

ENGINEERING
TOMORROW

Danfoss

Danfoss steering systems

Steering towards a **competitive difference**

50 years
of steering
innovation

meeting tomorrow's
need for safe, high-
performing machines

powersolutions.danfoss.com

Steering solutions that save you time and money

There's a lot to think about when choosing the best steering system for your mobile machinery. From high speed and precision to low noise and impeccable safety, all your needs must be converted into a dependable solution with a clear competitive edge.

At Danfoss, we do some of the thinking for you. After 50 years in the steering business, we know how to anticipate your needs in innovative mobile steering solutions. Regardless of whether you build machines for agriculture, construction or material handling, our systems can help you save time and money.

Great steering performances are fundamental to maximum productivity and operator comfort in the field. Systems should be responsive to the touch and capable of a smooth turn, even in a tight corner. Depending on the task, you may benefit from auto-guidance to keep your machine on the right track.

We tailor our steering systems to your application, making them as compact as possible so they fit neatly on your machine. Robust, high-quality components are used throughout, giving the lowest possible lifecycle cost. From the smallest hydraulic unit to the most sophisticated electrohydraulic steering solution, our portfolio can fulfill almost every specification.

This is what has made us a global market leader.

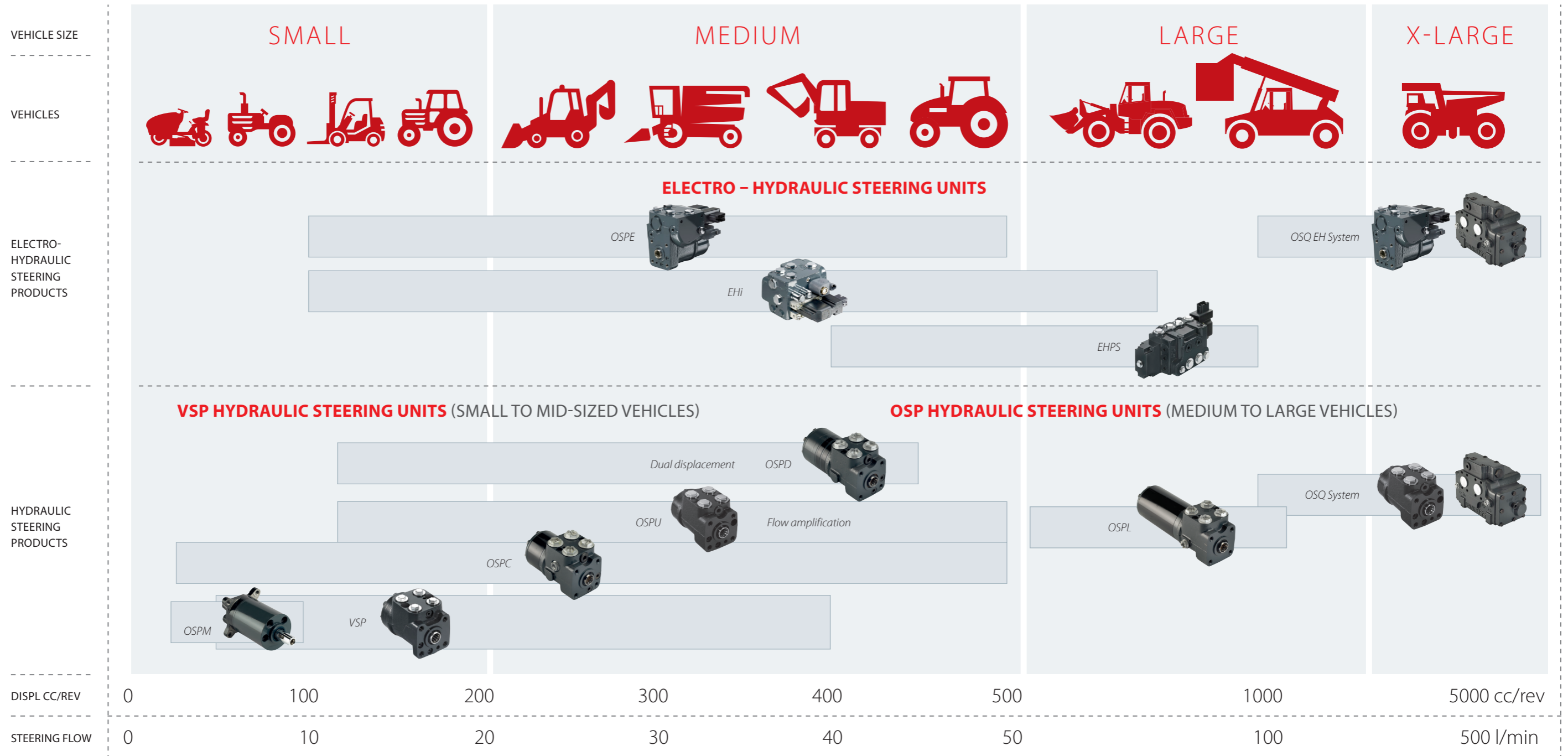
Engineering tomorrow's mobile steering solutions – for 50 years

- » Customized steering systems for individual applications
- » Highest steering performance and feature availability
- » Top productivity and operator satisfaction
- » Market-leading quality components for minimum lifecycle costs
- » Accurate deliveries with a short lead time
- » Worldwide product and application support

Customized
to save
you time
and cost



TECHNOLOGY LADDER



Comfort, reliability and cost efficiency – agile steering for all your machines

Proven OSP technology

Our steering innovation all started with hydraulic units for light and efficient maneuverability. Today, OEMs around the world know our OSP technology for precise, consistent steering, low noise and high cost efficiency over its lifecycle.

