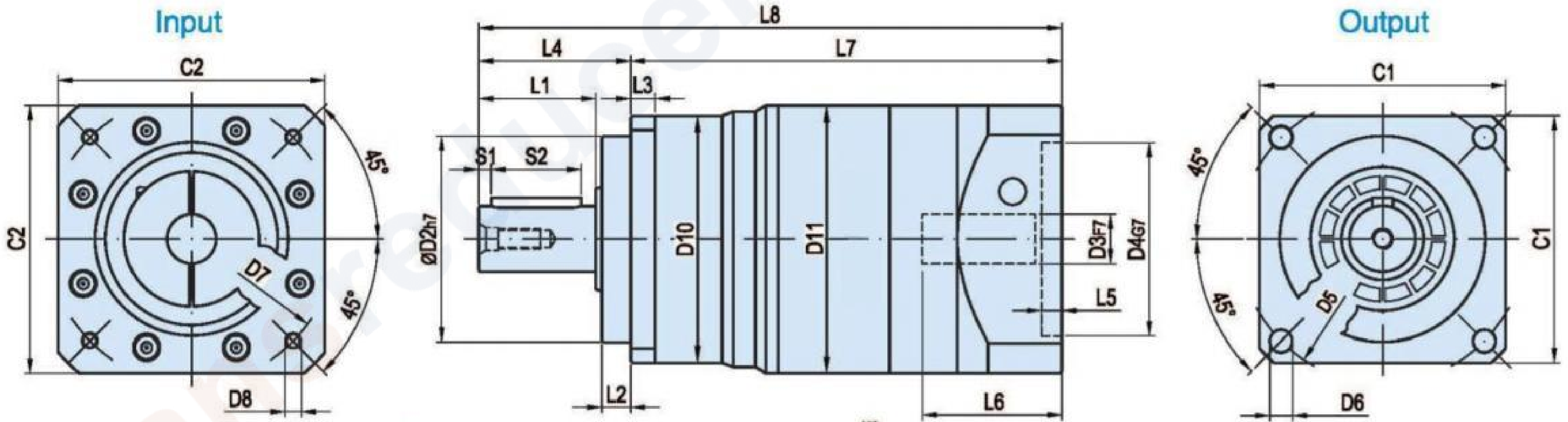
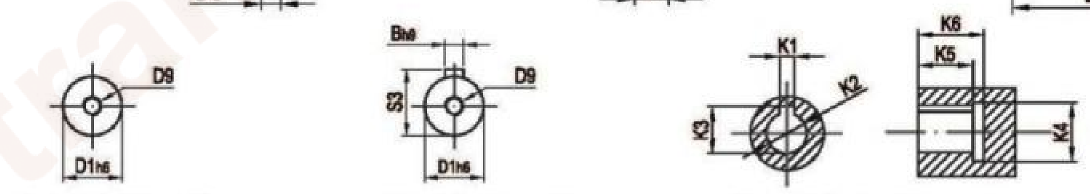
# MODEL：VRB

