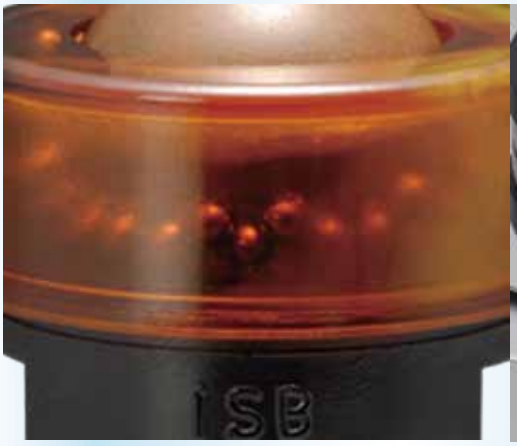
IGUCHIBEAR PRODUCT CATALOGUE

Cleanroom Type Ball Transfer




IGUCHI KIKO CO., LTD.

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Cleanroom Type Ball Transfer

About Balls Transfers for Cleanroom Use

Our abundant line-up of ball transfers for cleanrooms have been meticulously designed and manufactured to meet each individual needs of our customers.

Cleanroom Ball Transfers (ISC Series) are used in Flat Panel Display (FPD), Photovoltaic (PV), solar, and medical equipment production lines all over the world, due to its innovative technology for alignment and positioning.ISC Ball Transfers have evolved continuously with newly added value to satisfy manufacturers to improve production. These units have a successfully proven track-record of usage in pre-processes and post-processes of LCD manufacturing. We have also developed a low-cost molded type (ISCS series) ball transfer that is suitable for use in less-aggressive environments.

Features of Cleanroom Ball Transfers

1. Scratch-free DuPont Vespel and variety of other engineering plastics such as PBI and PEEK for handling glass substrates.
2. Our original and unique clean-technology enables to suppress particle generation to the highest cleanness.
3. We developed a new range of low-cost molded ball transfers in addition to high precision machine-cut ball transfers.
4. Varity of degreasing cleaning packages are available upon request for specific environments and Cleanrooms. For more details please contact us.
5. A wide range of products with variety of materials are available for specific applications such as wet, dry processes, mother glass trimming, cutting, optical measuring apparatus where minimum light reflection is desired, vacuum chambers and high temp over 200°C, etc.
6. Customized ball transfers for specific applications are also available upon request.

Advantages of Cleanroom Ball Transfers

1. Friction resistance 1/10 compared to conventional Pin alignment.
2. Ball transfer alignment and positioning enables, less friction, long life, stability, compared to Pin which wear soon.
3. With low friction reduce lines, cracks and flaws on glass substrate; improve yields at loader/unloader and other applications.
4. Frequent replacement is not needed which occurs from abrasion or wear.

About Cleanroom Ball Transfers - Load Capacity

Load capacity on each ball transfer used inside a Cleanroom differs depending on the application specification. We highly recommend consulting with our sales staff in order to select the right material for your application. Also please keep in mind following points.

1.Device characteristics and operating environment.
2.Materials in contact (ball vs. floor, wall, etc.)
3.Travel distance
4.Travel speed

From our long experience with wide range of products specified in variety of applications from FPD to PV and other Cleanroom applications, we recommend when using Cleanroom ball transfers in an application, consider 0-1kg on each ball transfer. Although in some cases above information may not be applicable. In that case please contact us for a better solution.

Electrically Conductive ISC Series Ball Transfers

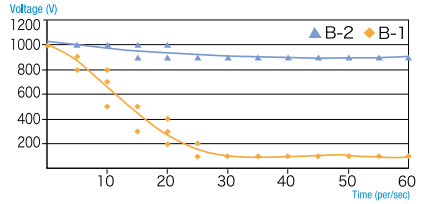
ISB electrically conductive ball transfers are used extensively in FPD production lines; especially in Array Process of LCD production lines. We offer customized ball transfers to meet application needs of the customer.

Anti-static Property Test of Electrically Conductive ISC Series Ball Transfers

The anti-static properties of the electrically conductive ISC Series ball transfers were tested by the following method. When the surface of LCD glass substrate is charged with electrostatics, we attached an ESD and a normal ball transfer to glass substrate and measured the static voltage reduction for both products.

B1 ESD ball transfer : Electrically conductive ball transfer
Main ball surface electric resistance factor: 10^4 to 10^5
B2 Normal ball transfer : Non-electrically conductive ball transfer
Main ball surface electric resistance factor: over 10^{12} or greater

Transition of Static Voltage level



* The data are obtained by applying in-house test rules. The data is not guaranteed. Use data for reference only

Cleanroom Ball Transfers - Basic Performance

Using Cleanroom ball transfers in an application depends on application specifications, article, load, class of Cleanroom as well as environment. Choosing a combination of materials is a critical key when selecting a ball transfer for a specific application. Since the design and concept of conventional ball transfers are no longer applicable, we tested the new ball transfers in our in-house test room to obtain preliminary approximate data, assuming that application is limited to glass substrate alignment in semiconductor/FPD production lines.

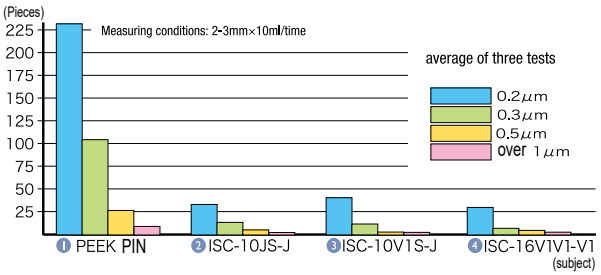
Note: Use utmost care when evaluating the data below, they were obtained under limited conditions. For more information and details, contact our sales department.

■ Dust generation comparison test between Ball transfer and PEEK Pin

How we conduct the test: In Cleanroom booth, FPD glass substrate supported by ISC Ball Transfer.
Transfers or PEEK Pins, then moved glass substrate few millimeters while an estimated weight is given. Generated particles are collected in water and counted by a particle counter.

Note: The number of particle accuracy is not guarantee

Dust generation comparison test Between Ball Transfer unit and PEEK Pin



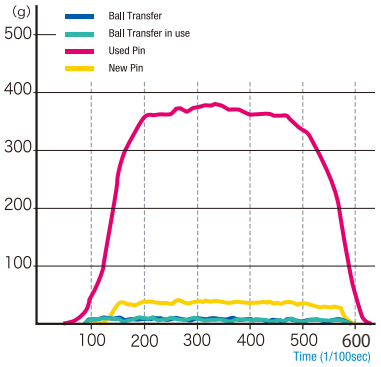
Note: The number of particles obtained by applying in-house test rules. The data accuracy is not guaranteed and is for reference only.

The following parts were tested.
1.PEEK pins
2.ISC Ball Transfer, ISC-10JS-J
3.ISC Ball Transfer, ISC-101S-J
4.ISC Ball Transfer, ISC-16V1V1-V1

■ Friction Comparison Test of Ball Transfer vs. PEEK Pin

Test conditions: In general environment, glass substrate supported by six ISC ball transfers and PEEK pins, moved few times with a fixed force to horizontal direction then measured by a load-cell device.

