9B

IAI
Quality and Innovation

Field Network Type
(DeviceNet, CC-Link, PROFIBUS-DP,
EtherCAT, EtherNet/IP, CC-Link IE Field)

XSEL-RA/SA, RAX/SAX, RAXD/SAXD

First Step Guide Ninth Edition

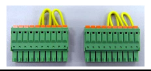
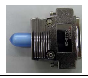
Thank you for purchasing our product.
Make sure to read the Safety Guide and detailed Instruction Manual as well as this First Step Guide to ensure correct use.
This Instruction Manual is original.

Warning: Read the instruction manual carefully and follow the instruction manual when handling this equipment.
Please downloaded the user's manual from our website.
You can download it free of change. User registration is required for first time users.
URL www.iai-robot.co.jp/data_dl/CAD_MANUAL/
Keep a printout of the introduction manual near the equipment in which this product is installed so that it can be checked at all times, or display it on your computer, tablet terminal, etc. so that you can check it immediately.
If you need a bound copy of the instruction manual, order it from the nearest sales office listed in the First Step Guide or at the end of the instruction manual. It will be provided for a fee.

Product Check

This product is comprised of the following parts if it is of standard configuration:
If you find any fault in the contained model or any missing parts, contact us or our distributor.

1. Parts (Options are excluded.)

No.	Part Name	Remarks	Quantity RA/RAX/RAXD	Quantity SA/SAX/SAXD
1	Controller	Refer to "How to read the model plate" and "How to read the model of the controller."	1	
Accessories				
2	System I/O plug	FMC1.5/10-ST-3.5 (Manufacturer: Phoenix Contact) 	2	2
3	AC Power Supply plug	GMSTB2.5/6-STF-7.62 (Manufacturer: Phoenix Contact) 	1	1
		For XSEL-SAX4 (high capacity type) (Note 1): PC4/6-STF-7.62 (Manufacturer: Phoenix Contact)	-	1
4	Brake Power Input Plug	FMC1.5/2-ST-3.5-RF (Manufacturer: Phoenix Contact) 	1	1
5	Dummy plug	DP-2 	1	1
6	Absolute Battery (Note 1)	AB-5 	Number of Absolute Type Actuators to be Connected (except for SCARA type ones)	Number of Absolute Type Actuators to be Connected (except for SCARA type ones)
7	For DeviceNet Type	SMSTB2.5/5-STF-5.08 AU (Manufacturer: Phoenix Contact) 	1	1
8	For CC-Link Type	SMSTB2.5/5-STF-5.08 AU (Manufacturer: Phoenix Contact) (Terminal resistance 110, 130Ω one unit each) 	1	1
8	First Step Guide	ME0365	1	1
9	Safety Guide	M0194	1	1

Note 1 Attach the absolute battery following (Step 4 in 8.4.2 Replace Absolute Battery) in Instruction Manual.

2. Teaching tool (Optional accessory)

The PC software or teaching box is necessary to perform setup operations such as position and parameter settings through teaching or other means. Use either of them.

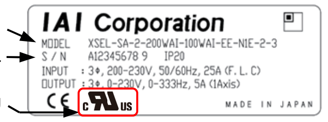
No.	Part Name	Model	Applicable Controller RA/RAX/RAXD	Applicable Controller SA/SAX/SAXD
1	PC Software (with RS-232C Cable + Emergency Stop Box)	IA-101-X-MW	○	×
2	PC Software (with USB Conversion Adapter + RS-232C Cable + Emergency Stop Box)	IA-101-X-USBMW	○	×
3	PC Software (Safety Categories 4 Compliance Cable + Emergency Stop Box)	IA-101-XA-MW	○	○
4	Touch Panel Teaching Pendant (Standard / with Dead-man Switch)	TB-01/01D/01DR	○	○
5	Touch Panel Teaching Pendant (Standard / with Dead-man Switch)	TB-02/02D	○	○
6	Touch Panel Teaching Pendant	TB-03	○	○

3. Instruction manuals related to this product, which are contained in the instruction manual.

No.	Name	Manual No.
1	SEL Language Programming Manual	ME0224
2	PC Software IA-101-X-MW/ IA-101-X-USBMW RC Gateway Function Instruction Manual	ME0154
3	Touch Panel Teaching Pendant TB-01/01D/01DR Applicable for Program Controller Instruction Manual	ME0325
4	Touch Panel Teaching Pendant TB-02/02D Applicable for Program Controller Instruction	ME0356
5	Touch Panel Teaching Pendant TB-03 Applicable for Program Controller Instruction Manual	ME0377
6	DeviceNet Instruction Manual	ME0124
7	CC-Link Instruction Manual	ME0123
8	PROFIBUS Instruction Manual	ME0153
9	EtherNet Instruction Manual	ME0140
10	EtherCAT Instruction Manual	ME0309
11	EtherNet/IP Instruction Manual	ME0308
12	CC-Link IE Field Instruction Manual	ME0454
13	Extension Motion Control Instruction Manual	ME0364

4. How to read the model plate

- Those with UL/cUL mark in the name plate are complied with UL/cUL standards. Refer to the instruction manual for detail.



5. How to read the model

5.1 Controller for Single-Axis Robots and Orthogonal Robots

XSEL	-RA	-8	-400WAI	-200WAI	-100WAIB	-60AL	-200A	-100A	-60AB	-30RAL	-EPCC	-N1E	-2	-3
❶	❷	❸	❹ (Axis1)	❹ (Axis-2)	❹ (Axis-3)	❹ (Axis-4)	❹ (Axis-5)	❹ (Axis-6)	❹ (Axis-7)	❹ (Axis-8)	❺	❻	❼	❽

Model table

❶ Series	❷ Controller type	❸ Number of axes	❹ Details of axis 1 to axis 8 (Note 1): Motor wattage	Encoder type	Brake	Creep	High acceleration/ deceleration	Home sensor (LS)	Synchronization designation	❺ Network slot: Slot 1	Slot 2	❻ I/O slots: Slot 1	Slot 2	❼ I/O flat cable length	❽ Power supply voltage
XSEL	RA (Standard type) SA*1 (Safety categories compliance type)	1 (1-axis) 2 (2-axis) 3 (3-axis) 4 (4-axis) 5 (5-axis) 6 (6-axis) 7 (7-axis) 8 (8-axis)	12 (12W) 20 (20W) 30D (30W for DS) 30R (30W for RS/RCS2) 60 (60W) 100 (100W) 100S (100W for linear) 150 (150W) 200 (200W) 200S (200W for linear) 300 (300W) 400 (400W) 600 (600W) 750 (750W)	WAI (Battery-less absolute/ incremental) A (Absolute) G (Spurious absolute) AI (Index absolute) AM (Multiple-rotation absolute)	Not specified (w/o brake) B (with brake)	Not specified (w/o creep) C (with creep)	Not specified (w/o Acceleration/ deceleration) HA (Acceleration/ deceleration type)	Not specified (w/o home sensor) L (with home sensor)	Not specified (No synchronization) M (Master-axis designation) S (Slave-axis designation)	E Not for use EP (Note 2) EtherNet/IP Input 256/ Output 256 EC EtherCAT Input 256/ Output 256	E Not for use DV DeviceNet Input256/ Output256 CC CC-Link Input256/ Output256 PR PROFIBUS-DP Input256/ Output256 CIE (Note 2) CC-Link IE Field Input1024/ Output1024	E (Not for use) N1 Extension PIO Input32/ Output16 NPN board N2 Extension PIO Input16/ Output32 NPN board N3 Extension PIO Input48/ Output48 NPN board P1 Extension PIO Input32/ Output16 PNP board P2 Extension PIO Input16/ Output32 PNP board P3 Extension PIO Input48/ Output48 PNP board	E (Not for use) N1 Extension PIO Input32/ Output16 NPN board N2 Extension PIO Input16/ Output32 NPN board N3 Extension PIO Input48/ Output48 NPN board P1 Extension PIO Input32/ Output16 PNP board P2 Extension PIO Input16/ Output32 PNP board P3 Extension PIO Input48/ Output48 PNP board	2: 2m (Standard) 3: 3m 5: 5m 0: None	2: Single-phase 200V 2L Only for linear single-phase 200V 3 3-phase 200V 3L Only for linear 3-phase 200V

*1 Safety categories compliance type: In this type, the safety circuit can be configured with the motor driving power source separated.
Note 1 ● *Any of the RCS2-R**7 series, RCS2-SRA7BD/SRGS7BD/SRGD7BD, RCS2-□□5N (Incremental), RCS-RB75 series, RCS-G20, RCS-R* or the linear motor actuator (LSA), incremental of NS-SXM□/SZM□ is not connected.*
● *High-speed type (RCS3-CTZ5C, RCS3-CT8C) actuators are available for connection only with 3-phase type. The maximum number of connectable axes is three when only RCS3-CT8C is connected.*
Note 2 Equipping CC-Link IE Field and EtherNet/IP in parallel should not available.

