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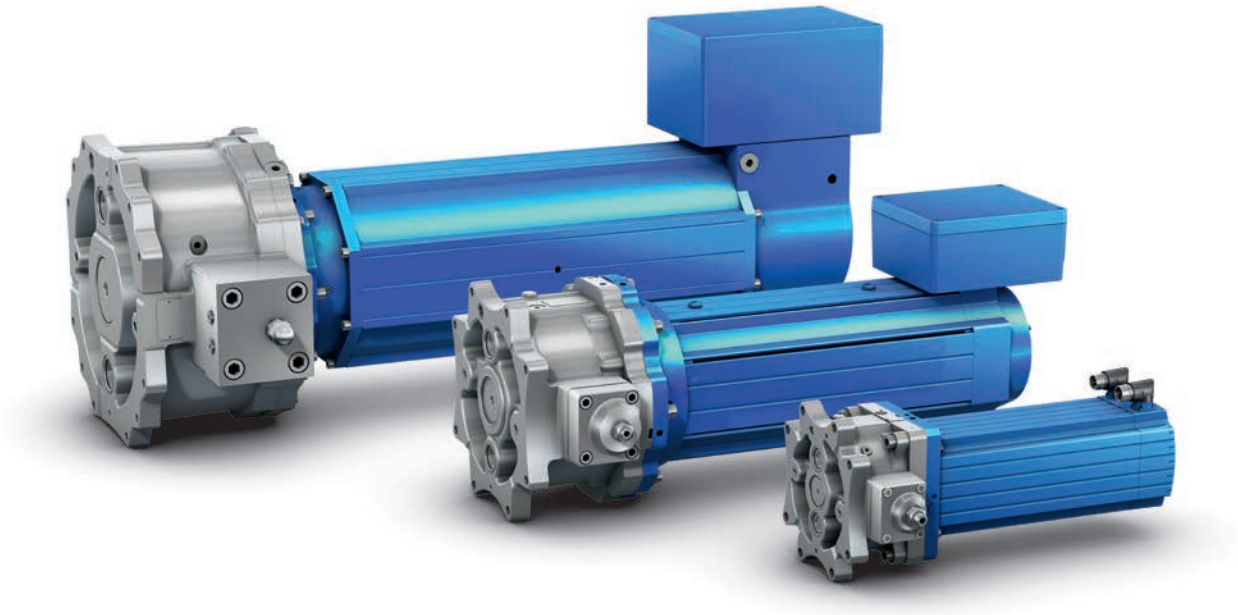
VOITH

DrivAx RQ4
Variable speed pump drives
Product data sheet



Advantages

+ Energy savings up to 70 %
+ Noise reduction by up to 20 dB(A)
+ Outstanding pressure holding function
+ Dual displacement
+ Reversible operation

DrivAx servo drives
Efficient drive technology for high productivity

DrivAx servo drives combine the advantages of hydraulics with the advantages of servo drives. The result: energy-efficient drives with low heat and noise emissions and at the same time high robustness, power density and dynamics.

DrivAx servo drives consist of a variable speed pump and a servo motor, which simultaneously serves as drive and control for the actuator.

They are suitable for all linear movements requiring high forces and precision. At the same time, they are highly productive while protecting the environment, climate and resources.

Perfectly adaptable to your requirements, DrivAx servo drives are available in various system configurations:
- Motor pump combination
- Self-contained drives
- Application-specific system solutions

Machine and equipment manufacturer
Why you should rely on DrivAx servo drives?

The allrounder with a modular set-up

DrivAx servo drives supports all common standard interfaces, enabling them to be easily integrated into existing machines. Various pre-configured modules allow optimal dimensioning of the system, precisely matching to your application. Furthermore, the drive can be scaled and synchronized to cover all conceivable force spectra. The allrounder for all applications.

Less is always more – no servo valves required

The drive technology of the future works without a complex infrastructure. DrivAx drives are based on a combination of a servo motor and a variable speed pump. The servo motor drives the system and precisely controls the force, movement, and position of the actuator. Control valves, hydraulic power units and complex piping are no longer required. True to the principle: less is more.

Easily integrated, rapidly enabled

DrivAx drives are compact, optionally self-contained systems and therefore very easy to integrate into machines. A mechanical interface, an electrical connection, and data connections for the sensor system are all that is needed. As there is no need for complex power unit pipings, valve technology cabling, and filtering of the hydraulic fluid, you save a lot of time while designing and commissioning your machine. For lean mechanical engineering without compromise.

2002 2011 2012 2014

Operators of machines and plants
Why you should rely on DrivAx servo drives?

Increase productivity, save resources

No proportional valves, but the pump regulates the volume flow and pressure. Only as much electrical energy as the process actually requires is converted into power. Efficiency at its best. And at the same time, electricity costs and CO_2 emissions are reduced. It's not just the environment that benefits.

The reliable endurance runner

DrivAx servo drives are compact power packs with a high level of endurance and low maintenance. The actuator is practically wear-free in operation, while proven pump technology and reduced system complexity guarantee long maintenance intervals. Compared to electromechanical solutions, the lifetime is increased by 80%, even in highly demanding operating conditions.

Intelligent solutions for Industry 4.0

DrivAx servo drives work precisely, with high forces, while paving the way for sustainable, climate-friendly production processes. Intelligent sensors and electronics control, regulate and monitor the drive system, which not only enables high machine productivity but also gives the system diagnostic capability – ready for Condition Monitoring and Predictive Maintenance.

Less oil, good for the environment

DrivAx servo drives only consume as much energy as is currently needed in the process. This not only reduces electricity costs, but also the heat input into the hydraulic medium and the necessary cooling effort are reduced. Hydraulic fluid can be reduced by up to 90 %. Green light for clean technology.

DrivAx CLCP

2016

DrivAx RQ4

2021

DrivAx IQ4

2022

DrivAx RQ4 is a hydraulic variable speed drive suitable for all applications with high power density and high dynamics

Consisting of a servomotor and a directly mounted radial piston pump, the Voith DrivAx RQ4 variable speed pump drive combines energy efficiency and environmental cleanliness of electromechanical drives with high power density and robustness of hydraulics at a cost that provides highly attractive return on investment within 1 – 2 years.

Unlike conventional, valve controlled hydraulic systems the DrivAx RQ4 offers power on demand. This means flow and pressure are controlled via the electric motor and the radial piston pump. In the part load range and outside the machine cycle, the system can thereby operate at lower speeds or stop operation at all. The radial piston pump is available in two versions: Fixed or dual displacement. As a fixed displacement pump, the pump permanently delivers a certain volume per revolution. The dual displacement pump version can be switched between two fixed volumes (V_{max} and V_{min} adjustable) during operation, Thus, Voith DrivAx RQ4 variable speed pump drives reduce not only noise by up to 20 dB(A), but also energy consumption by up to 70 percent while minimizing the CO_2 footprint significantly. In addition, the lower average pump speed lowers the oil temperature of the system, minimizing the cost and energy required to cool the hydraulic system.

While operators benefit from reduced total cost of ownership (TCO) by up to 35 percent, hydraulic power units and complex piping are a thing of the past for machine builders. The compact design of Voith DrivAx RQ4 offers easy integration and along with reduced cooling and elimination of most noise containment components, Voith DrivAx RQ4 helps machine builders to maintaining a small machine footprint, while increasing functionality.

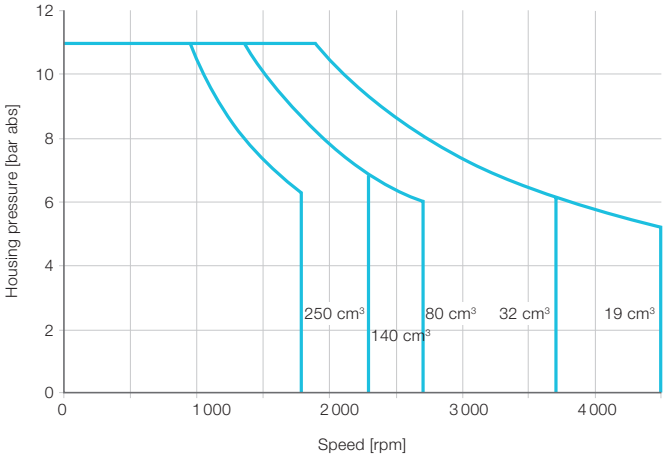
Inhalt

Performance specifications

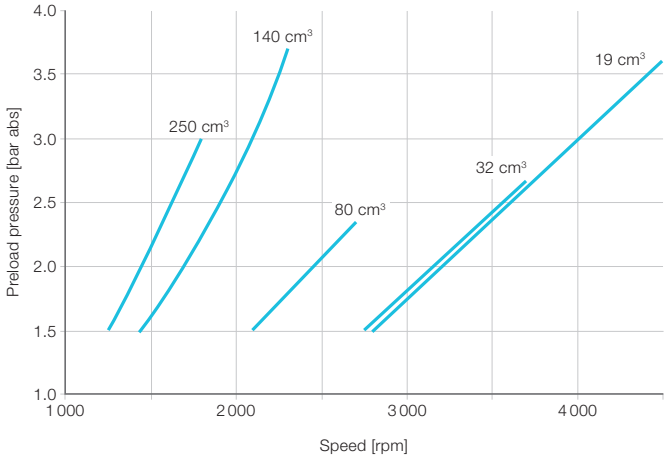
Size	19	32	80	140	250
Maximum flow	85 l/min	118 l/min	216 l/min	322 l/min	450 l/min
Maximum pressure ports A and B	350 bar				
Maximum housing pressure[1)]	10 bar				
Pump version	Radial piston pump, fixed or dual displacement				
Motor version	Brushless servo motor: air, air fan or liquid cooled				
Temperature range	Ambient: -15 to +60 °C Fluid: -15 to +80 °C				
Seal material	FKM				
Pilot pressure supply[2)]	External				
Operating fluid	Mineral oil according to DIN 51524, HFD, others upon request				
Viscosity	Allowable viscosity operational range 12 to 100 mm^2/s (12 to 100 cSt) Recommended hydraulic fluid viscosity class VG 46 to VG 100 according to ISO 3448; maximum viscosity 500 mm^2/s during start-up with electric motor at 1 800 r/min				
System filtration	• NAS 1638, class 9 • ISO 4406, class 20/18/15; obtained with filter fineness of $\beta_{20} = 75$				
Installation position	Any				
Installation note	To avoid pump damages the housing pressure p_L must not exceed the pressure in the low pressure line (p_A or p_B) by more than 1 bar. Design the drain line with lowest possible pressure losses. Maximum pump speed is preload pressure dependent on suction line, see diagram below. The fluid temperature in the tank shall not exceed the temperature of the pump by more than +25 °C. If this should occur, the pump shall be jog started for intervals of approximately 1 to 2 seconds until pump casing has heated up.				

[1)] Maximum housing pressure p_{Lmax}, p_{Sp} = f(n), see diagram below
[2)] For option N1 (dual displacement) only

Housing pressure



Preload pressure



Technical data
Size 19 – Air-cooled

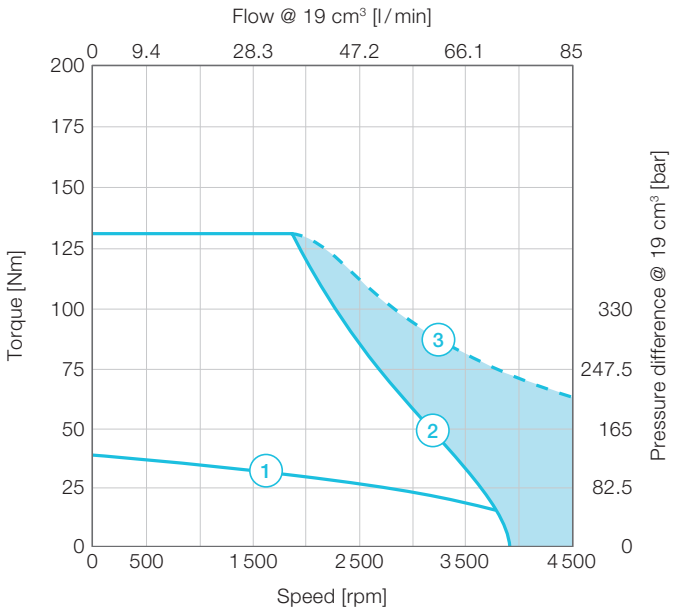
Characteristics table

Performance class		Small	Medium	High
S RQ4 019 A D xx		S0 C	M0 C	H0 C
Pump				
Displacement	V_{max}	19 cm^3/rev		
Maximum pump speed at 3.6 bar (abs)	n_{max}	4 500 rpm		
Maximum pump acceleration	$\dot{n}_{max}$	112 500 r/min/s		
Maximum housing pressure[1]	p_{Lmax}, p_{Sp}	10 bar		
Maximum flow	Q_{max}	85 l/min		
Maximum pressure ports A and B	p_A, p_B	350 bar		
Flushing flow rate[3]	Q_{Sp}	2 – 3 l/min		
Motor				
Continuous stall torque[2]	M_0	40 Nm	93 Nm	137 Nm
Rated torque[2]	M_n	22 Nm	45 Nm	52 Nm
Maximum torque	M_{max}	141 Nm	391 Nm	595 Nm
Rated speed	n_n	3 000 rpm	2 500 rpm	
Maximum speed	n_{max}	Maximum speed see M = f(n) performance curve		
Continuous stall current	I_0	23.08 A_{rms}	52.61 A_{rms}	69.17 A_{rms}
Maximum current	I_{max}	101 A_{rms}	250 A_{rms}	340.5 A_{rms}
Torque constant	k_t	1.72 Nm/A_{rms}	1.77 Nm/A_{rms}	1.98 Nm/A_{rms}
Voltage constant	k_e	103.67 V_{rms}/1 000$_{rpm}$	106.63 V_{rms}/1 000$_{rpm}$	119.96 V_{rms}/1 000$_{rpm}$
Thermal time constant	t_{th}	3 882 s	4 200 s	5 200 s
Winding resistance at 25 °C	R_{tt}	0.351 Ω	0.096 Ω	0.074 Ω
Winding inductance	L_{tt}	4.254 mH	1.719 mH	1.433 mH
Power connector		Size 1 rotatable	Size 1.5 rotatable	
Feedback connector		Signal resolver connector rotatable		
Thermal sensor		NTC 220 kOhm, Pt1000		
Unit				
Inertia	J	38 kg cm^2	121.52 kg cm^2	172.37 kg cm^2
Weight	m	50.1 kg	82.7 kg	105.4 kg
Tightening torque	8x M12x45 -12.9 hexagon head	120 Nm + 10 Nm		

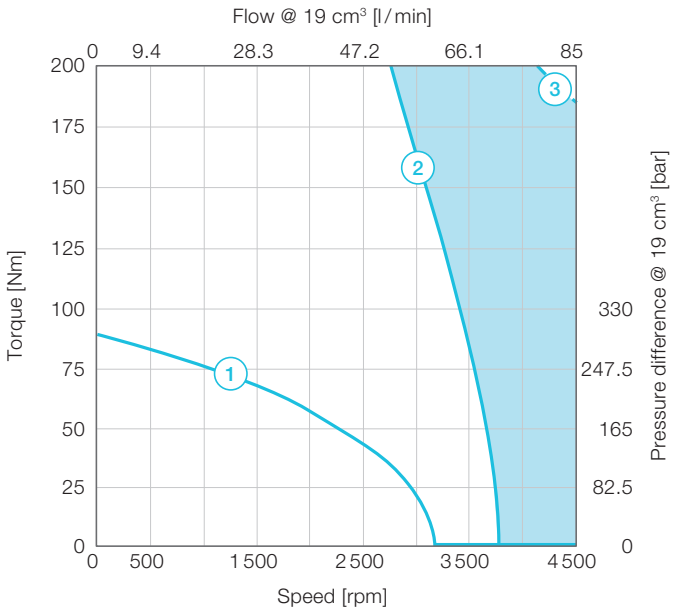
[1] See diagram “Maximum housing pressure p_{Lmax}, p_{Sp} = f(n)” and “Installation note”
[2] Operation in still air with ambient temperatures up to +40 °C. Winding temperature measure up to +110 °C over ambient
[3] Optional via S_p port (flushing port)

Motor performance curves

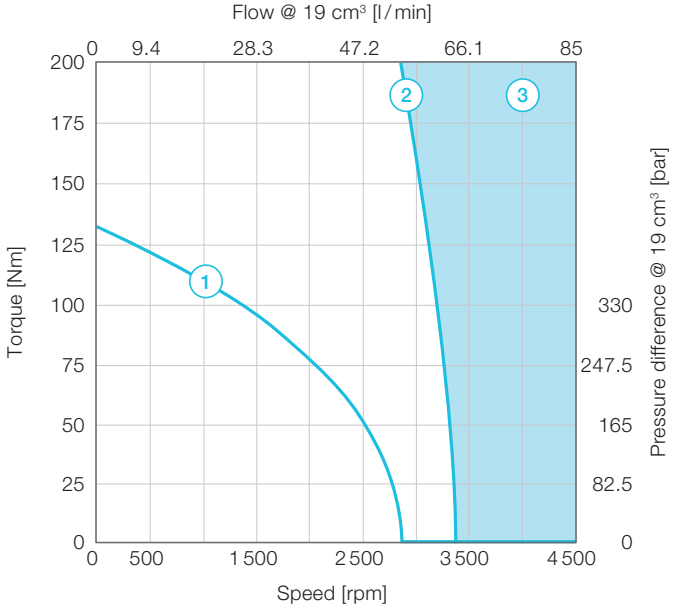
S0 C



M0 C



H0 C

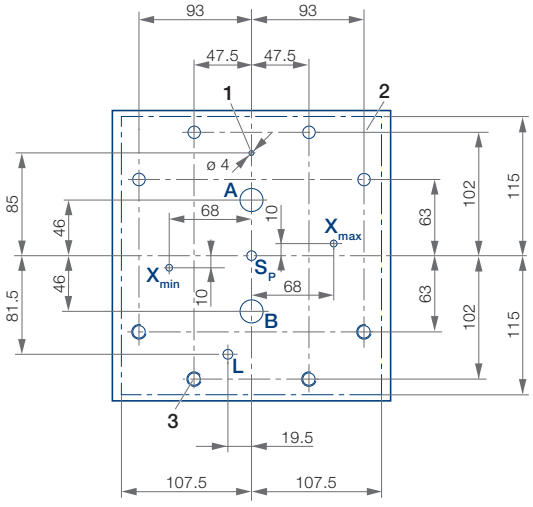


1. Continuous torque at 110 K temperature difference over ambient, max. winding temperature 150 °C
2. Maximum torque without field weakening
3. Maximum torque with field weakening

