

12. STEPLESS SPEED VARIATOR

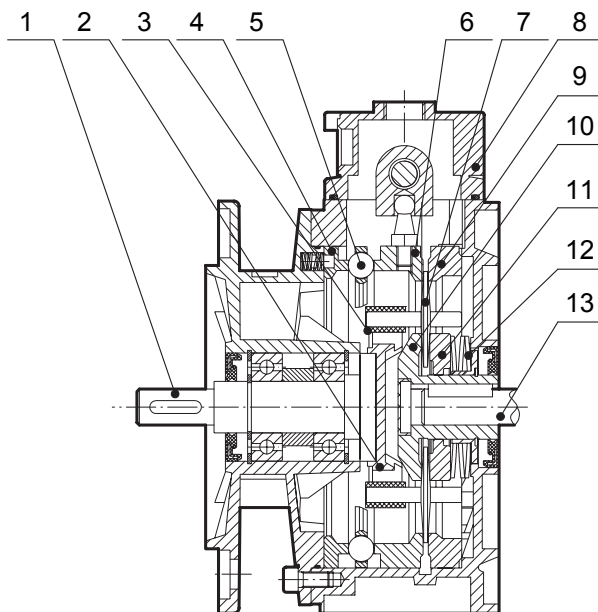
12.1 Brief introduction to stepless speed variator

The design of UDL series stepless speed variator comprises the advanced technology both at home and abroad. The products include the following main characteristics:

1. High speed-regulating precision: up to 0.5-1 rotation.
2. Large speed –changing range: The speed ratio ranges from 1:1.4 to 1:7 freely.
3. High in strength and long in service life.
4. Convenient to regulate the speed.
5. Continuous in running, front-to-back in running direction, smooth in driving, stable in performance and low in noise.
6. Full in sealing and suitable for any environment.
7. Compact in structure and small in volume.
8. Made of high-quality aluminium alloy diecast into forming, good-looking in appearance, light in weight and it never gets rusty.
9. Good in adaptation: UDL series stepless speed variators can be combined with all kinds of speed reducers, as to achieve low stepless speed-changing.

UDL series stepless speed variators are widely used for foodstuffs, ceramics, packing, chemicals, pharmacy, plastics, paper-making, machine-tools, communications, and all kinds of automatic lines, pipelines and assembly lines which need speed-regulation, It is a good companion for your production.

12.2 Structure



1. Output shaft
2. Planet carrier
3. Friction bearing - planet disk
4. Cam ring
5. Ball ring
6. Adjustable annulus ring
7. Planet disk
8. Control cover
9. Fixed annulus ring
10. Fixed sun race
11. Adjustable sun race
12. Belleville spring
13. Motor shaft

12.3 Product picture



UDL..B3



UDL..B5

12.4 Model illuminate

12.4.1 Stepless speed variator

UD **L** **0.75** **B3** **B5**
 ① ② ③ ④ ⑤

| No | Comments | No | Comments |
|----|---|----|--|
| 1 | Code of stepless speed variator | 4 | 1). B3 : Foot-mounted model 2). B5 : Flange-mounted model |
| 2 | 1). L : Aluminium alloy casing 2). No mark means cast iron casing | 5 | Code of installation positon |
| 3 | Motor power | | |

12.4.2 Combination of stepless speed variator and gear speed reducer

UDL **0.75** **C** **B3** **B5**
 ① ② ③ ④ ⑤

| No | Comments | No | Comments |
|----|---|----|--|
| 1 | Code of stepless speed variator with aluminium alloy casing | 4 | 1). B3 : Foot-mounted model 2). B5 : Flange-mounted model |
| 2 | Motor power | 5 | Code of installation positon |
| 3 | Code of gear reducer | | |

