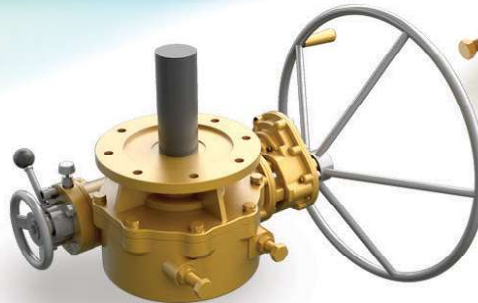




SAMBO Gear Actuators for Industrial Valves



Global Leader Worldwide

High Quality Gear Actuators
High Performance & Efficiency



Welcome to SAMBO INDUSTRIAL CO., LTD.

The endless and glorious Korean Mountain range has inspired SAMBO to follow an aggressive path for implementing the latest leading technology and manufacturing techniques. It is our commitment to be the world's leading provider of high quality and competitively priced products offering best possible deliveries.

General Information

At SAMBO Industrial Co., Ltd., We are committed to developing the most advanced products for the 21st century. Our highly skilled staff of engineers has over 35 years of experience in the field of valve control. Quality is the No.1 priority throughout our company including manufacturing, engineering and customer service.

Valve gear actuators and kit solution-Worldwide

We, SAMBO IND. CO., LTD. established in 1980 and we are special company for the manufacturing of high quality gearboxes. Based on long experience and skill, our quality is No.1 Priority in the Korea market. Also, we have a good reputation from all around the world. We have made many efforts to produce the best quality gearbox while offering new models thanks to our continuous R&D focus which makes us the most advanced product with competitive prices to establish the gearbox company for a better tomorrow. We promise to make development through challenge mind, passion and long experience of management. We strive to make Sambo the leading gearbox supplier around the globe. In the future, we would appreciate highly appreciate if you supply any advice for our improvement.

