RE 15325/04.2020
Replaces: 03.2018

rexroth
A Bosch Company

Hägglunds DUe Drive Unit

Valid for:

- Flow capacity: Up to 3000 lpm at 50Hz
- Flow capacity: Up to 3600 lpm at 60Hz
- Max operating pressure: 350 bar (5076 psi)
- Frame size: Small, Medium and Large
- 2-3 hydraulic compartment assembly
- Pump size: 40-750 cc
- 1-4 pump assembly

Features

- Closed sound insulated cabinet
- Vertical assembly - small footprint
- Configurable for many applications and customer demands
- Equipped with Hägglunds advanced control system

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1 Ordering

1.1 Ordering code

In order to identify Hägglunds equipment, the following ordering code is used.

Example Hägglunds DUE-L2:

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
DU	E	- L	2	- 315	/ 000	- 500	+ 000	/ 000	+ 000	- 0	- W	- Y	- S	- 0400	/ 50

01	**Drive unit**	
		DU

02	**Type**	
	Excellence	**E**

03	**Frame size**	
	Small frame	**S**
	Medium frame	**M**
	Large frame	**L**

04	**Number of compartments**	
	One compartment	**1**
	Two compartments	**2**
	Three compartments	**3**

	Electric motor size	
05	Electric power (kW) - Right compartment	**011**
06	Electric power (kW) - Left compartment	**015**
		022
		030
		037
		045
		055
		075
		090
		110
		132
		160
		200
		250
		315
		355
		400
		500

	Pump size SP pumps - upper	
07	Pump size (cc) SP pumps - upper right compartment	**040**
09	Pump size (cc) SP pumps - upper left compartment	**071**
		125
		180
		250
		355
		500
		750

	Pump size SP pumps - lower	
08	Pump size (cc) SP pumps - lower right compartment	**040**
10	Pump size (cc) SP pumps - lower left compartment	**071**
		125
		180
		250
		355
		500

11	**Hazardous area**	
	Not used in hazardous area	**0**
	ATEX	**1**
	Other	**9**

12	**Cooler type**	
	Air oil cooler	**A**
	Water oil cooler	**W**

13	**Electric motor**	
	Included in Drive Unit	**Y**
	Customer supplied	**N**

14	**Control system**	
	Hägglunds Spider control system	**S**
	No control system - Only terminal box	**N**
	Hägglunds ICp pump control	**D**

15	**Voltage (V)**	
	Main Voltage	

16	**Frequency (Hz)**	
		50
		60

2 Function Hägglunds DUe

2.1 General

The DUe drive unit provides the hydraulic motor(s) with required hydraulic oil flow and pressure together with system control functionality.

The drive unit is divided to 3 basic sizes depending on electric motor power and hydraulic flow requirements:

- Small (S)
- Medium (M)
- Large (L)

The drive units are built with two or three hydraulic compartments which contains one with the hydraulic oil tank and one or two with the electric motor/pump combination. All compartments are assembled in one common cabinet.
The basic combinations will be DUe S2, DUe S3, DUe M2, DUe M3, DUe L2 and DUe L3.
A single compartment cabinet can be added to the M and L variants for higher flow requirements, for emergency drives or as standby unit.

The drive unit supports functionality for one or two driven machine shafts.
Functions as cold/warm flushing and brake circuits for the hydraulic motors are available as options.

The drive unit has an embedded control system with a large variety of configurable functionality to simplify the control and monitoring of the hydraulic drive.
The control system is pre-programmed and easy to configure and contains functions as:

- Variable-speed control
- Speed feedback
- Power limitation
- Industrial fieldbus communication
- Analog and digital signal monitoring
- Pressure control (torque control)

and application specific functions as:

- Friction control
- Shedder control
- Synchronized control

For detailed functionality and configuration, see User manual Hägglunds Spider, RE 15330-WA.
The DUe drive unit can be delivered without control system if required. All electrical wiring for sensors and pump control will be wired to a junction box assembled on the side of the drive unit. Card for pump control can be assembled as an alternative, see data sheet for Hägglunds ICp, RE 15422.
Monitoring of the drive unit sensors must be handled externally according to *"Fig. 3: Monitoring logic diagram", page 12*.

The drive unit is available for:

- Power ranges from 11 kW to 2 x 500 kW.
- Flow ranges up to 3 000 lpm at 1 500rpm (3 600 lpm at 1 800 rpm).
- Working pressure max 350 bar.

2.1.1 Test certificate

Test certificates for each drive unit may be provided upon request. They are issued according to European Standard EN 10204 - 3.1.

2.1.2 Standards

Declaration of Incorporation, as defined by the EC Machinery Directive 2006/42/EC, Appendix IIB

Control system

- EMC Directive 2014/30/EU
- Low Voltage Directive 2014/35/EU

Quality assurance system, certified to standard ISO 9001.

2.1.3 Ambient temperature

Upper limit

A standard drive unit has an upper ambient temperature limit of 40°C (104°F).

Lower limit

A standard drive unit has a lower ambient temperature limit of -20°C (-4°F). Below 0°C (32°F) should water oil cooler be used due to freezing point of water.

2.1.4 Combination of pump and electric motor

Table 1: Pre-defined pump/electric motor combinations for single pumps

● Configurable drive unit.

○ Customized drive unit.

⊙ This configuration will be placed in medium frame. SP250 single pump is not allowed to be placed in Small frame.

			Pump (cc)							
			40	71	125	180	250	355	500	750
Small (S)	Electric motor (kW)	11	○							
		15	○							
		22	○	●						
		30	○	●	●					
		37		●	●	○				
		45		●	●	●				
		55		●	●	●	⊙			
Medium (M)		75			●	●	○	○		
		90			●	●	●	○		
		110				●	●	●	○	
		132				●	●	●	●	
		160				●	●	●	●	
		200					●	●	●	
Large (L)		250						●	●	●
		315							●	●
		355							●	●
		400								●
		500								○

Table 2: Pre-defined pump/electric motor combinations for tandem pumps

● Configurable drive unit.

○ Customized drive unit.

		Pump (cc)																														
		40	40	71	40	71	125	40	71	125	180	40	71	125	180	250	40	71	125	180	250	355	40	71	125	180	250	355	500
		40	71	71	125	125	125	180	180	180	180	250	250	250	250	250	355	355	355	355	355	355	500	500	500	500	500	500	500
Medium (M)	Electric motor (kW) 11																												
	15																												
	22	○																											
	30	○	○	○																									
	37	○	○	○	○																								
	45	○	○	○	○																								
	55	○	○	○	○	○																							
	75		○	○	○	○	○	○	○	○	○	○	○	○															
	90		○	○	○	○	●	○	○	○	○	○	○	○	○														
	110			○	○	○	●	○	○	○	●	○	○	●	○	○	○	○	○	○			○						
	132				○	○	●	○	○	○	●	○	○	●	○	●	○	○	○	○	●	○	○	○	○				
	160						●	○	○	○	●	○	○	●	○	●	○	○	○	○	●	●	○	○	○	○	●	○		
	200						●		○	○	●	○	○	●	○	●	○	○	○	○	●	●	○	○	○	○	●	●		
Large (L)	250										●		○	●	○	●	○	○	○	○	●	●	○	○	○	○	●	●	●	
	315														○	●	○	○	○	○	●	●	○	○	○	○	●	●	●	
	355															●			○	○	●	●	○	○	○	○	●	●	●	
	400																			○	●	●	○	○	○	○	●	●	●	
	500																					○			○	○	●	●	●	

3 Circuit diagram

3.1 Simplified hydraulic circuit single SP pump

Features; air-oil cooler, cold flushing via check valve, cold flushing pump case

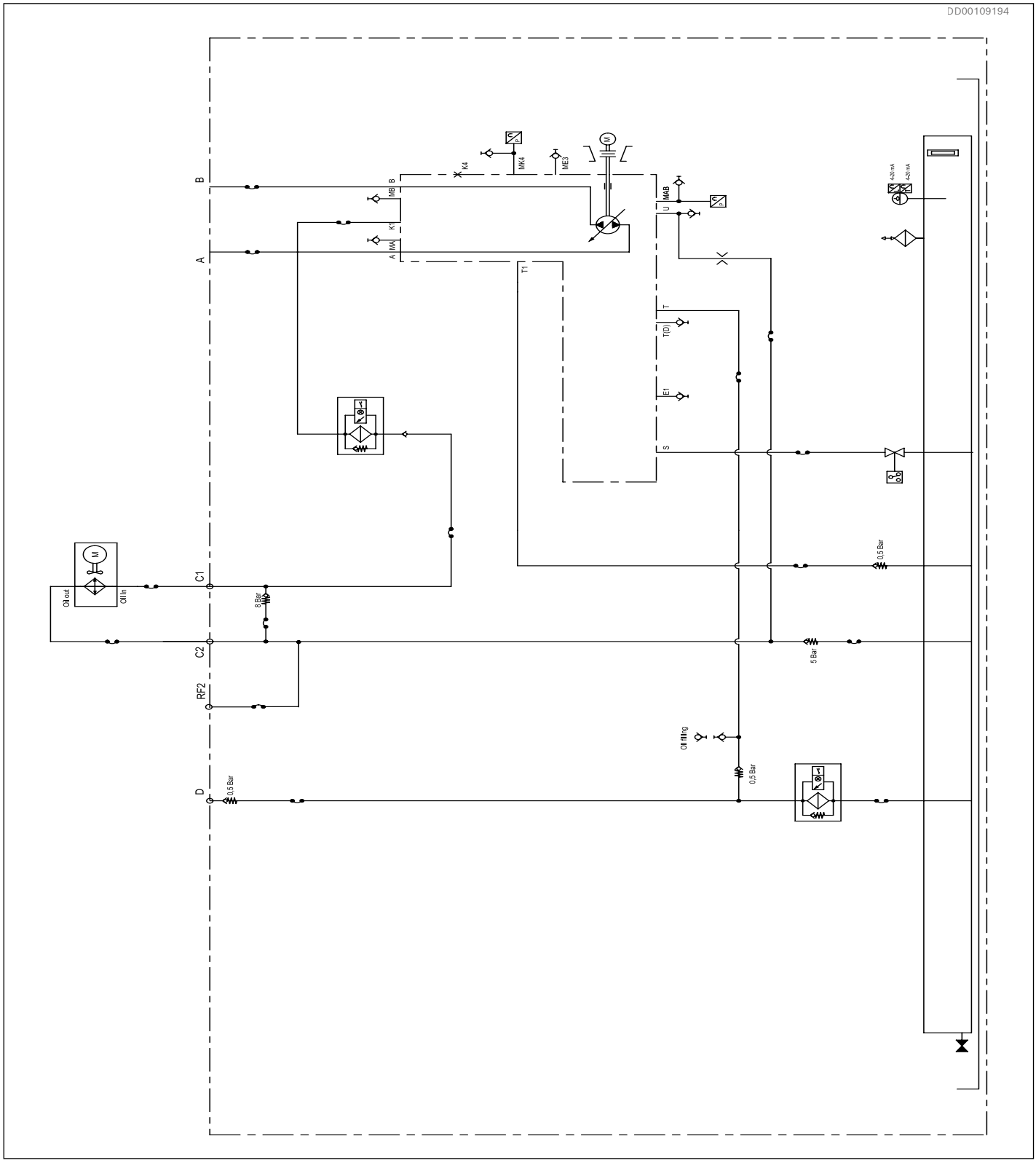

Fig. 1: Simplified hydraulic circuit single pump

3.2 Simplified hydraulic circuit SP double pumps

Features; plate cooler, accumulator, heater in tank, cold flushing via external pump

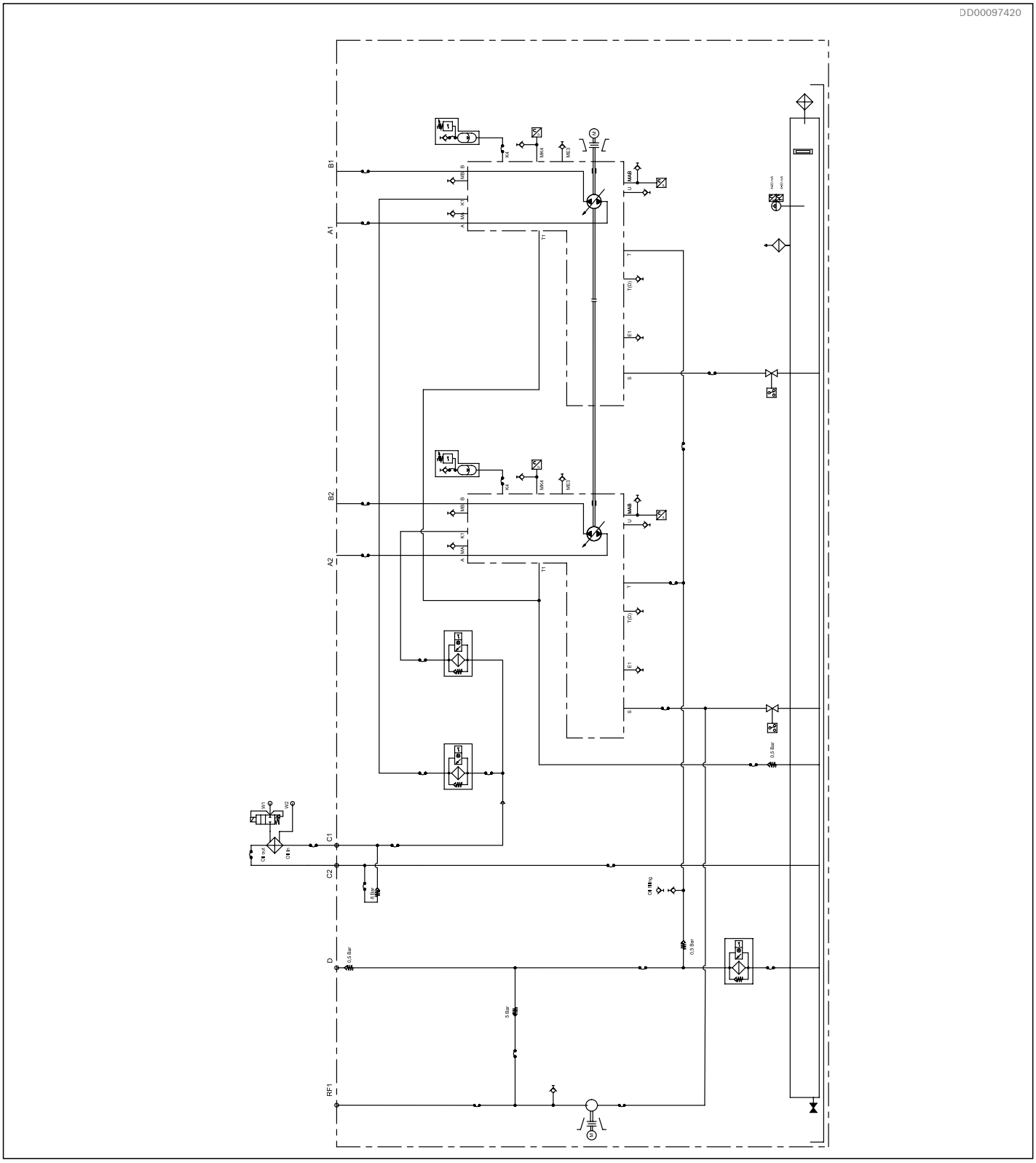

Fig. 2: Simplified hydraulic circuit double pumps

3.3 Monitoring logic diagram

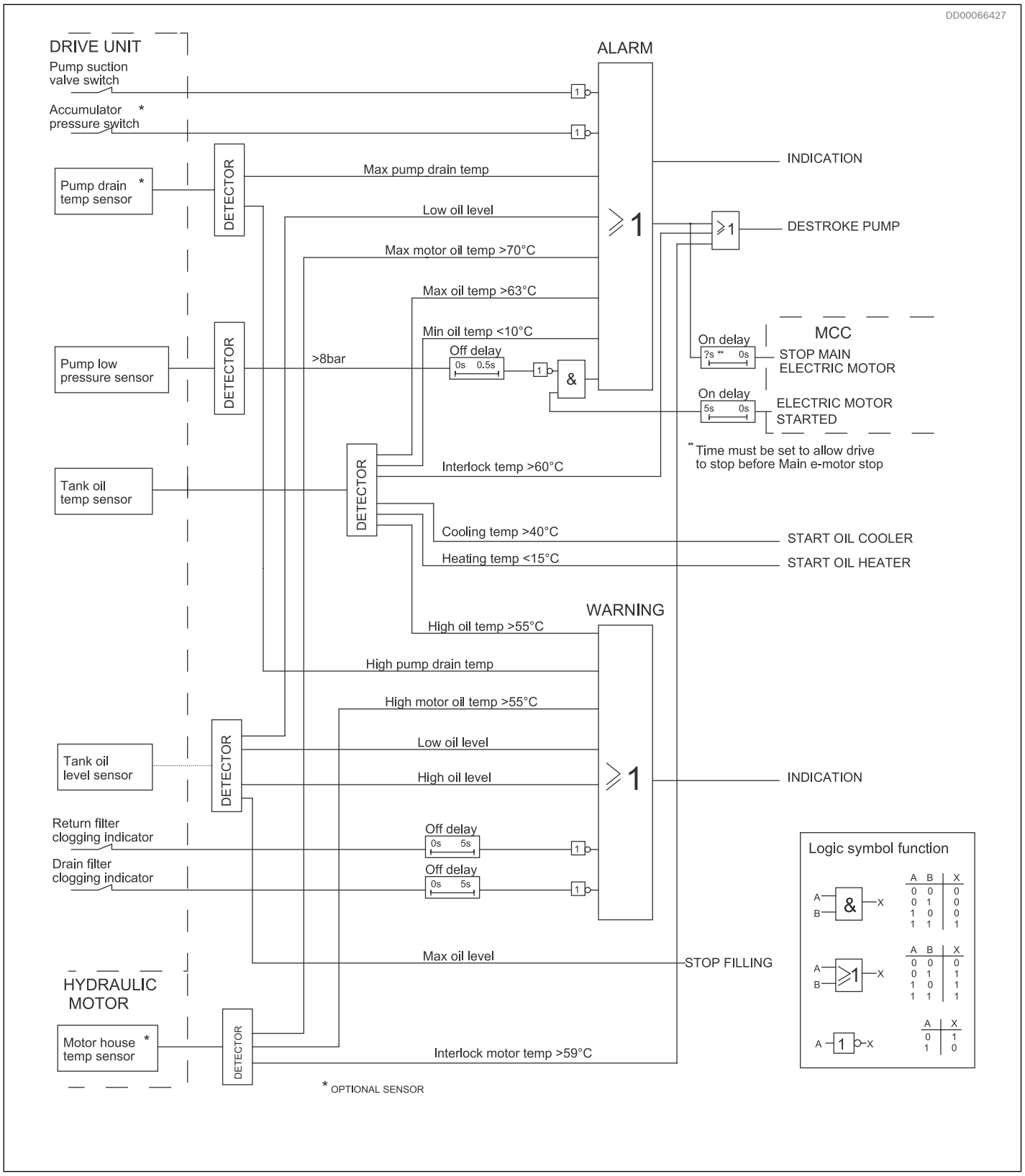

Fig. 3: Monitoring logic diagram

4 Technical data

4.1 Drive unit (DUe)

4.1.1 Weights

Table 3: Weight drive unit

Cabinet size	Weight without oil, electric motor, tank, top cover, pump and cooler	
	kg*	lb*
DUe S2	750	1 650
DUe S3	1 100	2 450
DUe M2	1 100	2 450
DUe M3	1 750	3 900
DUe L2	1 400	3 100
DUe L3	2 300	5 100

* Values are rounded to the higher number fifty.

Table 4: Weight top cover

Top cover height	Frame size	2 compartments		3 compartments	
mm		kg	lb	kg	lb
320	S	105	232	155	342
320	M	120	265	190	419
500	M	136	300	215	474
620	L	155	342	250	551
700	M	155	342	240	529
800	L	170	375	290	639
900	M	185	408	265	584
1 000	L	190	419	320	705
1 100	M	210	463	290	639
1 200	L	250	551	365	805
1 300	M	215	474	315	694
1 400	L	270	595	395	871
1 700	L	305	672	440	970
2 000	L	340	750	485	1 069

Table 5: Weight tank

Tank size	Weight	
l	kg	lb
120	130	287
255	160	353
350	180	397
505	230	507
765	245	540
835	285	628

Table 6: Weight electric motor

Siemens	Weight	
(kW)	kg	lb
11	83	183
15	100	220
22	170	375
30	240	529
37	285	628
45	320	705
55	420	926
75	570	1 257
90	670	1 477
110	760	1 676
132	960	2 116
160	990	2 183
200	1 190	2 623
250	1 326	2 923
315	1 653	3 644
355	2 026	4 467
400	2 116	4 665
500	2 296	5 062

Table 7: Weight replenishment (included electric motor, pump, and valve block)

		Electric motor	Pump size	Weight	
		kW	cc	kg	lb
Cold flushing		3	32	90	198
Warm and cold flushing		7.5	32 / 56	152	335
Brake circuit	15 bar			9	20
	60 / 200 bar	3	4/ 11	67	148

Table 8: Weight pump

Pump	Weight		Attachment kit	Weight	
	kg	lb		kg	lb
SP40	74	163	SP40 + SP40	4	9
SP71	98	216	SP71 + SP71	5	11
SP125	150	331	SP125 + SP125	10	22
SP180	158	348	SP180 + SP180	10	22
SP250	267	589	SP250 + SP250	25	55
SP355	277	611	SP355 + SP355	29	64
SP500	394	869	SP500 + SP500	33	73
SP750	540	1 191			

Table 9: Weight air cooler

Air cooler type	Weight	
	kg	**lb**
HDC 050-4	38	84
HDC 060-4	60	132
HDC 080-4	101	223
HDC 085-6	131	289
HDC 090-6	173	381
HDC 100-4	222	489
HDC 100-6	196	432
HDC 200-4	429	946
HDC 200-6	357	787

Table 10: Weight plate cooler

Cooler type	Weight	
	kg	lb
B015T-30	4	9
B025T-40	12	25
B025T-80	21	46
B120T-60	32	71
B120T-80	40	88
B120T-120	55	121

Table 11: Weight tube cooler

Cooler type	Weight	
	kg	lb
FC160	11	24
GK400	54	119
GK600	74	163
PK600	158	348

Example

Given:
Cabinet type, DUe M3 with 500mm top cover, 350 l tank and B25T-80 plate cooler.
Electric motors, Siemens 90 kW and 132 kW
Pumps, SP250 and SP250+SP125

Solution:
Weights from tables:
Power unit without e-motors and pumps 1 750 kg
Top cover 215 kg
Tank 180 kg
Cooler 21 kg
Electric motors, from table 670 kg and 960 kg
Pumps, from table 267 kg and 442 kg (267+150+25)

Total weight :
1 750+215+180+21+670+960+267+442=4 505 kg
Round the value to the higher number hundred: 4 600 kg

4.1.2 Positioning the DUe

The following space should be left free around the drive unit, to allow free ventilation and to provide sufficient working space for maintenance. Heavier maintenance such as change of motor/pump will demand more working space.
The drive units is recommended not be installed side by side without facing panels removed.
It is important that all pipes (both for water and hydraulics) are arranged to provide sufficient working space for maintenance.

Table 12: Recommended minimum space around DUe

Minimum space		mm	in
A_1 *)	min.	700	28
A_2 *)	min.	1 100	43
B	min.	1 500	59
C	min.	900	35
D	min.	200	8
E	min	300	12

*) The control unit (Spider) can be placed on either side of the cabinet. A_2 is needed on the spider side and A_1 is for the opposite side.

