

YAMAHA SCARA ROBOT YK-X series

YK-XP

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>

E23-Ver. 2.05

Introduction

This user's manual was prepared for YK-XP series dust/drip proof models (YK250XP to YK1000XP) of the YAMAHA industrial robots.

This user's manual describes the safety measures, handling, adjustment and maintenance of YK-XP 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 description of standard models listed in the "YAMAHA SCARA Robot YK-X/XH User's Manual". Also refer to that 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".

Always use air purge. Water or dust may get inside the robot depending on the usage environment.

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

CHAPTER 1 Functions

1 Robot Manipulator	1-1
---------------------------	-----

CHAPTER 2 Installation

1 Robot Installation Conditions	2-1
1-1 Protection rating for moisture and dust on dust/drip proof models	2-1
2 User Wiring Connectors and User Tubing	2-2
3 Air Purge Tubing	2-5
4 Exhaust Port.....	2-6

CHAPTER 3 Adjustment

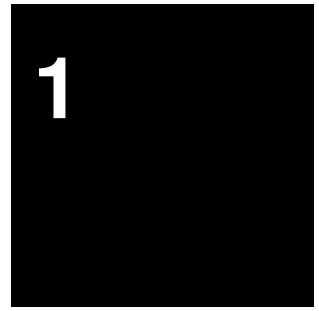
1 Removing the Robot Covers	3-1
1-1 Removing the Y-axis arm upper cover (YK250XP to YK400XP)	3-2
1-2 Removing the Y-axis arm upper cover (YK500XP, YK600XP)	3-6
1-3 Removing the Y-axis arm upper cover (YK700XP to YK1000XP) ...	3-10
2 Origin Position Stickers	3-14
3 Adjusting the Z-axis Machine Reference	3-15

CHAPTER 4 Specifications

1 Robot Manipulator	4-1
1-1 Basic specifications	4-1
1-2 External view and dimensions	4-4

MEMO

CHAPTER 1



Functions

1	Robot Manipulator	1-1
---	-------------------------	-----

MEMO

1 Robot Manipulator

Figs.1-1 and 1-2 below show the part names and functions of the YK-XP series robots.

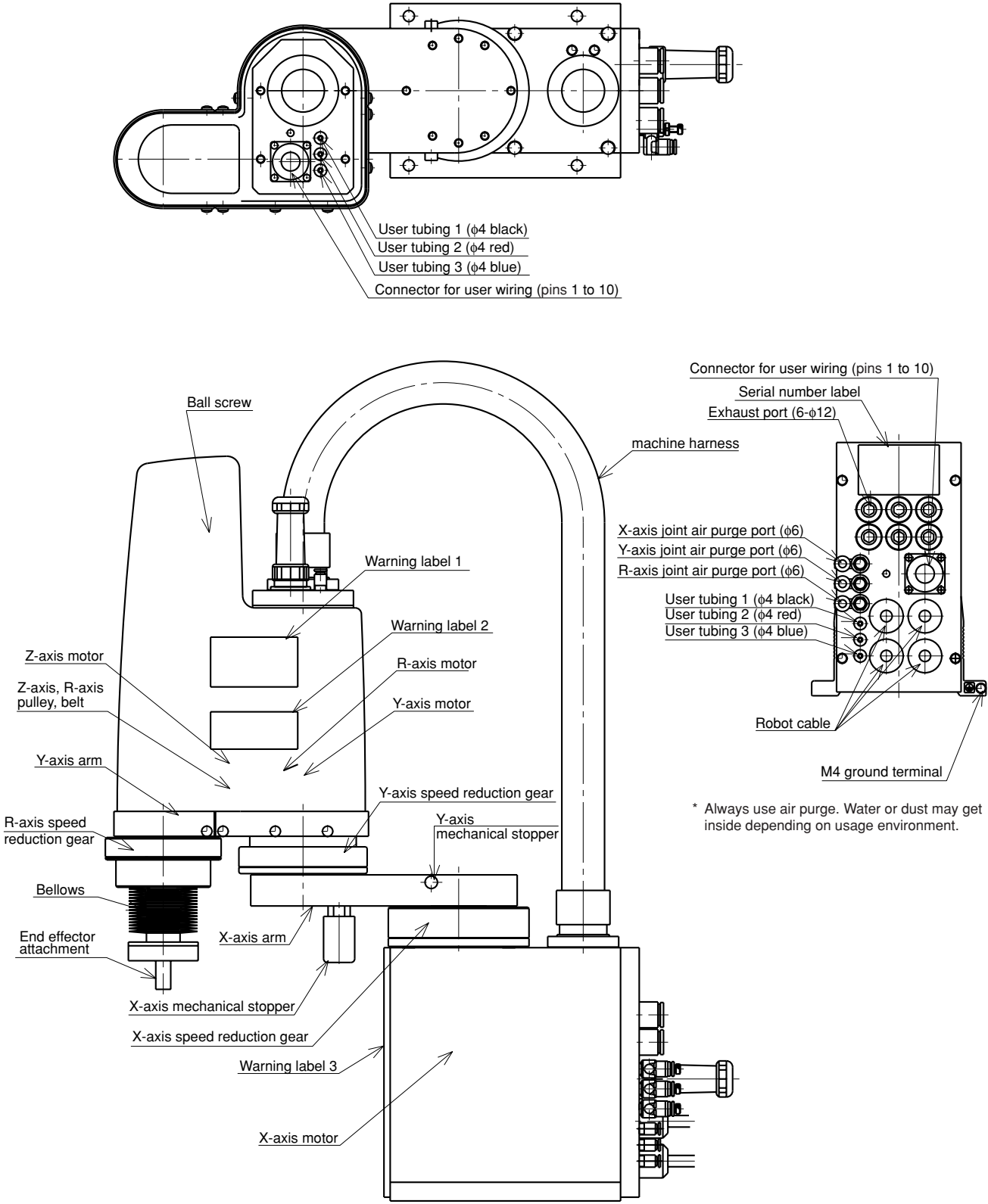


Fig. 1-1 YK250XP to YK400XP dust/drip proof robots

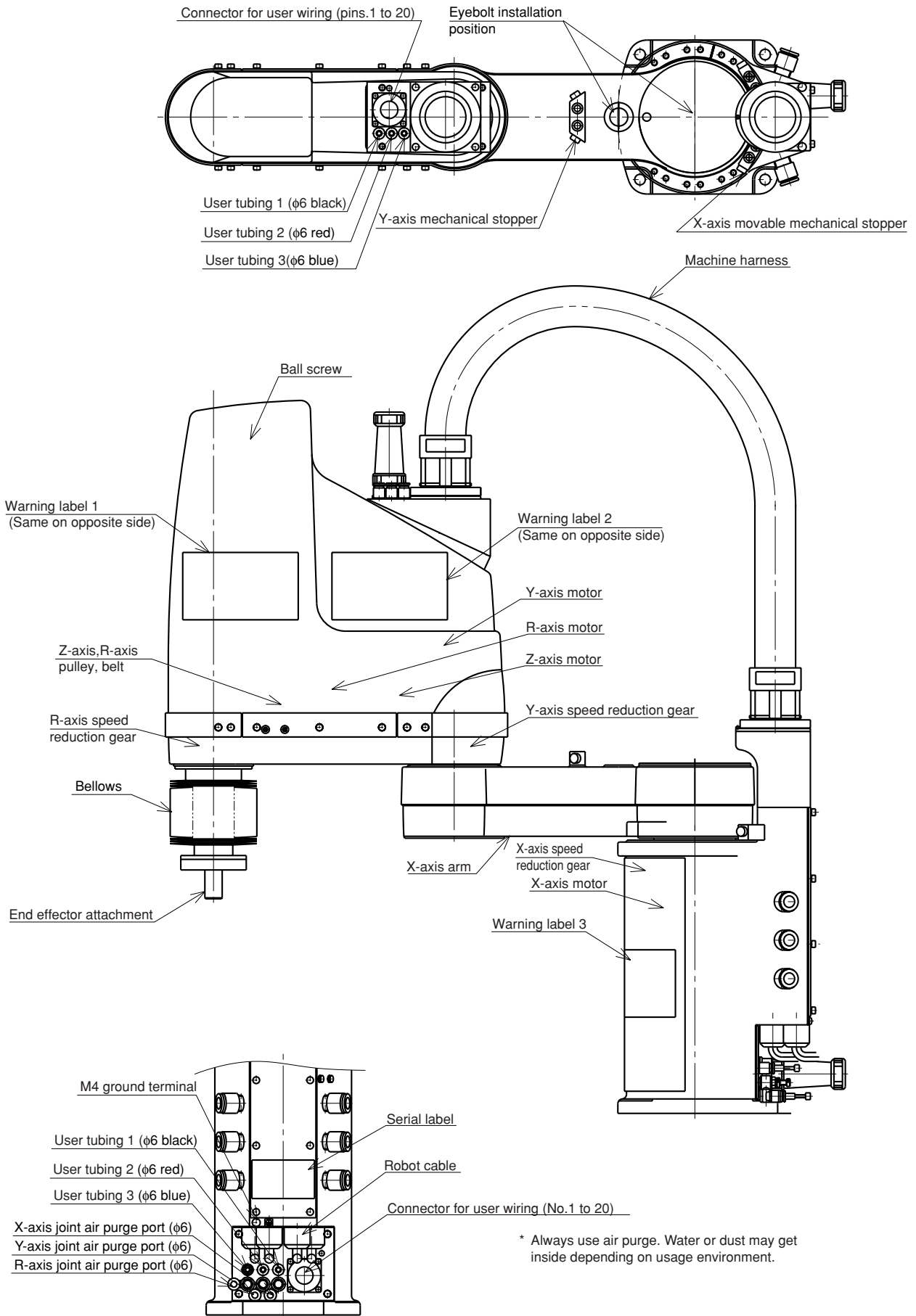


Fig. 1-2 YK500XP to YK1000XP dust/drip proof robots

CHAPTER 2



Installation

1	Robot Installation Conditions	2-1
1-1	Protection rating for moisture and dust on dust/drip proof models	2-1
2	User Wiring Connectors and User Tubing	2-2
3	Air Purge Tubing	2-5
4	Exhaust Port	2-6

MEMO

1 Robot Installation Conditions

Aside from moisture and dust conditions, the dust/drip proof model is identical to the standard specification model.

1-1 Protection rating for moisture and dust on dust/drip proof models

The protection rating for moisture and dust in the YK-250XP through YK1000XP dust/drip proof models are equivalent to IP65. Please consult YAMAHA for drip-proof specifications for other than water.

Always use air purge. Water or dust may get inside depending on usage environment.

IP 6 5

Degree of protection versus water penetration : 5

At level 5, water injected from an optional angle does not exert a harmful effect.

Water injection pressure per the standards is 30kPa (30kN/m², 0.3kgf/cm²)

Injection speed is 12.5 liters per minute, at a time interval of 3 minutes.

Water may penetrate inside the robot if the water pressure is higher than this level.

Degree of protection versus solid debris : 6

At level 6 there is no dust penetration.

⚠ WARNING

Do not immerse and use the robot or any part of the robot in water. Water will otherwise penetrate inside the robot.

⚠ WARNING

Do not use the robot in environments exceeding the listed levels of protection for dust and moisture. Water or dust may otherwise penetrate inside the robot.

2 User Wiring Connectors and User Tubing

⚠ WARNING

Wiring and tubing work may cause malfunctions so turn off the power to the controller and shut off the air supply.

Only the user signal wiring for the YK-500XP through YK1000XP dust/drip proof models are different from the standard wiring.

Other dust/drip proof model user signal wiring and air tubes are identical to the standard parts.

- 1) The number of signal wires for the YK-500XP to YK1000XP dust/drip proof models is as follows.

Models	User wires
YK500XP, YK600XP, YK700XP, YK800XP, YK1000XP	20 wires

User Wiring

Rated voltage	30V
Allowable current	1.5A
Nominal cross-section area of conductor	0.2mm ²
Shield	Yes

- 2) Both the arm and the base (robot pedestal) have user wiring connectors and user tubing joints. For their locations, refer to "1-2 External view and dimensions" in Chapter 4.

Attach the end caps and plugs (supplied) when the user wiring connectors and user tubing joints on the YK-250XP to YK1000XP dust/drip proof models are not used. Moisture and dust will penetrate inside if these end caps and plugs are not used.

- 3) Signal wire connections in the machine harness
 Connector pins 1 through 23 can be used for user signal wires in the YK500XP, YK600XP, YK700XP, YK800XP, YK1000XP. The shield wire is connected to pin 24 and so it cannot be used as a signal wire.

Signal	Connector	NO	Connection	NO	Connector	Color
User signal line	I O (Arm side)	1	[Diagram showing a dashed line connecting pins 1-20 on the left to pins 1-20 on the right]	1	I O (Base side)	Blue
		2		2		Orange
		3		3		Green
		4		4		Brown
		5		5		Grey
		6		6		Red
		7		7		Black
		8		8		Yellow
		9		9		Pink
		10		10		Violet
		11		11		White
		12		12		Blue/Red
		13		13		Orange/White
		14		14		Green/White
		15		15		Brown/White
		16		16		Grey/White
		17		17		Red/White
		18		18		Black/White
		19		19		Yellow/Black
		20		20		Pink/Black
Flame Ground		24		24		Orange/White
Flame Ground				1	FG	Green

- 4) Make wiring to the YK-250XP through YK1000XP connectors as follows.
 Solder the user signal wires to the connector as shown in Fig. 2-1 and assemble the connector. Then connect it to the user wiring connector. Tighten each connector screw to the specified torque. When the outer diameter of the cable is small, use tape or an equivalent item to make the section under the cable clamp fatter. Otherwise, moisture and dust will penetrate inside.

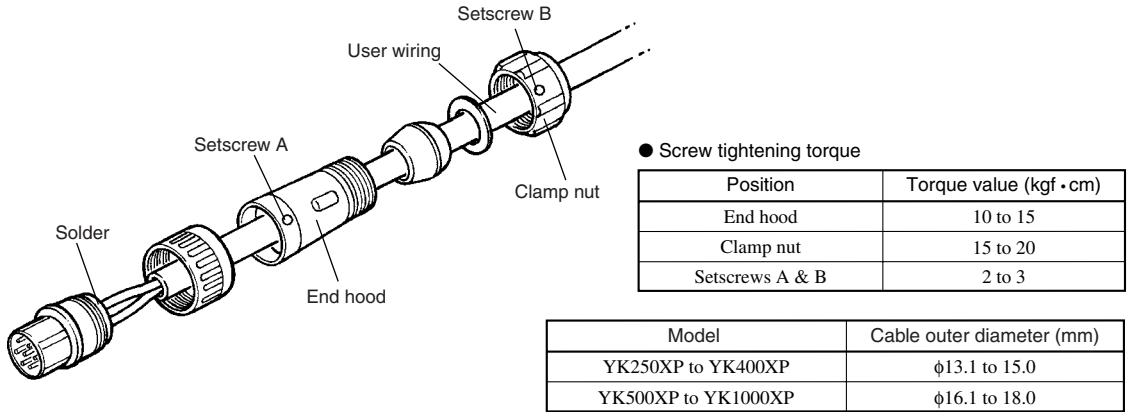


Fig. 2-1

⚠ WARNING

- The user cable wires should have a shield wire. Connect it to the same No. pin in the user wiring connector on the robot side, which also connects to the shield wire. If this task is omitted, noise may cause malfunction of the robot.
- Securely attach the connector (supplied with the robot) into the user wiring connector on the robot side, by tightening the screws on the connector hood. If this connector comes loose or comes off, malfunction may result.
- Avoid fastening the user cable or tube with the machine harness, as this may lead to harness breakage and malfunction.
- Make sure that the user cable attached to the user wiring connector and the user tubing joint will not interfere with the robot movement, entangle around the robot or flap around during operation. Wiring and tubing might then be damaged causing malfunction of the robot.
- Lay out the user cable attached to the user wiring connector and the user tubing coupling so that they do not obstruct the movement of the operator or any other persons. Bodily injury may result if anyone trips on the cable or air tube.