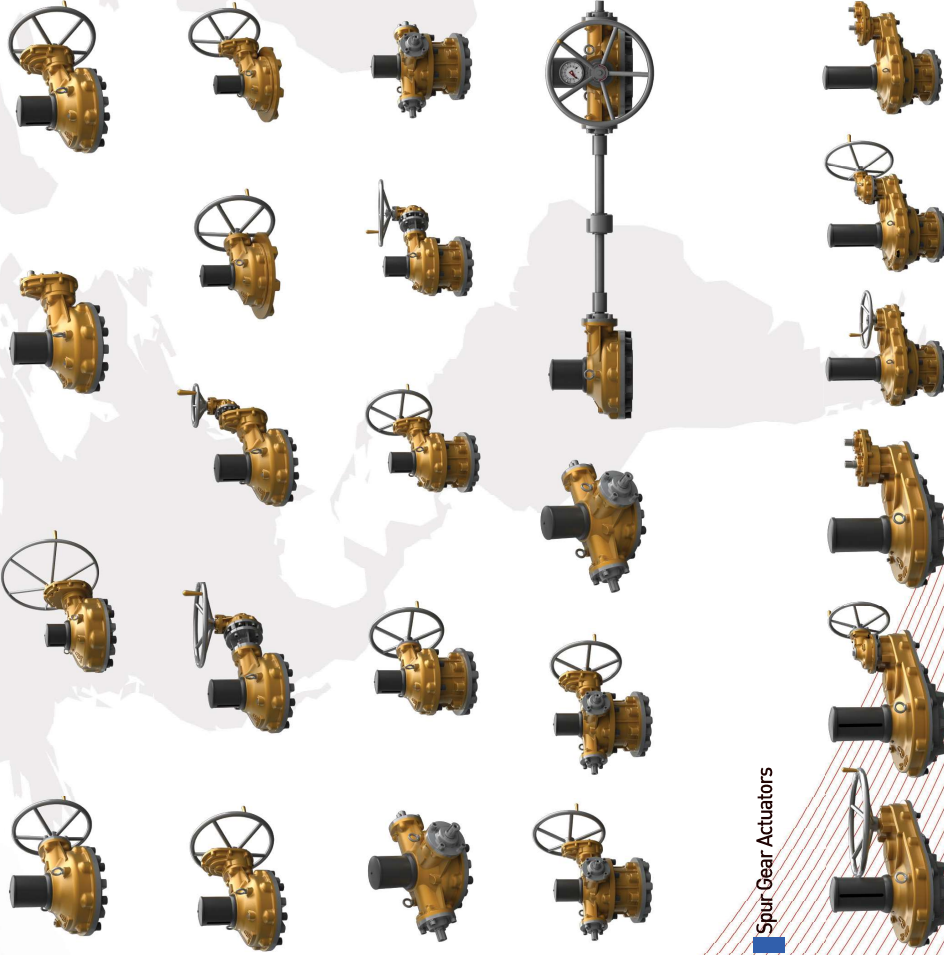
BRIEF HISTORY

- 1980.03 Established as SAMBO COMPANY
- 1990.01 Changed company name SAMBO INDUSTRIAL
- 1995.03 Introduced Quality Control System
- 1995.09 Obtained the membership of KITA (Korea International Association)
- 1997.01 Changed company name SAMBO IND CO., LTD.
- 1997.03 Moved into Kwaebeop-dong, Sasang-gu, Busan, Korea
- 1999.09 Launched computerized operation system covering all company activities(ERP system)
- 2000.08 Enrolled the membership of KITA (Korea International Association)
- 2001.10 Launched web-site service (<http://sambo21.co.kr>) Selected as a pro-issuing company by the Busan Bank-Korea. Enrolled Utility model (Korean Intellectual Property Office)
- 2002.07 Obtained CE Mark by Lloyd's Register
- 2002.08 Approved ISO 9001:2000 by ABS Quality Evaluation Inc.
- 2002.11 Enrolled Trademark (Diagram+SAMBO)
- 2003.01 Selected as a Military Manpower Company
- 2005.11 Selected as a Clean Factory
- 2006.08 R&D Center Organization by KOITA
- 2006.09 Approved Venture Company by KOTEC (Korea Technology Finance Corporation)
- 2006.11 Factory extension and complete range of actuators offered any where At present SAMBO believes we offer the most extensive
- 2007.03 Enrolled the membership of Busan Machinery Cooperatives
- 2007.11 Receiving Export prize (44th Trade Day)
- 2008.06 Selected as Export Venture Company (SABA)
- 2008.08 Established SAMBO Skill Research (KOITA)
- 2008.09 Certified "INNO-BIZ" Company by SAMBO (Small&Medium Business Administration)
- 2008.10 Approved as Venture Company (KIBO)
- 2008.11 Receiving Export prize (45th Trade Day)
- 2009.03 Receiving Award of Best Taxpayer (43th Taxpayer's Day)
- 2010.10 Approved Exporter with certificate of origin by Busan Customhouse.
- 2011.03 Receiving Award of Best Taxpayer (45th Taxpayer's Day)
- 2011.04 Starting construction for new factory (#561-5, Kwaebeop-dong)
- 2011.07 Selected as BS Small Giant Company from Busan Bank
- 2012.01 Completion of New Factory
- 2012.09 Approved as a "A PLUS VENTURE COMPANY" by KOTEC (Korea Technology Finance Corporation)
- 2012.12 Approved as a "LEADING COMPANY" by Busan Metropolitan City
- 2013.05 Approved as a "EXCELLENT EMPLOYMENT COMPANY" by Busan Metropolitan City
- 2014.07 Grand prize in Small Business Awards hosted by Busan Metropolitan city
- 2014.12 Receiving Export prize(US \$:10M)

SINCE 1980 SAMBO

Contents

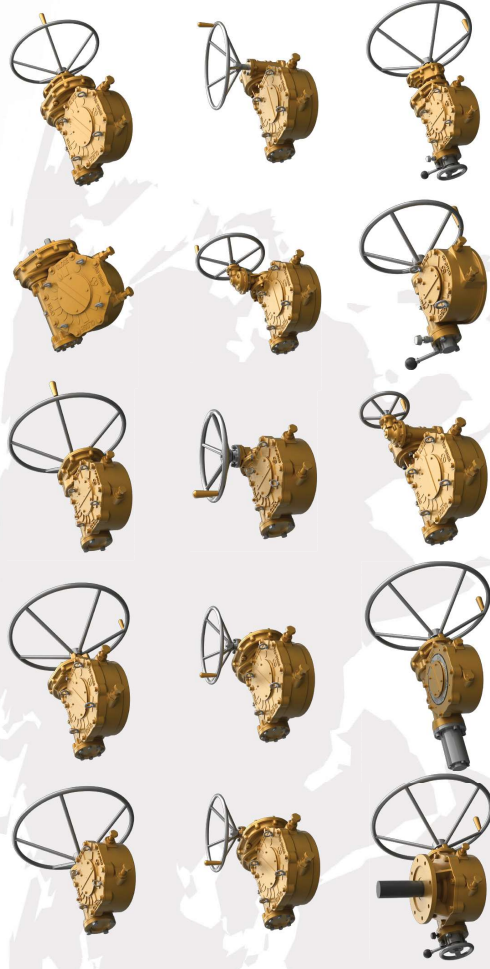
Bevel Gear Actuators



Spur Gear Actuators



Worm Gear Actuators



Planet Reduction Gear Actuators



Air Cylinder

M.I.O.V Type

Hand Wheel

User's Manual

Technical Data

SAMBO Gear Actuators For Industrial Valves

BEVEL GEAR ACTUATORS

BEVEL GEAR ACTUATORS

Special View & Features

Pinion and Bevel Gear

Pinion gear is 1045 heat treated steel. Bevel Gear is 1045 steel. Both gears are precision cut.

O-ring

Units are completely O-ring sealed, suitable for temporary submergence to meet Ip67 Class.

Ball Bearing

This input Bevel pinion is fully supported on deep groove ball bearings to provide excellent radial support.

Gaskets

The Base & end cap is sealed by a Non-asbestos Gasket to prevent any leakage and is waterproof.

Grease ZENITH EPSB 2

Each unit has a Alemite Grease type fitting and a grease plug for adding lubricant.

The SB-V Series of Bevel Gear ranges up to 71,000Nm (52,367ft-lbf) Torque and Thrust capacities up to 7300KN (1,609,374 lbf)

Stem capacities are up to 240mm (9.45inch).

A high Load design, type SB-VH is also available ranging up to 133,000m (98,095ft-lbf).

Thrust capacities up to 11,500KN (2,535,316lbf) stem capacities are up to 270mm (10.63inch).

Thrust ball or self-aligning Thrust roller bearing

Provides anti-friction capacity and are high load type.

Dual Locking Nuts

This design incorporates dual locking nuts which provide a jam Effect for positive locking. No set screw or pinning is required.

