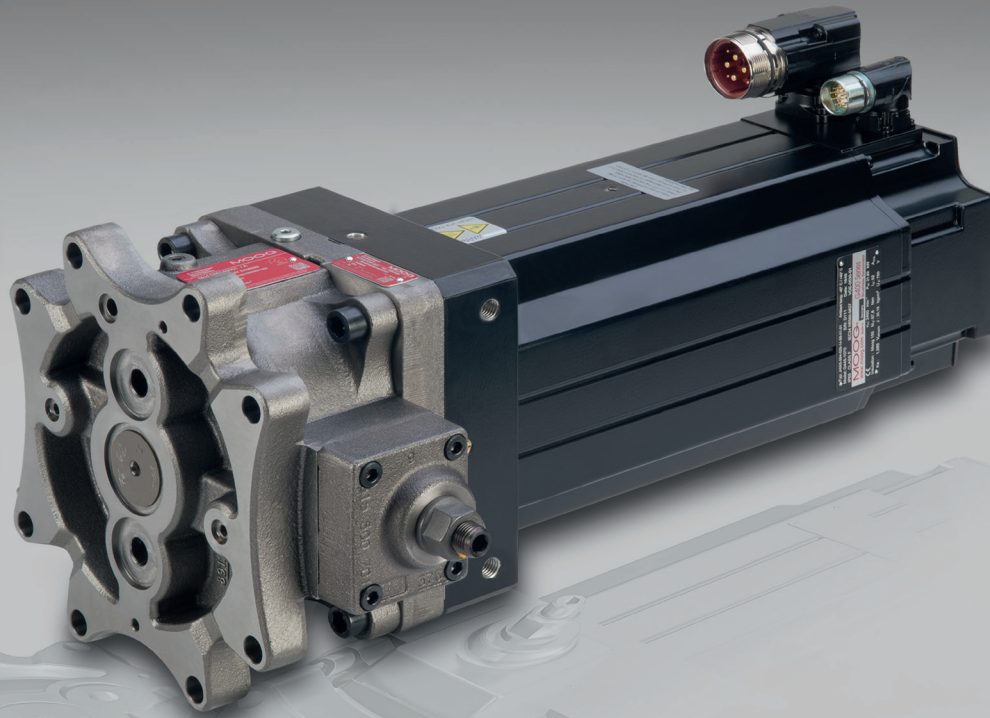


ELECTROHYDROSTATIC PUMP UNIT



Rev. G, October 2018

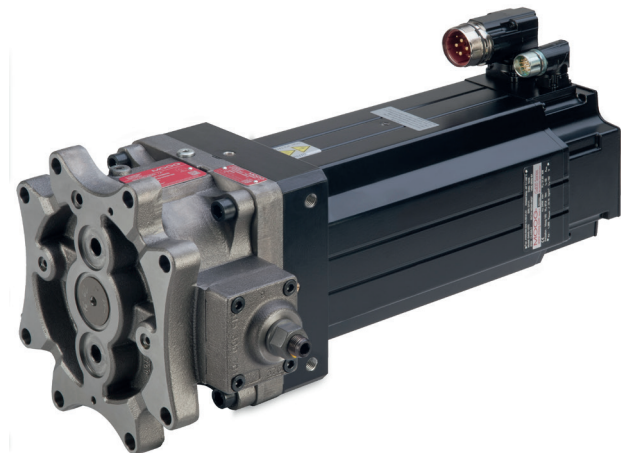
MODULAR ELECTROHYDROSTATIC PUMP UNIT
FOR INDUSTRIAL APPLICATIONS

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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For the most current information, visit www.moog.com/industrial or contact your local Moog office.

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. Automation engineers moving toward electro-mechanical actuation in pursuit of energy efficiency and environmental cleanliness, will find an EPU an attractive option for high force density actuators.

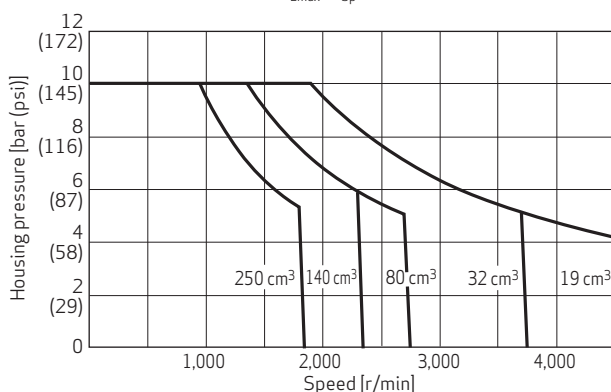
This catalog describes the Electrohydrostatic Pump Unit used in such electro-hydrostatic actuation systems, like the Moog EAS. The EPU is able to operate in 2 or 4 quadrant operations and has a mechanical interface, which allows to connect it directly to hydraulic cylinders or manifolds.

The 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. Moog's global engineering teams help customers select and integrate these building blocks into a highly customized system that serves unique application requirements across diverse industries

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 (5,000 psi)				
Maximum housing pressure ¹	10 bar (145 psi)				
Pump version	Radial piston pump, fixed or dual displacement				
Motor version	Brushless servo motor, natural or liquid cooled				
Temperature range					
Ambient	-15 to +60 °C (5 to 140 °F)				
Fluid	-15 to +80 °C (5 to 176 °F)				
Seal material	FKM				
Pilot pressure supply²	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	<ul style="list-style-type: none"> NAS 1638, class 9 ISO 4406, class 20/18/15; obtained with filter fineness of $\beta_{20} = 75$ 				
Installation position	Any				

1) Maximum housing pressure $p_{Lmax}, P_{Sp} = f(n)$



2) For option N1 (dual displacement) only

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 1bar.

Design the drain line with lowest possible pressure losses.

SIZE 19

Natural Cooling, S EHA - 019 x x xx - XX C

Characteristics Table

		Small	Medium	High
S EHA - 019 x x xx -		S0 C	M0 C	H0 C
Pump				
Displacement	V_{max}	19 cm ³ (1.16 in ³)		
Maximum pump speed @ 3 bar (abs.)	n_{max}	4,500 r/min		
Maximum housing pressure ¹⁾	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 (5,000 psi)		
Flushing flow rate ⁴⁾	Q_{Sp}	2-3 l/min (0.5 - 0.8 gpm)		
Motor				
Continuous stall torque ³⁾	M_0	40 Nm (30 lbf ft)	93 Nm (69 lbf ft)	137 Nm (101 lbf ft)
Rated torque ³⁾	M_n	22 Nm (195 lbf ft)	45 Nm (33 lbf ft)	52 Nm (38 lbf ft)
Maximum torque	M_{max}	141 Nm (104 lbf ft)	391 Nm (288 lbf ft)	595 Nm (439 lbf ft)
Rated speed	n_n	3,000 r/min	2,500 r/min	
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} /1000 _{rpm}	106.63 V _{rms} /1000 _{rpm}	119.96 V _{rms} /1000 _{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		
EHA Unit				
Inertia	J	38 kg cm ² (280.3 lbf ft s ²)	121.5 kg cm ² (896.1 lbf ft s ²)	172.4 kg cm ² (1,271.6 lbf ft s ²)
Weight	m	50.1 kg (110.45 lbf)	82.7 kg (182.32 lbf)	105.4 kg (232.36 lbf)
Tightening torque	8x M12x45 -12.9 hexagon head	120 Nm+10 Nm (89 lbf ft + 7 lbf ft)		
Servo Drive				
Recommended drive size ²⁾		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 (see page 3)

2) See catalog, MODULAR MULTI-AXIS SERVO DRIVE SYSTEM (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

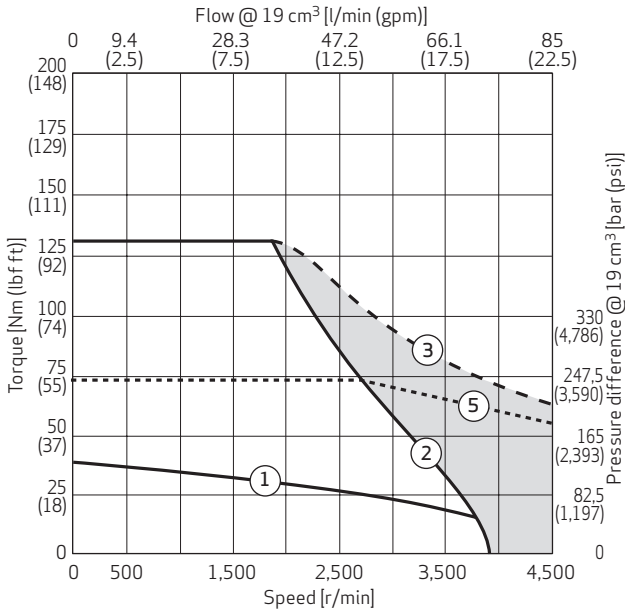
4) Optional via SP port

SIZE 19

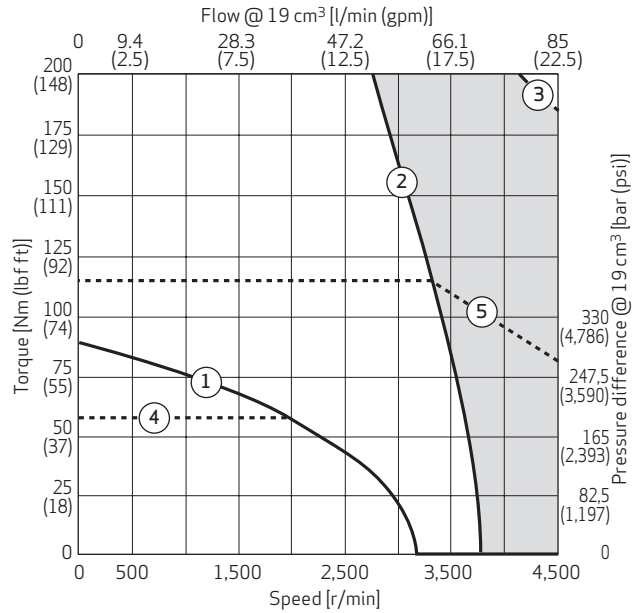
Natural Cooling, S EHA - 019 x x xx - XX C

Motor Performance Curves

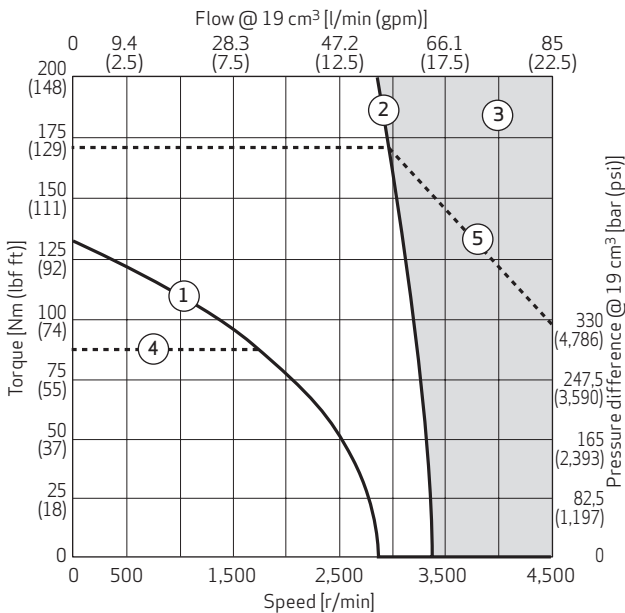
50 C



M0 C



H0 C



- ① Continuous torque @ 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_{DC} link voltage

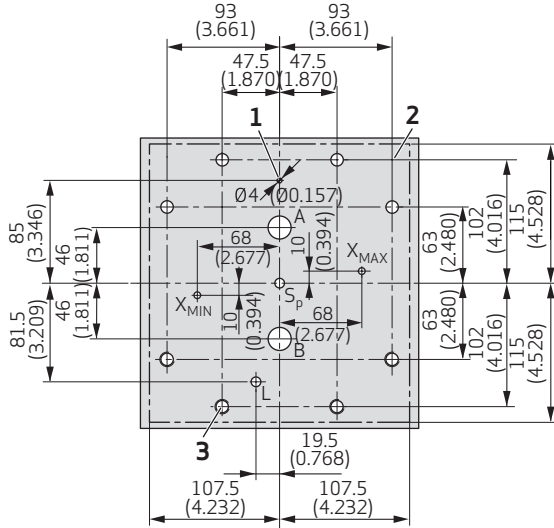
Motor performance doesn't take the pump efficiency into account

Pressure difference $\Delta p = p_A - p_B$

SIZE 19

Natural Cooling, S EHA - 019 x x xx - XX C

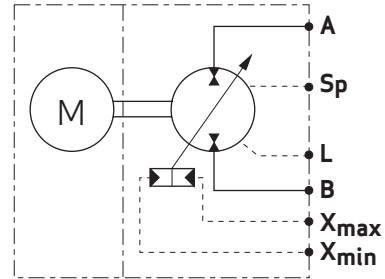
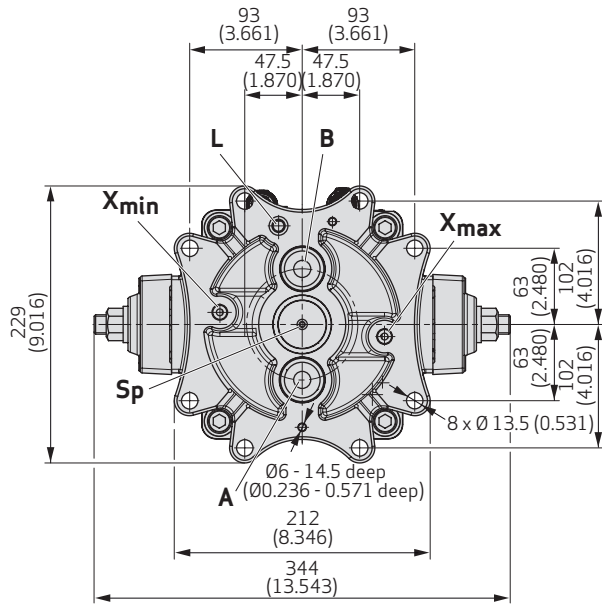
Mounting Pattern



1. Use a spring-type pin with nominal diameter of 4 mm (e.g. 4x12) according to ISO 13337
2. Area of Surface flatness: $\square 0.02$
Surface roughness: $\sqrt{Rz4}$
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

Note: Dimensions mm (inch)

Pump Front View



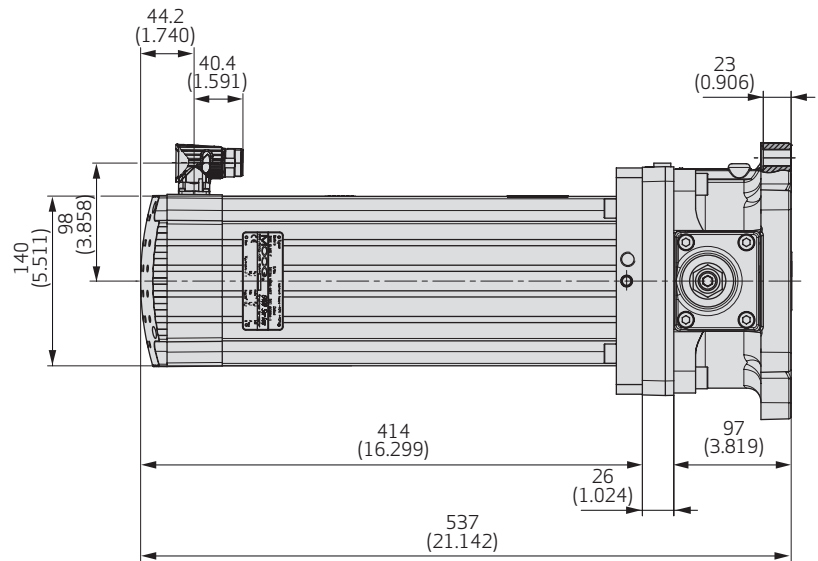
Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350	14	20
Sp	Flushing port	10	5	15
L	Leakage port	10	8	9
X _{max}	Control port for maximum displacement (option N1 only)	350	5	5.5
X _{min}	Control port for minimum displacement (option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

