SANYO DENKI

SANMOTION C S500

Motion controller

Ver.2
English

SANMOTION C

MOTION CONTROLLER

EtherCAT®

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PROG.CNTLR.
E302733
AT2

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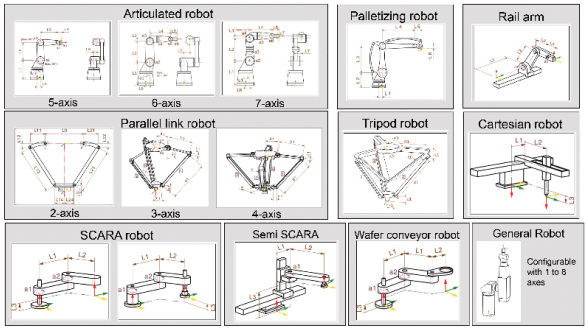
SANMOTION C
MOTION CONTROLLER S500

This motion controller can control 7-axis articulated robots. It can control the motion of a variety of robots, contributing to the in-house robot motion planning for your system.

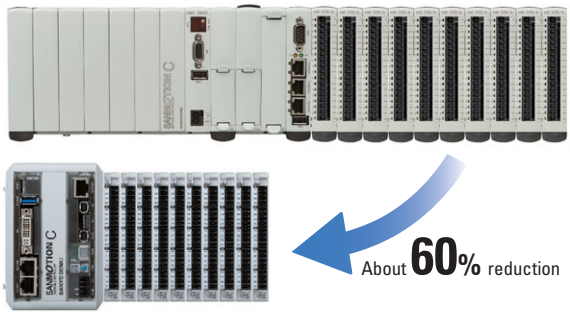
Abundant Robot Control Functions

This motion controller can control 15 robot configurations, including complex 7-axis articulated robots. Functions such as trajectory control and interpolated operation can be done with ease, contributing to the in-house robot motion planning.



Space-Saving of Equipment

The product volume has been reduced by approximately 60% compared to our current model. This allows it to be installed in a limited space, helping miniaturizing your system.



Comparison with our existing motion controller SANMOTION C SMC263X with 10 I/O modules installed.

High-Speed Control of Multiple Axes

This motion controller can control a maximum of 64 motor axes with cycle time of up to 1 ms, improving the accuracy of position control.

Control of Multiple Robots

This motion controller can control multiple robots simultaneously, allowing different types of robots, e.g. assembly and sorting robots, to be controlled with a single unit.

Helps Make Systems IoT-ready

This motion controller can connect to a variety of open networks such as EtherCAT, Modbus TCP, and OPC UA. It can contribute to making factories automated and IoT-ready by sharing information between devices in a network in real time.

Reduces Development Time

This motion controller can integrate robot control and machine control development environments into one. This makes it possible to simulate the motion of the entire system in a single development environment, greatly reducing the maintenance and development time of machines.

Information on SANMOTION C S100 (separate catalog available)

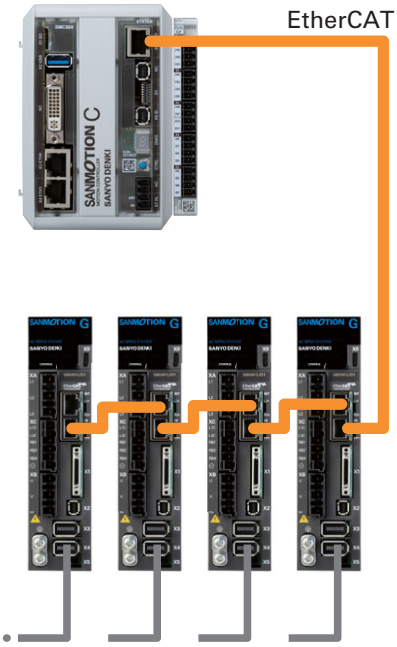
This motion controller specializes in the control of robots with up to 4 axes and point-to-point (PTP) positioning control.
They are ideal for applications such as assembly equipment and conveying machines.

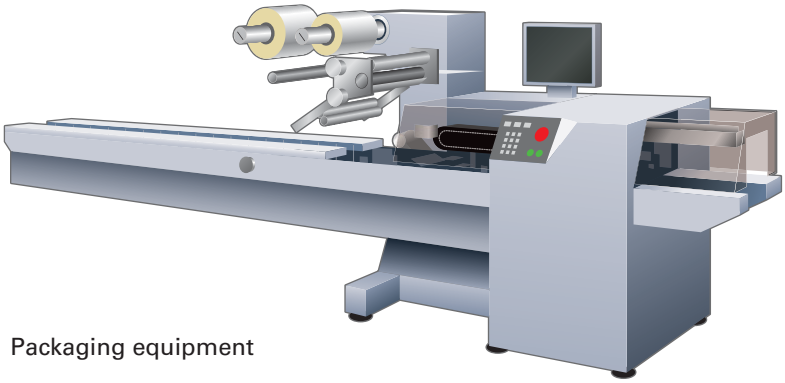
EtherCAT®

System Configuration Example

Packaging equipment (electronic cam, electronic gear control)

Items	Model no.
CPU module	SMC505
I/O module	DM570
Runtime firmware	SMC-505-MFB-□□□
Integrated development tool software SANMOTION C Studio	SMC-500-STUDIO-□□□

