Hydraulic Free Roller Lifter

Model **RQA**

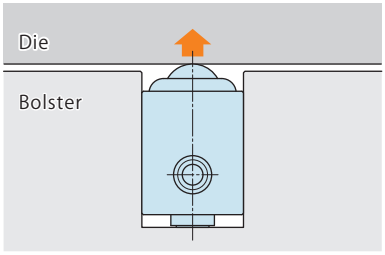
Smooth Die Movement on the Bolster of Press Machine

Able to move a die flexibly with light force.

Lift and Move a Die with Light Force

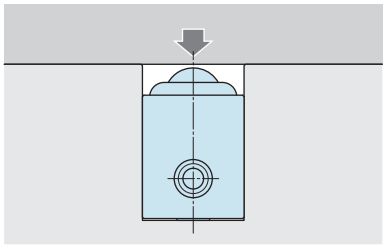
LIFT UP HYD : **SUPPLY**

When loading/unloading a die, it is able to move the die smoothly by supplying hydraulic pressure.



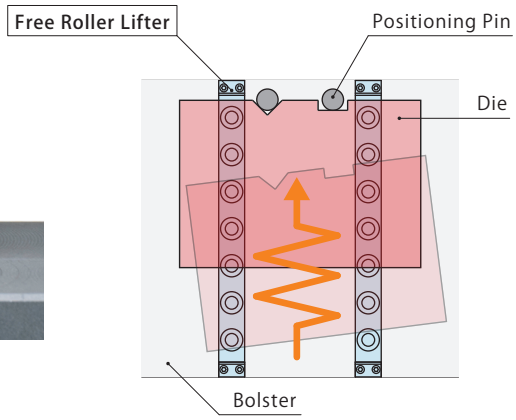
LIFT DOWN HYD : **RELEASE**

During production, the die can be lowered to the bolster surface by stopping hydraulic supply.



The Ball Moves 360° Flexibly

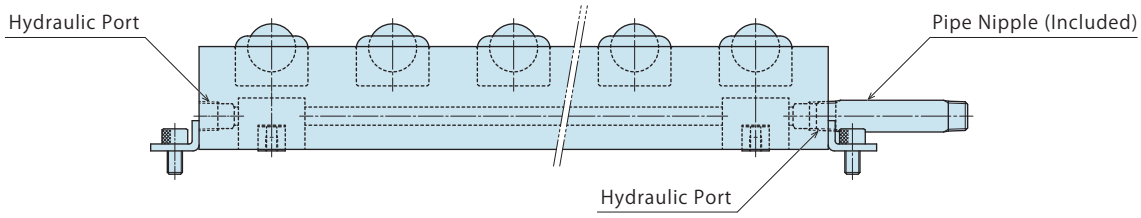
Smooth Move
Low Friction



Option ※ Please contact us for a combination of options.

D:Hydraulic Ports on Both Ends

When requiring a hydraulic ports on both ends.

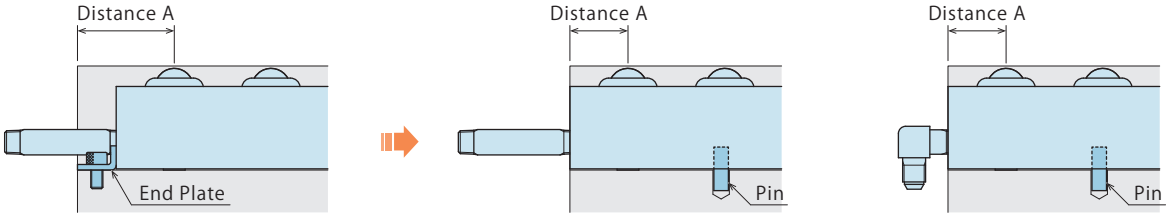


※ The size of two ports is common and the same as standard.

G:Pin Specifications

Fix the die lifter with the pin on the bottom.

- For shortening the distance A: from the end of a bolster or a scrap hole to the first roller.
- When not using the end plate in order to prevent contaminants from entering in the slot.



G : Pin Specifications

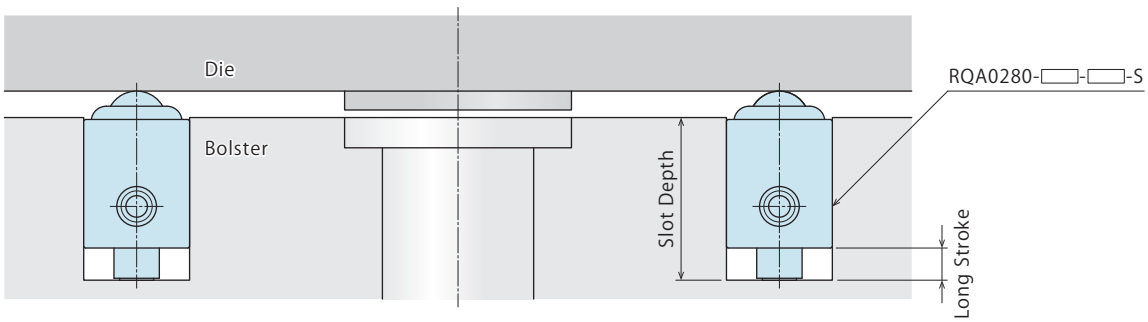
N:Hydraulic Port NPT Thread

In case of using NPT thread to a hydraulic port.

S:Long Stroke

In case of increasing lifting stroke because of fit part or projection between the bolster and die.

※ Please contact us for further information. (Applicable slot depth is different from the standard model.)



V:High Temperature (0 ~ 120℃)

For high temperature environment.

- Retractable die lifter option with accessory : RAT stopper is also available. (Refer to P.136)

Model No. Indication

RQA **028** **0** - **600** - **P38** - **D**

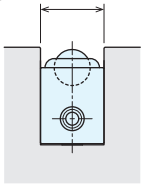
1 2 3 4 5

1 Applicable Slot Width

028 : Applicable Slot Width $28^{+0.25}_{+0.05}$ mm

050 : Applicable Slot Width $50^{+0.25}_{+0.05}$ mm

Applicable Slot Width



2 Design No.

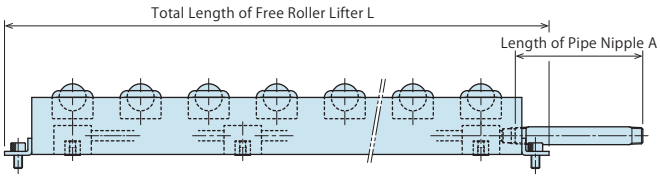
0 : Revision Number

3 Total Length of Free Roller Lifter L

3 **Total Length of Free Roller Lifter** differs between

5 **Option : Standard** and **Pin Specification**.

