

800-VALACE3SD / 800-VALACE3LS

3SD/3LS valve

Mechanic's manual



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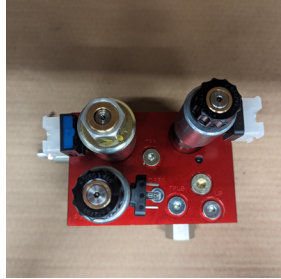
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1. Identifying faces

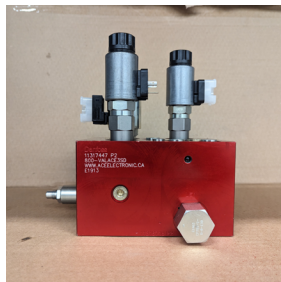
Top



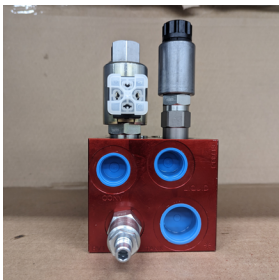
All ACE hydraulic blocks are identified in the same way:

- Top face: coils and conveyor cartridges, turnstile, and fluid.
- Front face: engraved with FR FACE AV.
- Bottom face: opposite the top face. Suitable for mounting.
- Rear face: engraved with RE FACE AR. Suitable for mounting.
- Left and right faces: viewed from the front face.

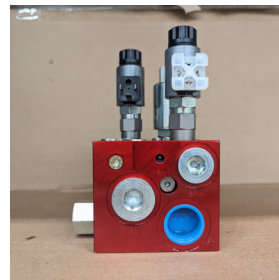
Front



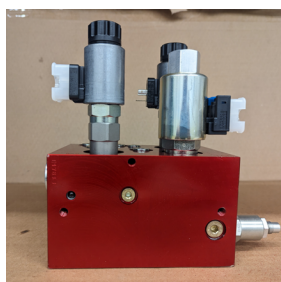
Left



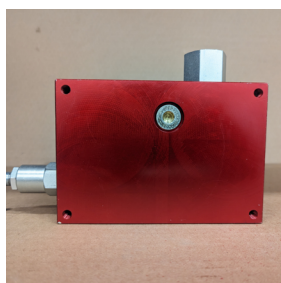
Right



Rear



Bottom



2. Product description

The 3SD hydraulic control system is a simple and lightweight spreader block that allows the operation of a spreader's conveyor, spinner, and liquid functions using either a fixed or variable flow pump as a power source.

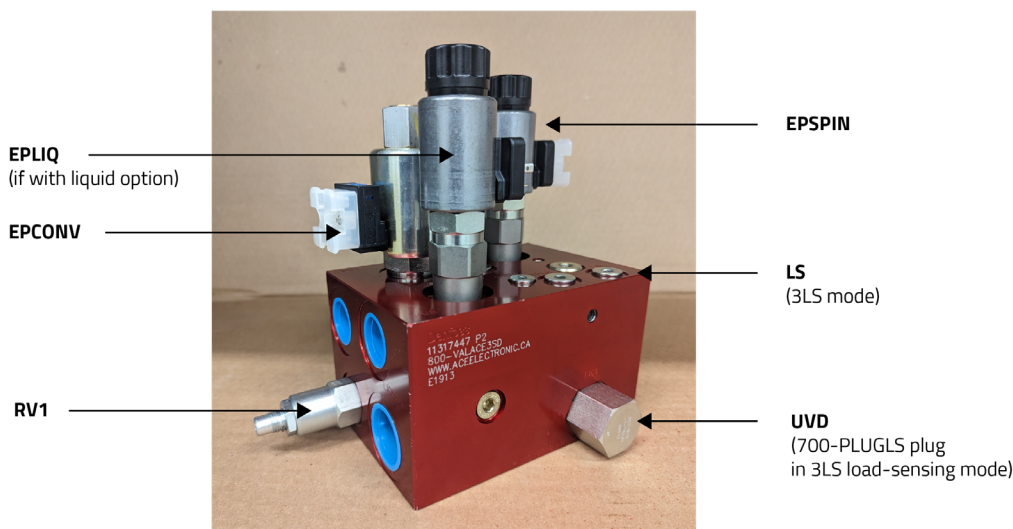
Other equipment must be operated by a separate system, making it ideal for installing a salt spreader on trucks that are already equipped with plows.

This anodized, machined aluminum housing is designed specifically for this application and contains all the necessary passages, cavities, and connections. It mounts on the rear face (3 holes) or on the bottom face (4 holes).

