

FENNE[®]
INDUSTRIAL



NOX Tiltrotators

**More torque.
More tilt.
Less time!**

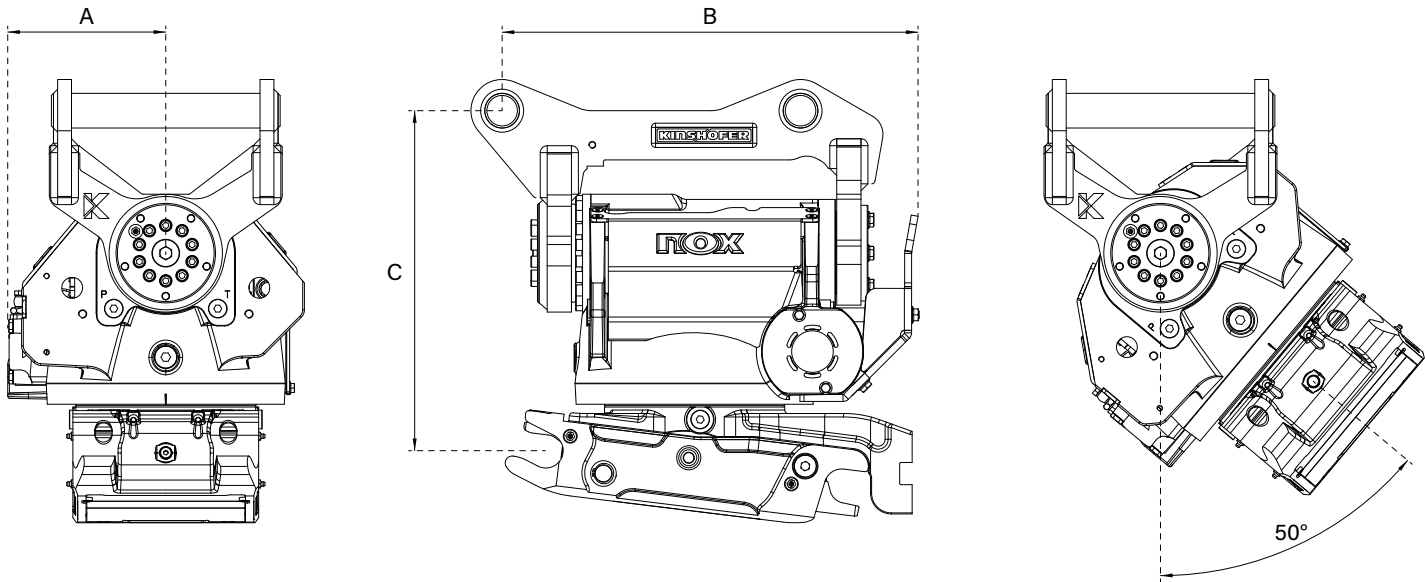
Four Facts about the use of Tiltrotators:

- PRODUCTIVITY AND PROFITABILITY:** Manage the same amount of work in less time.

SAFETY: The NOX Tiltrotator complies with all current safety regulations and helps the operator and surrounding workforce to achieve an accident-free environment.

VERSATILITY AND FLEXIBILITY: Increase the use of your machine dramatically and accept more jobs. Especially in conjunction with the NOX.

READY FOR THE FUTURE: The NOX tiltrotator comes GPS-ready with its very modern NOXProp+ Control System. The most common 3D Machine Control Systems can be implemented. Even retroactively.



With our NOX Tiltrotator, your attachments can be rotated by 360° continuously and tilted by up to 50° to both sides. Therefore, the efficiency of your machine will be increased dramatically as time and resources will be saved.



TR045NOX

TR07NOX

TR11NOX

Operating weight	2.5 - 4.5t	4 - 7t	6 - 11t
Weight* (from)	150 kg	200 kg	320 kg
Width A* (from)	190 mm	205 mm	215 mm
Length B* (from)	435 mm	460 mm	580 mm
Height C* (from)	380 mm	420 mm	475 mm
Recomm. bucket width max.	1,100 mm	1,200 mm	1,300 mm
Breakout force max. (ISO)	40 kN	50 kN	75 kN
Breakout torque max.	29 kNm	40 kNm	79 kNm
Tilt angle	2 x 45°	2 x 50°	2 x 50°
Tilt torque (constant)	6.5 kNm	11 kNm	16 kNm
Rotation speed	8.5 per min	8.5 per min	8.5 per min
Rotation torque	3,800 Nm	4,700 Nm	7,500 Nm
Hydraulic pressure max.	21 MPa	25 MPa	27 MPa
Recomm. pump capacity CSP	30-80 l/min	30-80 l/min	40-100 l/min
Recomm. pump capacity DF04/06/10	15 / 32 l/min	15 / 32 l/min	21 / 40 l/min
Electric swivel	-	optional	optional

*Specifications depend on the machine configuration (upper bracket and lower quick coupler)



2 YEARS WARRANTY NOX TILTROTATORS

It is our goal that you can always rely on your attachment and make you feel confident of its quality and longevity. KINSHOFER stands for attachments of highest quality. All our employees and our quality management are committed to this quality every day. We are confident of the quality level we provide and therefore grant a 2-year-standard-warranty. Enjoy working with them and experience and create quality.



