

# RATO S / RATO S+

## ALIGNMENT VALUES (FOR STANDARD EXECUTION)

### Basic Information

The more accurate the alignment,

- **the more** effective the compensation of operational displacement by the coupling.
- **the longer** the lifetime of the coupling.
- **the lower** the reaction forces between the connected machinery.

The alignment consists of three different dimensions:

#### 1. Radial

The radial offset describes the distance between the two axes of rotation at a certain point.

#### 2. Angular

The angular offset describes the angle between two axes of rotation.

#### 3. Axial

The axial misalignment described the distance between connected machinery related to the couplings installation length.

Explaining pictures can be found on the following pages.

In case where alignment can only be done when the system is in non-operational temperature (for example "cold"), the tolerances may only be applied in combination with an alignment "target". The alignment target anticipates the change in rotational centers of the two rotating equipment from non-operational temperature(s) to operational temperature(s). System specific targets and specific tolerances (relevant equipment) under specific circumstances, such as temperatures, must be issued by the system engineer. For further information, please contact VULKAN.

On systems with flexible mounted machinery, the setting of the resilient mounts has to be considered as well as operational condition. The setting of the elastic mounts is always a question of age, load, temperature, general condition and has to be calculated. When aligning or realigning the system, the coupling initially operates with intended radial misalignment related to the setting calculation and operating condition. This means, for system with flexible mounted machinery, the alignment tolerances  $\Delta X_r$  are increased in order to have maximum operating time with proper alignment. In this regard, the restoring forces of the coupling have to be taken into account as well.

- Measuring procedure carried out by dial gauge is explained on the following pages.
- Measurement by laser alignment tool has to be done in accordance with the manufacturer's instruction manual.

Results have to be evaluated using the tables of recommended alignment tolerances.

### Recommended alignment tolerances RATO S

	$\Delta X_r$		$\Delta X_w$	$\Delta X_s$	
	resilient mounted	rigid mounted			
	[mm]	[mm]	[mm]/100mm	[mm]	
G0210 – G0340	+1,0	+1,0 -2,0	±0,50	0,09	±0,50
G0510 – G0840	+1,0	+1,0 -2,0	±0,60	0,09	±0,50
G1210 – G1340	+0,5	+0,5 -1,0	±0,25	0,09	±0,25
G1410 – G1740	+1,0	+1,0 -2,0	±0,30	0,09	±0,30
G1910 – G2340	+1,0	+1,0 -2,0	±0,50	0,09	±0,40
G2510 – G2940	+1,0	+1,0 -2,0	±0,60	0,09	±0,50
G3110 – G3940	+1,5	+1,0 -2,5	±0,70	0,09	±0,60
G4310 – G4940	+1,5	+1,0 -2,5	±0,80	0,09	±0,70
G5110 – G5840	+1,5	+1,0 -2,5	±0,80	0,09	±0,80
G6010 – G7340	+1,5	+1,0 -2,5	±1,00	0,09	±1,00

### Recommended alignment tolerances RATO S+

	$\Delta X_r$		$\Delta X_w$	$\Delta X_s$	
	resilient mounted	rigid mounted			
	[mm]	[mm]	[mm]/100mm	[mm]	
G4J10 – G4J40	+1,5	+1,0 -2,5	±0,80	0,09	±0,50
G5B10 – G5G40	+1,5	+1,0 -2,5	±0,80	0,09	±0,60

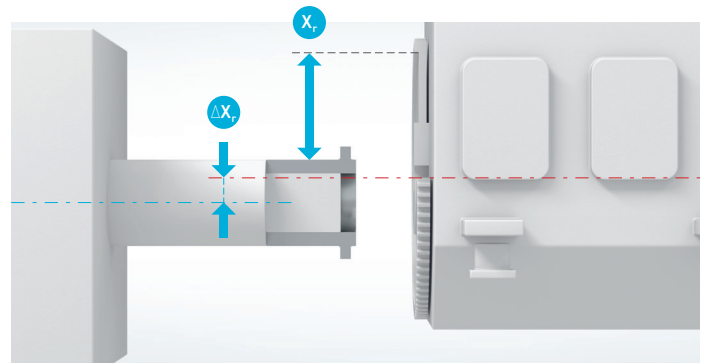
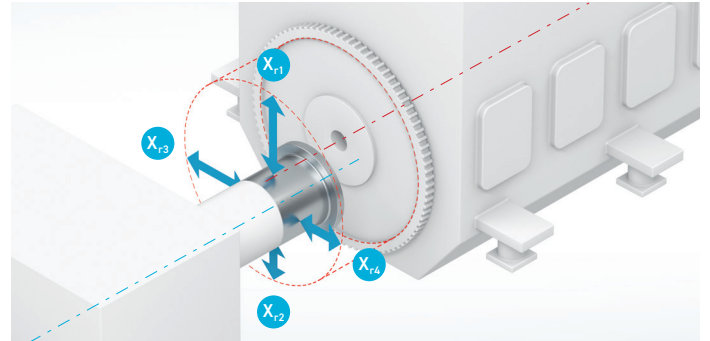
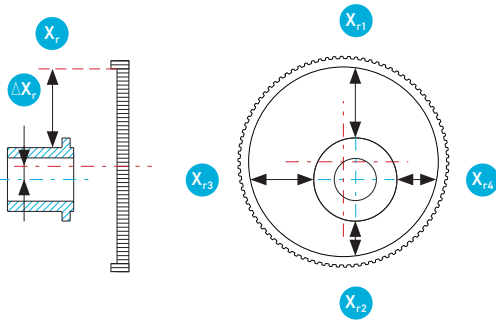
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## ALIGNMENT VALUES (FOR STANDARD EXECUTION)

