая скорость перемещения нагрузки (увеличение в 6 раз в сравнении со специальным низкоскоростным цилиндром) при этом цилиндр обеспечивает плавное движение без толчков
- Конструкция цилиндра упрощает пневмосхему и позволяет сэкономить место при монтаже

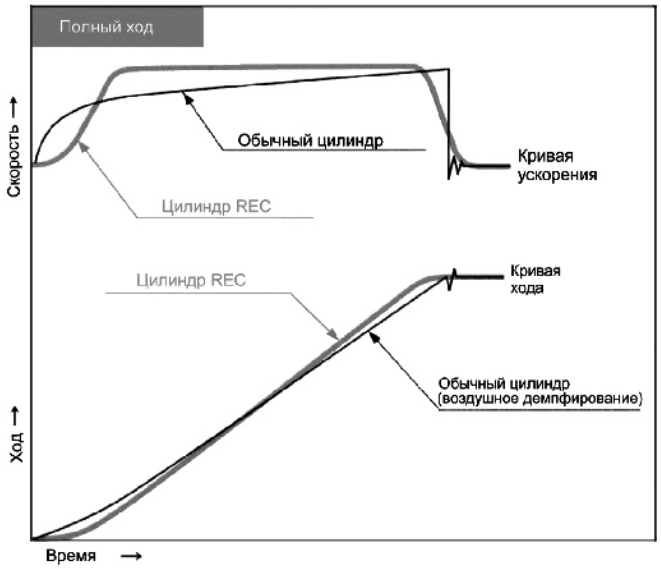


Технические характеристики

Среда	Сжатый воздух
Испытательное давление (МПа)	1.5
Макс. рабочее давление (МПа)	1.0
Мин. рабочее давление (МПа)	0.2
Рабочая температура (°C)	От -10 до +60
Скорость поршня (мм/с)	От 50 до 500
Воздушное демпфирование	есть
Точность резьбы	JIS Класс 2
Допуск по длине хода	+1.4 / 0
Смазка	Не требуется

Графики, отражающие характеристики цилиндра:





Номер для заказа

REC **B** **40** — **200**

Монтаж

B	Базовый/прямой
L	Опорные лапы
F	Передний фланец
G	Задний фланец
C	Простая проушина
D	Двойная проушина
U	Передняя поворотная ось
T	Задняя поворотная ось

□, мм

20
25
32
40

Стандартный ход

Стандартный ход	Макс. возм. ход	Типоразмер
150 – 700	1500	Цилиндры □20, □25
150 – 1000	1500	Цилиндры □32
200 – 1000	1500	Цилиндры □40

Примечание: для заказа цилиндров с нестандартным ходом обращайтесь в SMC

Sine Rodless Cylinder

Series REA
Basic Type/ø25, ø32, ø40, ø50, ø63

How to Order

Basic type **REA** **25** — **300**

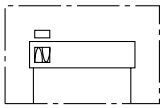
- **REA**: Sine rodless cylinder (basic type)
- **25**: Bore size

25	25mm
32	32mm
40	40mm
50	50mm
63	63mm

- **300**: Stroke (mm) — Refer to the standard stroke table.

Specifications

Fluid	Air
Proof pressure	1.05MPa
Maximum operating pressure	0.7MPa
Minimum operating pressure	0.18MPa
Ambient and fluid temperature	–10 to 60°C (with no freezing)
Piston speed	50 to 300mm/s
Lubrication	Non-lube
Stroke length tolerance	0 to 250st: $^{+1}_{0}$, 251 to 1000st: $^{+1.4}_{0}$, 1001st and up: $^{+1.8}_{0}$



Symbol

Standard Strokes

Bore size (mm)	Standard stroke (mm)	Maximum manufacturable stroke (mm)
25	200, 250, 300, 350, 400, 450, 500, 600, 700, 800	4000
32	200, 250, 300, 350, 400, 450, 500, 600, 700, 800	
40	200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000	5000
50	200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000	6000
63	200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000	

Note 1) Intermediate strokes can be arranged in 1mm increments.
Note 2) Strokes over 2000mm are available as order made. (Refer to -XB11 on page 88)

Magnetic Holding Force

(N)

Bore size (mm)	**25**	**32**	**40**	**50**	**63**
Holding force	363	588	922	1,470	2,260

Weights

(kg)

Bore size (mm)	**25**	**32**	**40**	**50**	**63**
Basic weight	0.71	1.34	2.15	3.4	5.7
Additional weight per 50mm stroke	0.05	0.07	0.08	0.095	0.12

Calculation example: REA32-500
Basic weight 1.34kg
Additional weight 0.07/50mm
Cylinder stroke 500mm
} 1.34 + 0.07 x 500 ÷ 50 = 2.04kg

⚠ Specific Product Precautions

Be sure to read before handling. Refer to pages 92 through 94 for safety instructions and actuator precautions.

Mounting

⚠ Caution

1. Take care to avoid nicks or other damage on the outside surface of the cylinder tube.

This can lead to damage of the scraper and wear ring, which in turn can cause malfunction.

2. Pay attention to the rotation of the external slider.

Rotation should be controlled by connecting it to another shaft (linear guide, etc.).

3. Do not operate with the magnetic coupling out of position.

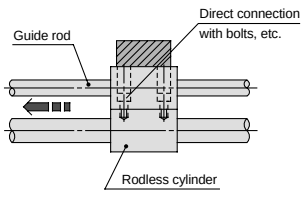
In case the magnetic coupling is out of position, push the external slider back into the correct position by hand at the end of the stroke (or correct the piston slider with air pressure).

4. Be sure that both head covers are secured to the mounting surface before operating the cylinder.

Avoid operation with the external slider secured to the surface.

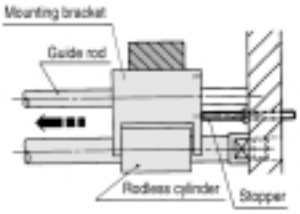
5. Do not apply a lateral load to the external slider.

When a load is mounted directly to the cylinder, variations in the alignment of each shaft center cannot be offset, and this results in the generation of a lateral load that can cause malfunction. The cylinder should be operated using a connection method which allows for shaft alignment variations and deflection due to the cylinder's own weight. A drawing of a recommended mounting is shown in Figure 2.



Variations in the load and cylinder shaft alignment cannot be offset and may result in a malfunction.

Figure 1.
Incorrect mounting



Shaft alignment variations are offset by providing clearance between the mounting bracket and cylinder. Moreover, the mounting bracket is extended above the cylinder shaft center, so that the cylinder is not subjected to moment.

Figure 2.
Recommended mounting

6. Use caution regarding the allowable load weight when operating in a vertical direction.

The allowable load weight when operating in a vertical direction (reference values on page 5 is determined by the model selection method. However, if a load greater than the allowable value is applied, the magnetic coupling may break and there is a possibility of dropping the load. When using this type of application, contact SMC regarding the operating conditions (pressure, load, speed, stroke, frequency, etc.).

Disassembly & Maintenance

⚠ Caution

1. When reattaching the head covers after disassembly, confirm that they are tightened securely.

When disassembling, hold the wrench flats of one head cover with a vise, and remove the other cover using a spanner or adjustable wrench on the wrench flats. When retightening, first coat with Loctite (No. 542 red), and retighten 3 to 5° past the original position prior to removal.

Stroke Adjustment

⚠ Caution

1. This mechanism is not intended for adjustment of the cushion effect (smooth start-up, soft stop). This mechanism is for matching of the cylinder's stroke end position to the mechanical stopper, etc., of a machine. (adjustment range from 0 to -2mm)

2. Before adjustment is performed, shut off the drive air, release any residual pressure and implement measures to prevent dropping of work pieces, etc.

Stroke End Adjustment

(To ensure safety, implement with air shut down.)

⚠ Caution

1. Loosen lock nut A.

2. Insert a wrench into the hexagon socket of the adjustment screw, and turn it to the left or right, matching the cushion ring holder (stroke end) with the position of the external stopper by moving it backward or forward.

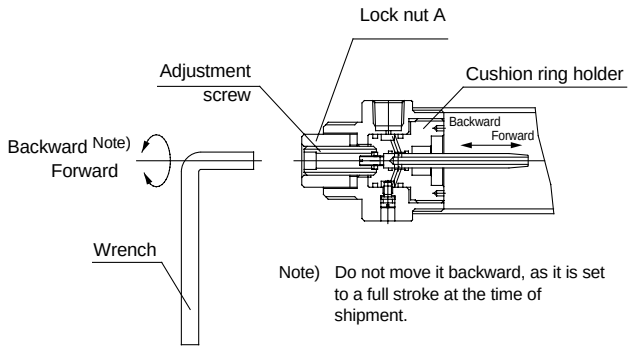
3. After the stroke end adjustment is completed, retighten lock nut A, and apply high strength Loctite No. 262 or another comparable locking agent.

Adjustment screw hexagon socket

Model	Width across flats (mm)
REA25	5
REA32	5
REA40	6
REA50	8
REA63	8

Lock nut A fastening torque

Model	Fastening torque (N·m)
REA25	1.2
REA32	1.2
REA40	2.1
REA50	3.4
REA63	3.4



Note) Do not move it backward, as it is set to a full stroke at the time of shipment.

Series REA
Model Selection 1

Fn: Allowable driving force (N)
Pv: Maximum operating pressure for vertical operation (MPa)
W_{Bmax}: Maximum connection fitting weight (kg)
Wv: Allowable load weight for vertical operation (kg)

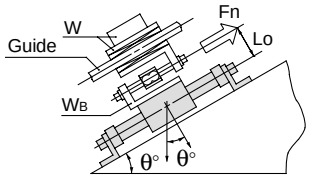
Operating conditions

- **W: Load weight (kg)**
- **W_B: Connection fitting weight (kg)**
- **μ: Guide's coefficient of friction**
- **L_O: Distance from cylinder shaft center to work piece point of application (cm)**
- **Mode of operation (horizontal, inclined, vertical)**
- **P: Operating pressure (MPa)**
- **U: Maximum speed (mm/s)**
- **Stroke (mm)**

Mode of operation

- **Horizontal operation**
- **Inclined operation**
- **Vertical operation**

Review of load weight and operating pressure



Inclined operation

Allowable driving force (Fn) (n = 1, 2, 3)

Horizontal	$F_1 = \mu \times (W + W_B) \times 9.8$
Inclined	$F_2 = (W + W_B) \times 9.8 \times (\mu\cos\theta + \sin\theta)$
Vertical	$F_3 = (W + W_B) \times 9.8 \times (\mu + 1)$

Refer to the allowable driving force table for (Fn) of data A .

First tentative bore size determination

- Horizontal: $\varnothing D \geq 1.6 \times \sqrt{\frac{F_1}{P}}$
- Inclined: $\varnothing D \geq 1.6 \times \sqrt{\frac{F_2}{P}}$
- Vertical: $\varnothing D \geq 1.6 \times \sqrt{\frac{F_3}{P}}$

Determination of allowable load weight & pressure

- **$W + W_B \leq W_V$, $P \leq P_V$**
- **$W + W_B > W_V$, $P > P_V$** (Refer to page 5 for vertical operation.)

(Refer to page 5 for connection fitting weight.)

Determination of connection fitting weight (W_B)

- **$W_B > W_{BMAX}$** — **Review of connection fitting**
- **$W_B \leq W_{Bmax}$** (Refer to page 4 for data A .)

Second tentative determination of bore size using the graph of allowable driving force (Fn) and distance from cylinder shaft center (Lo)

(Refer to page 4 for data B .)

Third tentative determination of bore size using the graph of maximum speed (U) and load weight (W).

Bore size determination (Bore size is the largest of 3 tentative determinations.)

Note 1)

Review of order made products based on operating conditions

(Refer to pages 87 through 91.)

Model determination

Note 1) Depending on the operating environment, etc., order made products should also be reviewed.

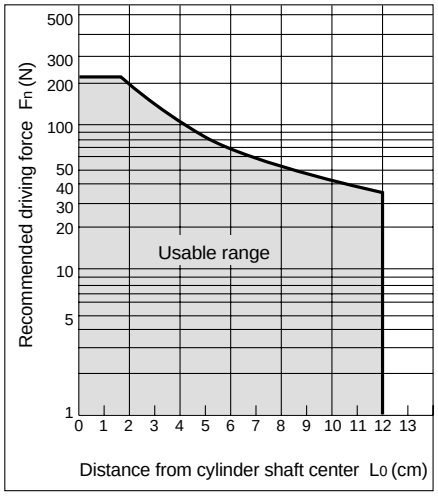
Series REA
Model Selection 2

Design Parameters 1

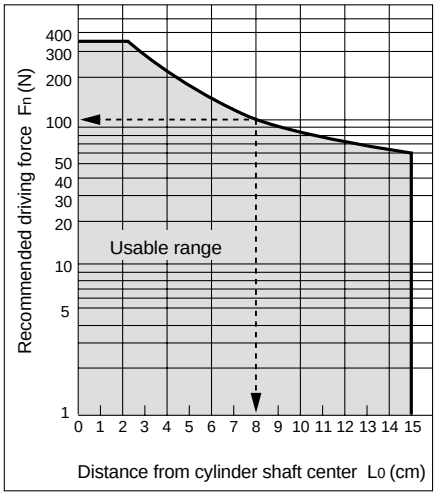
Selection Method

<Data A: Distance from cylinder shaft center ——— Allowable driving capacity>

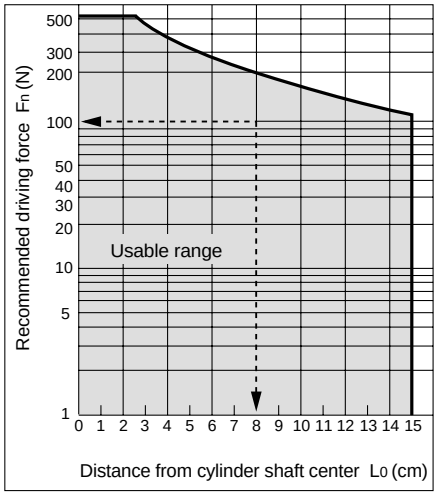
ø25



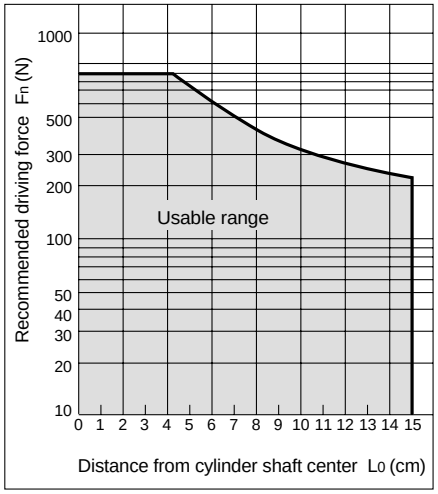
ø32



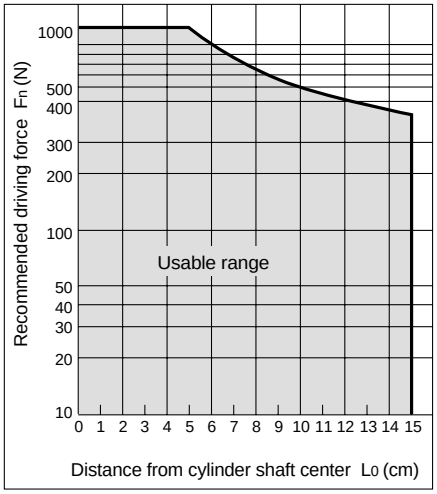
ø40



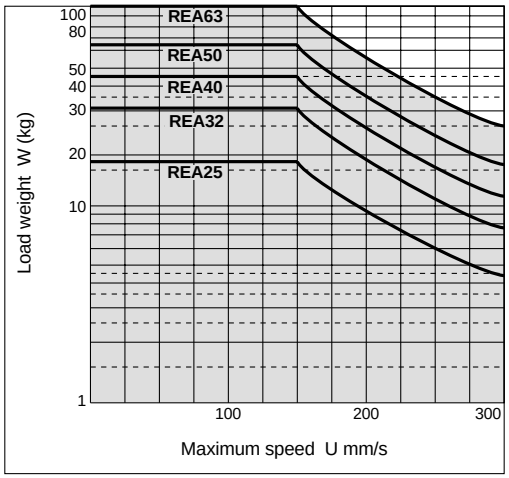
ø50



ø63



<Data B: Maximum speed ——— Load weight chart >

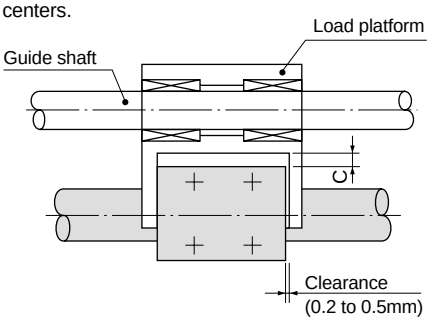


Series REA
Model Selection 3

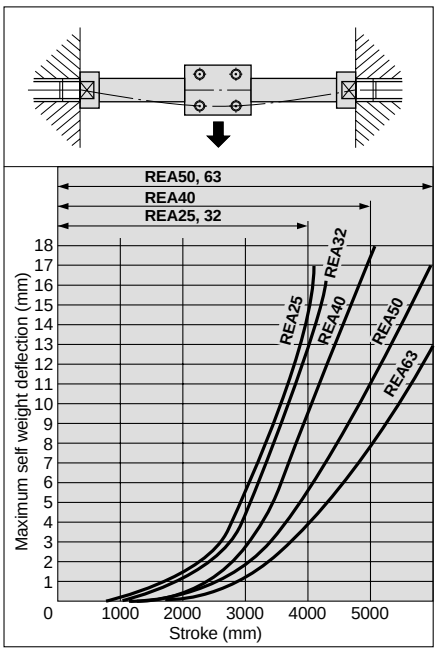
Design Parameters 2

Cylinder Self Weight Deflection

When the cylinder is mounted horizontally, deflection appears due to its own weight as shown in the data, and the longer the stroke the greater the amount of variation in the shaft centers.



∗ The clearance C is determined by considering the cylinder's self weight deflection and the amount of discrepancy with respect to the other shaft.
Normal value: (self weight deflection) +1.5 to 2mm



∗ The above deflection data indicate values for external movement within the stroke.

Max. Connection Fitting Weight

The REA (basic type) is not directly connected to the load, and is guided by another shaft (LM guide, etc.). Load connection fittings should be designed so that they do not exceed the weights given in the table below.

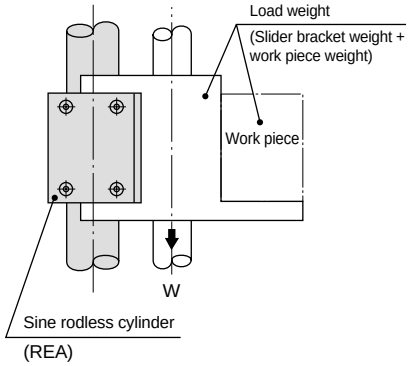
Maximum connection fitting weight W_{Bmax} (kg)

Model	Maximum load (kg)
REA25	1.2
REA32	1.5
REA40	2.0
REA50	2.5
REA63	3.0

∗ Consult with SMC if weights greater than the above will be connected.

Vertical Operation

The load should be guided by a ball type bearing (LM guide, etc.). If a slide bearing is used, sliding resistance increases due to the load weight and load moment, which can cause malfunction.



Model	Allowable load weight Wv (kg)	Maximum operating pressure Pv (MPa)
REA25	18.5	0.65
REA32	30.0	0.65
REA40	47.0	0.65
REA50	75.0	0.65
REA63	115.0	0.65

Note) Use caution, as operation above the maximum operating pressure may result in dislocation of the piston.

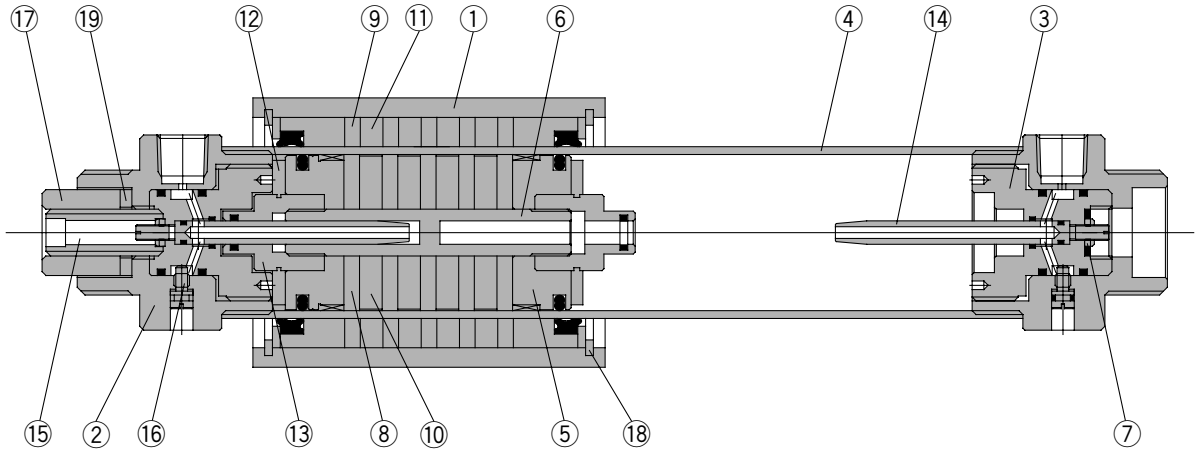
Intermediate Stops

The cushion effect (smooth start-up, soft stop) exists only before the stroke end in the stroke ranges indicated in the table below.
The cushion effect (smooth start-up, soft stop) cannot be obtained in an intermediate stop or a return from an intermediate stop using an external stopper, etc.

Cushion stroke

Model	Stroke (mm)
REA25	30
REA32	30
REA40	35
REA50	40
REA63	40

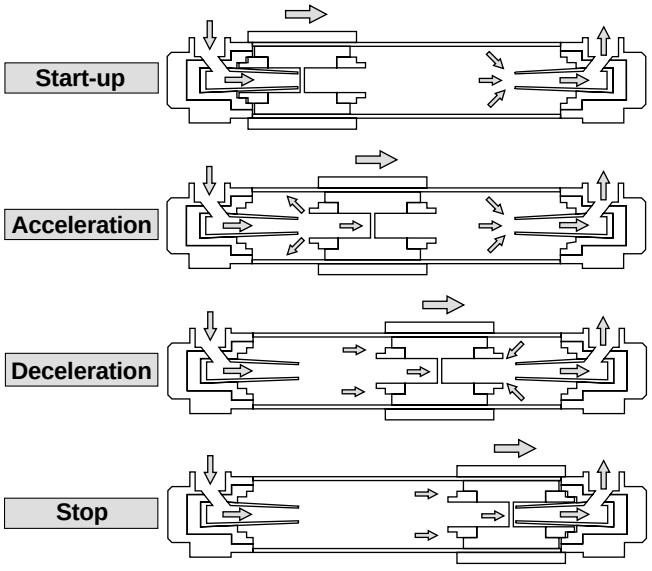
Construction



Parts list

No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Head cover**	Aluminum alloy	Anodized
3	**Cushion ring holder**	Aluminum alloy	Chromated
4	**Cylinder tube**	Stainless steel	
5	**Piston**	Aluminum alloy	Chromated
6	**Shaft**	Stainless steel	
7	**Lock nut B**	Carbon steel	Nickel plated
8	**Piston side yoke**	Rolled steel	Zinc chromated
9	**External slider side yoke**	Rolled steel	Zinc chromated
10	**Magnet A**	Rare earth magnet	

No.	Description	Material	Note
11	**Magnet B**	Rare earth magnet	
12	**Bumper**	Urethane rubber	
13	**Cushion seal holder**	Aluminum alloy	Chromated
14	**Cushion ring**	Brass	Electroless nickel plated
15	**Adjustment screw**	Carbon steel	Nickel plated
16	**Stopper bolt**	Carbon steel	Nickel plated
17	**Lock nut A**	Carbon steel	Nickel plated
18	**Snap ring**	Carbon tool steel	
19	**Spring washer**	Steel wire	



Operating Principle

Start-up/Acceleration

The driving air from the cylinder port passes through the inside of the cushion ring, and flows into the left chamber of the drive piston from the clearance between the cushion seal and the U-shaped groove in the outer surface of the cushion ring. Further, the exhaust air in the right chamber of the drive piston passes from inside the hollow cushion ring through the cylinder port and is released to the atmosphere by the drive solenoid valve.

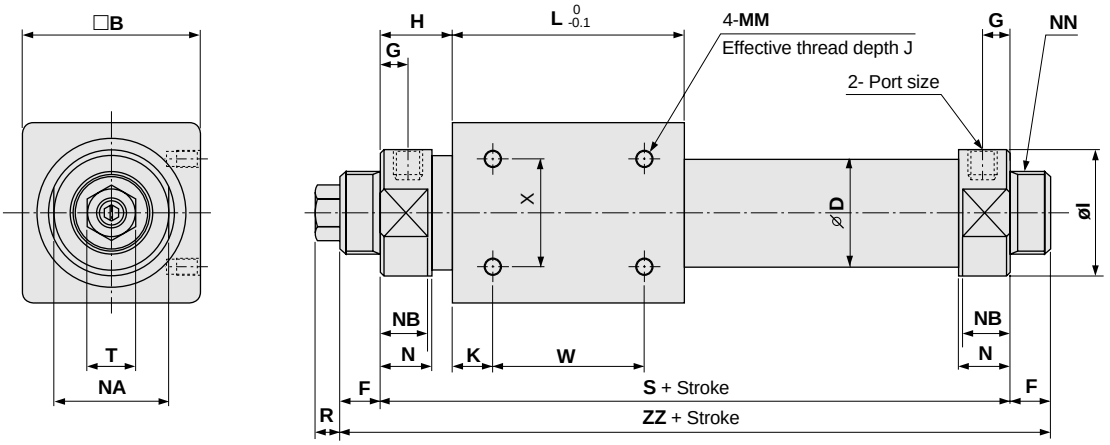
When the differential pressure (thrust) generated on either side of the drive piston becomes larger than the starting resistance of the machinery, the drive piston begins to move to the right. As the drive piston moves to the right, the U-shaped groove in the outer surface of the cushion ring gradually becomes deeper, a flow corresponding to the drive speed of the drive piston flows into the left chamber of the drive piston, and the drive piston proceeds to accelerate. The U-shaped groove is machined into the cushion ring in such a way that this acceleration process can proceed smoothly (as a sine function).

Deceleration/Stop

In conventional cushion mechanisms, when the cushion seal installed on the drive piston is pushed into the cushion ring at the right stroke end, the drive piston's right chamber is pressurized and a sudden braking force is generated. However, in a sine rodless cylinder, due to the U-shaped groove provided on the outer surface of the cushion ring, whose depth changes as a sine function, a large quantity of the air in the cushion chamber is discharged when the cushion seal is pushed in, and a sudden braking force is not generated. With the progression of the cushion stroke, the discharge flow from the cushion chamber is restricted, and therefore, a soft stop is achieved at the stroke end.

Dimensions

REA 25, 32, 40

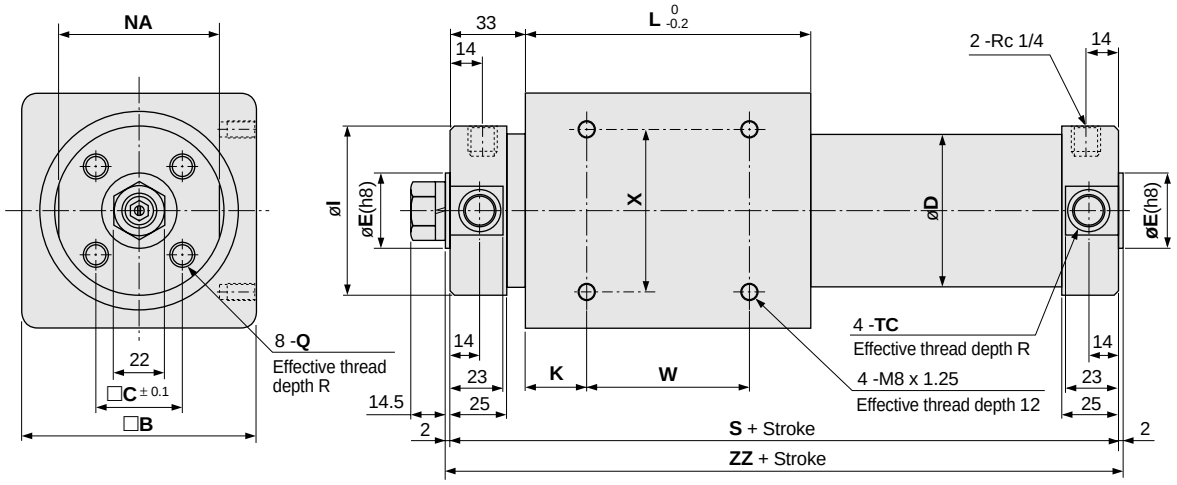


(mm)

Model	Port size	B	D	F	G	H	I	K	L	MM x J	N	NA	NB	NN
REA25	Rc 1/8	46	27.8	13	8	20.5	34	10	70	M5 x 0.8 x 8	15	30	13	M26 x 1.5
REA32	Rc 1/8	60	35	16	9	22	40	15	80	M6 x 1.0 x 8	17	36	15	M26 x 1.5
REA40	Rc 1/4	70	43	16	11	29	50	16	92	M6 x 1.0 x 10	21	46	19	M32 x 2.0

Model	S	W	X	ZZ	R	T
REA25	111	50	30	137	8	17
REA32	124	50	40	156	8	17
REA40	150	60	40	182	10	19

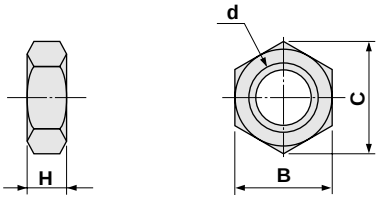
REA 50, 63



(mm)

Model	B	C	D	E(h8)	I	K	L	NA	Q x R	S	TC x R	W	X	ZZ
REA50	86	32	53	$30^{0}_{-0.033}$	58.2	25	110	55	M8 x 1.25 x 16	176	M12 x 1.25 x 7.5	60	60	180
REA63	100	38	66	$32^{0}_{-0.039}$	72.2	26	122	69	M10 x 1.5 x 16	188	M14 x 1.5 x 11.5	70	70	192

Mounting nuts: 2pcs. packaged with each cylinder



(mm)

Part No.	Applicable bore size (mm)	d	H	B	C
SN-032B	**ø25, ø32**	M26 x 1.5	8	32	37
SN-040B	**ø40**	M32 x 2.0	11	41	47.3

Sine Rodless Cylinder

Series REAR
Direct Mount Type
ø10, ø15, ø20, ø25, ø32, ø40

How to Order

REA R 25 — 300 [ ] — Z73 [ ]

Sine rodless cylinder

Direct mount type

Bore size

10	10mm
15	15mm
20	20mm
25	25mm
32	32mm
40	40mm

Standard stroke

Refer to the standard stroke table on page 9.

Switch rails

Nil	With switch rails
N	Without switch rails

Note 1) When equipped with switch rails, magnets for switches are built in.

Note 2) In case of ø15, magnets for switches are built in even when not equipped with switch rails.

Auto switch type

Nil	Without auto switch

Note 1) In case of ø20 with switch rail but without switches, the cylinder configuration is for reed switches.

∗ Refer to the table below for auto switch part numbers.

Number of auto switches

Nil	2 pcs.
S	1 pc.
n	"n" pcs.

Applicable auto switches
For ø10, ø15, ø20

Refer to "Auto Switch Guide" (E274-A) for further details on auto switch units.
Refer to pages 84 and 85 for auto switch circuit diagrams.

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage			Auto switch model	Lead wire length (m) Note 1)			Applicable load	
					DC		AC		0.5 (Nil)	3 (L)	5 (Z)		
Reed switch	—	Grommet	No	2 wire	24V	5, 12V	100V or less	**A90**	●	●	—	IC circuit	Relay, PLC
			Yes			12V	100V	**A93**	●	●	—	—	
				3 wire (NPN equiv.)	—	5V	—	**A96**	●	●	—	IC circuit	—
Solid state switch	—	Grommet	Yes	3 wire (NPN)	24V	12V	—	**F9N**	●	●	—	—	Relay, PLC
				3 wire (PNP)				**F9P**	●	●	—		
				2 wire				**F9B**	●	●	—		

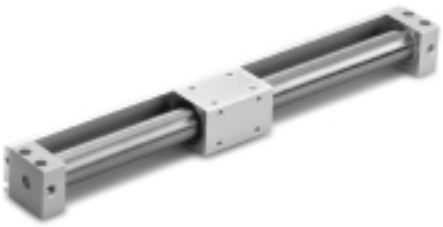
Note 1) Lead wire length symbol 0.5m ..... Nil (Example) F9N
3m ..... L F9NL

For ø25, ø32, ø40

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage			Auto switch model	Lead wire length (m) Note 1)			Applicable load	
					DC		AC		0.5 (Nil)	3 (L)	5 (Z)		
Reed switch	—	Grommet	Yes	3 wire	—	5V	—	**Z76**	●	●	—	IC circuit	—
				2 wire	24V	12V	100V	**Z73**	●	●	●	—	Relay, PLC
			No			5, 12V	100V or less	**Z80**	●	●	—	IC circuit	
Solid state switch	—	Grommet	Yes	3 wire (NPN)	24V	5, 12V	—	**Y59A**	●	●	○	IC circuit	Relay, PLC
				3 wire (PNP)				**Y7P**	●	●	○		
				2 wire		12V		**Y59B**	●	●	○	—	
	Diagnostic indication (2 color indicator)			3 wire (NPN)		5, 12V		**Y7NW**	●	●	○	IC circuit	
				3 wire (PNP)				**Y7PW**	●	●	○		
				2 wire		12V		**Y7BW**	●	●	○	—	

Note 1) Lead wire length symbol 0.5m ..... Nil (Example) Y59A
3m ..... L Y59AL
5m ..... Z Y59AZ

Note 2) Solid state auto switches marked with a "○" are produced upon receipt of order.



Specifications

Fluid	Air
Proof pressure	1.05MPa
Maximum operating pressure	0.7MPa
Minimum operating pressure	0.18MPa
Ambient and fluid temperature	–10 to 60°C
Piston speed	50 to 300mm/s
Lubrication	Non-lube
Stroke length tolerance	0 to 250st: $^{+1.0}_{0}$, 251 to 1000st: $^{+1.4}_{0}$, 1001st and up: $^{+1.8}_{0}$
Mounting	Direct mount type

Standard Strokes

Bore size (mm)	Standard stroke (mm)	Maximum manufacturable stroke (mm)	Maximum stroke with switch (mm)
10	150, 200, 250, 300	500	500
15	150, 200, 250, 300, 350, 400 450, 500	1000	750
20	200, 250, 300, 350, 400, 450 500, 600, 700, 800	1500	1000
25		2000	1500
32			
40	200, 250, 300, 350, 400, 450 500, 600, 700, 800, 900, 1000	2000	1500

Note) Intermediate strokes can be arranged in 1mm increments.

Magnetic Holding Force

(N)

Bore size (mm)	**10**	**15**	**20**	**25**	**32**	**40**
Holding force	53.9	137	231	363	588	922

Weights

(kg)

Item \ Bore size (mm)		**10**	**15**	**20**	**25**	**32**	**40**
Basic weight (for 0st)	**REAR□ (with switch rail)**	0.111	0.277	0.440	0.660	1.27	2.06
	REAR□-□N (without switch rail)	0.080	0.230	0.370	0.580	1.15	1.90
Additional weight per 50mm stroke (when equipped with switch rail)		0.034	0.045	0.071	0.083	0.113	0.133
Additional weight per 50mm stroke (when not equipped with switch rail)		0.014	0.020	0.040	0.050	0.070	0.080

Calculation method/Example: REAR25-500 (with switch rail)
Basic weight ... 0.660kg, Additional weight ... 0.083kg/50mm, Cylinder stroke ... 500mm
0.660 + 0.083 x 500 ÷ 50 = 1.49kg

⚠ Specific Product Precautions

Be sure to read before handling. Refer to pages 92 through 94 for safety instructions and actuator precautions.

Mounting

⚠ Caution

1. Take care to avoid nicks or other damage on the outside surface of the cylinder tube.

This can lead to damage of the scraper and wear ring, which in turn can cause malfunction.

2. Pay attention to the rotation of the external slider.

Rotation should be controlled by connecting it to another shaft (linear guide, etc.).

3. Do not operate with the magnetic coupling out of position.

In case the magnetic coupling is out of position, push the external slider back into the correct position by hand at the end of the stroke (or correct the piston slider with air pressure).

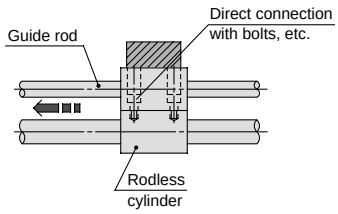
4. The cylinder is mounted with bolts through the mounting holes in the end covers. Be sure they are tightened securely.

5. Be sure that both end covers are secured to the mounting surface before operating the cylinder.

Avoid operation with the external slider secured to the surface.

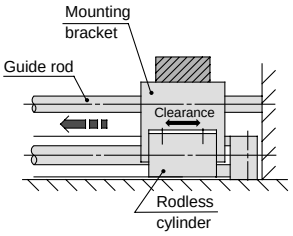
6. Do not apply a lateral load to the external slider.

When a load is mounted directly to the cylinder, variations in the alignment of each shaft center cannot be offset, which results in the generation of a lateral load that can cause malfunction. The cylinder should be operated using a connection method which allows for shaft alignment variations and deflection due to the cylinder's own weight. A drawing of a recommended mounting is shown in Figure 2.



Variations in the load and cylinder shaft alignment cannot be offset and may result in a malfunction.

Figure 1. Incorrect mounting



Shaft alignment variations are offset by providing clearance between the mounting bracket and cylinder. Moreover, the mounting bracket is extended above the cylinder shaft center, so that the cylinder is not subjected to moment.

Figure 2. Recommended mounting

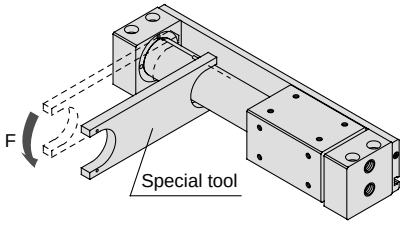
7. Use caution regarding the allowable load weight when operating in a vertical direction.

The allowable load weight when operating in a vertical direction (reference values on page 13) is determined by the model selection method. However, if a load greater than the allowable value is applied, the magnetic coupling may break and there is a possibility of dropping the load. When using this type of application, contact SMC regarding the operating conditions (pressure, load, speed, stroke, frequency, etc.).

Disassembly & Maintenance

⚠ Caution

1. Special tools are necessary for disassembly.



Special tool number list

No.	Applicable bore size (mm)
CYRZ-V	10, 15, 20
CYRZ-W	25, 32, 40

Series REAR
Model Selection 1

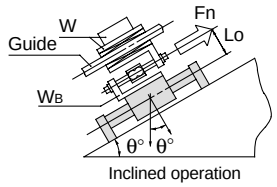
Fn: Allowable driving force (N)
MD: Maximum allowable moment when connection fitting, etc., is directly loaded (N·m)
Pv: Maximum operating pressure for vertical operation (MPa)
WBmax: Maximum load weight when loaded directly on the body (kg)
Wv: Allowable load weight for vertical operation (kg)

Operating conditions

- **W:** Load weight (kg)
- **WB:** Connection fitting weight (kg)
- **μ:** Guide's coefficient of friction
- **L0:** Distance from cylinder shaft center to work piece point of application (cm)
- **L1:** Distance from cylinder shaft center to center of gravity of connection fitting, etc. (mm)
- **Presence of switches**
- **P:** Operating pressure (MPa)
- **U:** Maximum Speed (mm/s)
- **Stroke (mm)**
- **Mode of operation (horizontal, inclined, vertical)**

Mode of operation

Horizontal operation | Inclined operation | Vertical operation



Inclined operation

Allowable driving force (Fn) (n = 1, 2, 3)

Horizontal	$F_1 = \mu \times (W + W_B) \times 9.8$
Inclined	$F_2 = (W + W_B) \times 9.8 \times (\mu\cos\theta + \sin\theta)$
Vertical	$F_3 = (W + W_B) \times 9.8 \times (\mu + 1)$

Refer to the allowable driving force table for (Fn) of data A.

First tentative bore size determination $\varnothing D \geq 1.6 \times \sqrt{\frac{F_1}{P}}$

First tentative bore size determination $\varnothing D \geq 1.6 \times \sqrt{\frac{F_2}{P}}$

First tentative bore size determination $\varnothing D \geq 1.6 \times \sqrt{\frac{F_3}{P}}$

Review of load weight and operating pressure

Determination of allowable load weight & pressure

$W + W_B \leq W_V$, $P \leq P_V$

$W + W_B > W_V$, $P > P_V$

(See page13 for maximum load weight when loaded directly on the body.)

(See page13 for vertical operation.)

Determination of connection fitting weight (W_B)

$W_B > W_{Bmax}$ Review of connection fitting

$W_B \leq W_{Bmax}$

Review of switches and stroke

(See the standard stroke table on p.9.)

Presence of switch rails — Yes — Presence of switches — Yes — Determination of stroke with switches

NG

OK

No

No

(Refer to page 12 for data A.)

Second tentative determination of bore size using the graph of allowable driving force (Fn) and distance from cylinder shaft center (Lo)

Yes

Presence of external guide system

No

Note 2) $W_B \times L_1 > M_D$

(See page 14 for body non-rotating accuracy and maximum allowable moment.)

Determination of rotational moment

$W_B \times L_1 \leq M_D$

(See page 14 for body non-rotating accuracy and maximum allowable moment.)

Note 2) NG

Determination of allowable stroke

OK

(Refer to page 12 for data B.)

Third tentative determination of bore size using the graph of maximum speed (U) and load weight (W).

(Bore size is the largest of 3 tentative determinations.)

Bore size determination

Note 1)

Review of order made products based on operating conditions

(Refer to pages 87 through 91.)

Model determination

Note 1) Depending on the operating environment, etc., order made products should also be reviewed.

Note 2) An external guide system should be used if the specification is exceeded.

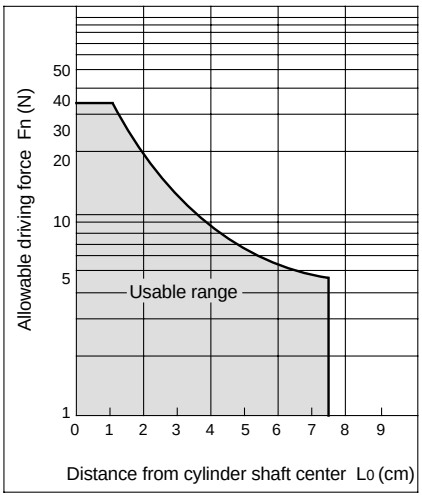
Series REAR
Model Selection 2

Design Parameters 1

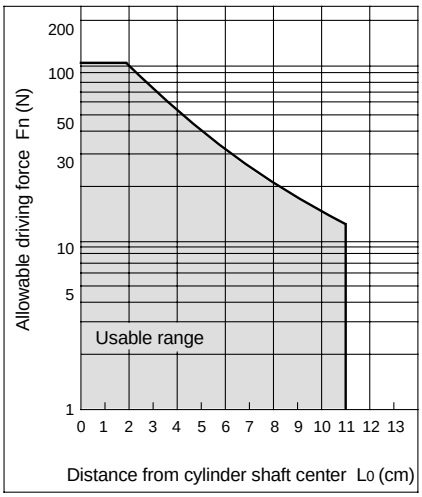
Selection Method

<Data A: Distance from cylinder shaft center ——— Allowable driving capacity>

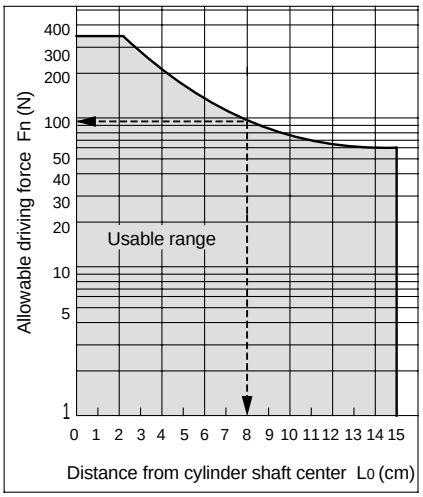
REAR10



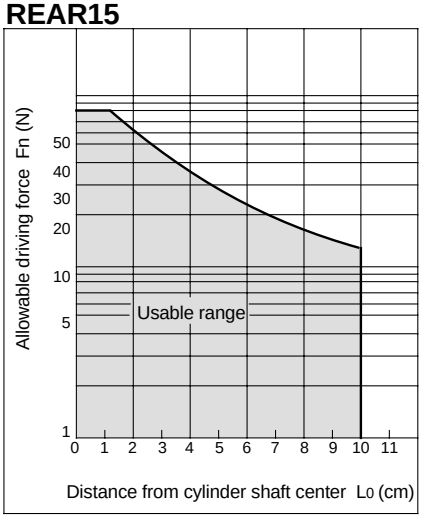
REAR20



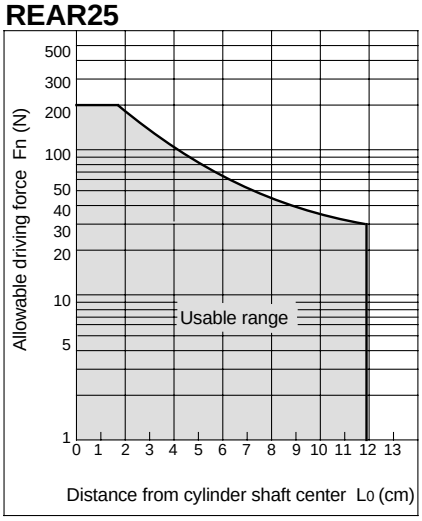
REAR32



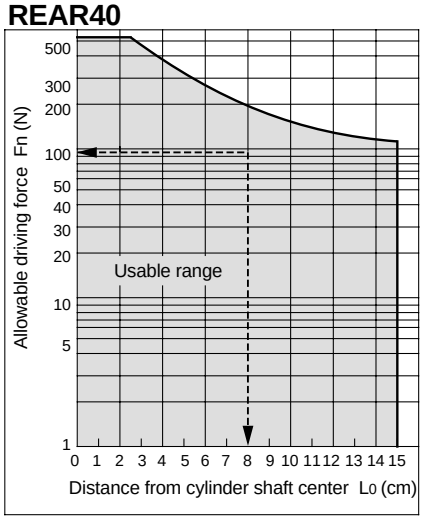
REAR15



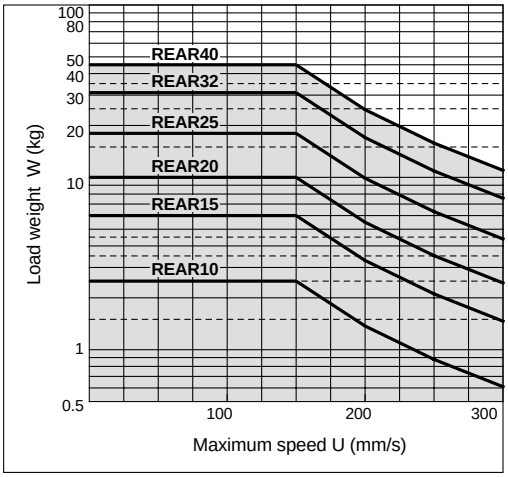
REAR25



REAR40



<Data B: Maximum speed ——— Load weight chart >

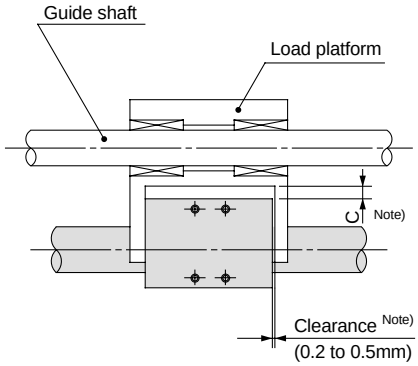


Series REAR
Model Selection 3

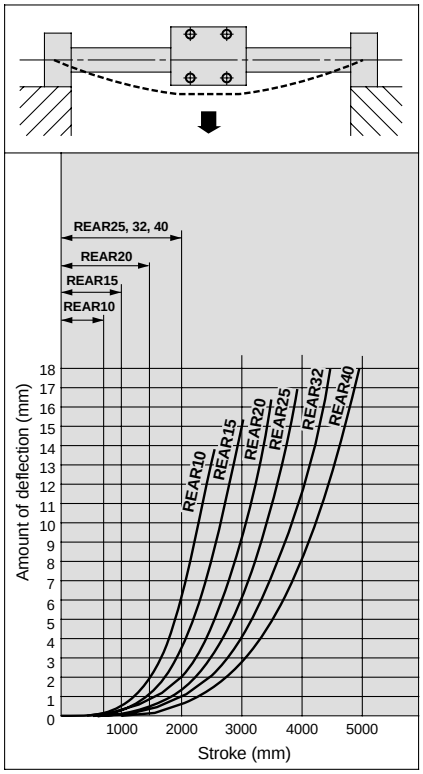
Design Parameters 2

Cylinder Self Weight Deflection

When the cylinder is mounted horizontally, deflection appears due to its own weight as shown in the data, and the longer the stroke, the greater the amount of variation in the shaft centers. Therefore, a connection method should be considered which allows for this variation as shown in the drawing.



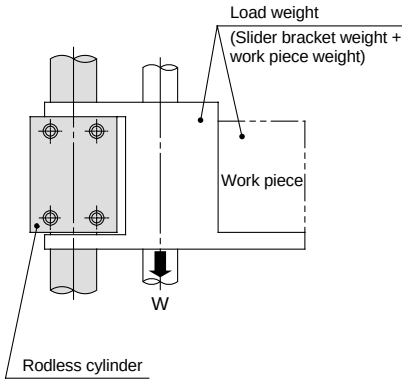
Note) Referring to the self weight deflection in the figure below, provide clearance so that the cylinder is able to operate smoothly through the full stroke within the minimum operating pressure range, without touching the mounting surface or the load, etc.



∗ The above deflection data indicate values when the external slider has moved to the middle of the stroke.

Vertical Operation

The load should be guided by a ball type bearing (LM guide, etc.). If a slide bearing is used, sliding resistance will increase due to the load weight and moment, and this can cause malfunction.



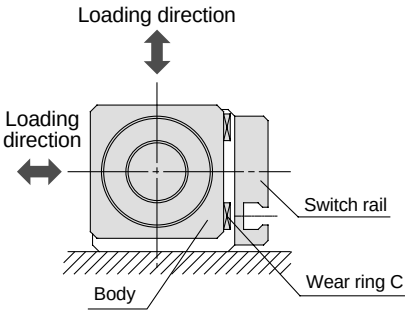
Cylinder bore size (mm)	Model	Allowable load weight Wv (kg)	Max. operating pressure Pv (MPa)
10	**REAR10**	2.7	0.55
15	**REAR15**	7.0	0.65
20	**REAR20**	11.0	0.65
25	**REAR25**	18.5	0.65
32	**REAR32**	30.0	0.65
40	**REAR40**	47.0	0.65

Note) Use caution, as operation above the maximum operating pressure can result in breaking of the magnetic coupling.

Max. Load Weight when Loaded Directly on Body

When the load is applied directly to the body, it should be no greater than the maximum values shown in the table below.

Model	Maximum load weight Wɛmax (kg)
REAR10	0.4
REAR15	1.0
REAR20	1.1
REAR25	1.2
REAR32	1.5
REAR40	2.0



Design Parameters 3

Intermediate Stops

The cushion effect (smooth start-up, soft stop) exists only before the stroke end in the stroke ranges indicated in the table below.
The cushion effect (smooth start-up, soft stop) cannot be obtained in an intermediate stop or a return from an intermediate stop using an external stopper, etc.

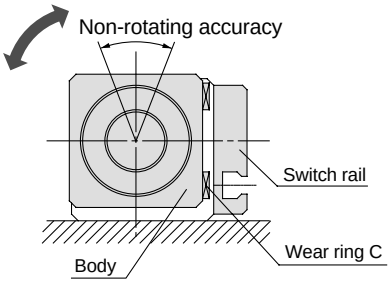
Cushion Stroke

Model	Stroke (mm)
REAR10	20
REAR15	25
REAR20	30
REAR25	30
REAR32	30
REAR40	35

Body Non-rotating Accuracy and Maximum Allowable Moment (with Switch Rail) (Reference Values)

Reference values for non-rotating accuracy and maximum allowable moment at stroke end are indicated below.

Bore size (mm)	Non-rotating accuracy (°)	Max. allowable moment (M_D) (N·m)	Note 2) Allowable stroke (mm)
10	6.0	0.05	100
15	4.5	0.15	200
20	3.7	0.20	300
25	3.7	0.25	300
32	3.1	0.40	400
40	2.8	0.62	400

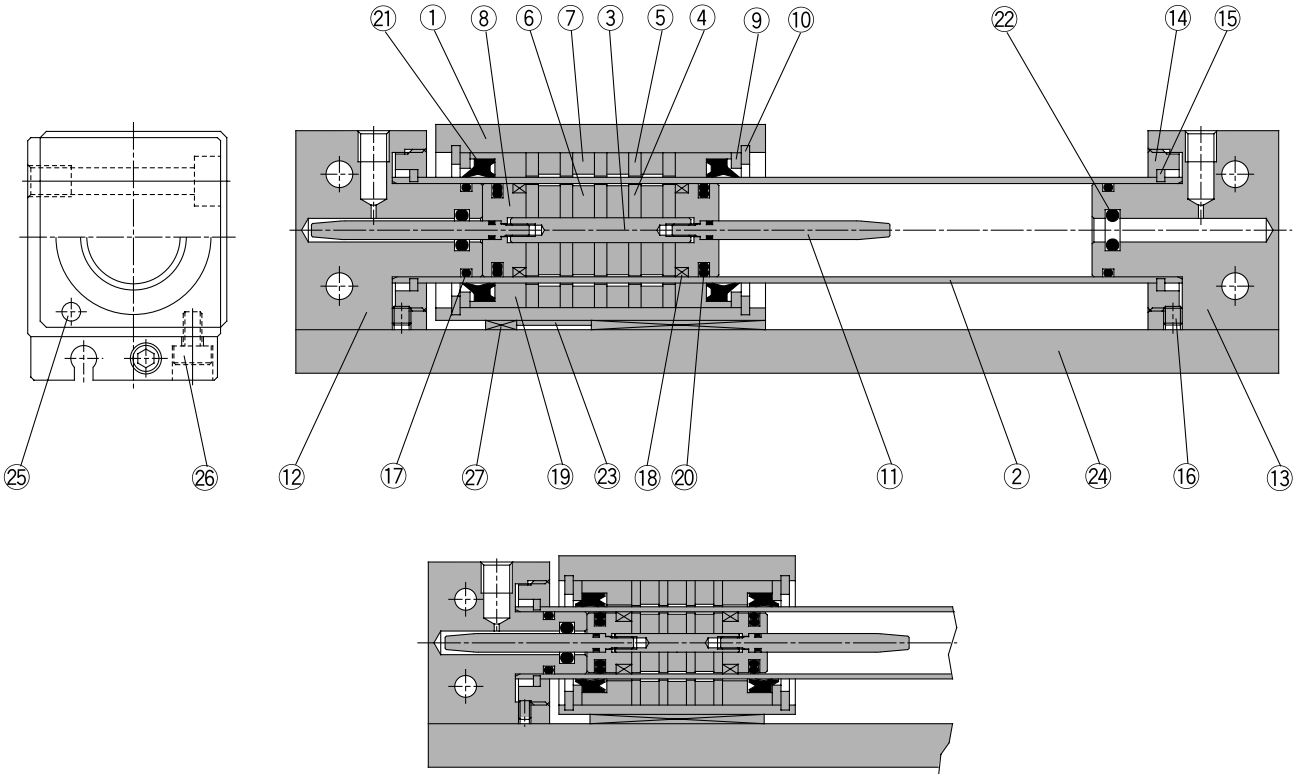


Note 1) Avoid operations where rotational torque (moment) is applied. In such a case, the use of an external guide is recommended.

Note 2) The above reference values will be satisfied within the allowable stroke ranges. However, caution is necessary because as the stroke becomes longer the inclination (rotation angle) within the stroke can be expected to increase.

Note 3) When a load is applied directly to the body, the loaded weight should be no greater than the allowable load weights on page 13.

Construction/ø10, ø15



REAR10

Parts list

No.	Description	Material	Note
1	**Body**	Aluminum alloy	Hard anodized
2	**Cylinder tube**	Stainless steel	
3	**Shaft**	Stainless steel	
4	**Piston side yoke**	Rolled steel plate	Zinc chromated
5	**External slider side yoke**	Rolled steel plate	Zinc chromated
6	**Magnet A**	Rare earth magnet	
7	**Magnet B**	Rare earth magnet	
8	**Piston**	Brass	Electroless nickel plated
9	**Spacer**	Rolled steel plate	Nickel plated
10	**Snap ring**	Carbon tool steel	Nickel plated
11	**Cushion ring**	Stainless steel	
12	**End cover A**	Aluminum alloy	Hard anodized
13	**End cover B**	Aluminum alloy	Hard anodized
14	**Attachment ring**	Aluminum alloy	Hard anodized
15	**C type snap ring for shaft**	Stainless steel	REAR10
		Hard steel wire	Nickel plated (REAR15)
16	**Hexagon socket head set screw**	Chromium steel	Nickel plated
17*	**Cylinder tube gasket**	NBR	

Parts list

No.	Description	Material	Note
18*	**Wear ring A**	Special resin	
19*	**Wear ring B**	Special resin	
20*	**Piston seal**	NBR	
21*	**Scraper**	NBR	
22*	**Cushion seal**	NBR	
23	**Magnetic shielding plate**	Rolled steel plate	Chromated
24	**Switch rail**	Aluminum alloy	Clear anodized
25	**Magnet**	Rare earth magnet	
26	**Hexagon socket head screw**	Chromium steel	Nickel plated
27*	**Wear ring C**	Special resin	

* Seal kits are sets consisting of numbers 17 through 22 above, and can be ordered using the order number for each bore size.

Replacement parts: Seal kits

Bore size (mm)	Order no.	Content
10	**REAR10-PS**	Above numbers 17, 18, 19, 20, 21, 22, 27
15	**REAR15-PS**	

Switch Rail Accessory Kits

CYR 10 E — ☐

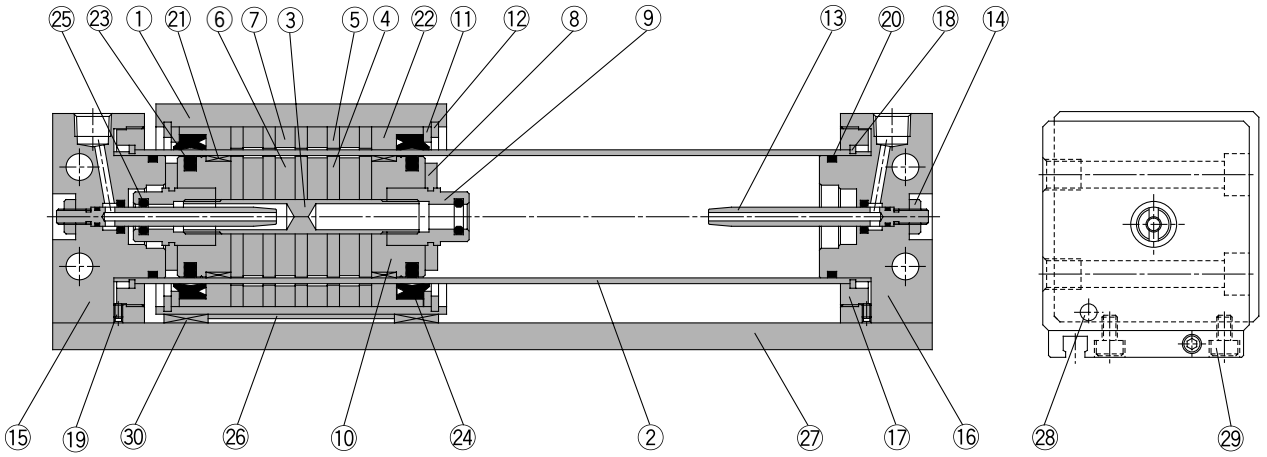
Bore size ● ● Stroke

Switch rail accessory kits

Bore size (mm)	Kit no.	Content
10	**CYR10E-☐**	Above numbers 24, 25, 26, 27
15	**CYR15E-☐**	Above numbers 23, 24, 26, 27 Note 2)

Note 1) ☐ indicates the stroke.
Note 2) ø15 has internal magnets in the body.

Construction/ø20 to ø40



Parts list

No.	Description	Material	Note
1	**Body**	Aluminum alloy	Hard anodized
2	**Cylinder tube**	Stainless steel	
3	**Shaft**	Stainless steel	
4	**Piston side yoke**	Rolled steel plate	Zinc chromated
5	**External slider side yoke**	Rolled steel plate	Zinc chromated
6	**Magnet A**	Rare earth magnet	
7	**Magnet B**	Rare earth magnet	
8	**Bumper**	Urethane rubber	
9	**Cushion seal holder**	Aluminum alloy	Chromated
10	**Piston**	Aluminum alloy	Chromated
11	**Spacer**	Rolled steel plate	Nickel plated
12	**Snap ring**	Carbon tool steel	Nickel plated
13	**Cushion ring**	Brass	Electroless nickel plated (REAR 32, 40)
		Stainless steel	REAR 20, 25
14	**Lock nut B**	Carbon steel	Nickel plated
15	**End cover A**	Aluminum alloy	Hard anodized
16	**End cover B**	Aluminum alloy	Hard anodized
17	**Attachment ring**	Aluminum alloy	Hard anodized
18	**C type snap ring for shaft**	Stainless steel	REAR 25, 32
		Hard steel wire	Nickel plated (REAR 20, 40)
19	**Hexagon socket head set screw**	Chromium steel	Nickel plated
20*	**Cylinder tube gasket**	NBR	

Parts list

No.	Description	Material	Note
21*	**Wear ring A**	Special resin	
22*	**Wear ring B**	Special resin	
23*	**Piston seal**	NBR	
24*	**Scraper**	NBR	
25*	**Cushion seal**	NBR	
26	**Magnetic shielding plate**	Rolled steel plate	Chromated
27	**Switch rail**	Aluminum alloy	Clear anodized
28	**Magnet**	Rare earth magnet	
29	**Hexagon socket head screw**	Chromium steel	Nickel plated
30*	**Wear ring C**	Special resin	

* Seal kits are sets consisting of numbers 20 through 25 and 30 above, and can be ordered using the kit number for each bore size.

Replacement parts: Seal kits

Bore size (mm)	Kit no.	Content
20	**REAR20-PS**	Above numbers 20, 21, 22, 23, 24, 25, 30
25	**REAR25-PS**	
32	**REAR32-PS**	
40	**REAR40-PS**	

Switch Rail Accessory Kits

CYR 20 E — □

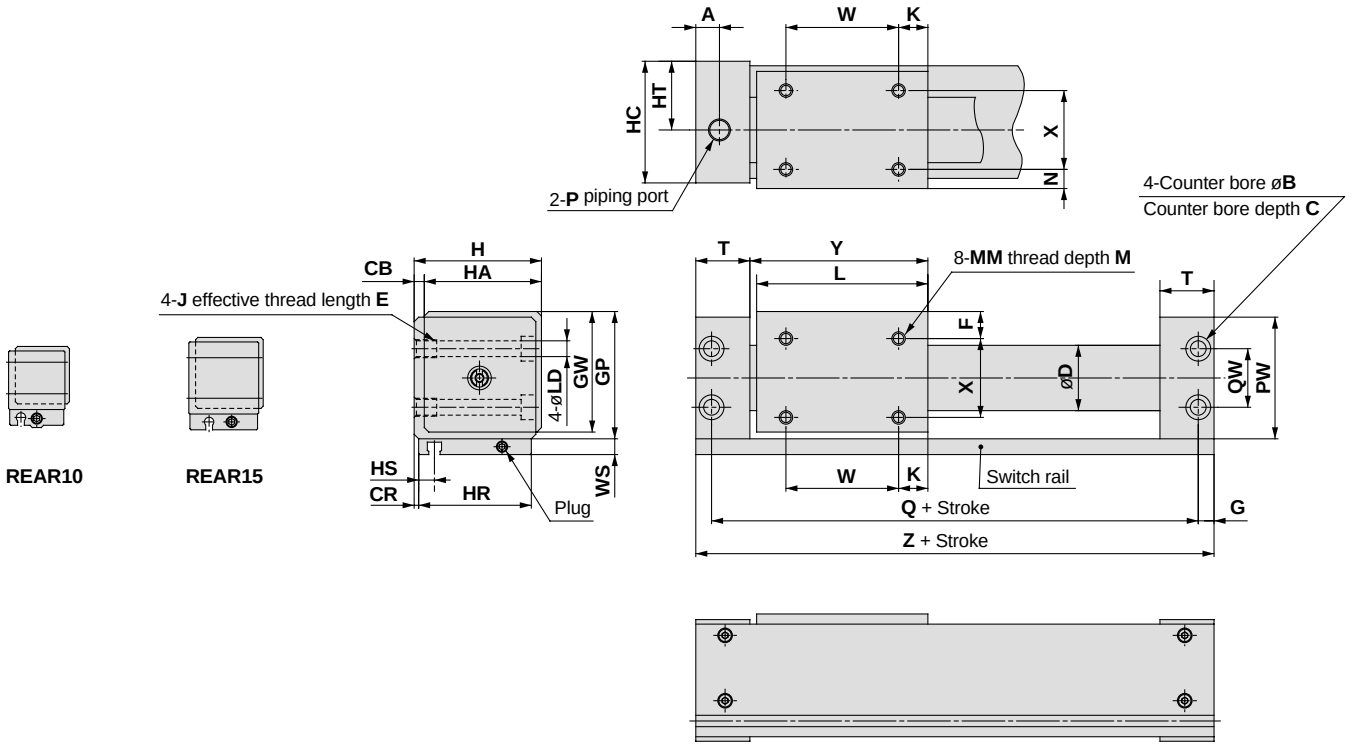
- □ → **Stroke**
- **20** → **Bore size**

Switch rail accessory kits

Bore size (mm)		Kit no.	Content
20	For reed switch	**CYR20E-□**	Above numbers 26, 27, 28, 29, 30
	For solid state	**CYR20EN-□**	
25		**CYR25E-□**	
32		**CYR32E-□**	
40		**CYR40E-□**	

Note 1) □ indicates the stroke.

Dimensions

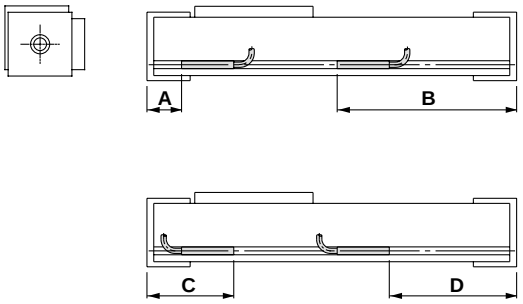


(mm)

Model	A	B	C	CB	CR	D	F	G	GP	GW	H	HA	HC	HR	HS	HT	J x E
REAR10	10.5	6.5	3.2	2	0.5	12	6.5	6	27	25.5	26	24	25	24	5	14	M4 x 0.7 x 6
REAR15	12	8	4.2	2	0.5	17	8	7	33	31.5	32	30	31	30	8.5	17	M5 x 0.8 x 7
REAR20	9	9.5	5.2	3	1	22.8	9	6	39	37.5	39	36	38	36	7.5	21	M6 x 1 x 8
REAR25	8.5	9.5	5.2	3	1	27.8	8.5	6	44	42.5	44	41	43	41	6.5	23.5	M6 x 1 x 8
REAR32	10.5	11	6.5	3	1.5	35	10.5	7	55	53.5	55	52	54	51	7	29	M8 x 1.25 x 10
REAR40	10	11	6.5	5	2	43	13	7	65	63.5	67	62	66	62	8	36	M8 x 1.25 x 10

Model	K	L	LD	M	MM	N	P	PW	Q	QW	T	W	WS	X	Y	Z
REAR10	9	38	3.5	4	M3 x 0.5	4.5	M5 x 0.8	26	68	14	19.5	20	8	15	39.5	80
REAR15	14	53	4.3	5	M4 x 0.7	6	M5 x 0.8	32	84	18	21	25	7	18	54.5	98
REAR20	11	62	5.6	5	M4 x 0.7	7	Rc 1/8	38	95	17	20.5	40	7	22	64	107
REAR25	15	70	5.6	6	M5 x 0.8	6.5	Rc 1/8	43	105	20	21.5	40	7	28	72	117
REAR32	13	76	7	7	M6 x 1	8.5	Rc 1/8	54	116	26	24	50	7	35	79	130
REAR40	15	90	7	8	M6 x 1	11	Rc 1/4	64	134	34	26	60	7	40	93	148

Proper Auto Switch Mounting Position for Stroke End Detection



ø10 to ø20

(mm)

Bore size (mm) \ Auto switch model	A		B		C		D	
	D-A9□	D-F9□	D-A9□	D-F9□	D-A9□	D-F9□	D-A9□	D-F9□
10	28	32	48	44	48	44	28	32
15	17.5	21.5	76.5	72.5	—	—	56.5	60.5
20	19.5	23.5	87.5	83.5	39.5	35.5	67.5	71.5

Note) Auto switches cannot be installed in Area C in the case of ø15.

ø25 to ø40

(mm)

Bore size (mm) \ Auto switch model	A		B		C		D	
	D-Z7□ D-Z8□	D-Y5□ D-Y7□ D-Y7□W	D-Z7□ D-Z8□	D-Y5□ D-Y7□ D-Y7□W	D-Z7□ D-Z8□	D-Y5□ D-Y7□ D-Y7□W	D-Z7□ D-Z8□	D-Y5□ D-Y7□ D-Y7□W
25	18	18	97	99	43	43	74	74
32	21.5	21.5	108.5	108.5	46.5	46.5	83.5	83.5
40	23.5	23.5	124.5	124.5	48.5	48.5	99.5	99.5

Auto Switch Operation Range

(mm)

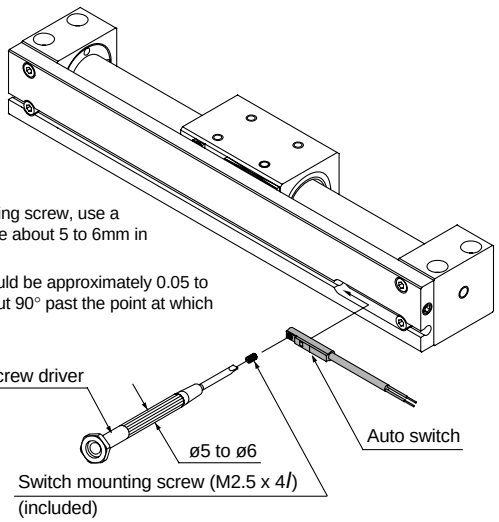
Bore size (mm) \ Auto switch model	D-A9□	D-F9□	D-Z7□ D-Z8□	D-Y5□ D-Y7□ D-Y7□W
10	13	7	–	–
15	8	5	–	–
20	6	4	–	–
25	–	–	9	7
32	–	–	9	6
40	–	–	11	6

Note 1) Switches cannot be mounted in some cases.

Note 2) Operating ranges are standards including hysteresis, and are not guaranteed. Large variations may occur depending on the surrounding environment (variations on the order of ±30%).

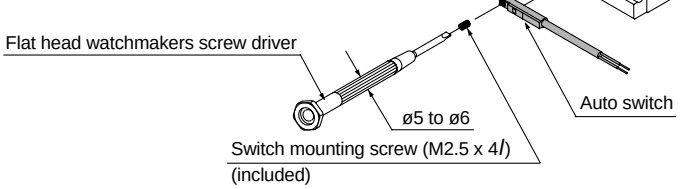
Auto Switch Mounting

When mounting auto switches, they should be inserted into the cylinder's switch groove from the direction shown in the drawing on the right. After setting in the mounting position, use a flat head watchmakers screw driver to tighten the mounting screw which is included.



Note) When tightening the auto switch mounting screw, use a watchmakers screw driver with a handle about 5 to 6mm in diameter.

Furthermore, the tightening torque should be approximately 0.05 to 0.1N·m. As a rule, it can be turned about 90° past the point at which tightening can be felt.



Auto Switch Specifications

(1) Switches (switch rail) can be added to the standard type (without switch rail). Switch rail accessory kits are mentioned on pages 15 and 16 and can be ordered together with auto switches.

(2) Refer to the separate disassembly instructions for switch magnet installation procedures.

Series REAS
Slider Type/Slide Bearing

How to Order

REA S 25 — 300 — A72 □

- **Sine rodless cylinder**
- **Slider type (slide bearing)**
- **Bore size**

10	10mm
15	15mm
20	20mm
25	25mm
32	32mm
40	40mm

- **Standard stroke**
  Refer to the standard stroke table on page 20.
- **Auto switch type**

Nil	Without auto switch

∗ Refer to the table below for applicable auto switch models.
∗ In cases without auto switches, there are switch rails only.

- **Number of auto switches**

Nil	2 pcs.
S	1 pc.
n	"n" pcs.

Applicable auto switches

Refer to "Auto Switch Guide" (E-274-A) for further details on auto switch units.
Refer to pages 84 and 85 for auto switch circuit diagrams.

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage DC		Load voltage AC	Auto switch model: Electrical entry direction: Perpendicular	Auto switch model: Electrical entry direction: In-line	Lead wire length (m) Note 1): 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Applicable load	
Reed switches	—	Grommet	Yes	3 wire (NPN equiv.)	—	5V	—	—	**A76H**	●	●	—	—	IC circuit	—
				2 wire	—	—	200V	**A72**	**A72H**	●	●	—	—	—	Relay, PLC
					24V	12V	100V	**A73**	**A73H**	●	●	●	—		
			No			5V, 12V	100V or less	**A80**	**A80H**	●	●	—	—	IC circuit	
		Connector	Yes			12V		**A73C**	—	●	●	●	●	—	
			No			5V, 12V	24V or less	**A80C**	—	●	●	●	●	IC circuit	
Solid state switches	—	Grommet	Yes	3 wire (NPN)	24V	5V, 12V	—	**F7NV**	**F79**	●	●	○	—	IC circuit	Relay, PLC
				3 wire (PNP)				**F7PV**	**F7P**	●	●	○	—		
				2 wire		12V		**F7BV**	**J79**	●	●	○	—	—	
		Connector						**J79C**	—	●	●	●	●		
	Diagnostic indication (2 color indicator)	Grommet		3 wire (NPN)		5V, 12V		**F7NWV**	**F79W**	●	●	○	—	IC circuit	
				3 wire (PNP)				—	**F7PW**	●	●	○	—		
				2 wire		12V		**F7BWV**	**J79W**	●	●	○	—	—	
	Water resistant (2 color indicator)							—	**F7BA**	—	●	○	—		
	With timer			3 wire (NPN)		5V, 12V		—	**F7NT**	—	●	○	—	IC circuit	
	With diagnostic output (2 color indicator)			4 wire (NPN)				—	**F79F**	●	●	○	—		
	Latch type with diagnostic output (2 color indicator)					—		—	**F7LF** Note 3)	●	●	○	—	—	

Note 1) Lead wire length symbol 0.5m ..... Nil (Example) A80C
3m ..... L (Example) A80CL
5m ..... Z (Example) A80CZ
None ..... N (Example) A80CN

Note 2) Solid state auto switches marked with a "○" are produced upon receipt of order.
Note 3) Type D-F7LF cannot be mounted on bore size ø10.

Specifications

Fluid	Air
Proof pressure	1.05MPa
Maximum operating pressure	0.7MPa
Minimum operating pressure	0.18MPa
Ambient and fluid temperature	–10 to 60°C
Piston speed	50 to 300mm/s
Lubrication	Non-lube
Stroke length tolerance	0 to 250st: $^{+1.0}_{0}$, 251 to 1000st: $^{+1.4}_{0}$, 1001st and up: $^{+1.8}_{0}$

Standard Strokes

Bore size (mm)	Standard stroke (mm)	Maximum manufacturable stroke (mm)
10	150, 200, 250, 300	500
15	150, 200, 250, 300, 350, 400 450, 500	750
20	200, 250, 300, 350, 400, 450 500, 600, 700, 800	1000
25		1500
32		
40	200, 250, 300, 350, 400, 450 500, 600, 700, 800, 900, 1000	1500

Note) Intermediate strokes can be arranged in 1mm increments.

Magnetic Holding Force

(N)

Bore size (mm)	**10**	**15**	**20**	**25**	**32**	**40**
Holding force	53.9	137	231	363	588	922

Weights

(kg)

Bore size (mm)	**10**	**15**	**20**	**25**	**32**	**40**
Basic weight	0.48	0.91	1.48	1.84	3.63	4.02
Additional weight per 50mm stroke	0.074	0.104	0.138	0.172	0.267	0.406

Calculation method/Example: REAS32-500
Basic weight ..... 3.63kg Additional weight ..... 0.267/50mm Cylinder stroke ... 500mm
3.63 + 0.267 x 500 ÷ 50 = 6.3kg

⚠ Specific Product Precautions

Be sure to read before handling. Refer to pages 92 through 94 for safety instructions and actuator precautions.

Operation

⚠ Warning

1. Be aware of the space between the plates and the slide block.

Take sufficient care as fingers and hands, etc., may be injured if caught while the cylinder is in operation.

2. Do not apply a load to a cylinder, which is greater than the allowable value stated in the "model selection pages".

Mounting

⚠ Caution

1. Avoid operation with the external slider fixed to the mounting surface.

The cylinder should be operated with the plates fixed to the mounting surface.

2. Perform mounting so that the external slider will operate through the entire stroke at the minimum operating pressure.

If the mounting surface is not flat, the guides will be warped, increasing the minimum operating pressure and causing premature wear of the bearings. Therefore, mounting should be performed so that the external slider will operate through the entire stroke at the minimum operating pressure. A mounting surface with a high degree of flatness is desirable, but in cases where this is not possible, adjust with shims, etc.

Series REAS
Model Selection 1

Pv: Maximum operating pressure for vertical operation (MPa)
WA: Allowable load weight based on these operating conditions (kg)
Wv: Allowable load weight for vertical operation (kg)
σ: Stroke coefficient

$$\sigma = \frac{\text{Load weight within stroke}}{\text{Max. load weight}}$$

Operating conditions

- W: Load weight (kg)
- U: Maximum speed (mm/s)
- P: Operating pressure (MPa)
- Stroke (mm)
- L0: Distance from slide block mounting surface to work piece center of gravity (cm)
- Mode of operation (horizontal, inclined, vertical)

Mode of operation

Horizontal operation | Inclined operation | Vertical operation

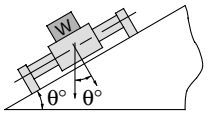
Review of load weight and operating pressure

First tentative bore size determination

Horizontal: $\varnothing D \geq 2.8 \times \sqrt{\frac{W}{P}}$

Inclined: $\varnothing D \geq 5.0 \times \sqrt{\frac{0.3 \times W\cos\theta + W\sin\theta}{P}}$

Vertical: $\varnothing D \geq 5.0 \times \sqrt{\frac{0.3 \times W + W}{P}}$



Inclined operation

Determination of allowable load weight & pressure

W > Wv
P > Pv

(Refer to page 25 for vertical operation.)

W ≤ Wv
P ≤ Pv

(Refer to page 23 for formulas to find σ.)

Calculate stroke coefficient (σ) with stroke and tentatively determined bore size

$$\sigma = \frac{\text{Load weight in stroke}}{\text{Maximum load weight}}$$

Select an example calculation for allowable weight based on cylinder mounting orientation

(Refer to pages 23 and 24.)

Calculate (WA) from the formula for the tentatively determined bore size

W > WA: Review of bore size, stroke and L0

W ≤ WA

(Refer to Data B on page 23.)

Second tentative determination of bore size from graph of maximum speed (U) and load weight (W)

Note 1) Depending on the operating environment, etc., order made products should also be reviewed.

(The larger bore size is selected from two tentative determinations.)

Bore size determination

Note 1)

Review of order made products based on operating conditions

(Refer to pages 87 through 91.)

Model determination

Series REAS
Model Selection 2

Design Parameters 1

How to Find σ when Selecting the Allowable Load Weight

Since the maximum load weight with respect to the cylinder stroke changes as shown in the table below, σ should be considered as a coefficient determined in accordance with each stroke.

Example) for REAS25–650

(1) Maximum load weight = 20kg

(2) Load weight for 650st = 13.6kg

(3) $\sigma = \frac{13.6}{20} = 0.68$ is the result.

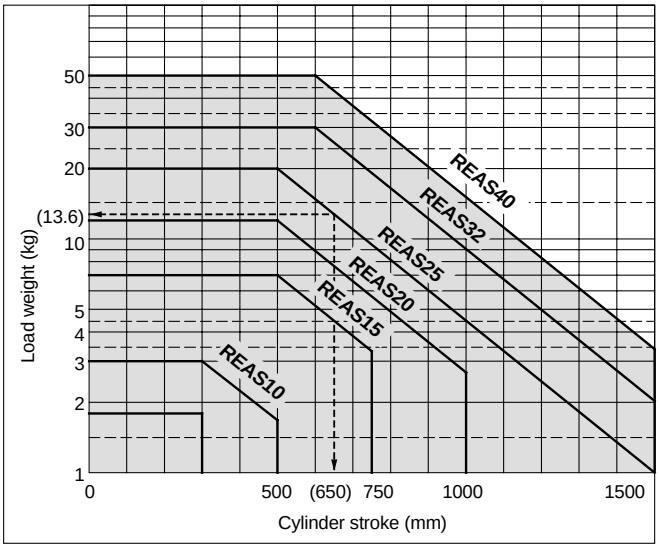
Calculation formula for σ (σ≤1)

ST: Stroke (mm)

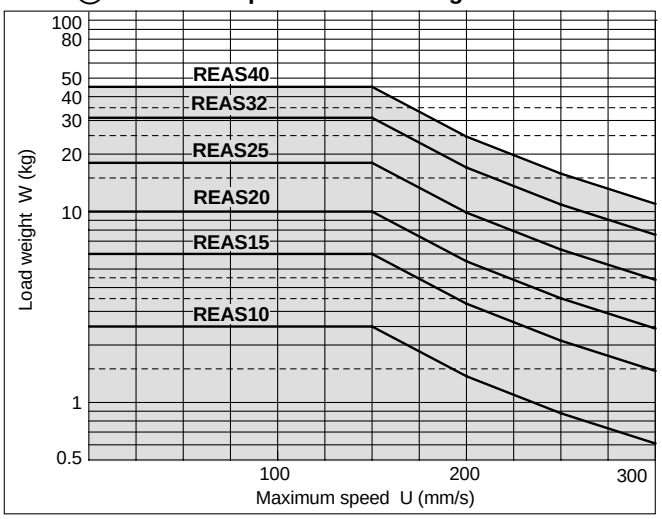
Model	REAS10	REAS15	REAS20
σ=	$\frac{10^{(0.86 - 1.3 \times 10^{-3} \times ST)}}{3}$	$\frac{10^{(1.5 - 1.3 \times 10^{-3} \times ST)}}{7}$	$\frac{10^{(1.71 - 1.3 \times 10^{-3} \times ST)}}{12}$

Model	REAS25	REAS32	REAS40
σ=	$\frac{10^{(1.98 - 1.3 \times 10^{-3} \times ST)}}{20}$	$\frac{10^{(2.26 - 1.3 \times 10^{-3} \times ST)}}{30}$	$\frac{10^{(2.48 - 1.3 \times 10^{-3} \times ST)}}{50}$

Note) Calculate with σ = 1 for all applications up to ø10–300mmST, ø15–500mmST, ø20–500mmST, ø25–500mmST, ø32–600mmST and ø40–600mmST.

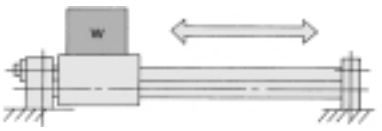


<Data Ⓑ: Maximum speed—— Load weight chart>



Examples of Allowable Load Weight Calculation Based on Cylinder Mounting Orientation

1. Horizontal operation (floor mounting)

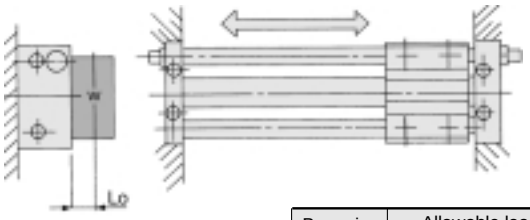


Maximum load weight (center of slide block) (kg)

Bore size (mm)	10	15	20	25	32	40
Max. load weight (kg)	3	7	12	20	30	50
Stroke (max)	to 300st	to 500st	to 500st	to 500st	to 600st	to 600st

The above maximum load weight values will change with the stroke length for each cylinder size, due to limitation from warping of the guide shafts. (Take note of the coefficient σ.) Moreover, depending on the operating direction, the allowable load weight may be different from the maximum load weight.

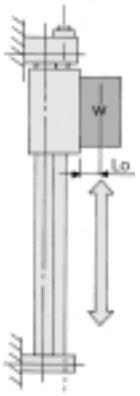
2. Horizontal operation (wall mounting)



Lo: Distance from mounting surface to load center of gravity (cm)

Bore size (mm)	Allowable load weight W_A (kg)
10	$\frac{\sigma \cdot 12.0}{8.4 + 2Lo}$
15	$\frac{\sigma \cdot 36.4}{10.6 + 2Lo}$
20	$\frac{\sigma \cdot 74.4}{12 + 2Lo}$
25	$\frac{\sigma \cdot 140}{13.8 + 2Lo}$
32	$\frac{\sigma \cdot 258}{17 + 2Lo}$
40	$\frac{\sigma \cdot 520}{20.6 + 2Lo}$

3. Vertical operation



Bore size (mm)	Allowable load weight W_A (kg)
10	$\frac{\sigma \cdot 4.16}{2.2 + Lo}$
15	$\frac{\sigma \cdot 13.23}{2.7 + Lo}$
20	$\frac{\sigma \cdot 26.8}{2.9 + Lo}$
25	$\frac{\sigma \cdot 44.0}{3.4 + Lo}$
32	$\frac{\sigma \cdot 88.2}{4.2 + Lo}$
40	$\frac{\sigma \cdot 167.8}{5.1 + Lo}$

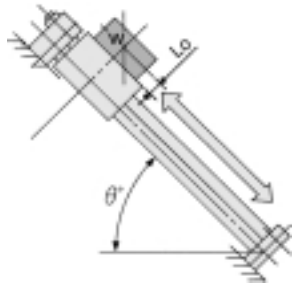
Lo: Distance from mounting surface to load center of gravity (cm)
Note) A safety factor should be considered to prevent dropping.

Model Selection 3

Design Parameters 2

Examples of Allowable Load Weight Calculation Based on Cylinder Mounting Orientation

4. Inclined operation (in operating direction)



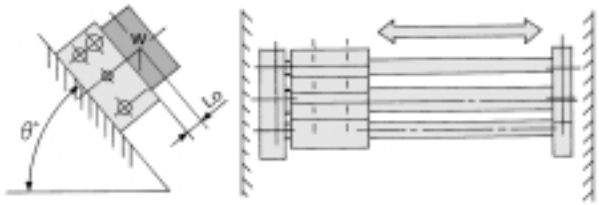
Angle	to 45°	to 60°	to 75°	to 90°
k	1	0.9	0.8	0.7

Angle coefficient (k): k = [to 45° (= θ)] = 1, [to 60°] = 0.9, [to 75°] = 0.8, [to 90°] = 0.7

Bore size (mm)	Allowable load weight W_A (kg)
10	$\frac{\sigma \cdot 10.5 \cdot K}{3.5\cos\theta + 2\,(2.2 + Lo)\sin\theta}$
15	$\frac{\sigma \cdot 35 \cdot K}{5\cos\theta + 2\,(2.7 + Lo)\sin\theta}$
20	$\frac{\sigma \cdot 72 \cdot K}{6\cos\theta + 2\,(2.9 + Lo)\sin\theta}$
25	$\frac{\sigma \cdot 120 \cdot K}{6\cos\theta + 2\,(3.4 + Lo)\sin\theta}$
32	$\frac{\sigma \cdot 210 \cdot K}{7\cos\theta + 2\,(4.2 + Lo)\sin\theta}$
40	$\frac{\sigma \cdot 400 \cdot K}{8\cos\theta + 2\,(5.1 + Lo)\sin\theta}$

Lo: Distance from mounting surface to load center of gravity (cm)

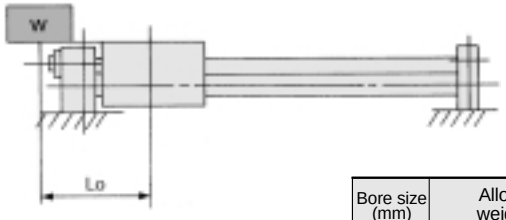
5. Inclined operation (at a right angle to operating direction)



Lo: Distance from mounting surface to load center of gravity (cm)

Bore size (mm)	Allowable load weight W_A (kg)
10	$\frac{\sigma \cdot 12.0}{4 + 2\,(2.2 + Lo)\sin\theta}$
15	$\frac{\sigma \cdot 36.4}{5.2 + 2\,(2.7 + Lo)\sin\theta}$
20	$\frac{\sigma \cdot 74.4}{6.2 + 2\,(2.9 + Lo)\sin\theta}$
25	$\frac{\sigma \cdot 140}{7 + 2\,(3.4 + Lo)\sin\theta}$
32	$\frac{\sigma \cdot 258}{8.6 + 2\,(4.2 + Lo)\sin\theta}$
40	$\frac{\sigma \cdot 520}{10.4 + 2\,(5.1 + Lo)\sin\theta}$

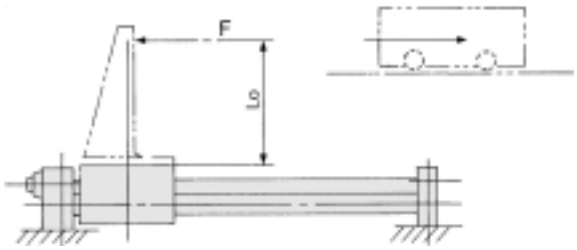
6. Load center offset in operating direction (Lo)



Lo: Distance from slide block center to load center of gravity (cm)

Bore size (mm)	Allowable load weight W_A (kg)
10	$\frac{\sigma \cdot 5.25}{Lo + 3.5}$
15	$\frac{\sigma \cdot 17.5}{Lo + 5.0}$
20	$\frac{\sigma \cdot 36}{Lo + 6.0}$
25	$\frac{\sigma \cdot 60}{Lo + 6.0}$
32	$\frac{\sigma \cdot 105}{Lo + 7.0}$
40	$\frac{\sigma \cdot 200}{Lo + 8.0}$

7. Horizontal operation (pushing load, pusher)

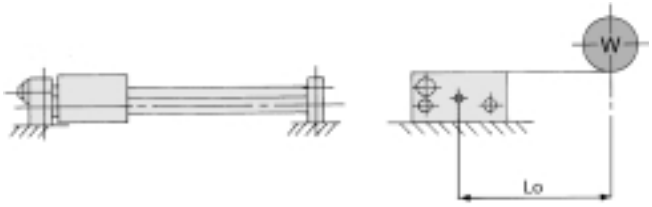


F: Drive (from slide block to position Lo) resistance force (kg)
Lo: Distance from mounting surface to load center of gravity (cm)

Bore size (mm)	10	15	20
Allowable load weight W_A (kg)	$\frac{\sigma \cdot 5.25}{2.2 + Lo}$	$\frac{\sigma \cdot 17.5}{2.7 + Lo}$	$\frac{\sigma \cdot 36}{2.9 + Lo}$

Bore size (mm)	25	32	40
Allowable load weight W_A (kg)	$\frac{\sigma \cdot 60}{3.4 + Lo}$	$\frac{\sigma \cdot 105}{4.2 + Lo}$	$\frac{\sigma \cdot 200}{5.1 + Lo}$

8. Horizontal operation (load, lateral offset Lo)



Lo: Distance from mounting surface to load center of gravity (cm)

Bore size (mm)	10	15	20
Allowable load weight W_A (kg)	$\frac{\sigma \cdot 8.40}{4 + Lo}$	$\frac{\sigma \cdot 25.48}{5.2 + Lo}$	$\frac{\sigma \cdot 52.1}{6.2 + Lo}$

Bore size (mm)	25	32	40
Allowable load weight W_A (kg)	$\frac{\sigma \cdot 98}{7.0 + Lo}$	$\frac{\sigma \cdot 180}{8.6 + Lo}$	$\frac{\sigma \cdot 364}{10.4 + Lo}$

Series REAS
Model Selection 4

Design Parameters 3

Vertical Operation

When operating a load vertically, it should be operated within the allowable load weights and maximum operating pressures shown in the table below.
Use caution, as operating above the prescribed values may lead to dropping of the load.

Bore size (mm)	Model	Allowable load weight Wv (kg)	Max. operating pressure Pv (MPa)
10	**REAS10**	2.7	0.55
15	**REAS15**	7.0	0.65
20	**REAS20**	11.0	0.65
25	**REAS25**	18.5	0.65
32	**REAS32**	30.0	0.65
40	**REAS40**	47.0	0.65

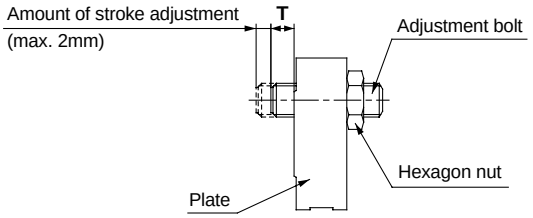
Note) Use caution, as there is a possibility of breaking the magnetic coupling if operated above the maximum operating pressure.

Stroke Adjustment

The adjustment bolt is adjusted to the optimum position for smooth acceleration and deceleration at the time of shipment, and should be operated at the full stroke. When stroke adjustment is necessary, the maximum amount of adjustment on one side is 2mm. (Do not adjust more than 2mm, as it will not be possible to obtain smooth acceleration and deceleration.)

Stroke Adjustment

Loosen the hexagon nut, and after performing the stroke adjustment from the plate side with a hexagon wrench, retighten and secure the hexagon nut.



Adjustment Bolt Position (at Shipment), Hexagon Nut Tightening Torque

Model	T (mm)	Tightening torque (N·m)
REAS10	1	1.67
REAS15	1	
REAS20	1.5	3.14
REAS25	1.5	10.8
REAS32	3	23.5
REAS40	2	

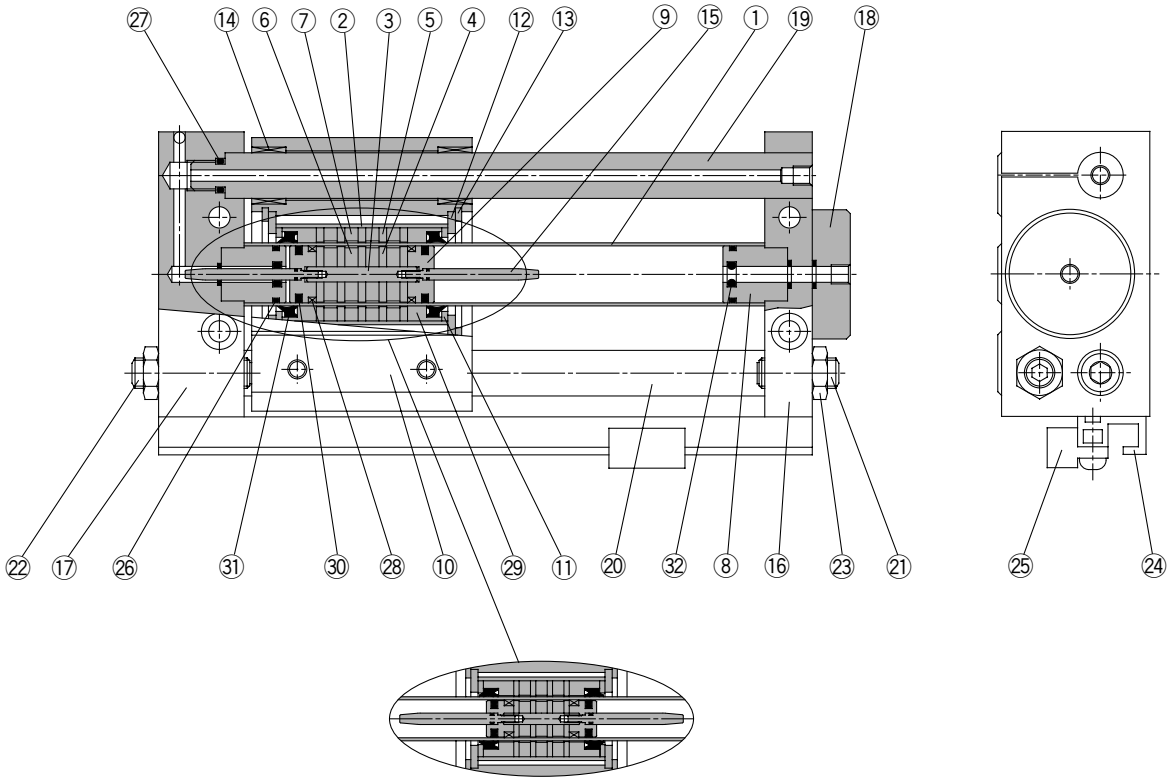
Intermediate Stops

The cushion effect (smooth start-up, soft stop) exists only before the stroke end in the stroke ranges indicated in the table below.
The cushion effect (smooth start-up, soft stop) cannot be obtained in an intermediate stop or a return from an intermediate stop using an external stopper, etc.

Cushion stroke

Model	Stroke (mm)
REAS10	20
REAS15	25
REAS20	30
REAS25	30
REAS32	30
REAS40	35

Construction/ø10, ø15



REAS10

Parts list

No.	Description	Material	Note
1	**Cylinder tube**	Stainless steel	
2	**External slider tube**	Aluminum alloy	
3	**Shaft**	Stainless steel	
4	**Piston side yoke**	Rolled steel plate	Zinc chromated
5	**External slider side yoke**	Rolled steel plate	Zinc chromated
6	**Magnet A**	Rare earth magnet	
7	**Magnet B**	Rare earth magnet	
8	**Cushion seal holder**	Aluminum alloy	Anodized
9	**Piston**	Brass	Electroless nickel plated
10	**Slide block**	Aluminum alloy	Hard anodized
11	**Spacer**	Rolled steel plate	Nickel plated
12	**Slider spacer**	Rolled steel plate	Nickel plated
13	**Snap ring**	Carbon tool steel	Nickel plated
14	**Bushing**	Oil retaining bearing material	
15	**Cushion ring**	Stainless steel	
16	**Plate A**	Aluminum alloy	Hard anodized

Replacement parts: Seal kits

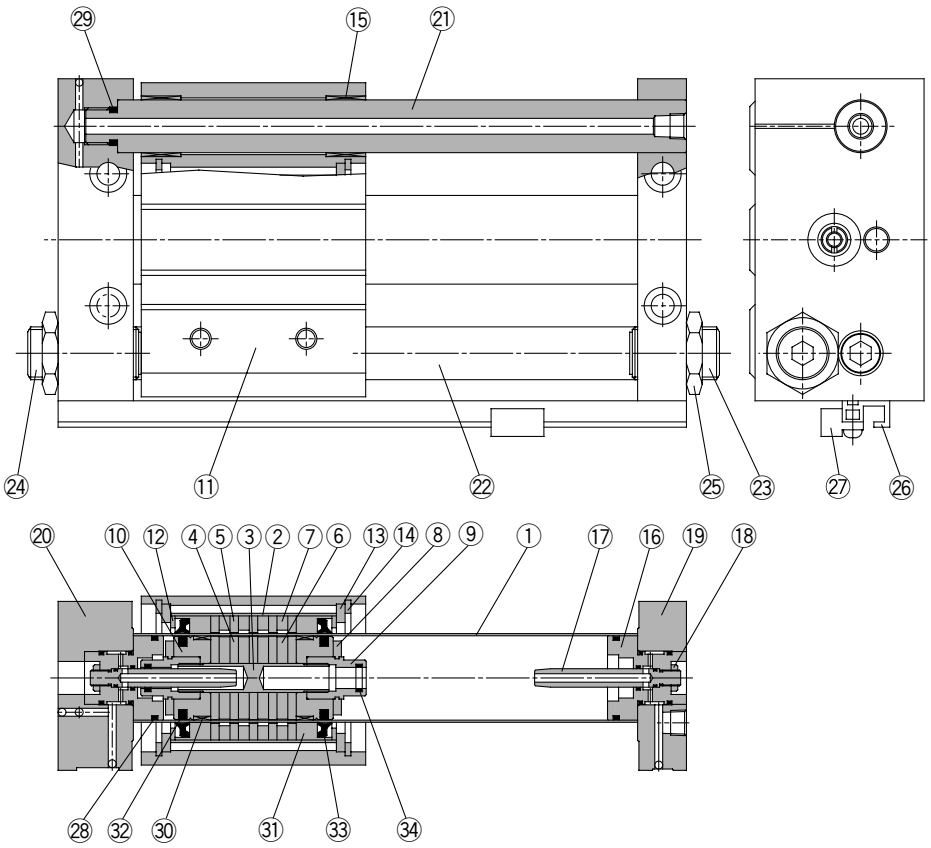
Bore size (mm)	Kit no.	Contents
10	**REAS10-PS**	Above numbers 26, 27, 28, 29, 30, 31, 32
15	**REAS15-PS**	

Parts list

No.	Description	Material	Note
17	**Plate B**	Aluminum alloy	Hard anodized
18	**Port cover**	Aluminum alloy	Hard anodized
19	**Guide shaft A**	Carbon steel	Hard chrome plated
20	**Guide shaft B**	Carbon steel	Hard chrome plated
21	**Adjustment bolt A**	Chromium molybdenum steel	Nickel plated
22	**Adjustment bolt B**	Chromium molybdenum steel	Nickel plated
23	**Hexagon nut**	Carbon steel	Nickel plated
24	**Switch mounting rail**	Aluminum alloy	
25	**Auto switch**	–	
26*	**Cylinder tube gasket**	NBR	
27*	**Guide shaft gasket**	NBR	
28*	**Wear ring A**	Special resin	
29*	**Wear ring B**	Special resin	
30*	**Piston seal**	NBR	
31*	**Scraper**	NBR	
32*	**Cushion seal**	NBR	

* Seal kits are sets consisting of items 26 through 32 above, and can be ordered using the kit number for each bore size.

Construction/ø20 to ø40



Parts list

No.	Description	Material	Note
1	**Cylinder tube**	Stainless steel	
2	**External slider tube**	Aluminum alloy	
3	**Shaft**	Stainless steel	
4	**Piston side yoke**	Rolled steel plate	Zinc chromated
5	**External slider side yoke**	Rolled steel plate	Zinc chromated
6	**Magnet A**	Rare earth magnet	
7	**Magnet B**	Rare earth magnet	
8	**Bumper**	Urethane rubber	
9	**Cushion seal holder**	Aluminum alloy	Chromated
10	**Piston**	Aluminum alloy	Chromated
11	**Slide block**	Aluminum alloy	Hard anodized
12	**Spacer**	Rolled steel plate	Nickel plated
13	**Slider spacer**	Rolled steel plate	Nickel plated
14	**Snap ring**	Carbon tool steel	Nickel plated
15	**Bushing**	Oil retaining bearing material	
16	**Cushion ring holder**	Aluminum alloy	Anodized
17	**Cushion ring**	Brass	Electroless nickel plated (REAS32, 40)
		Stainless steel	REAS20, 25

Parts list

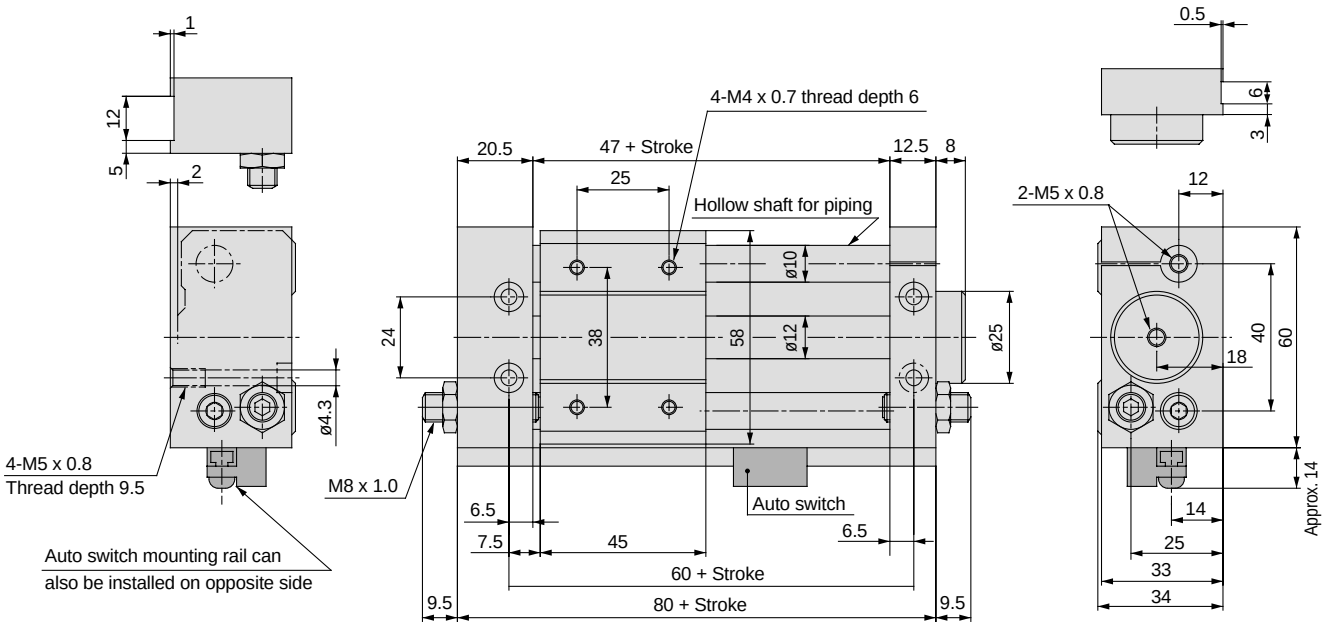
No.	Description	Material	Note
18	**Lock nut B**	Carbon steel	Nickel plated
19	**Plate A**	Aluminum alloy	Hard anodized
20	**Plate B**	Aluminum alloy	Hard anodized
21	**Guide shaft A**	Carbon steel	Hard chrome plated
22	**Guide shaft B**	Carbon steel	Hard chrome plated
23	**Adjustment bolt A**	Chromium molybdenum steel	Nickel plated
24	**Adjustment bolt B**	Chromium molybdenum steel	Nickel plated
25	**Hexagon nut**	Carbon steel	Nickel plated
26	**Switch mounting rail**	Aluminum alloy	
27	**Auto switch**	–	When equipped with auto switch
28*	**Cylinder tube gasket**	NBR	
29*	**Guide shaft gasket**	NBR	
30*	**Wear ring A**	Special resin	
31*	**Wear ring B**	Special resin	
32*	**Piston seal**	NBR	
33*	**Scraper**	NBR	
34*	**Cushion seal**	NBR	

* Seal kits are sets consisting of items 28 through 34 above, and can be ordered using the kit number for each bore size.

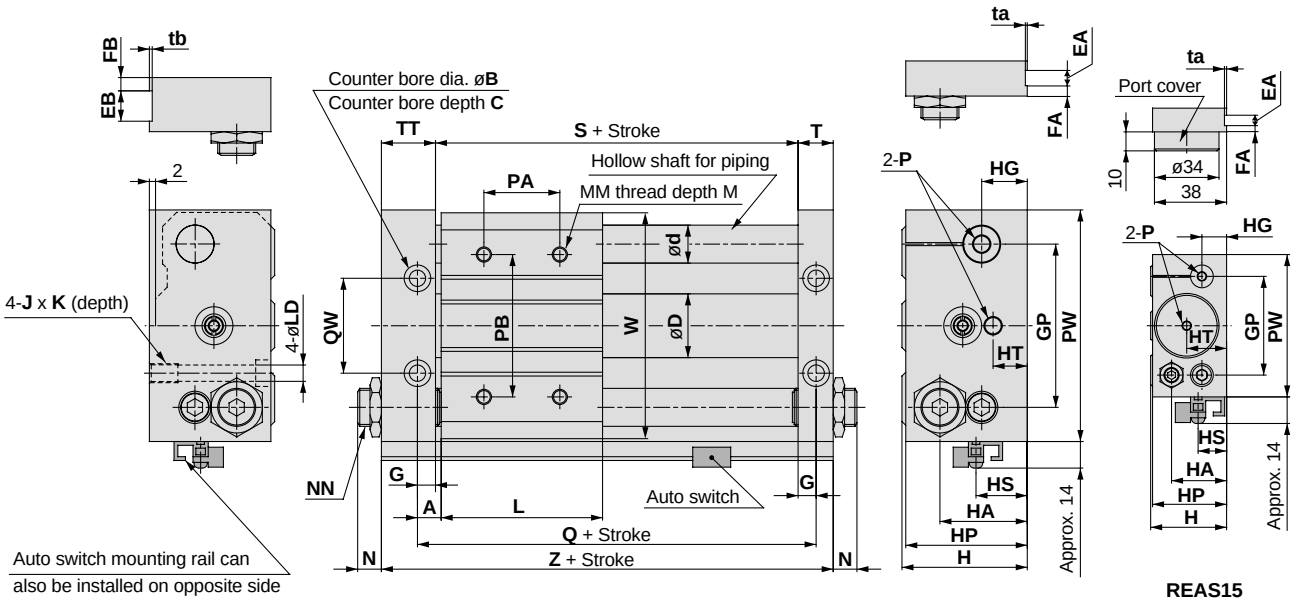
Replacement parts: Seal kits

Bore size (mm)	Kit no.	Contents
20	**REAS20-PS**	Above numbers 28, 29, 30, 31, 32, 33, 34
25	**REAS25-PS**	
32	**REAS32-PS**	
40	**REAS40-PS**	

Dimensions/ø10



Dimensions/ø15 to ø40



(mm)

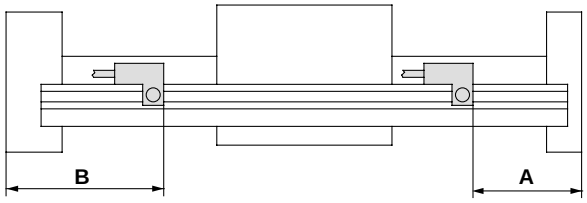
Model	A	B	C	D	d	EA	EB	FA	FB	G	GP	H	HA	HG
REAS15	7.5	9.5	5	16.6	12	6	13	3	6	6.5	52	40	29	13
REAS20	10	9.5	5	21.6	16	–	–	–	–	8.5	62	46	36	17
REAS25	10	11	6.5	26.4	16	8	14	4	7	8.5	70	54	40	20
REAS32	12.5	14	8	33.6	20	8	16	5	7	9.5	86	66	46	24
REAS40	12.5	14	8	41.6	25	10	20	5	10	10.5	104	76	57	25

Model	HP	HS	HT	J x K	L	LD	M	MM	N	NN
REAS15	39	15	21	M6 x 1.0 x 9.5	60	5.6	8	M5 x 0.8	7.5	M8 x 1.0
REAS20	45	25.5	10	M6 x 1.0 x 9.5	70	5.6	10	M6 x 1.0	9.5	M10 x 1.0
REAS25	53	23	10	M8 x 1.25 x 10	70	7	10	M6 x 1.0	11	M14 x 1.5
REAS32	64	27	17	M10 x 1.5 x 15	85	8.7	12	M8 x 1.25	11.5	M20 x 1.5
REAS40	74	31	14	M10 x 1.5 x 15	95	8.7	12	M8 x 1.25	10.5	M20 x 1.5

Model	P	PA*	PB	PW	Q	QW	S	T	TT	ta	tb	W	Z
REAS15	M5 x 0.8	30	50	75	75	30	62	12.5	22.5	0.5	1	72	97
REAS20	Rc 1/8	40	70	90	90	38	73	16.5	25.5	–	–	87	115
REAS25	Rc 1/8	40	70	100	90	42	73	16.5	25.5	0.5	1	97	115
REAS32	Rc 1/8	40	75	122	110	50	91	18.5	28.5	0.5	1	119	138
REAS40	Rc 1/4	65	105	145	120	64	99	20.5	35.5	1	1	142	155

* PA dimensions are for split from center.

