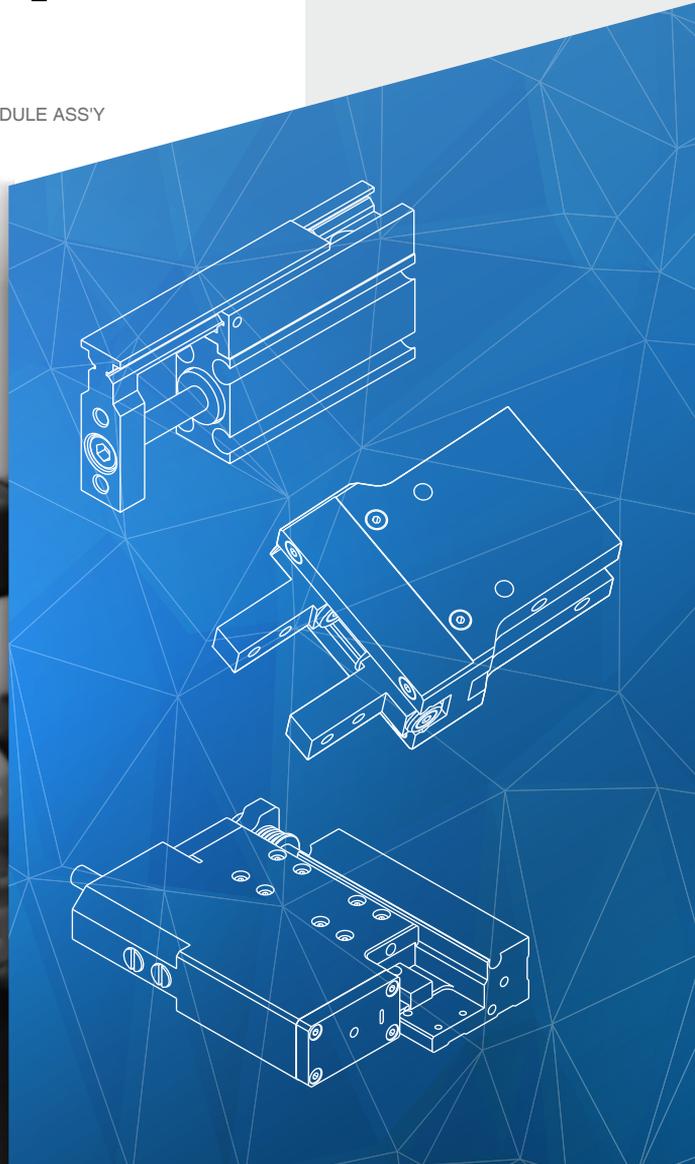


# PNEUMATIC PRODUCT

GENERAL HAND / CHECK VALVE / SWIVEL UNIT & MODULE ASS'Y

GENERAL CYLINDER / BLOCK CYLINDER /  
SLIDE CYLINDER / ROTARY CYLINDER /  
SWING CLAMP CYLINDER / ROTARY JOINT /  
SEPARATOR CYLINDER

PRECISION GUIDE CYLINDER /  
PICK UP CYLINDER / PRECISION STAGE /  
AUTO PITCH CHANGER



# COMPANY MESSAGE

## Year 2020, New start as P&M Incorporated!

Since established in 1997, PROTEC with composed two divisions with System Division and Pneumatic Division, playing a key role in the development of the FA industry both at home and abroad.

The Pneumatic division PROTEC Co.,Ltd has been kept on developing their own technology for manufacturing special pneumatic cylinders which is more specialized and space-saving component to meet customers needs than competitors.

The Pneumatic Cylinder is a critical component for handling semiconductor, LCD, SMT and heavy handling industrial. Also, pneumatic system is most economical and easy handling component for automation than other components.

Year 2020, The pneumatic division of PROTEC Co.,Ltd has been separated as new company named "**P&M Incorporated**" to meet customers various needs more specialized and for more serve direct solution.

P&M Incorporated will be best solution partner with customer friendly and specialized service for various range of special actuator.

With the absolute proposition that only the best technique can survive,  
All of **P&M Incorporated** members will be united in one mind to  
put forth our best efforts to advance not only domestically but also worldwide.



Technology that captivates the world!  
Quality that delights customers!



# TOTAL PRODUCT LINE UP

## GENERAL HAND

<p>PH01-A 53</p> 	<p>PH01-D 65</p> 	<p>PH01-G 79</p> 	<p>PH01J-C 89</p>  <p><b>NEW</b></p>
<p>PH01K 99</p> 	<p>PH02 119</p> 	<p>PH02-H 137</p> 	<p>PH04 145</p> 
<p>PH05 157</p> 	<p>PH06 169</p> 	<p>PH06-L 179</p> 	<p>PH06-L2 189</p>  <p><b>NEW</b></p>
<p>PH07 199</p> 	<p>PH08 209</p> 	<p>PH09 219</p> 	<p>PH10 229</p> 
<p>PH12 237</p> 	<p>PH14-S 249</p> 	<p>PH14-CL 263</p>  <p><b>NEW</b></p>	<p>PH14-CF 279</p>  <p><b>NEW</b></p>
<p>PH15-S 295</p> 	<p>PH15-CL 311</p>  <p><b>NEW</b></p>	<p>PH15-CF 329</p>  <p><b>NEW</b></p>	<p>PH15-W 345</p>  <p><b>NEW</b></p>

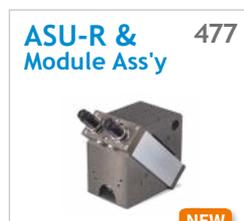
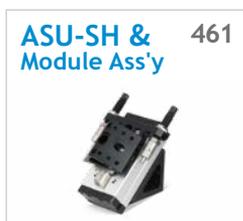
▪ **GENERAL HAND** .....



▪ **CHECK VALVE** .....



▪ **SWIVEL UNIT & MODULE ASS'Y** .....



# ● TOTAL PRODUCT LINE UP

## ▀ GENERAL CYLINDER

PFT

493



PFTG

503



NEW

PSK

513



## ▀ BLOCK CYLINDER

PT

527



PB

545



PBM-N

563



PQG

583



PBF

589



PGL

599



NEW

PGC

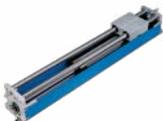
609



## ▀ SLIDE CYLINDER

PSC

621



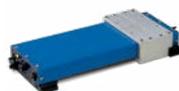
PSC-N

629



PSC-NC

637

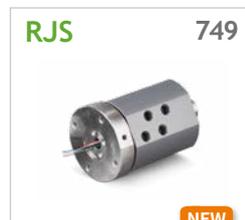


▪ ROTARY CYLINDER



▪ SWING CLAMP CYLINDER

▪ ROTARY JOINT



▪ SEPARATOR CYLINDER



# TOTAL PRODUCT LINE UP

## PRECISION GUIDE CYLINDER



## PICK UP CYLINDER



▪ **PRECISION STAGE** .....



▪ **AUTO PITCH CHANGER** .....



▪ **SUPPLEMENTS** .....

- Basic Safety Notes for AUTO SWITCH      1133
- Technical data of Auto Switch      1135
- Air Consumption & Required Air Volume      1140
- Application examples      1141
- Engineering Unit Conversion Table      1147

# PRODUCT INDEX

## GENERAL HAND

PH01-A



MODEL	Stroke(mm)	Effective Gripping Force(kgf)		Page
		Close	Open	
PH01-06A	4	0.84	1.12	58
PH01-10A	6	3.42	4.57	59
PH01-16A	8	8.16	9.49	60
PH01-20A	12	12	14	61
PH01-25A	16	20.1	24	62
PH01-30A	24	30.5	36.3	63

PH01-D



MODEL	Stroke(mm)	Effective Gripping Force(kgf)				Page
		Close	Open	-NC	-NO	
PH01-10D	6	2.9	3.9	3.3	2.3	72
PH01-16D	8	6.3	7.3	6.1	5	73
PH01-20D	12	8.9	10.6	9.3	7.6	74
PH01-25D	16	13.3	15.8	13.5	11	75
PH01-32D	24	22.7	26.4	22.8	18.7	76

PH01-G



MODEL	Stroke(mm)	Effective Gripping Force(kgf)		Page
		Close	Open	
PH01-10G	4	3.46	4.61	84
PH01-16G	6	8.22	9.57	85
PH01-20G	10	12.2	14.5	86
PH01-25G	14	20.2	24	87

PH01J-C



NEW

MODEL	Stroke(mm)	Effective Gripping Force(kgf)		Page
		Close	Open	
PH01J-16C	8	8.1	9.4	94
PH01J-20C	12	12	14	95
PH01J-25C	16	20.1	24	96

※ Listed gripping force means the gripping force from the end point of master jaw, based on 5kgf/cm<sup>2</sup> air pressure is applied.

**GENERAL HAND**



MODEL	Stroke(mm)	Effective Gripping Force(kgf)		Page
		Close	Open	
PH01K-20	12	12.1	14.2	104
PH01K-30	24	30.6	36.5	106
PH01K-40	30	48.1	57.3	108
PH01K-50	36	84.7	100	110
PH01K-60	40	133	159	112
PH01K-80	50	250	277	114
PH01K-100	60	370	407	116



MODEL	Stroke(mm)	Effective Gripping Force(kgf)		Page
		Close	Open	
PH02-16	6	8	9.3	125
PH02-20	8	12.3	14.6	126
PH02-25	10	18.7	22.3	127
PH02-30	12	29	34.2	128
PH02-40	16	54	65	129
PH02-50	20	83.5	99.5	130
PH02-60	25	142	158	131
PH02-80	30	231	256	132
PH02-100	40	363	400	133
PH02-125	45	530	683	134



MODEL	Stroke(mm)	Effective Gripping Force(kgf)		Page
		Close	Open	
PH02-30H	12	29	34	141
PH02-40H	16	54	65	142
PH02-50H	20	83.5	99.5	143



MODEL	Stroke(mm)	Effective Gripping Force(kgf)		Page
		Close	Open	
PH04-12	5	2.1	3.2	150
PH04-16	6	6.1	7.2	151
PH04-20	8	9.4	11.2	152

※ Listed gripping force means the gripping force from the end point of master jaw, based on 5kgf/cm<sup>2</sup> air pressure is applied.

# PRODUCT INDEX

## GENERAL HAND

PH05



MODEL	Stroke(°)	Effective Gripping Force(kgf)	Page
		Close	
PH05-16	-5 ~ 180	2.1	160
PH05-20	-5 ~ 180	3.4	161
PH05-30	-5 ~ 180	8.4	162
PH05-40	-5 ~ 180	15	163
PH05-50	-5 ~ 180	25.7	164
PH05-80	-5 ~ 180	83	165

PH06



MODEL	Stroke(mm)	Effective Gripping Force(kgf)	Page
		Close	
PH06-10	10	2.9	172
PH06-12	20	5.1	173
PH06-16	30	9.1	174
PH06-20	40	14.2	175
PH06-30	60	30.8	176
PH06-40	100	57	177

PH06-L



MODEL	Stroke(mm)	Effective Gripping Force(kgf)	Page
		Close	
PH06-10L	10	2.9	182
PH06-12L	20	5.1	183
PH06-16L	30	9.1	184
PH06-20L	90	14.2	185
PH06-30L	120	30.8	186

PH06-L2



NEW

MODEL	Stroke(mm)	Effective Gripping Force(kgf)	Page
		Close	
PH06-10L2	40	2.9	192
PH06-12L2	60	5.1	193
PH06-16L2	80	9.1	194
PH06-20L2	100	14.2	195
PH06-30L2	160	30.8	196

※ Listed gripping force means the gripping force from the end point of master jaw, based on 5kgf/cm<sup>2</sup> air pressure is applied.

**■ GENERAL HAND**



MODEL	Stroke(mm)	Effective Gripping Force(kgf)	Page
		Close	
PH07-06	10	1.3	202
PH07-10	20	2.1	202
PH07-20	30	8.8	203
PH07-30	40	18.8	204
PH07-40	80	28	205
PH07-50	100	53	206



MODEL	Stroke(mm)	Effective Gripping Force(kgf)	Page
		Close	
PH08-06	8	1.2	213
PH08-10	15	3.4	214
PH08-16	20	8.8	215
PH08-20	20	13.8	216
PH08-30	30	31	217



MODEL	Stroke(°)	Effective Gripping Force(kgf)	Page
		Close	
PH09-12	-14 ~ +30	0.5	222
PH09-16	-5 ~ +15	2.8	223
PH09-20	-5 ~ +20	4.4	224
PH09-25	-5 ~ +20	7.8	225
PH09-30	-5 ~ +20	13.2	226
PH09-40	-5 ~ +25	22	227



MODEL	Stroke(mm)	Effective Gripping Force(kgf)	Page
		Open & Close	
PH10-12	20	3.2	232
PH10-16	30	5.5	234
PH10-20	36	9.4	235

※ Listed gripping force means the gripping force from the end point of master jaw, based on 5kgf/cm<sup>2</sup> air pressure is applied.

# PRODUCT INDEX

## GENERAL HAND

PH12



MODEL	Stroke(mm)	Effective Gripping Force(kgf)		Page
		Close	Open	
PH12-20	16	9.5	11.3	241
PH12-25	30	13.1	15.6	242
PH12-40	41	34.2	40.7	243

PH14-S



MODEL	Stroke(mm)	Effective Gripping Force(kgf)		Page
		Close	Open	
PH14-30S	8	19.1	21.5	253
PH14-40S	12	34.2	38.2	254
PH14-50S	14	54.8	59.8	255
PH14-60S	16	81.5	86.5	256
PH14-80S	20	148	162	257
PH14-100S	26	235	243	258
PH14-125S	32	369	378	259

PH14-CL



NEW

MODEL	Stroke(mm)	Effective Gripping Force(kgf)		Page
		Close	Open	
PH14-30CL	8	20.5	23	269
PH14-40CL	12	42.9	47.2	270
PH14-50CL	14	68.9	76.7	271
PH14-60CL	16	103	111	272
PH14-80CL	20	173	184	273
PH14-100CL	26	261	278	274
PH14-125CL	32	411	436	275

PH14-CF



NEW

MODEL	Stroke(mm)	Effective Gripping Force(kgf)		Page
		Close	Open	
PH14-30CF	6	27.3	30.7	283
PH14-40CF	10	49.9	54.9	284
PH14-50CF	12	77	85.8	285
PH14-60CF	14	115	124	286
PH14-80CF	17	208	221	287
PH14-100CF	21	326	348	288
PH14-125CF	25	514	545	289

※ Listed gripping force means the gripping force from the end point of master jaw, based on 5kgf/cm<sup>2</sup> air pressure is applied.

■ GENERAL HAND



MODEL	Stroke(mm)	Effective Gripping Force(kgf)		Page
		Close	Open	
PH15-20S	8	8.6	9.5	299
PH15-25S	12	12.3	15	300
PH15-30S	16	18.2	20.5	301
PH15-40S	20	32.8	38	302
PH15-50S	26	50.7	60.4	303
PH15-60S	32	79.3	89.3	304
PH15-80S	50	107	114	305
PH15-100S	60	162	178	306



MODEL	Stroke(mm)	Effective Gripping Force(kgf)		Page
		Close	Open	
PH15-20CL	8	9.5	10.4	317
PH15-25CL	12	15.9	18.9	318
PH15-30CL	16	23.2	27.6	319
PH15-40CL	20	38.6	45.9	320
PH15-50CL	26	57.9	68.9	321
PH15-60CL	32	88.8	99.8	322
PH15-80CL	50	153	178	323
PH15-100CL	60	235	258	324



MODEL	Stroke(mm)	Effective Gripping Force(kgf)		Page
		Close	Open	
PH15-20CF	6	12.7	13.9	333
PH15-25CF	10	18.3	21.8	334
PH15-30CF	14.5	26	31	335
PH15-40CF	17	46.4	55.3	336
PH15-50CF	21	72.4	86.2	337
PH15-60CF	25.5	111	125	338
PH15-80CF	40	191	222	339
PH15-100CF	44	317	349	340



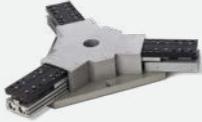
MODEL	Stroke(mm)	Effective Gripping Force(kgf)		Page
		Close	Open	
PH15-40W	40	30.4	36.1	349
PH15-50W	46	49.7	57	350
PH15-60W	52	82.1	91.3	351

※ Listed gripping force means the gripping force from the end point of master jaw, based on 5kgf/cm<sup>2</sup> air pressure is applied.

# PRODUCT INDEX

## GENERAL HAND

PH21



MODEL	Stroke(mm)	Effective Gripping Force(kgf)		Page
		Close	Open	
PH21-12	80	25	19	358
PH21-20	100	70	53	359
PH21-30	120	159	133	360

PH22



MODEL	Stroke(mm)	Effective Gripping Force(kgf)	Page
		Open & Close	
PH22-20	50	23.5	368
PH22-30	100	53	369
PH22-40	150	94	370

PH23



MODEL	Stroke(mm)	Effective Gripping Force(kgf)	Page
		Open & Close	
PH23-20	80	17.6	377
PH23-25	100	28.3	378
PH23-30	130	37.9	379
PH23-40	180	79	380
PH23-60	200	225	381

PH25



NEW

MODEL	Stroke(mm)	Effective Gripping Force(kgf)	Page
		Close	
PH25-08	8, 16, 32	4.3	388~390
PH25-12	12, 24, 48	9.6	391~393
PH25-16	16, 32, 64	17.1	394~396
PH25-20	20, 40, 80	26.7	397~399

※ Listed gripping force means the gripping force from the end point of master jaw, based on 5kgf/cm<sup>2</sup> air pressure is applied.

▪ **GENERAL HAND** .....



MODEL	Stroke(mm)	Effective Gripping Force(kgf)		Page
		Close	Open	
PH32-12	60	12.7	16.9	407
PH32-16	90	22.6	30.1	408
PH32-20	120	35.3	47.1	409
PH32-25	150	56.6	73.6	410



MODEL	Stroke (mm or °)	Effective Gripping Force(kgf)		Page
		Close	Open	
PHC01-08	4mm	0.25	0.1	419
PHC02-06	-6.8 ~ 31.5°	0.04	0.02	420
PHC02-08	-17 ~ 28°	0.08	0.03	421
PHC03-06	-3.5 ~ 23°	0.04	0.07	422
PHC03-08	-5.7 ~ 24°	0.02	0.04	423
PHC04-06	-3.5 ~ 23°	0.06	0.35	422
PHC04-08	-5.7 ~ 24°	0.05	0.57	423

▪ **CHECK VALVE** .....



MODEL	Minimum Orifice(mm)	Body Weight(Kgf)	Page
PCV10	4	0.1	428
PCV12	6.5	0.2	429

※ Listed gripping force means the gripping force from the end point of master jaw, based on 5kgf/cm<sup>2</sup> air pressure is applied.

# ● PRODUCT INDEX

## ▪ SWIVEL UNIT & MODULE ASS'Y .....

ASU-N



MODEL	Rotation Angle(°)	Effective Torque (Kgf·cm)	Page
ASU18N	90	3.6	444
ASU22N	90	6.6	445
ASU30N	90	18.5	448
ASU40N	90	38.5	451
ASU50N	90	75.6	454
ASU60N	90	229	457

ASU-SH



MODEL	Rotation Angle(°)	Effective Torque (Kgf·cm)	Page
ASU16SH	180	12.5	464
ASU20SH	180	24.1	466
ASU25SH	180	41.2	468
ASU30SH	180	74.2	470
ASU40SH	180	158.3	472

ASU-R



NEW

MODEL	Rotation Angle(°)	Effective Torque (Kgf·cm)	Page
ASU30R-40	180	70	480
ASU30R-50	180	70	482
ASU30R-60	180	70	484
ASU40R-60	180	155	486
ASU40R-80	180	155	488

※ Listed effective torque means when 5kgf/cm<sup>2</sup> air pressure is applied.



# PRODUCT INDEX

## GENERAL CYLINDER

PFT



MODEL	Stroke(mm)	Theoretical Thrust(kgf)		Page
		Forward	Backward	
PFT12	5 ~ 30	5.6	4.2	495
PFT16	5 ~ 30	10	7.5	496
PFT20	5 ~ 50	15.7	11.7	497
PFT25	5 ~ 50	24.5	18.8	498
PFT32	5 ~ 100	40.2	30.1	499
PFT40	5 ~ 100	62.8	52.7	500
PFT50	10 ~ 100	98.1	82.4	501

PFTG



NEW

MODEL	Stroke(mm)	Theoretical Thrust(kgf)		Page
		Forward	Backward	
PFTG12	5,10,15,20,25,30	5.6	4.2	505
PFTG16	5,10,15,20,25,30	10	7.5	506
PFTG20	5,10,20,30,40,50	15.7	11.7	507
PFTG25	5,10,20,30,40,50	24.5	18.8	508
PFTG32	5,10,20,30,40,50,75,100	40.2	30.1	509
PFTG40	5,10,20,30,40,50,75,100	62.8	52.7	510
PFTG50	10,20,30,40,50,75,100	98.1	82.4	511

PSK



MODEL	Stroke(mm)	Theoretical Thrust(kgf)		Page
		Forward	Backward	
PSK10	5 ~ 30	3.9	3.2	515
PSK16	5 ~ 30	10	8.6	516
PSK20	5 ~ 50	15.7	13.1	517
PSK25	5 ~ 50	24.5	20.6	518
PSK32	5 ~ 50	40.2	34.5	519

※ Listed theoretical thrust means when 5kgf/cm<sup>2</sup> air pressure is applied.

▪ BLOCK CYLINDER



MODEL	Stroke(mm)	Theoretical Thrust(kgf)		Page
		Forward	Backward	
PT12	15 ~ 50	11.3	8.5	531
PT16	15 ~ 75	20.1	15.1	533
PT20	25 ~ 100	31.4	23.5	535
PT25	25 ~ 125	49.1	37.8	537
PT30	25 ~ 125	70.6	50.6	539
PT40	25 ~ 125	125.6	94	541



MODEL	Stroke(mm)	Theoretical Thrust(kgf)	Page
PB12	25 ~ 75	8.5	549
PB16	25 ~ 100	15.1	551
PB20	25 ~ 125	23.5	553
PB25	25 ~ 150	37.8	555
PB30	25 ~ 150	50.6	557



MODEL	Stroke(mm)	Theoretical Thrust(kgf)		Page
		Forward	Backward	
PBM06N	5 ~ 15	1.4	1.1	569
PBM10N	5 ~ 20	3.9	2.9	570
PBM12N	10 ~ 50	5.6	4.2	571
PBM16N	10 ~ 50	10	7.5	572
PBM20N	20 ~ 100	15.5	11.8	573
PBM25N	20 ~ 100	24.5	19	574
PBM30N	25 ~ 100	35	25	575
PBM40N	25 ~ 100	63	52.5	576
PBM50N	25 ~ 100	98	82.5	577
PBM60N	25 ~ 100	155.5	140	578
PBM80N	25 ~ 100	251	226.5	579
PBM100N	25 ~ 100	392.5	357	580



MODEL	Stroke(mm)	Theoretical Thrust(kgf)		Page
		Forward	Backward	
PQG20	10 ~ 50	78.5	11.8	585
PQG30	10 ~ 100	176.5	29.6	586
PQG40	10 ~ 100	314	52.8	587

※ Listed theoretical thrust means when 5kgf/cm<sup>2</sup> air pressure is applied.

# PRODUCT INDEX

## ▪ BLOCK CYLINDER

PBF



MODEL	Stroke(mm)	Theoretical Thrust(kgf)	Page
PBF16	25 ~ 100	7.5	591
PBF20	25 ~ 125	11.8	592
PBF25	25 ~ 150	18.9	593
PBF30	25 ~ 200	25.3	594
PBF40	25 ~ 200	47	595

PGL



NEW

MODEL	Stroke(mm)	Theoretical Thrust(kgf)		Page
		Forward	Backward	
PGL16	50 ~ 200	10.05	8.65	601
PGL20	50 ~ 200	15.7	13.2	602
PGL25	50 ~ 200	24.55	20.6	603
PGL30	75 ~ 300	40.2	34.55	604
PGL40	75 ~ 300	62.5	52.5	605
PGL50	75 ~ 300	98	82.5	606

PGC



MODEL	Stroke(mm)	Theoretical Thrust(kgf)		Page
		Forward	Backward	
PGC20	75 ~ 200	15.7	13.2	611
PGC25	75 ~ 200	24.5	20.6	612
PGC30	75 ~ 300	40.2	34.6	613
PGC40	75 ~ 500	62.8	55.2	614
PGC50	75 ~ 500	98.2	82.5	615

※ Listed theoretical thrust means when 5kgf/cm<sup>2</sup> air pressure is applied.

■ **SLIDE CYLINDER** .....



MODEL	Stroke(mm)	Theoretical Thrust(Kgf)	Page
PSC30	200 ~ 600	10	623
PSC40	200 ~ 1000	18.5	624
PSC50	200 ~ 1000	29	625
PSC60	200 ~ 1500	48	626
PSC80	200 ~ 2000	81	627



MODEL	Stroke(mm)	Theoretical Thrust(Kgf)	Page
PSC16N	100 ~ 300	2.4	631
PSC20N	100 ~ 500	4	632
PSC30N	100 ~ 700	10	633
PSC40N	200 ~ 1000	18.5	634
PSC60N	200 ~ 1500	48	635



MODEL	Stroke(mm)	Theoretical Thrust(Kgf)	Page
PSC20NC	100 ~ 500	4	639
PSC30NC	100 ~ 700	10	640
PSC40NC	200 ~ 1000	18.5	641
PSC50NC	200 ~ 1000	29	642

※ Listed theoretical thrust means when 5kgf/cm<sup>2</sup> air pressure is applied.

# PRODUCT INDEX

## ▪ ROTARY CYLINDER

### PRC



MODEL	Rotation Angle(°)	Effective Torque (Kgf·cm)	Page
PRC12	90, 180	2.5	658
PRC16	90, 180	5.5	659
PRC20	90, 180	9	660
PRC25	90, 180	17	661
PRC30	90, 180	34.5	662

### PRK



NEW

MODEL	Rotation Angle(°)	Effective Torque (Kgf·cm)	Page
PRK16	0 ~ 180	12.5	672
PRK20	0 ~ 180	22	673
PRK25	0 ~ 180	46.5	674

### PRC-S



MODEL	Rotation Angle(°)	Effective Torque (Kgf·cm)	Page
PRC16S	0 ~ 180	10	682
PRC20S	0 ~ 180	20	683
PRC22S	0 ~ 180	24	684
PRC25S	0 ~ 180	41	685
PRC30S	0 ~ 180	74	686
PRC40S	0 ~ 180	155	687
PRC50S	0 ~ 180	370	688

### PRC-ST



MODEL	Rotation Angle(°)	Effective Torque (Kgf·cm)	Page
PRC16ST	90, 180	10	694
PRC20ST	90, 180	20	695
PRC22ST	90, 180	24	696
PRC25ST	90, 180	41	697
PRC30ST	90, 180	74	698
PRC40ST	90, 180	155	699
PRC50ST	90, 180	370	700

※ Listed theoretical thrust means when 5kgf/cm<sup>2</sup> air pressure is applied.

▪ **ROTARY CYLINDER** .....



MODEL	Rotation Angle(°)	Effective Torque (Kgf·cm)	Page
PRC16SH	90, 180	12.5	706
PRC20SH	90, 180	24	707
PRC25SH	90, 180	41	708
PRC30SH	90, 180	74	709
PRC40SH	90, 180	158.5	710
PRC50SH	90, 180	370	711



MODEL	Rotation Angle(°)	Effective Torque (Kgf·cm)	Page
PRY40S	90, 180	370	716
PRY60S	90, 180	720	717
PRY80S	90, 180	1265	718
PRY100S	90, 180	2195	719



MODEL	Rotation Angle(°)	Effective Torque (Kgf·cm)	Page
PRC40H	90, 180	140	724
PRC60H	90, 180	400	725
PRC80H	90, 180	855	726



MODEL	Rotation Angle(°)	Effective Torque (Kgf·cm)	Page
PRD12-60	60	1.8	732
PRD16-60	60	3.5	734

※ Listed theoretical thrust means when 5kgf/cm<sup>2</sup> air pressure is applied.

# PRODUCT INDEX

## SWING CYLINDER

SW-N



MODEL	Stroke(mm)	Theoretical Thrust(kgf)		Page
		Forward	Backward	
SW16N-15	15	10	7.5	742
SW25N-15	15	24.5	19	743

※ Listed theoretical thrust means when 5kgf/cm<sup>2</sup> air pressure is applied.

## ROTARY JOINT

RJS



NEW

MODEL	Max. Radial Load(kgf)	Max. Thrust Load(Kgf)	Page
RJS60	25	18	751
RJS70	30	24	752
RJS90	105	182	753

PRJ



MODEL	Max. Radial Load(kgf)	Max. Thrust Load(Kgf)	Page
PRJ50	25	18	757
PRJ70	30	24	758
PRJ90	105	182	759

▪ **SEPARATOR CYLINDER** .....



MODEL	Stroke(mm)	Theoretical Thrust(kgf)		Page
		Forward	Backward	
SP12-20	20	3.14	5.6	763

※ Listed theoretical thrust means when 5kgf/cm<sup>2</sup> air pressure is applied.