Stem Nut

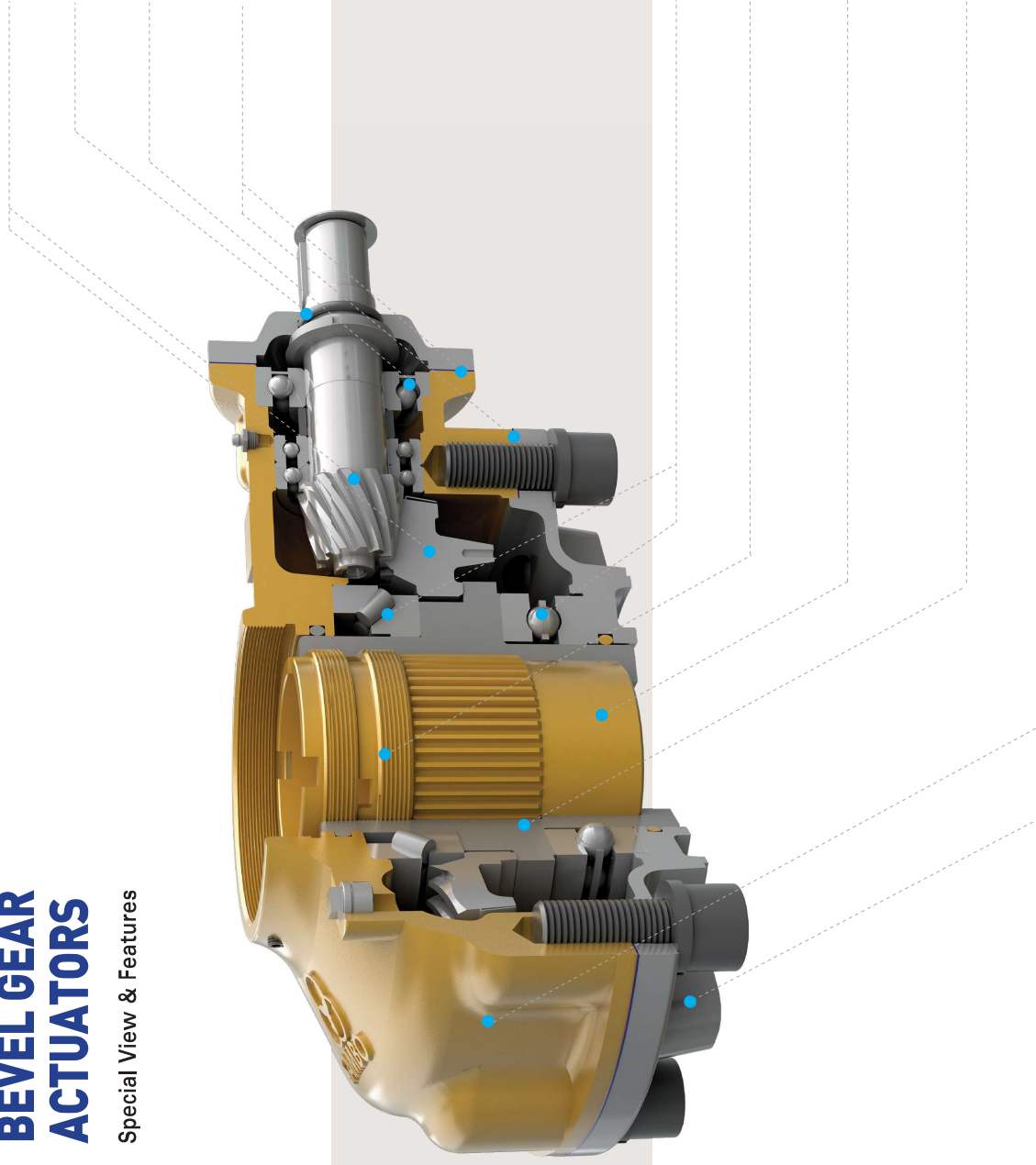
A unique top Entry Replaceable stem Nut. After long years of service can be easily replaced without removing Gear from valve. Material is High tensile brass providing both corrosion and abrasion resistance.

Drive Sleeve

Also Ductile Iron, Class 65-45-12. Supports both axial and radial loads.

