Data sheet

Axial piston double motor with variable displacement: DMVA

The Liebherr axial piston double motors DMVA series have a swash plate design for the open and closed circuit and were specially developed for use in mobile machinery in harsh environments.

The inverse drive with a swivel angle of 22° is very efficient and has a very high power density, making it ideal for applications that require an adjustable displacement.

These flanged variable displacement double motors are available in nominal sizes from 165–108 to 215–165.

The nominal pressure of the units is 450 bar and the maximum pressure is 500 bar absolute.

The rotary groups are separately or parallelly adjustable. A common port plate simplifies piping installation.

The DMVA series is available with the most common controls. Speed sensor or preparation for speed sensor available on request.

Valid for:
DMVA 165-108
DMVA 165-165
DMVA 165-215
DMVA 215-165
DMVA 165-165/108 (Axial piston-multi circuit motor)

Features:
Series D
Open and closed circuit

Regulator types:
Various regulator types can be selected

Pressure range:
Nominal pressure pHD_N = 450 bar
Max. pressure pHD_{max} = 500 bar

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LIEBHERR
Components

Table of contents

Axial piston double motor
DMVA 108 to 215

1 Type code

Axial piston double motor
DMVA 108 to 215

1.	2.	3.	/	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
DMVA			/			1	W		1	A	0			

1. Motor type

D series / motor / variable / flanged	DMVA

2. Type of circuit

Closed circuit	■	G
Open circuit	■	O

3. Nominal size (NS)

NS	165-108	165-165	165-215	215-165	

4. Residual displacement $V_{g\ min}$ cm^3

	Enter values in cm^3 for both axial piston units separated by "/", e.g.: 000 / 055	

5. Type of drive and regulator

Electro-proportional (negative characteristic)	□	■	□	□	EL
Electro-proportional (positive characteristic)	■	■	□	□	EL1
Electro-proportional (negative characteristic) / pressure regulation	□	■	■	■	EL - DA
Electro-proportional (negative characteristic) / pressure regulation with oversteer	■	■	□	□	EL - DA1
Hydro-proportional (negative characteristic) / pressure regulation	□	■	□	□	SD - DA

6. Design

	1

7. Direction of rotation (front view of the drive shaft)

Varying	W

8. Mounting flange

Mounting flange ISO 3019-2	180B4	■	■	■	□	31
	200B4	□	□	□	■	31

9. Shaft end

Toothed shaft	DIN 5480	1

10. Connections

ISO 6162-2 / SAE J518-2, high-pressure connection 6000 psi	A

11. Accessories

Without add-on parts	0

1 Type code

Axial piston double motor
DMVA 108 to 215

	165-108	165-165	165-215	215-165	
12. Through drive					
Without through-drive	■	■	■	■	0
Special through-drive	□	■	□	□	K
13. Valves					
Without valve	■	■	■	□	0
Flushing, closed circuit	■	■	■	■	SO
14. Sensors					
Without sensor	■	■	■	■	0
Speed sensor	■	■	□	□	D*
Angle sensor	□	■	□	□	W*

* Can be combined, separated by hyphen, e.g.: D-W

■ = available
□ = on request
- = not possible

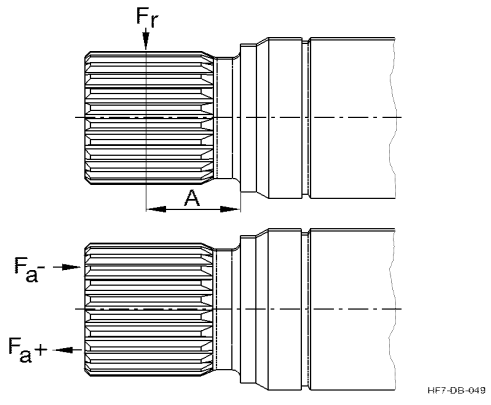
Note
Contact addresses for queries are provided on the back of this document.

2.1 Table of values

Nominal size			165-108	165-165	165-215	215-165
Displacement	$V_{g\ max}$	cm^3	167.8-107.7	167.8-167.8	167.8-216.6	216.6-167.8
	$V_{g\ min}$	cm^3	0 - 80% of $V_{g\ max}$, value specified in [cm^3/rev] Other values upon request			
Displacement flow at n_{max}	qv_{max}	l/min	827	1007	1038	1038
Max. speed at $V_{g\ max}$ and Δp^* = 430 bar	n_{max}	rpm	3000	3000	2700	2700
Max. speed at $V_{g\ max}$ = 0.65 and Δp = 200 bar	n_{max}	rpm	4500	4500	4100	4100
Output torque at $V_{g\ max}$ and Δp = 430 bar	M_{max}	Nm	1885	2297	2631	2631
Torq constant at $V_{g\ max}$	M_K	Nm/ bar	4.38	5.34	6.12	6.12
Output power at qv_{max} and Δp = 430 bar	p_{max}	kW	593	722	744	744
Torsional rigidity	Nm/rad * 10^3		353	353	353	511
Driving gear moment of inertia	J_{TW}	kgm^2	0.0464	0.0626	0.0773	0.0773
Weight (approx.)	m	kg	140	152	179	179

Note
The stated values (maximum values) are theoretical values, rounded, and without efficiencies or tolerances.

2.1.1 Maximum radial and axial load of the driving shaft

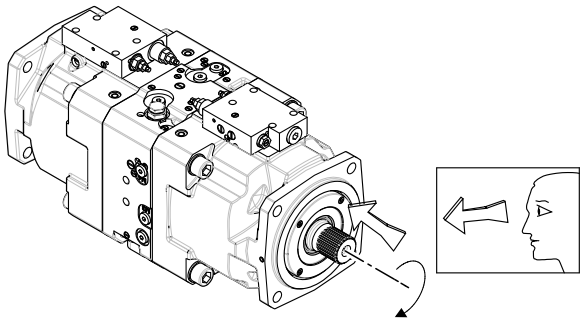


Nominal size			165-108	165-165	165-215	215-165
Max. radial force	$F_{r\ max}$	N	Values upon request			
Max. axial force	$F_{a\pm\ max}$	N				

Note
The radial and axial loads depend on the load cycle, e.g. pressure, revolutions and direction of force. If planning a belt drive or continuous axial and/or radial forces are expected, please contact Liebherr.

2.2 Direction of rotation

1.	2.	3.	/	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
DMVA			/			1	W			A				



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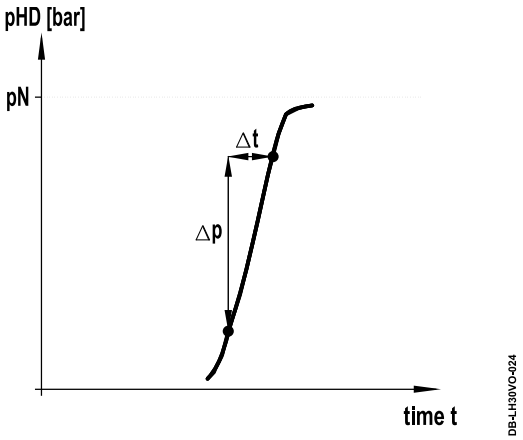
The direction of rotation is stated with view of the driving shaft, as shown in the figure.

R	Right	=	clockwise
L	Left	=	anti-clockwise
W	variable	=	depending on the activation at A / B

2.3 Permitted pressure range

2.3.1 Operating pressure



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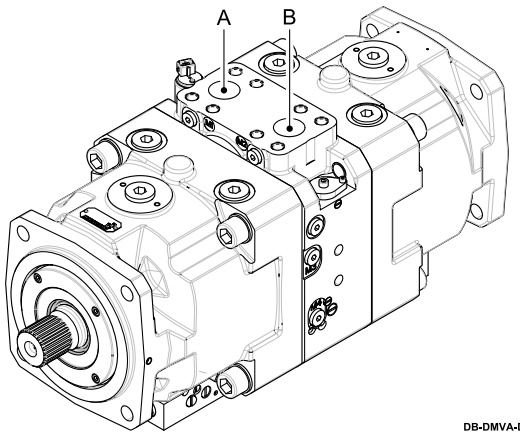

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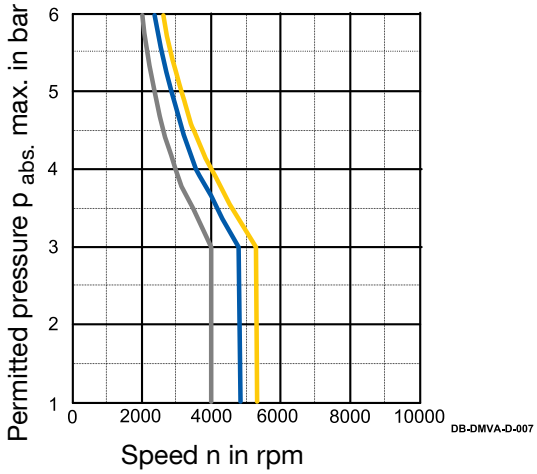
Operating pressure at connection A / B			108 to 215	
			open circuit	closed circuit
Minimum pressure***	pHD_{min}	bar	8	
Nominal pressure (fatigue endurable)	pHD_N	bar	400	450
Maximum pressure (single operating period)	pHD_{max}	bar	450	500
Single operating period at maximum pressure pHD_{max}	t	s	< 1	

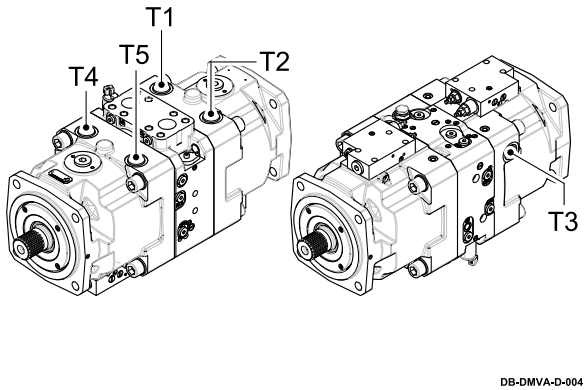
Total operating period at maximum pressure pHD_{max}	t	Bh*	300**
Rate of pressure change	RA	bar/s	17000

*) Bh = operating hours
**) If nothing else is stated
***) There must be minimum pressure in the working circuit at connection A / B to ensure adequate lubrication of the driving gear during operation

DANGER
Failure of the fastening screws at working connection A / B!
Danger to life.
Use fastening screws of strength category 10.9.

2.3.2 Housing, leakage oil pressure





Characteristic	Nominal size	Shaft diameter (mm)
	108	45
	165	50
	215	60

Leakage oil pressure at connection T1 to T5			
Nominal size			**108 to 215**
Permanent leakage oil pressure, absolute, open and closed circuit	p_L	bar	3
Maximum pressure, absolute, open and closed circuit at reduced speed	pL_{max}	bar	6*

*) Short pressure peaks of max. 10 bar abs. are permitted (t < 0.1 s).

Note
The pressure in the axial piston unit must always be higher than the external pressure on the shaft lip seal.

2.4 Shaft lip seal

2.4.1 General information

The rotary shaft lip seals (RWDR) are special sealing elements which permit a specific housing pressure. To ensure that the tribological system functions optimally, the operating conditions must be complied with.

Sealing edge temperature varies due to the following factors in the housing:
- Circumferential speed
- Hydraulic fluid temperature
- Lubricating medium
- Pressure build-up

The sealing edge temperature may be around 20 °C to 40 °C above the leakage oil temperature of a hydraulic axial piston unit.

2.4.2 Temperature range

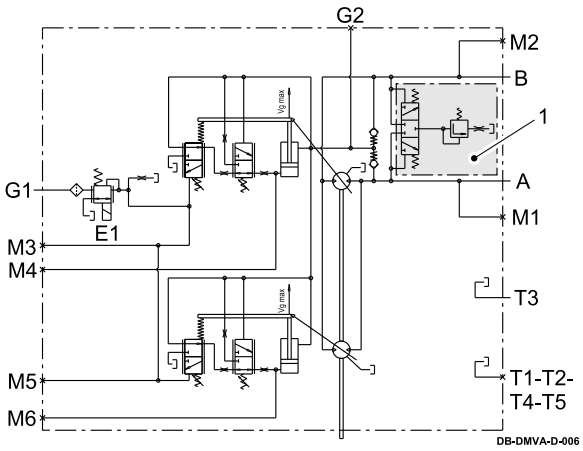
The FKM rotary shaft lip seal is permitted for leakage oil temperatures from -25 °C to +115 °C.
For applications under -25 °C: Please contact us.

2.5 Housing flushing

Under different operating conditions, e.g. a very low displacement flow over a longer period of time, the temperature in the housing may rise to its limit. see chapter 2.6

Depending on the hydraulic setup, a flushing circuit 1 for cooling and filtration may be required, where the "hot" hydraulic oil is led to an external cooler, cools down and is fed back into the hydraulic system.