5.2 SCARA Robot + Controller for Single-Axis Robots and Orthogonal Robots (4 axes Max.)

XSEL	-RAX8	-NNN5020H	-400WAI	-200WAI	-100WAIB	-60AL	-EPCC	-N1E	-2	-3
❶	❷	❸	❹ (Axis1)	❹ (Axis2)	❹ (Axis3)	❹ (Axis4)	❺	❻	❼	❽

Model table

❶ Series	❷ Controller type	❸ SCARA robot model	❹ Details of axis 5 to axis 8 (Note 1): Motor wattage	Encoder type	Brake	Creep	High acceleration/ deceleration	Home sensor (LS)	Synchronization designation	❺ Network slot: Slot 1	Slot 2	❻ I/O slots: Slot 1	Slot 2	❼ I/O Flat cable length	❽ Power supply voltage
XSEL	RAX4 (1unit of SCARA) RAX5 (1unit of SCARA + single axis 1-axis) RAX6 (1unit of SCARA + single axis 2-axis) RAX7 (1unit of SCARA + single axis 3-axis) RAX8 (1unit of SCARA + single axis 4-axis) SAX4*1 (1unit of SCARA safety categories compliance type) SAX5*1 (1unit of SCARA + single axis 1-axis safety categories compliance type) SAX6*1 (1unit of SCARA + single axis 2-axis safety categories compliance type) SAX7*1 (1unit of SCARA + single axis 3-axis safety categories compliance type) SAX8*1 (1unit of SCARA + single axis 4-axis safety categories compliance type)	NNN1205 to 8040H NNN10040 to 12040 (Standard type) NSN5016H to 6016H (High-speed type) NNC1205 to 8040H (Clean type) NNW2515H to 8040H (Splash proof type) TNN3015H to 3515H (Wall-mount type) UNN3015H to 3515H (Wall-mount inverse type) HNN5020H to 8040H (Ceiling-mount type) INN5020H to 8040H (Inverse type)	12 (12W) 20 (20W) 30D (30W for DS/RCS2) 30R (30W for RS) 60 (60W) 100 (100W) 100S (100W for linear) 150 (150W) 200 (200W) 200S (200W for linear) 300 (300W) 300S (300W for linear) 400 (400W) 600 (600W) 750 (750W)	WAI (Battery-less absolute/ incremental) A (Absolute) G (Spurious absolute) AI (Index absolute) AM (Multiple-rotation absolute)	Not Specified (w/o brake) B (with brake)	Not Specified (w/o creep) C (with creep)	Not Specified (w/o Acceleration/ deceleration) HA (Acceleration/ deceleration type)	Not Specified (w/o home sensor) L (with home sensor)	Not Specified (No synchronization) M (Master-axis designation) S (Slave-axis designation)	E Not for use EP (Note 2) EtherNet/IP Input 256/ Output 256 EC EtherCAT Input 256/ Output 256	E Not for use DV DeviceNet Input256/ Output256 CC CC-Link Input256/ Output256 PR PROFIBUS-DP Input256/ Output256 CIE (Note 2) CC-Link IE Field Input1024/ Output1024	E (Not for use) N1 Extension PIO Input32/ Output16 NPN board N2 Extension PIO Input16/ Output32 NPN board N3 Extension PIO Input48/ Output48 NPN board P1 Extension PIO Input32/ Output16 PNP board P2 Extension PIO Input16/ Output32 PNP board P3 Extension PIO Input48/ Output48 PNP board	E (Not for use) N1 Extension PIO Input32/ Output16 NPN board N2 Extension PIO Input16/ Output32 NPN board N3 Extension PIO Input48/ Output48 NPN board P1 Extension PIO Input32/ Output16 PNP board P2 Extension PIO Input16/ Output32 PNP board P3 Extension PIO Input48/ Output48 PNP board	2: 2m (Standard) 3: 3m 5: 5m 0: None	2: Single-phase 200V 2L Only for linear single-phase 200V 3 3-phase 200V 3L Only for linear 3-phase 200V

Model table

❶ Series	❷ Controller type	❸ SCARA robot model	❹ Details of axis 5 to axis 8 (Note 1): Motor wattage	Encoder type	Brake	Creep	High acceleration/ deceleration	Home sensor (LS)	Synchronization designation	❺ Network slot: Slot 1	Slot 2	❻ I/O slots: Slot 1	Slot 2	❼ I/O Flat cable length	❽ Power supply voltage
XSEL	RAX3 (1unit of 3-axis type SCARA) RAX4 (1unit of 4-axis type SCARA, 1unit of 3-axis type SCARA + single axis 1-axis) RAX5 (1unit of 4-axis type SCARA + single axis 1-axis, 1unit of 3-axis type SCARA + single axis 2-axis) RAX6 (1unit of 4-axis type SCARA + single axis 2-axis, 1unit of 3-axis type SCARA + single axis 3-axis) RAX7 (1unit of 4-axis type SCARA + single axis 3-axis, 1unit of 3-axis type SCARA + single axis 4-axis) RAX8 (1unit of 4-axis type SCARA + single axis 4-axis) SAX3*1 (1unit of 3-axis type SCARA safety categories compliance type) SAX4*1 (1unit of 4-axis type SCARA, 1unit of 3-axis type SCARA + single axis 1-axis safety categories compliance type) SAX5*1 (1unit of 4-axis type SCARA + single axis 1-axis, 1unit of 3-axis type SCARA + single axis 2-axis safety categories compliance type) SAX6*1 (1unit of 4-axis type SCARA + single axis 2-axis, 1unit of 3-axis type SCARA + single axis 3-axis safety categories compliance type) SAX7*1 (1unit of 4-axis type SCARA + single axis 3-axis, 1unit of 3-axis type SCARA + single axis 4-axis safety categories compliance type) SAX8*1 (1unit of 4-axis type SCARA + single axis 4-axis safety categories compliance type)	3NNN1805 4NNN1805 3NNN3015 4NNN3015 3NNN4518 4NNN4518 3NNN4533 4NNN4533 3NNN6018 4NNN6018 3NNN6033 4NNN6033 4NNN8020 4NNN8040 4NNN10020 4NNN10040 (Standard type) 3NSN3015 4NSN3015 3NSN4518 4NSN4518 3NSN4533 4NSN4533 3NSN6018 4NSN6018 3NSN6033 4NSN6033 4NSN8020 4NSN8040 4NSN10020 4NSN10040 (High-speed type) 4NHN10040 4NHN12040 (High payload type) 4NSW3015 4NSW4518 4NSW4533 4NSW6018 4NSW6033 4NSW8020 4NSW8040 4NSW10020 4NSW10040 (High-speed type, Dust proof/splash proof specifications) 4NHW12040 (High payload type, Dust proof/splash proof specifications) 4NSW3015 4NSW4518 4NSW4533 4NSW6018 4NSW6033 (Clean room type)	12 (12W) 20 (20W) 30D (30W for DS/RCS2) 30R (30W for RS) 60 (60W) 100 (100W) 100S (100W for linear) 150 (150W) 200 (200W) 200S (200W for linear) 300 (300W) 300S (300W for linear) 400 (400W) 600 (600W)	WAI (Battery-less absolute/ incremental) A (Absolute) G (Spurious absolute) AI (Index absolute) AM (Multiple-rotation absolute)	Not Specified (w/o brake) B (with brake)	Not Specified (w/o creep) C (with creep)	Not Specified (w/o Acceleration/ deceleration) HA (Acceleration/ deceleration type)	Not Specified (w/o home sensor) L (with home sensor)	Not Specified (No synchronization) M (Master-axis designation) S (Slave-axis designation)	E Not for use (Note 2) EP EtherNet/IP Input 256/ Output 256 EC EtherCAT Input 256/ Output 256	E Not for use DV DeviceNet Input256/ Output256 CC CC-Link Input256/ Output256 PR PROFIBUS-DP Input256/ Output256 (Note 2) CIE CC-Link IE Field Input1024/ Output1024	E (Not for use) N1 Extension PIO Input32/ Output16 NPN board N2 Extension PIO Input16/ Output32 NPN board N3 Extension PIO Input48/ Output48 NPN board P1 Extension PIO Input32/ Output16 PNP board P2 Extension PIO Input16/ Output32 PNP board P3 Extension PIO Input48/ Output48 PNP board	E (Not for use) N1 Extension PIO Input32/ Output16 NPN board N2 Extension PIO Input16/ Output32 NPN board N3 Extension PIO Input48/ Output48 NPN board P1 Extension PIO Input32/ Output16 PNP board P2 Extension PIO Input16/ Output32 PNP board P3 Extension PIO Input48/ Output48 PNP board	2: 2m (Standard) 3: 3m 5: 5m 0: None	2: Single-phase 200V 2L Only for linear single-phase 200V 3 3-phase 200V 3L Only for linear 3-phase 200V

*1 Safety categories compliance type: In this type, the safety circuit can be configured with the motor driving power source separated.
Note 1 ● *Any of the RCS2-R**7 series, RCS2-SRA7BD/SRGS7BD/SRGD7BD, RCS2-□□5N (Incremental), RCS-RB75 series, RCS-G20, RCS-R* or the linear motor actuator (LSA), incremental of NS-SXM□/SZM□ is not connected.*
● *High-speed type (RCS3-CTZ5C, RCS3-CT8C) actuators are available for connection only with 3-phase type. The maximum number of connectable axes is three when only RCS3-CT8C is connected.*
Note 2 Equipping CC-Link IE Field and EtherNet/IP in parallel should not available.

