

C32 Control unit (NPN Tr.) with thermistor input	C32 Control unit (NPN Tr.) Left-side expansion type with linear and circular interpolation functions and thermistor input	C24 Control unit (Relay output) Left-side expansion type with thermistor input	C28 Control unit (PNP Tr.) Left-side expansion type with linear and circular interpolation functions and thermistor input
FPG-C32THTM	FPG-C32T2HTM	FPG-C24R2HTM	FPG-C28P2HTM
FPG-C32TTM	FPG-C32T2TM	FPG-C24R2TM	FPG-C28P2TM










Power Supply Unit











Input:
100 to 240 V AC/
Output:
24 V DC, 0.7 A
FP0-PSA4

FP0 Expansion Units

Input/Output Units

8 points: Input 4/Relay output 4	16 points: Input 8/Relay output 8	16 points: Input 8/ Transistor output 8	32 points: Input 16/ Transistor output 16	
				
Terminal block FP0-E8RS	Connector FP0-E8RM	Terminal block FP0-E16RS	Connector FP0-E16RM	
		MIL connector FP0-E16T (NPN) FP0-E16P (PNP)	MIL connector FP0-E32T (NPN) FP0-E32P (PNP)	
8 points: Input 8	16 points: Input 16	8 points: Relay output 8	8 points: Transistor output 8	16 points: Transistor output 16
				
MIL connector FP0-E8X	MIL connector FP0-E16X	Terminal block FP0-E8YRS	MIL connector FP0-E8YT (NPN) FP0-E8YP (PNP)	MIL connector FP0-E16YT (NPN) FP0-E16YP (PNP)

Intelligent Units

							
FP Web-Server unit FP-WEB	Thermocouple units 4-channel FP0-TC4 8-channel FP0-TC8	Analog I/O unit (Input: 2 channels/ Output: 1 channel) FP0-A21	A/D converter unit (Input: 8 channels) FP0-A80	I/O link unit FP0-IOL	FP0 CC-Link slave unit FP0-CCLS	D/A converter unit (Output: 4 channels) FP0-A04V FP0-A04I	C-NET Adapter S2 type AFP15402

General Specifications

Item	Description		
Rated operating voltage	24 V DC		
Operating voltage range	21.6 to 26.4 V DC		
Allowed momentary power off time	C32 C28	4 ms at 21.6 V, 7 ms at 24 V, 10 ms at 26.4 V	
	C24	3 ms at 21.6 V, 5 ms at 24 V, 8 ms at 26.4 V	
Ambient temperature	0 to +55°C 32 to +131 °F		
Storage temperature	-20 to +70°C -4 to +158 °F		
Ambient humidity	30 to 85 % RH (at 25°C, non-condensing)		
Storage humidity	30 to 85 % RH (at 25°C, non-condensing)		
Breakdown voltage	C32 C28	Between input/output terminals and power supply terminal/function earth	500 VAC for 1 minute
		Between input terminal and output terminal	
	C24	Between input terminals (X0 to X7)/input terminals (X8 to XF) and power supply terminal/function earth	500 VAC for 1 minute
		Between output terminals and power supply terminal/function earth	1,500 VAC for 1 minute
		Between input terminals (X0 to X7) and input terminals (X8 to XF)	500 VAC for 1 minute
	Between input terminals (X0 to X7)/input terminals (X8 to XF) and output terminals	1,500 VAC for 1 minute	
Insulation resistance	C32 C28	Between input/output terminals and power supply terminal/function earth	Min. 100 MΩ (measured with a 500 V DC megger)
		Between input terminal and output terminal	
	C24	Between input terminals (X0 to X7)/input terminals (X8 to XF) and power supply terminal/function earth	
		Between output terminals and power supply terminal/function earth	
	Between input terminals (X0 to X7) and input terminals (X8 to XF)		
	Between input terminals (X0 to X7)/input terminals (X8 to XF) and output terminals		
Vibration resistance	10 to 55 Hz, 1 cycle/min: double amplitude of 0.75 mm/0.030 in., 10 min on 3 axes		
Shock resistance	Shock of 98 m/s ² or more, 4 times on 3 axes		
Noise immunity	1,000 Vp-p with pulse widths 50 ns and 1 μs (based on in-house measurements)		
Operating condition	Free from corrosive gases and excessive dust		

