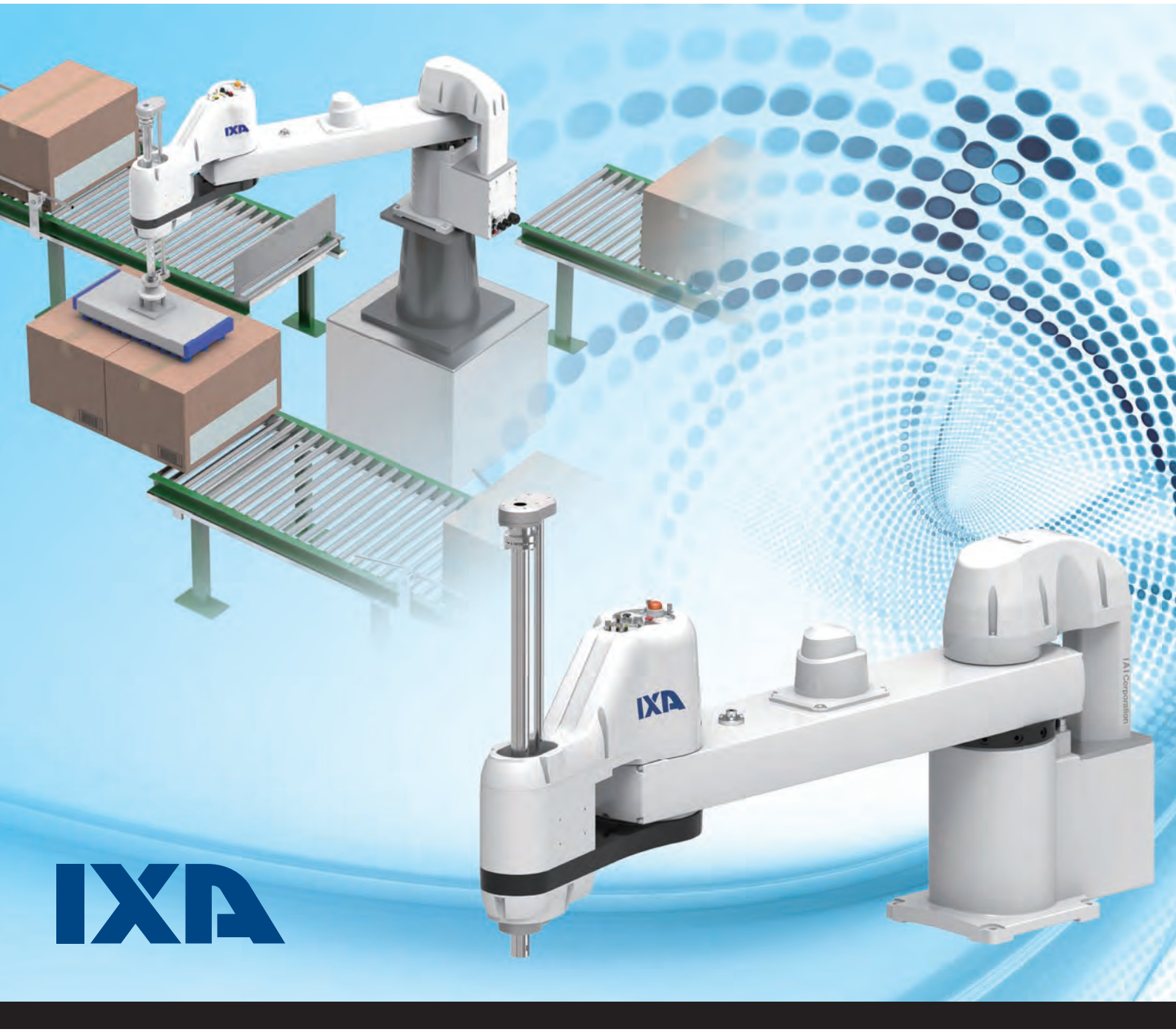
GB

IAI
Quality and Innovation

High-Power SCARA Robot
Super-Large High Payload Type

IXA 4NHN10040 4NHN12040



IXA

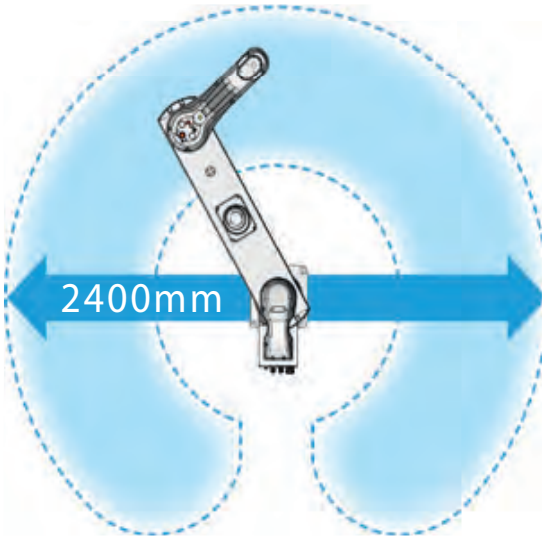
www.iai-automation.com

www.intelligentactuator.de

Maximum 50kg Payload
Arm length 1200mm
Ultra large ! SCARA Robot IXA

Operation range

Perfect for transferring large workpieces thanks to its large operation range.



(IXA-4NHN12040)

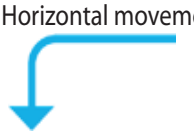
Standard cycle time

(IXA-4NHN12040)

0.61 seconds

Operating condition

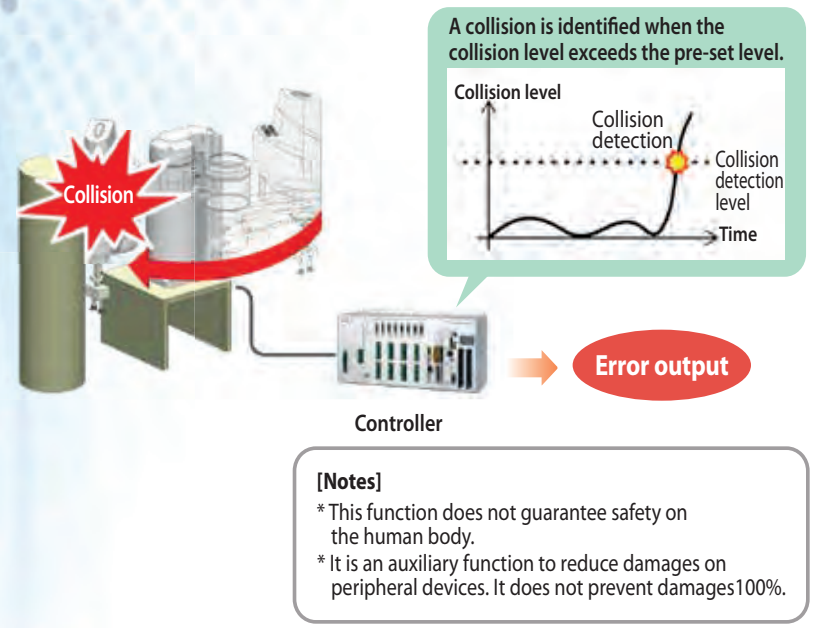
- 2 kg transfer
- Horizontal 300mm / vertical 25mm



New control functions by controller

Collision detection function

When the SCARA robot detects a collision with an object, it will stop its operation promptly. The collision detection function reduces damages on the gripper, workpiece and robot at the time of a collision.



[Notes]

* This function does not guarantee safety on the human body.
* It is an auxiliary function to reduce damages on peripheral devices. It does not prevent damages100%.

Model specification items

IXA — [Type] — [Cable length] — T2 — [Options]

Series: IXA

Type	
4NHN10040	4-axis high payload type/ arm length 1000mm/ vertical axis 400mm
4NHN12040	4-axis high payload type/ arm length 1200mm/ vertical axis 400mm

Applicable controller: T2

T2	XSEL-SAX

Cable length

N	None
5L	5m
10L	10m
□L	Specify length (every 1m), maximum 15m

Options

EXC	Built-in extended user cable specification

Type	Model	Number of axes	Arm length (mm)		Vertical stroke (mm)	Standard cycle time (s)	Continuous cycle time (s)	Maximum payload (kg)	Reference page
			1st arm	2nd arm					
High payload type	**IXA-4NHN10040**	4-axis	600	400	400	0.56	0.69	50	▶ P3
	IXA-4NHN12040	4-axis	800	400	400	0.61	0.69		▶ P7

IXA-4NHN10040

High Payload Type | Battery-less Absolute | Arm Length: 1000 mm | Vertical Axis: 400 mm

Model Specification Items

IXA	–	4	NHN	100	40	–		–	T2	–	
Series		Number of axes	Type	Arm length	Vertical axis stroke		Cable length		Applicable controller		Options
		4: 4 axes	NHN: High payload type	100: 1000mm	40: 400mm		N: No cable 5L: 5m 10L: 10m □L: Specified length (every 1m)		T2: XSEL-SAX		See below

CE RoHS 10

POINT Selection Notes

(1) Please refer to P11 for Notes 1 - 8.

(2) The maximum set value for acceleration/deceleration varies depending on the weight of the object being transported, the travel distance and the location. Operating continuously at the maximum set value could cause an overload error. For a continuous operation, either lower the acceleration/deceleration values or set a stop time after acceleration/deceleration, referring to the duty ratio (guideline).

(3) If the motor is replaced, absolute reset must be performed. An adjustment jig will be required to perform an absolute reset on the rotational axis (4th axis). Please refer to P13 for details.

(4) A continuous operation cannot be performed for SCARA robots at 100% of speed and acceleration. Refer to the "Acceleration/Deceleration Setting Guidelines" for executable operating conditions.

Main specifications

Item			Description 4-axis specification
Max. payload (kg) (Note 1)			50
Speed (Note 2)	Combined max. speed (mm/s)		7540
	Max. speed of individual axes	1st arm (deg/s)	280
		2nd arm (deg/s)	380
		Vertical axis (mm/s)	1200
		Rotational axis (deg/s)	920
Push force (N) (Note 3)		Upper limit	570
		Lower limit	70
Arm length (mm)			1000
Individual arm length (mm)		1st arm	600
		2nd arm	400
Operation range of individual axes		1st arm (deg)	±137
		2nd arm (deg)	±142
		Vertical axis (mm)	400
		Rotational axis (deg)	±360

Item		Description 4-axis specification
Positioning repeatability (Note 4)	Within horizontal surface	±0.04mm
	Vertical axis	±0.02mm
	Rotational axis	±0.01degrees
User wiring		10-core (9-core + shield) AWG24 (rated 30V/max. 1A)
User piping		Outer diameter Φ6, inner diameter Φ4, air tube 3 pcs. (max. usable pressure 0.6MPa)
Alarm lamp (Note 5)		Amber color LED, small pilot lamp 1 pc. (DC24V supply required)
Brake release switch (Note 6)		Brake release switch for preventing vertical axis from dropping.
Tip axis	Allowable torque	15 N・m
	Allowable load moment	48 N・m
Ambient operational temperature and humidity		0-40°C, 20-85% RH or lower (non-condensing)
Degree of protection		IP10
Vibration- and impact-resistance		No impact or vibration should be applied.
Noise (Note 7)		85 dB or lower
International standard		CE marking, RoHS
Motor type		AC servo motor
Motor wattage	1st arm	1000W
	2nd arm	750W
	Vertical axis	600W
	Rotational axis	200W
Encoder type		Battery-less absolute
Encoder pulse		131072 pulse/rev

Cable Length

Type	Cable code
Standard type	**5L** (5m)
	10L (10m)
Specified length	**1L** (1m) ~ **4L** (4m)
	6L (6m) ~ **9L** (9m)
	11L (11m)
	12L (12m)
	13L (13m)
	14L (14m)
	15L (15m)

[4-axis specification] · Motor cables: 4 · Encoder cables: 4 · Brake cable: 1

Options

* Please check the Options reference pages to confirm each option.

