TKSA60/80 Basic Guide to a Quick Alignment

This document is written as a basic guide for using the TKSA60/80 system to do a simple horizontal shaft quick alignment job.

The document also assumes that users are using the most up to date firmware – current release at time of writing is v1.6.1. Examples are given in Metric units, but the general principles also apply when working in English units.

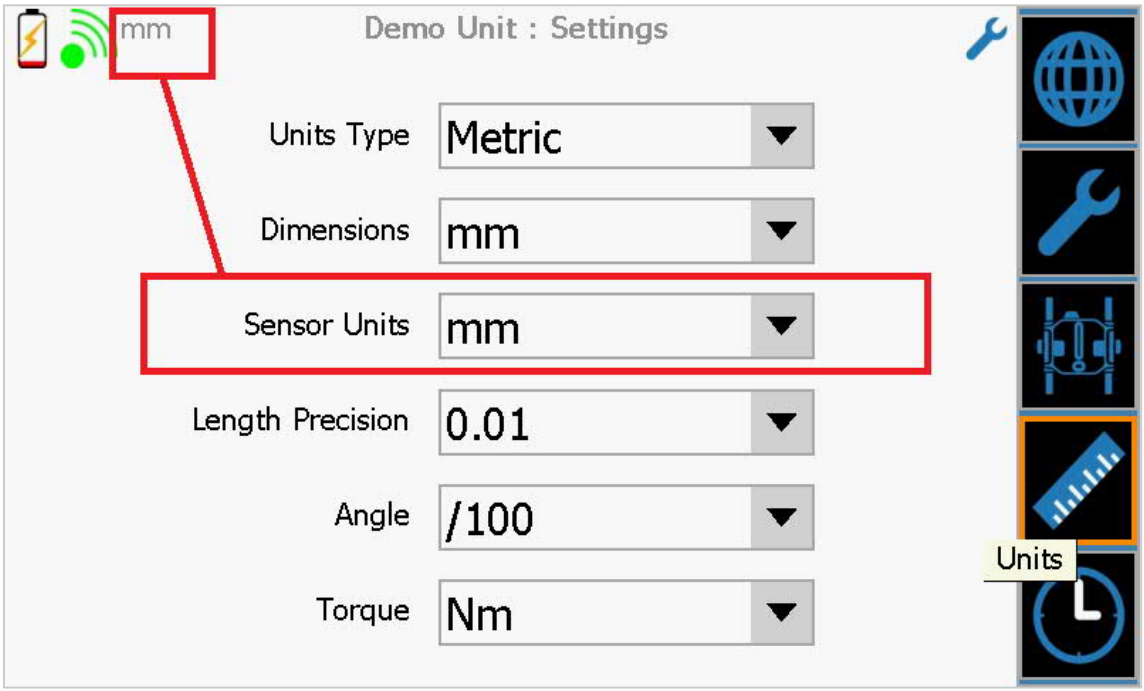
Settings – Units

The Units settings page allows users to specify two types of unit.

Dimensions – this allows the user to select a unit of length [mm, cm, m] to use when entering machine Dimensions.

