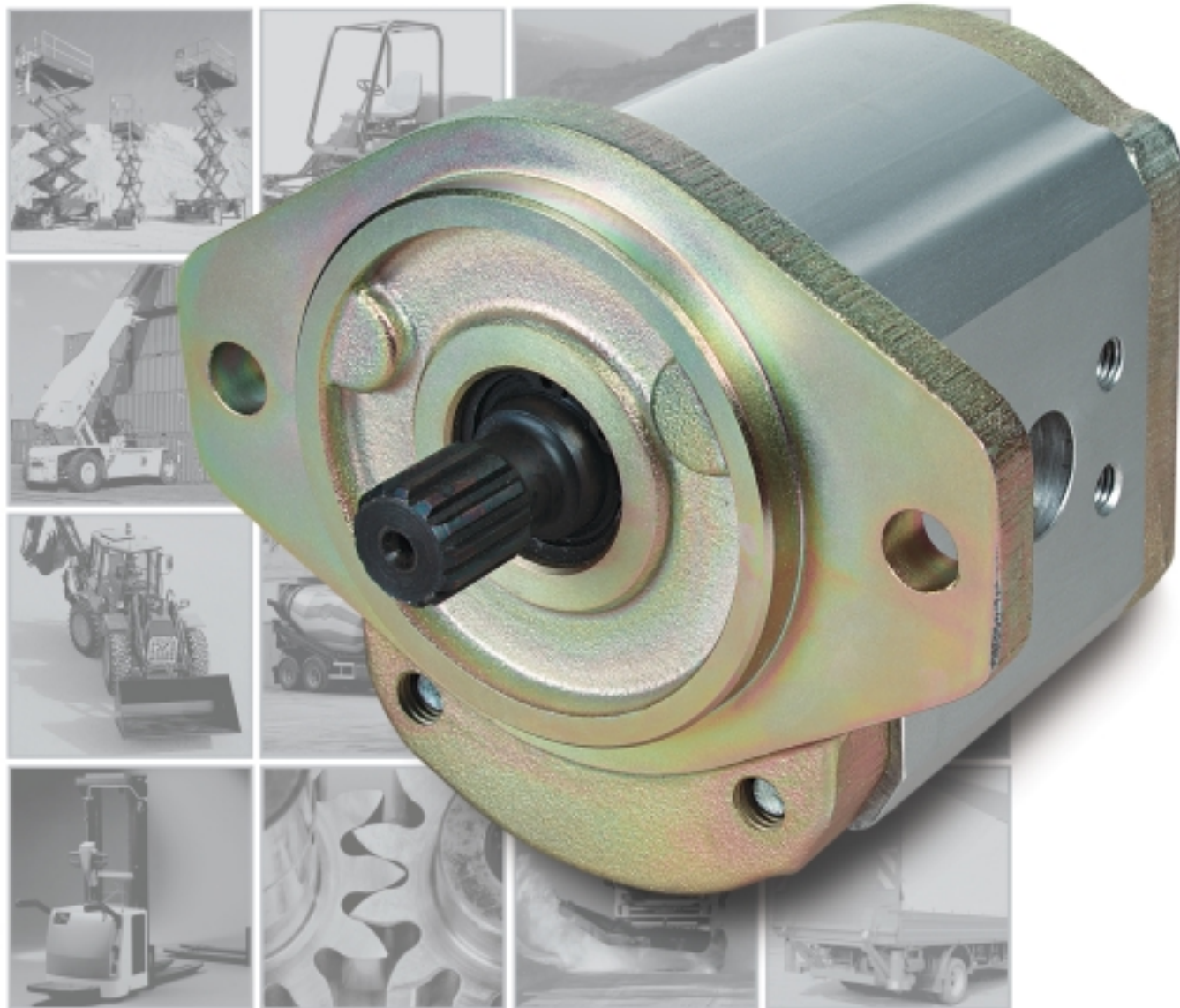


Haldex

HIGH PRESSURE GEAR PUMP W1500



HYDRAULIC SYSTEMS DIVISION

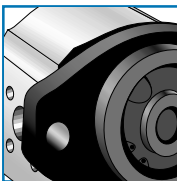
Outstanding Hydraulic Products, Service and Expertise, Worldwide



THE POWER OF THE W1500 A SERIES _____

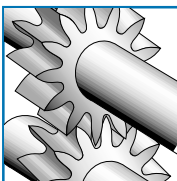
Haldex Hydraulics is one of the world's leading manufacturers of hydraulic pumps. In recent years we have focused on important markets, such as material handling and vehicles, and now the result is a series of high-performance hydraulic pumps. The W1500 series builds on the versatile technical platform represented by the W series.

W1500 High Pressure Gear Pumps are optimised for demanding work, with harsh weather conditions, rugged operations and long service intervals. The W1500 series is a range of cost-efficient group III pumps for all applications in which the customer's demands for quality and reliability are particularly high.



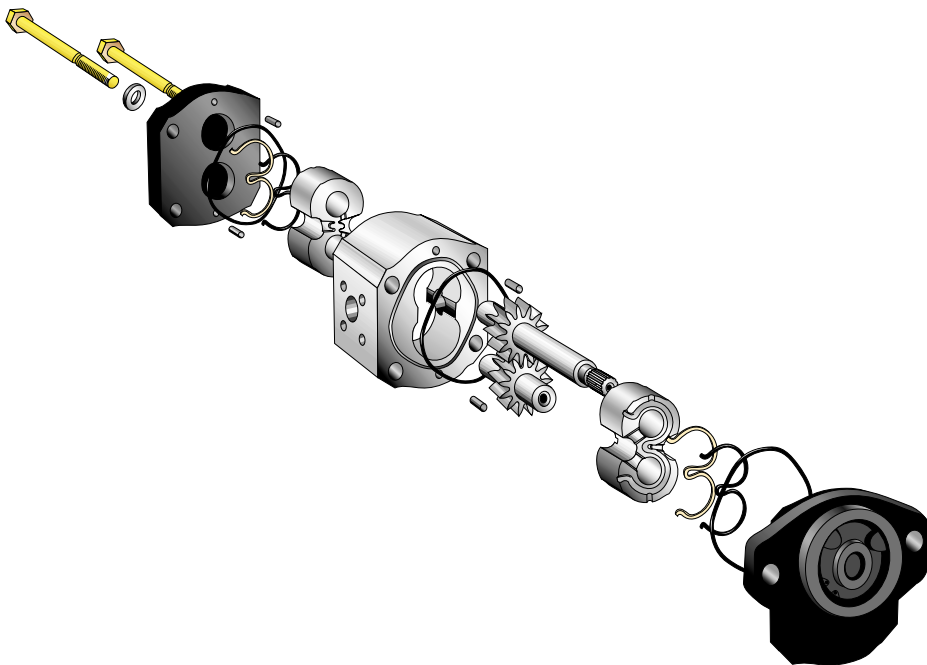
_____ **FLANGE CODE 04, 05, 14, 15** _____

4-7



_____ **MULTIPLE PUMPS AND EFFICIENCIES** _____

8-11



Model code example for a single pump

WP 15 A 1 B 190 R 04 DA 158 N N
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫

- | | |
|------------------------------|---------------------|
| ① = Type | ⑦ = Rotation |
| ② = Series | ⑧ = Mounting flange |
| ③ = Design | ⑨ = Drive shaft |
| ④ = # of sections | ⑩ = Portings |
| ⑤ = Seal material | ⑪ = Valve options |
| ⑥ = Displacement per section | ⑫ = 'N' Specials |

W1500 DESCRIPTION

The W1500 pumps come in single or multiple configuration of up to four sections. The basic pump is of a three piece modular design. Mounting flange and rear cover are of cast iron. The pump body is manufactured from high-strength aluminium alloy.