Name	Model name	Reference page
Built-in extended user cable	**EXC**	12

Single Unit Options

* Please check the Options reference pages to confirm each option.

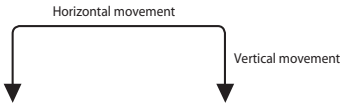
Name		Model name	Reference page
User cable		**CB-IXA-USR□□□-CS**	13
Flange		**IXA-FL-1**	13
Protective flange for external wiring *1		**IXA-PFL-EW-1**	13
Protective flange for R-axis wiring		**IXA-PFL-RW-1**	13
Side stay for Z-axis wiring	Z-axis 400st	**IXA-SST-ZW-2**	14
Upper stay for Z-axis wiring	Z-axis 400st	**IXA-TST-ZW-2**	14
Solenoid valve set *1		**IXA-SVP-1**	14

*1 The protective flange for external wiring and the solenoid valve set cannot be installed at the same time.
(Note) Please order separately.

Cycle time

The standard/continuous cycle time represents the time required when an operation is performed with a cycle operation setting at maximum speed, under the following conditions.
2kg transport, vertical movement 25mm, horizontal movement 300mm (rough positioning arch motion)
[Standard cycle time]
The time required for maximum speed. This is a general guideline for high speed performance. Note that continuous operation is not possible under maximum speed operation.
[Continuous cycle time]
The cycle time for continuous operation.

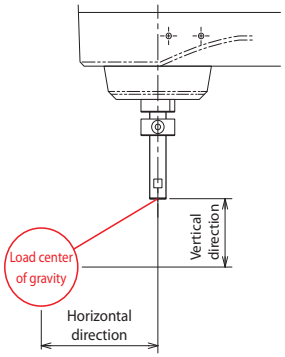
Item	Time
Standard cycle time	0.56 seconds
Continuous cycle time	0.69 seconds



Tip shaft allowable load inertia moment

The 4th axis allowable inertia moment is the allowable inertial moment value for the center of rotation conversion of the 4th axis (rotational axis) of the SACRA robot. Make sure that the offset value from center of the rotation of the 4th axis to the tool center of gravity is within the guideline values listed below. If the tool center of gravity is far from the 4th axis center, it is necessary to reduced speed and acceleration/deceleration appropriately. The overhang distance is limited depending on the payload and operating condition.

Number of axes	Tip shaft allowable load inertia moment
4-axis specification	0.5 kg・m^2



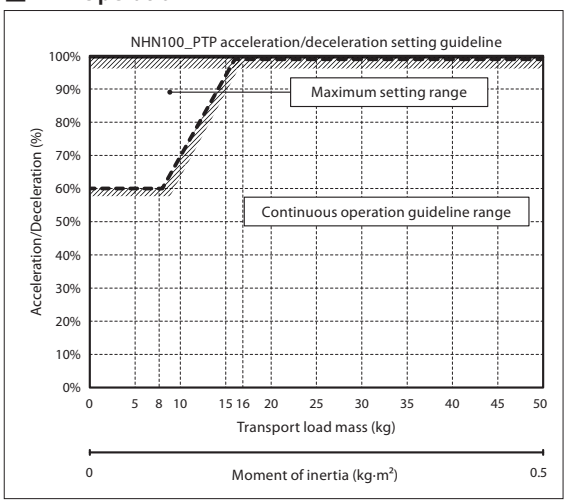
Horizontal direction	Vertical direction
200mm or less	150mm or less

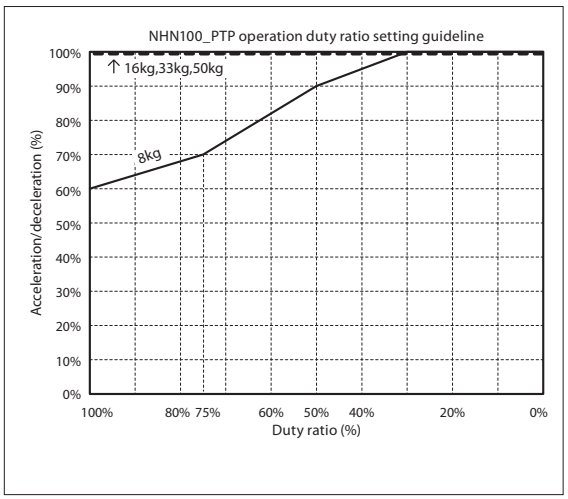
Acceleration/Deceleration Setting Guidelines

The SCARA Robot IXA cannot operate continuously at the maximum acceleration/deceleration or maximum speed specified in the catalog. To operate at the maximum acceleration/deceleration, set a stop time referring to the continuous operation duty guideline graph. If a continuous operation is required, do so within the continuous operation guideline range shown in the acceleration/deceleration setting guideline graph.

1) For a PTP operation, always use the WGHT command in the program to set the weight and moment of inertia. For the SCARA robot, the maximum acceleration/deceleration for each payload is set at 100%. When the payload differs, the operation time will also vary even at the same acceleration/deceleration or speed setting.
2) Adjust the acceleration/deceleration setting value by gradually increasing it from the continuous operation reference value.
3) If an overload error occurs, lower the acceleration/deceleration as required, or set a stop time by referring to the continuous operation duty guideline.
4) Duty (%) = (Operation time / (Operation time + Stop time)) x 100
5) When moving the robot horizontally at high speed, operate the vertical axis as close to the upward end as possible.
6) Set the moment of inertia and payload to the allowable value or lower.
7) The load mass represents the moment of inertia and weight at the center of rotation of the 4th axis.
8) Operate the robot at an appropriate acceleration/deceleration according to the weight and moment of inertia for the 4-axis specification. Otherwise, the drive section may become prematurely unusable or damaged, or vibration may occur.
9) If the load moment of inertia is high, vibration may occur in the vertical axis, depending on the position of the vertical axis. In such a case, decrease the acceleration/deceleration for operation as required.

■ PTP Operation

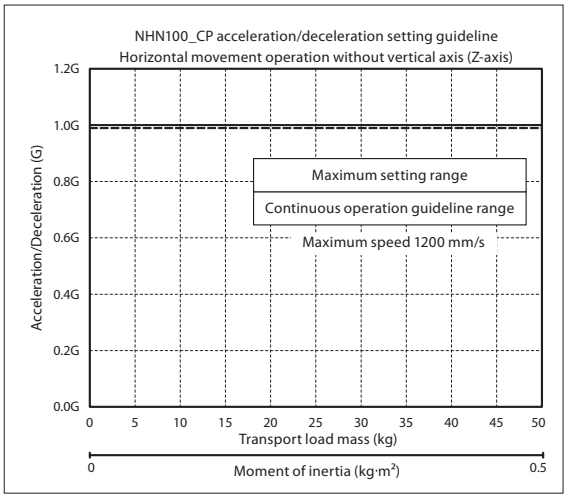




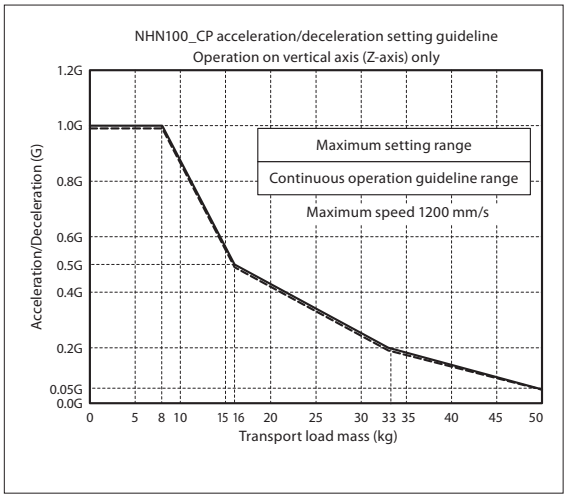
Acceleration/Deceleration Setting Guidelines