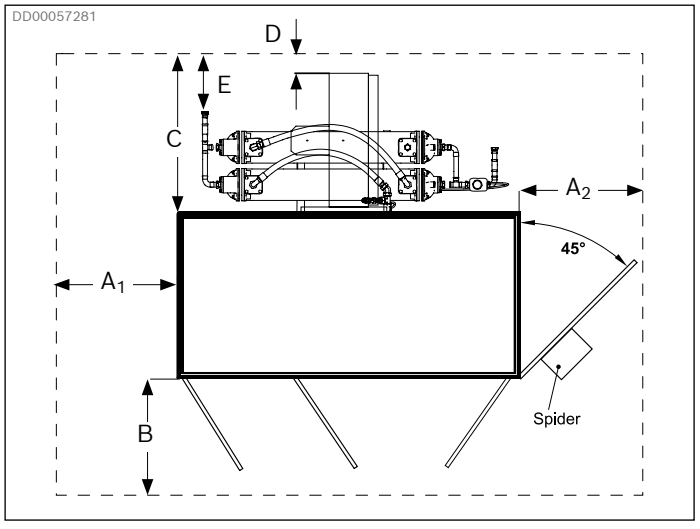

Fig. 4: Recommended minimum space around drive unit

4.1.3 Dimensions DUe

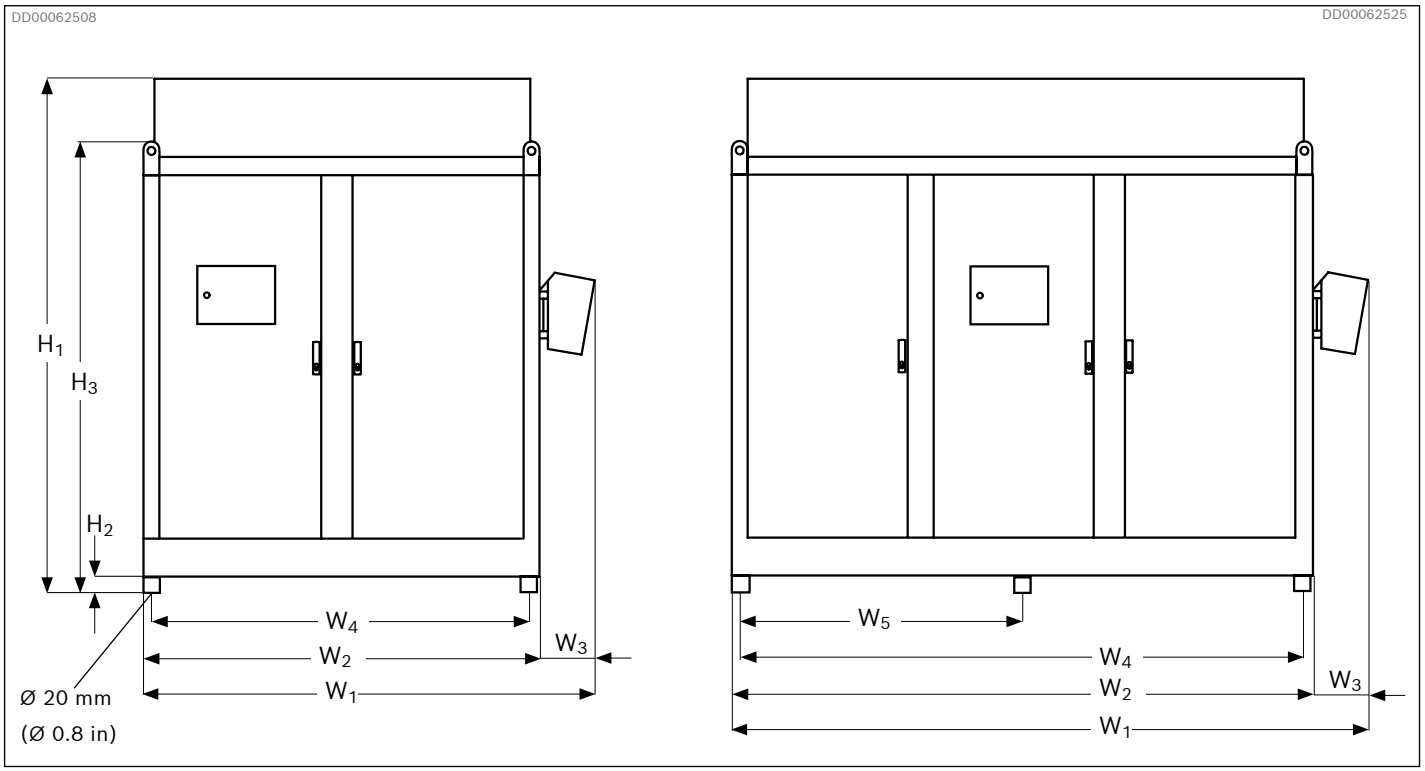

Fig. 5: Front view, example DUe with two compartments and DUe with three compartments

Table 13: Dimensions Hägglunds DUe

	Dimensions, height (H)*						Dimensions, width (W)									
Type	**H_1****		**H_2**		**H_3**		**W_1**		**W_2**		**W_3**		**W_4**		**W_5**	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
DUe S2	2 220	87.4	90	3.5	1 985	78.2	2 070	81.5	1 820	71.6	250	9.8	1 720	67.7	-	-
DUe S3	2 220	87.4	90	3.5	1 985	78.2	2 970	116.9	2 720	107.1	250	9.8	2 620	103.1	1 310	51.6
DUe M2	2 520/ 3 500	99.2/ 137.8	90	3.5	2 285	90.0	2 250	88.6	2 000	78.7	250	9.8	1 900	74.8	-	-
DUe M3	2 520/ 3 500	99.2/ 137.8	90	3.5	2 285	90.0	3 250	128.0	3 000	118.1	250	9.8	2 860	112.6	1 430	56.3
DUe L2	2 820/ 4 200	111.0/ 165.4	90	3.5	2 285	90.0	2 440	96.1	2 190	86.2	250	9.8	2 090	82.3	-	-
DUe L3	2 820/ 4 200	111.0/ 165.4	90	3.5	2 285	90.0	3 750	147.6	3 500	137.8	250	9.8	3 360	132.3	1 680	66.1

* Usage of machine feet will increase height with 30 mm (1.2 in).

** Min/max height (only one height on DUe S2 and S3)

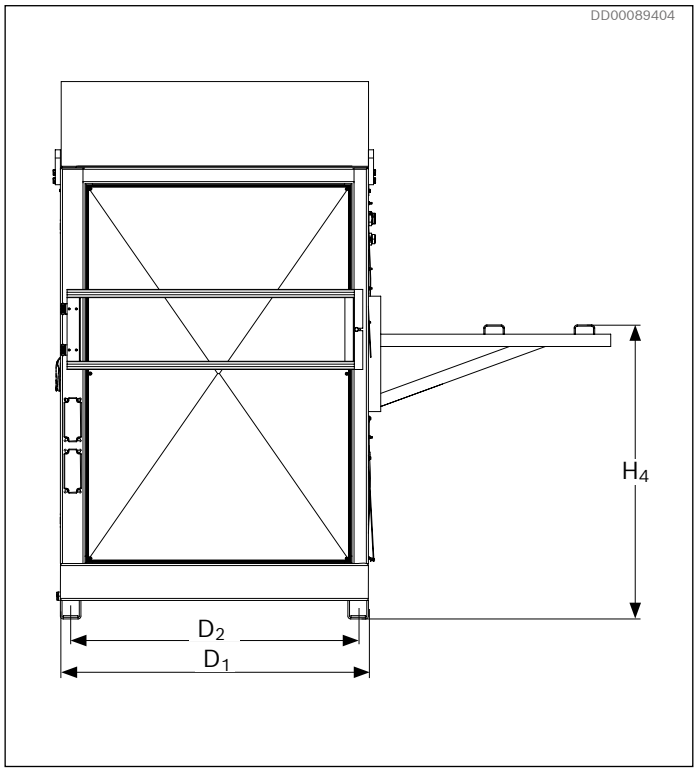

Fig. 6: Side view DUe

Table 14: Hägglunds DUe, frame depth

	Dimensions, depth (D)					
Type	**D_1 (frame)**		**D_2**		**H_4**	
	mm	in	mm	in	mm	in
DUe S2	1225	48.2	1125	44.3	1132	44.6
DUe S3	1225	48.2	1125	44.3	1132	44.6
DUe M2	1500	59.1	1400	55.1	1432	56.4
DUe M3	1500	59.1	1400	55.1	1432	56.4
DUe L2	1500	59.1	1400	55.1	1432	56.4
DUe L3	1500	59.1	1400	55.1	1432	56.4

4.1.4 Dimensions DUe with air-oil cooler

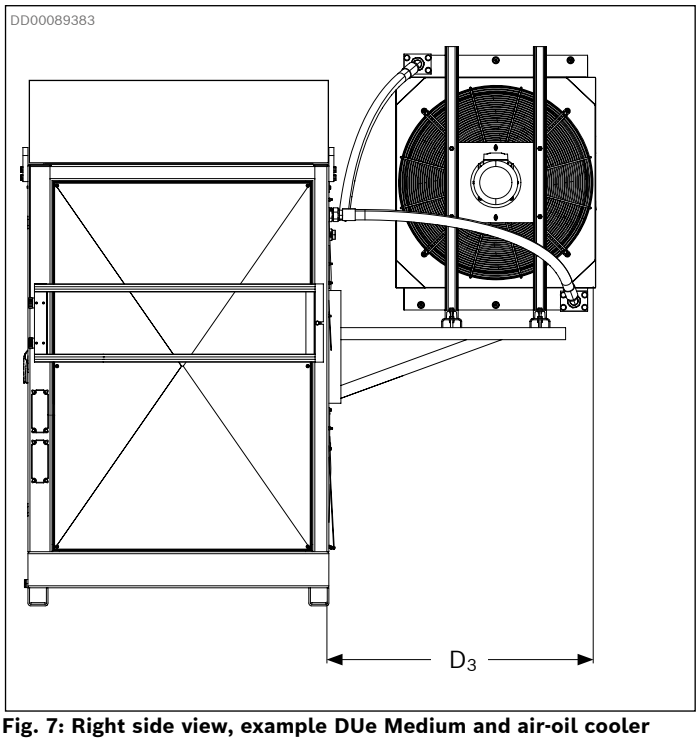

Fig. 7: Right side view, example DUe Medium and air-oil cooler

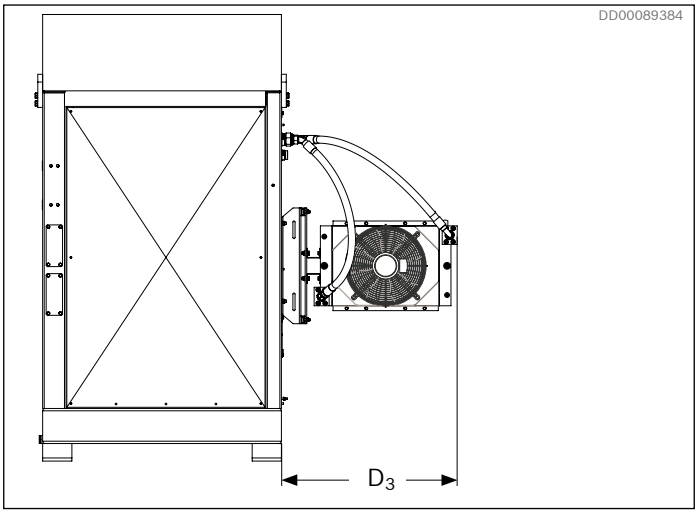

Fig. 8: Right side view, example DUe Small and air-oil cooler

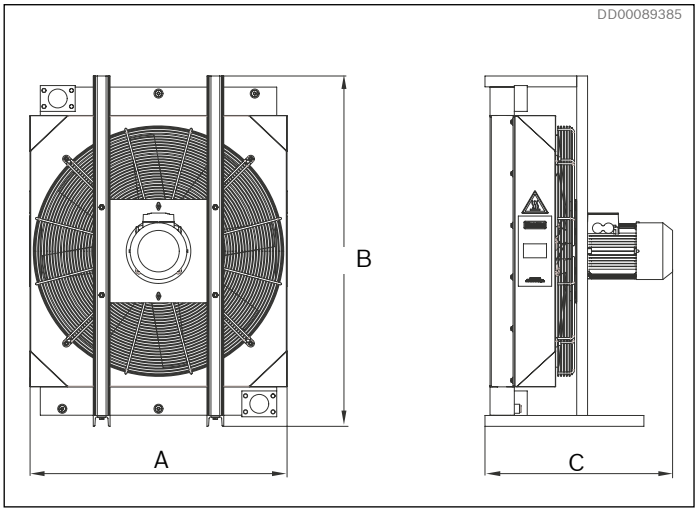

Fig. 9: HDC air-oil cooler

Table 16: Dimensions HDC air-oil cooler

Cooler size	A		B		C		D_3	
	mm	in	mm	in	mm	in	mm	in
HDC 050	460	18.1	772	30.4	473	18.6	902	35.5
HDC 060	607	23.9	815	32.1	609	24.0	1015	40.0
HDC 080	701	27.6	1035	40.7	711	28.0	1103	43.4
HDC 085	870	34.3	1046	41.2	678	26.7	1155	45.3
HDC 090	995	39.2	1356	53.4	707	27.8	1330	52.4
HDC 100	995	39.2	1356	53.4	726	28.6	1330	52.4
HDC 200	1286	50.6	1512	59.5	900	35.4	Not mounted	Not mounted

4.1.5 Dimensions DUe with water-oil plate cooler

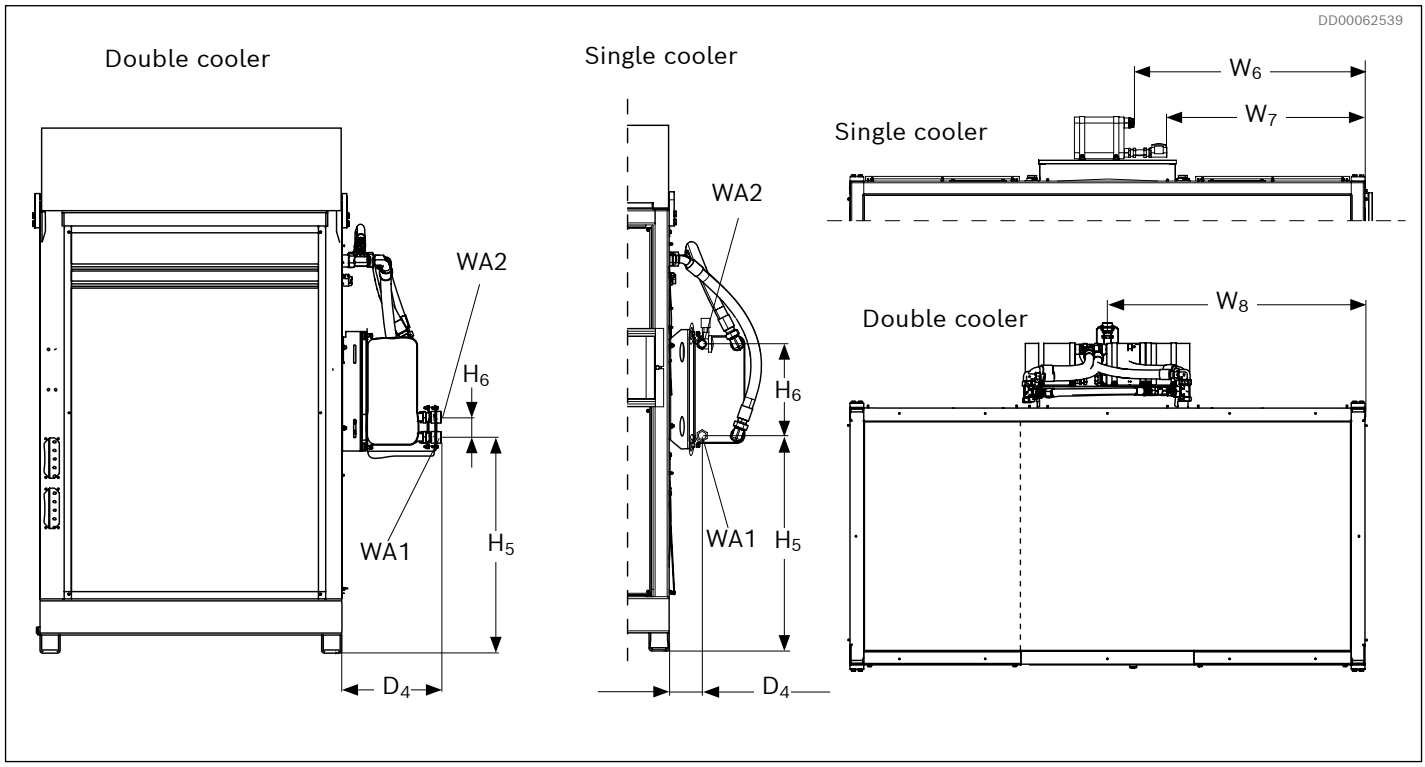

Fig. 10: Right side and top view, example DUe Medium and plate cooler

Table 17: Depth and width water-oil plate cooler mounted on Hägglunds DUe

	Dimensions, depth (D)				Dimensions, height (H)						Dimensions, width (W)					
Type	**D_4 single cooler**		**D_4 double cooler**		**H_5 single cooler**		**H_5 double cooler**		**H_6 single cooler**		**H_6 double cooler**		**W_6 single cooler**		**W_7 single cooler**		**W_8 double cooler**	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
DUe S2	153	6.0	–	–	772	30.4	–	–	See *Table 32 page 30*		–	–	1275	50.2	1027	40.4	–	–
DUe S3	153	6.0	–	–	772	30.4	–	–			–	–	1285	50.6	1037	40.8	–	–
DUe M2	153	6.0	493	19.4	1073	42.2	1073	42.2			100	3.9	1368	53.9	1120	44.1	509	20.0
DUe M3	153	6.0	493	19.4	1073	42.2	1073	42.2			100	3.9	1377	54.2	1129	44.4	1500	59.1
DUe L2	153	6.0	493	19.4	1073	42.2	1073	42.2			100	3.9	1548	60.9	1300	51.2	519	20.4
DUe L3	153	6.0	493	19.4	1073	42.2	1073	42.2			100	3.9	1537	60.5	1289	50.7	1750	68.9

4.1.6 Dimensions DUe with water-oil tube cooler

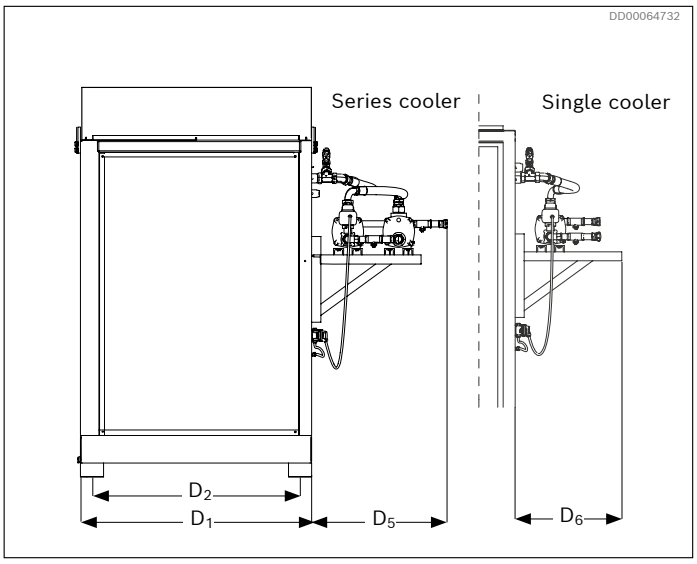

Fig. 11: Right side view example DUe M2, cooler, size 400

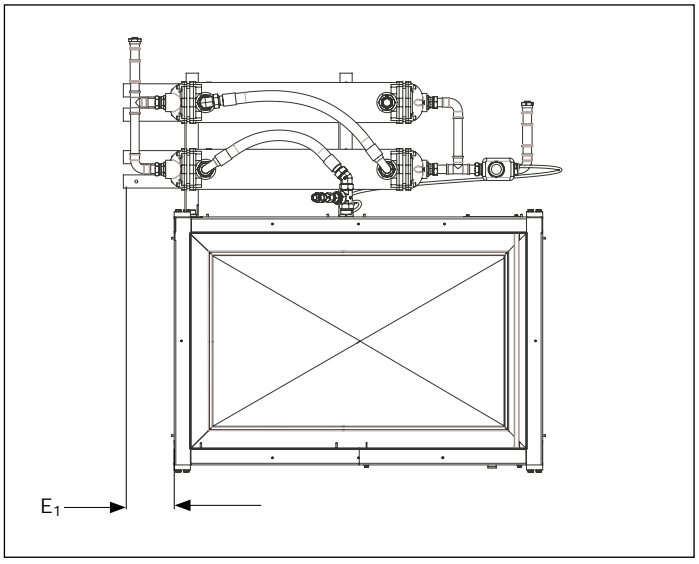

Fig. 12: Hägglunds top view example DUe S2 series cooler size 400

Table 18: Depth and width water-oil tube cooler mounted on Hägglunds DUe

	Dimensions, depth (D)							
Type	**D_5 Series mounted cooler**		**D_6 Bracket for all single mounted cooler**		**E_1 Tube cooler size 400**		**E_1 Tube cooler size 600**	
	mm	in	mm	in	mm	in	mm	in
DUe S2	879	34.6	710	27.9	251	9.9	760	29.9
DUe S3	879	34.6	710	27.9	---	---	---	---
DUe M2	879	34.6	710	27.9	163	6.4	676	26.6
DUe M3	879	34.6	710	27.9	---	---	---	---
DUe L2	879	34.6	710	27.9	153	6.0	662	26.1
DUe L3	879	34.6	710	27.9	---	---	---	---

4.1.7 Connections

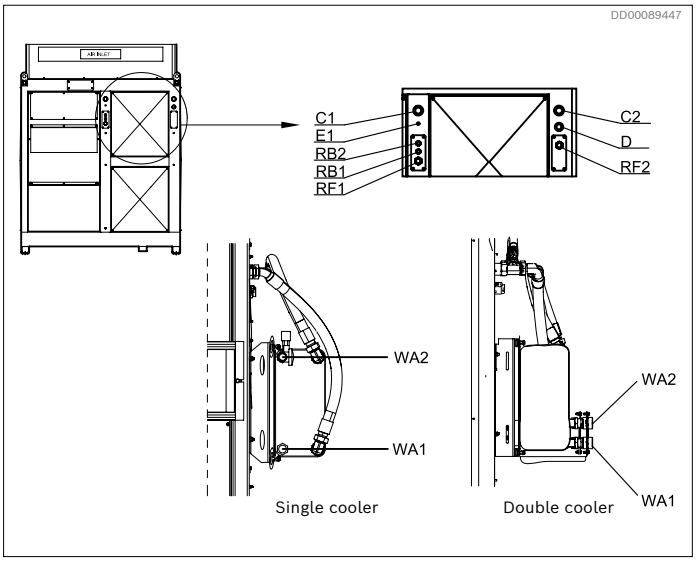

Fig. 13: Connections DUe

Table 19: Pump connections

Pump type	Dimensions main connection A&B	Thread
SP40	3/4" SAE J518C FLANGE CODE 62 - 6000 PSI	3/8“-16 UNC
SP71	1" SAE J518C FLANGE CODE 62 - 6000 PSI	7/16"-14 UNC
SP125	1 1/4" SAE J518C FLANGE CODE 62 - 6000 PSI	1/2"-13 UNC
SP180		
SP250	1 1/2" SAE J518C FLANGE CODE 62 - 6000 PSI	5/8-“11 UNC
SP355		
SP500	2" SAE J518C FLANGE CODE 62 - 6000 PSI	3/4“-10 UNC
SP750		

Comment: Connection directly at pump

Table 20: Connections DUe

		Optional BSP	Function
C1 **C2**	ISO 8434-1 42L Male	1½″	Oil OUT to cooler Oil IN from cooler
RF1 **RF2**	ISO 8434-1 28L Male	1″	Oil OUT flushing with separate pump Oil OUT flushing with check valve
RB1 **RB2**	ISO 8434-1 12L Male	⅜″	Oil OUT to brake 1 Oil OUT to brake 2
D	ISO 8434-1 35L Male	1¼″	Drain from hydraulic motor(s)
E1	Ø 17 mm		Cable gland opening for cable to water valve
WA1 **WA2**	1″ BSP Female (B25T) single cooler		Water IN to cooler Water OUT from cooler
	1¼″ BSP Female (B120T) single cooler		
	1½″ BSP Female (serial connected cooler)		
	1½″ BSP Female (GK400, GK600, PK600)		

4.1.8 DUe oil pan volume

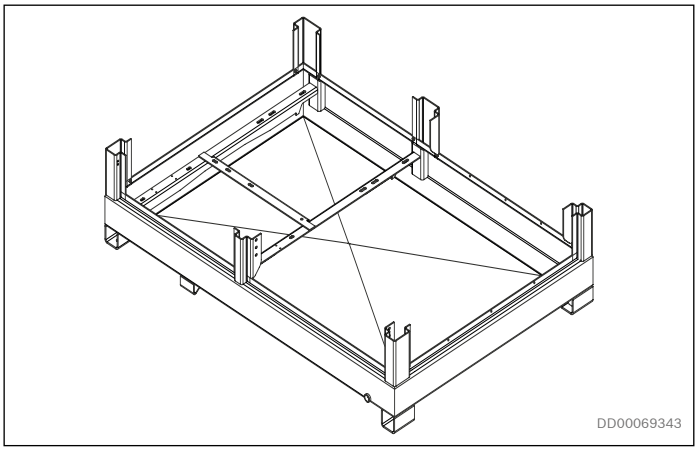

Fig. 14: Oil pan

Table 21: Oil pan volume

DUe S2	DUe S3	DUe M2	DUe M3	DUe L2	DUe L3
365 L	545 L	500 L	755 L	550 L	870 L
96 gal	144 gal	132 gal	199 gal	145 gal	230 gal

4.2 Main components

4.2.1 Electric motor

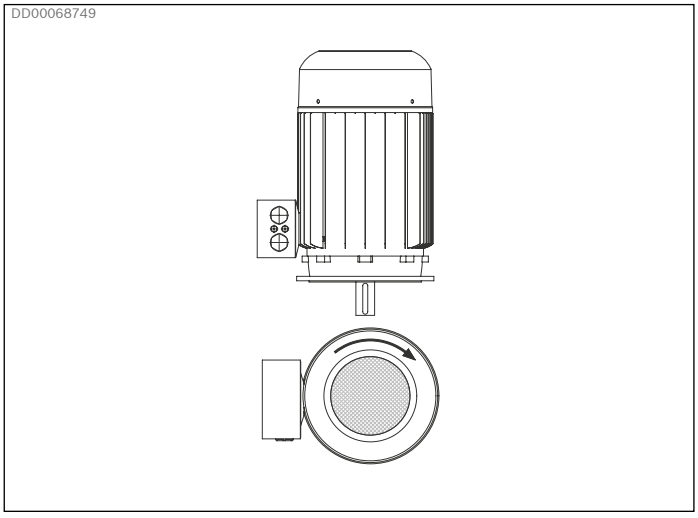

Fig. 15: Electric motor

Function
The electric motor is a totally enclosed, fan cooled TEFC squirrel-cage, 4-pole 3-phase motor

If the Hägglunds DUe will be operating in damp enviroment, it is advised to use an anti condensation heater to reduce the risk of short circuit in the electric motor.
The electric motors used as standard in the drive unit are manufactured by Siemens.

