

DURAPAC
ENGINEERED FOR RELIABILITY

Instruction Manual

Electric Torque Wrench Power Units

Models – DET-1114 & DET-1114-115V



Maximum Operating Pressure – 700 bar



This is a safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid injury or death

1.0 Product Information

DURAPAC – Electric Torque Wrench Power Units are engineered to meet Industrial Standards for Performance and Safety. The DET Series Torque Wrench Power Units are perfectly designed for operating the TW and LPC Series Hydraulic Torque Wrenches.

They have a three-stage pump for faster operation under load and incorporate a hydraulic oil cooler, providing cool operation under continuous use. A 6-metre remote hand pendant is standard and one or two tools can be operated at one time due to the multi outlet pump block.

- Roll cage for portability and protection
- Liquid filled pressure gauge has 1% accuracy and can be recalibrated. Scale is mpa/psi
- Electric motor 1.5 kW,
 - 230 Volt, 50 Hz induction motor 9.2 amp
 - 115 Volt, 60 Hz induction motor 18.1 amp
- Oil cooler electric fan operated for continuous duty operation
- 3 stage power unit for increased speed under load
- Multiple tool outlets for operating one or two tools simultaneously. Option to run four tools simultaneously by changing the valve block
- Adjustable torque control for accurate torque settings
- 6 metre remote pendant through a 24 Volt transformer for safety. Incorporates motor ON/OFF button and ADVANCE/AUTO RETRACT button

Special skill, knowledge and training may be required for a specific task and the product may not be suitable for all jobs. The user must ultimately make the decision regarding suitability of the product for any given task and assume the responsibility of safety for all in the work area. Contact a Durapac representative if you are unsure of your power unit's suitability for a particular application.

2.0 Receiving Instructions

It is recommended prior to use that an inspection be done by qualified personnel and that any missing or damaged parts, decals, warning/safety labels or signs are replaced with Durapac authorised replacement parts only. Any power unit that appears to be damaged in any way, is worn, leaking or operates abnormally should be removed from service immediately until such time as repairs can be made. Any power unit that has been or suspected to have been subject to a shock load should be removed from service immediately until inspected by a Durapac authorised service centre. Owners and operators of this equipment should be aware that the use and subsequent repair of this equipment may require specialised training and knowledge.

3.0 Safety

Save these instructions. For your safety, read and understand the information contained within. The owner and operator should understand this product and safe operating procedures before attempting to use this product. Instructions and safety information should be conveyed in the operator's native language before use of this product is authorised. Make certain that the operator thoroughly understands the inherent dangers associated with the use and misuse of the product. If

any doubt exists as to the safe and proper use of this product as outlined in this factory authorised manual, remove from service immediately.

**DANGER:**

- To avoid personal injury keep hands and feet away from work area during operation
- **Do NOT** handle pressurised hoses. Escaping oil under pressure can penetrate the skin causing serious injury. If oil is injected under the skin, see a doctor immediately
- Stay clear of loads supported by hydraulics. A cylinder, when used as a load lifting device, should never be used as a load holding device. After the load has been raised or lowered, it must always be supported mechanically

**WARNING:**

- The system operating pressure must not exceed the pressure rating of the lowest rated component in the system. Install a pressure gauge in the system to monitor operating pressure. It is your window to what is happening in the system
- Always wear appropriate personal protective equipment (PPE) when operating hydraulic equipment. The operator must take precaution against injury due to failure of the tool or work piece(s)
- **Do NOT** hold or stand directly in line with any hydraulic connections while pressurising
- **Do NOT** attempt to disconnect hydraulic connections under pressure. Release all line pressure before disconnecting hoses
- All personnel must be clear before lowering load or depressurising the system
- **Do NOT** attempt to lift a load weighing more than the capacity of the cylinder

**IMPORTANT:**

- If at any stage, the safety related decals become hard to read, these must be replaced
- Minimum age of the operator must be 18 years. The operator must have read and understood all instructions, safety issues, cautions and warnings before starting to operate the equipment. The operator is responsible for this activity towards other persons
- **Do NOT** lift hydraulic equipment by the hoses or couplers. Use the carrying handle or other means of safe transport
- Hydraulic equipment must only be serviced by a qualified hydraulic technician. For repair service, contact the Durapac authorised service centre in your area. To protect your warranty, use only high-quality hydraulic oil

**CAUTION:**

- **KEEP HYDRAULIC EQUIPMENT AWAY FROM FLAMES AND HEAT.** Hydraulic fluid can ignite and burn. Excessive heat will soften packings and seals, resulting in fluid leaks. Heat also weakens hose materials and packings. For optimum performance do not expose equipment to temperatures of 65°C (150°F) or higher. Protect all equipment from weld spatter
- No alteration should be made to this device

3.1 Hydraulic Power Units



- Ensure that the power is **SWITCHED OFF** prior to connection of hoses and other hydraulic equipment or prior to any repairs being undertaken
- **Do** use a gauge or other load measuring instrument to verify load
- **Do NOT** exceed the rated capacity of the pump or any equipment in the system. Burst hazard exists if connection pressure exceeds rated pressure
- Regularly inspect power unit, hoses and connections before each use to prevent unsafe conditions from developing. **Do NOT** use if they are damaged, altered or in poor condition. **Do NOT** operate the system with bent or damaged coupler or damaged threads
- **Do NOT** subject the power unit and its components to shock loads
- Use only Durapac approved accessories and components
- Ensure that the chosen application is stable to work on and around
- **Do NOT** connect to an application which can return more oil to the reservoir than the pump reservoir can hold
- **Do NOT** connect power unit to a hydraulic system that is powered by another pump

3.2 Hydraulic Hoses & Fluid Transmission Lines

- Avoid short runs of straight-line tubing. Straight line runs do not provide for expansion and contraction due to pressure and/or temperature changes
- Ensure that the minimum bending radius is greater than 120 mm
- Reduce stress in tube lines. Long tubing runs should be supported by brackets or clips. Before operating the pump, connections should be hand tightened securely and leak-free. Over tightening can cause premature thread failure or high-pressure fittings to burst
- Should a hydraulic hose ever rupture, burst or need to be disconnected, immediately shut off the pump and release all pressure. Never attempt to grasp a leaking pressurised hose with your hands. The force of escaping hydraulic fluid can inflict injury
- **Do NOT** subject the hose to potential hazard such as fire, sharp objects, extreme heat or cold or heavy impact
- **Do NOT** allow the hose to kink, twist, curl, crush, cut or bend so tightly that the fluid flow within the hose is blocked or reduced. Periodically inspect the hose for wear
- **Do NOT** pull, position or move setup by the hose
- Hose material and coupler seals must be compatible with the hydraulic fluid used. Hoses also must not come in contact with corrosive materials such as battery acid, creosote-impregnated objects and wet paint. Never paint a coupler or hose

FAILURE TO HEED THESE WARNINGS MAY RESULT IN PERSONAL INJURY AS WELL AS PROPERTY DAMAGE.

4.0 Installation

-  **IMPORTANT:** Always secure threaded port connections with high grade, non-hardening pipe thread sealant. Teflon tape can be used if only one layer of tape is used and it is applied carefully, two threads back, to prevent the tape from being introduced into hydraulic system, which could cause jamming of precision-fit parts
-  To avoid power loss between the electrical outlet and the power unit motor, use the shortest possible extension cord

4.1 Familiarise yourself with the specifications and illustrations in this owner’s manual. Know your power unit, its limitations and how it operates before attempting to use. Refer to the specification chart below or if in doubt, contact a Durapac representative.

Model Number	Flow (Lpm)			Pressure Rating (bar)	Motor (kW)	Voltage (1 Ph.)	Hz	Amps	Oil Capacity (L)	Dry Weight (kg)
	1st Stage 0-100 bar	2nd Stage 100-250 bar	3rd Stage 250-700 bar							
DET-1114	8.5	2.2	1.1	700	1.5	230	50	9.2	5.5	28
DET-1114-115V	8.4	1.9	0.9	700	1.5	115	60	18.1	5.5	28

- 4.2 Confirm the power unit’s voltage is the same as the voltage being supplied by the site, the source is a stable supply and that the motor is correctly grounded.
- 4.3 Ensure power is switched off prior to connection of hoses and equipment to prevent early pressurisation.
- 4.4 Hydraulic Connections - check all system fittings and connections to be sure they are tight and leak free.
- 4.5 Ensure that there is adequate oil in the reservoir to perform the required function. Ideally the gauge should not read less than 1/3. Should this be the case, please follow the steps in 6.1 – Adding Hydraulic Fluid in the Maintenance Section.
- 4.6 Bleeding Air from the System - air can accumulate in the hydraulic system prior to the initial setup or after prolonged storage. To prime the power unit, the motor may need to be started several times to ensure the lines are primed. Should removal of air from the system be required, please follow the steps in 6.2 – Bleeding Air from the System in the Maintenance Section.

5.0 Operation



IMPORTANT:

- To reduce the risk of personal injury and/or property damage, Hydraulic connections must be securely fastened before building pressure in the system. Release all system pressure before loosening any hydraulic connection in the system
- When only using one hydraulic torque wrench, cover the unused hydraulic coupling with a metal dust cap or plug the unused port
- Always monitor pressure, load or position using suitable equipment. Pressure may be monitored by means of an optional manifold and gauge. Correct application position can only be determined by the operator of the equipment
- **Do NOT** operate a pump that is disconnected from the application. If operated in this condition, the hose and connections will become pressurised. This increases the chance of a burst hazard. Damage may also occur to the pump and its components
- This power unit is designed for indoor use, please protect from the elements if used outside

Durapac Electric Torque Wrench Power Units have been specifically designed to integrate seamlessly with Durapac TW and LPC-Series Torque Wrenches. There is a 2-way, 4 position solenoid directional control valve on the power unit. Port A is a high-pressure port - it delivers the oil at a high pressure. Whereas Port B is a low-pressure port that delivers the oil at a low pressure.

