DURAPAC
ENGINEERED FOR RELIABILITY

Instruction Manual

Double Acting Diesel Driven Railway Power Unit - Model – PDM3054-RAIL

Maximum Operating Pressure – 700 bar

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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 – Double Acting Diesel Driven Railway Power Units are engineered to meet Industrial Standards for Performance and Safety. The PDM3054-RAIL model is suitable for heavy duty applications in the field and can deliver a minimum flow of 2.5 Lpm at 700 bar pressure. It is specifically designed to operate rail tensors and weld shears commonly used in the railway industry. It features a selector valve to choose which tool to operate and individual directional control valves for each tool. The power unit has a 50 L usable oil capacity coupled with the reliability of a 3.4 kW Hatz® diesel motor.

Note – PDM3054-RAIL power units can be custom designed to suit many applications. Variations in function, pressure and flow can be achieved.

- Selector valve for weld shear outlet / tensor outlet
- 12 V battery with isolation switch
- 5 litre fuel tank with filter
- Recoil start for manual backup
- Throttle control lever for manual adjustment
- Fuel and oil filter accessible for ease of service
- Air cooled diesel 3.4 kW engine with variable speed control
- 12 V electric start/stop control panel
- 63 mm panel mounted 0 - 1,000 bar pressure gauge
- Shutdown protection on high temperature and low oil pressure
- Side exit exhaust silencer with mesh guard

Please see the enclosed HATZ Diesel Instruction Book to obtain further information, safety warnings and alerts that relate specifically to the HATZ diesel engine.

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 units' 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 have an understanding of 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 pressure gauges 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

- **Do** use a gauge or other load measuring instrument to verify load
- **Do NOT** exceed the rated capacity of the power unit or any equipment in the system. Burst hazard exists if connection pressure exceeds rated pressure
- **Do NOT** operate the system with bent or damaged couplers or damaged threads
- **Do NOT** subject the power unit and its components to shock loads
- Use only Durapac approved accessories and components
- **Do NOT** connect to an application which can return more oil to the reservoir than the power unit 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
- Reduce stress in tube lines. Long tubing runs should be supported by brackets or clips. Before operating the power unit, tighten all hose connections with proper tools. Do not over tighten. Connections should be 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 power unit 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
- 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

Please also refer to the HATZ Diesel Instruction Book for safety warnings and alerts that relate specifically to the HATZ diesel engine.

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

4.0 Installation

IMPORTANT:

- This power unit is for use with a double-acting cylinder ONLY! Ensure that both A and B ports are properly connected to a double acting application
- 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

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 specification chart below or if in doubt, contact a Durapac representative.

Model Number	Kw	rpm	Flow Rate Lpm @ 700 bar	Usable Oil Capacity (L)	Dry Weight (kg)
PDM3054-RAIL	3.4	2,200	2.5	50	190

4.2 Ensure that there is adequate oil in the reservoir to perform the required function. Ideally the gauge should not read less than 1/3. If this is the case see section 6.1 Adding Hydraulic Fluid.

4.3 Hydraulic connections – check all system fittings and connections to be sure they are tight and leak free.

4.4 Completely fill the fuel tank with diesel following the instructions in the HATZ Diesel Instruction Book. The bleeding of the fuel system is automatic.

4.5 Remove air from the system – Air can accumulate in the hydraulic system during the initial setup or after prolonged use, causing the cylinder to respond slowly or in an unstable manner. Should removal of air from power unit be required, please follow the steps in 6.2 – Bleeding Air from the System in the Maintenance Section.

5.0 Operation

IMPORTANT:

- **Do NOT** operate the power unit in closed or badly ventilated rooms
- **Never** set the relief valve to a higher pressure than the maximum rated pressure of the power unit. Higher settings may result in equipment damage and/or personal injury
- **Do NOT** remove the relief valve
- The power unit has a high pressure safety valve set to 700 bar. The operator should ensure the tool being operated is adequately rated
- 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 power unit 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 power unit and its components