For optimum strength, gears and shafts are precision machined in one piece of steel. The 14-tooth gear geometry has been optimised for low noise level.

All shaft bearing surfaces are Teflon® coated - dimensioned and designed for long service life. They are continually cooled and lubricated by a controlled flow of fresh oil. This permits operation across a wide speed range at very high loads.

Multiple pumps in the W1500 range are very compact. The drive shaft is capable of transmitting high torque even to the rear section. Each section has its own inlet and pressure ports. Common inlet features are optional for multiple units.

A wide range of mounting flanges and port

sizes are available to meet international standards.

General data

Displacement V	19 - 50cc/rev
Speed n	500 - 3300 rpm
Pressure rated pressure p_r	up to 276 bar
intermittent pressure p_{ii}	up to 300 bar
peak pressure p_{iii}	up to 330 bar
Operating temperatures t	up to 105° C
Average volumetric efficiency	97%

The maximum values for n , p_r and t for a given pump specification may be applied simultaneously.

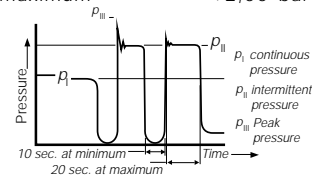
Options

- SAE mounting flange, through bolt model, rectangular flange.
- Splined, tapered or straight shaft with key, tang shaft.
- Flanged ports.
- Clockwise or anti-clockwise rotation.
- Integrated valve features.
- Common inlet for multiple units.

PERFORMANCE DATA

Operating pressure range

Inlet port: continuous, minimum -0,20 bar
 intermittent, minimum -0,35 bar
 maximum +2,00 bar



Outlet port (see tables on pages 4-7)

Product has been tested 1,000,000 cycles at p_r . Pressure p_{ii} is permitted at maxi. 20 sec loaded following 10 sec minimum unloaded. Product has been tested to 500,000 cycles at p_{iii} .

Above represents performance which can be expected from units incorporating flange port styles.

Speed range

Minimum speed for all pump sizes is $n = 500$ rpm at maximum pressure p_r .

Maximum speed for single pumps depends on the pump model in question and can be identified from tables on pages 4-7 for respective models.

Maximum speed for multiple pumps. The lowest max rpm for any of the sections will be the overall maximum speed for the complete unit.

(See pages 4-7).

Noise performance data according to DIN 45 635. Typical levels at 200 bar using mineral oil with viscosity of 40mm²/s and at temperature of 50° C at different speeds:

WP15A1-380	68dB(A) at $n = 1500$ rpm
WP15A1-380	74dB(A) at $n = 2300$ rpm
WP15A1-380	76dB(A) at $n = 3000$ rpm

Hydraulic fluids. The use of HL- or HLP-hydraulic oil according to DIN 51 524 is recommended.

The permissible viscosity for all WP1500 pumps ranges from 750 to 10 mm²/s. (The recommended operating viscosity).

The permissible cold start viscosity is 2000 mm²/s.

We recommend to contact Haldex Hydraulics before using fire resistant or bio-degradable fluids.

Temperature range

Amb. temperature,	mini. -25° C; maxi. +80° C
Fluid temperature,	continuous operation,
	maxi. +90° C
	short term operation,
	maxi. +105° C

Please note

Viscosities - when operating at above temperature, the limits have to remain within the range specified under "Hydraulic Fluids".

Fluid cleanliness

Fluid cleanliness according to ISO 4406/1986 Code 18/14 or better is required in order to assure the pump's high level of efficiency in the long term.

Drive arrangement

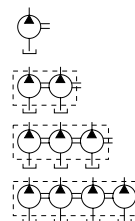
Flexible couplings are preferred for direct drives. Please contact Haldex Hydraulics for indirect drive requirements.

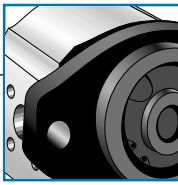
Mounting position

As required.

