

# SCARA IX

Thank you very much for purchasing SCARA IX Robot System.

Please use all necessary safety precautions in order to operate the robot.

- Install SCARA IX securely to the foundation base (flatness: within  $\pm 0.05\text{mm}$ ) horizontally with four M8 bolts for IX 250/350, M10 for IX 500/600 and clip plates (clamping torque: 3.2kgf·m for IX 250/350, 5.1kgf·m for IX 500/600). Strength of the bolts must be at least ISO10.9. Make sure that SCARA IX's base does not move anytime during the operation.
- Surround SCARA IX with safety enclosure which prevents anyone from being within the work envelope.
- Integrate an interlock switch system to the safety enclosure entry door so that the robot stops operating once the enclosure is opened. Make sure that the safety enclosure entry is the only way to get into the work envelope. Put up a sign in a visible area indicating that the robot is in motion.
- Install an emergency/stop switch within reach of the work envelope, which can be used in the event of an emergency.
- In the situations when it is mandatory to enter within the work envelope, either press the emergency stop button or disconnect the power. Make sure that the robot is no longer in motion before entering the work envelope. Put up a sign in a visible area indicating that the robot is under inspection.

## Accessories



For IX 500/600

IX500



Shipping Bracket needs to be removed before operation.



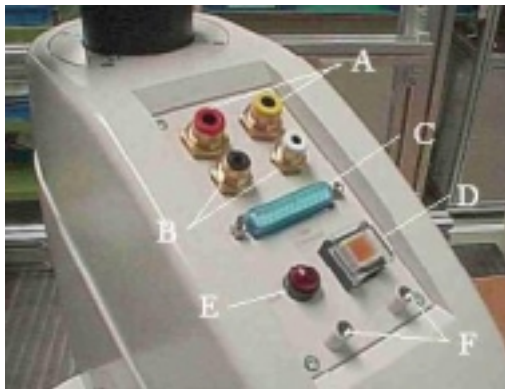
IX600

SCARA IX can be lifted with two I-bolts (one for IX 250/350). Please note that the cover needs to be removed in order to attach the I-Bolt(s).

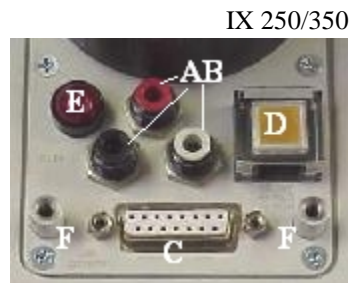
## Cables and Pneumatic Lines



Please connect Motor Cable and Encoder Cables to IX Controller securely. The user has to separately supply 24( $\pm 10\%$ )VDC / 20~30W for the brake. Please note that 24VDC needs to be supplied to the controller through the connector for KX (as shown in the picture) or Standard I/O Connector No.1/No.50 for JX.