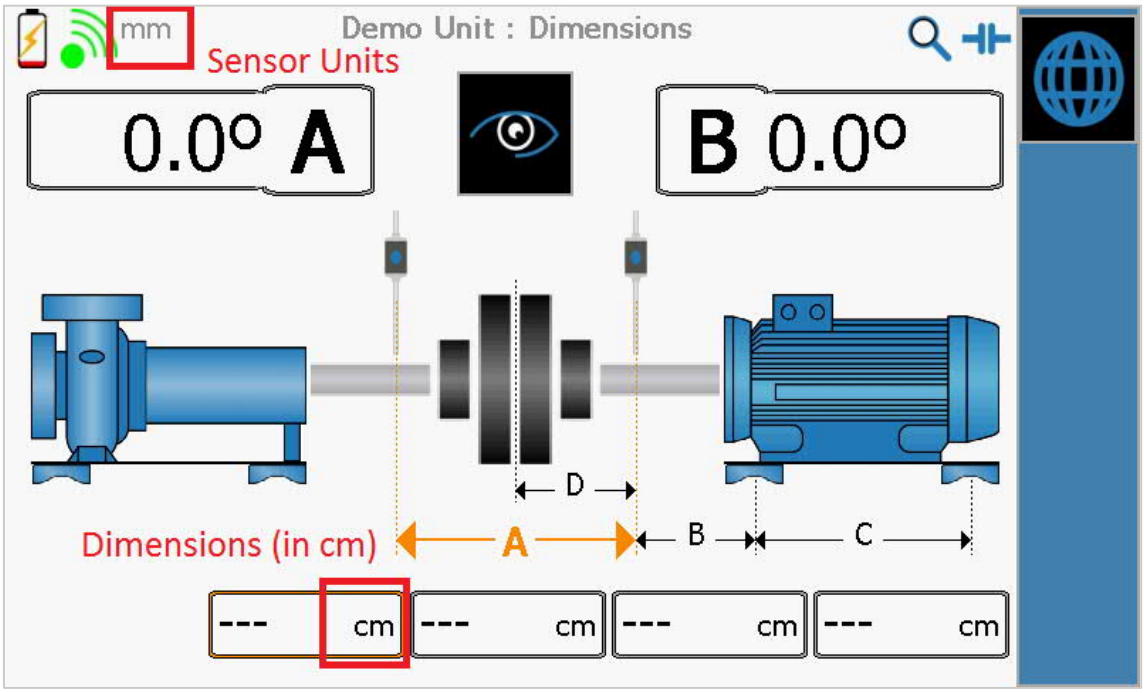
Sensor Units – this allows users to select the units [mm, cm, m] to use for all measurements. Any misalignment results and corrections will be given by the system in these units.

The currently selected Sensor Units are always displayed in the top left hand corner of the instrument.



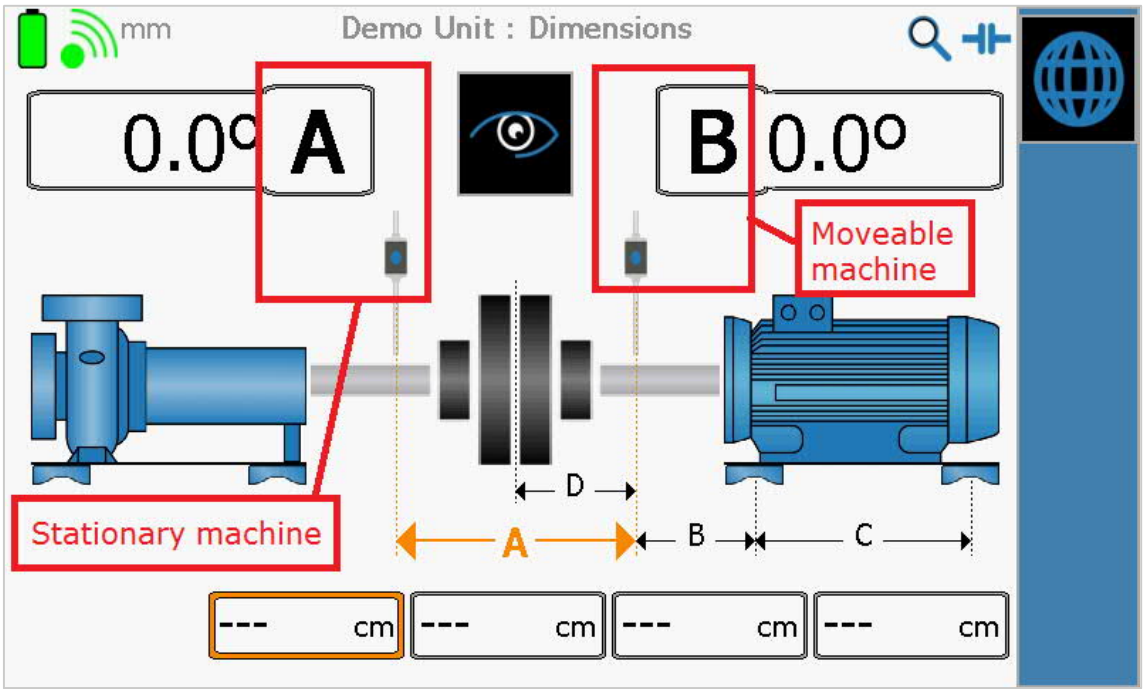
Dimensions and Setup

If the user chooses to enter Dimensions in a different unit to the selected Sensor Units (eg Sensor Units = mm, Dimensions = cm), then they will be reminded of this on the Dimensions screen.



If the user has configured the system to use the same units for Dimensions and Sensor units (eg both mm), then the dimensions boxes (A, D, B, C), will not show any information about units.