Options such as load-sensing flow amplification mean even the largest vehicles can be manually steered with minimum operator effort. Should a fault arise, that gives the best-in-class emergency steering.

The light and proficient VSP

Sometimes a high-quality steering performance can be achieved with less. Our VSP series for low horsepower applications meets this need – combining the best of OSP in a lightweight, low maintenance package.

Available with a range of options, VSP steering units are accompanied by our usual high level of support, reducing your engineering time and speeding up your time to market.

VSP hydraulic steering units (small to mid-sized vehicles)

- » Medium pressure: 170-190 bar
- » Displacement: 50-400 cm³/rev 3.05-24.41 in³/rev
- » Applications include low to medium horsepower tractors, forklifts and backhoe loaders

OSP hydraulic steering units (medium to large vehicles)

- » High pressure: 210-240 bar
- » Displacement: 40-1200 cm³/rev 2.44-73.23 in³/rev
- » Applications include: tractors, forklifts, backhoe loaders, wheel loaders and road rollers

Electrohydraulic steering units (medium to large vehicles)

- » High pressure: 210-250 (280) bar
- » Displacement 50-1000 cm³/rev 3.05-61.02 in³/rev
- » EH-steering flow: 10-100 (400 w. Flow amplifier) l/min
- » Integrated steering and safety controller designed to SIL 2 and agricultural performance level (AgPI) d
- » Applications include: auto-steering systems for large tractors, combines and sprayers; joystick and mini-wheel steering for construction and road-building machines, including wheel loaders, road rollers and motor graders

Accuracy, speed and functional safety

– keeping you on top of international standards

Intelligent steering control

Demands for faster machines and greater performance accuracy have driven the call for improved vehicle handling and intelligent steering control. To meet that need, we developed our OSPE electrohydraulic steering system, integrating our OSP steering technology with an electrohydraulic valve.

The OSPE is a steering system custom-built to give you improved vehicle stability at high speeds and an automotive feel. Used with our PVED-CLS electronic steering and safety controller, the OSPE offers fully integrated safety functionality certified to safety integrity level (SIL) 2.

Compact machine designs can mean, however, that the OSPE is not a viable choice, simply due to lack of space. Instead, you can choose our EHI inline valve, an advanced and easily configurable space-saver that also works with the PVED-CLS. The EHI meets the safety requirements of agricultural performance level (AgPI) d.

Because our electrohydraulic steering components are compatible with leading GPS suppliers, we can support you with auto-guided steering systems. Top-of-the-range agricultural machinery has set new standards for precision as a result – giving higher yields at every harvest.

With our EHPS steering valve, you'll find even the largest articulated vehicles become smooth and easy to steer. Machine performance and operator comfort have never been so good.

Technology with built-in safety

Fail-safe steering is a critical requirement on mobile machines. We have made it easy for you to fulfill it by integrating safety functionality in the design of our intelligent steering units.

Today, functional safety is the subject of extensive government legislation and industry standards. EU Machinery Directive 2006/42/EC, for example, requires that all OEMS carry out a comprehensive hazard and risk analysis in line with standards such as ISO 13849 and ISO 25119 (EN16590).

Our steering technology meets your needs for safety and performance, giving you the extra competitive advantage of a shorter time to market. You can also call on us for training and support when conducting hazard and risk assessments of vehicle functions.



Certified
to meet
your safety
needs

About Danfoss Power Solutions

Danfoss Power Solutions is a global manufacturer and supplier of high-quality hydraulic and electronic components. We specialize in providing state-of-the-art technology and solutions that excel in the harsh operating conditions of the mobile off-highway market. Building on our extensive applications expertise, we work closely with you to ensure exceptional performance for a broad range of off-highway vehicles. We help OEMs around the world speed up system development, reduce costs and bring vehicles to market faster.

Danfoss Power Solutions – your strongest partner in mobile hydraulics.

Products we offer:

- Bent Axis Motors
- Closed Circuit Axial Piston Pumps and Motors
- Displays
- Electrohydraulic Power Steering
- Electrohydraulics
- Hydraulic Power Steering
- Integrated Systems
- Joysticks and Control Handles
- Microcontrollers and Software
- Open Circuit Axial Piston Pumps
- Orbital Motors
- PLUS+1® GUIDE
- Proportional Valves
- Sensors
- Steering
- Transit Mixer Drives

Wherever off-highway vehicles are at work, so is Danfoss Power Solutions. We offer you expert worldwide support for ensuring the best possible solutions for outstanding performance. And with an extensive network of Global Service Partners, we also provide you with comprehensive global service for all of our components.

Go to www.powersolutions.danfoss.com for further product information.

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