Refer to each external dimension list for details.



4 Length of Pipe Nipple A

Blank : Elbow Fitting (Only for 5 Option **G**:Pin Specification)

50 : Standard Length of Pipe Nipple 50mm

75 : Standard Length of Pipe Nipple 75mm

100 : Standard Length of Pipe Nipple 100mm

125 : Standard Length of Pipe Nipple 125mm

150 : Standard Length of Pipe Nipple 150mm

P 25 ~ 149 : Special Length of Pipe Nipple 25 ~ 149mm ※1

E : No Pipe Nipple

Note :

※1. Special length of pipe nipple can be set within the range of 25 ~ 149mm in 1mm increments (except for the standard length of pipe nipple).
(Ex.) **50** : Length of pipe nipple is 50mm.
P49 : Length of pipe nipple is 49mm.

5 Option

※ Please contact us for specifications and external dimensions of options.

Blank : Standard

D : Hydraulic Port on Both Ends

G : Pin Specification ※2

N : Hydraulic Port NPT Thread

S : Long Stroke ※3

V : High Temperature (0 ~ 120℃)

Notes :

※2. In case of 5 Option **G** : Pin Specification, it is able to select 4 Length of Pipe Nipple **Blank** : Elbow Fitting. If pipe nipple is required, select 4 Length of Pipe Nipple.

※3. In case of 5 Option **S** : Long Stroke, the applicable slot depth is different from the standard model. Please contact us for further information.

Specifications

Model No.			RQA0280	RQA0500
Applicable Slot Width		mm	$28^{+0.25}_{+0.05}$	$50^{+0.25}_{+0.05}$
Applicable Slot Depth		mm	$43^{+0.5}_{0}$	$53^{+0.5}_{0}$
Full Stroke		mm	3	
Lift-Up Stroke		mm	2	
Allowable Die Weight per Steel Ball ※4 ※5	Die Material : SS400	kg	55	
	Die Material : S45C • FC250	kg	70	
Lifting Force (per Cylinder)		kN	5	11.3
Lift Cylinder Capacity (per Cylinder)		cm^3	0.6	1.4
Hydraulic Port			Rc1/8 Thread	Rc1/4 Thread
Operating Hydraulic Pressure		MPa	25	
Operating Temperature		℃	0 ~ 70 (**V** : High Temp. 0 ~ 120℃)	
Use Frequency			20 cycles or less / day	
Usable Fluid			General Hyd. Oil Equivalent to ISO-VG-32	

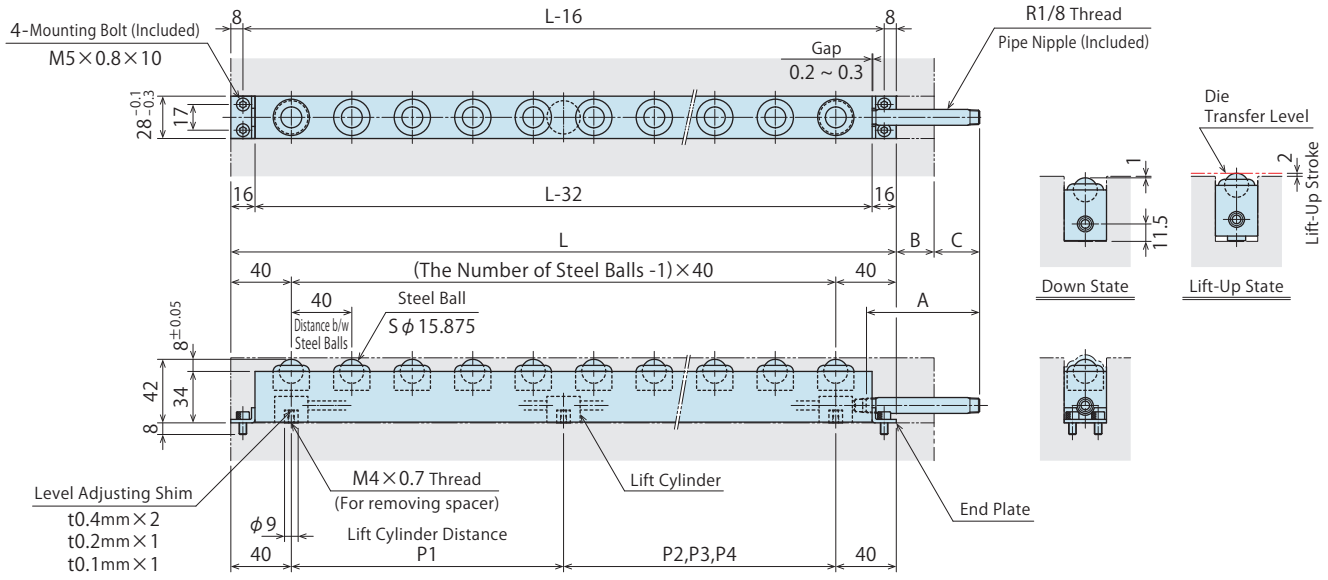
Notes :

※4. The number of steel balls and lift cylinders per Free Roller Lifter varies depending on the total length of the Free Roller Lifter. Please refer to each external dimension list for details.

※5. **Allowable die weight is based on the hardness of bottom of die (contact surface of steel ball).**

External Dimensions：RQA0280-□-□ (Standard)

※ This drawing shows the down state of the standard model of RQA0280.