When entering dimensions, it is essential that the setup matches what is being displayed on screen.

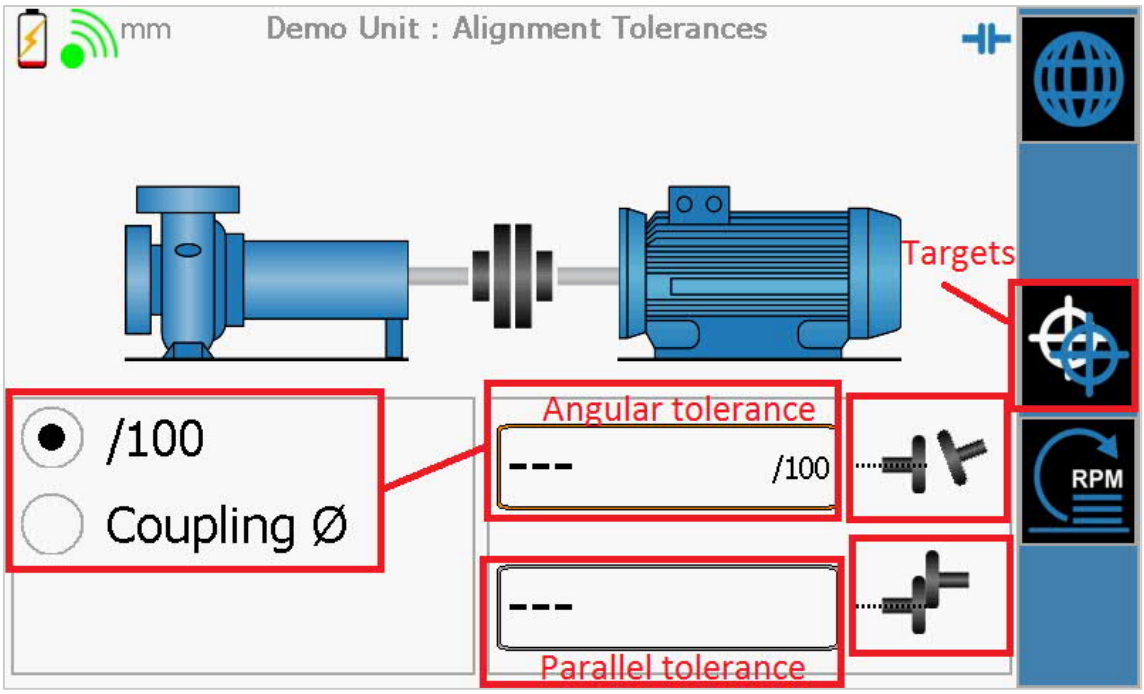


The default view is for Measuring Unit A to be mounted on the stationary machine and Measuring Unit B to be on the moveable machine. The stationary machine should also be on the left of the coupling, from the user's viewing position.

If your machine setup does not match the default view shown in the Dimensions screen, you must configure the Display Unit to match your actual setup (see View Options section of the User Manual).

Tolerances

The Tolerances screen is used to indicate how accurate we want to be with our alignment (ie, how close do we want to get to our 'target' alignment). For a typical Quick Alignment, the target is assumed to be 0 (ie perfect alignment), but users can choose to specify a non-zero target if they want to account for thermal growth.



Parallel Tolerance

The tolerance for any parallel misalignment is always specified in Sensor Units.

The parallel tolerance value entered (x) must be in Sensor Units (which are always indicated in the top left corner of the screen).

In the above example, our Sensor Units are mm, so if we enter 0.05 (mm), this corresponds to a parallel tolerance of 50 microns.

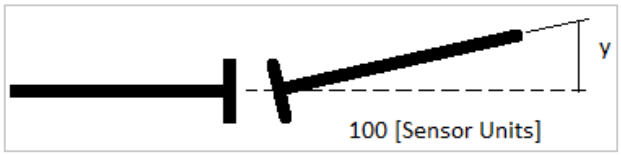
Angular Tolerance

Users can choose to specify their tolerance for any angular misalignment in two ways:

1. Relative to a fixed distance (/100)
2. As a proportion of the coupling diameter (Coupling Ø)

1. Angular Tolerance - Relative to a fixed distance (/100)

When expressing the angular tolerance relative to a fixed distance (/100), we are expressing the allowed angular misalignment in the following way.