Input Specifications

Item	Description	
Insulation method	Optical coupler	
Rated input voltage	24 V DC	
Operating voltage range	21.6 to 26.4 V DC	
Rated input current	For X0, X1, X3, X4: approx. 8 mA For X2, X5 to X7: approx. 4.3 mA For X8 to XF: approx. 3.5 mA	
Input points per common	C32, C28: 16 points/common C24: 8 points/common (Either the positive or negative of the input power supply can be connected to the common terminal.)	
Min. ON voltage/ Min. ON current	For X0, X1, X3, X4: 19.2 V DC/6 mA For X2, X5 to XF: 19.2 V DC/3 mA	
Max. OFF voltage/ Max. OFF current	2.4 V DC/1.3 mA	
Input impedance	For X0, X1, X3, X4: 3 kΩ For X2, X5 to X7: 5.6 kΩ For X8 to XF: 6.8 kΩ	
Response time	OFF→ON	For input X0, X1, X3, X4: 1 ms or less: normal input 5 μs or less: high-speed counter, pulse catch, interrupt input settings For input X2, X5 to X7: 1 ms or less: normal input 100 μs or less: high-speed counter, pulse catch, interrupt input settings For input X8 to XF: 1 ms or less: normal input only
	ON→OFF	Same as above
Operating mode indicator	LED display	

Note: X0 through X7 are inputs for the high-speed counter and have a fast response time.
If used as normal inputs, we recommend inserting a timer in the ladder program as chattering and noise may be interpreted as an input signal.
The above specifications apply when the rated input voltage is 24 VDC and the temperature is 25°C 70°F.

Output Specifications

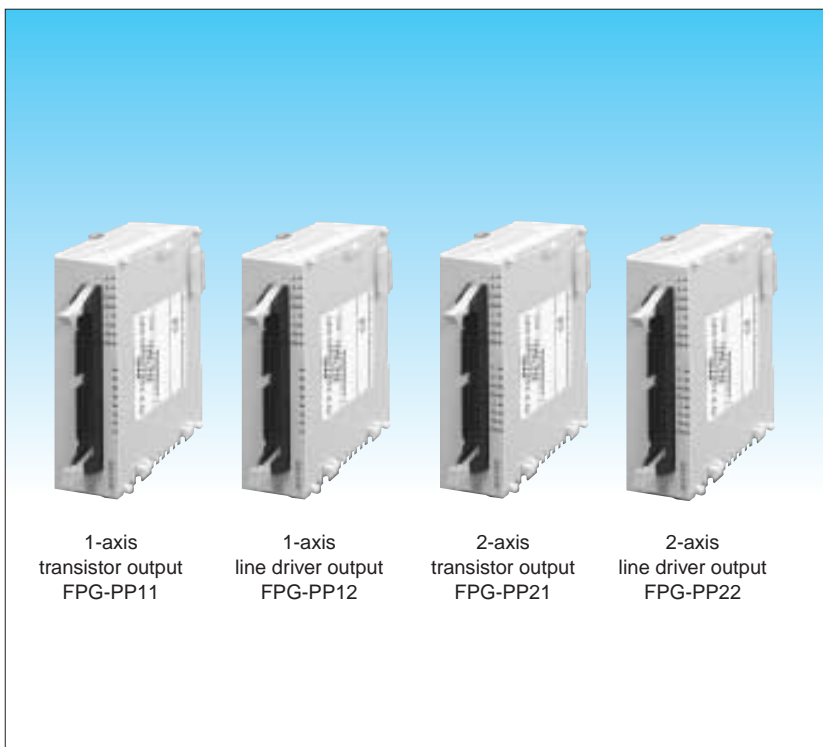
1. Relay Output Specifications (C24)

Item	Description	
Output type	1a (1 Form A, Normally open)	
Rated control capacity	2 A 250 V AC, 2 A 30 V DC (4.5 A or less per common)	
Output points per common	8 points/common	
Response time	OFF→ON	Approx. 10 ms
	ON→OFF	Approx. 8 ms
Lifetime	Mechanical	Min. 20,000,000 operations
	Electrical	Min. 100,000 operations
Surge absorber	-	
Operating mode indicator	LED display	

