

## TechNote #24 ROTALIGN®

### Selecting the proper ROTALIGN® measurement mode

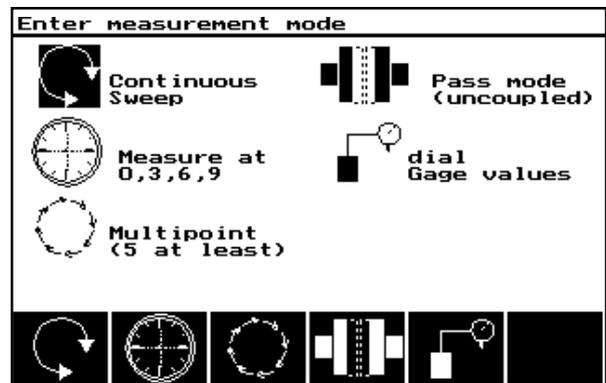
#### Introduction

During any alignment measurement, the machine shafts should be rotated by one complete revolution (or as far as possible) for greatest accuracy in determining the position of their rotating axes. In real life, however, it is not always possible to turn both shafts at the same time, by the exact same amount, through 360°. In cases where shafts cannot be rotated freely for measurement, ROTALIGN offers several different measurement modes to ensure accurate alignment results.

Depending upon the measurement mode selected, ROTALIGN allows reliable alignment using as little as 3 measurement points over a shaft rotation angle of as little as 75°. This note describes the situations in which each of the measurement modes can best be put to use.

#### Measurement mode entry

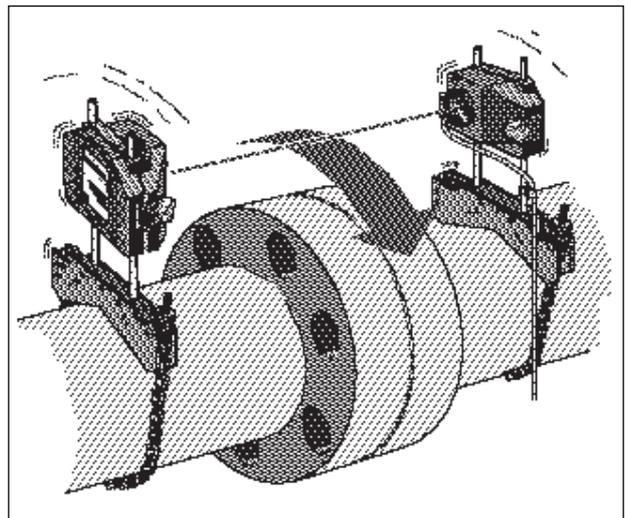
Press the Menu key on the ROTALIGN computer, then select 'measurement mode' to access the selection menu shown below. The desired mode is then activated by pressing the corresponding softkey marked in the bottom of the screen.



#### Continuous sweep mode

- **Standard method for basic horizontal alignment**
- **QUICK CHECK**
- **Horizontal alignment with two-bolt flanges**
- **Restricted shaft rotation**

When the shafts may be rotated together with no obstructions to block the beam, the continuous sweep is by far the easiest and most accurate ROTALIGN measurement method. That is why this method is activated by default when the computer is first switched on. During shaft rotation, the receiver takes approx. 20 measurements per second, noting for each individual measurement the exact angular rotation position reading of the built-in inclinometer. This allows accurate alignment calculation even when shafts cannot be rotated further than 75°.



The measurement procedure could not be easier: to start "Continuous Sweep" measurement, press START. Then slowly rotate the shafts through 360° in either direction (or as far as possible). Press STOP when finished.

