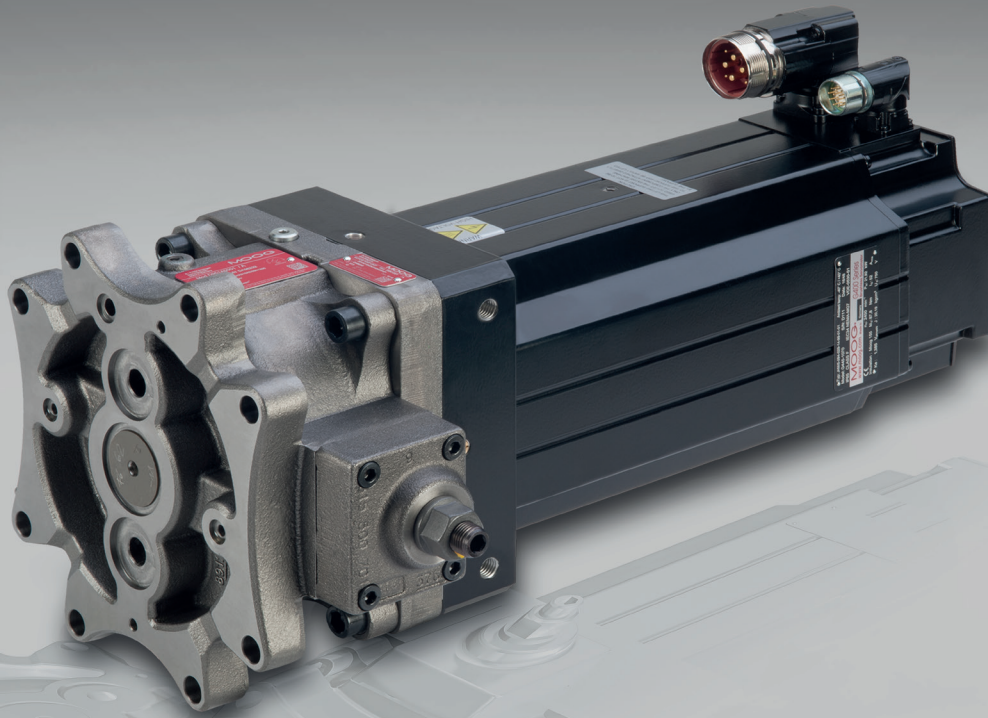


# ELECTROHYDROSTATIC PUMP UNIT



Rev. J, July 2022

MODULAR ELECTROHYDROSTATIC PUMP UNIT  
FOR INDUSTRIAL APPLICATIONS

WHAT MOVES YOUR WORLD

**MOOG**

Whenever the highest levels of motion control performance and design flexibility are required, you'll find Moog expertise at work. Through collaboration, creativity and world-class technological solutions, we help you overcome your toughest engineering obstacles, enhance your machine's performance, and help take your thinking further than you ever thought possible.

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This catalog is for users with technical knowledge. To ensure all necessary characteristics for function and safety of the system, the user has to check the suitability of the products described herein. The products described in this document are subject to change without notice. In case of doubt, please contact Moog.

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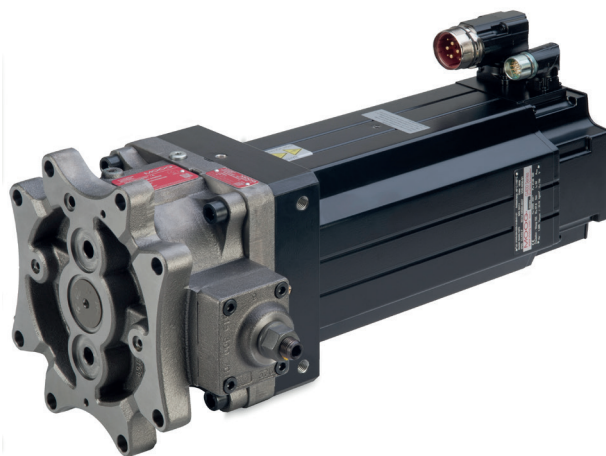
## PRODUCT OVERVIEW

### Moog Electrohydrostatic Pump Unit and Electrohydrostatic Actuation System

Moog Electrohydrostatic Pump Units (EPU) are emerging as a viable option for industrial machine builders as the design combines the best of both electro-mechanical and electro-hydraulic technologies. The EPU is a highly integrated, compact alternative to traditional hydraulic solutions.

This catalog describes the Electrohydrostatic Pump Unit used in such electro-hydrostatic actuation systems, like the Moog EAS. The EPU is able to operate in 2 or 4 quadrant operations and has a mechanical interface, which allows to connect it directly to hydraulic cylinders or manifolds. 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, see table in section "Ordering Code".

The Moog EAS is a modular actuation system comprised of a Electrohydrostatic Pump Unit (EPU), Servo Drive (MSD) and manifold. Adding a cylinder as part of the system is also a common option.



## PRODUCT OVERVIEW

### Moog Electrohydrostatic Pump Unit and Electrohydrostatic Actuation System

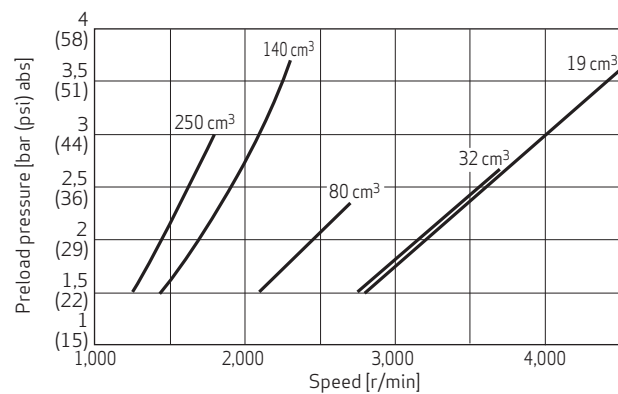
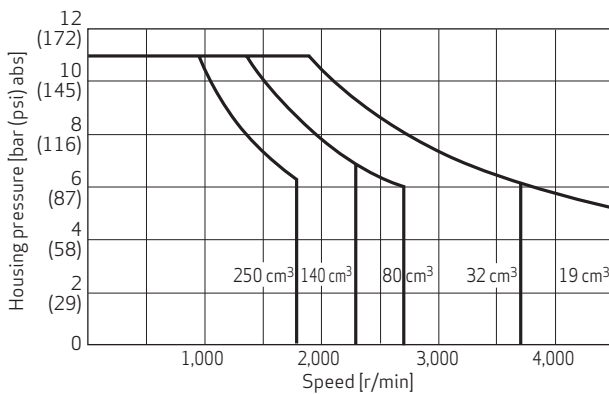
#### Performance Specifications

EPU series	019	032	080	140	250
Maximum flow	85 l/min (22.5 gpm)	118 l/min (31.2 gpm)	216 l/min (57.1 gpm)	322 l/min (85.1 gpm)	450 l/min (118.9 gpm)
Maximum pressure ports A and B	350 bar (5,076 psi)				
Maximum housing pressure <sup>1)</sup>	10 bar (145 psi)				
<b>Pump version</b>	Radial piston pump, constant, dual or variable displacement				
<b>Motor version</b>	Brushless servo motor: natural, fan or liquid cooled				
<b>Temperature range</b>					
Ambient	-15 to +60 °C (5 to 140 °F)				
Fluid	-15 to +80 °C (5 to 176 °F)				
<b>Seal material</b>	FKM				
<b>Pilot pressure supply<sup>2)</sup></b>	External				
<b>Operating fluid</b>	Mineral oil according to DIN 51524 , HFD, others upon request				
<b>Viscosity<sup>3)</sup></b>	Allowable viscosity operational range 12 to 100 mm <sup>2</sup> /s (12 to 100 cSt) Recommended hydraulic fluid viscosity class VG 46 to VG 100 according to ISO 3448 ; maximum viscosity 500 mm <sup>2</sup> /s during start-up with electric motor at 1,800 r/min				
<b>System filtration</b>	<ul style="list-style-type: none"> <li>NAS 1638, class 9</li> <li>ISO 4406, class 20/18/15; obtained with filter fineness of <math>\beta_{20} = 75</math></li> </ul>				
<b>Installation position</b>	Any				
<b>Installation note</b>	<p>To avoid pump damages the housing pressure <math>p_L</math> must not exceed the pressure in the low pressure line (<math>p_A</math> or <math>p_B</math>) by more than 1 bar. Design the drain line with lowest possible pressure losses. Maximal pump speed is preload pressure dependent on suction line, see diagram below.</p> <p>The fluid temperature in the tank shall not exceed the temperature of the pump by more than +25 °C (+77 °F). If this should occur, the pump shall be jog started for intervals of approximately 1 to 2 seconds until pump casing has heated up.<sup>3)</sup></p>				

<sup>1)</sup> Maximum housing pressure  $p_{Lmax}, p_{Sp} = f(n)$ , see diagram below

<sup>2)</sup> For option N1 (dual displacement) only

<sup>3)</sup> For more information see EPU user manual



## SIZE 19

## Natural Cooling, S EPU 019 A D xx xx C

## Characteristics Table

Performance class		Small	Medium	High
S EPU 019 A D xx		S0 C	M0 C	H0 C
<b>Pump</b>				
Displacement	$V_{max}$	19 cm <sup>3</sup> /rev (1.16 in <sup>3</sup> /rev)		
Maximum pump speed at 3.6 bar (abs)	$n_{max}$	4,500 r/min		
Maximum pump acceleration	$\dot{n}_{max}$	112,500 r/min/s		
Maximum housing pressure <sup>1)</sup>	$p_{Lmax}, p_{Sp}$	10 bar (145 psi)		
Maximum flow	$Q_{max}$	85 l/min (22.5 gpm)		
Maximum pressure ports A and B	$p_A, p_B$	350 bar (5,076 psi)		
Flushing flow rate <sup>4)</sup>	$Q_{Sp}$	2 - 3 l/min (0.5 - 0.8 gpm)		
<b>Motor</b>				
Continuous stall torque <sup>3)</sup>	$M_0$	40 Nm (354 lbf in)	93 Nm (823 lbf in)	137 Nm (1,213 lbf in)
Rated torque <sup>3)</sup>	$M_n$	22 Nm (195 lbf in)	45 Nm (398 lbf in)	52 Nm (460 lbf in)
Maximum torque	$M_{max}$	141 Nm (1,248 lbf in)	391 Nm (3,461 lbf in)	595 Nm (5,266 lbf in)
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 <sub>rms</sub>	52.61 A <sub>rms</sub>	69.17 A <sub>rms</sub>
Maximum current	$I_{max}$	101 A <sub>rms</sub>	250 A <sub>rms</sub>	340.5 A <sub>rms</sub>
Torque constant	$k_t$	1.72 Nm/A <sub>rms</sub> (15.2 lbf in/A <sub>rms</sub> )	1.77 Nm/A <sub>rms</sub> (15.7 lbf in/A <sub>rms</sub> )	1.98 Nm/A <sub>rms</sub> (17.5 lbf in/A <sub>rms</sub> )
Voltage constant	$k_e$	103.67 V <sub>rms</sub> /1,000 <sub>rpm</sub>	106.63 V <sub>rms</sub> /1,000 <sub>rpm</sub>	119.96 V <sub>rms</sub> /1,000 <sub>rpm</sub>
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		
<b>EPU unit</b>				
Inertia	J	38 kg cm <sup>2</sup> (336 10 <sup>-4</sup> lbf in s <sup>2</sup> )	121.52 kg cm <sup>2</sup> (1,076 10 <sup>-4</sup> lbf in s <sup>2</sup> )	172.37 kg cm <sup>2</sup> (1,526 10 <sup>-4</sup> lbf in s <sup>2</sup> )
Weight	m	50.1 kg (110.3 lb)	82.7 kg (182.2 lb)	105.4 kg (232.4 lb)
Tightening torque	8x M12x45 -12.9 hexagon head	120 Nm + 10 Nm (1,062 lbf in + 89 lbf in)		
<b>Servo drive</b>				
Recommended drive size <sup>2)</sup>		G392-024 size 4	G392-032 size 4	G392-045 size 5

1) See diagram "Maximum housing pressure  $p_{Lmax}, p_{Sp} = f(n)$ " and "Installation note" (page 3)

2) See catalog "Modular Multi-Axis Servo Drive Systems (MSD)"

3) Operation in still air with ambient temperatures up to +40 °C (+104 °F). Winding temperature measure up to +110 °C (+230 °F) over ambient

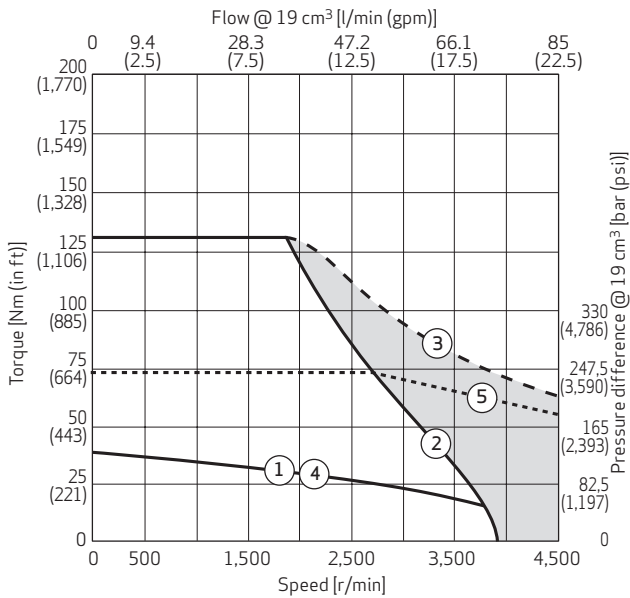
4) Optional via Sp port (flushing port)

# SIZE 19

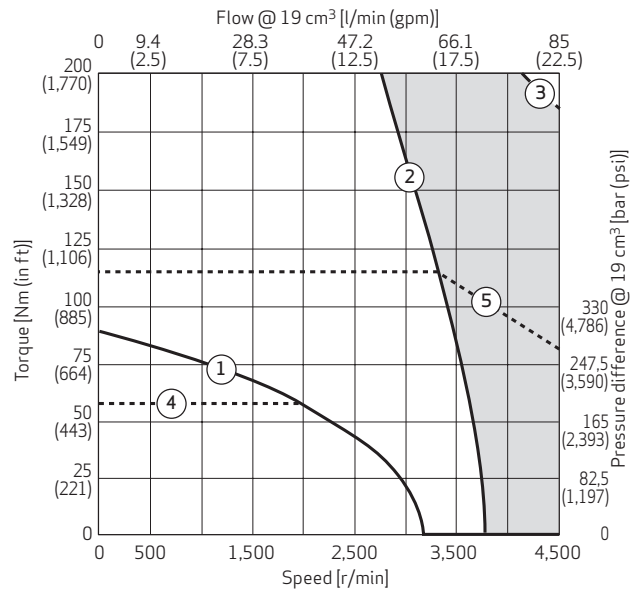
## Natural Cooling, S EPU 019 A D xx xx C

### Motor Performance Curves

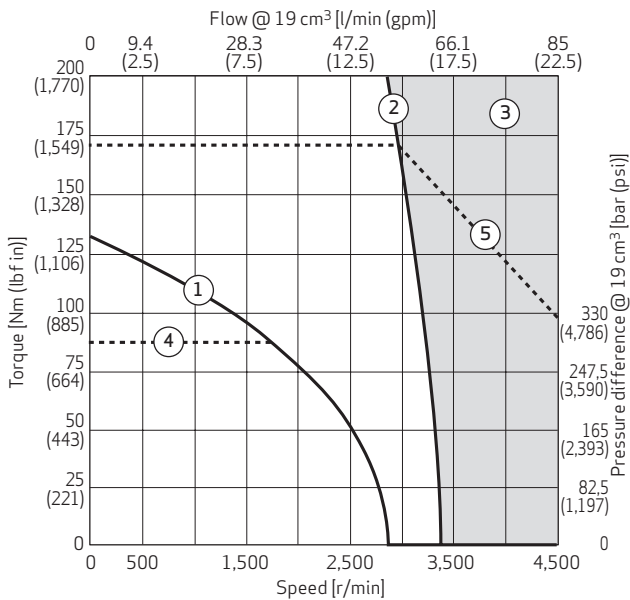
50 C



M0 C



H0 C



- ① Continuous torque at 110 K temperature difference over ambient, max. winding temperature 150 °C (302 °F)
- ② Maximum torque without field weakening
- ③ Maximum torque with field weakening
- ④ Continuous torque if recommended drive size is used
- ⑤ Maximum torque with field weakening if recommended drive size is used

Notes:

Motor performance with 565 V<sub>DC</sub> link voltage

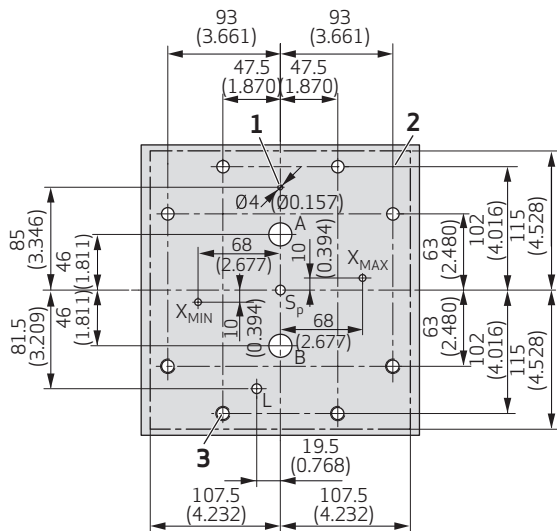
Motor performance doesn't take the pump efficiency into account

Pressure difference  $\Delta p = p_A - p_B$

## SIZE 19

### Natural Cooling, S EPU 019 A D xx xx C

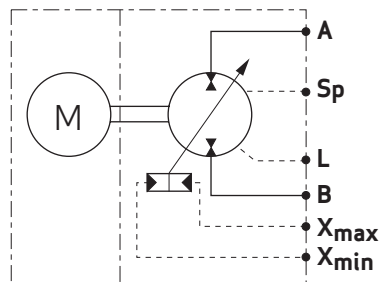
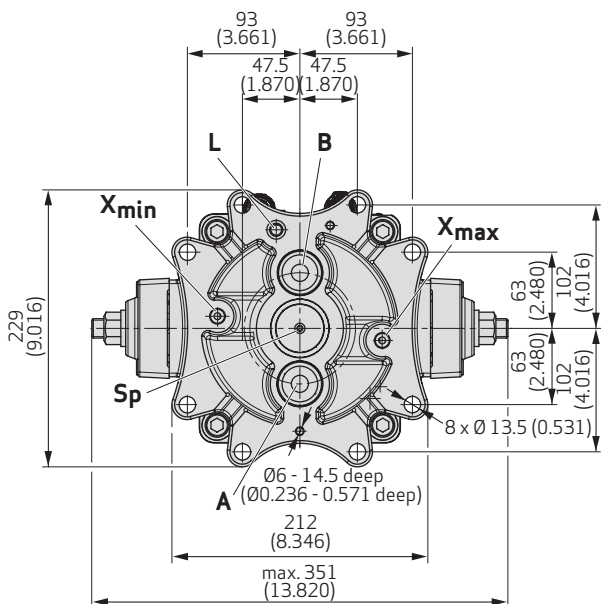
#### Mounting Pattern



1. Use a spring-type pin with nominal diameter of 4 mm (0.16 in) (e.g. 4x12) according to ISO 13337
2. Area of
  - surface flatness:  $\square 0.02$
  - surface roughness:  $\sqrt{Rz4}$
3. M12, minimum 25 mm (0.98 in) deep.  
Recommended: Use 8 hexagon head cap screws M12 (property class 12.9, minimum length 45 mm (1.8 in)) according to ISO 4762. Tightening torque 120 + 10 Nm (1,062 lbf in + 89 lbf in).