The flushing volume Q_V in l/min is to be set individually for each nominal size in connection with the application and is the responsibility of the device or system manufacturer.



2.6 Hydraulic fluids

2.6.1 General information

Selection of the appropriate hydraulic fluid is significantly influenced by the anticipated operating temperature relative to the ambient temperature, which is equivalent to the tank temperature.

ATTENTION
You must not mix different mineral oil hydraulic fluids!

Minimum required quality

Specification
LH-00-HYC3A
LH-00HYE3A

Note
For more information, see: www.liebherr.com (brochure: Lubricants and service fluids) Alternatively: Contact lubricants@liebherr.com.

2.6.2 Fill quantity

Nominal size	Fill quantity
108 to 215	Values upon request

Note
Before commissioning, the hydraulic unit must be filled with oil and vented.
This process must be checked and repeated if necessary during operation and after long downtimes!

2.6.3 Filtering

- To maintain the specified purity class “21/17/14 according to ISO 4406” under all circumstances, filtering of the hydraulic fluid is necessary.
- The hydraulic fluid is filtered by the device-specific use of oil filters in the hydraulic system.
- Cleaning and maintenance intervals for the oil filters and the entire oil circuit depend on use of the unit (see the device-specific operating instructions).

2.6.4 Operating limits

ATTENTION
Temperatures ≤ -40 °C in the system = axial piston unit must not be operated.
Pre-heat the axial piston unit to at least -40 °C.

Phase	Temperature [°C]**	Viscosity [mm^2/s]*
Cold start phase	-40 to -25	1600-1000
Warm-up phase	above -25	1000-500
Normal operation		< 500

*) Depending on the hydraulic fluid that is used
**) Relative to tank temperature

Note
Optimum operating range: 16-36 mm^2/s
The viscosity must not fall below 8 mm^2/s (for a short period, thud < 3 minutes, 7 mm^2/s) at maximum leakage oil temperature.

- Cold start phase:

ATTENTION
The following operating conditions must be maintained during the cold start phase:

- Operating pressure range: $pHD_{min} < pHD_{cold\ start} < 30$ bar
- Speed $n_{cold\ start} \leq 1000$ rpm

Start the drive motor and operate the axial piston unit under the specified operating conditions until a temperature of at least -25 °C has been reached.

- Warm-up phase:

ATTENTION
The following operating conditions must be maintained during the warm-up phase:

- Operating pressure range: $pHD_{min} < pHD_{warm\text{-}up} < 50\%$ of pHD_N
- Speed $n_{warm\text{-}up} \leq 50\%$ of n_{max}

Start the drive motor and operate the axial piston unit under the specified operating conditions until a viscosity of approx. 500 mm^2/s has been reached.

- Normal operation:

Note
No restrictions apply to operating data.

3 Type of drive and regulator

Axial piston double motor
DMVA 108 to 215

3.1 Regulator types

1.	2.	3.	/	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
DMVA			/			1	W		1	A	0			

Note
Only one nominal size is illustrated per regulator type or function, typically nominal size 165. Special applications and designs are not included in this chapter. Always use the information from the installation drawing provided or contact Liebherr.

The following applies to all regulator types:

DANGER
The spring-guided reset in the regulating valve is not a safety device!
Contaminants in the hydraulic system such as swarf or dirt from the device or system parts can cause blockages at undefined points of various regulator components.
Under some circumstances, the machine operator's specifications can no longer be implemented.
It is the device or system manufacturer's responsibility to install a safety device e.g. an emergency stop.

The following modular types of drive and regulator can be ordered for the DMVA series:

3.1.1 Mechanic-hydraulic regulators

- SD-DA regulator, see chapter 3.2.1

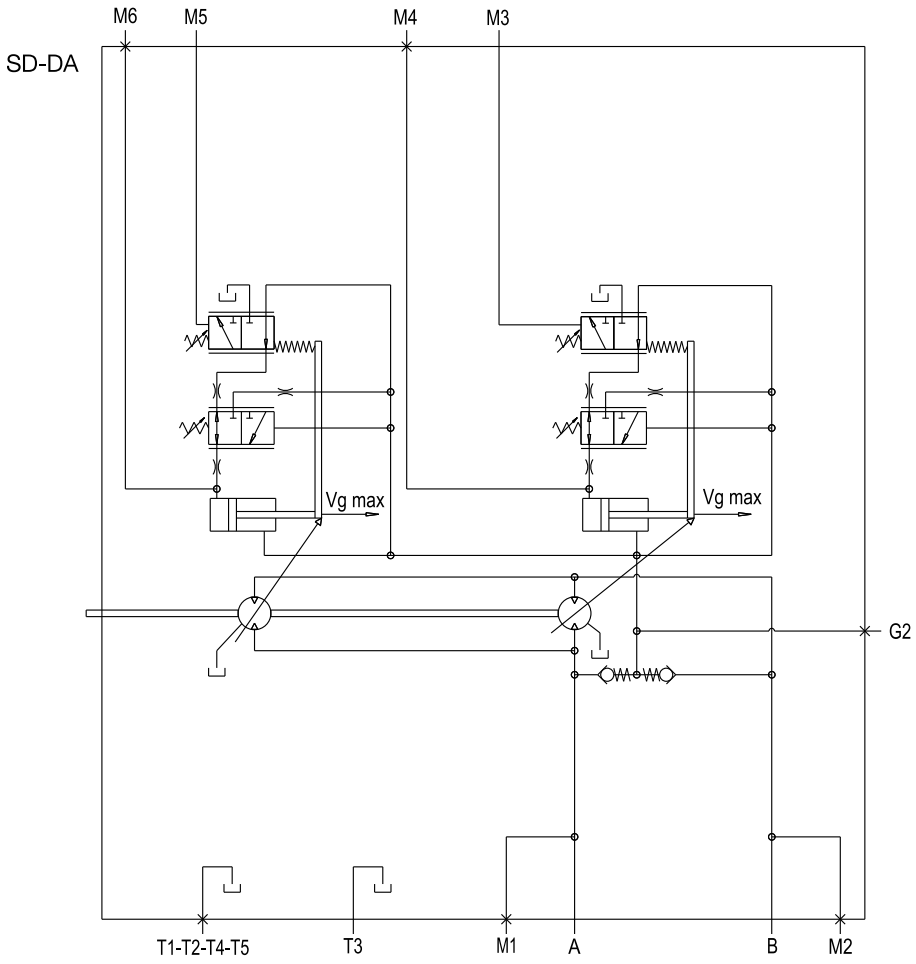
3.1.2 Electro-hydraulic regulators

- EL regulator, see chapter 3.2.2
- EL1 regulator, see chapter 3.2.2
- EL-DA regulator, see chapter 3.2.2
- EL-DA1 regulator, see chapter 3.2.2

Additional regulator types upon request.

3.2 Standard hydraulic diagrams

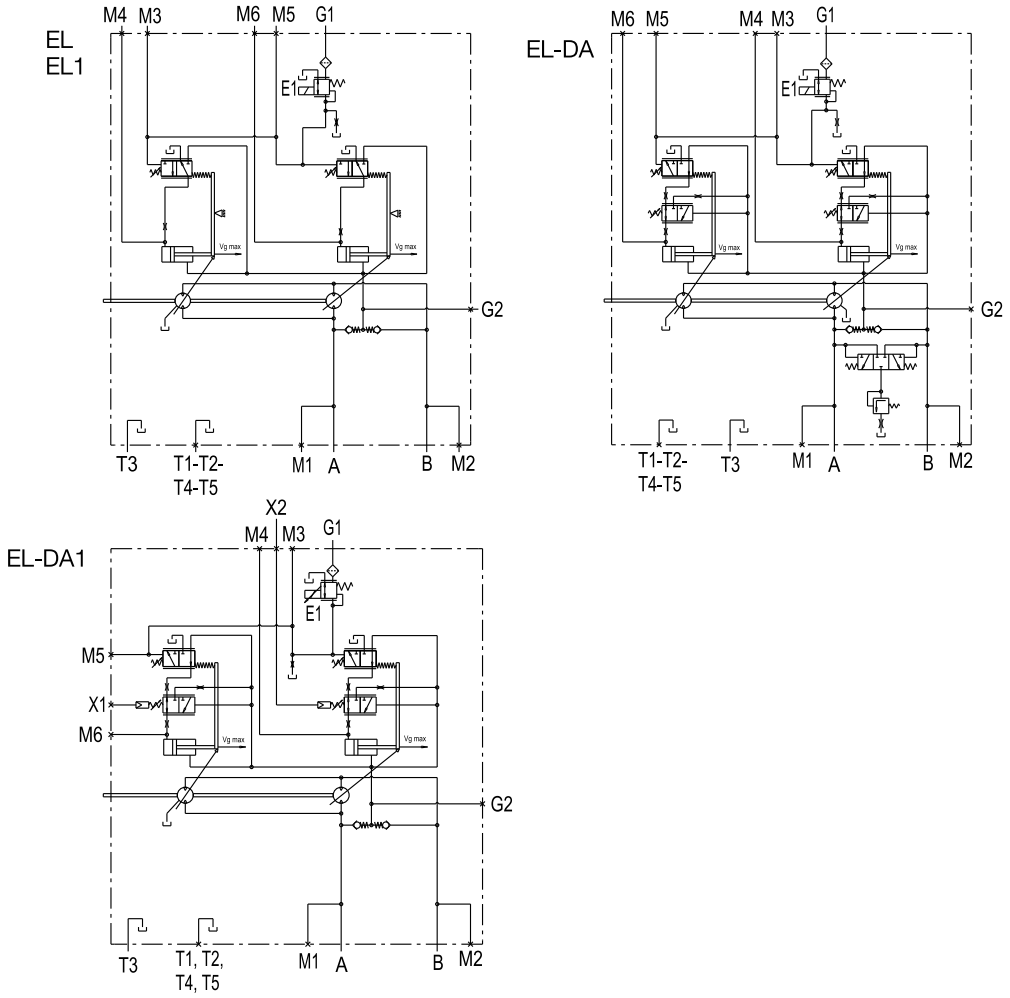
3.2.1 Mechanic-hydraulic regulators



A, B	Working connections SAE J 518	M3, M5	Steering pressure connection ISO 9974-1
G2	Auxiliary pressure ISO 9974-1	M4, M6	Regulating pressure measuring connection ISO 9974-1
M1, M2	High pressure measuring connections ISO 9974-1	T1, T2, T3 T4, T5	Leakage oil connection ISO 9974-1

Note
Oil inlet at connection A: direction of rotation = clockwise
Oil inlet at connection B: direction of rotation = anti-clockwise

3.2.2 Electro-hydraulic regulators:



A, B	Working connections SAE J 518	M3, M5	Steering pressure measuring connection ISO 9974-1
E1	DRE plug-in terminal AMP junior Timer, 2P	M4, M6	Regulating pressure measuring connection ISO 9974-1
G1	Regulating pressure supply ISO 9974-1	T1, T2, T3 T4, T5	Leakage oil connection ISO 9974-1
G2	Auxiliary pressure connection ISO 9974-1	X1, X2	DA1 oversteering signal ISO 9974-1
M1, M2	High pressure measuring connections ISO 9974-1	-	-

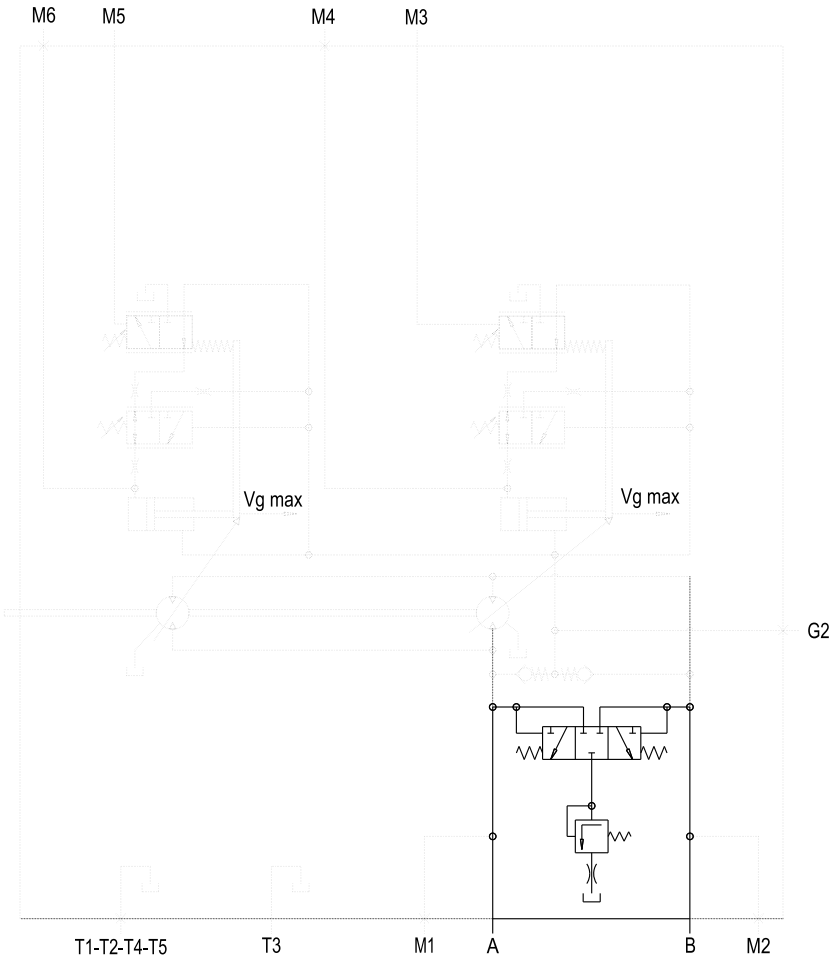
Note
Oil inlet at connection A: direction of rotation = clockwise
Oil inlet at connection B: direction of rotation = anti-clockwise