When /100 is selected the angular tolerance value entered (y) must be in Sensor Units. In this example our Sensor Units are mm, so if we enter 0.08 (mm), this corresponds to an angular tolerance of 0.08mm / 100mm.

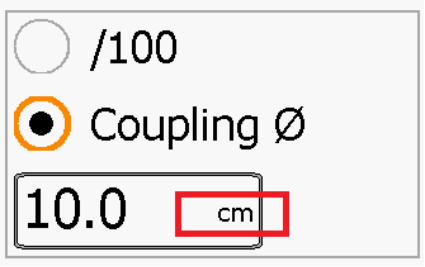
Working with gradients expressed as an angle

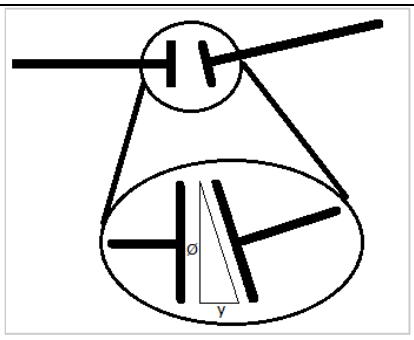
For users who are used to seeing their angular tolerance expressed as an angle, they will need to work back to this gradient format (y / 100). For example:

- For an angular misalignment of 1 milliradian (0.0573 degrees)
- The corresponding gradient is 0.001, or 0.1/100
- The user should therefore enter 0.1 (mm) as their tolerance.

2. Angular Tolerance - As a proportion of the coupling diameter (Coupling Ø)

When Coupling Ø is selected the user first needs to enter the coupling diameter and then select the tolerance as a proportion of this. If working with different units for Dimensions and Sensor Units, the coupling diameter box will indicate the appropriate units to enter (as shown below).





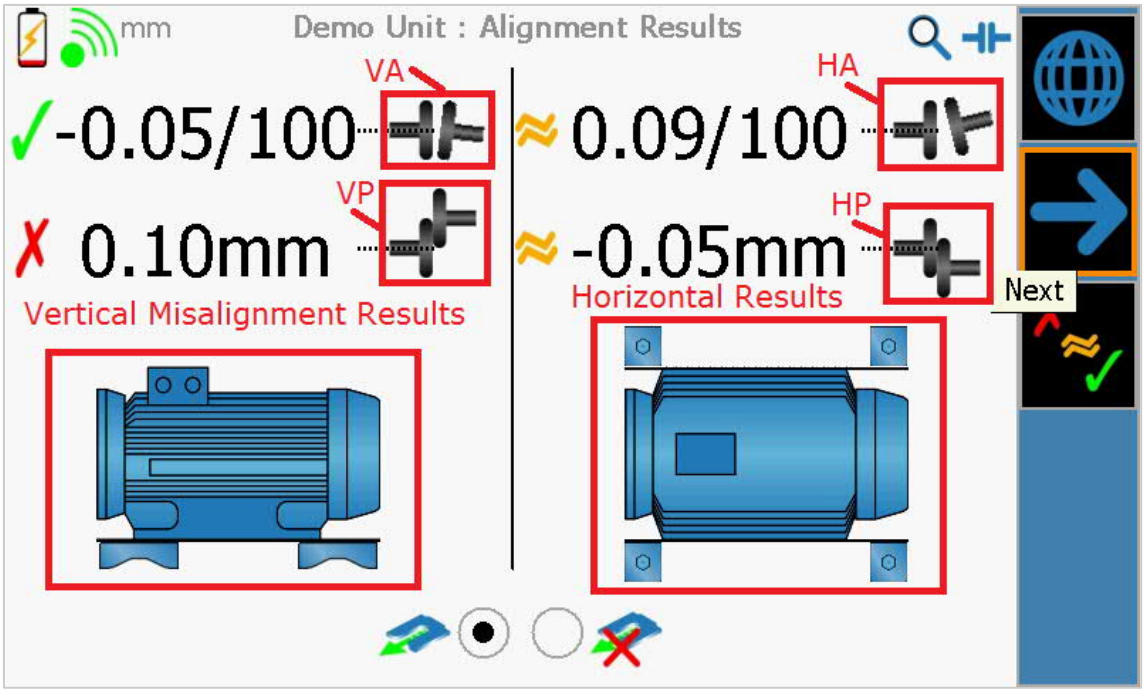
When expressing the angular tolerance as a proportion of coupling diameter (Coupling Ø), we are expressing the allowed angular misalignment in the following way.