2–Stage

Ratio：15，20，25，30，35，40，45，50，60
70，80，90，100


## Dimensions：




Output shaft type S1　　Output shaft type S2　　Output hole type S3

Unit:mm

| Size | VRB042–L2 | VRB060–L2 | VRB090–L2 | VRB115–L2 | VRB142–L2 | VRB180–L2 | VRB220–L2 |
|---|---|---|---|---|---|---|---|
| D1 | ϕ13 | ϕ16 | ϕ22 | ϕ32 | ϕ40 | ϕ55 | ϕ75 |
| D2 | ϕ35 | ϕ50 | ϕ80 | ϕ110 | ϕ130 | ϕ160 | ϕ180 |
| D3 | ϕ8（ϕ6.35–8） | ϕ14（ϕ11–14） | ϕ19（ϕ11–19） | ϕ22（ϕ16–24） | ϕ24（ϕ19–35） | ϕ35（ϕ22–35） | ϕ42（ϕ35–42） |
| D4 | ϕ30（ϕ30–38.1） | ϕ50 | ϕ70（ϕ50–ϕ80） | ϕ110（ϕ70–110） | ϕ110（ϕ114.3） | ϕ114.3（ϕ110–114.3） | ϕ180（ϕ114.3–200） |
| D5 | ϕ50 | ϕ70 | ϕ100 | ϕ130 | ϕ165 | ϕ215 | ϕ250 |
| D6 | 4–ϕ3.4 | 4–ϕ5.5 | 4–ϕ7 | 4–ϕ9 | 4–ϕ11 | 4–ϕ13 | 4–ϕ17 |
| D7 | ϕ46（ϕ45–66.67） | ϕ70 | ϕ90（ϕ70–100） | ϕ145（ϕ90–145） | ϕ145（ϕ145–200） | ϕ200（ϕ145–200） | ϕ215（ϕ200–235） |
| D8 | 4–M4(M3) | 4–M5（M4) | 4–M6（M4–M6） | 4–M8（M5–M8） | 4–M8（M8–M12） | 4–M12（M8–M12） | 4–M12 |
| D9 | M4X0.7P | M5X0.8P | M8X1.25P | M12X1.75P | M16X2P | M20X2.5P | M20X2.5P |
| D10 | ϕ42 | ϕ60 | ϕ87 | ϕ114.5 | ϕ142 | ϕ180 | ϕ218 |
| D11 | ϕ46 | ϕ65 | ϕ90 | ϕ118 | ϕ150 | ϕ184 | ϕ225.5 |
| L1 | 19.5 | 28.5 | 36.5 | 51 | 79 | 82 | 105 |
| L2 | 5.5 | 7 | 10 | 12 | 15 | 20 | 30 |
| L3 | 4 | 6 | 8 | 10 | 12 | 15 | 20 |
| L4 | 26 | 37 | 48 | 65 | 97 | 105 | 138 |
| L5 | 5 | 5 | 5 | 8（7–8） | 11（6–11） | 8（8–11） | 8（7–10） |
| L6 | 27.5 | 34 | 34（≤44） | 44（≤60） | 64.5（≤81.5） | 72.5（≤82 | 85（≤120） |
| L7 | 86 | 105 | 124.5（114.5–124.5） | 165.5（149.5–165.5） | 206（189–206） | 235（225.5–235） | 269（264–299） |
| L8 | 112 | 142 | 172.5（162.5–172.5） | 230.5（214.5–230.5） | 303（286–303） | 340（330.5–340） | 407（402–437） |
| C1 | 42 | 60 | 90 | 115 | 142 | 180 | 220 |
| C2 | 46（46–57） | 65 | 65（65–86） | 90（90–130） | 130（130–180） | 150（150–180） | 200（180–220） |
| S1 | 3 | 3 | 4 | 5 | 5 | 6 | 7 |
| S2 | 14 | 22 | 28 | 40 | 65 | 70 | 90 |
| S3 | 15 | 18 | 24.5 | 35 | 43 | 59 | 79.5 |
| B | 5 | 5 | 6 | 10 | 12 | 16 | 20 |
| K1 | 3 | 4 | 6 | 8 | 10 | 14 | 18 |
| K2 | ϕ8 | ϕ11 | ϕ22 | ϕ28 | ϕ38 | ϕ50 | ϕ60 |
| K3 | 9.4 | 12.8 | 24.5 | 31.3 | 41.3 | 53.8 | 64.4 |
| K4 | ϕ13 | ϕ16 | ϕ32 | ϕ38 | ϕ48 | ϕ60 | ϕ72 |
| K5 | 15 | 15 | 20 | 27 | 35 | 43 | 60 |
| K6 | 18 | 18 | 24 | 32 | 40 | 50 | 65 |

Note 1：Inside of () is the optional range of sizes, outside of () is the standard sizes.