SIZE 19

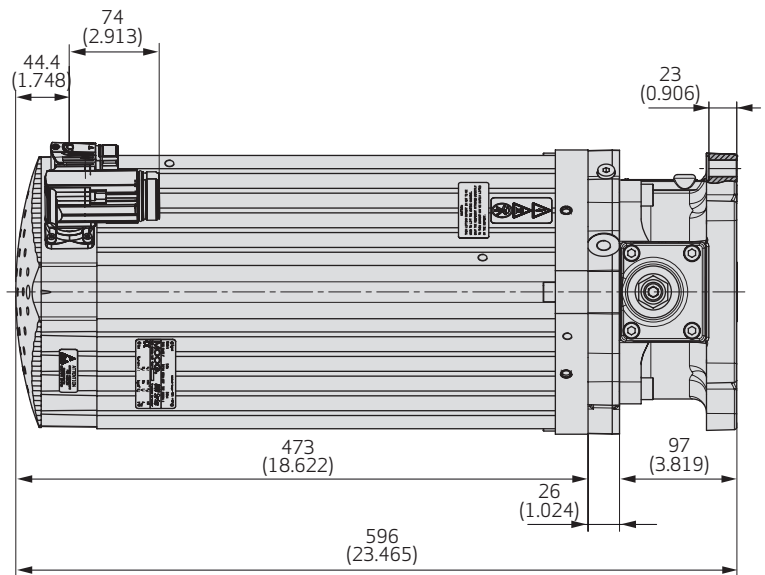
Natural Cooling, S EHA - 019 x x xx - XX C

Installation Drawings

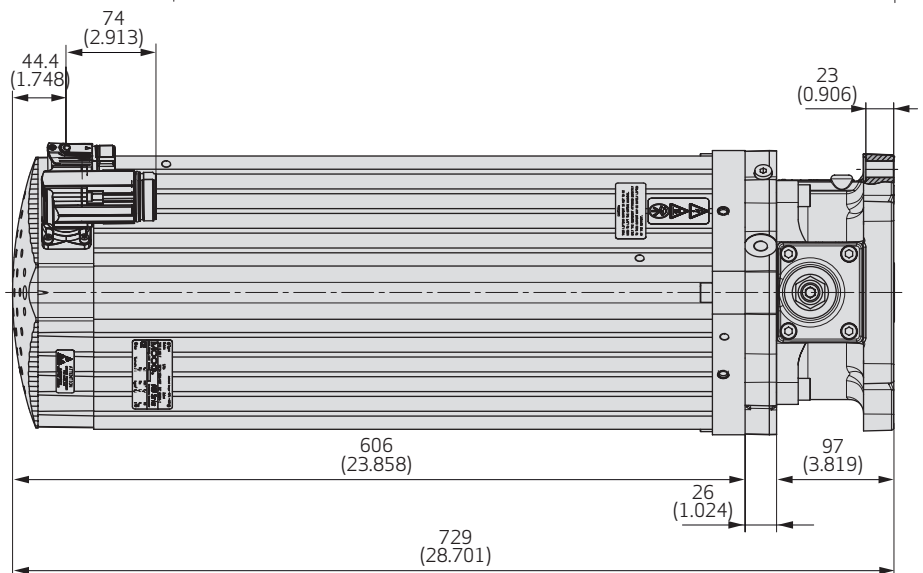
S0 C



M0 C



H0 C



Note: Dimensions mm (inch)

SIZE 19

Liquid Cooling, S EHA - 019 x x xx - XX W

Characteristics Table

		Medium	High
S EHA - 019 x x xx -		M0 W	H0 W
Pump			
Displacement	V_{max}	19 cm ³ (1,16 in ³)	
Maximum pump speed @ 3 bar (abs.)	n_{max}	4,500 r/min	
Maximum housing pressure ¹⁾	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 ⁴⁾	Q_{Sp}	2-3 l/min (0.5 - 0.8 gpm)	
Motor			
Continuous stall torque ³⁾	M_0	62 Nm (46 lbf ft)	91 Nm (67 lbf ft)
Rated torque ³⁾	M_n	58 Nm (43 lbf ft)	85 Nm (63 lbf ft)
Maximum torque	M_{max}	94 Nm (69 lbf ft)	140 Nm (103 lbf ft)
Rated speed	n_n	3,000 r/min	
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} /1000 _{rpm}	103.67 V _{rms} /1000 _{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	
Cooling water flow rate	Q_W	3-5 l/min (0.8 - 1.3 gpm)	
EHA Unit			
Inertia	J	31.7 kg cm ² (233.8 lbf ft s ²)	37.9 kg cm ² (279.5 lbf ft s ²)
Weight	m	47.5 kg (104.72 lbf)	56.3 kg (124.12 lbf)
Tightening torque	8x M12x45 -12.9 hexagon head	120 Nm+10 Nm (89 lbf ft + 7 lbf ft)	
Servo Drive			
Recommended drive size ²⁾		G392-045 size 5	G392-060 size 5

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

2) See catalog, MODULAR MULTI-AXIS SERVO DRIVE SYSTEM (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

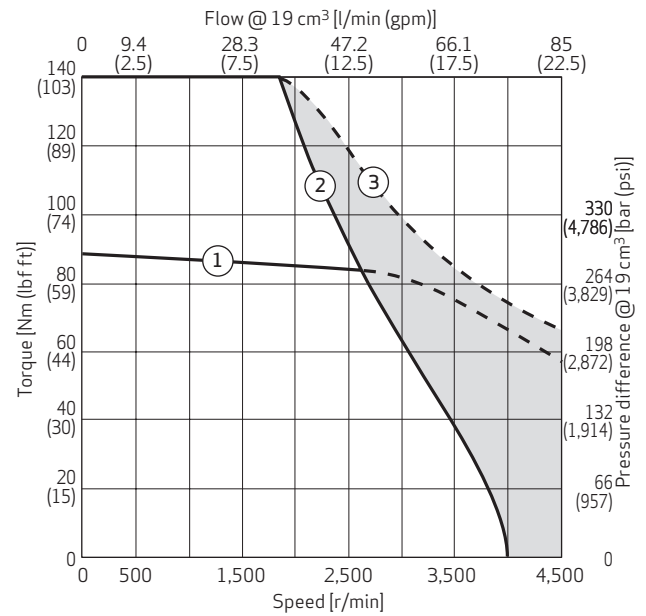
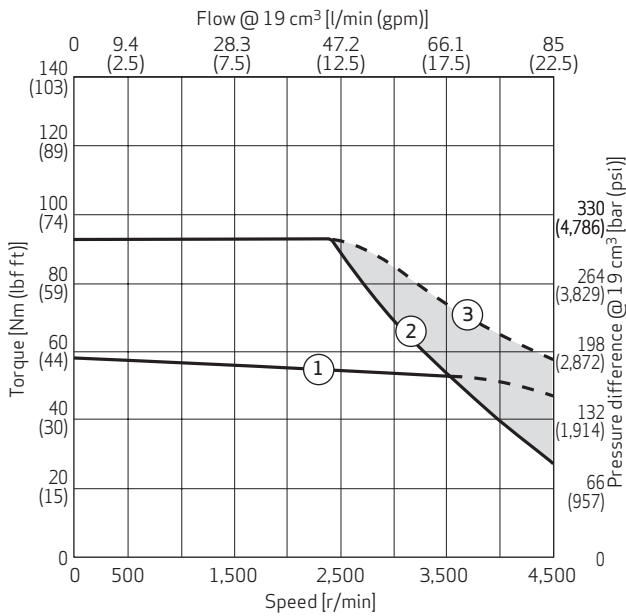
SIZE 19

Liquid Cooling, S EHA - 019 x x xx - XX W

Motor Performance Curves

M0 W

H0 W



- ① Continuous torque @ 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

Notes:

Motor performance with 565 V_{DC} link voltage

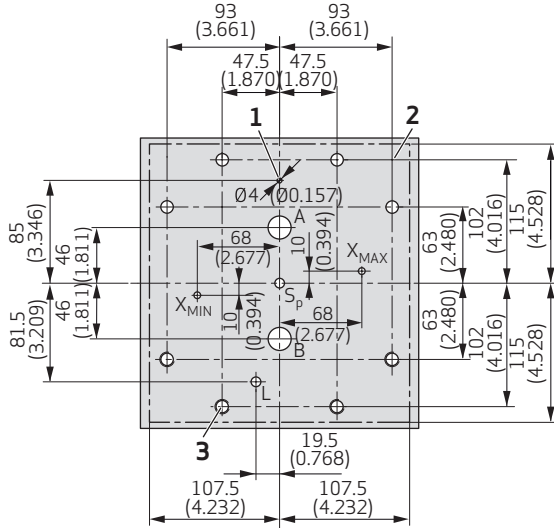
Motor performance doesn't take the pump efficiency into account

Pressure difference $\Delta p = p_A - p_B$

SIZE 19

Liquid Cooling, S EHA - 019 x x xx - XX W

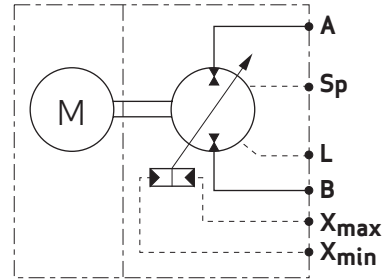
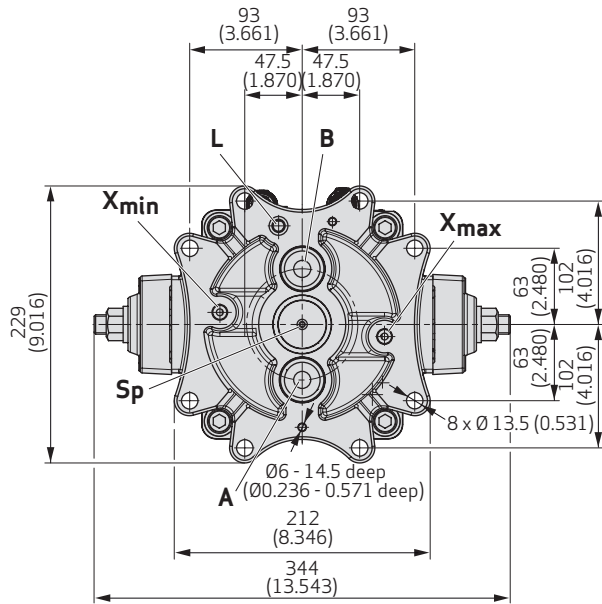
Mounting Pattern



1. Use a spring-type pin with nominal diameter of 4 mm (e.g. 4x12) according to ISO 13337
2. Area of
Surface flatness: $\square 0.02$
Surface roughness: $\sqrt{Rz4}$
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

Note: Dimensions mm (inch)

Pump Front View



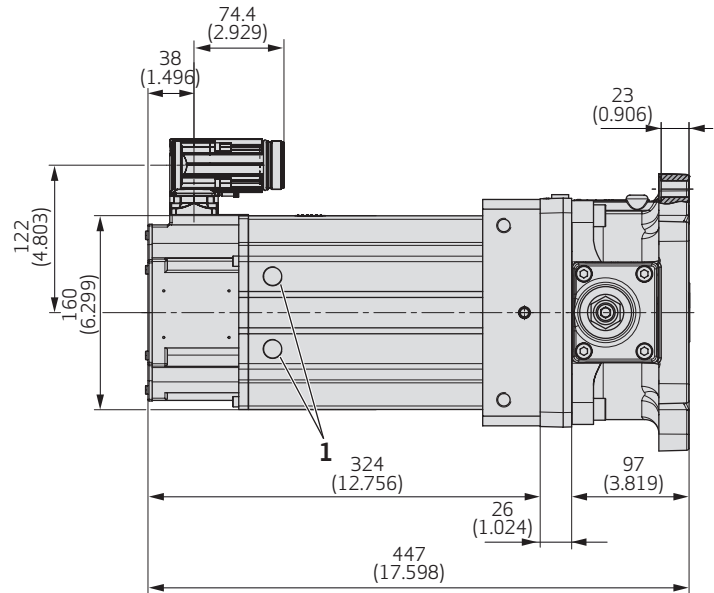
Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350	14	20
Sp	Flushing port	10	5	15
L	Leakage port	10	8	9
X _{max}	Control port for maximum displacement (option N1 only)	350	5	5.5
X _{min}	Control port for minimum displacement (option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

SIZE 19

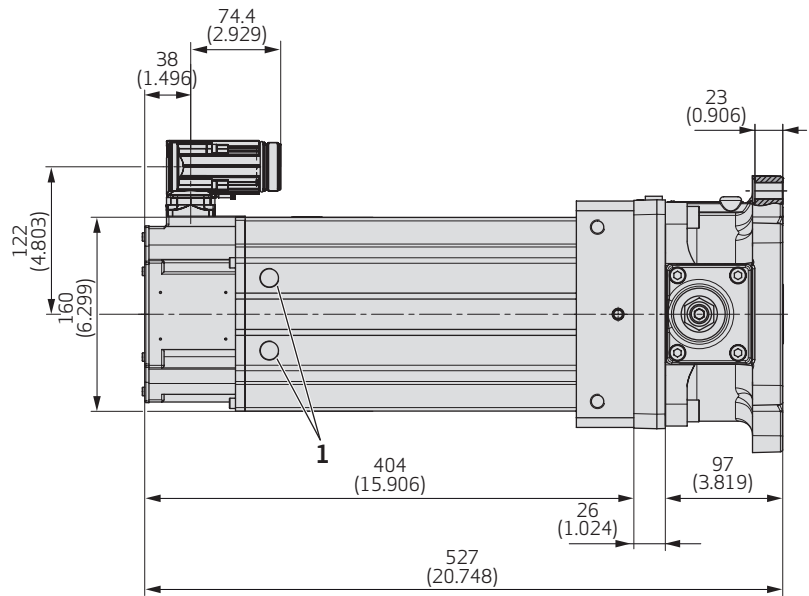
Liquid Cooling, S EHA - 019 x x xx - XX W

Installation Drawings

MO W



HO W



1) Cooler outlet G3/8"

Note: Dimensions mm (inch)

SIZE 32

Natural Cooling, S EHA - 032 x x xx - XX C

Characteristics Table

		Small	Medium
S EHA - 032 x x xx -		S0C	M0C
Pump			
Displacement	V_{max}	32 cm ³ (1,95 in ³)	
Maximum pump speed @ 3 bar (abs.)	n_{max}	3,700 r/min	
Maximum housing pressure ¹⁾	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 ⁴⁾	Q_{Sp}	3-4 l/min (0.8 - 1.1 gpm)	
Motor			
Continuous stall torque ³⁾	M_0	93 Nm (69 lbf ft)	137 Nm (101 lbf ft)
Rated torque ³⁾	M_n	45 Nm (33 lbf ft)	52 Nm (38 lbf ft)
Maximum torque	M_{max}	391 Nm (288 lbf ft)	595 Nm (439 lbf ft)
Rated speed	n_n	2,500 r/min	
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} /1000 _{rpm}	119.96 V _{rms} /1000 _{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	
EHA Unit			
Inertia	J	164.8 kg cm ² (1,215.5 lbf ft s ²)	215.7 kg cm ² (1,590.9 lbf ft s ²)
Weight	m	100.3 kg (221.12 lbf)	123 kg (271.17 lbf)
Tightening torque	8x M12x45 -12.9 hexagon head	120 Nm+10 Nm (89 lbf ft + 7 lbf ft)	
Servo Drive			
Recommended drive size ²⁾		G392-045 size 5	G392-045 size 5

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

2) See catalog, MODULAR MULTI-AXIS SERVO DRIVE SYSTEM (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

