YAMAHA
YAMAHA MOTOR CO., LTD.

YAMAHA SCARA ROBOT YK-X series

YK-XS

User's Manual

ENGLISH

YAMAHA MOTOR CO., LTD.
IM Operations
882 Soude, Naka-ku, Hamamatsu, Shizuoka 435-0054.Japan
URL http://www.yamaha-motor.jp/robot/index.html

E24-Ver. 2.14

Introduction

This user's manual was prepared for YK-XS series ceiling-mount models (YK300XHS to YK1000XS) of the YAMAHA industrial robots.

This user's manual describes the safety measures, handling, adjustment and maintenance of YK-XS series robots for correct, safe and effective use. Be sure to read this manual carefully before installing the robot. Even after you have read this manual, keep it in a safe and convenient place for future reference.

This user's manual should be used with the robot and considered an integral part of it. When the robot is moved, transferred or sold, send this manual to the new user along with the robot. Be sure to explain to the new user the need to read through this manual.

For the operating or maintenance procedures not described in this manual, please refer to the separate "YK-X Series User's Manual". Also refer to the "YK-X Series User's Manual" for precautions and warranty. If there are any obscure points in handling the robot, be sure to contact YAMAHA sales office or dealer.

For details on specific operation and programming of the robot, refer to the separate "YAMAHA Robot Controller User's Manual".

NOTES

- The contents of this manual are subject to change without prior notice.
- Information furnished by YAMAHA in this manual is believed to be reliable. However, if you find any part unclear or inaccurate in this manual, please contact YAMAHA sales office or dealer.

YAMAHA MOTOR CO., LTD.
IM Operations

MEMO

CONTENTS

MEMO

CHAPTER 1

Functions

MEMO

1 Robot Manipulator

YK-XS series robots are grouped into the ceiling-mount models of Fig. 1-1 and the inverted ceiling-mount models of Fig. 1-2. Jog key movement is in the directions shown in Figs. 1-1 and 1-2.
Robot part names and functions are shown in Fig. 1-3 and Fig. 1-4.

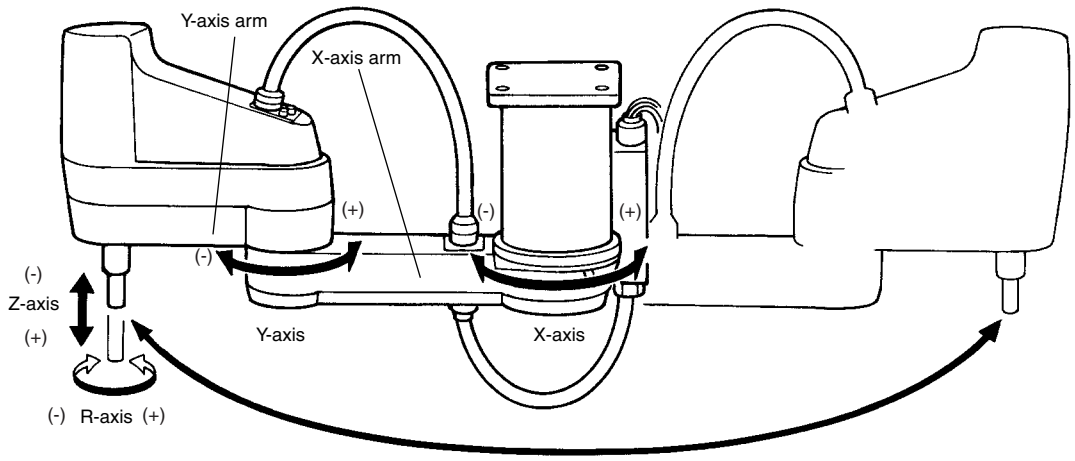


Fig. 1-1 Ceiling-mount model

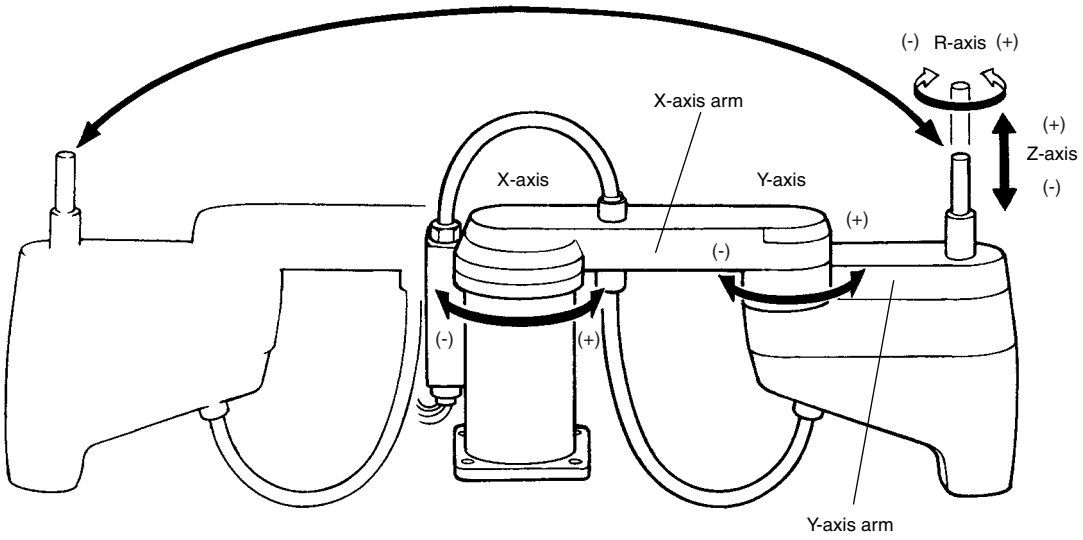


Fig. 1-2 Inverted ceiling -mount model

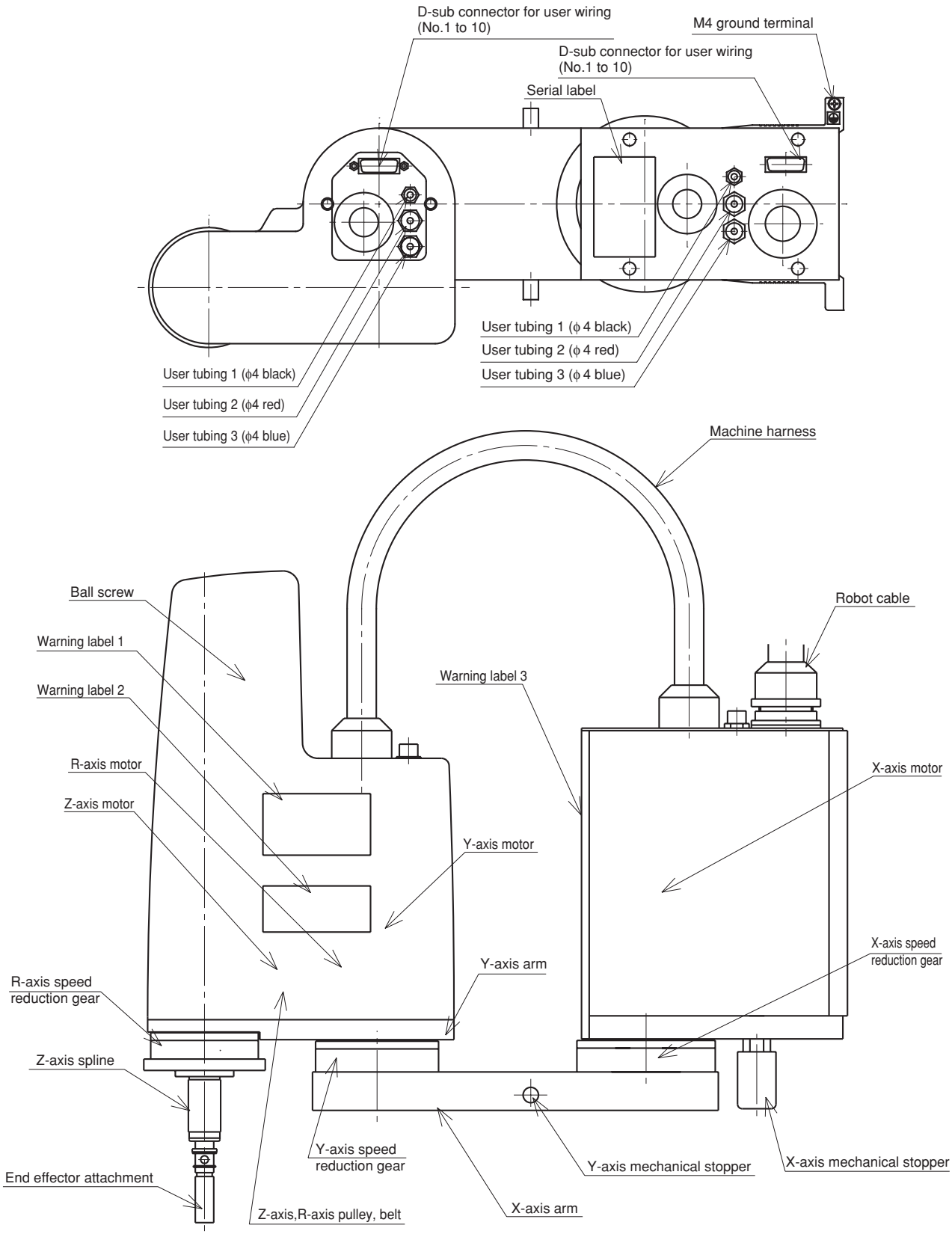


Fig. 1-3 YK300XHS, YK400XHS ceiling-mount robots

In the case of the inverted ceiling-mount models, the robot base up/down installation directions in the figure are reversed.

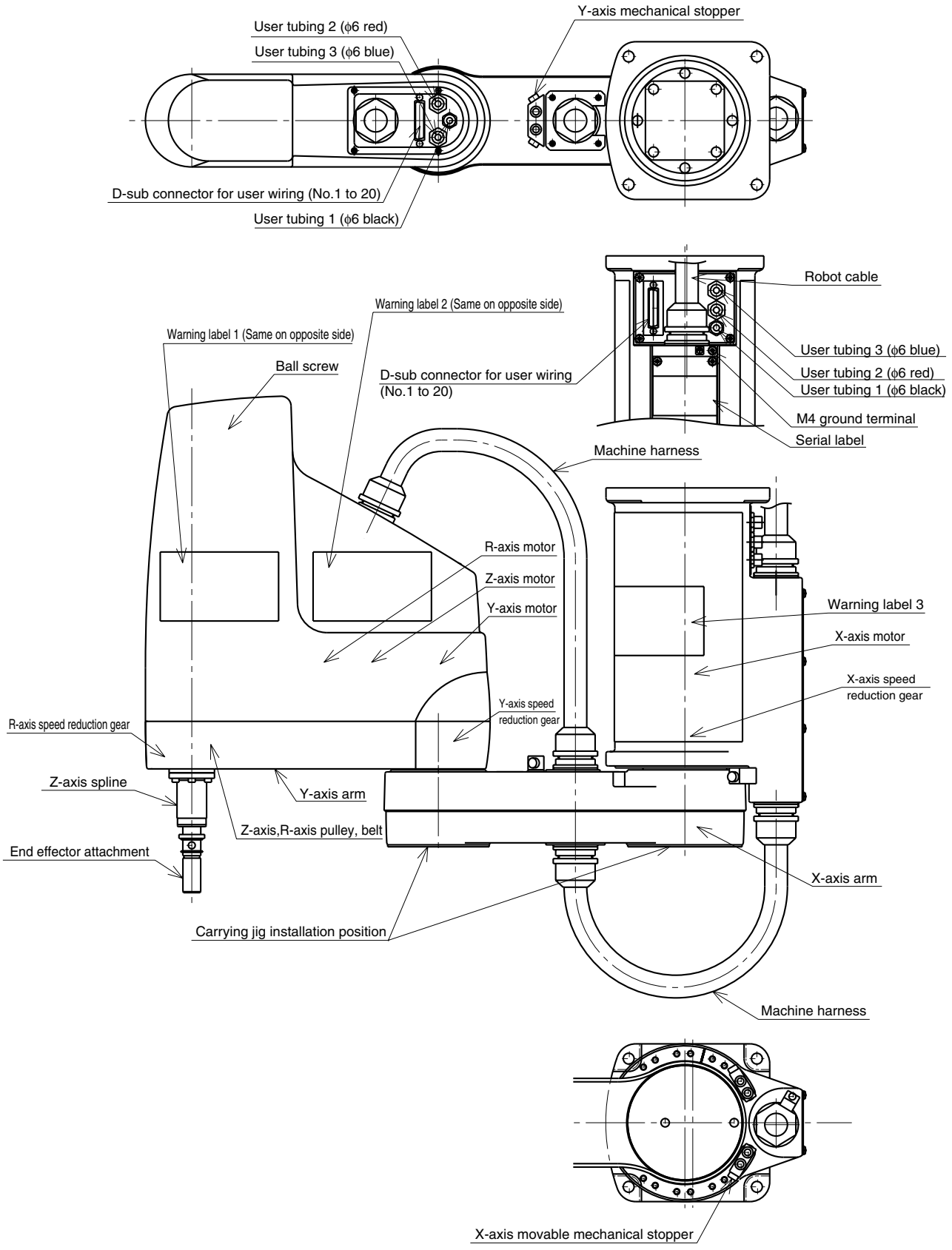


Fig. 1-4 YK500XS to YK1000XS ceiling-mount robots

In the case of the inverted ceiling-mount models, the robot base up/down installation directions in the figure are reversed.

