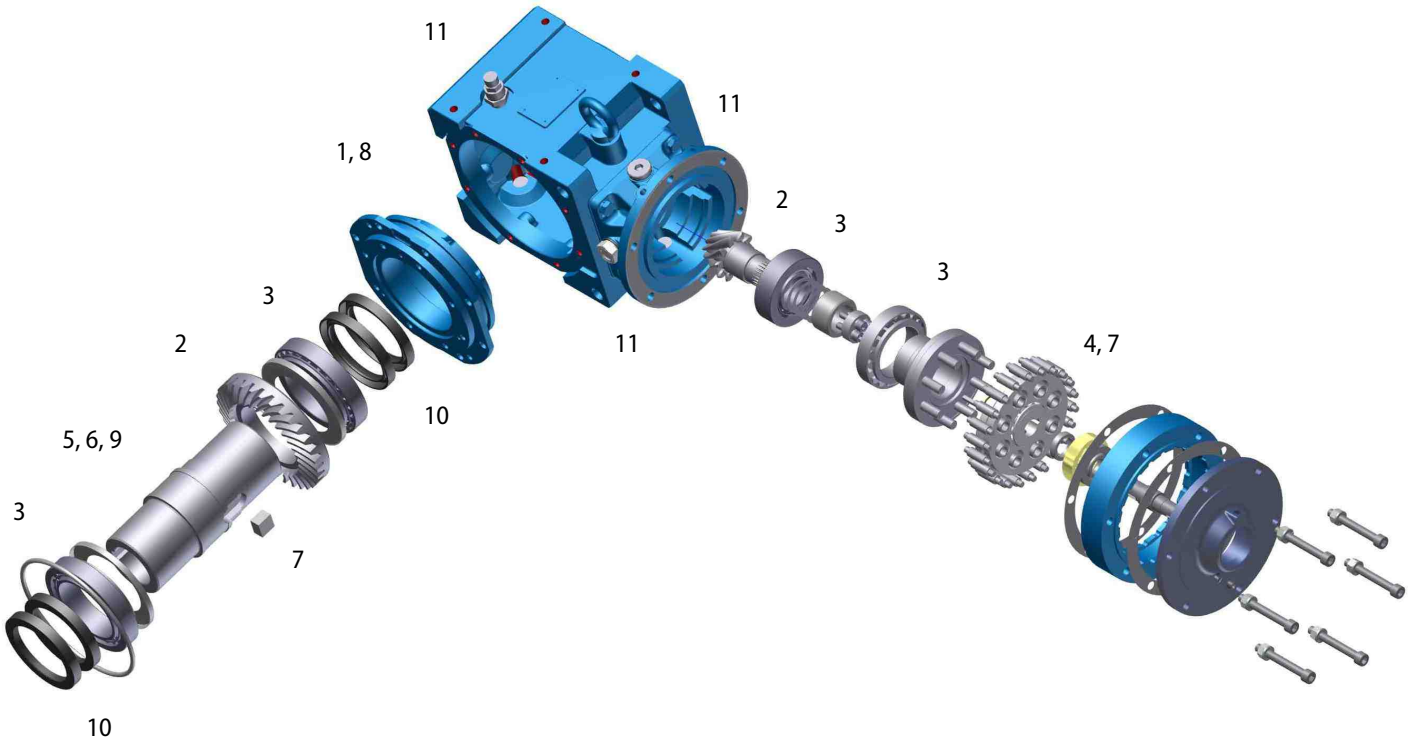
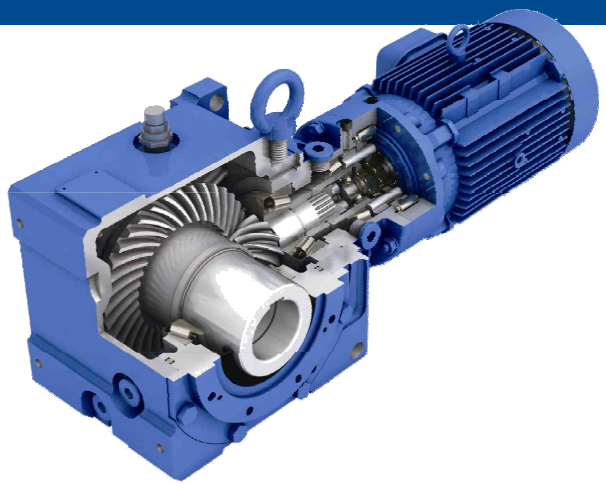
Cyclo® BBB 4 Series: Features & Options