Output power
3-500kW

Voltage Frequency

380 VD 50 Hz	440 VD 60 Hz
400 VD / 690 VY 50 Hz	460 VD 60 Hz
415 VD 50 Hz	480 VD 60 Hz

Technical data

Table 22: Technical data electric motor

Operating Duty:	S1
Method of mounting:	B5/V1
Degree of protection:	IP55 (Motor and conn.box)
Cooling form:	IC411, fan cooler.
Insulation class:	F/B
Motor protection:	3 PTC thermistors, 150ºC, in stator winding
Greasing:	Grease nipples for bearing D and N side, Type H1, acc. to DIN 71412
Heater elements:	230 VAC
Painting:	Corrosion class C3
Sound press. level Lp:	≤ 85 dB(A) acc. to IEC 60034-9

Standards

Table 23: Standards electrical motor

Standard	IEC/EN 60034
EU Efficiency classes:	According to IEC 60034-30, 3-500 kW, Efficiency class IE3.
Certificate:	Type approval test certificate type 3.1 according to EN 10-204 (on request)

Conditions, voltage
The motors can withstand a continuous voltage deviation of 5% and a maximum deviation of up to 10% for a short time.

Conditions, altitude
Ambient temperature: -20°C - +40°C (-4°F - +104°F).
Altitude above sea level: 1000 m.

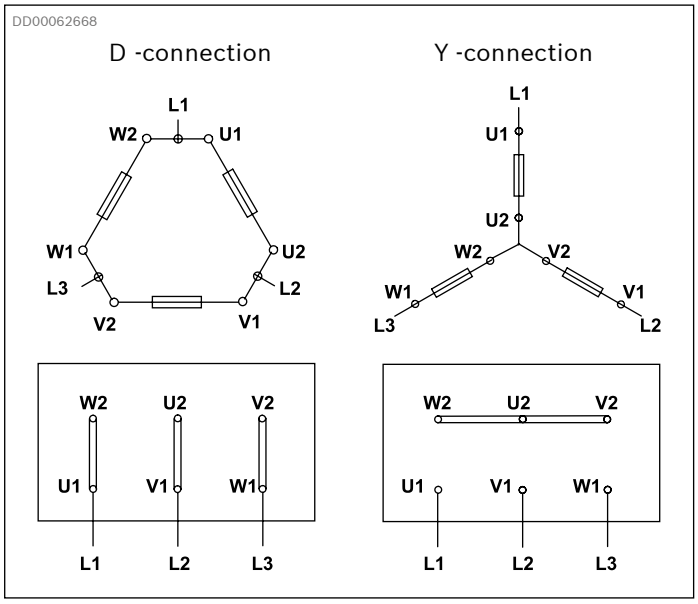

Fig. 16: D and Y connections

D and Y -connections

The three windings of the motor can be connected inside the terminal box to the three phase supply net in two different ways, Y-(star-) or D-(Δ-) connection.

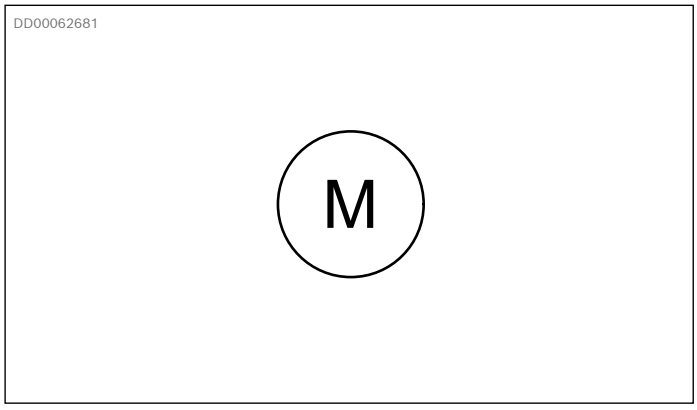

Fig. 17: Hydraulic symbol

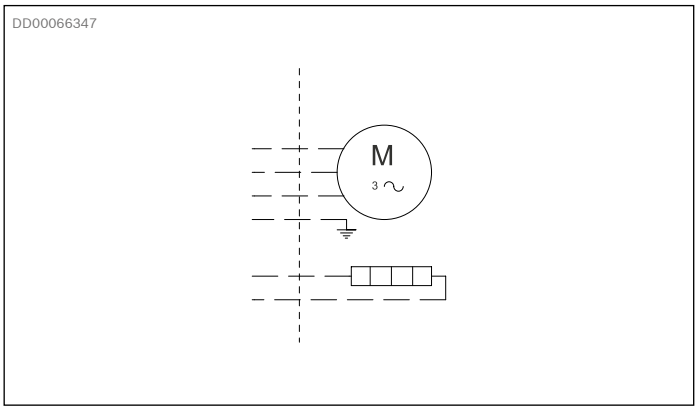

Fig. 18: Electrical symbol

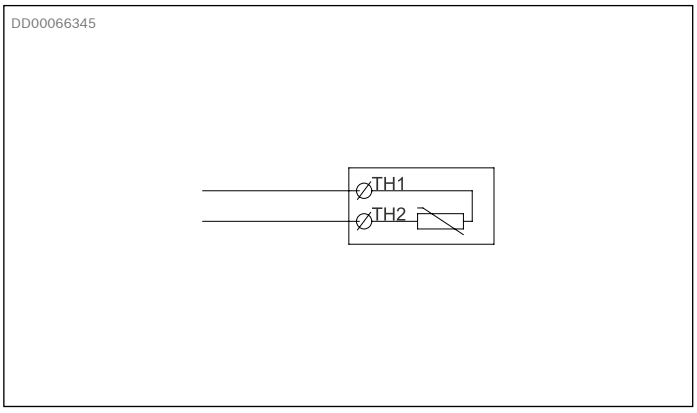

Fig. 19: Electrical symbol (thermistor)

4.2.2 Main pump SP

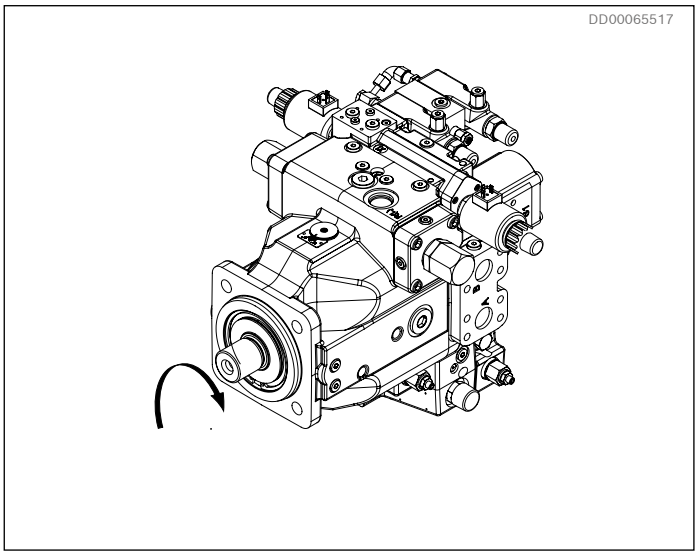

Fig. 20: Pump SP size 40 to 180

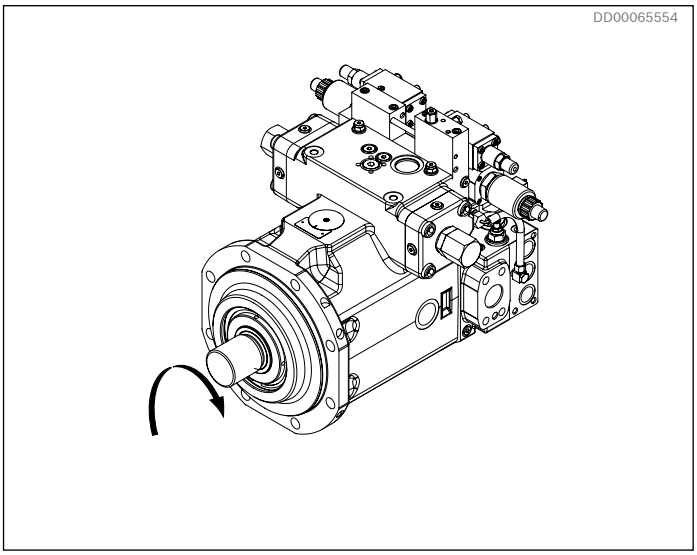

Fig. 21: Pump SP size 250 to 750

Functions

Variable displacement axial piston pump of swashplate design for hydrostatic closed circuit transmissions

- Flow is proportional to speed and displacement and is infinitely variable through adjustment of the swivel angle
- Output flow increases with swivel angle from 0 to its maximum value
- Swivelling the pump over centre smoothly changes the direction of flow
- A highly adaptable range of control and regulating devices are available
- The pump is equipped with two pressure relief valves on the high pressure ports to protect the hydrostatic transmission (pump and motor) from overloads
- One common pump for charge and EP displacement control
- Compact overall design
- Low noise level
- Long service life
- High efficiency
- Throughdrive for multiple pump combinations also possible with integrated charge pump up to 100%
- SP pumps can be tandem mounted to the same electric motor in combinations according to *Table 2*

Charge pump and control valves

- Auxillary for SP 40 to SP 180
- Integrated for SP 250 to SP 750

Operating pressure range

Depending on the behaviour of the transmitted hydraulic energy in the system, charge pressure fluctuations can occur. In order to prevent damage to the system, charge pressure protection, which monitors the static charge pressure part is necessary. Port M_{K4} is suitable to monitor the charge pressure. It is recommended to check regularly the charge pressure for the permissible max. and min. spikes with suitable measuring equipment.

In order to prevent excessive charge pressure spikes, a low pressure accumulator can be connected to port K_4. Accumulator sizing as well as the selection for the best connecting location depend on the system behaviour and the operating conditions under consideration of the available charge flow. Depending on the total systems leakage flow, it may be necessary to increase the charge flow by means of a larger or additional charge pump, see Inlet pressure at port S_1 (auxiliary pump).

Table 24: Operating pressure range, according to DIN 24312

Inlet operating pressure	**bar**
Required static charge pressure (M_{K4}), $p_{c\ min}$	15
Heavy duty pressure, $p_{c\ max}$	20
Static charge pressure (short periods), relief valve setting, $p_{c\ min.}$ Min.	8
Static charge pressure, $p_{c\ max.}$ Max.	20
Dynamic charge pressure (fluctuations) Min.	4
Dynamic charge pressure (fluctuations) Max.	40
Inlet pressure at port S1 (auxiliary pump) Ps. Min.	≥ 0,8 bar abs
Inlet pressure at port S1 (auxiliary pump) Ps. Max.	2
Outlet operating pressure, variable pump Pressure at port A or B	**bar**
Nominal pressure p_N	350
Peak pressure p_{max}	400
Case drain pressure Max. case pressure (housing pressure):	**bar**
$p_{L\ continous}$	5
P_L max	8
*T1 ,T2 and T3 must be unloaded to tank.	

*Only for SP 40 - SP 180

EP - Electro-hydraulic control with proportional solenoid

The EP control adjusts the pump displacement proportional to the solenoid current. The pump displacement is therefore step-less variable. One proportional solenoid is assigned to each direction of flow.

Operating voltage: 24 V
Nominal current: 800 mA
Current range 210...740 mA
Nominal resistance at 20 °C: 21 Ω

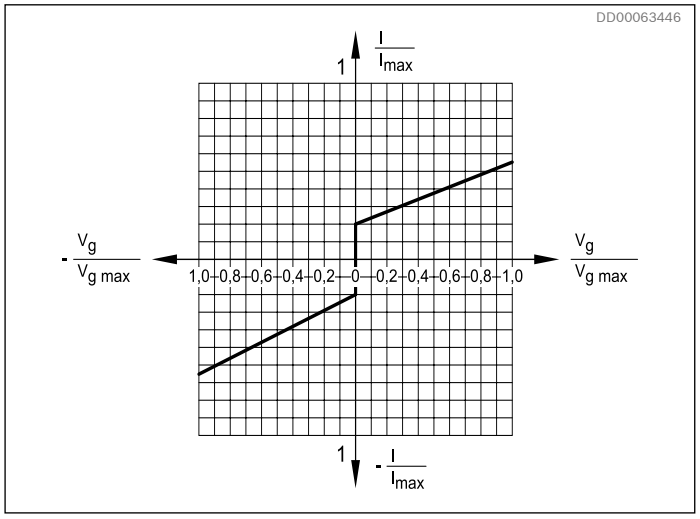

Fig. 22: EP, hydraulic control

Hydraulic circuit

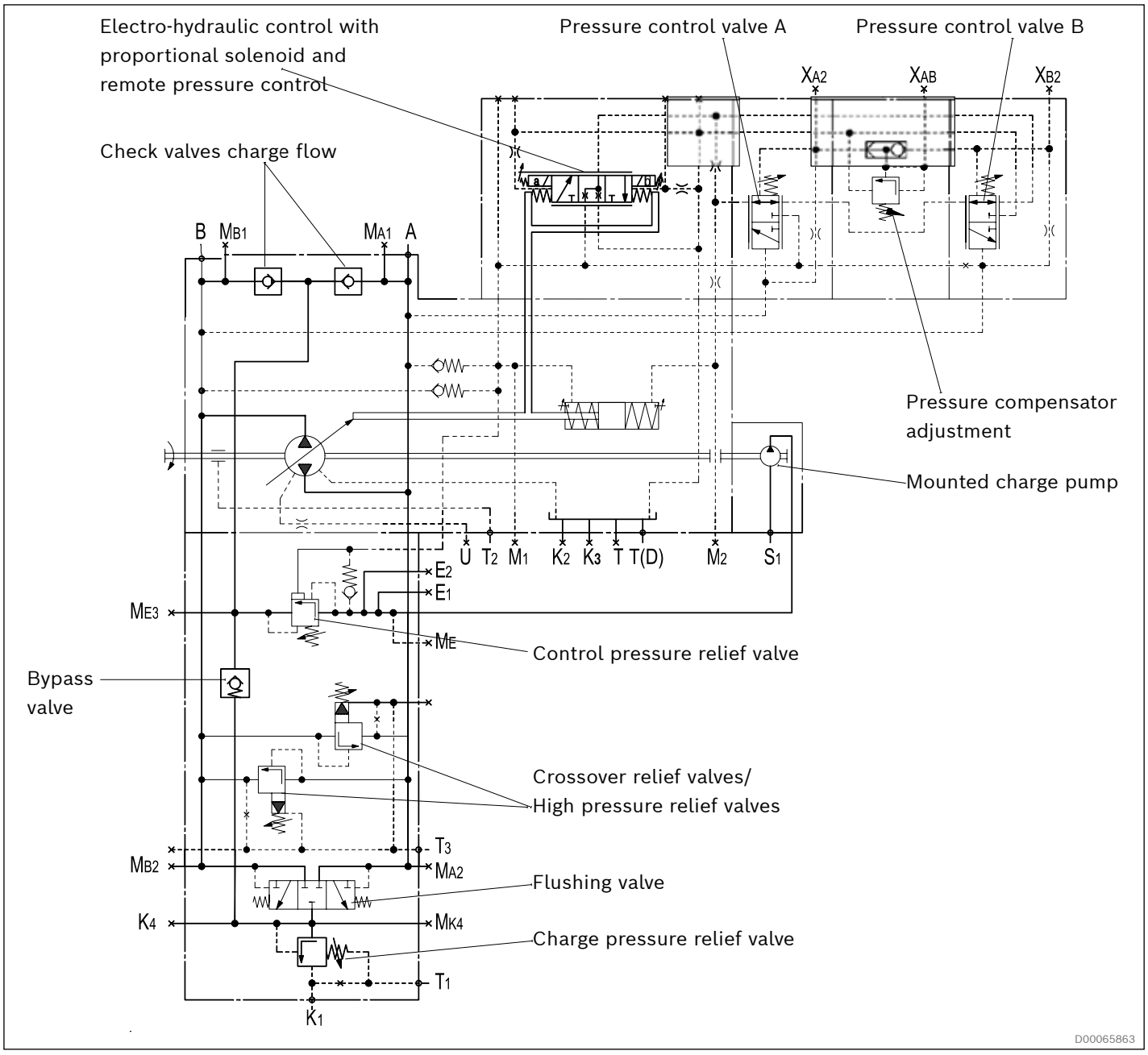

Fig. 23: Principal hydraulic circuit for SP pump size 40-180

Table 25: Ports

Ports	Description	Ports	Description
A, B	Pressure port	M_E, M_{E3}	Test points charge pressure
S	Inlet port	K_4	Accumulator port
M_{A1}, M_{A2}, M_{B1}, M_{B2}	Test points operating press.	M_{K4}	Test point charge pressure
T, K_2, K_3	Oil drain port	M_1, M_2	Test point control pressure
E_1	Brake function	X_{A2}, X_{B2}, X_{AB}	Ports for remote pressure pilot valves
K_1	Return flow	T_1, T_3	Ports for unloading of high pressure relief valves and charge pressure relief valve.
T(D)	Measure point	T_2	Port for unloading of shaft seal
U	Bearing flushing port/air bleed port		

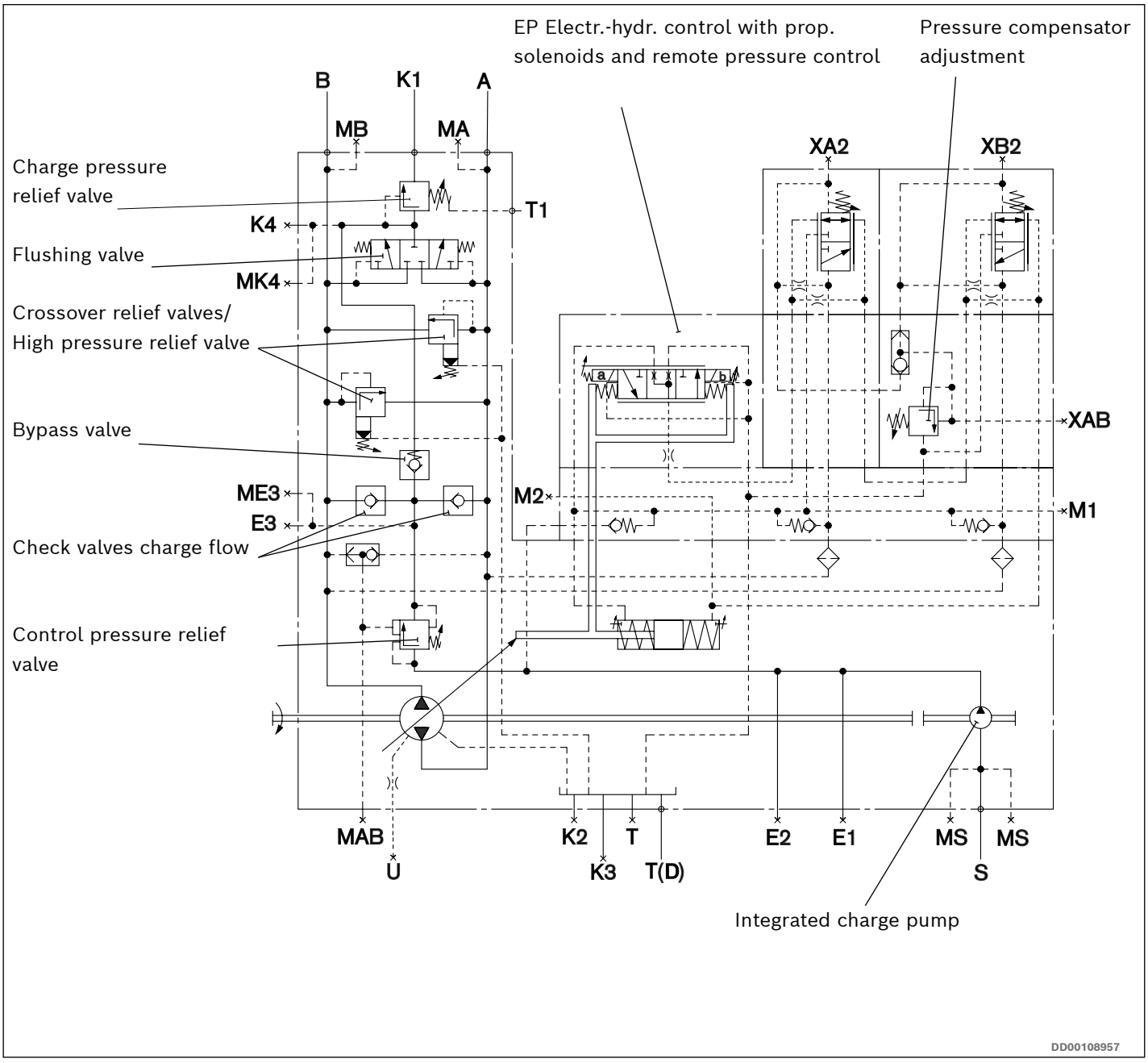

Fig. 24: Principal hydraulic circuit for SP pump size 250-750

Table 26: Ports

Port	Description	Port	Description
A, B	Pressure ports	M_{E3}	Measuring port ex. charge pressure
S	Inlet port	M_{K4}	Measuring port flushing pressure
E_1	To charge filter (optional)	M_1, M_2	Measuring ports control pressure
E_2	From charge filter (optional)	T(D)	Measure point
E_3	External charge port	T, K_2, K_3	Oil drain port
K_1	Return flow	T_1	Drain port pressure relief valve
K_4	Accumulator port	U	Bearing flushing port/air bleed port
M_A, M_B, M_{AB}	Measuring ports operating pressure	X_{A2}, X_{B2}, X_{AB}	Pilot port pressure control
M_S	Measuring port inlet pressure		

Technical data

Table 27: Technical data SP 40-180

Size				**40**	**71**	**125**	**180**
Displacement	Variable pump	$V_{g\ max}$	cm^3	40	71	125	180
	Auxiliary pump	$V_{g\ H}$	cm^3	20	25	38	45
Speed	max. speed	n_{max}	rpm	3 000	3 000	2 600	2 400
	min. speed	n_{min}	rpm	500	500	500	500
Flow	at n_{max}	$o_{v\ max}$	l/min	120	213	325	432
	at n_E=1500 rpm		l/min	60	107	188	270
Power, max. at (Dp=350 bar)	at $n_{o\ max}$	$P_{o\ max}$	kW	86	132	190	252
	at n_E=1500 rpm		kW	35	62	109	158
Torque at $V_{g\ max}$	Dp=350 bar	T_{max}	Nm	223	395	696	1 002
Variable pump (without aux.pump)	Dp=100 bar	T	Nm	64	113	199	286
Moment of inertia about drive axis		J	kgm^2	0.0049	0.0121	0.03	0.055
Case volume			l	2	2,5	5	4

Table 28: Technical data SP 250-750.