TR14NOX

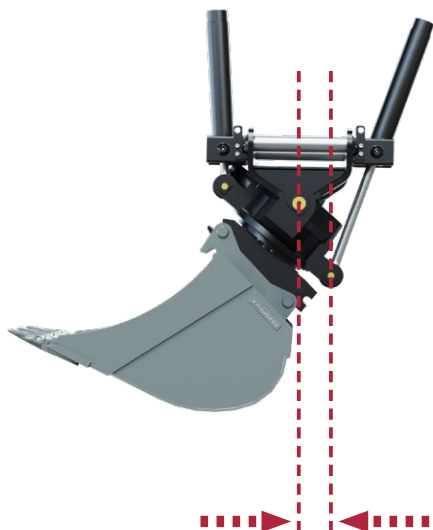


TR19NOX

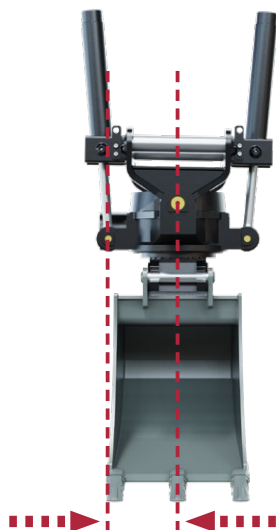


TR25NOX

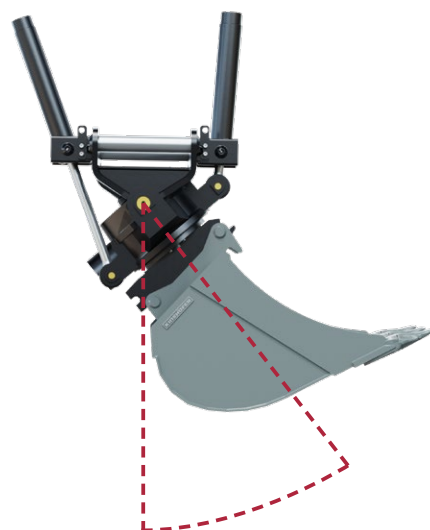
10 - 14t	14 - 19t	19 - 25t
485 kg	580 kg	860 kg
240 mm	230 mm	260 mm
610 mm	645 mm	845 mm
565 mm	580 mm	650 mm
1,600 mm	1,700 mm	2,000 mm
110 kN	150 kN	170 kN
145 kNm	200 kNm	250 kNm
2 x 50°	2 x 50°	2 x 50°
31 kNm	40.5 kNm	51.7 kNm
8.5 per min	8.5 per min	8.5 per min
11,000 Nm	12,000 Nm	15,000 Nm
30 MPa	30 MPa	30 MPa
80-160 l/min	100-180 l/min	120-200 l/min
40 / 45 l/min	60 / 50 l/min	70 / 70 l/min
optional	optional	optional



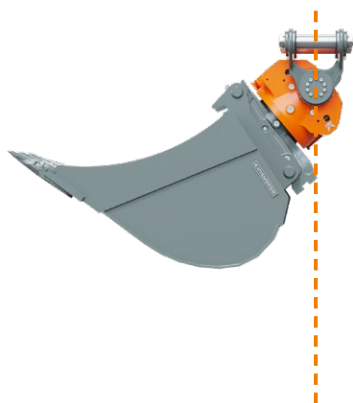
TILTROTATOR WITH CYLINDERS
Minimum pivot point distance



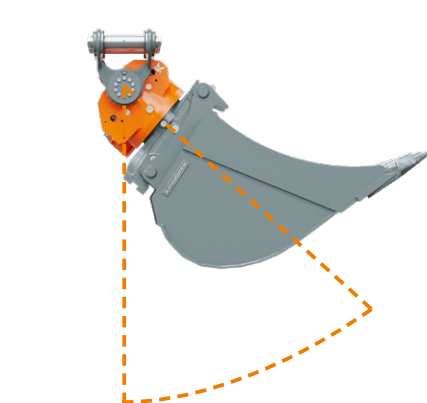
TILTROTATOR WITH CYLINDERS
Maximum pivot point distance



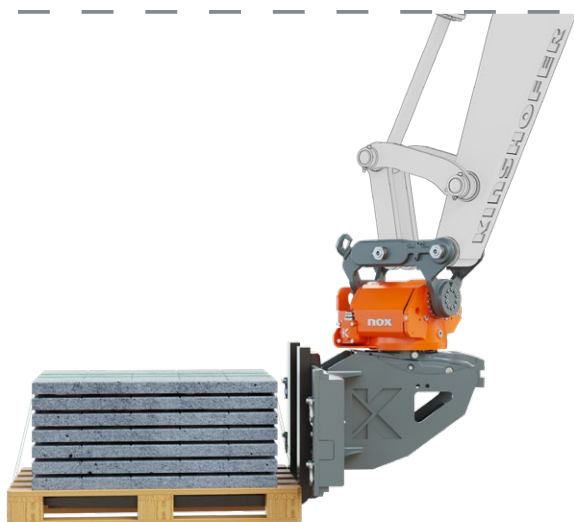
TILTROTATOR WITH CYLINDERS
Narrow tilt angle