Features



1. JIS FCD450-10 or equivalent (ASTM A536-65-45-12) ductile cast iron housings, input flanges, and covers.
2. Lapped steel spiral bevel pinions and gears heat treated and hardened to 58 – 62 Rockwell C.
3. JIS B 1514 Class 0 or equivalent (ANSI/AFBMA 19.1 Class K) tapered roller bearing tolerances.
4. JIS B 1514 Class 0 or equivalent (ANSI ABEC ABEC0-1) radial bearing tolerances.
5. JIS SCM435 (AISI 4135) steel output hubs, quenched and tempered to HB 269-331.
6. JIS SCM435H (AISI 4135H) steel solid output shafts, quenched and tempered to HB 269-331.
7. All keys inside the housings are captured.
8. The housing has five mounting surfaces, facilitating six mounting orientations.
9. All input shafts and all output shafts, except for the shrink disc option, are available in inch and metric sizes. The shrink disc output shaft option is available in metric sizes only.
10. Dual seals on each side of the output prevent lubricant leaks and protect from contamination.
11. Oil level gauges, oil drain hole plugs, and breathers strategically located according to the selected mounting position.

Cyclo® BBB 4 Series: Features & Options *(Continued)*



- **Style:** Right-angle shaft orientation – the output shaft is at 90° to the motor shaft, or to a solid or quill input shaft.
- **Flange:** Includes a centering pilot, plus thru holes on a bolt circle diameter conforming to FF series flanges per IEC60072-1 frame sizes (sometimes referenced as B5).

Unit Size	Flange Size
4A	IEC215
4B	IEC265
4C	IEC300
4D	IEC400
4E	
4F	IEC600

- **Input Types:** Accommodates NEMA, IEC, JIS, UL, CSA, and CE motors; solid and quill input shafts; torque limiters; and shovel bases.
- **Output Shaft – Keyed:** Hollow or solid output shafts available in inch or metric diameters. Keyed hollow shafts supplied with safety covers.
- **Output Shaft – Keyless:** Taper-Grip® bushings available in inch or metric diameters and supplied with safety covers. Metric shrink discs also available.
- Additional information about input and output options can be found in **EDOC1-12-011** ***"Cyclo® BBB4 & 5 Series: Input & Output Options"***.
- **Mounting:** Available with foot, flange, hollow shaft, or housing mounting.
- **Torque Ratings:** According to mechanical capacity under continuous operation.
- **Torque Capacity:** From 1095 in-lbs (size 4A100) to 153,980 in-lbs (size 4F19DB)
- **Shaft Rotation:** Clockwise and counterclockwise are allowable.
- **Efficiency:** High performance steel spiral bevel gearing delivers up to 94% efficiency across the entire product range.
- **Single Reduction Ratio Range:** 11 nominal (10.5 actual) – 417 nominal (416.5 actual)
- **Double Reduction Ratio Range:** 364 nominal (364.0 actual) – 26,492 nominal (26,491.5 actual)
- **Shock Capacity:** 500% momentary, intermittent shock load capacity for the Cyclo (input) stage; 200% momentary, intermittent shock load capacity for the spiral bevel (output) stage.

Housing Material

JIS FCD450-10 or equivalent (ASTM A536-65-45-12) ductile cast iron housings, input flanges, and covers. Ductile iron:

- has a high resistance to fracturing, so it's excellent for high shock or impact loading.
- has high fatigue strength.
- is easily molded and machined.
- has a high damping ability, extending bearing and gear life by minimizing vibrations.
- has a high compressive strength.