When Coupling Ø is selected the angular tolerance value entered (y) must be in Sensor Units. In this example, our Sensor Units are mm, so if we enter 0.08 (mm), this corresponds to an angular tolerance, expressed as a 'gap' (y) at the coupling of 0.08 (mm). The system then uses the entered coupling diameter (10cm) to work out the allowed angular misalignment between the two shafts.

Misalignment Results (Initial Inspection)

After taking an initial set of measurements, the calculated misalignment results are displayed as below. Icons are used to indicate whether a reading corresponds to an angular or a parallel result.

VA = Vertical Angular
VP = Vertical Parallel
HA = Horizontal Angular
HP = Horizontal Parallel



Coloured icons are used to indicate whether the results are within tolerance or not.

✓	Result is within specified tolerance.
≈	Result is out with (but less than double) the specified tolerance.
✗	Result is more than double the specified tolerance.

The system then also allows users to select whether to proceed with corrections or not.

	Do not do any corrections and go straight to Report.
	Go to corrections.

The system will default to one of the above, depending on the measured results. If all measurements are within tolerance the system will default to not doing any corrections. Otherwise, it will default to going to corrections next.

A user can always choose to change the selected option to meet their preference for that job.

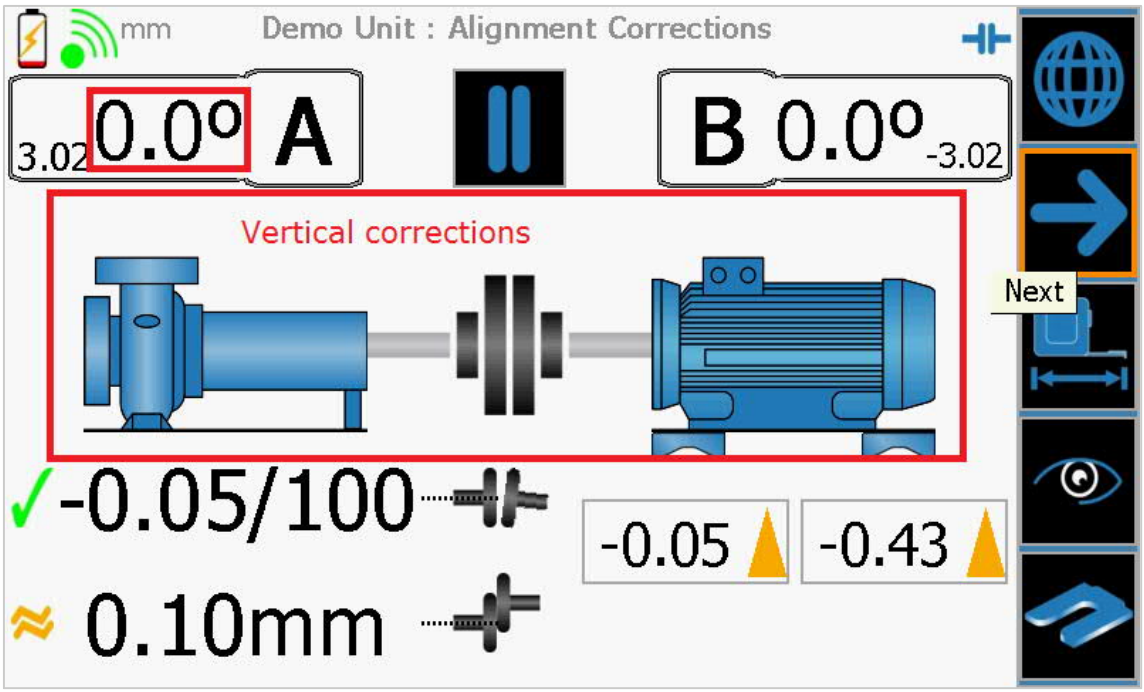
Corrections

In the corrections screen, the system will default to a view which matches the current position of the Measuring Units (A & B).

For most users, it usually makes sense to begin by correcting in the Vertical plane first – but the system will allow you to work in which ever order you prefer.

Corrections in the Vertical plane

Vertical corrections apply when the Measuring units are positioned in the vertical plane (ie at 0 degrees, 12 o'clock).



