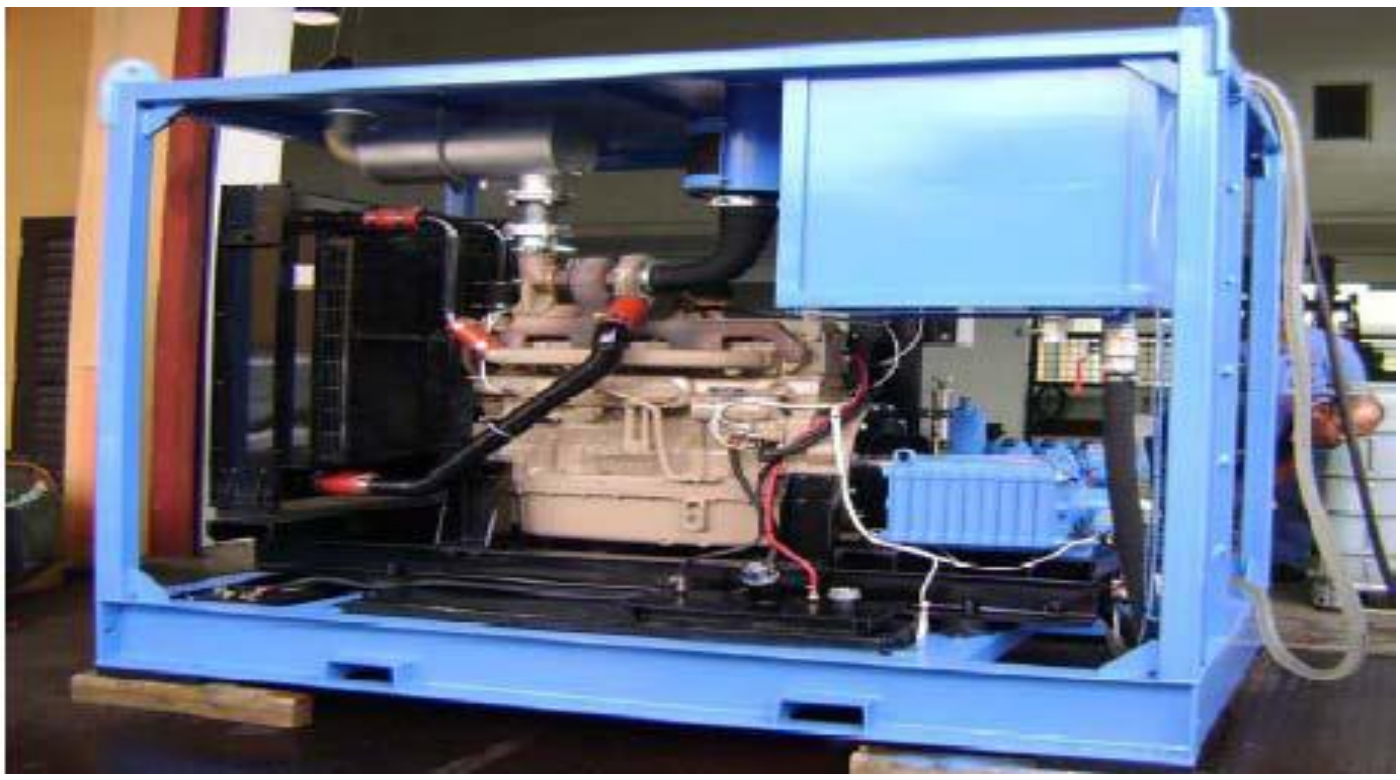


WOMA PUMP

WOMA DIESEL HIGH PRESSURE WATER BLASTER PUMP SPECIFICATIONS	
Pump	Manufacturer – WOMA Apparatebau GmbH
Model	WOMA 2502 P40
Pump Maximum operating pressure(psig/barg)	7250 (500)
Pump Maximum volumetric flow rate(ltr/min)	130 @ 504 rpm
Engine Manufacturer	Johndeere
Engine model	Powertech 8.1L 6081 OEM Diesel Engine
Engine Drive	160kW 6 cylinder; 1800rpm radiator water cooled
Engine stroke	95mm(3.74ins)
Engine Crankshaft	504RPM VIA INBUILT REDUCTION GEAR RATIO OF 3.57
Skid frame	2600 x 1600 x 2200mm x 3.5MT
No of units	1

OCS owned Woma pump is skid mounted pumping unit, which is used for hydro static testing of subsea pipelines. Woma pump is a high pressure pump with a maximum operating pressure of 7000psi (500bar). This pump is a normally used for hydrostatic testing of long and larger diameter pipelines where high volumetric flow rate is required.