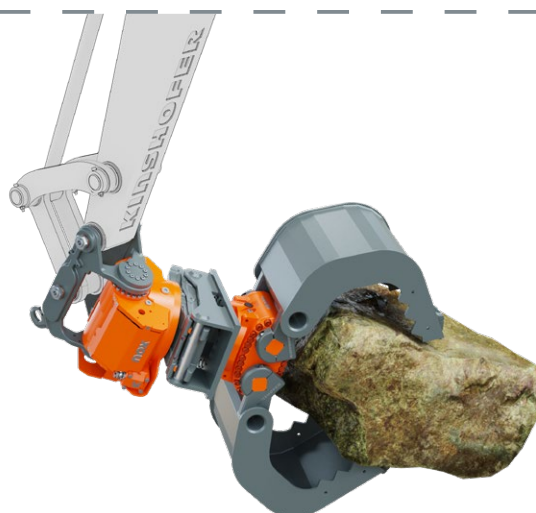
NOX TILTROTATOR
No pivot point, therefore high and constant tilt torque

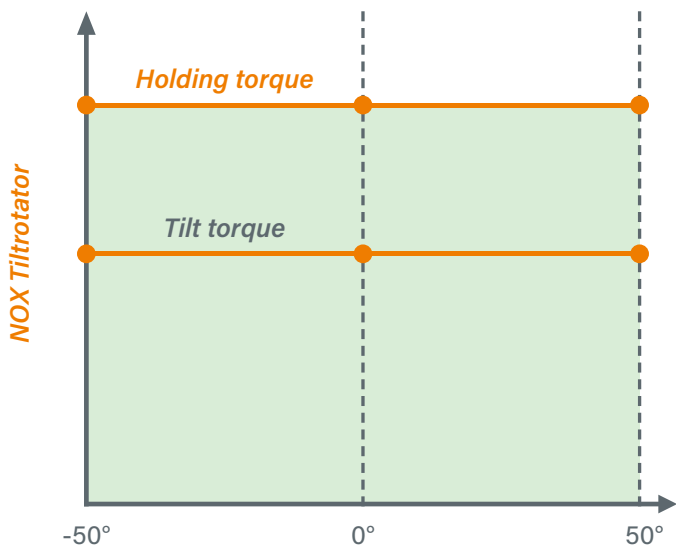
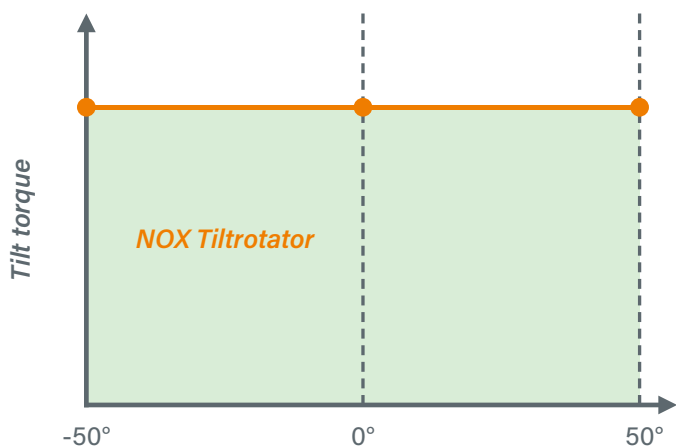
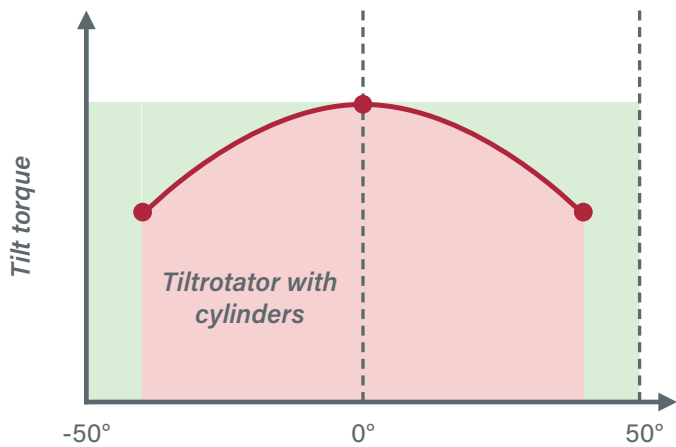


NOX TILTROTATOR
Maximum tilt angle (max. 2 x 50°)



NOX TILTROTATOR
Pilot check valve ensures a high holding torque





noX Tilt torque

The cylinderless, extremely flat drive provides for a very low height as well as a narrow width. An elliptic piston generates a high and constant tilt torque thanks to its single gearing. The robust cast housing features a high stability due to a special material alloy, guaranteeing a long life even under the toughest conditions. The extremely rugged and strong drive for difficult tasks has a proper greasing and is thus low-maintenance.

