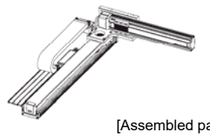
X-axis Nut-rotation Type Cartesian Robot Assembly Procedures First Edition

Thank you for purchasing an IAI product.
Assemble your product correctly by referring to this Assembly Procedures.

NS (nut-rotation type actuator) + ISA configuration unit

No.	Number of configured axes	Z-axis installation method	Model	Drawing No.
1	2 axes		ICSPA2-B1N（B2N）□H（M）	GMM07-061
2	3 axes	Z-axis base mount	ICSPA3-B1N（B2N）□H（M）B3H（M）	GMM07-062
3	3 axes	Z-axis slider mount	ICSPA3-B1N（B2N）□H（M）S3M	GMM07-063
4	4 axes		ICSPA4-B3N1H（M）	GMM07-064
5	6 axes	Z-axis base mount	ICSPA6-B3N1H（M）B3H（M）	GMM07-065
6	6 axes	Z-axis slider mount	ICSPA6-B3N1H（M）S3M	GMM07-066

X-axis Nut-rotation Type Cartesian Robot – High-precision 2-axis Specification



[Model]

ICSPA2-B1N ① H（M）
ICSPA2-B2N ① H（M）
- H: X-axis high-speed type / M: X-axis medium-speed type
- [1] XY configuration direction
- 1: Stroke 500 to 2200 / 2: Stroke 2250 to 3000

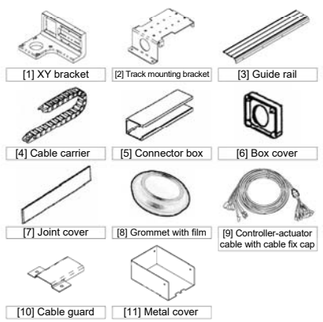
[1] XY configuration directions

[Constituent axes]

Constituent axis	Model
X-axis	NS-LXMS-□-400-40<20>- (stroke) -T2-AQ-RT
Y-axis	ISPA-MYM-□-200-20- (stroke) -T2-AQ

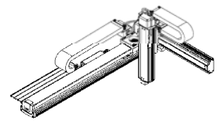
* □ in the above models indicates either A (absolute) or I (incremental).

[Assembled parts]



[Assembly Procedure] Drawing No.: GMM07-061

X-axis Nut-rotation Type Cartesian Robot – High-precision 3-axis Specification, Z-axis Base Mount



[Model]

ICSPA3-B1N ① H（M）B3H（M）
ICSPA3-B2N ① H（M）B3H（M）
- H: Z-axis high-speed type / M: Z-axis medium-speed type
- H: X-axis high-speed type / M: X-axis medium-speed type
- [1] XY configuration direction
- 1: Stroke 500 to 2200 / 2: Stroke 2250 to 3000

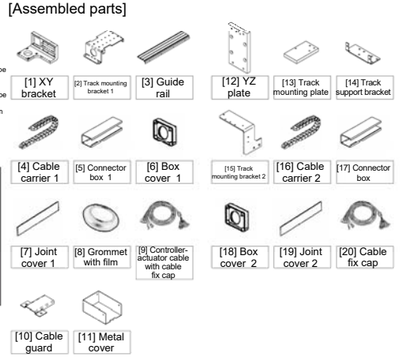
[1] XY configuration directions

[Constituent axes]

Constituent axis	Model
X-axis	NS-LXMS-□-400-40<20>- (stroke) -T2-AQ-RT
Y-axis	ISPA-MYM-□-200-20- (stroke) -T2-AQ
Z-axis	ISPA-MXM-□-200-20(10)- (stroke) -T2-AQ-B

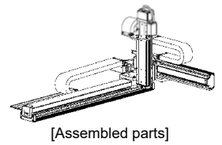
* □ in the above models indicates either A (absolute) or I (incremental).

[Assembled parts]



[Assembly Procedure] Drawing No.: GMM07-062

X-axis Nut-rotation Type Cartesian Robot – High-precision 3-axis Specification, Z-axis Slider Mount



[Model]

ICSPA3-B1N ① H（M）S3M
ICSPA3-B2N ① H（M）S3M
- M: Z-axis medium-speed type
- H: X-axis high-speed type / M: X-axis medium-speed type
- [1] XY configuration direction
- 1: Stroke 500 to 2200 / 2: Stroke 2250 to 3000

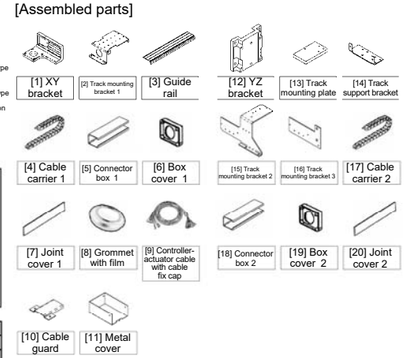
[1] XY configuration directions

[Constituent axes]

Constituent axis	Model
X-axis	NS-LXMS-□-400-40<20>- (stroke) -T2-AQ-RT
Y-axis	ISPA-MYM-□-200-20- (stroke) -T2-AQ
Z-axis	ISPA-MXM-□-200-20(10)- (stroke) -T2-AQ-B-NM

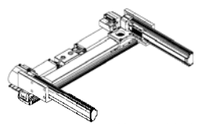
* □ in the above models indicates either A (absolute) or I (incremental).

[Assembled parts]



[Assembly Procedure] Drawing No.: GMM07-063

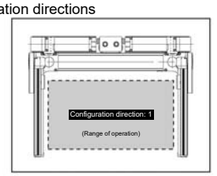
X-axis Nut-rotation Type Cartesian Robot – High-precision 4-axis Specification



[Model]

ICSPA4-B3N 1 H（M）
- H: X-axis high-speed type / M: X-axis medium-speed type
- [1] XY configuration direction

[1] XY configuration directions

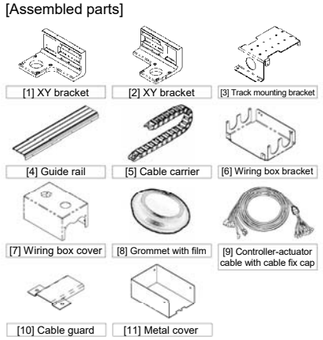


[Constituent axes]

Constituent axis	Model
X-axis	NS-LXMM-□-400-40<20>- (stroke) -T2-AQ-RT
Y1-axis	ISPA-MYM-□-200-20- (stroke) -T2-AQ
Y2-axis	ISPA-MYM-□-200-20- (stroke) -T2-AQ

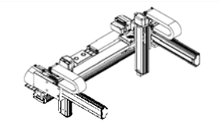
* □ in the above models indicates either A (absolute) or I (incremental).

[Assembled parts]



[Assembly Procedure] Drawing No.: GMM07-064

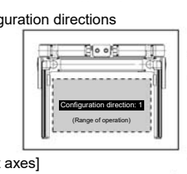
X-axis Nut-rotation Type Cartesian Robot – High-precision 6-axis Specification, Z-axis Base Mount



[Model]

ICSPA6-B3N 1 H（M）B3H（M）
- H: Z-axis high-speed type / M: Z-axis medium-speed type
- H: X-axis high-speed type / M: X-axis medium-speed type
- [1] XY configuration direction

[1] XY configuration directions

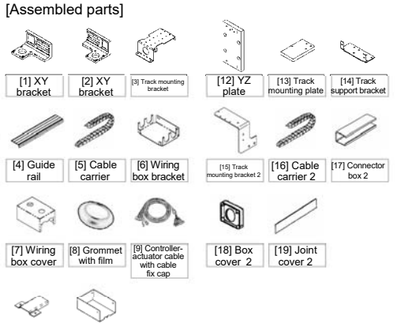


[Constituent axes]

Constituent axis	Model
X-axis	NS-LXMM-□-400-40<20>- (stroke) -T2-AQ-RT
Y1-axis	ISPA-MYM-□-200-20- (stroke) -T2-AQ
Y2-axis	ISPA-MYM-□-200-20- (stroke) -T2-AQ
Z1-axis	ISPA-MXM-□-200-20(10)- (stroke) -T2-AQ-B
Z2-axis	ISPA-MXM-□-200-20(10)- (stroke) -T2-AQ-B

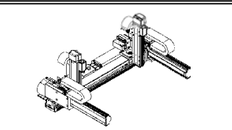
* □ in the above models indicates either A (absolute) or I (incremental).

[Assembled parts]



[Assembly Procedure] Drawing No.: GMM07-065

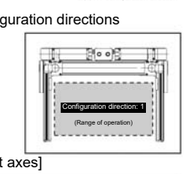
X-axis Nut-rotation Type Cartesian Robot – High-precision 6-axis Specification, Z-axis Slider Mount



[Model]

ICSPA6-B3N 1 H（M）S3M
- M: Z-axis medium-speed type
- H: X-axis high-speed type / M: X-axis medium-speed type
- [1] XY configuration direction

[1] XY configuration directions

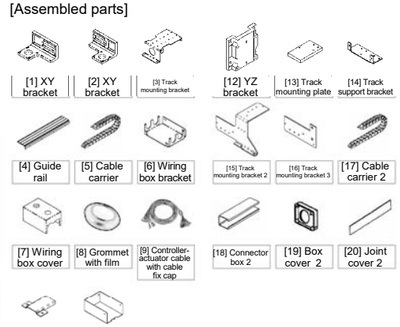


[Constituent axes]

Constituent axis	Model
X-axis	NS-LXMM-□-400-40<20>- (stroke) -T2-AQ-RT
Y1-axis	ISPA-MYM-□-200-20- (stroke) -T2-AQ
Y2-axis	ISPA-MYM-□-200-20- (stroke) -T2-AQ
Z1-axis	ISPA-MZM-□-200-10- (stroke) -T2-AQ-B-NM
Z2-axis	ISPA-MZM-□-200-10- (stroke) -T2-AQ-B-NM

* □ in the above models indicates either A (absolute) or I (incremental).

[Assembled parts]



[Assembly Procedure] Drawing No.: GMM07-066

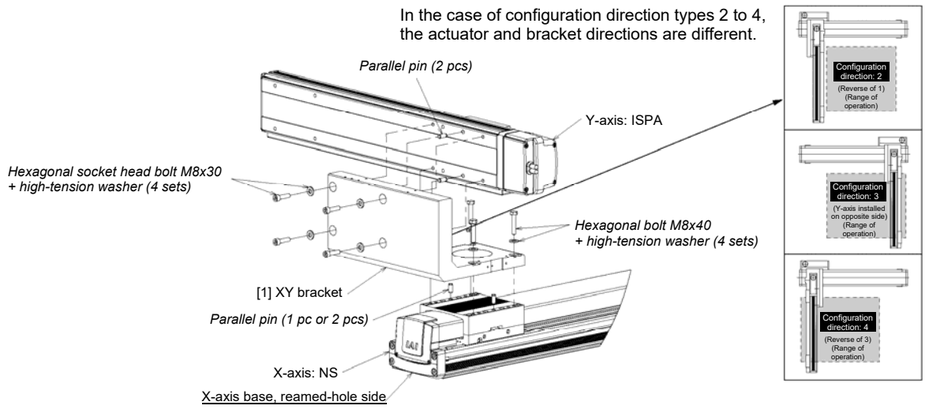
⚠ Caution:
- Although each part has been chamfered to remove sharp edges, exercise due caution during the assembly to prevent injury. If necessary, wear gloves or other protective gears.
- Exercise due caution during the assembly to prevent pinching of hands and fingers.

X-axis Nut-rotation Type Cartesian Robot – High-precision 2-axis Specification
ICSPA2-B1N (B2N) □H (M)

Drawing No.	GMM07-061	1／1

1

[Tools] Allen wrench, spanner wrench



[Installation of X-axis: NS on XY bracket [1]]

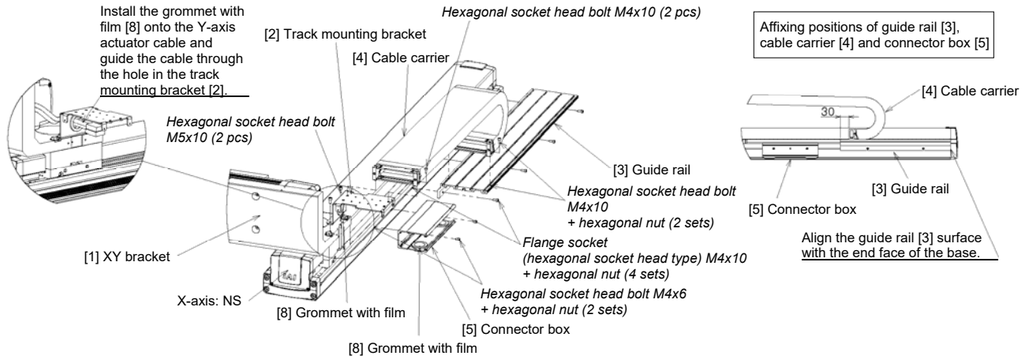
Parallel pin	Hexagonal bolt	Tightening torque
ϕ8h7×18	M8×40mm	306kgf・cm／2997N・cm

[Installation of Y-axis: ISPA on XY bracket [1]]

Parallel pin	Hexagonal socket head bolt	Tightening torque
ϕ8h7×18	M8×30mm	306kgf・cm／2997N・cm

Note: To ensure squareness between the X-axis and Y-axis, insert one parallel pin. Adjust the angle between the X-axis and Y-axis to the right angle, and then mount the hexagonal bolts.