Housing and Base

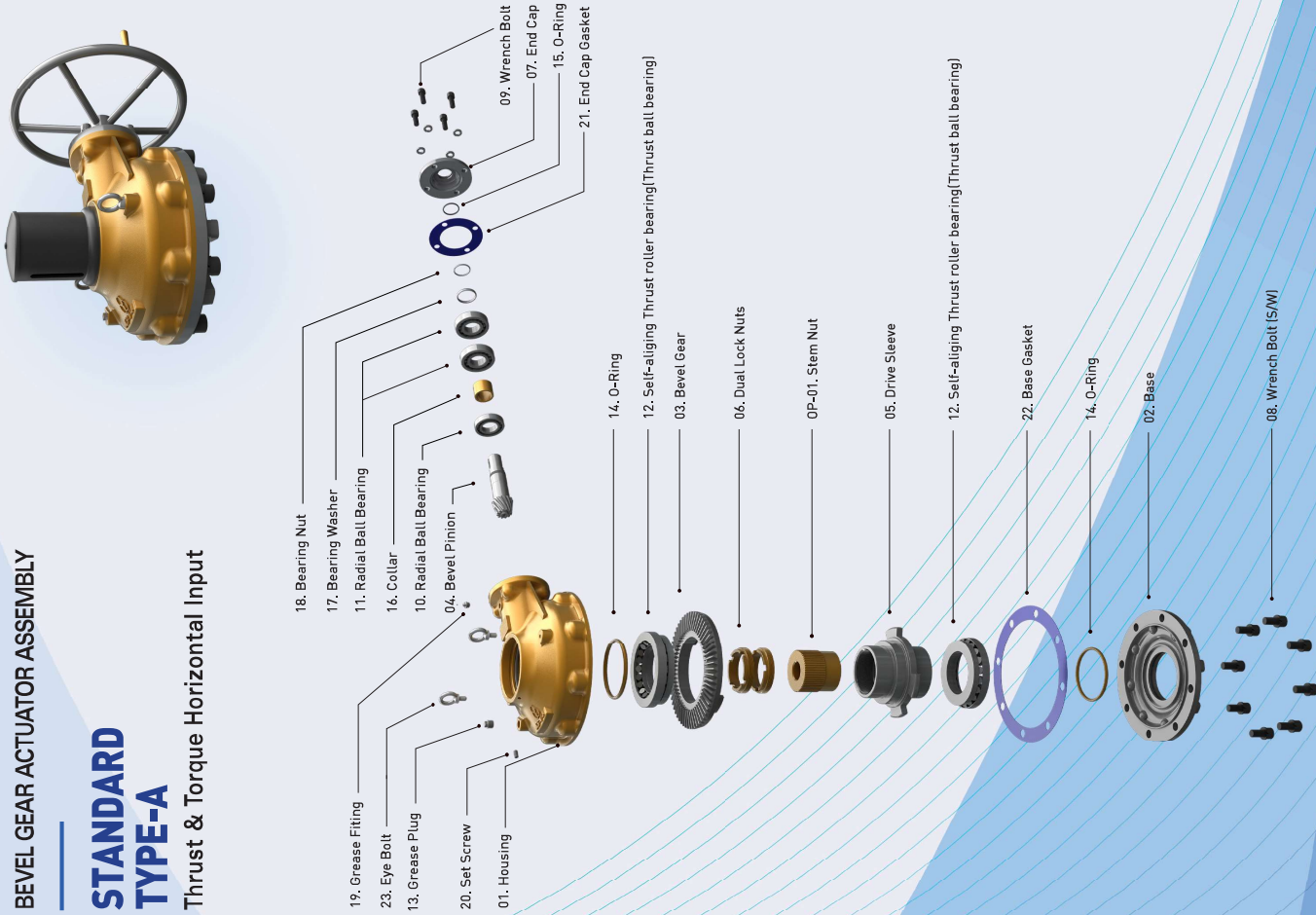
All external castings are Ductile Iron, Class 65-45-12. Tensile Strength of 65,000 psi. This provides high strength and excellent impact resistance.



BEVEL GEAR ACTUATOR ASSEMBLY

STANDARD TYPE-A

Thrust & Torque Horizontal Input



Part List & Material

NO	DESCRIPTION	MATERIAL			REMARK
		NAME	JIS	ASTM	
1	Housing	Ductile Iron	FCD-450	A536-65-45-12	NOTE.1
2	Base	Ductile Iron	FCD-450	A536-65-45-12	NOTE.1
3	Bevel Gear	Carbon Steel	S45C	A576-1045	
4	Bevel Pinion	Carbon Steel	S45C	A576-1045	NOTE.2
5	Drive Sleeve	Ductile Iron	FCD-450	A536-65-45-12	NOTE.1
6	Dual Lock Nuts	Carbon Steel	S45C	A576-1045	
7	End Cap	Ductile Iron	FCD-450	A536-65-45-12	NOTE.1
8	Wrench Bolt(S/W)	Alloy Steel	SOM435	A322-4135	
9	Wrench Bolt(S/W)	Alloy Steel	SOM435	A322-4135	
10	Radial Ball Bearing	Special Steel	SUJ2	A295-52100	
11	Radial Ball Bearing	Special Steel	SUJ2	A295-52100	
12	Thrust Bearing	Special Steel	SUJ2	A295-52100	
13	Grease Plug	Steel + Galvanizing			
14	O-Ring	Buna N	NBR		NOTE.4
15	O-Ring	Buna N	NBR		NOTE.4
16	Collar	Steel Pipe	S5P	A53	
17	Bearing Washer	Steel			SNAP RING
18	Bearing Nut	Steel			SNAP RING
19	Grease Fitting	Steel + Galvanizing			
20	Set Screw	Stainless Steel			
21	End Cap Gasket	Non-Asbestos			VALQJUA.6001
22	Base Gasket	Non-Asbestos			VALQJUA.6001
23	Eye Bolt	Steel + Galvanizing			
OP-01.	Stem Nut	Bronze	HB5C3	B566-C68200	NOTE.3
OP-02.	Hand Wheel	Steel Pipe	S5P	A53	
OP-03.	Key	Carbon Steel	S45C	A576-1045	
OP-04.	Name Plate	Stainless Steel			HANDLE PART NOTE.5
OP-05.	Washer	Stainless Steel			
OP-06.	HEX Bolt (S/W)	Stainless Steel			
OP-07.	Stem Cover	Steel Pipe	S5P	A53	
OP-08.	Indicate Bolt	Steel + Galvanizing			STEM COVER NOTE.6
OP-09.	HEX Nut	Steel + Galvanizing			
OP-10.	Indicator	Plastic			

STANDARD

OPTION

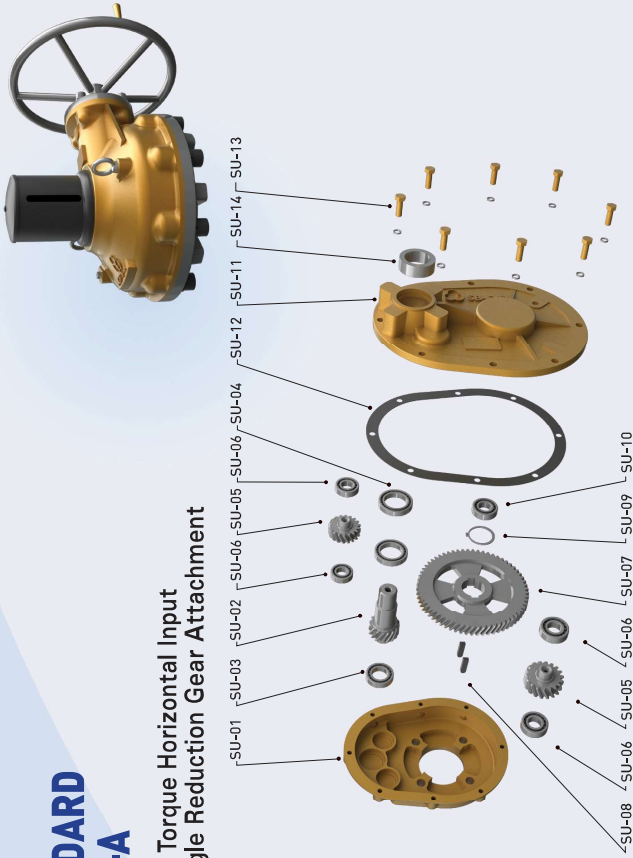
Material Detail : Option and Material Changes

