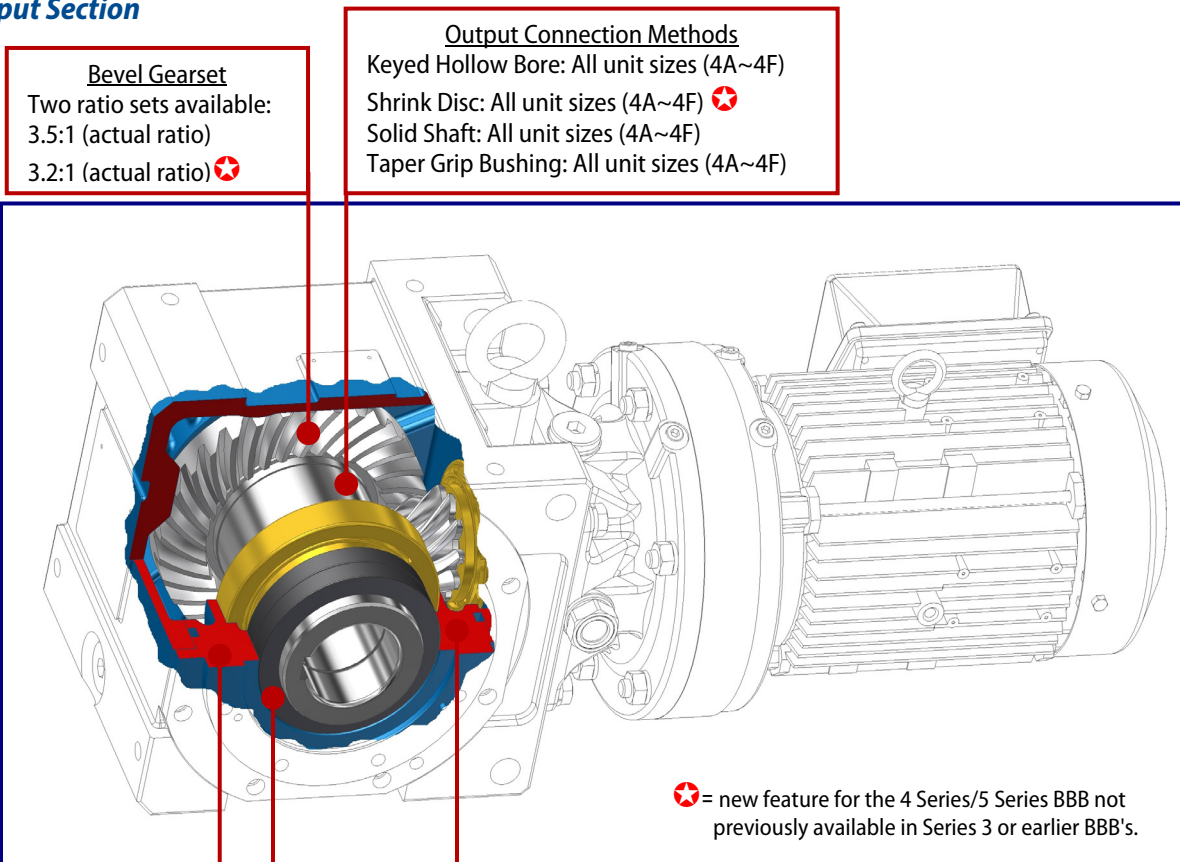


# BBB (3 Series vs. 4 Series vs. 5 Series)

## 4 Series BBB- Output Section



**Output Bearings:**  
Tapered Roller: All unit sizes (4A~4F)

**Output Oil Seals**  
Double Seals per Side: All Unit sizes (4A~4F)

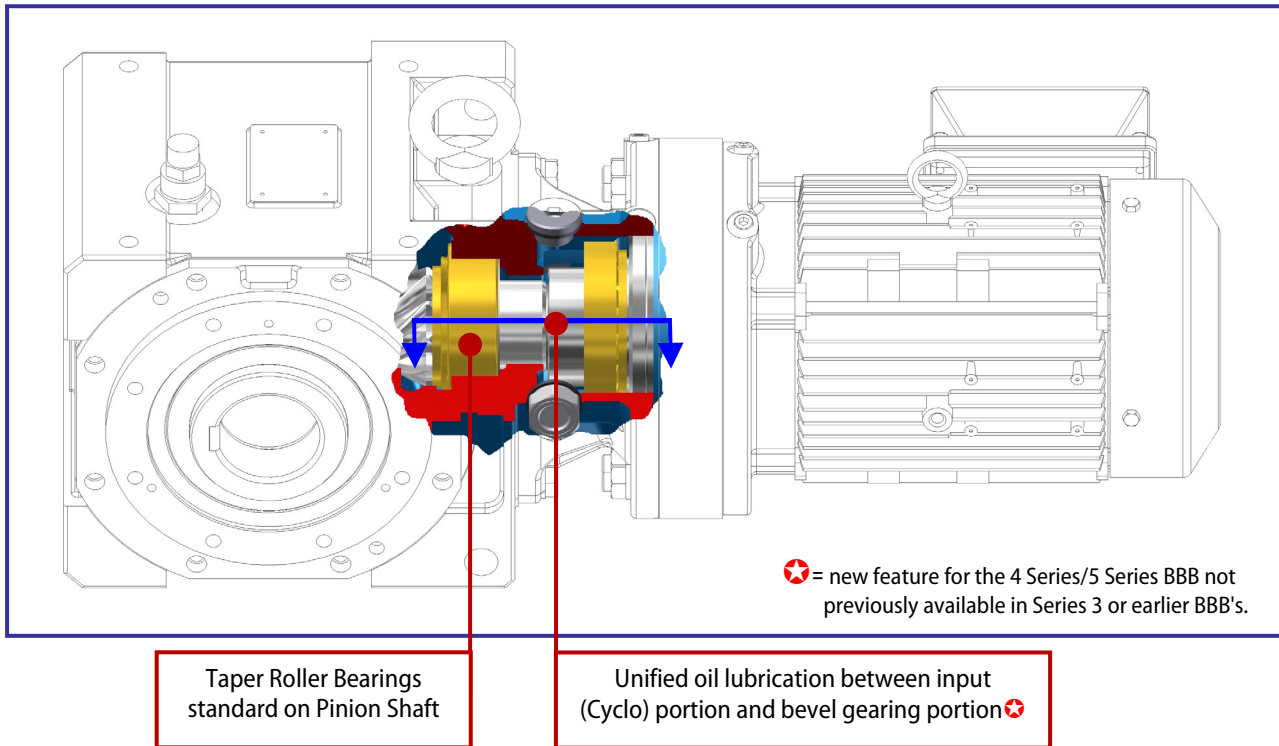
### Technical Notes:

- (1) ★ New 3.2 bevel ratio - combined in some cases with new planetary ratios - creates additional overall reduction ratios not available in 3 Series BBB. "New" nominal single reduction ratios include: 13, 14, 16, 22, 25, 35, 67, 80, 112
- (2) Bevel Gearing Tooth Count:
 

Bevel Ratio	Number of Teeth	
	Pinion	Gear
3.2:1	10	32
3.5:1	10	35
- (3) The gear geometry of the 3.2:1 Pinion Shaft is different from that of the 3.5:1 Pinion Shaft, thus, these two components are NOT interchangeable with each other.
- (4) ★ Ductile iron material (JIS FCD450) now used for Bevel Gear Housing, Bevel Housing cover, and Cyclo Input Flange. Refer to **EDOC1-12-004 "Cast vs. Ductile Iron Housing Material"** which provides a comprehensive technical comparison between cast iron and ductile iron materials.
- (5) ★ New, larger size, 4F unit has an output torque capacity of 18,000 N•m (≈159,300 lb•in)
- (6) For details regarding those output options which are available for the 4 Series BBB (i.e.: keyed hollow bore diameters, flange, etc.) Please refer to technical document **EDOC1-12-011 "Cyclo® BBB4 & 5 Series: Input & Output Options"**.