Proper Auto Switch Mounting Position for Stroke End Detection



(mm)

Auto switch model / Bore size (mm)	Dimension A				Dimension B			
	D-A73/A80	D-A72 D-A7□H/A80H D-A73C/A80C D-F7□/J79 D-J79C D-F7□V	D-F7□W/J79W D-F7□WV D-F7LF Note 1) D-F79F D-F7BAL	D-F7NTL	D-A73/A80	D-A72 D-A7□H/A80H D-A73C/A80C D-F7□/J79 D-J79C D-F7□V	D-F7□W/J79W D-F7□WV D-F7LF Note 1) D-F79F D-F7BAL	D-F7NTL
10	35	35.5	39.5	40.5	45	44.5	40.5	39.5
15	34.5	35	39	40	62.5	62	58	57
20	64	64.5	68.5	69.5	50	49.5	45.5	44.5
25	44	44.5	48.5	49.5	71	70.5	66.5	65.5
32	55	55.5	59.5	59.5	83	82.5	78.5	77.5
40	61	61.5	65.5	65.5	94	93.5	89.5	88.5

Note1) Model D-F7LF cannot be mounted on bore size ø10.

Auto Switch Operating Range

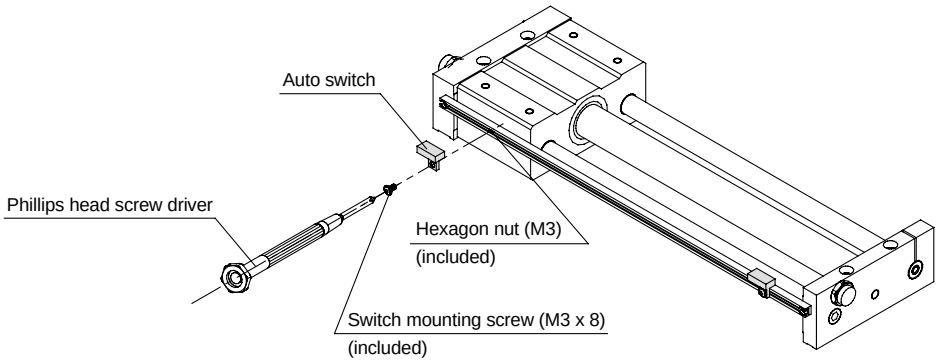
(mm)

Auto switch model / Bore size (mm)	D-A7□/A80 D-A7□H/A80H D-A73C/A80C	D-F7□/J79 D-J79C D-F7□V D-F7NTL D-F7□W/J79W D-F7□WV D-F7BAL	D-F7LF D-F79F
10	6	3	4.5
15	6	4	4.5
20	6	3	4.5
25	6	3	4.5
32	6	3	4.5
40	6	3.5	4.5

Note) Operating ranges are standards including hysteresis, and are not guaranteed. Large variations may occur depending on the surrounding environment. (variations on the order of ±30%)

Auto Switch Mounting

When mounting an auto switch, the switch mounting screw should be screwed into a hexagon nut (M3 x 0.5) which has been inserted into the groove of the switch rail. (The tightening torque should be about 0.05 to 0.1N·m.)



Series REAL
Slider Type/Ball Bushing

How to Order

REA L 25 — 300 — A72 □

- **REA**: Sine rodless cylinder
- **L**: Slider type (ball bushing)
- **25**: Bore size

10	10mm	**25**	25mm
15	15mm	**32**	32mm
20	20mm	**40**	40mm

- **300**: Standard stroke
  Refer to the standard stroke table on page 32.
- **A72**: Auto switch type

Nil	Without auto switch

Note 1) Refer to the table below for applicable auto switch models.
Note 2) In cases without auto switches, there are switch rails only.

- **□**: Number of auto switches

Nil	2 pcs.
S	1 pc.
n	"n" pcs.

Applicable auto switches / Refer to "Auto Switch Guide" (E-274-A) for further details on auto switch units. Refer to pages 84 and 85 for auto switch circuit diagrams.

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage DC	Load voltage AC	Auto switch model: Electrical entry direction Perpendicular	Auto switch model: Electrical entry direction In-line	Lead wire length (m) Note 1) 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Applicable load	
Reed switches	—	Grommet	Yes	3 wire (NPN equiv.)	—	5V	—	—	**A76H**	●	●	—	—	IC circuit	—
				2 wire	—	—	200V	**A72**	**A72H**	●	●	—	—	—	Relay, PLC
					24V	12V	100V	**A73**	**A73H**	●	●	●	—		
			No			5V, 12V	100V or less	**A80**	**A80H**	●	●	—	—	IC circuit	
		Connector	Yes			12V	—	**A73C**	—	●	●	●	●	—	
			No			5V, 12V	24V or less	**A80C**	—	●	●	●	●	IC circuit	
Solid state switches	—	Grommet	Yes	3 wire (NPN)	24V	5V, 12V	—	**F7NV**	**F79**	●	●	○	—	IC circuit	Relay, PLC
				3 wire (PNP)				**F7PV**	**F7P**	●	●	○	—		
				2 wire		12V		**F7BV**	**J79**	●	●	○	—	—	
		Connector						**J79C**	—	●	●	●	●		
	Diagnostic indication (2 color indicator)	Grommet		3 wire (NPN)		5V, 12V		**F7NWV**	**F79W**	●	●	○	—	IC circuit	
				3 wire (PNP)				—	**F7PW**	●	●	○	—		
				2 wire		12V		**F7BWV**	**J79W**	●	●	○	—	—	
	Water resistant (2 color indicator)							—	**F7BA**	—	●	○	—		
	With timer			3 wire (NPN)		5V, 12V		—	**F7NT**	—	●	○	—	IC circuit	
	With diagnostic output (2 color indicator)			4 wire (NPN)				—	**F79F**	●	●	○	—		
	Latch type with diagnostic output (2 color indicator)					—		—	**F7LF** Note 3)	●	●	○	—	—	

Note 1) Lead wire length symbol 0.5m ..... Nil (Example) A80C
3m ..... L (Example) A80CL
5m ..... Z (Example) A80CZ
None ..... N (Example) A80CN
Note 2) Solid state auto switches marked with a "○" are produced upon receipt of order.
Note 3) Type D-F7LF cannot be mounted on bore size ø10.

Specifications

Fluid	Air
Proof pressure	1.05MPa
Maximum operating pressure	0.7MPa
Minimum operating pressure	0.18MPa
Ambient and fluid temperature	–10 to 60°C
Piston speed	50 to 300mm/s
Lubrication	Non-lube
Stroke length tolerance	0 to 250st: $^{+1.0}_{0}$, 251 to 1000st: $^{+1.4}_{0}$, 1001st and up: $^{+1.8}_{0}$

Standard Strokes

Bore size (mm)	Standard stroke (mm)	Maximum manufacturable stroke (mm)
10	150, 200, 250, 300	500
15	150, 200, 250, 300, 350, 400 450, 500	750
20	200, 250, 300, 350, 400, 450 500, 600, 700, 800	1000
25		1500
32		
40	200, 250, 300, 350, 400, 450 500, 600, 700, 800, 900, 1000	1500

Note) Intermediate strokes can be arranged in 1mm increments.

Magnetic Holding Force

(N)

Bore size (mm)	**10**	**15**	**20**	**25**	**32**	**40**
Holding force	53.9	137	231	363	588	922

Weights

(kg)

Bore size (mm)	**10**	**15**	**20**	**25**	**32**	**40**
Basic weight	0.58	1.10	1.85	2.21	4.36	4.83
Additional weight per 50mm stroke	0.077	0.104	0.138	0.172	0.267	0.406

Calculation method/Example: REALS32-500
Basic weight ..... 4.36kg Additional weight ..... 0.267/50mm Cylinder stroke ... 500mm
4.36 + 0.267 x 500 ÷ 50 = 7.03kg

⚠ Specific Product Precautions

Be sure to read before handling. Refer to pages 92 through 94 for safety instructions and actuator precautions.

Operation

⚠ Warning

1. Be aware of the space between the plates and the slide block.

Take sufficient care as fingers and hands, etc., may be injured if caught while the cylinder is in operation.

2. Do not apply a load to a cylinder which is greater than the allowable value stated in the "model selection pages".

Mounting

⚠ Caution

1. Avoid operation with the external slider fixed to the mounting surface.

The cylinder should be operated with the plates fixed to the mounting surface.

2. Perform mounting so that the external slider will operate through the entire stroke at the minimum operating pressure.

If the mounting surface is not flat, the guides will be warped, increasing the minimum operating pressure and causing premature wear of the bearings. Therefore, mounting should be performed so that the external slider will operate through the entire stroke at the minimum operating pressure. A mounting surface with a high degree of flatness is desirable, but in cases where this is not possible, adjust with shims, etc.

Series REAL
Model Selection 1

Pv: Maximum operating pressure for vertical operation (MPa)
WA: Allowable load weight based on these operating conditions (kg)
Wv: Allowable load weight for vertical operation (kg)
σ: Stroke coefficient

$$\sigma = \frac{\text{Load weight within stroke}}{\text{Max. load weight}}$$

Operating conditions

- **W:** Load weight (kg)
- **U:** Maximum speed (mm/s)
- **P:** Operating pressure (MPa)
- **Stroke (mm)**
- **L0:** Distance from slide block mounting surface to work piece center of gravity (cm)
- **Mode of operation (horizontal, inclined, vertical)**

Mode of operation

Horizontal operation

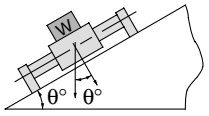
First tentative bore size determination

$$\text{ø}D \geq 1.6 \times \sqrt{\frac{W}{P}}$$

Inclined operation

First tentative bore size determination

$$\text{ø}D \geq 5.0 \times \sqrt{\frac{0.1 \times W\cos\theta + W\sin\theta}{P}}$$



Inclined operation

Vertical operation

First tentative bore size determination

$$\text{ø}D \geq 5.0 \times \sqrt{\frac{0.1 \times W + W}{P}}$$

Determination of allowable load weight & pressure

W > Wv
P > Pv

(Refer to page 37 for vertical operation.)

W ≤ Wv
P ≤ Pv

Review of load weight and operating pressure

(Refer to page 35 for formulas to find σ.)

Calculate stroke coefficient (σ) with stroke and tentatively determined bore size

$$\sigma = \frac{\text{Load weight in stroke}}{\text{Maximum load weight}}$$

Select an example calculation for allowable weight based on cylinder mounting orientation

(Refer to pages 35 and 36.)

Calculate (WA) from the formula for the tentatively determined bore size

W > WA

Review of bore size, stroke and L0

W ≤ WA

(Refer to Data B on page 35.)

Second tentative determination of bore size from graph of maximum speed (U) and load weight (W)

(The larger bore size is selected from two tentative determinations.)

Bore size determination

Note 1)

Review of order made products based on operating conditions

Note 1) Depending on the operating environment, etc., order made products should also be reviewed.

(Refer to pages 87 through 91.)

Model determination

Model Selection 2

Design Parameters 1

How to Find σ when Selecting the Allowable Load Weight

Since the maximum load weight with respect to the cylinder stroke changes as shown in the table below, σ should be considered as a coefficient determined in accordance with each stroke.

Example) for REAL25–650

(1) Maximum load weight = 20kg

(2) Load weight for 650st = 13.6kg

(3) $\sigma = \frac{13.6}{20} = 0.68$ is the result.

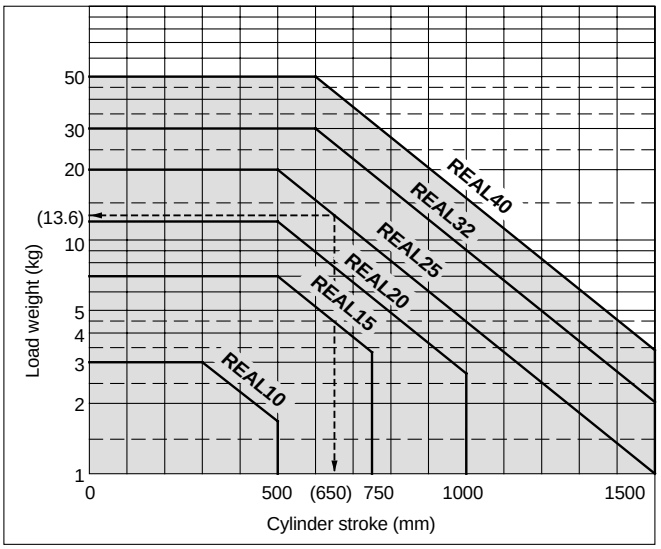
Calculation formula for σ (σ ≤ 1)

ST: Stroke (mm)

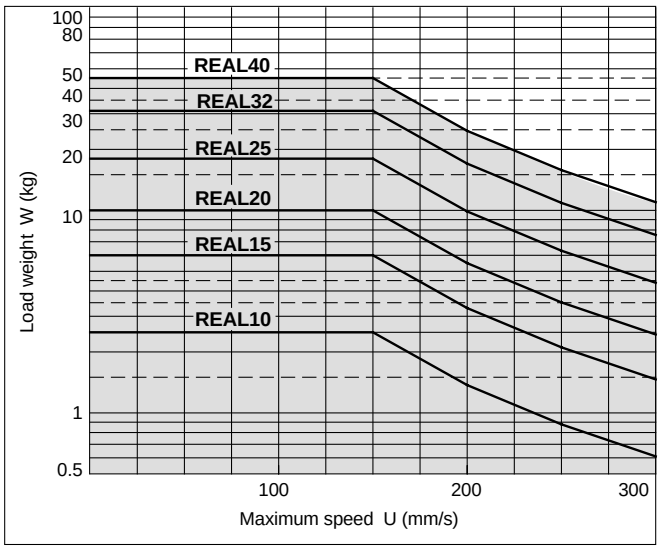
Model	REAL10	REAL15	REAL20
σ =	$\frac{10^{(0.86 - 1.3 \times 10^{-3} \times ST)}}{3}$	$\frac{10^{(1.5 - 1.3 \times 10^{-3} \times ST)}}{7}$	$\frac{10^{(1.71 - 1.3 \times 10^{-3} \times ST)}}{12}$

Model	REAL25	REAL32	REAL40
σ =	$\frac{10^{(1.98 - 1.3 \times 10^{-3} \times ST)}}{20}$	$\frac{10^{(2.26 - 1.3 \times 10^{-3} \times ST)}}{30}$	$\frac{10^{(2.48 - 1.3 \times 10^{-3} \times ST)}}{50}$

Note) Calculate with σ = 1 for all applications up to ø10–300mmST, ø15–500mmST, ø20–500mmST, ø25–500mmST, ø32–600mmST and ø40–600mmST.

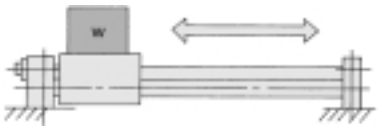


<Data B: Maximum speed —— Load weight chart>



Examples of Allowable Load Weight Calculation Based on Cylinder Mounting Orientation

1. Horizontal operation (floor mounting)

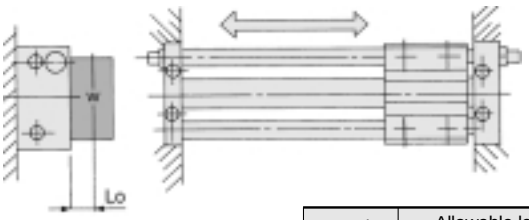


Maximum load weight (center of slide block) (kg)

Bore size (mm)	10	15	20	25	32	40
Max. load weight (kg)	3	7	12	20	30	50
Stroke (max)	to 300st	to 500st	to 500st	to 500st	to 600st	to 600st

The above maximum load weight values will change with the stroke length for each cylinder size, due to limitation from warping of the guide shafts. (Take note of the coefficient σ.) Moreover, depending on the operating direction, the allowable load weight may be different from the maximum load weight.

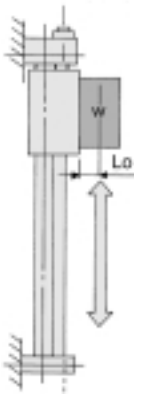
2. Horizontal operation (wall mounting)



Lo: Distance from mounting surface to load center of gravity (cm)

Bore size (mm)	Allowable load weight W_A (kg)
10	$\frac{\sigma \cdot 15.0}{8.9 + 2Lo}$
15	$\frac{\sigma \cdot 45.5}{11.3 + 2Lo}$
20	$\frac{\sigma \cdot 101}{13.6 + 2Lo}$
25	$\frac{\sigma \cdot 180}{15.2 + 2Lo}$
32	$\frac{\sigma \cdot 330}{18.9 + 2Lo}$
40	$\frac{\sigma \cdot 624}{22.5 + 2Lo}$

3. Vertical operation



Bore size (mm)	Allowable load weight W_A (kg)
10	$\frac{\sigma \cdot 5.00}{1.95 + Lo}$
15	$\frac{\sigma \cdot 15.96}{2.4 + Lo}$
20	$\frac{\sigma \cdot 31.1}{2.8 + Lo}$
25	$\frac{\sigma \cdot 54.48}{3.1 + Lo}$
32	$\frac{\sigma \cdot 112.57}{3.95 + Lo}$
40	$\frac{\sigma \cdot 212.09}{4.75 + Lo}$

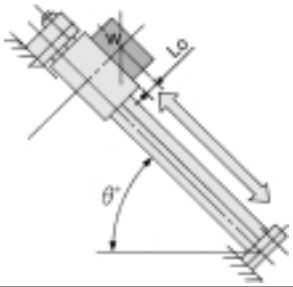
Lo: Distance from mounting surface to load center of gravity (cm)
Note) A safety factor should be considered to prevent dropping.

Model Selection 3

Design Parameters 2

Examples of Allowable Load Weight Calculation Based on Cylinder Mounting Orientation

4. Inclined operation (in operating direction)



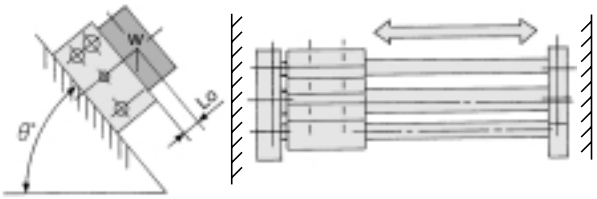
Angle	to 45°	to 60°	to 75°	to 90°
k	1	0.9	0.8	0.7

Angle coefficient (k): k = [to 45° (= θ)] = 1,
[to 60°] = 0.9,
[to 75°] = 0.8,
[to 90°] = 0.7

Lo: Distance from mounting surface to load center of gravity (cm)

Bore size (mm)	Allowable load weight WA (kg)
10	$\frac{\sigma \cdot 10.2 \cdot K}{2.8\cos\theta + 2\,(1.95 + Lo)\sin\theta}$
15	$\frac{\sigma \cdot 31.1 \cdot K}{2.9\cos\theta + 2\,(2.4 + Lo)\sin\theta}$
20	$\frac{\sigma \cdot 86.4 \cdot K}{6\cos\theta + 2\,(2.8 + Lo)\sin\theta}$
25	$\frac{\sigma \cdot 105.4 \cdot K}{3.55\cos\theta + 2\,(3.1 + Lo)\sin\theta}$
32	$\frac{\sigma \cdot 178 \cdot K}{4\cos\theta + 2\,(3.95 + Lo)\sin\theta}$
40	$\frac{\sigma \cdot 361.9 \cdot K}{5.7\cos\theta + 2\,(4.75 + Lo)\sin\theta}$

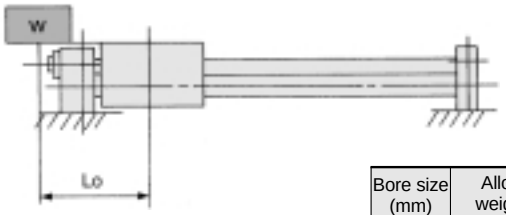
5. Inclined operation (at a right angle to operating direction)



Lo: Distance from mounting surface to load center of gravity (cm)

Bore size (mm)	Allowable load weight WA (kg)
10	$\frac{\sigma \cdot 15}{5 + 2\,(1.95 + Lo)\sin\theta}$
15	$\frac{\sigma \cdot 45.5}{6.5 + 2\,(2.4 + Lo)\sin\theta}$
20	$\frac{\sigma \cdot 115}{8 + 2\,(2.8 + Lo)\sin\theta}$
25	$\frac{\sigma \cdot 180}{9 + 2\,(3.1 + Lo)\sin\theta}$
32	$\frac{\sigma \cdot 330}{11 + 2\,(3.95 + Lo)\sin\theta}$
40	$\frac{\sigma \cdot 624}{13 + 2\,(4.75 + Lo)\sin\theta}$

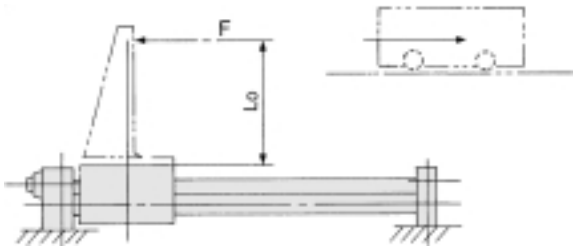
6. Load center offset in operating direction (Lo)



Lo: Distance from slide block center to load center of gravity (cm)

Bore size (mm)	Allowable load weight WA (kg)
10	$\frac{\sigma \cdot 5.6}{Lo + 2.8}$
15	$\frac{\sigma \cdot 13.34}{Lo + 2.9}$
20	$\frac{\sigma \cdot 43.2}{Lo + 6}$
25	$\frac{\sigma \cdot 46.15}{Lo + 3.55}$
32	$\frac{\sigma \cdot 80}{Lo + 4}$
40	$\frac{\sigma \cdot 188.1}{Lo + 5.7}$

7. Horizontal operation (pushing load, pusher)

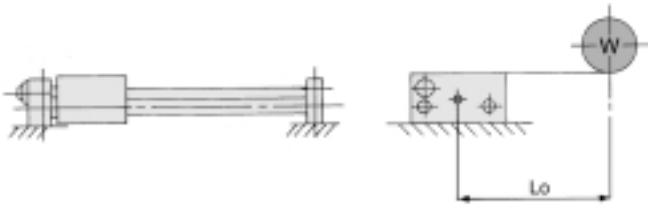


F: Drive (from slide block to position Lo) resistance force (kg)
Lo: Distance from mounting surface to load center of gravity (cm)

Bore size (mm)	10	15	20
Allowable load weight (W_A)(kg)	$\frac{\sigma \cdot 5.55}{1.95 + Lo}$	$\frac{\sigma \cdot 15.96}{2.4 + Lo}$	$\frac{\sigma \cdot 41.7}{2.8 + Lo}$

Bore size (mm)	25	32	40
Allowable load weight (W_A)(kg)	$\frac{\sigma \cdot 58.9}{3.1 + Lo}$	$\frac{\sigma \cdot 106.65}{3.95 + Lo}$	$\frac{\sigma \cdot 228}{4.75 + Lo}$

8. Horizontal operation (load, lateral offset Lo)



Lo: Distance from center of slide block to load's center of gravity (cm)

Bore size (mm)	10	15	20
Allowable load weight (W_A)(kg)	$\frac{\sigma \cdot 15}{5 + Lo}$	$\frac{\sigma \cdot 45.5}{6.5 + Lo}$	$\frac{\sigma \cdot 80.7}{8 + Lo}$

Bore size (mm)	25	32	40
Allowable load weight (W_A)(kg)	$\frac{\sigma \cdot 144}{9 + Lo}$	$\frac{\sigma \cdot 275}{11 + Lo}$	$\frac{\sigma \cdot 520}{13 + Lo}$

Series REAL
Model Selection 4

Design Parameters 3

Vertical Operation

When operating a load vertically, it should be operated within the allowable load weights and maximum operating pressures shown in the table below.
Use caution, as operating above the prescribed values may lead to dropping of the load.

Bore size (mm)	Model	Allowable load weight Wv (kg)	Max. operating pressure Pv (MPa)
10	**REAL10**	2.7	0.55
15	**REAL15**	7.0	0.65
20	**REAL20**	11.0	0.65
25	**REAL25**	18.5	0.65
32	**REAL32**	30.0	0.65
40	**REAL40**	47.0	0.65

Note) Use caution, as there is a possibility of breaking the magnetic coupling if operated above the maximum operating pressure.

Intermediate Stops

The cushion effect (smooth start-up, soft stop) exists only before the stroke end in the stroke ranges indicated in the table below.
The cushion effect (smooth start-up, soft stop) cannot be obtained in an intermediate stop or a return from an intermediate stop using an external stopper, etc.

Cushion stroke

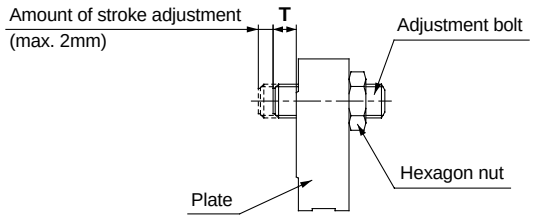
Model	Stroke (mm)
REAL10	20
REAL15	25
REAL20	30
REAL25	30
REAL32	30
REAL40	35

Stroke Adjustment

The adjustment bolt is adjusted to the optimum position for smooth acceleration and deceleration at the time of shipment, and should be operated at the full stroke. When stroke adjustment is necessary, the maximum amount of adjustment on one side is 2mm. (Do not adjust more than 2mm, as it will not be possible to obtain smooth acceleration and deceleration.)

Stroke Adjustment

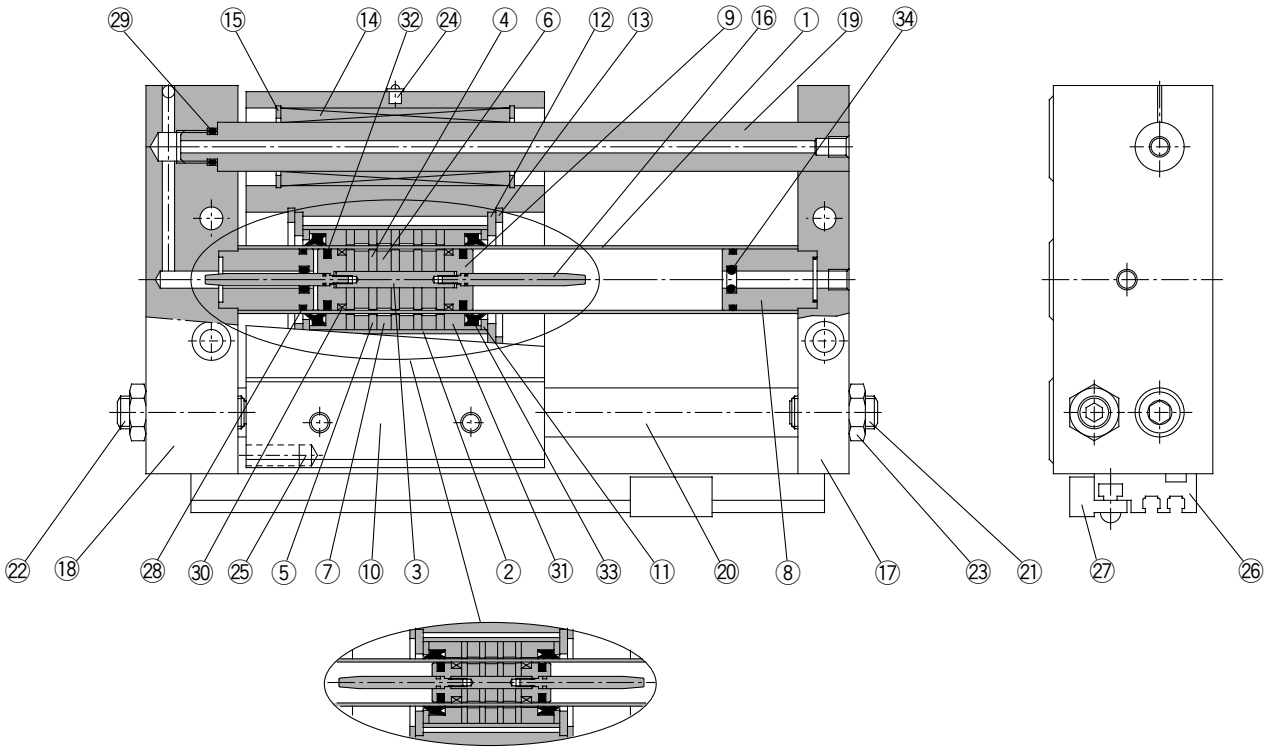
Loosen the hexagon nut, and after performing the stroke adjustment from the plate side with a hexagon wrench, retighten and secure the hexagon nut.



Adjustment Bolt Position (at Shipment), Hexagon Nut Tightening Torque

Model	T (mm)	Tightening torque (N·m)
REAL10	1	1.67
REAL15	1	
REAL20	1	3.14
REAL25	1	10.8
REAL32	1	23.5
REAL40	1	

Construction/ø10, ø15



REAL10

Parts list

No.	Description	Material	Note
1	**Cylinder tube**	Stainless steel	
2	**External slider tube**	Aluminum alloy	
3	**Shaft**	Stainless steel	
4	**Piston side yoke**	Rolled steel plate	Zinc chromated
5	**External slider side yoke**	Rolled steel plate	Zinc chromated
6	**Magnet A**	Rare earth magnet	
7	**Magnet B**	Rare earth magnet	
8	**Cushion seal holder**	Aluminum alloy	Anodized
9	**Piston**	Brass	Electroless nickel plated
10	**Slide block**	Aluminum alloy	Hard anodized
11	**Spacer**	Rolled steel plate	Nickel plated
12	**Slider spacer**	Rolled steel plate	Nickel plated
13	**Snap ring**	Carbon tool steel	Nickel plated
14	**Ball bushing**	–	
15	**Snap ring**	Carbon tool steel	Nickel plated
16	**Cushion ring**	Stainless steel	
17	**Plate A**	Aluminum alloy	Hard anodized

Parts list

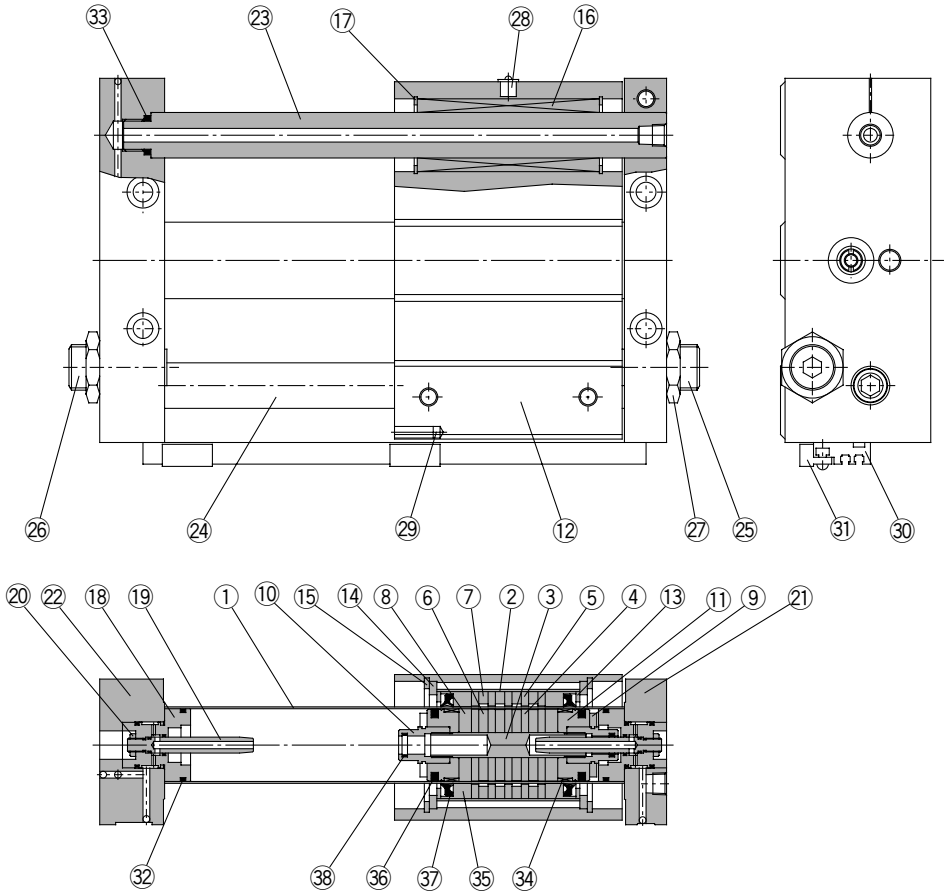
No.	Description	Material	Note
18	**Plate B**	Aluminum alloy	Hard anodized
19	**Guide shaft A**	Carbon steel	Hard chrome plated
20	**Guide shaft B**	Carbon steel	Hard chrome plated
21	**Adjustment bolt A**	Chromium molybdenum steel	Nickel plated
22	**Adjustment bolt B**	Chromium molybdenum steel	Nickel plated
23	**Hexagon nut**	Carbon steel	Nickel plated
24	**Nipple**	Carbon steel	Nickel plated (except REAL10)
25	**Magnet for auto switch**	Rare earth magnet	
26	**Switch mounting rail**	Aluminum alloy	
27	**Auto switch**	–	
28*	**Cylinder tube gasket**	NBR	
29*	**Guide shaft gasket**	NBR	
30*	**Wear ring A**	Special resin	
31*	**Wear ring B**	Special resin	
32*	**Piston seal**	NBR	
33*	**Scraper**	NBR	
34*	**Cushion seal**	NBR	

* Seal kits are sets consisting of items 28 through 34 above, and can be ordered using the kit number for each bore size.

Replacement parts: Seal kits

Bore size (mm)	Kit no.	Contents
10	**REAS10-PS**	Above numbers 28, 29, 30, 31, 32, 33, 34
15	**REAS15-PS**	

Construction/ø20 to ø40



Parts list

No.	Description	Material	Note
1	**Cylinder tube**	Stainless steel	
2	**External slider tube**	Aluminum alloy	
3	**Shaft**	Stainless steel	
4	**Piston side yoke**	Rolled steel plate	Zinc chromated
5	**External slider side yoke**	Rolled steel plate	Zinc chromated
6	**Magnet A**	Rare earth magnet	
7	**Magnet B**	Rare earth magnet	
8	**Piston side spacer**	Aluminum alloy	Chromated
9	**Bumper**	Urethane rubber	
10	**Cushion seal holder**	Aluminum alloy	Chromated
11	**Piston**	Aluminum alloy	Chromated
12	**Slide block**	Aluminum alloy	Hard anodized
13	**Spacer**	Rolled steel plate	Nickel plated
14	**Slider spacer**	Carbon steel	Nickel plated
15	**Snap ring**	Carbon tool steel	Nickel plated
16	**Ball bushing**	–	
17	**Snap ring**	Carbon tool steel	Nickel plated
18	**Cushion ring holder**	Aluminum alloy	Anodized
19	**Cushion ring**	Brass	Electroless nickel plated (REAL32, 40)
		Stainless steel	REAL20, 25

Parts list

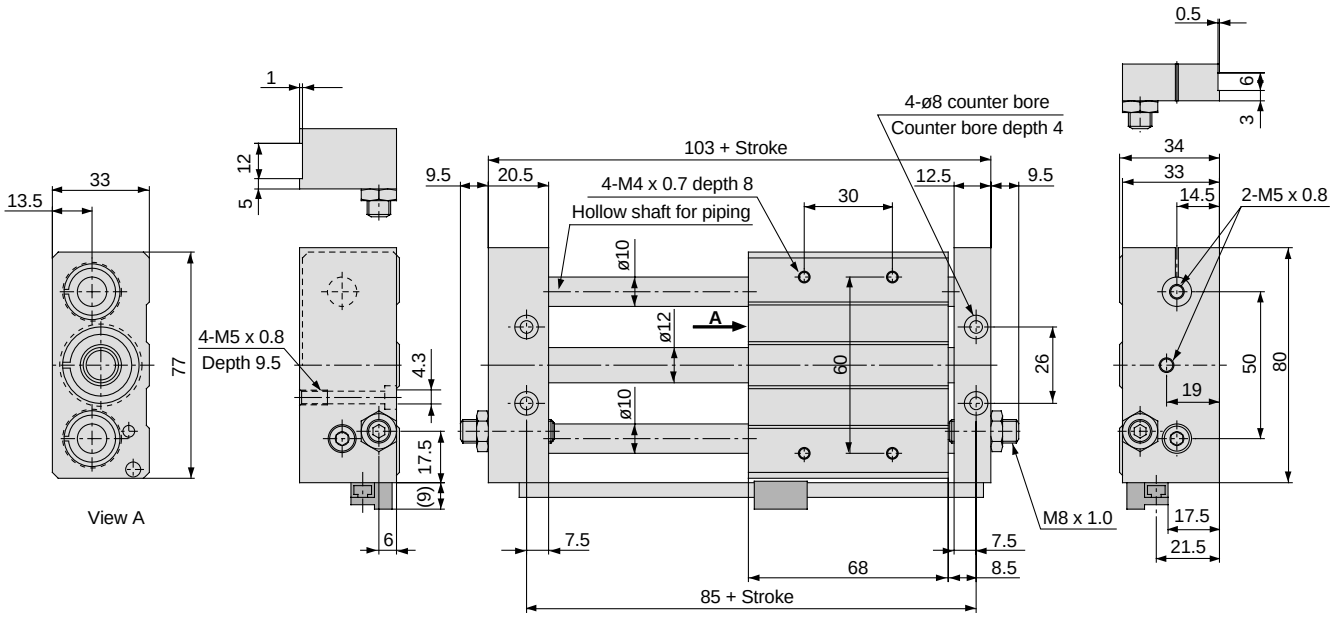
No.	Description	Material	Note
20	**Lock nut B**	Carbon steel	Nickel plated
21	**Plate A**	Aluminum alloy	Hard anodized
22	**Plate B**	Aluminum alloy	Hard anodized
23	**Guide shaft A**	Carbon steel	Hard chrome plated
24	**Guide shaft B**	Carbon steel	Hard chrome plated
25	**Adjustment bolt A**	Chromium molybdenum steel	Nickel plated
26	**Adjustment bolt B**	Chromium molybdenum steel	Nickel plated
27	**Hexagon nut**	Carbon steel	Nickel plated
28	**Nipple**	Brass	Nickel plated
29	**Magnet for auto switch**	Rare earth magnet	
30	**Switch mounting rail**	Aluminum alloy	
31	**Auto switch**	–	
32*	**Cylinder tube gasket**	NBR	
33*	**Guide shaft gasket**	NBR	
34*	**Wear ring A**	Special resin	
35*	**Wear ring B**	Special resin	
36*	**Piston seal**	NBR	
37*	**Scraper**	NBR	
38*	**Cushion seal**	NBR	

* Seal kits are sets consisting of items 32 through 38 above, and can be ordered using the kit number for each bore size.

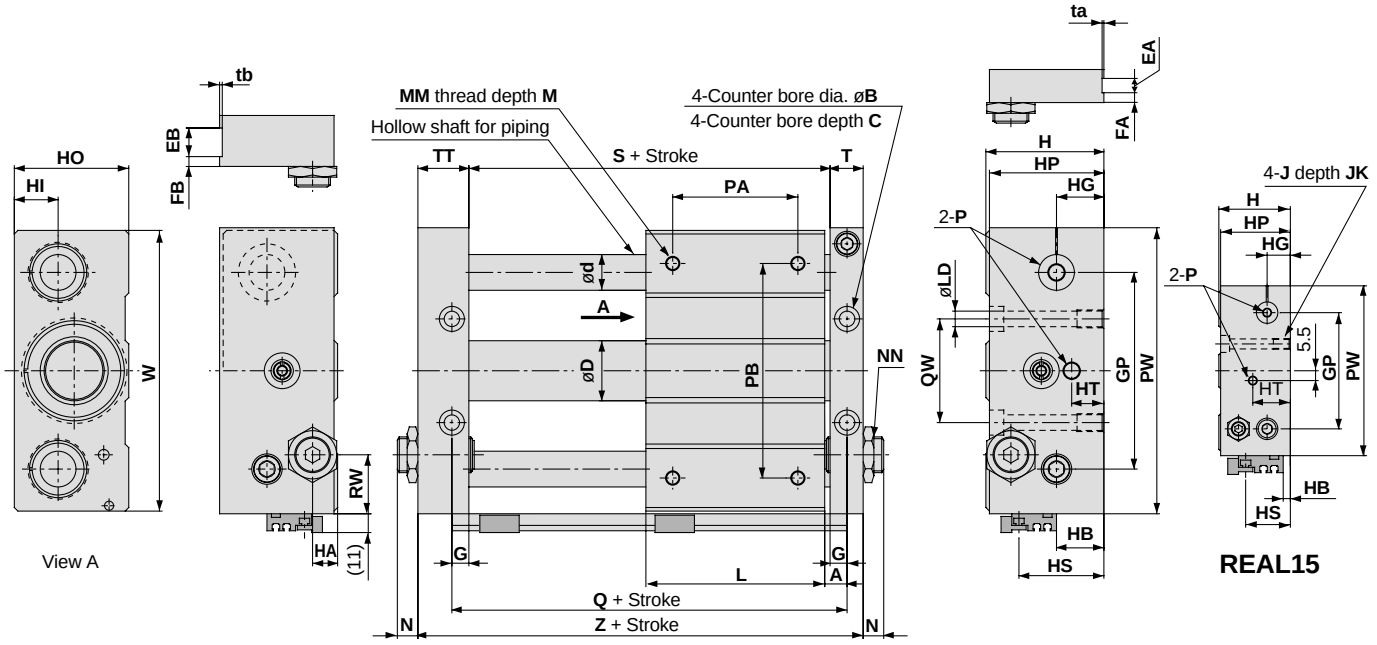
Replacement parts: Seal kits

Bore size (mm)	Kit no.	Contents
20	**REAS20-PS**	Above numbers 32, 33, 34, 35, 36, 37, 38
25	**REAS25-PS**	
32	**REAS32-PS**	
40	**REAS40-PS**	

Dimensions/ø10



Dimensions/ø15 to ø40



(mm)

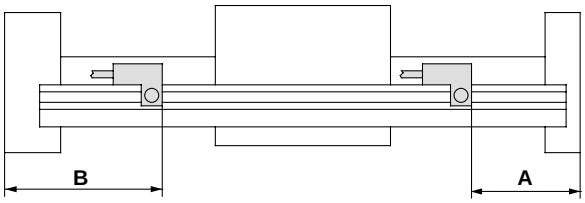
Model	A	B	C	D	d	EA	EB	FA	FB	G	GP	H	HA	HB	HG	HI	HO	HP
REAL15	7.5	9.5	5	16.6	12	6	13	3	6	6.5	65	40	6.5	4	16	14	38	39
REAL20	9.5	9.5	5	21.6	16	–	–	–	–	8.5	80	46	9	10	18	16	44	45
REAL25	9.5	11	6.5	26.4	16	8	14	4	7	8.5	90	54	9	18	23	21	52	53
REAL32	10.5	14	8	33.6	20	8	16	5	7	9.5	110	66	12	26.5	26.5	24.5	64	64
REAL40	11.5	14	8	41.6	25	10	20	5	10	10.5	130	78	12	35	30.5	28.5	76	74

Model	HS	HT	J	JK	L	LD	M	MM	N	NN	P	PA*	PB	PW
REAL15	25	21	M6 x 1.0	9.5	75	5.6	8	M5 x 0.8	7.5	M8 x 1.0	M5 x 0.8	45	70	95
REAL20	31	10	M6 x 1.0	10	86	5.6	10	M6 x 1.0	10	M10 x 1.0	Rc 1/8	50	90	120
REAL25	39	10	M8 x 1.25	10	86	7	10	M6 x 1.0	11	M14 x 1.5	Rc 1/8	60	100	130
REAL32	47.5	17	M10 x 1.5	15	100	9.2	12	M8 x 1.25	11.5	M20 x 1.5	Rc 1/8	70	120	160
REAL40	56	14	M10 x 1.5	15	136	9.2	12	M8 x 1.25	10.5	M20 x 1.5	Rc 1/4	90	140	190

∗ PA dimensions are for split from center.

Model	Q	QW	RW	S	T	TT	ta	tb	W	Z
REAL15	90	30	15	77	12.5	22.5	0.5	1.0	92	112
REAL20	105	40	28	88	16.5	25.5	–	–	117	130
REAL25	105	50	22	88	16.5	25.5	0.5	1.0	127	130
REAL32	121	60	33	102	18.5	28.5	0.5	1.0	157	149
REAL40	159	84	35	138	20.5	35.5	1.0	1.0	187	194

Proper Auto Switch Mounting Position for Stroke End Detection



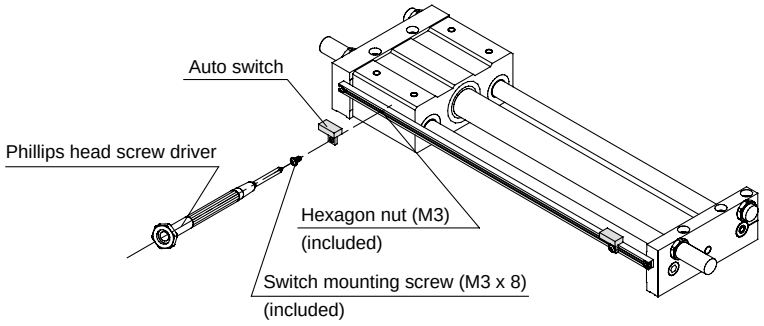
(mm)

Auto switch model / Bore size (mm)	Dimension A				Dimension B			
	D-A73/A80	D-A72 D-A7□H/A80H D-A73C/A80C D-F7□/J79 D-J79C D-F7□V	D-F7□W/J79W D-F7□WV D-F7LF Note 1) D-F79F D-F7BAL	D-F7NTL	D-A73/A80	D-A72 D-A7□H/A80H D-A73C/A80C D-F7□/J79 D-J79C D-F7□V	D-F7□W/J79W D-F7□WV D-F7LF Note 1) D-F79F D-F7BAL	D-F7NTL
10	58	58.5	62.5	63.5	45	44.5	40.5	39.5
15	65	65.5	69.5	70.5	47	46.5	42.5	41.5
20	76	76.5	80.5	81.5	54	53.5	49.5	48.5
25	76	76.5	80.5	81.5	54	53.5	49.5	48.5
32	92	92.5	96.5	97.5	57	56.5	52.5	51.5
40	130	130.5	134.5	135.5	64	63.5	59.5	58.5

Note1) Model D-F7LF cannot be mounted on bore size ø10.

Auto Switch Mounting

When mounting an auto switch, the switch mounting screw should be screwed into a hexagon nut (M3 x 0.5) which has been inserted into the groove of the switch rail. (The tightening torque should be about 0.05 to 0.1N·m.)



Auto Switch Operating range

(mm)

Auto switch model / Bore size (mm)	D-A7□/A80 D-A7□H/A80H D-A73C/A80C	D-F7□/J79 D-J79C D-F7□V D-F7NTL D-F7□W/J79W D-F7□WV D-F7BAL	D-F7LF D-F79F
10	6	3	4.5
15	6	4	4.5
20	6	3	4.5
25	6	3	4.5
32	6	3	4.5
40	6	3.5	4.5

Note) Operating ranges are standards including hysteresis, and are not guaranteed. Large variations may occur depending on the surrounding environment. (variations on the order of ±30%)

Sine Rodless Cylinder

Series REAH
High Precision Guide Type

How to Order

REA H □ 25 — 300 — Z73 □

- **Sine rodless cylinder**
- **High precision guide type**
- **Guide**

Symbol \ Bore size (mm)		10	15	20	25	32
Nil	1 axis	●	●	●	●	–
T	2 axes	–	–	–	●	●

- **Bore size**

10	10mm
15	15mm
20	20mm
25	25mm
32	32mm

- **Standard stroke (mm)**
  Refer to the standard stroke table on page 44.
- **Auto switch type**

Nil	Without auto switch

∗ Refer to the table below for auto switch models.

- **Number of auto switches**

Nil	2 pcs.
S	1 pc.
n	"n" pcs.

Applicable auto switches / Refer to "Auto Switch Guide" (E-274-A) for further details on auto switch units. Refer to pages 84 and 85 for auto switch circuit diagrams.

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage			Auto switch model		Lead wire length (m) Note 1)			Applicable load	
					DC		AC	Electrical entry direction: Perpendicular	Electrical entry direction: In-line	0.5 (Nil)	3 (L)	5 (Z)		
Reed switches	–	Grommet	Yes	3 wire (NPN equiv.)	–	5V	–	–	**Z76**	●	●	–	IC circuit	–
				2 wire	24V	12V	100V	–	**Z73**	●	●	●	–	Relay, PLC
			No			5V, 12V	100V or less	–	**Z80**	●	●	–	IC circuit	
Solid state switches	–	Grommet	Yes	3 wire (NPN)	24V	5V, 12V	–	**Y69A**	**Y59A**	●	●	○	IC circuit	Relay, PLC
				3 wire (PNP)				**Y7PV**	**Y7P**	●	●	○		
				2 wire		12V		**Y69B**	**Y59B**	●	●	○	–	
	Diagnostic indication (2 color indicator)			3 wire (NPN)		5V, 12V		**Y7NWV**	**Y7NW**	●	●	○	IC circuit	
				3 wire (PNP)				**Y7PWV**	**Y7PW**	●	●	○		
				2 wire		12V		**Y7BWV**	**Y7BW**	●	●	○	–	

Note 1) Lead wire length symbol 0.5m ..... Nil (Example) Y59A
3m ..... L (Example) Y59AL
5m ..... Z (Example) Y59AZ

Note 2) Solid state auto switches marked with a "○" are produced upon receipt of order.

Specifications

Bore size (mm)	10	15	20	25	32
Fluid	Air				
Action	Double acting				
Maximum operating pressure	0.7MPa				
Minimum operating pressure	0.2MPa				
Proof pressure	1.05MPa				
Ambient and fluid temperature	–10 to 60°C				
Piston speed	70 to 300mm/s				
Lubrication	Non-lube				
Stroke length tolerance	0 to 1.8mm				
Piping type	Centralized piping				
Piping port size	M5 x 0.8		Rc 1/8		

Standard Strokes

Bore size (mm)	Number of axes	Standard stroke (mm)	Maximum manufacturable stroke (mm)
10	1 axis	150, 200, 300	500
15		150, 200, 300, 400, 500	750
20		200, 300, 400, 500, 600	1000
25		200, 300, 400, 500, 600, 800	1200
25	2 axes	200, 300, 400, 500, 600, 800, 1000	
32			1500

Note 1) Strokes exceeding the standard strokes are available as a special order.
Note 2) Intermediate strokes other than order made (refer to page 91 for XB10) are available by special order.

Weights

(kg)

Model	Standard stroke mm							
	150	200	300	400	500	600	800	1000
REAH10	1.2	1.3	1.6	–	–	–	–	–
REAH15	2.5	2.7	3.2	3.6	4.1	–	–	–
REAH20	–	3.5	4.0	4.4	4.9	5.4	–	–
REAH25	–	5.3	6.0	6.6	7.3	8.0	9.4	–
REAHT25	–	6.2	7.3	8.3	9.4	10.4	12.5	14.6
REAHT32	–	9.6	10.7	11.9	13.0	14.2	16.5	18.8

Magnetic Holding Force

(N)

Bore size (mm)	10	15	20	25	32
Holding force	53.9	137	231	363	588

Theoretical Output

(N)

Bore size (mm)	Piston area (mm^2)	Operating pressure (MPa)					
		0.2	0.3	0.4	0.5	0.6	0.7
10	78	15	23	31	39	46	54
15	176	35	52	70	88	105	123
20	314	62	94	125	157	188	219
25	490	98	147	196	245	294	343
32	804	161	241	322	402	483	563

Note) Theoretical output (N) = Pressure (MPa) x Piston area (mm^2).

⚠ Specific Product Precautions

Be sure to read before handling. Refer to pages 92 through 94 for safety instructions and actuator precautions.

Mounting

⚠ Caution

1. The interior is protected to a certain extent by the top cover, however, when performing maintenance, etc., take care not to cause scratches or other damage to the cylinder tube, slide table or linear guide by striking them or placing objects on them.

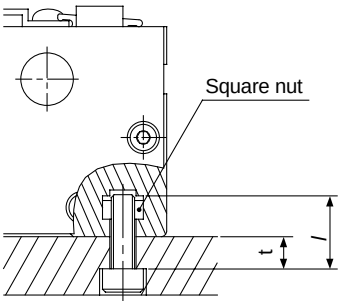
The bore and exterior of tubes are manufactured to precise tolerances, so that even a slight deformation can cause malfunction.

2. Since the slide table is supported by precision bearings, do not apply strong impacts or large moment, etc., when mounting work pieces.

3. Mounting of the cylinder body

The body is mounted using the square nuts, which are included, in the two T-slots on the bottom of the body. Refer to the table below for mounting bolt dimensions and tightening torque.

Model		REAH10	REAH15	REAH20	REAH25	REAHT25	REATH32
Bolt dimensions	Screw size	M4 x 0.7	M5 x 0.8		M6 x 1.0		M8 x 1.25
	Dimension t	*l*-7	*l*-8		*l*-9		*l*-12
Tightening torque	N·m	1.37	2.65		4.4		13.2



Operation

⚠ Caution

1. The unit can be used with a direct load within the allowable range, but when connecting to a load which has an external guide mechanism, careful alignment is necessary.

Since variation of the shaft center increases as the stroke becomes longer, a connection method should be devised which allows for this displacement.

2. Since the guide is adjusted at the time of shipment, unintentional movement of the adjustment setting should be avoided.

3. Contact SMC before operating in an environment where there will be contact with chips, dust (paper scraps, thread scraps, etc.) or cutting oil (gas oil, water, hot water, etc.).

4. Do not operate with the magnetic coupling out of position.

In case the magnetic coupling is out of position, push the external slider back into the correct position by hand at the end of the stroke (or correct the piston slider with air pressure).

Series REAH
Model Selection 1

Pv: Maximum operating pressure for vertical operation (MPa)
Wv: Allowable load weight for vertical operation (kg)
α: Load factor

$$\Sigma\alpha = \frac{\text{Load weight (W)}}{\text{Max. load weight (Wmax)}} + \frac{\text{Static moment (M)}}{\text{Allowable static moment (Mmax)}} + \frac{\text{Dynamic moment (Me)}}{\text{Allowable dynamic moment (Memax)}}$$

Operating conditions

- **W: Load weight (kg)**
- **U: Maximum Speed (mm/s)**
- **P: Operating pressure (MPa)**
- **Stroke (mm)**
- **Position of work piece center of gravity (m)**
- **Mode of operation (horizontal, inclined, vertical)**

Mode of operation

Horizontal operation

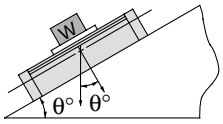
First tentative bore size determination

$$\text{øD} \geq 1.6 \times \sqrt{\frac{W}{P}}$$

Inclined operation

First tentative bore size determination

$$\text{øD} \geq 5.0 \times \sqrt{\frac{0.1 \times W\cos\theta + W\sin\theta}{P}}$$



Inclined operation

Vertical operation

First tentative bore size determination

$$\text{øD} \geq 5.0 \times \sqrt{\frac{0.1 \times W + W}{P}}$$

W > Wv
P > Pv

Determination of allowable load weight & pressure

(Refer to page 49 for vertical operation.)

W ≤ Wv
P ≤ Pv

Review of load weight and operating pressure

Review of operating conditions

Determination of load factor (Σα) (Refer to page 47.)

$\Sigma\alpha > 1$

$\Sigma\alpha \leq 1$

(Refer to Data B on page 47.)

Second tentative determination of bore size from graph of maximum speed (U) and load weight (W).

Bore size determination

(The larger bore size is selected from two tentative determinations)

Note 1)

Review of order made products based on operating conditions

(Refer to pages 87 through 91.)

Note 1) Depending on the operating environment, etc., order made products should also be reviewed.

Model determination

Series REAH
Model Selection 2

Design Parameters 1

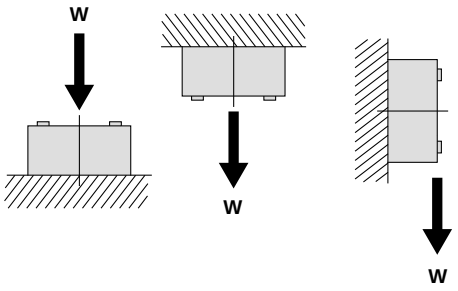
The maximum load weight and allowable moment will differ depending on the work piece mounting method , cylinder mounting orientation and piston speed.
A determination of suitability for use should be performed so that the total ($\Sigma\alpha n$) of the load factors (αn) for each weight and moment does not exceed 1.

$$\Sigma\alpha n = \frac{\text{Load weight (W)}}{\text{Max. load weight (Wmax)}} + \frac{\text{Static moment (M)}}{\text{Allowable static moment (Mmax)}} + \frac{\text{Dynamic moment (Me)}}{\text{Allowable dynamic moment (Memax)}} \leq 1$$

Load weight

Max. load weight (kg)

Model	W_{max}
REAH10	4
REAH15	9
REAH20	16
REAH25	25
REAHT25	
REAHT32	40

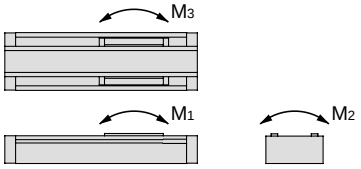


Moment

Allowable moment
(Static moment/Dynamic moment) (N·m)

Model	M_1	M_2	M_3
REAH10	1.5	2.5	1.5
REAH15	10	16	10
REAH20	13	16	13

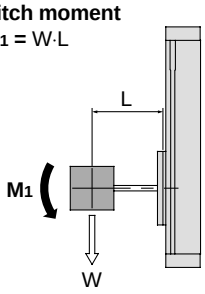
Model	M_1	M_2	M_3
REAH25	28	26	28
REAHT25	56	85	56
REAHT32	64	96	64



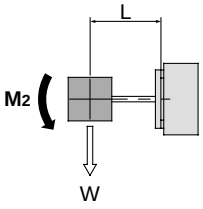
Static moment

Moment generated by the self weight of the load even when the cylinder is stopped

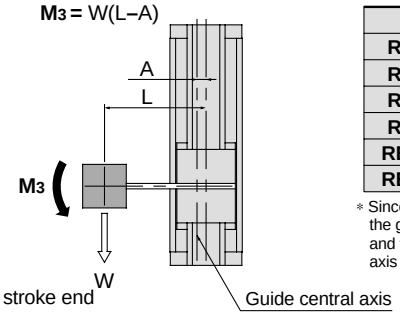
■ **Pitch moment**
M_1 = W·L



■ **Roll moment**
M_2 = W·L



■ **Yaw moment**
M_3 = W(L–A)



(mm)

Model	A
REAH10	15
REAH15	17.5
REAH20	19.5
REAH25	23.5
REAHT25	0*
REAHT32	0*

* Since there are 2 guides, the guides' central axis and the cylinder's central axis are the same.

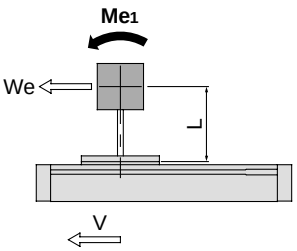
Dynamic moment

Moment generated by the load equivalent to the impact at the stroke end

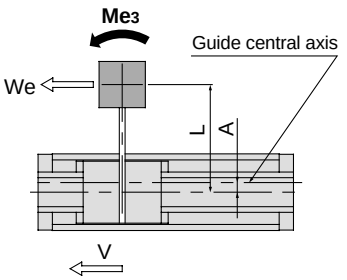
$$We = 5 \times 10^{-3} \cdot W \cdot g \cdot U$$

We: Load equivalent to impact [N]
W: Load weight [kg]
U: Maximum speed [mm/s]
g: Gravitational acceleration (approx. 9.8m/s²)

■ **Pitch moment**
Me_1 = 1/3·We·L



■ **Yaw moment**
Me_3 = 1/3·We(L–A)

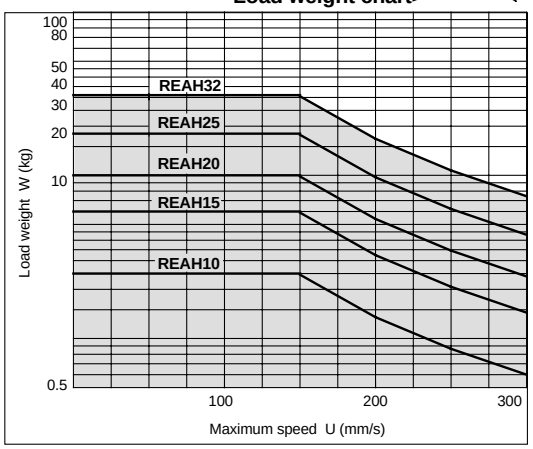


(mm)

Model	A
REAH10	15
REAH15	17.5
REAH20	19.5
REAH25	23.5
REAHT25	0*
REAHT32	0*

* Since there are 2 guides, the guides' central axis and the cylinder's central axis are the same.

<Data Ⓑ: Maximum speed Load weight chart>



Series REAH
Model Selection 3

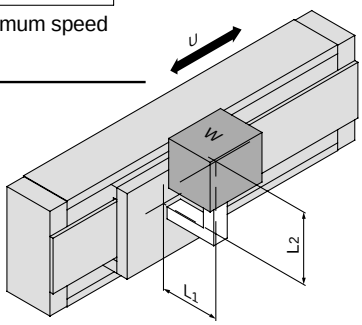
Selection Calculation

The selection calculation finds the load factors (αn) of the items below, where the total ($\Sigma\alpha n$) does not exceed 1.

$$\Sigma\alpha n = \alpha_1 + \alpha_2 + \alpha_3 \leq 1$$

Item	Load factor αn	Note
1. Max. load weight	α_1 = W/Wmax	Review W. Wmax is the maximum load weight.
2. Static moment	α_2 = M/Mmax	Review M_1, M_2, M_3. Mmax is the allowable moment.
3. Dynamic moment	α_3 = Me/Memax	Review Me_1, Me_3. Memax is the allowable moment.

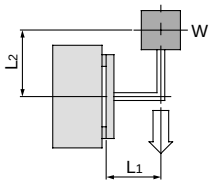
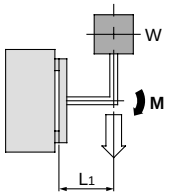
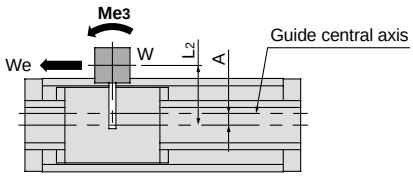
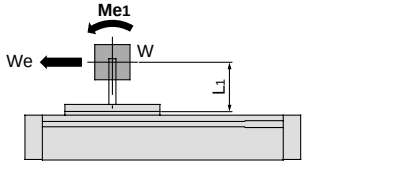
U: Maximum speed



Calculation examples

Operating conditions

Cylinder: REAH15
Mounting: Horizontal wall mounting
Maximum speed: U = 300 [mm/s]
Load weight: W = 1 [kg] (excluding weight of arm section)
L_1 = 200 [mm]
L_2 = 200 [mm]

Item	Load factor αn	Note
1. Maximum load weight 	α_1 = W/Wmax = 1/9 = **0.111**	Review W.
2. Static moment 	$M_2 = W \cdot L_1$ $= 10 \cdot 0.2$ $= 2$ [N·m] $\alpha_2 = M_2/M_2$ max = 2/16 = **0.125** W = 1 [kg] = 10 [N]	Review M_2. Since M_1 & M_3 are not generated, review is unnecessary.
3. Dynamic moment 	$We = 5 \times 10^{-3} \cdot W \cdot g \cdot U$ $= 5 \times 10^{-3} \cdot 19.8 \cdot 300$ = 15 [N] $Me_3 = 1/3 \cdot We(L_2 - A)$ $= 1/3 \cdot 15 \cdot 0.182$ = 0.91 [N·m] $\alpha_3 = Me_3/Me_3max$ = 0.91/10 **= 0.091**	Review Me_3.
	$Me_1 = 1/3 \cdot We \cdot L_1$ $= 1/3 \cdot 15 \cdot 0.2$ = 0.1 [N·m] $\alpha_4 = Me_1/Me_1$ max = 1/10 = **0.1**	Review Me_1.

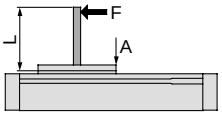
$\Sigma\alpha n = \alpha_1 + \alpha_2 + \alpha_3 + \alpha_4$
= 0.111 + 0.125 + 0.091 + 0.10
= 0.427 Can be used based on $\Sigma\alpha n = 0.427 \leq 1$

Series REAH
Model Selection 4

Design Parameters 2

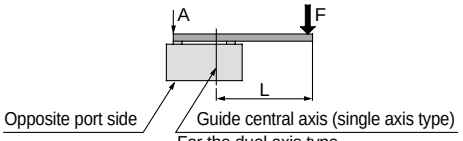
Table Deflection

Table deflection due to pitch moment load



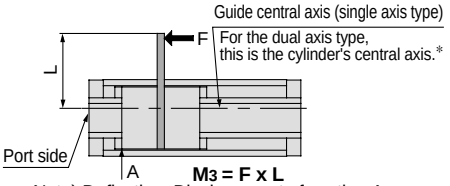
$M_1 = F \times L$

Table deflection due to roll moment load



$M_2 = F \times L$

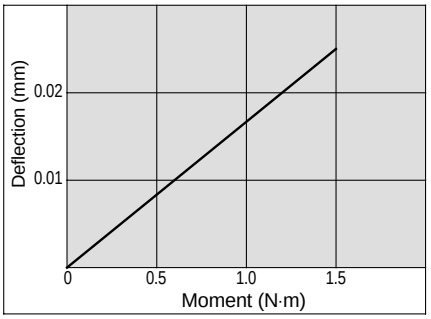
Table deflection due to yaw moment load



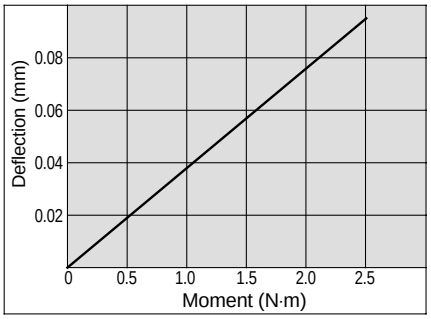
$M_3 = F \times L$

Note) Deflection: Displacement of section A when force acts on section F

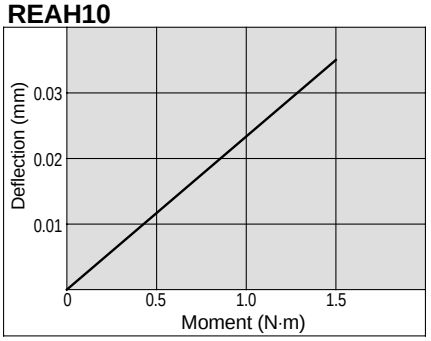
REAH10



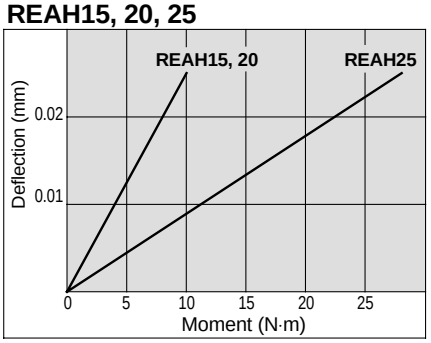
REAH10



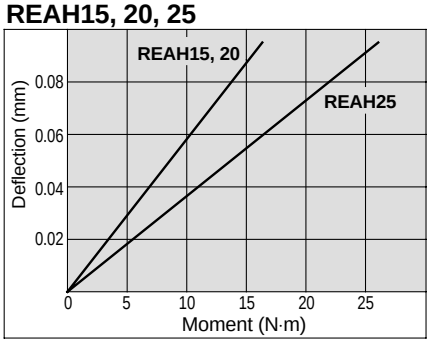
REAH10



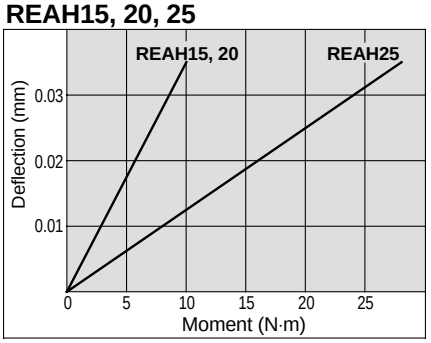
REAH15, 20, 25



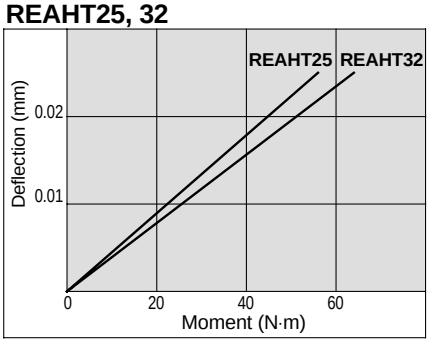
REAH15, 20, 25



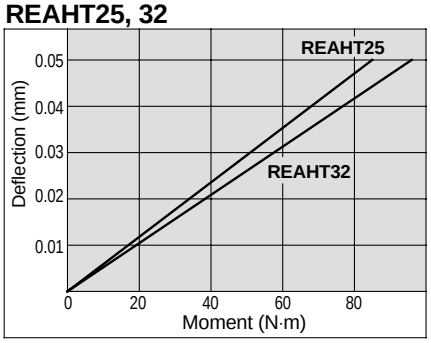
REAH15, 20, 25



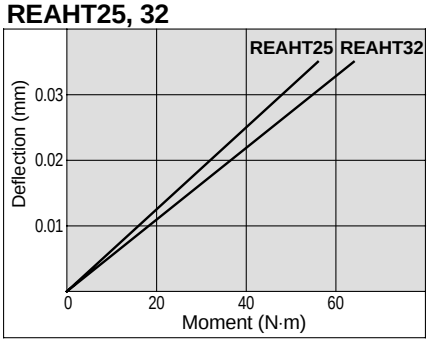
REAHT25, 32



REAHT25, 32



REAHT25, 32



Vertical Operation

When using in vertical operation, prevention of work piece dropping due to breaking of the magnetic coupling should be considered. The allowable load weight and maximum operating pressure should be as shown in the table below.

Model	Allowable load weight Wv (kg)	Max. operating pressure Pv (MPa)
REAH10	2.7	0.55
REAH15	7.0	0.65
REAH20	11.0	0.65
REAH25	18.5	0.65
REAHT25	18.5	0.65
REAHT32	30.0	0.65

Intermediate Stops

The cushion effect (smooth start-up, soft stop) exists only before the stroke end in the stroke ranges indicated in the table below.
The cushion effect (smooth start-up, soft stop) cannot be obtained in an intermediate stop or a return from an intermediate stop using an external stopper, etc.

Cushion stroke

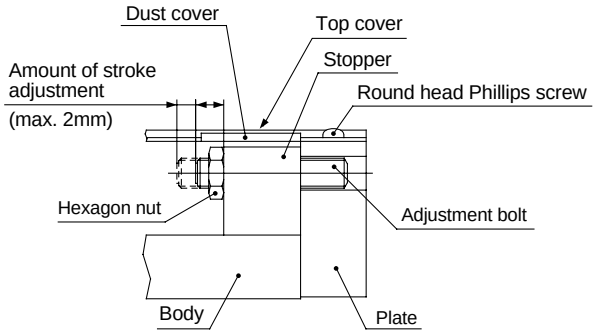
Model	Stroke (mm)
REAH10	20
REAH15	25
REAH20	30
REAH25	30
REAHT25	30
REAHT32	30

Stroke Adjustment

The adjustment bolt is adjusted to the optimum position for smooth acceleration and deceleration at the time of shipment, and should be operated at the full stroke. When stroke adjustment is necessary, the maximum amount of adjustment on one side is 2mm. (Do not adjust more than 2mm, as it will not be possible to obtain smooth acceleration and deceleration.)
Do not adjust based on the stopper's movement, as this can cause cylinder damage.

Stroke Adjustment

Loosen the round head Phillips screws, and remove the top covers and dust covers (4pcs.). Then loosen the hexagon nut, and after performing the stroke adjustment from the plate side with a hexagon wrench, retighten and secure the hexagon nut.



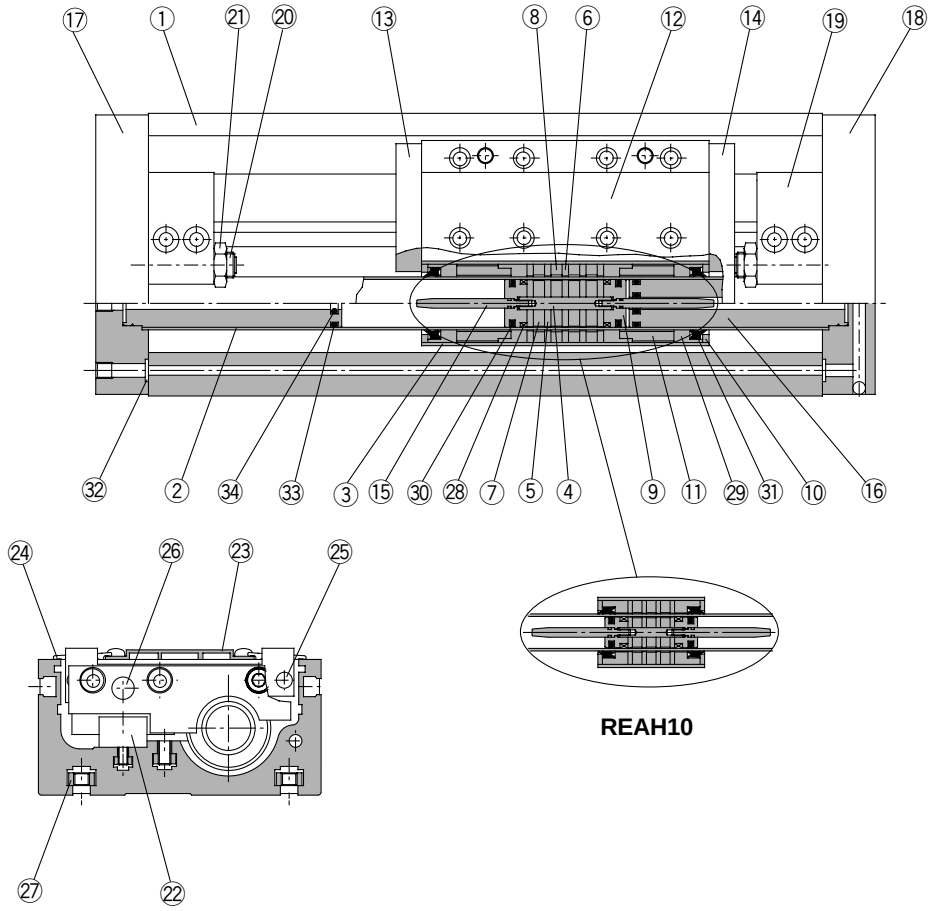
Adjustment Bolt Position (at Shipment), Hexagon Nut Tightening Torque

Model	T (mm)	Tightening torque (N·m)
REAH10	7	1.67
REAH15	7	
REAH20	7	
REAH25	9	3.14
REAHT25	9	
REAHT32	9	

After adjusting the stroke, replace the top covers and dust covers. Tighten the round head Phillips screws for securing the top covers with a torque of 0.58N·m.

Construction/ø10, ø15

Single axis type/REAH



REAH10

Parts list

No.	Description	Material	Note
1	**Body**	Aluminum alloy	Hard anodized
2	**Cylinder tube**	Stainless steel	
3	**External slider tube**	Aluminum alloy	
4	**Shaft**	Stainless steel	
5	**Piston side yoke**	Rolled steel plate	Zinc chromated
6	**External slider side yoke**	Rolled steel plate	Zinc chromated
7	**Magnet A**	Rare earth magnet	
8	**Magnet B**	Rare earth magnet	
9	**Piston**	Brass	Electroless nickel plated
10	**Spacer**	Rolled steel plate	Nickel plated
11	**Space ring**	Aluminum alloy	Chromated (except REAH10)
12	**Slide table**	Aluminum alloy	Hard anodized
13	**Side plate A**	Aluminum alloy	Hard anodized
14	**Side plate B**	Aluminum alloy	Hard anodized
15	**Cushion ring**	Stainless steel	
16	**Internal stopper**	Aluminum alloy	Anodized
17	**Plate A**	Aluminum alloy	Hard anodized

Parts list

No.	Description	Material	Note
18	**Plate B**	Aluminum alloy	Hard anodized
19	**Stopper**	Aluminum alloy	Anodized
20	**Adjustment bolt**	Chromium molybdenum steel	Nickel plated
21	**Hexagon nut**	Carbon steel	Nickel plated
22	**Linear guide**		
23	**Top cover**	Aluminum alloy	Hard anodized
24	**Dust cover**	Special resin	
25	**Magnet (for auto switch)**	Rare earth magnet	
26	**Parallel pin**	Carbon steel	Nickel plated
27	**Square nut for body mounting**	Carbon steel	Nickel plated (accessory)
28*	**Wear ring A**	Special resin	
29*	**Wear ring B**	Special resin	
30*	**Piston seal**	NBR	
31*	**Scraper**	NBR	
32*	**O-ring**	NBR	
33*	**O-ring**	NBR	
34*	**Cushion seal**	NBR	

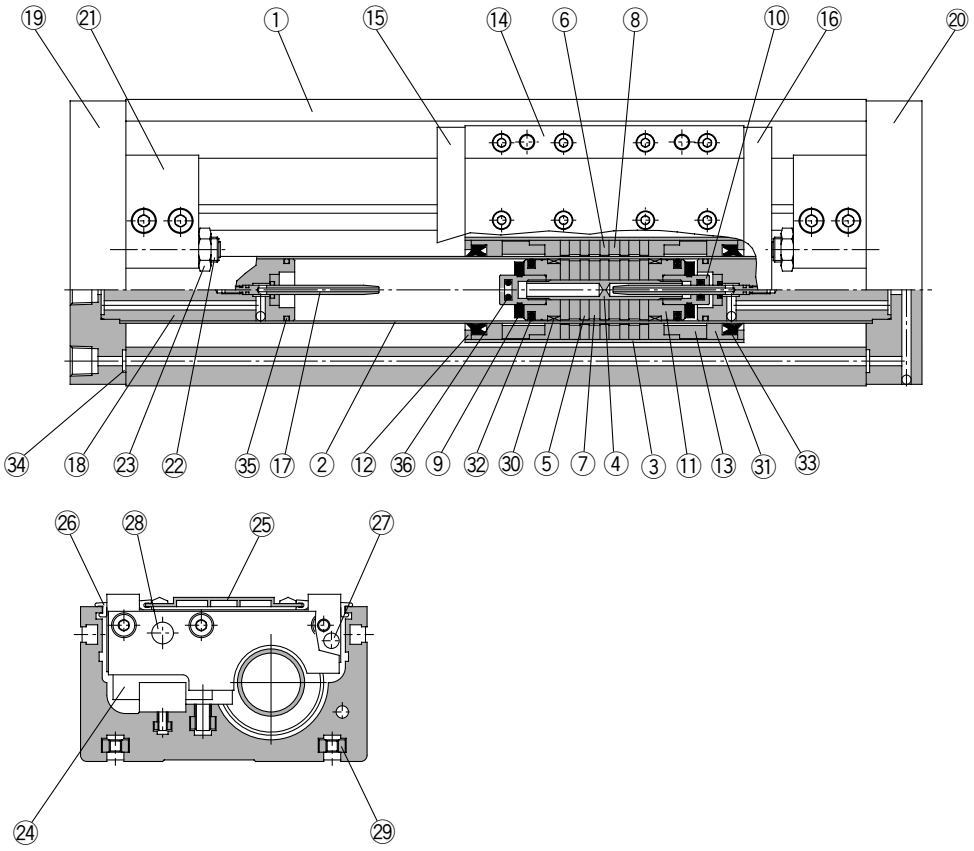
* Seal kits are sets consisting of items 28 through 34 above, and can be ordered using the kit number for each bore size.

Replacement parts: Seal kits

Bore size (mm)	Kit no.	Contents
10	**REAH10-PS**	Above numbers 28, 29, 30, 31, 32, 33, 34
15	**REAH15-PS**	

Construction/ø20, ø25

Single axis type/REAH



Parts list

No.	Description	Material	Note
1	**Body**	Aluminum alloy	Hard anodized
2	**Cylinder tube**	Stainless steel	
3	**External slider tube**	Aluminum alloy	
4	**Shaft**	Stainless steel	
5	**Piston side yoke**	Rolled steel plate	Zinc chromated
6	**External slider side yoke**	Rolled steel plate	Zinc chromated
7	**Magnet A**	Rare earth magnet	
8	**Magnet B**	Rare earth magnet	
9	**Bumper**	Urethane rubber	
10	**Cushion seal holder**	Aluminum alloy	Chromated
11	**Piston**	Aluminum alloy	Chromated
12	**Spacer**	Rolled steel plate	Nickel plated
13	**Space ring**	Aluminum alloy	Chromated
14	**Slide table**	Aluminum alloy	Hard anodized
15	**Side plate A**	Aluminum alloy	Hard anodized
16	**Side plate B**	Aluminum alloy	Hard anodized
17	**Cushion ring**	Stainless steel	
18	**Internal stopper**	Aluminum alloy	Anodized

Parts list

No.	Description	Material	Note
19	**Plate A**	Aluminum alloy	Hard anodized
20	**Plate B**	Aluminum alloy	Hard anodized
21	**Stopper**	Aluminum alloy	Anodized
22	**Adjustment bolt**	Chromium molybdenum steel	Nickel plated
23	**Hexagon nut**	Carbon steel	Nickel plated
24	**Linear guide**		
25	**Top cover**	Aluminum alloy	Hard anodized
26	**Dust cover**	Special resin	
27	**Magnet (for auto switch)**	Rare earth magnet	
28	**Parallel pin**	Carbon steel	Nickel plated
29	**Square nut for body mounting**	Carbon steel	Nickel plated (accessory)
30*	**Wear ring A**	Special resin	
31*	**Wear ring B**	Special resin	
32*	**Piston seal**	NBR	
33*	**Scraper**	NBR	
34*	**O-ring**	NBR	
35*	**O-ring**	NBR	
36*	**Cushion seal**	NBR	

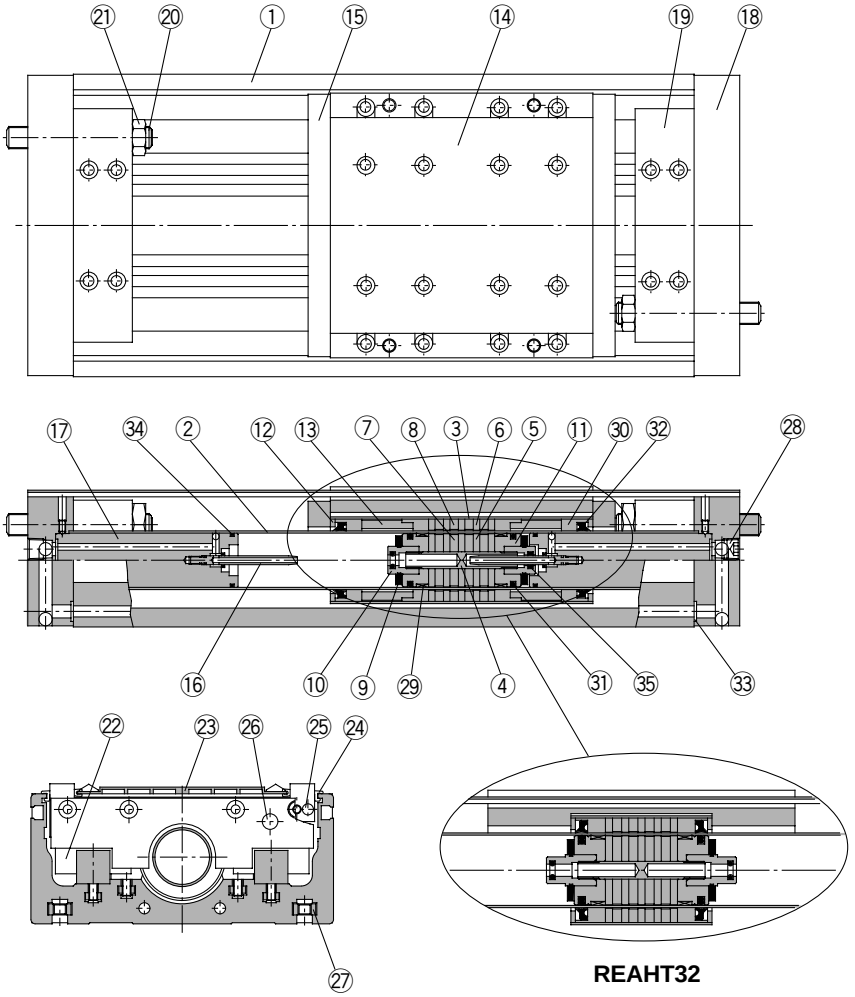
* Seal kits are sets consisting of items 30 through 36 above, and can be ordered using the kit number for each bore size.

Replacement parts: Seal kits

Bore size (mm)	Kit no.	Contents
20	**REAH20-PS**	Above numbers
25	**REAH25-PS**	30, 31, 32, 33, 34, 35, 36

Construction/ø25, ø32

Dual axis type/REAHT



REAHT32

Parts list

No.	Description	Material	Note
1	**Body**	Aluminum alloy	Hard anodized
2	**Cylinder tube**	Stainless steel	
3	**External slider tube**	Aluminum alloy	
4	**Shaft**	Stainless steel	
5	**Piston side yoke**	Rolled steel plate	Zinc chromated
6	**External slider side yoke**	Rolled steel plate	Zinc chromated
7	**Magnet A**	Rare earth magnet	
8	**Magnet B**	Rare earth magnet	
9	**Bumper**	Urethane rubber	
10	**Cushion seal holder**	Aluminum alloy	Chromated
11	**Piston**	Aluminum alloy	Chromated
12	**Spacer**	Rolled steel plate	Nickel plated
13	**Space ring**	Aluminum alloy	Chromated (except REAHT32)
14	**Slide table**	Aluminum alloy	Hard anodized
15	**Side plate**	Aluminum alloy	Hard anodized (except REAHT32)
16	**Cushion ring**	Brass	Electroless nickel plated (REAHT32)
		Stainless steel	REAHT25
17	**Internal stopper**	Aluminum alloy	Anodized

Parts list

No.	Description	Material	Note
18	**Plate**	Aluminum alloy	Hard anodized
19	**Stopper**	Aluminum alloy	Anodized
20	**Adjustment bolt**	Chromium molybdenum steel	Nickel plated
21	**Hexagon nut**	Carbon steel	Nickel plated
22	**Linear guide**		
23	**Top cover**	Aluminum alloy	Hard anodized
24	**Dust cover**	Special resin	
25	**Magnet (for auto switch)**	Rare earth magnet	
26	**Parallel pin**	Carbon steel	Nickel plated
27	**Square nut for body mounting**	Carbon steel	Nickel plated (accessory)
28	**Hexagon socket taper plug**	Carbon steel	Nickel plated
29*	**Wear ring A**	Special resin	
30*	**Wear ring B**	Special resin	
31*	**Piston seal**	NBR	
32*	**Scraper**	NBR	
33*	**O-ring**	NBR	
34*	**O-ring**	NBR	
35*	**Cushion seal**	NBR	

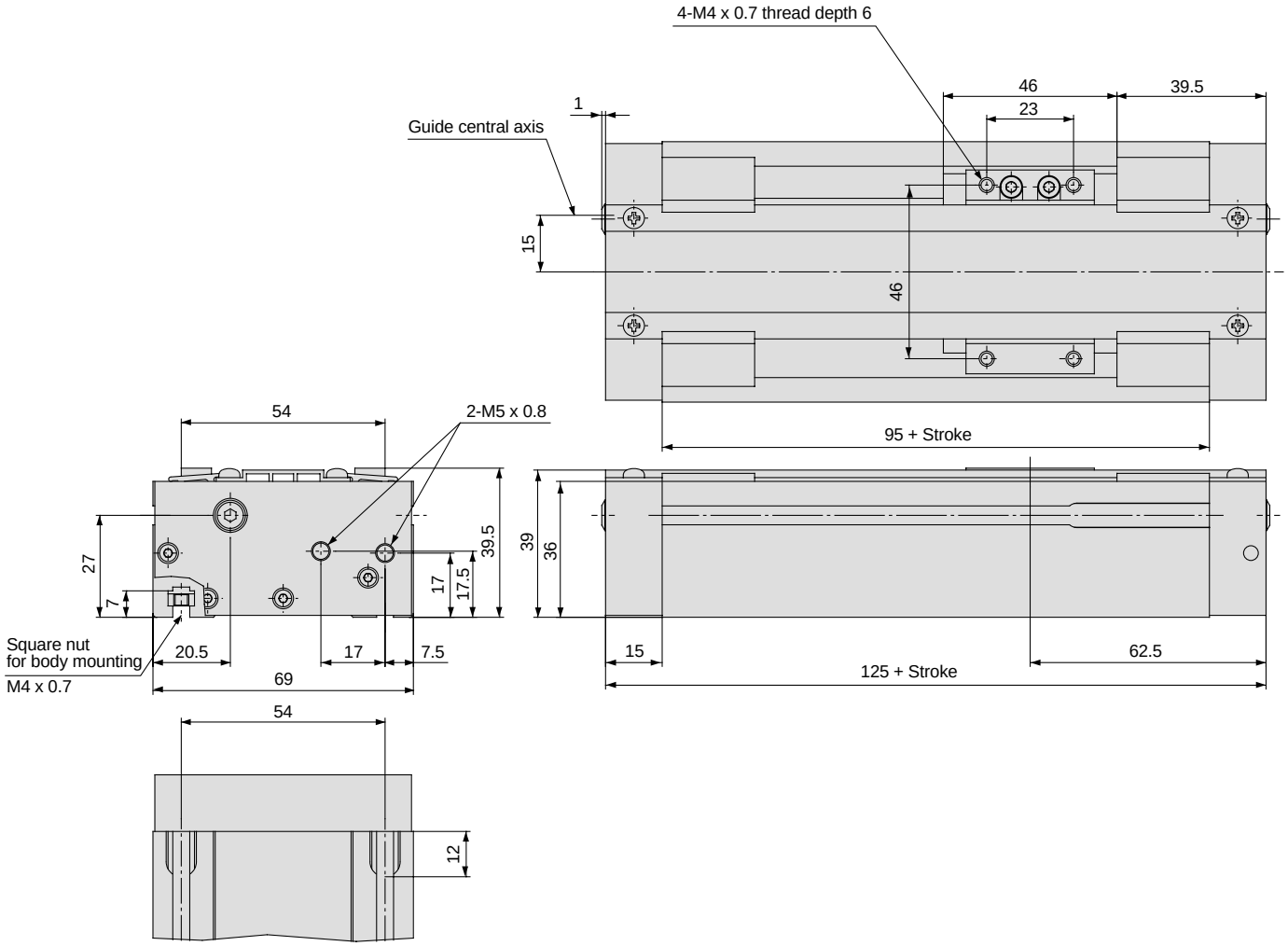
* Seal kits are sets consisting of items 29 through 35 above, and can be ordered using the kit number for each bore size.

Replacement parts: Seal kits

Bore size (mm)	Kit no.	Contents
25	**REAHT25-PS**	Above numbers 29, 30, 31, 32, 33, 34, 35
32	**REAHT32-PS**	

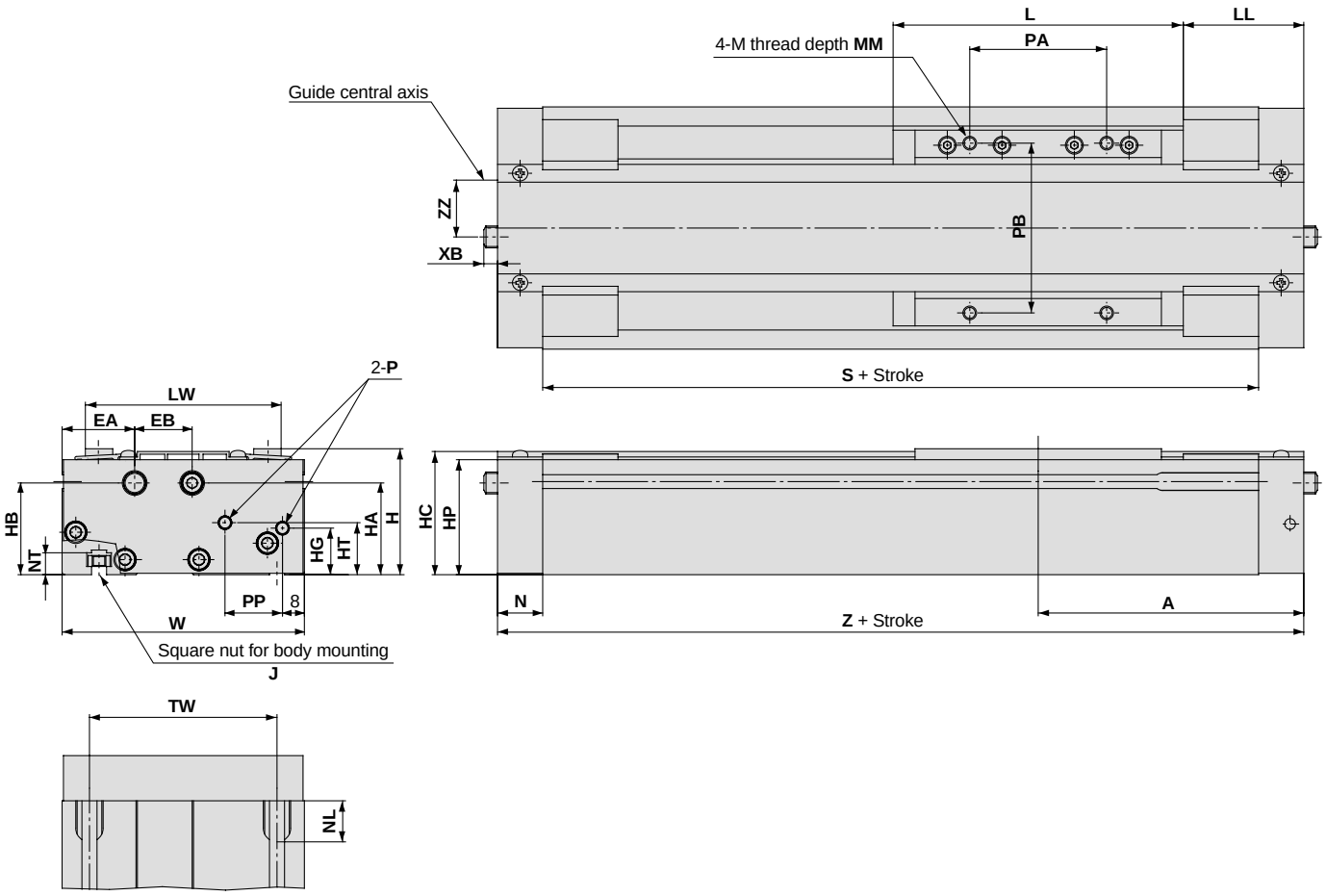
Dimensions/ø10

Single axis type/REAH



Dimensions/ø15, ø20, ø25

Single axis type/REAH



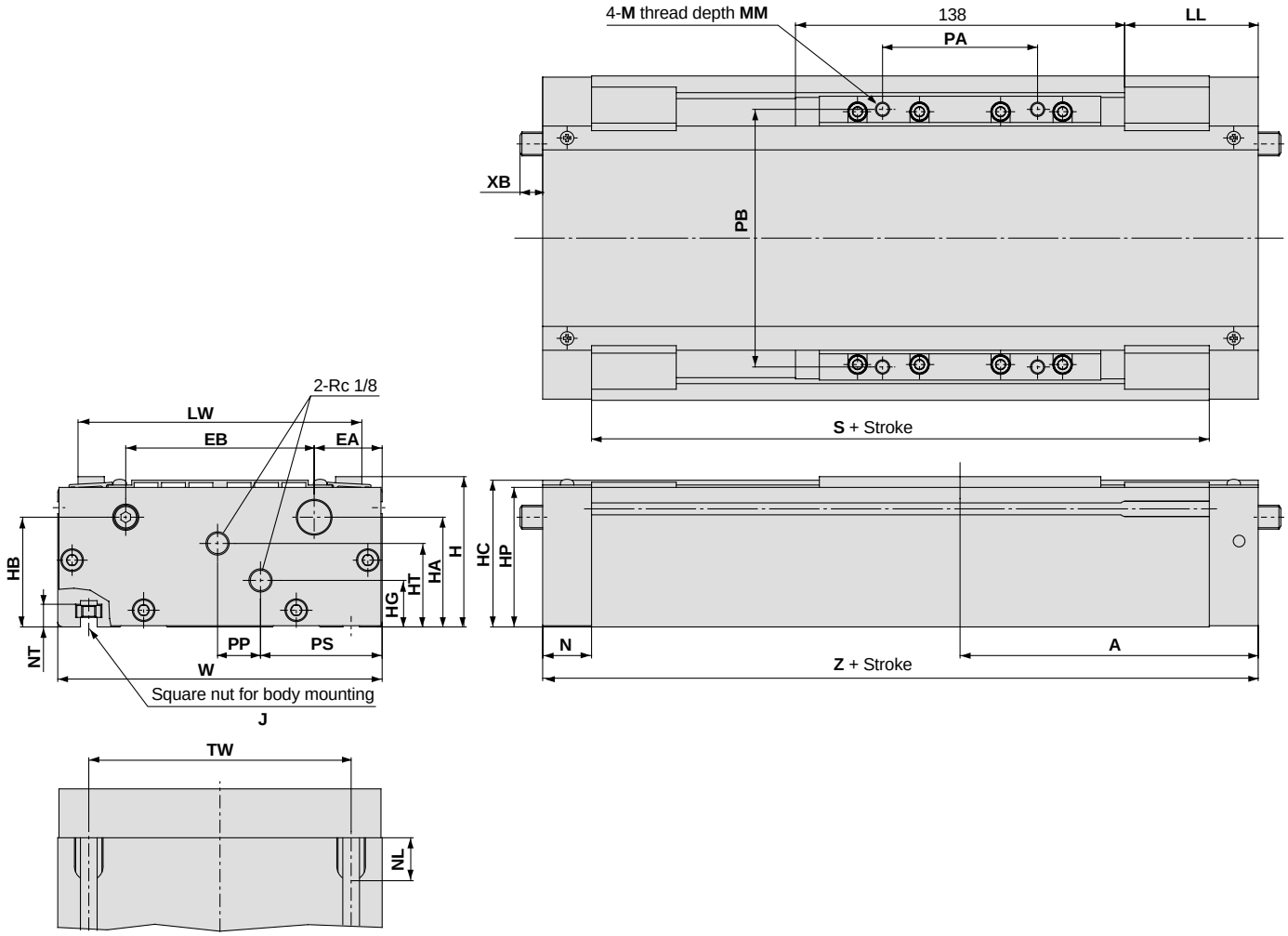
(mm)

Model	A	EA	EB	H	HA	HB	HC	HG	HP	HT	J	L	LL	LW	M	MM
REAH15	97	26.5	21	46	33.5	33.5	45	17	42	19	M5 x 0.8	106	44	71.5	M5 x 0.8	8
REAH20	102.5	26.5	22	54	42.5	41.5	53	16	50	23.5	M5 x 0.8	108	48.5	75.5	M5 x 0.8	8
REAH25	125	29	24	63	46	46	61.5	25	58.5	28	M6 x 1.0	138	56	86	M6 x 1.0	10

Model	N	NL	NT	P	PA	PB	PP	S	TW	W	XB	Z	ZZ
REAH15	16.5	15	8	M5 x 0.8	50	62	21	161	65	88.5	–	194	17.5
REAH20	18	15	8	Rc 1/8	50	65	23	169	70	92.5	–	205	19.5
REAH25	20.5	18	9	Rc 1/8	65	75	27	209	75	103	9.5	250	23.5

Dimensions/ø25, ø32

Dual axis type/REAHT

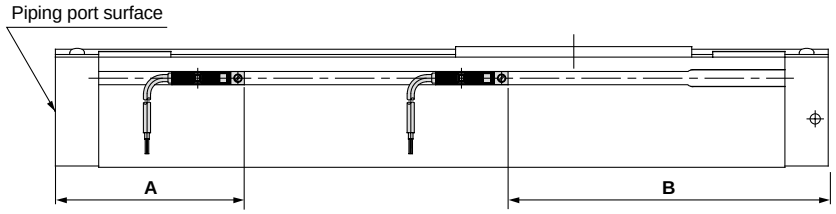


(mm)

Model	A	EA	EB	H	HA	HB	HC	HG	HP	HT	J	LL	LW	M	MM	N
REAHT25	125	28.5	79	63	46	46	61.5	19.5	58.5	35	M6 x 1.0	56	119	M6 x 1.0	10	20.5
REAHT32	132.5	30	90	75	52.5	57.5	72.5	25	69.5	43	M8 x 1.25	63.5	130	M8 x 1.25	12	23

Model	NL	NT	PA	PB	PP	PS	S	TW	W	XB	Z
REAHT25	18	9	65	108	18	51	209	110	136	9.5	250
REAHT32	22.5	12	66	115	14	61	219	124	150	2	265

Proper Auto Switch Mounting Position for Stroke End Detection



Proper auto switch mounting position

(mm)

Cylinder model \ Auto switch model	A			B		
	D-Z7□ D-Z80	D-Y7□W D-Y7□WV	D-Y5□ D-Y6□ D-Y7P D-Y7PV	D-Z7□ D-Z80	D-Y7□W D-Y7□WV	D-Y5□ D-Y6□ D-Y7P D-Y7PV
REAH10	65.5	65.5	65.5	59.5	59.5	59.5
REAH15	72	72	72	122	122	122
REAH20	77.5	77.5	77.5	127.5	127.5	127.5
REAH25	86	86	86	164	164	164
REAHT25	86	86	86	164	164	164
REAHT32	82	82	82	183	183	183

Auto switch operating range

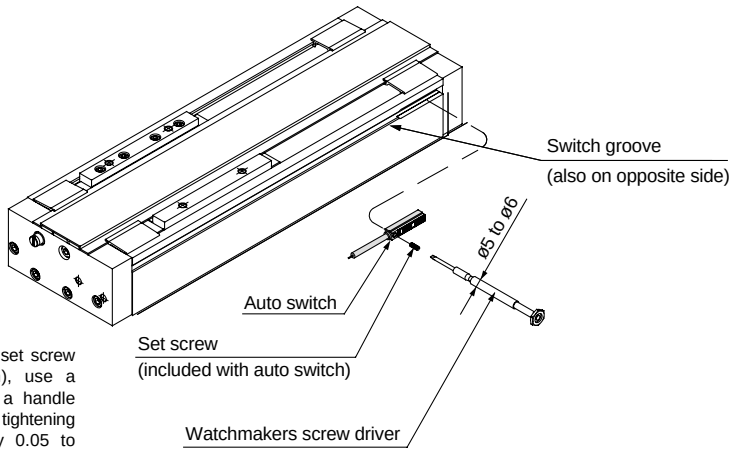
(mm)

Cylinder model \ Auto switch model	D-Z7□ D-Z80	D-Y7□W D-Y7□WV D-Y5□ D-Y6□ D-Y7P D-Y7PV
REAH10	8	6
REAH15	6	5
REAH20	6	5
REAH25	6	5
REAHT25	6	5
REAHT32	9	6

Note) Operating ranges are standards including hysteresis, and are not guaranteed. Large variations may occur depending on the surrounding environment. (variations on the order of ±30%)

Auto Switch Mounting

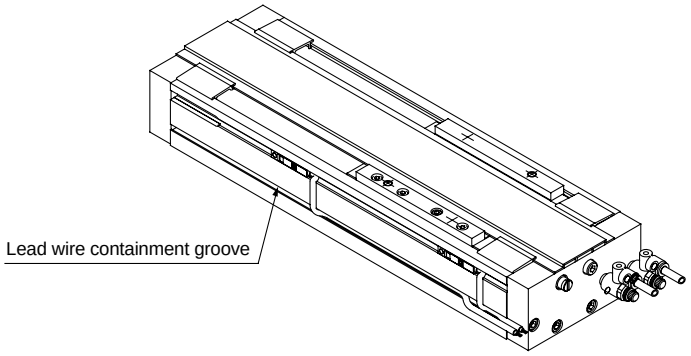
When mounting auto switches, they should be inserted into the cylinder's switch groove from the direction shown in the drawing on the right. After setting in the mounting position, use a flat head watchmakers screw driver to tighten the set screw which is included.



Note) When tightening the auto switch set screw (included with the auto switch), use a watchmakers screw driver with a handle about 5 to 6mm in diameter. The tightening torque should be approximately 0.05 to 0.1N·m.

Auto Switch Lead Wire Containment Groove

On models REAH20 and REAH25 a groove is provided on the side of the body (one side only) to contain auto switch lead wires. This should be used for placement of wiring.



Sine Rodless Cylinder

Series REBR
Direct Mount Type/ø15, ø25, ø32

How to Order

REB R 25 — 300 [ ] — Z73 [ ]

Sine rodless cylinder

Direct mount type

Bore size

15	15mm
25	25mm
32	32mm

Standard stroke
Refer to the standard stroke table on page 59.

Switch rails

Nil	With switch rails
N	Without switch rails

Note 1) When equipped with switch rails, magnets for switches are built in.
Note 2) In case of ø15, magnets for switches are built in even when not equipped with switches.

Auto switch type

Nil	Without auto switch

∗ Refer to the table below for auto switch models.

Number of auto switches

Nil	2 pcs.
S	1 pc.
n	"n" pcs.

Applicable auto switches / Refer to "Auto Switch Guide" (E274-A) for further details on auto switch units.
Refer to pages 84 and 85 for auto switch circuit diagrams.

For ø15

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage			Auto switch model	Lead wire length (m) Note 1)			Applicable load	
					DC		AC		0.5 (Nil)	3 (L)	5 (Z)		
Reed switch	–	Grommet	No	2 wire	24V	5, 12V	100V or less	**A90**	●	●	–	IC circuit	Relay, PLC
			Yes			12V	100V	**A93**	●	●	–	–	
				3 wire (NPN equiv.)	–	5V	–	**A96**	●	●	–	IC circuit	–
Solid state switch	–	Grommet	Yes	3 wire (NPN)	24V	12V	–	**F9N**	●	●	–	–	Relay, PLC
				3 wire (PNP)				**F9P**	●	●	–		
				2 wire				**F9B**	●	●	–		

Note 1) Lead wire length symbol 0.5m ..... Nil (Example) F9N
3m ..... L F9NL

For ø25, ø32

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage			Auto switch model	Lead wire length (m) Note 1)			Applicable load	
					DC		AC		0.5 (Nil)	3 (L)	5 (Z)		
Reed switch	–	Grommet	Yes	3 wire	–	5V	–	**Z76**	●	●	–	IC circuit	–
				2 wire	24V	12V	100V	**Z73**	●	●	●	–	Relay, PLC
			No			5, 12V	100V or less	**Z80**	●	●	–	IC circuit	
Solid state switch	–	Grommet	Yes	3 wire (NPN)	24V	5, 12V	–	**Y59A**	●	●	○	IC circuit	Relay, PLC
				3 wire (PNP)				**Y7P**	●	●	○		
				2 wire		12V		**Y59B**	●	●	○	–	
	Diagnostic indication (2 color indicator)			3 wire (NPN)		5, 12V		**Y7NW**	●	●	○	IC circuit	
				3 wire (PNP)				**Y7PW**	●	●	○		
				2 wire		12V		**Y7BW**	●	●	○	–	

Note 1) Lead wire length symbol 0.5m ..... Nil (Example) Y59A
3m ..... L Y59AL
5m ..... Z Y59AZ

Note 2) Solid state auto switches marked with a "○" are produced upon receipt of order.

Specifications

Fluid	Air
Proof pressure	1.05MPa
Maximum operating pressure	0.7MPa
Minimum operating pressure	0.18MPa
Ambient and fluid temperature	–10 to 60°C
Piston speed	50 to 600mm/s
Lubrication	Non-lube
Stroke length tolerance	0 to 250st: $^{+1.0}_{0}$, 251 to 1000st: $^{+1.4}_{0}$, 1001st and up: $^{+1.8}_{0}$
Mounting	Direct mount type

Standard Strokes

Bore size (mm)	Standard stroke (mm)	Maximum manufacturable stroke (mm)	Maximum stroke with switch (mm)
15	150, 200, 250, 300, 350, 400 450, 500	1000	750
25	200, 250, 300, 350, 400, 450 500, 600, 700, 800	2000	1500
32			

Note) Intermediate strokes can be arranged in 1mm increments.

Magnetic Holding Force

(N)

Bore size (mm)	**15**	**25**	**32**
Holding force	137	363	588

Weights

(kg)

Item \ Bore size (mm)		**15**	**25**	**32**
Basic weight (for 0st)	**REBR□ (with switch rail)**	0.277	0.660	1.27
	REBR□-□N (without switch rail)	0.230	0.580	1.15
Additional weight per 50mm stroke (when equipped with switch rail)		0.045	0.083	0.113
Additional weight per 50mm stroke (when not equipped with switch rail)		0.020	0.050	0.070

Calculation method/Example: REBR25-500 (with switch rail)
Basic weight ... 0.660kg, Additional weight ... 0.083kg/50mm, Cylinder stroke ... 500mm
0.660 + 0.083 x 500 ÷ 50 = 1.49kg

⚠ Specific Product Precautions

Be sure to read before handling. Refer to pages 92 through 94 for safety instructions and actuator precautions.