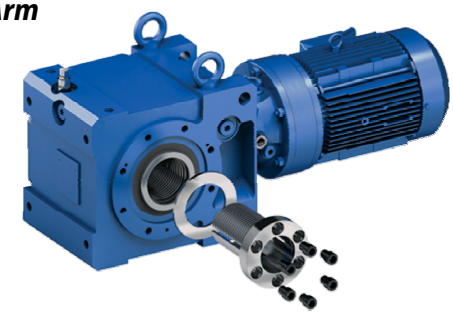
Cyclo® BBB 4 Series: Features & Options *(Continued)*

Matched Spiral Bevel Sets

Pinions are mated with gears during the lapping process, thereby creating a matched set. This matching process leads to a smoothly operating gear set and low noise levels.

After lapping, the gear set's backlash is measured and a serial number is etched into the pinion and the gear. Both share the same serial number, linking them as a pair. The measurement data and serial number are then stored for future reference should a need for the data ever arise. Material certifications can be traced as well. These are examples of Sumitomo's focus on delivering quality products and services to our customers.

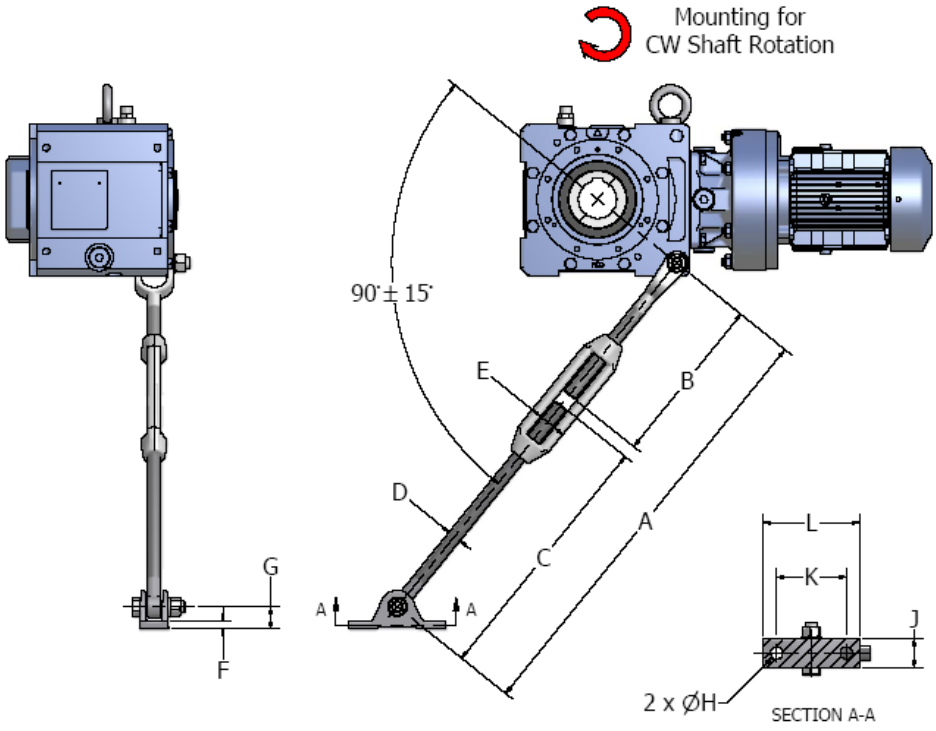
Shaft Mounting with a Keyless Taper-Grip® Bushing and Turnbuckle Torque Arm



The Taper-Grip® bushing is keyless and comprised of a small number of parts:

- Facilitates easy gearbox mounting and removal.
- The driven shaft does not require special tolerances or preparation.
- No backlash between the driven shaft and the Taper-Grip® bushing.

The standard torque arm is the Turnbuckle type. Since a shaft-mounted gearbox is not held in place by a foot or flange, a torque arm is required to prevent gearbox rotation during operation. A Turnbuckle torque arm must always be mounted in tension, otherwise it may buckle due to excessive compression.