Notes:

- Motor performance with 565 V_{DC} link voltage
- Motor performance doesn‘t take the pump efficiency into account
- Pressure difference $\Delta p = p_A - p_B$

Mounting pattern



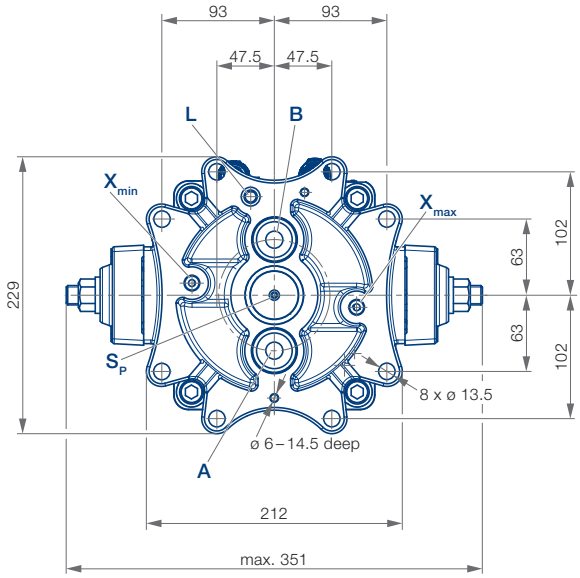
1. Use a spring-type pin with nominal diameter of 4 mm (e.g. 4x12) according to ISO 13337

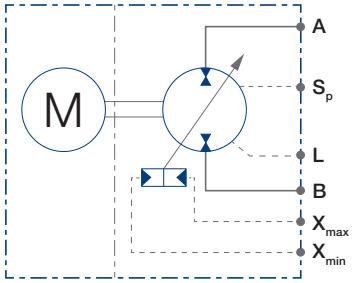
2. Area of
   – surface flatness: 0.02
   – surface roughness: Rz4

3. M12, minimum 25 mm deep.
   Recommended: Use 8 hexagon head cap screws M12 (property class 12.9, minimum length 45 mm) according to ISO 4762. Tightening torque 120 + 10 Nm.

Dimensions in mm.

Pump front view

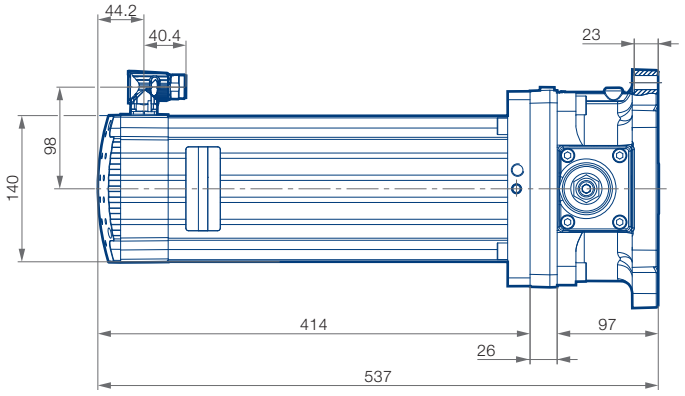




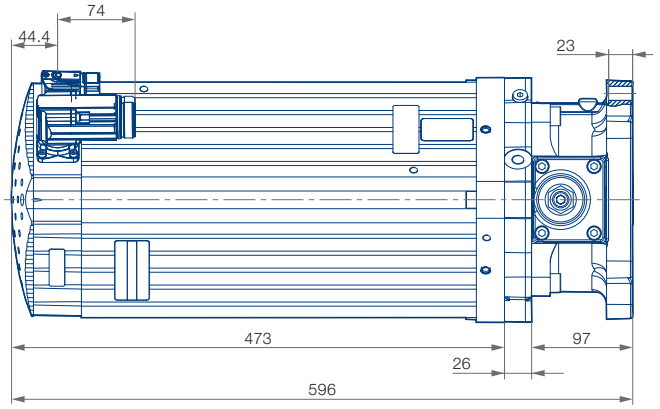
Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350	14	20
S_p	Flushing port	10	5	15
L	Leakage port	10	8	9
X_{max}	Control port for maximum displacement (option N1 only)	350	5	5.5
X_{min}	Control port for minimum displacement (option N1 only)	350	5	5.5

Installation drawings

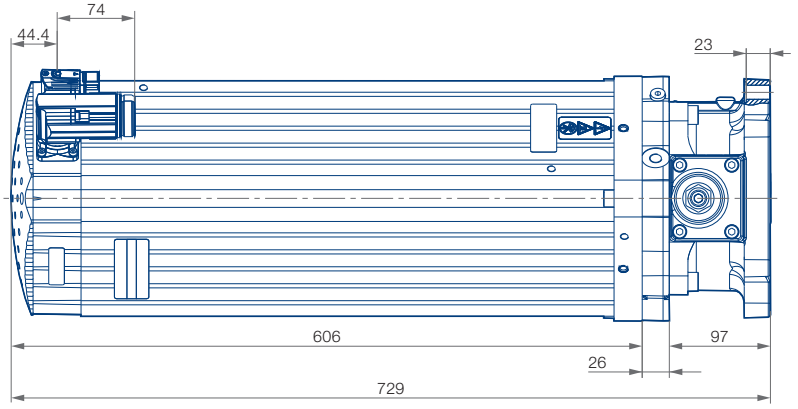
S0 C



M0 C



H0 C



Dimensions in mm.

Size 19 – Water-cooled

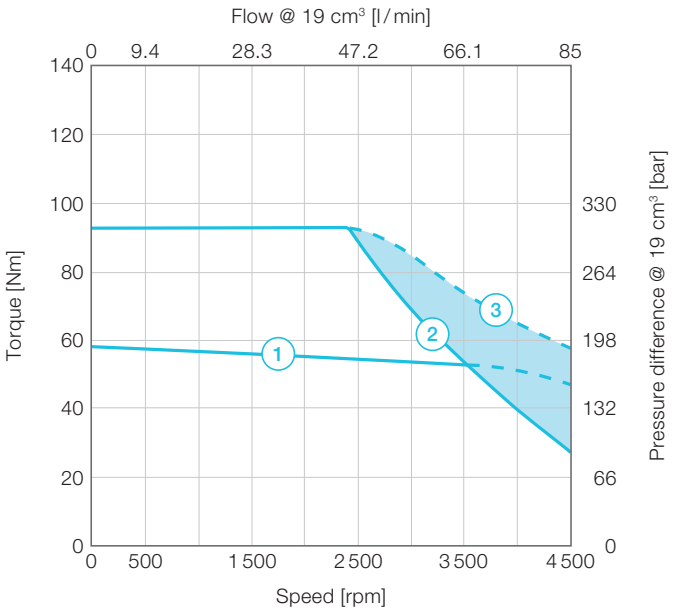
Characteristics table

Performance class		Medium	High
S RQ4 019 A D xx		M0 W	H0 W
Pump			
Displacement	V_{max}	19 cm^3/rev	
Maximum pump speed at 3.6 bar (abs.)	n_{max}	4 500 rpm	
Maximum pump acceleration	$\dot{n}_{max}$	112 500 r/min/s	
Maximum housing pressure[1)]	p_{Lmax}, p_{Sp}	10 bar	
Maximum flow	Q_{max}	85 l/min	
Maximum pressure ports A and B	p_A, p_B	350 bar	
Flushing flow rate[3)]	Q_{Sp}	2 – 3 l/min	
Motor			
Continuous stall torque[2)]	M_0	62 Nm	91 Nm
Rated torque[2)]	M_n	58 Nm	85 Nm
Maximum torque	M_{max}	94 Nm	140 Nm
Rated speed	n_n	3 000 rpm	
Maximum speed	n_{max}	Maximum speed see M = f(n) performance curve	
Continuous stall current	I_0	48.45 A_{rms}	54.22 A_{rms}
Maximum current	I_{max}	88 A_{rms}	100 A_{rms}
Torque constant	k_t	1.27 Nm/A_{rms}	1.68 Nm/A_{rms}
Voltage constant	k_e	78.49 V_{rms}/1 000_{rpm}	103.67 V_{rms}/1 000_{rpm}
Thermal time constant	t_{th}	460 s	525 s
Winding resistance at 25 °C	R_{tt}	0.319 Ω	0.345 Ω
Winding inductance	L_{tt}	3.551 mH	4.047 mH
Power connector		Size 1.5 rotatable	
Feedback connector		Signal resolver connector rotatable	
Thermal sensor		NTC 220 kOhm, Pt1000	
Cooling water flow rate	Q_W	3-5 l/min	
Unit			
Inertia	J	31.7 kg cm^2	37.9 kg cm^2
Weight	m	47.5 kg	56.3 kg
Tightening torque	8x M12x45 -12.9 hexagon head	120 Nm + 10 Nm	

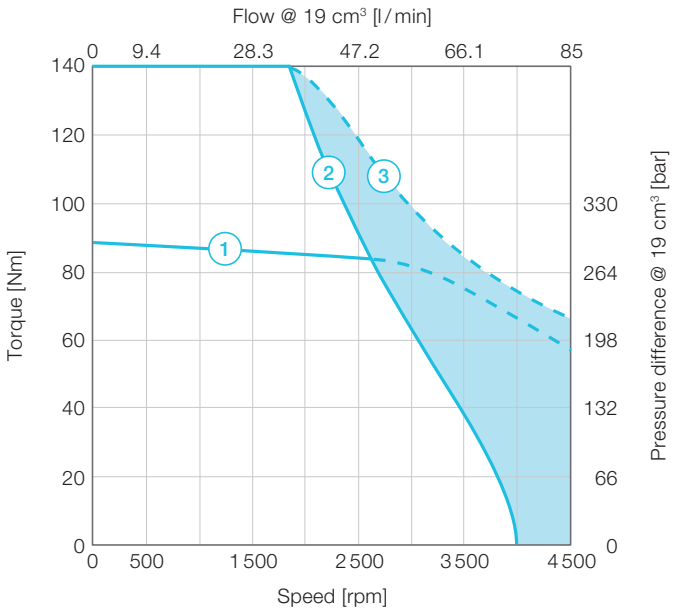
[1)] See diagram “Maximum housing pressure p_{Lmax}, p_{Sp} = f(n)” and “Installation note”
[2)] Operation in still air with water temperatures from +25 °C up to +40 °C. Winding temperature measure up to +110 °C over water temperature.
[3)] Optional via S_p port (flushing port)

Motor performance curves

M0 W



H0 W



(1) Continuous torque at 110 K temperature difference over water, max. winding temperature 150 °C

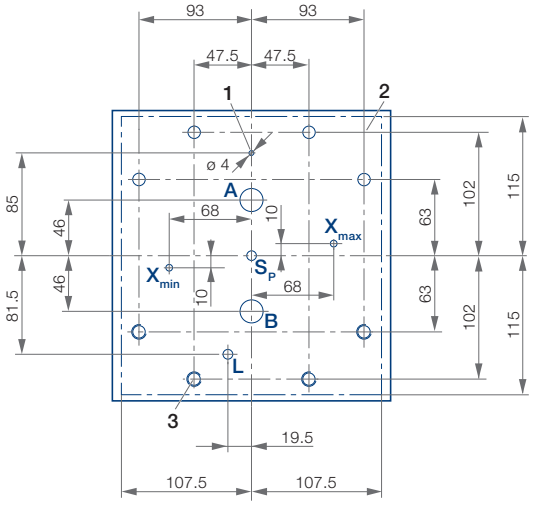
(2) Maximum torque without field weakening

(3) Maximum torque with field weakening

Notes:

- Motor performance with 565 V_{DC} link voltage
- Motor performance doesn‘t take the pump efficiency into account
- Pressure difference $\Delta p = p_A - p_B$
- Motor performance determined with respective max. cooling water flow rate, see characteristic table

Mounting pattern



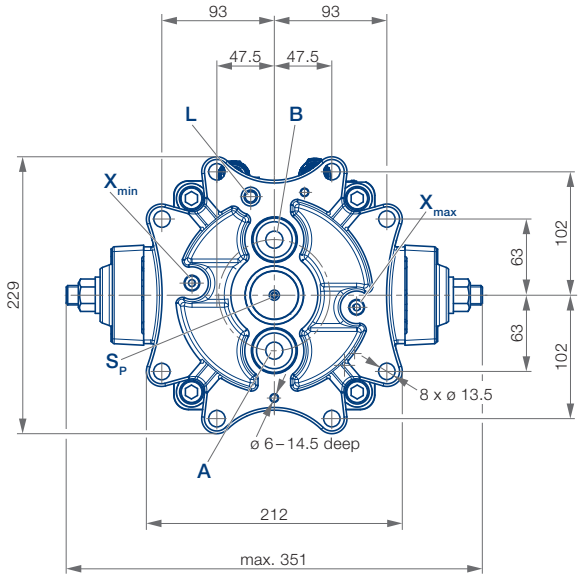
1. Use a spring-type pin with nominal diameter of 4 mm (e.g. 4x12) according to ISO 13337

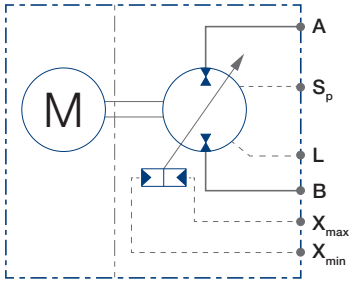
2. Area of
   – surface flatness: 0.02
   – surface roughness: Rz4

3. M12, minimum 25 mm deep.
   Recommended: Use 8 hexagon head cap screws M12 (property class 12.9, minimum length 45 mm) according to ISO 4762. Tightening torque 120 + 10 Nm.

Dimensions in mm.

Pump front view

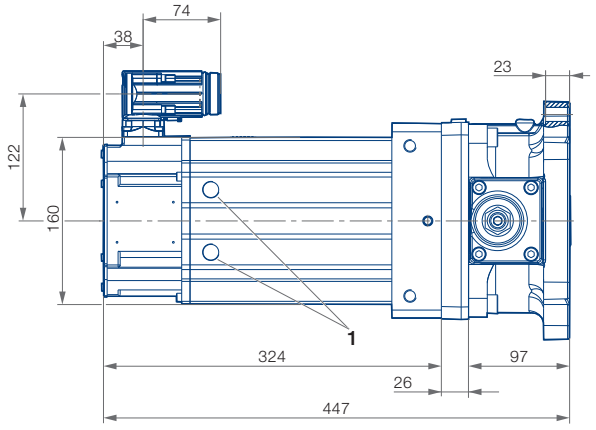




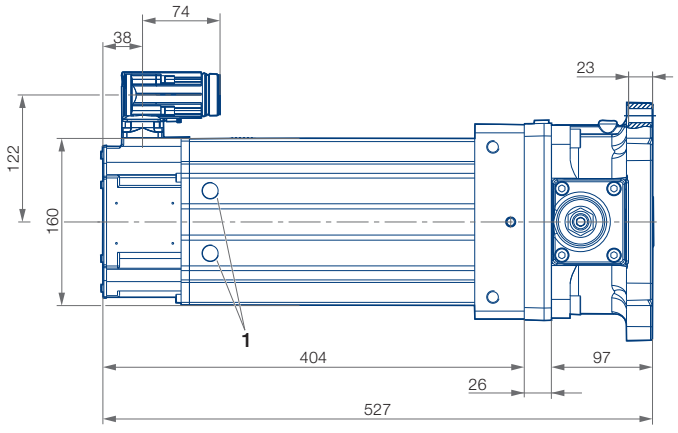
Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350	14	20
S_p	Flushing port	10	5	15
L	Leakage port	10	8	9
X_{max}	Control port for maximum displacement (option N1 only)	350	5	5.5
X_{min}	Control port for minimum displacement (option N1 only)	350	5	5.5

Installation drawings

M0 W



H0 W



Dimensions in mm.