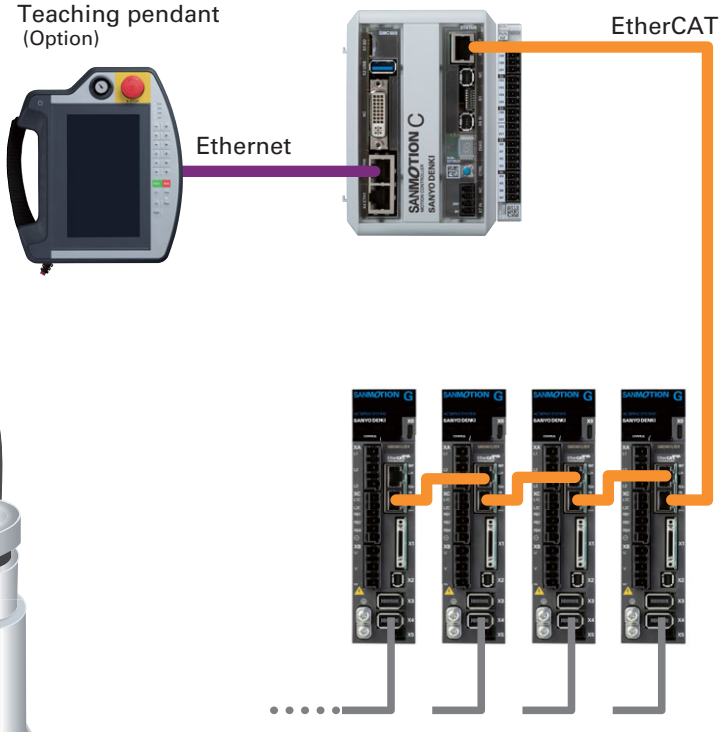




Packaging equipment

Conveying robot (SCARA robot)

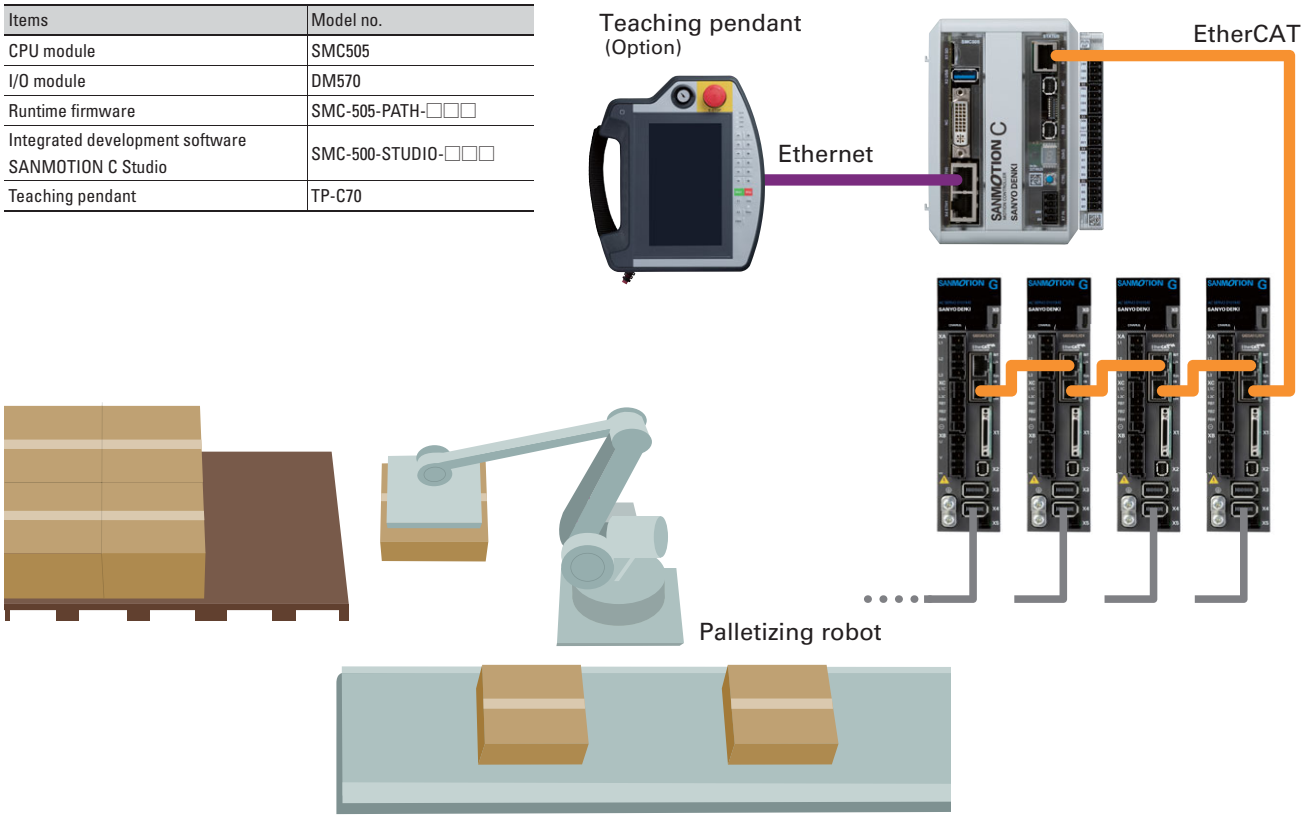
Items	Model no.
CPU module	SMC505
I/O module	DM570
Runtime firmware	SMC-505-PATH-□□□
Integrated development tool software SANMOTION C Studio	SMC-500-STUDIO-□□□
Teaching pendant	TP-C70