Cyclo® BBB 4 Series: Features & Options *(Continued)*

Turnbuckle Torque Arm Dimensions, inches and *(mm)*:

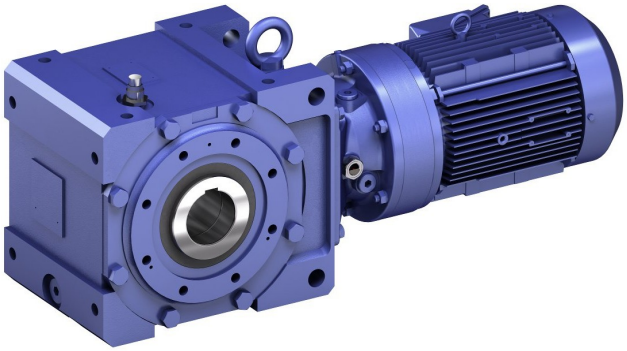
Unit Size	A		B	C	D Thread	E	F	G	∅H	J	K	L
	Min	Max										
4A	25.20 *(640)*	28.74 *(730)*	9.69 *(246)*	14.76 *(375)*	M20	2.24 *(57)*	0.47 *(12.0)*	1.26 *(32)*	0.69 *(17.5)*	1.65 *(42)*	3.94 *(100)*	5.51 *(140)*
4B, 4C	25.98 *(660)*	29.53 *(750)*	10.35 *(263)*	14.76 *(375)*	M24	2.32 *(59)*	0.81 *(20.5)*	2.13 *(54)*	0.69 *(17.5)*	2.76 *(70)*	4.76 *(121)*	6.61 *(168)*
4D, 4E	33.86 *(860)*	37.40 *(950)*	18.31* *(465)*	14.76 *(375)*	M24	2.32 *(59)*	0.81 *(20.5)*	2.13 *(54)*	0.69 *(17.5)*	2.76 *(70)*	4.76 *(121)*	6.61 *(168)*

Notes: BBB shown in Y1 position. Use two turnbuckle torque arms if output shaft will rotate in both directions. Value (*) is variable due to the turnbuckle's design.

Options

1. Keyed Hollow Shaft

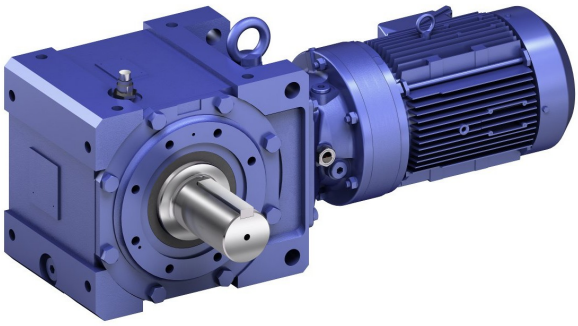
Available in the following inch and metric diameters:



Unit Size	Inch			Metric *(mm)*		
	Std	Min	Max	Std	Min	Max
4A	2	1-3/4	2-3/16	*(55)*	*(45)*	*(55)*
4B	2-3/8	2-3/16	2-5/8	*(65)*	*(55)*	*(65)*
4C	2-3/4	2-7/16	3	*(75)*	*(60)*	*(75)*
4D	3-1/4	2-3/4	3-7/16	*(85)*	*(70)*	*(85)*
4E	4	3-3/16	4	*(100)*	*(80)*	*(100)*
4F	4 1/2	4	4-3/4	*(120)*	*(100)*	*(120)*

2. Solid Output Shaft

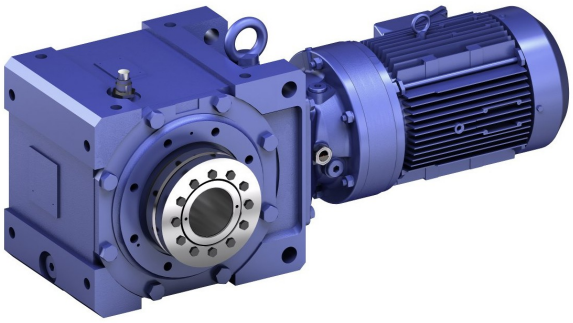
Available in the following inch and metric diameters:



Unit Size	Inch	Metric *(mm)*
4A	2	*(55)*
4B	2-7/8	*(65)*
4C	3-1/8	*(75)*
4D	3-5/8	*(85)*
4E	4-3/8	*(100)*
4F	4-3/4	*(120)*

3. Shrink Disc

Available in the following metric diameters:

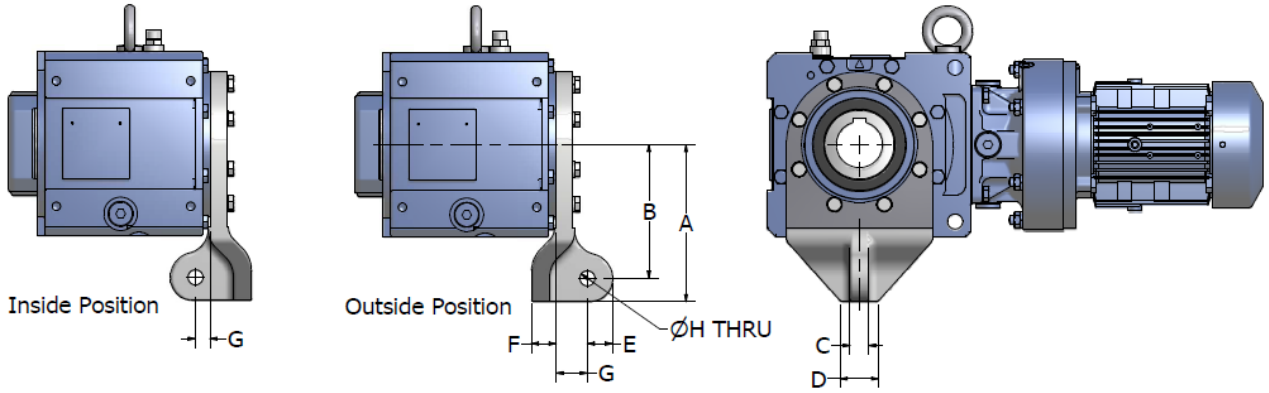


Unit Size	Metric *(mm)*
4A	*(55)*
4B	*(65)*
4C	*(75)*
4D	*(85)*
4E	*(100)*
4F	*(120)*

Cyclo® BBB 4 Series: Features & Options *(Continued)*

4. Flange Mount (Banjo) Torque Arm

The standard torque arm is a Turnbuckle type. We also offer the Flange Mounted Banjo-torque arm design.

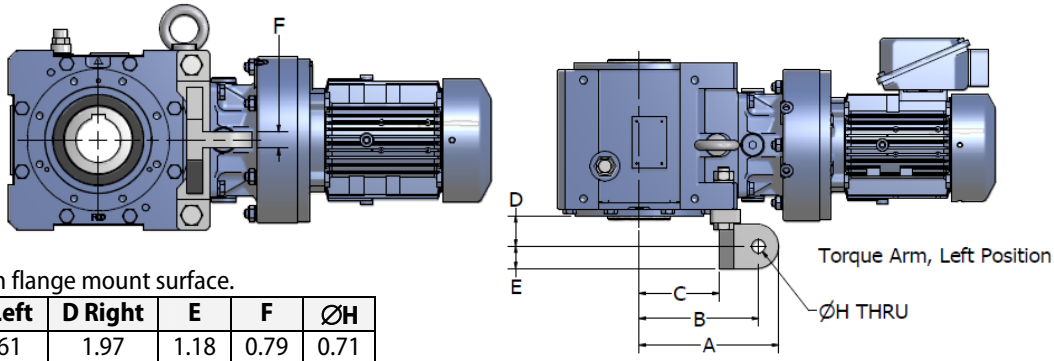


Flange Mount Torque Arm Dimensions, inches and *(mm)*.

