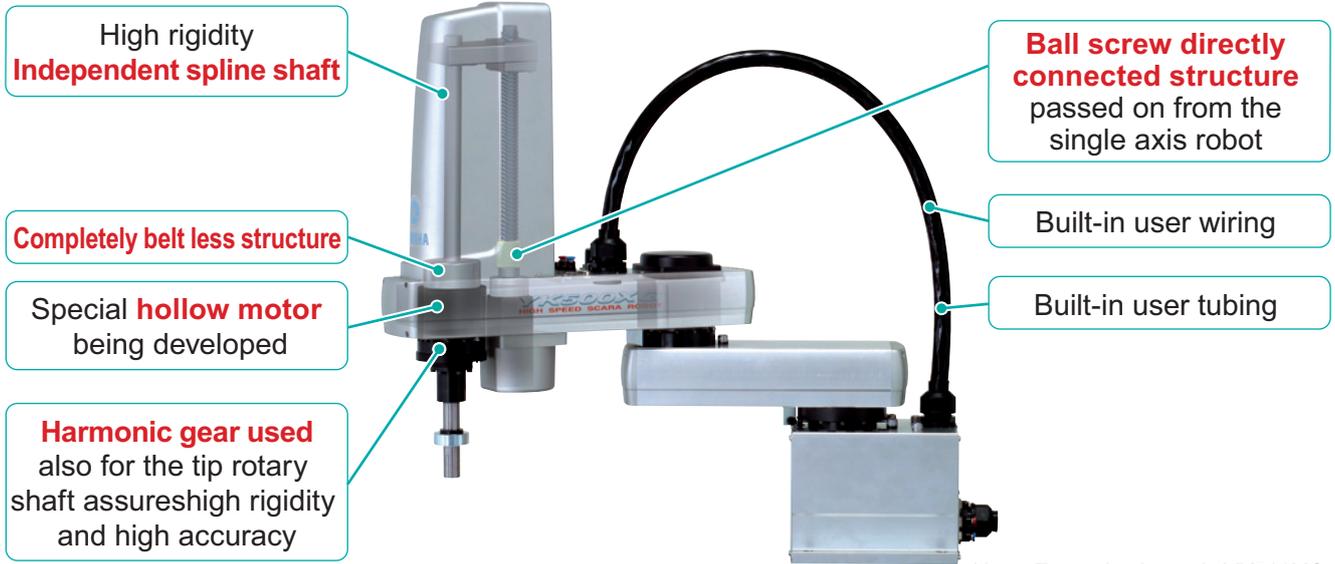


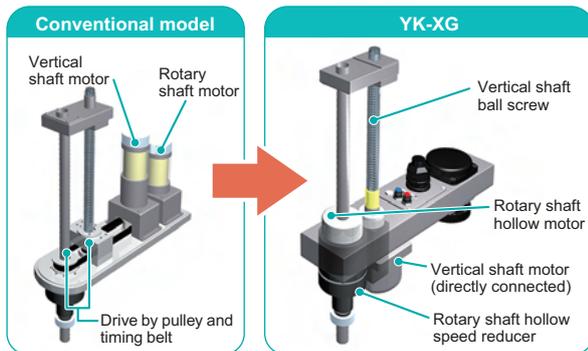
YAMAHA SCARA robots – everybody wants these great features!



Note. Example shown is YK500XG.

1 Completely beltless structure

A totally beltless structure was achieved by using a ZR axis direct coupling structure. This beltless structure drastically reduces wasted motion. It also maintains high accuracy over a long period of time. It ensure maintenance-free usage for extended periods with no worries about belt breakage, stretching or deterioration with age (feature applies to all XG series models and the YK180X/YK220X).



2 High speed

The standard cycle time is fast of course but the YAMAHA design also stresses tact time in the actual usage region. A drastic improvement in maximum speed was made by changing the gear ratio and maximum motor rpm. This also resulted in a better tact time during long distance movement.



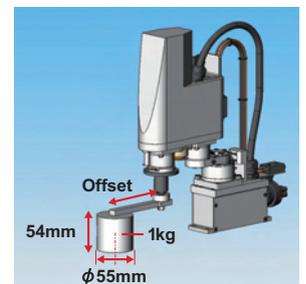
3 Amazing R axis allowable inertia moment

SCARA robot performance is not limited to just standard cycle time. Actual work situations include a diverse range of heavy work pieces as well as work with large offsets. Using a low R axis inertia moment in those cases will help drastically cut the cycle time. All YAMAHA SCARA robots have a speed reducer directly coupled to the tip of the rotating axis. The R axis produces an extremely high allowable inertia moment which delivers high speed operation compared to structures where positioning is usually done by a belt after decelerating.



R axis allowable inertia moment : Comparing YK120XG with competitor's models

A large inertia is generated when the offset from the R axis to the load center is large and this can severely restrict the acceleration during operation. The allowable inertia moment on the YAMAHA XG series is exceedingly large compared to other company SCARA robots in the same class and so can operate at high speed even with a work offset.