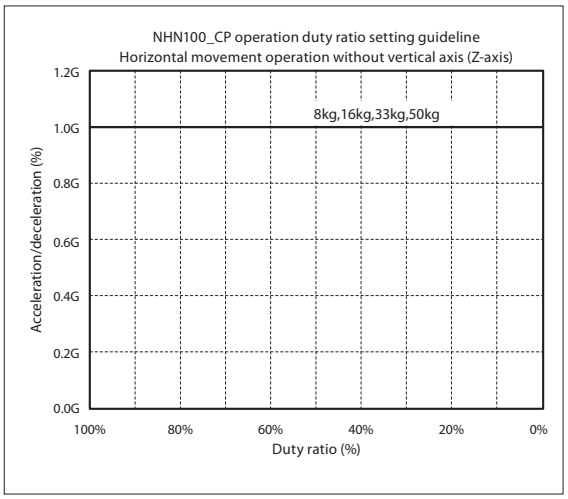
■ CP Operation

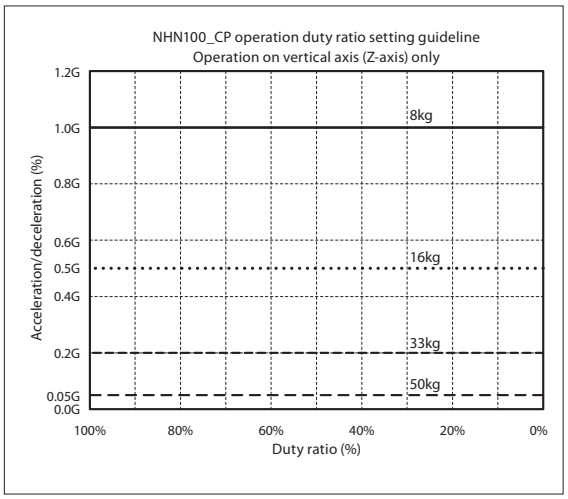
Horizontal



Vertical

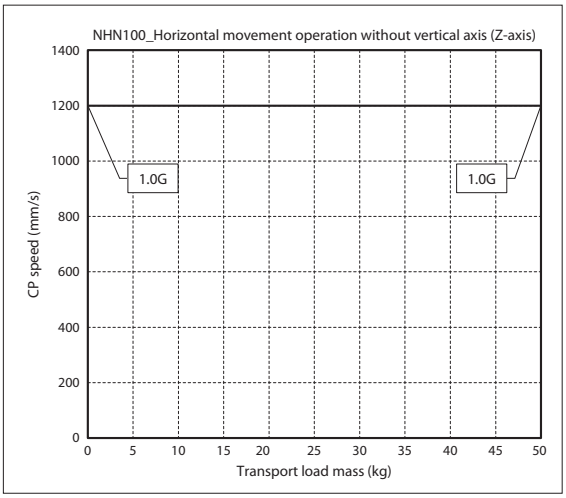




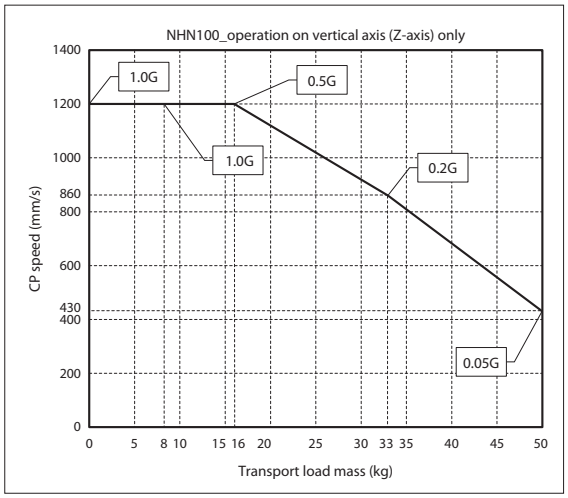


■ CP Operation: Acceleration/deceleration Limitations

Horizontal



Vertical

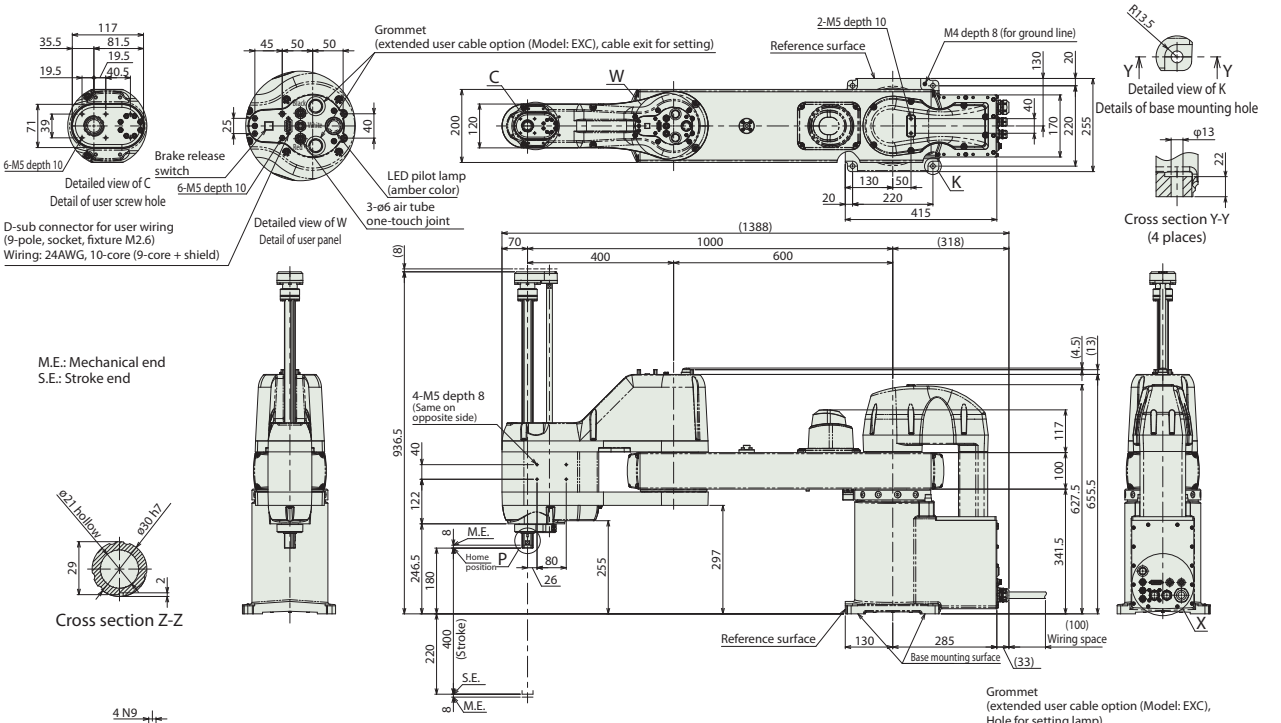


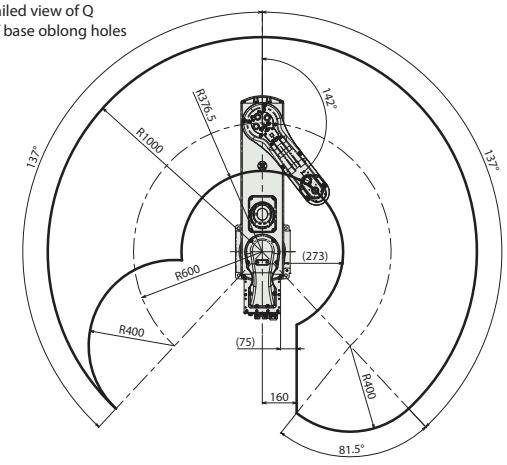
Dimensions

IXA-4NHN10040

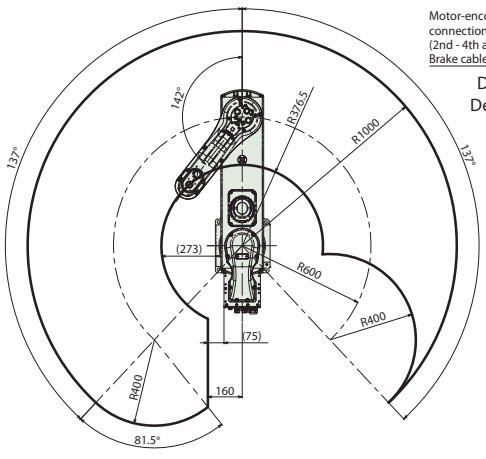
CAD drawings can be downloaded from our website.
www.intelligentactuator.de
2D CAD 3D CAD

(Note) Refer to P11 (Note 8) for cable connections.





Left-arm system operation range



Right-arm system operation range

Mass

Item	Description
Mass	80.0kg

Applicable Controllers

The IXA series actuator on this page can be operated by the controller indicated below. Select the right type that suits the application of use.

Name	External view	Max. number of connectable axes	Power supply voltage	Control method				Maximum number of positioning points	Reference page
				Positioner	Pulse-train	Program	Network * option		
XSEL-SAX4		4	Three-phase 230VAC	–	–	●	DeviceNet, CC-Link, PROFIBUS, EtherNet/IP, EtherCAT	36666	See P.15

IXA-4NHN12040

High Payload Type | Battery-less Absolute | Arm Length: 1200 mm | Vertical Axis: 400 mm

Model Specification Items

IXA	–	4	NHN	120	40	–		–	T2	–	
Series		Number of axes	Type	Arm length	Vertical axis stroke		Cable length		Applicable controller		Options
		4: 4 axes	NHN: High payload type	120: 1200mm	40: 400mm		N: No cable 5L: 5m 10L: 10m □L: Specified length (every 1m)		T2: XSEL-SAX		See below

CE RoHS 10

POINT Selection Notes

(1) Please refer to P11 for Notes 1 - 8.

(2) The maximum set value for acceleration/deceleration varies depending on the weight of the object being transported, the travel distance and the location. Operating continuously at the maximum set value could cause an overload error. For a continuous operation, either lower the acceleration/deceleration values or set a stop time after acceleration/deceleration, referring to the duty ratio (guideline).

(3) If the motor is replaced, absolute reset must be performed. An adjustment jig will be required to perform an absolute reset on the rotational axis (4th axis). Please refer to P13 for details.

(4) A continuous operation cannot be performed for SCARA robots at 100% of speed and acceleration. Refer to the "Acceleration/Deceleration Setting Guidelines" for executable operating conditions.

Main specifications

Item			Description 4-axis specification
Max. payload (kg) (Note 1)			50
Speed (Note 2)	Combined max. speed (mm/s)		8308
	Max. speed of individual axes	1st arm (deg/s)	270
		2nd arm (deg/s)	380
		Vertical axis (mm/s)	1200
		Rotational axis (deg/s)	920
Push force (N) (Note 3)		Upper limit	570
		Lower limit	70
Arm length (mm)			1200
Individual arm length (mm)		1st arm	800
		2nd arm	400
Operation range of individual axes		1st arm (deg)	±137
		2nd arm (deg)	±142
		Vertical axis (mm)	400
		Rotational axis (deg)	±360

Item		Description 4-axis specification
Positioning repeatability (Note 4)	Within horizontal surface	±0.05mm
	Vertical axis	±0.02mm
	Rotational axis	±0.01degrees
User wiring		10-core (9-core + shield) AWG24 (rated 30V/max. 1A)
User piping		Outer diameter Φ6, inner diameter Φ4, air tube 3 pcs. (max. usable pressure 0.6MPa)
Alarm lamp (Note 5)		Amber color LED, small pilot lamp 1 pc. (DC24V supply required)
Brake release switch (Note 6)		Brake release switch for preventing vertical axis from dropping.
Tip axis	Allowable torque	15 N・m
	Allowable load moment	48 N・m
Ambient operational temperature and humidity		0-40°C, 20-85% RH or lower (non-condensing)
Degree of protection		IP10
Vibration- and impact-resistance		No impact or vibration should be applied.
Noise (Note 7)		85 dB or lower
International standard		CE marking, RoHS
Motor type		AC servo motor
Motor wattage	1st arm	1000W
	2nd arm	750W
	Vertical axis	600W
	Rotational axis	200W
Encoder type		Battery-less absolute
Encoder pulse		131072 pulse/rev

Cable Length

Type	Cable code
Standard type	**5L** (5m)
	10L (10m)
Specified length	**1L** (1m) ~ **4L** (4m)
	6L (6m) ~ **9L** (9m)
	11L (11m)
	12L (12m)
	13L (13m)
	14L (14m)
	15L (15m)

[4-axis specification] · Motor cables: 4 · Encoder cables: 4 · Brake cable: 1

Options

* Please check the Options reference pages to confirm each option.

Name	Model name	Reference page
Built-in extended user cable	**EXC**	12

Single Unit Options

* Please check the Options reference pages to confirm each option.

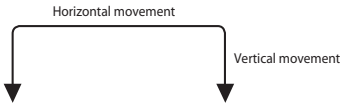
Name		Model name	Reference page
User cable		**CB-IXA-USR□□□-CS**	13
Flange		**IXA-FL-1**	13
Protective flange for external wiring *1		**IXA-PFL-EW-1**	13
Protective flange for R-axis wiring		**IXA-PFL-RW-1**	13
Side stay for Z-axis wiring	Z-axis 400st	**IXA-SST-ZW-2**	14
Upper stay for Z-axis wiring	Z-axis 400st	**IXA-TST-ZW-2**	14
Solenoid valve set *1		**IXA-SVP-1**	14

*1 The protective flange for external wiring and the solenoid valve set cannot be installed at the same time.
(Note) Please order separately.

Cycle time

The standard/continuous cycle time represents the time required when an operation is performed with a cycle operation setting at maximum speed, under the following conditions.
2kg transport, vertical movement 25mm, horizontal movement 300mm (rough positioning arch motion)
[Standard cycle time]
The time required for maximum speed. This is a general guideline for high speed performance.
Note that continuous operation is not possible under maximum speed operation.
[Continuous cycle time]
The cycle time for continuous operation.