3.2.3 Regulators with flushing

Note
For flushing:

closed circuit = flushing compulsory

Closed circuit



A, B	Working connections SAE J 518	M3, M5	Steering pressure connection ISO 9974-1
G2	Auxiliary pressure ISO 9974-1	M4, M6	Regulating pressure measuring connection ISO 9974-1
M1, M2	High pressure measuring connections ISO 9974-1	T1, T2, T3 T4, T5	Leakage oil connection ISO 9974-1

Note
Oil inlet at connection A: direction of rotation = clockwise
Oil inlet at connection B: direction of rotation = anti-clockwise

3.3 Regulator functions

- SD function / steering pressure-proportional hydraulic regulation, see chapter 3.3.1
- DA function / pressure regulation, see chapter 3.3.2
- DA1 function / pressure regulation with oversteering, see chapter 3.3.3
- EL function / electro-proportional regulation, see chapter 3.3.4

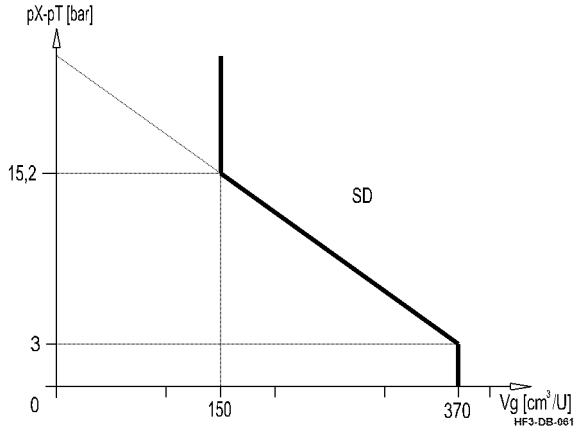
Note
For all regulator functions:

$V_{g\ min}$ = small torque “M” = high speed “n”
$V_{g\ max}$ = large torque “M” = low speed “n”

3.3.1 SD function (negative characteristic)

SD regulation is suitable for applications which require a proportionally regulated displacement flow.

Characteristic

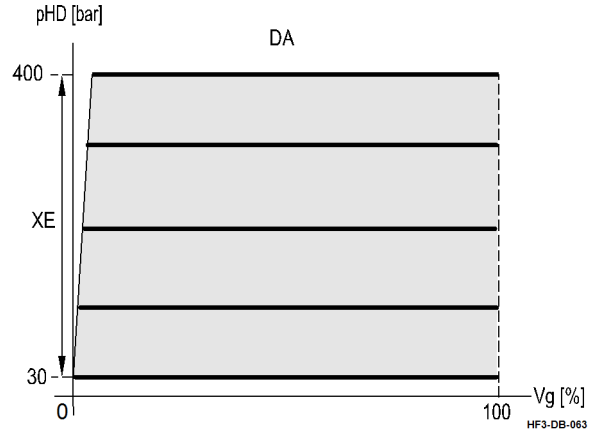


If the drive is adjusted from $V_{g\ max}$ towards $V_{g\ min}$, the axial piston unit swivels to a lower displacement V_g as the SD steering pressure at M3/M5 increases.

If the activating signal at M3/M5 is decreasing, missing or defective, the axial piston unit swivels towards $V_{g\ max}$.

3.3.2 DA function

Characteristic



The DA function regulates the displacement flow of the axial piston unit. The operating pressure is kept constant after reaching the setpoint, regardless of the torque at the driving shaft of the flange-mounted motor:

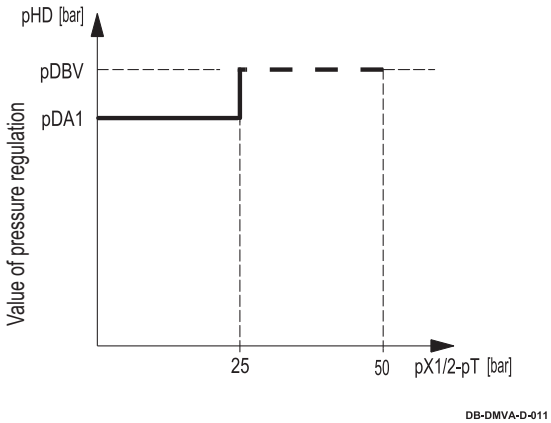
- As the output torque increases, the axial piston unit swivels towards $V_{g\ max}$ to keep the operating pressure constant.

- As the output torque decreases, the axial piston unit swivels towards $V_{g\ min}$ to keep the operating pressure constant.

Options
- Other internal design measures for vibration damping by arrangement.
- DA oversteering (DA1)

3.3.3 DA1 function

Characteristic



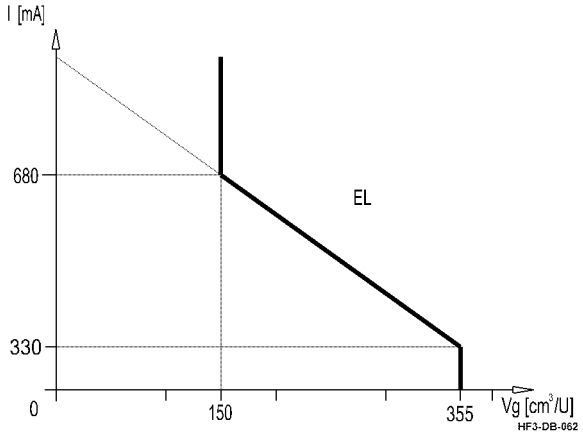
The DA1 function ensures for, e.g. with drilling head drive, for a deactivation of the DA function by controlling with an oversteer pressure (p_{min}= 25 bar, p_{max}= 50 bar) at X1/X2. The pressure increase is not limited until activation of the pressure limiting valve (pDBV).

The DA function remains active up to an oversteer pressure (p < 25 bar) at X1/X2.

3.3.4 ÉL function (negative characteristic)

EL regulation is suitable for applications which require a proportionally regulated displacement flow.

Characteristic



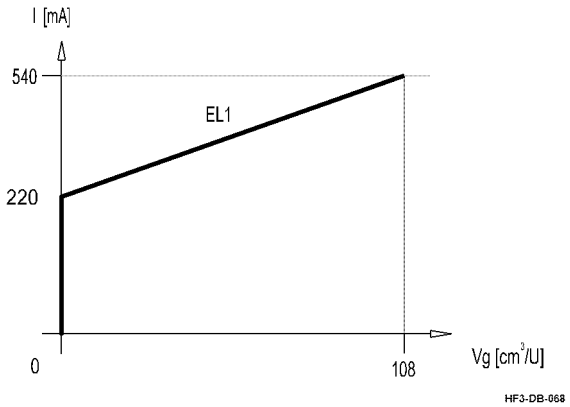
If the drive is adjusted from $V_{g\ max}$ towards $V_{g\ min}$, the axial piston unit swivels to a lower displacement V_g as the activating signal at E1 increases.

If the activating signal at E1 is decreasing, missing or defective, the axial piston unit swivels towards $V_{g\ max}$.

3.3.5 EL1 function (positive characteristic)

EL regulation is suitable for applications which require a proportionally regulated displacement flow.

Characteristic

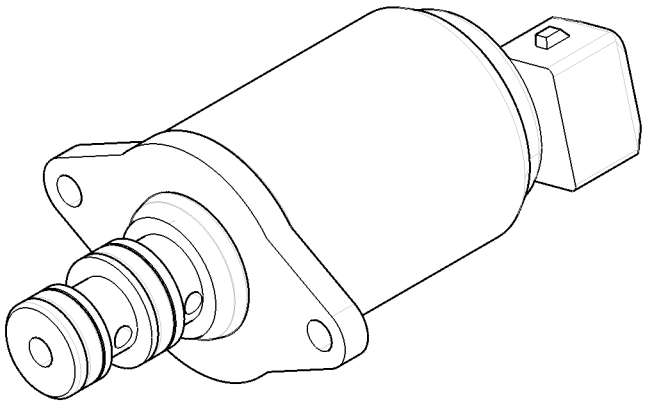


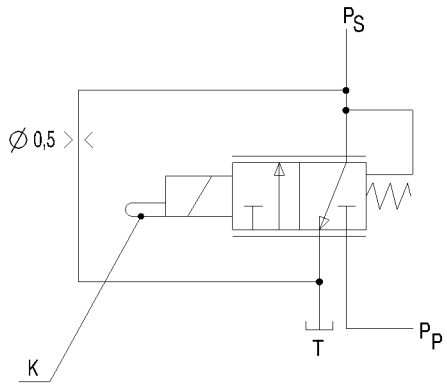
If the drive is adjusted from $V_{g\ min}$ towards $V_{g\ max}$, the axial piston unit swivels to a larger displacement V_g as the activating signal at E1 increases.

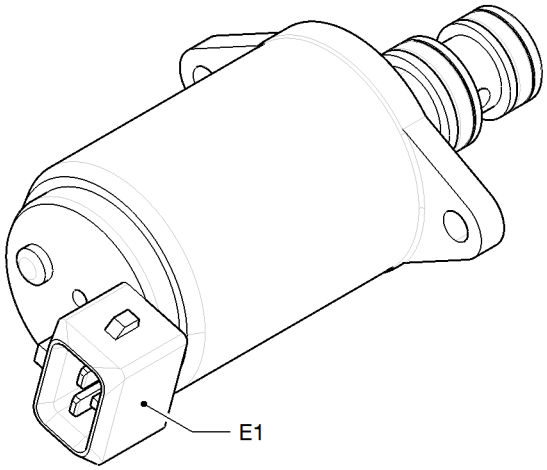
If the activating signal at E1 is decreasing, missing or defective, the axial piston unit swivels towards $V_{g\ min}$.

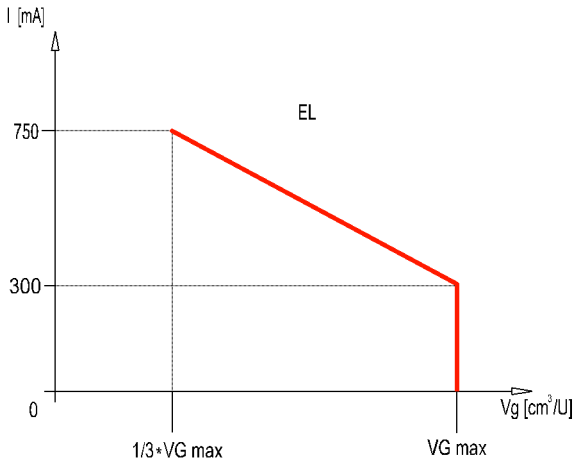
3.4 Electrical components

3.4.1 Pressure reduction valve (DRE)







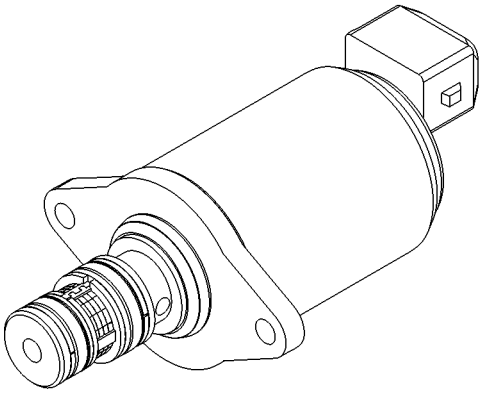


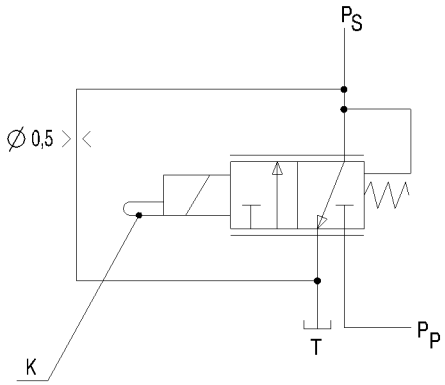
HF3-DB-066

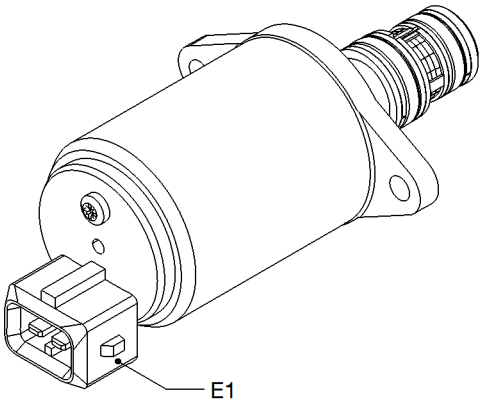
General information

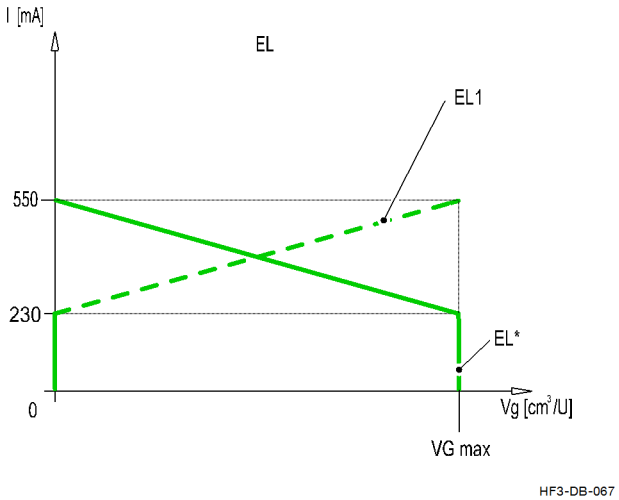
Technical data of pressure reduction valve	
Rated voltage U	24 V
Current $I_{max.}$	750 mA
Supply pressure p_{max}	50 bar
Magnet characteristic: flat around the regulating position	-
AMP JUNIOR TIMER plug connection	-