Note 2: The reducer output shaft size and length can be customized for customers.

Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.



# PRECISION PLANETARY GEARBOX

## VRL


- Quiet operation
  Helical gears are used to achieve smooth and quiet operation.
- High precision
  The backlash is less than 3 arcmin and the positioning is accurate.
- High rigidity & torqueThe use of integral ball bearings greatly improves the rigidity and torque.
- Methods of flange and connector
  It can be installed on any motor in the world.
- No grease leakage
  The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
- Convenient maintenance
  No need to replace the grease in the product life period , and the installation is more convenient.

## Model Selection of Speed Reducers

### VRL Type

VRL090 – 10 – S1 – P1 / Motor

**Reducer Model**
VRL050，VRL070，VRL090，VRL120，
VRL155，VRL205，VRL235

**Output Shaft Keyway**
S1:(Solid Output Shaft No Keyway)
S2Standard (Keyway)
S3：Output for holes

**Motor Model**
Motor Manufacturer & Model

**Ratio**
1–stage：3，4，5，6，7，8，9，10
2–stage：15，20，25，30，35，40，45，50，
60，70，80，90，100

**Backlash Grade**
P0：High precision backlash
P1：Precision backlash
P2：Standard backlash

Model Example：VRL090–100–S2–P1/Panasonic MSMJ 082S1A

## VRL Reducer Specifications

| Specs | Unit | Stage | Ratio | VRL050 | VRL070 | VRL090 | VRL120 | VRL155 | VRL205 | VRL235 |
|---|---|---|---|---|---|---|---|---|---|---|
| Rated Output Torque / $T_{2N}$ | Nm | 1 | 3 | 20 | 55 | 130 | 208 | 342 | 588 | 1140 |
| | | | 4 | 19 | 50 | 140 | 290 | 542 | 1050 | 1700 |
| | | | 5 | 22 | 60 | 160 | 330 | 650 | 1200 | 2000 |
| | | | 6 | 20 | 55 | 150 | 310 | 600 | 1100 | 1900 |
| | | | 7 | 19 | 50 | 140 | 300 | 550 | 1100 | 1800 |
| | | | 8 | 17 | 45 | 120 | 260 | 500 | 1000 | 1600 |
| | | | 9 | 14 | 40 | 100 | 230 | 450 | 900 | 1500 |
| | | | 10 | 14 | 40 | 100 | 230 | 450 | 900 | 1500 |
| | | 2 | 15 | 20 | 55 | 130 | 208 | 342 | 588 | 1140 |
| | | | 20 | 19 | 50 | 140 | 290 | 542 | 1050 | 1700 |
| | | | 25 | 22 | 60 | 160 | 330 | 650 | 1200 | 2000 |
| | | | 30 | 20 | 55 | 150 | 310 | 600 | 1100 | 1900 |
| | | | 35 | 19 | 50 | 140 | 300 | 550 | 1100 | 1800 |
| | | | 40 | 17 | 45 | 120 | 260 | 500 | 1000 | 1600 |
| | | | 45 | 14 | 40 | 100 | 230 | 450 | 900 | 1500 |
| | | | 50 | 22 | 60 | 160 | 330 | 650 | 1200 | 2000 |
| | | | 60 | 20 | 55 | 150 | 310 | 600 | 1100 | 1900 |
| | | | 70 | 19 | 50 | 140 | 300 | 550 | 1100 | 1800 |
| | | | 80 | 17 | 45 | 120 | 260 | 500 | 1000 | 1600 |
| | | | 90 | 14 | 40 | 100 | 230 | 450 | 900 | 1500 |
| | | | 100 | 14 | 40 | 100 | 230 | 450 | 900 | 1500 |