[Restrictions on Connected Axes to XSEL-RAX/SAX]

SCARA Model	Total Wattage and Number of Connectable Axes
IX-NNN1205/1505/1805	1500W in total or less 4 axes at max. 750W max. for 1 axis
IX-□N□2515H/3015H/3515H	1500W in total or less 4 axes at max. 750W max. for 1 axis
IX-□N□5020H/6020H	600W in total or less 4 axes at max. 600W max. for 1 axis
IX-□N□70□□H/□80□□H	Unavailable
IX-NSN5016H/6016H	Unavailable
IX-NNN10040/12040	Unavailable
IXA-□NNN1805	1500W in total or less 4 axes at max. 750W max. for 1 axis
IXA-3NNN3015/3NNN45□□/3NNN60□□	700W in total or less 4 axes at max. 600W max. for 1 axis
IXA-4NNN3015/4NNN45□□	600W in total or less 4 axes at max. 600W max. for 1 axis
IXA-4NNN60□□	600W in total or less 4 axes at max. 600W max. for 1 axis
IXA-4NNN80□□/IXA-4NNN100□□	Unavailable
IXA-3NSN3015/3NSN45□□/3NSN60□□ IXA-4NSN3015/4NSN45□□/4NSN60□□	Unavailable
IXA-4NSN80□□/IXA-4NSN100□□	Unavailable
IXA-4NHN100□□/IXA-4NHN120□□	Unavailable
IXA-4NSW3015/4NSW45□□/4NSW60□□/ 4NSW80□□/4NSW100□□	Unavailable
IXA-4NHW12040	Unavailable
IXA-4NSC3015/4NSC45□□/4NSC60□□	Unavailable

5.3 Controller for SCARA Robot 2-Unit Connection Dedicated

XSEL	-RAXD8	-NNN5020H	-NNN1805	-EPCC	-N1E	-2	-3
❶	❷	❸	❹	❺	❻	❼	❽

Model table

❶ Series	❷ Controller type	❸ SCARA Robot Model 1	❹ SCARA Robot Model 2	❺ Network Slot: Slot 1	Slot 2	❻ I/O slots: Slot 1	Slot 2	❼ I/O Flat cable length	❽ Power supply voltage
XSEL	RAXD8 (For connection of 2 units of SCARA) SAXD8*1 (For connection of 2 units of SCARA safety categories compliance type)	NNN1205 to 1805 NNN2515H to 6030H (Standard type) NNC1205 to 1805 NNC2515H to 6030H (Clean type) NNW2515H to 6030H (Splash proof type) TNN3015H to 3515H (Wall-mount type) UNN3015H to 3515H (Wall-mount inverse type) HNN5020H to 6020H (Ceiling-mount type) INN5020H to 6020H (Inverse type)	NNN1205 to 1805 NNN2515H to 6030H (Standard type) NNC1205 to 1805 NNC2515H to 6030H (Clean type) NNW2515H to 6030H (Splash proof type) TNN3015H to 3515H (Wall-mount type) UNN3015H to 3515H (Wall-mount inverse type) HNN5020H to 6020H (Ceiling-mount type) INN5020H to 6020H (Inverse type)	E Not for use EP (Note1) EtherNet/IP Input256/ Output256 EC EtherCAT Input256/ Output256	E Not for use DV DeviceNet Input256/ Output256 CC CC-Link Input256/ Output256 PR ProfiBus Input256/ Output256 CIE (Note1) CC-Link IE Field Input 1024/ Output 1024	E (Not for use) N1 Extension PIO Input32/ Output16 NPN board N2 Extension PIO Input16/ Output32 NPN board N3 Extension PIO Input48/ Output48 NPN board P1 Extension PIO Input32/ Output16 PNP board P2 Extension PIO Input16/ Output32 PNP board P3 Extension PIO Input48/ Output48 PNP board	E (Not for use) N1 Extension PIO Input32/ Output16 NPN board N2 Extension PIO Input16/ Output32 NPN board N3 Extension PIO Input48/ Output48 NPN board P1 Extension PIO Input32/ Output16 PNP board P2 Extension PIO Input16/ Output32 PNP board P3 Extension PIO Input48/ Output48 PNP board	2: 2m (Standard) 3: 3m 5: 5m 0: None	3: 3-phase 200V

*1 Safety categories compliance type: In this type, the safety circuit can be configured with the motor driving power source separated.
Note 1Equipping CC-Link IE Field and EtherNet/IP in parallel should not available.

[Limitations in SCARA Robot Combination in XSEL-RAXD/SAXD]
(1) 3-phase type

First Unit	Second Unit
IX-NNN1205/1505/1805 IX-□N□2515H/3015H/3515H	IX-NNN1205/1505/1805 IX-□N□2515H/3015H/3515H
IX-□N□5020H/6020H	IX-NNN1205/1505/1805

Basic Specifications

Specifications

Specification Item			XSEL-RA/RAX/RAXD	XSEL-SA/SAX/SAXD
Number of controlled axes			XSEL-RA/SA: 1-axis to 4-axis (4-axis specification), 1-axis to 8-axis (8-axis specification) XSEL-RAX/SAX: SCARA Robot 1-axis to 4-axis, Additional 5-axis to 8-axis (8-axis specification) XSEL-RAXD/SAXD: SCARA Robot 1-axis to 4-axis, 5-axis to 8-axis XSEL-SAX4(High Capacity Type (Note 1)): SCARA Robot 1-axis to 4-axis	
Applicable motor capacity			20W to 750W (200 to 1000W for High Capacity Type (Note 1))	
Total connectable wattage			3-phase type controller: 2400W (3600W for High Capacity Type (Note 1)) Single-phase type controller: 1600W (RA/SA type only)	
Control Power supply voltage			Single-phase 200 to 230V AC ±10%	
Motor Driving Source Voltage			3-phase 200 to 230V AC ±10% / Single-phase 200 to 230V AC ±10%	
Power Supply Frequency			50Hz/60Hz	
Rush Current (Note 2)	Control power supply		60A	
	Motor drive power supply		60A (MAX.) (Less than 1200W) 120A (MAX.) (1200W or more)	
Leakage Current (Note 3) (Excluding Higher Harmonic Content)	Control power supply		0.4mA	0.2mA
	Motor drive power supply		2mA or less	
Heat Generation			Refer to the item for the power capacity and heating value.	
PIO Power Supply (Note 4)			24V DC ±10% (Supplied from external equipment)	
Electromagnetic Brake Power Supply (For the actuator with the brake)			24V DC ±10% Per 1 actuator approx. 0.4A (Supplied from external equipment)	
Transient Power Cutoff Durability			10ms (when power source frequency 50Hz is used), 8ms (when power source frequency 60Hz is used)	
Motor Control System			AC full-digital servo	
Applicable Encoder			Battery-less absolute encoder, incremental serial encoder or absolute serial encoder	
Speed Setting			From 1mm/s The upper limit depends on the specifications of actuator	
Acceleration Setting			From 0.01G The upper limit depends on the specifications of actuator	
Serial Communication Interface	Teaching port		Connector dedicated for teaching tool (XSEL serial communication protocol (Format B)) connector : D-sub 25 pin	
	USB port		Applicable for USB2.0 Connector: Mini-B	
	EtherNet		10/100/1000BASE-T Connector: RJ-45	
	RS232C Port 1		RS-232C: 1CH Baud rate: Max. 230.4kbps Connector: D-sub 9 pin Cable length: Max.10m	
External Interface	PIO Type		PIO Board MAX. 2 pieces Signal I/O dedicated for 24V DC (Input and output ports, selected from NPN/PNP) Refer to [How to read the model]	
	Field Network Type		DeviceNet, CC-Link, PROFIBUS-DP, EtherNet/IP, EtherCAT, CC-Link IE Field (For either of DeviceNet, CC-Link, PROFIBUS-DP or CC-Link IE Field and either of EtherNet/IP or EtherCAT, either of the boards can be inserted at the same time.) * Equipping CC-Link IE Field and EtherNet/IP in parallel unavailable Refer to [Field Network Instruction Manual] provided separately.	
Data Setting and Input			PC software, touch panel teaching pendant TB-01/01D/01DR, TB-02/02D, TB-03	
Program Specification			SEL language	
Max. Number of Program Steps			20000 steps	
Number of Positions			1-axis type :60000 Position 5-axis type : 33333 Position 2-axis type :50000 Position 6-axis type : 30000 Position 3-axis type :42867 Position 7-axis type : 27272 Position 4-axis type :37500 Position 8-axis type : 25000 Position	
Max. Number of Programs			255 programs	
Max. Number of Multitask Programs			16 programs	
Data Retention Memory			Flash ROM + FRAM	
Extension Motion Control Master Feature			Number of Connectable Axes:32 axes max. of MECHATROLINK-III controllers in SCON-CB, SCON-CA, PCON-CB, ACON-CB, DCON-CB and MCON-C	
Clock Function			Retaining time after power turned off: approximately 10 days Time for battery charge after power is on after the clock data is lost: approximately 100 hours	
System I/O			Emergency stop input, safety gate input, system ready output and other safety circuit inputs and outputs, and MANU/AUTO external changeover	
Safety Circuit Configuration	Drive-source Cutoff Method		Internal Relay	External Safety Circuit
	Emergency-Stop Input		b Contact (Normally Closed) Input (internal power supply)	b Contact (Normally Closed) Input (external power supply, duplication available)
	Enable Input		b Contact (Normally Closed) Input (internal power supply)	b Contact (Normally Closed) Input (external power supply, duplication available)
System Ready Output			No-voltage contact (relay) output Max.200mA (DC24V)	
Protective Functions			Motor over current, overload, motor driver temperature check, overload check, encoder open circuit detection, soft limit over, system abnormality, battery abnormality	
Regenerative Resistor			Equipped with built-in 1kΩ/20W regenerative resistor Extension available with connecting an external regenerative resistor	
Absolute Battery			Cartesian axis: AB-5 (Enclosed in Product) Mounted inside robot for SCARA Robot.	
Protection Function against Electric Shock			Class 1 In case grounding conducted on ground terminal in addition to basic insulation for electric shock proof.	
Overvoltage Category			Category 2 Voltage durability 2500V at less than 300V AC for input rating	
Insulation Resistance			10MΩ or more (Between power terminal and I/O terminal and also all external terminals and case at the power supply of DC500V)	
Insulation strength			1500V AC for 1 min.	
Cooling Method			Forced Air-Cooling	
Environment	Surrounding air temperature		0 to +40°C	
	Surrounding humidity		5% RH to 85% RH (Should be no-condensing)	
	Surrounding environment		[Refer to the Item for the Installation Environment]	
	Surrounding storage temperature		-20 to 70°C (The Absolute Battery is excluded.)	
	Surrounding storage humidity		5% RH to 85% RH (Should be no-condensing)	
	Maximum Operation Height		1000m	
	Vibration Resistance		10 to 57Hz in XYZ directions/Pulsating amplitude 0.035mm (continuous), 0.075mm (intermittent) 57 to 150Hz/4.9m/s² (continuous), 9.8m/s² (intermittent)	
	Protection Class		IP20	
	Pollution Degree		Pollution Degree 2	
External Dimensions			[Refer to the External dimensions Dimension]	
Mass	Four-axis type frame	Without absolute battery unit	Approx. 4.4kg	3-phase type: Approx. 3.8kg Single-phase type: Approx. 4.4kg
		With the absolute battery unit	Approx. 5.0kg	3-phase type: Approx. 4.4kg Single-phase type: Approx. 5.0kg
	Eight-axis type frame	Without absolute battery unit	Approx. 5.3kg	3-phase type: Approx. 4.7kg Single-phase type: Approx. 5.3kg XSEL-SAX4 (High Capacity Type): Approx. 5.3kg
		With the absolute battery unit	Approx. 6.0kg	3-phase type: Approx. 5.4kg Single-phase type: Approx. 6.0kg