- 5.1 Prior to operation, loosen the locknut on the pressure regulating valve, turn counterclockwise to decrease /clockwise to increase pressure (Fig. 1):

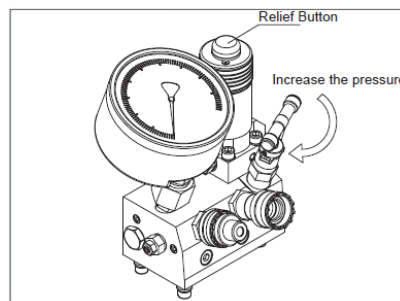


Figure 1 – Adjust Pressure

- ⚠ The power unit must be completely connected but the hydraulic torque wrench must **not** be connected to the application when adjusting pressure
- 5.2 Connect the power and set the power ON/OFF switch at the back of the power unit to the ON position (upwards).
- 5.3 Press the motor ON/OFF button on the remote-control pendant to start the power unit operating. Pump directional valve will automatically be in 'retract' mode at this stage.
- 5.4 Press the ON button on the remote-control pendant to advance the tool. At this stage the high-pressure adjusting valve can be increased to the operator's predetermined pressure setting.

⚠ **DO NOT EXCEED 700 bar!**

5.5 Pressing and releasing the ON button will advance and retract the torque wrench.



Figure 2 – Release Pressure

Note – When using a hydraulic power unit for the first time, activate the hydraulic torque wrench prior to putting the tool on an application; this will help remove any air from the system.

6.0 Maintenance




IMPORTANT:

- Disconnect power supply before disassembly or repair
- Check oil level regularly
- Use only good quality hydraulic fluid. **Do NOT** use brake fluid, transmission fluid, turbine oil, motor oil, alcohol, glycerine etc. Use of anything other than good quality hydraulic oil will void warranty and damage the pump, hose, and application. We recommend Durapac Hydraulic Oil or equivalent
- Equipment must only be serviced by a qualified hydraulic technician. For repair service, contact your local Durapac authorised service centre
- Damage to hydraulic hoses may not be detected during visual inspections. For this reason, Durapac recommends that hydraulic hoses be replaced on a regular basis
- Tighten connections as needed. Use non-hardening pipe thread compound when servicing connections

Dirt, sand, etc. will quickly ruin any hydraulic system. Ensure that couplings are clean and free of foreign matter. After each use, clean couplings and attach dust caps.

Maintenance is required when wear or leakage is noticed. Periodically inspect all components to detect any problem that may require service and maintenance.

6.1 Adding Hydraulic Fluid

 **WARNING:** Always add oil with cylinders or tools fully retracted (or extended, if pull cylinders) or the system will contain more oil than the reservoir can hold

 **WARNING:** Disconnect equipment before adding oil and never over fill the reservoir

6.1.1 Depressurise and disconnect hydraulic hose from application/cylinder.

6.1.2 Clean the area around the filler cap. Any dirt or grime in the hydraulic oil can damage the internal workings of the power unit.

- 6.1.3 Remove the filler cap located on the top plate of the reservoir.
- 6.1.4 Use a small funnel to fill the reservoir to within 25mm (1") from the top of the filler hole.
- 6.1.5 Bleed air from system if necessary.
- 6.1.6 Wipe up any spilled fluid and reinstall the air vent plug/reservoir cap.

6.2 Bleeding Air from the System

- 6.2.1 Repeat Steps 6.1.1 to 6.1.4 (above), if required.
- 6.2.2 Cycle the power unit (with hydraulic torque wrench attached) several times.
- 6.2.3 Retract the hydraulic torque wrench. Air will be released into the power unit reservoir.
- 6.2.4 Recheck oil level after removing air.
- 6.2.5 Wipe up any spilled fluid and reinstall the air vent plug/reservoir cap.

6.3 Changing Hydraulic Fluid


 For best results, change fluid once a year or every 300 hours of use

- 6.3.1 Repeat Steps 6.1.1 to 6.1.3 (above).
- 6.3.2 Pour used fluid into a sealable container.
- 6.3.3 Repeat Steps 6.1.4 to 6.1.6 (above).
- 6.3.4 Wipe up any spilled fluid and reinstall the air vent plug/reservoir cap.
- 6.3.5 Dispose of fluid in accordance with local regulations.

6.4 Storage

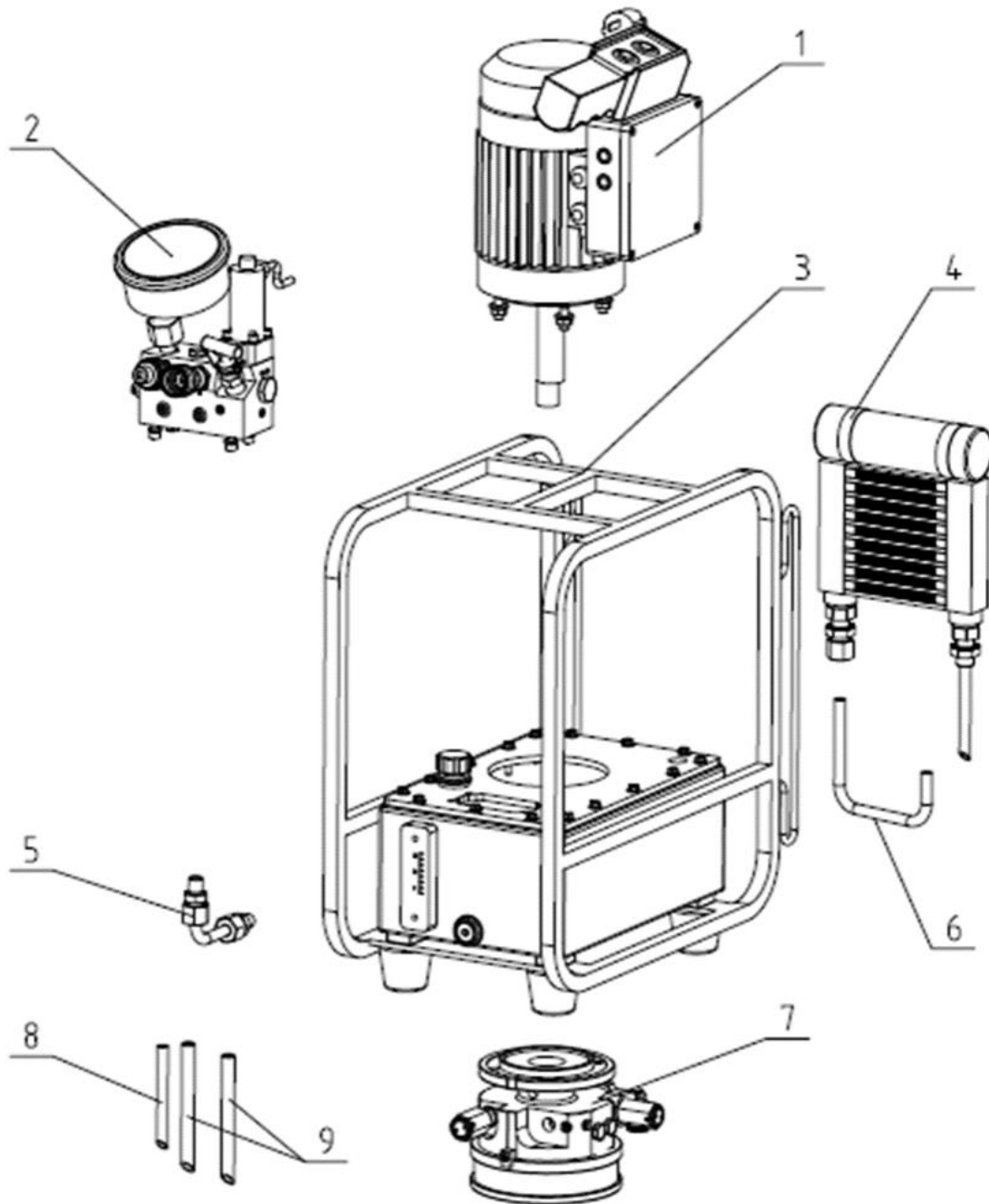
- 6.4.1 When not in use, depressurise and disconnect the hydraulic power unit from the application.
- 6.4.2 Wipe clean thoroughly and store in a clean, dry environment. Avoid temperature extremes.
- 6.4.3 For transportation or long storage, replace the air vent plug with shipping plug.
- 6.4.4 Shield power unit with a protective cover.