Note: Dimensions mm (inch)

#### Pump Front View



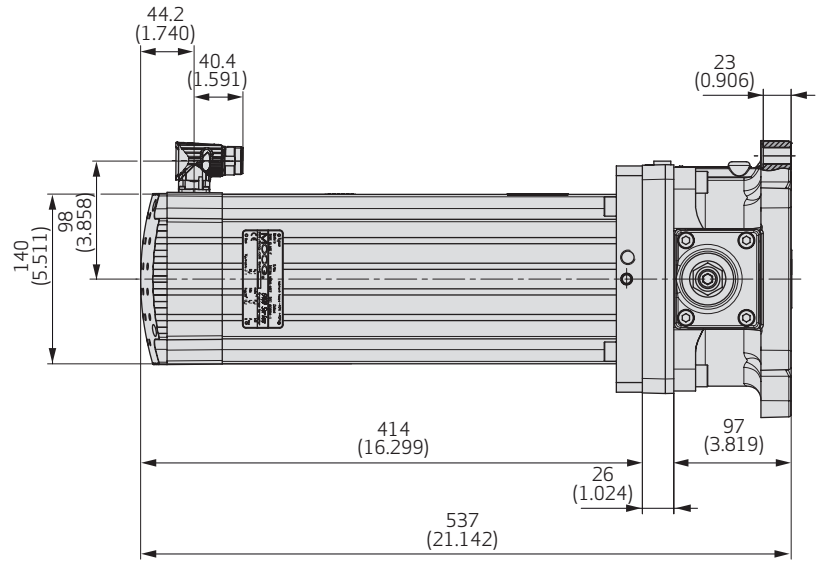
Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350 (5,076 psi)	14 (0.55 in)	20 (0.79 in)
Sp	Flushing port	10 (145 psi)	5 (0.20 in)	15 (0.60 in)
L	Leakage port	10 (145 psi)	8 (0.31 in)	9 (0.35 in)
X <sub>max</sub>	Control port for maximum displacement (option N1 only)	350 (5,076 psi)	5 (0.20 in)	5.5 (0.22 in)
X <sub>min</sub>	Control port for minimum displacement (option N1 only)	350 (5,076 psi)	5 (0.20 in)	5.5 (0.22 in)

# SIZE 19

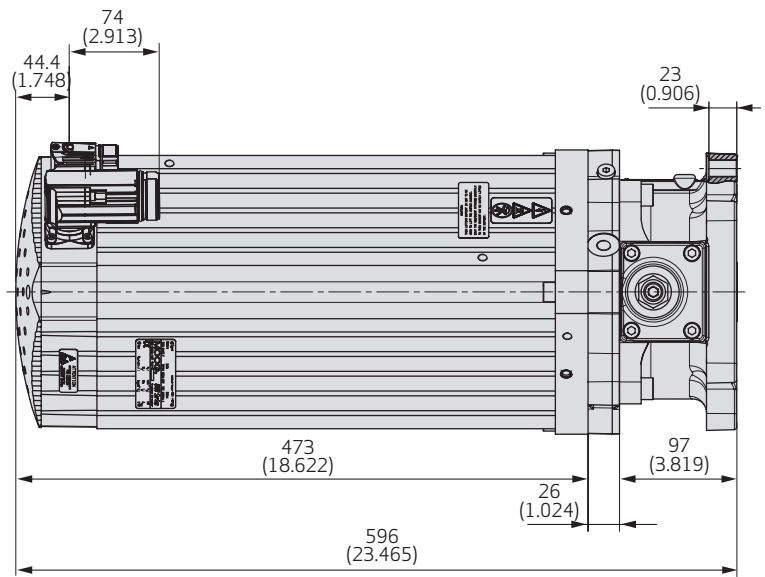
## Natural Cooling, S EPU 019 A D xx xx C

### Installation Drawings

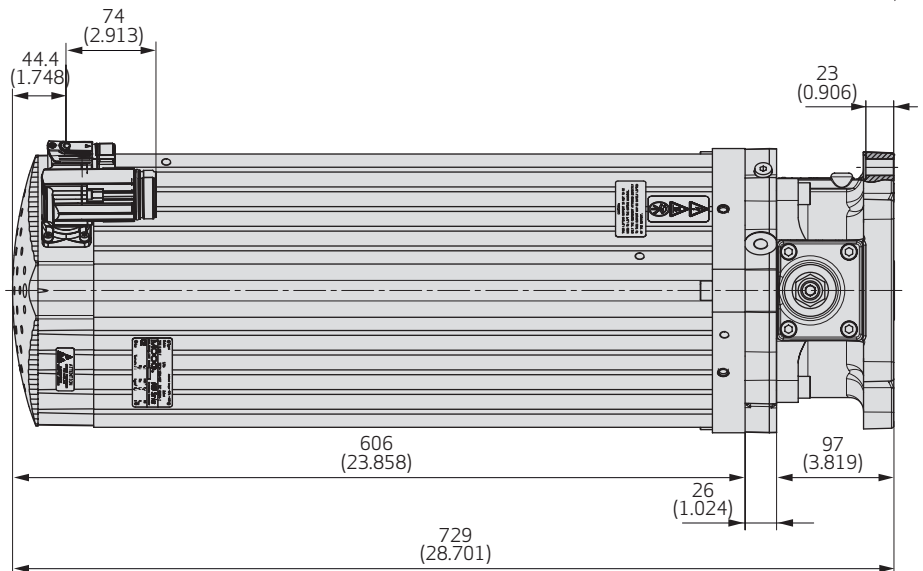
S0 C



M0 C



H0 C



Note: Dimensions mm (inch)



## SIZE 19

## Liquid Cooling, S EPU 019 A D xx xx W

## Characteristics Table

Performance class		Medium	High
S EPU 019 A D xx		M0 W	H0 W
<b>Pump</b>			
Displacement	$V_{max}$	19 cm <sup>3</sup> /rev (1.16 in <sup>3</sup> /rev)	
Maximum pump speed at 3.6 bar (abs.)	$n_{max}$	4,500 r/min	
Maximum pump acceleration	$\dot{n}_{max}$	112,500 r/min/s	
Maximum housing pressure <sup>1)</sup>	$p_{Lmax}, p_{Sp}$	10 bar (145 psi)	
Maximum flow	$Q_{max}$	85 l/min (22.5 gpm)	
Maximum pressure ports A and B	$p_A, p_B$	350 bar (5,076 psi)	
Flushing flow rate <sup>4)</sup>	$Q_{Sp}$	2 - 3 l/min (0.5 - 0.8 gpm)	
<b>Motor</b>			
Continuous stall torque <sup>3)</sup>	$M_0$	62 Nm (549 lbf in)	91 Nm (805 lbf in)
Rated torque <sup>3)</sup>	$M_n$	58 Nm (513 lbf in)	85 Nm (752 lbf in)
Maximum torque	$M_{max}$	94 Nm (832 lbf in)	140 Nm (1,239 lbf in)
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 <sub>rms</sub>	54.22 A <sub>rms</sub>
Maximum current	$I_{max}$	88 A <sub>rms</sub>	100 A <sub>rms</sub>
Torque constant	$k_t$	1.27 Nm/A <sub>rms</sub> (11.2 lbf in/A <sub>rms</sub> )	1.68 Nm/A <sub>rms</sub> (14.9 lbf in/A <sub>rms</sub> )
Voltage constant	$k_e$	78.49 V <sub>rms</sub> /1,000 <sub>rpm</sub>	103.67 V <sub>rms</sub> /1,000 <sub>rpm</sub>
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 (0.8 - 1.3 gpm)	
<b>EPU unit</b>			
Inertia	J	31.7 kg cm <sup>2</sup> (281 10 <sup>-4</sup> lbf in s <sup>2</sup> )	37.9 kg cm <sup>2</sup> (335 10 <sup>-4</sup> lbf in s <sup>2</sup> )
Weight	m	47.5 kg (104.7 lb)	56.3 kg (124.1 lb)
Tightening torque	8x M12x45 -12.9 hexagon head	120 Nm + 10 Nm (1,062 lbf in + 89 lbf in)	
<b>Servo drive</b>			
Recommended drive size <sup>2)</sup>		G392-045 size 5	G392-060 size 5

1) See diagram "Maximum housing pressure  $p_{Lmax}, p_{Sp} = f(n)$ " and "Installation note" (page 3)

2) See catalog "Modular Multi-Axis Servo Drive Systems (MSD)"

3) Operation in still air with water temperatures from +25°C(+77°F) up to +40°C (+104°F). Winding temperature measure up to +110°C (+230 °F) over water

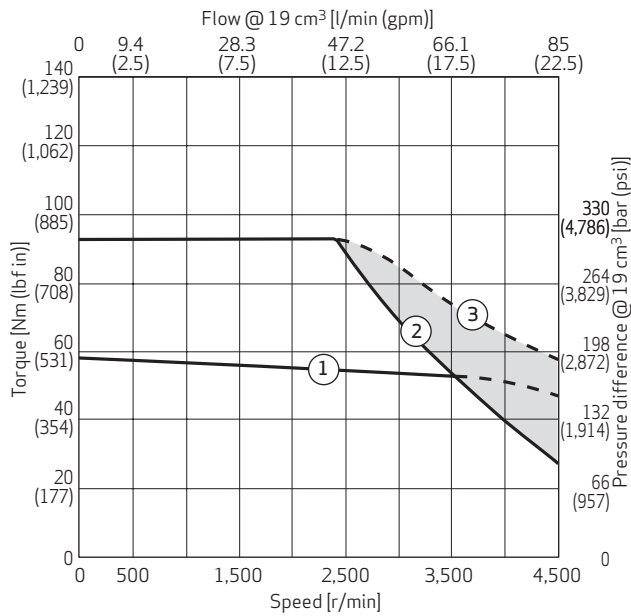
4) Optional via Sp port (flushing port)

# SIZE 19

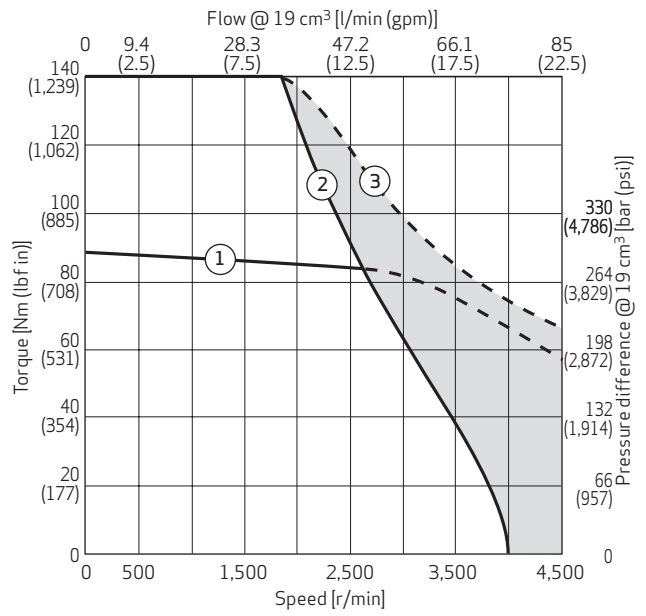
## Liquid Cooling, S EPU 019 A D xx xx W

### Motor Performance Curves

M0 W



H0 W



- ① Continuous torque at 110 K temperature difference over water, max. winding temperature 150 °C (302 °F)
- ② Maximum torque without field weakening
- ③ Maximum torque with field weakening

Notes:

Motor performance with 565 V<sub>DC</sub> link voltage

Motor performance doesn't take the pump efficiency into account

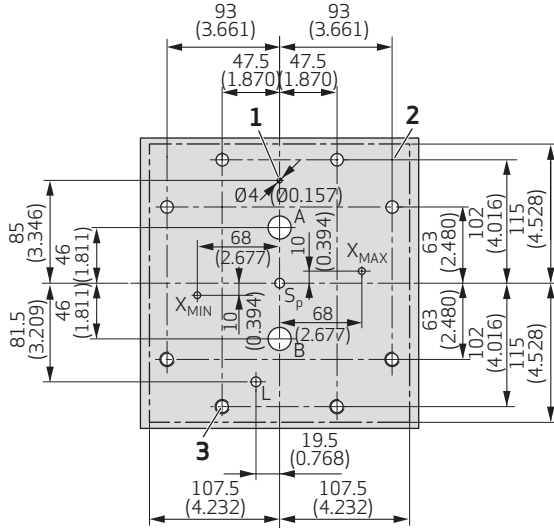
Pressure difference  $\Delta p = p_A - p_B$

Motor performance determined with respective max. cooling water flow rate, see characteristic table

# SIZE 19

## Liquid Cooling, S EPU 019 A D xx xx W

### Mounting Pattern



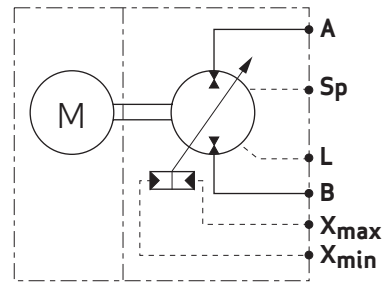
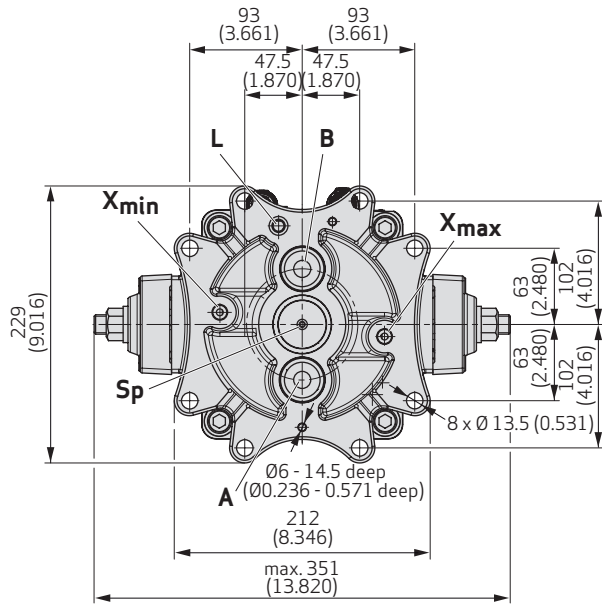
1. Use a spring-type pin with nominal diameter of 4 mm (0.16 in) (e.g. 4x12) according to ISO 13337

2. Area of  
 - surface flatness:  $\square 0.02$   
 - surface roughness:  $\sqrt{Rz4}$

3. M12, minimum 25 mm (0.9 in) deep.  
 Recommended: Use 8 hexagon head cap screws M12 (property class 12.9, minimum length 45 mm (1.78 in)) according to ISO 462. Tightening torque 120 + 10 Nm (1,062 lbf in + 89 lbf in)

Note: Dimensions mm (inch)

### Pump Front View



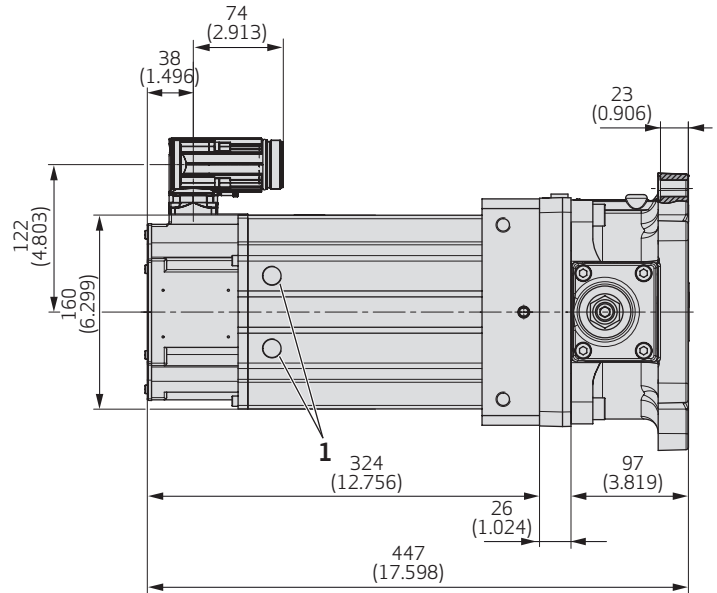
Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350 (5,076 psi)	14 (0.55 in)	20 (0.79 in)
Sp	Flushing port	10 (145 psi)	5 (0.20 in)	15 (0.60 in)
L	Leakage port	10 (145 psi)	8 (0.31 in)	9 (0.35 in)
X <sub>max</sub>	Control port for maximum displacement (option N1 only)	350 (5,076 psi)	5 (0.20 in)	5.5 (0.22 in)
X <sub>min</sub>	Control port for minimum displacement (option N1 only)	350 (5,076 psi)	5 (0.20 in)	5.5 (0.22 in)

# SIZE 19

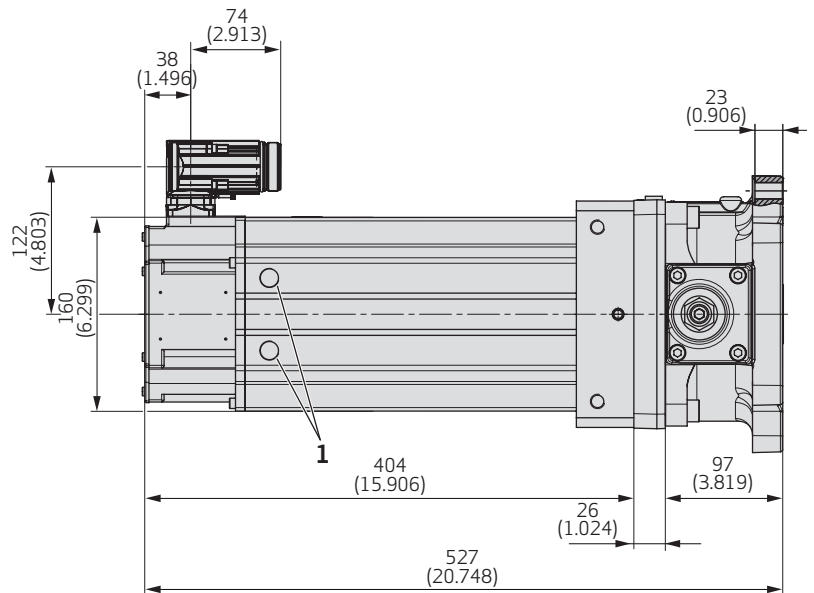
## Liquid Cooling, S EPU 019 A D xx xx W

### Installation Drawings

MOW



HOW



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

Note: Dimensions mm (inch)

## SIZE 32

## Natural Cooling, S EPU 032 A D xx xx C

## Characteristics Table

Performance class		Small	Medium
S EPU 032 A D xx		S0 C	M0 C
<b>Pump</b>			
Displacement	$V_{max}$	32 cm <sup>3</sup> /rev (1.95 in <sup>3</sup> /rev)	
Maximum pump speed at 2.7 bar (abs.)	$n_{max}$	3,700 r/min	
Maximum pump acceleration	$\dot{n}_{max}$	80,400 r/min/s	
Maximum housing pressure <sup>1)</sup>	$p_{Lmax}, p_{Sp}$	10 bar (145 psi)	
Maximum flow	$Q_{max}$	118 l/min (31.2 gpm)	
Maximum pressure ports A and B	$p_A, p_B$	350 bar (5,076 psi)	
Flushing flow rate <sup>4)</sup>	$Q_{Sp}$	3 - 4 l/min (0.8 - 1.1 gpm)	
<b>Motor</b>			
Continuous stall torque <sup>3)</sup>	$M_0$	93 Nm (823 lbf in)	137 Nm (1,213 lbf in)
Rated torque <sup>3)</sup>	$M_n$	45 Nm (398 lbf in)	52 Nm (460 lbf in)
Maximum torque	$M_{max}$	391 Nm (3,461 lbf in)	595 Nm (5,266 lbf in)
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 <sub>rms</sub>	69,17 A <sub>rms</sub>
Maximum current	$I_{max}$	250 A <sub>rms</sub>	340.5 A <sub>rms</sub>
Torque constant	$k_t$	1.77 Nm/A <sub>rms</sub> (15.7 lbf in/A <sub>rms</sub> )	1.98 Nm/A <sub>rms</sub> (17.5 lbf in/A <sub>rms</sub> )
Voltage constant	$k_e$	106.63 V <sub>rms</sub> /1,000 rpm	119.96 V <sub>rms</sub> /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	
<b>EPU unit</b>			
Inertia	$J$	164.8 kg cm <sup>2</sup> (1,459 10 <sup>-4</sup> lbf in s <sup>2</sup> )	215.7 kg cm <sup>2</sup> (1,909 10 <sup>-4</sup> lbf in s <sup>2</sup> )
Weight	$m$	100.3 kg (221.0 lb)	123 kg (271.2 lb)
Tightening torque	8x M12x45 -12.9 hexagon head	120 Nm + 10 Nm (1,062 lbf in + 89 lbf in)	
<b>Servo drive</b>			
Recommended drive size <sup>2)</sup>		G392-045 size 5	G392-045 size 5

1) See diagram "Maximum housing pressure  $p_{Lmax}, p_{Sp} = f(n)$ " and "Installation note" (page 3)

2) See catalog "Modular Multi-Axis Servo Drive Systems (MSD)"

3) Operation in still air with ambient temperatures up to +40 °C (+104 °F). Winding temperature measure up to +110 °C (+230 °F) over ambient

4) Optional via Sp port (flushing port)