Note 1 XSEL-SAX4 (high capacity type) is a dedicated controller for IXA-4NSN80□□/4NSN100□□, 4NHN10040/12040, IXA-4NHN100□□/IXA-4NHN120□□, IXA-4NSW80□□/4NSW100□□, IXA-4NHW12040 and IX-NNN10040/12040.

Note 2 Rush current at the power connection continues for 3 msec. Note that the value of in-rush current differs depending on the impedance of the power supply line.

Note 3 Leak current varies depending on the capacity of connected motor, cable length and the surrounding environment. Measure the leak current at the point where a ground fault circuit interrupter is to be installed when leakage protection is conducted. Regarding the leakage breaker, it is necessary to have a clear purpose for selection such as a fire protection or protection of human body. Use the harmonic type (for inverter) for a leakage breaker.

Note 4 Power supply is not necessary if PIO is not to be used.

[Power Capacity and Heating Value]

Rated Power Capacity (VA) = Total Capacity of Motor Power (VA) + Total of the power consumption at the control part (VA)

Heating Value (W) = Total Output Loss (W) + (Total of internal power consumption (VA) × 0.7 (Efficiency) × 0.6 (Power factor))

- Select the Motor Driving Power (VA) from the Table 1 and 2.
- Figure out the total of the power consumption at the control part (VA) with the total of power of the actually mounted components • quantity, by selecting the applicable ones from Table 3 Control Power Source (Internal Consumption and External Consumption).
- To calculate the sum total of output loss (W), refer to the “Output Loss” column in Table 1 below and select the values corresponding to the output losses of each connected actuator.

- For the inner power demand (VA) for calculating the heating value (W) in the control unit, select the components which are being placed, from the columns of Control Power Supply (Internal Consumption) and External Power Supply (Internal Consumption) in Table 3 and calculate it using the formula “Power • Quantity of the Placement Component”

Table: 1 Motor Power Capacity of Single-Axis Actuator and Output Loss

Wattage of Actuator Motor (W)	Motor Power Capacity (VA)	Output loss = Heat Generation (W)	Wattage of Actuator Motor (W)	Motor Power Capacity (VA)	Output loss = Heat Generation (W)
20	26	1.58	100 (Linear Actuator LSAS-N10SS)	379	4.48
30	46	2.07			
60	138	3.39	200 (Linear Actuator LSAS-N15SS)	486	4.37
100	234	6.12			
150	328	8.30	200 (Linear Actuator LSAS-N15HS)	773	6.42
200	421	9.12			
400	796	19.76	DD/DDA (200W)	503	7.5
600	1164	27.20	DD/DDA (600W)	1462	20.8
750	1521	29.77	RCS3-CTZ5C (60W) (Note 1)	197	3.6
			RCS3-CT8C (400W) (Note 1)	1230	18.0

Note 1 Assume 120W for RCS3-CTZ5C and 800W for RCS3-CT8C when performing calculation for those such as the power capacity.

Table: 2 Motor Volt Amperage of SCARA Robot and Output Loss

SCARA Robot	Wattage (W) (Rated output)	Motor Power Capacity (VA) (Note 1)	Output loss = Heat Generation (W)
IX-NN□1205/1505/1805	129.8	216.3	8.13
IX-NN□2515H/3515H、IX-TNN(UNN)3015H/3515H	1117.9	1863.1	44.8
IX-NN□50□□H/60□□H、IX-HNN(INN)5020H/6020H	2218.0	3696.7	69.7
IX-NN□70□□H/80□□H、IX-HNN(INN)7020H/8020H	3880.6	6467.7	93.2
IX-NSN5016H/6016H	4102.9	6338.1	95.2
IX-NNN10040/12040	6112.7	10187.9	134.2
IXA-3NNN1805	319.4	532.3	10.7
IXA-3NNN3015	1330.4	2217.3	34.0
IXA-3NNN45□□	1178.8	1964.7	33.3
IXA-3NNN60□□	1469.1	2448.5	43.6
IXA-4NNN1805	356.0	593.4	14.3
IXA-4NNN3015	1582.3	2637.1	40.3
IXA-4NNN45□□	1370.6	2284.3	38.6
IXA-4NNN60□□	1660.9	2768.1	48.9
IXA-4NNN80□□	3468.5	5780.8	82.3
IXA-4NNN100□□	3398.3	5663.8	82.3
IXA-3NSN3015	2343.0	3905.1	54.0
IXA-3NSN45□□	2533.6	4222.7	55.3
IXA-3NSN60□□	2413.5	4022.6	56.3
IXA-4NSN3015	2594.9	4324.8	60.4
IXA-4NSN45□□	2725.4	4542.3	60.5
IXA-4NSN60□□	2605.3	4342.2	61.6
IXA-4NSN80□□/IXA-4NSN100□□	5589.1	9315.2	118.5
IXA-4NSW3015	2555.5	4259.1	61.6
IXA-4NSW45□□	2399.3	3998.9	60.5
IXA-4NSW60□□	2496.2	4160.3	61.6
IXA-4NSW80□□	5489.5	9149.2	118.5
IXA-4NSW100□□	5329.6	8882.7	118.5
IXA-4NHW12040	5209.4	8682.3	118.5
IXA-4NSC3015	2616.5	4360.8	60.5
IXA-4NSC45□□	2725.4	4542.3	60.5
IXA-4NSC60□□	2656.5	4427.5	61.6