1 Cooler outlet G3/8“ (thread depth max. 7 mm)

Size 32 – Air-cooled

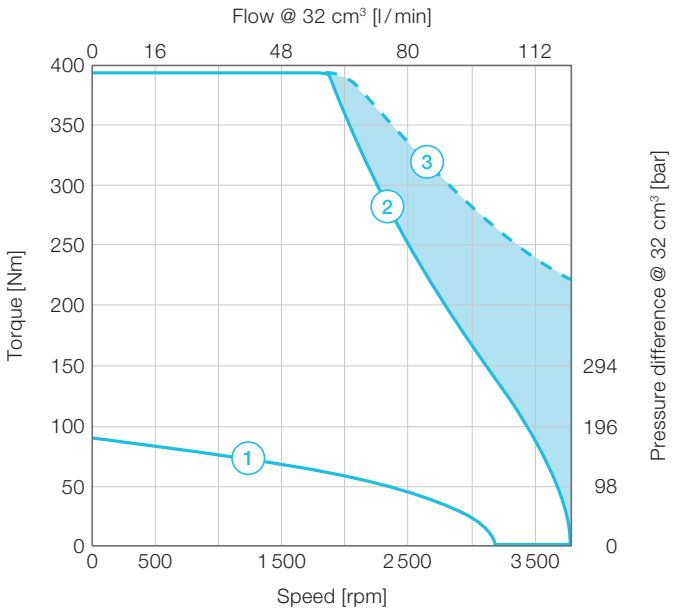
Characteristics table

Performance class		Small	Medium
S RQ4 032 A D xx		S0 C	M0 C
Pump			
Displacement	V_{max}	32 cm^3/rev	
Maximum pump speed at 2.7 bar (abs.)	n_{max}	3 700 rpm	
Maximum pump acceleration	$\dot{n}_{max}$	80 400 r/min/s	
Maximum housing pressure[1]	p_{Lmax}, p_{Sp}	10 bar	
Maximum flow	Q_{max}	118 l/min	
Maximum pressure ports A and B	p_A, p_B	350 bar	
Flushing flow rate[3]	Q_{Sp}	3 – 4 l/min	
Motor			
Continuous stall torque[2]	M_0	93 Nm	137 Nm
Rated torque[2]	M_n	45 Nm	52 Nm
Maximum torque	M_{max}	391 Nm	595 Nm
Rated speed	n_n	2 500 rpm	
Maximum speed	n_{max}	Maximum speed see M = f(n) performance curve	
Continuous stall current	I_0	52.61 A_{rms}	69.17 A_{rms}
Maximum current	I_{max}	250 A_{rms}	340.5 A_{rms}
Torque constant	k_t	1.77 Nm/A_{rms}	1.98 Nm/A_{rms}
Voltage constant	k_e	106.63 V_{rms}/1 000$_{rpm}$	119.96 V_{rms}/1 000$_{rpm}$
Thermal time constant	t_{th}	4 200 s	5 200 s
Winding resistance at 25 °C	R_{tt}	0.096 Ω	0.074 Ω
Winding inductance	L_{tt}	1.719 mH	1.433 mH
Power connector		Size 1.5 rotatable	
Feedback connector		Signal resolver connector rotatable	
Thermal sensor		NTC 220 kOhm, Pt1000	
Unit			
Inertia	J	164.8 kg cm^2	215.7 kg cm^2
Weight	m	100.3 kg	123 kg
Tightening torque	8x M12x45 -12.9 hexagon head	120 Nm + 10 Nm	

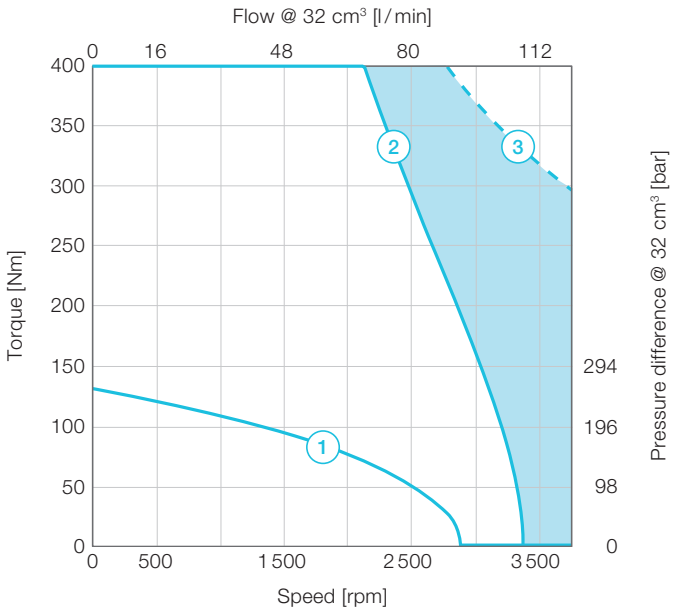
[1] See diagram “Maximum housing pressure p_{Lmax}, p_{Sp} = f(n)” and “Installation note”
[2] Operation in still air with ambient temperatures up to +40 °C. Winding temperature measure up to +110 °C over ambient
[3] Optional via S_p port (flushing port)

Motor performance curves

S0 C



M0 C

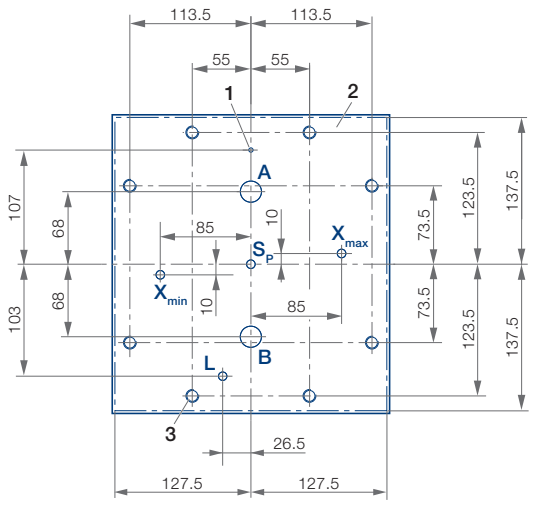


1. Continuous torque at 110 K temperature difference over ambient max. winding temperature 150 °C
2. Maximum torque without field weakening
3. Maximum torque with field weakening

Notes:

- Motor performance with 565 V_{DC} link voltage
- Motor performance doesn‘t take the pump efficiency into account
- Pressure difference $\Delta p = p_A - p_B$

Mounting pattern



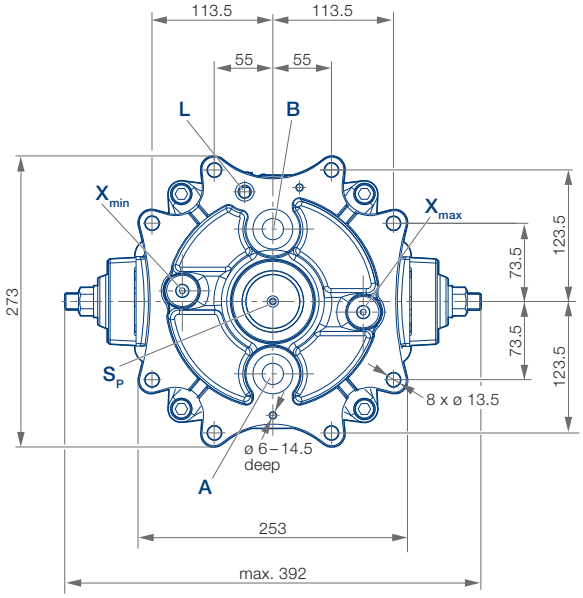
1. Use a spring-type pin with nominal diameter of 4 mm (e.g. 4x12) according to ISO 13337

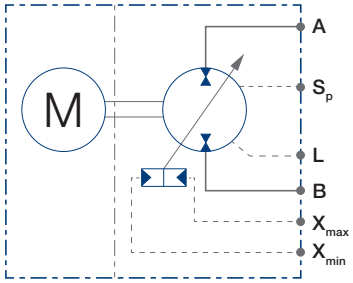
2. Area of
   – surface flatness: ⏥ 0.02
   – surface roughness: Rz4

3. M12, minimum 25 mm deep.
   Recommended: Use 8 hexagon head cap screws M12 (property class 12.9, minimum length 45 mm) according to ISO 4762. Tightening torque 120 + 10 Nm.

Dimensions in mm.

Pump front view

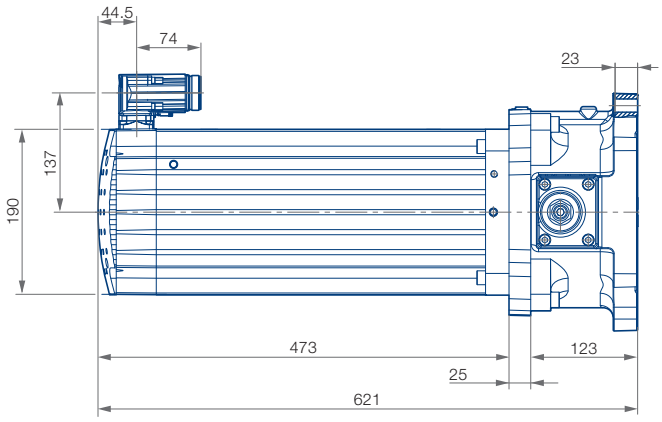




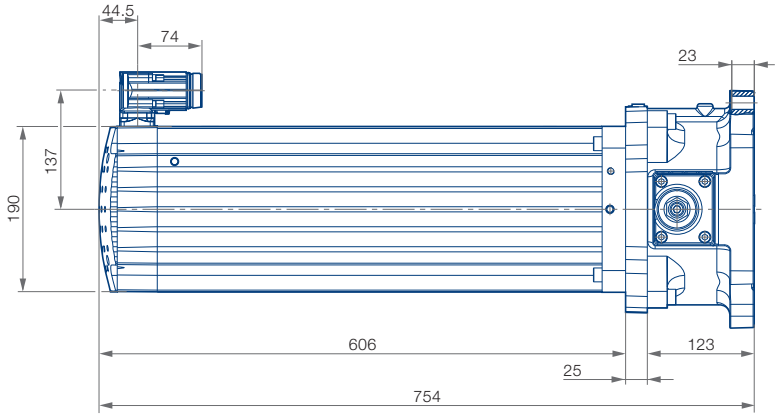
Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350	20	25
S_p	Flushing port	10	7	15
L	Leakage port	10	11	11.5
X_{max}	Control port for maximum displacement (option N1 only)	350	5	5.5
X_{min}	Control port for minimum displacement (option N1 only)	350	5	5.5

Installation drawings

S0 C



M0 C



Dimensions in mm.

Size 32 – Water-cooled

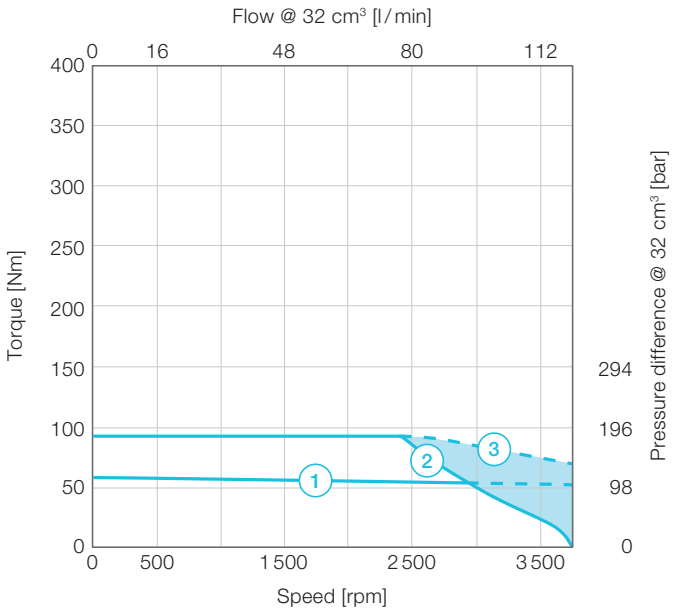
Characteristics table

Performance class		Small	Medium	High
S RQ4 032 A D xx		S0 W	M0 W	H0 W
Pump				
Displacement	V_{max}	32 cm^3/rev		
Maximum pump speed at 2.7 bar (abs.)	n_{max}	3 700 rpm		
Maximum pump acceleration	$\dot{n}_{max}$	80 400 r/min/s		
Maximum housing pressure[1]	p_{Lmax}, p_{Sp}	10 bar		
Maximum flow	Q_{max}	118 l/min		
Maximum pressure ports A and B	p_A, p_B	350 bar		
Flushing flow rate[3]	Q_{Sp}	3 – 4 l/min		
Motor				
Continuous stall torque[2]	M_0	62 Nm	91 Nm	151 Nm
Rated torque[2]	M_n	58 Nm	85 Nm	128 Nm
Maximum torque	M_{max}	94 Nm	140 Nm	391 Nm
Rated speed	n_n	3 000 rpm		2 500 rpm
Maximum speed	n_{max}	Maximum speed see M = f(n) performance curve		
Continuous stall current	I_0	48.45 A_{rms}	54.22 A_{rms}	85.95 A_{rms}
Maximum current	I_{max}	88 A_{rms}	100 A_{rms}	250 A_{rms}
Torque constant	k_t	1.27 Nm/A_{rms}	1.68 Nm/A_{rms}	1.76 Nm/A_{rms}
Voltage constant	k_e	78.49 V_{rms}/1 000_{rpm}	103.67 V_{rms}/1 000_{rpm}	106.63 V_{rms}/1 000_{rpm}
Thermal time constant	t_{th}	460 s	525 s	568 s
Winding resistance at 25 °C	R_{tt}	0.319 Ω	0.345 Ω	0.096 Ω
Winding inductance	L_{tt}	3.551 mH	4.047 mH	1.727 mH
Power connector		Size 1.5 rotatable		Cable box A
Feedback connector		Signal resolver connector rotatable		Signal resolver connector
Thermal sensor		NTC 220 kOhm, Pt1000		
Cooling water flow rate	Q_W	3-5 l/min	3-5 l/min	6-8 l/min
Unit				
Inertia	J	75 kg cm^2	81.2 kg cm^2	170.5 kg cm^2
Weight	m	65.1 kg	73.9 kg	107.9 kg
Tightening torque	8x M12x45 -12.9 hexagon head	120 Nm + 10 Nm		

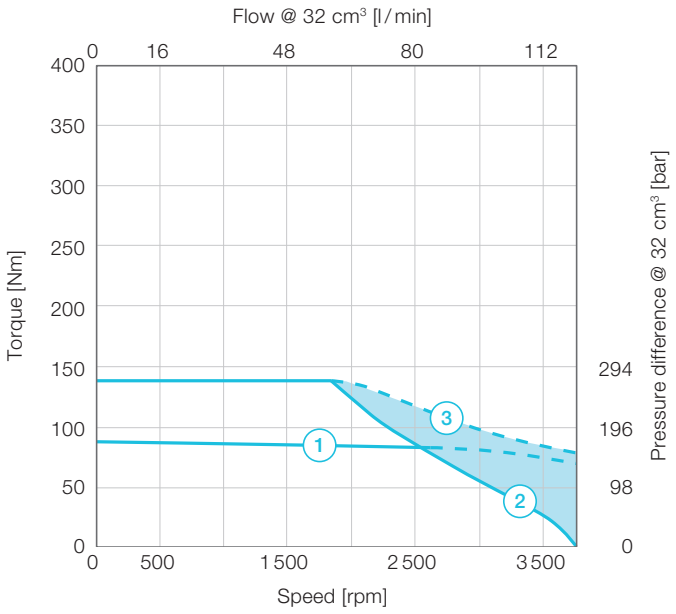
[1] See diagram “Maximum housing pressure p_{Lmax}, p_{Sp} = f(n)” and “Installation note”
[2] Operation in still air with water temperatures from +25 °C up to +40 °C. Winding temperature measure up to +110 °C over water temperature.
[3] Optional via S_p port (flushing port)

Motor performance curves

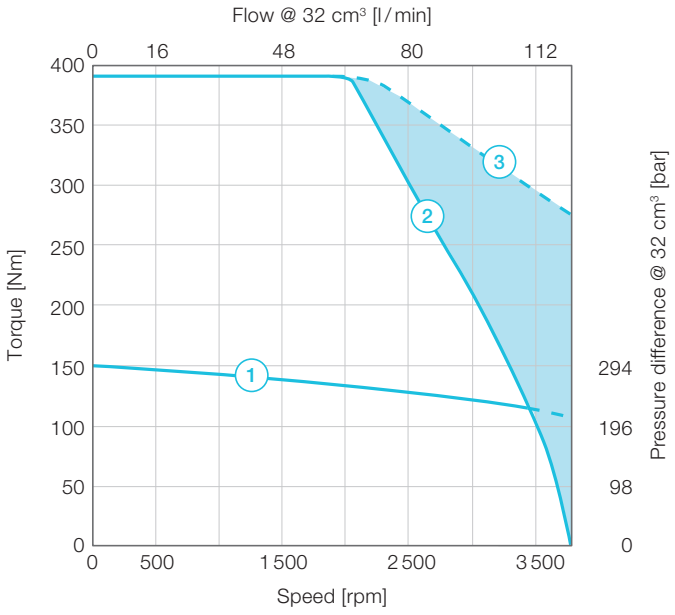
S0 W



M0 W



H0 W



(1) Continuous torque at 110 K temperature difference over water, max. winding temperature 150 °C

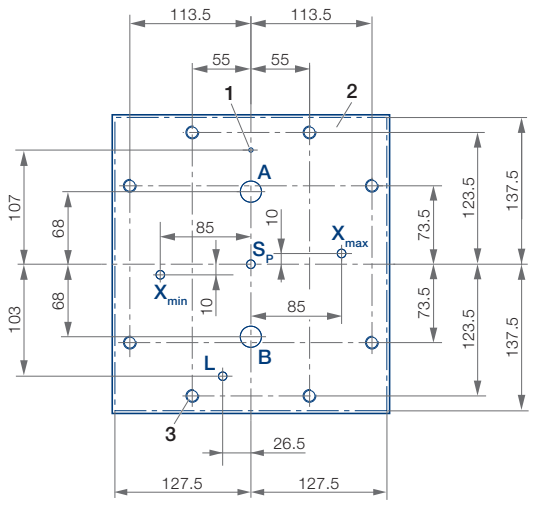
(2) Maximum torque without field weakening

(3) Maximum torque with field weakening

Notes:

- Motor performance with 565 V_{DC} link voltage
- Motor performance doesn‘t take the pump efficiency into account
- Pressure difference $\Delta p = p_A - p_B$
- Motor performance determined with respective max. cooling water flow rate, see characteristic table

Mounting pattern



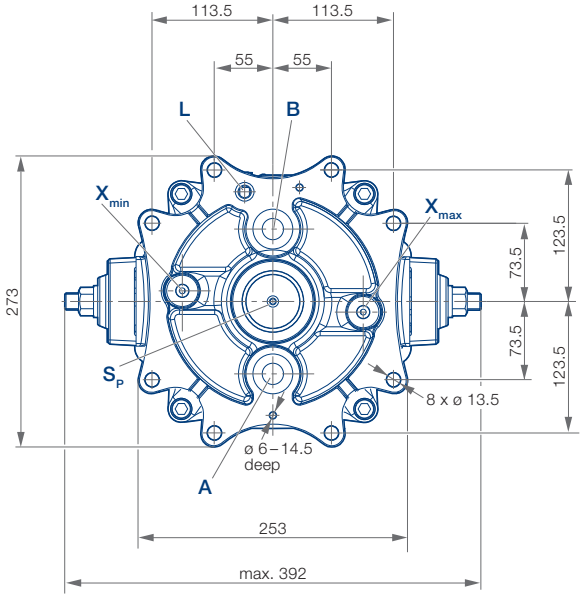
1. Use a spring-type pin with nominal diameter of 4 mm (e.g. 4x12) according to ISO 13337

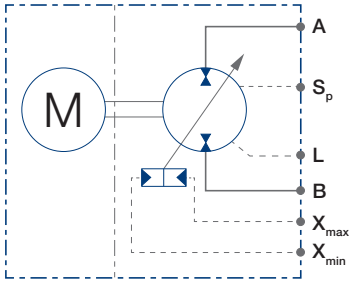
2. Area of
   – surface flatness: ⏥ 0.02
   – surface roughness: Rz4

3. M12, minimum 25 mm deep.
   Recommended: Use 8 hexagon head cap screws M12 (property class 12.9, minimum length 45 mm) according to ISO 4762. Tightening torque 120 + 10 Nm.