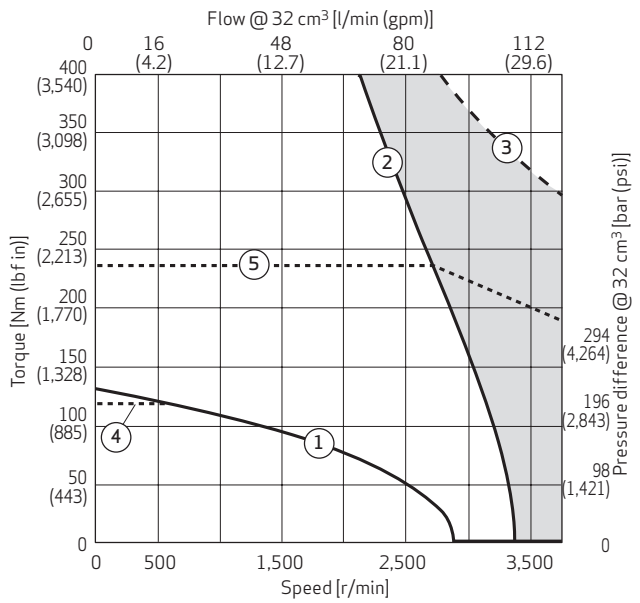
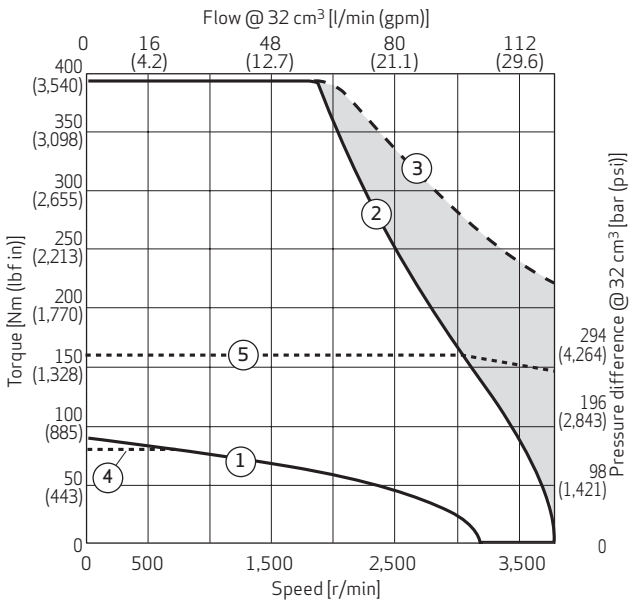
# SIZE 32

## Natural Cooling, S EPU 032 A D xx xx C

### Motor Performance Curves

50 C

M0 C



- ① Continuous torque at 110 K temperature difference over ambient, max. winding temperature 150 °C (302 °F)
- ② Maximum torque without field weakening
- ③ Maximum torque with field weakening
- ④ Continuous torque if recommended drive size is used
- ⑤ Maximum torque with field weakening if recommended drive size is used

Notes:

Motor performance with 565 V<sub>DC</sub> link voltage

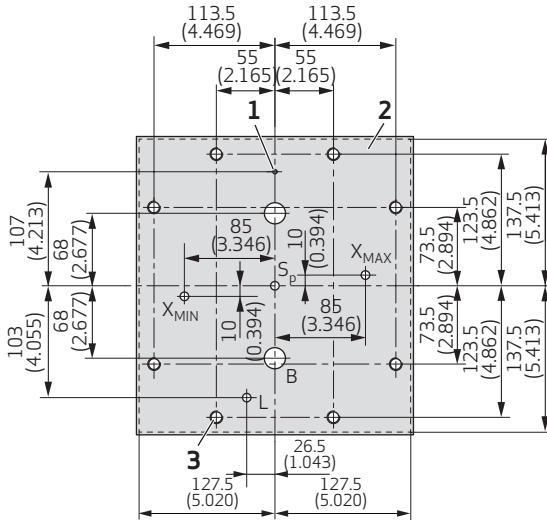
Motor performance doesn't take the pump efficiency into account

Pressure difference  $\Delta p = p_A - p_B$

# SIZE 32

## Natural Cooling, S EPU 032 A D xx xx C

### Mounting Pattern



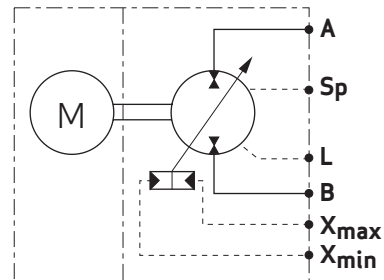
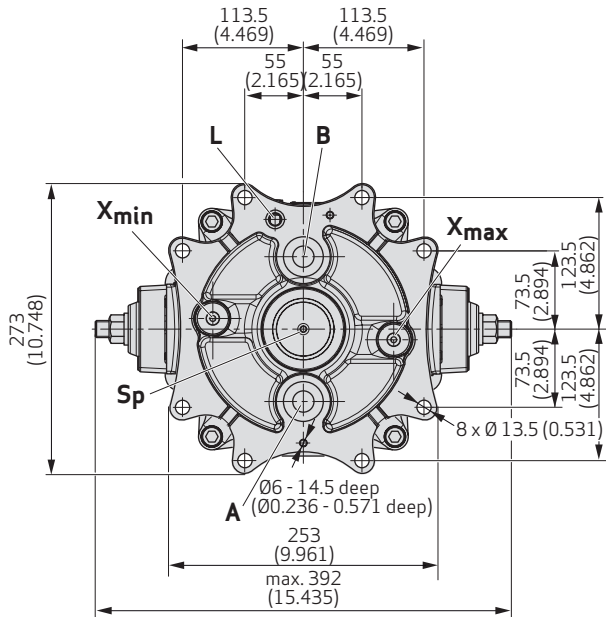
1. Use a spring-type pin with nominal diameter of 4 mm (0.16 in) (e.g. 4x12) according to ISO 13337

2. Area of  
 - surface flatness:  $\square 0.02$   
 - surface roughness:  $\sqrt{Rz4}$

3. M12, minimum 25 mm (0.91 in) deep.  
 Recommended: Use 8 hexagon head cap screws M12 (property class 12.9, minimum length 45 mm (1.8 in)) according to ISO 4762. Tightening torque 120 + 10 Nm (1,062 lbf in + 89 lbf in)

Note: Dimensions mm (inch)

### Pump Front View



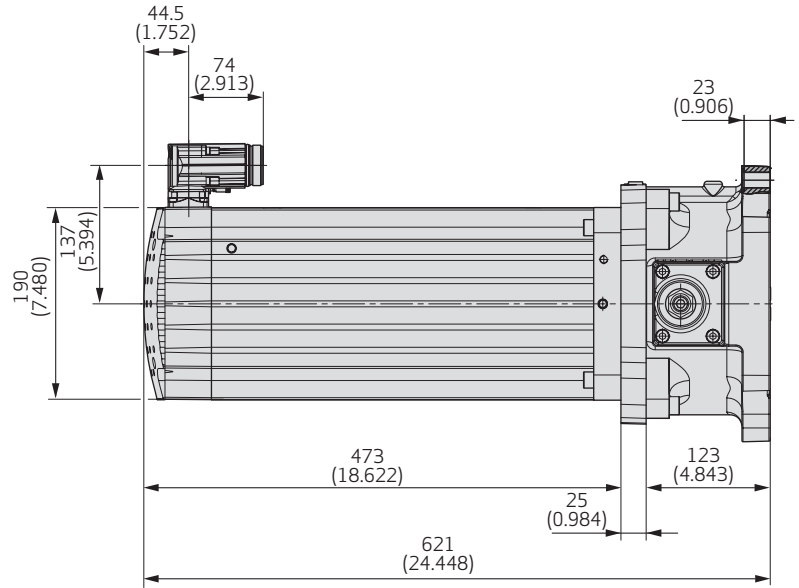
Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350 (5,076 psi)	20 (0.79 in)	25 (0.98 in)
Sp	Flushing port	10 (145 psi)	7 (0.28 in)	15 (0.60 in)
L	Leakage port	10 (145 psi)	11 (0.43 in)	11.5 (0.45 in)
X <sub>max</sub>	Control port for maximum displacement (option N1 only)	350 (5,076 psi)	5 (0.20 in)	5.5 (0.22 in)
X <sub>min</sub>	Control port for minimum displacement (option N1 only)	350 (5,076 psi)	5 (0.20 in)	5.5 (0.22 in)

# SIZE 32

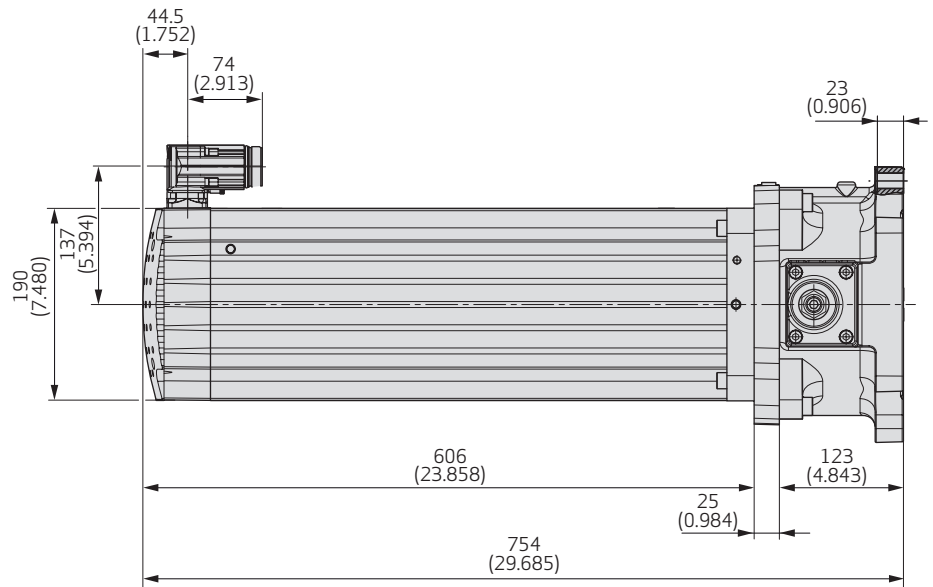
## Natural Cooling, S EPU 032 A D xx xx C

### Installation Drawings

S0 C



M0 C



Note: Dimensions mm (inch)



## SIZE 32

## Liquid Cooling, S EPU 032 A D xx xx W

## Characteristics Table

Performance class		Small	Medium	High
S EPU 032 A D xx		S0 W	M0 W	H0 W
<b>Pump</b>				
Displacement	$V_{max}$	32 cm <sup>3</sup> /rev (1.95 in <sup>3</sup> /rev)		
Maximum pump speed at 2.7 bar (abs.)	$n_{max}$	3,700 r/min		
Maximum pump acceleration	$\dot{n}_{max}$	80,400 r/min/s		
Maximum housing pressure <sup>1)</sup>	$p_{Lmax}, p_{Sp}$	10 bar (145 psi)		
Maximum flow	$Q_{max}$	118 l/min (31.2 gpm)		
Maximum pressure ports A and B	$p_A, p_B$	350 bar (5,076 psi)		
Flushing flow rate <sup>4)</sup>	$Q_{Sp}$	3 - 4 l/min (0.8 - 1.1 gpm)		
<b>Motor</b>				
Continuous stall torque <sup>3)</sup>	$M_0$	62 Nm (549 lbf in)	91 Nm (805 lbf in)	151 Nm (1,336 lbf in)
Rated torque <sup>3)</sup>	$M_n$	58 Nm (513 lbf in)	85 Nm (752 lbf in)	128 Nm (1,133 lbf in)
Maximum torque	$M_{max}$	94 Nm (832 lbf in)	140 Nm (1,239 lbf in)	391 Nm (3,461 lbf in)
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 <sub>rms</sub>	54.22 A <sub>rms</sub>	85.95 A <sub>rms</sub>
Maximum current	$I_{max}$	88 A <sub>rms</sub>	100 A <sub>rms</sub>	250 A <sub>rms</sub>
Torque constant	$k_t$	1.27 Nm/A <sub>rms</sub>	1.68 Nm/A <sub>rms</sub>	1.76 Nm/A <sub>rms</sub>
Voltage constant	$k_e$	78.49 V <sub>rms</sub> /1,000 <sub>rpm</sub>	103.67 V <sub>rms</sub> /1,000 <sub>rpm</sub>	106.63 V <sub>rms</sub> /1,000 <sub>rpm</sub>
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 (0.8 - 1.3 gpm)	3-5 l/min (0.8 - 1.3 gpm)	6-8 l/min (1.6 - 2.1 gpm)
<b>EPU unit</b>				
Inertia	J	75 kg cm <sup>2</sup> (664 10 <sup>-4</sup> lbf in s <sup>2</sup> )	81.2 kg cm <sup>2</sup> (719 10 <sup>-4</sup> lbf in s <sup>2</sup> )	170.5 kg cm <sup>2</sup> (1,509 10 <sup>-4</sup> lbf in s <sup>2</sup> )
Weight	m	65.1 kg (143.5 lb)	73.9 kg (162.9 lb)	107.9 kg (237.9 lb)
Tightening torque	8x M12x45 -12.9 hexagon head	120 Nm + 10 Nm (1,062 lbf in + 89 lbf in)		
<b>Servo drive</b>				
Recommended drive size <sup>2)</sup>		G392-045 size 5	G392-060 size 5	G392-072 size 5

1) See diagram "Maximum housing pressure  $p_{Lmax}, p_{Sp} = f(n)$ " and "Installation note" (page 3)

2) See catalog "Modular Multi-Axis Servo Drive Systems (MSD)"

3) Operation in still air with water temperatures from +25 °C (+77 °F) up to +40 °C (+104 °F). Winding temperature measure up to +110 °C (+230 °F) over water

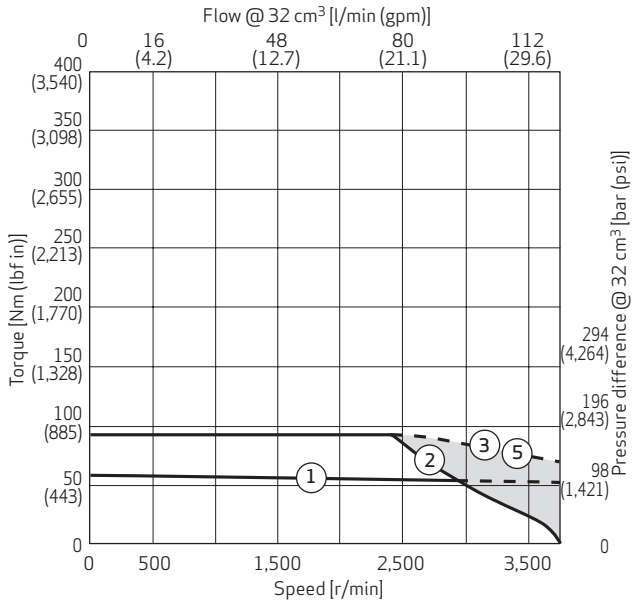
4) Optional via Sp port (flushing port)

# SIZE 32

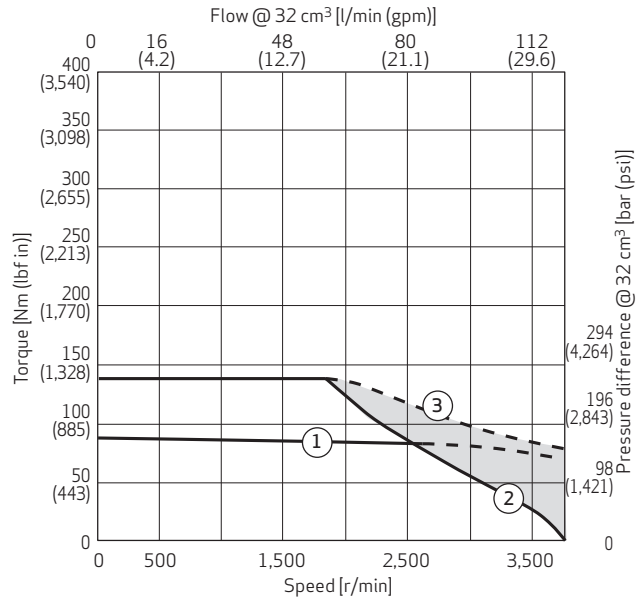
## Liquid Cooling, S EPU 032 A D xx xx W

### Motor Performance Curves

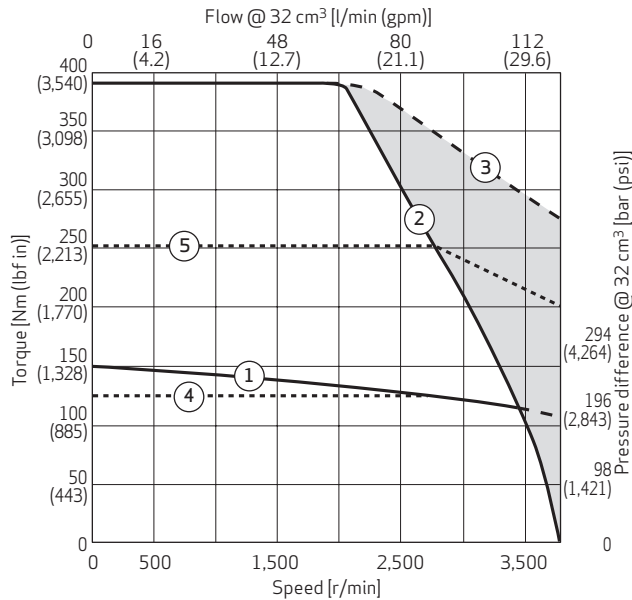
50 W



M0 W



H0 W



- ① Continuous torque at 110 K temperature difference over water, max. winding temperature 150 °C (302 °F)
- ② Maximum torque without field weakening
- ③ Maximum torque with field weakening
- ④ Continuous torque if recommended drive size is used
- ⑤ Maximum torque with field weakening if recommended drive size is used

Notes:

Motor performance with 565 V<sub>DC</sub> link voltage

Motor performance doesn't take the pump efficiency into account

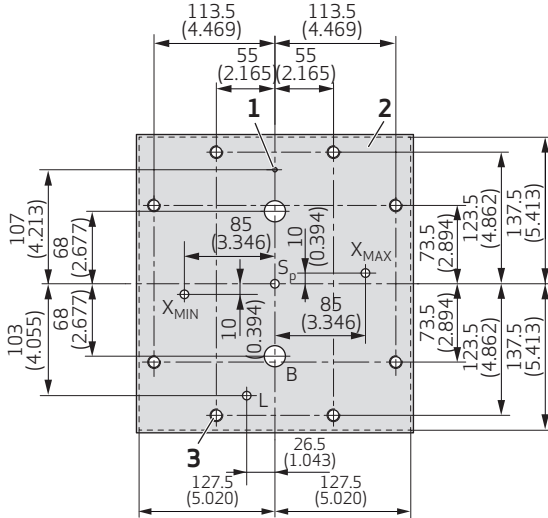
Pressure difference  $\Delta p = p_A - p_B$

Motor performance determined with respective max. cooling water flow rate, see characteristic table

# SIZE 32

## Liquid Cooling, S EPU 032 A D xx xx W

### Mounting Pattern



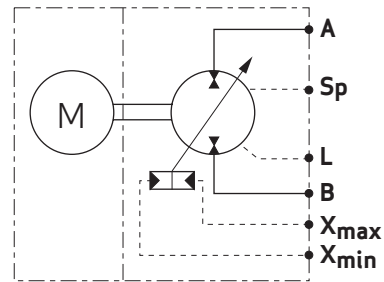
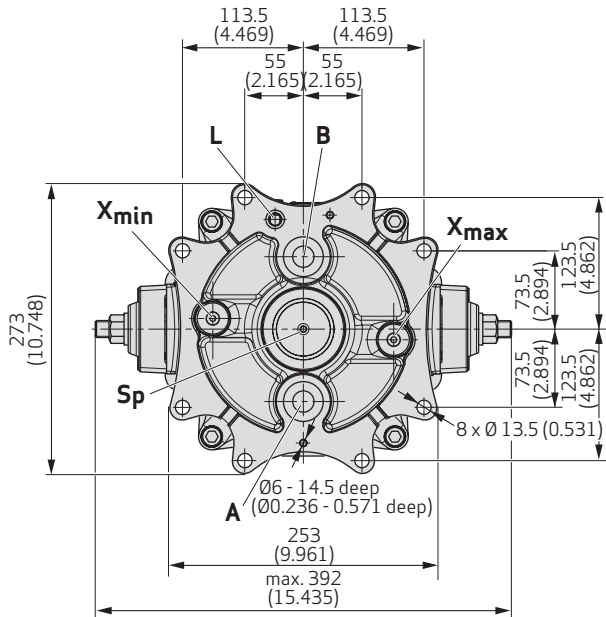
1. Use a spring-type pin with nominal diameter of 4 mm (0.16 in) (e.g. 4x12) according to ISO 13337

2. Area of  
 - surface flatness:  $\square 0.02$   
 - surface roughness:  $\sqrt{Rz4}$

3. M12, minimum 25 mm (0.9 in) deep.  
 Recommended: Use 8 hexagon head cap screws M12 (property class 12.9, minimum length 45 mm (1.8 in)) according to ISO 4762. Tightening torque 120 + 10 Nm (1,062 lbf in + 89 lbf in).