Note 1 Calculated with 0.6 for power factor

Table: 3 Motor Driving Power and Output Loss

			Control power supply		External Power Source (24VDC)		Quantity	
			Internal Consumption (VA)	External Consumption (VA)	Internal Consumption (VA)	External Consumption (VA)		
Base Unit			46.64				1	
Driver	Per Board		6.26				[Refer to Table 4]	
Encoder Section	Per axis		2.38	3.57				
Fan Unit	Per fan		5.71					
Axis Sensor	Per axis		4.57					
I/O Board	DIO (48 points)	N1, N2 P1, P2	5.95		14.52		0 to 2	Number of PCBs on PIO Board 1 and 2
	DIO (96 points)	N3, P3	8.33		26.81		0 to 2	
Network Module	DeviceNet	DV	1.98		3.43		0 to 1	Number of PCBs on Field Network Board 1
	CC-Link	CC	5.67				0 to 1	
	PROFIBUS-DP	PR	1.98				0 to 1	
	CC-Link IE Field	CIE	3.30				0 to 1	
	EtherNET/IP	EP	1.98				0 to 1	Number of PCBs on Field Network Board 2
	EtherCAT	EC	3.93				0 to 1	
Teaching pendant	TB-01, TB-02, TB-03			8.57			0 to 1	
Brake	Per axis		0.12		2.5	7.5	Total number of brake-equipped actuators 0 to 8	

Table: 4 Number of Controlled Parts

	Number of axes							
	1-Axis	2-Axis	3-Axis	4-Axis	5-Axis	6-Axis	7-Axis	8-Axis
Driver	1	1	2	2	3	3	4	4
Encoder Section	1	2	3	4	5	6	7	8
Fan Unit	Four-axis type frame				Eight-axis type frame			
	XSEL-RA/RAX : 5 units XSEL-SA/SAX (three phase type) : 4 units XSEL-SA (single phase type) : 5 units				XSEL-RA/RAX/RAXD : 6 units XSEL-SA/SAX/SAXD (three phase type) : 5 units XSEL-SA (single phase type) : 6 units XSEL-SAX4(high capacity type) : 6 units			
Axis Sensor	1	2	3	4	5	6	7	8

[Selection of Circuit Interrupter]

- 3 times of the rated current flows to the controller during the acceleration/deceleration. Select one that does not trip when the above current passes. When it trips, select the breaker with a rated current one rank above. (Confirm that Operation Characteristic Curve described in the catalogue of each manufacturer.)
- Select the breaker that does not trip with the rush current.
  (Confirm that Operation Characteristic Curve described in the catalogue of each manufacturer.)
- For the rated breaking current, select the current value which can break the current even when a short circuit occurs.
  Rated Breaking Current > Short-circuit Current = Primary Power Supply Capacity/Power Voltage
- Consider margin for the rated current on the circuit breaker.

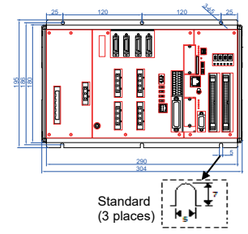
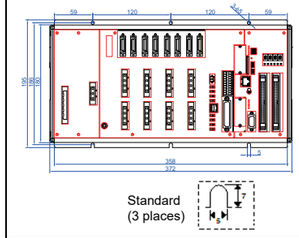
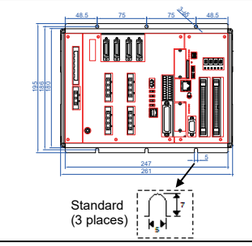
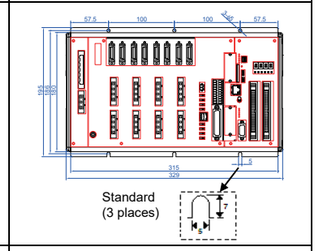
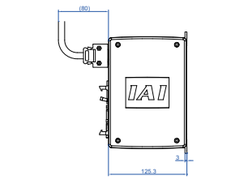
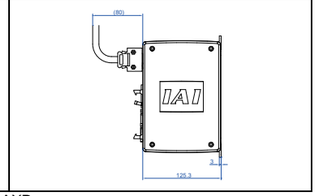
Rated current of circuit breaker >
rated voltage amperage [VA] / AC input voltage × Margin (1.2 to 1.4 for reference)

[Selection of Leakage Breaker]

- Regarding the leakage breaker, it is necessary to have a clear purpose for selection such as a fire protection or protection of human body.
- Leak current varies depending on the capacity of connected motor, cable length and the surrounding environment. Measure the leak current at the point where a ground fault circuit interrupter is to be installed when leakage protection is conducted.
- Use the applicable to higher harmonics type leakage breaker.

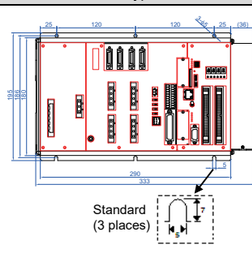
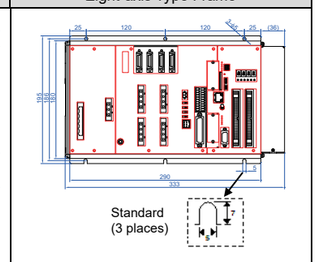
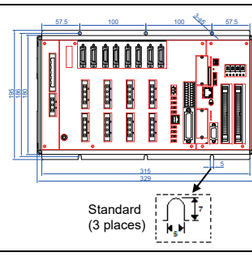
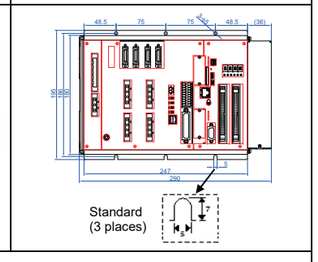
External Dimensions

1. Absolute Battery Non-Equipped Type

Controller Type	All Types Equipped	
	Four-axis Type Frame	Eight-axis Type Frame
RA (Single-phase/ 3-phase type) SA (Single-phase type) RAX/RAXD (3-phase type) XSEL-SAX4- (High Capacity Type)		
SA/SAX/SAXD (3-phase type)		
Side View		

* There is only the eight-axis type frame for XSEL-RAXD/SAXD.

2. Absolute Battery Equipped Type

Controller Type	All Types Equipped	
	Four-axis Type Frame	Eight-axis Type Frame
RA (Single-phase/ 3-phase type) SA (Single-phase type) RAX/RAXD (3-phase type)		
SA/SAX/SAXD (3-phase type)		
Side View	Side view is the same as that for absolute battery non-equipped type	

* There is only the eight-axis type frame for XSEL-RAXD/SAXD.

Brake Box (Option): RCB-110-RA13-0

Brake Box: A brake release unit dedicated for NS-MZMS, NS-MZMM, NS-LZMS, NS-LZMM, ZR
Brakes for two axes can be controlled with one brake box.
For detail of the brake box, refer to [2.4.3 in XSEL-RA/SA/RAX/SAX/RAXD/SAXD Instruction Manual]

Brake Box (Option): IA-110-DD-4

Brake Box: Brake release unit for DD(A)
For detail of the brake box, refer to [2.4.4 in XSEL-RA/SA/RAX/SAX/RAXD/SAXD Instruction Manual]

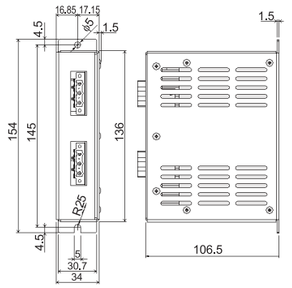
Regenerative Resistor Unit (Option): RESU-1, RESUD-1

This is a unit that converts the regenerative current to heat when the motor decelerates.

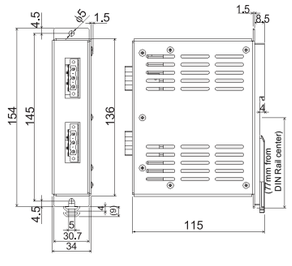
[Specification]

Item		Specification
Internal Regenerative Resistor		235Ω/80W
Heat Generation		32W max.
Accessories		Controller link cable (Model CB-ST-REU010) 1m
Environment	Surrounding air temperature	0 to +40°C
	Surrounding humidity	5% RH to 85% RH (Should be no-condensing)
	Surrounding environment	(Refer to the Item for the Installation Environment).
	Surrounding storage temperature	-20 to 70°C
	Surrounding storage humidity	5% RH to 85% RH (Should be no-condensing)
External Dimensions		W34 × H154 × D106.5mm (RESU-1) W34 × H158 × D115mm (RESUD-1)
Weight		Approx. 0.4kg

[External Dimensions]



Fixing Screw Type (RESU-1)



DIN Rails Fixing Type (RESUD-1)

[Number of Connectable]

To calculate the total number of necessary units, select the suitable conditions from the table below for the actuator type connected to XSEL controller and sum up the numbers.