2. Transistor Output Specifications (C32 and C28)

Item	Description	
	C32 (NPN)	C28 (PNP)
Insulation method	Optical coupler	
Output type	Open collector (NPN)	Open collector (PNP)
Rated load voltage	5 to 24 V DC	24 V DC
Operating load voltage range	4.75 to 26.4 V DC	21.6 to 26.4 V DC
Max. load current	For Y0, Y1, Y3, Y4: 0.3 A For Y2, Y5 to YF: 0.1 A	For Y0, Y1, Y3, Y4: 0.5 A For Y2, Y5 to YF: 0.3 A
Max. surge current	For Y0, Y1, Y3, Y4: 0.9 A For Y2, Y5 to YF: 0.5 A	For Y0, Y1, Y3, Y4: 1.5 A For Y2, Y5 to YF: 0.7 A
Output points per common	16 points/common	12 points/common
OFF state leakage current	100 μA or less	
ON state voltage drop	0.5 V or less	
Response time	OFF→ON	For Y0, Y1, Y3, Y4 (When the load current is 15 mA or more.): 2 μs or less For Y2, Y5 to YF: 0.2 ms or less
	ON→OFF	For Y0, Y1, Y3, Y4 (When the load current is 15 mA or more.): 8 μs or less For Y2, Y5 to YF: 0.5 ms or less
External power supply for driving internal circuit	Voltage	21.6 to 26.4 V DC
	Current	70 mA or less
Response time	Zener diode	
Operating mode indicator	LED display	
Phase fault protection	Thermal protection for Y2, Y5 to YF	

FPS Positioning Unit



■ Features

1. High-speed pulse and startup for great performance in compact package and even supports linear servos

Max. output frequency: 4 Mpps,
Startup speed: 0.005 ms

2. Supports indexed feeding with JOG positioning function

Able to support indexed feed processing applications with high-speed startup and repeated control.

3. Count of feedback pulse possible

Since feedback pulses from encoders, etc., can be counted, control is possible while detecting the out of step and verifying the current position in step motors.

■ Performance Specifications

Part number	FPG-PP11	FPG-PP12	FPG-PP21	FPG-PP22
Output type	Transistor	Line driver	Transistor	Line driver
Occupied I/O points	Input: 16 points, Output: 16 points		Input: 32 points, Output: 32 points	
Number of axes controlled	1 axis		2 axes, independent	
Position command	Command units	Pulse unit (The program specifies whether Increment or Absolute is used.)		
	Max. pulse count	Signed 32 bits (-2,147,483,648 to +2,147,483,647 pulses)		
Speed command	Command range	1 pps to 500 kpps (can set in 1 pps.)	1 pps to 4 Mpps (can set in 1 pps.)	1 pps to 500 kpps (can set in 1 pps.)
				1 pps to 4 Mpps (can set in 1 pps.)
Acceleration/deceleration command	Acceleration/deceleration method	Linear acceleration/deceleration, S acceleration/deceleration (this takes the form of an 'S')		
	'S' Acceleration/deceleration	Can select from Sin curve, Secondary curve, Cycloid curve and Third curve.		
	Acceleration/deceleration time	0 to 32,767 ms (can set in 1 ms)		
Home return	Home return speed	Speed setting possible (changes return speed and search speed)		
	Input terminals	Home input, Near home input, Over limit input (+), Over limit input (-)		
	Output terminals	Deviation counter clear output signal		
Operation mode	<ul style="list-style-type: none"> • E point control (Linear and S accelerations/decelerations selecting possible) • P point control (Linear and S accelerations/decelerations selecting possible) • Home return function (Home search) • JOG operation function *1 • JOG positioning function • Pulser input function *3 Transfer multiplication ratio (× 1, × 2, × 5, × 10, × 50, × 100, × 500, × 1000 selecting possible) • Real-time frequency change function • Infinity output function 			
Startup time	0.02 ms or 0.005 ms possible *2			
Output interface	Output mode	1-pulse output (Pulse/Sign), 2-pulse output (CW/CCW)		
	Countable range	Signed 32 bits (-2,147,483,648 to +2,147,483,647 pulses)		
Feedback counter function *3	Input mode	2-phase input, Direction distinction input, Individual input (transfer multiple available for each.)		
	Other functions	<ul style="list-style-type: none"> • The flag to compare the elapsed value is built in. (The timing signal outputs at the optional position during an operation.) 		
Internal current consumption (at 5 V DC)	150 mA max.		220 mA max.	
External power supply	Voltage	21.6 V DC to 26.4 V DC		
	Current consumption	20 mA		35 mA
Mass	Approx. 75 g max.		Approx. 80 g max.	

*1: When selected Linear acceleration/deceleration operation, the target speed can be changed during an operation.

*2: The startup time can be changed by the control code setting in the shared memory. The factory setting (default setting) is 0.02 ms. The startup time is the time from the start request to the first pulse output.