noX Tilt angle

360° continuous rotation and up to 2 x 50° tilt angle turn your machine into a multifunctional allrounder, increasing the flexibility and efficiency of all your attachments.

noX Holding torque

The NOX Tiltrotators are equipped with counter-balance valves, providing firm load holding in the desired position.

nox Tiltrotator

SYSTEM:

UPPER BRACKET & LOWER QUICK COUPLER

The Tiltrotator can be mounted directly to the excavator arm (direct mount) or it can be "Sandwich" mounted to the excavator by a quick coupler. Preferably, the excavator coupler is the same as the lower quick coupler on the NOX Tiltrotator, but it is not necessarily required. The Tiltrotator can thus be uncoupled and coupled again in no time. The lower quick coupler allows for a safe and fast exchange between attachments.

DESIGN:

SELF-CONTAINED UNIT

The compact design with its fully integrated tilt and rotation unit provides highest safety against damage. There are no protruding cylinders or piston rods that can be damaged, increasing the reliability of the NOX. In addition, the low design maintains higher breakout forces of the machine.



WORM DRIVE

The oversized worm gear absorbs shock loads with ease. The compact diameter and yet high torque ensures a very slim design, hence keeps the overall width of the NOX extremely small.



HOUSING

The robust cast housing features a high stability due to a special material alloy, guaranteeing a long life even under the toughest conditions. The integrated motor cover protects the hydraulic motor of the worm drive from damage from below. The quality of our precision components is ensured by 3D coordinate measuring machines with tactile and optical measuring sensors.



HIGH-FLOW SWIVEL

The optional high-flow swivel provides industry leading flows for attachments that require more flow to operate properly. As an option, an electric rotary unit for quick coupler sensors and attachments with switch valve (mainly in railway construction) can be used.

SET-UP:

COMPACT DESIGN

The cylinderless, extremely low and narrow built drive unit allows for very narrow bucket width, that are usually not wider than the excavator boom. Therefore, digging down in deep trenches becomes possible and very easy.

SAFETY:

SAFE WORKING AREA

The increased working radius reduces the need for repositioning your excavator to a minimum. Manual works such as manual digging in the danger zone by a co-worker are not necessary, as these works can be managed from the excavator cabin with the NOX Tiltrotator. The S-Lock quick coupler with front-lock prevents the attachments from falling down unintendedly.

INTEGRATED GRIPPER TRG

With the integrated gripper you get an additional attachment for handling poles, tubes and curb stones. The gripper is integrated at the lower quick coupler and does not affect the height or the attachment cross-movement.

Gripper module also available as attachment version F-H with different adapter systems.



RAILROAD GRIPPER RR-TRG

The RR-TRG gripper has been designed especially for heavy duty tasks, such as gripping railroad sleepers or rails. The extremely strong gripper module has been constructed for efficient gripping at a 40° angle. The gripper unit can be removed quickly and easily.



noX Benefits

FLEXIBLE OPERATION

Fast and uncomplicated response to requirements to be more competitive.

HIGHER SAFETY

Manual works within the danger area are reduced to a minimum.

LESS WEAR

The compact and extremely robust design without hydraulic cylinders lowers the risk of damages.

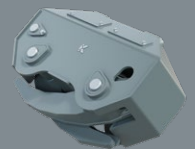
HIGHER EFFICIENCY

Working more efficiently saves consumables and labor costs and reduces the required working times. The tasks can thus be finished faster and the wear is kept to a minimum.

Optional accessories



TRG gripper



RR-TRG gripper



Type	Opening	Closing time	Closing force	Capacity
TRG07	424 mm	1.5 sec.	7.5 kN	300 kg
TRG11	644 mm	1.5 sec.	10 kN	500 kg
TRG19	825 mm	3.0 sec.	18.5 kN	900 kg
TRG25	1,050 mm	2.0 sec.	19.5 kN	1,400 kg
RR-TRG	822 mm	3.9 sec.	30.1 kN	5,000 kg

The RR-TRG gripper is only available for TR19NOX and TR25NOX.

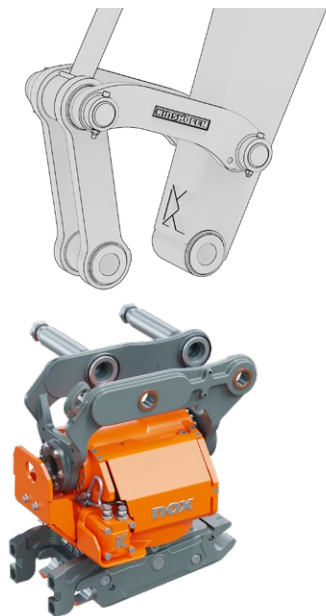
NOX Flexibility

MOUNTING TO EXCAVATOR ARM

When mounting the NOX Tiltrotator directly to the excavator dipper, the tiltrotator can use its maximum force. The "Sandwich" mounted Tiltrotator features a quick coupling adapter at the top to accept pick up by the machine coupler.