Note: Dimensions mm (inch)

### Pump Front View



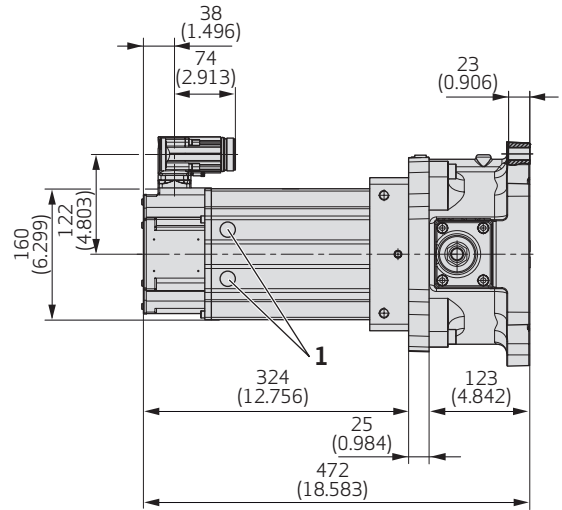
Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350 (5,076 psi)	20 (0.79 in)	25 (0.98 in)
Sp	Flushing port	10 (145 psi)	7 (0.28 in)	15 (0.60 in)
L	Leakage port	10 (145 psi)	11 (0.43 in)	11.5 (0.45 in)
X <sub>max</sub>	Control port for maximum displacement (option N1 only)	350 (5,076 psi)	5 (0.20 in)	5.5 (0.22 in)
X <sub>min</sub>	Control port for minimum displacement (option N1 only)	350 (5,076 psi)	5 (0.20 in)	5.5 (0.22 in)

# SIZE 32

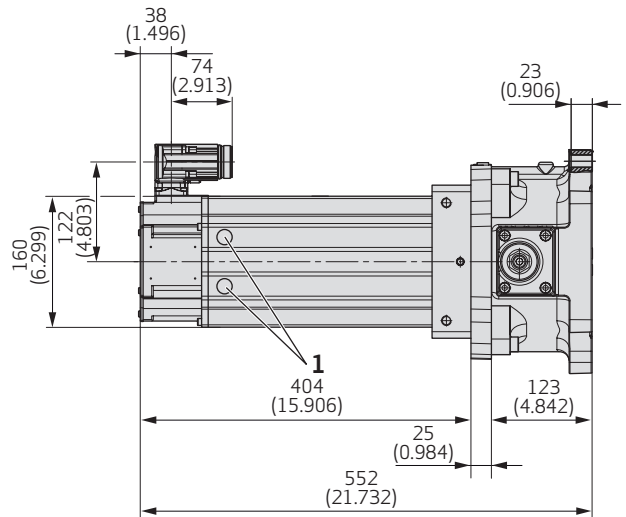
## Liquid Cooling, S EPU 032 A D xx xx W

### Installation Drawings

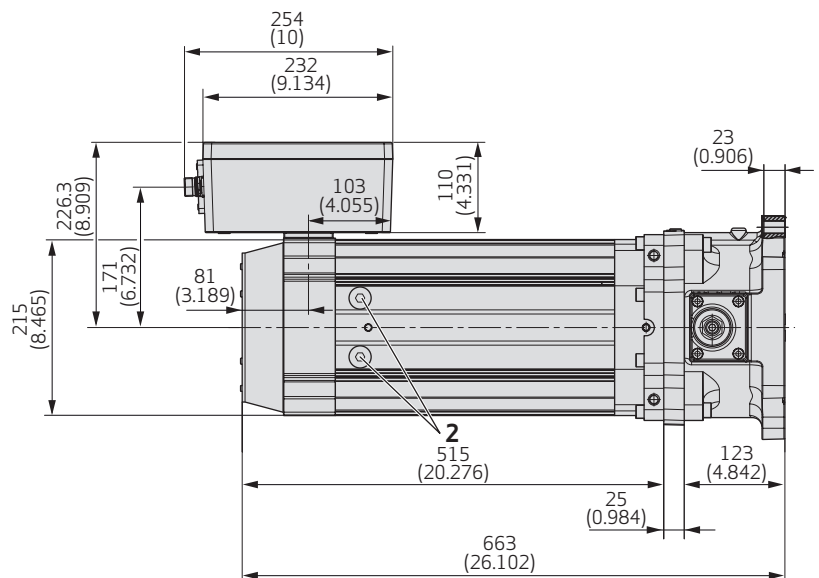
50 W



M0 W



H0 W



Note: Dimensions mm (inch)

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

# SIZE 80

## Natural Cooling, S EPU 080 A D xx xx C

### Characteristics Table

Performance class		Small	Medium	High
S EPU 080 A D xx		SO C	M0 C	H0 C
<b>Pump</b>				
Displacement	$V_{max}$	80 cm <sup>3</sup> /rev (4.88 in <sup>3</sup> /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 <sup>1)</sup>	$p_{Lmax}, p_{Sp}$	10 bar (145 psi)		
Maximum flow	$Q_{max}$	216 l/min (57.1 gpm)		
Maximum pressure ports A and B	$p_A, p_B$	350 bar (5,076 psi)		
Flushing flow rate <sup>4)</sup>	$Q_{Sp}$	4 - 6 l/min (1.1 - 1.6 gpm)		
<b>Motor</b>				
Continuous stall torque <sup>3)</sup>	$M_0$	137 Nm (1,213 lbf in)	235 Nm (2,080 lbf in)	298 Nm (2,638 lbf in)
Rated torque <sup>3)</sup>	$M_n$	52 Nm (460 lbf in)	169 Nm (1,496 lbf in)	230 Nm (2,036 lbf in)
Maximum torque	$M_{max}$	595 Nm (5,266 lbf in)	1,477 Nm (13,073 lbf in)	1,972 Nm (17,454 lbf in)
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 <sub>rms</sub>	106.32 A <sub>rms</sub>	100,63 A <sub>rms</sub>
Maximum current	$I_{max}$	340.5 A <sub>rms</sub>	795 A <sub>rms</sub>	795 A <sub>rms</sub>
Torque constant	$k_t$	1.98 Nm/A <sub>rms</sub> (17.5 lbf in A <sub>rms</sub> )	2.21 Nm/A <sub>rms</sub> (19.6 lbf in A <sub>rms</sub> )	2.96 Nm/A <sub>rms</sub> (26.2 lbf in A <sub>rms</sub> )
Voltage constant	$k_e$	119.96 V <sub>rms</sub> /1,000 <sub>rpm</sub>	148.09 V <sub>rms</sub> /1,000 <sub>rpm</sub>	197.70 V <sub>rms</sub> /1,000 <sub>rpm</sub>
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		
<b>EPU unit</b>				
Inertia	$J$	340.97 kg cm <sup>2</sup> (3,018 10 <sup>-4</sup> lbf in s <sup>2</sup> )	1207.69 kg cm <sup>2</sup> (10,689 10 <sup>-4</sup> lbf in s <sup>2</sup> )	1528.3 kg cm <sup>2</sup> (13,527 10 <sup>-4</sup> lbf in s <sup>2</sup> )
Weight	$m$	159.4 kg (351.4 lb)	198.6 kg (437.8 lb)	249.5 kg (550.1 lb)
Tightening torque	8x M12x45 -12.9 hexagon head	120 Nm + 10 Nm (1,062 lbf in + 89 lbf in)		
<b>Servo drive</b>				
Recommended drive size <sup>2)</sup>		G392-072 size 5	G392-090 size 6	G392-090 size 6

1) See diagram “Maximum housing pressure  $p_{Lmax}, p_{Sp} = f(n)$ ” and “Installation note” (page 3)

2) See catalog “Modular Multi-Axis Servo Drive Systems (MSD)”

3) Operation in still air with ambient temperatures up to +40 °C (+104 °F). Winding temperature measure up to +110 °C (+230 °F) over ambient

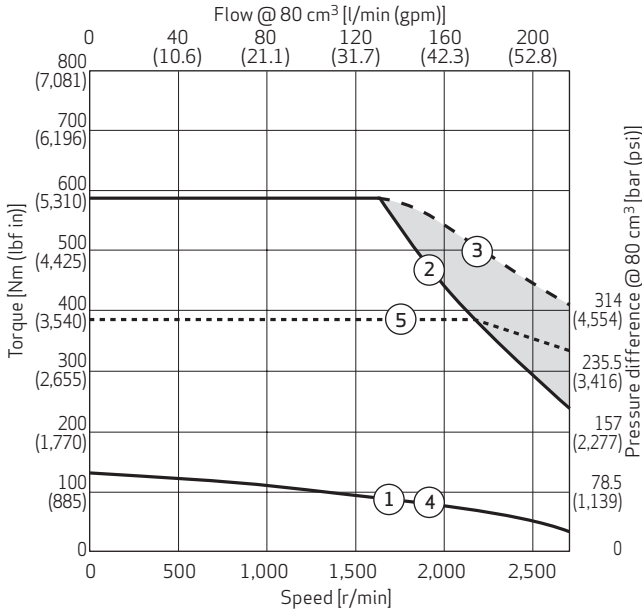
4) Mandatory via Sp port (flushing port)

# SIZE 80

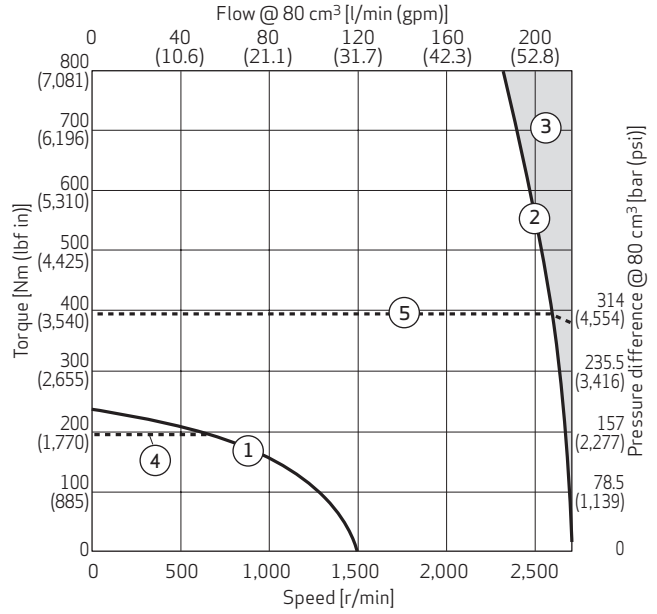
## Natural Cooling, S EPU 080 A D xx xx C

### Motor Performance Curves

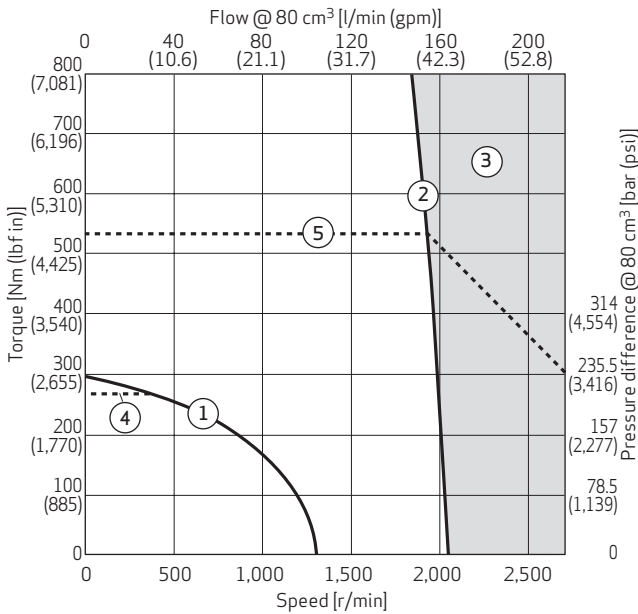
50 C



M0 C



H0 C



- ① Continuous torque at 110 K temperature difference over water, max. winding temperature 150 °C (302 °F)
- ② Maximum torque without field weakening
- ③ Maximum torque with field weakening
- ④ Continuous torque if recommended drive size is used
- ⑤ Maximum torque with field weakening if recommended drive size is used

**Notes:**

Motor performance with 565 V<sub>DC</sub> link voltage

Motor performance doesn't take the pump efficiency into account

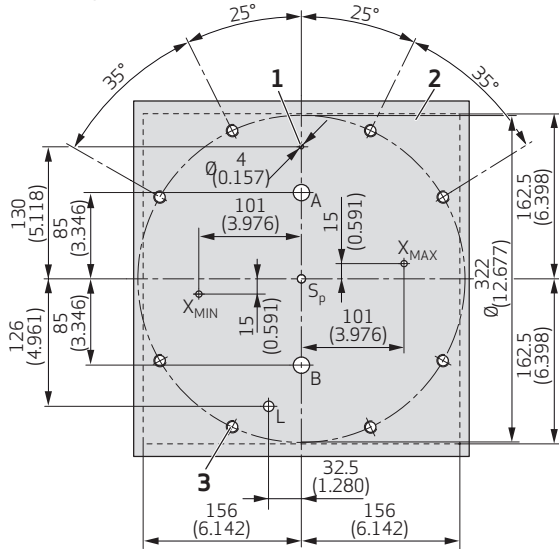
Pressure difference  $\Delta p = p_A - p_B$

Motor performance determined with respective max. cooling water flow rate, see characteristic table

# SIZE 80

## Natural Cooling, S EPU 080 A D xx xx C

### Mounting Pattern



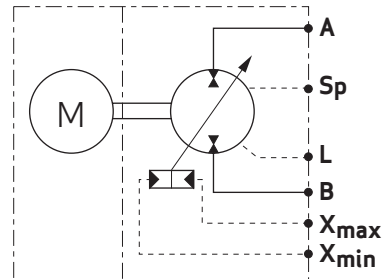
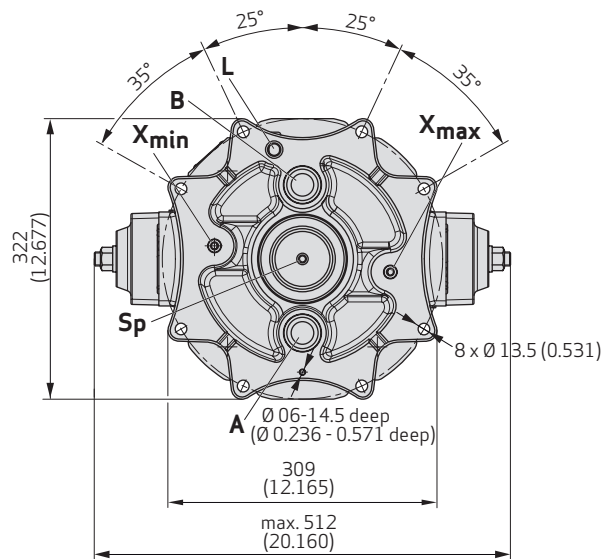
1. Use a spring-type pin with nominal diameter of 4 mm (0.16 in) (e.g. 4x12) according to ISO 13337

2. Area of  
 - surface flatness:  $\square 0.02$   
 - surface roughness:  $\sqrt{Rz4}$

3. M12, minimum 25 mm (0.9 in) deep.  
 Recommended: Use 8 hexagon head cap screws M12 (property class 12.9, minimum length 45 mm (1.8 in)) according to ISO 4762. Tightening torque 120 + 10 Nm (1,062 lbf in + 89 lbf in).

Note: Dimensions mm (inch)

### Pump Front View



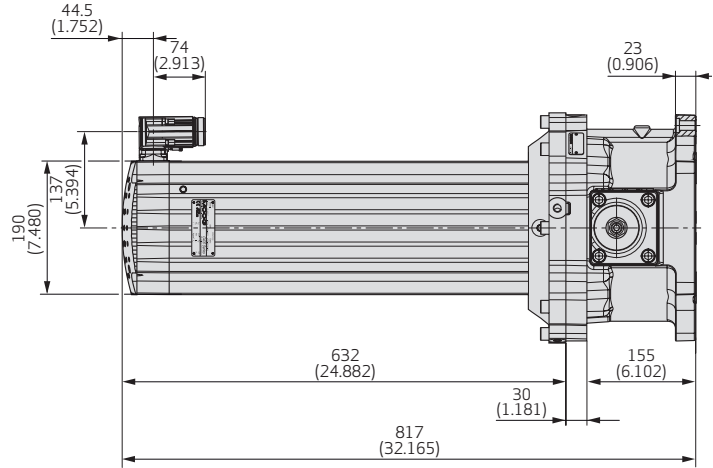
Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350 (5,076 psi)	26 (1.02 in)	32 (1.26 in)
Sp	Flushing port	10 (145 psi)	10 (0.39 in)	20 (0.79 in)
L	Leakage port	10 (145 psi)	16.5 (0.65 in)	17 (0.67 in)
X <sub>max</sub>	Control port for maximum displacement (option N1 only)	350 (5,076 psi)	7 (0.28 in)	7,5 (0.30 in)
X <sub>min</sub>	Control port for minimum displacement (option N1 only)	350 (5,076 psi)	7 (0.28 in)	7,5 (0.30 in)

SIZE 80

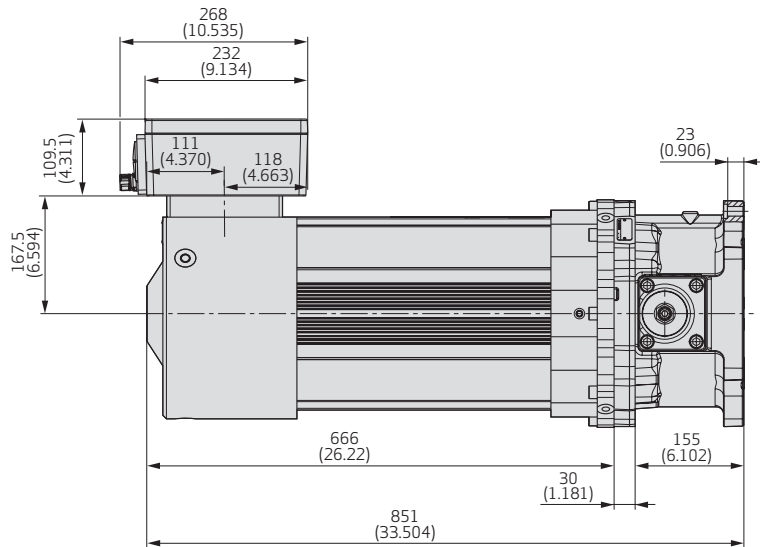
Natural Cooling, S EPU 080 A D xx xx C

Installation Drawings

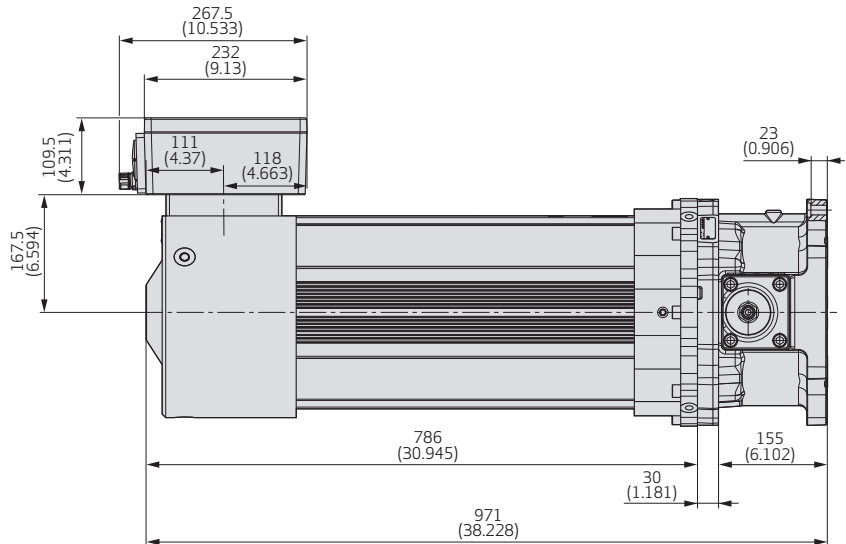
50 C



M0 C



H0 C



Note: Dimensions mm (inch)