# PRODUCT INDEX

## PRECISION GUIDE CYLINDER

### PST-NS



MODEL	Stroke(mm)	Theoretical Thrust(kgf)		Page
		Forward	Backward	
PST06NS	5 ~ 50	2.8	2.1	777~782
PST08NS	10 ~ 75	5.5	3.8	783~788
PST12NS	10 ~ 100	11.3	8.5	789~793
PST16NS	10 ~ 125	20.1	15.1	794~799
PST20NS	10 ~ 150	31.4	23.5	800~806
PST25NS	10 ~ 150	49.1	37.8	807~813

### PSB



NEW

MODEL	Stroke(mm)	Theoretical Thrust(kgf)		Page
		Forward	Backward	
PSB06	10 ~ 50	2.9	2.1	827~831
PSB08	10 ~ 75	5	3.8	832~837
PSB12	10 ~ 100	11.3	8.5	838~844
PSB16	10 ~ 125	20.1	15.1	845~852
PSB20	10 ~ 150	31.4	23.6	853~861
PSB25	10 ~ 150	49.1	37.8	862~870

### PST



MODEL	Stroke(mm)	Theoretical Thrust(kgf)		Page
		Forward	Backward	
PST12	50 ~ 150	11.3	8.5	880
PST16	75 ~ 200	20	15	881
PST20	100 ~ 250	31.4	23.5	882
PST25	100 ~ 250	49.1	37.8	883

### SC



MODEL	Stroke(mm)	Theoretical Thrust(kgf)		Page
		Forward	Backward	
SC06	5 ~ 15	1.4	1.1	894
SC10	5 ~ 30	3.9	2.5	894
SC08A	5 ~ 15	2.5	1.9	895
SC10A	5 ~ 30	3.9	2.5	896
SC16A	5 ~ 40	10.1	7.6	897
SC06D	5 ~ 15	2.8	2.1	898
SC10D	5 ~ 30	7.9	5.1	899

※ Listed theoretical thrust means when 5kgf/cm<sup>2</sup> air pressure is applied.

## PRECISION GUIDE CYLINDER

**ST**



MODEL	Stroke(mm)	Theoretical Thrust(kgf)	Page
ST06S	5	1.4	910
ST06L	5, 10	1.4	911~912
ST10L	10, 20	3.9	913~914
ST12L	15, 25	5.7	915~916

**STS-L**



MODEL	Stroke(mm)	Theoretical Thrust(kgf)	Page
STS06L	5, 10	1.4	929~930
STS10L	10, 15, 20	3.9	931~933
STS12L	15, 20, 25	5.7	934~936
STS16L	20, 25, 30, 35	10.1	937~940

**SD**



MODEL	Stroke(mm)	Theoretical Thrust(kgf)		Page
		Forward	Backward	
SD05	5, 10	1.4	1	953~954
SD06	5, 10, 15	1.4	1	955~957
SD08	5, 10, 15, 20	2.5	1.9	958~961
SD12	10, 20, 30	5.7	4.2	962~964

**PSW**



MODEL	Stroke(mm)	Theoretical Thrust(kgf)		Page
		Forward	Backward	
PSW06	5, 10, 15, 20	1.4	1	976~979
PSW08	5, 10, 20, 30	2.5	1.9	980~983
PSW12	10, 20, 30, 40, 50	5.7	4.2	984~988

※ Listed theoretical thrust means when 5kgf/cm<sup>2</sup> air pressure is applied.

# PRODUCT INDEX

## ▪ PICK UP CYLINDER

PPU-B



MODEL	Stroke(mm)	Theoretical Thrust(kgf)		Page
		Forward	Backward	
PPU06B	5, 10, 15, 20, 25, 30	1.4	1.1	1001~1003
PPU12B	5, 10, 15, 20, 25, 30	5.7	4.3	1004~1006

PPU-CV



NEW

MODEL	Stroke(mm)	Theoretical Thrust(kgf)		Page
		Forward	Backward	
PPU06CV	5, 10, 15, 20	1.4	1.1	1015~1016
PPU08CV	5, 10, 15, 20	2.5	1.9	1017~1018

PPU-H



NEW

MODEL	Stroke(mm)	Theoretical Thrust(kgf)		Page
		Forward	Backward	
PPU06H	5, 10, 15, 20, 25, 30	1.4	1.1	1023~1025

PPU-S



MODEL	Stroke(mm)	Theoretical Thrust(kgf)		Page
		Forward	Backward	
PPU06S	10	1.4	1.1	1029

※ Listed theoretical thrust means when 5kgf/cm<sup>2</sup> air pressure is applied.

**▪ PICK UP CYLINDER**



MODEL	Stroke(mm)	Theoretical Thrust(kgf)		Page
		Forward	Backward	
PPU06F	10	1.4	1.1	1035



MODEL	Stroke(mm)	Theoretical Thrust(kgf)		Page
		Forward		
PPU03D	5	0.3		1041
PPU04D		0.5		1042
PPU05D		1.1		1043



MODEL	Stroke(mm)	Theoretical Thrust(kgf)		Page
		Forward	Backward	
PPC06	5, 10, 15	1.4	1.1	1047



MODEL	Rotation Angle(°)	Theoretical Torque(Kgf·cm)	Page
PPR10	90, 180	0.85	1051
PPR13	90, 180	2	1052

※ Listed theoretical thrust means when 5kgf/cm<sup>2</sup> air pressure is applied.

# PRODUCT INDEX

## ▪ PICK UP CYLINDER

### PPRL



MODEL	Stroke (mm)	Theoretical Thrust(Kgf)		Rotation Angle (°)	Theoretical Torque (Kgf·cm)	Page
		Forward	Backward			
PPRL06	10, 20	1.4	1.1	90, 180	0.2	1057~1058
PPRL10	10, 20, 30	2.5	1.9	90, 180	0.9	1059~1061
PPRL13	10, 20, 30	3.9	2.5	90, 180	2	1062~1064

### PPRM



MODEL	Stroke (mm)	Theoretical Thrust (Kgf)		Rotation Angle (°)	Page
		Forward	Backward		
PPRM10	10, 20	3.9	2.5	0 ~ 360	1069
PPRM12	10, 20, 30	5.6	4.2	0 ~ 360	1071~1076
PPRM16	10, 20, 30	5.6	4.2	0 ~ 360	1077~1079

※ Listed theoretical thrust and torque mean when 5kgf/cm<sup>2</sup> air pressure is applied.

PRECISION STAGE



MODEL	Table Size (mm)	Stroke (mm)	Max. Load (kg)	Page
GNY50	50×50	±7.5	5	1091
GNY70	70×70	±10	10	
GNY100	100×100	±12.5	20	1092



MODEL	Table Size (mm)	Rotation Angle (°)	Max. Load (kg)	Page
GNR50	50×50	±5	3	1095
GNR70	70×70		5	
GNR100	100×100		8	1096



MODEL	Table Size (mm)	Stroke (mm)	Max. Load (kg)	Page
GNZ50	50×50	±1.5	4	1099
GNZ70	70×70	±2.5	5	
GNZ100	100×100	±2.5	7	1100



MODEL	Table Size (mm)	Pivot Distance (mm)			Max. Load (kg)	Page
GNT50	50×50	50	68	86	3	1103~1104
GNT70	70×70	70	96	122	5	1105~1106
GNT100	100×100	95	134	172	7	1107~1108

※ Position accuracy of pivot distance : ±0.2

# PRODUCT INDEX

## ▪ AUTO PITCH CHANGER



MODEL	Pitch Change Range	Num of Head	Page
PDCM1122	11 ~ 22	4, 5	1118
PDCM1428	14 ~ 28	6, 7	1119

※ Repeatability  $\pm 0.03$ , Position accuracy  $\pm 0.1$



MODEL	Pitch Change Range	Num of Head	Page
PDLM1022	10 ~ 22	6, 8, 10	1125~1126
PDLM1432	14 ~ 32	6, 8, 10	1127~1128

※ Repeatability  $\pm 0.02$ , Position accuracy  $\pm 0.07$





## Please read the followings before use

# For the safe use of Pneumatic devices.

### Caution

### Safety Note

The purpose of notes presented here is to use the product correctly and safely, and prevent any damage or risk in advance for user and others. In order to prevent accident, the notes are classified into three categories (caution, warning, and danger) according to the size and urgency of risk or damage. Please be well-informed with these notes, as they are critical for safety.

- |  |  |
|--|--|
|  <b>Caution</b> | The case considered as risky status as wrong handling may cause minor injury or physical damage.                             |
|  <b>Warning</b> | The case considered as risky status as wrong handling may cause human death or severe injury.                                |
|  <b>Danger</b>  | The case considered as urgent risky status as it will, if not avoid, cause human death or severe injury, or physical damage. |

Even an item stated under “Caution”, may create serious result depending on situation. Therefore, all of them contain critical information, so please be informed in advance thoroughly. In addition, please understand that the safety notes may be changed without pre-notification.

### Warning

### Warning Note

- 1 This product is designed and manufactured as the standard industrial equipment or component. Therefore, it shall be handled by a person who has full prior knowledge.**

Compressed air is very dangerous when it is incorrectly handled. Therefore, the assembling or maintenance of mechanical equipment using pneumatic devices shall be handled by a qualified person who has sufficient knowledge and experience.
- 2 The product shall be used within the specified range.**

The product stated on this catalogue is designed to be used only in air compression system.  
Otherwise, it may cause damage to the equipment.
- 3 For the safety of compressed air, comply with the following legal regulations.**

KS B 6376 (General rules of pneumatic system.)  
JIS B 8370 (General rules of pneumatic system.)  
ISO 4414 (Pneumatic fluid power)
- 4 Select pneumatic devices properly.**

The usage conditions of products stated on this catalogue are so variety that the determination of system acceptability shall be made by pneumatic system designer or person who determines its specification after complete analysis or test.  
Responsibility about system safety assurance belongs to the person who decides its specification.
- 5 Do not handle or disassemble this product before its safety is confirmed.**

If starting or re-starting the machine or equipment using pneumatic devices, make sure that system safety, such as preventive measures against the drop of moving object or instant protrusion, is ensured.

## Safety Note for Pneumatic Actuator ①

### Warning

- **Pneumatic cylinder may have malfunction due to the change of power caused by abnormal operation by mechanical frictional surfaces.**

If it may create injury in human body including hand or foot jam, or damage on the equipment, it is need to adjust actuator system to move smoothly to avoid any injury in human body.

- **If there is a possibility to lead any danger in human body, please attach safety devices such as protective cover.**

If during cylinder on operating, the load or the working area of cylinder may lead danger in human body. In this case, change the structure not to contact that dangerous area directly by human body.

- **Make sure the firm connection for fixing or connection area in cylinder to avoid loosening.**

When the cylinder is used in the place that is frequently operated or has big vibration, make sure the connection to avoid its loosening.

- **Shock Absorber or decelerator may be required.**

When the working speed of load is fast or its mass is big, it may difficult to absorb shock by cushion in cylinder. In this case, installing shock absorber just before cushion or preparing deceleration circuit may be required. When it considered, the hardness of mechanical equipment shall be fully reviewed also.

- **The possibility of circuit pressure deterioration due to power failure shall be considered as well.**

When the cylinder is used as clamp device, the losing of air pressure came from power failure might lead losing of workpiece by leak of clamping power. Therefore, safety equipment shall be considered and installed to prevent injury to human body or damage to mechanical equipment.

### Notes in Design

- **The possibility of failure in power source shall be considered.**

It is needed to set up the measures for equipment controlled with power source including air pressure, oil pressure, and electricity, to prevent injury to human body or damage to mechanical equipment, even when such power sources are in failure.

- **Prepare a structure to prevent the load from sticking out.**

When 3-position center exhaustion valve is used for cylinder operation, re-starting after release can pressurize on the one side of piston because there is no residual pressure on the cylinder and it may cause protrude of shaft or object in high-speed. On this occasion, it may cause injury to human body including hand & food jam or damage to mechanical equipment. Therefore, measures to prevent sudden start shall be established.

- **Operation in emergency stop shall be considered.**

Please be careful not to cause injury to human body or damage to mechanical equipment from unex-pected operation of cylinder, while the mechanical structure is stopped by the safety equipment due to system abnormality such as power failure or intentional stop by people.

- **Re-operation after emergency stop or abnormal stop shall be considered.**

Make sure no injury to human body or damage to mechanical equipment occurs by re-starting. In addition, when the cylinder needs to be reset to the original position, safe manual controller shall be prepared.

## Safety Note for Pneumatic Actuator ②

### Caution

### Notes in Selection

#### ■ Full review of the specification of product is required.

In case of review the usage that requires special safety, such as when injury in human body or damage to property is expected from the use of air facilities, research equipment, leisure tools, safety equipment as well as from the use of condition and environment not specified in this catalogue or handling manual, apply this product only after sufficient specification review.

#### ■ Please use it within the allowable maximum stroke range.

Using over the maximum stroke of product specified in this catalogue may damage to piston rod. Please follow the allowable maximum stroke specified in this catalogue.

#### ■ To control the moving speed of cylinder, please use speed controller.

When controlling of moving speed, increase it from low-speed to required speed gradually.

#### ■ In the cylinder with long stroke, install reinforcing bar at the center.

For long stroke cylinder, reinforced bar shall be installed at the center to prevent the deflection of piston rod and cylinder chamber, and damage to rod due to vibration or external weight.

#### ■ Use within the range where the cylinder piston is not damaged by crash at the end of stroke.

When a piston with inertia force is crashed to cylinder cover at the end of stroke, it makes damage on the cylinder. For the specified range not be damaged by crash, please refer to each model selection guide for cylinders.

### Warning

### Notes in Selection

#### ■ Full review of the specification of product.

Products included in this catalogue are designed to be used as compressed air source only. Pressure or temperature out of the specified range shall be forbidden as it may cause damage or malfunction. In addition, please contact us if you need to use other fluid other than compressed air.

#### ■ Check for vibration or shock.

Do not use the cylinder as a buffer of shock or vibration for mechanical equipment. Such use may create injury or damage to mechanical equipment.

#### ■ Check for middle position stop.

When stopping cylinder at the middle stroke by 3-position exhaustion center type valve, it is hard to stopping at the middle of stroke with accuracy due to the character of compressed air.

In addition, neither valve nor cylinder assures air leakage completely, so long time stop position would be guaranteed. If you need middle stop position for long, please contact us.

### Danger

### Notes in Selection

#### ■ Do not use for following purposes.

- ① When very high stability is required in mechanical equipment.
- ② For medical instruments related to maintain or manage human body and life.

## Safety Note for Pneumatic Actuator ③

### Caution

#### ■ Avoid overcharge beyond torsion and bending strength to piston rod.

It may cause degradation in the life of product, and disorder, abrasion, and damage to the piston rod or tube.

#### ■ Be careful not to crash or damage to piston motion part and/or inside of cylinder.

Inside of cylinder is managed by very precise allowance and its small wound or transform would be the reason of malfunction.

In addition, any scratches on the motion parts of piston rod bring deflection of sealing parts such as O-ring and packing which could bring malfunction from air leakage.

#### ■ Do not exceed eccentric or lateral load to piston rod.

If an eccentric or lateral load is effect on the cylinder rod directly, malfunction or air leakage from damaged packing will occurs.

### Notes in Installation

#### ■ When using external guide, please make sure the connection between the end of piston rod and load without any torsion for every stroke positions.

#### ■ Notes in work.

Do not seat on, step on or put another object on the product. It may drop or fall over.

#### ■ During process, install indication board.

Install indication board that shows it is in progress, so as to avoid unexpected air or electric supply, and to avoid injury to human body from sudden accident.

#### ■ Please read the product manual carefully.

Understand product-handling manual for respective series, and use it correctly.

### Warning

#### ■ Maintenance space shall be secured.

For product installation, proper working space shall be secured near the installation site. Insufficient space may give difficulty in daily checking and maintenance work, and results in a product malfunction or damage.

#### ■ Be careful not to damage on the cable line of auto switch.

Over bending or scar, damage on the cable of auto switch will cause of current leakage or defect on connection may lead electric shock and/or fire, abnormal motion.

#### ■ Do NOT locate auto switch on the external magnetic field area.

Any effects of external magnetic field may cause of malfunction on the auto switch which bring accidental motion of actuator may lead injury on human body or damage to machine.

#### ■ Perform trial driving test before use.

If the equipment hasn't been operated for more than 48 hours, or start to operate new items stored for a long time, its motion might be abnormal. Therefore, trial driving test is required before operation.

### Notes in Installation

#### ■ Be careful to handle heavy products.

In the transportation or installation of heavy products, install reinforced bar for safe work.

#### ■ Do not apply impractical lateral load to cylinder rod.

Do not apply over than following lateral load on the cylinder rod connected bush. For bore size below than 16mm, less than 1/40 of thrust generated from applied compressed air, above 20mm, less than 1/20.

#### ■ Install safety valve.

Not to exceed constant pressure when the pressure is increased in cylinder by external force, install safety valve. Excessive pressure may lead damage on cylinder.

#### ■ Follow specified fasten and tightening torque for each Screw.

Fasten screw to the specified torque in installation.

Please read it before use, with individual notes for each series as well, for your safe use.

## Safety Note for Pneumatic Actuator ④

### Warning

- **Be careful to prevent product from water contact.**  
Spray water on the product, wipe it with water or using product in water, it may cause malfunction and result in human injury, electric shock, or fire.
- **Make sure the installation status whether it firmly mounted.**

### Notes in Installation

Dropping of the installed product or operation in unstable status may cause injury to human body.

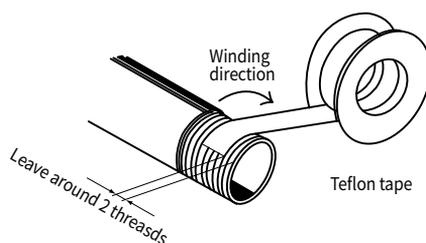
- **Do not touch or approach to the product while it is in operation.**

When the product is in operation, do not make any control on internal attached devices. Actuator may move suddenly and hurt you.

### Caution

- **Preventive action before piping.**  
Insert enough air before piping for thorough cleaning. This will allow removal of chip debris, cutting oil, and dust from the inside of pipe, which can cause air leakage.
- **How to wind Teflon tape.**  
Wind the Teflon tape along the pipe connection from 2 grooves inside position from the tip of screw area on pipe in the reverse direction of screw direction. Putting Teflon tape into the device during piping may cause air leakage.

### Notes in Installation



< How to wind Teflon tape >

### Caution

- **Re-adjust cushion according to usage environment.**  
The cushion in cylinder was adjusted at the time of product delivery; but it shall be adjusted again according to work size, and cylinder operation speed and other environmental factors. For cushion adjustment, turning it clockwise will make the orifice hole smaller and cushion

### Notes in Cushion Adjustment

effect will be bigger. After adjustment, make sure fasten status with using lock nut.

- **Do not use with the cushion needle is fully closed.**

It may cause damage to applied packing.

### Caution

- **In Case of oil-feeding type cylinder.**  
Install lubricator in the circuit for feeding oil (SPEC : ISOVG32). Usage of Spindle oil or machine oil may cause of damage of sealing part such as packing and O-ring which bring air leakage problem.

### Notes in Oil-Feeding

- **In Case of oil free type cylinder.**

It can be used in oil free state and also all right to feed oil. But the pre-lubricant may be lost in oil feeding, so consistent lubrication is required. For oil feeding, please use turbine oil SPEC 1 ISOVG 32.

### Caution

- **Note in the use of Shock Absorber**  
Observe allowable temperature (5~60°C) for cylinder to allow normal shock absorption.

### Notes in the use of Shock Absorber & Auto Switch

- **Note in the use of Auto Switch**

Be careful for using under over shocking or heavy cutting oil, dust environment. It may cause of abnormal operation of auto switch.

Please read it before use, with individual notes for each series as well, for your safe use.

## Safety Note for Pneumatic Actuator 5

### Caution

### Notes for Air Quality

#### ■ Air filter needs to be equipped.

Attach an air filter with 5 $\mu$ m or less of filtering degree at the upper stream side near the valve.

#### ■ Air dryer needs to be equipped.

Compressed air containing lots of drain may be the cause of failure in pneumatic devices. Therefore, install an air dryer or air catch so as to reduce occurring drain.

#### ■ Temperature needs to be within the specified range.

Establish counter measure to make sure that the drain or moisture in compressed air is not frozen when you use the pneumatic devices at low temperature less than 5°C, so as not to damage to packing or cause faulty operation.

### Warning

### Notes for Usage Environment

#### ■ Do not use in the place having a risk of corrosion.

#### ■ In the use of auto switch, be careful for the approach of magnetic material.

#### ■ Establish preventive action including protective cover on the piston rod area in the place having much dust, moisture, or oil.

### Danger

### Notes for Usage Environment

#### ■ Inspection for usage environment.

As this product is not proved for preventing explosions, do not use it in the explosive place.

### Warning

### Notes in Maintenance

#### ■ Check for the maintenance sequence.

Incorrect handling may cause damage or malfunction in mechanical equipment, make sure to check correct handling.

#### ■ Checklists before maintenance.

Check if there is preventive measure for load from drop, deflection, and projection, and conduct inspection after block compressed air and power, and exhaust remained air in system. If air pressure is remained in cylinder, the actuator may cause injury to human body due to accidental operation.

#### ■ Checklists after maintenance.

Check anti-protrusion action for re-starting, and inspect leakage and appropriate function by supplying compressed air or power to the pneumatic system. If the machine is not operated due to leakage, stop using it and check if the installation is correct.

#### ■ Do NOT disassemble or remodel to Air Cylinder.

Do NOT disassemble or remodel to Air Cylinder for other purpose. It could bring human injury or electrical shocks, fire due to abnormal operation.

### Caution

### Notes in Maintenance

#### ■ Frequent inspection item.

With daily frequent inspection, check the deterioration of durability and function in pneumatic devices to prevent accident in advance.

**MEMO**

A series of horizontal dotted lines for writing.



**P&M Catalogue**

**GENERAL HAND**

## ⚠ Basic Safety Notes for GENERAL HAND ①

### ⚠ Warning

#### ■ When there is a risk of human body, install protective cover and set up safety measures.

When there is a risk of bodily injury by moving parts or a concern of finger jam in the Master Jaw of General Hand, install protective cover and set up safety measures.

#### ■ Establish measures for power failure.

Set up safety measures in case of power failure, for devices powered by air pressure or electricity.

#### ■ Emergency stop should be considered during cylinder operation.

When the machine makes an emergency stop, cylinder may cause risk to mechanical equipment depending on usage environment, so appropriate measures should be taken.

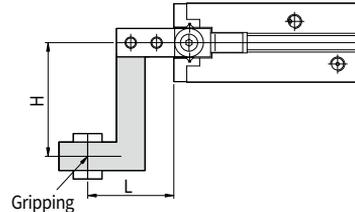
#### ■ Re-operation of cylinder after emergency stop needs to be considered.

Re-operation after emergency stop may cause damage to human body or machine, so appropriate measures shall be taken.

#### ■ Gripping point should be used within limited range of cylinder.

In case of the using gripping point exceed maximum limit range, excessive moment load may affect open & close unit and the life of cylinder; therefore, observe the maximum limited range for respective series.

### Notes in Design

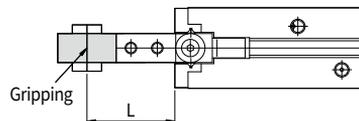


<Case 3> The lengths of L and H are appropriate.

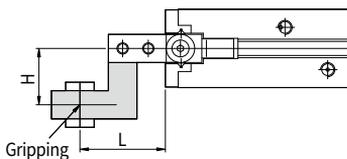
#### ■ Attachments installed on cylinder shall be short and light.

When attachments of cylinder is too large that it may have an adverse impact on lifespan. Therefore, short and light attachments should be used within the limited range of gripping point.

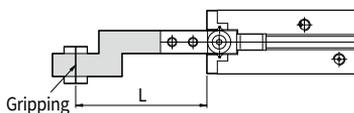
In addition, for more stability, use attachments whose cylinder are long and heavy, increase the size of applied cylinder and apply 2 or more cylinders.



<Case 4> An attachment is installed lightly and shortly.



<Case 1> The length of H is too long.



<Case 2> The length of L is too long.

Please read it before use, with individual notes for each series as well, for your safe use.

## Basic Safety Notes for GENERAL HAND ②

### Warning

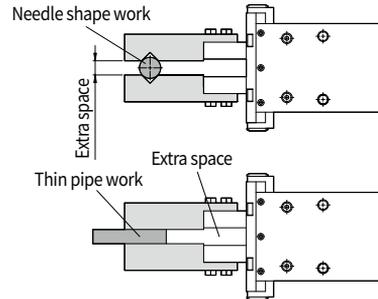
■ **When the work is too thin or slim, install attachments with extra space.**

Without extra space, the gripping is unsafe that it may cause dislocation or faulty gripping.

■ **Do not allow excessive external force or shock.**

Impractical operation may cause failure in cylinder or adverse effect on mechanical equipment.

### Notes in Design



### Caution

■ **To control the operation speed of cylinder, please use speed controller.**

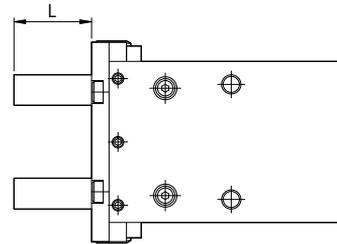
For operation speed control, increase it from low-speed to required speed gradually.

Increasing open & close speed in cylinder will cause bigger shock effect on the cylinder, and the repeatability will be worse in the grip of workpiece.

■ **The gripping force of cylinder represents the force applied to open & close direction for Length L.**

Making the work gripping length L longer may reduce the life of guide, so design it short as possible.

### Notes in Design



### Warning

■ **Select the model with sufficient gripping force than work weight.**

Using a model having insufficient gripping force may cause workpiece drop. In the selection of model for respective series, select the model only after full review of theoretical gripping force and work weight for the series.

■ **Select the model with sufficient open & close width than the work size.**

Model selection with insufficient stroke may be unstable due to its own or work deviation difference.

If using auto switch with insufficient stroke may cause detection error. Refer to the allowable sensing tolerance of each series' auto switch before using stroke.

### Notes in Selection

■ **Refer to the specifications in this catalogue for the selection of respective series.**

Refer to the specification in this catalogue for the selection of cylinder. Correct use of cylinder within usable temperature and pressure range could reduce malfunction and failure.

■ **Check optimal gripping type for each process to reduce overload applied to cylinder.**

■ **For the gripping of peculiar workpiece, please contact us for further review.**

## ⚠ Basic Safety Notes for GENERAL HAND ③

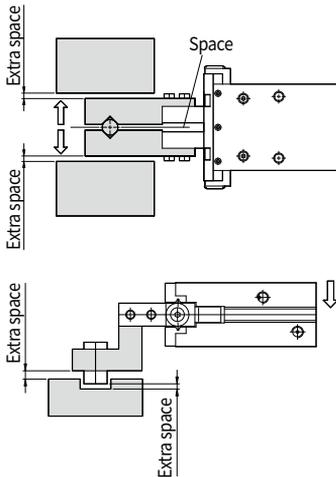
### ⚠ Caution

- In the installation of attachments to cylinder, make sure that the cylinder is not twisted.

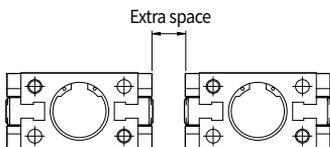
Any small distortion may cause deterioration of accuracy or malfunction.

- Make sure that there is no external force that gives the cylinder a shock.

The repeated application of lateral or shock load on the cylinder may cause damage or clattering. Put a clearance (space) at the open & close stroke area of cylinder to avoid contact to the workpiece or other attachments.



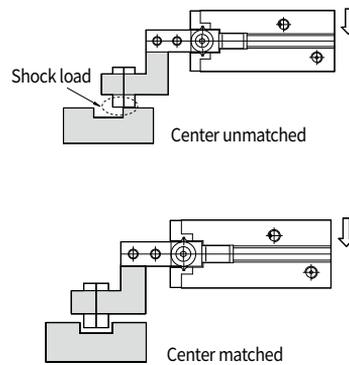
- If cylinders are installed as too close, there is a possibility of malfunction of auto switch by magnetic interruption. So, install them with sufficient extra space in between.



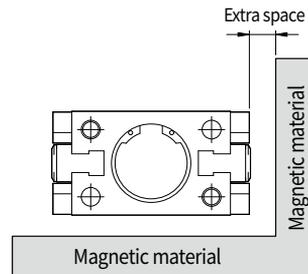
### Notes in Installation

- When you configuring a work inserting progress, position it at the center of hole, so that no impractical force is applied in the master jaw of general hand.

During the trial test of cylinder, make sure there is no shock caused by careless processing, by operating it in low-speed with manual operation or by lower compressed air pressure.



- When there are magnetic materials like steel plate near the auto switch of cylinder, most likely they may cause malfunction in the auto switch, therefore they need to be designed and installed with sufficient space from the surface of cylinder.



Please read it before use, with individual notes for each series as well, for your safe use.

## Basic Safety Notes for GENERAL HAND 4

### Warning

### Notes in Installation

- In the installation of cylinder, make sure that the cylinder is not damaged by dropping it or crashing it.  
Any small distortion may cause deterioration or malfunction.
- Start the system after confirming the smooth operation of equipment.  
Perform air leakage test after installing the cylinder. Start the system after confirmed whether it is operating correctly.
- Secure a space as sufficient as possible for maintenance and inspection.
- When fastening the screws for installation of cylinder or fixing attachments(workpiece) to cylinder, use the proper torque value within the limited range.  
Otherwise, it may cause defects during operation. Also, insufficient fastening in fixing area may result in dislocation or cause attachments to drop.

### Warning

### Notes for Usage Environment

- Avoid using it in the places with serious vibration or shock.
- Install protective cover to protect against dropping dust and cutting oil due to vibration.

### Danger

### Notes for Usage Environment

- Do not use cylinder in the places where there is risk of explosion.

### Caution

### Notes for Usage Environment

- To maintain the quality of compressed air, exhaust drains in filter periodically.

### Caution

### Notes for Maintenance

- Add lubricant at the frictional surfaces of cylinder periodically.  
Adding lubricant periodically at the frictional surfaces of cylinder can extend lifespan.