- All castings are Ductile Iron, FCD-450 (ASTM Class 65-45-12)
 - In case of option for special request, it can be worked Nickel coating, high tensile stainless.
 - Also, the material can be changed as ALBC3(Aluminum Bronze), steel(A576-1045), A439 Gr D2C (Austenitic ductile iron casting), etc.
 - O-Ring Seal & Lubricant : Standard is Buna "N", temperature range -30°C to +120°C [-22°F to +248°F]
Standard lubricant is Zenith EPSB 2, temperature Range -20°C to +200°C [-4°F to +392°F]
Other option are : High Temperature Viton O-Ring Grade V75, Temperature Range -25°C to +200°C [-13°F to +392°F]
Lubricant - Zenith SYN WS2 Temperature Range -30°C ~ 400°C [-22°F ~ 752°F]
Low Temperature Viton O-Ring Grade V15, Temperature Range -35°C to +160°C [-31°F to 320°F]
Lubricant - Zenith SLP402, Temperature Range -60°C ~ 140°C [-76°F 284°F]
 - SAMBO offers a wide variety of Handwheels, Chainwheels, Input Shaft, Locking Devices, etc.
 - SAMBO offers a wide variety of stem cover, stainless steel, Polycarbonate.
- Paint : Unless specified, units are supplied with vp184, Red epoxy primer, SAMBO can provide finish coating upon request.

BEVEL GEAR ACTUATOR ASSEMBLY

STANDARD TYPE-A

Thrust & Torque Horizontal Input with Single Reduction Gear Attachment



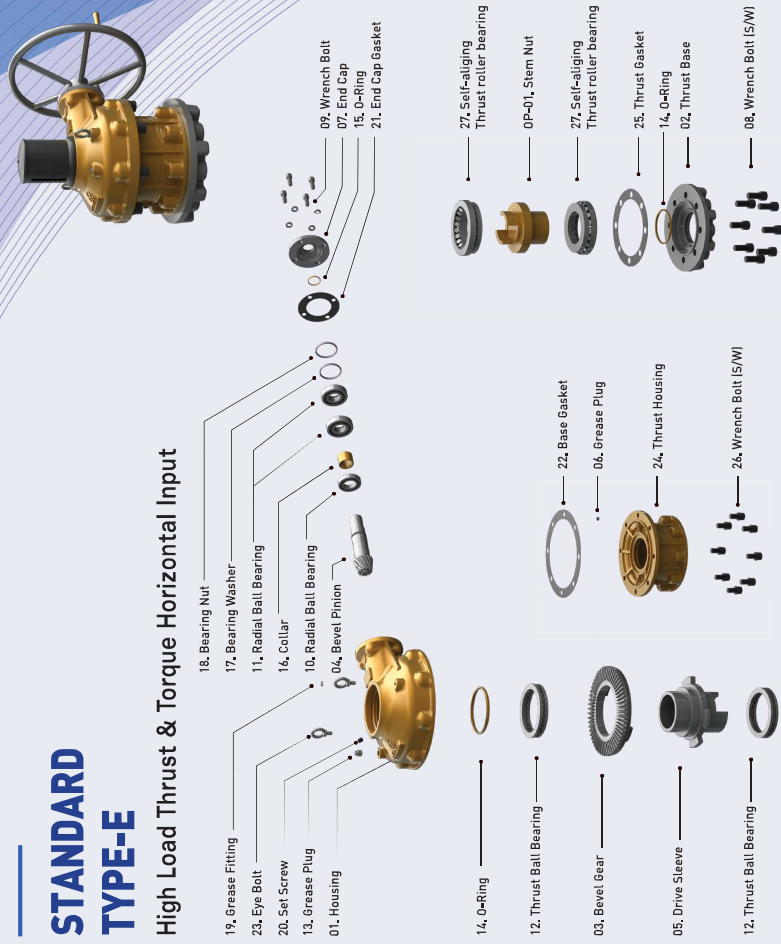
Part List & Material

NO	DESCRIPTION	MATERIAL		REMARK
		NAME	JIS ASTM	
1	Housing	Ductile Iron	FDD-450 A536-65-45-12	
2	Base	Ductile Iron	FDD-450 A536-65-45-12	
3	Bevel Gear	Carbon Steel	S45C A576-10A5	
4	Bevel Pinion	Carbon Steel	S45C A576-10A5	
5	Drive Sleeve	Ductile Iron	FDD-450 A536-65-45-12	
6	Dual Lock Nuts	Carbon Steel	S45C A576-10A5	
7	Wrench Bolt(S/W)	Alloy Steel	SOM435 A322-4135	
9	Wrench Bolt(S/W)	Alloy Steel	SOM435 A322-4135	
10	Radial Ball Bearing	Special Steel	SUJ2 A295-52100	
11	Radial Ball Bearing	Special Steel	SUJ2 A295-52100	
12	Thrust Bearing	Special Steel	SUJ2 A295-52100	
13	Grease Plug	Steel + Galvanizing		
14	O-Ring	Buna N	NBR	
15	O-Ring	Buna N	NBR	
16	Collar	Steel Pipe	SGP A53	
17	Bearing Washer	Steel		
18	Bearing Nut	Steel		
19	Grease Fitting	Steel + Galvanizing		
20	Set Screw	Stainless Steel		
21	End Cap Gasket	Non-Asbestos		VALQJUA 6601
22	Base Gasket	Non-Asbestos		VALQJUA 6601
23	Eye Bolt	Steel + Galvanizing		