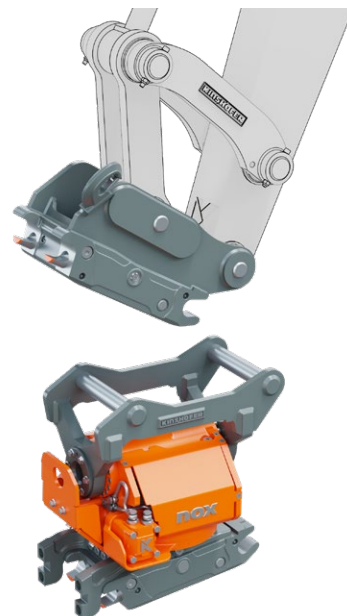
DIRECT MOUNT

- > Lower height
- > Higher force transmission

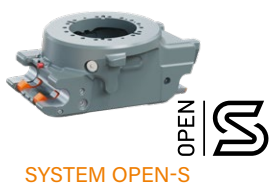


"SANDWICH"-STYLE MOUNT

- > Can be used with different excavators of the same class
- > Can be uncoupled to use attachments that do not require a Tiltrotator



FULLY HYDRAULIC QUICK COUPLER SYSTEM



SYSTEM OPEN-S

HYDRAULIC QUICK COUPLER SYSTEM



SYSTEM S-LOCK



SYSTEM L-LOCK



SYSTEM LIEBHERR &
SYSTEM LIEBHERR + LIKUFIX



SYSTEM D-LOCK



SYSTEM OILQUICK



SYSTEM OILQUICK



SYSTEM VERACHTERT

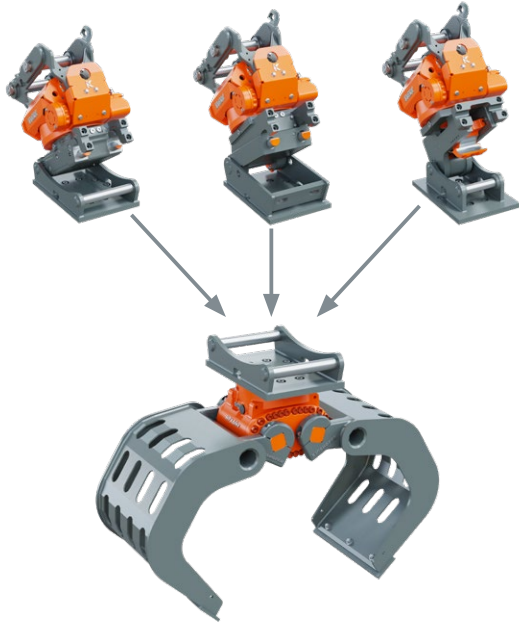


SYSTEM LIEBHERR

QUICK CHANGE ADAPTATIONS:

COMPATIBLE ADAPTATIONS FOR YOUR REQUIREMENTS

All attachments can be supplied with the compatible L-Lock, S-Lock or D-Lock adaptors. To ensure compatibility with your existing systems, Kinshofer also offers adaptations for all common quick change systems.



MECHANIC QUICK COUPLER SYSTEM



SYSTEM S-LOCK



SYSTEM L-LOCK



SYSTEM OILQUICK



SYSTEM LIEBHERR

Functional exchange, depending on demands!

As a global company we know that customers of different regions become familiar with certain styles and characteristics of products, including quick couplers.

We constantly improve our designs for higher productivity and greater safety and we also understand that customers may already own existing products which require a compatible coupler solution to keep on using them. We are generally differentiating between three different quick coupler systems:

FULLY HYDRAULIC QUICK COUPLERS

Fully hydraulic quick couplers connect the worktool mechanically as well as hydraulically without leaving the cabin. No need to connect hoses anymore.

HYDRAULIC QUICK COUPLERS

The hydraulic quick coupler allows for an efficient and safe mounting of the attachment without leaving the cabin. The spring-pretensioned locking pins provide for a force-fit connection without play. Besides the special spring-locking system, the carrier pin (system S-Lock) is also secured mechanically. The attachment cannot get loose.

MECHANIC QUICK COUPLERS

An automatic spring-locking system facilitates the coupling of the tool. By simply turning a socket, the coupler is opened or closed for the tool exchange. This provides a high functional safety; the spring loaded system is over-center locking. Besides the special spring-locking system, the carrier pin is also secured mechanically.

NOX Control

NOXProp+ & NOXProp CSP - CONTROL SYSTEM

Although this control system only requires one hydraulic function from the excavator, all Tiltrotator functions can be used at the same time. Also functions like steering/driving control, boom swing and dozer blade etc. can be controlled optionally. All functions are controlled proportionally and a separate control system is installed at the excavator. The joysticks of the machine will be replaced by new joysticks provided by KINSHOFER.

