

TECHNICAL SPECIFICATION FOR OPTICAL LASER ALIGNMENT KIT

SUITABLE FOR STEAM TURBINE APPLICATION

The system should consist of the following:

A

1. Dedicated **CPU/COMPUTER** for Center alignment of steam turbine application (Max bore dia 4600 mm)
2. Firmware/ Software for the Center alignment package
3. Rechargeable battery
4. Battery Charger
5. Receiver including dust cap – 2 Nos.
6. Rotor align laser including dust cap
7. Suitable USB cable.
8. Extension USB cable.
9. Receiver cable - approx 5 Mtr.
10. Sliding magnetic bracket with Z adopter.
11. Magnetic base adopter.
12. Central alignment laser emitter with cable – 2 Mtr.
13. Central alignment laser bracket
14. Laser / sensor power box.
15. Main battery charger.
16. Receiver cable with power supply – 10 Mtrs
17. Receiver cable without power supply – 25 Mtrs.
18. Receiver cable without power supply – 15 Mtrs.
19. T adopter
20. Multipurpose cable with adopter – 2 Nos.
21. Accessories case
22. System operating instruction manuals.
23. Central alignment operation instruction manual

B. LARGE BORE BRACKET ELEMENT.

1. Sensor rotation frame extra long, package with case
 - 1.1 Sensor rotation frame
 - 1.2 Measurement surface probe assembly (1 set) (250 mm / 9 x 1/4 “ and 500 mm / 19 5/8 “ 1 each)
 - 1.3 Rotation frame carrier
 - 1.4 Combination probes

1.5 Case with contoured insert (also holds one additional package)

2. Standard support package – Application for open machine “Tops-offs”

2.1 Telescopic arm (3pcs) 361-7695 mm / 14 ¼” to 31 ¼”

2.2 Lateral support magnetic (2pcs)

2.3 Support foot.

3. T Support package – Application for open machine “Tops-offs” with magnetic test

3.1 Telescopic arm (3pcs) App 160 – 237mm x 6 3/8” to 9 ¼”

3.2 Extension arm (100mm / 3 7/8”) (3pcs)

3.3 Magnetic foot (“Tops on”) (3pcs)

4. Extension package.

4.1 Telescopic arm (3pcs) 539 – 3007 mm / 21 ¼” – 51 3/8”

4.2 Extension arm (500 mm / 19 5/8” (3pcs)

5. Additional extension package. for 4.8 Mtrs.

5.1 5.1 Extension arm (500 mm / 19 5/8” (3 pcs)

THE SYSTEM SHOULD HAVE THE FOLLOWING FEATURE

Control sensor to automatically track and compensate the laser drift due to time or temperature changes and long distance (up to 40 m) measurement to eliminate error.
Resolution of 0.001 mm in calculation and display
5 axis Receiver with built-in electronic inclinometer able to take readings every 0.1-deegree
Graphical display on the std deviation for any inconsistency result at individual bearing pocket that caused by poor measurement surface or bad measurement
Table display on the std deviation of the shape of the bore/circle and accuracy on single point calculation
Allow Preset- values for machine thermal growth &. Offset compensation for machine rotor /pockets wear over time
Allow multiple measurement on single bore with display table to show std deviation and result accuracy

Multi-point measurement mode with more than 3 points measurements at any part/section of the rotational degree on the plain bearings/pockets. Measuring only 3 points might not be representative of the true shape of the bore. Only with the patented PT multipoint mode and the evaluate of the Standard Deviation can the user be confident with the quality of the measurement i.e. that more than 3 points (usually more than at least 5) based on the y value have collectively calculated the center of the X, Y and the deviation of any one single measurement point has not affected the calculated center value. The individual measurement points can be disabled to see what effect this has on the X,Y value i.e. if there is one specific point where the measurement point should not be taken.
Multi-point measurement for tops-off and tops-on bore application
Static measurement mode for fix vertical and horizontal measuring requirement
Continuous Sweep measurement mode for continuous measurement when bracket slide along the bore at any position
Measurement can be taken in any direction during one measurement, to any position
Splice measurement capability. Especially useful if the laser is accidentally knocked or a repeat measurement to be performed where only a number of locations have been moved i.e. no requirement to re measure the complete application but only 2 repeat bores plus the new bore locations..
Universal and flexible Large bore bracket for all turbine capacity
Interchangeable bracket telescopic arm cover diameters up to 4500 mm (optional)
Adjustable averaging for measurements from 8 - 2048 values per measurement point
Instantaneously plot vertical & horizontal planes deviation along initial reference line, including rotor sag correction and presets value.
Calculate all corrections values from an optimized reference line position or the laser line position. Several bores can also be fixed in order to define the best line through these points.
Calculate the optimum position of each bore for minimum correction amounts
Individual measurement points can be calculate with four enhance formula - Circle Y Phi, Circle .XY" Phi, ellipse .XY" Phi or ellipse 'Y" Phi. Possible to analyse if the shape is as a circle or elliptical.
Graphical results display individual bore of all diaphragm both horizontally and vertically simultaneously
Results to indicate with both, visual positions of bore/diaphragm center measurement and values with sign +/-
Real time on-line -move- function on one or group bore/ diaphragm for both horizontal and vertical with simultaneously viewed with limits for tolerance displayed
Date and time of each measurement readings at the moment reading taken recorded
USB port for data exchange
Edit saved files, and re-measure on any machine at any time
Capabilities to stored and reload measurement file for further handling.
Blue tooth communication and data transmission capability (optional)

Laser power output should be class IIA($<1\text{mw}$ visible red)