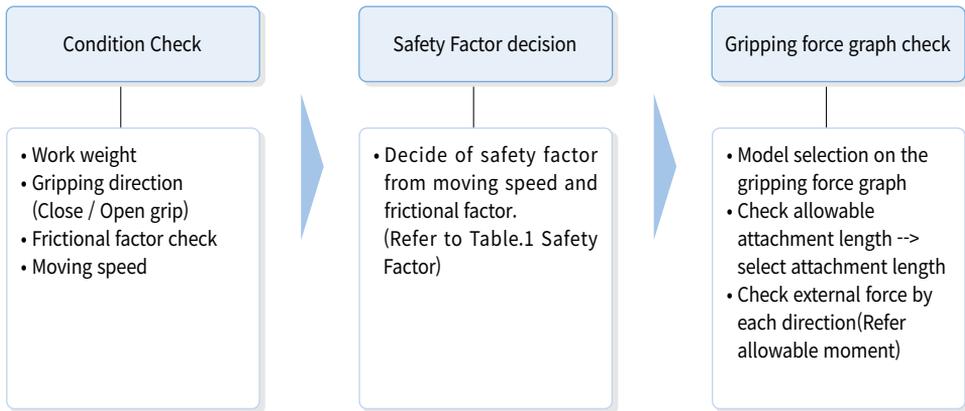
### Warning

### Notes for Maintenance

- Do not put your finger into the Mater Jaw area or between attachments of cylinder.
- To remove cylinder from installation, remove it after make sure gripping status of workpiece and, remove compressed air.

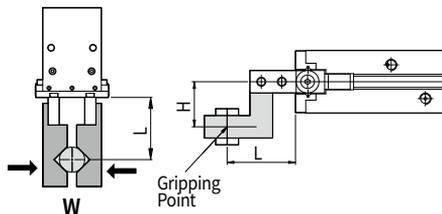
# GENERAL HAND Model Selection Guide

## Model Selection



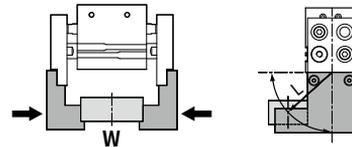
## Gripping Point Checking

- The gripping force written on <Gripping force graph> represents the gripping force by all numbers of Master Jaws (Gripping force for one Master Jaw × the numbers of Master Jaws) when the attachment is contact to work.
- Gripping point length (L) and displacement (H), when the attachment is attached, are as follows.



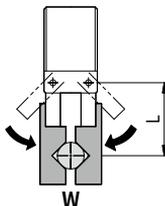
### ■ Parallel operating General Hand

- Gripping Point (L) : Distance from end of body to gravity center of workpiece
- Displacement (H) : Distance from the center of guide to gravity center of workpiece.
- Please refer for every product written attachment and displacement on the specification of this catalogue.



### ■ Parallel operating General Hand

- Gripping Point (L) : Distance from end of body to gravity center of workpiece.



### ■ Angular operating General Hand

- Gripping Point (L) : Distance from hinge point of master jaw to gravity center of workpiece.

# GENERAL HAND Model Selection Guide

## Relationship Between the Gripping Force and Weight of Workpiece

■ In general, 1/10 or less of gripping force is applied as the work weight for the gripping force of General hand. But it can be changed by following factors according to work condition.

- ① The more fraction factor of workpiece material and attachment are increased, the more weight can be gripped.
- ② In case of moving workpiece as linear or rotational motion, the more the stopping shock is reduced; the more gripping force (inertial resistance according to acceleration) is increased in the general hand.

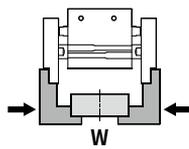
- ③ In the state of gripping a work, horizontal motion affects gripping force less than vertical motion.
- ④ The gripping force of parallel operating type General hand is relatively superior to that of angular operating one.
- ⑤ Using the length of attachment longer than the allowable length of the gripping force graph will have an adverse effect on guide part and may cause problem to durability, so use the allowable length as specified in the gripping force graph.

## How to Check Attachment - Gripping Force Graph

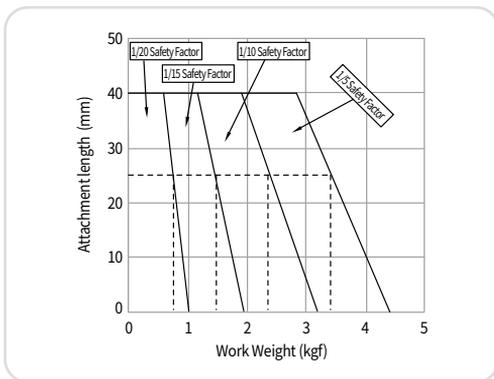
■ Below <Gripping force graph> shows the correlation of attachment length according to the weight of workpiece when 5kgf/cm<sup>2</sup> of air pressure is supplied.

■ Because the gripping force of work can be varied according to the 5 items mentioned above, determine the safety factor of gripping force as shown in the safety factor table [Table.1 Safety Factor].

■ For workpiece gripping, safety factor can be up to 1/5 of the capacity if it moved with hooked attachment and in a low speed.



<Example of attachment>



[ Gripping force graph ]

■ Safety Factor table according to moving speed and friction factor of workpiece.

Moving Speed		Friction factor of Gripping Capacity	work and Attachment Margin Value
Low-speed	100mm/sec or less	Big	1/5
		Small	1/10
Medium speed	100~300mm/sec	Big	1/10
	300~500mm/sec	Small	1/15
High-speed	500~1000mm/sec	Big	1/15
		Small	1/20
		-	1/30

[ Table.1 Safety Factor ]

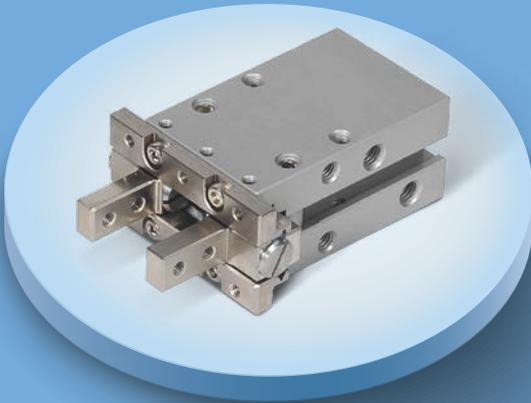
■ An example of gripping force graph interpretation. (Refer to the gripping force graph)

- ① When Work weight (W) = 0.8kgf and safety factor is 1/20, attachment length (L) shall be set as 25mm or less. If 1/10 is applied as safety factor, attachment length shall be set as 40mm or less.
- ② When the safety factor is 1/20, 1/15, 1/10, and 1/5 under the condition that maximum attachment length is 25mm, maximum workpiece weight for gripping is 0.8kgf, 1.5kgf, 2.3kgf and 3.4kgf respectively.

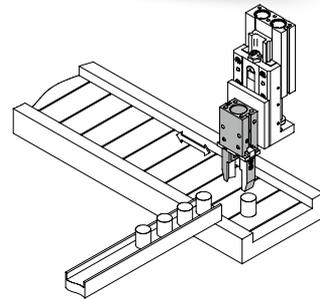
Parallel type General Hand  
with Cross Roller Guide

# PH01-A Series

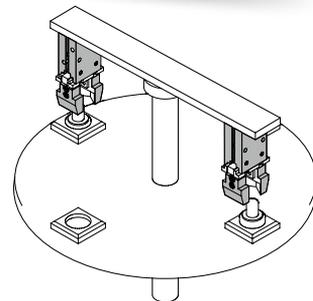
High solidity and High precise  
General Hand 



Application 1

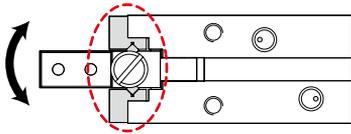


Application 2



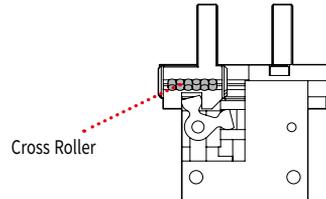
### "┌" Shaft Stable structure guide

- Enhanced twist prevent for high external load by "┌" shape seated guide rail.



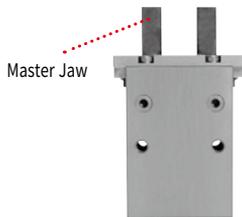
### Cross Roller Guide application

- Increased attachment overhang.
- Precision operation with high solidity structure.
- More than 1.5 times moment tolerance compare with ball type guide.



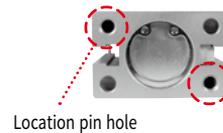
### Surface reinforced treatment on Master Jaw

- Reinforced corrosion and abrasion resistance of Master Jaw.

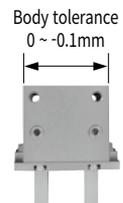


### Location pin hole for position accuracy

- Two positioning holes are supplied for Mounting reproducibility.

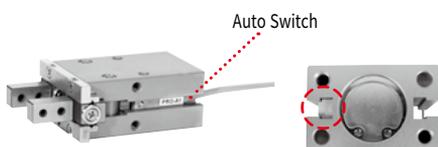


- Tolerance has been applied on the body width for positioning.



### Auto Switch installation (Optional)

- Seated internally without projection.



### Widen products selection range

- Diversity products based on PH01-A Series.



- PH01K
  - Increased stroke
  - Dust Cover (Optional)



- PH01J-C
  - Various dust covers materials for using environment.



- PH01G
  - Guide enhanced type

## GENERAL HAND / Parallel Operation

# PH01-A Series

### Features

- Parallel operation by Crank Lever.
- Precise operation from cross roller guide application.
- High durability from high solidity and precise structure.
- Possible to operate on low pressure range. (1.5kgf/cm<sup>2</sup>)
- Various installation options.
- Auto Switch installation. (Optional)



### Order Form

## PH01 - 10A - E - A1 L S

①                      ②                      ③                      ④                      ⑤                      ⑥

#### ① Series Name

#### ② Cylinder Bore Size and Stroke

Order	CYL Bore(mm)	Stroke(mm)	④ Available Auto Switches									
			A1	A2	A2C	A2V	Order					
							B1	B2	B2B	B3B	B3C	
06A	6	4		○	○	○		○	○	○	○	
10A	12	6	○				○					
16A	16	8	○				○					
20A	20	12	○				○					
25A	25	16	○				○					
30A	30	24	○				○					

※ For "Blank", no Auto Switch is provided.

#### ③ Special Option

Order	Special Option
Blank	Standard
E	Secondary battery field

#### ⑤ Auto Switch Cable Length

Order	Cable Length
Blank	1M
L	3M

#### ⑥ Auto Switch Quantity

Order	Quantity
Blank	2PCS
S	1PCS

\* Only one Auto Switch(Close) available for PH01-06A, PH01-10A model.

#### ※ Auto Switch Specification

Order	Sensing Type	Cable Spec		Voltage		Current		Protect Level	Operation Time
		Wires	Direction	AC	DC	AC	DC		
A1	Magnetic reed switch	2-Wire	Horiz	100V	24V	5~20mA	5~40mA	IP 67	1ms
A2	Magnetic reed switch	2-Wire	Horiz	100V	24V	5~20mA	5~40mA	IP 67	1ms
A2C	Magnetic reed switch	2-Wire	Horiz	100V	24V	5~20mA	5~40mA	IP 67	1ms
A2V	Magnetic reed switch	2-Wire	Ver	100V	24V	5~20mA	5~40mA	IP 67	1ms
B1	Magnetic solid state	3-Wire	Horiz	-	24V (5~28V)	-	Less than 50mA	IP 67	1ms
B2	Magnetic solid state	3-Wire	Horiz	-	24V (5~28V)	-	Less than 50mA	IP 67	1ms
B2B	Magnetic solid state	2-Wire	Horiz	-	24V (10~28V)	-	Less than 50mA	IP 67	1ms
B3B	Magnetic solid state	2-Wire	Ver	-	24V (10~28V)	-	Less than 50mA	IP 67	1ms
B3C	Magnetic solid state	3-Wire	Ver	-	24V (5~28V)	-	Less than 50mA	IP 67	1ms

\* Be careful of projection for vertical wire exposed type Auto Switch model. (Please refer technical information of Auto Switch)

Specification

HAND

PH01-A  
PH01-D  
PH01-G  
PH01J-C  
PH01K  
PH02  
PH02-H  
PH04  
PH05  
PH06  
PH06-L  
PH06-L2  
PH07  
PH08  
PH09  
PH10  
PH12  
PH14-S  
PH14-CL  
PH14-CF  
PH15-S  
PH15-CL  
PH15-CF  
PH15-W  
PH21  
PH22  
PH23  
PH25  
PH32  
PHC

Item Name		PH01-06A	PH01-10A	PH01-16A	PH01-20A	PH01-25A	PH01-30A
CYL Bore Size(mm)		6	12	16	20	25	30
Stroke(mm)		4	6	8	12	16	24
Effective Gripping Force(kgf)	Close	0.84	3.42	8.16	12	20.1	30.5
	Open	1.12	4.57	9.49	14	24	36.3
Fitting Size		M3		M5			
Weight(kgf)		0.027	0.059	0.14	0.27	0.5	0.7
Max. Attachment L(mm)		20	30	40	50	60	80
Max. Attachment H(mm)	Note 4)	10	12	15	25	35	40
Fluid		Clean Air Note 1)					
Pressure Range(kgf/cm <sup>2</sup> )		1.5 ~ 7 (Guaranteed Resist Pressure : 10.5) Note 2)					
Lubrication		Not Need (If need, use one sort of turbine oil : SPEC ISOVG 32)					
Temperature Range(°C)		5 ~ 60					
Repeat Accuracy(mm)		±0.01					
Max. Cycle Per Minute(C.P.M)		140					
Operation Type		Double Acting (Structure : Parallel Operation by Crank Lever) (Guide : Cross Roller Bearing Guide)					
Tolerance of Stroke(mm)		Open : -0.5 ~ +1					
		Close : -1 ~ +0.5					

Note 1) Clean Air : Fresh air containing solid matters with 0.3% of supersaturated moisture and 99.9% of liquid oil that passed through the 3-10µm degree of filtering.

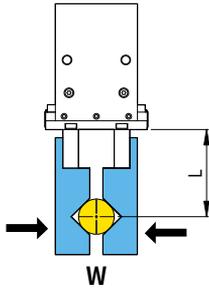
Note 2) Guaranteed Resist Pressure : A pressure that does not cause an abnormality in parts when it is applied for 1 minute without any weight loaded.

Note 3) The position of the effective gripping force point is the end point of the Master Jaw.

Note 4) For Max. Attachment L and H, please refer <GENERAL HAND Model Selection Guide>. (it is permitted length for 5kgf/cm<sup>2</sup> pressure applied)

## Gripping Force Graph (Close)

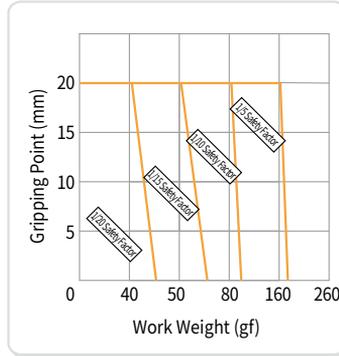
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



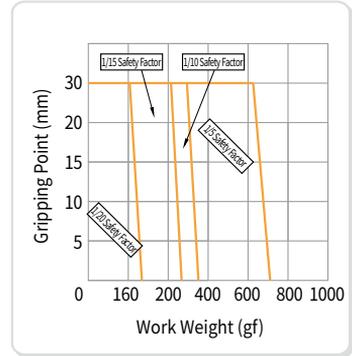
Close Grip State

W: Work Weight  
L: Attachment Length

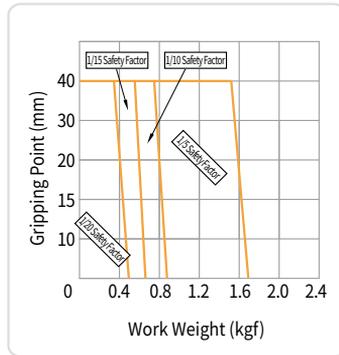
► PH01-06A



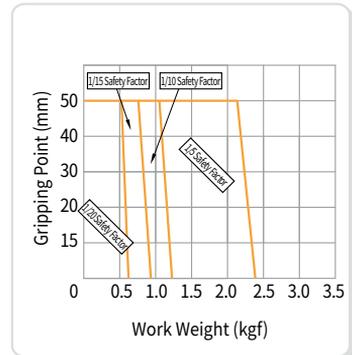
► PH01-10A



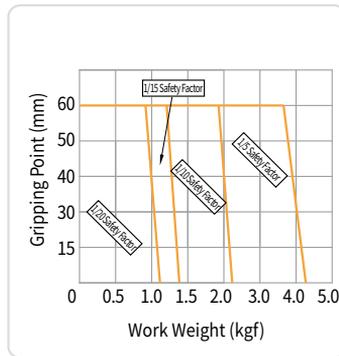
► PH01-16A



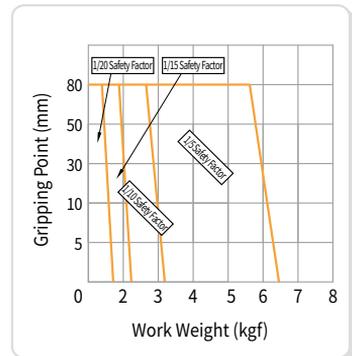
► PH01-20A



► PH01-25A



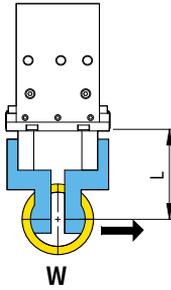
► PH01-30A



**⚠ Caution** If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it with the maximum attachment length which specified.

Gripping Force Graph (Open)

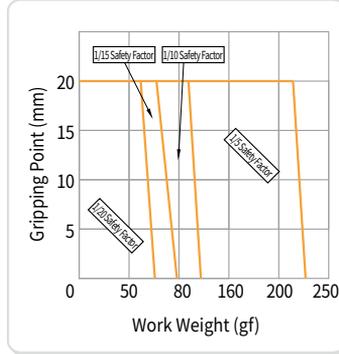
▶ Refer <GENERAL HAND Selection Guide> for how to read below graph.



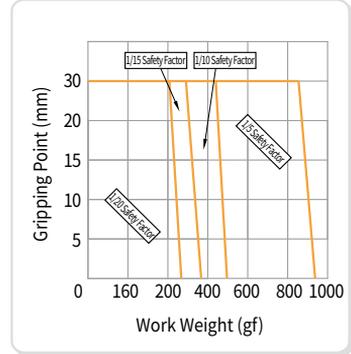
Open Grip State

W: Work Weight  
L: Attachment Length

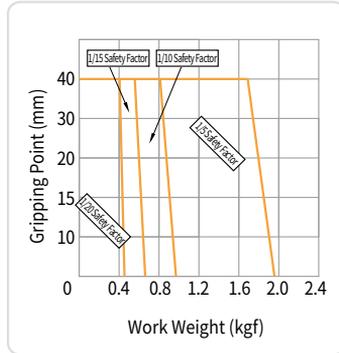
▶ PH01-06A



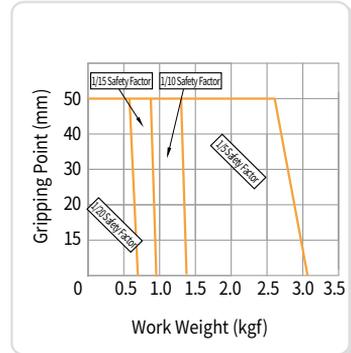
▶ PH01-10A



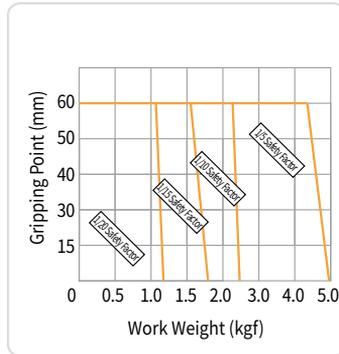
▶ PH01-16A



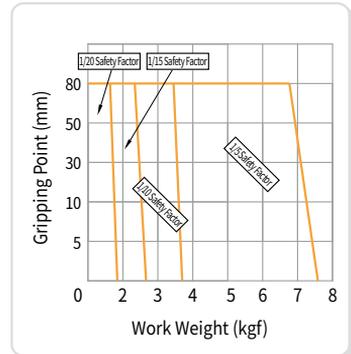
▶ PH01-20A



▶ PH01-25A



▶ PH01-30A



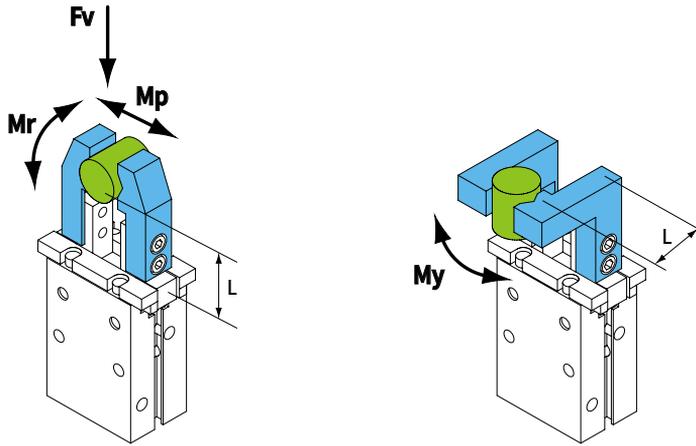
HAND

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

**⚠ Caution** If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

## Check of Allowable Moment and Weight

- ※ L : Distance between the center of guide and gripping point of work.
- ※ The moment center equals with guide center.



Item	Allowable Weight for Vertical Direction. Fv (kgf)	Maximum Allowable Moment (kgf·cm)		
		Pitching moment Mp	Yawing moment My	Rolling moment Mr
PH01-06A	5	1.69	1.69	3.19
PH01-10A	8.6	3.13	3.13	6.93
PH01-16A	16.9	8.12	8.12	21.2
PH01-20A	20.3	10.1	10.1	31.3
PH01-25A	32	20	20	59.7
PH01-30A	41	32	32	77.2

※ Above listed allowable moment and weight refer static values.

### Calculation of allowable weight for moment weight applied.

$$\text{Allowable Weight } F \text{ (kgf)} = \frac{\text{Maximum Allowable Moment } M \text{ (kgf·cm)}}{\text{The point of external load applied } L \text{ (cm)}}$$

### Example)

Checking of 1kgf weight(F) force to pitching moment direction(Mp) at the 30mm attachment length on PH01-20A.

$$\Rightarrow \text{Allowable Weight } F \text{ (kgf)} = \frac{\text{Maximum Allowable Moment } M \text{ (kgf·cm)}}{\text{The point of external load applied } L \text{ (cm)}} = \frac{10.1}{3} = 3.36 \text{ kgf} > 1 \text{ kgf}$$

The allowable weight(3.36kgf) is bigger than applied weight (1kgf), so, it is applicable.

# PH01-A Series

06A

10A

16A

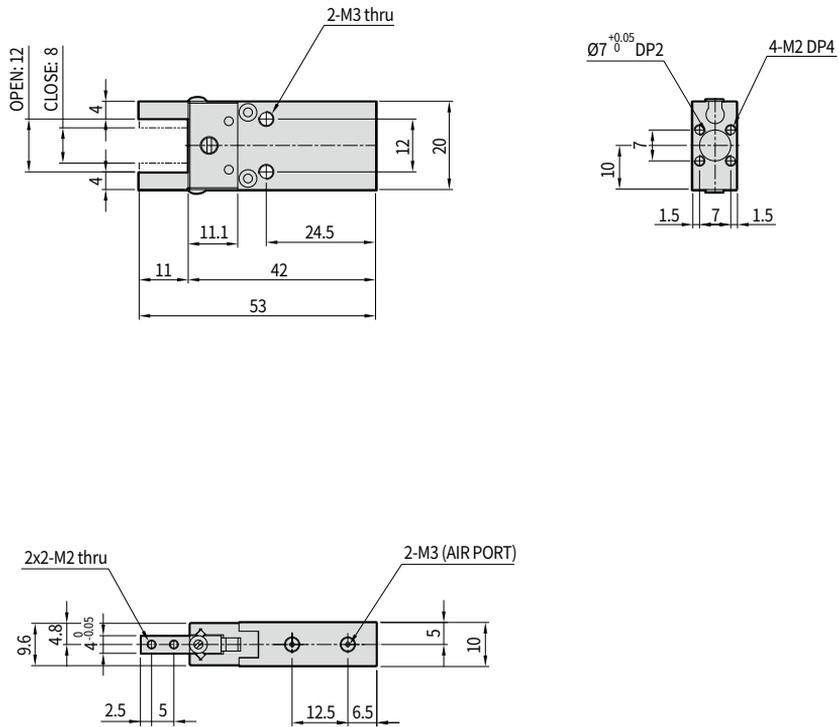
20A

25A

30A

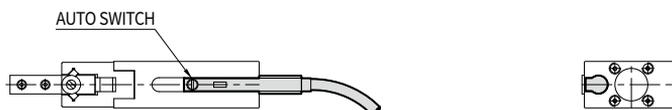
HAND

## PH01-06A



- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

## PH01-06A Example of Auto Switch installation



※ Only 1 Auto Switch(Close) can be mounted.

# PH01-A Series

06A

10A

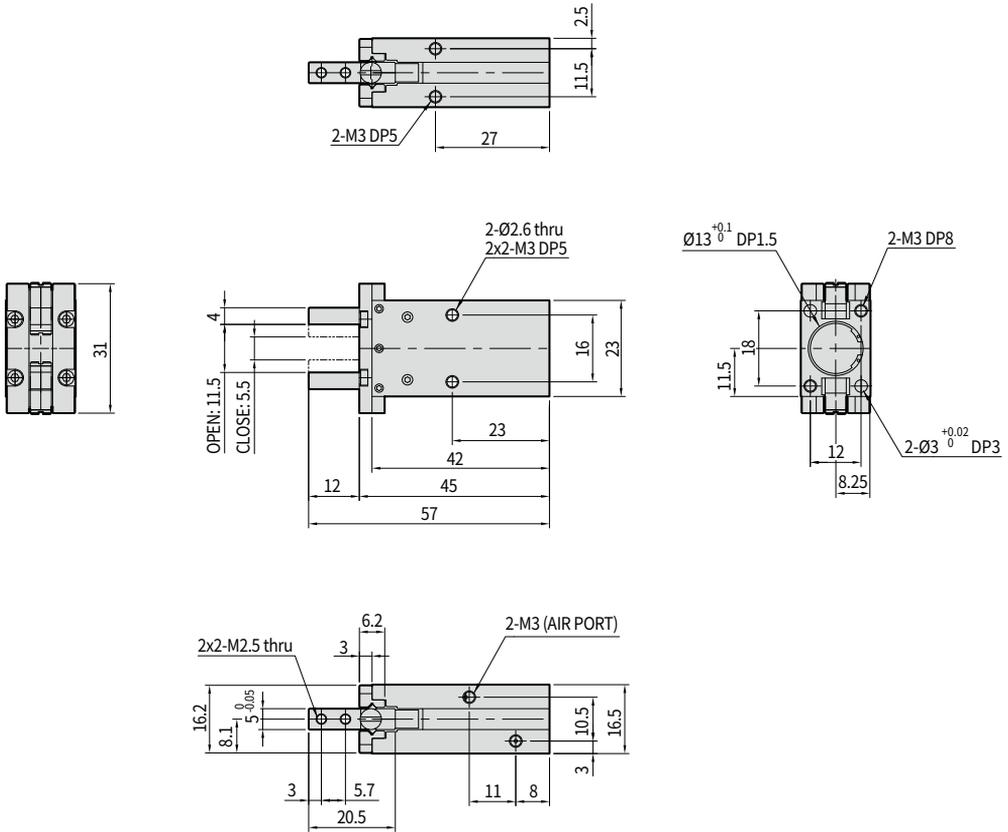
16A

20A

25A

30A

## PH01-10A



## PH01-10A Example of Auto Switch installation



※ Only 1 Auto Switch(Close) can be mounted.