Mounting

⚠ Caution

1. Take care to avoid nicks or other damage on the outside surface of the cylinder tube.

This can lead to a damage of the scraper and wear ring, which in turn can cause malfunction.

2. Pay attention to the rotation of the external slider.

Rotation should be controlled by connecting it to another shaft (linear guide, etc.).

3. Do not operate with the magnetic coupling out of position.

In case the magnetic coupling is out of position, push the external slider back into the correct position by hand at the end of the stroke (or correct the piston slider with air pressure).

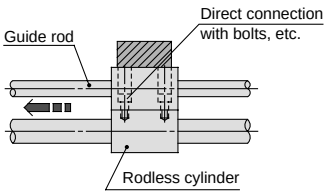
4. The cylinder is mounted with bolts through the mounting holes in the end covers. Be sure they are tightened securely.

5. Be sure that both end covers are secured to the mounting surface before operating the cylinder.

Avoid operation with the external slider secured to the surface.

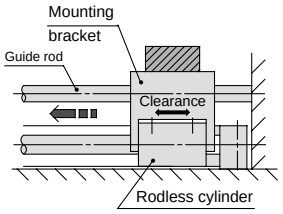
6. Do not apply a lateral load to the external slider.

When a load is mounted directly to the cylinder, variations in the alignment of each shaft center cannot be offset, which results in the generation of a lateral load that can cause malfunction. The cylinder should be operated using a connection method which allows for shaft alignment variations and deflection due to the cylinder's own weight. A drawing of a recommended mounting is shown in Figure 2.



Variations in the load and cylinder shaft alignment cannot be offset and may result in a malfunction.

Figure 1.
Incorrect mounting



Shaft alignment variations are offset by providing clearance between the mounting bracket and cylinder. Moreover, the mounting bracket is extended above the cylinder shaft center, so that the cylinder is not subjected to moment.

Figure 2.
Recommended mounting

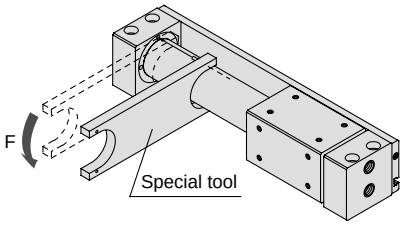
7. Use caution regarding the allowable load weight when operating in a vertical direction.

The allowable load weight when operating in a vertical direction (reference values on page 63) is determined by the model selection method. However, if a load greater than the allowable value is applied, the magnetic coupling may break and there is a possibility of dropping the load. When using this type of application, contact SMC regarding the operating conditions (pressure, load, speed, stroke, frequency, etc.).

Disassembly & Maintenance

⚠ Caution

1. Special tools are necessary for disassembly.



Special tool number list

No.	Applicable bore size (mm)
CYRZ-V	15
CYRZ-W	25, 32

Series REBR
Model Selection 1

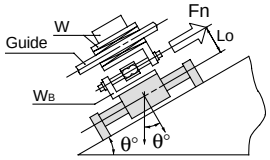
Fn: Allowable driving force (N)
MD: Maximum allowable moment when connection fitting, etc., is directly loaded (N·m)
Pv: Maximum operating pressure for vertical operation (MPa)
WBmax: Maximum load weight when loaded directly on the body (kg)
Wv: Allowable load weight for vertical operation (kg)

Operating conditions

- **W:** Load weight (kg)
- **WB:** Connection fitting weight (kg)
- **μ:** Guide's coefficient of friction
- **Lo:** Distance from cylinder shaft center to work piece point of application (cm)
- **L1:** Distance from cylinder shaft center to center of gravity of connection fitting, etc. (mm)
- **Presence of switches**
- **P:** Operating pressure (MPa)
- **U:** Maximum Speed (mm/s)
- **Stroke (mm)**
- **Mode of operation (horizontal, inclined, vertical)**

Mode of operation

Horizontal operation | **Inclined operation** | **Vertical operation**



Inclined operation

Allowable driving force (Fn) (n = 1, 2, 3)

Horizontal	$F_1 = \mu \times (W + W_B) \times 9.8$
Inclined	$F_2 = (W + W_B) \times 9.8 \times (\mu\cos\theta + \sin\theta)$
Vertical	$F_3 = (W + W_B) \times 9.8 \times (\mu + 1)$

Refer to the allowable driving force table for (Fn) of data A.

First tentative bore size determination $\varnothing D \geq 1.6 \times \sqrt{\frac{F_1}{P}}$

First tentative bore size determination $\varnothing D \geq 1.6 \times \sqrt{\frac{F_2}{P}}$

First tentative bore size determination $\varnothing D \geq 1.6 \times \sqrt{\frac{F_3}{P}}$

Review of load weight and operating pressure

Determination of allowable load weight & pressure

$W + W_B \leq W_V$, $P \leq P_V$ — (See page 63 for maximum load weight when loaded directly on the body.)

$W + W_B > W_V$, $P > P_V$ — (See page 63 for vertical operation.)

Determination of connection fitting weight (W_B)

$W_B > W_{Bmax}$ — **Review of connection fitting**

$W_B \leq W_{Bmax}$

Review of switches and stroke (See the standard stroke table on p.59.)

Presence of switch rails — Yes

Presence of switches — Yes

Determination of stroke with switches — NG / OK

No

No

(Refer to page 62 for data A.)

Second tentative determination of bore size using the graph of allowable driving force (Fn) and distance from cylinder shaft center (Lo)

Presence of external guide system — Yes

No

(See page 64 for body non-rotating accuracy and maximum allowable moment.)

Note 2) $W_B \times L_1 > M_D$

Determination of rotational moment

$W_B \times L_1 \leq M_D$

(See page 64 for body non-rotating accuracy and maximum allowable moment.)

(Refer to page 62 for data B.)

Third tentative determination of bore size using the graph of maximum speed (U) and load weight (W).

(Bore size is the largest of 3 tentative determinations.)

Bore size determination

Note 2) NG

Determination of allowable stroke — OK

Note 1)

Review of order made products based on operating conditions

(Refer to pages 87 through 91.)

Model determination

Note 1) Depending on the operating environment, etc., order made products should also be reviewed.

Note 2) An external guide system should be used if the specification is exceeded.

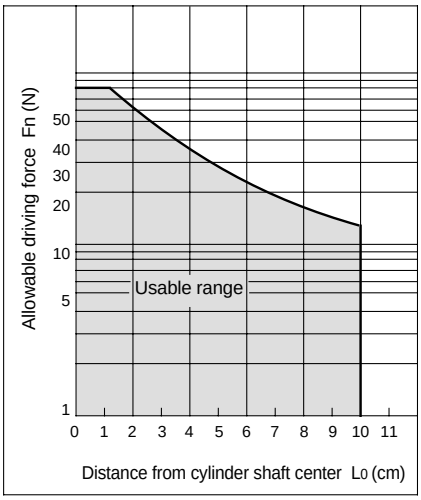
Series REBR
Model Selection 2

Design Parameters 1

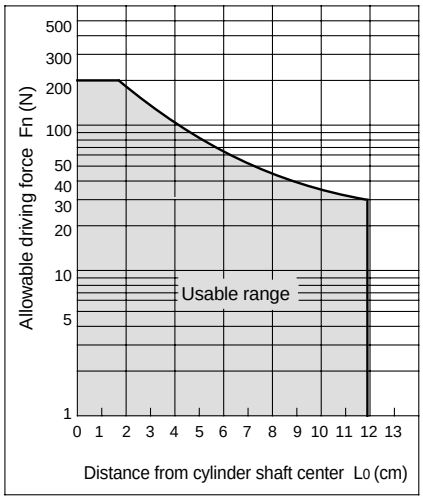
Selection Method

<Data A: Distance from cylinder shaft center ——— Allowable driving capacity>

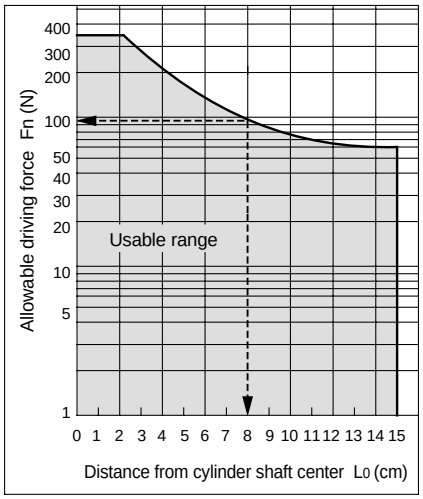
REBR15



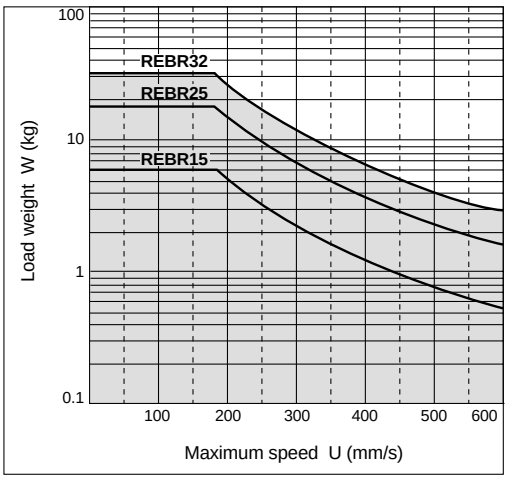
REBR25



REBR32



<Data B: Maximum speed ——— Load weight chart >

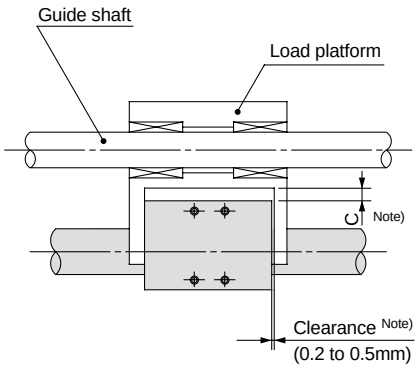


Series REBR
Model Selection 3

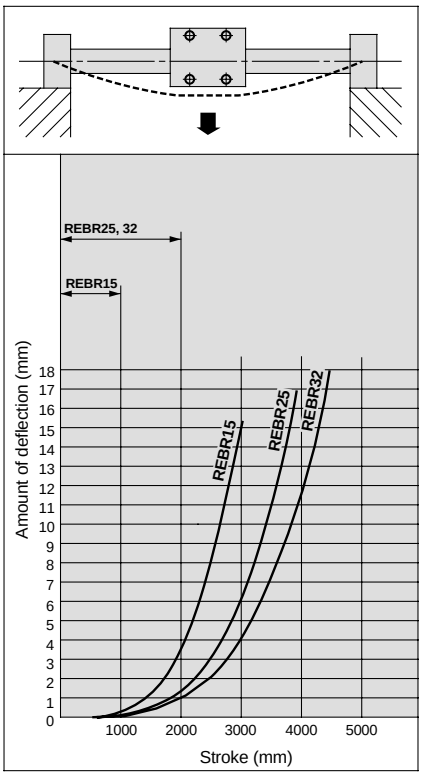
Design Parameters 2

Cylinder Self Weight Deflection

When the cylinder is mounted horizontally, deflection appears due to its own weight as shown in the data, and the longer the stroke, the greater the amount of variation in the shaft centers. Therefore, a connection method should be considered which allows for this variation as shown in the drawing.



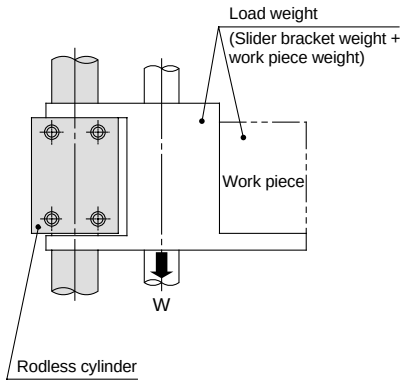
Note) Referring to the self weight deflection in the figure below, provide clearance so that the cylinder is able to operate smoothly through the full stroke within the minimum operating pressure range, without touching the mounting surface or the load, etc.



∗ The above deflection data indicate values when the external slider has moved to the middle of the stroke.

Vertical Operation

The load should be guided by a ball type bearing (LM guide, etc.). If a slide bearing is used, sliding resistance will increase due to the load weight and moment, and this can cause malfunction.



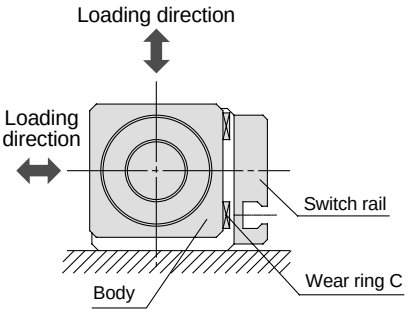
Cylinder bore size (mm)	Model	Allowable load weight Wv (kg)	Max. operating pressure Pv (MPa)
15	**REBR15**	7.0	0.65
25	**REBR25**	18.5	0.65
32	**REBR32**	30.0	0.65

Note) Use caution, as operation above the maximum operating pressure can result in breaking of the magnetic coupling.

Maximum Load Weight when Loaded Directly on Body

When the load is applied directly to the body, it should be no greater than the maximum values shown in the table below.

Model	Maximum load weight Wɛmax (kg)
REBR 15	1.0
REBR 25	1.2
REBR 32	1.5



Series REBR
Model Selection 4

Design Parameters 3

Intermediate Stops

The cushion effect (smooth start-up, soft stop) exists only before the stroke in the stroke ranges indicated in the table below.
The cushion effect (smooth start-up, soft stop) cannot be obtained in an intermediate stop or a return from an intermediate stop using an external stopper, etc.

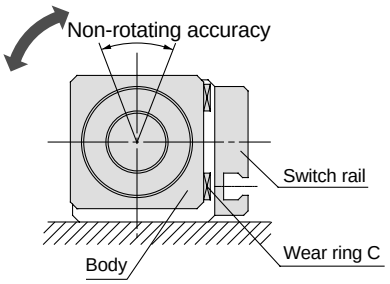
Cushion Stroke

Model	Stroke (mm)
REBR15	25
REBR25	30
REBR32	30

Body Non-rotating Accuracy and Maximum Allowable Moment (with Switch Rail) (Reference Values)

Reference values for non-rotating accuracy and maximum allowable moment at stroke end are indicated below.

Bore size (mm)	Non-rotating accuracy (°)	Max. allowable moment (M_D) (N·m)	Allowable stroke (mm) Note 2)
15	4.5	0.15	200
25	3.7	0.25	300
32	3.1	0.40	400

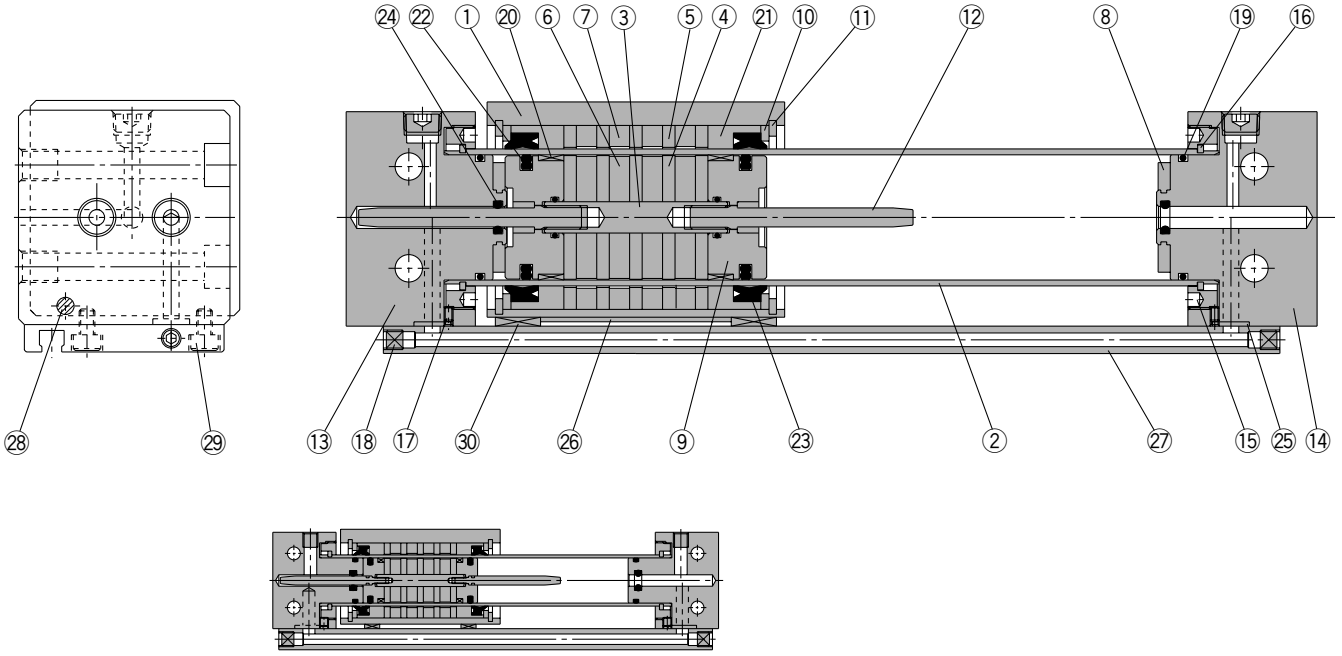


Note 1) Avoid operations where rotational torque (moment) is applied. In such a case, the use of an external guide is recommended.

Note 2) The above reference values will be satisfied within the allowable stroke ranges. However, caution is necessary because as the stroke becomes longer the inclination (rotation angle) within the stroke can be expected to increase.

Note 3) When a load is applied directly to the body, the loaded weight should be no greater than the allowable load weights on page 63.

Construction/ø15, ø25, ø32



REBR15

Parts list

No.	Description	Material	Note
1	**Body**	Aluminum alloy	Hard anodized
2	**Cylinder tube**	Stainless steel	
3	**Shaft**	Stainless steel	
4	**Piston side yoke**	Rolled steel plate	Zinc chromated
5	**External slider side yoke**	Rolled steel plate	Zinc chromated
6	**Magnet A**	Rare earth magnet	
7	**Magnet B**	Rare earth magnet	
8	**Bumper**	Urethane rubber	Except REBR15
9	**Piston**	Aluminum alloy	Chromated
10	**Spacer**	Rolled steel plate	Nickel plated
11	**Snap ring**	Carbon tool steel	Nickel plated
12	**Cushion ring**	Stainless steel	REBR15, 25: Compound electroless nickel plated
		Brass	REBR32: Compound electroless nickel plated
13	**End cover A**	Aluminum alloy	Hard anodized
14	**End cover B**	Aluminum alloy	Hard anodized
15	**Attachment ring**	Aluminum alloy	Hard anodized
16	**C type snap ring for shaft**	Hard steel wire	Nickel plated (REBR15)
		Stainless steel	REBR25,32
17	**Hexagon socket head set screw**	Chromium steel	Nickel plated
18	**Hexagon socket head plug**	Chromium steel	Nickel plated
19	**Cylinder tube gasket**	NBR	

Parts list

No.	Description	Material	Note
20	**Wear ring A**	Special resin	
21	**Wear ring B**	Special resin	
22	**Piston seal**	NBR	
23	**Scraper**	NBR	
24	**Cushion seal**	NBR	
25	**Switch rail gasket**	NBR	
26	**Magnetic shielding plate**	Rolled steel plate	Chromated
27	**Switch rail**	Aluminum alloy	Clear anodized
28	**Magnet**	Rare earth magnet	
29	**Hexagon socket head screw**	Chromium steel	Nickel plated
30	**Wear ring C**	Special resin	

Replacement parts: Seal kits

Bore size (mm)	Kit no.	Content
15	**REBR15-PS**	Above numbers 19, 20, 21, 22, 23, 24, 25, 30
25	**REBR25-PS**	
32	**REBR32-PS**	

Switch Rail Accessory Kits

CYR 25 E — □

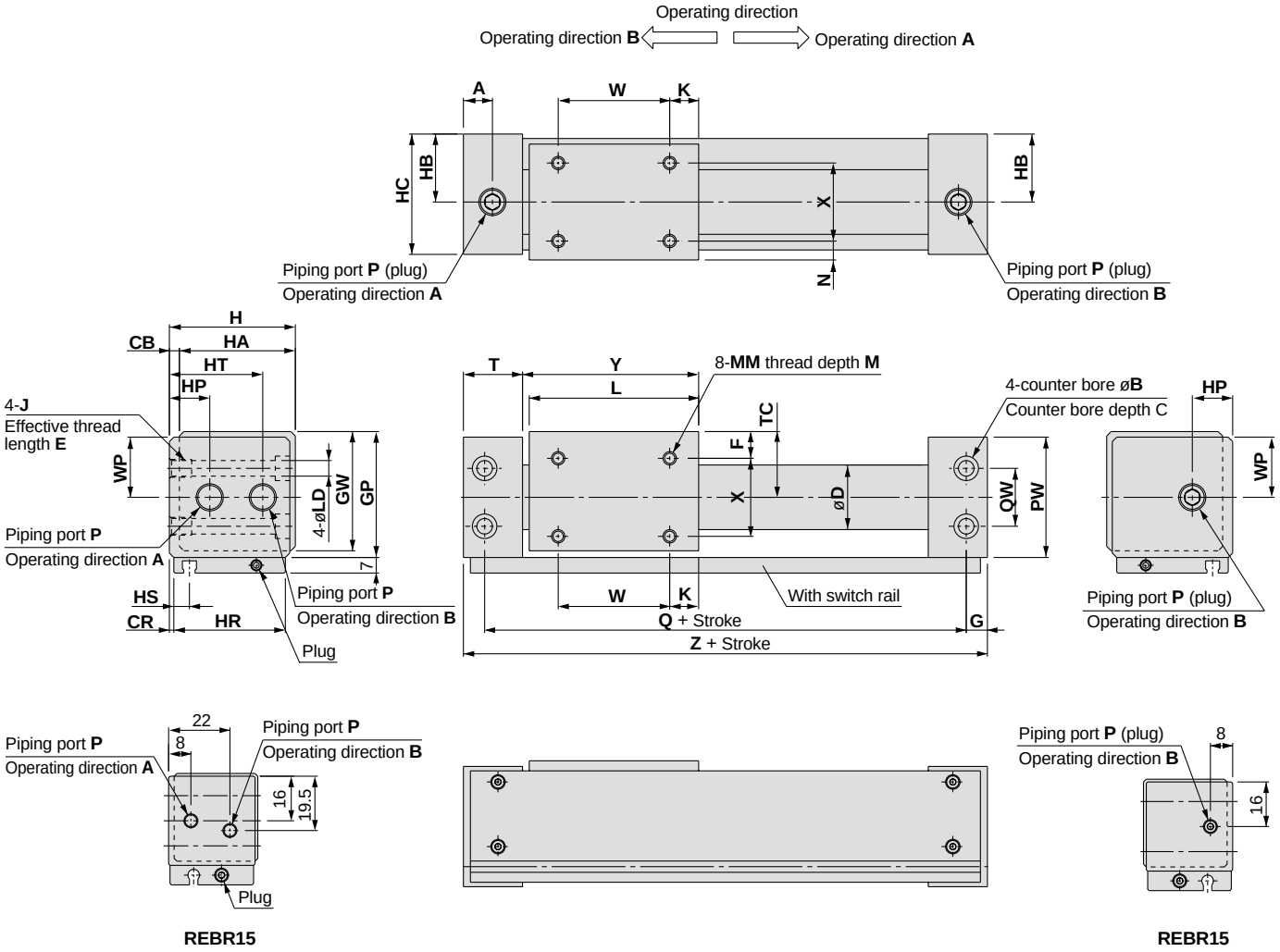
Bore size ● ● Stroke

Switch rail accessory kits

Bore size (mm)	Kit no.	Content
15	**CYR15E-□**	Above numbers 26, 27, 28, 29, 30
25	**CYR25E-□**	
32	**CYR32E-□**	

Note 1) □ indicates the stroke.
Note 2) ø15 has internal magnets in the body.

Dimensions/ø15, ø25, ø32



REBR15 **REBR15**

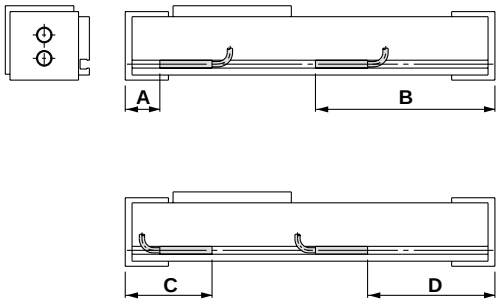
(mm)

Model	A	B	C	CB	CR	D	F	G	GP	GW	H	HA	HB	HC	HP	HR	HS	HT
REBR15	12.5	8	4.2	2	0.5	17	8	5	33	31.5	32	30	17	31	—	30	8.5	—
REBR25	12.5	9.5	5.2	3	1	27.8	8.5	10	44	42.5	44	41	23.5	43	14.5	41	6.5	23.5
REBR32	19.5	11	6.5	3	1.5	35	10.5	16	55	53.5	55	52	29	54	20	51	7	29

Model	J x E	K	L	LD	M	MM	N	P	PW	Q	QW	T	TC	W	WP
REBR15	M5 x 0.8 x 7	14	53	4.3	5	M4 x 0.7	6	M5 x 0.8	32	84	18	21	17	25	—
REBR25	M6 x 1 x 8	15	70	5.6	6	M5 x 0.8	6.5	Rc 1/8	43	105	20	25.5	22.5	40	21.5
REBR32	M8 x 1.25 x 10	13	76	7	7	M6 x 1	8.5	Rc 1/8	54	116	26	33	28	50	27

Model	X	Y	Z
REBR15	18	54.5	98
REBR25	28	72	125
REBR32	35	79	148

Proper Auto Switch Mounting Position for Stroke End Detection



ø15 (mm)

Bore size (mm) \ Auto switch model	A		B		C		D	
	D-A9□	D-F9□	D-A9□	D-F9□	D-A9□	D-F9□	D-A9□	D-F9□
15	17.5	21.5	76.5	72.5	—	—	56.5	60.5

Note) Auto switches cannot be installed in Area C in the case of ø15.

ø25, ø32 (mm)

Bore size (mm) \ Auto switch model	A		B		C		D	
	D-Z7□ D-Z8□	D-Y5□ D-Y7□ D-Y7□W	D-Z7□ D-Z8□	D-Y5□ D-Y7□ D-Y7□W	D-Z7□ D-Z8□	D-Y5□ D-Y7□ D-Y7□W	D-Z7□ D-Z8□	D-Y5□ D-Y7□ D-Y7□W
25	22	22	101	103	47	47	78	78
32	30.5	30.5	117.5	117.5	55.5	55.5	92.5	92.5

Auto Switch Operation Range

(mm)

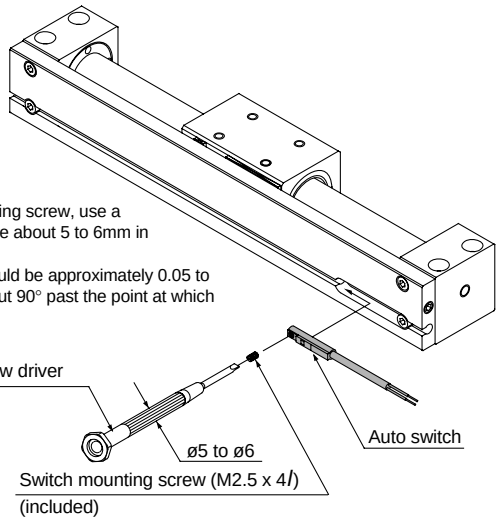
Bore size (mm) \ Auto switch model	D-A9□	D-F9□	D-Z7□ D-Z8□	D-Y5□ D-Y7□ D-Y7□W
15	8	5	—	—
25	—	—	9	7
32	—	—	9	6

Note 1) Switches cannot be mounted in some cases.

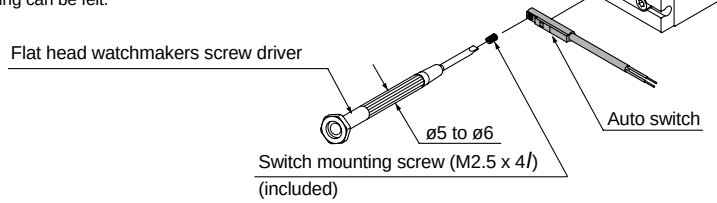
Note 2) Operating ranges are standards including hysteresis, and are not guaranteed. Large variations may occur depending on the surrounding environment (variation on the order of ±30%).

Auto Switch Mounting

When mounting auto switches, they should be inserted into the cylinder's switch groove from the direction shown in the drawing on the right. After setting in the mounting position, use a flat head watchmakers screw driver to tighten the mounting screw which is included.



Note) When tightening the auto switch mounting screw, use a watchmakers screw driver with a handle about 5 to 6mm in diameter.
Furthermore, the tightening torque should be approximately 0.05 to 0.1N·m. As a rule, it can be turned about 90° past the point at which tightening can be felt.



Auto Switch Specifications

(1) Switches (switch rail) can be added to the standard type (without switch rail). Switch rail accessory kits are mentioned on page 65 and can be ordered together with auto switches.

(2) Refer to the separate disassembly instructions for switch magnet installation procedures.

Sine Rodless Cylinder

Series REBH
High Precision GuideType

How to Order

REB H □ 25 — 300 — Z73 □

Sine rodless cylinder

High precision guide type

Guide

Symbol \ Bore size (mm)		15	25	32
Nil	1 axis	●	●	—
T	2 axes	—	●	●

Bore size

15	15mm
25	25mm
32	32mm

Standard stroke (mm)

Refer to the standard stroke table on page 69.

Auto switch type

Nil	Without auto switch

∗ Refer to the table below for auto switch models.

Number of auto switches

Nil	2 pcs.
S	1 pc.
n	"n" pcs.

Applicable auto switches / Refer to "Auto Switch Guide" (E-274-A) for further details on auto switch units. Refer to pages 84 and 85 for auto switch circuit diagrams.

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage DC		Load voltage AC	Auto switch model: Electrical entry direction Perpendicular	Auto switch model: Electrical entry direction In-line	Lead wire Note 1) length (m): 0.5 (Nil)	3 (L)	5 (Z)	Applicable load	
Reed switches	–	Grommet	Yes	3 wire (NPN equiv.)	–	5V	–	–	**Z76**	●	●	–	IC circuit	–
				2 wire	24V	12V	100V	–	**Z73**	●	●	●	–	Relay, PLC
			No			5V, 12V	100V or less	–	**Z80**	●	●	–	IC circuit	
Solid state switches	–	Grommet	Yes	3 wire (NPN)	24V	5V, 12V	–	**Y69A**	**Y59A**	●	●	○	IC circuit	Relay, PLC
				3 wire (PNP)				**Y7PV**	**Y7P**	●	●	○		
				2 wire		12V		**Y69B**	**Y59B**	●	●	○	–	
	Diagnostic indication (2 color indicator)			3 wire (NPN)		5V, 12V		**Y7NWV**	**Y7NW**	●	●	○	IC circuit	
				3 wire (PNP)				**Y7PWV**	**Y7PW**	●	●	○		
				2 wire		12V		**Y7BWV**	**Y7BW**	●	●	○	–	

Note 1) Lead wire length symbol 0.5m ..... Nil (Example) Y59A
3m ..... L (Example) Y59AL
5m ..... Z (Example) Y59AZ

Note 2) Solid state auto switches marked with a "○" are produced upon receipt of order.

Specifications

Bore size (mm)	15	25	32
Fluid	Air		
Action	Double acting		
Maximum operating pressure	0.7MPa		
Minimum operating pressure	0.2MPa		
Proof pressure	1.05MPa		
Ambient and fluid temperature	–10 to 60°C		
Piston speed	70 to 600mm/s		
Lubrication	Non-lube		
Stroke length tolerance	0 to 1.8mm		
Piping type	Centralized piping		
Piping port size	M5 x 0.8	Rc 1/8	

Standard Strokes

Bore size (mm)	Number of axes	Standard stroke (mm)	Maximum manufacturable stroke (mm)
15	1 axis	150, 200, 300, 400, 500	750
25		200, 300, 400, 500, 600, 800	1200
25	2 axes	200, 300, 400, 500, 600, 800, 1000	
32			1500

Note 1) Strokes exceeding the standard strokes are available as a special order.
Note 2) Intermediate strokes other than order made (refer to page 91 for XB10) are available by special order.

Weights

(kg)

Model	Standard stroke mm							
	150	200	300	400	500	600	800	1000
REBH15	2.5	2.7	3.2	3.6	4.1	—	—	—
REBH25	—	5.3	6.0	6.6	7.3	8.0	9.4	—
REBHT25	—	6.2	7.3	8.3	9.4	10.4	12.5	14.6
REBHT32	—	9.6	10.7	11.9	13.0	14.2	16.5	18.8

Magnetic Holding Force

(N)

Bore size (mm)	15	25	32
Holding force	137	363	588

Theoretical Output

(N)

Bore size (mm)	Piston area (mm²)	Operating pressure (MPa)					
		0.2	0.3	0.4	0.5	0.6	0.7
15	176	35	52	70	88	105	123
25	490	98	147	196	245	294	343
32	804	161	241	322	402	483	563

Note) Theoretical output (N) = Pressure (MPa) x Piston area (mm²).

⚠ Specific Product Precautions

Be sure to read before handling. Refer to pages 92 through 94 for safety instructions and actuator precautions.

Mounting

⚠ Caution

1. The interior is protected to a certain extent by the top cover, however, when performing maintenance, etc., take care not to cause scratches or other damage to the cylinder tube, slide table or linear guide by striking them or placing objects on them.

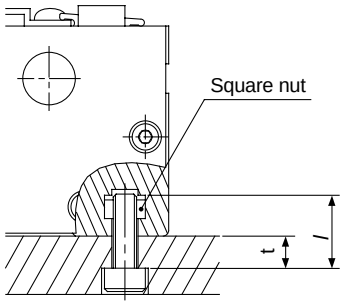
The bore and exterior of tubes are manufactured to precise tolerances, so that even a slight deformation can cause malfunction.

2. Since the slide table is supported by precision bearings, do not apply strong impacts or large moment, etc., when mounting work pieces.

3. Mounting of the cylinder body

The body is mounted using the square nuts, which are included, in the two T-slots on the bottom of the body. Refer to the table below for mounting bolt dimensions and tightening torque.

Model		REBH15	REBH25	REBHT25	REBHT32
Bolt dimensions	Screw size	M5 x 0.8	M6 x 1.0		M8 x 1.25
	Dimension t	*l*-8	*l*-9		*l*-12
Tightening torque	N·m	2.65	4.4		13.2



Operation

⚠ Caution

1. The unit can be used with a direct load within the allowable range, but when connecting to a load which has an external guide mechanism, careful alignment is necessary.

Since variation of the shaft center increases as the stroke becomes longer, a connection method should be devised which allows for this displacement.

2. Since the guide is adjusted at the time of shipment, unintentional movement of the adjustment setting should be avoided.

3. Contact SMC before operating in an environment where there will be contact with chips, dust (paper scraps, thread scraps, etc.) or cutting oil (gas oil, water, hot water, etc.).

4. Do not operate with the magnetic coupling out of position.

In case the magnetic coupling is out of position, push the external slider back into the correct position by hand at the end of the stroke (or correct the piston slider with air pressure).

Series REBH
Model Selection 1

Pv: Maximum operating pressure for vertical operation (MPa)
Wv: Allowable load weight for vertical operation (kg)
α: Load factor

$$\Sigma\alpha = \frac{\text{Load weight (W)}}{\text{Max. load weight (Wmax)}} + \frac{\text{Static moment (M)}}{\text{Allowable static moment (Mmax)}} + \frac{\text{Dynamic moment (Me)}}{\text{Allowable dynamic moment (Memax)}}$$

Operating conditions

- W: Load weight (kg)
- U: Maximum Speed (mm/s)
- P: Operating pressure (MPa)
- Stroke (mm)
- Position of work piece center of gravity (m)
- Mode of operation (horizontal, inclined, vertical)

Mode of operation

Horizontal operation

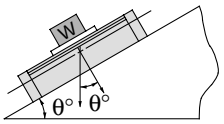
First tentative bore size determination

$$\text{øD} \geq 1.6 \times \sqrt{\frac{W}{P}}$$

Inclined operation

First tentative bore size determination

$$\text{øD} \geq 5.0 \times \sqrt{\frac{0.1 \times W\cos\theta + W\sin\theta}{P}}$$



Inclined operation

Vertical operation

First tentative bore size determination

$$\text{øD} \geq 5.0 \times \sqrt{\frac{0.1 \times W + W}{P}}$$

Determination of allowable load weight & pressure

W > Wv
P > Pv

Review of load weight and operating pressure

W ≤ Wv
P ≤ Pv

(Refer to page 75 for vertical operation.)

Determination of load factor (Σα)

(Refer to page 72.)

$\Sigma\alpha > 1$

Review of operating conditions

$$\Sigma\alpha = \frac{\text{Load weight (W)}}{\text{Max. load weight (Wmax)}} + \frac{\text{Static moment (M)}}{\text{Allowable static moment (Mmax)}} + \frac{\text{Dynamic moment (Me)}}{\text{Allowable dynamic moment (Memax)}}$$

$\Sigma\alpha \leq 1$

(Refer to Data B on page 73.)

Second tentative determination of bore size from graph of maximum speed (U) and load weight (W).

Bore size determination

(The larger bore size is selected from two tentative determinations)

Note 1)

Review of order made products based on operating conditions

Note 1) Depending on the operating environment, etc., order made products should also be reviewed.

(Refer to pages 87 through 91.)

Model determination

Series REBH
Model Selection 2

Design Parameters 1

The maximum load weight and allowable moment will differ depending on the work piece mounting method , cylinder mounting orientation and piston speed.
A determination of suitability for use should be performed so that the total ($\Sigma\alpha n$) of the load factors (αn) for each weight and moment does not exceed 1.

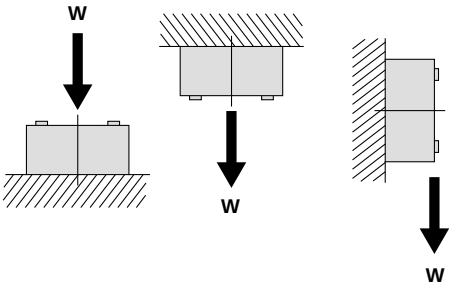
$$\Sigma\alpha n = \frac{\text{Load weight (W)}}{\text{Max. load weight (Wmax)}} + \frac{\text{Static moment (M)}}{\text{Allowable static moment (Mmax)}} + \frac{\text{Dynamic moment (Me)}}{\text{Allowable dynamic moment (Memax)}} \leq 1$$

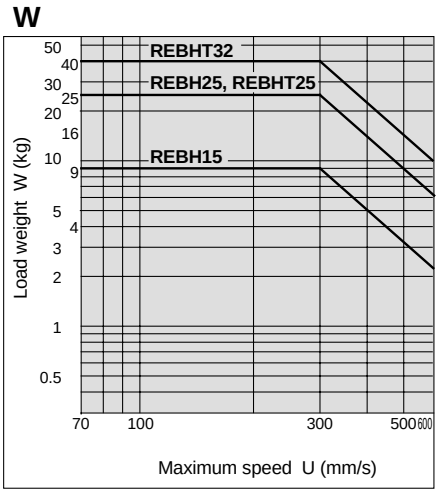
Design Parameters

Load weight

Max. load weight (kg)

Model	W_{max}
REBH15	9
REBH25	25
REBHT25	
REBHT32	40





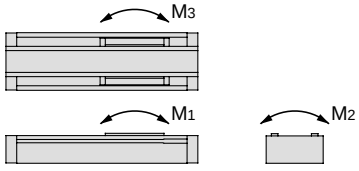
<Graph 1>

Moment

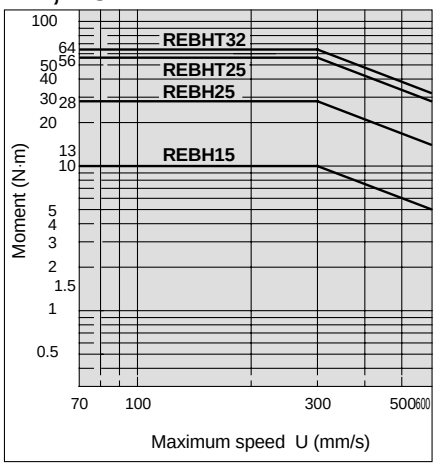
Allowable moment
(Static moment/Dynamic moment)

(N·m)

Model	M_1	M_2	M_3
REBH15	10	16	10
REBH25	28	26	28
REBHT25	56	85	56
REBHT32	64	96	64

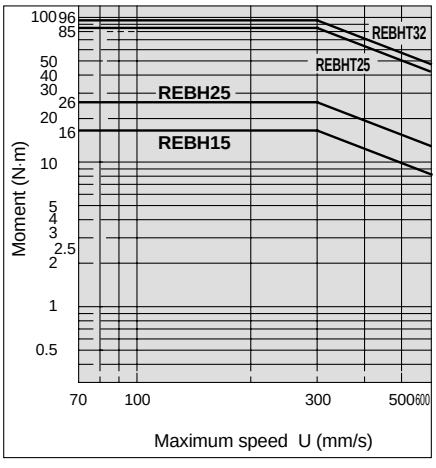


M1, M3



<Graph 2>

M2

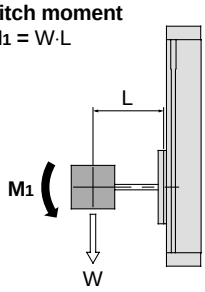


<Graph 3>

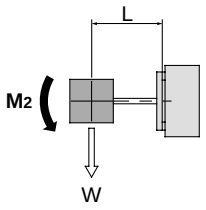
Static moment

Moment generated by the self weight of the load even when the cylinder is stopped

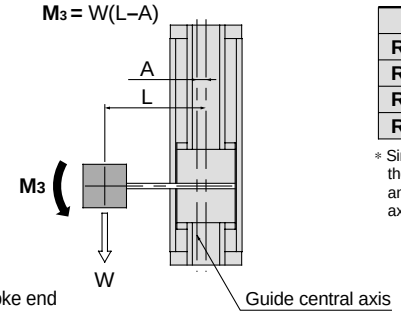
■ **Pitch moment**
M_1 = W·L



■ **Roll moment**
M_2 = W·L



■ **Yaw moment**
M_3 = W(L–A)



(mm)

Model	A
REBH15	17.5
REBH25	23.5
REBHT25	0*
REBHT32	0*

* Since there are 2 guides, the guides' central axis and the cylinder's central axis are the same.

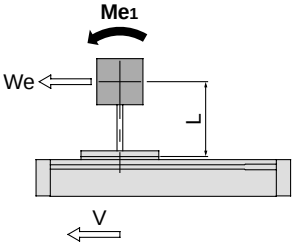
Dynamic moment

Moment generated by the load equivalent to the impact at the stroke end

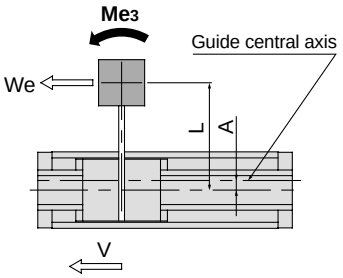
$We = 5 \times 10^{-3} \cdot W \cdot g \cdot U$

We : Load equivalent to impact [N]
W : Load weight [kg]
U : Maximum speed [mm/s]
g : Gravitational acceleration (9.8m/s²)

■ **Pitch moment**
Me_1 = 1/3·We·L



■ **Yaw moment**
Me_3 = 1/3·We(L–A)

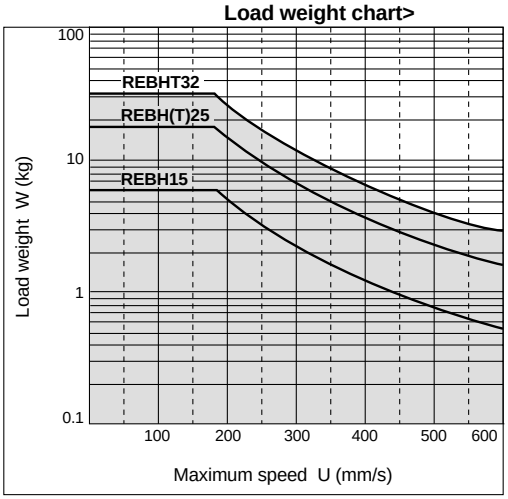


(mm)

Model	A
REBH15	17.5
REBH25	23.5
REBHT25	0*
REBHT32	0*

* Since there are 2 guides, the guides' central axis and the cylinder's central axis are the same.

<Data B: Maximum speed Load weight chart>



Series REBH
Model Selection 3

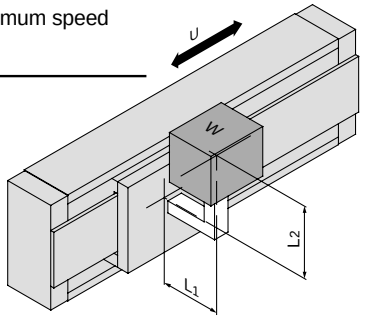
Selection Calculation

The selection calculation finds the load factors (αn) of the items below, where the total ($\Sigma\alpha n$) does not exceed 1.

$$\Sigma\alpha n = \alpha_1 + \alpha_2 + \alpha_3 \leq 1$$

Item	Load factor αn	Note
1. Max. load weight	α_1 = W/Wmax	Review W. Wmax is the maximum load weight.
2. Static moment	α_2 = M/Mmax	Review M_1, M_2, M_3. Mmax is the allowable moment.
3. Dynamic moment	α_3 = Me/Memax	Review Me_1, Me_3. Memax is the allowable moment.

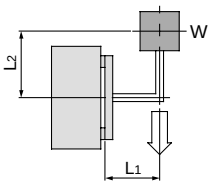
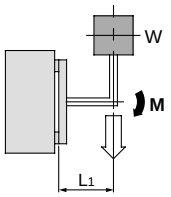
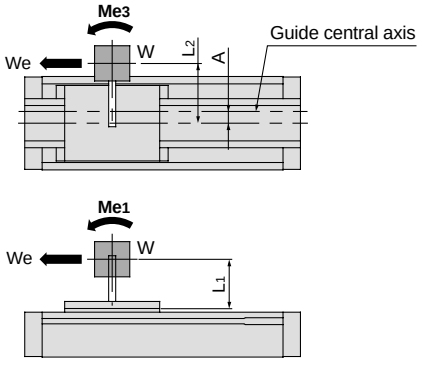
U: Maximum speed



Calculation examples

Operating conditions

Cylinder: REBH15
Mounting: Horizontal wall mounting
Maximum speed: U = 500 [mm/s]
Load weight: W = 1 [kg] (excluding weight of arm section)
L_1 = 200 [mm]
L_2 = 200 [mm]

Item	Load factor αn	Note
1. Maximum load weight 	α_1 = W/Wmax = 1/3 = **0.111** = **0.333**	Review W. (For Wmax, find the value in <Graph 2> when U = 500mm/s.)
2. Static moment 	$M_2 = W \cdot L_1$ = 10·0.2 = 2 [N·m] $\alpha_2 = M_2/M_2$ max = 2/16 = **0.125** W = 1 [kg] = 10 [N]	Review M_2. Since M_1 & M_3 are not generated, review is unnecessary.
3. Dynamic moment 	We = 5 x 10^{-3}·W·g·U = 5 x 10^{-3}·1.9.8·500 = 25 [N] $Me_3 = 1/3 \cdot We(L_2-A)$ = 1/3·25·0.182 = 1.52 [N·m] $\alpha_3 = Me_3/Me_3max$ = 1.52/6 **= 0.25**	Review Me_3. (For Memax, find the value in <Graph 2> when U = 500mm/s.)
	$Me_1 = 1/3 \cdot We \cdot L_1$ = 1/3·25·0.2 = 1.6 [N·m] $\alpha_4 = Me_1/Me_1$ max = 1.6/6 = **0.27**	Review Me_1. (For Memax, find the value in <Graph 2> when U = 500mm/s.)

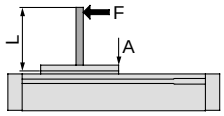
$\Sigma\alpha n = \alpha_1 + \alpha_2 + \alpha_3 + \alpha_4$
= 0.333 + 0.125 + 0.25 + 0.27
= 0.978 Can be used based on $\Sigma\alpha n = 0.978 \leq 1$.

Series REBH
Model Selection 4

Design Parameters 2

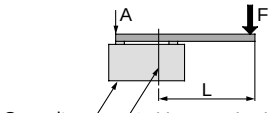
Table Deflection

Table deflection due to pitch moment load



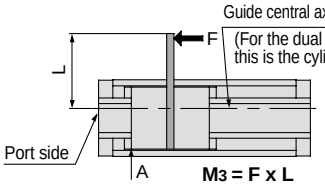
$M_1 = F \times L$

Table deflection due to roll moment load



$M_2 = F \times L$

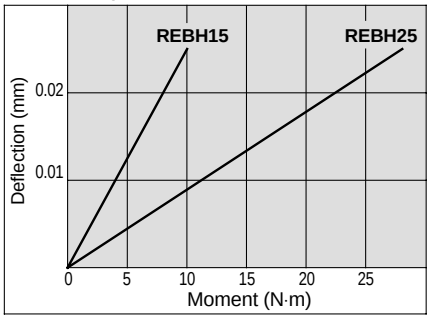
Table deflection due to yaw moment load



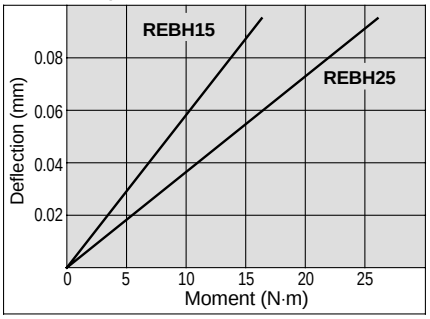
$M_3 = F \times L$

Note) Deflection: Displacement of section A when force acts on section F

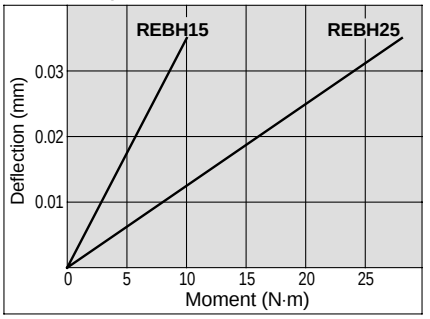
REBH15, 25



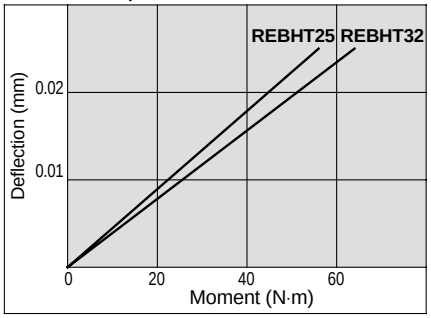
REBH15, 25



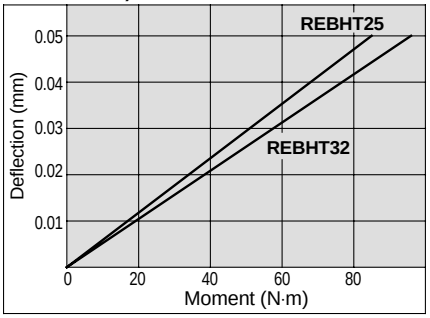
REBH15, 25



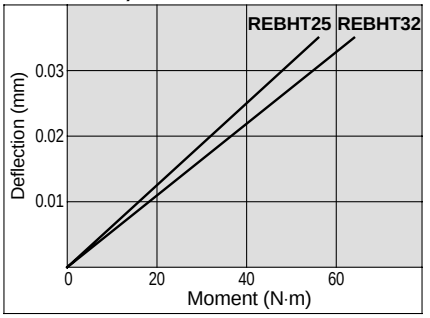
REBHT25, 32



REBHT25, 32



REBHT25, 32



Vertical Operation

When using in vertical operation, prevention of work piece dropping due to breaking of the magnetic coupling should be considered. The allowable load weight and maximum operating pressure should be as shown in the table below.

Model	Allowable load weight Wv (kg)	Max. operating pressure Pv (MPa)
REBH15	7.0	0.65
REBH25	18.5	0.65
REBHT25	18.5	0.65
REBHT32	30.0	0.65

Intermediate Stops

The cushion effect (smooth start-up, soft stop) exists only before the stroke end in the stroke ranges indicated in the table below.
The cushion effect (smooth start-up, soft stop) cannot be obtained in an intermediate stop or a return from an intermediate stop using an external stopper, etc.

Cushion stroke

Model	Stroke (mm)
REBH15	25
REBH25	30
REBHT25	30
REBHT32	30

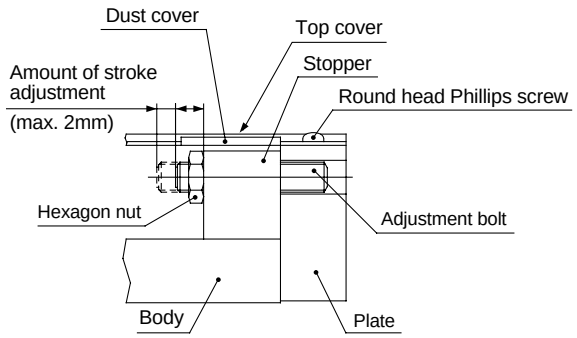
Stroke Adjustment

The adjustment bolt is adjusted to the optimum position for smooth acceleration and deceleration at the time of shipment, and should be operated at the full stroke. When stroke adjustment is necessary, the maximum amount of adjustment on one side is 2mm. (Do not adjust more than 2mm, as it will not be possible to obtain smooth acceleration and deceleration.)

Do not adjust based on the stopper's movement, as this can cause cylinder damage.

Stroke Adjustment

Loosen the round head Phillips screws, and remove the top covers and dust covers (4pcs.). Then loosen the hexagon nut, and after performing the stroke adjustment from the plate side with a hexagon wrench, retighten and secure the hexagon nut.



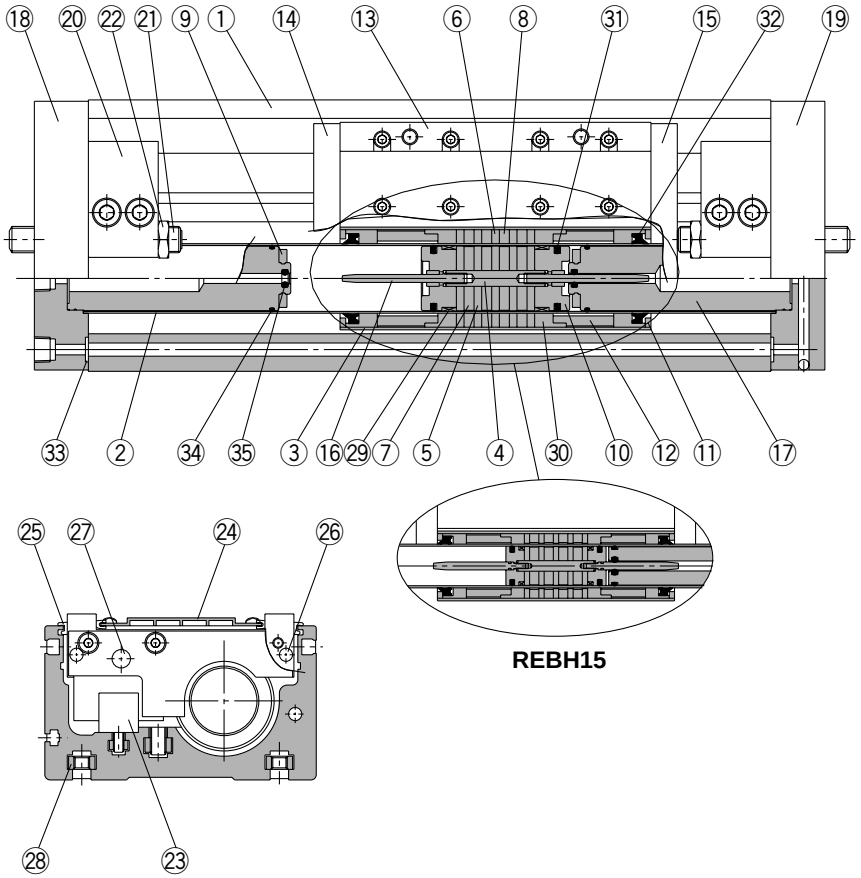
Adjustment Bolt Position (at Shipment), Hexagon Nut Tightening Torque

Model	T (mm)	Tightening torque (N·m)
REBH15	7	1.67
REBH25	9	3.14
REBHT25	9	
REBHT32	9	

After adjusting the stroke, replace the top covers and dust covers. Tighten the round head Phillips screws for securing the top covers with a torque of 0.58N·m.

Construction/ø15, ø25

Single axis type/REBH



REBH15

Parts list

No.	Description	Material	Note
1	**Body**	Aluminum alloy	Hard anodized
2	**Cylinder tube**	Stainless steel	
3	**External slider tube**	Aluminum alloy	
4	**Shaft**	Stainless steel	
5	**Piston side yoke**	Rolled steel plate	Zinc chromated
6	**External slider side yoke**	Rolled steel plate	Zinc chromated
7	**Magnet A**	Rare earth magnet	
8	**Magnet B**	Rare earth magnet	
9	**Bumper**	Urethane rubber	Except REBH15
10	**Piston**	Aluminum alloy	Chromated
11	**Spacer**	Rolled steel plate	Nickel plated
12	**Space ring**	Aluminum alloy	Chromated
13	**Slide table**	Aluminum alloy	Hard anodized
14	**Side plate A**	Aluminum alloy	Hard anodized
15	**Side plate B**	Aluminum alloy	Hard anodized
16	**Cushion ring**	Stainless steel	Compound electroless nickel plated
17	**Internal stopper**	Aluminum alloy	Anodized
18	**Plate A**	Aluminum alloy	Hard anodized

Parts list

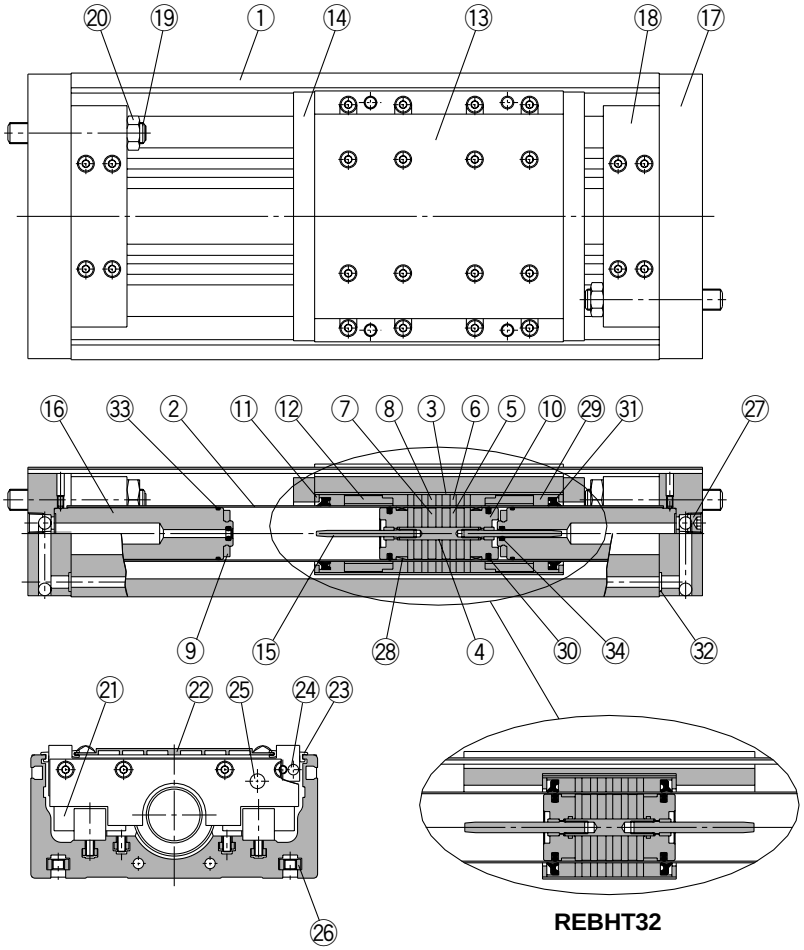
No.	Description	Material	Note
19	**Plate B**	Aluminum alloy	Hard anodized
20	**Stopper**	Aluminum alloy	Anodized
21	**Adjustment bolt**	Chromium molybdenum steel	Nickel plated
22	**Hexagon nut**	Carbon steel	Nickel plated
23	**Linear guide**		
24	**Top cover**	Aluminum alloy	Hard anodized
25	**Dust cover**	Special resin	
26	**Magnet (for auto switch)**	Rare earth magnet	
27	**Parallel pin**	Carbon steel	Nickel plated
28	**Square nut for body mounting**	Carbon steel	Nickel plated (accessory)
29	**Wear ring A**	Special resin	
30	**Wear ring B**	Special resin	
31	**Piston seal**	NBR	
32	**Scraper**	NBR	
33	**O-ring**	NBR	
34	**O-ring**	NBR	
35	**Cushion seal**	NBR	

Replacement parts: Seal kits

Bore size (mm)	Kit no.	Contents
10	**REBH15-PS**	Above numbers 29, 30, 31, 32, 33, 34, 35
15	**REBH25-PS**	

Construction/ø25, ø32

Dual axis type/REBHT



REBHT32

Parts list

No.	Description	Material	Note
1	**Body**	Aluminum alloy	Hard anodized
2	**Cylinder tube**	Stainless steel	
3	**External slider tube**	Aluminum alloy	
4	**Shaft**	Stainless steel	
5	**Piston side yoke**	Rolled steel plate	Zinc chromated
6	**External slider side yoke**	Rolled steel plate	Zinc chromated
7	**Magnet A**	Rare earth magnet	
8	**Magnet B**	Rare earth magnet	
9	**Bumper**	Urethane rubber	
10	**Piston**	Aluminum alloy	Chromated
11	**Spacer**	Rolled steel plate	Nickel plated
12	**Space ring**	Aluminum alloy	Chromated (except REBHT32)
13	**Slide table**	Aluminum alloy	Hard anodized
14	**Side plate**	Aluminum alloy	Hard anodized (except REBHT32)
15	**Cushion ring**	Stainless steel	REBHT25 — Compound electroless nickel plated
		Brass	REBHT32 — Compound electroless nickel plated
16	**Internal stopper**	Aluminum alloy	Anodized
17	**Plate**	Aluminum alloy	Hard anodized

Parts list

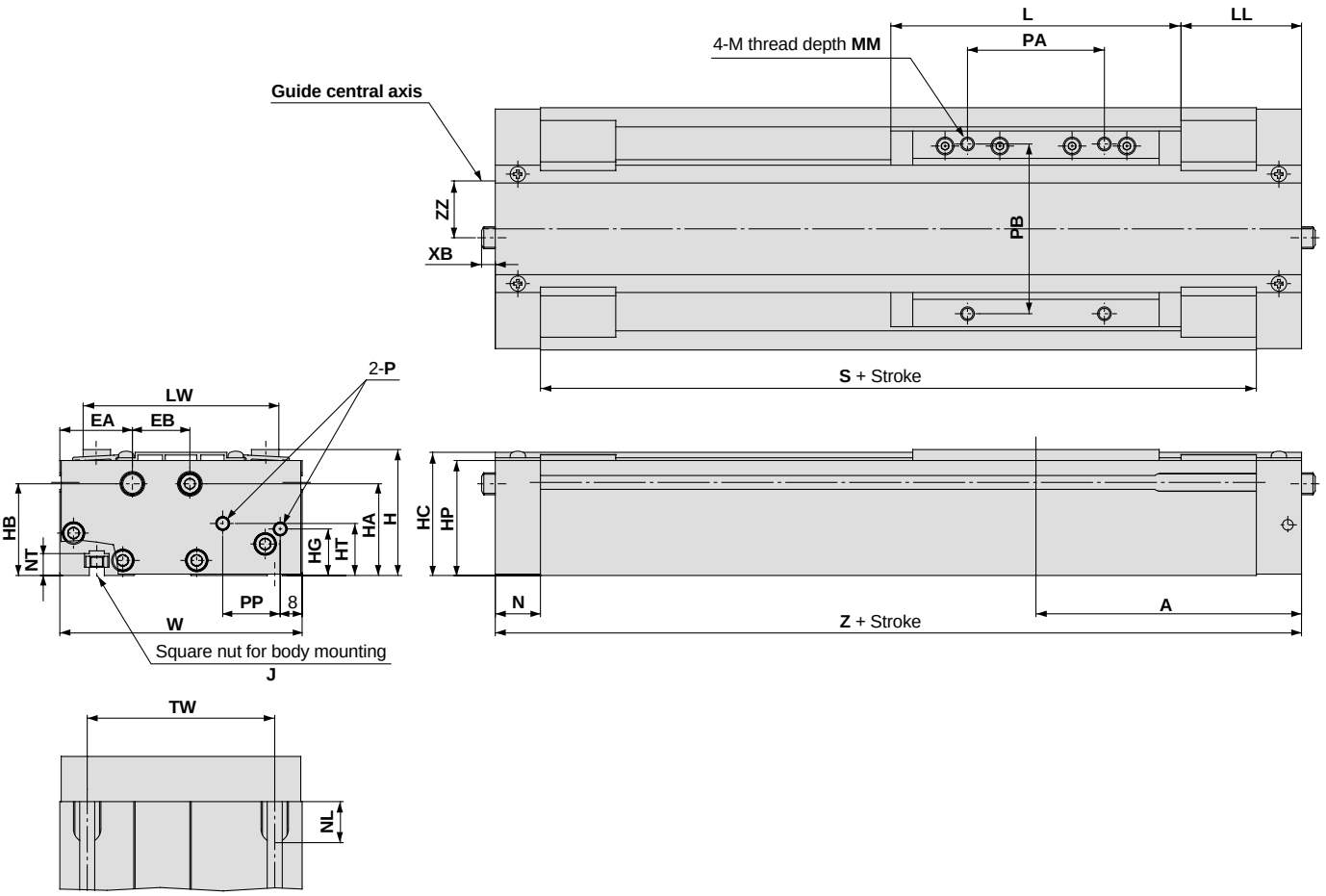
No.	Description	Material	Note
18	**Stopper**	Aluminum alloy	Anodized
19	**Adjustment bolt**	Chromium molybdenum steel	Nickel plated
20	**Hexagon nut**	Carbon steel	Nickel plated
21	**Linear guide**		
22	**Top cover**	Aluminum alloy	Hard anodized
23	**Dust cover**	Special resin	
24	**Magnet (for auto switch)**	Rare earth magnet	
25	**Parallel pin**	Carbon steel	Nickel plated
26	**Square nut for body mounting**	Carbon steel	Nickel plated (accessory)
27	**Hexagon socket head taper plug**	Carbon steel	Nickel plated
28	**Wear ring A**	Special resin	
29	**Wear ring B**	Special resin	
30	**Piston seal**	NBR	
31	**Scraper**	NBR	
32	**O-ring**	NBR	
33	**O-ring**	NBR	
34	**Cushion seal**	NBR	

Replacement parts: Seal kits

Bore size (mm)	Kit no.	Contents
25	**REBHT25-PS**	Above numbers 28, 29, 30, 31, 32, 33, 34
32	**REBHT32-PS**	

Dimensions/ø15, ø25

Single axis type/REBH



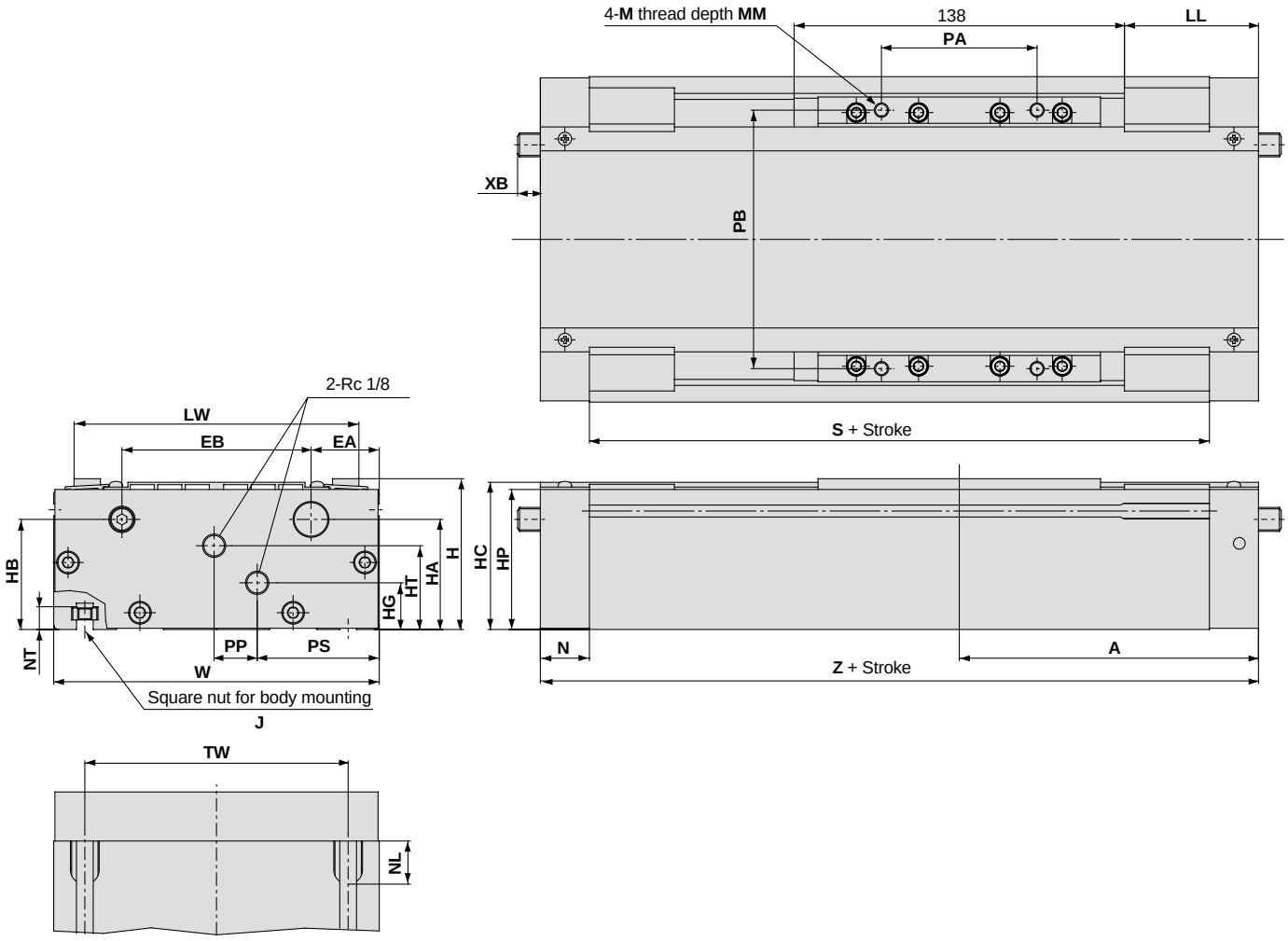
(mm)

Model	A	EA	EB	H	HA	HB	HC	HG	HP	HT	J	L	LL	LW	M	MM
REBH15	97	26.5	21	46	33.5	33.5	45	17	42	19	M5 x 0.8	106	44	71.5	M5 x 0.8	8
REBH25	125	29	24	63	46	46	61.5	25	58.5	28	M6 x 1.0	138	56	86	M6 x 1.0	10

Model	N	NL	NT	P	PA	PB	PP	S	TW	W	XB	Z	ZZ
REBH15	16.5	15	8	M5 x 0.8	50	62	21	161	65	88.5	—	194	17.5
REBH25	20.5	18	9	Rc 1/8	65	75	27	209	75	103	9.5	250	23.5

Dimensions/ø25, ø32

Dual axis type/REBHT

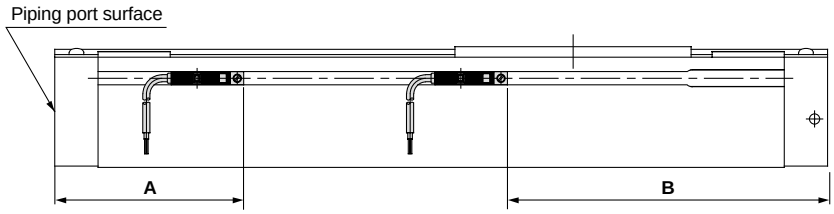


(mm)

Model	A	EA	EB	H	HA	HB	HC	HG	HP	HT	J	LL	LW	M	MM	N
REBHT25	125	28.5	79	63	46	46	61.5	19.5	58.5	35	M6 x 1.0	56	119	M6 x 1.0	10	20.5
REBHT32	132.5	30	90	75	52.5	57.5	72.5	25	69.5	43	M8 x 1.25	63.5	130	M8 x 1.25	12	23

Model	NL	NT	PA	PB	PP	PS	S	TW	W	XB	Z
REBHT25	18	9	65	108	18	51	209	110	136	9.5	250
REBHT32	22.5	12	66	115	14	61	219	124	150	2	265

Proper Auto Switch Mounting Position for Stroke End Detection



Proper auto switch mounting position

(mm)

Auto switch model / Cylinder model	A			B		
	D-Z7□ D-Z80	D-Y7□W D-Y7□WV	D-Y5□ D-Y6□ D-Y7P D-Y7PV	D-Z7□ D-Z80	D-Y7□W D-Y7□WV	D-Y5□ D-Y6□ D-Y7P D-Y7PV
REBH15	72	72	72	122	122	122
REBH25	86	86	86	164	164	164
REBHT25	86	86	86	164	164	164
REBHT32	82	82	82	183	183	183

Auto switch operating range

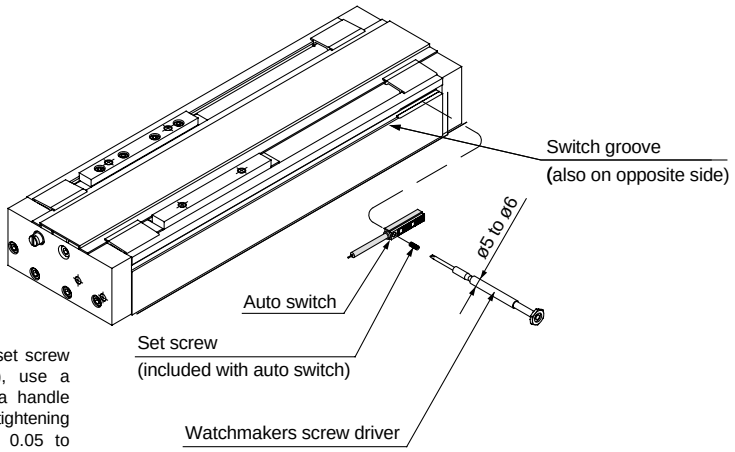
(mm)

Auto switch model / Cylinder model	D-Z7□ D-Z80	D-Y7□W D-Y7□WV D-Y5□ D-Y6□ D-Y7P D-Y7PV
REBH15	6	5
REBH25	6	5
REBHT25	6	5
REBHT32	9	6

Note) Operating ranges are standards including hysteresis, and are not guaranteed. Large variations may occur depending on the surrounding environment. (variations on the order of ±30%)

Auto Switch Mounting

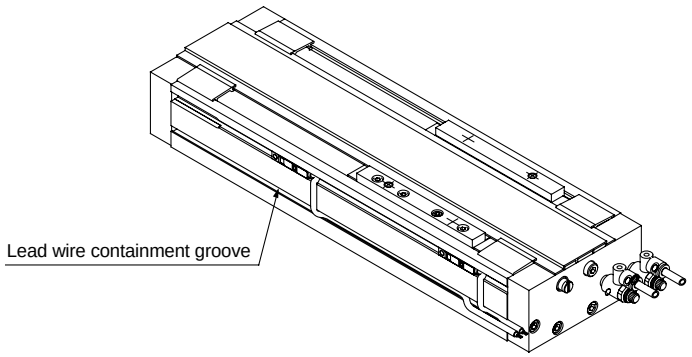
When mounting auto switches, they should be inserted into the cylinder's switch groove from the direction shown in the drawing on the right. After setting in the mounting position, use a flat head watchmakers screw driver to tighten the set screw which is included.



Note) When tightening the auto switch set screw (included with the auto switch), use a watchmakers screw driver with a handle about 5 to 6mm in diameter. The tightening torque should be approximately 0.05 to 0.1N·m.

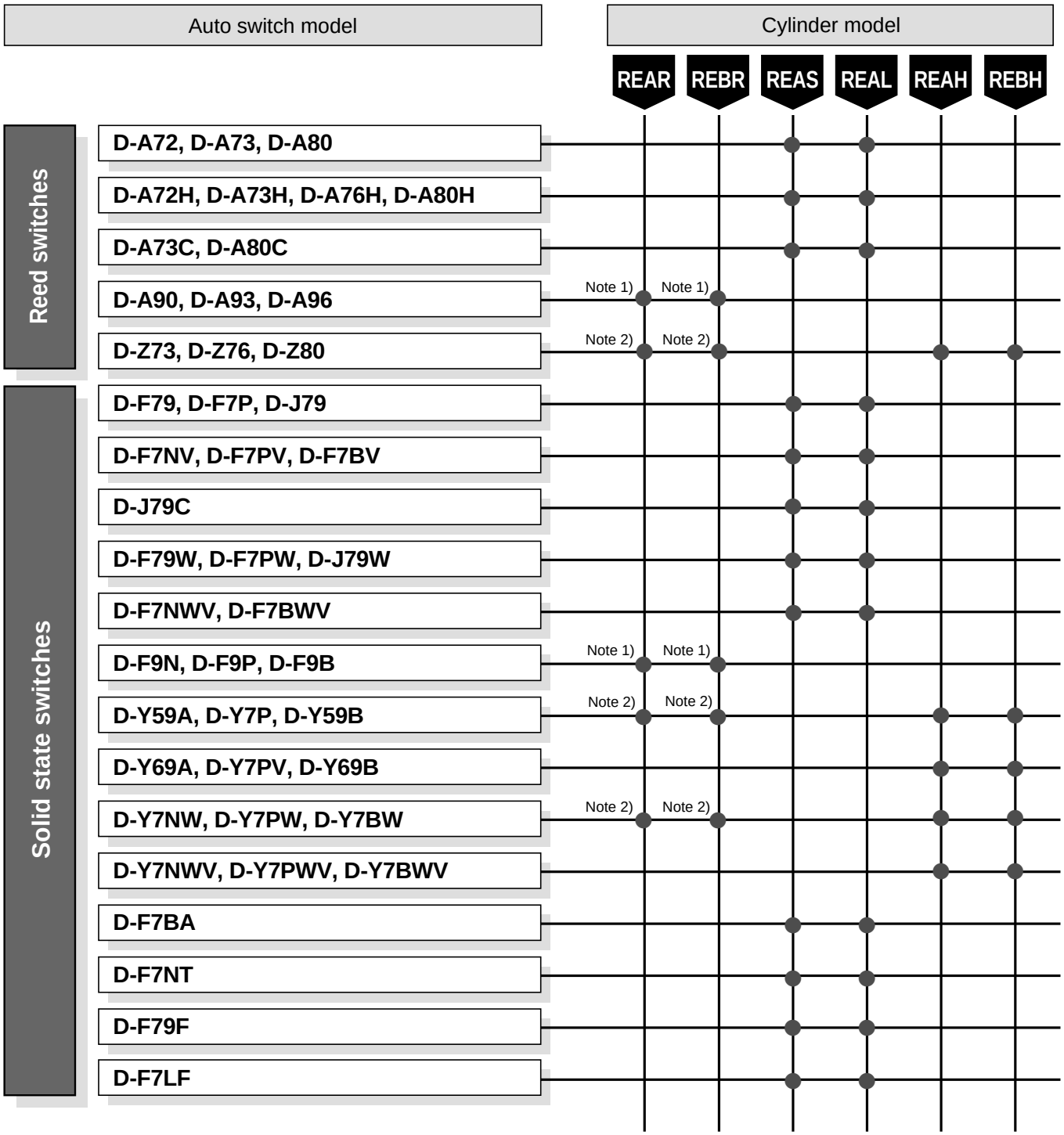
Auto Switch Lead Wire Containment Groove

On model REBH25 a groove is provided on the side of the body (one side only) to contain auto switch lead wires. This should be used for placement of wiring.



Series REA/REB
Auto Switch Specifications

Auto switch application table



Note 1) Indicates auto switches for REAR10/15/20 and REBR15.

Note 2) Indicates auto switches for REAR25/32/40 and REBR25/32.

Note 3) Refer to "Auto Switch Guide" (E274-A) for detailed specifications (specifications, dimensions, etc.) of switch units.

Series REA/REB
Auto Switch Specifications

⚠Specific Product Precautions

Before handling auto switches, be sure to read "Auto Switch Precautions" on pages 96 through 98.

Auto Switch Common Specifications

Type	Reed switch	Solid state switch
Leakage current	None	3 wire: 10μA or less 2 wire: 1mA or less
Actuation time	1.2ms	1ms or less Note 2)
Impact resistance	300m/s²	1000m/s²
Insulation resistance	50MΩ or more at a 500VDC (between lead wire & case)	
Withstand voltage	1500VAC for 1 minute Note 1) (between lead wire & case)	1000VAC for 1 minute (between lead wire & case)
Ambient temperature	–10 to 60°C	

Note 1) Electrical entry: Connector type (A73C, A80C, C73C) and A9 are 1000VAC for 1 minute (between lead wire and case).

Note 2) Except for solid state auto switch with timer (F7NTL).

Lead Wire Length

Lead wire length indication (Example)

D–A73 L

Lead wire length

Nil	0.5m
L	3m
Z	5m
N*	None

* Applicable only to connector type switch D-□□C.

Note 1) Lead wire length Z: 5m applicable auto switches
Reed switch: D-A73(C)(H)/A80C, D-Z73
Solid state switch: All models are produced upon receipt of order (standard procedure). Except for D-F9/F7□WV.

Note 2) The standard lead wire length is 3m for solid state switches with timer and water resistant solid state switches with 2 color indication. (0.5m length is not available.)

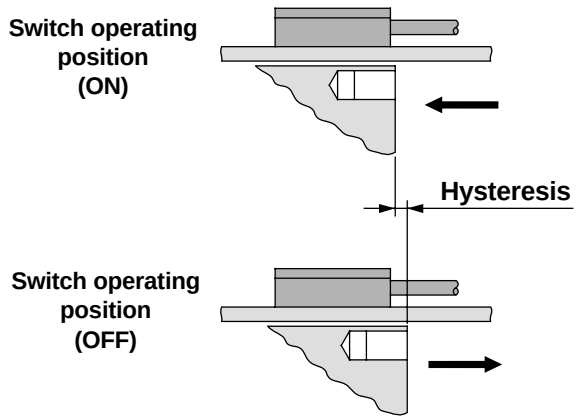
Note 3) The standard lead wire lengths are 3m and 5m for strong magnetic field resistant 2 color indicator type solid state switches. (0.5m length is not available.)

Part nos. for lead wires with connector
(applicable only to connector type switches)

Model	Lead wire length
D-LC05	0.5m
D-LC30	3m
D-LC50	5m

Auto Switch Hysteresis

The distance from the position at which movement of the external slider turns on an auto switch, to the point at which reverse movement turns off the switch is called hysteresis. This hysteresis is included in part (one side) of the operating range.



The difference between the switch operating position (ON) and the return position (OFF) is usually 2mm or less for reed switches and 1mm or less for solid state switches. Contact SMC regarding applications in which hysteresis becomes a problem.

Recommended Relays

Fuji Electric Co., Ltd. HH5
OMRON Corporation ..... MY
Matsushita Electric Works, Ltd. ..... HC
Tokyo Electric ..... MPM
IDEC IZUMI CORPORATION ..... RM
Mitsubishi Electric Corporation ..... RD

Series REA/REB
Auto Switch Specifications

Contact Protection Box/CD-P11, CD-P12

1.

<Applicable switches>

D-A7/A8, D-A7□H/A80H, D-A73C, A80C, D-Z7/Z8, D-A9

The above auto switches do not have built-in contact protection circuits.

1. The operating load is an induction load.

2. The length of wiring to the load is 5m or more.

3. The load voltage is 100V or 200VAC.

A contact protection box should be used in any of the above cases, as the life of the contacts may be reduced. (They may stay on continuously.)

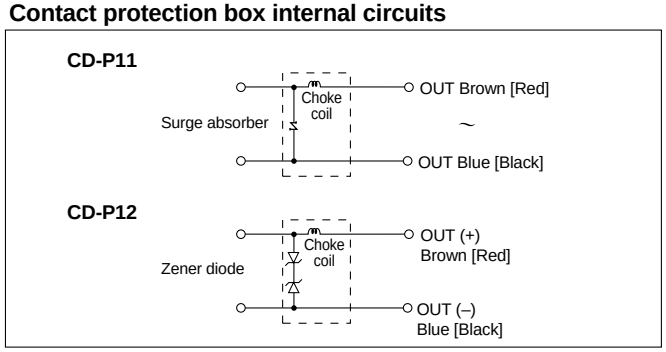
Since this effect is especially strong in the case of type D-A72(H), a contact protection box should always be used, regardless of the type of load or length of wiring.

Contact protection box specifications

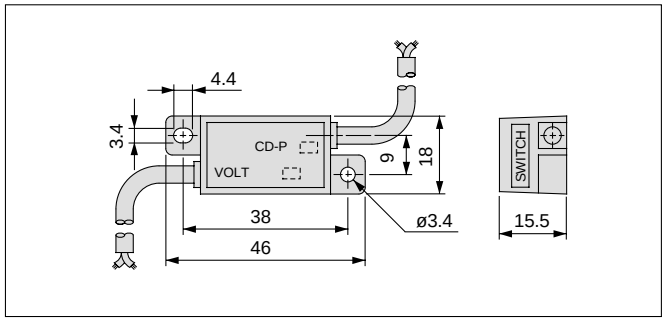
Part no.	CD-P11		CD-P12
Load voltage	100VAC	200VAC	24VDC
Max. load current	25mA	12.5mA	50mA

∗Lead wire length —— Switch connection side 0.5m
Load connection side 0.5m

Contact protection box internal circuits



Contact protection box dimensions



Contact protection box connection

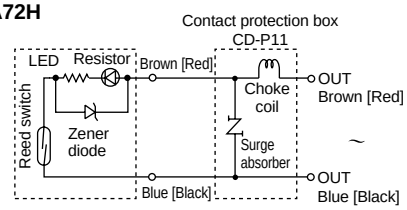
To connect a switch unit to a contact protection box, connect the lead wire from the side of the contact protection box marked SWITCH to the lead wire coming out of the switch unit.

Moreover, the switch unit should be kept as close as possible to the contact protection box, with a lead wire length of no more than 1m.

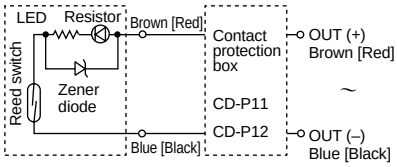
Auto Switch Internal Circuits

Reed switches

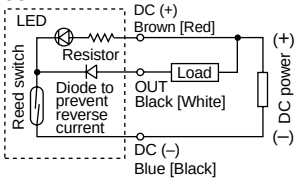
D-A72, D-A72H



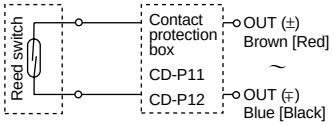
D-A73, D-A73H, D-A93



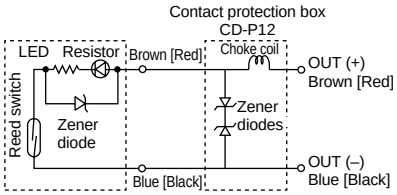
D-A76H, D-A96



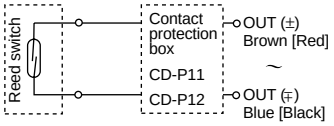
D-A80, D-A80H, D-A90



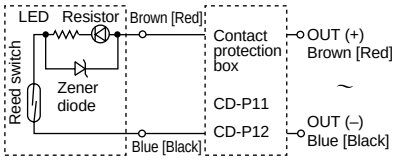
D-A73C



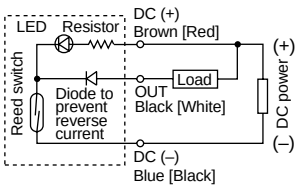
D-A80C



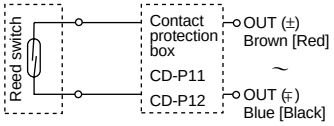
D-Z73



D-Z76



D-Z80



Note) Lead wire colors inside [ ] are those prior to conformity with IEC standards.

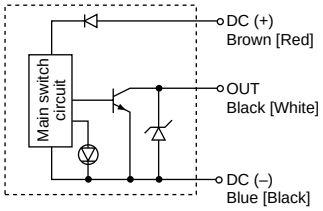
Auto Switch Specifications

Auto Switch Internal Circuits

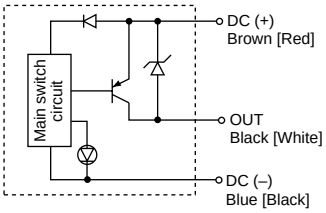
Note) Lead wire colors inside [ ] are those prior to conformity with IEC standards.

Solid state switches

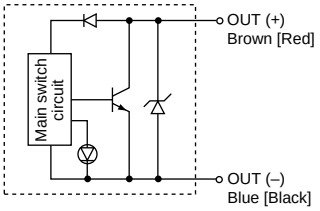
D-F79, D-F7NV



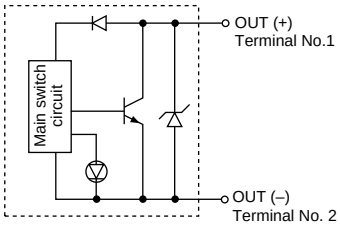
D-F7P, D-F7PV



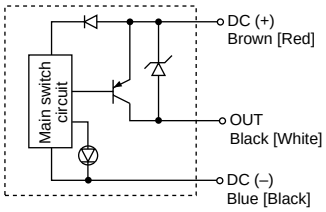
D-J79, D-J79C, D-F7BV



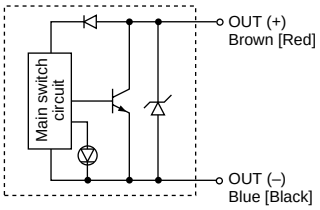
D-F79W



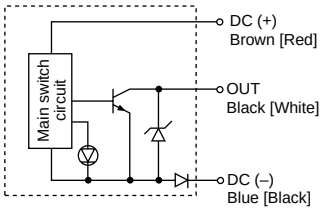
D-F7PW



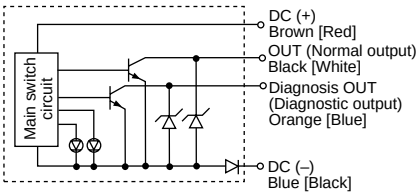
D-J79W



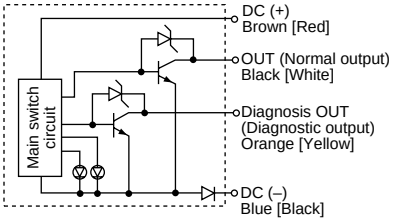
D-F7NT



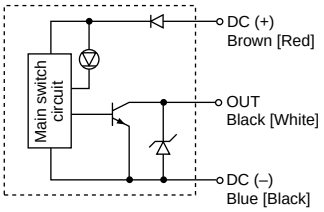
D-F7LF



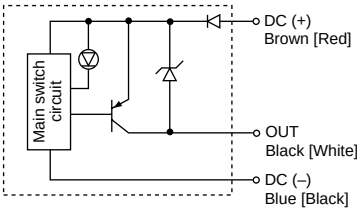
D-F79F



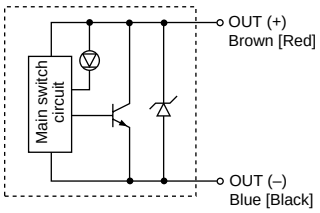
D-F9N



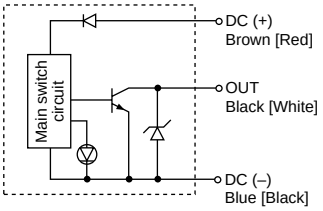
D-F9P



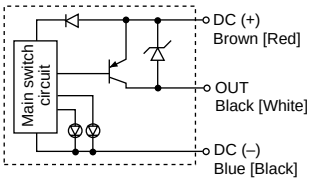
D-F9B



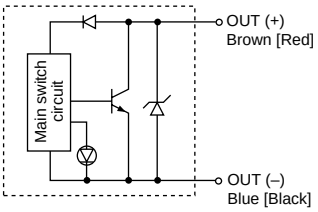
D-Y59A, D-Y69A



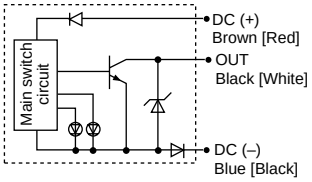
D-Y7P(V)



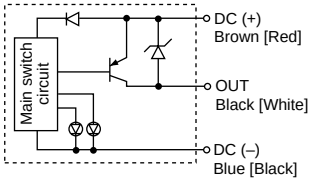
D-Y59B, D-Y69B



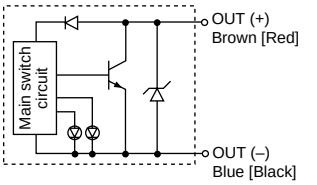
D-Y7NW(V)



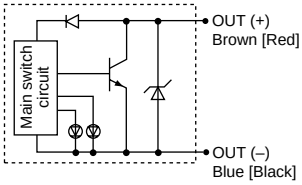
D-Y7PW(V)



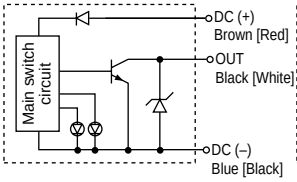
D-Y7BW(V)



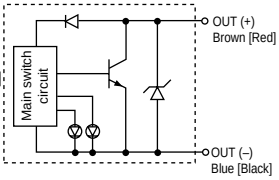
D-F7BA



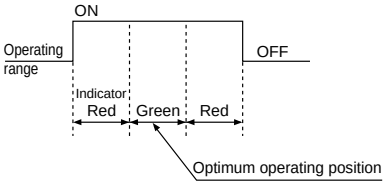
D-F7NWV



D-F7BWV



Indicator lights/Method of indication

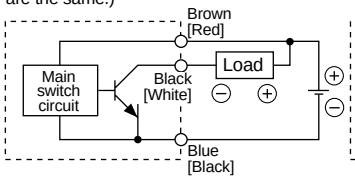


Series REA/REB
Auto Switch Connections and Examples

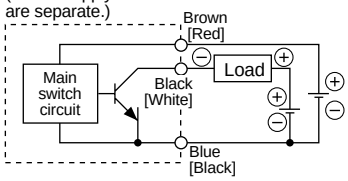
Basic Wiring

Note) Lead wire colors inside [ ] are those prior to conformity with IEC standards.

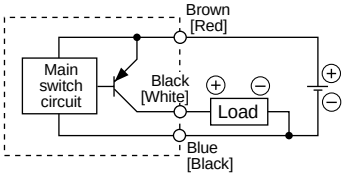
Solid state 3 wire, NPN
(Power supply for switch and load are the same.)



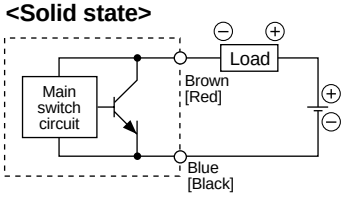
(Power supply for switch and load are separate.)

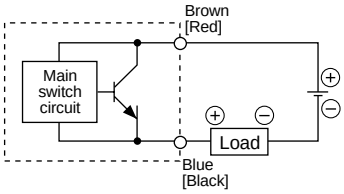


Solid state 3 wire, PNP

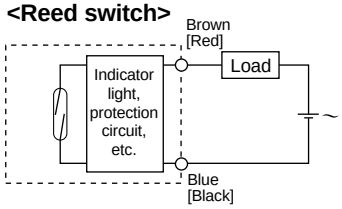


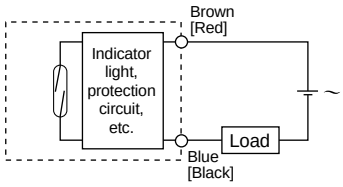
2 wire <Solid state>





2 wire <Reed switch>

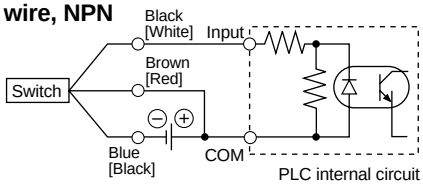




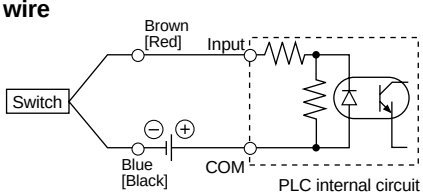
Examples of Connection to PLC (Programable Logic Controller)

Specification for sink input

3 wire, NPN

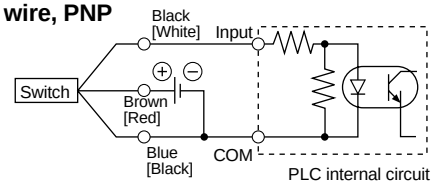


2 wire

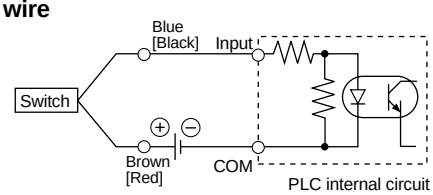


Specification for source input

3 wire, PNP



2 wire

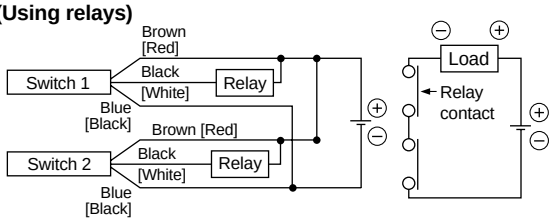


Connect according to the applicable PLC input specifications, as the connection method will vary depending on the PLC input specifications.

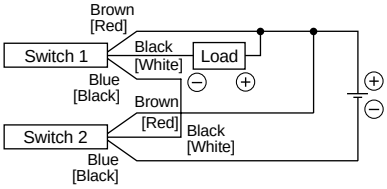
Connection Examples for AND (Series) and OR (Parallel)

3 wire

AND connection for NPN output (Using relays)

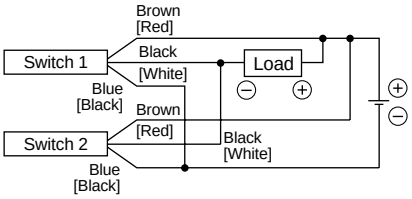


AND connection for NPN output (Performed with switches only)

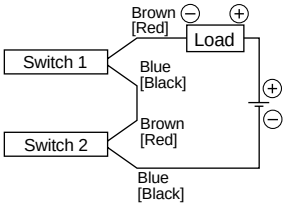


The indicator lights will light up when both switches are turned ON.

OR connection for NPN output



2 wire with 2 switch AND connection



When two switches are connected in series, the load may malfunction because the load voltage will decline when in the ON state.
The indicator lights will light up if both of the switches are in the ON state.

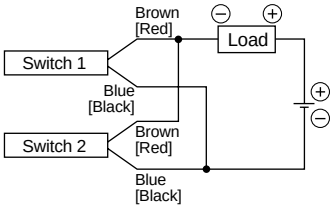
Load voltage at ON = $\frac{\text{Power supply voltage}}{} - \frac{\text{Residual voltage}}{}$ x 2 pcs.

= 24V – 4V x 2 pcs.

= 16V

Example: Power supply is 24VDC.
Voltage drop in switch is 4V.

2 wire with 2 switch OR connection



<Solid state>
When two switches are connected in parallel, malfunction may occur because the load voltage will increase when in the OFF state.

<Reed switch>
Because there is no current leakage, the load voltage will not increase when turned OFF. However, due to the number of switches in the ON state, the indicator lights will sometimes dim or not light up, because of dispersion and reduction of the current flowing to the switches.

Load voltage at OFF = $\frac{\text{Leakage current}}{}$ x 2 pcs. x $\frac{\text{Load impedance}}{}$

= 1mA x 2 pcs. x 3kΩ

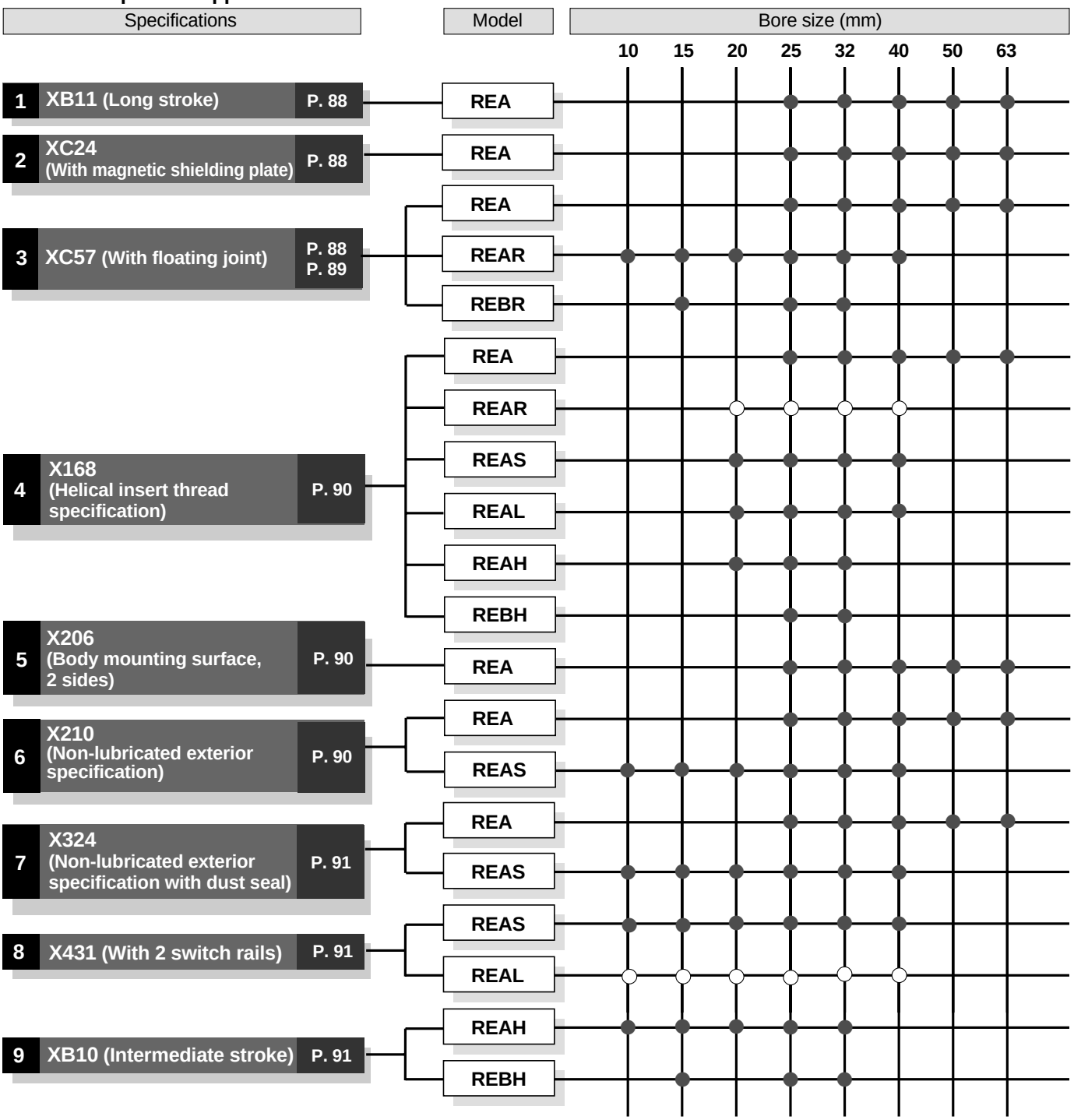
= 6V

Example: Load impedance is 3kΩ.
Leakage current from switch is 1mA.

Series REA/REB
Individual Order Made Specifications

Contact SMC for detailed specifications, lead times and prices, etc.

Order made product application table



Note) The applicable series and bore sizes of products are indicated by the "●" symbol. Contact SMC regarding products with the "○" symbol.

Series REA
Order Made Specifications 1

Contact SMC for detailed specifications, lead times and prices, etc.

1 Long stroke (2001mm and up)

Symbol: -XB11

REA — Bore size — Stroke — XB11

Long stroke (2001mm and up)

When the stroke exceeds 2000mm (2001mm and up)

Specifications

Applicable series	REA
Bore size	ø25 to ø63
Applicable stroke	2001mm and up

2 With magnetic shielding plate

Symbol: -XC24

REA — Bore size — Stroke — XC24

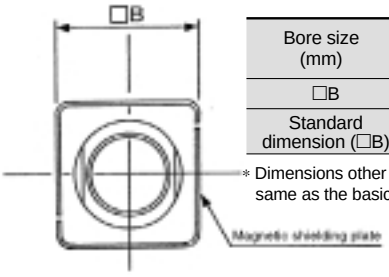
With magnetic shielding plate

Shields against leakage of magnetic flux from the external slider.

Specifications

Applicable series	REA
Bore size	ø25 to ø63

Dimensions



(mm)

Bore size (mm)	25	32	40	50	63
□B	48	62	72	88	102
Standard dimension (□B)	46	60	70	86	100

∗ Dimensions other than those in the table above are the same as the basic type. Refer to page 7.

3 With floating joint (REA)

Symbol: -XC57

REA — Bore size — Stroke — XC57

With floating joint

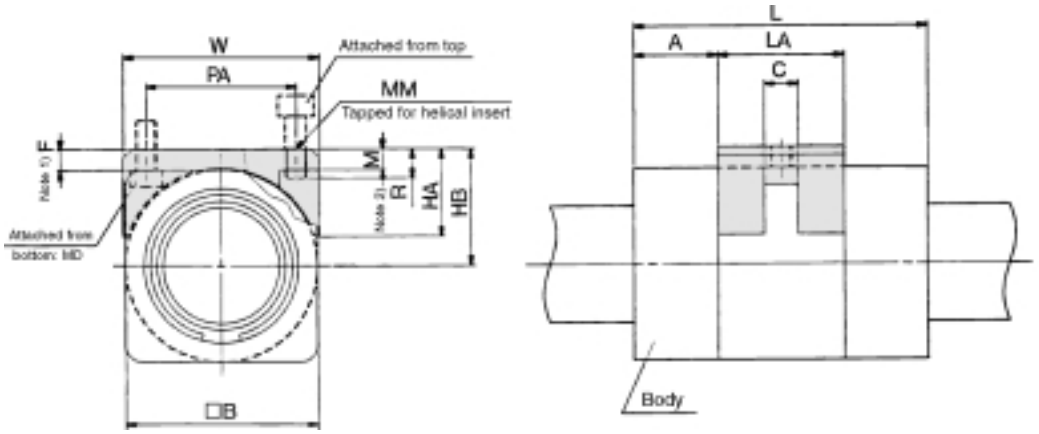
A special floating joint is added to the Series REA, and the labor for connections to the guide on the other axis (the load side) is reduced.
The attachment of the bolt to the floating joint and the load is not limited to the top or bottom.

Specifications

Fluid	Air
Cylinder bore size	ø25, ø32, ø40, ø50, ø63
Max. operating pressure	0.7MPa
Min. operating pressure	0.18MPa
Piston speed	50 to 300mm/s
Mounting orientation	Free
Auto switch	Not mountable

Note) Since the body of this cylinder is designed for connection with a floating joint, and cannot be connected to the bodies of standard products, contact SMC if necessary.

Construction/Dimensions



(mm)

Model	A	□B	C	F Note 1)	HA	HB	L	LA	MM	MD	M	PA	R Note 2)	W
REA25	20	46	8.0	5.5	21	28.5	70	30	M5 x 0.8	M4	5	36	7	47
REA32	22.5	60	9.5	6.0	27.5	36	80	35	M6 x 1.0	M5	6	47	8	61
REA40	26	70	9.5	6.0	28.5	41	92	40	M6 x 1.0	M5	6	55	8	71
REA50	35	86	11	6.0	35	49	110	40	M8 x 1.25	M6	8	65	11	87
REA63	36	100	18	7.0	42	57	122	50	M8 x 1.25	M6	10	80	11	101

Note 1) Dimension F provides a clearance of 1mm between the body and the floating joint, but does not consider self weight deflection of the cylinder tube, etc. When put into operation, an appropriate value should be set which considers self weight deflection and alignment variations with respect to the other axis. (Refer to the self weight deflection table on page 5.)

Note 2) Use caution when attached from the top and operated at or above dimension R, because the end of the screw will contact the body, and a floating condition will not be maintained in some cases.

Series REA/REB
Order Made Specifications 2

Contact SMC for detailed specifications, lead times and prices, etc.

Order Made

Symbol

3 With floating joint (REAR/REBR) Cont'd — -XC57

REAR / REBR — Bore size — Stroke — XC57

With floating joint

A special floating joint is added to the Series REAR, and the labor for connections to the guide on the other axis (the load side) is reduced.
The attachment of the bolt to the floating joint and the load is not limited to the top or bottom.