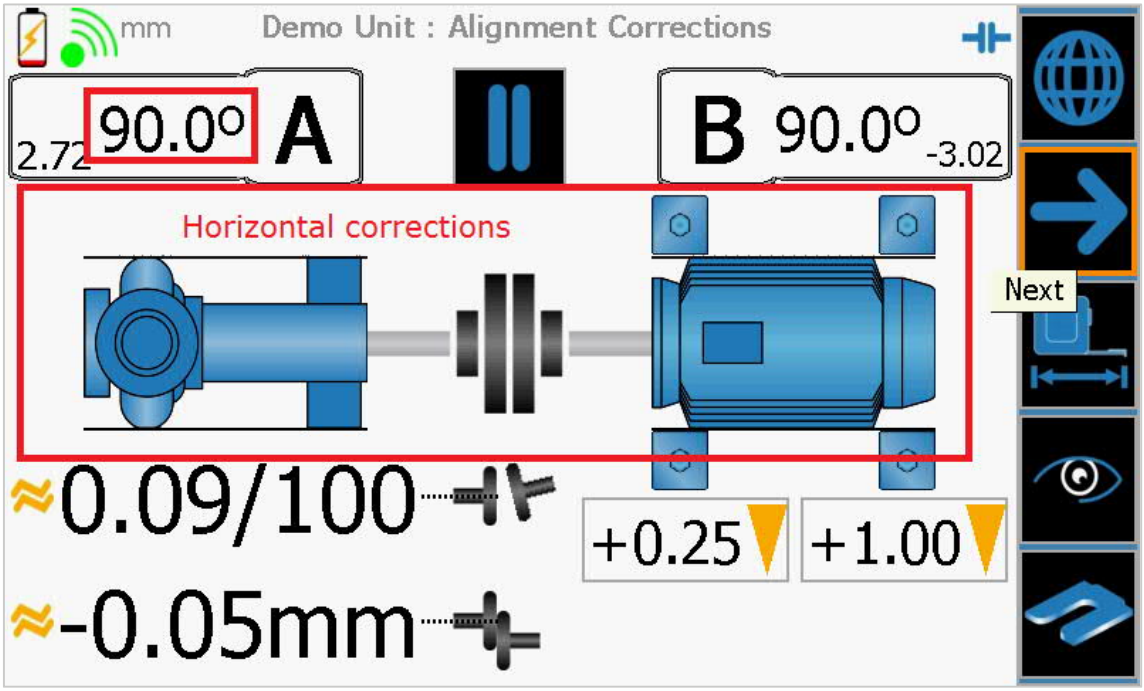
Here we are being told that the vertical misalignment (VA and VP) are -0.05m/100mm and 0.10mm. Because we have not moved the machine yet, this is the same as on the previous Misalignment Results screen.

The direction of the arrows indicates the direction the machine needs to move, so we are also being told that in order to correct the misalignment we need to add 0.05mm shim to the front feet and add 0.43mm shims to the back feet.

As the machine is moved, the screen will update live to confirm whether the movement has had the desired effect or not.

Corrections in the Horizontal plane

Horizontal corrections apply when the Measuring units are positioned in the horizontal plane (ie at 90 degrees).



Here we are being told that the horizontal misalignment (HA and HP) are 0.09mm/100mm and -0.05mm. Because we have not moved the machine yet, this is the same as on the previous Misalignment Results screen.