| Max.Output Torque / $T_{2NOT}$[1]/ | Nm | 1,2 | 3~100 | 3Times of Nominal Output Torque | | | | | | |
| Rated Input Speed / $n_{1N}$ | rpm | 1,2 | 3~100 | 5000 | 5000 | 4000 | 4000 | 3000 | 3000 | 2000 |
| Max.Input Speed / $n_{1B}$ | rpm | 1,2 | 3~100 | 10000 | 10000 | 8000 | 8000 | 6000 | 6000 | 4000 |
| Precision Backlash P1 | arcmin | 1 | 3~10 | ≤2 | ≤2 | ≤2 | ≤2 | ≤2 | ≤2 | ≤2 |
| | | 2 | 15~100 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 |
| Standard Backlash P2 | arcmin | 1 | 3~10 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 |
| | | 2 | 15~100 | ≤6 | ≤6 | ≤6 | ≤6 | ≤6 | ≤6 | ≤6 |
| Torsional Rigidity | Nm/arcmin | 1,2 | 3~100 | 3 | 7 | 14 | 25 | 50 | 145 | 225 |
| Max.Radial Force / $F_{2rB}$[2] | N | 1,2 | 3~100 | 680 | 1260 | 2880 | 6000 | 8200 | 12800 | 27800 |
| Max.Axial Force / $F_{2a1B}$[2] | N | 1,2 | 3~100 | 330 | 625 | 1250 | 2400 | 3890 | 6100 | 15000 |
| Max.Axial Force / $F_{2a1B}$[2] | N | 1,2 | 3~100 | 370 | 760 | 1580 | 3360 | 4660 | 7250 | 18500 |
| Service Life | hr | 1,2 | 3~100 | 20000h | | | | | | |
| Efficiency / η | % | 1 | 3~10 | ≥97% | | | | | | |
| | | 2 | 15~100 | ≥94% | | | | | | |
| Weight | kg | 1 | 3~10 | 0.5 | 1.2 | 3.5 | 7.8 | 14.5 | 30 | 50 |
| | | 2 | 15~100 | 0.8 | 1.4 | 4.1 | 9 | 17.5 | 33 | 63 |
| Operating Temperature | ℃ | 1,2 | 3~100 | (−15℃ ~ +90℃) | | | | | | |
| Lubrication | | 1,2 | 3~100 | (Synthetic Grease) | | | | | | |
| Protection Class | | 1,2 | 3~100 | IP65 | | | | | | |
| Mounting Position | | 1,2 | 3~100 | (Any Direction) | | | | | | |
| Noise Level(n1=3000rpm, No load) | dB(A) | 1,2 | 3~100 | ≤56 | ≤58 | ≤60 | ≤63 | ≤65 | ≤67 | ≤70 |

## Reducer Rotary Inertia

| Specs | Unit | Stage | Ratio | VRL050 | VRL070 | VRL090 | VRL120 | VRL155 | VRL205 | VRL235 |
|---|---|---|---|---|---|---|---|---|---|---|
| Moment of Inertia | $kg.cm^2$ | 1 | 3 | 0.03 | 0.16 | 0.61 | 3.25 | 9.21 | 28.98 | 69.61 |
| | | | 4 | 0.03 | 0.14 | 0.48 | 2.74 | 7.54 | 23.67 | 54.37 |
| | | | 5 | 0.03 | 0.13 | 0.47 | 2.71 | 7.42 | 23.29 | 53.27 |
| | | | 6 | 0.03 | 0.13 | 0.45 | 2.65 | 7.25 | 22.75 | 51.72 |
| | | | 7 | 0.03 | 0.13 | 0.45 | 2.62 | 7.14 | 22.48 | 50.97 |
| | | | 8 | 0.03 | 0.13 | 0.44 | 2.58 | 7.07 | 22.59 | 50.84 |
| | | | 9 | 0.03 | 0.13 | 0.44 | 2.57 | 7.04 | 22.53 | 50.63 |
| | | | 10 | 0.03 | 0.13 | 0.44 | 2.57 | 7.03 | 22.51 | 50.56 |
| | | 2 | 12–40 | 0.03 | 0.03 | 0.13 | 0.47 | 2.71 | 7.42 | 23.29 |
| | | | 50–100 | 0.03 | 0.03 | 0.13 | 0.44 | 2.57 | 7.03 | 22.51 |

1. Ratio (i=Nin/Nout)
2. Output revolutions 100rpm, acting on the output shaft center position.
3. The Max. acceleration torque T2B=60% of T2NOT, continuous operation, service life is 10000hrs.

