Data Sheet
OSPM EFU

Chapter 1

OSPM Description

Characteristically fully hydraulic steering systems do not rely on a mechanical link between the steering wheel and the wheels on the ground. This is a major advantage for the vehicle designer and is probably one of the main drivers for the widespread success of fully hydraulic steering systems.

However, the absence of a mechanical link leads to a loss of positional relationship between the steering wheel and the wheels on the ground. The relationship between the rotational position of the steering wheel and the driving direction of the vehicle may vary. This is a traditional short coming of fully hydraulic steering systems, and is well understood in the industry.

EFU represents a means to establish a fixed relationship between rotational position of the steering wheel and the driving direction of the vehicle, with fully hydraulic steering systems. EFU is designed to provide very high positional accuracy while at the same time maintaining smooth and unobtrusive operation with no unwanted side effects for the driver.

EFU is patented technology.

Chapter 2

OSPM Features

EFU provides a number of advantages:

- Keeps steering wheel aligned with tires
  - Improved driver comfort and efficiency
  - Improved intuitive steering control
  - Knob stays in same position
  - Steering wheel logo stays correct
  - Allows special steering wheel design
- Smooth operation
  - Seamless and transparent for the driver
  - No comfort trade-offs
- Fast and accurate
  - Generous compensation capacity means fast and accurate performance
  - No safety trade-offs
- Open center and load sensing models
  - OSPM ON-EFU
  - OSPM LS-EFU

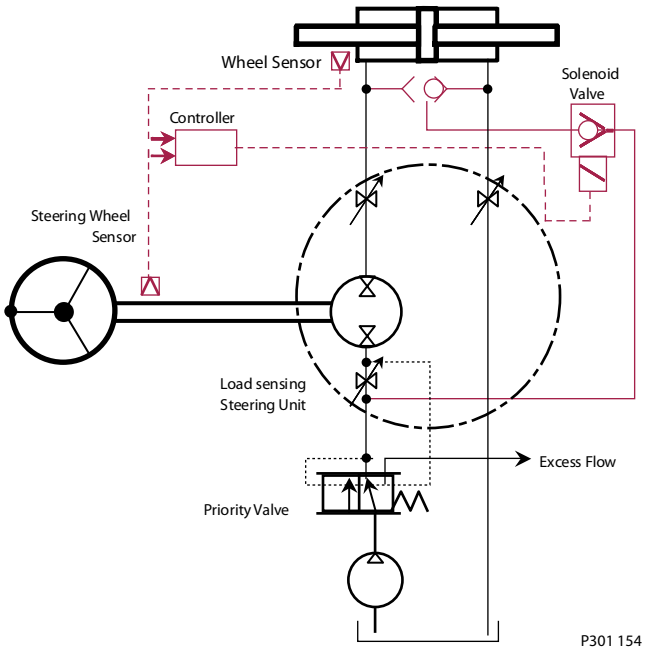
Chapter
3

OSPM Detailed description

What really matters is inside – So what is inside EFU?

An EFU system is comprised of several individual components:

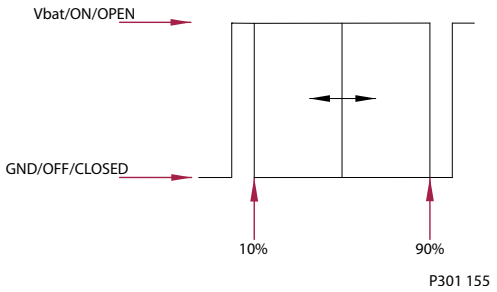
1. EFU type steering unit with solenoid valve
2. Steering wheel position sensor
3. Ground wheel position sensor*
4. Micro controller unit*



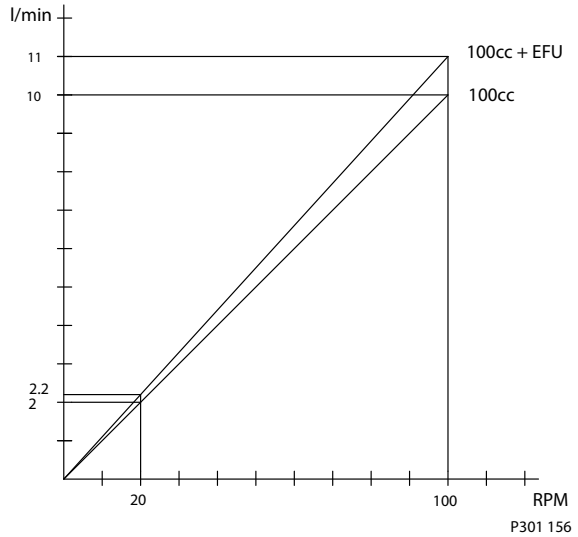
The controller will monitor ground wheel position as well as steering wheel position, and determine if correction is required. If so a suitable compensation is calculated, adapted to steering wheel direction and scaled to steering wheel speed. An appropriate signal is then fed to the solenoid valve to achieve compensation.

By means of Pulse Width Modulation (PWM) the solenoid valve provides quasi-proportional flow control. This allows a smooth and appropriately scaled compensation oil volume to be added to the steering unit oil flow.

* OEM supplied parts



Suitable compensation is calculated and scaled according to steering wheel speed.



The result is that EFU compensation is always appropriately scaled to steering wheel speed. The operator will never notice any sudden noises or uncomfortable changes in perceived displacement.

OSPM EFU

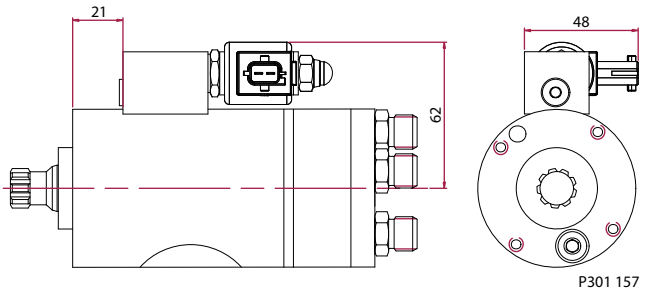


Table 1: Specifications

Ports	UNF ORFS; UNF flare; G1/4” 30° flare
Displacement	32cc to 100cc
Pressure	125 bar
Coil	12V/0.36A; 24V/0.18A
Coil connector	AMP JT

Coil drive	PWM 10% - 90% @ 40Hz