⚠ CAUTION

- The connector supplied with the robot should be connected to the arm side by pin contact, and to the robot pedestal side by socket contact. Use caution at these points when soldering.
- Be sure to use the connector supplied with the robot. Using other types may result in contact failure.

Robot model	Connector on arm side	Connector on base (pedestal) side
YK250XP, YK350XP, YK400XP	NJW-24-16-PM-15	NJW-24-16-PF-15
YK500XP, YK600XP, YK700XP, YK800XP, YK1000XP	NJW-28-24-PM-18	NJW-28-24-PF-18

Manufacturer: Nanahoshi Science Laboratory

- 5) To check the operation and signal exchange between the end effector and the controller or peripheral equipment after making connections, refer to “6. Trial operation” of Chapter 1 in the YAMAHA SCARA robot YK-X/XH user’s manual.

3 Air Purge Tubing

⚠ WARNING

Turn off power to the controller before doing piping or tubing work and shut off the air supply.

The dust/drip proof models have air supply inlets in the base (pedestal) rear panel for air purge of X-axis, Y-axis and R-axis joints. Supplying air to these inlets prevents dust from penetrating into the robot joint. Specifications are as follows.

Maximum pressure	0.58MPa (6kgf·cm ²)
Outer diameter × Inner diameter	φ6mm×φ4mm
Fluid	Use pure dry air containing no deteriorated compressor oil or other elements. Filtration rate of air filter should be 40μm or less.

Always use air purge. Water or dust may get inside the robot depending on the usage environment. Adjust the pressure and flow rate with the speed controllers on the rear of the base (pedestal) to keep water and dust from getting inside. See "1 Robot Manipulator" in Chapter 1 for the locations of the air purge ports.

⚠ WARNING

Install the air purge tubing so it will not become an obstruction that might cause injuries if people stumble on it and fall.

⚠ CAUTION

Install the air purge tubing so it will not obstruct robot movement.

4 Exhaust Port

⚠ WARNING

Turn off power to the controller before doing piping or tubing work.

⚠ CAUTION

Before operating the robot, always be sure to remove the plug installed in the exhaust port prior to shipping. If not removed, the bellows will be unable to extend and retract and may be damaged.

The dust/drip proof models have 6 air exhaust ports (12mm dia.) in the base (pedestal) rear panel. These provide an air passage for extending and retracting the Z-axis bellows. If these exhaust ports are blocked, the bellows cannot adequately extend or retract and may be damaged.

Plugs are inserted in these exhaust ports before shipment so always be sure to remove them before operating the robot.

If moisture or dust is entering from these exhaust ports, connect them to a 12mm diameter air tube extending to a location free of dust and moisture.

⚠ WARNING

Install the exhaust tubing so they will not become an obstruction that might cause injuries if people stumble on it and fall.

⚠ CAUTION

Install the exhaust tubing so they will not obstruct robot movement.

CHAPTER 3



Adjustment

1	Removing the Robot Covers	3-1
1-1	Removing the Y-axis arm upper cover (YK250XP to YK400XP)	3-2
1-2	Removing the Y-axis arm upper cover (YK500XP, YK600XP)	3-6
1-3	Removing the Y-axis arm upper cover (YK700XP to YK1000XP) ...	3-10
2	Origin Position Stickers	3-14
3	Adjusting the Z-axis Machine Reference	3-15

MEMO

1 Removing the Robot Covers

The following steps show the procedure for removing the robot cover. Follow these steps for maintenance work.

- 1) Prepare the necessary tools.
 - Hex wrench set
 - Phillips-head screwdriver
- 2) Turn off the controller.
- 3) Place a sign indicating the robot is being adjusted, to keep others from operating the controller switch.
- 4) Enter the safeguard enclosure.
- 5) Remove the covers while referring to Fig. 3-1 to Fig. 3-3.
Screws used to fasten each cover are listed in Tables 3-1 to 3-3.
- 6) To remove the Y-axis upper cover, see the procedure explained in 1-1 to 1-3.

Table 3-1 YK250XP, YK350XP, YK400XP (See Fig. 3-1)

Cover name	Screw No.	Screw size	Qty
Base (pedestal) rear cover	①	M4×18	4
Base (pedestal) front cover	②	M4×12	4
Y-axis arm upper block	③	M3×20 M3 seal washer	4
Y-axis arm side frame	④	M4×6	10 (YK250XP, YK350XP) 11 (YK400XP)

Table 3-2 YK500XP, YK600XP (See Fig. 3-2)

Cover name	Screw No.	Screw size	Qty
Base (robot pedestal) rear cover 1	①	M4×8 M4 seal washer	8
Base (robot pedestal) front cover	②	M4×8	4
Y-axis arm upper block	③	M3×25 M3 seal washer	4
Y-axis arm side frame	④	M4×8 M4 seal washer	14
Y-axis arm upper bearing holder	⑤	M4×10	4
Y-axis arm upper cover: bottom	⑥	M3×50 M3 seal washer	4
Base (robot pedestal) rear cover 2	⑦	M4×8 M4 seal washer	4
X-axis arm upper cover	⑧	M4×6	2
Y-axis arm under cover	⑨	M4×10 M4 seal washer	4

Table 3-3 YK700XP, YK800XP, YK1000XP (See Fig. 3-3)

Cover name	Screw No.	Screw size	Qty
Base (robot pedestal) rear cover 1	①	M4×8 M4 seal washer	8
Base (robot pedestal) side cover	②	M4×8	8
Y-axis arm upper block	③	M4×50	2
		M4×30	2
Y-axis arm side frame	④	M4×8 M4 seal washer	14 (YK700XP, YK800XP) 16 (YK1000XP)
Y-axis arm upper bearing holder	⑤	M4×10	4
Y-axis arm upper cover: bottom	⑥	M3×50 M4 seal washer	4
Base (robot pedestal) rear cover 2	⑦	M4×8 M4 seal washer	4
X-axis arm upper cover	⑧	M4×8	2
Y-axis arm under cover	⑨	M4×10 M4 seal washer	4 (YK700XP, YK800XP) 6 (YK1000XP)

1-1 Removing the Y-axis arm upper cover (YK250XP to YK400XP)

Proceed as follows while referring to Fig. 3-1.

- 1) Turn off the controller power.
- 2) Place a sign indicating “work in progress”, to keep others from operating the controller switch.
- 3) Remove the front cover and rear cover of the robot base (pedestal).
- 4) Remove the FG wire round terminals (2 pcs) from the machine harness.
- 5) Remove the user air tubes 1 to 3 from their couplings.
The air tube colors match the coupling colors.
- 6) Remove the Y-axis and R-axis joint air purge tubes from their couplings.
Place marks so the air tubes can later be connected back to their original positions.
- 7) Remove the YM, ZM, RM, YP, ZP, RP, ZBK, FG and IO connectors.
- 8) Cut the Insulock tie straps that are clamping the machine harness.

- 9) Loosen the flexible couplings and extract from the shaft.
- 10) Remove the machine harness from the shaft hole.
Handle with care not to damage the connector, wiring, and tubing.
- 11) Loosen the Y-axis arm flexible coupling and extract from the shaft.
- 12) Pull the flexible coupling in the direction shown by the arrow, and move it all the way to the edge of the wiring connector on the robot base side.
- 13) Remove the Y-axis arm upper block.
- 14) Remove the user air tubes 1 to 3 inside the cover from the couplings. The air tube colors match the coupling colors.
- 15) Remove the Y-axis and R-axis joint air purge tubes from their couplings. Place marks so the air tubes can later be connected back to their original positions.
- 16) Remove the IO connectors inside the cover.
- 17) Remove the screws on Y-axis arm side frame and remove the cover holder.
- 18) Remove the block and cover together from the Y-axis arm.
Bring the block and cover over to the robot base side and perform the required maintenance or other task.
- 19) When reinstalling the cover, reassemble by performing the above steps in reverse.
When reassembling, be sure not to forget to connect the connectors, the FG cable, and the air tubes. Be careful not to damage the flexible coupling gaskets, and cover seals. Do not forget to insert the seal washer and to clamp the machine harness (robot base side) with the Insulock tie straps.

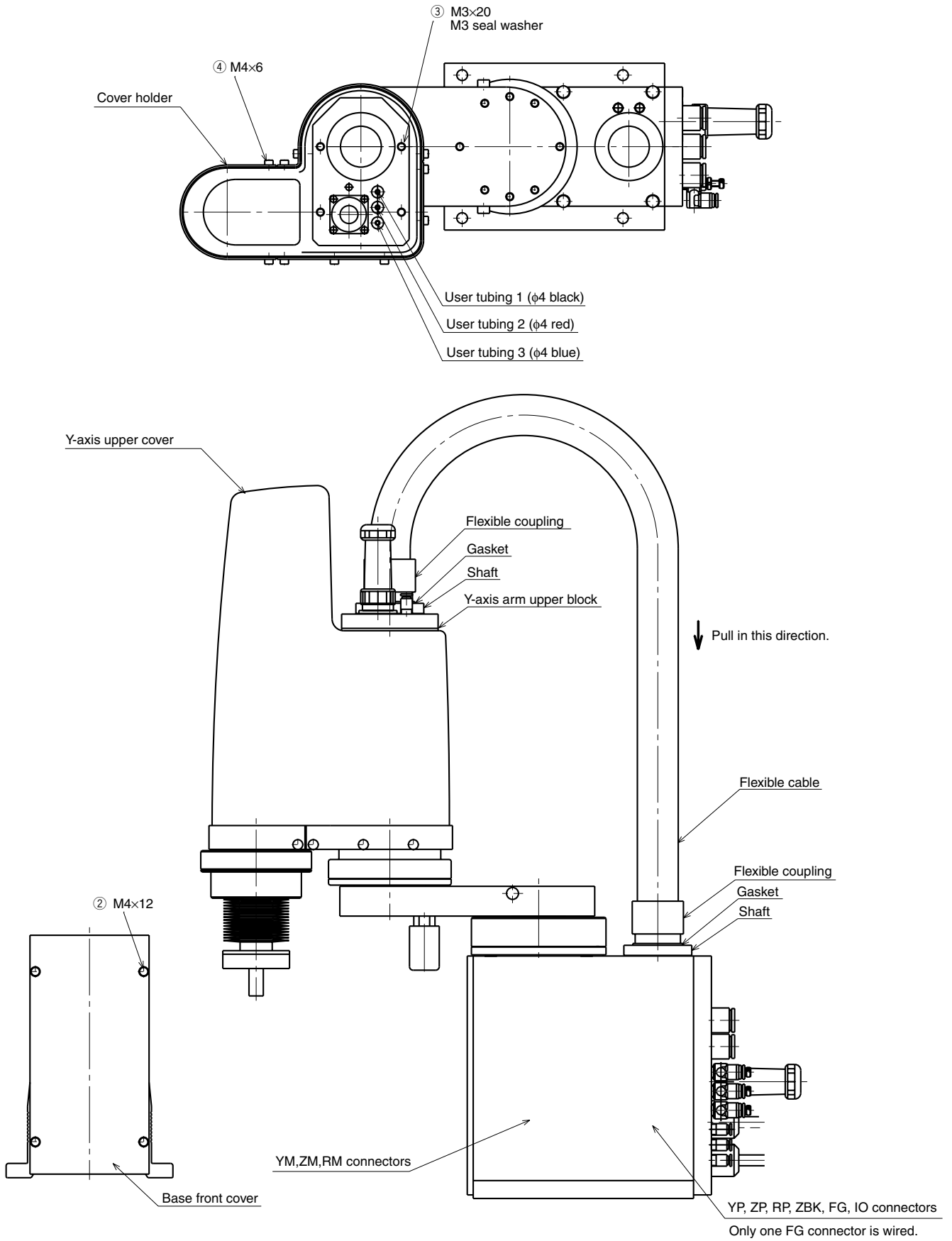
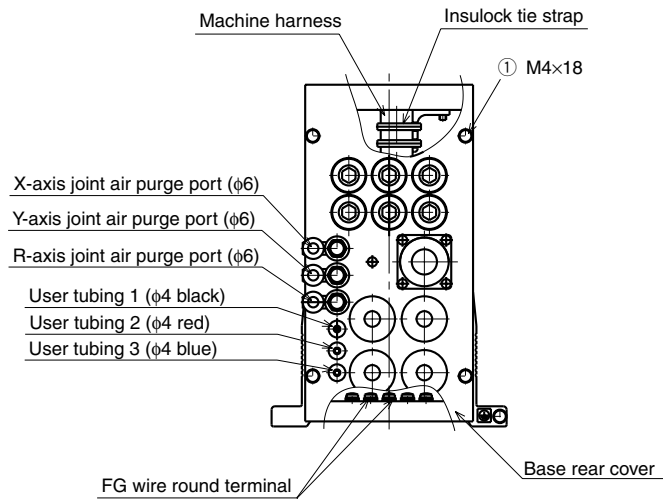


Fig. 3-1



1-2 Removing the Y-axis arm upper cover (YK500XP, YK600XP)

Proceed as follows while referring to Fig. 3-2.

- 1) Turn off the controller power.
- 2) Place a sign indicating “work in progress”, to keep others from operating the controller switch.
- 3) Remove the front cover and rear cover 1 of the robot base (pedestal).
- 4) Remove the FG wire round terminals (2 pcs) from the machine harness.
- 5) Remove the user air tubes 1 to 3 from their couplings.
The air tube colors match the coupling colors.
- 6) Remove the Y-axis and R-axis joint air purge tubes from their couplings.
Place marks so the air tubes can later be connected back to their original positions.
- 7) Remove the YM, ZM, RM, YP, ZP, RP, ZBK, FG and IO connectors.
- 8) Cut the Insulock tie straps that are clamping the machine harness.
- 9) Loosen the flexible couplings and extract from the shaft.
- 10) Remove the machine harness from the shaft hole.
Handle with care not to damage the connector, wiring, and tubing.
- 11) Loosen the Y-axis arm flexible coupling and extract from the shaft.
- 12) Pull the flexible coupling in the direction shown by the arrow, and move it all the way to the edge of the wiring connector on the robot base side.
- 13) Remove the bolts that secure the bearing holder on the top of the Y-axis cover.
Shift the bearing holder position so that you can see the bolts that secure the Y-axis arm upper block.
- 14) Remove the bolts that secure the Y-axis arm upper block and remove the block.
- 15) Remove the user air tubes 1 to 3 inside the cover from the couplings. The air tube colors match the coupling colors.