External Dimension List

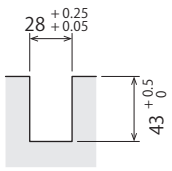
Model No.	Total Length of Free Roller Lifter L (mm)	Weight (kg)	Number of Steel Balls	Allowable Die Weight (kg) ※1 Die Material ※2		Lift Cylinder		Lift Cylinder Distance (mm)			
				SS400	S45C	Qty.	Lifting Force (kN)	P1	P2	P3	P4
RQA0280-200-□	200	1.3	4	220	280	2	10	120			
RQA0280-240-□	240	1.6	5	275	350	2	10	160			
RQA0280-280-□	280	1.9	6	330	420	2	10	200			
RQA0280-320-□	320	2.2	7	385	490	2	10	240			
RQA0280-360-□	360	2.5	8	440	560	2	10	280			
RQA0280-400-□	400	2.8	9	495	630	2	10	320			
RQA0280-440-□	440	3.1	10	550	700	3	15	180	180		
RQA0280-480-□	480	3.4	11	605	770	3	15	200	200		
RQA0280-520-□	520	3.7	12	660	840	3	15	220	220		
RQA0280-560-□	560	4.0	13	715	910	3	15	240	240		
RQA0280-600-□	600	4.2	14	770	980	3	15	260	260		
RQA0280-640-□	640	4.5	15	825	1050	3	15	280	280		
RQA0280-680-□	680	4.8	16	880	1120	3	15	300	300		
RQA0280-720-□	720	5.1	17	935	1190	3	15	320	320		
RQA0280-760-□	760	5.4	18	990	1260	4	20	225	230	225	
RQA0280-800-□	800	5.7	19	1045	1330	4	20	240	240	240	
RQA0280-840-□	840	6.0	20	1100	1400	4	20	250	260	250	
RQA0280-880-□	880	6.3	21	1155	1470	4	20	265	270	265	
RQA0280-920-□	920	6.6	22	1210	1540	4	20	280	280	280	
RQA0280-960-□	960	6.9	23	1265	1610	4	20	290	300	290	
RQA0280-1000-□	1000	7.2	24	1320	1680	4	20	305	310	305	
RQA0280-1040-□	1040	7.5	25	1375	1750	5	25	240	240	240	240
RQA0280-1080-□	1080	7.8	26	1430	1820	5	25	250	250	250	250
RQA0280-1120-□	1120	8.1	27	1485	1890	5	25	260	260	260	260
RQA0280-1160-□	1160	8.4	28	1540	1960	5	25	270	270	270	270
RQA0280-1200-□	1200	8.7	29	1595	2030	5	25	280	280	280	280

Notes :

※1. The allowable die weight is for when a die rests on all Steel Balls.

※2. The allowable die weight of die material：FC250 is the same as S45C.

U-Slot Dimensions



Projection of Pipe Nipple C ※3

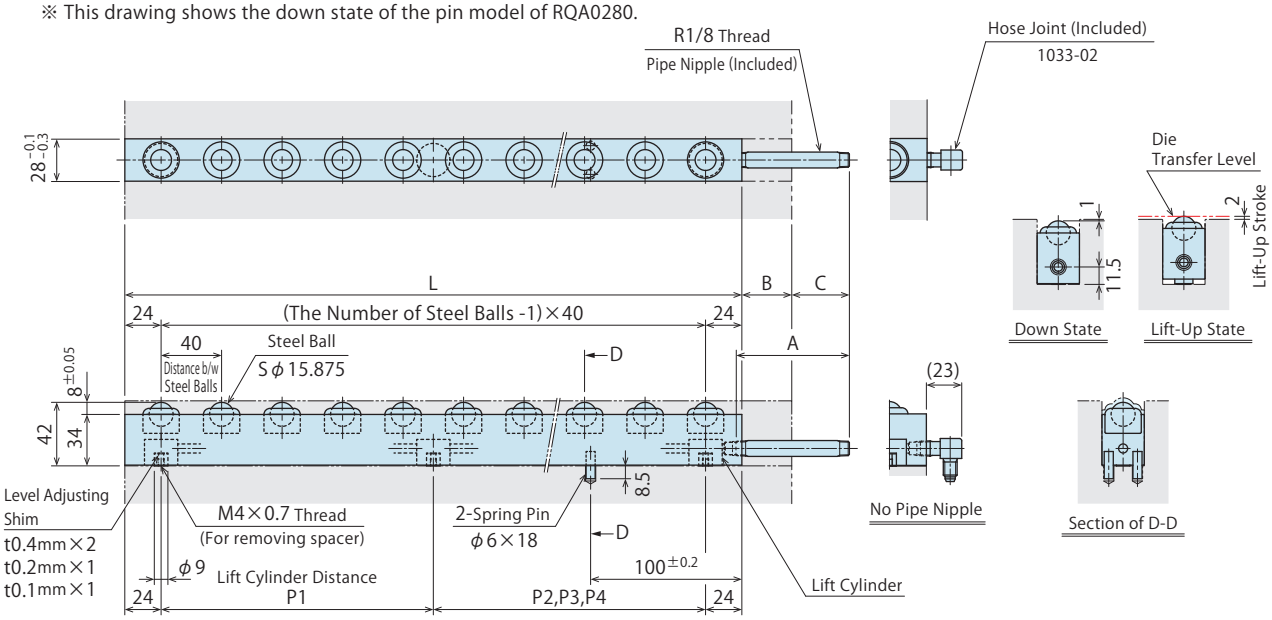
Length of Pipe Nipple A	B	Projection on Pipe Nipple C ※3
50	0 ~ 16	12 ~ 28
75	17 ~ 41	12 ~ 36
100	42 ~ 66	
125	67 ~ 91	
150	92 ~ 116	

Note :

※3. Tolerance of projection on pipe nipple C is ±1.5mm depending on screwing amount of R thread.
Calculation Formula：C = A-B-22

External Dimensions : RQA0280-□-□-G (Pin Model)

※ This drawing shows the down state of the pin model of RQA0280.