2



[Installation of track mounting bracket [2] on XY bracket [1]]

Hexagonal socket head bolt	Tightening torque
M5×10mm	74.2kgf・cm／727N・cm

[Installation of X-axis: NS side of guide rail [3] in T-slot]

Flange socket (hexagonal socket head type)	Tightening torque
M4×10mm	18.0kgf・cm／176N・cm

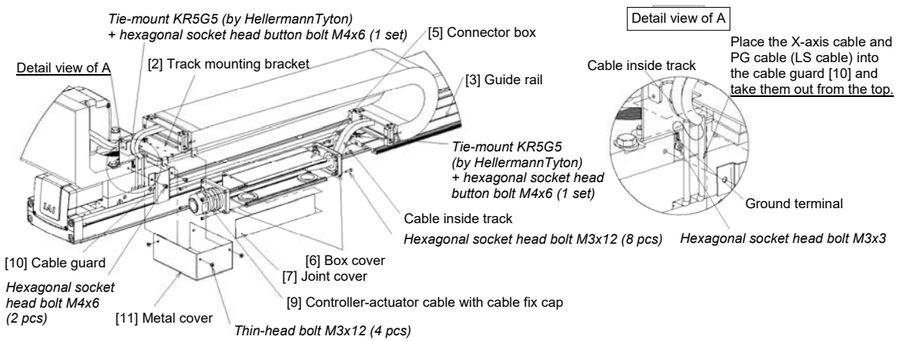
[Installation of X-axis: NS side of connector box [5] in T-slot]

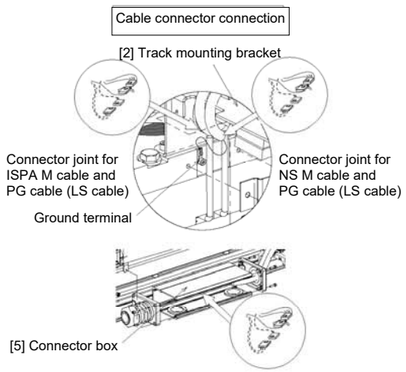
Hexagonal socket head bolt	Tightening torque
M4×6mm	18.0kgf・cm／176N・cm

[Installation of cable carrier [4] on track mounting bracket [2]]
[Installation of guide rail [3] for cable carrier [4] in T-slot]

Hexagonal socket head bolt	Tightening torque
M4×10mm	36.7kgf・cm／359N・cm

3





Make sure the numbers on the connectors to be connected match.

⚠ Caution: The cables for X-axis (axis 1) and Y-axis (axis 2) are placed in tracks. Install each cable correctly.
[Cable markings]
• X-axis (axis 1): 1 • Y-axis (axis 2): 2

[Installation of box cover [6] on connector box [5]]

Hexagonal socket head bolt	Tightening torque
M3×12mm	5.51kgf・cm／54N・cm

[Installation of metal cover [11] on track mounting bracket [2]]

Thin-head bolt	Tightening torque
M3×4mm	7.12kgf・cm／69.8N・cm

⚠ Caution: Since the hexagonal holes in thin-head bolts are small, the hexagonal holes may be damaged depending on the tightening method. Exercise due caution when tightening thin-head bolts.

[Installation of cable guard [10] on XY bracket [1]]

Hexagonal socket head bolt	Tightening torque
M4×6mm	36.7kgf・cm／359N・cm

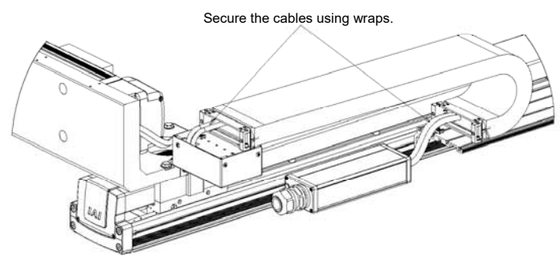
[Installation of tie-mount on track mounting bracket [2]]
[Installation of tie-mount on guide rail [3]]

Hexagonal socket head button bolt	Tightening torque
M4×6mm	11.7kgf・cm／114N・cm

[Installation of ground terminal on [1] XY bracket]

Hexagonal socket head bolt	Tightening torque
M3×3mm	15.8kgf・cm／154N・cm

4



⚠ Caution: Secure the wires to prevent the cables and connectors from contacting each axis when the axis is moved over its entire stroke.
When manually moving the actuator with brake, connect the controller, supply the power, and then release the brake release switch (by turning the switch to the RLS side).

* This assembly procedure applies to configuration direction 1. If other configuration direction such as 2, 3 or 4 is used, the actuator and bracket directions vary. However, you can still use this assembly drawing as a reference.

⚠ Caution:
- Although each part has been chamfered to remove sharp edges, exercise due caution during the assembly to prevent injury. If necessary, wear gloves or other protective gears.
- Exercise due caution during the assembly to prevent pinching of hands and fingers.

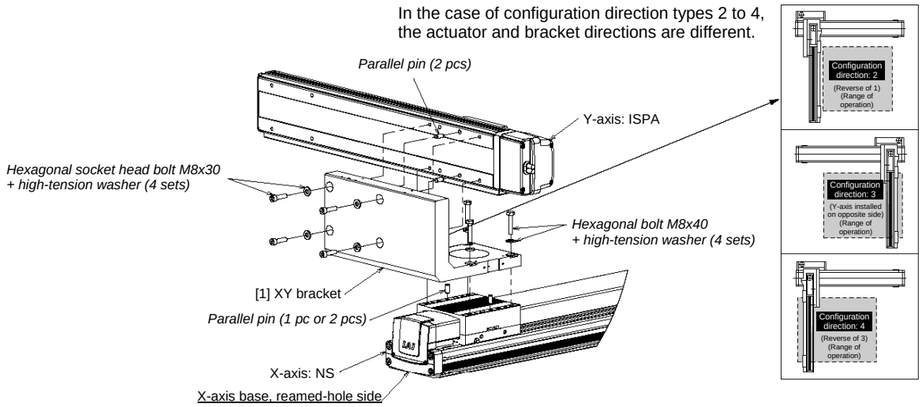
X-axis Nut-rotation Type Cartesian Robot – High-precision 3-axis Specification, Z Base Mount

ICSPA3-B1N (B2N) □H (M) B3H (M)

Drawing No.	GMM07-062	1/2

1

[Tools] Allen wrench, spanner wrench



[Installation of X-axis: NS on XY bracket [1]]

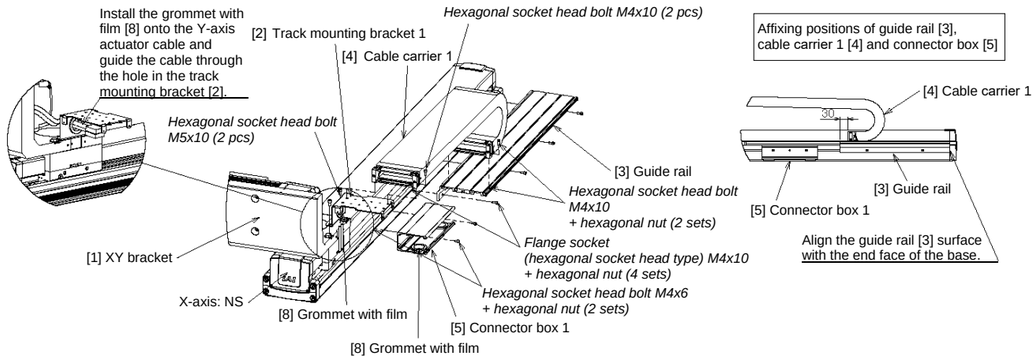
Parallel pin	Hexagonal bolt	Tightening torque
ϕ8h7×18	M8×40mm	306kgf・cm／2997N・cm

[Installation of Y-axis: ISPA on XY bracket [1]]

Parallel pin	Hexagonal socket head bolt	Tightening torque
ϕ8h7×18	M8×30mm	306kgf・cm／2997N・cm

Note: To ensure squareness between the X-axis and Y-axis, insert one parallel pin. Adjust the angle between the X-axis and Y-axis to the right angle, and then mount the hexagonal bolts.

2



[Installation of track mounting bracket 1 [2] on XY bracket [1]]

Hexagonal socket head bolt	Tightening torque
M5×10mm	74.2kgf・cm／727N・cm

[Installation of X-axis: NS side of connector box 1 [5] in T-slot]

Hexagonal socket head bolt	Tightening torque
M4×6mm	18.0kgf・cm／176N・cm

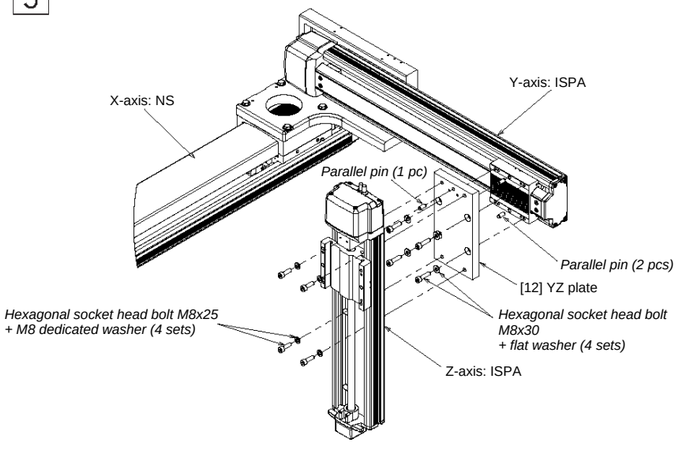
[Installation of X-axis: NS side of guide rail [3] in T-slot]

Flange socket (hexagonal socket head type)	Tightening torque
M4×10mm	18.0kgf・cm／176N・cm

[Installation of cable carrier 1 [4] on track mounting bracket 1[2]]
[Installation of guide rail [3] for cable carrier 1 [4] in T-slot]

Hexagonal socket head bolt	Tightening torque
M4×10mm	36.7kgf・cm／359N・cm

3



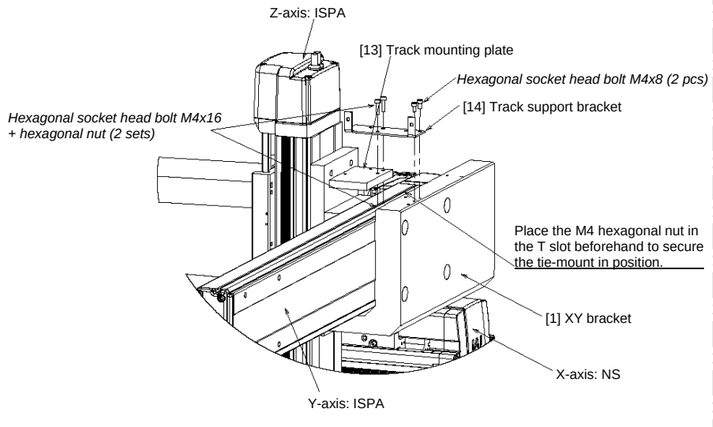
[Installation of YZ plate [12] on Y-axis: ISPA]

Parallel pin	Hexagonal socket head bolt	Tightening torque
ϕ8h7×18	M8×30mm	306kgf・cm／2997N・cm

[Installation of Z-axis: ISPA on YZ plate [12]]

Parallel pin	Hexagonal socket head bolt	Tightening torque
ϕ8h7×25	M8×25mm	306kgf・cm／2997N・cm

4



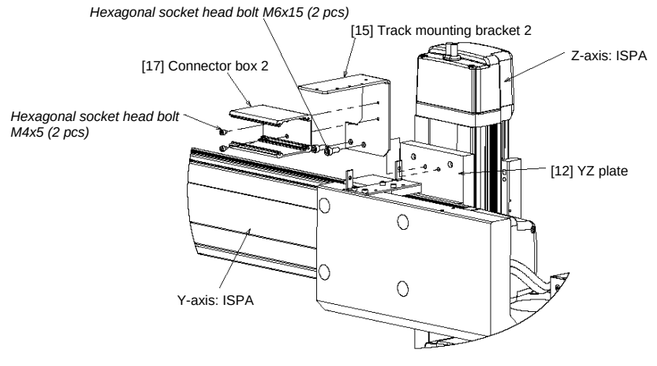
[Installation of track support bracket [14] on XY bracket [1]]

Hexagonal socket head bolt	Tightening torque
M4×8mm	36.7kgf・cm／359N・cm

[Installation of track support metal [14] on track mounting plate [13]]

Hexagonal socket head bolt	Tightening torque
M4×16mm	36.7kgf・cm／359N・cm

5



[Installation of track mounting bracket 2 [15] on YZ plate [12]]

Hexagonal socket head bolt	Tightening torque
M6×15mm	126kgf・cm／1234N・cm

[Installation of connector box 2 [17] on track mounting bracket 2 [15]]

Hexagonal socket head bolt	Tightening torque
M4×5mm	18.0kgf・cm／176N・cm

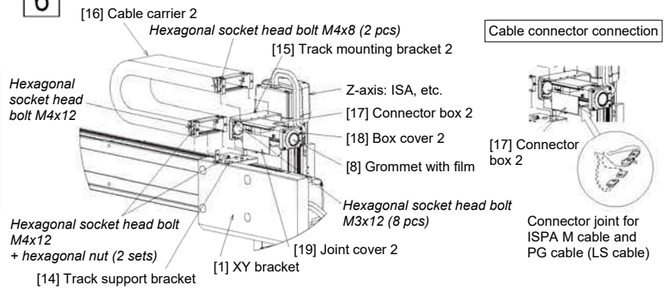
* This assembly procedure applies to configuration direction 1. If other configuration direction such as 2, 3 or 4 is used, the actuator and bracket directions vary. However, you can still use this assembly drawing as a reference.