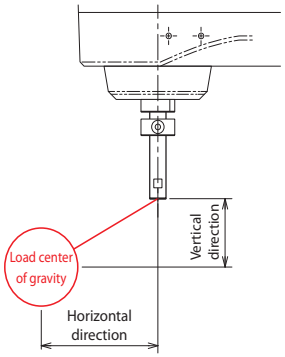
Item	Time
Standard cycle time	0.61 seconds
Continuous cycle time	0.69 seconds



Tip shaft allowable load inertia moment

The 4th axis allowable inertia moment is the allowable inertial moment value for the center of rotation conversion of the 4th axis (rotational axis) of the SACRA robot. Make sure that the offset value from center of the rotation of the 4th axis to the tool center of gravity is within the guideline values listed below. If the tool center of gravity is far from the 4th axis center, it is necessary to reduced speed and acceleration/deceleration appropriately. The overhang distance is limited depending on the payload and operating condition.

Number of axes	Tip shaft allowable load inertia moment
4-axis specification	0.5 kg・m^2



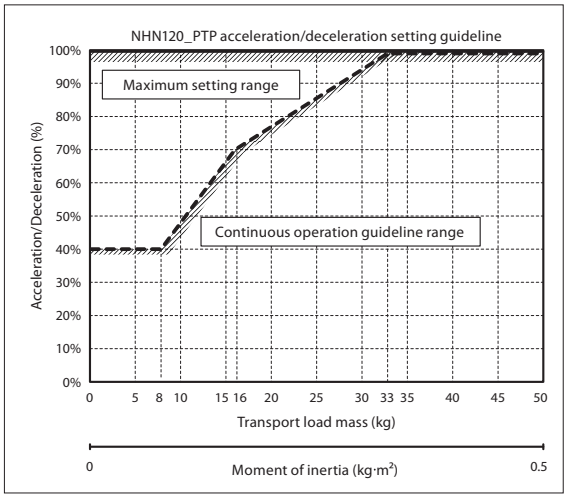
Horizontal direction	Vertical direction
200mm or less	150mm or less

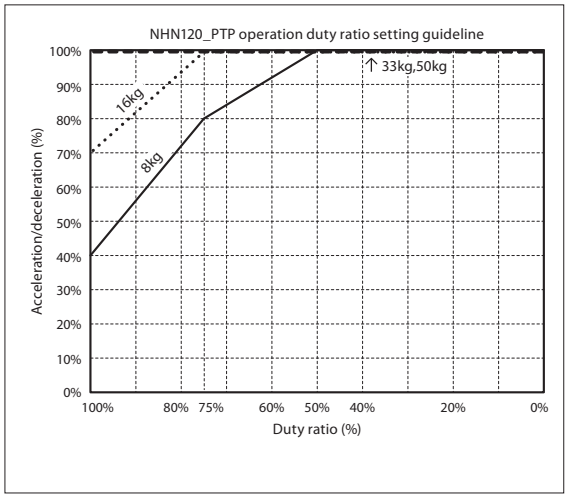
Acceleration/Deceleration Setting Guidelines

The SCARA Robot IXA cannot operate continuously at the maximum acceleration/deceleration or maximum speed specified in the catalog. To operate at the maximum acceleration/deceleration, set a stop time referring to the continuous operation duty guideline graph. If a continuous operation is required, do so within the continuous operation guideline range shown in the acceleration/deceleration setting guideline graph.

1) For a PTP operation, always use the WGHT command in the program to set the weight and moment of inertia. For the SCARA robot, the maximum acceleration/deceleration for each payload is set at 100%. When the payload differs, the operation time will also vary even at the same acceleration/deceleration or speed setting.
2) Adjust the acceleration/deceleration setting value by gradually increasing it from the continuous operation reference value.
3) If an overload error occurs, lower the acceleration/deceleration as required, or set a stop time by referring to the continuous operation duty guideline.
4) Duty (%) = (Operation time / (Operation time + Stop time)) x 100
5) When moving the robot horizontally at high speed, operate the vertical axis as close to the upward end as possible.
6) Set the moment of inertia and payload to the allowable value or lower.
7) The load mass represents the moment of inertia and weight at the center of rotation of the 4th axis.
8) Operate the robot at an appropriate acceleration/deceleration according to the weight and moment of inertia for the 4-axis specification. Otherwise, the drive section may become prematurely unusable or damaged, or vibration may occur.
9) If the load moment of inertia is high, vibration may occur in the vertical axis, depending on the position of the vertical axis. In such a case, decrease the acceleration/deceleration for operation as required.

■ PTP Operation

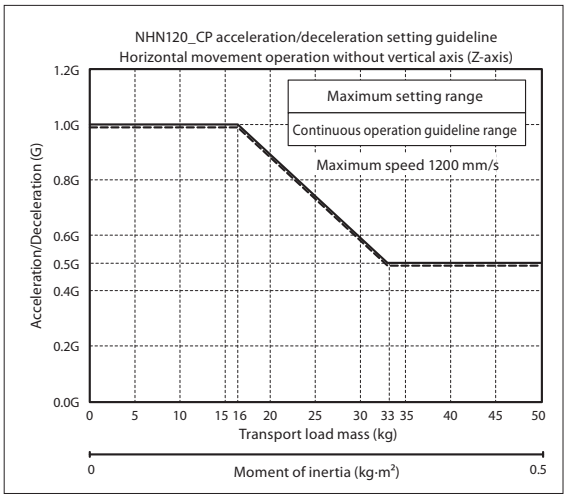




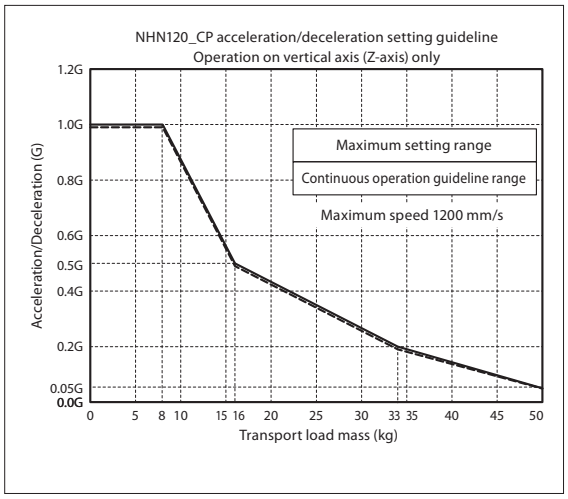
Acceleration/Deceleration Setting Guidelines