3.4.2 Pressure reduction valve (DRE)









General information

Technical data of pressure reduction valve	
Rated voltage U	24 V
Current $I_{max.}$	750 mA
Supply pressure p_{max}	350 bar
Magnet characteristic: flat around the regulating position	-
AMP JUNIOR TIMER plug connection	-

3.4.3 Sensors

1.	2.	3.	/	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
DMVA			/			1	W		1	A	0			

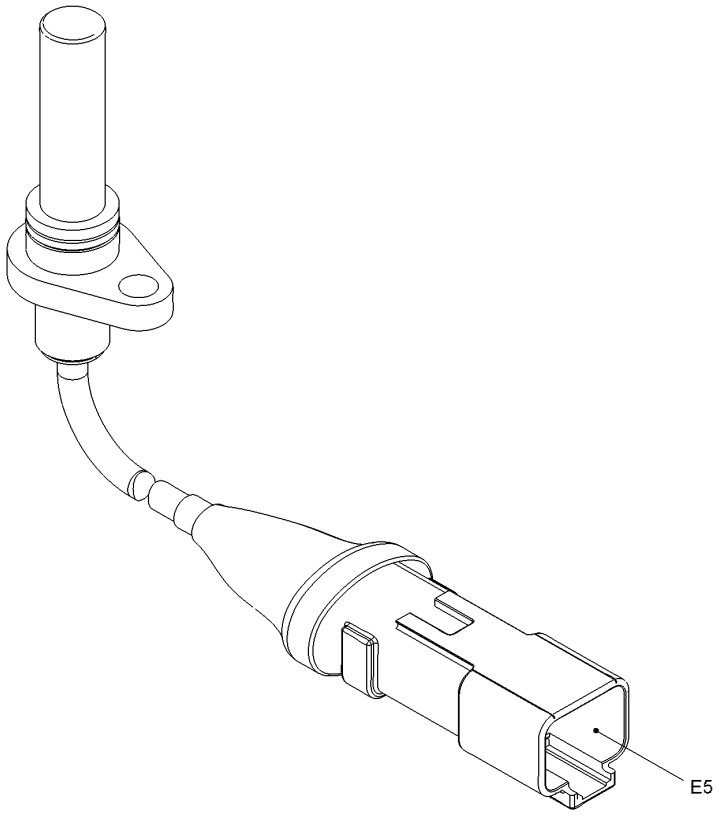
0 without sensor

D* With speed sensor

W* with rotation angle sensor

* can be combined, separated by hyphen, e.g.: D-W

Speed sensor

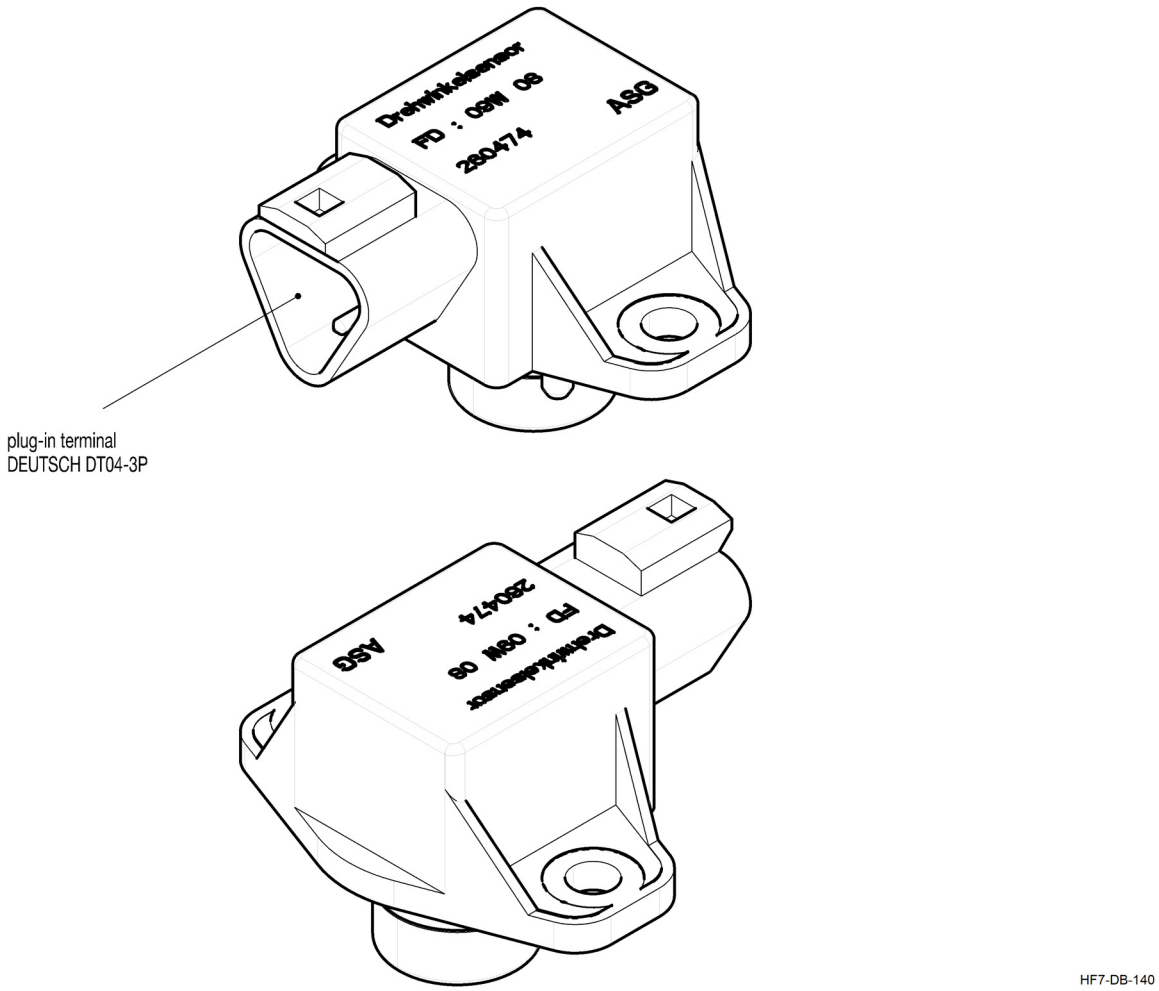


General information

Technical data of speed sensor	
Technical data according to BA 374E-64799	-
Plug-in terminal Deutsch DT04-4P-CE04	-

Note
The speed sensor cannot be retrofitted and must be included in the reconfiguration of the DMVA.

Rotation angle sensor



General information

Technical data of rotation angle sensor	
Rated voltage U	5 V
Measuring range	-27° to +27°
Output signal	0.5 VDC to 4.5 VDC
Working temperature	-40 °C to +125 °C
Plug-in terminal Deutsch DT04-3P	-

Note
The angle sensor cannot be retrofitted and must be included in the reconfiguration of the DMVA.

The installation variant for the device or system must be coordinated with Liebherr, as well as the installation position, at the conceptual design stage of the axial piston unit and must be approved by Liebherr.

The factory values set by Liebherr are only preset values:
- Readjust the settings on the device or on the system if necessary.
- Prevent foaming: Make sure that the lines meet at least 200 mm below the minimum liquid level in the tank in every installation variant / position.

Note
Liebherr recommends:
Lay the leakage oil lines so that they are above the level of the axial piston unit.

Design the hydraulic fluid tank so that the hydraulic oil cools off sufficiently during circulation and impurities that develop during operation settle to the bottom of the tank.

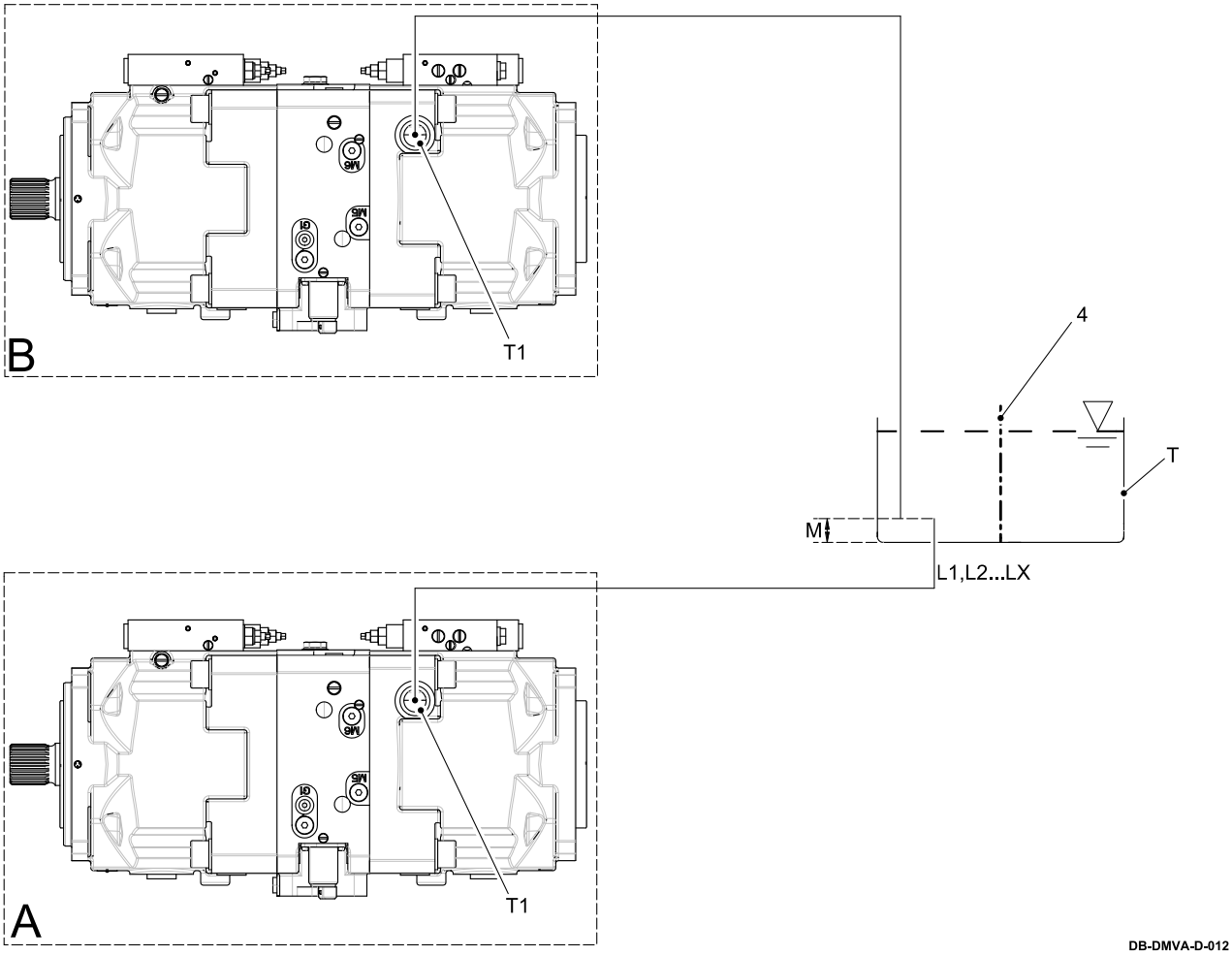
Liebherr distinguishes between two installation variants for axial piston units: A and B, and six installation positions: 1-6.