## BBB (3 Series vs. 4 Series vs. 5 Series) - Continued

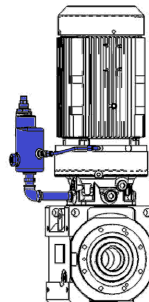
### 4 Series BBB - Intermediate Section



#### Technical Notes:

- (1) ★ For the Y2 (motor up) mounting configuration, oil remains the lubricant for both the Cyclo input and the Bevel output sections - unlike the 3 Series BBB where the Cyclo portion required grease lubrication and derating. Units supplied in the Y2 configuration will include an external oil piping/breather assembly as seen below:

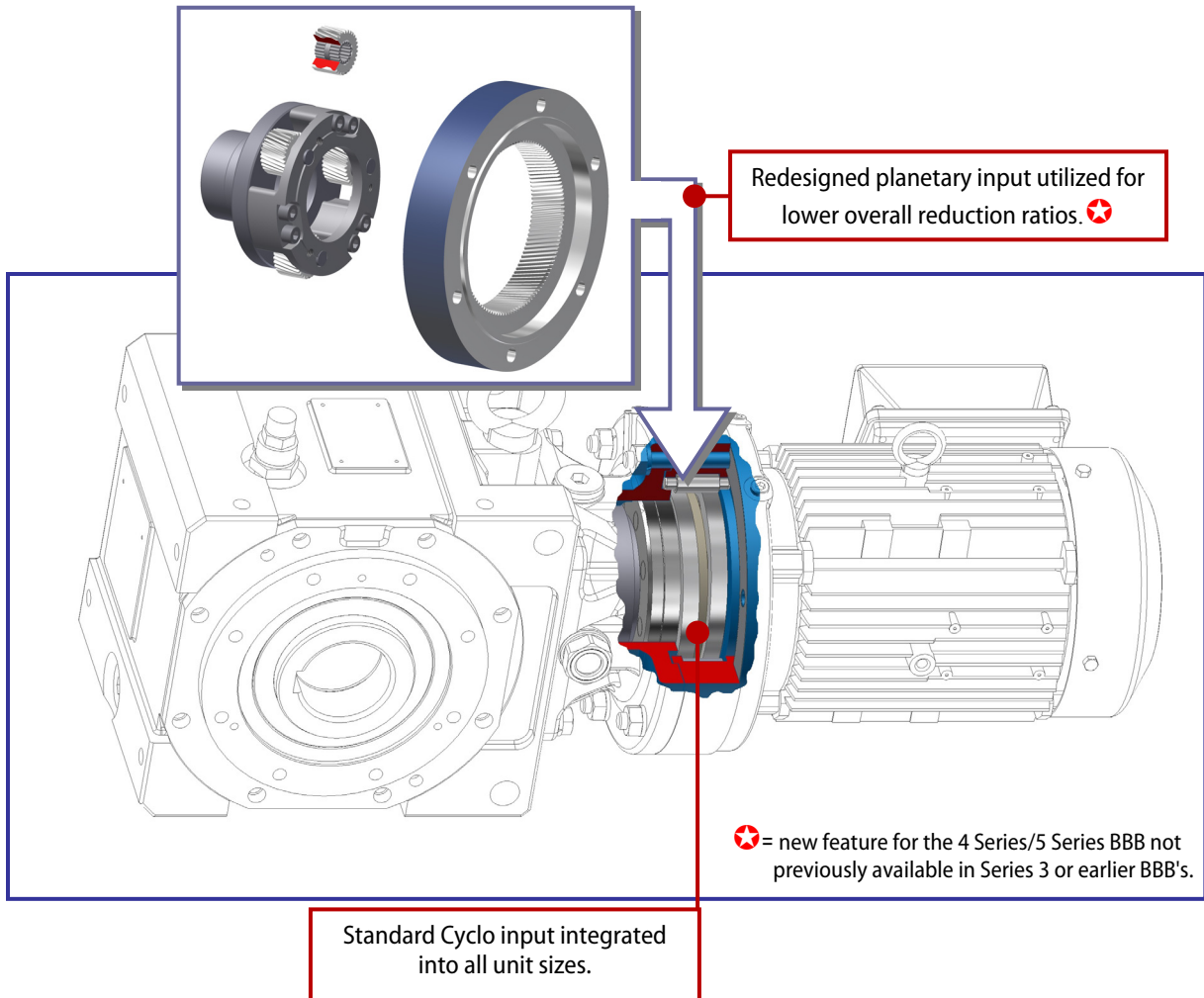
External oil piping/breather system →



- (2) In the Y4 (motor down) mounting configuration, the Input Cyclo portion must be grease lubricated and, subsequently, derated. Internal oil seals and collar are incorporated on the pinion shaft to prevent mixing of the oil and grease lubricants.