2 Robot Parameters

A portion of the robot parameters for ceiling-mount models and inverted ceiling-mount models are changed from the standard specifications when shipped.
The following is a description of these changed parameters and precautions you should take when using these robots.

To purchasers of this robot

At this time our sincere thanks for your purchase of this robot.
This robot is made to custom specifications so some parameters are different from standard robots. Please be aware of the following points before attempting to use the robot.

Cautions regarding use

Always make a backup of parameters.
Initializing the parameters voids all parameters that were entered. When initialized, load the backup parameters.

Parameter changes

A description of parameter changes is given below. Boxes left blank indicate standard specifications.

(1) Ceiling-mount model

Axis settings

Parameter	Changes			
Axis parameters	X-axis	Y-axis	Z-axis	R-axis
16. Motor direction	+++			

(2) Inverted ceiling-mount models

Axis settings

Parameter	Changes			
Axis parameters	X-axis	Y-axis	Z-axis	R-axis
16. Motor direction		+++		- - -

Axis settings (YK300XHS, YK400XHS)

Parameter	Changes			
Axis parameters	X-axis	Y-axis	Z-axis	R-axis
37. Max. motor rotation				6000

Axis settings (YK500XS, YK600XS, YK700XS, YK800XS, YK1000XS)

Parameter	Changes			
Axis parameters	X-axis	Y-axis	Z-axis	R-axis
37. Max. motor rotation				4000

(3) YK300XHS

Axis settings

Parameter	Changes			
Axis parameters	X-axis	Y-axis	Z-axis	R-axis
11. Arm length [mm]	175.00	125.00		

Note that the model name “YK350X” is shown on the nameplate of the YK300XHS.

Robot numbers used to initialize the parameters are as follows

Robot numbers	Robot model
2101	YK300XHS
2102	YK400XHS
2103	YK500XS Z200
2104	YK600XS Z200
2105	YK700XS Z200
2106	YK800XS Z200
2107	YK1000XS Z200
2110	YK500XS Z300
2111	YK600XS Z300
2112	YK700XS Z400
2113	YK800XS Z400
2114	YK1000XS Z400

Manufacturer serial No.	
Controller serial No.	

MEMO

CHAPTER 2

Installation

MEMO

1 Installation Base

1) Please read the description of standard robot models for the installation base and comply with the caution items provided.

⚠WARNING

The ceiling-mount robot models are hung from the ceiling so a dangerous situation can occur if the robot support section breaks and the robot falls.
Make sure the robot support section has sufficient strength, rigidity and safety.

⚠CAUTION

- When using the YK300XHS and YK400XHS, make sure that the arm does not interfere with the base installation section.
- When using the YK500XS to YK1000XS, make sure that the machine harness and Y-axis arm upper cover do not interfere with the base installation section.
  See “1-2 External view and dimensions” in Chapter 4.

2) Tap the required holes into the surface of the installation base. See “1-2 External view and dimensions” in Chapter 4 for how to tap the holes.

2 Installation

2-1 Unpacking

⚠WARNING

The robot and controller are heavy. Take sufficient care not to drop them during moving or unpacking as this may damage the equipment or cause bodily injury.

⚠CAUTION

When moving the robot or controller by equipment such as a folk-lift that requires a license, only properly qualified personnel may operate it. The equipment and tools used for moving the robot should be serviced daily.

The YK-X series robot comes packed with a robot controller and accessories, according to the order specifications. Using a carrying cart (dolly) or forklift, move the package to near the installation base. Take sufficient care not to apply shocks to the equipment when unpacking it.

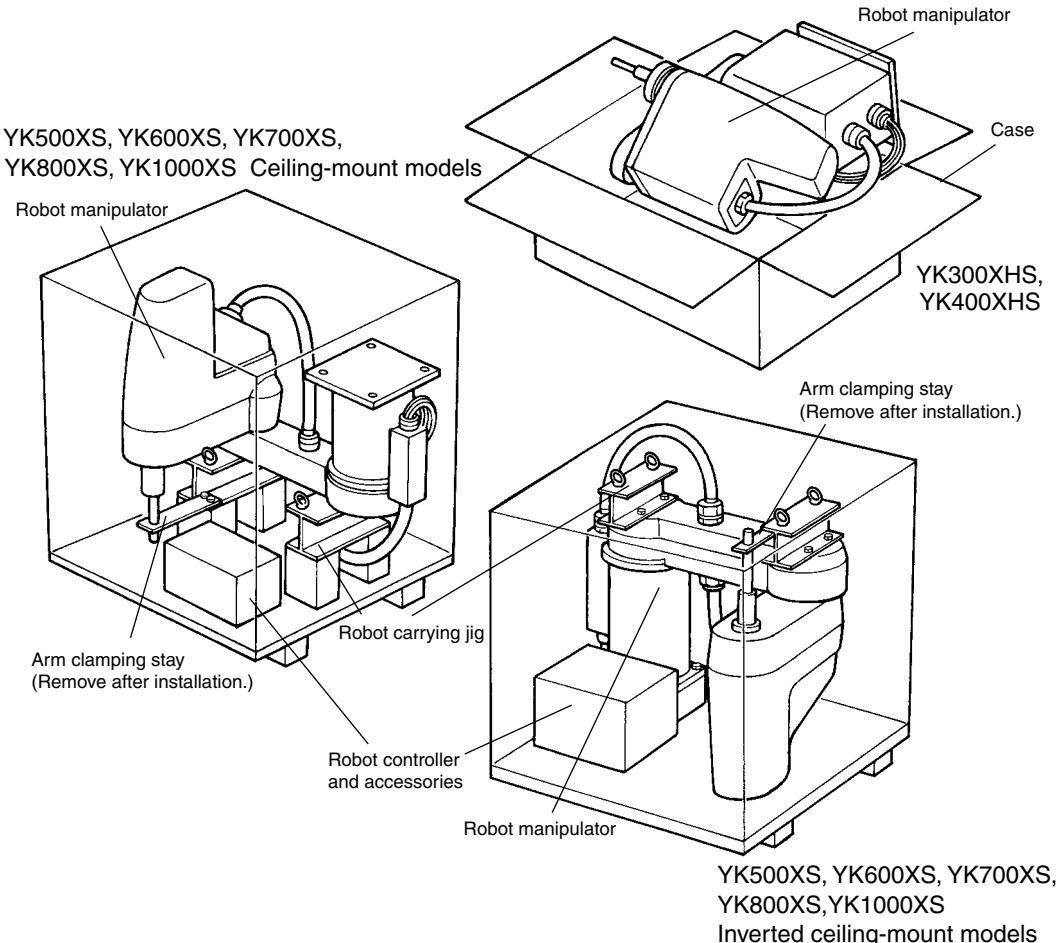


Fig. 2-1 Packed state

2-2 Checking the product

After unpacking, check the product configuration and conditions.
The illustration below shows typical configurations for YK500XS to YK1000XS ceiling-mount and inverted ceiling-mount models, which are different from standard models.

⚠CAUTION

If there is any damage due to transportation or insufficient parts, please notify your YAMAHA sales office or dealer immediately.

Controller : RCX240
Robot : YK500XS, YK600XS, YK700XS, YK800XS, YK1000XS

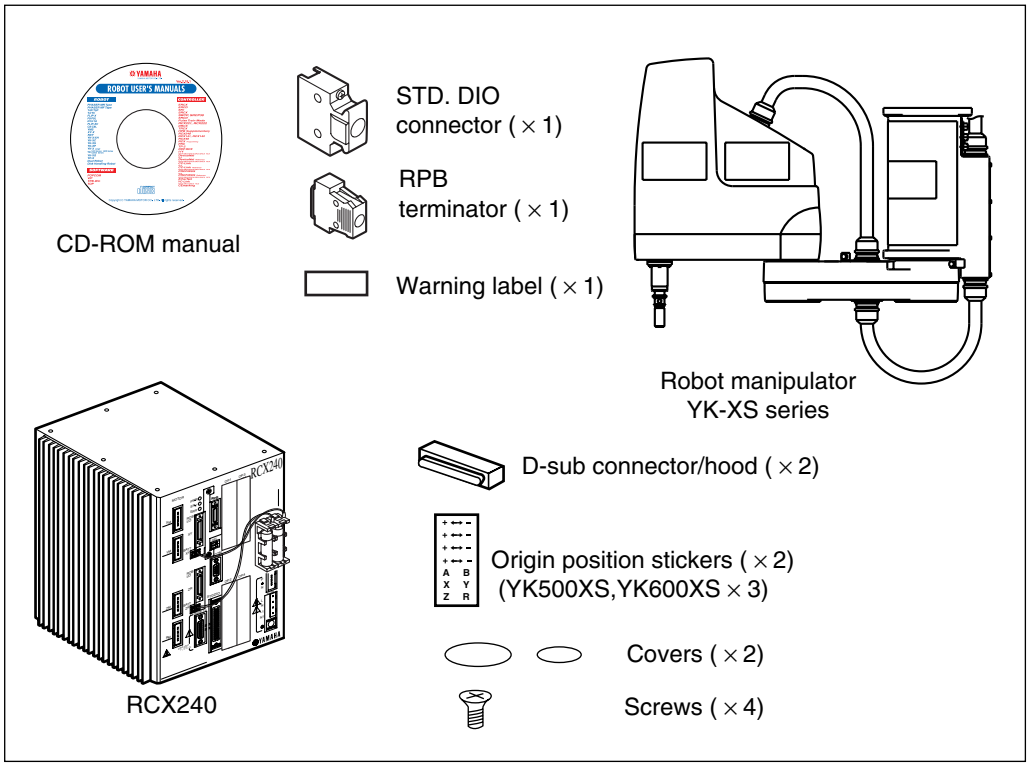


Fig. 2-2 Product configurations

2-3 Moving the robot

⚠WARNING

Serious injury may occur if the robot falls and pins someone under it.
- Do not allow any part of your body to enter the area beneath the robot during work.
- Always wear a helmet, safety shoes and gloves during work.

To check the mass of each robot, refer to "1-1 Basic specifications" in Chapter 4.

2-3-1 Moving the YK300XHS, YK400XHS

1) Fold the X and Y axis arms as shown in Fig. 2-3, and wind the robot cable around the machine harness, then fasten the robot cable with adhesive tape so as not to cover the bolt installation holes.
   When moving an inverted ceiling mount robot, wind the robot cable around the spline shaft as shown and fasten the cable with adhesive tape.
2) Holding the support parts as shown in the figure with both hands, place the robot on the installation base and secure it temporarily by tightening the bolts. (For tightening torque to secure the robot firmly, see "2-4 Installing the robot" in the YK-X standard model user's manual.)

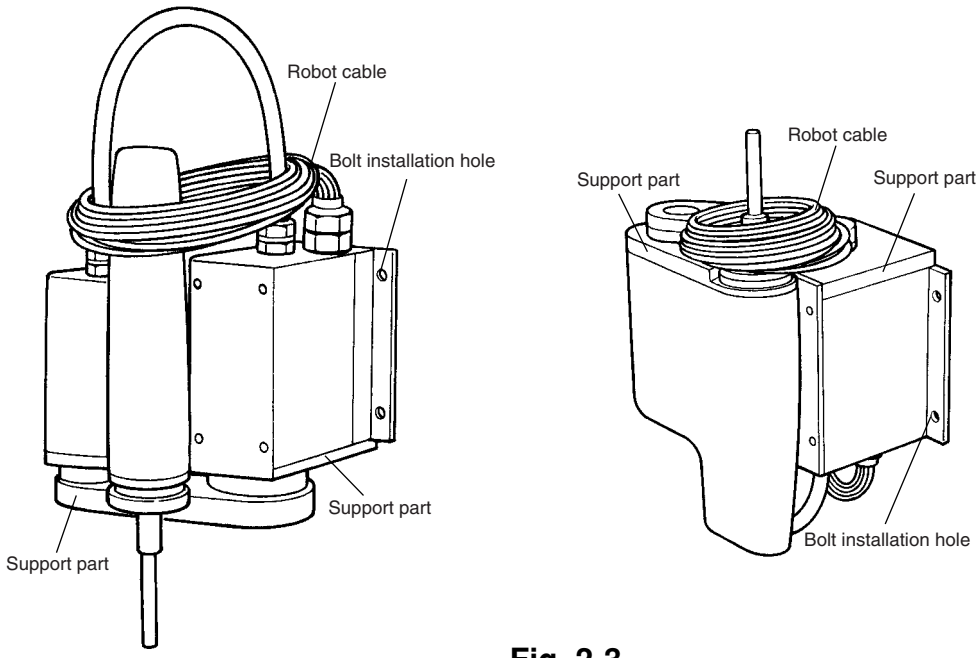


Fig. 2-3

2-3-2 Moving the YK500XS, YK600XS, YK700XS, YK800XS, YK1000XS

⚠ WARNING

Serious injury may occur if the robot falls and pins someone under it.