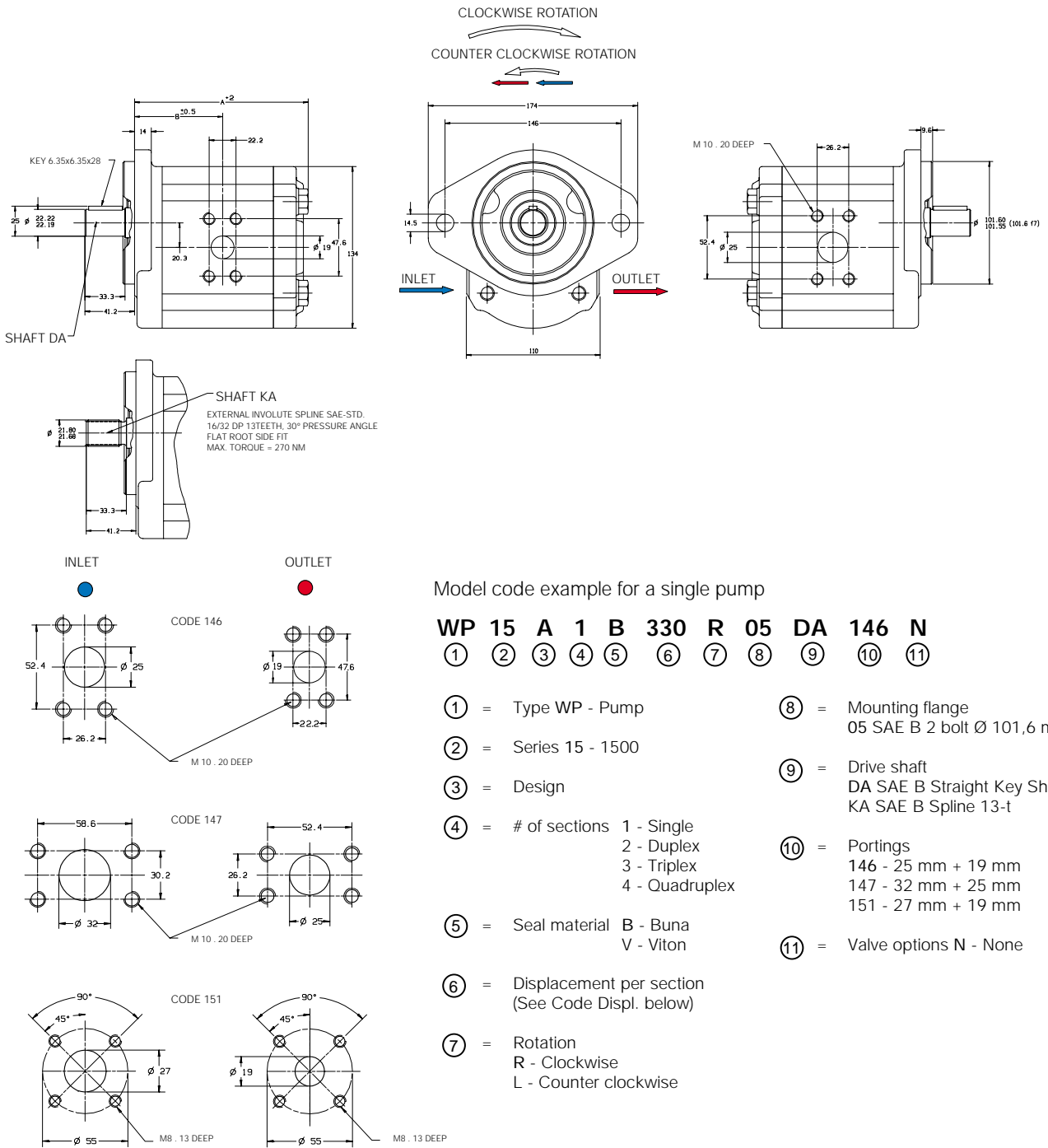
Symbol

- Single pump
- Double pump
- Triple pump
- Quadruple pump





FLANGE CODE 05 (SAE B 2-bolt)

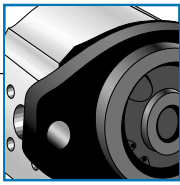


Model code example for a single pump

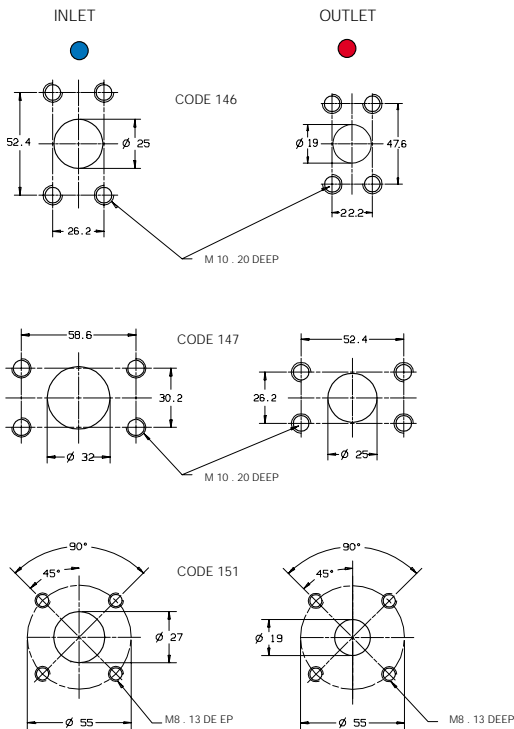
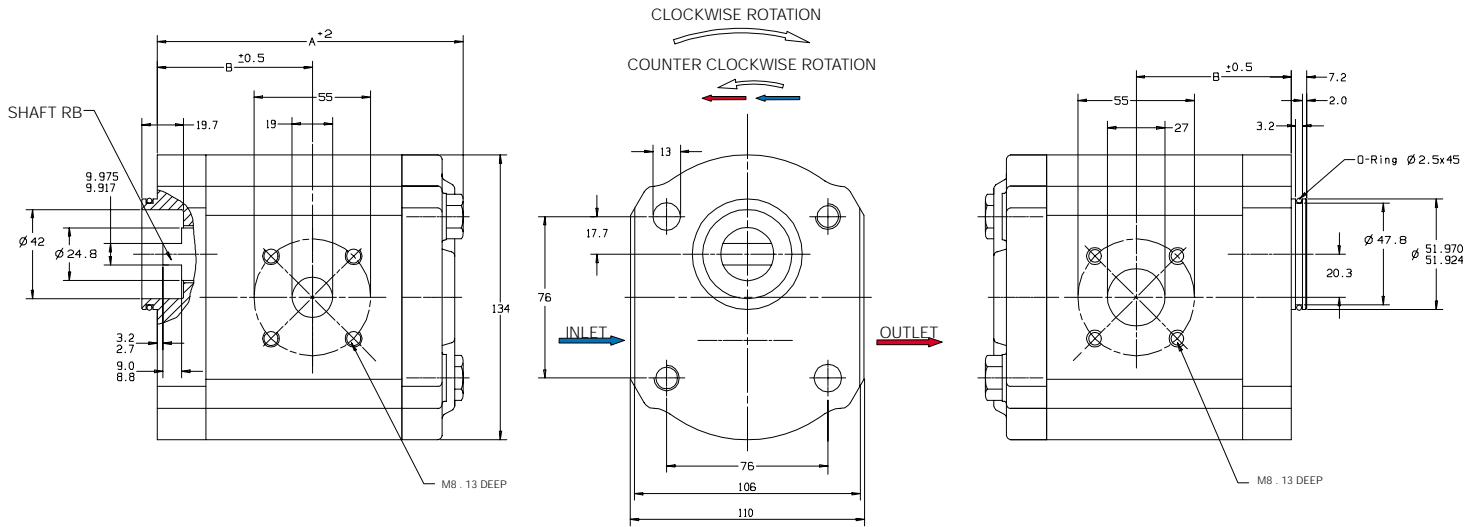
WP 15 A 1 B 330 R 05 DA 146 N
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

- ① = Type WP - Pump
- ② = Series 15 - 1500
- ③ = Design
- ④ = # of sections
 1 - Single
 2 - Duplex
 3 - Triplex
 4 - Quadruplex
- ⑤ = Seal material
 B - Buna
 V - Viton
- ⑥ = Displacement per section
 (See Code Displ. below)
- ⑦ = Rotation
 R - Clockwise
 L - Counter clockwise
- ⑧ = Mounting flange
 05 SAE B 2 bolt Ø 101,6 mm pilot
- ⑨ = Drive shaft
 DA SAE B Straight Key Shaft
 KA SAE B Spline 13-t
- ⑩ = Portings
 146 - 25 mm + 19 mm
 147 - 32 mm + 25 mm
 151 - 27 mm + 19 mm
- ⑪ = Valve options N - None

Size	Rated pressure (bar) P ₁	Maximum speed (rpm)			Dimensions		Weight (approx.) (kg)
		Port code 146	Port code 147	Port code 151	A (mm)	B (mm)	
190 - 19 cc	276	3300	-	3300	124,0	63,3	8,0
230 - 23 cc	276	3300	-	3300	128,2	65,4	8,3
280 - 28 cc	276	3100	-	3100	133,4	68,0	8,4
330 - 33 cc	276	3000	-	3000	138,6	70,6	8,6
380 - 38 cc	276	2700	3000	3000	143,8	73,2	9,0
440 - 44 cc	221	-	2800	2700	150,0	76,3	9,2
500 - 50 cc	200	-	2700	2300	156,2	79,4	9,5