External Dimension List

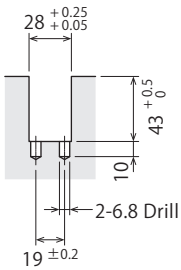
Model No.	Total Length of Free Roller Lifter L (mm)	Weight (kg)	Number of Steel Balls	Allowable Die Weight (kg) ※1 Die Material ※2		Lift Cylinder		Lift Cylinder Distance (mm)			
				SS400	S45C	Qty.	Lifting Force (kN)	P1	P2	P3	P4
RQA0280-168-□-G	168	1.3	4	220	280	2	10	120			
RQA0280-208-□-G	208	1.6	5	275	350	2	10	160			
RQA0280-248-□-G	248	1.9	6	330	420	2	10	200			
RQA0280-288-□-G	288	2.2	7	385	490	2	10	240			
RQA0280-328-□-G	328	2.5	8	440	560	2	10	280			
RQA0280-368-□-G	368	2.8	9	495	630	2	10	320			
RQA0280-408-□-G	408	3.1	10	550	700	3	15	180	180		
RQA0280-448-□-G	448	3.4	11	605	770	3	15	200	200		
RQA0280-488-□-G	488	3.7	12	660	840	3	15	220	220		
RQA0280-528-□-G	528	4.0	13	715	910	3	15	240	240		
RQA0280-568-□-G	568	4.2	14	770	980	3	15	260	260		
RQA0280-608-□-G	608	4.5	15	825	1050	3	15	280	280		
RQA0280-648-□-G	648	4.8	16	880	1120	3	15	300	300		
RQA0280-688-□-G	688	5.1	17	935	1190	3	15	320	320		
RQA0280-728-□-G	728	5.4	18	990	1260	4	20	225	230	225	
RQA0280-768-□-G	768	5.7	19	1045	1330	4	20	240	240	240	
RQA0280-808-□-G	808	6.0	20	1100	1400	4	20	250	260	250	
RQA0280-848-□-G	848	6.3	21	1155	1470	4	20	265	270	265	
RQA0280-888-□-G	888	6.6	22	1210	1540	4	20	280	280	280	
RQA0280-928-□-G	928	6.9	23	1265	1610	4	20	290	300	290	
RQA0280-968-□-G	968	7.2	24	1320	1680	4	20	305	310	305	
RQA0280-1008-□-G	1008	7.5	25	1375	1750	5	25	240	240	240	240
RQA0280-1048-□-G	1048	7.8	26	1430	1820	5	25	250	250	250	250
RQA0280-1088-□-G	1088	8.1	27	1485	1890	5	25	260	260	260	260
RQA0280-1128-□-G	1128	8.4	28	1540	1960	5	25	270	270	270	270
RQA0280-1168-□-G	1168	8.7	29	1595	2030	5	25	280	280	280	280

Notes :

※1. The allowable die weight is for when a die rests on all Steel Balls.

※2. The allowable die weight of die material : FC250 is the same as S45C.

U-Slot Dimensions



Projection of Pipe Nipple C ※3

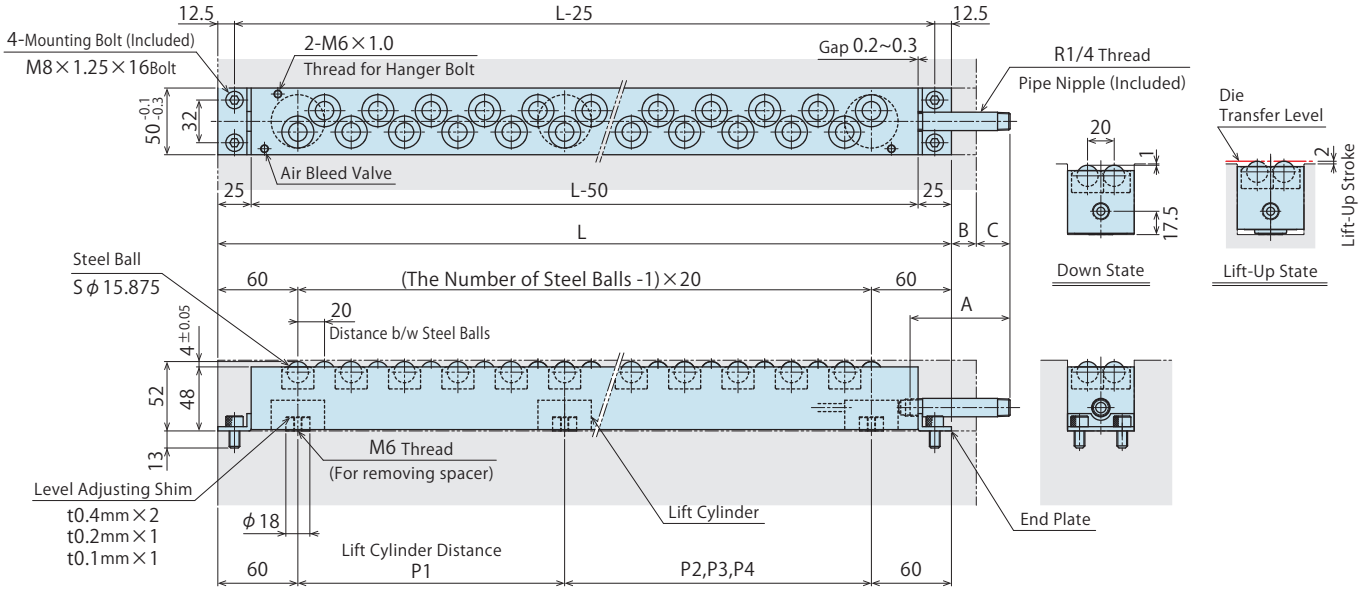
Length of Pipe Nipple A	B	Projection on Pipe Nipple C ※3
50	0 ~ 32	12 ~ 44
75	33 ~ 57	12 ~ 36
100	58 ~ 82	
125	83 ~ 107	
150	108 ~ 132	

Note :

※3. Tolerance of projection on pipe nipple C is ±1.5mm depending on screwing amount of R thread.
Calculation Formula : C = A-B-6

External Dimensions：RQA0500-□-□ (Standard)

※ This drawing shows the down state of the standard model of RQA0500.



External Dimension List

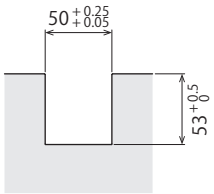
Model No.	Total Length of Free Roller Lifter L (mm)	Weight (kg)	Number of Steel Balls	Allowable Die Weight (kg) ※1 Die Material ※2		Lift Cylinder		Lift Cylinder Distance (mm)			
				SS400	S45C	Qty.	Lifting Force (kN)	P1	P2	P3	P4
RQA0500-220-□	220	3.1	6	330	420	2	22.6	100			
RQA0500-300-□	300	4.6	10	550	700	2	22.6	180			
RQA0500-380-□	380	6.0	14	770	980	2	22.6	260			
RQA0500-460-□	460	7.5	18	990	1260	2	22.6	340			
RQA0500-540-□	540	9.0	22	1210	1540	3	33.9	210	210		
RQA0500-620-□	620	10.5	26	1430	1820	3	33.9	250	250		
RQA0500-700-□	700	11.9	30	1650	2100	3	33.9	290	290		
RQA0500-780-□	780	13.4	34	1870	2380	3	33.9	330	330		
RQA0500-860-□	860	14.9	38	2090	2660	4	45.2	246.5	247	246.5	
RQA0500-940-□	940	16.4	42	2310	2940	4	45.2	273	274	273	
RQA0500-1020-□	1020	17.8	46	2530	3220	4	45.2	300	300	300	
RQA0500-1100-□	1100	19.3	50	2750	3500	4	45.2	326.5	327	326.5	
RQA0500-1180-□	1180	20.8	54	2970	3780	5	56.5	265	265	265	265
RQA0500-1260-□	1260	22.3	58	3190	4060	5	56.5	285	285	285	285
RQA0500-1340-□	1340	23.7	62	3410	4340	5	56.5	305	305	305	305
RQA0500-1420-□	1420	25.2	66	3630	4620	5	56.5	325	325	325	325
RQA0500-1500-□	1500	26.7	70	3850	4900	5	56.5	345	345	345	345

Notes :

※1. The allowable die weight is for when a die rests on all Steel Balls.