Unit Size	A	B	C	D	E	F	G		H
							Inside	Outside	
4A	7.39 *(188)*	6.30 *(160)*	0.87 *(22)*	1.73 *(44)*	1.06 *(27)*	1.16 *(30)*	0.68 *(17.3)*	1.47 *(37.3)*	0.71 *(18)*
4B	9.02 *(229)*	7.68 *(195)*	1.02 *(26)*	2.05 *(52)*	1.42 *(36)*	1.30 *(33)*	0.67 *(16.9)*	1.61 *(40.9)*	0.87 *(22)*
4C	11.2 *(284)*	9.45 *(240)*	1.18 *(30)*	2.36 *(60)*	1.97 *(50)*	1.30 *(33)*	1.22 *(30.9)*	2.32 *(58.9)*	1.02 *(26)*
4D	13.6 *(345)*	11.6 *(295)*	1.38 *(35)*	1.38 *(35)*	1.97 *(50)*	1.42 (36)	1.17 *(29.6)*	2.43 *(61.6)*	1.30 *(33)*
4E	15.4 *(390)*	13.2 *(335)*	1.57 *(40)*	1.57 *(40)*	2.17 *(55)*	1.18 *(30)*	1.34 *(34.0)*	2.76 *(70.0)*	1.30 *(33)*
4F	20.3 *(515)*	17.7 *(450)*	1.97 *(50)*	1.97 *(50)*	2.56 *(65)*	1.57 *(40)*	2.32 *(59.0)*	4.13 *(105)*	1.54 *(39)*

Note: BBB shown in Y1 position.

5. T-Type Torque Arm

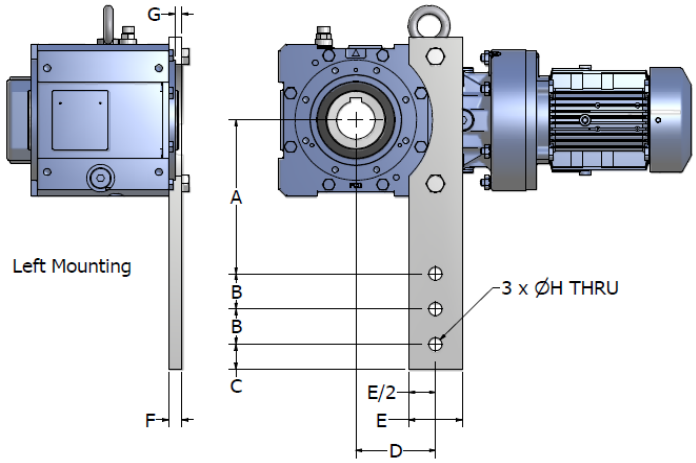


T-Type Torque Arm Dimensions, inches and *(mm)*.
Note: BBB shown in Y1 Position. D is from flange mount surface.

Unit Size	A	B	C	D Left	D Right	E	F	ØH
4A	7.40 *(188)*	6.34 *(161)*	4.25 *(108)*	1.61 *(41)*	1.97 *(50)*	1.18 *(30)*	0.79 *(20)*	0.71 *(18)*
4B	8.98 *(228)*	7.68 *(195)*	5.00 *(127)*	2.09 *(53)*	2.44 *(62)*	1.42 *(36)*	1.13 *(29)*	0.87 *(22)*
4C	10.8 *(274)*	9.13 *(232)*	6.14 *(156)*	2.60 *(66)*	2.95 *(75)*	1.77 *(45)*	1.25 *(32)*	1.02 *(26)*
4D	12.9 *(327)*	11.0 *(279)*	7.40 *(188)*	3.19 *(81)*	3.58 *(91)*	2.17 *(55)*	1.50 *(38)*	1.30 *(33)*
4E	14.2 *(361)*	12.1 *(306)*	8.27 *(210)*	3.17 *(81)*	3.58 *(91)*	2.17 *(55)*	1.42 *(36)*	1.30 *(33)*