# BBB (3 Series vs. 4 Series vs. 5 Series) - Continued

## 4 Series BBB – Input Section

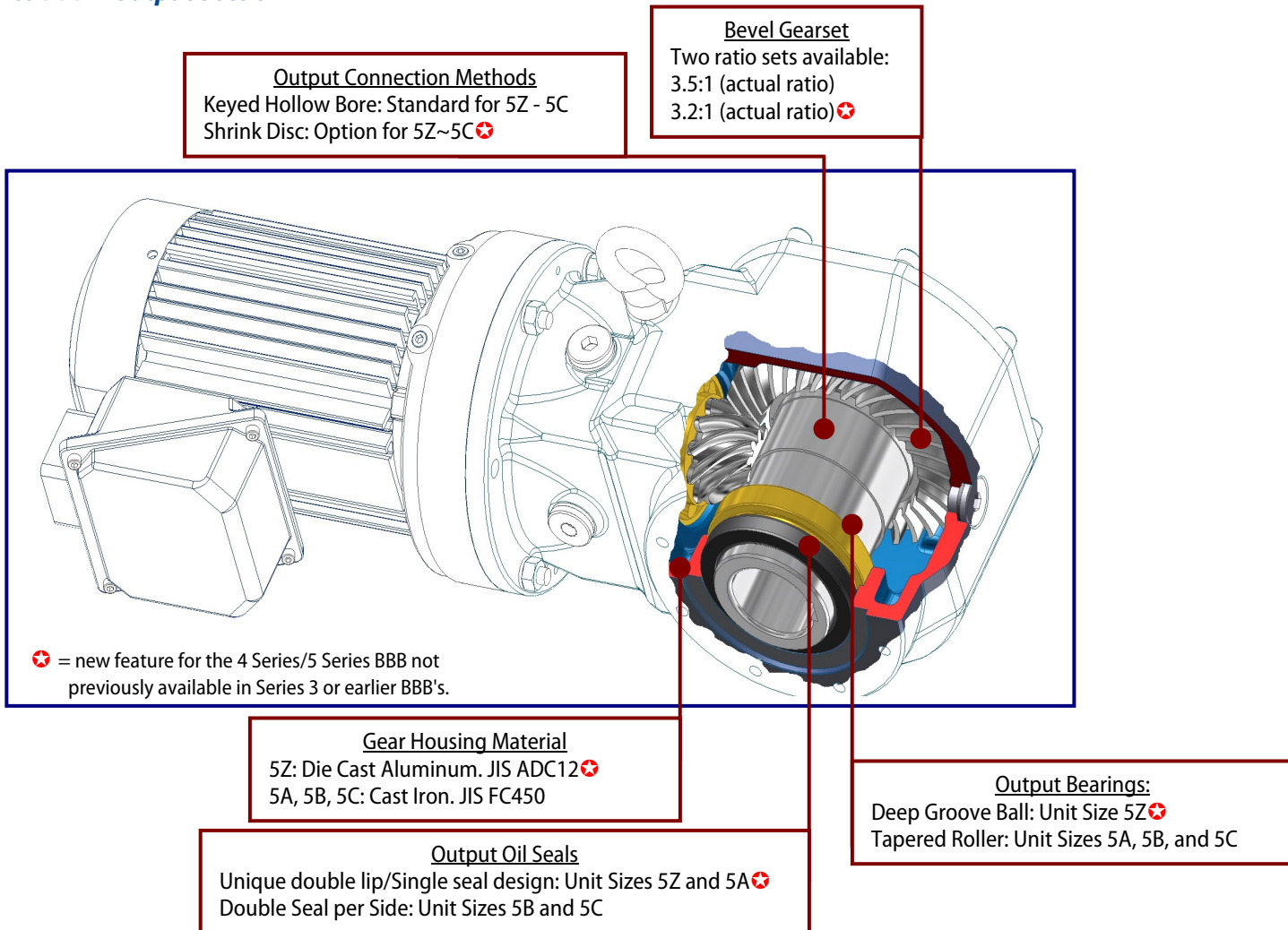


### Technical Notes:

(1)	For planetary input, new reduction ratios have been designed and are available in a larger number of frame sizes. Exact planetary ratios (per frame size) are listed as follows:			
	Frame Size	Nominal Ratio		
		3:1	4:1	5:1
	610	3.000	4.059	4.800
	611	3.000	4.000	4.966
	612	3.000	4.000	4.895
	614	3.111	4.047	5.000
	616	3.100	4.000	5.077
	617	3.103	4.091	5.053
	618	3.000	4.136	4.914
619	3.121	4.089	4.833	
(2)	For specifics regarding various input options (i.e.: Quill motor input, "C" Face motor input, etc.) for the 4 Series BBB, refer to technical document <b>EDOC1-12-011 "Cyclo® BBB4 &amp; 5 Series: Input &amp; Output Options"</b> .			