12.5 Performance parameter

12.5.1 UDL Performance table for udl series speed variator

($n_1 = 1400$ r/min)

| Motor | Model | i | n_2 [r/min] | M_2 [Nm] |
|--------|----------------|-----------|---------------|------------|
| 0.18KW | UDL0.18 | 1.6 ~ 8.2 | 880 ~ 170 | 1.5 ~ 3 |
| 0.37KW | UDL0.37 | 1.4 ~ 7 | 1000 ~ 200 | 3 ~ 6 |
| 0.55KW | UDL0.55 | 1.4 ~ 7 | 1000 ~ 200 | 4 ~ 8 |
| 0.75KW | UDL0.75 | 1.4 ~ 7 | 1000 ~ 200 | 6 ~ 12 |
| 1.1KW | UD1.1 | 1.4 ~ 7 | 1000 ~ 200 | 9 ~ 18 |
| 1.5KW | UD1.5 | 1.4 ~ 7 | 1000 ~ 200 | 12 ~ 24 |
| 2.2KW | UD2.2 | 1.4 ~ 7 | 1000 ~ 200 | 18 ~ 36 |
| 3.0KW | UD3.0 | 1.4 ~ 7 | 1000 ~ 200 | 24 ~ 48 |
| 4.0KW | UD4.0 | 1.4 ~ 7 | 1000 ~ 200 | 32 ~ 64 |
| 5.5KW | UD5.5 | 1.4 ~ 7 | 1000 ~ 200 | 45 ~ 90 |
| 7.5KW | UD7.5 | 1.4 ~ 7 | 1000 ~ 200 | 59 ~ 118 |

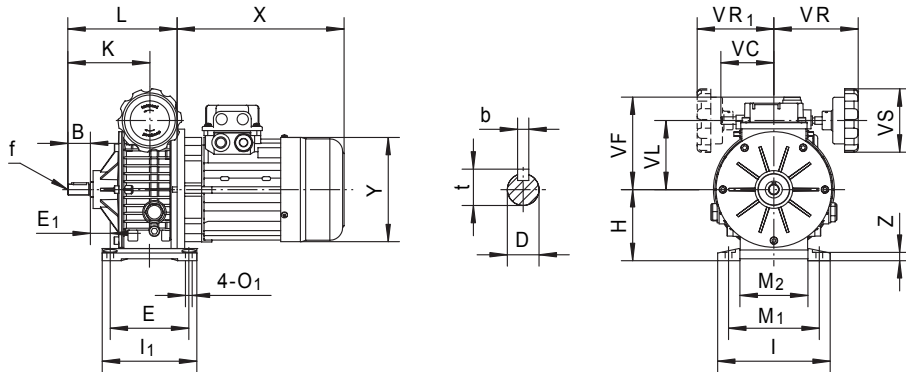
12.5.2 Performance table for stepless speed variator & gear speed reducer

($n_1 = 1400$ r/min)

| Model | i | n_2 [r/min] | M_2 [Nm] |
|--------------------|-----|---------------|------------|
| UDL0.18-CB3 | 5 | 176 ~ 34 | 7 ~ 15 |
| UDL0.37-CB3 | 5 | 200 ~ 40 | 15 ~ 30 |
| UDL0.75-CB3 | 5 | 200 ~ 40 | 30 ~ 60 |