06A

10A

16A

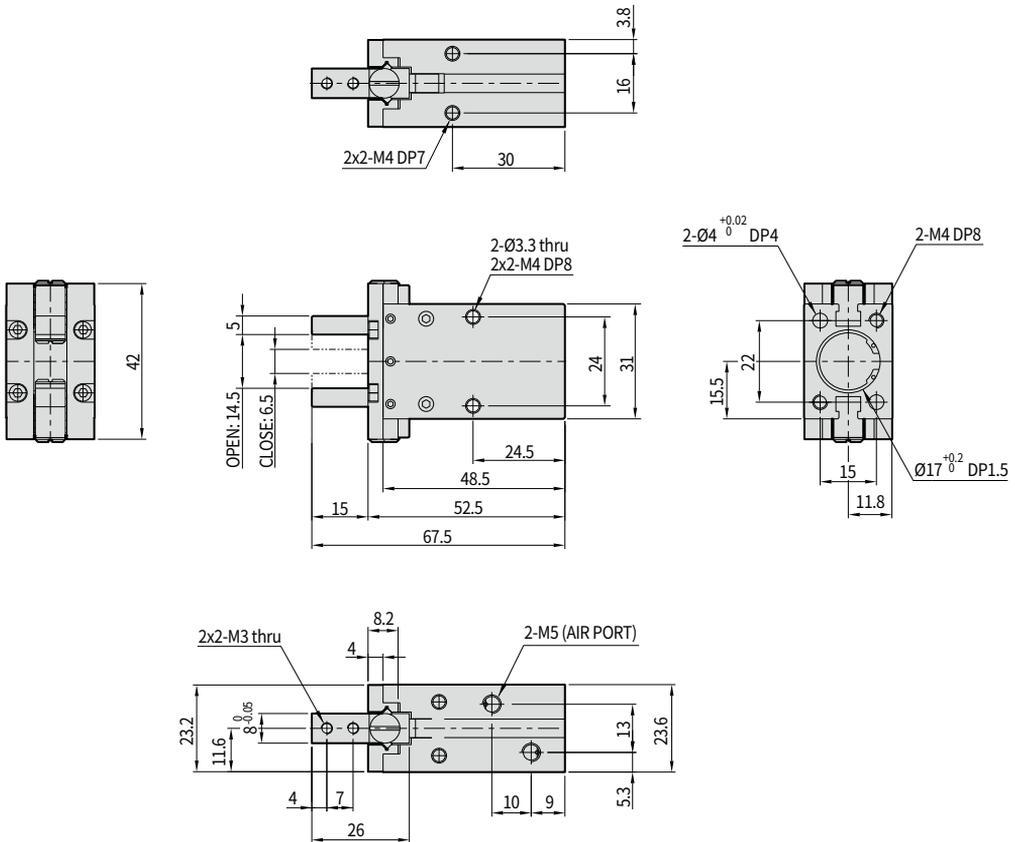
20A

25A

30A

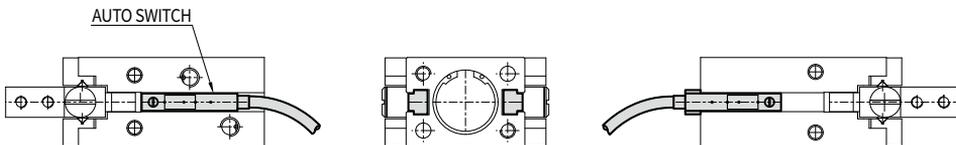
HAND

PH01-16A



- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

PH01-16A Example of Auto Switch installation



# PH01-A Series

06A

10A

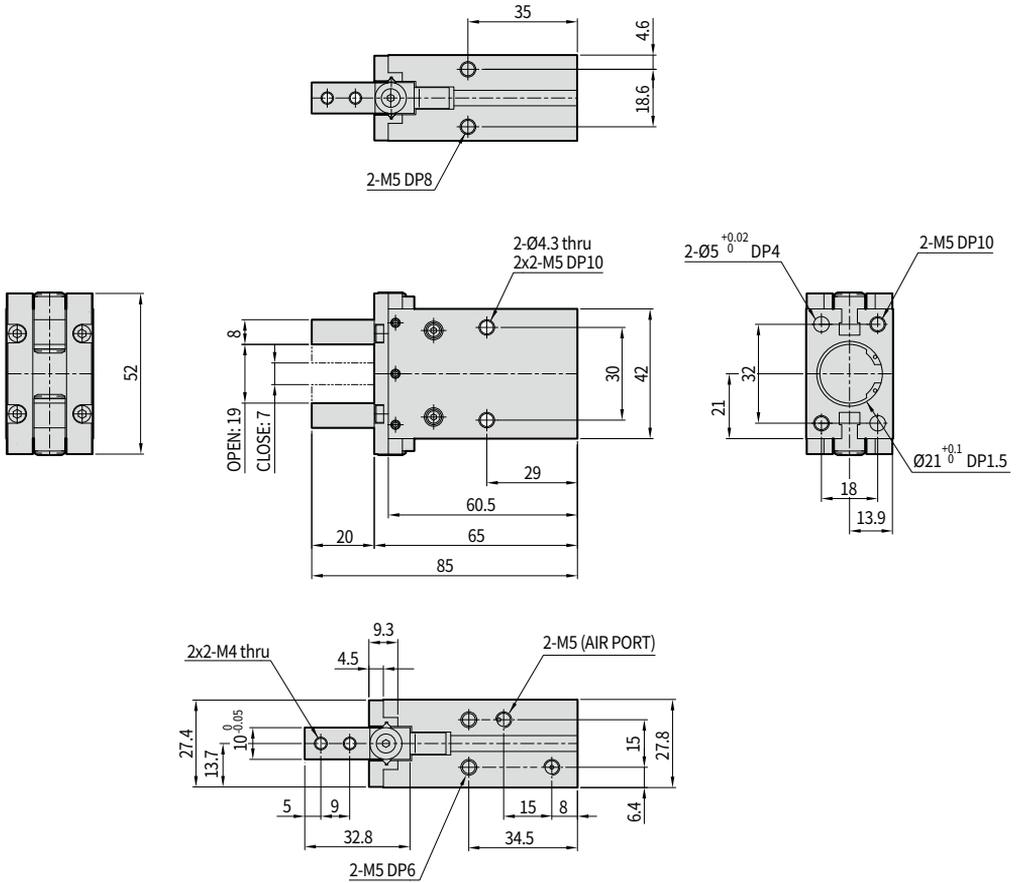
16A

**20A**

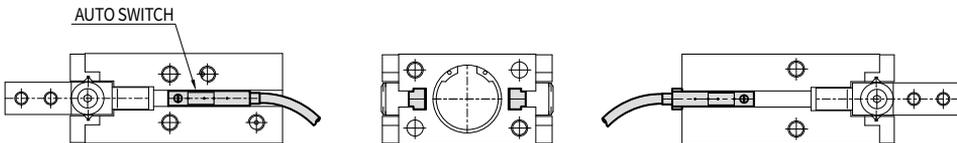
25A

30A

## PH01-20A



## PH01-20A Example of Auto Switch installation



06A

10A

16A

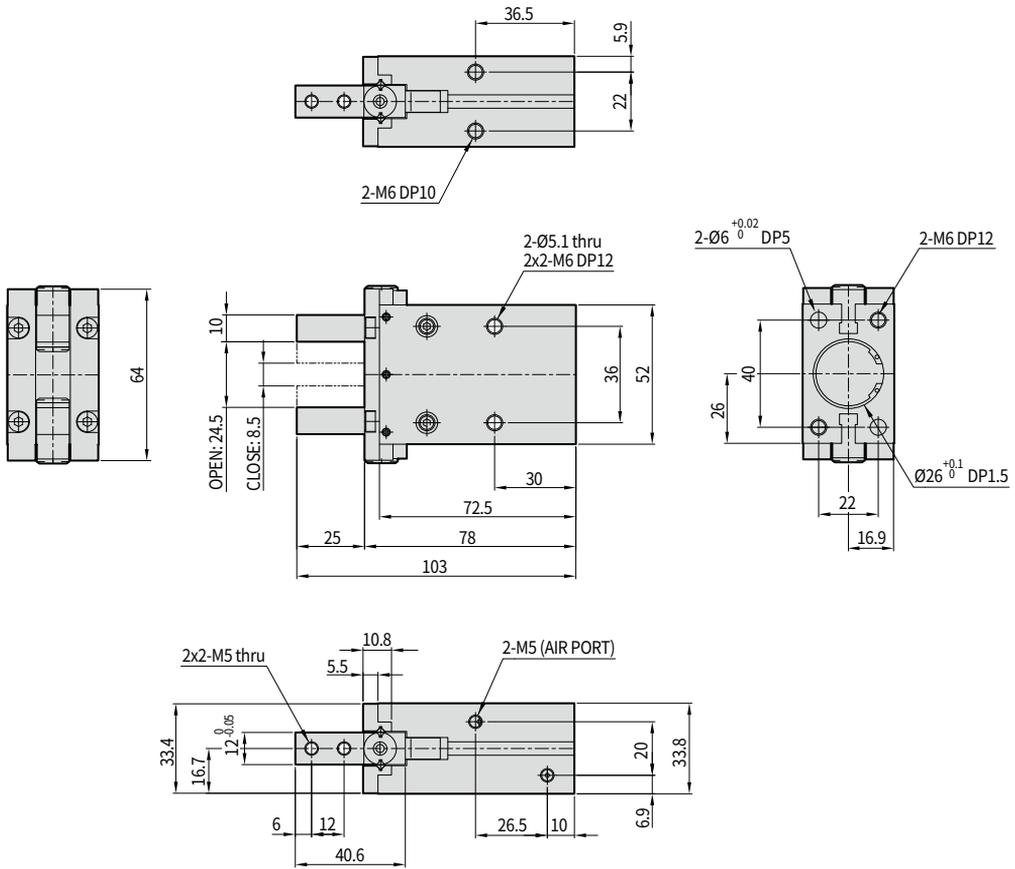
20A

25A

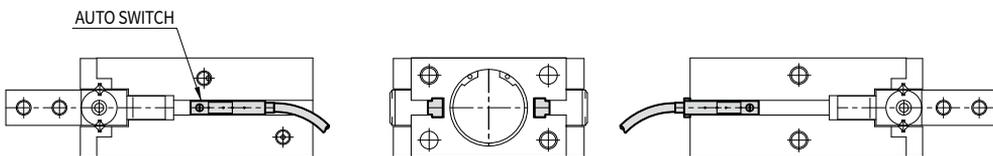
30A

HAND

PH01-25A



PH01-25A Example of Auto Switch installation



- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

# PH01-A Series

06A

10A

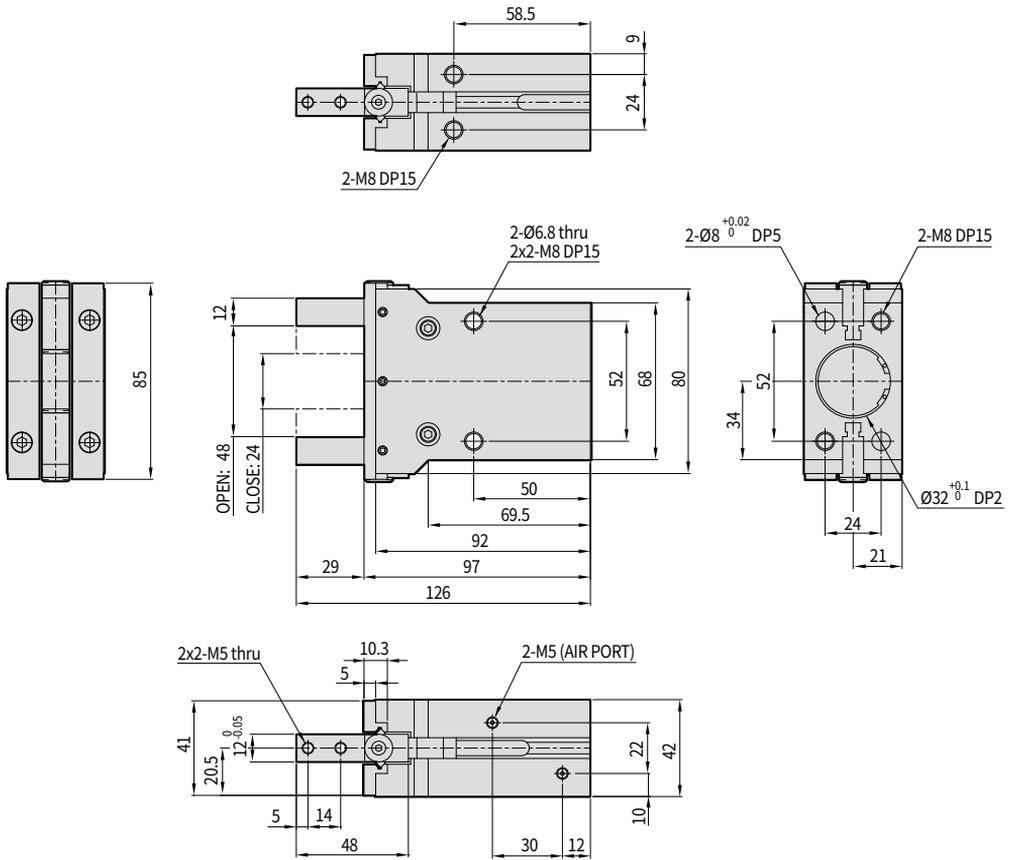
16A

20A

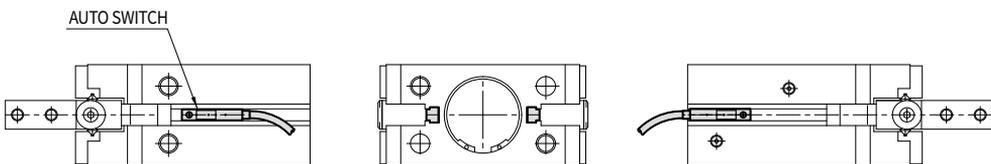
25A

30A

## PH01-30A



## PH01-30A Example of Auto Switch installation

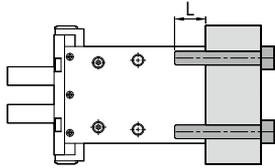


Installation Information

HAND

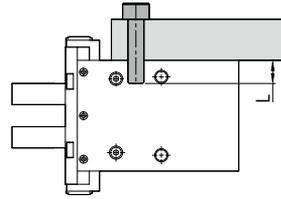
PH01-A  
PH01-D  
PH01-G  
PH01J-C  
PH01K  
PH02  
PH02-H  
PH04  
PH05  
PH06  
PH06-L  
PH06-L2  
PH07  
PH08  
PH09  
PH10  
PH12  
PH14-S  
PH14-CL  
PH14-CF  
PH15-S  
PH15-CL  
PH15-CF  
PH15-W  
PH21  
PH22  
PH23  
PH25  
PH32  
PHC

1. Installation by body tap holes



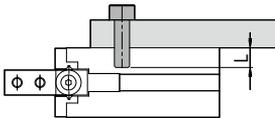
Item	Fastening Bolt	Max Torque (kgf·cm)	Max Bolt Length L (mm)
PH01-06A	M2×P0.4	1.5	4
PH01-10A	M3×P0.5	11	8
PH01-16A	M4×P0.7	25	8
PH01-20A	M5×P0.8	51	10
PH01-25A	M6×P1	81	12
PH01-30A	M8×P1.25	157	15

2. Installation by body tap holes



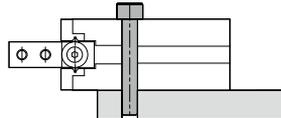
Item	Fastening Bolt	Max Torque (kgf·cm)	Max Bolt Length L (mm)
PH01-06A		Not usable	
PH01-10A	M3×P0.5	11	5
PH01-16A	M4×P0.7	25	7
PH01-20A	M5×P0.8	51	8
PH01-25A	M6×P1	81	10
PH01-30A	M8×P1.25	157	15

3. Installation by body tap holes



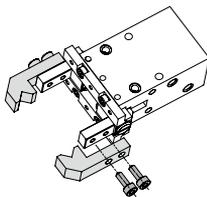
Item	Fastening Bolt	Max Torque (kgf·cm)	Max Bolt Length L (mm)
PH01-06A	M3×P0.5	11	4
PH01-10A	M3×P0.5	11	5
PH01-16A	M4×P0.7	25	8
PH01-20A	M5×P0.8	51	10
PH01-25A	M6×P1	81	12
PH01-30A	M8×P1.25	157	15

4. Installation by body through holes



Item	Fastening Bolt	Max Torque (kgf·cm)
PH01-06A	M2.5×P0.45	4.9
PH01-10A	M2.5×P0.45	4.9
PH01-16A	M3×P0.5	11
PH01-20A	M4×P0.7	25
PH01-25A	M5×P0.8	51
PH01-30A	M6×P1	81

5. Attachment installation



Item	Fastening Bolt	Max Torque (kgf·cm)
PH01-06A	M2×P0.4	1.5
PH01-10A	M2.5×P0.45	4.9
PH01-16A	M3×P0.5	11
PH01-20A	M4×P0.7	25
PH01-25A	M5×P0.8	51
PH01-30A	M5×P0.8	51

## GENERAL HAND / Parallel Operation

# PH01-D Series

### Features

- Parallel operation by Crank Lever.
- High precise linear guide application.
- Maximized solidity and accuracy by unified guide rail.
- Increase of customer convenience by two types of Master Jaw initial position. (Optional)
- Selectable options for double and single acting.
- Auto Switch installation. (Optional)



### Order Form

**PH01 - 10D - W - NO - A2 L S**

①

②

③

④

⑤

⑥

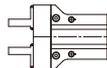
⑦

#### ① Series Name

#### ② Cylinder Bore Size and Stroke

Order	CYL Bore(mm)	Stroke(mm)
10D	12	6
16D	16	8
20D	20	12
25D	25	16
32D	32	24

#### ③ Master Jaw Initial Position

Order	Master Jaw Initial Position
Blank	Standard 
W	Widen 

#### ④ Operation Type

Order	Operation Type
Blank	Double Acting
NO	Single Acting (Normal Open)
NC	Single Acting (Normal Close)

⑤ Auto Switch Specification

Order	Sensing Type	Cable Spec		Voltage		Current		Protect Level	Operation Time
		Wires	Direction	AC	DC	AC	DC		
Blank		No Auto Switch provided							
A2	Magnetic reed switch	2-Wire	Horiz	100V	24V	5~20mA	5~40mA	IP 67	1ms
A2C	Magnetic reed switch	2-Wire	Horiz	100V	24V	5~20mA	5~40mA	IP 67	1ms
A2V	Magnetic reed switch	2-Wire	Ver	100V	24V	5~20mA	5~40mA	IP 67	1ms
B2	Magnetic solid state	3-Wire	Horiz	-	24V (5~28V)	-	Less than 50mA	IP 67	1ms
B2B	Magnetic solid state	2-Wire	Horiz	-	24V (10~28V)	-	Less than 50mA	IP 67	1ms
B3B	Magnetic solid state	2-Wire	Ver	-	24V (10~28V)	-	Less than 50mA	IP 67	1ms
B3C	Magnetic solid state	3-Wire	Ver	-	24V (5~28V)	-	Less than 50mA	IP 67	1ms

\* Be careful of projection for vertical wire exposed type Auto Switch model. (Please refer technical information of Auto Switch)

⑥ Auto Switch Cable Length

Order	Cable Length
Blank	1M
L	3M

⑦ Auto Switch Quantity

Order	Quantity
Blank	2PCS
S	1PCS

\* Only one Auto Switch(Close) available for PH01-10D model.

Specification

Item Name	PH01-10D	PH01-16D	PH01-20D	PH01-25D	PH01-32D	
CYL Bore Size(mm)	12	16	20	25	32	
Stroke(mm)	6	8	12	16	24	
Effective Gripping Force (kgf) <small>Air pressure : 5kgf/cm<sup>2</sup> Note 2)</small>	Close	2.9	6.3	8.9	22.7	
	Open	3.9	7.3	10.6	26.4	
	Close(NO)	2.3	5	7.6	11	18.7
	Open(NC)	3.3	6.1	9.3	13.5	22.8
Fitting Size	M3			M5		
Weight(kgf)	0.07	0.17	32	0.56	1.1	
Max. Attachment L(mm)	30	40	50	60	80	
Max. Attachment H(mm) <small>Note 3)</small>	12	15	25	35	40	
Fluid	Clean Air <small>Note 1)</small>					
Pressure Range(kgf/cm <sup>2</sup> )	3 ~ 7					
Lubrication	Not Need (If need, use one sort of turbine oil : SPEC ISOVG 32)					
Temperature Range(°C)	5 ~ 60					
Repeat Accuracy(mm)	±0.05					
Max. Cycle Per Minute(C.P.M)	90					
Operation Type	Optional for Double or Single acting (Structure : Parallel operation by Crank Lever) (Guide : Linear Guide)					
Tolerance of Stroke(mm)	Open : -0.5 ~ +1 Close : -1 ~ +0.5					

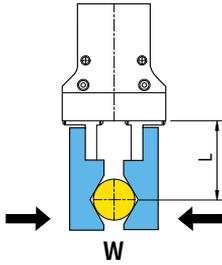
Note 1) Clean Air : Fresh air containing solid matters with 0.3% of supersaturated moisture and 99.9% of liquid oil that passed through the 3-10µm degree of filtering.

Note 2) The position of the effective gripping force point is the end point of the Master Jaw.

Note 3) For Max. Attachment L and H, please refer <GENERAL HAND Model Selection Guide>. (it is permitted length for 5kgf/cm<sup>2</sup> pressure applied)

## Gripping Force Graph (Close - Double Acting)

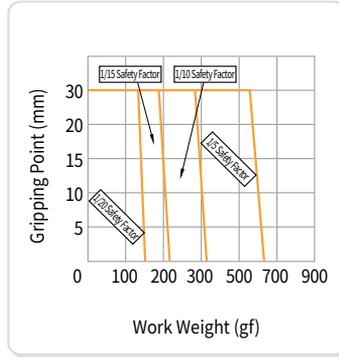
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



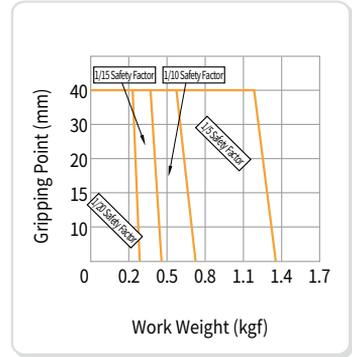
Close Grip State

W: Work Weight  
L: Attachment Length

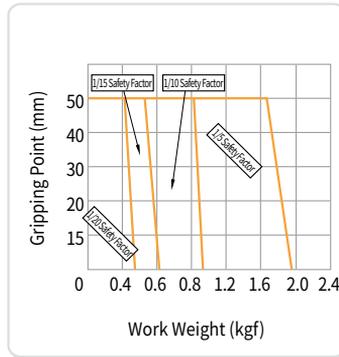
### ► PH01-10D



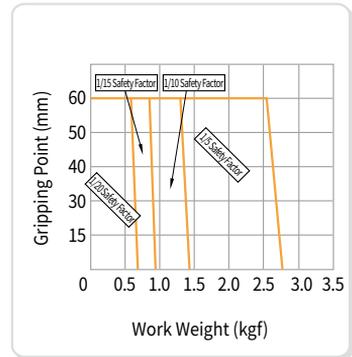
### ► PH01-16D



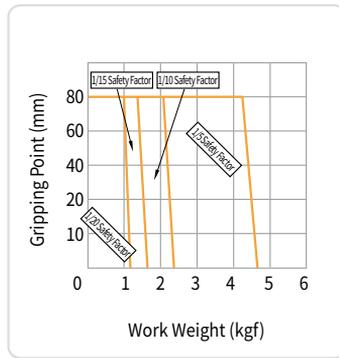
### ► PH01-20D



### ► PH01-25D



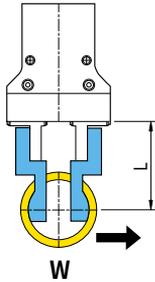
### ► PH01-32D



**⚠ Caution** If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it with the maximum attachment length which specified.

Gripping Force Graph (Open - Double Acting)

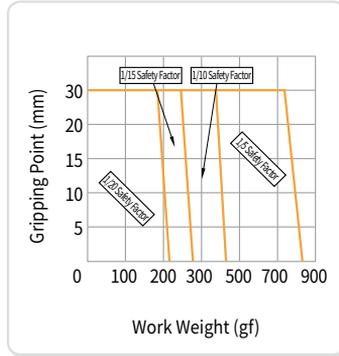
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



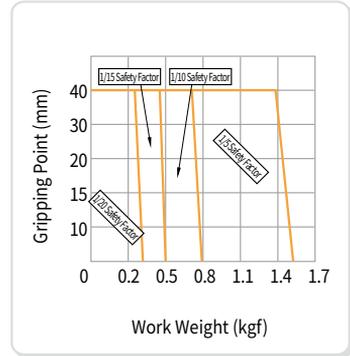
Open Grip State

W: Work Weight  
L: Attachment Length

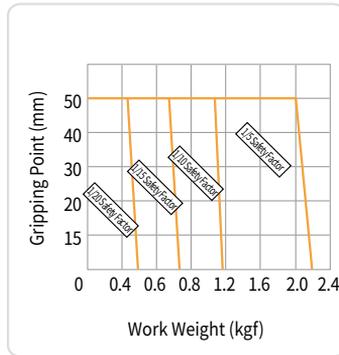
► PH01-10D



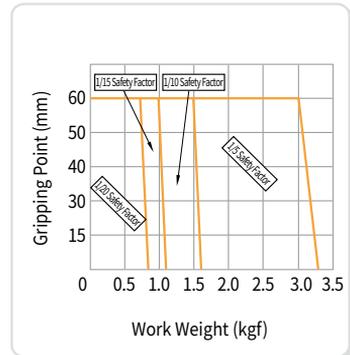
► PH01-16D



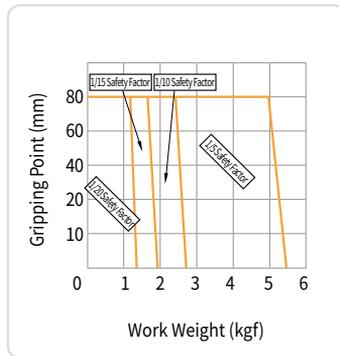
► PH01-20D



► PH01-25D



► PH01-32D



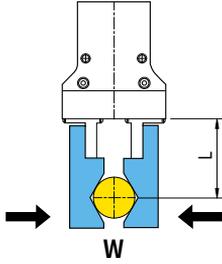
HAND

- PH01-A
- PH01-D
- PH01-G
- PH01-J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

**⚠ Caution** If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

## Gripping Force Graph (Close - Single Acting-NO)

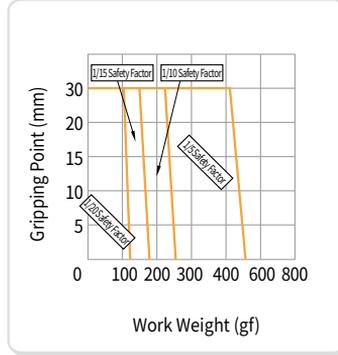
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



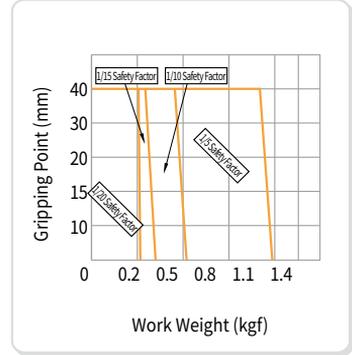
Close Grip State

W: Work Weight  
L: Attachment Length

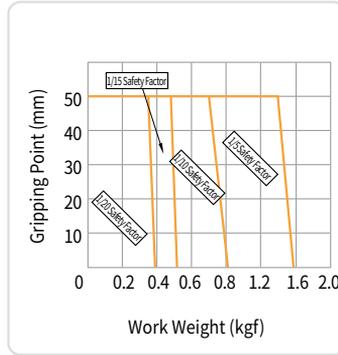
► PH01-10D-NO



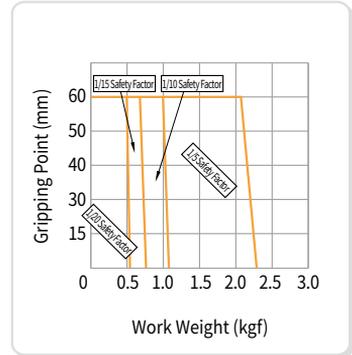
► PH01-16D-NO



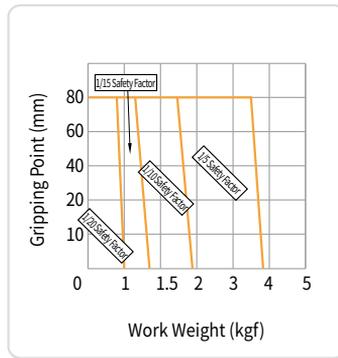
► PH01-20D-NO



► PH01-25D-NO



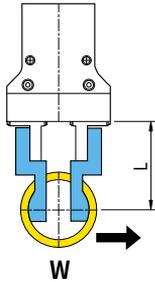
► PH01-32D-NO



**⚠ Caution** If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it with the maximum attachment length which specified.

Gripping Force Graph (Open - Single Acting-NC)

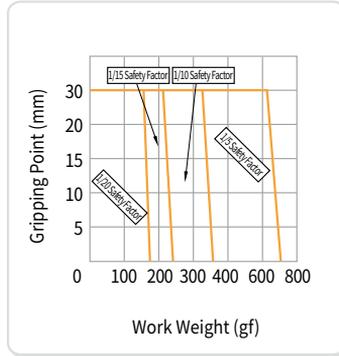
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



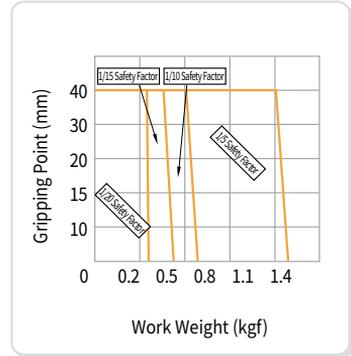
Open Grip State

W: Work Weight  
L: Attachment Length

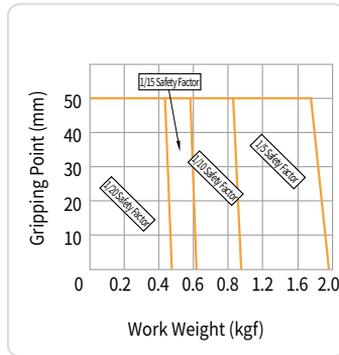
► PH01-10D-NC



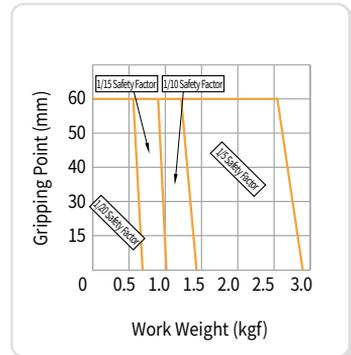
► PH01-16D-NC



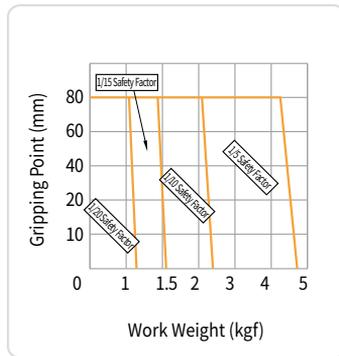
► PH01-20D-NC



► PH01-25D-NC



► PH01-32D-NC



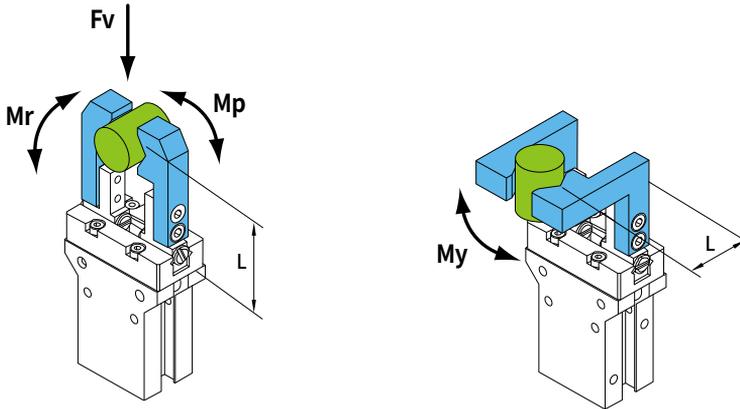
HAND

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

**⚠ Caution** If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

## Check of Allowable Moment and Weight

- ※ L : Distance between the center of guide and gripping point of work.
- ※ The moment center equals with guide center.