- Check that there are no cracks and corrosion on the eyebolt installation. If found, do not use eyebolts to move the robot.
- Insert the eyebolts into the holes of the carrying jig so that their bearing surfaces make tight contact with each other, and securely fasten the eyebolts with the nuts.
- Use a hoist and rope with carrying capacity strong enough to support the robot weight.
- Make sure the rope stays securely on the hoist hook.
- Remove all loads attached to the robot manipulator end. If any load is still attached, the robot may lose balance while being carried, and topple over causing accidents.

⚠ CAUTION

- When moving the robot by equipment such as cranes that require a license, only properly qualified personnel may operate it.
- The equipment and tools used for moving the robot should be serviced daily.

To move a robot (for example, the YK500XS) correctly and safely, follow the procedure below. Use the same procedure to move other robots.

2-3-2-1 Moving the ceiling-mount robot

(1) When using eyebolts (See Fig. 2-4.)

1) Remove the X-axis and Y-axis under covers and attach the carrying jigs as shown in Fig. 2-4. Remove all loads if attached to the Z-axis to set the servo free and release the brake. Then fold the Z-axis to a position where it can be fastened to the arm clamping stay

2) Insert the eyebolts into the holes on the carrying jig and securely fasten the eyebolts with the nuts. Then attach the arm clamping stay to the carrying jig.

3) Clamp the Y-axis arm by using the stay and bolts that come with the robot. If the arms cannot be folded in the carrying position (see Fig. 2-4) due to the X-axis mechanical stoppers, then remove them. (When the robot is shipped, the mechanical stoppers are installed to provide the maximum movement range.)

4) Wind the robot cable around the robot base while keeping the cable from hanging up on the base mount, then fasten the cable end with adhesive tape.

5) Prepare 4 looped ropes with the same length to allow a good lifting balance, then pass each rope through each eyebolt and catch it on the hoist hook.

6) Slightly lift the hoist so that each rope has light tension to hold the robot. In this state, remove the bolts securing the robot base to the pallet supplied or installation base (if robot is to be moved to another installation base).

7) Using caution to keep the balance of the robot and avoid subjecting it to any strong vibrations and shocks, operate the hoist carefully to move to the installation base. The angle between each rope and the arm surface should be kept at 45 degrees or more.

8) Temporarily secure the robot to the installation base by tightening the bolts. (Use the same tightening torque as specified to secure the standard model robots.)

9) Remove the ropes and carrying jigs, then reattach the X-axis and Y-axis under covers. Be sure to keep the carrying jigs, eyebolts, arm clamping stay, bolts and pallet for future use in case the robot needs to be moved or transported.

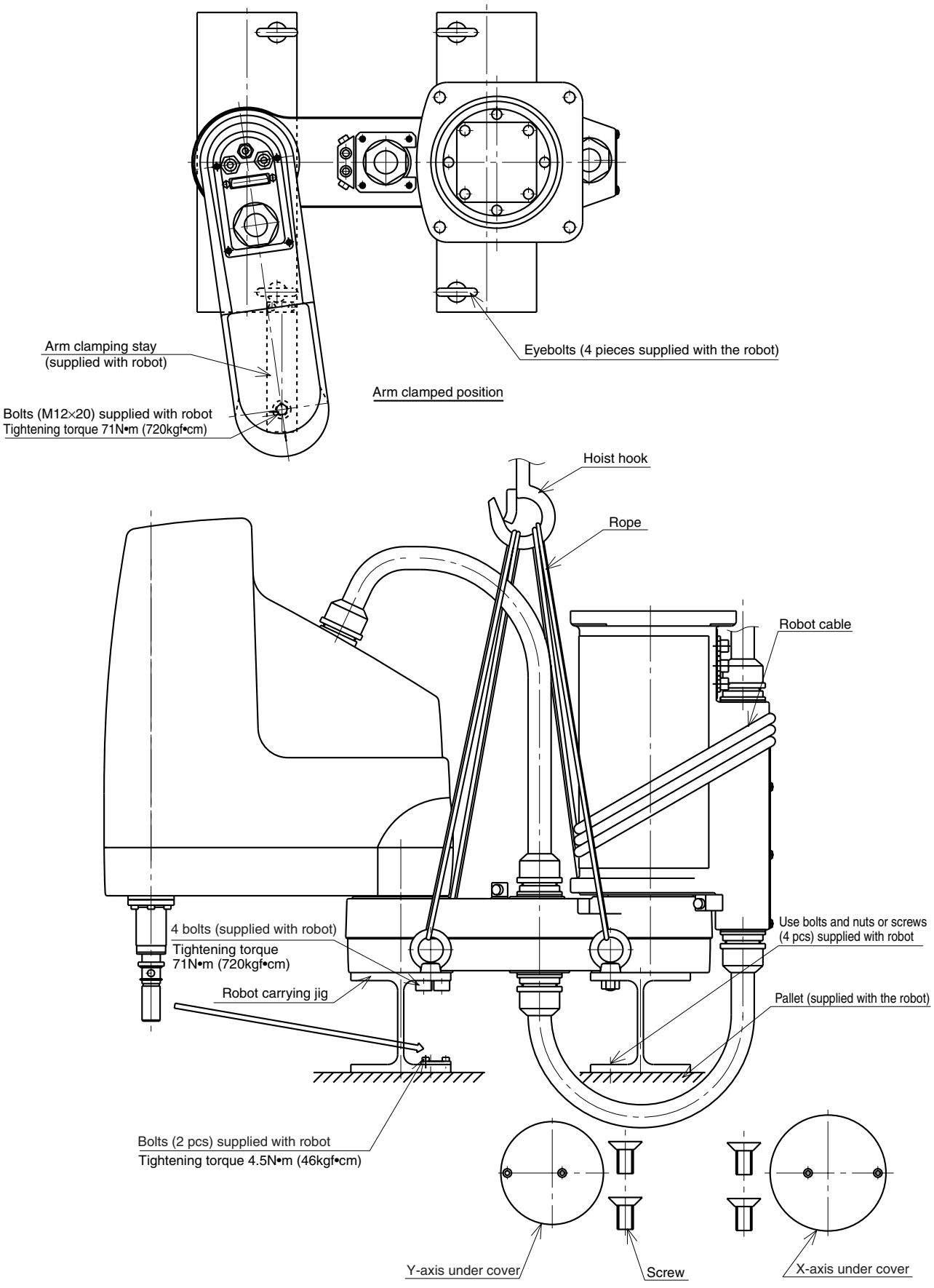

Arm clamping stay
(supplied with robot)
Bolts (M12×20) supplied with robot
Tightening torque 71N•m (720kgf•cm)
Eyebolts (4 pieces supplied with the robot)
Arm clamped position
Hoist hook
Rope
Robot cable
4 bolts (supplied with robot)
Tightening torque
71N•m (720kgf•cm)
Robot carrying jig
Use bolts and nuts or screws
(4 pcs) supplied with robot
Pallet (supplied with the robot)
Bolts (2 pcs) supplied with robot
Tightening torque 4.5N•m (46kgf•cm)
Y-axis under cover
Screw
X-axis under cover

Fig. 2-4

(2) When using the hand forklift (See Fig. 2-5)

1) Remove the X- and Y-axis under covers and install the robot carrying jigs.

2) Set the X- and Y-axis arms straight (See Fig. 2-5). If the robot is in the shipped state, remove the spline from the arm clamping stay, and set the X- and Y-axis arms straight. If the arms cannot be folded in the carrying position (see Fig. 2-5) due to the X-axis mechanical stoppers, then remove them.

3) Wind the robot cable around the robot base while keeping the cable from hanging up on the base mount, then fasten the cable end with adhesive tape.

4) Insert the prongs of the hand forklift into the robot carrying jigs and raise the hand forklift supporting the robot. Remove the bolts securing the pallet supplied or installation base (if moving the robot to another installation base).

5) Using caution to keep the balance of the robot and avoid subjecting it to vibrations and shocks, slowly move to the installation base.

6) Temporarily secure the robot to the installation base by tightening the bolts. (Bolt tightening torque is the same as the standard model robots.)

7) Remove the carrying jigs, and reattach the X- and Y-axis under covers. Be sure to keep the carrying jigs, bolts, arm clamping stay and pallet for future use in case the robot needs to be moved or transported.

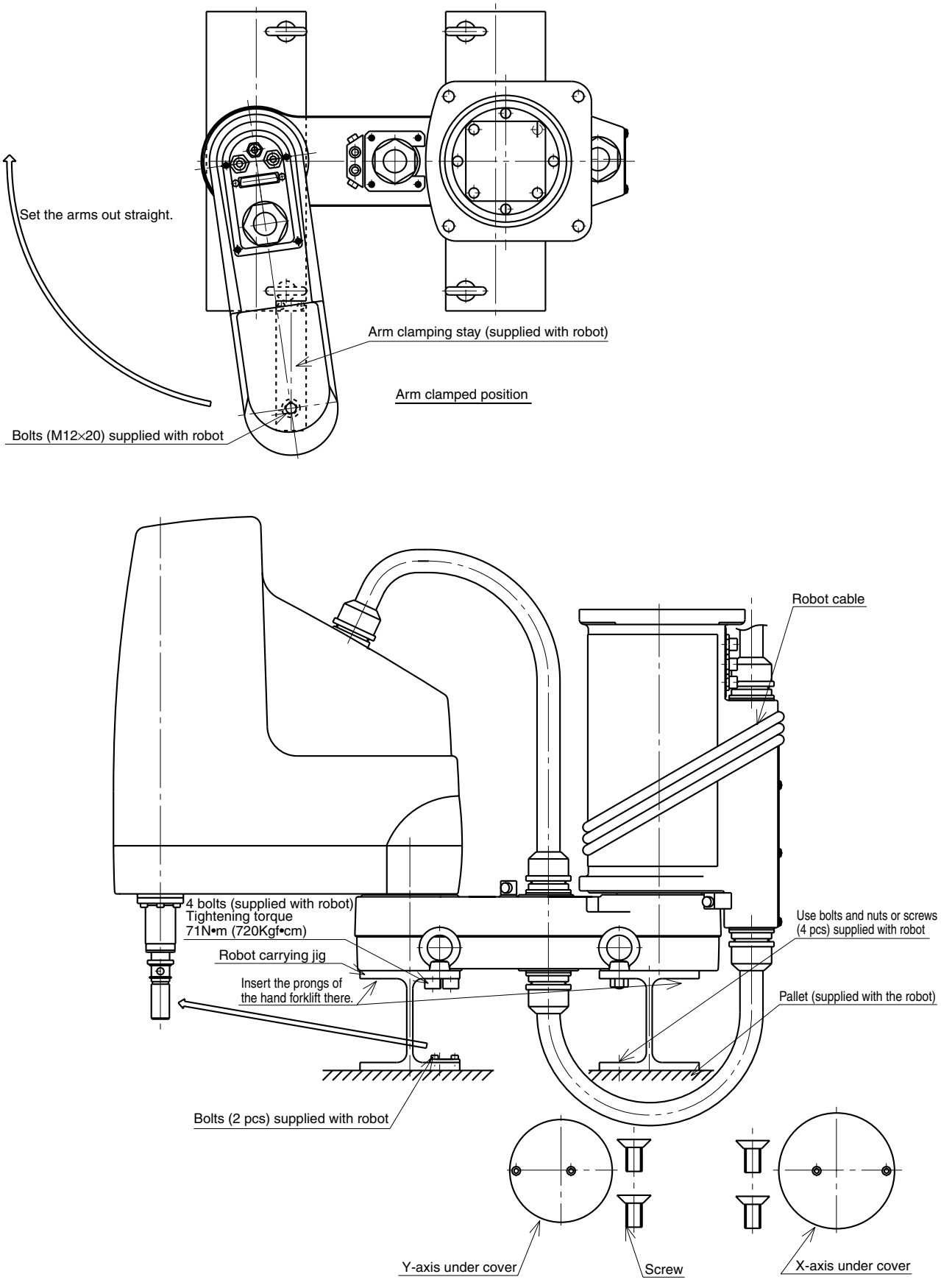

Set the arms out straight.
Arm clamping stay (supplied with robot)
Arm clamped position
Bolts (M12×20) supplied with robot
Robot cable
4 bolts (supplied with robot)
Tightening torque
71N•m (720Kgf•cm)
Robot carrying jig
Insert the prongs of
the hand forklift there.
Use bolts and nuts or screws
(4 pcs) supplied with robot
Pallet (supplied with the robot)
Bolts (2 pcs) supplied with robot
Y-axis under cover
Screw
X-axis under cover

Fig. 2-5

2-3-2-2 Moving the inverted ceiling-mount robot

(1) When using eyebolts (See Fig. 2-6.)

1) Remove the X-axis and Y-axis upper covers and attach the robot carrying jigs. Remove all loads if attached to the Z-axis to set the servo free and release the brake. Then fold the Z-axis to a position where it can be fastened to the arm clamping stay

2) Insert the eyebolts into the holes on the carrying jigs and securely fasten the eyebolts with the nuts. Then attach the arm clamping stay to the carrying jigs.

3) Clamp the Y-axis arm by using the stay and bolts that come with the robot. If the arms cannot be folded in the carrying position (see Fig. 2-4) due to the X-axis mechanical stoppers, then remove them. (When the robot is shipped, the mechanical stoppers are installed to provide the maximum movement range.)

4) Wind the robot cable around the robot base while keeping the cable from hanging up on the base mount, then fasten the cable end with adhesive tape.