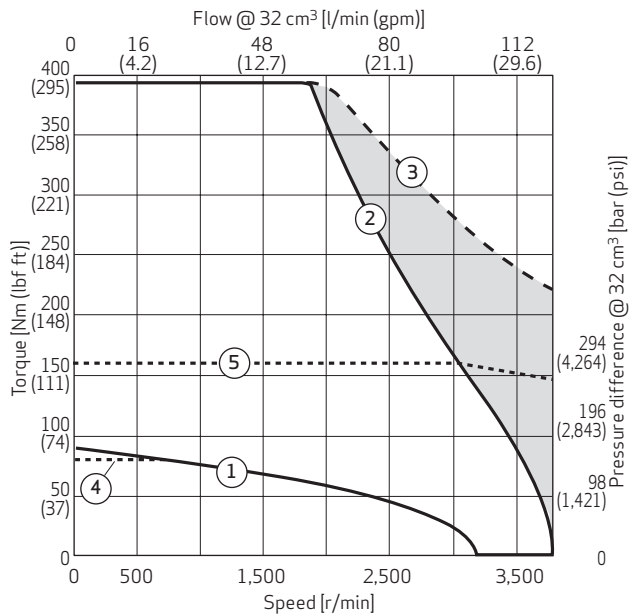
4) Optional via SP port

SIZE 32

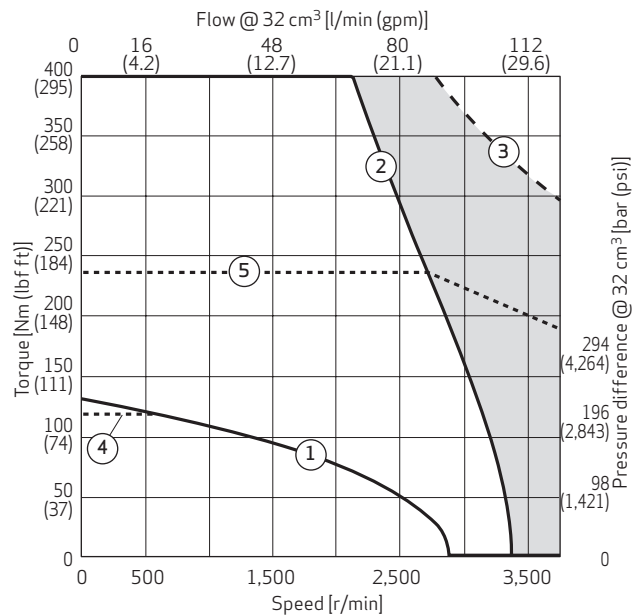
Natural Cooling, S EHA - 032 x x xx - XX C

Motor Performance Curves

50 C



M0 C



- ① Continuous torque @ 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_{DC} link voltage

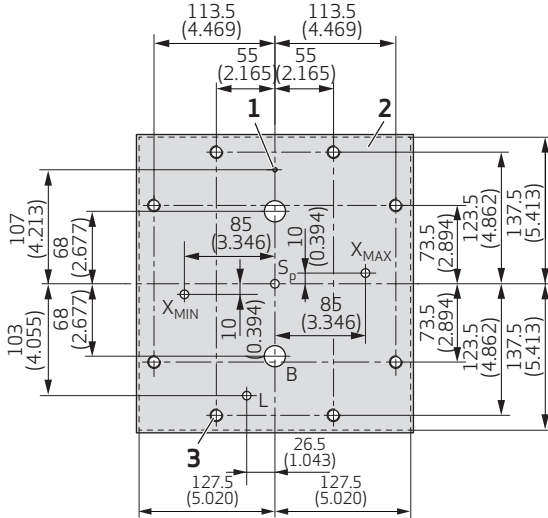
Motor performance doesn't take the pump efficiency into account

Pressure difference $\Delta p = p_A - p_B$

SIZE 32

Natural Cooling, S EHA - 032 x x xx - XX C

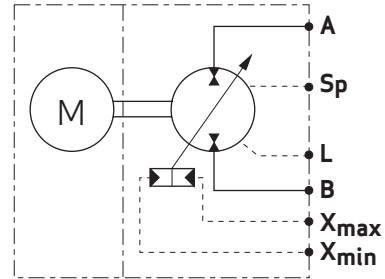
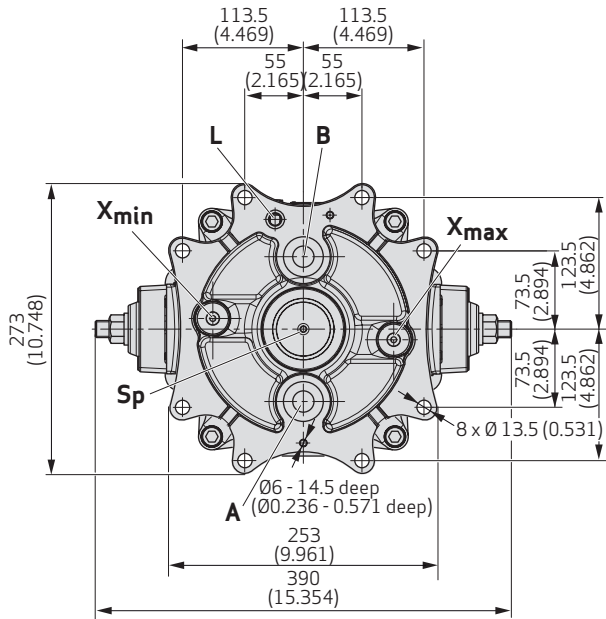
Mounting Pattern



1. Use a spring-type pin with nominal diameter of 4 mm (e.g. 4x12) according to ISO 13337
2. Area of Surface flatness: $\square 0.02$
Surface roughness: $\sqrt{Rz4}$
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

Note: Dimensions mm (inch)

Pump Front View



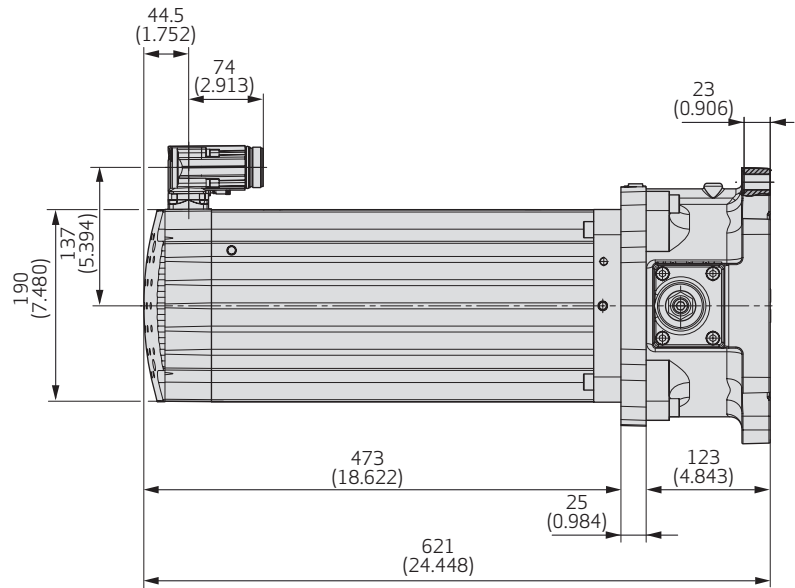
Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350	20	25
Sp	Flushing port	10	7	15
L	Leakage port	10	11	11.5
X _{max}	Control port for maximum displacement	350	5	5.5
X _{min}	Control port for minimum displacement	350	5	5.5

SIZE 32

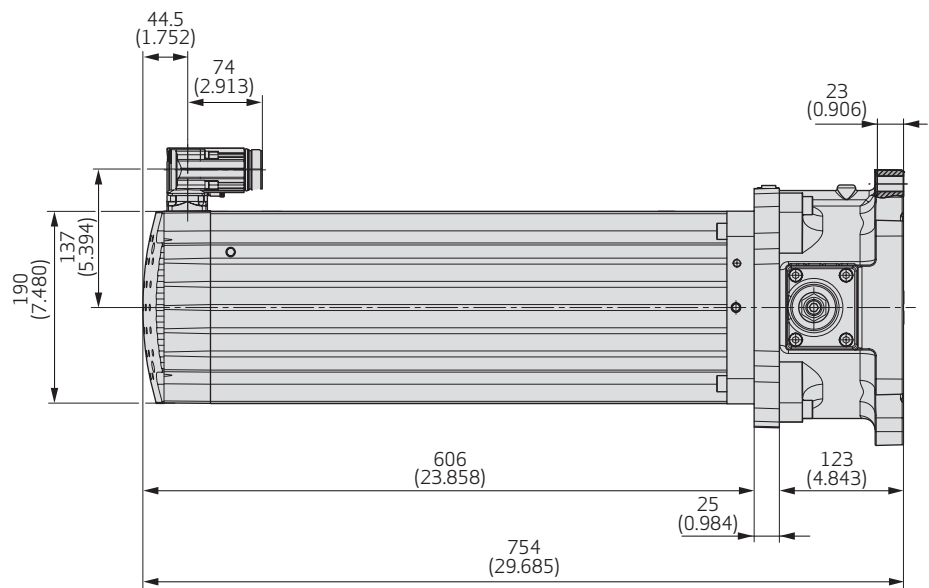
Natural Cooling, S EHA - 032 x x xx - XX C

Installation Drawings

S0 C



M0 C



Note: Dimensions mm (inch)

SIZE 32

Liquid Cooling, S EHA - 032 x x xx - XX W

Characteristics Table

		Small	Medium	High
S EHA - 032 x x xx -		S0 W	M0 W	H0 W
Pump				
Displacement	V_{max}	32 cm ³ (1,95 in ³)		
Maximum pump speed @ 3 bar (abs.)	n_{max}	3,700 r/min		
Maximum housing pressure ¹⁾	p_{Lmax}, p_{Sp}	10 bar (145 psi)		
Maximum flow	Q_{max}	118 l/min (22.5 gpm)		
Maximum pressure ports A and B	p_A, p_B	350 bar (145 psi)		
Flushing flow rate ⁴⁾	Q_{Sp}	3-4 l/min (0.8 - 1.1 gpm)		
Motor				
Continuous stall torque ³⁾	M_0	62 Nm (46 lbf ft)	91 Nm (67 lbf ft)	151 Nm (111 lbf ft)
Rated torque ³⁾	M_n	58 Nm (43 lbf ft)	85 Nm (63 lbf ft)	128 Nm (94 lbf ft)
Maximum torque	M_{max}	94 Nm (69 lbf ft)	140 Nm (103 lbf ft)	391 Nm (288 lbf ft)
Rated speed	n_n	3,000 r/min		2,500 r/min
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} /1000 _{rpm}	103.67 V _{rms} /1000 _{rpm}	106.63 V _{rms} /1000 _{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		
Thermal sensor		NTC 220 kOhm		
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)
EHA Unit				
Inertia	J	75 kg cm ² (553.2 lbf ft s ²)	81.2 kg cm ² (598.9 lbf ft s ²)	170.5 kg cm ² (1,257.5 lbf ft s ²)
Weight	m	65.1 kg (143.52 lbf)	73.9 kg (162.92 lbf)	107.9 kg (237.88 lbf)
Tightening torque	8xM12x45 -12.9 hexagon head	120 Nm+10 Nm (89 lbf ft + 7 lbf ft)		
Servo Drive				
Recommended drive size ²⁾		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 (see page 3)

2) See catalog, MODULAR MULTI-AXIS SERVO DRIVE SYSTEM (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

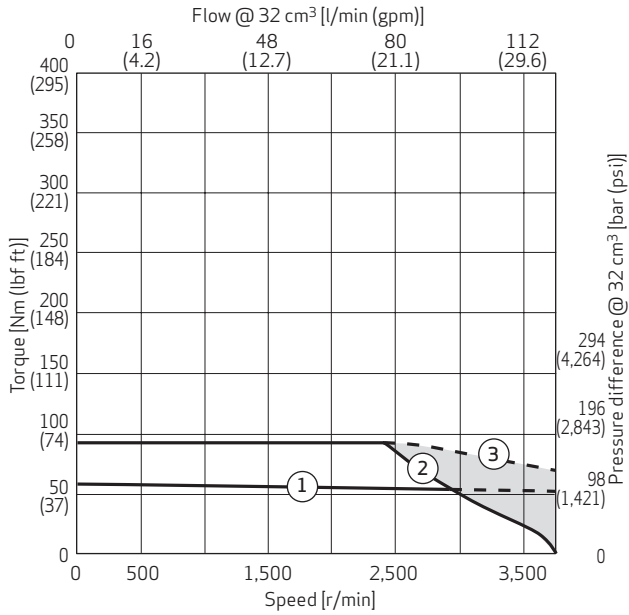
4) Optional via SP port

SIZE 32

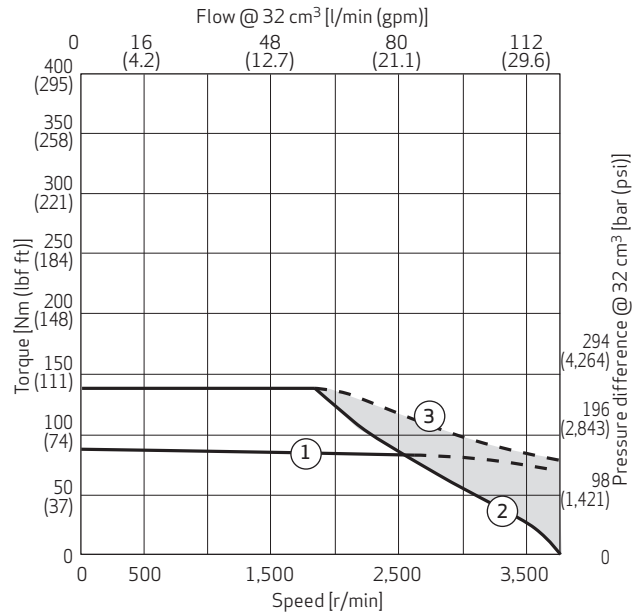
Liquid Cooling, S EHA - 032 x x xx - XX W

Motor Performance Curves

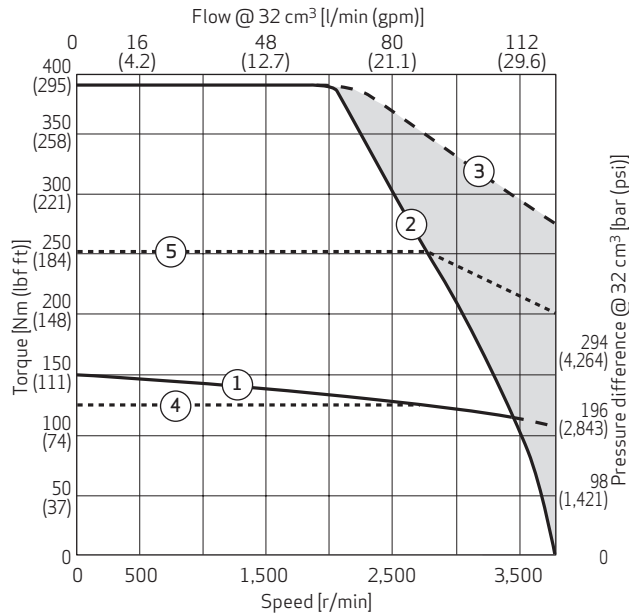
50 W



M0 W



H0 W



- ① Continuous torque @ 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_{DC} link voltage

Motor performance doesn't take the pump efficiency into account

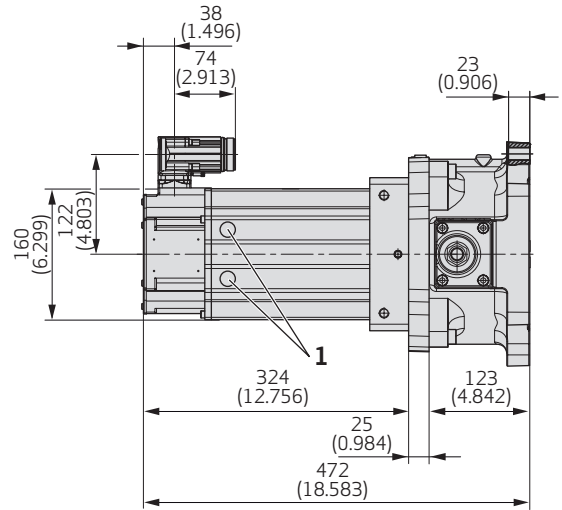
Pressure difference $\Delta p = p_A - p_B$