5.1 Before Using the Power Unit

5.1.1 Check all system fittings and connections to be sure they are tight and leak free.

5.1.2 Check hydraulic oil level in reservoir. See section 6.1 Adding Hydraulic Fluid, if required.

5.1.3 Check the engine oil level. Refill as per the HATZ Diesel Instruction Book, if required.

5.1.4 Check fuel level. Refill as per the HATZ Diesel Instruction Book, if required.

5.1.5 Auxiliary equipment should be placed in neutral.

5.2 Before Starting the Engine

5.2.1 Set the speed control lever to the STOP position.

5.2.2 Ensure the hydraulic selector valve and tool directional valves (Figure 1) are in the centre position

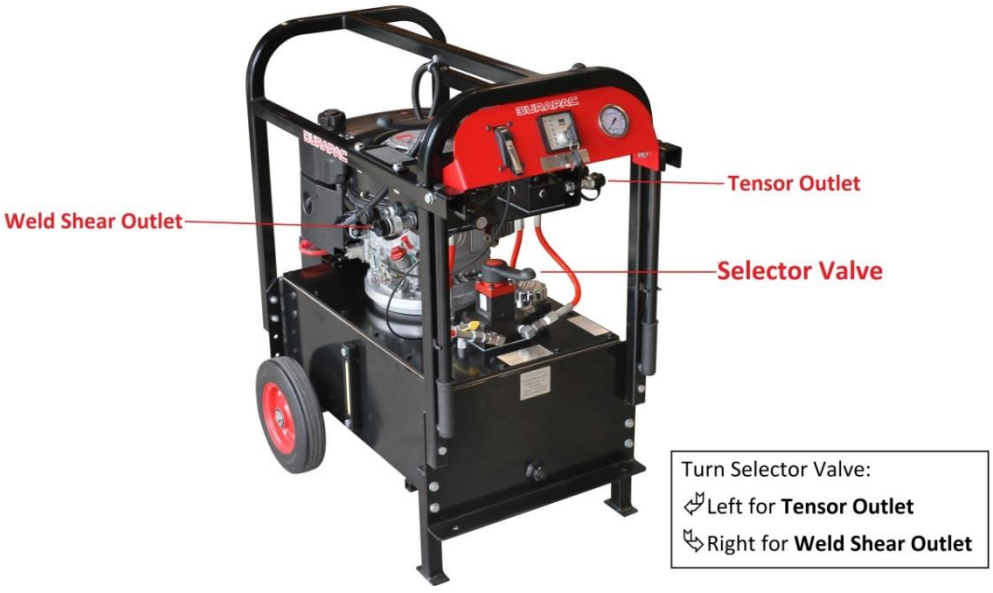

Figure 1 – Selector Valve & Outlets

5.2.3 Move the speed control lever to ½ START or all the way to the START position, as desired or necessary.

Note - Starting at a lower speed will minimise exhaust smoke.

5.3 Starting the Engine

5.3.1 Insert the key fully and turn to position "I" (Figure 2). Battery charge telltale (2) and the oil pressure warning (3) must light up.

5.3.2 Turn start key to position "II".

5.3.3 As soon as the engine is running, release the start key. It will automatically return to position "I" and will remain in this position during operation.

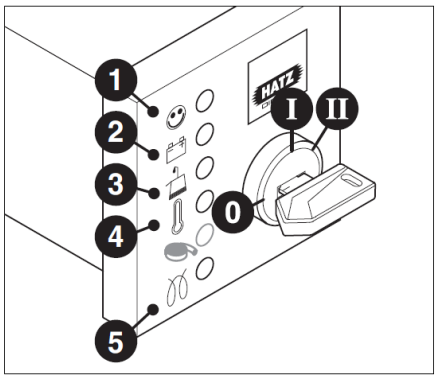

Figure 2 – Starting the Engine

- Battery charge telltale and oil pressure warning will go out immediately after starting
- Indicator light (1) will be on when the engine is in operation

⚠ The engine temperature display (4) will light up if the temperature at the cylinder head becomes too high. If this occurs, switch off the engine and identify the cause of the problem (refer to the HATZ Instruction Book for further details)

⚠ Always turn the start key back to position 0 before restarting the engine. The repeat lock in the ignition lock prevents the starter motor from engaging and possibly being damaged while the engine is still running

⚠ The preheating light (5) will light up at temperatures below 0^{o} C. Do not start the engine when the light is on

5.4 Stopping the Engine

5.4.1 Move the speed adjustment lever back to the STOP position. The engine will cut out.

5.4.2 Turn the key to position 0 (Figure 2) and remove. All indicator lights will go out.

Note – Failure to return the starter key to position 0 may result in the battery being totally discharged.

Please refer to the HATZ Diesel Instruction Book for further operational details, safety warnings and alerts that relate specifically to the HATZ diesel engine.

5.5 Tool Operation

5.5.1 Ensure both tool directional control valves are in the centre position.

5.5.2 Move the selector valve to the desired position to power either the tensor or weld shear.

5.5.3 The operator can now control the advance and retract function of the chosen tool by operating the tool directional control valve.

⚠ **CAUTION:** The rail tensor circuit is fitted with a pilot operated check valve system to hold hydraulic pressure positively when shifting from advance or retract to the centre position. To prevent pressure build up and difficult hose removal ensure the rail tensor cylinder is not pressurised in the fully advanced or retracted position. Prior to shutting down the engine, advance the cylinder a few millimetres to remove pressure from the hydraulic hoses.

5.6 Relief Valve Adjustment

All power units contain a factory set relief valve to prevent over-pressurisation of the system. A deck mounted adjustable pressure relief valve is also included and can be set to lower working pressures.