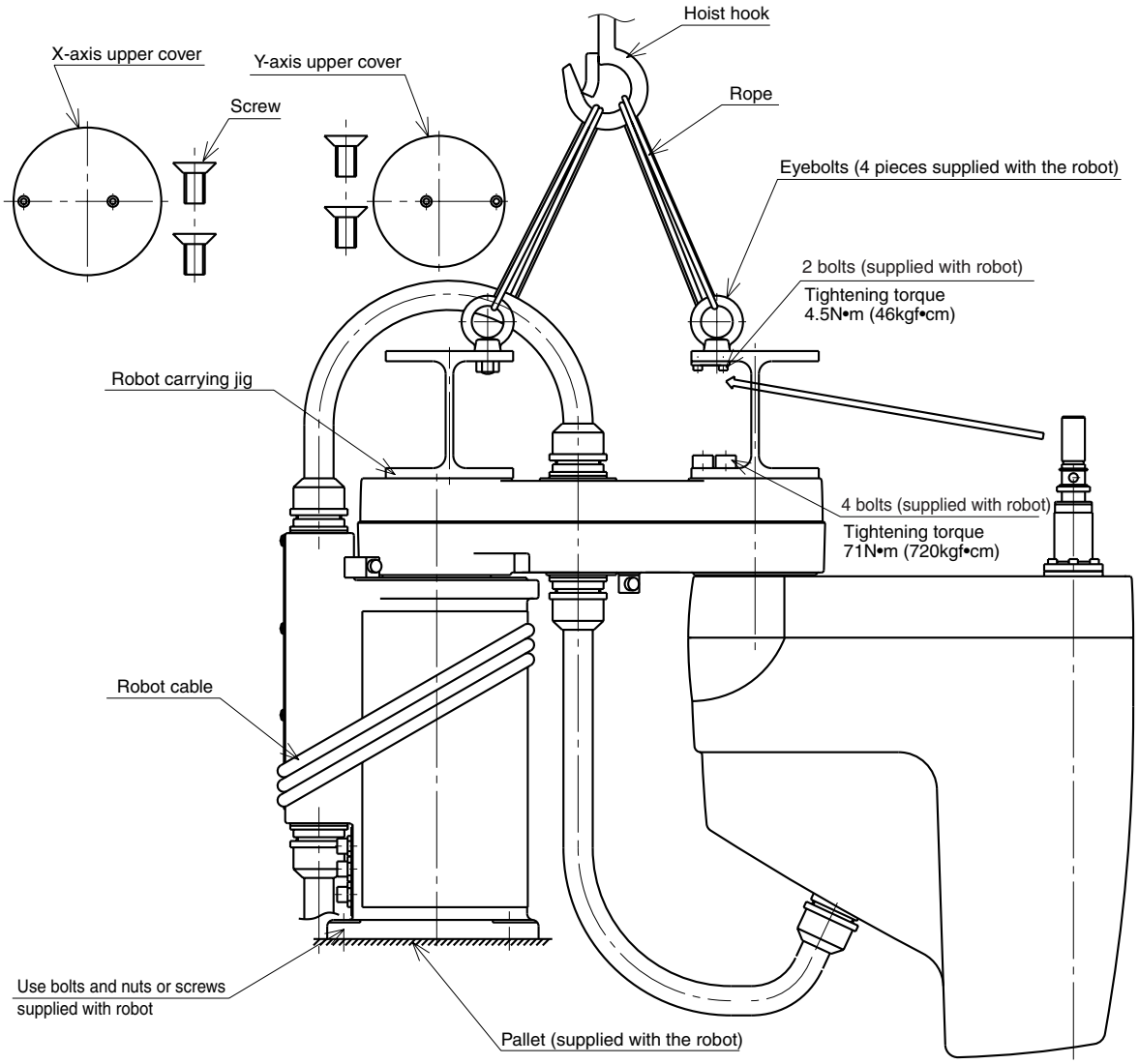
5) Prepare 4 looped ropes with the same length to allow a good lifting balance, then pass each rope through each eyebolt and catch it on the hoist hook.

6) Slightly lift the hoist so that each rope has light tension to hold the robot. In this state, remove the bolts securing the robot base to the pallet supplied or installation base (if moving the robot to another installation base).

7) Using caution to keep the balance of the robot and avoid subjecting it to any strong vibrations and shocks, operate the hoist carefully to move to the installation base. The angle between each rope and the arm surface should be kept at 45 degrees or more.

8) Temporarily secure the robot to the installation base by tightening the bolts. (Bolt tightening torque is the same as the standard model robots.)

9) Remove the ropes and carrying jigs, then reattach the X-axis and Y-axis upper covers. Be sure to keep the carrying jigs, eyebolts, arm clamping stay, bolts and pallet for future use in case the robot needs to be moved or transported.


Hoist hook
X-axis upper cover
Y-axis upper cover
Screw
Rope
Eyebolts (4 pieces supplied with the robot)
2 bolts (supplied with robot)
Tightening torque
4.5N•m (46kgf•cm)
Robot carrying jig
4 bolts (supplied with robot)
Tightening torque
71N•m (720kgf•cm)
Robot cable
Use bolts and nuts or screws
supplied with robot
Pallet (supplied with the robot)

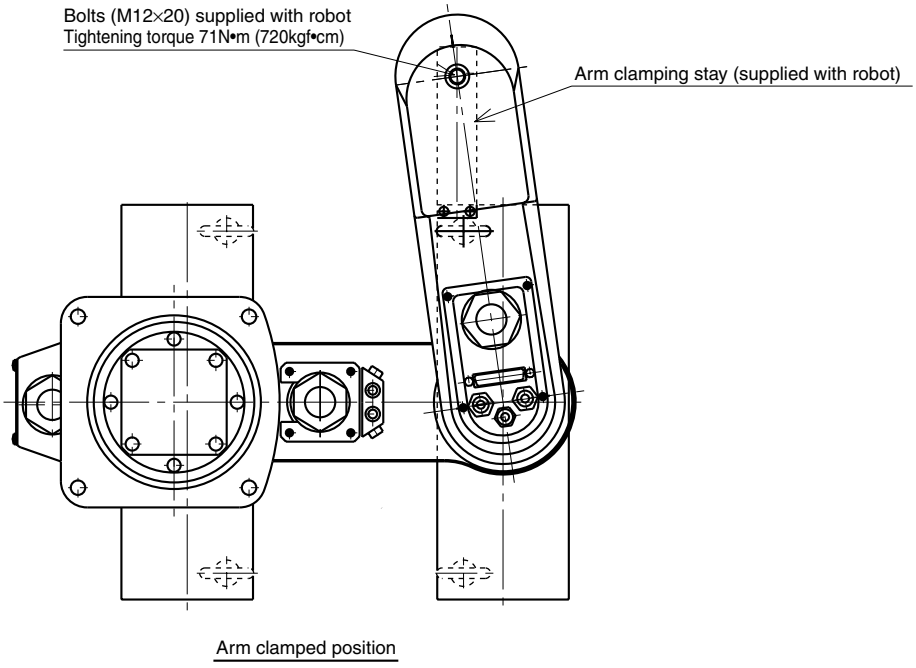

Bolts (M12×20) supplied with robot
Tightening torque 71N•m (720kgf•cm)
Arm clamping stay (supplied with robot)
Arm clamped position

Fig. 2-6

(2) When using the hand forklift (See Fig. 2-7)

1) Remove the X- and Y-axis upper covers and install the robot carrying jigs.

2) Set the X- and Y-axis arms straight (See Fig. 2-5). If the robot is in the shipped state, remove the spline from the arm clamping stay, and set the X- and Y-axis arms straight. If the arms cannot be folded in the carrying position (see Fig. 2-5) due to the X-axis mechanical stoppers, then remove them. (When the robot is shipped, the mechanical stoppers are installed to provide the maximum movement range.)

3) Wind the robot cable around the robot base while keeping the cable from hanging up on the base mount, then fasten the cable end with adhesive tape.

4) Insert the prongs of the hand forklift into the robot carrying jigs and raise the hand forklift supporting the robot. Remove the bolts securing the pallet supplied or installation base (if moving the robot to another installation base).

5) Using caution to keep the balance of the robot and avoid subjecting it to vibrations and shocks, slowly move to the installation base.

6) Temporarily secure the robot to the installation base by tightening the bolts. (Bolt tightening torque is the same as the standard model robots.)

7) Remove the carrying jigs, and reattach the X- and Y-axis upper covers. Be sure to keep the carrying jigs, bolts, arm clamping stay and pallet for future use in case the robot needs to be moved or transported.

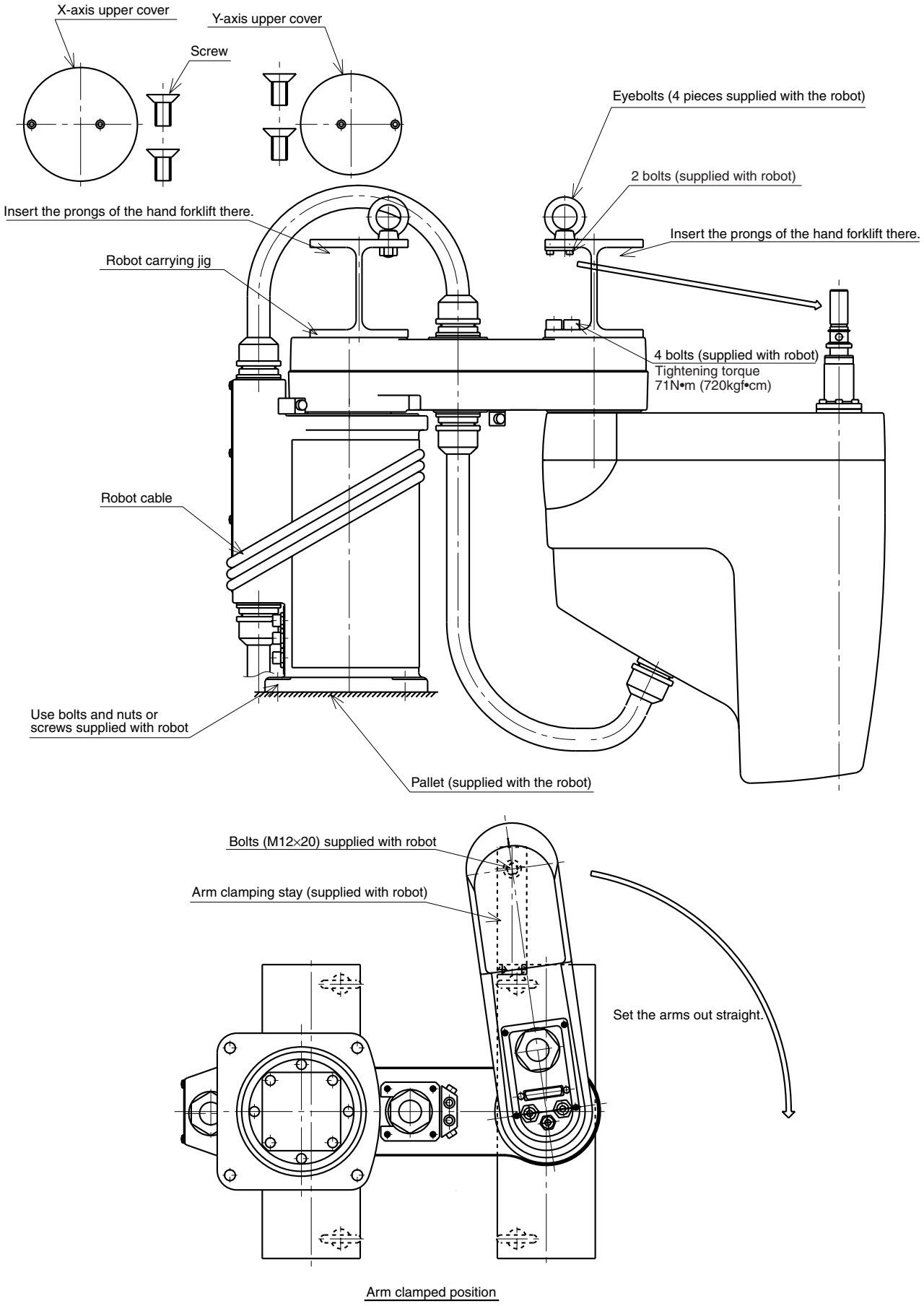

X-axis upper cover
Y-axis upper cover
Screw
Eyebolts (4 pieces supplied with the robot)
2 bolts (supplied with robot)
Insert the prongs of the hand forklift there.
Insert the prongs of the hand forklift there.
Robot carrying jig
4 bolts (supplied with robot)
Tightening torque
71N•m (720kgf•cm)
Robot cable
Use bolts and nuts or
screws supplied with robot
Pallet (supplied with the robot)
Bolts (M12×20) supplied with robot
Arm clamping stay (supplied with robot)
Set the arms out straight.
Arm clamped position

Fig. 2-7

MEMO

CHAPTER 3

Periodic Inspection

MEMO

1 Replacing the Harmonic Grease (Inverted ceiling-mount model R-axis)

Only the R-axis harmonic drive of the inverted ceiling-mount model uses harmonic grease HC-1A. This grease must be replaced periodically. Use the guideline explained below to determine the appropriate replacement period and replace the grease.