SIZE 32

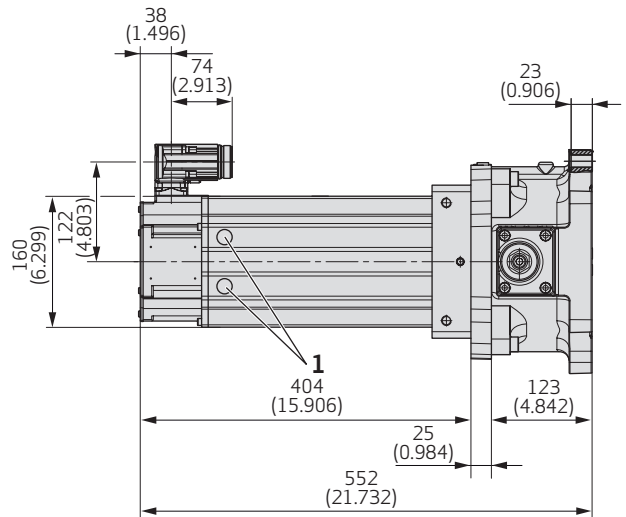
Liquid Cooling, S EHA - 032 x x xx - XX W

Installation Drawings

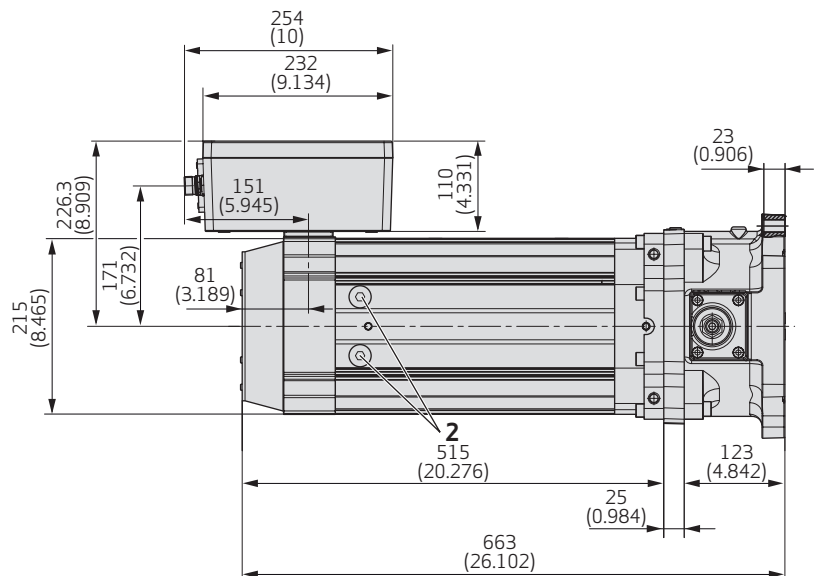
50 W



M0 W



H0 W



Note: Dimensions mm (inch)

- 1) Cooler outlet G3/8"
- 2) Cooler outlet G1/2"

SIZE 80

Natural Cooling, S EHA - 080 x x xx - XX C

Characteristics Table

		Small	Medium	High
S EHA - 080 x x xx -		S0 C	M0 C	H0 C
Pump				
Displacement	V_{max}	80 cm ³ (4.88 in ³)		
Maximum pump speed @ 3 bar (abs.)	n_{max}	2,700 rpm		
Maximum housing pressure ¹⁾	$p_{L,max}, p_{Sp}$	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 ⁴⁾	Q_{Sp}	4-6 l/min (1.1 - 1.6 gpm)		
Motor				
Continuous stall torque ³⁾	M_0	137 Nm (101 lbf ft)	235 Nm (173 lbf ft)	298 Nm (220 lbf ft)
Rated torque ³⁾	M_n	52 Nm (38 lbf ft)	169 Nm (125 lbf ft)	230 Nm (170 lbf ft)
Maximum torque	M_{max}	595 Nm (439 lbf ft)	1.477 Nm (1.089 lbf ft)	1.972 Nm (1.454 lbf ft)
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} /1000 rpm	148.09 V _{rms} /1000 rpm	197.70 V _{rms} /1000 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 B	
Feedback connector		Signal resolver connector rotatable		
Thermal sensor		NTC 220 kOhm		
EHA Unit				
Inertia	J	340.97 kg cm ² (2,514.9 lbf ft s ²)	1207.69 kg cm ² (8,907.5 lbf ft s ²)	1528.3 kg cm ² (11,272.2 lbf ft s ²)
Weight	m	159.4 kg (351.41 lbf)	198.6 kg (437.83 lbf)	249.5 kg (550.05 lbf)
Tightening torque	8xM12x45 -12.9 hexagon head	120 Nm+10 Nm (89 lbf ft + 7 lbf ft)		
Servo Drive				
Recommended drive size ²⁾		G392-072 size 5	G392-090 size 6	G392-090 size 6

1) See diagram, Maximum housing pressure $p_{L,max}, p_{Sp} = f(n)$ and installation note (see page 3)

2) See catalog, MODULAR MULTI-AXIS SERVO DRIVE SYSTEM (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

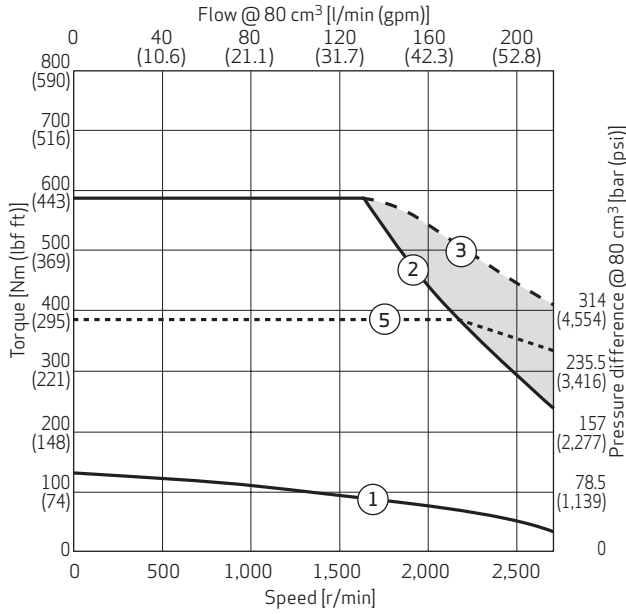
4) Optional via SP port

SIZE 80

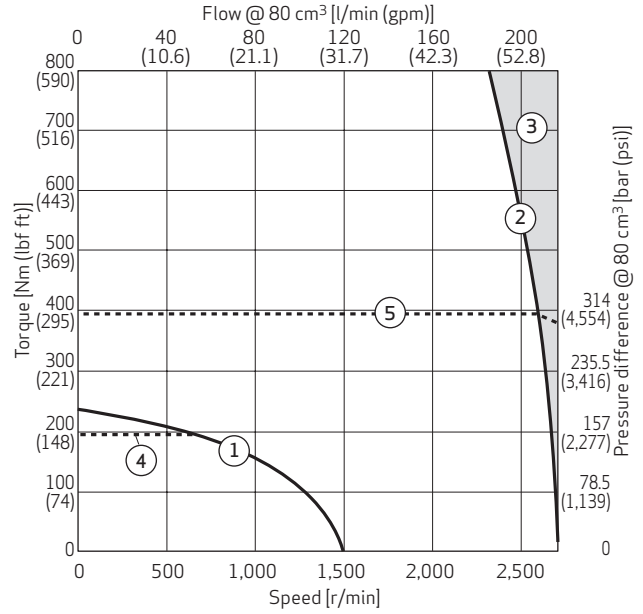
Natural Cooling, S EHA - 080 x x xx - XX C

Motor Performance Curves

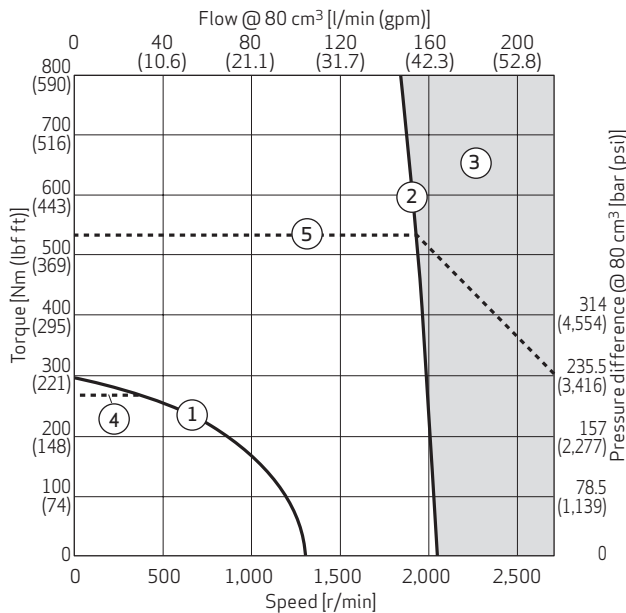
50 C



M0 C



H0 C



- ① Continuous torque @ 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_{DC} link voltage

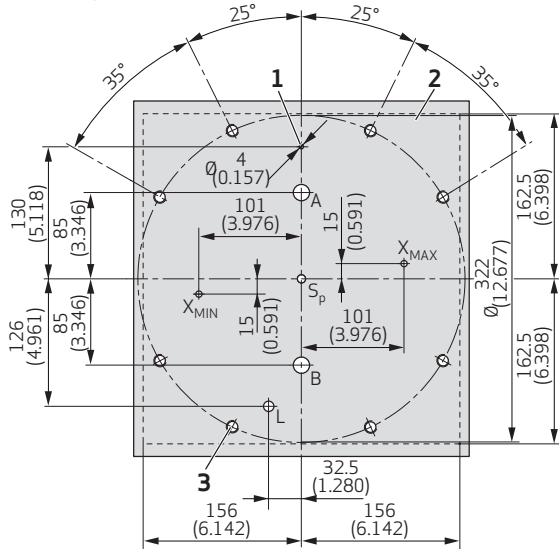
Motor performance doesn't take the pump efficiency into account

Pressure difference $\Delta p = p_A - p_B$

SIZE 80

Natural Cooling, S EHA - 080 x x xx - XX C

Mounting Pattern



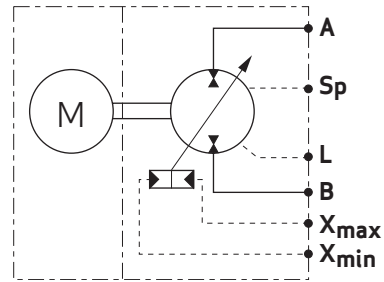
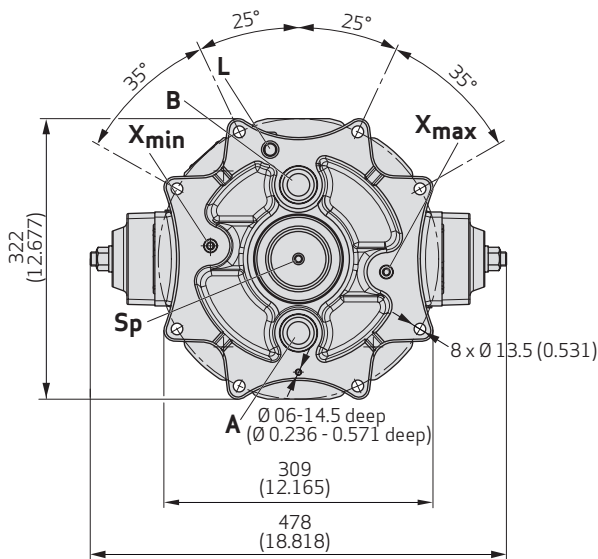
1. Use a spring-type pin with nominal diameter of 4 mm (e.g. 4x12) according to ISO 13337

2. Area of Surface flatness: $\boxed{0.02}$
 Surface roughness: $\sqrt{Rz4}$

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

Note: Dimensions mm (inch)

Pump Front View



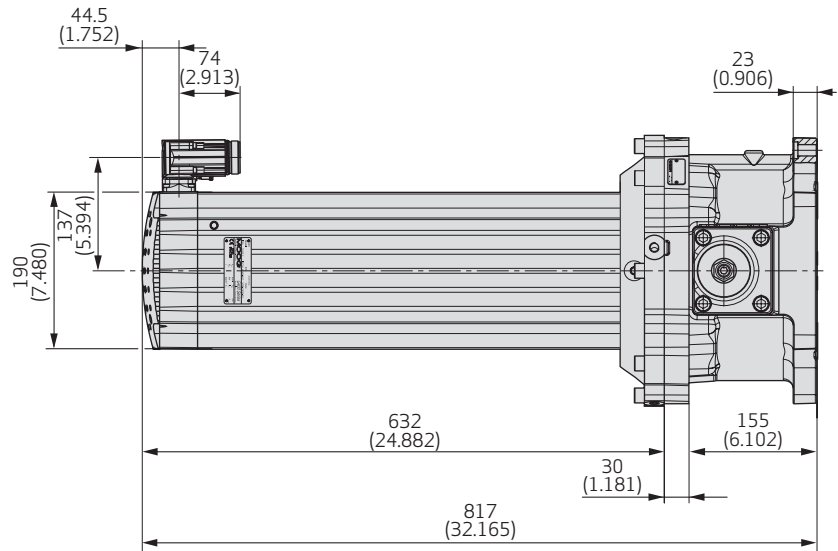
Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350	26	32
Sp	Flushing port	10	10	20
L	Leakage port	10	16.5	17
X _{max}	Control port for maximum displacement (option N1 only)	350	7	7,5
X _{min}	Control port for minimum displacement (option N1 only)	350	7	7,5

SIZE 80

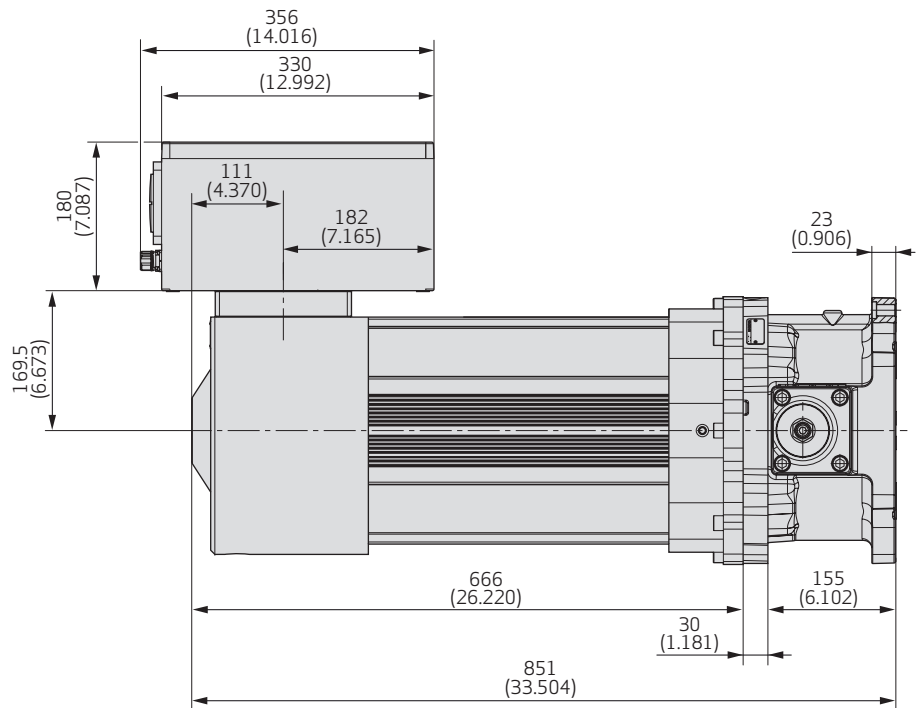
Natural Cooling, S EHA - 080 x x xx - XX C

Installation Drawings

S0 C



M0 C



Note: Dimensions mm (inch)