FLANGE CODE 14 (Through bolt Ø 52 mm pilot without shaft seal)

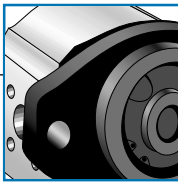


Model code example for a single pump

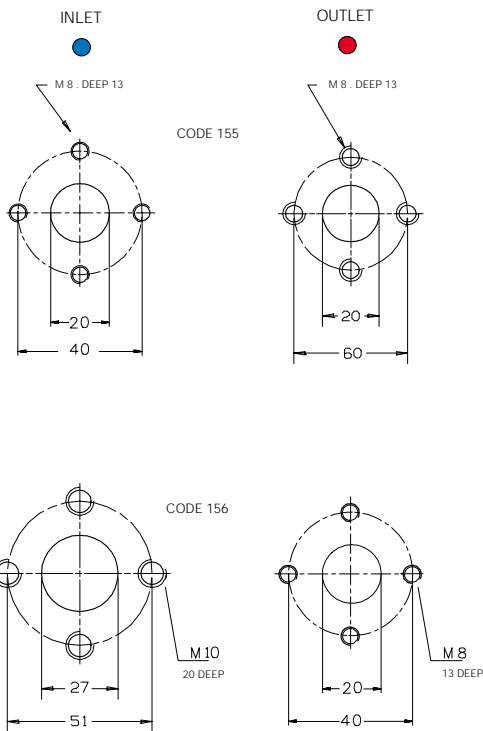
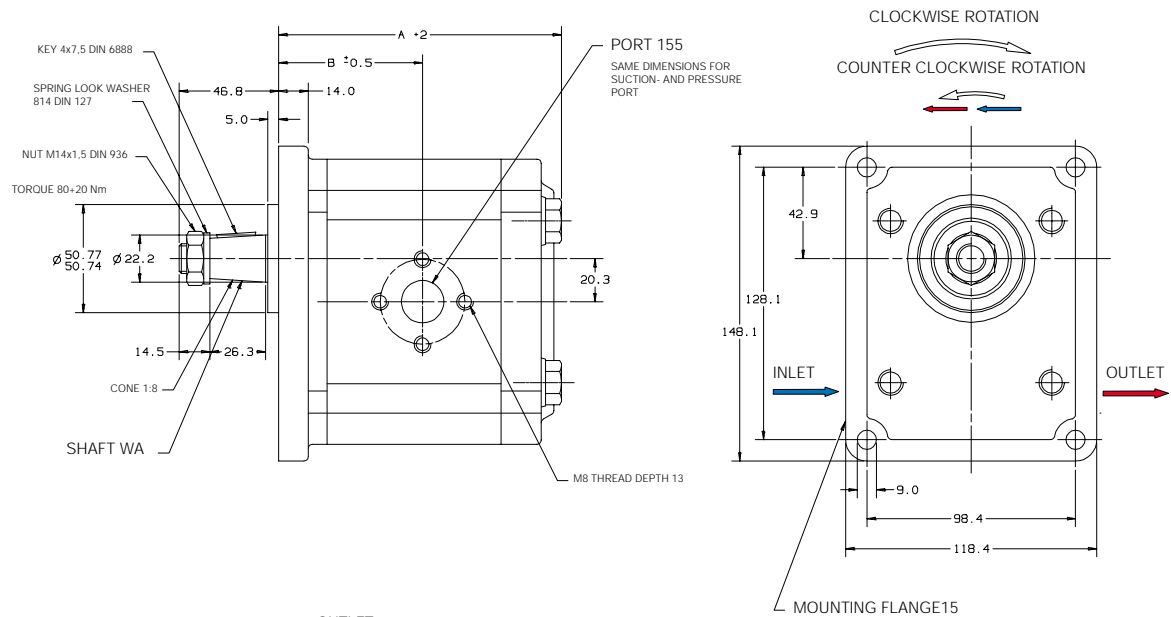
WP 15 A 1 B 330 R 14 RB 151 N
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

- ① = Type WP - Pump
- ② = Series 15 - 1500
- ③ = Design
- ④ = # of sections 1 - Single
2 - Duplex
3 - Triplex
4 - Quadruplex
- ⑤ = Seal material B - Buna
V - Viton
- ⑥ = Displacement per section
(See Code Displ. below)
- ⑦ = Rotation
R - Clockwise
L - Counter clockwise
- ⑧ = Mounting flange
14 Through-bolt Ø 52 mm pilot
- ⑨ = Drive shaft
RB Wet Tang
KA SAE B Spline 13-t
- ⑩ = Portings
146 - 25 mm + 19 mm
147 - 30,2 mm + 26,2 mm
151 - 27 mm + 19 mm
- ⑪ = Valve options N - None

Size	Rated pressure (bar) P _I		Maximum speed (rpm)			Dimensions		Weight (approx.) (kg)
	Shaft code RB	KA	Port code 146	Port code 147	Port code 151	A (mm)	B (mm)	
190-19 cc	276	276	3300	-	3300	124,0	63,3	8,0
230-23 cc	276	276	3300	-	3300	128,2	65,4	8,3
280-28 cc	260	276	3100	-	3100	133,4	68,0	8,4
330-33 cc	220	276	3000	-	3000	138,6	70,6	8,6
380-38 cc	190	276	2700	3000	3000	143,8	73,2	9,0
440-44 cc	165	221	-	2800	2700	150,0	76,3	9,2
500-50 cc	145	200	-	2700	2300	156,2	79,4	9,5



FLANGE CODE 15 (Ø 50,8 mm pilot)

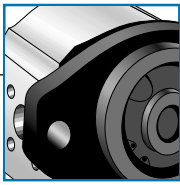


Model code example for a single pump

WP 15 A 1 B 330 R 15 WA 155 N
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

- ① = Type WP - Pump
- ② = Series 15 - 1500
- ③ = Design
- ④ = # of sections
 1 - Single
 2 - Duplex
 3 - Triplex
 4 - Quadruplex
- ⑤ = Seal material B - Buna
 V - Viton
- ⑥ = Displacement per section
 (See Code Displ. below)
- ⑦ = Rotation
 R - Clockwise
 L - Counter clockwise
- ⑧ = Mounting flange
 15 Rect. Ø 50,8 mm pilot
- ⑨ = Drive shaft
 WA Tapered 1:8, M 14 x 1,5
- ⑩ = Portings
 155 - 20 mm + 20 mm
 156 - 27 mm + 20 mm
- ⑪ = Valve options N - None

Size	Rated pressure (bar) P _I Shaft code WA	Maximum speed (rpm)		Dimensions		Weight (approx.) (kg)
		Port code 155	Port code 156	A (mm)	B (mm)	
190-19 cc	276	3300	-	124,0	63,3	8,0
230-23 cc	276	2800	-	128,2	65,4	8,3
280-28 cc	276	2300	3100	133,4	68,0	8,4
330-33 cc	276	-	3000	138,6	70,6	8,6
380-38 cc	276	-	3000	143,8	73,2	9,0
440-44 cc	221	-	2700	150,0	76,3	9,2
500-50 cc	200	-	2300	156,2	79,4	9,5