Comparison Test of Friction Resistance between Ball Transfer and PEEK Pin



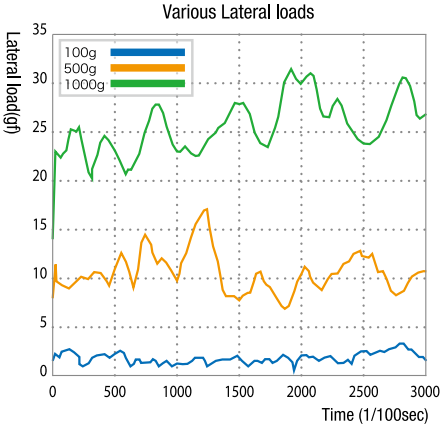
Note: The date is obtained by applying in-house test rules.
The data accuracy is not guaranteed and is for reference only.

Conditions of worn PEEK Pins
* Weight of glass substrate: 300 g (supported at 6 points)
* Total travel distance: Approx. 12 meter (obtained by 4000 times alignments /3 mm)

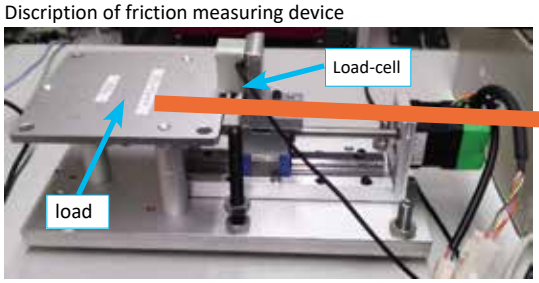
■Measurement of ball transfer friction coefficient

Research objective : to measure friction coefficient of ISCS-10P1S-J
Survey content : measured each ball transfer friction coefficient under 100gf, 500gf, 1000gf.
Traveling speed: about 5mm/min

Various Lateral loads



Discription of friction measuring device



Number of ball transfers under the load ×3

Friction coefficient average

Load 1000gf =about 0.025	Load 500gf=about 0.021	Load 100gf =about 0.018

Materials of Ball Transfer

Main ball :	PEEK
Small Balls :	Stainless
Body :	POM
Cap :	POM

ISCS-10P1S-J

ISC Type Quick Reference Chart

ISC- [1] [2] [3] - [4] [5]

1. Main ball size (Diameter in mm)
2. Main ball material
3. Small Balls material
4. Body material
5. Cap material (No referance if material is same as body)

ISCS Type Quick Reference Chart

ISCS- [1] [2] [3] - [4]

1. Main Ball size (Diameter in mm)
2. Main Ball material
3. Small balls material
4. Body material

IP Type Reference Chart

IP- [1] [2] W/NW/B/NB

1. Main ball size (diameter in mm)
2. Main Ball material

What is W/NW/B/NB ?
W : POM (White) Flange
NW : POM (White) Bolt type
B : POM (Black) Flange
NB : POM (Black) Bolt type

Material

Vespel® SP	PEEK	UHMWPE	3F	SUS304	POM	Ceramic
ESD Vespel® SP	ESD PEEK	ESD UHMWPE	POM	Ceramic	SUS304	

Degreasing Cleaning Process

ISB Cleaning is a process of degreasing by Ultrasonic Vaccum Washing using hydrocarbon solvent. After the washing and drying process all parts are handled using gloves to prevent any type of impurity caused by direct contact, and finally individually packaged.

Type of Packing

Standard Packaging
For uses when opened outside a cleanroom environment and taken into the cleanroon without using gloves.

Standard Packaging

Standard Packaging

Vacuum Packaging
For long term storage or shipping abroad.

Vacuum Packaging

Cleanpack Packaging
All parts with be degreased, and packed within a cleanroom environment.

Cleanpack Packaging

About Cleanroom

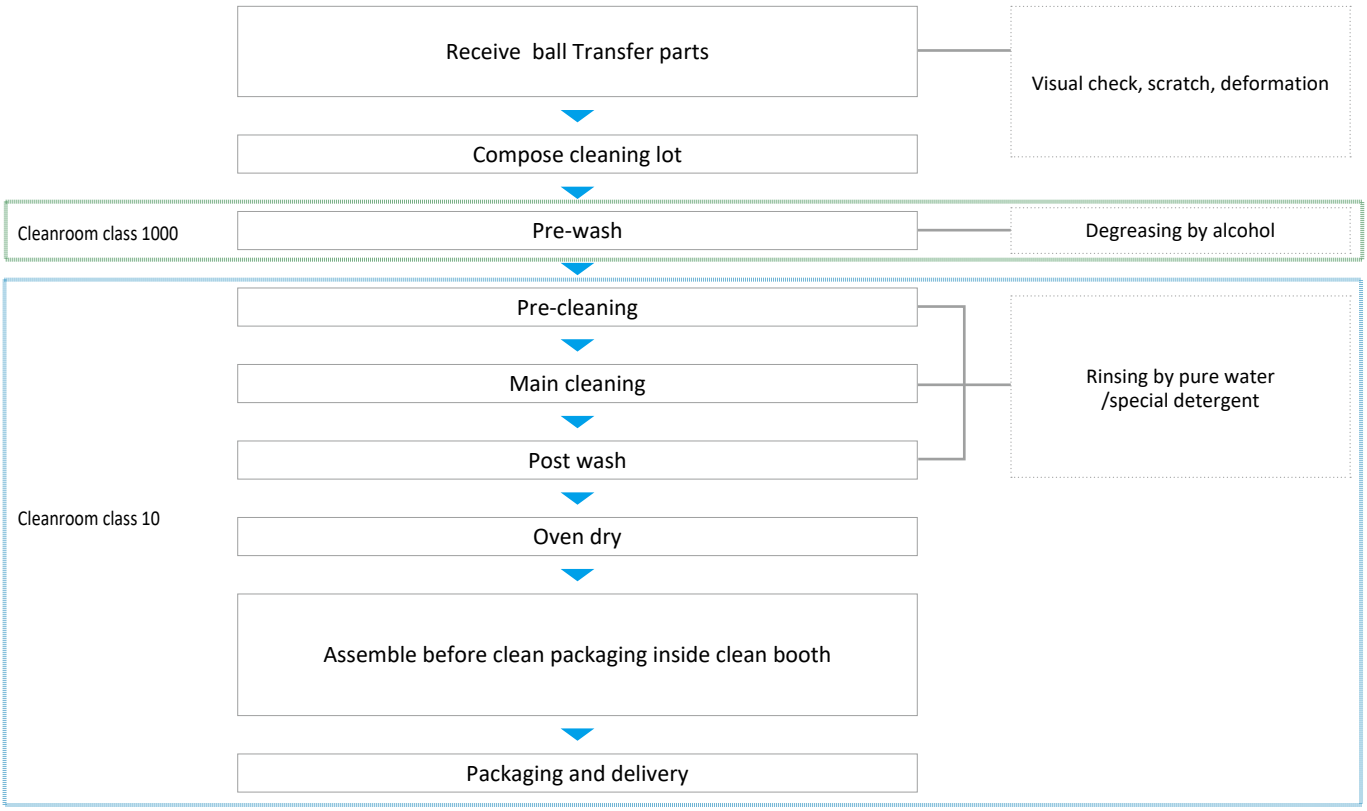
A cleanroom is a controlled environment that is designed to maintain extremely low levels of particulates, such as dust, airborne organisms, or vaporized particles.