SIZE 80

Liquid Cooling, S EHA - 080 x x xx - XX W

Characteristics Table

		Small	Medium	High
S EHA - 080 x x xx -		50 W	MO W	HO W
Pump				
Displacement	V_{max}	80 cm ³ (4.88 in ³)		
Maximum pump speed @ 3 bar (abs.)	n_{max}	2,700 rpm		
Maximum housing pressure ¹⁾	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 ⁴⁾	Q_{Sp}	4-6 l/min (1.1 - 1.6 gpm)		
Motor				
Continuous stall torque ³⁾	M_0	151 Nm (111 lbf ft)	227 Nm (167 lbf ft)	517 Nm (381 lbf ft)
Rated torque ³⁾	M_n	128 Nm (94 lbf ft)	189 Nm (139 lbf ft)	444 Nm (327 lbf ft)
Maximum torque	M_{max}	391 Nm (288 lbf ft)	595 Nm (439 lbf ft)	1.477 Nm (1.089 lbf ft)
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 _{rms}	114.87 A _{rms}	241.32 A _{rms}
Maximum current	I_{max}	250 A _{rms}	340 A _{rms}	795 A _{rms}
Torque constant	k_t	1.76 Nm/A _{rms}	1.97 Nm/A _{rms}	2.14 Nm/A _{rms}
Voltage constant	k_e	106.63 V _{rms} /1000 rpm	119.96 V _{rms} /1000 rpm	148.09 V _{rms} /1000 rpm
Thermal time constant	t_{th}	568 s	704 s	1680 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	0.603 mH
Power connector		Cable box A		Cable box B
Feedback connector		Cable box		
Thermal sensor		NTC 220 kOhm		
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)
EHA Unit				
Inertia	J	295.8 kg cm ² (2,181.7 lbf ft s ²)	346.3 kg cm ² (2,554.2 lbf ft s ²)	1,207.3 kg cm ² (10,684.61 lbf ft s ²)
Weight	m	144.3 kg (318.12 lbf)	168.1 kg (370.59 lbf)	227.5 kg (501.55 lbf)
Tightening torque	8xM12x45 -12.9 hexagon head	120 Nm+10 Nm (89 lbf ft + 7 lbf ft)		
Servo Drive				
Recommended drive size ²⁾		G392-110 size 6	G392-110 size 6	G392-143 size 6A

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

2) See catalog, MODULAR MULTI-AXIS SERVO DRIVE SYSTEM (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

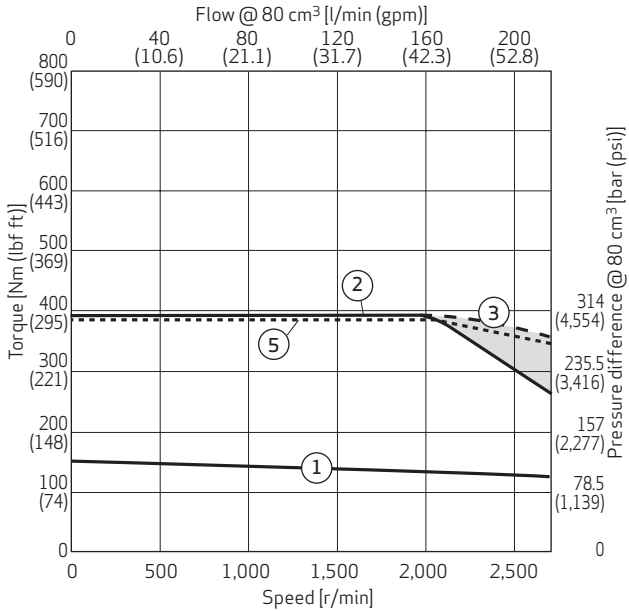
4) Optional via SP port

SIZE 80

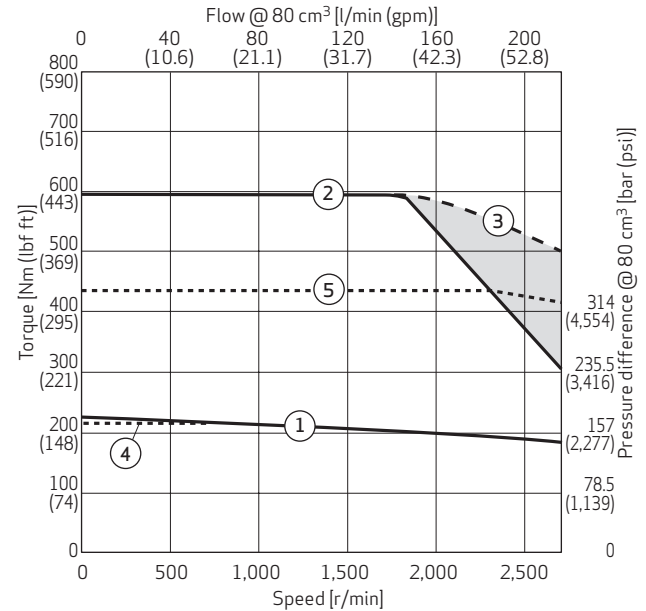
Liquid Cooling, S EHA - 080 x x xx - XX W

Motor Performance Curves

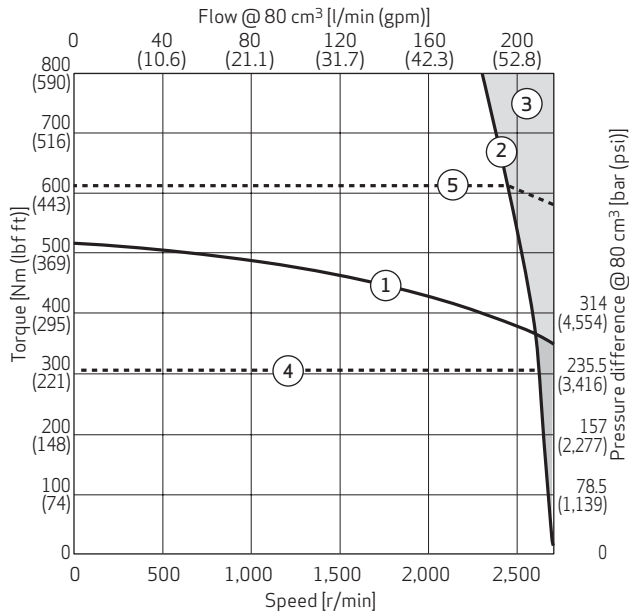
50 W



M0 W



H0 W



- ① Continuous torque @ 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_{DC} link voltage

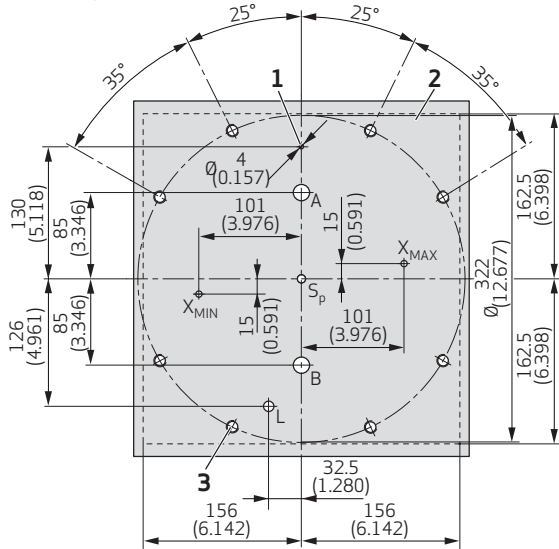
Motor performance doesn't take the pump efficiency into account

Pressure difference $\Delta p = p_A - p_B$

SIZE 80

Liquid Cooling, S EHA - 080 x x xx - XX W

Mounting Pattern



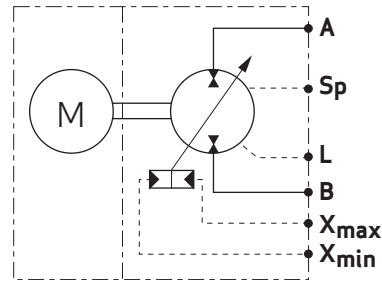
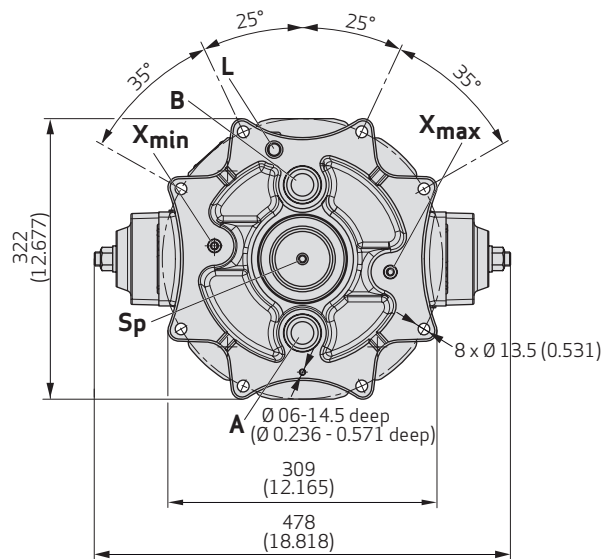
1. Use a spring-type pin with nominal diameter of 4 mm (e.g. 4x12) according to ISO 13337

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

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

Note: Dimensions mm (inch)

Pump Front View



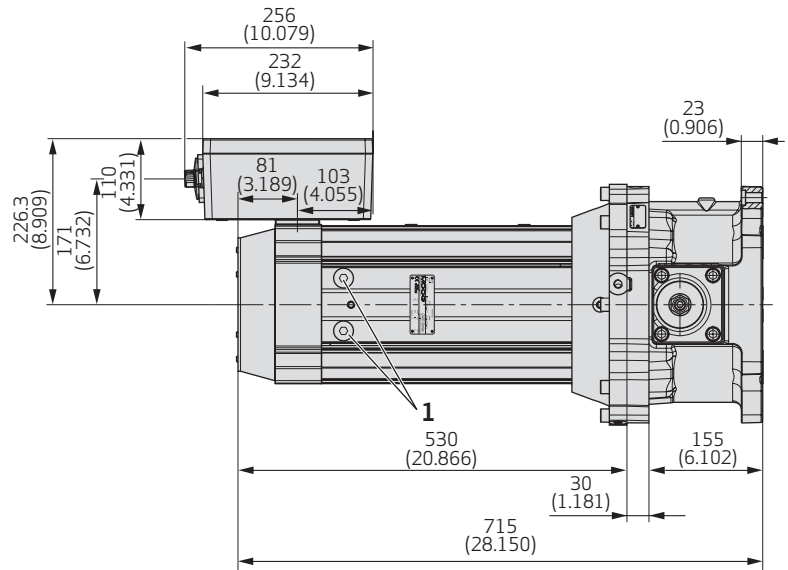
Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350	26	32
Sp	Flushing port	10	10	20
L	Leakage port	10	16.5	17
X _{max}	Control port for maximum displacement	350	7	7,5
X _{min}	Control port for minimum displacement	350	7	7,5

SIZE 80

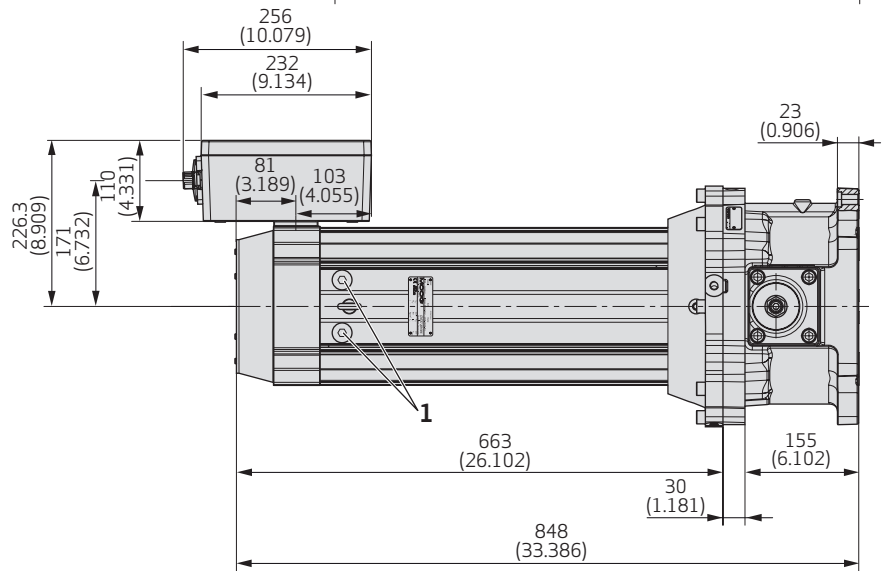
Liquid Cooling, S EHA - 080 x x xx - XX W

Installation Drawings

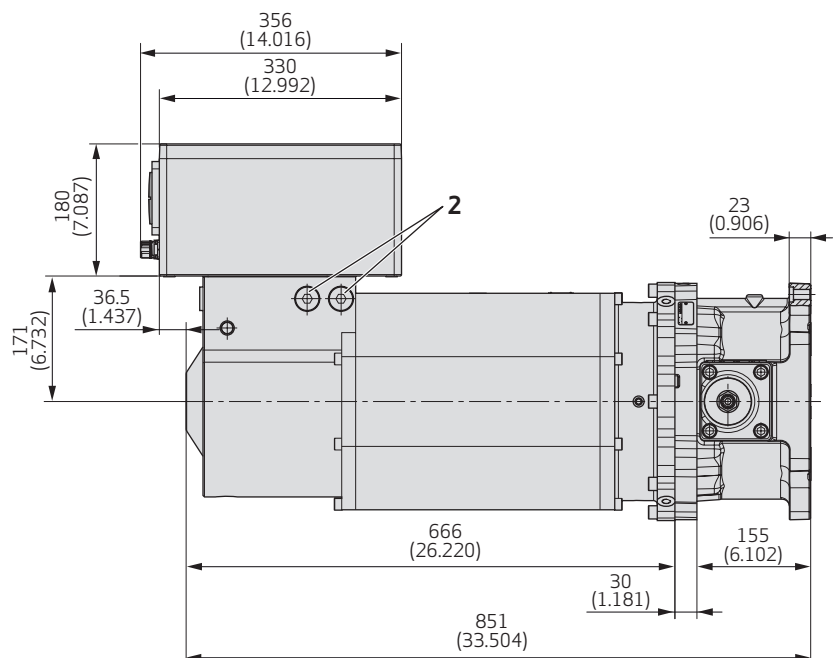
50 W



M0 W



H0 W



Note: Dimensions mm (inch)

- 1) Cooler outlet G1/2"
- 2) Cooler outlet G3/4"

SIZE 140

Natural Cooling, S EHA - 140 x x xx - XX C

Characteristics Table

		Small
S EHA - 140 x x xx -		S0C
Pump		
Displacement	V_{max}	140 cm ³ (8.54 in ³)
Maximum pump speed @ 4 bar (abs.)	n_{max}	2,300 rpm
Maximum housing pressure ¹⁾	$p_{L,max}, p_{Sp}$	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 ⁴⁾	Q_{Sp}	6-8 l/min (1.6 - 2.1 gpm)
Motor		
Continuous stall torque ³⁾	M_0	298 Nm (220 lbf ft)
Rated torque ³⁾	M_n	230 Nm (170 lbf ft)
Maximum torque	M_{max}	1,972 Nm (1,454 lbf ft)
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 _{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} /1000 _{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 B
Feedback connector		Cable box
Thermal sensor		NTC 220 kOhm
EHA Unit		
Inertia	J	1,722 kg cm ² (1,270 lbf ft s ²)
Weight	m	280.8 kg (619,05 lbf)
Tightening torque	12xM12x45 -12.9 hexagon head	120 Nm + 10 Nm (89 lbf ft + 7 lbf ft)
Servo Drive		
Recommended drive size ²⁾		G392-143 BG6

1) See diagram, Maximum housing pressure $p_{L,max}, p_{Sp} = f(n)$ and installation note (see page 3)

2) See catalog, MODULAR MULTI-AXIS SERVO DRIVE SYSTEM (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