Dimensions in mm.

Pump front view

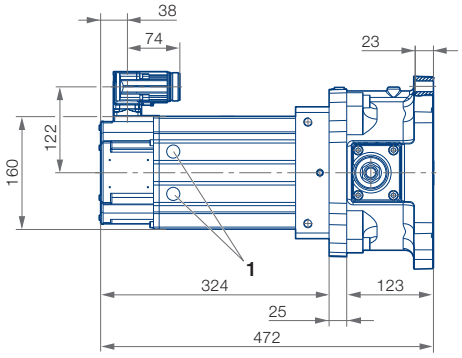




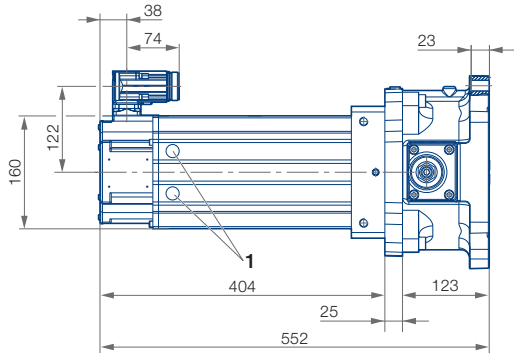
Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350	20	25
S_p	Flushing port	10	7	15
L	Leakage port	10	11	11.5
X_{max}	Control port for maximum displacement (option N1 only)	350	5	5.5
X_{min}	Control port for minimum displacement (option N1 only)	350	5	5.5

Installation drawings

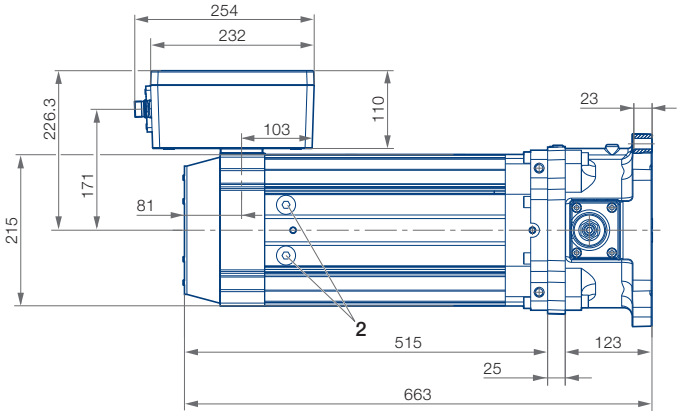
S0 W



M0 W



H0 W



Dimensions in mm.

1 Cooler outlet G3/8“ (thread depth max. 7 mm)
2 Cooler outlet G1/2“ (thread depth max. 7 mm)

Size 80 – Air-cooled

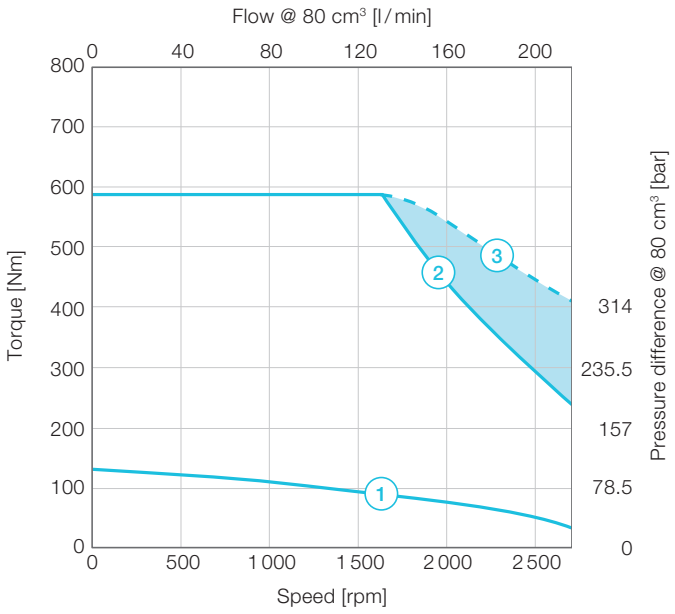
Characteristics table

Performance class		Small	Medium	High
S RQ4 080 A D xx		S0 C	M0 C	H0 C
Pump				
Displacement	V_{max}	80 cm^3/rev		
Maximum pump speed at 2.4 bar (abs.)	n_{max}	2 700 rpm		
Maximum pump acceleration	$\dot{n}_{max}$	45 000 r/min/s		
Maximum housing pressure[1]	p_{Lmax}, p_{Sp}	10 bar		
Maximum flow	Q_{max}	216 l/min		
Maximum pressure ports A and B	p_A, p_B	350 bar		
Flushing flow rate[3]	Q_{Sp}	4 – 6 l/min		
Motor				
Continuous stall torque[2]	M_0	137 Nm	235 Nm	298 Nm
Rated torque[2]	M_n	52 Nm	169 Nm	230 Nm
Maximum torque	M_{max}	595 Nm	1 477 Nm	1,972 Nm
Rated speed	n_n	2 500 rpm	900 rpm	700 rpm
Maximum speed	n_{max}	Maximum speed see M = f(n) performance curve		
Continuous stall current	I_0	69.17 A_{rms}	106.32 A_{rms}	100.63 A_{rms}
Maximum current	I_{max}	340.5 A_{rms}	795 A_{rms}	795 A_{rms}
Torque constant	k_t	1.98 Nm/A_{rms}	2.21 Nm/A_{rms}	2.96 Nm/A_{rms}
Voltage constant	k_e	119.96 V_{rms}/1 000$_{rpm}$	148.09 V_{rms}/1 000$_{rpm}$	197.70 V_{rms}/1 000$_{rpm}$
Thermal time constant	t_{th}	5 200 s	5 900 s	6 850 s
Winding resistance at 25 °C	R_{tt}	0.074 Ω	0.024 Ω	0.03 Ω
Winding inductance	L_{tt}	1.433 mH	0.583 mH	0.778 mH
Power connector		Size 1.5 rotatable	Cable box A	
Feedback connector		Signal resolver connector rotatable	Signal resolver connector	
Thermal sensor		NTC 220 kOhm, Pt1000		
Unit				
Inertia	J	340.97 kg cm^2	1 207.69 kg cm^2	1 528.3 kg cm^2
Weight	m	159.4 kg	198.6 kg	249.5 kg
Tightening torque	8x M12x45 -12.9 hexagon head	120 Nm + 10 Nm		

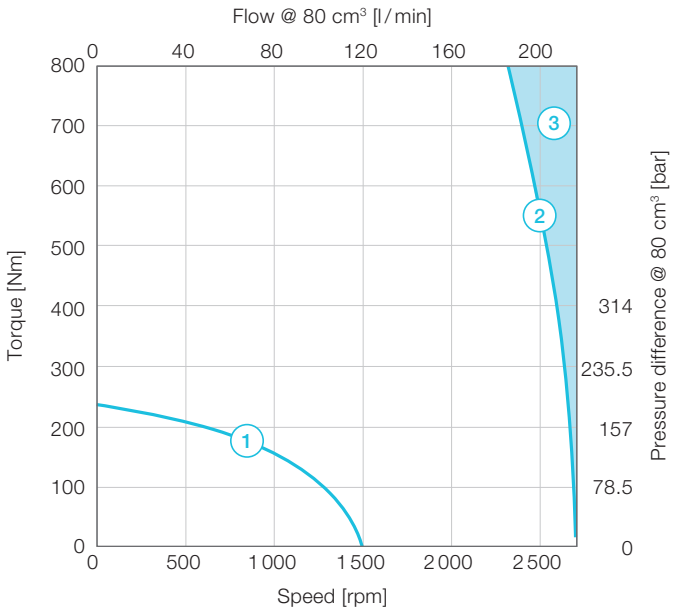
[1] See diagram “Maximum housing pressure p_{Lmax}, p_{Sp} = f(n)” and “Installation note”
[2] Operation in still air with ambient temperatures up to +40 °C. Winding temperature measure up to +110 °C over ambient
[3] Optional via S_p port (flushing port)

Motor performance curves

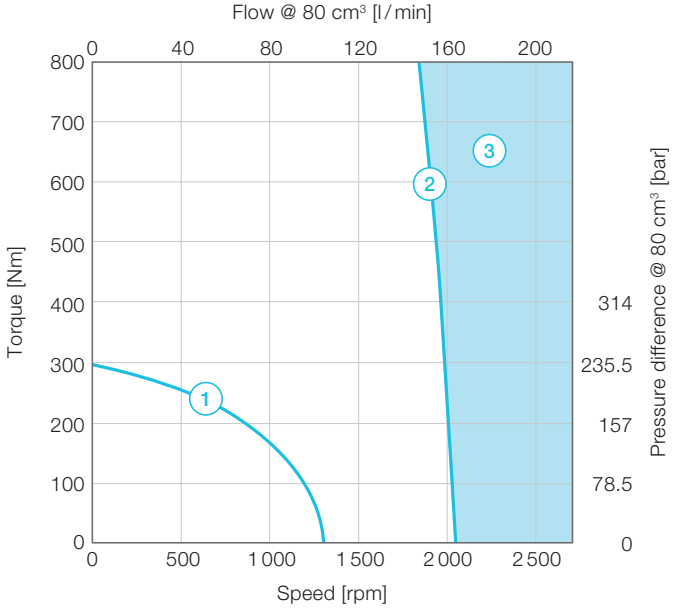
S0 C



M0 C



H0 C

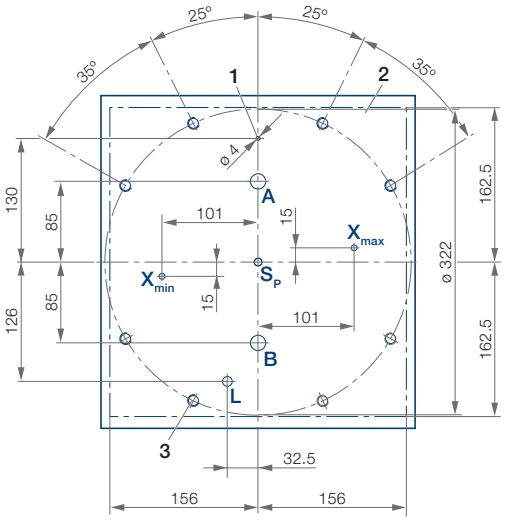


1. Continuous torque at 110 K temperature difference over ambient, max. winding temperature 150 °C
2. Maximum torque without field weakening
3. Maximum torque with field weakening

Notes:

- Motor performance with 565 V_{DC} link voltage
- Motor performance doesn‘t take the pump efficiency into account
- Pressure difference $\Delta p = p_A - p_B$

Mounting pattern



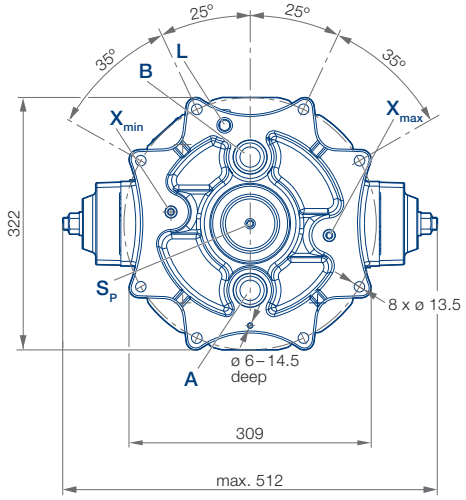
1. Use a spring-type pin with nominal diameter of 4 mm (e.g. 4x12) according to ISO 13337

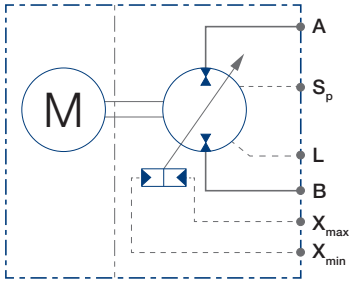
2. Area of
   – surface flatness: 0.02
   – surface roughness: Rz4

3. M12, minimum 25 mm deep.
   Recommended: Use 8 hexagon head cap screws M12 (property class 12.9, minimum length 45 mm) according to ISO 4762. Tightening torque 120 + 10 Nm.

Dimensions in mm.

Pump front view

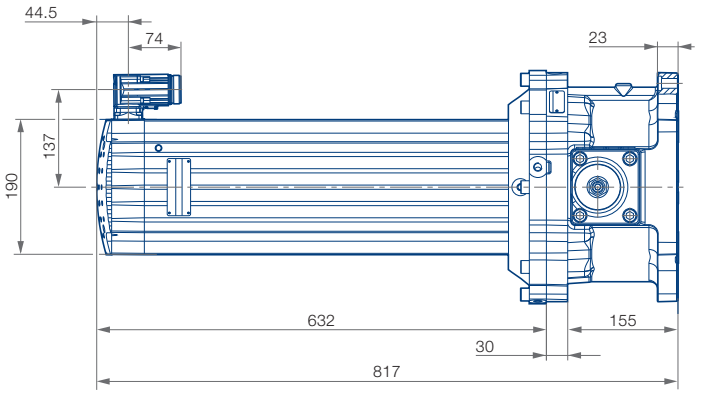




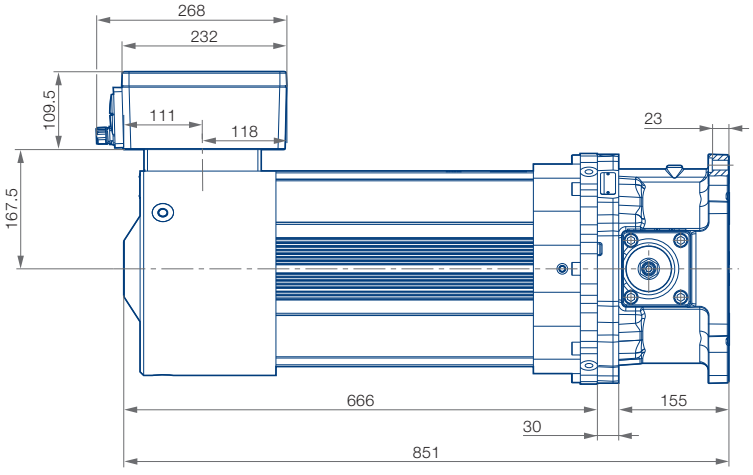
Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350	26	32
S_p	Flushing port	10	10	20
L	Leakage port	10	16.5	17
X_{max}	Control port for maximum displacement (option N1 only)	350	7	7.5
X_{min}	Control port for minimum displacement (option N1 only)	350	7	7.5

Installation drawings

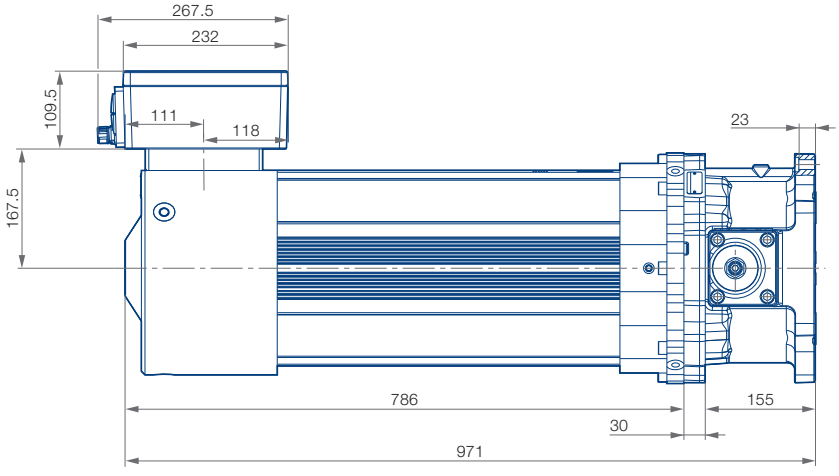
S0 C



M0 C



H0 C



Dimensions in mm.