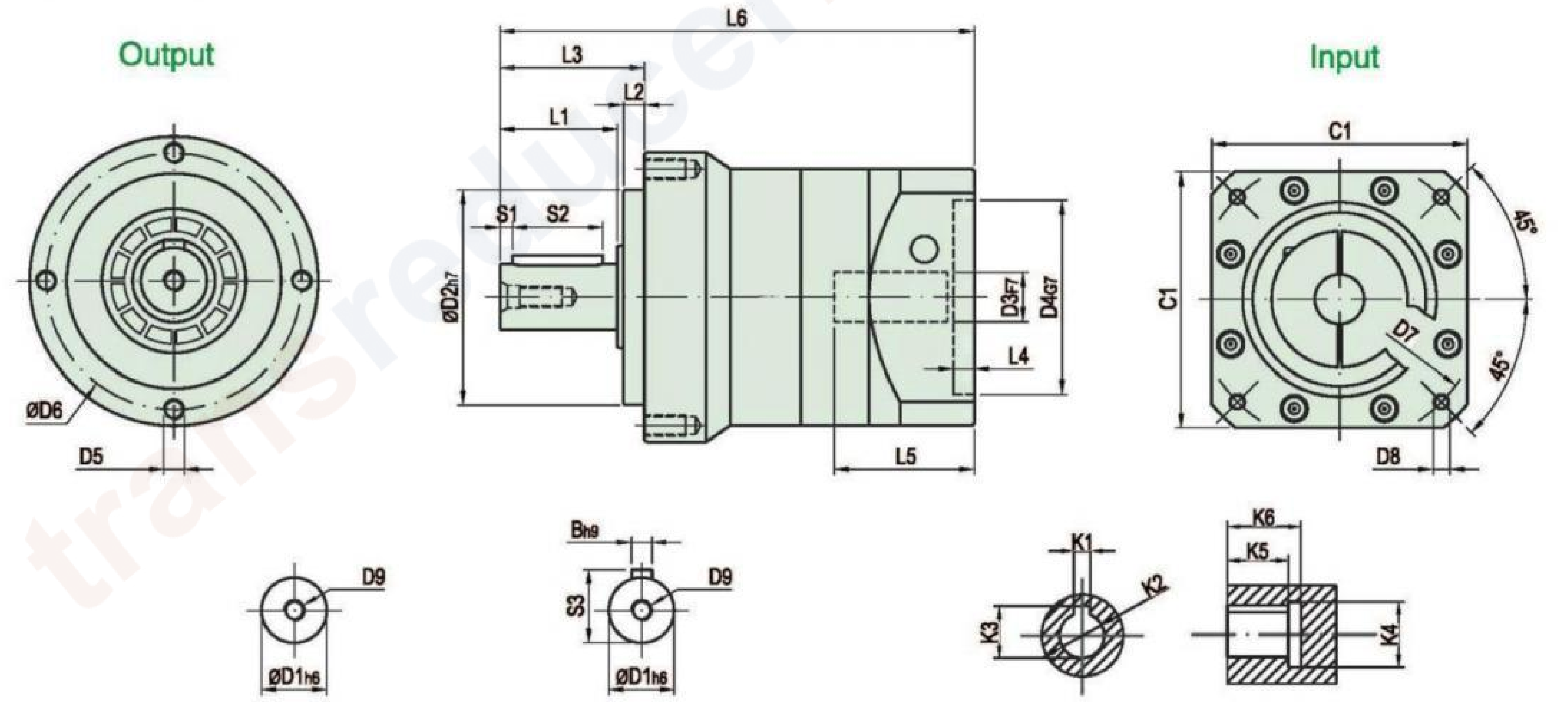


# MODEL：VRL

1–Stage

Ratio：3, 4, 5, 6, 7, 8, 9, 10


## Dimensions：




Output shaft type S1 Output shaft type S2 Output hole type S3

Unit:mm

| Size | VRL070–L1 | VRL090–L1 | VRL120–L1 | VRL155–L1 | VRL205–L1 | VRL235–L1 |
|---|---|---|---|---|---|---|
| D1 | ϕ16 | ϕ22 | ϕ32 | ϕ40 | ϕ55 | ϕ75 |
| D2 | ϕ52 | ϕ68 | ϕ90 | ϕ120 | ϕ160 | ϕ180 |
| D3 | ϕ14 ( ϕ11–14 ) | ϕ19 ( ϕ16–24 ) | ϕ22 ( ϕ19–35 ) | ϕ24 ( ϕ22–35 ) | ϕ35 ( ϕ35–ϕ42 ) | ϕ42 ( ϕ35–55 ) |
| D4 | ϕ50 ( ϕ50–70 ) | ϕ70 ( ϕ70–ϕ110 ) | ϕ110 ( ϕ114.3 ) | ϕ110 ( ϕ114.3 ) | ϕ114.3 ( ϕ114.3–200 ) | ϕ180 ( ϕ114.3~200 ) |
| D5 | 4–M5X10L | 4–M6X12L | 4–M8X16L | 4–M10X20L | 4–M12X22L | 4–M16X28L |
| D6 | ϕ62 | ϕ80 | ϕ108 | ϕ140 | ϕ184 | ϕ210 |
| D7 | ϕ70 ( ϕ70–90 ) | ϕ90 ( ϕ90–145 ) | ϕ145 ( ϕ145–200 ) | ϕ145 ( ϕ145–200 ) | ϕ200 ( ϕ200–235 ) | ϕ215 ( ϕ200~235 ) |
| D8 | 4–M5 ( M4–M6 ) | 4–M6 ( M5–M8 ) | 4–M8 ( M8–M12 ) | 4–M8 ( M8–M12 ) | 4–M12 | 4–M12 |