2.1. Components

The following components are integrated:

- On the left side, a pressure limiter (RV1).
- On the top face, an electro-proportional cartridge to control conveyor flow (EPCONV) and one to control spinner flow (EPSPIN). Optionally, an electro-proportional cartridge for liquid pump flow control (EPLIQ), access to orifice ORF1, and the LS control output in load-sensing mode.
- On the front face, a relief valve (UVD) to maintain the required system operating pressure and allow excess oil to flow back to the tank, or a 700-PLUGLS plug to switch to load-sensing mode.

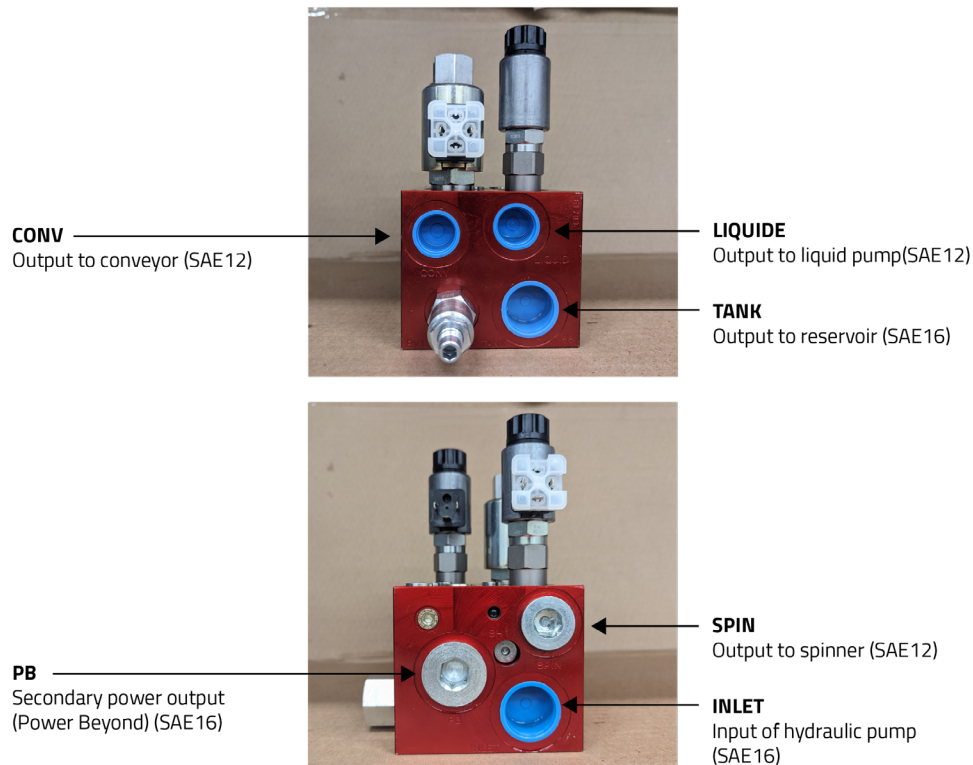


2.2. Inputs/outputs

Several test ports are located on the top face:

- A TPP port (for measuring the pump pressure in the block) (SAE06).
- A TPLS port (for measuring the load-sensing signal pressure from the pump) (SAE06), used in variable flow configuration only.
- An LS port (for connecting the load-sensing signal to the variable flow pump) (SAE06).
- An ORF1 port (for checking or cleaning the ORF1 orifice) (SAE).

The left and right faces contain the main ports of the block:



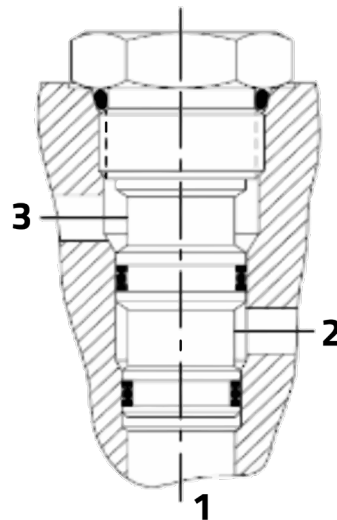
2.3. Configuration in 3SD mode toward 3LS (for variable flow pump)

If the valve was ordered with an open center (3SD standard fixed flow) and needs to be modified for a closed center system (3LS variable flow):

- Remove the UVD cartridge and replace it with the multi-stage plug (700-PLUGLS) available from ACE for this purpose.
- Remove the LS plug and connect the pump control hose to the LS port.