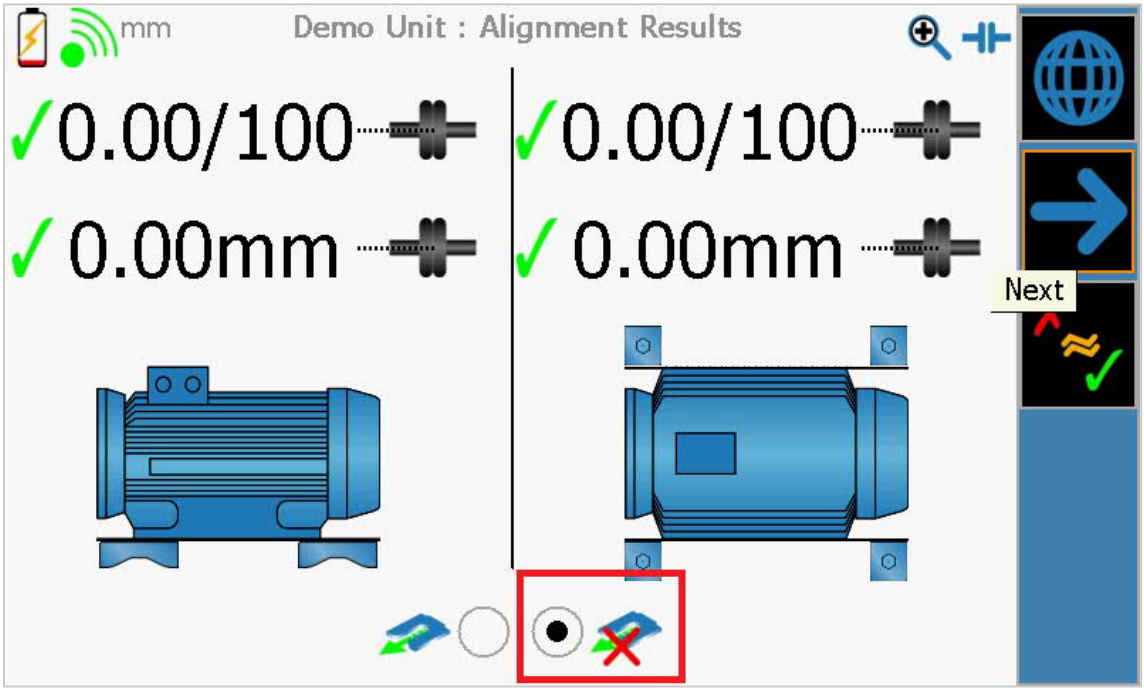
The direction of the arrows indicates the direction the machine needs to move, so we are also being told that in order to correct the misalignment we need to move the front feet 0.25mm towards us and to move the back feet 1mm towards us. The direction of movement assumes that the user's position has not changed since the job began, so in our example the user is stood with the stationary machine to his left and the moveable machine to his right.

As the machine is moved, the screen will update live to confirm whether the movement has had the desired effect or not.

Misalignment Results (Re-inspection)

After moving the machine, we then re-measure the misalignment. This is because the live corrections screen is only a guide, based on data from the initial measurements. To get an accurate measurement of the new misalignment, we must re-measure.

If we have correctly adjusted the machine, then the new misalignment results will be good and the system will suggest that no further corrections are required.

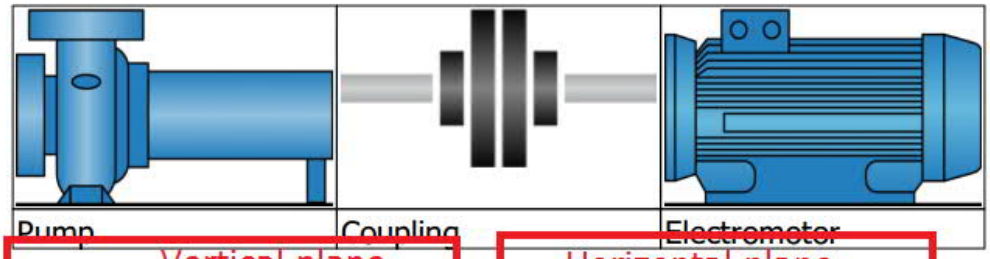


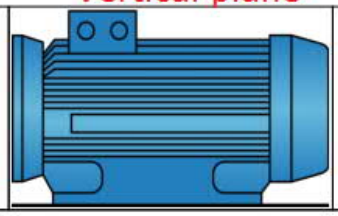
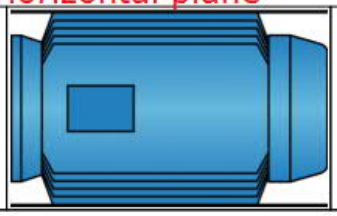
As before, the user can always choose to do another round of corrections if they want. Otherwise, if they choose not to correct, then the system will move on and allow them to save the final report.

Report

The final report will show our ‘as found’ condition (Initial Inspection) and our ‘as corrected’ result (Reinspection). If multiple correct and re-measure cycles are carried out, then only the final result is shown in the re-inspection part of the report.

Shaft Alignment



Vertical plane			Horizontal plane		
					
Tolerances:					
⏥	±	0.08/100	⏥	±	0.08/100
⏤	±	0.05mm	⏤	±	0.05mm
Initial Inspection					
⏥	✓	VA -0.05/100	⏥	≈	HA 0.09/100
⏤	✗	VP 0.10mm	⏤	≈	HP -0.05mm
Reinspection					
⏥	✓	VA 0.00/100	⏥	✓	HA 0.00/100
⏤	✓	VP 0.00mm	⏤	✓	HP 0.00mm