European Headquarters ECSC
Albert Thijsstraat 12
NL-6471 WX EYGELSHOVEN
www.spxhydraulictech.com

HYDRAULIC DC POWER PACK

Installation & Maintenance manual.
UDXXXX part numbers

1 GENERAL:

Congratulations with purchasing this STONE® hydraulic power pack.
STONE® offers a wide range of DC and AC power packs for diverse industries. The power packs are designed to operate in a variety of applications. There are tens of thousands of STONE® units in service, serving markets around the globe. In fact, STONE® personnel are located in offices around the world to serve the global market.
STONE® is a brand of SPX Hydraulic Technologies, a division of SPX Corporation.

Each Hydraulic Unit has been performance checked to our customer's specification before delivery. It should require no further adjustment other than connecting to a proper electrical supply and the driven hydraulic equipment, like a hose with the correct pressure rate, and the correct couplers. It also needs to be filled with CLEAN hydraulic oil to the correct specifications.

2 SAFETY SYMBOLS AND DEFINITIONS.

The safety signal word, designates the degree or level of hazard seriousness.

DANGER:
Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING:
Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION:
Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION: Used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

IMPORTANT: Important is used when action or lack of action can cause equipment failure, either immediate or over a long period of time.

3 INTENDED USE

This UDXXXX STONE® hydraulic power pack is intended for use in industrial mobile applications which use batteries to provide direct electrical current (DC) either 12V or 24VDC.
It's particularly intended for single and/or double acting applications like tipping trucks and tipping trailers. (raise, hold, gravity lower/power raise hold/not hold, power down).
The same unit may be used in other applications providing guidance from SPX has been approved in writing and the unit is built in to the application by trained technical personnel.

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A risk analysis must always be carried out.

This unit can be used with a STONE® control box, wired or wireless.

WARNING : The Stone® hydraulic power pack does not have a safety function !

WARNING : The hydraulic power pack may not be used:

- For uses other than those listed in the 'Intended use" paragraph. (if in doubt, contact your local STONE® distributor)
- Without having connected the pressure port (P) and having filled the tank with the prescribed oil;
- In an ATEX environment;
- In aviation and space systems;
- In braking, stopping and parking systems;
- In military, medical and hospital systems and equipment; (contact your Local STONE® distributor)
- As a safety component.

4 TECHNICAL SPECIFICATIONS AND SPARE PARTS

Technical specifications (hydraulic, and electric schematics, flow, amps etc.) can be found on the actual drawing of the hydraulic power pack. Each power pack has a silver decal located on the tank which contains the power pack part number, serial number and pressure setting on it.
Drawings and spare parts can be requested via your STONE® distributor. (www.Stonehydraulic.com.)
Only use original STONE® spare parts!

5 INSTALLATION OF THE UNIT

5.1 FASTENING AND PROTECTION

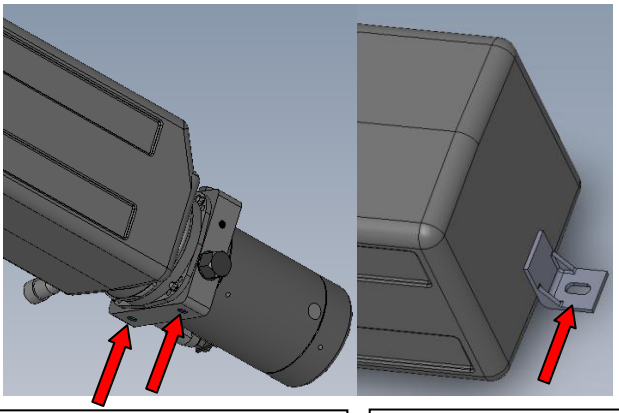
CAUTION:

The installation of the power pack must be done by qualified trained personnel. The installer is responsible for the correct power supply of the power pack, to be protected with a suitable fuse and a battery isolation switch.
When the power pack is used on a mobile application and whilst driving on the road, the user is responsible to ensure that the power feed of the battery is disconnected from the power pack. This then ensures that the control box is not powered, nor any other method of switching can operate the power pack whilst the battery isolator switch has disabled power from the battery to the power pack.