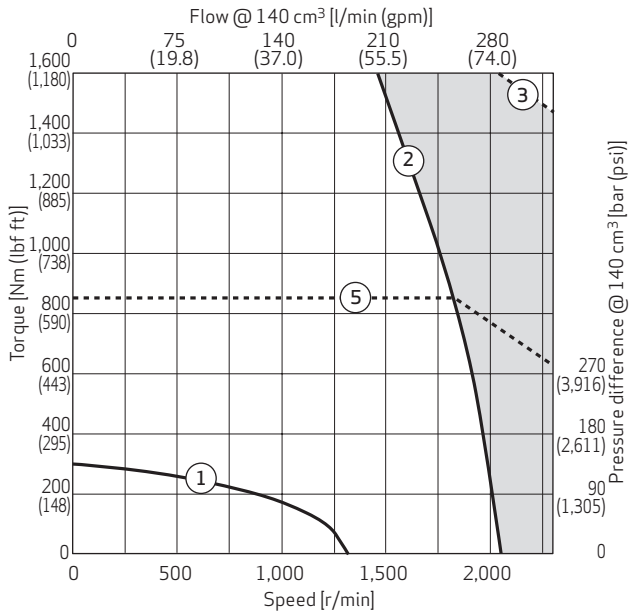
4) Optional via SP port

SIZE 140

Natural Cooling, S EHA - 140 x x xx - XX C

Motor Performance Curves

50 C



- ① Continuous torque @ 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_{DC} link voltage

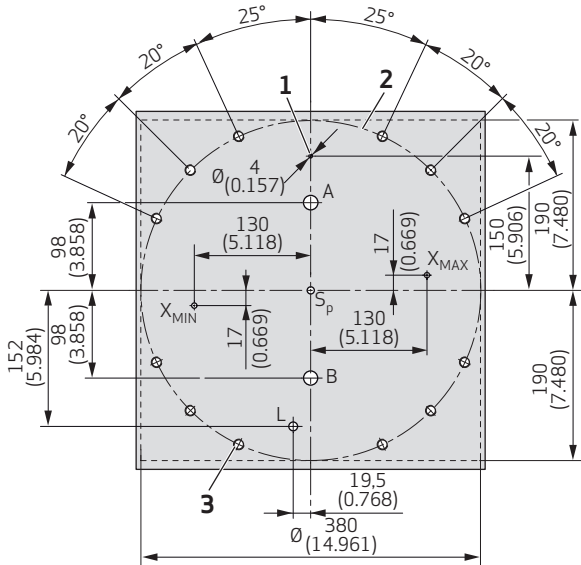
Motor performance doesn't take the pump efficiency into account

Pressure difference $\Delta p = p_A - p_B$

SIZE 140

Natural Cooling, S EHA - 140 x x xx - XX C

Mounting Pattern



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

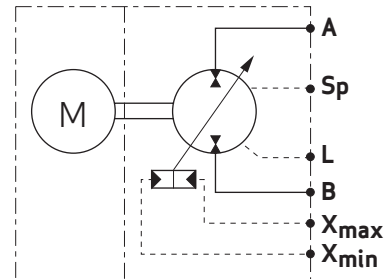
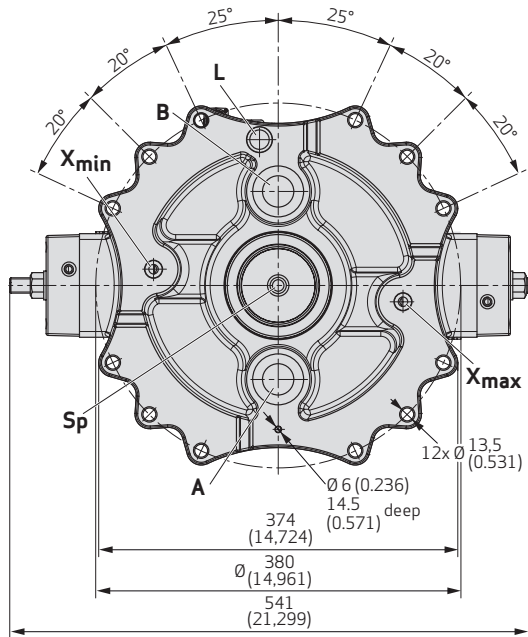
2. Area of Surface flatness: $\square 0.02$

Surface roughness: $\sqrt{Rz^4}$

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

Note: Dimensions mm (inch)

Pump Front View



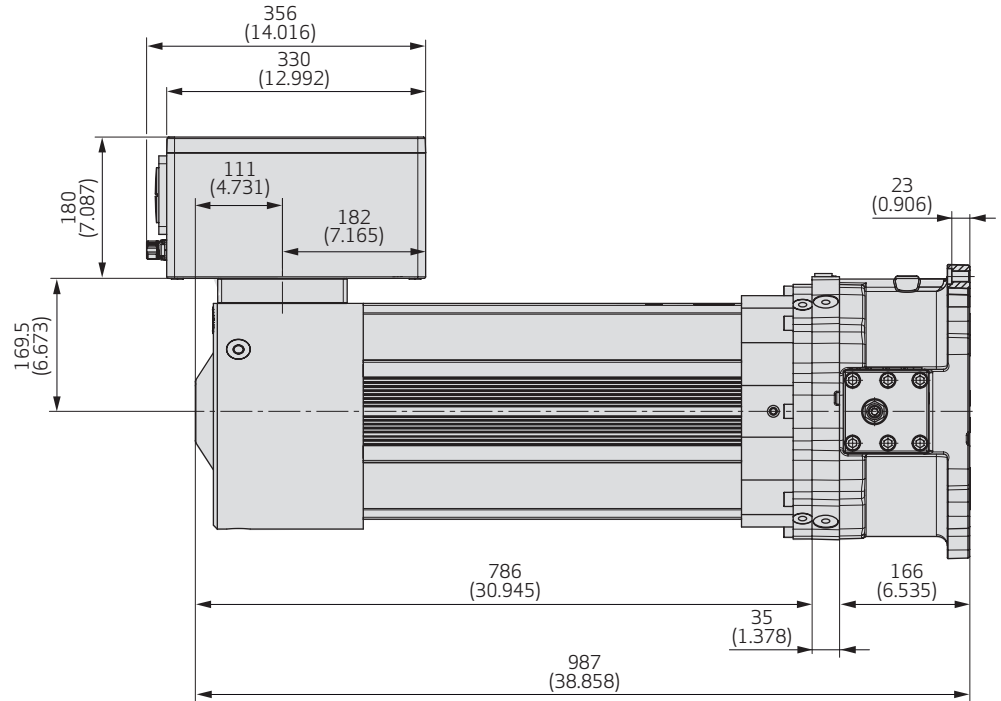
Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350	32.5	38
Sp	Flushing port	10	12	25
L	Leakage port	10	19.5	20
X _{max}	Control port for maximum displacement (option N1 only)	350	9.5	10
X _{min}	Control port for minimum displacement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

SIZE 140

Natural Cooling, S EHA - 140 x x xx - XX C

Installation Drawings

S0 C



Note: Dimensions mm (inch)

SIZE 140

Liquid Cooling, S EHA - 140 x x xx - XX W

Characteristics Table

		Small	Medium	High
S EHA - 140 x x xx -		50 W	M0 W	HO W
Pump				
Displacement	V_{max}	140 cm ³ (8.54 in ³)		
Maximum pump speed @ 4 bar (abs.)	n_{max}	2,300 rpm		
Maximum housing pressure ¹⁾	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 ⁴⁾	Q_{Sp}	6-8 l/min (1.6 -2.1 gpm)		
Motor				
Continuous stall torque ³⁾	M_0	227 Nm (167 lbf ft)	517 Nm (381 lbf ft)	689 Nm (508 lbf ft)
Rated torque ³⁾	M_n	189 Nm (139 lbf ft)	444 Nm (327 lbf ft)	585 Nm (431 lbf ft)
Maximum torque	M_{max}	595 Nm (439 lbf ft)	1,477 Nm (1.089 lbf ft)	1,972 Nm (1.454 lbf ft)
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}	241.32 A _{rms}	240.71 A _{rms}
Maximum current	I_{max}	340 A _{rms}	795 A _{rms}	795 A _{rms}
Torque constant	k_t	1.97 Nm/A _{rms}	2.14 Nm/A _{rms}	2.86 Nm/A _{rms}
Voltage constant	k_e	119.96 V _{rms} /1000 rpm	148.09 V _{rms} /1000 rpm	197.70 V _{rms} /1000 rpm
Thermal time constant	t_{th}	704 s	1680 s	1970 s
Winding resistance at 25 °C	R_{tt}	0.074 Ω	0.024 Ω	0.03 Ω
Winding inductance	L_{tt}	1.44 mH	0.603 mH	0.804 mH
Power connector		Cable box A	Cable box B	
Feedback connector		Cable box		
Thermal sensor		NTC 220 kOhm		
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)
EHA Unit				
Inertia	J	540 kg cm ² (3,982.8 lbf ft s ²)	1,401 kg cm ² (10,333.2 lbf ft s ²)	1,722 kg cm ² (12,700.8 lbf ft s ²)
Weight	m	199.4 kg (439.60 lbf)	258,8 kg (570.55 lbf)	295,8 kg (652.12 lbf)
Tightening torque	12xM12x45 -12.9 hexagon head	120 Nm + 10 Nm (89 lbf ft + 7 lbf ft)		
Servo Drive				
Recommended drive size ²⁾		G392-143 BG6A	G395-210 BG6A	G395-210 BG6A

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

2) See catalog, MODULAR MULTI-AXIS SERVO DRIVE SYSTEM (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

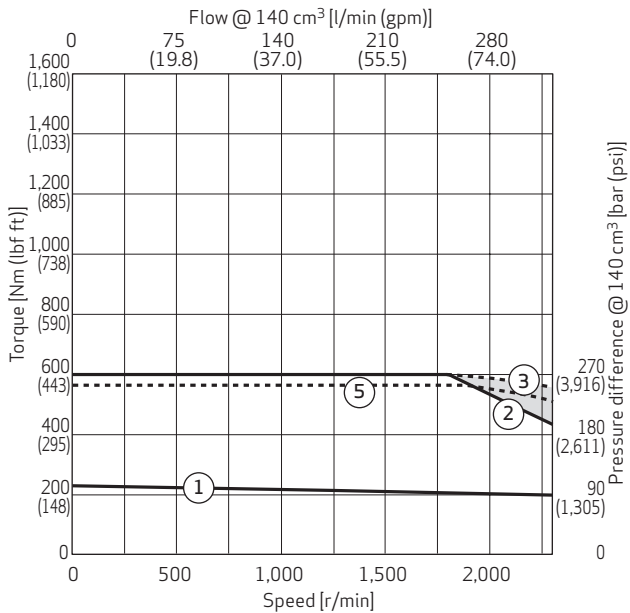
4) Optional via SP port

SIZE 140

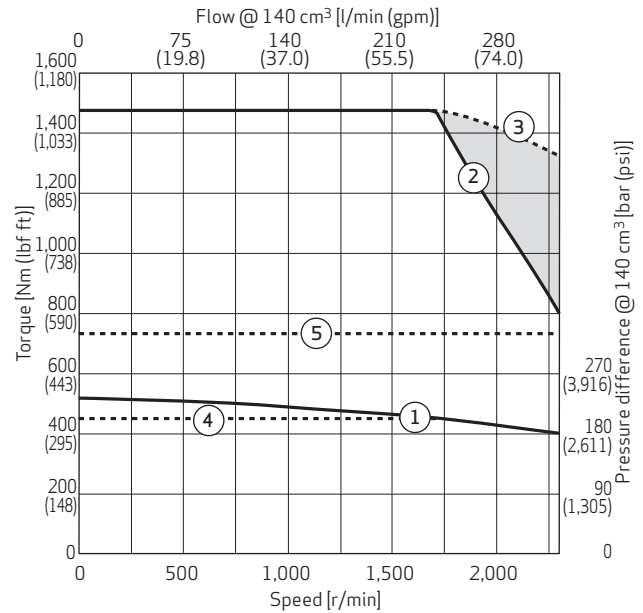
Liquid Cooling, S EHA - 140 x x xx - XX W

Motor Performance Curves

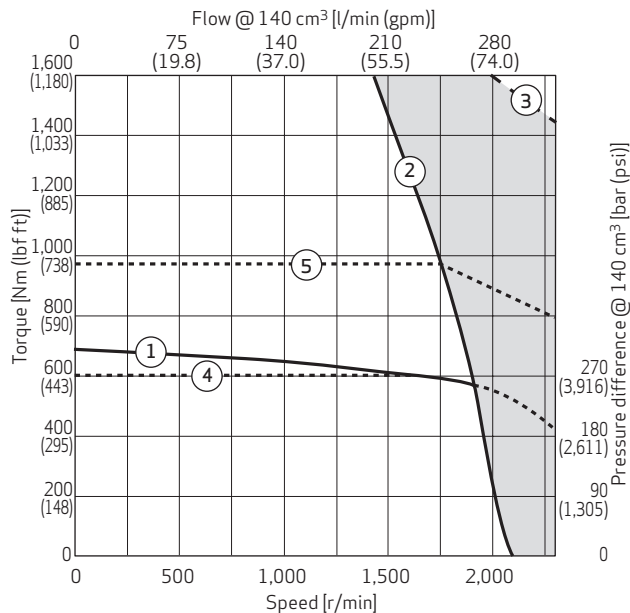
50 W



M0 W



H0 W



- ① Continuous torque @ 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_{DC} link voltage

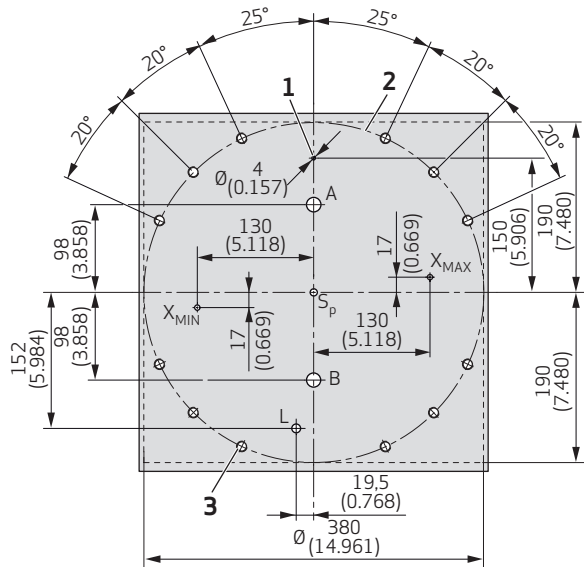
Motor performance doesn't take the pump efficiency into account

Pressure difference $\Delta p = p_A - p_B$

SIZE 140

Liquid Cooling, S EHA - 140 x x xx - XX W

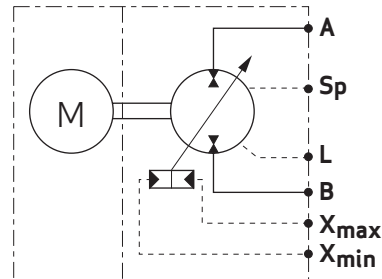
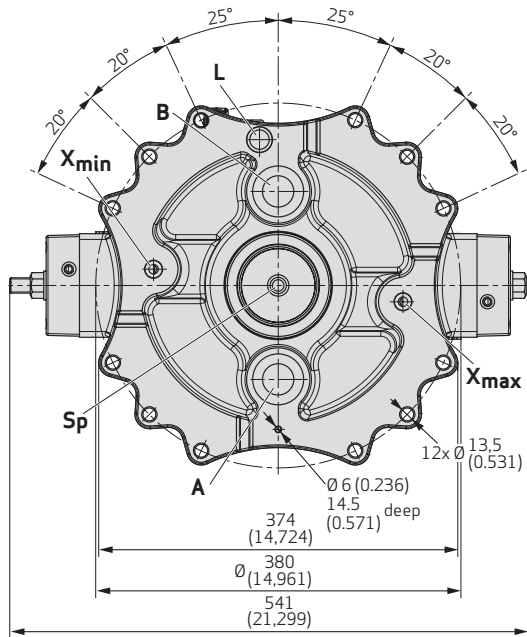
Mounting Pattern



1. Use a spring-type pin with nominal diameter of 4 mm (e.g. 4x12) according to ISO 13337
2. Area of
Surface flatness: $\boxed{0.02}$
Surface roughness: $\sqrt{Rz4}$
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

Note: Dimensions mm (inch)