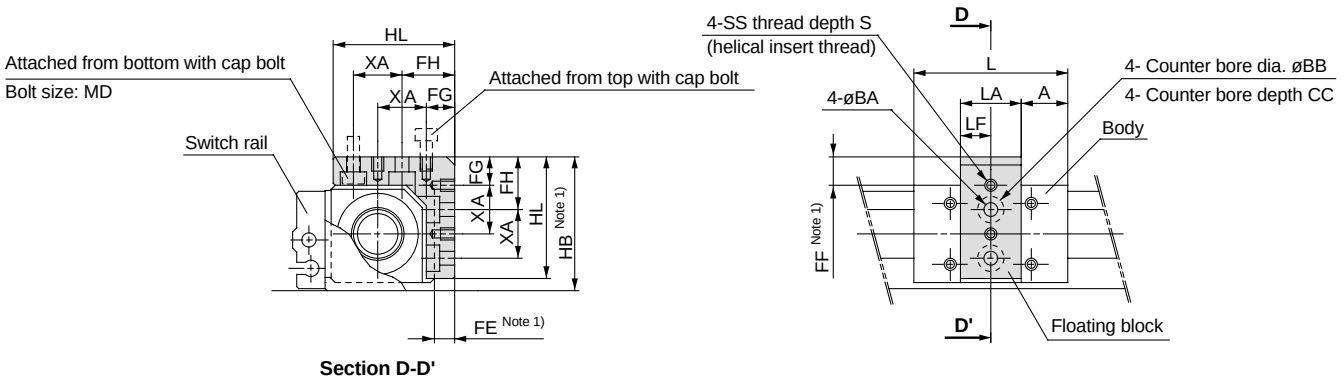
Specifications

	REAR	REBR
Fluid	Air	
Cylinder bore size	ø10, ø15, ø20, ø25, ø32, ø40	ø15, ø25, ø32
Max. operating pressure	0.7MPa	
Min. operating pressure	0.18MPa	
Piston speed	50 to 300mm/s	50 to 600mm/s
Mounting	Direct mount type	
Auto switch	Mountable	

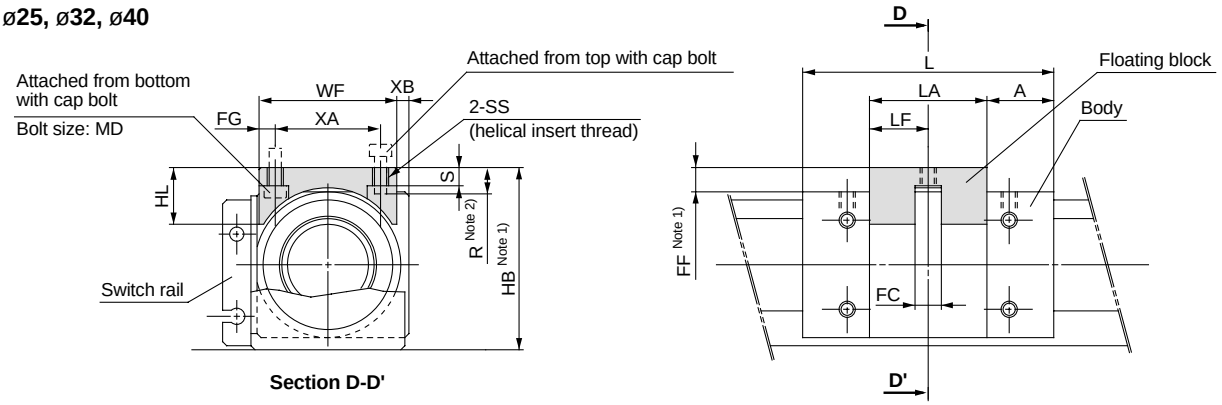
Note) Since the body of this cylinder is designed for connection with a floating joint, and cannot be connected to the bodies of standard products, contact SMC if necessary.

Construction/Dimensions

ø10, ø15



ø20, ø25, ø32, ø40



(mm)

Bore size	A	BA	BB	CC	FC	FE Note 1)	FF Note 1)	FG	FH	HB Note 1)	HL	L	LA	LF	MD	R Note 2)	S	SS	WF	XA	XB
ø10	11.5	3.4	6.5	3.3	—	5	7	7	13	33	30	38	15	7.5	M3	—	3.5	M3 x 0.5	—	12	—
ø15	18	4.5	8	4.4	—	4.5	6.5	7.5	14.5	38.5	35.5	53	17	8.5	M4	—	4.5	M4 x 0.7	—	14	—
ø20	16.5	—	—	—	6.5	—	6	4	—	45	14	62	29	14.5	M3	7	4.5	M4 x 0.7	34	26	3
ø25	20.5	—	—	—	8	—	7	4	—	51	17	70	29	14.5	M4	8	5.5	M5 x 0.8	39	31	3
ø32	21	—	—	—	9.5	—	7.5	4.5	—	62.5	22	76	34	17	M5	10	6.5	M6 x 1	50	41	3
ø40	25.5	—	—	—	9.5	—	7.5	7.5	—	74.5	28	90	39	19.5	M5	10	6.5	M6 x 1	60	45	3

Note 1) FE, FF and HB provide a clearance of 1mm between the body and the floating joint, but do not consider self weight deflection of the cylinder tube, etc. When put into operation, an appropriate value should be set which considers self weight deflection and alignment variations with respect to the other axis. (Refer to the self weight deflection table on pages 13 and 63.)

Note 2) Use caution when attached from the top and operated at or above dimension R, because the end of the screw will contact the body, and a floating condition will not be maintained in some cases.

Series REA/REB
Order Made Specifications 3

Contact SMC for detailed specifications, lead times and prices, etc.

4 Helical insert thread specification

Symbol: -X168

REA
REAS
REAL
REAH
REBH

Bore size — Stroke — X168

X168: Helical insert thread specification

The standard mounting threads have been changed to helical insert specifications.

Specifications

Applicable series	REA, REAS, REAL, REAH, REBH
Bore size	REA: ø25 to ø63 REAS, REAL: ø20 to ø40 REAH: ø20 to ø32 REBH: ø25 to ø32

The mounting thread positions and size are the same as standard.

5 Additional mounting tap positions for slider

Symbol: -X206

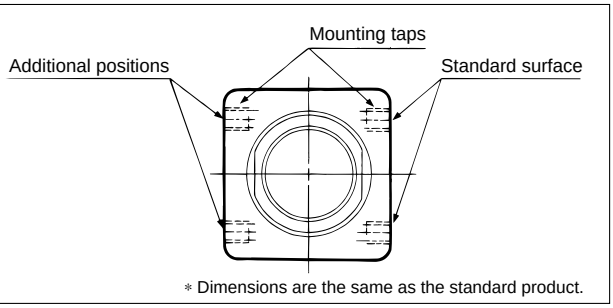
REA Bore size — Stroke — X206

X206: Additional mounting tap positions for slider

Mounting taps have been added on the surface opposite the standard positions.

Specifications

Applicable series	REA
Bore size	ø25 to ø63



∗ Dimensions are the same as the standard product.

6 Non-lubricated exterior specification

Symbol: -X210

REA
REAS

Bore size — Stroke — X210

X210: Non-lubricated exterior specification

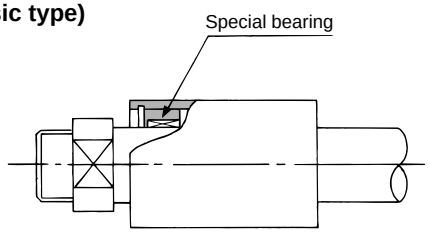
Suitable for environments where oils are not tolerated. A scraper is not installed. A separate version -X324 (with dust seal) is available for cases in which dust, etc., is scattered throughout the environment.

Specifications

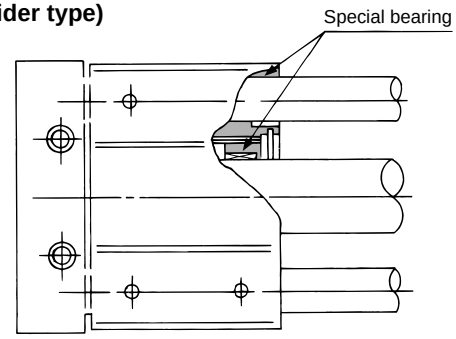
Applicable series		REA, REAS
Bore size	REA	ø25 to ø63
	REAS	ø10 to ø40

Construction

REA (basic type)



REAS (slider type)



Series REA/REB
Order Made Specifications 4

Contact SMC for detailed specifications, lead times and prices, etc.

7 Non-lubricated exterior specification (with dust seal) — Symbol -X324

REA / REAS Bore size — Stroke — **X324**

Non-lubricated exterior specification (with dust seal)

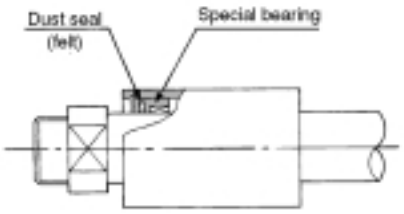
This unit has non-lubricated exterior specifications, with a felt dust seal provided on the cylinder body.

Specifications

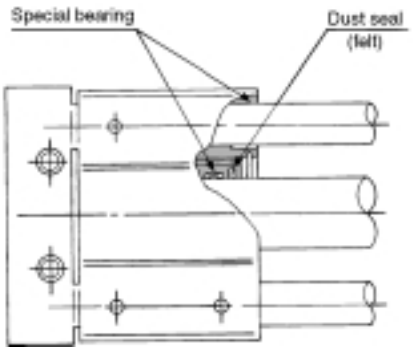
Applicable series		REA, REAS
Bore size	REA	ø25 to ø63
	REAS	ø10 to ø40

Construction

REA (basic type)



REAS (slider type)



8 Switch rail mounting on both sides (with 2pcs.) — Symbol -X431

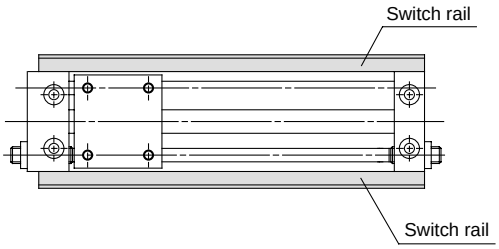
REAS Bore size — Stroke — **X431**

Switch rail mounting on both sides (with 2pcs.)

Effective in cases with switches when the stroke is short.

Specifications

Applicable series	REAS
Bore size	ø10 to ø40



9 Intermediate stroke — Symbol -XB10

REAH / REBH Bore size — Stroke — **XB10**

(Refer to table below.) **Intermediate stroke**

Strokes

Bore size	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600	650	700	750	800	850	900	950	1000
REAH10	●	○	●	○	○	○	●																				
REAH15	●	○	●	○	○	○	●	○	○	○	●	○	○	○	●												
REAH20			●	○	○	○	●	○	○	○	●	○	○	○	●	○	○	○	●								
REAH25			●	—	○	—	●	—	○	—	●	—	○	—	●	—	○	—	●	○	○	○	●				
REAHT25			●	—	○	—	●	—	○	—	●	—	○	—	●	—	○	—	●	○	○	○	●	○	○	○	●
REAHT32			●	—	○	—	●	—	○	—	●	—	○	—	●	—	○	—	●	○	○	○	●	○	○	○	●

● : Standard strokes
○ : Strokes available with -XB10
— : Not available

Guide Cylinder

Series MGG

ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100

How to Order

MGG **L** **B** **32** — **100** — **C73** ☐

Guide cylinder

Bearing type

M	Slide bearing
L	Ball bushing

Mounting type

B	Basic
F	Front mounting flange

Bore size

20	20mm
25	25mm
32	32mm
40	40mm
50	50mm
63	63mm
80	80mm
100	100mm

Cylinder stroke (mm)

Refer to the models and strokes table on page 2.

Auto switch type

Nil	Without auto switch (built-in cylinder magnet)

∗ Refer to the table below for auto switch models.

Number of auto switches

Nil	2 pcs.
S	1 pc.
n	"n" pcs.

Applicable auto switches/Refer to pages 29 through 36 for detailed auto switch specifications.

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage DC	Load voltage AC	Switch mounting screw in-line direction ø20 ø25	ø32	ø40 to ø63	ø80 ø100	Perpendicular ø20 to ø63	Lead wire length (m)∗ 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Applicable load	
Reed switch	—	Grommet	Yes	3 wire (NPN equiv.)	—	5V	—	C76		—	B76	●	●	—	—	IC circuit	—
				2 wire	24V	12V	100V	C73		—	B73	●	●	●	—		Relay, PLC
							—	(B53)	B53		—	●	●	●	—	—	PLC
							100V, 200V	(B54)	B54		—	●	●	●	—		Relay, PLC
			No				200V or less	(B64)	B64		—	●	●	—	—		
						5V, 12V	100V or less	C80		—	B80	●	●	—	—	IC circuit	
		Connector	Yes			12V	—	C73C		—	B73C	●	●	●	●	—	
			No			5V, 12V	24V or less	C80C		—	B80C	●	●	●	●	IC circuit	
	Diagnostic indication (2 color indicator)	Grommet	Yes			—	—	(B59W)	B59W		—	●	●	—	—	—	
Solid state switch	—	Grommet	Yes	3 wire (NPN)	24V	5V, 12V	—	H7A1		G59	G79	●	●	○	—	IC circuit	Relay, PLC
				3 wire (PNP)				H7A2		G5P	—	●	●	○	—		
				2 wire		12V		H7B		K59	K79	●	●	○	—	—	
		Connector						H7C		—	K79C	●	●	●	●		
	Diagnostic indication (2 color indicator)	Grommet		3 wire (NPN)		5V, 12V		H7NW		G59W	—	●	●	○	—	IC circuit	
				3 wire (PNP)				H7PW		G5PW	—	●	●	○	—		
				2 wire		12V		H7BW		K59W	—	●	●	○	—	—	
	Water resistant (2 color indicator)							H7BA		G5BA	—	—	●	○	—		
	With timer			3 wire (NPN)		5V, 12V		(G5NT)	G5NT		—	—	●	○	—	IC circuit	
	With diagnostic output (2 color indicator)			4 wire (NPN)				H7NF		G59F	—	●	●	○	—		
	Latch type with diagnostic output (2 color indicator)					—		H7LF		—	—	●	●	○	—	—	

∗ Lead wire length symbols 0.5m ..... Nil Example: B80C
3m ..... L Example: B80CL
5m ..... Z Example: B80CZ
None ..... N Example: B80CN

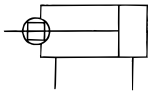
∗ Solid state switches marked with "○" are produced upon receipt of order.

∗ Refer to page 29 when using solid state switches (G59, G5P, K59, G59W, G5PW, K59W, G5BA, G59F) on bore sizes ø20 to ø63.

⚠Caution When using auto switches shown inside ( ), stroke end detection may not be possible depending on the One-touch fitting or speed controller model. Contact SMC in this case.

Models and Specifications

JIS symbol



Models and strokes

Model	Bearing type	Bore size (mm)	Standard stroke (mm)	Long stroke (mm)
MGGM	Slide bearing	20	75, 100, 125, 150, 200	250, 300, 350, 400
		25	75, 100, 125, 150, 200, 250, 300	350, 400, 450, 500
		32		350, 400, 450, 500, 600
		40		350, 400, 450, 500, 600, 700, 800
MGGL	Ball bushing	50		350, 400, 450, 500, 600, 700, 800, 900, 1000
		63		350, 400, 450, 500, 600, 700, 800, 900, 1000, 1100
		80		350, 400, 450, 500, 600, 700, 800, 900, 1000, 1100, 1200
		100		350, 400, 450, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300

∗ Intermediate strokes and short strokes other than the above are produced upon receipt of order.

Specifications

Model		MGG□□20	MGG□□25	MGG□□32	MGG□□40	MGG□□50	MGG□□63	MGG□□80	MGG□□100
Base cylinder		CDG1BN20	CDG1BN25	CDG1BN32	CDG1BN40	CDG1BN50	CDG1BN63	CDG1BN80	CDG1BN100
Bore size (mm)		20	25	32	40	50	63	80	100
Action		Double acting							
Fluid		Air							
Proof pressure		1.5MPa							
Maximum operating pressure		1.0MPa							
Minimum operating pressure		0.15MPa (horizontal with no load)							
Ambient and fluid temperature		–10° to 60°C							
Piston speed		50 to 1000mm/s						50 to 700mm/s	
Cushion	Base cylinder	Rubber bumper							
	Guides	Built-in shock absorber (2 pcs.)							
Stroke adjustment range (one side) [built-in adjustment bolts (2 pcs.)]		0 to -10mm	0 to –15mm						
Base cylinder lubrication		Non-lube							
Thread tolerance		JIS class 2							
Stroke length tolerance		$^{+1.9}_{+0.2}$mm (1000mm or less), $^{+2.3}_{+0.2}$mm (1001mm or more)							
Non-rotating accuracy (except deflection of guide rods)	Slide bearing	±0.07°	±0.06°	±0.06°	±0.05°	±0.04°	±0.04°	±0.04°	±0.03°
	Ball bushing	±0.06°	±0.05°	±0.04°	±0.04°	±0.04°	±0.03°	±0.03°	±0.02°
Port size		Rc 1/8				Rc 1/4		Rc 3/8	Rc 1/2

Shock absorber specifications

Shock absorber model		RB1007	RB1412	RB2015	RB2725
Applicable guide cylinder		MGG□□20	MGG□□25, 32	MGG□□40, 50, 63	MGG□□80, 100
Maximum energy absorption J		5.88	19.6	58.8	147
Stroke absorption mm		7	12	15	25
Maximum collision speed m/s		5			
Maximum operating frequency cycle/min∗		70	45	25	10
Ambient temperature range °C		–10° to 80°C			
Spring force N	Extended	4.22	6.86	8.34	8.83
	Compressed	6.86	15.98	20.5	20.01

∗ With the maximum energy absorption per cycle. Consequently, the operating frequency can be increased depending on the energy absorption.

Theoretical Output

(Unit: N)

Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm²)	Operating pressure (MPa)								
				0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
20	8	OUT	314	62.8	94.2	126	157	188	220	251	283	314
		IN	264	52.8	79.2	106	132	158	185	211	238	264
25	10	OUT	491	98.2	147	196	246	295	344	393	442	491
		IN	412	82.4	124	165	206	247	288	330	371	412
32	12	OUT	804	161	241	322	402	482	563	643	724	804
		IN	691	138	207	276	346	415	484	553	622	691
40	16	OUT	1260	252	378	504	630	756	882	1010	1130	1260
		IN	1060	212	318	424	530	636	742	848	954	1060
50	20	OUT	1960	392	588	784	980	1180	1370	1570	1760	1960
		IN	1650	330	495	660	825	990	1160	1320	1490	1650
63	20	OUT	3120	624	936	1250	1560	1870	2180	2500	2810	3120
		IN	2800	560	840	1120	1400	1680	1960	2240	2520	2800
80	25	OUT	5030	1010	1510	2010	2520	3020	3520	4020	4530	5030
		IN	4540	908	1360	1820	2270	2720	3180	3630	4090	4540
100	30	OUT	7850	1570	2360	3140	3930	4710	5500	6280	7070	7850
		IN	7150	1430	2150	2860	3580	4290	5010	5720	6440	7150

Note) Theoretical output (N) = Pressure (MPa) x Piston area (mm²)

Weights

(kg)

Bore size (mm)		20	25	32	40	50	63	80	100
Standard weight	Basic type	1.2	1.98	2.66	5.21	8.23	10.26	16.79	23.61
	Front mounting flange type	1.75	2.71	3.41	6.81	9.99	14.17	23.25	31.95
Weight by bearing type	Slide bearing	0.73	1.13	1.53	2.8	4.33	5.98	8.96	12.93
	Ball bushing	0.74	1.14	1.52	2.78	4.51	6.6	9.76	14.24
Additional weight per 50mm of stroke		0.14	0.17	0.25	0.4	0.61	0.82	1.11	1.48
Additional weight for long stroke		0.01	0.01	0.02	0.03	0.06	0.1	0.19	0.26
Additional weight with bracket		0.012	0.017	0.018	0.031	0.062	0.27	0.39	0.57

Calculation method Example: **MGGLB32-500** (basic type, ball bushing, ø32, 500mm stroke, with bracket)

- Standard weight .... 2.66 (basic type)
- Bearing weight ..... 1.52 (ball bushing)
- Additional weight for stroke 0.25/50mm
- Stroke 500mm
- Additional weight for long stroke … 0.02
- Additional weight with bracket 0.018

2.66 + 1.52 + 0.25 x 500/50 + 0.02 + 0.018 = 6.718kg

Weights of Moving Parts

(kg)

Bore size (mm)	20	25	32	40	50	63	80	100
Moving parts basic weight	0.73	1.23	1.74	3.32	5.61	8.45	13.21	18.79
Additional weight per 50mm of stroke	0.11	0.135	0.203	0.327	0.51	0.68	0.949	1.266

Calculating weight of moving parts Example: **MGGLB32-500**

- Moving parts basic weight 1.74
- Additional weight for stroke 0.203/50mm
- Stroke 500mm

1.74 + 0.203 x 500/50 = 3.77kg

Air-hydro Type

Low pressure hydraulic cylinder of 1.0MPa or less
When used together with a series CC air-hydro unit, constant and low speed actuation, and intermediate stopping similar to hydraulic units are possible with the use of valves and other pneumatic equipment.

MGG**H** | **Bearing type** | **Mounting** | **Bore size** — **Stroke**

H: Air-hydro type

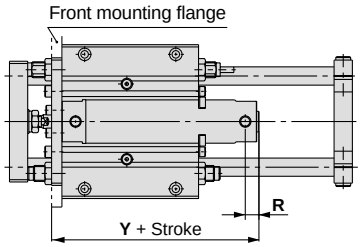
Specifications

Bore size (mm)		20, 25, 32, 40, 50, 63
Action		Double acting
Fluid		Turbine oil
Proof pressure		1.5MPa
Maximum operating pressure		1.0MPa
Minimum operating pressure		0.18MPa (horizontal with no load)
Piston speed		15 to 300mm/s
Cushion	Base cylinder	None
	Guides	Built-in shock absorber (2 pcs.)
Ambient and fluid temperature		+5° to 60°C
Thread tolerance		JIS class 2
Mounting		Basic type Front mounting flange type

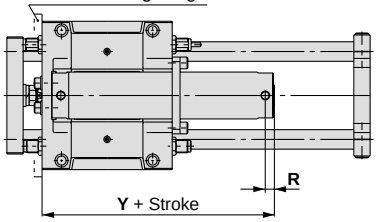
∗ Refer to page 2 for specifications other than the above.
∗ Auto switch capable

Dimensions

ø20 to ø50



ø63



(mm)

Bore size (mm)	20	25	32	40	50	63
R	14	14	14	15	16	16
Y	88	88	90	101	116	119

∗ Dimensions other than the above are the same as those on pages 17, 18, 19 and 20.

Copper-Free Type (for CRT production processes)

In order to eliminate the adverse effects of copper ions and halogen ions on CRT production processes, this type does not use copper or fluorine materials.

20-MGG | **Bearing type** | **Mounting** | **Bore size** — **Stroke**

20: Copper-free

Specifications

Bore size (mm)		20, 25, 32, 40, 50, 63, 80, 100
Action		Double acting
Fluid		Air
Maximum operating pressure		1.0MPa
Minimum operating pressure		0.15MPa (horizontal with no load)
Cushion	Base cylinder	Rubber bumper
	Guides	Built-in shock absorber (2 pcs.)
Mounting		Basic type Front mounting flange type

∗ Refer to page 2 for specifications and pages 17 through 20 for dimensions other than the above.
∗ Auto switch capable

Water Resistant Type

The installation of a special scraper in front of the rod seal on the base cylinder protects against the entry of liquids from the environment into the cylinder. This type can be used in environments with machine tool coolants, and with water spray such as food processing and car washing equipment.

MGG**M** | **Mounting** | **Bore size** | **R** — **Stroke** — **G5BAL**

M: Slide bearing
G5BAL: Water resistant 2 color indication solid state switch
R: Water resistant cylinder

R	Seals NBR (nitrile rubber)
V	Seals FKM (fluoro rubber)

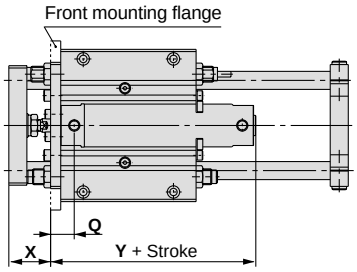
Specifications

Bore size (mm)		32, 40, 50, 63, 80, 100
Action		Double acting
Fluid		Air
Maximum operating pressure		1.0MPa
Minimum operating pressure		0.15MPa (horizontal with no load)
Bearing type		Slide bearing
Cushion	Base cylinder	Rubber bumper
	Guides	Built-in shock absorber (2 pcs.)
Mounting		Basic type Front mounting flange type

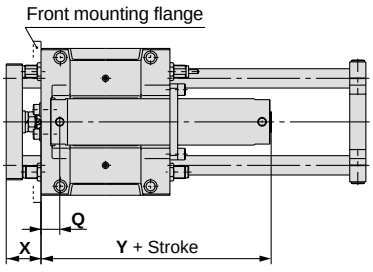
∗ Refer to page 2 for specifications other than the above.
∗ Auto switch capable (water resistant type)
Note) RBL (coolant resistant) type shock absorbers are used.

Dimensions

ø32 to ø50



ø63 to ø100

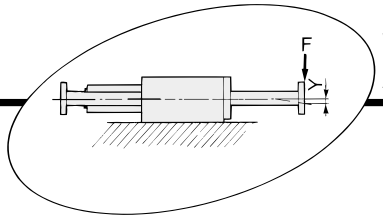


(mm)

Bore size (mm)	Q	X	Y
32	25	39	86 (94)
40	29	46	96 (105)
50	31	57	109 (121)
63	34	56	112 (124)
80	46	68	137 (151)
100	47	68	138 (152)

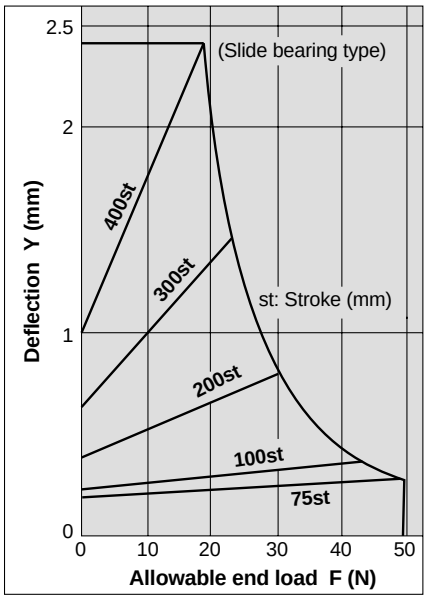
∗ Dimensions inside ( ) are for long strokes.
∗ Dimensions other than the above are the same as those on pages 17 through 20.

Refer to the separate catalog (CAT.E244-Ⓑ) for detailed specifications (except ø63 to ø100).

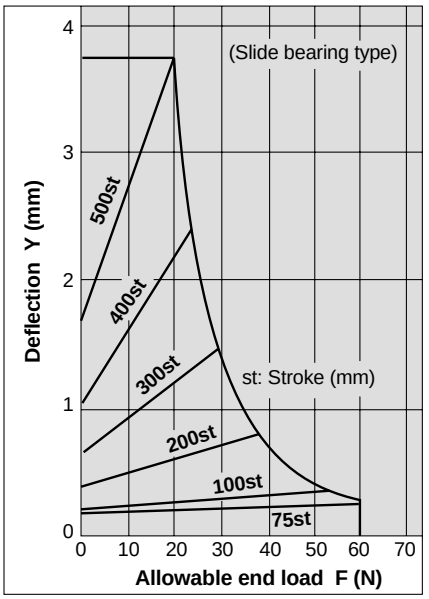


Slide Bearing
Allowable End Load and Deflection

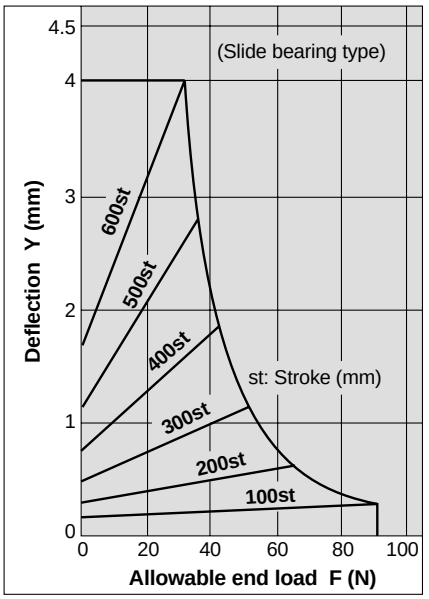
MGGM□20- Stroke



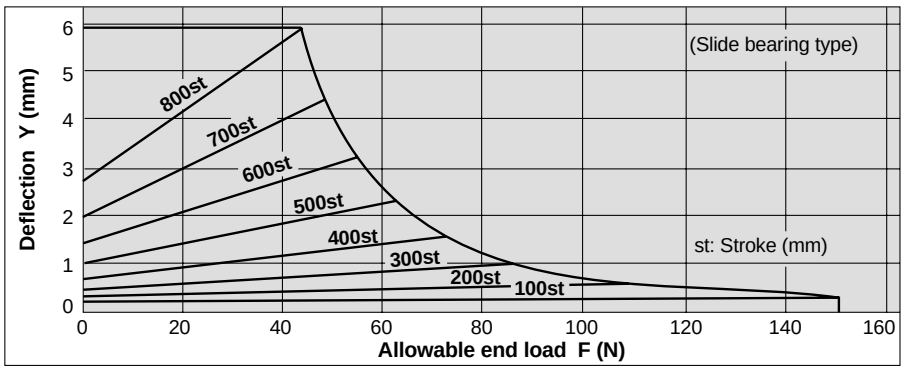
MGGM□25- Stroke



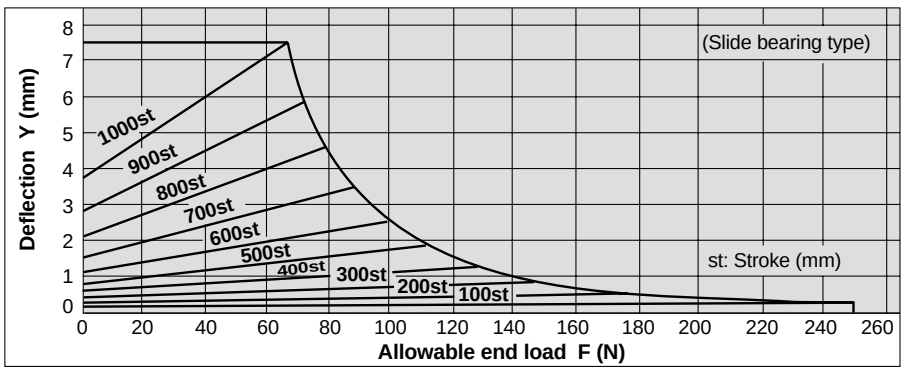
MGGM□32- Stroke



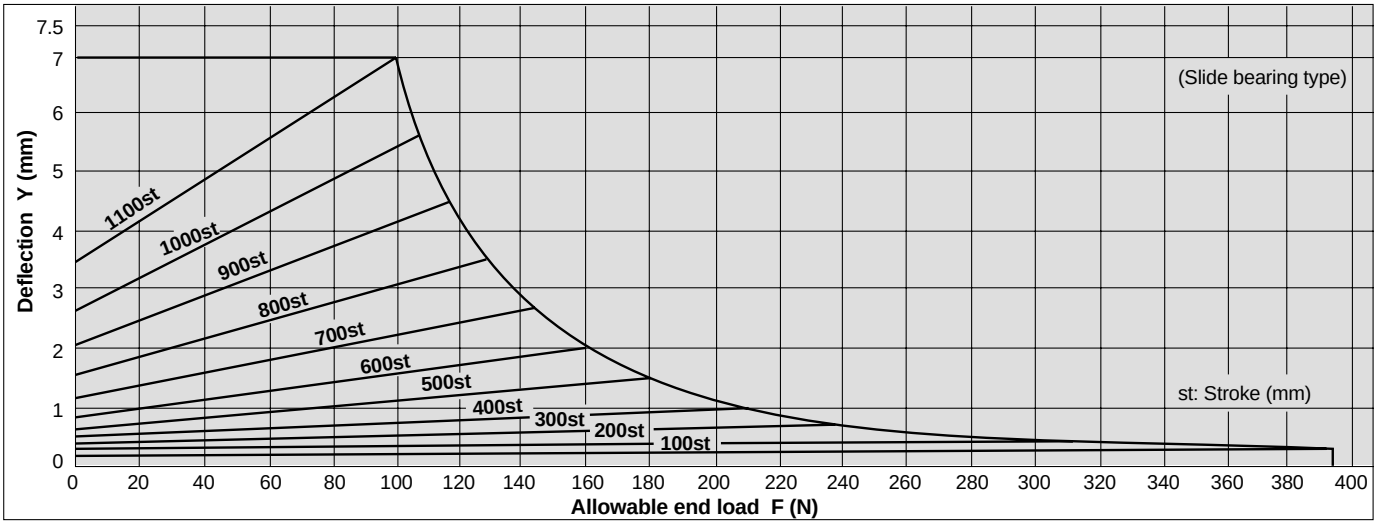
MGGM□40- Stroke



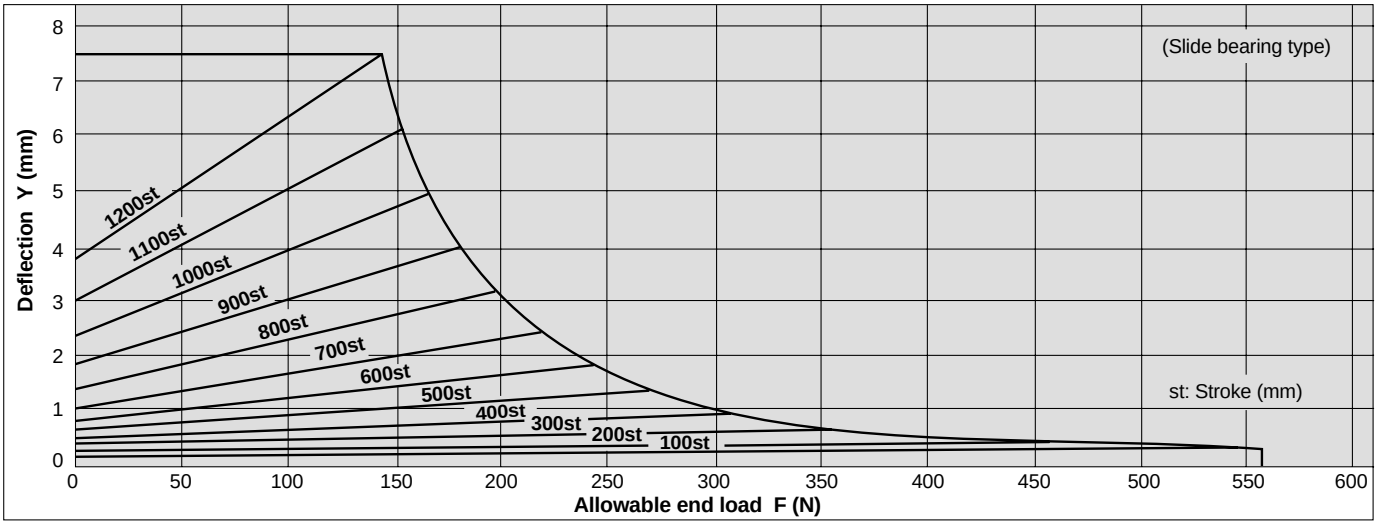
MGGM□50- Stroke



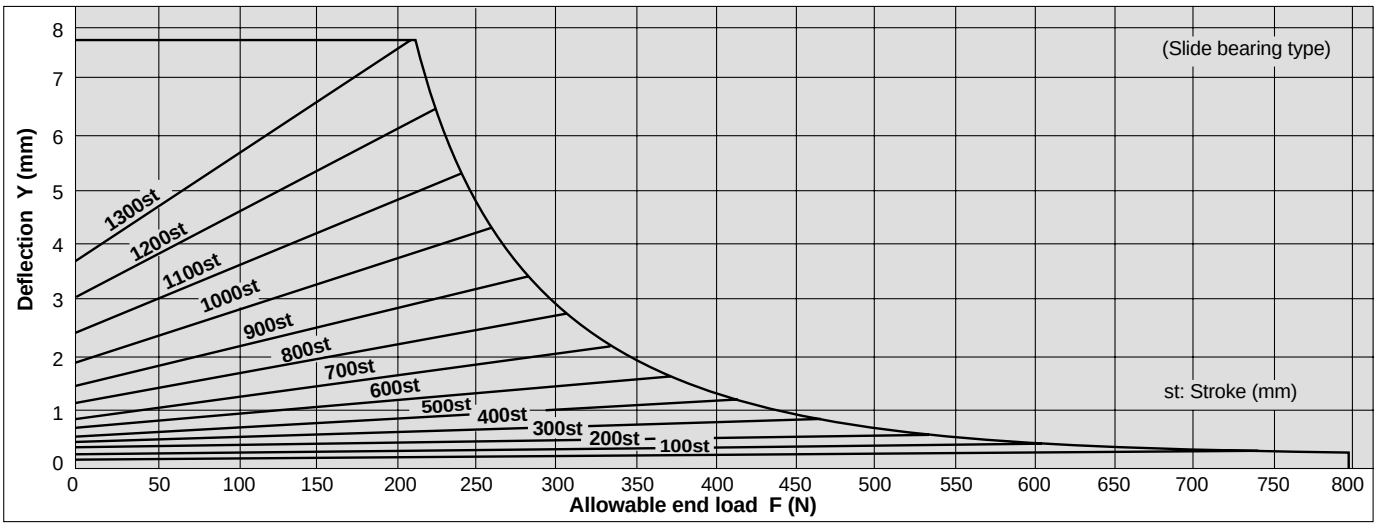
MGGM□63-Stroke

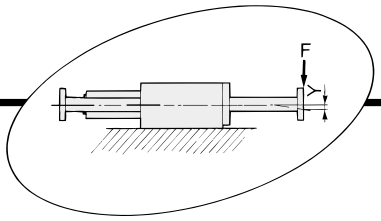


MGGM□80-Stroke



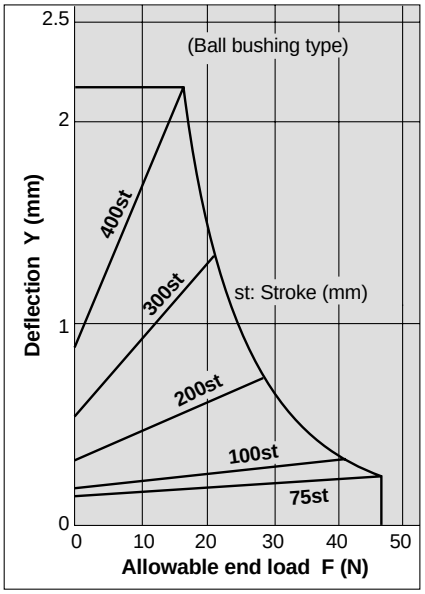
MGGM□100-Stroke



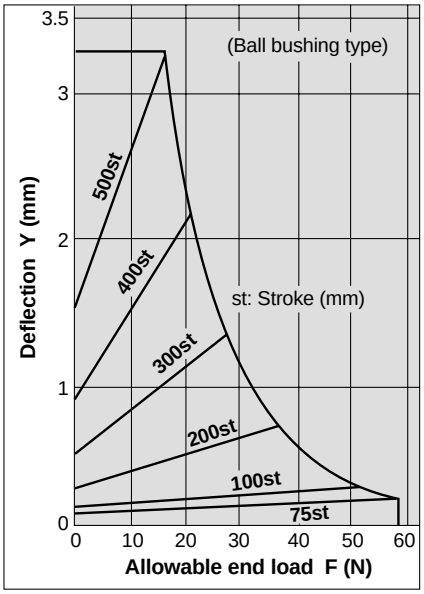


Ball Bushing
Allowable End Load and Deflection

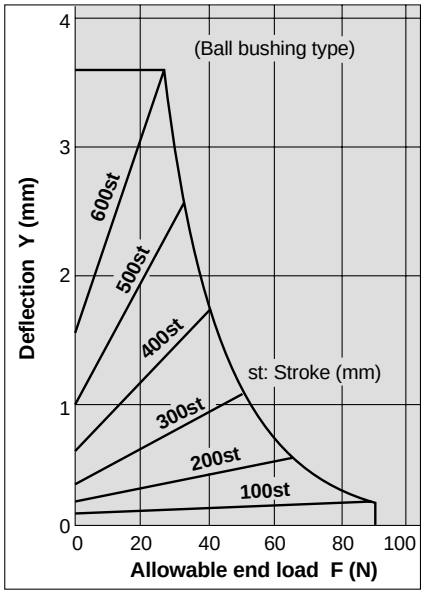
MGGL□20- Stroke



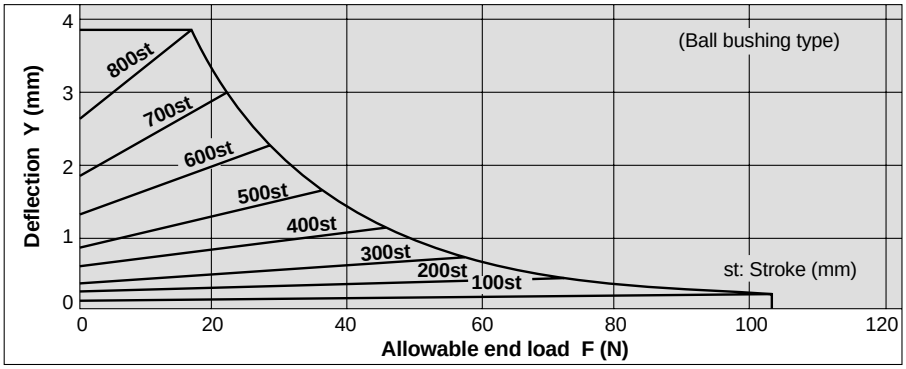
MGGL□25- Stroke



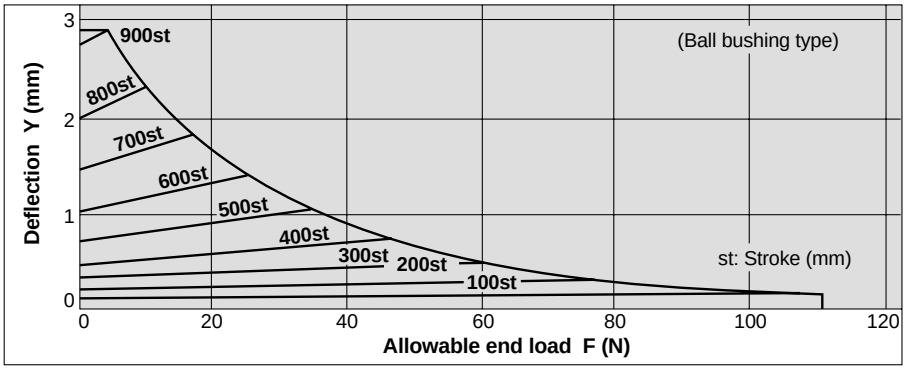
MGGL□32- Stroke



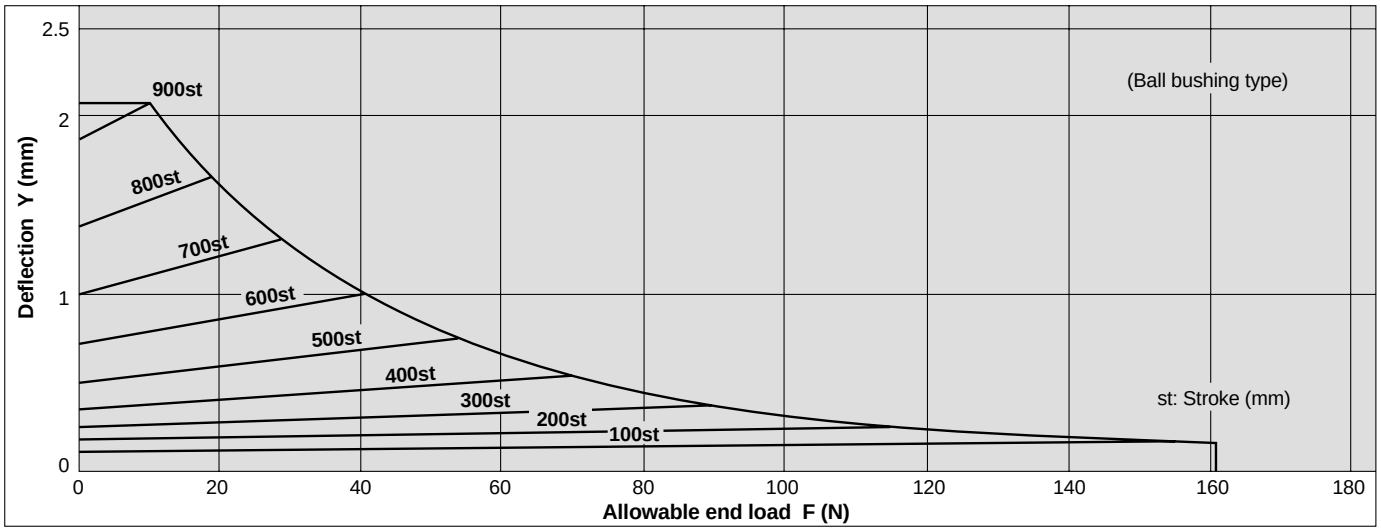
MGGL□40- Stroke



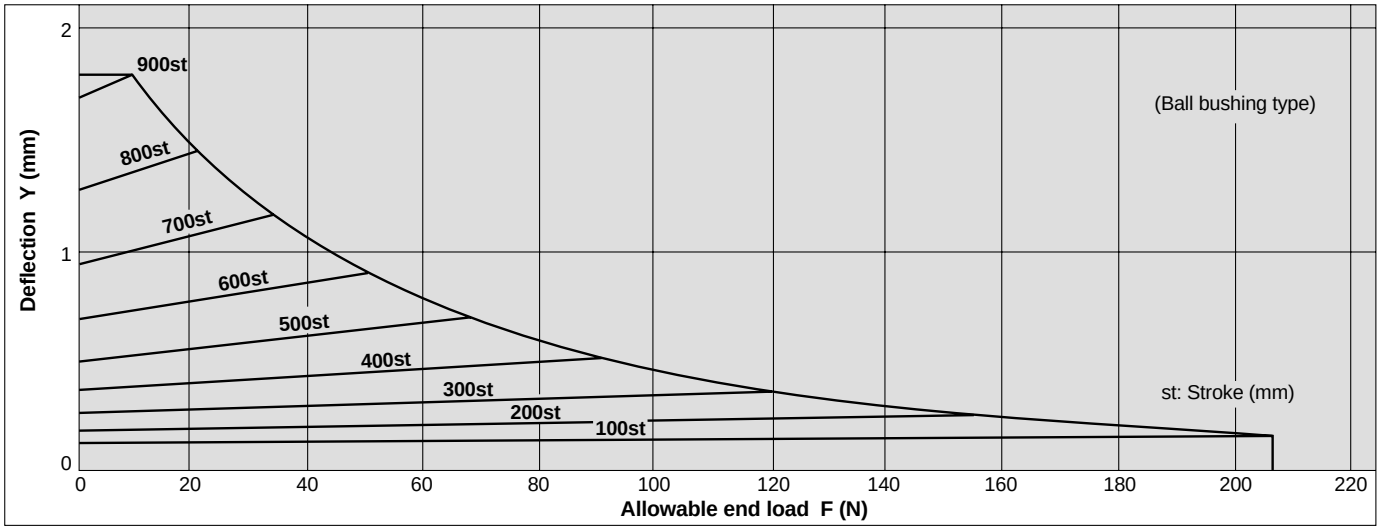
MGGL□50- Stroke



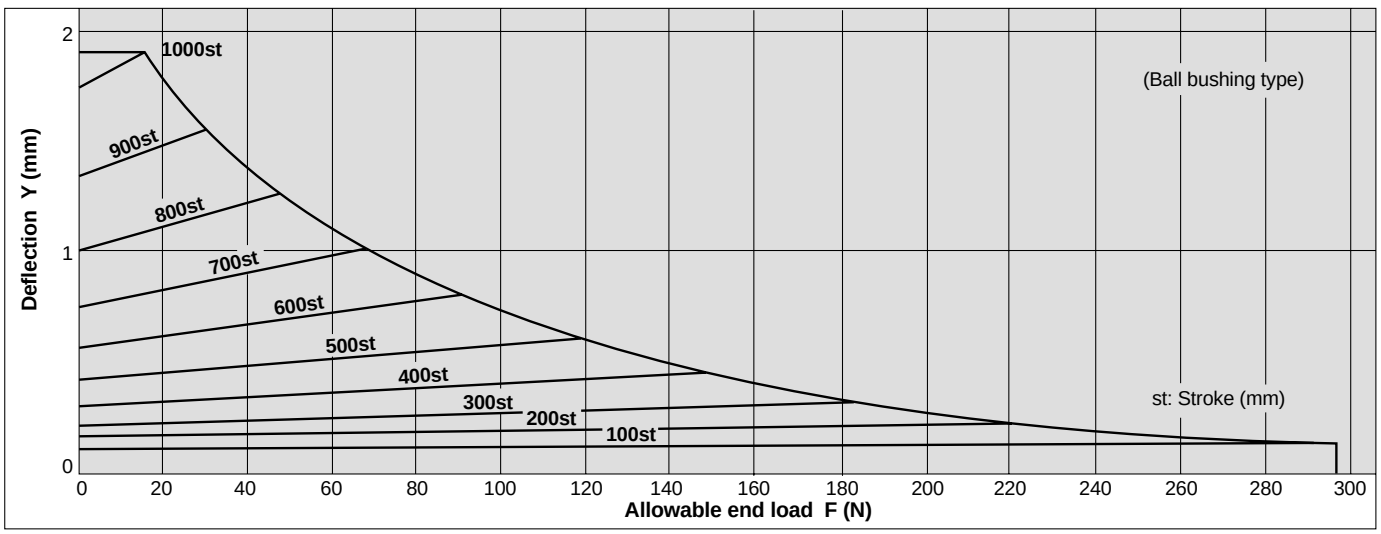
MGGL□63- Stroke

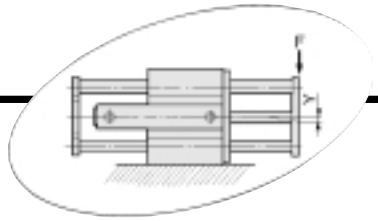


MGGL□80- Stroke



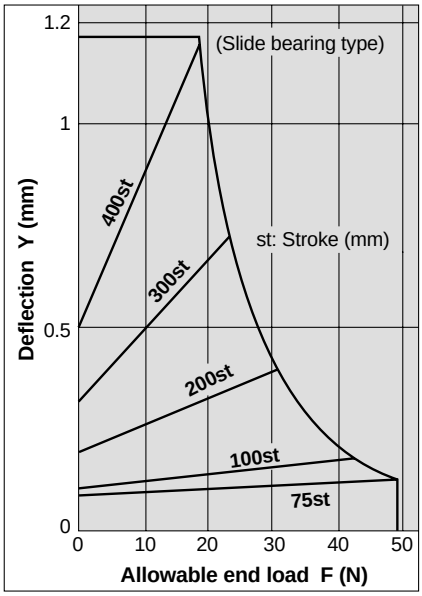
MGGL□100- Stroke



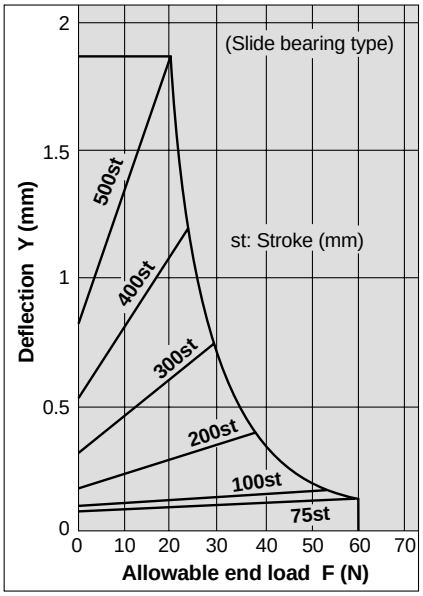


Slide Bearing
Allowable End Load and Deflection

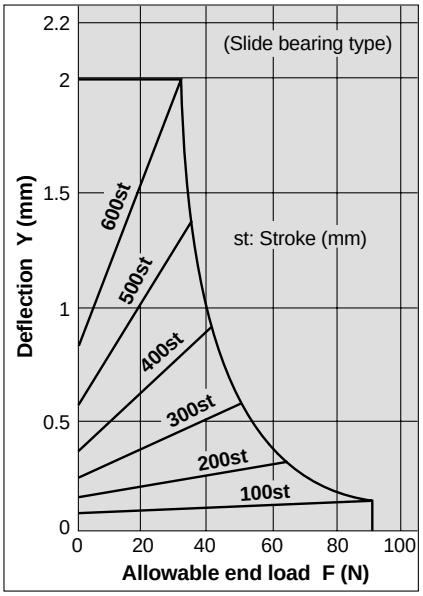
MGGM□20- Stroke



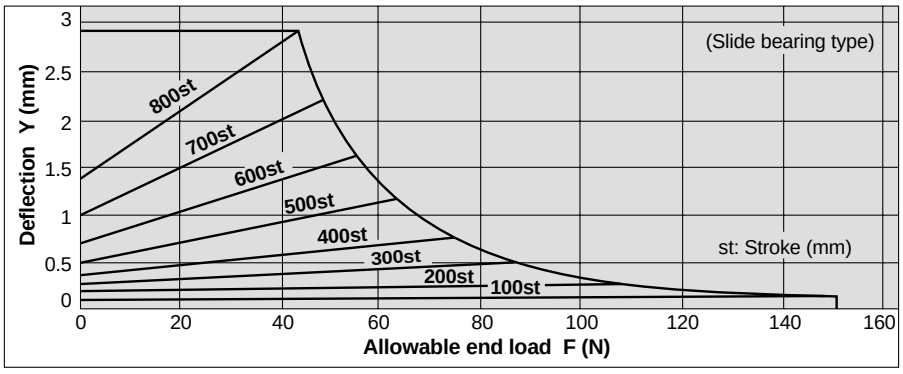
MGGM□25- Stroke



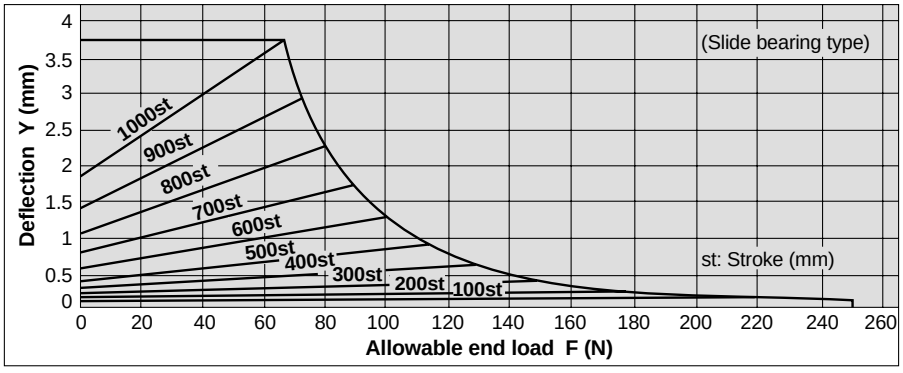
MGGM□32- Stroke



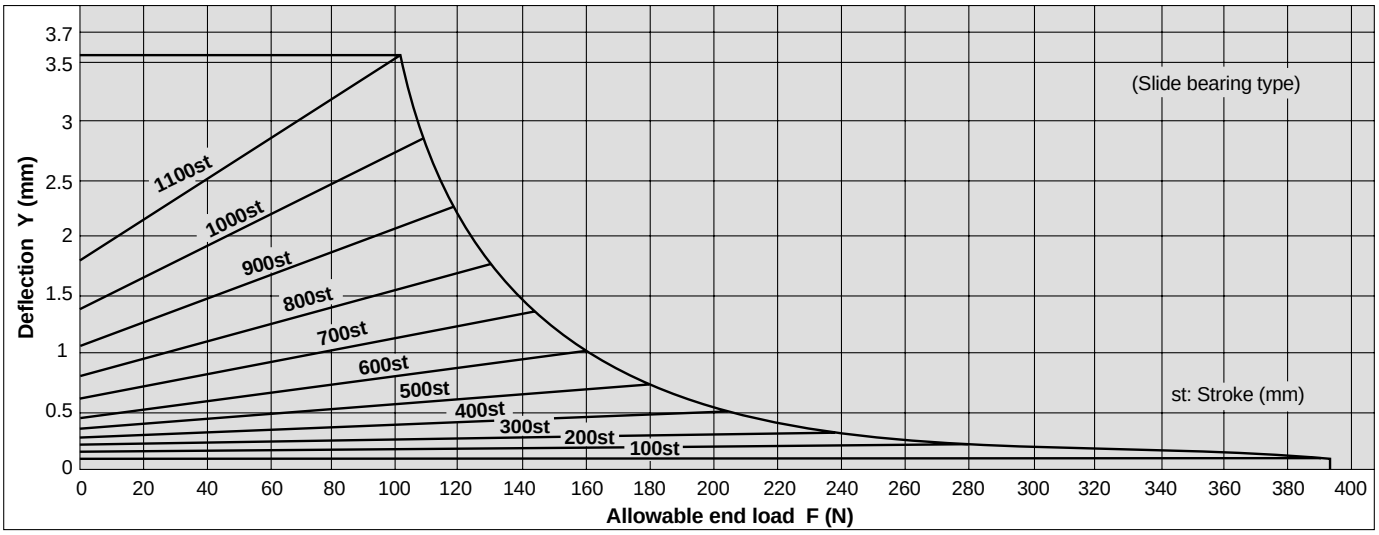
MGGM□40- Stroke



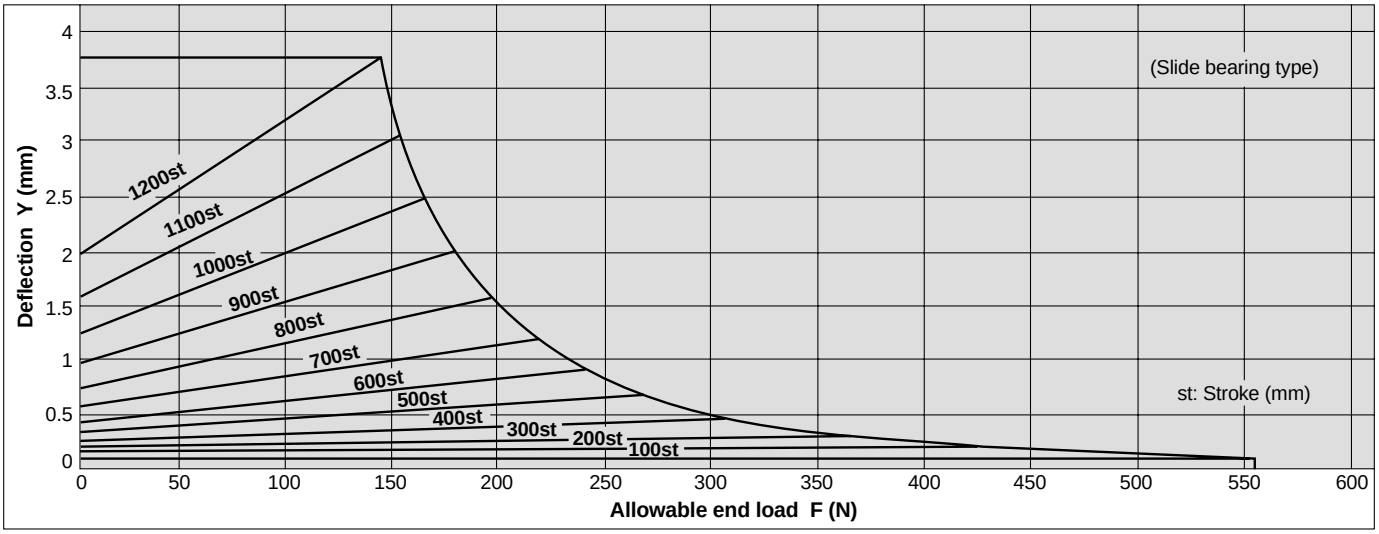
MGGM□50- Stroke



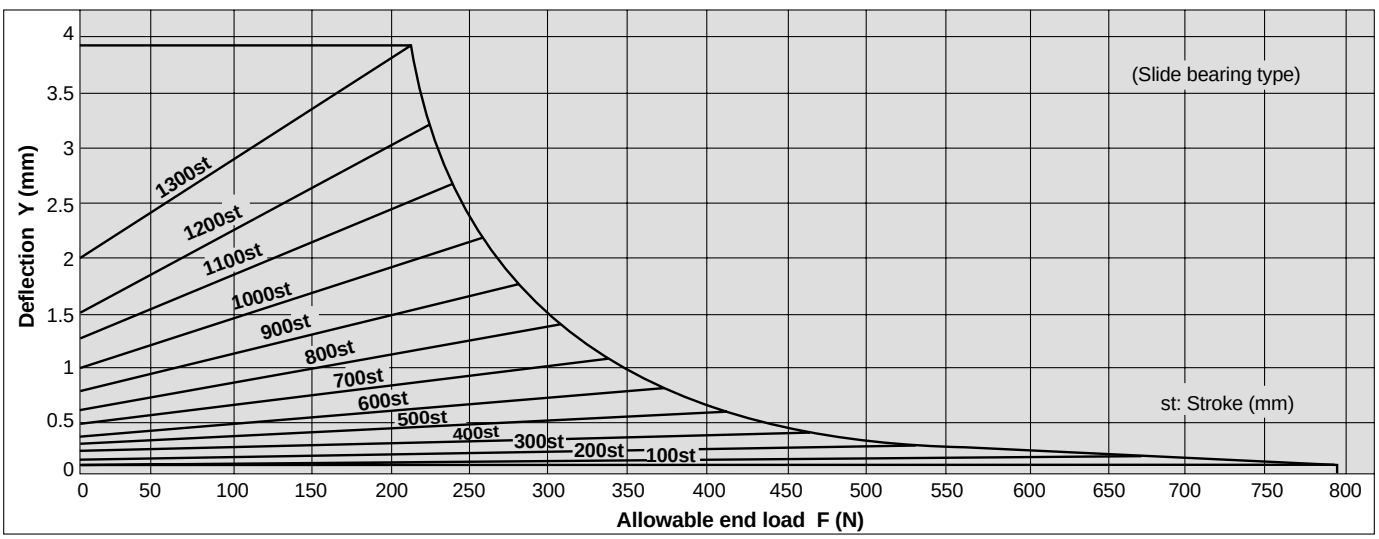
MGGM□63- Stroke

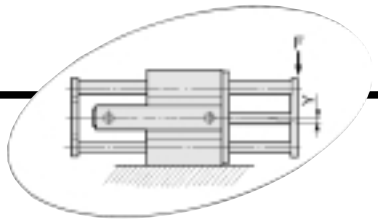


MGGM□80- Stroke



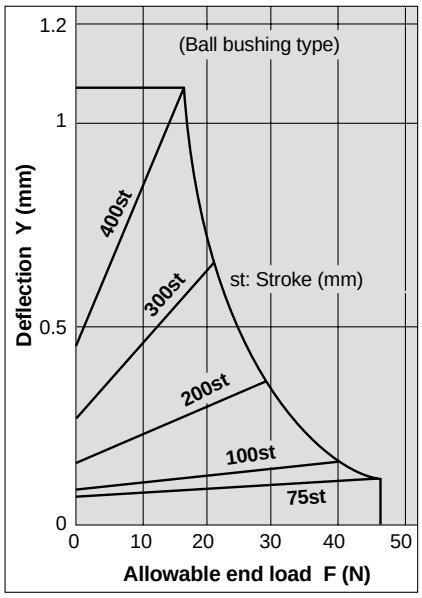
MGGM□100- Stroke



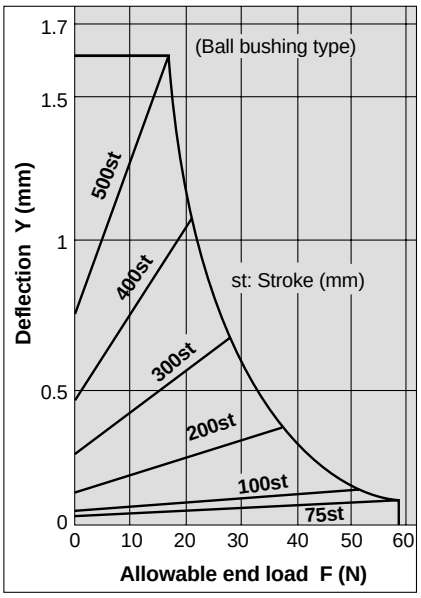


Ball Bushing
Allowable End Load and Deflection

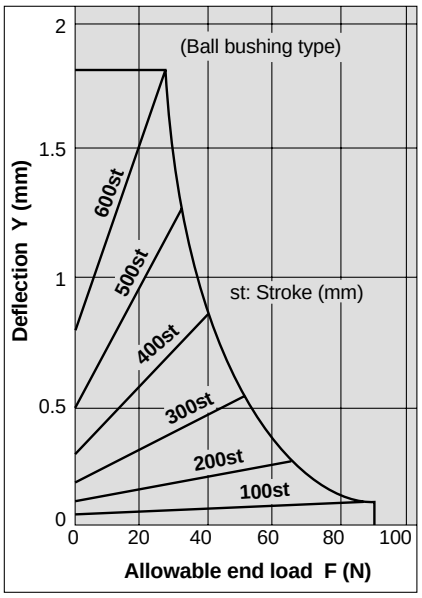
MGGL□20-Stroke



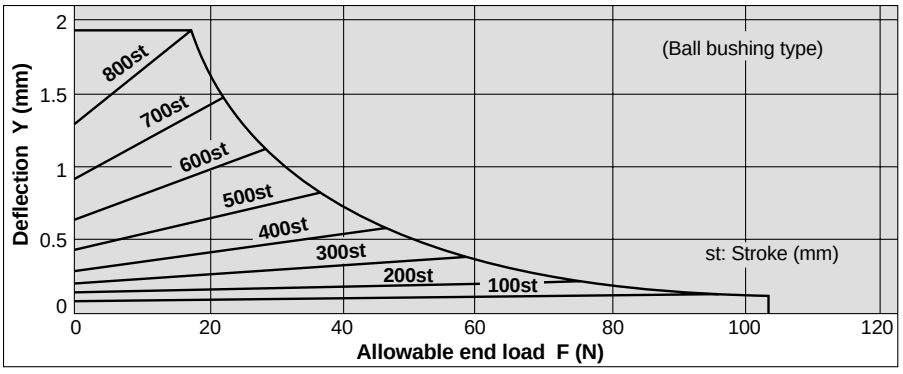
MGGL□25-Stroke



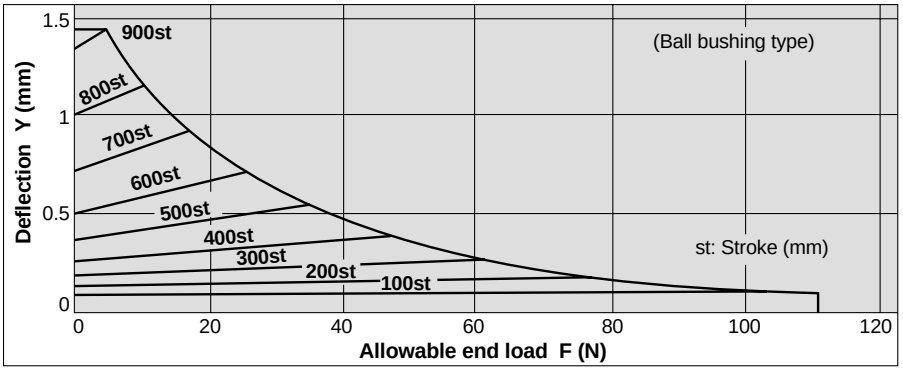
MGGL□32-Stroke



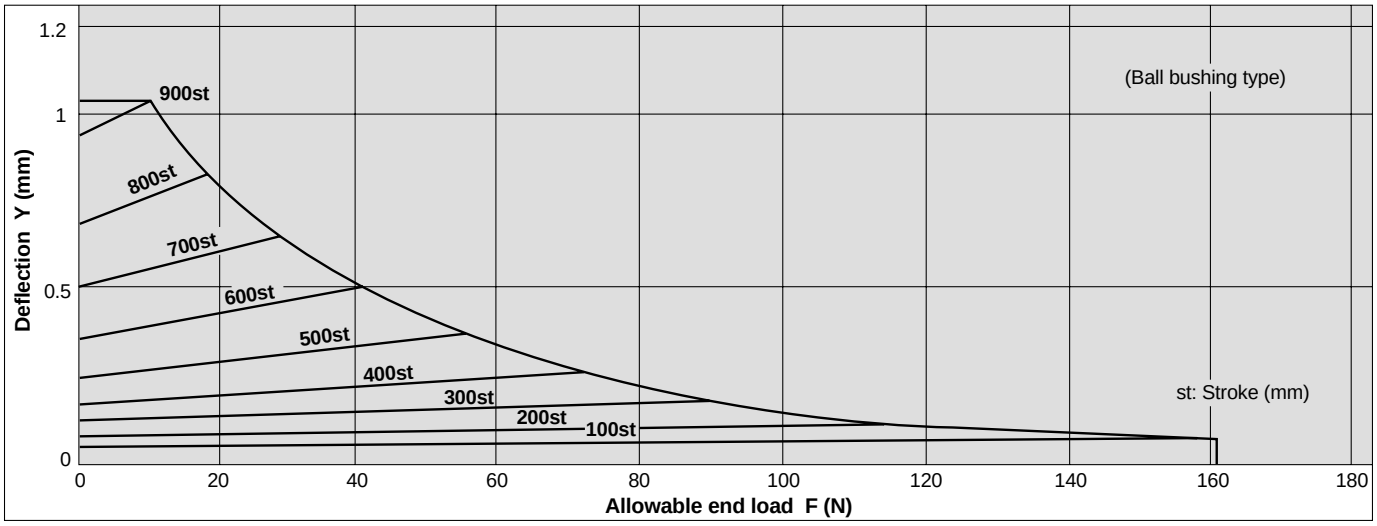
MGGL□40-Stroke



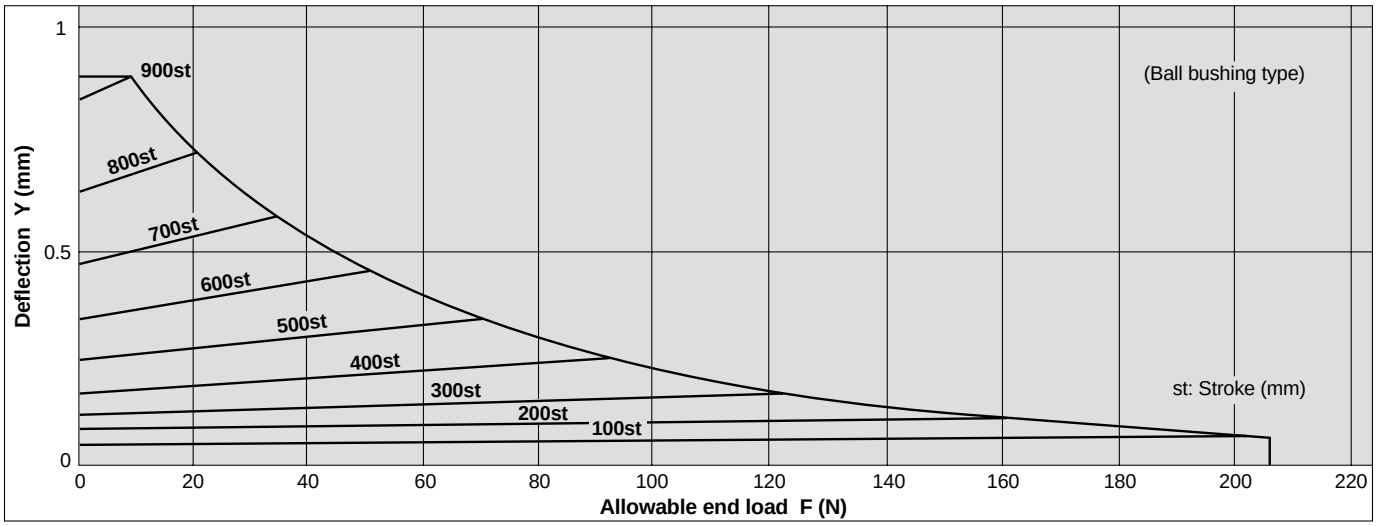
MGGL□50-Stroke



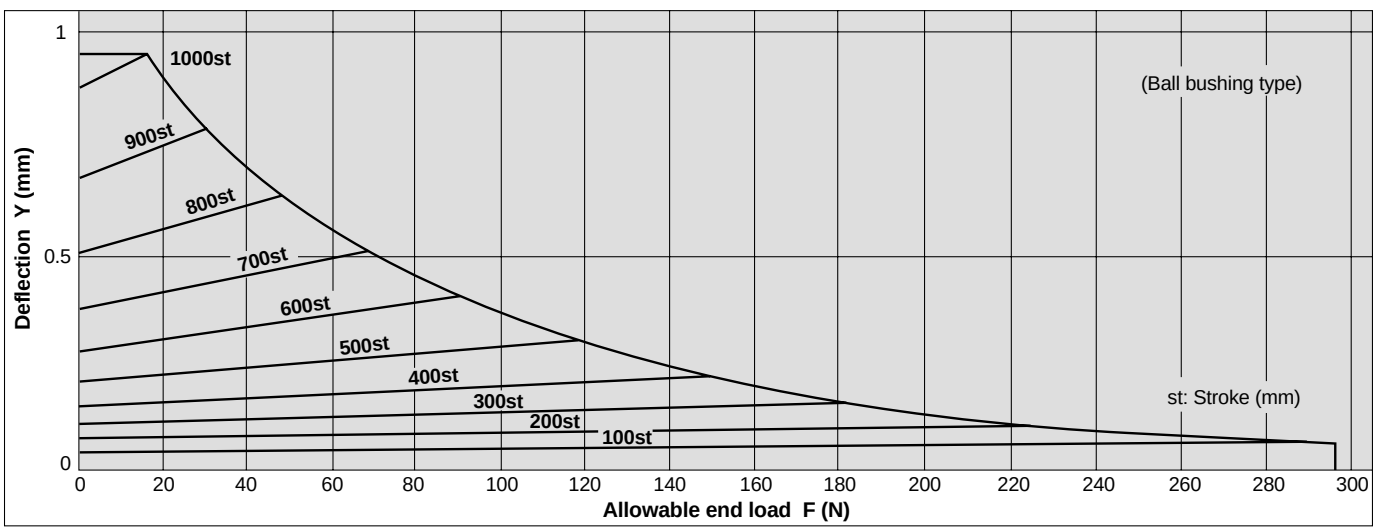
MGGL□63- Stroke



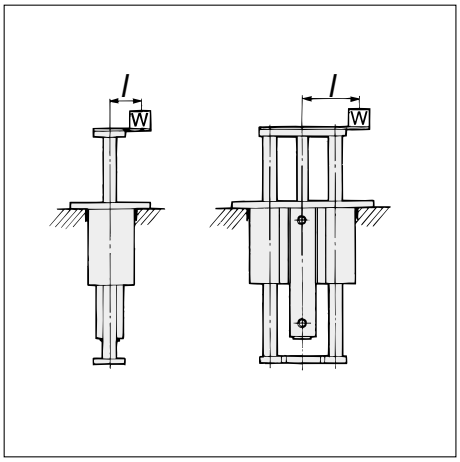
MGGL□80- Stroke



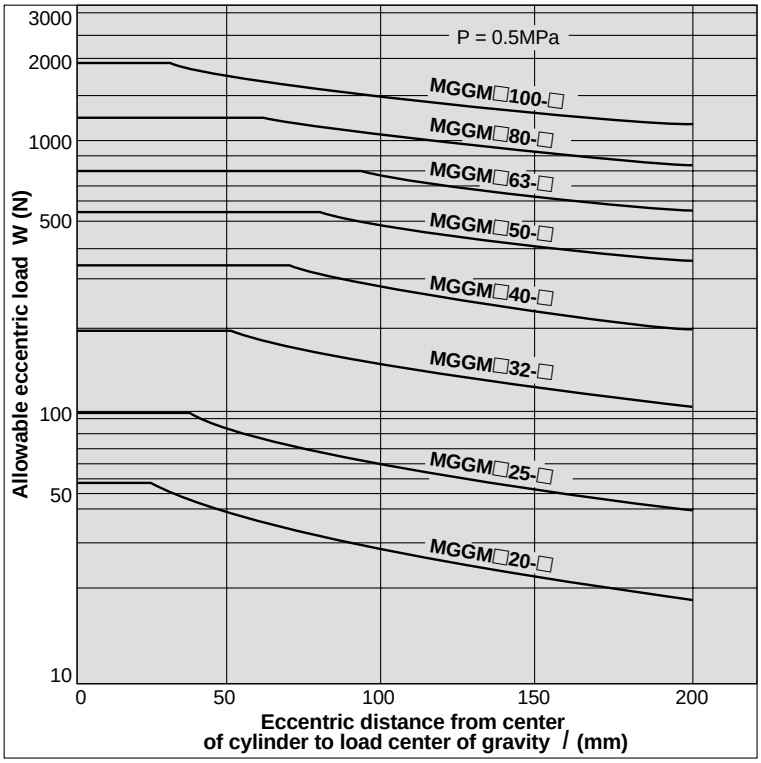
MGGL□100- Stroke



Allowable Eccentric Load

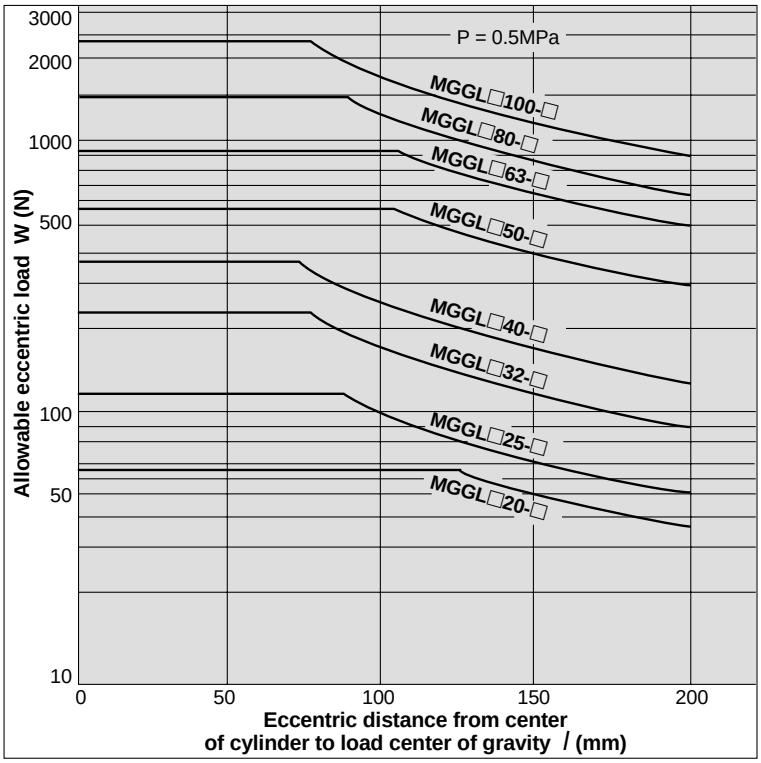


Slide bearing/MGGM□□-Stroke



(Set the maximum allowable load so that it does not exceed the following percentages of the theoretical output: 35% for ø20, 40% for ø25, 50% for ø32, 55% for ø40 and ø50, and 50% for ø63, ø80 and ø100.)

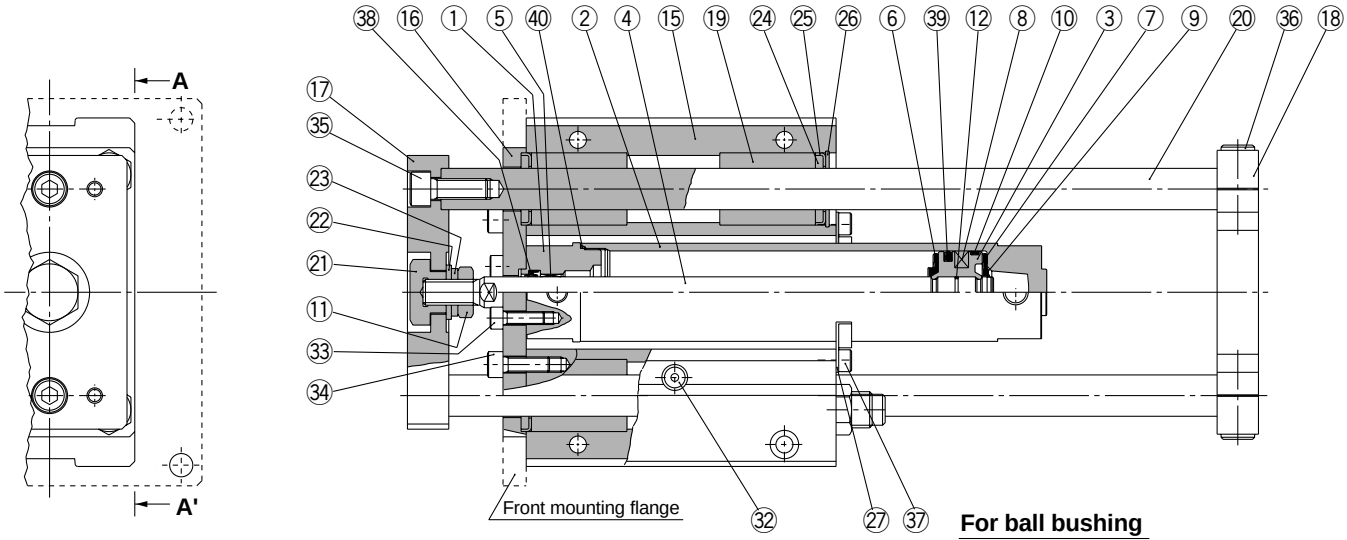
Ball bushing/MGGL□□-Stroke



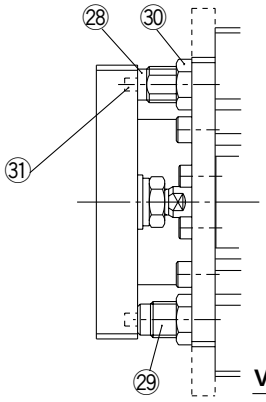
(Set the maximum allowable load so that it does not exceed the following percentages of the theoretical output: 40% for ø20, 50% for ø25, and 60% for ø32, ø40, ø50, ø63, ø80 and ø100.)

Construction

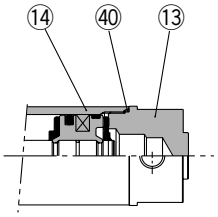
ø20 to ø50/MGG□□



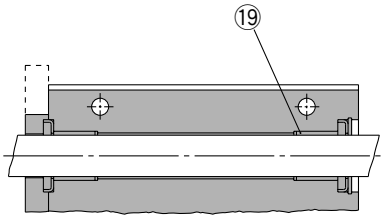
For ball bushing



View A-A'



For long stroke



For slide bearing

Parts list

No.	Description	Material	Note	
1	**Rod cover**	Aluminum alloy	Clear hard anodized	
2	**Tube cover**	Aluminum alloy	Clear hard anodized	
3	**Piston**	Aluminum alloy	Chromated	
4	**Piston rod**	Carbon steel	Hard chrome plated	ø20, ø25 are stainless steel
5	**Bushing**	Oil-impregnated sintered alloy	ø40 and larger are lead-bronze casting	
6	**Bumper A**	Urethane		
7	**Bumper B**	Urethane	ø40 and larger are the same as bumper A	
8	**Rubber magnet**	Synthetic rubber		
9	**Snap ring**	Stainless steel		
10	**Wear ring**	Resin		
11	**Rod end nut**	Rolled steel	Nickel plated	
12	**Piston gasket**	NBR		
13	**Head cover**	Aluminum alloy	Clear hard anodized	For long stroke
14	**Cylinder tube**	Aluminum alloy	Hard anodized	
15	**Guide body**	Aluminum alloy	Clear anodized	
16	**Small flange**	Rolled steel	Flat nickel plated	For basic type
	Large flange			For front mounting flange type
17	**Front plate**	Rolled steel	Flat nickel plated	
18	**Rear plate**	Cast iron	Metallic gold	
19	**Slide bearing**	Special friction material	For slide bearing	
	Ball bush bearing	—	For ball bushing	
20	**Guide rod**	Carbon steel	Hard chrome plated	For slide bearing
		High carbon chromium bearing steel	Tempered, hard chrome plated	For ball bushing
21	**End bracket**	Carbon steel	Flat nickel plated	
22	**Flat washer**	Rolled steel	Nickel plated	
23	**Spring washer**	Steel wire	Nickel plated	
24	**Felt**	Felt		
25	**Holder**	Stainless steel		

Parts list

No.	Description	Material	Note	
26	**C type snap ring for hole**	Carbon tool steel	Nickel plated	
27	**Bracket**	Stainless steel		
28	**Shock absorber**	—		
29	**Adjustment bolt**	Rolled steel	Nickel plated	
30	**Nut**	Rolled steel	Nickel plated	
31	**Parallel pin**	High carbon chromium bearing steel	Nickel plated	
32	**Grease nipple**	—	Nickel plated	
33	**Hexagon socket head cap screw**	Chromium molybdenum steel	Nickel plated	For cylinder mounting
34	**Hexagon socket head cap screw**	Chromium molybdenum steel	Nickel plated	For large/small flange mounting
35	**Hexagon socket head cap screw**	Chromium molybdenum steel	Nickel plated	For front plate mounting
36	**Hexagon socket head cap screw**	Chromium molybdenum steel	Nickel plated	For rear plate mounting
37	**Hexagon socket head cap screw**	Chromium molybdenum steel	Nickel plated	For bracket mounting
38	**Rod seal**	NBR		
39	**Piston seal**	NBR		
40	**Tube gasket**	NBR		

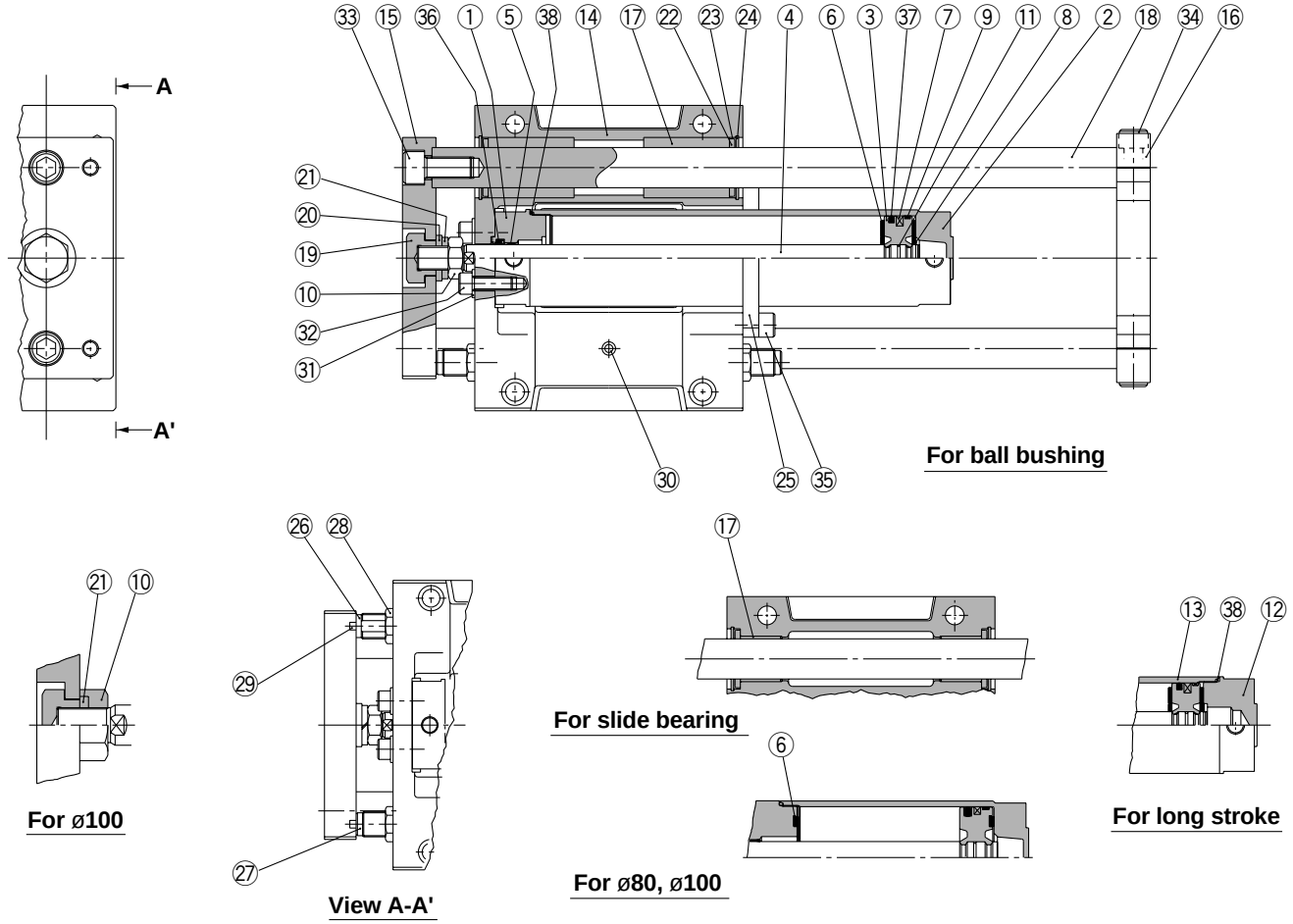
Replacement parts: Seal kits

Bore size (mm)	Seal kit no.	Content
20	CG1N20-PS	A set of the above nos. 38, 39, 40
25	CG1N25-PS	
32	CG1N32-PS	
40	CG1N40-PS	
50	CG1N50-PS	

Seal kits are sets of items 38 through 40, which can be ordered using the seal kit number for each bore size.

Construction

ø63 to ø100/MGG□B



Parts list

No.	Description	Material	Note	
1	**Rod cover**	Aluminum alloy	Clear hard anodized	
2	**Tube cover**	Aluminum alloy	Clear hard anodized	
3	**Piston**	Aluminum alloy	Chromated	
4	**Piston rod**	Carbon steel	Hard chrome plated	
5	**Bushing**	Lead-bronze casting		
6	**Bumper**	Urethane		
7	**Rubber magnet**	Synthetic rubber		
8	**Snap ring**	Stainless steel	Not required for ø80 and ø100	
9	**Wear ring**	Resin		
10	**Rod end nut**	Rolled steel	Nickel plated	ø100 is carbon steel
11	**Piston gasket**	NBR		
12	**Head cover**	Aluminum alloy	Clear hard anodized	For long stroke
13	**Cylinder tube**	Aluminum alloy	Hard anodized	
14	**Guide body**	Aluminum alloy	Metallic silver	
15	**Front plate**	Rolled steel	Flat nickel plated	
16	**Rear plate**	Cast iron	Metallic gold	
17	**Slide bearing**	Special friction material	For slide bearing	
	Ball bush bearing	—	For ball bushing	
18	**Guide rod**	Carbon steel	Hard chrome plated	For slide bearing
		High carbon chromium bearing steel	Tempered, hard chrome plated	For ball bushing
19	**End bracket**	Carbon steel	Flat nickel plated	
20	**Flat washer**	Rolled steel	Nickel plated	Not required for ø100
21	**Spring washer**	Steel wire	Nickel plated	
22	**Felt**	Felt		
23	**Holder**	Rolled steel	Nickel plated	
24	**C type snap ring for hole**	Carbon tool steel	Nickel plated	

Parts list

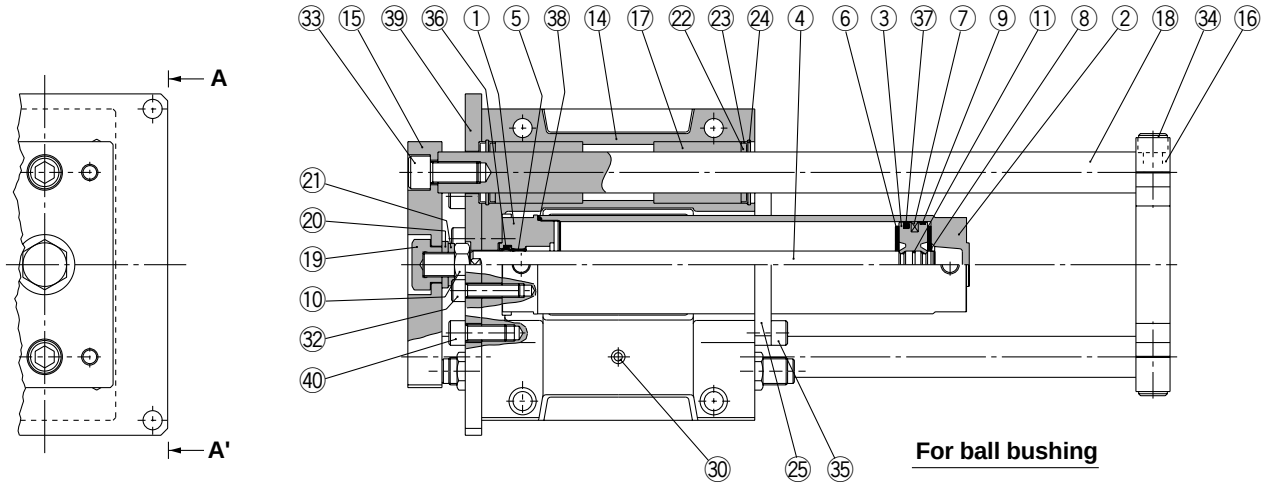
No.	Description	Material	Note	
25	**Bracket**	Aluminum alloy	Clear anodized	
26	**Shock absorber**	—		
27	**Adjustment bolt**	Rolled steel	Nickel plated	
28	**Nut**	Rolled steel	Nickel plated	
29	**Parallel pin**	High carbon chromium bearing steel	Nickel plated	
30	**Grease nipple**	—	Nickel plated	
31	**Flat washer**	Carbon steel	Nickel plated	
32	**Hexagon socket head cap screw**	Chromium molybdenum steel	Nickel plated	For cylinder mounting
33	**Hexagon socket head cap screw**	Chromium molybdenum steel	Nickel plated	For front plate mounting
34	**Hexagon socket head cap screw**	Chromium molybdenum steel	Nickel plated	For rear plate mounting
35	**Hexagon socket head cap screw**	Chromium molybdenum steel	Nickel plated	For bracket mounting
36	**Rod seal**	NBR		
37	**Piston seal**	NBR		
38	**Tube gasket**	NBR		

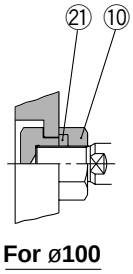
Replacement parts: Seal kits

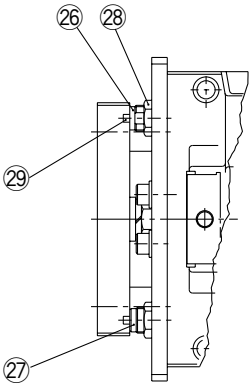
Bore size (mm)	Seal kit no.	Content
63	CG1N63-PS	A set of the above nos. 36, 37, 38
80	CG1N80-PS	
100	CG1N100-PS	

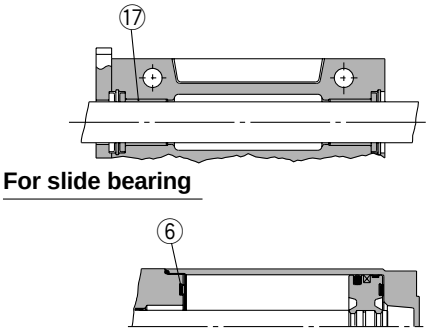
Seal kits are sets of items 36 through 38, which can be ordered using the seal kit number for each bore size.

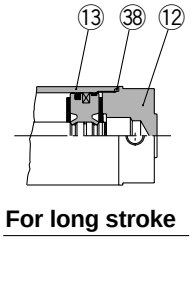
ø63 to ø100/MGG□F











Parts list

No.	Description	Material	Note	
1	**Rod cover**	Aluminum alloy	Clear hard anodized	
2	**Tube cover**	Aluminum alloy	Clear hard anodized	
3	**Piston**	Aluminum alloy	Chromated	
4	**Piston rod**	Carbon steel	Hard chrome plated	
5	**Bushing**	Lead-bronze casting		
6	**Bumper**	Urethane		
7	**Rubber magnet**	Synthetic rubber		
8	**Snap ring**	Stainless steel	Not required for ø80 and ø100	
9	**Wear ring**	Resin		
10	**Rod end nut**	Rolled steel	Nickel plated	ø100 is carbon steel
11	**Piston gasket**	NBR		
12	**Head cover**	Aluminum alloy	Clear hard anodized	For long stroke
13	**Cylinder tube**	Aluminum alloy	Hard anodized	
14	**Guide body**	Aluminum alloy	Metallic silver	
15	**Front plate**	Rolled steel	Flat nickel plated	
16	**Rear plate**	Cast iron	Metallic gold	
17	**Slide bearing**	Special friction material	For slide bearing	
	Ball bush bearing	—	For ball bushing	
18	**Guide rod**	Carbon steel	Hard chrome plated	For slide bearing
		High carbon chromium bearing steel	Tempered, hard chrome plated	For ball bushing
19	**End bracket**	Carbon steel	Flat nickel plated	
20	**Flat washer**	Rolled steel	Nickel plated	Not required for ø100
21	**Spring washer**	Steel wire	Nickel plated	
22	**Felt**	Felt		
23	**Holder**	Rolled steel	Nickel plated	
24	**C type snap ring for hole**	Carbon tool steel	Nickel plated	
25	**Bracket**	Aluminum alloy	Clear anodized	

Parts list

No.	Description	Material	Note	
26	**Shock absorber**	—		
27	**Adjustment bolt**	Rolled steel	Nickel plated	
28	**Nut**	Rolled steel	Nickel plated	
29	**Parallel pin**	High carbon chromium bearing steel	Nickel plated	
30	**Grease nipple**	—	Nickel plated	
31	**––**	—		
32	**Hexagon socket head cap screw**	Chromium molybdenum steel	Nickel plated	For cylinder mounting
33	**Hexagon socket head cap screw**	Chromium molybdenum steel	Nickel plated	For front plate mounting
34	**Hexagon socket head cap screw**	Chromium molybdenum steel	Nickel plated	For rear plate mounting
35	**Hexagon socket head cap screw**	Chromium molybdenum steel	Nickel plated	For bracket mounting
36	**Rod seal**	NBR		
37	**Piston seal**	NBR		
38	**Tube gasket**	NBR		
39	**Large flange**	Rolled steel	Nickel plated	
40	**Hexagon socket head cap screw**	Chromium molybdenum steel	Nickel plated	For large flange mounting

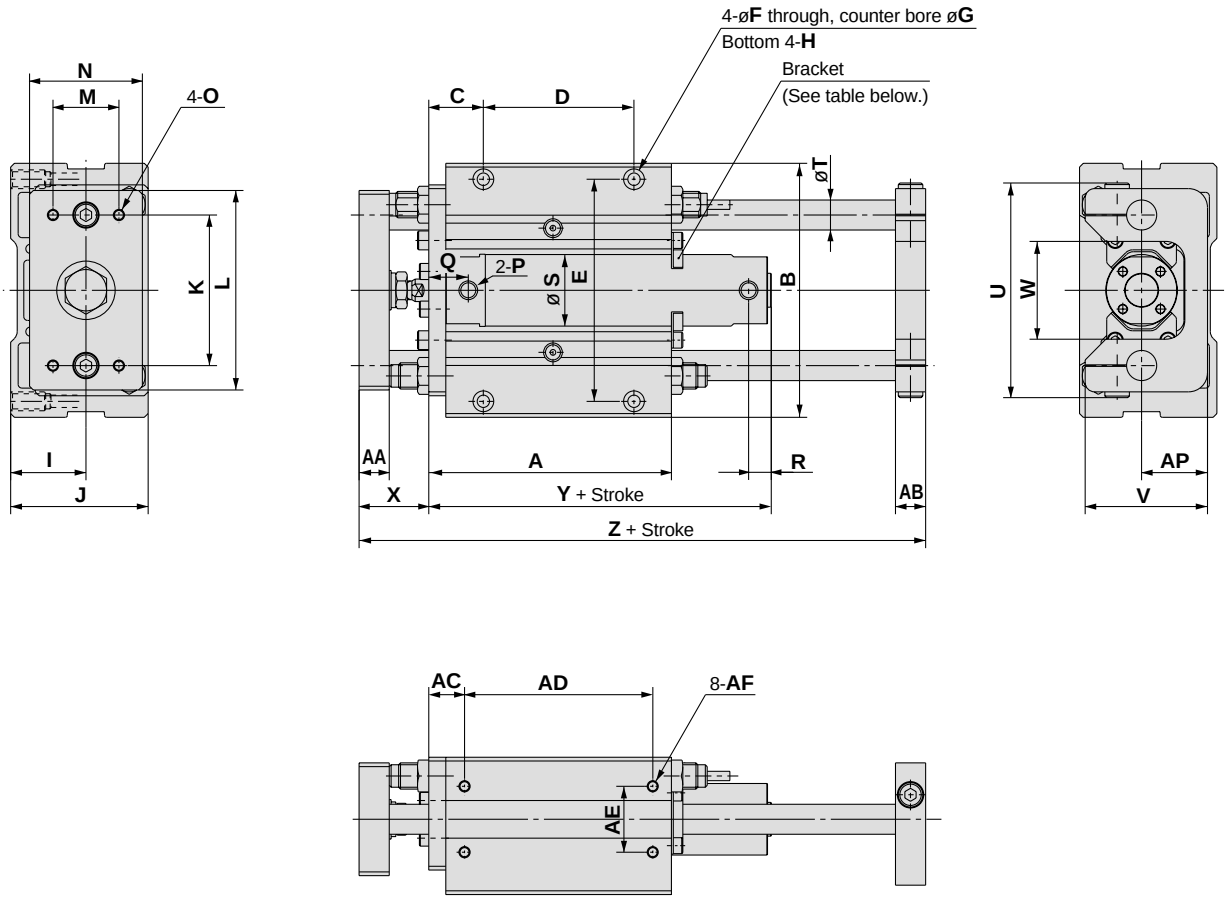
Replacement parts: Seal kits

Bore size (mm)	Seal kit no.	Content
63	CG1N63-PS	A set of the above nos. 36, 37, 38
80	CG1N80-PS	
100	CG1N100-PS	

Seal kits are sets of items 36 through 38, which can be ordered using the seal kit number for each bore size.

Dimensions

Basic type/MGG□B
ø20 to ø50



For standard stroke (mm)

Bore size (mm)	Stroke range (mm)	A	AA	AB	AC	AD	AE	AF	AP	B	C	D	E	F	G	H	I	J	K	L	M	N
20	75, 100, 125, 150, 200	99	12	11	16.5	75	30	M5 x 0.8 depth 10	25	108	24	60	92	5.5	9.5 depth 6	M8 x 1.25 depth 14	30	55	60	80	25	45
25	75, 100, 125, 150, 200, 250, 300	109	16	13	16.5	85	30	M6 x 1 depth 12	30	130	26.5	65	113	6.6	11 depth 8	M10 x 1.5 depth 18	35	65	70	100	35	54
32		129	16	16	19	100	35	M6 x 1 depth 12	35	135	29	80	118	6.6	11 depth 8	M10 x 1.5 depth 18	40	73	80	106	35	60
40		152	19	19	22	120	40	M8 x 1.25 depth 16	45	170	32	100	150	9	14 depth 10	M12 x 1.75 depth 21	50	93	95	134	50	75
50		182	25	21	22	150	45	M10 x 1.5 depth 20	50	194	37	120	170	11	17 depth 12	M14 x 2 depth 25	55	103	115	152	56	90

Bore size (mm)	O	P	Q	R	S	T	U	V	W	X	Y	Z
20	M6 x 1 depth 9	Rc 1/8	21	12	26	12	82	48	40	30	80	157
25	M6 x 1 depth 13	Rc 1/8	21	12	31	13	100	57	46	37	80	175
32	M6 x 1 depth 13	Rc 1/8	21	12	38	16	114	65	52	37	82	201
40	M8 x 1.25 depth 16	Rc 1/8	25	12	47	20	138	84	62	44	92	238
50	M10 x 1.5 depth 21	Rc 1/4	26	14	58	25	164	94	75	55	104	285

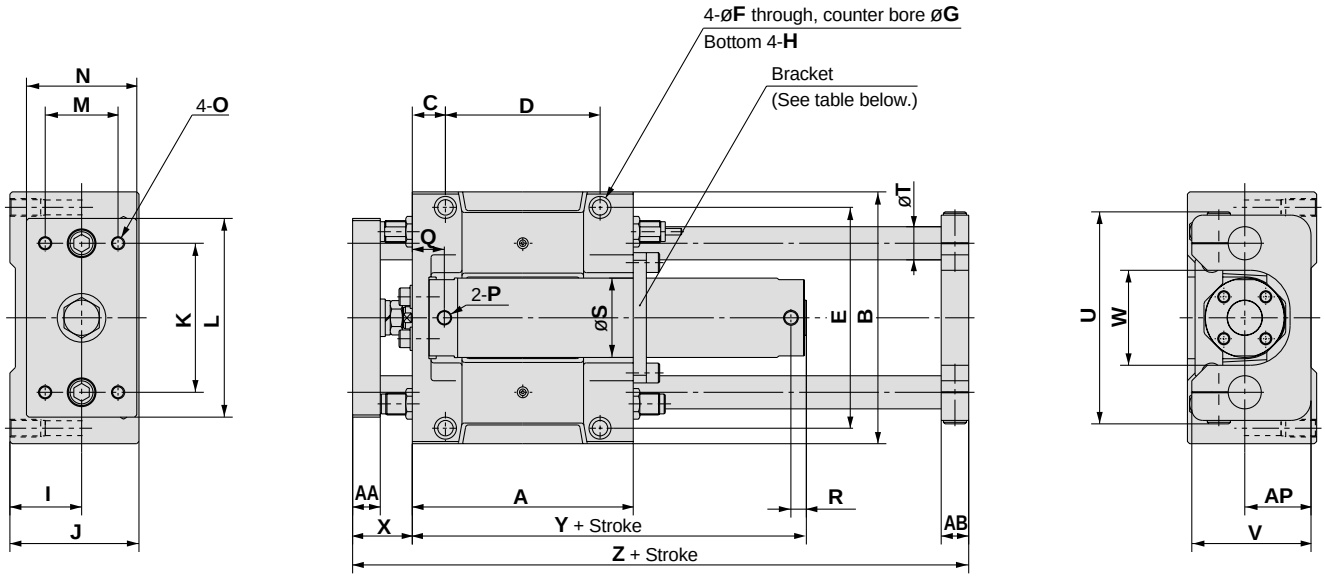
For long strokes

Bore size (mm)	Stroke range (mm)	R	Y
20	250 to 400	14	88
25	350 to 500	14	88
32	350 to 600	14	90
40	350 to 800	15	101
50	350 to 1000	16	116

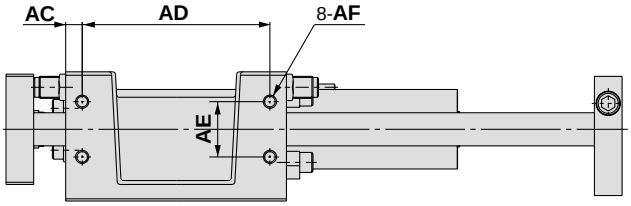
Bracket mounting strokes

Bore size (mm)	Bracket mounting stroke
20	100mm or more
25	125mm or more
32	150mm or more
40	200mm or more
50	250mm or more

Basic type/MGG□B
ø63 to ø100



ø100 piston rod end connection



For standard strokes (mm)

Bore size (mm)	Stroke range (mm)	A	AA	AB	AC	AD	AE	AF	AP	B	C	D	E	F	G	H	I	J	K	L	M	N
63	75, 100 125, 150 200, 250 300	200	25	25	15	170	50	M12 x 1.75 depth 24	60	228	30	140	200	13.5	20 depth 14.5	M16 x 2 depth 28	65	117	135	180	66	100
80		230	30	27	15	200	55	M12 x 1.75 depth 24	70	262	30	170	234	13.5	20 depth 14.5	M16 x 2 depth 28	75	138	160	214	76	115
100		280	32	30	17.5	245	70	M14 x 2 depth 28	80	304	35	210	274	15	23 depth 17	M18 x 2.5 depth 32	85	153	190	245	80	125

Bore size (mm)	O	P	Q	R	S	T	U	V	W	X	Y	Z
63	M12 x 1.75 depth 23	Rc 1/4	29	14	72	30	192	108	86	54	107	308
80	M12 x 1.75 depth 28	Rc 3/8	40	19	89	35	224	128	104	66	131	355
100	M14 x 2 depth 30	Rc 1/2	40	19	110	40	262	143	128	66	131	410

For long strokes

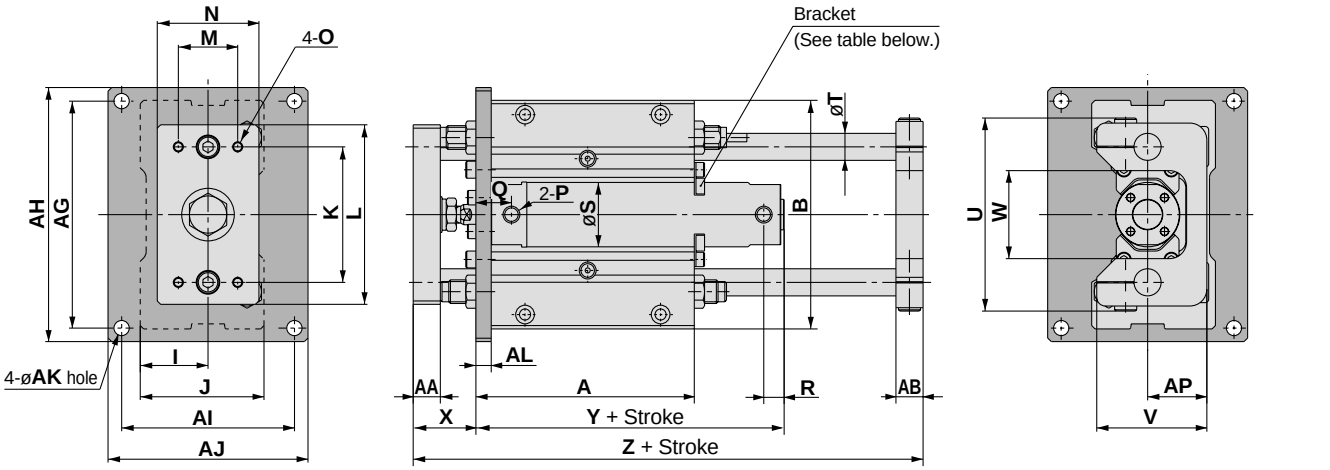
Bore size (mm)	Stroke range (mm)	R	Y
63	350 to 1100	16	119
80	350 to 1200	23	145
100	350 to 1300	23	145

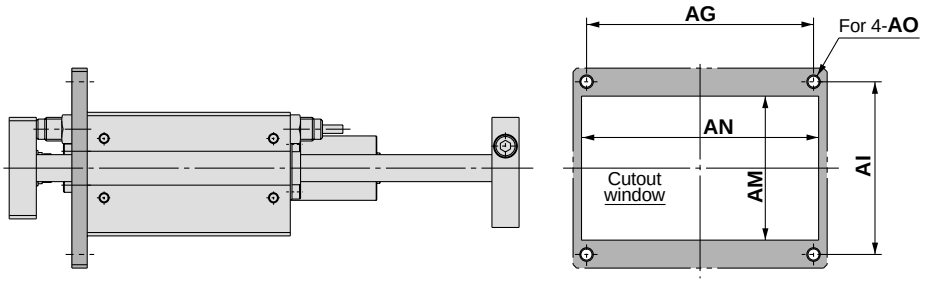
Bracket mounting strokes

Bore size (mm)	Bracket mounting stroke
63	300mm or more
80	400mm or more
100	500mm or more

Dimensions

Front mounting flange type/MGG□F
ø20 to ø50





Mounting dimensions

For standard strokes (mm)

Bore size (mm)	Stroke range (mm)	A	AA	AB	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	B	I	J	K	L	M	N	O
20	75, 100, 125, 150, 200	99	12	11	112	125	82	95	6.6	9	65	115	M6	25	108	30	55	60	80	25	45	M6 x 1 depth 9
25	75, 100 125, 150 200, 250 300	109	16	13	134	150	92	108	9	9	75	135	M8	30	130	35	65	70	100	35	54	M6 x 1 depth 13
32		129	16	16	134	150	102	118	9	9	85	140	M8	35	135	40	73	80	106	35	60	M6 x 1 depth 13
40		152	19	19	170	186	134	150	9	12	105	175	M8	45	170	50	93	95	134	50	75	M8 x 1.25 depth 16
50		182	25	21	190	210	140	160	11	12	115	200	M10	50	194	55	103	115	152	56	90	M10 x 1.5 depth 21

Bore size (mm)	P	Q	R	S	T	U	V	W	X	Y	Z
20	Rc 1/8	21	12	26	12	82	48	40	30	80	157
25	Rc 1/8	21	12	31	13	100	57	46	37	80	175
32	Rc 1/8	21	12	38	16	114	65	52	37	82	201
40	Rc 1/8	25	12	47	20	138	84	62	44	92	238
50	Rc 1/4	26	14	58	25	164	94	75	55	104	285

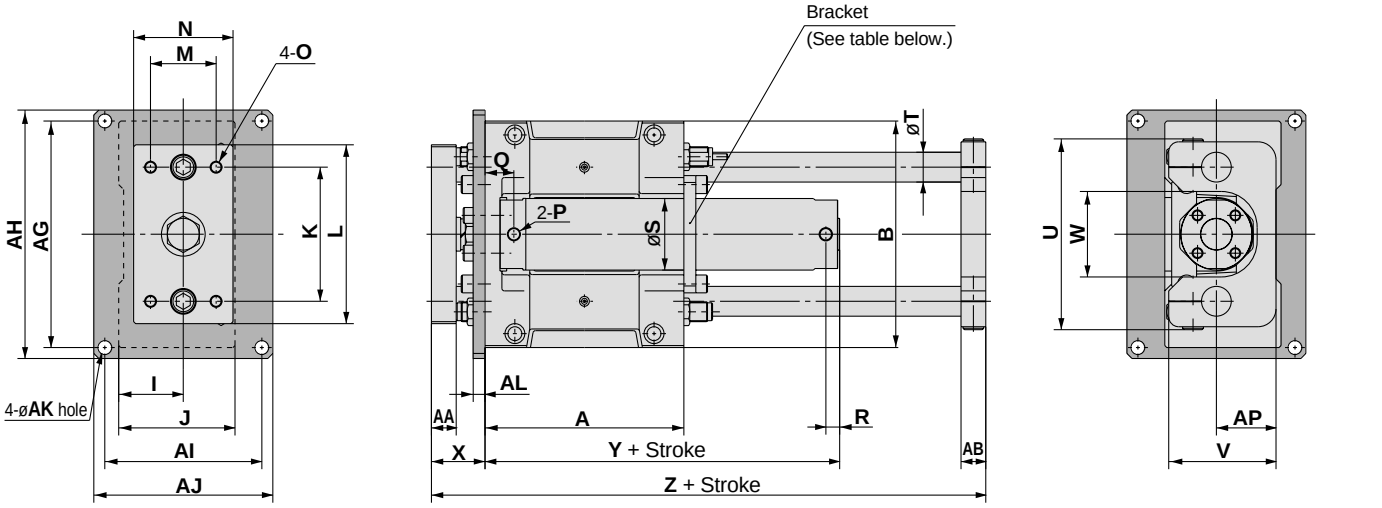
For long strokes

Bore size (mm)	Stroke range (mm)	R	Y
20	250 to 400	14	88
25	350 to 500	14	88
32	350 to 600	14	90
40	350 to 800	15	101
50	350 to 1000	16	116

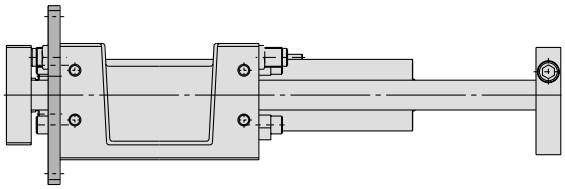
Bracket mounting strokes

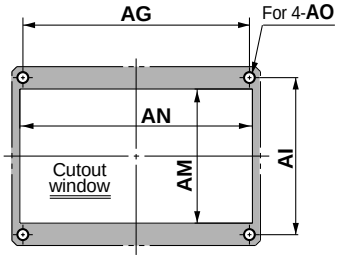
Bore size (mm)	Bracket mounting stroke
20	100mm or more
25	125mm or more
32	150mm or more
40	200mm or more
50	250mm or more

Front mounting flange type/MGG□F
ø63 to ø100



ø100 piston rod end connection





Mounting dimensions

For standard strokes (mm)

Bore size (mm)	Stroke range (mm)	A	AA	AB	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	B	I	J	K	L	M	N	O	P
63	75, 100 125, 150 200, 250 300	200	25	25	228	250	158	180	14	12	135	234	M12	60	228	65	117	135	180	66	100	M12 x 1.75 depth 23	Rc 1/4
80		230	30	27	262	284	178	200	14	16	155	268	M12	70	262	75	138	160	214	76	115	M12 x 1.75 depth 28	Rc 3/8
100		280	32	30	300	326	200	226	16	16	175	310	M14	80	304	85	153	190	245	80	125	M14 x 2 depth 30	Rc 1/2

Bore size (mm)	Q	R	S	T	U	V	W	X	Y	Z
63	29	14	72	30	192	108	86	54	107	308
80	40	19	89	35	224	128	104	66	131	355
100	40	19	110	40	262	143	128	66	131	410

For long strokes

Bore size (mm)	Stroke range (mm)	R	Y
63	350 to 1100	16	119
80	350 to 1200	23	145
100	350 to 1300	23	145

Bracket mounting strokes

Bore size (mm)	Bracket mounting stroke
63	300mm or more
80	400mm or more
100	500mm or more

Guide Cylinder/End Lock Type

Series MGG

ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100

How to Order

MGG **L** **B** **32** — **100** — **H** **N** — **C73** **□**

Guide cylinder

Bearing type

M	Slide bearing
L	Ball bushing

Mounting type

B	Basic
F	Front mounting flange

Bore size

20	20mm
25	25mm
32	32mm
40	40mm
50	50mm
63	63mm
80	80mm
100	100mm

Cylinder stroke (mm)

Refer to the models and strokes table on page 22.