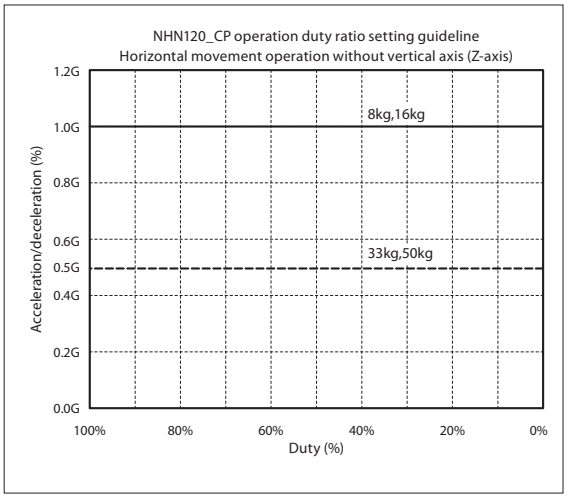
■ CP Operation

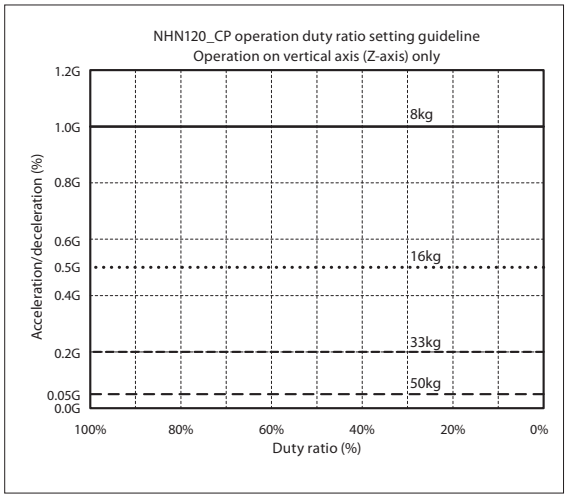
Horizontal



Vertical

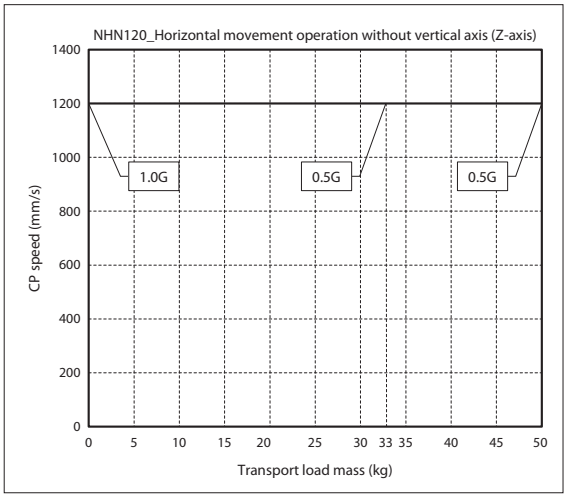




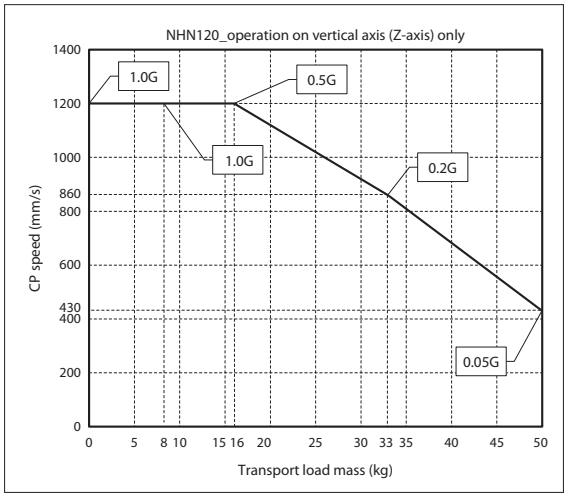


■ CP Operation: Acceleration/deceleration Limitations

Horizontal



Vertical

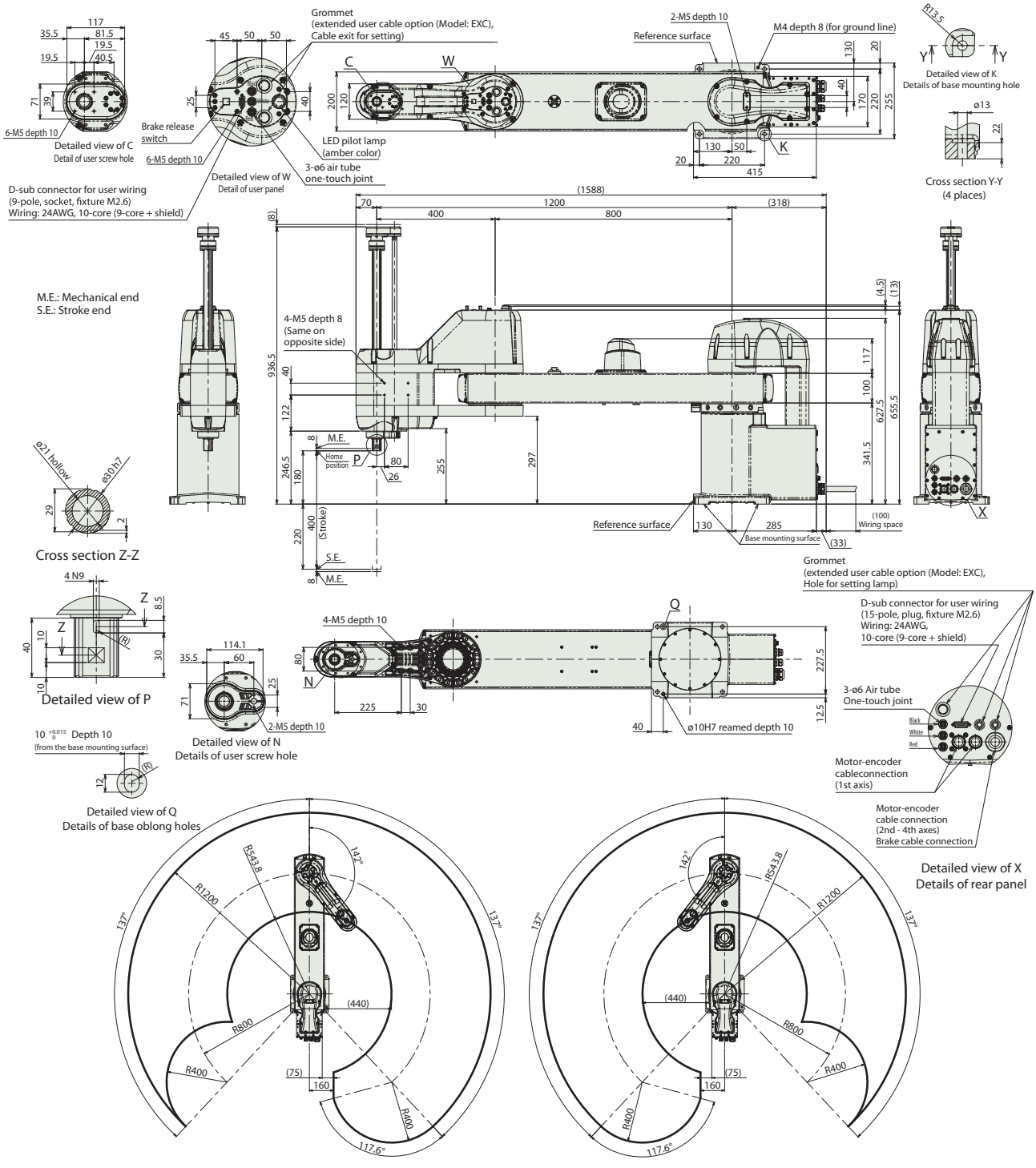


Dimensions

IXA-4NHN12040

CAD drawings can be downloaded from our website.
www.intelligentactuator.de
2D CAD 3D CAD

(Note) Refer to P11 (Note 8) for cable connections.



Mass

Item	Description
Mass	84.0kg

Applicable Controllers

The IXA series actuator on this page can be operated by the controller indicated below. Select the right type that suits the application of use.

Name	External view	Max. number of connectable axes	Power supply voltage	Control method				Maximum number of positioning points	Reference page
				Positioner	Pulse-train	Program	Network * option		
XSEL-SAX4		4	Three-phase 230VAC	–	–	●	DeviceNet, CC-Link, PROFIBUS, EtherNet/IP, EtherCAT	36666	See P.15

Precautions

(Note 1) Payload

Payload is the maximum weight that can be carried.
The optimal acceleration automatically sets the weight of the load and the moment of inertia in the program.
A heavier load will cause a lower acceleration to be configured.

(Note 2) Maximum operation speed during a PTP operation

The value of the maximum operation speed in the specifications is for PTP command operation.
For CP operation commands (interpolation operation), there are limitations on operations at high speed.

(Note 3) 3rd axis push force control range

The controllable range of the push force by the 3rd axis is the push force of the tip part of the vertical axis.
This will be the push force when there is no load (nothing mounted) on the 3rd axis.
Continuous pushing is not possible.
The upper limit is the push force when the push force setting value is 70%.
The lower limit is the push force when the push force setting value is 20%.
There is some tolerance on the actual push force.

(Note 4) Positioning repeatability

This represents the ability to reproduce the same positioning result when an operation is repeated at the same speed, acceleration/deceleration, and arm system, between the operation start position (The value is for JIS B 8432 Ambient temperature 20°C constant).
This is NOT the absolute positioning accuracy.
Note that when the arm system is switched while starting from multiple positions to the target position, or when the operation conditions (such as operation speed or acceleration/deceleration setting) are changed, the value may fall outside of the positioning repeatability specification value.

(Note 5) Alarm pilot lamp

The Alarm indicator lamp is installed on the user panel part.
It will be activated when the controller generates an error.
The customer is required to form a circuitry for supplying 24VDC to the LED terminal in the user wiring part using the controller I/O output signal.

(Note 6) Brake release switch

The brake release switch is located on the user panel part.
24V DC power must be supplied to the controller to release the brake, regardless of whether the brake release switch is used or not.

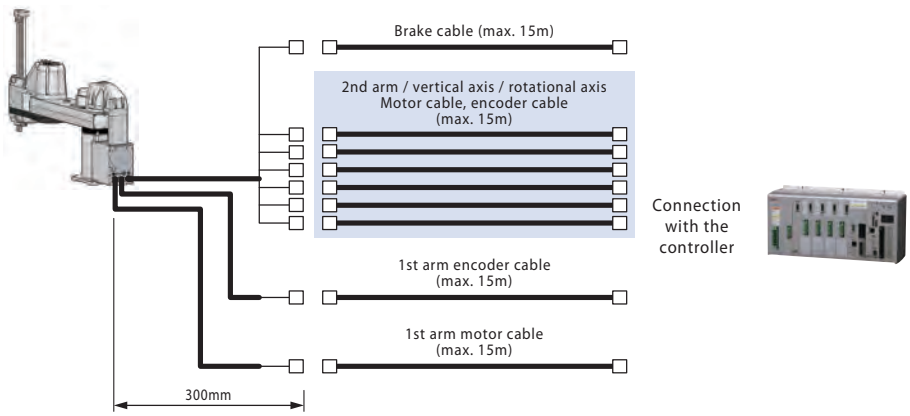
(Note 7) Noise

This is the value measured when all axes are operating at their maximum speed.
Noise may change depending on operating conditions and the surrounding reverberation environment (JIS B 6195).

Operation range

When switching the arm system, the arms extend once in a straight line.
Beware of potential interference with the peripheral devices.

(Note 8) Cable



Options and maintenance parts

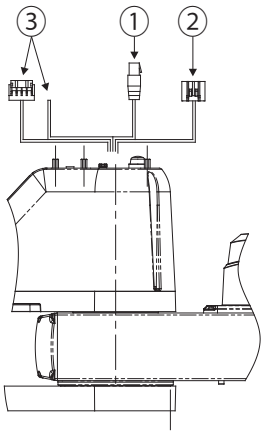
Options

Built-in extended user cable specification

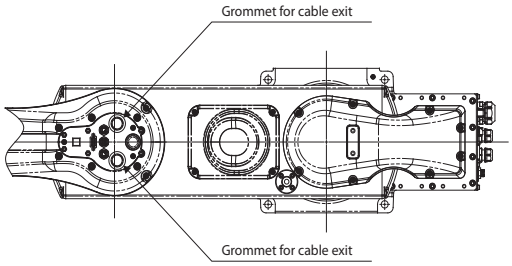
Model EXC

Description The following cables (1) to (3) are built in the SCARA robot body.
The body mass increases by 0.5 kg.

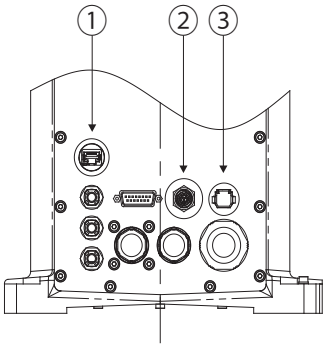
	Cable type	Connector		Application example
		User panel side	Rear panel side	
①	Ethernet cable	TM21CP- 88P(03) (Hirose Electric)	09_45_452_1561 (HARTING)	Vision camera, etc.
②	10-core composite cable	7-core: DF11-8DS-2C (Hirose Electric)	LF10WBRB-12P (Hirose Electric)	Solenoid valve power cable (supports solenoid valve set option) Vision camera power, etc.
		5-core: No connector		
③	13-core composite cable	DF62C-24S-2.2C (Hirose Electric)	DF62P-24EP-2.2C (Hirose Electric)	Power and signal lines Electric gripper (RCP4-GR series)



User panel side



Rear panel side



① Ethernet cable

Color	Signal	Pin No.
Blue	—	4
White	—	5
Orange	—	6
White	—	3
Green	—	2
White	—	1
Brown	—	8
White	—	7
—	SHIELD	BODY

Pin No.	Signal	Color
4	—	Blue
5	—	White
6	—	Orange
3	—	White
2	—	Green
1	—	White
8	—	Brown
7	—	White
BODY	SHIELD	—

Sheath
Shield

② 10-core composite cable

Color	Signal	Pin No.
Red	SV1a	1
White	SV1b	2
Black	SV2a	3
Blue	SV2b	4
Green	SV3a	5
Yellow	SV3b	6
Brown-purple	COM	7
—	—	8

Color	Signal	Pin No.
Red	24V(+)	—
Black	GND	—
Green/Yellow	FG	—

Pin No.	Signal	Color
1	SV1a	Red
2	SV1b	White
3	SV2a	Black
4	SV2b	Blue
5	SV3a	Green
6	SV3b	Yellow
7	COM	Brown-purple
8	24V(+)	Red
9	GND	Black
10	FG	Green/Yellow
11~12	—	—

Sheath

③ 13-core composite cable

Color	Signal	Pin No.
Red	A	3
White	VMM	5
Black	/A	4
Brown	B	10
Yellow	VMM	9
Green	/B	15
Yellow	A	1
White	/A	6
Red	B	11
Green	/B	16
Black	Vcc	21
Brown	GND	7
Blue	VPS	18
—	SHIELD	24

Pin No.	Signal	Color
3	A	Red
5	VMM	White
4	/A	Black
10	B	Brown
9	VMM	Yellow
15	/B	Green
1	A	Yellow
6	/A	White
11	B	Red
16	/B	Green
21	Vcc	Black
7	GND	Brown
18	VPS	Blue
24	SHIELD	☒

Sheath
Single wire
Soldered
Shield
Soldered
Single wire

Single unit options and maintenance parts

Series	Type	Type code		Single unit			Maintenance Parts
				Flange	User cable	Wiring and piping options	Absolute reset adjusting jig
IXA	High payload type	NHN	10040	IXA-FL-1	CB-IXA-USR □□□ -SC	*	JG-IXA4
			12040				

* Wiring and piping options

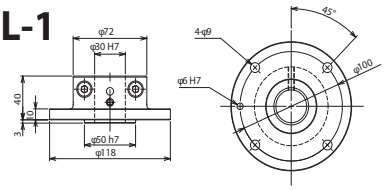
Name		Model
External wire protecting flange		IXA-PLF-EW-1
R-axis wire protecting flange		IXA-PLF-RW-1
Z-axis wire side stay	(Z-axis)400ST	IXA-SST-ZW-2
Z-axis wire upper stay	(Z-axis)400ST	IXA-TST-ZW-2
Solenoid valve set		IXA-SVP-1

Flange

Used when an object is mounted on the vertical axis tip.

Single unit model **IXA-FL-1**

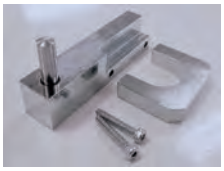
(Single weight: 2.0kg / Material: steel)



Absolute reset adjusting jig

This jig is used to reset the absolute encoder that has lost absolute data when the motor is replaced.