About Cleanliness levels

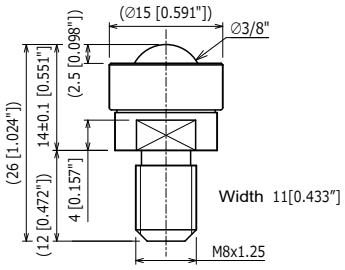
The cleanliness level of a cleanroom is quantified by the number of particles per cubic foot at a predetermined molecule measure. The commonly used standard is U.S. Federal Standard 209D which classifies cleanliness levels of cleanrooms by the number of 0.5micron sized particles found per cubic foot.
Accordingly Class 100 refers to a cleanroom with less that 100 0.5micron sized particles in an area of 1 cubic foot. Moreover, Class 1000 refers to less that 1000 0.5miron particles and Class 10,000 refers to less that 10,000 0.5micron sized particles in an area of 1 cubic foot.

Fed. Std. 209D	0.1μm	0.2μm	0.3μm	0.5μm	5μm
Class 1	35	8	3	1	—
Class 10	350	75	30	10	—
Class 100	3,500	750	300	100	—
Class 1,000	35,000	7.500	3,000	1,000	7
Class 10,000	—	—	—	10,000	70
Class 100,000	—	—	—	100,000	700

■ Clean Pack Flow Chart



ISC-10



- Besides ISC standard clean pack, other cleaning packages are also available upon request for specific applications.
- Load capacity depends on the application and environment, for more information please contact our sales.
- For conveyor applications please contact our sales.

ISC-10V1C-V1

Main Ball :	Vespel® SP
Small Balls :	Ceramic
Body :	Vespel® SP
Cap :	Vespel® SP

ISC-10V1S-V1

Main Ball :	Vespel® SP
Small Balls :	Stainless
Body :	Vespel® SP
Cap :	Vespel® SP

ISC-10JS-J

Main Ball :	POM
Small Balls :	Stainless
Body :	POM
Cap :	POM

ISC-10U1S-J

Main Ball :	UHMWPE
Small Balls :	Stainless
Body :	POM
Cap :	POM

ISC-10FS-J

Main Ball :	3F
Small Balls :	Stainless
Body :	POM
Cap :	POM

ISC-10P1S-J

Main Ball :	PEEK
Small Balls :	Stainless
Body :	POM
Cap :	POM

ISC-10V1S-J

Main Ball :	Vespel® SP
Small Balls :	Stainless
Body :	POM
Cap :	POM

ISC-10U1S-U1

Main Ball :	UHMWPE
Small Balls :	Stainless
Body :	UHMWPE
Cap :	UHMWPE

ISC-10FS-U1

Main Ball :	3F
Small Balls :	Stainless
Body :	UHMWPE
Cap :	UHMWPE

ISC-10P1S-U1

Main Ball :	PEEK
Small Balls :	Stainless
Body :	UHMWPE
Cap :	UHMWPE

ISC-10V1S-U1

Main Ball :	Vespel® SP
Small Balls :	Stainless
Body :	UHMWPE
Cap :	UHMWPE

ISC-10FS-F

Main Ball :	3F
Small Balls :	Stainless
Body :	3F
Cap :	3F

ISC-10P1S-F

Main Ball :	PEEK
Small Balls :	Stainless
Body :	3F
Cap :	3F

ISC-10V1S-F

Main Ball :	Vespel® SP
Small Balls :	Stainless
Body :	3F
Cap :	3F

ISC-10P1S-P1

Main Ball :	PEEK
Small Balls :	Stainless
Body :	PEEK
Cap :	PEEK

ISC-10V1S-P1

Main Ball :	Vespel® SP
Small Balls :	Stainless
Body :	PEEK
Cap :	PEEK

Cleanroom Type Ball Transfer

ISC-10

Stainless Body

ISC-10JS-SJ

Main Ball :	POM
Small Balls :	Stainless
Body :	Stainless
Cap :	POM

ISC-10U1S-SU1

Main Ball :	UHMWPE
Small Balls :	Stainless
Body :	Stainless
Cap :	UHMWPE

ISC-10P1S-SP1

Main Ball :	PEEK
Small Balls :	Stainless
Body :	Stainless
Cap :	PEEK

ISC-10P2S-SP1

Main Ball :	ESD PEEK
Small Balls :	Stainless
Body :	Stainless
Cap :	PEEK

ISC-10V1S-SV1

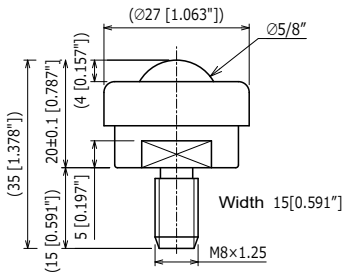
Main Ball :	Vespel® SP
Small Balls :	Stainless
Body :	Stainless
Cap :	VESPEL®SP

ISC-10V2S-SV1

Main Ball :	ESD Vespel® SP
Small Balls :	Stainless
Body :	Stainless
Cap :	Vespel® SP

Cleanroom Type Ball Transfer

ISC-16



ISC-16JS-J

Main Ball :	POM
Small Balls :	Stainless
Body :	POM
Cap :	POM

ISC-16U1S-J

Main Ball :	UHMWPE
Small Balls :	Stainless
Body :	POM
Cap :	POM

ISC-16FS-J

Main Ball :	3F
Small Balls :	Stainless
Body :	POM
Cap :	POM

ISC-16P1S-J

Main Ball :	PEEK
Small Balls :	Stainless
Body :	POM
Cap :	POM

ISC-16V1S-J

Main Ball :	Vespel® SP
Small Balls :	Stainless
Body :	POM
Cap :	POM

Cleanroom Type Ball Transfer

ISC-16

Stainless Body

ISC-16JS-SJ

Main Ball :	POM
Small Balls :	Stainless
Body :	Stainless
Cap :	POM

ISC-16U1S-SJ

Main Ball :	UHMWPE
Small Balls :	Stainless
Body :	Stainless
Cap :	POM

ISC-16FS-SJ

Main Ball :	3F
Small Balls :	Stainless
Body :	Stainless
Cap :	POM

ISC-16P1S-SJ

Main Ball :	PEEK
Small Balls :	Stainless
Body :	Stainless
Cap :	POM

ISC-16V1S-SJ

Main Ball :	Vespel® SP
Small Balls :	Stainless
Body :	Stainless
Cap :	POM

ISC-16U2S-SJ

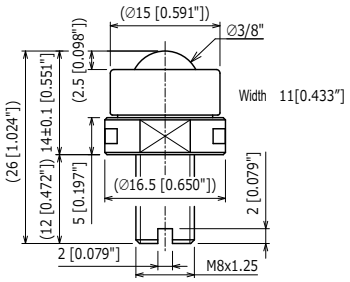
Main Ball :	ESD UHMWPE
Small Balls :	Stainless
Body :	Stainless
Cap :	POM

ISC-16P2S-SJ

Main Ball :	ESD PEEK
Small Balls :	Stainless
Body :	Stainless
Cap :	POM

Cleanroom Type Ball Transfer

ISCS-10



- Besides ISCS ISB Cleaning other cleaning and packaging options are also available upon request.
- Load capacity depends on the application and environment, for more information please contact our sales.
- For conveyor applications please contact our sales.
- Cap and Body can be changed to POM (Black) upon request.
- Body and cap are low-cost molded type.