Lock position

H	With head side locking
R	With rod side locking

Manual release type

N	Non-locking type
L	Locking type

Auto switch type

Nil	Without auto switch (built-in cylinder magnet)

∗ Refer to the table below for auto switch models.

Number of auto switches

Nil	2 pcs.
S	1 pc.
n	"n" pcs.

Applicable auto switches/Refer to pages 29 through 36 for detailed auto switch specifications.

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage DC	Load voltage AC	Switch mounting screw in-line direction ø20 ø25	ø32	ø40 to ø63	ø80 ø100	Perpendicular ø20 to ø63	Lead wire length (m)∗ 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Applicable load	
Reed switch	—	Grommet	Yes	3 wire (NPN equiv.)	5V	—	C76			—	B76	●	●	—	—	IC circuit	—
				2 wire	12V	100V	C73			—	B73	●	●	●	—		Relay, PLC
						—	(B53)		B53		—	●	●	●	—	—	PLC
						100V, 200V	(B54)		B54		—	●	●	●	—		Relay, PLC
			No			200V or less	(B64)		B64		—	●	●	—	—		
					24V 5V, 12V	100V or less	C80			—	B80	●	●	—	—	IC circuit	
		Connector	Yes		12V	—	C73C			—	B73C	●	●	●	●	—	
			No		5V, 12V	24V or less	C80C			—	B80C	●	●	●	●	IC circuit	
	Diagnostic indication (2 color indicator)	Grommet	Yes		—	—	(B59W)	B59W			—	●	●	—	—	—	
Solid state switch	—	Grommet	Yes	3 wire (NPN)	5V, 12V	—	H7A1			G59	G79	●	●	○	—	IC circuit	Relay, PLC
				3 wire (PNP)			H7A2			G5P	—	●	●	○	—		
				2 wire	12V		H7B			K59	K79	●	●	○	—	—	
		Connector					H7C			—	K79C	●	●	●	●		
	Diagnostic indication (2 color indicator)	Grommet		3 wire (NPN)	5V, 12V		H7NW			G59W	—	●	●	○	—	IC circuit	
				3 wire (PNP)			H7PW			G5PW	—	●	●	○	—		
				2 wire	12V		H7BW			K59W	—	●	●	○	—	—	
	Water resistant (2 color indicator)						H7BA			G5BA	—	—	●	○	—		
	With timer			3 wire (NPN)			(G5NT)		G5NT		—	—	●	○	—	IC circuit	
	With diagnostic output (2 color indicator)				5V, 12V		H7NF			G59F	—	●	●	○	—		
	Latch type with diagnostic output (2 color indicator)			4 wire (NPN)	—		H7LF			—	—	●	●	○	—	—	

∗ Lead wire length symbols 0.5m ..... Nil Example: B80C 5m ..... Z Example: B80CZ
3m ..... L Example: B80CL None ..... N Example: B80CN

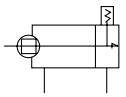
∗ Solid state switches marked with "○" are produced upon receipt of order.

∗ Refer to page 29 when using solid state switches (G59, G5P, K59, G59W, G5PW, K59W, G5BA, G59F) on bore sizes ø20 to ø63.

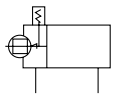
⚠**Caution** When using auto switches shown inside ( ), stroke end detection may not be possible depending on the One-touch fitting or speed controller model. Contact SMC in this case.

Models and Specifications

JIS symbol



With rear lock



With front lock

Models and strokes

Model	Bearing type	Bore size (mm)	Standard stroke (mm)	Long stroke (mm)
MGGM	Slide bearing	20	75, 100, 125, 150, 200	250, 300, 350, 400
		25	75, 100, 125, 150, 200, 250, 300	350, 400, 450, 500
		32		350, 400, 450, 500, 600
		40		350, 400, 450, 500, 600, 700, 800
MGGL	Ball bush bearing	50		350, 400, 450, 500, 600, 700, 800, 900, 1000
		63		350, 400, 450, 500, 600, 700, 800, 900, 1000, 1100
		80		350, 400, 450, 500, 600, 700, 800, 900, 1000, 1100, 1200
		100		350, 400, 450, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300

∗ Intermediate strokes and short strokes other than the above are produced upon receipt of order.

Specifications

Model		MGG□□20	MGG□□25	MGG□□32	MGG□□40	MGG□□50	MGG□□63	MGG□□80	MGG□□100
Base cylinder		CDBG1BN – Bore size – Stroke – Lock position – Manual release – Auto switch – XC70							
Bore size (mm)		20	25	32	40	50	63	80	100
Action		Double acting							
Fluid		Air							
Proof pressure		1.5MPa							
Maximum operating pressure		1.0MPa							
Minimum operating pressure		0.15MPa (horizontal with no load)							
Ambient and fluid temperature		–10° to 60°C							
Piston speed		50 to 1000mm/s						50 to 700mm/s	
Cushion	Base cylinder	Rubber bumper							
	Guides	Built-in shock absorber (2 pcs.)							
Stroke adjustment range (one side) [built-in adjustment bolts (2 pcs.)]		0 to –10mm	0 to –15mm						
Base cylinder lubrication		Non-lube							
Thread tolerance		JIS class 2							
Stroke length tolerance		$^{+1.9}_{+0.2}$ mm (1000mm or less), $^{+2.3}_{+0.2}$ mm (1001mm or more)							
Non-rotating accuracy (except deflection of guide rods)	Slide bearing	±0.07°	±0.06°	±0.06°	±0.05°	±0.04°	±0.04°	±0.04°	±0.03°
	Ball bush bearing	±0.06°	±0.05°	±0.04°	±0.04°	±0.04°	±0.03°	±0.03°	±0.02°
Port size		Rc 1/8				Rc 1/4		Rc 3/8	Rc 1/2

Lock Unit Specifications

Bore size (mm)	20	25	32	40	50	63	80	100
Holding force (maximum) N	215	330	550	860	1340	2140	3450	5390
Lock position	Rear side, Front side							
Backlash	2mm or less							
Manual release	Non-locking type, Locking type							

Adjust switch positions so that they will operate for movement to both the stroke end and backlash (2mm) positions.

Shock absorber specifications

Shock absorber model		RB1007	RB1412	RB2015	RB2725
Applicable guide cylinder		MGG□□20	MGG□□25, 32	MGG□□40, 50, 63	MGG□□80, 100
Maximum energy absorption J		5.88	19.6	58.8	147
Stroke absorption mm		7	12	15	25
Maximum collision speed m/s		5			
Max. operating frequency cycle/min∗		70	45	25	10
Ambient temperature range °C		–10° to 80°C			
Spring force N	Extended	4.22	6.86	8.34	8.83
	Compressed	6.86	15.98	20.5	20.01

∗ With the maximum energy absorption per cycle. Consequently, the operating frequency can be increased depending on the energy absorption.

Theoretical Output

(Unit: N)

Bore size (mm)	Rod diameter (mm)	Operating direction	Piston area (mm²)	Operating pressure (MPa)								
				0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
20	8	OUT	314	62.8	94.2	126	157	188	220	251	283	314
		IN	264	52.8	79.2	106	132	158	185	211	238	264
25	10	OUT	491	98.2	147	196	246	295	344	393	442	491
		IN	412	82.4	124	165	206	247	288	330	371	412
32	12	OUT	804	161	241	322	402	482	563	643	724	804
		IN	691	138	207	276	346	415	484	553	622	691
40	16	OUT	1260	252	378	504	630	756	882	1010	1130	1260
		IN	1060	212	318	424	530	636	742	848	954	1060
50	20	OUT	1960	392	588	784	980	1180	1370	1570	1760	1960
		IN	1650	330	495	660	825	990	1160	1320	1490	1650
63	20	OUT	3120	624	936	1250	1560	1870	2180	2500	2810	3120
		IN	2800	560	840	1120	1400	1680	1960	2240	2520	2800
80	25	OUT	5030	1010	1510	2010	2520	3020	3520	4020	4530	5030
		IN	4540	908	1360	1820	2270	2720	3180	3630	4090	4540
100	30	OUT	7850	1570	2360	3140	3930	4710	5500	6280	7070	7850
		IN	7150	1430	2150	2860	3580	4290	5010	5720	6440	7150

Note) Theoretical output (N) = Pressure (MPa) x Piston area (mm²)

Weights

(kg)

Bore size (mm)			20	25	32	40	50	63	80	100
Standard weight		Basic type	1.2	1.98	2.66	5.21	8.23	10.26	16.79	23.61
		Front mounting flange type	1.75	2.71	3.41	6.81	9.99	14.17	23.25	31.95
Weight by bearing type		Slide bearing	0.73	1.13	1.53	2.8	4.33	5.98	8.96	12.93
		Ball bush bearing	0.74	1.14	1.52	2.78	4.51	6.6	9.76	14.24
Additional weight per 50mm of stroke			0.14	0.17	0.25	0.4	0.61	0.82	1.11	1.48
Additional weight for long stroke			0.01	0.01	0.02	0.03	0.06	0.1	0.19	0.26
Additional weight with bracket			0.012	0.017	0.018	0.031	0.062	0.27	0.39	0.57
Additional weight of lock unit	Head side locking (H)	Non-locking type (N)	0.05	0.07	0.08	0.17	0.26	0.44	0.8	1.15
		Locking type (L)	0.07	0.08	0.1	0.21	0.3	0.48	0.88	1.23
	Rod side locking (R)	Non-locking type (N)	0.07	0.08	0.12	0.19	0.31	0.51	0.9	1.31
		Locking type (L)	0.09	0.1	0.14	0.23	0.34	0.54	0.97	1.39

Calculation method Example: **MGGLB32-500-HN** (basic type, ball bushing, ø32, 500mm stroke, with bracket)

- Standard weight .....2.66 (basic type)
- Bearing weight ..... 1.52 (ball bushing)
- Additional weight for stroke 0.25/50mm

2.66 + 1.52 + 0.25 x 500/50 + 0.02 + 0.018 + 0.08 = 6.798kg

- Stroke ……..... 500mm
- Additional weight for long stroke ... 0.02
- Additional weight with bracket 0.018
- Additional weight of lock unit..…..... 0.08 (head side non-locking type)

Weights of Moving Parts

(kg)

Bore size (mm)	20	25	32	40	50	63	80	100
Moving parts basic weight	0.73	1.23	1.74	3.32	5.61	8.45	13.21	18.79
Additional weight per 50mm of stroke	0.11	0.135	0.203	0.327	0.51	0.68	0.949	1.266

Calculating weight of moving parts Example: **MGGLB32-500-HN**

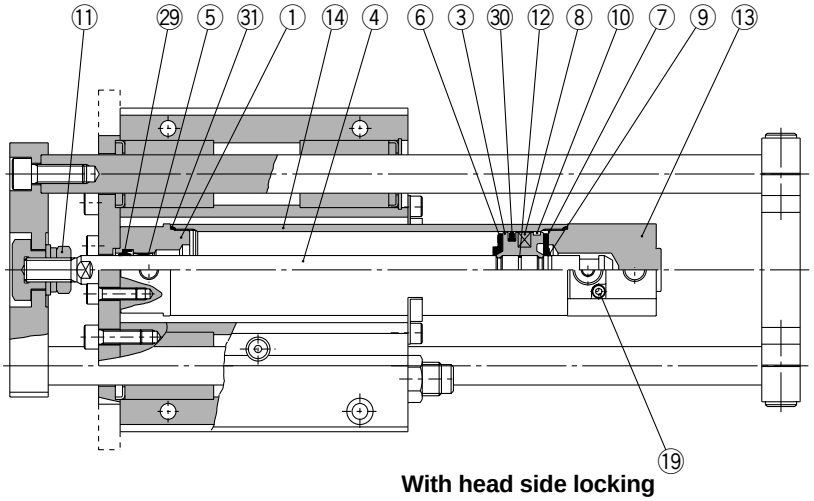
- Moving parts basic weight 1.74
- Additional weight for stroke 0.203/50mm
- Stroke 500mm

1.74 + 0.203 x 500/50 = 3.77kg

Refer to pages 5 through 13 for the allowable end load and deflection, as well as the allowable eccentric load.

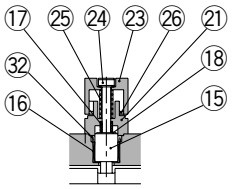
Construction

ø20 to ø100/MGG□□

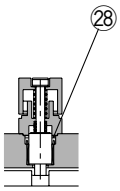


With head side locking

Manual release (locking type)

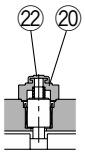


For ø20 to ø63

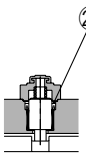


For ø80, ø100

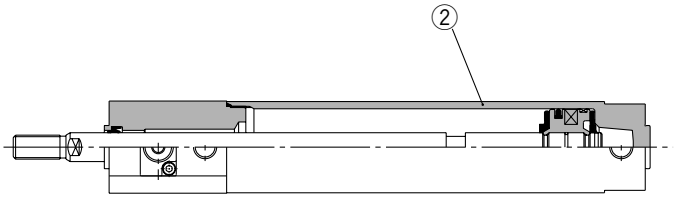
Manual release (non-locking type)



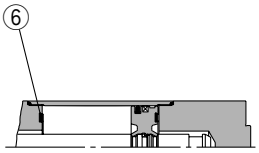
For ø20 to ø63



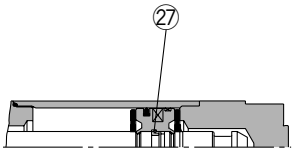
For ø80, ø100



With rod side locking (base cylinder only)



For ø80, ø100



For ø40 to ø100

∗ Since the guide unit drawing is the same as the standard type, refer to pages 14 through 16.

Parts list

No.	Description	Material	Note	
1	**Rod cover**	Aluminum alloy	Clear hard anodized	
2	**Tube cover**	Aluminum alloy	Clear hard anodized	
3	**Piston**	Aluminum alloy	Chromated	
4	**Piston rod**	Carbon steel	Hard chrome plated	ø20, ø25 are stainless steel
5	**Bushing**	Oil-impregnated sintered alloy	ø40 and larger are lead-bronze casting	
6	**Bumper A**	Urethane	Description is "Bumper" for ø63 and larger	
7	**Bumper B**	Urethane	ø40 and larger are the same as number 6.	
8	**Rubber magnet**	Synthetic rubber		
9	**Snap ring**	Stainless steel	Not required for ø80, ø100	
10	**Wear ring**	Resin		
11	**Rod end nut**	Rolled steel	Nickel plated	ø100 is carbon steel
12	**Piston gasket**	NBR		
13	**Head cover**	Aluminum alloy	Clear hard anodized	For head side locking type and long stroke
14	**Cylinder tube**	Aluminum alloy	Hard anodized	
15	**Lock piston**	Carbon steel	Hard chrome plated, Heat treated	
16	**Lock bushing**	Bronze alloy		
17	**Lock spring**	Stainless steel		
18	**Bumper**	Urethane		
19	**Hexagon socket head cap screw**	Chromium molybdenum steel	Black zinc chromated	
20	**Cap A**	Die-cast aluminum	Black coating	For non-locking type
21	**Cap B**	Carbon steel	Oxide film treatment	For locking type
22	**Rubber cap**	Synthetic rubber	For non-locking type	
23	**M/O knob**	Die-cast zinc	Black Coating	For locking type
24	**M/O bolt**	Chromium molybdenum steel	Black zinc chromated, Red coating	For locking type
25	**M/O spring**	Steel wire	Zinc chromated	For locking type

Parts list

No.	Description	Material	Note	
26	**Stopper ring**	Carbon steel	Zinc chromated	For locking type
27	**Piston holder**	Urethane	Used for ø40 and larger	
28	**Seal retainer**	Rolled steel	Used for ø80 and ø100	
29	**Rod seal**	NBR		
30	**Piston seal**	NBR		
31	**Tube gasket**	NBR		
32	**Lock piston seal**	NBR		

∗ Since guide unit parts are the same as the standard type, refer to pages 14 through 16.

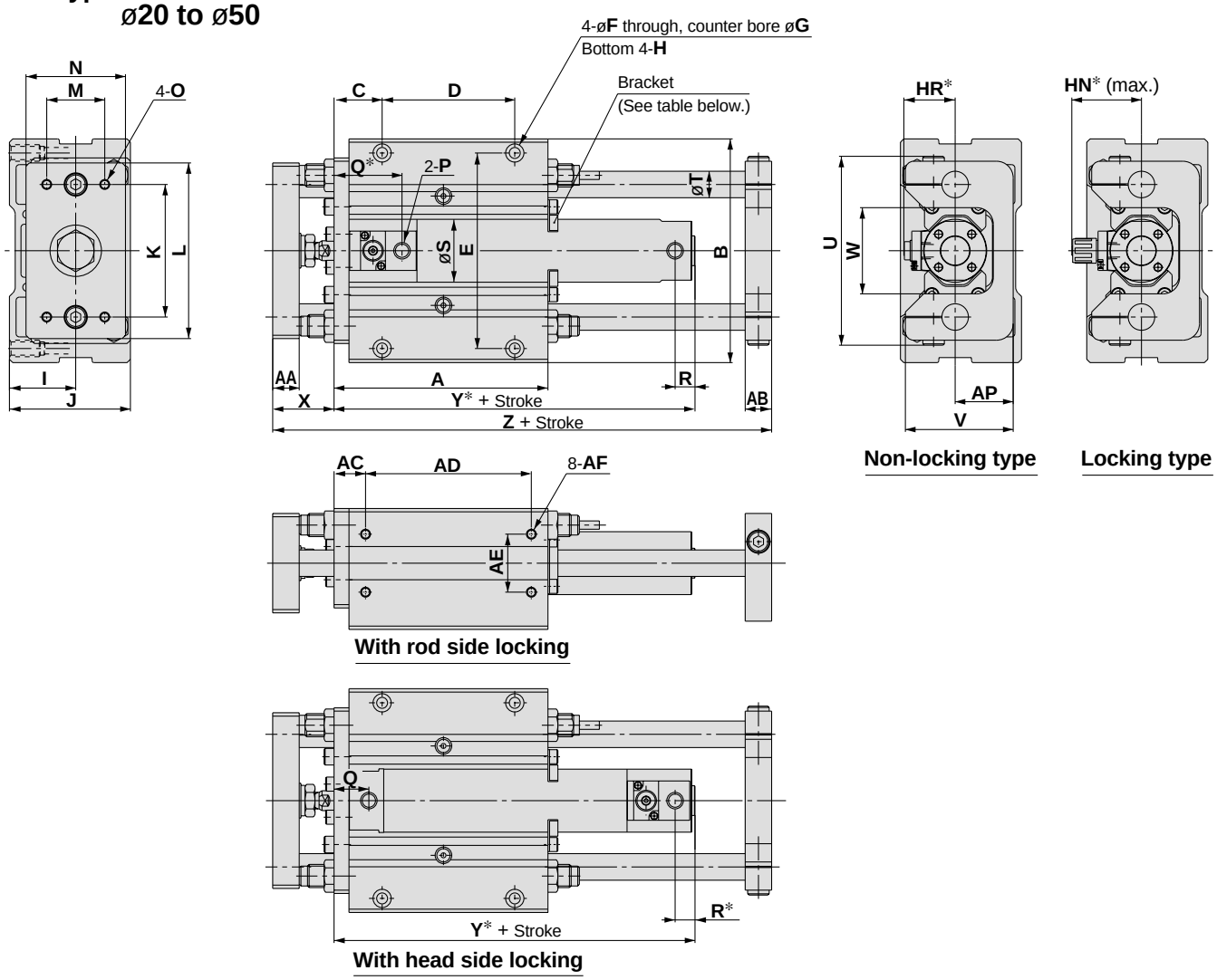
Replacement parts: Seal kits

Bore size (mm)	Seal kit no.	Content
20	CBG1N20-PS	A set of the above nos. 29, 30, 31, 32
25	CBG1N25-PS	
32	CBG1N32-PS	
40	CBG1N40-PS	
50	CBG1N50-PS	
63	CBG1N63-PS	
80	CBG1N80-PS	
100	CBG1N100-PS	

Seal kits are sets of items 29 through 32 which can be ordered using the seal kit number for each bore size.

Dimensions

Basic type/MGG□B
ø20 to ø50



For standard strokes

Dimensions not marked with an "*" are the same as standard. (mm)

Bore size (mm)	Stroke range (mm)	A	AA	AB	AC	AD	AE	AF	AP	B	C	D	E	F	G	H	I	J	K	L	M	N
20	75, 100, 125, 150, 200	99	12	11	16.5	75	30	M5 x 0.8 depth 10	25	108	24	60	92	5.5	9.5 depth 6	M8 x 1.25 depth 14	30	55	60	80	25	45
25	75, 100, 125, 150, 200, 250, 300	109	16	13	16.5	85	30	M6 x 1 depth 12	30	130	26.5	65	113	6.6	11 depth 8	M10 x 1.5 depth 18	35	65	70	100	35	54
32		129	16	16	19	100	35	M6 x 1 depth 12	35	135	29	80	118	6.6	11 depth 8	M10 x 1.5 depth 18	40	73	80	106	35	60
40		152	19	19	22	120	40	M8 x 1.25 depth 16	45	170	32	100	150	9	14 depth 10	M12 x 1.75 depth 21	50	93	95	134	50	75
50		182	25	21	22	150	45	M10 x 1.5 depth 20	50	194	37	120	170	11	17 depth 12	M14 x 2 depth 25	55	103	115	152	56	90

Bore size (mm)	O	P	S	T	U	V	W	X	Z
20	M6 x 1 depth 9	Rc 1/8	26	12	82	48	40	30	157
25	M6 x 1 depth 13	Rc 1/8	31	13	100	57	46	37	175
32	M6 x 1 depth 13	Rc 1/8	38	16	114	65	52	37	201
40	M8 x 1.25 depth 16	Rc 1/8	47	20	138	84	62	44	238
50	M10 x 1.5 depth 21	Rc 1/4	58	25	164	94	75	55	285

Bore size (mm)	For locking type	For non-locking type
	HN*	**HR***
20	37	25.3
25	40	28.3
32	43	31.3
40	52.5	38.3
50	58.5	44.5

Bore size (mm)	With rod side locking			With head side locking		
	Q*	**R**	**Y***	**Q**	**R***	**Y***
20	47.5	12 (14)	107 (115)	21	11	104
25	48	12 (14)	107 (115)	21	11	104
32	49	12 (14)	110 (118)	21	11	106
40	53	12 (15)	121 (130)	25	11	123
50	59	14 (16)	137 (149)	26	16	140

Note) Dimensions inside ( ) are for long strokes.

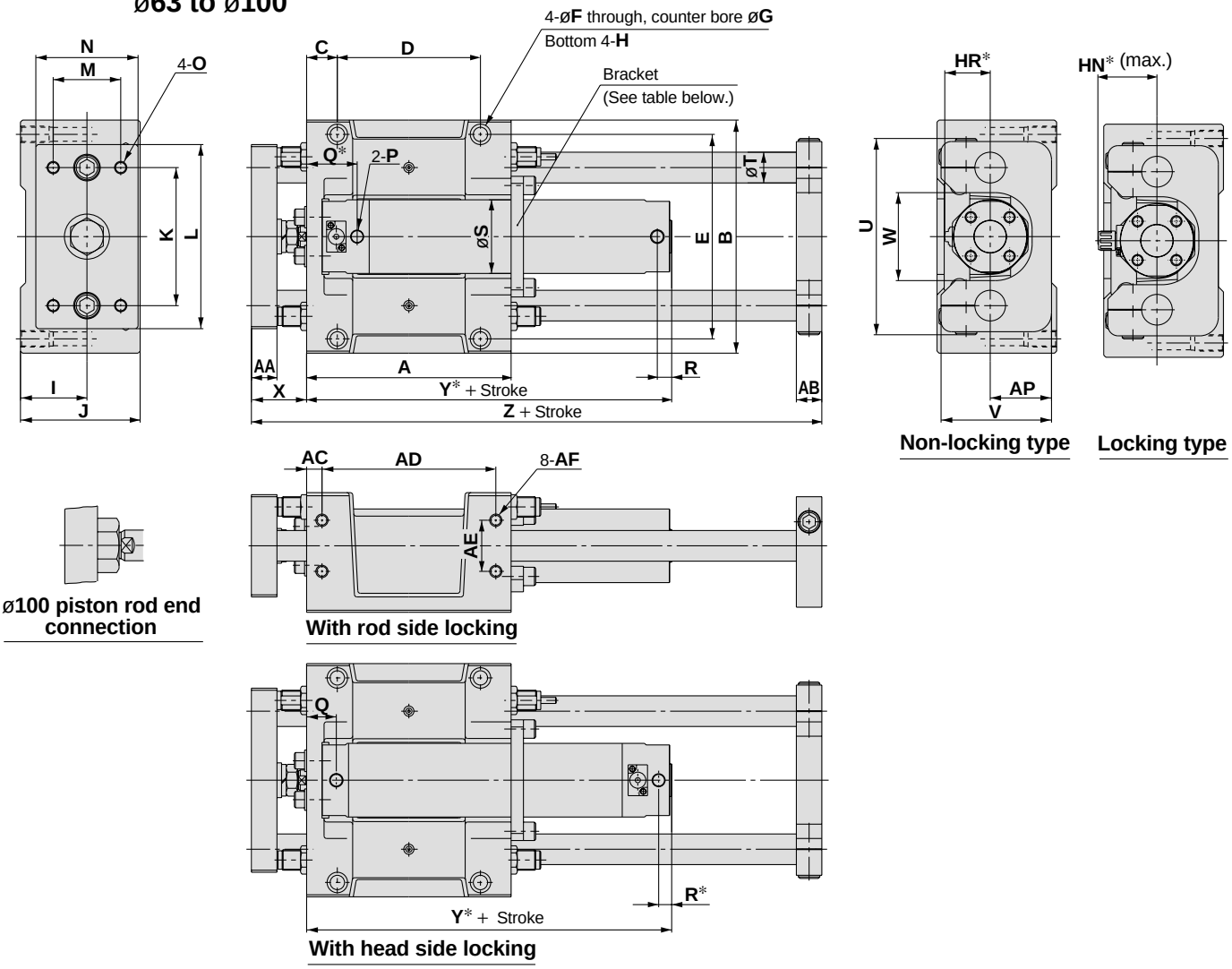
For long strokes

Bore size (mm)	Stroke range (mm)
20	250 to 400
25	350 to 500
32	350 to 600
40	350 to 800
50	350 to 1000

Bracket mounting strokes

Bore size (mm)	Bracket mounting stroke
20	100mm or more
25	125mm or more
32	150mm or more
40	200mm or more
50	250mm or more

Basic type/MGG□B
ø63 to ø100



For standard strokes

Dimensions not marked with an "*" are the same as standard. (mm)

Bore size (mm)	Stroke range (mm)	A	AA	AB	AC	AD	AE	AF	AP	B	C	D	E	F	G	H	I	J	K	L	M	N
63	75, 100, 125 150, 200 250, 300	200	25	25	15	170	50	M12 x 1.75 depth 24	60	228	30	140	200	13.5	20 depth 4.5	M16 x 2 depth 28	65	117	135	180	66	100
80		230	30	27	15	200	55	M12 x 1.75 depth 24	70	262	30	170	234	13.5	20 depth 14.5	M16 x 2 depth 28	75	138	160	214	76	115
100		280	32	30	17.5	245	70	M14 x 2 depth 28	80	304	35	210	274	15	23 depth 17	M18 x 2.5 depth 32	85	153	190	245	80	125

Bore size (mm)	O	P	S	T	U	V	W	X	Z
63	M12 x 1.75 depth 23	Rc 1/4	72	30	192	108	86	54	308
80	M12 x 1.75 depth 28	Rc 3/8	89	35	224	128	104	66	355
100	M14 x 2 depth 30	Rc 1/2	110	40	262	143	128	66	410

Bore size (mm)	For locking type	For non-locking type
	HN*	**HR***
63	59	45
80	68	53.5
100	79	64.5

Bore size (mm)	With rod side locking			With head side locking		
	Q*	**R**	**Y***	**Q**	**R***	**Y***
63	63	14 (16)	142 (154)	29	15	147
80	82	19 (23)	175 (189)	40	17	182
100	85	19 (23)	180 (194)	40	23	188

Note) Dimensions inside ( ) are for long strokes.

For long strokes

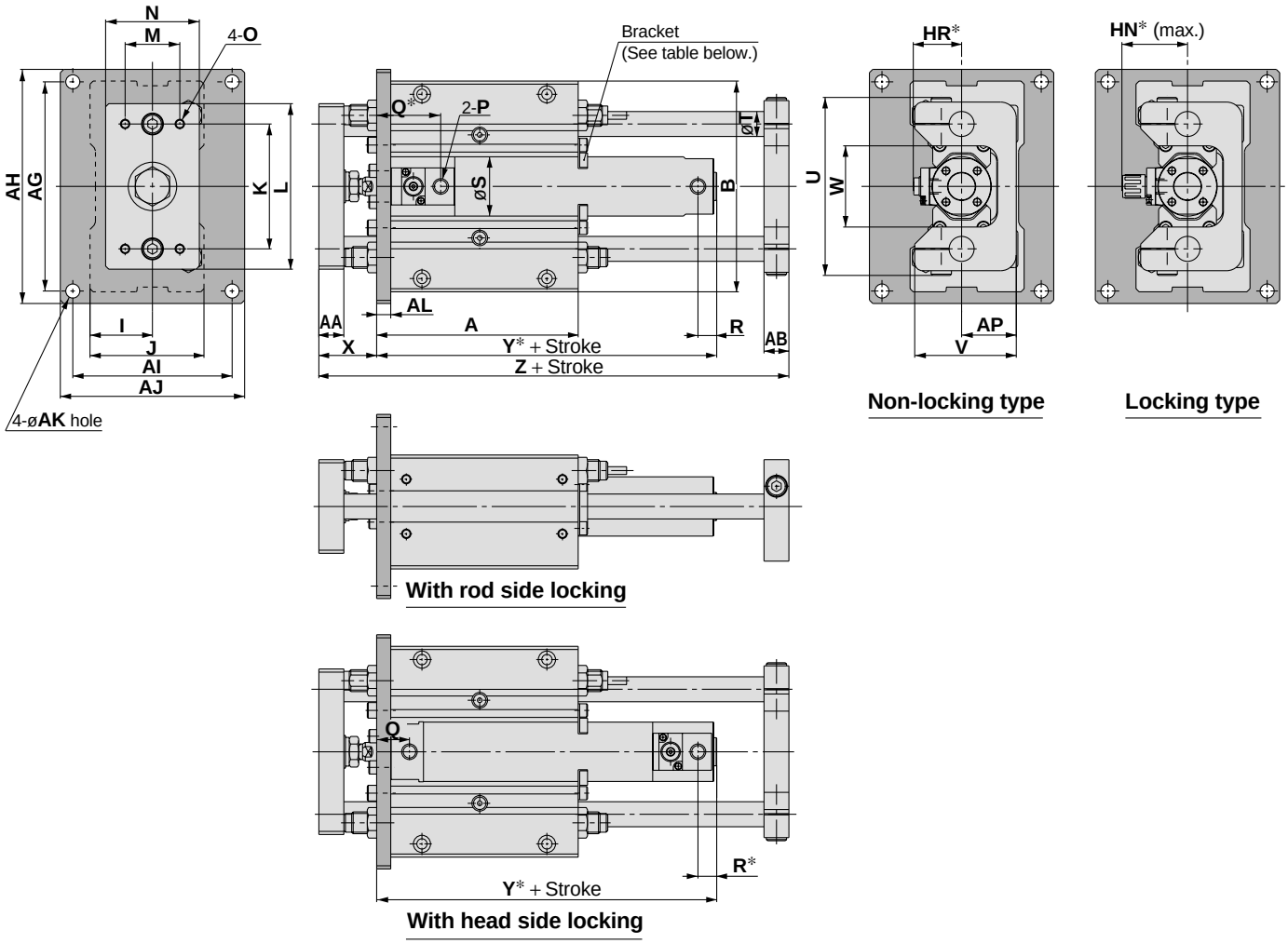
Bore size (mm)	Stroke range (mm)
63	350 to 1100
80	350 to 1200
100	350 to 1300

Bracket mounting strokes

Bore size (mm)	Bracket mounting stroke
63	300mm or more
80	400mm or more
100	500mm or more

Dimensions

Front mounting flange type/MGG□F
ø20 to ø50



For standard strokes

Dimensions not marked with an "*" are the same as standard. (mm)

Bore size (mm)	Stroke range (mm)	A	AA	AB	AG	AH	AI	AJ	AK	AL	AP	B	I	J	K	L	M	N	O	P	S	T	U	V
20	75, 100, 125, 150, 200	99	12	11	112	125	82	95	6.6	9	25	108	30	55	60	80	25	45	M6 x 1 depth 9	Rc 1/8	26	12	82	48
25	75, 100, 125, 150, 200, 250, 300	109	16	13	134	150	92	108	9	9	30	130	35	65	70	100	35	54	M6 x 1 depth 13	Rc 1/8	31	13	100	57
32		129	16	16	134	150	102	118	9	9	35	135	40	73	80	106	35	60	M6 x 1 depth 13	Rc 1/8	38	16	114	65
40		152	19	19	170	186	134	150	9	12	45	170	50	93	95	134	50	75	M8 x 1.25 depth 16	Rc 1/8	47	20	138	84
50		182	25	21	190	210	140	160	11	12	50	194	55	103	115	152	56	90	M10 x 1.5 depth 21	Rc 1/4	58	25	164	94

Bore size (mm)	W	X	Z
20	40	30	157
25	46	37	175
32	52	37	201
40	62	44	238
50	75	55	285

Bore size (mm)	For locking type	For non-locking type
	HN*	**HR***
20	37	25.3
25	40	28.3
32	43	31.3
40	52.5	38.3
50	58.5	44.5

Bore size (mm)	With rod side locking			With head side locking		
	Q*	**R**	**Y***	**Q**	**R***	**Y***
20	47.5	12 (14)	107 (115)	21	11	104
25	48	12 (14)	107 (115)	21	11	104
32	49	12 (14)	110 (118)	21	11	106
40	53	12 (15)	121 (130)	25	11	123
50	59	14 (16)	137 (149)	26	16	140

Note) Dimensions inside ( ) are for long strokes.

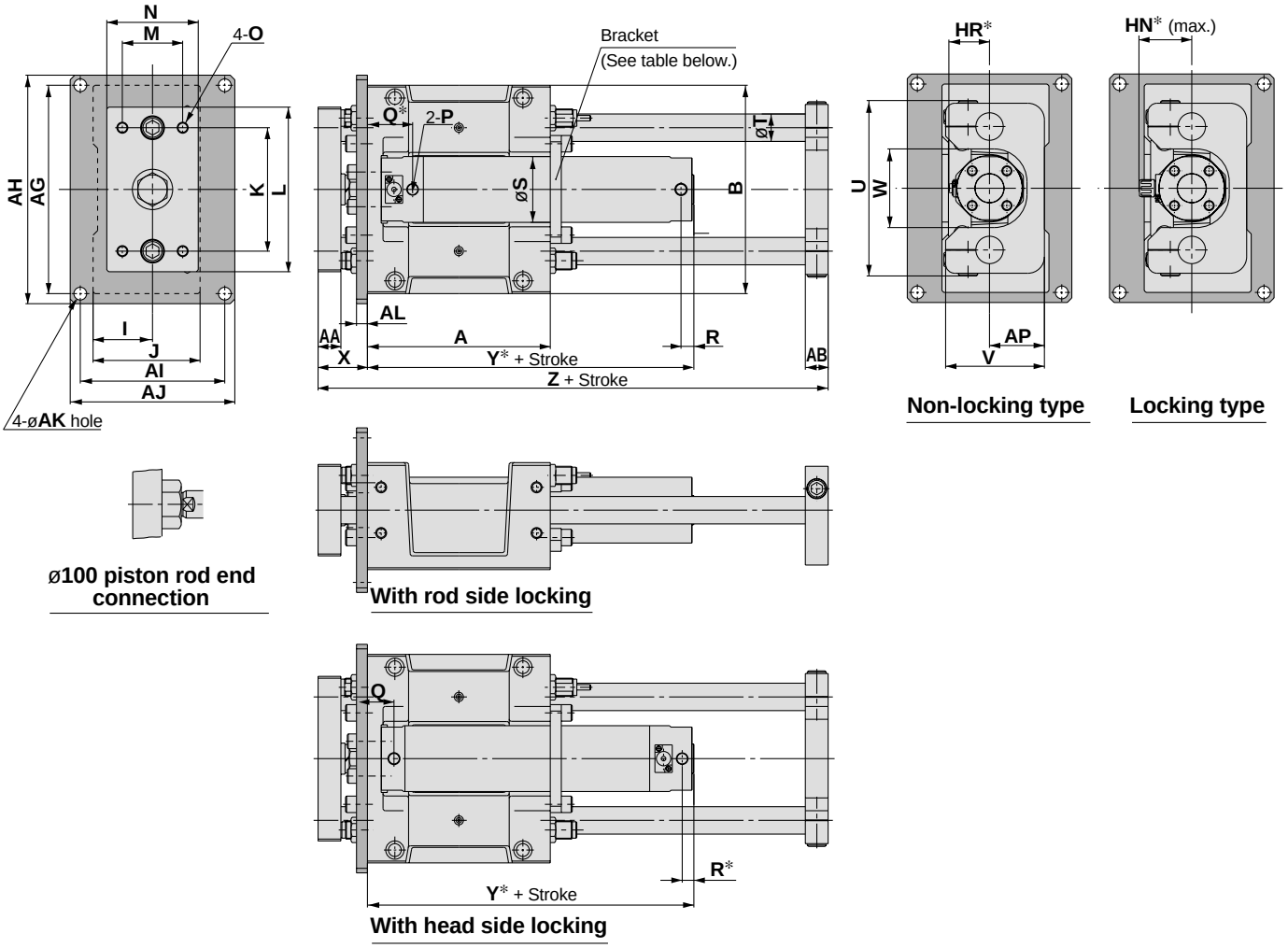
For long strokes

Bore size (mm)	Stroke range (mm)
20	250 to 400
25	350 to 500
32	350 to 600
40	350 to 800
50	350 to 1000

Bracket mounting strokes

Bore size (mm)	Bracket mounting stroke
20	100mm or more
25	125mm or more
32	150mm or more
40	200mm or more
50	250mm or more

Front mounting flange type/MGG□F
ø63 to ø100



For standard strokes

Dimensions not marked with an "*" are the same as standard. (mm)

Bore size (mm)	Stroke range (mm)	A	AA	AB	AG	AH	AI	AJ	AK	AL	AP	B	I	J	K	L	M	N	O	P	S	T	U	V
63	75, 100, 125 150, 200, 250 300	200	25	25	228	250	158	180	14	12	60	228	65	117	135	180	66	100	M12 x 1.75 depth 23	Rc 1/4	72	30	192	108
80		230	30	27	262	284	178	200	14	16	70	262	75	138	160	214	76	115	M12 x 1.75 depth 28	Rc 3/8	89	35	224	128
100		280	32	30	300	326	200	226	16	16	80	304	85	153	190	245	80	125	M14 x 2 depth 30	Rc 1/2	110	40	262	143

Bore size (mm)	W	X	Z
63	86	54	308
80	104	66	355
100	128	66	410

Bore size (mm)	For locking type	For non-locking type
	HN*	**HR***
63	59	45
80	68	53.5
100	79	64.5

Bore size (mm)	With rod side locking			With head side locking		
	Q*	**R**	**Y***	**Q**	**R***	**Y***
63	63	14 (16)	142 (154)	29	15	147
80	82	19 (23)	175 (189)	40	17	182
100	85	19 (23)	180 (194)	40	23	188

Note) Dimensions inside ( ) are for long strokes.

For long strokes

Bore size (mm)	Stroke range (mm)
63	350 to 1100
80	350 to 1200
100	350 to 1300

Bracket mounting strokes

Bore size (mm)	Bracket mounting stroke
63	300mm or more
80	400mm or more
100	500mm or more

Series MGG

Auto Switch Specifications

Cylinder Bore Size and Applicable Auto Switches

Type	Switch mounting screw direction						Electrical entry
	In-line					Perpendicular	
	ø20, ø25	ø32	ø40	ø50, ø63	ø80, ø100	ø20 to ø63	
Reed switch	C76				—	B76	Grommet
	C73				—	B73	
	(B53)		B53			—	
	(B54)		B54			—	
	(B64)		B64			—	
	C80				—	B80	
	C73C				—	B73C	Connector
	C80C				—	B80C	
	(B59W)	B59W				—	Grommet (2 color indicator)
Solid state switch	H7A1, (G59)		H7A1, G59		G59	G79	Grommet
	H7A2, (G5P)		H7A2, G5P		G5P	—	
	H7B, (K59)		H7B, K59		K59	K79	
	H7C				—	K79C	Connector
	H7NW, (G59W)		H7NW, G59W		G59W	—	Grommet (2 color indicator)
	H7PW, (G5PW)		H7PW, G5PW		G5PW	—	
	H7BW, (K59W)		H7BW, K59W		K59W	—	
	H7BA, (G5BA)		H7BA, G5BA		G5BA	—	Grommet (2 color indicator, water resistant)
	(G5NT)		G5NT			—	Grommet (with timer)
	H7NF, (G59F)			H7NF, G59F	G59F	—	Grommet (2 color indicator, with diagnostic output)
	H7LF				—	—	

⚠**Caution** When using auto switches shown inside ( ), stroke end detection may not be possible depending on the One-touch fitting or speed controller model. Contact SMC in this case.

⚠Specific Product Precautions

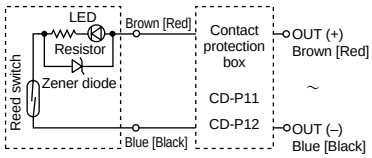
Be sure to read before handling.
Refer to pages 53 through 55 for auto switch precautions.

Auto Switch Internal Circuits

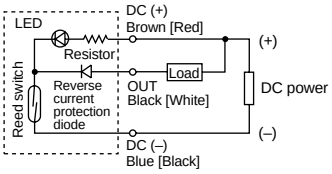
Lead wire colors inside [ ] are those prior to conformity with IEC standards.

Reed switches

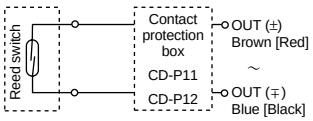
D-C73, D-B73



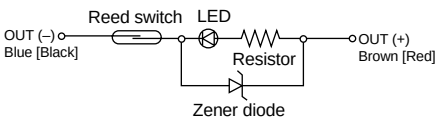
D-C76, D-B76



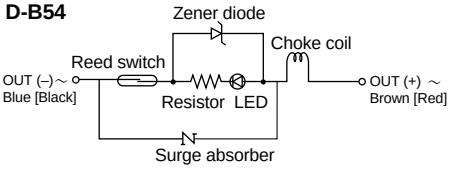
D-C80, D-B80, D-C80C, D-B80C



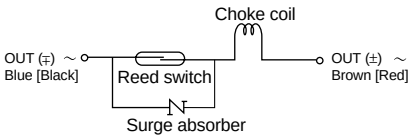
D-B53



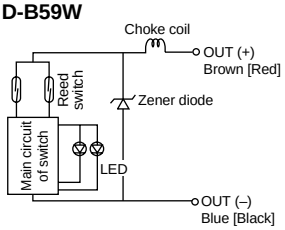
D-B54



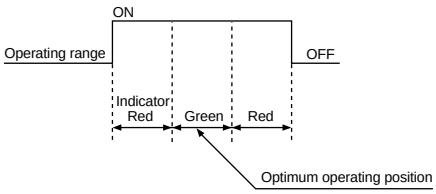
D-B64



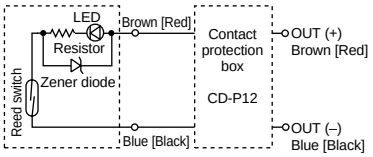
D-B59W



Indicator lights/Display method

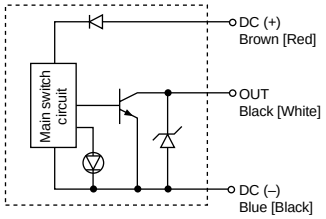


D-C73C, D-B73C

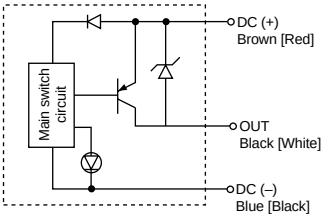


Solid state switches

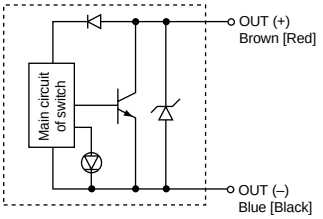
D-H7A1, D-G59, D-G79



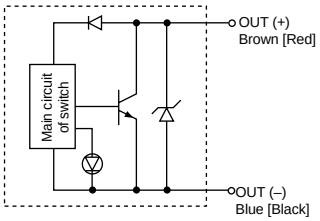
D-H7A2, D-G5P



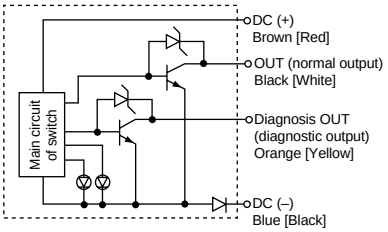
D-H7B, D-K59, D-K79



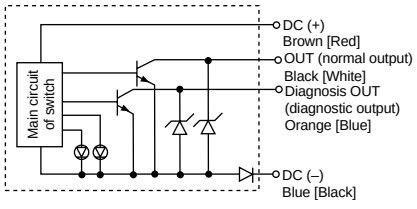
D-H7C, D-K79C



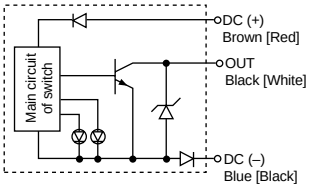
D-H7NF, D-G59F



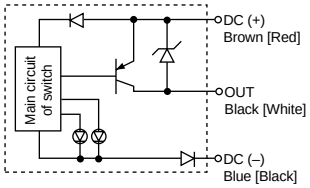
D-H7LF



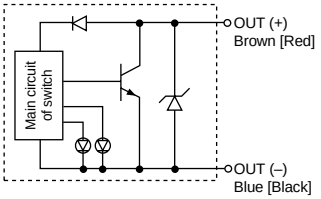
D-Y7NW, D-G59W



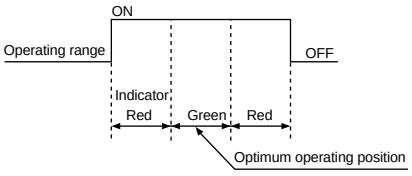
D-H7PW, D-G5PW



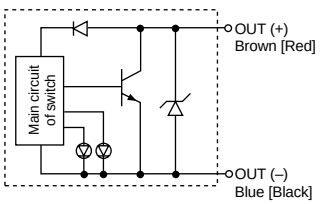
D-H7BW, D-K59W



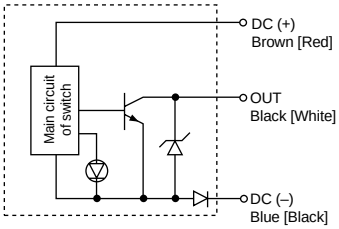
Indicator lights/Display method



D-H7BAL, D-G5BAL



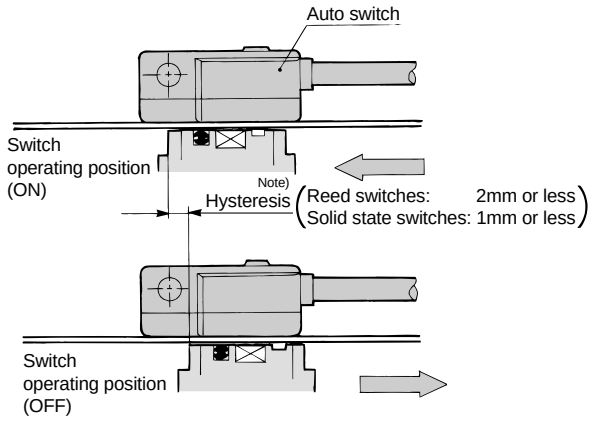
D-G5NTL



Auto Switch Specifications

Auto Switch Hysteresis

Hysteresis is the distance from the position at which piston movement turns an auto switch ON, to the position at which reverse movement turns the switch OFF. This hysteresis is included in part of the operating range (on one side).



Note) This varies depending on the operating environment, and is not guaranteed. Contact SMC regarding applications in which hysteresis becomes a problem.

Contact Protection Boxes/CD-P11, CD-P12

1

<Applicable switch models>

D-C7/C8, D-C73C/C80C, D-B7/B8, D-B73C/B80C

The above auto switches do not have built-in contact protection circuits.

1. The operated load is an induction load.

2. The length of wiring to the load is 5m or more.

3. The load voltage is 100 or 200VAC.

Use a contact protection box in any of the above situations.

Otherwise, the life of the contacts may be reduced. (They may stay on continuously.)

2

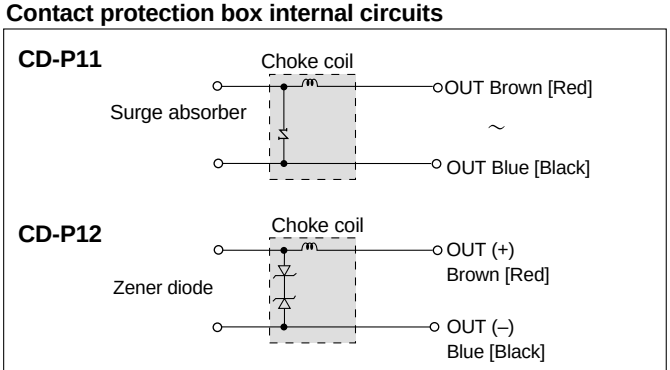
Furthermore, even in the case of a type having a built-in contact protection circuit (D-B54, B64, D-B59W), **if the length of the wiring to the load is extremely long (30m or more) and a PLC having a large rush current is used, confirm with SMC whether a contact protection box may be necessary.**

Contact protection box specifications

Part number	CD-P11		CD-P12
Load voltage	100VAC or less	200VAC	24VDC
Maximum load current	25mA	12.5mA	50mA

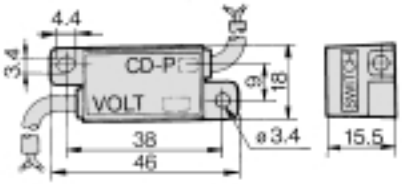
∗ Lead wire length …… Switch connection side 0.5m
Load connection side 0.5m

Contact protection box internal circuits



Lead wire colors inside [ ] are those prior to conformity with IEC standards.

Contact protection box dimensions

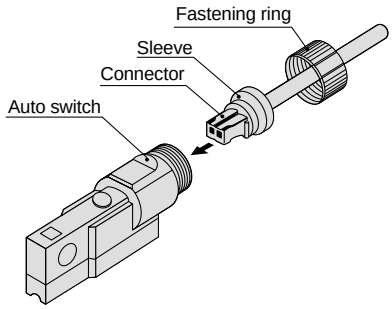


Contact protection box connection

To connect a switch unit to a contact protection box, connect the lead wire from the side of the contact protection box marked SWITCH to the lead wire coming out of the switch unit. Keep the switch as close as possible to the contact protection box, with a lead wire length of no more than 1 meter.

How to Insert the Connector

D-C73C/C80C, D-H7C
D-B73C/B80C, D-K79C

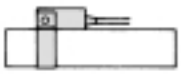


Keeping the protruding section of the connector on top, insert it all the way until the sleeve contacts the auto switch, and then tighten the fastening ring.
(Do not tighten it with pliers or other tools.)

Auto Switch Mounting

⚠ Caution

1. Do not tighten with more than the recommended tightening torque.
2. Mount so that the band does not run on a diagonal.


Correct mounting


Incorrect mounting

Auto switch mounting bracket part no. (Including band and screw)

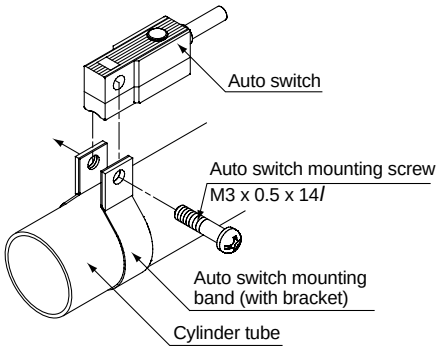
Auto switch model	Bore size (mm)							
	20	25	32	40	50	63	80	100
D-C7/C8	BMA2	BMA2	BMA2	BMA2	BMA2	BMA2	___	___
D-H7	– 020	– 025	– 032	– 040	– 050	– 063		
D-B5/B6	BA	BA	BA	BA	BA	BA	BA	BA
D-G5/K5	– 01	– 02	– 32	– 04	– 05	– 06	– 08	– 10
D-B7/B8	BM1	BM1	BM1	BM1	BM1	BM1	___	___
D-G7/K7	– 01	– 02	– 32	– 04	– 05	– 06		

<Stainless steel mounting screw kit>
The following stainless steel mounting screw kits (including set screws) are available for use depending on the operating environment. (Order the mounting band separately, as it is not included.)
BBA3: For types D-B5/B6/G5/K5
BBA4: For types D-C7/C8/H7
When D-G5BAL and H7BAL type switches are mounted on a cylinder at the factory, the above stainless steel screws are used. When switches are shipped separately, **BBA3** and **BBA4** are included.

Mounting and Moving Auto Switches

<Applicable auto switches>

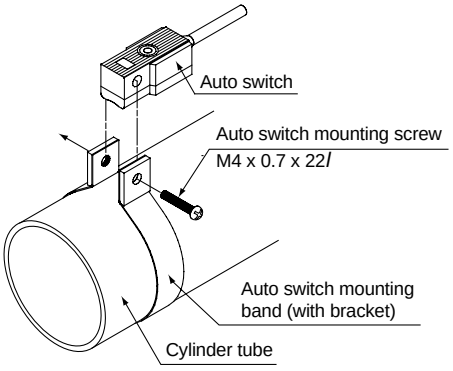
Reed switches …… D-C73, D-C76, D-C80
D-C73C, D-C80C
Solid state switches ... D-H7A1, D-H7A2
D-H7B, D-H7BAL
D-H7C
D-H7NF, D-H7LF
D-H7NW, D-H7PW
D-H7BW



1. Wrap the mounting band around the cylinder tube, and place it in the approximate auto switch mounting position.
2. Insert the mounting section of the auto switch between the band's holding brackets, and align its mounting hole with the holes in the mounting brackets.
3. Pass the mounting screw through the mounting hole and gently screw it into the threaded section of the band's bracket.
4. After sliding the entire assembly to the detection position, secure the auto switch by tightening the mounting screw. (The tightening torque for the M3 screw should be 0.8 to 1N·m.)
5. Make changes to the detection position under the same conditions as in step 3.

<Applicable auto switches>

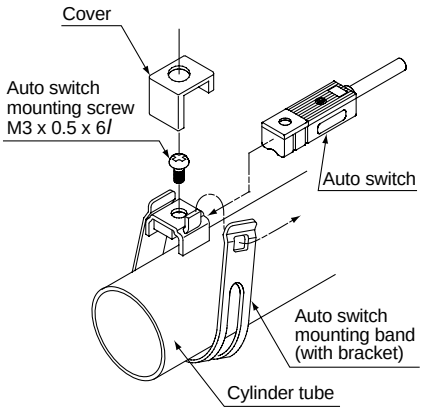
Reed switches …… D-B53, D-B54, D-B64
D-B59W
Solid state switches ... D-G59, D-G5P
D-K59, D-G5BAL
D-G59W, D-G5PW
D-K59W
D-G59F
D-G5NTL



1. Wrap the mounting band around the cylinder tube, and place it in the approximate auto switch mounting position.
2. Insert the mounting section of the auto switch between the band's holding brackets, and align its mounting hole with the holes in the mounting brackets.
3. Pass the mounting screw through the mounting hole and gently screw it into the threaded section of the band's bracket.
4. After reconfirming the detection position, secure the auto switch by tightening the mounting screw. (The tightening torque for the M4 screw should be 1 to 1.2N·m.)
5. Make changes to the detection position under the same conditions as in step 3.

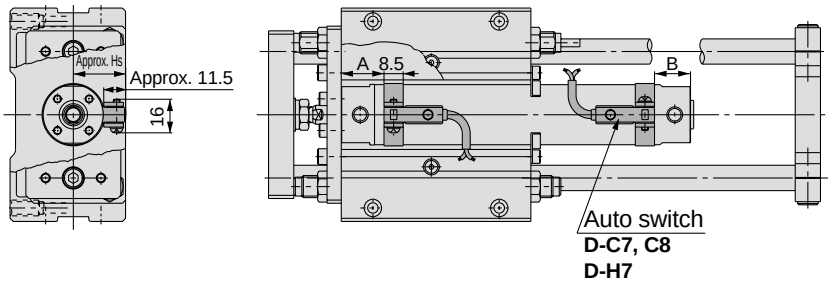
<Applicable auto switches>

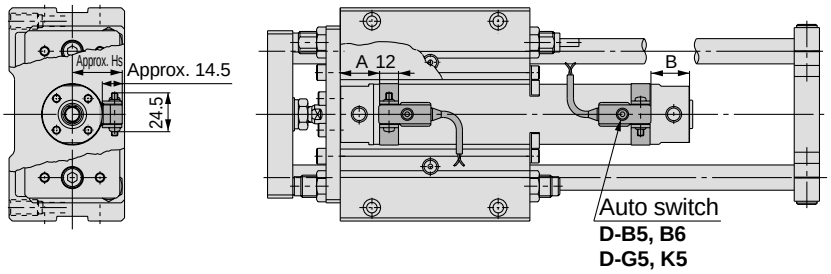
Reed switches …… D-B73, D-B76, D-B80
D-B73C, D-B80C
Solid state switches ... D-G79, D-K79,
D-K79C

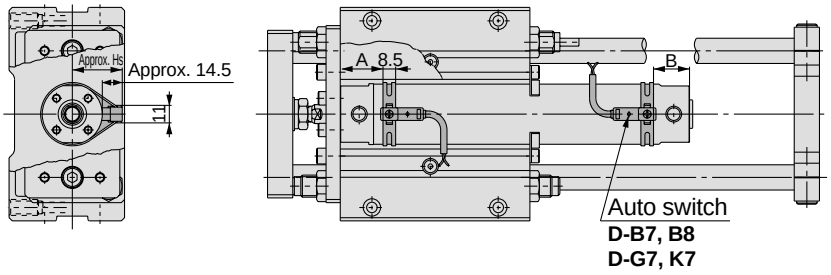


1. Wrap the mounting band around the cylinder in the approximate auto switch mounting position, and hang one side of the band on one of the bracket's hooks.
2. Insert the mounting section of the auto switch (metal plate section) into the band bracket, and align its indented area with the hole in the mounting bracket.
3. Pass the mounting screw through the mounting hole and gently screw it into the threaded section of the band's bracket.
4. After sliding the entire assembly to the detection position, secure the auto switch by tightening the mounting screw. (The tightening torque for the M3 screw should be 0.5 to 0.7N·m.)
5. Attach the cover to the band bracket.
6. Make changes to the detection position under the same conditions as in step 3 (with the cover installed).

Proper Auto Switch Mounting Position (Stroke End)







Auto switch mounting position (mm)

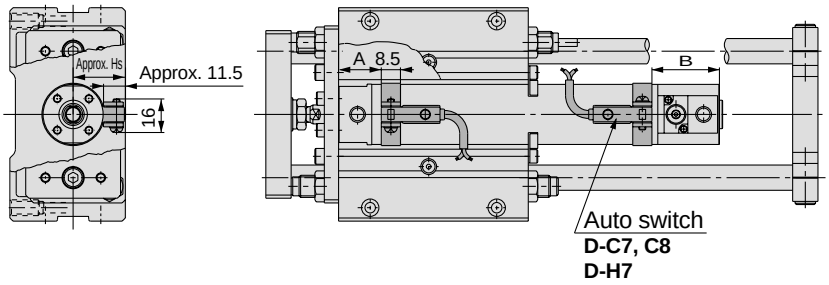
Auto switch model / Applicable bore size	D-B7, B8 D-B73C D-B80C D-G7, K7 D-K79C		D-C7, C8 D-C73C D-C80C		D-B5, B6 D-G5□W D-K59W D-G5BAL D-G59F		D-B59W		D-H7 D-H7C		D-H7□W D-H7□F D-H7BAL		D-G5 D-K5 D-G5NTL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
20	30.5	21.5 (29.5)	29.5	20.5 (28.5)	24	16 (23)	27	18 (26)	28.5	19.5 (27.5)	27	21 (29)	25.5	17.5 (24.5)
25	30.5	21.5 (29.5)	29.5	20.5 (28.5)	24	16 (23)	27	18 (26)	28.5	19.5 (27.5)	27	21 (29)	25.5	17.5 (24.5)
32	31.5	22.5 (30.5)	30.5	21.5 (29.5)	25	16 (24)	28	19 (27)	29.5	20.5 (28.5)	28	22 (30)	26.5	17.5 (25.5)
40	36.5	24.5 (33.5)	35.5	23.5 (32.5)	30	18 (27)	33	21 (30)	34.5	22.5 (31.5)	33	24.5 (33.5)	31.5	19.5 (28.5)
50	43.5	29.5 (41.5)	42.5	28.5 (40.5)	37	23 (35)	40	26 (38)	41.5	27.5 (39.5)	40	29 (41)	38.5	24.5 (36.5)
63	43.5	29.5 (41.5)	42.5	28.5 (40.5)	37	23 (35)	40	26 (38)	41.5	27.5 (39.5)	40	29 (41)	38.5	24.5 (36.5)
80	—	—	—	—	47	31 (45)	50	34 (48)	—	—	—	—	48.5	32.5 (46.5)
100	—	—	—	—	47	31 (45)	50	34 (48)	—	—	—	—	48.5	32.5 (46.5)

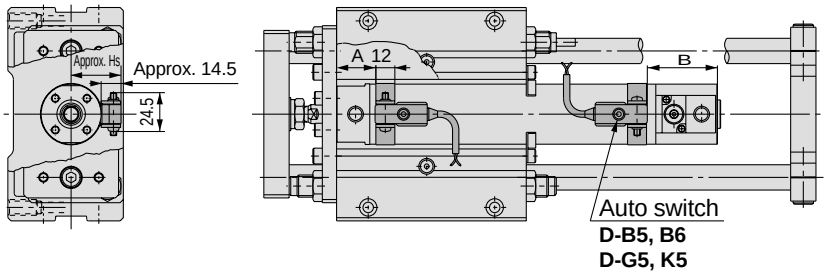
Auto switch mounting height (mm)

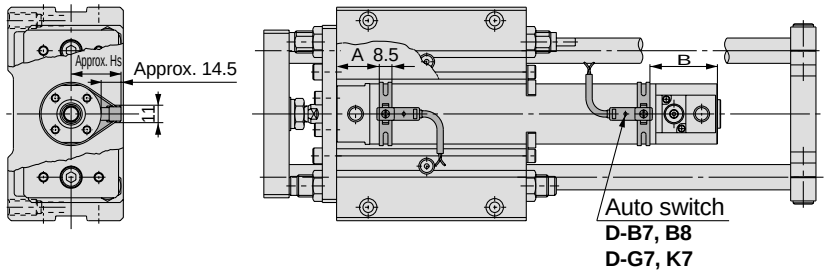
D-C7, C8 D-H7 D-H7□W D-H7□F D-H7BAL	D-C73C D-C80C	D-B7, B8 D-B73C D-B80C D-G7, K7 D-K79C D-H7C	D-G5, K5 D-G5□W D-K59W D-G5NTL D-B5, B6 D-B59W D-G5BAL D-G59F
Hs	Hs	Hs	Hs
24.5	27	27.5	27.5
27	29.5	30	30
30.5	33	33.5	33.5
35	37.5	38	38
40.5	43	43.5	43.5
47.5	50	50.5	50.5
—	—	—	59
—	—	—	69.5

∗ Numbers inside ( ) are for long strokes.

Proper Auto Switch Mounting Position (Stroke End)/End Lock Type: With Head Side Locking







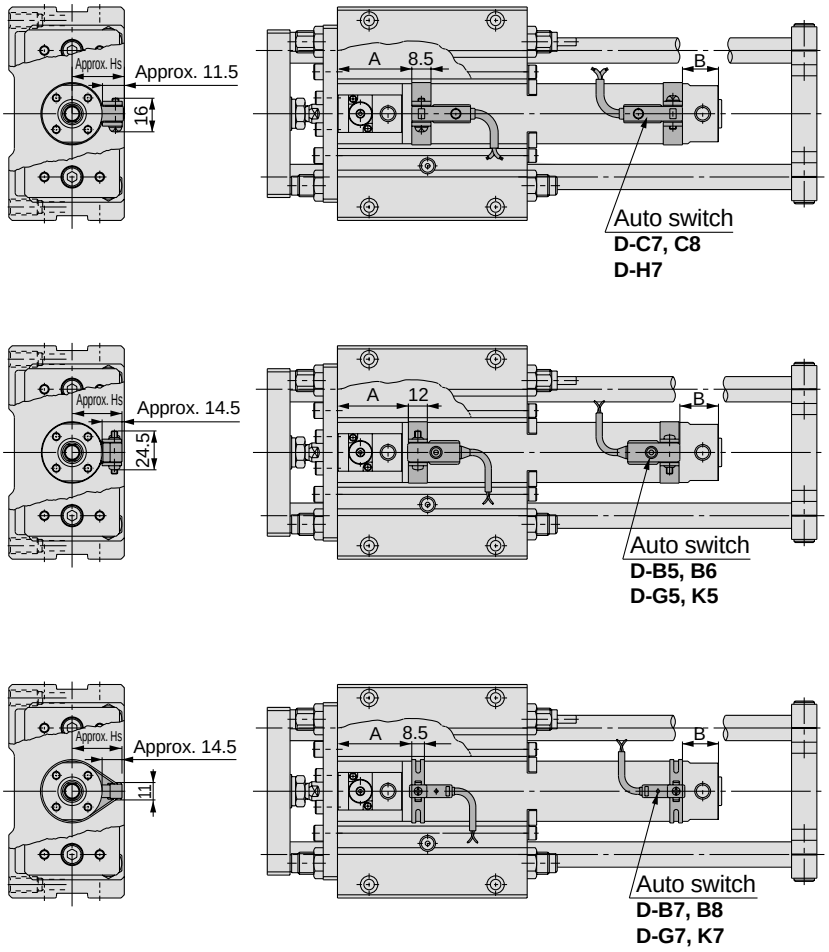
Auto switch mounting position (mm)

Auto switch model / Applicable bore size	D-B7, B8 D-B73C D-B80C D-G7, K7 D-K79C		D-C7, C8 D-C73C D-C80C		D-B5, B6 D-G5□W D-K59W D-G5BAL D-G59F		D-B59W		D-H7 D-H7C		D-H7□W D-H7□F D-H7BAL		D-G5 D-K5 D-G5NTL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
20	30.5	45.5	29.5	44.5	24	40	27	42	28.5	43.5	27	45	25.5	41.5
25	30.5	45.5	29.5	44.5	24	40	27	42	28.5	43.5	27	45	25.5	41.5
32	31.5	46.5	30.5	45.5	25	40	28	43	29.5	44.5	28	46	26.5	41.5
40	36.5	55.5	35.5	54.5	30	49	33	52	34.5	53.5	33	55.5	31.5	50.5
50	43.5	65.5	42.5	64.5	37	59	40	62	41.5	63.5	40	65	38.5	60.5
63	43.5	69.5	42.5	68.5	37	63	40	66	41.5	67.5	40	69	38.5	64.5
80	—	—	—	—	47	82	50	85	—	—	—	—	48.5	83.5
100	—	—	—	—	47	88	50	91	—	—	—	—	48.5	89.5

Auto switch mounting height (mm)

D-C7, C8 D-H7 D-H7□W D-H7□F D-H7BAL	D-C73C D-C80C	D-B7, B8 D-B73C D-B80C D-G7, K7 D-K79C D-H7C	D-G5, K5 D-G5□W D-K59W D-G5NTL D-B5,B6 D-B59W D-G5BAL D-G59F
Hs	Hs	Hs	Hs
24.5	27	27.5	27.5
27	29.5	30	30
30.5	33	33.5	33.5
35	37.5	38	38
40.5	43	43.5	43.5
47.5	50	50.5	50.5
—	—	—	59
—	—	—	69.5

Proper Auto Switch Mounting Position (Stroke End)/End Lock Type: With Rod Side Locking



Auto switch mounting position (mm)

Auto switch model / Applicable bore size	D-B7, B8 D-B73C D-B80C D-G7, K7 D-K79C		D-C7, C8 D-C73C D-C80C		D-B5, B6 D-G5□W D-K59W D-G5BAL D-G59F		D-B59W		D-H7 D-H7C		D-H7□W D-H7□F D-H7BAL		D-G5 D-K5 D-G5NTL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
20	57.5	21.5 (29.5)	56.5	20.5 (28.5)	51	16 (23)	54	18 (26)	55.5	19.5 (27.5)	54	21 (29)	52.5	17.5 (24.5)
25	57.5	21.5 (29.5)	56.5	20.5 (28.5)	51	16 (23)	54	18 (26)	55.5	19.5 (27.5)	54	21 (29)	52.5	17.5 (24.5)
32	59.5	22.5 (30.5)	58.5	21.5 (29.5)	53	16 (24)	56	19 (27)	57.5	20.5 (28.5)	56	22 (30)	54.5	17.5 (25.5)
40	65.5	24.5 (33.5)	64.5	23.5 (32.5)	59	18 (27)	62	21 (30)	63.5	22.5 (31.5)	62	24.5 (33.5)	60.5	19.5 (28.5)
50	76.5	29.5 (41.5)	75.5	28.5 (40.5)	70	23 (35)	73	26 (38)	74.5	27.5 (39.5)	73	29 (41)	71.5	24.5 (36.5)
63	78.5	29.5 (41.5)	77.5	28.5 (40.5)	72	23 (35)	75	26 (38)	76.5	27.5 (39.5)	75	29 (41)	73.5	24.5 (36.5)
80	—	—	—	—	91	31 (45)	94	34 (48)	—	—	—	—	92.5	32.5 (46.5)
100	—	—	—	—	96	31 (45)	99	34 (48)	—	—	—	—	97.5	32.5 (46.5)

Auto switch mounting height (mm)

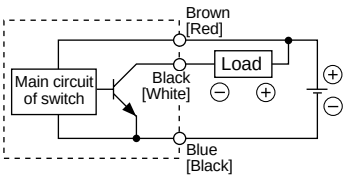
D-C7, C8 D-H7 D-H7□W D-H7□F D-H7BAL	D-C73C D-C80C	D-B7, B8 D-B73C D-B80C D-G7, K7 D-K79C D-H7C	D-G5, K5 D-G5□W D-K59W D-G5NTL D-B5, B6 D-B59W D-G5BAL D-G59F
Hs	Hs	Hs	Hs
24.5	27	27.5	27.5
27	29.5	30	30
30.5	33	33.5	33.5
35	37.5	38	38
40.5	43	43.5	43.5
47.5	50	50.5	50.5
—	—	—	59
—	—	—	69.5

∗ Numbers inside ( ) are for long strokes.

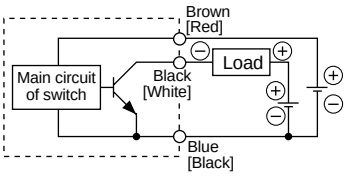
Auto Switch Connections and Examples

Basic Wiring

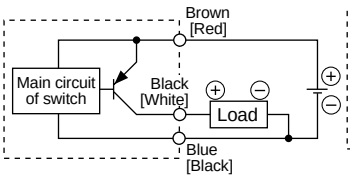
Solid state 3-wire, NPN



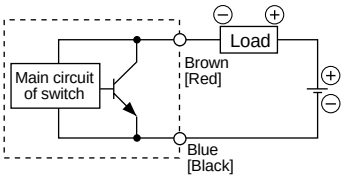
(Power supplies for switch and load are separate.)

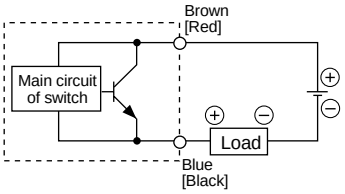


Solid state 3-wire, PNP

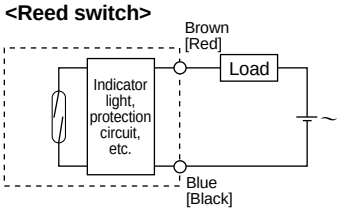


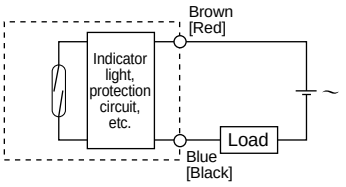
2-wire
<Solid state>





2-wire
<Reed switch>

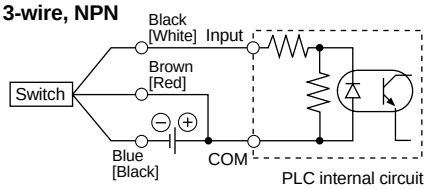




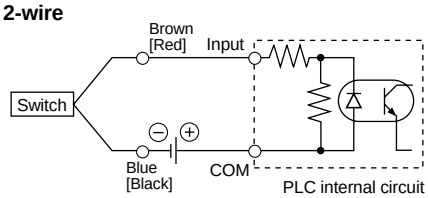
Examples of Connection to PLC

Sink input specifications

3-wire, NPN

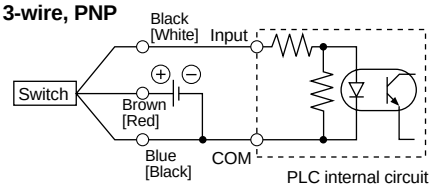


2-wire

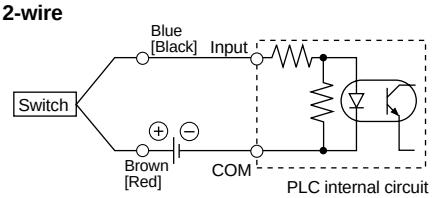


Source input specifications

3-wire, PNP



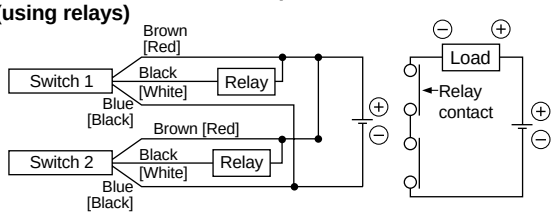
2-wire



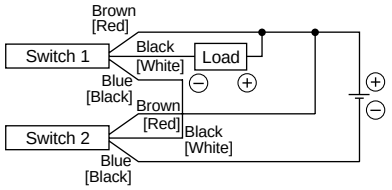
Connect according to the applicable PLC input specifications, as the connection method will vary depending on the PLC input specifications.

Connection Examples for AND (Series) and OR (Parallel)

3-wire
AND connection for NPN output (using relays)

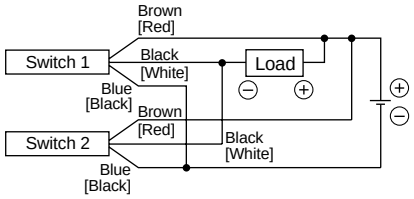


AND connection for NPN output (performed with switches only)

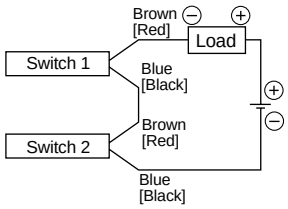


The indicator lights will light up when both switches are turned ON.

OR connection for NPN output



2-wire with 2 switch AND connection



When two switches are connected in series, a load may malfunction because the load voltage will drop when in the ON state.
The indicator lights will light up if both of the switches are in the ON state.

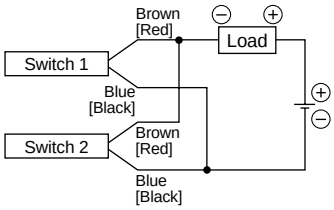
$$\text{Load voltage at ON} = \frac{\text{Power supply voltage}}{} - \frac{\text{Internal voltage drop}}{} \times 2 \text{ pcs.}$$

$$= 24\text{V} - 4\text{V} \times 2 \text{ pcs.}$$

$$= 16\text{V}$$

Example: Power supply is 24VDC
Internal voltage drop in switch is 4V

2-wire with 2 switch OR connection



<Solid state>
When two switches are connected in parallel, malfunction may occur because the load voltage will increase when in the OFF state.

$$\text{Load voltage at OFF} = \frac{\text{Leakage current}}{} \times 2 \text{ pcs.} \times \frac{\text{Load impedance}}{}$$

$$= 1\text{mA} \times 2 \text{ pcs.} \times 3\text{k}\Omega$$

$$= 6\text{V}$$

Example: Load impedance is 3kΩ
Leakage current from switch is 1mA

<Reed switch>
Because there is no current leakage, the load voltage will not increase when turned OFF. However, depending on the number of switches in the ON state, the indicator lights may sometimes dim or not light up, because of dispersion and reduction of the current flowing to the switches.

Series MGG

Contact SMC for detailed specifications, lead times and pricing.

Made to Order Specifications

Symbol	Specifications/Content	
1 -XB6	**Heat Resistant Cylinder (150°C)**	Page 38
2 -XB13	**Low Speed Cylinder**	38
3 -XC4	**With Heavy Duty Scraper**	38
4 -XC6□	**Stainless Steel Components**	38
5 -XC8	**Variable Stroke Cylinder with Adjustable Extension**	39
6 -XC9	**Variable Stroke Cylinder with Adjustable Retraction**	40
7 -XC11	**Dual Stroke Cylinder with Single Rod**	41
8 -XC13	**Auto Switch Rail Mounting**	42
9 -XC18	**NPT Piping Ports**	43
10 -XC22	**Fluoro Rubber Seals**	43
11 -XC35	**With Coil Scraper**	43
12 -XC37	**Enlarged Piping Port Orifice**	43
13 -XC56	**With Knock Pin Holes**	44
14 -XC58	**Water Resistant Type with Built-in Hard Plastic Magnet**	44
15 -XC59	**Fluoro Rubber Seals with Built-in Hard Plastic Magnet**	45
16 -XC71	**Helical Insert Thread Specifications**	45
17 -XC72	**Without Built-in Auto Switch Magnet**	46
18 -XC73	**Built-in Cylinder with Lock (CDNG)**	46, 47
19 -X440	**With Piping Ports for Grease**	47

Series MGG
Made to Order Specifications

Contact SMC for detailed dimensions, specifications and lead times.

1 Heat Resistant Cylinder (150°C)

MGG [Standard part number from page 1] — XB6

XB6: Heat resistant cylinder

This is an air cylinder with seal and grease materials modified to allow operation at high ambient temperatures up to 150°C.

Specifications

Series	MGG
Bore size (mm)	20, 25, 32, 40, 50, 63, 80, 100
Ambient temperature range	–10° to 150°C
Piston speed	50 to 500mm/s
Seal material	Fluoro rubber
Grease	Heat resistant grease
Auto switches	Not applicable

∗ With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.

∗ Shock absorbers and rubber bumpers are not applicable.

Precautions on Usage

⚠Warning

1. Be aware that there is a danger of generating gases harmful to the human body if tobacco products are smoked with heat resistant grease on one's hands.

⚠Caution

1. Use this type of cylinder without lubrication.
   The maintenance schedule for this cylinder is different from the one for the standard cylinder. Contact SMC for further details.

2 Low Speed Cylinder

MGG M [Standard part number from page 1] — XB13

M: Slide bearing

XB13: Low speed cylinder

Operates smoothly without sticking and slipping at drive speeds as low as 5 to 50mm/s.

Specifications

Series	MGGM
Bore size (mm)	20, 25, 32, 40, 50, 63, 80, 100
Bearing type	Slide bearing
Piston speed	5 to 50mm/s

∗ With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.

∗ Shock absorbers are not applicable.

⚠Caution

1. Avoid operating this cylinder with lubrication.

3 With Heavy Duty Scraper

MGG [Standard part number from page 1] — XC4

XC4: With heavy duty scraper

Heavy duty scrapers are used for the piston rod and guide rods (front and rear). This cylinder is suitable for use in extremely dusty conditions, and in environments where dirt gets on the cylinder, as in the case of casting equipment, construction equipment and industrial vehicles.

Specifications

Series	MGG
Bore size (mm)	32, 40, 50, 63, 80, 100
Heavy duty scraper	SCB scraper

∗ With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.

4 Stainless Steel Components

MGG [Standard part number from page 1] — XC6 [ ]

XC6: Stainless steel components

[ ]: Parts symbol

A	Stainless steel used on all standard iron parts
B	Stainless steel rod end moving parts
C	Stainless steel rods

∗ Refer to the table below regarding parts changed to stainless steel.

Suitable for use where there is a danger of rust or corrosion, when immersed in water, etc.

Specifications

Series	MGG
Bore size (mm)	20, 25, 32, 40, 50, 63, 80, 100

∗ With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.

Note) RBL (coolant resistant) type shock absorbers are used (-XC6A only).

Parts changed to stainless steel

Symbol	Bore size (mm)	Part number	Note
-XC6A	20, 25, 32, 40, 50	④⑪⑯⑰⑱⑲⑳㉑㉒㉓㉖㉙㉚㉛㉝㉞㉟㊱㊲	⑲ is type L only.
	63, 80, 100	④⑩⑮⑯⑰⑱⑲⑳㉑㉓㉔㉗㉘㉙㉛㉜㉝㉞㉟㊴㊵	⑰ is type L only, ㉛ is type B only, ㊴ and ㊵ are type F only.
-XC6B	20, 25, 32, 40, 50	④⑪⑰⑳㉑㉒㉓㉛㉟	㉛ is rod side only.
	63, 80, 100	④⑩⑮⑱⑲⑳㉑㉙㉝	㉙ is rod side only.
-XC6C	20, 25, 32, 40,50	④⑪⑳	
	63, 80, 100	④⑩⑱	

∗ For part numbers, refer to the construction drawings on pages 14, 15 and 16.

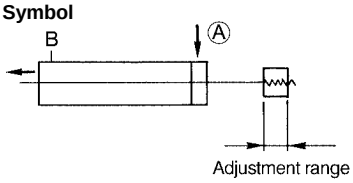
5 Variable Stroke Cylinder with Adjustable Extension

MGG | **Bearing type** | **Mounting type** | **Bore size** | **Stroke** | **Stroke adjustment symbol** | **XC8**

XC8: Variable stroke cylinder with adjustable extension

The extension stroke can be adjusted within a range of "0 to 25mm" or "0 to 50mm" from the full stroke.
A stroke adjustment mechanism is provided on the rear side which adjusts the extension stroke. (Since the rear shock absorber is changed to a free state after stroke adjustment, movement of the rear plate is recommended.)

Symbol



Specifications

Series	MGG
Bore size (mm)	**20, 25, 32, 40, 50, 63**
Stroke adjustment	Stopper adjustment
Stroke adjustment range (adjustment symbol)	A: 0 to 25mm B: 0 to 50mm
Piston speed	50 to 500mm/s (extension)

∗ With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.

Precautions on Usage

⚠Warning

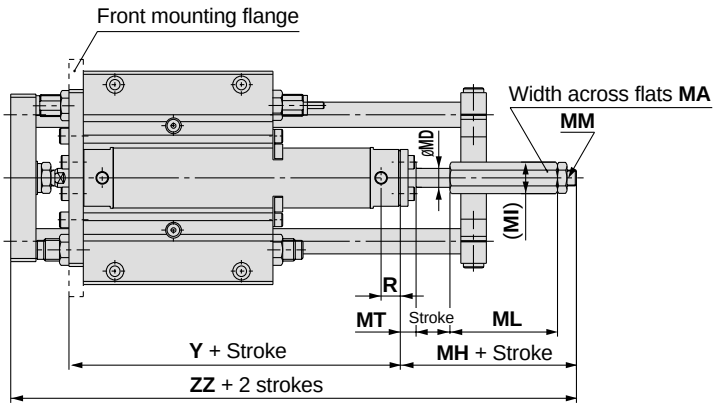
1. There is a danger of injury to human body parts and damage to peripheral equipment if they are caught between the stroke adjustment stopper bracket and the cylinder body during operation. Therefore, implement safety measures such as protective cover installation, etc., as needed.

⚠Caution

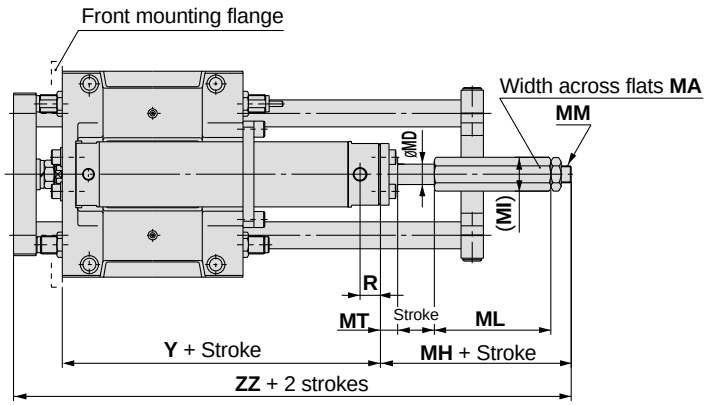
1. When adjusting the stroke, be sure to loosen the nut after securing the wrench flats of the stopper bracket. Be aware that if the nut is loosened without securing the stopper bracket, there is a danger of the load and piston rod connector or the load side and stopper bracket side piston rod connector becoming loose first.

Dimensions

ø20 to ø50



ø63



(mm)

Bore size (mm)	R	Y	MA	MD	MI	MM	MT	Adjustment 0 to 25mm			Adjustment 0 to 50mm		
								MH	ML	ZZ	MH	ML	ZZ
20	12	86	14	8	16.2	M8 x 1.25	9	63	43	179	88	68	204
25	12	86	17	10	19.7	M10 x 1.25	11	66	43	189	91	68	214
32	12	88	17	12	19.7	M10 x 1.25	11	66	43	191	91	68	216
40	13	99	24	16	27.8	M14 x 1.5	11	72	47	215	97	72	240
50	14	114	32	20	37	M18 x 1.5	11	85	53	254	110	78	279
63	14	117	32	20	37	M18 x 1.5	13	85	53	256	110	78	281

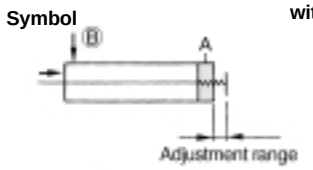
∗ Dimensions other than the above are the same as those on pages 17 through 20.

6 Variable Stroke Cylinder with Adjustable Retraction

MGG | **Bearing type** | **Mounting type** | **Bore size** — **Stroke** | **Stroke adjustment symbol** — **XC9**

XC9: Variable stroke cylinder with adjustable retraction

The cylinder's retracting stroke can be adjusted with the adjustment bolt within a range of "0 to 25mm" or "0 to 50mm" on the return stroke. (After stroke adjustment, the front shock absorber is changed to a free state.)



Specifications

Series	MGG
Bore size (mm)	**20, 25, 32, 40, 50, 63**
Stroke adjustment	Adjustment bolt
Stroke adjustment range (adjustment symbol)	A: 0 to 25mm B: 0 to 50mm
Piston speed	50 to 500mm/s (return side)

∗ With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.

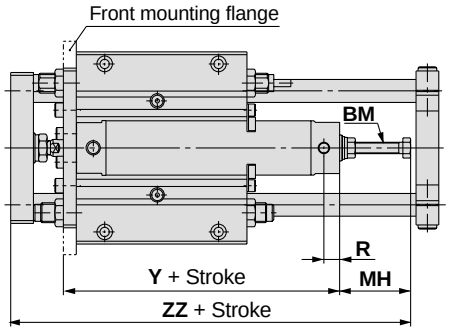
Precautions on Usage

⚠ Caution

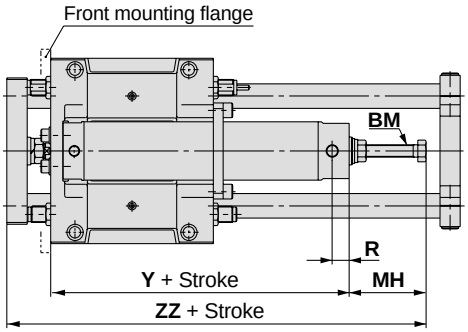
1. If the stroke adjustment bolt is loosened beyond the stroke adjustment range while air is being supplied to the cylinder, the stroke adjustment bolt may fly out and air may be ejected. Use caution, as there is a danger of human injury or damage to peripheral equipment.
2. Perform stroke adjustment when there is no air pressure.
   If the stroke is adjusted while pressure is being applied, the adjustment unit seal may be deformed and cause air leakage.

Dimensions

ø20 to ø50



ø63



(mm)

Bore size (mm)	R	Y	BM	Adjustment 0 to 25mm		Adjustment 0 to 50mm	
				MH	ZZ	MH	ZZ
20	12	86	M6 x 1	48	164	73	189
25	12	86	M6 x 1	48	171	73	196
32	12	88	M8 x 1.25	50	175	75	200
40	13	99	M12 x 1.75	65	208	90	233
50	14	114	M12 x 1.75	58	227	83	252
63	14	117	M16 x 2	65	236	90	261

∗ Dimensions other than the above are the same as those on pages 17 through 20.

7 Dual Stroke Cylinder with Single Rod

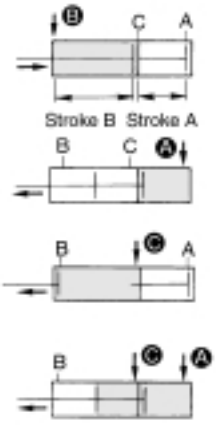
MGG | **Bearing type** | **Mounting type** | **Bore size** | **Stroke A** + **Stroke B-A** — **XC11**

Dual stroke cylinder with single rod

Two cylinders are integrated in a serial arrangement, wherein 2-stage control is possible on both reciprocal strokes of the cylinder.

Symbols

Function



When air pressure is supplied from port Ⓑ, both strokes A and B retract.

When air pressure is supplied from port Ⓐ, the rod is operated by the amount of stroke A.

When air pressure is supplied from port Ⓒ, the rod is operated by the amount of stroke B.

When air pressure is supplied from both ports Ⓐ and Ⓒ, the output force in the range of stroke A is doubled.

Precautions on Usage

⚠Caution

1. Do not supply air until the cylinder is secured with the bolts which are included.
2. Be aware that if air is supplied before the cylinder is secured, it may be thrown off, causing a danger of human injury and damage to peripheral equipment.

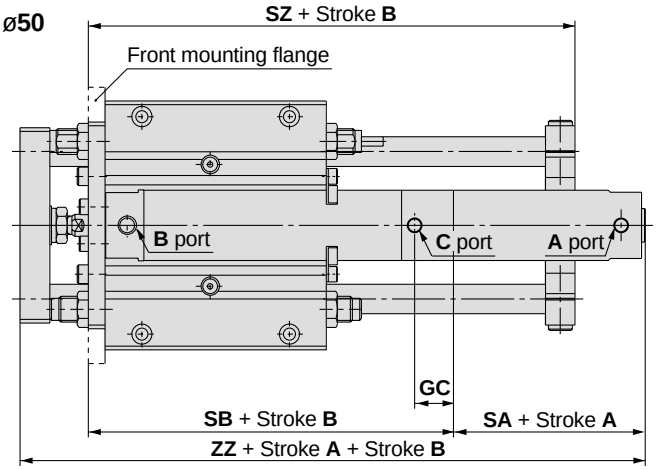
Specifications

Series	MGG
Bore size (mm)	20, 25, 32, 40, 50, 63

∗ With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.

Dimensions

ø20 to ø50

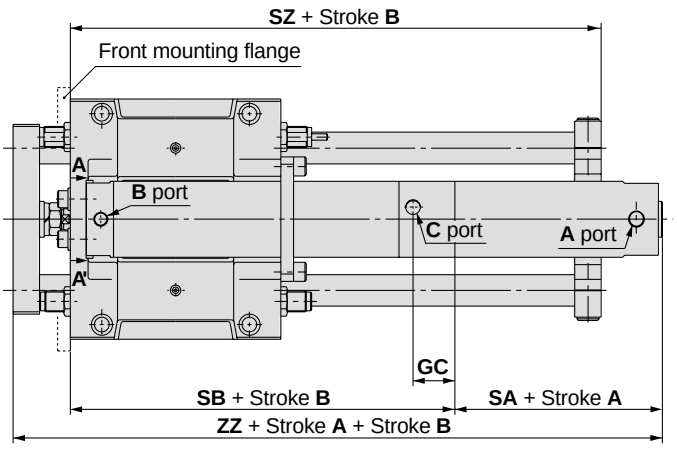


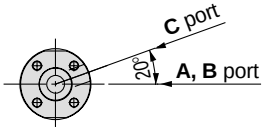
(mm)

Bore size (mm)	GC	SA	SB	SZ	ZZ	Bracket mounting stroke (Stroke A + Stroke B)	Stroke A availability
20	21	50	96	127	176	35mm or more	to 200
25	21	50	96	138	183	60mm or more	to 300
32	23	52	100	164	189	80mm or more	
40	24	59	111	194	214	125mm or more	
50	28	66	129	230	250	160mm or more	
63	28	66	132	254	252	210mm or more	

∗ Dimensions other than the above are the same as those on pages 17 through 20.

ø63





View A-A'

8 Auto Switch Rail Mounting

MGG | **Bearing type** | **Mounting type** | **Bore size** — **Stroke** — **Auto switch type** | **Auto switch symbol** — **XC13**

XC13: Auto switch rail mounting

In addition to the standard auto switch mounting method (band mounting), this type has rails attached to the cylinder body making auto switch mounting possible.

Specifications

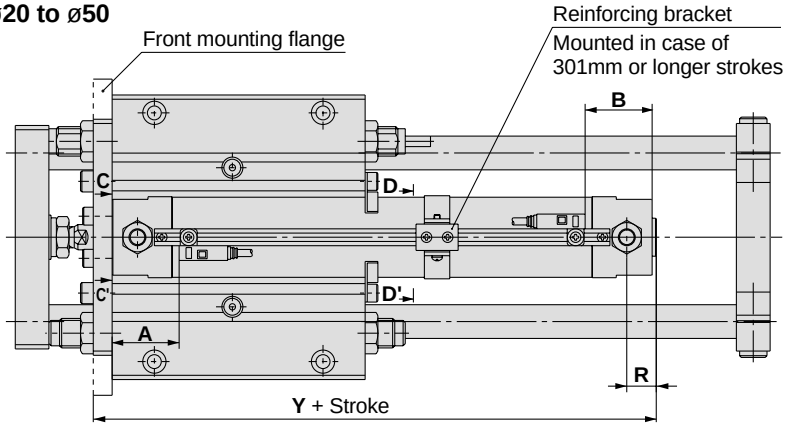
Series		MGG
Bore size (mm)		20, 25, 32, 40, 50, 63, 80, 100
Applicable auto switches	Reed type	D-A7/A8, D-A7□H/A80H, D-A73C/A80C, D-A79W
	Solid state	D-F7□, D-F7□V, D-F7BAL, D-F7□F, D-F7□W, D-F7□WV, D-J79, D-J79C, D-J79W, D-F7NTL

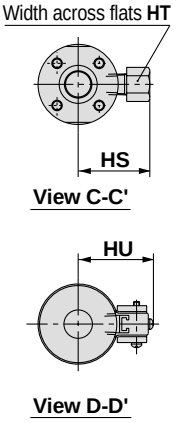
∗ With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.

∗ Refer to "Best Pneumatics No. 2" page 5.3-2 for detailed specifications of individual auto switches.

Dimensions

ø20 to ø50



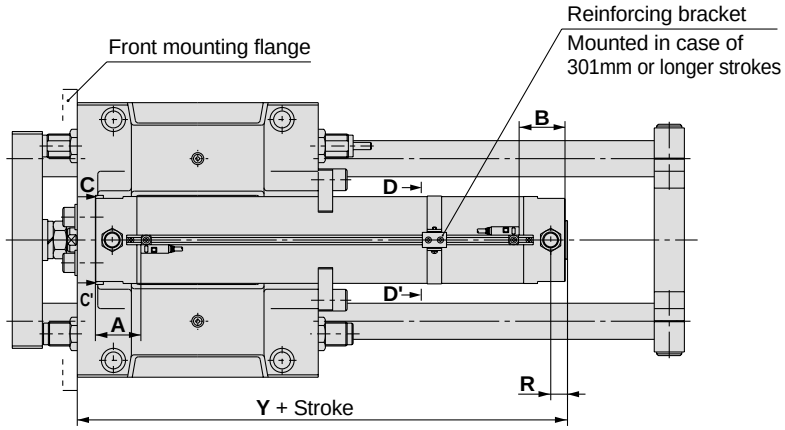


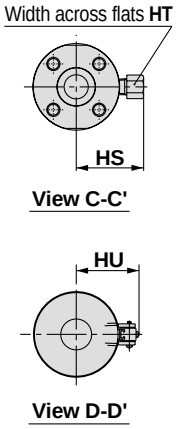
(mm)

Bore size (mm)	R	Y	HS	HT	HU
20	14	108	28.5	14	30.7
25	14	108	31	14	33.2
32	14	110	34.5	14	36.5
40	15	121	39	14	41
50	16	136	49.5	17	46.2
63	16	139	56.5	17	53.2
80	23	165	75.5	23	62.2
100	23	165	86	26	72.7

∗ Dimensions other than the above are the same as those on pages 17 through 20.

ø63 to ø100





Auto switch mounting position (mm)

Bore size (mm)	D-A72, A7□H, A80H D-A73C, A80C D-F7□, F7□V, F7□W D-F7□WV, F7BAL D-J7□		D-A73 D-A80		D-A79W		D-F7□F		D-F7NTL	
	A	B	A	B	A	B	A	B	A	B
20	40.5	39.5	40	39	37.5	36.5	44.5	43.5	45.5	44.5
25	40.5	39.5	40	39	37.5	36.5	44.5	43.5	45.5	44.5
32	41.5	40.5	41	40	38.5	37.5	45.5	44.5	46.5	45.5
40	46.5	43.5	46	43	43.5	40.5	50.5	47.5	51.5	48.5
50	53.5	51.5	53	51	50.5	48.5	57.5	55.5	58.5	56.5
63	53.5	51.5	53	51	50.5	48.5	57.5	55.5	58.5	56.5
80	63.5	51.5	63	51	60.5	48.5	67.5	55.5	68.5	56.5
100	63.5	51.5	63	51	60.5	48.5	67.5	55.5	68.5	56.5

Auto switch mounting height (mm)

D-A7, A8	D-A7□H, J79W D-A80H, F7BAL D-F7□, F7□F D-J79, F7NTL D-F7□W	D-A73C D-A80C D-F7□WV	D-F7□V	D-J79C	D-A79W
Hs	Hs	Hs	Hs	Hs	Hs
26.5	26.5	32.5	29	31	30
29	29	35	31.5	33.5	32.5
32	32.5	38.5	34.5	36.5	35.5
36.5	37	43	39	41	40
42	42	48	44.5	46.5	45.5
49	49	55	51.5	53.5	52.5
58	58	64	60.5	62.5	61.5
68.5	69	74.5	71	73	72

9 NPT Piping Ports

MGG | Standard part number from page 1 — XC18

XC18: NPT piping ports

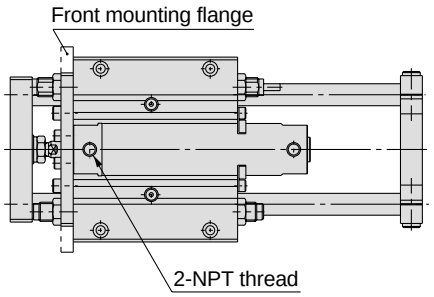
The air cylinder's piping ports are changed from Rc thread to NPT thread.

Specifications

Series	MGG
Bore size (mm)	20, 25, 32, 40, 50, 63, 80, 100

∗ With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.

Dimensions



Bore size (mm)	Connection thread size
20	NPT 1/8
25	
32	
40	
50	NPT 1/4
63	
80	NPT 3/8
100	NPT 1/2

∗ Dimensions other than the above are the same as those on pages 17 through 20.

10 Fluoro Rubber Seals

MGG | Standard part number from page 1 — XC22

XC22: Fluoro rubber seals

Seals are changed to a fluoro rubber material having superior chemical resistance.

Specifications

Series	MGG
Bore size (mm)	20, 25, 32, 40, 50, 63, 80, 100
Piston speed	50 to 500mm/s

∗ With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.

∗ RBL type shock absorbers are used.

⚠ Caution

1. Confirm with SMC, as use may not be possible in some cases depending on the type of chemical and the operating temperature.
2. Cylinders with auto switches can also be produced; however, auto switch related parts (auto switch units, mounting brackets, built-in magnets) are the same as standard products. Before using these, contact SMC regarding their suitability for the operating environment.

11 With Coil Scraper

MGG | Standard part number from page 1 — XC35

XC35: With coil scraper

Scrapers are used on the piston rod and guide rods (front and rear) to protect the seals by removing frost, welding spatter and chips, etc., that adhere to the moving parts.

Specifications

Series	MGG
Bore size (mm)	32, 40, 50, 63, 80, 100

∗ With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.

12 Enlarged Piping Port Orifice

MGG | Standard part number from page 1 — XC37

XC37: Enlarged piping port orifice

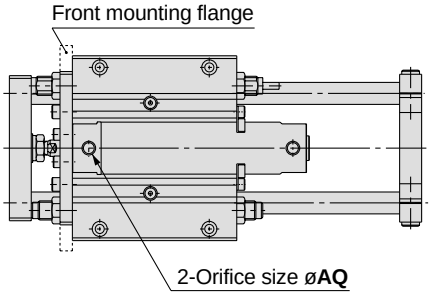
This is a cylinder with a piping port larger than the standard type.

Specifications

Series	MGG
Bore size (mm)	20, 25, 32, 40, 50, 63

∗ With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.

Dimensions



(mm)

Bore size (mm)	AQ
20	5
25	5
32	6
40	7
50	9
63	9

∗ Dimensions other than the above are the same as those on pages 17 through 20.

13 With Knock Pin Holes

MGG **Bearing type** **B** **Bore size** — **Stroke** — **XC56**

- **B**: Basic type
- **XC56**: With knock pin holes

Knock pin holes for positioning are machined into the front plate and the body of the standard cylinder.

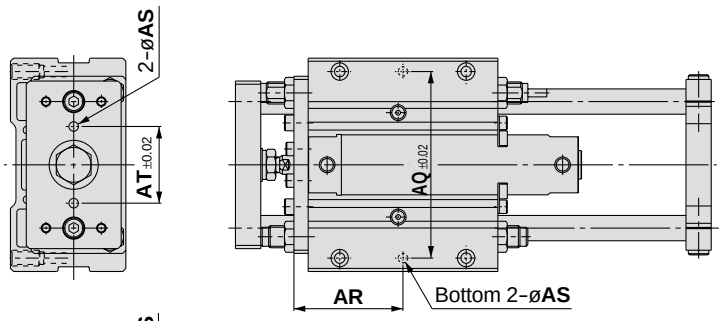
Specifications

Series	MGG□B
Bore size (mm)	20, 25, 32, 40, 50, 63, 80, 100
Mounting type	Basic type
Knock pin hole type	H7

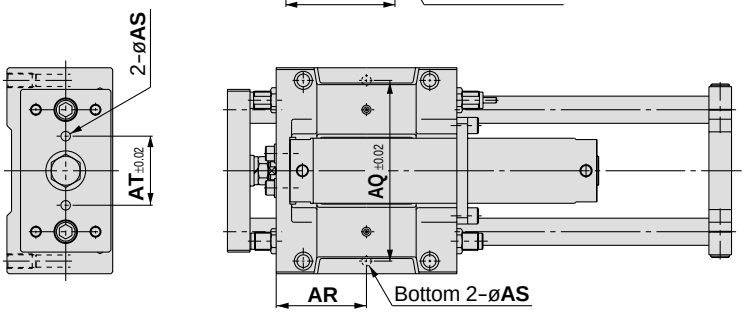
∗ With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.