7.0 Troubleshooting

 **WARNING:** Disconnect power supply before disassembly or repair

Problem	Cause	Solution
Power unit cannot be started	Unsuitable power source	<ul style="list-style-type: none"> Ensure the power supply meets the power unit's specifications
	Power is not connected	<ul style="list-style-type: none"> Connect power
Power unit has no pressure	Loose couplers	<ul style="list-style-type: none"> Tighten couplers
	Faulty couplers	<ul style="list-style-type: none"> Replace couplers
	Oil level too low	<ul style="list-style-type: none"> Refer to 6.1 – Adding Hydraulic Fluid
	Faulty pressure gauge	<ul style="list-style-type: none"> Replace gauge
	Hydraulic couplers have a vacuum lock	<ul style="list-style-type: none"> Check hydraulic couplers to hydraulic torque wrench Inspect couplers to ensure they are completely coupled Replace couplers if damaged
Leaking couplers	O-ring is worn or missing in the female couplers	<ul style="list-style-type: none"> Replace the couplers
Power unit cannot reach the rated pressure	Pressure is adjusted too low for the high-pressure valve	<ul style="list-style-type: none"> Check the gauge Adjust to rated value
	Oil is mixed with water	<ul style="list-style-type: none"> Refer to 6.3 – Changing Hydraulic Fluid
	Malfunctioning pressure relief valve	<ul style="list-style-type: none"> Replace pressure relief valve
	Loose high-pressure valve	<ul style="list-style-type: none"> Tighten valve
	Air in system	<ul style="list-style-type: none"> Refer to 6.2 – Bleeding Air from the System
Power unit emits a loud noise while operating	Bearings worn or broken	<ul style="list-style-type: none"> Replace bearing(s)
	Air in system	<ul style="list-style-type: none"> Refer to 6.2 – Bleeding Air from the System
High pressure flow is reduced	Piston or springs may be broken	<ul style="list-style-type: none"> Replace piston assembly
	Loose couplers	<ul style="list-style-type: none"> Tighten couplers
	Oil level too low	<ul style="list-style-type: none"> Refer to 6.1 – Adding Hydraulic Fluid
	Oil too cold	<ul style="list-style-type: none"> Control the temperature to at least -10°C (14°F)
	Dirt in pump or filter is clogged	<ul style="list-style-type: none"> Replace filter and clean tank

8.0 Complete Unit Parts Breakdown & List(s)

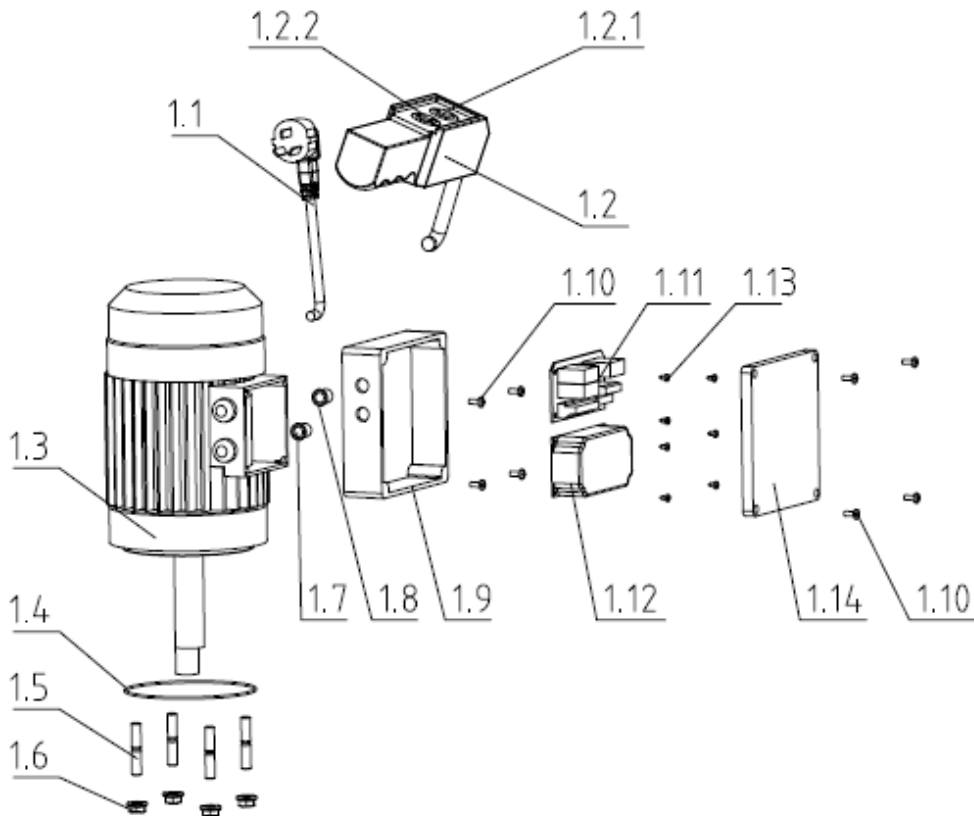


Item	Description	Part No.	Qty	Item	Description	Part No.	Qty
1	Electric control assembly			4	Cooler assembly		
1a	230 V, 50 Hz Elec. control assy.	ZDB3752	1	4a	Cooler assembly - new style	ZDB3801	1
1b	115 V, 60 Hz Elec. control assy.	ZDB3788	1	4b	Cooler assembly - old style	ZDB3755	1
2	Valve block assembly	ZDB3753	1	5	Oil inlet pipe components	ZBD3729	1
3	Oil tank assembly			6	Cooler oil pipe	ZDB3756	1
3a	Oil tank assembly - new style	ZDB3794	1	7	Pump assembly	ZDB3757	1
3b	Oil tank assembly - old style	ZDB3754	1	8	Oil return pipe 10mm dia.	ZDB3728	1
				9	Oil return pipe 12mm dia.	ZDB3759	2

Assembly Breakdowns, Lists & Part Numbers are shown on the following pages.

8.1 Electric Control Assembly Parts Breakdown & List

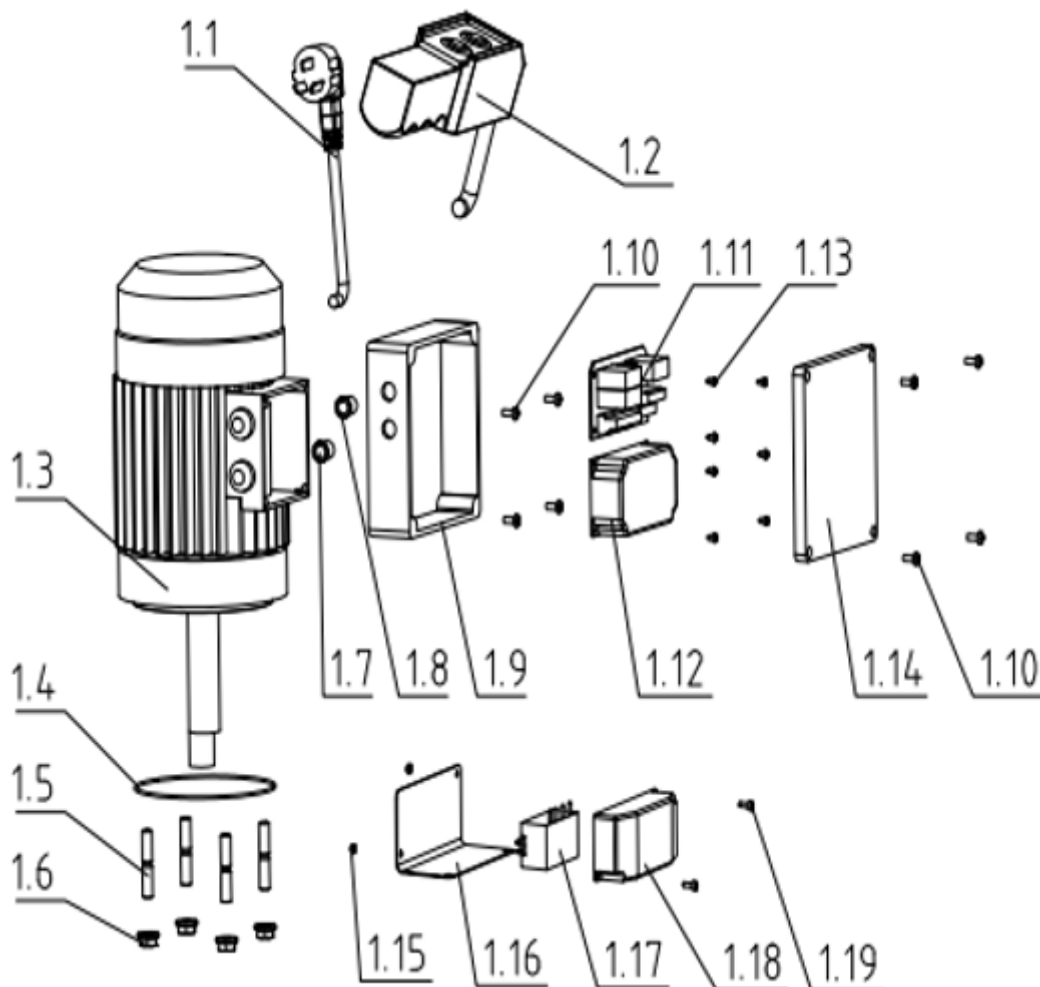
a) 230 V, 50 Hz Electric Control Assembly - ZDB3752



Item	Description	Part No.	Qty	Item	Description	Part No.	Qty
1	230V 50Hz Electric control assy	ZDB3752	1	1.6	Flange nut	ZDB3680	4
1.1	Power cable	ZBD3678	1	1.7	Work indicator (green)	ZDB3655	1
1.2	Remote pendant assembly	ZDB3624	1	1.8	Work indicator (red)	ZDB3656	1
1.2.1	Self-locking button	ZDB3625	1	1.9	Base of electric control box	ZDB3657	1
1.2.2	Self-reset button	ZDB3626	1	1.10	Cross slotted screw	ZDB3658	8
1.2.3	Delay module PCB (not shown)	ZDB3786	1	1.11	Control circuit board	ZDB3627	1
1.3	Motor 230V, 50Hz, 1.5 Kw	ZDB3672	1	1.12	Switching mode power supply	ZDB3628	1
1.4	O-ring	ZDB3634	1	1.13	Self-tapping screw	ZDB3659	7
1.5	Stud	ZDB3679	4	1.14	Cover of electric control box	ZDB3660	1