ISCS-10JS-J

Main Ball :	POM
Small Balls :	Stainless
Body :	POM
Cap :	POM

ISCS-10U1S-J

Main Ball :	UHMWPE
Small Balls :	Stainless
Body :	POM
Cap :	POM

ISCS-10FS-J

Main Ball :	3F
Small Balls :	Stainless
Body :	POM
Cap :	POM

ISCS-10P1S-J

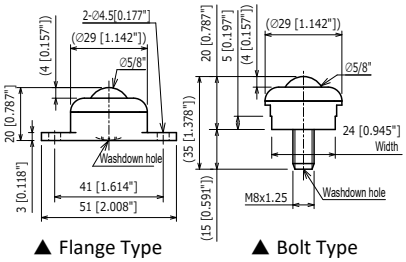
Main Ball :	PEEK
Small Balls :	Stainless
Body :	POM
Cap :	POM

ISCS-10V1S-J

Main Ball :	Vespel® SP
Small Balls :	Stainless
Body :	POM
Cap :	POM

Cleanroom Type Ball Transfer

IP-16



▲ Flange Type ▲ Bolt Type

- Besides IP ISB Cleaning other cleaning and packaging options are also available upon request.
- Load capacity depends on the application and environment, for more information please contact our sales.
- For conveyor applications please contact our sales.
- Materiel of Small balls can be changed upon request.
- Recommended tightening torque is less than 0.8N·m.
- Body and cap are low-cost molded type.

IP-16JW

Main Ball : POM
Body / Cap / Small Balls : POM

IP-16U1W

Main Ball : UHMWPE
Body / Cap / Small Balls : POM

IP-16P1W

Main Ball : PEEK
Body / Cap / Small Balls : POM

✣ IP-16V1W

Main Ball : Vespel® SP
Body / Cap / Small Balls : POM

✣ IP-16U2B

Main Ball : ESD UHMWPE
Body / Cap / Small Balls : POM

✣ IP-16JNW

Main Ball : POM
Body / Cap / Small Balls : POM

✣ IP-16U1NW

Main Ball : UHMWPE
Body / Cap / Small Balls : POM

✣ IP-16P1NW

Main Ball : PEEK
Body / Cap / Small Balls : POM

✣ IP-16V1NW

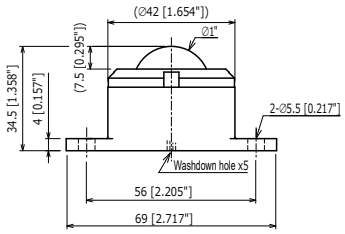
Main Ball : Vespel® SP
Body / Cap / Small Balls : POM

✣ IP-16U2NB

Main Ball : ESD UHMWPE
Body / Cap / Small Balls : POM

Cleanroom Type Ball Transfer

IP-25



▲ Flange Type

✣ IP-25JW

Main Ball : POM
Body / Cap / Small Balls : POM

✣ IP-25U1W

Main Ball : UHMWPE
Body / Cap / Small Balls : POM

✣ IP-25P1W

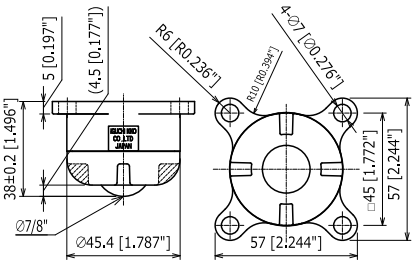
Main Ball : PEEK
Body / Cap / Small Balls : POM

✣ IP-25U2B

Main Ball : ESD UHMWPE
Body / Cap / Small Balls : POM

Cleanroom Type Ball Transfer

IPK-22



- Besides IPK ISB Cleaning other cleaning and packaging options are also available upon request.
- For conveyor applications please contact our sales.

IPK-22

Load Capacity	: 15.4 lbf
Product Weight	: 1.0 lbs

Body	: POM
Main Ball	: POM
Small Balls	: POM
Cap	: POM
Support Cup	: POM
Internal Cap	: POM
Seal	: PBT

The features of IPK

Caster type Ball Transfer with a good cost performance.

Application

Medical, Food plants, Cleanrooms and places where steel can't be used.

Cleanroom Type Ball Transfer

Engineering innovation and custom solutions a specialty of our company

We also are enthusiastic about developing custom-made products to meet our customer's specific demands for new applications. Our next challenge is to develop products for extreme environments, such as temperature higher than 1000°C, and unique special model for vacuum environments with new construction and movement so they can be specified in the next generation processing systems and semiconductor industries.

We have enhanced our facilities with specialized equipment such as CNC Machines for products as small as ϕ 6mm, and CNC machines with the ability of precision machining of plastic and stainless steel products.

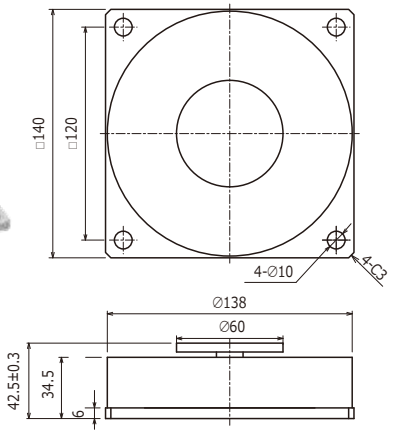
ILS lock free series ILS lock series

ILS Series Positioning Stages (Patented)

ILS Series positioning stages have been developed as buffers at each stage of glass substrate processing for simply positioning glass substrates buffer cassettes.
Since we have developed ILS stage units, there has been worldwide market demand for positioning cassettes especially the large types G7 and G8 mother glasses in FPD industries processing systems as well as the small types for updating existing processing systems. The ILS Series positioning stages upper plate rolls smoothly in any 360 degree direction. Despite their compactness, they also can carry heavy loads than conventional type and set the substrate cassette at a desired position. The cassettes are then unloaded by AGV to let the ILS upper plate return to its original position to load the next cassette. Instead of returning the upper plate of ILS stage unit to its original position, an S type is also available to hold the stage at an unloading position.

ILS lock free series

ILS-150

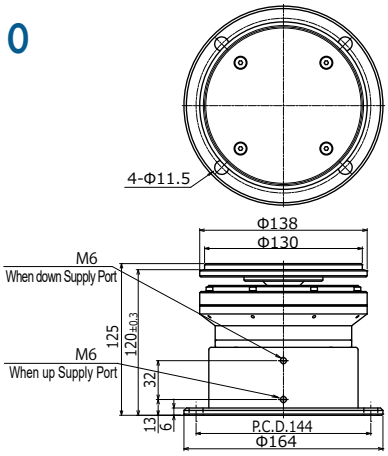


Product Weight	:	1.5kg / 3.3lbs
Moving Distance	:	±15mm / ±0.590"
Load Capacity	:	150kgf/ 1470 N/ 331lbf
Case	:	Aluminum+Alumite
Fixing flange	:	Aluminum+Alumite
Moving stage	:	SUS304

ILS-350-H10

Recommended Air Pressure/ Lifting Capability

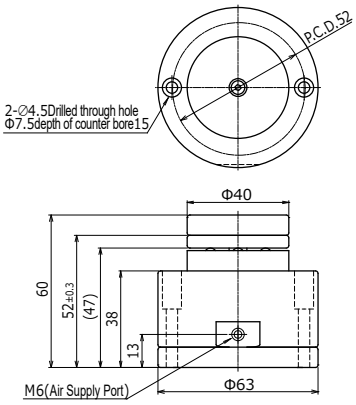
0.4MPa = 314kg
0.5MPa = 392kg
0.6MPa = 417kg