6.0 Maintenance

IMPORTANT:

- 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 power unit, 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 fully retracted (or extended, if pull cylinders) or the system will contain more oil than the reservoir can hold

6.1.1 Depressurise and disconnect hydraulic hose from application/cylinder.

6.1.2 With the power unit in its upright, horizontal position, remove the air vent plug located on the top plate of the reservoir.

6.1.3 Take out the filling plug.

6.1.4 Use a small funnel to fill the oil to within 20mm of the opening.

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 Invert cylinder and place at a lower level than the power unit reservoir.

6.2.3 Extend and retract the cylinder several times without putting a load on the system. Air will be released into the power unit reservoir.

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 Tilt power unit to drain out old oil into a sealable container.

6.3.3 Repeat Steps 6.1.4 to 6.1.6 (above).

6.3.4 Dispose of fluid in accordance with local regulations.

6.4 Storage

6.4.1 When not in use, depressurise and disconnect the power unit from the application.

6.4.2 Wipe clean, thoroughly and store in clean, dry environment. Avoid temperature extremes.

6.4.3 For transportation or long storage, replace the air vent plug with the shipping plug.

Please also refer to the HATZ Diesel Instruction Book for maintenance tasks that relate specifically to the HATZ diesel engine.

7.0 Troubleshooting

Problem	Cause	Solution
Noisy operation	Air trapped in system	• Check all points where air may leak into the system • Refer to 6.2 – Bleeding Air from the System
	Power unit reservoir too full	• Drain fluid to correct level
	Low fluid level in power unit reservoir	• Refer to 6.1 – Adding Hydraulic Fluid • Fill and bleed the system
Power unit oil is over-heating	Oil viscosity is too high	• Refer to 6.3 – Changing Hydraulic Fluid • Refill with a good quality hydraulic oil
	High pressure leakage on upper pressure plate	• Tighten plug
	Low fluid level in power unit reservoir	• Refer to 6.1 – Adding Hydraulic Fluid • Fill and bleed the system
Power unit runs but will not pump oil	Power unit is not primed	• Run power unit a few minutes tipping from side to side
	Externally adjustable relief valve is not correctly set	• Reset the relief valve to appropriate level
	Damaged o-ring	• Send to a Durapac authorised service centre for repair
	Defective control valve	• Send to a Durapac authorised service centre for repair
Power unit does not reach rated capacity	Low fluid level in reservoir	• **Secure load by other means.** • Depressurise power unit and hose, remove application, then fill and bleed the system
	Leaking system components	• Repair or replace as necessary
Poor performance	Fluid level in power unit is low	• **Secure load by other means.** • Depressurise power unit and hose, remove application, then fill and bleed the system
Application does not extend, move or respond to pressurised fluid	Overload condition	• Remedy overload condition
	Loose couplers	• Tighten couplers
	Faulty couplers	• Replace couplers
	Malfunctioning power unit	• Contact a Durapac authorised service centre for repair
Application does not fully extend (cylinder or spreader)	Reservoir overfilled	• **Secure load by other means.** • Depressurise power unit and hose, remove application, then drain fluid to proper level
	Low fluid level in power unit reservoir	• **Secure load by other means.** • Depressurise power unit and hose, remove application, then fill and bleed the system

Problem	Cause	Solution
	Load above capacity of system	• Use correct equipment
Application responds slower than normal	Loose connection or coupler	• Tighten couplers
	Restricted hydraulic line or fitting	• Clean and replace if damaged
	Power unit not operating correctly	• Check the power unit's operating instructions • Check the HATZ Diesel Instruction Manual • Repair or replace as necessary
	Low fluid level in power unit reservoir	• **Secure load by other means.** • Depressurise power unit and hose, remove application, then fill and bleed the system
Application responds to pressurised fluid, but system does not maintain pressure	Leaky connection	• Clean, reseal with thread sealant, and tighten connection
	Leaking cylinder seals	• Replace worn seals. Look for excessive contamination or wear. Replace contaminated fluid
	Power unit or valve not operating correctly	• Contact a Durapac authorised service centre for repair
	Overload condition	• Remedy overload condition
Application does not return fluid to power unit (i.e. cylinder will not retract)	Closed release valve	• **Secure load by other means.** • Open release valve
	Loose couplers	• **Secure load by other means.** • Tighten couplers
	Blocked hydraulic lines	• **Secure load by other means.** • Clean and flush lines
	Weak or broken retraction springs	• **Secure load by other means.** • Contact a Durapac authorised service centre for repair
	Internally damaged cylinder	• **Secure load by other means.** • Contact a Durapac authorised service centre for repair
	Power unit reservoir too full	• **Secure load by other means.** • Depressurise power unit and hose, remove application, then drain fluid to proper level

Please also refer to the HATZ Diesel Instruction Book for maintenance tasks that relate specifically to the HATZ diesel engine.

8.0 Hydraulic Circuit