Figures when using 1kg load (see view at upper right)

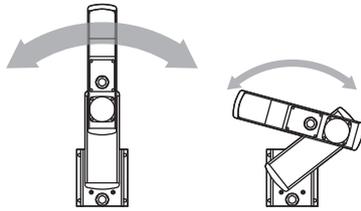
Offset (mm)	Inertia (kgfcm ²)	Operation	
		YK120XG	A Corp.
0	0.0039	○	○
45	0.025	○	×
97	0.1	○	×

○: Operation OK
 ×: Operation deviates from allowable range of catalog values

◆ R axis allowable inertia moment: YK120XG...0.1kgfcm²
 A Corporation...0.0039kgfcm²

4 Zone control (=Automatically sets the maximum acceleration/deceleration) function

On SCARA robots there is a large difference in the load applied to the motor and the speed reducer depending on whether the robot arm is folded or extended. YAMAHA SCARA robots however **can automatically set** an optimal maximum acceleration and deceleration using the arm status when starting operation and the arm status when ending operation. This capability means that just entering the initial payload will prevent the robot from exceeding tolerance values for **motor peak torque** and **speed reducer allowable peak torque**. So full power can be extracted from the motor whenever needed and a high level of acceleration/deceleration maintained.



Note. A motor torque that exceeds the peak value will cause bad effects on robot controllability and cause mechanical vibration. Also, exceeding the speed reducer allowable peak torque value will cause early stage robot breakdowns and lead to a drastic drop in the robot service life span.

5 Tough & highly reliable resolver

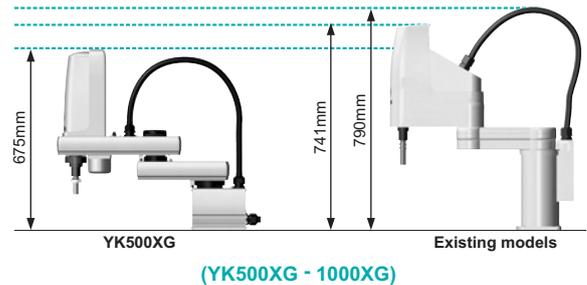
The position detector is a resolver. The resolver has a simple yet strong structure using not electronic components or elements and so has great features such as being extremely tough in harsh environments as well as a low breakdown rate. The resolver structure has none of the detection problems that occur in other detectors such as optical encoders whose electronic components breakdown or suffer from moisture or oil that sticks to the disk. Moreover, **mechanical specifications for both absolute and incremental specifications are common to all controllers** so one can switch to either absolute or incremental specifications just by setting a parameter. Also even if the absolute battery is completely worn down, the SCARA can operate on incremental specifications so in the unlikely event of trouble one can feel secure knowing that there will be no need to stop the production line. The backup circuit has been completely renovated and now has a backup period extending to 1 year.



Resolver
(Positioning system)

6 Compact

Changing the cable layout made the overall cable height lower than the unit cover. Also, utilizing a motor with a small overall length and extrusion material base yielded the smallest dimensions among equipment in the same class.



7 Superb maintenance features

The covers on the YAMAHA SCARA robot YK-XG series can be removed from the front or upwards. The cover is separate from the cable so maintenance tasks are easy.

On ordinary robots replacing the grease on the harmonic gear takes a great deal of time and trouble because the gear must be disassembled and position deviations might occur. On YAMAHA SCARA robots however the harmonic gear is the grease-sealed type so no grease replacement is needed (YK-500XG < YK1000XG).

8 History of 30 years

The first YAMAHA robots were SCARA robots. Since the first SCARA robot called "CAME" was produced in 1979, some 30 years of SCARA robot innovations have continually appeared. These SCARA robots have undergone countless modifications in an ever-changing marketplace and amassed a hefty record of successful products making them an essential part of the YAMAHA robot lineup.

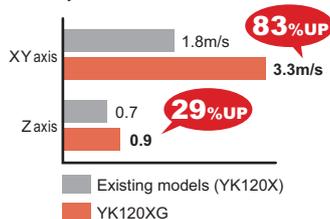


1979
<YK7000>

Tiny SCARA micro-mini

These are extremely compact SCARA robots with an arm length of 120 to 220mm.

These are the only robots in their class using absolutely no belts. Though ultra-small these provide super high-rigidity and high-accuracy. Raising the maximum motor rpm has provided an amazingly high maximum speed compared to ordinary models.



Ceiling-mount / inverse type

YK-XStype

Raises efficiency through effective use of the space.

◆ Ceiling-mount type

Type where the robot body is installed in the ceiling or wall.

◆ Inverse type

Type where ceiling-mount type is mounted upside down.



YK500XS to YK1000XS can be carried by using the eye bolt or hand lifter so that the installation can be made safely.

● Built-to-order product. Contact us for the delivery period.

Dust-proof & drip-proof type YK-XPtype

Plays active part in the working environment with much water or dust (protection class equivalent to IP65).^{Note}

● Equipped with anti-dust, anti-droplet connector to protect user wiring.
(Number of wires : 10 for YK250XP to YK400XP, 20 for YK500XP to YK1000XP)



Dust-proof & drip-proof connector for user wiring



YK500XP to 1000XP



YK250XP to 400XP

User piping and wiring connectors are standard.

● Equipped with a port for air-purging joints of X,Y and R axes.

Note **IP 65** **Class of protection against invasion of water : 5**
Prevents adverse effects by protecting from water injected from any direction. The standard requires to comply with conditions including the pressure of injected water of 30 KPa (30 KN/m² or 0.3 kgf/cm²), rate of injection of 12.5 liters/minute, and period of injection of 3 minutes.
Note. Water injected with the pressure over the above standard may invade the unit.
Class of protection against solid objects : 6
No invasion of dust

● Please consult our company for anti-droplet moisture protection for other than water.
● Built-to-order product. Contact us for the delivery period.