IX 500/600



IX 250/350

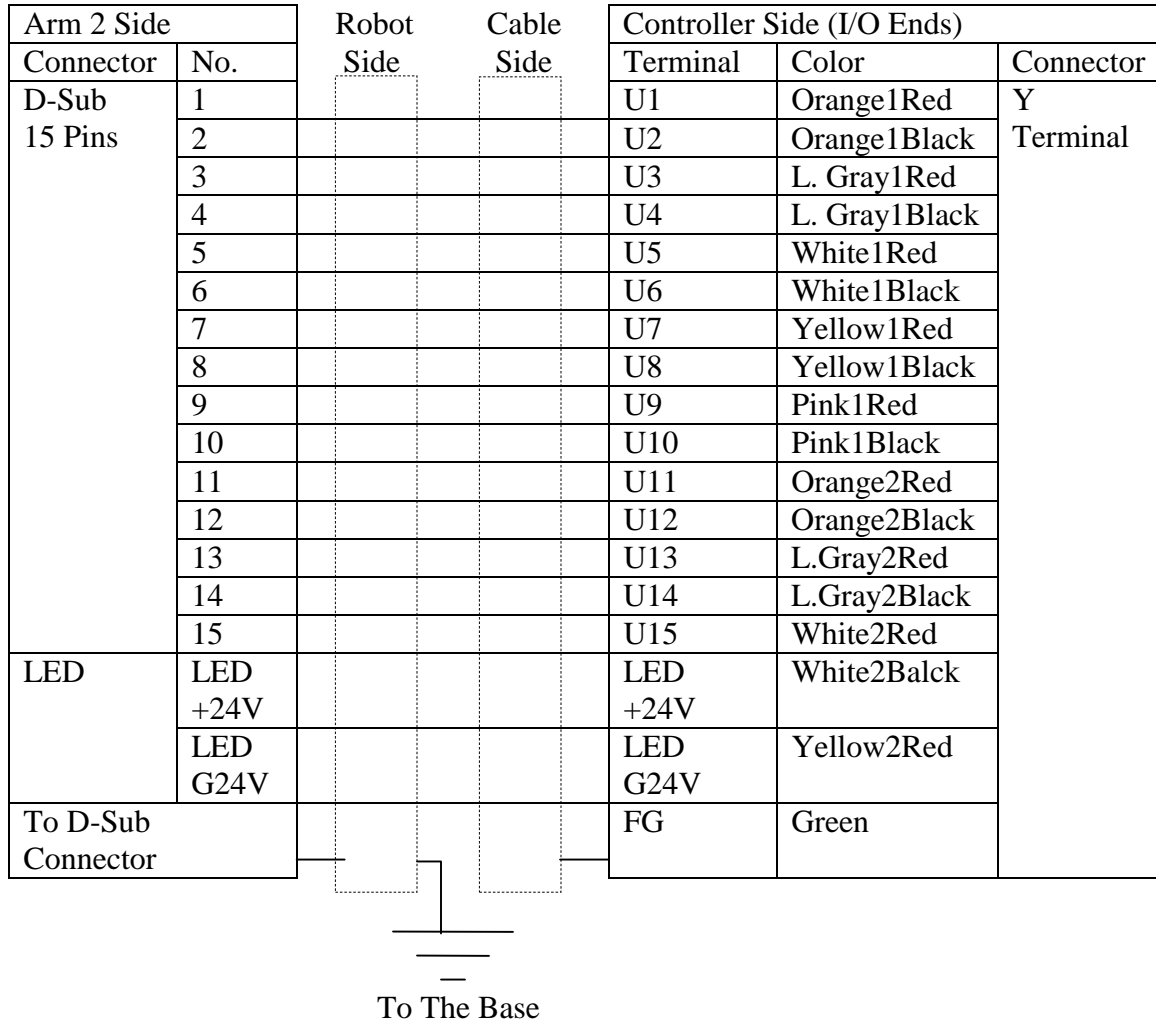
- A: (IX 500/600) Pneumatic Line Connectors (OD 6mm / ID 4mm / Rated: 0.8MP)
- B: (IX 500/600) Pneumatic Line Connectors (OD 4mm / ID 2.5mm / Rated: 0.8MP)
- AB: (IX 250/350) Pneumatic Line Connectors (OD 4mm / ID 2.5mm / Rated: 0.8MP)
- C: Auxiliary I/O Connector (Rated: 30V / 1.1A)
- D: Brake Release: The brake (the 3<sup>rd</sup> axis for IX 250/350, the 3<sup>rd</sup> and 4<sup>th</sup> axes for IX 500/600) can be released at the Arm 2 panel. The brake can be released even when the controller is down. The user has to separately supply 24( $\pm 10\%$ )VDC / 20~30W to the brake cable.
- E: Alarm LED: The red LED (Rating: 24VDC / 12mA) can be used to indicate whether the robot has a problem or not. Note: The user has to make the wiring to enable the function.
- F: Tapped Holes (M4 / 5mm depth) with Spacer (10mm tall)  
These tapped holes can be used to attach light weight equipment.