※2. The allowable die weight of die material：FC250 is the same as S45C.

U-Slot Dimensions



Projection of Pipe Nipple C ※3

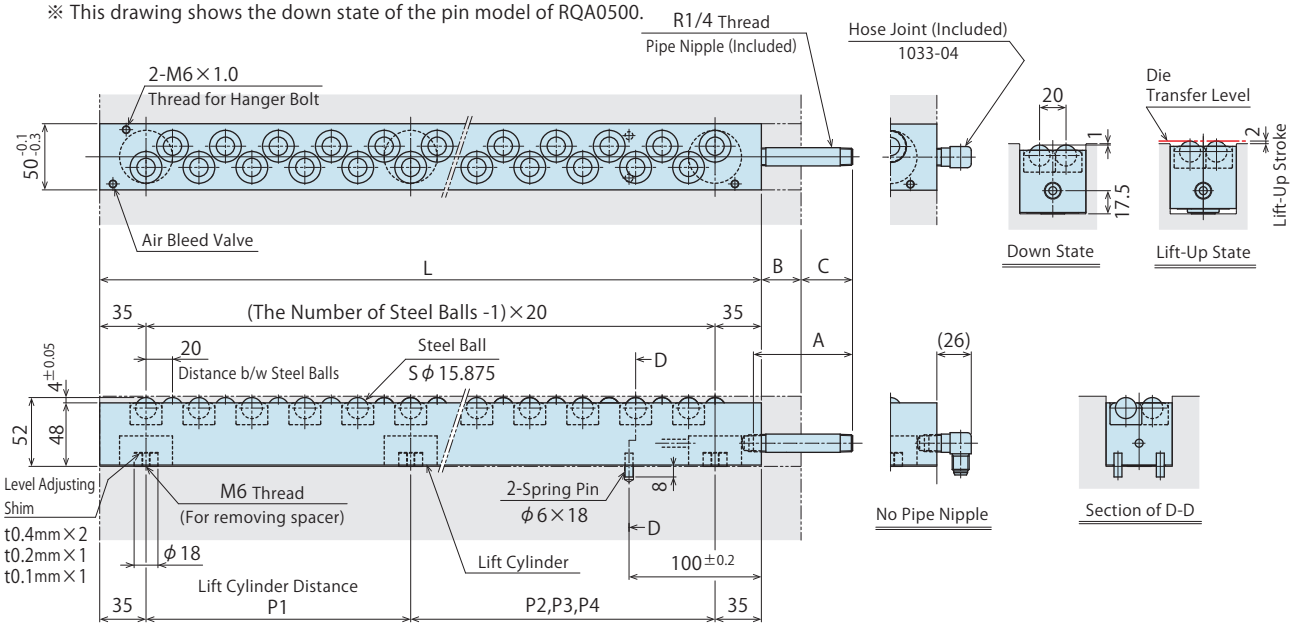
Length of Pipe Nipple A	B	Projection on Pipe Nipple C ※3
50	0	16
75	1 ～ 25	16 ～ 40
100	26 ～ 50	
125	51 ～ 75	
150	76 ～ 100	

Note :

※3. Tolerance of projection on pipe nipple C is ±1.5mm depending on screwing amount of R thread.
Calculation Formula：C = A-B-34

External Dimensions : RQA0500-□-□-G (Pin Model)

※ This drawing shows the down state of the pin model of RQA0500.



External Dimension List

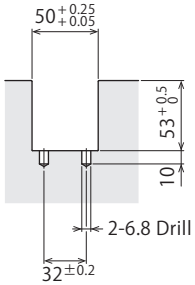
Model No.	Total Length of Free Roller Lifter L (mm)	Weight (kg)	Number of Steel Balls	Allowable Die Weight (kg) ※1 Die Material ※2		Lift Cylinder		Lift Cylinder Distance (mm)			
				SS400	S45C	Qty.	Lifting Force (kN)	P1	P2	P3	P4
RQA0500-170-□-G	170	3.1	6	330	420	2	22.6	100			
RQA0500-250-□-G	250	4.6	10	550	700	2	22.6	180			
RQA0500-330-□-G	330	6.0	14	770	980	2	22.6	260			
RQA0500-410-□-G	410	7.5	18	990	1260	2	22.6	340			
RQA0500-490-□-G	490	9.0	22	1210	1540	3	33.9	210	210		
RQA0500-570-□-G	570	10.5	26	1430	1820	3	33.9	250	250		
RQA0500-650-□-G	650	11.9	30	1650	2100	3	33.9	290	290		
RQA0500-730-□-G	730	13.4	34	1870	2380	3	33.9	330	330		
RQA0500-810-□-G	810	14.9	38	2090	2660	4	45.2	246.5	247	246.5	
RQA0500-890-□-G	890	16.4	42	2310	2940	4	45.2	273	274	273	
RQA0500-970-□-G	970	17.8	46	2530	3220	4	45.2	300	300	300	
RQA0500-1050-□-G	1050	19.3	50	2750	3500	4	45.2	326.5	327	326.5	
RQA0500-1130-□-G	1130	20.8	54	2970	3780	5	56.5	265	265	265	265
RQA0500-1210-□-G	1210	22.3	58	3190	4060	5	56.5	285	285	285	285
RQA0500-1290-□-G	1290	23.7	62	3410	4340	5	56.5	305	305	305	305
RQA0500-1370-□-G	1370	25.2	66	3630	4620	5	56.5	325	325	325	325
RQA0500-1450-□-G	1450	26.7	70	3850	4900	5	56.5	345	345	345	345

Notes :

※1. The allowable die weight is for when a die rests on all Steel Balls.

※2. The allowable die weight of die material : FC250 is the same as S45C.