Dimensions

ø20 to ø50



ø63 to ø100



(mm)

Bore size (mm)	AQ	AR	AS	AT
20	92	54	$5^{H7}{}^{+0.012}_{0}$ depth 6	36
25	113	59	$6^{H7}{}^{+0.012}_{0}$ depth 8	45
32	118	69	$6^{H7}{}^{+0.012}_{0}$ depth 8	48
40	150	82	$8^{H7}{}^{+0.015}_{0}$ depth 11	56
50	170	97	$10^{H7}{}^{+0.015}_{0}$ depth 13	68
63	200	100	$10^{H7}{}^{+0.015}_{0}$ depth 13	74
80	234	115	$12^{H7}{}^{+0.018}_{0}$ depth 15	92
100	274	140	$12^{H7}{}^{+0.018}_{0}$ depth 15	106

∗ Dimensions other than the above are the same as those on pages 17 and 18.

14 Water Resistant Type with Built-in Hard Plastic Magnet

MGG **M** **Mounting type** **Bore size** **V** — **Stroke** — **G5BAL** — **XC58**

- **M**: Slide bearing
- **V**: Water resistant cylinder

V	FKM seals (fluoro rubber)

- **G5BAL**: Water resistant 2 color indication solid state switch
- **XC58**: Water resistant type with built-in hard plastic magnet

The auto switch magnet for this water resistant cylinder have been changed to hard plastic magnet.

This prevents swelling of the magnet.

Specifications

Series		MGGM
Bore size (mm)		32, 40, 50
Action		Double acting
Fluid		Air
Maximum operating pressure		1.0MPa
Minimum operating pressure		0.15MPa (horizontal with no load)
Bearing type		Slide bearing
Cushion	Base cylinder	Rubber bumper
	Guide unit	Built-in shock absorbers (2 pcs.)
Mounting type		Basic type Front mounting flange

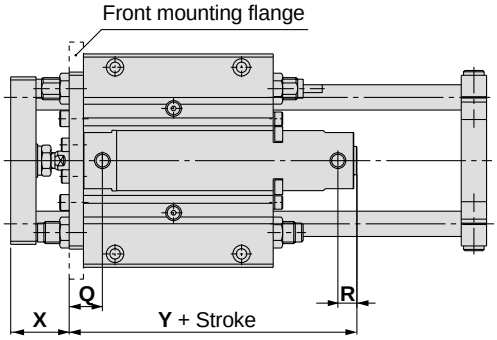
∗Refer to page 2 for specifications other than the above.

∗Auto switch capable (water resistant type)

Note) RBL (coolant resistant) type shock absorbers are used.

Dimensions

ø32 to ø50



(mm)

Bore size (mm)	Q	R	X	Y
32	25	13	39	86 (94)
40	29	14	46	96 (105)
50	31	15	57	109 (121)

∗ Dimensions inside ( ) are for long strokes.

∗ Dimensions other than the above are the same as those on pages 17 and 19.

15 Fluoro Rubber Seals with Built-in Hard Plastic Magnet

MGG**M** | **Mounting type** | **Bore size** — **Stroke** — **XC59**

M: **Slide bearing**

XC59: **Fluoro rubber seals and built-in hard plastic magnet**

The auto switch magnet for this fluoro rubber seal cylinder have been changed to hard plastic magnet.

This prevents swelling of the magnet.

Specifications

Series	MGGM
Bore size (mm)	**20, 25, 32, 40, 50**
Piston speed	50 to 500mm/s

∗ With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.

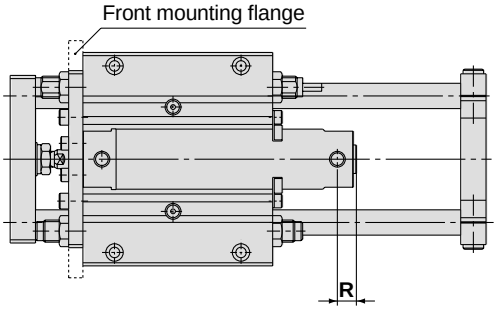
∗ RBL type shock absorbers are used.

⚠Caution

1. Confirm with SMC, as use may not be possible in some cases depending on the type of chemical and the operating temperature.
2. Cylinders with auto switches can also be produced; however, auto switch related parts (auto switch units, mounting brackets, built-in magnets) are the same as standard products. Before using these, contact SMC regarding their suitability for the operating environment.

Dimensions

ø20 to ø50



(mm)

Bore size (mm)	R
20	14
25	14
32	13
40	14
50	15

∗ Dimensions other than the above are the same as those on pages 17 and 19.

16 Helical Insert Thread Specifications

MGG | **Bearing type** | **B** | **Bore size** — **Stroke** — **XC71**

B: **Basic type**

XC71: **Helical insert thread specifications**

The guide body mounting threads are helical insert threads.

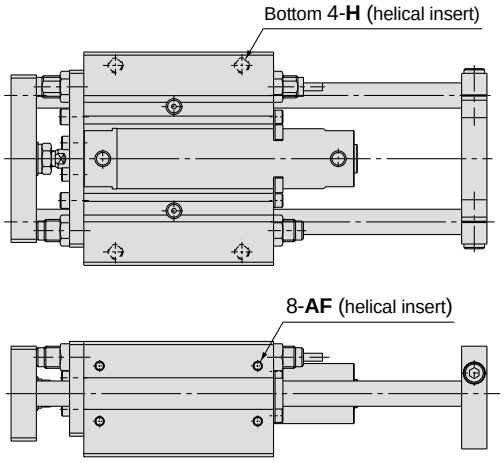
Specifications

Series	MGG□B
Bore size (mm)	**20, 25, 32, 40, 50**
Mounting type	Basic type

∗ With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.

Dimensions

ø20 to ø50



(mm)

Bore size (mm)	H	AF
20	M6 x 1 depth 12	M5 x 0.8 depth 7.5
25	M8 x 1.25 depth 16	M6 x 1 depth 9
32	M8 x 1.25 depth 16	M6 x 1 depth 9
40	M10 x 1.5 depth 20	M8 x 1.25 depth 12
50	M12 x 1.75 depth 24	M10 x 1.5 depth 15

∗ Dimensions other than the above are the same as those on page 17.

17 Without Built-in Auto Switch Magnet

MGG | **Bearing type** | **Mounting type** | **Bore size** | **Stroke** — **XC72**

Without built-in auto switch magnet

This cylinder type does not have built-in auto switch magnet.

Specifications

Series	MGG
Bore size (mm)	**20, 25, 32, 40, 50**
Auto switches	Not applicable

∗ With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.

18 Built-in Cylinder with Lock (CDNG)

MGG | **Standard part number from page 1** — **XC73**

Built-in cylinder with lock

This type has a built-in cylinder with lock, which accommodates intermediate stops, emergency stops and drop prevention, etc.

Specifications

Series		MGG			
Bore size (mm)		**20**	**25**	**32**	**40**
Basic cylinder		CDNGBN20	CDNGBN25	CDNGBN32	CDNGBN40
Minimum operating pressure		0.2MPa (horizontal with no load)			
Piston speed		50 to 1000mm/s Note 1)			
Stroke adjustment range (one side) [built-in adjustment bolts (2pcs.)]		0 to –15mm			
Non-rotating accuracy (except deflection of guide rods)	**Slide bearing**	±0.06°	±0.05°		±0.04°
	Ball bushing bearing	±0.04°	±0.04°		±0.04°
Shock absorber type		RB1412	RB2015		

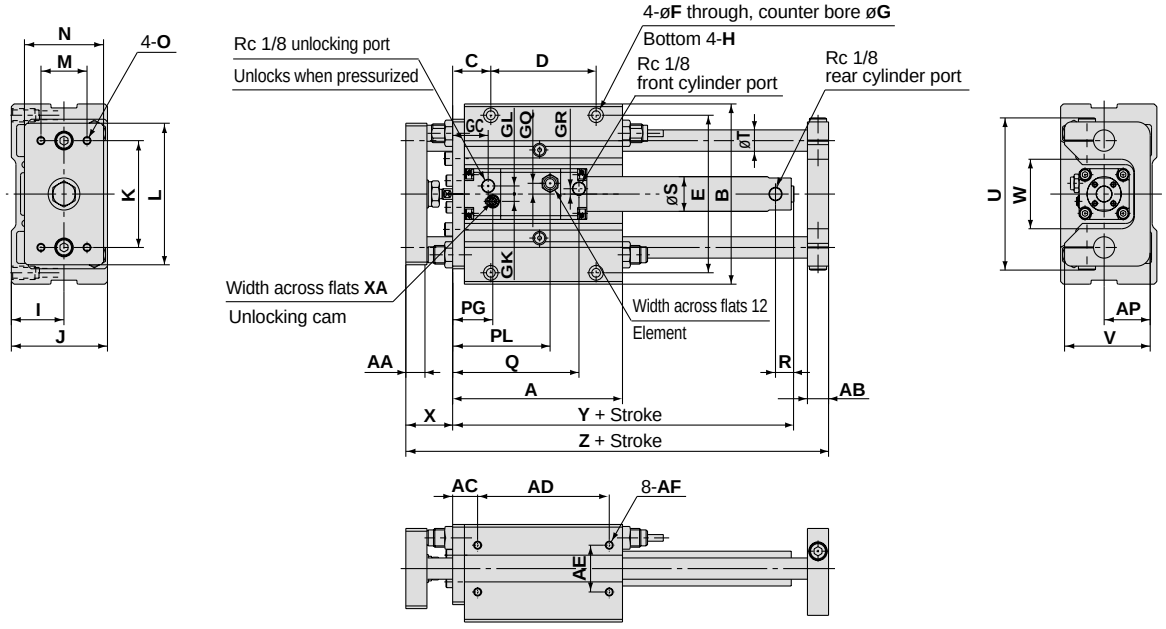
Note 1) When the piston is locked, the load weight is limited by the mounting orientation and the operating pressure.

∗ Refer to the series CNG "Cylinder with Lock" catalog (CAT.E281-A) for lock specifications, etc.

∗ With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.

Dimensions

Basic type
ø20 to ø40



For standard strokes (mm)

Bore size (mm)	Stroke range (mm)	A	AA	AB	AC	AD	AE	AF	AP	B	C	D	E	F	G	GC	GK	GL	GQ	GR	H	I	J
20	**75, 100, 125, 150, 200**	129	12	16	19	100	35	M6 x 1 depth 12	35	135	29	80	118	6.6	11 depth 8	27	5.5	6	8	4	M10 x 1.5 depth 18	40	73
25	**75, 100, 125**	149	16	19	19	120	40	M8 x 1.25 depth 16	45	170	29	100	150	9	14 depth 10	34	6.5	9	10	7	M12 x 1.75 depth 21	50	93
32	**150, 200, 250**	149	16	19	19	120	40	M8 x 1.25 depth 16	45	170	29	100	150	9	14 depth 10	34	6.5	9	10	7	M12 x 1.75 depth 21	50	93
40	**300**	182	19	21	22	150	45	M10 x 1.5 depth 20	50	194	37	120	170	11	17 depth 12	38	7	11	12	7	M14 x 2 depth 25	55	103

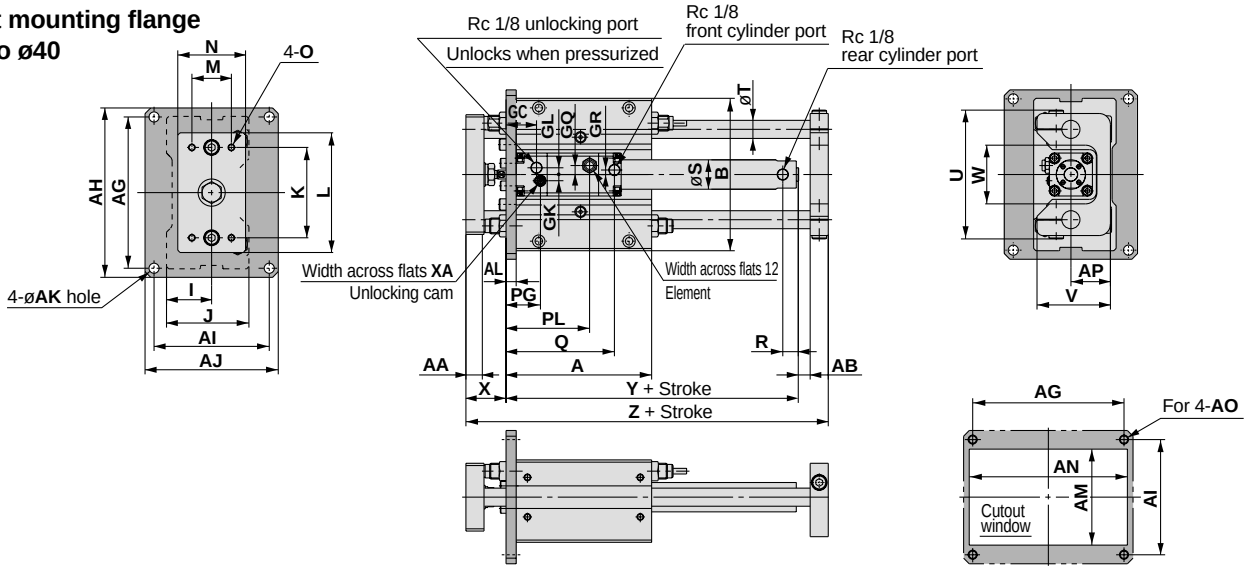
Bore size (mm)	K	L	M	N	O	PG	PL	Q	R	S	T	U	V	W	X	XA	Y	Z
20	80	106	35	60	M6 x 1 depth 9	30.5	74	94	12	26	16	114	65	52	30	3	152	194
25	95	134	50	75	M8 x 1.25 depth 13	35.5	82	105	12	31	20	138	84	62	37	3	162	228
32	95	134	50	75	M8 x 1.25 depth 13	35.5	82	106	12	38	20	138	84	62	37	3	165	228
40	115	152	56	90	M10 x 1.5 depth 16	40	93	116	12	47	25	164	94	75	44	4	183	274

For long strokes

Bore size (mm)	Stroke range (mm)	R	Y
20	250 to 400	14	160
25	350 to 500	14	170
32	350 to 600	14	173
40	350 to 800	15	192

Dimensions

Front mounting flange
ø20 to ø40



Mounting dimensions

For standard strokes (mm)

Bore size (mm)	Stroke range (mm)	A	AA	AB	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	B	GC	GK	GL	GQ	GR	I	J	K	L	M	N
20	**75, 100, 125, 150, 200**	129	12	16	134	150	102	118	9	9	85	140	M8	35	135	27	5.5	6	8	4	40	73	80	106	35	60
25	**75, 100, 125**	149	16	19	170	186	134	150	9	9	105	175	M8	45	170	34	6.5	9	10	7	50	93	95	134	50	75
32	**150, 200, 250**	149	16	19	170	186	134	150	9	9	105	175	M8	45	170	34	6.5	9	10	7	50	93	95	134	50	75
40	**300**	182	19	21	190	210	140	160	11	12	115	200	M10	50	194	38	7	11	12	7	55	103	115	152	56	90

Bore size (mm)	O	PG	PL	Q	R	S	T	U	V	W	X	XA	Y	Z
20	M6 x 1 depth 9	30.5	74	94	12	26	16	114	65	52	30	3	152	194
25	M8 x 1.25 depth 13	35.5	82	105	12	31	20	138	84	62	37	3	162	228
32	M8 x 1.25 depth 13	35.5	82	106	12	38	20	138	84	62	37	3	165	228
40	M10 x 1.5 depth 16	40	93	116	12	47	25	164	94	75	44	4	183	274

For long strokes

Bore size (mm)	Stroke range (mm)	R	Y
20	250 to 400	14	160
25	350 to 500	14	170
32	350 to 600	14	173
40	350 to 800	15	192

19 With Piping Ports for Grease

MGG | **Bearing type** | **Mounting type** | **Bore size** — **Stroke** — **X440**

X440: With piping ports for grease

This type is equipped with Rc 1/8 piping ports for grease on both sides of the guide body.

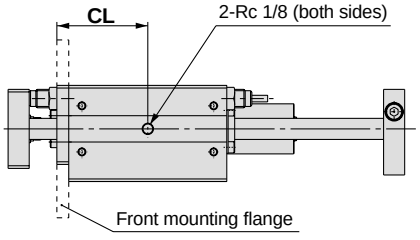
Specifications

Series	MGG
Bore size (mm)	**20, 25, 32, 40, 50, 63, 80, 100**

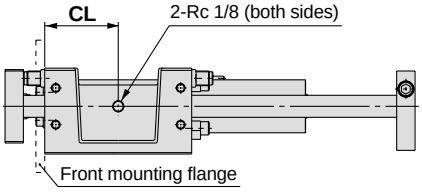
∗ With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.

Dimensions

ø20 to ø50



ø63 to ø100



(mm)

Bore size (mm)	CL
20	49
25	54
32	64
40	77
50	92
63	100
80	115
100	140

∗ Dimensions other than the above are the same as those on pages 17 through 20.

∗ The standard grease supply port has a hexagon socket head set screw.

Series MGG
Actuator Precautions 3
Be sure to read before handling.

Air-Hydro

Design

⚠Warning

1. Do not use near flames or in equipment or machinery where the ambient temperature exceeds 60°C.

There is a danger of causing a fire because the air-hydro cylinder uses a flammable hydraulic fluid.

⚠Caution

1. Do not use in environments, equipment or machinery where mist is unacceptable.

Air-hydro cylinders generate an oil mist during operation which may affect the environment.

2. Be sure to install an exhaust cleaner on a directional control valve used for an air-hydro cylinder.

A very small amount of hydraulic fluid is discharged from the exhaust port of the air-hydro cylinder's directional control valve, and this may contaminate the surrounding area.

3. Mount an air-hydro cylinder in a location where maintenance will be easy.

Since an air-hydro cylinder requires maintenance, such as refilling of hydraulic fluid and bleeding of air, ensure sufficient space for these activities.

Selection

⚠Caution

1. Select an air-hydro cylinder in combination with an air-hydro unit.

Since good operation of an air-hydro cylinder depends on combination with an air-hydro unit, be sure to select an appropriate air-hydro unit.

2. Set the air-hydro cylinder's load at 50% or less of its theoretical output.

For an air-hydro cylinder to obtain constant speed and stopping accuracy close to that of a hydraulic cylinder, it is necessary to keep the load at 50% or less of the theorectical output.

Piping

⚠Caution

1. Use self-align fittings in the piping for an air-hydro cylinder.

Do not use One-touch fittings in the piping for an air-hydro cylinder, as oil leakage may occur.

2. Use tubing materials such as hard nylon or copper for air-hydro cylinder piping.

As in the case of hydraulic circuits, surge pressures greater than the operating pressure may occur in an air-hydro cylinder's piping, making it necessary to use safer piping materials.

Supply of Hydraulic Fluid

⚠Warning

1. Supply hydraulic fluid to the air-hydro unit after exhausting all of the compressed air from the system.

When supplying hydraulic fluid to the air-hydro unit, first confirm that safety measures are implemented to prevent dropping of driven objects and release of clamped objects, etc. Then, shut off the air supply and the equipment's electric power, and exhaust the compressed air in the system.

If the air-hydro unit's supply port is opened with compressed air still remaining in the system, there is a danger of hydraulic fluid being blown out.

Maintenance

⚠Caution

1. Bleed air from the air-hydro cylinder regularly.

Since air may accumulate inside an air-hydro cylinder, bleed air from it at times such as before starting work. Bleed air from a bleeder valve provided on the air-hydro cylinder or the piping.

2. Confirm the amount of fluid in the air-hydro system regularly.

Since a very small amount of hydraulic fluid is discharged from the air-hydro cylinder and air-hydro unit circuit, the fluid will gradually decrease. Therefore, check the fluid regularly and refill as necessary.

The amount of fluid can be confirmed with the level gauge on the air-hydro converter.

Series MGG
Auto Switch Precautions 1

Be sure to read before handling.

Design and Selection

⚠Warning

1. Confirm the specifications.

Read the specifications carefully and use the product appropriately. The product may be damaged or malfunction if it is used outside the range of specifications of load current, voltage, temperature or impact.

2. Take precautions when multiple cylinders are used close together.

When multiple auto switch cylinders are used in close proximity, magnetic field interference may cause the switches to malfunction. Maintain a minimum cylinder separation of 40mm. (When the allowable interval is specified, use the indicated value.)

3. Monitor the length of time that a switch is ON at an intermediate stroke position.

When an auto switch is placed at an intermediate position of the stroke and a load is driven at the time the piston passes, the auto switch will operate, but if the speed is too great, the operating time will be shortened and the load may not operate properly. The maximum detectable piston speed is:

$$V(mm/s) = \frac{\text{Auto switch operating range (mm)}}{\text{Load operating time (ms)}} \times 1000$$

In the case of a high piston speed, it is possible to extend the operating time of the load by using an auto switch (D-G5NT) with a built-in off delay timer (approx. 200ms).

4. Keep wiring as short as possible.

<Reed switches>
As the length of the wiring to a load gets longer, the rush current at switching ON becomes greater, and this may shorten the product's life. (The switch will stay ON all the time.)

1) For an auto switch without a contact protection circuit, use a contact protection box when the wire length is 5m or longer.
2) Even when an auto switch has a built-in contact protection circuit, if the lead wire length is 30m or more, the rush current cannot be adequately absorbed and the life of the switch may be shortened. Contact SMC, as it is also necessary in this case to connect a contact protection box to extend the switch life.

<Solid state switches>
3) Although wire length should not affect switch function, use a wire 100m or shorter.

5. Be careful of the internal voltage drop of the switch.

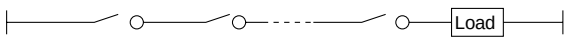
<Reed switches>

1) Switches with an indicator light (except D-B76, C76)

- If auto switches are connected in series as shown below, be aware that there will be a large voltage drop because of internal resistance in the light emitting diodes. (Refer to internal voltage drop in the auto switch specifications.)

  [The voltage drop will be "n" times larger when "n" auto switches are connected.]

  Even though an auto switch operates normally, the load may not operate.



⚠Warning

- Simply, when operating below a specified voltage, it is possible that the load may be ineffective even through the auto switch function is normal.

  Supply voltage − Internal voltage drop of switch > Minimum operating voltage of load

2) If the internal resistance of a light emitting diode causes a problem, select a switch without an indicator light (D-B80, C80).

<Solid state switches>
3) Generally, the internal voltage drop will be greater with a 2 wire solid state auto switch than with a reed switch. Take the same precautions as in 1).

   Also, note that a 12VDC relay is not applicable.

6. Be careful of leakage current.

<Solid state switches>

With a 2 wire solid state auto switch, current (leakage current) flows to the load to operate the internal circuit even when in the OFF state.

Operating current of load (OFF condition) > Leakage current

If the condition given in the above formula is not met, it will not reset correctly (stays ON). Use a 3 wire switch if this specification cannot be satisfied.

Moreover, leakage current flow to the load will be "n" times larger when "n" auto switches are connected in parallel.

7. Do not use a load that generates surge voltage.

<Reed switches>

If driving a load such as a relay that generates a surge voltage, use a switch with a built-in contact protection circuit or a contact protection box.

<Solid state switches>

Although a zener diode for surge protection is connected at the output side of a solid state auto switch, damage may still occur if the surge is applied repeatedly. When a load, such as a relay or solenoid, which generates surge is directly driven, use a type of switch with a built-in surge absorbing element.

8. Cautions for use in an interlock circuit

When an auto switch is used for an interlock signal requiring high reliability, devise a double interlock system to avoid trouble by providing a mechanical protection function, or by also using another switch (sensor) together with the auto switch.

Also, perform periodic maintenance and confirm proper operation.

9. Ensure sufficient clearance for maintenance activities.

When designing an application, be sure to allow sufficient clearance for maintenance and inspections.

Series MGG
Auto Switch Precautions 2

Be sure to read before handling.

Mounting and Adjustment

⚠Warning

1. Do not drop or bump.

Do not drop, bump or apply excessive impacts (300m/s² or more for reed switches and 1000m/s² or more for solid state switches) while handling. Although the body of the switch may not be damaged, the inside of the switch could be damaged and cause a malfunction.

2. Do not carry a cylinder by the auto switch lead wires.

Never carry a cylinder by its lead wires. This may not only cause broken lead wires, but it may cause internal elements of the switch to be damaged by the stress.

3. Mount switches using the proper tightening torque.

When a switch is tightened beyond the range of tightening torque, the mounting screws, mounting bracket or switch may be damaged.

On the other hand, tightening below the range of tightening torque may allow the switch to slip out of position. (Refer to page 32 regarding switch mounting, movement and tightening torque, etc.)

4. Mount a switch at the center of the operating range.

Adjust the mounting position of an auto switch so that the piston stops at the center of the operating range (the range in which a switch is ON). (The mounting positions shown on pages 33 to 35 indicate the optimum position at the stroke end.) If mounted at the end of the operating range (around the borderline of ON and OFF), operation will be unstable.

Wiring

⚠Warning

1. Avoid repeatedly bending or stretching lead wires.

Broken lead wires will result from repeatedly applying bending stress or stretching force to the lead wires.

2. Be sure to connect the load before power is applied.

<2-wire type>

If the power is turned ON when an auto switch is not connected to a load, the switch will be instantly damaged because of excess current.

3. Confirm proper insulation of wiring.

Be certain that there is no faulty wiring insulation (contact with other circuits, ground fault, improper insulation between terminals, etc.). Damage may occur due to excess current flow into a switch.

4. Do not wire with power lines or high voltage lines.

Wire separately from power lines or high voltage lines, avoiding parallel wiring or wiring in the same conduit with these lines. Control circuits including auto switches may malfunction due to noise from these other lines.

Wiring

⚠Warning

5. Do not allow short circuit of loads.

<Reed switches>

If the power is turned ON with a load in a short circuited condition, the switch will be instantly damaged because of excess current flow into the switch.

<Solid state switches>

D-G5NB and all models of PNP output type switches do not have built-in short circuit protection circuits. If loads are short circuited, the switches will be instantly damaged.

Take special care to avoid reverse wiring with the brown [red] power supply line and the black [white] output line on 3 wire type switches.

6. Avoid incorrect wiring.

<Reed switches>

A 24VDC switch with indicator light has polarity. The brown [red] lead wire is (+), and the blue [black] lead wire is (–).

1) If connections are reversed, the switch will operate, however, the light emitting diode will not light up.

   Also note that a current greater than specified will damage a light emitting diode and it will no longer operate.

   Applicable models: D-B73, B73C, C73, C73C, B53, B54

2) Note however, in the case of 2-color indicator type auto switches (D-B59W), if the wiring is reversed, the switch will be in a normally ON condition.

<Solid state switches>

1) If connections are reversed on a 2-wire type switch, the switch will not be damaged if protected by a protection circuit, but the switch will be in a normally ON condition. However, it is still necessary to avoid reversed connections, since the switch could be damaged by a load short circuit in this condition.

2) If connections are reversed (power supply line + and power supply line –) on a 3-wire type switch, the switch will be protected by a protection circuit. However, if the power supply line (+) is connected to the blue [black] wire and the power supply line (–) is connected to the black [white] wire, the switch will be damaged.

∗ Lead wire color changes

Lead wire colors of SMC switches and related products have been changed in order to meet NECA Standard 0402 for production beginning September 1996 and thereafter. Please refer to the tables provided.
Special care should be taken regarding wire polarity during the time that the old colors still coexist with the new colors.

2-wire

	Old	New
Output (+)	Red	Brown
Output (–)	Black	Blue

3-wire

	Old	New
Power supply+	Red	Brown
GND	Black	Blue
Output	White	Black

Solid state with diagnostic output

	Old	New
Power supply+	Red	Brown
GND	Black	Blue
Output	White	Black
Diagnostic output	Yellow	Orange

Solid state with latch type diagnostic output

	Old	New
Power supply+	Red	Brown
GND	Black	Blue
Output	White	Black
Latch type diagnostic output	Yellow	Orange

Series MGG
Auto Switch Precautions 3

Be sure to read before handling.

Operating Environment

⚠Warning

1. Never use in an atmosphere of explosive gases.

The construction of auto switches is not intended to prevent explosion. Never use in an atmosphere with an explosive gas since this may cause a serious explosion.

2. Do not use in an area where a magnetic field is generated.

Auto switches will malfunction or magnets inside cylinders will become demagnetized. (Consult SMC regarding the availability of a magnetic field resistant auto switch.)

3. Do not use in an environment where the auto switch will be continually exposed to water.

Although switches, except for some models, satisfy IEC standard IP67 construction (JIS C 0920: watertight construction), they should not be used in applications where they are continually exposed to water splash or spray. Poor insulation or swelling of the potting resin inside switches may cause malfunction.

4. Do not use in an environment with oil or chemicals.

Consult SMC if auto switches will be used in an environment with coolant, cleaning solvent, various oils or chemicals. If auto switches are used under these conditions for even a short time, they may be adversely affected by improper insulation, malfunction due to swelling of the potting resin, or hardening of the lead wires.

5. Do not use in an environment with temperature cycles.

Consult SMC if switches are used where there are temperature cycles other than normal air temperature changes, as they may be adversely affected internally.

6. Do not use in an environment where there is excessive impact shock.

<Reed switches>

When excessive impact (300m/s² or more) is applied to a reed switch during operation, the contact point may malfunction and generate or cut off a signal momentarily (1ms or less). Consult SMC regarding the need to use a solid state switch depending on the environment.

7. Do not use in an area where surges are generated.

<Solid state switches>

When there are units (solenoid type lifter, high frequency induction furnace, motor, etc.) that generate a large amount of surge in the area around cylinders with solid state auto switches, this may cause deterioration or damage to the switch. Avoid sources of surge generation and crossed lines.

8. Avoid accumulation of iron waste or close contact with magnetic substances.

When a large amount of ferrous waste such as machining chips or welding spatter is accumulated, or a magnetic substance (something attracted by a magnet) is brought into close proximity with an auto switch cylinder, it may cause the auto switch to malfunction due to a loss of the magnetic force inside the cylinder.

Maintenance

⚠Warning

1. Perform the following maintenance periodically in order to prevent possible danger due to unexpected auto switch malfunction.

1) Securely tighten switch mounting screws.

If screws become loose or the mounting position is dislocated, retighten them after readjusting the mounting position.

2) Confirm that there is no damage to lead wires.

To prevent faulty insulation, replace switches or repair lead wires, etc., if damage is discovered.

3) Confirm that the green light on the 2 color indicator type switch lights up.

Confirm that the green LED is on when stopped at the established position. If the red LED is on, the mounting position is not appropriate. Readjust the mounting position until the green LED lights up.

Other

⚠Warning

1. Consult SMC concerning water resistance, flexibility of lead wires and usage at welding sites, etc.

Series MGG
Specific Product Precautions 1

Be sure to read before handling.
Refer to pages 49 through 55 for safety instructions, actuator precautions and auto switch precautions.

Mounting and Adjustment

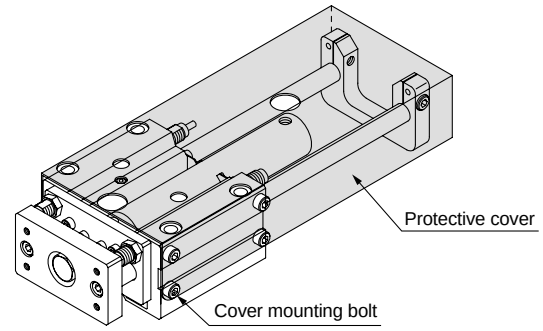
⚠Warning

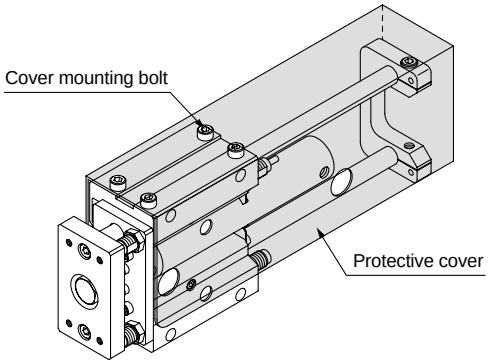
1. Install a protective cover.

Since the rear plate moves back and forth during mounting, handling and operation, be careful that hands, etc., do not get caught between the cylinder and the rear plate.

In cases where this product is installed on the outside of equipment, implement safety measures such as providing a protective cover.

Protective cover installation example





⚠Caution

1. Do not scratch or gouge the sliding sections of the guide rods by grasping or striking them with other objects.

Since the exterior of a guide rod is manufactured to precise tolerances, even a slight deformation or scratch, etc., can cause malfunction or decreased durability.

2. When mounting the guide body, use a mounting surface having a high degree of flatness.

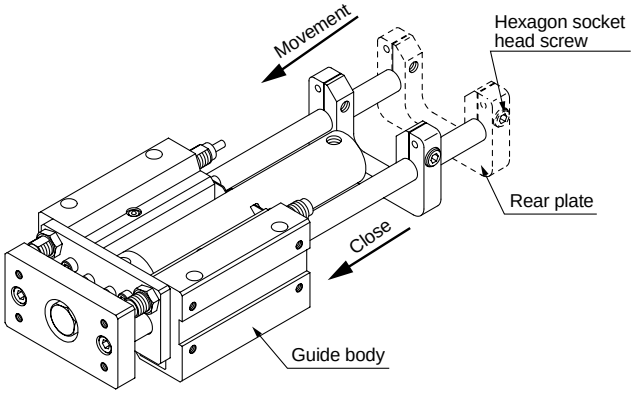
If twisting or bending occurs in the guide rods, this can cause problems such as a large increase in operating resistance and reduced performance due to premature wear of the bearings.

3. Mount in a location where maintenance will be easy.

Insure enough clearance around the cylinder to allow for unobstructed maintenance and inspection work.

4. Extension stroke adjustment

To adjust the extension stroke by moving the rear plate, loosen the hexagon socket head screws on the left and right sides of the plate, move the rear plate to the desired stroke position in proximity to the guide body, and retighten the hexagon socket head screws on the left and right.



5. Lubrication of bearings

Lubricate from the grease nipple so that there is no contamination from foreign matter.

In addition, use good quality No. 2 lithium soap base grease.

Shock Absorber Handling

⚠Caution

Be sure to confirm by referring to the shock absorber (series RB) for details.

Series MGG
Specific Product Precautions 2

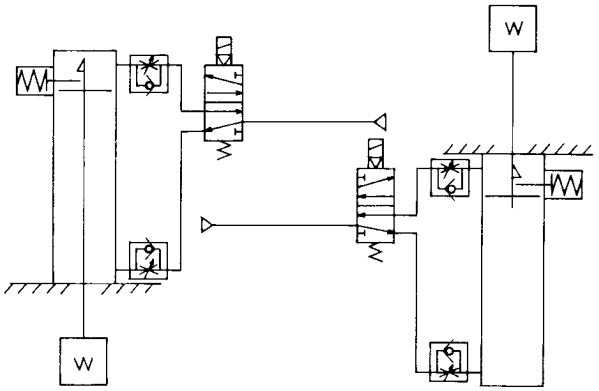
Be sure to read before handling.
Refer to pages 49 through 55 for safety instructions, actuator precautions and auto switch precautions.

End Lock Type

Use the recommended pneumatic circuits.

⚠Caution

• This is necessary for proper operation and release of the lock.



With head side locking **With rod side locking**

Operation

⚠Caution

1. Do not use 3 position solenoid valves.

Avoid use in combination with 3 position solenoid valves (especially closed center metal seal types). If pressure is trapped in the port on the lock mechanism side, the cylinder cannot be locked.

Furthermore, even after being locked, the lock may be released after some time, due to air leaking from the solenoid valve and entering the cylinder.

2. Back pressure is required when releasing the lock.

Before starting operation, be sure to control the system so that air is supplied to the side without the lock mechanism as shown in the figure above. There is a possibility that the lock may not be released. (Refer to the section on releasing the lock.)

3. Release the lock when mounting or adjusting the cylinder.

If mounting or other work is performed when the cylinder is locked, the lock unit may be damaged.

4. Operate with a load ratio of 50% or less.

If the load ratio exceeds 50%, this may cause problems such as failure of the lock to release, or damage to the lock unit.

5. Do not operate multiple synchronized cylinders.

Avoid applications in which two or more end lock cylinders are synchronized to move one workpiece, as one of the cylinder locks may not be able to release when required.

6. Use a speed controller with meter-out control.

It may not be possible to release the lock with meter-in control.

Operation

⚠Caution

7. Be sure to operate completely to the cylinder stroke end on the side with the lock.

If the cylinder piston does not reach the end of the stroke, locking and unlocking may not be possible. Therefore, do not adjust the stroke with the adjustment bolts or shock absorbers.

8. Do not use an air cylinder as an air-hydro cylinder.

This will cause leakage of hydraulic fluid.

9. Adjust an auto switch's position so that it operates for movement to both the stroke end and backlash (2mm) positions.

A 2 color indication switch adjusted for green indication at the stroke end may change to red indication after the backlash return, but this is not abnormal.

⚠Warning

1. Operate within the prescribed cylinder speed.

Otherwise, cylinder and seal damage may occur.

Operating Pressure

⚠Caution

1. Use air pressure of at least 0.15MPa for the port on the lock mechanism side. This is necessary to release the lock.

Exhaust Speed

⚠Caution

1. Locking will occur automatically if the pressure applied to the port on the lock mechanism side drops to 0.05MPa or less. In cases where the piping on the lock mechanism side is long and thin, or the speed controller is separated at some distance from the cylinder port, the exhaust speed will be reduced and some time may be required for the lock to engage. In addition, clogging of a silencer mounted on the solenoid valve exhaust port can produce the same result.

Releasing the Lock

⚠Warning

1. Before releasing the lock, be sure to supply air to the side without the lock mechanism, so that there is no load applied to the lock mechanism when it is released. (Refer to the recommended pneumatic circuits.) If the lock is released when the port on the other side is in an exhaust state, and with a load applied to the lock unit, the lock unit may be subjected to an excessive force and be damaged. Furthermore, the piston rod may move suddenly, which is very dangerous.

Series MGG
Specific Product Precautions 3

Be sure to read before handling.
Refer to pages 49 through 55 for safety instructions, actuator precautions and auto switch precautions.

End Lock Type

Manual Release

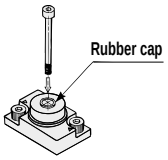
⚠Caution

1. Non-locking type

Insert the accessory bolt from the top of the rubber cap (it is not necessary to remove the rubber cap), and after screwing it into the lock piston, pull it to release the lock. If you stop pulling the bolt, the lock will return to an operational state.

Thread sizes, pulling forces and strokes are as shown below.

Bore size (mm)	Thread size	Pulling force N	Stroke (mm)
20, 25, 32	M2.5 x 0.45 x 25ℓ or more	4.9	2
40, 50, 63	M3 x 0.5 x 30ℓ or more	10	3
80, 100	M5 x 0.8 x 40ℓ or more	24.5	3



∗ Remove the bolt for normal operation.
It can cause lock malfunction or faulty release.

2. Locking type

While pushing the M/O knob, turn it 90° counterclockwise. The lock is released (and remains in a released state) by aligning the ▲ mark on the cap with the ▼ OFF mark on the M/O knob.

To operate the lock, turn the M/O knob 90° clockwise while pushing it all the way down, and align the ▲ mark on the cap with the ▼ ON mark on the M/O knob. When doing this, be sure that it locks into place with a click. Failure to click it into place properly can cause the lock to disengage.

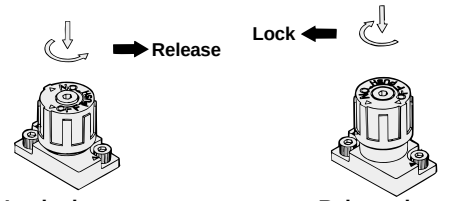


Plate Cylinder/Double Acting Single Rod

Series MU

ø25, ø32, ø40, ø50, ø63

How to Order

Standard

MU B 25 — 30 D M

With auto switch

MDU B 25 — 30 D M — A73 S

Built-in magnet

Mounting

B	Basic
L	Axial foot
F	Front flange
G	Rear flange
C	Single clevis
D	Double clevis

Number of auto switches

—	2
S	1
n	n

Auto switch

—	Without auto switch(built-in magnet)

Size

25	Equiv. ø25 piston area
32	Equiv. ø32 piston area
40	Equiv. ø40 piston area
50	Equiv. ø50 piston area
63	Equiv. ø63 piston area

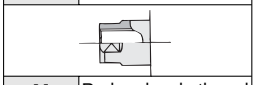
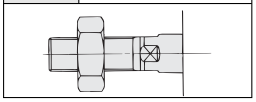
Stroke (mm)

Refer to standard stroke on p.2.5-3.
Refer to p.2.5-3 when using auto switch.

Action

D	Double acting

Rod end shape

—	Rod end female thread
	
M	Rod end male thread
	

Applicable Auto Switches/Refer to p.5.3-2 for further information on auto switch.

Style	Special function	Electrical entry	Indicator	Wiring (output)	Load voltage DC	Load voltage AC	Auto switch model Perp.	Auto switch model In-line	Lead wire (m)* 0.5 (—)	3 (L)	5 (Z)	None (N)	Applicable load	
Reed switch	—	Grommet	Yes	3 wire (Equiv. NPN)	5V	—	—	**A76H**	●	●	—	—	IC	—
				2 wire	—	200V	**A72**	**A72H**	●	●	—	—	—	Relay, PLC
					12V	100V	**A73**	**A73H**	●	●	●	—		
			No		5V 12V	100V or less	**A80**	**A80H**	●	●	—	—	IC	
		Connector	Yes		12V	—	**A73C**	—	●	●	●	●	—	
			No		5V 12V	24V or less	**A80C**	—	●	●	●	●	IC	
	Diagnostic indicator (2 colour)	Grommet	Yes		—	—	**A79W**	—	●	●	—	—	—	
Solid state switch	—	Grommet	Yes	3 wire (NPN)	5V 12V	—	**F7NV**	**F79**	●	●	○	—	IC	Relay, PLC
				3 wire (PNP)			**F7PV**	**F7P**	●	●	○	—		
				2 wire	12V		**F7BV**	**J79**	●	●	○	—	—	
		Connector					**J79C**	—	●	●	●	●		
	Diagnostic indicator (2 colour)	Grommet		3 wire (NPN)	5V 12V	—	**F7NWV**	**F79W**	●	●	○	—	IC	
				3 wire (PNP)			—	**F7PW**	●	●	○	—		
				2 wire	12V		**F7BWV**	**J79W**	●	●	○	—	—	
	Water resistant (2 colour)						—	**F7BA**	—	●	○	—		
	With timer			3 wire (NPN)	5V 12V		—	**F7NT**	—	●	○	—	IC	
	With diagnostic output (2 colour)			4wire (NPN)			—	**F79F**	●	●	○	—		
	Latch with diagnostic output (2 colour)				—		—	**F7LF**	●	●	○	—	—	

∗Lead wire length 0.5m·····— (Example) A80C 5m·····Z (Example) A80CZ
3m·····L A80CL — ·····N A80CN

∗∗Solid state switches marked with a "○" are manufactured upon receipt of order.

Mounting Bracket/Part No.

Size / Mounting bracket	25	32	40	50	63
Foot (1)	MU-L02	MU-L03	MU-L04	MU-L05	MU-L06
Flange	MU-F02	MU-F03	MU-F04	MU-F05	MU-F06
Single clevis	MU-C02	MU-C03	MU-C04	MU-C05	MU-C06
Double clevis (3)	MU-D02	MU-D03	MU-D04	MU-D05	MU-D06

Note 1) When ordering foot brackets, 2pcs. should be ordered for each cylinder.
Note 2) Parts attached with each mounting brackets are as follows.
Foot, Flange, Single clevis/Body mounting bolt
Double clevis/A clevis pin, C shape snap rings for axis, body mounting bolts
Note 3) A clevis pin and snap rings are packed with the double clevis style.

Auto Switch Mounting Bracket/Part No.

Size	Model	Note
25, 32, 40, 50, 63	BMU1-025	• Auto switch mounting screw (M3 X 0.5 X 6.5ℓ) • Switch mounting nut

∗ Mounting screw set made of stainless steel
Following stainless steel mounting screw set (included nut) is provided. Use them with accordance to environment. (Auto switch interface is available. Order it separately.)
BBA2: For D-A7/A8/F7/J7
When D-F7BAL mounted on cylinder is required, the stainless steel screw mentioned above is used at shipping. When auto switch unit is shipped, BBA2 is attached.

⚠ Precautions

Be sure to read before handling. Refer to p.0-39 to 0-46 for Safety Instructions and common precautions.

Specifications

Action	Double acting single rod
Fluid	Air
Proof pressure	1.05MPa
Max. operating pressure	0.7MPa
Min. operating pressure	0.05MPa
Ambient and fluid temperature	–10 to 60°C
Lubrication	Not required (Non-lube)
Piston speed	50 to 500mm/S
Stroke length tolerance	$^{+1.4}_{0}$
Cushion	Rubber bumper
Thread tolerance	JIS Class 2
Equivalent tube bore (mm)	ø25, ø32, ø40, ø50, ø63
Mounting	Axial foot, Front flange, Rear flange, Single clevis, Double clevis
Rod end shape	Rod end male thread, Rod end female thread

Rod Non-rotating Accuracy

Model	MU25	MU32	MU40	MU50	MU63
Non-rotating accuracy	±1°	±0.8°	±0.5°	±0.5°	±0.5°

Standard Stroke

(mm)

Size	Standard stroke	Allowable max. stroke
25, 32, 40 50, 63	5, 10, 15, 20, 25, 30, 35, 40, 45, 50 75, 100, 125, 150, 175, 200, 250, 300	300

∗ Contact SMC for any intermediate strokes that are not indicated above, as they will be produced upon receipt of order.
∗∗ Strokes longer than 300mm are not available.

Minimum Stroke for Auto Switch Mounting

(mm)

Number of auto switches	D-F7□V D-J79C	D-A7□ D-A80 D-A73C D-A80C	D-F7□WV	D-A7□H, A80H D-F7□W, J79W D-A79W D-F7□, J79 D-F7BA, F7NT D-F7□F
2	5	10	15	15
1	5	5	10	15

OUT ←
IN →

Theoretical Force

Unit: N

Size	Rod dia. (mm)	Operating direction	Piston area (mm^2)	Operating pressure (MPa) 0.2	0.3	0.4	0.5	0.6	0.7
25	**12**	OUT	491	98	147	196	246	295	344
		IN	378	76	113	151	189	227	265
32	**14**	OUT	804	161	241	322	402	482	563
		IN	650	130	195	260	325	390	455
40	**16**	OUT	1257	251	377	503	629	754	880
		IN	1056	211	317	422	528	634	739
50	**20**	OUT	1963	393	589	785	982	1178	1374
		IN	1649	330	495	660	824	989	1154
63	**20**	OUT	3117	623	935	1247	1559	1870	2182
		IN	2803	561	841	1121	1402	1682	1962

Note) Theoretical force (N) = Pressure (MPa) X Piston area (mm^2)

Weight

Unit: kg

Size		25	32	40	50	63
Basic weight	Basic	0.18	0.28	0.42	0.80	1.20
	Axial foot	0.25	0.42	0.63	1.14	1.83
	Flange/ Front/Rear side	0.28	0.42	0.65	1.26	2.03
	Single clevis	0.24	0.40	0.64	1.20	1.88
	Double clevis (with pin)	0.25	0.44	0.68	1.27	1.96
Additional weight per 50mm stroke		0.12	0.16	0.22	0.34	0.47
Accessories	Single clevis (Pivot bracket for double clevis)	0.06	0.12	0.22	0.40	0.68
	Double clevis (with pin) (Pivot bracket for single clevis)	0.07	0.16	0.26	0.47	0.76
	Single knuckle joint	0.03	0.04	0.07	0.16	0.16
	Double knuckle joint (with pin)	0.05	0.09	0.14	0.29	0.29

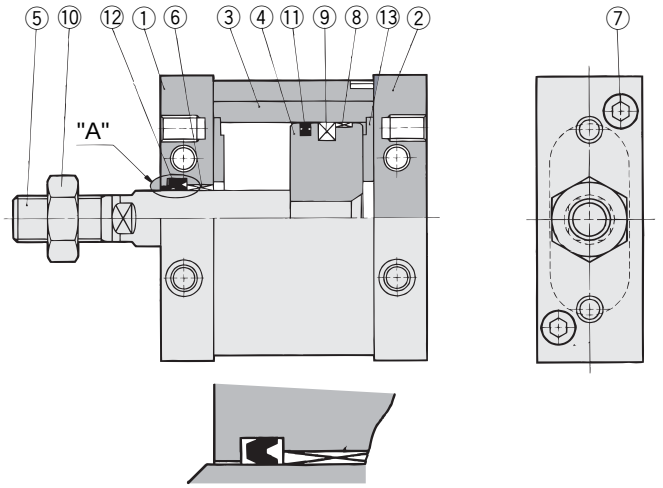
Note) The weight of the single and double clevis bracket includes the weight of the 2 bolts for mounting the bracket.

Calculation:
Example: MUL32-100
- Basic weight: 0.42 (Foot style Ø32 equiv.)
- Added weight: 0.16/50 stroke
- Stroke: 100mm stroke

0.42 + 100 / 50 X 0.16 = 0.74 kg

CUJ
CU
CQS
CQ2
RQ
MU

Construction



"A" section **MU□25**

Component Parts

No.	Description	Material	Note
①	Rod cover	Aluminum alloy	Anodized
②	Head cover	Aluminum alloy	Anodized
③	Cylinder tube	Aluminum alloy	Hard anodized
④	Piston	Aluminum alloy	Chromated
⑤	Piston rod	Carbon steel	Hard chromated
⑥	Bushing	Oil impregnated sintered alloy	
⑦	Hex. socket head cap screw	Stainless steel	
⑧	Wearing	Resin	
⑨	Magnet	Magnet material	Only built-in magnet style
⑩	Rod end nut	Rolled steel	Only male thread rod end
⑪	Piston seal	NBR	
⑫	Rod seal	NBR	
⑬	Bumper	Urethane	

Replacement Parts: Seal Kits

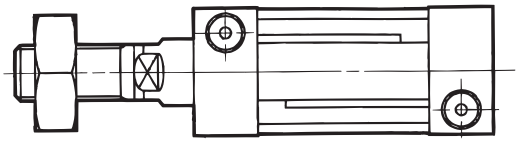
Bore size (mm)	Kit No.	Contents
25	MUB25-PS	A set of above numbers ⑪, ⑫ and ⑬.
32	MUB32-PS	
40	MUB40-PS	
50	MUB50-PS	
63	MUB63-PS	

∗ Seal kits consist of items ⑪, ⑫ and ⑬, contained in one kit, and can be ordered using the order number for each cylinder bore size.

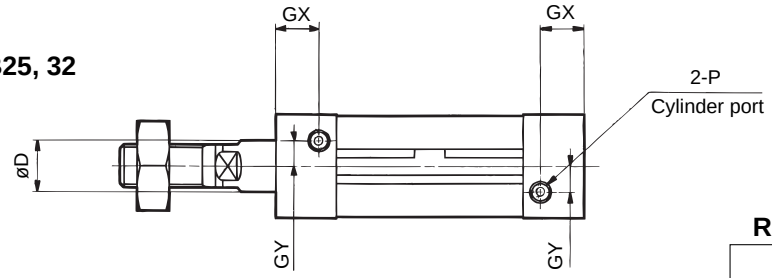
Basic: MUB

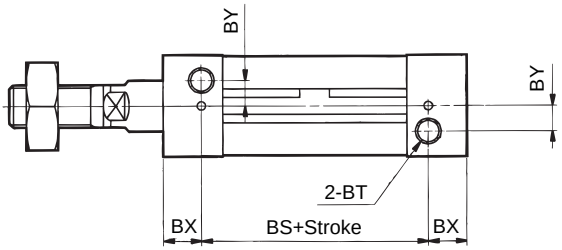
Rod end male thread

MUB40, 50, 63

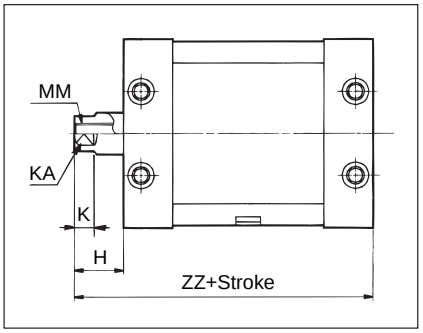


MUB25, 32

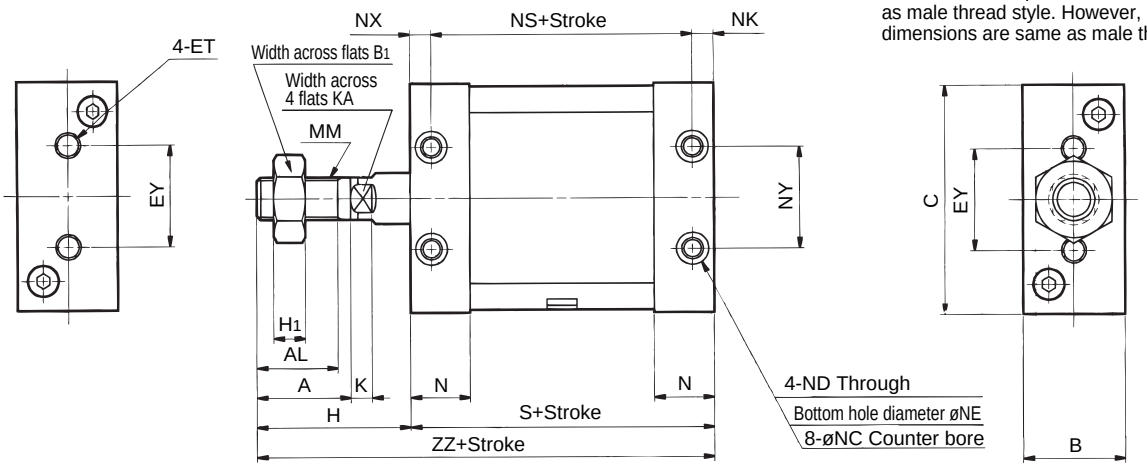




Rod end female thread



∗ Dimensions except mentioned above are same as male thread style. However, K and KA dimensions are same as male thread style.



(mm)

Model	Stroke range (mm)	A	AL	B	B_1	BS	BT	BX	BY	C	D	ET	EY	GX	GY	H	H_1	K
MUB25	5 to 300	22	19.5	24	17	37	M5 X 0.8Depth7.5	9	7	54	12	M5 X 0.8Depth11	26	10	5	36	6	5.5
MUB32	5 to 300	26	23.5	28	19	45	M6 X 1Depth12	6.5	8	68	14	M6 X 1Depth11	42	8.5	5.5	40	7	5.5
MUB40	5 to 300	30	27	32	22	44	M8 X 1.25Depth13	8	9	86	16	M8 X 1.25Depth11	54	9	7	45	8	6
MUB50	5 to 300	35	32	39	27	54	M10 X 1.5Depth14.5	10	9	104	20	M10 X 1.5Depth15	64	11.5	8	53	11	7
MUB63	5 to 300	35	32	50	27	53	M12 X 1.75Depth18	11	12	124	20	M12 X 1.75Depth15	72	11.5	10	56	11	7

(mm)

Model	KA	MM	N	NC	ND	NE	NS	NX	NY	P	S	ZZ
MUB25	10	M10 X 1.25	14	7.5Depth4.5	M5 X 0.8	4.3	43	6	26	M5 X 0.8	55	91
MUB32	12	M12 X 1.25	15.5	9Depth5.5	M6 X 1	5.1	45	6.5	28	$Rc(PT)^1/_8$	58	98
MUB40	14	M14 X 1.5	16	10.5Depth6.5	M8 X 1.25	6.9	44	8	36	$Rc(PT)^1/_8$	60	105
MUB50	18	M18 X 1.5	21.5	13.5Depth8.5	M10 X 1.5	8.7	54	10	42	$Rc(PT)^1/_4$	74	127
MUB63	18	M18 X 1.5	21.5	17Depth10.5	M12 X 1.75	10.5	53	11	46	$Rc(PT)^1/_4$	75	131

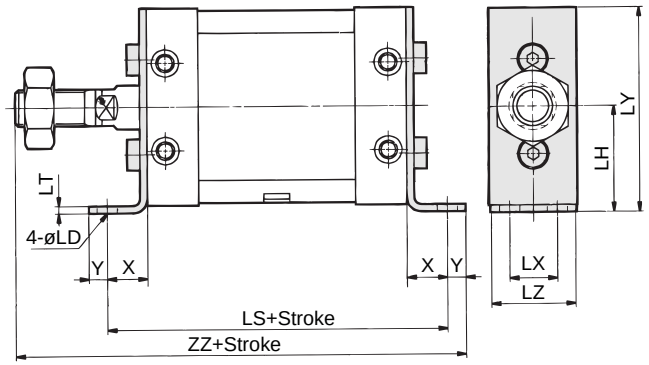
∗ The position of the four flats of the piston rod is ±3° in relation to the cylinder side surface.

Rod end female thread (mm)

Model	H	MM	ZZ
MUB25	14	M6 X 1Depth12	69
MUB32	14	M8 X 1.25Depth13	72
MUB40	15	M8 X 1.25Depth13	75
MUB50	18	M10 X 1.5Depth15	92
MUB63	21	M10 X 1.5Depth15	96

Dimensions

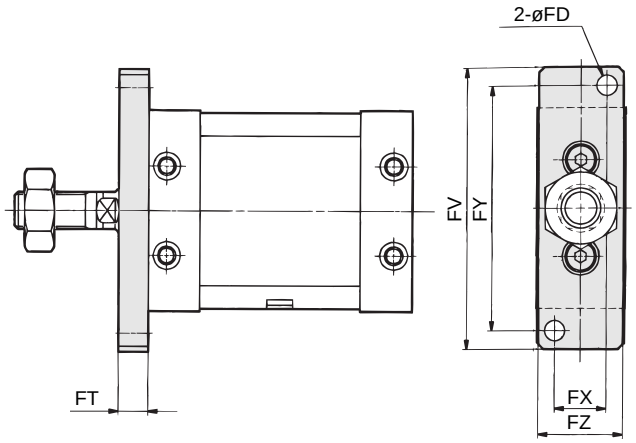
Axial foot



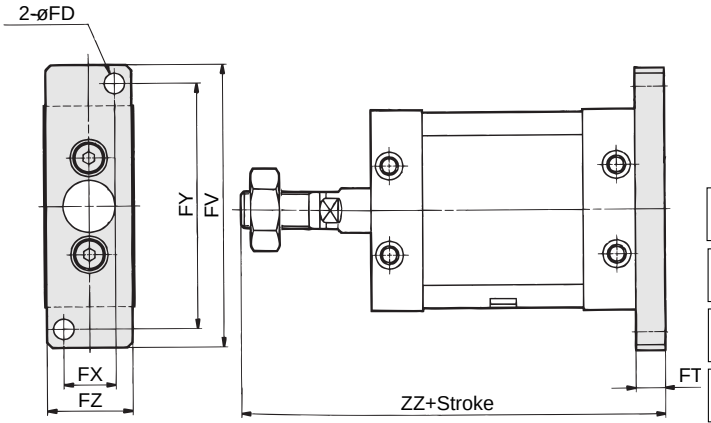
(mm)

Model	LD	LH	LS	LT	LX	LY	LZ	X	Y	ZZ
MUL25	5.5	29	79	3.2	11	56	23	12	6	109
MUL32	6.6	37	90	4.5	12	71	27	16	8	122
MUL40	9	46	96	4.5	15	89	31	18	10	133
MUL50	11	57	116	5	18	109	37	21	11	159
MUL63	13.5	67	123	6	22	129	48	24	14	169

Front flange



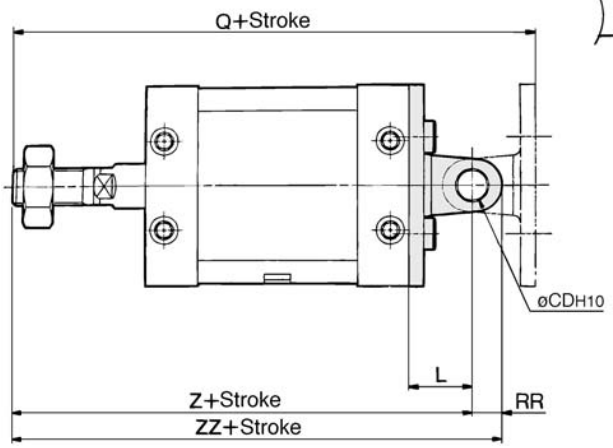
Rear flange



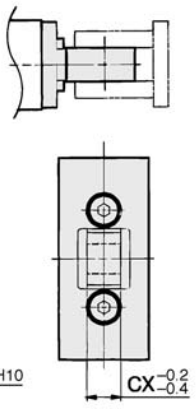
(mm)

Model	FD	FT	FV	FX	FY	FZ	ZZ
MUF25, MUG25	5.5	8	76	14	66	24	99
MUF32, MUG32	7	8	94	16	82	28	106
MUF40, MUG40	9	9	118	18	102	32	114
MUF50, MUG50	11	12	144	22	126	39	139
MUF63, MUG63	13	14	168	30	148	50	145

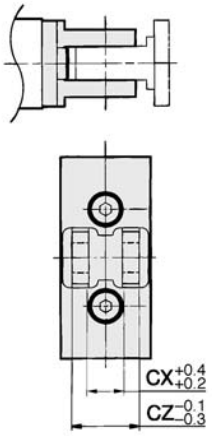
Single clevis
Double clevis

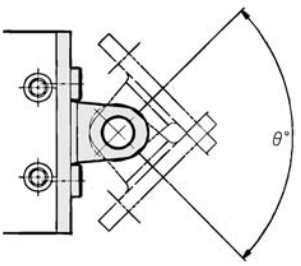


Single clevis



Double clevis





(mm)

Model	CDH10	CX	CZ	L	Q	RR	Z	ZZ	Rotation(θ°)
MUC25, MUD25	$8^{+0.058}_{0}$	9	18	17	125	8	108	116	100
MUC32, MUD32	$10^{+0.058}_{0}$	11	22	22	142	10	120	130	90
MUC40, MUD40	$10^{+0.058}_{0}$	13	26	27	159	10	132	142	80
MUC50, MUD50	$14^{+0.070}_{0}$	16	32	32	191	14	159	173	80
MUC63, MUD63	$14^{+0.070}_{0}$	16	32	38	207	16	169	185	80

A clevis pin and snap ring are packed with the double clevis style.

Plate Cylinder/Double Acting Double Rod

Series MUW

ø20, ø32, ø40, ø50, ø63

How to Order

Standard

MUW B 25 — 30 D M

With auto switch

MDUW B 25 — 30 D M — A73 S

Built-in magnet

Double rod

Mounting

B	Basic
L	Foot
F	Flange

Size

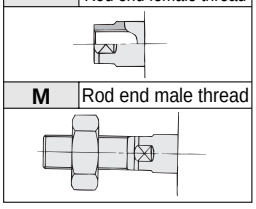
25	Equiv. ø25 piston area
32	Equiv. ø32 piston area
40	Equiv. ø40 piston area
50	Equiv. ø50 piston area
63	Equiv. ø63 piston area

Stroke(mm)

Refer to standard stroke on p.2.5-7.
Refer to p.2.5-7 when using auto switch.

Rod end shape

—	Rod end female thread
M	Rod end male thread



Number of auto switches

—	2
S	1
n	n

Auto Switch

—	Without auto switch (Built-magnet)

Applicable Auto Switches/Refer to p.5.3-2 for further information on auto switch.

Style	Special function	Electrical entry	Indicator	Wiring (output)	Load voltage DC	Load voltage AC	Auto switch model Perp.	Auto switch model In-line	Lead wire (m)* 0.5 (–)	3 (L)	5 (Z)	None (N)	Applicable load	
Reed switch	—	Grommet	Yes	3 wire (Equiv. NPN)	5V	—	—	**A76H**	●	●	—	—	IC	—
				2 wire	—	200V	**A72**	**A72H**	●	●	—	—	—	Relay, PLC
					12V	100V	**A73**	**A73H**	●	●	●	—		
			No		5V 12V	100V or less	**A80**	**A80H**	●	●	—	—	IC	
		Connector	Yes		24V 12V	—	**A73C**	—	●	●	●	●	—	
			No		5V 12V	24V or less	**A80C**	—	●	●	●	●	IC	
	Diagnostic indicator (2 colour)	Grommet	Yes		—	—	**A79W**	—	●	●	—	—	—	
Solid state switch	—	Grommet	Yes	3 wire (NPN)	24V	5V 12V	—	**F7NV**	**F79**	●	●	○	—	IC	Relay, PLC
				3 wire (PNP)				**F7PV**	**F7P**	●	●	○	—	
				2 wire		12V		**F7BV**	**J79**	●	●	○	—	—
		Connector						**J79C**	—	●	●	●	●	
	Diagnostic indicator (2 colour)	Grommet		3 wire (NPN)		5V 12V		**F7NWV**	**F79W**	●	●	○	—	IC
				3 wire (PNP)				—	**F7PW**	●	●	○	—	
				2 wire		12V		**F7BWV**	**J79W**	●	●	○	—	—
	Diagnostic indicator (2 colour)							—	**F7BA**	—	●	○	—	
	With timer			3 wire (NPN)		5V 12V		—	**F7NT**	—	●	○	—	IC
	With diagnostic output (2 colour)			4 wire (NPN)				—	**F79F**	●	●	○	—	
	Latch with diagnostic output (2 colour)					—		—	**F7LF**	●	●	○	—	—

* Lead wire length — 0.5m·····— (Example) A80C 5m·····Z (Example) A80CZ
3m·····L A80CL None·····N A80CN

* Solid state switches marked with a "○" are manufactured upon receipt of order.

Auto Switch Mounting Bracket/Part No.

Size	Model	Note
25, 32, 40, 50, 63	BMU1-025	• Auto switch mounting screw (M3 X 0.5 X 6.5ℓ) • Switch mounting nut

*Mounting screw set made of stainless steel
Following stainless steel mounting screw set (included nut) is provided. Use them with accordance to environment. (Auto switch interface is available. Order it separately.)
BBA2:For D-A7/A8/F7/J7
When D-F7BAL mounted on cylinder is required,the stainless steel screw mentioned above is used when shipping. When auto switch unit is shipped, BBA2 is attached.

Mounting Bracket/Part No.

Bracket \ Size	25	32	40	50	63
Foot (1)	MU-L02	MU-L03	MU-L04	MU-L05	MU-L06
Flange	MU-F02	MU-F03	MU-F04	MU-F05	MU-F06

Note 1) When ordering foot brackets, 2pcs. should be ordered for each cylinder.
Note 2) Body mounting bolts are packed with the foot style and flange style.

⚠ Precautions

Be sure to read before handling. Refer to p.0-39 to 0-46 for Safety Instructions and common precautions.

Specifications

Action	Double acting double rod style
Fluid	Air
Proof pressure	1.05MPa
Max. operating pressure	0.7MPa
Min. operating pressure	0.05MPa
Ambient and fluid temperature	–10 to 60°C
Lubrication	Not required (Non-lube)
Piston speed	50 to 500mm/S
Stroke length tolerance	$^{+1.4}_{0}$
Cushion	Rubber bumper
Thread tolerance	JIS Class 2
Equivalent tube bore (mm)	ø25, ø32, ø40, ø50, ø63
Mounting	Foot, Flange

Rod Non-rotating Accuracy

Model	MU25	MU32	MU40	MU50	MU63
Non-rotating accuracy	±1°	±0.8°	±0.5°	±0.5°	±0.5°

Standard Stroke

(mm)

Size	Standard stroke	Max. stroke(mm)
25, 32, 40 **50, 63**	5, 10, 15, 20, 25, 30, 35, 40, 45, 50 75, 100, 125, 150, 175, 200, 250, 300	300

∗ Contact SMC for any intermediate strokes that are not indicated above, as they will be produced upon receipt of order.

∗∗ Strokes longer than 300mm are not available.

Minimum Stroke for Auto Switch Mounting

(mm)

Number of auto switches	D-F7□V D-J79C	D-A7□ D-A80 D-A73C D-A80C	D-F7□WV	D-A7□H, A80H D-F7□W, J79W D-A79W D-F7□, J79 D-F7BA, F7NT D-F7□F
2 pcs.	5	10	15	15
1 pc.	5	5	10	15

Theoretical Force

OUT ←
IN →

Unit: N

Size	Rod dia. (mm)	Operating direction	Piston area (mm^2)	Operating pressure (MPa)					
				0.2	0.3	0.4	0.5	0.6	0.7
25	**12**	IN/OUT	378	76	113	151	189	227	265
32	**14**	IN/OUT	650	130	195	260	325	390	455
40	**16**	IN/OUT	1056	211	317	422	528	634	739
50	**20**	IN/OUT	1649	330	495	660	824	989	1154
63	**20**	IN/OUT	2803	561	841	1121	1402	1682	1962

Note) Theoretical force (N) = Pressure (MPa) X Piston area (mm^2)

Weight

Unit: kg

Size		25	32	40	50	63
Standard weight	Basic	0.19	0.32	0.48	0.91	1.38
	Foot	0.26	0.46	0.69	1.25	2.01
	Flange	0.29	0.46	0.71	1.37	2.21
Additional weight per 50mm stroke		0.16	0.23	0.31	0.48	0.59
Accessories	Single knuckle joint	0.03	0.04	0.07	0.16	0.16
	Double knuckle joint (with pin)	0.05	0.09	0.14	0.29	0.29

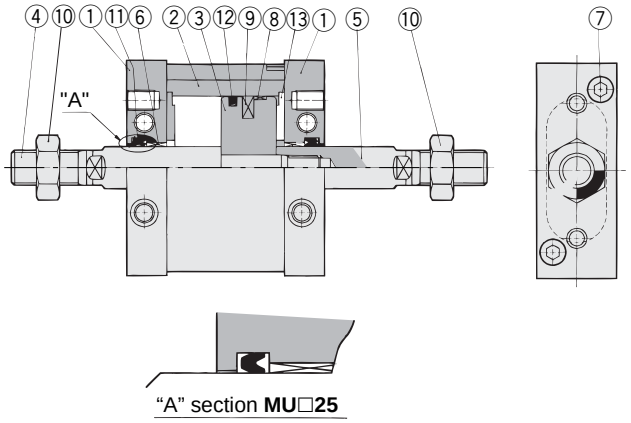
Calculation — Depends on double acting single rod

Example: MUWL32-100

- Basic weight ····· 0.46 (Foot style ø32 equiv.)
- Additional weight ····· 0.23/50 stroke
- Stroke ····· 100 stroke

0.46 + 100 / 50 X 0.23 = 0.92kg

Construction



"A" section **MU□25**

Component Parts

No.	Description	Material	Note
①	Rod cover	Aluminum alloy	Anodized
②	Cylinder tube	Aluminum alloy	Hard anodized
③	Piston	Aluminum alloy	Chromated
④	Piston rod A	Carbon steel	Hard chrome plated
⑤	Piston rod B	Carbon steel	Hard chrome plated
⑥	Bushing	Oil impregnated sintered alloy	
⑦	Hex. socket head cap screw	Stainless steel	
⑧	Wearing	Resin	
⑨	Magnet	Magnet material	Only built-in magnet style
⑩	Rod end nut	Rolled steel	Only male thread rod end
⑪	Rod seal	NBR	
⑫	Piston seal	NBR	
⑬	Bumper	NBR	

Replacement Parts: Seal Kits

Bore size (mm)	Kit No.	Contents
25	MUW25-PS	A set of above numbers ⑪, ⑫ and ⑬
32	MUW32-PS	
40	MUW40-PS	
50	MUW50-PS	
63	MUW63-PS	

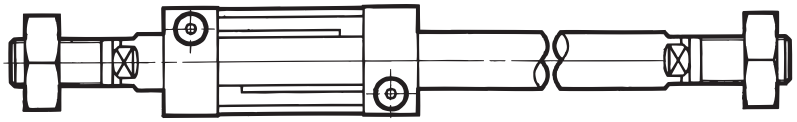
∗ Seal kits consist of items ⑪, ⑫ and ⑬ contained in one kit, and can be ordered using the kit number for each cylinder bore size.

Series MUW

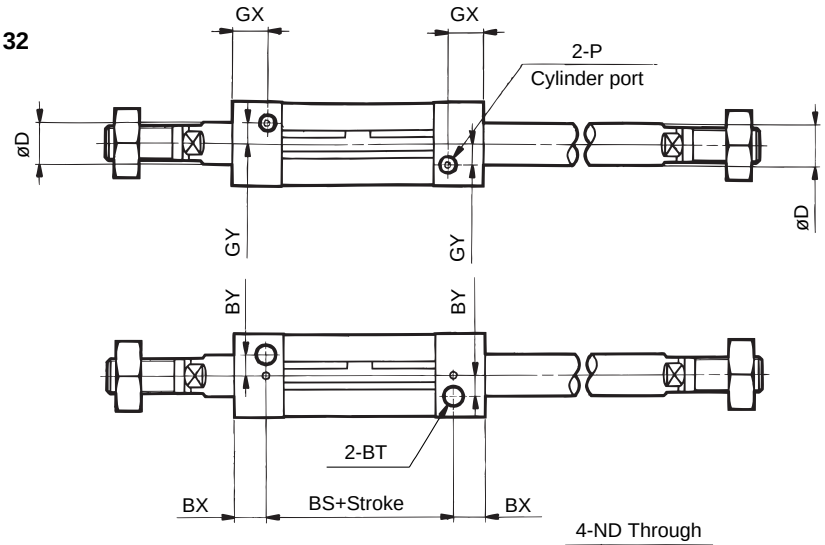
Basic: MUWB

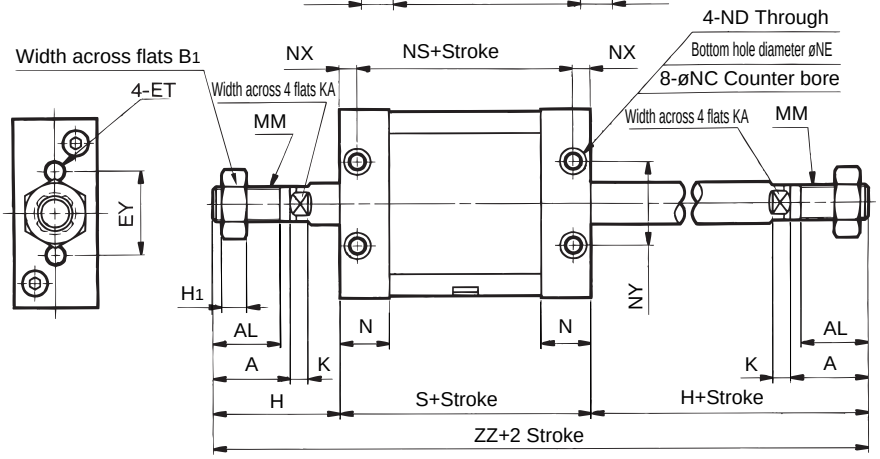
Rod end male thread

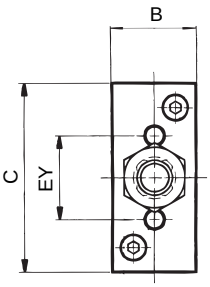
MUW40, 50, 63



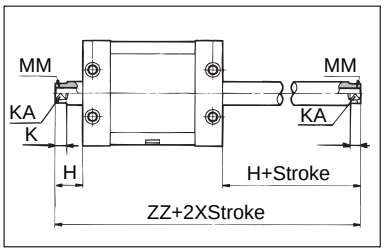
MUW25, 32







Rod end female thread



∗ Dimensions except mentioned above are same as male thread style.
However, K and KA dimensions are same as male thread style.

(mm)

Model	Stroke range (mm)	A	AL	B	B1	BS	BT	BX	BY	C	D	ET	EY	GX	GY	H	H1	K
MUWB25	5 to 300	22	19.5	24	17	37	M5 X 0.8 Depth 7.5	9	7	54	12	M5 X 0.8 Depth 11	26	10	5	36	6	5.5
MUWB32	5 to 300	26	23.5	28	19	45	M6 X 1 Depth 12	6.5	8	68	14	M6 X 1 Depth 11	42	8.5	5.5	40	7	5.5
MUWB40	5 to 300	30	27	32	22	44	M8 X 1.25 Depth 13	8	9	86	16	M8 X 1.25 Depth 11	54	9	7	45	8	6
MUWB50	5 to 300	35	32	39	27	54	M10 X 1.5 Depth 14.5	10	9	104	20	M10 X 1.5 Depth 15	64	11.5	8	53	11	7
MUWB63	5 to 300	35	32	50	27	53	M12 X 1.75 Depth 18	11	12	124	20	M12 X 1.75 Depth 15	72	11.5	10	56	11	7

(mm)

Model	KA	MM	N	NC	ND	NE	NS	NX	NY	P	S	ZZ
MUWB25	10	M10 X 1.25	14	7.5 Depth 4.5	M5 X 0.8	4.3	43	6	26	M5 X 0.8	55	127
MUWB32	12	M12 X 1.25	15.5	9 Depth 5.5	M6 X 1	5.1	45	6.5	28	Rc(PT)1/8	58	138
MUWB40	14	M14 X 1.5	16	10.5 Depth 6.5	M8 X 1.25	6.9	44	8	36	Rc(PT)1/8	60	150
MUWB50	18	M18 X 1.5	21.5	13.5 Depth 8.5	M10 X 1.5	8.7	54	10	42	Rc(PT)1/4	74	180
MUWB63	18	M18 X 1.5	21.5	17 Depth 10.5	M12 X 1.75	10.5	53	11	46	Rc(PT)1/4	75	187

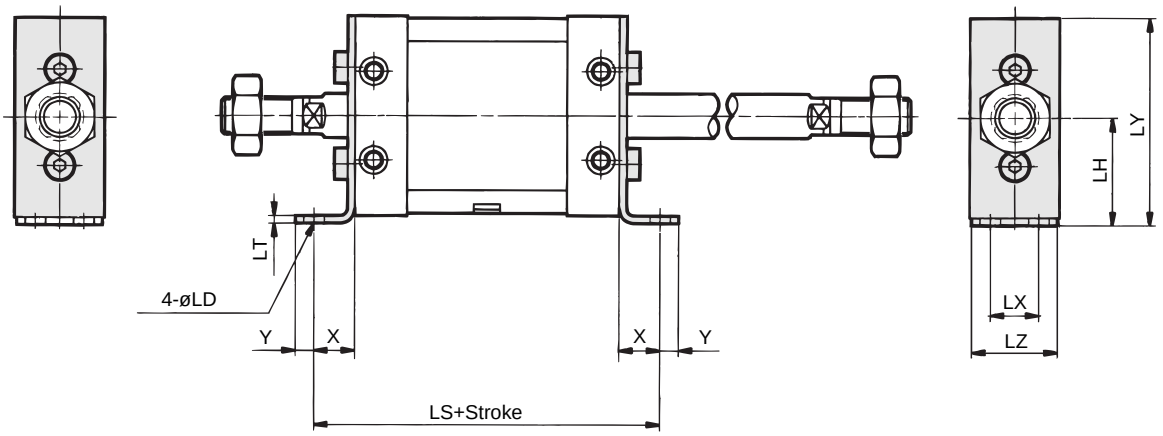
∗ The position of piston across 4 flats are different from above drawing. Position of piston across 4 flats of double rod is not same.

Rod end female thread (mm)

Model	H	MM	ZZ
MUWB25	14	M6 X 1 Depth 12	83
MUWB32	14	M8 X 1.25 Depth 13	86
MUWB40	15	M8 X 1.25 Depth 13	90
MUWB50	18	M10 X 1.5 Depth 15	110
MUWB63	21	M10 X 1.5 Depth 15	117

Dimensions

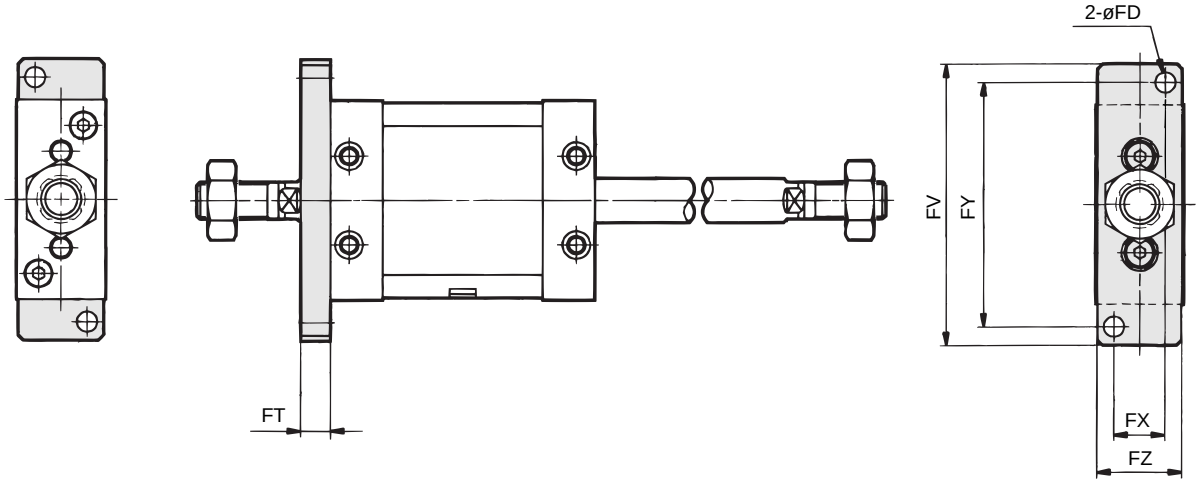
Foot



(mm)

Model	LD	LH	LS	LT	LX	LY	LZ	X	Y
MUWL25	5.5	29	79	3.2	11	56	23	12	6
MUWL32	6.6	37	90	4.5	12	71	27	16	8
MUWL40	9	46	96	4.5	15	89	31	18	10
MUWL50	11	57	116	5	18	109	37	21	11
MUWL63	13.5	67	123	6	22	129	48	24	14

Flange



(mm)

Model	FD	FT	FV	FX	FY	FZ
MUWF25	5.5	8	76	14	66	24
MUWF32	7	8	94	16	82	28
MUWF40	9	9	118	18	102	32
MUWF50	11	12	144	22	126	39
MUWF63	13	14	168	30	148	50

Plate Cylinder/Single Acting Spring Return/Extend

Series MU

ø25, ø32, ø40, ø50, ø63

How to Order

Standard

MU | B | 25 | 10 | S | M

With auto switch

MDU | B | 25 | 10 | S | M | A73 | S

Built-in magnet

Mounting

B	Basic
L	Axial foot
F	Front flange
G	Rear flange
C	Single clevis
D	Double clevis

∗ Mounting accessories are not mounted, should be order separate. Please refer order keys in next pages.

Size

25	Equiv. ø25 piston area
32	Equiv. ø32 piston area
40	Equiv. ø40 piston area
50	Equiv. ø50 piston area
63	Equiv. ø63 piston area

Standard Stroke (mm)

ø25, **ø32**	5, 10
ø40, **ø50**, **ø63**	5, 10, 15, 20

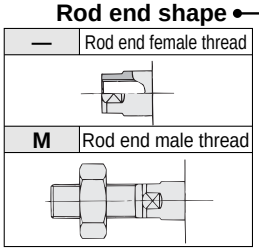
∗ Refer to p.2.5-11 when using auto switch.

Action

S	Single acting spring return
T	Single acting spring extend

Rod end shape

—	Rod end female thread
M	Rod end male thread



Number of auto switches

—	2
S	1
n	n

Auto Switch

—	Without auto switch(built-in magnet)

Applicable Auto Switches/Refer to p.5.3-2 for further information on auto switch.

Style	Special function	Electrical entry	Indicator	Wiring (output)	Load voltage DC	Load voltage AC	Auto switch model Perp.	Auto switch model In-line	Lead wire (m)∗ 0.5 (—)	3 (L)	5 (Z)	None (N)	Applicable load	
Reed switch	—	Grommet	Yes	3 wire (Equiv. NPN)	— 5V	—	—	**A76H**	●	●	—	—	IC circuit	—
				2 wire	—	200V	**A72**	**A72H**	●	●	—	—	—	Relay, PLC
					24V 12V	100V	**A73**	**A73H**	●	●	●	—		
			No		5V 12V	100V or less	**A80**	**A80H**	●	●	—	—	IC circuit	
		Connector	Yes		12V	—	**A73C**	—	●	●	●	●	—	
			No		5V 12V	24V or less	**A80C**	—	●	●	●	●	IC circuit	
	Diagnostic indicator (2 colour)	Grommet	Yes		—	—	**A79W**	—	●	●	—	—	—	
Solid state switch	—	Grommet	Yes	3 wire (NPN)	24V 5V 12V	—	**F7NV**	**F79**	●	●	○	—	IC circuit	Relay, PLC
				3 wire (PNP)			**F7PV**	**F7P**	●	●	○	—		
				2 wire	12V		**F7BV**	**J79**	●	●	○	—	—	
		Connector					**J79C**	—	●	●	●	●		
	Diagnostic indicator (2 colour)	Grommet		3 wire (NPN)	5V 12V		**F7NWV**	**F79W**	●	●	○	—	IC circuit	
				3 wire (PNP)			—	**F7PW**	●	●	○	—		
				2 wire	12V		**F7BWV**	**J79W**	●	●	○	—	—	
	Water resistant (2 colour)						—	**F7BA**	—	●	○	—		
	With timer			3 wire (NPN)	5V 12V		—	**F7NT**	—	●	○	—	IC circuit	
	With diagnostic output (2 colour)			4 wire (NPN)			—	**F79F**	●	●	○	—		
	Latch with diagnostic output (2 colour)				—		—	**F7LF**	●	●	○	—	—	

∗ Lead wire length 0.5m·····— (Example) A80C 5m·····Z (Example) A80CZ
3m·····L A80CL None ·····N A80CN

∗ Solid state switches marked with a "○" are manufactured upon receipt of order.

Auto Switch Mounting Bracket/Part No.

Size	Part No.	Note
25, 32, 40, 50, 63	BMU1-025	• Auto switch mounting screw (M3 X 0.5 X 6.5ℓ) • Switch mounting nut

∗ Mounting screw set made of stainless steel
Following stainless steel mounting screw set (included nut) is provided. Use them with accordance to environment. (Auto switch interface is available. Order it separately.)
BBA2: For D-A7/A8/F7/J7
When D-F7BAL mounted on cylinder is required, the stainless steel screw mentioned above is used at shipping. When auto switch unit is shipped, BBA2 is attached.

Mounting Bracket/Part No.

Bracket \ Size	25	32	40	50	63
Foot (1)	MU-L02	MU-L03	MU-L04	MU-L05	MU-L06
Flange	MU-F02	MU-F03	MU-F04	MU-F05	MU-F06
Single clevis	MU-C02	MU-C03	MU-C04	MU-C05	MU-C06
Double clevis (3)	MU-D02	MU-D03	MU-D04	MU-D05	MU-D06

Note 1) When ordering foot brackets, 2pcs. should be ordered for each cylinder.
Note 2) Parts attached with each mounting brackets are as follows.
Foot, Flange, Single clevis/Body mounting bolt
Double clevis/A clevis pin, C shape snap rings for axis, body mounting bolts
Note 3) A clevis pin and snap rings are packed with the double clevis style.

⚠ Precautions

Be sure to read before handling. Refer to p.0-39 to 0-46 for Safety Instructions and common precautions.

Specifications

Action	Single acting/Spring return, Spring extend
Fluid	Air
Proof pressure	1.05MPa
Max. operating pressure	0.7MPa
Min. operating pressure	0.18MPa
Ambient and fluid temperature	–10 to 60°C
Lubrication	Not required (Non-lube)
Piston speed	50 to 500mm/S
Stroke length tolerance	$^{+1.4}_{0}$
Cushion	Rubber bumper
Thread tolerance	JIS Class 2
Equivalent tube I.D. (mm)	ø25, ø32, ø40, ø50, ø63
Mounting	Axial foot, Front flange, Rear flange, Single clevis, Double clevis

Rod Non-rotating Accuracy

Model	MU25	MU32	MU40	MU50	MU63
Non-rotating accuracy	±1°	±0.8°	±0.5°	±0.5°	±0.5°

Standard Stroke

(mm)

Action	Equivalent bore size				
	25	32	40	50	63
Spring return/extend	5, 10		5, 10, 15, 20		

∗ Contact SMC for strokes not indicated.

Minimum Stroke for Auto Switch Mounting

(mm)

Number of auto switches	D-F7□V D-J79C	D-A7□ D-A80 D-A73C D-A80C	D-F7□WV	D-A7□H, A80H D-F7□W, J79W D-A79W D-F7□, J79 D-F7BA, F7NT D-F7□F
2 pcs.	5	10	15	15
1 pc.	5	5	10	15

Theoretical Force

Unit: N

Action	Size	Rod diameter (mm)	Operating direction	Piston area (mm^2)	Operating pressure (MPa)						Spring force	
					0.2	0.3	0.4	0.5	0.6	0.7	Begin	End
Spring return	**25**	**12**	OUT	491	68	117	166	216	265	314	30	15
	32	**14**	OUT	804	119	199	280	360	440	521	42	24
	40	**16**	OUT	1257	195	321	447	573	698	824	56	30
	50	**20**	OUT	1963	346	542	738	935	1131	1327	47	76
	63	**20**	OUT	3117	510	822	1134	1446	1757	2069	113	61
Spring extend	**25**	**12**	IN	378	46	83	121	159	197	235	30	15
	32	**14**	IN	650	88	153	218	283	348	413	42	24
	40	**16**	IN	1056	155	261	366	472	578	683	56	30
	50	**20**	IN	1649	283	448	613	777	942	1107	47	76
	63	**20**	IN	2803	448	728	1008	1289	1569	1849	113	61

Note) Theoretical force (N) = Pressure (MPa) X Piston area (mm^2)

Weight

Unit: kg

Size		25	32	40	50	63
Weight	5 stroke	0.22	0.27	0.57	1.06	1.55
	10 stroke	0.23	0.35	0.60	1.09	1.60
	15 stroke	—	—	0.62	1.12	1.64
	20 stroke	—	—	0.64	1.16	1.69
Mounting bracket	Axial foot	0.07	0.14	0.21	0.34	0.63
	Flange/Front side, Rear side	0.10	0.14	0.23	0.46	0.83
	Single clevis	0.06	0.12	0.22	0.40	0.68
	Double clevis (with pin)	0.07	0.16	0.26	0.47	0.76
Accessories	Single clevis (Pivot bracket for double clevis)	0.06	0.12	0.22	0.40	0.68
	Double clevis (Pivot bracket for single clevis)	0.07	0.16	0.26	0.47	0.76
	Single knuckle joint	0.03	0.04	0.07	0.16	0.16
	Double knucle joint (with pin)	0.05	0.09	0.14	0.29	0.29

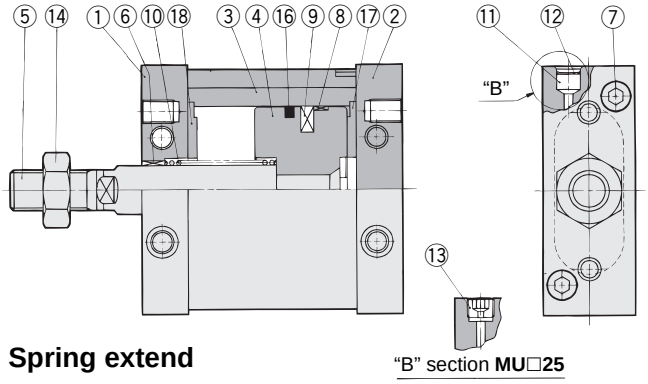
Note) Weight of single clevis and double clevis as optional bracket includes 2pcs. brackets for bracket mounting.

Calculation
Example 1: MUB40-15S(T)
• Basic weight·····0.62kg

Example 2: MUC50-5S(T)
• Basic weight·····1.06
• Additional weight (mounting bracket)·····0.40
1.06 + 0.40 = 1.46 kg

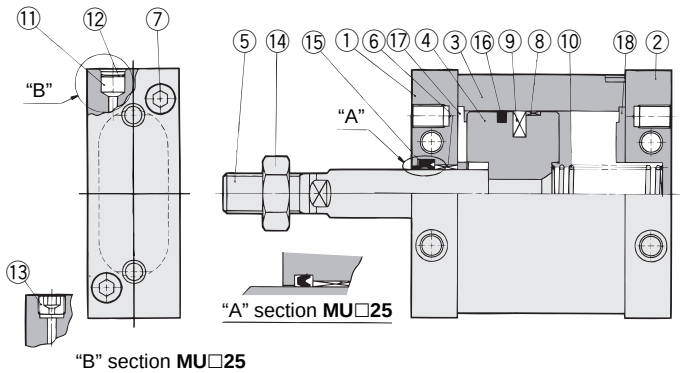
Construction

Spring return



"B" section **MU□25**

Spring extend



"A" section **MU□25**

"B" section **MU□25**

Component Parts

No.	Description	Material	Note
①	Rod cover	Aluminum alloy	Anodized
②	Head cover	Aluminum alloy	Anodized
③	Cylinder tube	Aluminum alloy	Hard anodized
④	Piston	Aluminum alloy	Chromated
⑤	Piston rod	Carbon steel	Hard chrome plated
⑥	Bushing	Oil impregnated sintered alloy	
⑦	Hex. socket head cap screw	Stainless steel	
⑧	Wearing	Resin	
⑨	Magnet	Magnet material	Only built-in magnet style
⑩	Return spring	Steel wire	Zinc chromated
⑪	Element	Bronze	
⑫	Snap ring	Spring steel	
⑬	Plug	Chromium molybdenum steel	
⑭	Rod end nut	Rolled steel	Attached for only male thread rod end
⑮	Rod seal	NBR	
⑯	Piston seal	NBR	
⑰	Bumper	Urethane	
⑱	Bumper B	Urethane	

Replacement Parts: Seal Kits

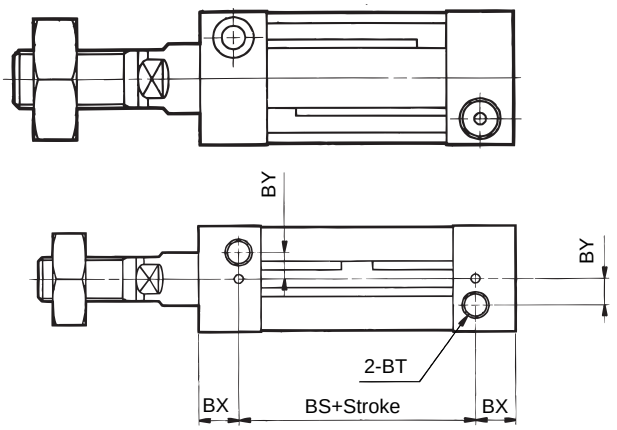
Bore size (mm)	Kit No.		Contents
	Spring return	Spring extend	
25	MU25S-PS	MU25T-PS	A set of above numbers ⑮, ⑯, ⑰ and ⑱.
32	MU32S-PS	MU32T-PS	
40	MU40S-PS	MU40T-PS	
50	MU50S-PS	MU50T-PS	
63	MU63S-PS	MU63T-PS	

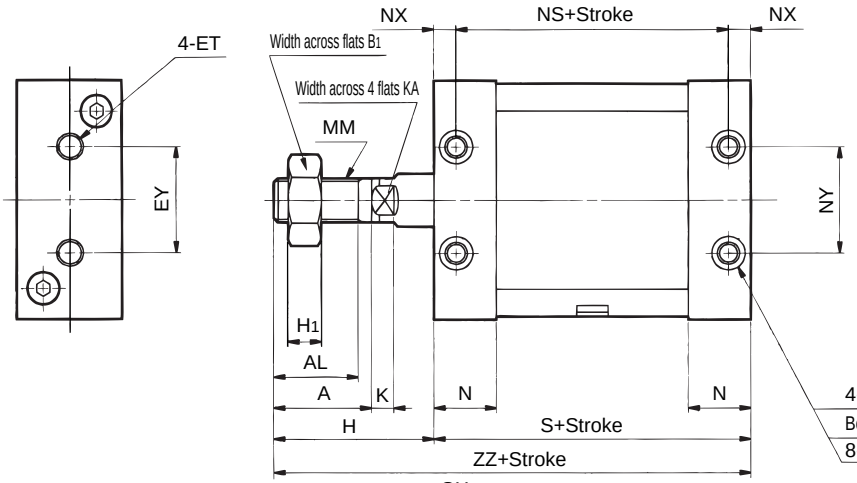
∗ Seal kits consist of items ⑮, ⑯, ⑰ and ⑱ contained in one kit, and can be ordered using the kits number for each cylinder bore size.

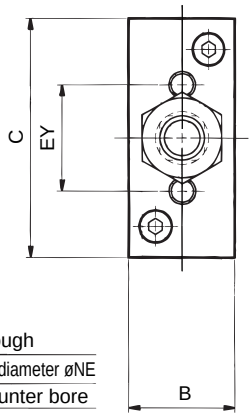
Basic

Spring return

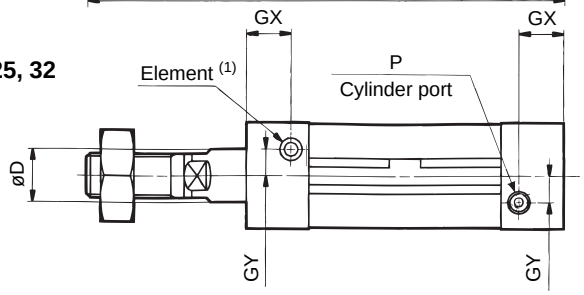
MUB40, 50, 63



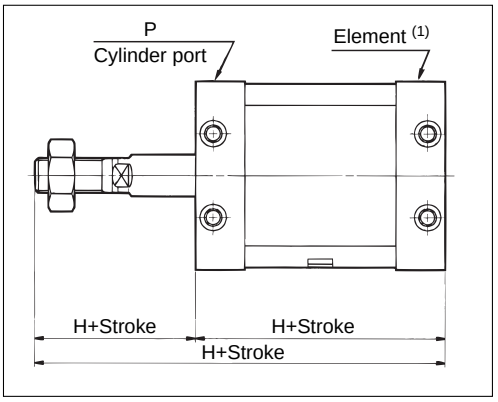




MUB25, 32

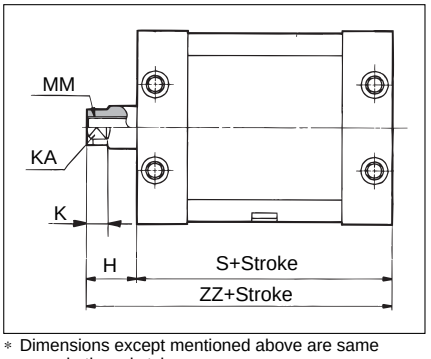


Spring extend



Note1) Plug with bleeding hole is used instead of element for MUB25.

Rod end female thread



∗ Dimensions except mentioned above are same as male thread style.
However, K and KA dimensions are same as male thread style.

(mm)

Model	Standard stroke(mm)	A	AL	B	B1	BS	BT	BX	BY	C	D	ET	EY	GX	GY	H	H1	K
MUB25	5, 10	22	19.5	24	17	42	M5 X 0.8 Depth 7.5	9	7	54	12	M5 X 0.8 Depth 11	26	10	5	36	6	5.5
MUB32	5, 10	26	23.5	28	19	50	M6 X 1 Depth 12	6.5	8	68	14	M6 X 1 Depth 11	42	8.5	5.5	40	7	5.5
MUB40	5, 10, 15, 20	30	27	32	22	54	M8 X 1.25 Depth 13	8	9	86	16	M8 X 1.25 Depth 11	54	9	7	45	8	6
MUB50	5, 10, 15, 20	35	32	39	27	64	M10 X 1.5 Depth 14.5	10	9	104	20	M10 X 1.5 Depth 15	64	11.5	8	53	11	7
MUB63	5, 10, 15, 20	35	32	50	27	63	M12 X 1.75 Depth 18	11	12	124	20	M12 X 1.75 Depth 15	72	11.5	10	56	11	7

(mm)

Model	KA	MM	N	NC	ND	NE	NS	NX	NY	P	S	ZZ
MUB25	10	M10 X 1.25	14	7.5 Depth 4.5	M5 X 0.8	4.3	48	6	26	M5 X 0.8	60	96
MUB32	12	M12 X 1.25	15.5	9 Depth 5.5	M6 X 1	5.1	50	6.5	28	Rc(PT)1/8	63	103
MUB40	14	M14 X 1.5	16	10.5 Depth 6.5	M8 X 1.25	6.9	54	8	36	Rc(PT)1/8	70	115
MUB50	18	M18 X 1.5	21.5	13.5 Depth 8.5	M10 X 1.5	8.7	64	10	42	Rc(PT)1/4	84	137
MUB63	18	M18 X 1.5	21.5	17 Depth 10.5	M12 X 1.75	10.5	63	11	46	Rc(PT)1/4	85	141

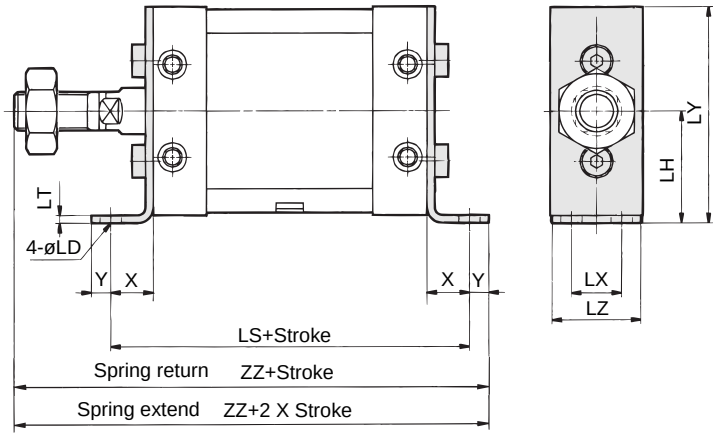
∗ The position of the four flats of the piston rod is ±3° in relation to the cylinder side surface.

Rod end female thread (mm)

Model	H	MM	ZZ
MUB25	14	M6 X 1 Depth 12	74
MUB32	14	M8 X 1.25 Depth 13	77
MUB40	15	M8 X 1.25 Depth 13	85
MUB50	18	M10 X 1.5 Depth 15	102
MUB63	21	M10 X 1.5 Depth 15	106

Dimensions

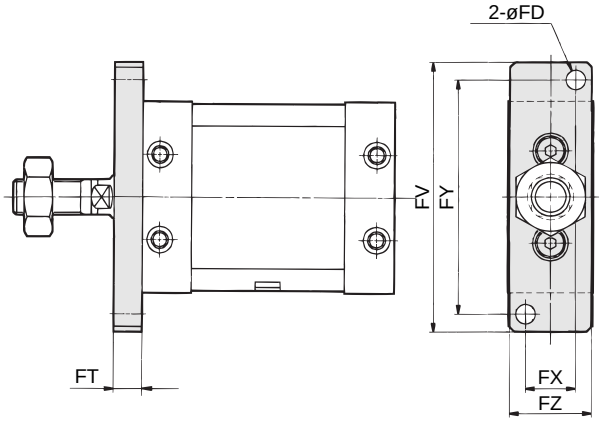
Axial foot



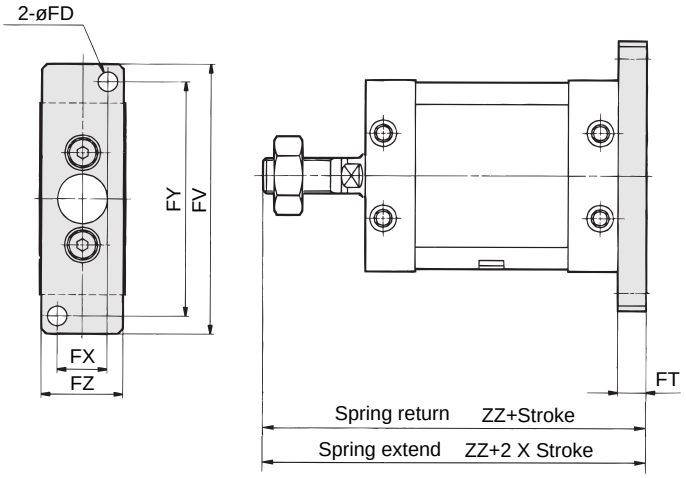
(mm

Model	LD	LH	LS	LT	LX	LY	LZ	X	Y	ZZ
MUL25	5.5	29	84	3.2	11	56	23	12	6	114
MUL32	6.6	37	95	4.5	12	71	27	16	8	127
MUL40	9	46	106	4.5	15	89	31	18	10	143
MUL50	11	57	126	5	18	109	37	21	11	169
MUL63	13.5	67	133	6	22	129	48	24	14	179

Front flange



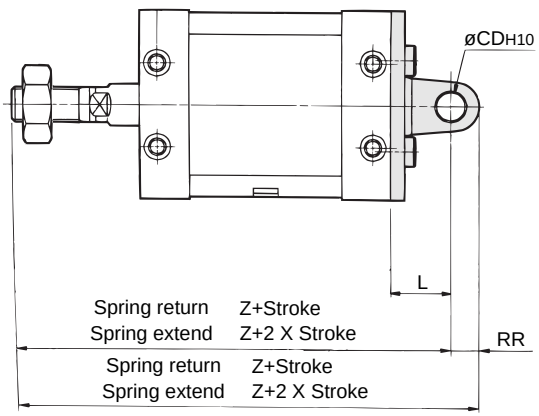
Rear flange



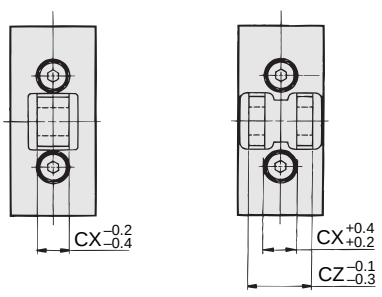
(mm

Model	FD	FT	FV	FX	FY	FZ	ZZ
MUF25, MUG25	5.5	8	76	14	66	24	104
MUF32, MUG32	7	8	94	16	82	28	111
MUF40, MUG40	9	9	118	18	102	32	124
MUF50, MUG50	11	12	144	22	126	39	149
MUF63, MUG63	13	14	168	30	148	50	155

Single clevis
Double clevis



Single clevis **Double clevis**



(mm

Model	CDH10	CX	CZ	L	RR	Z	ZZ
MUC25, MUD25	8 +0.058 0	9	18	17	8	113	121
MUC32, MUD32	10 +0.058 0	11	22	22	10	125	135
MUC40, MUD40	10 +0.058 0	13	26	27	10	142	152
MUC50, MUD50	14 +0.070 0	16	32	32	14	169	183
MUC63, MUD63	14 +0.070 0	16	32	38	16	179	185

A clevis pin and snap rings are packed with the double clevis style.

Series MDU
Auto Switch Specifications

Refer to p.5.3-2 for auto switch specifications.

Applicable Auto Switch

Auto switch model		Electrical entry	Page
Reed switch	**D-A7/A8**	Grommet (Perpendicular)	5.3-14
	D-A7□H/A80H	Grommet (In-line)	5.3-15
	D-A73C/A80C	Connector	5.3-16
	D-A79W	Grommet (2 colour, Perpendicular)	5.3-26
Solid state switch	**D-F7□V**	Grommet (Perpendicular)	5.3-35
	D-F7/J7	Grommet (In-line)	5.3-34
	D-J79C	Connector	5.3-36
	D-F7□WV	Grommet (2 colour, Perpendicular)	5.3-45
	D-7□W/J79W	Grommet (2 colour, In-line)	5.3-44
	D-F7BAL	Grommet (2 colour, Water resistant, In-line)	5.3-57
	D-F79F	Grommet (2 colour, With diagnostic output, In-line)	5.3-53
	D-F7LF	Grommet (2 colour, Latch with diagnostic output, In-line)	5.3-52
	D-F7NTL	Grommet (With timer, In-line)	5.3-60

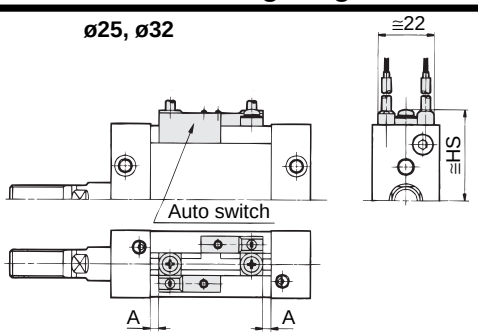
⚠ Precautions

Be sure to read before handling. Refer to p.0-44 to 0-46 for auto switch common precautions.