SCARA robot

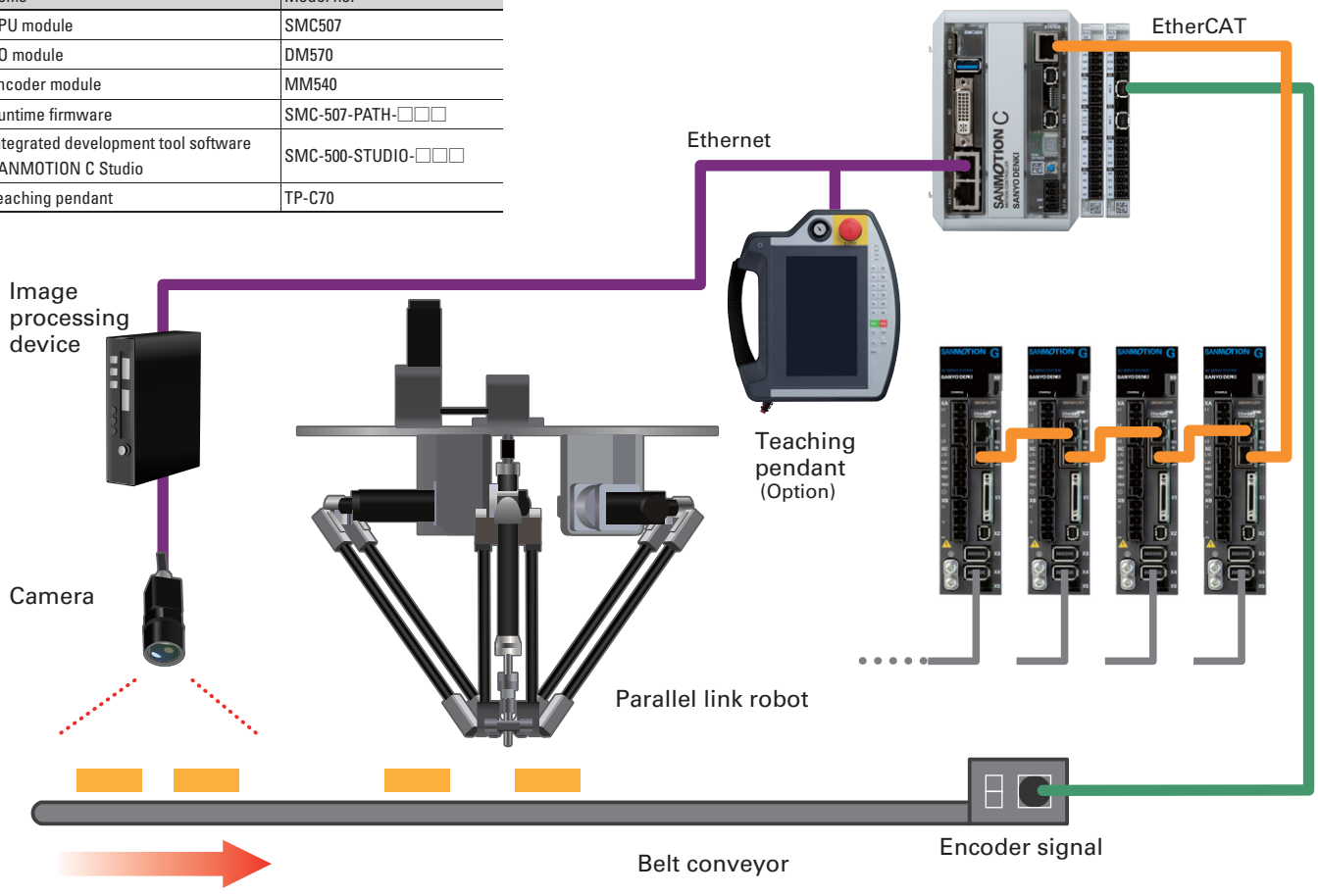
Palletizing system (palletizing robot)

Items	Model no.
CPU module	SMC505
I/O module	DM570
Runtime firmware	SMC-505-PATH-□□□
Integrated development software SANMOTION C Studio	SMC-500-STUDIO-□□□
Teaching pendant	TP-C70



Conveyor tracking system (with parallel link robot tracking function)

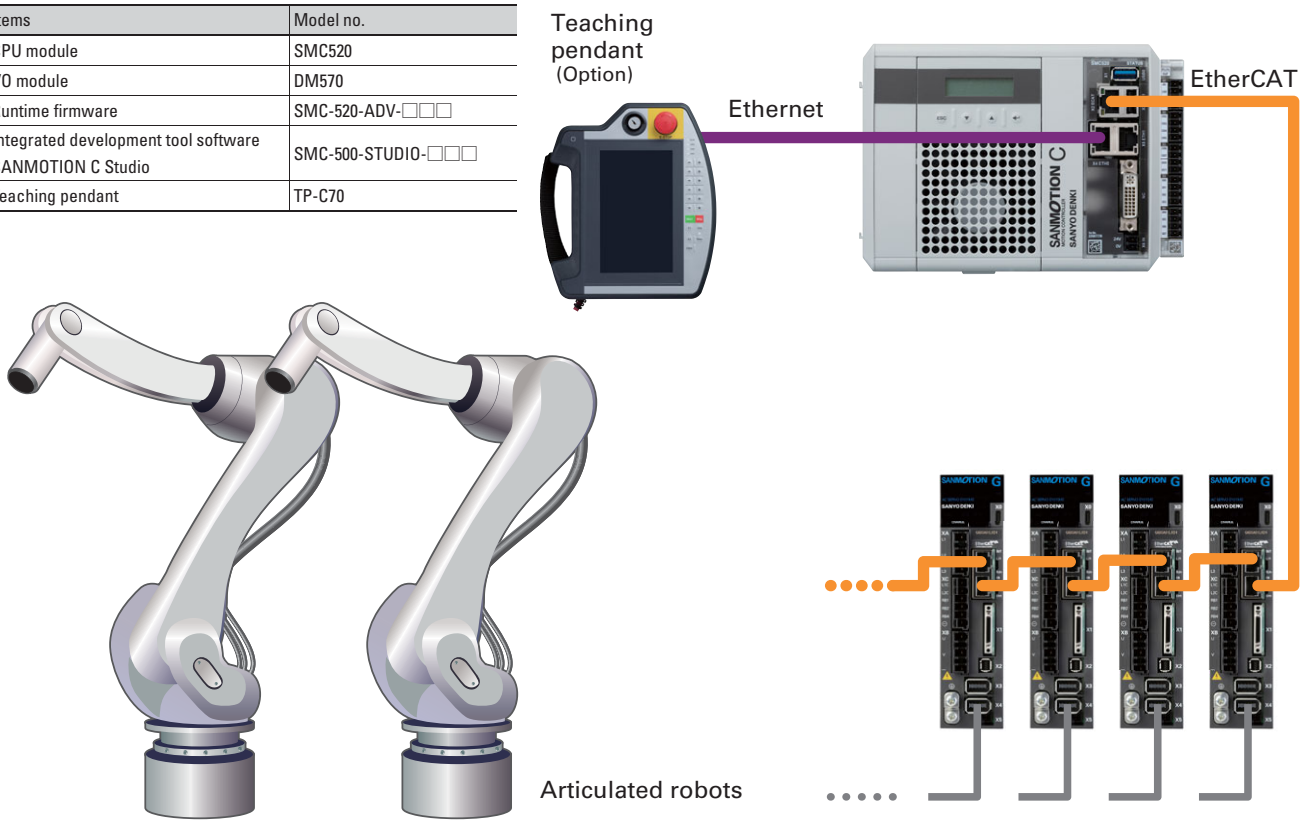
Items	Model no.
CPU module	SMC507
I/O module	DM570
Encoder module	MM540
Runtime firmware	SMC-507-PATH-□□□
Integrated development tool software SANMOTION C Studio	SMC-500-STUDIO-□□□
Teaching pendant	TP-C70