U-Slot Dimensions



Projection of Pipe Nipple C ※3

Length of Pipe Nipple A	B	Projection on Pipe Nipple C ※3
50	0 ~ 25	16 ~ 41
75	26 ~ 50	16 ~ 40
100	51 ~ 75	
125	76 ~ 100	
150	101 ~ 125	

Note :

※3. Tolerance of projection on pipe nipple C is ±1.5mm depending on screwing amount of R thread.
Calculation Formula : C = A-B-9

Cautions

Notes for Design

1) Check Specifications
- Working pressure of RQA/RA Die Lifter is 25MPa, and maximum operating pressure is 27MPa.
- Please use the product according to each specification of RQA/RA/RB Die Lifter and RAF Roller.

2) Check Die Weight
- Please use the product within the allowable die weight range. If weight of the die exceeds the allowable range, the bottom of the die may be damaged and it may cause lifting failure.

3) Check the positions of scrap hole and cylinders (only for RQA/RA Die Lifter).
- If the bolster has a scrap hole, make sure that cylinders on the bottom of RQA/RA Die Lifter are not on the space of the scrap hole. If cylinders are on a scrap hole, RQA/RA Die Lifter will be damaged resulting in malfunction and/or dangerous working conditions.

4) Check the positions of scrap hole and mounting bolts (only for RAF Roller).
- If the bolster has a scrap hole, make sure that mounting bolts of RAF Roller are not on the space of the scrap hole.

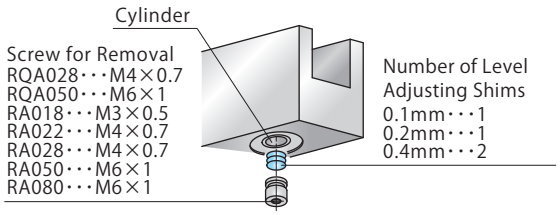
Installation Notes

1) Check the fluid to use (for RQA/RA Die Lifter Only)
- Please refer to Hydraulic Fluid List and use the appropriate fluid.

2) Procedure before Piping (for RQA/RA Die Lifter Only)
- The pipeline and piping connector should be cleaned by thorough flushing.

3) Use Hydraulic Hose for Piping (for RQA/RA Die Lifter Only)
- Please use a hydraulic hose since hydraulic connection port moves up and down.

4) Level Adjustment
- Set the die lifter into U-slot (T-slot) and adjust the level according to dimensions when moving upward and downward. Please refer to the external dimensions for U-slot (T-slot) dimensions and setting of level adjustment. If the level is not adjusted, the load may not be uniformly distributed, which could damage the die and die lifter. Use the level adjusting shims to adjust the RQA/RA roller level, and use the level adjusting bolt to adjust the RB roller level and fasten the level adjusting bolt with a lock nut tightened with 5.9 - 9.8 N・m of torque.



5) Air Bleeding within Hydraulic Circuit (for RQA/RA Die Lifter Only)
- Excessive air in the hydraulic circuit will slow the reaction time and may result in continuous idling of the pump.
  After installing the hydraulic circuit, or if the pump runs out of oil, be sure to release the air from the nipple in the case of RQA028 and RA018/022/028, or from the air bleed valve in the case of RQA050 and RA050/080.

Hydraulic Fluid List

ISO Viscosity Grade ISO-VG-32

Maker	Anti-Wear Hydraulic Oil	Multi-Purpose Hydraulic Oil
Showa Shell Sekiyu	Tellus S2 M 32	Morlina S2 B 32
Idemitsu Kosan	Daphne Hydraulic Fluid 32	Daphne Super Multi Oil 32
JX Nippon Oil & Energy	Super Hyrando 32	Super Mulpus DX 32
Cosmo Oil	Cosmo Hydro AW32	Cosmo New Mighty Super 32
ExxonMobil	Mobil DTE 24	Mobil DTE 24 Light
Matsumura Oil	Hydol AW-32	
Castrol	Hyspin AWS 32	

Note : Please contact manufacturers when customers require products in the list above.

Notes on Handling

1) The product should be operated by qualified personnel.

2) Do not operate or remove the product unless the safety protocols are ensured.
① The machine and equipment can only be inspected or prepared when it is confirmed that the safety devices are in place.
② Before removing the product, make sure that the above-mentioned safety devices are in place. Shut off the pressure and power source, and make sure no pressure exists in the hydraulic circuits.
③ After stopping the product, do not remove until the temperature drops.
④ Make sure there is no abnormality in the bolts and respective parts before restarting the machine or equipment.

3) Do not disassemble or modify.
- If the product is taken apart or modified, the warranty will be voided even within the warranty period.

4) Do not touch die lifters while they are working.
- Otherwise, your hands may be injured.

5) Hold the main body of RQA/RA Die Lifter when moving and removing.
- If pulling on the hose, RQA/RA Die Lifter may fall off leading to accident. Also, rivet part of the hose will be loosened leading to fluid leakage.

6) Do not pour water or oil over the product.
- Failure to do so causes malfunctions and deterioration of the product leading to an accident.

Maintenance / Inspection

1) Removal of Product
- Before removing the product, make sure that safety devices and preventive devices are in place.
- Make sure there is no trouble/issue in the bolts and respective parts before restarting.

2) Make sure that the steel balls move smoothly and do not make noises.

3) Please contact us for overhaul and repairs.

4) Regularly tighten pipe lines to ensure proper use.

5) Regularly check that the supply hydraulic pressure is in the range of the operating pressure.

6) Make sure hydraulic fluid is not deteriorated.

7) Make sure there is a smooth action without an irregular noise.
- Especially when it is restarted after left unused for a long period, make sure it can be operated correctly.

8) Regularly tighten the mounting bolts of the end plate to ensure proper use.

9) The products should be stored in the cool and dark place without direct sunshine or moisture.

※ Refer to P.203 for common cautions.
• Notes on Installation • Hydraulic Fluid List • Speed Control Circuit of Hydraulic Cylinder & Notes
• Notes on Handling • Maintenance / Inspection • Warranty

Cautions

Installation Notes (Cautions for Hydraulic Series)

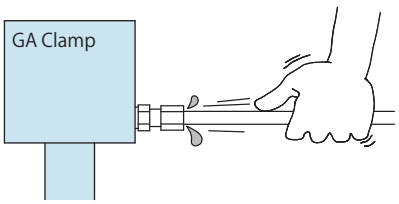
1) Check the Usable Fluid
- Please use the appropriate fluid by referring to the Hydraulic Fluid List.
- If viscosity grade of hydraulic oil is higher than ISO-VG-32, action time becomes longer.
- If using it at low temperature, action time will be longer because the viscosity of hydraulic oil becomes higher.