Item	Allowable Weight for Vertical Direction. Fv (kgf)	Maximum Allowable Moment (kgf·cm)		
		Pitching moment Mp	Yawing moment My	Rolling moment Mr
PH01-10D	7.9	2.8	2.8	6.3
PH01-16D	14.1	6.7	6.7	17.7
PH01-20D	16.9	8.4	8.4	26.1
PH01-25D	26.5	16.5	16.5	49.3
PH01-32D	44.5	34.3	34.3	82.8

※ Above listed allowable moment and weight refer static values.

### Calculation of allowable weight for moment weight applied.

$$\text{Allowable Weight } F \text{ (kgf)} = \frac{\text{Maximum Allowable Moment } M \text{ (kgf·cm)}}{\text{The point of external load applied } L \text{ (cm)}}$$

### Example)

Checking of 1kgf weight(F) force to pitching moment direction(Mp) at the 30mm attachment point on PH01-20D.

$$\Rightarrow \text{Allowable Weight } F \text{ (kgf)} = \frac{\text{Maximum Allowable Moment } M \text{ (kgf·cm)}}{\text{The point of external load applied } L \text{ (cm)}} = \frac{8.4}{3} = 2.8 \text{ kgf} > 1 \text{ kgf}$$

The allowable weight(2.8kgf) is bigger than applied weight (1kgf), so, it is applicable.

# PH01-D Series

10D

16D

20D

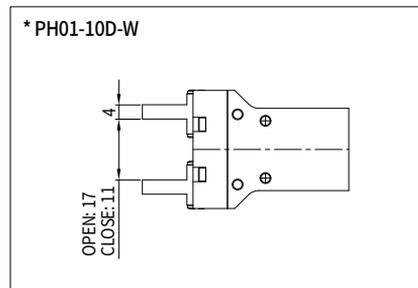
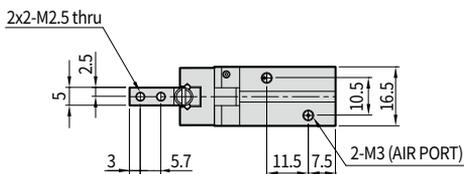
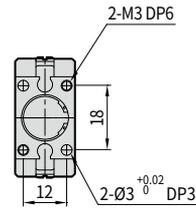
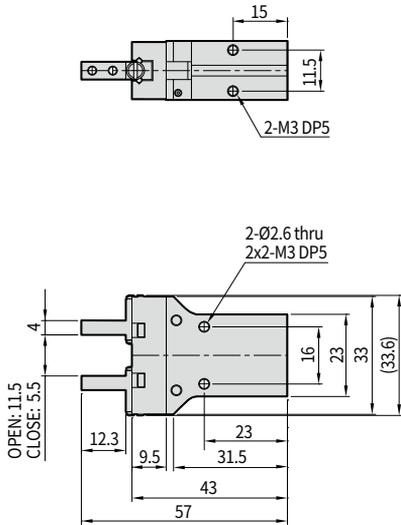
25D

32D

HAND

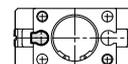
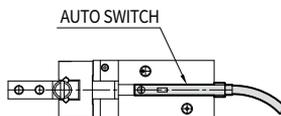
## PH01-10D

※ Out dimensions of double and single acting model are same.



- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

## PH01-10D Example of Auto Switch installation



※ Only 1 Auto Switch(Close) can be mounted.

# PH01-D Series

10D

16D

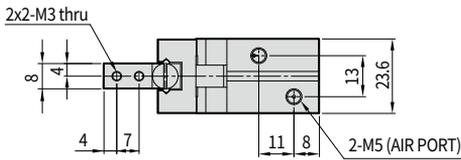
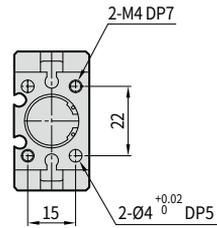
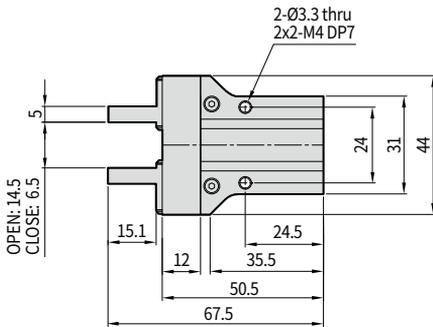
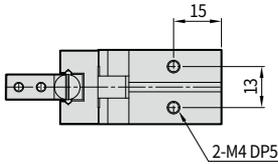
20D

25D

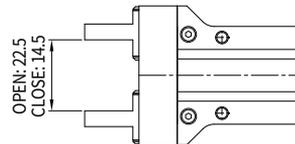
32D

## PH01-16D

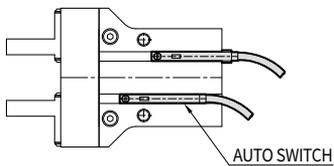
※ Out dimensions of double and single acting model are same.



\* PH01-16D-W

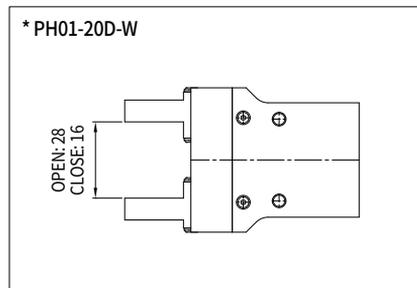
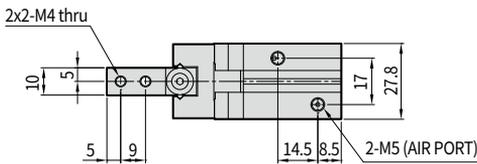
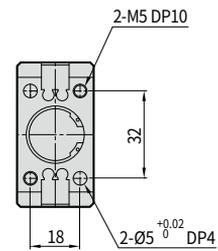
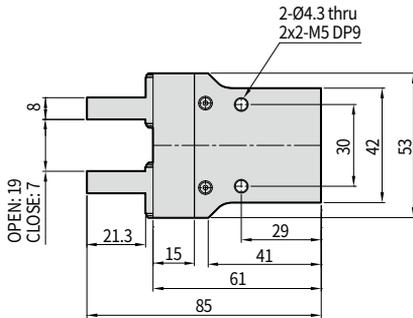
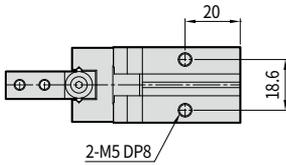


## PH01-16D Example of Auto Switch installation



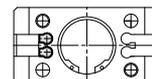
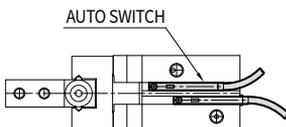
PH01-20D

※ Out dimensions of double and single acting model are same.



- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

PH01-20D Example of Auto Switch installation



# PH01-D Series

10D

16D

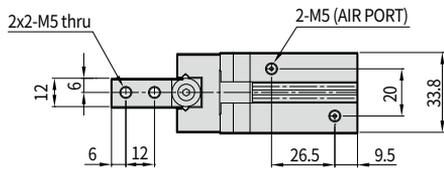
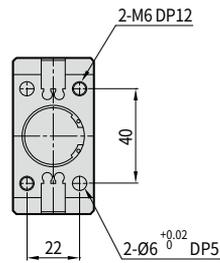
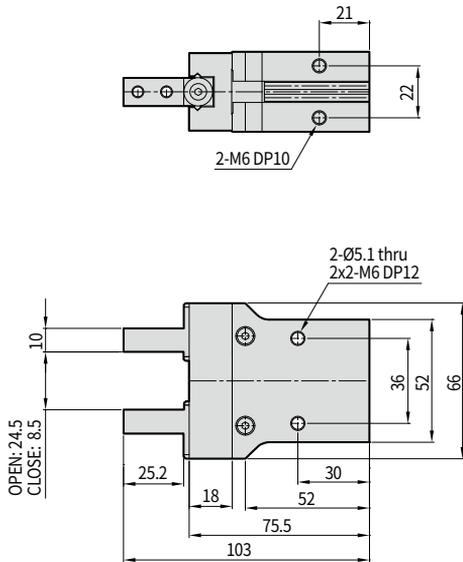
20D

25D

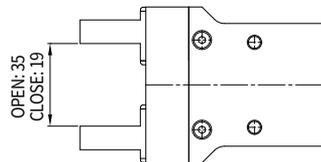
32D

## PH01-25D

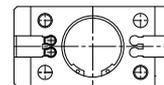
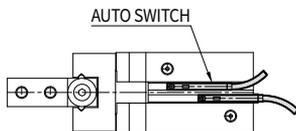
※ Out dimensions of double and single acting model are same.



\* PH01-25D-W

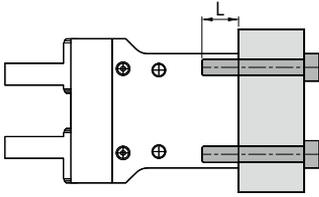


## PH01-25D Example of Auto Switch installation



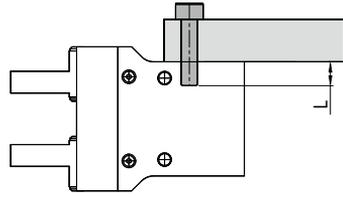


1. Installation by body tap holes



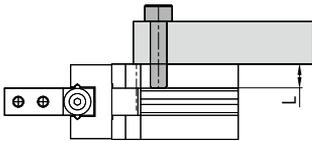
Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH01-10D	M3×P0.5	11	8
PH01-16D	M4×P0.7	25	8
PH01-20D	M5×P0.8	51	10
PH01-25D	M6×P1	81	12
PH01-32D	M8×P1.25	157	15

2. Installation by body tap holes



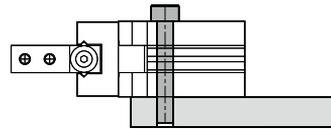
Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH01-10D	M3×P0.5	11	5
PH01-16D	M4×P0.7	25	7
PH01-20D	M5×P0.8	51	8
PH01-25D	M6×P1	81	10
PH01-32D	M8×P1.25	157	15

3. Installation by body tap holes



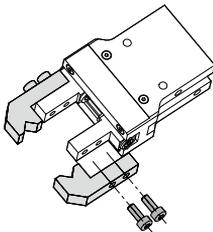
Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH01-10D	M3×P0.5	11	5
PH01-16D	M4×P0.7	25	8
PH01-20D	M5×P0.8	51	10
PH01-25D	M6×P1	81	12
PH01-32D	M8×P1.25	157	15

4. Installation by body through holes



Item	Fastening Bolt	Max Torque (kgf-cm)
PH01-10D	M2.5×P0.45	4.9
PH01-16D	M3×P0.5	11
PH01-20D	M4×P0.7	25
PH01-25D	M5×P0.8	51
PH01-32D	M6×P1	81

5. Attachment installation



Item	Fastening Bolt	Max Torque (kgf-cm)
PH01-10D	M2.5×P0.45	4.9
PH01-16D	M3×P0.5	11
PH01-20D	M4×P0.7	25
PH01-25D	M5×P0.8	51
PH01-32D	M5×P0.8	51

MEMO

Handwriting practice area with horizontal dotted lines.

**HAND**

PH01-A
<b>PH01-D</b>
PH01-G
PH01J-C
PH01K
PH02
PH02-H
PH04
PH05
PH06
PH06-L
PH06-L2
PH07
PH08
PH09
PH10
PH12
PH14-S
PH14-CL
PH14-CF
PH15-S
PH15-CL
PH15-CF
PH15-W
PH21
PH22
PH23
PH25
PH32
PHC

## GENERAL HAND / Parallel Operation

# PH01-G Series

### Features

- Parallel operation by Crank Lever.
- High precision cross roller guide application.
- Especially enforced guide based on PH01-A series model.
- Increased resist to external force on the guide.
- High solidity and precise structure.
- Various installation options.
- Auto Switch installation. (Optional)



### Order Form

## PH01 - 25G - A1 L S

①

②

③

④

⑤

#### ① Series Name

#### ② Cylinder Bore Size and Stroke

Order	CYL Bore(mm)	Stroke(mm)
10G	12	4
16G	16	6
20G	20	10
25G	25	14

#### ③ Auto Switch Specification

Order	Sensing Type	Cable Spec		Voltage		Current		Protect Level	Operation Time
		Wires	Direction	AC	DC	AC	DC		
Blank		No Auto Switch provided							
A1	Magnetic reed switch	2-Wire	Horiz	100V	24V	5~20mA	5~40mA	IP 67	1ms
B1	Magnetic solid state	3-Wire	Horiz	-	24V (5~28V)	-	Less than 50mA	IP 67	1ms

#### ④ Auto Switch Cable Length

Order	Cable Length
Blank	1M
L	3M

#### ⑤ Auto Switch Quantity

Order	Quantity
Blank	2PCS
S	1PCS

\* For PH01-10G, PH01-16G, only 1 Auto Switch(Close) can be mounted.

Specification

HAND

PH01-A  
PH01-D  
**PH01-G**  
PH01J-C  
PH01K  
PH02  
PH02-H  
PH04  
PH05  
PH06  
PH06-L  
PH06-L2  
PH07  
PH08  
PH09  
PH10  
PH12  
PH14-S  
PH14-CL  
PH14-CF  
PH15-S  
PH15-CL  
PH15-CF  
PH15-W  
PH21  
PH22  
PH23  
PH25  
PH32  
PHC

Item Name		PH01-10G	PH01-16G	PH01-20G	PH01-25G
CYL Bore Size(mm)		12	16	20	25
Stroke(mm)		4	6	10	14
Effective Gripping Force(kgf)	Close	3.46	8.22	12.2	20.2
	Open	4.61	9.57	14.5	24
Air pressure : 5kgf/cm <sup>2</sup> Note 3)					
Fitting Size		M3		M5	
Weight(kgf)		0.1	0.2	0.38	0.72
Max. Attachment L(mm)		40	50	60	80
Max. Attachment H(mm) Note 4)		15	20	35	40
Fluid		Clean Air Note 1)			
Pressure Range(kgf/cm <sup>2</sup> )		1.5 ~ 7 (Guaranteed Resist Pressure : 10.5) Note 2)			
Lubrication		Not Need (If need, use one sort of turbine oil : SPEC ISOVG 32)			
Temperature Range(°C)		5 ~ 60			
Repeat Accuracy(mm)		±0.01			
Max. Cycle Per Minute(C.P.M)		140			
Operation Type		Double Acting (Structure : Parallel Operation by Crank Lever) (Guide : Cross Roller Bearing Guide)			
Tolerance of Stroke(mm)		Open : -0.5 ~ +1			
		Close : -1 ~ +0.5			

Note 1) Clean Air : Fresh air containing solid matters with 0.3% of supersaturated moisture and 99.9% of liquid oil that passed through the 3~10µm degree of filtering.

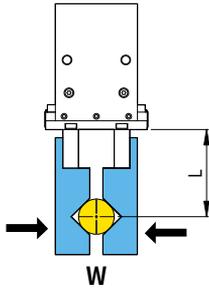
Note 2) Guaranteed Resist Pressure : A pressure that does not cause an abnormality in parts when it is applied for 1 minute without any weight loaded.

Note 3) The position of the effective gripping force point is the end point of the Master Jaw.

Note 4) For Max. Attachment L and H, please refer <GENERAL HAND Model Selection Guide>. (it is permitted length for 5kgf/cm<sup>2</sup> pressure applied)

## Gripping Force Graph (Close)

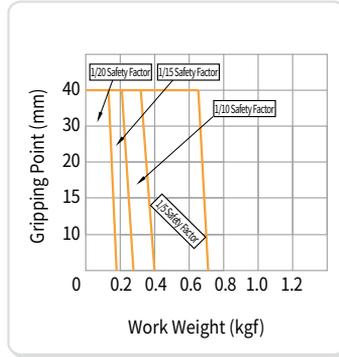
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



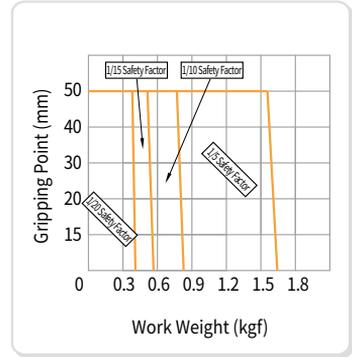
Close Grip State

W: Work Weight  
L: Attachment Length

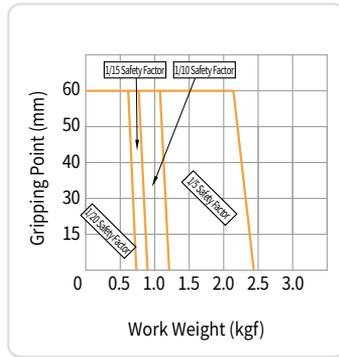
► PH01-10G



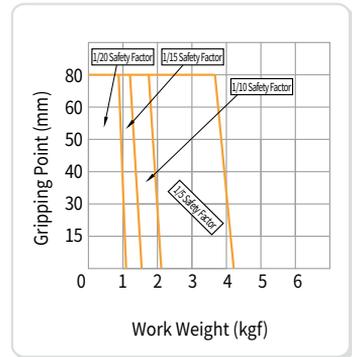
► PH01-16G



► PH01-20G



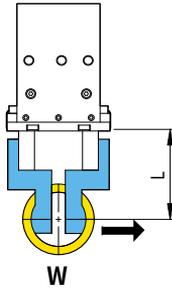
► PH01-25G



**⚠ Caution** If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it with the maximum attachment length which specified.

Gripping Force Graph (Open)

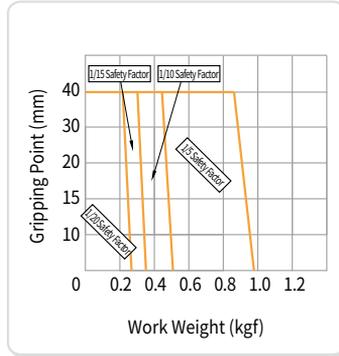
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



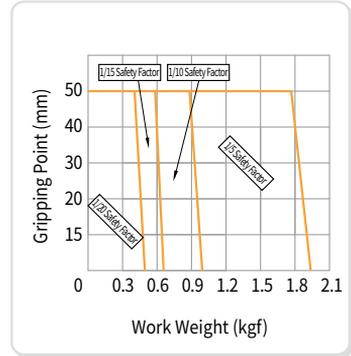
Open Grip State

W: Work Weight  
L: Attachment Length

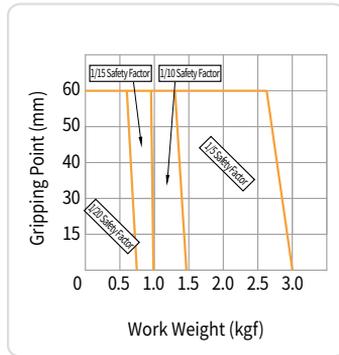
► PH01-10G



► PH01-16G



► PH01-20G



► PH01-25G



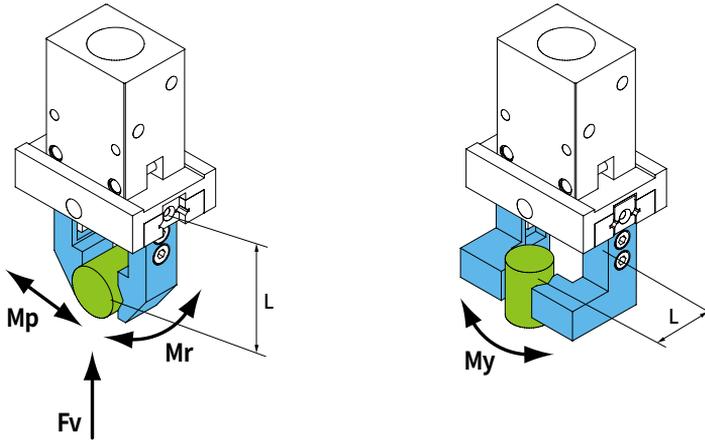
HAND

- PH01-A
- PH01-D
- PH01-G**
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

**⚠ Caution** If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

## Check of Allowable Moment and Weight

- ※ L : Distance between the center of guide and gripping point of work.
- ※ The moment center equals with guide center.



Item	Allowable Weight for Vertical Direction. Fv (kgf)	Maximum Allowable Moment (kgf·cm)		
		Pitching moment Mp	Yawing moment My	Rolling moment Mr
PH01-10G	10.4	3.9	3.9	8.3
PH01-16G	20.3	10.1	10.1	25.4
PH01-20G	27	14.2	14.2	41.7
PH01-25G	35	26.5	26.5	65.8

※ Above listed allowable moment and weight refer static values.

### Calculation of allowable weight for moment weight applied.

$$\text{Allowable Weight } F \text{ (kgf)} = \frac{\text{Maximum Allowable Moment } M \text{ (kgf·cm)}}{\text{The point of external load applied } L \text{ (cm)}}$$

### Example)

Checking of 2kgf weight(F) force to pitching moment direction(Mp) at the 40mm attachment point on PH01-20G.

$$\Rightarrow \text{Allowable Weight } F \text{ (kgf)} = \frac{\text{Maximum Allowable Moment } M \text{ (kgf·cm)}}{\text{The point of external load applied } L \text{ (cm)}} = \frac{14.2}{4} = 3.55 \text{ kgf} > 2 \text{ kgf}$$

The allowable weight(3.35kgf) is bigger than applied weight (2kgf), so, it is applicable.

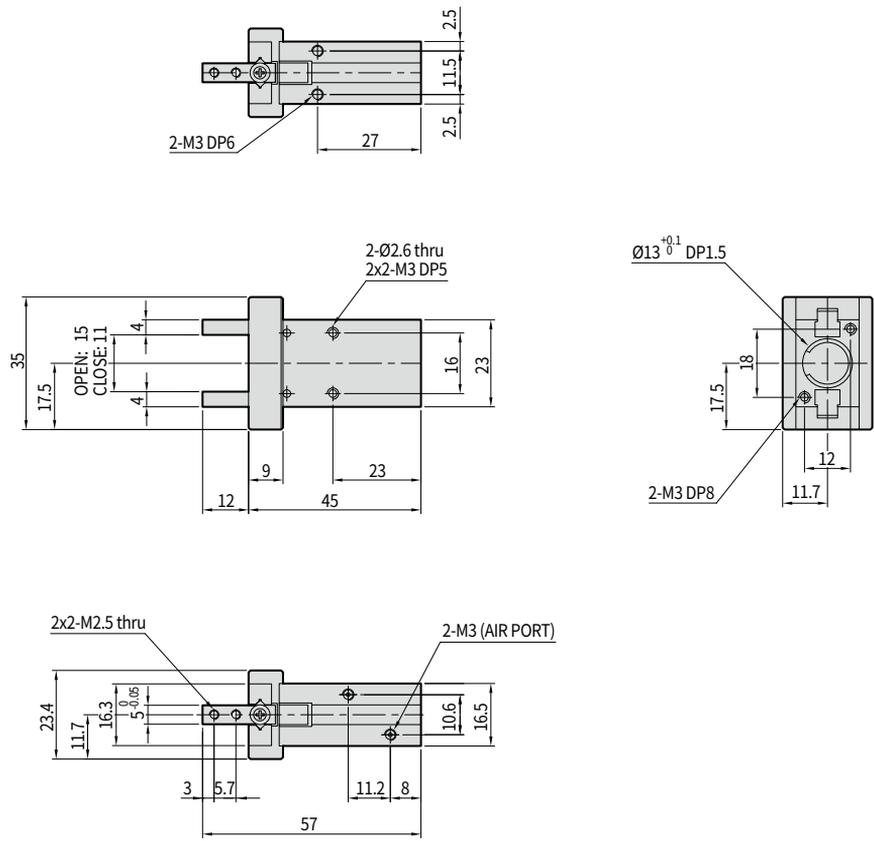
# PH01-G Series

10G 16G 20G 25G

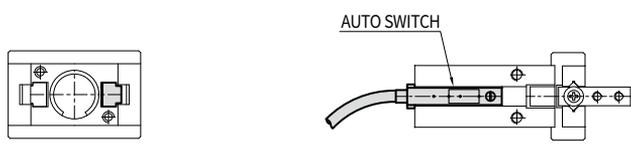
HAND

- PH01-A
- PH01-D
- PH01-G**
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

## PH01-10G



## PH01-10G Example of Auto Switch installation

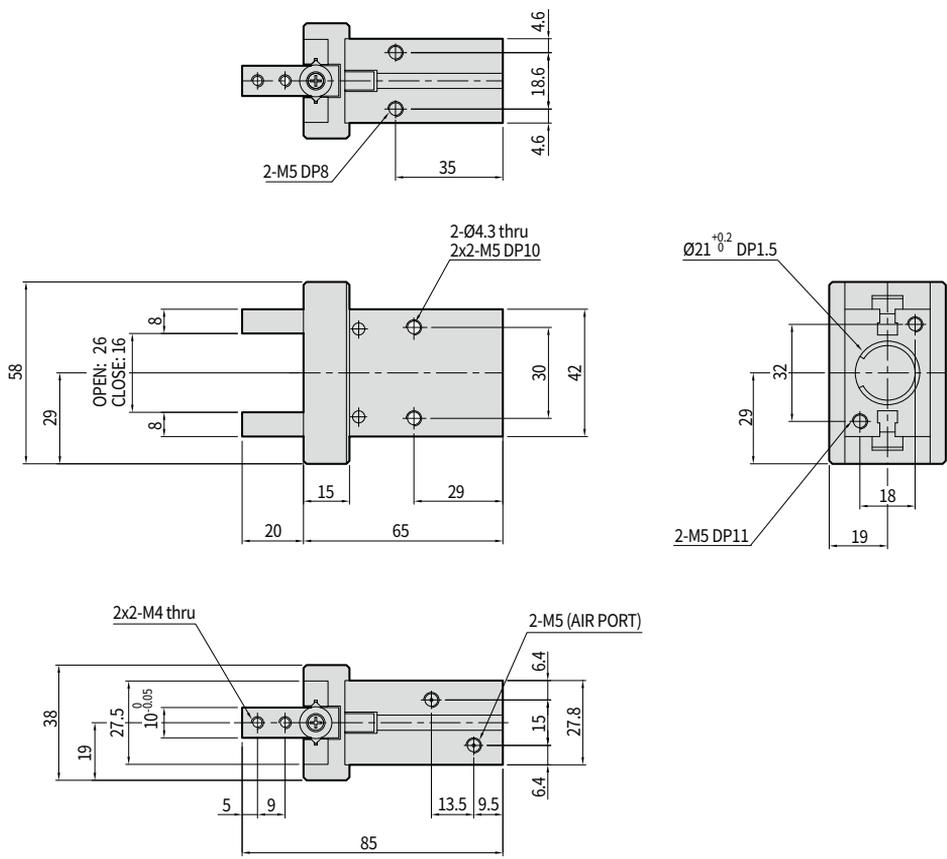


※ Only 1 Auto Switch(Close) can be mounted.