X-axis Nut-rotation Type Cartesian Robot – High-precision 3-axis Specification, Z Base Mount

ICSPA3-B1N (B2N) □H (M) B3H (M)

Drawing No.	GMM07-062	2／2

6



Cable connector connection

[Installation of cable carrier 2 [16] on track support bracket [14]]

Hexagonal socket head bolt	Tightening torque
M4×12mm	36.7kgf・cm／359N・cm

[Installation of cable carrier 2 [16] on XY bracket [1]]

Hexagonal socket head bolt	Tightening torque
M4×12mm	36.7kgf・cm／359N・cm

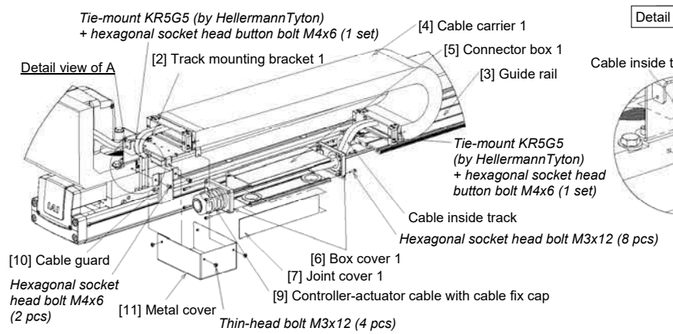
[Installation of cable carrier 2 [16] on track mounting bracket 2 [15]]

Hexagonal socket head bolt	Tightening torque
M4×8mm	36.7kgf・cm／359N・cm

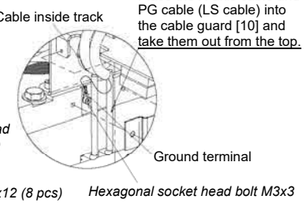
[Installation of box cover 2 [18] on connector box 2 [17]]

Hexagonal socket head bolt	Tightening torque
M3×12mm	5.51kgf・cm／54N・cm

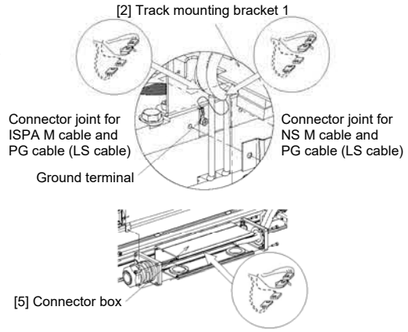
7



Detail view of A



Cable connector connection



Make sure the numbers on the connectors to be connected match.

⚠ Caution: The cables for X-axis (axis 1), Y-axis (axis 2) and Z-axis (axis 3) are placed in tracks. Install each cable correctly.
[Cable markings]
• X-axis (axis 1): 1 • Y-axis (axis 2): 2 • Z-axis (axis 3): 3

[Installation of metal cover [11] on track mounting bracket 1 [2]]

Thin-head bolt	Tightening torque
M3×4mm	7.12kgf・cm／69.8N・cm

[Installation of box cover 1 [6] on connector box 1 [5]]

Hexagonal socket head bolt	Tightening torque
M3×12mm	5.51kgf・cm／54N・cm

⚠ Caution: Since the hexagonal holes in thin-head bolts are small, the hexagonal holes may be damaged depending on the tightening method. Exercise due caution when tightening thin-head bolts.

[Installation of cable guard [10] on XY bracket [1]]

Hexagonal socket head bolt	Tightening torque
M4×6mm	36.7kgf・cm／359N・cm

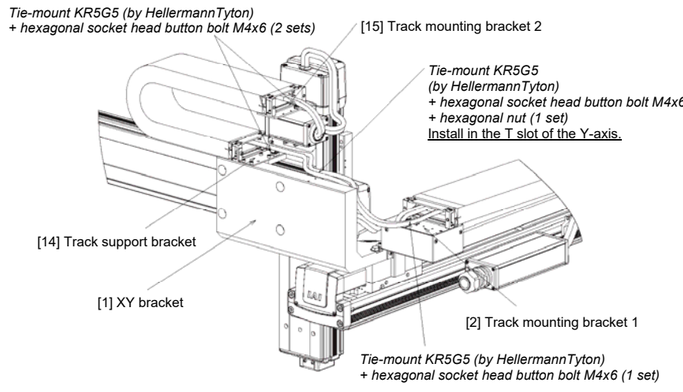
[Installation of tie-mount on track mounting bracket 1 [2]]
[Installation of tie-mount in T slot of guide rail [3]]

Hexagonal socket head button bolt	Tightening torque
M4×6mm	11.7kgf・cm／114N・cm

[Installation of ground terminal on [1] XY bracket]

Hexagonal socket head bolt	Tightening torque
M3×3mm	15.8kgf・cm／154N・cm

8

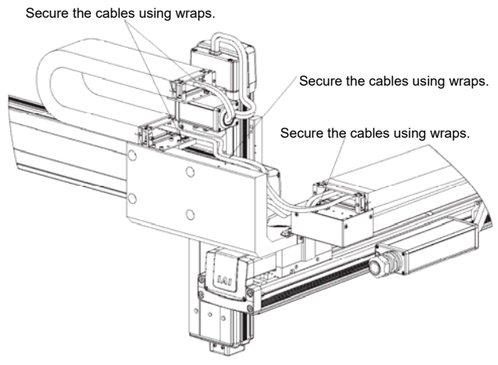


[Installation of tie-mount in track mounting bracket 2 [15]]
[Installation of tie-mount on track support bracket [14]]
[Installation of tie-mount in T slot of XY bracket [1]]
[Installation of tie-mount on track mounting bracket 1 [2]]

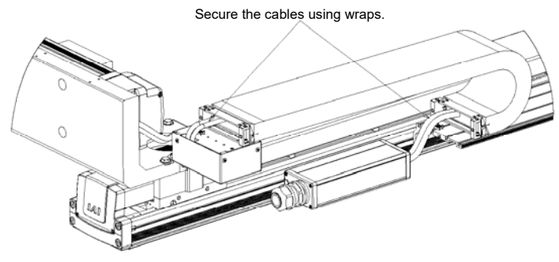
Hexagonal socket head button bolt	Tightening torque
M4×6mm	11.7kgf・cm／114N・cm

9

Z-axis cables



X-axis, Y-axis cables



⚠ Caution: Secure the wires to prevent the cables and connectors from contacting each axis when the axis is moved over its entire stroke.
When manually moving the actuator with brake, connect the controller, supply the power, and then release the brake release switch (by turning the switch to the RLS side).

⚠ Caution:
- Although each part has been chamfered to remove sharp edges, exercise due caution during the assembly to prevent injury. If necessary, wear gloves or other protective gears.
- Exercise due caution during the assembly to prevent pinching of hands and fingers.

X-axis Nut-rotation Type Cartesian Robot – High-precision 3-axis Specification, Z Slider Mount

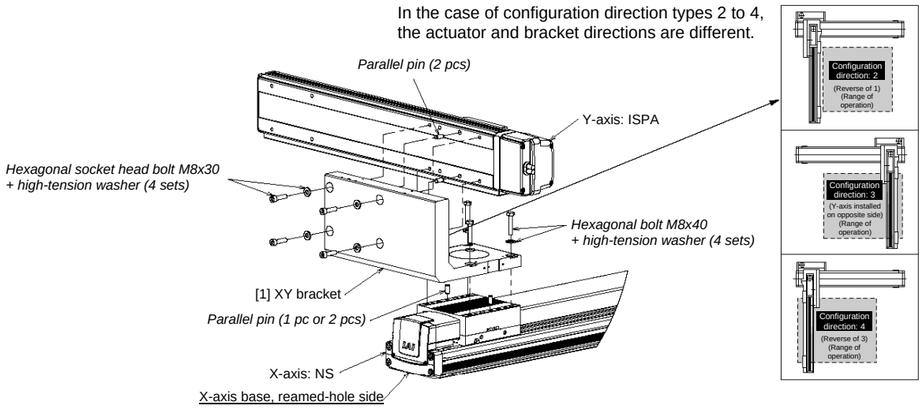
ICSPA3-B1N (B2N) □H (M) S3H (M)

Drawing No.	GMM07-063	1/2

1

[Tools] Allen wrench, spanner wrench

In the case of configuration direction types 2 to 4, the actuator and bracket directions are different.



[Installation of X-axis: NS on XY bracket [1]]

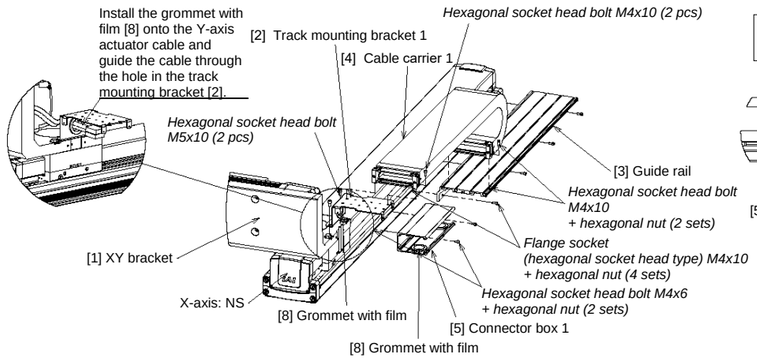
Parallel pin	Hexagonal bolt	Tightening torque
φ8h7×18	M8×40mm	306kgf・cm／2997N・cm

[Installation of Y-axis: ISPA on XY bracket [1]]

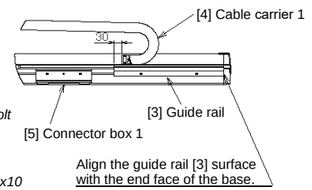
Parallel pin	Hexagonal socket head bolt	Tightening torque
φ8h7×18	M8×30mm	306kgf・cm／2997N・cm

Note: To ensure squareness between the X-axis and Y-axis, insert one parallel pin. Adjust the angle between the X-axis and Y-axis to the right angle, and then mount the hexagonal bolts.

2



Affixing positions of guide rail [3], cable carrier 1 [4] and connector box [5]



[Installation of track mounting bracket 1 [2] on XY bracket [1]]

Hexagonal socket head bolt	Tightening torque
M5×10mm	74.2kgf・cm／727N・cm

[Installation of X-axis: NS side of guide rail [3] in T-slot]

Flange socket (hexagonal socket head type)	Tightening torque
M4×10mm	18.0kgf・cm／176N・cm

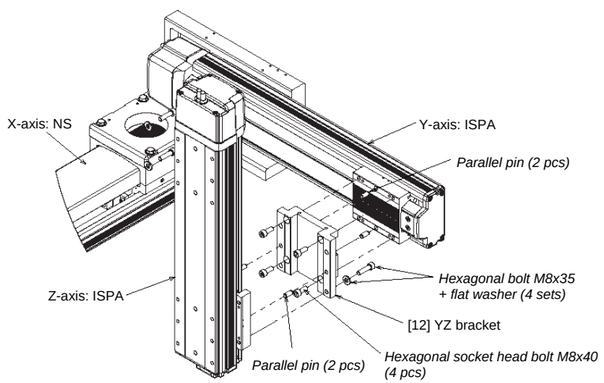
[Installation of X-axis: NS side of connector box 1 [5] in T-slot]

Hexagonal socket head bolt	Tightening torque
M4×6mm	18.0kgf・cm／176N・cm

[Installation of cable carrier 1 [4] on track mounting bracket 1 [2]] [Installation of guide rail [3] for cable carrier 1 [4] in T-slot]

Hexagonal socket head bolt	Tightening torque
M4×10mm	36.7kgf・cm／359N・cm

3



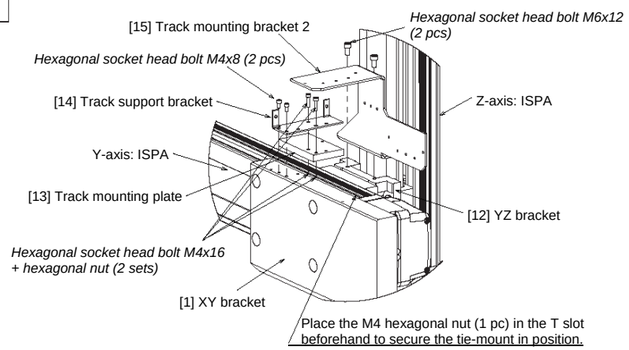
[Installation of YZ bracket [12] on Y-axis: ISPA]

Parallel pin	Hexagonal socket head bolt	Tightening torque
φ8h7×18	M8×35mm	117kgf・cm／1148N・cm

[Installation of Z-axis: ISPA on YZ bracket [12]]

Parallel pin	Hexagonal socket head bolt	Tightening torque
φ8h7×18	M8×40mm	306kgf・cm／2997N・cm

4



[Installation of track support bracket [14] and track mount [13] on Y-axis: ISPA]

Hexagonal socket head bolt	Tightening torque
M4×16mm	36.7kgf・cm／359N・cm

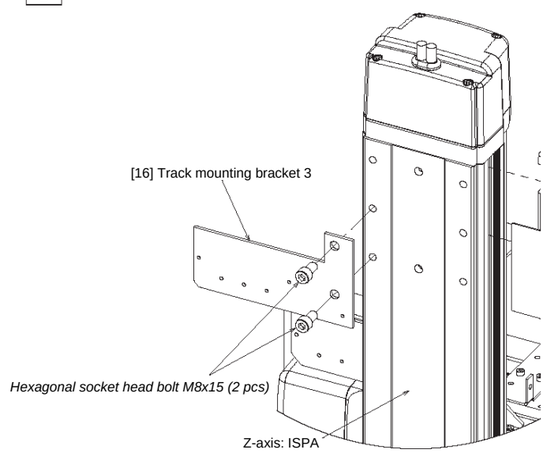
[Installation of track support bracket [14] on XY bracket [1]]

Hexagonal socket head bolt	Tightening torque
M4×8mm	36.7kgf・cm／359N・cm

[Installation of track mounting bracket 2 [15] on YZ bracket [12]]

Hexagonal socket head bolt	Tightening torque
M6×12mm	126kgf・cm／1234N・cm

5



[Installation of track mounting bracket 3 [16] on Z-axis: ISPA]

Hexagonal socket head bolt	Tightening torque
M8×15mm	306kgf・cm／2997N・cm

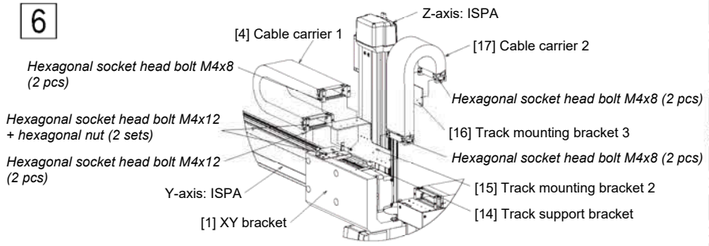
* This assembly procedure applies to configuration direction 1. If other configuration direction such as 2, 3 or 4 is used, the actuator and bracket directions vary. However, you can still use this assembly drawing as a reference.