KEY FEATURES NOXProp+

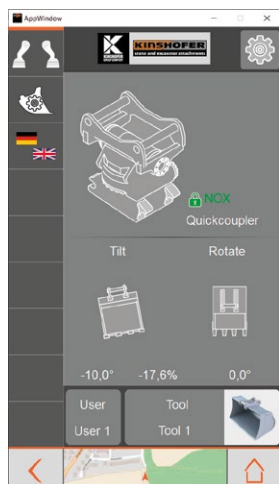
- Optimal NOX performance thanks to perfectly adjusted control
- Bright and high-definition touchscreen
- Autocalibration
- Position indicator at the display
- 4 different user profiles with up to 10 tool profiles (more flexibility)
- CAN Bus system
- All main settings can be adjusted directly on the touchscreen, no laptop/smartphone necessary
- Direct mode: When the NOX is disconnected, it is possible to control the original AUX lines in both directions
- Connectivity (WiFi, LTE, GPS, Bluetooth)
- Easy installation
- Integration with 2D/3D excavation system - NOXGeo
- BIM-ready



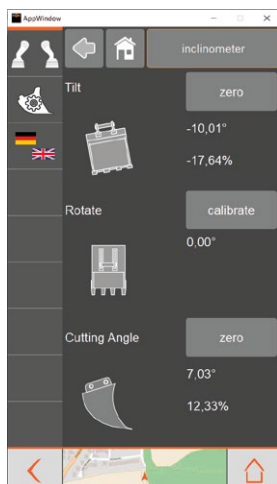
NOXProp+
TOUCHSCREEN

TOUCHSCREEN: ERGONOMIC CONTROL UNIT

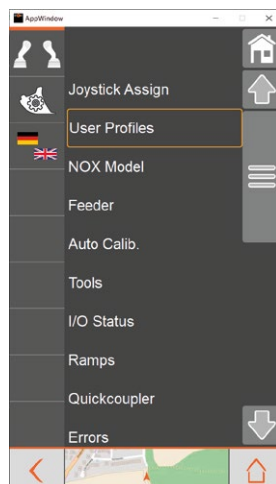
- Highly bright display - legible even at direct sunlight
- Easy switch between different profiles
- Locking/unlocking of quick coupler
- Sensor control of the quick coupler
- Tool profile settings
- Adjustment of single function speed
- Reliable ram mount



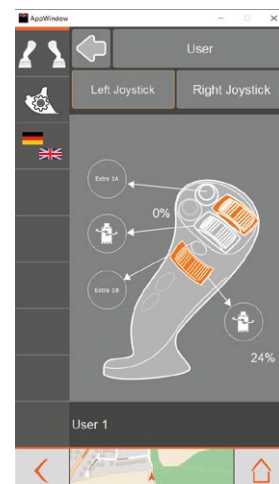
Home display
attachment & quick coupler



Geometry overview of
attachment and interface to
2D/3D systems



Easy and logical menu
navigation



Individual function
configuration of joystick
buttons

MACHINE REQUIREMENTS

CSP - NOXProp+ & NOXProp

- ▷ Single-acting hydraulic circuit (hammer line)
- ▷ Pressure line
- ▷ Tank line (free return directly to tank)



NOXProp
CONTROL UNIT

KEY FEATURES NOXProp

- ▷ All functions can be controlled proportionally
- ▷ All parameters can be adjusted individually with laptop
- ▷ 4 different user profiles with up to 10 tool profiles (more flexibility)
- ▷ Direct mode: When the NOX is disconnected, it is possible to control the original AUX lines in both directions.

NOXProp+ Control system

The NOXProp+ control system provides more safety and precision. NOX Tiltrotator, quick coupler and attached tools are controlled effectively and conveniently with ergonomic joysticks by the smart NOXProp+. Easily retrofittable for each excavator.

Features are the individual function setting and the easy menu navigation thanks to the corresponding touchscreen. Integrated GPS, LTE, Bluetooth and WiFi link your machine with the digital workplace.



BG-MODULE CONNECTOR



STANDARD-JOYSTICK
FRONT

Joysticks

The L8 is the multifunctional ergonomic joystick grip that has set a new standard with its innovative, functional design. You can control two roller functions simultaneously with your thumb and index finger. Up to three rollers can be installed, two for the thumb and one for the index finger. On the grip there is room for up to nine buttons, meaning that most functions can be gathered in a small area. (Joysticks must be replaced when CSP - NOXProp+ or NOXProp is installed.)

OPTIONALLY EXTENDABLE:



F-N-R
JOYSTICK OPTION



ADDITIONAL PROP
JOYSTICK OPTION



ADDITIONAL PROP &
F-N-R
JOYSTICK OPTION



STANDARD-JOYSTICK
BACK

DF04

CONTROL SYSTEM

The DF04 control system requires 2 double-acting hydraulic circuits. Only two functions, e.g. rotation and tilting, can be realized simultaneously. In order to control the attachment or the quick coupler, one of the two hydraulic circuits is separated by a switch valve, installed on the NOX Tiltrotator. Therefore, up to two extra functions, e.g. quick coupler, can be realized.