The power train used for this pump skids is a Johndeere Powertech 8.1L 6081 OEM diesel engine. This engine is a 4 cycle engine with in-line application. It has 6 cylinder engine with 8.1L (494 cubic inches) displacement producing 100BHP (75kW) @1000 RPM and upto 225 BHP (168kW)@2200RPM. In order to prevent overstressing the engine is usually run at approximately 1600RPM. The fuel consumption rate varies from 6 USG/hr @1000 RPM to 19.2 USG/hr @ 2200 RPM

The fluid end used in this pumping unit is WOMA 2502 P40 pump. This pump is positive displacement pump with a maximum volumetric flow rate of 130 lit/min @ 504rpm. This pump is also ideal for cleaning pipes, tube bundles, sewer lines, tanks and containers. The modular design provides a high degree of flexibility and allows varying the output parameters by a simple exchange of the interchangeable plunger sets. The pumps are equipped with an auxiliary shaft which allows coupling of a second pump thus doubling the output. A special feature of this pump is that it can operate with inlet temperature up to 65°C with possibilities to accept up to 90°C.

The pumps skids (2600 x 1600 x 2200mm x 3.5MT) have been designed to comply with DNV criteria (DNV 2.7-3) for offshore portable equipment lifting operations. The skid status for each individual skid needs to be reviewed before each project. The aim is for all OCS offshore skids to be DNV compliant for offshore operations and before each project the status should be reviewed.

OCS has Equipment passports for individual Engines, Skids and Fluid Ends which must be reviewed before each project to assess the status. The equipment passport gives the working history, maintenance and certification history for Engines, Fluid Ends and Pump skids.

It is important to regularly review the list of critical spare parts of the equipment before each project. Common problems occur in these units during the operation include:

- *Problem with Drive coupling between Engine and Fluid End.*
- *Pump impellers and internals.*
- *Pump Seals and Bearings.*

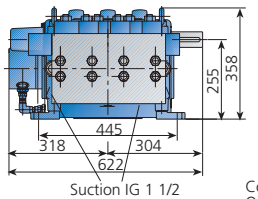
Where failures occur during operations Equipment bulletins will be issued to document the problem and the remediation solutions applied. The equipment bulletin will be circulated to all field engineers to be informed about the possible failure that can occur during the operation and thereby avoid future failure.

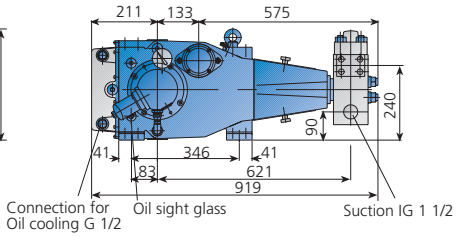
This equipment file remains a live document and will be constantly updated by the equipment department.

Technical Data

High-Pressure Plunger Pump Type 2502

All dimensions in mm
Thread "M" as per DIN 13/ISO 261
Thread "G" as per DIN ISO 228/1

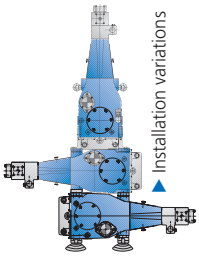


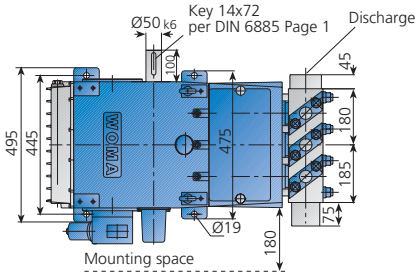


Technical Data:

- Oil capacity: approx. 8 l
- Weight: approx. 350 kg net
- Stroke: 95 mm/3.74
- Inlet pressure required*: from P 40: 2 bar/30 psi
- Rod force: 70 kN

