

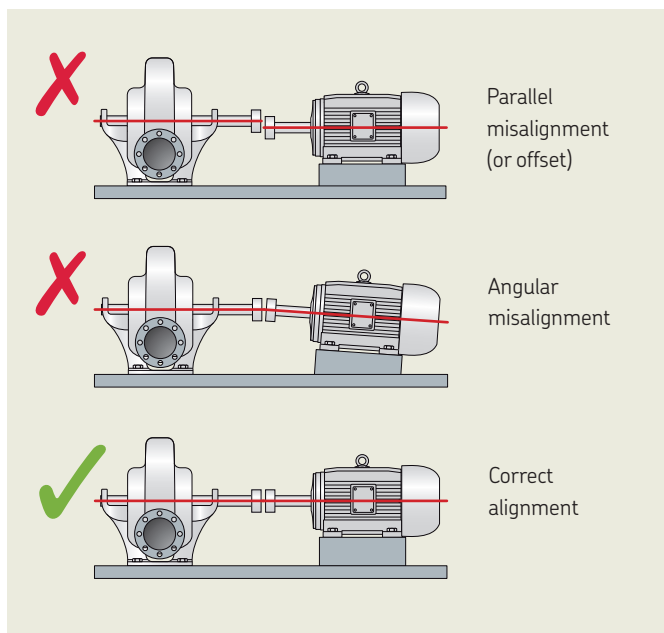
Alignment



Accurate shaft alignment really matters

Reduce machinery breakdowns and increase your uptime

It's a fact. Shaft misalignment is a major contributor to rotating machinery breakdowns. Accurately aligning shafts can prevent a large number of machinery breakdowns and reduce unplanned downtime that results in a loss of production. In today's challenging environment of reducing costs and optimising assets, the necessity of accurate shaft alignment is now greater than ever.



What is shaft misalignment?

Machines need to be aligned in both the horizontal and vertical plane. The misalignment can be caused by both parallel or angular misalignment. The possible consequences of shaft misalignment are serious to any company's bottom line and include:

- Increased friction and thereby energy consumption
- Premature bearing and seal failure
- Premature shaft and coupling failure
- Excessive seal lubricant leakage
- Failure of coupling and foundation bolts
- Increased vibration and noise



What methods can be used to align shafts?

In general, it's clear that laser alignment systems are quicker and easier to use than dial indicators, have better accuracy and don't require special skills to get accurate results virtually every time.

Which type of laser alignment system should be considered?

Before purchasing a system, identify the applications where it is to be used and make a list of requirements. Buying an expensive system that can accommodate virtually every need can be a costly mistake, as the technicians need to be skilled in using it.

The majority of alignment tasks consist of such things as a horizontally placed electric motor with a pump or fan with a single coupling. For such tasks, the technician needs a system that is quick and easy to use and doesn't need a long set up time.

What can SKF offer?

SKF has developed, after extensive consultation with users, a range of affordable, easy to use shaft alignment tools that are suitable for a majority of alignment tasks.

	Straight edge	Dial indicators	Laser shaft alignment
Accuracy	--	++	++
Speed	++	--	+
Ease of use	++	--	+

New technology makes shaft alignment easier and more affordable

SKF Shaft Alignment Tool TKSA 11



The SKF TKSA 11 is an innovative shaft alignment tool that uses smartphones and tablets and intuitively guides the user through the shaft alignment process. With a focus on the core alignment tasks, the TKSA 11 is designed to be a very easy-to-use instrument that is especially suitable for alignment learners and compact applications. The SKF TKSA 11 is the first instrument on the market that uses inductive proximity sensors, enabling accurate and reliable shaft alignment to be affordable for every budget.

- Live view of the instrument and motor position makes the measurement and horizontal alignment intuitive and easy.
- The TKSA 11 app offers a fully functional demonstration mode allowing the complete alignment process to be experienced without the need to purchase the TKSA 11.
- The TKSA 11 is designed to give a fast return on its investment and is also affordable for almost every budget.
- By using inductive proximity sensors, the measurement is no longer affected by bright sunlight, the influence of backlash is reduced and the instrument becomes more robust. All enabling the TKSA 11 to deliver accurate and reliable shaft alignments.
- Automatic alignment reports give a complete overview of the alignment process and results. Reports can easily be shared via email or cloud services.
- Also available as TKSA 11D2 with rugged, industrial display device and pre-installed apps included.