1-1 Replacement period

The harmonic drive grease replacement period is determined by the total number of turns of the wave generator used in the harmonic drive. It is recommended to replace the harmonic drive grease when the total number of turns has reached 1.5×10^8 (at ambient operating temperatures of 0°C to +40°C). This means that the replacement period will differ depending on the following operating conditions. If the robot operation duty ratio is high or the robot is operated in environments at higher temperatures, the harmonic drive should be replaced earlier.

Replacement period = $1.5\times10^8/(n\times60\times h\times D\times N\times\theta)$ years

where
- n : Number of axis movements per minute
- θ : Average turn per axis movement
- N : Speed reduction ratio
- h : Operation time per day
- D : Operation days per year

For example, when the robot is used under the following conditions, the replacement period for the R-axis harmonic drive grease of the YK500X can be calculated as follows.

- n : 10
- θ : 0.25
- N : 80
- h : 24 hours per day
- D : 240 days per year

Replacement period = $1.5\times10^8/(n\times60\times h\times D\times N\times\theta)$
= $1.5\times10^8/(10\times60\times24\times240\times80\times0.25)$
= 2.17 years

Table 3-1 Harmonic drive speed reduction ratio

Robot model	R-axis
YK300XHS,YK400XHS	50
YK500XS,YK600XS	50
YK700XS,YK800XS	50
YK1000XS	50

MEMO

CHAPTER 4

Specifications

MEMO

1 Robot Manipulator

1-1 Basic specifications

1-1-1 Ceiling-mount model

Robot model			YK300XHS	YK400XHS
Axis specifications	X-axis	Arm length	175mm	225mm
		Rotation angle	±115°	±115°
	Y-axis	Arm length	125mm	175mm
		Rotation angle	±140°	±140°
	Z-axis	Stroke	150mm	150mm
	R-axis	Rotation angle	±360°	±360°
Motor		X-axis	200W	200W
		Y-axis	100W	100W
		Z-axis	100W	100W
		R-axis	100W	100W
Maximum speed		XY resultant	4.4m/s	6.0m/s
		Z-axis	1.0m/s	1.0m/s
		R-axis	1020°/s	1020°/s
Repeatability *1		XY-axes	±0.01mm	±0.01mm
		Z-axis	±0.01mm	±0.01mm
		R-axis	±0.005°	±0.005°
Payload			3kg	3kg
R-axis tolerable moment of inertia *2			0.05kgm^2 (0.5kgfcms^2)	
User wiring			0.2sq×10cables	
User tubing			φ4×3	
Travel limit			1.Soft limit 2.Mechanical limit (XYZ-axes)	
Robot cable			Standard: 3.5m Option: 5m, 10m	
Weight			15kg	15kg

*1 At constant ambient temperature (XY)

*2 There are limits to acceleration coefficient settings.

Robot model			YK500XS	YK600XS
Axis specifications	X-axis	Arm length	250mm	350mm
		Rotation angle	±120°	±120°
	Y-axis	Arm length	250mm	250mm
		Rotation angle	±135°	±145°
	Z-axis	Stroke	200, 300mm	200, 300mm
	R-axis	Rotation angle	±360°	±360°
Motor		X-axis	400W	400W
		Y-axis	200W	200W
		Z-axis	200W	200W
		R-axis	100W	100W
Maximum speed		XY resultant	4.9m/s	5.6m/s
		Z-axis	1.7m/s	1.7m/s
		R-axis	876°/s	876°/s
Repeatability *1		XY-axes	±0.02mm	±0.02mm
		Z-axis	±0.01mm	±0.01mm
		R-axis	±0.005°	±0.005°
Payload			10kg	10kg
R-axis tolerable moment of inertia *2			0.12kgm^2 (1.2kgfcms^2)	
User wiring			0.2sq×20cables	
User tubing			φ6×3	
Travel limit			1.Soft limit 2.Mechanical limit (XYZ-axes)	
Robot cable			Standard: 3.5m Option: 5m, 10m	
Weight			30kg	32kg

*1 At constant ambient temperature (XY)

*2 There are limits to acceleration coefficient settings.

Robot Model			YK700XS	YK800XS	YK1000XS
Axis specifications	X-axis	Arm length	350mm	450mm	550mm
		Rotation angle	±120°	±120°	±120°
	Y-axis	Arm length	350mm	350mm	450mm
		Rotation angle	±145°	±145°	±145°
	Z-axis	Stroke	200, 400mm	200, 400mm	200, 400mm
	R-axis	Rotation angle	±360°	±360°	±360°
Motor		X-axis	800W	800W	800W
		Y-axis	400W	400W	400W
		Z-axis	400W	400W	400W
		R-axis	200W	200W	200W
Maximum speed		XY resultant	6.7m/s	7.3m/s	8.0m/s
		Z-axis	1.7m/s	1.7m/s	1.7m/s
		R-axis	600°/s	600°/s	600°/s
Repeatability *1		X,Y-axes	±0.02mm	±0.02mm	±0.02mm
		Z-axis	±0.01mm	±0.01mm	±0.01mm
		R-axis	±0.005°	±0.005°	±0.005°
Payload			20kg	20kg	20kg
R-axis tolerable moment of inertia *2			0.32kgm^2 (3.2kgfcms^2)		
User wiring			0.2sq×20cables		
User tubing			φ6×3		
Travel limit			1.Soft limit 2.Mechanical limit (XYZ-axes)		
Robot cable			Standard: 3.5m Option: 5m, 10m		
Weight			56kg	57kg	58kg

*1 At constant ambient temperature (XY)

*2 There are limits to acceleration coefficient settings.

1-1-2 Inverted ceiling-mount model

Robot model			YK300XHS	YK400XHS	YK500XS	YK600XS
Axis specifications	X-axis	Arm length	175mm	225mm	250mm	350mm
		Rotation angle	±115°	±115°	±120°	±120°
	Y-axis	Arm length	125mm	175mm	250mm	250mm
		Rotation angle	±140°	±140°	±135°	±145°
	Z-axis	Stroke	150mm	150mm	200, 300mm	200, 300mm
	R-axis	Rotation angle	±360°	±360°	±360°	±360°
Motor		X-axis	200W	200W	400W	400W
		Y-axis	100W	100W	200W	200W
		Z-axis	100W	100W	200W	200W
		R-axis	100W	100W	100W	100W
Maximum speed		XY resultant	4.4m/s	6.0m/s	4.9m/s	5.6m/s
		Z-axis	1.0m/s	1.0m/s	1.7m/s	1.7m/s
		R-axis	720°/s	720°/s	480°/s	480°/s
Repeatability *1		XY-axes	±0.01mm	±0.01mm	±0.02mm	±0.02mm
		Z-axis	±0.01mm	±0.01mm	±0.01mm	±0.01mm
		R-axis	±0.005°	±0.005°	±0.005°	±0.005°
Payload			3kg	3kg	10kg	10kg
R-axis tolerable moment of inertia *2			0.05kgm^2 (0.5kgfcms^2)		0.12kgm^2 (1.2kgfcms^2)	
User wiring			0.2sq×10cables		0.2sq×20cables	
User tubing			φ4×3		φ6×3	
Travel limit			1.Soft limit 2.Mechanical limit (XYZ-axes)			
Robot cable			Standard: 3.5m Option: 5m, 10m			
Weight			15kg	15kg	30kg	32kg

*1 At constant ambient temperature (XY)

*2 There are limits to acceleration coefficient settings.

Robot Model			YK700XS	YK800XS	YK1000XS
Axis specifications	X-axis	Arm length	350mm	450mm	550mm
		Rotation angle	±120°	±120°	±120°
	Y-axis	Arm length	350mm	350mm	450mm
		Rotation angle	±145°	±145°	±145°
	Z-axis	Stroke	200, 400mm	200, 400mm	200, 400mm
	R-axis	Rotation angle	±360°	±360°	±360°
Motor		X-axis	800W	800W	800W
		Y-axis	400W	400W	400W
		Z-axis	400W	400W	400W
		R-axis	200W	200W	200W
Maximum speed		XY resultant	6.7m/s	7.3m/s	8.0m/s
		Z-axis	1.7m/s	1.7m/s	1.7m/s
		R-axis	480°/s	480°/s	480°/s
Repeatability *1		X,Y-axes	±0.02mm	±0.02mm	±0.02mm
		Z-axis	±0.01mm	±0.01mm	±0.01mm
		R-axis	±0.005°	±0.005°	±0.005°
Payload			20kg	20kg	20kg
R-axis tolerable moment of inertia *2			0.32kgm^2 (3.2kgfcms^2)		
User wiring			0.2sq×20cables		
User tubing			φ6×3		
Travel limit			1.Soft limit 2.Mechanical limit (XYZ-axes)		
Robot cable			Standard: 3.5m Option: 5m, 10m		
Weight			56kg	57kg	58kg

*1 At constant ambient temperature (XY)

*2 There are limits to acceleration coefficient settings.

1-2 External view and dimensions

The drawing below is for the ceiling-mount robots. The inverted ceiling-mount robots also have the same dimensions.

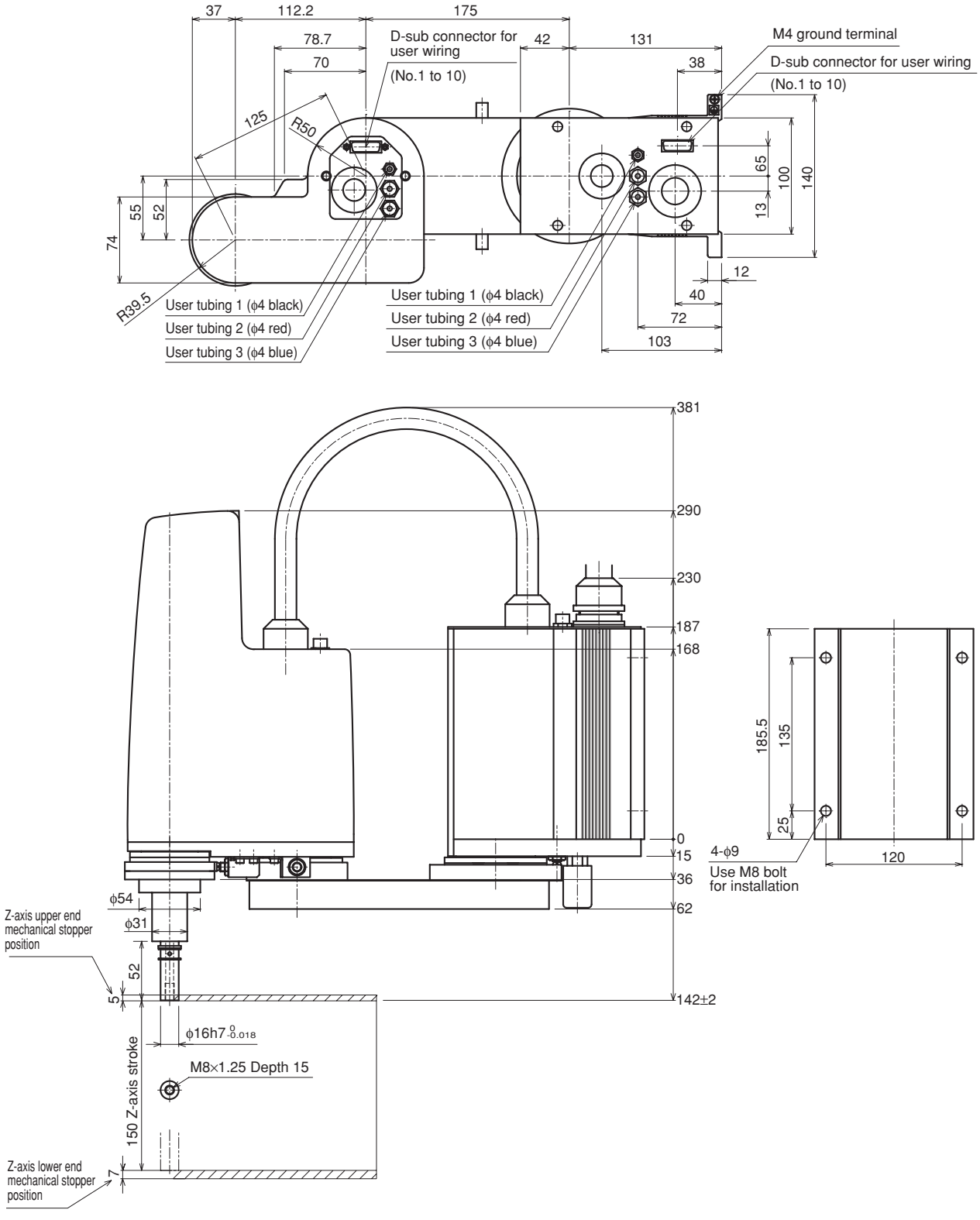
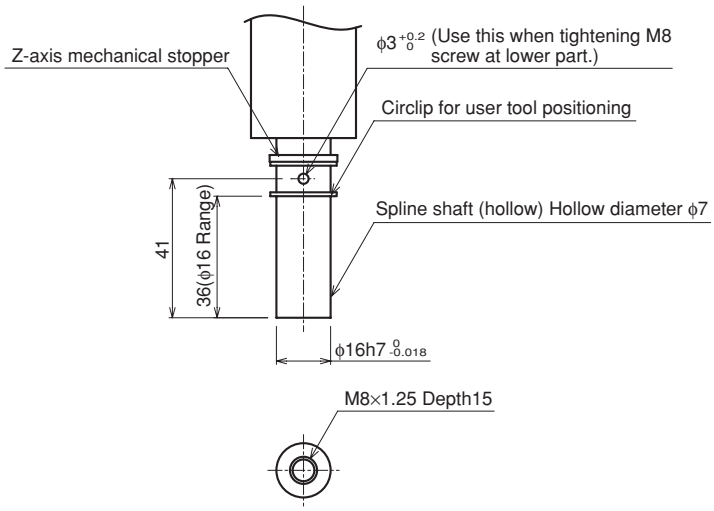
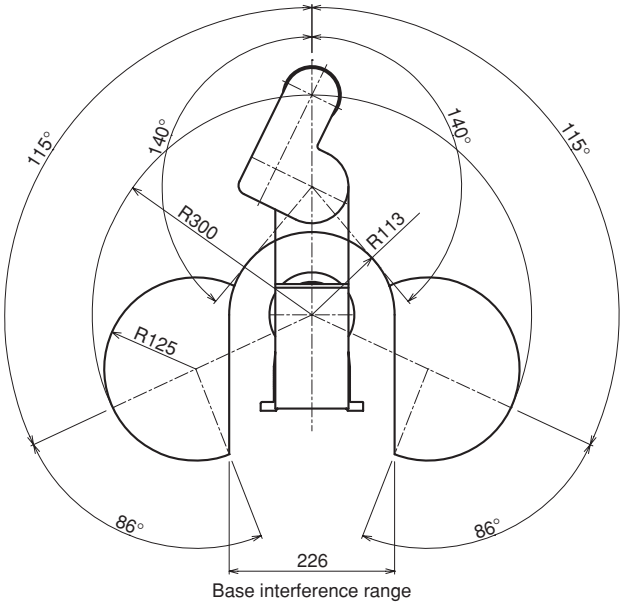


Fig. 4-1 YK300XHS



Z-axis tip shape



Base interference range

Working envelope

Use caution to prevent interference with installation wall

✱Inverse type is installed upside down.