SPX declines any responsibilities related to short circuits resulting from lack of proper protection of the electric circuit!

- Fit the power pack in its designated position and tighten the mounting bolts (2 x M10 thread holes at bottom or on the side of the valve block depending on orientation of the valve block) at a torque of **54Nm**.

The powerpack can be mounted horizontally or vertically (tank down) depending on the partnumber of the unit. Tanks can have a mounting bracket (plastic or steel) at the back, which should always be used for extra stability of the powerpack.



M10 THREADED MOUNTING HOLES	MOUNTING BRACKET

- If the power pack is mounted outside a closed box and in an outdoor environment, protective plastic cover mouldings are recommended to protect electrical parts. These can be purchased via your local STONE® distributor.
- Protect the power pack from corrosive environments.

6 RECOMMENDED HYDRAULIC OILS

Mineral oil based hydraulic fluids suitable for hydraulic systems can be used. They should have physical lubricating and chemical properties as specified by:

- Mineral oil based hydraulic fluids HL (DIN 51524 part 1)
- Mineral oil based hydraulic fluids HLP (DIN51524 Part 2)

For use of other oils please contact factory.

6.1 FLUID VISCOSITY, TEMPERATURE RANGE OF THE OPERATING FLUID, AMBIENT TEMPERTURE.

The fluid viscosity should remain within the range 10 to 300 cSt (centistokes);
Recommended 15 to 120 cSt.
Permissive cold start viscosity is maximum 1000 cSt.
The fluid temperature should remain within the range -20° C and 80° C.
Ambient temperature -15° C and 40° C.

- Most common used oil is ISO Viscosity Grade 32, 46 or 68 depending on the ambient temperature.

IMPORTANT: In order to maximize the useful lifetime of the unit and the hydraulic oil, operating temperatures under the **-20 and above 80˚C** are not recommended.

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6.2 FLUID CLEANLINESS REQUIREMENTS AND MAINTENANCE

We recommend a cleanliness of the operating fluid according to ISO 4406 Class 20/18/14.
All components of the hydraulic circuit must be flushed and clean, before assembling, because the power pack has only a suction filter.
It's recommended to change the oil after the first 500 working hours and every 2000 hours after that, or at least once a year.

IMPORTANT: Fill up the unit with a fine filter, filtration rating 20 µm. Do not use a cloth strainer as most pump failures, valve malfunctions and short unit life, can be directly or indirectly attributed to dirt or other foreign material (water, swarf, grit, lint, etc) getting into the system.

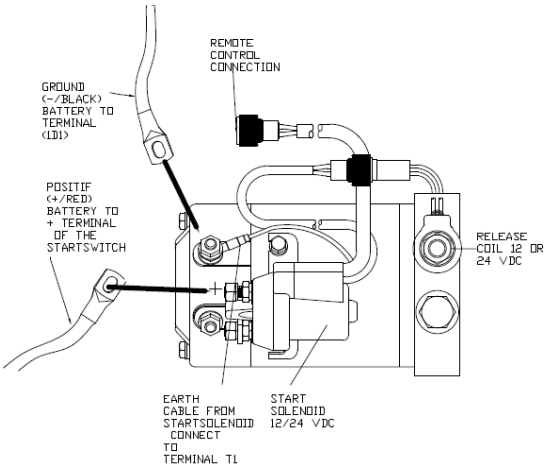
CAUTION: WHEN FILLING OR TOPPING UP, ONLY USE NEW, FILTERED HYDRAULIC OIL OF THE SAME TYPE AND BRAND, NEVER MIX TYPES OR BRANDS!