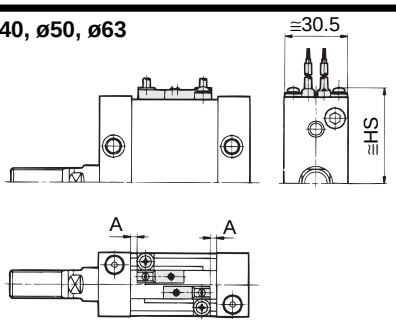
Auto Switch Mounting Position and Mounting Height

D-A7, D-A8

ø25, ø32

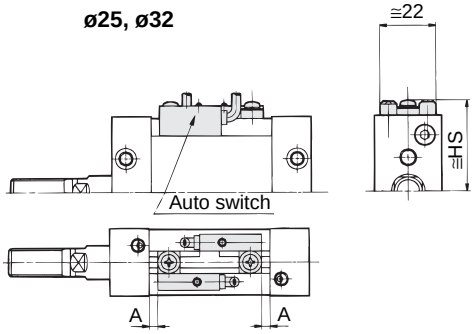


ø40, ø50, ø63

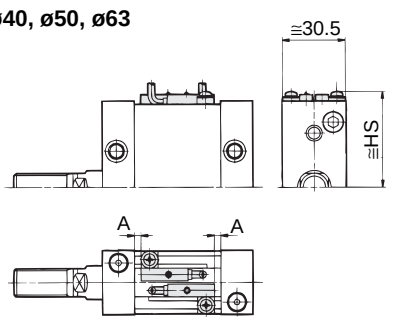


D-A7□H, D-A80H
D-F7□, D-J79
D-F7□W, D-J79W
D-F7□F, D-FBAL
D-F7NTL

ø25, ø32

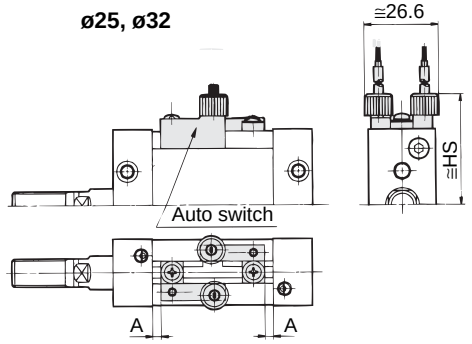


ø40, ø50, ø63

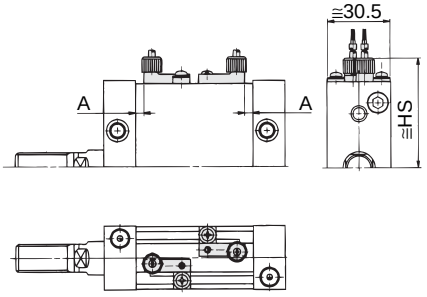


Connector style
D-A73C, D-A80C, D-J79C

ø25, ø32

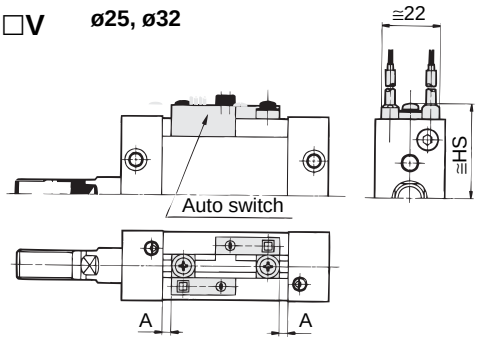


ø40, ø50, ø63

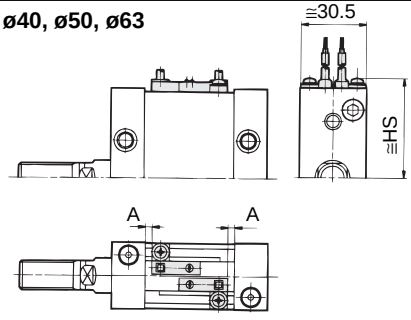


D-A79W, D-F7□WV, D-F7□V

ø25, ø32



ø40, ø50, ø63



Auto Switch Mounting Position

(mm)

Auto switch model / Equiv. bore size	D-A7 D-A8	D-A7□H D-A80H D-F7 D-J7 D-F7□V	D-A73C D-A80C D-J79C	D-A79W	D-F7BA D-F7□W D-F7□F D-J79W D-F7□WV	D-F7NTL
	A	A	A	A	A	A
25	4.5 (7)	5 (7.5)	5 (7.5)	2 (4.5)	9 (11.5)	10 (12.5)
32	4.5 (7)	5 (7.5)	5 (7.5)	2 (4.5)	9 (11.5)	10 (12.5)
40	5 (10)	5.5 (10.5)	0 (4)	2.5 (7.5)	9.5 (14.5)	10.5 (15.5)
50	6.5 (11.5)	7 (12)	1 (6)	4 (9)	11 (16)	12 (17)
63	7 (12)	7.5 (12.5)	1.5 (6.5)	4.5 (9.5)	11.5 (16.5)	12.5 (17.5)

Note) ( ): Value of single acting(spring return, spring extend)

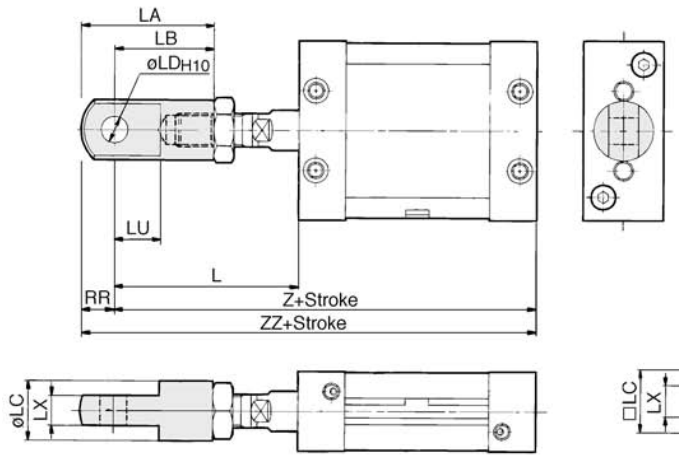
Auto Switch Mounting Height

(mm)

D-A7 D-A8	D-A7□H D-A80H D-F7 D-J7 D-F7□W D-J79W D-F7BAL D-F7□F D-F7NTL	D-A73C D-A80C	D-F7□V D-F7□WV	D-J79C	D-A79W
Hs	Hs	Hs	Hs	Hs	Hs
32	33	39	35.5	37.5	34.5
39	40	46	42.5	44.5	41.5
47	48	54	50.5	52.5	49.5
56	57	63	59.5	61.5	58.5
66	67	73	69.5	71.5	68.5

Plate Cylinder
Series MU
Accessory Dimensions

Single Knuckle Joint

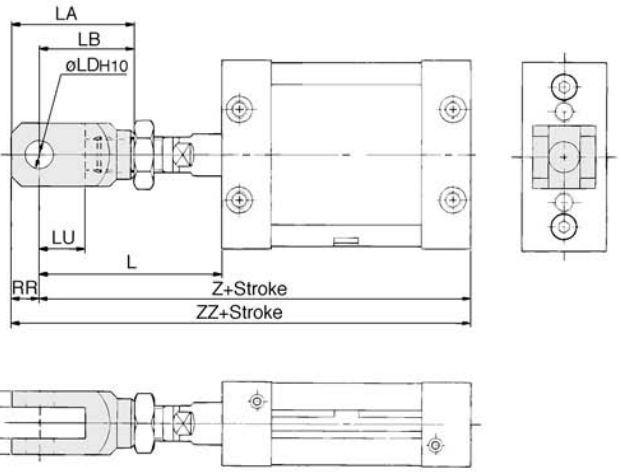


(mm)

Model	L	LA	LB	LC	LD	LU	LX	RR	Z	ZZ
MU□25	52.5	35.5	27	16	$8^{+0.058}_{0}$	11	$9^{-0.2}_{-0.4}$	8.5	107.5	116
MU□32	59	41	31	18	$10^{+0.058}_{0}$	14	$11^{-0.2}_{-0.4}$	10	117	127
MU□40	67	47	36	20	$10^{+0.058}_{0}$	15	$13^{-0.2}_{-0.4}$	11	127	138
MU□50	81	62	46	28	$14^{+0.070}_{0}$	20	$16^{-0.2}_{-0.4}$	16	155	171
MU□63	84	62	46	28	$14^{+0.070}_{0}$	20	$16^{-0.2}_{-0.4}$	16	159	175

∗ Dimensions L, Z, and ZZ are reference dimensions for installing a single knuckle joint, which may be used as a guide.

Double Knuckle Joint

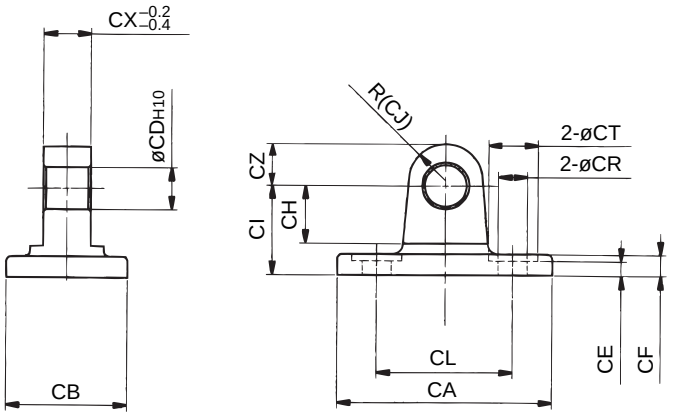


(mm)

Model	L	LA	LB	□LC	LD	LU	LX	RR	Z	ZZ	Applicable pin
MU□25	52.5	35	27	18	$8^{+0.058}_{0}$	13	$9^{+0.2}_{+0.4}$	8	107.5	115.5	CD-MU02
MU□32	59	41	31	22	$10^{+0.058}_{0}$	14	$11^{+0.2}_{+0.4}$	10	117	127	CD-MU03
MU□40	67	46	36	26	$10^{+0.058}_{0}$	17	$13^{+0.2}_{+0.4}$	10	127	137	CD-MU04
MU□50	81	62	46	32	$14^{+0.070}_{0}$	23	$16^{+0.2}_{+0.4}$	16	155	171	CD-MU05
MU□63	84	62	46	32	$14^{+0.070}_{0}$	23	$16^{+0.2}_{+0.4}$	16	159	175	CD-MU05

∗ Dimensions L, Z, and ZZ are reference dimensions for installing a double knuckle joint, which may be used as a guide.

Single Clevis (Pivot Bracket for Double Clevis)

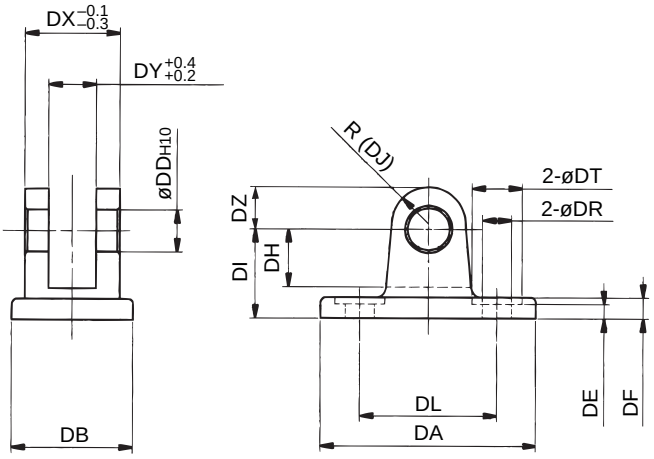


(mm)

Part No.	Size	CA	CB	CDH10	CE	CF	CH	CI	CJ
MU-C02	25	53	23	$8^{+0.058}_{0}$	3.5	4	11	17	7
MU-C03	32	67	27	$10^{+0.058}_{0}$	3.5	7	13	22	10
MU-C04	40	85	31	$10^{+0.058}_{0}$	3.5	10	13	27	10
MU-C05	50	103	37	$14^{+0.070}_{0}$	5.5	12	17	32	14
MU-C06	63	122	48	$14^{+0.070}_{0}$	6	14	19	38	16

Part No.	CL	CR	CT	CX	CZ
MU-C02	26	5.3	9.5	9	8
MU-C03	42	6.4	11	11	10
MU-C04	54	8.4	14	13	10
MU-C05	64	10.5	17	16	14
MU-C06	72	13	20	16	16

Double Clevis (Pivot Bracket for Single Clevis)



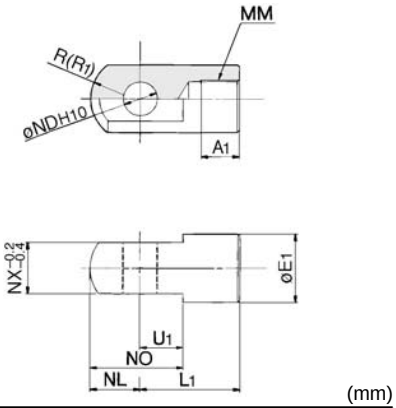
(mm)

Part No.	Size	DA	DB	DDH10	DE	DF	DH	DI	DJ
MU-D02	25	53	23	$8^{+0.058}_{0}$	3.5	4	11	17	7
MU-D03	32	67	27	$10^{+0.058}_{0}$	3.5	7	13	22	10
MU-D04	40	85	31	$10^{+0.058}_{0}$	3.5	10	13	27	10
MU-D05	50	103	37	$14^{+0.070}_{0}$	5.5	12	17	32	14
MU-D06	63	122	48	$14^{+0.070}_{0}$	6	14	19	38	16

Part No.	DL	DR	DT	DX	DY	DZ	Applicable pin
MU-D02	26	5.3	9.5	18	9	8	CD-MU02
MU-D03	42	6.4	11	22	11	10	CD-MU03
MU-D04	54	8.4	14	26	13	10	CD-MU04
MU-D05	64	10.5	17	32	16	14	CD-MU05
MU-D06	72	13	20	32	16	16	CD-MU05

Clevis pin and snap ring are packed with the double clevis style.

Single Knuckle Joint

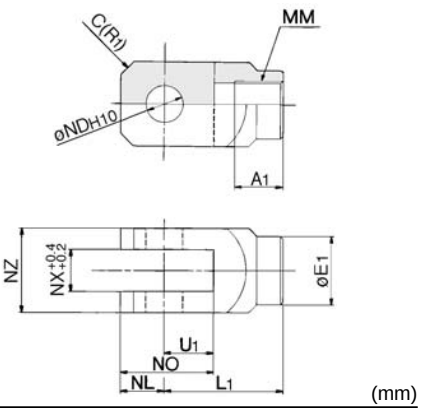


(mm)

Part No.	Size	A1	E1	L1	MM
I-MU02	25	10.5	16	27	M10 X 1.25
I-MU03	32	12	18	31	M12 X 1.25
I-MU04	40	14	20	36	M14 X 1.5
I-MU05	50, 63	18	28	46	M18 X 1.5

Part No.	NDH10	NL	NO	NX	R1	U1
I-MU02	$8^{+0.058}_{0}$	8.5	19.5	9	8.5	11
I-MU03	$10^{+0.058}_{0}$	10	24	11	10	14
I-MU04	$10^{+0.058}_{0}$	11	26	13	11	15
I-MU05	$14^{+0.070}_{0}$	16	36	16	16	20

Double Knuckle Joint



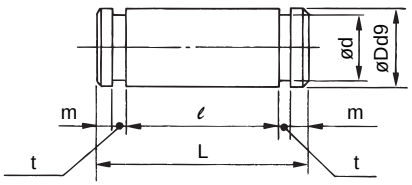
(mm)

Part No.	Size	A1	E1	L1	MM	NDH10
Y-MU02	25	10.5	14	27	M10 X 1.25	$8^{+0.058}_{0}$
Y-MU03	32	12	18	31	M12 X 1.25	$10^{+0.058}_{0}$
Y-MU04	40	14	20	36	M14 X 1.5	$10^{+0.058}_{0}$
Y-MU05	50, 63	18	28	46	M18 X 1.5	$14^{+0.070}_{0}$

Part No.	NL	NO	NX	NZ	R1	U1	Applicable pin
Y-MU02	8	21	9	18	3	13	CD-MU02
Y-MU03	10	24	11	22	4	14	CD-MU03
Y-MU04	10	27	13	26	5	17	CD-MU04
Y-MU05	16	39	16	32	6	23	CD-MU05

∗ Knuckle pin and snap ring are packed with the double clevis style.

Clevis Pin, Knuckle Pin



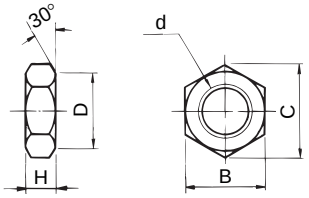
(mm)

Part No.	Size	Dd9	L	d	ℓ
CD-MU02	25	$8^{-0.040}_{-0.076}$	23	7.6	18.2
CD-MU03	32	$10^{-0.040}_{-0.076}$	27	9.6	22.2
CD-MU04	40	$10^{-0.040}_{-0.076}$	31	9.6	26.2
CD-MU05	50, 63	$14^{-0.050}_{-0.093}$	38	13.4	32.2

Part No.	m	t	Snap ring
CD-MU02	1.5	0.9	C shape for axis8
CD-MU03	1.25	1.15	C shape for axis10
CD-MU04	1.25	1.15	C shape for axis10
CD-MU05	1.75	1.15	C shape for axis14

∗ These are installed with double clevis style and double knuckle joint style as standard.

Rod End Nut



(mm)

Part No.	Size	d	H	B	C	D
NT-03	25	M10 X 1.25	6	17	19.6	16.5
NT-MU03	32	M12 X 1.25	7	19	21.9	18
NT-04	40	M14 X 1.5	8	22	25.4	21
NT-05	50, 63	M18 X 1.5	11	27	31.2	26

∗ A nut is attached with rod end male thread as standard. (Double rod style: 2 pcs.)

⚠ Precautions

Be sure to read before handling. Refer to p.0-39 to 0-43 for Safety Instructions and common precautions.

Mounting

⚠ Caution

① To secure a workpiece to the end of the piston rod, make sure to retract the piston rod entirely. Place a wrench on the wrench flats at the end of the rod, and tighten it without applying torque to the piston rod in excess of the allowable installation torque.

② Operate in such a way that the load to the piston rod is always applied in the axial direction. Furthermore, avoid operations that could apply rotational torque to the piston rod. If rotational torque must be applied due to unavoidable circumstances, use the table below as a guide to make sure the allowable rotational torque is not exceeded.

Allowable Rotating Torque (Nm)

Size	25	32	40	50	63
Allowable rotating torque	0.25	0.25	0.55	1.25	2.0
Work mounting allowable torque	1.7	1.9	2.0	4.9	7.3

③ Operating the cylinder by connecting the piping directly to the cylinder can cause the piston speed to exceed the maximum operating speed of 500mm/s. Therefore, to operate the cylinder, make sure to use an SMC speed controller and adjust the piston speed to 500mm/s or less.

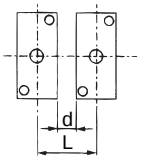
Auto Switch Precaution

Be sure to read before handling. Refer to p.0-44 to 0-46 for auto switch common precautions.

⚠ Warning

① If multiple cylinders are operated adjacent to each other, the magnets that are enclosed in the adjacent cylinders could affect the operation of the auto switches, causing the switches to malfunction. Therefore, make sure that the mounting pitch of the cylinders is at least that indicated in the table below.

Cylinder minimum mounting pitch



(mm)

Size	ø25	ø32	ø40	ø50	ø63
L(d)	33(10)	32(5)	36(5)	38(0)	49(0)

If the cylinders must be operated with the mounting pitch less than indicated above, they must be shielded with steel plates or magnetic shield plates (Part No.: MU-S025). Contact SMC for details.

Rotary Clamp Cylinder

Series MK/Standard

ø12, ø16, ø20, ø25, ø32, ø40, ø50, ø63

Series MK2/Heavy Duty

ø20, ø25, ø32, ø40, ø50, ø63

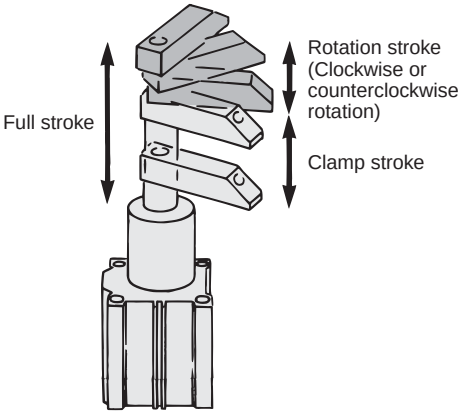
Series MK

Series MK2

Max. operating pressure: 1MPa

Compact equipment design is possible.

Suited for electronic parts inspection clamps. Ideal for use in small mounting space.



Auto switch is attachable

A built-in magnet is standard, an auto switch can be directly mounted.

- A solid state auto switch that is designed to be used in a strong magnetic fields is available. (ø40, ø50, ø63) Suitable for welding applications.

Made to Order

Heat resistant **Max. 150°C**

Refer to to p.5.4-1 regarding detailed specifications.

Series MK/MK2
Precautions

⚠ Precautions

Be sure to read before handling. Refer to p.0-39 to 0-46 for Safety Instructions and actuator and auto switch precautions.

Environment

⚠ Warning

Do not use the cylinder under following environments:

①An area in which fluids such as cutting oil splash on the piston rod.
②An area in which foreign matter such as particles, cutting chips, dust, or spatter is present.
③An area in which the ambient temperature exceeds the operating range.
④An area exposed to direct sunlight.
⑤An environment that poses the risk of corrosion.

Removing and Reinstalling The Clamp Arm

⚠ Warning

To remove and reinstall the arm on the piston rod, instead of securing the cylinder body, use a wrench to secure the arm to loosen or to tighten the bolt (Fig. 1). An excessive amount of rotational force will be applied to the piston rod if the bolt is tightened by securing the cylinder body, which could damage the internal parts. To fabricate an arm, make sure to machine a detect portion that corresponds to the parallel section at the rod end.

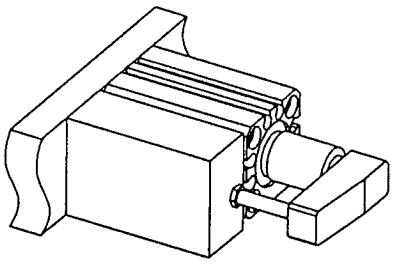


Figure 1

Speed Adjusting

⚠ Warning

Make sure to connect a speed controller to the cylinder and adjust it so that the cylinder speed will be within a range of 50 to 200mm/s.
If a clamp arm other than the available options is used, make sure to select an appropriate arm after calculating the inertial moment of the arm.
To operate a speed controller, make sure that the valve is fully closed, and gradually open the valve to adjust the speed.

How to Operate

⚠ Warning

The MK cylinder could malfunction or the non-rotating accuracy could be affected if a rotational force is applied to the piston rod. Therefore, observe the particulars given below before operating the cylinder.

① Make sure to mount the cylinder vertically (Fig. 3).
② Never perform work (such as clamping or stopping) in a rotational direction (Fig. 4).
③ To clamp, make sure to do so within the clamp stroke (straight-line stroke) range (Fig. 5).
④ Make sure that the clamping surface of the workpiece is perpendicular to the cylinder's axial line (Fig. 6).
⑤ Do not operate the cylinder in such a way that an external force causes the workpiece to move while being clamped (Fig. 7).
⑥ Furthermore, do not operate the cylinder in an application in which a rotational force will be applied to the piston rod.

① Do not operate the cylinder horizontally. ×

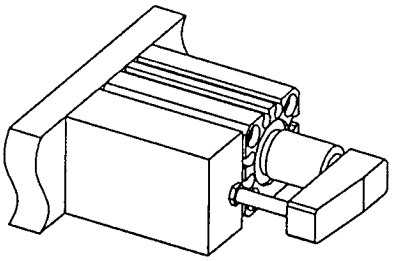


Figure 3

② Do not perform work in the rotational direction.

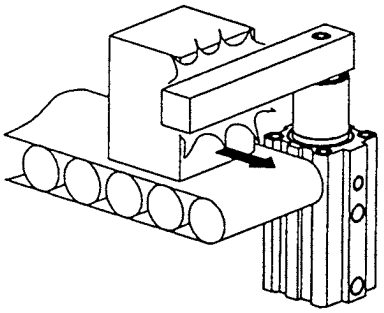
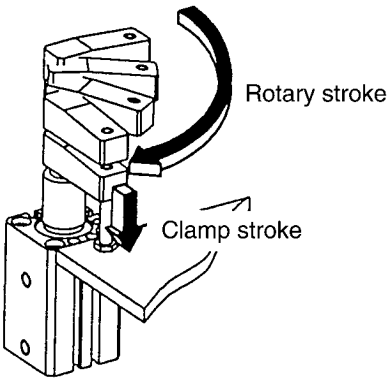


Figure 4

③ Do not clamp during a rotational stroke.

○



×

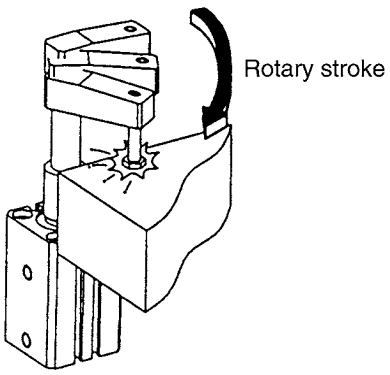


Figure 5

④ Do not clamp on a slanted surface.

×

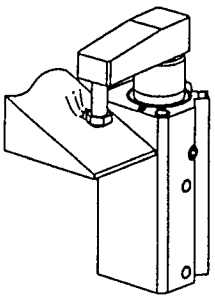


Figure 6

⑤ Make sure that the workpiece does not move during clamping.

×

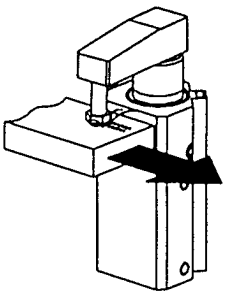


Figure 7

Rotary Clamp Cylinder/Standard

Series MK

ø12, ø16, ø20, ø25, ø32, ø40, ø50, ø63

How to Order

MK **A** **20** — **10** **R** **F** — **A73** **S**

Rotary clamp cylinder

Mounting

Symbol	Style	Bore size
B	Through hole & both ends tapped (Standard)	ø12, ø16
A	Both ends tapped	ø20 to ø63
B	Through hole	
G	Rear flange*	

* The rear flange is equipped with a boss mounting, so be sure to specify body option "F".

Bore size

12	12mm	**32**	32mm
16	16mm	**40**	40mm
20	20mm	**50**	50mm
25	25mm	**63**	63mm

Clamp stroke

Symbol	Clamp stroke	Bore size
10	10mm	ø12 to ø40
20	20mm	ø12 to ø63
50	50mm	ø50 to ø63

Rotation direction (Release → Clamp)

R	Clockwise
L	Counterclockwise

Body option

—	Standard (Female thread)
M	Rod end width across flats*
F	Rear boss mounting*
N	With arm

* Refer to the table regarding production range of body option.

Auto switch

—	Without auto switch (Built-in magnet)

* Refer to the table below regarding auto switch model no.

Number of auto switches

—	2
S	1

Option Part No./Arm

Bore size (mm)	Part No.	Accessories
12	**MK-A012**	Clamp bolt Hexagonal socket head cap screw Hexagonal nut Spring seat
16	**MK-A016**	
20	**MK-A020**	
25		
32	**MK-A032**	
40		
50	**MK-A050**	
63		

Mounting Bracket Part No./Flange

Bore size (mm)	Part No.	Accessories
20	**MK-F020**	Boss mounting ring Set pin Bolt for cylinder body
25	**MK-F025**	
32	**MK-F032**	
40	**MK-F040**	
50	**MK-F050**	
63	**MK-F063**	

Applicable Auto Switches/ Refer to p.5.3-2 for further information on auto switch.

Style	Special function	Electrical entry	Indicator	Wiring (Output)	Load voltage DC	Load voltage AC	Rail mounting ø20 to ø63 Perpendicular	Rail mounting ø20 to ø63 In-line	Direct mounting ø12, ø16, ø32 to ø63 Perpendicular	Direct mounting ø12, ø16, ø32 to ø63 In-line	Lead wire* (m) 0.5 (—)	3 (L)	5 (Z)	— (N)	Applicable load	
Reed switch	—	Grommet	Yes	3 wire (NPN Equiv.)	—	5V	—	—	**A76H**	**A96V**	**A96**	●	●	—	—	IC	—
				2 wire	—	—	200V	**A72**	**A72H**	—	—	●	●	—	—		Relay PLC
					24V	12V	100V	**A73**	**A73H**	—	—	●	●	●	—	—	
								—	—	**A93V**	**A93**	●	●	—	—		
			No			5V, 12V	≤100V	**A80**	**A80H**	**A90V**	**A90**	●	●	—	—	IC	
		Connector	Yes			12V	—	**A73C**	—	—	—	●	●	●	●	—	
			No			5V, 12V	≤24V	**A80C**	—	—	—	●	●	●	●	IC	
	Diagnostic indication (2 colour)	Grommet	Yes			—	—	**A79W**	—	—	—	●	●	—	—	—	
Solid state switch	—	Grommet	Yes	3 wire (NPN)	24V	5V, 12V	—	**F7NV**	**F79**	—	—	●	●	○	—	IC	Relay PLC
						12V		—	—	**F9NV**	**F9N**	●	●	—	—	—	
				3 wire (PNP)		5V, 12V		**F7PV**	**F7P**	—	—	●	●	○	—	IC	
						12V		—	—	**F9PV**	**F9P**	●	●	—	—	—	
				2 wire				**F7BV**	**J79**	—	—	●	●	○	—		
								—	—	**F9BV**	**F9B**	●	●	—	—		
		Connector						**J79C**	—	—	—	●	●	●	●		
	Diagnostic indication (2 colour)	Grommet		3 wire (NPN)		5V, 12V		—	—	**F9NWV**	**F9NW**	●	●	○	—		
								F7NWV	**F79W**	—	—	●	●	○	—	IC	
				3 wire (PNP)				—	**F7PW**	—	—	●	●	○	—		
						12V		—	—	**F9PWV**	**F9PW**	●	●	○	—	—	
				2 wire				**F7BWV**	**J79W**	**F9BWV**	**F9BW**	●	●	○	—		
	Water resistant (2 colour)							—	**F7BA**	—	**F9BA**	—	●	○	—		
	With timer			3 wire (NPN)		5V, 12V		—	**F7NT**	—	—	—	●	○	—		
	Diagnostic output (2 colour)			4 wire (NPN)				—	**F79F**	—	—	●	●	○	—	IC	
	Latching with diagnostic output (2 colour)					—		—	**F7LF**	—	—	●	●	○	—	—	
	Strong magnetic field resistant (2 colour)			2 wire				—	**P5DW****	—	—	—	●	●	—	—	

* Lead wire 0.5m·····– (Example) A80C 5m····· Z (Example) A80CZ
3m·····L (Example) A80CL – ····· N (Example) A80CN

* Solid state auto switches marked with a "○" are manufactured upon receipt of order.

** D-P5DWL can be mounted for ø40, ø50 and ø63.

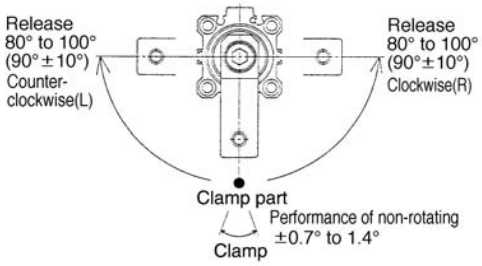
With arm　　Rear flange With arm

Specifications

Bore size (mm)	12	16	20	25	32	40	50	63
Operation	Double acting							
Rotary angle (4)	90° ± 10°							
Rotary direction (3)	R: Clockwise L: Counterclockwise							
Rotary stroke (mm)	7.5		9.5		15		19	
Clamp stroke (mm)	10, 20						20, 50	
Allowable moment Nm (1)	1	3.8	7	13	27	47	107	182
Theoretical clamp force N (2)	40	75	100	185	300	525	825	1400
Fluid	Air							
Proof pressure	1.5 MPa							
Operating pressure range	0.1 to 1 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							
Port size	M5 X 0.8				Rc(PT) 1/8		Rc(PT) 1/4	
Mounting	Through hole & Both ends tapped	Both ends tapped, Through hole, Rear flange						
Cushion	Rubber bumper							
Stroke tolerance (mm)	$^{+0.6}_{-0.4}$							
Piston speed	50 to 200 mm/s							
Non-rotating accuracy (4)	±1.4°	±1.2°			±0.9°		±0.7°	

Note 1) Max. bending moment applied to the piston rod side
Note 2) At 0.5 MPa
Note 3) Direction of rotation viewed from the rod side when the piston rod retracting.
Note 4) Refer to "Rotary angle" diagram.

Rotary Angle



Made to Order

Refer to the p.5.4-1 regarding made to order for series MK.

Theoretical Force

Unit: N

Bore size (mm)	Rod dia. (mm)	Operating direction	Piston area (cm^2)	Operating pressure (MPa) 0.3	0.5	0.7	1.0
12	6	R	0.8	24	40	56	80
		H	1.1	33	55	77	110
16	8	R	1.5	45	75	105	150
		H	2	60	100	140	200
20	12	R	2	60.8	100	139	200
		H	3	90.2	149	208	298
25	12	R	3.7	112	185	258	370
		H	4.9	149	245	341	490
32	16	R	6	182	300	418	600
		H	8	243	400	557	800
40	16	R	10.5	319	525	731	1050
		H	12.5	380	625	870	1250
50	20	R	16.5	502	825	1149	1648
		H	19.6	596	980	1365	1961
63	20	R	28	851	1400	1950	2801
		H	31.2	948	1560	2172	3121

Note) Theoretical force (N)=Pressure (MPa) X Piston area (cm^2) X 100　Operation direction　R: Rod side (Clamp)
H: Head side (Release)

Weight/Mounting Through Hole

Unit: g

Clamp stroke (mm)	Bore size (mm) 12	16	20	25	32	40	50	63
10	70	100	250	280	500	595	—	—
20	87	123	290	320	525	640	1100	1520
50	—	—	—	—	—	—	1350	1805

Availability of Body Options

Bore size	—	M	F	N	MF	FN
ø12, ø16	●	—	—	●	—	—
ø20 to ø63	●	●	●	●	●	●

Additional Weight

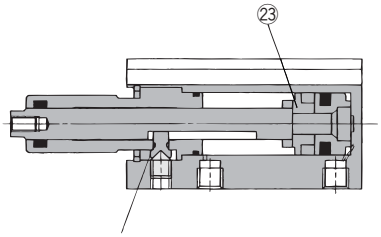
Unit: g

Bore size (mm)	12	16	20	25	32	40	50	63
Both ends tapped	—	—	6	7	7	6	7	17
Rod end width across flats	—	—	10	10	21	21	46	46
Rear boss mounting	—	—	2	3	5	7	13	25
With arm	13	32	100	100	200	200	350	350
Rear flange	—	—	133	153	166	198	345	531

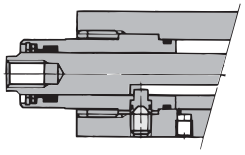
Calculation method/Example　MKG20-10RFN
- Standard calculation: MKB20-10R　250g
- Extra weight calculation: Both ends tapped　6g
  Rear flange　133g
  Rear boss mounting　2g
  With arm　100g
  491g

Construction

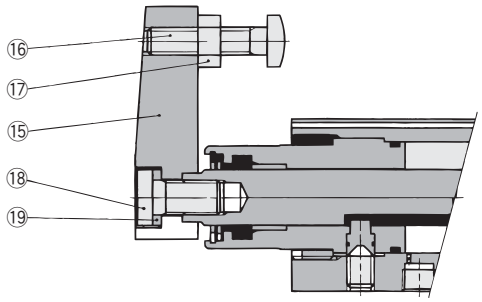
MK□12, 16



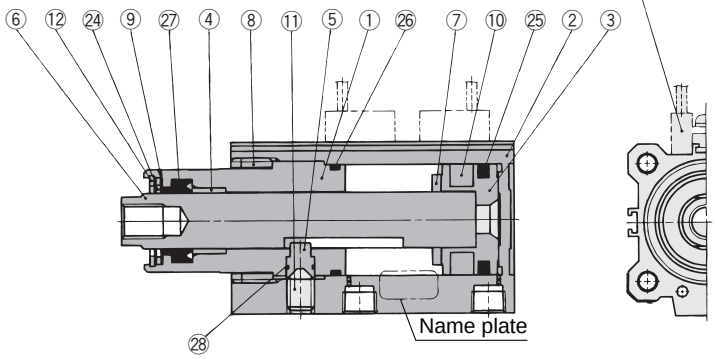
MK□20, 25



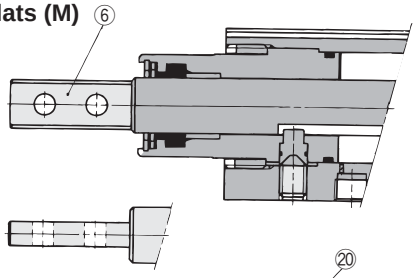
With arm (N)



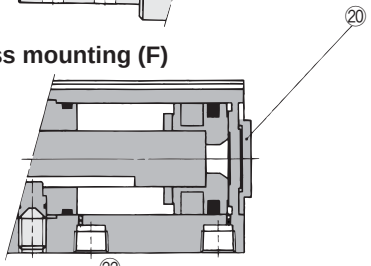
MK□32



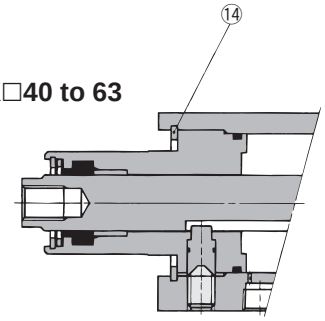
Rod end width across flats (M)



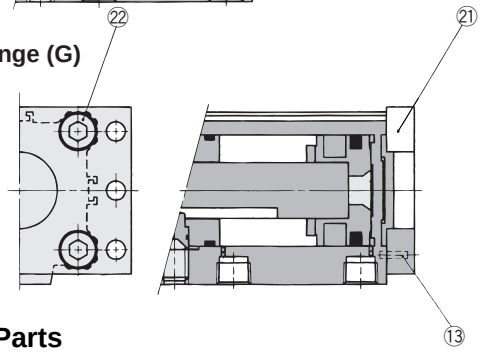
Rear boss mounting (F)



MK□40 to 63



Rear flange (G)



Component Parts

No.	Description	Material	Note
①	Rod cover	Aluminum alloy	Hard anodized
②	Cylinder tube	Aluminum alloy	Hard anodized
③	Piston	Aluminum alloy	
④	Bushing	Copper bearing material	Only ø32 to ø63
⑤	Guide pin	Stainless steel	Nitrided
⑥	Piston rod	Carbon steel	Heated, Nickel plated
⑦	Bumper	Urethane	
⑧	Ring nut	Copper alloy	Only ø20 to ø32
⑨	Scraper pressure	Stainless steel	Except for ø12, ø16
⑩	Rubber magnet	Synthetic rubber	
⑪	Hex. socket head cap screw	Chrome molybdenum steel	Sharp end section: 90°
⑫	R-shape snap ring	Spring steel	
⑬	Parallel pin	Stainless steel	

Component Parts

No.	Description	Material	Note
⑭	C type retaining ring	Carbon tool steel	Only ø40 to ø63
⑮	Arm	Rolled steel	
⑯	Clamp bolt	Chrome molybdenum steel	
⑰	Hexagonal nut	Rolled steel	
⑱	Hex. socket head cap bolt	Chrome molybdenum steel	
⑲	Spring washer	Hard steel	
⑳	Boss mount ring	Aluminum alloy	Except for ø12, ø16
㉑	Flange	Rolled steel	Except ø12, ø16
㉒	Hex. socket head cap bolt	Chrome molybdenum steel	Quantity: ø25, 25: 2; ø32 to 63: 4
㉓	Spacer for switch	Aluminum alloy	Only ø12, ø16
㉔	Coil scraper	Phosphor bronze	
㉕	Piston seal	NBR	
㉖	Gasket	NBR	
㉗	Rod seal	NBR	
㉘	O ring	NBR	

Replacement Parts: Seal Kits

Bore size (mm)	ø12	ø16	ø20 to ø32	ø40	ø50	ø63
Part no.	MK-12-PS	MK-16-PS	Not disassembled	MK-40-PS	MK-50-PS	MK-63-PS
Contents	Set of above ㉔, ㉕, ㉖, ㉗ and ㉘					

∗Seal Kit includes coil scraper ㉔, piston seal ㉕, gasket ㉖, rod seal ㉗ and O ring ㉘.
Order a seal kit according to applicable bore size.

⚠ Precautions

Be sure to read before handling. Refer to p.0-39 to 0-46 for Safety Instructions and common precautions on the products mentioned in this catalog.

⚠ Caution

Mounting of Clamp Arm

① Use a clamp arm that is available as an option. To fabricate a clamp arm, make sure that the allowable bending moment and the inertial moment will be within the specified range. If a clamp arm that exceeds the specified value is installed, the internal mechanism in the cylinder could become damaged.

Ensuring Safety

① If one side of the piston is pressurized by supplying air with the clamp arm attached, the piston will move vertically while the clamp arm rotates. This operation could be hazardous to personnel, as their hands or feet could get caught by the clamp arm, or could lead to equipment damage. Therefore, it is important to secure as a danger zone a cylindrical area with the length of the clamp arm as its radius, and the stroke plus 20mm as its height.

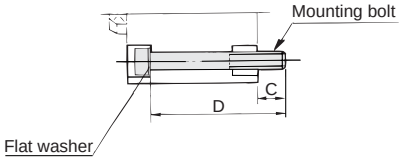
Installation and Adjustment/ Regarding Clamp Arm Removal and Reinstallation

① During the removal or reinstallation of the clamp arm, make sure to use a wrench or a vise to secure the clamp arm before removing or tightening the bolt. This is to prevent the bolt tightening torque from being applied to the piston rod, which could damage the cylinder's internal mechanism.

Mounting bolt for MKB

Mounting method: A through hole mounting bolt is available.
How to order: Suffix "**(MKB)**" to the size of bolts to be used.

Example) M5 X 75ℓ **(MKB)**



Note) Be sure to use a flat washer to mount ø12 and ø16 cylinders via through holes.

Part No.	C	D	Mounting bolt
MKB12-10	8	50	M3 X 50ℓ
MKB12-20	8	60	M3 X 60ℓ
MKB16-10	8.5	50	M3 X 50ℓ
MKB16-20	8.5	60	M3 X 60ℓ
MKB20-10	10	75	M5 X 75ℓ
MKB20-20		85	M5 X 85ℓ
MKB25-10	9	75	M5 X 75ℓ
MKB25-20		85	M5 X 85ℓ
MKB32-10	10.5	85	M5 X 85ℓ
MKB32-20		95	M5 X 95ℓ
MKB40-10	7	75	M5 X 75ℓ
MKB40-20		85	M5 X 85ℓ
MKB50-20	6.5	95	M6 X 95ℓ
MKB50-50	11.5	130	M6 X 130ℓ
MKB63-20	10.5	100	M8 X 100ℓ
MKB63-50		130	M8 X 130ℓ

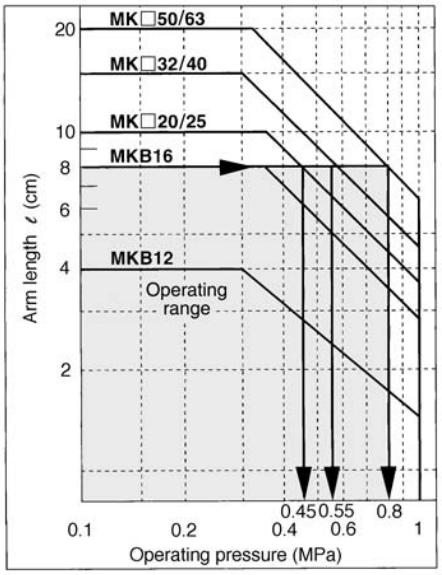
Precautions for Designing and Mounting Arms

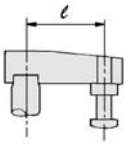
When arms are to be made separately, their length and weight should be within the following range.

1. Allowable bending moment

Use the arm length and operating pressure within graph 1 for allowable bending moment loaded piston rod.

Graph 1



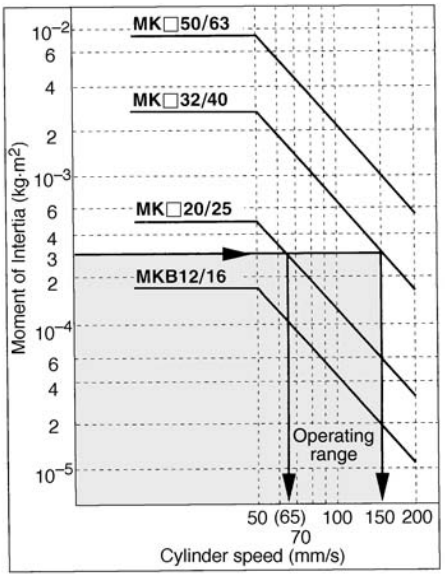


When arm length is 8cm, pressure should be less than
MK□20/25: 0.45MPa
MK□32/40: 0.55MPa
MK□50/63: 0.8MPa

2. Moment of inertia

When the arm is long and heavy, damage of internal parts may be caused due to inertia. Use the inertia moment and cylinder speed within graph 2 based on arm requirements.

Graph 2

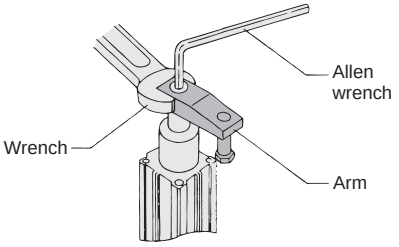


When arm's inertia is 3 X 10^{-4}kg·m², cylinder speed should be less than
MK□20/25: 65mm/s
MK□32/40: 150mm/s
Refer to p.4.1-21 for calculating moment of inertia.

●To attach and detach the arm to and from the piston rod, fix the arm with a wrench or vise and then tighten the bolt. (Excessive force in the direction of rotation applied to the piston rod may damage the internal mechanism.)
Refer to the following table for the tightening torque for mounting.

Nm

Bore size (mm)	Standard tightening torque
12	0.4 to 0.6
16	2 to 2.4
20, 25	4 to 6
32, 40	8 to 10
50, 63	14 to 16

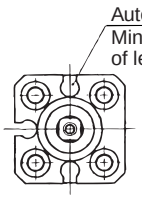


ø12, ø16, ø20, ø25

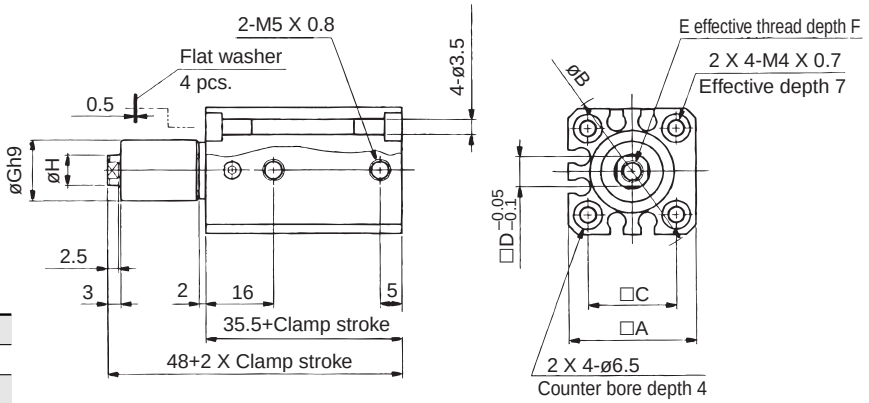
Through hole (Basic)/MKB

Note: Actuators are drawn/shown in their retractesor clamping position.

ø12

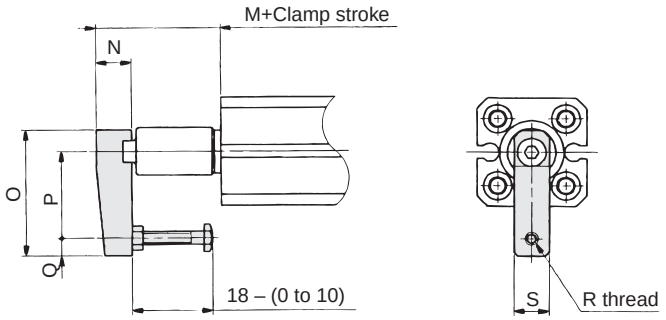


ø16



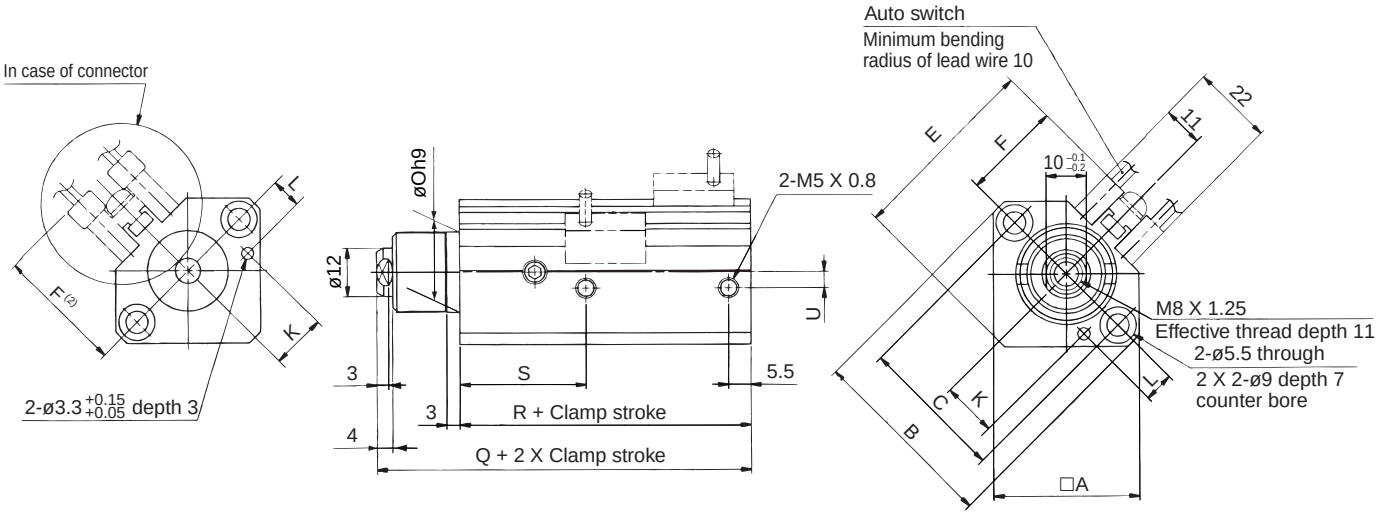
Model	A	B	C	D	E	F	G	H
MKB12	25	32	15.5	5	M3 X 0.5	5.5	11h9 $^{0}_{-0.043}$	6
MKB16	29	38	20	7	M5 X 0.8	6.5	14h9 $^{0}_{-0.043}$	8

With arm/MK□$^{12}_{16}$-□□N

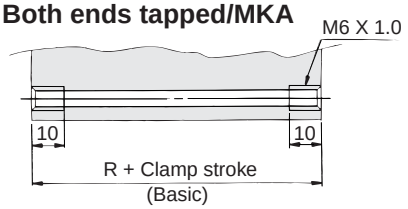


Model	M	N	O	P	Q	R	S
MKB12-□□N	18.5	8	29	20	4	M3 X 0.5	8
MKB16-□□N	21.5	11	36	25	5	M4 X 0.7	11

ø20, ø25



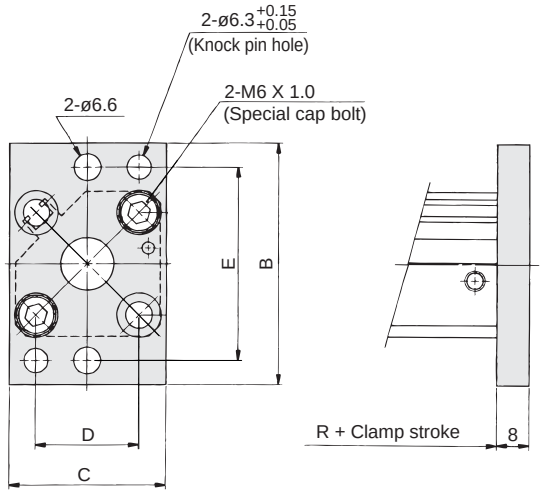
Both ends tapped/MKA



Model	A	B	C	E	F	K	L	Oh9	Q	R	S	U
MKB20	36	46.8	36	48	24.5	13.5 $^{\pm 0.15}$	7.5 $^{\pm 0.15}$	20 $^{0}_{-0.052}$	72.5	62	31	4
MKB20	40	52	40	53.8	27.5	16 $^{\pm 0.15}$	8 $^{\pm 0.15}$	23 $^{0}_{-0.052}$	73.5	63	32	5

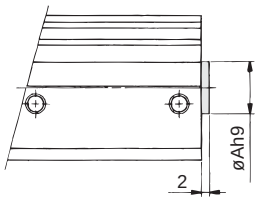
Note 1) Above figure is for D-A73, A80.
Note 2) Dimensions E and F are 7 mm longer for the auto switches with connector (D-A7□C, A80C, J79C).
Note 3) When the rod is extended, the clamp stroke and rotary stroke are added to the appropriate dimensions.

Rear flange/MKG



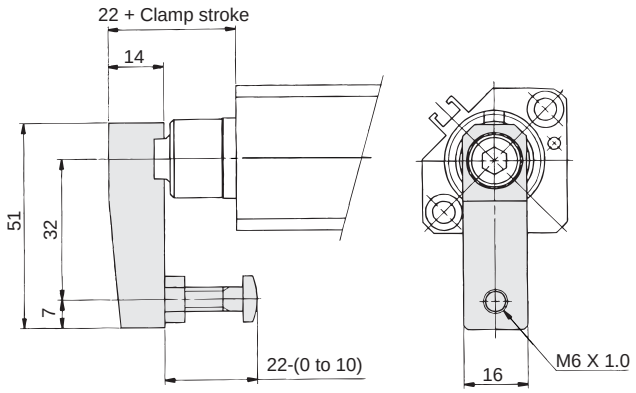
Model	B	C	D	E
MKG20	60	39	$25.5^{\pm0.1}$	$48^{\pm0.15}$
MKG25	64	42	$28^{\pm0.1}$	$52^{\pm0.15}$

Rear boss mounting



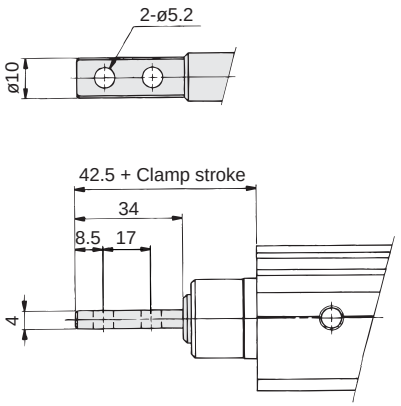
Model	Ah9
MK□20-□□F	$13\ ^{0}_{-0.043}$
MK□25-□□F	$15\ ^{0}_{-0.043}$

With arm/MK□ 20/25 -□□N

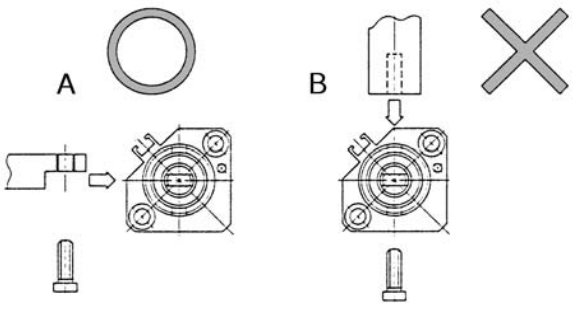


Arm for width across flats

Rod end width across flats/MK□ 20/25 -□□M



Mounting arms for width across flats

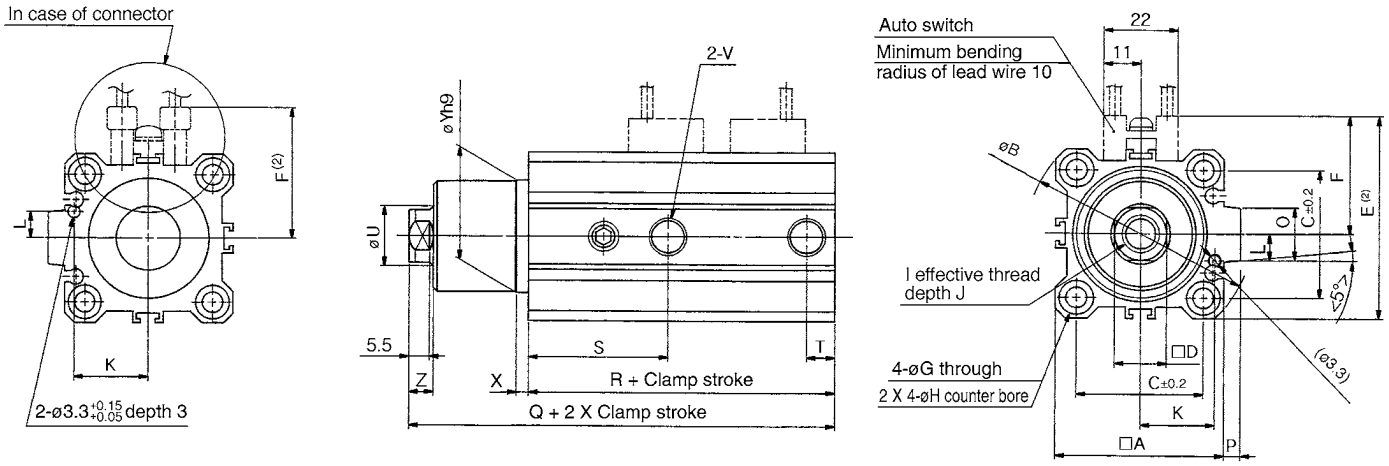


∗When installing the arm for the parallel section at the rod end, the strength of the piston rod may be insufficient depending on the direction in which the arm is installed. Therefore, make sure to install the arm in the direction indicated in diagram A.

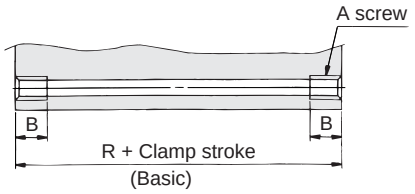
ø32, ø40, ø50, ø63

Through hole (Basic)/MKB

Note: Actuators are drawn/shown in their retractesor clamping position.



Both ends tapped/MKA

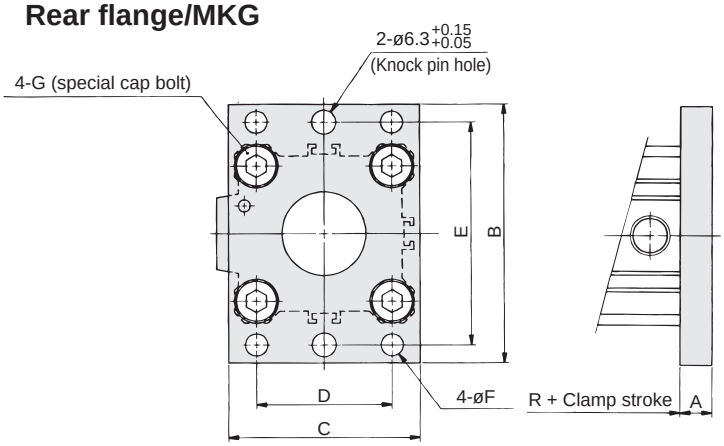


Model	A	B
MKA 32 40	M6 X 1.0	10
MKA50	M8 X 1.25	14
MKA63	M10 X 1.5	18

Model	A	B	C	D	E	F	G	H	I	J	K	L	O	P	Q	R	S	T	U	V	X	Yh9	Z
MKB32	45	60	34	$14^{-0.1}_{-0.2}$	54	31.5	5.5	9 Depth 7	M10 X 1.5	12	$20^{\pm0.15}$	$7^{\pm0.15}$	18	4.5	93.5	71.5	37	7.5	16	Rc(PT)1/8	3	$30^{0}_{-0.062}$	6.5
MKB40	52	69	40	$14^{-0.1}_{-0.2}$	61	35	5.5	9 Depth 7	M10 X 1.5	12	$24^{\pm0.15}$	$7^{\pm0.15}$	18	5	94.5	65	29.5	8	16	Rc(PT)1/8	3	$30^{0}_{-0.062}$	6.5
MKB50	64	86	50	$17^{-0.1}_{-0.2}$	73	41	6.6	11 Depth 8	M12 X 1.75	15	$30^{\pm0.15}$	$8^{\pm0.15}$	22	7	112	76.5	34	10.5	20	Rc(PT)1/4	3.5	$37^{0}_{-0.062}$	7.5
MKB63	77	103	60	$17^{-0.1}_{-0.2}$	86	47.5	9	14 Depth 10.5	M12 X 1.75	15	$35^{\pm0.15}$	$9^{\pm0.15}$	22	7	115	80	35	10.5	20	Rc(PT)1/4	3.5	$48^{0}_{-0.062}$	7.5

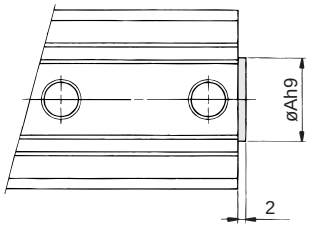
Note 1) Above figure is for D-A73, A80.
Note 2) Dimensions E and F are 7 mm longer for the auto switches with connector (D-A7□C, A80C, J79C).
Note 3) When the rod is extended, the clamp stroke and rotary stroke are added to the appropriate dimensions.

Rear flange/MKG



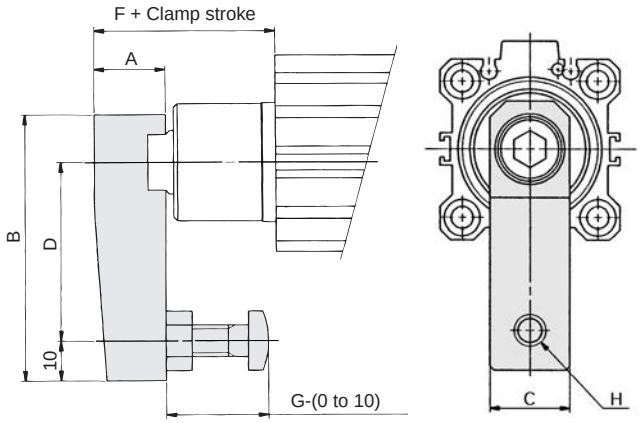
Model	A	B	C	D	E	F	G
MKG32	8	65	48	$34^{\pm0.1}$	$56^{\pm0.15}$	5.5	M6 X 1.0
MKG40	8	72	54	$40^{\pm0.1}$	$62^{\pm0.15}$	5.5	M6 X 1.0
MKG50	9	89	67	$50^{\pm0.1}$	$76^{\pm0.15}$	6.6	M8 X 1.25
MKG63	9	108	80	$60^{\pm0.1}$	$92^{\pm0.15}$	9	M10 X 1.5

Rear boss mounting



Model	Ah9
MK□32-□□F	$21\ ^{0}_{-0.052}$
MK□40-□□F	$28\ ^{0}_{-0.052}$
MK□ 50/63 -□□F	$35\ ^{0}_{-0.062}$

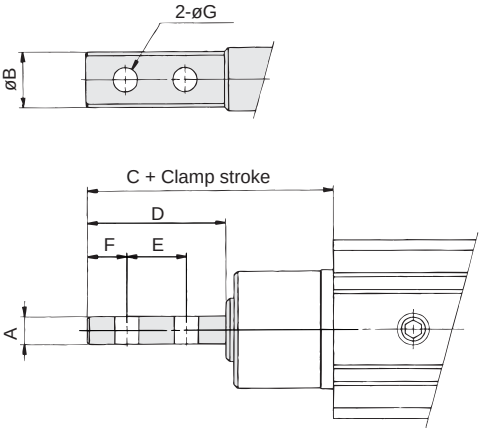
With arm



Model	A	B	C	D	F	G	H
MK□32-□□N	18	67	20	45	35.5	25	M8 X 1.25
MK□40-□□N	18	67	20	45	43	25	M8 X 1.25
MK□50-□□N	22	88	22	65	53	40	M10 X 1.5
MK□63-□□N	22	88	22	65	52.5	40	M10 X 1.5

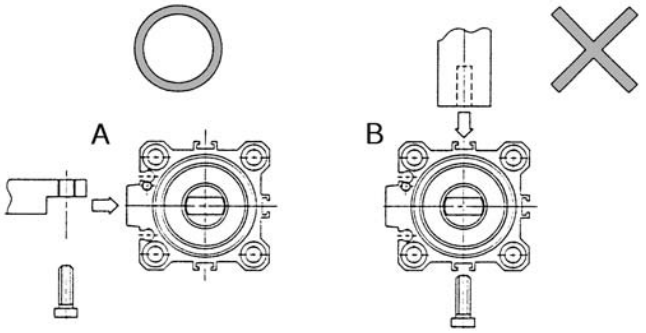
Arm for width across flats

Rod end width across flats



Model	A	B	C	D	E	F	G
MK□32-□□M	6	14	53.5	36	18	9	6.2
MK□40-□□M	6	14	61	36	18	9	6.2
MK□50-□□M	8	18	77	46	23	11.5	8.2
MK□63-□□M	8	18	76.5	46	23	11.5	8.2

Mounting arms for width across flats



∗When installing the arm for the parallel section at the rod end, the strength of the piston rod might be insufficient depending on the direction in which the arm is installed. Therefore, make sure to install the arm in the direction indicated in diagram A.

Series MK
Auto Switch Specifications

Refer to the p.5.3-2 for details of auto switch.

Auto Switch Mounting

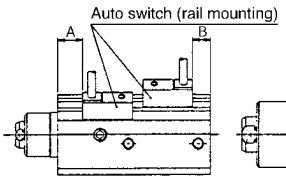
Refer to p.5.3-74 regarding how to mount auto switch.

Applicable Auto Switch

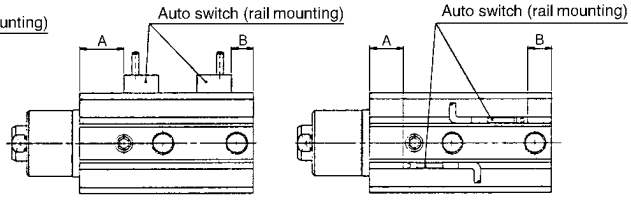
Style	Auto Switch Model	Electrical entry (Function)	Bore size	Page
Reed switch	**D-A7, A8**	Grommet (Perpendicular)	**ø20 to ø63**	5.3-14
	D-A7□H, A80H	Grommet (In-line)		5.3-15
	D-A73C, A80C	Connector		5.3-16
	D-A79W	Grommet (2 colour indication, perpendicular)		5.3-26
	D-A9□	Grommet (In-line)	**ø12, ø16 ø32 to ø63**	5.3-19
	D-A9□V	Grommet (Perpendicular)		5.3-20
Solid state switch	**D-F7□, J79**	Grommet (In-line)	**ø20 to ø63**	5.3-34
	D-F7□V	Grommet (Perpendicular)		5.3-35
	D-J79C	Connector		5.3-36
	D-F7□W, J79W	Grommet (2 colour indication, in-line)		5.3-44
	D-F7□WV	Grommet (2 colour indication, perpendicular)		5.3-45
	D-F7BAL	Grommet (2 colour, water resistant, in-line)		5.3-57
	D-F7□F	Grommet (2 colour, diagnostic output, in-line)		5.3-53
	D-F7NTL	Grommet (With timer, in-line)		5.3-60
	D-F9□	Grommet (In-line)	**ø12, ø16 ø32 to ø63**	5.3-39
	D-F9□V	Grommet (Perpendicular)		5.3-39
	D-F9□W	Grommet (2 colour, in-line)		5.3-66
	D-F9□WV	Grommet (2 colour, perpendicular)		5.3-66
	D-F9BAL	Grommet (2 colour, water resistant, in-line)		5.3-67
	D-F5DWL	Grommet (2 colour, strong magnetic field resistant, in-line)	**ø40 to ø63**	5.3-64

Auto Switch Mounting Position (Stroke end)

ø20, ø25



ø32 to ø63



Mounting	Rail mounting										Direct mounting					
Model	**D-A7, A8**		**D-A7□H, A80H D-A73C, A80C D-F7□, J79 D-F7□V, J79C**		**D-A79W**		**D-F7BAL D-F7PW D-F7□F D-J79W D-F7□WV**		**D-P5DW**		**D-A9□ D-A9□V**		**D-F9□ D-F9□V D-F9□WV**		**D-F9□W D-F9BAL**	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
MK□20	28	6.5	28.5	7	25.5	4	32.5	11	—	—	—	—	—	—	—	—
MK□25	28.5	7	29	7.5	26	4.5	33	11.5	—	—	—	—	—	—	—	—
MK□32	32.5	6	33	6.5	30	3.5	37	10.5	—	—	31.5	5	35.5	9	34.5	8
MK□40	23.5	8.5	24	9	21	6	28	13	19.5	4.5	22.5	7.5	26.5	11.5	25.5	10.5
MK□50	28	11.5	28.5	12	25.5	9	32.5	16	24	7.5	27	10.5	31	14.5	30	13.5
MK□63	28	14.5	28.5	15	25.5	12	32.5	19	24	10.5	27	13.5	31	17.5	30	16.5

Auto Switch Mounting Bracket Part No.

Bore size (mm)	Mounting bracket	Note	Applicable switch	
			Reed switch	Solid state switch
20/25	BQ-1	•Auto switch mounting screw (M3 X 0.5 X 8ℓ) •Square nut	**D-A7, A8 D-A73C, A80C D-A7□H, A80H D-A79W**	**D-F7□, J79 D-F7□V D-J79C D-F7□W, J79W D-F7□WV D-F7BAL D-F7□F D-F7NTL**
32/40 50/63	BQ-2	•Auto switch mounting screw (M3 X 0.5 X 10ℓ) •Auto switch spacer •Auto switch mounting nut		
40/50 63	BQP1-050	•Switch mounting bracket •Auto switch mounting nut •Cross-recessed panhead small screw (M3 X 0.5 X 16ℓ) •Hexagon socket head cap bolt (M3 X 0.5 X 14ℓ)	———	**D-P5DW□**

Stainless steel mounting screw set

The set of stainless steel mounting screws (with nuts) described below is available and can be used depending on the operating environment. (The spacers for auto switches must be ordered separately, as they are not included.)

BBA2: For D-A7/A8/F7/J7 types

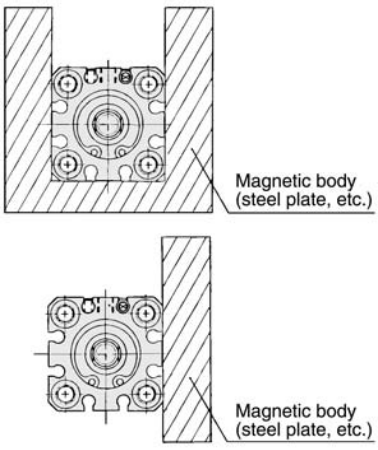
The stainless steel screws described above are used when the D-F7BAL switch is shipped mounted on to the cylinder. When the switches are shipped as individual parts, the BBA2 set is included.

⚠ Precautions

Be sure to read before handling. Refer to p.0-44 to 0-46 for common precautions.

Mounting

- As shown in the drawing below, when a magnetic body is in close contact with the cylinder body periphery (including the case where only one side is in contact), the function of the auto switch may be unstable. Contact SMC if this occurs.



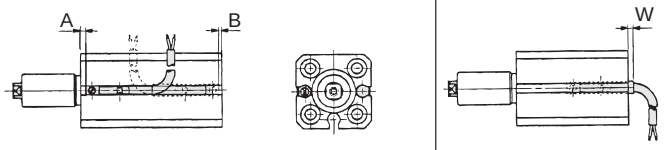
Auto Switch Mounting Position and Mounting Height

ø12

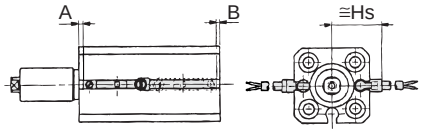
Mounting condition

a) b)

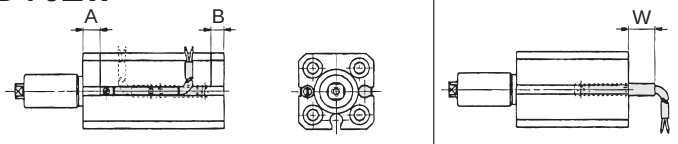
D-A9□



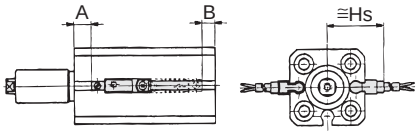
D-A9□V



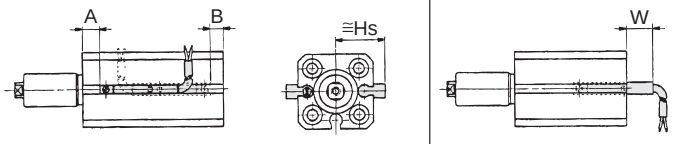
D-F9□
D-F9□W



D-F9□V
D-F9□WV



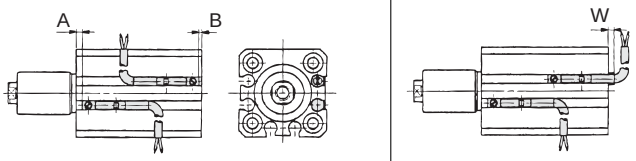
D-F9BAL

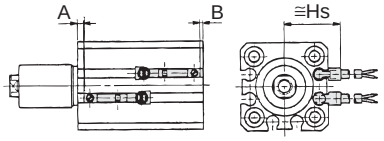


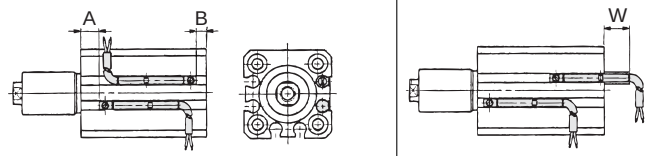
ø16

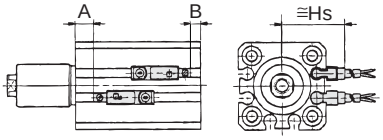
Mounting condition

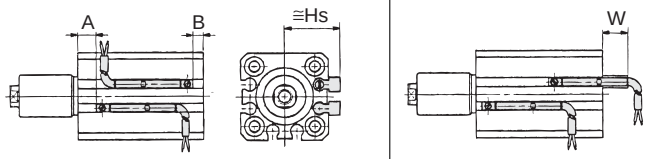
a) b)











(mm)

Model		D-A9□			D-A9□V			D-F9N/D-F9B D-F9P/D-F9□W			D-F9□V/D-F9□WV		
Symbol		A	B	W	A	B	Hs	A	B	W	A	B	W
Bore size (mm)	**12**	7.5	0	1.5(4)	7.5	0	17	11.5	4.5	5.5	11.5	4.5	19.5
	16	8	0	2(4.5)	8	0	19	12	4	6	12	4	21.5

Model		D-F9BAL			
Symbol		A	B	W	Hs
Bore size (mm)	**12**	10.5	3.5	14.5	17
	16	11	3	15	19

Rotary Clamp Cylinder/Heavy Duty

Series MK2

ø20, ø25, ø32, ø40, ø50, ø63

How to Order

E MK2 B 20 10 R F A73 S

Thread Port (ø32 to ø63)

—	Rc(PT)
E	G(PF)

Rotary clamp cylinder

Mounting

Symbol	Style
B	Through hole & both ends tapped (Standard)
G	Rear flange*

* The rear flange is equipped with boss mounting, so be sure to specify body option "F".

Bore size

20	20mm	40	40mm
25	25mm	50	50mm
32	32mm	63	63mm

Clamp stroke

Symbol	Clamp stroke	Bore size
10	10mm	ø20 to ø40
20	20mm	ø20 to ø63
50	50mm	ø50 to ø63

Rotation direction (Release → Clamp)

R	Clockwise
L	Counterclockwise

Body option

—	Standard (Female thread)
F	Rear boss mounting
N	With arm

Auto switch

—	Without auto switch (Built-in magnet)

* Refer to table below regarding auto switch model no.

Number of auto switches

—	2
S	1

Option Part No./Arm

Bore size (mm)	Part No.	Accessories
20	MK-A020	Clamp bolt Hexagonal socket head cap screw Hexagonal nut Spring seat
25		
32	MK-A032	
40		
50	MK-A050	
60		

Mounting Bracket Part No./Flange

Bore size (mm)	Part No.	Accessories
20	MK2-F020	Boss mounting ring Set pin Bolt for cylinder body
25	MK2-F025	
32	MK2-F032	
40	MK2-F040	
50	MK2-F050	
63	MK2-F063	

Applicable Auto Switches/ Refer to the p.5.3-2 for further information on auto switch.

Style	Special function	Electrical entry	Indicator	Wiring (output)	Load voltage DC	Load voltage DC	Load voltage AC	Rail mounting ø20 to ø63 Perpendicular	Rail mounting ø20 to ø63 In-line	Direct mounting ø32 to ø63 Perpendicular	Direct mounting ø32 to ø63 In-line	Lead wire* (m) 0.5 (—)	3 (L)	5 (Z)	— (N)	Applicable load	
Reed switch	—	Grommet	Yes	3 wire (NPN Equiv.)	—	5V	—	—	A76H	A96V	A96	●	●	—	—	IC	—
				2 wire	—	—	200V	A72	A72H	—	—	●	●	—	—		Relay PLC
					24V	12V	100V	A73	A73H	—	—	●	●	●	—	—	
			No					—	—	A93V	A93	●	●	—	—		
						5V, 12V	≤100V	A80	A80H	A90V	A90	●	●	—	—	IC	
		Connector	Yes			12V	—	A73C	—	—	—	●	●	●	●	—	
			No			5V, 12V	≤24V	A80C	—	—	—	●	●	●	●	IC	
	Diagnostic indicator (2 colour)	Grommet	Yes			—	—	A79W	—	—	—	●	●	—	—	—	
Solid state switch	—	Grommet	Yes	3 wire (NPN)	24V	5V, 12V	—	F7NV	F79	—	—	●	●	○	—	IC	Relay PLC
						12V		—	—	F9NV	F9N	●	●	—	—	—	
				3 wire (PNP)		5V, 12V		F7PV	F7P	—	—	●	●	○	—	IC	
						12V		—	—	F9PV	F9P	●	●	—	—		
				2 wire				F7BV	J79	—	—	●	●	○	—	—	
								—	—	F9BV	F9B	●	●	—	—		
		Connector						J79C	—	—	—	●	●	●	●		
	Diagnostic indicator (2 color)	Grommet		3 wire (NPN)		5V, 12V	—	—	—	F9NWV	F9NW	●	●	○	—		
								F7NWV	F79W	—	—	●	●	○	—	IC	
				3 wire (PNP)				—	F7PW	—	—	●	●	○	—		
						12V		—	—	F9PWV	F9PW	●	●	○	—	—	
				2 wire				F7BWV	J79W	F9BWV	F9BW	●	●	○	—		
	Water resistant (2 colour)							—	F7BA	—	F9BA	—	●	○	—		
	With timer			3 wire (NPN)		5V, 12V		—	F7NT	—	—	—	●	○	—	IC	
	Diagnostic output (2 colour)			4 wire (NPN)				—	F79F	—	—	●	●	○	—		
	Latching with diagnostic output (2 colour)					—		—	F7LF	—	—	●	●	○	—	—	
	Strong magnetic field (2 colour)			2 wire				—	P5DW**	—	—	—	●	●	—	—	

* Lead wire 0.5m····· – (Example) A80C 5m····· Z (Example) A80CZ
3m····· L (Example) A80CL – ····· N (Example) A80CN

* Solid state auto switches marked with a "○" are manufactured upon receipt of order.

** D-P5DW can be mounted for only ø40, ø50 and ø63.

With arm

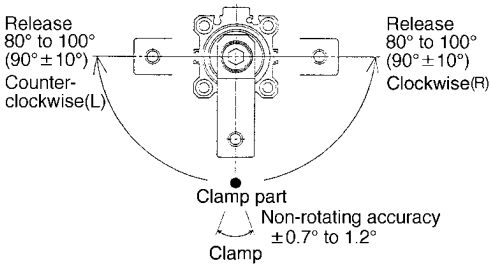
Head side flange

Specifications

Bore size (mm)	20	25	32	40	50	63
Operation	Double acting					
Rotary angle (4)	90° ± 10°					
Rotary direction (3)	R: Clockwise L: Counterclockwise					
Rotary stroke (mm)	9.5		15		19	
Clamp stroke (mm)	10·20				20·50	
Allowable moment Nm (1)	7	13	27	47	107	182
Theoretical clamp force N (2)	100	185	300	525	825	1400
Fluid	Air					
Proof pressure	1.5MPa					
Operating pressure range	0.1 to 10MPa					
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					
Port size	M5 X 0.8		1/8		1/4	
Mounting	Through hole/Both ends tapped (Common), Rear flange					
Cushion	Rubber bumper					
Stoke tolerance (mm)	$^{+0.6}_{-0.4}$					
Piston speed	50 to 200 mm/s					
Non-rotating accuracy	±1.2°		±0.9°		±0.7°	

Note 1) Max. bending moment applied to the piston rod side.
Note 2) At 0.5 MPa.
Note 3) Direction of rotation viewed from the rod side when the piston rod is retracting.
Note 4) Refer to "Rotary angle" diagram.

Rotary Angle



Theoretical Force

Unit: N

Bore size (mm)	Rod dia. (mm)	Operating direction	Piston area (cm^2)	Operating pressure (MPa) 0.3	0.5	0.7	1.0
20	12	R	2	60.8	100	139	200
		H	3	90.2	149	208	298
25	12	R	3.7	112	185	258	370
		H	4.9	149	245	341	490
32	16	R	6	182	300	418	600
		H	8	243	400	557	800
40	16	R	10.5	319	525	731	1050
		H	12.5	380	625	870	1250
50	20	R	16.5	502	825	1149	1648
		H	19.6	596	980	1365	1961
63	20	R	28	851	1400	1950	2801
		H	31.2	948	1560	2172	3121

Note) Theoretical force (N)=Pressure (MPa) X Piston area (cm^2) X 100 Operation direction R: Rod side (Clamp) H: Head side (Release)

Made to Order

Refer to the p.5.4-1 regarding made to order for series MK2.

Weight/Mounting

Unit: g

Clamp stroke (mm)	Bore size (mm) 20	25	32	40	50	63
10	260	295	353	635	—	—
20	300	335	555	680	1170	1620
50	—	—	—	—	1420	1890

Additional Weight

Unit: g

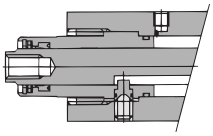
Bore size (mm)	20	25	32	40	50	63
Rear boss mounting	2	3	5	7	13	25
With arm	100	100	200	200	350	350
Rear flange	133	153	166	198	345	531

Calculation method (Example) MK2G20-10RFN

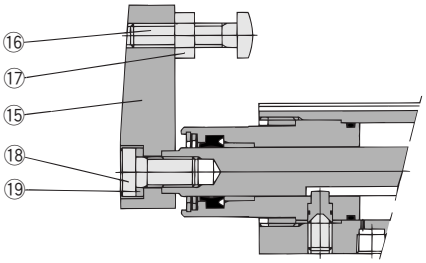
- Standard calculation: MK2B20-10R 260g
- Extra weight calculation: Rear flange 133g
  Rear boss mounting 2g
  With arm 100g
  495g

Construction

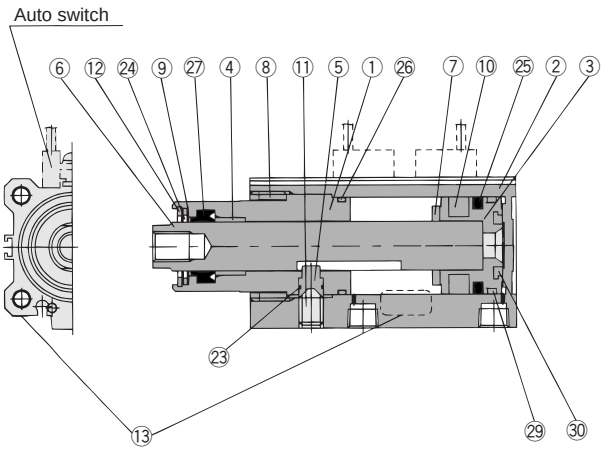
MK2□20, 25



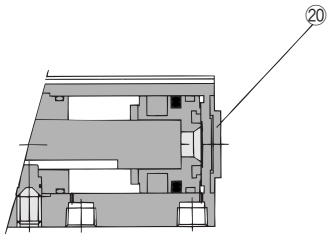
With arm (N)



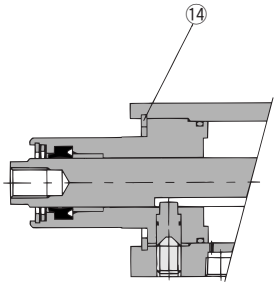
MK2□32



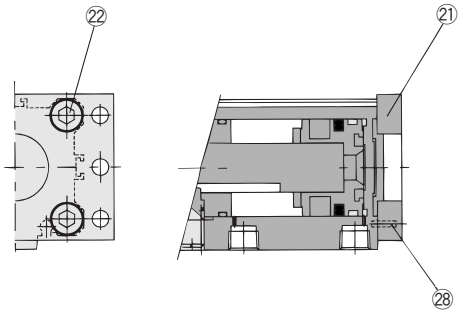
Rear boss mounting (F)



MK2□40 to 63



Rear flange (G)



Component Parts

No.	Description	Material	Note
①	Rod cover	Aluminum alloy	
②	Cylinder tube	Aluminum alloy	
③	Piston	Aluminum alloy	
④	Bushing	Copper bearing material	Only ø32 to ø63
⑤	Guide pin	Stainless steel	
⑥	Piston rod	Stainless steel	
⑦	Bumper	Urethane	
⑧	Ring nut	Copper alloy	Only ø20 to ø32
⑨	Scraper pressure	Stainless steel	
⑩	Magnet		
⑪	Hex. socket head cap screw	Chrome molybdenum steel	Sharp end section: 90°
⑫	R-shape snap ring	Spring steel	
⑬	Plate	Aluminum	
⑭	C type retaining ring	Carbon tool steel	Only ø40 to ø53
⑮	Arm	Rolled steel	
⑯	Clamp bolt	Chrome molybdenum steel	

Component Parts

No.	Description	Material	Note	
⑰	Hexagonal nut	Rolled steel		
⑱	Hex. socket head cap bolt	Chrome molybdenum steel		
⑲	Spring washer	Hard steel		
⑳	Boss mount ring	Aluminum alloy		
㉑	Flange	Rolled steel		
㉒	Hex. socket head cap bolt	Chrome molybdenum steel	Quantity	ø20, 25: 2 ø32 to 63: 4
㉓	O ring	NBR		
㉔	Coil scraper	Phosphor bronze		
㉕	Piston seal	NBR		
㉖	Gasket	NBR		
㉗	Rod seal	NBR		
㉘	Parallel pin	Stainless steel		
㉙	Wear ring	Resin		
㉚	Bumper B	Urethane		

Replacement Parts: Seal Kits

Bore size (mm)	ø20	ø25	ø32	ø40	ø50	ø63
Part No.	Not disassembled			MK2-40-PS	MK2-50-PS	MK2-63-PS
Contents	Set of above ㉓ ㉔ ㉕ ㉖ ㉗					

∗Seal kit includes O ring ㉓, coil scraper ㉔, piston seal ㉕, gasket ㉖ and rod seal ㉗.
Order a seal kit according to applicable bore size.

⚠ Precautions

Be sure to read before handling.
Refer to p.0-39 to 0-46 for Safety Instructions and common precautions on the products mentioned in this catalog.

⚠ Caution

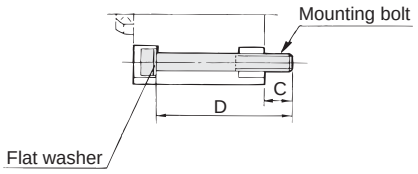
Handling

① Mount the cylinder so that the clamping piston will be approximately in the centre of the clamp stroke.
② The auto switch is temporarily mounted for shipment, so adjust its position when mounting the cylinder. (See the auto switch mounting position on p.4.1-20.)
③ Do not apply clamping and other loads when the piston rod is turning.

Mounting bolt for MK2B

Mounting method: A through hole mounting bolt is available.
How to order: Suffix "**(MK2B)"** to the size of bolts to be used.

Example) M5 X 75ℓ **(MK2B)**



Note) Be sure to use a flat washer to mount cylinders via through holes.

Part No.	C	D	Mounting bolt
MK2B20-10	8.5	75	M5 X 75ℓ
MK2B20-20		85	M5 X 85ℓ
MK2B25-10	10.5	80	M5 X 80ℓ
MK2B25-20		90	M5 X 90ℓ
MK2B32-10	10	90	M5 X 90ℓ
MK2B32-20		100	M5 X 100ℓ
MK2B40-10	6	80	M5 X 80ℓ
MK2B40-20		90	M5 X 90ℓ
MK2B50-20	10.5	105	M6 X 105ℓ
MK2B50-50	10.5	135	M6 X 135ℓ
MK2B63-20	9	105	M8 X 105ℓ
MK2B63-50		135	M8 X 135ℓ

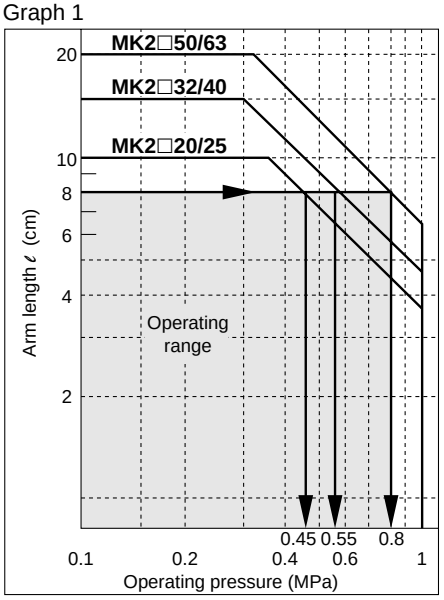
Precautions for Designing and Mounting Arms

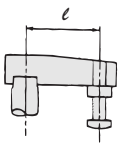
When arms are to be made separately, their length and weight should be within the following range.

1. Allowable bending moment

Use the arm length and operating pressure within graph 1 for allowable bending moment loaded piston rod.

Graph 1



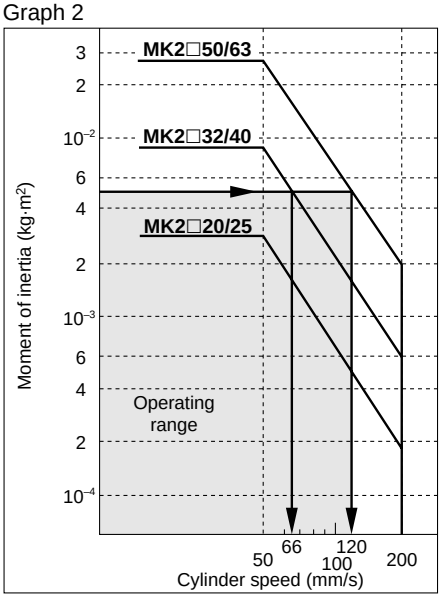


When arm length is 8cm, pressure should be less than
MK2□20/25: 0.45MPa
MK2□32/40: 0.55MPa
MK2□50/63: 0.8MPa

2. Moment of inertia

When the arm is long and heavy, damage of internal parts may be caused due to inertia. Use the inertia moment and cylinder speed within graph 2 based on arm requirements.

Graph 2

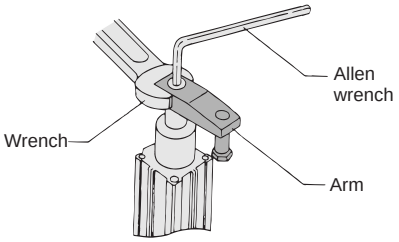


When arm's moment of inertia is 5 X 10^{-3}kg/m², cylinder speed should be less than
MK2□32/40: 66mm/s
MK2□50/63: 120mm/s
Refer to p.4.1-21 for calculating moment of inertia.

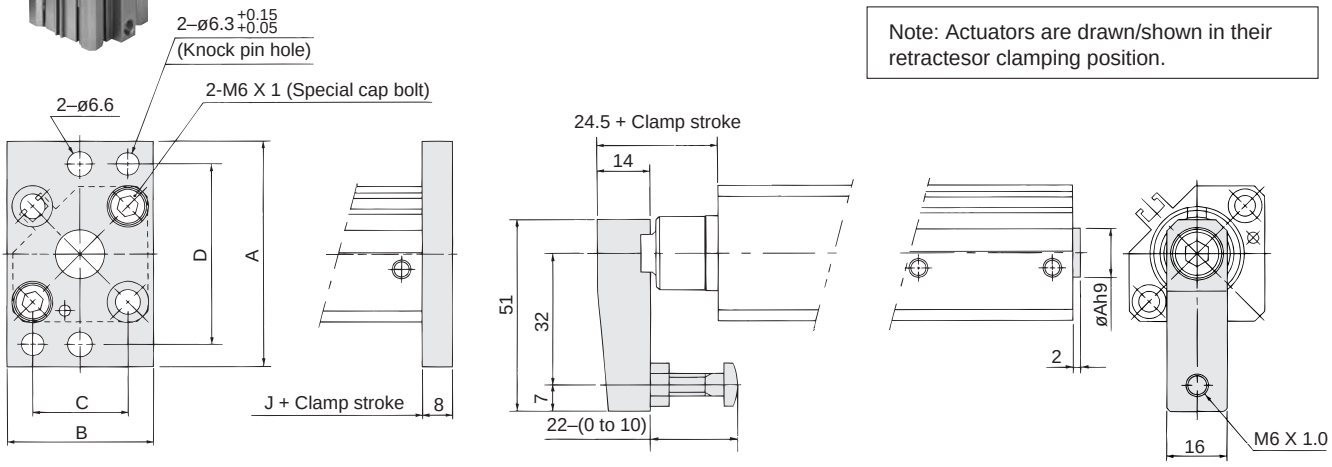
●To attach and detach the arm to and from the piston rod, fix the arm with a wrench or vise and then tighten the bolt. (Excessive force in the direction of rotation applied to the piston rod may damage the internal mechanism.)
Refer to the following table for the tightening torque for mounting.

Nm

Bore size (mm)	Standard tightening torque
20, 25	4 to 6
32, 40	8 to 10
50, 63	14 to 16



ø20, ø25



Note: Actuators are drawn/shown in their retractesor clamping position.

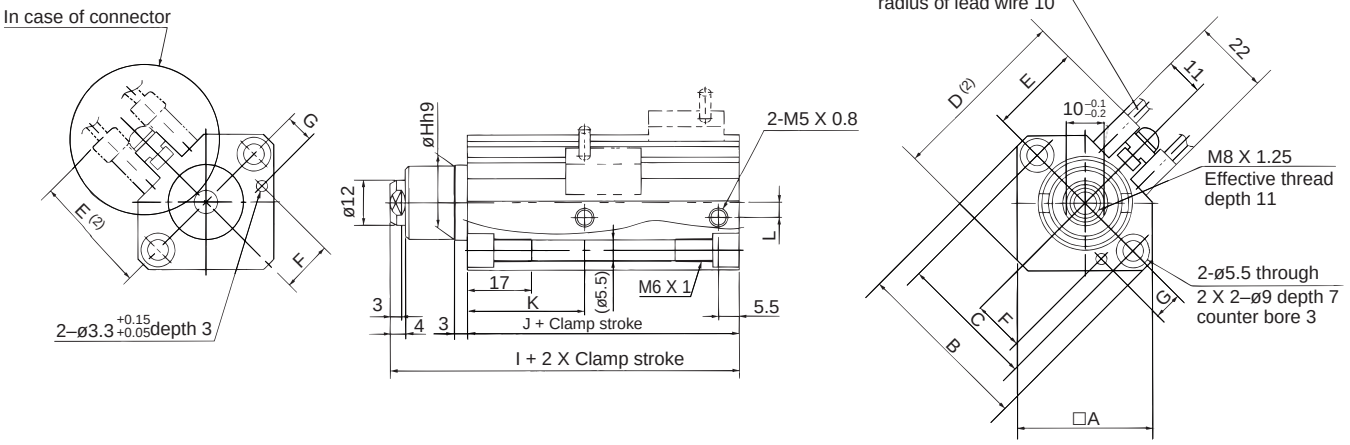
With arm

Rear flange

Model	A	B	C	D
MK2G20	60	39	$25.5^{\pm0.1}$	$48^{\pm0.15}$
MK2G25	64	42	$28^{\pm0.1}$	$52^{\pm0.15}$

Rear boss mounting

Model	øAh9
MK2□20-□□F	$13\ ^{0}_{-0.043}$
MK2□25-□□F	$15\ ^{0}_{-0.043}$

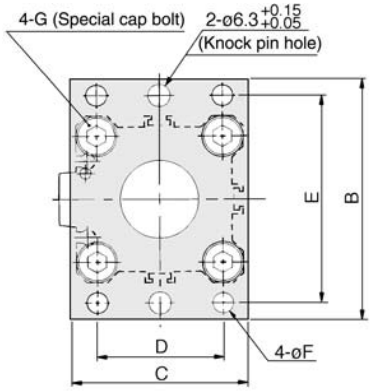


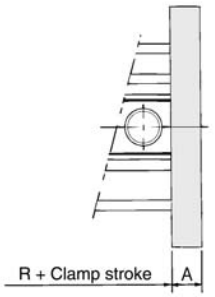
Through hole & both ends tapped (standard)

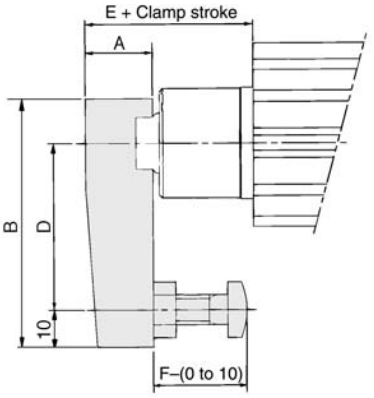
Model	□A	B	C	D	E	F	G	øHh9	I	J	K	L
MK2B20	36	46.8	36	48	24.5	$13.5^{\pm0.15}$	$7.5^{\pm0.15}$	$20\ ^{0}_{-0.052}$	75.5	62.5	31	4
MK2B25	40	52	40	53.8	27.5	$16\ ^{\pm0.15}$	$8^{\pm0.15}$	$23\ ^{0}_{-0.052}$	78.5	65.5	32	5

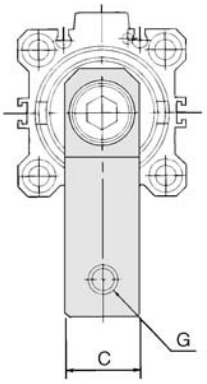
Note 1) Above figure is for D-A73, A80
Note 2) Dimensions E and F are 7mm longer for the auto switches with connector (D-A7□C, A80C, J79C).
Note 3) When the rod is extended, the clamp stroke and rotary stroke are added to the appropriate dimensions.

ø32, ø40, ø50, ø63







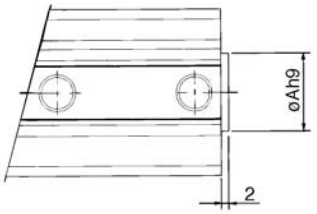


Rear flange

Model	A	B	C	D	E	øF	G
MK2G32	8	65	48	34 ±0.1	56 ±0.15	5.5	M6 X 1.0
MK2G40	8	72	54	40 ±0.1	62 ±0.15	5.5	M6 X 1.0
MK2G50	9	89	67	50 ±0.1	76 ±0.15	6.6	M8 X 1.25
MK2G63	9	108	80	60 ±0.1	92 ±0.15	9	M10 X 1.5

With arm

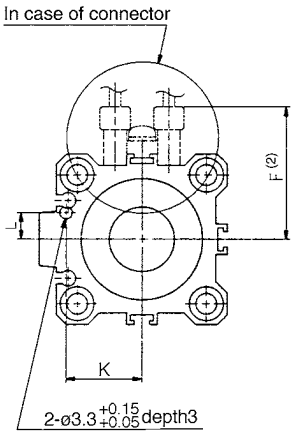
Model	A	B	C	D	E	F	G
MK2□32-□□N	18	67	20	45	39	25	M8 X 1.25
MK2□40-□□N	18	67	20	45	46	25	M8 X 1.25
MK2□50-□□N	22	88	22	65	58	40	M10 X 1.5
MK2□63-□□N	22	88	22	65	57.5	40	M10 X 1.5

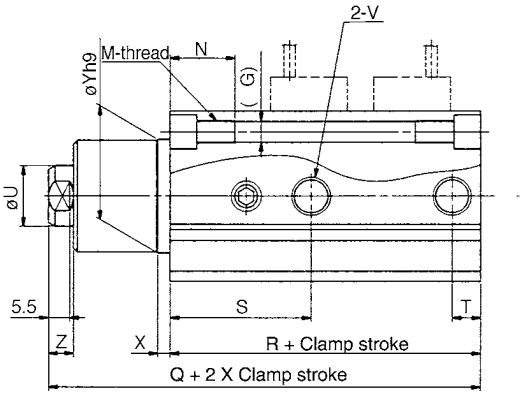


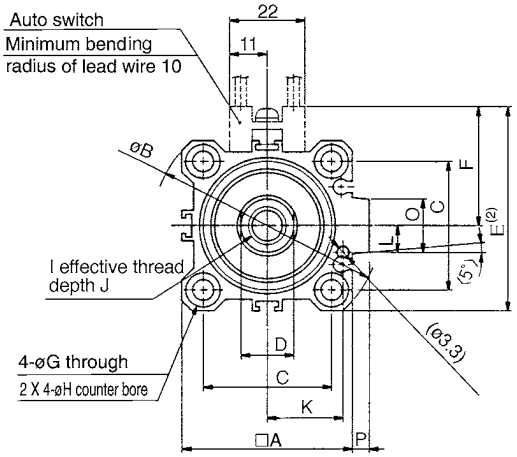
Rear boss mounting

Model	øAh9
MK2□32-□□F	21 $^{0}_{-0.052}$
MK2□40-□□F	28 $^{0}_{-0.052}$
MK2□$^{50}_{63}$-□□F	35 $^{0}_{-0.062}$

Note 1) Below figure is for D-A73, A80.
Note 2) Dimensions E and F are 7mm longer for the auto switches with connector (D-A7□C, A80C, J79C).







Through hole & both ends tapped (standard)

Model	□A	B	C	D	E	F	øG	øH	I	J	K	L	M	N	O	P	Q	R	S	T	øU	V	X	øYh9	Z
MK2B32	45	60	34	14 $^{-0.1}_{-0.2}$	54	31.5	5.5	9 Depth 7	M10 X 1.5	12	20 ±0.15	7 ±0.15	M6 X 1.0	17	14	4.5	101.5	76	37	7.5	16	1/8	3	30 $^{0}_{-0.62}$	6.5
MK2B40	52	69	40	14 $^{-0.1}_{-0.2}$	61	35	5.5	9 Depth 7	M10 X 1.5	12	24 ±0.15	7 ±0.15	M6 X 1.0	17	14	5	102.5	70	29.5	8	16	1/8	3	30 $^{0}_{-0.62}$	6.5
MK2B50	64	86	50	17 $^{-0.1}_{-0.2}$	73	41	6.6	11 Depth 8	M12 X 1.75	15	30 ±0.15	8 ±0.15	M8 X 1.25	22	19	7	122	81.5	34	10.5	20	1/4	3.5	37 $^{0}_{-0.62}$	7.5
MK2B63	77	103	60	17 $^{-0.1}_{-0.2}$	86	47.5	9	14 Depth 10.5	M12 X 1.75	15	35 ±0.15	9 ±0.15	M10 X 1.5	28.5	19	7	125	85	35	10.5	20	1/4	3.5	48 $^{0}_{-0.62}$	7.5

Note 1) This cylinder rod is retracted.
Note 2) Rotation direction is in the retracted direction from the rod side.
Note 3) When the rod is extended, the clamp stroke and rotary stroke are added to the appropriate dimensions.

Series MK2
Auto Switch Specifications (ø20 to ø63)

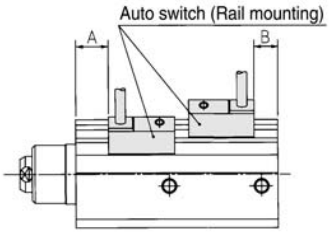
Refer to the p.5.3-2 for details of auto switch.

Applicable Auto Switch

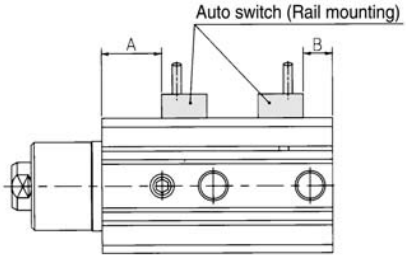
Style	Auto switch model	Electrical entry (Function)	Bore size	Page
Reed switch	**D-A7, A8**	Grommet (Perpendicular)	**ø20 to ø63**	5.3-14
	D-A7□H, A80H	Grommet (In-line)		5.3-15
	D-A73C, A80C	Grommet (Connector)		5.3-16
	D-A79W	Grommet (2 colour indication, Perpendicular)		5.3-26
	D-A9□	Grommet (In-line)	**ø32, ø63**	5.3-19
	D-A9□V	Grommet (Perpendicular)		5.3-20
Solid state switch	**D-F7□, J79**	Grommet (In-line)	**ø20 to ø63**	5.3-34
	D-F7□V	Grommet (Perpendicular)		5.3-35
	D-J79C	Grommet (Connector)		5.3-36
	D-F7□W, J79W	Grommet (2 colour indication, in-line)		5.3-44
	D-F7□WV	Grommet (2 colour indication, Perpendicular)		5.3-45
	D-F7BAL	Grommet (2 colour, water resistant, in-line)		5.3-57
	D-F7□F	Grommet (2 colour, diagnostic output, in-line)		5.3-53
	D-F7NTL	Grommet (With timer, in-line)		5.3-60
	D-F9□	Grommet (In-line)	**ø32, ø63**	5.3-39
	D-F9□V	Grommet (Perpendicular)		5.3-39
	D-F9□W	Grommet (2 colour indication, in-line)		5.3-66
	D-F9□WV	Grommet (2 colour indication, Perpendicular)		5.3-66
	D-F9BAL	Grommet (2 colour, water resistant, in-line)		5.3-67
	D-P5DWL	Grommet (2 colour, strong magnetic field resistant, in-line)	**ø40 to ø63**	5.3-64

Auto Switch Mounting Position (Stroke end)

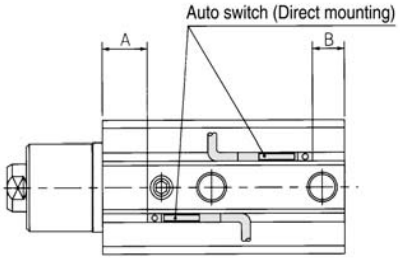
ø20, ø25



ø32 to ø63



ø32 to ø63



Mounting	Rail mounting										Direct mounting					
Model	**D-A7, A8**		**D-A7□H, A80H D-A73C, A80C D-F7□, J79 D-F7□V, J79C**		**D-A79W**		**D-F7BA D-F7□W D-F7□F D-J79W D-F7□WV**		**D-P5DW**		**D-A9□ D-A9□V**		**D-F9□ D-F9□V**		**D-F9□W D-F9□WV D-F9BAL**	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
MK2□20	28.5	6	29	6.5	26	3.5	33	10.5	–	–	–	–	–	–	–	–
MK2□25	29	6.5	29.5	7	26.5	4	33.5	11	–	–	–	–	–	–	–	–
MK2□32	32.5	10.5	33	11	30	8	37	15	–	–	31.5	9.5	35.5	13.5	34.5	12.5
MK2□40	23.5	13.5	24	14	21	11	28	18	19.5	9.5	22.5	12.5	26.5	16.5	25.5	15.5
MK2□50	28	16.5	28.5	17	25.5	14	32.5	21	24	12.5	27	15.5	31	19.5	30	18.5
MK2□63	28.5	19.5	29	20	26	17	33	24	24.5	15.5	27.5	18.5	31.5	22.5	30.5	21.5

Auto Switch Mounting Bracket Part No.

Bore size (mm)	Mounting bracket No.	Note	Applicable auto switch	
			Reed switch	Solid state switch
20/25	BQ-1	●Auto switch mounting screw (M3 X 0.5 X 8ℓ) ●Square nut	**D-A7, A8 D-A73C, A80C D-A7□H, A80H D-A79W**	**D-F7□, J79, D-F7□V D-J79C D-F7□W, J79W, D-F7□WV D-F7BAL, D-F7□F, D-F7NTL**
32/40 50/63	BQ-2	●Auto switch mounting screw (M3 X 0.5 X 10ℓ) ●Auto switch spacer ●Auto switch mounting nut		
40/50 63	BQP1-050	●Switch mounting bracket ●Auto switch mounting nut ●Cross-recessed panhead small screw (M3 X 0.5 X 16ℓ) ●Hexagon socket head cap bolt (M3 X 0.5 X 14ℓ)	—	**D-P5DW**

The set of stainless steel mounting screws (with nuts) described below is available and can be used depending on the operating environment. (The spacers for auto switches must be ordered separately, as they are not included.)

BBA2: For D-A7/A8/F7/J7 types

The stainless steel screws described above are used when the D-F7BAL switch is shipped mounted on to the cylinder.

When the switches are shipped as individual parts, the BBA2 set is included.

Caution/Precautions for Handling

Be sure to read before handling.

Refer to p.0.44 to 0-46 for common auto switch precautions.

When equipped with strong magnetic resistant auto switch D-P5DWL

If welding cables or welding gun electrodes are in the vicinity of the cylinder, the magnets in the cylinder could be affected by the external magnetic fields. (Contact SMC if the welding amperage exceeds 20,000A.) If the source of strong magnetism comes in contact with the cylinder or an auto switch, make sure to install the cylinder away from the source of the magnetism.

If the cylinder is to be used in an environment in which spatter will come in direct contact with the lead wires, cover the lead wires with a protective tube. For the protective tube, use a tube with a bore of ø7 or more, which excels in heat resistance and flexibility.

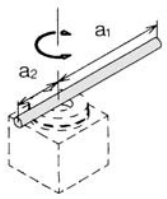
Contact SMC if an inverter welder or a DC welder will be used.

Calculation for Moment of Inertia

I: Moment of Inertia (kg·m^2) m: Load weight (kg)

q Thin bar

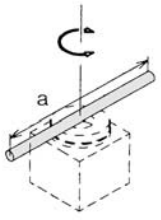
Position of rotary axis: Vertical to the bar and through the end



$$I = m_1 \cdot \frac{a_1^2}{3} + m_2 \cdot \frac{a_2^2}{3}$$

w Thin bar

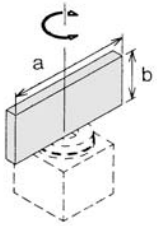
Position of rotary axis: Vertical to the bar and through the centre of gravity



$$I = m \cdot \frac{a^2}{12}$$

e Thin rectangular plate

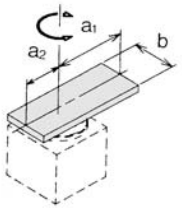
Position of rotary axis: Parallel to side b and through the centre of gravity



$$I = m \cdot \frac{a^2}{12}$$

r Thin rectangular plate

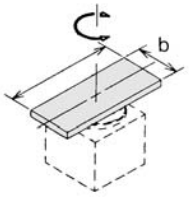
Position of rotary axis: Vertical to the plate and through the end



$$I = m_1 \cdot \frac{4a_1^2+b^2}{12} + m_2 \cdot \frac{4a_2^2+b^2}{12}$$

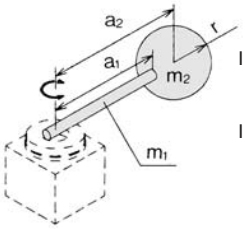
t Thin rectangular plate

Position of rotary axis: Through the centre of gravity and vertical to the plate (Same as also thick rectangular plate)



$$I = m \cdot \frac{a^2+b^2}{12}$$

y Load at the end of lever arm



$$I = m_1 \cdot \frac{a_1^2}{3} + m_2 \cdot a_2^2 + K$$

$$I = m_2 \cdot \frac{2r^2}{5}$$

CAD

Stopper Cylinder: Fixed Mounting Height

Series RSQ

ø12, ø16, ø20, ø32, ø40, ø50

How to Order

Without auto switch RSQ B 20 — 15 D

With auto switch RSDQ B 20 — 15 D — J79W

Built-in magnet

Mounting style

B	Through-hole (Standard)
A	Both ends tapped style

Note 1) Since ø12 uses a common tube for both A and B, only B is used for part no. denotation.

Bore size

12	12 mm
16	16 mm
20	20 mm
32	32 mm
40	40 mm
50	50 mm

Piping

Nil	Screw-in piping
F	Built-in One-touch fittings (2)

Note 2) Bore sizes available w/ One-touch fittings are ø20 to ø50.

Cylinder stroke (mm)

12	10
16	10, 15
20	10, 15, 20
32	10, 15, 20
40, 50	20, 25, 30

Action

D	Double acting
B	Double acting with spring loaded
T	Single acting (Spring extend)

Auto switch

Nil	Without auto switch

* For the applicable auto switch model, refer to the table below.
* Auto switches are shipped together, (but not assembled).