* Depends on operating mode, crank shaft speed and water temperature

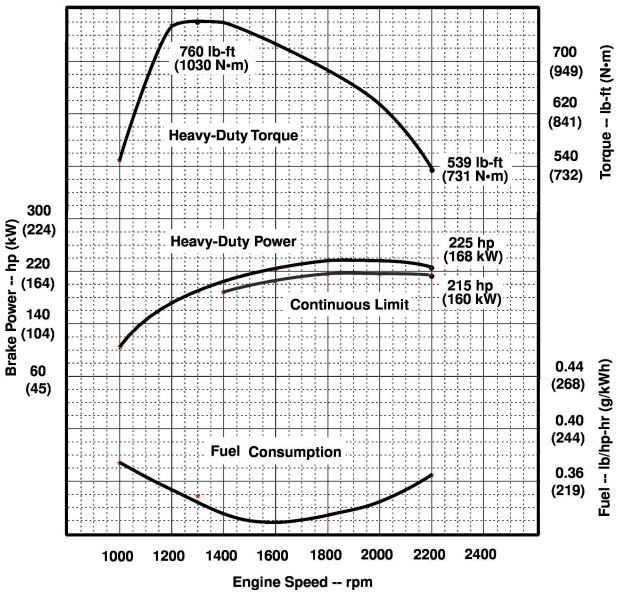




Performance Chart Pump Type 2502

Plunger-diameter (mm)	Gear ratio Pinion shaft (Rpm) 1,500	1,800	2,100	Crank shaft (Rpm)	Required drive (kW)	Nominal flow rate USG pm	IMPG pm	(l/min)	Maximum permissible operating pressure (psi/bar)
P 30			4.52	464	120	24.0	20.0	91	10,875/750
		3.57		504	130	26.2	21.8	99	
		4.52		398	103	20.6	17.2	78	
	3.04			493	127	25.4	21.1	96	
	3.57			420	108	21.7	18.0	82	
	4.52			331	85	17.2	14.3	65	
P 35			4.52	464	143	32.8	27.3	124	9,425/650
		3.57		504	155	35.4	29.5	134	
		4.52		398	122	28.0	23.3	106	
	3.04			493	152	34.9	29.0	132	
	3.57			420	129	29.6	24.6	112	
	4.52			331	102	23.2	19.4	88	
P 40			4.52	464	146	43.9	36.5	166	7,250/500
		3.57		504	158	47.6	39.6	180	
		4.52		398	125	37.5	31.2	142	
	3.04			493	155	46.5	38.7	176	
	3.57			420	132	39.6	33.0	150	
	4.52			331	104	31.2	26.0	118	
P 45			4.52	464	149	55.5	46.2	210	5,800/400
		3.57		504	162	60.2	50.2	228	
		4.52		398	128	47.6	39.6	180	
	3.04			493	159	58.9	49.1	223	
	3.57			420	135	50.2	41.8	190	
	4.52			331	106	39.6	33.0	150	

Performance curve



Performance data

Intermittent rated speed	168 kW (225 hp) @ 2200 rpm
Peak power	177 kW (237 hp) @ 2000 rpm
Peak torque	1030 N.m (760 ft-lb) @ 1300 rpm
Torque rise %	41% @ 1300 rpm

Features and benefits

Replaceable, Directed Top-Liner Cooling

- Reduces upper liner temperature by as much as 100 degrees Fahrenheit or 54 degrees Celsius
- Durable and reliable power cylinder components
- Hardened and precision machined for long life
- Rebuild to original specifications

Rugged Cast Iron Engine Block

- Deep skirted design provides added strength and reduced noise

Easy to Apply, Easy to Install

- Front and rear engine mounting pads on the side of the block facilitates installation
- Either side service for filters and service points facilitates packaging
- All connection points in common locations make it easy to install or package
- Adjustable fan drive with multiple fan ratios with automatic belt tensioner

Compact Size

- Narrow design and low profile arrangement contribute to compact packaging
- High mount or low mount turbocharger position to meet packaging requirements

World-class performance

- Excellent fuel economy and low oil consumption

Fuel System Controls

- In-line fuel injection pump with resulting in excellent fuel economy and excellent performance
- Self diagnostics and protection
- 3-5% Droop Governing
- 12V or 24V Electric Shutoff

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All values at rated speed and power with standard options unless otherwise noted. Specifications and design subject to change without notice.