X-axis Nut-rotation Type Cartesian Robot – High-precision 3-axis Specification, Z Slider Mount

ICSPA3-B1N (B2N) □H (M) S3M

Drawing No.	GMM07-063	2／2

6



[Installation of cable carrier 1 [4] on track support bracket [14]]

Hexagonal socket head bolt	Tightening torque
M4×12mm	36.7kgf・cm／359N・cm

[Installation of cable carrier 1 [4] on XY bracket [1]]

Hexagonal socket head bolt	Tightening torque
M4×12mm	36.7kgf・cm／359N・cm

[Installation of cable carrier 1 [4] on track mounting bracket 2 [15]]

Hexagonal socket head bolt	Tightening torque
M4×8mm	36.7kgf・cm／359N・cm

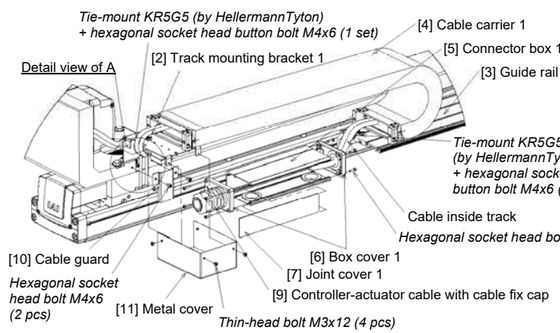
[Installation of cable carrier 2 [17] on track mounting bracket 3 [16]]

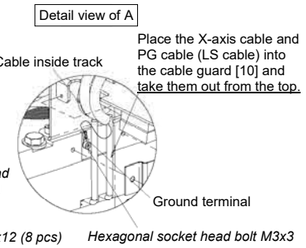
Hexagonal socket head bolt	Tightening torque
M4×8mm	36.7kgf・cm／359N・cm

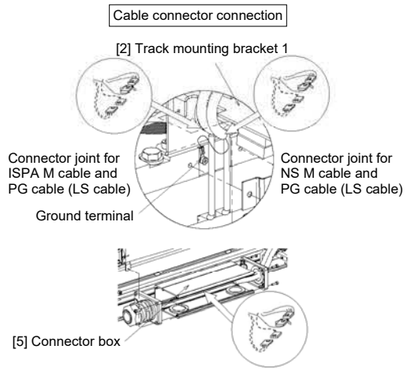
[Installation of cable carrier 2 [17] on track mounting bracket 2 [15]]

Hexagonal socket head bolt	Tightening torque
M4×8mm	36.7kgf・cm／359N・cm

7







⚠ Caution: The cables for X-axis (axis 1), Y-axis (axis 2) and Z-axis (axis 3) are placed in tracks. Install each cable correctly.
[Cable markings]
• X-axis (axis 1): 1 • Y-axis (axis 2): 2 • Z-axis (axis 3): 3

[Installation of box cover 1 [6] on connector box 1 [5]]

Hexagonal socket head bolt	Tightening torque
M3×12mm	5.51kgf・cm／54N・cm

[Installation of cable guard [10] on XY bracket [1]]

Hexagonal socket head bolt	Tightening torque
M4×6mm	36.7kgf・cm／359N・cm

[Installation of metal cover [11] on track mounting bracket 1 [2]]

Thin-head bolt	Tightening torque
M3×4mm	7.12kgf・cm／69.8N・cm

⚠ Caution: Since the hexagonal holes in thin-head bolts are small, the hexagonal holes may be damaged depending on the tightening method. Exercise due caution when tightening thin-head bolts.

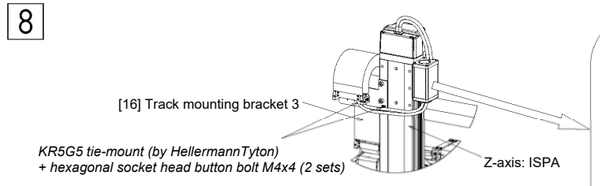
[Installation of tie-mount on track mounting bracket 1 [2]]
[Installation of tie-mount in T slot of guide rail [3]]

Hexagonal socket head button bolt	Tightening torque
M4×6mm	11.7kgf・cm／114N・cm

[Installation of ground terminal on [1] XY bracket]

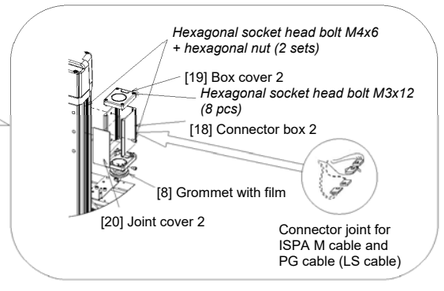
Hexagonal socket head bolt	Tightening torque
M3×3mm	15.8kgf・cm／154N・cm

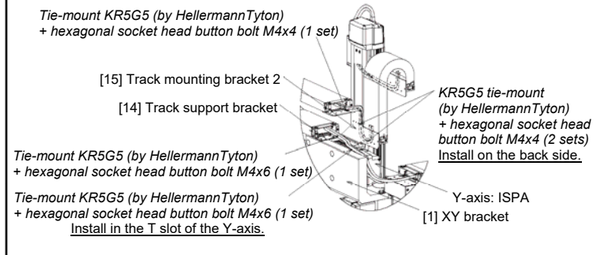
8



[Installation of tie-mount on track mounting bracket 3 [16]]

Hexagonal socket head button bolt	Tightening torque
M4×4mm	11.7kgf・cm／114N・cm





[Installation of connector box 2 [18] on Z-axis: ISPA]

Hexagonal socket head bolt	Tightening torque
M4×6mm	18.0kgf・cm／176N・cm

[Installation of box cover 2 [19] on connector box 2 [18]]

Hexagonal socket head bolt	Tightening torque
M3×12mm	5.51kgf・cm／54N・cm

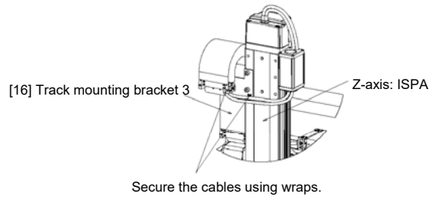
[Installation of tie-mount on track mounting bracket 2 [15]]

Hexagonal socket head button bolt	Tightening torque
M4×4mm	11.7kgf・cm／114N・cm

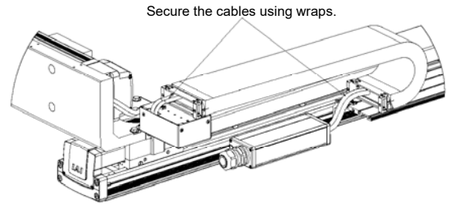
[Installation of tie-mount on track support bracket [14]]
[Installation of tie-mount in T slot of Y-axis: ISPA]

Hexagonal socket head button bolt	Tightening torque
M4×6mm	11.7kgf・cm／114N・cm

Z-axis cables



X-axis, Y-axis cables



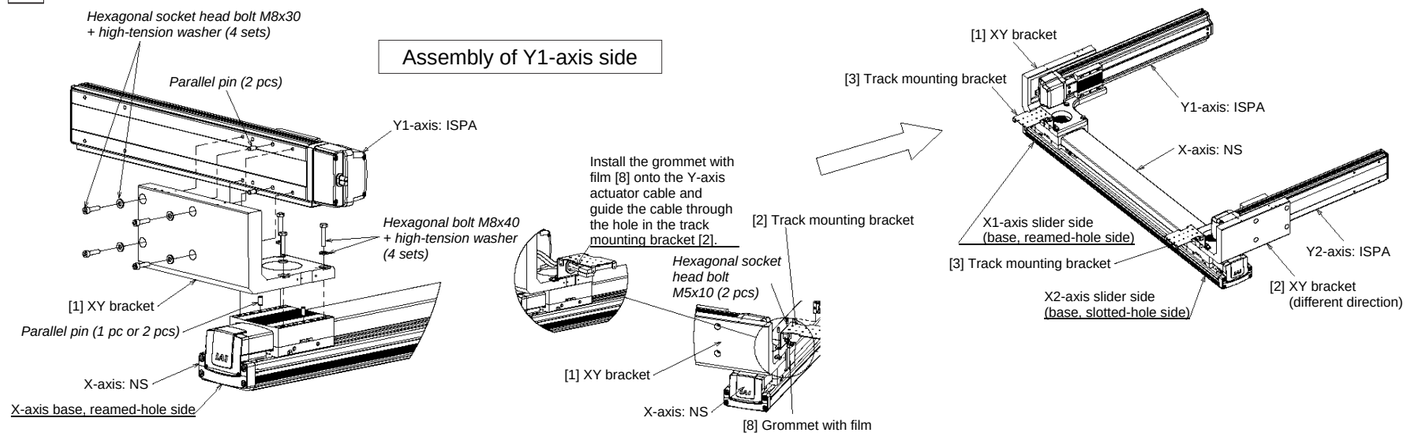
⚠ Caution: Secure the wires to prevent the cables and connectors from contacting each axis when the axis is moved over its entire stroke.
When manually moving the actuator with brake, connect the controller, supply the power, and then release the brake release switch (by turning the switch to the RLS side).

⚠ Caution:
- Although each part has been chamfered to remove sharp edges, exercise due caution during the assembly to prevent injury. If necessary, wear gloves or other protective gears.
- Exercise due caution during the assembly to prevent pinching of hands and fingers.

X-axis Nut-rotation Type Cartesian Robot – High-precision 4-axis Specification
ICSPA4-B3N1H (M)

Drawing No.	GMM07-064	1/2

1 [Tools] Allen wrench, spanner wrench



Note: To ensure squareness between the X-axis and Y-axis, insert one parallel pin. Adjust the angle between the X-axis and Y-axis to the right angle, and then mount the hexagonal bolts.

[Installation of X-axis: NS on XY bracket [1]]

Parallel pin	Hexagonal bolt	Tightening torque
φ8h7×18	M8×40mm	306kgf・cm／2997N・cm

[Installation of Y1-axis: ISPA on XY bracket [1]]

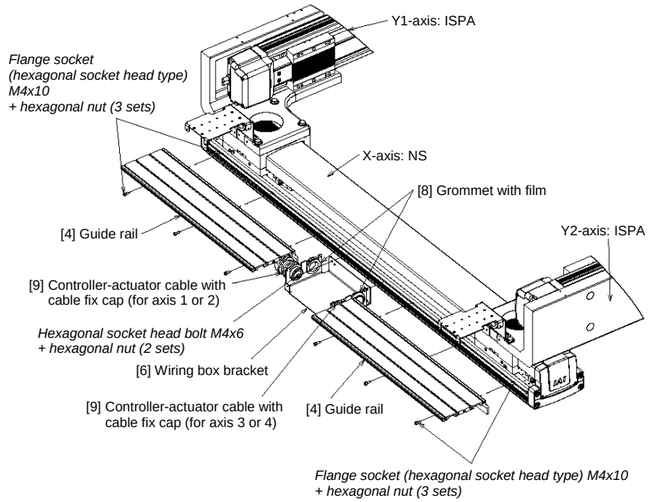
Parallel pin	Hexagonal socket head bolt	Tightening torque
φ8h7×18	M8×30mm	306kgf・cm／2997N・cm

[Installation of track mounting bracket [2] on XY bracket [1]]

Hexagonal socket head bolt	Tightening torque
M5×10mm	74.2kgf・cm／727N・cm

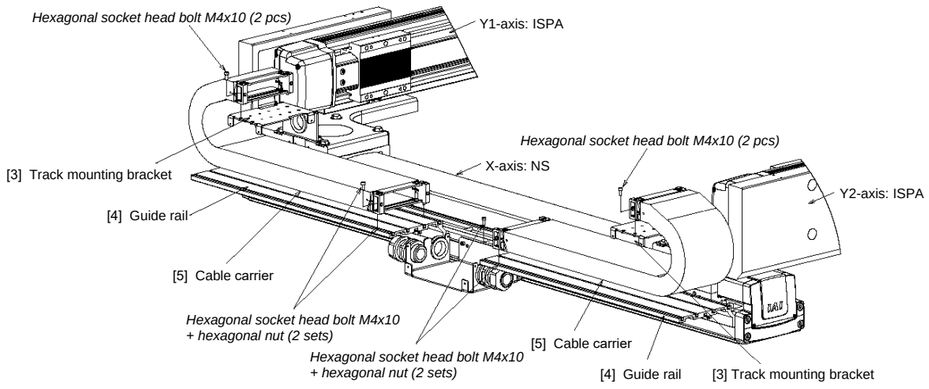
* The direction is different on the Y2-axis side. Assemble the parts by referring to the Y1-axis side.