- 16) Remove the Y-axis and R-axis joint air purge tubes from their couplings. Place marks so the air tubes can later be connected back to their original positions.
- 17) Remove the IO connectors inside the cover.
- 18) Remove the screws on Y-axis arm side frame and remove the cover holder.
- 19) Remove the screws on the bottom of the Y-axis arm upper cover, then remove the block and cover together from the Y-axis arm.
Bring the block and cover over to the robot base side and perform the required maintenance or other task.
- 20) When reinstalling the cover, reassemble by performing the above steps in reverse.
When reassembling, be sure not to forget to connect the connectors, the FG cable, and the air tubes. Be careful not to damage the flexible coupling gaskets, and cover seals. Do not forget to insert the seal washer and to clamp the machine harness (robot base side) with the Insulock tie straps.

CHAPTER 3 Adjustment

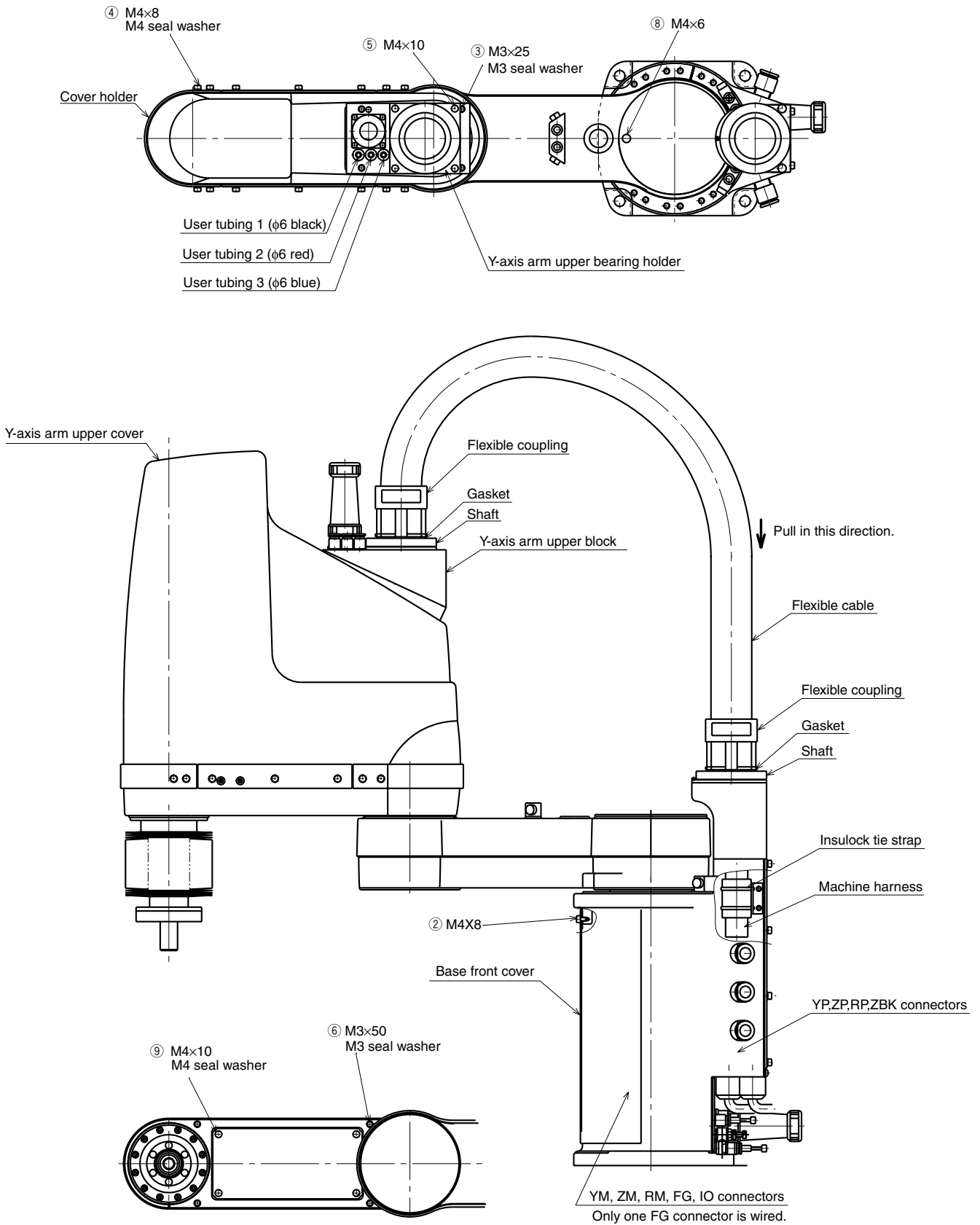
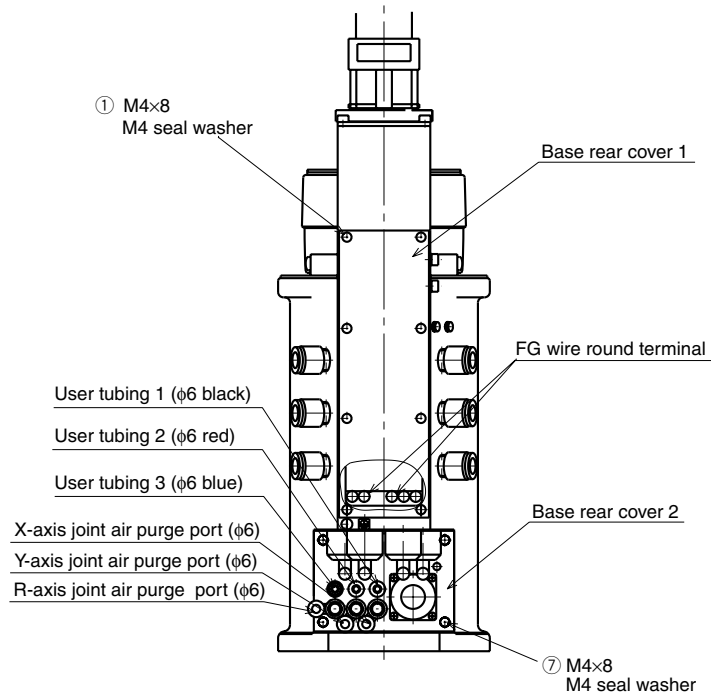


Fig. 3-2



1-3 Removing the Y-axis arm upper cover (YK700XP to YK1000XP)

Proceed as follows while referring to Fig. 3-3.

- 1) Turn off the controller power.
- 2) Place a sign indicating “work in progress”, to keep others from operating the controller switch.
- 3) Remove the two side covers and rear cover 1 of the robot base (pedestal).
- 4) Remove the FG wire round terminals (2 pcs) from the machine harness.
- 5) Remove the user air tubes 1 to 3 from their couplings.
The air tube colors match the coupling colors.
- 6) Remove the Y-axis and R-axis joint air purge tubes from their couplings.
Place marks so the air tubes can later be connected back to their original positions.
- 7) Remove the YM, ZM, RM, YP, ZP, RP, ZBK, FG and IO connectors.
- 8) Cut the Insulock tie straps that are clamping the machine harness.
- 9) Loosen the flexible couplings and extract from the shaft.
- 10) Remove the machine harness from the shaft hole.
Handle with care not to damage the connector, wiring, and tubing.
- 11) Loosen the Y-axis arm flexible coupling and extract from the shaft.
- 12) Pull the flexible coupling in the direction shown by the arrow, and move it all the way to the edge of the wiring connector on the robot base side.
- 13) Remove the bolts that secure the bearing holder on the top of the Y-axis cover.
Insert a flat-blade screwdriver between the bearing holder and the Y-axis arm upper block, to pull out the shaft along with the bearing. There are O-rings fitted into the top of the block and also the inner side of the block. Fit these O-rings back into their original positions when reassembling.
- 14) Remove the bolts that secure the Y-axis arm upper block and remove the block.

- 15) Remove the user air tubes 1 to 3 inside the cover from the couplings. The air tube colors match the coupling colors.
- 16) Remove the Y-axis and R-axis joint air purge tubes from their couplings. Place marks so the air tubes can later be connected back to their original positions.
- 17) Remove the IO connectors inside the cover.
- 18) Remove the screws on Y-axis arm side frame and remove the cover holder.
- 19) Remove the screws on the bottom of the Y-axis arm upper cover, then remove the block and cover together from the Y-axis arm.
Bring the block and cover over to the robot base side and perform the required maintenance or other task.
- 20) When reinstalling the cover, reassemble by performing the above steps in reverse.
When reassembling, be sure not to forget to connect the connectors, the FG cable, and the air tubes. Be careful not to damage the flexible coupling gaskets, and cover seals. Do not forget to insert the seal washer and to clamp the machine harness (robot base side) with the Insulock tie straps.

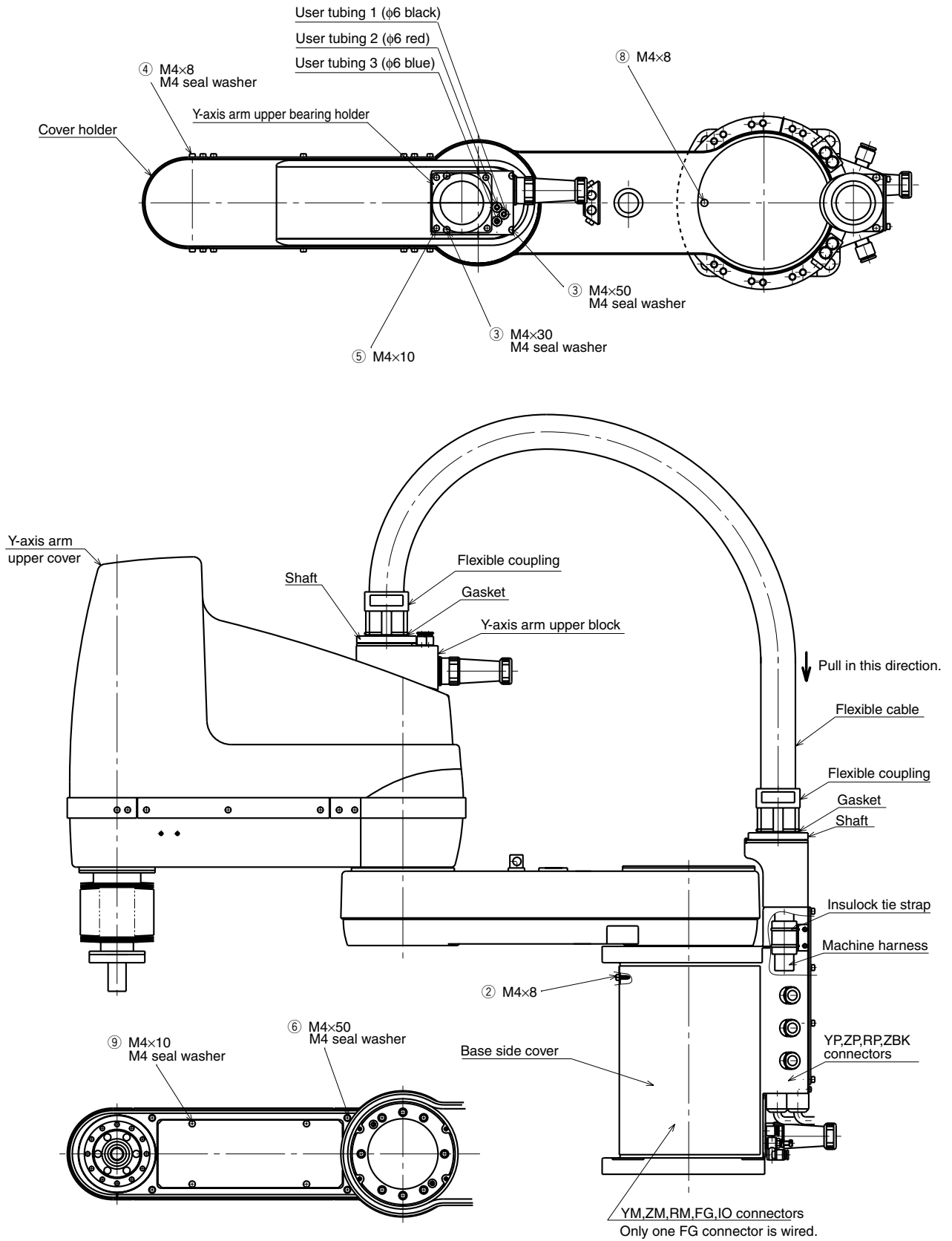
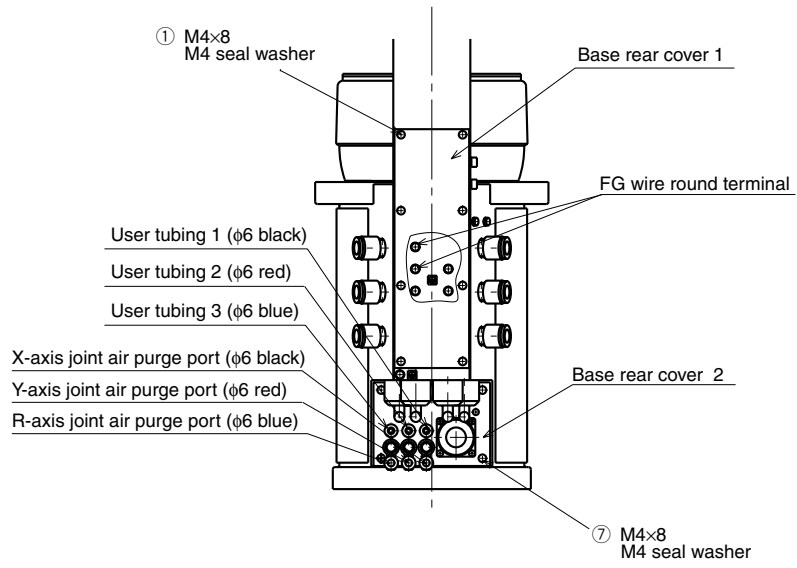


Fig. 3-3



2 Origin Position Stickers

Refer to the origin sticker locations below only when the mark method is used for absolute reset.

The origin position stickers are attached to the robot arm joints prior to shipment from factory. These stickers for the YK250XP to YK400XP are attached to the locations shown in Fig. 3-4 below, which are different from standard YK-X/XH models. Refer to Fig. 3-4 when performing absolute reset or changing the origin positions and affixing the stickers to the new origin positions.

The origin position stickers for other models are attached to the same locations as standard models, so refer to Figs. 4-5 to 4-7 in Chapter 4 of the YAMAHA SCARA robot YK-X/XH user's manual for standard models.

