

DC Power Units Installation Manual





We reserve the right to change technical specifications and dimensions without giving notice.



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Introduction

This manual provides descriptive installation, service and maintenance instructions for DC hydraulic power units manufactured by Related Fluid Power Ltd. The information provided is not exhaustive or application specific. If further information is required please contact Related Fluid Power.

Warning

Only appropriately qualified and experienced personnel with knowledge of good hydraulic practices must be allowed to work on the installation, service and maintenance of the power pack.

Before working on the power pack make sure:

- System pressure is exhausted.
- Equipment is mechanically secured and electrically isolated.
- Safety notices are in place.

Installation

Mounting

Verify product orientation and attach using mountings found on the motor, port plate or tank. The tank must be adequately supported to prevent fatigue particularly to the neck seals and welds. For easy maintenance, ensure adequate access to oil filler, valves and electrical terminals.

Check:

- Pack is oriented and mounted correctly.
- Tank is supported to prevent fatigue.
- Access is available to oil filler, electrical terminals and valves.
- IP ratings are considered when locating pack.

Location

Location of the power pack and controls must be such that they are not exposed to inappropriate temperatures, and they are protected from dust, water/moisture, condensation and general tampering. IP (Ingress Protection) ratings of all components must be carefully considered when specifying and locating equipment. Failure to do so may result in rejection of warranty claims. See data sheet **RFP-IP** for more information on IP ratings.

Uccate pack to ensure protection from:

- Extreme temperatures.
- Dust.
- Water.
- Moisture.
- Condensation.
- General tampering.

Hydraulic Connection

Use only suitably rated fittings for the application.

• Never use:

- Cast iron fittings.
- Brass fittings.
- Low pressure fittings.
- Reusable hose ends.
- Mixed threads.

! All fittings and hoses must be:

- Stored in clean conditions.
- Threads must be free from damage and capped up to the point of final assembly.
- Hoses must be nitrogen flushed or pellet cleaned during manufacture, prior to being capped.
- Hoses must not be over tightened.
- Hoses must not be twisted, or the bend radius exceeded.
- Routed free from causes of chafing.

Actuators (cylinders) must meet ISO 4406 standards for cleanliness, minimum grade 18/16/13

Flow velocities for sizing pipework:

- Suction lines: <1.5 m/s max.
- Pressure lines: 3.5 / 4.5 m/s max.
- Tank return lines: 2.5 m/s max.

Low pressure systems may require adjustment to these figures. Use a bore vs. velocity nomograph calculator for easy reference.

DC Motor Electrical Connections

Connect all control boxes, relays, pressure switches, contactors, valves etc. to electrical supply.

Connect thermal switch (optional) to start relay. Failure to do so will render the motor unprotected.

Ensure electrical supply to pack does not suffer undue voltage drop. Read motor information label to verify nominal voltage. Low voltage is a common problem and must be avoided.

U To avoid voltage drop or resistance heating check ratings for:

- Wire size.
- Connectors.
- Distance from supply (battery).



Reservoir Oil

From a clean source, fill the unit with mineral based hydraulic oil which has been filtered (ISO 4406 18/16/13). Maintain a 25mm (1") air gap at the top of the reservoir. Allow greater air gaps where oil tanks may be subject to agitation or significant inclinations (e.g. a road vehicle).

Caution:

- Never use hydraulic brake fluid.
- Never thin out oils.
- Never use water based fluids.
- Never add oil to the tank when actuating ram(s) are extended.

See Contamination & Oil Cleanliness PDF for more info.

Special Fluids

If special fluids are used, top up with similar fluid compatible with oil seals in system.

For environments where temperature extremes are experienced, use oil with a higher VI (Viscosity Index) rating. Please note, Viscosity Index is not the same as the Viscosity Grade.

Examples	Ambient temp. degree C	ISO viscosity grade VG no.	Viscosity index
Standard grade oils	-5 to 25	32	98
	5 to 35	46	98
Premium grade oils with high viscosity index	-10 to 30	37	155
	-25 to 35	22/32	up to 400

Power Unit Priming

Most systems are self-priming. Never run an unprimed pack as this will damage the pump.

Before starting system, make a final check that all external pipe work connections have been tightened and that control valves allow the power pack to start without generating pressure.

If difficulty is experience in priming, follow this priming procedure:

- Disconnect the pressure hose from the cylinder and place end of hose into tank filler or separate container.
- Press and hold the Start button for a maximum of 2 seconds, repeating process at least 5 times until a continuous flow of oil is seen. The unit is now primed. Securely reconnect the fittings and top up the tank with clean oil.

Pressure Settings

Factory pre-set pressure relief valves should not be adjusted. If load capacity testing has to be carried out, connect a pressure gauge of the appropriate range to the system.

Pressure relief valve settings should not be increased in the event of sudden or gradual failure. A full, step by step logical system diagnosis must be carried out.



Incorrectly adjusted relief valves may result in damage to equipment and serious physical injury.

General Information

Motor Duty

All DC mini power units are intended for short time S2 or S3 duty cycles only. See data sheet **RFP-MD** for more information.

S2 Rating

Short time operation, i.e. a period of operation (e.g. 10, 30 or 60 min) which raises the motor to its maximum operating temperature before being allowed to cool to ambient before the next operation. Measured in minutes.

S3 Rating

The operation of the motor is a continuous sequence of running and then rest periods, so that it may reach its maximum permissible temperature. Measured as a percentage (%) of run time against rest time.

Operating motors outwith the recommended duty cycle will damage the motor and invalidate warranty.

Overload Protection

The motors must be protected against short circuit and overloads by fuse, thermal-magnetic switches or electronic protection circuits. Battery guard equipment is recommended to protect the system from operation at low voltage, i.e. a discharged battery. Low voltages will cause damage to start switch relays and motors.

Motor Life: Bearings and Brushes

Motor brushes are normally the limiting factor in the life of the motor. Most motors are not brush serviceable and the motor should be replaced.

Motors are manufactured with sealed for life lubricated bearings and are not serviceable.



Motor Start Switches (Relays)

Start switches have a finite life. Avoid low voltages and excessive moisture to maximise motor switch life.

Pumps

Most pumps are of the pressure balance spur gear type. They have a long life and internally compensate for wear which would otherwise cause inefficiency / slow operation of equipment.

1 Important

Observe oil and anti-contamination instructions above. Pumps have a maximum continuous and short time pressure ratings. Contact RFP for detailed information as necessary for your application. Failure to observe these ratings will cause failure and will invalidate warranty.

Maintenance

Inspect on a regular basis:

- Oil levels and leaks throughout the system.
- General cleanliness of the equipment and the surrounding area.
- Presence, condition and security of the filler breather in the tank. Replace this item on a regular basis in heavily contaminated environments.
- Condition of hoses for wear and damage. Replace as necessary.
- Electrical connections for condition and security.
- Battery charge condition.
- Oil quality. Change every 12 months in heavily contaminated environments.
- Spares critical to operation. Contact RFP for dedicated spares list.

RFP-PUI-01