**Warning:** *Disconnect all the electric power and air supplies to the lines during the installations.*

## Auxiliary I/O Connections

IX 250/350

Twisted Pairs: 1 to 14 / 15 & LED+24V



IX 500/600

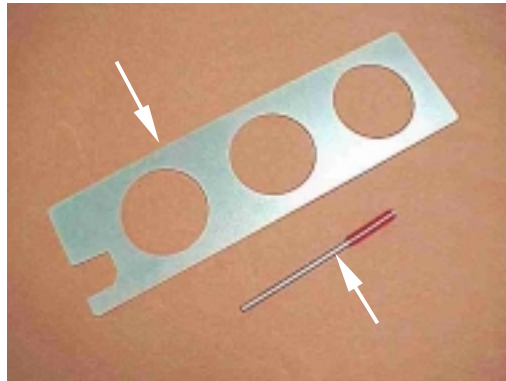
Twisted Pairs: 1 to 24 / 25 & LED+24V

Arm 2 Side		Robot Side	Cable Side	Controller Side (I/O Ends)		
Connector	No.			Terminal	Color	Connector
D-Sub 25 Pins	1			U1	Orange1Red	Y Terminal
	2			U2	Orange1Black	
	3			U3	L. Gray1Red	
	4			U4	L. Gray1Black	
	5			U5	White1Red	
	6			U6	White1Black	
	7			U7	Yellow1Red	
	8			U8	Yellow1Black	
	9			U9	Pink1Red	
	10			U10	Pink1Black	
	11			U11	Orange2Red	
	12			U12	Orange2Black	
	13			U13	L.Gray2Red	
	14			U14	L.Gray2Black	
	15			U15	White2Red	
	16			U16	White2Black	
	17			U17	Yellow2Red	
	18			U18	Yellow2Black	
	19			U19	Pink2Red	
	20			U20	Pink2Black	
	21			U21	Orange3Red	
	22			U22	Orange3Black	
	23			U23	L.Gray3Red	
	24			U24	L.Gray3Black	
	25			U25	White3Red	
LED	LED +24V			LED +24V	White3Black	
	LED G24V			LED G24V	Yellow3Red	
To D-Sub Connector				FG	Green	

To The Base

## Homing Jigs (for Absolute Zero Adjustment and Machine Alignments) - Option Items -

These jigs are used for homing (when the home position needs to be set exactly).  
Normally the arms' home positions are indicated by Set-mark sticker.  
These jigs are option items.



For IX 500/600

Set Mark Sticker: 1<sup>st</sup> Axis



2<sup>nd</sup> Axis



4<sup>th</sup> Axis



IX 500



The set-screw needs to be removed before inserting the jig.

IX 500



The 4<sup>th</sup> axis jig has to be parallel to the 2<sup>nd</sup> arm and touch the 2<sup>nd</sup> axis jig.

## Homing Procedure

Homing procedure for SCARA IX is simple. The Absolute Encoder Reset menu guides the user through each step. "Abs. Encoder Rest" is under "Controller".

Homing is done through the jogging portion of the procedure and the robot can be fixed into the home position with Homing Jigs (option items). Alternatively the user can use the marker stickers as references to put the robot into the home position.

The red arrow will point to the button that should be clicked. Press the buttons once in order as prompted by the arrow.

Notes:

For Arm 1 and Arm 2 – Please skip "Home pos. automatic update" step. If you get into the step, you must have Homing Jigs to fix the robot into the home position.

Please write the flash ROM and reset the controller after the procedure.

SCARA IX – Absolute Encoder Reset Menu Window

Abs. Encoder Reset

After it ends "Home pos. automatic update",  
Please do "Write Flash Rom" -> "Software reset"

Arm1 (A1c) | Arm2 (A2c) | Rot. Axis (Rc) + Vert. Axis (Zc)

Encoder Rotation Data Reset1

Reset Controller Error

Servo ON

Jog -> Basic Position(Eye Mark) [Jog end]

Servo-OFF

Emergency stop -> Positioning pin insertion (When positioning pin is used) [OK]

Encoder Rotation Data Reset2

Home pos. automatic update(Only newly reset) [Cancel]

Positioning pin removal -> Emergency stop release (When positioning pin is used) [OK]

Jog Vel: 2

Inc.Distance: 0.00

[← (-)] [→ (+)]

Reset Encoder Error

Stop

## Maintenance

To maximize its mechanical life and maintain its performance, SCARA IX robot requires scheduled maintenances.

**WARNING:** *Please read this section carefully and follow the instructions. Failure to do so may result in serious accident or damage the robot.*

**CAUTION:** Do not attempt to disassemble or modify the following parts.

•Motor •Ball Reduction •Ball-Screw Spline •Bearing •Harmonic Drive •Brake •Cable  
The above items' maintenance must be performed by the authorized personnel.

### Periodic Maintenances

Please perform the following maintenances. Please use all necessary safety precautions during the maintenances. If you notice anything unusual about the robot system, please contact IAI Corporation.

#### Daily Maintenance

Maintenance Area	Maintenance Description
Safety Cage	Make sure the cage is installed correctly. Check the interlock(s).
Robot	Make sure the robot is installed securely. Check its appearance (look for looseness, scratch, dent & etc.) Check for any abnormal vibration or sound.
Cables	Check for looseness, cut, and scratch.
E-Stop Switch	Make sure it works properly.

#### Biannual Maintenance

Maintenance Area	Maintenance Description
Robot	Check the arms for loose mounting bolts. (When necessary, re-tighten mounting bolts.)
Ball-Screw Spline	Re-grease.
Belts for the 3 <sup>rd</sup> and 4 <sup>th</sup> axes	Check the tensions. Check for cut, scratch, and wear.
Connectors	Check for looseness.

#### Annual Maintenance

Maintenance Area	Maintenance Description
Harmonic Drive	Change the grease when the robot is used for 24 hours/day. *Change the grease every 3 years if it is used for 8 hours/day.
Ball-Screw Spline	Check for wear and extra play.

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