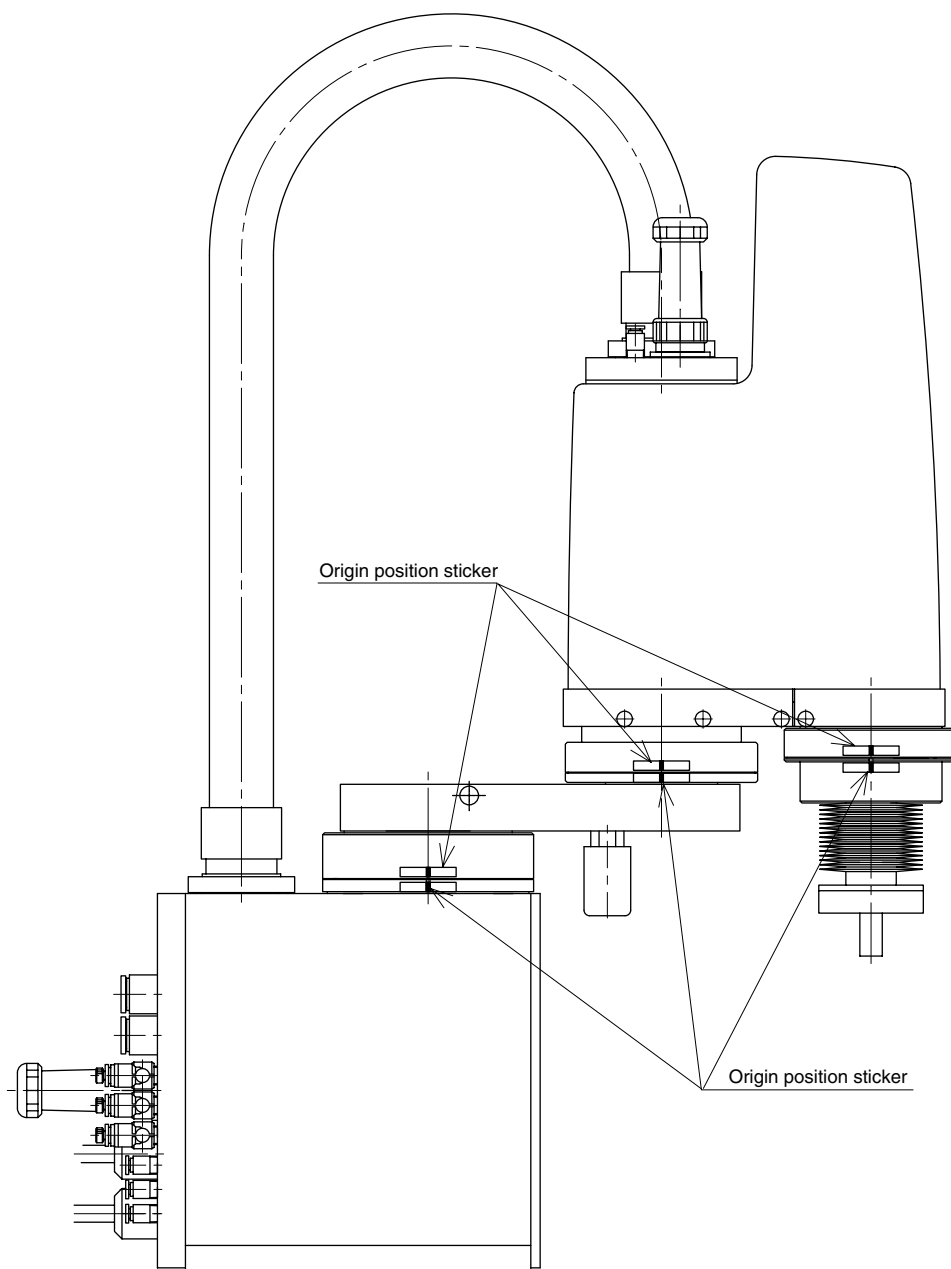


Fig. 3-4

3 Adjusting the Z-axis Machine Reference

Before adjusting the machine reference, read the precautions and procedure explained in "3-4-3 Stroke end method" of the YAMAHA SCARA robot YK-X/XH user's manual for standard models. The parts shown in Fig. 4-19 in the standard model manual will appear after removing the Z-axis bellows with the following procedure. (See Fig. 3-5 below.)

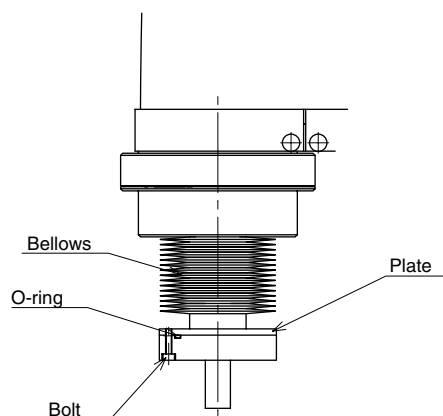


Fig. 3-5

- 1) Prepare the following tools and items.
 - Hex wrench set
 - O-ring (one piece) if worn or slackened.

Model	O-ring part No.	Type
YK250XP to YK400XP	KN7-M1895-000	S38
YK500XP, YK600XP	KN8-M1895-000	S50
YK700XP to YK1000XP	KN8-M1895-000	S50

- 2) Turn off the controller.
- 3) Place a sign indicating the robot is being adjusted, to keep others from operating the controller switches.
- 4) Enter the safeguard enclosure.
- 5) Remove the bolt.
- 6) Remove the plate and move it upwards along with the bellows. You will see the Z-axis mechanical stopper.
- 7) Adjust the Z-axis machine reference by following the instruction explained in the standard model manual.
- 8) When adjustment is complete, replace the O-ring if necessary, tighten the bolt to reattach the plate, and reassemble bellows. Use caution not to twist the bellows during reassembly.

MEMO

CHAPTER 4



Specifications

1	Robot Manipulator	4-1
1-1	Basic specifications	4-1
1-2	External view and dimensions	4-4

MEMO

1 Robot Manipulator

1-1 Basic specifications

Robot model		YK250XP	YK350XP	YK400XP	
Axis specifications	X-axis	Arm length	125mm	225mm	225mm
		Rotation angle	±115°	±115°	±115°
	Y-axis	Arm length	125mm	125mm	175mm
		Rotation angle	±130°	±130°	±140°
	Z-axis	Stroke	150mm	150mm	150mm
R-axis	Rotation angle	±360°	±360°	±360°	
Motor	X-axis	200W	200W	200W	
	Y-axis	100W	100W	100W	
	Z-axis	100W	100W	100W	
	R-axis	100W	100W	100W	
Maximum speed	XY resultant	4.0m/s	5.0m/s	6.0m/s	
	Z-axis	1.0m/s	1.0m/s	1.0m/s	
	R-axis	1020°/s	1020°/s	1020°/s	
Repeatability *1	XY-axes	±0.01mm	±0.01mm	±0.01mm	
	Z-axis	±0.01mm	±0.01mm	±0.01mm	
	R-axis	±0.005°	±0.005°	±0.005°	
Payload		3kg	3kg	3kg	
R-axis tolerable moment of inertia *2		0.05kgm ² (0.5kgfcm 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	15kg	

*1 At constant ambient temperature (XY)

*2 There are limits to acceleration coefficient settings.

CHAPTER 4 Specifications

Robot model		YK500XP	YK600XP	
Axis specifications	X-axis	Arm length	250mm	350mm
		Rotation angle	±120°	±120°
	Y-axis	Arm length	250mm	250mm
		Rotation angle	±145°	±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 (1.2kgfcm 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		YK700XP	YK800XP	YK1000XP	
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 (3.2kgfcm 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

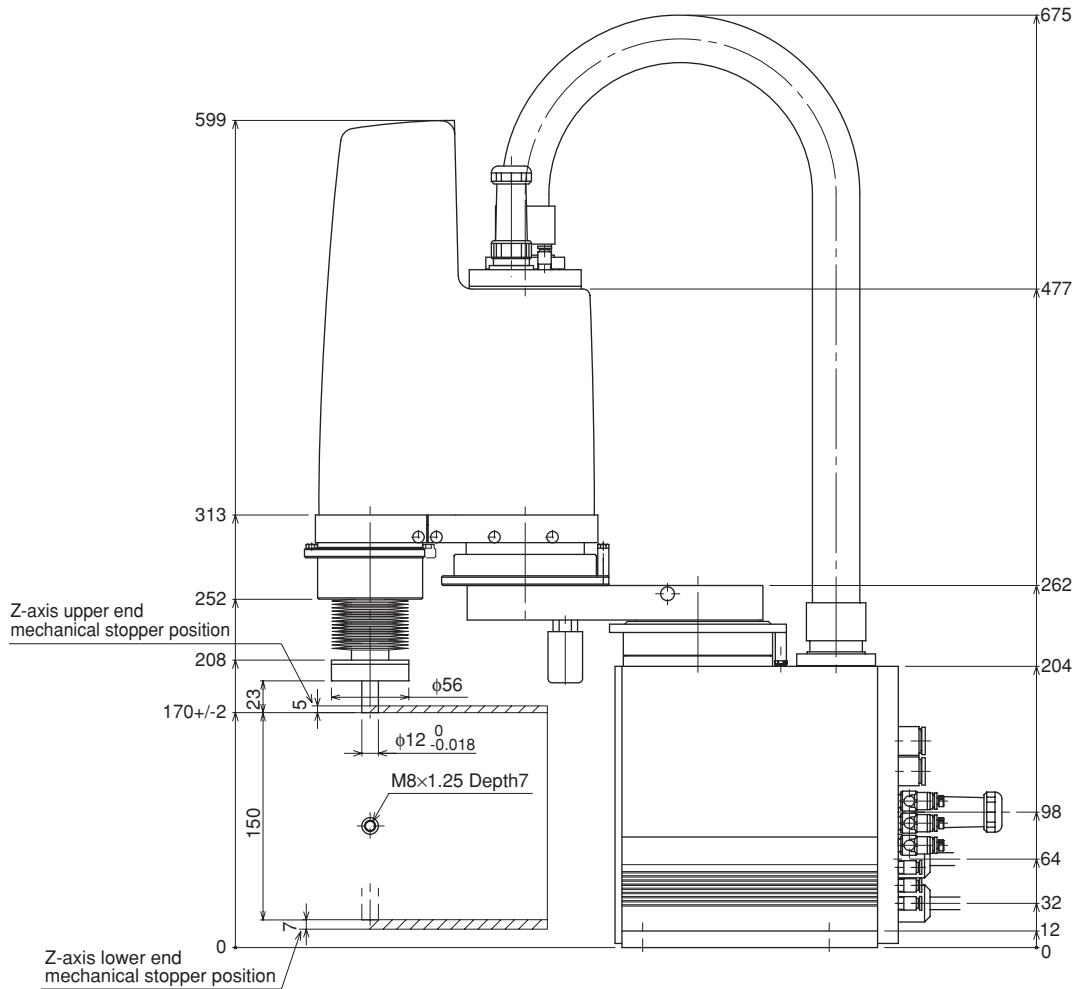
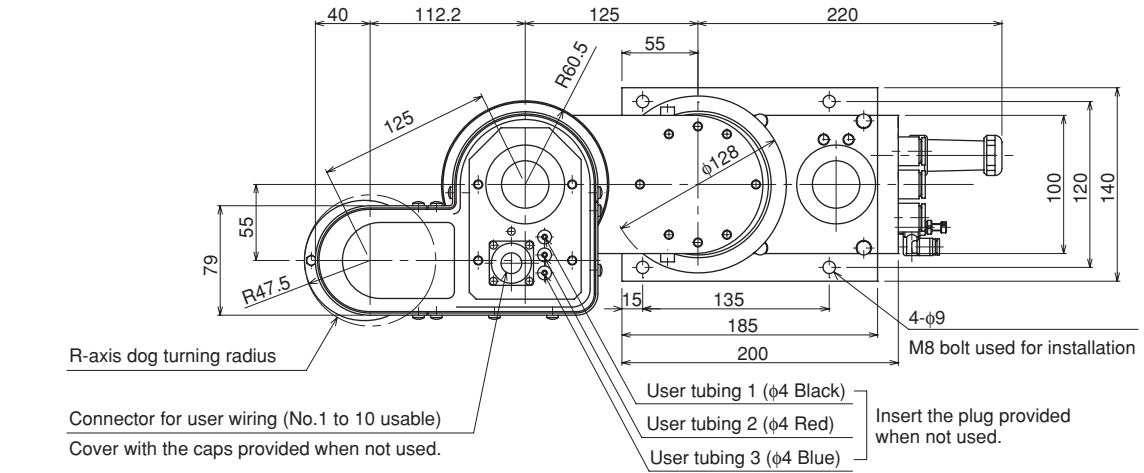
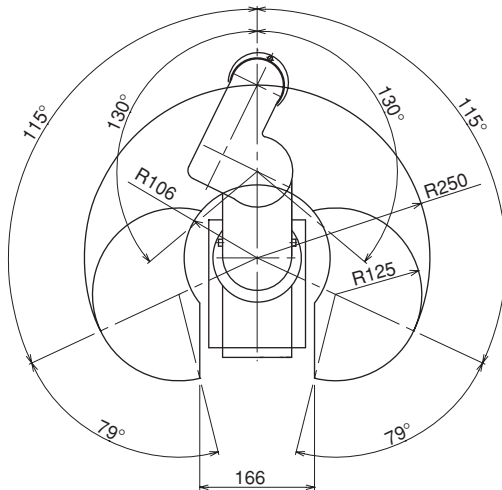
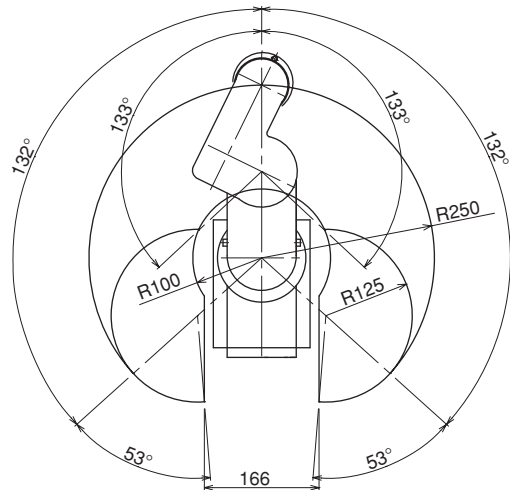


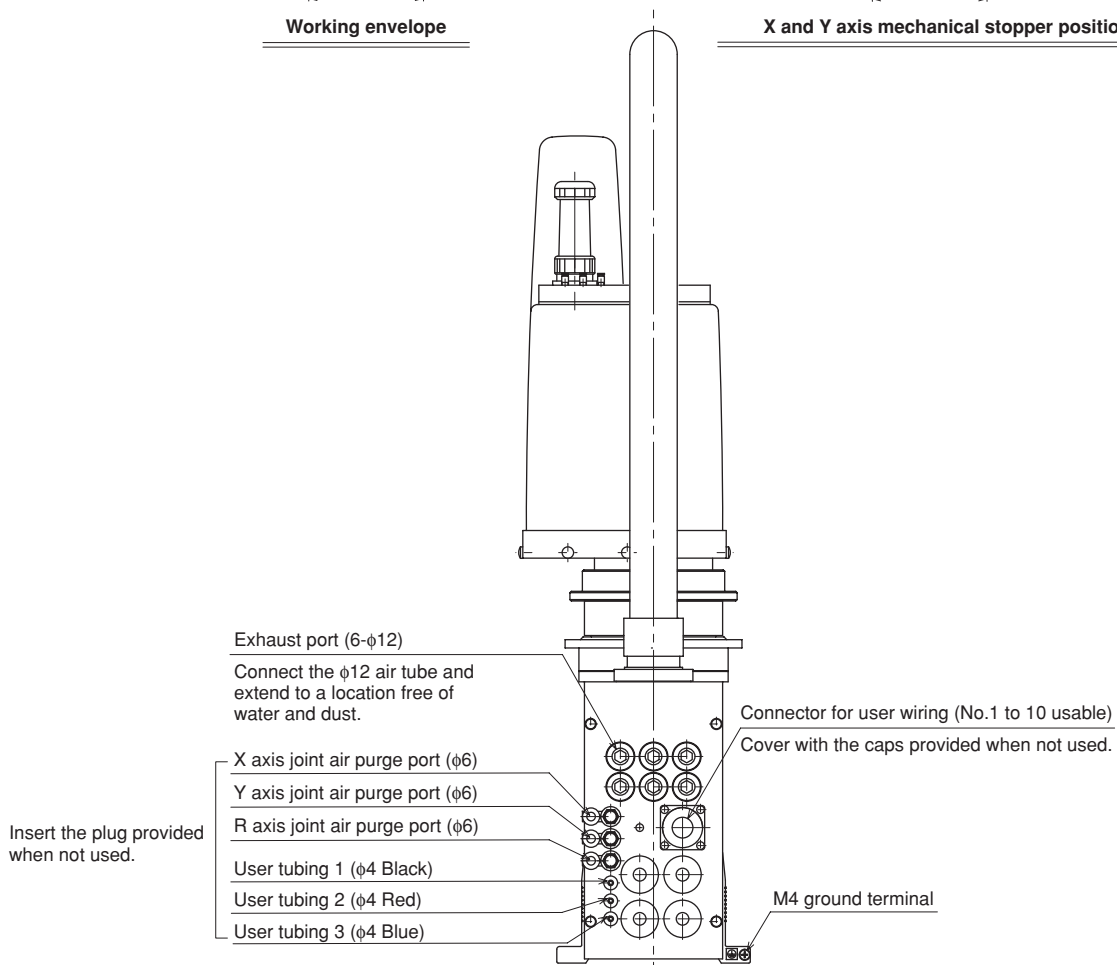
Fig. 4-1 YK250XP



Working envelope



X and Y axis mechanical stopper positions



Note. Always use air purge. Water or dust may get inside the robot depending on the usage environment.