UVD



4. Technical specs

Valve 3SD/3LS	Métrique	CDA-US
Dimensions of block (W x H x D)	16.5 cm x 10 cm x 11.3 cm	6,5" x 3.94" x 4.44"
Total dimensions (W x H x D)	22.2 cm x 21.4 cm x 13.8 cm	8.74" x 8.42" x 5.43"
Weight	5,9 kg	13 lbs
Conveyor flow	0 to 73 L/min	0 to 16 GPM
Spinner flow	0 to 45 L/min	0 to 10 GPM
Liquid flow	0 to 45 L/min	0 to 10 GPM
Supply pressure	13.1 Bar	190 PSI (UVD)
Maximum working pressure	206.8 Bar	3000 PSI
Security clearance pressure	172.4 Bar	2500 PSI
Dimensions des ports : -Pressurized inlet (INLET) -Return to tank (TANK) -Power beyond (PB) -Conveyor (CONV) -Spinner (SPIN) -Liquid (LIQUID) -Load-sensing signal (LS) -Pressure test port (TPP) -Load sensing test port (TPLS)	SAE 16 SAE 16 SAE 16 SAE 12 SAE 12 SAE 12 SAE 06 SAE 06 SAE 06	
Oil type	See specs of pump manufacturer	
Filtration and oil purity	See specs of pump manufacturer	
Current for conveyor coil	20 VDC, 30 W, 1.5 A, 13 Ohms	
Current for spinner coil	12 VDC, 22 W, 1.8 A, 3.7 Ohms	
Current for liquid coil	12 VDC, 22 W, 1.8 A, 3.7 Ohms	

4.1. Recommendations for hydraulic hoses and fittings:

- All hoses must be cleaned before installation.
- All fittings going to valves, motors, cylinders, etc., must comply with SAE 514 (O-ring boss) specifications.
- All hoses must meet or exceed SAE100-R2AT standards.
- All hoses, fittings, and connectors should come from the same manufacturer.
- All fittings should meet SAE-J514 (JIC 37°) specifications.

5. Installation and configuration

5.1. Planning

- Determine if you need to install an enclosure or protective case.
- Choose a location to install the 3SD/3LS block that allows easy access for inspection and maintenance.
- Plan for adequate space to connect hydraulic hoses on each side.
- Ensure access to components and ports for maintenance.

5.2. Important precautions

Cleanliness is crucial for any hydraulic system installation. Take all possible precautions to prevent impurities and contamination, especially in the system's oil.

5.3. Execution

This valve offers two mounting surfaces: on the rear or underneath. Choose the most suitable one and drill holes using the appropriate template (see «11. Appendix A : mounting dimensions», page 28).

- > Note : The threaded mounting holes in the housing have 5/16 NC threads, with a ½-inch depth. It is recommended to allow a cleaning gap between the valve housing and the truck's mounting surface by adding a stainless steel spacer (e.g., 3/8-inch nuts).

Connect properly sized and cleaned hoses to their respective functions according to the photos.

6. Using Power Beyond output, fixed flow only

> **IMPORTANT**

The TANK output (return to the reservoir) should never be used to connect a valve for another actuator (such as a dump or plow). Use the PB (Power Beyond) output as the oil flow source for any actuator other than the spreader motors.

If you need the Power Beyond function (e.g., to supply the dump valve):

- Install a ½ NPT plug at the bottom of the T output (lower right on the left side) before connecting it to the reservoir.
- Connect the opposite PB output (right side) to the dump valve.
- Connect the returns from the spreader and dump motors directly to the reservoir.

7. Maintenance

The only regular maintenance recommended for this valve is to ensure that all coils are detachable from their respective cartridges.

Separate the two components, clean them, and reassemble with anti-corrosion grease. At the same time, check that the top of each cartridge is covered with a drop of silicone to prevent manual activation from rusting and thus losing a valuable diagnostic tool. Use a 7/64 Allen key to manually activate this coil.

8. System diagnostics

8.1. Essential preliminary checks

If a malfunction is detected, check the following items before starting diagnostic steps:

- Ensure that no mechanical element is obstructing the conveyor or spinner.
- Ensure that the hydraulic oil level is normal.
- Verify that the hydraulic pump drive shaft is correctly connected and able to turn freely when the engine is running. For automatic transmissions, specifically check that the PTO is properly engaged.
- Perform a visual inspection of all hoses and components in the hydraulic system for oil leaks.
- Ensure that the electronic control module is supplied with 12 VDC power and has a solid ground connection.