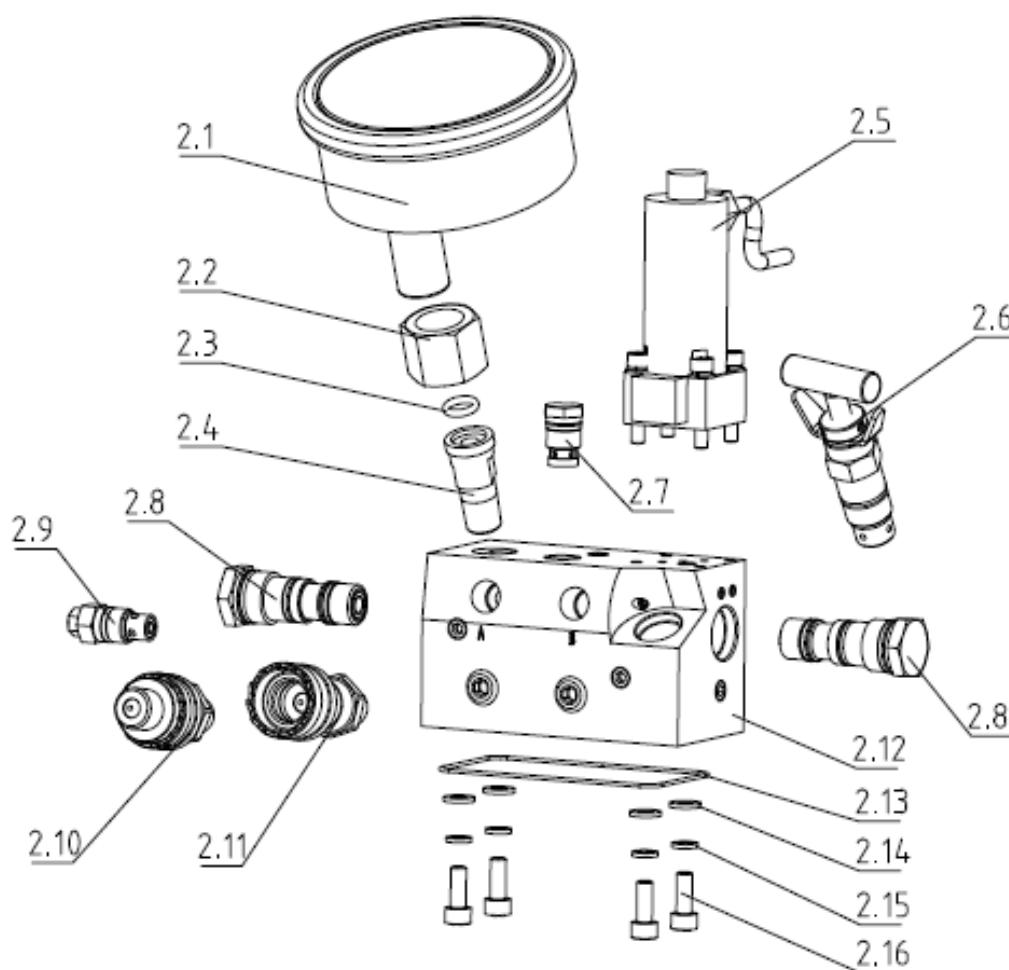
Remote pendant assembly contains Items 1.2.1 - 1.2.3

b) 115 V, 60 Hz Electric Control Assembly - ZDB3788



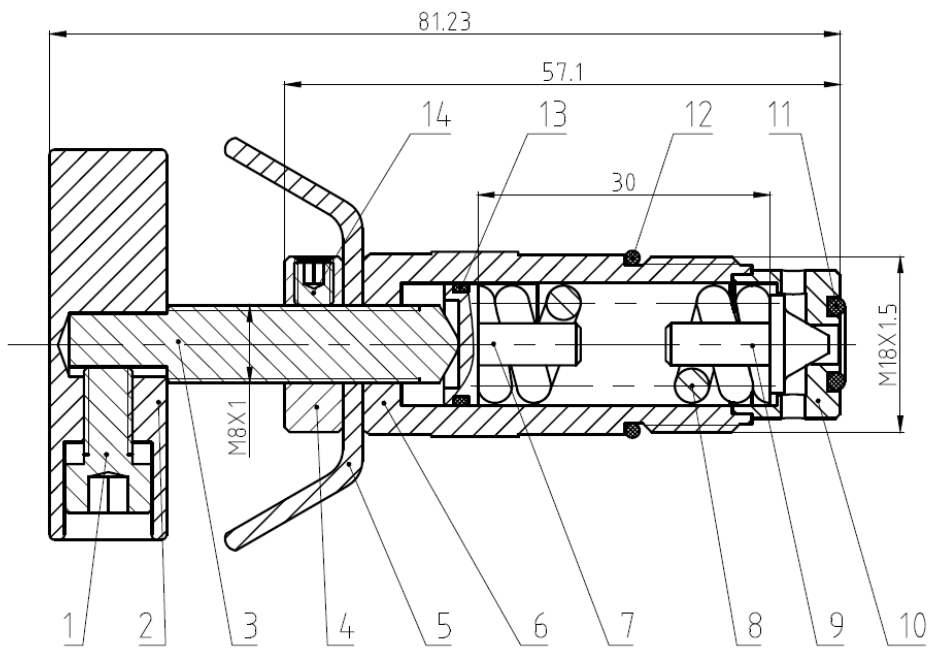
Item	Description	Part No.	Qty	Item	Description	Part No.	Qty
1	115V 60Hz Electric control assy	ZDB3788	1	1.10	Cross slotted screw	ZDB3658	8
1.1	Power cable	ZDB3800	1	1.11	Control circuit board	ZDB3627	1
1.2	Remote pendant	ZDB3624	1	1.12	Switching mode power supply	ZDB3628	1
1.3	Motor 115V, 60Hz, 1.5 Kw	ZDB3789	1	1.13	Self-tapping screw	ZDB3659	7
1.4	O-ring	ZDB3634	1	1.14	Cover of electric control box	ZDB3660	1
1.5	Stud	ZDB3679	4	1.15	Nut	ZDB3789	2
1.6	Flange nut	ZDB3680	4	1.16	Fixed plate	ZDB3790	1
1.7	Work indicator (green)	ZDB3655	1	1.17	Electronic centrifugal switch	ZDB3791	1
1.8	Work indicator (red)	ZDB3656	1	1.18	Container	ZDB3792	1
1.9	Base of electric control box	ZDB3657	1	1.19	Hexagon socket head screw	ZDB3793	2

8.2 Valve Block Assembly Parts Breakdown & List - ZDB3753



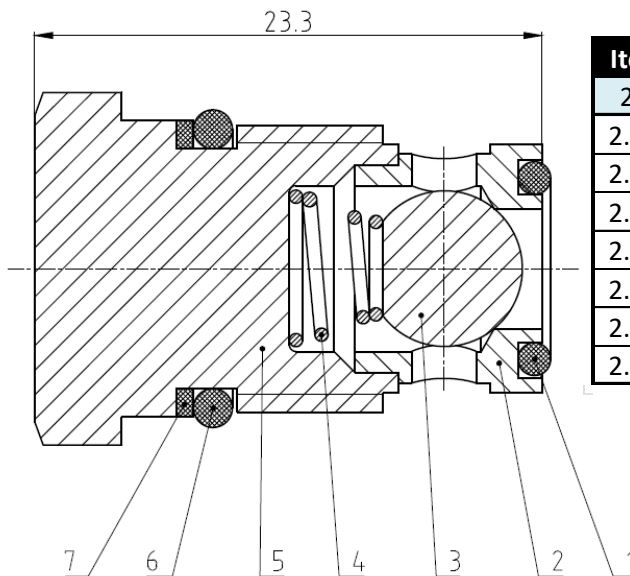
Item	Description	Part No.	Qty	Item	Description	Part No.	Qty
2	Valve block assembly	ZDB3753	1	2.9	Pressure regulating valve assy	ZDB3633	1
2.1	Pressure gauge	ZDB3619	1	2.10	Male coupling	ZDB2906	1
2.2	Nut	ZDB3620	1	2.11	Female coupling	ZDB2907	1
2.3	O-ring	ZDB3622	1	2.12	Valve block	ZDB3666	1
2.4	Pressure gauge connecting rod	ZDB3621	1	2.13	O-ring	ZDB3634	1
2.5	Solenoid valve	ZDB3629	1	2.14	Flat washer 6mm	ZDB3745	4
2.6	Pressure regulating valve assy	ZDB3630	1	2.15	Spring washer 6mm	ZDB3746	4
2.7	Check valve assembly	ZDB3631	1	2.16	Hexagon socket head cap screw M6 x 16	ZDB3750	4
2.8	Pilot operated directional valve assy	ZDB3632	2				