System Configuration Example

Assembly system with multiple robots (6-/7-axis articulated robot)

Items	Model no.
CPU module	SMC520
I/O module	DM570
Runtime firmware	SMC-520-ADV-□□□
Integrated development tool software SANMOTION C Studio	SMC-500-STUDIO-□□□
Teaching pendant	TP-C70



See the following catalogs for AC servo systems and closed loop stepping systems.
Catalogs are available for download from our Catalog Site.

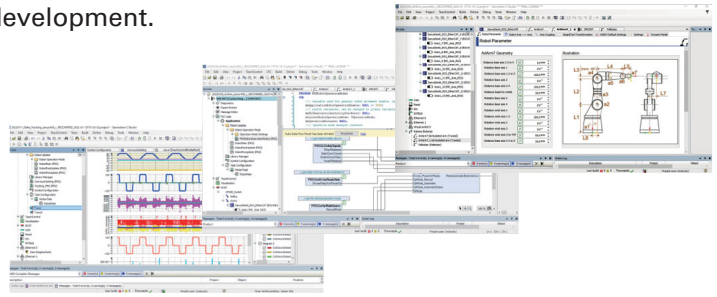
- SANMOTION G Catalog
- SANMOTION R 100/200 V General Catalog
- SANMOTION R 400 V Catalog
- SANMOTION R ADVANCED MODEL 48 VDC Catalog
- SANMOTION Model No.PB Closed Loop Stepping System Catalog

Software and Peripherals

Integrated development software
SANMOTION C Studio

This software features various functions for system development.

- Programming tool
- Electronic cam editor
- Configuration tool
- Simple HMI (human machine interface) tool
- Analysis and diagnostic tool



User-friendly
Teaching pendant

- The 7-inch touch screen is easy to use.
- You can easily create a robot motion program by simply selecting the desired preset commands.
- To ensure operator safety, this teaching pendant features an emergency stop button and a 3-position enabling switch.

Module Structure

CPU module
SMC505
SMC507

EtherCAT

USB

Ethernet

Runtime firmware

microSD card

SMC-505-MFB-□□□
SMC-505-PTP-□□□
SMC-505-PATH-□□□

SMC-507-MFB-□□□
SMC-507-PTP-□□□
SMC-507-PATH-□□□
SMC-507-ADV-□□□

The □ symbols denote the software version.

CFast card

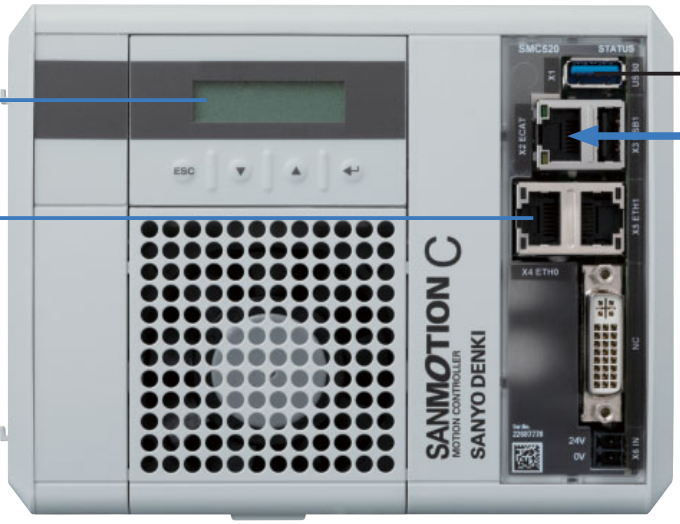
SMC-520-MFB-□□□
SMC-520-PTP-□□□
SMC-520-PATH-□□□
SMC-520-ADV-□□□

The □ symbols denote the software version.