2) Procedure before Piping
- Pipelines, piping connectors and others should be cleaned by thorough flushing.
- Dust and cutting chips in the circuit may lead to fluid leakage and malfunction.
- Our products except some valves are not equipped with protective function that prevents contamination.

3) Applying Sealing Tape
- Wrap with tape 1 to 2 times following the screw direction.
- Pieces of the sealing tape can lead to fluid leakage and malfunction.
- Please implement piping construction in a clear environment to prevent anything getting in products.

4) Air Bleeding of the Hydraulic Circuit
- If the hydraulic circuit has excessive air, the action time may become very long. If air enters the circuit after connecting the hydraulic port or under the condition of no air in the oil tank, please perform the following steps.

① Reduce hydraulic pressure to less than 2MPa.
② Loosen the cap nut of pipe fitting closest to the clamp, RQA/RA Die Lifter by one full turn.
③ Shake the pipeline to loosen the outlet of pipe fitting. Hydraulic fluid mixed with air comes out.



④ Tighten the cap nut after air bleeding.
⑤ It is more effective to release air at the highest point inside the circuit or at the end of the circuit.

5) Checking Looseness and Retightening
- At the beginning of the machine installation, the bolt and nut may be tightened lightly. Check the looseness and re-tighten as required.

Hydraulic Fluid List

ISO Viscosity Grade ISO-VG-32

Maker	Anti-Wear Hydraulic Oil	Multi-Purpose Hydraulic Oil
Showa Shell Sekiyu	Tellus S2 M 32	Morlina S2 B 32
Idemitsu Kosan	Daphne Hydraulic Fluid 32	Daphne Super Multi Oil 32
JX Nippon Oil & Energy	Super Hyrando 32	Super Mulpus DX 32
Cosmo Oil	Cosmo Hydro AW32	Cosmo New Mighty Super 32
ExxonMobil	Mobil DTE 24	Mobil DTE 24 Light
Matsumura Oil	Hydol AW-32	
Castrol	Hyspin AWS 32	

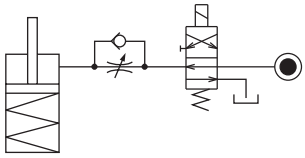
Note : Please contact manufacturers when customers require products in the list above.

Notes on Hydraulic Cylinder Speed Control Unit

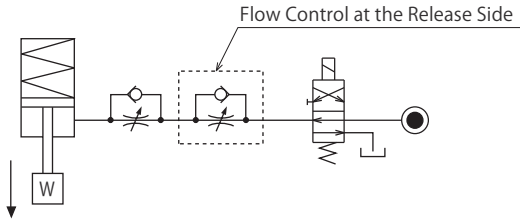
Please pay attention to the cautions below. Design the hydraulic circuit for controlling the action speed of hydraulic cylinder. Improper circuit design may lead to malfunctions and damages. Please review the circuit design in advance.

Flow Control Circuit for Single Acting Cylinder

For spring return single-acting cylinders, restricting flow during release can extremely slow down or disrupt release action. The preferred method is to control the flow during the lock action using a valve that has free-flow in the release direction. It is also preferred to provide a flow control valve at each actuator.



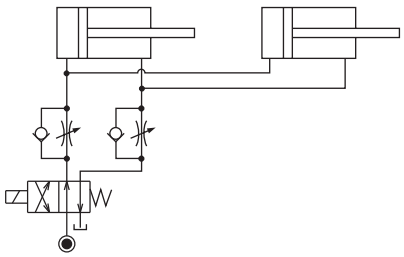
Accelerated clamping speed by excessive hydraulic flow to the cylinder may sustain damage. In this case add flow control to regulate flow.



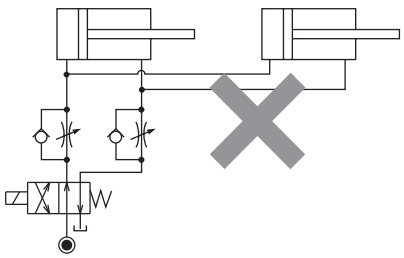
Flow Control Circuit for Double-Acting Cylinder

Flow control circuit for double-acting cylinder should have meter-out circuits for both the lock and release sides. Meter-in control can have adverse effect by presence of air in the system.

【Meter-out Circuit】

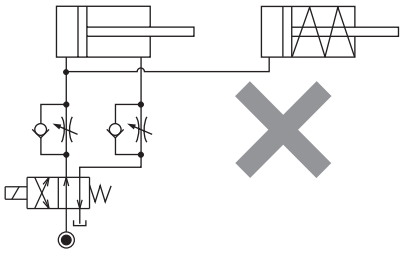


【Meter-in Circuit】



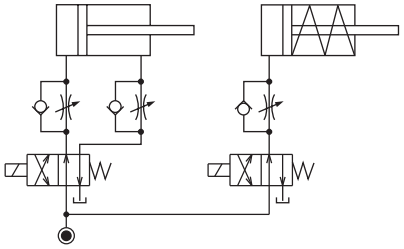
In the case of meter-out circuit, the hydraulic circuit should be designed with the following points.

① Single-acting components should not be used in the same flow control circuit as the double acting components. The release action of the single-acting cylinders may become erratic or very slow.

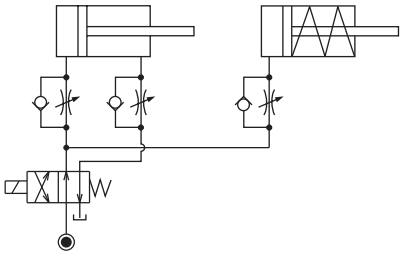


Refer to the following circuit when both the single-acting cylinder and double-acting cylinder are used together.

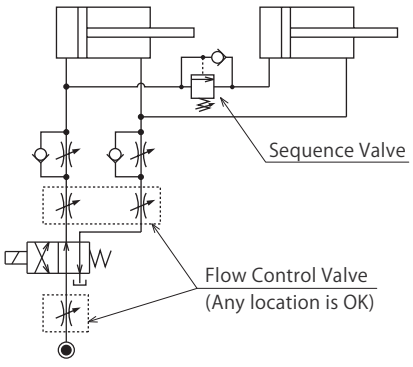
○ Separate the control circuit.