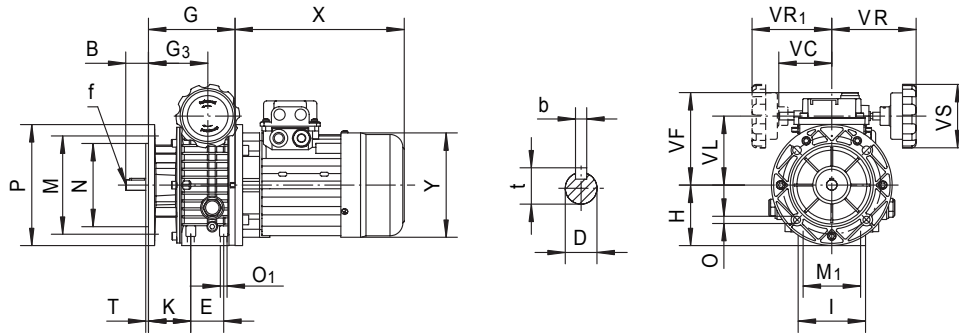
12.6 Outline dimension sheet

12.6.1 B3 Model



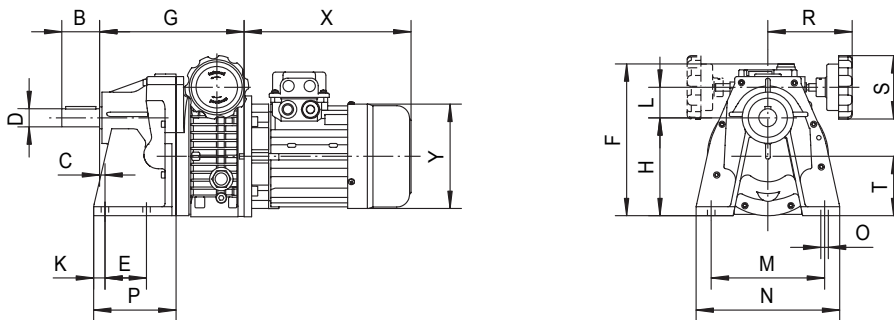
| Model | B | D_{j6} | E | E_1 | H | I | I_1 | K | L | M_1 | M_2 | O_1 | VC | VF | VL | VR | VR_1 | VS | b | f | t | X | Y | Z |
|------------------|----|----------|-----|-------|-----|-----|-------|-----|-----|-------|-------|-------|----|-----|-----|-----|--------|-----|----|-----|------|-----|-----|----|
| UDL0.18B3 | 23 | 11 | 105 | 18 | 80 | 145 | 120 | 88 | 136 | 110 | 71 | 9 | 71 | 111 | 78 | 110 | 110 | 85 | 4 | - | 12.5 | 200 | 120 | 10 |
| UDL0.37B3 | 30 | 14 | 104 | 20 | 93 | 149 | 125 | 104 | 140 | 120 | 96 | 9 | 71 | 123 | 90 | 110 | 110 | 85 | 5 | M6 | 16 | 227 | 141 | 10 |
| UDL0.75B3 | 40 | 19 | 125 | 26 | 113 | 190 | 150 | 126 | 179 | 160 | 135 | 11 | 79 | 140 | 107 | 120 | 120 | 110 | 6 | M6 | 21.5 | 268 | 160 | 15 |
| UD1.1B3 | 40 | 24 | 105 | 35 | 100 | 207 | 130 | 136 | 187 | 160 | 115 | 13 | - | 124 | 102 | 150 | - | 110 | 8 | M8 | 27 | 265 | 195 | 15 |
| UD1.5B3 | 50 | 24 | 115 | 54 | 123 | 241 | 150 | 165 | 238 | 190 | 143 | 13 | - | 144 | 122 | 150 | - | 110 | 8 | M8 | 27 | 290 | 195 | 18 |
| UD2.2B3 | 60 | 28 | 230 | 25 | 150 | 300 | 270 | 191 | 268 | 245 | 190 | 14 | - | 188 | 150 | 150 | - | 110 | 8 | M8 | 33 | 320 | 215 | 25 |
| UD3.0B3 | 60 | 28 | 230 | 25 | 150 | 300 | 270 | 191 | 268 | 245 | 190 | 14 | - | 188 | 150 | 150 | - | 110 | 8 | M8 | 33 | 320 | 215 | 25 |
| UD4.0B3 | 60 | 28 | 230 | 25 | 150 | 300 | 270 | 191 | 268 | 245 | 190 | 14 | - | 188 | 150 | 150 | - | 110 | 8 | M8 | 33 | 340 | 240 | 25 |
| UD5.5B3 | 70 | 38 | 250 | 33 | 200 | 365 | 290 | 201 | 319 | 315 | 245 | 18 | - | - | 192 | 192 | - | 110 | 10 | M10 | 38 | 395 | 275 | 30 |
| UD7.5B3 | 70 | 38 | 250 | 33 | 200 | 365 | 290 | 201 | 319 | 315 | 245 | 18 | - | - | 192 | 192 | - | 110 | 10 | M10 | 38 | 435 | 275 | 30 |

