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**Thank you for choosing a ToolTuff Direct LLC Hydraulics power unit.
Please fill out the information box below before installing power unit.
Keep this document in a secure location, making it available for future reference**

Power unit model number: _____

Power Unit serial number: _____

Relief valve setting: _____ Installation date: _____

Auto lift manufacturer: _____ Auto lift model number: _____

Auto lift serial number: _____

1. Preface

In order to use our products safely and effectively, this manual introduces and explains matters needing attention, maintenance, adjustment methods, schematic and outline dimension. Please read this manual carefully before operating the equipment. Ensure the operator is adhering to the proper method of use.

This product applies to auto hoist and scissor lift applications. Please read this manual and other related manuals carefully before installing and operating.

As our products are updated constantly, we reserve the right to amend this manual as needed, please kindly understand. Contact equipment manufacturer for an up to date manual if needed.

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Please read manual thoroughly before attempting to install and/or operate power unit. Failure to do so may result in property, equipment and/or serious personal injury.

2. Installation and Assembly

2.1 Before installation

- ◆ The individual who installs, uses or maintains this power unit should be familiar with basic hydraulic knowledge.
- ◆ Please read all warning labels in this manual and on power unit carefully before use.
- ◆ Clean all the Hydraulic parts before installing the power unit. Contamination of the fluid may occur, which can result in poor performance or unit failure.
- ◆ Do not open electrical cabinet or conduit/junction box when equipment is in use.
- ◆ Always use hydraulic hoses intended for use on that equipment and application to avoid hose failure, which can result in personal and/or property damage.

2.2 Notice during installation

- ◆ Power unit must be wired by a qualified electrician.
- ◆ Ensure the power being supplied is shut off and locked out when wiring the power unit.
- ◆ Maximum acceptable voltage drop is 10% of rated voltage.
- ◆ Use the wire of which the diameter is more than 2.5mm to reduce voltage drop. Also shortening the length of the wire will help.
- ◆ Starting at a lower than acceptable voltage will lead to poor performance and motor failure.
- ◆ Install all fitting on power unit before installation.
- ◆ When using three-phase power unit, motor rotating direction should be checked by jog running after wiring to supplied power.
- ◆ Lubricate all o-rings on fittings with hydraulic fluid before installation.

- ◆ Do not over bend hydraulic hoses and electric wire (bending radius should be more than nine times outer diameter).
- ◆ Do not rout hydraulic or electrical lines around or across sharp objects. Failure to follow instruction can result in personal and property damage.
- ◆ Don't strike or damage the exposed parts when carrying, assembling or storing power unit. Failure to conform to this will cause poor performance and/or damage the equipment.

2.3 Notice in use

- ◆ Ensure there is no person under the lift equipment when operating. Failure to comply can result in severe injury or even death.
 - ◆ Don't adjust preset pressure of relief valve without prior authorization. Consult equipment manufacturer for authorization. After permission has been granted, adjust the relief valve according to adjustment method in this manual.
- Please note that adjusting the relief valve will not increase flow.
- ◆ Never crack hydraulic lined when system is under pressure and in operation.
 - ◆ Repetitive motor activation will result in premature switch and possible motor failure.
 - ◆ Always pause a minimum of 2 seconds before between lift activations.
 - ◆ The working temperature for the power unit is -13°F to 140°F (-25°C to 60°C).
 - ◆ The power unit should never be exposed to rain or snow.
 - ◆ Severe vibration and electromagnetic interference should be avoided.
 - ◆ The power unit is rated for S3 duty cycle, which can only be worked

- intermittently, (1 minute on and 9 minutes off) Failure to operate according to the power units duty rating will cause poor performance or even damage to the equipment.
- ◆ Check the fluid level in the tank after the initial running of the power unit.

3. Hydraulic Fluid

Hydraulic fluid selection & regular fluid inspection is very important to increase the life of your hydraulic system. The function of hydraulic fluid is to transfer power from the gear pump to the actuator. In this application the actuator is a cylinder.

