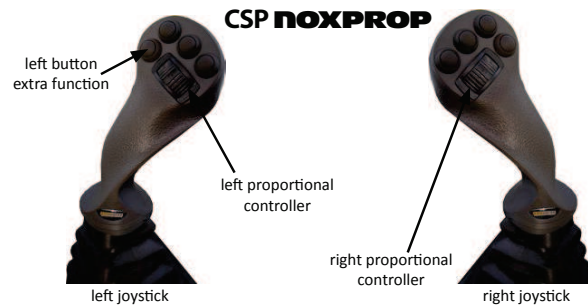


## Proportional Control Systems

Operators can now control the actions of their **NOX-Tiltrotator** with two joysticks. Quick Coupler and attached tools are also operated comfortably and effectively by means of the smart **NOXPROP** Control System: tilt and rotation are controlled by proportional solenoid valves and can be run simultaneously. The extra function is controlled proportionally, too. A separate display module is included. The system has been engineered by VEMCON, a partner of **KINSHOFER**, to facilitate the control of the ten valves.



### Control Systems for NOX Tiltrotators

| Type               | Description                                                                                                                                                                                                                                                                                                                             |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CSP NOXPROP</b> | Tilt, rotation, extra function proportional; choice of tool or profile via display; configuration via laptop or smartphone                                                                                                                                                                                                              |
| <b>DF10</b>        | All functions are controlled by the excavator directly; max. 5 double acting circles can be connected; 2 extra functions + quick hitch (6-port swivel)                                                                                                                                                                                  |
| <b>DF8</b>         | All functions are controlled by the excavator directly; max. 4 double acting circles can be connected; 1 extra function + quick hitch (4-port swivel)                                                                                                                                                                                   |
| <b>DF4</b>         | 2 double acting circles required. Circle 1 controls rotation, circle 2 manages tilt, extra function plus quick coupler. The change between the functions is controlled by an integrated solenoid valve. A free ON/OFF button at the joystick is required. The quick coupler is controlled by a security switch on the instrument board. |
| <b>CSP SVAB</b>    | Tilt, rotation proportional; extra function ON/OFF; limited choice of profiles via display; configuration only by controller                                                                                                                                                                                                            |
| <b>CSS</b>         | All functions ON/OFF; no choice of profile possible; control via ON/OFF-buttons                                                                                                                                                                                                                                                         |

| Functions                                   | CSP NOXPROP     | DF10        | DF8      | DF4        | CSP SVAB        | CSS        |
|---------------------------------------------|-----------------|-------------|----------|------------|-----------------|------------|
| Hydraulic circuit needed <sup>1)</sup>      | 1s              | 2d - 4d     | 2d - 3d  | 2d         | 1s              | 1s         |
| Quick coupler hydraulics <sup>2)</sup>      | integrated      | required    | required | integrated | integrated      | integrated |
| Control valves in excavator                 | NO              | YES         | YES      | NO         | NO              | NO         |
| Functions tiltrotator                       | T+R+E+C         | T+R+E(x2)+C | T+R+E+C  | R / T+E+C  | T+R+E+C         | T+R+E+C    |
| Control valves in tiltrotator <sup>3)</sup> | YES             | NO          | NO       | YES        | YES             | YES        |
| Number of extra functions                   | 1 / 2           | 2           | 1        | 1          | 1               | 2          |
| Adapted to TR06NOX                          | ✓ <sup>4)</sup> | ✓           | ✓        | ✓          | ✓ <sup>5)</sup> | ✓          |
| Adapted to TR10NOX                          | ✓ <sup>5)</sup> | ✓           | ✓        | ✓          | ✓ <sup>5)</sup> | ✓          |
| Adapted to TR18NOX                          | ✓ <sup>5)</sup> | ✓           | ✓        | ✓          | ✓ <sup>5)</sup> | ✓          |
| Adapted to TR25NOX                          | ✓ <sup>4)</sup> | ✓           | ✓        | ✓          | ✓ <sup>5)</sup> | ✗          |

#### Description:

**1s** One single acting hydraulic circuit (hammer line)

**2d** Two double acting hydraulic circuits are available in the machine (high pressure as well as high flow) and functions can be controlled proportional or ON/OFF depending on the machine

**3d** Three (or two) double acting hydraulic circuits are available in the machine (high pressure as well as high flow) and functions can be controlled proportional or ON/OFF depending on the machine

**T+R+E+C** Tilt, rotation, extra function, hydraulic quick coupler

**T+R+E(x2)+C** Tilt, rotation, 2 x extra function, hydraulic quick coupler

**R / T+E+C** Circle 1 controls the rotation, circle 2 manages tilt, extra function, hydraulic quick coupler

<sup>1)</sup> Free return line must be available or must be installed for tiltrotator

<sup>2)</sup> Most quick couplers need a double acting hydraulic circuit. Please always specify LQC model and hydraulics before choosing controlling system

<sup>3)</sup> Only with CSP and CSS control systems all functions will be controlled by directional valves in the tiltrotator. All other DF control systems must have 6/2 directional valves in order to split circuits. 6/2 directional valves are not included in the prices. Also 2/2 directional valve to operate a hydraulic LQC must be installed on the machine and is not included in the price.

