

系列 Model	定位精度 Positioning accuracy	徑向力 Radial forces	扭轉剛性 Torsional stiffness	背隙 Backlash	規格多樣性 Wide range of size	功率密度 Power density	傳動多樣性 Wide range of ratios
PAF							
PAE							
PAB							
PAR							
VRB							
VRL							
VRS							
PAD							
PFR							
PER							
PADR							
PLF							
PLE							
VRSF							
ZR							
ZK							

標準 STANDARD  
 強勁 STRONG  
 最佳 BEST

## 減速機選用參考表 Reducer Selection Table

減速機選用參考表依據伺服馬達輸出功率選擇  
Selection Table Of Reducer (By power of servo-motor)

容量	型號	1/3	1/4	1/5	1/7	1/10	1/12	1/15	1/16	1/20	1/25	1/28	1/30	1/35	1/40	1/50	1/70	1/100
100w	042	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	060	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
200w	060	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	090	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
400w	060	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	090	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
500w	090	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	120	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
750w	090	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	120	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
1.0kw	090	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	120	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	150	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
1.5kw	090	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	120	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	150	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2.0kw	120	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	150	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2.0kw	180	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	180	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
3.5kw	120	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	150	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
3.5kw	180	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	220	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	220	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
5.0kw	120	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	150	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
5.0kw	180	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	220	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	220	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
7.0kw	180	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	220	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
11.0kw	180	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	220	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
15.0kw	220	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

P.S: 此\*●記號為可選用之減速比。

注1.三段減速比不在上表中，若需用到請告知銷售人員。

注2.慣性距較大的場合減速機型號需大一級使用。

### 功率等級

### Performance classes

快速找到目标： 程序概覽

您今后不再需要花费大量时间通过给出详细数值进行搜索；只需要使用我公司一目了然的搜索程序就能快速选到您所需的产品。在此概覽中您可以找到产品的重要规格特性。

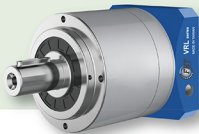
Achieve your goal faster: Our programme at a glance.

You no longer need to perform time-consuming searches of detailed information; Utilise our easy-to-use quick selection to select the products you need. In this overview you will find a direct comparison of the key features of our products.

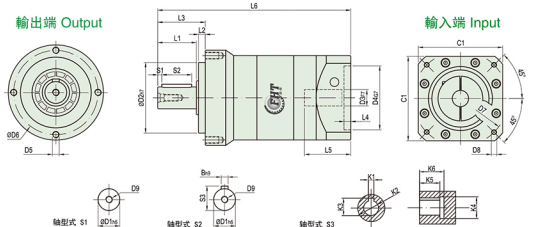
# MODEL: VRL

雙段 2-Stage

速比: 15, 20, 25, 30, 35, 40, 45, 50, 60, 70  
80, 90, 100



外形尺寸圖 Dimensions:



Unit:mm

尺寸 Size	VRL070-L1	VRL090-L2	VRL120-L2	VRL155-L2	VRL205-L2	VRL235-L2
D1	φ16	φ22	φ32	φ40	φ55	φ75
D2	φ52	φ68	φ90	φ120	φ160	φ180
D3	φ14 (φ11-14)	φ19 (φ11-19)	φ22 (φ16-24)	φ24 (φ19-35)	φ35 (φ22-35)	φ42 (φ35-42)
D4	φ50	φ70 (φ50-80)	φ110 (φ70-110)	φ110 (φ114.3)	φ110 (φ114.3)	φ180 (φ114.3-200)
D5	4-M5X10L	4-M5X12L	4-M5X16L	4-M10X20L	4-M12X22L	4-M16X28L
D6	φ62	φ80	φ108	φ140	φ194	φ210
D7	φ70	φ90 (φ70-100)	φ145 (φ90-145)	φ145 (φ145-200)	φ145 (φ145-200)	φ215 (φ200-235)
D8	4-M5 (M4)	4-M5 (M4-M6)	4-M5 (M5-M8)	4-M8 (M8-M12)	4-M8 (M8-M12)	4-M12
D9	MSX0.8P	MBX1.25P	M12X1.75P	M16X2P	M20X2.5P	M20X2.5P
L1	28.5	36.5	51	79	82	100
L2	5	6	9	12	15	18
L3	35	44	62	94	100	126
L4	5	5	8 (7-8)	11 (5-11)	8 (5-11)	8 (7-10)
L5	34	34 (φ44)	44 (φ46)	64.5 (φ61.5)	72.5 (φ82)	85 (φ100)
L6	142	172.5 (162.5-172.5)	230.5 (214.5-230.5)	286 (286-303)	340 (330.5-340)	407 (402-437)
C1	65	80 (65-86)	130 (90-130)	130 (150-180)	150 (150-180)	200 (180-220)
S1	3	4	5	5	6	7
S2	22	28	40	65	70	90
S3	18	24.5	35	43	59	79.5
B	5	6	10	12	16	20
K1	4	6	8	10	14	18
K2	φ11	φ22	φ28	φ38	φ50	φ60
K3	12.8	24.5	31.3	41.3	53.8	64.4
K4	φ16	φ32	φ38	φ48	φ60	φ72
K5	15	20	27	35	43	60
K6	18	24	32	40	50	65