*3: Pulser input function and feedback counter function use the same pulse input terminal, so the both cannot function simultaneously.

FPΣ S-LINK unit

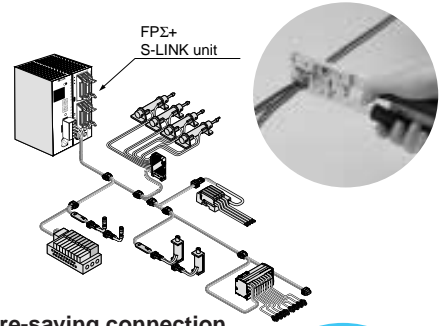
Comprises the S-LINK wire-saving system (SUNX Ltd.) and controls up to 128 I/O points at a transmission distance of up to 400 m.



■ Features

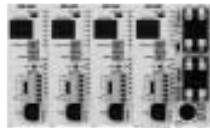
1. T-branches allow you to freely determine the wiring layout.

A wire-saving layout is available with a four-wire cable (two signal wires and two power wires), and a flexible layout is available with T-branches. You can easily make T-branches with one operation of the dedicated wire-crimping tool.



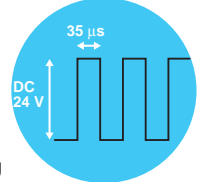
2. Up to four units can be connected. Each unit can control up to 128 I/O points.

One unit controls up to 128 I/O points. Up to four S-LINK units can be connected to one FPΣ control unit.



3. Highly reliable wire-saving connection is available.

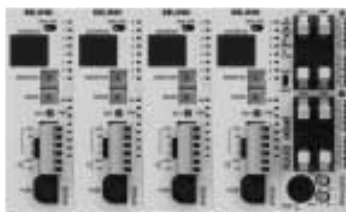
Approx. 60 different types of S-LINK I/O devices can be connected, meeting the diverse needs for I/O. The high transmission voltage (24 V DC) and wide clock pulse width (35 μs) provide high noise immunity. Flexible and reliable wire-saving connection is available.



● Refer to SUNX Limited's S-LINK catalogs and manuals for details and I/O devices of the S-LINK system.

■ No time-consuming programming for communications is required

The control unit automatically recognizes I/O allocations by the S-LINK unit installation position. It can be used as though it were an ordinary expansion I/O unit.

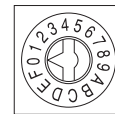


When 64 input points and 64 output points are set to each unit

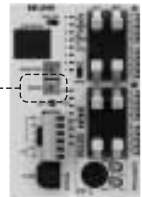
X100 - X13F, Y100 - Y13F
X180 - X21F, Y180 - Y21F
X260 - X29F, Y260 - Y29F
X340 - X37F, Y340 - Y37F

■ Setting of the number of I/O points

The balance between the number of input and output points within 128 can be selected in increments of 32 points by a rotary switch.

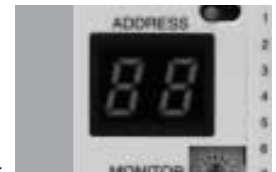


Example:
Setting 8 → 64 input points
64 output points



■ Indication of the address of I/O devices in error state

Even if the main line is broken, making it impossible to recognize an I/O device, the device address will be indicated on the display of the S-LINK unit. This function significantly reduces the time required for solving problems found during equipment start-up checks and for recovery work at the operation site.



■ Performance specifications

Transmission method	Bi-directional time division multiplex transmission
Synchronization	Bit/Frame synchronization
Transmission protocol	S-LINK protocol
Transmission line	Exclusive flat cable or cabtyre cable
Transmission speed	28.5 k bits/s
Transmission distance *1	Main signal line: Extensible to 200 m (400 m when a booster is used)
Connection	T-branch multi-drop wiring or multi-drop wiring
Number of I/O points	128 points max. (The number of I/O points can be selected in increments of 32 points.)

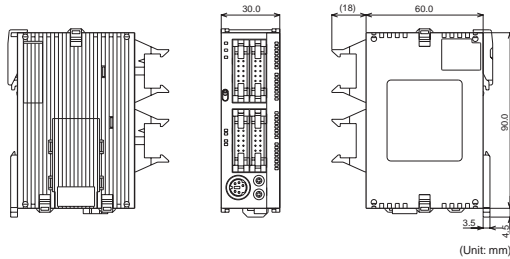
*1: Refer to SUNX Limited's S-LINK catalogs and manuals for the booster.