Note
Liebherr recommends:
Installation variant: Under-the-tank installation A
Installation position: Horizontal driving shaft, regulator on top

4.1 Installation variants

Note
When using the DMVA in a "closed circuit", the installation variant is irrelevant due to the missing tank.

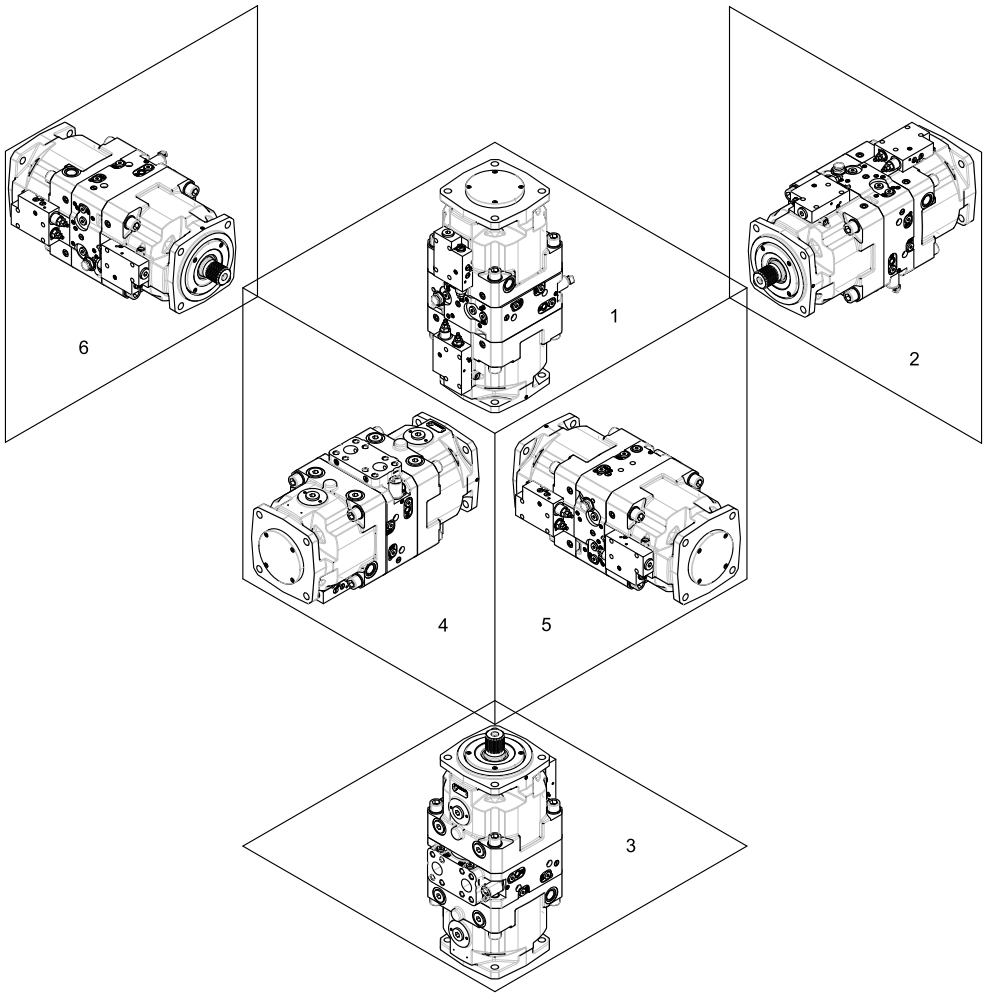
Under-the-tank installation "A": Axial piston unit is installed **under** the minimum liquid level of the tank.
Over-the-tank installation "B": Axial piston unit is installed **over** the minimum liquid level of the tank.



4	Baffle	To calm the hydraulic fluid in the tank
L1, L2...LX	Leakage oil line	Depiction of the feed into the tank is only an example, additional connection options possible, observe distance of the ends of the lines M!
M	Minimum line end distance from tank bottom	115 mm
T	Tank	-
T1	Leakage oil connection	-

4.2 Installation locations

In each of the two installation variants, there are six possible installation locations.



ATTENTION

The air cushion in the bearing area or on the rotary shaft lip seal “runs hot” in installation positions 1 and 3!
Damage of the hydraulic product.
Make sure that the following requirements are observed:
- Housing is completely filled with hydraulic fluid during commissioning and operation.
- Housing is ventilated during commissioning and operation.

Check hydraulic fluid level in the housing regularly.

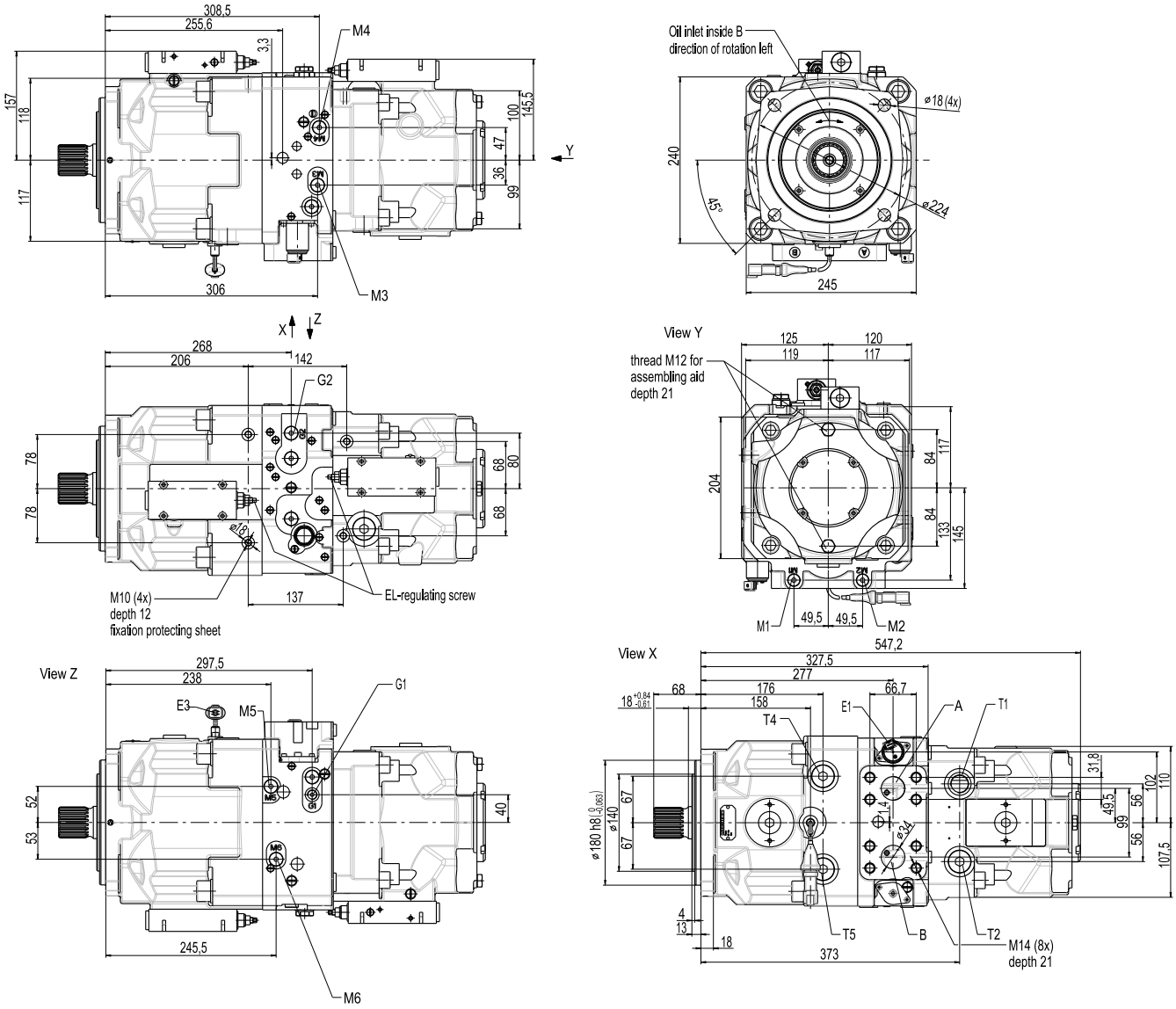
Note

Liebherr recommends:
Consult with Liebherr to install a non-return valve with an opening pressure of a maximum of 0.5 bar.
Emptying of the axial piston unit is prevented in installation location 3 and installation variant B.

5.1 Nominal size 165-108

5.1.1 Nominal size 165-108, EL1 regulator

center of gravity location



DB-DMVA-D-014_en

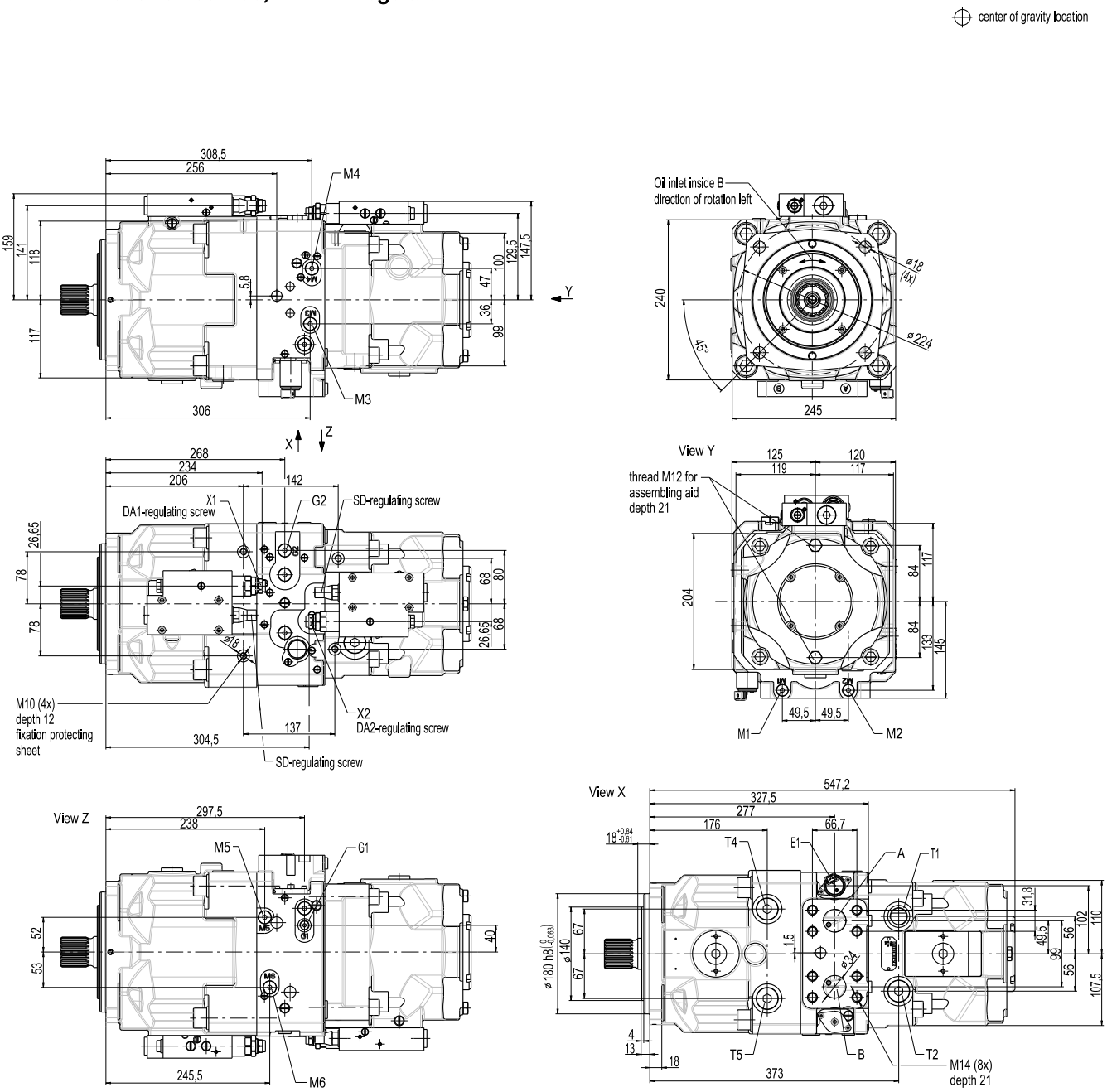
E1	DRE / AMP Junior Timer 2-pin, PWM= 100 Hz, Un= 24 V, $I_{max.}$= 750 mA
A / B	Working connection SAE J 518 - 1, 1/4“, 6000 psi