8.2.6 Pressure Regulating Valve Assy - ZDB3630



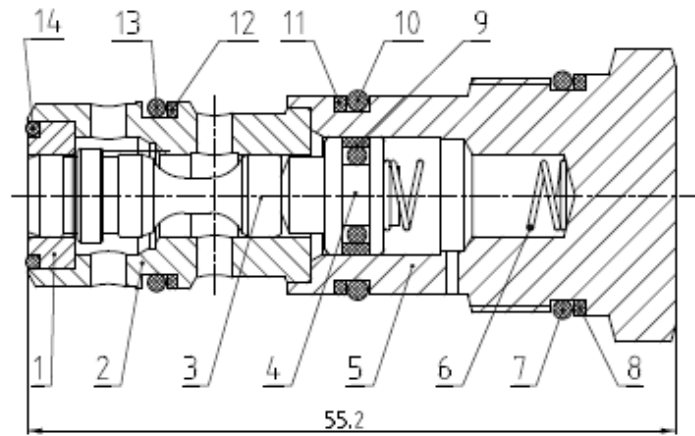
Item	Description	Part No.	Qty	Item	Description	Part No.	Qty
2.6	Pressure regulating valve assy	ZDB3630	1	2.6.8	Compression spring	ZDB3688	1
2.6.1	Hexagon socket head cap screw M5 x 10	ZDB3751	1	2.6.9	Spool	ZDB3689	1
2.6.2	Pressure regulating handle	ZDB3682	1	2.6.10	Valve seat	ZDB3690	1
2.6.3	Pressure regulating rod	ZDB3683	1	2.6.11	O-ring 6.07 x 1.78	ZDB3663	1
2.6.4	Lock nut	ZDB3684	1	2.6.12	O-ring 16 x 1.5	ZDB3664	1
2.6.5	Lock handle	ZDB3685	1	2.6.13	O-ring 10.3 x 1.2	ZDB3665	1
2.6.6	Valve body	ZDB3686	1	2.6.14	Hexagon screw M4 x 4	ZDB3691	3
2.6.7	Anti-leak roof	ZDB3687	1				

8.2.7 Check Valve Assembly - ZDB3631



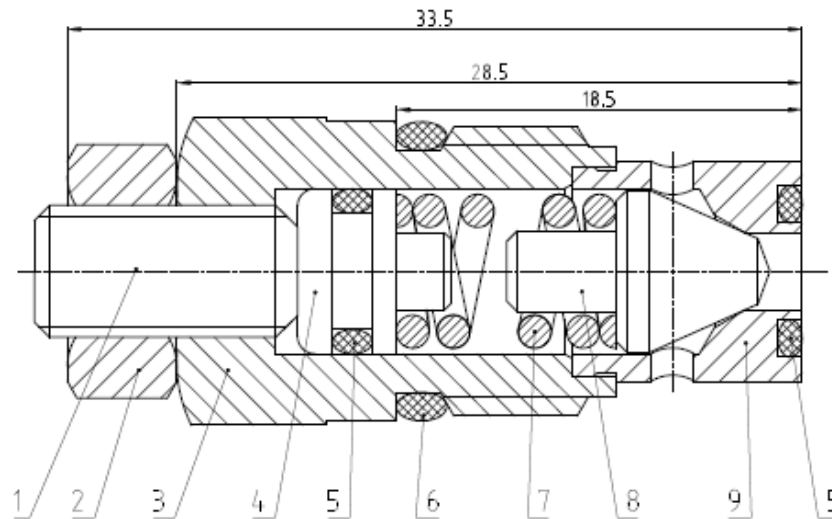
Item	Description	Part No.	Qty
2.7	Check valve assembly	ZDB3631	1
2.7.1	O-ring	ZDB3649	1
2.7.2	Valve seat	ZDB3692	1
2.7.3	Steel ball	ZDB3693	1
2.7.4	Tower spring	ZDB3694	1
2.7.5	Valve body	ZDB3695	1
2.7.6	O-ring 10.82 x 1.78	ZDB3650	1
2.7.7	Retaining ring	ZDB3696	1

8.2.8 Pilot Operated Directional Valve Assembly ZDB3632



Item	Description	Part No.	Qty	Item	Description	Part No.	Qty
2.8	Pilot operated directional valve assy	ZDB3632	2	2.8.8	Retaining ring	ZAW1621	1
2.8.1	Front cover of valve body	ZDB3701	1	2.8.9	Grid circle	ZDB3707	1
2.8.2	Valve body	ZDB3702	1	2.8.10	O-ring 14 x 1.9	ZDB3698	1
2.8.3	Spool	ZDB3703	1	2.8.11	Retaining ring	ZAW1618	1
2.8.4	Pilot valve core	ZDB3704	1	2.8.12	Retaining ring	ZAW1617	1
2.8.5	Valve seat	ZDB3705	1	2.8.13	O-ring 13 x 1.8	ZDB3699	1
2.8.6	Compression spring 0.5 dia.x6 dia.x 7 x 17	ZDB3706	1	2.8.14	Seal 10.3 x 1.2	ZDB3700	1
2.8.7	O-ring 17.17 x 1.78	ZDB3697	1				

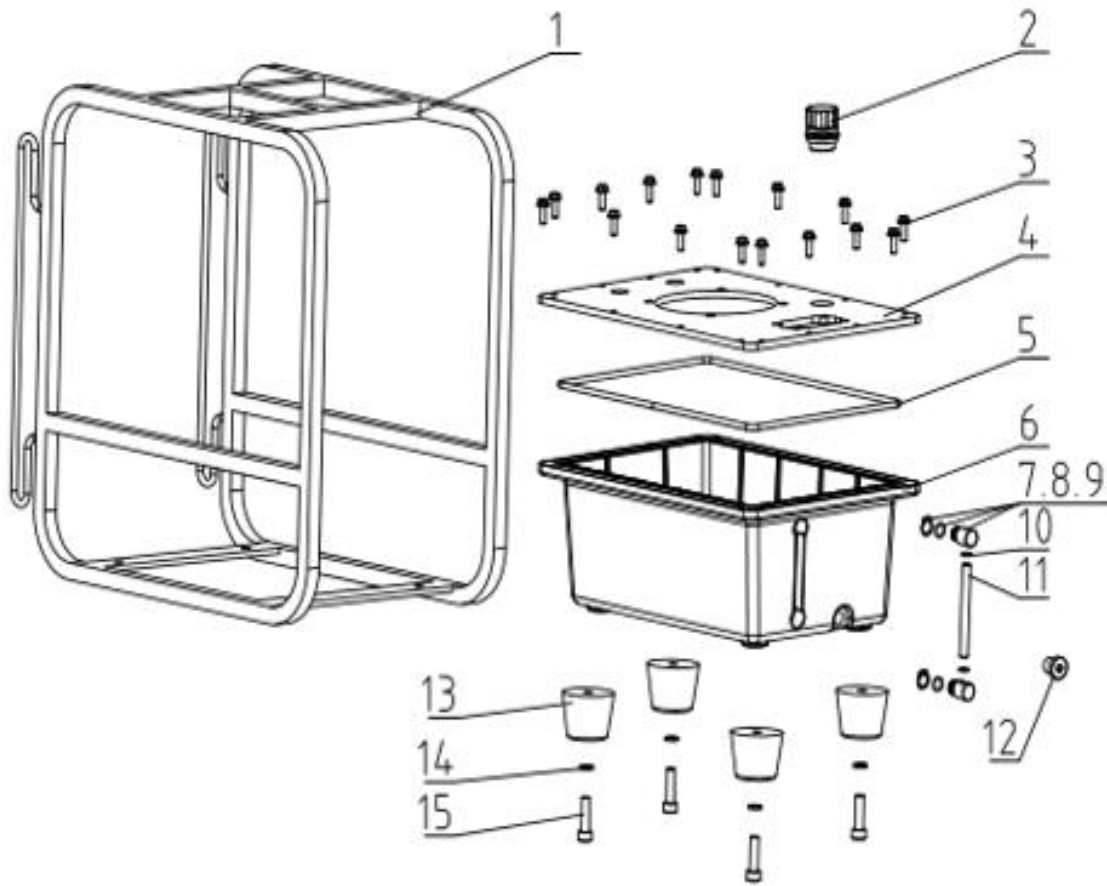
8.2.9 Pressure Regulating Valve Assy ZDB3633



Item	Description	Part No.	Qty	Item	Description	Part No.	Qty
2.9	Pressure regulating valve assy	ZDB3633	1	2.9.5	O-ring 5 x 1.5	ZDB3711	2
2.9.1	Hexagon screw	ZDB3691	1	2.9.6	O-ring 10.82 x 1.78	ZDB3650	1
2.9.2	Hexagon nut	ZDB3708	1	2.9.7	Compression spring	ZDB3712	1
2.9.3	Valve body	ZDB3709	1	2.9.8	Spool	ZDB3713	1
2.9.4	Anti-leak roof	ZDB3710	1	2.9.9	Valve seat	ZDB3714	1