Product Weight	:	4.1kg / 9.03lbs
Horizontal Stroke	:	±20mm / ±0.787"
Vertical Stroke	:	10mm / ±0.394
Load Capacity	:	350kgf/ 3432N/ 771lbf
Case	:	Aluminum+Alumite
Fixing flange	:	Aluminum+Alumite
Moving stage	:	SUS304+ESD UHMWPE

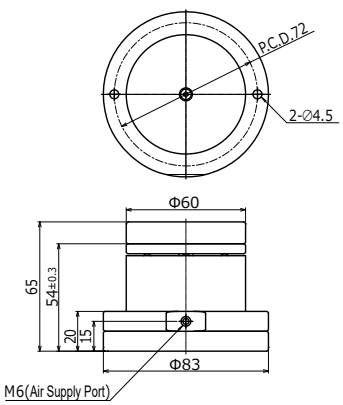
ILS lock series

ILS-30S-40



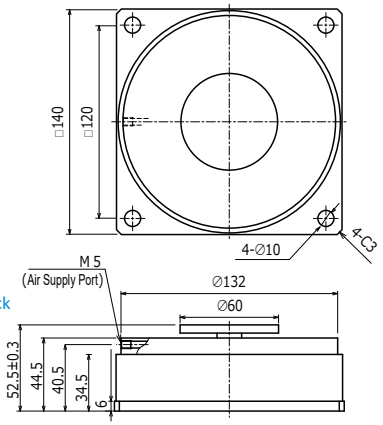
Product Weight	:	0.4kg / 0.88lbs
Moving Distance	:	±5mm/ ±0.197"
Load Capacity	:	30kgf/ 294N/ 66lbf
Recommended Air Pressure	:	0.4MPa~0.6MPa
Case	:	Aluminum+Alumite
Fixing flange	:	Aluminum+Alumite
Moving stage	:	UHMWPE

ILS-30S-60



Product Weight	:	0.6kg / 1.32lbs
Moving Distance	:	±5mm/ ±0.197"
Load Capacity	:	30kgf/ 294N/ 66lbf
Recommended Air Pressure	:	0.4MPa~0.6MPa
Case	:	Aluminum+Alumite
Fixing flange	:	Aluminum+Alumite
Moving stage	:	UHMWPE

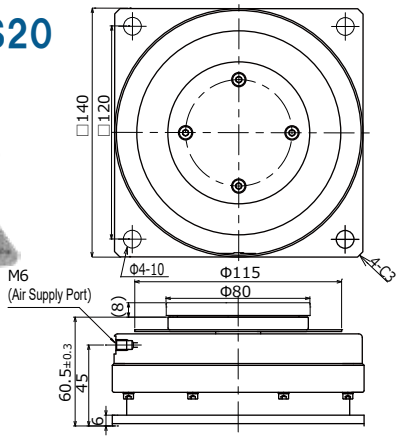
ILS-150S



Vacuuming is needed to release lock

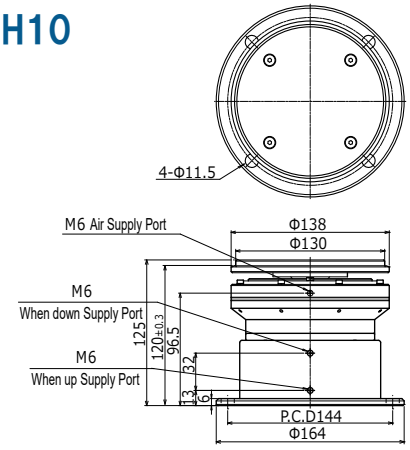
Product Weight	:	1.8kg / 3.96lbs
Moving Distance	:	±15mm/ ±0.590"
Load Capacity	:	150kgf/ 1470 N/ 331lbf
Recommended Air Pressure	:	0.4MPa~0.6MPa
Case	:	Aluminum+Alumite
Fixing flange	:	Aluminum+Alumite
Moving stage	:	SUS304

ILS-150S-S20



Product Weight	:	2.2kg / 4.85lbs
Moving Distance	:	±20mm/ ±0.787"
Load Capacity	:	150kgf/ 1470 N/ 331lbf
Recommended Air Pressure	:	0.4MPa~0.6MPa
Case	:	Aluminum+Alumite
Fixing flange	:	Aluminum+Alumite
Moving stage	:	SUS304+ESD UHMWPE

ILS-350S-H10

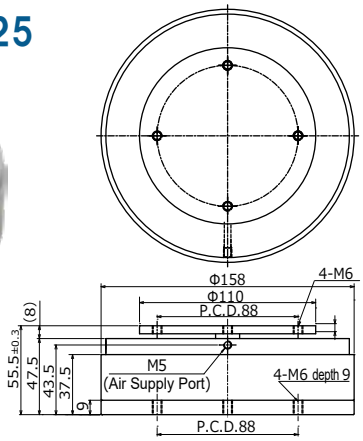


Recommended Air Pressure/
Lifting Capability

0.4MPa = 314kg
0.5MPa = 392kg
0.6MPa = 417kg

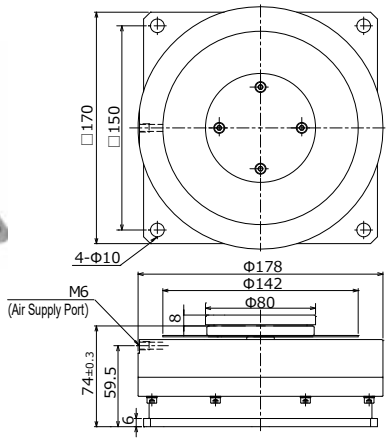
Product Weight	:	4.2kg / 9.25lbs
Vertical Stroke	:	±20mm/ ±0.787"
Vertical Stroke	:	10mm / ±0.394
Load Capacity	:	350kgf/ 3432N/ 771lbf
Case	:	Aluminum+Alumite
Fixing flange	:	Aluminum+Alumite
Moving stage	:	SUS304+ESD UHMWPE

ILS-350S-S25



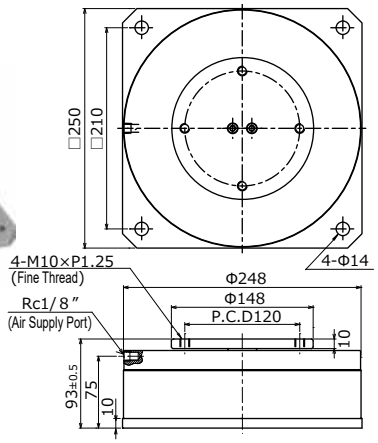
Product Weight	:	2.8kg / 6.17lbs
Moving Distance	:	±25mm/ ±0.984"
Load Capacity	:	350kgf/ 3432N/ 771lbf
Recommended Air Pressure	:	0.4MPa~0.6MPa
Case	:	Aluminum+Alumite
Fixing flange	:	Aluminum+Alumite
Moving stage	:	SUS304

ILS-500S



Product Weight	:	3.9kg / 8.59lbs
Moving Distance	:	±30mm/ ±1.181"
Load Capacity	:	500kgf/ 4903N/ 1102lbf
Recommended Air Pressure	:	0.4MPa~0.6MPa
Case	:	Aluminum+Alumite
Fixing flange	:	Aluminum+Alumite
Moving stage	:	SUS304+ESD UHMWPE