MACHINE REQUIREMENTS FOR DF04

- Hydraulic rotation circuit to control the NOX rotation
- Hydraulic circuit with high flow controls tilt, additional functions and quick coupler
- Control system for switch between tilt, additional functions and quick coupler
- One free ON/OFF button at existing joysticks to control the switch between the different functions



DF04 CONTROL UNIT

DF06

CONTROL SYSTEM

The DF06 control system requires 2 double-acting hydraulic circuits for the rotation and tilt movement of the NOX Tiltrotator. For the use of a hydraulic quick coupler, an additional circuit is required. The tilt function can be switched by pressing a button on the joystick to the extra function controlling e.g. the opening and closing of a grab.

MACHINE REQUIREMENTS FOR DF06

- Hydraulic rotation circuit to control the NOX rotation
- Hydraulic circuit with high flow controls tilt and extra function, e.g. grab
- Control system to switch between tilt and extra function
- One free ON/OFF button at existing joysticks to control the switch between tilt and extra function
- Original joysticks remain
- No additional control required - all hydraulic circuits on the excavator
- Each function needs a double-acting hydraulic circuit

	NOXProp+	DF04	DF06	DF10
NOXGeo (GPS-ready)	✓	●	●	●
Autocalibration	✓	⊖	⊖	⊖
Angle position indication	✓	⊖	⊖	⊖
Individual operator settings	✓	⊖	⊖	⊖
Individual speed setting	✓	⊖	⊖	⊖
Touchscreen in cabin	✓	⊖	⊖	⊖
Trouble shooting on display	✓	⊖	⊖	⊖
Connectivity tools (Bluetooth, LTE, WiFi)	✓	⊖	⊖	⊖
Fully proportional control	✓	depending on machine	depending on machine	depending on machine
Changing roller position	✓	⊖	⊖	⊖
Individual tool settings	✓	⊖	⊖	⊖
Tilt, rotation & extra in same movement	✓	⊖	⊖	depending on machine
High flow attachment	●	⊖	⊖	●
Quick coupler safety sensors	●	⊖	⊖	⊖
Quick coupler control	✓	⊖	⊖	⊖
Driving/steering function	●	⊖	⊖	⊖
Fleet management	●	●	●	●
Machine assistance systems	●	⊖	⊖	⊖

DF10

DIRECT FEED SYSTEM

The DF10 control system requires at least 2 double-acting hydraulic circuits for the rotation and tilt movement of the NOX Tiltrotator. Including the lines of the quick coupler function, two other hydraulic circuits, e.g. open/close grab and open/close integrated gripper, can be connected to the NOX Tiltrotator. Furthermore, an additional drain line can be installed.

MACHINE REQUIREMENTS FOR DF10

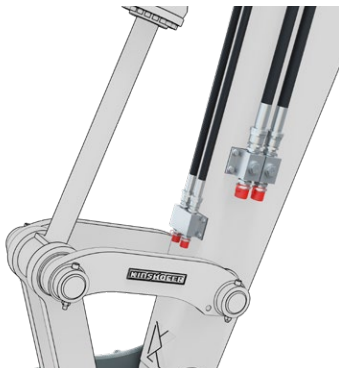
- For complete control of the NOX, 4 double-acting hydraulic circuits are required: rotation, tilt, extra function 1 and extra function 2 (gripper), one quick coupler circuit
- Special solution: division of one hydraulic circuit with a switch valve, so two different functions can be controlled by one control circuit. The switch valve has to be installed at an adequate place at the carrier machine or the NOX
- No additional control required - all hydraulic circuits on the excavator
- Original joysticks remain
- No valves or cables on the NOX required
- Each function needs a double-acting hydraulic circuit
- Minimal configuration: 2 hydraulic circuits (tilt and rotation) when mechanical quick coupler and no hydraulic attachment



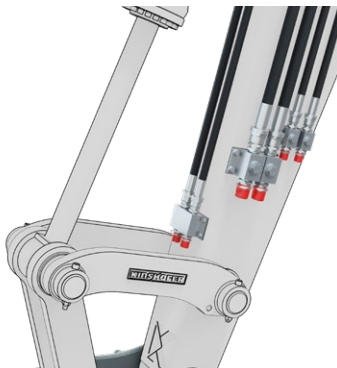
CSP-NOXProp+
HYDRAULIC LINES



DF04
HYDRAULIC LINES



DF06
HYDRAULIC LINES



DF10
HYDRAULIC LINES

DF04, DF06 & DF10 Control systems

Always the right control system depending on the machine's hydraulic configuration

The table provides a quick overview on the different functions and for which control system they are available. Short summary on machine requirements:

CSP: NOXProp+
Hammer/shear circuit

DF04
2 x proportional double-acting circuits

DF06
2 x proportional double-acting circuits (tilt and rotation)
1 x hydraulic quick coupler circuit

DF10
2 x proportional double-acting circuits (tilt and rotation)
1 x hydraulic quick coupler circuit
1 x double-acting high pressure circuit (compactor)
1 x double-acting low pressure circuit (gripper)

NOX Sensors

NOXGeo

SENSOR TECHNOLOGY

With the NOXGeo, sensors send position data to the digital control at the NOXprop+ touchscreen in the driver's cabin. Thereby, the attachments are connected to the digital technology of the excavator/machine control. The NOXGeo system also allows the functionality to interface with 2D/3D systems of all common manufacturers thanks to the open system.