8.3 Oil Tank Assembly Parts Breakdown & List

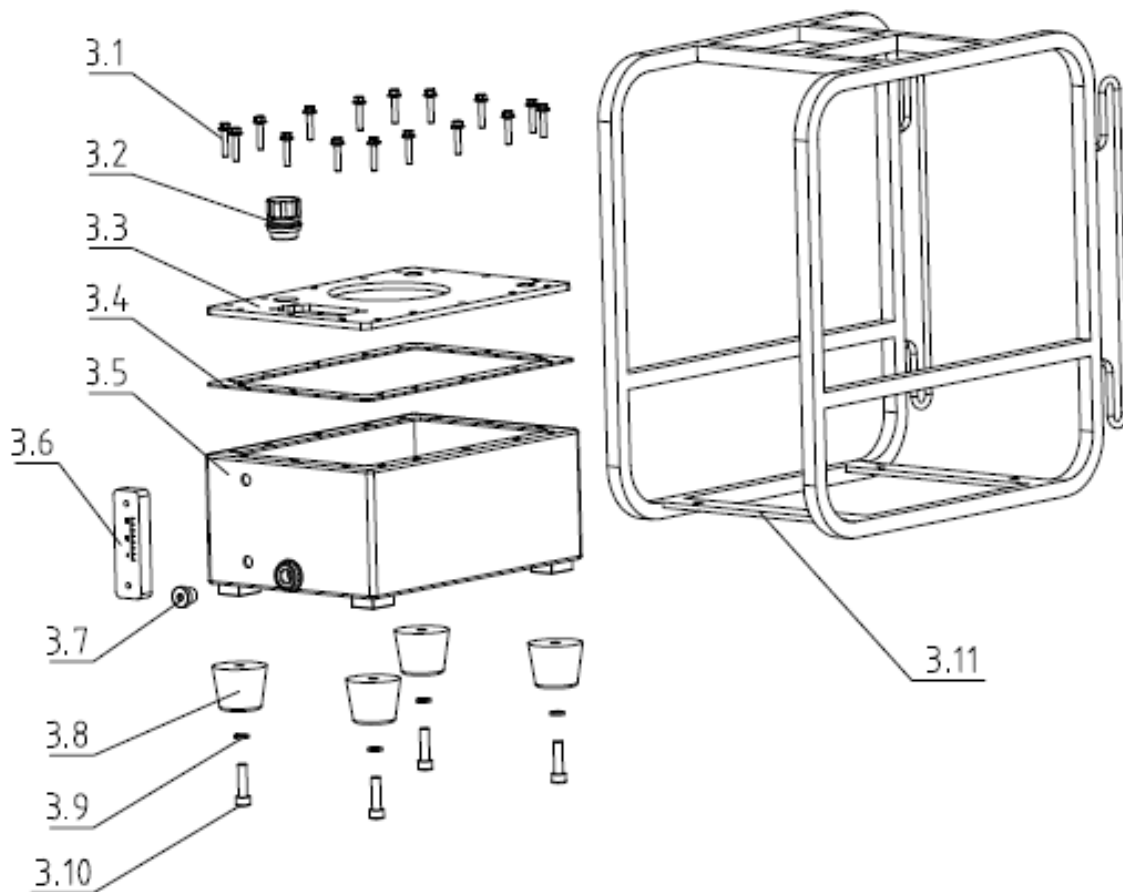
a) Oil Tank Assembly – New Style - ZDB3794



Item	Description	Part No.	Qty
3	Oil tank assembly	ZDB3794	1
3.1	Handle frame	ZDB3795	1
3.2	Vent plug	ZDB3677	1
3.3	Flange screw M5 x 16	ZDB3796	16
3.4	Fuel tank cover plate	ZDB3798	1
3.5	Oil tank seal	ZDB3635	1
3.6	Reservoir assembly	ZDB3799	1
3.7	Clasp spring	ZDB3797	2
3.8	O-ring 9.25 x 1.78	ZDB3670	2
3.9	Fixed seat of oil pointer	ZDB3669	2
3.1	O-ring 8 x 1.3	ZDB3668	2
3.11	Liquid level meter	ZDB3667	1
3.12	Oil tank plug	ZDB3718	1
3.13	Fuel tank pad	ZDB3636	4
3.14	Spring washer 8mm	ZDB3637	4
3.15	Hexagon socket head screw M8 x 30	ZDB3638	4

Reservoir assembly contains Reservoir + Items 3.7 - 3.12

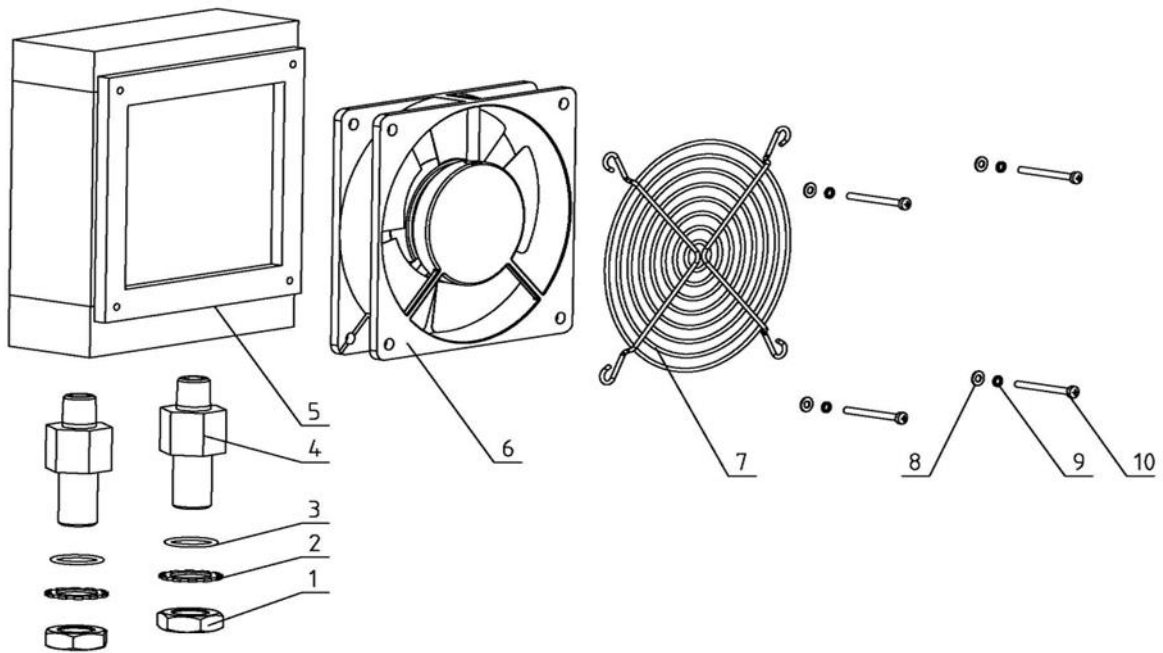
b) Oil Tank Assembly – Old Style - ZDB3754



Item	Description	Part No.	Qty
3	Oil tank assembly	ZDB3754	1
3.1	Hexagon flange bolt M5 x 25	ZDB3715	16
3.2	Vent plug	ZDB3677	1
3.3	Fuel tank cover plate	ZDB3716	1
3.4	Oil tank seal	ZDB3803	1
3.5	Reservoir	ZDB3717	1
3.6	Liquid level meter	ZDB3681	1
3.7	Oil tank plug	ZDB3718	1
3.8	Fuel tank pad	ZDB3636	4
3.9	Spring washer 8mm	ZDB3637	4
3.10	Hexagon socket head screw M8 x 30	ZDB3638	4
3.11	Handle frame	ZDB3719	1

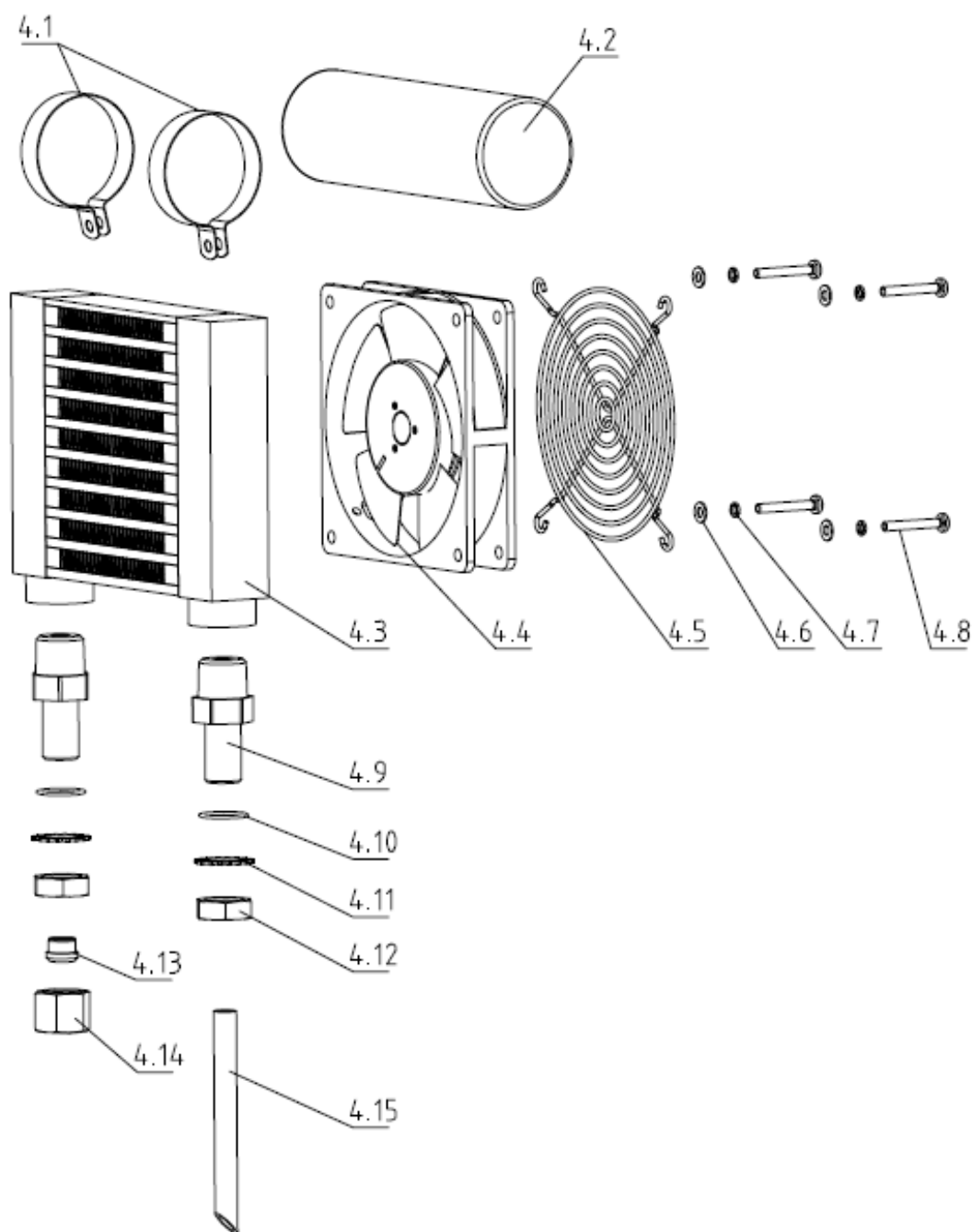
8.4 Cooler Assembly Parts Breakdown & List