Single unit model **JG-IXA4**



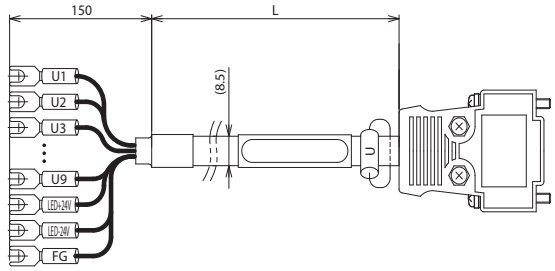
User cable

This user cable is connected to the D-sub connector for user wiring at the rear panel.

Single unit model number **CB-IXA-USR□□□-CS**

* Please indicate the cable length (L) in □□□.
(e.g. 050=5m), maximum 15m.

[Controller side] [Actuator side]



Tube code	Color	Signal	Pin No.
U1	Blue	U1	1
U2	White	U2	2
U3	Yellow	U3	3
U4	White	U4	4
U5	Green	U5	5
U6	White	U6	6
U7	Red	U7	7
U8	White	U8	8
U9	Purple	U9	9
—	—	—	10~13
LED+24V	Blue	LED+24V	14
LED+24V	Brown	LED+24V	15
FG	Black	FG	—

(White)

Pin No.	Signal	Signal	Tube code
1	U1	3	U
2	U2	5	
3	U3	4	
4	U4	10	
5	U5	9	
6	U6	15	
7	U7	1	
8	U8	6	
9	U9	11	
10~13	—	16	
14	LED+24V	21	
15	LED+24V	7	

Braided shield is clamped to the hood.

Single wire Soldered Braided Sheath

Protective flange for external wiring

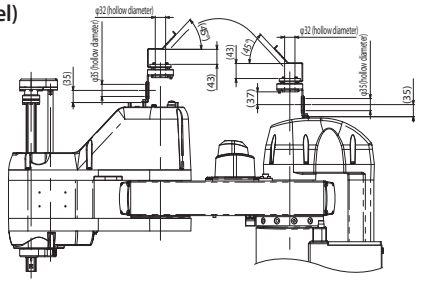
The flange is used to protect the wire that is external to the robot.

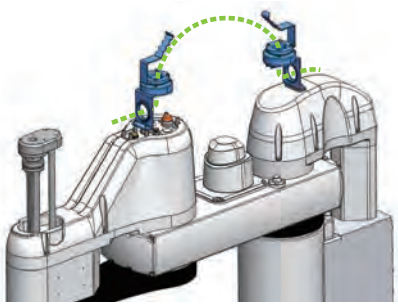
* When this option is used, the D-sub connector for user panel cannot be used.

Single unit model number **IXA-PLF-EW-1**

(Single unit mass 0.6kg/material aluminum, steel)

(Note) The model code represents one piece of a flange.
Please place an order for required quantity.



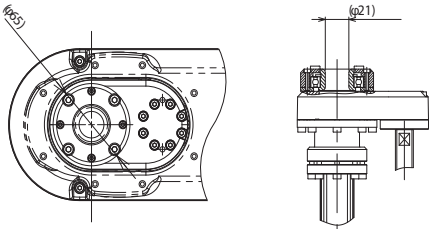


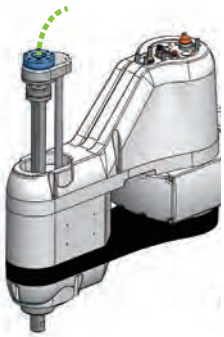
Protective flange for R-axis wiring

This flange protects the wire that goes through the hollow part of the tip axis.

Single unit model number **IXA-PLF-RW-1**

(Single unit mass 0.3kg / material aluminum, steel)



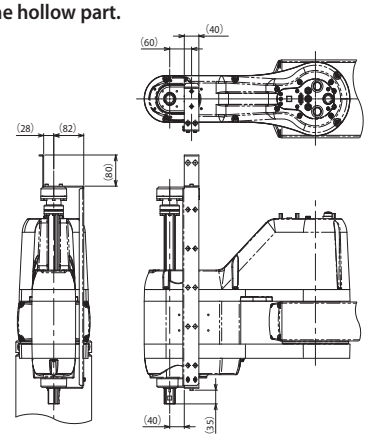


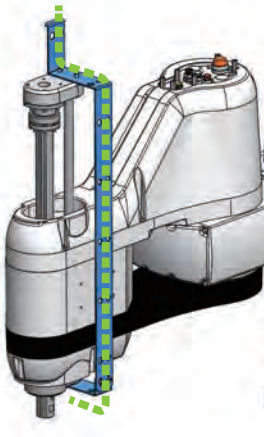
Side stay for Z-axis wiring

This side stay is for wiring at the Z-axis side without using the hollow part.

Single unit model **IXA-SST-ZW-2**

(Z-axis stroke 400mm),
(Single unit weight: 0.9 kg / Material: steel)



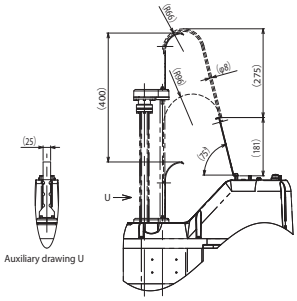


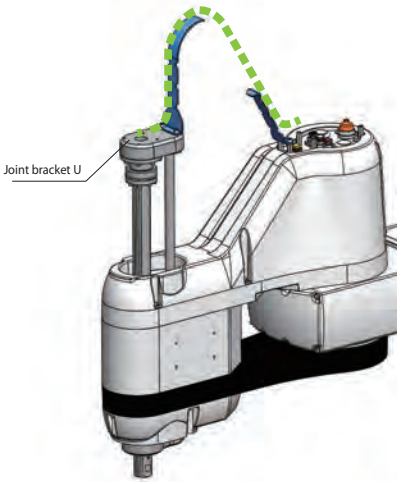
Upper stay for Z-axis wiring

This is an auxiliary stay for wiring between the user panel and joint bracket U for Z-axis operations.

Single unit model **IXA-TST-ZW-2**

(Z-axis stroke 400mm),
(Single unit weight: 0.25kg / Material: steel)



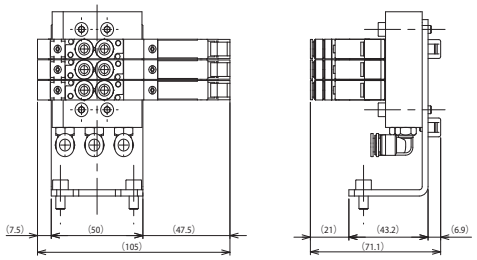


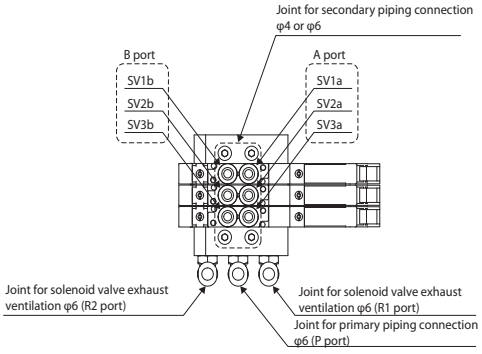
Solenoid valve set

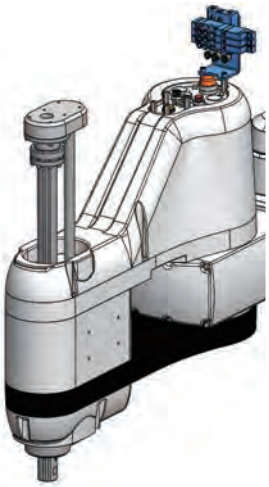
This is an optional solenoid valve when installing an air chuck at the tip.
When the robot built-in cable is used for power supply to the solenoid valve, select the built-in extended user cable (option: EXC).

Single unit model **IXA-SVP-1**

(Single unit weight: 0.5 kg)







Model	F10M3Fstn.1~3 F10T3-FJ-CPS DC24V
Maker	Koganei
Number of positions	3 positions
Number of ports	5
Valve function	Closed center
Fluid to be used	Air
Operation method	Internal pilot type
Acoustic conductance	0.93 $dm^3/(s \cdot bar)$
Effective sectional area (Cv value)	4.6mm^2(0.25)
Piping connecting diameter	φ4 and φ6 dual joint
Pressure range for use	0.2 ~ 0.6MPa
Rated voltage	DC24V
Lubrication	Not necessary

X-SEL

SCARA Robot Program Controller

Model

XSEL - SAX4 - ☐ - ☐ ☐ - ☐ ☐ - ☐ - 3

XSEL	SAX4	☐	☐ ☐	☐ ☐	3
Series	Type	SCARA robot main body type	Network dedicated slot (Slot 1)	(Slot 2)	I/O slot (Slot 1)	(Slot 2)	I/O cable length	Power supply voltage

SCARA robot main body type

4NHN10040	IXA-4NHN10040
4NHN12040	IXA-4NHN12040

Network dedicated slot (Slot 1)

E	Not used
EP	EtherNet/IP
EC	EtherCAT

Network dedicated slot (Slot 2)

E	Not used
DV	DeviceNet
CC	CC-Link
CIE	CC-Link IE Field
PR	PROFIBUS-DP

* EP and CIE cannot used together.

I/O slot (Slot 1) (Slot 2)

E	Not used
N1	Input32/Output16(NPN)
N2	Input16/Output32(NPN)
N3	Input48/Output48(NPN)
P1	Input32/Output16(PNP)
P2	Input16/Output32(PNP)
P3	Input48/Output48(PNP)

(*) Selectable boards are fixed for the network dedicated slot.
(*) The network dedicated slot and IO slot can be used together.