| D9 | M5X0.8P | M8X1.25P | M12X1.75P | M16X2P | M20X2.5P | M20X2.5P |
| L1 | 28.5 | 36.5 | 51 | 79 | 82 | 105 |
| L2 | 5 | 6 | 9 | 12 | 15 | 18 |
| L3 | 35 | 44 | 62 | 94 | 100 | 126 |
| L4 | 5 | 7~8 | 6~11 | 8~11 | 7~10 | 8~15 |
| L5 | 34 ( ≤44 ) | 44 ( ≤60 ) | 64.5 ( ≤81.5 ) | 72.5 ( ≤82 ) | 85 ( ≤120 ) | 109 ( ≤119 ) |
| L6 | 115 ( 115–125 ) | 146 ( 146–162 ) | 201 ( 201–218 ) | 251.5 ( 251.5–261 ) | 284 ( 284–319 ) | 358 ( 358–368 ) |
| C1 | 65 ( 65–80 ) | 90 ( 90–130 ) | 130 ( 130–180 ) | 150 ( 150–180 ) | 180 ( 180–220 ) | 200 ( 200–220 ) |
| S1 | 3 | 4 | 5 | 5 | 6 | 7 |
| S2 | 22 | 28 | 40 | 65 | 70 | 90 |
| S3 | 18 | 24.5 | 35 | 43 | 59 | 79.5 |
| B | 5 | 6 | 10 | 12 | 16 | 20 |
| K1 | 4 | 6 | 8 | 10 | 14 | 18 |
| K2 | ϕ11 | ϕ22 | ϕ28 | ϕ38 | ϕ50 | ϕ60 |
| K3 | 12.8 | 24.5 | 31.3 | 41.3 | 53.8 | 64.4 |
| K4 | ϕ16 | ϕ32 | ϕ38 | ϕ48 | ϕ60 | ϕ72 |
| K5 | 15 | 20 | 27 | 35 | 43 | 60 |
| K6 | 18 | 24 | 32 | 40 | 50 | 65 |