a) Cooler Assembly – New Style – ZDB3801



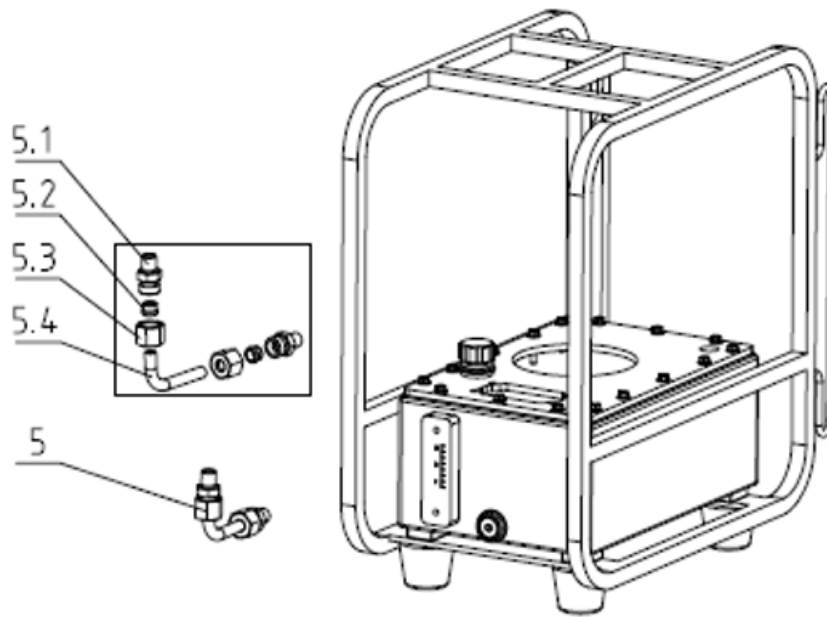
Item	Description	Part No.	Qty	Item	Description	Part No.	Qty
4	Cooler assembly	ZDB3801	1	4.8	Cross slotted pan head screw	ZDB3644	4
4.1	Hoop	ZDB3720	2	4.9	Cooler joint	ZDB3722	2
4.2	Operating capacitance	ZDB3639	1	4.10	O-ring 15.54 x 2.62	ZDB3723	2
4.3	Radiator	ZDB3787	1	4.11	External serrated lock washer	ZDB3724	2
4.4	Fan	ZDB3460	1	4.12	Thin hexagon nut with fine teeth M16 x 1.5	ZDB3725	2
4.5	Fan protection cover	ZDB3641	1	4.13	Ferrule	ZDB3726	2
4.6	Flat washer 4mm	ZDB3642	4	4.14	Ferrule nut	ZDB3727	2
4.7	Spring washer 4mm	ZDB3643	4	4.15	Oil return pipe	ZDB3728	1

b) Cooler Assembly – Old Style – ZDB3755



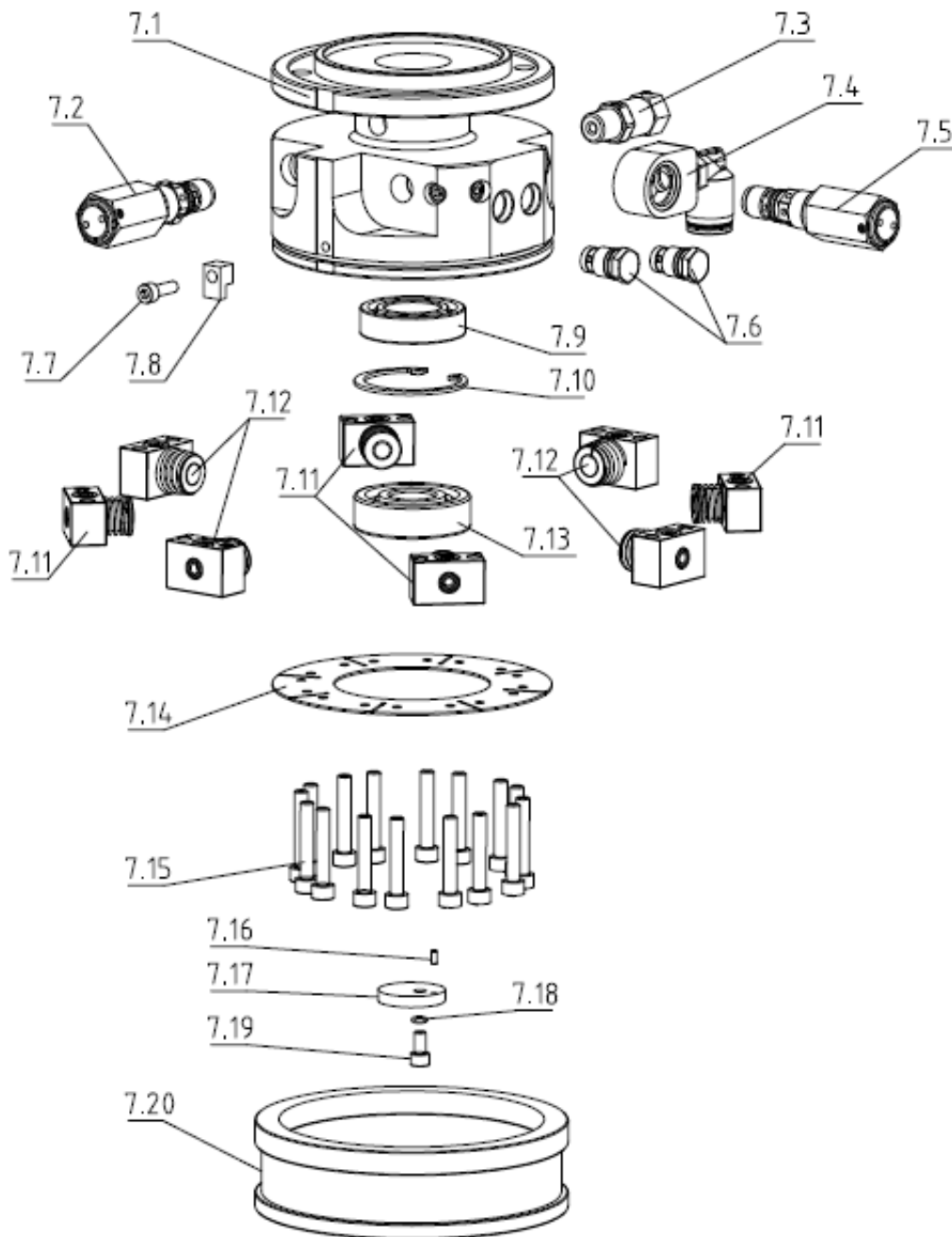
Item	Description	Part No.	Qty	Item	Description	Part No.	Qty
4	Cooler assembly	ZDB3755	1	4.8	Cross slotted pan head screw	ZDB3644	4
4.1	Hoop	ZDB3720	2	4.9	Cooler joint	ZDB3722	2
4.2	Operating capacitance	ZDB3639	1	4.10	O-ring 15.54 x 2.62	ZDB3723	2
4.3	Radiator	ZDB3673	1	4.11	External serrated lock washer	ZDB3724	2
4.4	Fan	ZDB3721	1	4.12	Thin hexagon nut with fine teeth M16 x 1.5	ZDB3725	2
4.5	Fan protection cover	ZDB3641	1	4.13	Ferrule	ZDB3726	2
4.6	Flat washer 4mm	ZDB3642	4	4.14	Ferrule nut	ZDB3727	2
4.7	Spring washer 4mm	ZDB3643	4	4.15	Oil return pipe	ZDB3728	1