T1 / T2 T4 / T5	Leakage oil connection ISO 9974-1, M26x1.5
M4 / M6	Adjusting pressure meas. port ISO 9974-1, M14x1.5

M1 / M2	High pressure meas. port ISO 9974-1, M12x1.5
M3 / M5	Steering pressure meas. port ISO 9974-1, M14x1.5

G1	Adjusting pressure supply ISO 9974-1, M14x1.5
G2	Auxiliary pressure ISO 9974-1, M14x1.5

5.1.2 Nominal size 165-108, EL-DA1 regulator



DB-DMVA-D-015_en

A / B	Working connection SAE J 518 - 1, 1/4“, 6000 psi
M1 / M2	High pressure meas. port ISO 9974-1, M12x1.5

G1	Adjusting pressure supply ISO 9974-1, M14x1.5
G2	Auxiliary pressure ISO 9974-1, M14x1.5

5 Dimensions

Axial piston double motor
DMVA 108 to 215

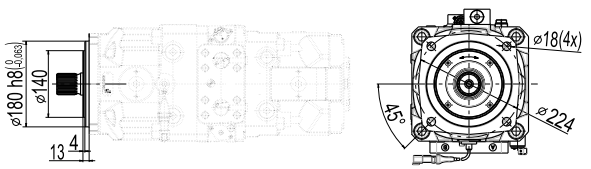
M3 / M5	Steering pressure meas. port ISO 9974-1, M14x1.5
M4 / M6	Adjusting pressure meas. port ISO 9974-1, M14x1.5
E1	DRE / AMP Junior Timer 2-pin, PWM= 100 Hz, Un= 24 V, $I_{max.}$= 750 mA

X1 / X2	DA1 oversteering ISO 9974-1, M12x1.5
-	-
T1 / T2 T4 / T5	Leakage oil connection ISO 9974-1, M26x1.5

5.2 Nominal size 165-108, mounting flange

1.	2.	3.	/	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
DMVA			/			1	W		1	A	0			

ISO 3019-2



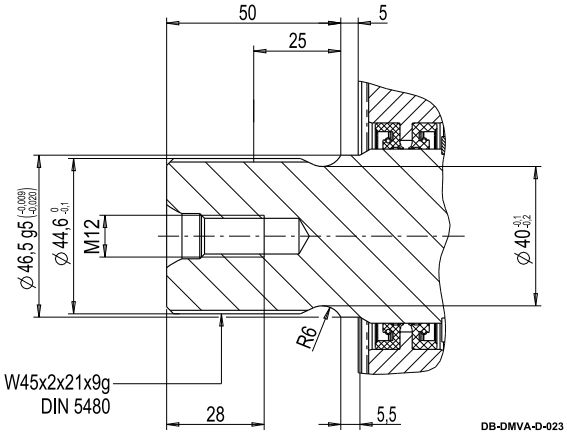
31

DB-DMVA-D-022

5.3 Nominal size 165-108, shaft end

1.	2.	3.	/	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
DMVA			/			1	W		1	A	0			

DIN 5480 splined shaft W45x2x21x9g

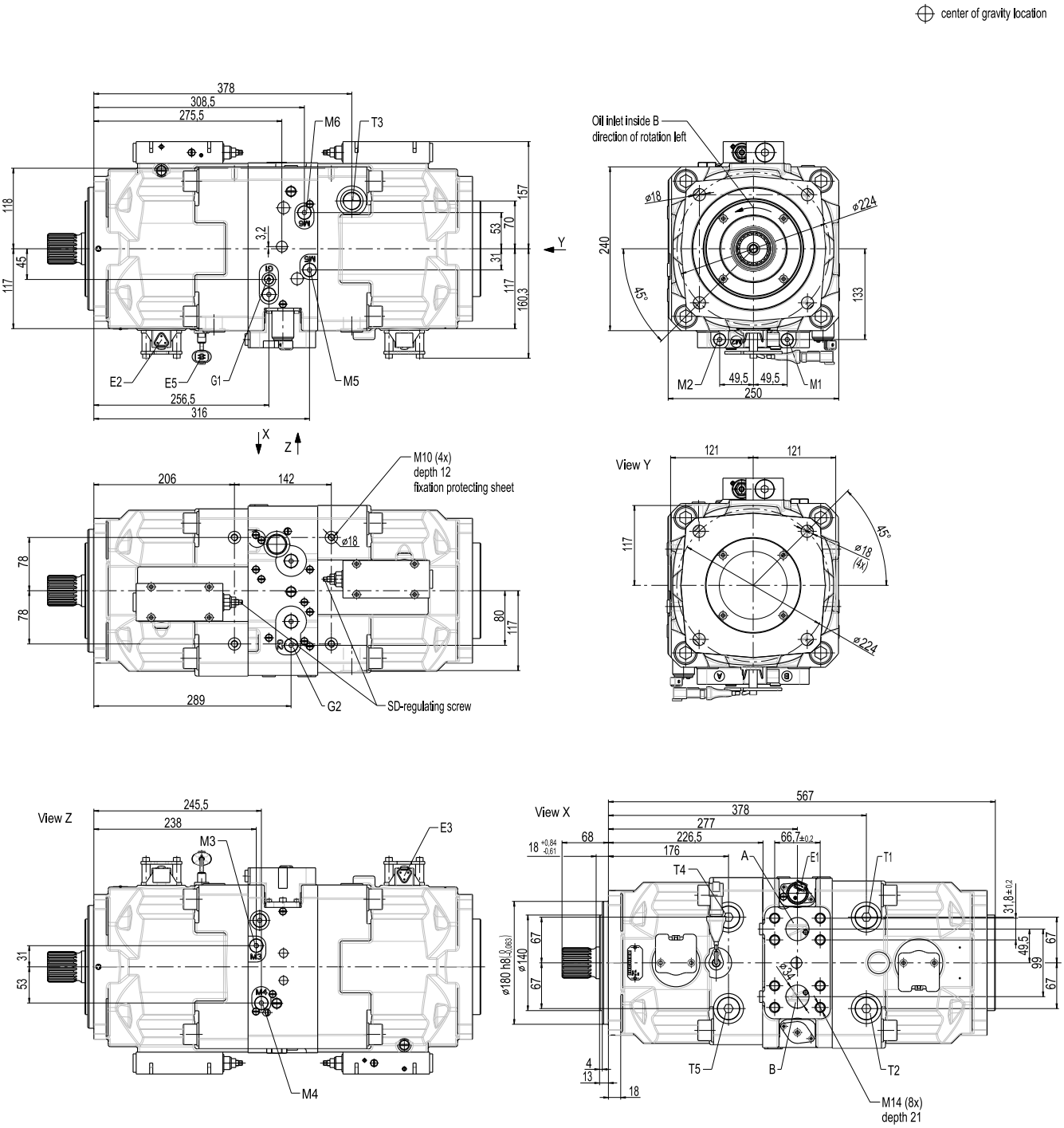


1

DB-DMVA-D-023

5.4 Nominal size 165-165

5.4.1 Nominal size 165-165, EL and EL1 regulator



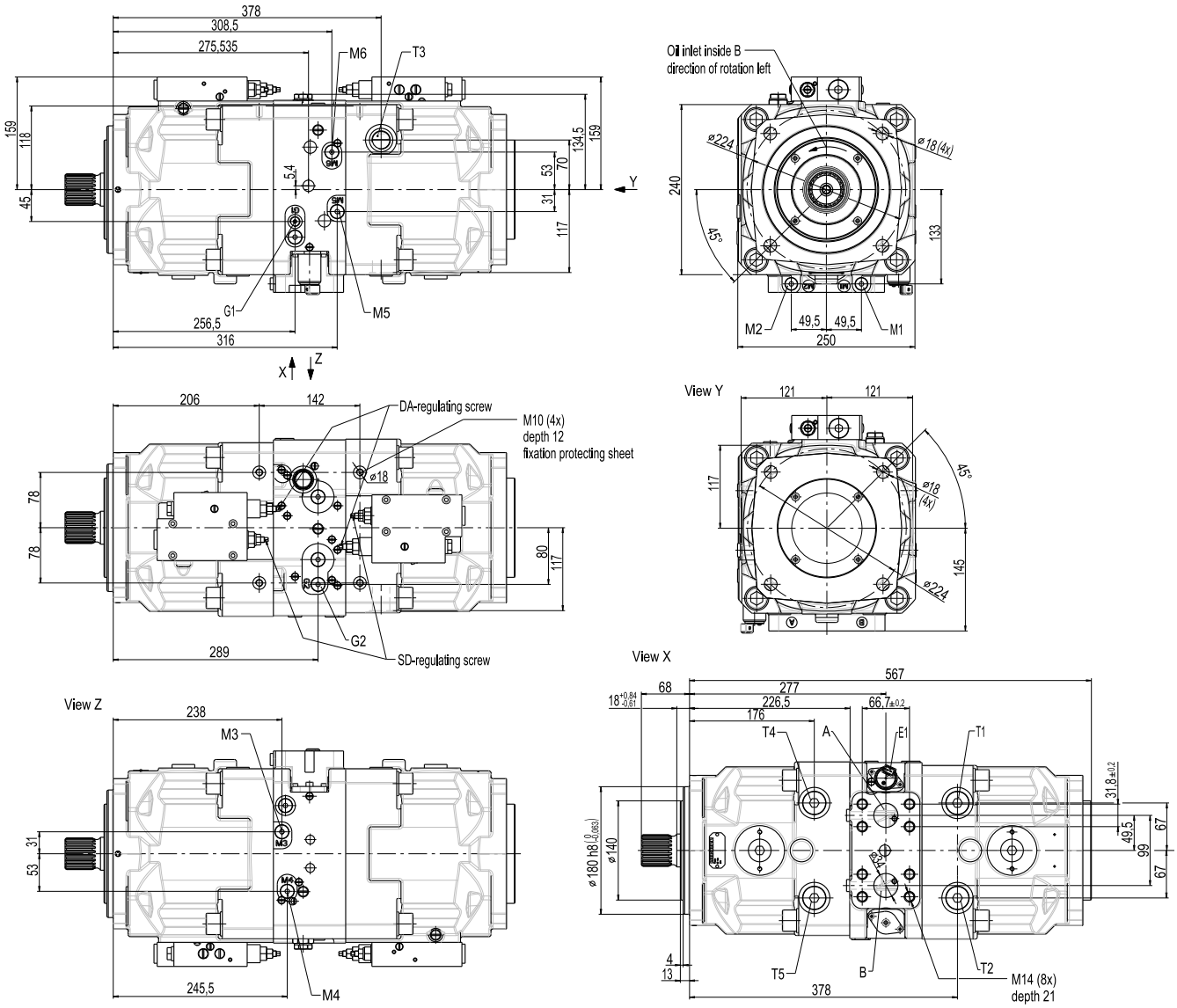
DB-DMVA-D-016_en

E1	DRE / AMP Junior Timer 2-pin, PWM= 100 Hz, Un= 24 V, $I_{max.}$= 750 mA	T1/T2/T3 T4 / T5	Leakage oil connection ISO 9974-1, M26x1.5
A / B	Working connection SAE J 518 - 1, 1/4“, 6000 psi	M4 / M6	Adjusting pressure meas. port ISO 9974-1, M14x1.5

M1 / M2	High pressure meas. port ISO 9974-1, M12x1.5
M3 / M5	Steering pressure meas. port ISO 9974-1, M14x1.5

G1	Adjusting pressure supply ISO 9974-1, M14x1.5
G2	Auxiliary pressure ISO 9974-1, M14x1.5