BEVEL GEAR ACTUATOR ASSEMBLY

STANDARD TYPE-E

High Load Thrust & Torque Horizontal Input



Part List & Material

NO	DESCRIPTION	MATERIAL		REMARK
		NAME	JIS ASTM	
1	Housing	Ductile Iron	FDD-450 A536-65-45-12	
2	Thrust Base	Ductile Iron	FDD-450 A536-65-45-12	
3	Bevel Gear	Carbon Steel	S45C A576-10A5	
4	Bevel Pinion	Carbon Steel	S45C A576-10A5	
5	Drive Sleeve	Ductile Iron	FDD-450 A536-65-45-12	
6	Grease plug	Steel + Galvanizing		
7	Eye Cap	Ductile Iron	FDD-450 A536-65-45-12	
8	Wrench Bolt(S/W)	Alloy Steel	SOM435 A322-4135	
9	Wrench Bolt	Alloy Steel	SOM435 A322-4135	
10	Radial Ball Bearing	Special Steel	SUJ2 A295-52100	
11	Radial Ball Bearing	Special Steel	SUJ2 A295-52100	
12	Thrust Ball Bearing	Special Steel	SUJ2 A295-52100	
13	Grease Plug	Steel + Galvanizing		
14	O-Ring	Buna N	NBR	
15	O-Ring	Buna N	NBR	
16	Collar	Steel Pipe	SGP A53	
17	Bearing Washer	Steel		
18	Bearing Nut	Steel		
19	Grease Fitting	Steel + Galvanizing		
20	Set Screw	Stainless Steel		
21	End Cap Gasket	Non-Asbestos		VALQJUA 6601
22	Base Gasket	Non-Asbestos		VALQJUA 6601
23	Eye Bolt	Steel + Galvanizing		
24	Thrust Housing	Ductile Iron	FDD-450 A536-65-45-12	
25	Thrust Gasket	Non-Asbestos		VALQJUA 6601
26	Wrench Bolt(S/W)	Alloy Steel	SOM435 A322-4140	
27	SR Thrust Bearing	Special Steel	SUJ2 A295-52100	
OP-01	Stem Nut	Bronze	HB5C3 B584-C8x200	
OP-02	Hand Wheel	Steel Pipe	SGP A53	
OP-03	Key (F/R)	Carbon Steel	S45C A576-10A5	
OP-04	Name Plate	Stainless Steel		OPTION HANDLE PART
OP-05	Washer	Stainless Steel		
OP-06	HEX Bolt(S/W)	Stainless Steel		
OP-07	Stem Cover	Steel Pipe	SGP A53	
OP-08	Indicate Bolt	Steel + Galvanizing		
OP-09	HEX Nut	Steel + Galvanizing		
OP-10	Indicator	Plastic		OPTION STEM COVER