Cyclo® BBB 4 Series: Features & Options *(Continued)*

6. Transverse Torque Arm

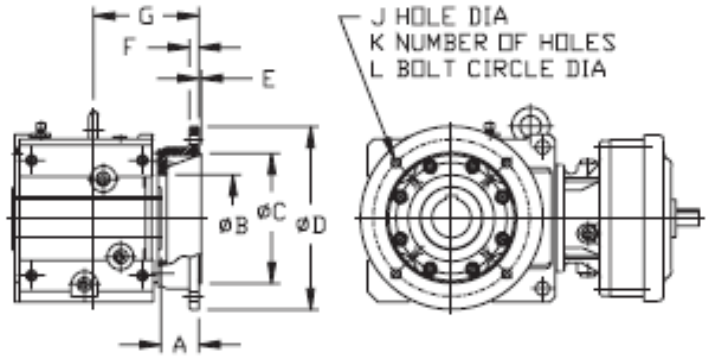


Transverse Torque Arm Dimensions, inches and *(mm)*.

Unit Size	A	B	C	D	E	F	G Left	G Right	H
4A	8.74 *(222)*	2.01 *(51)*	1.42 *(36)*	4.49 *(114)*	3.00 *(76)*	0.75 *(19.1)*	0.40 *(10)*	0.75 *(19)*	0.75 *(19)*
4B	10.2 *(259)*	1.97 *(50)*	1.18 *(30)*	5.59 *(142)*	3.50 *(89)*	1.00 *(25.4)*	0.65 *(16)*	1.00 *(25)*	0.79 *(20)*

Note: BBB shown in Y1 position. G is from flange mount surface.

7. Output Flange Mounting

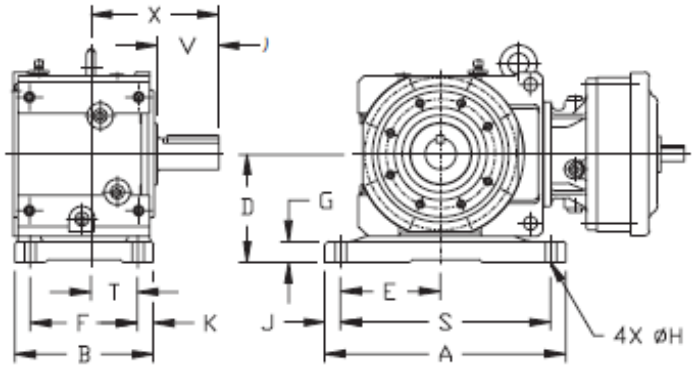


Dimensions are in inches *(mm)*.

Unit Size	A	ØB	ØC	ØD	E	F	G	J	K	L
4A	2.36 *(60)*	4.72 *(120)*	7.09 *(180)*	9.84 *(250)*	0.16 *(4)*	0.59 *(15)*	6.30 *(160)*	0.55 *(14)*	4	8.46 *(215)*
4B	2.40 *(61)*	5.51 *(140)*	9.06 *(230)*	11.8 *(300)*	0.16 *(4)*	0.63 *(16)*	7.40 *(188)*	0.55 *(14)*	4	10.4 *(265)*
4C	2.87 *(73)*	6.50 *(165)*	9.84 *(250)*	13.8 *(350)*	0.20 *(5)*	0.71 *(18)*	7.95 *(202)*	0.71 *(18)*	4	11.8 *(300)*
4D	3.15 *(80)*	7.68 *(195)*	13.8 *(350)*	17.7 *(450)*	0.20 *(5)*	0.87 *(22)*	9.25 *(235)*	0.71 *(18)*	8	15.8 *(400)*
4E	3.15 *(80)*	8.66 *(220)*	13.8 *(350)*	17.7 *(450)*	0.20 *(5)*	0.87 *(22)*	9.57 *(243)*	0.71 *(18)*	8	15.8 *(400)*
4F	2.56 *(65)*	9.45 *(240)*	21.7 *(550)*	26.0 *(660)*	0.20 *(5)*	0.94 *(24)*	10.0 *(255)*	0.87 *(22)*	8	23.6 *(600)*