5.4.2 Nominal size 165-165, EL-DA regulator



DB-DMVA-D-017_en

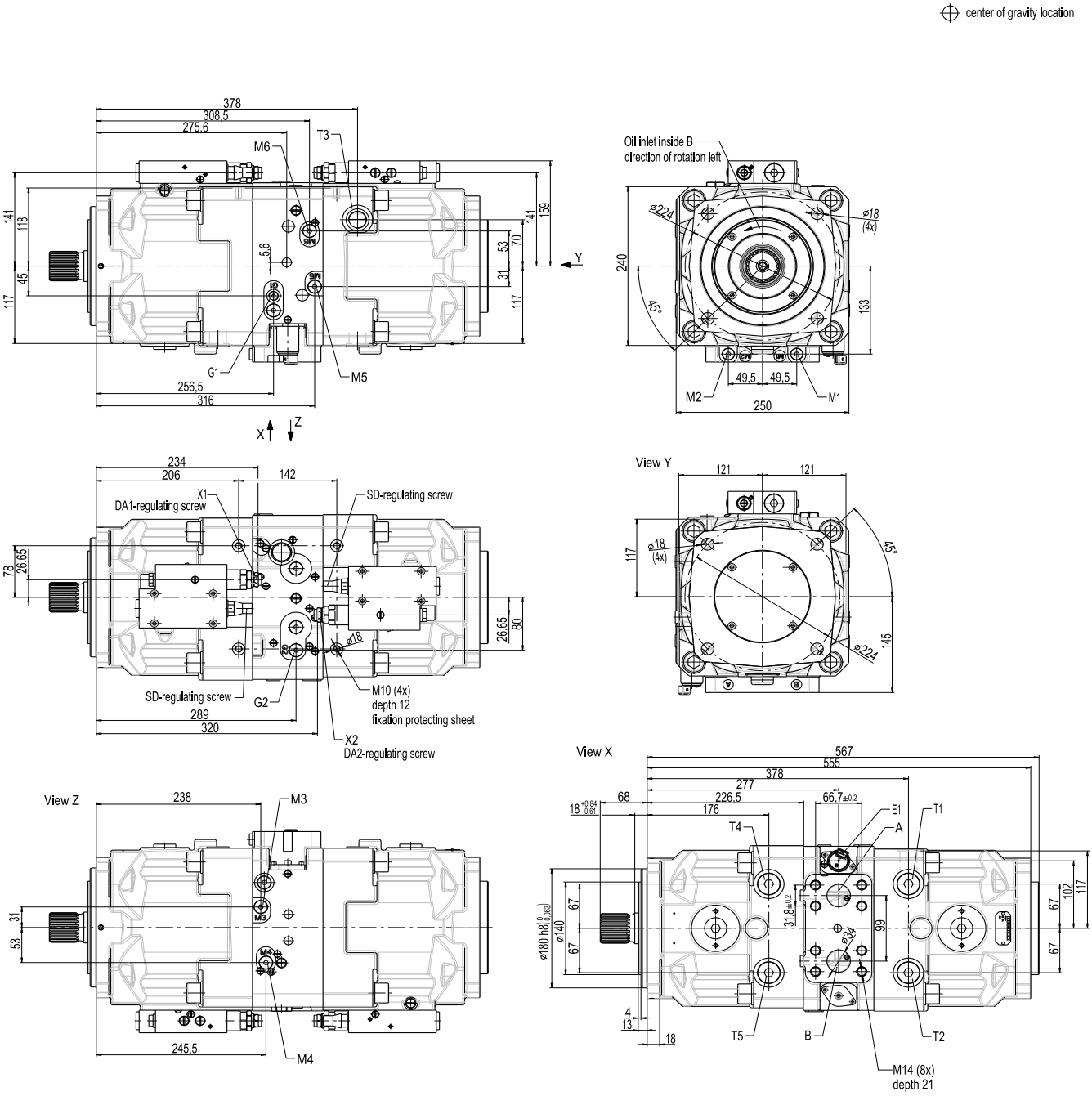
A / B	Working connection SAE J 518 - 1, 1/4“, 6000 psi

M4 / M6	Adjusting pressure meas. port ISO 9974-1, M14x1.5

E1	DRE / AMP Junior Timer 2-pin, PWM= 100 Hz, Un= 24 V, $I_{max.}$= 750 mA
M1 / M2	High pressure meas. port ISO 9974-1, M12x1.5
M3 / M5	Steering pressure meas. port ISO 9974-1, M14x1.5

T1/T2/T3 T4 / T5	Leakage oil connection ISO 9974-1, M26x1.5
G1	Adjusting pressure supply ISO 9974-1, M14x1.5
G2	Auxiliary pressure ISO 9974-1, M14x1.5

5.4.3 Nominal size 165-165, EL-DA1 regulator



DB-DMVA-D-018_en

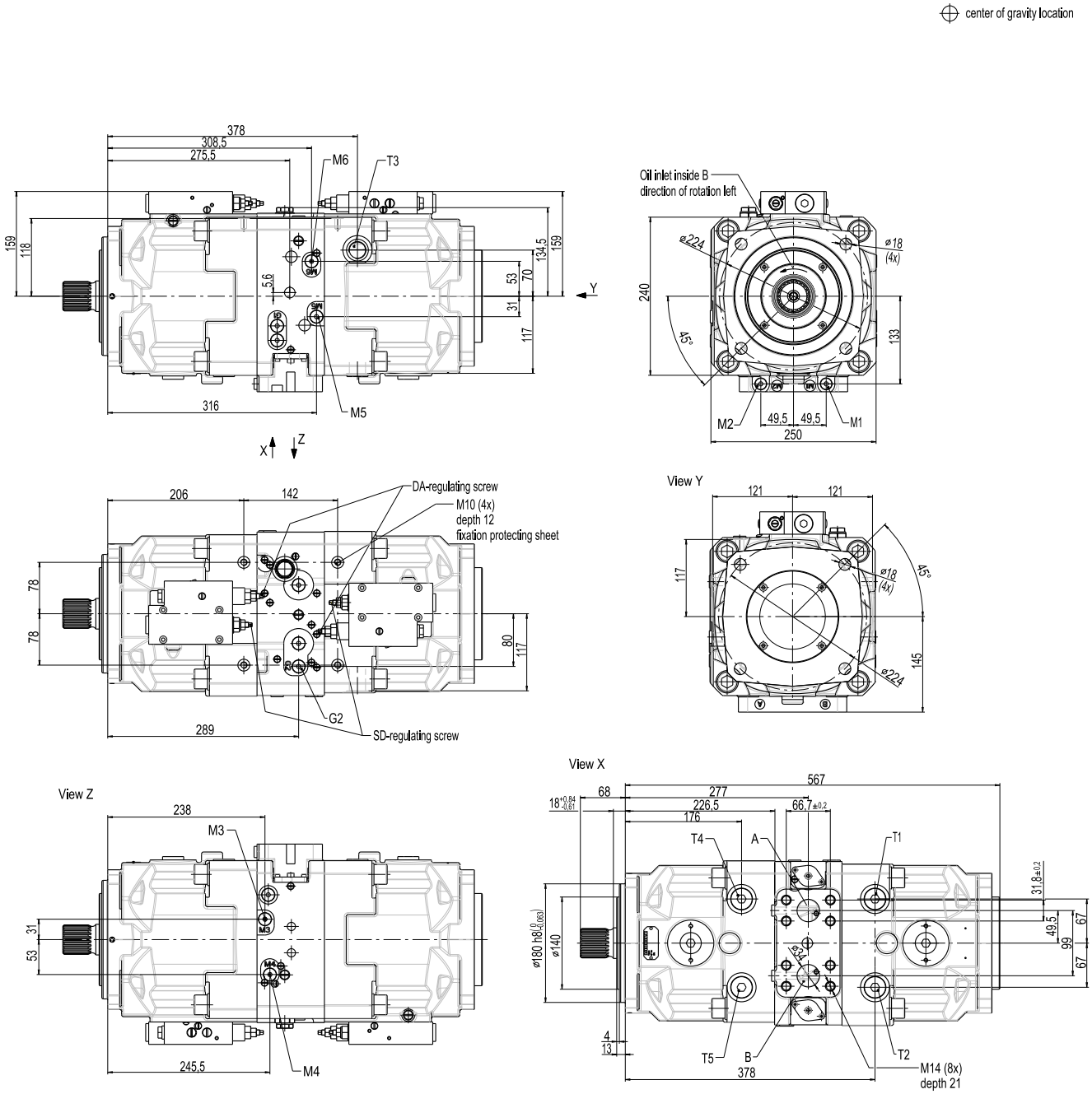
A / B	Working connection SAE J 518 - 1, 1/4“, 6000 psi

G1	Adjusting pressure supply ISO 9974-1, M14x1.5

M1 / M2	High pressure meas. port ISO 9974-1, M12x1.5
M3 / M5	Steering pressure meas. port ISO 9974-1, M14x1.5
E1	DRE / AMP Junior Timer 2-pin, PWM= 100 Hz, Un= 24 V, $I_{max.}$= 750 mA
M4 / M6	Adjusting pressure meas. port ISO 9974-1, M14x1.5

G2	Auxiliary pressure ISO 9974-1, M14x1.5
X1 / X2	DA1 oversteering ISO 9974-1, M12x1.5
T1/T2/T3 T4 / T5	Leakage oil connection ISO 9974-1, M26x1.5
-	-

5.4.4 Nominal size 165-165, SD-DA regulator



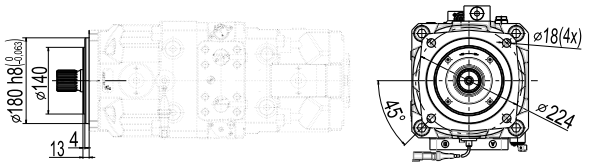
A / B	Working connection SAE J 518 - 1, 1/4“, 6000 psi
M1 / M2	High pressure meas. port ISO 9974-1, M12x1.5
M3 / M5	Steering pressure meas. port ISO 9974-1, M14x1.5

T1/T2/T3 T4 / T5	Leakage oil connection ISO 9974-1, M26x1.5
M4 / M6	Adjusting pressure meas. port ISO 9974-1, M14x1.5
G2	Auxiliary pressure ISO 9974-1, M14x1.5

5.5 Nominal size 165-165, mounting flange

1.	2.	3.	/	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
DMVA			/			1	W		1	A	0			

ISO 3019-2



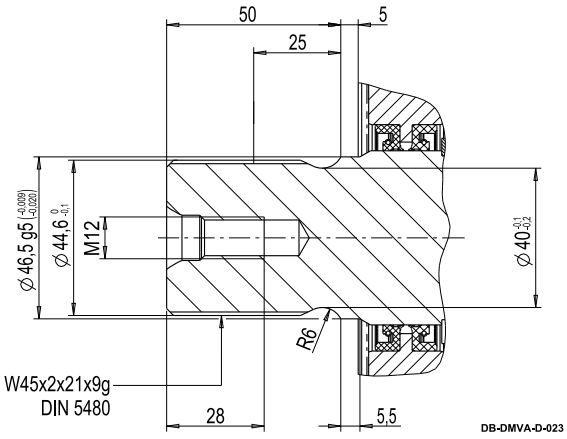
31

DB-DMVA-D-022

5.6 Nominal size 165-165, shaft end

1.	2.	3.	/	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
DMVA			/			1	W		1	A	0			

DIN 5480 splined shaft W45x2x21x9g

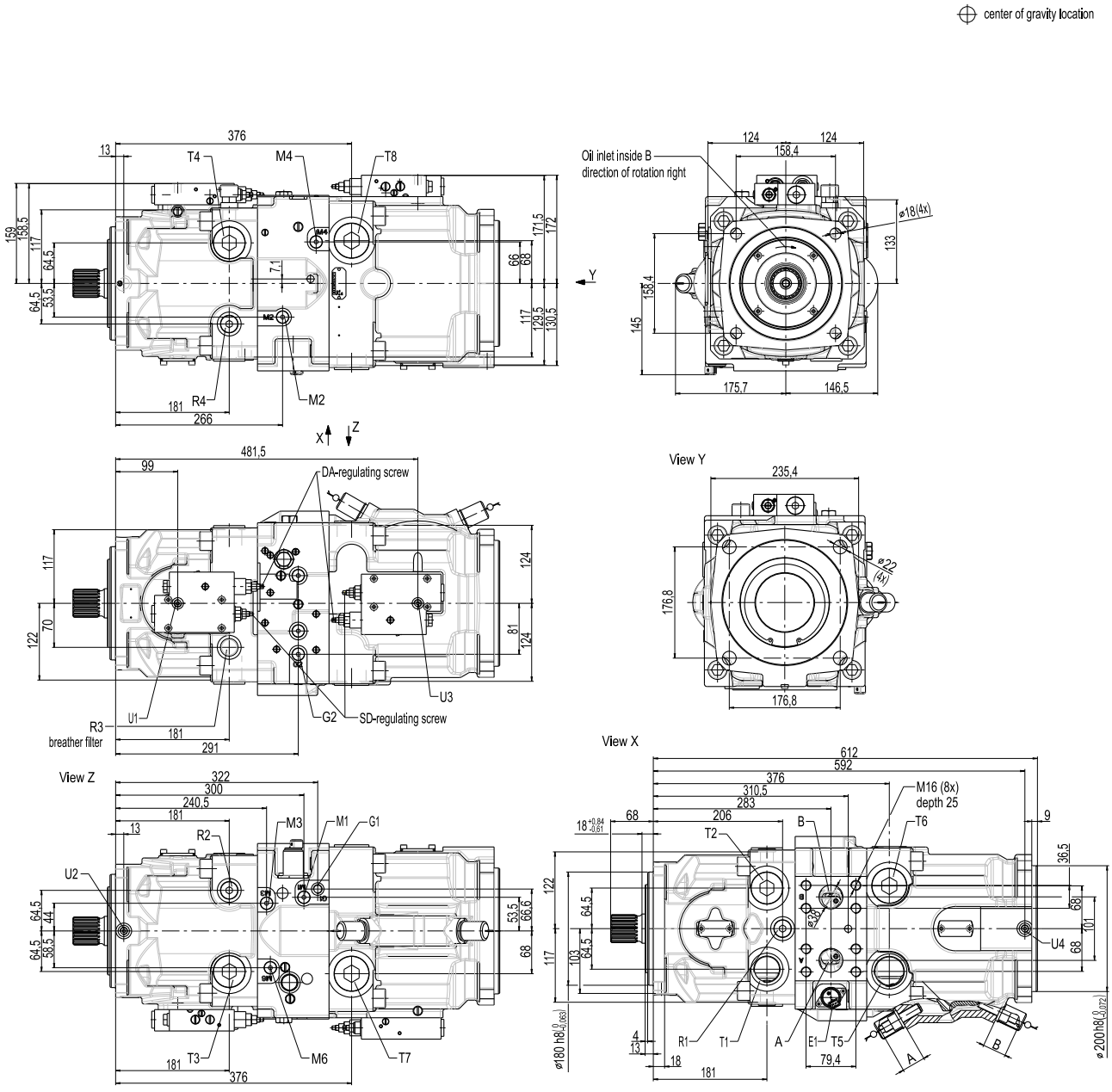


1

DB-DMVA-D-023

5.7 Nominal size 165-215

5.7.1 Nominal size 165-215, EL-DA regulator



DB-DMVA-D-020_en

A / B	Working connection SAE J 518 - 1, 1/2“, 6000 psi	M1 / M2	High pressure meas. port ISO 9974-1, M14x1.5
M3	Steering pressure meas. port ISO 9974-1, M14x1.5	G2	Auxiliary pressure ISO 9974-1, M14x1.5
R1 / R2 R3 / R4	Vent connection ISO 9974-1, M22x1.5	T5 / T6 T7 / T8	Leakage oil connection ISO 9974-1, M48x2