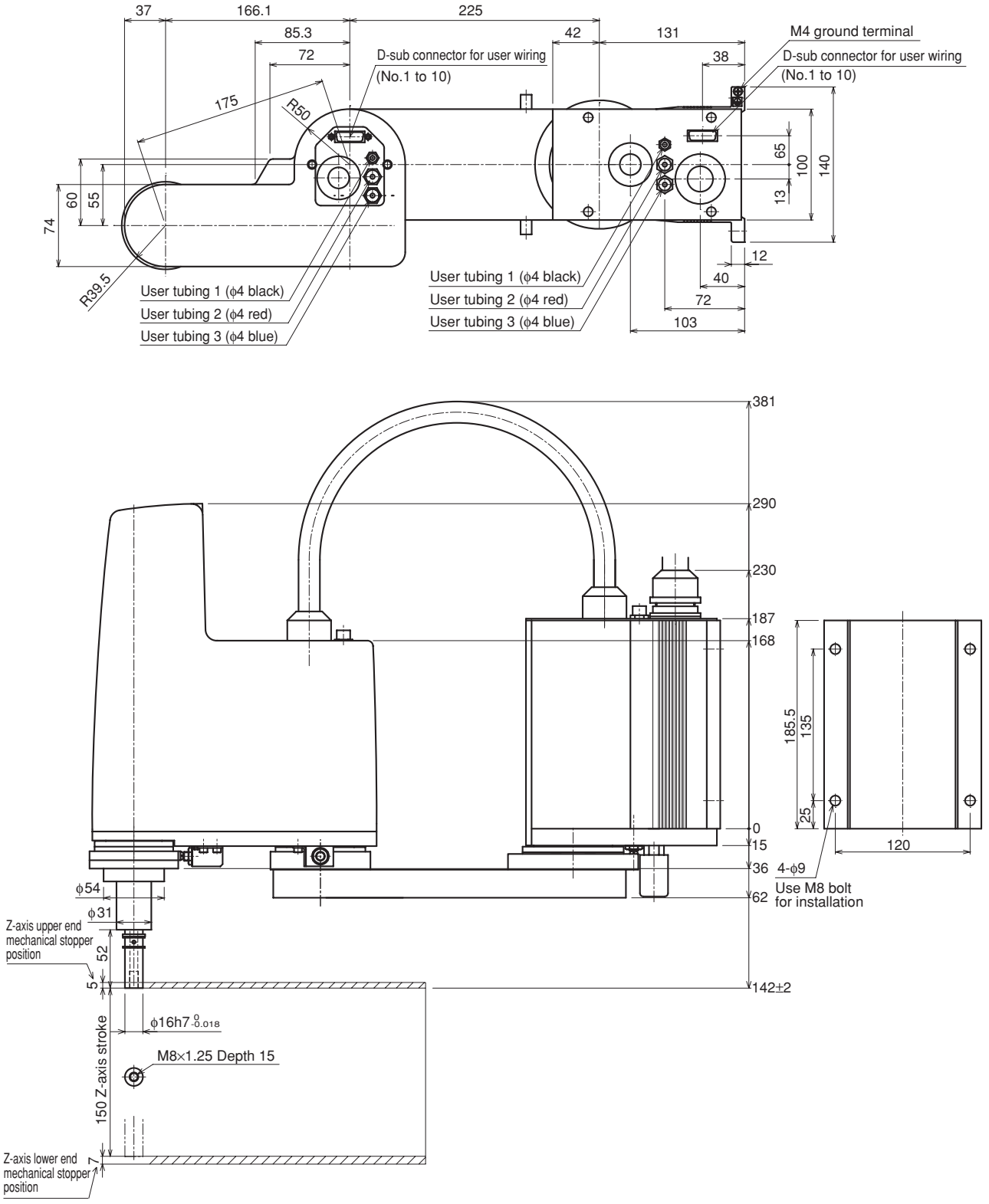
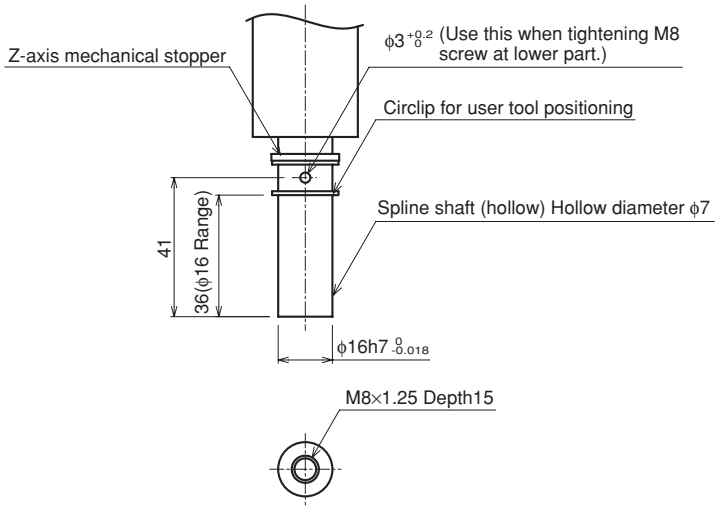
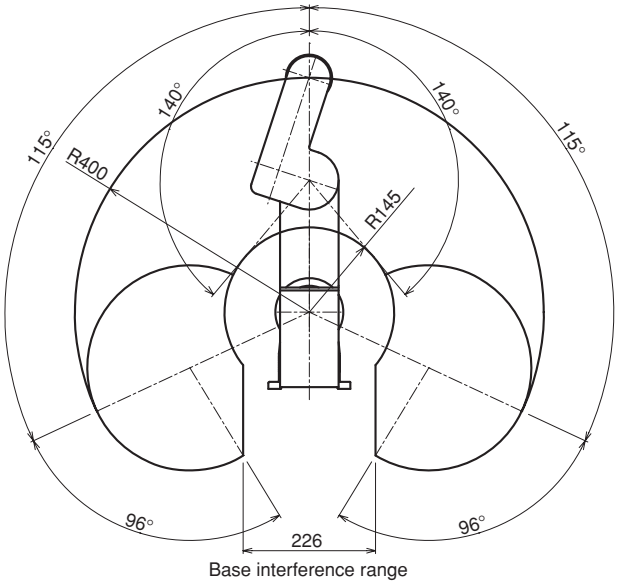


Fig. 4-2 YK400XHS



Z-axis tip shape



Base interference range

Working envelope

Use caution to prevent interference with installation wall

✱Inverse type is installed upside down.

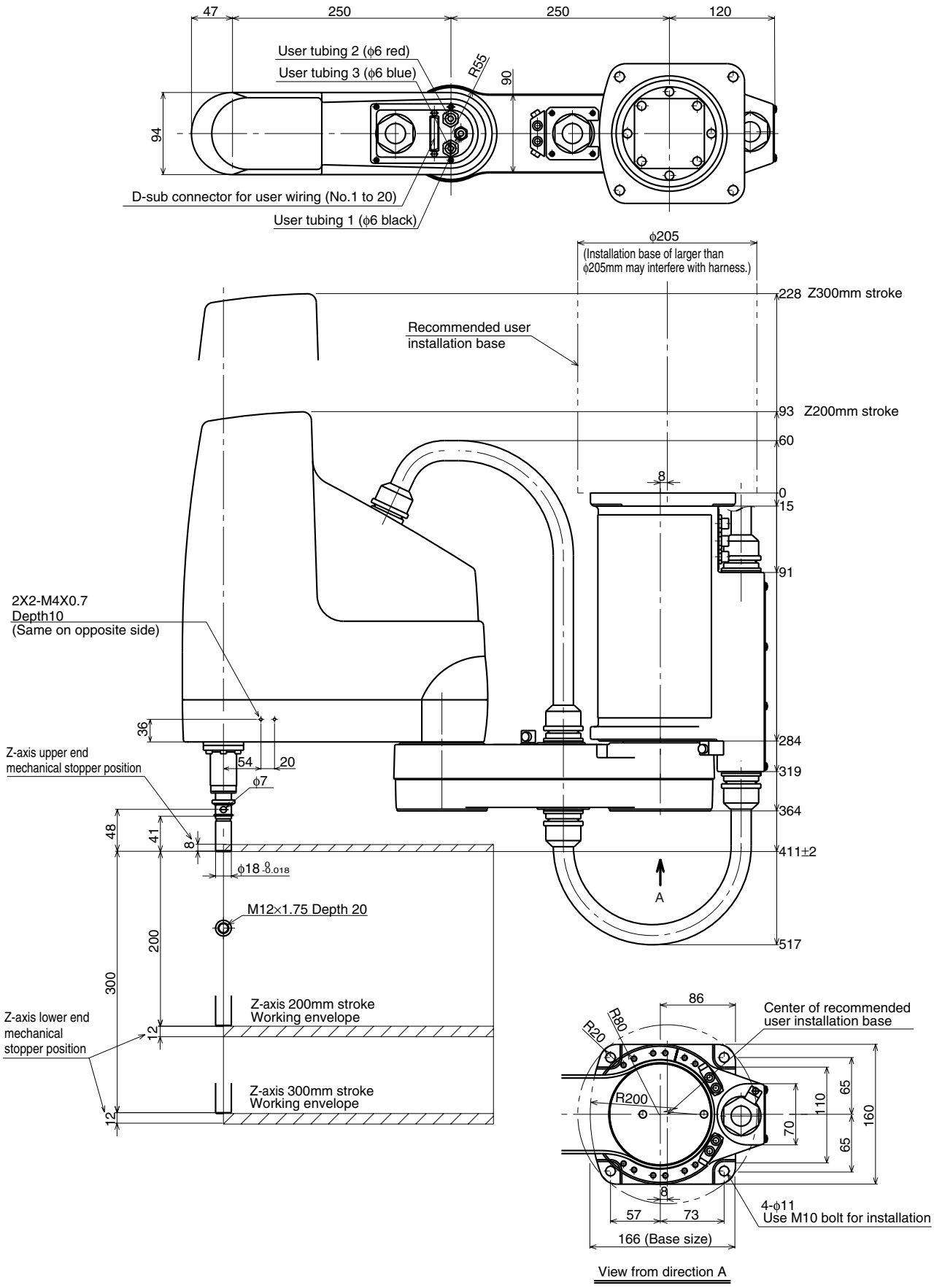
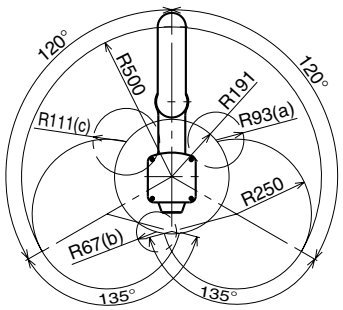
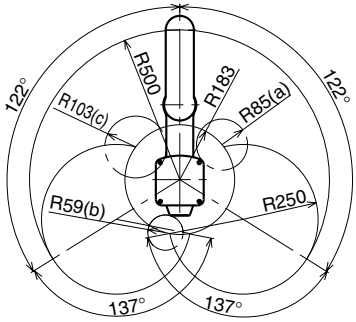