注1: ( ) 括號內可選擇範圍尺寸, ( ) 括號外為標準尺寸。  
注2: 減速機出力軸可以為客戶定制大小和長度。  
注3: 輸入尺寸依據各品牌同類馬達或步進馬達可以有所變動。

Note 1: Inside of ( ) is the optional range of sizes, outside of ( ) is the standard sizes.  
Note 2: The reducer output shaft size and length can be customized for customers.  
Note 3: Input sizes can be subject to changed according to the brand servo motors or stepper motors sizes.

# PRECISION PLANETARY REDUCERS

## 精密行星減速機

### PAB



- 行星背架與輸出軸一體式結構確保大扭力耐用性及穩定性  
Integrated design of planet carrier and output shaft ensures the maximum torque stiffness and stability
- 齒輪表面利用無電鍍處理, 連接板採藍色陽極處理, 提高環境的耐受性和抗腐蝕能力。  
Electroless Nickel deposition treatment and black anodizing treatment are employed to gear box surface and motor adapter module respectively, the tolerance to the environment and resistant to corrosion are enhanced.
- 最低的回程間隙 low backlash
- 高效率(95%)high efficiency (95%)
- 終生潤滑 life time lubrication

## 減速機的選型/Indication of Model Numbers

### PAB 系列/PAB Type

PAB 090 - 10 - S1 - P1 / 馬達

#### 減速機型式/Type

PAB042, PAB060, PAB090, PAB115  
PAB142, PAB180, PAB220

#### 出力軸鍵槽 Output Shaft Keyway

S1: 實心軸, 無鍵槽  
(Solid Output Shaft No Keyway)  
S2: 標準品, 有鍵槽  
Standard (Keyway)  
S3: 輸出為孔  
Output for holes

#### 馬達型號/Motor Type

馬達製造商及型號  
Motor manufacturer and model

#### 減速比 Ratio

單節: 3, 4, 5, 6, 7, 8, 9, 10  
雙節: 12, 15, 16, 20, 25, 28, 30, 35, 40, 50,  
70, 80, 100

#### 背隙等級Backlash Class

P0: 高精度背隙/Micro Backlash P0  
P1: 精密背隙/Precision Backlash P1  
P2: 標準背隙/Standard Backlash P2