2



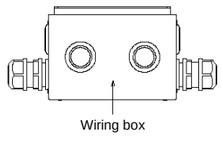
⚠Caution: The cables for Y1-axis side (axes 1 and 2) and Y2-axis side (axes 3 and 4) are placed in tracks. Install each cable correctly.
[Cable markings]
- Y1-axis side (axes 1 and 2): 1-M, PG, (LS), 2-M, PG, (LS)
- Y2-axis side (axes 3 and 4): 3-M, PG, (LS), 4-M, PG, (LS)

3

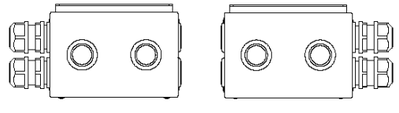


[Installation of cable carrier [5] on track mounting bracket [3]]
[Installation of guide rail [4] for cable carrier [5] in T-slot]

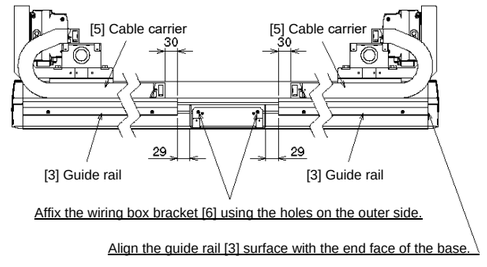
Hexagonal socket head bolt	Tightening torque
M4×10mm	36.7kgf・cm／359N・cm



In this assembly procedure, the controller-actuator cable is taken out from the wiring box in the direction shown above.
The cable can also be taken out in the directions shown below.



Affixing positions of guide rail [4], cable carrier [5] and wiring box bracket [6]



Affix the wiring box bracket [6] using the holes on the outer side.

Align the guide rail [3] surface with the end face of the base.

[Installation of wiring box bracket [6] in T slot on X-axis: NS side]

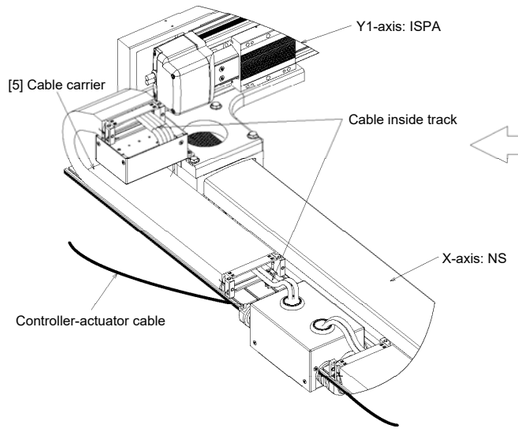
Hexagonal socket head bolt	Tightening torque
M4×6mm	18.0kgf・cm／176N・cm

[Installation of guide rail [4] in T slot on X-axis: NS side]

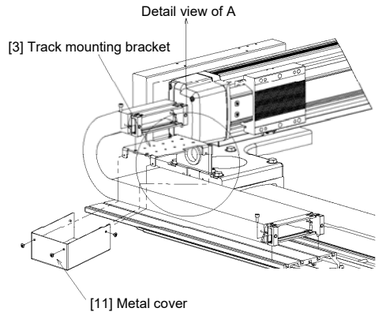
Flange socket (hexagonal socket head type)	Tightening torque
M4×10mm	18.0kgf・cm／176N・cm

4

Cable wiring diagram



Installation of metal cover [11]



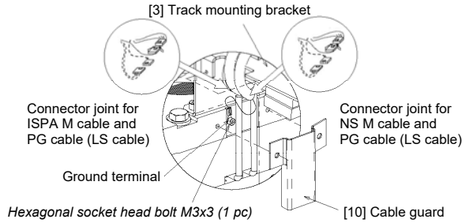
[Installation of metal cover [11] on track mounting bracket [3]]

Thin-head bolt	Tightening torque
M3×4mm	7.12kgf・cm／69.8N・cm

⚠ Caution: Since the hexagonal holes in thin-head bolts are small, the hexagonal holes may be damaged depending on the tightening method. Exercise due caution when tightening thin-head bolts.

Detail view of A

Connector connection of ISPA, NS cable and cable inside track
Installation of cable guard [10]



⚠ Caution: The cables for X-axis slider on Y1-axis side (axis 1), Y1-axis (axis 2), X-axis slider on Y2-axis side (axis 3) and Y2-axis (axis 4) are placed in tracks.
Install each cable correctly.
[Cable markings]
- X-axis on Y1-axis side (axis 1): 1
- Y1-axis (axis 2): 2
- X-axis on Y2-axis side (axis 3): 3
- Y2-axis (axis 4): 4

[Installation of cable guard [10]]

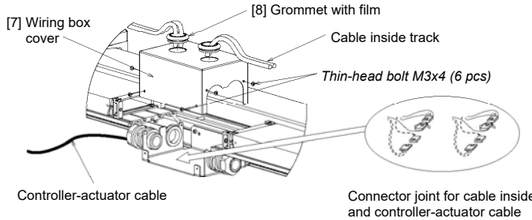
Hexagonal socket head bolt	Tightening torque
M4×6mm	36.7kgf・cm／359N・cm

[Installation of ground terminal]

Hexagonal socket head bolt	Tightening torque
M3×3mm	15.8kgf・cm／154N・cm

* Assemble the Y2-axis side by referring to the Y1-axis side.

Connector connection of cable inside cable carrier and controller-actuator cable
Installation of wiring box cover [7]



Make sure the numbers on the connectors to be connected match.

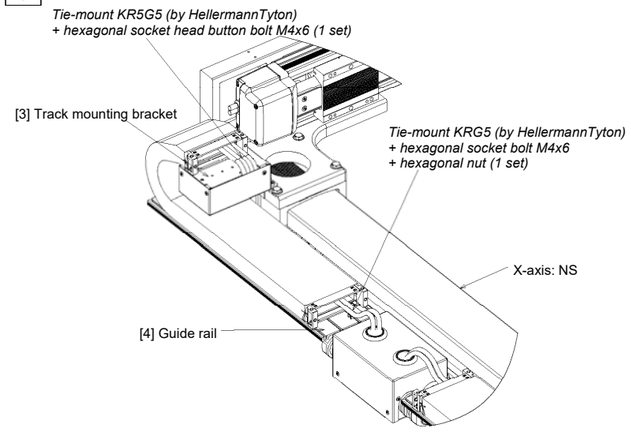
[Installation of wiring box cover [7] on wiring box bracket [6]]

Thin-head bolt	Tightening torque
M3×4mm	7.12kgf・cm／69.8N・cm

⚠ Caution: Since the hexagonal holes in thin-head bolts are small, the hexagonal holes may be damaged depending on the tightening method. Exercise due caution when tightening thin-head bolts.

* Assemble the Y2-axis side by referring to the Y1-axis side.

5

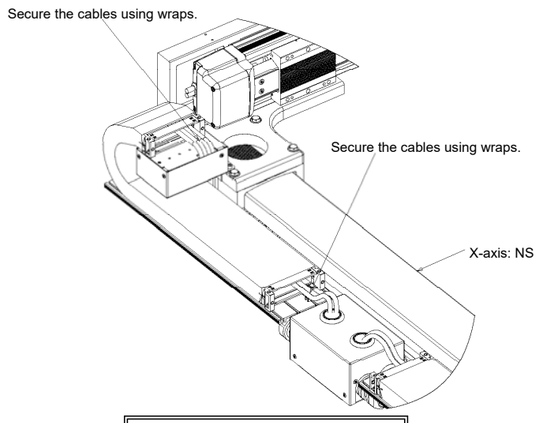


[Installation of tie-mount on track mounting bracket [3]]
[Installation of tie-mount on guide rail [4]]

Hexagonal socket head button bolt	Tightening torque
M4×6mm	11.7kgf・cm／114N・cm

* Assemble the Y2-axis side by referring to the Y1-axis side.

6



* Assemble the Y2-axis side by referring to the Y1-axis side.

⚠ Caution: Secure the wires to prevent the cables and connectors from contacting each axis when the axis is moved over its entire stroke.
When manually moving the actuator with brake, connect the controller, supply the power, and then release the brake release switch (by turning the switch to the RLS side).

⚠ Caution:
- Although each part has been chamfered to remove sharp edges, exercise due caution during the assembly to prevent injury. If necessary, wear gloves or other protective gears.
- Exercise due caution during the assembly to prevent pinching of hands and fingers.

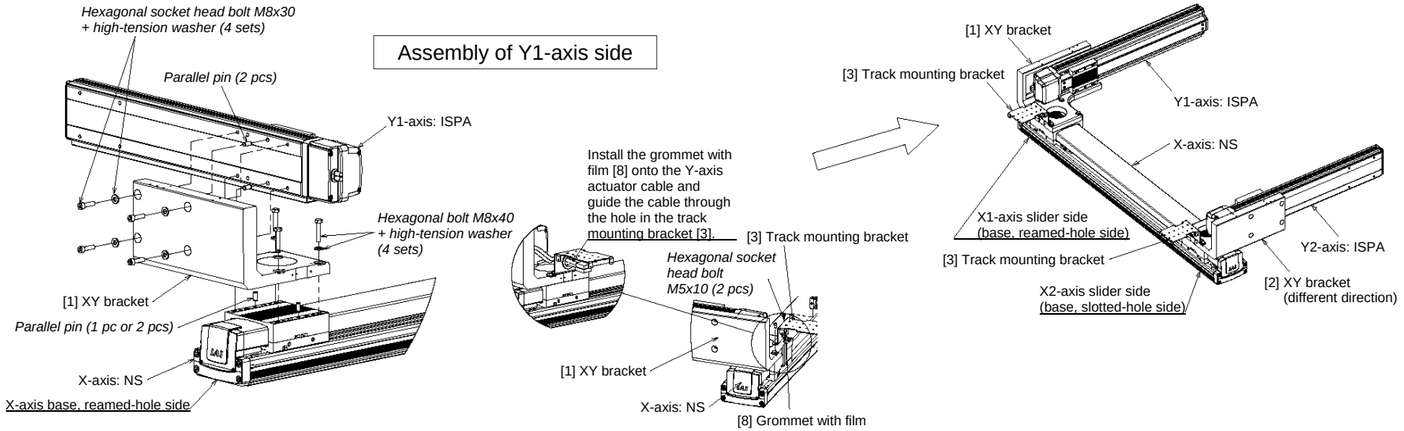
X-axis Nut-rotation Type Cartesian Robot – High-precision 6-axis Specification, Z Base Mount

ICSPA6-B3N1H (M) B3H (M)

Drawing No. GMM07-065 1/4

1

[Tools] Allen wrench, spanner wrench



Note: To ensure squareness between the X-axis and Y-axis, insert one parallel pin. Adjust the angle between the X-axis and Y-axis to the right angle, and then mount the hexagonal bolts.

[Installation of X-axis: NS on XY bracket [1]]

Parallel pin	Hexagonal bolt	Tightening torque
φ8h7×18	M8×40mm	306kgf・cm／2997N・cm

[Installation of Y1-axis: ISPA on XY bracket [1]]

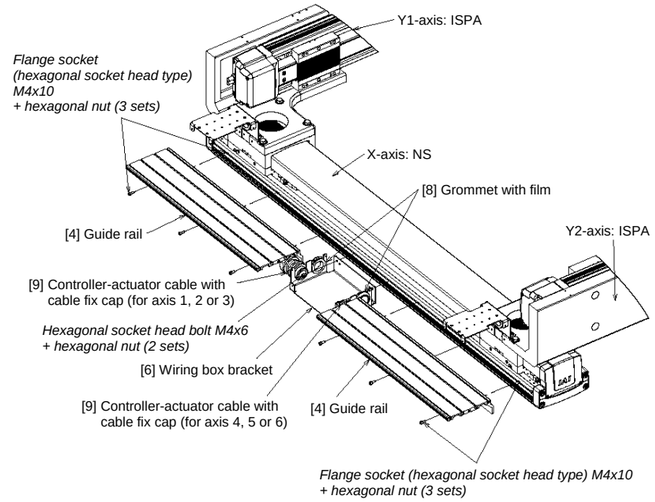
Parallel pin	Hexagonal socket head bolt	Tightening torque
φ8h7×18	M8×30mm	306kgf・cm／2997N・cm

[Installation of track mounting bracket [3] on XY bracket [1]]

Hexagonal socket head bolt	Tightening torque
M5×10mm	74.2kgf・cm／727N・cm

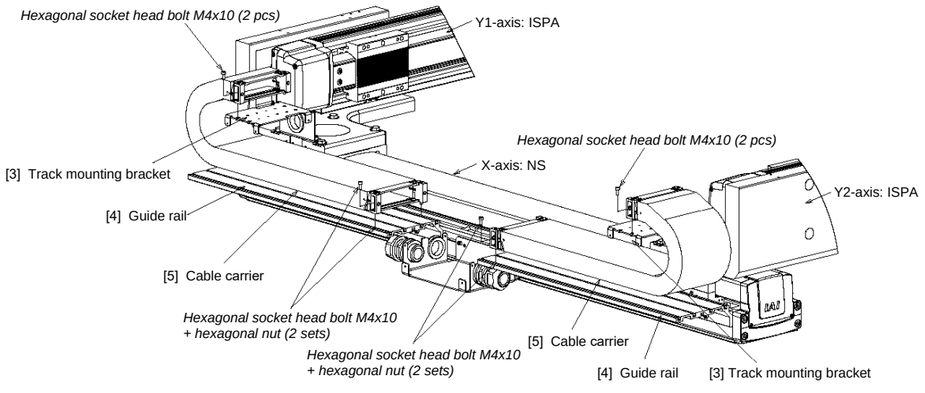
* The direction is different on the Y2-axis side. Assemble the parts by referring to the Y1-axis side.