Size				**250**	**355**	**500**	**750**
Displacement	variable pump	$V_{g\ max}$	cm^3	250	355	500	750
	charge pump	$V_{g\ max}$	cm^3	63	80	98	143
Speed	max. speed	n_{max}	min^{-1}	2 200	2 000	1 800	1 600
	min. speed	n_{min}	min^{-1}	800	800	800	800
Flow	at n_{max}	$q_{V\ max}$	l/min	550	710	900	1 200
	at n_E=1500 min^{-1}	$q_{VE\ max}$	l/min	375	533	750	1 125
Power , max. at (Dp = 350 bar)	at n_{max}	P_{max}	kW	321	414	525	700
	at n_E=1500 min^{-1}	$P_{E\ max}$	kW	219	311	438	656
Torque at $V_{g\ max}$	Dp = 350 bar	T_{max}	Nm	1 391	1 976	2 783	4 174
Variable pump (without aux. pump)	Dp = 100 bar	T	Nm	398	564	795	1 193
Moment of inertia about drive axis		J	kgm^2	0.0959	0.19	0.3325	0.66
Case volume			l	10	8	14	19

Bearing flushing

For the following operating conditions bearing flushing is required for reliable continuous operation:

- Applications with special fluids (non mineral oils), due to limited lubricity and narrow operating temperature range
- Operation with critical conditions of temperature and viscosity with mineral oil

Flushing is carried out via U-port, which is located in the front flange area of the pump. The flushing oil flows through the front bearing and leaves the system together with the leakage oil at the case drain port.

Recommended flushing flows for the various pump sizes: These flushing flows create a pressure drop of approximately 3 bar between U-port and pump housing (including fitting).

Note. When using bearing flushing at U-port the throttle screw, which can be found at U-port, has to be turned in all the way to the stop.

Table 29: Recommended flushing flows

Size	Flushing flow, q_{fl} l/min
40	3
71	4
125	5
180	7
250	10
355	15
500	20
750	30

Table 30: Installed electric motor power when flushing is needed

Size	Installed electric motor power, kW	Installed electric motor power, hp
40	50	67
71	69	93
125	108	145
180	133	178
250	186	249
355	242	324
500	303	406
750	445	597

Charge pressure and control valves

High pressure relief valves

Two pilot operated relief valves that prevent pump damage from excessive pressure levels. Each pressure side has its own relief valve, which is vented to the low pressure side of the loop.

Charge pressure relief valve

The charge pressure relief valve is direct operated.
T_1 needs external drain.
Setting pressure range: 12-21 bar (174-305 psi).
Standard setting 15 bar (218 psi).

Control pressure relief valve

Control pressure relief valve is direct operated with unloading function.
Setting pressure range: 30-45 bar (435-653 psi)
Normal setting range: 35-42 bar (508-610 psi) depending on pump size.

4.2.3 Water-oil cooler - plate type

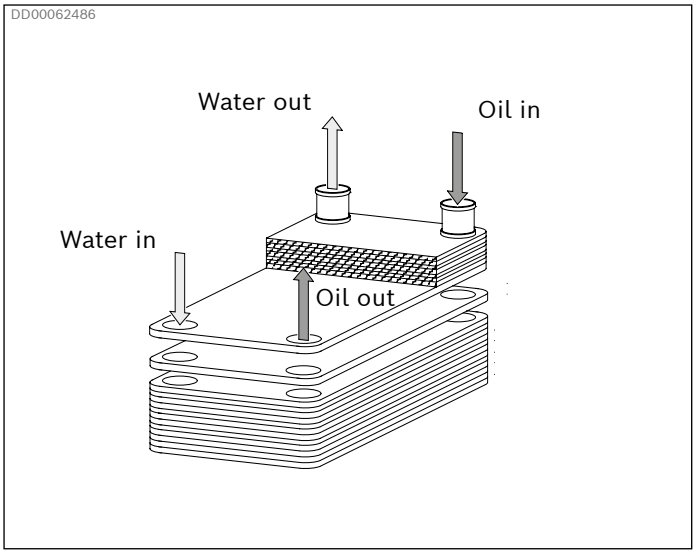

Fig. 25: Plate cooler function

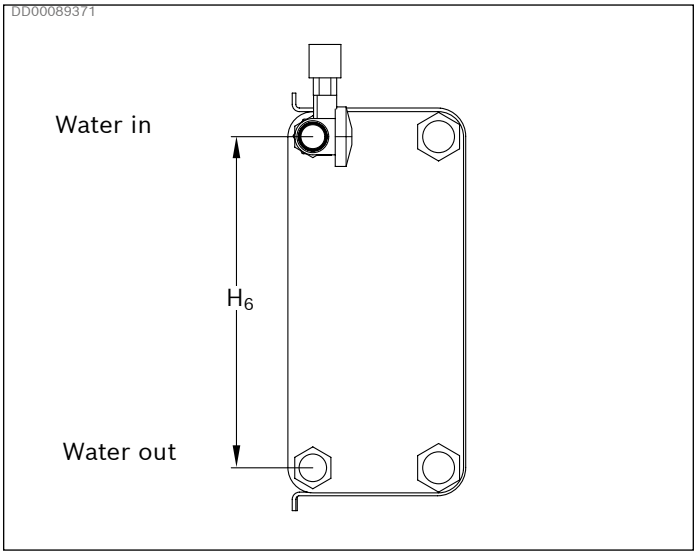

Fig. 26: Water connections plate cooler

Function

The plate water-oil cooler consists of pattern-embossed plates. The pattern is reversed on every other plate so that the ridges on adjacent plates intersect with each other, creating a lattice of contact points. All to achieve a turbulent flow. The oil and the water is flowing in opposite directions through the cooler.
The water flow is switched on and off by a temperature controlled valve. The water used for plate cooler needs to be of the type process water, otherwise there is a risk for the cooler being contaminated.

Table 31: Material Plate cooler

Part	Material
Plates	EN 10028/7-1.4401 (AISI 316)
Brazing	Pure copper
Connections	EN 10272-1.4401 (AISI 316)

Recommended max temperature

For oil viscosity 68 cSt the maximum recommended temperature of the inlet oil is limited to 63 °C (145 °F) and for 100 and 150 cSt limited to 66 °C (151 °F).
The temperature is limited by:

- The life of the hydraulic motor
- The recommended min. viscosity of the hydraulic fluid

Table 32: Dimensions water connections

Cooler size	H_6	
	mm	in
B15-30	432	17,01
B25T-40	479	18.86
B25T-80	479	18.86
B120T-60	456	17.95
B120T-80	456	17.95
B120T-120	456	17.95

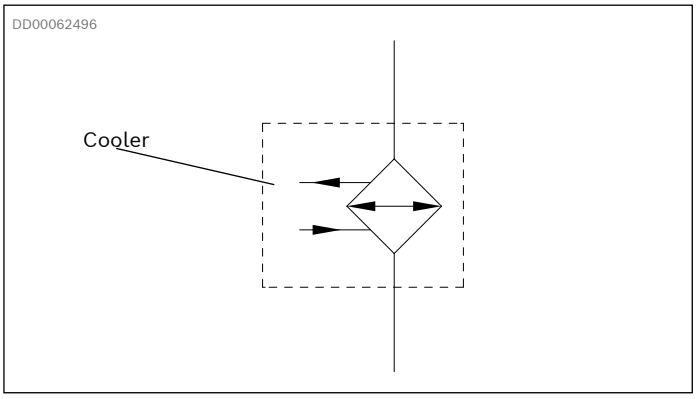

Fig. 27: Hydraulic symbol

Water connection

Recommended water pressure over cooler: 3.5 bar.
Max allowed water pressure: 16 bar
Stainless steel water pipes are recommended to avoid corrosion. If other material is used, galvanic isolation is required between the stainless steel connections and water piping.
If the drive unit is equipped with rubber feets, flexible hoses are recommended between water connections and water piping

Influence of water composition on corrosion resistance

The guide below is to give a picture of the corrosion resistance of stainless steels and brazing materials in tap water at room temperature.

Explanations: + = Good resistance under normal conditions
0 = Corrosion problems may occur especially when more factors are valued 0
- = Use is not recommended

Table 33: Acceptable water chemical content

Water content	Concentration (mg/l or ppm)	Time limits Analyze before	AISI 316	Copper
Alkalinity (HCO_3)	< 70	Within 24 h	+	0
	70-300		+	+
	> 300		+	=/+
Sulfate * (SO_4^2)	< 70	No limit	+	+
	70-300		+	0/-
	> 300		+	-
HCO_3 / SO_4^2	< 1.0	No limit	+	+
	> 1.0		+	0/-
Electrical conductivity	< 10 µS/cm	No limit	+	0
	10-500 µS/cm		+	+
	> 500 µS/cm		+	0
pH **	< 6.0	Within 24 h	0	0
	6.0-7.5		+	0
	7.5-9.0		+	+
	> 9.0		+	0
Ammonium (NH_4^+)	< 2	Within 24 h	+	+
	2-20		+	0
	> 20		+	-
Chlorides (Cl) at 60° At 80° the Cl value is limited to 150 ppm.	< 100	No limit	+	+
	100-200		+	+
	200-300		+	+
	> 300		-	0/+
Free chlorine (Cl_2)	< 1	Within 5 h	+	+
	1-5		-	0
	> 5		-	0/-
Hydrogen sulfide (H_2S)	< 0.05	No limit	+	+
	> 0.05		+	0/-
Free (aggressive) carbon dioxide (CO_2)	< 5	No limit	+	+
	5-20		+	0
	> 20		+	-
Total hardness (°dH)	4.0-8.5	No limit	+	+
Nitrate * (NO_3)	< 100	No limit	+	+
	> 100		+	0
Iron *** (Fe)	< 0.2	No limit	+	+
	> 0.2		+	+
Aluminium (Al)	< 0.2	No limit	+	+
	> 0.2		+	0
Manganese *** (Mn)	< 0.1	No limit	+	+
	> 0.1		+	0

* Sulfates and nitrates works as inhibitors for pitting corrosion caused by chlorides in pH neutral environments
** In general low pH (below 6) increase corrosion risk and high pH (above 7.5) decrease the corrosion risk
*** Fe3+ and Mn4+ are strong oxidants and may increase the risk for localised corrosion on stainless steels SiO2 above 150 ppm increase the risk of scaling

4.2.4 Water-oil cooler - tube type

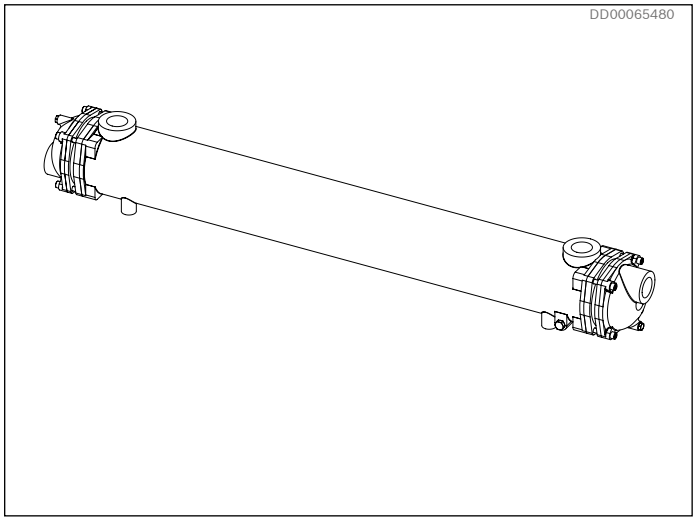

Fig. 28: Tube cooler

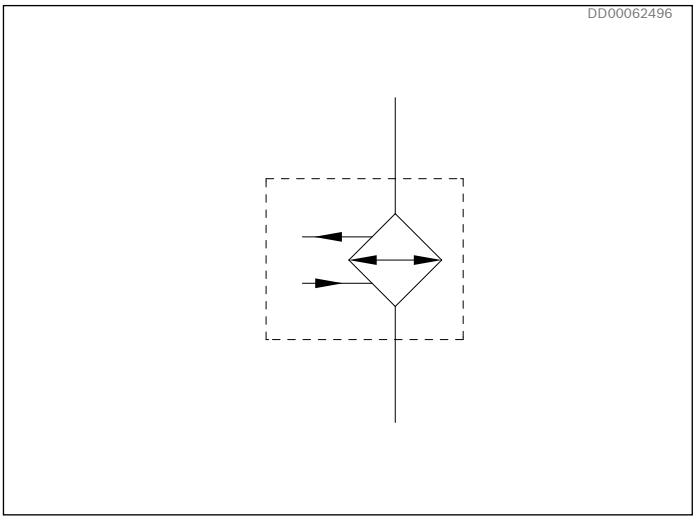

Fig. 29: Hydraulic symbol

Function

The tube water-oil cooler consists of several tubes in a tubestack for heat exchange. The tube cooler is easy to clean and it is suitable for contaminated water.
The oil and water is flowing in opposite directions.
The water flow is switched on and off by a temperature controlled valve.

Table 34: Material tube cooler

Part	Material
Housing:	Aluminium
End cover:	Cast iron
Tube stack:	90/10 Cu.NI

Table 35: Acceptable water chemical content

Chemical	Level
Free Chlorine	1.0 - 3.0 ppm
Calcium Hardness	200 - 400 ppm
pH	7.2 -7.8
Alkalinity	100 - 150 ppm
Bromine	2.0 - 4.0 ppm
Chloride	> 150 ppm

Recommended max temperature

For oil viscosity 68 cSt the maximum recommended temperature of the inlet oil is limited to 63 °C (145 °F) and for 100 and 150 cSt limited to 66 °C (151 °F).
The temperature is limited by:

- The life of the hydraulic motor
- The recommended min. viscosity of the hydraulic fluid

Water connection

Recommended water pressure over cooler: 3.5 bar.
Max allowed water pressure: 16 bar
Stainless steel water pipes are recommended to avoid corrosion. If other material is used, galvanic isolation is required between the stainless steel connections and water piping.
If the drive unit is equipped with rubber feets, flexible hoses are recommended between water connections and water piping

4.2.5 Hägglunds HDC cooler (air-oil cooler)

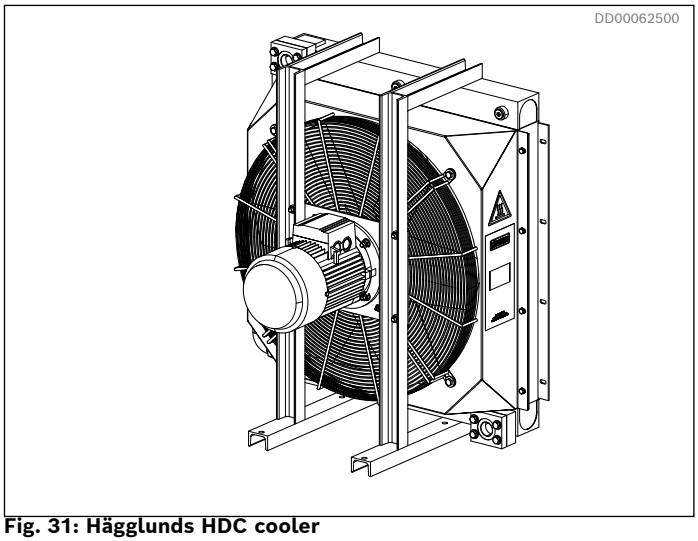

Fig. 31: Hägglunds HDC cooler

Function

- The air-oil cooler consists of a fan driven by an electric motor, blowing air through the cooler matrix.
- The cooling pipes are made by extruded aluminium sections. They are flat with narrow short sides to expose a maximum heat-emitting area and to allow low air pressure drop.
- The electric motor is a 3-phase asynchronous motor.
- An 8 bar bypass valve is always installed inside the DUe between the inlet and outlet of the cooler.
  An extra bypass valve is mounted directly on the cooler under following conditions
  -When the cooler is mounted separately and the ambient temperature is below 0°C.
  -When the cooler is mounted on the unit and the ambient temperature is below -20°C ,

Note!

When the air-oil cooler is separated from the Power unit, the pressure drop through the piping hoses is not allowed to exceed 1 bar (14 psi). Always applicable for size HDC 200.

Recommended max temperature

For oil viscosity 68 cSt the maximum recommended temperature of the inlet oil is limited to 63 °C (145 °F) and for 100 and 150 cSt limited to 66 °C (151 °F).
The temperature is limited by:

- The life of the hydraulic motor
- The recommended min. viscosity of the hydraulic fluid

Mechanical data

Electric motor:

- Insulation: Class F
- Temperature rise: Class B
- Protection standard: IP55

Table 36: Oil volume

Cooler Type	Oil volume of the cooler	
	l	gal
HDC 050	5.7	1.51
HDC 060	8.7	2.30
HDC 080	17.7	4.68
HDC 085	15.5	4.09
HDC 090	28.6	7.56
HDC 100	32.7	8.64
HDC 200	54.8	14.48

Table 37: Material types

Part	Material
Matrix	Aluminum
Fan blades	Nylon PAG
Fan housing	Steel
Fan guard	Steel
Electric motor	Aluminum
Other parts	Steel
Coating	Painted black RAL 9005

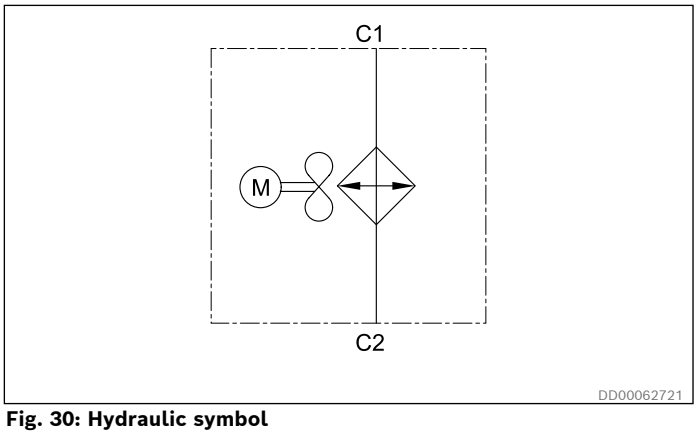

Fig. 30: Hydraulic symbol

HDC cooler, electric motor data / sound data

Table 38: Ordering code HDC cooler and electric motor data / sound data

Cooler ordering code	Driving power (kW)		Noise	Max perm.dynamic pressure		Max. perm.static pressure	
	50 Hz	60 Hz	dBA	bar	psi	bar	psi
HDC 050-4	0.37	0.43	78	14	203	26	377
HDC 060-4	0.75	0.90	78	14	203	26	377
HDC 080-4	1.5	1.8	78	14	203	26	377
HDC 085-6	2.2	2.6	78	14	203	21	305
HDC 090-6	2.2	2.6	85	14	203	21	305
HDC 100-6	2.2	2.6	87	14	203	21	305
HDC 100-4	7.5	9.0	97	14	203	21	305
HDC 200-6	7.5	9.0	92	14	203	21	305
HDC 200-4	18.5	22.2	100	14	203	21	305

Electrical data

Table 39: Rated data electric motors

Voltage (V)	Frequency (Hz)
380	50
400	50
440	60
460	60

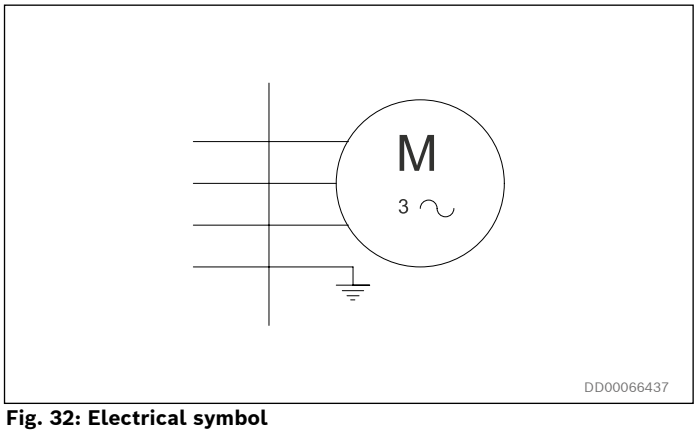

Fig. 32: Electrical symbol

Ordering code
In order to identify Hägglunds equipment, the following ordering code is used.