12.6.2 B5 Model



| Model | B | D _{j6} | E | G | G ₃ | H | I | M | M1 | N | O | O ₁ | P | T | K | VC | VF | VL | VR | VR ₁ | VS | b | f | t | X | Y |
|------------------|----|-----------------|----|-----|----------------|-----|-----|-----|----|-----|----|----------------|-----|-----|----|----|-----|-----|-----|-----------------|-----|----|-----|----|-----|-----|
| UDL0.18B5 | 23 | 11 | 50 | 113 | 64.5 | 70 | 72 | 115 | 60 | 95 | 9 | M6 | 140 | 3.5 | 46 | 71 | 111 | 78 | 110 | 110 | 85 | 4 | - | 13 | 200 | 120 |
| UDL0.37B5 | 30 | 14 | 40 | 110 | 74 | 80 | 90 | 130 | 77 | 110 | 9 | M8 | 160 | 3.5 | 53 | 71 | 123 | 90 | 100 | 110 | 85 | 5 | M6 | 16 | 227 | 141 |
| UDL0.75B5 | 40 | 19 | 58 | 139 | 85.5 | 100 | 98 | 165 | 84 | 130 | 11 | M8 | 200 | 3.5 | 60 | 79 | 140 | 107 | 120 | 120 | 110 | 6 | M6 | 22 | 268 | 160 |
| UD1.1B5 | 40 | 24 | - | 147 | 95 | 98 | 207 | 165 | - | 130 | 11 | - | 200 | 3.5 | - | - | 124 | 102 | 150 | - | 110 | 8 | M8 | 27 | 265 | 195 |
| UD1.5B5 | 50 | 24 | - | 188 | 115 | 126 | 241 | 165 | - | 130 | 11 | - | 200 | 3.5 | - | - | 144 | 122 | 150 | - | 110 | 8 | M8 | 27 | 290 | 195 |
| UD2.2B5 | 60 | 28 | - | 208 | 131 | 150 | 270 | 165 | - | 230 | 15 | - | 300 | 4 | - | - | 188 | 150 | 160 | - | 100 | 8 | M8 | 33 | 320 | 215 |
| UD3.0B5 | 60 | 28 | - | 208 | 131 | 150 | 270 | 265 | - | 230 | 15 | - | 300 | 4 | - | - | 188 | 150 | 160 | - | 100 | 8 | M8 | 33 | 320 | 215 |
| UD4.0B5 | 60 | 28 | - | 208 | 131 | 150 | 270 | 265 | - | 230 | 15 | - | 300 | 4 | - | - | 188 | 150 | 160 | - | 110 | 8 | M8 | 33 | 340 | 240 |
| UD5.5B5 | 70 | 38 | - | 244 | 131 | 200 | - | 300 | - | 250 | 19 | - | 350 | 5 | - | - | - | 192 | 194 | - | 110 | 10 | M10 | 38 | 395 | 275 |
| UD7.5B5 | 70 | 38 | - | 244 | 131 | 200 | - | 300 | - | 250 | 19 | - | 350 | 5 | - | - | - | 192 | 194 | - | 100 | 10 | M10 | 38 | 435 | 275 |

12.6.3 Combined outline & installation sizes for stepless speed variator & gear speed reducer with foot screws

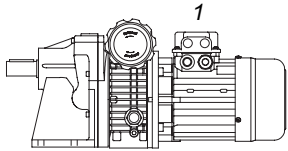
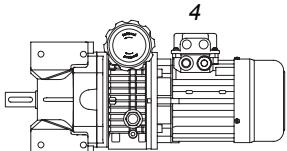
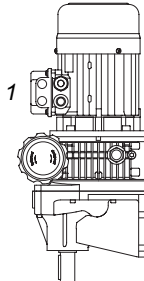
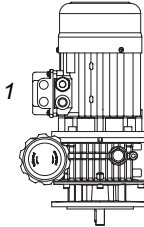
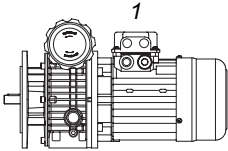
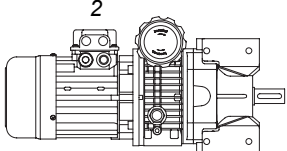
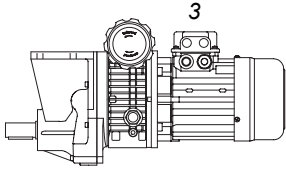
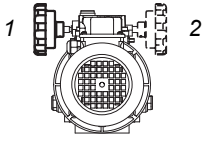
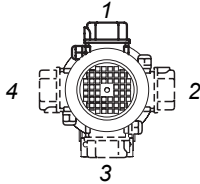