The intuitive and affordable laser shaft alignment system

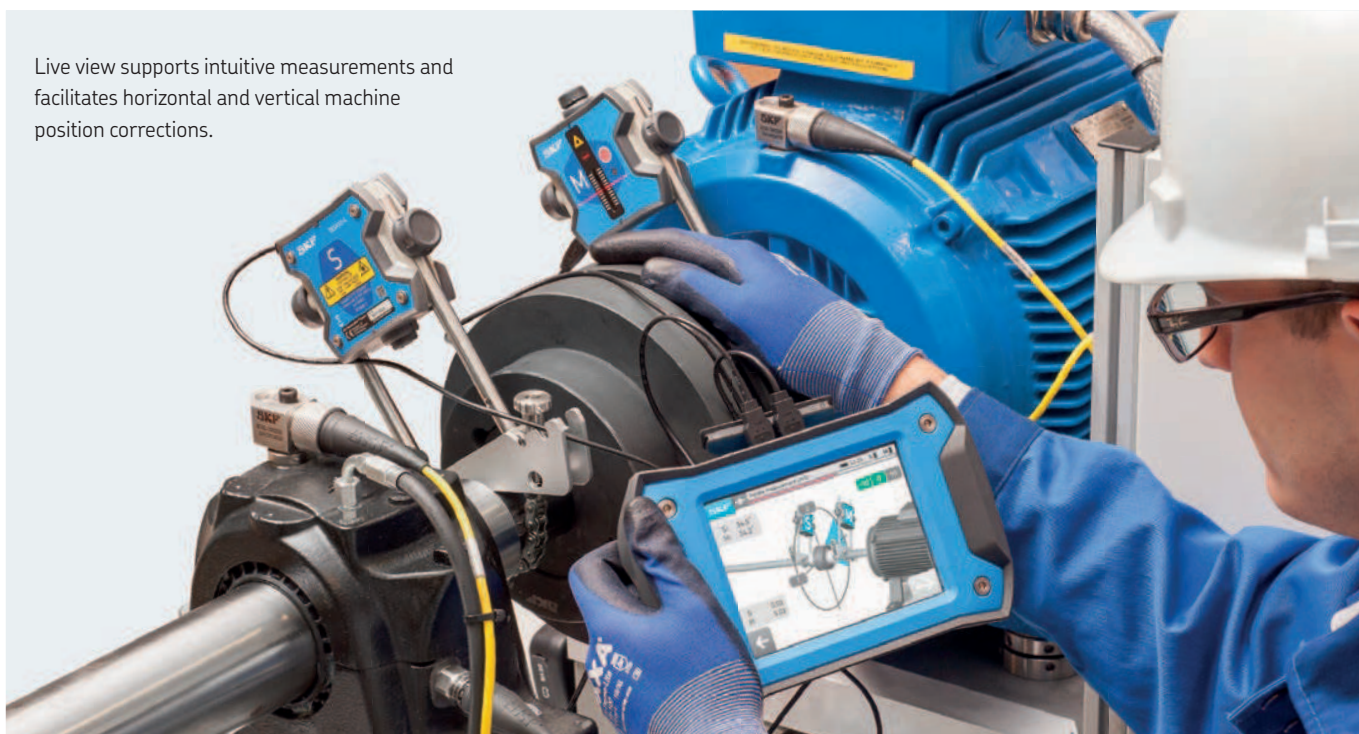
SKF Shaft Alignment Tool TKSA 31

The TKSA 31 is SKF's most affordable solution for easy laser shaft alignment. The ergonomic display unit with touch screen makes the instrument very easy to use and the built-in machine library helps storing alignment reports for multiple machines. Large sized laser detectors in the measuring heads reduce the need for pre-alignments and the embedded soft foot tool helps establish the foundation for a successful alignment. Additional functions such as live view and automatic measurement support fast and effective alignment tasks and make the TKSA 31 an innovative laser shaft alignment tool that is affordable for almost every budget.

- Easy measurements can be performed by using the well-known three position measurement (9-12-3 o'clock) with additional positioning flexibility of 40° around each measurement position.
- High affordability is achieved by focussing on the standard shaft alignment process and essential functions to allow quick and effective shaft alignments.
- "Automatic measurement" enables hands-free measurements by detecting the position of the heads and only taking a measurement when the heads are in the right position.
- Automatic reports are generated after each alignment and can be customised with notes about the application. All reports can be exported as pdf files.
- The machine library gives an overview of all machines and alignment reports. It simplifies the machine identification and improves the alignment workflow.



Live view supports intuitive measurements and facilitates horizontal and vertical machine position corrections.



The advanced laser shaft alignment system with enhanced measuring and reporting capabilities

SKF Shaft Alignment Tool TKSA 41



Free measurement allows alignment measurements to start at any angle and finish with an angular sweep of just 90°.