Example Hägglunds HDC200

01	02		03	04	05		06		07		08		09		10		11		12
HDC	**200**	**-**	**A**	**6**	**G**		**01**	**-**	**20**	**-**	**40**	**-**	**0**	**-**	**1**	**-**	**4**	**-**	**00**

01	**Hägglunds air-oil cooler**	
		HDC

02	**Cooler size**	
	20	**020**
	30	**030**
	50	**050**
	60	**060**
	80	**080**
	85	**085**
	90	**090**
	100	**100**
	200	**200**

03	**Cooling media**	
	Air	**A**

04	**Number of poles, electric motor**	
	4-pole	**4**
	6-pole	**6**
	8-pole	**8**

05	**Electric motor type/voltage**	
	230V 50Hz	**A**
	380V 50Hz	**B**
	400V 50Hz	**C**
	415V 50Hz	**D**
	415V 50Hz (355-455V) (47-53Hz)	**E**
	460V 50Hz	**F**
	500V 50Hz	**G**
	525V 50Hz	**H**
	550V 50Hz	**I**
	660V 50Hz	**J**
	690V 50Hz	**K**
	440V 60Hz	**L**
	460V 60Hz	**M**
	480V 60Hz	**N**
	Special electric motor	**Z**

06	**Motor output**	
	0,18 kW 50Hz	**00**
	0,37 kW 50Hz	**01**
	0,75 kW 50Hz	**02**
	1,5 kW 50Hz	**03**
	2,2 kW 50Hz	**04**
	3 kW 50Hz	**05**
	4 kW 50Hz	**06**
	5,5 kW 50Hz	**07**
	7,5 kW 50Hz	**08**
	11 kW 50Hz	**09**
	18,5 kW 50Hz	**10**
	22 kW 50 Hz	**11**
	30 kW 50 Hz	**12**
	0,21 kW 60Hz	**20**
	0,43 kW 60Hz	**21**
	0,9 kW 60Hz	**22**
	1,8 kW 60Hz	**23**
	2,6 kW 60Hz	**24**
	3,6 kW 60Hz	**25**
	4,8 kW 60Hz	**26**
	9,0 kW 60Hz	**27**
	13,2 kW 60Hz	**28**
	22,2 kW 60Hz	**29**

07	**Ambient temperature min**	
	-20°C (Standard)	**20**
	-30°C	**30**
	-40°C	**40**
	-45°C	**45**

08	**Ambient temperature max**	
	+40°C (Standard)	**40**
	+45°C	**45**
	+50°C	**50**

09	**Heater**	
	None (Standard)	**0**
	Space heater	**S**

10	**Altitude (A)**	
	A < 1000 m (standard)	**1**
	1000 m < A < 2000 m	**2**
	2000 m < A < 3000 m	**3**
	3000 m < A < 4000 m	**4**
	4000 m < A < 4500 m	**5**
	4500 m < A < 5000 m	**6**

11	**Cooler matrix**	
	Without bypass (Standard)	**0**
	4 bar bypass	**4**

12	**Special design**	
	Standard	**00**
	Special index 01-99	**01**

4.2.6 Tank

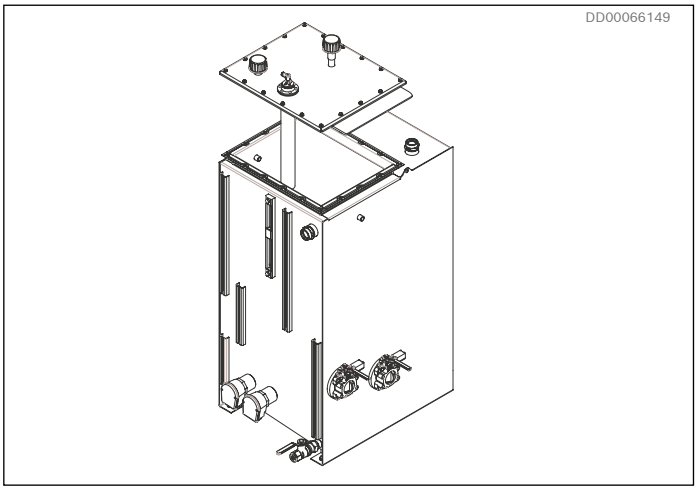

Fig. 33: Tank

Function

The tank contains cooled clean oil for the continous oil exchange in the hydraulic system.
The tank is welded of stainless steel plates.
In the drive unit the tank supplies up to four pumps.
The tank volume has a ratio of minimum 1:1 to the exchange demand of the drive unit.

The tank is equipped with:

- Visual level gauge
- Suction valve with position switch
- Level sensor
- Temperature sensor
- Drain tap
- Filling point with quick release coupling.(oil filling via drain filter)
- Air breather filter
- Oil heater (option)
- Bladder (option)
- Inspection cover (option).
- Leveling pipe connection (option)

Leakage test by supplier:
Air pressure 0,2 bar, max 0,3 bar inside tank.
Soap water are sprayed at the weldings outside the tank and check for leakage.

Mechnical data

Table 40: Tank volume

Frame variant/version	Tank volume (l)
Small / 2 compartments	120, 255
Small /3 compartments	120, 255, 350
Medium /2 compartments	120, 255, 350, 505
Medium /3 compartments	120, 255, 350, 505, 765
Large /2 compartments	120, 255, 350, 505
Large /3 compartments	255, 350, 505, 765, 835

Table 41: Material

Part		Material
Tank		Stainless steel 1.4301
Fluid level gauge	Lens	Polyamid
	Lens base	Nylon
	Shroud	Polystyrene

Fluid level temperature gauge

The fluid level gauge is resistant to mineral and petroleum based fluids.

Standards

Welding according to SS-ISO 5817

4.2.7 Oil filter

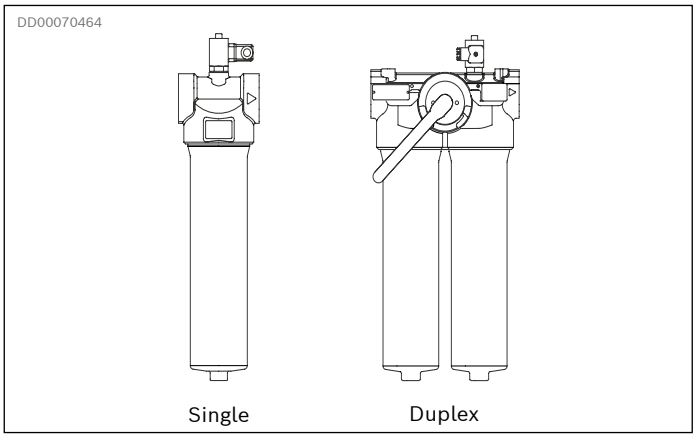

Fig. 34: Oil filter

Separation characteristics

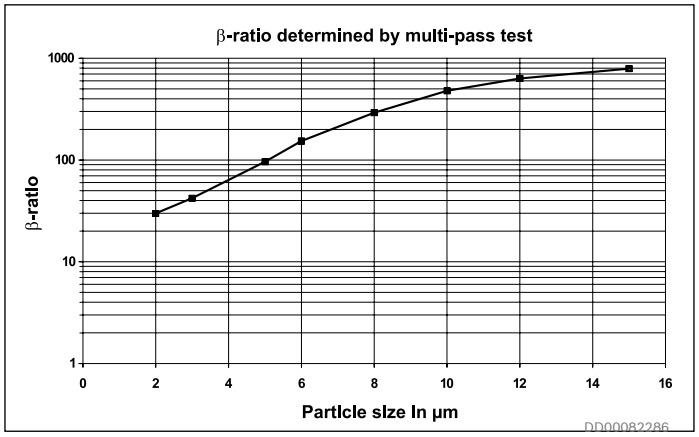

Fig. 35: Separation characteristics

Function

The filters are used in drain and return lines. The filter housing is equipped with bypass valve and an electrical and visual contamination indicator. The oil flow through the filter is according to the picture above. Single (standard) or duplex (option) filters can be selected. There is a contamination indicator that gives indication if the differential pressure is above 2.2 bar (31.9 psi) - 10% and the temperature of the oil is above 30 °C (86 °F).
A single filter has one filter element and a duplex filter has two filter elements but only one filter is used at any one time. On duplex filters the filter elements can easily be replaced without interrupting operation.

The filter elements are β-stable (*Fig. 35*), has a multi layered structure and are compatible with HFA , HFB and HFC fluids. The opening pressure for the by-pass valve ΔP = 3.5 bar (50.8 psi) + 10%.

The β-ratio for the particle size 10 (µm) fullfills ISO 4572 ($\beta_{10} \geq 75$).

Standards

Filter and filter elements according to DIN 24550

Mechnical data

Table 42: Technical data, filters

Part			Single/Duplex
Filter complete:	Filter head	Low pressure	Aluminum alloy
		Medium pressure	Ductile cast iron
	Filter bowl	Low pressure	Aluminum
		Medium pressure	Steel
	Seals		Nitrile rubber
	Max pressure	Low pressure	25 bar (360 psi)
		Medium pressure	210 bar (3 050 psi)
	Bypass pressure Δp	Low pressure	3.5 bar (50 psi) + 10%
		Medium pressure	7 bar (100 psi) + 10%
	Max flow	Size 250	250 l/min (66 gpm)
		Size 400	400 l/min (106 gpm)
		Size 600	600l/min (160 gpm)
Filter element:	Filtration grade		10 µm (standard)
			6 µm (optional)
	Filter		Synthetic glass fibre material
	End shields		Sn plated
	Inside tube		Sn plated
	Antistatic layer		Optional

4.2.8 Hägglunds Spider

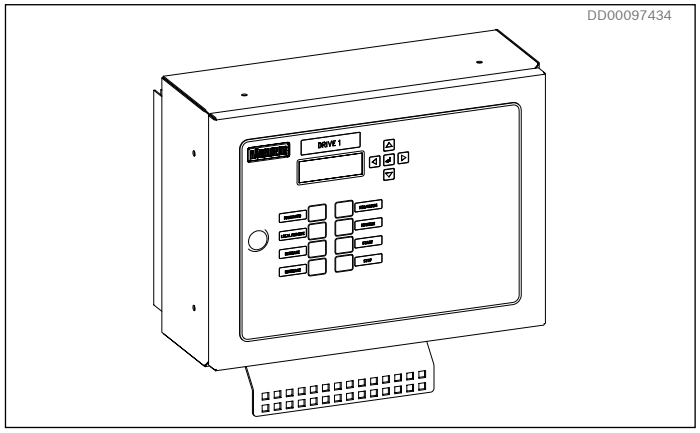

Fig. 36: Hägglunds Spider

Function

The Hägglunds Spider is the monitoring and control system for the Hägglunds DUe drive unit. It can work as a stand-alone control system or be slaved under a factory system and contains drivers for pumps, monitoring of the hydraulic system and functionality for many applications. Hägglunds Spider is delivered assembled to the drive unit at suitable location, fully parameterized, tested and ready to use.

The configuration of Hägglunds Spider can be adopted for various applications needs, providing consistent start and stop sequences. It is the connection point for remote interface cabling e.g. to a customer DCS via discrete cabling or via a number of different Field bus types.

The Spider control panel is used for local control and monitoring of the drive unit. The panel is available with one set of buttons and display for a single drive or with two sets of buttons and displays for two drives.

Two display types are available

- **OLED** with yellow characters on a black background for European and Japanese texts.
- **VFD** with bright blue characters on a black background for European and Chinese texts.

Table 43: Technical data Hägglunds Spider

Hägglunds spider		
	Material	Stainless steel, EN 1.4301
	Dimension	400x300X145 (WxHxD)
	Protection class	IP65
	Power supply	90...264VAC, 50...60Hz
	Power consumption	max 300 VA
	+24 VDC outlets	Fused
	Electric motor interlock	3 x Relay contacts 3 A, 30VDC / 250VAC, Closed = OK, to interlock relay in MCC
	Digital inputs	47 x 24 VDC
	Analog inputs	9 x 4-20mA
	Digital outputs	13 x Relay contacts 3 A, 30VDC / 250VAC
	Encoder inputs	2 x Quad incremental
	Fieldbus slave Card	Profibus DP Modbus RTU Controlnet EtherNet IP ProfiNet DeviceNet Modbus TCP CC-Link
	Space heater (optional)	PTC, < 30 °C, moisture prevention
	Terminals	One row spring clamp type, max 2.5 mm^2
	Cable gland plate	Multigate MC 25
	Corrosion protection	VCI Emitter
Control panel		
	Material	Stainless steel, EN 1.4301
	Dimension	395 x 295 x 35 (WxHxD)
	Protection class	IP65
	Communication	CAN
	Connector	M12
	Corrosion protection	VCI Emitter

For detailed information about Hägglunds Spider, see User manual RE 15330-WA.

4.2.9 Hägglunds ICp Pump control

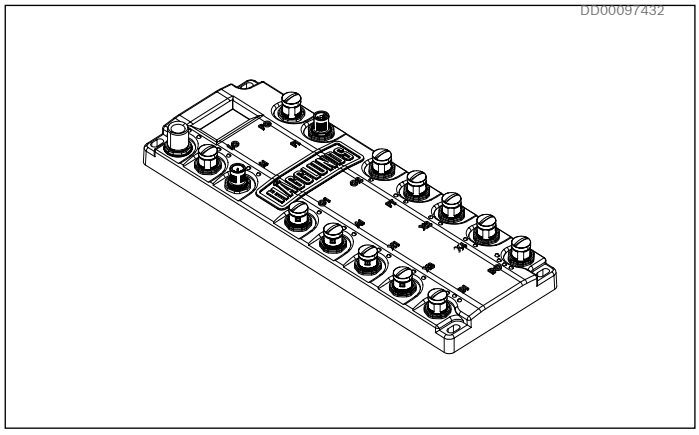

Fig. 37: Hägglunds ICp pump control

Function

The Hägglunds ICp pump control is an alternative to Spider for controlling the pump. The solenoid coils of each pump in the drive unit is connected to an ICp unit. The pumps can be controlled without feedback, using the ICp as an amplifier or locked into closed loop control using either work pressure or swash angle as input.

Configuration of ICp is done via Bluetooth and the Hägglunds ICp app is available for both android and iOS.

Table 44: Technical data Hägglunds ICp

Dimension	111x310x31 (WxHxD)
Protection class	IP67
Power supply	+24VDC(18-30)
Power consumption	Max 60VA
+24V outlets	Fused 100mA
Digital inputs	12 x 24VDC
Analog inputs	6 x 4-20 mA, 1 x PT100
Digital outputs	8 x 24VDC, 800mA
Contacts	M12
Wireless connection	Bluetooth low energy

For detailed information about Hägglunds ICp, see data sheet RE 15422.

4.3 Other components

4.3.1 Water valve

4.3.1.1 Water solenoid valve

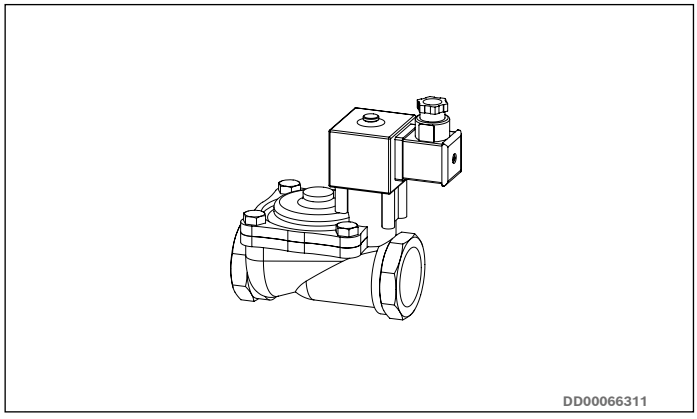

Fig. 38: Water solenoid valve

Function

The water valve is a two-way, normally closed, pilot operated solenoid valve with a floating diaphragm . The water valve shall be connected to turn the cooling water on at the preset oil temperature in the tank. All water valves are equipped with a manual override control. The valve is used for plate coolers.

Mechnical data

Table 45: Pressure

Water valve size	Differential pressure bar (psi)	Max. pressure bar (psi)
1/2", 1"	0.3-10 (4.3-145)	10 (145)
1 1/4", 1 1/2"	0.3-9 (5-130)	9 (130)

Table 46: Flow

Water valve size	Max flow at ΔP 1 bar, l/min (gpm)
1/2"	70 (18)
1"	165 (44)
1 1/4"	213 (56)
1 1/2"	322 (85)

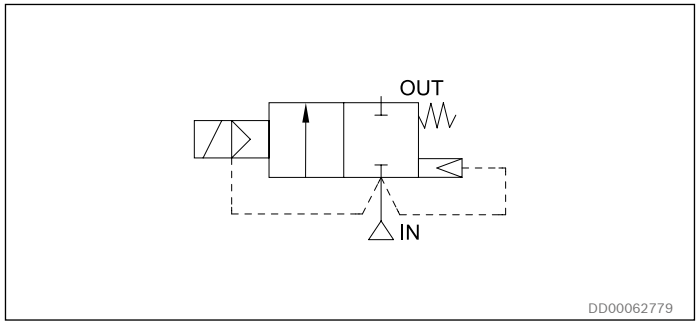

Fig. 39: Hydraulic symbol

Table 47: Material

Part	Material
Body	Brass
Core tube	Stainless steel
Core and plugnut	Stainless steel
Springs	Stainless steel
Seat	Brass
Seal, diaphragm & disc	NBR
Shading coil	Copper

Electrical data

Table 48: Electrical characteristics

Coil insulation class	F
Connector	Spade plug
Connector specification	EN 175301-803 (DIN 43650)-A
Coil safety	IEC 335
Coil enclosure protection	Moulded IP65 (EN 60529)
Control voltage	24 VDC

Table 49: Power ratings

Water valve size	Power ratings	
	holding	hot/cold
	(W)	(W)
1/2", 1"	4	6.9
1 1/4", 1 1/2"	6	11.2

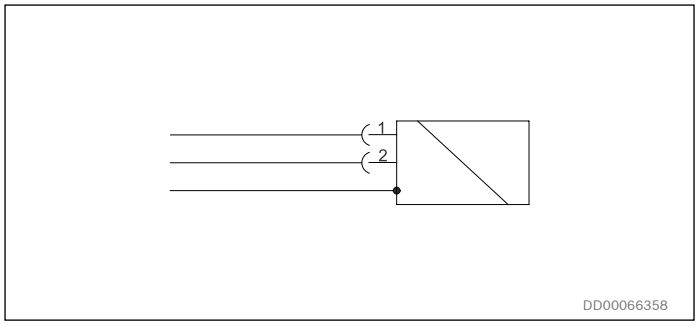

Fig. 40: Electrical symbol

4.3.1.2 Water ball valve

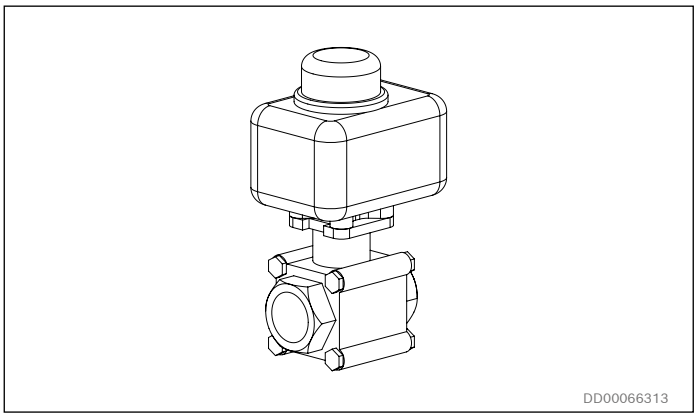

Fig. 41: Water ball valve

Function

The water valve for tube cooler is a two-way ball valve manoeuvred by an electric actuator.
The water valve will turn the cooling water at the preset oil temperature in the tank.
The water valve is equipped with a manual override control and visual position.
The valve is used for tube coolers.

Mechanical data

Table 50: Ball valve

Size	Max pressure
1 ½”	10 bar (145 psi)

Table 51: Electric actuator

Enclosure	IP67 Nema 4 and 6
Ambient temp	-20°C to +70°C
Limit switches	Open/Close, 2+2 pcs
Travel Angle	90°±5°
Weight	2.8 kg
Opening time 90°	17/14 sek (50/60Hz)

Table 52: Material

Part		Material
Valve	Body	CF8M
	Ball	SS316
	Seat	CTFE
Electric actuator		Steel, Aluminum and Al Bronze

Electrical data

Conduit Entries: M20 x 1,5
Space Heater: 5W (110/230VAC & 24VDC)
Anti-condensation

Control voltages

Two different voltages are available for the water valve

Table 53: Supply

Voltage	Max Current
110 VAC	0.35 A
230 VAC	0.23 A

Table 54: Connection

Terminal	Function
1	Neutral
2	Heater 5 W
3	Close
4	Opened
5	PE

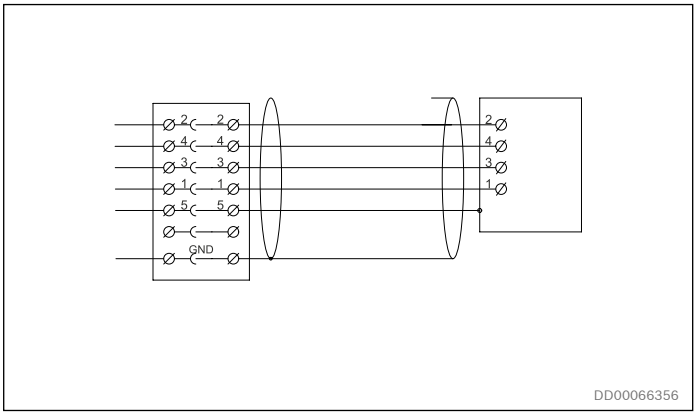

Fig. 42: Electrical symbol

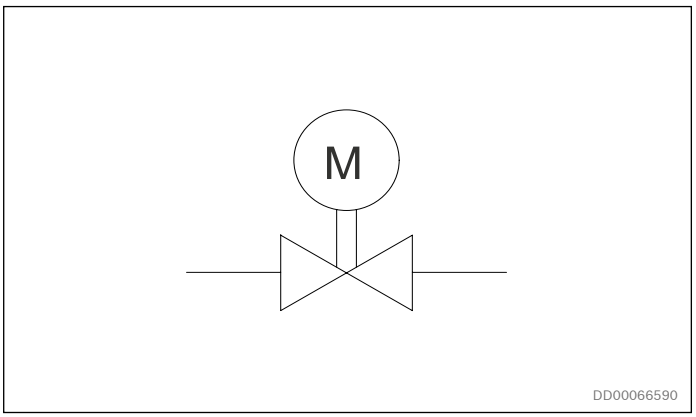

Fig. 43: Hydraulic symbol

4.3.2 Suction line valve

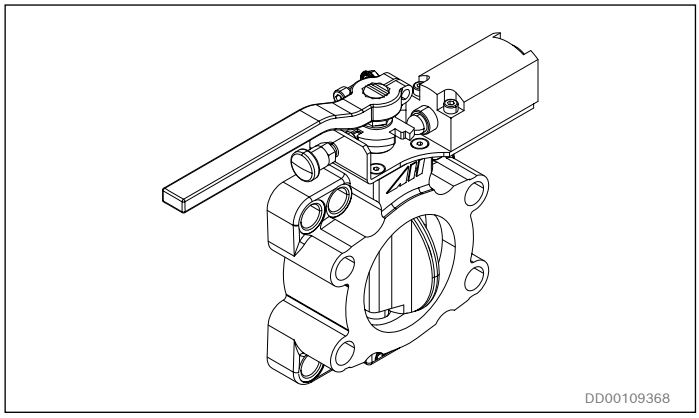

Fig. 44: Suction line valve

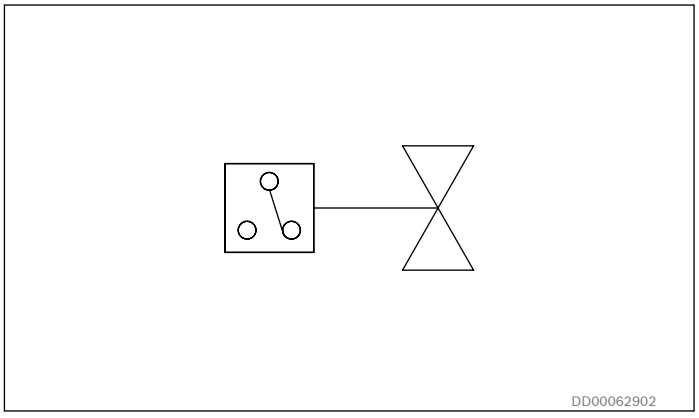

Fig. 45: Hydraulic symbol

Function

The suction line valve will separate the pump from the tank at service.

The suction line indicator is a limit switch with forced breaking contact that opens when the suction line valve is closed.

It shall be connected to stop the power unit when the switch is open.