8.2. Fixed and variable flow problem diagnostics

If no faults are found after the preliminary checks, follow these steps based on the nature of the problem:

8.2.1. Problem #1: The conveyor or spinner does not operate

STEP 1

This step checks whether the issue is electrical or hydraulic.

- Manually activate the cartridge head of the conveyor (EPCONV) or the spinner (EPSPIN).

Cas 1.1.1 : The conveyor or spinner still does not operate.

- Check the cartridge: Separate the round stem from the base. Clean the components and reassemble the cartridge.
- If the manually activated cartridge still does not work, replace it.
- If it still does not work, proceed to Step 2.

Cas 1.1.2 : The conveyor operates when the cartridge is manually activated.

- Check the LED on the coil connection:
- LED is on: Power is present. Check the coil; its resistance should be 13 Ohms. Replace if necessary.
- LED is off: Check the electronic controller and the cable.

STEP 2

This step identifies if the issue is hydraulic.

- Attach a 3000 psi pressure gauge to the pump output feeding the block and let it run without activating the spreader.

> Note : The 3SD/3LS blocks have a port labeled TPP on the top face for this gauge.

Cas 1.2.1 : The TPP gauge reads less than 300 psi.

For a gear pump (fixed flow):

- Check if the pump is working.
- If the pump is functional, check the UVD relief valve on the front face.
- Clean or replace as necessary.
- If the conveyor still does not operate, refer to an ACE service center as the problem may be complex.

For a variable flow pump (load-sensing):

- Install another 3000 psi gauge on the TPLS port on top of the 3SD/3LS block.
- When the system is in standby, the TPP should indicate the pump's standby pressure setting (usually between 300 psi and 400 psi). If not, verify the pump's neutral adjustment.
- In standby mode, the TPLS pressure should be 0 psi.
- If TPLS pressure is above 0 psi, disassemble, inspect, and clean the ORF1 orifice. A plug labeled ORF1 on top of the block provides access.
- If pressures are correct, proceed to Case 1.2.2.

Cas 1.2.2 : The TPP gauge reads around 300 psi

- Insert a plug into the conveyor or spinner outlet (depending on which section is problematic) and start the conveyor or spinner.

For a fixed flow gear pump:

Gauge Reads 2200 psi:

- The issue is likely mechanical, not hydraulic.

Gauge Does Not Read 2200 psi:

- Adjust the RVS relief valve.
- If adjusting it does not change the pressure:
- Disassemble and clean the RVS relief valve.
- If no result, disassemble and clean the UVD relief valve.
- If still unresolved, replace the RVS and UVD valves.

If the issue persists after these changes, proceed to Step 3.

For a variable flow (Load-Sensing) pump:

Gauge Reads 2200 psi:

- The issue is likely mechanical, not hydraulic.

Gauge Does Not Read 2200 psi:

Check if TPLS pressure increases when activating the function.

- If it does not, disassemble, clean, and inspect the SH1 pilot selection cartridge, located on the right face in the center, between PB, SPIN, and INLET.
- If no improvement, replace the SH1 cartridge.
- Check the pump compensator setting (on the pump).
- Check and adjust the RVS relief valve.
- The RVS should be set around 300 psi above the pump compensator pressure. To check the maximum RVS setting, increase the pump compensator setting temporarily and then reset to 2200 psi after adjusting the RVS.
- If adjusting the RVS does not change the pressure:
- Disassemble and clean the RVS relief valve.

If the issue persists after these changes, proceed to Step 3.

STEP 3

For both fixed flow gear pump and variable flow (load-sensing) pump:

Adjust the relief valve (and the pump compensator in the case of variable flow) to 3000 psi. Increase the RPM while operating the spreader. Normally, the conveyor should operate below 2200 psi. The spinner should operate between 300 psi and 1000 psi.

> **NOTE IMPORTANTE**

If the hydraulic system of the spreader is used with the Power Beyond function, the pressure-limiting valve of the other actuator (e.g., plow or dump) sets the system's maximum pressure. In this case, the RVS relief valve is not used.

If everything works at 3000 psi: Check the mechanical parts of the problematic section (motor, gearbox, chain tension, etc.).

If the conveyor does not work even at 3000 psi: Consult an ACE service center as this may be a complex issue.

8.2.2. Problem #2 : circuit heats up without conveyor operation:

STEP 1

- Place a 3000 psi pressure gauge in the T position on the pump outlet that supplies the spreader valve, or on the TPP port of the block.

Case 2.1.1: Pressure is below 300 psi and hydraulic oil heats up

For both fixed flow gear pump and variable flow (load-sensing) pump:

- Have the hydraulic pump checked at a service center, as it is abnormal for a pump to heat up at low pressure.