ILS-800S

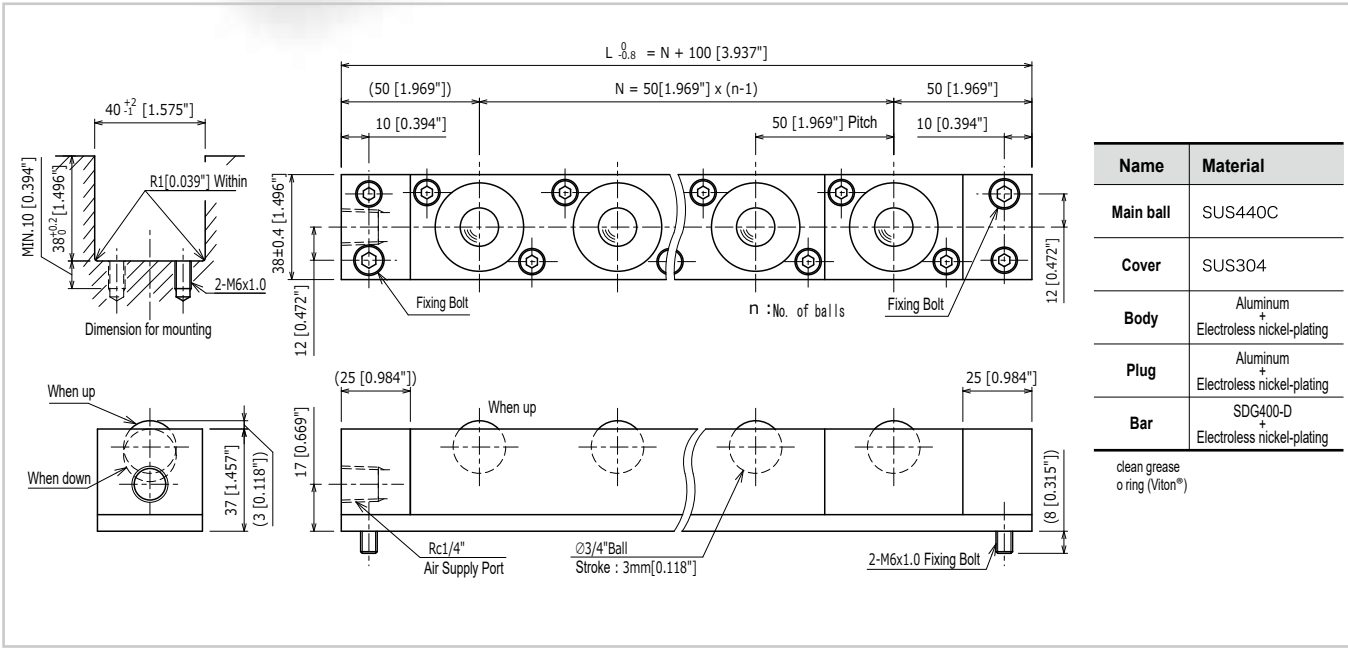


Product Weight	:	12.3kg / 27.1lbs
Moving Distance	:	±50mm/ ±1.969"
Load Capacity	:	800kgf/ 7845N/ 1763lbf
Recommended Air Pressure	:	0.4MPa~0.6MPa
Case	:	Aluminum+Alumite
Fixing flange	:	Aluminum+Alumite
Moving stage	:	SUS304

ISR-C38 TYPE

ISR-C Series Air Ball Lifters (Patented)

ISR-C Series air ball lifters are designed based on conventional air ball lifters to improve the cleanliness grade for Cleanroom applications. Proven technology in wide range of applications such as Semiconductor/FPD production lines,positioning and alignment of glass substrates, universal jigs and transferring heavy tools inside Cleanrooms.
Customized models are also available for specific applications upon request.
Please contact us.



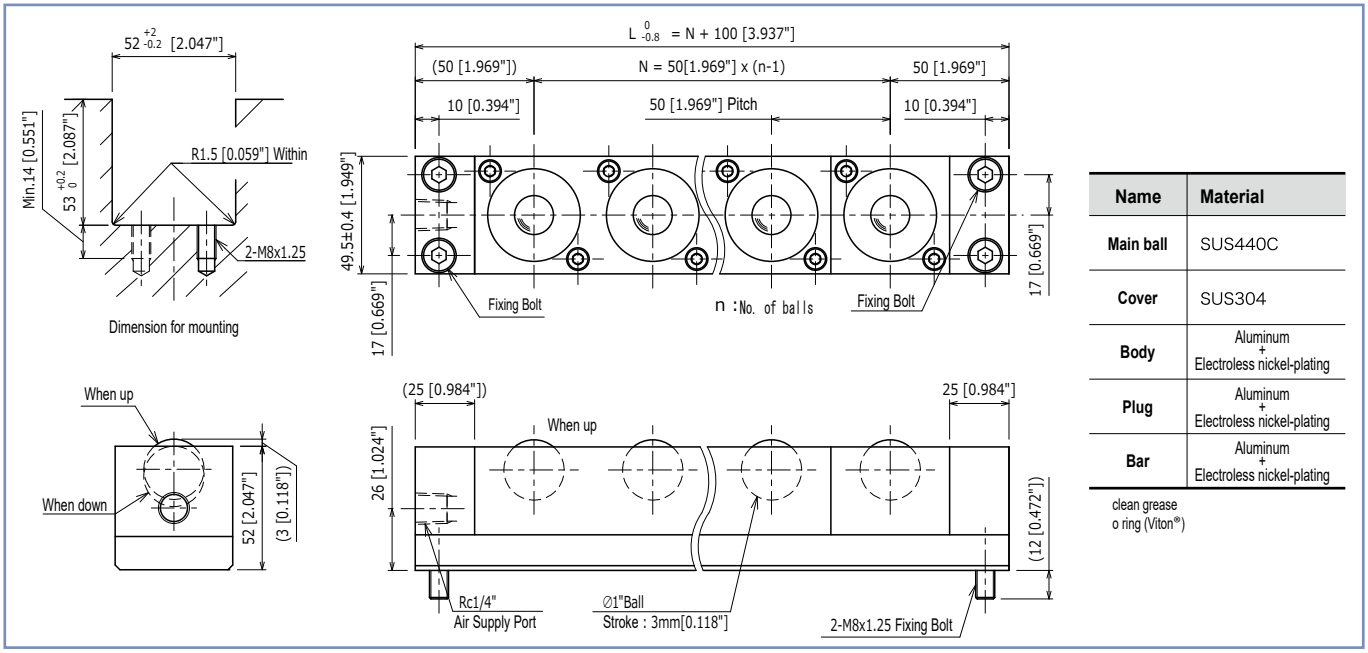
Name	Material
Main ball	SUS440C
Cover	SUS304
Body	Aluminum + Electroless nickel-plating
Plug	Aluminum + Electroless nickel-plating
Bar	SDG400-D + Electroless nickel-plating

clean grease
o ring (Viton®)

•Accessory mounting bolts.