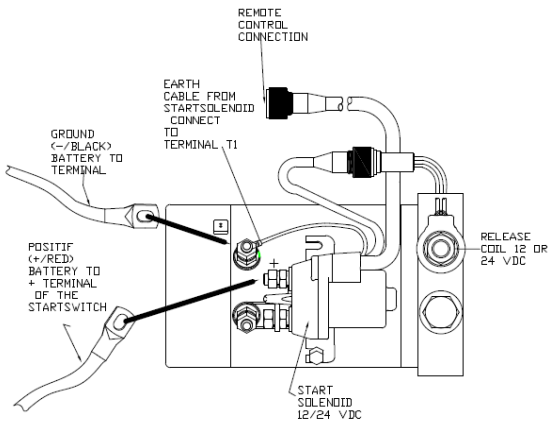
7 ELECTRICAL INSTALLATION

CAUTION: Ensure the battery cables are disconnected from the battery before connecting them to the power pack!

Connect the ground cable from the battery, as indicated hereunder onto the motor terminal.
Be sure the earth (black) cable of the start solenoid is also connected to this terminal.
Connect the feed (+) cable from the battery onto the free terminal (+) of the start switch. See drawings below for the different valve connectors.

7.1 CONNECTION 12 OR 24 VDC FOR 4.5" MOTORS WITH 12/24 SPX START SOLENOID (EF-1070 = DUAL VOLTAGE)





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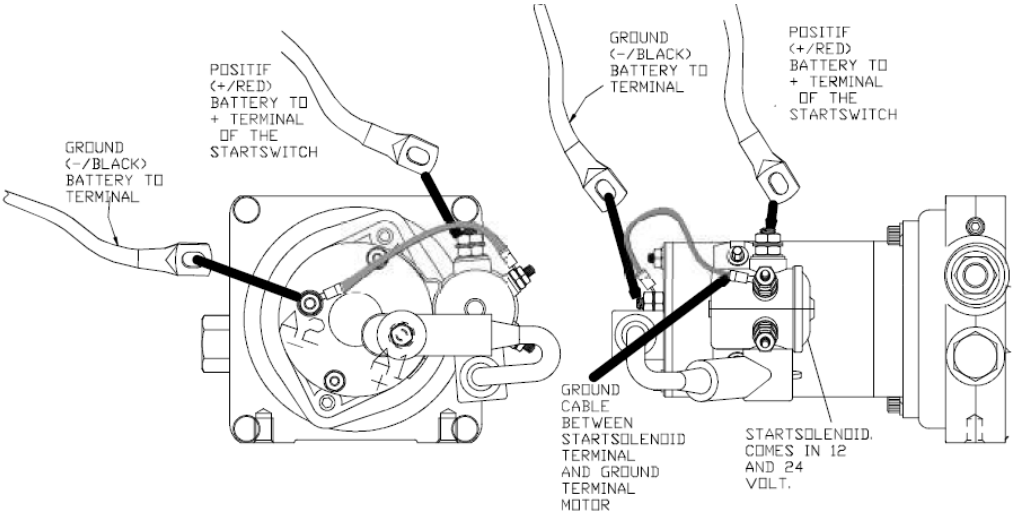
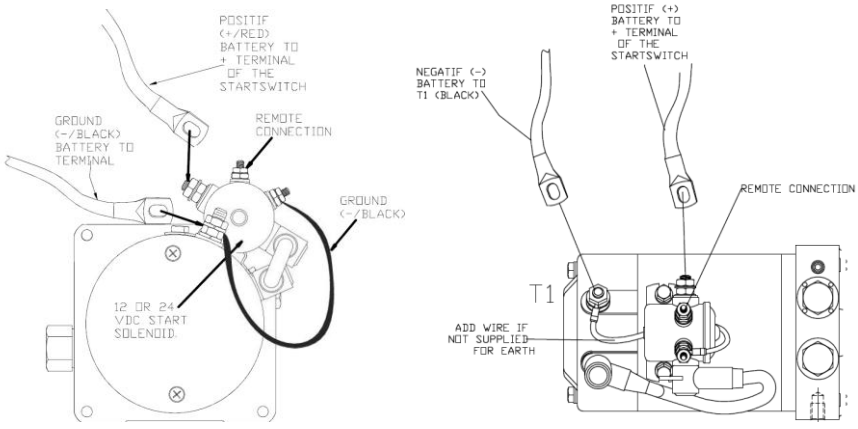
7.2 CONNECTION 12 AND 24 VDC FOR 3” MOTORS WITH 12 OR 24 STANDARD START SOLENOID WITH EXT. GROUND. (SEPERATE VOLTAGE PER STARTSOLENOID)



7.3 CONNECTION 12 AND 24 VDC FOR 4.5” MOTORS WITH 12 OR 24 STANDARD START SOLENOID WITH EXT. GROUND. (SEPERATE VOLTAGE PER START SOLENOID)



CAUTION:

- The positive and negative (ground) supply need to be taken direct from the battery with wires having an adequate size, with a cross section of at least 16mm2 and protected with an external sleeve.