Case 2.1.2: Pressure is above 300 psi, while the conveyor and spinner are not operating

For a fixed flow gear pump:

- Check the ORF orifice on the top face.
- Clean and replace it if necessary.
- If the problem persists, inspect the UVD relief valve on the front face.
- Clean and replace it if necessary.
- If the issue continues, verify that the conveyor (EPCONV) and spinner (EPSPIN) cartridges (on the top face) are sealing correctly.
- Disassemble, clean, and reassemble them.
- If the issue persists, replace the UVD relief valve.
- If there is still no improvement, replace the EPCONV and EPSPIN cartridges.

If the problem remains unsolved: Refer to an ACE service center, as the issue may be complex.

For a variable flow (load-sensing) pump:

- Check the ORF orifice on the top face.
- Clean and replace it if necessary.
- If the problem persists, ensure that the conveyor (EPCONV) and spinner (EPSPIN) cartridges (on the top face) are sealing correctly.
- Disassemble, clean, and reassemble them.
- If the problem continues, disconnect the LS signal hose that leads to the pump and plug it.
- If TPP pressure is above 500 psi, there is likely an issue with the pump.

If unresolved: Refer to an ACE service center, as this could indicate a major issue.

8.2.3. Problem #4: circuit heats up when conveyor is running

This issue indicates excessive pressure in the conveyor line, suggesting a mechanical problem with the conveyor.

9. Reparation service

You can reach customer service by phone during normal business hours (8:30 AM to 5:00 PM Eastern Time) at **(418) 847- 6344**.

10. Warranty

ACE warrants that its hydraulic products and accessories are free from defects in materials and workmanship. ACE's warranty obligations are limited, at its discretion, to the repair or replacement of parts or products proven to be defective in material or workmanship under normal use and maintenance conditions.

Claims under this warranty will be valid only if the purchaser notifies ACE in writing of the discovered defects within twelve (12) months from the product's shipping date. Upon ACE's request, the purchaser must return, prepaid, the parts or product for which a warranty claim is made to the factory or a designated service center. The purchaser assumes the risk of loss or damage for the returned products and parts.

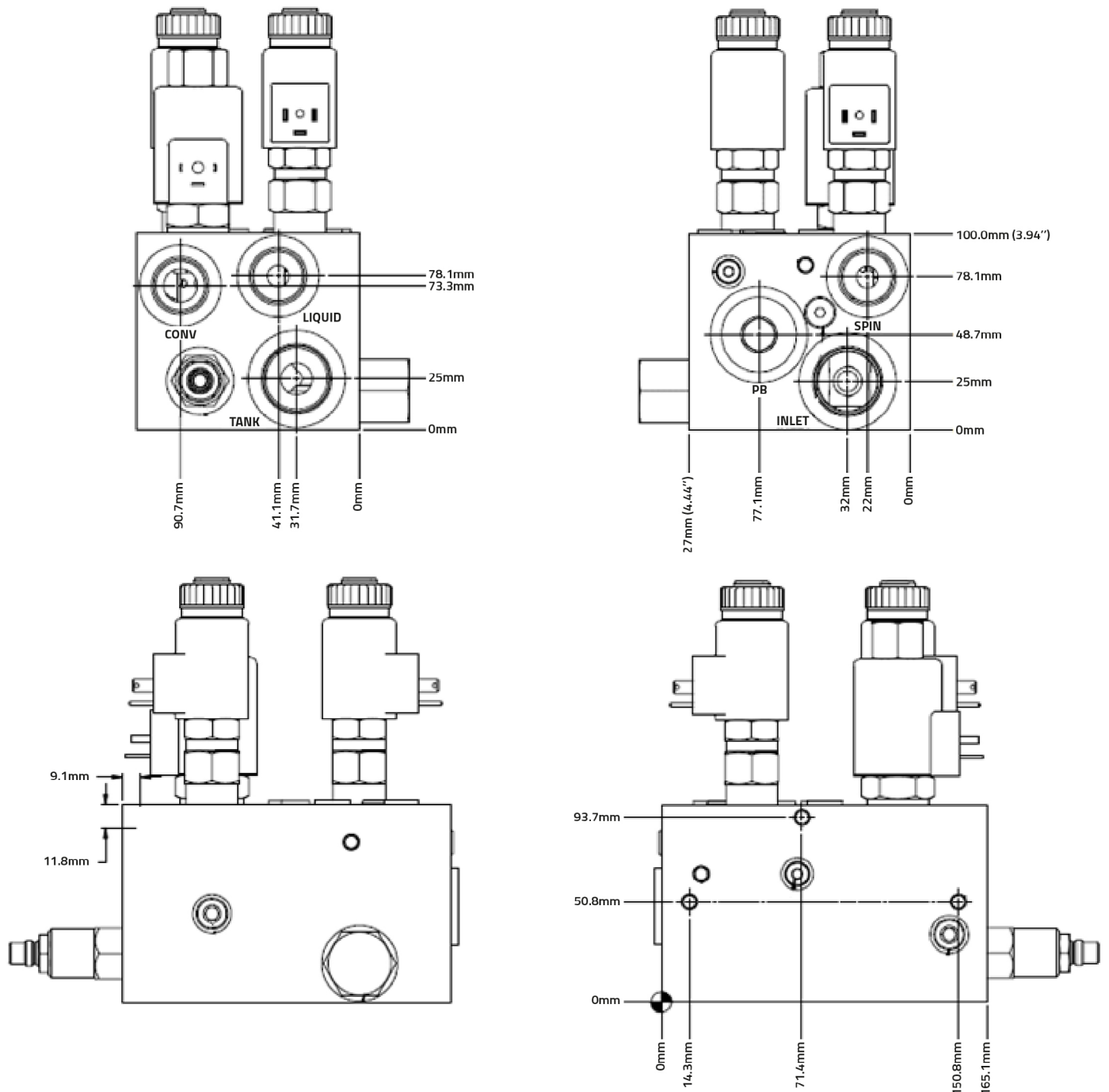
If the warranty claim is accepted, ACE covers the return shipping costs for the parts or product.