## SIZE 80

## Liquid Cooling, S EPU 080 A D xx xx W

## Characteristics Table

Performance class		Small	Medium	High
S EPU 080 A D xx		50 W	M0 W	HO W
<b>Pump</b>				
Displacement	$V_{max}$	80 cm <sup>3</sup> /rev (4.88 in <sup>3</sup> /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 <sup>1)</sup>	$p_{Lmax} \cdot P_{Sp}$	10 bar (145 psi)		
Maximum flow	$Q_{max}$	216 l/min (57.1 gpm)		
Maximum pressure ports A and B	$p_A, p_B$	350 bar (5,076 psi)		
Flushing flow rate <sup>4)</sup>	$Q_{Sp}$	4 - 6 l/min (1.1 - 1.6 gpm)		
<b>Motor</b>				
Continuous stall torque <sup>3)</sup>	$M_0$	151 Nm (1,336 lbf in)	227 Nm (2,009 lbf in)	498 Nm (4,408 lbf in)
Rated torque <sup>3)</sup>	$M_n$	128 Nm (1,133 lbf in)	189 Nm (1,673 lbf in)	347 Nm (3,071 lbf in)
Maximum torque	$M_{max}$	391 Nm (3,461 lbf in)	595 Nm (5,266 lbf in)	1,387 Nm (12,276 lbf in)
Rated speed	$n_n$	2,500 rpm		1,800 rpm
Maximum speed	$n_{max}$	Maximum speed see $M = f(n)$ performance curve		
Continuous stall current	$I_0$	85.95 A <sub>rms</sub>	114.87 A <sub>rms</sub>	235.21 A <sub>rms</sub>
Maximum current	$I_{max}$	250 A <sub>rms</sub>	340 A <sub>rms</sub>	750 A <sub>rms</sub>
Torque constant	$k_t$	1.76 Nm/A <sub>rms</sub> (15.6 lbf in/A <sub>rms</sub> )	1.97 Nm/A <sub>rms</sub> (17.4 lbf in/A <sub>rms</sub> )	2.12 Nm/A <sub>rms</sub> (18.8 lbf in/A <sub>rms</sub> )
Voltage constant	$k_e$	106.63 V <sub>rms</sub> /1,000 <sub>rpm</sub>	119.96 V <sub>rms</sub> /1,000 <sub>rpm</sub>	145.87 V <sub>rms</sub> /1,000 <sub>rpm</sub>
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 (1.6 - 2.1 gpm)	6-8 l/min (1.6 - 2.1 gpm)	8 l/min (2.1 gpm)
<b>EPU unit</b>				
Inertia	$J$	295.8 kg cm <sup>2</sup> (2,618 10 <sup>-4</sup> lbf in s <sup>2</sup> )	346.3 kg cm <sup>2</sup> (3,065 10 <sup>-4</sup> lbf in s <sup>2</sup> )	1,207.3 kg cm <sup>2</sup> (10,686 10 <sup>-4</sup> lbf in s <sup>2</sup> )
Weight	$m$	144.3 kg (318.1 lb)	168.1 kg (370.6 lb)	227.5 kg (501.6 lb)
Tightening torque	8x M12x45 -12.9 hexagon head	120 Nm + 10 Nm (1,062 lbf in + 89 lbf in)		
<b>Servo drive</b>				
Recommended drive size <sup>2)</sup>		G392-110 size 6	G392-110 size 6	G392-143 size 6A

1) See diagram "Maximum housing pressure  $p_{Lmax} \cdot P_{Sp} = f(n)$ " and "Installation note" (page 3)

2) See catalog "Modular Multi-Axis Servo Drive Systems (MSD)"

3) Operation in still air with water temperatures from +25°C(+77°F) up to +40°C(+104°F). Winding temperature measure up to +110°C(+230°F) over water

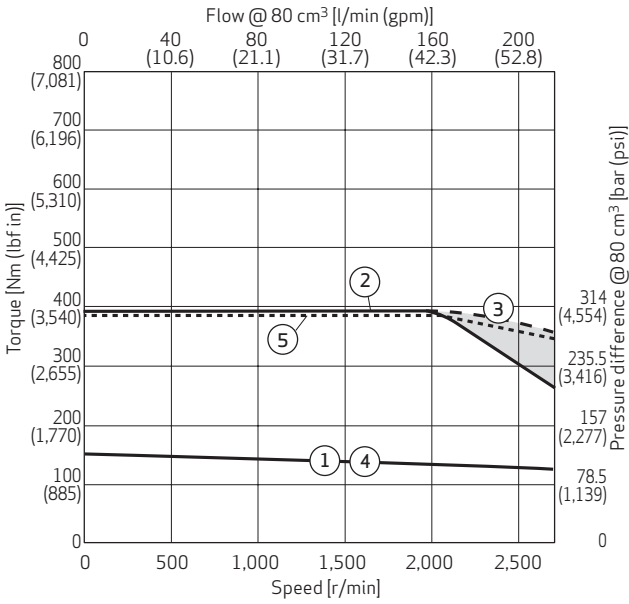
4) Mandatory via Sp port (flushing port)

# SIZE 80

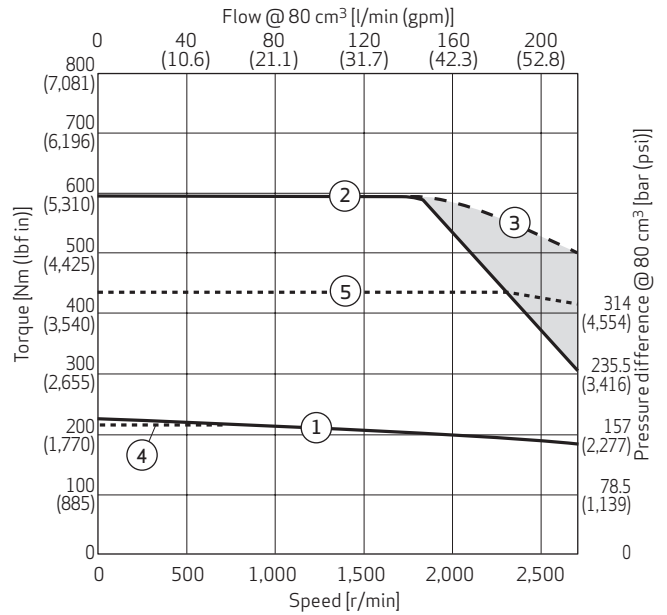
## Liquid Cooling, S EPU 080 A D xx xx W

### Motor Performance Curves

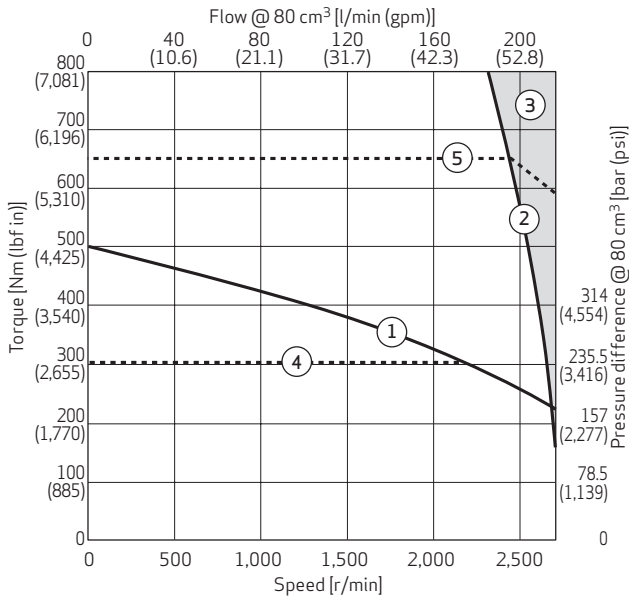
50 W



M0 W



H0 W



- ① Continuous torque at 110 K temperature difference over water, max. winding temperature 150 °C (302 °F)
- ② Maximum torque without field weakening
- ③ Maximum torque with field weakening
- ④ Continuous torque if recommended drive size is used
- ⑤ Maximum torque with field weakening if recommended drive size is used

**Notes:**

Motor performance with 565 V<sub>DC</sub> link voltage

Motor performance doesn't take the pump efficiency into account

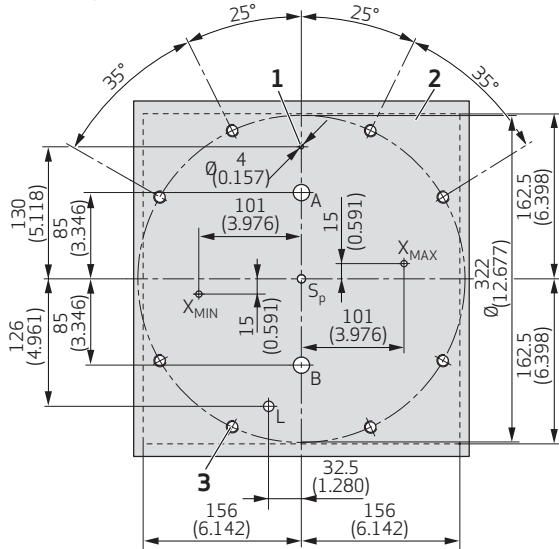
Motor performance determined with respective max. cooling water flow rate, see characteristic table

Pressure difference  $\Delta p = p_A - p_B$

# SIZE 80

## Liquid Cooling, S EPU 080 A D xx xx W

### Mounting Pattern



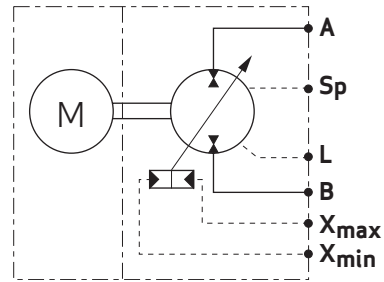
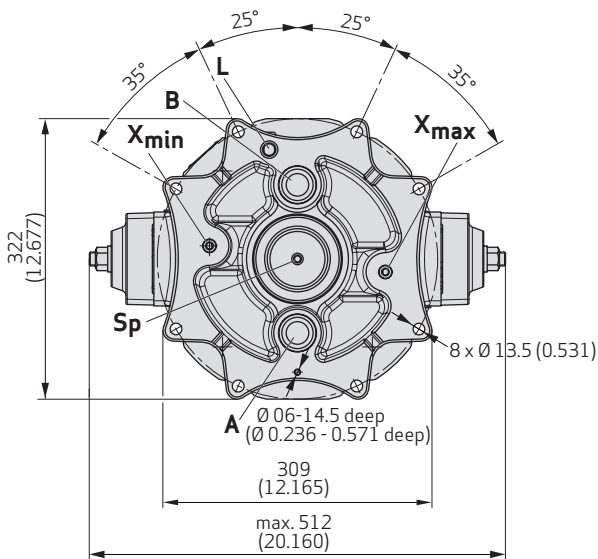
1. Use a spring-type pin with nominal diameter of 4 mm (0.16 in) (e.g. 4x12) according to ISO 13337

2. Area of  
 - surface flatness:  $\square 0.02$   
 - surface roughness:  $\sqrt{Rz4}$

3. M12, minimum 25 mm (0.9 in) deep.  
 Recommended: Use 8 hexagon head cap screws M12 (property class 12.9, minimum length 45 mm (1.8 in)) according to ISO 4762. Tightening torque 120 + 10 Nm (1,062 lbf in + 89 lbf in).

Note: Dimensions mm (inch)

### Pump Front View



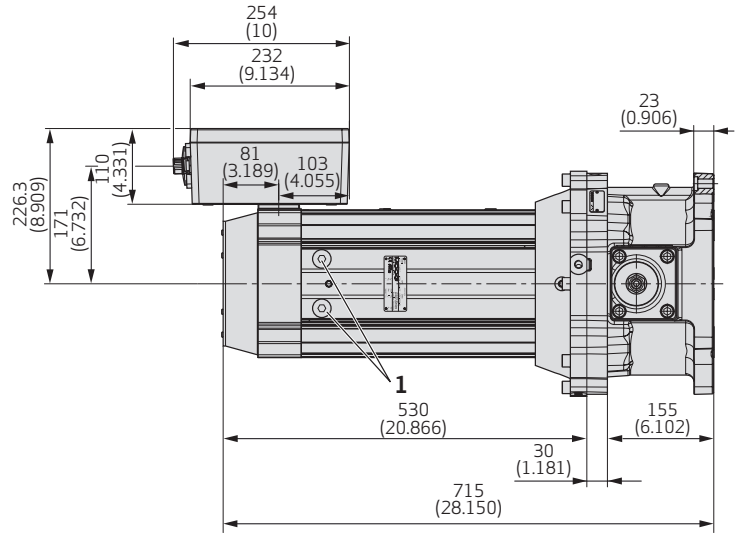
Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350 (5,076 psi)	26 (1.02 in)	32 (1.26 in)
Sp	Flushing port	10 (145 psi)	10 (0.39 in)	20 (0.79 in)
L	Leakage port	10 (145 psi)	16.5 (0.65 in)	17 (0.67 in)
X <sub>max</sub>	Control port for maximum displacement (option N only)	350 (5,076 psi)	7 (0.28 in)	7,5 (0.30 in)
X <sub>min</sub>	Control port for minimum displacement (option N1 only)	350 (5,076 psi)	7 (0.28 in)	7,5 (0.30 in)

# SIZE 80

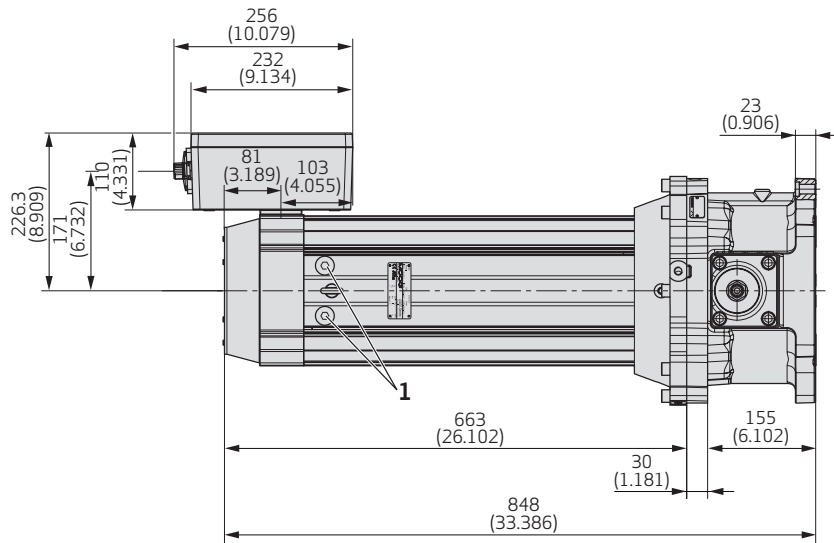
## Liquid Cooling, S EPU 080 A D xx xx W

### Installation Drawings

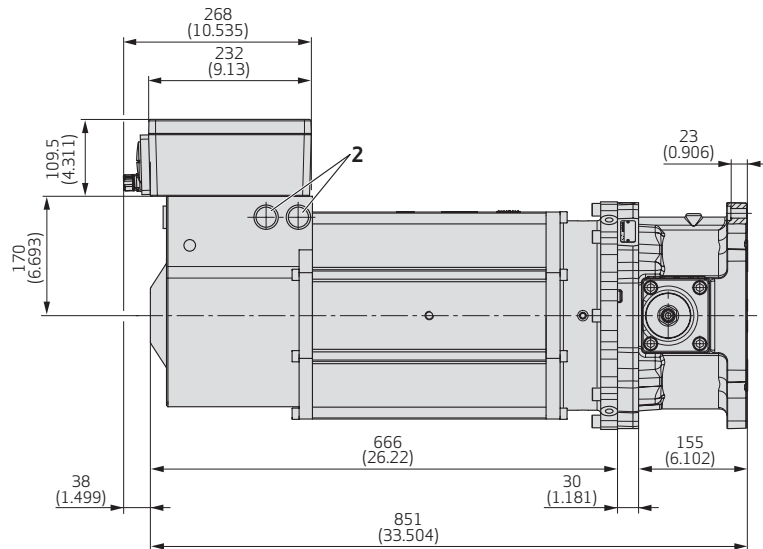
S0 W



M0 W



H0 W



Note: Dimensions mm (inch)

1) Cooler outlet G1/2" (thread depth max. 7 mm)

2) Cooler outlet G3/4" (thread depth max. 16 mm)

## SIZE 140

### Natural Cooling, S EPU 140 A D xx xx C

#### Characteristics Table

Performance class		Small
S EPU 140 A D xx		S0C
<b>Pump</b>		
Displacement	$V_{max}$	140 cm <sup>3</sup> /rev (8.54 in <sup>3</sup> /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 <sup>1)</sup>	$p_{Lmax}, p_{Sp}$	10 bar (145 psi)
Maximum flow	$Q_{max}$	322 l/min (85.1 gpm)
Maximum pressure ports A and B	$p_A, p_B$	350 bar (5,076 psi)
Flushing flow rate <sup>4)</sup>	$Q_{Sp}$	6 - 8 l/min (1.6 - 2.1 gpm)
<b>Motor</b>		
Continuous stall torque <sup>3)</sup>	$M_0$	298 Nm (2,638 lbf in)
Rated torque <sup>3)</sup>	$M_n$	230 Nm (2,036 lbf in)
Maximum torque	$M_{max}$	1,972 Nm (17,454 lbf in)
Rated speed	$n_n$	700 rpm
Maximum speed	$n_{max}$	Maximum speed see $M = f(n)$ performance curve
Continuous stall current	$I_0$	100.63 A <sub>rms</sub>
Maximum current	$I_{max}$	795 A <sub>rms</sub>
Torque constant	$k_t$	2.96 Nm/A <sub>rms</sub> (26.2 lbf in/A <sub>rms</sub> )
Voltage constant	$k_e$	197.70 V <sub>rms</sub> /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
<b>EPU unit</b>		
Inertia	J	1,722 kg cm <sup>2</sup> (15,241 10 <sup>-4</sup> lbf in s <sup>2</sup> )
Weight	m	280.8 kg (619.1 lb in)
Tightening torque	12x M12x45 -12.9 hexagon head	120 Nm + 10 Nm (1,062 lbf in + 89 lbf in)
<b>Servo drive</b>		
Recommended drive size <sup>2)</sup>		G392-143 size 6

1) See diagram "Maximum housing pressure  $p_{Lmax}, p_{Sp} = f(n)$ " and "Installation note" (page 3)

2) See catalog "Modular Multi-Axis Servo Drive Systems (MSD)"

3) Operation in still air with ambient temperatures up to +40 °C (+104 °F). Winding temperature measure up to +110 °C (+230 °F) over ambient

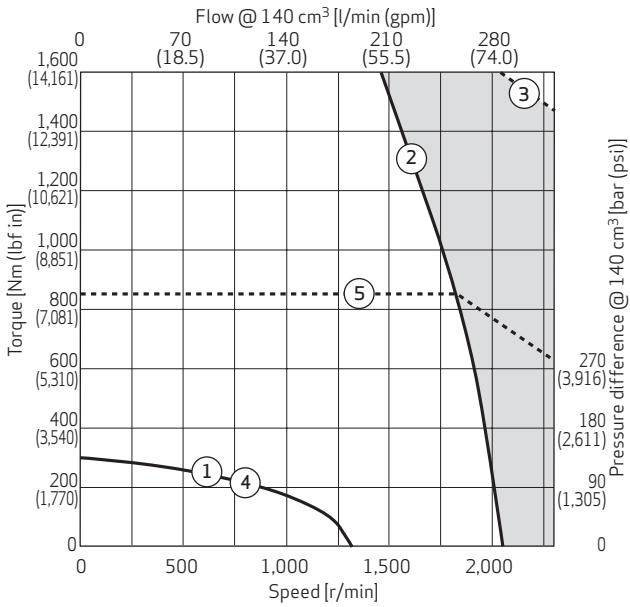
4) Mandatory via Sp port (flushing port)

# SIZE 140

## Natural Cooling, S EPU 140 A D xx xx C

### Motor Performance Curves

50 C



- ① Continuous torque at 110 K temperature difference over ambient, max. winding temperature 150 °C (302 °F)
- ② Maximum torque without field weakening
- ③ Maximum torque with field weakening
- ④ Continuous torque if recommended drive size is used
- ⑤ Maximum torque with field weakening if recommended drive size is used

Notes:

Motor performance with 565 V<sub>DC</sub> link voltage

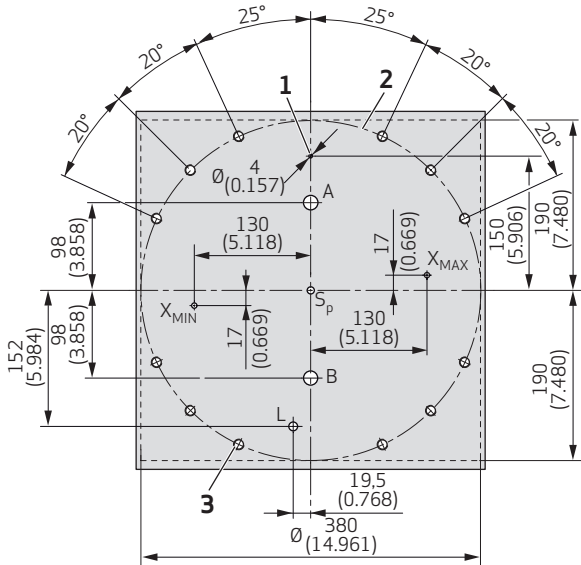
Motor performance doesn't take the pump efficiency into account

Pressure difference  $\Delta p = p_A - p_B$

# SIZE 140

## Natural Cooling, S EPU 140 A D xx xx C

### Mounting Pattern



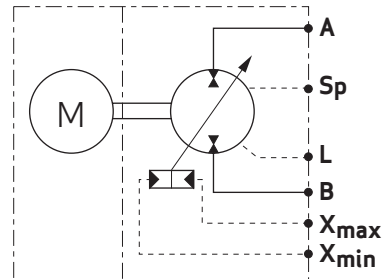
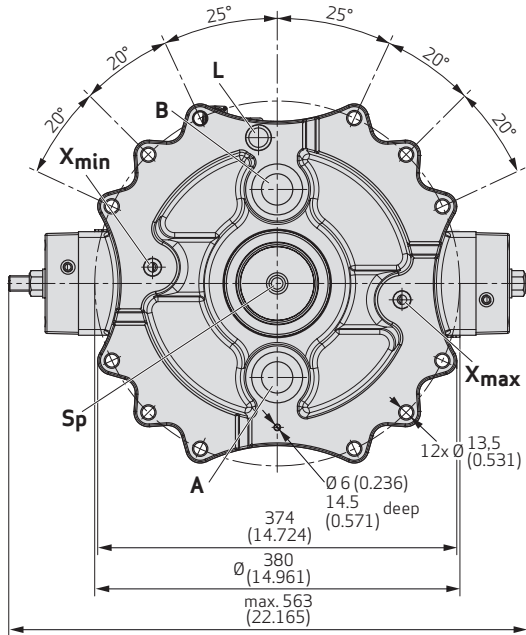
1. Use a spring-type pin with nominal diameter of 4 mm (0.16 in) (e.g. 4x12) according to ISO 13337

2. Area of  
 - surface flatness:  $\square 0.02$   
 - surface roughness:  $\sqrt{Rz4}$

3. M12, minimum 25 mm (0.9 in) deep.  
 Recommended: Use 12 hexagon head cap screws M12 (property class 12.9, minimum length 45 mm (1.8 in)) according to ISO 4762. Tightening torque 120 + 10 Nm (1,062 lbf in + 89 lbf in).