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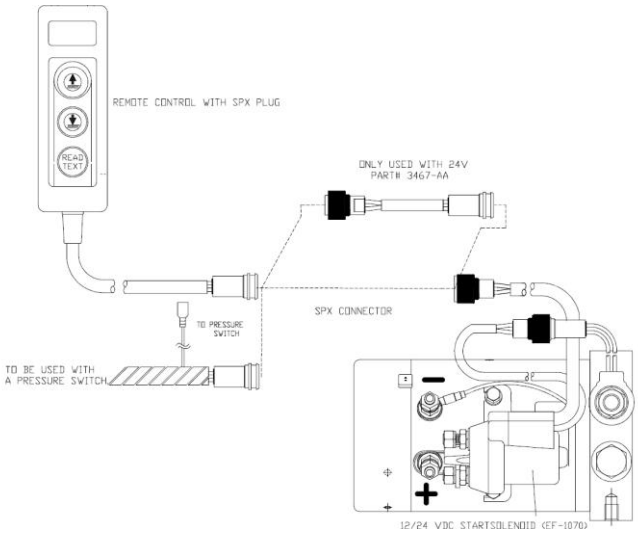
- The negative (ground) must not be taken from the chassis as this can result in faults or damages in the control box, start switch and/or motor, which could lead to a fire hazard.
- The installer must be sure that the positive feed wire is protected with a fuse of adequate value (depending on the configuration of the power pack), which must be installed between the battery and the power pack.
- Some power packs are supplied with an acoustic pressure alarm. When there is pressure (>10 bar) in the hydraulic system, the alarm will sound, cylinder is lifting, and will cut out when pressure is <10 bar. The acoustic alarm is intended to create a safer environment around the application.
- Carefully connect the controller. It depends on the power pack and it's start switch how to connect the controller. See drawing "How to connect the remote".
- The battery needs to be fully charged when operating. A voltage below 10 volt can damage the electrical system!

HOW TO CONNECT THE REMOTE WITH A SPX PLUG.



7 HYDRAULIC CONNECTIONS.

CAUTION: The hydraulic connections and hoses need to be of adequate sizes, thread form, torques and safety factors, to withstand the maximum pressures within the hydraulic system.

Liberally squirt some clean oil into the pressure port of the pump before making the connection to the cylinder line.

The manufacturer of the complete hydraulic system needs to follow the applicable norms and regulations, so that the safety for the operator is assured under all conditions.

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8 STARTING

Make sure the reservoir is filled with the recommended hydraulic oil. Pay attention to the oil level if the cylinder is extended and already filled with oil.

IMPORTANT: The power pack must never operate without oil !

PLEASE NOTE: **If the oil flow doesn't start on running the power pack, air might have to be bled from the system, at the highest point and with the system under pressure.**
Air in the system generates uneven and noisy operation. It might also cause a sudden drop of the cylinder and system.

9 MAINTENANCE, CLEANING AND STORAGE.

Pump & motor:

Under normal operating conditions, neither the pump nor the motor should require any attention. The motor bearings are life-lubricated; The pump bearings are lubricated by the fluid being pumped.

PERIODICALLY CHECK:

A. The level and degree of pollution of the hydraulic oil. if needed fill up the oil to the max level.
B. The oil level must never go below the suction filter.
C. It's recommended to change the oil after the first 500 working hours and every 2000 hours after that.
D. Check the suction filter of the power pack regularly. the filter can become clogged over time. this must be checked and if necessary cleaned or replaced.
E. Check the complete hydraulic system for leakages regularly and if necessary tighten connections.
F. Check electrical connections for corrosion. spray them with some corrosion protection (wd-40) regularly.
G. Check the cable insulation for cracks and bare wires.