2



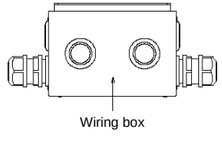
⚠ Caution: The controller-actuator cables for Y1-axis side (axes 1, 2 and 3) and Y2-axis side (axes 4, 5 and 6) are available. Install each cable correctly.
[Cable markings]
- Y1-axis side (axes 1, 2 and 3): 1-M, PG, (LS), 2-M, PG, (LS), 3-M, PG, (LS)
- Y2-axis side (axes 4, 5 and 6): 4-M, PG, (LS), 5-M, PG, (LS), 6-M, PG, (LS)

3

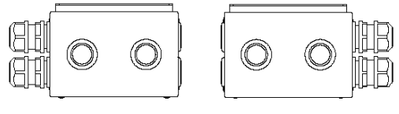


[Installation of cable carrier [5] on track mounting bracket [3]]
[Installation of guide rail [4] for cable carrier [5] in T-slot]

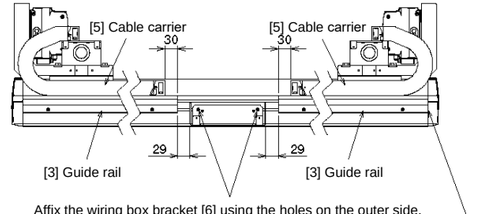
Hexagonal socket head bolt	Tightening torque
M4×10mm	36.7kgf・cm／359N・cm



In this assembly procedure, the controller-actuator cable is taken out from the wiring box in the direction shown above. The cable can also be taken out in the directions shown below.



Affixing positions of guide rail [4], cable carrier [5] and wiring box bracket [6]



Affix the wiring box bracket [6] using the holes on the outer side.

Align the guide rail [3] surface with the end face of the base.

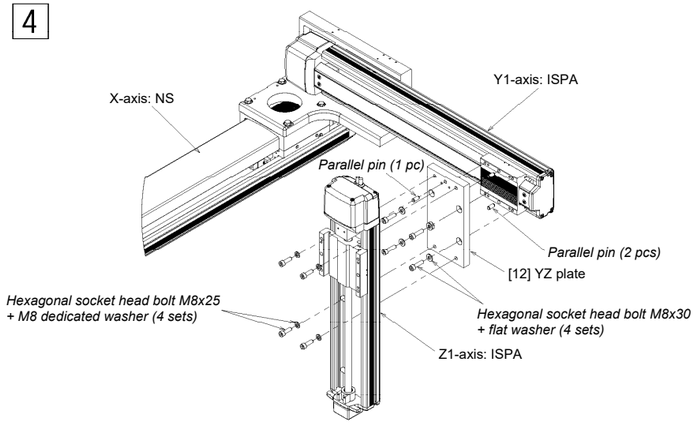
[Installation of wiring box bracket [6] in T slot on X-axis: NS side]

Hexagonal socket head bolt	Tightening torque
M4×6mm	18.0kgf・cm／176N・cm

[Installation of guide rail [4] in T slot on X-axis: NS side]

Flange socket (hexagonal socket head type)	Tightening torque
M4×10mm	18.0kgf・cm／176N・cm

4



[Installation of YZ plate [12] on Y1-axis: ISPA]

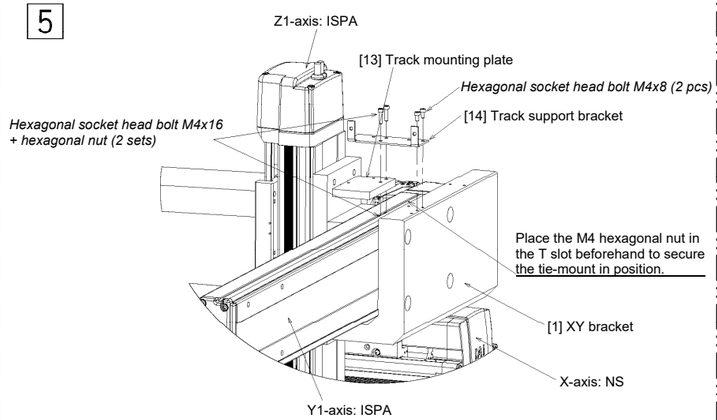
Parallel pin	Hexagonal socket head bolt	Tightening torque
ϕ8h7×18	M8×30mm	306kgf・cm／2997N・cm

[Installation of Z1-axis: ISPA on YZ plate [12]]

Parallel pin	Hexagonal socket head bolt	Tightening torque
ϕ8h7×25	M8×25mm	306kgf・cm／2997N・cm

* The direction is different on the Z2-axis side.
Assemble the parts by referring to the Z1-axis side.

5



[Installation of track support bracket [14] on XY bracket [1]]

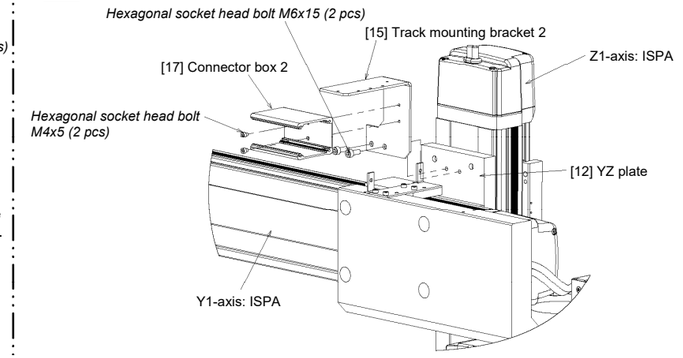
Hexagonal socket head bolt	Tightening torque
M4×8mm	36.7kgf・cm／359N・cm

[Installation of track support metal [14] on track mounting plate [13]]

Hexagonal socket head bolt	Tightening torque
M4×16mm	36.7kgf・cm／359N・cm

* The direction is different on the Z2-axis side.
Assemble the parts by referring to the Z1-axis side.

6



[Installation of track mounting bracket 2 [15] on YZ plate [12]]

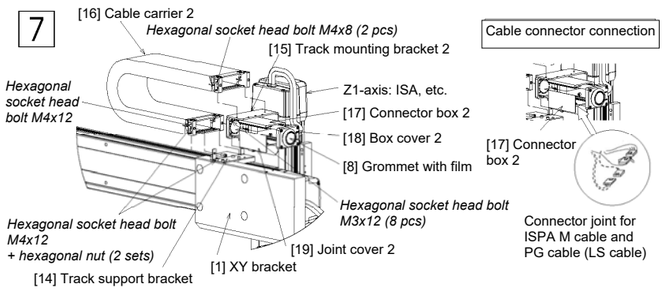
Hexagonal socket head bolt	Tightening torque
M6×15mm	126kgf・cm／1234N・cm

[Installation of connector box 2 [17] on track mounting bracket 2 [15]]

Hexagonal socket head bolt	Tightening torque
M4×5mm	18.0kgf・cm／176N・cm

* The direction is different on the Z2-axis side.
Assemble the parts by referring to the Z1-axis side.

7



Cable connector connection

[Installation of cable carrier 2 [16] on track support bracket [14]]

Hexagonal socket head bolt	Tightening torque
M4×12mm	36.7kgf・cm／359N・cm

[Installation of cable carrier 2 [16] on XY bracket [1]]

Hexagonal socket head bolt	Tightening torque
M4×12mm	36.7kgf・cm／359N・cm

[Installation of cable carrier 2 [16] on track mounting bracket 2 [15]]

Hexagonal socket head bolt	Tightening torque
M4×8mm	36.7kgf・cm／359N・cm

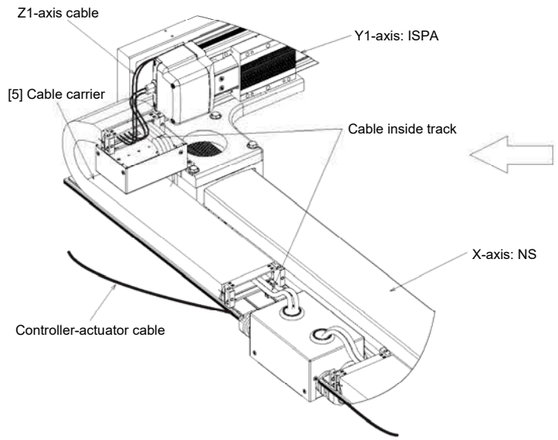
[Installation of box cover 2 [18] on connector box 2 [17]]

Hexagonal socket head bolt	Tightening torque
M3×12mm	5.51kgf・cm／54N・cm

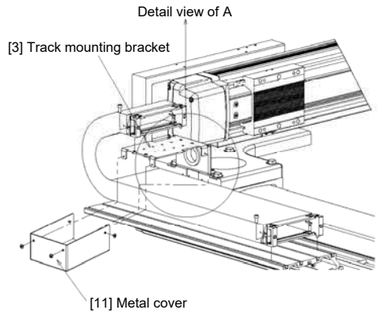
* The direction is different on the Z2-axis side.
Assemble the parts by referring to the Z1-axis side.

8

Cable wiring diagram



Installation of metal cover [11]



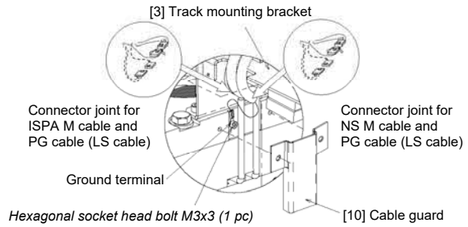
[Installation of metal cover [11] on track mounting bracket [3]]

Thin-head bolt	Tightening torque
M3×4mm	7.12kgf・cm／69.8N・cm

⚠ Caution: Since the hexagonal holes in thin-head bolts are small, the hexagonal holes may be damaged depending on the tightening method. Exercise due caution when tightening thin-head bolts.

Detail view of A

Connector connection of ISPA, NS cable and cable inside track
Installation of cable guard [10]



[Installation of cable guard [10]]

Hexagonal socket head bolt	Tightening torque
M4×6mm	36.7kgf・cm／359N・cm

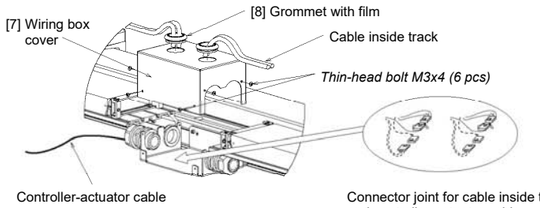
[Installation of ground terminal]

Hexagonal socket head bolt	Tightening torque
M3×3mm	15.8kgf・cm／154N・cm

* Assemble the Y2-axis side by referring to the Y1-axis side.

⚠ Caution: The cables for X-axis slider on Y1-axis side (axis 1), Y1-axis (axis 2), Z1-axis (axis 3), X-axis slider on Y2-axis side (axis 4), Y2-axis (axis 5) and Z2-axis (axis 6) are placed in tracks.
Install each cable correctly.
[Cable markings]
- X-axis slider on Y1-axis side (axis 1): 1
- Y1-axis (axis 2): 2
- Z1-axis (axis 3): 3
- X-axis slider on Y2-axis side (axis 4): 4
- Y2-axis (axis 5): 5
- Z2-axis (axis 6): 6

Connector connection of cable inside cable carrier and controller-actuator cable
Installation of wiring box cover [7]



Make sure the numbers on the connectors to be connected match.

[Installation of wiring box cover [7] on wiring box bracket [6]]

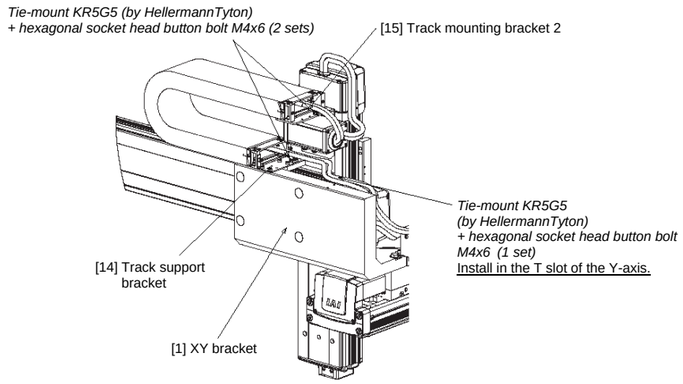
Thin-head bolt	Tightening torque
M3×4mm	7.12kgf・cm／69.8N・cm

⚠ Caution: Since the hexagonal holes in thin-head bolts are small, the hexagonal holes may be damaged depending on the tightening method. Exercise due caution when tightening thin-head bolts.

* Assemble the Y2-axis side by referring to the Y1-axis side.