Note: Dimensions mm (inch)

### Pump Front View



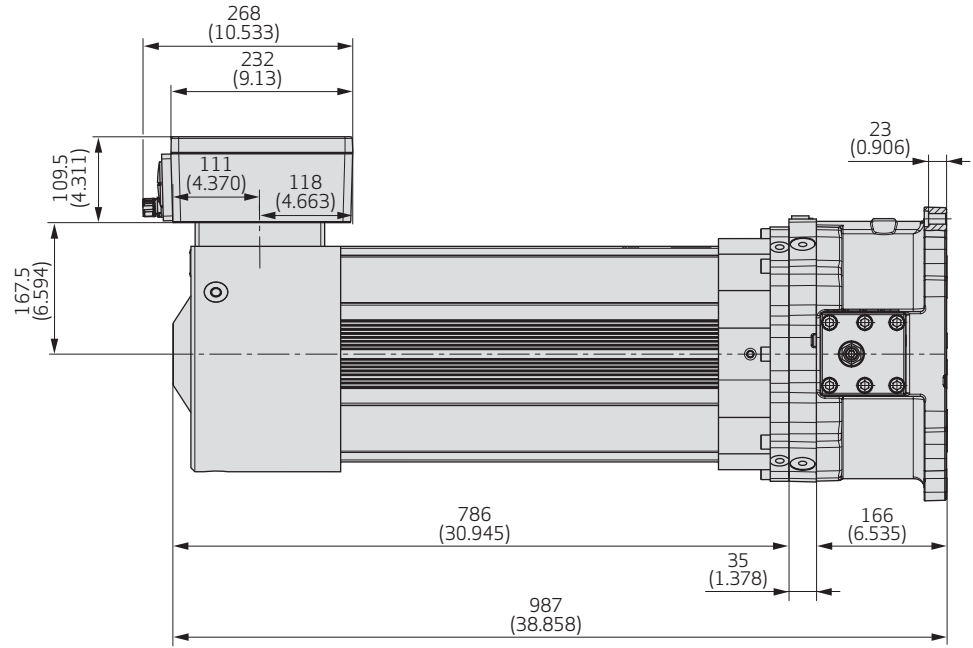
Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350 (5,076 psi)	32.5 (1.28 in)	38 (1.50 in)
Sp	Flushing port	10 (145 psi)	12 (0.47 in)	25 (0.98 in)
L	Leakage port	10 (145 psi)	19.5 (0.77 in)	20 (0.79 in)
X <sub>max</sub>	Control port for maximum displacement (option N1 only)	350 (5,076 psi)	9.5 (0.37 in)	10 (0.39 in)
X <sub>min</sub>	Control port for minimum displacement (option N1 only)	350 (5,076 psi)	9.5 (0.37 in)	10 (0.39 in)

# SIZE 140

## Natural Cooling, S EPU 140 A D xx xx C

### Installation Drawings

S0 C



Note: Dimensions mm (inch)



## SIZE 140

## Liquid Cooling, S EPU 140 A D xx xx W

## Characteristics Table

Performance class		Small	Medium	High
S EPU 140 A D xx		S0 W	M0 W	HO W
<b>Pump</b>				
Displacement	$V_{max}$	140 cm <sup>3</sup> /rev (8.54 in <sup>3</sup> /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 <sup>1)</sup>	$p_{Lmax}, p_{Sp}$	10 bar (145 psi)		
Maximum flow	$Q_{max}$	322 l/min (85.1 gpm)		
Maximum pressure ports A and B	$p_A, p_B$	350 bar (5,076 psi)		
Flushing flow rate <sup>4)</sup>	$Q_{Sp}$	6 - 8 l/min (1.6 - 2.1 gpm)		
<b>Motor</b>				
Continuous stall torque <sup>3)</sup>	$M_0$	227 Nm (2,009 lbf in)	498 Nm (4,408 lbf in)	654 Nm (5,788 lbf in)
Rated torque <sup>3)</sup>	$M_n$	189 Nm (1,673 lbf in)	347 Nm (3,071 lbf in)	427 Nm (3,779 lbf in)
Maximum torque	$M_{max}$	595 Nm (5,266 lbf in)	1,387 Nm (12,276 lbf in)	1,950 Nm (17,259 lbf in)
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 <sub>rms</sub>	235.21 A <sub>rms</sub>	230.9 A <sub>rms</sub>
Maximum current	$I_{max}$	340 A <sub>rms</sub>	750 A <sub>rms</sub>	795 A <sub>rms</sub>
Torque constant	$k_t$	1.97 Nm/A <sub>rms</sub> (17.4 lbf in/A <sub>rms</sub> )	2.12 Nm/A <sub>rms</sub> (18.8 lbf in/A <sub>rms</sub> )	2.83 Nm/A <sub>rms</sub> (25.0 lbf in/A <sub>rms</sub> )
Voltage constant	$k_e$	119.96 V <sub>rms</sub> /1,000 rpm	145.87 V <sub>rms</sub> /1,000 rpm	195.48 V <sub>rms</sub> /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 (1.6 - 2.1 gpm)	8 l/min (2.1 gpm)	8 l/min (2.1 gpm)
<b>EPU unit</b>				
Inertia	$J$	540 kg cm <sup>2</sup> (4,779 10 <sup>-4</sup> lbf in s <sup>2</sup> )	1,401 kg cm <sup>2</sup> (12,400 10 <sup>-4</sup> lbf in s <sup>2</sup> )	1,722 kg cm <sup>2</sup> (15,241 10 <sup>-4</sup> lbf in s <sup>2</sup> )
Weight	$m$	199.4 kg (439.6 lb)	258.8 kg (570.6 lb)	295.8 kg (652.1 lb)
Tightening torque	12x M12x45 -12.9 hexagon head	120 Nm + 10 Nm (1,062 lbf in + 89 lbf in)		
<b>Servo drive</b>				
Recommended drive size <sup>2)</sup>		G392-143 size 6A	G395-210 size 6A	G395-210 size 6A

1) See diagram "Maximum housing pressure  $p_{Lmax}, p_{Sp} = f(n)$ " and "Installation note" (page 3)

2) See catalog "Modular Multi-Axis Servo Drive Systems (MSD)"

3) Operation in still air with water temperatures from +25°C(+77°F) up to +40°C(+104°F). Winding temperature measure up to +110 °C(+230 °F) over water

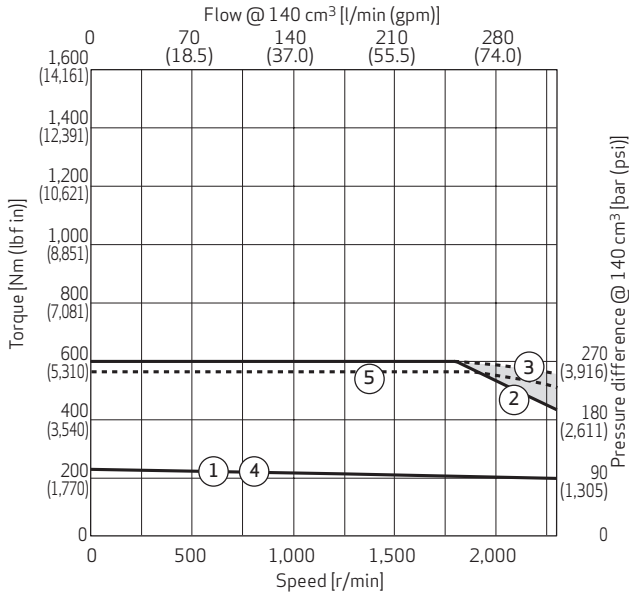
4) Mandatory via Sp port (flushing port)

# SIZE 140

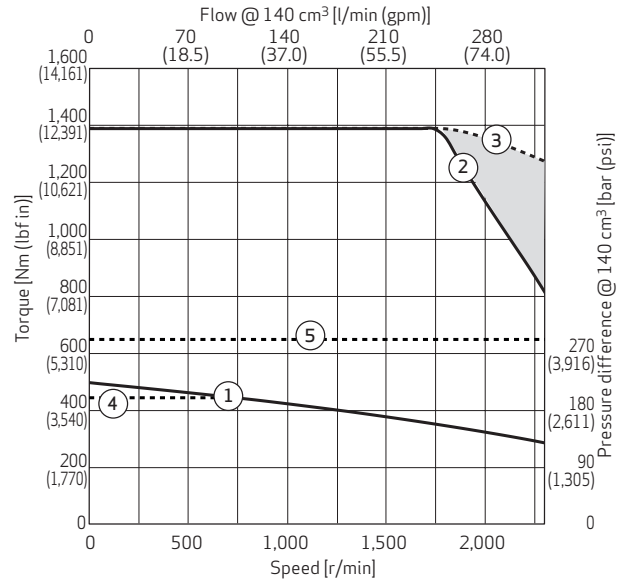
## Liquid Cooling, S EPU 140 A D xx xx W

### Motor Performance Curves

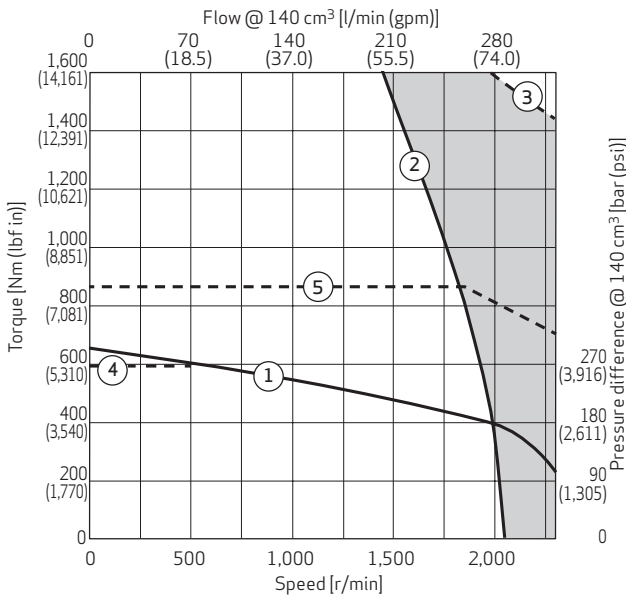
50 W



M0 W



H0 W



- ① Continuous torque at 110 K temperature difference over water, max. winding temperature 150 °C (302 °F)
- ② Maximum torque without field weakening
- ③ Maximum torque with field weakening
- ④ Continuous torque if recommended drive size is used
- ⑤ Maximum torque with field weakening if recommended drive size is used

**Notes:**

Motor performance with 565 V<sub>DC</sub> link voltage

Motor performance doesn't take the pump efficiency into account

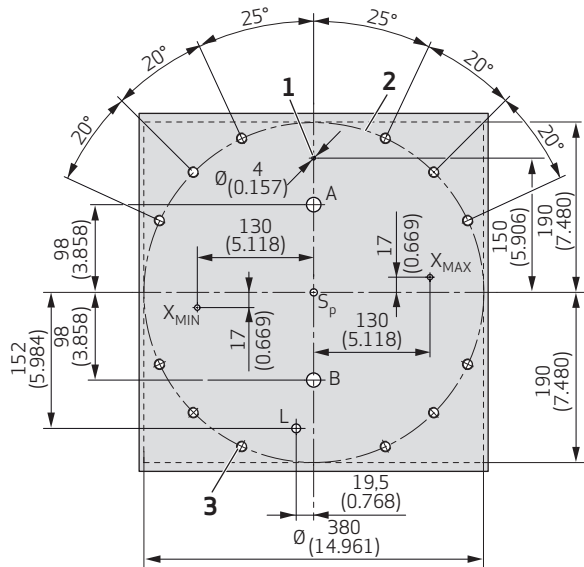
Pressure difference  $\Delta p = p_A - p_B$

Motor performance determined with respective max. cooling water flow rate, see characteristic table

# SIZE 140

## Liquid Cooling, S EPU 140 A D xx xx W

### Mounting Pattern



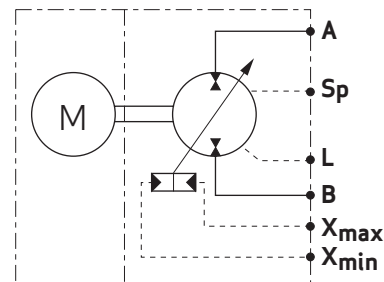
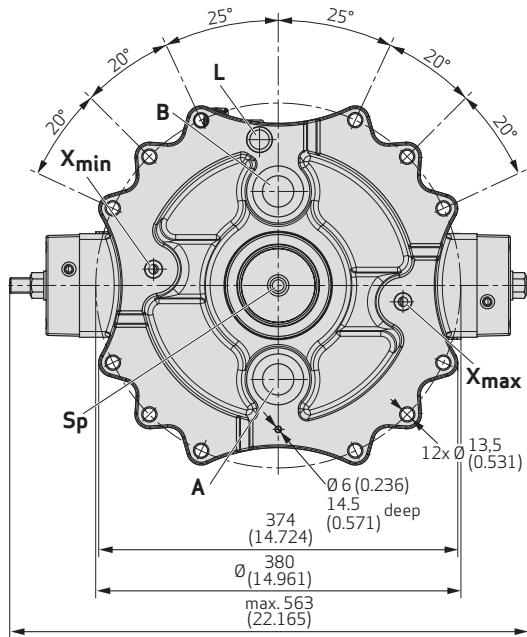
1. Use a spring-type pin with nominal diameter of 4 mm (0.16 in) (e.g. 4x12) according to ISO 13337

2. Area of  
 - surface flatness:  $\square 0.02$   
 - surface roughness:  $\sqrt{Rz4}$

3. M12, minimum 25 mm (0.9 in) deep.  
 Recommended: Use 12 hexagon head cap screws M12 (property class 12.9, minimum length 45 mm (1.8 in)) according to ISO 4762. Tightening torque 120 + 10 Nm (1,062 lbf in + 89 lbf in).

Note: Dimensions mm (inch)

### Pump Front View



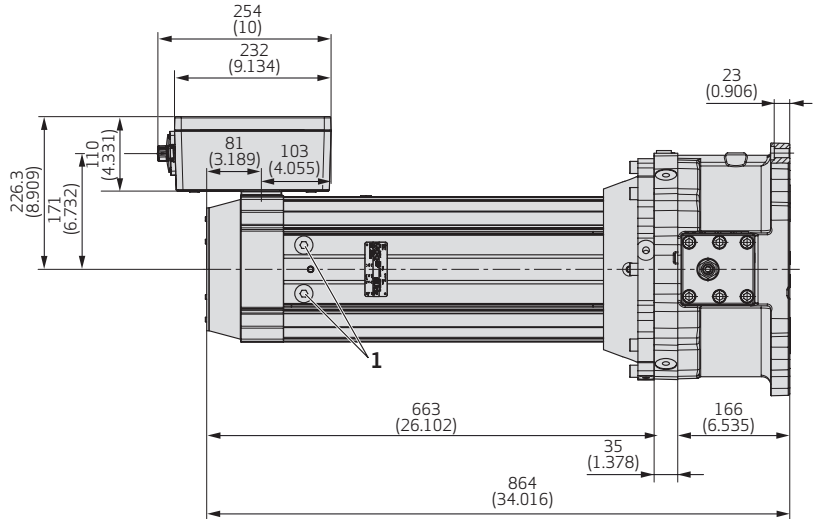
Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350 (5,076 psi)	32.5 (1.28 in)	38 (1.50 in)
Sp	Flushing port	10 (145 psi)	12 (1.47 in)	25 (0.98 in)
L	Leakage port	10 (145 psi)	19.5 (0.78 in)	20 (0.79 in)
X <sub>max</sub>	Control port for maximum displacement (option N1 only)	350 (5,076 psi)	9.5 (0.37 in)	10 (0.39 in)
X <sub>min</sub>	Control port for minimum displacement (option N1 only)	350 (5,076 psi)	9.5 (0.37 in)	10 (0.39 in)

# SIZE 140

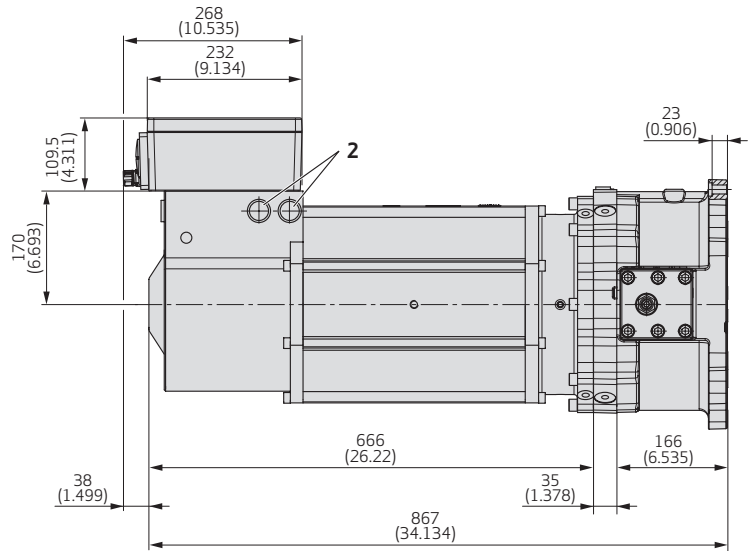
## Liquid Cooling, S EPU 140 A D xx xx W

### Installation Drawings

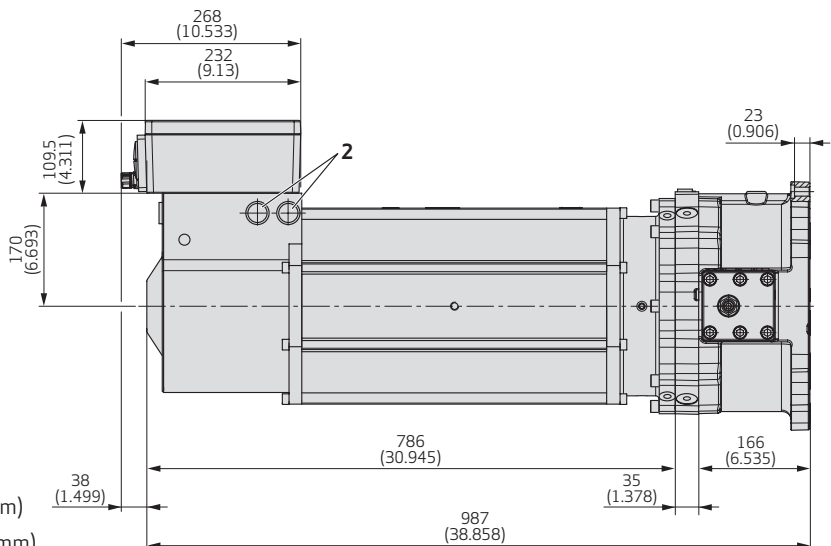
50 W



M0 W



H0 W



Note: Dimensions mm (inch)

1) Cooler outlet G1/2" (thread depth max. 7 mm)

2) Cooler outlet G3/4" (thread depth max. 16 mm)