Machine library gives an overview of all machines and alignment reports.

The TKSA 41 is an advanced laser alignment solution for achieving accurate shaft alignments. With two wireless measurement units, large sized detectors and powerful lasers, the instrument performs precise measurements in even the most challenging conditions.

The ergonomic display unit with intuitive touch screen navigation makes your alignments fast and easy, whilst innovative features, like the "free measurement", increase the alignment performance. With the focus on improving alignment practices, the SKF Shaft Alignment Tool, TKSA 41, is one of the industry's best value alignment solutions.

- Wireless communication improves instrument handling and allows alignments of difficult to reach applications from a safe position.
- Automatic measurement enables hands-free measurements by detecting the head position and taking a measurement when the heads are rotated into the right position.
- Automatic reports are generated after each alignment. The reports can be customised with notes and pictures from the built-in camera for the most comprehensive overview. All reports can be exported as pdf files.
- Live view supports intuitive measurements and facilitates horizontal and vertical alignments.
- The simplicity of the TKSA 41 provides greater confidence for the performance of alignment tasks on all types of horizontal rotating machines.
- QR codes can be used to further simplify machine identification and improve the alignment workflow.

Comprehensive and intuitive shaft alignment utilising tablets and smart phones

SKF Shaft Alignment Tool TKSA 51



The TKSA 51 shaft alignment tool provides high measurement flexibility and performance suitable for entry-level to expert alignment jobs. Designed to work with the SKF shaft alignment apps on a tablet or smart phone, this intuitive tool is easy to use and requires no special training. The included accessories enable use of the TKSA 51 for a wide range of alignment applications with horizontal and vertical shafts, such as motors, drives, fans, pumps, gearboxes and more. The apps include tutorial videos to show operators how to perform accurate measurements.

- **Measurement flexibility** – The well-known, three-position measurement gains additional flexibility as measurements can start at any angle and require a total minimal rotation of only 40 degrees. This enables operators to perform alignments of applications with limited space.
- **Automatic reports** – Alignment reports are generated automatically and can be customised with notes, a machine picture and a signature via touchscreen. The reports can be easily exported as PDF files and shared with other mobile apps.
- **Comprehensive and compact** – A range of included components, such as magnetic mounting brackets and extension rods and chains, increase the TKSA 51's versatility, yet it remains compact, lightweight and easy to carry.
- **3-D live view** – This feature enables intuitive positioning of the heads for quick alignment measurements and displays the horizontal and vertical alignment correction live. The apps enable 3-D rotation of the virtual motor to correspond with the actual machine position view.
- **Disturbance compensation** – Measurement values are averaged over time to provide greater accuracy in presence of external disturbances.
- Also available as TKSA 51D2 with rugged, industrial display device and pre-installed apps included

Alignment applications

The TKSA 51 uses dedicated apps for alignments of horizontal and vertical shaft and the correction of soft foot.

The apps are icon-driven and very easy to use. All apps are free of charge and features a fully functional demonstration mode that allows the alignment process to be experienced before purchasing the instrument.



Shaft alignment



Vertical shaft alignment



Soft foot

Versatility and performance for professional alignment

SKF Shaft Alignment Tool TKSA 71



TKSA 71 delivers precision and durability

Designed for professional alignment in harsh industrial environments, the TKSA 71 complements SKF's offering with a high-end shaft alignment tool. The instrument is very versatile with ultra-compact measuring units for use in extremely narrow spaces. Its dedicated software applications enable different types of alignments, including horizontal and vertical shafts, spacer shafts and machine trains.

Superior alignment performance and long-term industrial durability are achieved with an innovative instrument design that offers high measurement accuracy and excellent protection against dust and water in harsh environments.

- **Easy-to-use** – Intuitive software applications, guided alignment processes and explanatory videos
- **Wide range of applications** – Comprehensive accessories and dedicated software applications

- **Superior alignment performance** – Up to 10 m measurement distance, disturbance compensation, measurement flexibility, only 40° total rotation, automatic measurement and customised alignments with target values
- **Protection against harsh environments** – Completely sealed measuring units (IP67) to withstand dust and water
- **Ultra-compact measuring units** – Use in extremely narrow spaces
- **Robust carrying case** – Excellent protection, convenient transport and wireless in-case charging

Complete system for your alignment needs

The TKSA 71 base model includes standard accessories for most alignment tasks. It is supplied in a rugged case that meets most airline requirements for cabin luggage.

The TKSA 71/PRO model includes additional accessories such as sliding brackets, magnetic bases and offset brackets that are useful for more demanding alignment jobs.

This model is supplied in a larger, rugged trolley case.