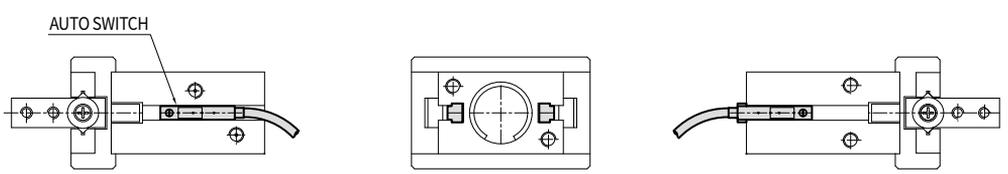


- PH01-A
- PH01-D
- PH01-G**
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

PH01-20G



PH01-20G Example of Auto Switch installation



# PH01-G Series

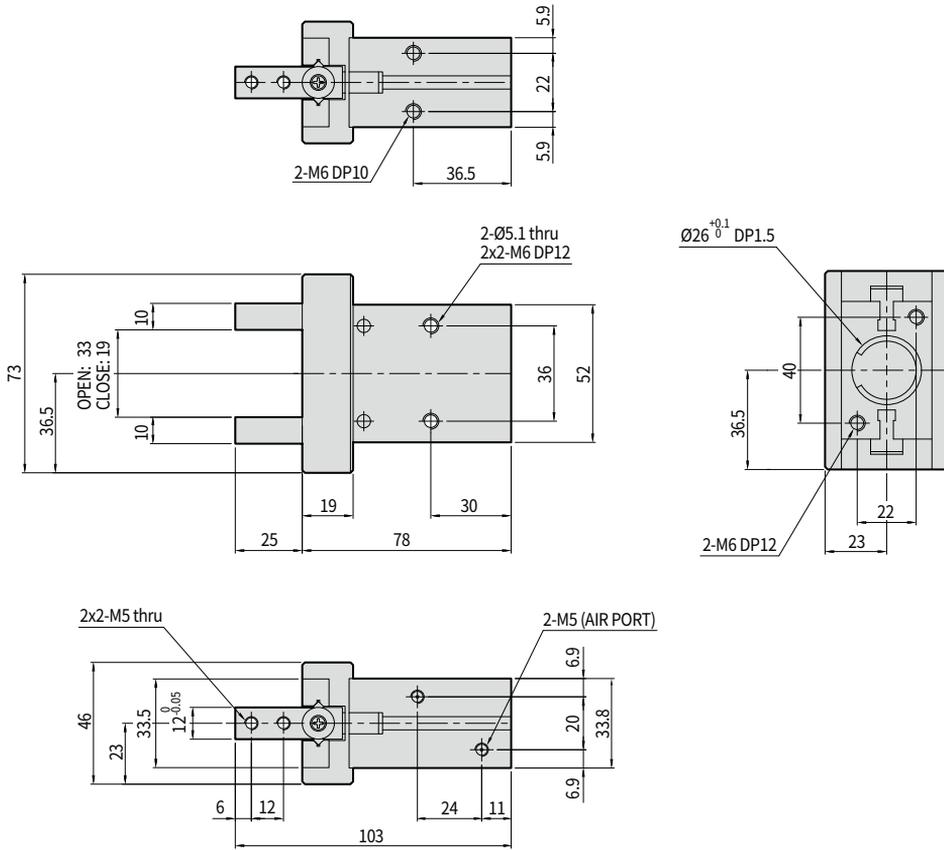
10G

16G

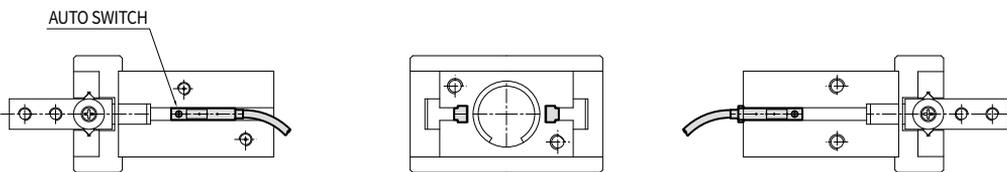
20G

25G

## PH01-25G



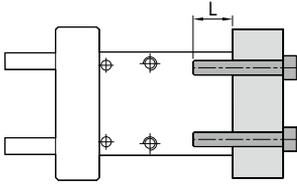
## PH01-25G Example of Auto Switch installation



Installation Information

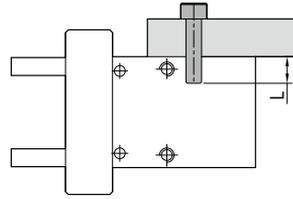
PH01-A  
PH01-D  
**PH01-G**  
PH01-J-C  
PH01K  
PH02  
PH02-H  
PH04  
PH05  
PH06  
PH06-L  
PH06-L2  
PH07  
PH08  
PH09  
PH10  
PH12  
PH14-S  
PH14-CL  
PH14-CF  
PH15-S  
PH15-CL  
PH15-CF  
PH15-W  
PH21  
PH22  
PH23  
PH25  
PH32  
PHC

1. Installation by body tap holes



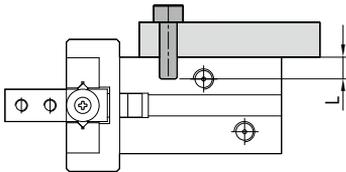
Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH01-10G	M3×P0.5	11	8
PH01-16G	M4×P0.7	25	8
PH01-20G	M5×P0.8	51	11
PH01-25G	M6×P1	81	12

2. Installation by body tap holes



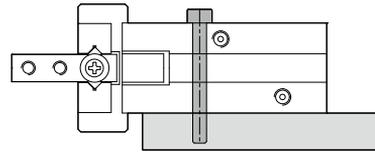
Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH01-10G	M3×P0.5	11	6
PH01-16G	M4×P0.7	25	7
PH01-20G	M5×P0.8	51	8
PH01-25G	M6×P1	81	10

3. Installation by body tap holes



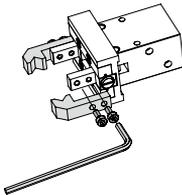
Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH01-10G	M3×P0.5	11	5
PH01-16G	M4×P0.7	25	8
PH01-20G	M5×P0.8	51	10
PH01-25G	M6×P1	81	12

4. Installation by body through holes



Item	Fastening Bolt	Max Torque (kgf-cm)
PH01-10G	M3×P0.5	11
PH01-16G	M4×P0.7	25
PH01-20G	M5×P0.8	51
PH01-25G	M6×P1	81

5. Attachment installation



Item	Fastening Bolt	Max Torque (kgf-cm)
PH01-10G	M2.5×P0.45	4.9
PH01-16G	M3×P0.5	11
PH01-20G	M4×P0.7	25
PH01-25G	M5×P0.8	51

# GENERAL HAND / Parallel Operation

# PH01J-C Series

## Features

NEW

- Parallel operation by Crank Lever.
- High precision linear guide application
- Dust cover applied to prevent external dust and metalworking chips.
- Various options for dust cover material.
- Auto Switch installation. (Optional)



## Order Form

**PH01J - 16C S - H - A2 L S**

①                      ②                      ③                      ④                      ⑤                      ⑥                      ⑦

### ① Series Name

### ② Cylinder Bore Size and Stroke

Order	CYL Bore(mm)	Stroke(mm)
16C	16	8
20C	20	12
25C	25	16

### ⑥ Auto Switch Cable Length

Order	Cable Length
Blank	1M
L	3M

### ③ Materials of Dust Cover

Order	Material	Use For
Blank	Chloroprene Rubber (CR)	Equipment for Semiconductor & Clean Room
S	Silicon (Si)	Food & Medicine Industry
F	Fluorine (FKM)	Exposed to chemical and / or high temperature condition

### ⑦ Auto Switch Quantity

Order	Quantity
Blank	2PCS
S	1PCS

\* For PH01-16J, only 1 Auto Switch(Close) can be mounted.

### ④ Special Option

Order	Special Option
Blank	Standard
E	Secondary battery field
H	Food grade grease application <small>Note 1)</small>
V	High temperature condition <small>Note 2)</small>

Note 1) Caution for food grade grease option : Grease of applied on the produce is food grade grease which risk-free handing foods. However master jaw of product is Electroless Nickel Plating on carbon steel so please careful of direct contact between master jaws to foods.

Note 2) For high temperature option, normal auto switch is not available.

⑤ Auto Switch Specification

Order	Sensing Type	Cable Spec		Voltage		Current		Protect Level	Operation Time
		Wires	Direction	AC	DC	AC	DC		
Blank		No Auto Switch provided							
A2	Magnetic reed switch	2-Wire	Horiz	100V	24V	5~20mA	5~40mA	IP 67	1ms
A2C	Magnetic reed switch	2-Wire	Horiz	100V	24V	5~20mA	5~40mA	IP 67	1ms
A2V	Magnetic reed switch	2-Wire	Ver	100V	24V	5~20mA	5~40mA	IP 67	1ms
B2	Magnetic solid state	3-Wire	Horiz	-	24V (5~28V)	-	Less than 50mA	IP 67	1ms
B2B	Magnetic solid state	2-Wire	Horiz	-	24V (10~28V)	-	Less than 50mA	IP 67	1ms
B3B	Magnetic solid state	2-Wire	Ver	-	24V (10~28V)	-	Less than 50mA	IP 67	1ms
B3C	Magnetic solid state	3-Wire	Ver	-	24V (5~28V)	-	Less than 50mA	IP 67	1ms

\* Be careful of projection for vertical wire exposed type Auto Switch model. (Please refer technical information of Auto Switch)

HAND

- PH01-A
- PH01-D
- PH01-G
- PH01-J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

Accessory Order Form

(1) Dust Cover

**PH01J - 16C S - CV - PART**

①                      ②                      ③                      ④                      ⑤

① Series Name

④ Dust Cover

② CYL Bore Size

⑤ Order Name for Accessory

③ Materials of Dust Cover

Order	Blank	S	F
Material	Chloroprene Rubber (CR)	Silicon (Si)	Fluorine (FKM)

※ Be careful when changing dust cover. For large force would be caused of torn or damaged on dust cover.

Specification

Item Name	PH01J-16C	PH01J-20C	PH01J-25C
CYL Bore Size(mm)	16	20	25
Stroke(mm)	8	12	16
Effective Gripping Force(kgf)	Close	8.1	12
	Open	9.4	14
Pressure Range(kgf/cm <sup>2</sup> )		14	24
Fitting Size		M5	
Weight(kgf)	0.15	0.28	0.51
Max. Attachment L(mm)	40	50	60
Max. Attachment H(mm)	15	25	35
Fluid		Clean Air	Note 1)
Pressure Range(kgf/cm <sup>2</sup> )		2 ~ 7	
Lubrication		Not Need (If need, use one sort of turbine oil : SPEC ISOVG 32)	
Temperature Range(°C)		Standard model : 5 ~ 60 High temperature model : 5 ~ 100	
Repeat Accuracy(mm)		± 0.05	
Max. Cycle Per Minute(C.P.M)		90	
Operation Type		Double Acting (Structure : Parallel operation by Crank Lever) (Guide : Linear Guide)	
Tolerance of Stroke(mm)		Open : -0.5 ~ +1 Close : -1 ~ +0.5	

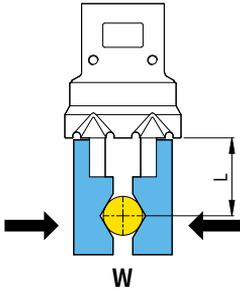
Note 1) Clean Air : Fresh air containing solid matters with 0.3% of supersaturated moisture and 99.9% of liquid oil that passed through the 3-10µm degree of filtering.

Note 2) The position of the effective gripping force point is the end point of the Master Jaw.

Note 3) For Max. Attachment L and H, please refer <GENERAL HAND Model Selection Guide>. (it is permitted length for 5kgf/cm<sup>2</sup> pressure applied)

## Gripping Force Graph (Close)

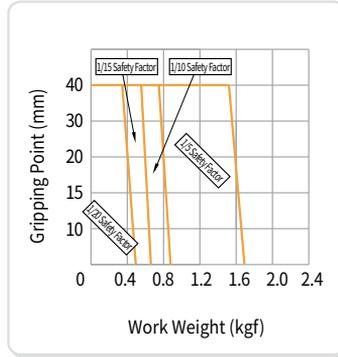
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



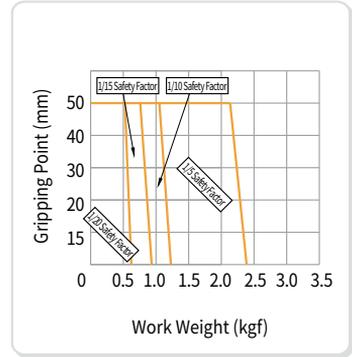
Close Grip State

W: Work Weight  
L: Attachment Length

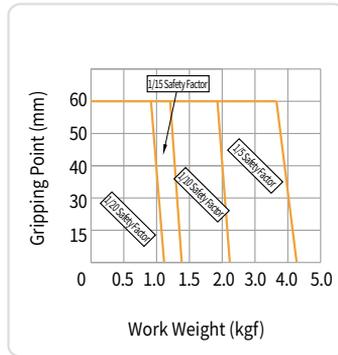
### ► PH01J-16C



### ► PH01J-20C



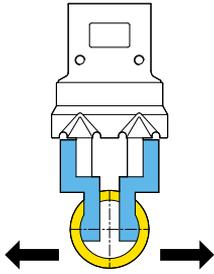
### ► PH01J-25C



**⚠ Caution** If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it with the maximum attachment length which specified.

Gripping Force Graph (Open)

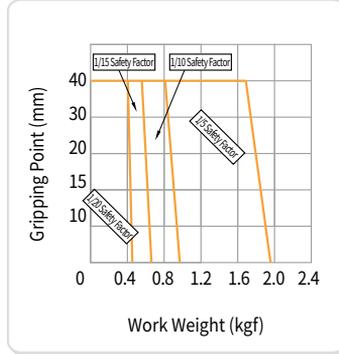
▶ Refer <GENERAL HAND Selection Guide> for how to read below graph.



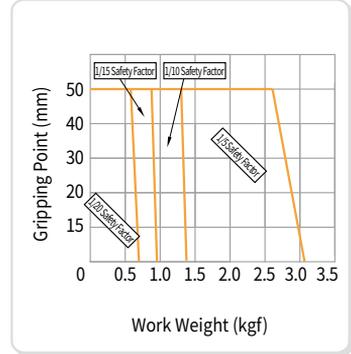
Open Grip State

W: Work Weight  
L: Attachment Length

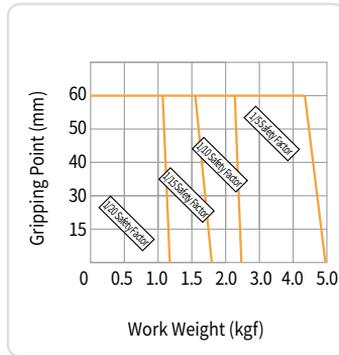
▶ PH01J-16C



▶ PH01J-20C



▶ PH01J-25C



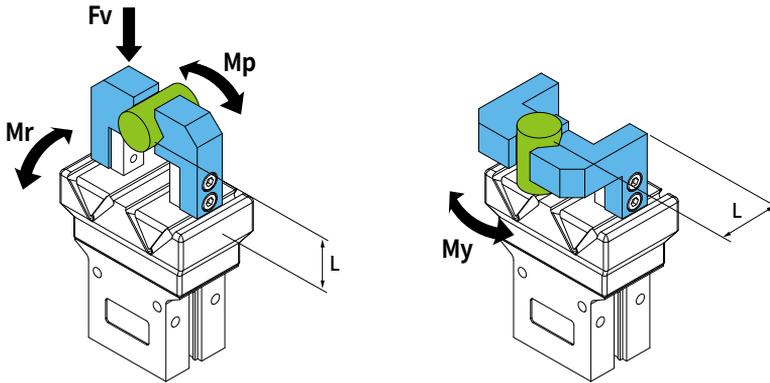
HAND

- PH01-A
- PH01-D
- PH01-G
- PH01J-C**
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

**⚠ Caution** If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

## Check of Allowable Moment and Weight

- ※ L : Distance between the center of guide and gripping point of work.
- ※ The moment center equals with guide center.



Item	Allowable Weight for Vertical Direction. Fv (kgf)	Maximum Allowable Moment (kgf·cm)		
		Pitching moment Mp	Yawing moment My	Rolling moment Mr
PH01J-16C	14.1	6.7	6.7	17.7
PH01J-20C	16.9	8.4	8.4	26.1
PH01J-25C	26.5	16.5	16.5	49.3

※ Above listed allowable moment and weight refer static values.

### Calculation of allowable weight for moment weight applied.

$$\text{Allowable Weight } F \text{ (kgf)} = \frac{\text{Maximum Allowable Moment } M \text{ (kgf·cm)}}{\text{The point of external load applied } L \text{ (cm)}}$$

### Example)

Checking of 1kgf weight(F) force to pitching moment direction(Mp) at the 30mm attachment point on PH01J-20C.

$$\Rightarrow \text{Allowable Weight } F \text{ (kgf)} = \frac{\text{Maximum Allowable Moment } M \text{ (kgf·cm)}}{\text{The point of external load applied } L \text{ (cm)}} = \frac{8.4}{3} = 2.8 \text{ kgf} > 1 \text{ kgf}$$

The allowable weight(2.8kgf) is bigger than applied weight (1kgf), so, it is applicable.

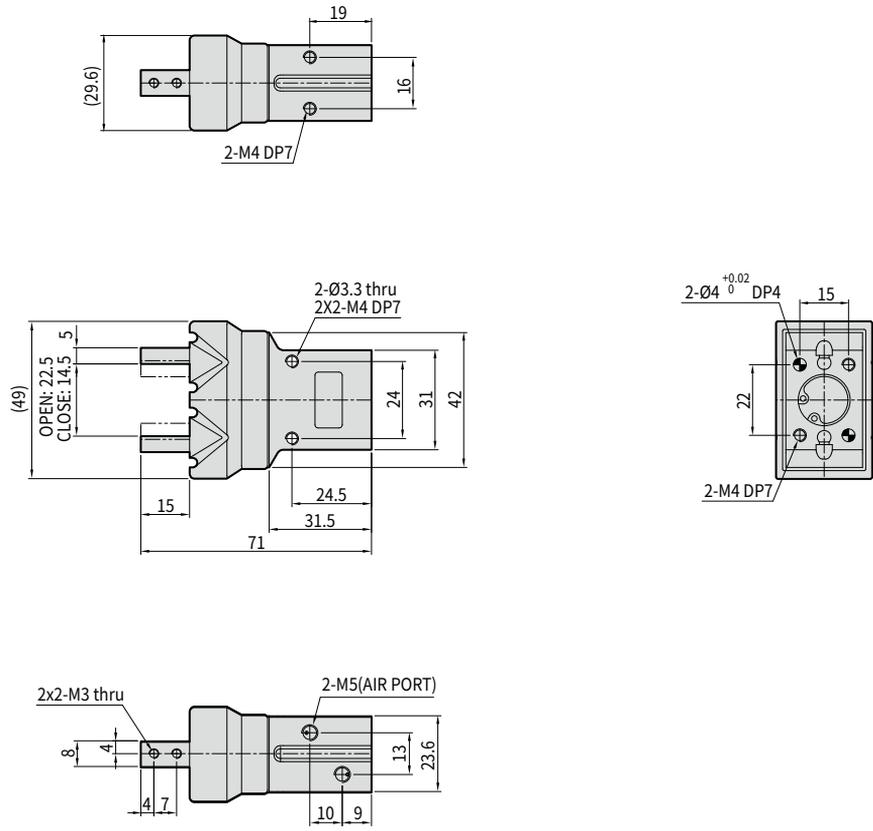
# PH01J-C Series

16C 20C 25C

HAND

- PH01-A
- PH01-D
- PH01-G
- PH01J-C**
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

## PH01J-16C



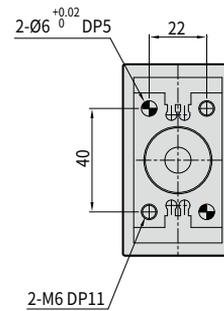
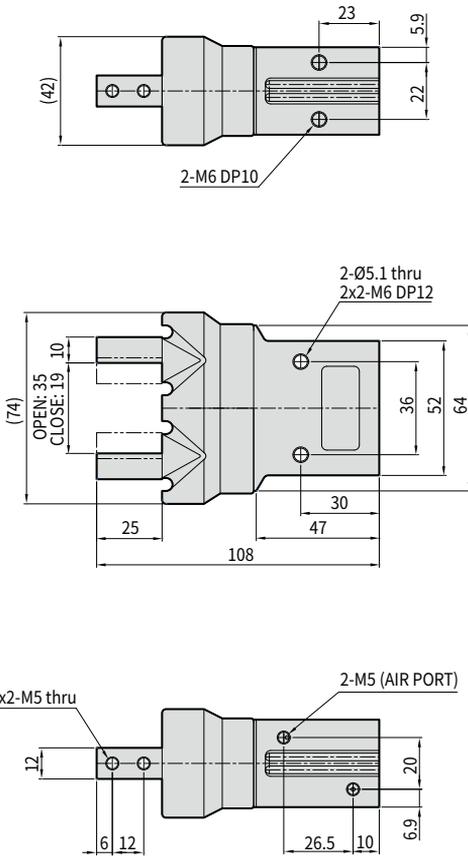
## PH01J-16C Example of Auto Switch installation



※ Only 1 Auto Switch(Close) can be mounted.

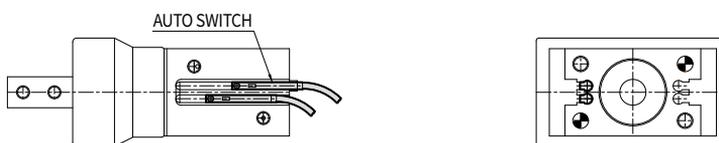


PH01J-25C

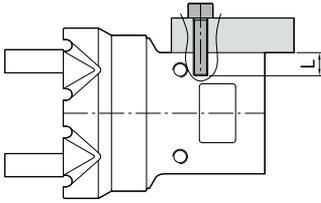


- PH01-A
- PH01-D
- PH01-G
- PH01J-C**
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

PH01J-25C Example of Auto Switch installation

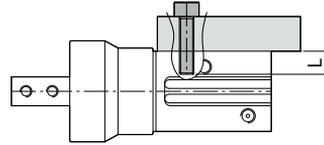


1. Installation by body tap holes



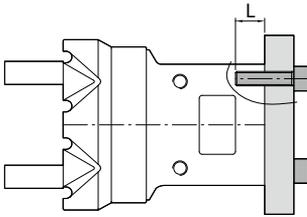
Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH01J-16C	M4×P0.7	25	7
PH01J-20C	M5×P0.8	51	8
PH01J-25C	M6×P1	81	10

2. Installation by body tap holes



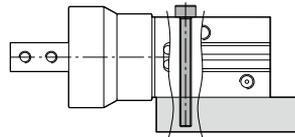
Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH01J-16C	M4×P0.7	25	7
PH01J-20C	M5×P0.8	51	9
PH01J-25C	M6×P1	81	12

3. Installation by body tap holes



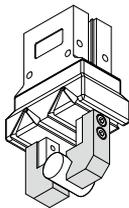
Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH01J-16C	M4×P0.7	25	7
PH01J-20C	M5×P0.8	51	10
PH01J-25C	M6×P1	81	12

4. Installation by body through holes



Item	Fastening Bolt	Max Torque (kgf-cm)
PH01J-16C	M3×P0.5	11
PH01J-20C	M4×P0.7	25
PH01J-25C	M5×P0.8	51

5. Attachment installation



Item	Fastening Bolt	Max Torque (kgf-cm)
PH01J-16C	M3×P0.5	11
PH01J-20C	M4×P0.7	25
PH01J-25C	M5×P0.8	51

MEMO

Handwriting practice area with horizontal dotted lines.

**HAND**

PH01-A
PH01-D
PH01-G
<b>PH01-J-C</b>
PH01K
PH02
PH02-H
PH04
PH05
PH06
PH06-L
PH06-L2
PH07
PH08
PH09
PH10
PH12
PH14-S
PH14-CL
PH14-CF
PH15-S
PH15-CL
PH15-CF
PH15-W
PH21
PH22
PH23
PH25
PH32
PHC

## GENERAL HAND / Parallel Operation

# PH01K Series

### Features

- Parallel operation by Crank Lever.
- High precise cross roller guide application.
- High durability from high solidity and precise structure.
- Various installation options.
- Dust cover to prevent scattering of metalworking chips and dust is applicable. (Optional)
- Auto Switch installation. (Optional)



### Order Form

## PH01K - 30 C - A1 L S

①                      ②                      ③                      ④                      ⑤                      ⑥

#### ① Series Name

#### ② Cylinder Bore Size and Stroke

Order	CYL Bore(mm)	Stroke(mm)
20	20	12
30	30	24
40	40	30
50	50	36
60	63	40
80	80	50
100	100	60

#### ⑤ Auto Switch Cable Length

Order	Cable Length
Blank	1M
L	3M

#### ⑥ Auto Switch Quantity

Order	Quantity
Blank	2PCS
S	1PCS

#### ③ Dust Cover

Order	Dust Cover
Blank	Non-Mounted
C	Mounted

#### ④ Auto Switch Specification

Order	Sensing Type	Cable Spec		Voltage		Current		Protect Level	Operation Time
		Wires	Direction	AC	DC	AC	DC		
Blank		No Auto Switch provided							
A1	Magnetic reed switch	2-Wire	Horiz	100V	24V	5~20mA	5~40mA	IP 67	1ms
B1	Magnetic solid state	3-Wire	Horiz	-	24V (5~28V)	-	Less than 50mA	IP 67	1ms

Specification

HAND

PH01-A  
PH01-D  
PH01-G  
PH01J-C  
PH01K  
PH02  
PH02-H  
PH04  
PH05  
PH06  
PH06-L  
PH06-L2  
PH07  
PH08  
PH09  
PH10  
PH12  
PH14-S  
PH14-CL  
PH14-CF  
PH15-S  
PH15-CL  
PH15-CF  
PH15-W  
PH21  
PH22  
PH23  
PH25  
PH32  
PHC

Item Name		PH01K-20	PH01K-30	PH01K-40	PH01K-50	PH01K-60	PH01K-80	PH01K-100
CYL Bore Size(mm)		20	30	40	50	63	80	100
Stroke(mm)		12	24	30	36	40	50	60
Effective Gripping Force(kgf)	Close	12.12	30.6	48.1	84.7	133	250	370
	Open	14.23	36.5	57.3	100	159	277	407
Fitting Size		M5		PT1/8			PT1/4	
Weight(kgf)		0.52	1.8	2.2	3.1	4.5	8.2	12.1
Max. Attachment L(mm)		60	80	100	120	140	170	200
Max. Attachment H(mm)	Note 4)	40	50	60	70	80	90	100
Fluid		Clean Air Note 1)						
Pressure Range(kgf/cm <sup>2</sup> )		1.5 ~ 7 (Guaranteed Resist Pressure : 10.5) Note 2)						
Lubrication		Not Need (If need, use one sort of turbine oil : SPEC ISOVG 32)						
Temperature Range(°C)		5 ~ 60						
Repeat Accuracy(mm)		±0.01		±0.03			±0.05	
Max. Cycle Per Minute(C.P.M)		120		90			60	
Operation Type		Double Acting (Structure : Parallel Operation by Crank Lever) (Guide : Cross Roller Bearing Guide)						
Tolerance of Stroke(mm)		Open : -0.5 ~ +1						
		Close : -1 ~ +0.5						

Note 1) Clean Air : Fresh air containing solid matters with 0.3% of supersaturated moisture and 99.9% of liquid oil that passed through the 3-10µm degree of filtering.

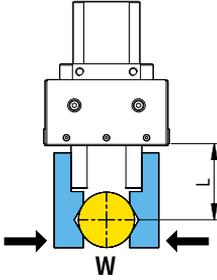
Note 2) Guaranteed Resist Pressure : A pressure that does not cause an abnormality in parts when it is applied for 1 minute without any weight loaded.

Note 3) The position of the effective gripping force point is the end point of the Master Jaw.

Note 4) For Max. Attachment L and H, please refer <GENERAL HAND Model Selection Guide>. (it is permitted length for 5kgf/cm<sup>2</sup> pressure applied)

## Gripping Force Graph (Close)

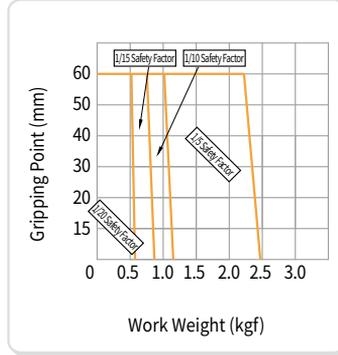
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



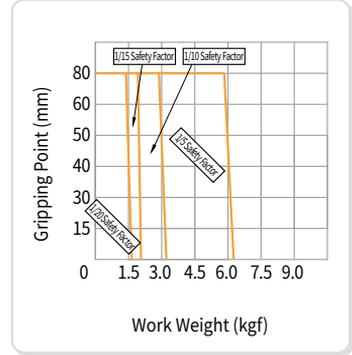
Close Grip State

W: Work Weight  
L: Attachment Length

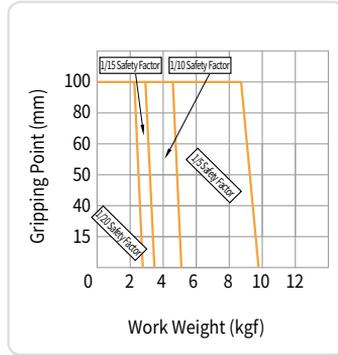
► PH01K-20



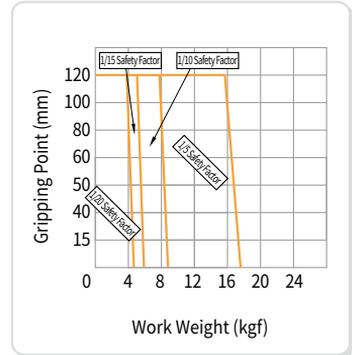
► PH01K-30



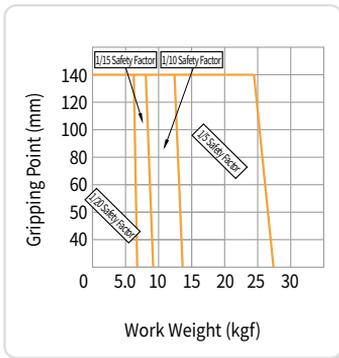
► PH01K-40



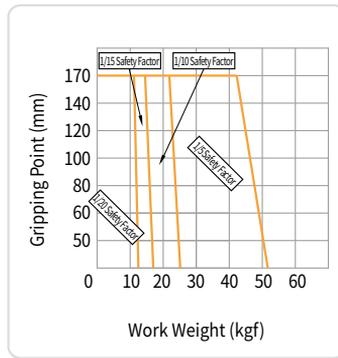
► PH01K-50



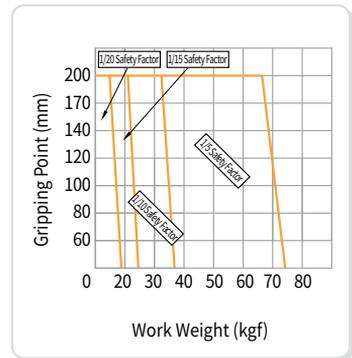
► PH01K-60



► PH01K-80



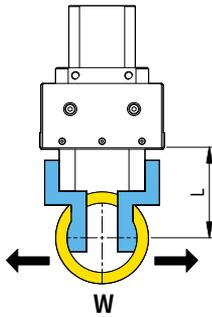
► PH01K-100



**▲ Caution** If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

Gripping Force Graph (Open)

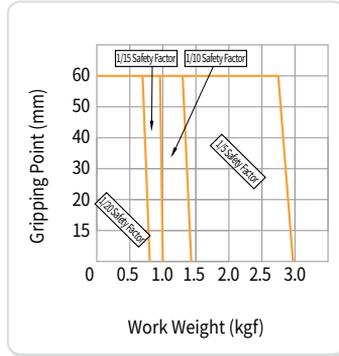
▶ Refer <GENERAL HAND Selection Guide> for how to read below graph.