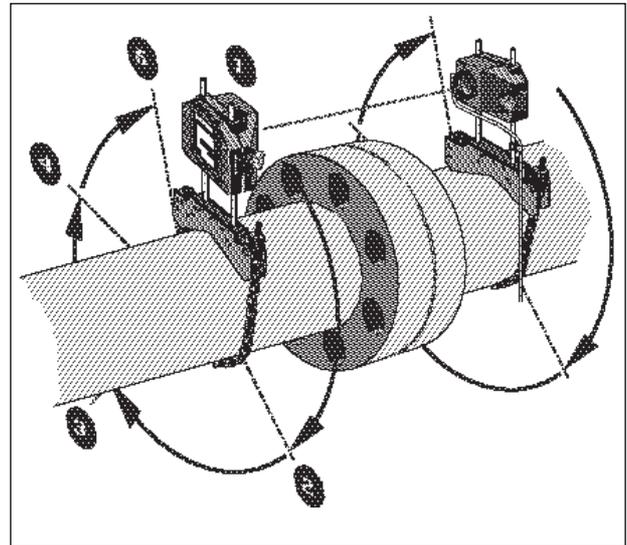


### Multipoint mode

- **'Odd' measurement positions**
- **Difficult shaft rotation**
- **Hand-triggered measurement**
- **For eliminating shaft float in oil-filled bearings**
- **When extreme misalignment requires range extension**

Some alignment situations call for measurement readings to be triggered by hand in a number of shaft rotation positions other than the perfectly horizontal and vertical orientations used in the '0,3,6,9' mode (described later in this note). Consider, for example, the case where a clear line of sight between laser emitter and receiver is possible in only a few odd rotation positions. The multipoint mode allows you to take any desired number of readings by pressing the ENTER key at each different rotation position; the internal inclinometer in the receiver provides the exact measurement of rotation angle for each position.

Note that measurement at each position begins when the key is pressed. Therefore, please wait after pressing the TAKE POINT key until the averaging bar graph in the display fills out before beginning to rotate the shafts to the next position. Due to its relatively complicated calculation algorithm, multipoint mode requires at least five points taken over shaft rotation of at least 75° in order to ensure maximum accuracy.





**Pass mode**

- **Uncoupled shafts**
- **Non-rotatable shafts (one or both)**

This mode is ideal for measurement under the following challenging alignment conditions:

- Uncoupled shafts
- One or both shafts cannot be rotated for measurement

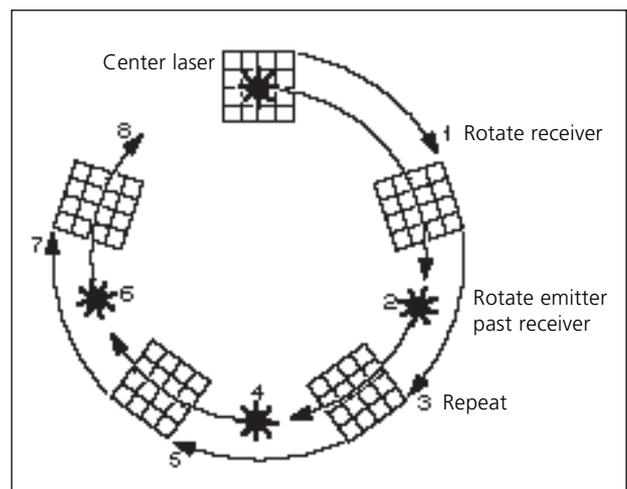
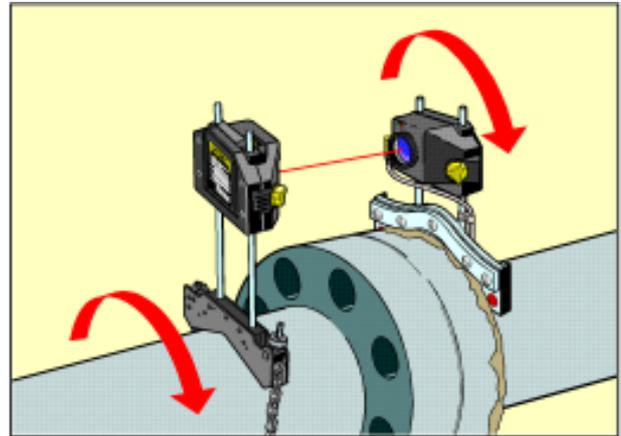
The pass mode allows convenient, yet highly accurate measurement by rotating the laser past the receiver. The internal inclinometer notes the rotation angle each time the beam passes by the receiver.