Pump Front View



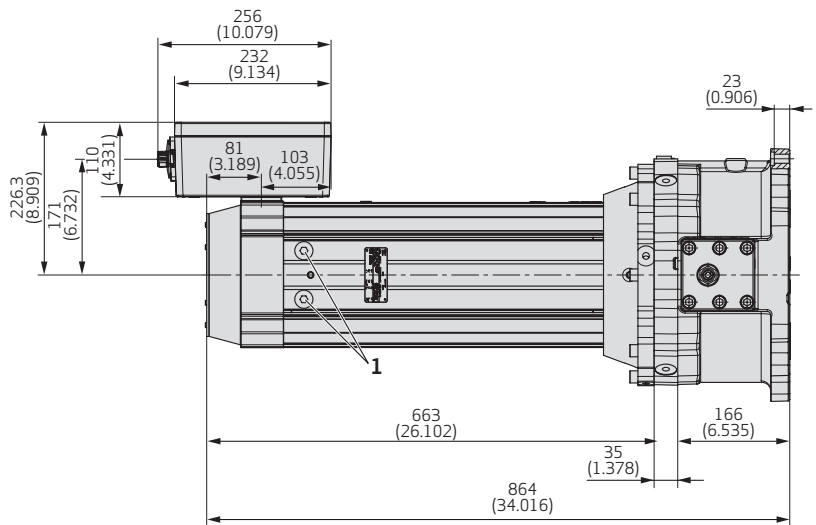
Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350	32.5	38
Sp	Flushing port	10	12	25
L	Leakage port	10	19.5	20
X _{max}	Control port for maximum displacement	350	9.5	10
X _{min}	Control port for minimum displacement	350	9.5	10

SIZE 140

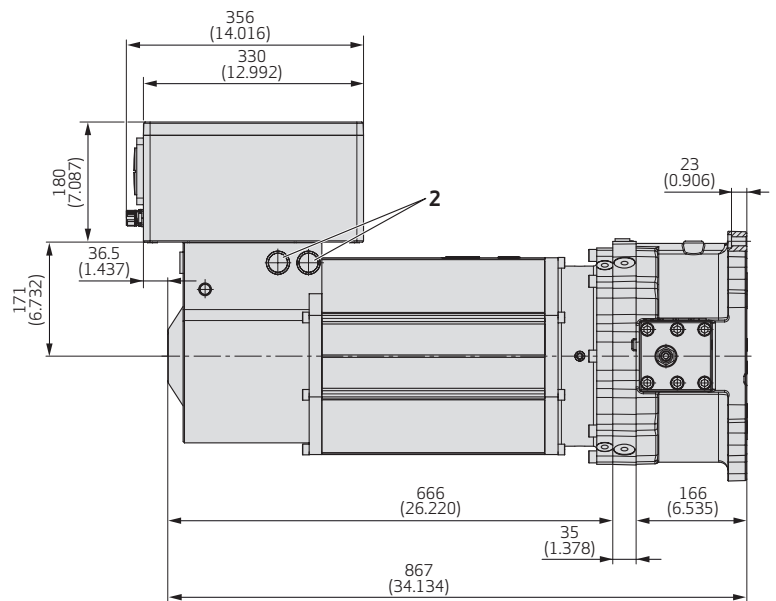
Liquid Cooling, S EHA - 140 x x xx - XX W

Installation Drawings

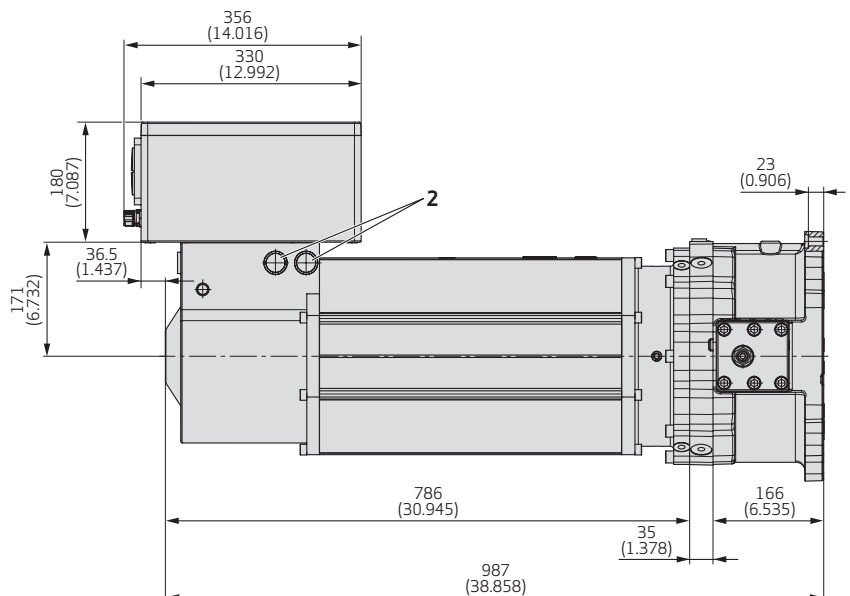
50 W



M0 W



H0 W



Note: Dimensions mm (inch)

- 1) Cooler outlet G1/2"
- 2) Cooler outlet G3/4"

SIZE 250

Natural Cooling, S EHA - 250 x x xx - XX C

Characteristics Table

		Small
S EHA - 250x x xx -		50 C
Pump		
Displacement	V_{max}	250 cm ³ (9.84 in ³)
Maximum pump speed @ 3 bar (abs.)	n_{max}	1,800 rpm
Maximum housing pressure ¹⁾	p_{Lmax}, P_{Sp}	10 bar (145 psi)
Maximum flow	Q_{max}	350 l/min (57.1 gpm)
Maximum pressure ports A and B	p_A, p_B	350 bar (5.076 psi)
Flushing flow rate ⁴⁾	Q_{Sp}	10-12 l/min (2.6 - 3.2 gpm)
Motor		
Continuous stall torque ³⁾	M_0	418 Nm (308 lbf ft)
Rated torque ³⁾	M_n	330 Nm (243 lbf ft)
Maximum torque	M_{max}	2100 Nm (1.549 lbf ft)
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} /1000 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		Cable box
Thermal sensor		NTC 220 kOhm
EHA Unit		
Inertia	J	3540 kg cm ² (31,329.9 lbf ft s ²)
Weight	m	535 kg (1179.46 lbf)
Tightening torque	12xM12x50 -12.9 hexagon head	120 Nm+10 Nm (89 lbf ft + 7 lbf ft)
Servo Drive		
Recommended drive size ²⁾		G392-170 size 6A

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

2) See catalog, MODULAR MULTI-AXIS SERVO DRIVE SYSTEM (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

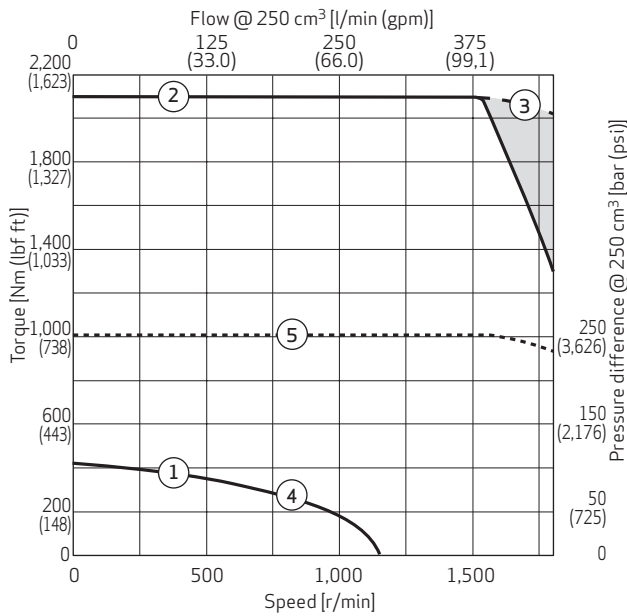
4) Optional via SP port

SIZE 250

Natural Cooling, S EHA - 250 x x xx - XX C

Motor Performance Curves

50 C



- ① Continuous torque @ 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_{DC} link voltage

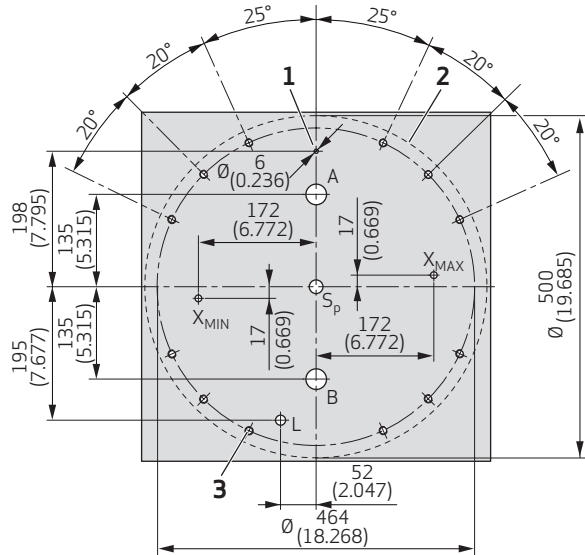
Motor performance doesn't take the pump efficiency into account

Pressure difference $\Delta p = p_A - p_B$

SIZE 250

Natural Cooling, S EHA - 250 x x xx - XX C

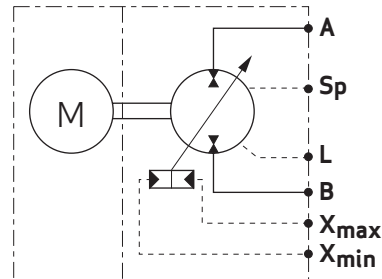
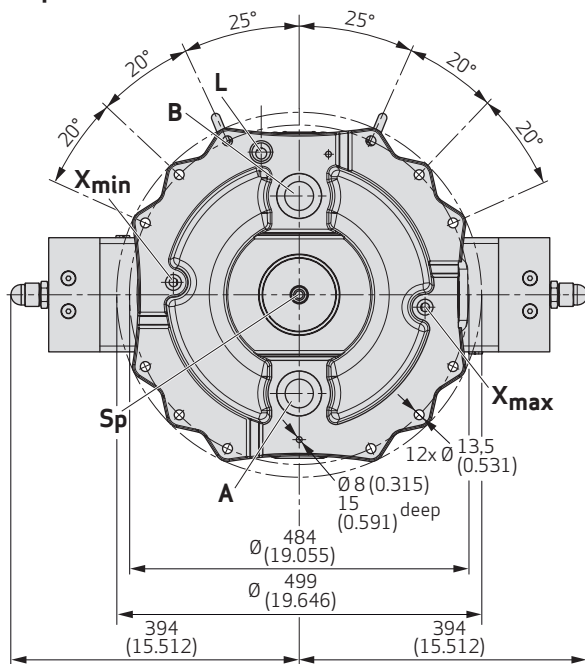
Mounting Pattern



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

Note: Dimensions mm (inch)

Pump Front View



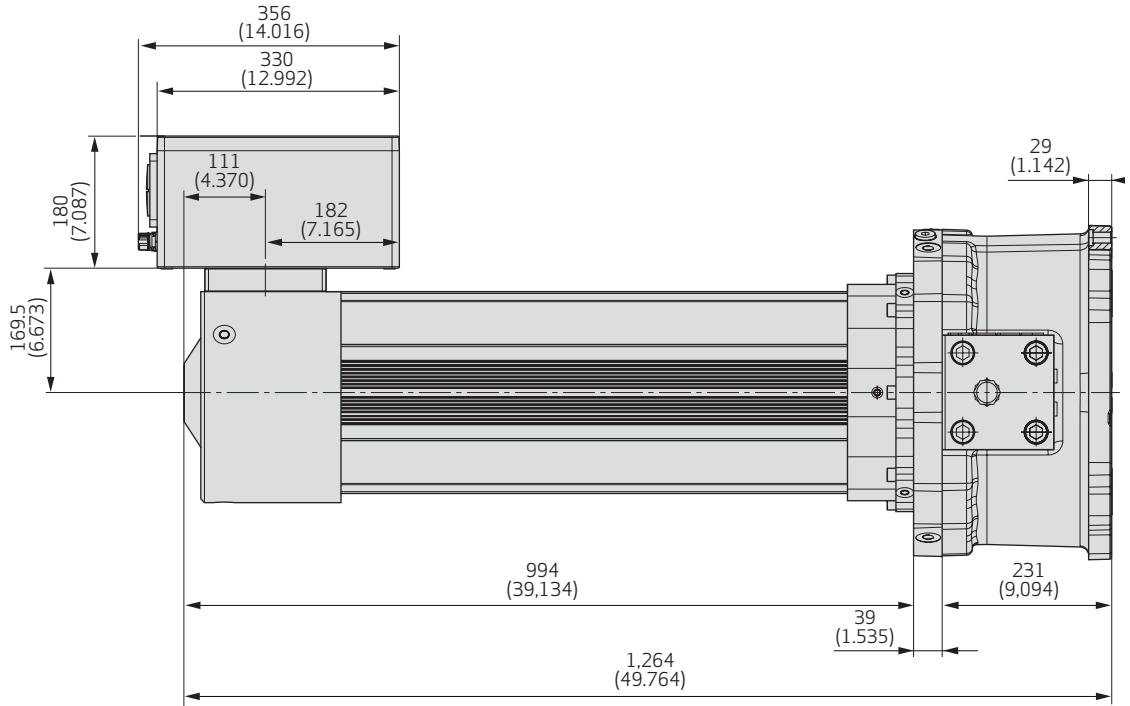
Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350	39	45
Sp	Flushing port	10	10	25
L	Leakage port	10	24	25
X _{max}	Control port for maximum displacement (option N1 only)	350	12	13
X _{min}	Control port for minimum displacement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

SIZE 250

Natural Cooling, S EHA - 250 x x xx - XX C

Installation Drawings

S0 C



Note: Dimensions mm (inch)

SIZE 250

Liquid Cooling, S EHA - 250 x x xx - XX W

Characteristics Table

		High
S EHA - 250x x xx -		H0 W
Pump		
Displacement	V_{max}	250 cm ³ (9.84 in ³)
Maximum pump speed @ 3 bar (abs.)	n_{max}	1,800 rpm
Maximum housing pressure ¹⁾	$p_{L,max}, p_{Sp}$	10 bar (145 psi)
Maximum flow	Q_{max}	350 l/min (57.1 gpm)
Maximum pressure ports A and B	p_A, p_B	350 bar (5.076 psi)
Flushing flow rate ⁴⁾	Q_{Sp}	10-12 l/min (2.6 - 3.2 gpm)
Motor		
Continuous stall torque ³⁾	M_0	1,036 Nm (308 lbf ft)
Rated torque ³⁾	M_n	949 Nm (243 lbf ft)
Maximum torque	M_{max}	2,100 Nm (1.549 lbf ft)
Rated speed	n_n	1,200 rpm
Maximum speed	n_{max}	Maximum speed see $M = f(n)$ performance curve
Continuous stall current	I_0	361.21 A _{rms}
Maximum current	I_{max}	800 A _{rms}
Torque constant	k_t	2.87 Nm/A _{rms}
Voltage constant	k_e	197.70 V _{rms} /1000 rpm
Thermal time constant	t_{th}	2,500 s
Winding resistance at 25 °C	R_{tt}	0.019 Ω
Winding inductance	L_{tt}	0,567 mH
Power connector		Cable box B
Feedback connector		Cable box
Thermal sensor		NTC 220 kOhm
Cooling water flow rate	Q_w	8 l/min (2.1 gpm)
EHA Unit		
Inertia	J	3540 kg cm ² (31,329.9 lbf ft s ²)
Weight	m	535 kg (1179.46 lbf)
Tightening torque	12xM12x50 -12.9 hexagon head	120 Nm+10 Nm (89 lbf ft + 7 lbf ft)
Servo Drive		
Recommended drive size ²⁾		G395 450 size 7

1) See diagram, Maximum housing pressure $p_{L,max}, p_{Sp} = f(n)$ and installation note (see page 3)

2) See catalog, MODULAR MULTI-AXIS SERVO DRIVE SYSTEM (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