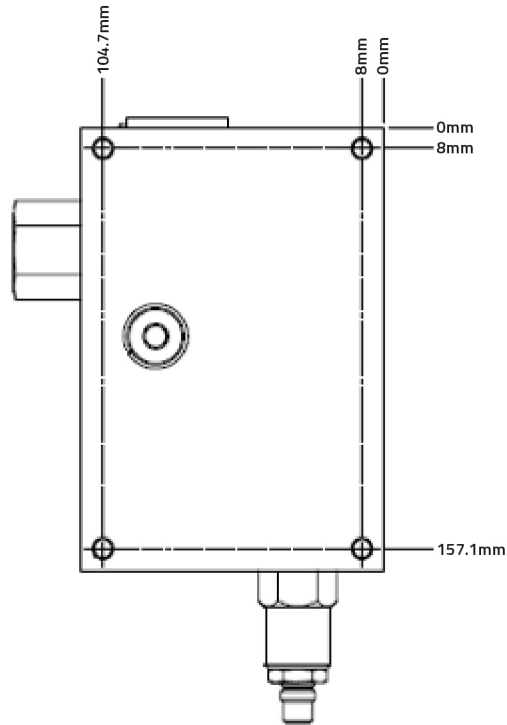
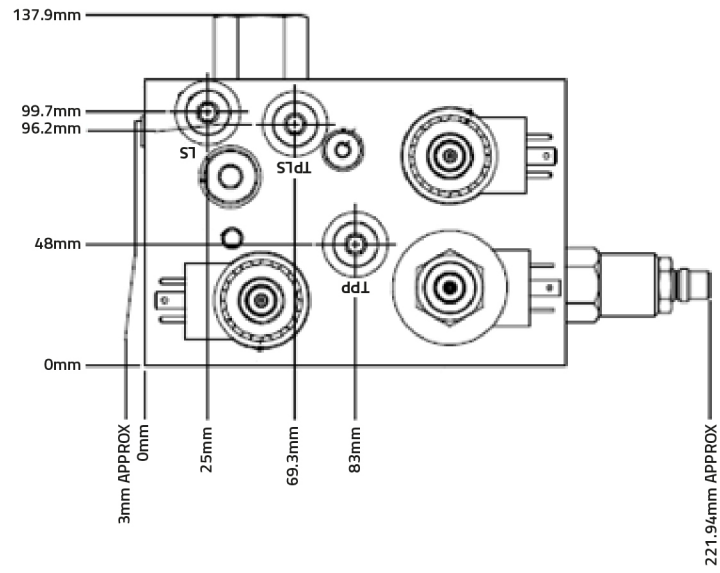
The ACE warranty does not cover:

- Normal wear and tear, abuse, misuse, overloading, or modifications;
- Shipping costs for returns, installation, replacement, or repair outside the factory, or any other costs related to returning the product to ACE or an authorized service center;
- Liability for direct, indirect, or incidental damages or any delays.