Mechanical data

Table 55: Standards

Item	Standard
Construction	DIN-EN 50047
Electrical safety	VDE 0113

Protection class

Protection class IP67 according to IEC Publ. 34-5 / DIN 40050

Table 56: Material

Part	Material
Cage, valve	Aluminium
Shifter	Aluminium
Seals	Nitrile rubber
Valve, other parts	Steel galvanized
Cage and lifter, limit switch	Thermoplast glass-fibre reinforced

Electrical connections

The cable is connected on screw terminals inside the housing. Cable glands: Pg 13,5

Electrical data

Table 57: Electrical data

Max. voltage	Max. cont. current	Max. switch on current
400 VAC	6 A	16 A

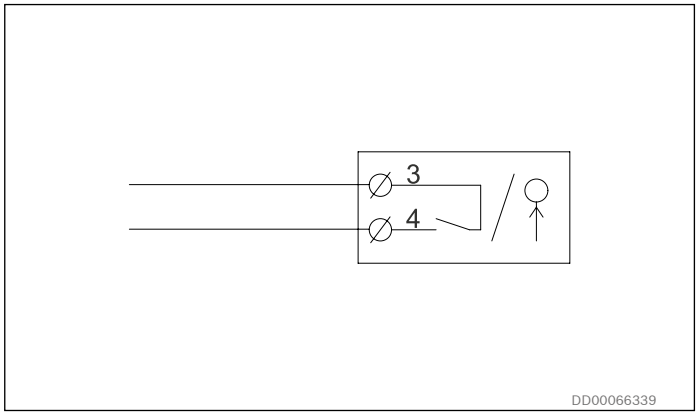

Fig. 46: Electric symbol

4.3.3 Clogging Indicator, oil filter

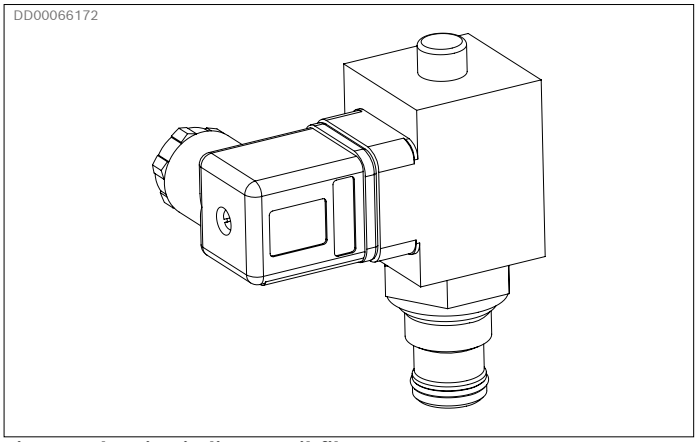

Fig. 47: Clogging indicator, oil filter

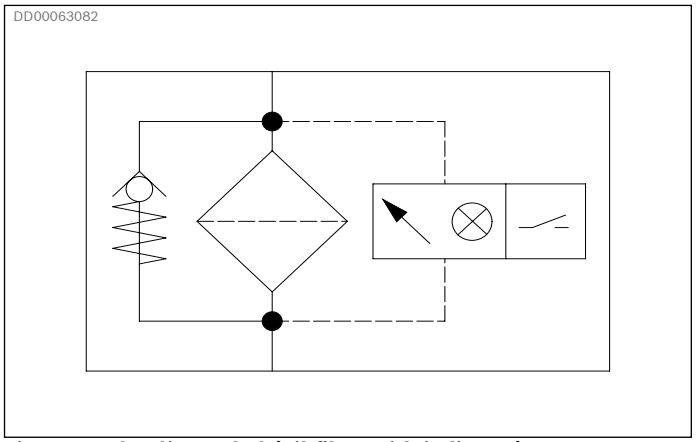

Fig. 48: Hydraulic symbol (oil filter with indicator)

Function

A clogging indicator is mounted in the oil filter housing to indicate when the filter element must be changed.
Both a visual and an electric indication are obtained.
When the level of contamination in the filter element is increased, the pressure drop over the filter will increase.
Indication takes place at a differential pressure across the filter of 2.2 bar (32 psi) for return and drain filter and 5 bar (73 psi) for charge and flushing filter.
The visual indicator is reset automatically.
The electrical indication is internally interlocked by a thermo switch below 30 °C (86 °F) rising temperature to avoid indication due to high viscosity. The interlock is activated at 20 °C (68 °F) falling temp.

Protection class

IP 65 acc. to IEC 529 / DIN 40050

Mechanical data

Table 58: Clogging indicator

Material	Lower section	Aluminum alloy, Steel
	Upper section	Polyamid
	Seals	Nitrile rubber
Max. operating pressure		420 bar
Temperature range		-10°C ... +100°C (50°F...212 °F)

Electrical data

Table 59: Clogging indicator

Switch type	normally closed
Indication	Mechanical
Switching voltage	nominal 24 VDC max 48 VDC
Max. switching power with resitive load	20 VA/20 W
Cold start supression	30°C, rising
	20°C, falling

Electrical connections

Socket plug acc. to DIN 43650 / ISO 4400
Cable diameter: Ø 6-10 mm

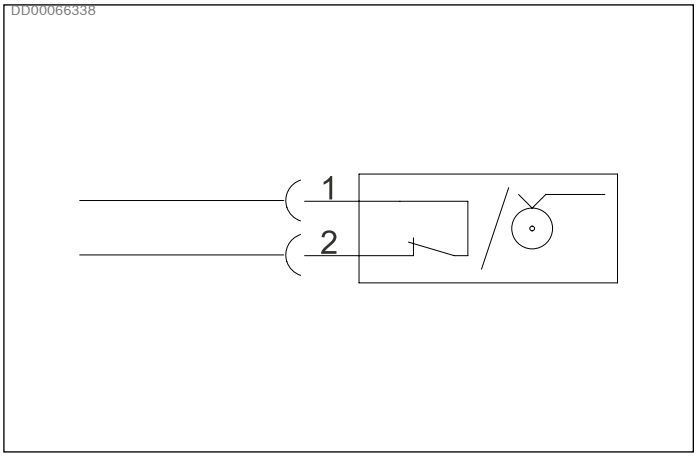

Fig. 49: Electrical symbol

4.3.4 Air breather

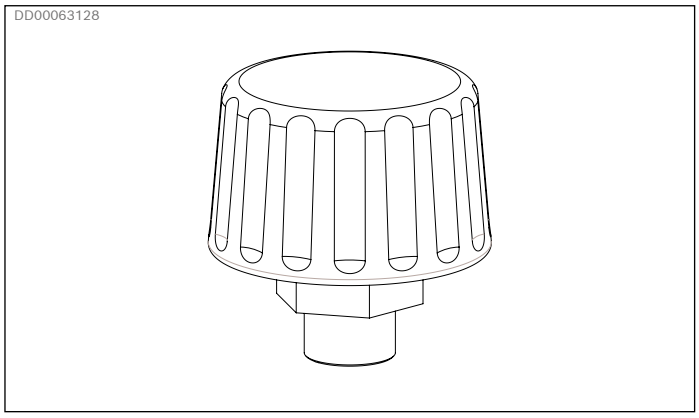

Fig. 50: Air breather

Function

The air breathing of the tank is via an air filter element to prevent contamination of the oil by particles in the air. The breather filter consists of a housing which is screwed onto the oil tank and a built-in filter element.

Mechanical data

Table 60: Material, Air breather filter

Filter		Standard	For bladder
Filtration rating		3 µm (absolute)	
Check/bypass valve:		No	Yes Δp at 0.2 bar
Clogging indicator		No	
Temperature range		-30 °C or +100 °C	
Material	Hose	Steel, zinc-plated/plastic coated	
	Filter element	Paper fiber	
	Seal	NBR (Nitrile)	
	Tread	G3/4″	
Additional attributes		Anti-splash device	
Hydraulic fluids		The standard models are suitable for use with mineral and lubrication oils according to ISO 2943	
The filter elements are made from phenolic resin impregnated paper and cannot therefore be cleaned			

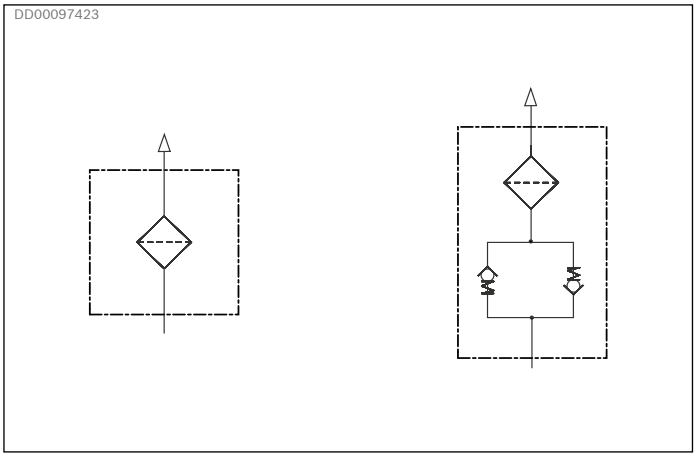

Fig. 51: Hydarulic symbol

4.3.5 Tank bladder

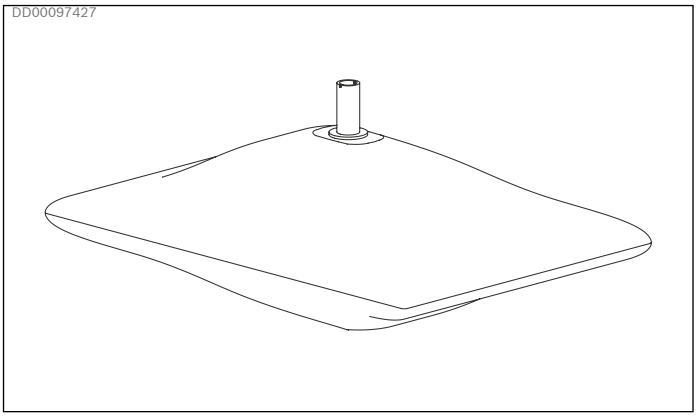

Fig. 52: Tank bladder

Function

The separators (bladder) task is to prevent contamination to enter into the tank and contaminate the hydraulic fluid. If the drive unit is operating in dusty environment it is advisable to choose an air bladder combine with an air relief valve for the tank air breathing.

Mechanical data

Volume (Expanded): 6 l, 8 l, 15 l, 25 l.
Shape: Rectangular Standard.
Thread: 3/4″ BSP Carbon Steel.
Material: Reinforced Polyurethane with coated thermoplastic sheet.

4.3.6 Electronic level and temperature sensor

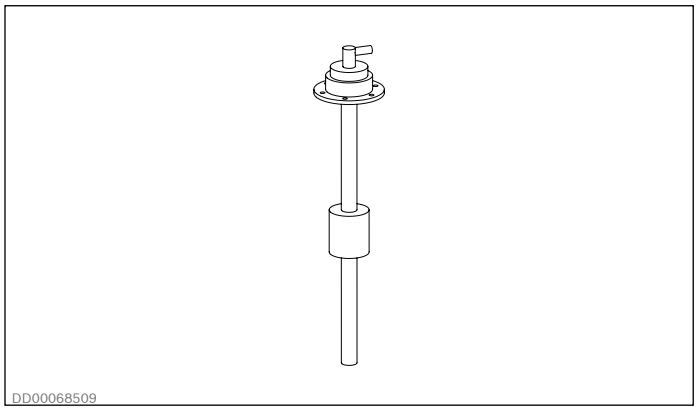

Fig. 53: Electronic level and temperature sensor

Function

The tank oil sensor gives analog outputs for oil temperature and oil level. Sensor readings and threshold levels are set in the control system depending on the tank volume.

Mechnical data

Table 61: Electronic level and temperature sensor

Sensing method temperature	Pt 100
Sensing method level	Reed contacts
Material in contact with media	Stainless steel
Probe length	500 mm
Medium temperature range	-20 .. +80 °C
Protection class	IP65

Electrical data

Table 62: Electronic level and temperature sensor

Supply voltage U	10...36VDC	
Output signal	4-20mA,	
Max load	(U-9.0V)/20mA	
Signal increment steps level	5 mm	
Temperature range	0...100°C	
Accuracy	± 1.5 °C	
Electrical connection	4 pin, Female M12	
Pin connection	pin 1	+U
	pin 2	Temp signal
	pin 3	Not used
	pin 4	Level signal

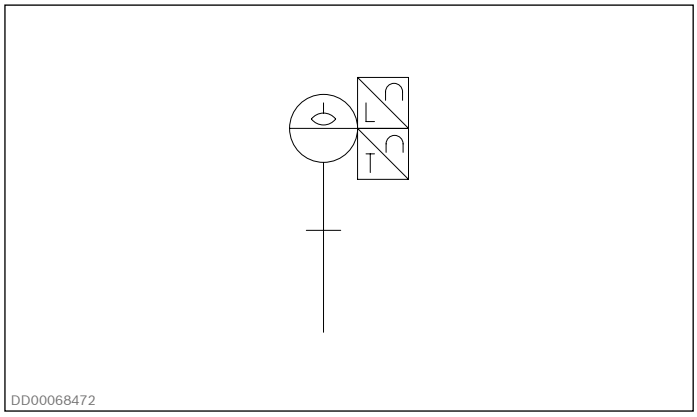

Fig. 54: Hydraulic symbol

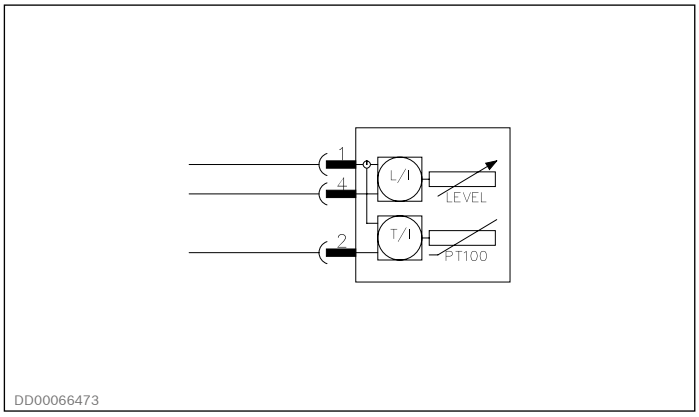

Fig. 55: Electrical symbol

Table 63: Volumes for threshold levels, electronic level and temperature sensor

Tank type	Max level				Nominal level				Warning level				Alarm (Stop) level			
	Volume		Distance from top		Volume		Distance from top		Volume		Distance from top		Volume		Distance from top	
	L	gal	mm	inch	L	gal	mm	inch	L	gal	mm	inch	L	gal	mm	inch
120 l	128	34	97	3,82	120	32	136	5,35	109	29	190	7,48	100	26	234	9,21
255 l	264	70	115	4,53	255	67	142	5,59	229	60	220	8,66	211	56	273	10,75
350 l	370	98	110	4,33	350	92	170	6,69	315	83	274	10,79	289	76	352	13,86
505 l	526	139	111	4,37	505	133	155	6,10	455	120	260	10,24	417	110	339	13,35
765 l	785	207	112	4,41	765	202	148	5,83	677	179	307	12,09	631	167	390	15,35
835 l	878	232	119	4,69	835	221	181	7,13	746	197	309	12,17	685	181	397	15,63

4.3.7 Accumulator

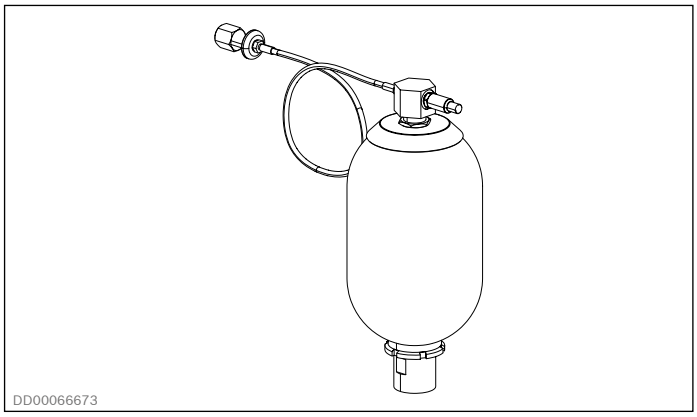

Fig. 56: Accumulator

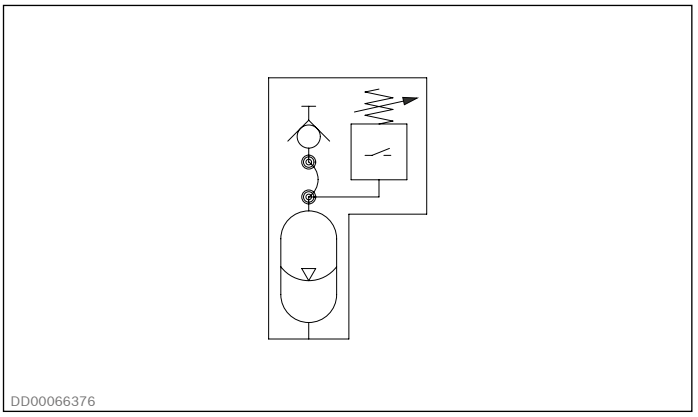

Fig. 57: Hydraulic symbol

Function

The hydropneumatic accumulator has bladder and gaskets for operating with mineral oil or non aggressive fluids. The precharge pressure is 9 bar (130.5 psi). It feeds the closed hydraulic circuit at low pressure side to:

- Damp hydraulic pressure pulses at the low pressure side.
- Supply the low pressure side with oil to prevent cavitation.

Available sizes are 2.5, 4 and 10 litres.
The accumulator pressure is monotored via a pressure switch

Mechanical data

Table 64: Material, accumulator

Part	Material
Shell	Chrome molybdenum steel
Bladder	Nitrile (NBR 20)
Gas	Dry nitrogen
Painting	Primer RAL 3003
Coated (inside)	Plastic

Limits

Maximum allowed working pressure 330 bar (4786 psi).
Maximum allowed oil flow 120 l/min (31.7 gpm).
Pressure ratio 1:4 (precharge pressure: maximum pressure in the system).
The precharge pressure may not exceed 90% of the lowest working pressure in the system and not be less than 25% of the highest working pressure in the system.

The pressure switch is monitoring the preloading pressure in the accumulator bladder. If the pressure falls below 7 bar (101 psi) the switching contact is opened. The contact shall be connected in the interlock circuit for the hydraulic drive to permit restart of the system.

Delivery

Accumulators in DUe delivered by air freight are delivered empty (= pre-charged to 1-2 bar (14-19 psi)) and need to be charged with N_2 (Nitrogen gas) to 9 bar (130 psi) before start of system. Empty accumulators are marked with a tag at delivery.

Electrical data

Table 65: Pressure switch

Supply voltage Ub	10...30VDC
Switch output	PNP transistor output
Max load	400mA
Protection class	IP67
Connector	M12 A coded 4-pin contact
Pin connection	Pin 1 - +Ub
	Pin 2 - PNP output
	Pin 3 - 0V
	Pin 4 - NC

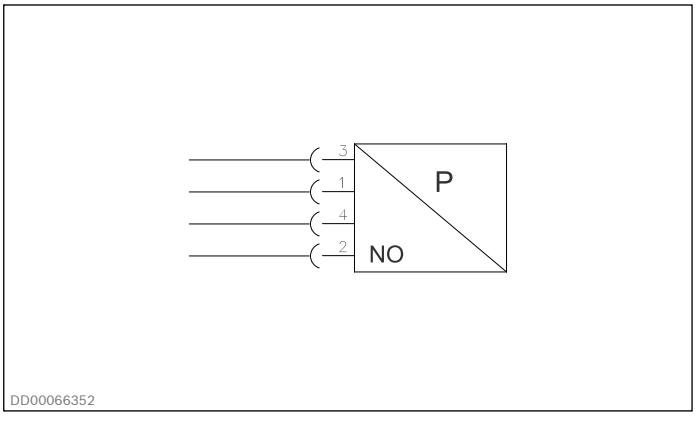

Fig. 58: Electrical symbol

4.3.8 Auxillary pumps

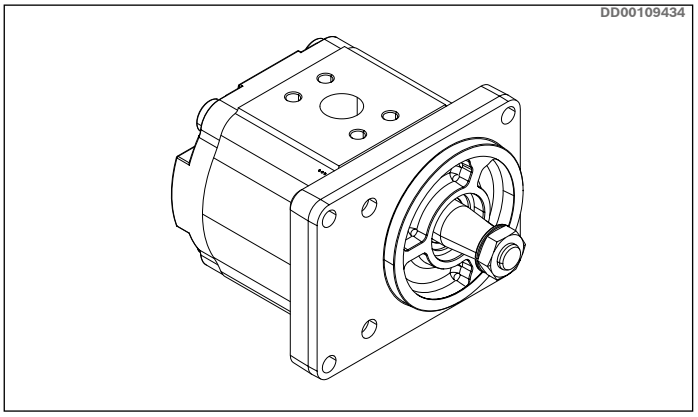

Fig. 59: Auxillary pump

Table 66: Auxillary pumps

Pump size	Ordering code	Max continuous pressure		Max peak pressure	
cc		bar	psi	bar	psi
4	AZPF-12-004RCB20MB	250	3626	300	4351
11	AZPF-12-011RCB20MB	250	3626	300	4351
32	AZPG-22-032RCB07MB	250	3626	300	4351
56	AZPG-22-056RCB07MB	195	2828	250	3626

Function

The auxiliary pumps are used when external circuits are needed for flushing and/or brake functionalities.

The pump type used is an external gear pump.

Reference

For more information see the specific data sheets chapter *7 Required and additional documents*

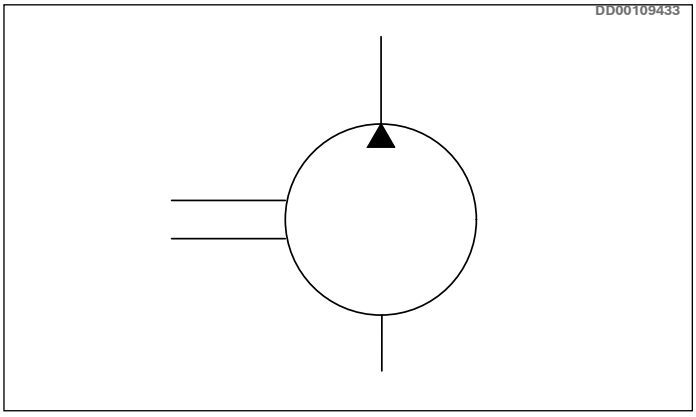

Fig. 60: Hydraulic symbol

4.3.9 Pressure sensor

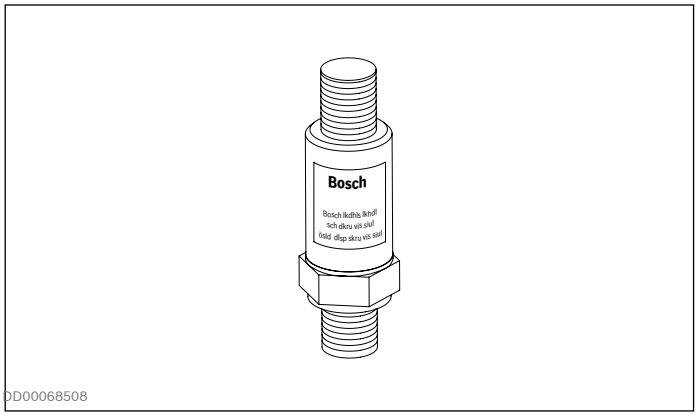

Fig. 61: Pressure sensor

Function

The pressure sensor gives information about the pressure level in different parts of the hydraulic system. The signal is used for information about system usage and/or used for control functions.