I/O cable length

0	No cable
2	2m (standard)
3	3m
5	5m

Power supply voltage

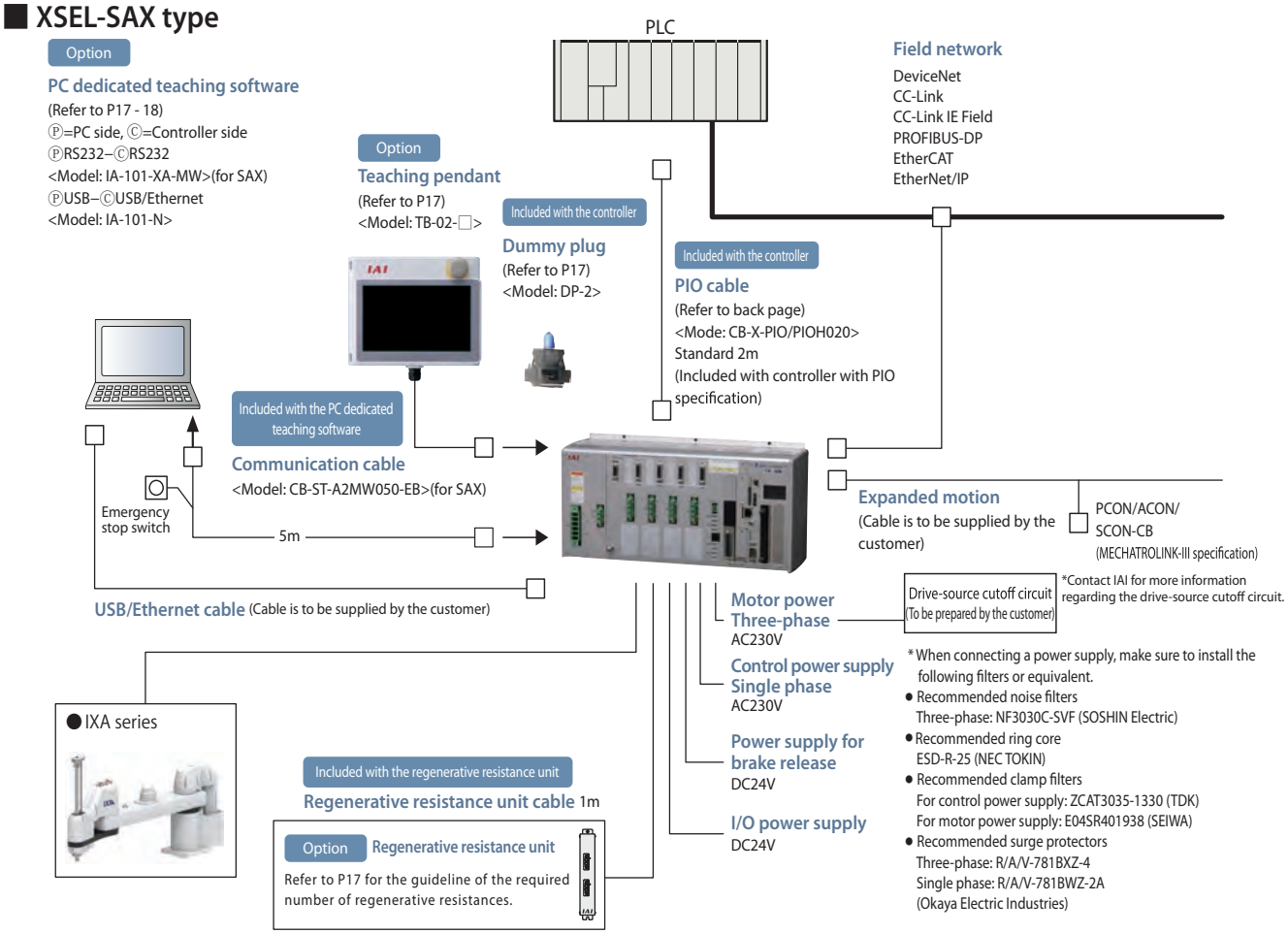
3	3-phase 230VAC

Limitations on Additional Axis Connection

Additional axes cannot be connected to high payload type SCARA robots.

System configuration

XSEL-SAX type

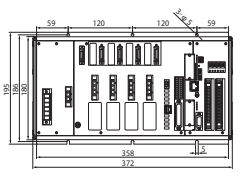


Specifications Table

Controller type	SAX type
Compatible motor output	200W~1000W
Number of controlled axes	1st to 4th axes: SCARA robot
Max. output of connected axes	Three-phase 3600W
Control power input	Single-phase 200/230VAC ±10%
Power frequency	50/60Hz
Insulation resistance	10MΩ or more (at 500VDC between the power supply terminal and I/O terminal, and between the external terminal batch and case)
Withstand voltage	1500VAC (1 minute)
Power capacity (max.)	4NHN10040 : 8522.6VA 4NHN12040 : 8388.8VA
Position detection method	Battery absolute
Safety circuit configuration	Duplex possible
Drive-source cutoff method	External safety circuit
Emergency stop input	BB contact input (External power supply, duplex possible)
Enable input	B contact input (External power supply, duplex possible)
Speed setting	1mm/s and up. Upper limit depends on the actuator specification
Acceleration/deceleration setting	0.01G and up. Upper limit depends on the actuator specification
Programming language	Super SEL language
Number of programs	255 programs
Number of program steps	20000 steps (total)
Number of multi-tasking programs	16 programs
Number of positions	36,666
Data recording element	Flash ROM + non-volatile RAM (FRAM): system battery (button battery) not required
Data input method	Teaching pendant or PC compatible software
Standard I/O	I/O 48-point PIO board (NPN/PNP), I/O 96-point PIO board (NPN/PNP) 2 boards attachable
Expansion I/O	None
Serial communication function	Teaching port (D-sub25 pin), USB port (Mini-B) 1ch RS232C port (D-sub 9 pin), Ethernet (RJ-45)
Expansion motion control function	Up to 32 axes are connectable to the controller that is compatible with MECHATOROLINK-Ⅲ for SCON-CA/CB, PCON-CB, ACON-CB, DCON-CB and MCON-C.
Fieldbus communication function	DeviceNet, CC-Link, CC-Link IE Field, PROFIBUS-DP, EtherNet/IP, EtherCAT
Clock function	Retention time: about 10 days Charging time: about 100 hours
Regenerative resistance	Built-in 1kΩ/20W regenerative resistance (Can be expanded by external regenerative resistance unit connection)
Protection function	Motor overcurrent, overload, motor driver temperature check, overload check, encoder disconnection detection, soft limit over, system malfunction, absolute battery error, etc.
Ambient operating temperature, humidity and ambience	0-40°C, 5%-85%RH (Non-condensing, Non-freezing). Avoid corrosive gas and excessive dust.

* For the power supply capacity etc., please refer to the operation manual or contact IAI.

External dimensions

Type	Controller specification	Front view
SAX	Three-phase specification	

Options

Regenerative resistance unit

Model **RESU-1** (Standard specification)

RESUD-1 (DIN rail mounting specification)

Specification

Model	RESU-1	RESUD-1
Unit weight	Approx. 0.4 kg	
Bult-in regenerative resistance value	235Ω 80W	
Mounting method	Screw mount	DIN rail mount
Attached cable	CB-ST-REU010	

Description

Unit that converts the regenerative current generated during motor deceleration to heat. Although the controller is equipped with a regenerative resistance inside, and additional external regenerative resistance unit may be necessary if the load in the vertical axis is large and the capacity is insufficient. Refer to the IXA SCARA main catalogue for external dimensions.

Guideline for installation

Model		Required number of regenerative resistance units
NHN	10040	10 units
	12040	

Dummy plug

Model **DP-2**

Description

A dummy plug to be attached to the teaching connector when a PC or teaching pendant is not connected.

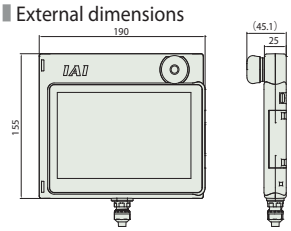
Touch panel teaching pendant

Features

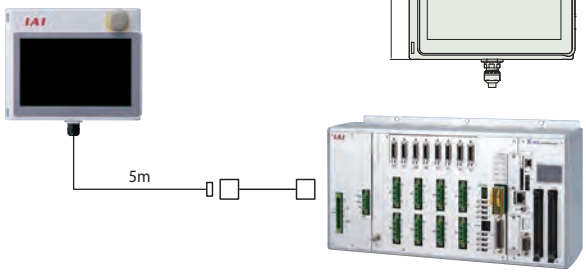
A teaching device equipped with functions such as position teaching, trial operation and monitoring.

Model **TB-02-□**

External dimensions



Configuration



Specifications

Rated voltage	24V DC
Power consumption	3.6W or less (150mA or less)
Ambient operating temperature	0~40°C
Ambient operating humidity	20-85% RH (non-condensing)
Environmental resistance	IP20
Weight	470g (TB-02 single unit only)

PC-compatible teaching software

Model **IA-101-N**

Features

This is PC-compatible software (CD-ROM) only.
When both the controller and the PC are connected with a USB cable or Ethernet cable, use only the software. The following cable is to be prepared by the customer.

Description

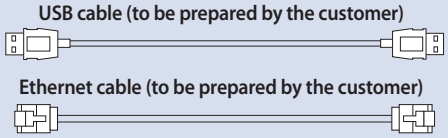
Software (CD), compatible with Windows 7/8/8.1/10

Notes

Make sure to connect a stop switch to the system I/O connector when the actuator is operated with a USB connection. If a stop switch cannot be prepared, use the IA-101-X-USBMW with an emergency stop.

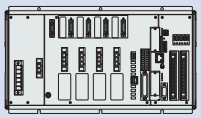
	Controller side connector	Maximum cable length
USB cable specification	USB Mini-B	5m
Ethernet cable specification	10/100/1000BASE-T (RJ-45)	100m

PC software (CD)



USB cable (to be prepared by the customer)

Ethernet cable (to be prepared by the customer)



PC dedicated teaching software compatible with safety category 4 (for XSEL-SAX)

Model **IA-101-XA-MW(-EB)***

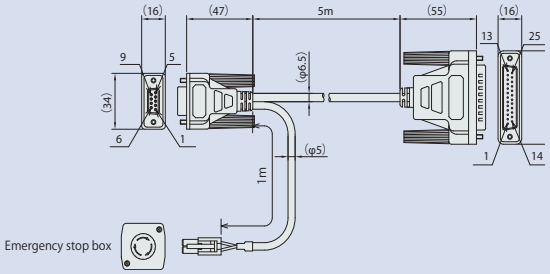
Features Startup supporting software that has program/position input, test operation and monitoring functions. Debugging functions are considerably improved, reducing startup time. The connecting cable with PC has a duplex circuitry for emergency stop, which is compatible with safety category 4.

Description Software (CD), compatible with Windows 7/8/8.1/10

*** IA-101-XA-MW-EB:**
Model set with PC software, PC connection cable + emergency stop box

Notes

The model number for cable only is CB-ST-A2MW050, and that comes with an emergency stop box as a set is CB-ST-A2MW050-EB. When the teaching tool is not used, connect the dummy plug DP-2 (attached to the controller) to the teaching connector.



Wiring diagram

D-sub 9P socket		
Signal	Color	No.
RXD	Orange/Black point	2
TXD	Orange/Red point	3
SG	Grey/Black point	5
	Grey/Red point	
DTR	(Short circuit)	4
DSR		6
RTS	(Short circuit)	7
CTS		8
Connector hood FG		

Emergency stop box		
Signal	Color	No.
EMG1	Orange	1
EMG1	Grey	2
EMG2	White	3
EMG2	Yellow	4

D-sub 9P plug		
No.	Signal	Color
2	TXD	Orange/Black point
3	RXD	Orange/Red point
7	SG	Grey/Black point
		Grey/Red point
4	RTS	(Short circuit)
5	CTS	
6	DSR	(Short circuit)
20	DTR	
17	ENB1	(Short circuit)
19	ENB1	
21	ENB2	(Short circuit)
22	ENB2	
12	EMG1	White/Black point
13	EMG1	White/Red point
16	EMG2	Yellow/Black point
24	EMG2	Yellow/Red point
1	Shield FG	
Connector hood FG		

(Shield)

Maintenance Parts

■ **Table of applicable cables**

To purchase a replacement cable, use the model name listed below.

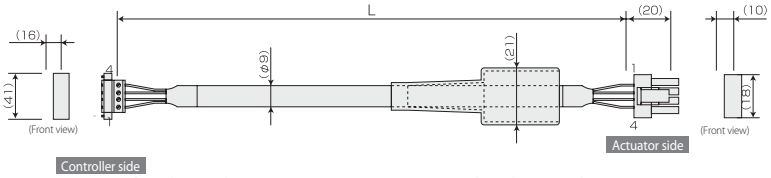
Product model		Motor robot cable (*)	Encoder robot cable (**)	Brake cable
IXA	4NHN10040	CB-X-MA □□□	CB-X1-PA □□□	CB-IXA-BK □□□ -3
	4NHN12040	(1st axis only : CB-XMC-MA □□□)		

Product model	PIO flat cable
XSEL-SAX	CB-X-PIO □□□
	Flat cable for multi-point PIO
	CB-X-PIOH □□□

(*) The alternative EU motor robot cable CB-XEU-MA□□□ (with round plastic connector) is not connectable to IXA SCARA robot.
(**) The alternative EU encoder robot cable CB-XEU1-PA□□□ (with round metal connector) is not connectable to IXA SCARA robot.