### Radial

1. Determine the dimension  $X_{r1}$ .
2. Turn hub and shaft 180° and determine the dimension  $X_{r2}$ .
3. Turn hub and shaft 90° and determine the dimension  $X_{r3}$ .
4. Turn hub and shaft 180° and determine the dimension  $X_{r4}$ .
5. Determine the value  $\Delta X_r$  using the following formula:

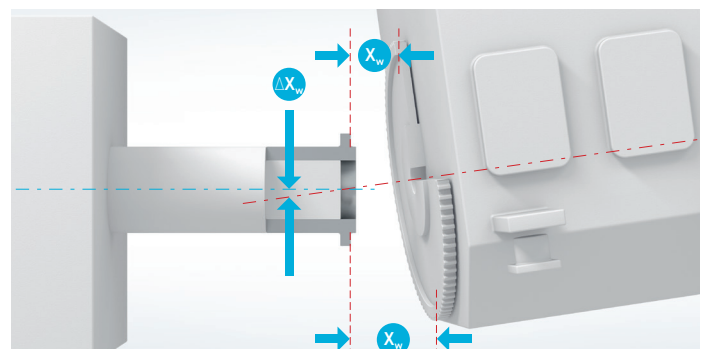
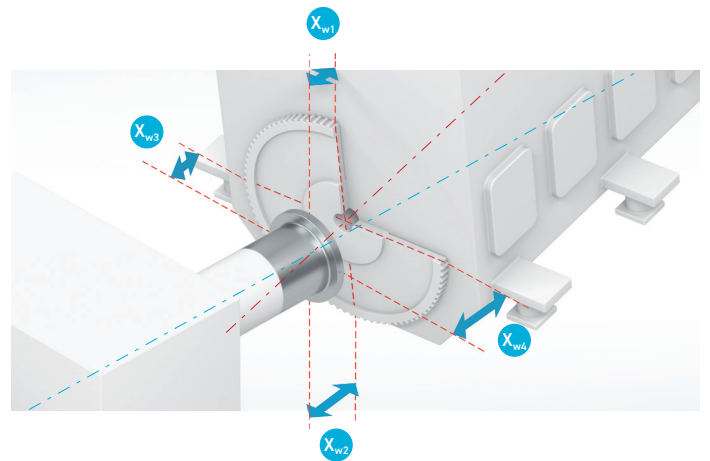
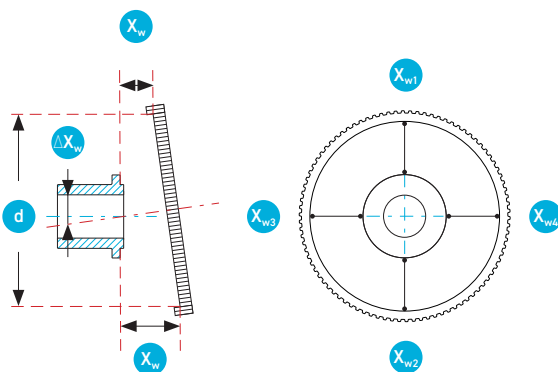
$$\Delta X_r = \sqrt{\left(\frac{X_{r2} - X_{r1}}{2}\right)^2 + \left(\frac{X_{r3} - X_{r4}}{2}\right)^2}$$



### Angular

1. Specify the diameter ( $d$ ) where the measurement is taken.
2. Determine the dimension  $X_{w1}$ .
3. Turn hub and shaft 180° and determine the dimension  $X_{w2}$ .
4. Turn hub and shaft 90° and determine the dimension  $X_{w3}$ .
5. Turn hub and shaft 180° and determine the dimension  $X_{w4}$ .
6. Determine the value  $\Delta X_w$  using the following formula:

$$\Delta X_w = \sqrt{\left(X_{w2} - X_{w1}\right)^2 + \left(X_{w3} - X_{w4}\right)^2} \cdot \frac{100}{d}$$



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## ALIGNMENT VALUES (FOR STANDARD EXECUTION)

### Axial

1. Read the assembly control dimension  $X_a$  from the assembly drawing.
2. Determine the dimension  $X_{a1}$ .
3. Turn hub and shaft  $180^\circ$  and determine the dimension  $X_{a2}$ .
4. Turn hub and shaft  $90^\circ$  and determine the dimension  $X_{a3}$ .
5. Turn hub and shaft  $180^\circ$  and determine the dimension  $X_{a4}$ .
6. Determine the value  $\Delta X_a$  using the following formula:

$$\Delta X_a = \frac{X_{a1} + X_{a2} + X_{a3} + X_{a4}}{4} - X_a$$