Model	Overrall length of Ball Lifter L		No. of balls n	Product Weight		Load capacity on each unit								
						Supplied air pressure								
						0.4MPa (4.08kgf/cm^2)			0.5MPa (5.10kgf/cm^2)			0.6MPa (6.12kgf/cm^2)		
	(mm)	(inch)		(kg)	(lbs)	(kgf)	(kN)	(lbf)	(kgf)	(kN)	(lbf)	(kgf)	(kN)	(lbf)
ISR-C38-100-A	100	3.94	1	0.6	1.3	33	0.32	73	42	0.41	93	52	0.51	115
ISR-C38-150-A	150	5.91	2	0.9	2	66	0.65	146	84	0.82	185	104	1.02	229
ISR-C38-200-A	200	7.87	3	1.2	2.6	99	0.97	218	126	1.23	278	156	1.53	344
ISR-C38-250-A	250	9.84	4	1.5	3.3	132	1.29	291	168	1.65	370	208	2.04	459
ISR-C38-300-A	300	11.81	5	1.8	4	165	1.62	364	210	2.06	463	260	2.55	573
ISR-C38-350-A	350	13.78	6	2.1	4.6	198	1.94	437	252	2.47	556	312	3.06	688
ISR-C38-400-A	400	15.75	7	2.4	5.3	231	2.26	509	294	2.88	648	364	3.57	803
ISR-C38-450-A	450	17.72	8	2.7	6	264	2.59	582	336	3.29	741	416	4.08	917
ISR-C38-500-A	500	19.69	9	3	6.6	297	2.91	655	378	3.70	833	468	4.59	1032
ISR-C38-550-A	550	21.65	10	3.3	7.3	330	3.23	728	420	4.12	926	520	5.10	1146
ISR-C38-600-A	600	23.62	11	3.6	7.9	363	3.56	800	462	4.53	1019	572	5.61	1261
ISR-C38-650-A	650	25.59	12	3.9	8.6	393	3.88	866	504	4.94	1111	624	6.12	1376
ISR-C38-700-A	700	27.56	13	4.2	9.3	429	4.20	946	546	5.35	1204	676	6.62	1490
ISR-C38-750-A	750	29.53	14	4.5	9.9	462	4.53	1019	588	5.76	1296	728	7.13	1605
ISR-C38-800-A	800	31.5	15	4.8	10.6	495	4.85	1091	630	6.17	1389	780	7.64	1720
ISR-C38-850-A	850	33.46	16	5.1	11.2	528	5.17	1164	672	6.59	1482	832	8.15	1834
ISR-C38-900-A	900	35.43	17	5.4	11.9	561	5.50	1237	714	7.00	1574	884	8.66	1949
ISR-C38-950-A	950	37.4	18	5.7	12.6	594	5.82	1310	756	7.41	1667	936	9.17	2064
ISR-C38-1000-A	1000	39.37	19	6	13.2	627	6.14	1382	798	7.82	1759	988	9.68	2178

ISR-C50S SINGLE PISTON TYPE



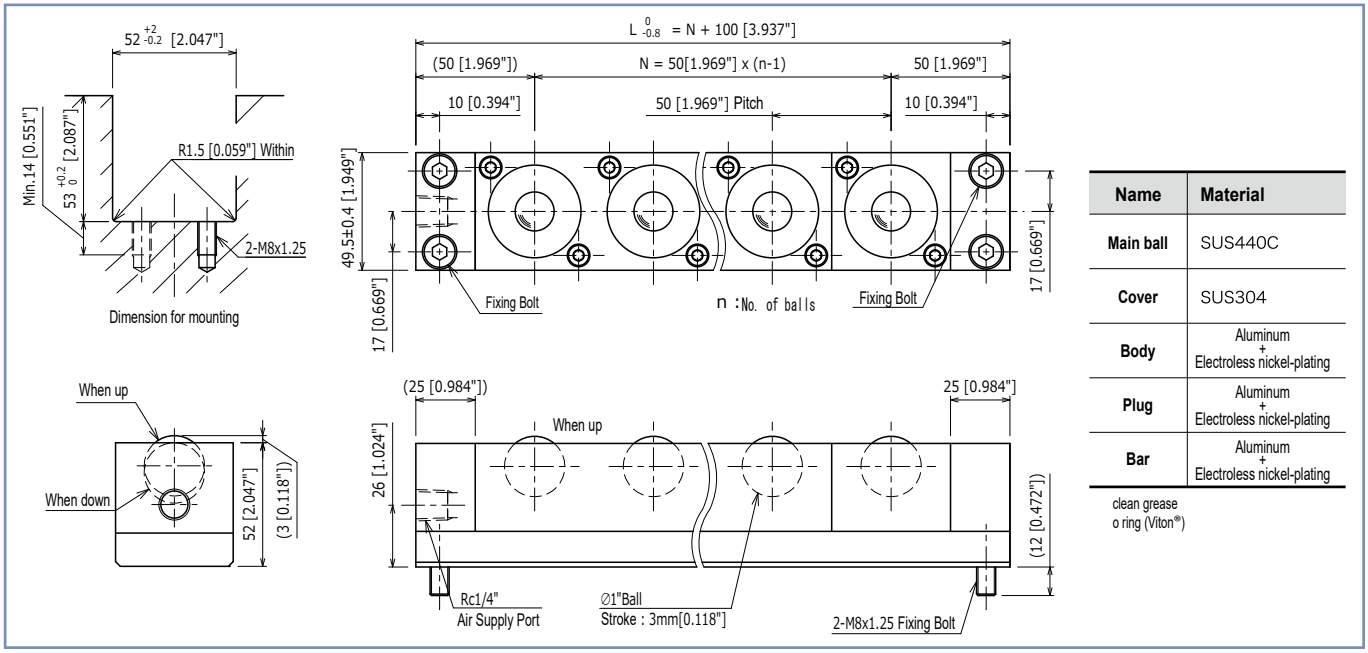
Name	Material
Main ball	SUS440C
Cover	SUS304
Body	Aluminum + Electroless nickel-plating
Plug	Aluminum + Electroless nickel-plating
Bar	Aluminum + Electroless nickel-plating

clean grease
o ring (Viton®)

•Accessory mounting bolts.

Model	Overrall length of Ball Lifter L		No. of balls n	Product Weight		Load capacity on each unit								
						Supplied air pressure								
						0.4MPa (4.08kgf/cm2)			0.5MPa (5.10kgf/cm2)			0.6MPa (6.12kgf/cm2)		
	(mm)	(inch)		(kg)	(lbs)	(kgf)	(kN)	(lbf)	(kgf)	(kN)	(lbf)	(kgf)	(kN)	(lbf)
ISR-C50S-100-A	100	3.94	1	0.9	2	47	0.46	104	61	0.60	135	75	0.73	165
ISR-C50S-150-A	150	5.91	2	1.4	3	94	0.92	207	122	1.20	269	150	1.47	331
ISR-C50S-200-A	200	7.87	3	1.8	4	141	1.38	311	183	1.79	403	225	2.20	496
ISR-C50S-250-A	250	9.84	4	2.3	5	188	1.84	415	244	2.39	538	300	2.94	661
ISR-C50S-300-A	300	11.81	5	2.7	6	235	2.30	518	305	2.99	672	375	3.68	827
ISR-C50S-350-A	350	13.78	6	3.2	6.9	282	2.76	622	366	3.59	807	450	4.41	992
ISR-C50S-400-A	400	15.75	7	3.6	7.9	329	3.22	725	427	4.19	941	525	5.15	1157
ISR-C50S-450-A	450	17.72	8	4.1	8.9	376	3.69	829	488	4.78	1076	600	5.88	1323
ISR-C50S-500-A	500	19.69	9	4.5	9.9	423	4.15	933	549	5.38	1210	675	6.62	1488
ISR-C50S-550-A	550	21.65	10	5	10.9	470	4.61	1036	610	5.98	1345	750	7.35	1653
ISR-C50S-600-A	600	23.62	11	5.4	11.9	517	5.07	1140	671	6.58	1479	825	8.09	1819
ISR-C50S-650-A	650	25.59	12	5.9	12.9	564	5.53	1243	732	7.18	1614	900	8.82	1984
ISR-C50S-700-A	700	27.56	13	6.3	13.9	611	5.99	1347	793	7.77	1748	975	9.56	2150
ISR-C50S-750-A	750	29.53	14	6.8	14.9	658	6.45	1451	854	8.37	1883	1050	10.30	2315
ISR-C50S-800-A	800	31.5	15	7.2	15.9	705	6.91	1554	915	8.97	2017	1125	11.00	2480
ISR-C50S-850-A	850	33.46	16	7.7	16.9	752	7.37	1658	976	9.57	2152	1200	11.80	2646
ISR-C50S-900-A	900	35.43	17	8.1	17.9	799	7.83	1761	1037	10.20	2286	1275	12.50	2811
ISR-C50S-950-A	950	37.4	18	8.6	18.8	846	8.29	1865	1098	10.80	2421	1350	13.20	2976
ISR-C50S-1000-A	1000	39.37	19	9	19.8	893	8.75	1969	1159	11.40	2555	1425	14.00	3142