Number of auto swiches

Nil	2 pcs.
S	1 pc.

Rod end configuration

Symbol	Configuration	Application
Nil	Rounde bar type	—
K	Chamfered type	—
R	Roller type	—
L	Lever type (Non-adjustable) (3)	Basic style
B	Lever type (3) (Energy absorbing Adjustable deformation)	—
C		With cancel cap
D		With lock menchanism
E		With lock & cancel

Note 3) The lever types are applicable only to bore sizes ø32, ø40 and ø50.

Applicable Auto Switch/Refer to page 10-20-1 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage DC	Load voltage AC	Rail mounting ø16 to ø50 Perpendicular	Rail mounting ø16 to ø50 In-line	Direct mounting ø12, ø32 to ø50 Perpendicular	Direct mounting ø12, ø32 to ø50 In-line	Lead wire length (m)* 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Pre-wire connector	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	—	A76H	A96V	A96	●	●	—	—	—	IC circuit	—
				2-wire	—	—	200 V	A72	A72H	—	—	●	●	—	—	—	—	Relay, PLC
					24 V	12 V	100 V	A73	A73H	—	—	●	●	●	—	—		
								—	—	A93V	A93	●	●	—	—	—		
		Connector				12 V	—	A73C	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet				—	—	A79W	—	—	—	●	●	—	—	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	F7NV	F79	M9NV	M9N	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				F7PV	F7P	M9PV	M9P	●	●	○	—	○		
				2-wire		12 V		F7BV	J79	M9BV	M9B	●	●	○	—	○	—	
		Connector						J79C	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		F7NWV	F79W	F9NWV	F9NW	●	●	○	—	○	IC circuit	
				3-wire (PNP)				—	F7PW	F9PWV	F9PW	●	●	○	—	○		
				2-wire		12 V		F7BWV	J79W	F9BWV	F9BW	●	●	○	—	○		
	Water resistant (2-color indication)							—	F7BA	—	F9BA	—	●	○	—	○	—	
								F7BAV	—	—	—	—	●	○	—	—		
	With diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		—	F79F	—	—	●	●	○	—	○	IC circuit	

* Lead wire length symbols: 0.5 m ····· Nil (Example) A73C
3 m ····· L (Example) A73CZ
5 m ····· Z (Example) A73CL
None ····· Z (Example) A73CN

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

• Since there are other applicable auto switches than listed, refer to page 10-8-14 for details.
• For details about auto switches with pre-wire connector, refer to page 10-20-66.

Series RSQ

Lever type with built-in shock absorber

Roller type

Round bar

Model

Bore size (mm)		12	16	20	32	40	50
Mounting	Through-hole	●*	●	●	●	●	●
	Both ends tapped style		●	●	●	●	●
Built-in magnet		●	●	●	●	●	●
Piping	Screw-in type	M5 x 0.8		Rc 1/8			
	Built-in One-touch fittings	—		ø6/4			ø8/6
Action		Double acting, Single acting (Spring extend), Double acting with spring loaded					
Rod end configuration	Round bar	●			●		
	Chamfered	●			●		
	Roller type	●			●		
	Lever type	—			●		

∗ ø12 tubes can have both through-hole and tap mountings in the same tube.

Specifications

Action	Double acting, Double acting with spring loaded, Single acting (Spring extend)
Fluid	Air
Proof pressure	1.5 MPa
Maximum operating pressure	1.0 MPa
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)
Lubrication	Not required (Non-lube)
Cushion	Rubber bumper
Stroke length tolerance	$^{+1.4}_{0}$
Mounting	Through-hole/Both ends tapped common
Auto switch	Mountable

Made to Order Specifications (For details, refer to page 10-21-1.)

Symbol	Specifications
-XA□	Change of rod end shape
-XC3	Special port location
-XC18	NPT finish piping port

Bore Size/Standard Stroke

Bore size (mm)	Rod end configuration		
	Round bar, Chamfered type	Roller type	Lever type with shock absorber
12	10	10	—
16	10, 15	10, 15	—
20	10, 15, 20	10, 15, 20	—
32			10, 15, 20
40	20, 25, 30	20, 25, 30	20, 25, 30
50			

Spring Force (Single acting)

(N)

Bore size (mm)	Extended	Compressed
12	3.9	9.6
16	4.9	14.9
20	3.4	14.9
32	8.8	18.6
40, **50**	13.7	27.5

∗ Applicable only to round bar type, chamfered type and rollertype end configurations.

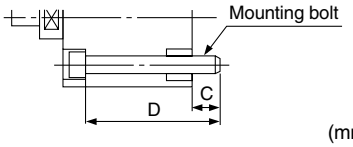
Auto Switch Mounting Bracket Part No.

Bore size (mm)	Mounting bracket part no.	Note	Applicable auto switch
16 **20**	**BQ-1**	• Switch mounting screw (M3 x 0.5 x 8ℓ) • Square nut	D-A7/A8 D-A7□H D-A73C/A80C D-F7□ D-F7□V, D-F7NT□ D-F7□W/J79W D-F7□WV D-F79F D-J79/J79C D-F7BAL/F7BAVL
32 **40** **50**	**BQ-2**	• Switch mounting nut • Switch mounting screw (M3 x 0.5 x 10ℓ) • Switch spacer	

[Mounting screws set made of stainless steel]
The following stainless steel mounting screw kit (including nuts) is available and may be used depending on the operating environment.
(Auto switch spacer is not included. Please contact SMC.)
BBA2: For D-A7/A8/F7/J7
"D-F7BAL/F7BAVL" switch is set on the cylinder with the stainless steel screws above when shipped.
When a switch is shipped independently, "BBA2" screws are attached.

Mounting Bolt for RSQB

Mounting method: Mounting bolt for through-hole mounting style of RSQB is available as an option.
Ordering: Add the word "Bolt" in front of the bolts to be used.
Example) Bolt M5 x 65ℓ 4 pcs.



(mm)

Model	C	D	Mounting bolt
RSQB12-10□ Note)	5	40	M3 x 45ℓ
RSQB16-10□	7	48	M3 x 55ℓ
-15□		53	M3 x 60ℓ
RSQB20-10□		55	M5 x 55ℓ
-15□		60	M5 x 60ℓ
-20□		65	M5 x 65ℓ
RSQB32-10□	9	60	M5 x 60ℓ
-15□		65	M5 x 65ℓ
-20□		70	M5 x 70ℓ
RSQB40-20□	9.5	75	M5 x 75ℓ
-25□		80	M5 x 80ℓ
-30□		85	M5 x 85ℓ
RSQB50-20□	9	75	M6 x 75ℓ
-25□		80	M6 x 80ℓ
-30□		85	M6 x 85ℓ

Weight

(kg)

Action	Bore size (mm)	Rod end configuration	Cylinder stroke (mm)				
			10	15	20	25	30
Double acting	**12**	Round bar, Chamfered, Roller	0.07	—	—	—	—
	16	Round bar, Chamfered, Roller	0.14	0.15	—	—	—
	20	Round bar, Chamfered, Roller	0.23	0.24	0.25	—	—
Single acting, Spring extend	**32**	Round bar, Chamfered, Roller	0.42	0.44	0.46	—	—
		Lever with built-in shock absorber	0.51	0.53	0.55	—	—
Double acting with spring loaded	**40**	Round bar, Chamfered, Roller	—	—	0.74	0.80	0.86
		Lever with built-in shock absorber	—	—	0.97	1.01	1.05
	50	Round bar, Chamfered, Roller	—	—	1.03	1.07	1.11
		Lever with built-in shock absorber	—	—	1.26	1.30	1.34

Note) When using the through-hole mounting for a size ø12 cylinder, be sure to use the flat washer which is attached.

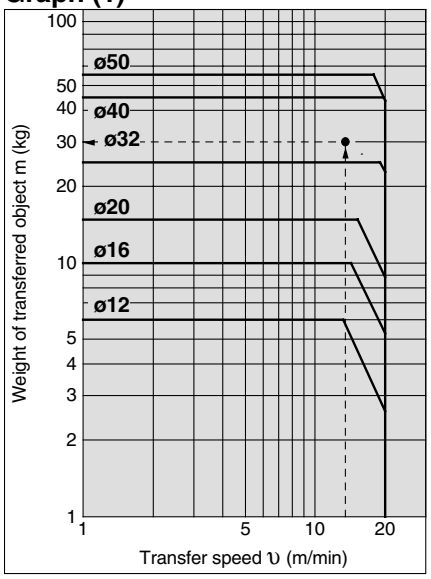
Operating Ranges by Rod End Configuration

(Example) For roller type with transfer speed of 15 m/min. and the weight of transferred object of 30 kg.

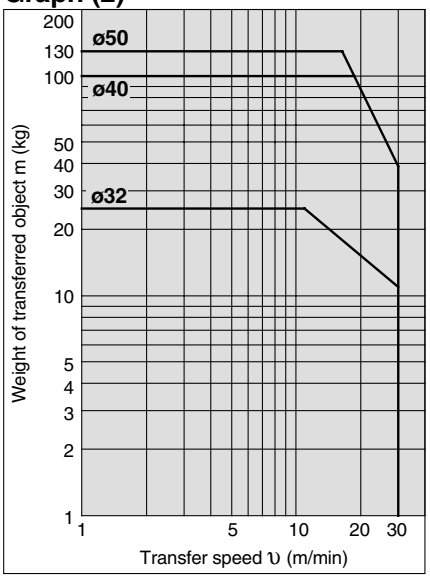
<How to read the graphs>

To select a cylinder based on the above specifications, find the intersection of the speed of 15 m/min. on the horizontal axis, and the weight of 30 kg on the vertical axis of Graph (1) to the right, and choose the model **RSQ□40** within whose operating range the intersection point falls.

Roller Type/Round Bar Type/Chamfered Type Graph (1)

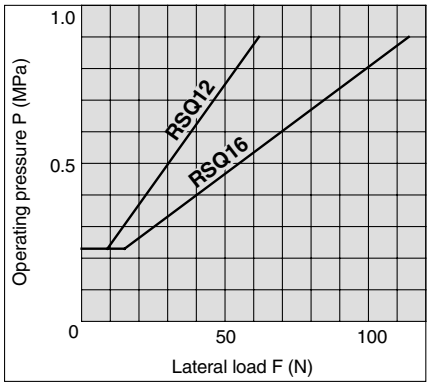


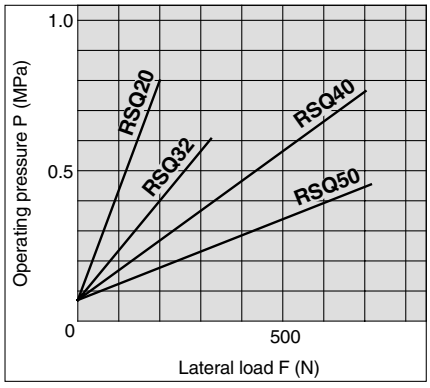
Lever Type (With shock absorber) Graph (2)



Lateral Load and Operating Pressure

The larger the lateral load, the higher the operating pressure required for the stopper cylinder. Set the operating pressure using the graphs as a guide.
(Applicable for round bar, roller and chamfered type rod end configurations.)



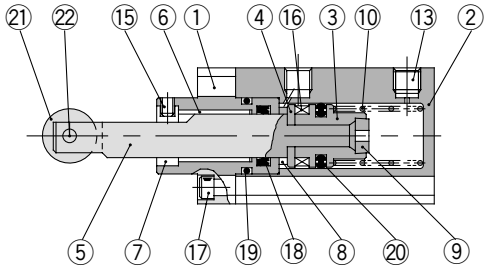


Series RSQ

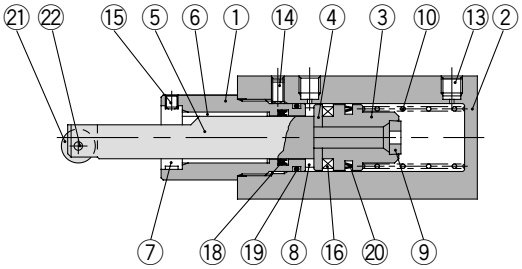
Construction

Single acting, Roller rod end

ø12



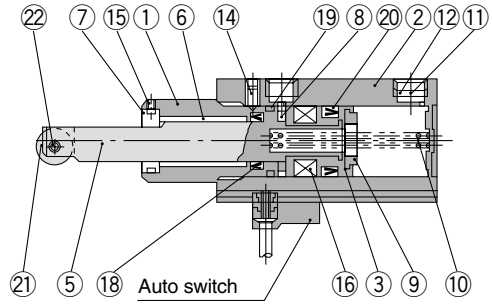
ø16



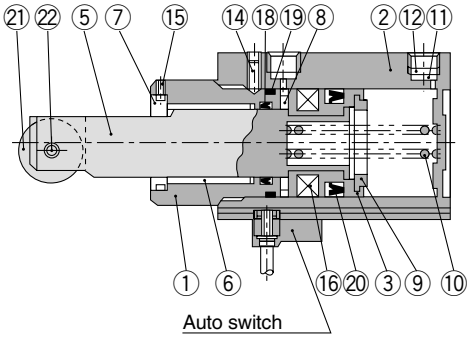
Round bar rod end type (D)

Chamfered rod end type (K)

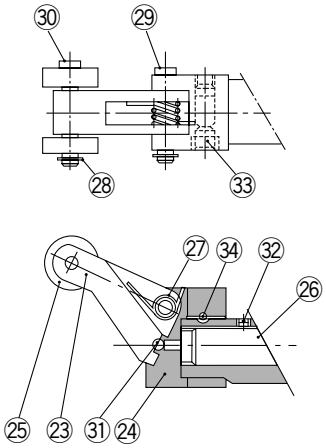
ø20



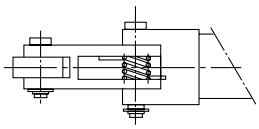
ø32, ø40, ø50



Built-in shock absorber Lever rod end type (ø32, ø40, ø50 only)



Only one roller is provided for ø32.



Component Parts (For single acting)

No.	Description	Material	Note
①	Rod cover	Aluminum alloy	Anodized*
②	Cylinder tube	Aluminum alloy	Hard anodized
③	Piston	Aluminum alloy	Chromated
④	Spacer for switch	Aluminum alloy	ø12, ø16
⑤	Piston rod	ø12, ø16, ø20 Stainless steel ø32, ø40, ø50 Carbon steel	Hard chrome plated
⑥	Bushing	Lead-bronze casted	
⑦	Non-rotating guide	Rolled steel	Non-rotating type only
⑧	Bumper A	Urethane	
⑨	Bumper B	Urethane	
⑩	Return spring	Steel wire	Zinc chromated
⑪	Element	Sintered metallic BC	ø32 to ø50
⑫	Snap ring	Carbon tool steel	ø32 to ø50
⑬	Plug with fixed orifice	Alloy steel	ø12, ø16
⑭	Hexagon socket head set screw	Chromium molybdenum steel	Except ø12
⑮	Hexagon socket head set screw	Chromium molybdenum steel	
⑯	Magnet	Synthetic rubber	
⑰	Hexagon socket head cap screw	Alloy steel	Only ø12
⑱	Rod seal	NBR	
⑲	Gasket	NBR	
⑳	Piston seal	NBR	

* For bore size 20, 32, 40 and 50, the surface treament of rod cover has been changed to “Anodized (natural color)” from Black anodized.

In the case of roller type

㉑	Roller A	Resin	
㉒	Spring pin	Carbon tool steel	

Component Parts (For single acting)

No.	Description	Material	Note
Lever type			
㉓	Lever	Cast iron	
㉔	Lever holder	Rolled steel	
㉕	Roller B	Resin	
㉖	Shock absorber	—	ø32—RB1007-X225 ø40, 50—RB1407-X552
㉗	Lever spring	Stainless steel wire	
㉘	Type C snap ring for axis	Carbon tool steel	
㉙	Lever pin	Carbon steel	
㉚	Roller pin	Carbon steel	
㉛	Steel balls	High carbon chrome bearing steel	
㉜	Hexagon socket head set screw	Chromium molybdenum steel	
㉝	Hexagon socket head set screw	Chromium molybdenum steel	
㉞	One-side tapered pin	Carbon steel	

Replacement Parts: Seal Kit

Bore size (mm)	Kit no.			Contents
	Double acting	Double acting with spring loaded	Single acting	
12	RSQ12D-PS	RSQ12T-PS		Set of above nos. ⑱, ⑲, ⑳
16	RSQ16B-PS	RSQ16D-PS	RSQ16T-PS	
20	RSQ20D-PS	RSQ20B-PS	RSQ20T-PS	
32	RSQ32D-PS	RSQ32B-PS	RSQ32T-PS	
40	RSQ40D-PS	RSQ40B-PS	RSQ40T-PS	
50	RSQ50D-PS	RSQ50B-PS	RSQ50T-PS	

* Seal kit includes ⑱, ⑲, ⑳. Order the seal kit, based on each bore size.

Replacement Parts: Shock Absorber

Bore size (mm)	Kit no.
32	RB1007-X225
40, 50	RB1407-X552

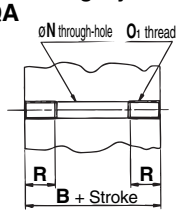
Rod End Configuration: Round Bar Type

Basic style: Through-hole mounting, Screw mounting

These 5 figures show the piston rod extended.

Screw mounting style: Both ends tapped style (mm)

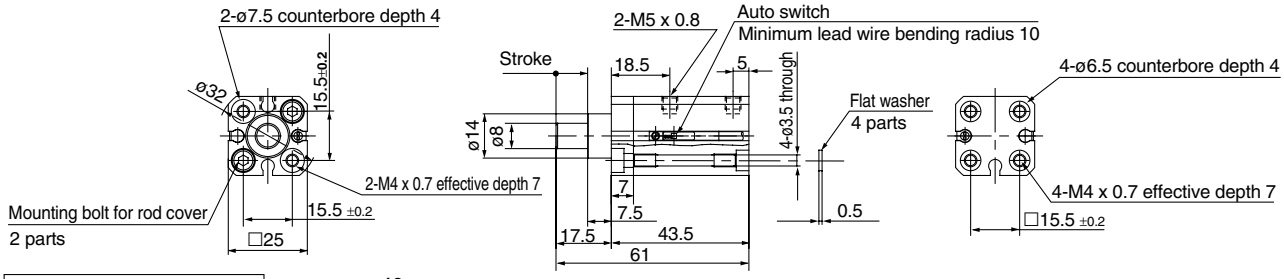
RS□QA



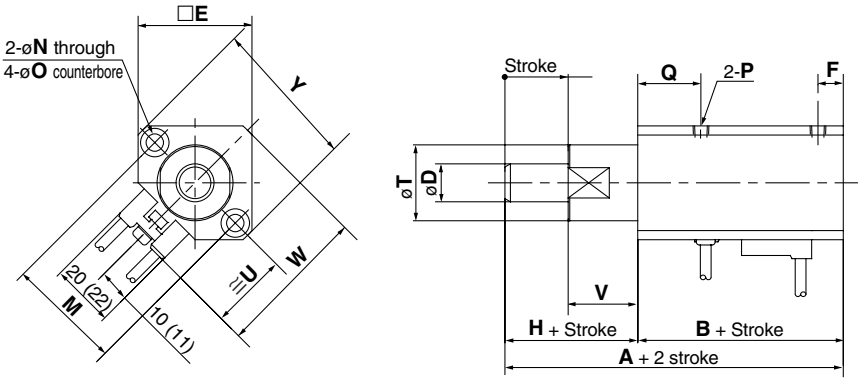
Model	B	N	O_1	R
RS□QA16	41.5	3.5	M4 x 0.7	7
RS□QA20	45	5.5	M6 x 1	10
RS□QA32	48	5.5	M6 x 1	10
RS□QA40	52.5	5.5	M6 x 1	10
RS□QA50	54	6.6	M8 x 1.25	14

∗Dimensions other than above are the same as those of the basic style (on the left).

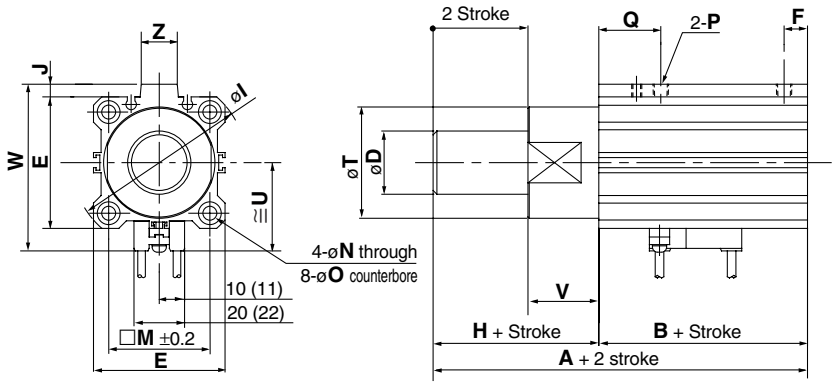
Bore size: ø12 **RS□QB12-10□**



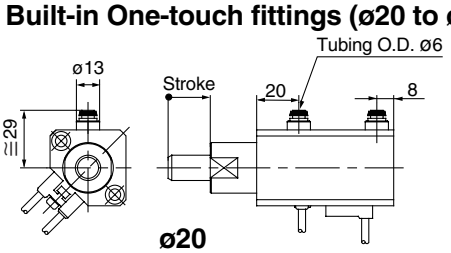
Bore size: ø16, ø20 **RS□QB $\frac{16}{20}$-□□**



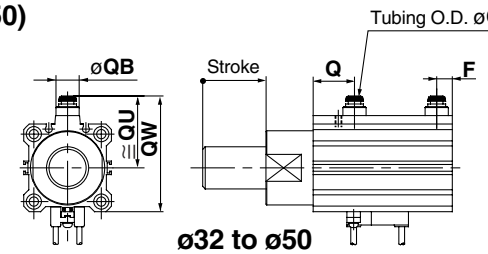
Bore size: ø32, ø40, ø50 **RS□QB $\frac{32}{40}$-□□**



Built-in One-touch fittings (ø20 to ø50)



ø20



ø32 to ø50

Built-in One-touch Fittings

Bore size (mm)	Applicable tubing O.D. QA	F	Q	QB	QU	QW
32	6	7.5	20	13	38	60.5
40	6	8	24.5	13	42	68
50	8	9.5	26	16	50	82

Bore size (mm)	A	B	D	E	F	H	I	J	M	N	O counterbore	P	Q	T	U	V	W	Y	Z
16	59.5	41.5	10	29	6	18	—	—	28	3.5	6.5 depth 4	M5 x 0.8	17	20	22.5	18	41.5	38	—
20	67	45	12	36	8	22	—	—	36	5.5	9 depth 7	Rc 1/8	20	24	24.5	22	48	47	—
32	68	48	20	45	7.5	20	60	4.5	34	5.5	9 depth 7	Rc 1/8	20	36	31.5	20	58.5	—	14
40	80.5	52.5	25	52	8	28	69	5	40	5.5	9 depth 7	Rc 1/8	24.5	44	35	28	66	—	14
50	82	54	25	64	8	28	86	7	50	6.6	11 depth 8	Rc 1/8	24.5	56	41	28	80	—	19

Note 1) Dimensions without auto switch are the same as drawing above.
Note 2) These figures show the dimensions when equipped with D-A73 or D-A80 auto switches.
Note 3) For the auto switch mounting position and its mounting height, refer to page 10-8-13.
Note 4) These figures show the piston rod extended.
Note 5) In the case of single acting type, a One-touch fitting is on the rod side only.

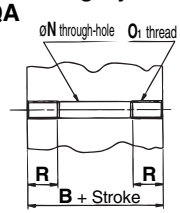
Series RSQ

Rod End Configuration: Chamfered (Non-rotating piston rod)

Basic style: Through-hole mounting, Screw mounting

These 5 figures show the piston rod extended.

Screw mounting style: Both ends tapped style
RS□QA

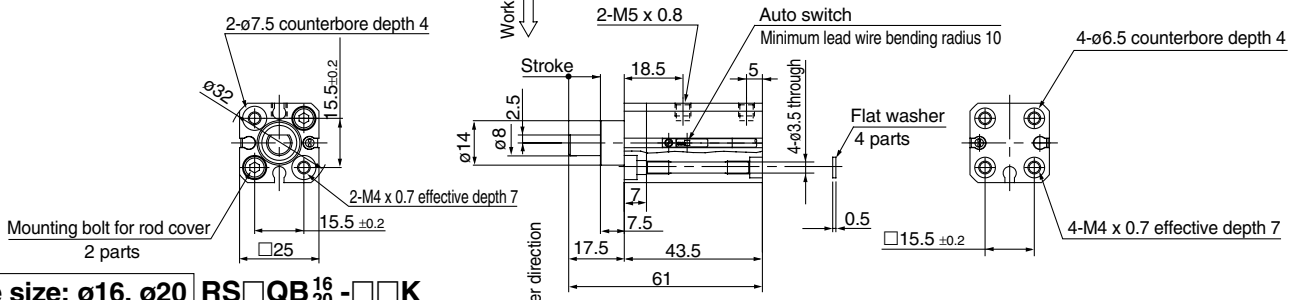


(mm)

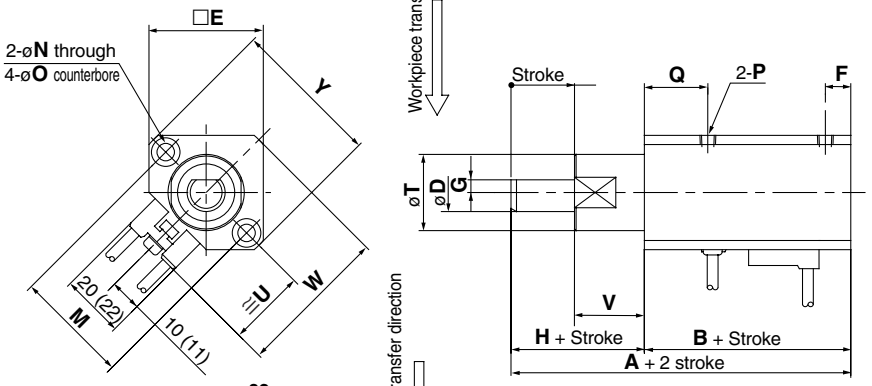
Model	B	N	O_1	R
RS□QA16	41.5	3.5	M4 x 0.7	7
RS□QA20	45	5.5	M6 x 1	10
RS□QA32	48	5.5	M6 x 1	10
RS□QA40	52.5	5.5	M6 x 1	10
RS□QA50	54	6.6	M8 x 1.25	14

∗Dimensions other than above are the same as those of the basic style (on the left).

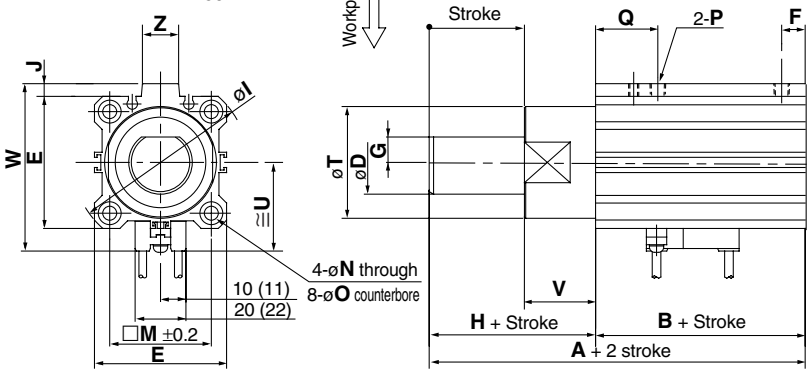
Bore size: ø12 **RS□QB12-10□K**



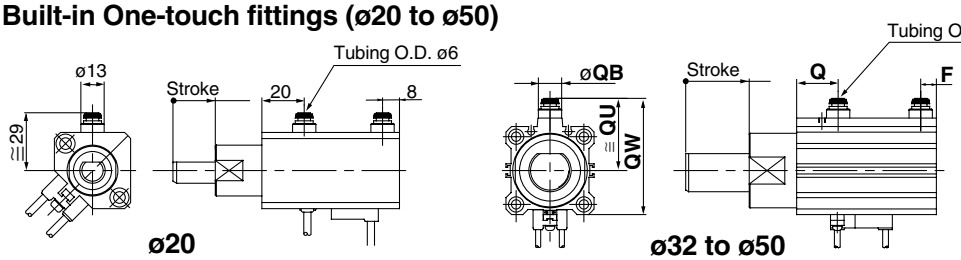
Bore size: ø16, ø20 **RS□QB$^{16}_{20}$-□□K**



Bore size: ø32, ø40, ø50 **RS□QB$^{32}_{40}_{50}$-□□K**



Built-in One-touch fittings (ø20 to ø50)



Built-in One-touch Fittings

Bore size (mm)	Applicable tubing O.D. QA	F	Q	QB	QU	QW
32	6	7.5	20	13	38	60.5
40	6	8	24.5	13	42	68
50	8	9.5	26	16	50	82

Bore size (mm)	A	B	D	E	F	G	H	I	J	M	N	O counterbore	P	Q	T	U	V	W	Y	Z
16	59.5	41.5	10	29	6	3	18	—	—	28	3.5	6.5 depth 4	M5 x 0.8	17	20	22.5	18	41.5	38	—
20	67	45	12	36	8	4	22	—	—	36	5.5	9 depth 7	Rc 1/8	20	24	24.5	22	48	47	—
32	68	48	20	45	7.5	8	20	60	4.5	34	5.5	9 depth 7	Rc 1/8	20	36	31.5	20	58.5	—	14
40	80.5	52.5	25	52	8	10	28	69	5	40	5.5	9 depth 7	Rc 1/8	24.5	44	35	28	66	—	14
50	82	54	25	64	8	10	28	86	7	50	6.6	11 depth 8	Rc 1/8	24.5	56	41	28	80	—	19

Note 1) Dimensions without auto switch are the same as drawing above.
Note 2) These figures show the dimensions when equipped with D-A73 or D-A80 auto switches.
Note 3) For the auto switch mounting position and its mounting height, refer to page 10-8-13.
Note 4) These figures show the piston rod extended.
Note 5) In the case of single acting type, a One-touch fitting is on the rod side only.

Rod End Configuration: Roller Type

Basic style: Through-hole mounting, Screw mounting

These 5 figures show the piston rod extended.

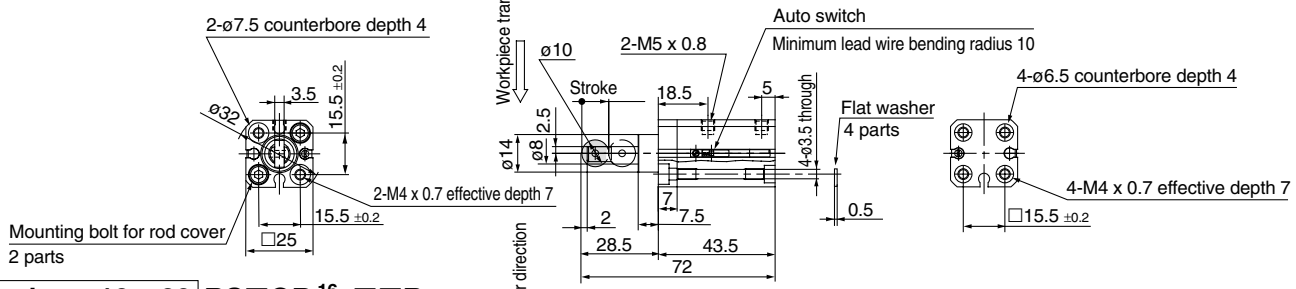
Screw mounting style: Both ends tapped style
RS□QA

(mm)

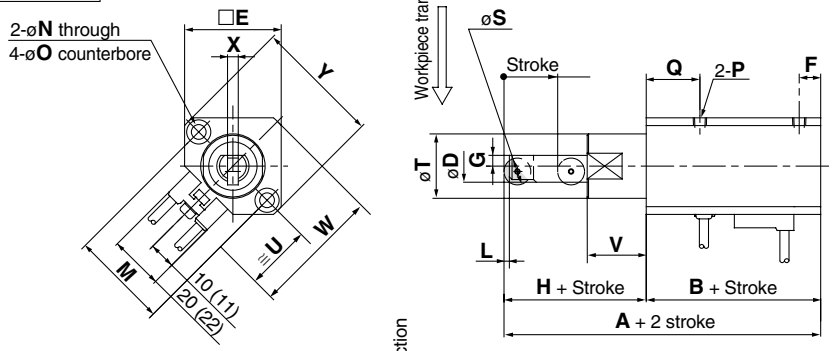
Model	B	N	O_1	R
RS□QA16	41.5	3.5	M4 x 0.7	7
RS□QA20	45	5.5	M6 x 1	10
RS□QA32	48	5.5	M6 x 1	10
RS□QA40	52.5	5.5	M6 x 1	10
RS□QA50	54	6.6	M8 x 1.25	14

∗ Dimensions other than above are the same as those of the basic style (on the left).

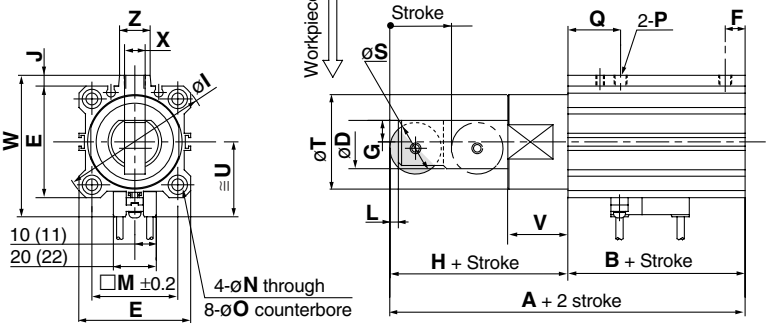
Bore size: ø12 **RS□QB12-10□R**



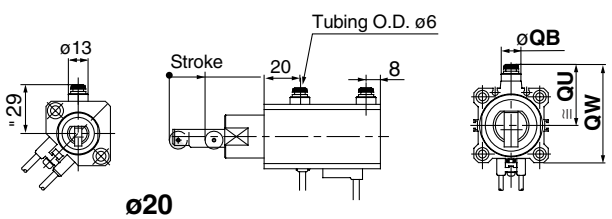
Bore size: ø16, ø20 **RS□QB $\frac{16}{20}$-□□R**

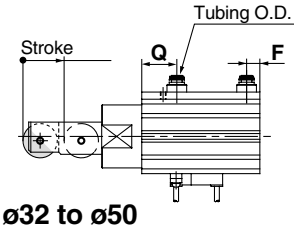


Bore size: ø32, ø40, ø50 **RS□QB $\frac{32}{40}$ $\frac{}{50}$-□□R**



Built-in One-touch fittings (ø20 to ø50)





Built-in One-touch Fittings

Bore size (mm)	Applicable tubing O.D. QA	F	Q	QB	QU	QW
32	6	7.5	20	13	38	60.5
40	6	8	24.5	13	42	68
50	8	9.5	26	16	50	82

Bore size (mm)	A	B	D	E	F	G	H	I	J	L	M	N	O counterbore	P	Q	S	T	U	V	W	X	Y	Z
16	68	41.5	10	29	6	3	26.5	—	—	2	28	3.5	6.5 depth 4	M5 x 0.8	17	8	20	22.5	18	41.5	3.5	38	—
20	78	45	12	36	8	4	33	—	—	2	36	5.5	9 depth 7	Rc 1/8	20	10	24	24.5	22	48	4	47	—
32	87	48	20	45	7.5	8	39	60	4.5	3	34	5.5	9 depth 7	Rc 1/8	20	18	36	31.5	20	58.5	8	—	14
40	105.5	52.5	25	52	8	10	53	69	5	4	40	5.5	9 depth 7	Rc 1/8	24.5	24	44	35	28	66	9	—	14
50	107	54	25	64	8	10	53	86	7	4	50	6.6	11 depth 8	Rc 1/8	24.5	24	56	41	28	80	9	—	19

Note 1) Dimensions without auto switch are the same as drawing above.
Note 2) These figures show the dimensions when equipped with D-A73 or D-A80 auto switches.
Note 3) For the auto switch mounting position and its mounting height, refer to page 10-8-13.
Note 4) These figures show the piston rod extended.
Note 5) In the case of single acting type, a One-touch fitting is on the rod side only.

Series RSQ

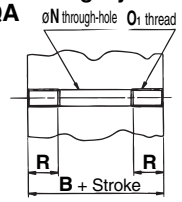
Rod End Configuration: Lever Type with Shock Absorber

Basic style: Through-hole mounting, Screw mounting

These 3 figures show the piston rod extended.

Screw mounting style: Both ends tapped style (mm)

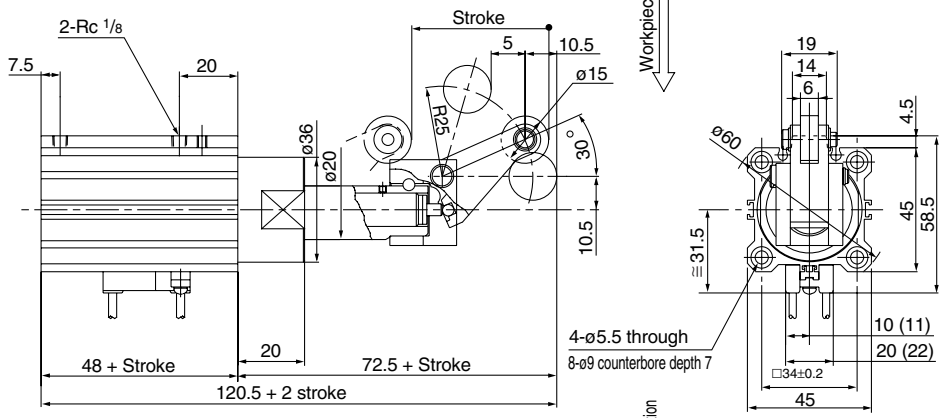
RS□QA



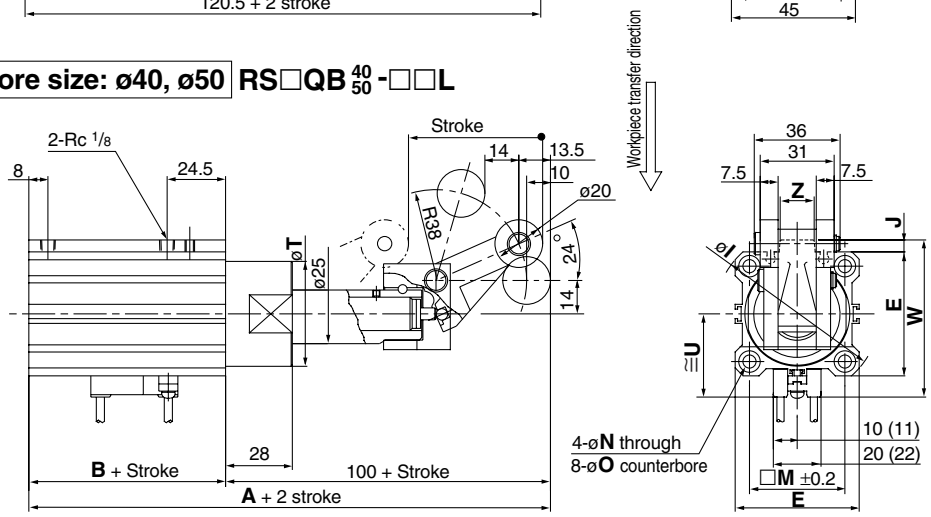
Model	B	N	O_1	R
RS□QA32	48	5.5	M6 x 1	10
RS□QA40	52.5	5.5	M6 x 1	10
RS□QA50	54	6.6	M8 x 1.25	14

∗Dimensions other than above are the same as below drawings.

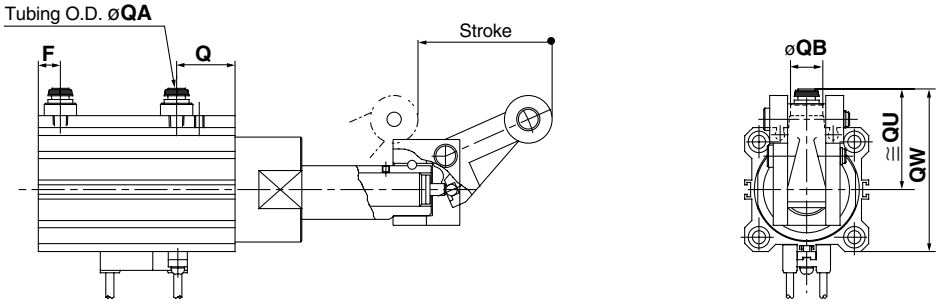
Bore size: ø32 **RS□QB32-□□L**



Bore size: ø40, ø50 **RS□QB $\frac{40}{50}$-□□L**



Built-in One-touch fittings



Built-in One-touch Fittings

Bore size (mm)	Applicable tubing O.D. QA	F	Q	QB	QU	QW
32	6	7.5	20	13	38	60.5
40	6	8	24.5	13	42	68
50	8	9.5	26	16	50	82

Bore size (mm)	A	B	E	I	J	M	N	O counterbore	T	U	W	Z
40	152.5	52.5	52	69	5	40	5.5	9 depth 7	44	35	66	14
50	154	54	64	86	7	50	6.6	11 depth 8	56	41	80	19

Note 1) Dimensions without auto switch are the same as drawing above.
Note 2) These figures show the dimensions when equipped with D-A73 or D-A80 auto switches.
Note 3) For the auto switch mounting position and its mounting height, refer to page 10-8-13.
Note 4) These figures show the piston rod extended.
Note 5) In the case of single acting type, a One-touch fitting is on the rod side only.

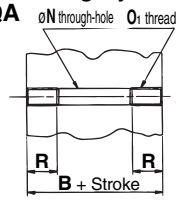
Rod End Configuration: Lever Type with Shock Absorber

Variable energy absorbing type/Through-hole mounting, Screw mounting style Adjustable shock absorber stroke

These 3 figures show the piston rod extended.

Screw mounting style: Both ends tapped style (mm)

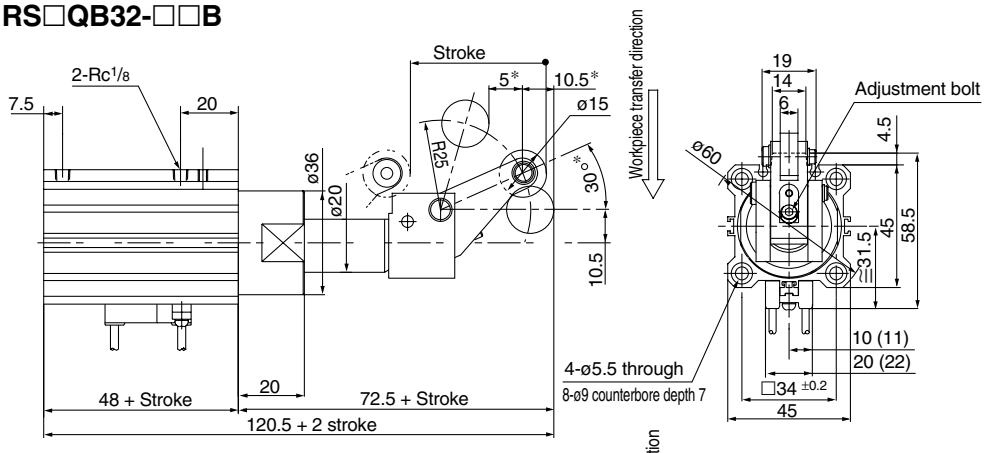
RS□QA



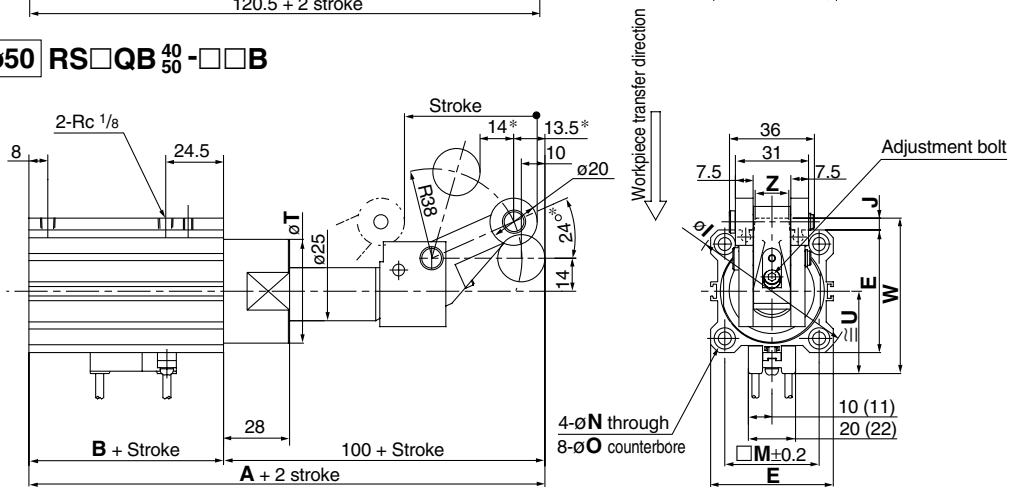
Model	B	N	O_1	R
RS□QA32	48	5.5	M6 x 1	10
RS□QA40	52.5	5.5	M6 x 1	10
RS□QA50	54	6.6	M8 x 1.25	14

∗ Dimensions other than above are the same as below drawings.

Bore size: ø32 RS□QB32-□□B

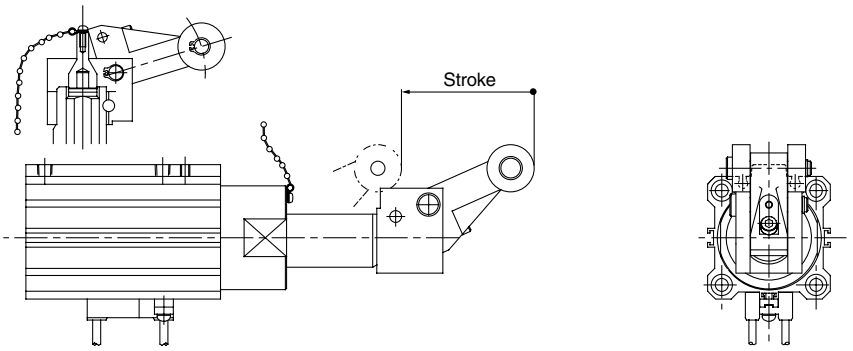


Bore size: ø40, ø50 RS□QB $^{40}_{50}$-□□B



With cancel cap RS□QB□-□□C

∗ Dimensions when equipped with cancel cap are the same as the drawing above.



∗ These figures show dimensions when set for maximum energy absorbing capacity.

Bore size (mm)	A	B	E	I	J	M	N	O counterbore	T	U	W	Z
40	152.5	52.5	52	69	5	40	5.5	9 depth 7	44	35	66	14
50	154	54	64	86	7	50	6.6	11 depth 8	56	41	80	19

Note 1) Dimensions without auto switch are the same as drawing above.
Note 2) These figures show the dimensions when equipped with D-A73 or D-A80 auto switches.
Note 3) For the auto switch mounting position and its mounting height, refer to page 10-8-13.
Note 4) These figures show the piston rod extended.
Note 5) In the case of single acting type, a One-touch fitting is on the rod side only.
Note 6) The figures show the dimensions when the adjustment bolt is lowered (when energy absorption is at its maximum).
However, these dimensions change within the ranges shown below as the adjustment bolt is raised (energy absorption is reduced).
ø32···30°* → 20°*, 10.5* → 9*, 5* → 6*
ø40, 50···24°* → 16°*, 13.5* → 11.5*, 14* → 16*

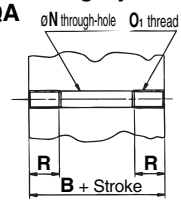
Rod End Configuration: Lever Type with Shock Absorber

Variable energy absorbing type/Through-hole mounting, Screw mounting style
With lock mechanism

These 3 figures show the piston rod extended.

Screw mounting style: Both ends tapped style (mm)

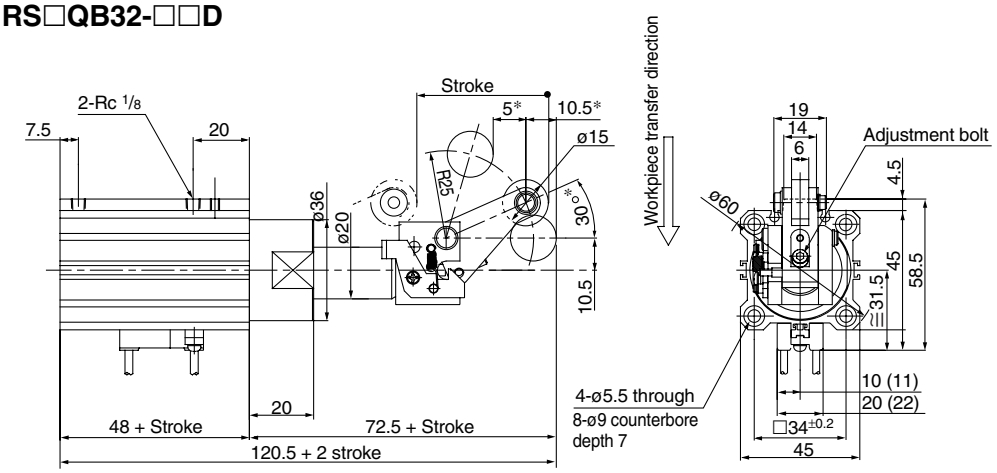
RS□QA



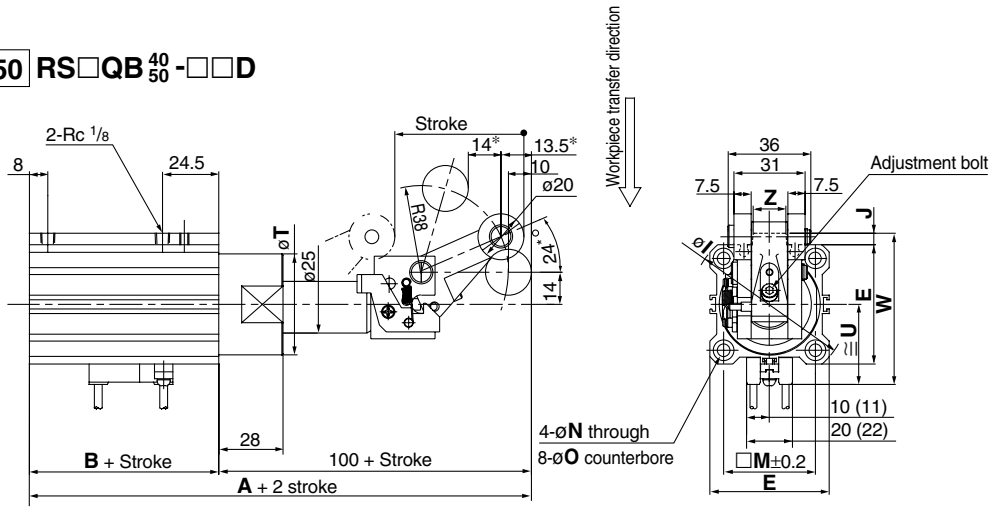
Model	B	N	O_1	R
RS□QA32	48	5.5	M6 x 1	10
RS□QA40	52.5	5.5	M6 x 1	10
RS□QA50	54	6.6	M8 x 1.25	14

∗ Dimensions other than above are the same as the drawings below.

Bore size: ø32 RS□QB32-□□D

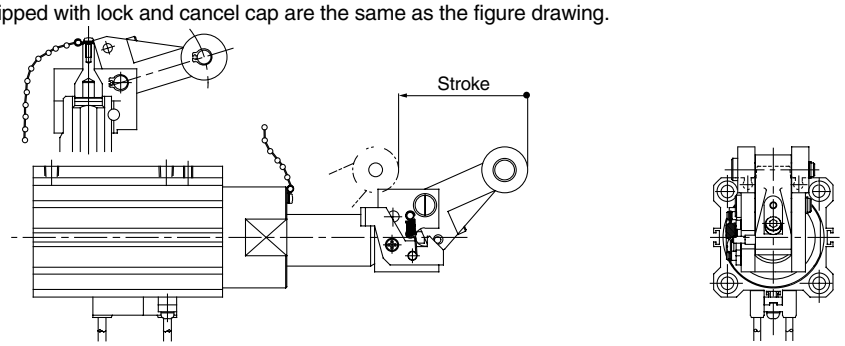


Bore size: ø40, ø50 RS□QB $\frac{40}{50}$-□□D



With lock mechanism + Cancel cap RS□QB□□-□□E

∗ Dimensions when equipped with lock and cancel cap are the same as the figure drawing.



∗ These figures show dimensions when set for maximum energy absorbing capacity. (mm)

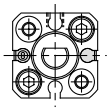
Bore size (mm)	A	B	E	I	J	M	N	O counterbore	T	U	W	Z
40	152.5	52.5	52	69	5	40	5.5	9 depth 7	44	35	66	14
50	154	54	64	86	7	50	6.6	11 depth 8	56	41	80	19

Note 1) Dimensions without auto switch are the same as drawing above.
Note 2) These figures show the dimensions when equipped with D-A73 or D-A80 auto switches.
Note 3) For the auto switch mounting position and its mounting height, refer to page 10-8-13.
Note 4) These figures show the piston rod extended.
Note 5) In the case of single acting type, a One-touch fitting is on the rod side only.
Note 6) The figures shows the dimensions when the adjustment bolt is lowered (when energy absorption is at its maximum).
However, these dimensions change within the ranges shown below as the adjustment bolt is raised (energy absorption is reduced).
ø32···30°* → 20°*, 10.5* → 9*, 5* → 6*
ø40, 50···24°* → 16°*, 13.5* → 11.5*, 14* → 16*

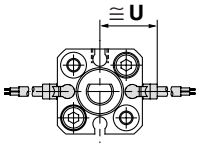
Proper Auto Switch Mounting Position (Detection at stroke end) and Its Mounting Height

ø12

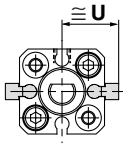
D-A9□
D-M9□
D-F9□W

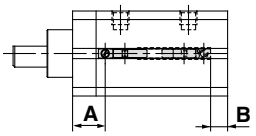


D-A9□V
D-M9□V
D-F9□WV



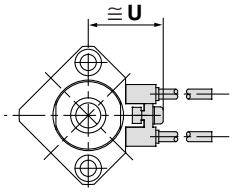
D-F9BAL



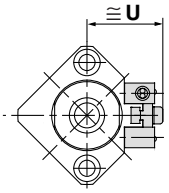


ø16, ø20

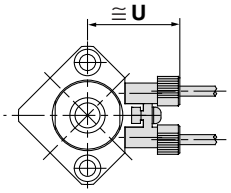
D-A7
D-A8



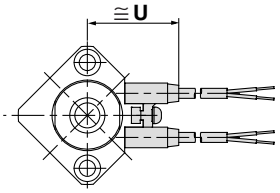
D-A7□H, D-A80H
D-F7□, D-J79
D-F7□W, D-J79W
D-F79F, D-FNTL
DF7BAL

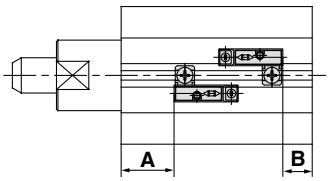


D-A73C
D-A80C
D-J79C



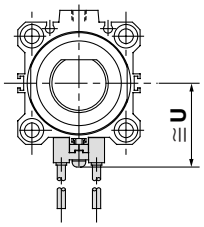
D-A79W
D-F7□WV
D-F7□V
D-F7BAVL



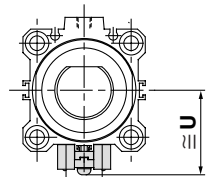


ø32 to ø50

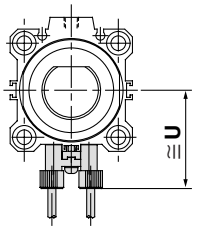
D-A7
D-A8



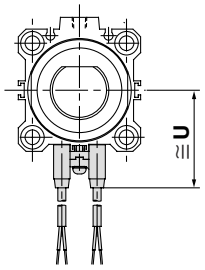
D-A7□H, D-A80H
D-F7□, D-J79
D-F7□W, D-J79W
D-F79F, D-F7NTL
D-F7BAL

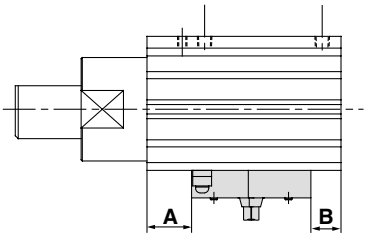


D-A73C
D-A80C
D-J79C



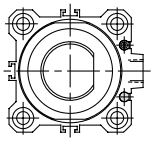
D-A79W
D-F7□WV
D-F7□V
D-F7BAVL



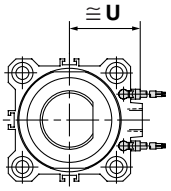


ø32 to ø50

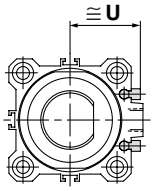
D-A9□
D-M9□
D-F9□W

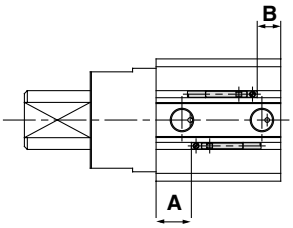


D-A9□V
D-M9□V
D-F9□WV



D-F9BAL





Proper Auto Switch Mounting Position

Bore size (mm)	D-A7□ D-A80		D-A7□H D-A80H D-A73C D-A80C D-F7□ D-J79 D-F7□V D-J79C D-F7BAVL D-F7BAL D-F7□W D-J79W D-F7□WV D-F79F		D-A79W		D-A9□ D-A9□V		D-M9□ D-M9□V D-F9□WV D-F9□W		D-F9BAL	
	A	B	A	B	A	B	A	B	A	B	A	B
12	—	—	—	—	—	—	9	4	13	8	12	7
16	11.5	11.5	12	12	9	9	—	—	—	—	—	—
20	17.5	9.5	18	10	15	7	—	—	—	—	—	—
32	18	12	18.5	12.5	15.5	9.5	17	11	21	15	20	14
40	22.5	12	23	12.5	20	9.5	21.5	11	25.5	15	24.5	14
50	30.5	5.5	31	6	28	3	29.5	4.5	33.5	8.5	32.5	7.5

Auto Switch Mounting Height

(mm)

D-A7□ D-A80	D-A7□H D-A80H D-F7□ D-J79 D-F7□W D-F7BAL D-J79W D-F79F D-F7NTL	D-A73C D-A80C	D-F7□V D-F7□WV D-F7BAVL	D-J79C	D-A79W	D-A9□V	D-M9□V D-F9□WV	D-F9BAL
U	U	U	U	U	U	U	U	U
—	—	—	—	—	—	17	19.5	16.5
22.5	23.5	29.5	26	29	25	—	—	—
24.5	25.5	31.5	28	31	27	—	—	—
31.5	32.5	38.5	35	38	34	27	29	26.5
35	36	42	38.5	41.5	37.5	30.5	32.5	30
41	42	48	44.5	47.5	43.5	36.5	38.5	36

Operating Range

Auto switch model	Bore size (mm)					
	12	16	20	32	40	50
D-A7□/A80 D-A7H/A80H D-A73C/A80C	—	12	12	12	11	10
D-A79W	—	13	13	13	14	14
D-A9□/A9□V	6	—	—	9.5	9.5	9.5
D-F7□/J79 D-F7□V/J79C D-F7□W/J7□WV D-F7BAL/F7BAVL D-F79F	—	6	5.5	6	6	6
D-M9□/M9□V	—	—	—	3.5	3.5	3.5
D-F9□W/F9□WV D-F9BAL	3	—	—	5.5	5.5	5.5

∗ Since this is a guideline including hysteresis, not meant to be guaranteed. (Assuming approximately ±30% dispersion) There may be the case to change substantially depending on an ambient environment.

Other than the applicable auto switches listed in “How to Order”, following auto switches can be mounted. For detailed specifications, refer to page 10-20-1.

Type	Model	Electrical entry (Fetching direction)	Features	Applicable bore size (mm)
Reed switch	D-A80	Grommet (Perpendicular)	Without indicator light	16 to 50
	D-A80H	Grommet (In-line)		
	D-A80C	Connector (Perpendicular)		
	D-A90	Grommet (In-line)		12, 32 to 50
	D-A90V	Grommet (Perpendicular)		
Solid state switch	D-F7NTL	Grommet (In-line)	With timer	16 to 50

∗ With pre-wire connector is available for D-F7NTL type, too. For details, refer to page 10-20-66.
∗ Normally closed (NC = b contact), solid state switch (D-F9G/F9H type) are also available. For details, refer to page 10-20-40.

Stopper Cylinder: Adjustable Mounting Height

Series RSG

ø40, ø50

How to Order

Without auto switch RSG 40 ☐ — 30 D ☐

With auto switch RSDG 40 ☐ — 30 D ☐ — H7BW ☐

Built-in magnet

Bore size

40	40 mm
50	50 mm

Piping

Nil	Screw-in piping
F	Built-in One-touch fittings

Cylinder stroke (mm)

40, 50	20, 25, 30

Auto switch

Nil	Without auto switch

∗ For the applicable auto switch model, refer to the table below.

Number of auto swiches

Nil	2 pcs.
S	1 pc.

Rod end configuration

Symbol	Configuration	Application
Nil	Round bar type	—
K	Chamfered type	—
R	Roller type	—
L	Lever type (Non-adjustable)	Basic style
B	Lever type (Energy absorbing, Adjustable deformation)	—
C		With cancel cap
D		With lock menchanism
E		With lock & cancel

Action

D	Double acting
B	Double acting with spring loaded
T	Single acting (Spring extend)

Auto Switch Mounting Bracket Part No.

Auto switch model	Bore size (mm)	
	40	**50**
D-C7/C8	BMA2-040	BMA2-050
D-H7		

[Mounting screws set made of stainless steel]
The following stainless steel mounting screw kit is available and may be used depending on the operating environment.
(A switch mounting band is not included, so please order it separately.)
BBA4: For D-C7/C8/H7
"D-H7BAL" switch is set on the cylinder with the stainless steel screws above when shipped.
When a switch is shipped independently, "BBA4" screws are attached.

Applicable Auto Switch/Refer to page 10-20-1 for further information on auto switches.

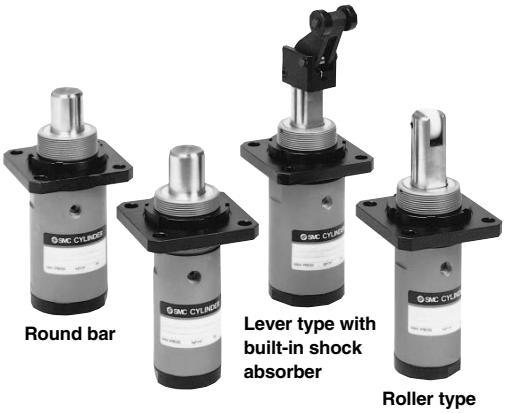
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC		Load voltage AC	Auto switch model	Lead wire length (m)∗ 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Pre-wire connector	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**C76**	●	●	—	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	**C73**	●	●	●	—	—	—	Relay, PLC
		Connector					—	**C73C**	●	●	●	●	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	**H7A1**	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				**H7A2**	●	●	○	—	○		
				2-wire		12 V		**H7B**	●	●	○	—	○	—	
		Connector						**H7C**	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		**H7NW**	●	●	○	—	○	IC circuit	
				3-wire (PNP)				**H7PW**	●	●	○	—	○		
				2-wire		12 V		**H7BW**	●	●	○	—	○	—	
	Water resistant (2-color indication)							**H7BA**	—	●	○	—	○		
	With diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		**H7NF**	●	●	○	—	○	IC circuit	

∗ Lead wire length symbols: 0.5 m ····· Nil (Example) C73C
3 m ····· L (Example) C73CL
5 m ····· Z (Example) C73CZ
None ····· N (Example) C73CN

∗ Solid state switches marked with "○" are produced upon receipt of order.

• Since there are other applicable auto switches than listed, refer to page 10-8-24 for details.
• For details about auto switches with pre-wire connector, refer to page 10-20-66.

Series RSG



Model

Bore size (mm)		40	50
Mounting	Flange	●	●
Built-in magnet		●	●
Piping	Screw-in type	Rc 1/8	
	Built-in One-touch fittings	ø6/4	ø8/6
Action		Double acting, Single acting (Spring extended), Double acting with spring loaded	
Rod end configuration	Round bar type	●	●
	Chamfered type	●	●
	Roller type	●	●
	Lever type	●	●

Spring Force (Single acting)

(N)

Bore size (mm)	Extended	Compressed
40, **50**	13.7	27.5

∗ For Round bar type, Chamfered type and Roller type.

Specifications

Action	Double acting, Double acting with spring loaded, Single acting (Spring extended)
Fluid	Air
Proof pressure	1.5 MPa
Maximum operating pressure	1.0 MPa
Ambient and fluid temperature	Without auto switch –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)
Lubrication	Not required (Non-lube)
Cushion	Rubber bumper
Stroke length tolerance	$^{+1.4}_{0}$
Mounting	Flange style
Auto switch	Mountable

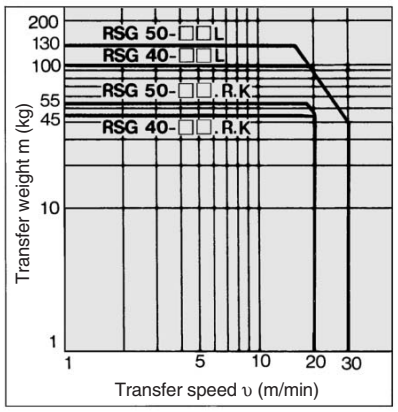
Made to Order Specifications (For details, refer to page 10-21-1.)

Symbol	Specifications
-XA□	Change of rod end shape
-XC3	Special port position

Bore Size/Standard Stroke

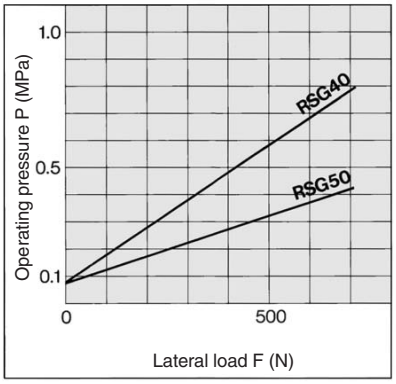
Bore size (mm)	Rod end configuration
	Round bar type, Chamfered type, Roller type, Lever type with shock absorber
40	20, 25, 30
50	20, 25, 30

Operating Range



Lateral Load and Operating Pressure

Greater lateral loads need higher stopper cylinder operation pressures. Set the operation pressure by using the graph as guidelines. (Applicable to the round bar, roller, and chamfered type.)



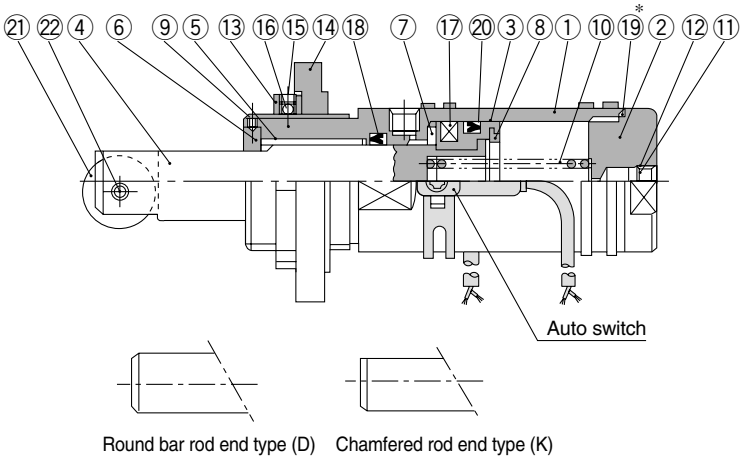
Weight

(kg)

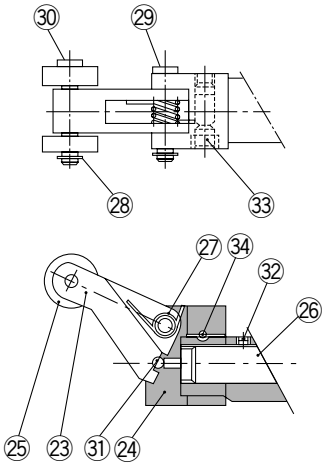
Action	Bore size (mm)	Rod end configuration	Cylinder stroke (mm)		
			20	25	30
Double acting Single acting, Spring extend Double acting with spring loaded	40	Round bar type, Chamfered type, Roller type	1.14	1.17	1.2
		Lever type with built-in shock absorber	1.38	1.41	1.44
	50	Round bar type, Chamfered type, Roller type	1.34	1.37	1.4
		Lever type with built-in shock absorber	1.56	1.59	1.62

Construction

Single acting, Roller rod end



Lever rod end with shock absorber type



Component Parts (For single acting)

No.	Description	Material	Note
①	Tube cover	Aluminum alloy	Hard anodized
②	Head cover	Aluminum alloy	Anodized
③	Piston	Aluminum alloy	Chromated
④	Piston rod	Carbon steel	Hard chrome plated
⑤	Bushing	Lead-bronze casted	
⑥	Non-rotating guide	Rolled steel	Use collar for round bar type.
⑦	Bumper A	Urethane	
⑧	Bumper B	Urethane	
⑨	Hexagon socket head set screw	Chromium molybdenum steel	
⑩	Return spring	Steel wire	Zinc chromated
⑪	Snap ring	Carbon tool steel	
⑫	Element	Sintered matallic BC	
⑬	lock nut	Carbon steel	
⑭	Flange	Cast iron	
⑮	Hexagon socket head set screw	Chromium molybdenum steel	
⑯	Ball	Resin	
⑰	Magnet	Synthetic rubber	
⑱	Rod seal	NBR	
⑲	Gasket	NBR	Used Only for double acting and double acting with spring loaded.
⑳	Piston seal	NBR	

Component Parts (For single acting)

No.	Description	Material	Note
In the case of roller type			
㉑	Roller A	Resin	
㉒	Spring pin	Carbon tool steel	
Lever type			
㉓	Lever	Cast iron	
㉔	Lever holder	Rolled steel	
㉕	Roller B	Resin	
㉖	Shock absorber	—	RB1407-X552
㉗	Lever spring	Stainless steel wire	
㉘	Type C snap ring for shaft	Carbon tool steel	
㉙	Lever pin	Carbon steel	
㉚	Roller pin	Carbon steel	
㉛	Steel balls	High carbon chrome bearing steel	
㉜	Hexagon socket head set screw	Chromium molybdenum steel	
㉝	Hexagon socket head set screw	Chromium molybdenum steel	
㉞	One-side tapered pin	Carbon steel	

Replacement Parts: Shock Absorber

Bore size (mm)	Kit no.
40, 50	RB1407-X552

Replacement Parts: Seal Kit

Bore size (mm)	Kit no.			Contents
	Double acting	Double acting with spring loaded	Single acting	
40	RSG40D-PS	RSG40B-PS	RSG40T-PS	Set of above nos. ⑱, ⑲, ⑳
50	RSG50D-PS	RSG50B-PS	RSG50T-PS	

∗ Seal kit includes ⑱, ⑲, ⑳. Order the seal kit, based on each bore size.

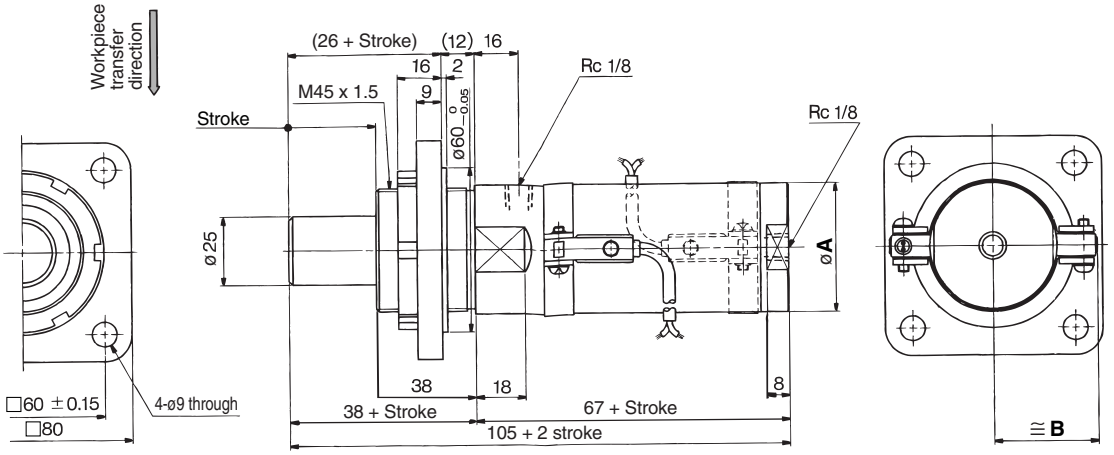
Series RSG

Rod End Configuration: Round Bar Type

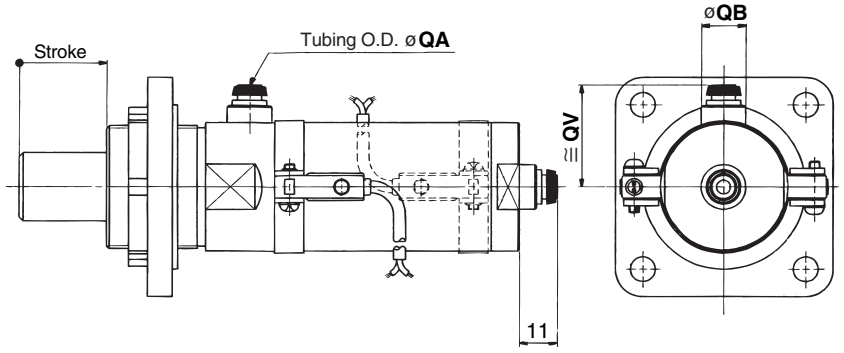
Basic style: Flange mounting

These 2 figures show the piston rod extended.

Bore size: ø40, ø50 **RS□G□-□□**



Built-in One-touch fittings



Bore size (mm)	A	B	QA	QB	QV
40	47	35	6	13	33
50	58	40.5	8	16	38.5

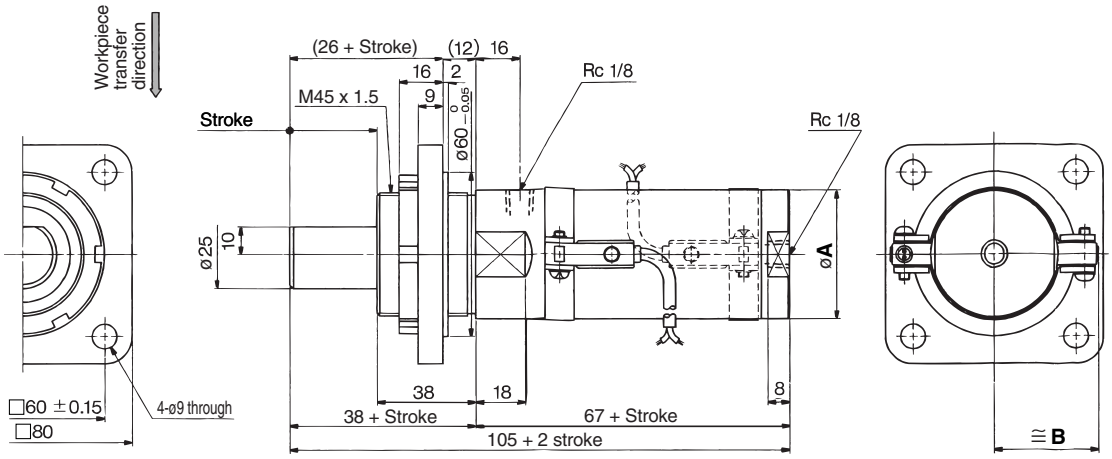
Note 1) Body dimensions without auto switch are the same as drawing above.
Note 2) In the case of single acting type, a One-touch fitting is on the rod side only.
Note 3) These figures show the dimensions when equipped with D-C7/C8 type auto switches.
Note 4) These figures show the piston rod extended.
Note 5) For the auto switch mounting position and its mounting height, refer to page 10-8-24.

Rod End Configuration: Chamfered Type (Non-rotating piston rod)

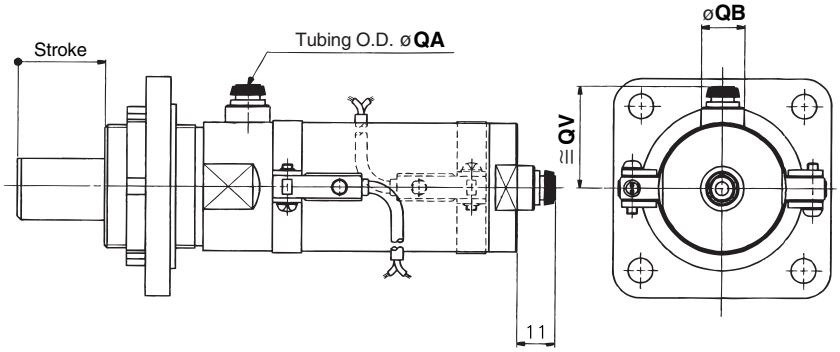
Basic style: Flange mounting

These 2 figures show the piston rod extended.

Bore size: ø40, ø50 **RS□G□-□□K**



Built-in One-touch fittings



Bore size (mm)	A	B	QA	QB	QV
40	47	35	6	13	33
50	58	40.5	8	16	38.5

Note 1) Body dimensions without auto switch are the same as drawing above.
Note 2) In the case of single acting type, a One-touch fitting is on the rod side only.
Note 3) These figures show the dimensions when equipped with D-C7/C8 type auto switches.
Note 4) These figures show the piston rod extended.
Note 5) For the auto switch mounting position and its mounting height, refer to page 10-8-24.

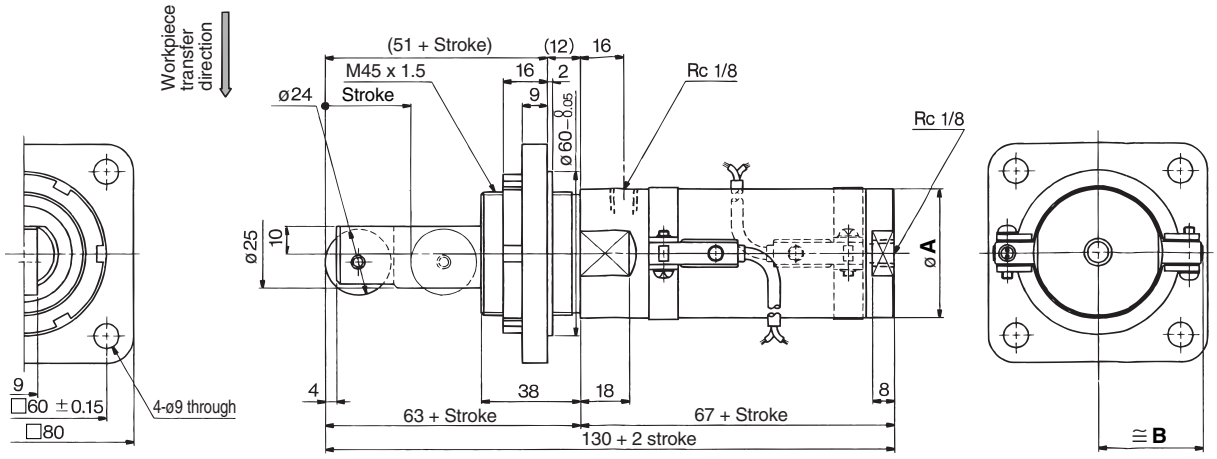
Series RSG

Rod End Configuration: Roller Type

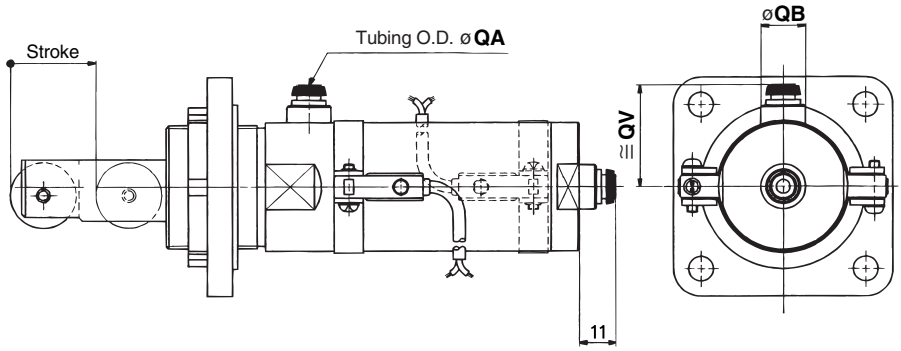
Basic style: Flange mounting

These 2 figures show the piston rod extended.

Bore size: ø40, ø50 **RS□G□-□□R**



Built-in One-touch fittings



Bore size (mm)	A	B	QA	QB	QV
40	47	35	6	13	33
50	58	40.5	8	16	38.5

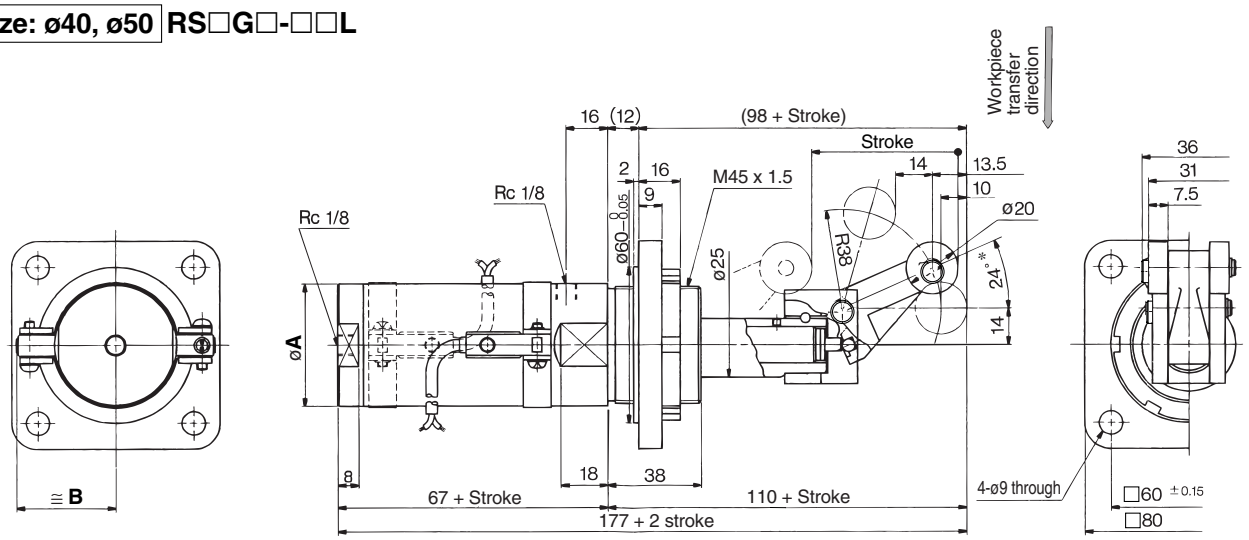
Note 1) Body dimensions without auto switch are the same as drawing above.
Note 2) In the case of single acting type, a One-touch fitting is on the rod side only.
Note 3) These figures show the dimensions when equipped with D-C7/C8 type auto switches.
Note 4) These figures show the piston rod extended.
Note 5) For the auto switch mounting position and its mounting height, refer to page 10-8-24.

Rod End Configuration: Lever Type with Shock Absorber

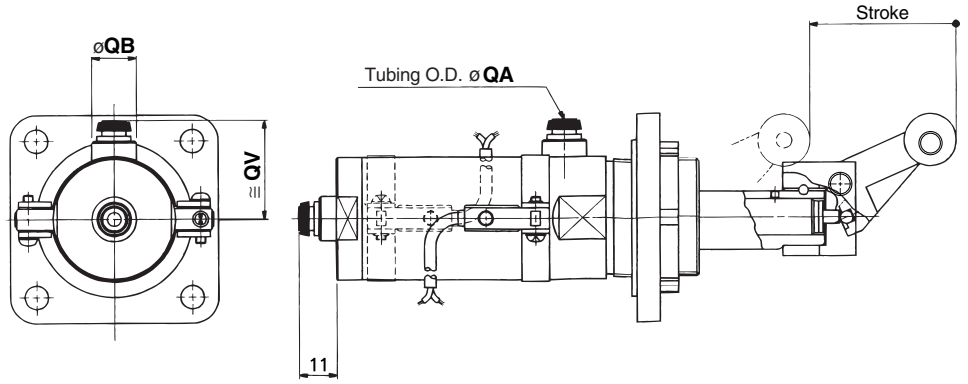
Basic style: Flange mounting

These 2 figures show the piston rod extended.

Bore size: ø40, ø50 **RS□G□-□□L**



Built-in One-touch fittings



Bore size (mm)	A	B	QA	QB	QV
40	47	35	6	13	33
50	58	40.5	8	16	38.5

Note 1) Body dimensions without auto switch are the same as drawing above.
Note 2) In the case of single acting type, a One-touch fitting is on the rod side only.
Note 3) These figures show the dimensions when equipped with D-C7/C8 type auto switches.
Note 4) These figures show the piston rod extended.
Note 5) For the auto switch mounting position and its mounting height, refer to page 10-8-24.

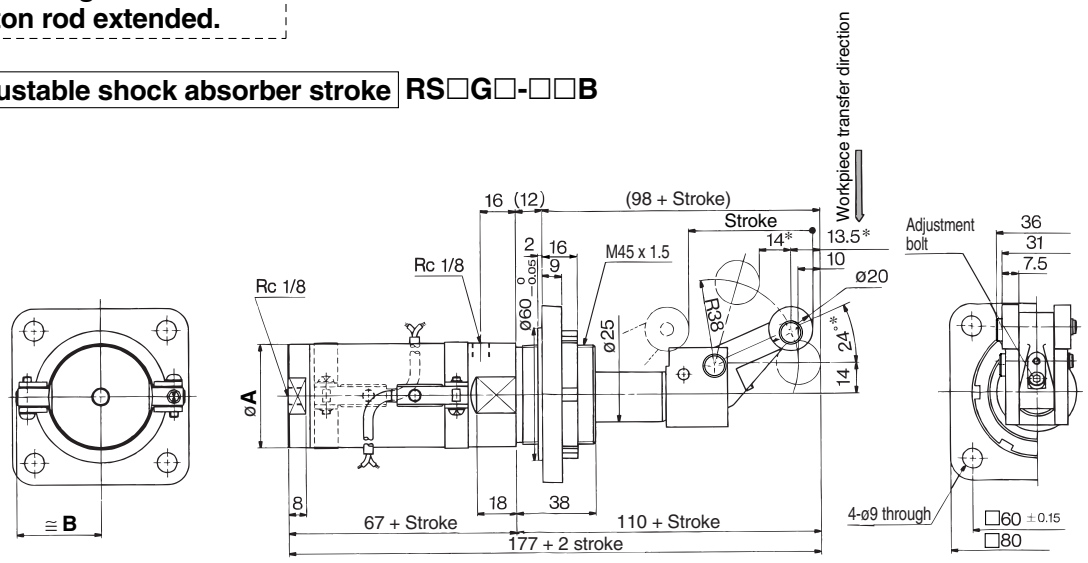
Series RSG

Rod End Configuration: Lever Type with Shock Absorber

Variable energy absorbing type/Flange mounting style

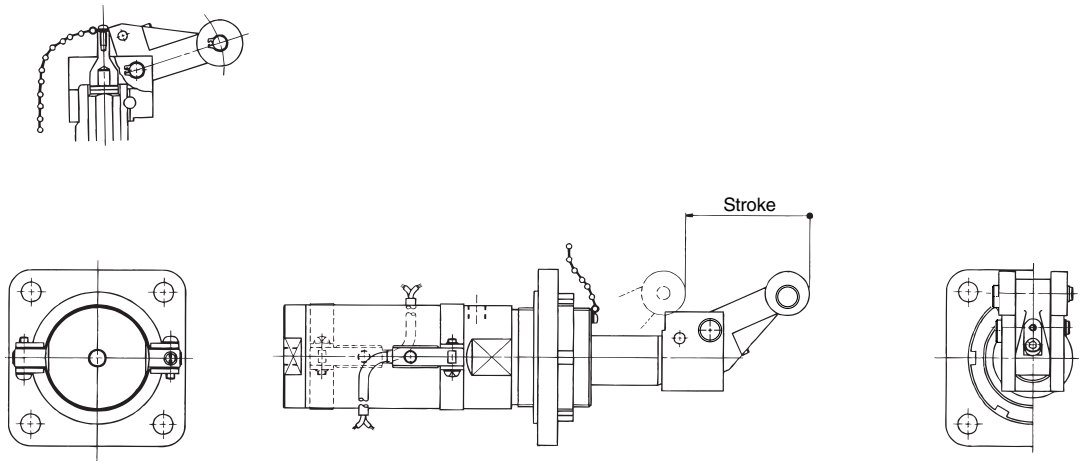
These 2 figures show the piston rod extended.

Adjustable shock absorber stroke **RS□G□-□□B**



With cancel cap **RS□G□-□□C**

∗ Dimensions when equipped with cancel cap are the same as the drawing above.



Bore size (mm)	A	B
40	47	35
50	58	40.5

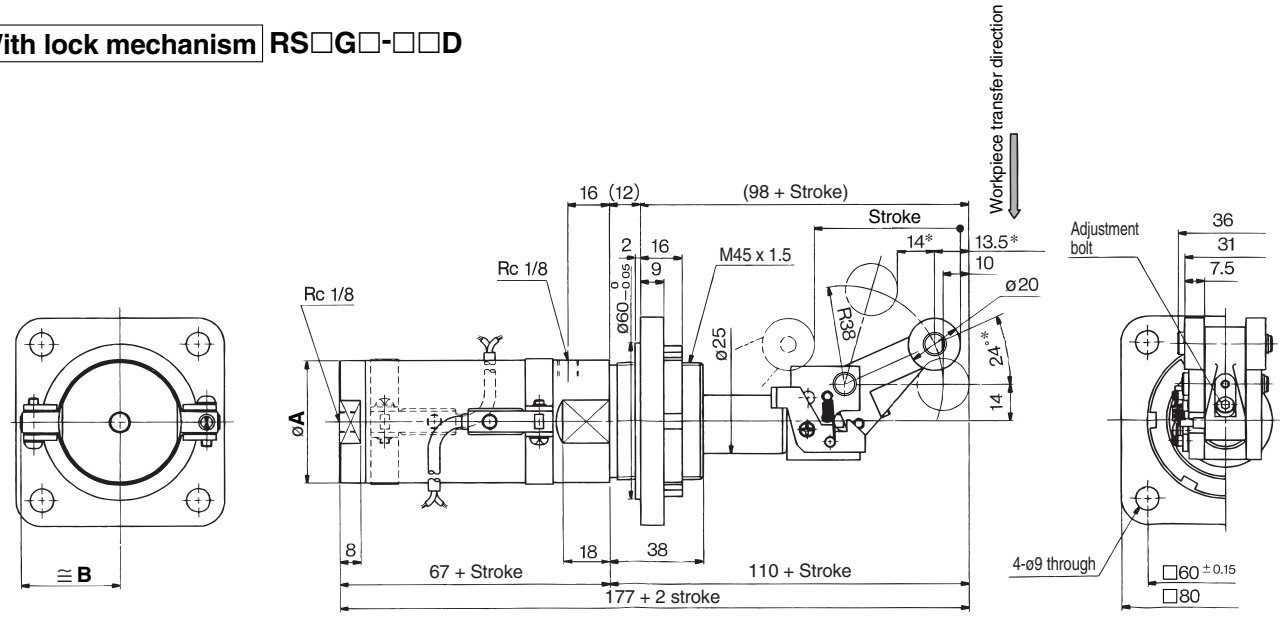
Note 1) Body dimensions without auto switch are the same as drawing above.
Note 2) In the case of single acting type, a One-touch fitting is on the rod side only.
Note 3) These figures show the dimensions when equipped with D-C7/C8 type auto switches.
Note 4) These figures show the piston rod extended.
Note 5) For the auto switch mounting position and its mounting height, refer to page 10-8-24.
Note 6) The figure shows these dimensions when the adjustment bolt is lowered (when energy absorption is at its maximum). However, these dimensions change within the ranges shown below as the adjusting bolt is raised (energy absorption is reduced).
24°* → 16°*, 13.5* → 11.5*, 14* → 16*

Rod End Configuration: Lever Type with Shock Absorber

Variable energy absorbing type/Flange mounting style

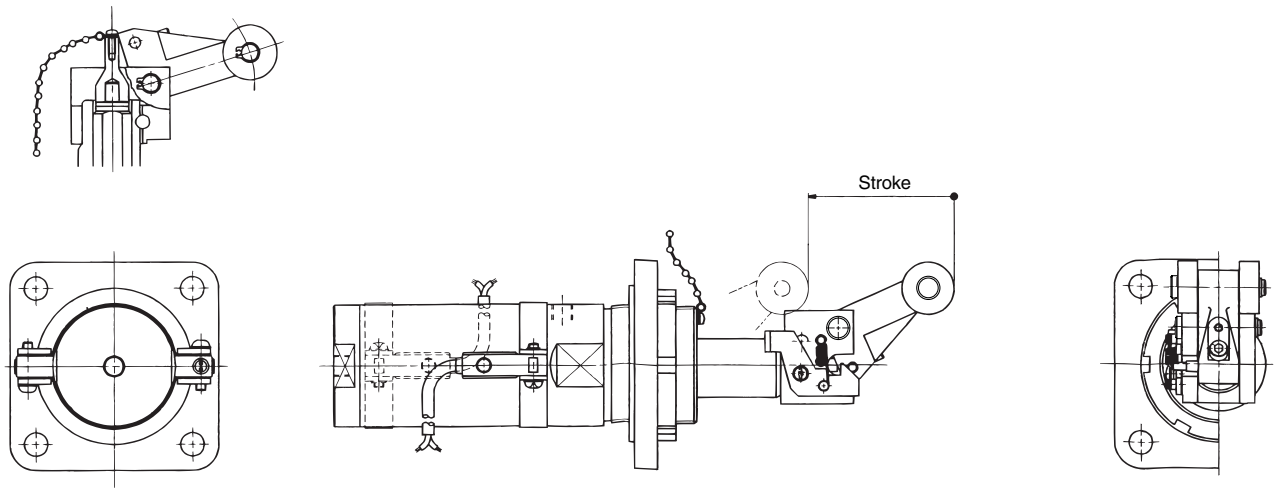
These 2 figures show the piston rod extended.

With lock mechanism **RS□G□-□□D**



With lock mechanism + Cancel cap **RS□G□-□□E**

∗ Dimensions when equipped with lock and cancel cap are the same as the figure drawing.

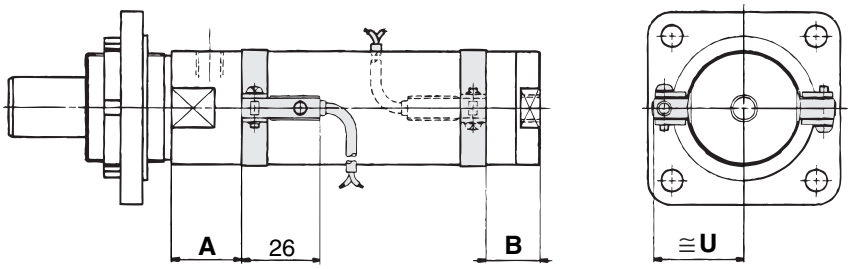


Bore size (mm)	A	B
40	47	35
50	58	40.5

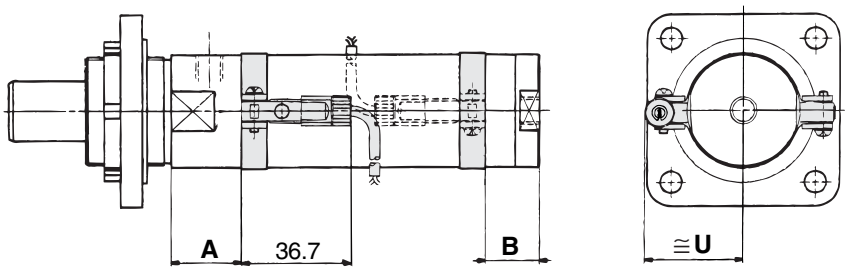
Note 1) Body dimensions without auto switch are the same as drawing above.
Note 2) In the case of single acting type, a One-touch fitting is on the rod side only.
Note 3) These figures show the dimensions when equipped with D-C7/C8 type auto switches.
Note 4) These figures show the piston rod extended.
Note 5) For the auto switch mounting position and its mounting height, refer to page 10-8-24.
Note 6) The figure shows these dimensions when the adjustment bolt is lowered (when energy absorption is at its maximum). However, these dimensions change within the ranges shown below as the adjusting bolt is raised (energy absorption is reduced).
$24°^{*} \rightarrow 16°^{*}$, $13.5^{*} \rightarrow 11.5^{*}$, $14^{*} \rightarrow 16^{*}$

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

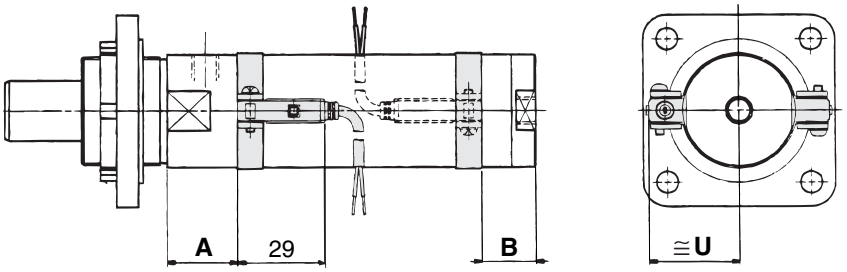
D-C7
D-C8



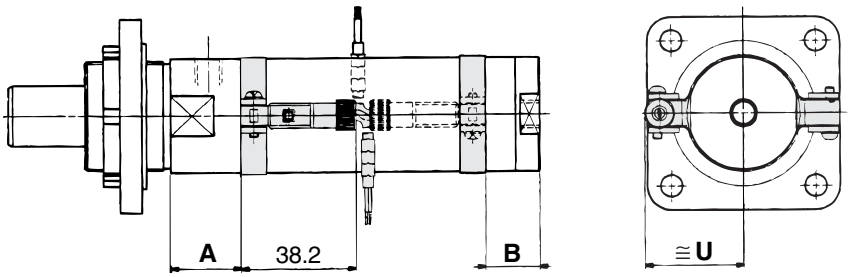
D-C73C
D-C80C



D-H7
D-H7□W
D-H79F
D-H7BAL



D-H7C



Proper Auto Switch Mounting Position

Auto switch model / Bore size (mm)	D-C7, D-C8, D-C73C, D-C80		D-H7BAL, D-H7□W, D-H7, D-H7C		D-H7NF	
	A	B	A	B	A	B
40	22.0	26.0	21.0	25.0	19.5	23.5
50	30.0	18	29.0	17.0	27.5	15.5

Auto Switch Mounting Height

D-C7, D-C8, D-H7, D-H7□W, D-H79F, D-H7BAL	D-H7C	D-C73C, D-C80C
U	U	U
35.0	38.0	37.5
40.5	43.5	43.0

Operating Range

Auto switch model	Bore size (mm)	
	40	50
D-C7□/C80 D-C73C/C80C	10	10
D-H7□/H7□W D-H7BAL/H7NF	5	6
D-H7C	10	9.5

∗ Since this is a guideline including hysteresis, not meant to be guaranteed. (Assuming approximately ±30% dispersion)
There may be the case to change substantially depending on an ambient environment.

Other than the models listed in “How to Order”, the following auto switches are applicable. For detailed specifications, refer to page 10-20-1.

Type	Model	Electrical entry	Features
Reed switch	D-C80	Grommet	Without indicator light
	D-C80C	Connector	

Пневматический встряхиватель

XT316

Предназначен для встряхивания, удаления остатков сыпучих масс со стенок питающих бункеров, лотков и т.д.

Технические характеристики

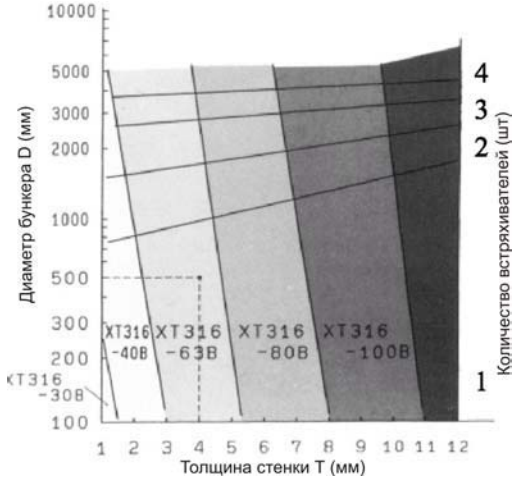
Номер для заказа*	XT316-30B	XT316-40B	XT316-63B	XT316-80B	XT316-100B
Диаметр поршня (мм)	30	40	63	80	100
Рабочая среда	Сжатый воздух (не требует смазки)				
Рабочий диапазон давлений (МПа	0.4 ~ 0.6				
Макс. частота срабатывания (циклов/мин.)	15				
Диапазон рабочих температур (°C)	-5 ~ 60				
Потребление сжатого воздуха (н.л/цикл)	0.33	0.75	1.29	1.91	4.0
Энергия удара (Дж)	0.5 ~ 0.7	1.7 ~ 3.0	4.4 ~ 7.4	9.8 ~ 17.7	21.6 ~ 39.2
Присоединительная резьба	1/8				3/8
Вес (кг)	2.5	4.4	11.2	15	33.5

Защитный элемент для выхлопного порта (заказывается отдельно)

Номер для заказа	XT316-13-12	XT316-4-12	XT316-11-15	XT316-14-16	XT316-12-14
Кол-во на один встряхиватель	1	2			
Присоединительная резьба	M8X1	M10X1	M12x1.5	M16x1.5	M20x1.5

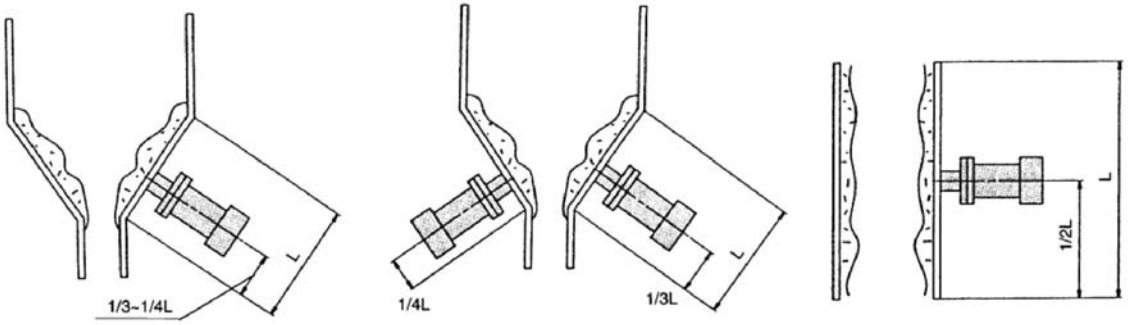
*В комплект поставки входит фланец для крепления к бункеру

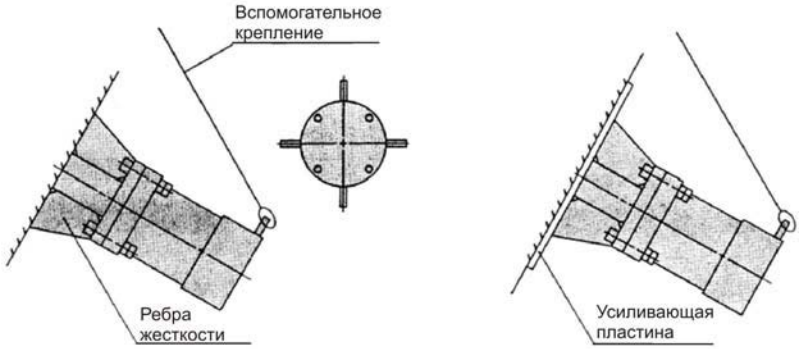
Выбор типоразмера встряхивателя



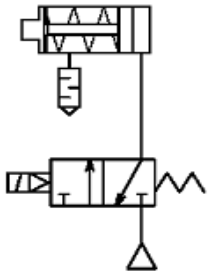
Пример: для бункера D= 500 мм, T= 4 мм,
Выбирается встряхиватель **XT316-63B** в количестве 1 шт.

Варианты монтажа



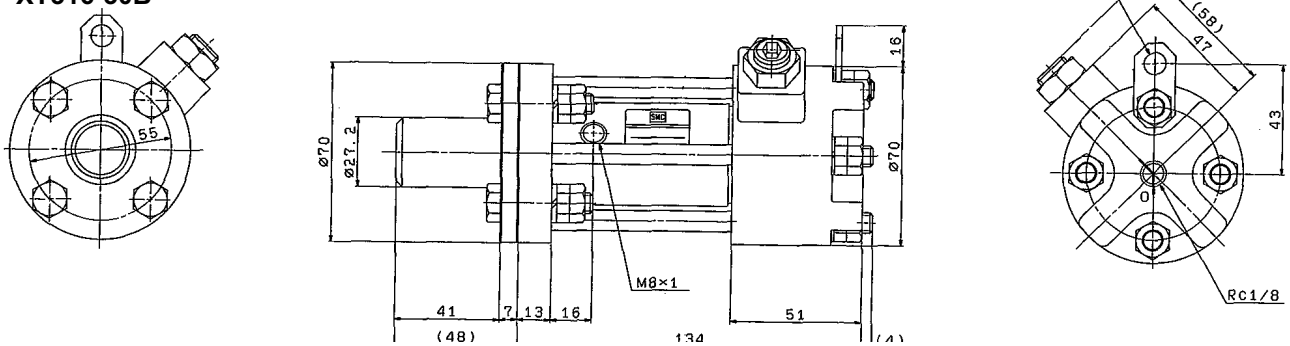


Пневматическая схема управления встряхивателем

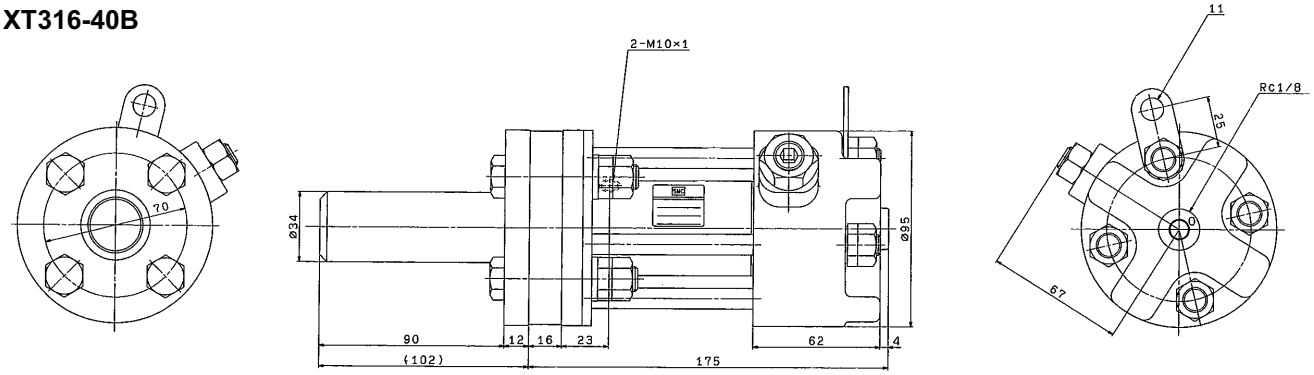


Размеры

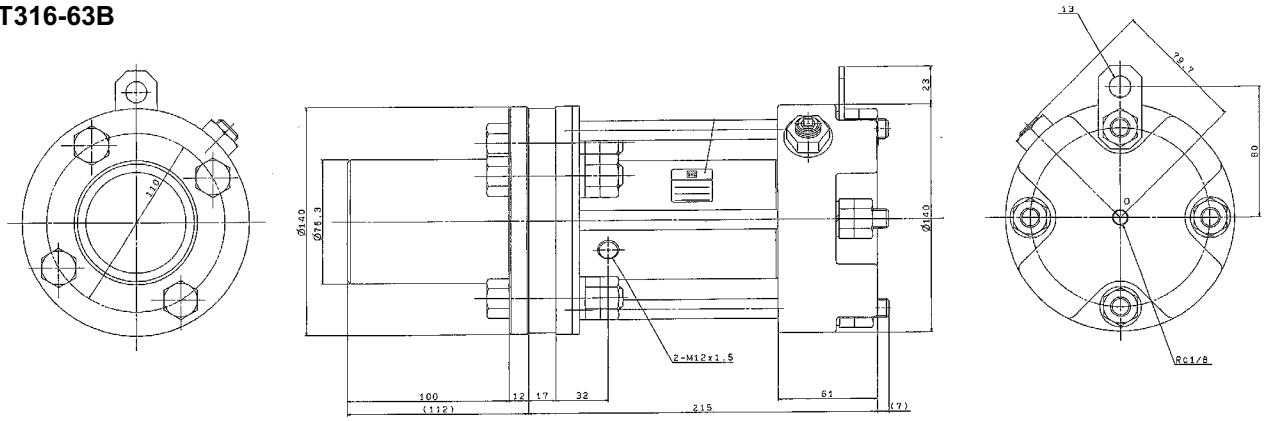
XT316-30B



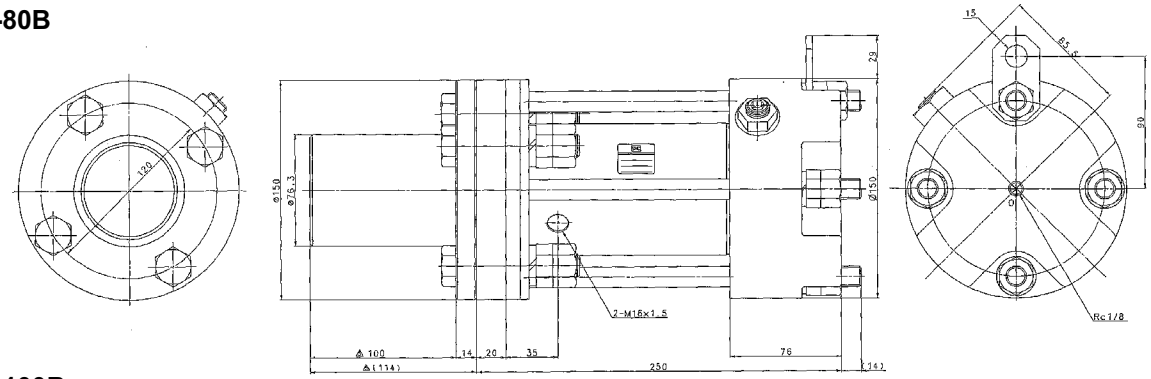
XT316-40B



XT316-63B



XT316-80B



XT316-100B