FPΣ Dimensions and Restrictions when combining unit and using programming tools

■ FPΣ Control units

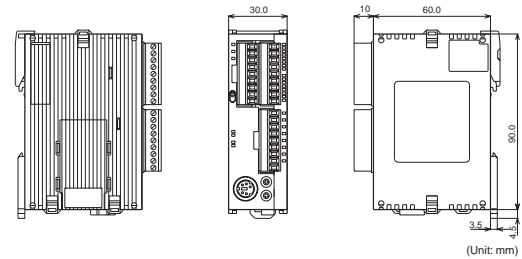
V3 FPG-C32TH/FPG-C32T2H/FPG-C28P2H
FPG-C32THTM/FPG-C32T2HTM/FPG-C28P2HTM

FPG-C32T/FPG-C32T2/FPG-C28P2
FPG-C32TTM/FPG-C32T2TM/FPG-C28P2TM



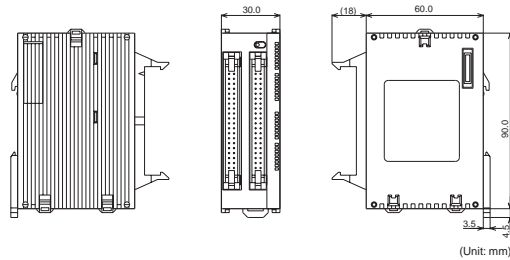
V3 FPG-C24R2H/FPG-C24R2HTM

FPG-C24R2/FPG-C24R2TM

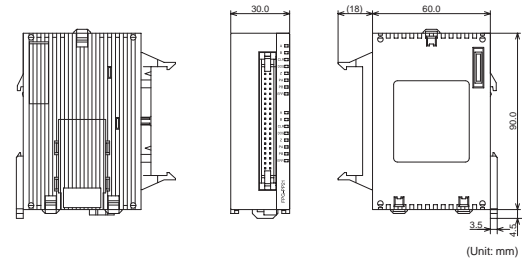


■ FPΣ Expansion units/FP0 Expansion units

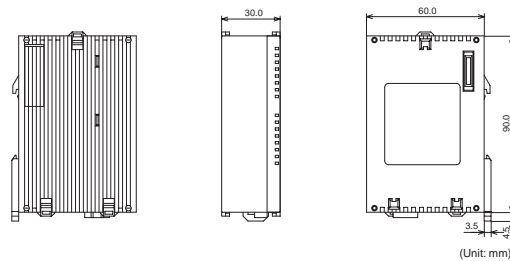
FPG-XY64D2T



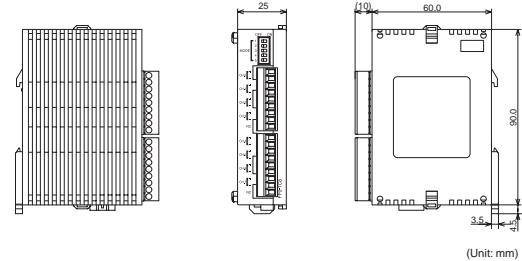
FPG-PP11/FPG-PP12/FPG-PP21/FPG-PP22



FPG-EM1



FP0-TC4/FP0-TC8



■ Restrictions when combining unit and using programming tools

1. Expansion I/O units for the FPΣ

- 1) The left-side expansion type FPΣ control unit is necessary for use with the FPΣ expansion I/O unit.
The previously available control units (Part No.: FPG-C32T/FPG-C32TTM, Product No.: AFPG2543/AFP2543TM) cannot be used for expansion.
- 2) A maximum of four units can be used for expansion.

2. FPΣ and FP0 shared expansion I/O units and intelligence units

When combining expansion I/O units and intelligence units a maximum of up to three units can be added to the right side of control unit.

3. Programming tools

- 1) Either FPWIN GR Ver. 2 or FPWIN Pro Ver. 4 are necessary for use with the FPΣ control unit.
Users of FPWIN GR Ver. 1 will have to upgrade.
However, the upgrade only applies to Version 1.1 or higher. Those users with versions below Version 1.1 are asked to send us your user registration card. Upon receipt we will send you Version 1.1.
- 2) Either FPWIN GR Ver. 2.1 or FPWIN Pro Ver. 4.1 are necessary for use the left-side expansion type FPΣ control unit. An upgrade service is available from our programmable controller home page at <http://www.nais-e.com/plc/>
- 3) Handy-type programmers cannot be used with the FPΣ series PLC.