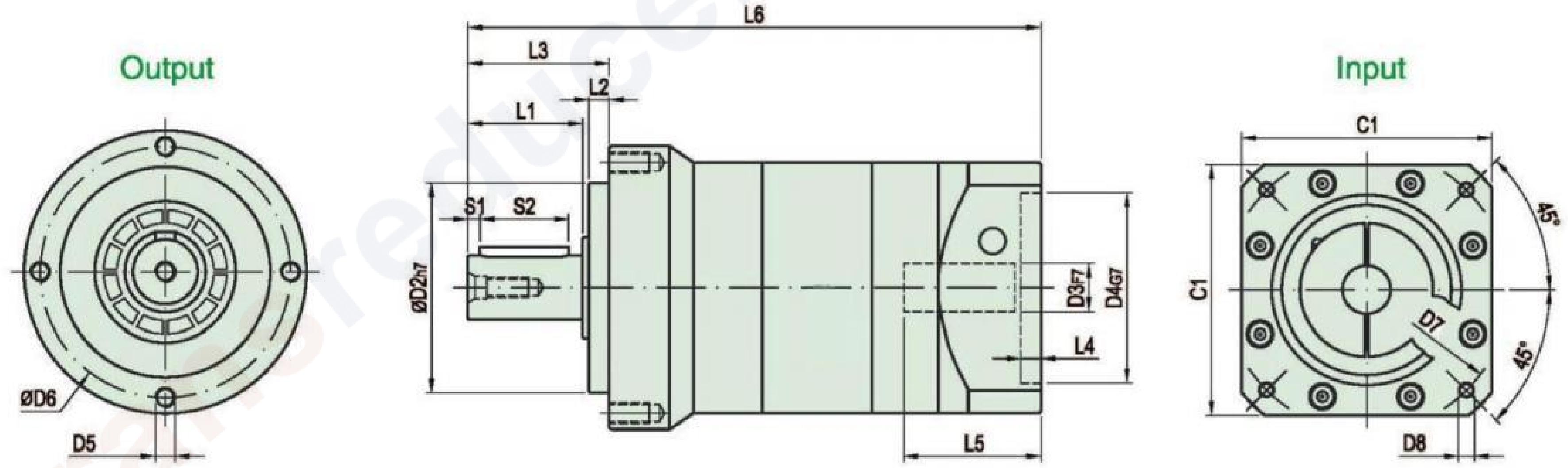
Note 1：Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