ISR-C50D DOUBLE PISTON TYPE



Name	Material
Main ball	SUS440C
Cover	SUS304
Body	Aluminum + Electroless nickel-plating
Plug	Aluminum + Electroless nickel-plating
Bar	Aluminum + Electroless nickel-plating

clean grease
o ring (Viton®)

•Accessory mounting bolts.

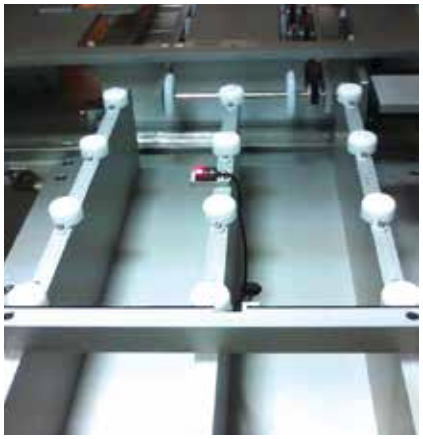
Model	Overall length of Ball Lifter L		No. of balls n	Product Weight		Load capacity on each unit								
						Supplied air pressure								
						0.4MPa (4.08kgf/cm2)			0.5MPa (5.10kgf/cm2)			0.6MPa (6.12kgf/cm2)		
	(mm)	(inch)		(kg)	(lbs)	(kgf)	(kN)	(lbf)	(kgf)	(kN)	(lbf)	(kgf)	(kN)	(lbf)
ISR-C50D-100-A	100	3.94	1	0.9	1.9	100	0.98	221	127	1.24	280	154	1.51	340
ISR-C50D-150-A	150	5.91	2	1.3	2.8	200	1.96	441	254	2.49	560	308	3.02	679
ISR-C50D-200-A	200	7.87	3	1.7	3.8	300	2.94	661	381	3.73	840	462	4.53	1019
ISR-C50D-250-A	250	9.84	4	2.2	4.7	400	3.92	882	508	4.98	1120	616	6.04	1358
ISR-C50D-300-A	300	11.81	5	2.6	5.7	500	4.90	1102	635	6.22	1400	770	7.55	1698
ISR-C50D-350-A	350	13.78	6	3	6.6	600	5.88	1323	762	7.47	1680	924	9.06	2037
ISR-C50D-400-A	400	15.75	7	3.4	7.6	700	6.86	1543	889	8.71	1960	1078	10.60	2377
ISR-C50D-450-A	450	17.72	8	3.9	8.5	800	7.84	1764	1016	9.96	2240	1232	12.10	2716
ISR-C50D-500-A	500	19.69	9	4.3	9.5	900	8.82	1984	1143	11.20	2520	1386	13.60	3056
ISR-C50D-550-A	550	21.65	10	4.7	10.4	1000	9.80	2205	1270	12.40	2800	1540	15.10	3395
ISR-C50D-600-A	600	23.62	11	5.2	11.4	1100	10.80	2425	1397	13.70	3080	1694	16.60	3735
ISR-C50D-650-A	650	25.59	12	5.6	12.3	1200	11.80	2646	1524	14.90	3360	1848	18.10	4074
ISR-C50D-700-A	700	27.56	13	6	13.3	1300	12.70	2866	1651	16.20	3640	2002	19.60	4414
ISR-C50D-750-A	750	29.53	14	6.5	14.2	1400	13.70	3086	1778	17.40	3920	2156	21.10	4753
ISR-C50D-800-A	800	31.5	15	6.9	15.2	1500	14.70	3307	1905	18.70	4200	2310	22.60	5093
ISR-C50D-850-A	850	33.46	16	7.3	16.1	1600	15.70	3527	2032	19.90	4480	2464	24.10	5432
ISR-C50D-900-A	900	35.43	17	7.7	17.1	1700	16.70	3748	2159	21.20	4760	2618	25.70	5772
ISR-C50D-950-A	950	37.4	18	8.2	18	1800	17.60	3968	2286	22.40	5040	2772	27.20	6111
ISR-C50D-1000-A	1000	39.37	19	8.6	19	1900	18.60	4189	2413	23.60	5320	2926	28.70	6451

Usage example

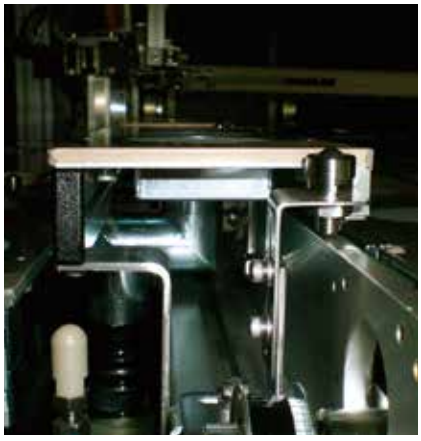










IGUCHIKIKO CO., LTD.

Head Office	1-20-7, Minamiohizumi, Nerima-ku, Tokyo, 178-0064, Japan	TEL.03-3923-1211 FAX.03-3923-8100
Osaka Branch	Esakachou, Suita-shi, Osaka, 564-0063, Japan	TEL.06-6192-7785 FAX.06-6192-7786
Nagoya Branch	1-34-601, Noritakehontoori, Nakamura-ku, Nagoya, Aichi, 453-0017, Japan	TEL.052-486-7557 FAX.052-486-7565
Kyushu Branch	2356-7-1, Nakayama, Kurate-machi kurate-gun, Fukuoka 8071312, Japan	TEL.0949-28-9400 FAX.0949-28-9401
Nerima Factory	1-22-9, Minamiohizumi, Nerima-ku, Tokyo, 178-0064, Japan	TEL.03-3923-1211 FAX.03-3923-8100
Fuchu Factoru	5-40, Yotsuya, Fuchu, Tokyo, 183-0035, Japan	TEL.042-361-8783 FAX.042-360-7899
Ibaraki Factory	962-157, Yamazaki, Ishioka-shi, Ibaraki, 3150125, Japan	TEL.0299-46-5811 FAX.0299-46-5817

ISB KOREA (Head Office, Factory)
IGUCHI Thailand (Head Office, Factory)
America Office(San Diego) TAIWAN Office

www.isb-iguchi.com

ISB mascot character
「Ta-botto」