The TKSA 71D2 and TKSA 71D2/PRO include an additional display device with a protective cover and pre-installed apps. Both systems are ready for use without internet connection or account setup.



Measuring device: (1) Measuring units (M & S) with standard V-bracket, (2) Wireless charging pods with USB cable, (3) Tape measure

Standard accessories: (4) Extension chains, (5) Extension rods, (6) Mounting magnets

Advanced accessories: (7) Sliding brackets, (8) Offset brackets, (9) Additional extension rods, (10) Magnetic bases

Alignment applications

The TKSA 71 functions quickly and intuitively using six software apps tailored for different alignment jobs. Designed for use without prior training, these simple-to-use apps are available free of charge for both Android and iOS platforms. Common features include comprehensive, automatic reports, export and sharing options, machine library with QR code identification, instructional videos within the app, built-in tolerance guidelines, 3-D live view, disturbance compensation and a fully functional demonstration mode.



Shaft alignment

Easy and intuitive alignments of horizontal shafts with additional features including automatic measurement, minimal 40° total rotation, 9-12-3 guidance and alignment customisation with target values¹⁾.



Soft foot

Assists technician in verifying that machine is standing evenly on all four feet. The app supports the operator identifying and correcting a soft foot¹⁾.



Vertical shaft alignment

Easy and intuitive alignment of vertical shaft machines with shimming support for different bolt configurations¹⁾.



Spacer shaft alignment

Accommodates special requirements of spacer shafts and facilitates the alignment process²⁾.



Machine train shaft alignment

Enables operator to align three connected machines, giving a complete overview of machine train alignment and allowing the operator to select stationary feet²⁾.



Values

Allows the shaft alignment tool to be used as digital dial gauges; operators can record absolute, zeroed and halved readings to perform customised alignments with manual calculations²⁾.

¹⁾ Compatible with: TKSA 51, TKSA 51D2, TKSA 71, TKSA 71/PRO, TKSA 71D2, TKSA 71D2/PRO. ²⁾ Compatible with: TKSA 71, TKSA 71/PRO, TKSA 71D2, TKSA 71D2/PRO.

Rugged, industrial display device

TKSA DISPLAY2

The TKSA DISPLAY2 is an Android tablet intended for use with SKF Shaft Alignment Tools.

- Protective cover for industrial use
- 8 inch screen diagonal
- 8 hours of continuous operation
- All shaft alignment apps pre-installed
- Ready for use without account setup or internet connection
- Included with shaft alignment kits TKSA 11D2, TKSA 51D2, TKSA 71D2 and TKSA 71D2/PRO



Selection chart

	TKSA 11	TKSA 31	TKSA 41	TKSA 51	TKSA 71	TKSA 71/PRO
User interface Type of display device	phone, tablet (iOS & Android)	touch screen display device	touch screen display device	phone, tablet (iOS & Android)	phone, tablet (iOS & Android)	phone, tablet (iOS & Android)
Display device included	TKSA 11: no ¹⁾ TKSA 11D2: yes	yes	yes	TKSA 51: no ¹⁾ TKSA 51D2: yes	TKSA 71: no ¹⁾ TKSA 71D2: yes	TKSA 71/PRO: no ¹⁾ TKSA 71D2/PRO: yes
Measurement positions The "9-12-3" measurement directs the user to three pre-defined measurement positions. The "free" measurement allows the user to freely select the measurement positions. All measurements are guided.	9-12-3	9-12-3	free	free	free	free
Wireless measuring heads	●	—	●	●	●	●
Measurement distance Maximum possible distance between the brackets of the measuring heads.	18,5 cm	2 m ²⁾	4 m	5 m	10 m	10 m
Minimal shaft rotation Describes the minimal required total shaft rotation angle to perform alignment measurements.	180°	140°	90°	40°	40°	40°
Camera Machine picture(s) can be taken and added to alignment reports.	●	—	●	●	●	●
Machine library Overview of all registered machines and previous alignment reports.	—	●	●	●	●	●
QR code recognition QR labels can be used to simplify the machine identification and increase the usage convenience.	—	—	●	●	●	●
Machine view The machine view describes how the machine is shown on the display. The free 3D rotation allows to view the machine from all directions.	fixed 2D view	fixed 3D view	fixed 3D view	free 3D rotation	free 3D rotation	free 3D rotation
Target values Using target values for alignment, it is possible to compensate for thermal expansion or similar adjustments.	—	—	—	●	●	●
Disturbance compensation Measurement values are averaged over time, allowing accurate measurements in the presence of laser distortions from air temperature gradients or similar disturbances.	—	—	—	●	●	●