Model: CB-X-MA□□□

* Please indicate the cable length (L) in □□□, (e.g. 050 = 5m), maximum 15m



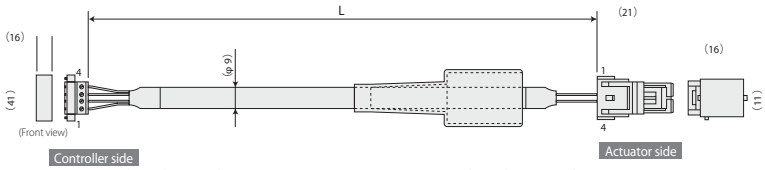
Wiring	Color	Signal	
0.75sq	Green	PE	1
	Red	U	2
	White	V	3
	Black	W	4

	Signal	Color	Wiring
1	U	Red	0.75sq (Crimped)
2	V	White	
3	W	Black	
4	PE	Green	

Minimum bending radius r = 51mm or more (Dynamic bending condition)
* Only the robot cable is available for this model.

Model: CB-XMC-MA□□□

* Please indicate the cable length (L) in □□□, (e.g. 080 = 8m), maximum 15m



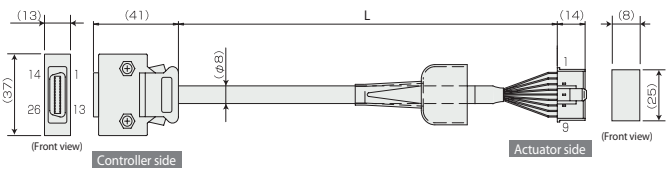
Wiring	Color	Signal	No.
1.25sq	Green	PE	1
	Red	U	2
	White	V	3
	Black	W	4

No.	Signal	Color	Wiring
1	U	Red	1.25sq (Crimped)
2	V	White	
3	W	Black	
4	PE	Green	

Minimum bending radius r = 55mm or more (Dynamic bending condition)
* Only the robot cable is available for this model.

Model: CB-X1-PA□□□

* Please indicate the cable length (L) in □□□, (e.g. 050 = 5m), maximum 15m



Wiring	Color	Signal	No.
AWG26 (Soldered)	-	-	10
	-	-	11
	-	E24V	12
	-	OV	13
	-	LS	26
	-	CREEP	25
	-	OT	24
	-	RSV	23
	-	-	9
	-	-	18
	-	-	19
	-	A+	1
	-	A-	2
	-	B+	3
	-	B-	4
	-	Z+	5
	-	Z-	6
	Orange	SRD+	7
	Green	SRD-	8
	Purple	BAT+	14
	Gray	BAT-	15
	Red	VCC	16
	Black	GND	17
	Blue	BKR-	20
	Yellow	BKR+	21
	-	-	22
Shield is clamp connected to the hood			

No.	Signal	Color	Wiring
1	BAT+	Purple	AWG26 (Crimped)
2	BAT-	Gray	
3	SD	Orange	
4	SD	Green	
5	VCC	Red	
6	GND	Black	
7	FG	Drain	
8	BK-	Blue	
9	BK+	Yellow	

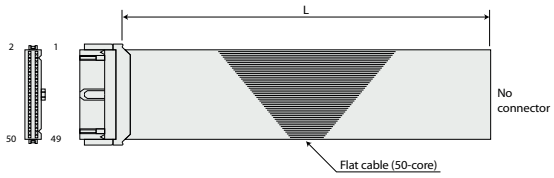
Ground wire and braided shield

Minimum bending radius r = 44mm or more (Dynamic bending condition)
* Only the robot cable is available for this model.

Maintenance Parts (Cables)

Model: CB-X-PIO□□□

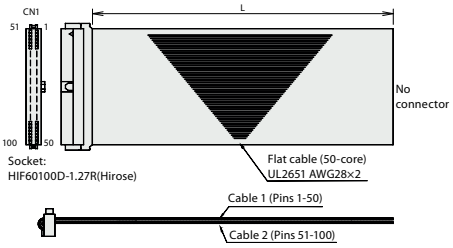
* Please indicate the cable length (L) in □□□, (e.g. 080 = 8m), maximum 10m



No.	Color	Wiring	No.	Color	Wiring	No.	Color	Wiring
1	Brown1	Flat cable (pressure-welded)	18	Gray2	Flat cable (pressure-welded)	35	Green4	Flat cable (pressure-welded)
2	Red1		19	White2		36	Blue4	
3	Orange1		20	Black2		37	Purple4	
4	Yellow1		21	Brown−3		38	Gray4	
5	Green1		22	Red3		39	White4	
6	Blue1		23	Orange3		40	Black4	
7	Purple1		24	Yellow3		41	Brown−5	
8	Gray1		25	Green3		42	Red5	
9	White1		26	Blue3		43	Orange5	
10	Black1		27	Purple3		44	Yellow5	
11	Brown−2		28	Gray3		45	Green5	
12	Red2		29	White3		46	Blue5	
13	Orange2		30	Black3		47	Purple5	
14	Yellow2		31	Brown−4		48	Gray5	
15	Green2		32	Red4		49	White5	
16	Blue2		33	Orange4		50	Black5	
17	Purple2		34	Yellow4				

Model: CB-X-PIOH□□□

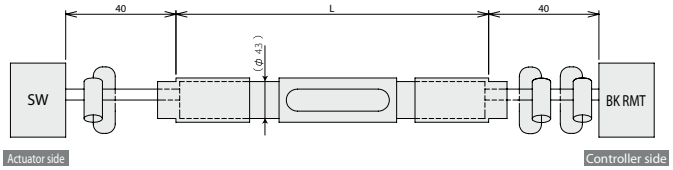
* Please indicate the cable length (L) in □□□, (e.g. 080 = 8m), maximum 10m



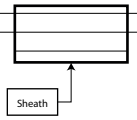
	Cable 1										Cable 2									
Category	Pin No.	Color	Port No.	Function	Category	Pin No.	Color	Port No.	Function		Category	Pin No.	Color	Port No.	Function		Category	Pin No.	Color	Port No.	Function	
–	1	Brown-1	–	External power supply 24VDC for pin No. 2~25, 51~74	–	26	Blue-3	–	External power supply 24VDC for pin No. 27~50, 76~99			51	Brown-1	300	Alarm output			76	Blue-3	324	General-purpose output	
	2	Red-1	000	Program start		27	Purple-3	024	General-purpose input			52	Red-1	301	Ready output			77	Purple-3	325	General-purpose output	
	3	Orange-1	001	General-purpose input		28	Gray-3	025	General-purpose input			53	Orange-1	302	Emergency stop output			78	Gray-3	326	General-purpose output	
	4	Yellow-1	002	General-purpose input		29	White-3	026	General-purpose input			54	Yellow-1	303	General-purpose output			79	White-3	327	General-purpose output	
	5	Green-1	003	General-purpose input		30	Black-3	027	General-purpose input			55	Green-1	304	General-purpose output			80	Black-3	328	General-purpose output	
	6	Blue-1	004	General-purpose input		31	Brown-4	028	General-purpose input			56	Blue-1	305	General-purpose output			81	Brown-4	329	General-purpose output	
	7	Purple-1	005	General-purpose input		32	Red-4	029	General-purpose input			57	Purple-1	306	General-purpose output			82	Red-4	330	General-purpose output	
	8	Gray-1	006	General-purpose input		33	Orange-4	030	General-purpose input			58	Gray-1	307	General-purpose output			83	Orange-4	331	General-purpose output	
	9	White-1	007	Program designation (PRG No.1)		34	Yellow-4	031	General-purpose input			59	White-1	308	General-purpose output			84	Yellow-4	332	General-purpose output	
	10	Black-1	008	Program designation (PRG No.2)		35	Green-4	032	General-purpose input			60	Black-1	309	General-purpose output			85	Green-4	333	General-purpose output	
	11	Brown-2	009	Program designation (PRG No.4)		36	Blue-4	033	General-purpose input			61	Brown-2	310	General-purpose output			86	Blue-4	334	General-purpose output	
	12	Red-2	010	Program designation (PRG No.8)		37	Purple-4	034	General-purpose input			62	Red-2	311	General-purpose output			87	Purple-4	335	General-purpose output	
	13	Orange-2	011	Program designation (PRG No.10)		38	Gray-4	035	General-purpose input			63	Orange-2	312	General-purpose output			88	Gray-4	336	General-purpose output	
Input	14	Yellow-2	012	Program designation (PRG No.20)	Input	39	White-4	036	General-purpose input		Output	64	Yellow-2	313	General-purpose output		Output	89	White-4	337	General-purpose output	
	15	Green-2	013	Program designation (PRG No.40)		40	Black-4	037	General-purpose input			65	Green-2	314	General-purpose output			90	Black-4	338	General-purpose output	
	16	Blue-2	014	General-purpose input		41	Brown-5	038	General-purpose input			66	Blue-2	315	General-purpose output			91	Brown-5	339	General-purpose output	
	17	Purple-2	015	General-purpose input		42	Red-5	039	General-purpose input			67	Purple-2	316	General-purpose output			92	Red-5	340	General-purpose output	
	18	Gray-2	016	General-purpose input		43	Orange-5	040	General-purpose input			68	Gray-2	317	General-purpose output			93	Orange-5	341	General-purpose output	
	19	White-2	017	General-purpose input		44	Yellow-5	041	General-purpose input			69	White-2	318	General-purpose output			94	Yellow-5	342	General-purpose output	
	20	Black-2	018	General-purpose input		45	Green-5	042	General-purpose input			70	Black-2	319	General-purpose output			95	Green-5	343	General-purpose output	
	21	Brown-3	019	General-purpose input		46	Blue-5	043	General-purpose input			71	Brown-3	320	General-purpose output			96	Blue-5	344	General-purpose output	
	22	Red-3	020	General-purpose input		47	Purple-5	044	General-purpose input			72	Red-3	321	General-purpose output			97	Purple-5	345	General-purpose output	
	23	Orange-3	021	General-purpose input		48	Gray-5	045	General-purpose input			73	Orange-3	322	General-purpose output			98	Gray-5	346	General-purpose output	
	24	Yellow-3	022	General-purpose input		49	White-5	046	General-purpose input			74	Yellow-3	323	General-purpose output			99	White-5	347	General-purpose output	
	25	Green-3	023	General-purpose input		50	Black-5	047	General-purpose input		–	75	Green-3	–	External power supply 0V for pin No. 2~25, 51~74		–	100	Black-5	–	External power supply 0V for pin No. 27~50, 76~99	

Model: CB-IXA-BK□□□-3

* Please indicate the cable length (L) in □□□, (e.g. 050 = 5m), maximum 15m



Connector	Identification	Signal	Pin No.
SW	Red	BK5	1
	White	COM	2
	–	–	3



Pin No.	Signal	Identification	Connector
A4	BK5	Red	BK RMT
A3	COM	White	
Remaining	–	–	