BEVEL GEAR ACTUATORS INDEX

TYPE A

TYPE B

TYPE C

TYPE D

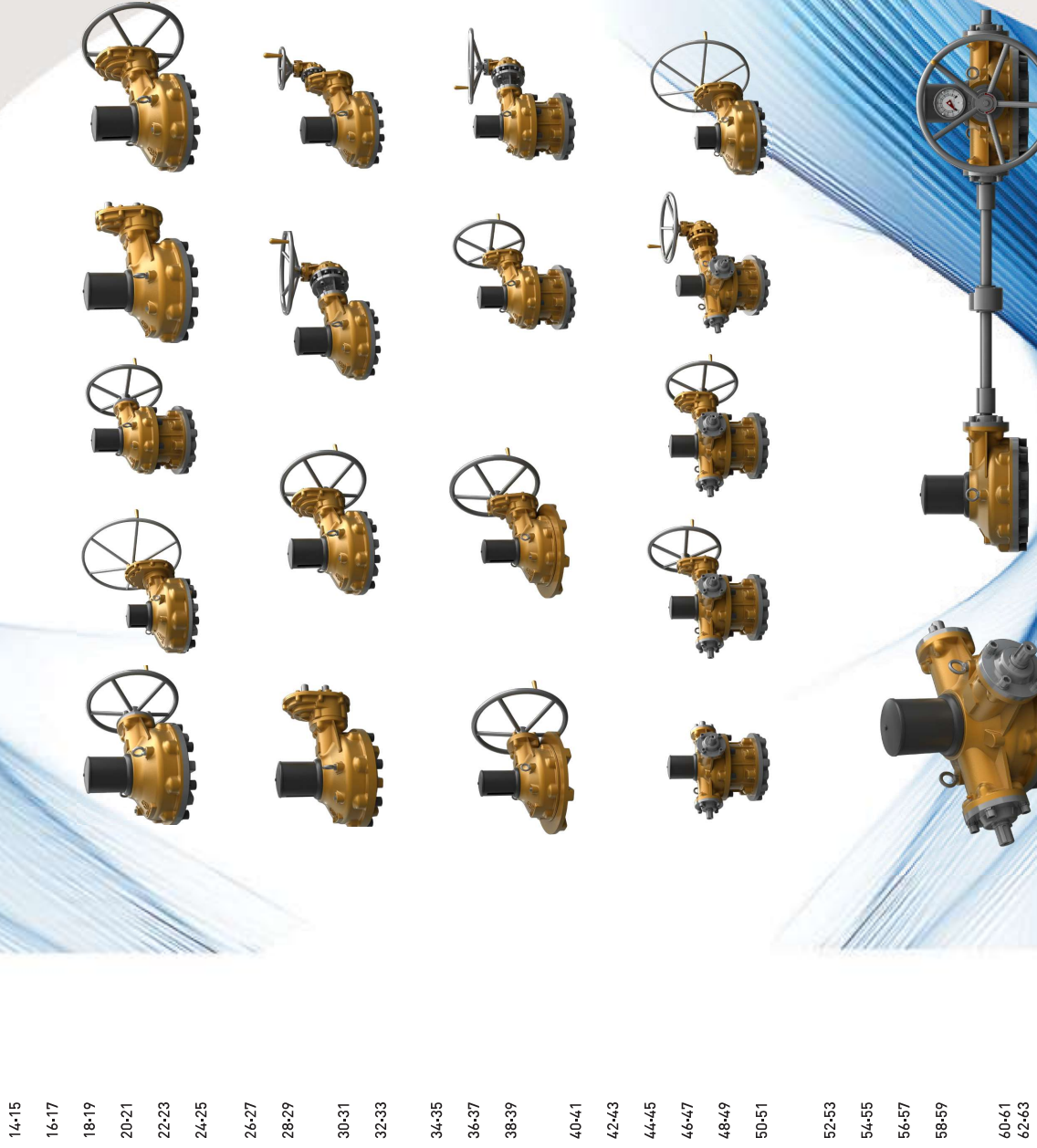
TYPE E

TYPE F

- Standard Type A - Thrust & Torque**
Horizontal Input
- Standard Type A - Thrust & Torque**
Horizontal Input with Single Reduction Gear Attachment
- Standard Type A - Thrust & Torque (Twin Shaft)**
Horizontal Input with Single Reduction Gear Attachment
- Standard Type A - Thrust & Torque**
Horizontal Input with Double Reduction Gear Attachment
- Standard Type A - Thrust & Torque (Twin Shaft)**
Horizontal Input with Double Reduction Gear Attachment
- Standard Type A - Thrust & Torque**
Horizontal Input with Double Reduction Gear Attachment
- Standard Type B - Thrust & Torque**
Horizontal Input with Single Reduction Gear Attachment
- Standard Type B - Thrust & Torque**
Horizontal Input with Double Reduction Gear Attachment
- Standard Type C - Thrust & Torque**
Horizontal Input
- Standard Type C - Thrust & Torque**
Horizontal Input with Single Reduction Gear Attachment
- Standard Type D - Multiple Input Shaft - Thrust & Torque**
Horizontal Input
- Standard Type D - Multiple Input Shaft - Thrust & Torque**
Horizontal Input with Single Reduction Gear Attachment
- Standard Type D - Multiple Input Shaft - Thrust & Torque**
Horizontal Input with Double Reduction Gear Attachment
- Standard Type E - High Load Thrust & Torque**
Horizontal Input
- Standard Type E - High Load Thrust & Torque**
Horizontal Input with Single Reduction Gear Attachment
- Standard Type E - High Load Thrust & Torque (Twin Shaft)**
Horizontal Input with Single Reduction Gear Attachment
- Standard Type E - High Load Thrust & Torque**
Horizontal Input with Double Reduction Gear Attachment
- Standard Type E - High Load Thrust & Torque (Twin Shaft)**
Horizontal Input with Double Reduction Gear Attachment
- Standard Type E - High Load Thrust & Torque**
Vertical Input with Single Reduction Gear Attachment
- Standard Type F - Multiple Input Shaft - High Load Thrust & Torque**
Horizontal Input
- Standard Type F - Multiple Input Shaft - High Load Thrust & Torque**
Horizontal Input with Single Reduction Gear Attachment
- Standard Type F - Multiple Input Shaft - High Load Thrust & Torque**
Horizontal Input with Single Reduction Gear Attachment
- Standard Type F - Multiple Input Shaft - High Load Thrust & Torque**
Vertical Input with Single Reduction Gear Attachment

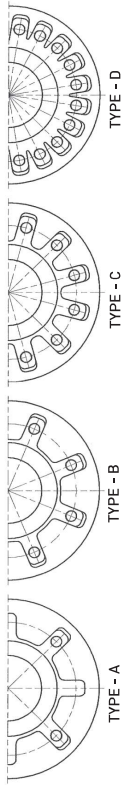
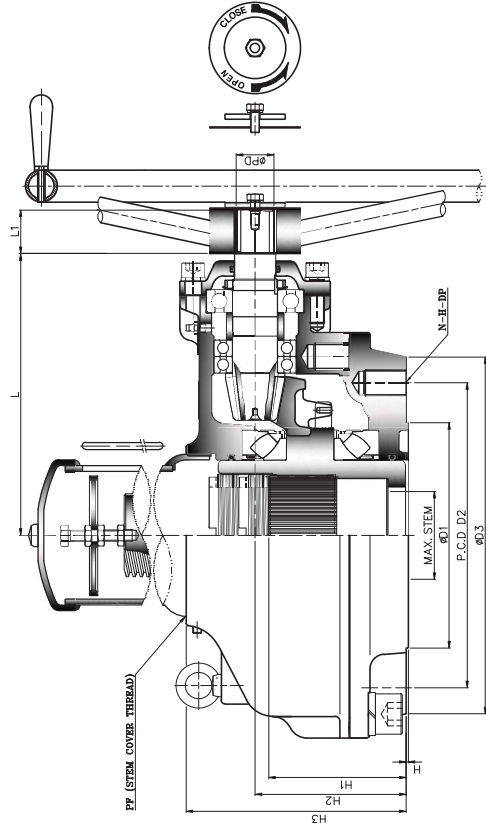
**Hand Wheel Type
Specification & Option**