Electrical data

Table 67: Pressure sensor

Measuring range	Work pressure 0...400bar
	Low pressure 0...250bar
Supply voltage Ub	16...36VDC
Output	4...20mA
Max load (ohm)	(Ub-8.5V)/20mA
Protection class	IP65
Connector	4 pole M12
Pin connection	Pin 1 - +Ub
	Pin 2 - signal output

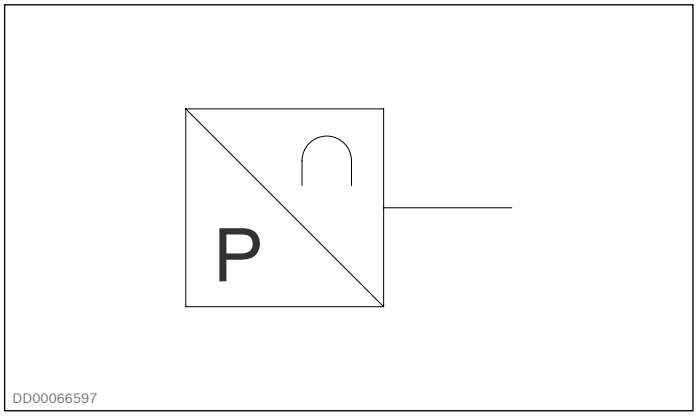

Fig. 62: Hydraulic symbol

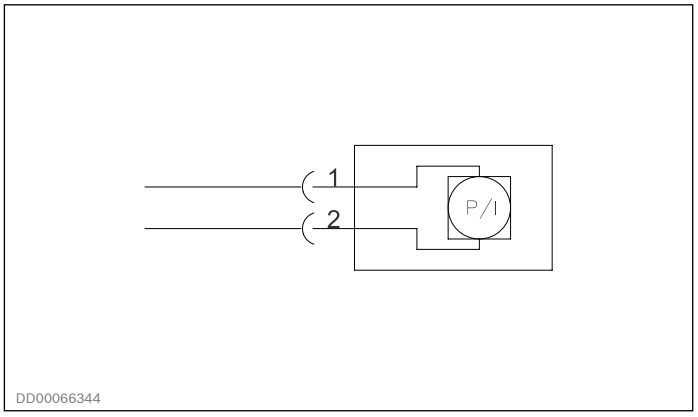

Fig. 63: Electrical symbol

4.3.10 Oil heater

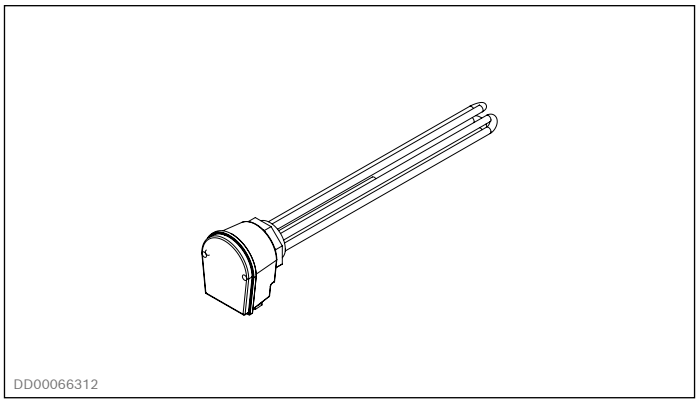

Fig. 64: Oil heater

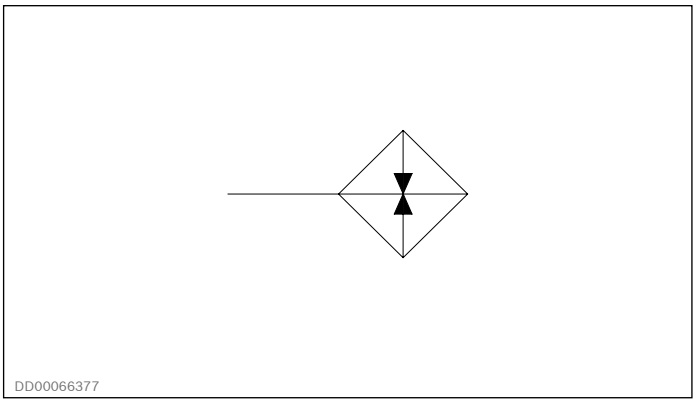

Fig. 65: Hydraulic symbol

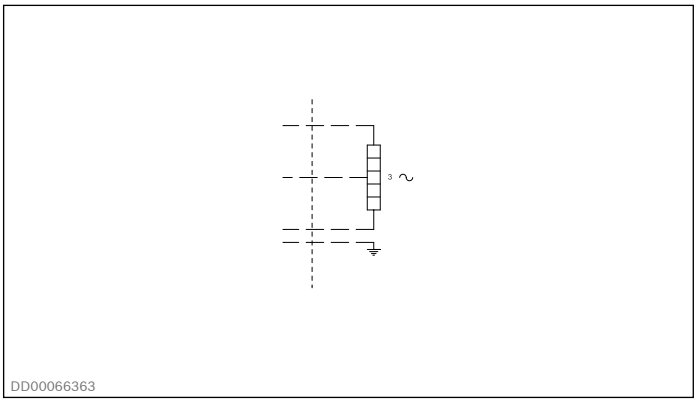

Fig. 66: Electrical symbol

Function

At installation in ambient temperature below 0 °C (32 °F) a heater is needed in the oil tank to keep the oil temperature above a set level. The control system measures the temperature in the tank and gives an output to control an external relay to switch on/off power to the heater.

The oil heater is an electrical block heater, with the heating coils in direct contact with the oil.

Mechanical data

Table 68: Oilheater

Tubular elements	Stainless steel 1.4404
Head	Brass 2”
Heater length	435 mm
Terminal box	Silumin
Lid	Carbonate plastic
Protection class	IP54

Electrical data

Table 69: Oilheater

Power	670 W
Voltage	220-240 V
	380-415 V
	440-480 V
	660-690 V

Electrical connections

The cable is connected on screw terminals inside the terminal box.

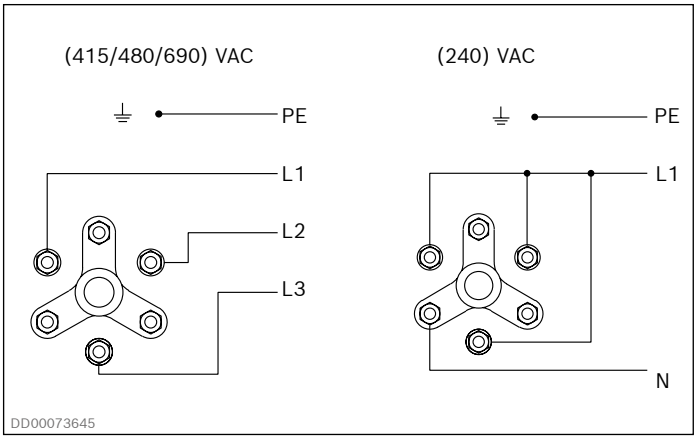

Fig. 67: Electrical connections

4.3.11 Drain temperature sensor

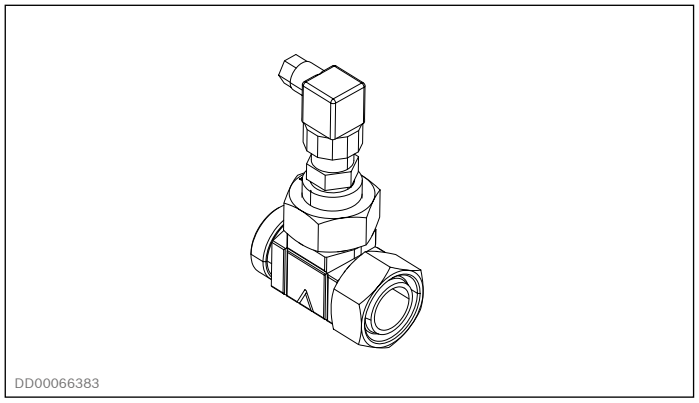

Fig. 68: Drain temperature sensor

Function

The drain temp sensor measures the temperature in the drain line from the hydraulic motor or/and from the main pump. The signal is controlling the flushing circuit for cooling/heating of the hydraulic motor and the main pump.

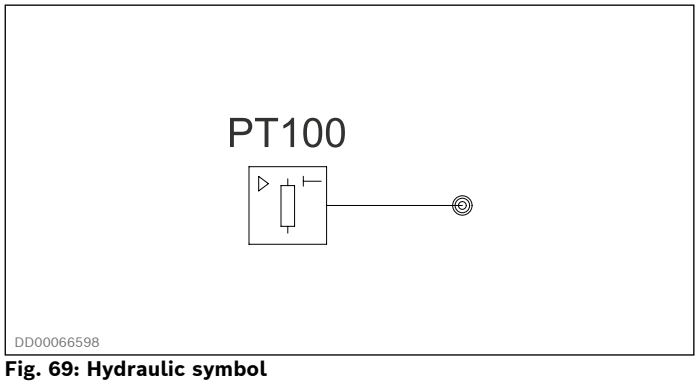

Fig. 69: Hydraulic symbol

Electrical data

Table 70: Drain temperature sensor

Temp range	0...100°C
Supply voltage Ub	10...30VDC
Output	4...20mA
Max load (ohm)	(Ub-7.5V/22mA
Protection class	IP65
Connector	DIN 43650 (Hirschman)
Pin connection	Pin 1 - +Ub
	Pin 2 - signal output

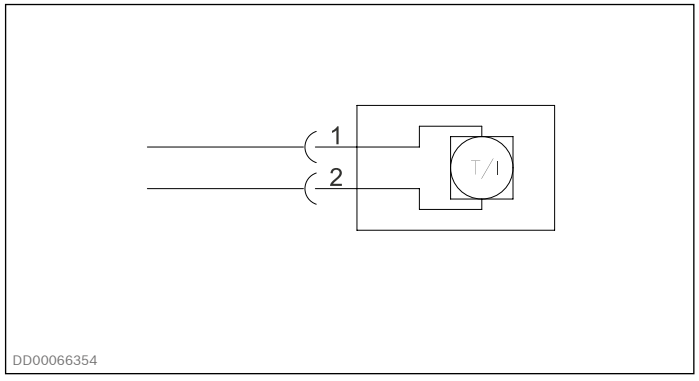

Fig. 70: Electrical symbol

4.3.12 Electrical connection box

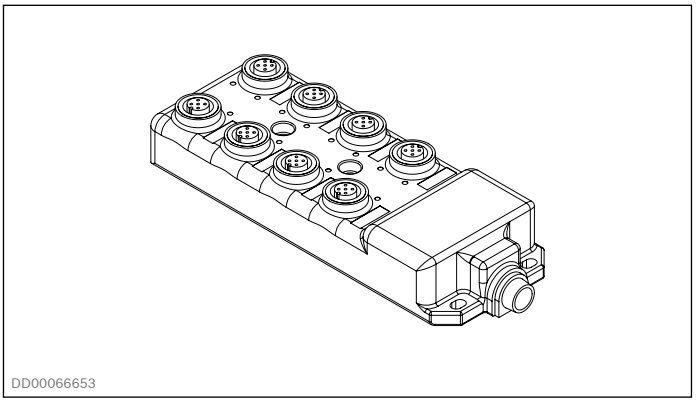

Fig. 71: Electrical connection box

Function

Electrical signals from sensors and valves in the drive unit are connected to the control system or junction box via distributed connection boxes.
Connections from the boxes to the actuators are distributed via short connection cables with M12 contacts on the connection box side.

Electrical data

Table 71: Connection box

Material	Housing PBT, Moulding PUR
Degree of protection	IP67
Contact material	CU alloy goldplated
Cable type	PUR black (LiYY11Y-HF)
Cable area	0.5 mm² (Power 1 mm²)
Ambient temperature	-25 °C ... 80 °C
Electrical connections	4 pin, Female M12 A-standard (IEC 610 76-2-101)
Number of connections	4 or 8

4.3.13 LED lightning

Function

The lightning inside the drive unit is of LED list type. One LED list per compartment is installed. The LED list is controlled via the Hägglunds Spider.

Electrical data

Table 72: LED lightning

Material	Aluminum
Lenght	500 mm
Degree of protection	IP68
Ambient temperature	-40 °C ... 80 °C
Supply voltage	24VDC
Light output	260 Lumen
Power consumption	7,2W

4.4 Sound

The emission sound pressure levels have been calculated according to ISO 3747 for unattended machines.
A-weighted sound power level of DUe with panels and water cooler, selected standard configurations with sound pressure at selected distances.