MULTIPLE PUMPS



The two following parameters are of the utmost importance when selecting multiple pumps and must never be exceeded:

- Drive shaft load index "A"
- Internal coupling load index "K"

Maxi. load index

K 10488
for double pump

$K = (p_2 \times V_2)$
for triple pump

$K = (p_2 \times V_2) + (p_3 \times V_3)$
for quadruple pump

$K = (p_2 \times V_2) + (p_3 \times V_4) + (p_4 \times V_4)$

- Maximum drive shaft load index "A", see table below
for double pump

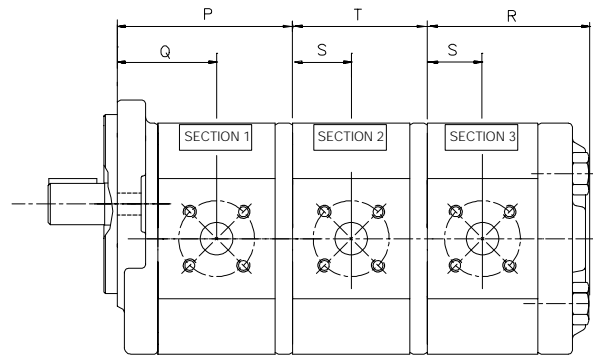
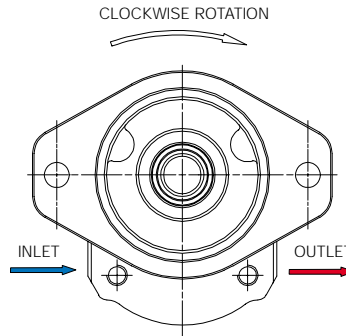
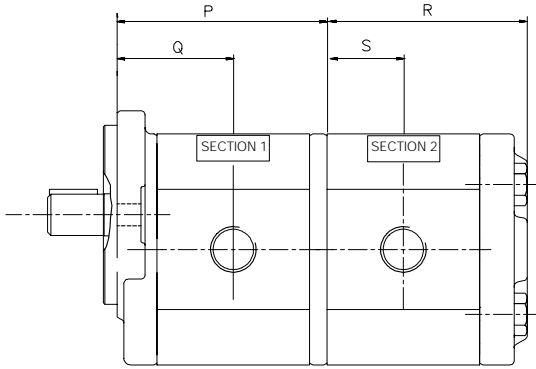
$A = (p_1 \times V_1) + (p_2 \times V_2)$
for triple pump

$A = (p_1 \times V_1) + (p_2 \times V_2) + (p_3 \times V_3)$
for quadruple pump

$A = (p_1 \times V_1) + (p_2 \times V_2) + (p_3 \times V_3) + (p_4 \times V_4)$

Drive shaft	Load index A	Drive shaft	Load index A
DA	20976	RB	7210
KA	18240	WA	20976

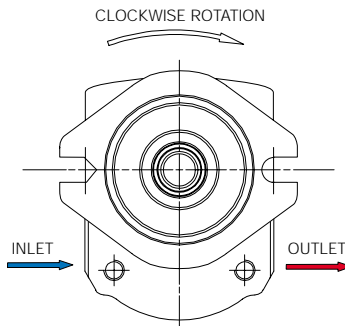
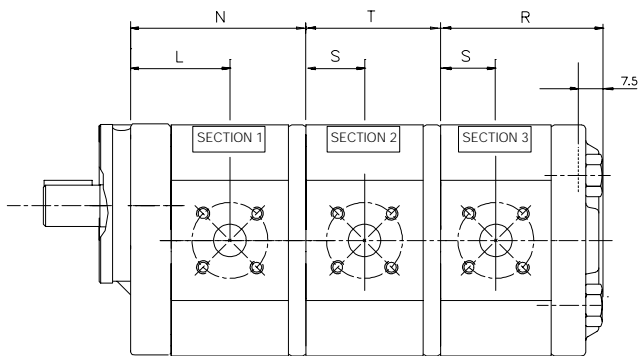
Note: p = actual pressure in bar,
V = applicable displacement in cc
from table page 4-9.



In multiple pumps, shaft end section must have largest displacement. Each consecutive section must have displacement equal to or smaller than section preceding.

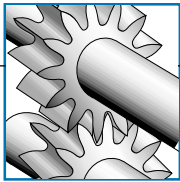
Haldex Hydraulics multiple pumps are also available with reduced number of inlets. Please contact Haldex Hydraulics for details. Please, contact Haldex Hydraulics for pump applications requiring independently sealed sections.

W1500 plus W900 pump assemblies are possible, please contact Haldex Hydraulics.



At left are shown the diverge dimensions for the SAE A flange bolt type pumps.

Size	P (mm)	Q (mm)	Shaft end section			Rear section			SAE A Flange		
			Weight (kg)	R (mm)	S (mm)	Weight (kg)	T (mm)	Weight (kg)	N (mm)	L (mm)	Weight (kg)
190 - 19 cc	105,5	63,3	7,0	104,5	40,3	5,0	82,5	4,1	131,5	89,3	7,4
230 - 23 cc	109,7	65,4	7,3	108,7	42,4	5,3	86,7	4,3	135,7	91,4	7,6
280 - 28 cc	114,9	68,0	7,5	112,9	45,0	5,5	91,9	4,6	140,9	94,0	7,9
330 - 33 cc	120,1	70,6	7,8	119,1	47,6	5,8	97,1	4,8	146,1	96,6	8,1
380 - 38 cc	125,3	73,2	8,1	124,3	50,2	6,1	102,3	5,1	151,3	95,2	8,4
440 - 44 cc	131,5	76,3	8,3	130,5	53,3	6,3	108,5	5,4	157,5	102,3	8,7
500 - 50 cc	137,7	79,4	9,1	136,7	56,4	7,1	114,7	6,2	163,7	105,4	9,5