型號範圍: PAB090-100-S2-P1/Panasonic MSMJ 082S1A

# PAB 減速機性能資料 Specification Table

規格 Model No	單位 Unit	級數 Stage	減速比 Ratio	PAB042	PAB060	PAB090	PAB115	PAB142	PAB180	PAB220
額定輸出力矩T <sub>2</sub> Rated Output Torque	Nm	1	3	19	56	148	280	520	1020	1550
			4	20	55	160	330	580	1280	2160
			5	21	58	159	330	580	1250	2100
			6	16	48	120	240	410	960	1350
			7	19	50	148	300	530	1030	1580
			8	13	45	130	230	450	880	1260
			9	12	40	100	220	410	880	1450
			10	15	46	125	260	475	950	1530
			12	18	52	155	300	530	1100	1750
		15	18	53	150	280	550	1050	1650	
		16	20	53	158	320	580	1200	2050	
		20	20	52	155	320	580	1200	2050	
		25	19	52	158	320	580	1200	2000	
		28	19	50	150	300	550	1100	1850	
		30	18	49	145	300	500	1050	1600	
		35	17	48	155	300	500	1050	1500	
		40	18	48	150	290	530	1100	1350	
		50	18	50	145	290	530	1000	1300	
70	16	50	140	290	490	1000	1200			
80	10	43	110	230	410	960	980			
100	10	43	120	260	450	950	1100			
最大輸出扭矩T <sub>2max</sub> Rated Output Torque	Nm	1,2	3-100	3倍額定輸出力矩/3Times of Nominal Output Torque						
額定輸入轉速n <sub>1</sub> Rated Input Speed	rpm	1,2	3-100	4000	4000	4000	3500	3000	2000	2000
最大輸入轉速n <sub>1max</sub> Max Input Speed	rpm	1,2	3-100	6000	6000	6000	5500	4500	4500	4000
超精密背隙P0/Micro Backlash P0	arcmin	1	3-10	—	—	≤1	≤1	≤1	≤1	≤1
2	12-100	—	—	—	≤3	≤3	≤3	≤3	≤3	
精密背隙P1/Precision Backlash P1	arcmin	1	3-10	≤3	≤3	≤3	≤3	≤3	≤3	≤3
2	12-100	≤5	≤5	≤5	≤5	≤5	≤5	≤5	≤5	
標準背隙P2/Standard Backlash P2	arcmin	1	3-10	≤7	≤7	≤7	≤7	≤7	≤7	≤7
2	12-100	≤9	≤9	≤9	≤9	≤9	≤9	≤9	≤9	
扭轉剛性/Torsional Rigidity	Nm/arcmin	1,2	3-100	3	7	12	25	50	140	210
容許切向力F <sub>t</sub> /Max Radial Force	N	1,2	3-100	780	1300	3200	6750	9400	14500	50000
容許切向力F <sub>a</sub> /Max Axial Force	N	1,2	3-100	330	700	1580	3300	4700	7200	28000
使用壽命/Service Life	hr	1,2	3-10	21000h						
效率 η/Efficiency	%	1	12-100	≥97%						
重量/Weight	kg	1	3-10	0.5	1.3	3.7	7.8	15	29	52
2	12-100	0.8	1.48	4.1	9.4	18.9	33	66		
使用溫度/Operating Temperature	°C	1,2	3-100	全合成潤滑油(Synthetic Grease) (-15°C~+90°C)						
潤滑/Lubrication	1,2	3-100	全合成潤滑油(Synthetic Grease)							
防護等級/Protection Class	1,2	3-100	IP65							
安裝方向/Mounting Position	1,2	3-100	任意方向/Any Direction							
噪音值[n=3000rpm, 負載]/ Noise Level	dB(A)	1,2	3-100	≤63	≤63	≤63	≤65	≤65	≤70	≤70

## 減速機轉動慣量/Moment of Inertia

規格 Model No	單位 Unit	級數 Stage	減速比 Ratio	PAB042	PAB060	PAB090	PAB115	PAB142	PAB180	PAB220
轉動慣量J <sub>1</sub> Moment of Inertia	kg·cm <sup>2</sup>	1	3	0.03	0.16	0.61	3.25	9.21	28.98	69.61
			4	0.03	0.48	2.14	7.54	23.67	54.37	
			5	0.03	0.13	0.47	2.71	7.42	23.29	53.27
			6	0.03	0.13	0.45	2.65	7.25	22.75	51.72
			7	0.03	0.13	0.45	2.62	7.14	22.48	50.97
			8	0.03	0.13	0.44	2.58	7.07	22.59	50.84
			9	0.03	0.13	0.44	2.57	7.04	22.53	50.63
			10	0.03	0.13	0.44	2.57	7.03	22.51	50.56
			12-40	0.03	0.03	0.13	0.47	2.71	7.42	23.29
		50-100	0.03	0.03	0.13	0.44	2.57	7.03	22.51	

- 最大加速力矩T<sub>2B</sub>=60% of T<sub>2N</sub>
- 輸出轉數100rpm時，作用於輸出軸中心位置。
- 三段大減速比不在上表中，有軸加長和加大設計，需要用到請告知銷售人員。