CHAPTER 4 Specifications

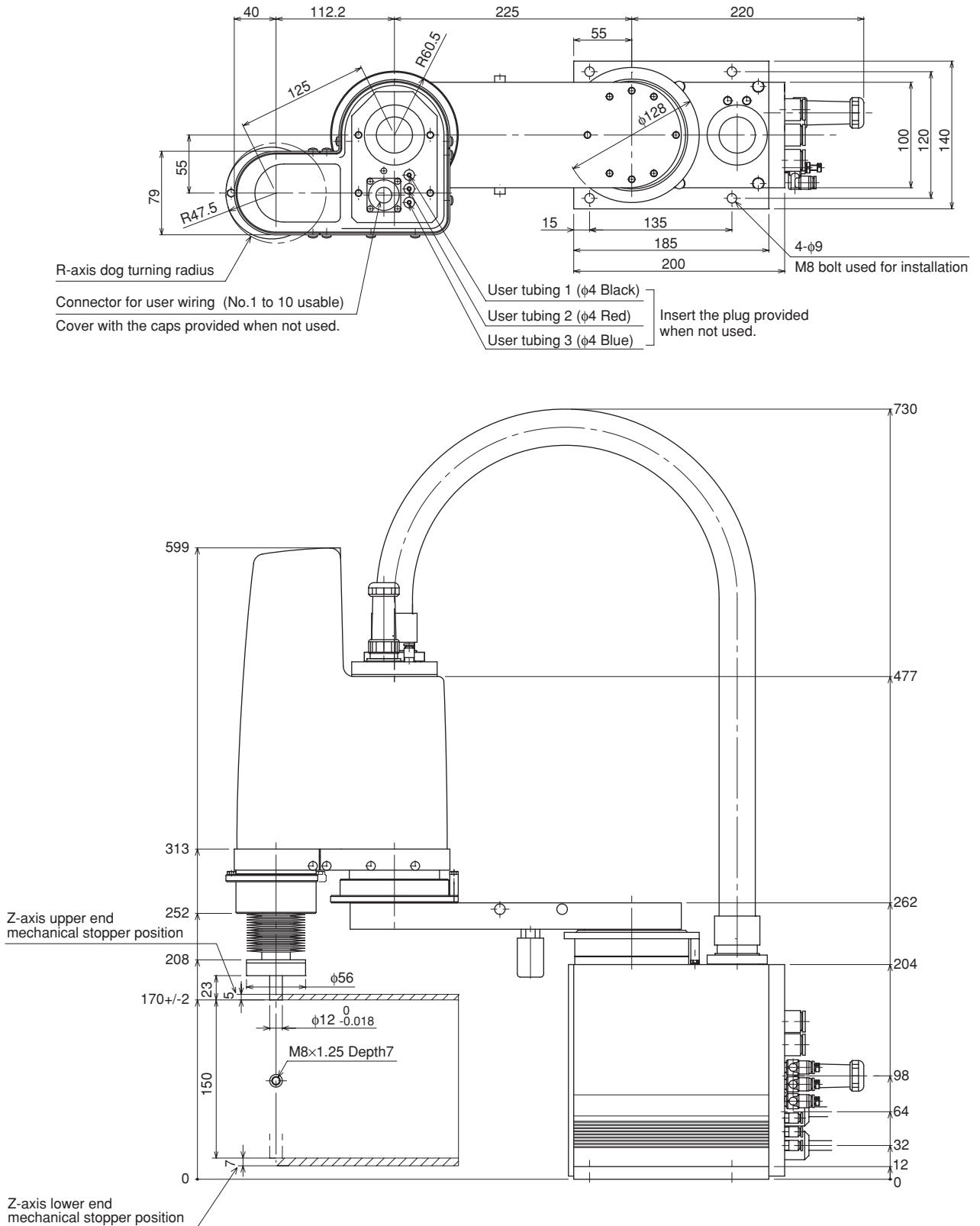
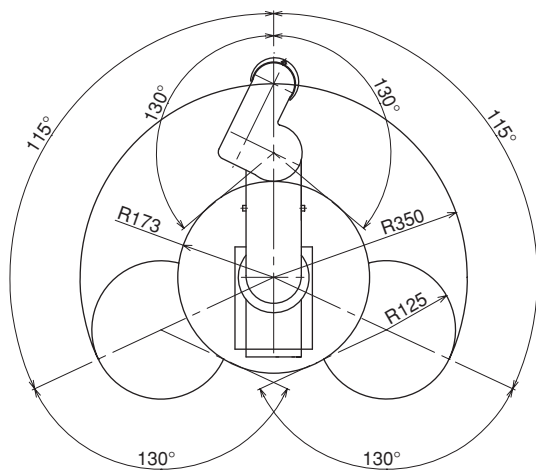
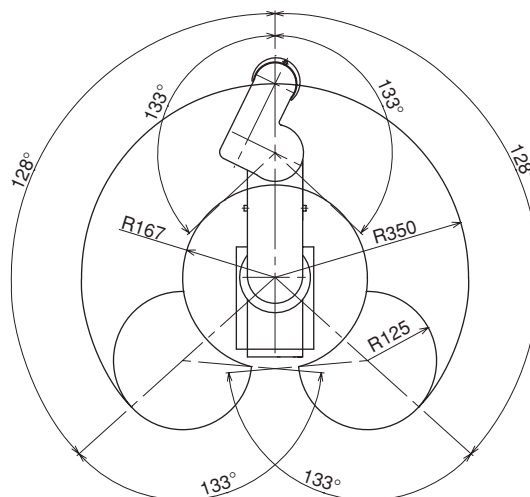


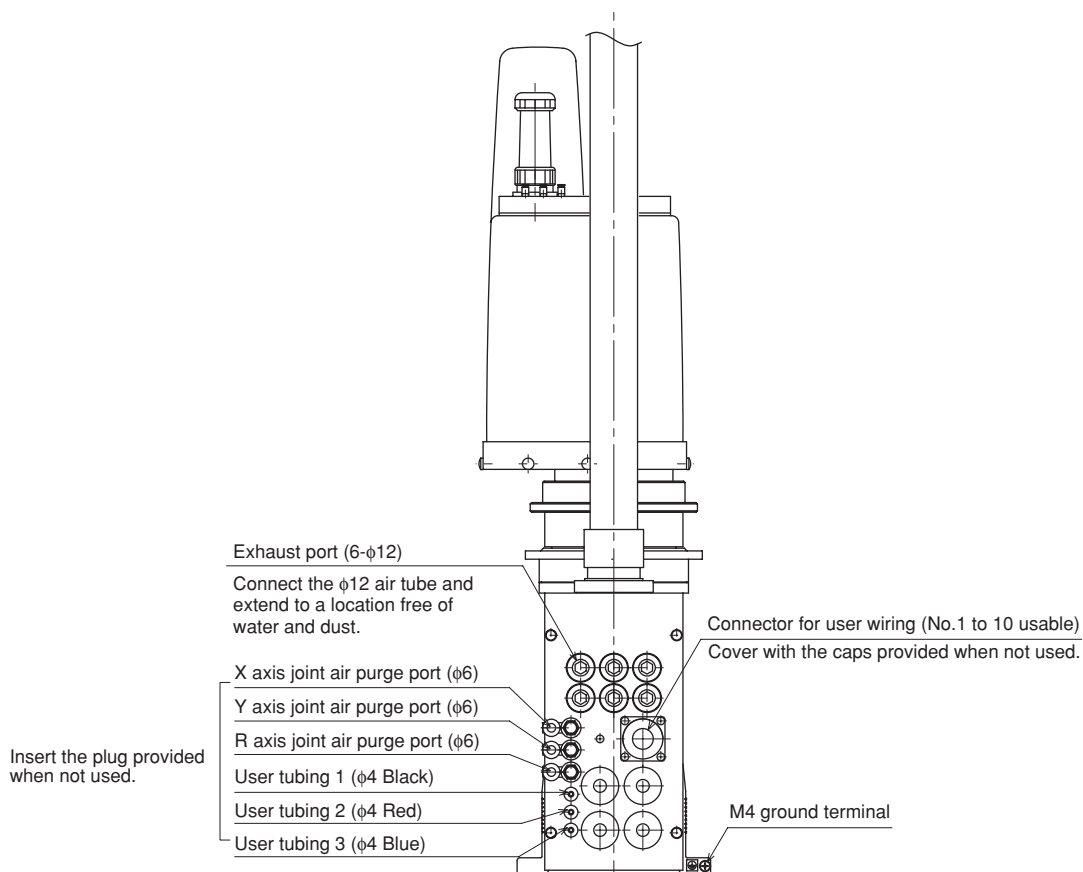
Fig. 4-2 YK350XP



Working envelope



X and Y axis mechanical stopper positions



Note. Always use air purge. Water or dust may get inside the robot depending on the usage environment.

CHAPTER 4 Specifications

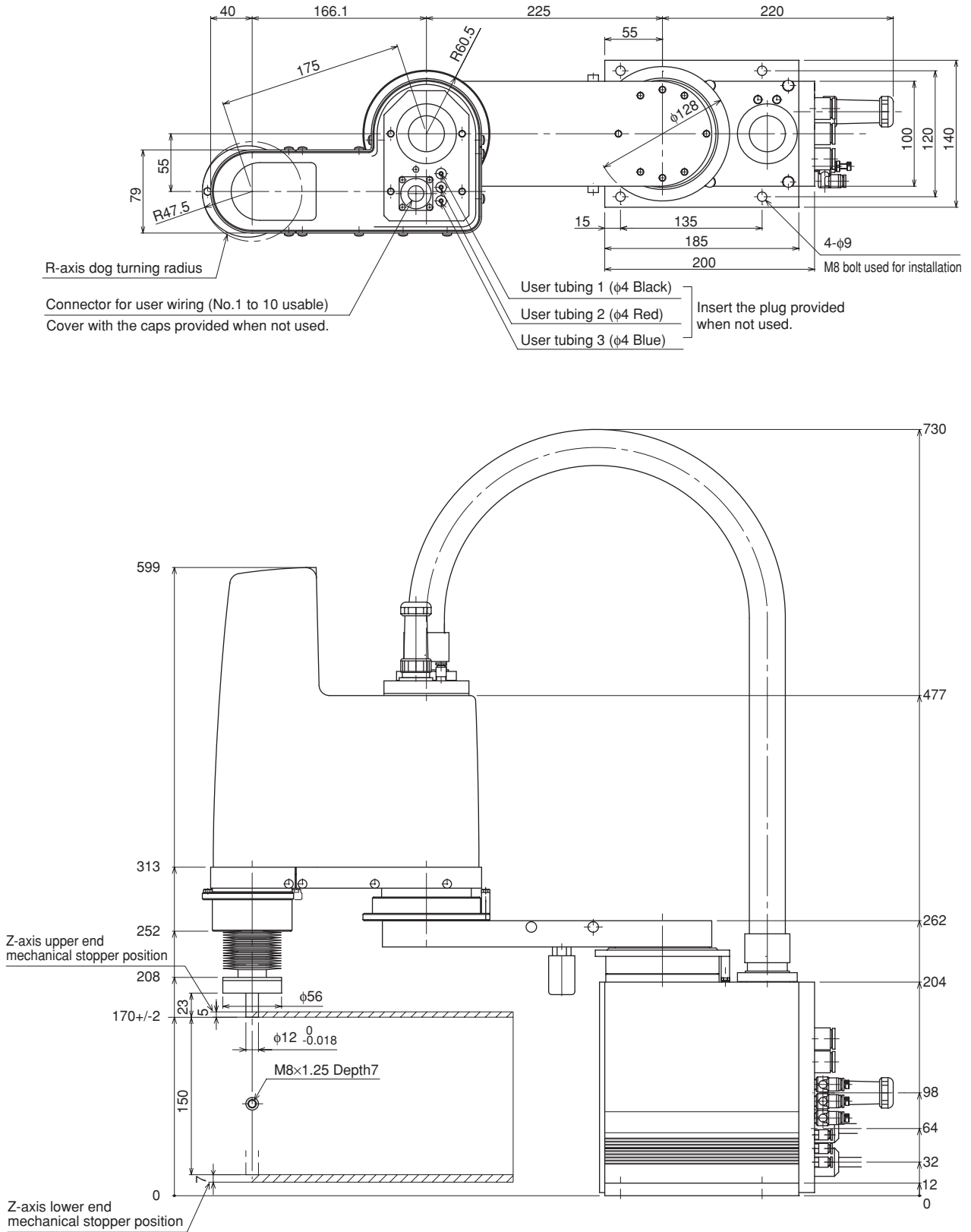
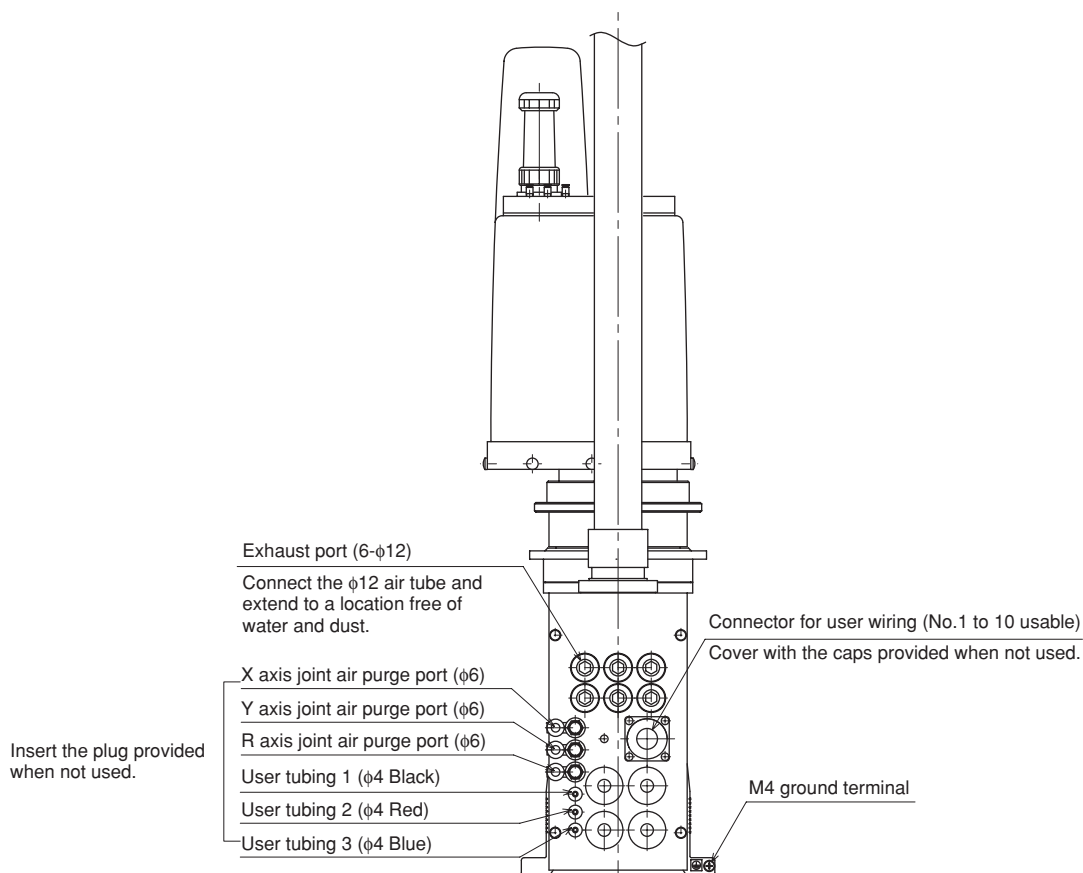
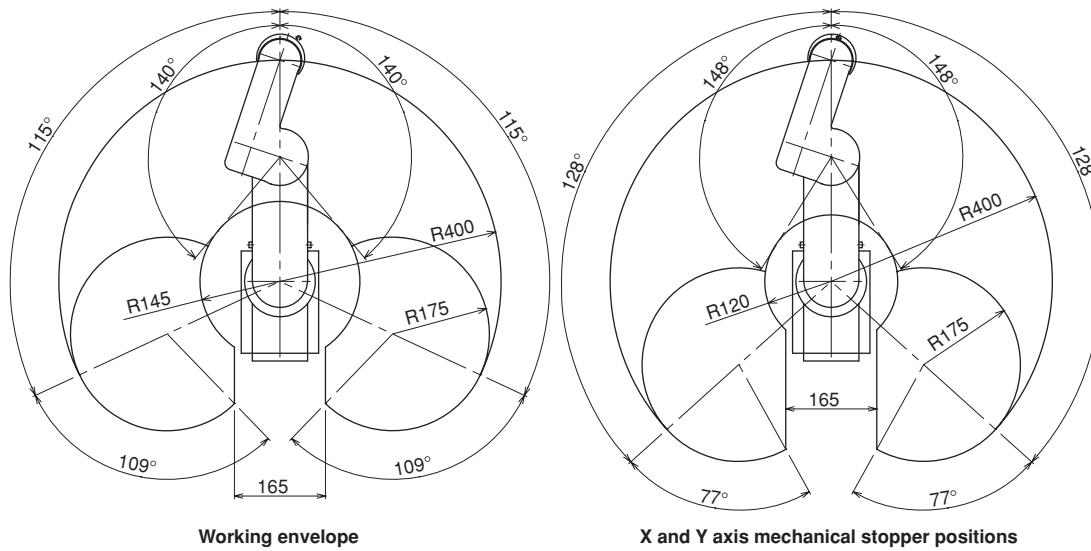