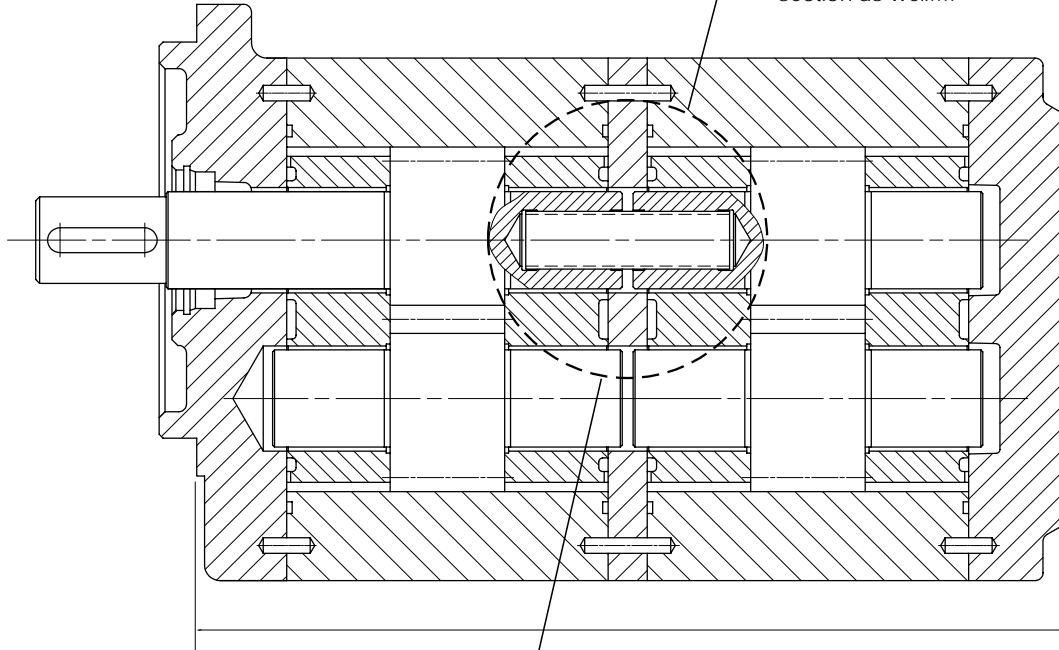


CROSS SECTION

Cross section of W1500 double pump

Common suction port for two or three pump sections is available on request.

Key design detail, to ensure high torque transmission in the 2nd, 3rd and 4th pump section as well....

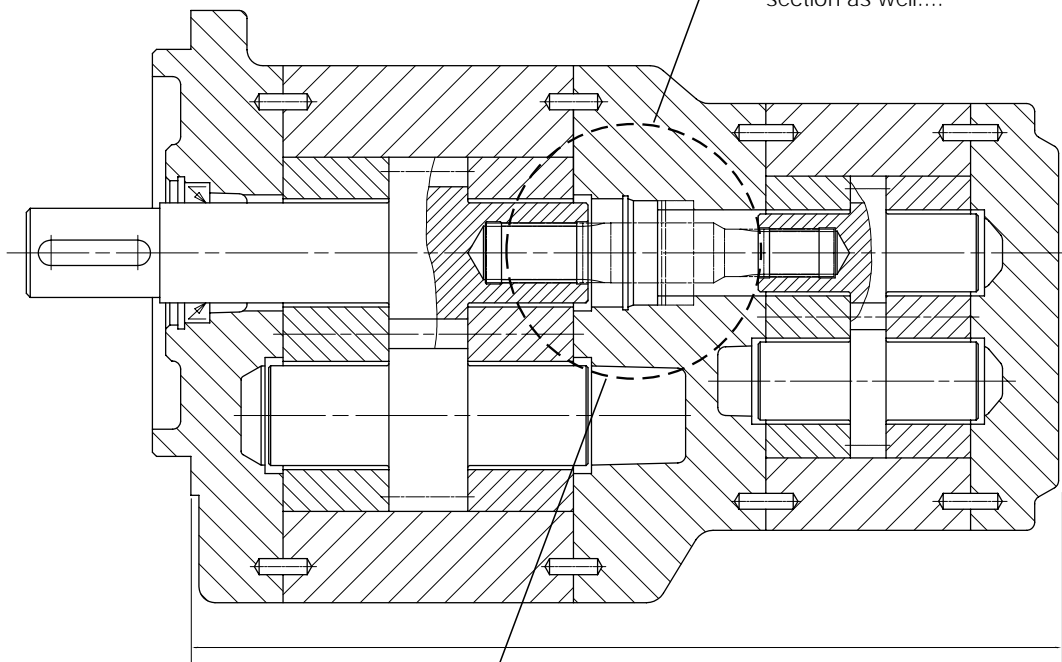


.... as shortens the overall length of all W1500 multiple pumps.

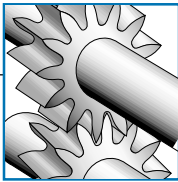
Cross section of W1500 plus W900 pump assembly

Common suction port for two or three pump sections is available on request.

Key design detail, to ensure high torque transmission in the 2nd, 3rd and 4th pump section as well....



.... as shortens the overall length of all WP1500 multiple pumps.