Total Number of Connected Units = Number in 1) + Number in 2) + Number in 3)

Calculation Table for Necessary Number of Regenerative Units

No.	Actuator Type		Quantity
1)	Total capacity of single-axis actuator motors in horizontally oriented installation	0～100W	Not required
		～600W	1 Unit
		～1200W	2 Units
		～1800W	3 Units
		～2400W	4 Units
2)	Total capacity of single-axis actuator motors in vertically oriented installation	0～100W	Not required
		～600W	1 Unit
		～1000W	2 Units
		～1400W	3 Units
		～2000W	4 Units
		～2400W	5 Units
3)	SCARA Robot	IX-NNN1205/1505/1805	Not required
		IX-NNN2515H/3515H、IX-NNW2515H/3515H IX-TNN(UNN)3015H/3515H、IX-NNC2515H/3515H	1 Unit per controller
		IX-NNN50□□H/60□□H、IX-NNW50□□H/60□□H IX-HNN(INN)50□□H/60□□H、 IX-NNC50□□H/60□□H	3 Units per controller
		IX-NNN70□□H/80□□H、IX-NNW70□□H/80□□H IX-HNN(INN)70□□H/80□□H、 IX-NNC70□□H/80□□H、IX-NNN10040/12040	4 Units per controller
		IX-NSN5016H/NSN6016H	3 Units per controller
		IXA-□NNN1805	Not required
		IXA-□NNN3015、IXA-□NNN45□□、 IXA-□NNN60□□	2 Units per controller
		IXA-4NNN80□□、IXA-4NNN100□□	6 Units per controller
		IXA-□NSN3015、IXA-□NSN45□□	3 Units per controller
		IXA-□NSN60□□	4 Units per controller
		IXA-4NSN80□□、IXA-4NSN100□□	7 Units per controller
		IXA-4NHN10040、IXA-4NHN12040	10 Units per controller
		IXA-4NSW3015、IXA-4NSW45□□	3 Units per controller
		IXA-4NSW60□□	4 Units per controller
		IXA-4NSW80□□、IXA-4NSW100□□	7 Units per controller
		IXA-4NHW12040	10 Units per controller
		IXA-4NSC3015、IXA-4NSC45□□	3 Units per controller
		IXA-4NSC60□□	4 Units per controller

Installation Environment

This product is capable for use in the environment of pollution degree 2*1 or equivalent.
*1 Pollution Degree 2: Environment that may cause non-conductive pollution or transient conductive pollution by frost (IEC60664-1).

1. Installation Environment

Do not use this product in the following environment:

- Location where the surrounding air temperature exceeds the range of 0 to 40°C
- Location where condensation occurs due to abrupt temperature changes
- Location where relative humidity exceeds 5%RH to 85%RH
- Location exposed to corrosive gases or combustible gases
- Location exposed to significant amount of dust, salt or iron powder
- Location subject to direct vibration or impact
- Location exposed to direct sunlight
- Location where the product may come in contact with water, oil or chemical droplets
- Environment that blocks the air vent [Refer to Heat Radiation and Installation]
- Where the altitude is more than 1,000m

When using the product in any of the locations specified below, provide a sufficient shield.

- Location subject to electrostatic noise
- Location where high electrical or magnetic field is present
- Location with the mains or power lines passing nearby

2. Storage and Preservation Environment

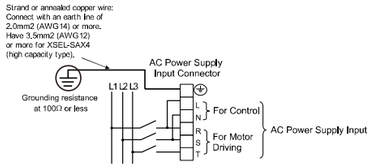
Storage and preservation environment follows the installation environment. However, it should be a place in a condition that does not exceed the ambient temperature in the range -20 to 70°C and the relative humidity 5%RH to 85%RH. Especially in a long-term storage, consider to avoid condensation of surrounding air.
Unless specially specified, moisture absorbency protection is not included in the package when the machine is delivered. In the case that the machine is to be stored and preserved in an environment where dew condensation is anticipated, take the condensation preventive measures from outside of the entire package, or directly after opening the package.

Installation and Noise Elimination

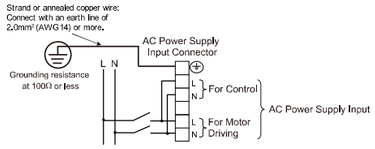
1. Protective Ground

For grounding, make sure to conduct grounding resistance 100Ω or less.
The wiring should apply a twist line or an annealed copper wire of 2.0 mm^2 (AWG14) or more.
Have 3.5mm^2 (AWG12) or more for XSEL-SAX4 (high capacity type).

[3-phase type]

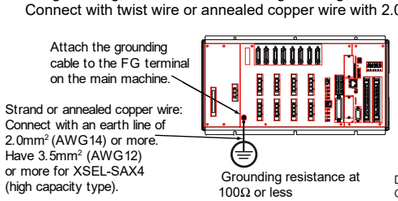


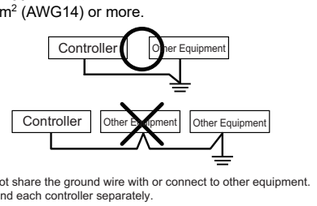
[Single-phase type]



2. Noise Elimination Grounding (Frame Ground (FG))

For grounding, make sure to conduct grounding resistance 100Ω or less.
Connect with twist wire or annealed copper wire with 2.0 mm^2 (AWG14) or more.





Do not share the ground wire with or connect to other equipment.
Ground each controller separately.

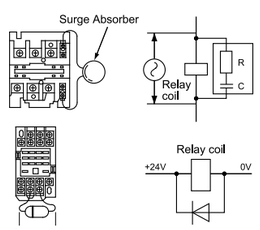
3. Precautions regarding wiring method

(1) Use a twisted cable for connection to the power supply.
(2) To reduce the interference to each other, have the I/O line, communication and encoder lines, power and driving supply lines separate from each other.

4. Noise Sources and Elimination

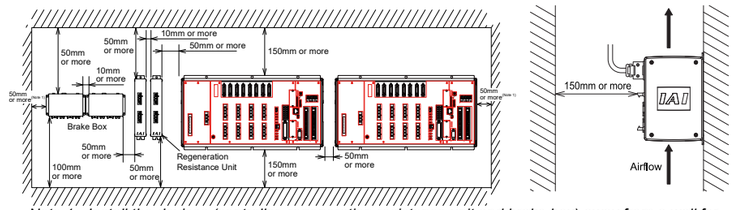
Carry out noise elimination measures for power devices on the same power path and in the same equipment.
The following are examples of measures to eliminate noise sources:

(1) AC solenoid valves, magnet switches and relays
[Measure] Install a Surge Absorber parallel with the coil.
(2) DC solenoid valves, magnet switches and relays
[Measure] Install a diode parallel with the coil.
Use a DC relay with a built-in diode.



5. Heat Radiation and Installation

Conduct design and manufacture in consideration of the control box size, controller layout and cooling in such a way that the temperature around the controller will be 40°C or less.

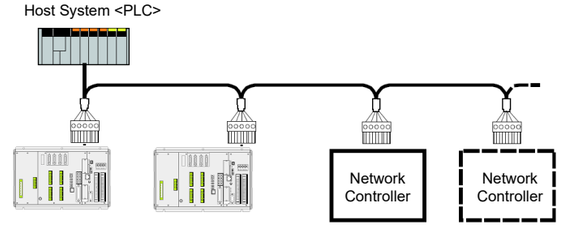


Note 1 Install the devices (controller, regeneration resistance unit and brake box) away from a wall for 50mm or more.

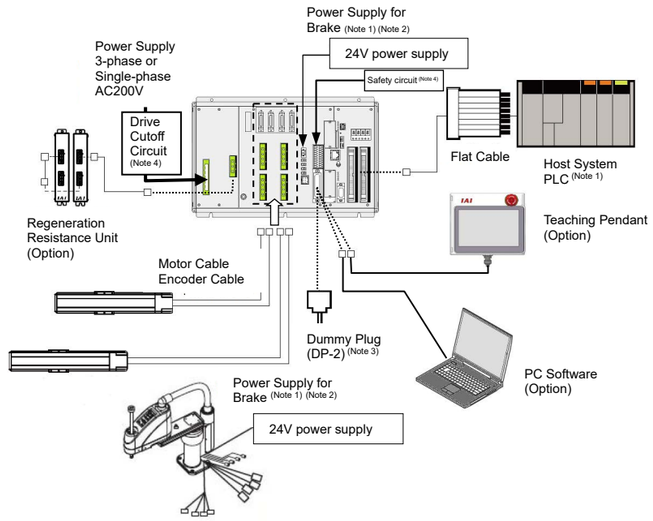
Wiring Layout Diagram

> ⚠ *Caution: In the case of ICSB etc... (Orthogonal Robot) and SCARA robot, a number is attached to each cable.*
> *Connect it according to the controller connector number.*
> *For the actuator regarded as that for single-axis robot, the connector Nos. are not indicated.*
> *In such case, give a number to each connector to avoid any mistake.*

[Network Wiring Example]



[Connection to actuator and optional unit]

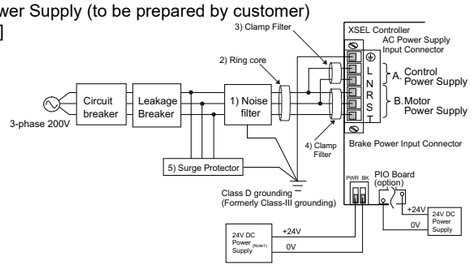


Note 1 Please prepare the host system (PLC) and 24VDC power supply for PIO / brake by the customer.
Note 2 It is necessary to have a power supply for brake for SCARA Robot except for IX-NNN1205/ 1505/1805 (with brake equipped), IX-NNN10040/12040 and IXA SCARA Robot. For an actuator equipped with a brake, supply of power +24V to the controller for the brake operation is required.
Note 3 When the unit is not connected to the personal computer or teaching pendant, connect the dummy plug (DP-2).
Note 4 Construct a safety circuit for SA, SAX and SAXD Types.
(Note) There is only 3-phase AC200V for XSEL-SAX/SAXD.