SMC520

Status display

Ethernet



USB

EtherCAT

I/O module

DM556
DM570
DI570
DO550

AM571

Interface module

SM510

Encoder module

MM540

Bus link module

BL570

Specifications

■ CPU module

Model no.		SMC505	SMC507	SMC520	Remarks	Manufacturer
CPU		1.75 GHz	1.91 GHz	2 GHz		
Memory		2 GB		4 GB		
Battery backed SRAM		512 kB		1 MB		
Storage media		2 GB microSD card		4 GB CFast card (Type 1)		
Built-in interface specifications	EtherCAT	100 Mbps, 1 port			RJ-45 connector	
	Ethernet	10/100/1000 Mbps, 2 ports			RJ-45 connector	
	Serial	RS-232C/RS-422/RS-485 selectable in software, 1 port		–	Industrial Mini I/O connector type II	TE Connectivity
	USB	USB 3.0 (SuperSpeed), 1 port		USB 3.0 (SuperSpeed), 1 port USB 2.0 (Hi-Speed), 1 port	Type A	
Max. no. of controllable axes		64				
Robot communication cycle		4 ms ～	2 ms ～	1 ms ～		
Max. controllable robot		1	2	4		
Max. number of connectable units		12				
Input voltage		24 VDC (19.2 to 30 VDC)				
Power supply connector		1969950000, BCF 3.81/04/180 SN BK BX type		1969890000, BCF 3.81/02/180 SN BK BX type		Weidmüller
Maximum input power		76.2 W	96.2 W	140 W		
Inrush current		10 A max.				
Maximum output power (Ke-bus 5 VDC)		10.5 W	20 W	30 W		
Maximum output power (Ke-bus 24 VDC)		48 W				
Cooling method		Passive air cooling	Forced air cooling			
Mass		500 g	515 g	900 g		

■ Expansion modules

Module types	Model no.	Specifications	Mass	Remarks	Manufacturer
I/O module	**DM556**	8 digital inputs, 24 VDC, positive common input 8 digital outputs, 24 VDC, 0.5 A, sink output	70 g	1969950000 × 5 pcs, BCF 3.81/04/180 SN BK BX type	Weidmüller
	DM570	8 digital inputs, 24 VDC, negative common input 8 digital outputs, 24 VDC, 2 A, source output			
	DI570	19 digital inputs, 24 VDC, negative common input			
	DO550	16 digital outputs, 24 VDC, 0.5 A, source output			
	AM571	4 analog inputs, ±10 V (Resolution: 65536, 16 bit) or 0 to 10 V (Resolution: 32768, 15 bit) 4 analog outputs, ±10 V (Resolution: 4096, 12 bit)	87 g	1969950000 × 8 pcs, BCF 3.81/04/180 SN BK BX type	Weidmüller
Interface module	**SM510**	RS-232C/RS-422/RS-485 selectable in software, 2 ports Communication speed: baud rate 1200 to 115200 bps	70 g	Industrial Mini I/O connector type II	TE Connectivity
Encoder module	**MM540**	2 encoder inputs, counter 32 bit, maximum input frequency 700 kHz 4 latch inputs, positive/negative common available 2 digital outputs, 24 VDC, 0.3 A, source output	70 g	Industrial Mini I/O connector type II × 2 pcs	TE Connectivity
				1969950000 × 3 pcs, BCF 3.81/04/180 SN BK BX type	Weidmüller
Bus link module	**BL570**	Communication speed: 100 Mbps (EtherCAT) Maximum output power: Ke-Bus 5 V: 25 W, Ke-Bus 24 V: 48 W	91 g	1969950000 × 1 pc, BCF 3.81/04/180 SN BK BX type RJ-45 connector (Ethernet connector)	Weidmüller

Connector kit options are available. Prepare connectors and cables as necessary.

■ Specifications common to modules

Operating ambient temperature	0 to +55˚C
Storage ambient temperature	-40 to +70˚C
Operating/storage humidity	10 to 95% (non-condensing)
Vibration resistance	3.5 mm constant amplitude at 5 ≤ f < 8.4 Hz, 9.8 m/s^2 constant acceleration at 8.4 ≤ f < 150 Hz in compliance with EN 61131-2
Shock resistance	147 m/s^2 in compliance with EN 61131-2
Operating altitude	2000 m or less
Installation locations	In control panel
Over-voltage category	II
Degree of pollution	2

Options

■ EtherCAT cables with RJ-45 plug

Model no.	Cable length	Specifications	Manufacturer
AL-01109322-R50	0.5 m	Plug: RJ-45 (TM21P-88P), on both ends	Plug: Hirose Electric Co., Ltd.
AL-01109322-01	1 m	Boot color: black	Cable: Bando Densen Co., Ltd.
AL-01109322-03	3 m	Cable: 20276 ESVP AWG#24X4P, CAT5e	
AL-01109322-05	5 m		
AL-01109322-10	10 m		

■ Ethernet cables with RJ-45 plug

Model no.	Cable length	Specifications	Manufacturer
AL-01111556-01	1 m	Plug: RJ-45 (TM21P-88P), on both ends	Plug: Hirose Electric Co., Ltd.
AL-01111556-03	3 m	Boot color: yellow	Cable: Bando Densen Co., Ltd.
AL-01111556-05	5 m	Cable: 20276 ESVP AWG#24X4P, CAT5e	
AL-01111556-10	10 m		

■ RS-422/485 encoder cables with Industrial Mini I/O plug (Flying leads on one end)

Model no.	Cable length	Specifications	Manufacturer
AL-01119298-03	3 m	Plug: Industrial Mini I/O connector type II (2040008-2) on one end	Plug: TE Connectivity
AL-01119298-05	5 m	Cable: 20789 TSVP AWG#26X4P	Cable: Bando Densen Co., Ltd.
AL-01119298-10	10 m		

■ RS-232C cables with Industrial Mini I/O plug (Flying leads on one end)

Model no.	Cable length	Specifications	Manufacturer
AL-01119299-03	3 m	Plug: Industrial Mini I/O connector type II (2040008-2) on one end	Plug: TE Connectivity
AL-01119299-05	5 m	Cable: 20789 TSVP AWG#26X4P	Cable: Bando Densen Co., Ltd.
AL-01119299-10	10 m		