Fig. 4-3 YK500XS

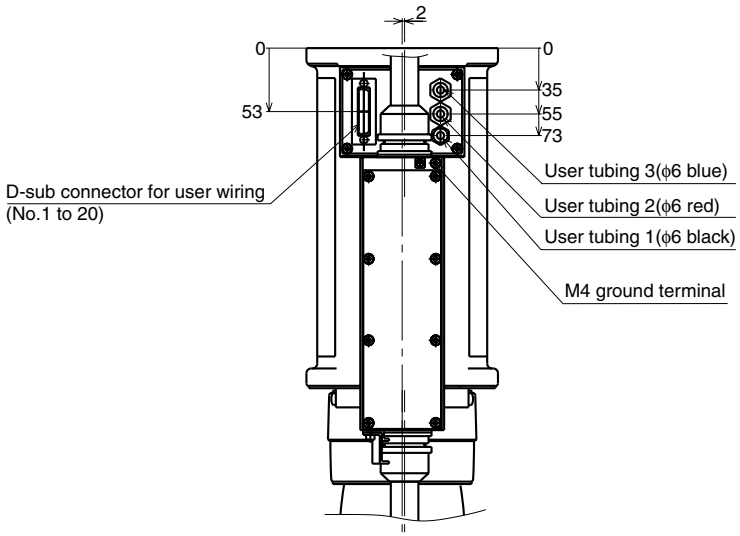
Interference position
(a) Base flange
(b) Base rear side
(c) Base



Working envelope



X and Y-axis mechanical stopper positions (maximum working envelope)



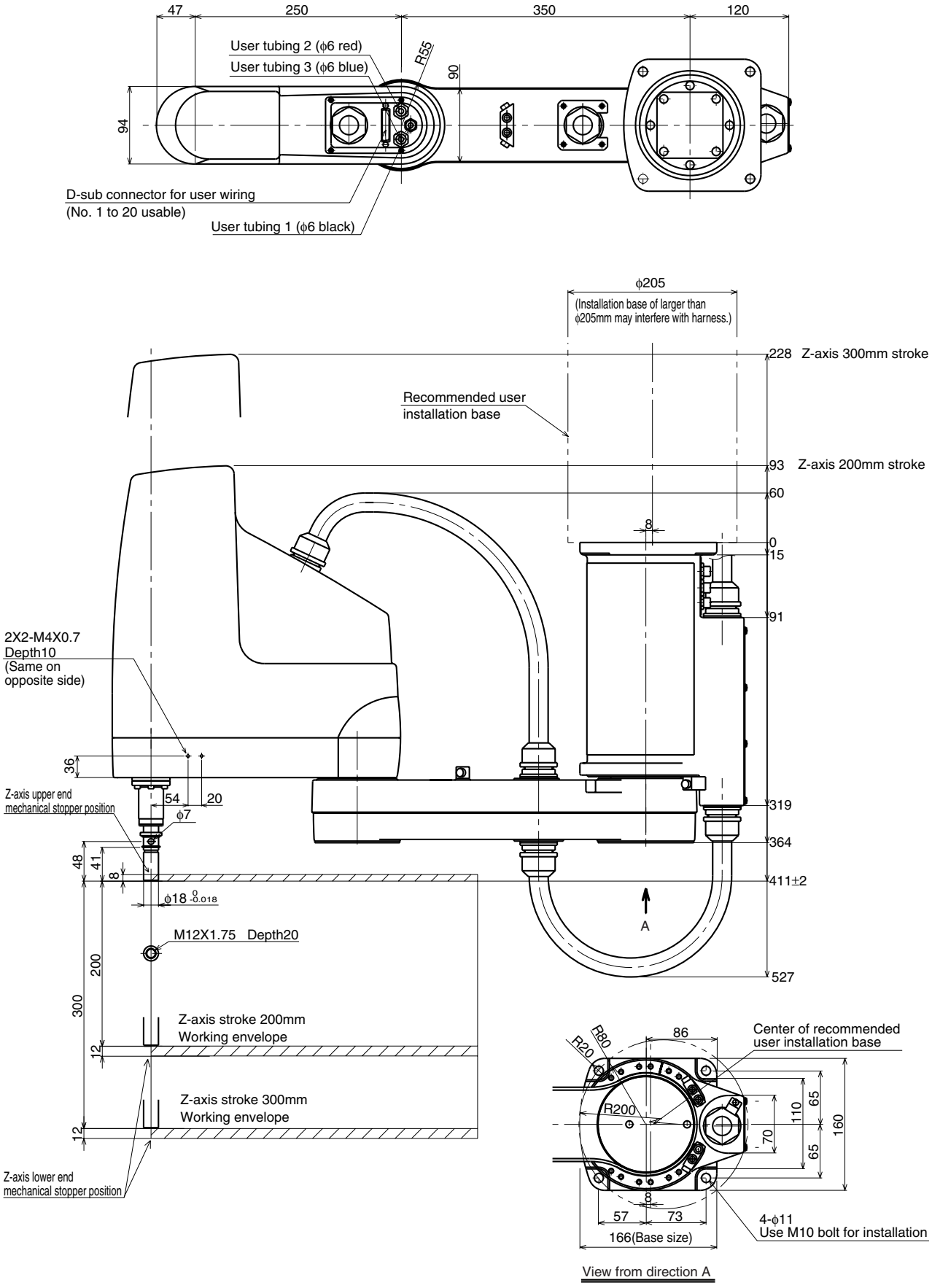
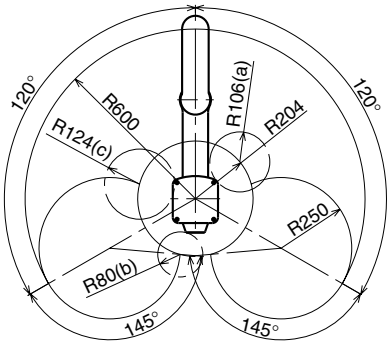
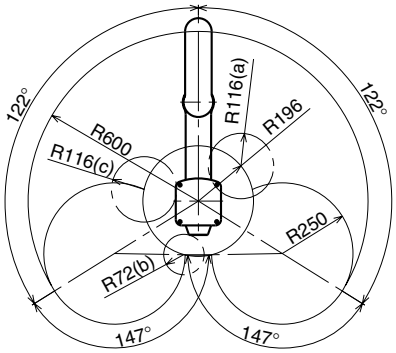


Fig. 4-4 YK600XS

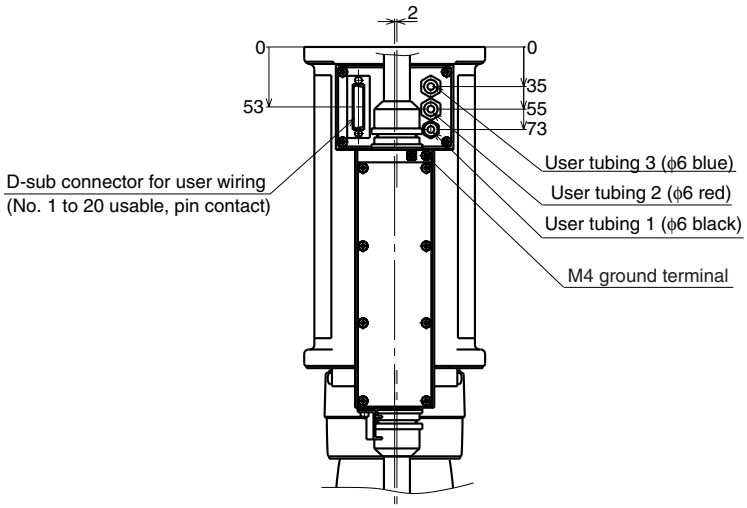
Interference position
(a) Base flange
(b) Base rear side
(c) Base



Working envelope



X and Y-axis mechanical stopper positions (maximum working envelope)



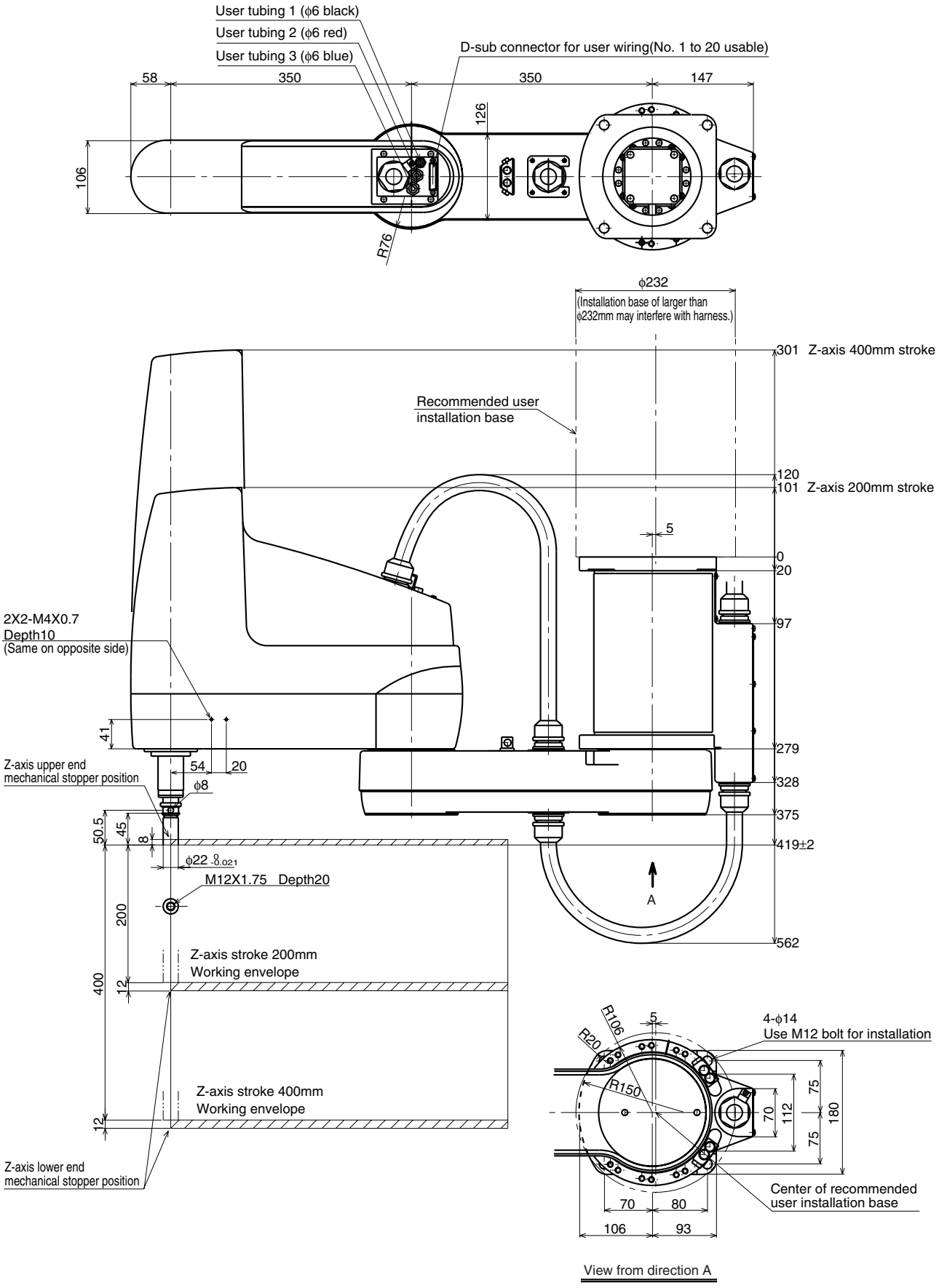
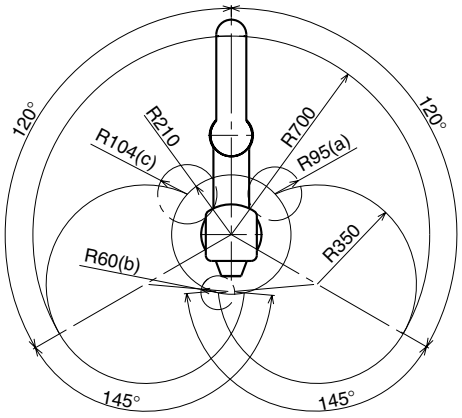
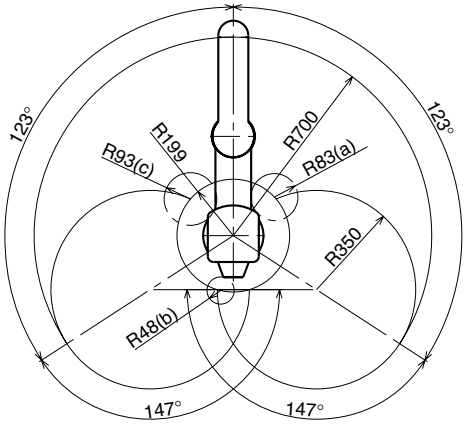


Fig. 4-5 YK700XS

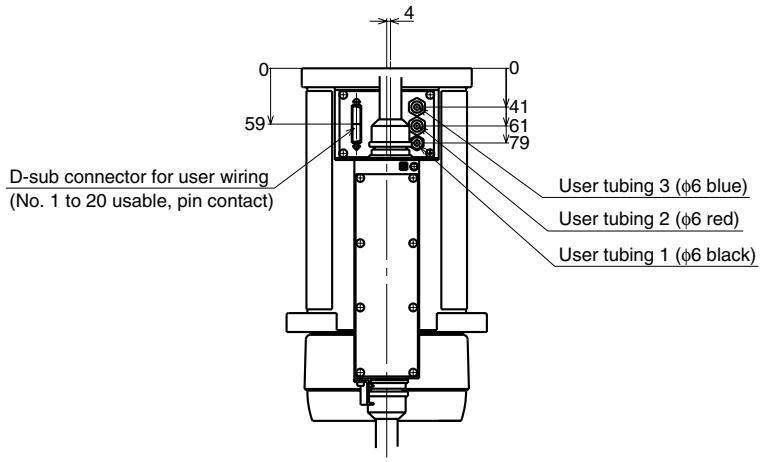
Interference position
(a) Base flange
(b) Base rear side
(c) Base