No employee or representative of ACE is authorized to alter the warranty in any way or to offer any additional warranty unless these changes are made in writing and signed by an ACE executive.

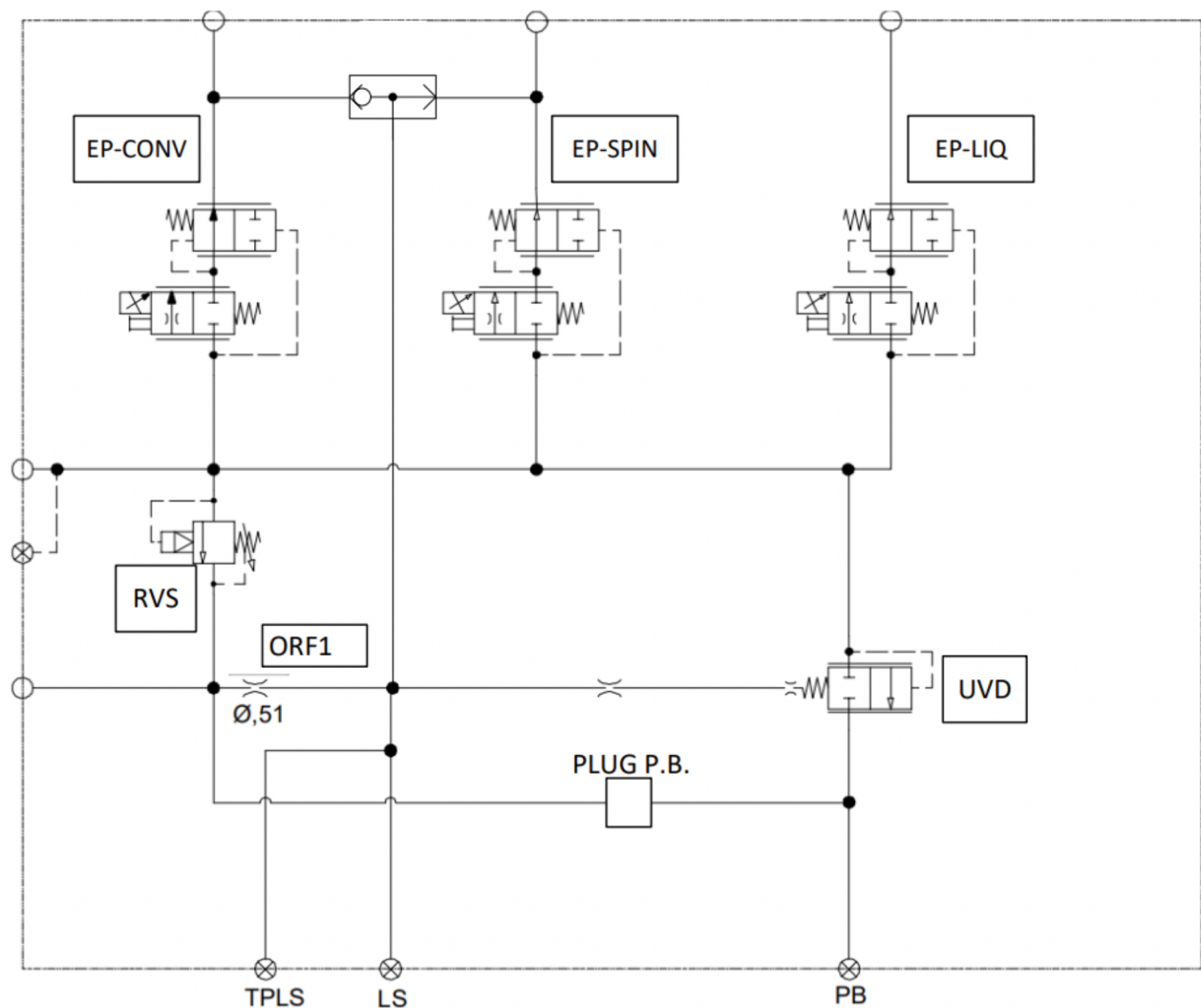
11. Appendix A: mounting dimensions



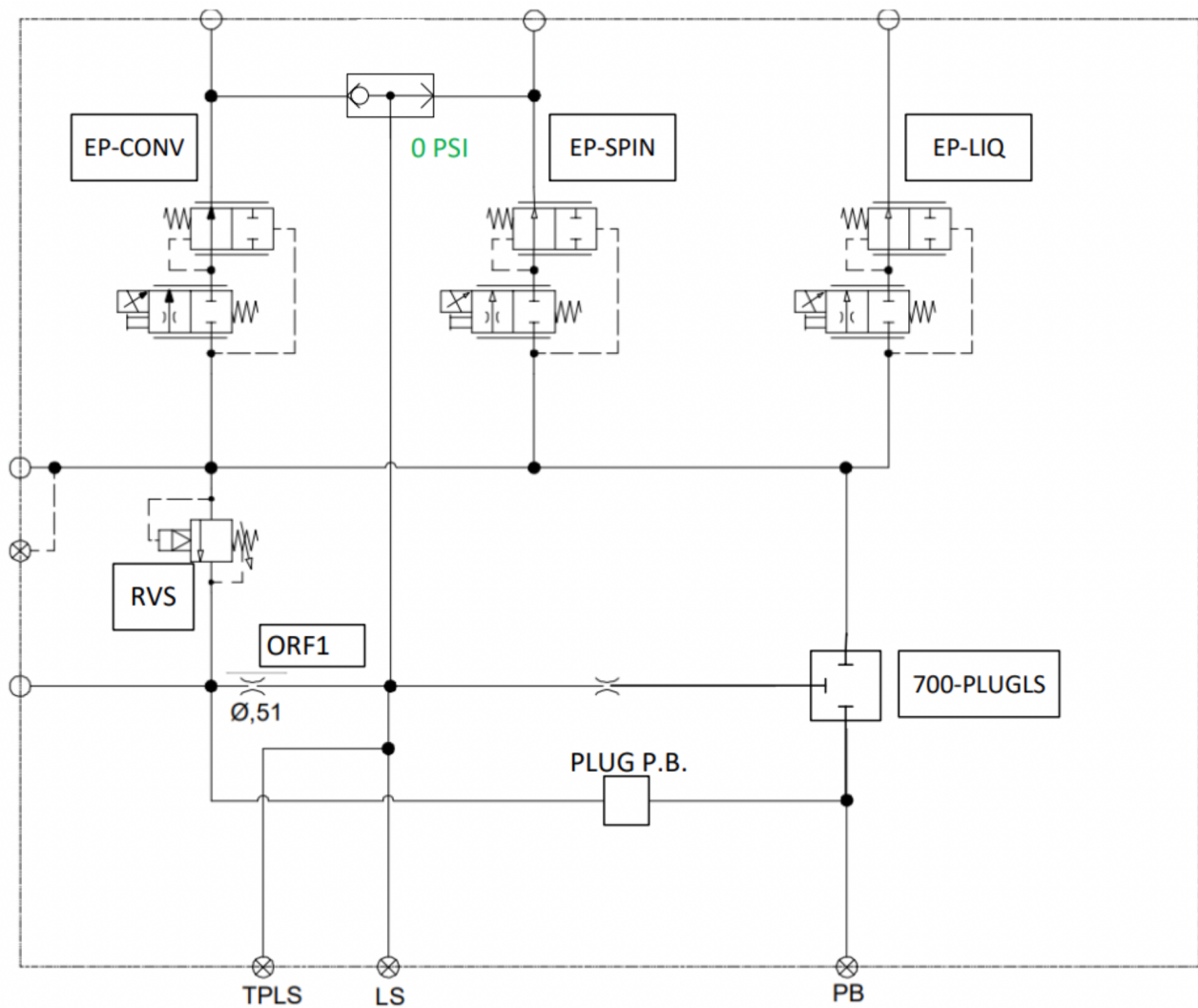


12. Appendix B: hydraulic diagrams

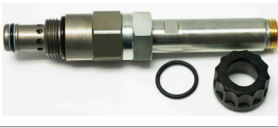
3SD fixed flow



3LS variable flow



13. Appendix C: list of parts

Name	Part number	Photo	Description
800-VALACE3SD/ 800-VALACE3LS			3 function valve block For fixed flow: 800-VALACE3SD For variable flow: 800-VALACE3LS
RVS	700-CP210-2		Relief valve 0-3000 psi
UVD	700-CP701-1		Unloading valve
EP CONV	700-D14E-30W		Coil 20 V, 30 W for conveyor
	700-PFC12-RC		Electro-proportional cartridge for conveyor
EP SPIN et EP LIQ	700-M19P-12D		Coil 12 V, 22 W for spinner/liquid
	700-PFC10-RC		Electro-proportional cartridge for spinner/liquid
700-PNPT-8 (option)			1/2 npt plug for power-beyond option
700-PLUGLS (option)			Conversion plug for 3LS (variable flow)