Fig. 4-3 YK400XP



Note. Always use air purge. Water or dust may get inside the robot depending on the usage environment.

CHAPTER 4 Specifications

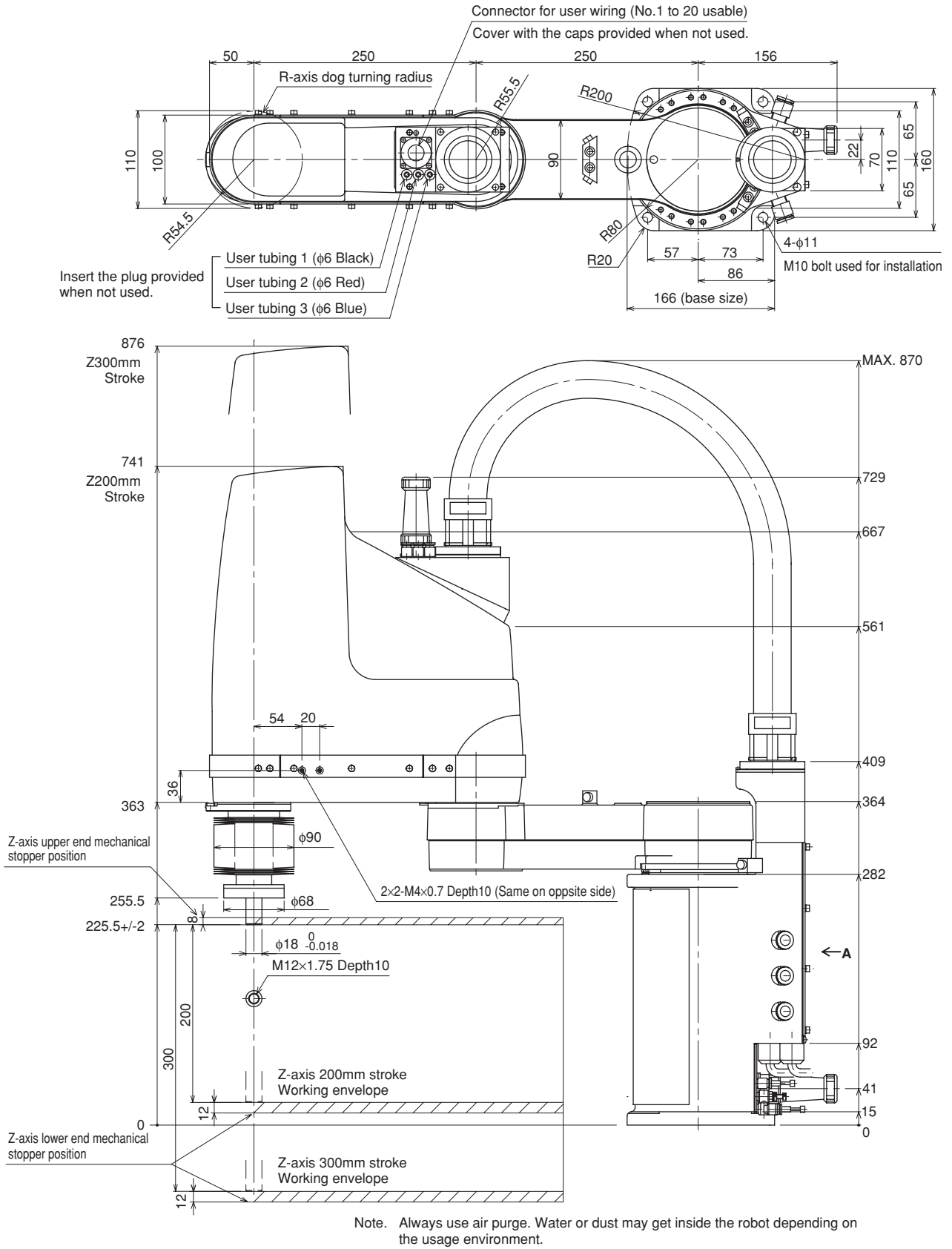
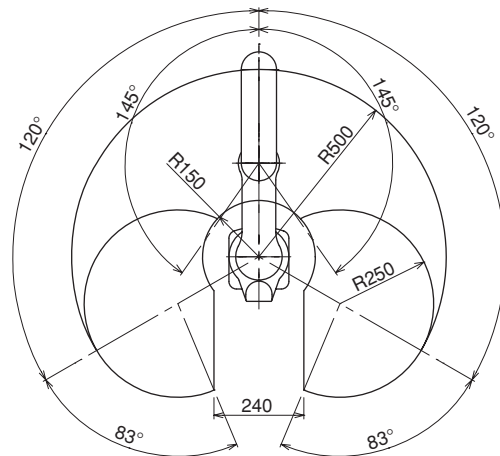
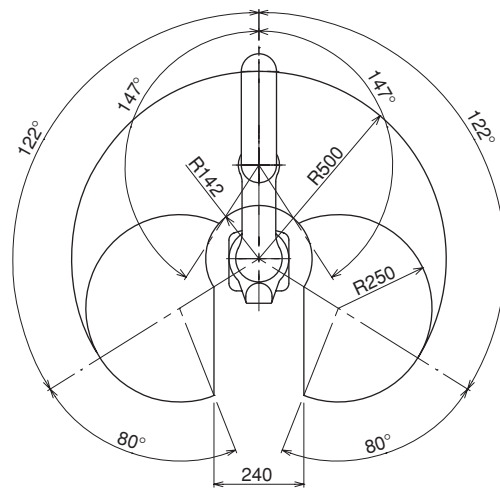