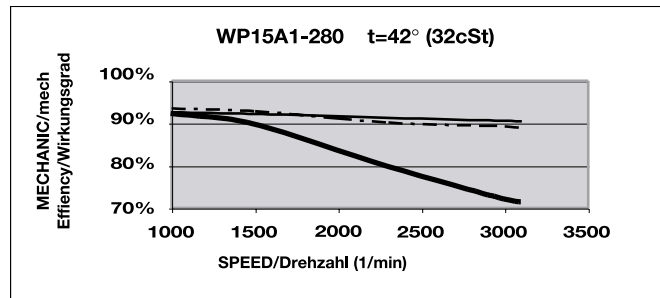
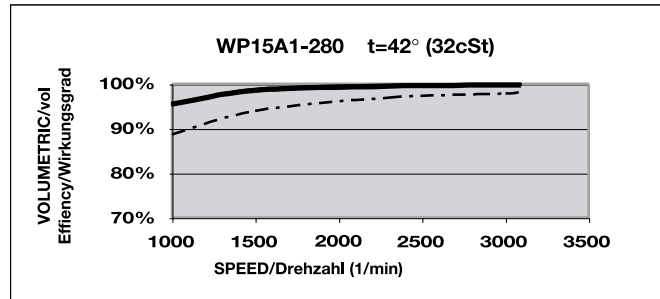
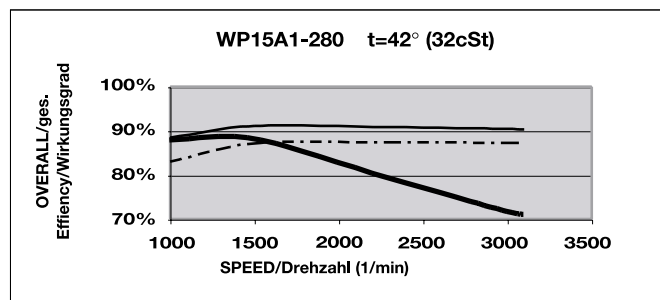
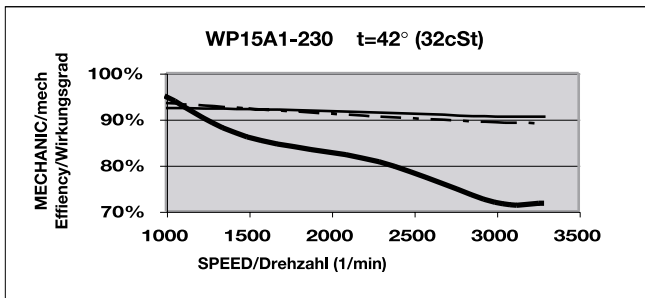
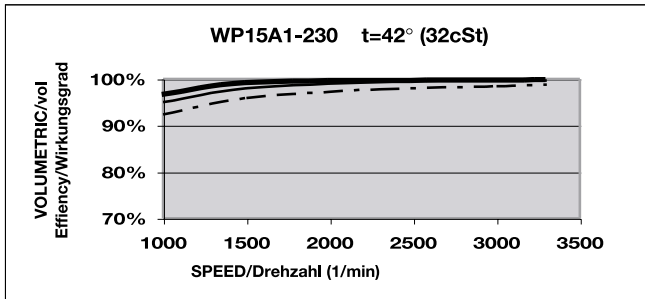
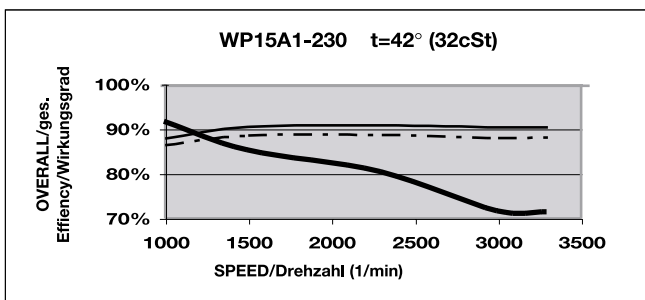
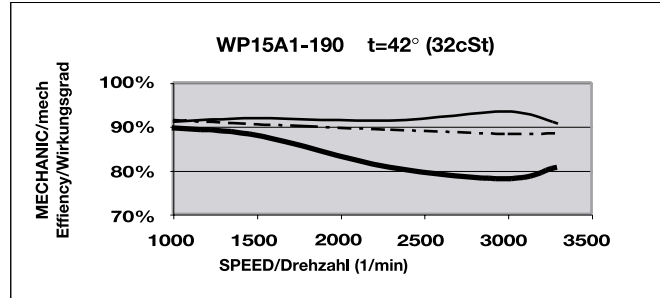
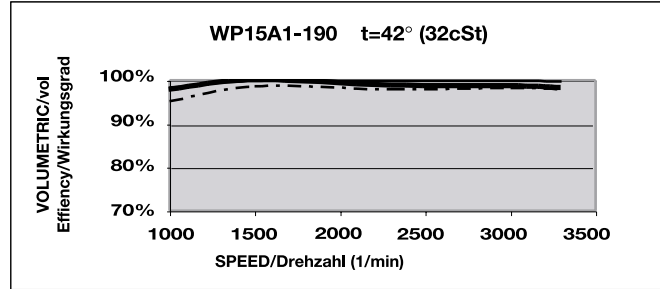
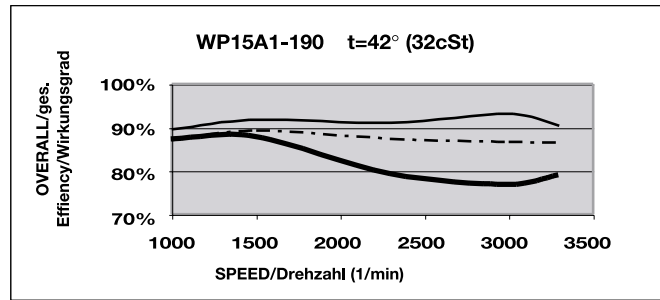
PERFORMANCE CURVES

EXPLANATIONS

Measuring conditions is $t=42^{\circ}\text{C}$ (32cSt)