# MODEL：VRL

2–Stage

Ratio：15，20，25，30，35，40，45，50，
60，70，80，90，100


## Dimensions：





Output shaft type S1 Output shaft type S2 Output hole type S3

Unit:mm

| Size | VRL070–L1 | VRL090–L2 | VRL120–L2 | VRL155–L2 | VRL205–L2 | VRL235–L2 |
|---|---|---|---|---|---|---|
| D1 | ϕ16 | ϕ22 | ϕ32 | ϕ40 | ϕ55 | ϕ75 |
| D2 | ϕ52 | ϕ68 | ϕ90 | ϕ120 | ϕ160 | ϕ180 |
| D3 | ϕ14（ϕ11–14） | ϕ19（ϕ11–19） | ϕ22（ϕ16–24） | ϕ24（ϕ19–35） | ϕ35（ϕ22–35） | ϕ42（ϕ35–42） |
| D4 | ϕ50 | ϕ70（ϕ50–ϕ80） | ϕ110（ϕ70–ϕ110） | ϕ110（ϕ114.3） | ϕ110（ϕ114.3） | ϕ180（ϕ114.3–200） |
| D5 | 4–M5X10L | 4–M6X12L | 4–M8X16L | 4–M10X20L | 4–M12X22L | 4–M16X28L |
| D6 | ϕ62 | ϕ80 | ϕ108 | ϕ140 | ϕ184 | ϕ210 |
| D7 | ϕ70 | ϕ90（ϕ70–100） | ϕ145（ϕ90–145） | ϕ145（ϕ145–200） | ϕ145（ϕ145–200） | ϕ215（ϕ200–235） |
| D8 | 4–M5（M4） | 4–M6（M4–M6） | 4–M8（M5–M8） | 4–M8（M8–M12） | 4–M8（M8–M12） | 4–M12 |
| D9 | M5X0.8P | M8X1.25P | M12X1.75P | M16X2P | M20X2.5P | M20X2.5P |
| L1 | 28.5 | 36.5 | 51 | 79 | 82 | 105 |
| L2 | 5 | 6 | 9 | 12 | 15 | 18 |
| L3 | 35 | 44 | 62 | 94 | 100 | 126 |
| L4 | 5 | 5 | 8（7–8） | 11（6–11） | 8（8–11） | 8（7–10） |
| L5 | 34 | 34（≤44） | 44（≤60） | 64.5（≤81.5） | 72.5（≤82） | 85（≤120） |
| L6 | 142 | 172.5（162.5–172.5） | 230.5（214.5–230.5） | 286（286–303） | 340（330.5–340） | 407（402–437） |
| C1 | 65 | 80（65–86） | 130（90–130） | 130（130–180） | 150（150–180） | 200（180–220） |
| S1 | 3 | 4 | 5 | 5 | 6 | 7 |
| S2 | 22 | 28 | 40 | 65 | 70 | 90 |
| S3 | 18 | 24.5 | 35 | 43 | 59 | 79.5 |
| B | 5 | 6 | 10 | 12 | 16 | 20 |
| K1 | 4 | 6 | 8 | 10 | 14 | 18 |
| K2 | ϕ11 | ϕ22 | ϕ28 | ϕ38 | ϕ50 | ϕ60 |
| K3 | 12.8 | 24.5 | 31.3 | 41.3 | 53.8 | 64.4 |
| K4 | ϕ16 | ϕ32 | ϕ38 | ϕ48 | ϕ60 | ϕ72 |
| K5 | 15 | 20 | 27 | 35 | 43 | 60 |
| K6 | 18 | 24 | 32 | 40 | 50 | 65 |

Note 1：Inside of () is the optional range of sizes, outside of () is the standard sizes.

Note 2: The reducer output shaft size and length can be customized for customers.

Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.



# PRECISION PLANETARY GEARBOX

## AB


- The integral structure of the planetary wall frame and the output shaft ensures the maximum torsion rigidity and stability
- The surface of the gear box is treated with electroless Nickel, and the plate is treated with blue anode to improve the tolerance and corrosion resistance of the environment.
- Lowest backlash
- High efficiency 95%
- Life time lubrication

## Model Selection of Speed Reducers

### AB Type

AB090 – 10 – S1 – P1 / Motor

**Reducer Model**

AB042, AB060, AB090, AB115 PAB115

AB142, AB180, AB220

**Output Shaft Keyway**

S1:(Solid Output Shaft No Keyway)

S2：Standard (Keyway)

S3：Output for holes

**Motor Model**

Motor Manufacturer & Model

**Ratio**

1–stage：3，4，5，6，7，8，9，10

2–stage：12，15，16，20，25，28，30，35，
40，50，70，80，100

**Backlash Grade**

P0：High precision backlash

P1：Precision backlash

P2：Standard backlash

Model Example：AB090–100–S2–P1/Panasonic MSMJ 082S1A