Supported alignment applications	TKSA 11	TKSA 31	TKSA 41	TKSA 51	TKSA 71	TKSA 71/PRO
Horizontal shaft alignment	●	●	●	●	●	●
Soft foot correction	—	●	●	●	●	●
Vertical shaft alignment	—	—	—	●	●	●
Spacer shaft	—	—	—	—	●	●
Machine train	—	—	—	—	●	●
Digital dial gauge mode	—	—	—	—	●	●

Alignment accessories	TKSA 11	TKSA 31	TKSA 41	TKSA 51	TKSA 71	TKSA 71/PRO
Extension chains	optional	optional	included	included	included	included
Extension rods	optional	optional	included	included	included	included
Magnetic V-brackets	optional	optional	optional	included	included	included
Offset brackets	optional	optional	optional	optional	optional	included
Sliding brackets	optional	optional	optional	optional	optional	included
Magnetic base	—	optional	optional	optional	optional	included
Spindle bracket	optional	—	—	optional	optional	optional

¹⁾ Optional TKSA DISPLAY2 with pre-installed apps is recommended

²⁾ With supplied USB cables

Accessories		Compatible				
Ordering designations	Content and description	TKSA 11	TKSA 31	TKSA 41	TKSA 51	TKSA71(/PRO)
Extension chains						
TKSA 41-EXTCH	2 × Extension chains of 500 mm (19.7 in.) for shaft diameters up to 300 mm (11.8 in.)	—	●	●	—	—
TKSA 51-EXTCH	2 × Extension chains of 1 m (3.3 ft.) for shaft diameters up to 450 mm (17.7 in.)	●	—	—	●	●
Rods						
TKSA ROD90	4 × threaded rods of 90 mm (3.5 in.)	—	●	●	—	—
TKSA ROD150	4 × threaded rods of 150 mm (5.9 in.)	—	●	●	—	—
TKSA 51-ROD80	4 × threaded rods of 80 mm (3.1 in.)	●	—	—	●	●
TKSA 51-ROD120	4 × threaded rods of 120 mm (4.7 in.)	●	—	—	●	●
Magnetic V-brackets						
TKSA MAGVBK	2 × Magnetic V-brackets, supplied without rods or chains	—	●	●	—	—
TKSA 51-VBK	1 × Standard V-bracket, supplied with 2 × threaded rods of 80 mm (3.2 in.), 1 × standard chain of 480 mm (18.9 in.) and 4 × magnets	●	—	—	●	●
Spindle brackets Rods						
TKSA 51-SPDBK	1 × Spindle bracket, supplied with 2 × threaded rods of 80 mm (3.2 in.)	●	—	—	●	●
Sliding brackets						
TKSA 51-SLDBK	1 × Adjustable sliding bracket for use with shaft diameters >30 mm (1.2 in.) or bore diameters >120 mm (4.7 in.), supplied without rods	●	—	—	●	●
TKSA SLDBK	2 × Wheels to be used with standard V-Bracket (TKSA VBK), supplied without V-bracket	—	●	●	—	—
Offset brackets						
TKSA EXT50	2 × Offset brackets of 50 mm (2 in.) compatible with standard (TKSA VBK) and magnetic V-brackets (TKSA MAGVBK) and magnetic base (TKSA MAGBASE)	—	●	●	—	—
TKSA EXT100	2 × Offset brackets of 100 mm (3.9 in.) compatible with standard (TKSA VBK) and magnetic V-brackets (TKSA MAGVBK) and magnetic base (TKSA MAGBASE)	—	●	●	—	—
TKSA 51-EXT50	1 × Offset bracket 50 mm (2 in.), supplied with 2 × rods 80 mm (3.2 in.)	●	—	—	●	●
Magnetic base						
TKSA MAGBASE	2 × Magnetic bases, supplied with 2 × fixation screws M8 × 20 mm	—	● ¹⁾	● ¹⁾	●	●
Other accessories						
TKSA DISPLAY2	1 × Industrial display device (Android tablet with protective cover and pre-installed apps)	●	—	—	●	●
TKSA 11-EBK	2 × Extendable V-brackets, supplied with 4 × threaded rods of 120 mm (4.7 in.) and 4 × threaded rods of 80 mm (3.1 in.), supplied without chains	●	—	—	—	—
TKSAVBK	2 × Standard V-brackets, supplied without rods or chains	—	●	●	—	—
TKSA 41-QR	5 × A4 sheets with 12 × QR code stickers per sheet (total of 60 × stickers)	—	—	●	●	●

¹⁾ Requires offset brackets TKSA EXT50 or TKSA EXT100 for usage with TKSA 31 and TKSA 41.