GPS

INTEGRATION OF 2D/3D SYSTEMS

It is possible to integrate various makes of GPS into the NOX control system. Thanks to the GPS you can use the excavator to collect and define points. Connect the computer of the machine via the integrated GSM-modem to get fast support and transfer data. With our 3D-system you can take the last step towards machine control.

Leica
Geosystems

Trimble

MOBA
MOBILE AUTOMATION

TOPCON

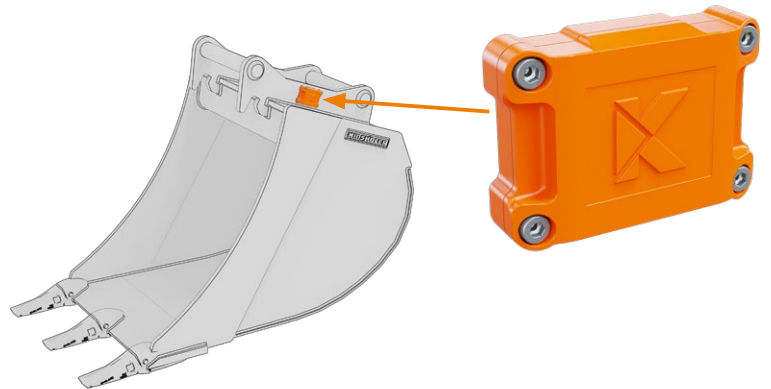
Dig



SYSTEM:

SMARTTAG

The SmartTag is a microcontrol-based tool with a communication functionality via mobile radio and an internal storage to locally back up operating information, error information, etc. The unit only measures 15 cm, it is waterproof, shock resistant, thermo-stable from -25 up to 80 °C, shockproof and has an internal energy supply for approx. 2 years.



NETWORKING:

DATA EXCHANGE

The tool management system consists of a SmartTag at the attachment as well as its interconnection with the terminal and/or cloud. The SmartTag measures vibrations and positions of the attachment. This information is directly transferred to the cloud via LTE and is thus independent from the machine. From there, the data can be read with every terminal device. The way, frequency and send release of the data exchange can be set individually.



2G, LTE / WIFI

2G, LTE / WIFI

BLUETOOTH



TILT SENSOR TILT MOVEMENT



The exact position of the tiltrotator's tilt movement and the attachment is transferred directly to the control display in the driver's cabin by means of the tilt sensor.

ROTATION SENSOR ROTATION MOVEMENT



The KINSHOFER rotation sensor shows the exact position of the tiltrotator and the attachment during rotation. The determined data is transferred directly to the control display in the driver's cabin.

SMARTTAG FUNCTIONS

GPS-TRACKING

The function GPS-tracking is used to detect the location of an attachment by entitled persons.

DIGITAL TYPE PLATE

The digital type plate provides the identical data as does the mechanical type plate like serial number, name and weight, as well as operating pressure.

PREVENTIVE MAINTENANCE

This function is used for issuing a service recommendation in which a preventive service for the respective attachment will be recommended in order to prevent downtimes.

FLEET MANAGEMENT CONNECTION

ACCELERATION MEASUREMENT

This function of the three-axle acceleration sensors is the detection of the attachment's position as well as of shock values.

BLUETOOTH-CONNECTIVITY for tool recognition.

THEFT PROTECTION

This function shall be used to find an attachment by locating.

WORKING HOURS

Especially important for rental companies - working hours can be recorded and reported.

NOXGeo *Sensor technology*

By means of the sensors, the manual staking out of the work area by a person is reduced, as the precise dimensioning is shown on the display in the driver's cabin. The controlled and exact excavation of the required amount results in large time savings and reduced fuel consumption. Furthermore, the attachments and the carrier wear less.

KINSHOFER equips the NOX Tiltrotator with the rotation sensor, the tilt sensor comes from the 2D/3D system provider. In combination with certain excavator systems and makes, the NOXGeo system allows for an auto-turning function.

SmartTag *Tooltracker*

The SmartTag and the cloud-based tool management support the driver and operator with the efficient choice and detection of suitable tools for each special task. Operators have their complete fleet under control and thus avoid downtimes and maximize their tool workload.

The SmartTag combines two up to now separated functions in one sensor: tool detection and tracking. As digital type plate, the tool tracker files information on geometries, name, manufacturer, year, ID and operation (e.g. required operating pressure of attachment). At the same time, it gathers, analyzes and detects operating hours, cycles and work processes. Thanks to GPS position and timestamp, you receive data like when and where an attachment had been put down and how it had been used.



Fennex Industrial is a New Zealand-owned company providing high-performance attachments and equipment for the civil construction, infrastructure, demolition, forestry and roading industries. Trusted nationwide by contractors, councils, and construction crews, we deliver durable, productivity-boosting solutions backed by expert service and technical support. Built for tough environments and designed to work smarter, Fennex helps teams get more done with less effort.

Turning power into progress.

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