> ⚠ *Warning:*
> - *In the case PC is connected to XSEL-SA, SAX or SAXD, the standard PC cable CB-ST-E1MW050(-EB): Black enclosed in the PC software IA-101-X-MW cannot be used.*
> - *Even though the PC software can be used, make sure to use the cable CB-ST-A1MW050(-EB): Grey or CB-ST-A2MW050(-EB): Black with Yellow Line.*

Wiring for the Power/Emergency Stop Circuit and Brake Forced Release Switch

● Wiring for Power Supply (to be prepared by customer)
[3-phase type]

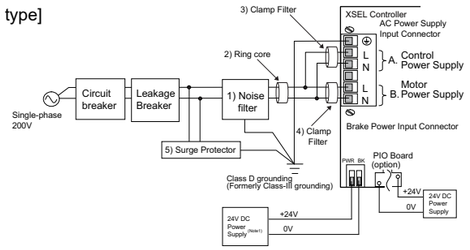


The power consumption and heat generation of X-SEL controller may differ depending how to construct the options. Select the circuit breaker and leakage breaker that suits to the specification. Refer to [Basic Specifications]

Note 1 It is not required when there is no actuator with the brake.

Parts Name		Model	Supplier	Position to Attach
1)	Noise Filter	TAC-20-683	COSEL	Attach in range of 300mm or less from controller
		NF3020C-SVA(Note2)	SOSHIN ELECTRIC Co., Ltd.	
2)	Ring Core	ESD-R-25	NEC TOKIN	
3)	Clamp Filter	ZCAT3035-1330	TDK	Attach as close as possible to controller
4)	Clamp Filter	RFC-H13	Kitagawa Industries Co., Ltd.	
5)	Surge Protector	R·A·V-781BXZ-4	Okaya Denki	Attach at the input terminal of noise filter

[Single-phase type]

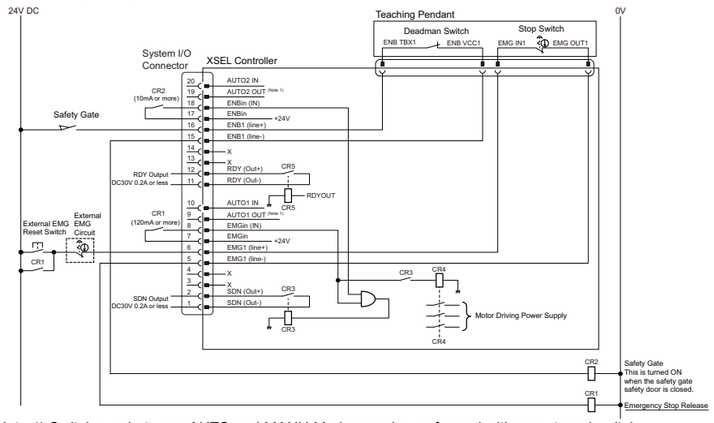


The power consumption and heat generation of X-SEL controller may differ depending how to construct the options. Select the circuit breaker and leakage breaker that suits to the specification. Refer to [Basic Specifications]

Note 1 It is not required when there is no actuator with the brake.

Parts Name		Model	Supplier	Position to Attach
1)	Noise Filter	NBH-20-432	COSEL	Attach in range of 300mm or less from controller
2)	Ring Core	ESD-R-25	NEC TOKIN	
3)	Clamp Filter	ZCAT3035-1330	TDK	Attach as close as possible to controller
4)	Clamp Filter	RFC-H13	Kitagawa Industries Co., Ltd.	
5)	Surge Protector	R·A·V-781BWZ-2A	Okaya Denki	Attach at the input terminal of noise filter

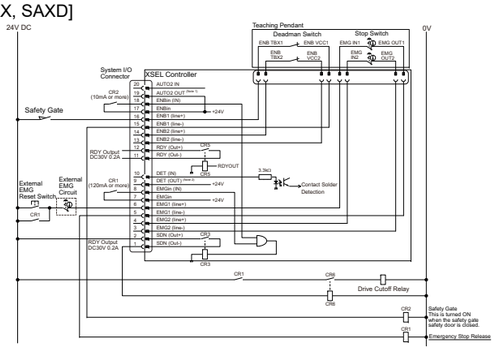
● Wiring for Emergency Stop Input
[XSEL-RA, RAX, RAXD]



(Note 1) Switchover between AUTO and MANU Modes can be performed with an external switch connected. Make the line short-circuited if not to be used. Refer to [2.3.2 Wiring of Emergency Stop Circuit (System I/O) in XSEL-RA/SA/RAX/SAX/RAXD/SAXD Instruction Manual]

> ⚠ *Caution: Make sure not to connect 100V or 200V AC accidently to the system I/O. It may destroy the internal circuit.*

[XSEL-SA, SAX, SAXD]

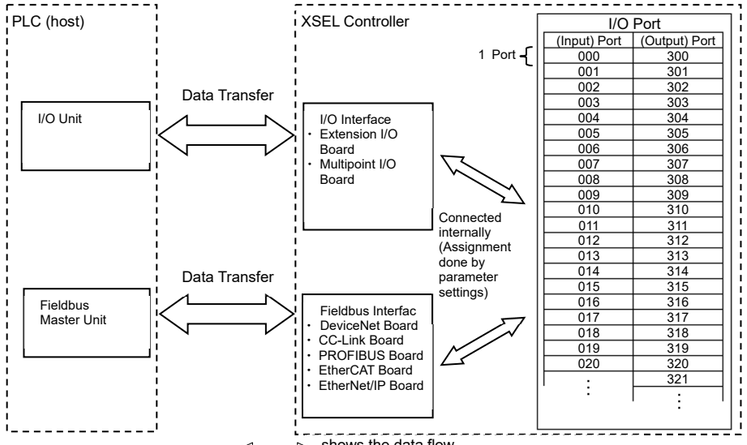


> ⚠ *Caution: Make sure not to connect 100V or 200V AC accidently to the system I/O. It may destroy the internal circuit.*

> ⚠ *Caution:*
> - *Do not fail to lay out (EMGin, EMG1, SDN, ENBin and ENB1) regardless of the safety category.*
> - *EMG2 and ENB2 are mandatory to realize Safety Category 3, and they enable the double layout of the safety circuit.*
> - *DET is an input to detect the operational errors (mainly at soldered contact points of relay) in the safety circuit, and do not forget to use it if it is required to have XSEL Controller detect the contact solder. When closing in the safety circuit side to control the contact solder and other errors, it is possible to realize Safety Category 4 without connecting to the controller. Refer to the [Instruction manual of XSEL-RA/SA/RAX/SAX/RAXD/SAXD]*

XSEL I/O Port

I/O port is a point to receive and send data located inside the controller. 1 port can handle data of 1 contact (1 bit). Data are sent and received via either PIO (24V input and output) or field network. Connection to one port is available from only one of PIO or field network. Set a parameter to determine which of PIO or field network is to be used.



● I/O Mapping
Shown below are the I/O port numbers and their functions of XSEL Controller at the delivery.
The allocation of the XSEL port numbers or functions, can be changed using the I/O parameter setting.