3.1 Fluid Recommendations

- ◆ L-HM46 hydraulic oil is recommended.
- ◆ Fluid viscosity should be between 15-46 cst.
- ◆ ATF Dexron III is acceptable.
- ◆ If using biodegradable, fluid must be compatible with Buna o-rings and have anti wear properties.
- ◆ Motor oil is not to be used in hydraulic system.

3.2. Fluid maintenance

- ◆ Hydraulic system should be clean and free of contamination.
- ◆ Fluid should be kept at a level in the tank. Normally the working temperature
- ◆ Clean hydraulic lines and tanks when changing hydraulic Fluid.
- ◆ Change hydraulic fluid and clean the filter and reservoir after the initial 100 hours of operation. Afterwards change hydraulic fluid every 3000 hours.

4. Power Unit Maintenance

4.1 Maintenance

- ◆ Disconnect or terminate power to equipment and lower platform before attempting to access power unit for maintenance.
- ◆ Ensure that electric wire and hoses are of the same specifications as originals when replacing.
- ◆ Ensure that other components are of the same specifications when replacing.
- ◆ Ensure the hydraulic system as been depressurized before cracking hydraulic lines.
- ◆ Often clean the equipment and the environment around equipment.

Hydraulic system can be influenced by natural environment, human factors and life of system parts. Regular maintenance will reduce the possibility of failure.

4.2 Inspection

◆ Daily inspection ◆

- ◆ Operate equipment through one cycle ensuring unit holds and releases load when needed.
- ◆ Listen for any abnormal noises during operation.
- ◆ Check motor temperature periodically, ensuring motor is not operating at a higher temperature than normal -13°F to 140°F (-25°C to 60°C).
- ◆ Check all hydraulic connections for leaks and wear, tighten or replace hoses or fittings if necessary.

◆ Monthly inspection ◆

- ◆ Inspect hydraulic hoses for cracks abrasion and leaks, replace if needed
- ◆ If unit is equipped with power cord inspect insulation for cracks, abrasions and cuts.
- ◆ Check fluid cleanliness if fluid has changed color replace fluid and flush system.
- ◆ Check fluid level when equipment is at its lowest at rest position. Add fluid if needed.

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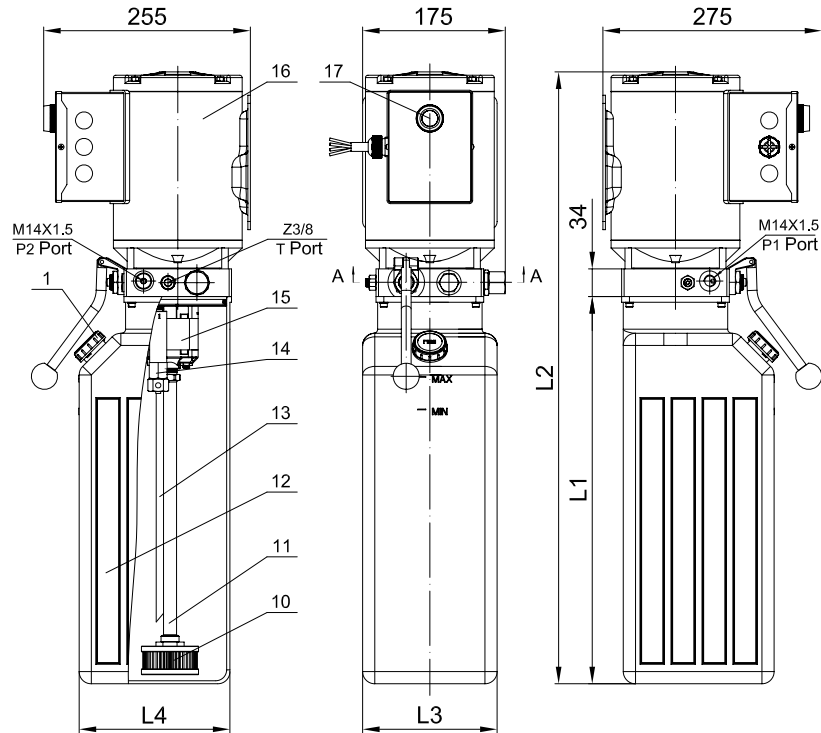
4.3 Troubleshooting