6 Intelligent units for FPΣ and FP0

Product name	Specifications	Part No.	Product No.
FP0 Thermocouple unit	K, J, T, R thermocouple, Resolution: 0.1°C	FP0-TC4	AFP0420
	K, J, T, R thermocouple, Resolution: 0.1°C	FP0-TC8	AFP0421
FP Web-Server unit	Unit for connecting FP series/RS232C interface and Ethernet Web-Server function and E-mail sending function	FP-WEB	AFP0610
FP0 I/O Link unit	This is a link unit designed to connect FP0 as a station to MEWNET-F (our remote I/O system).	FP0-IOL	AFP0732
FP0 CC-Link Slave unit	Unit to connect to FP0 CC-Link	FP0-CCLS	AFP07943
FP0 A/D Converter Unit	Analog input 8 points: 0 to 5 V, -10 to +10 V, -100 to +100 mV, 0 to 20 mA Resolution: 1/4000 (12 bits)	FP0-A80	AFP0401
FP0 D/A Converter Unit	Analog output 4 points: FP0-A04V: -10 to +10 V (Resolution: 1/4000) FP0-A04I: 4 to 20 mA (Resolution: 1/4000)	FP0-A04V	AFP04121
		FP0-A04I	AFP04123
FP0 Analog I/O unit	Analog input 2 points: 0 to 5 V, -10 to +10 V Analog output 1 points: -10 to +10 V, 0 to 20 mA Resolution: 1/4000 (12 bits)	FP0-A21	AFP0480

*1: Refer to the FAQ section on our website for thermocouple units.

7 Power supply unit

Product name	Specifications	Part No.	Product No.
FP0 Power supply unit	Input: 100 to 240 V AC, Output: 24 V DC 0.7 A	FP0-PSA4	AFP0634

8 Options

Product name	Specifications	Product No.
Backup battery for FPΣ	Battery for full-time back up of operation memory and clock/calendar function	AFPG804
FP0 Slim 30 type mounting plate	Plastic plate to mount FPΣ units and FPΣ expansion units on a panel (including 10 pieces)	AFP0811
Slim type FP0 mounting plate	Plastic plate to mount FP0 expansion units on a wall (including 10 pieces)	AFP0803
Power cable for FPΣ	Included with control unit. Maintenance part. 1 m length	AFPG805
FP Memory loader	Data clear type	AFP8670
	Data hold type	AFP8671

9 Programming tools

Product name	Specifications	Product No.	
Standard programming tool software Control FPWIN GR Ver.2	English-language menu	Full type (for all type FP series PLC)	AFPS10520
		Small type (for FP0, FPΣ)	AFPS11520
		Upgrade (to upgrade from Ver.1.1)	AFPS10520R
	Chinese-language menu	Standard	AFPS10820
		Upgrade (to upgrade from Ver.1.1)	AFPS10820R
	Korean-language menu	Standard	AFPS10920
Conforms to IEC61131-3 programming tool software Control FPWIN Pro Ver.5	English-language menu	Full type (for all type FP series PLC)	AFPS50550
		Small type (for FP0, FPΣ)	AFPS51550
PC connection cable	Between D-sub 9 pins and DIN 5 pins, 3 m length	AFC8503	

10 Motor Driver I/F Terminal II

Product name	Specifications	Product No.
Motor Driver I/F Terminal II 1-axis type	I/F terminal for connecting the MINAS series and FPΣ Positioning unit/FP2	AFP8503
Motor Driver I/F Terminal II 2-axis type	Multi function type Positioning unit.	AFP8504
Exclusive cable for MINAS AIII Series, 1 m 3.281 ft	Cable for connecting the MINAS A IV/AIII series and motor driver I/F terminal II. The transmission speed becomes 500 kbps at a maximum when connected to the MINAS A IV Series.	AFP85131
Exclusive cable for MINAS AIII Series, 2 m 6.562 ft		AFP85132
Exclusive cable for MINAS S Series, 1 m 3.281 ft	Cable for connecting the MINAS E/S series and motor driver I/F terminal II.	AFP85141
Exclusive cable for MINAS S Series, 2 m 6.562 ft		AFP85142
Connection cable for FP2 Positioning unit, 0.5 m 1.640 ft	Cable for connecting the FPΣ Positioning unit/FP2 Multi function type Positioning unit and motor driver I/F terminale II.	AFP85100
Connection cable for FP2 Positioning unit, 1 m 3.281 ft		AFP85101