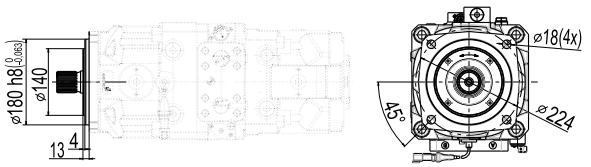
E1	DRE / AMP Junior Timer 2-pin, PWM= 100 Hz, Un= 24 V, $I_{max.}$= 750 mA
M4 / M6	Adjusting pressure meas. port ISO 9974-1, M14x1.5
G1	Adjusting pressure supply ISO 9974-1, M14x1.5

T1 / T2 T3 / T4	Leakage oil connection ISO 9974-1, M42x2
U1 / U2 U3 / U4	Flushing connection ISO 9974-1, M12x1.5
-	-

5.8 Nominal size 165-215, mounting flange

1.	2.	3.	/	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
DMVA			/			1	W		1	A	0			

ISO 3019-2



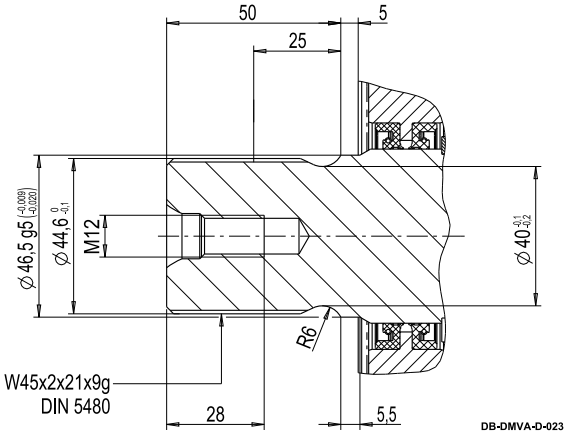
31

DB-DMVA-D-022

5.9 Nominal size 165-215, shaft end

1.	2.	3.	/	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
DMVA			/			1	W		1	A	0			

DIN 5480 splined shaft W45x2x21x9g

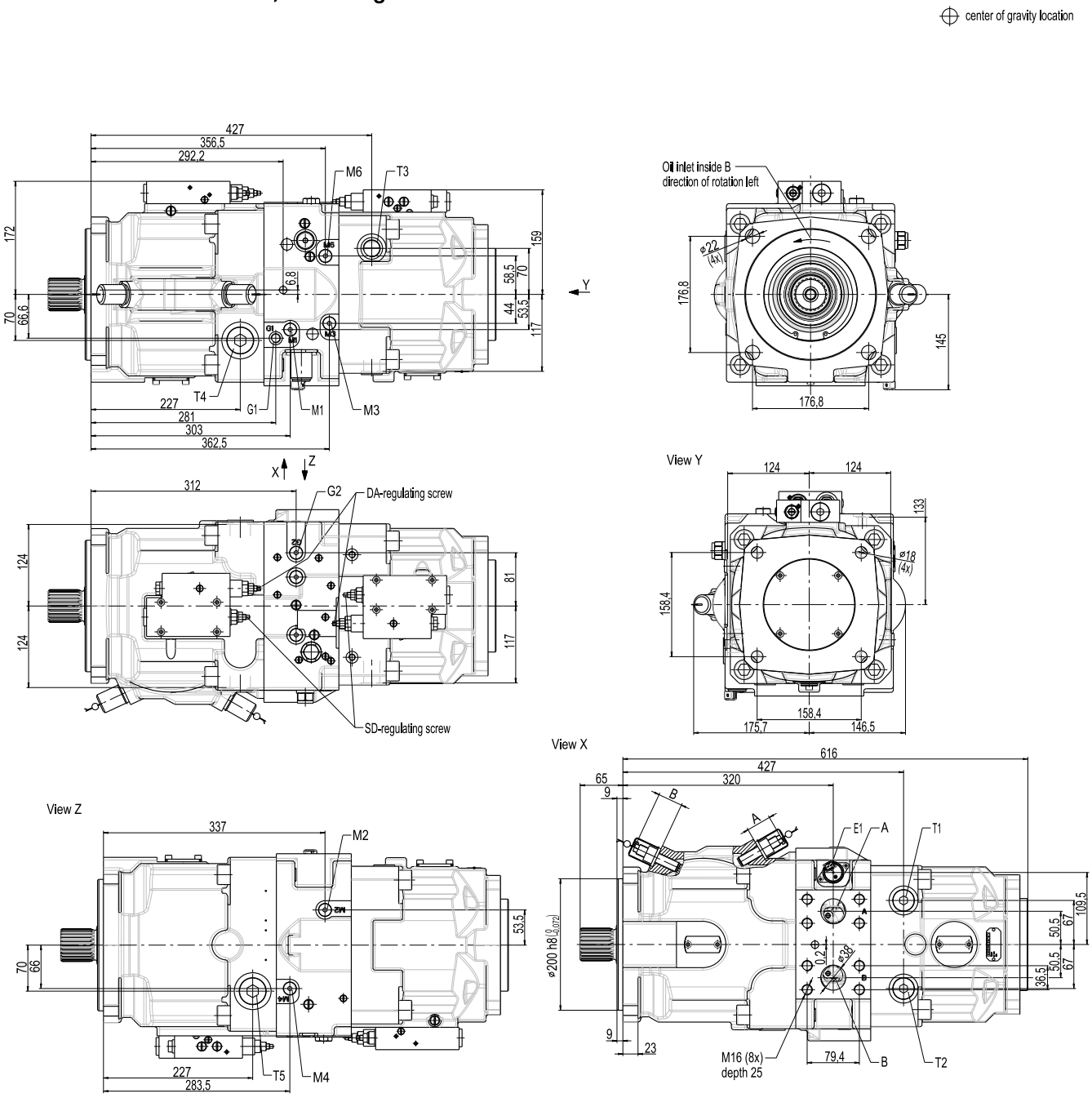


1

DB-DMVA-D-023

5.10 Nominal size 215-165

5.10.1 Nominal size 215-165, EL-DA regulator



DB-DMVA-D-021_en

A / B	Working connection SAE J 518 - 1, 1/2“, 6000 psi
M1 / M2	High pressure meas. port ISO 9974-1, M14x1.5
M3	Steering pressure meas. port ISO 9974-1, M14x1.5

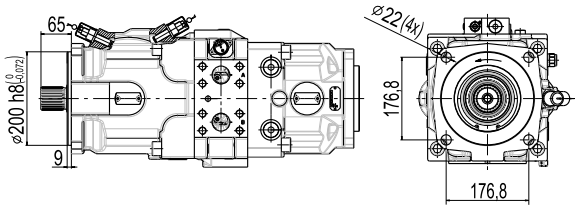
T4 / T5	Leakage oil connection ISO 9974-1, M33x2
G1	Adjusting pressure supply ISO 9974-1, M14x1.5
G2	Auxiliary pressure ISO 9974-1, M14x1.5

E1	DRE / AMP Junior Timer 2-pin, PWM= 100 Hz, Un= 24 V, $I_{max.}$= 750 mA	T1 / T2 T3	Leakage oil connection ISO 9974-1, M26x1.5
M4 / M6	Adjusting pressure meas. port ISO 9974-1, M14x1.5	-	-

5.11 Nominal size 215-165, mounting flange

1.	2.	3.	/	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
DMVA			/			1	W		1	A	0			

ISO 3019-2



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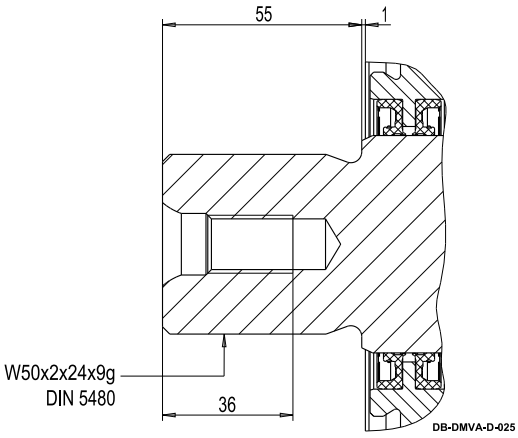
5.12 Nominal size 215-165, shaft end

1.	2.	3.	/	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
DMVA			/			1	W		1	A	0			

DIN 5480 splined shaft W50x2x24x9g



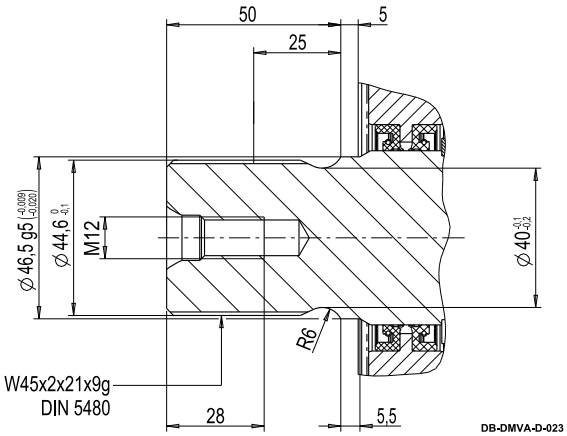
1

5.13 Through-drive DIN 5480

1.	2.	3.	/	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
DMVA			/			1	W		1	A	0			

5.13.1 Nominal size 165 special through-drive

W45x2x21x9g



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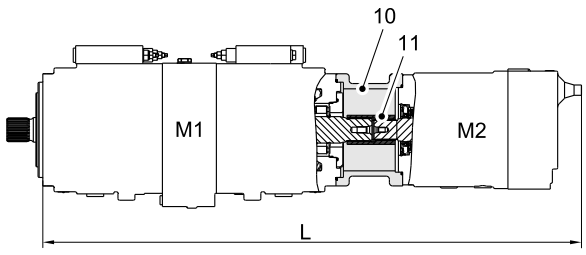
5.14 Multi-circuit motor in tandem design

General information
Multi inline axial piston units of two or more single units can be supplied on request. In this case, the base Axial piston double motor M1 must be connected with another axial piston pump M2 through an adapter plate 10 and a coupling ferrule 11.

The type code must be filled out separately for each single unit. An abbreviated type designation on an additional nameplate is used to identify the multi unit.



M1	Base motor
M2	Flange-mounted motor
L	Multi-circuit motor overall length in mm

10	Adapter
11	Coupling ferrule
-	-

5.14.1 Dimensions of the multi-circuit motor in tandem design

Nominal size M1	Nominal size M2
	108
165-165	■ (L = 1018)

■ = available
L = total length in mm

Changes, conditions, copyright

Subject to changes without prior notice in the course of technical development.

The user is not released from the obligation to complete its own evaluations and tests by the information in this data sheet.

An example configuration is illustrated in this data sheet; if not otherwise stated (DMVA 165-165, EL-DA). The product delivered to you can therefore differ from the figures.

Deviations are likewise possible with data and values in this data sheet; these only serve to select the product configuration and are not binding. Unless indicated otherwise, the values stated are for the example configuration (DMVA 165-165, EL-DA). Always use the values from the installation drawing provided.

The warranty and liability terms of the general terms and conditions of Liebherr Machines Bulle SA and Liebherr-Components AG are not extended in scope by the preceding information.

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