Working envelope



X and Y-axis mechanical stopper positions (maximum working envelope)



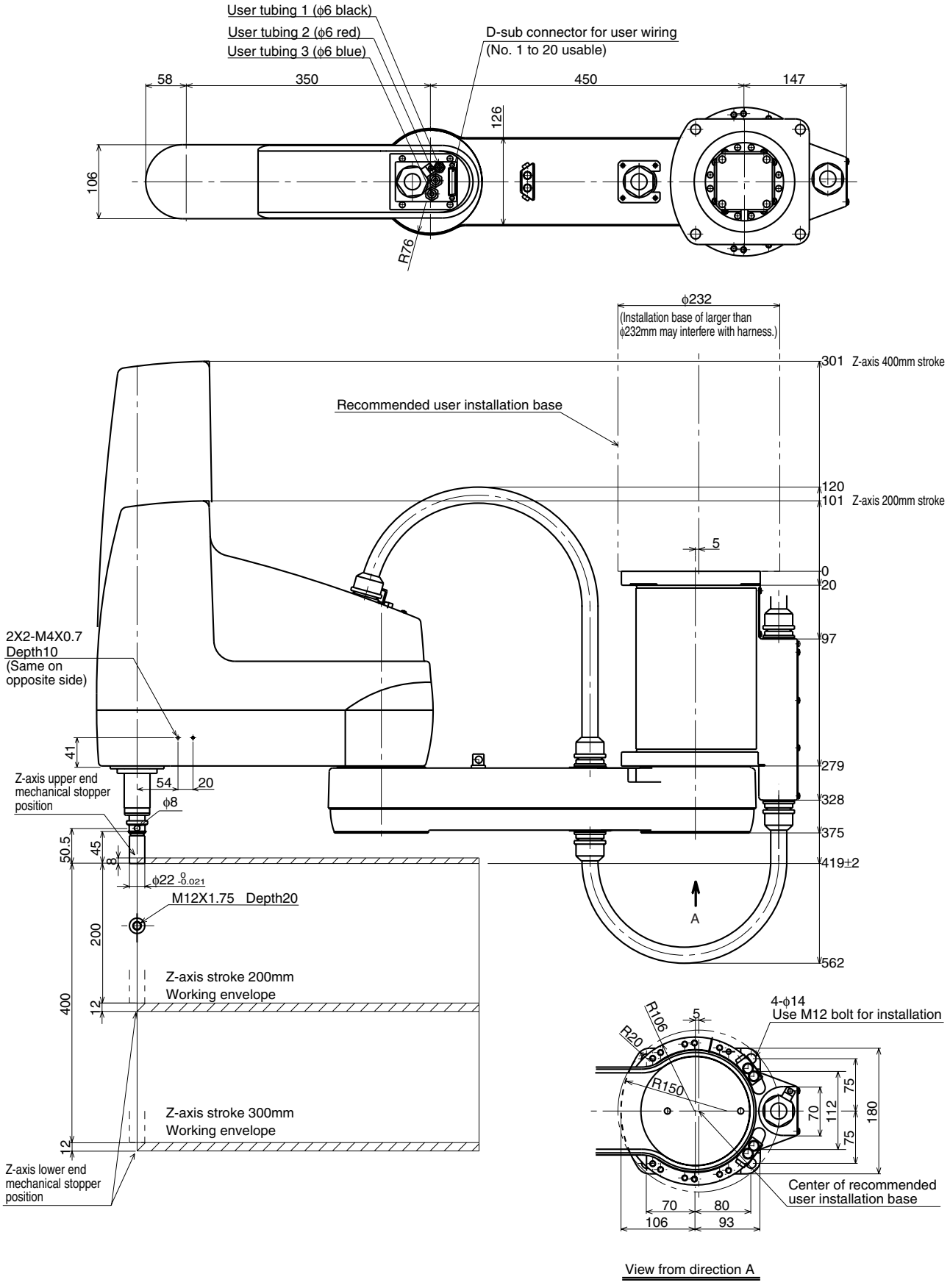
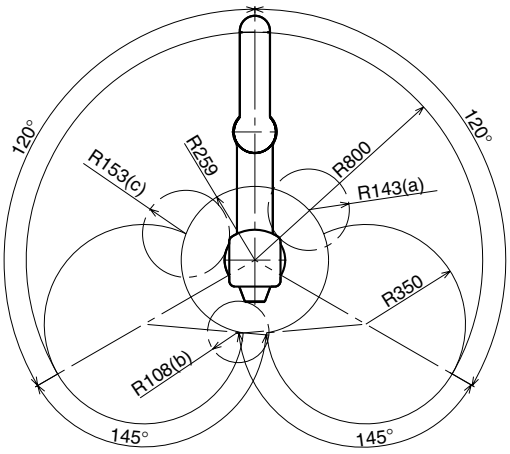
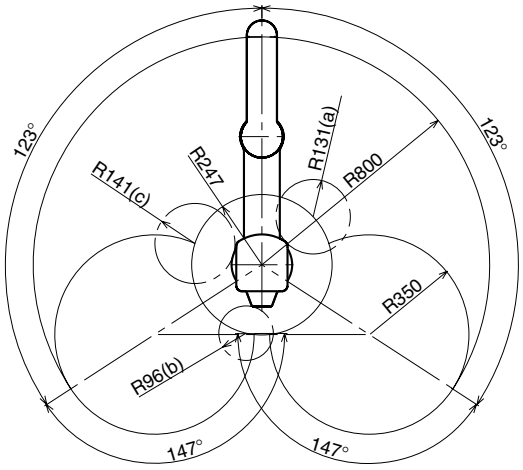


Fig. 4-6 YK800XS

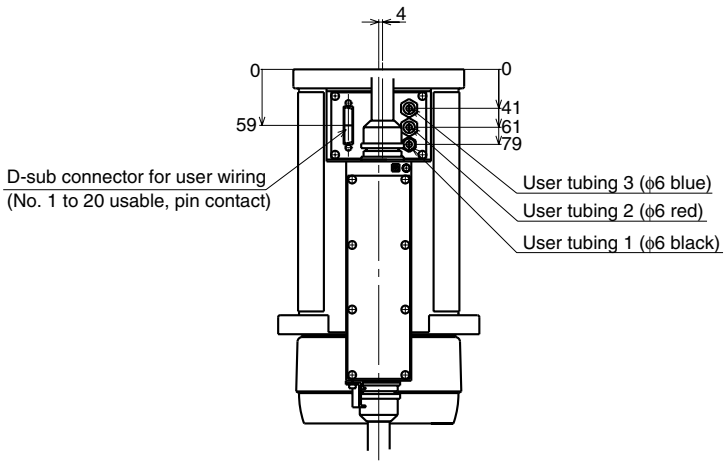
Interference position
(a) Base flange
(b) Base rear side
(c) Base



Working envelope



X and Y-axis mechanical stopper positions (maximum working envelope)



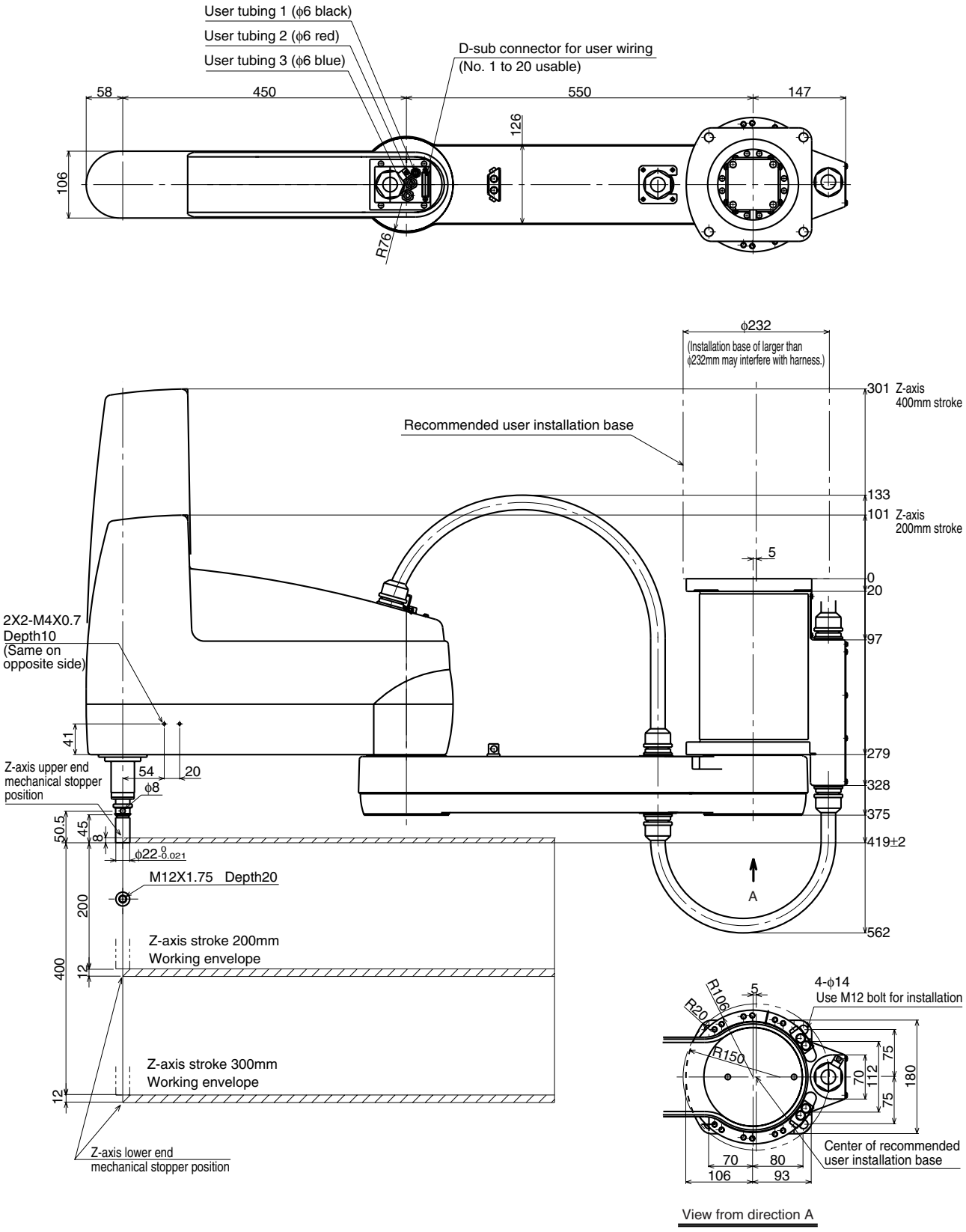
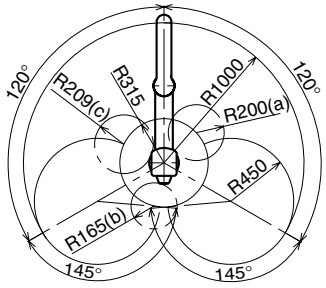
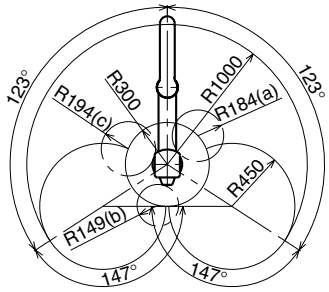


Fig. 4-7 YK1000XS

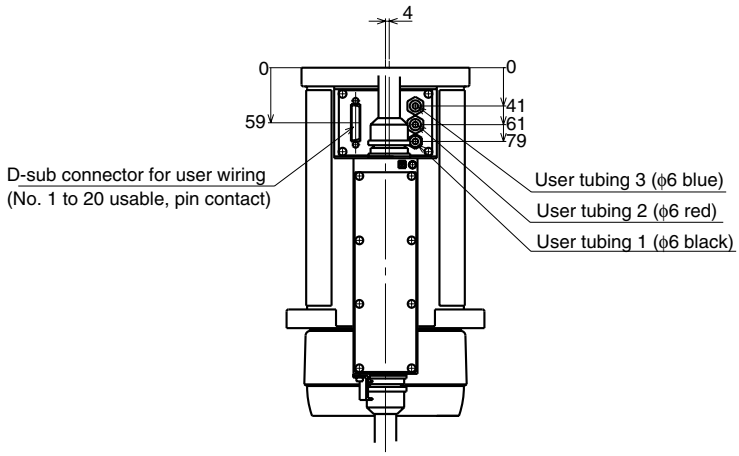
Interference position
(a) Base flange
(b) Base rear side
(c) Base



Working envelope



X and Y-axis mechanical stopper positions (maximum working envelope)



User's Manual

YAMAHA
SCARA Robot

YK-X series
YK-XS

Mar. 2010
Ver. 2.14
This manual is based on Ver. 2.15 of Japanese manual.