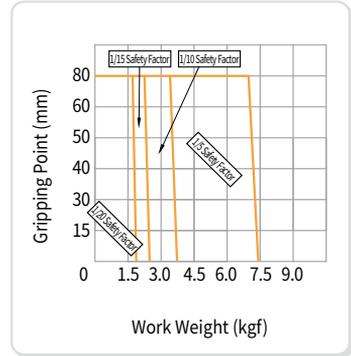
Open Grip State

W: Work Weight  
L: Attachment Length

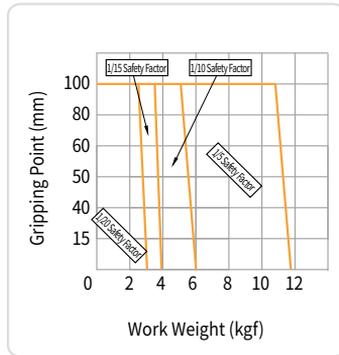
▶ PH01K-20



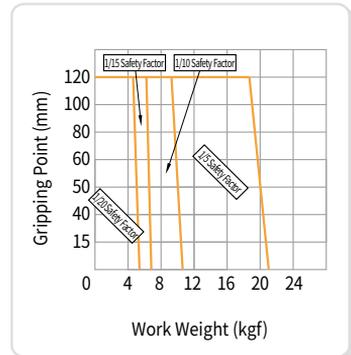
▶ PH01K-30



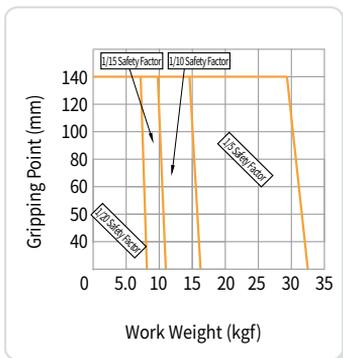
▶ PH01K-40



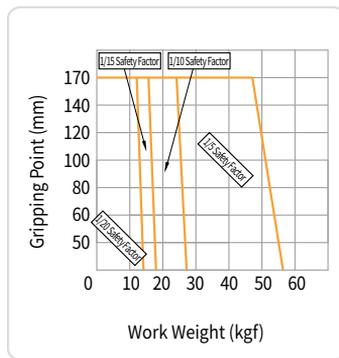
▶ PH01K-50



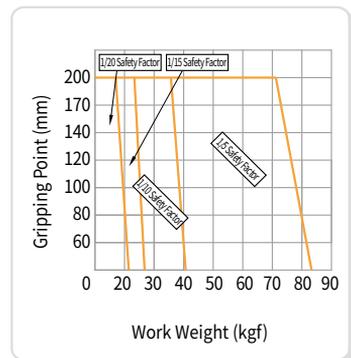
▶ PH01K-60



▶ PH01K-80



▶ PH01K-100



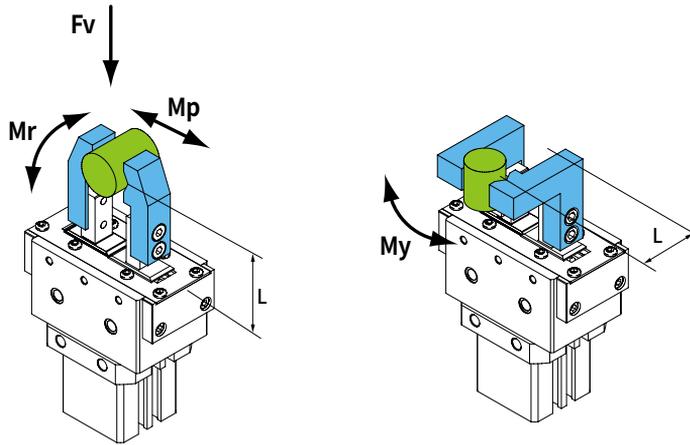
HAND

- PH01-A
- PH01-D
- PH01-G
- PH01-J-C
- PH01K**
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

⚠ **Caution** If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

## Check of Allowable Moment and Weight

- ※ L : Distance between the center of guide and gripping point of work.
- ※ The moment center equals with guide center.



Item	Allowable Weight for Vertical Direction. Fv (kgf)	Maximum Allowable Moment (kgf-cm)		
		Pitching moment Mp	Yawing moment My	Rolling moment Mr
PH01K-20	35.5	26	26	55
PH01K-30	47	37	37	102
PH01K-40	67	64	64	179
PH01K-50	77	79	79	262
PH01K-60	120	150	150	518
PH01K-80	131	189	189	606
PH01K-100	158	237	237	774

※ Above listed allowable moment and weight refer static values.

### Calculation of allowable weight for moment weight applied.

$$\text{Allowable Weight } F \text{ (kgf)} = \frac{\text{Maximum Allowable Moment } M \text{ (kgf-cm)}}{\text{The point of external load applied } L \text{ (cm)}}$$

### Example)

Checking of 2kgf weight(F) force to pitching moment direction(Mp) at the 50mm attachment point on PH01K-20

$$\Rightarrow \text{Allowable Weight } F \text{ (kgf)} = \frac{\text{Maximum Allowable Moment } M \text{ (kgf-cm)}}{\text{The point of external load applied } L \text{ (cm)}} = \frac{26}{5} = 5.2 \text{ kgf} > 2 \text{ kgf}$$

The allowable weight(5.2kgf) is bigger than applied weight (2kgf), so, it is applicable.

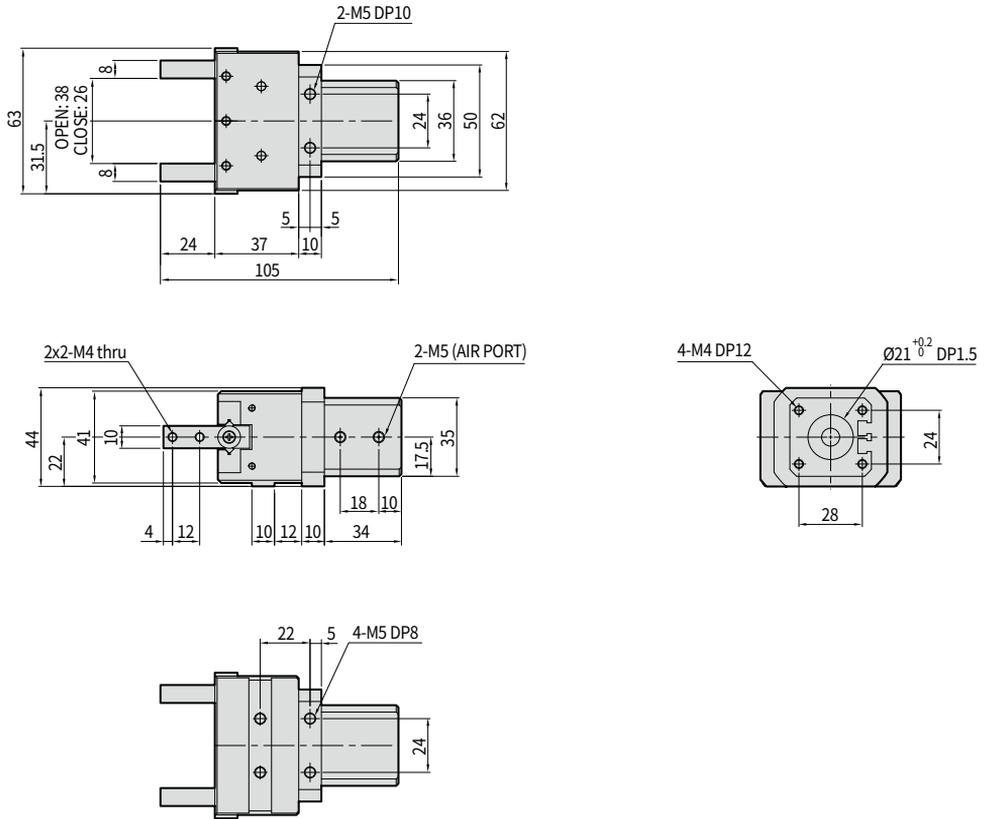
# PH01K Series

- 20
- 20C
- 30
- 30C
- 40
- 40C
- 50
- 50C
- 60
- 60C
- 80
- 80C
- 100
- 100C

HAND

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K**
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

PH01K-20



PH01K-20 Example of Auto Switch installation



# PH01K Series

20

20C

30

30C

40

40C

50

50C

60

60C

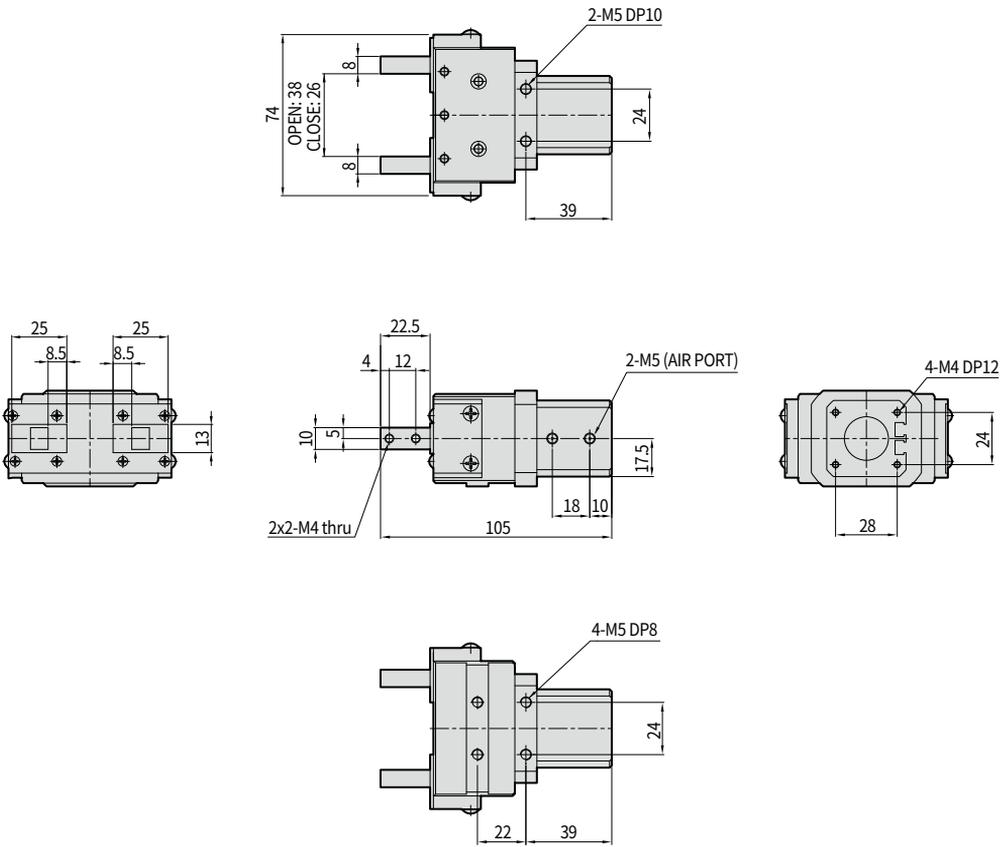
80

80C

100

100C

## PH01K-20C

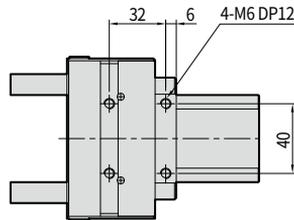
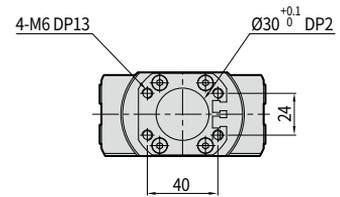
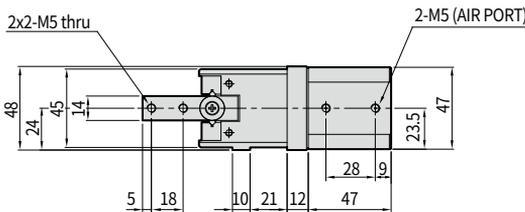
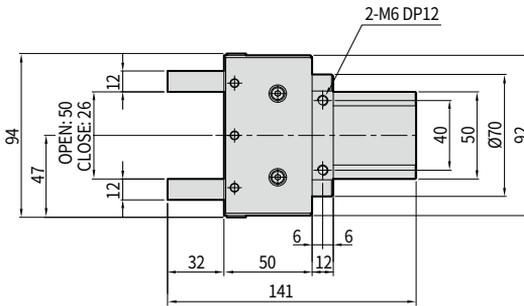


## PH01K-20C Example of Auto Switch installation

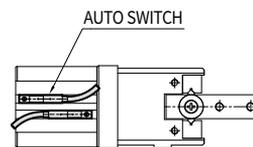
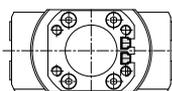


- 20
- 20C
- 30
- 30C
- 40
- 40C
- 50
- 50C
- 60
- 60C
- 80
- 80C
- 100
- 100C

PH01K-30



PH01K-30 Example of Auto Switch installation



- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

# PH01K Series

20

20C

30

30C

40

40C

50

50C

60

60C

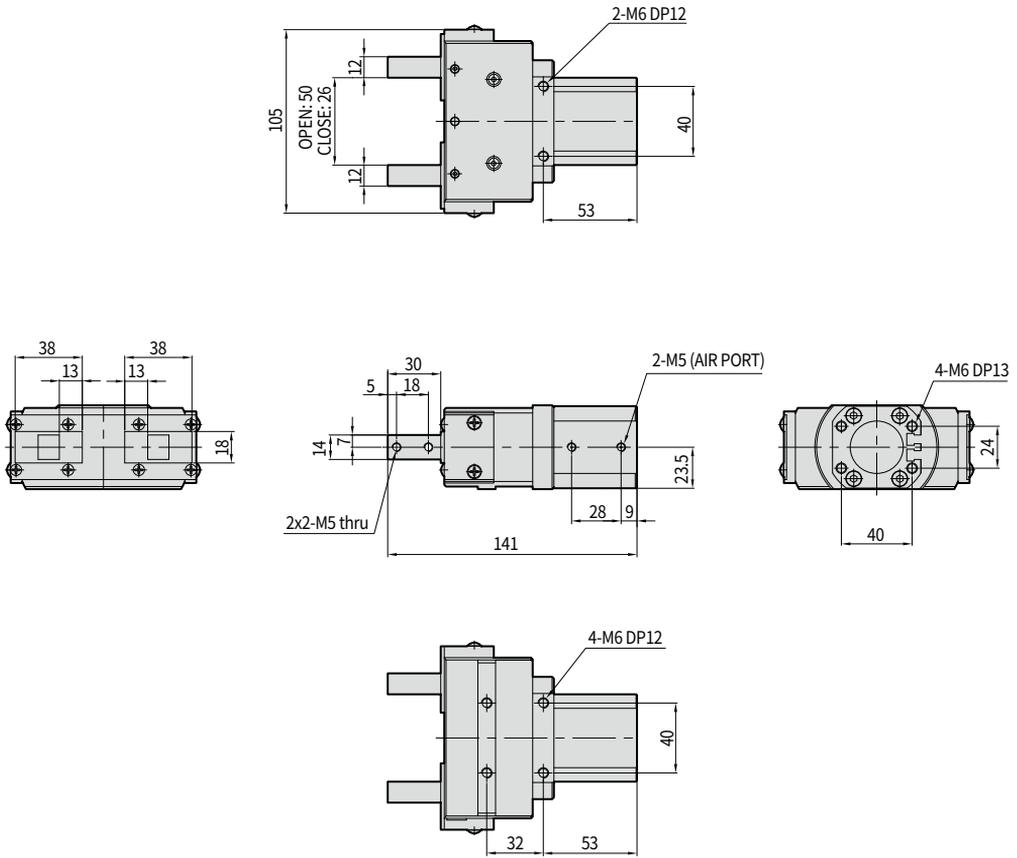
80

80C

100

100C

## PH01K-30C

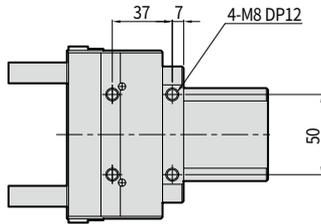
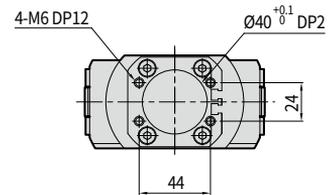
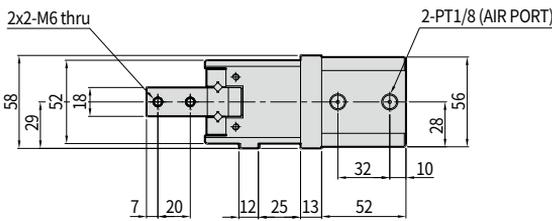
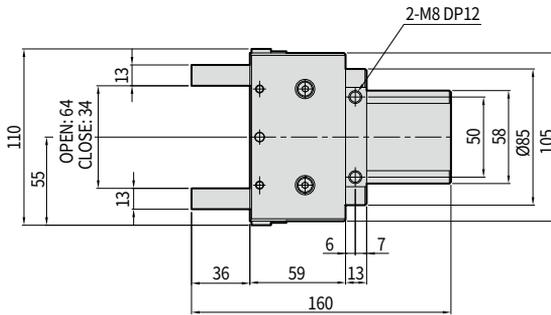


## PH01K-30C Example of Auto Switch installation

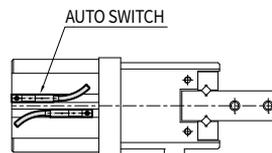
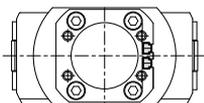


- 20
- 20C
- 30
- 30C
- 40
- 40C
- 50
- 50C
- 60
- 60C
- 80
- 80C
- 100
- 100C

PH01K-40



PH01K-40 Example of Auto Switch installation



- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

# PH01K Series

20

20C

30

30C

40

40C

50

50C

60

60C

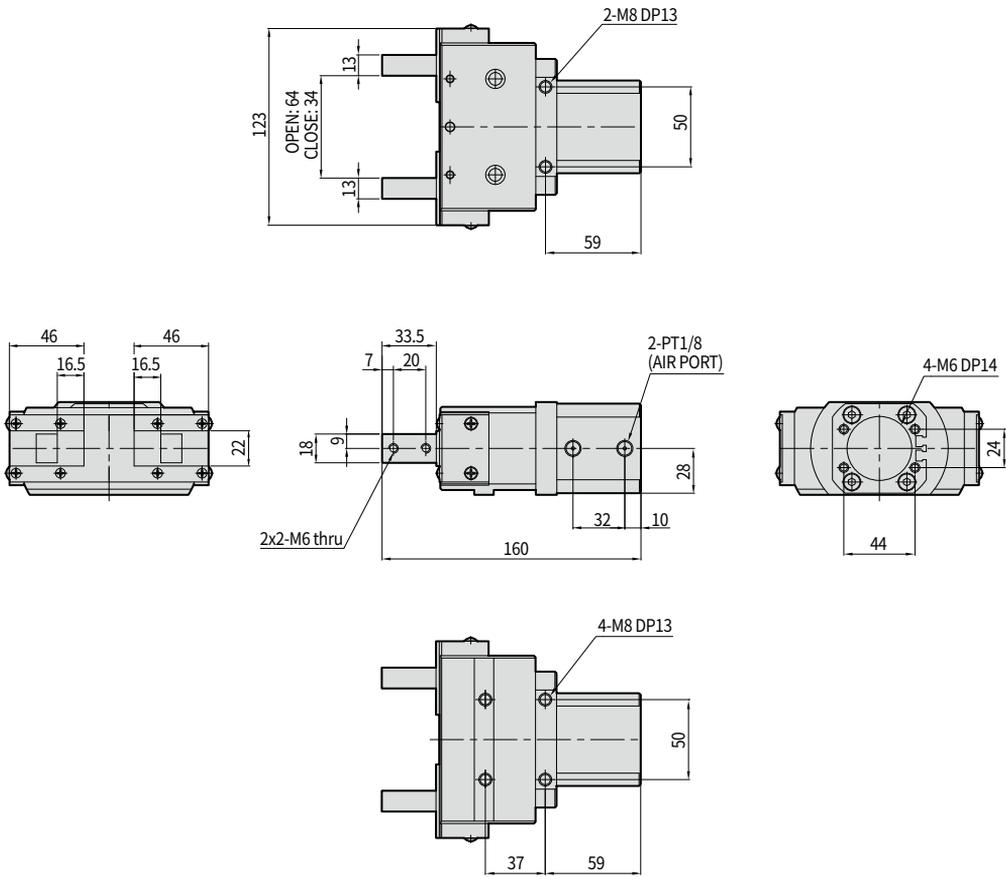
80

80C

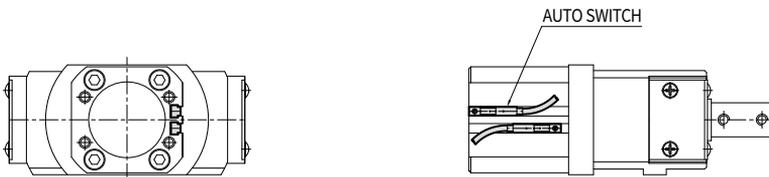
100

100C

## PH01K-40C

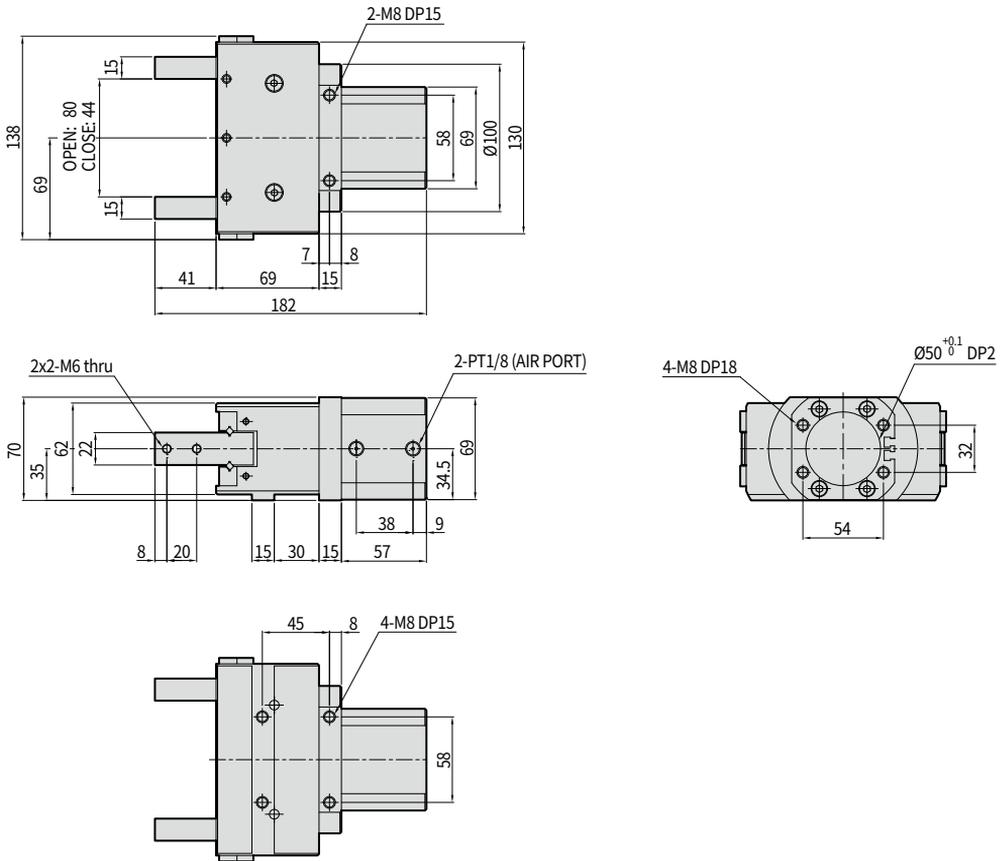


## PH01K-40C Example of Auto Switch installation



- 20
- 20C
- 30
- 30C
- 40
- 40C
- 50
- 50C
- 60
- 60C
- 80
- 80C
- 100
- 100C

PH01K-50



- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K**
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

PH01K-50 Example of Auto Switch installation



# PH01K Series

20

20C

30

30C

40

40C

50

50C

60

60C

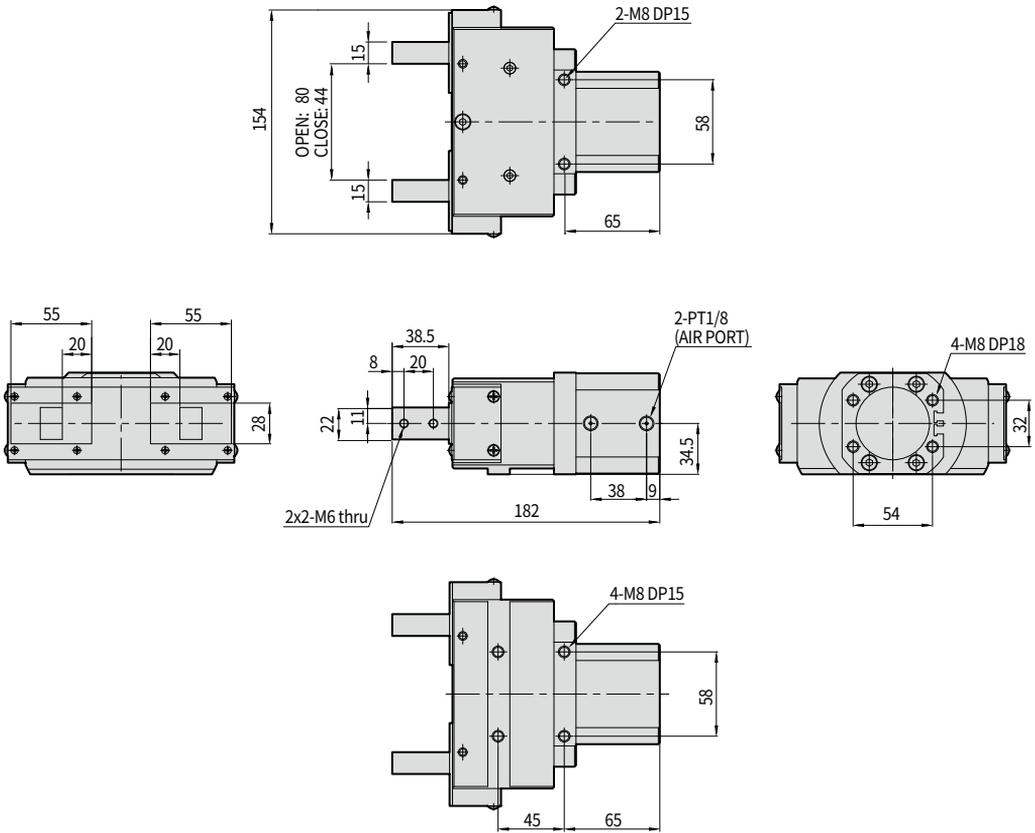
80

80C

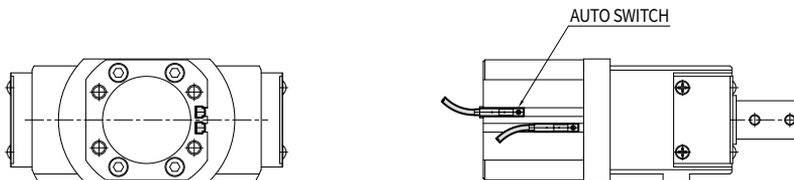
100

100C

## PH01K-50C



## PH01K-50C Example of Auto Switch installation





# PH01K Series

20

20C

30

30C

40

40C

50

50C

60

60C

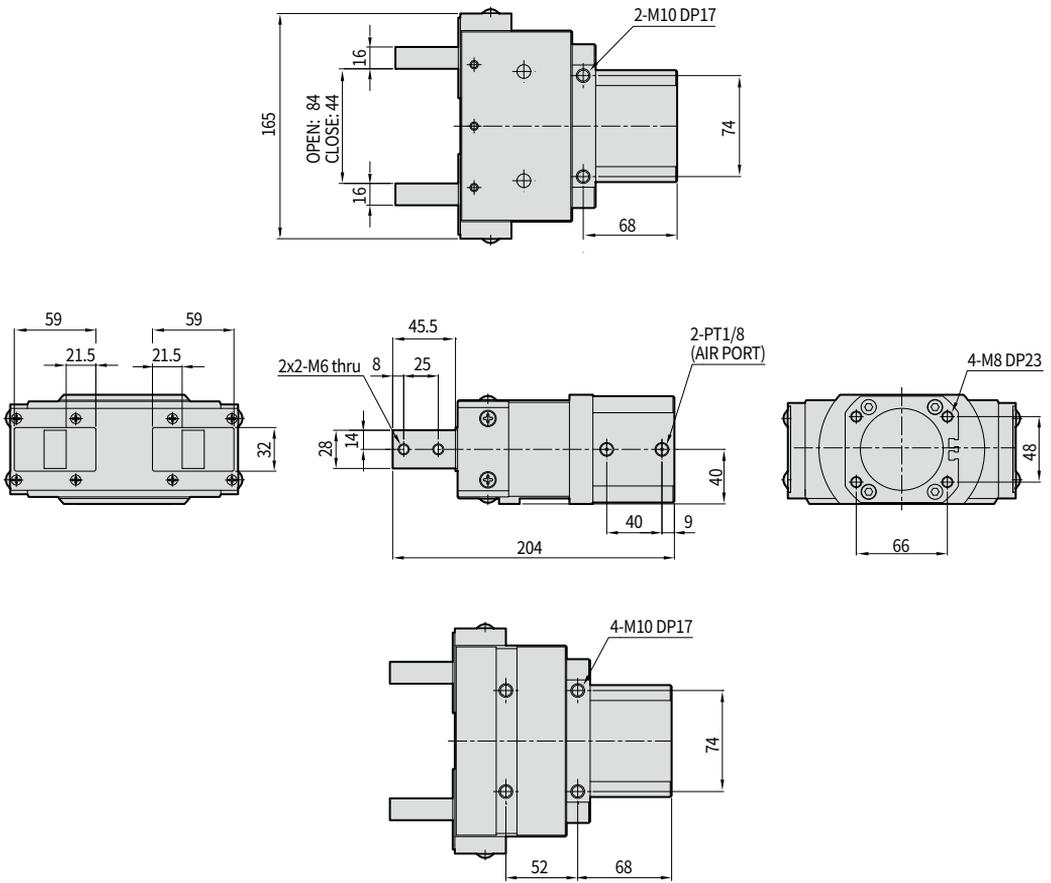
80

80C

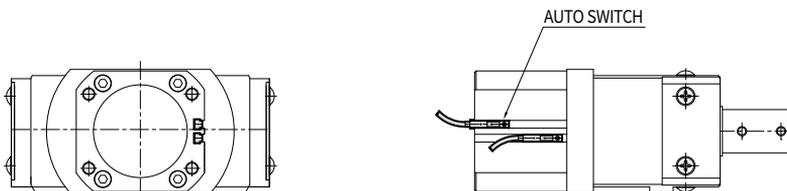
100

100C

## PH01K-60C

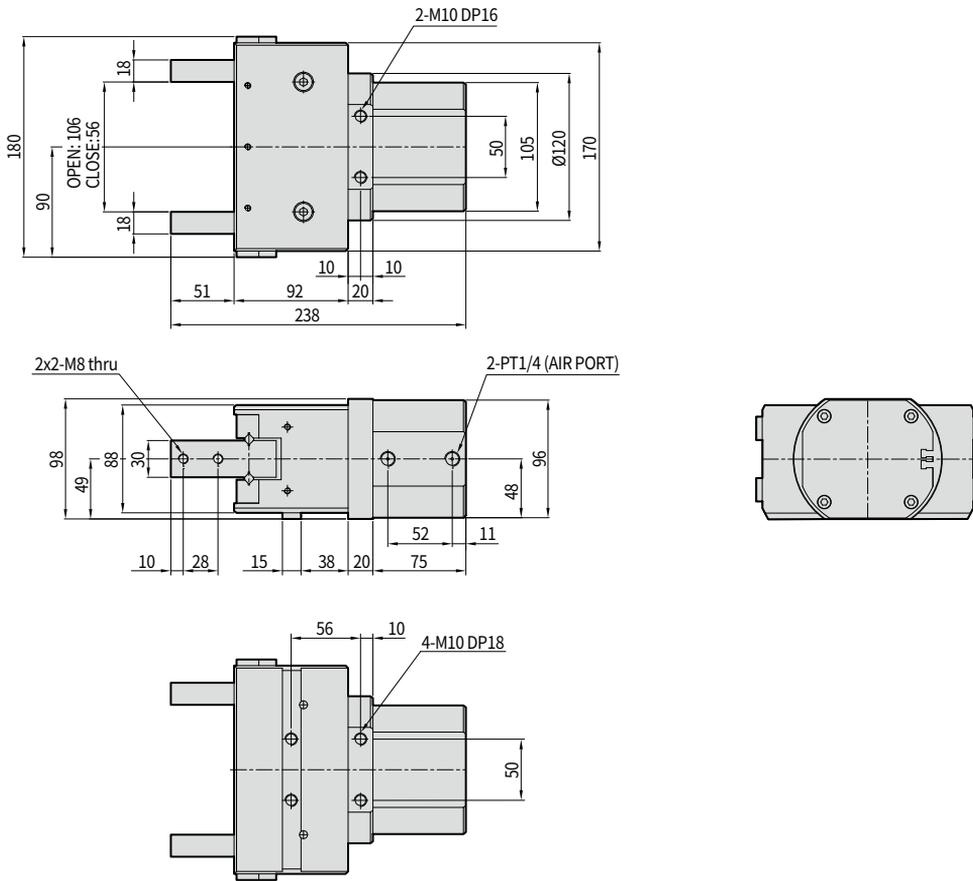


## PH01K-60C Example of Auto Switch installation



- 20
- 20C
- 30
- 30C
- 40
- 40C
- 50
- 50C
- 60
- 60C
- 80
- 80C
- 100
- 100C

PH01K-80



- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K**
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