8.5 Oil Inlet Pipe Components Parts Breakdown & List – ZDB3729



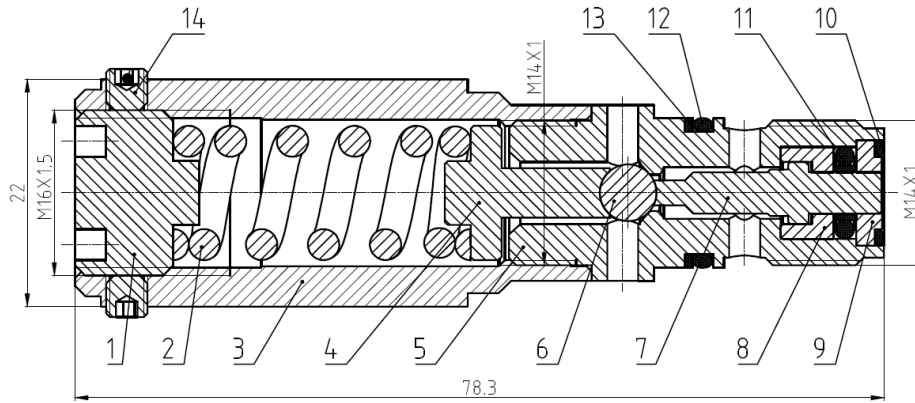
Item	Description	Part No.	Qty
5	Oil inlet pipe components	ZBD3729	1
5.1	Ferrule connector	ZDB3730	2
5.2	Ferrule	ZDB3731	2
5.3	Ferrule nut	ZDB3732	2
5.4	High pressure pipeline	ZDB3733	1

8.7 Pump Body Assembly Parts Breakdown & List – ZDB3757



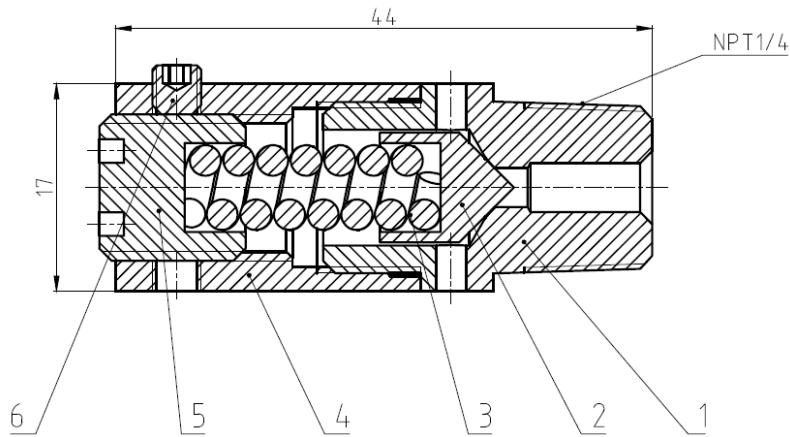
Item	Description	Part No.	Qty	Item	Description	Part No.	Qty
7	Pump assembly	ZDB3757	1	7.11	Plunger assembly 6mm dia.	ZDB3661	4
7.1	Pump body	ZDB3734	1	7.11A	Plunger assembly seal kit	ZDB3785	1
7.2	Medium pressure unloading valve	ZDB3645	1	7.12	Plunger assembly 11mm dia.	ZDB3662	4
7.3	Over pressure protection valve	ZDB3646	1	7.12A	Plunger assembly seal kit	ZDB3785	1
7.4	Splitter block assembly	ZDB3735	1	7.13	Deep groove ball bearing 6304	ZDB3739	1
7.4A	Splitter block assembly seal kit	ZDB3784	1	7.14	Connector	ZDB3740	1
7.5	Low pressure unloading valve	ZDB3647	1	7.15	Hexagon socket head cap screw M6 x 35	ZDB3749	16
7.6	Check valve	ZDB3631	2	7.16	Cylindrical pin 2.5 dia. x 6mm	ZDB3741	1
7.7	Hexagon socket head screw M5 x 16	ZDB3747	1	7.17	Shaft end pressing plate	ZDB3742	1
7.8	Filter press block	ZDB3736	1	7.18	Spring washer 5mm	ZDB3743	1
7.9	Deep groove ball bearing 6005	ZDB3737	1	7.19	Hexagon socket head cap screw M5 x 12	ZDB3748	1
7.10	Circlip	ZDB3738	1	7.20	Filter screen cover	ZDB3744	1

8.7.2 Medium Pressure Unloading Valve Assy – ZDB3645



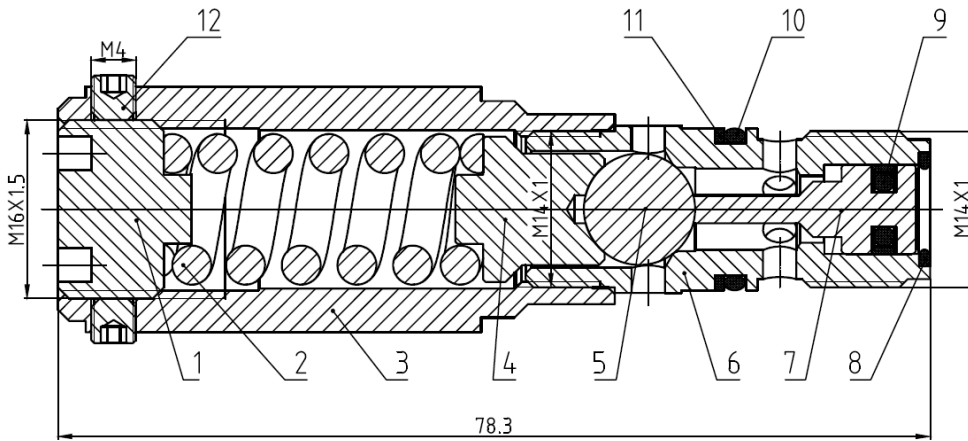
Item	Description	Part No.	Qty	Item	Description	Part No.	Qty
7.2	Medium pressure unloading valve	ZDB3645	1	7.2.8	Retaining ring seat	ZDB3767	1
7.2.1	Pressure regulating screw	ZDB3760	1	7.2.9	Retaining ring cover	ZDB3768	1
7.2.2	Compression spring 3 dia. x 13 dia. x 4 x 30	ZDB3761	1	7.2.10	O-ring 8 x 1.25	ZDB3769	1
7.2.3	Spring sleeve	ZDB3762	1	7.2.11	Seal 4 x 8.9 x 2.2	ZDB3770	1
7.2.4	Spring bracket	ZDB3763	1	7.2.12	O-ring 11.8 x 1.8	ZDB3771	1
7.2.5	Valve body	ZDB3764	1	7.2.13	Retaining ring 14.5 x 11.9 x 0.8	ZDB3772	1
7.2.6	Steel ball 5.5 dia.	ZDB3765	1	7.2.14	Hexagon screw M4 x 4	ZDB3691	2
7.2.7	Spool	ZDB3766	1				

8.7.3 Over Pressure Protection Valve Assy – ZDB3645



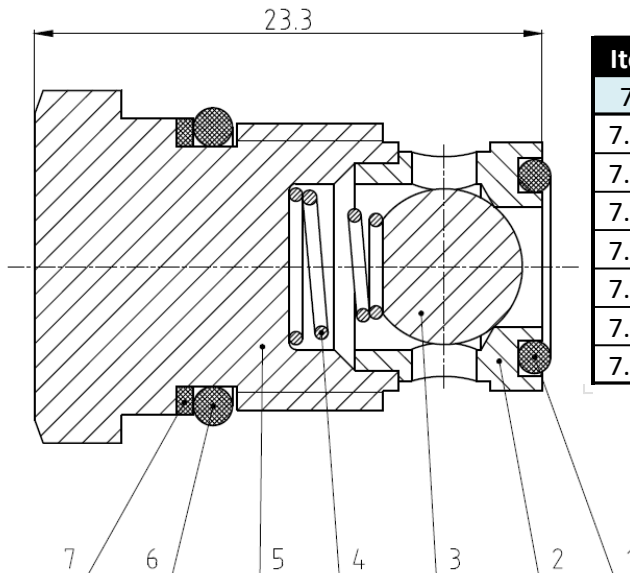
Item	Description	Part No.	Qty
7.3	Over pressure protection valve	ZDB3646	1
7.3.1	Valve body	ZDB3773	1
7.3.2	Spool	ZDB3774	1
7.3.3	Compression spring 2.5 dia.x 7 dia.x 5.25 x 21	ZDB3775	1
7.3.4	Spring sleeve	ZDB3776	1
7.3.5	Pressure regulating screw	ZDB3777	1
7.3.6	Hexagon screw M4 x 4	ZDB3691	1

8.7.5 Low Pressure Unloading Valve Assy – ZDB3647



Item	Description	Part No.	Qty	Item	Description	Part No.	Qty
7.5	Low pressure unloading valve	ZDB3647	1	7.5.7	Spool	ZDB3782	1
7.5.1	Pressure regulating screw	ZDB3760	1	7.5.8	O-ring 8 x 1.25	ZDB3769	1
7.5.2	Compression spring 3.5 dia. x 13.5 dia. x 4.5 x 30	ZDB3778	1	7.5.9	Seal 8 x 3.1 x 2.2	ZDB3783	1
7.5.3	Spring sleeve	ZDB3762	1	7.5.10	O-ring 11.8 x 1.8	ZDB3771	1
7.5.4	Spring bracket	ZDB3779	1	7.5.11	Retaining ring 14.5 x 11.9 x 0.8	ZDB3772	1
7.5.5	Steel ball 10 dia.	ZDB3780	1	7.5.12	Hexagon screw M4 x 4	ZDB3691	2
7.5.6	Valve body	ZDB3781	1				

8.7.6 Check Valve Assembly – ZDB3631



Item	Description	Part No.	Qty
7.6	Check valve	ZDB3631	1
7.6.1	O-ring	ZDB3649	1
7.6.2	Valve seat	ZDB3692	1
7.6.3	Steel ball	ZDB3693	1
7.6.4	Tower spring	ZDB3694	1
7.6.5	Valve body	ZDB3695	1
7.6.6	O-ring 10.82 x 1.78	ZDB3650	1
7.6.7	Retaining ring	ZDB3696	1