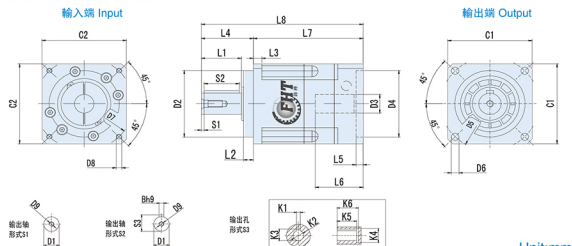
# MODEL: PAB

單段 1-Stage

速比: 3, 4, 5, 6, 7, 8, 9, 10



## 外形尺寸圖 Dimensions:



Unit:mm

尺寸 Size	PAB042-L1	PAB060-L1	PAB090-L1	PAB115-L1	PAB142-L1	PAB180-L1	PAB220-L1
D1	φ 13	φ 16	φ 22	φ 32	φ 40	φ 55	φ 75
D2	φ 35	φ 50	φ 80	φ 110	φ 130	φ 160	φ 180
D3	φ 8(≤11)	φ 14(≤14)	φ 19(≤24)	φ 24(≤32)	φ 35(≤42)	φ 38(≤50)	φ 55(≤65)
D4	φ 30(30-50)	φ 50(30-70)	φ 70(50-110)	φ 110(50-130)	φ 114.3(95-180)	φ 180(95-180)	φ 215(180-255)
D5	φ 50	φ 70	φ 100	φ 130	φ 165	φ 215	φ 250
D6	4-φ 3.4	4-φ 5.5	4-φ 6.6	4-φ 9	4-φ 11	4-φ 13	4-φ 17
D7	φ 46(22-70)	φ 70(45-90)	φ 90(70-145)	φ 145(70-145)	φ 200(90-215)	φ 200(90-300)	φ 235(200-300)
D8	(4-M3X3L)	(4-M5X10L)	(4-M6X12L)	(4-M8X25L)	(4-M12X30L)	(4-M12X30L)	(4-M12X30L)
D9	M4X0.7P	M5X0.8P	M6X1.25P	M12X1.75P	M16X2.0P	M20X2.5P	M20X2.5P
L1	19	28.5	36.5	51	79	82	105
L2	5.5	7	10	12	15	20	30
L3	4	6	9	10	12	15	20
L4	26	37	48	65	97	105	138
L5	(4)	(5)	(7)	(11)	(7)	(7)	(12.5)
L6	30	34	45	65	67.5	85	105
L7	(65.5)	(78)	(99)	(135)	(150)	(182)	(226)
L8	(91.5)	(115)	(147)	(200)	(247)	(287)	(365)
C1	□42	□60	□90	□115	□142	□160	□220
C2	(C)42	(C)60	(C)90	(C)130	(C)142	(C)160	(C)220
S1	2	2	3	5	5	5	7
S2	16	25	32	40	65	70	90
S3	15	18	24.5	35	43	59	79
B	5	5	6	10	12	16	20
K1	3	4	6	8	10	14	16
K2	φ 8	φ 11	φ 22	φ 28	φ 38	φ 50	φ 60
K3	φ 2	φ 2.5	φ 3.5	φ 4.5	φ 6	φ 8	φ 10
K4	φ 13	φ 16	φ 32	φ 38	φ 48	φ 60	φ 72
K5	15	15	20	27	35	43	60
K6	18	18	24	32	40	50	65

- ( ) 括弧內為可選擇範圍尺寸，( ) 括弧外為標準尺寸。 Note 1: Inside of ( ) is the optional range of sizes, outside of ( ) is the standard sizes.
- 註2: 減速機出力軸可以為客戶定制大小和長短。 Note 2: The reducer output shaft size and length can be customized for customers.
- 註3: 輸入尺寸依據各品牌伺服馬達或步進馬達可以有所變動。 Note 3: Input sizes can be changed according to the brand servo motors or stepper motors sizes.