| Model | B | C | D | E | F | G | H | Y | L | M | N | O | P | R | S | T | X | K |
|--------------------|----|----|----|----|-----|-----|-----|-----|----|-----|-----|----|-----|-----|-----|----|-----|----|
| UDL0.18-CB3 | 40 | 18 | 19 | 45 | 162 | 189 | 108 | 120 | 33 | 115 | 130 | 9 | 80 | 110 | 85 | 66 | 200 | 16 |
| UDL0.37-CB3 | 50 | 6 | 24 | 70 | 187 | 190 | 130 | 141 | 39 | 150 | 190 | 10 | 110 | 100 | 85 | 79 | 227 | 15 |
| UDL0.75-CB3 | 60 | 7 | 28 | 70 | 228 | 225 | 160 | 160 | 46 | 165 | 210 | 12 | 130 | 130 | 110 | 99 | 268 | 25 |

12.7 Installation positions diagram

Explain:

- For special requirements, orders must specify the position of the terminal box with reference to the diagram. Unless otherwise specified the terminal box, the position of that will be mounted as shown in the diagram for the mounting position.
- Unless specified otherwise, the standard positions are B3 or B5.
- For positions not envisaged, it is necessary to call our Technical Service.

| | | | |
|---|--|---|---|
| B3 | B6S | V5 | V1 |
|  |  |  |  |
| B5 | B6D | | |
|  |  | | |
| B8 | Pos.of hand wheel | Pos.of terminal box | |
|  | Standard pos.=1  |  | |

12.8 Operation & maintenance

1. The shapes of shaft extension are all cylindrical. It is subject to GB1569-1990 Cylindrical shaft extension. The key joint refers to GB1095-2003 Ordinary flat key.
2. The shaft lines should be kept concentric when the coupling is connected with a motor. The installation error should be no more than the tolerance value of the coupling.
3. When the output shaft is installed with the coupling or belt wheel, they should be pressed into the screw hole on shaft end. Or assembled by heating. No hammering on it!
4. The mechanical stepless speed variator is not used in such an occasion where overload or running-blockage happen to occur.
5. Speed-regulation should be effected in running. Do not turn the hand wheel of speed-regulation when the machine stops!
6. The limit screws of speed-regulation on two ends under the operating box are well adjusted, Please don't touch them!
7. This set is not suited to work in the environment over 40°C, especially no more than 45°C when the temperature rises. In regard to its temperature rise, please read the explanation as follows:
if a 4-pole motor is used for the speed variator, the temperature under running-in (empty running) is 40-50°C higher than that of normal working environment. After running-in up to 60-80 hours, the temperature rise will go down gradually. From that time on, it is 20°C higher than of environment; and the temperature will keep on rising stably. The high temperature rise in running will affect normal permissive working condition, but it won't bring any bad effects to the service life of parts.
8. The liquid lubricating oil is used for the speed variator. Its trade mark is Ub-3x. Please check up the oil level before use.
9. The machine is filled with lubricating oil before leaving factory. When it starts to work up to 2000 hours for the first time, its lubricating oil should be replaced, changing the lubricating oil every 5000 hours later.
10. The lubricating oil level inside the speed variator should be kept at the height of two-third in the oil scale.
Users should usually check the height of oil level. It is strictly prohibited to operate it when short of lubricating oil. The air screw nut on the operating box is screwed up for preventing from oil leakage in moving before leaving factory. It should be loosed when it starts to run. It is strictly forbidden to use it before losing!

13. LUBRICATION

In cases of ambient temperatures not envisaged in the table, call our Technical Service.