■ Connector sets

Model no.	Specifications	Mfr. part no.	Quantity	Manufacturer
AL-01139898-01	Power supply connector for SMC505/507/BL570	1969950000, BCF 3.81/04/180 SN BK BX type	1	Weidmüller
AL-01139898-02	Power supply connector for SMC520	1969890000, BCF 3.81/02/180 SN BK BX type	1	
AL-01139898-03	Serial/encoder connector	2040008-2	1	TE Connectivity
AL-01139898-04	Encoder module connectors	1969950000, BCF 3.81/04/180 SN BK BX type	3	Weidmüller
AL-01139898-05	Digital I/O module connectors		5	
AL-01139898-06	Analog I/O module connectors		8	

■ Cooling fans

Model no.	Specifications
SMC507FAN	Replacement cooling fan (for SMC507)
SMC520FAN	Replacement cooling fan (for SMC520)

Runtime firmware

Model no.	Use	Controllable robots
SMC-△△△-MFB-□□□	Sequence/motion control	
SMC-△△△-PTP-□□□	Sequence/motion/robot-1 control	Cartesian, SCARA, palletizing robots
SMC-△△△-PATH-□□□	Sequence/motion/robot-2 control	Parallel link (tracking function) and 6-/7-axis articulated robot control in addition to robot-1 control
SMC-○○○-ADV-□□□	Sequence/motion/robot-3 control	Multiple robot control in addition to robot-2 control

The □ symbols denote the software version. Please contact us for more information.
The △ symbols = either 505/507/520 and the ○ symbols = either 507/520. 505/507 supports microSD cards and 520 supports CFast cards.

■ Motion control function

No. of controllable axes	64 max.
Communication cycle	1 to 8 ms
Control system	Position control (PTP), speed control, torque control
Acceleration/deceleration profile	Automatic trapezoidal acceleration/deceleration, S-curve acceleration/deceleration
Unit for positioning control	Arbitrary (pulse, mm, inch, degree)
Max. command value	-2147483648 to 2147483647 (32 bit)
Programming language	IL, ST, LD, FBD, SFC, and CFC defined in IEC 61131-3
Function block	Homing, incremental mode, absolute mode, constant speed mode, electronic cam, electronic gear

■ Robot control function

No. of controllable axes (per one robot)	13 max. (7 main axes + 6 external axes)
Communication cycle	1 to 8 ms
Control system	PTP, 3D linear, 3D circular
Teaching method	Remote teaching, numeric input
Unit for positioning control	Arbitrary (pulse, mm, inch, degree)
Max. command value	-2147483648 to 2147483647 (32 bit)
Programming language	Original robot language
Supported robots	Cartesian, SCARA, palletizing, parallel link, 6-/7-axis articulated robots

Software

Model no.	Use
SMC-500-STUDIO-□□□	Integrated development tool (programming, debugging, and scope)

■ Software options

Model no.	Remarks
SMC-500-SIMU-□□□	Device simulation tool
SMC-500-OPCUA-□□□	OPC UA Server license

The □ symbols denote the software version. Please contact us for more information.

Teaching pendant

Items	Specifications
Model no.	TP-C70
Display	7-inch TFT LCD, LED backlight, 1024 × 600 pixels (WSVGA)
Operating panel	Touch screen, emergency stop button, enabling switch (3 positions), membrane switch
Connection	To be connected with CPU module via junction box (connection cable length: 5 m)
Communication	Ethernet 10/100 Mbps
Emergency stop button	Turn-to-Release operator, output: 2 NC contacts
Enabling switch	3-position switch (ON-OFF-ON), output: 2 circuits
Vibration resistance	3.5 mm constant amplitude at $5 \leq f < 8.4$ Hz, 9.8 m/s^2 constant acceleration at $8.4 \leq f < 150$ Hz in compliance with EN 61131-2
Shock resistance	147 m/s^2 in compliance with EN 61131-2
Protection rating	IP65
Operating ambient temperature	0 to +40˚C
Storage ambient temperature	-20 to +70˚C
Operating ambient humidity	10 to 95% (non-condensing)
Mass	950 g

■ Junction box

Items	Specifications
Model no.	JBOX-01
Connector	11-pin terminal block connector (for power supply, emergency stop signal, and enabling signal) RJ-45 connector (for Ethernet) 17-pin male circular connector (for pendant cable connection)
Protection rating	IP20
Dimensions	76.1 (H) × 67.2 (W) × 26 (D) mm
Mass	220 g

This junction box is included in the teaching pendant.

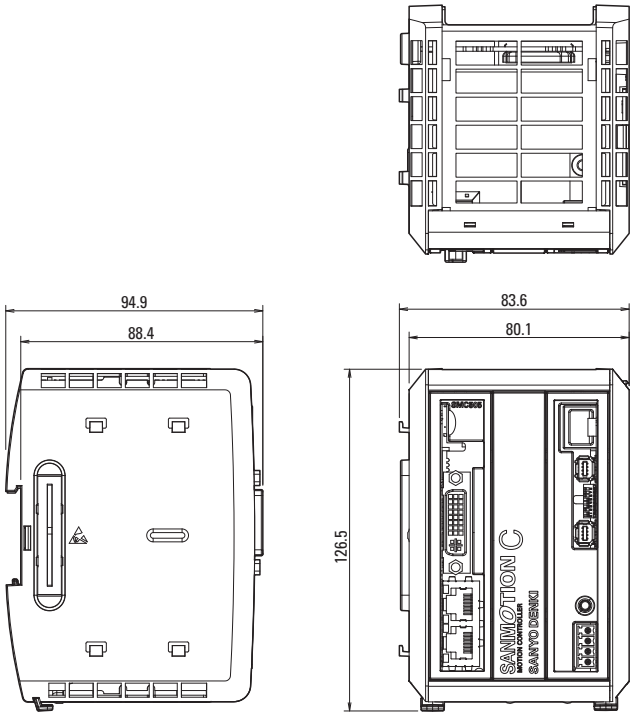
■ Bridge connector (For short-circuiting emergency stop signal when a pendant is not connected)