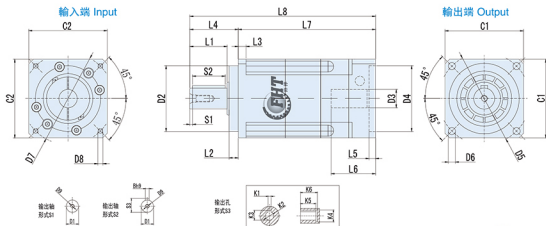
# MODEL: PAB

雙段 2-Stage

速比: 12, 15, 16, 20, 25, 28, 30, 35, 40, 50, 70, 80, 100



## 外形尺寸圖 Dimensions:



尺寸 Size	PAB042-L2	PAB060-L2	PAB090-L2	PAB115-L2	PAB142-L2	PAB180-L2	PAB220-L2
D1	φ13	φ16	φ22	φ32	φ40	φ55	φ75
D2	φ35	φ50	φ80	φ110	φ130	φ160	φ180
D3	φ8(≦11)	φ14(≦14)	φ19(≦24)	φ24(≦32)	φ35(≦42)	φ38(≦50)	φ55(≦55)
D4	φ30(30-50)	φ50(30-70)	φ70(50-110)	φ110(50-130)	φ114.3(95-180)	φ180(95-180)	φ215(180-255)
D5	φ50	φ70	φ100	φ130	φ165	φ215	φ250
D6	4-φ3.4	4-φ5.5	4-φ6.6	4-φ9	4-φ11	4-φ13	4-φ17
D7	φ40(2-70)	φ70(45-90)	φ90(70-145)	φ145(70-145)	φ200(90-215)	φ200(90-300)	φ235(200-300)
D8	(4-M5X8L)	(4-M5X10L)	(4-M5X12L)	(4-M5X25L)	(4-M12X30L)	(4-M12X30L)	(4-M12X30L)
D9	MAXQ 7P	MSXQ 8P	MSX1 25P	M12X1 75P	M16X2 0P	M20X2 5P	M20X2 5P
L1	19	28.5	36.5	51	79	82	105
L2	5.5	7	10	12	15	20	30
L3	4	6	8	10	12	15	20
L4	26	37	48	65	97	105	138
L5	(4)	(5)	(7)	(11)	(7)	(7)	(12.5)
L6	25	34	45	65	67.5	85	105
L7	(90)	(117)	(144)	(161)	(196)	(232)	(277)
L8	(114)	(154)	(192)	(228)	(293)	(337)	(415)
C1	□42	□60	□90	□115	□142	□180	□220
C2	□42	□60	□90	□130	□142	□180	□220
S1	2	2	3	5	5	5	7
S2	16	25	32	40	65	70	90
S3	15	18	24.5	35	43	59	79
B	5	5	6	10	12	16	20
K1	3	4	6	8	10	14	16
K2	φ8	φ11	φ22	φ28	φ38	φ50	φ60
K3	φ2	φ2.7	φ5	φ6.3	φ8	φ10	φ12.5
K4	φ13	φ16	φ32	φ38	φ48	φ60	φ72
K5	15	15	20	27	35	43	60
K6	18	18	24	32	40	50	65

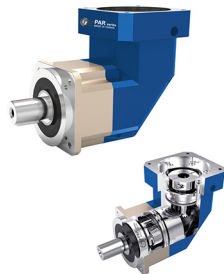
注1: ( ) 括號內為可選範圍尺寸, ( ) 括號外為標準尺寸。  
 注2: 減速機輸出軸可以為客戶定制大小和長度。  
 注3: 輸入尺寸依據各品牌伺服馬達或步進馬達可以有所變動。

Note 1: Inside of ( ) is the optional range of sizes, outside of ( ) is the standard sizes.  
 Note 2: The reducer output shaft size and length can be customized for customers.  
 Note 3: Input sizes can be subject to changed according to the brand servo motors or stepper motors sizes.

# PRECISION PLANETARY REDUCERS

## 精密行星減速機

### PAR



- 1.省空間**  
直交型減速機使用螺旋式齒輪, 馬達的安裝可實現90度彎曲, 節省了安裝空間。
  - 2.高剛性、高扭矩**  
使用整體式滾針軸承, 大大提高了剛性和扭矩。
  - 3.連接器、軸套方式**  
可以安裝到世界上任何一種馬達上。
  - 4.無潤滑脂滲漏**  
使用高粘度、不易分離的潤滑脂, 有效防止潤滑脂滲漏。  
使用高粘度、不易分離的潤滑脂, 有效防止潤滑脂滲漏。
  - 5.維護方便**  
在產品壽命期內無需更換潤滑脂, 安裝更便捷。
- 1.Space-saving**  
Right angle reducer using spiral bevel gear. Customer can locate the motor at 90 degree away from the reducer if required to save space.
  - 2.High rigidity & torque**  
High rigidity & high torque was achieved by uncaged needle roller bearings.
  - 3.Adapter-bushing connection**  
Can be attached to any motor all over the world.
  - 4.No grease leakage**  
Perfect solution by high viscosity anti-separation grease.
  - 5.Maintenance-free**  
No need to replace the grease for the life time. Can be attached in any position.

## 減速機的選型/Indication of Model Numbers

### PAR 系列 /PAR Type

PAR090 - 10 - S1 - P1 / 馬達

#### 減速機機型/Type

PAR042, PAR060, PAR090, PAR115  
PAR142, PAR180, PAR220

#### 出力軸鍵槽 Output Shaft Keyway

S1: 實心軸, 無鍵槽  
(Solid Output Shaft No Keyway)  
S2: 標準品, 有鍵槽  
Standard (Keyway)  
S3: 輸出穿孔  
Output for holes

#### 馬達型號/Motor Type

馬達製造商及型號  
Motor manufacturer and model

#### 減速比 Ratio

單節: 3, 4, 5, 6, 7, 8, 9, 10, 14, 20  
雙節: 15, 20, 25, 30, 35, 40, 50, 70, 80, 100  
120, 140, 160, 180, 200

#### 背隙等級Backlash Class

P0: 高精度背隙/Micro Backlash P0  
P1: 精密背隙/Precision Backlash P1  
P2: 標準背隙/Standard Backlash P2

型號範圍: PAR090-100-S2-P1/Panasonic MSMJ 082S1A