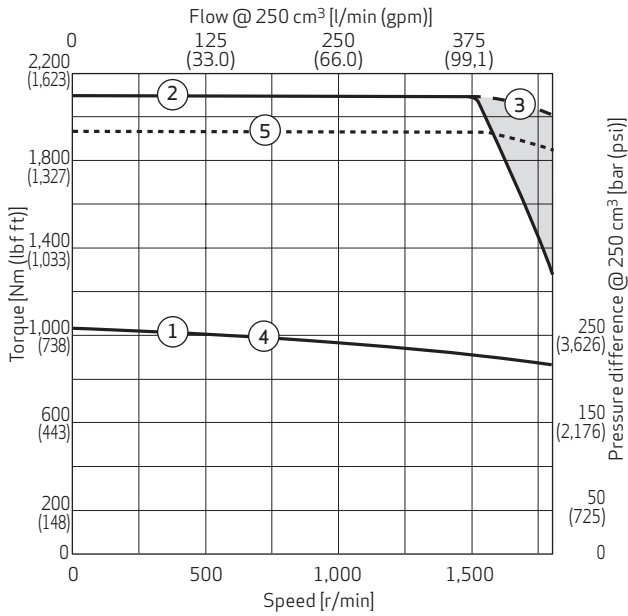
4) Optional via SP port

SIZE 250

Liquid Cooling, S EHA - 250 x x xx - XX W

Motor Performance Curves

H0 W



- ① Continuous torque @ 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_{DC} link voltage

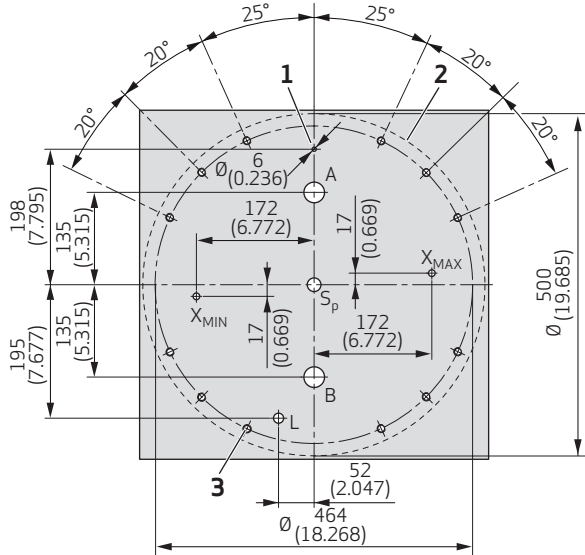
Motor performance doesn't take the pump efficiency into account

Pressure difference $\Delta p = p_A - p_B$

SIZE 250

Liquid Cooling, S EHA - 250 x x xx - XX W

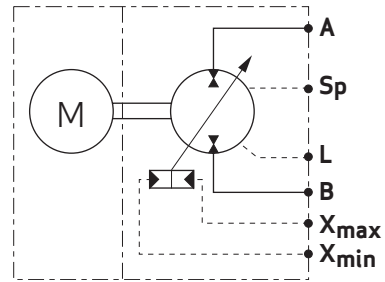
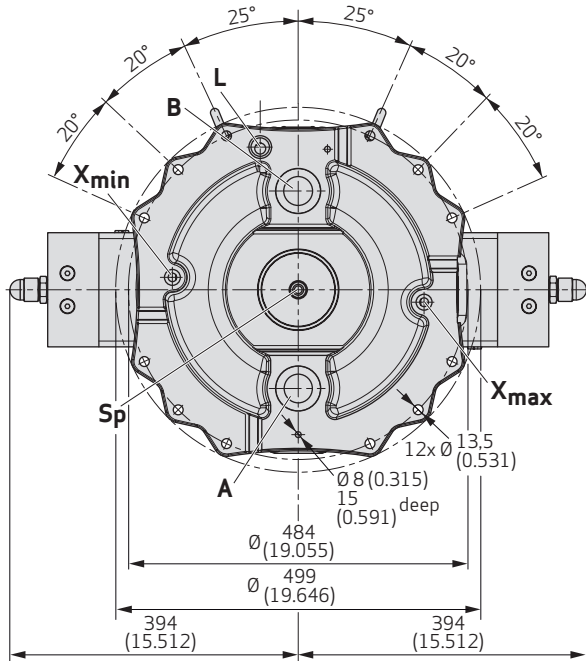
Mounting Pattern



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

Note: Dimensions mm (inch)

Pump Front View



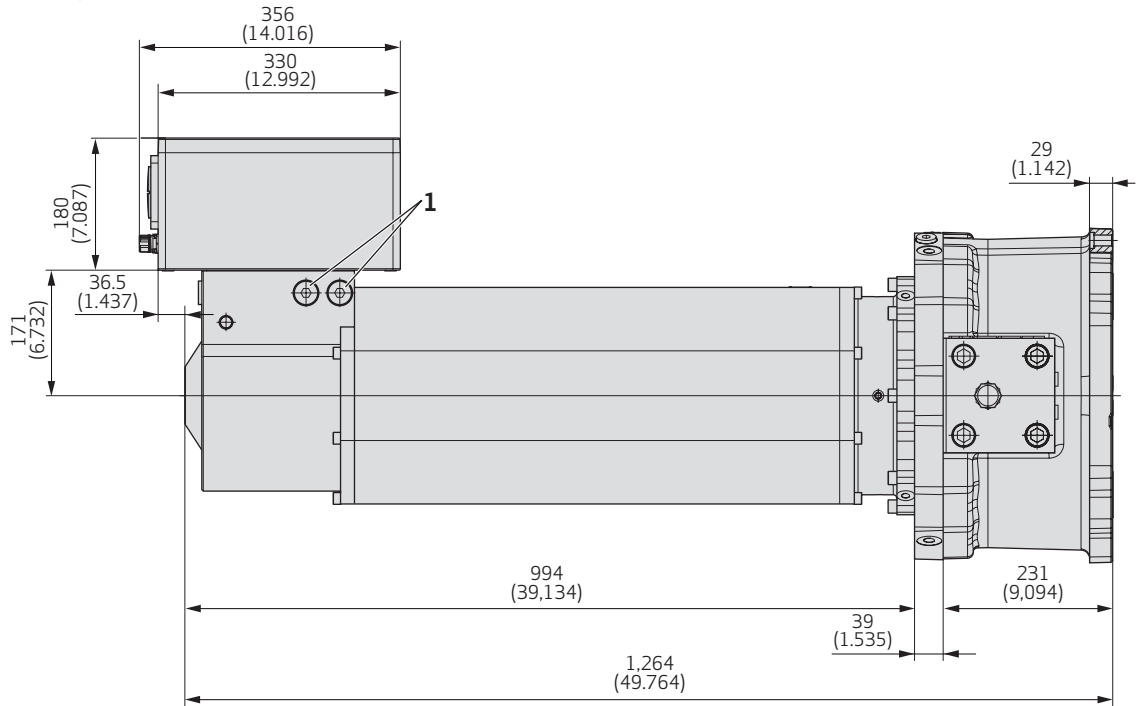
Port	Designation	Pressure [bar]	Port dimension in counter surface	
			Minimum Ø [mm]	Maximum Ø [mm]
A, B	Operating ports	350	39	45
Sp	Flushing port	10	10	25
L	Leakage port	10	24	25
X _{max}	Control port for maximum displacement	350	12	13
X _{min}	Control port for minimum displacement	350	12	13

SIZE 250

Liquid Cooling, S EHA - 250 x x xx - XX W

Installation Drawings

H0 W



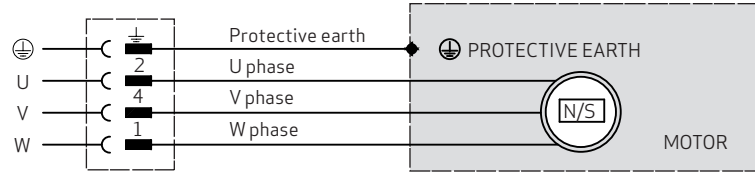
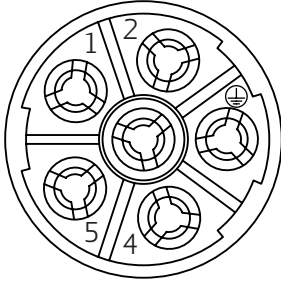
Note: Dimensions mm (inch)

1) Cooler outlet G3/4"

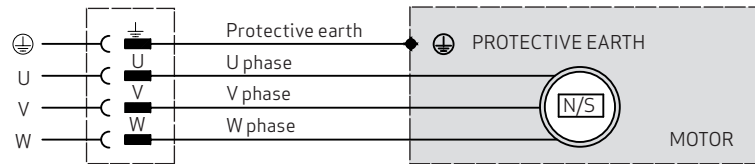
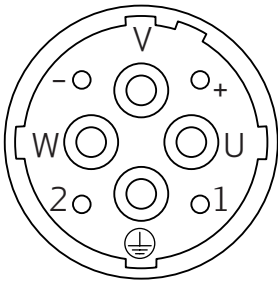
ELECTRICAL INTERFACES

Power Connectors

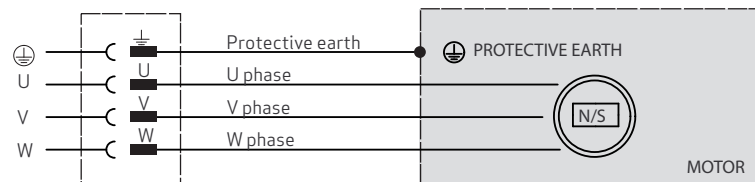
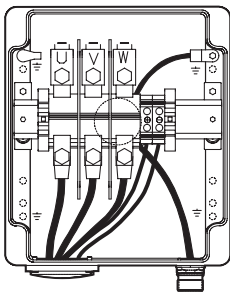
Size 1



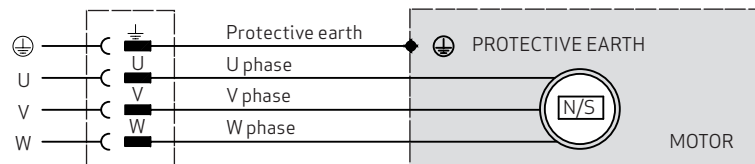
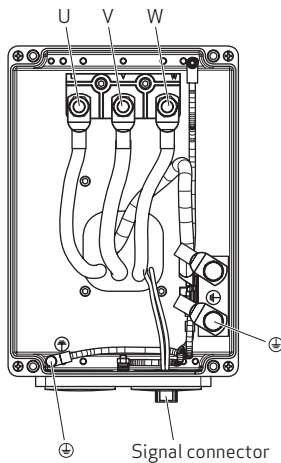
Size 1.5



Cable box A

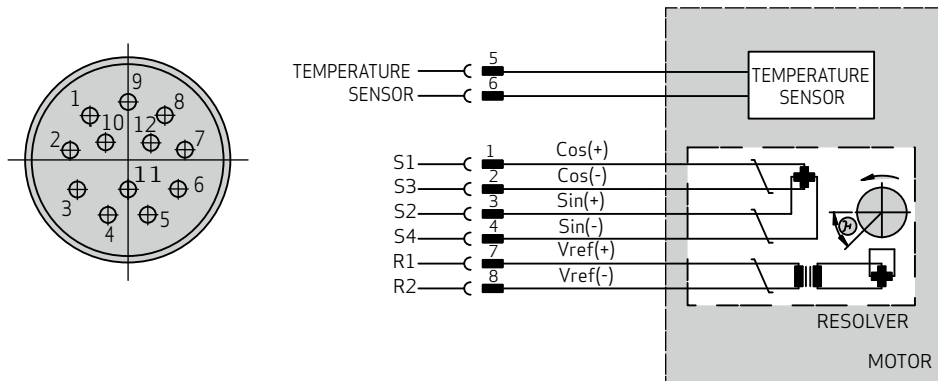


Cable box B

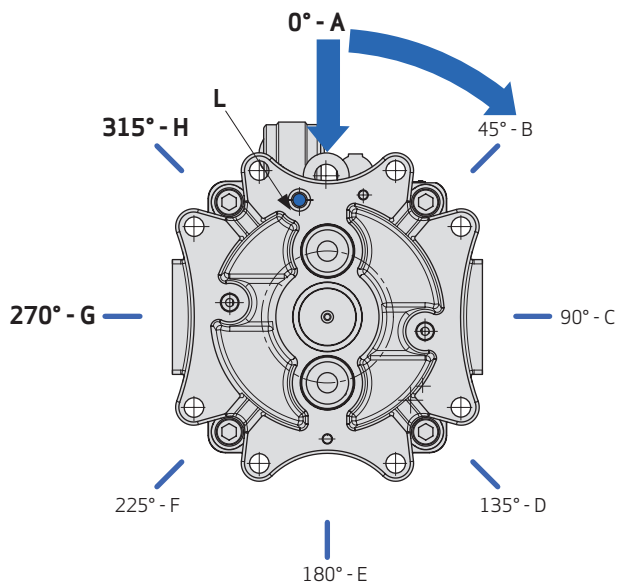


For more information on connectors, please see Moog Maximum Dynamic Brushless Servo Motor User Manual.

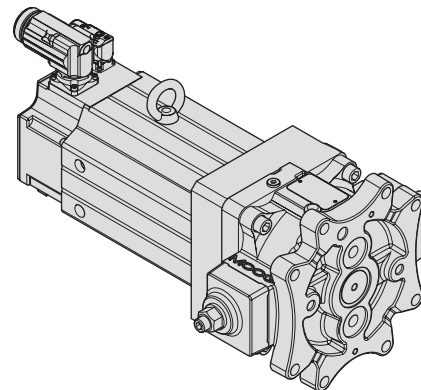
Signal Resolver Connector



ORIENTATION OF ELECTRICAL CONNECTORS AND LIQUID COOLING PORTS



Note: Angle starts on port L



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

CALCULATIONS

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

M [Nm] = Torque
V [cm³] = Displacement
 Δp [bar] = Pressure Difference
pA-pB

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

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

MOTOR POWER CABLES



Ordering number	CB05708-001-yyy ¹⁾²⁾		CA44958-001-yyy ¹⁾²⁾		CB00076-001-yyy ¹⁾²⁾	
Continuous rated current	25 A		44 A		61 A	
Cable cross-section	4 x 4 mm ² + 2 x 1.5 mm ²		4 x 6 mm ² + 2 x 1.5 mm ²		4 x 10 mm ² + 2 x 1.5 mm ²	
Temperature range	-50 to +90 °C		-50 to +90 °C		-50 to +90 °C	
Wiring	Connector pin	Wiring	Connector pin	Wiring	Connector pin	Wiring
	2	U				
	4	VV	V	VV	V	VV
	1	WWW	W	WWW	W	WWW
	PE	yellow / green	PE	yellow / green	PE	yellow / green
	5	N. c. / white	+	N. c. / white	+	N. c. / white
	6	N. c. / black	-	N. c. / black	-	N. c. / black
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

RESOLVER FEEDBACK CABLE



Ordering number	C08335-013-yyy ¹⁾
Motor with encoder system	Resolver
Controller-end assignment (sub-D connector)	1 = S2 2 = S4 3 = S1 4 = N. c. 5 = PTC+ 6 = R1 7 = R2 8 = S3 9 = PTC-
Capable for energy chains	Yes
Minimum bend radius	90 mm
Temperature range	-40 to +85 °C
Cable diameter approximatly	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

Ordering number connector only	CA46373-001
---------------------------------------	--------------------

- 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

NOTES

NOTES

ORDERING CODE

Type designation

1	2	3	4	5	6	7	8	9	10	11	12	13	
S	E	H	A						S				1

Model number (assigned at the factory)

1	Product division												
S	Standard												
2	Product type												
EHA	Electrohydrostatic Pump Unit												
3	Displacement [cm³]												
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	Natural cooling												
W	Liquid cooling												
9	Motor construction												
S	Sealing												
10	Electrical connection												
3	Angle rotatable												
4	Cable box												
11	Connector orientation												
A	0°												
H	315° for S EHA - 019 x x xx - M0 C or S EHA - 019 x x xx - H0 C												
12	Cooling connection (liquid cooling)												
G	270°												
Z	Not liquid cooled												
13	Feedback option												
1	2-poles resolver												

MORE PRODUCTS. MORE SUPPORT.

Moog designs a range of motion control products to complement those featured in this document. Moog also provides service and support for all of our products. For more information, contact the Moog facility closest to you.

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Electrohydraulic Pump Unit
STAR/PUBLISHING Rev. G, October 2018, Id. CDL49052-en