Model no.	Specifications
AL-00920880-01	17-pin female circular screw lock connector (for short-circuiting emergency stop signal)

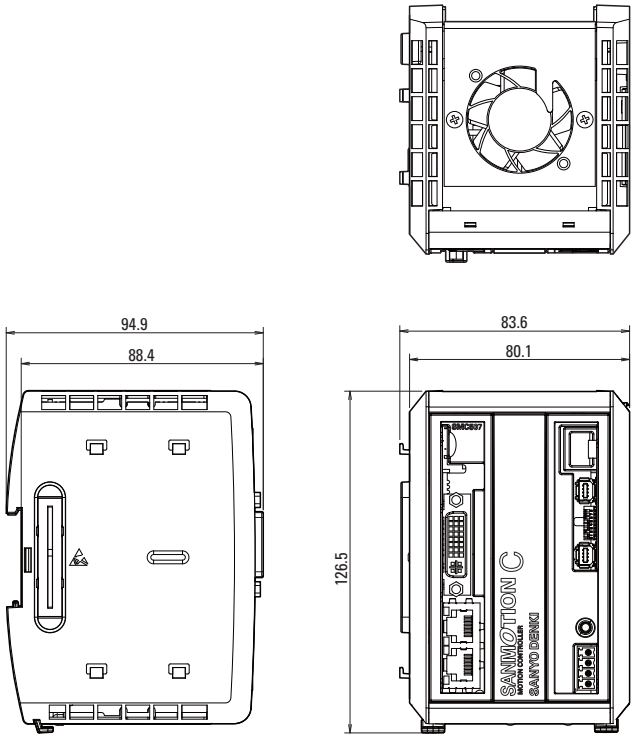
Dimensions [Unit: mm]

CPU module

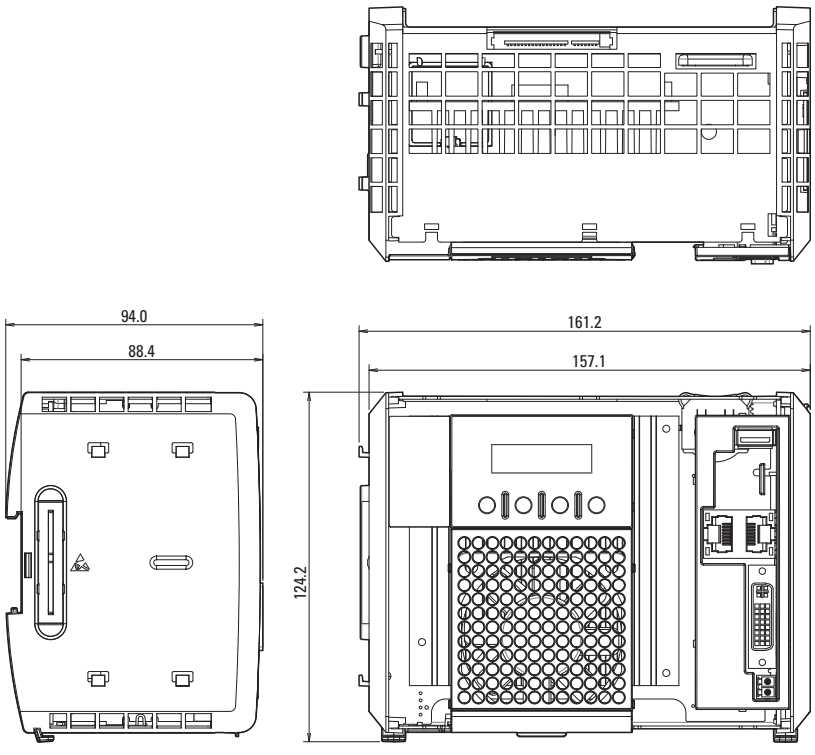
Model: SMC505



Model: SMC507



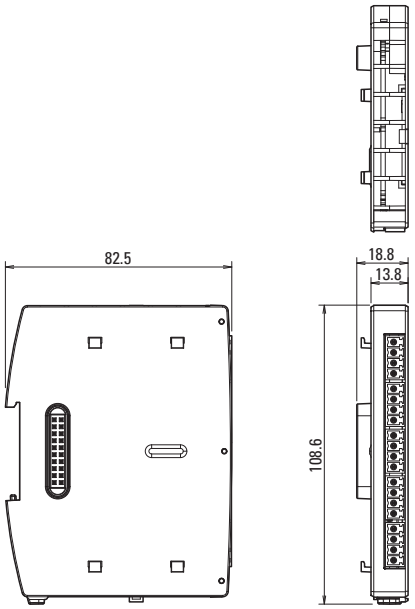
Model: SMC520



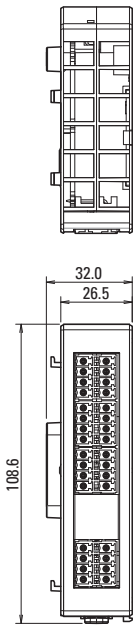
Dimensions [Unit: mm]