Size 80 – Water-cooled

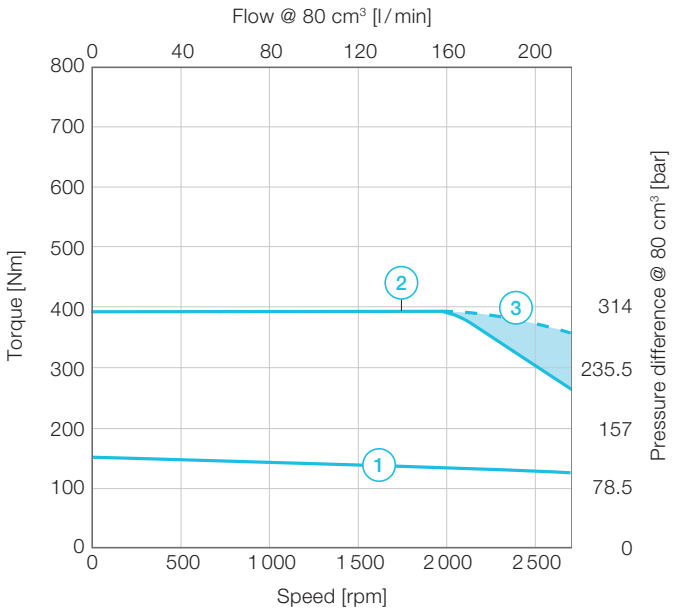
Characteristics table

Performance class		Small	Medium	High
S RQ4 080 A D xx		S0 W	M0 W	H0 W
Pump				
Displacement	V_{max}	80 cm^3/rev		
Maximum pump speed at 2.4 bar (abs.)	n_{max}	2 700 rpm		
Maximum pump acceleration	$\dot{n}_{max}$	45 000 r/min/s		
Maximum housing pressure[1]	p_{Lmax}, p_{Sp}	10 bar		
Maximum flow	Q_{max}	216 l/min		
Maximum pressure ports A and B	p_A, p_B	350 bar		
Flushing flow rate[3]	Q_{Sp}	4 – 6 l/min		
Motor				
Continuous stall torque[2]	M_0	151 Nm	227 Nm	498 Nm
Rated torque[2]	M_n	128 Nm	189 Nm	347 Nm
Maximum torque	M_{max}	391 Nm	595 Nm	1 387 Nm
Rated speed	n_n	2 500 1/min		1 800 1/min
Maximum speed	n_{max}	Maximum speed see M = f(n) performance curve		
Continuous stall current	I_0	85.95 A_{rms}	114.87 A_{rms}	235.21 A_{rms}
Maximum current	I_{max}	250 A_{rms}	340 A_{rms}	750 A_{rms}
Torque constant	k_t	1.76 Nm/A_{rms}	1.97 Nm/A_{rms}	2.12 Nm/A_{rms}
Voltage constant	k_e	106.63 V_{rms}/1,000$_{rpm}$	119.96 V_{rms}/1,000$_{rpm}$	145.87 V_{rms}/1,000$_{rpm}$
Thermal time constant	t_{th}	568 s	704 s	1 680 s
Winding resistance at 25 °C	R_{tt}	0.096 Ω	0.074 Ω	0.024 Ω
Winding inductance	L_{tt}	1.727 mH	1.44 mH	0.608 mH
Power connector		Cable box A		
Feedback connector		Signal resolver connector		
Thermal sensor		NTC 220 kOhm, Pt1000		
Cooling water flow rate	Q_W	6 – 8 l/min	6-8 l/min	8 l/min
Unit				
Inertia	J	295.8 kg cm^2	346.3 kg cm^2	1 207.3 kg cm^2
Weight	m	144.3 kg	168.1 kg	227.5 kg
Tightening torque	8x M12x45 -12.9 hexagon head	120 Nm + 10 Nm		

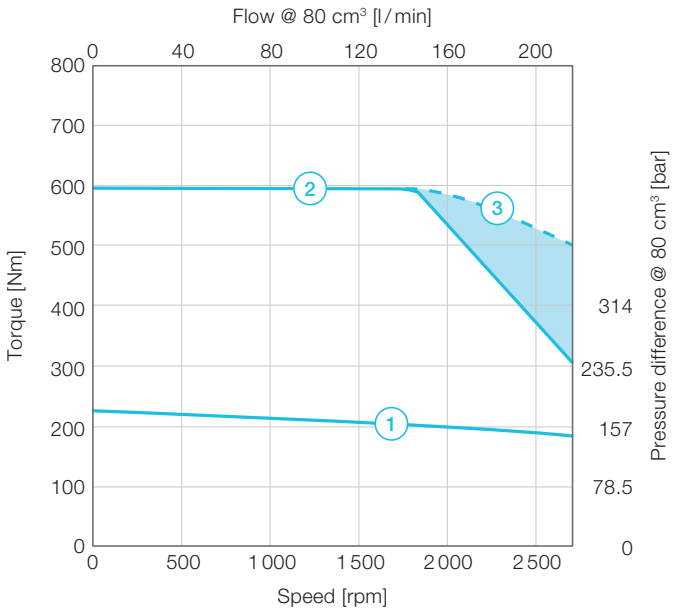
[1] See diagram “Maximum housing pressure p_{Lmax}, p_{Sp} = f(n)” and “Installation note”
[2] Operation in still air with water temperatures from +25 °C up to +40 °C. Winding temperature measure up to +110 °C over water temperature.
[3] Optional via S_p port (flushing port)

Motor performance curves

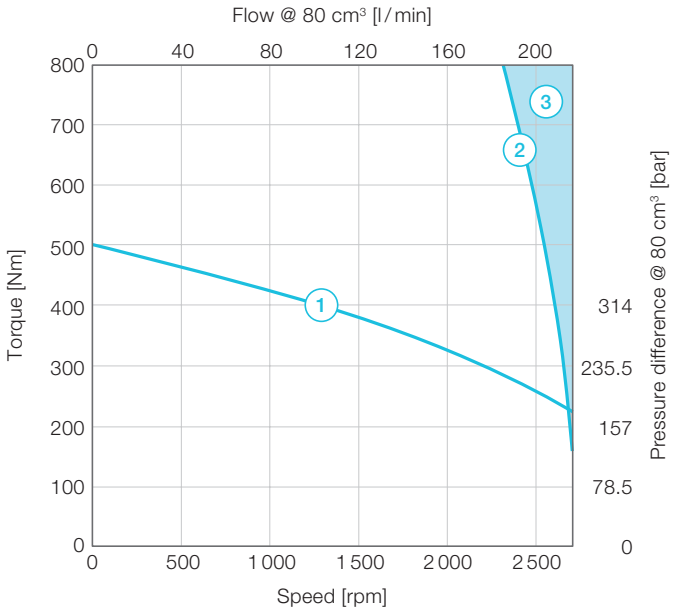
S0 W



M0 W



H0 W



(1) Continuous torque at 110 K temperature difference over water, max. winding temperature 150 °C

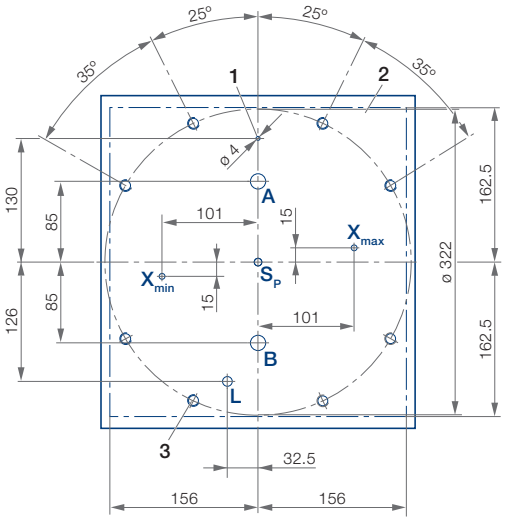
(2) Maximum torque without field weakening

(3) Maximum torque with field weakening

Notes:

- Motor performance with 565 V_{DC} link voltage
- Motor performance doesn‘t take the pump efficiency into account
- Pressure difference $\Delta p = p_A - p_B$
- Motor performance determined with respective max. cooling water flow rate, see characteristic table

Mounting pattern



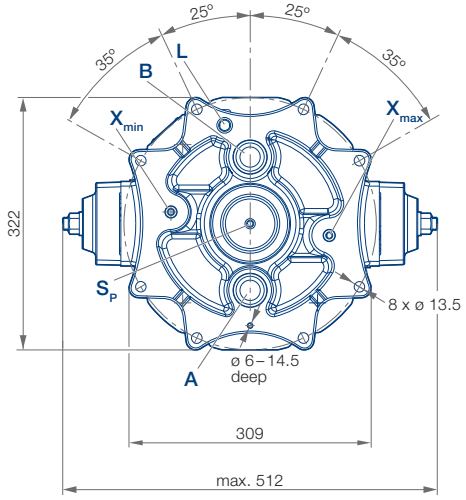
1. Use a spring-type pin with nominal diameter of 4 mm (e.g. 4x12) according to ISO 13337

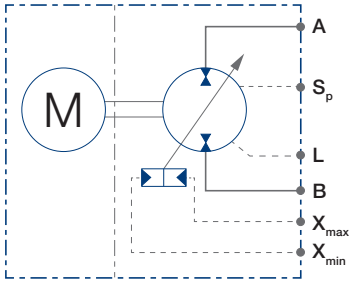
2. Area of
   – surface flatness: 0.02
   – surface roughness: Rz4

3. M12, minimum 25 mm deep.
   Recommended: Use 8 hexagon head cap screws M12 (property class 12.9, minimum length 45 mm) according to ISO 4762. Tightening torque 120 + 10 Nm.

Dimensions in mm.

Pump front view

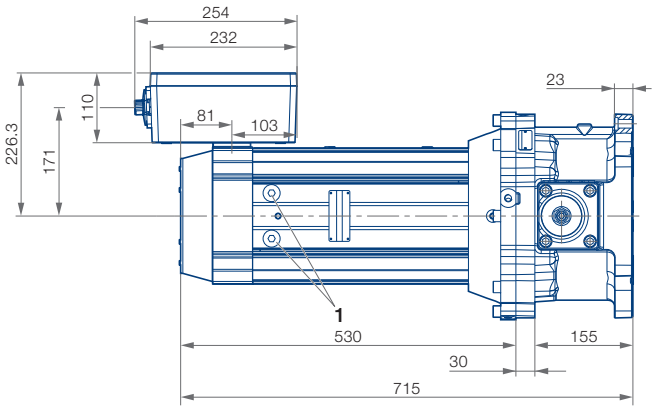




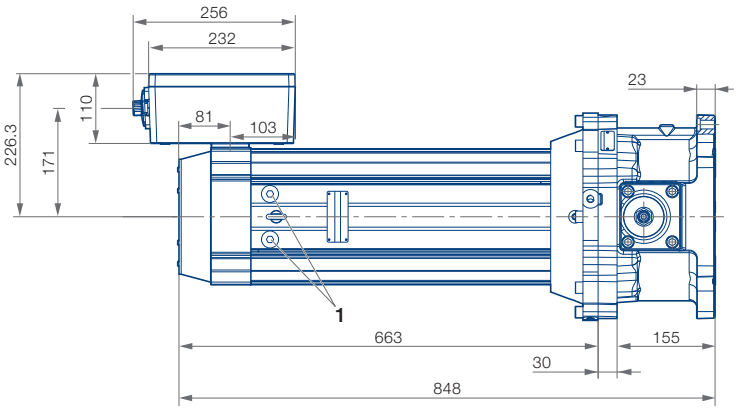
Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350	26	32
S_p	Flushing port	10	10	20
L	Leakage port	10	16.5	17
X_{max}	Control port for maximum displacement (option N1 only)	350	7	7.5
X_{min}	Control port for minimum displacement (option N1 only)	350	7	7.5

Installation drawings

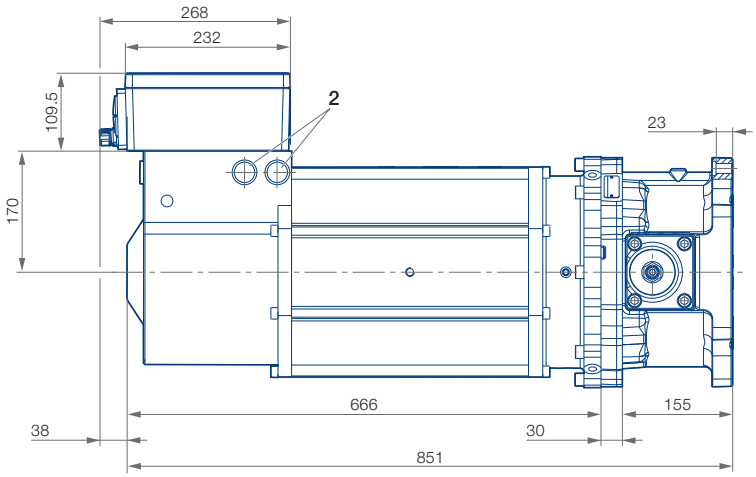
S0 W



M0 W



H0 W



Dimensions in mm.

1 Cooler outlet G1/2“ (thread depth max. 7 mm)
2 Cooler outlet G3/4“ (thread depth max. 16 mm)

Size 140 – Air-cooled

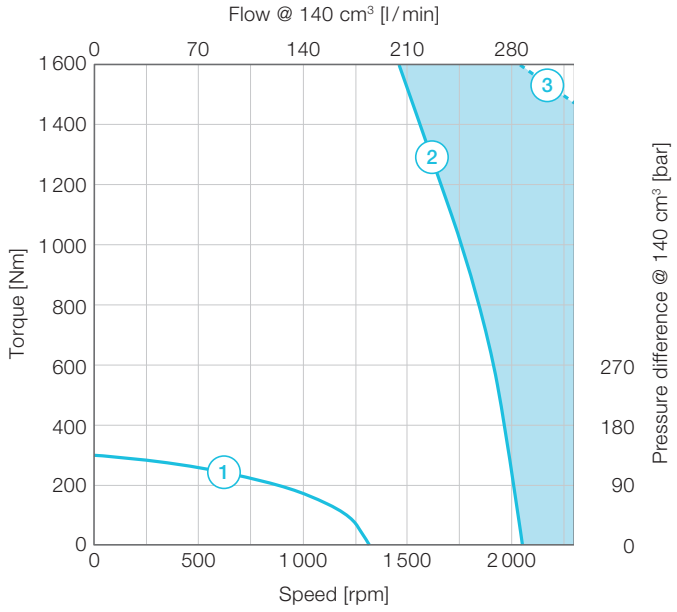
Characteristics table

Performance class		Small
S RQ4 140 A D xx		S0 C
Pump		
Displacement	V_{max}	140 cm^3/rev
Maximum pump speed at 3.7 bar (abs.)	n_{max}	2 300 rpm
Maximum pump acceleration	$\dot{n}_{max}$	28 750 r/min/s
Maximum housing pressure[1)]	p_{Lmax}, p_{Sp}	10 bar
Maximum flow	Q_{max}	322 l/min
Maximum pressure ports A and B	p_A, p_B	350 bar
Flushing flow rate[3)]	Q_{Sp}	6 – 8 l/min
Motor		
Continuous stall torque[2)]	M_0	298 Nm
Rated torque[2)]	M_n	230 Nm
Maximum torque	M_{max}	1 972 Nm
Rated speed	n_n	7 00 rpm
Maximum speed	n_{max}	Maximum speed see M = f(n) performance curve
Continuous stall current	I_0	100.63 A_{rms}
Maximum current	I_{max}	795 A_{rms}
Torque constant	k_t	2.96 Nm/A_{rms}
Voltage constant	k_e	197.70 V_{rms}/1,000$_{rpm}$
Thermal time constant	t_{th}	6 850 s
Winding resistance at 25 °C	R_{tt}	0.03 Ω
Winding inductance	L_{tt}	0.778 mH
Power connector		Cable box A
Feedback connector		Signal resolver connector
Thermal sensor		NTC 220 kOhm, Pt1000
Unit		
Inertia	J	1 722 kg cm^2
Weight	m	280.8 kg
Tightening torque	12x M12x45 -12.9 hexagon head	120 Nm + 10 Nm

[1)] See diagram “Maximum housing pressure p_{Lmax}, p_{Sp} = f(n)” and “Installation note”
[2)] Operation in still air with ambient temperatures up to +40 °C. Winding temperature measure up to +110 °C over ambient
[3)] Optional via S_p port (flushing port)

Motor performance curves

S0 C

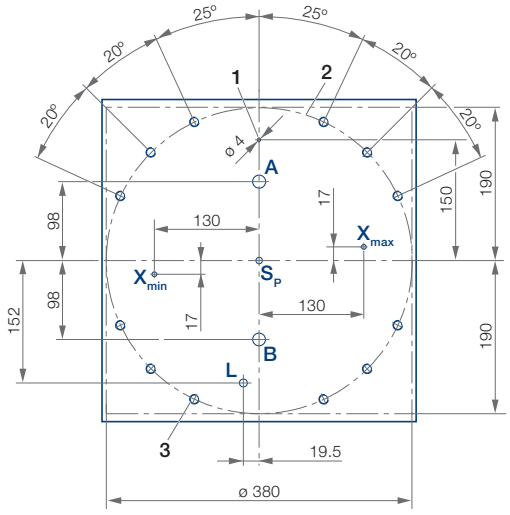


1. Continuous torque at 110 K temperature difference over ambient, max. winding temperature 150 °C
2. Maximum torque without field weakening
3. Maximum torque with field weakening

Notes:

- Motor performance with 565 V_{DC} link voltage
- Motor performance doesn‘t take the pump efficiency into account
- Pressure difference $\Delta p = p_A - p_B$

Mounting pattern



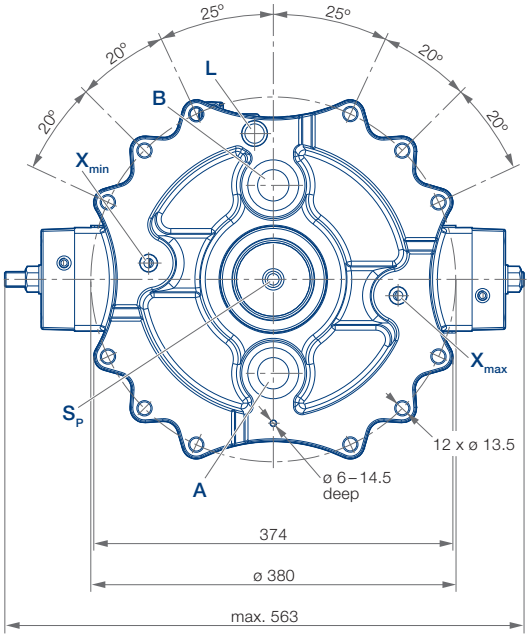
1. Use a spring-type pin with nominal diameter of 4 mm (e.g. 4x12) according to ISO 13337

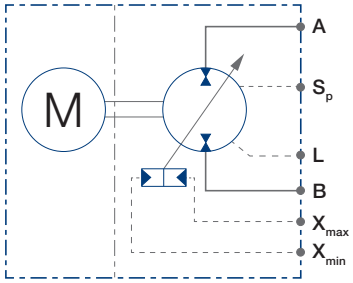
2. Area of
   – surface flatness: ▱ | 0.02
   – surface roughness: Rz4

3. M12, minimum 25 mm deep.
   Recommended: Use 12 hexagon head cap screws M12 (property class 12.9, minimum length 45 mm) according to ISO 4762. Tightening torque 120 + 10 Nm.