Cyclo® BBB 4 Series: Features & Options *(Continued)*

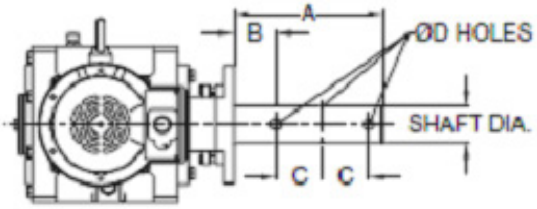
8. Foot Mounting

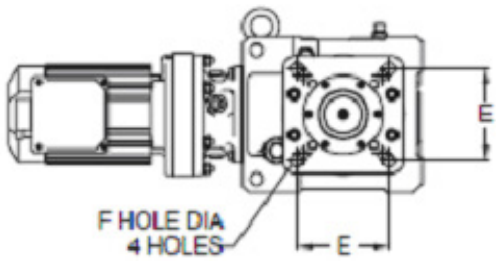


Dimensions are in inches *(mm)*.

Unit Size	A	B	D	E	F	G	H	J	K	S	T	V	X
4A	12.6 *(320)*	7.95 *(202)*	5.51 *(140)*	5.31 *(135)*	6.30 *(160)*	0.98 *(25)*	0.55 *(14)*	0.79 *(20)*	0.83 *(21)*	11.0 *(280)*	2.83 *(72)*	3.54 *(90)*	7.48 *(190)*
4B	15.2 *(385)*	9.65 *(245)*	6.69 *(170)*	6.30 *(160)*	7.68 *(195)*	1.38 *(35)*	0.71 *(18)*	0.79 *(20)*	0.98 *(25)*	13.6 *(345)*	3.74 *(95)*	4.53 *(115)*	9.53 *(242)*
4C	19.9 *(505)*	10.6 *(270)*	8.27 *(210)*	7.68 *(195)*	8.27 *(210)*	1.57 *(40)*	0.87 *(22)*	1.18 *(30)*	1.18 *(30)*	17.5 *(445)*	3.58 *(91)*	5.71 *(145)*	10.8 *(274)*
4D	22.1 *(560)*	12.6 *(320)*	9.65 *(245)*	9.25 *(235)*	10.2 *(260)*	1.77 *(45)*	1.02 *(26)*	1.18 *(30)*	1.18 *(30)*	19.7 *(500)*	4.53 *(115)*	6.69 *(170)*	12.8 *(325)*
4E	25.6 *(650)*	14.0 *(355)*	10.8 *(275)*	10.6 *(270)*	11.0 *(280)*	1.77 *(45)*	1.30 *(33)*	1.38 *(35)*	1.50 *(38)*	22.8 *(580)*	4.57 *(116)*	7.87 *(200)*	14.3 *(363)*
4F	29.1 *(740)*	15.8 *(400)*	12.6 *(320)*	11.8 *(300)*	12.6 *(320)*	2.56 *(65)*	1.30 *(33)*	1.38 *(35)*	1.57 *(40)*	26.4 *(670)*	4.43 *(113)*	3.54 *(210)*	15.8 *(400)*

9. Screw Conveyor Drive





- The screw conveyor option design conforms to established CEMA inch dimensions.
- Complete Cyclo® BBB screw conveyor drive consists of reducer, CEMA drive shaft assembly and mounting adapter kit. The CEMA drive shaft and mounting adapter kit require customer assembly.
- CEMA drive shafts are three-hole style.

Dimensions are in inches.

Unit Size	Shaft Dia.	A	B	C	ØD	E (max.)	ØF
4A, 4B	1-1/2	9	2.13	3.00	17/32	4	0.531
	2	9	2.13	3.00	21/32	5.13	0.669
	2-7/16	9.69	2.75	3.00	21/32	5.63	0.669
	3	9.88	2.88	3.00	25/32	6	0.827
4C, 4D	2	9	2.13	3.00	21/32	5.13	0.669
	2-7/16	9.69	2.75	3.00	21/32	5.63	0.669
	3	9.88	2.88	3.00	25/32	6	0.827
	3-7/16	13.13	3.88	4.00	29/32	6.75	0.827
4E	2-7/16	9.69	2.75	3.00	21/32	5.63	0.669
	3	9.88	2.88	3.00	25/32	6	0.827
	3-7/16	13.13	3.88	4.00	29/32	6.75	0.827