## BBB (3 Series vs. 4 Series vs. 5 Series) - Continued

### 5 Series BBB – Output Section

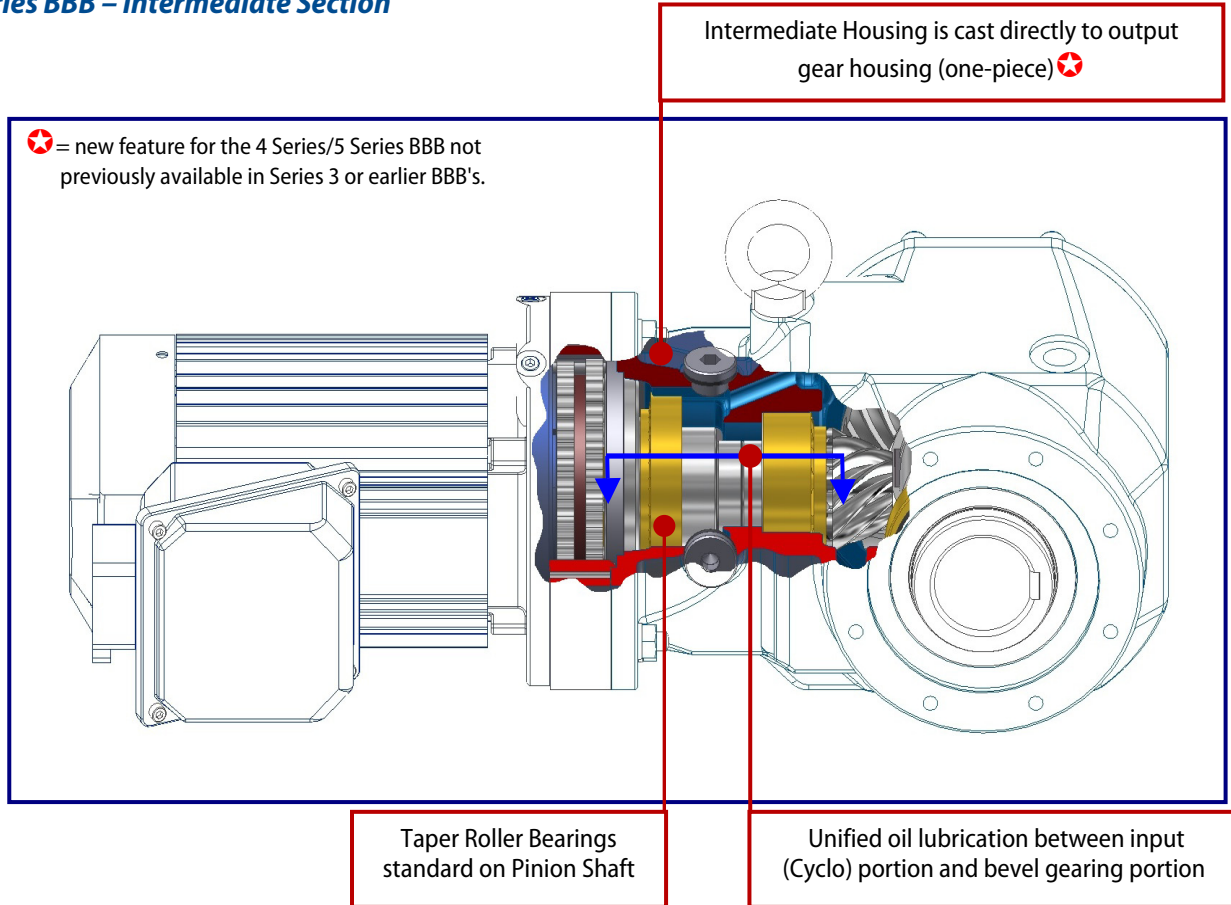


#### Technical Notes:

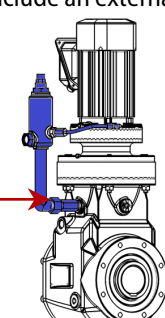
(1)	New 3.2 bevel ratio - combined in some cases with new planetary ratios - creates additional overall reduction ratios not available in 3 Series BBB. "New" nominal single reduction ratios include: 13, 14, 16, 22, 25, 35, 67, 80, 112											
(2)	Bevel Gearing Tooth Count: <table border="1" data-bbox="685 1604 1031 1745"> <thead> <tr> <th rowspan="2">Bevel Ratio</th> <th colspan="2">Number of Teeth</th> </tr> <tr> <th>Pinion</th> <th>Gear</th> </tr> </thead> <tbody> <tr> <td>3.2:1</td> <td>10</td> <td>32</td> </tr> <tr> <td>3.5:1</td> <td>10</td> <td>35</td> </tr> </tbody> </table>	Bevel Ratio	Number of Teeth		Pinion	Gear	3.2:1	10	32	3.5:1	10	35
Bevel Ratio	Number of Teeth											
	Pinion	Gear										
3.2:1	10	32										
3.5:1	10	35										
(3)	The gear geometry of the 3.2:1 Pinion shaft is different from that of 3.5:1 Pinion shaft. These two components are NOT interchangeable.											
(4)	For details regarding those output options which are available for the 5 Series BBB (ie: keyed hollow bore diameters, flange, etc.) please refer to technical document <b>EDOC1-12-011 "Cyclo® BBB4 &amp; 5 Series: Input &amp; Output Options"</b> .											