Dimensions in mm.

Pump front view

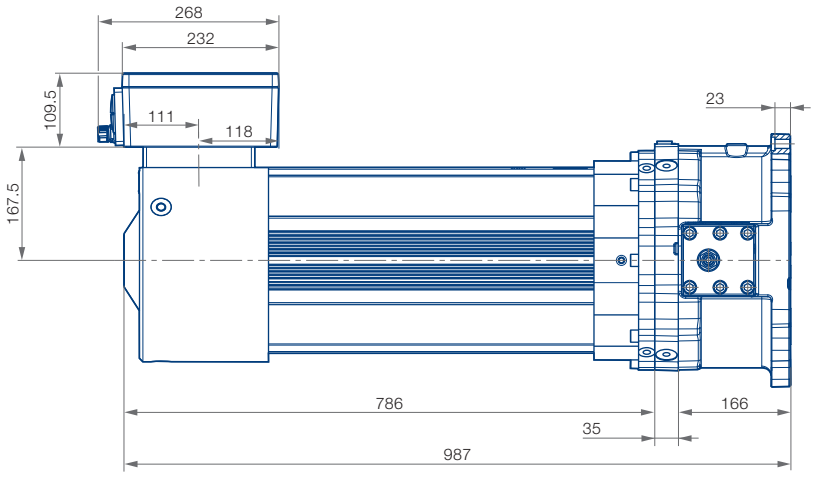




Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350	32.5	38
S_p	Flushing port	10	12	25
L	Leakage port	10	19.5	20
X_{max}	Control port for maximum displacement (option N1 only)	350	9.5	10
X_{min}	Control port for minimum displacement (option N1 only)	350	9.5	10

Installation drawings

S0 C



Dimensions in mm.

Size 140 – Water-cooled

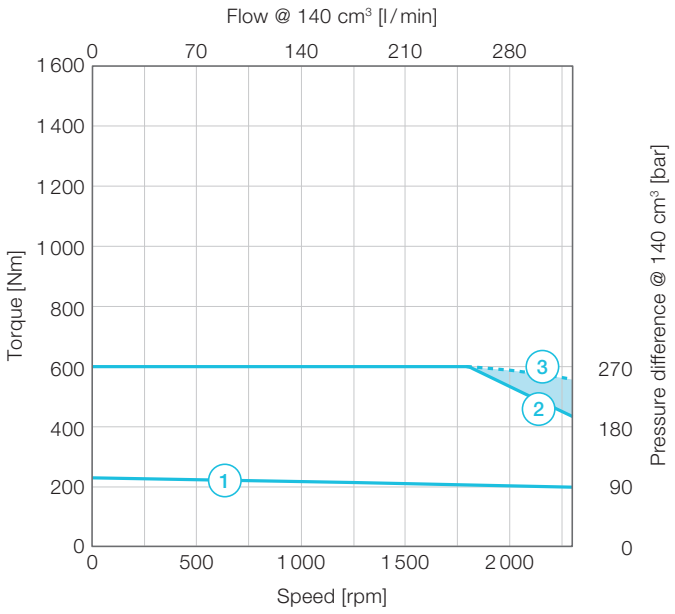
Characteristics table

Performance class		Small	Medium	High
S RQ4 140 A D xx		S0 W	M0 W	H0 W
Pump				
Displacement	V_{max}	140 cm^3/rev		
Maximum pump speed at 3.7 bar (abs.)	n_{max}	2 300 rpm		
Maximum pump acceleration	$\dot{n}_{max}$	28 750 r/min/s		
Maximum housing pressure[1]	p_{Lmax}, p_{Sp}	10 bar		
Maximum flow	Q_{max}	322 l/min		
Maximum pressure ports A and B	p_A, p_B	350 bar		
Flushing flow rate[3]	Q_{Sp}	6 – 8 l/min		
Motor				
Continuous stall torque[2]	M_0	227 Nm	498 Nm	654 Nm
Rated torque[2]	M_n	189 Nm	347 Nm	427 Nm
Maximum torque	M_{max}	595 Nm	1 387 Nm	1 950 Nm
Rated speed	n_n	2 500 rpm	1 800 rpm	1 800 rpm
Maximum speed	n_{max}	Maximum speed see M = f(n) performance curve		
Continuous stall current	I_0	114.87 A_{rms}	235.21 A_{rms}	230.9 A_{rms}
Maximum current	I_{max}	340 A_{rms}	750 A_{rms}	795 A_{rms}
Torque constant	k_t	1.97 Nm/A_{rms}	2.12 Nm/A_{rms}	2.83 Nm/A_{rms}
Voltage constant	k_e	119.96 V_{rms}/1 000_{rpm}	145.87 V_{rms}/1 000_{rpm}	195.48 V_{rms}/1 000_{rpm}
Thermal time constant	t_{th}	704 s	1,680 s	1,970 s
Winding resistance at 25 °C	R_{tt}	0.074 Ω	0.024 Ω	0.03 Ω
Winding inductance	L_{tt}	1.44 mH	0.608 mH	0.804 mH
Power connector		Cable box A		
Feedback connector		Signal resolver connector		
Thermal sensor		NTC 220 kOhm, Pt1000		
Cooling water flow rate	Q_W	6 – 8 l/min	8 l/min	8 l/min
Unit				
Inertia	J	540 kg cm^2	1,401 kg cm^2	1,722 kg cm^2
Weight	m	199.4 kg	258.8 kg	295.8 kg
Tightening torque	12x M12x45 -12.9 hexagon head	120 Nm + 10 Nm		

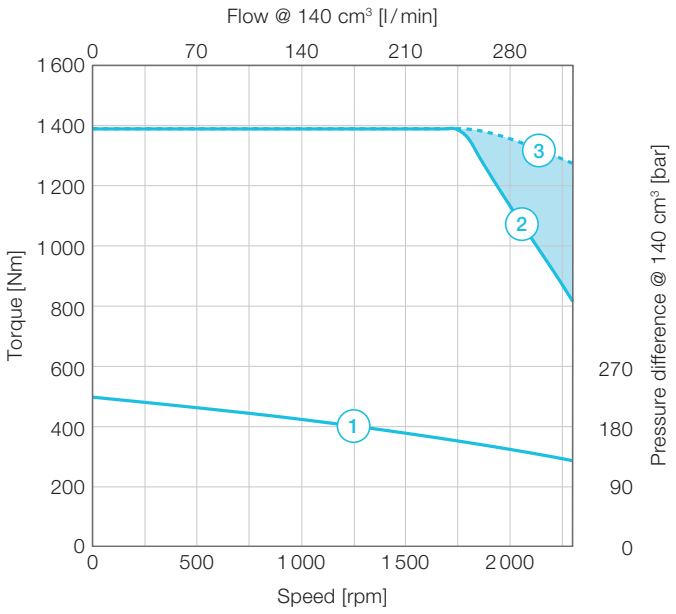
[1] See diagram “Maximum housing pressure p_{Lmax}, p_{Sp} = f(n)” and “Installation note”
[2] Operation in still air with water temperatures from +25 °C up to +40 °C. Winding temperature measure up to +110 °C over water temperature.
[3] Optional via S_p port (flushing port)

Motor performance curves

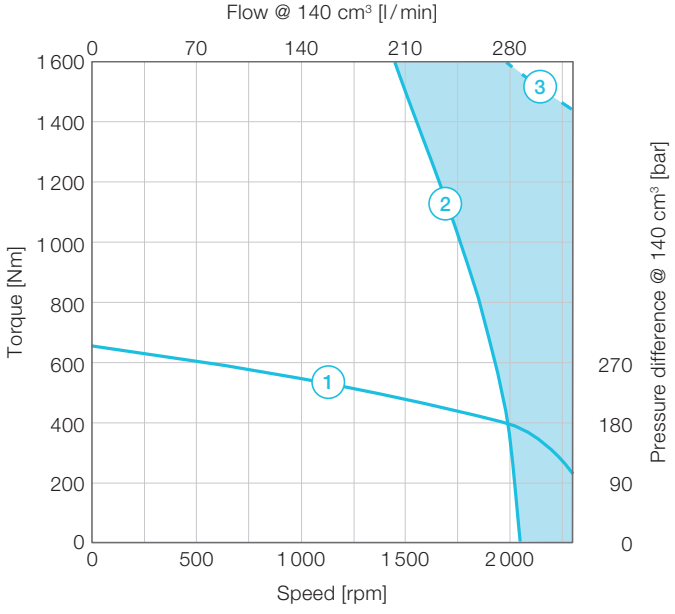
S0 W



M0 W



H0 W

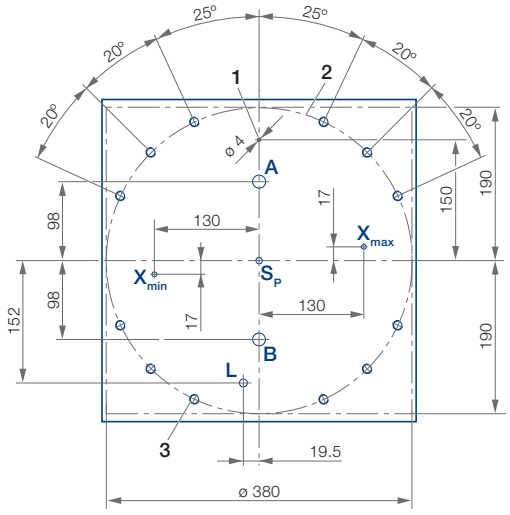


1. Continuous torque at 110 K temperature difference over water, max. winding temperature 150 °C
2. Maximum torque without field weakening
3. Maximum torque with field weakening

Notes:

- Motor performance with 565 V_{DC} link voltage
- Motor performance doesn‘t take the pump efficiency into account
- Pressure difference $\Delta p = p_A - p_B$
- Motor performance determined with respective max. cooling water flow rate, see characteristic table

Mounting pattern



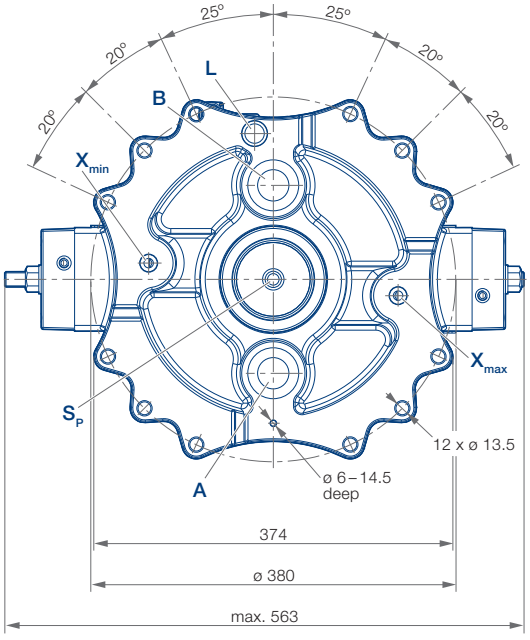
1. Use a spring-type pin with nominal diameter of 4 mm (e.g. 4x12) according to ISO 13337

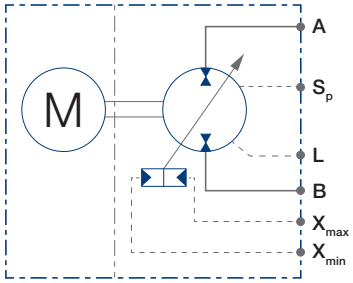
2. Area of
   – surface flatness: 0.02
   – surface roughness: Rz4

3. M12, minimum 25 mm deep.
   Recommended: Use 12 hexagon head cap screws M12 (property class 12.9, minimum length 45 mm) according to ISO 4762. Tightening torque 120 + 10 Nm.

Dimensions in mm.

Pump front view

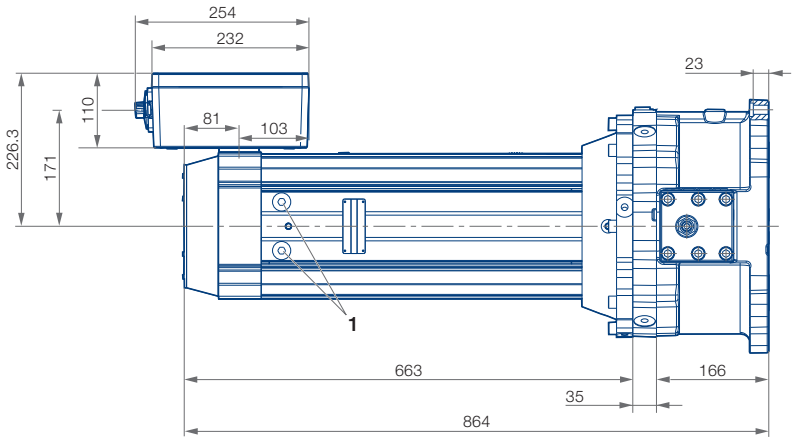




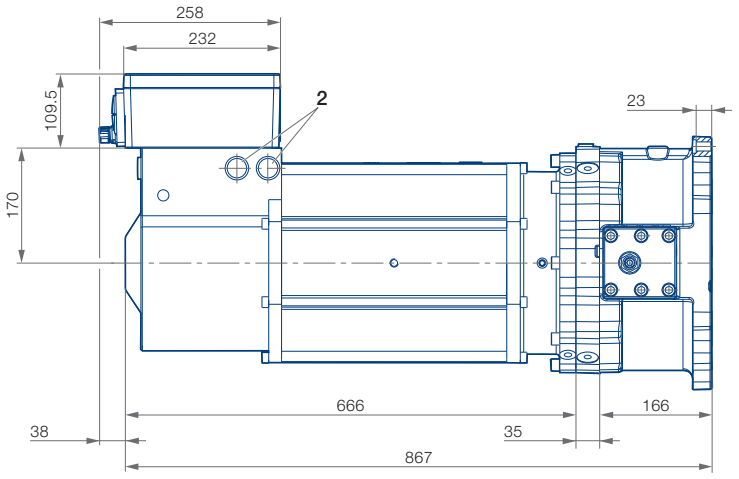
Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350	32.5	38
S_p	Flushing port	10	12	25
L	Leakage port	10	19.5	20
X_{max}	Control port for maximum displacement (option N1 only)	350	9.5	10
X_{min}	Control port for minimum displacement (option N1 only)	350	9.5	10

Installation drawings

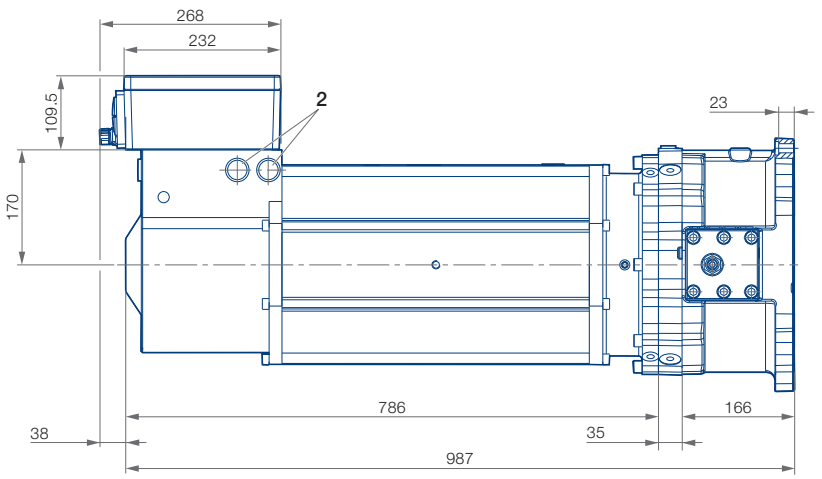
S0 W



M0 W



H0 W



Dimensions in mm.