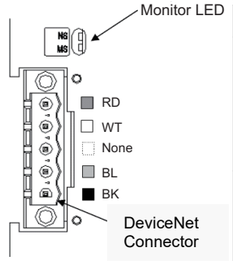
	Port No.	Function		Port No.	Function
Input	000	Program Start	Output	300	Alarm Output
	001	Universal Input		301	Ready Output
	002	Universal Input		302	Emergency Stop Output
	003	Universal Input		303	Universal Output
	004	Universal Input		304	Universal Output
	005	Universal Input		305	Universal Output
	006	Universal Input		306	Universal Output
Input	007	Program Specification (PRG No.1)	Output	307	Universal Output
	008	Program Specification (PRG No.2)		308	Universal Output
	009	Program Specification (PRG No.4)		309	Universal Output
	010	Program Specification (PRG No.8)		310	Universal Output
	011	Program Specification (PRG No.10)		311	Universal Output
	012	Program Specification (PRG No.20)		312	Universal Output
	013	Program Specification (PRG No.40)		313	Universal Output
	014	Universal Input		314	Universal Output
	015	Universal Input		315	Universal Output
	⋮	⋮		⋮	⋮

I/O Interface
(Note) Number of I/O ports is:
• Input 000 to 299 (MAX,300 points)
• Output 300 to 599 (MAX,300 points)

Field Network Interface
(Note) Number of I/O ports is:
• Input Port No. 000 to 299 or 1000 to 3999
• Output Port No. 300 to 599 or 4000 to 6999

DeviceNet

Refer to the [instruction manuals for DeviceNet]



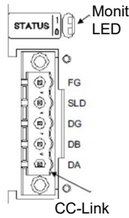
Monitor LED ○ Illuminating, ×OFF, ☆Flashing

LED	Color	Indication Status	Indication Description
NS	green	○	Online, Communication in normal condition
		☆	Online, No connection established
	Orange	○	Critical link error
		☆	Connection timeout
	green / Orange	☆ (Illuminated by turns)	Self-testing
	-	×	Offline/ No power supply
MS	green	○	Normal operation
		☆	Configuration setting not established or not complete → test run required
	Orange	○	An error that cannot be recovered
		☆	An error that can be recovered
	green / Orange	☆ (Illuminated by turns)	Self-testing
	–	×	No power supply

Connector Name	DeviceNet Connector	
Cable Side	SMSTB2.5/5-STF-5.08 AU	Enclosed in standard package Manufactured by PHOENIX CONTACT
Controller Side	MSTB2.5/5-GF-5.08 AU	

CC-Link

Refer to the [instruction manuals for CC-Link]



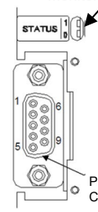
Monitor LED ○Illuminating, ×OFF, ☆Flashing

LED	Color	Indication Status	Indication Description
STATUS1	Orange	○	Error in reception data to self-station Communication setting error (station setting, baud rate setting, etc.)
		☆	The station No. and baud rate set values are changed from ones set at the time of reset cancellation (flashes in 0.4sec cycle)
		×	In normal communication
STATUS0	green	○	Turns on when communication is started, and turns off when communication is disconnected for the specified time

Connector Name	CC-Link Connector	
Cable Side	MSTB2.5/5-ST-5.08AU	Enclosed in standard package Manufactured by PHOENIX CONTACT
Controller Side	MSTBA2.5/5-G-5.08AU	

PROFIBUS-DP

Refer to the [instruction manuals for PROFIBUS-DP]



Monitor LED ○Illuminating, ×OFF, ☆Flashing

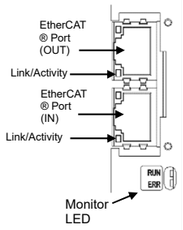
LED	Color	Indication Status	Indication Description
Operation Mode	green	○	Online (Communication in normal condition)
		☆	Online (Cleared)
	Orange	☆(1HZ)	Parameterizing data error
		☆(2HZ)	Configuration error
	-	×	Online ／ No power supply
Status	green	○	Completed
		☆	Completed (with network check event)
	Orange	○	exceptional error
	-	×	No power supply ／ Initializing not executed

Connector Name	PROFIBUS-DP Connector	
Cable Side	9-pin D-sub Connector (Male)	Please prepare separately
Controller Side	9-pin D-sub Connector (Female)	

EtherCAT

Refer to the [instruction manuals for EtherCAT]

Monitor LED ○Illuminating, ×OFF, ☆Flashing



LED	color	Indication Status	Indication Description
RUN	green	○	Communication in normal condition (OPERATION condition)
		☆ ON 0.2sec/OFF 0.2sec	Under configuration condition in mailbox communication (PRE-OPERATION condition)
		☆ ON 0.2sec/OFF 1sec	Configuration complete (SAFE-OPERATION condition)
	Orange	○	An error that cannot be recovered (Module error)
	-	×	Initial condition (INIT condition) / No power supply
ERR	Orange	○	An error that cannot be recovered (Module error)
		☆ 0.2sec cycle	Network construction error
		☆ On 0.2sec 2 times / OFF 1sec	Communication error (Watchdog timeout)
	-	×	No power supply / No abnormality
Link/ Activity	green	○	Linked (Communication traffic not detected)
		☆ 0.05sec cycle	Linked (Communication traffic detected)
	-	×	No link / No power supply

Connector Name	EtherCAT Connector	
Cable Side	8P8C Modular Plug	Straight STP cable with Category 5e or more
Controller Side	8P8C Modular Jack	

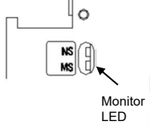
* Ethernet Cable: 100m or less of straight cable with Category 5 or more (Double shielded cable braided with aluminum foil recommended)

Note 1 Only the daisy chain is supported in the network topology.
Note 2 There are IN and OUT designated for the communication port for EtherCAT. Be careful not to plug in the communication cable in the wrong way.
Note 3 There is no need of terminal treatment.

EtherNet/IP

Refer to the [instruction manuals for EtherNet/IP]

Monitor LED ○Illuminating, ×OFF, ☆Flashing



LED	Color	Indication Status	Indication Description
NS	green	○	Online, Communication in normal condition
		☆	Online, No connection established
	Orange	○	IP address duplication, Critical link error
		☆	Connection Timeout
	-	×	No power supply / No abnormality
MS	green	○	Normal Operation
		☆	Configuration setting not established or not complete, Test run required
	Orange	○	An error that cannot be recovered
		☆	An error that can be recovered
	-	×	No power supply

(Note) When only TCP/IP messages are used, both NS and MS flash in green.

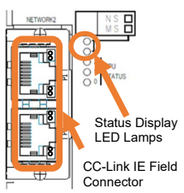
Connector Name	EtherNet/IP Connector	
Cable Side	8P8C Modular Plug	Straight STP cable with Category 5e or more
Controller Side	8P8C Modular Jack	

* Ethernet Cable: 100m or less of straight cable with Category 5 or more (Double shielded cable braided with aluminum foil recommended)

CC-Link IE Field

Refer to the [instruction manuals for CC-Link IE Field]

Monitor LED ○Illuminating, ×OFF, ☆Flashing



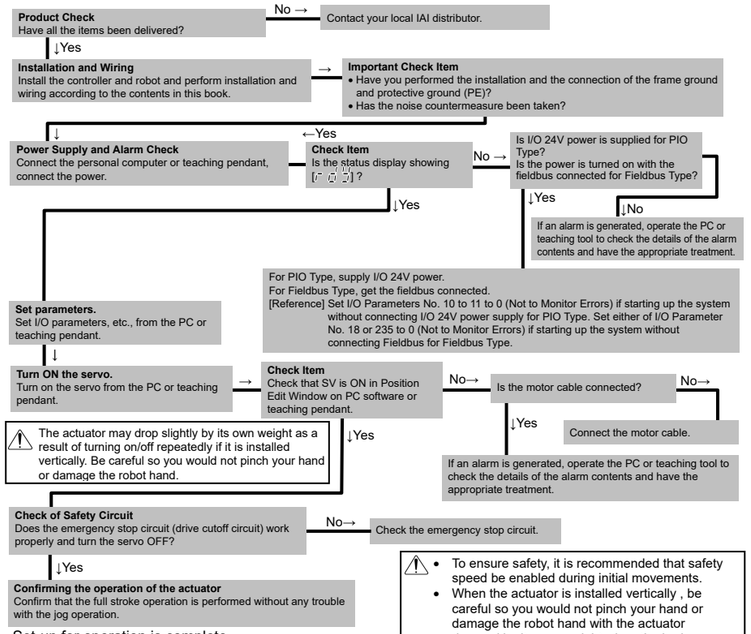
LED	color	Indication Status	Indication Description
NS	Green	○	Cyclic transmission ON
		☆	Cyclic transmission OFF
		×	Cyclic transmission not implemented, fragmented or power not ON
	Orange	○	Receive data error (lights together with L.ER)
		×	Receive data normal, power not ON
MS	Green	○	Normal operation
		×	Hardware error generated, power not ON
	Orange	○	Error generated (node error/station number setting error)
		×	Normal operation, power not ON
LINK	Green	○	Linking up
		×	Linking down, power not ON
L ER	Yellow	○	Receive data error
		×	Receive data normal, power not ON

*Use an Ethernet cable applicable for 1000BASE-T (Category 5e or higher, double shielded / STP) for the communication cables.

Starting Procedures

When using this product for the first time, make sure to avoid omission and incorrect wiring by referring to the procedure below. “PC” stated in this section means “PC software”.

⚠ *Warning:*
- *Make sure to put the brake release switch of the controller on the right side (NOM) before turning ON the power.*
- *When releasing the brake release switch (RLS), be careful not to fall under its own weight and cause an accident.*
- *Make sure to connect the robot with the manufacturing number indicated on the controller. Connecting a robot not indicated may cause a wrong operation.*



Set-up for operation is complete.
Establish the setting that suits to your operation patterns.

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