○ Reduce the influence of double-acting cylinder control unit. However, due to the back pressure in tank line, single-acting cylinder is activated after double-acting cylinder works.



② In the case of meter-out circuit, the inner circuit pressure may increase during the cylinder action because of the fluid supply. The increase of the inner circuit pressure can be prevented by reducing the supplied fluid beforehand via the flow control valve. Especially when using sequence valve or pressure switches for clamping detection. If the back pressure is more than the set pressure then the system will not work as it is designed to.



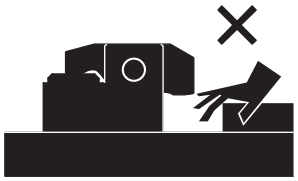
Cautions

Notes on Handling

1) It should be operated by qualified personnel.
- Hydraulic products, machines and devices should be operated and maintained by qualified personnel.

2) Do not operate or remove the product unless the safety protocols are ensured.
① The machine and equipment can only be inspected or prepared when it is confirmed that the safety devices are in place.
② Before the product is removed, make sure that the above-mentioned safety devices are in place. Shut off the pressure and power source, and make sure no pressure exists in the hydraulic and air circuits.
③ After stopping the product, do not remove until the temperature drops.
④ Make sure there is no abnormality in the bolts and respective parts before restarting the machine or equipment.

3) Do not touch a clamp (cylinder) while it is working.
Otherwise, your hands may be injured.

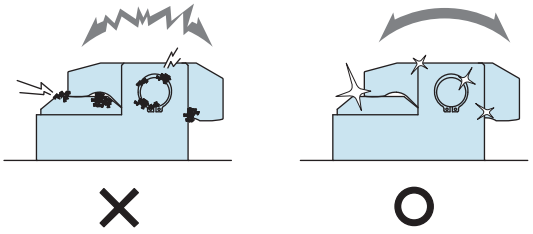


4) Do not disassemble or modify.
- If the product is taken apart or modified, the warranty will be voided even within the warranty period.

Maintenance・Inspection

1) Removal of the Product and Shut-off of Pressure Source
- Before removing the product, make sure that safety devices are in place. Shut off the pressure and power source, and make sure no pressure exists in the air and hydraulic circuits.
- Make sure there is no abnormality in the bolts and respective parts before restarting.

2) Regularly clean the area around the product.
- If it is used when the surface is contaminated with dirt, it may lead to packing seal damage, malfunctioning and fluid leakage.



3) If disconnecting by couplers, air bleeding should be carried out on a regular basis to avoid air mixed in the circuit.

4) Regularly tighten bolts, pipe line, mounting bolt, nut, snap ring, cylinder and others to ensure proper use.

5) Make sure the hydraulic fluid has not deteriorated.

6) Make sure there is a smooth action without an irregular noise.
- Especially when it is restarted after left unused for a long period, make sure it can be operated correctly.

7) The products should be stored in the cool and dark place without direct sunshine or moisture.

8) Please contact us for overhaul and repair.

Warranty

1) Warranty Period

- The product warranty period is 18 months from shipment from our factory or 12 months from initial use, whichever is earlier.

2) Warranty Scope

- If the product is damaged or malfunctions during the warranty period due to faulty design, materials or workmanship, we will replace or repair the defective part at our expense.
  Defects or failures caused by the following are not covered.

① If the stipulated maintenance and inspection are not carried out.
② If the product is used while it is not suitable for use based on the operator's judgment, resulting in defect.
③ If it is used or operated in an inappropriate way by the operator. (Including damage caused by the misconduct of the third party.)
④ If the defect is caused by reasons other than our responsibility.
⑤ If repair or modifications are carried out by anyone other than Kosmek, or without our approval and confirmation, it will void warranty.
⑥ Other caused by natural disasters or calamities not attributable to our company.
⑦ Parts or replacement expenses due to parts consumption and deterioration.
(Such as rubber, plastic, seal material and some electric components.)

Damages excluding from direct result of a product defect shall be excluded from the warranty.

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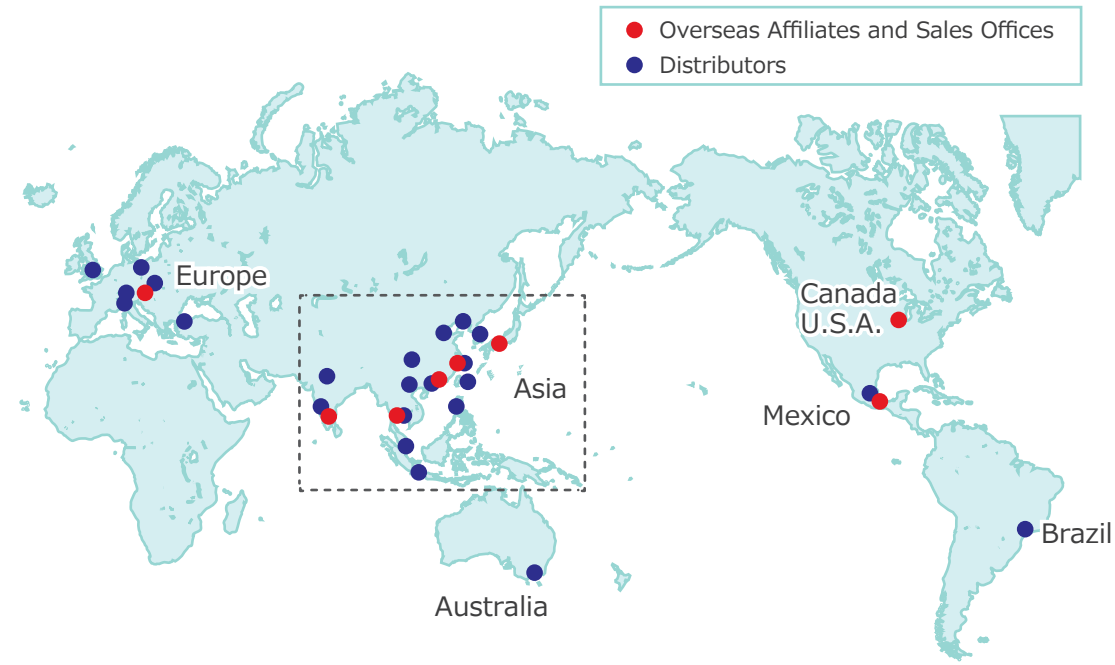
Global Network



Asia Detailed Map

KOSMEK
Harmony in Innovation

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