## SIZE 250

### Natural Cooling, S EPU 250 A D xx xx C

#### Characteristics Table

Performance class		Small
S EPU 250 A D xx		S0 C
<b>Pump</b>		
Displacement	$V_{max}$	250 cm <sup>3</sup> /rev (15.25 in <sup>3</sup> /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 <sup>1)</sup>	$p_{Lmax}, p_{Sp}$	10 bar (145 psi)
Maximum flow	$Q_{max}$	450 l/min (118.9 gpm)
Maximum pressure ports A and B	$p_A, p_B$	350 bar (5,076 psi)
Flushing flow rate <sup>4)</sup>	$Q_{Sp}$	10 - 12 l/min (2.6 - 3.2 gpm)
<b>Motor</b>		
Continuous stall torque <sup>3)</sup>	$M_0$	418 Nm (3,700 lbf in)
Rated torque <sup>3)</sup>	$M_n$	330 Nm (2,921 lbf in)
Maximum torque	$M_{max}$	2,100 Nm (18,587 lbf in)
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 <sub>rms</sub>
Maximum current	$I_{max}$	800 A <sub>rms</sub>
Torque constant	$k_t$	2.96 Nm/A <sub>rms</sub> (26.2 lbf in/A <sub>rms</sub> )
Voltage constant	$k_e$	197.70 V <sub>rms</sub> /1,000 <sub>rpm</sub>
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
<b>EPU unit</b>		
Inertia	$J$	3,540 kg cm <sup>2</sup> (31,332 10 <sup>-4</sup> lbf in s <sup>2</sup> )
Weight	$m$	535 kg (1,179.5 lb)
Tightening torque	12x M12x50 -12.9 hexagon head	120 Nm + 10 Nm (1,062 lbf in + 89 lbf in)
<b>Servo drive</b>		
Recommended drive size <sup>2)</sup>		G392-170 size 6A

1) See diagram "Maximum housing pressure  $p_{Lmax}, p_{Sp} = f(n)$ " and "Installation note" (page 3)

2) See catalog "Modular Multi-Axis Servo Drive Systems (MSD)"

3) Operation in still air with ambient temperatures up to +40 °C (+104 °F). Winding temperature measure up to +110 °C (+230 °F) over ambient

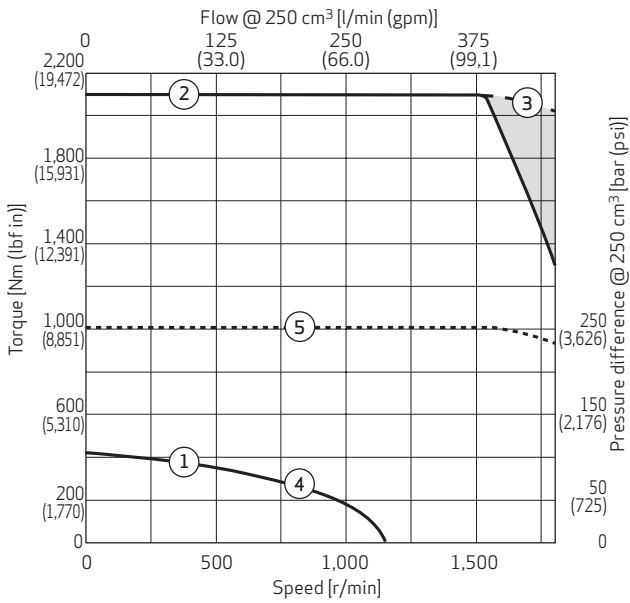
4) Mandatory via Sp port (flushing port)

# SIZE 250

## Natural Cooling, S EPU 250 A D xx xx C

### Motor Performance Curves

50 C



- ① Continuous torque at 110 K temperature difference over ambient, max. winding temperature 150 °C (302 °F)
- ② Maximum torque without field weakening
- ③ Maximum torque with field weakening
- ④ Continuous torque if recommended drive size is used
- ⑤ Maximum torque with field weakening if recommended drive size is used

Notes:

Motor performance with 565 V<sub>DC</sub> link voltage

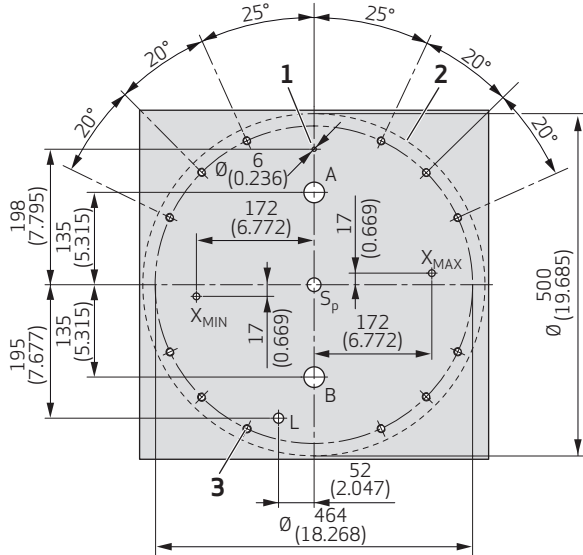
Motor performance doesn't take the pump efficiency into account

Pressure difference  $\Delta p = p_A - p_B$

# SIZE 250

## Natural Cooling, S EPU 250 A D xx xx C

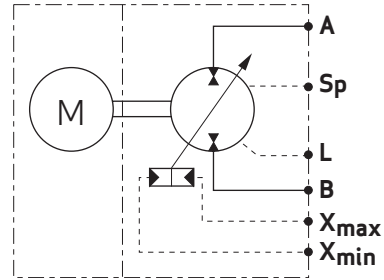
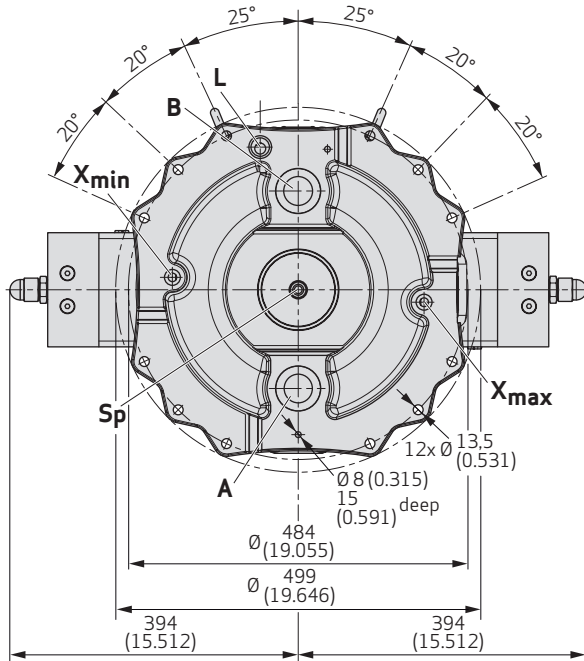
### Mounting Pattern



1. Use a spring-type pin with nominal diameter of 6 mm (0.236 in) (e.g. 4x12) according to ISO 13337
2. Area of
  - surface flatness:  $\square 0.02$
  - surface roughness:  $\sqrt{Rz4}$
3. M12, minimum 25 mm (0.9 in) deep.  
Recommended: Use 12 hexagon head cap screws M12 (property class 12.9, minimum length 50 mm (1.8 in)) according to ISO 4762. Tightening torque 120 + 10 Nm (1,062 lbf in + 89 lbf in).

Note: Dimensions mm (inch)

### Pump Front View



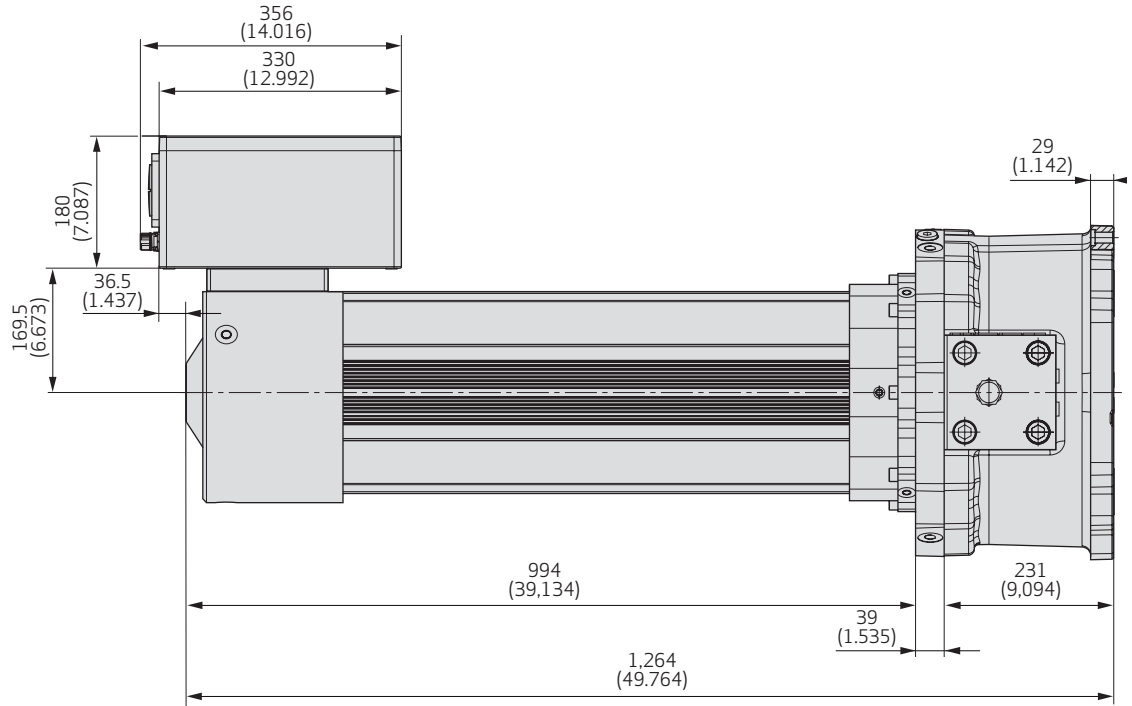
Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350 (5,076 psi)	39 (1.53 in)	45 (1.77 in)
Sp	Flushing port	10 (145 psi)	10 (0.39 in)	25 (0.98 in)
L	Leakage port	10 (145 psi)	24 (0.94 in)	25 (0.98 in)
X <sub>max</sub>	Control port for maximum displacement (option N1 only)	350 (5,076 psi)	12 (0.47 in)	13 (0.51 in)
X <sub>min</sub>	Control port for minimum displacement (option N1 only)	350 (5,076 psi)	12 (0.47 in)	13 (0.51 in)

# SIZE 250

## Natural Cooling, S EPU 250 A D xx xx C

### Installation Drawings

S0 C



Note: Dimensions mm (inch)



# SIZE 250

## Liquid Cooling, S EPU 250 A D xx xx W

### Characteristics Table

Performance class		Small	Medium	High
S EPU 250 A D xx		SO W	M0 W	HO W
<b>Pump</b>				
Displacement	$V_{max}$	250 cm <sup>3</sup> /rev (15.26 in <sup>3</sup> /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 <sup>1)</sup>	$p_{Lmax}, p_{Sp}$	10 bar (145 psi)		
Maximum flow	$Q_{max}$	450 l/min (118.9 gpm)		
Maximum pressure ports A and B	$p_A, p_B$	350 bar (5,076 psi)		
Flushing flow rate <sup>4)</sup>	$Q_{Sp}$	10 - 12 l/min (2.6 - 3.2 gpm)		
<b>Motor</b>				
Continuous stall torque <sup>3)</sup>	$M_0$	498 Nm (4,408 lbf in)	654 Nm (5,788 lbf in)	967 Nm (8,559 lbf in)
Rated torque <sup>3)</sup>	$M_n$	347 Nm (3,071 lbf in)	427 Nm (3,779 lbf in)	605 Nm (5,355 lbf in)
Maximum torque	$M_{max}$	1,387 Nm (12,276 lbf in)	1,950 Nm (17,259 lbf in)	1,969 Nm (17,427 lbf in)
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 <sub>rms</sub>	230.9 A <sub>rms</sub>	340.35 A <sub>rms</sub>
Maximum current	$I_{max}$	750 A <sub>rms</sub>	795 A <sub>rms</sub>	750 A <sub>rms</sub>
Torque constant	$k_t$	2.12 Nm/A <sub>rms</sub> (18.9 lbf in/A <sub>rms</sub> )	2.83 Nm/A <sub>rms</sub> (25.0 lbf in/A <sub>rms</sub> )	2.84 Nm/A <sub>rms</sub> (25.1 lbf in/A <sub>rms</sub> )
Voltage constant	$k_e$	145.87 V <sub>rms</sub> /1,000 rpm	195.48 V <sub>rms</sub> /1,000 rpm	195.48 V <sub>rms</sub> /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 (2.1 gpm)	8 l/min (2.1 gpm)	8 l/min (2.1 gpm)
<b>EPU unit</b>				
Inertia (pump and motor)	$J$	2,576 kg cm <sup>2</sup> (22,800 10 <sup>-4</sup> lbf in s <sup>2</sup> )	2,897 kg cm <sup>2</sup> (25,641 10 <sup>-4</sup> lbf in s <sup>2</sup> )	3,540 kg cm <sup>2</sup> (31,332 10 <sup>-4</sup> lbf in s <sup>2</sup> )
Weight (pump and motor)	$m$	443 kg (976.6 lb)	480 kg (1,058.21 lb)	555 kg (1,223.5 lb)
Tightening torque	12x M12x50 -12.9 hexagon head	120 Nm + 10 Nm (1,062 lbf in + 89 lbf in)		
<b>Servo drive</b>				
Recommended drive size <sup>2)</sup>		G395-210 size 6A	G395-210 size 6A	G395-450 size 7

1) See diagram "Maximum housing pressure  $p_{Lmax}, p_{Sp} = f(n)$ " and "Installation note" (page 3)

2) See catalog "Modular Multi-Axis Servo Drive Systems (MSD)"

3) Operation in still air with water temperatures from +25 °C(+77 °F) up to +40 °C (+104 °F). Winding temperature measure up to +110 °C(+230 °F) over water

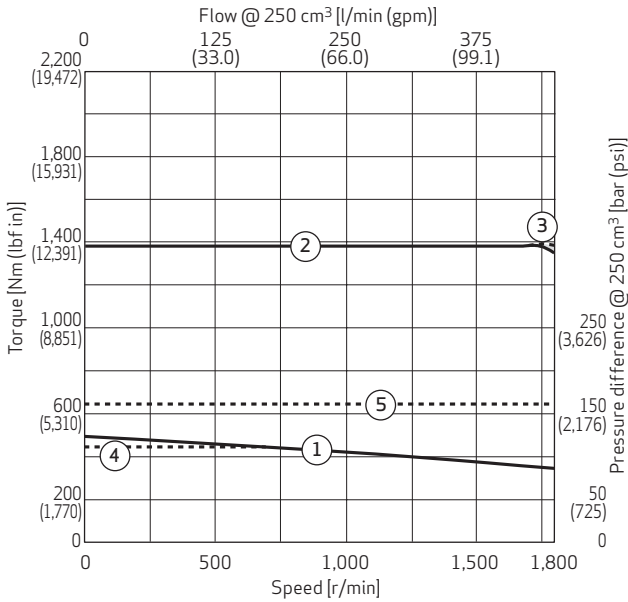
4) Mandatory via Sp port (flushing port)

# SIZE 250

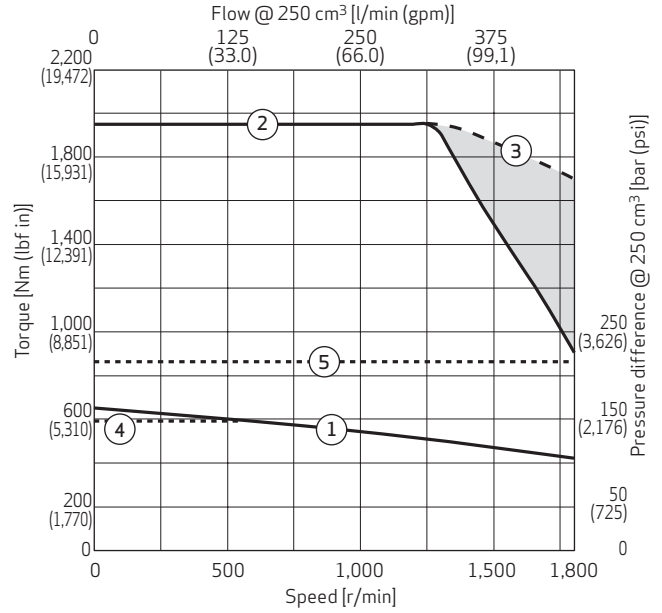
## Liquid Cooling, S EPU 250 A D xx xx W

### Motor Performance Curves

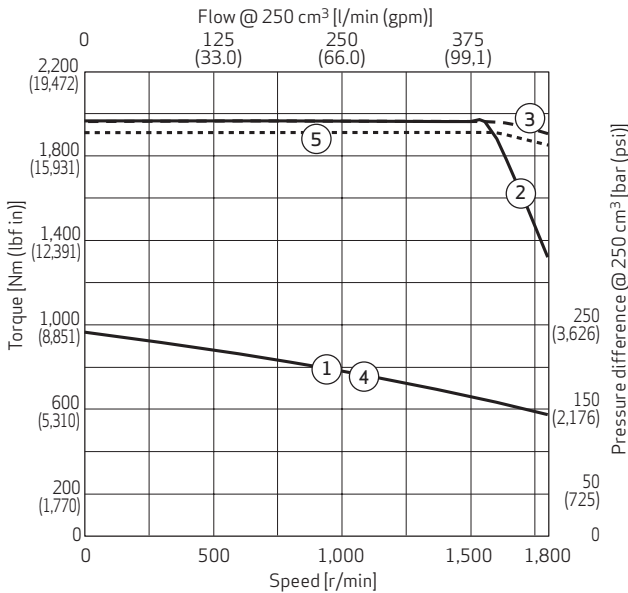
50 W



M0 W



H0 W



- ① Continuous torque at 110 K temperature difference over water, max. winding temperature 150 °C (302 °F)
- ② Maximum torque without field weakening
- ③ Maximum torque with field weakening
- ④ Continuous torque if recommended drive size is used
- ⑤ Maximum torque with field weakening if recommended drive size is used

**Notes:**

Motor performance with 565 V<sub>DC</sub> link voltage

Motor performance doesn't take the pump efficiency into account

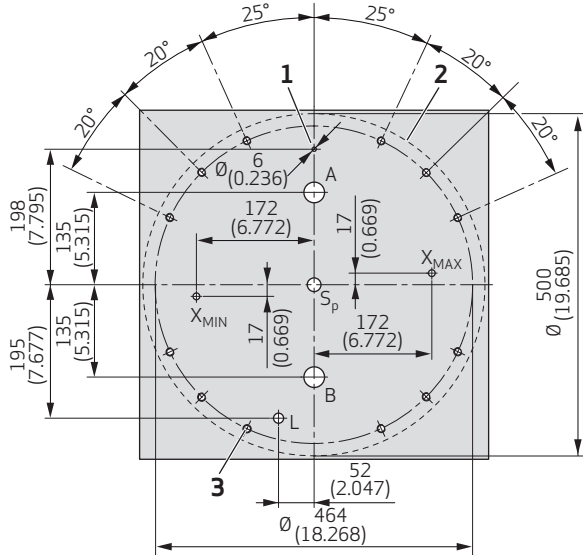
Pressure difference  $\Delta p = p_A - p_B$

Motor performance determined with respective max. cooling water flow rate, see characteristic table

# SIZE 250

## Liquid Cooling, S EPU 250 A D xx xx W

### Mounting Pattern



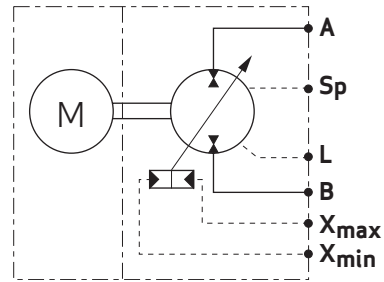
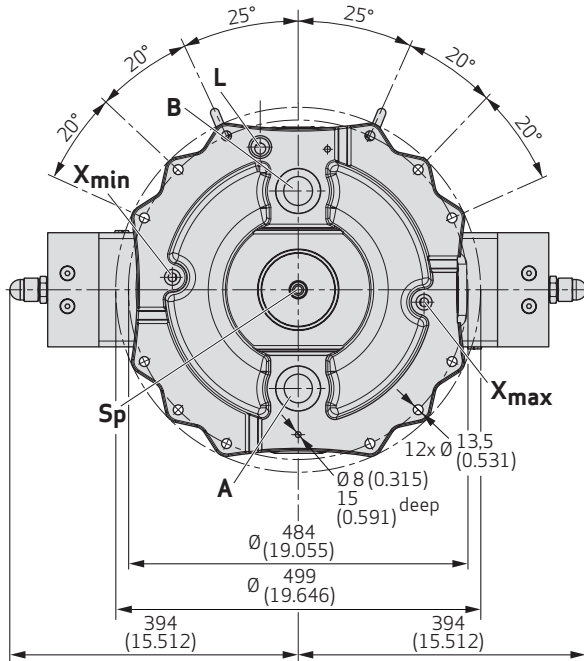
1. Use a spring-type pin with nominal diameter of 6 mm (0.236 in) (e.g. 4x12) according to ISO 13337

2. Area of  
 - surface flatness:  $\square 0.02$   
 - surface roughness:  $\sqrt{Rz4}$

3. M12, minimum 25 mm (0.9 in) deep.  
 Recommended: Use 12 hexagon head cap screws M12 (property class 12.9, minimum length 50 mm (1.9 in)) according to ISO 4762. Tightening torque 120 + 10 Nm (1,062 lbf in + 89 lbf in).