PH01K-80 Example of Auto Switch installation



# PH01K Series

20

20C

30

30C

40

40C

50

50C

60

60C

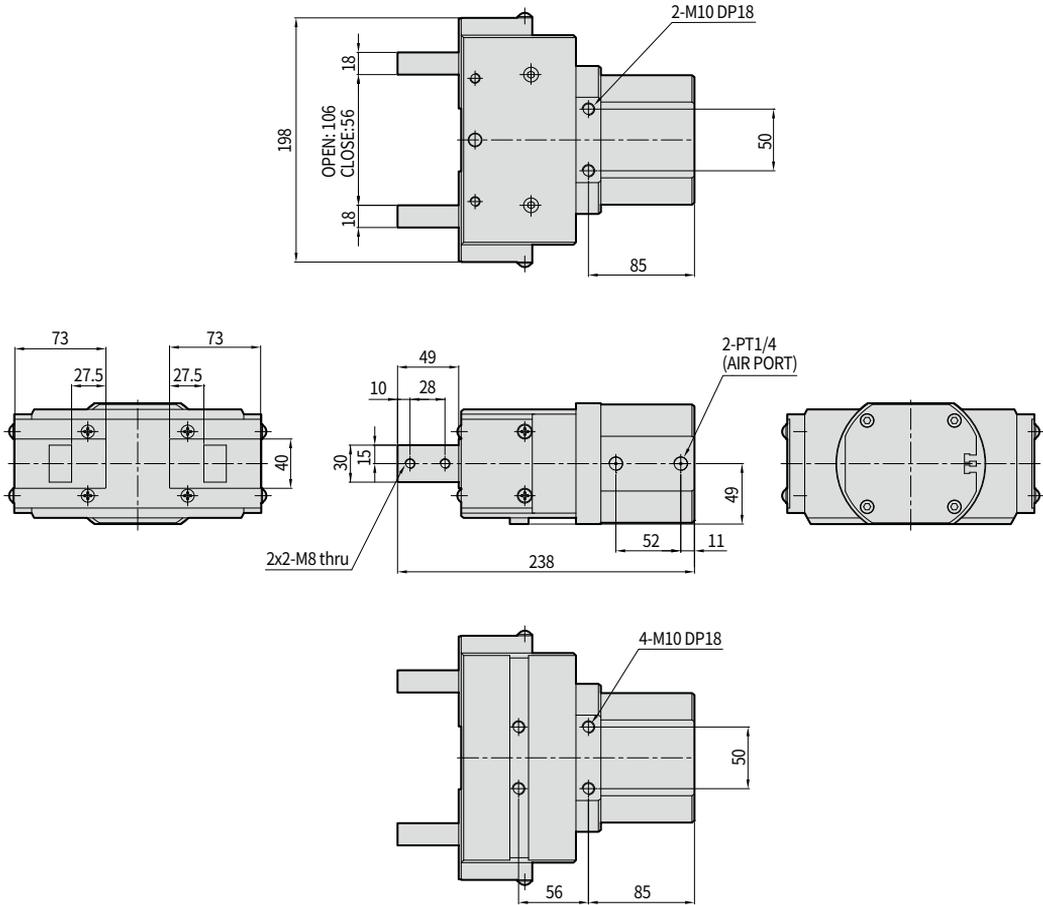
80

80C

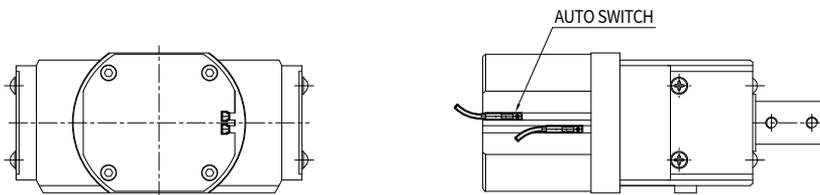
100

100C

## PH01K-80C

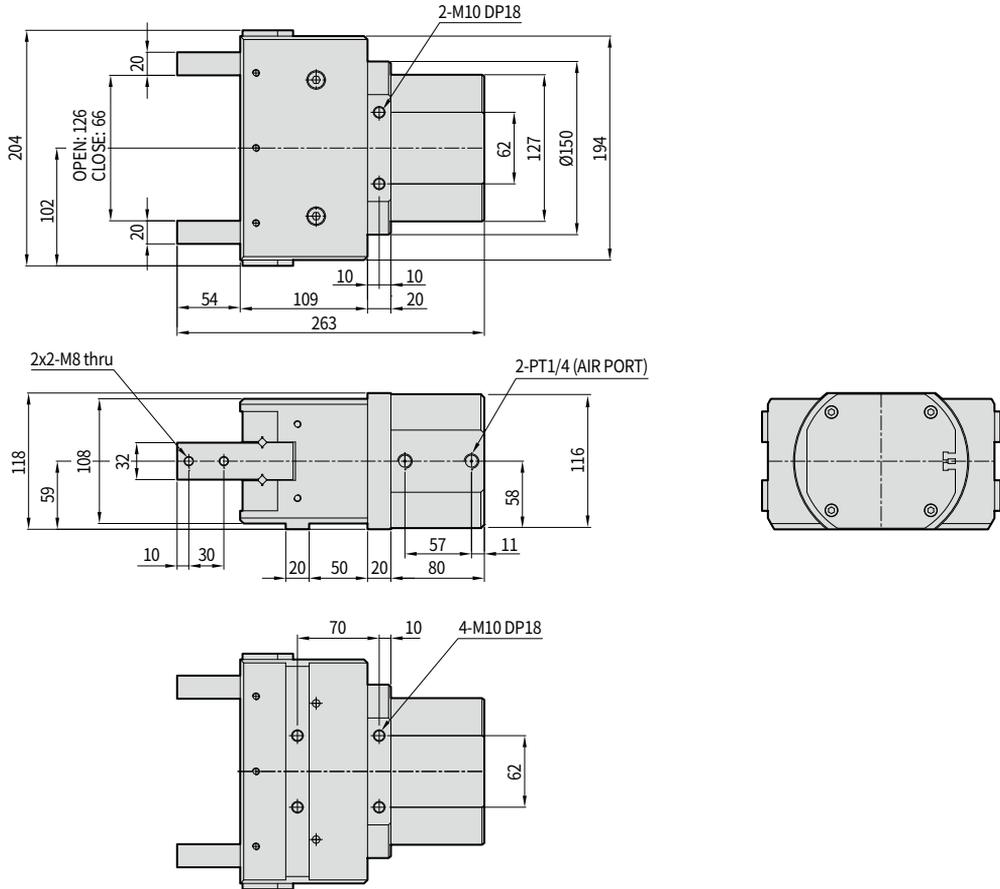


## PH01K-80C Example of Auto Switch installation



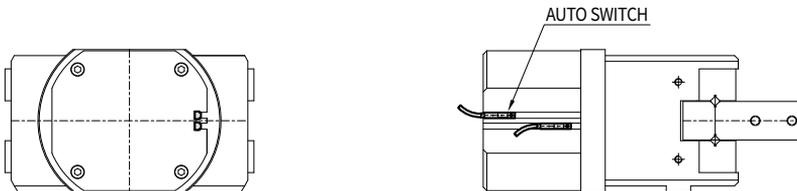
- 20
- 20C
- 30
- 30C
- 40
- 40C
- 50
- 50C
- 60
- 60C
- 80
- 80C
- 100
- 100C

PH01K-100



- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

PH01K-100 Example of Auto Switch installation



# PH01K Series

20

20C

30

30C

40

40C

50

50C

60

60C

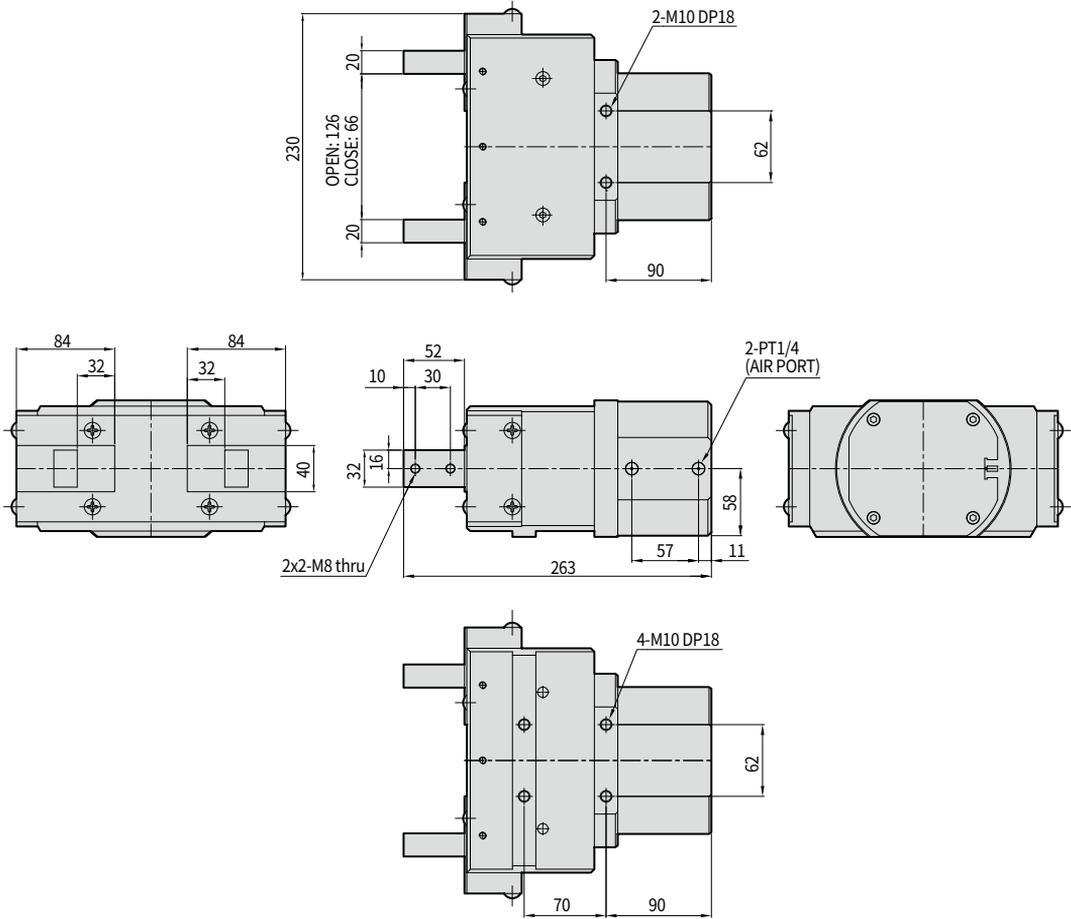
80

80C

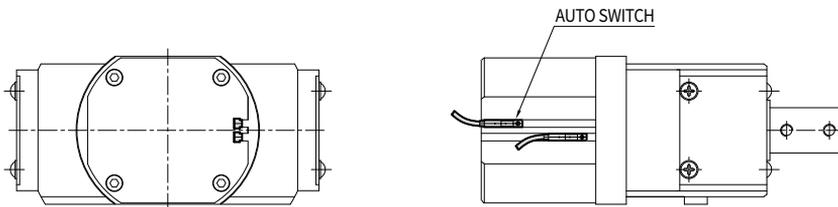
100

100C

## PH01K-100C



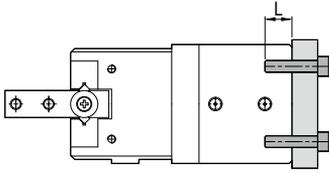
## PH01K-100C Example of Auto Switch installation



Installation Information

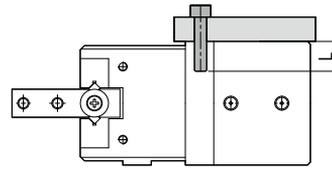
- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K**
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

1. Installation by body tap holes



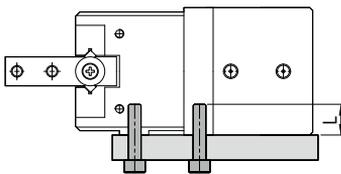
Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH01K-20	M4×P0.7	25	12
PH01K-30	M6×P1	81	13
PH01K-40	M6×P1	81	12
PH01K-50	M8×P1.25	157	18
PH01K-60	M8×P1.25	157	20
PH01K-80	Not usable		
PH01K-100	Not usable		

2. Installation by body tap holes



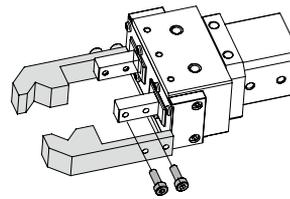
Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH01K-20	M5×P0.8	51	10
PH01K-30	M6×P1	81	12
PH01K-40	M8×P1.25	157	12
PH01K-50	M8×P1.25	157	15
PH01K-60	M10×P1.5	240	15
PH01K-80	M10×P1.5	240	16
PH01K-100	M10×P1.5	240	18

3. Installation by body tap holes



Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH01K-20	M5×P0.8	51	8
PH01K-30	M6×P1	81	12
PH01K-40	M8×P1.25	157	12
PH01K-50	M8×P1.25	157	15
PH01K-60	M10×P1.5	240	15
PH01K-80	M10×P1.5	240	18
PH01K-100	M10×P1.5	240	18

4. Attachment installation



Item	Fastening Bolt	Max Torque (kgf-cm)
PH01K-20	M4×P0.7	25
PH01K-30	M5×P0.8	51
PH01K-40	M6×P1	81
PH01K-50	M6×P1	81
PH01K-60	M6×P1	81
PH01K-80	M8×P1.25	157
PH01K-100	M8×P1.25	157

## GENERAL HAND / Parallel Operation

# PH02 Series

### Features

- Circular General Hand of Parallel operation by Crank Lever.
- Selectable options for number of master jaws according to the purpose of usage.
- Minimized interrupt by no projecting motion of master jaw.
- Various item selection range from small to big according to weight and size of workpiece.
- Auto Switch installation. (Optional)



### Order Form

**PH02 - 30 B - E - A1 L S**

①                      ②                      ③                      ④                      ⑤                      ⑥                      ⑦

#### ① Series Name

#### ② Cylinder Bore Size and Stroke

Order	CYL Bore(mm)	Stroke(mm)
16	16	6
20	20	8
25	25	10
30	30	12
40	40	16
50	50	20
60	63	25
80	80	30
100	100	40
125	125	45

#### ③ Number of Master Jaws

Order	Number of Master Jaws
A	2 JAW
B	3 JAW
C	4 JAW

#### ④ Special Option

Order	Special Option
Blank	Standard
E	Secondary battery field

#### ⑤ Auto Switch Specification

Order	Sensing Type	Cable Spec		Voltage		Current		Protect Level	Operation Time
		Wires	Direction	AC	DC	AC	DC		
Blank		No Auto Switch provided							
A1	Magnetic reed switch	2-Wire	Horiz	100V	24V	5~20mA	5~40mA	IP 67	1ms
B1	Magnetic solid state	3-Wire	Horiz	-	24V (5~28V)	-	Less than 50mA	IP 67	1ms

#### ⑥ Auto Switch Cable Length

Order	Cable Length
Blank	1M
L	3M

#### ⑦ Auto Switch Quantity

Order	Quantity
Blank	2PCS
S	1PCS

\* For PH02-16C, PH02-20C, only 1 Auto Switch(Close) can be mounted. (Not for A and B type)

Specification

HAND

PH01-A  
PH01-D  
PH01-G  
PH01J-C  
PH01K  
PH02  
PH02-H  
PH04  
PH05  
PH06  
PH06-L  
PH06-L2  
PH07  
PH08  
PH09  
PH10  
PH12  
PH14-S  
PH14-CL  
PH14-CF  
PH15-S  
PH15-CL  
PH15-CF  
PH15-W  
PH21  
PH22  
PH23  
PH25  
PH32  
PHC

Item Name	PH02-16	PH02-20	PH02-25	PH02-30	PH02-40	PH02-50	PH02-60	PH02-80	PH02-100	PH02-125
CYL Bore Size(mm)	16	20	25	30	40	50	63	80	100	125
Stroke(mm)	6	8	10	12	16	20	25	30	40	45
Effective Gripping Force(kgf) Air pressure : 5kgf/cm <sup>2</sup> Note 3)	Close	8	12.3	18.7	29	54	83.5	142	231	363
	Open	9.3	14.6	22.3	34.2	65	99.5	158	256	400
Fitting Size	M5			PT1/8				PT3/8		
Weight(kgf)	0.12	0.21	0.4	0.6	1.2	1.7	2.7	4.5	6.4	9.1
Max. Attachment L(mm)	20	25	30	35	40	50	60	80	100	120
Max. Attachment H(mm) Note 4)										
Fluid	Clean Air Note 1)									
Pressure Range(kgf/cm <sup>2</sup> )	3 ~ 7 (Guaranteed Resist Pressure : 10.5) Note 2)									
Lubrication	Not Need (If need, use one sort of turbine oil : SPEC ISOVG 32)									
Temperature Range(°C)	5 ~ 60									
Repeat Accuracy(mm)	±0.05			±0.08				±0.1		
Max. Cycle Per Minute(C.P.M)	100				70				40	
Operation Type	Double Acting (Structure : Parallel Operation by Crank Lever) (Guide : Metal Guide)									
Tolerance of Stroke(mm)	Open : -0.5 ~ +1 Close : -1 ~ +0.5									

Note 1) Clean Air : Fresh air containing solid matters with 0.3% of supersaturated moisture and 99.9% of liquid oil that passed through the 3-10µm degree of filtering.

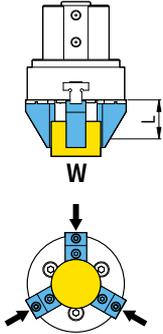
Note 2) Guaranteed Resist Pressure : A pressure that does not cause an abnormality in parts when it is applied for 1 minute without any weight loaded.

Note 3) The position of the effective gripping force point is the end point of the Master Jaw.

Note 4) For Max. Attachment L and H, please refer <GENERAL HAND Model Selection Guide>. (it is permitted length for 5kgf/cm<sup>2</sup> pressure applied)

## Gripping Force Graph (Close)

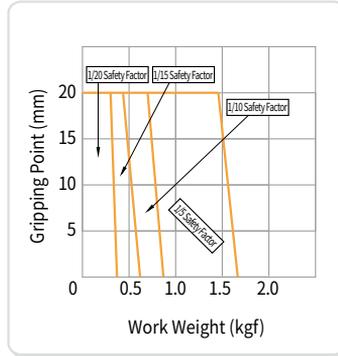
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



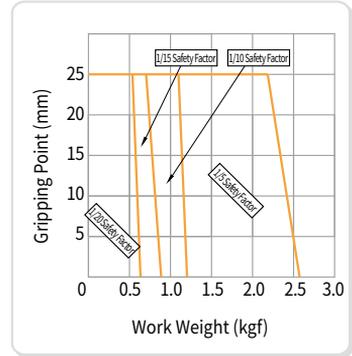
Close Grip State

W: Work Weight  
L: Attachment Length

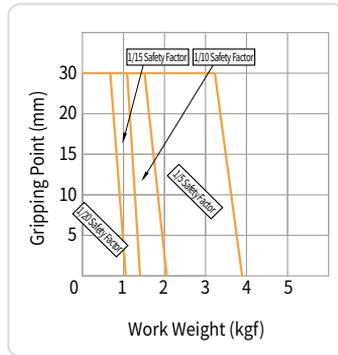
► PH02-16



► PH02-20



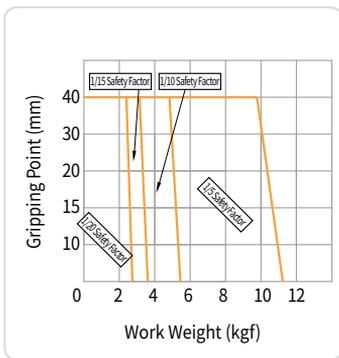
► PH02-25



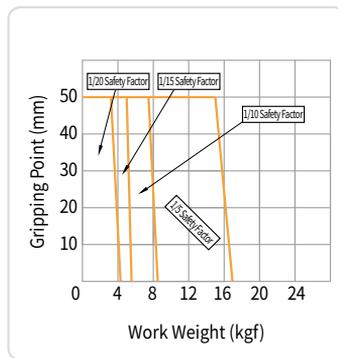
► PH02-30



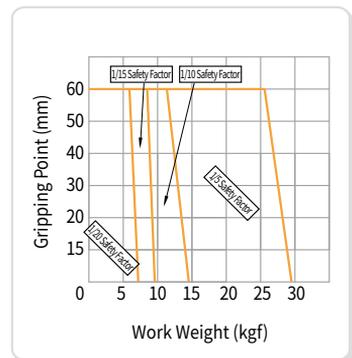
► PH02-40



► PH02-50



► PH02-60

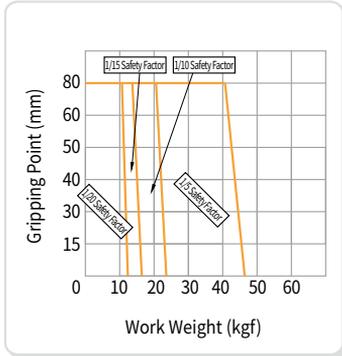


▲ **Caution** If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it with the maximum attachment length which specified.

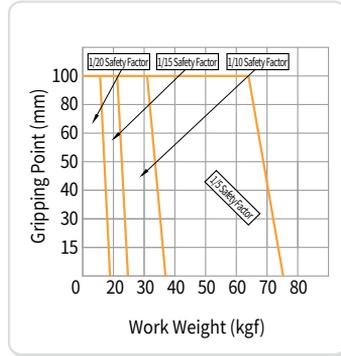
▶ Refer <GENERAL HAND Selection Guide> for how to read below graph.

- PH01-A
- PH01-D
- PH01-G
- PH01-J-C
- PH01K
- PH02**
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

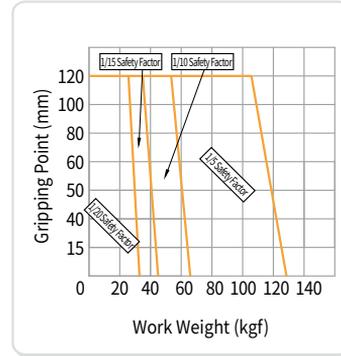
▶ PH02-80



▶ PH02-100

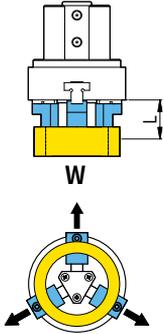


▶ PH02-125



**⚠ Caution** If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

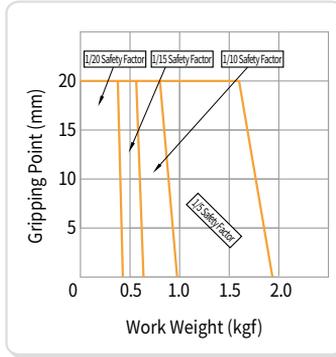
▶ Refer <GENERAL HAND Selection Guide> for how to read below graph.



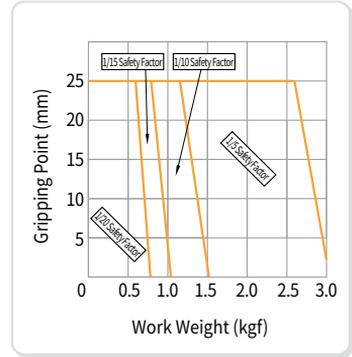
Open Grip State

W: Work Weight  
L: Attachment Length

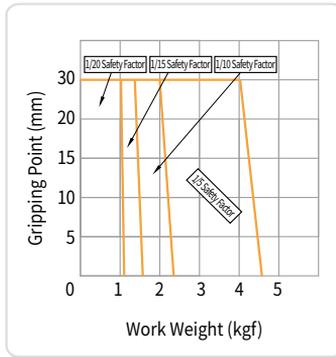
▶ PH02-16



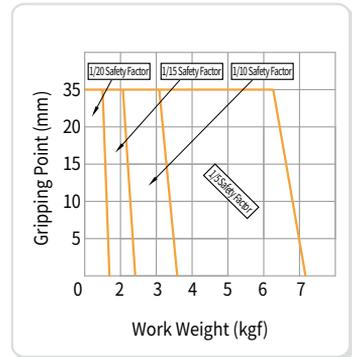
▶ PH02-20



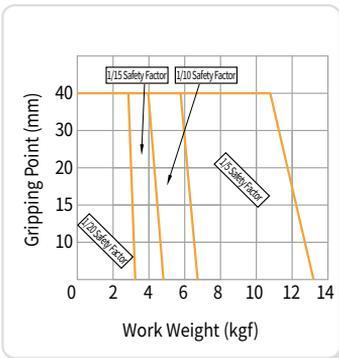
▶ PH02-25



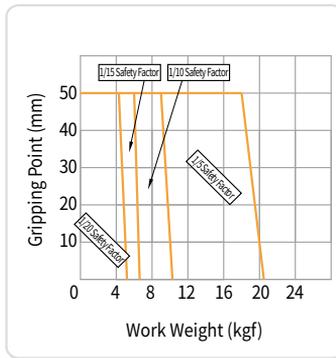
▶ PH02-30



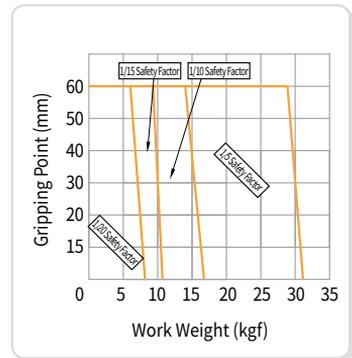
▶ PH02-40



▶ PH02-50



▶ PH02-60



▲ **Caution** If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it with the maximum attachment length which specified.

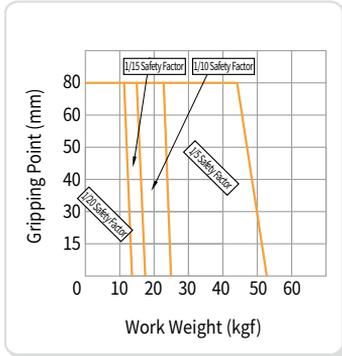
Gripping Force Graph (Open)

▶ Refer <GENERAL HAND Selection Guide> for how to read below graph.

HAND

- PH01-A
- PH01-D
- PH01-G
- PH01-J-C
- PH01K
- PH02**
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

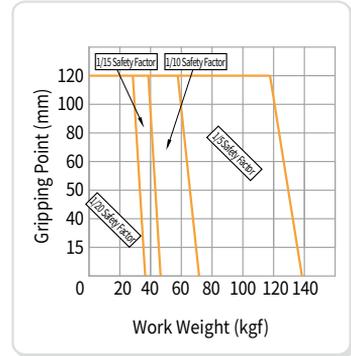
▶ PH02-80



▶ PH02-100



▶ PH02-125



**⚠ Caution** If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.