9

Z1-axis cables

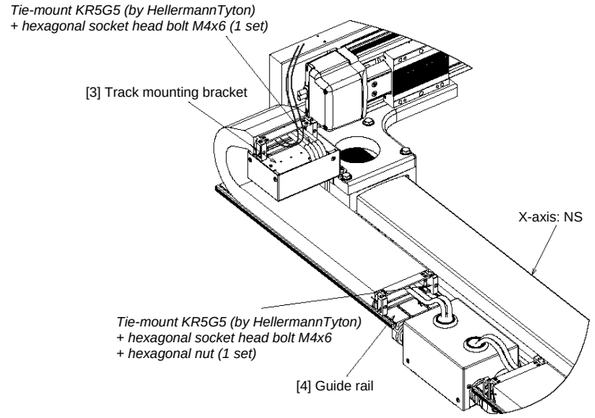


[Installation of tie-mount in track mounting bracket 2 [15]]
[Installation of tie-mount on track support bracket [14]]
[Installation of tie-mount in T slot of Y1-axis: ISPA]

Hexagonal socket head button bolt	Tightening torque
M4×6mm	11.7kgf・cm／114N・cm

* The direction is different on the Z2-axis side.
Assemble the parts by referring to the Z1-axis side.

X-axis, Y1-axis cables



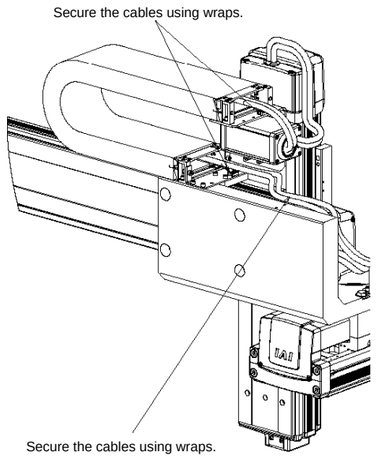
[Installation of tie-mount on track mounting bracket [3]]
[Installation of tie-mount in T slot of guide rail [4]]

Hexagonal socket head button bolt	Tightening torque
M4×6mm	11.7kgf・cm／114N・cm

* Assemble the Y2-axis side by referring to the Y1-axis side.

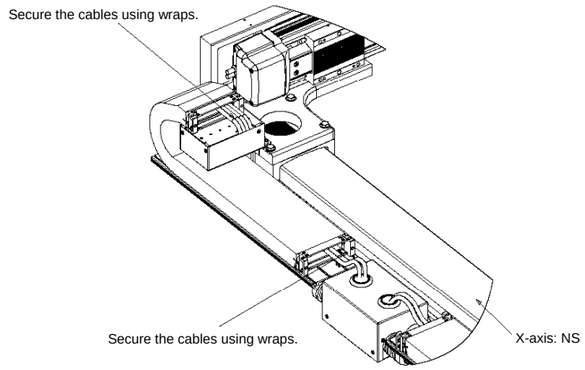
10

Z1-axis cables

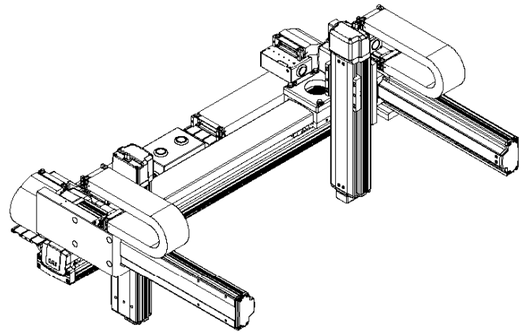


* The direction is different on the Z2-axis side.
Assemble the parts by referring to the Z1-axis side.

X-axis, Y1-axis, Z1-axis cables



* Assemble the Y2-axis side by referring to the Y1-axis side.



⚠ Caution: Secure the wires to prevent the cables and connectors from contacting each axis when the axis is moved over its entire stroke.
When manually moving the actuator with brake, connect the controller, supply the power, and then release the brake release switch (by turning the switch to the RLS side).

⚠ Caution:
- Although each part has been chamfered to remove sharp edges, exercise due caution during the assembly to prevent injury. If necessary, wear gloves or other protective gears.
- Exercise due caution during the assembly to prevent pinching of hands and fingers.

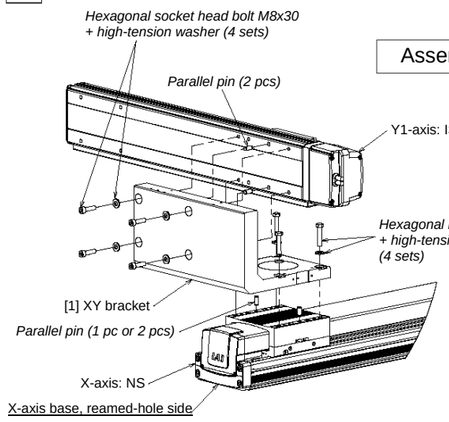
X-axis Nut-rotation Type Cartesian Robot – High-precision 6-axis Specification, Z Slider Mount

ICSPA6-B3N1H (M) S3M

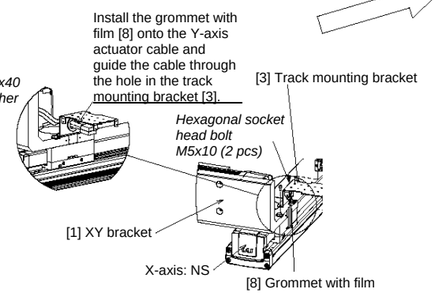
Drawing No.	GMM07-066	1/4

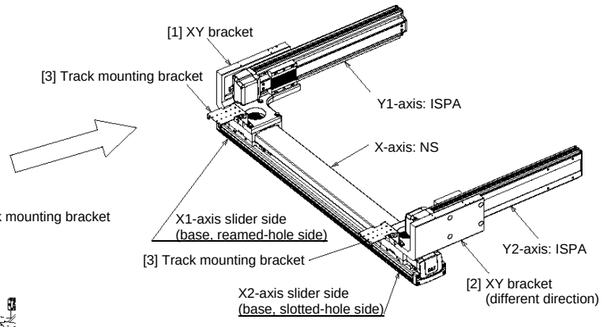
1

[Tools] Allen wrench, spanner wrench



Assembly of Y1-axis side





Note: To ensure squareness between the X-axis and Y-axis, insert one parallel pin. Adjust the angle between the X-axis and Y-axis to the right angle, and then mount the hexagonal bolts.

[Installation of X-axis: NS on XY bracket [1]]

Parallel pin	Hexagonal bolt	Tightening torque
φ8h7×18	M8×40mm	306kgf・cm／2997N・cm

[Installation of Y1-axis: ISPA on XY bracket [1]]

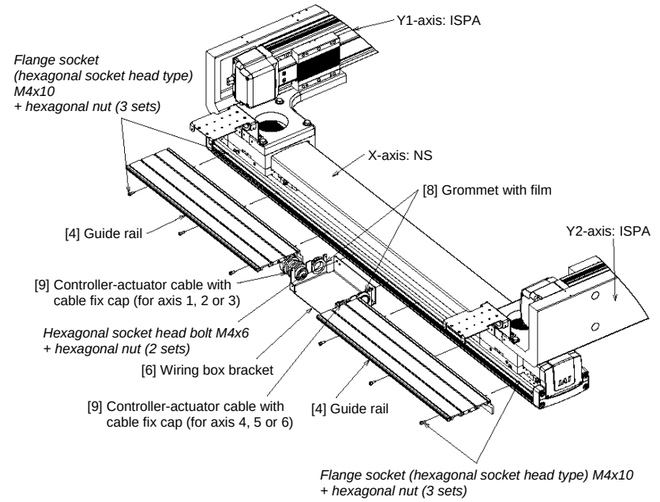
Parallel pin	Hexagonal socket head bolt	Tightening torque
φ8h7×18	M8×30mm	306kgf・cm／2997N・cm

[Installation of track mounting bracket [3] on XY bracket [1]]

Hexagonal socket head bolt	Tightening torque
M5×10mm	74.2kgf・cm／727N・cm

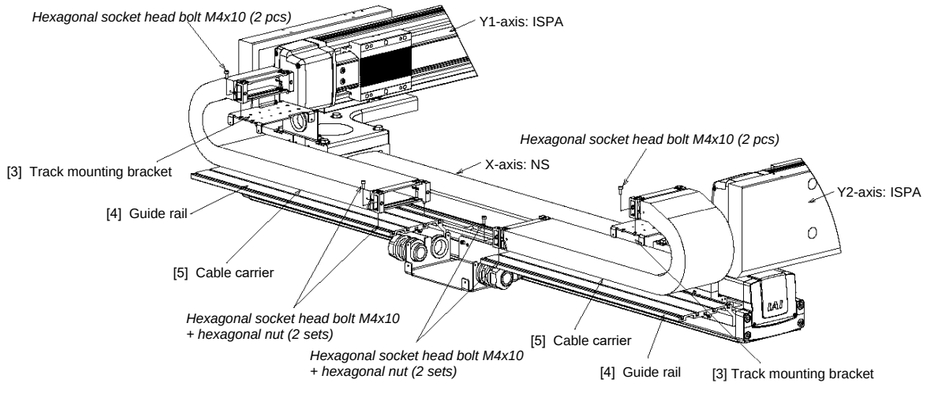
* The direction is different on the Y2-axis side. Assemble the parts by referring to the Y1-axis side.

2



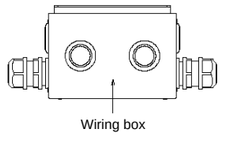
⚠ Caution: The controller-actuator cables for Y1-axis side (axes 1, 2 and 3) and Y2-axis side (axes 4, 5 and 6) are available. Install each cable correctly.
[Cable markings]
- Y1-axis side (axes 1, 2 and 3): 1-M, PG, (LS), 2-M, PG, (LS), 3-M, PG, (LS)
- Y2-axis side (axes 4, 5 and 6): 4-M, PG, (LS), 5-M, PG, (LS), 6-M, PG, (LS)

3

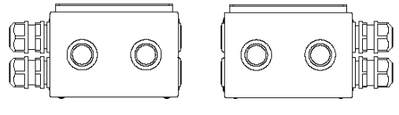


[Installation of cable carrier [5] on track mounting bracket [3]]
[Installation of guide rail [4] for cable carrier [5] in T-slot]

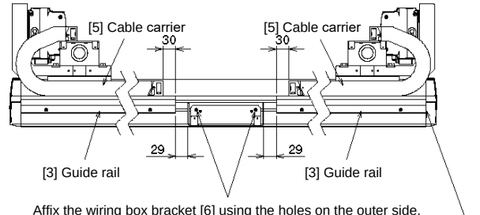
Hexagonal socket head bolt	Tightening torque
M4×10mm	36.7kgf・cm／359N・cm



In this assembly procedure, the controller-actuator cable is taken out from the wiring box in the direction shown above.
The cable can also be taken out in the directions shown below.



Affixing positions of guide rail [4], cable carrier [5] and wiring box bracket [6]



Affix the wiring box bracket [6] using the holes on the outer side.

Align the guide rail [3] surface with the end face of the base.

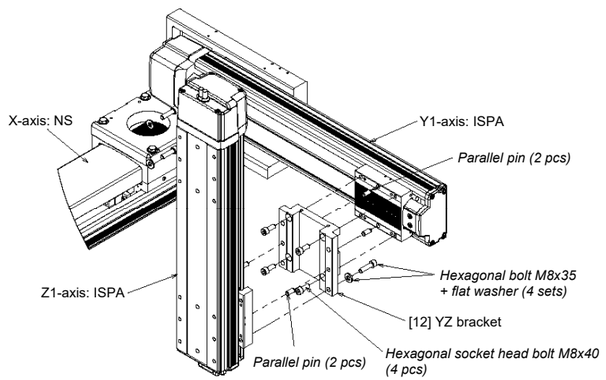
[Installation of wiring box bracket [6] in T slot on X-axis: NS side]

Hexagonal socket head bolt	Tightening torque
M4×6mm	18.0kgf・cm／176N・cm

[Installation of guide rail [4] in T slot on X-axis: NS side]

Flange socket (hexagonal socket head type)	Tightening torque
M4×10mm	18.0kgf・cm／176N・cm

4



[Installation of YZ bracket [12] on Y1-axis: ISPA]

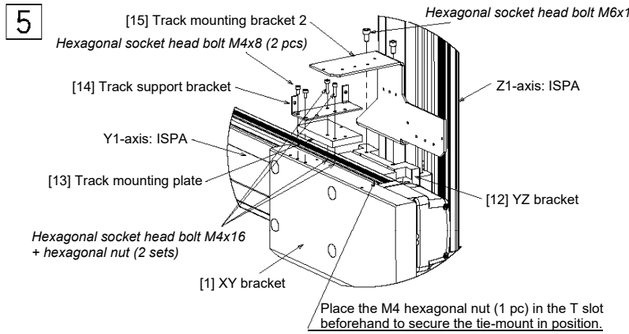
Parallel pin	Hexagonal bolt	Tightening torque
ϕ 8h7×18	M8×35mm	117kgf・cm／1148N・cm

[Installation of Z1-axis: ISPA on YZ bracket [12]]

Parallel pin	Hexagonal socket head bolt	Tightening torque
ϕ 8h7×18	M8×40mm	306kgf・cm／2997N・cm

* The direction is different on the Z2-axis side.
Assemble the parts by referring to the Z1-axis side.