1 Cooler outlet G1/2“ (thread depth max. 7 mm)
2 Cooler outlet G3/4“ (thread depth max. 16 mm)

Size 250 – Air-cooled

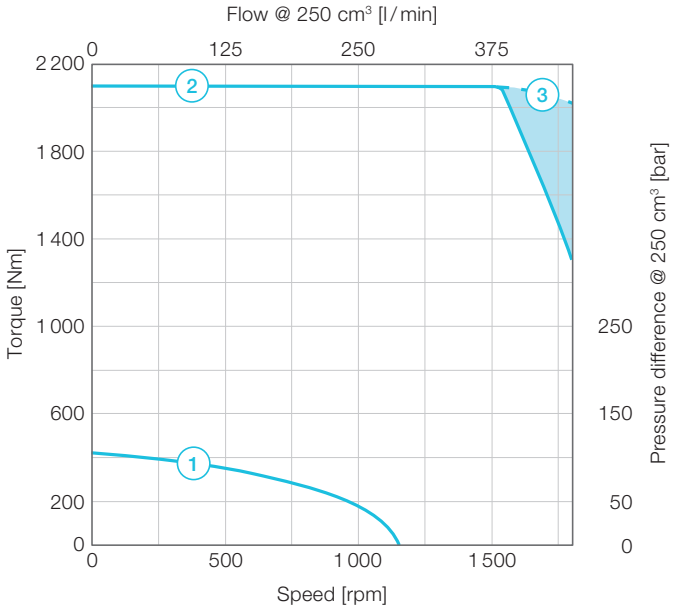
Characteristics table

Performance class		Small
S RQ4 250 A D xx		S0 C
Pump		
Displacement	V_{max}	250 cm^3/rev
Maximum pump speed at 3 bar (abs.)	n_{max}	1 800 rpm
Maximum pump acceleration	$\dot{n}_{max}$	18 000 r/min/s
Maximum housing pressure[1)]	p_{Lmax}, p_{Sp}	10 bar
Maximum flow	Q_{max}	450 l/min
Maximum pressure ports A and B	p_A, p_B	350 bar
Flushing flow rate[3)]	Q_{Sp}	10 – 12 l/min
Motor		
Continuous stall torque[2)]	M_0	418 Nm
Rated torque[2)]	M_n	330 Nm
Maximum torque	M_{max}	2 100 Nm
Rated speed	n_n	575 rpm
Maximum speed	n_{max}	Maximum speed see M = f(n) performance curve
Continuous stall current	I_0	141.11 A_{rms}
Maximum current	I_{max}	800 A_{rms}
Torque constant	k_t	2.96 Nm/A_{rms}
Voltage constant	k_e	197.70 V_{rms}/1 000$_{rpm}$
Thermal time constant	t_{th}	8 600 s
Winding resistance at 25 °C	R_{tt}	0.019 Ω
Winding inductance	L_{tt}	0.548 mH
Power connector		Cable box B
Feedback connector		Signal resolve connector
Thermal sensor		NTC 220 kOhm, Pt1000
Unit		
Inertia	J	3 540 kg cm^2
Weight	m	535 kg
Tightening torque	12x M12x50 -12.9 hexagon head	120 Nm + 10 Nm

[1)] See diagram “Maximum housing pressure p_{Lmax}, p_{Sp} = f(n)” and “Installation note”
[2)] Operation in still air with ambient temperatures up to +40 °C. Winding temperature measure up to +110 °C over ambient
[3)] Optional via S_p port (flushing port)

Motor performance curves

S0 C

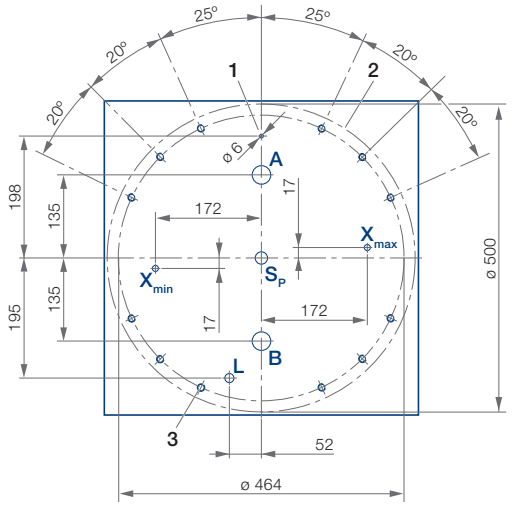


1. Continuous torque at 110 K temperature difference over ambient, max. winding temperature 150 °C
2. Maximum torque without field weakening
3. Maximum torque with field weakening

Notes:

- Motor performance with 565 V_{DC} link voltage
- Motor performance doesn‘t take the pump efficiency into account
- Pressure difference $\Delta p = p_A - p_B$

Mounting pattern



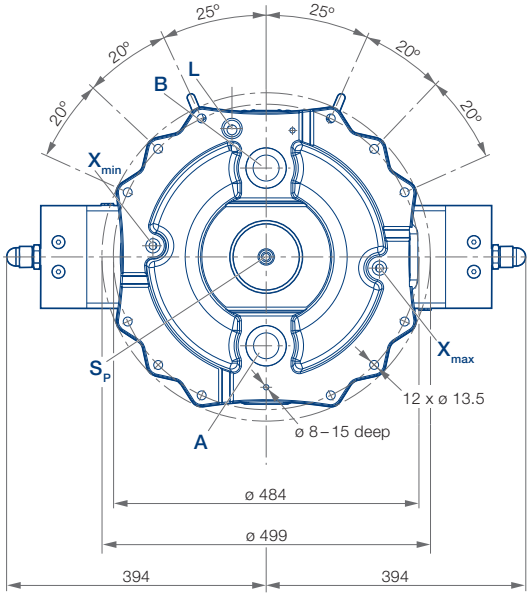
1. Use a spring-type pin with nominal diameter of 4 mm (e.g. 4x12) according to ISO 13337

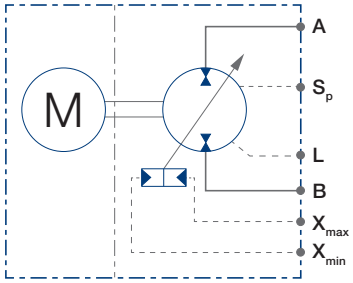
2. Area of
   – surface flatness: 0.02
   – surface roughness: Rz4

3. M12, minimum 25 mm deep.
   Recommended: Use 12 hexagon head cap screws M12 (property class 12.9, minimum length 45 mm) according to ISO 4762. Tightening torque 120 + 10 Nm.

Dimensions in mm.

Pump front view

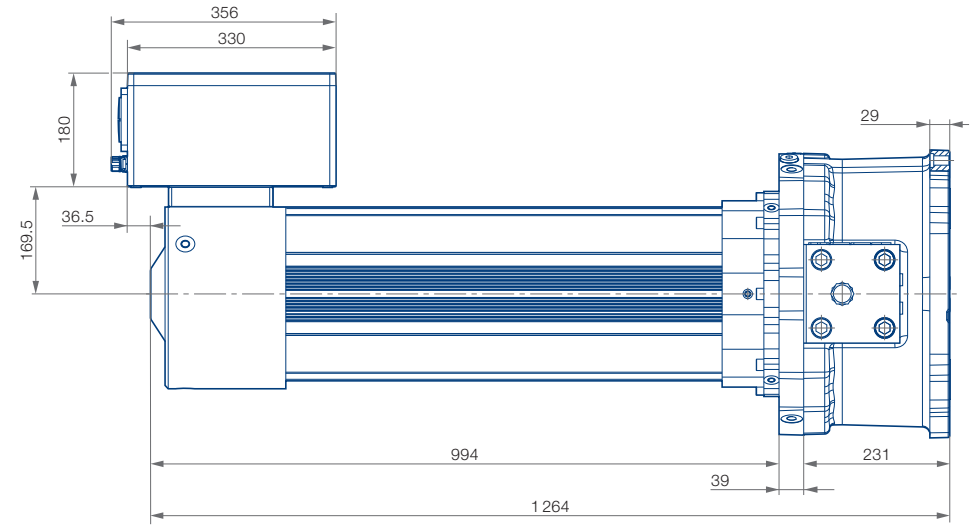




Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350	39	45
S_p	Flushing port	10	10	25
L	Leakage port	10	24	25
X_{max}	Control port for maximum displacement (option N1 only)	350	12	13
X_{min}	Control port for minimum displacement (option N1 only)	350	12	13

Installation drawings

S0 C



Dimensions in mm.

Size 250 – Water-cooled

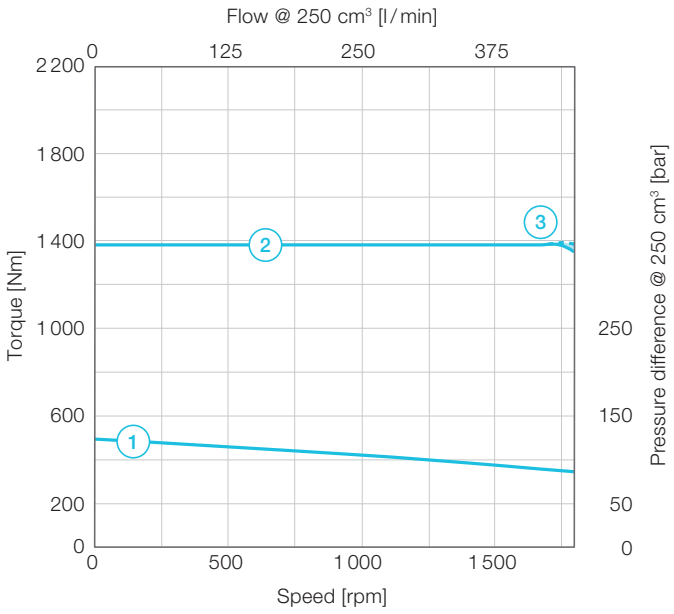
Characteristics table

Performance class		Small	Medium	High
S RQ4 250 A D xx		S0 W	M0 W	H0 W
Pump				
Displacement	V_{max}	250 cm^3/rev		
Maximum pump speed at 3 bar (abs.)	n_{max}	1 800 rpm		
Maximum pump acceleration	$\dot{n}_{max}$	18 000 r/min/s		
Maximum housing pressure[1]	p_{Lmax}, p_{Sp}	10 bar		
Maximum flow	Q_{max}	450 l/min		
Maximum pressure ports A and B	p_A, p_B	350 bar		
Flushing flow rate[3]	Q_{Sp}	10 – 12 l/min		
Motor				
Continuous stall torque[2]	M_0	498 Nm	654 Nm	967 Nm
Rated torque[2]	M_n	347 Nm	427 Nm	605 Nm
Maximum torque	M_{max}	1 387 Nm	1 950 Nm	1 969 Nm
Rated speed	n_n	1 800 rpm	1 800 rpm	1 700 rpm
Maximum speed	n_{max}	Maximum speed see M = f(n) performance curve		
Continuous stall current	I_0	235.21 A_{rms}	230.9 A_{rms}	340.35 A_{rms}
Maximum current	I_{max}	750 A_{rms}	795 A_{rms}	750 A_{rms}
Torque constant	k_t	2.12 Nm/A_{rms}	2.83 Nm/A_{rms}	2.84 Nm/A_{rms}
Voltage constant	k_e	145.87 V_{rms}/1 000_{rpm}	195.48 V_{rms}/1 000_{rpm}	195.48 V_{rms}/1 000_{rpm}
Thermal time constant	t_{th}	1 680 s	1 970 s	2 500 s
Winding resistance at 25 °C	R_{tt}	0.024 Ω	0.03 Ω	0.018 Ω
Winding inductance	L_{tt}	0.608 mH	0.804 mH	0.572 mH
Power connector		Cable box A		Cable box B
Feedback connector		Signal resolver connector		
Thermal sensor		NTC 220 kOhm, Pt1000		
Cooling water flow rate	Q_W	8 l/min	8 l/min	8 l/min
Unit				
Inertia (pump and motor)	J	2 576 kg cm^2	2 897 kg cm^2	3 540 kg cm^2
Weight (pump and motor)	m	443 kg	480 kg	555 kg
Tightening torque	12x M12x50 -12.9 hexagon head	120 Nm + 10 Nm		

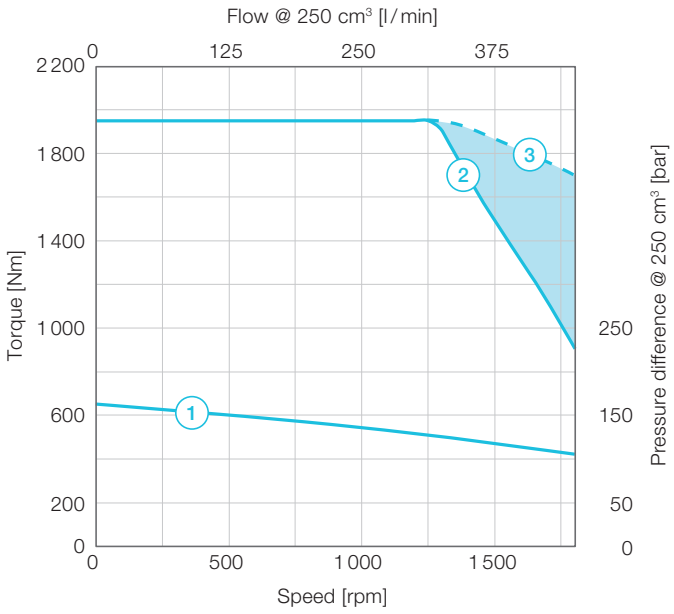
[1] See diagram “Maximum housing pressure p_{Lmax}, p_{Sp} = f(n)” and “Installation note”
[2] Operation in still air with water temperatures from +25 °C up to +40 °C. Winding temperature measure up to +110 °C over water temperature.
[3] Optional via S_p port (flushing port)

Motor performance curves

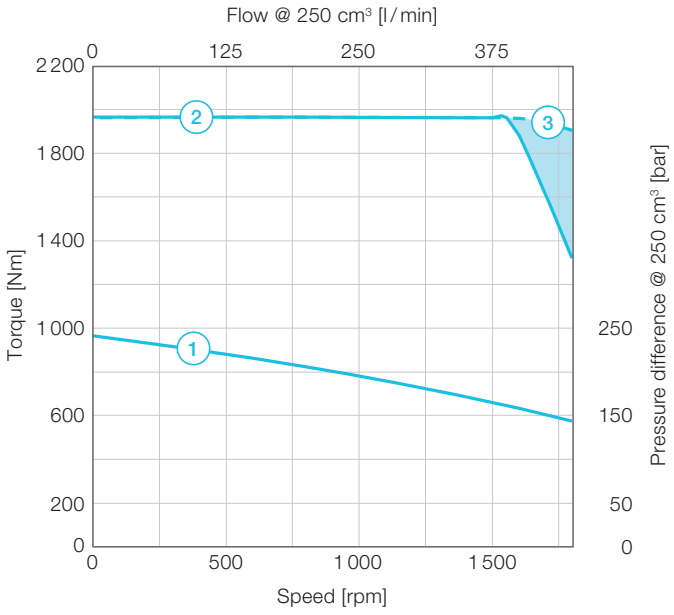
S0 W



M0 W



H0 W



(1) Continuous torque at 110 K temperature difference over water, max. winding temperature 150 °C

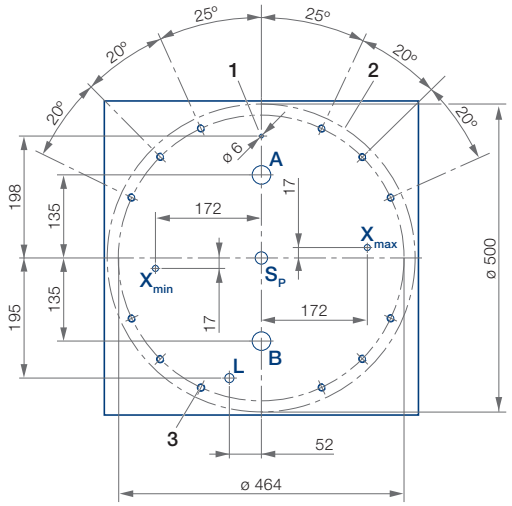
(2) Maximum torque without field weakening

(3) Maximum torque with field weakening

Notes:

- Motor performance with 565 V_{DC} link voltage
- Motor performance doesn‘t take the pump efficiency into account
- Pressure difference $\Delta p = p_A - p_B$
- Motor performance determined with respective max. cooling water flow rate, see characteristic table

Mounting pattern



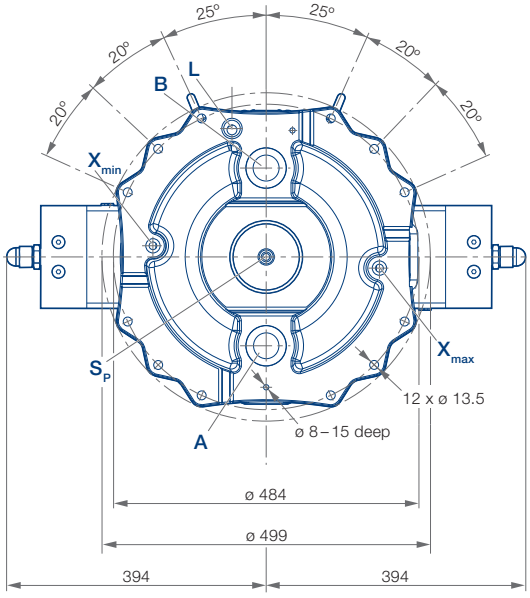
1. Use a spring-type pin with nominal diameter of 4 mm (e.g. 4x12) according to ISO 13337

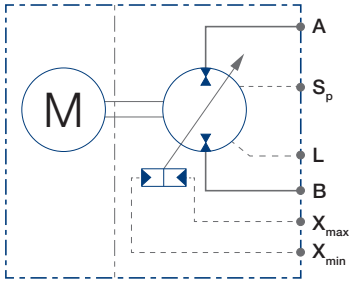
2. Area of
   – surface flatness: 0.02
   – surface roughness: Rz4

3. M12, minimum 25 mm deep.
   Recommended: Use 12 hexagon head cap screws M12 (property class 12.9, minimum length 45 mm) according to ISO 4762. Tightening torque 120 + 10 Nm.

Dimensions in mm.