- In the case of temperatures under -30°C or over 60°C it is necessary to use oil seals with special material.
- For operating ranges with temperatures under 0°C it is necessary to consider the following:
 - The motors need to be suitable for operation at the envisaged ambient temperature.
 - The power of the electric motor needs to be adequate for exceeding the higher starting torques required.
 - In the case of reduction units with a cast-iron case, pay attention to impact loads since cast iron may have problems of fragility at temperatures under -15°C .
 - During the early stages of service, problems of lubrication may arise due to the high level of viscosity taken on by the oil and so it is wise to have a few minutes of rotation under no load.
- The oil needs to be changed after approximately 10,000 hours. This period depends on the type of service and the environment where the reduction unit works.
- The reduction units size 025-030-040-050-063-075-090-105 are supplied complete with lubricant for life, synthetic oil (SHELL TEVELA OIL 320), and can therefore be mounted in any position envisaged in the catalogue. V5/V6 for which you should call our Technical Service to assess the conditions of use.
- The reduction units size 110 and 130 are supplied complete with lubricant, mineral oil, (SHELL TEVELA OIL 320).
- The variator speed are supplied complete with lubricant, mineral oil (GUANGYAN Ub-3x).
- For sizes 110 and 130 it is necessary to specify the position, otherwise the reduction units are supplied with the quantity of oil relating to pos. B3.
- Only reduction units 110 and 130 are fitted with breather, level and oil drainage plugs. It is necessary, after installation, to replace the closed plug used for transportation with the breather plug supplied with the unit.
- PC is supplied complete with life-long lubricant, synthetic oil (SHELL TEVELA OIL 320), and can therefore be mounted in all the positions.

13.1 Lubricants oil chosen table

| | C -50 0 +50 +100 | ISO | SHELL | AGIP | ESSO | MOBIL | CASTROL | BP | GMER | |
|-------------------------|------------------|-------|-----------------|---------------|---------------|---------------|----------------|------------------|--------|---------------|
| MRV025~105 PC063~090 | -25 +50 | VG320 | Tivela OIL S320 | Telium VSF320 | S220 | Glygoyle 30 | Alphasyn PG320 | Energol SG-XP320 | | Synthetic oil |
| MRV110~130 | -5 +40 | VG460 | Omala OIL460 | Blasia 460 | Spartan EP460 | Mobilgear 634 | Alpha MAX 460 | Energol GR-XP460 | CKE460 | Mineral oil |
| | -15 +25 | VG220 | Omala OIL220 | Blasia 220 | Spartan EP220 | Mobilgear 630 | Alpha MAX 220 | Energol GR-XP220 | | |
| UDL | -25 +40 | VG32 | A.T.F.DXRON | A.T.F.DXRON | A.T.F.DXRON | A.T.F.220 | TQ.DXRON II | Autran DX | Ub-3x | Mineral oil |

13.2 Lubricant fill quantity

(L)

| | B3 | B6 | B7 | B8 | V5 | V6 |
|---------|-------|-----|-----|-----|------|-----|
| MRV 025 | 0.023 | | | | | |
| MRV 030 | 0.05 | | | | | |
| MRV 040 | 0.1 | | | | | |
| MRV 050 | 0.15 | | | | | |
| MRV 063 | 0.3 | | | | | |
| MRV 075 | 0.5 | | | | | |
| MRV 090 | 1 | | | | | |
| MRV 105 | 1.6 | | | | | |
| MRV 110 | 3 | 2.5 | 2.5 | 2.2 | 3 | 2.2 |
| MRV 130 | 4.5 | 3.5 | 3.5 | 3.3 | 4.5 | 3.3 |
| PC063 | 0.05 | | | | | |
| PC071 | 0.07 | | | | | |
| PC080 | 0.15 | | | | | |
| PC090 | 0.16 | | | | | |
| UDL0.18 | 0.13 | | | | 0.2 | |
| UDL0.37 | 0.15 | | | | 0.25 | |
| UDL0.55 | 0.33 | | | | 0.45 | |
| UDL0.75 | 0.33 | | | | 0.45 | |
| UD1.1 | 0.8 | | | | 1 | |
| UD1.5 | 0.8 | | | | 1 | |
| UD2.2 | 1.2 | | | | 1.2 | |
| UD3.0 | 1.2 | | | | 1.2 | |
| UD4.0 | 1.2 | | | | 1.2 | |

14. NOTICE FOR ORDERING

- Please refer to the sheet of performance parameter、MRV series dimensions、Mounting and operation positions diagram, make reasonable choice of model, and write down model mark to your required revolution scope ,output torque and structural form on ordering (when ordering, you should show whether the reducers are equipped with motors, otherwise reducers aren't supplied with motors).
- Please make the best choice of standard products in this catalogue, and give an additional explanation for your special requirement and motors.