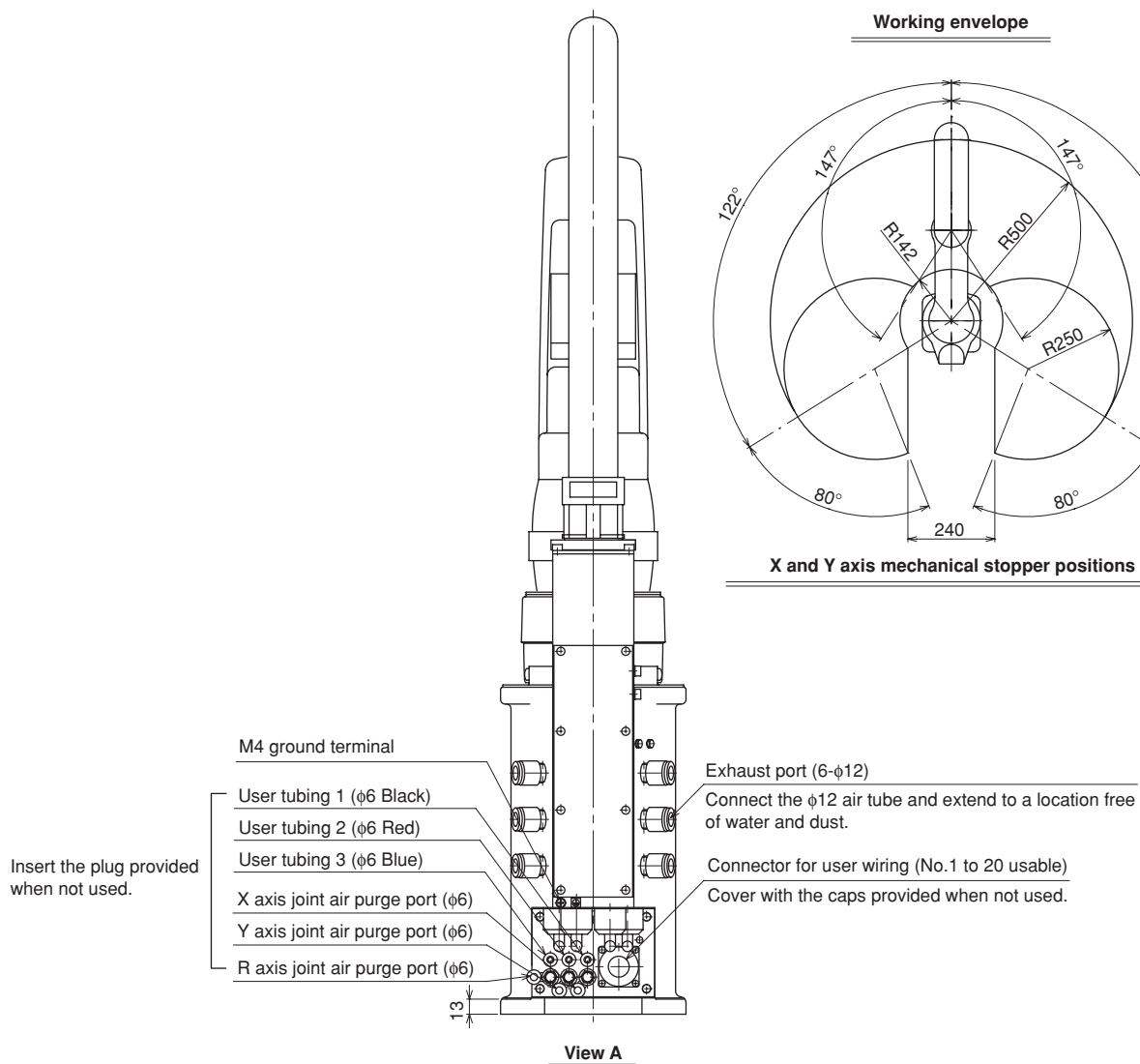
Fig. 4-4 YK500XP



Working envelope



X and Y axis mechanical stopper positions



CHAPTER 4 Specifications

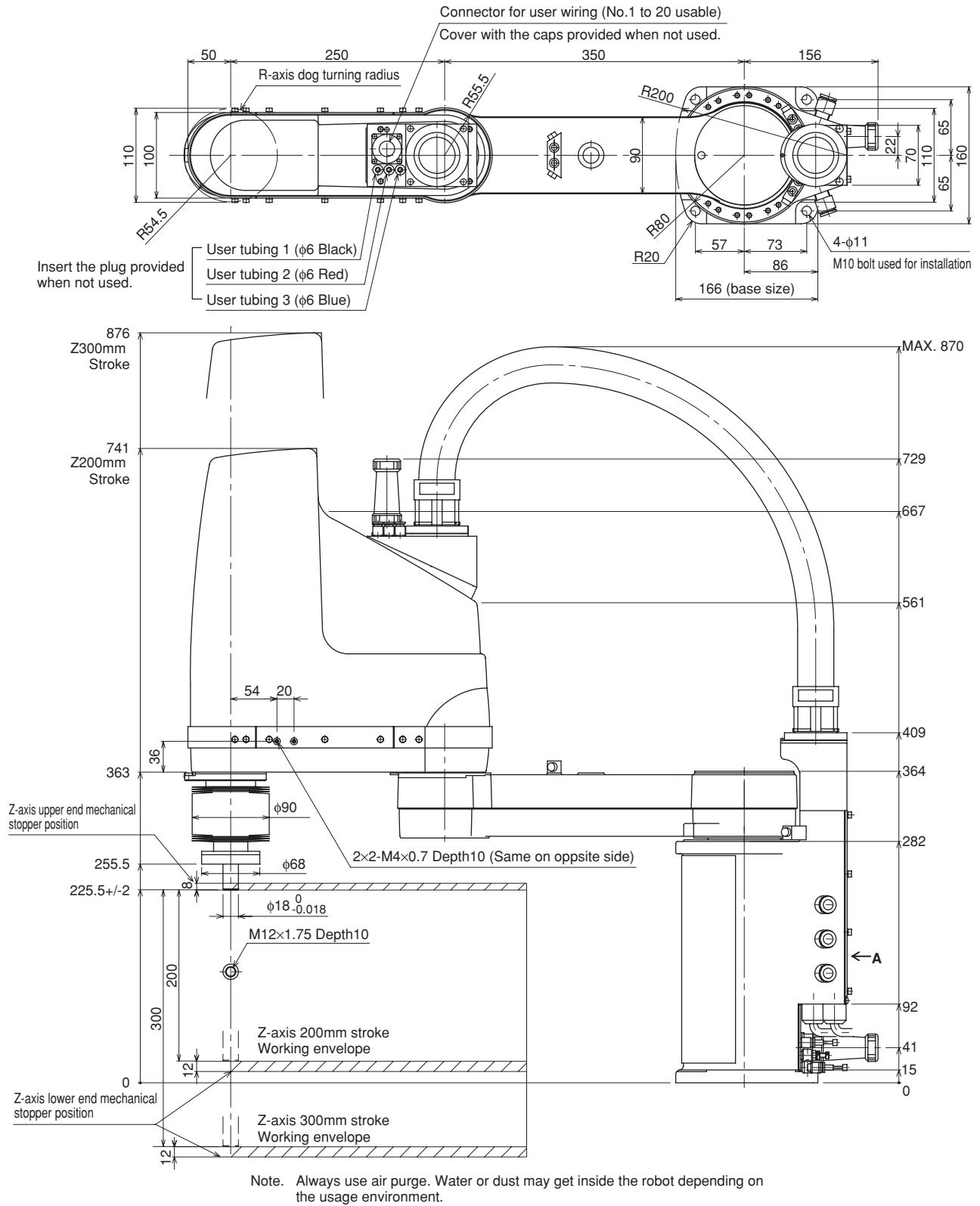
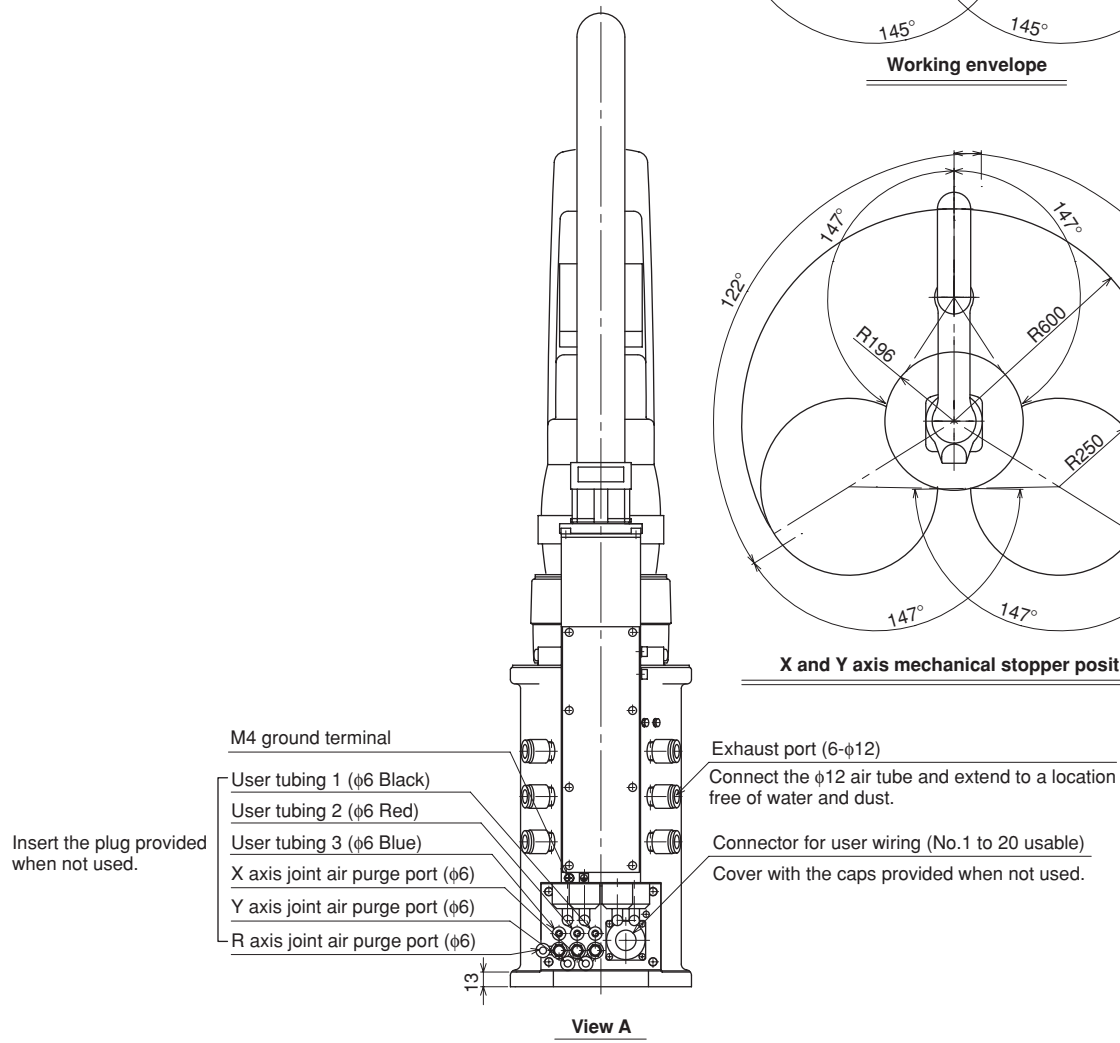
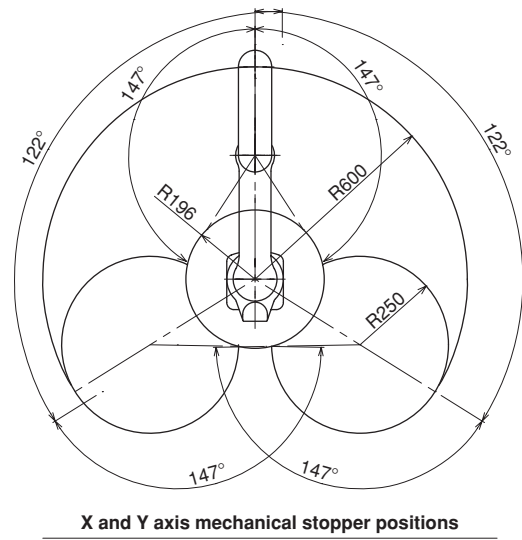
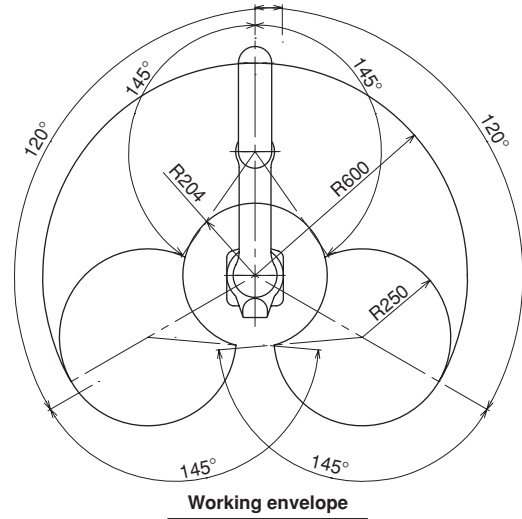


Fig. 4-5 YK600XP



CHAPTER 4 Specifications

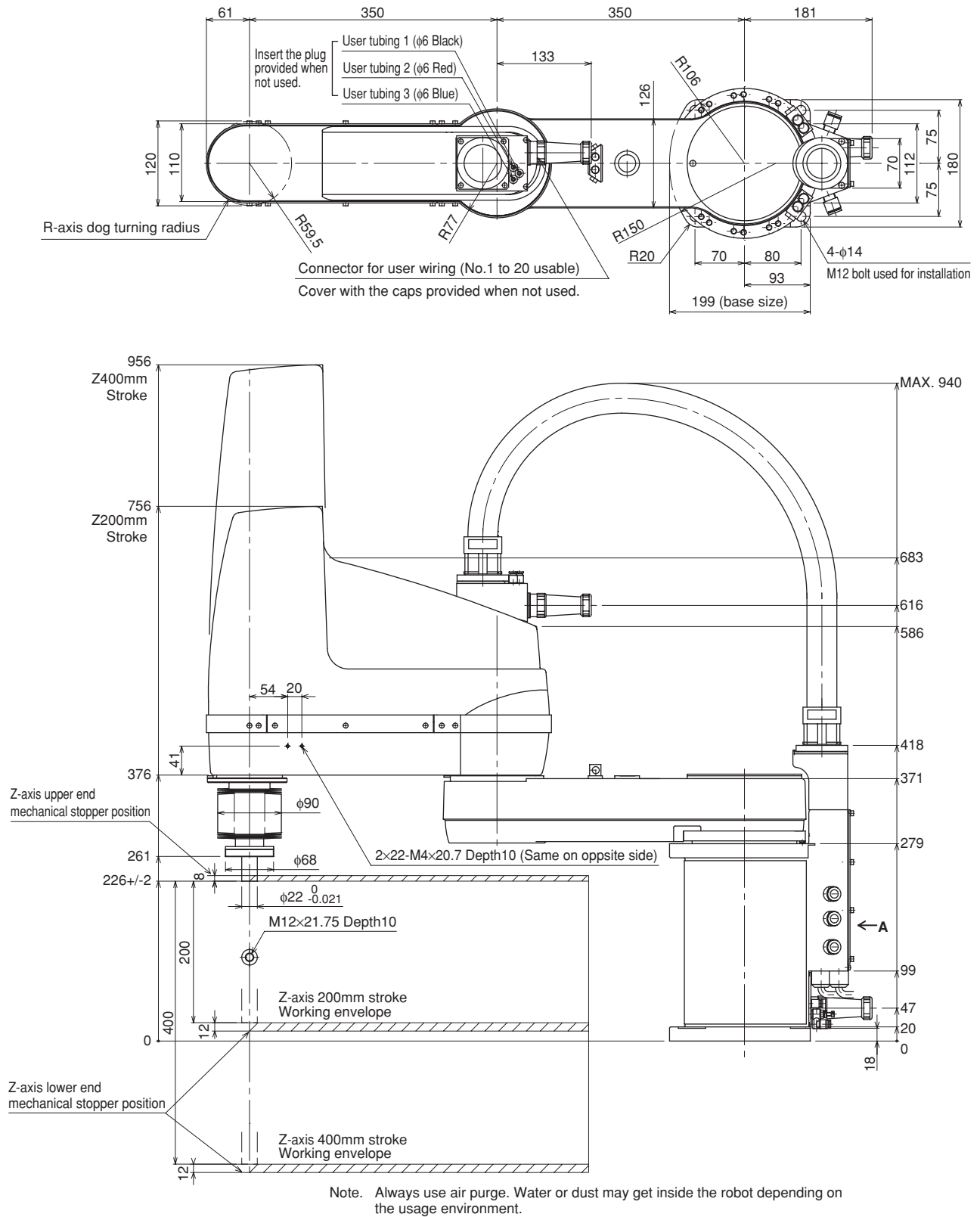
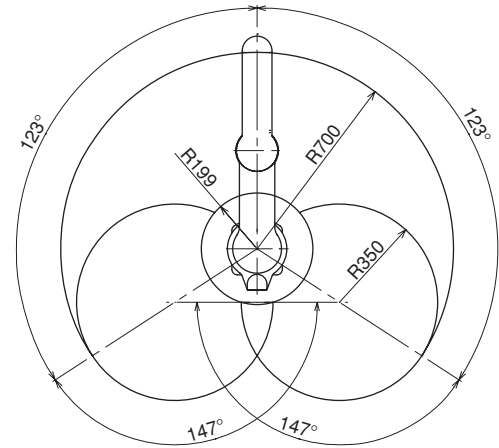
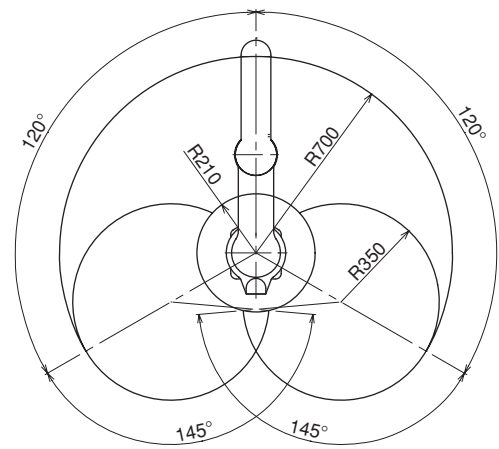