BEVEL GEAR ACTUATORS PRODUCT



STANDARD TYPE-A

Thrust & Torque Horizontal Input



Dimension

DIM / MODEL	BASE PART			EXTERNAL PART				INPUT SHAFT PART			HAND WHEEL	STEM COVER	
	FLANGE SIZE	ØD1	P.C.D. ØD2	ØD3	H	H1	H2	H3	L	L1			ØPD
SB-V510	F-10	70	102	4-M10-15	125	56	71	95	121	34	26	8X7	PF2"
SB-V520	F-12	85	125	4-M12-18	150	63	76	106	131	34			PF2-1/2"
SB-V0	F-14	100	140	4-M16-24	175	72	81	121	155	34	32	10X8	
SB-V1	F-16	130	145	4-M20-30	210	84	98	140	167				PF3"
SB-V2	(F-16) F-20	140	205	8-M16-24	250	95	115	160	188	34	32	10X8	PF3-1/2"
SB-V3	F-25	200	254	8-M16-24	300	102	119	167	209				PF4"
SB-V25	F-30	230	298	8-M20-30	350	122	138	196	266				PF5"
SB-V4	F-35	260	356	8-M30-45	410	133	150	210	291	44	38	12X8	PF6"
SB-V5	F-40	300	406	8-M36-55	475	171	182	253	334				PF6"
SB-V6	F-40	300	406	8-M36-55	475	182	201	279	375	58	50	16X10	PF8"
SB-V7	F-48	370	483	12-M36-55	560	208	222	316	409	58	50	16X10	PF8"
SB-V8	F-48	370	483	12-M36-55	560	234	258	353	471	58	50	16X10	PF10"
SB-V85	F-48	370	483	12-M36-55	560	250	277	375	525	58	50	16X10	PF12"
SB-V9	F-60	470	603	20-M36-55	700	263	295	398	590	58	50	16X10	PF12"
SB-V10	(F-60) F-80	650	800	20-M42-63	900	315	355	480	644				

UNIT: mm

FEATURE

This series suitable for use with Gate & Globe type valve. Also sluice gates and any other type requiring linear motion for thrust and torque applications.

Unique Top Entry Replaceable Stem Nut.

High Tensile Aluminum bronze material providing corrosion and abrasion resistance.

Castings are Ductile Iron, class 65-45-12 providing high strength and impact resistance.

Heavy duty roller bearings supporting both radial & axial thrust loads.

Gears are Machine cut, heat treated and ground for optimum operation. Units are completely O-Ring Sealed suitable for temporary submergence to meet IP67 class.

Many options, such as hand wheels, chain wheels, stem covers, position dial indicators are available.

DIAL INDICATOR

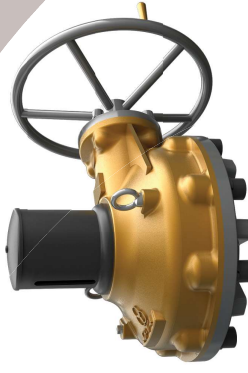
A unique local position dial indicator is available. It is graduated in percent from 0% (close) to 100% (open)

M-O OPTION

Bevel Gear can be provided with Motor actuator input flanges to accept standard ISO Mounting Base.

LOCKING DEVICE OPTION

Input can be equipped with a Hand wheel locking device for Manually operated units.



Selection Chart for Manual Operation

SIZE / MODEL	GEAR RATIO	MAX. STEM ACCEPTANCE		MOUNTING OPTION & STANDARD	MAX. THRUST CAPACITY		MAX. TORQUE CAPACITY		WEIGHT
		TW	KEY		KN	lbf	N-m	Ft.-lbf	
SB-V510	2.5:1	30	22 (8X7)	F-07, F-10	75.5	16970	220	162	8
SB-V520	3:1	40	32 (10X8)	F-10, F-12	113	25400	370	273	11
SB-V0	3.25:1	46	38 (12X8)	F-10, F-12, F-14	127	28550	600	442	16
SB-V1	3.5:1	55	45 (14X9)	F-14, F-16	141	31700	980	723	22
SB-V2	4:1	62	52 (16X10)	F-14, F-16, (F-20)	190	42710	1500	1106	34
SB-V3	5:1	72	60 (18X11)	F-16, (F-20), F-25	288	64750	2500	1844	45
SB-V35	5.5:1	85	72 (20X12)	F-25, F-30	350	78480	3500	2581	78
SB-V4	6:1	98	84 (22X14)	F-25, F-30, F-35	400	89920	5200	3835	99
SB-V5	6.5:1	115	100 (28X16)	F-30, F-35, F-40	510	114650	7800	5753	154
SB-V6	7:1	130	115 (32X18)	F-35, F-40	2310	519300	13000	9588	238
SB-V7	7.55:1	150	130 (36X20)	F-40, F-48	2500	562020	17600	12981	318
SB-V8	8:1	180	160 (40X22)	F-40, F-48	4100	921700	26000	19177	463
SB-V85	8:1	190	170 (40X22)	F-40, F-48	5150	1157760	34000	25077	532
SB-V9	8:1	200	180 (48X25)	F-48, F-60	5450	1225180	42000	30978	736
SB-V10	8:1	230	200 (50X28)	F-40, (F-80)	7300	2585300	71000	52367	883