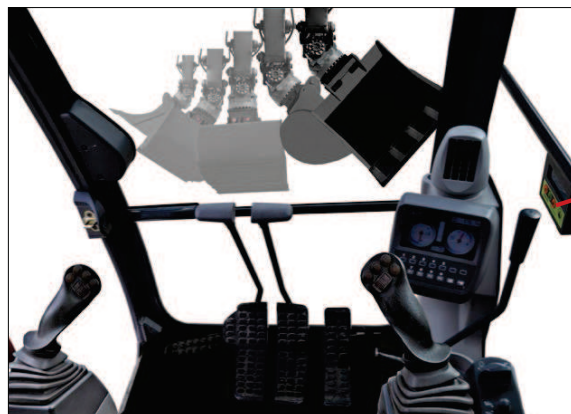
<sup>4)</sup> 2 extra functions possible

<sup>5)</sup> 1 extra functions possible

**Note:** 1. Mechanical LQC can be used with all control systems

2. Hydraulic upper quick coupler must be controlled separately and not by the standard control system

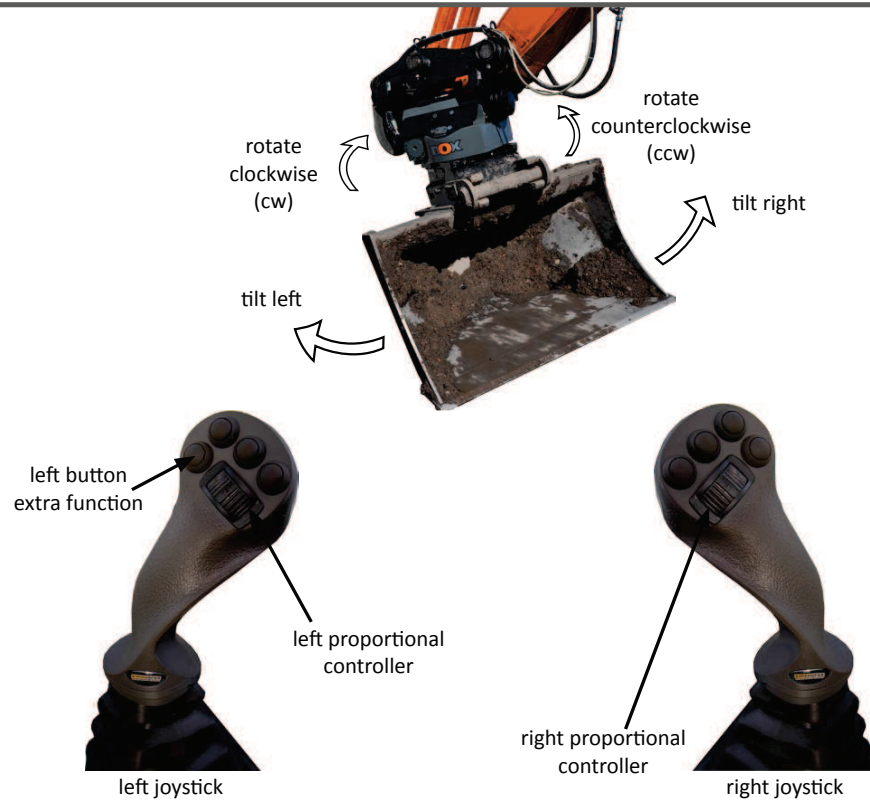
### Pictures



## Proportional Control System

**CSP NOXPROP**

Operators can now control the actions of their **nox** Tiltrotator with two joysticks. Quick Coupler and attached tools are also operated comfortably and effectively by means of the smart **NOXPROP** Control System: Tilt and rotation are controlled by proportional solenoid valves and can be run simultaneously. The extra function is controlled proportionally, too. A separate display module is included. The system has been engineered by VEMCON a partner of **KINSHOFER** to facilitate the control of ten valves.



### Advantages



#### **nox-Control Unit:**

- Optimized for **nox**
- Can control other tiltrotators
- 10 different user profiles possible



#### **Display:**

- High brightness display
- Legible in direct sunlight
- Easy change between different profiles
- Locking / unlocking of quick coupler



#### **Joysticks:**

- Mounted as standard



#### **Configurable with Laptop or Smartphone and KINSHOFER-App\*:**

- Configuration software
- Easy user interface
- Fast and easy to set up different profiles

\* available 3<sup>rd</sup> quarter 2014

#### **Optional Driving Function:**

- Wheel or track control



#### **2 Extra Functions:**

- Proportionally controlled

#### **Gripper:**

- Proportionally controlled

#### **Joystick-Options:**

- Rotating adapter for joysticks
- Original proportional joysticks of the excavator can be used

#### **Controllability of nox:**

- All parameters of **nox** can be adjusted individually