Note: Dimensions mm (inch)

### Pump Front View



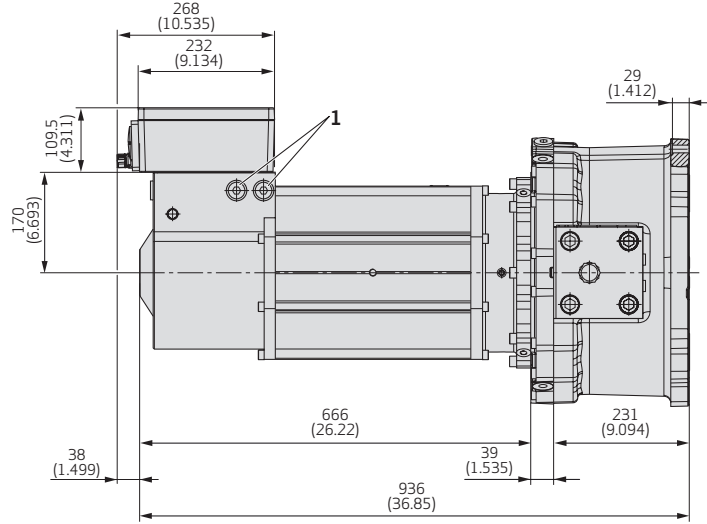
Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350 (5,076 psi)	39 (1.53 in)	45 (1.77 in)
Sp	Flushing port	10 (145 psi)	10 (0.39 in)	25 (0.98 in)
L	Leakage port	10 (145 psi)	24 (0.94 in)	25 (0.98 in)
X <sub>max</sub>	Control port for maximum displacement (option N1 only)	350 (5,076 psi)	12 (0.47 in)	13 (0.51 in)
X <sub>min</sub>	Control port for minimum displacement (option N1 only)	350 (5,076 psi)	12 (0.47 in)	13 (0.51 in)

# SIZE 250

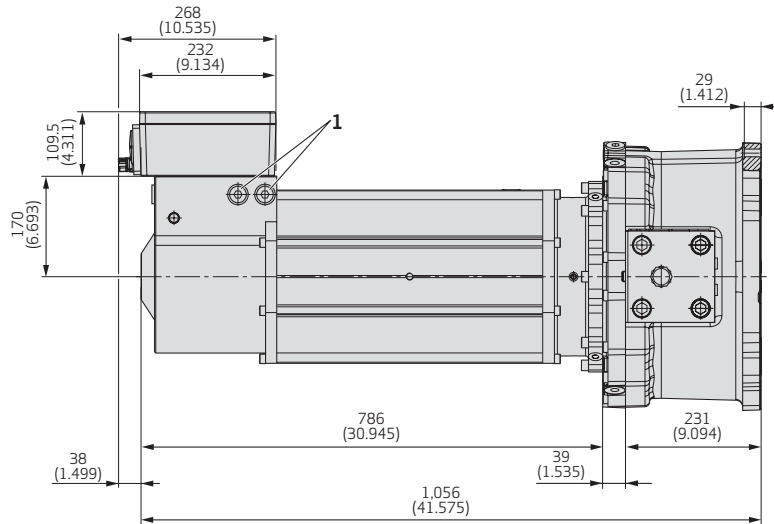
## Liquid Cooling, S EPU 250 A D xx xx W

### Installation Drawings

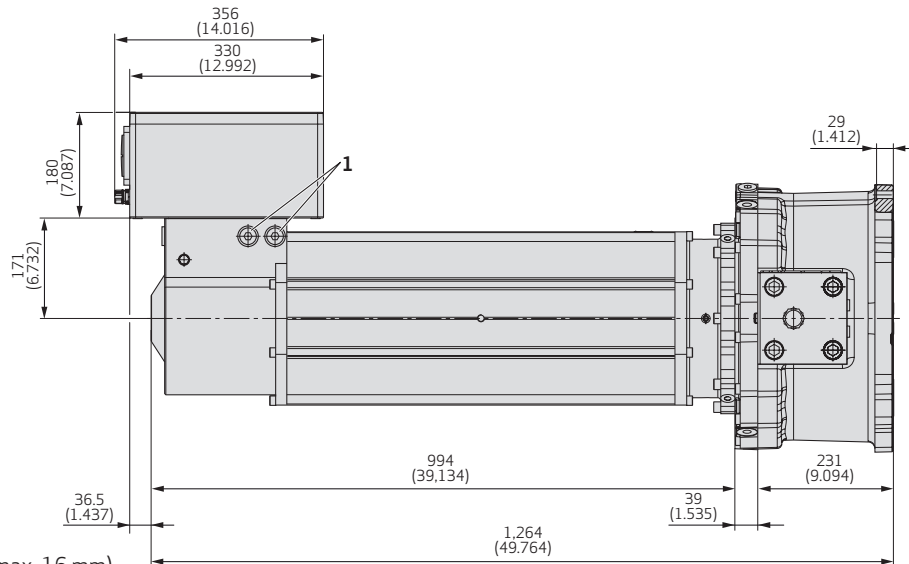
S0 W



M0 W



H0 W



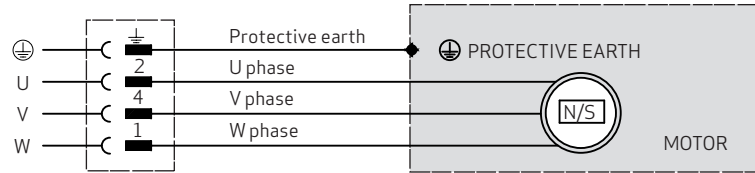
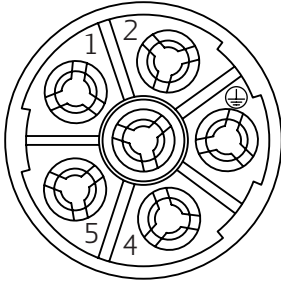
Note: Dimensions mm (inch)

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

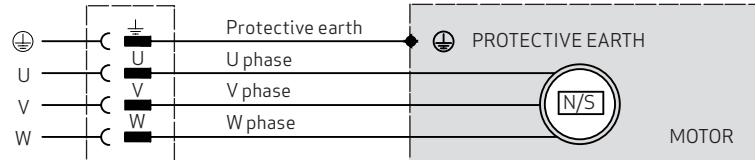
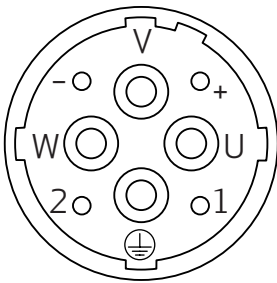
# ELECTRICAL INTERFACES

## Power Connectors

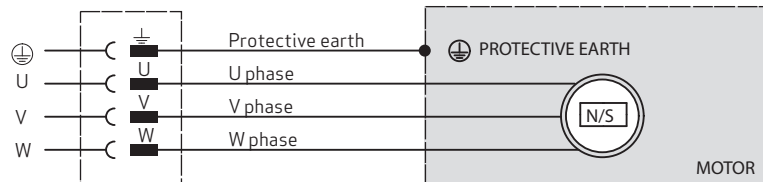
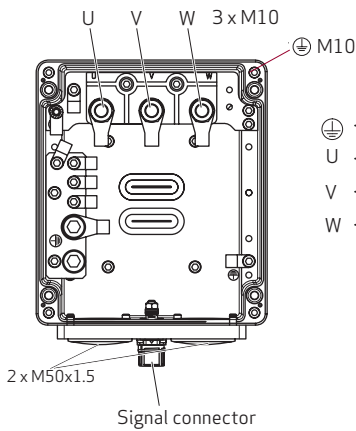
### Size 1



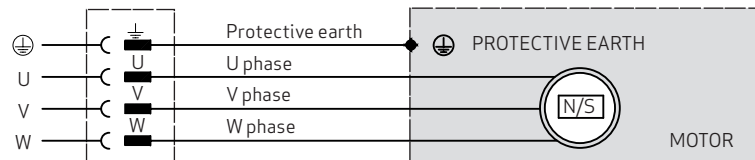
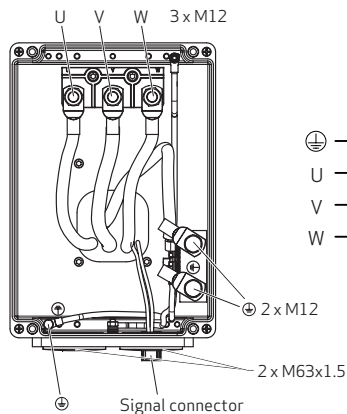
### Size 1.5



### Cable box A

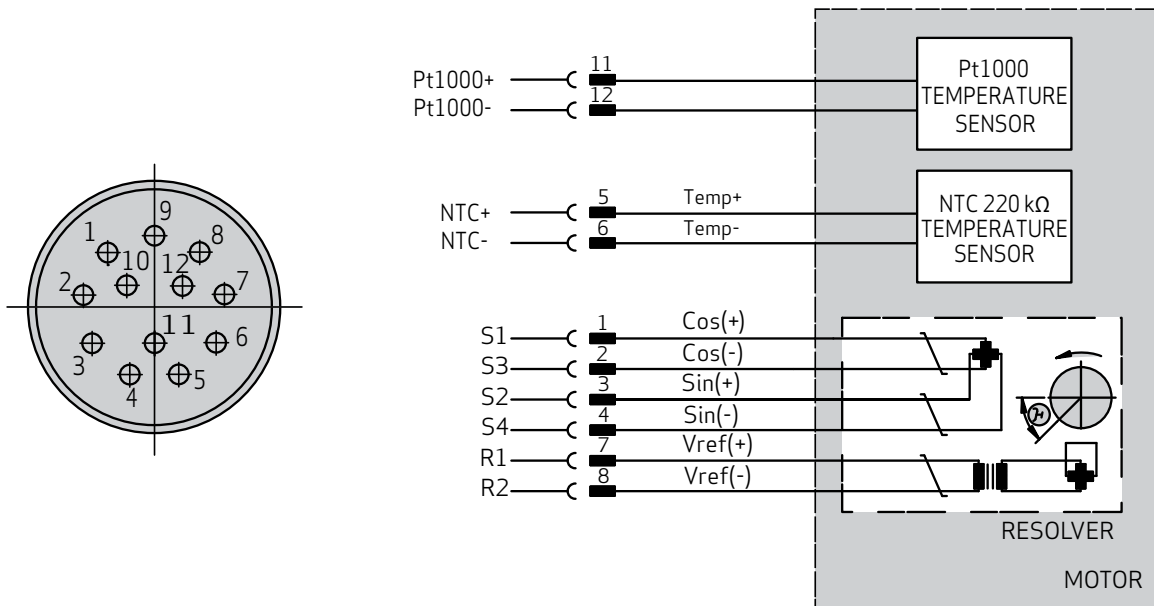


### Cable box B



For more information on connectors, please see Moog Maximum Dynamic Brushless Servo Motor User Manual.

## Signal Resolver Connector



## Calculations

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

M [Nm] = Torque  
 V [cm<sup>3</sup>] = Displacement  
 Δp [bar] = Pressure difference  
 $P_A - P_B$

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

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

## MOTOR POWER CABLES



Ordering number	CB05708-001-yyy <sup>1)2)</sup>		CA44958-001-yyy <sup>1)2)</sup>		CB00076-001-yyy <sup>1)2)</sup>		CA98676-001-yyy <sup>1)2)</sup>	
Continuous rated current <sup>3)</sup>	25 A		44 A		61 A		82 A	
Cable cross-section	4 x 4 mm <sup>2</sup> + 2 x 1.5 mm <sup>2</sup>		4 x 6 mm <sup>2</sup> + 2 x 1.5 mm <sup>2</sup>		4 x 10 mm <sup>2</sup> + 2 x 1.5 mm <sup>2</sup>		4 x 16 mm <sup>2</sup> + 2 x 1.5 mm <sup>2</sup>	
Temperature range <sup>3)</sup>	-50 to +80 °C (-58 to 194 °F)		-50 to +80 °C (-58 to 194 °F)		-50 to +80 °C (-58 to 194 °F)		-50 to +80 °C (-58 to 194 °F)	
Wiring	Connector pin	Wiring	Connector pin	Wiring	Connector pin	Wiring	Connector pin	Wiring
	2	U	U	U	U	U	U	U
	4	VV	V	VV	V	VV	V	VV
	1	WWW	W	WWW	W	WWW	W	WWW
	PE	Yellow / green	PE	Yellow / green	PE	Yellow / green	PE	Yellow / green
	5	N. c. / white	+	N. c. / white	+	N. c. / white	+	N. c. / white
	6	N. c. / black	-	N. c. / black	-	N. c. / black	-	N. c. / black
Connector housing	Screen	Connector housing	Screen	Connector housing	Screen	Connector housing	Screen	
Connector type	Size 1		Size 1.5					

Ordering number connector only	C08365-002	CA37698-001
-----------------------------------	------------	-------------

- 1) 001 for standard configuration option, others upon request
- 2) yyy stands for length in meters  
Standard length: 1 m, 5 m, 10 m, 15 m, 20 m, 50 m  
Further lengths upon request
- 3) Installation type: fixed. Maximum current carrying capacity at 30 °C (following DIN VDE 0298-4). The final maximum current carrying capacity depends, among other things, on the ambient conditions, the type of installation and the number of loaded cores.

## RESOLVER FEEDBACK CABLES



<b>Ordering number</b>	<b>C08335-013-yyy<sup>1)</sup></b>	<b>CC75041-002-yyy<sup>1)</sup></b>
Motor feedback system	Resolver, NTC temperature sensor	Resolver, Pt1000 temperature sensor
Cable-end assignment	Sub-D 9pol	Open end
Configuration		
Capable for energy chains	Yes	
Minimum bend radius	90 mm	
Temperature range	-40 to +85 °C	
Cable diameter approximately	8.8 mm	
Material of outer sheath	Polyurethane	
Resistance	Resistant to oil, hydrolysis and microbic attack (VDE0472)	
Approvals	UL-Style 20233,+80 °C -300 V CSA-C22.2N.210-M90, +75 °C -300 V FT1	

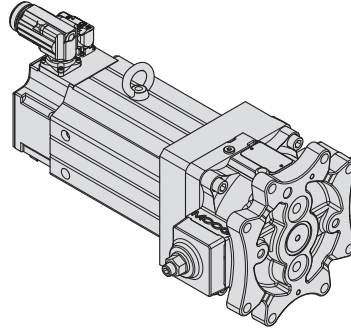
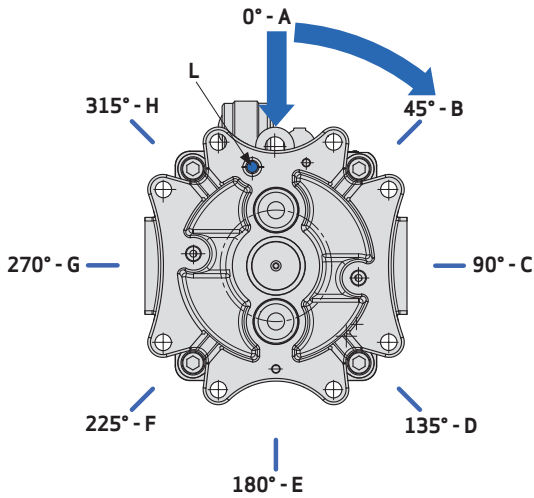
<b>Ordering number connector only</b>	<b>CA46373-001</b>
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1) yyy stands for length in meters  
 Standard length: 1 m, 5 m, 10 m, 15 m, 20 m, 50 m  
 Further lengths upon request



## NOTES

# ORIENTATION OF ELECTRICAL CONNECTORS AND LIQUID COOLING PORTS



Note: • Angle starts on port L  
 • Natural and fan cooled options use Z in model number pos. 12  
 • Angle between electrical and liquid cooling ports is fixed at -90°

Example shows:  
 Connector orientation = A,  
 Cooling connection = G

## Available Connector Orientations

### Natural Cooling

												A	Z	B	Z	C	Z	D	Z	E	Z	F	Z	G	Z	H	Z		
x	EPU	019	x	x	xx	S0	C	x	x	■	■							□	□									...	
x	EPU	019	x	x	xx	M0	C	x	x				□	□							□	□					■	■	...
x	EPU	019	x	x	xx	H0	C	x	x				□	□							□	□					■	■	...
x	EPU	032	x	x	xx	xx	C	x	x	■	■			□	□									□	□				...
x	EPU	080	x	x	xx	xx	C	x	x	■	■			□	□									□	□				...
x	EPU	140	x	x	xx	xx	C	x	x	■	■			□	□									□	□				...
x	EPU	250	x	x	xx	xx	C	x	x	■	■			□	□									□	□				...

### Fan Cooling

												A	Z	B	Z	C	Z	D	Z	E	Z	F	Z	G	Z	H	Z		
x	EPU	019	x	x	xx	S0	F	x	x	■	■							□	□										...
x	EPU	019	x	x	xx	M0	F	x	x	■	■							□	□										...
x	EPU	019	x	x	xx	H0	F	x	x				□	□							□	□					■	■	...
x	EPU	032	x	x	xx	xx	F	x	x	■	■			□	□									□	□				...
x	EPU	080	x	x	xx	xx	F	x	x	■	■			□	□									□	□				...
x	EPU	140	x	x	xx	xx	F	x	x	■	■			□	□									□	□				...
x	EPU	250	x	x	xx	xx	F	x	x	■	■			□	□									□	□				...

### Liquid Cooling

												A	G	C	A	E	C	G	E	
x	EPU	019	x	x	xx	xx	W	x	x	■	■			□	□			...		
x	EPU	032	x	x	xx	xx	W	x	x	■	■			□	□			...		
x	EPU	080	x	x	xx	xx	W	x	x	■	■	□	□	□	□	□	□	...		
x	EPU	140	x	x	xx	xx	W	x	x	■	■	□	□	□	□	□	□	...		
x	EPU	250	x	x	xx	xx	W	x	x	■	■	□	□	□	□	□	□	...		

■ Standard option  
 □ Available option

# ORDERING CODE

## Type designation

Model number (assigned at the factory)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
S	E	P	U					A	D					

<b>1</b>	<b>Product division</b>
S	Standard

<b>2</b>	<b>Product type</b>
EPU	Electrohydrostatic Pump Unit

<b>3</b>	<b>Nominal displacement RPP [cm<sup>3</sup>/U]</b>
019	19
032	32
080	80
140	140
250	250

<b>4</b>	<b>Pump ports</b>
A	2 operating ports

<b>5</b>	<b>Fluid</b>
D	Mineral oil, HFD

<b>6</b>	<b>Controllers</b>
B1	Mechanical stroke adjustment (V = constant)
N1	Dual displacement

<b>7</b>	<b>Performance class</b>
S0	Small performance class
M0	Medium performance class
H0	High performance class

<b>8</b>	<b>Cooling</b>
C	Natural cooling
F	Fan cooling
W	Liquid cooling

<b>15</b>	<b>Minimum displacement V<sub>min</sub></b>
YYY	V <sub>min</sub> (see table below)
000	Controller B1 (V = constant)

<b>14</b>	<b>Maximum displacement V<sub>max</sub></b>
XXX	V <sub>max</sub> (see table below)

<b>13</b>	<b>Feedback option</b>
1	2-poles resolver

<b>12</b>	<b>Cooling connection (liquid cooling)</b>
G	270°
Z	Not liquid cooled

<b>11</b>	<b>Connector orientation</b>
A	0°
H	315° for S EPU - 019 x x xx - M0 C or S EPU - 019 x x xx - H0 C or S EPU - 019 x x xx - H0 F

<b>10</b>	<b>Electrical connection</b>
3	Angle rotatable
4	Cable box

<b>9</b>	<b>Motor construction</b>
S	Sealing

The Electrohydrostatic Pump Unit is delivered with seal kit to the manifold

## V<sub>max</sub> and V<sub>min</sub> Options for Ordering Code (Positions 14, 15)

Nominal displacement V <sub>n</sub> [cm <sup>3</sup> ]	Maximum displacement V <sub>max</sub> [cm <sup>3</sup> ]		Ratio V <sub>n</sub> /V <sub>min</sub>					
			1.5	2	2.5	3	4	
019	019	015	010	013	010	008	006	005
032	032	028	024	021	016	013	011	008
080	080	064	048	053	040	032	027	020
140	140	120	100	093	070	056	047	035
250	250	215	180	167	125	100	083	063

Standard option

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Electrohydrostatic Pump Unit  
KEM, Rev. J, July 2022, Id. CDL49052-en