# BBB (3 Series vs. 4 Series vs. 5 Series) - Continued

## 5 Series BBB – Intermediate Section



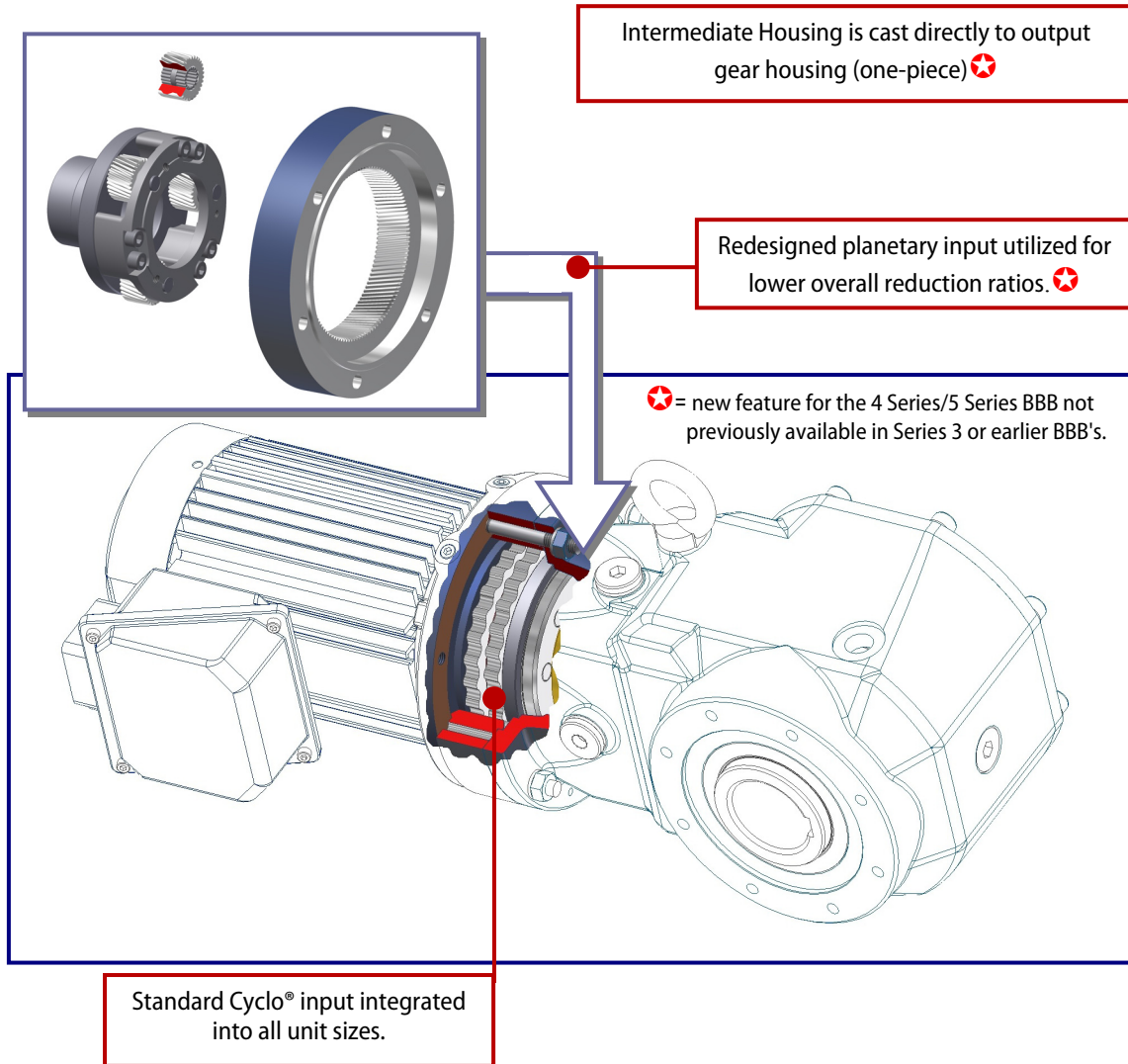
### Technical Notes:

(1) ★	"One piece housing" design <u>only</u> applies to 5-Series BBB. 4-Series still utilizes two piece housing - specifically: Cyclo Input Flange is separate from Output Bevel Gear Housing.
(2)	With one-piece housing, multiple designs exist for each bevel unit size. This is required to accommodate various Cyclo input sizes.
(3) ★	<p>For the Y2 (motor up) mounting configuration, oil remains the lubricant for both the Cyclo input and the Bevel output sections. Units supplied in the Y2 configuration will include an external oil piping/breather assembly.</p> <div style="text-align: center;">  <p>External piping/breather assembly</p> </div>
(4)	In the Y4 (motor down) mounting configuration, the Input Cyclo portion must be grease lubricated and, subsequently, derated. Internal oil seals and collar are incorporated on the pinion shaft to prevent mixing of the oil and grease lubricants.



## BBB (3 Series vs. 4 Series vs. 5 Series) - Continued

### 5 Series BBB – Input Section



#### Technical Notes:

- (1) ✱ For planetary input, new reduction ratios have been designed and are available in a larger number of frame sizes. Exact planetary ratios (per frame size) are listed as follows:

Frame Size	Nominal Ratio		
	3:1	4:1	5:1
610	3.000	4.059	4.800
611	3.000	4.000	4.966
612	3.000	4.000	4.895
614	3.111	4.047	5.000
616	3.100	4.000	5.077
617	3.103	4.091	5.053
618	3.000	4.136	4.914
619	3.121	4.089	4.833

- (2) For specifics regarding various Input Options (i.e.: Quill motor input, "C" Face motor input) available for the 5 Series BBB, refer to technical document **EDOC1-12-001 "Cyclo® BBB4 & 5 Series: Input & Output Options"**.