STORAGE AND PACKAGING:

A. Store the power pack in a clean environment.
B. When the power pack is stored over a long period of time, high humidity and temperature differences should be avoided.
C. Keep port plugs in place and check for foreign material in the hydraulic ports before use.
D. Protect the power pack from shaking and falling.
E. Prevent the power pack from coming in contact with corrosive substances.

CLEANING:

F. never use a high pressure washer to clean the power pack.

10 DISPOSAL.

Properly dispose of all fluids, components, and assemblies at the end of their useful life.
After end of lifetime of the power pack, follow the local regulations to dispose the power pack, or contact your STONE supplier for instructions of disposal.

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11 TROUBLE SHOOTING

GENERAL

1 Check to see that the motor is wired correctly with tight connections, and the proper voltage.
2 Check reservoirs oil level.
3 Check relief valve for proper setting with pressure gauge in outlet line.
4 Check for external leakges at cylinder, hoses and power unit.

TYPICAL EXAMPLES

SYMPTOM	POSSIBLE CAUSE	FIXES & HINTS
Unit will not start (see causes 1,2,10,12,13) Cylinder or work load drops. (see causes 5,6,7 & 8) Slow cylinder travel (see causes 1,2,3,7,8,9,10 & 11) Unit will not lower. (See causes 2,4,5 & 11)	1. Improper voltage to motor. (A,F,G) 2. Improper ground. (A,H,I) 3. Relief valve set too low. (C,E) 4. Relief valve set too high. (C,E) 5. Improper voltage to valve solenoid. (A,H) 6. Leakage through pump check valve. (D,F) 7. Leakage through solenoid lowering valve. (D,F) 8. Internal leakage at cylinder. (F,G) 9. Insufficient oil to pump. (B,D,G) 10. Pump seized-frozen up. (F,G) 11. Cylinder overloaded. (C,E) 12. Broken start solenoid. (F) 13. Broken motor. (F)	A. Check wiring and insure connections are tight, as well as proper voltage. B. Keep oil reservoir full & clean. C. Do not adjust valves without proper equipment (pressure gauges) D. Flush & clean Hydraulic system. E. Adjust relief valve to proper setting. F. Replace component. G. Return for necessary repair. H. Check for clean tight metal to metal connection. I. Make sure nut is tight on start solenoid.

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EC DECLARATION OF CONFORMITY

We declare under our sole responsibility that our Hydraulic Power Packs Model:

UD-xxxx series
UA-xxxx series

to which this declaration relates are in conformity with the following:

EN, EN-ISO, ISO standards	Title
Per the provisions of the Machinery Safety Directive	**2006/42 EC**
EN_ISO 12100:2011	Safety of machinery, basic concepts, general principles for design, risk assessment & risk reduction
EN 4413:2010	Hydraulic Fluid Power – general rules and safety requirements for systems & their components
Per the provisions of the EMC Directive	**2004/108 EC**
EN_61000-4-2:2001	Electromagnetic Discharge Immunity test
EN_61000-4-3:2001	Radiated, Radio Frequency, Electromagnetic Field Immunity test
EN_61000-4-6:2001	Immunity to Conducted Disturbances, Induced by Radio-Frequency Fields
EN55011_2007	Industrial, Scientific and Medical (ISM) Radio Frequency Equipment-Electromagnetic Disturbance Characteristics-Limits and Methods of Measurement
Per the provisions of the Noise Emission in the Environment by Equipment for Use Outdoors Directive	**2000/14 EC**
EN_3200L0014	Noise emission in the environment for use outdoors
ISO 3744:1994	Sound Power Level Measurements
Per the provisions of the RoHS Directive	**2011/65 EU**
	Restriction of the use of certain hazardous substances in electrical and electronic equipment

We, the undersigned, hereby declare that the equipment specified conforms to the above European Communities Directive(s) and Standard(s).

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