Pump front view

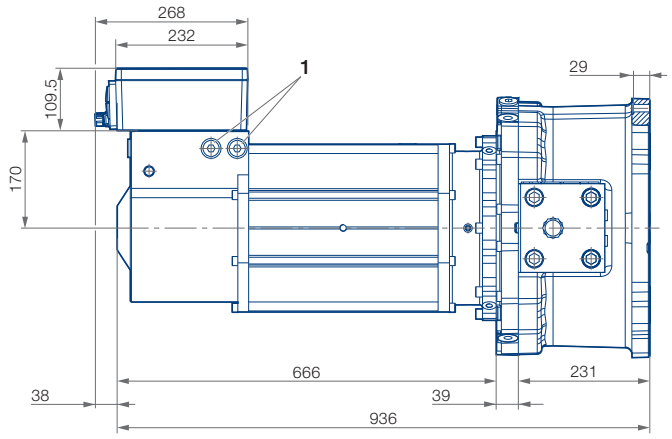




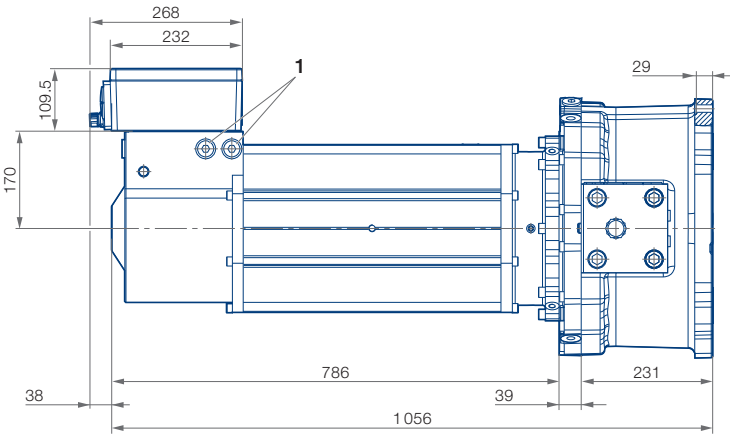
Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350	39	45
S_p	Flushing port	10	10	25
L	Leakage port	10	24	25
X_{max}	Control port for maximum displacement (option N1 only)	350	12	13
X_{min}	Control port for minimum displacement (option N1 only)	350	12	13

Installation drawings

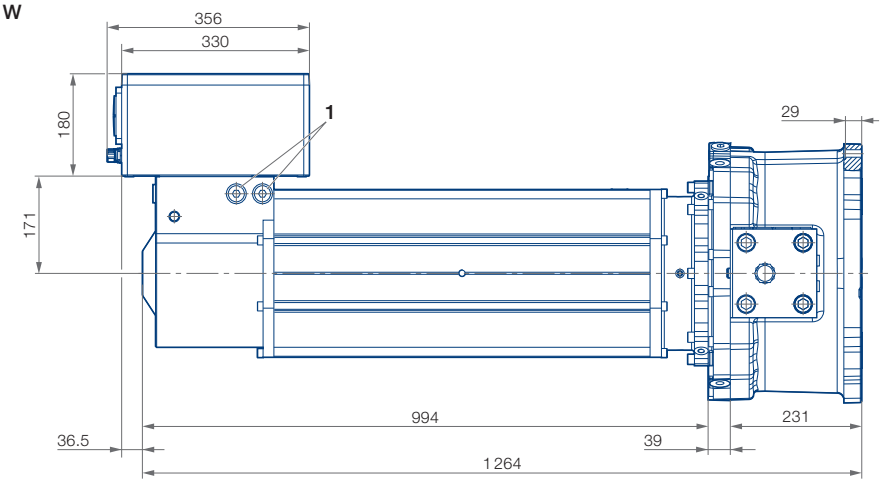
S0 W



M0 W



H0 W

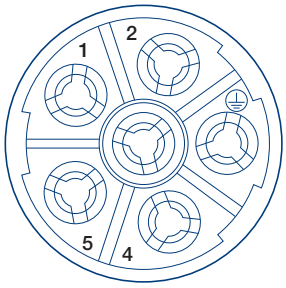


Dimensions in mm.

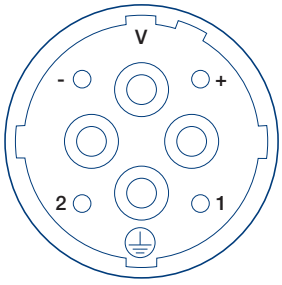
1 Cooler outlet G3/4“ (thread depth max. 16 mm)

Electrical interfaces
Power connectors

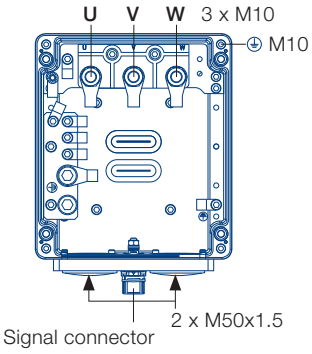
Size 1

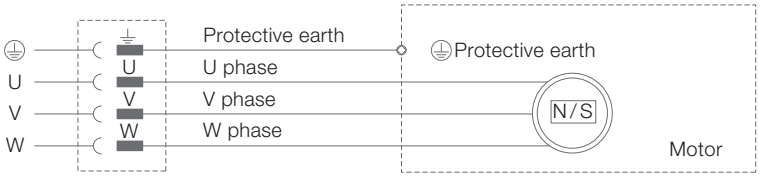


Size 1.5

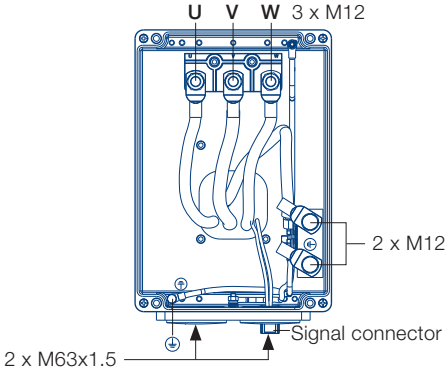


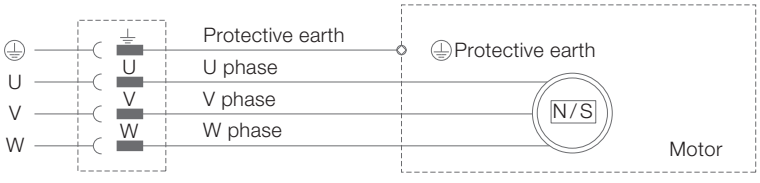
Cable box A



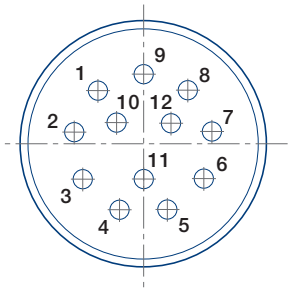


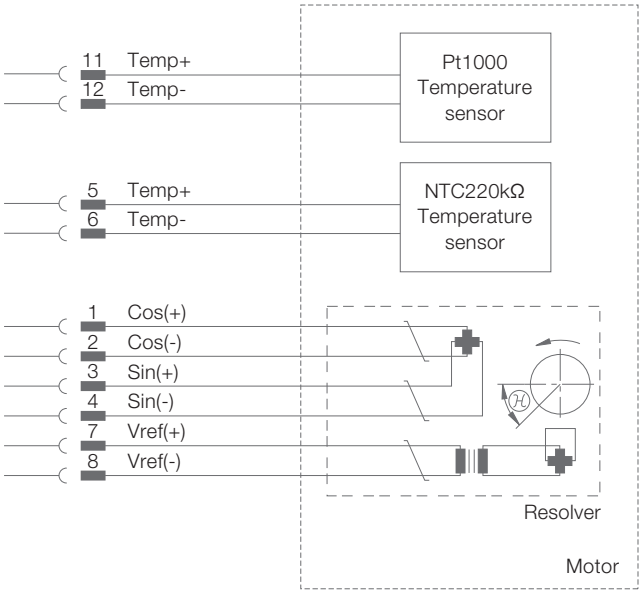
Cable box B





Signal resolver connector





Calculations

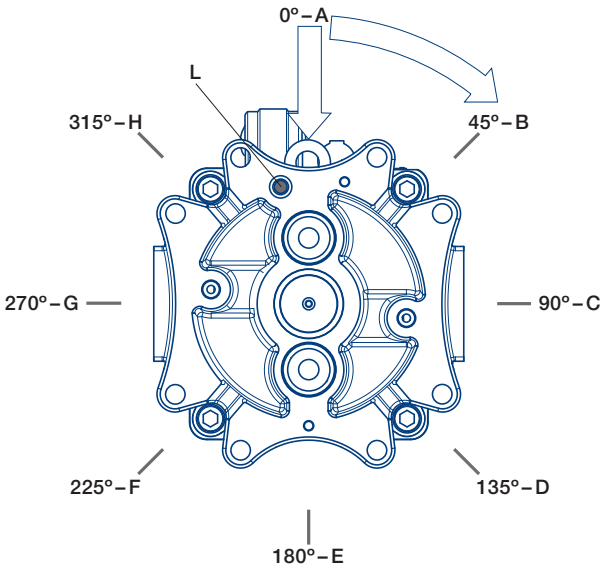
$$M = \frac{V \cdot \Delta p}{2\pi \cdot 10}$$

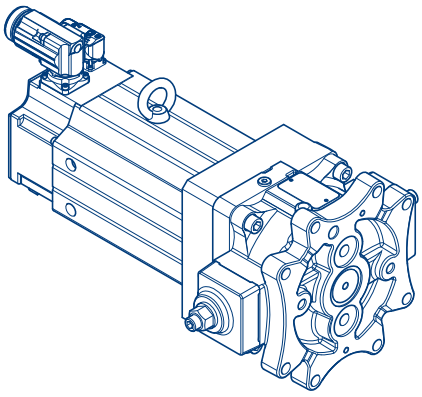
M [Nm] = Torque
V [cm^3] = Displacement
Δp [bar] = Pressure difference $p_A - p_B$

$$n = \frac{Q \cdot 1\,000}{V}$$

n [r/min] = Speed
Q [l/min] = Flow

Orientation of electrical connectors and liquid cooling ports





Example shows:
Connector orientation = A
Cooling connection = G

Notes:

- Angle starts on port L
- Air cooled and fan cooled option uses Z in model number pos. 12
- Angle between electrical and liquid cooling ports is fixed at -90°

Available connector orientations

Air-cooled

										A	Z	B	Z	C	Z	D	Z	E	Z	F	Z	G	Z	H	Z	
x	RQ4	19	x	x	xx	S0	C	x	x	●	●															…
x	RQ4	19	x	x	xx	M0	C	x	x			●	●			●	●			●	●			●	●	…
x	RQ4	19	x	x	xx	H0	C	x	x			●	●			●	●			●	●			●	●	…
x	RQ4	32	x	x	xx	xx	C	x	x	●	●			●	●			●	●			●	●			…
x	RQ4	80	x	x	xx	xx	C	x	x	●	●			●	●			●	●			●	●			…
x	RQ4	140	x	x	xx	xx	C	x	x	●	●			●	●			●	●			●	●			…
x	RQ4	250	x	x	xx	xx	C	x	x	●	●			●	●			●	●			●	●			…

Fan-cooled

										A	Z	B	Z	C	Z	D	Z	E	Z	F	Z	G	Z	H	Z	
x	RQ4	19	x	x	xx	S0	C	x	x	●	●							●	●							…
x	RQ4	19	x	x	xx	M0	C	x	x	●	●							●	●							…
x	RQ4	19	x	x	xx	H0	C	x	x			●	●			●	●			●	●			●	●	…
x	RQ4	32	x	x	xx	xx	C	x	x	●	●			●	●			●	●			●	●			…
x	RQ4	80	x	x	xx	xx	C	x	x	●	●			●	●			●	●			●	●			…
x	RQ4	140	x	x	xx	xx	C	x	x	●	●			●	●			●	●			●	●			…
x	RQ4	250	x	x	xx	xx	C	x	x	●	●			●	●			●	●			●	●			…

Water-cooled

										A	G	C	A	E	C	G	E	
x	RQ4	19	x	x	xx	xx	W	x	x	●	●			●	●			…
x	RQ4	32	x	x	xx	xx	W	x	x	●	●			●	●			…
x	RQ4	80	x	x	xx	xx	W	x	x	●	●	●	●	●	●	●	●	…
x	RQ4	140	x	x	xx	xx	W	x	x	●	●	●	●	●	●	●	●	…
x	RQ4	250	x	x	xx	xx	W	x	x	●	●	●	●	●	●	●	●	…

● Standard option
● Available option

Switching of displacement volumes depending on the working phase
Dual Displacement

Drive systems in machines have to meet different requirements in the course of a machine cycle. High feed and retraction speeds are required in alternation with high forces. To meet these requirements, drive systems with hydraulic power transmission need high volume flows to realize fast movements and high pressures to apply high forces. The sizes of the drive components pump, motor and servo inverter are designed in such a way that the requirements for volume flow and pressure correspond to the two work phases.

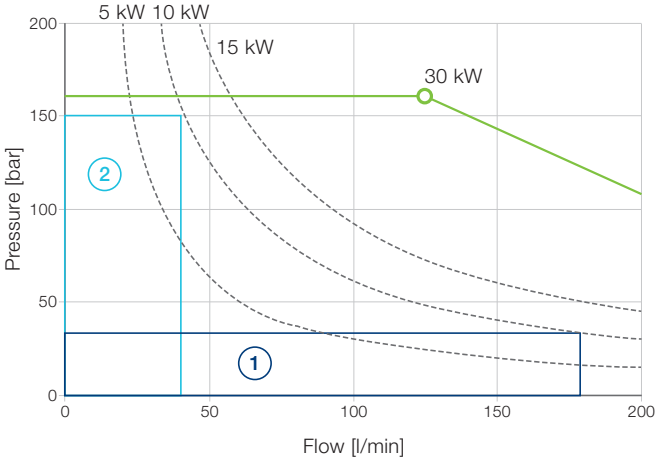
With DrivAx RQ4, this is not necessary. The delivery volume of the pump can be adapted to the requirements of two different work phases. In phases where high speed with low force is required, the pump is set to maximum displacement volume. When high force is required in the process, the pump is switched to minimum displacement volume. This reduces the travel speed, but motor torque is able to generate the maximum pressure, and thus the maximum force, due to the reduced displacement volume.

We call the switching of displacement volumes depending on the working phase “Dual Displacement”. Dual Displacement reduces the required size and power of the servo motor and inverter, resulting in:

- Reduced costs for the machine builder
- Reduced investment costs for the end user
- Increased energy efficiency and thus reduced CO_2 emissions of the drive / plant
- Reduced resource requirements and thus protection of the environment

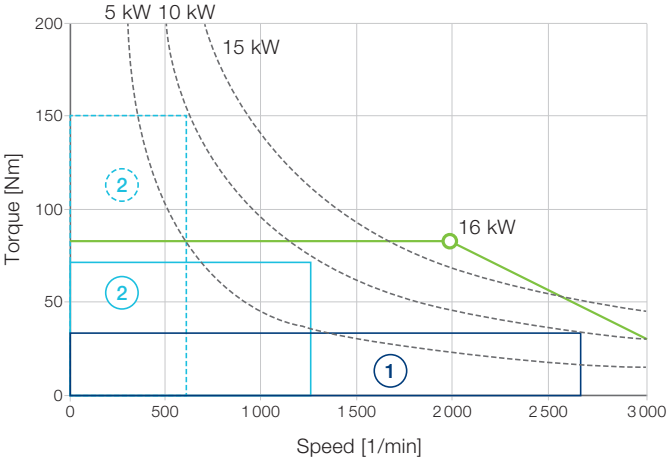
Comparison of machine cycles

Without Dual Displacement



1 Phase 1
2 Phase 2
Motor power curve
Motor characteristic

With Dual Displacement



1 Phase 1: 63 cm³
2 Phase 2: 63 cm³, Dual Displacement inactiv
2 Phase 2: 30 cm³, Dual Displacement activ
Motor power curve
Motor characteristic

Phase 1: High displacement volume for high actuator speed at low pressure
Phase 2: High pressure for high actuator force at low displacement volume

Type code

Model number
(assigned at the factory)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
S	RQ4	_ _ _	A	D	_ _	_ _ _	_	S	_	_	_	1 -	_ _ _	/ _ _ _

1 Product division
S Standard

2 Product type
DrivAx RQ4

3 Nominal displacement RPP [cm³/U]
019 19
032 32
080 80
140 140
250 250

4 Pump ports
A 2 operating ports

5 Fluid
D Mineral oil, HFD

6 Controllers
B1 Mechanical stroke adjustment (V = constant)
N1 Dual displacement

7 Performance class
S0 Small performance class
M0 Medium performance class
H0 High performance class

8 Cooling
C Air-cooled
F Fan-cooled
W Water-cooled

9 Motor construction
S Sealing

10 Electrical connection
3 Angle rotatable
4 Cable box

11 Connector orientation
A 0°
H 315° for S RQ4 - 019 x x xx - M0 C or S RQ4 - 019 x x xx - H0 C or S RQ4 - 019 x x xx - H0 F

12 Cooling connection (liquid cooling)
G 270°
Z Not liquid cooled

13 Feedback option
1 2-poles resolver

14 Maximum displacement V_{max}
XXX V_{max} (see table below)

15 Minimum displacement V_{min}
YYY V_{min} (see table below)
000 Controller B1 (V = constant)

V_{max} and V_{min} options for type code (positions 14, 15)

				Ratio V_n / V_{min}				
				1.5	2	2.5	3	4
Nominal displacement V_n [cm³]	Maximum displacement V_{max} [cm³]			Minimum displacement V_{min} [cm³]				
19	19	15	10	13	10	8	6	5
32	32	28	24	21	16	13	11	8
80	80	64	48	53	40	32	27	20
140	140	120	100	93	70	56	47	35
250	250	215	180	167	125	100	83	63

XXX Standard option

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