5



[Installation of track support bracket [14] and track mount [13] on Y1-axis: ISPA]

Hexagonal socket head bolt	Tightening torque
M4×16mm	36.7kgf・cm／359N・cm

[Installation of track support bracket [14] on XY bracket [1]]

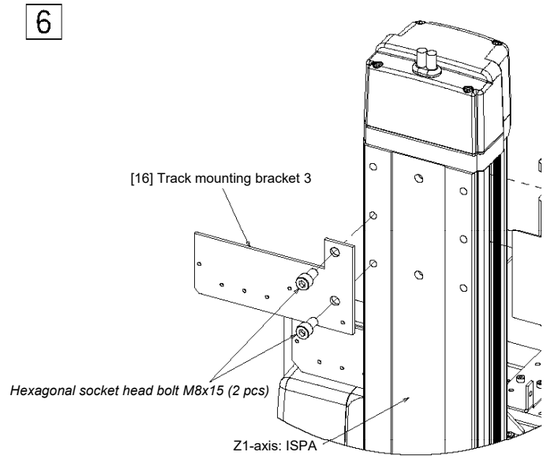
Hexagonal socket head bolt	Tightening torque
M4×8mm	36.7kgf・cm／359N・cm

[Installation of track mounting bracket 2 [15] on YZ bracket [12]]

Hexagonal socket head bolt	Tightening torque
M6×12mm	126kgf・cm／1234N・cm

* The direction is different on the Z2-axis side.
Assemble the parts by referring to the Z1-axis side.

6

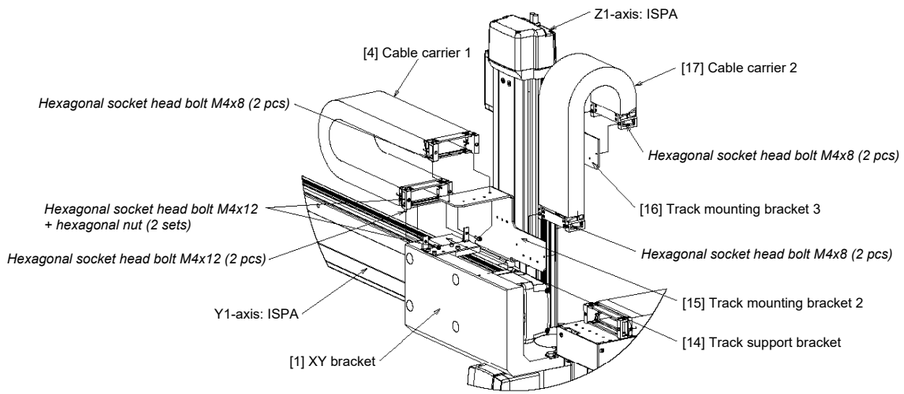


[Installation of track mounting bracket 3 [16] on Z1-axis: ISPA]

Hexagonal socket head bolt	Tightening torque
M8×15mm	306kgf・cm／2997N・cm

* The direction is different on the Z2-axis side.
Assemble the parts by referring to the Z1-axis side.

7



[Installation of cable carrier 1 [4] on track support bracket [14]]

Hexagonal socket head bolt	Tightening torque
M4×12mm	36.7kgf・cm／359N・cm

[Installation of cable carrier 1 [4] on XY bracket [1]]

Hexagonal socket head bolt	Tightening torque
M4×12mm	36.7kgf・cm／359N・cm

[Installation of cable carrier 1 [4] on track mounting bracket 2 [15]]

Hexagonal socket head bolt	Tightening torque
M4×8mm	36.7kgf・cm／359N・cm

[Installation of cable carrier 2 [17] on track mounting bracket 3 [16]]

Hexagonal socket head bolt	Tightening torque
M4×8mm	36.7kgf・cm／359N・cm

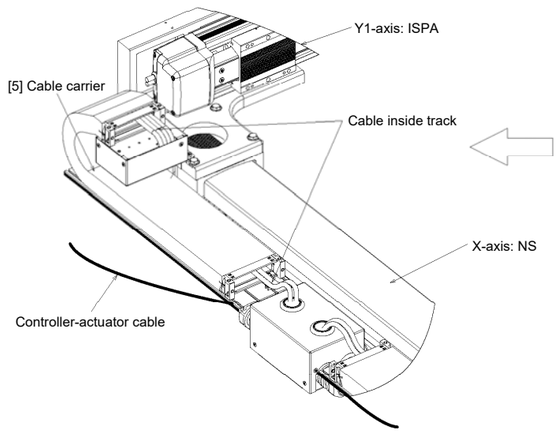
[Installation of cable carrier 2 [17] on track mounting bracket 2 [15]]

Hexagonal socket head bolt	Tightening torque
M4×8mm	36.7kgf・cm／359N・cm

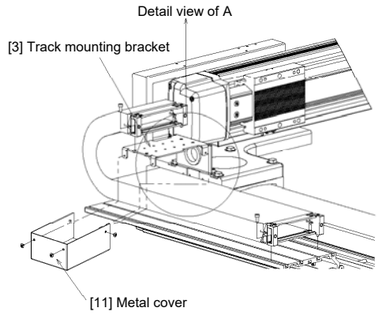
* The direction is different on the Z2-axis side.
Assemble the parts by referring to the Z1-axis side.

8

Cable wiring diagram



Installation of metal cover [11]



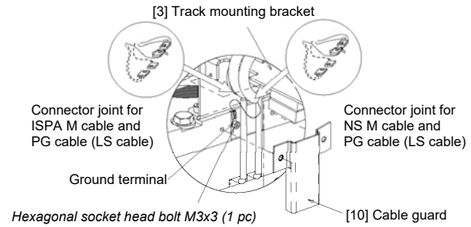
[Installation of metal cover [11] on track mounting bracket [3]]

Thin-head bolt	Tightening torque
M3×4mm	7.12kgf・cm／69.8N・cm

⚠ Caution: Since the hexagonal holes in thin-head bolts are small, the hexagonal holes may be damaged depending on the tightening method. Exercise due caution when tightening thin-head bolts.

Detail view of A

Connector connection of ISPA, NS cable and cable inside track
Installation of cable guard [10]



[Installation of cable guard [10]]

Hexagonal socket head bolt	Tightening torque
M4×6mm	36.7kgf・cm／359N・cm

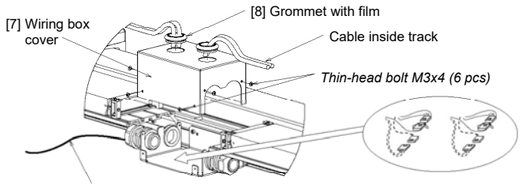
[Installation of ground terminal]

Hexagonal socket head bolt	Tightening torque
M3×3mm	15.8kgf・cm／154N・cm

* Assemble the Y2-axis side by referring to the Y1-axis side.

⚠ Caution: The cables for X-axis slider on Y1-axis side (axis 1), Y1-axis (axis 2), Z1-axis (axis 3), X-axis slider on Y2-axis side (axis 4), Y2-axis (axis 5) and Z2-axis (axis 6) are placed in tracks.
Install each cable correctly.
[Cable markings]
- X-axis slider on Y1-axis side (axis 1): 1
- Y1-axis (axis 2): 2
- Z1-axis (axis 3): 3
- X-axis slider on Y2-axis side (axis 4): 4
- Y2-axis (axis 5): 5
- Z2-axis (axis 6): 6

Connector connection of cable inside cable carrier and controller-actuator cable
Installation of wiring box cover [7]



Connector joint for cable inside track and controller-actuator cable

Make sure the numbers on the connectors to be connected match.

[Installation of wiring box cover [7] on wiring box bracket [6]]

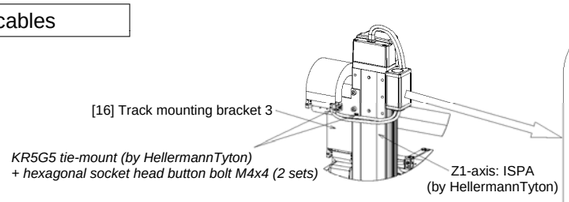
Thin-head bolt	Tightening torque
M3×4mm	7.12kgf・cm／69.8N・cm

⚠ Caution: Since the hexagonal holes in thin-head bolts are small, the hexagonal holes may be damaged depending on the tightening method. Exercise due caution when tightening thin-head bolts.

* Assemble the Y2-axis side by referring to the Y1-axis side.

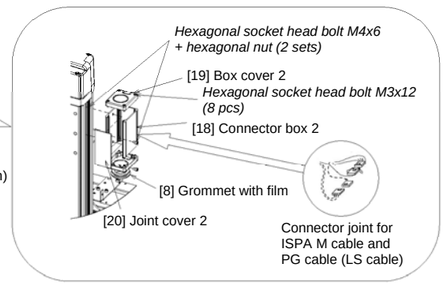
9

Z1-axis cables



[Installation of tie-mount on track mounting bracket 3 [16]]

Hexagonal socket head button bolt	Tightening torque
M4×4mm	11.7kgf・cm／114N・cm

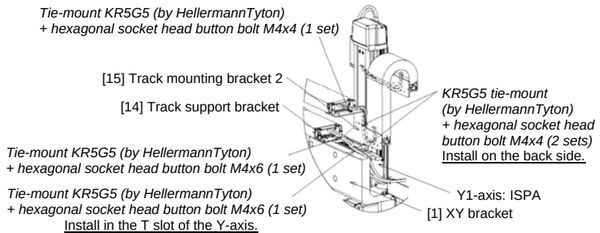


[Installation of connector box 2 [18] on Z1-axis: ISPA]

Hexagonal socket head bolt	Tightening torque
M4×6mm	18.0kgf・cm／176N・cm

[Installation of box cover 2 [19] on connector box 2 [18]]

Hexagonal socket head bolt	Tightening torque
M3×12mm	5.51kgf・cm／54N・cm



[Installation of tie-mount on track mounting bracket 2 [15]]

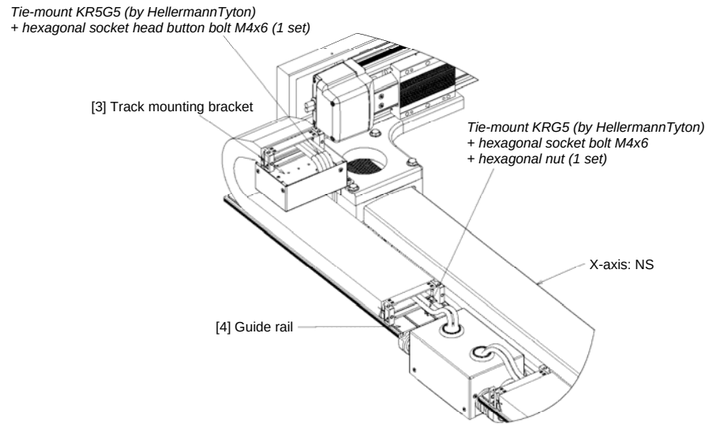
Hexagonal socket head button bolt	Tightening torque
M4×4mm	11.7kgf・cm／114N・cm

[Installation of tie-mount on track support bracket [14]]
[Installation of tie-mount in T slot of Y1-axis: ISPA]

Hexagonal socket head button bolt	Tightening torque
M4×6mm	11.7kgf・cm／114N・cm

* The direction is different on the Z2-axis side.
Assemble the parts by referring to the Z1-axis side.

X-axis, Y1-axis cables



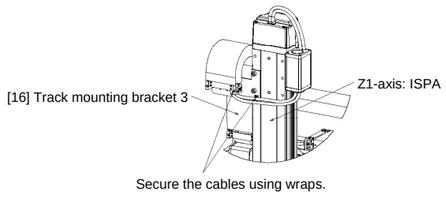
[Installation of tie-mount on track mounting bracket [3]]
[Installation of tie-mount in T slot of guide rail [4]]

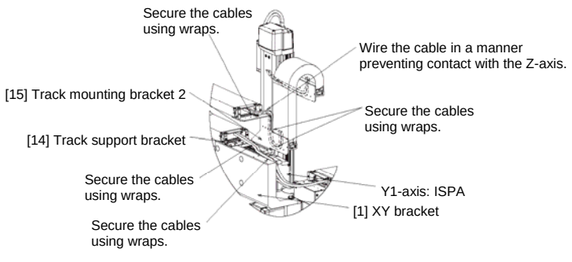
Hexagonal socket head button bolt	Tightening torque
M4×6mm	11.7kgf・cm／114N・cm

* Assemble the Y2-axis side by referring to the Y1-axis side.

10

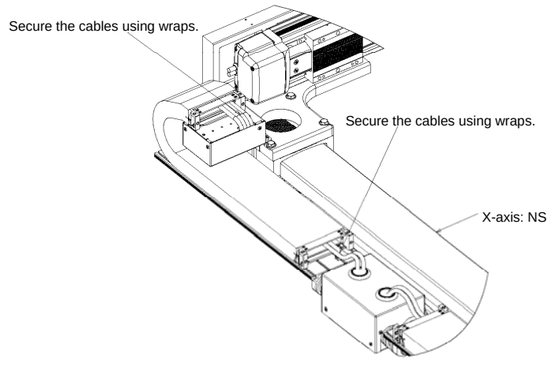
Z1-axis cables



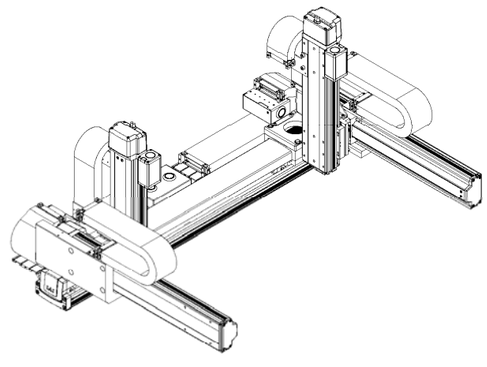


* The direction is different on the Z2-axis side.
Assemble the parts by referring to the Z1-axis side.

X-axis, Y1-axis, Z1-axis cables



* Assemble the Y2-axis side by referring to the Y1-axis side.



⚠ Caution: Secure the wires to prevent the cables and connectors from contacting each axis when the axis is moved over its entire stroke.
When manually moving the actuator with brake, connect the controller, supply the power, and then release the brake release switch (by turning the switch to the RLS side).