I/O module

Model: DM556, DM570, DI570, DO550

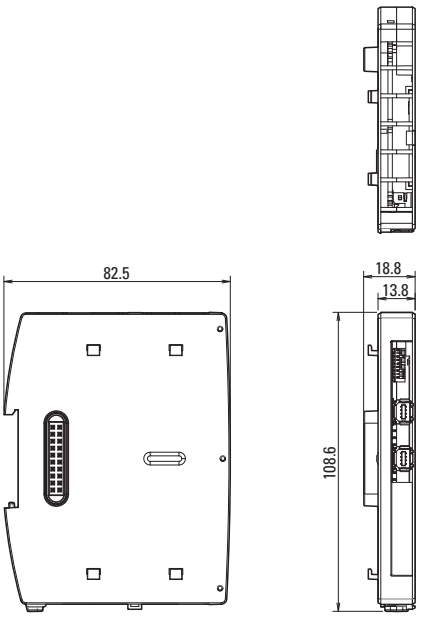


Model: AM571



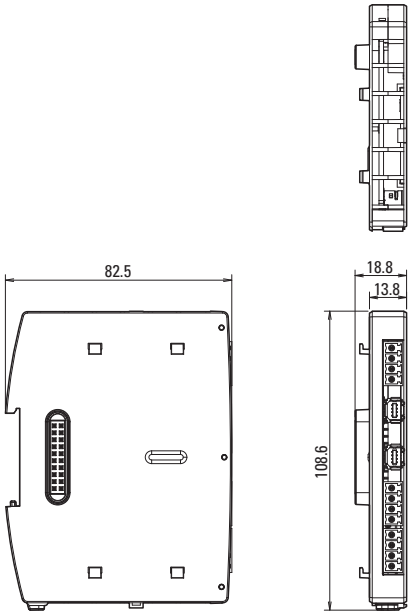
Interface module

Model: SM510



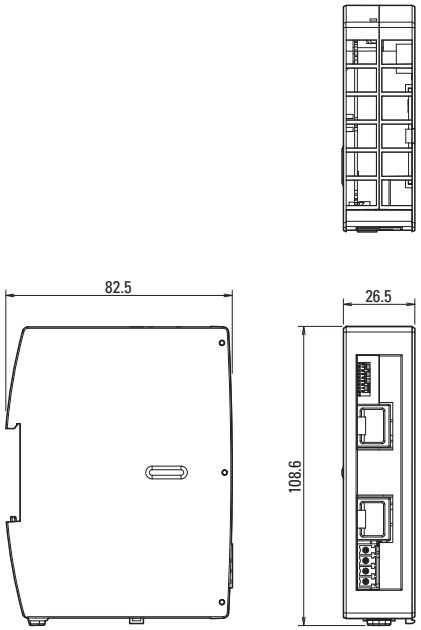
Encoder module

Model: MM540



Bus link module

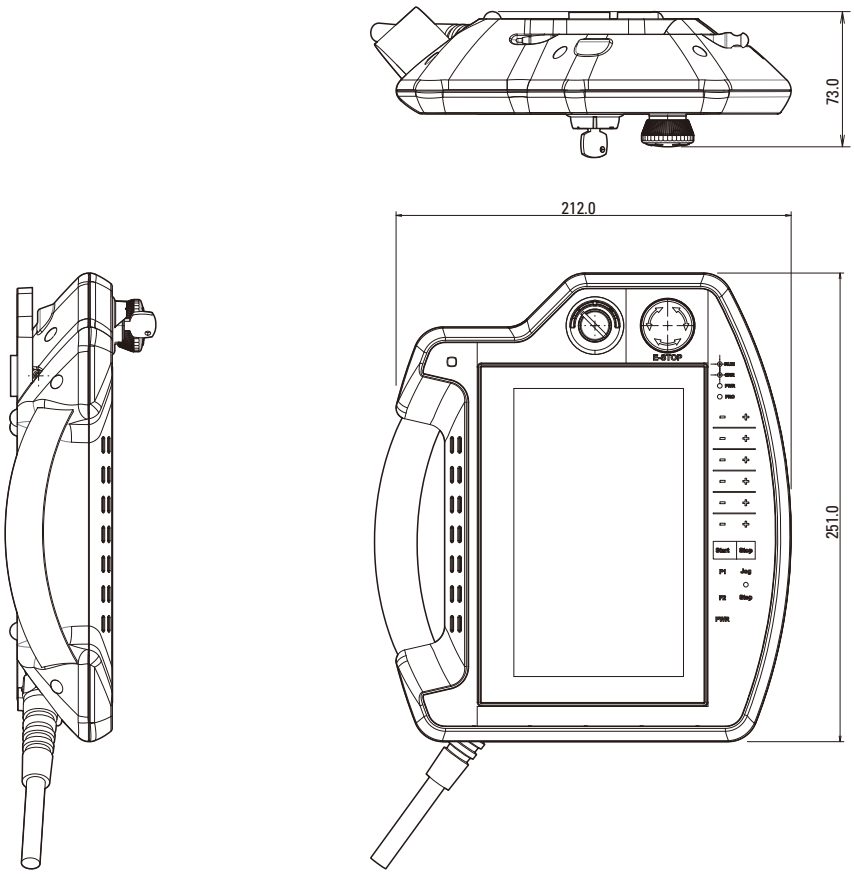
Model: BL570



Dimensions [Unit: mm]

Teaching pendant

Model: TP-C70



ECO PRODUCTS

■ ECO PRODUCTS

ECO PRODUCTS are designed to reduce the environmental impacts throughout the product's life cycle. Ranging from design to manufacturing stages, the environmental impact of a product and its packaging materials is assessed against the eco-design requirements. Those products that satisfy the requirements are accredited as ECO PRODUCTS.

Notes Before Purchase

- Read the accompanying Instruction Manual carefully prior to using the product.
- Do not use this product in an environment where vibration is present, such as in moving vehicles or shipping vessels.
- Do not modify or alter the product in any way.

Please contact us beforehand if you intend to use this product in the following applications.

- Medical equipment that may have an effect on human life
- Systems or equipment that may have a major impact on society or on the public.
- Special applications related to aviation and space, nuclear power, electric power, submarine repeaters, etc.

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