Proceed as follows:

1. If the shafts are rotatable but uncoupled, mount the laser and receiver on standard chain brackets in the normal way.
2. If a shaft cannot be rotated, the ALI 2.230 magnetic sliding bracket must be used: mount the sliding bracket on the coupling flange or exposed end of the non-rotatable shaft; for best results, the receiver should be mounted on the sliding bracket. The flange or shaft must be steel, surface-finished, clean and lightly oiled. Alignment accuracy depends on these conditions! Aligning two nonrotatable shafts both with sliding brackets is possible but very dependent on the surface finishes and should be regarded as a method of last resort.
3. Mount the laser and receiver. If one shaft is non-rotatable then mount the receiver on it if possible:

If neither shaft can be rotated, the laser and receiver can both be mounted on magnetic sliding brackets. Note, this is regarded as a method of last resort.

4. Select PASS MODE and center the laser as usual. Press START; the first measurement is immediately taken.
5. Rotate the receiver (or slide the bracket) by about 60° to the next measuring position.



6. Slowly rotate (or slide) the laser past the receiver so that the beam traces an arc across the lens. The green LED on the receiver lights for one second to confirm that the measurement has been accepted.
7. Repeat steps 5 and 6 at a series of angles, alternating movement of the laser or receiver in a fashion similar to that shown in the illustration.



**Note**

Shield the laser beam with your hand when the receiver is moved. Take measurements only by passing the laser across the receiver.

The exact amount of shaft rotation is not critical, but 75° total rotation is required. At least 5 measurements must be taken in order to calculate reliable alignment results.

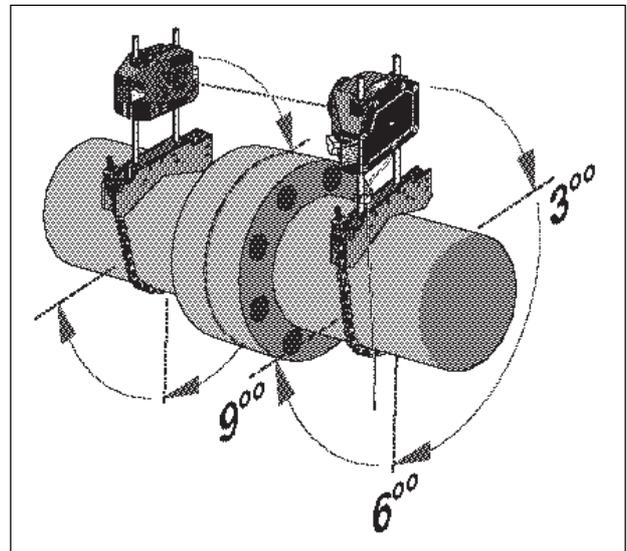
8. Press STOP. Measurement is now complete.



### '0, 3, 6, 9' mode

- **Alignment of vertical machines mounted on feet (not flanged)**
- **Alignment of inclined drives**
- **Alignment at temperatures below freezing**

As its name indicates, the '0, 3, 6, 9' mode prescribes four fixed measurement positions at 90° shaft rotation intervals. When this mode is active, the readings of the receiver's internal inclinometer are disregarded, making this the mode of choice whenever the internal inclinometer cannot be used. In such cases, the shaft and machine housing must be marked at 90° rotation intervals; for horizontal machines, an external (mechanical) inclinometer must be used to rotate the shafts so that the sensors are 'leveled' in exact vertical and horizontal orientation for each measurement.



Turn the shaft to each of the clock positions and press the corresponding key: "0" for 12:00, "3" for 3:00, "6" and "9". Measurement at each position begins when a number key is pressed, so please wait after pressing the position key until the averaging bar graph in the display fills out before proceeding to the next position. A result can be calculated from only three points, but maximum accuracy is ensured when four points are measured. If the machine is arranged horizontally, the shaft positions can be set to match the inclinometer "clock" displayed on the screen.



### Dial gage mode

- **Comparison with dial gage specifications**

ROTALIGN is also capable of expressing its measurements in terms of dial gage readings in any mounting configuration for comparison with target alignment specifications. It can also calculate the equivalent ROTALIGN alignment condition from dial gage readings. Please consult Technical Note #25 for complete instructions.