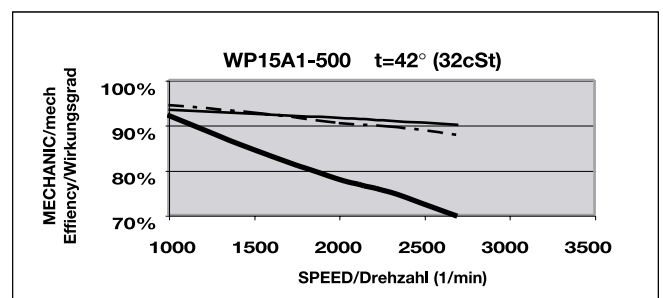
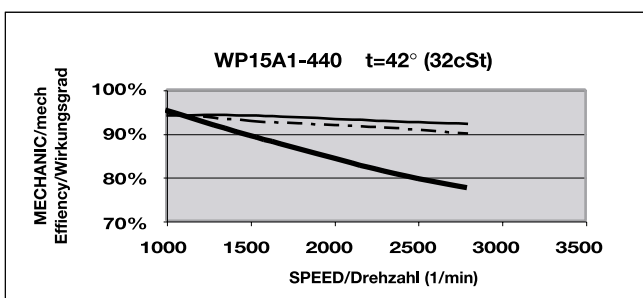
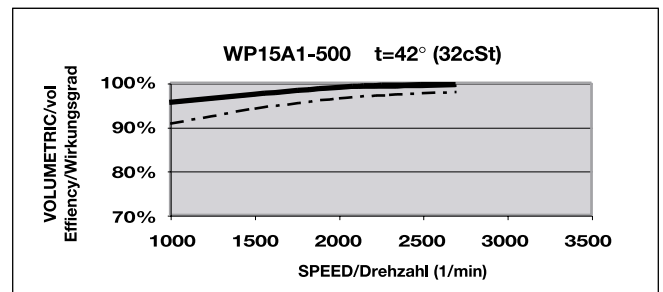
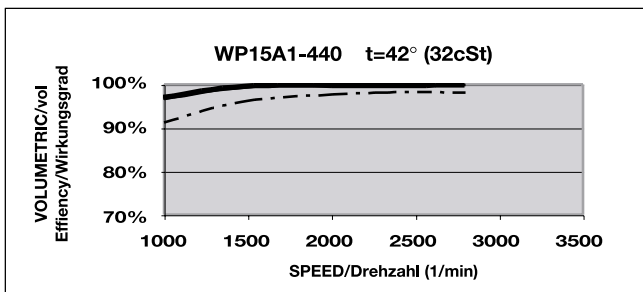
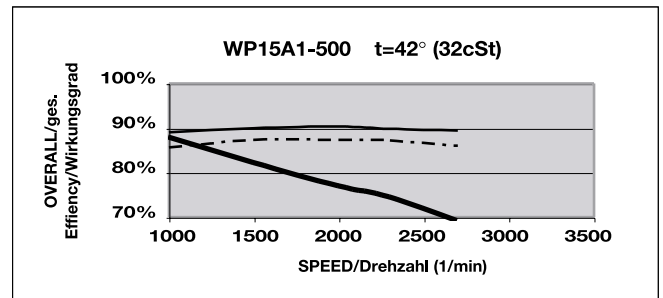
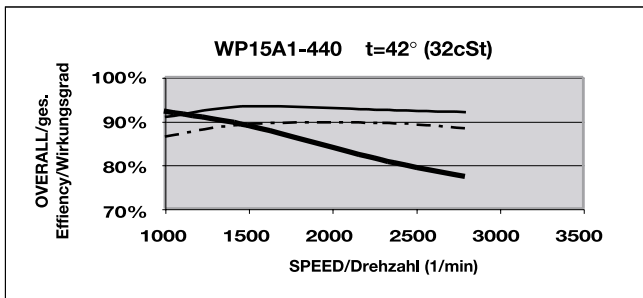
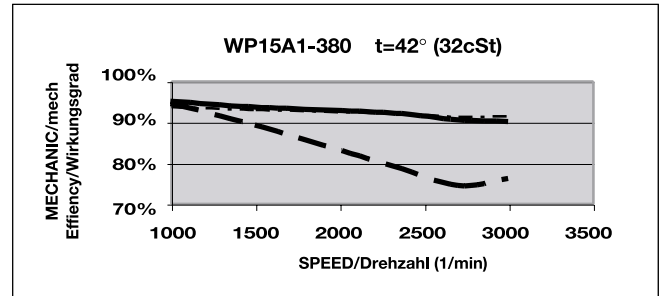
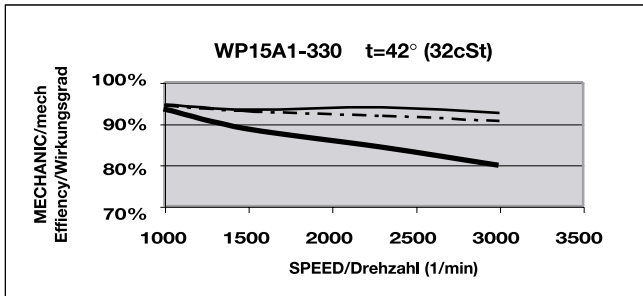
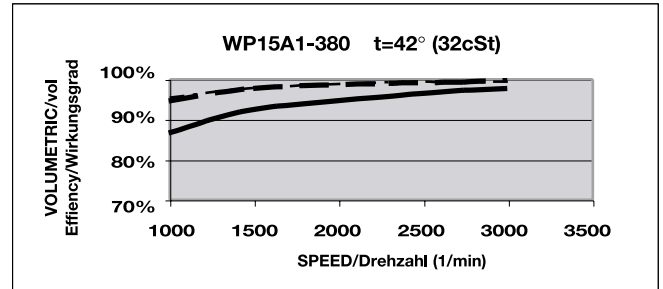
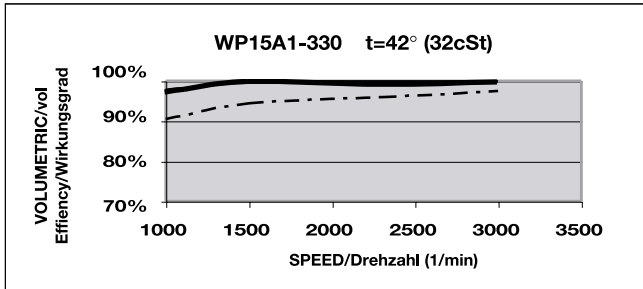
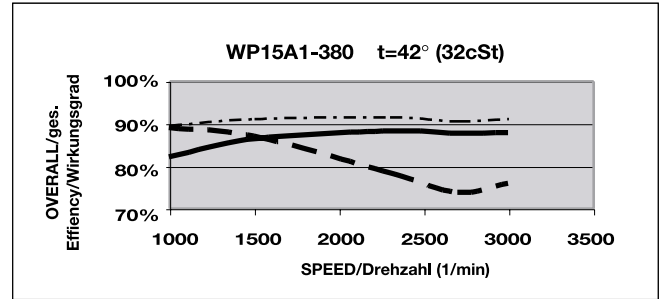
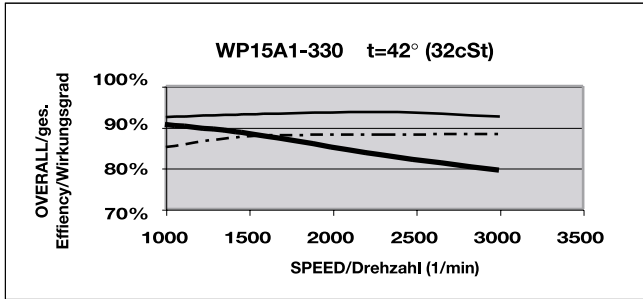
Oil> ISO VG32 RENOLIN B10

25 bar —————
 125 bar - - - - -
 200 bar _____





PERFORMANCE CURVES



www.haldex.com



Haldex Hydraulics AB
 Industrigatan 6
 Box 511
 SE-195 25 ARLANDASTAD
 Sweden
 Tel: +46-8 591 288 50
 Fax: +46-8 591 288 60
info.hydraulics.eu@haldex.com

Haldex Hydraulics Corp.
 2222 15th Street
 ROCKFORD, IL 61104
 USA
 Tel: +1-815 398 4400
 Fax: +1-815 398 5977
info.hydraulics.us@haldex.com

Haldex Hydraulics AB
 Ringvägen 3
 SE-280 40 SK. FAGERHULT
 Sweden
 Tel: +46-433 32400
 Fax: +46-433 30546
info.hydraulics.eu@haldex.com

Haldex Hydraulics Corp.
 214 James Farm Road
 Statesville, NC 28625
 USA
 Tel: +1-704 873 2587
 Fax: +1-704 838 7989
info.hydraulics.us@haldex.com

Haldex Hydraulics GmbH
 Seligenweg 12
 Postfach 1507
 DE-95014 HOF
 Germany
 Tel: +49-9281 895-0
 Fax: +49-9281 87133
info.hydraulics.eu@haldex.com

 Haldex is an innovator in vehicle technology and supplies proprietary systems and components for trucks, cars and industrial vehicles worldwide. Haldex is listed on the Stockholm Stock Exchange and has yearly sales exceeding 6,5 billion Swedish Krona with 4.000 employees (www.haldex.com).

PRODUCT RANGE

HE Powerpacks
 12/24/48 VDC 0.3 – 4.5 kW and
 0.75 – 3 kW AC modular power
 packs

Pressure Switches
 5 - 350 bar, connecting/
 disconnecting

HE Box Powerpacks
 12/24/48 VDC modular
 powerpacks in weatherproof
 boxes

W100 Hydraulic pumps
 0,5 - 2,0 cc 227 bar

W300 Hydraulic pumps
 0.8 – 5.7 cc 230 bar

W600 Hydraulic pumps
 3 – 12 cc 276 bar

WM600 Hydraulic motors
 3 – 12 cc 276 bar

W900 Hydraulic pumps
 5 – 31 cc/section 276 bar

WM900 Hydraulic motors
 5 - 31 cc/section 276 bar

WQ900 The quiet pump
 5 - 23 cc/section 230 bar

W1500 Hydraulic pumps
 19 - 50 cc/section 276 bar

WM1500 Hydraulic motors
 19 - 50 cc/section 276 bar

G25 Hydraulic pumps
 21.3 – 63 cc/section 250 bar

GPA Internal Gear pumps
 1.7 – 63 cc/section 100 bar

GC Hydraulic pumps
 1.06 – 11.65 cc/section 275 bar

II-Stage Hydraulic pumps
 4.2 – 22.8 cc/section 275 bar

Rotary Flow Dividers
 3.8 – 13.3 cc/section 300 bar

G20/G30 (LS) Hydraulic pumps
 23 – 161 cc/section 275 bar

Transmission pumps

Fuel pumps