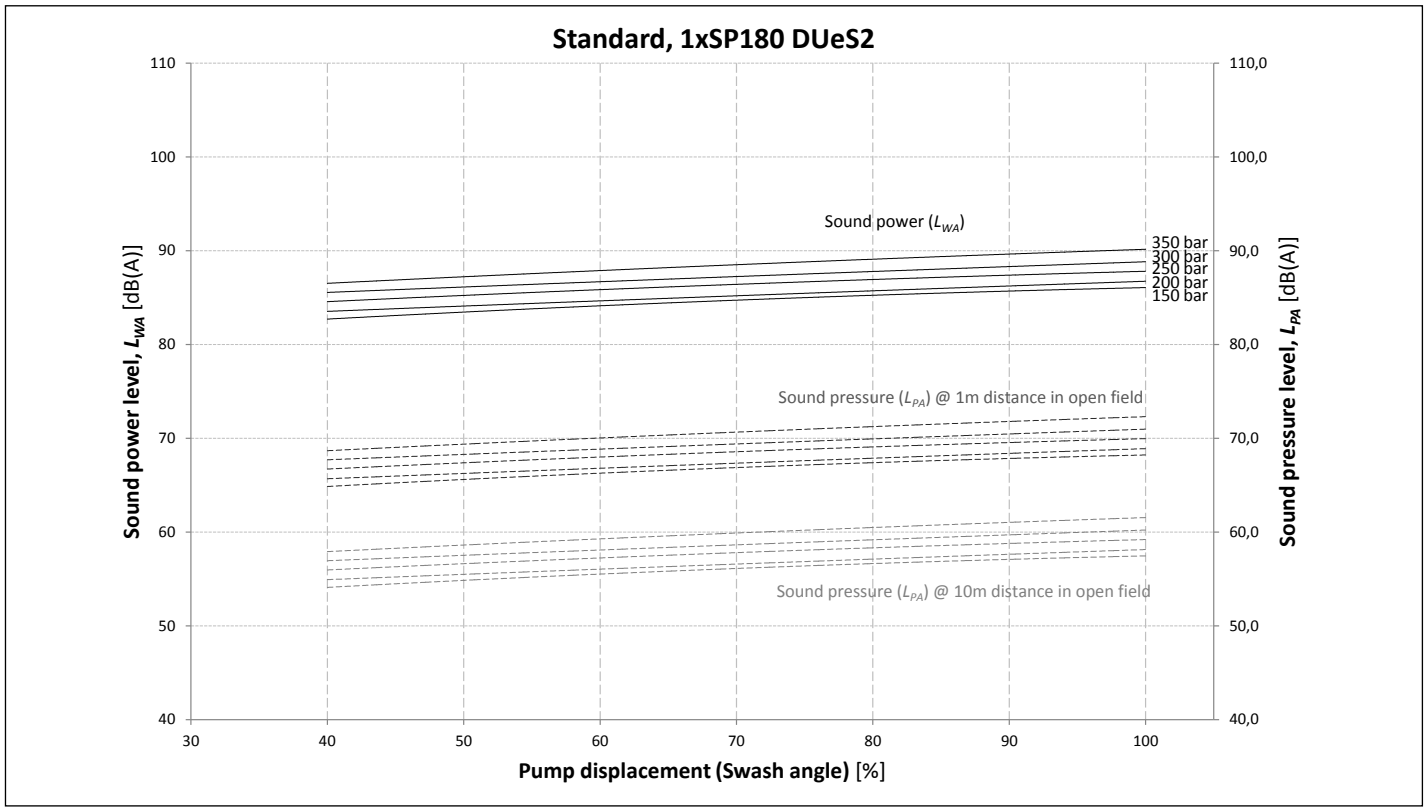

Fig. 72: Sound power / pressure level 1 x SP180, 45 kW DUe S2

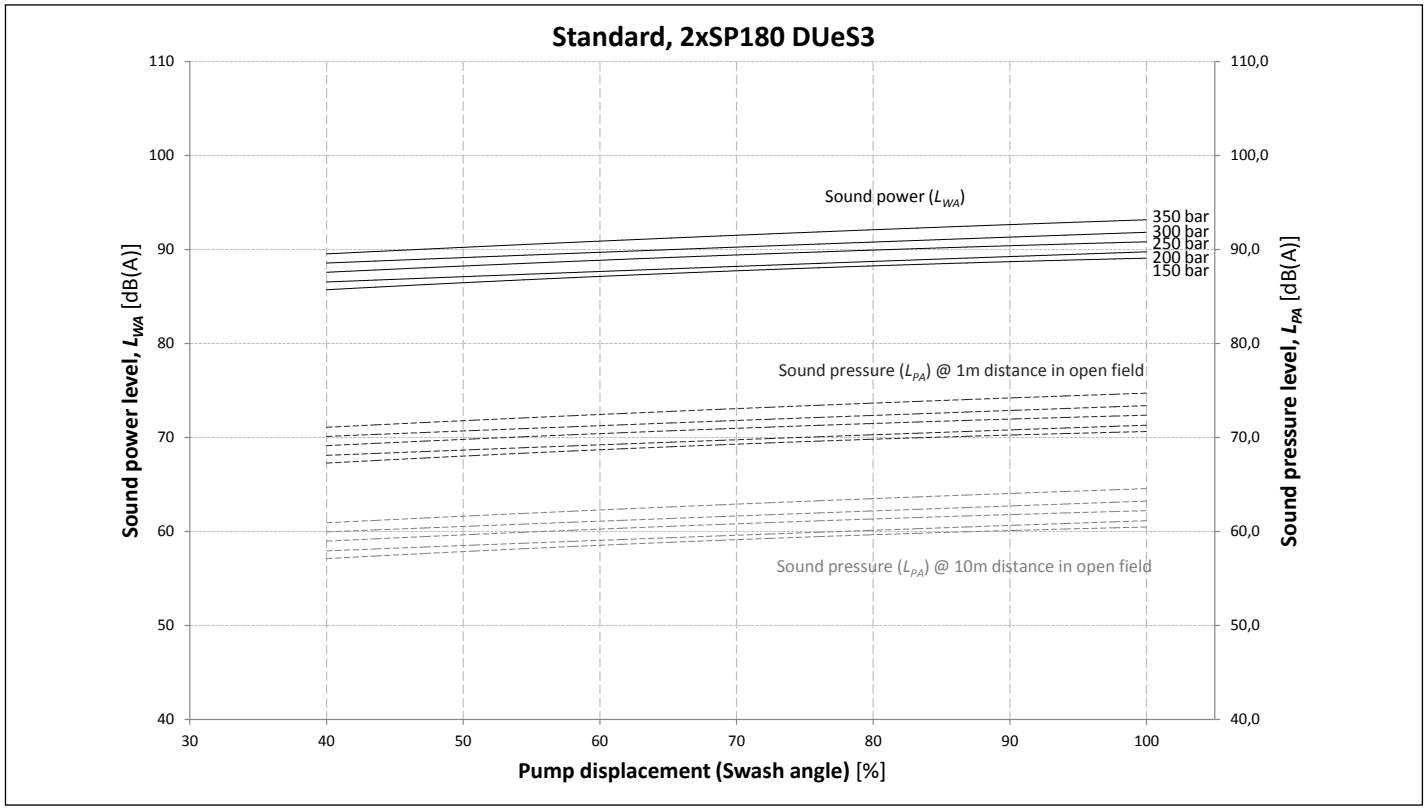

Fig. 73: Sound power / pressure level 2 x SP180, 45 kW DUe sS3

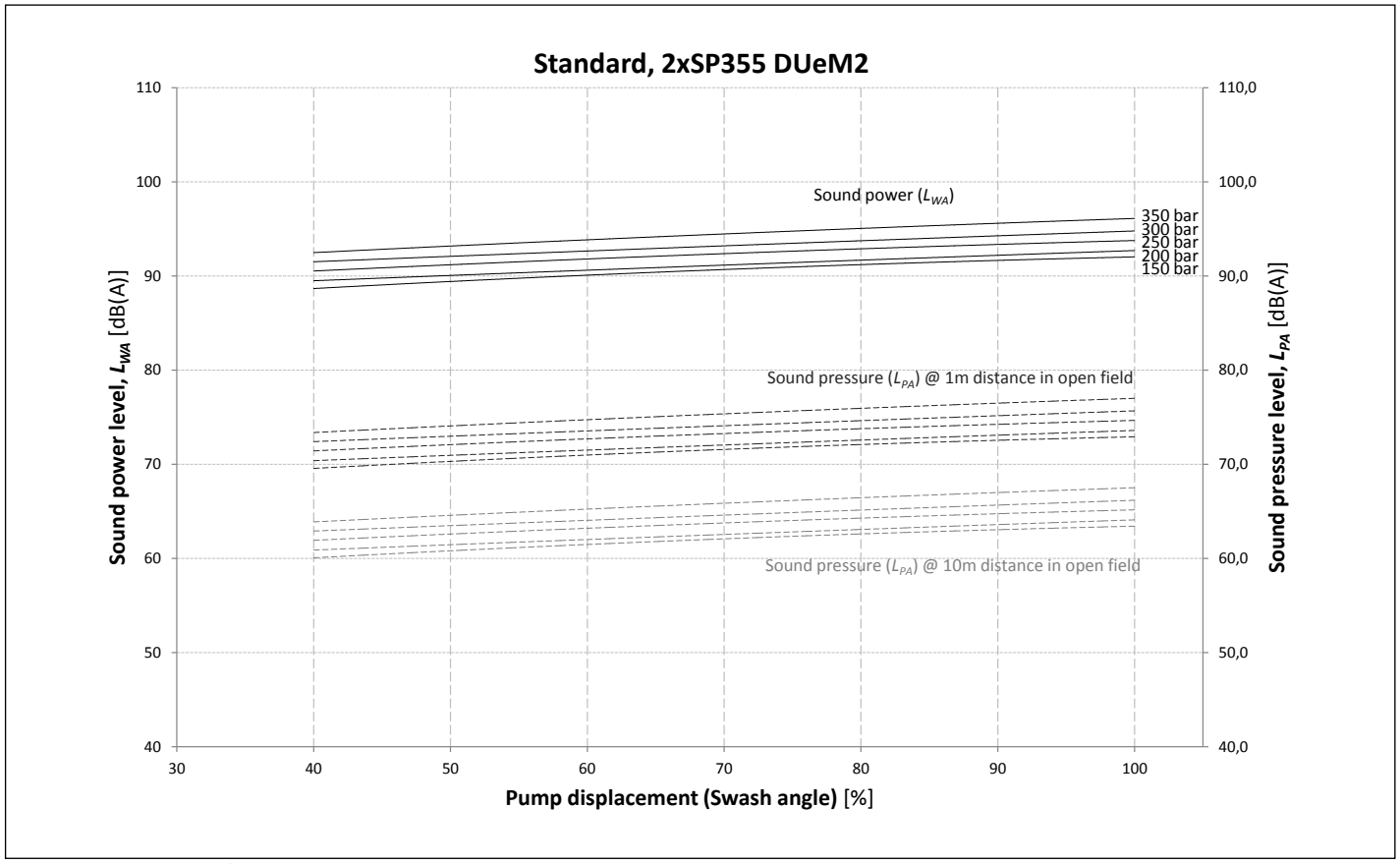

Fig. 74: Sound power / pressure level 2 x SP355, 60 kW DUe M2

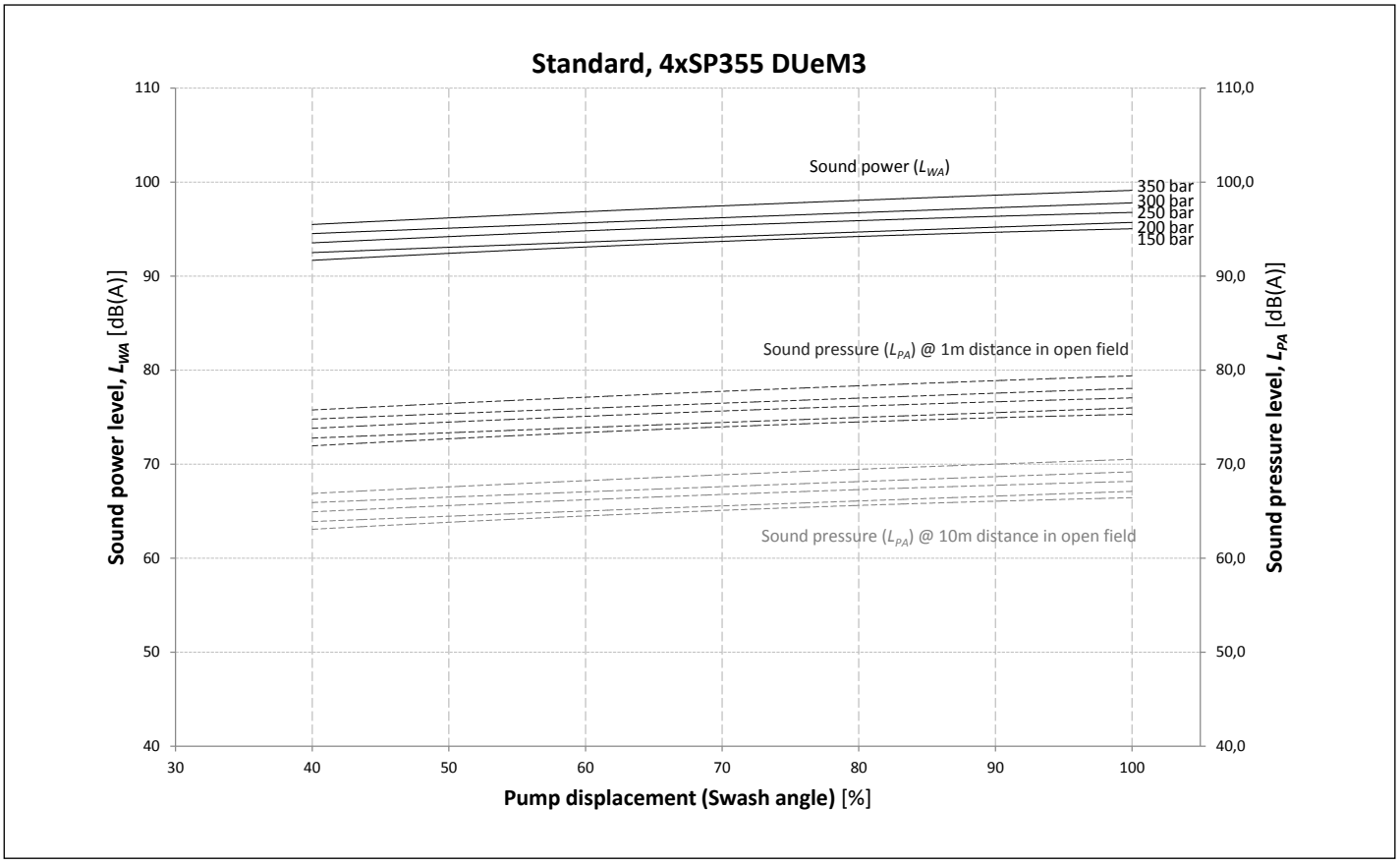

Fig. 75: Sound power / pressure level 4 x SP355, 60 kW DUe M3

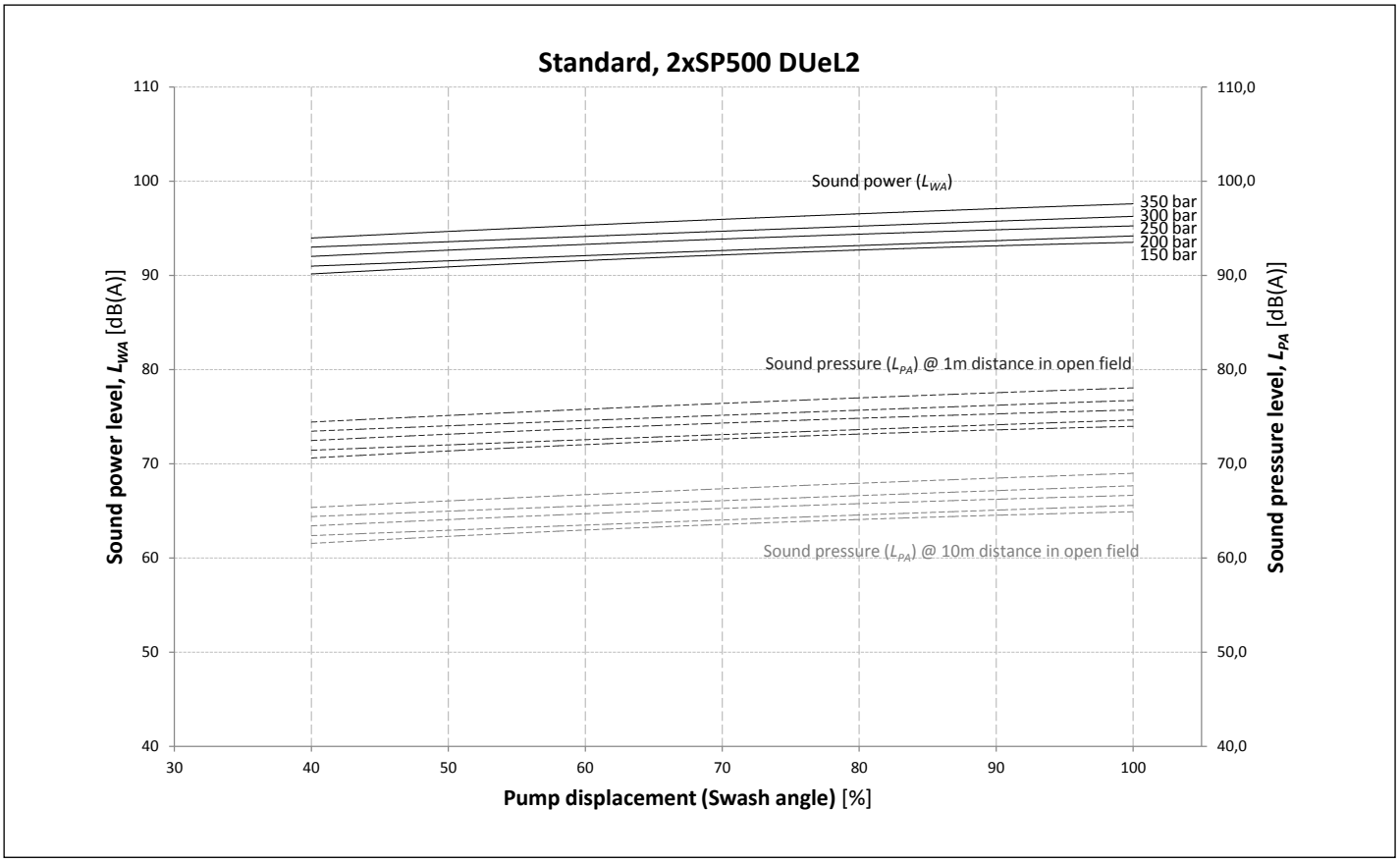

Fig. 76: Sound power / pressure level 2 x SP500, 315 kW DUe L2

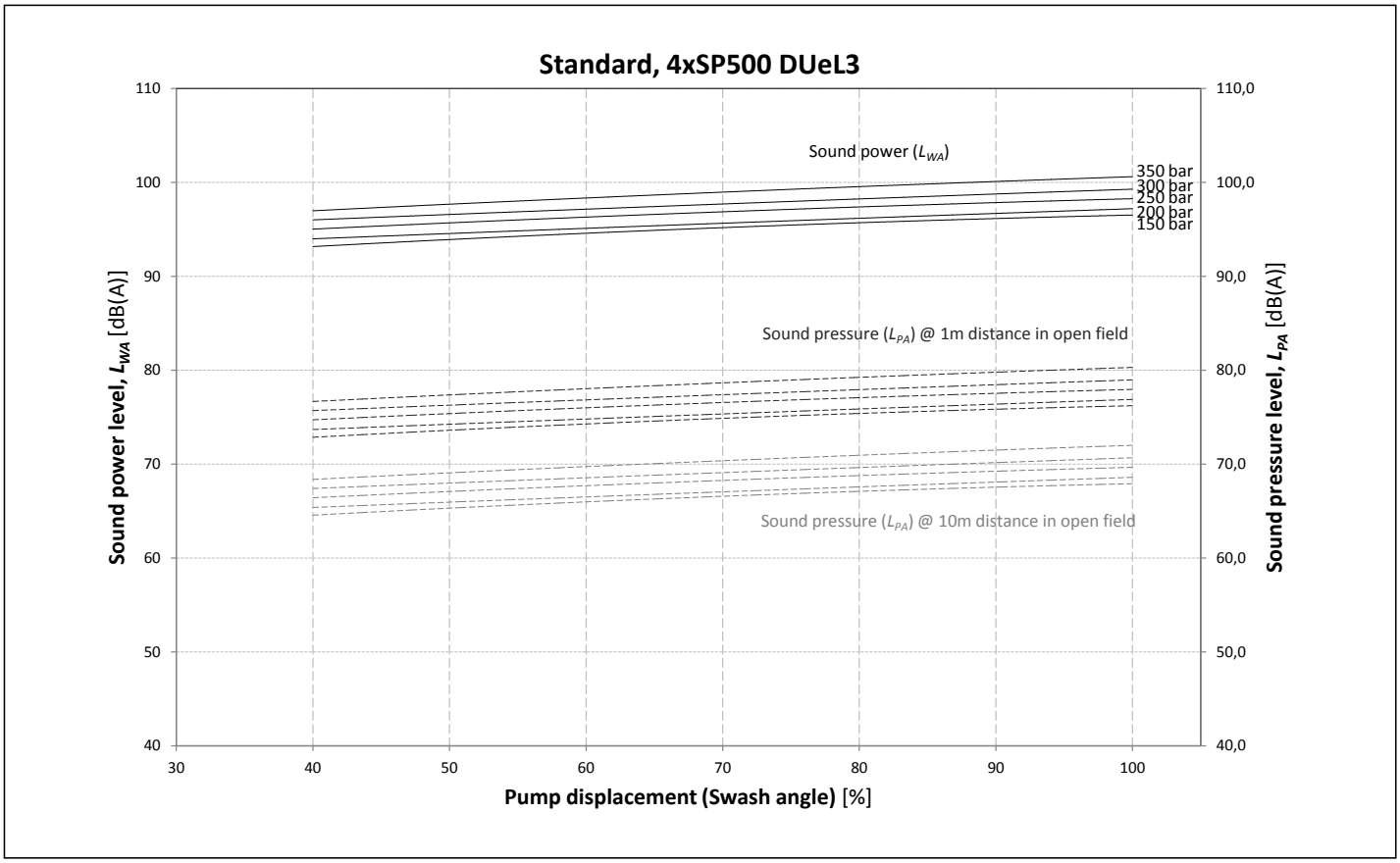

Fig. 77: Sound power / pressure level 4 x SP500, 315 kW DUe L3

4.5 Environment options

4.5.1 Flushing

Flushing is used either to cool or warm up the hydraulic motor and/or pump, depending on need due to the environmental conditions that the drive unit will be working at.
Cold flushing is done by one of two different methods;

- A separate pump that takes oil from the oil tank and pumps it through one of the drain connections on the motor and/or pump and back to the tank.
- A check valve leads a part of the cooled oil from the oil cooler to the connecting ports on the motor and/or pump and back to the tank via drain line. This method can cause problems for air coolers due to pressure spikes, if the drive unit is supporting chock load applications.

When warm flushing is activated, oil from the tank is pumped by a separate flushing pump through a pressure relief valve and further to the motor and pump. When the oil passes the valve it gets warmed up.

4.5.2 Brake release system

The brake release system is an additional function where flow from either the charge pump or a separate pump is used to open the brake on the hydraulic motor depending on brake opening pressure level. The preset brake opening pressure level is 15, 60 or 200 bar (218, 870 or 2 901 psi) depending on brake type. The flow is controlled via a directional valve in the drive unit.

4.5.3 Low temperature

< 0°C (< 32°F)

- It is recommended to equip the oil tank with a heater.
- It is recommended to equip the drive unit with an auxiliary flushing circuit for warm flushing of pump(s) and hydraulic motor(s).
- An air-oil cooler has to be used, due to the freezing point of water.

< -20°C (< -4°F)

- It is mandatory to equip the oil tank with a heater.
- It is mandatory to equip the drive unit with an auxiliary flushing circuit for warm flushing of pump(s) and hydraulic motor(s). The electric motor for the auxiliary circuit will be placed outside of the drive unit.
- All electric motors will be specified for temperatures < -20°C.
- Spider control unit will be equipped with heater.
- The hydraulic compartment in the drive unit will be sealed off, to avoid cold air from the electric motor to cool down the hydraulic area.
- The hydraulic compartments in the drive unit will be equipped with heaters.

< -30°C (< -22°F)

All electric motors will be specified for temperatures < -30°C.

< -40°C (< -40°F)

The drive unit has to be placed indoors.

4.5.4 High temperature

Ambient temperatures > 40 °C (104 °F) limit the permitted output power for the electric motor.
For ambient temperatures > 40 °C (104 °F) it is recommended to use water-oil cooler.

4.5.5 Sound protection

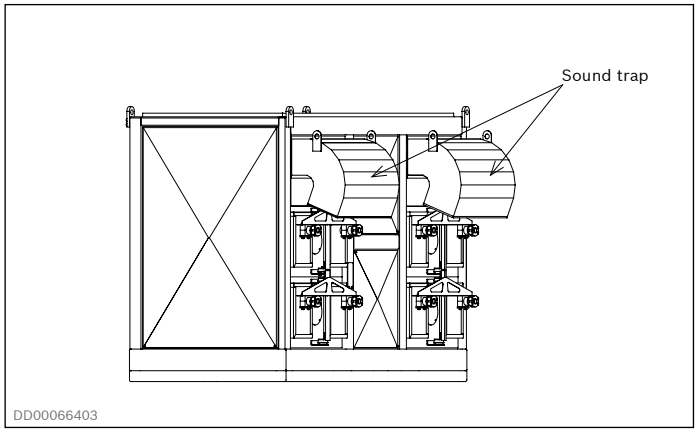

Fig. 78: Sound trap

The drive unit can be equipped with extra sound protection, which means that the weighted sound power level is in average 2dB(A) lower than than a drive unit with original panels.
A drive unit with sound protection has sound trap fitted at the outlet for electric motor air and the outlet area for the pump high pressure hoses is covered with a thick insulation.

4.5.6 Dust protection

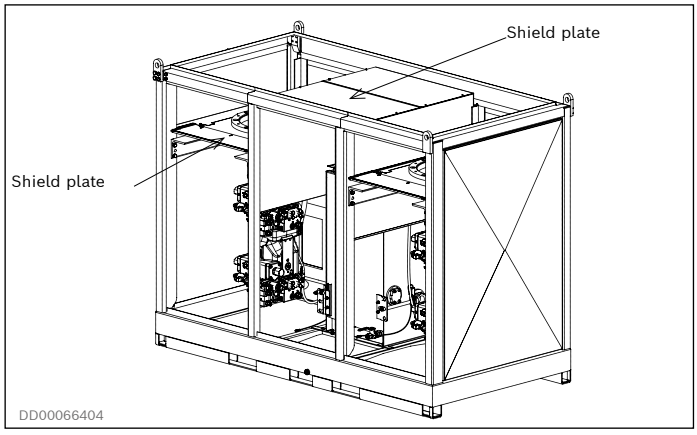

Fig. 79: Shield plate

The drive unit can be equipped with dust protection if the unit is located in an environment with high dust content in the air. The unit is sealed off with shield plates between electiric motor and hydraulic compartment to prevent dirt contamination into the hydraulic part of the unit.

4.5.7 Rain protection

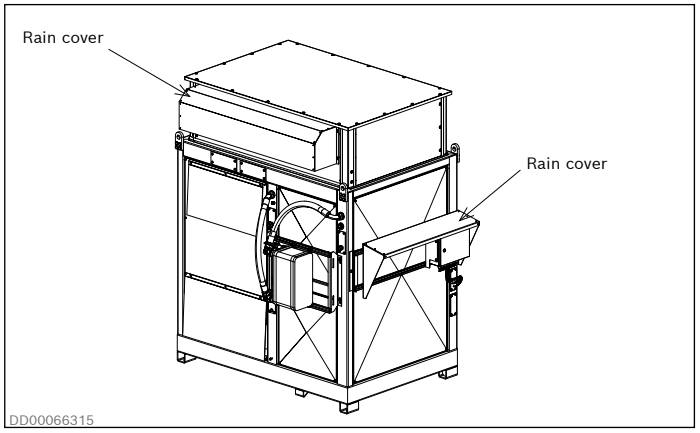

Fig. 80: Rain cover

The drive unit can be equipped with rain protection if the hydraulic unit is placed outdoors exposed to rain. This is to prevent water to follow the air into the unit. An additional rain cover is protecting the top of Spider control unit.

4.5.8 Anchoring possibility

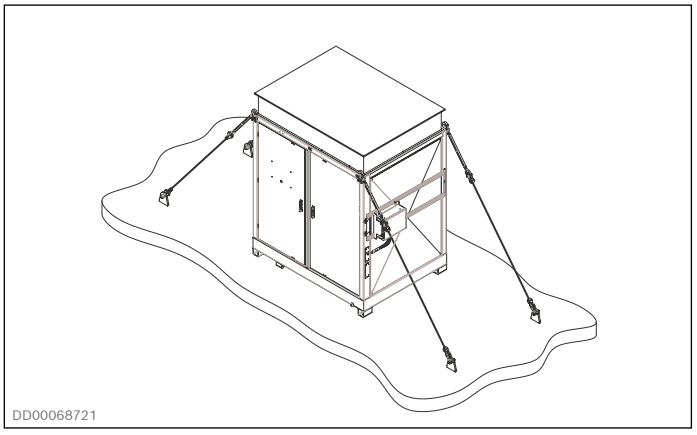

Fig. 81: Anchored DUe

If the unit is mounted on an inclined plane or if it is exposed to external influences such as wind or vibration, the unit can be anchored according to *Fig. 81* .
Anchoring support is not included in scope of supply.

4.5.9 Machine feet

If the unit needs to be isolated regarding vibrations or to compensate for uneven surfaces machine feet can be used. They have an adjustment range of 30-38 mm (1.18-1.50 inch).

4.5.10 Oil pan

The bottom part of the DUe is designed to work as an oil pan for leakage oil. The oil can be removed from the pan via a drain tap on the front side. For oil pan size see *4.1.8*

4.5.11 Painting

Two different corrosivity categories regarding corrosion protection are available in accordance with SS-EN ISO 12944:

• Corrosivity category - C3

Frame and external brackets:	RAL 9005 Black
Doors, hoods and panels	RAL 2002 Orange

• Corrosivity category - C5

Frame and external brackets:	RAL 9005 Black
Doors, hoods and panels:	Stainless steel EN 1.4301

All external bolts, washers and nuts are A4 stainless steel.

4.5.12 Hazardous areas

The drive unit can be adapted to work in hazardous areas, ATEX Zone 1 or Zone 2.
In order to comply with the requirements for certification particular components are needed and there may also be some limitations of functions from what a non-certified drive unit can handle.

4.6 External pipe work General

The drive unit should be placed close to the hydraulic motor in order to minimise piping if it is possible.
See*"4.1.2 Positioning the DUe", page 15*

4.6.1 Pipe size

The pipe work between motor and the drive unit shall be dimensioned for at least four times the maximum pressure, the equipment may be re-adjusted to higher pressures in service.
It is important that the lines between the main connections of the motor and drive unit are as short as possible. The total pressure drop in the main and return line must not exceed 5% of the normal working pressure.
The pipe shall be sized to give the following approximate flow rates:

Main lines	<	5-7 m/s
Return lines	<	3 m/s
Drain & suction lines	<	1 m/s

It is particularly important that the pressure in drain lines does not exceed the max. case pressure for motor/pump.

4.6.2 Material in hydraulic pipes

Use a high-grade steel as per ISO 3304, DIN 2391/C or ASTMA 519 1010 for the hydraulic pipes.

4.6.3 Pipe couplings

For pipes with:
d ≤ 25 mm: SAE J514 (SAE-16)
25 ≤ d ≤ 60 mm: SAE J518 (SAE-16)

4.6.4 Pipe clamps

The pipes shall be clamped with uniformly spaced clamps. The distance between the clamps depends on the type of clamps but it may not exceed the following values:
15 ≤ d ≤ 38 mm max. 2 000 mm
d ≥ 38 mm max. 3 000 mm
In addition, the pipes must be clamped immediately before and after a bend and immediately before transition to a hose.
The pipe clamps shall be secured to a stable and non vibrating surface.
The pipe clamps must be of a type permitting a certain amount of axial and radial motion in the clamped joint and have good vibration-absorbing property.

4.6.5 Welded couplings

Welded couplings shall be avoided because of the high possibility of system contamination due to the welding process.

4.6.6 Hoses

- Hoses shall always be used between piping and hydraulic motor/pump.
- Use flexible hoses to prevent imposing stress from moving/vibrating equipment.
- Connect hoses with attention to bending radius, adequate slack for machine movement and select to hang without stressing the end fittings.
- Use hoses, if it is possible, to connect direct between unit and machine to ease fitting and reduce transmission of noise.
- The hoses must be short and have the smallest possible diameter in order to obtain a small compression volume. Maximum flow velocities listed under “Pipe size“ must however be taken into consideration.

4.7 Hydraulic fluids

The Hägglunds DUe is primarily designed for operation with hydraulic fluids according to ISO 11158 HM.
Before the start of project planning, see data sheet RE 15414, Hydraulic fluid quick reference, for detailed information on hydraulic fluids and specific additional demands.

ISO 11158	ISO 15380	ISO 12922
Mineral oil based and mineral oil related hydraulic fluids	Environmentally acceptable hydraulic fluids	Fire resistanthydraulic fluids

Within these standards, not all fluid classes are allowed, some are recommended, and there are also additional demands (see data sheet RE 15414).

5 Accessories

5.1 Spidercom

Spidercom is a Windows program for communication with Spider control system.
It is used for:

- uploading and conversion of log data
- uploading, editing and downloading of setup parameters

The program can run on Windows 7, 8 or 10. A standard RS232 serial port is recommended for communication with Spider. If that is not available, a USB to serial converter must be used.

5.2 VpCI

The emitter VpCI (Vapor phase Corrosion Inhibitor) is mounted inside electrical and electronic enclosures to protect against oxidation. The emitter (containing a pulverous substance) emits a vapor that covers all components with a protective layer when the air inside the enclosure is saturated.
The Emitter can be stored for 2 years before installation if the protective bag is air tight. Life time after installation is 2 years.

6 Packing

6.1 Packing procedure

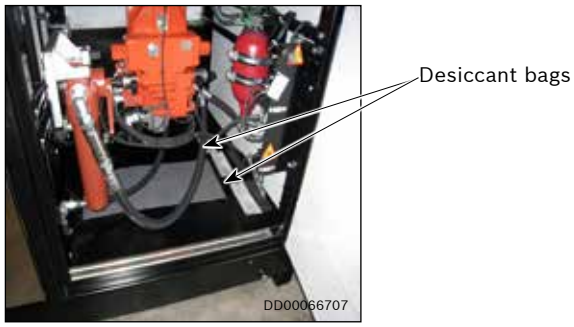

Fig. 82: Desiccant bags

- Desiccant bags are placed inside the DUe to avoid corrosion

Fig. 83: Plastic bag

- The cabinet is sealed with a plastic bag. and covered with a crate

Fig. 85: Rain protection **Fig. 84: Crate**

- The top of the crate is rain protected with plastic film
- The crate is marked with centre of gravity, fork lifting points and weight
- Packing material confirming with ISPM No. 15

6.2 Items not assembled at delivery

6.2.1 Items not assembled at delivery

- Main electric motors with an assembly height above the lifting ears of the frame
  DUe Small: Siemens max 37 kW
  DUe Medium: Siemens max 110kW
  Motors for tandem pumps not assembled.
- Top cover
- Cooler assembly
- High pressure hoses (optional)
- Sound trap (optional)
- Leveling pipe (optional)

All items delivered separated from the drive unit are protected with VCI plastic bags.

6.2.2 Small items not assembled at delivery

- Machine feet (optional)
- Filter element - spare

7 Required and additional documents

	Title	Document no	Document type
🕮	Installation and maintenance manual, Hägglunds DUe	RE 15325-WA	Instruction manual
🕮	User manual Hägglunds Spider	RE 15330-WA	Instruction manual
🕮	Pump control, Hägglunds ICp	RE 15422	Data sheet
🕮	Sound and vibration	RE 15411	Data sheet
🕮	Hydraulic fluid quick reference	RE 15414	Data sheet
🕮	Hydraulic fluids based on mineraloils and related hydrocarbons	RE 90220	Data sheet
🕮	Environmentally acceptable hydraulic fluids	RE 90221	Data sheet
🕮	External gear pump High Performance AZPF (Pump size 4/11 cc)	RE 10089	Data sheet
🕮	External gear pump High Performance AZPG (Pump size 32/56 cc)	RE 10093	Data sheet

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