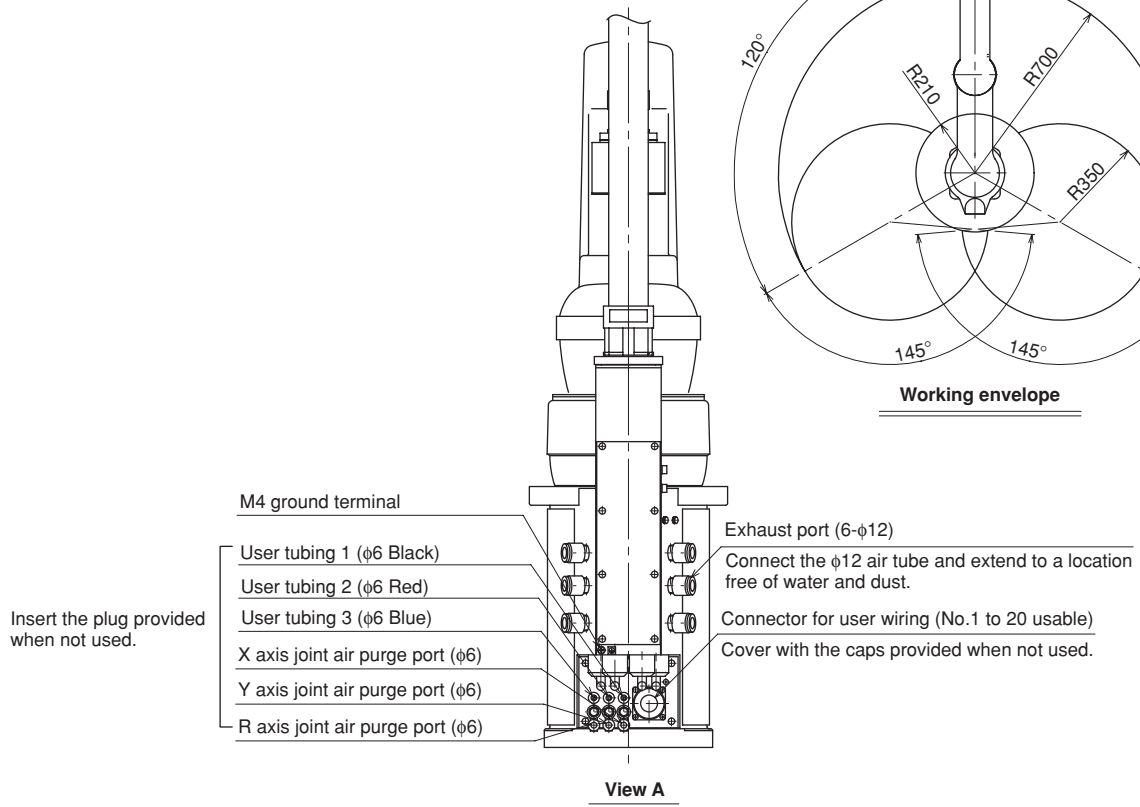
Fig. 4-6 YK700XP



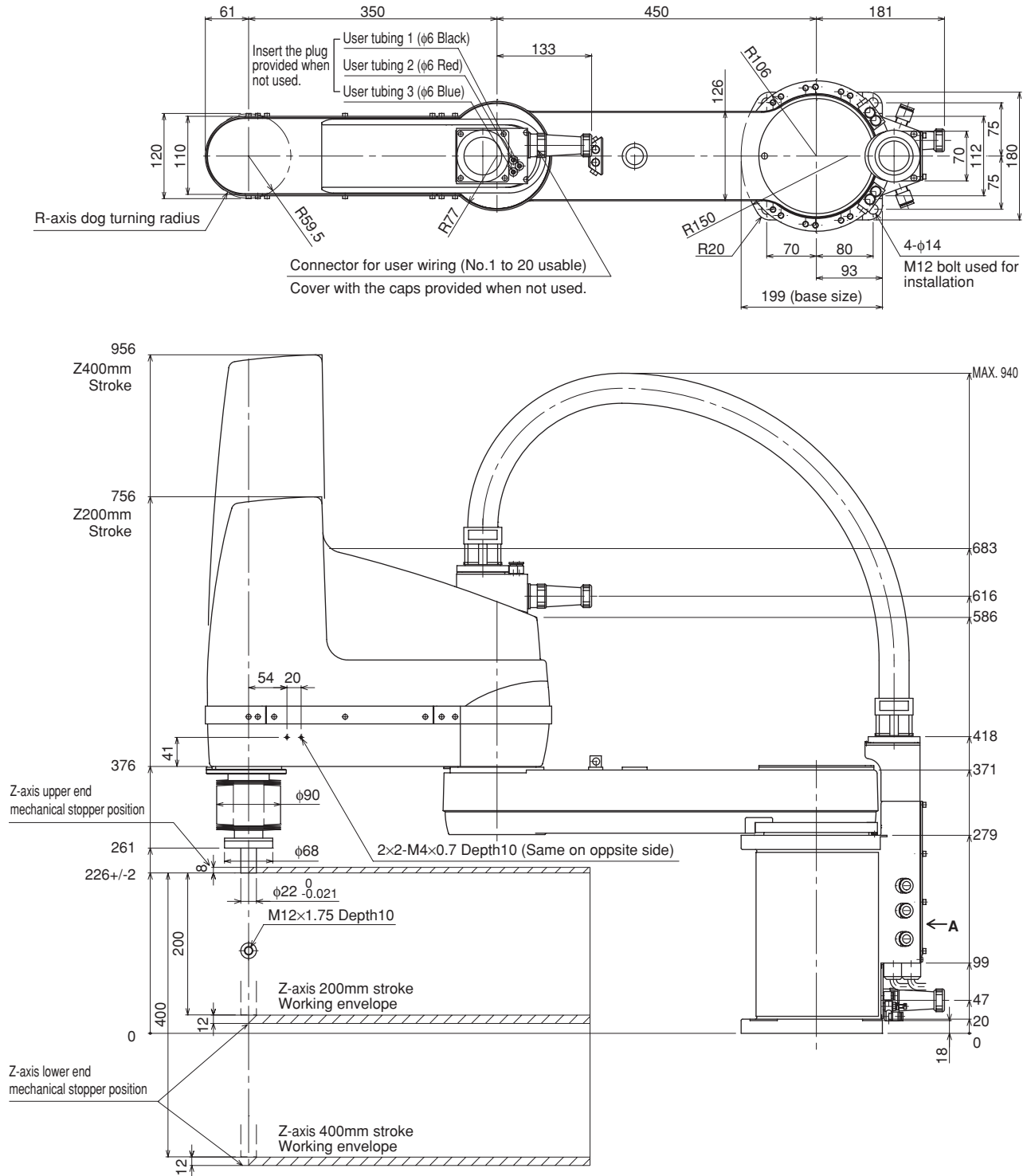
X and Y axis mechanical stopper positions



Working envelope

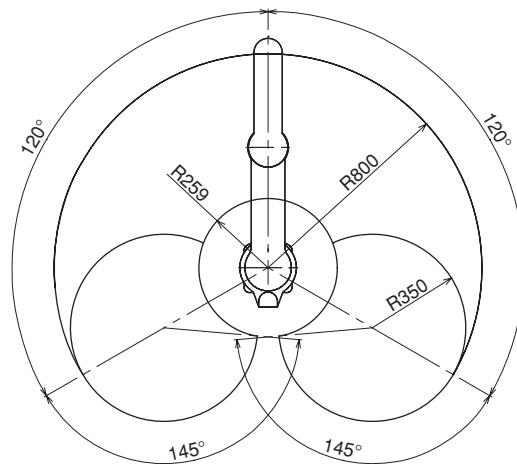


CHAPTER 4 Specifications

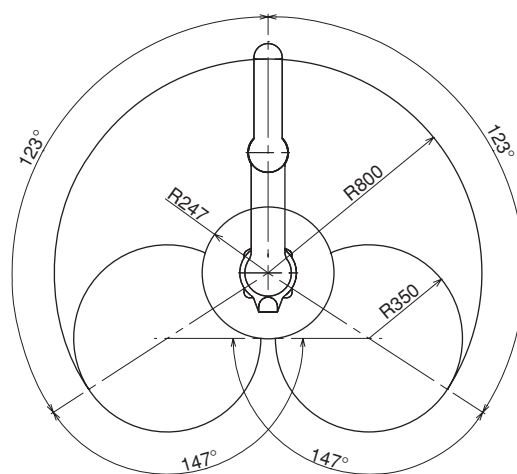


Note. Always use air purge. Water or dust may get inside the robot depending on the usage environment.

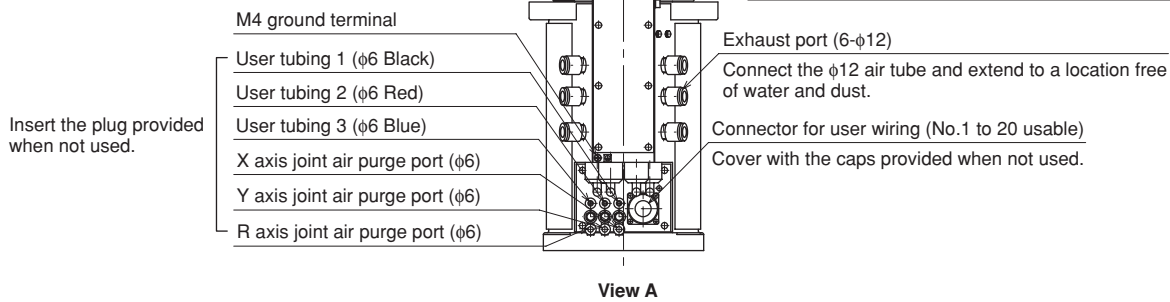
Fig. 4-7 YK800XP



Working envelope



X and Y axis mechanical stopper positions



View A

CHAPTER 4 Specifications

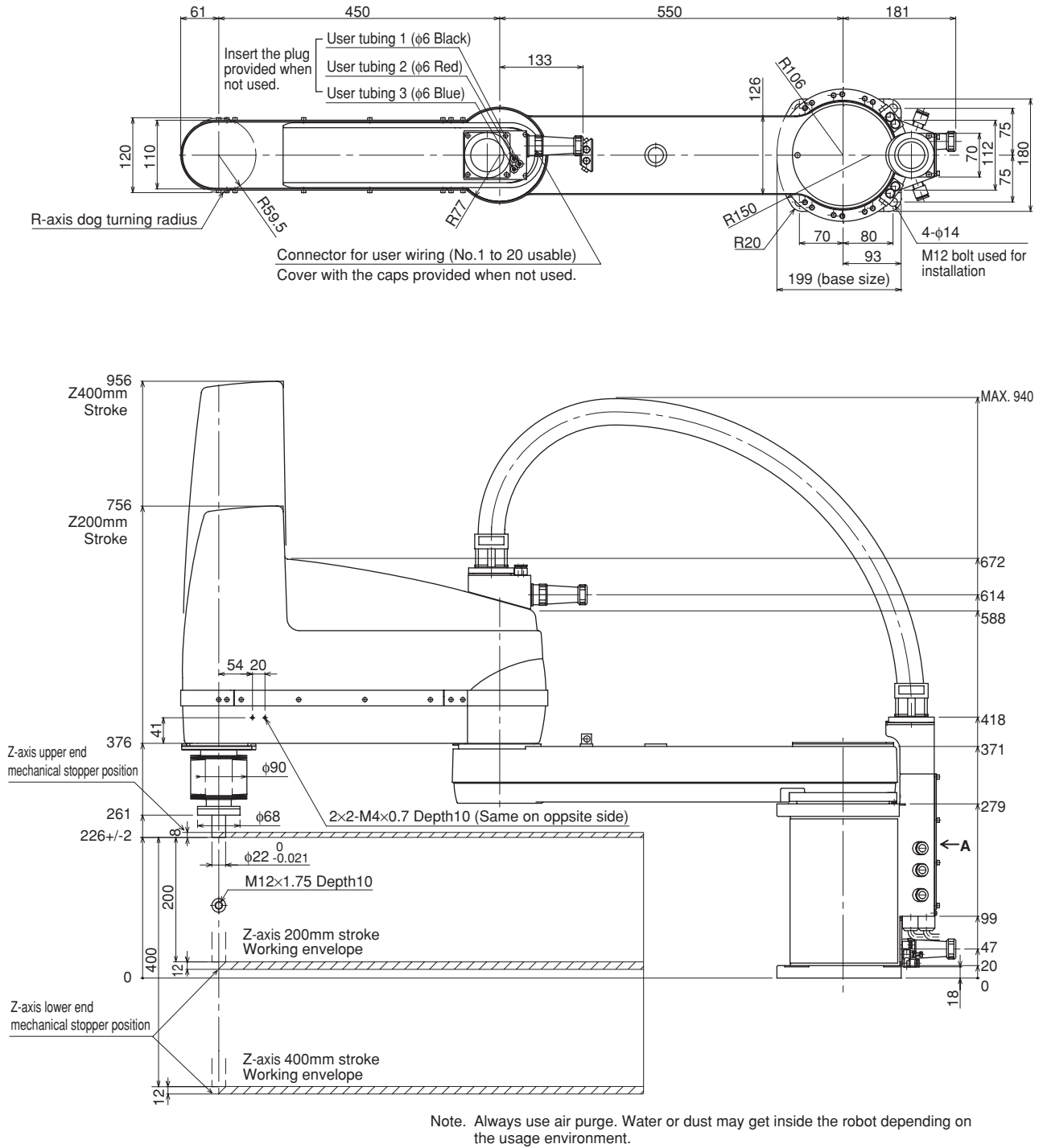
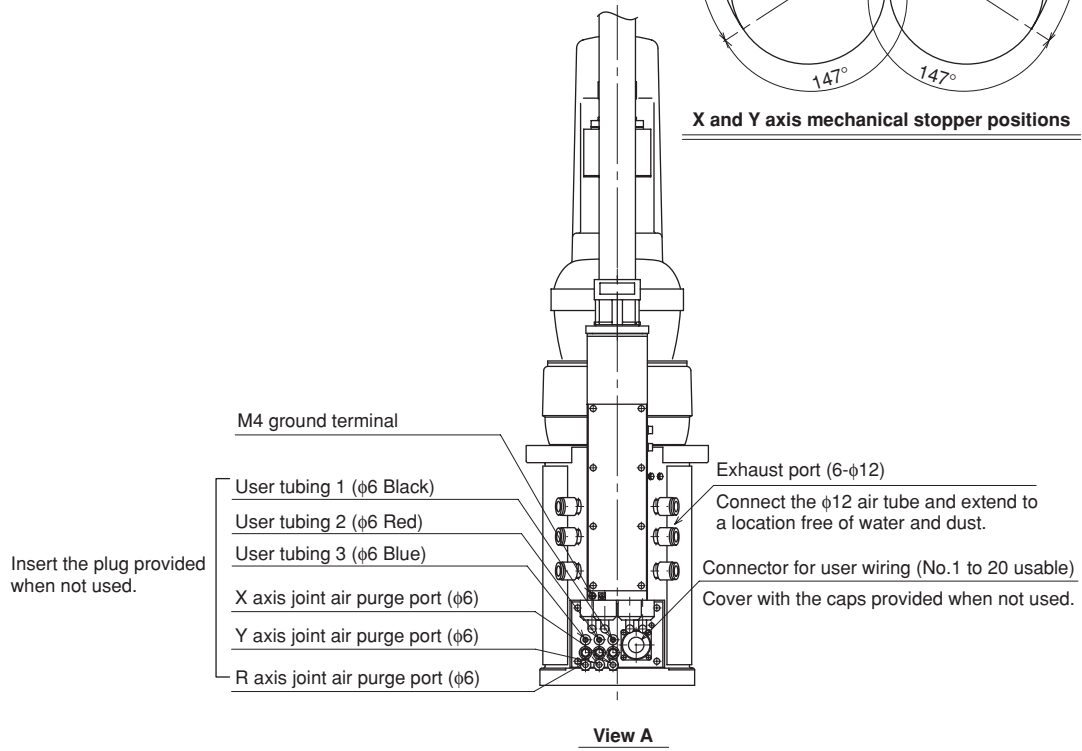
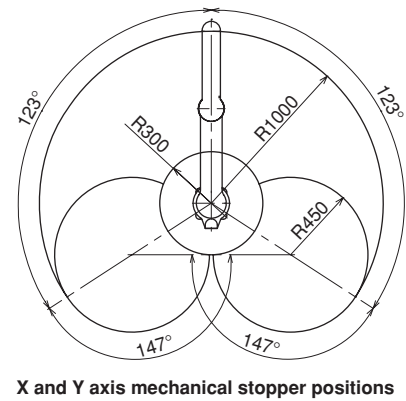
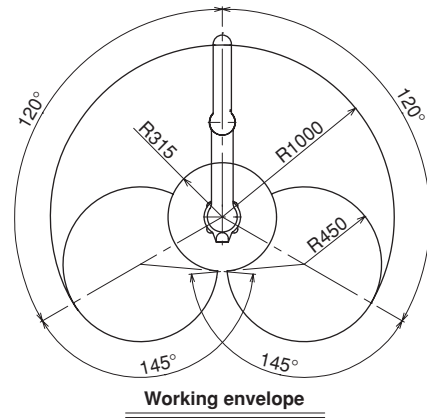


Fig. 4-8 YK1000XP



User's Manual

YAMAHA
SCARA Robot

YK-X series
YK-XP

Feb. 2010

Ver. 2.05

This manual is based on Ver. 2.07 of Japanese manual.

© YAMAHA MOTOR CO., LTD.
IM Operations

All rights reserved. No part of this publication may be reproduced in any form without the permission of YAMAHA MOTOR CO., LTD. Information furnished by YAMAHA in this manual is believed to be reliable. However, no responsibility is assumed for possible inaccuracies or omissions. If you find any part unclear in this manual, please contact YAMAHA or YAMAHA sales representatives.