Failures	Possible causes	Solutions
Motor runs but the cylinder doesn't rise	1. Wrong wire connection leads to motor rotating in wrong direction	1. Correct the wire connection
	2. Insufficient hydraulic fluid in the tank	2. Add hydraulic fluid into the tank
	3. Suction tube is damaged	3. Replace the suction tube
	4. Coupling is damaged	4. Replace the coupling
	5. Suction filter clogged	5. Clean or replace the suction filter
	6. Release valve is blocked by contamination	6. Inspect valve and clean or replace it
	7. The seal in buffer valve failed	7. Inspect valve and clean or replace it
	8. Relief valve is contaminated	8. Inspect valve and clean or replace the relief valve
	9. Relief valve's setting pressure is low	9. Reset the valve
	10. The emergency device of the electric release valve is not closed	10. Close the emergency lowering device
	11. Gear pump is damaged	11. Change the pump
	12. Cylinder is damaged	12. Repair or replace cylinder
	13. The emergency release valve is not fully closed	13. Inspect valve and clean or replace it
Motor runs but the cylinder rises slowly	1. Insufficient fluid in the reservoir	1. Add fluid into the tank
	2. Suction tube is damaged	2. Replace the suction tube
	3. Suction filter clogged	3. Clean or replace the suction filter
	4. Release valve is blocked by contamination	4. Inspect valve and clean or replace it
	5. The seal in buffer valve failed	5. Inspect valve and clean or replace it
	6. Relief valve is contaminated	6. Inspect valve and clean or replace the relief valve
	7. Relief valve's setting pressure is low	7. Reset the valve
	8. Hydraulic fluid is deteriorated or contaminated	8. Change hydraulic fluid as well as cleaning suction filter and reservoir
	9. Gear pump is damaged	9. Change the pump

Failures	Possible causes	Solutions
Motor runs but the cylinder rises slowly	10. Cylinder is damaged	10. Repair or replace cylinder
	11. The emergency release valve is not fully closed	11. Inspect valve and clean or replace it
	12. Hydraulic fluid temperature is too high	12. Stop running and cool down
Platform comes down automatically	1. The poppet of check valve is stuck open by contamination	1. Clean the poppet of check valve or replace it with a new one
	2. The poppet of release valve is stuck open by contamination	2. Clean the valve or change it
	3. Poor outlet tube connection leads to leakage	3. Tighten the pipe joint or change the seal
	4. Hydraulic fluid is deteriorated or contaminated	4. Change the fluid as well as cleaning suction filter and tank
Platform comes down slowly	1. Throttle valve is not adjusted rightly	1. Readjust the throttle valve according to P9
	2. The poppet of release valve is clogged with contamination	2. Clean the valve or change it
	3. Release valve is blocked by contamination	3. Inspect valve and clean or replace it
Platform doesn't come down.	1. Release valve is blocked by contamination	1. Inspect valve and clean or replace it
	2. The coils is damaged or voltage is too low	2. Change the coil and check the power supply
Abnormal noise	1. The motor is damaged	1. Change the motor
	2. Insufficient hydraulic fluid in the tank	2. Add hydraulic fluid into the tank
	3. Motor is overloaded	3. Reduce load or increase the relief valve setting pressure (if manufacturer allows)
	4. Suction filter clogged	4. Clean or replace the suction filter
	5. Gear pump is damaged	5. Change the pump
	6. Hydraulic fluid is deteriorated or contaminated	6. Change hydraulic fluid as well as cleaning suction filter and reservoir
	7. Relief valve is damaged	7. Change the relief valve
Abnormal start up	1. Power supply voltage is insufficient	1. Configure regulator
	2. The cable is too long	2. Shorten the cable as well as configure regulator
	3. The thin diameter of the wire leads to voltage loss	3. Use strong wire and configure regulator
	4. Start capacitor is damaged	4. Change the start capacitor

7. Outline dimension

The following outline dimensions are mainly for the power units with 3-phase steel housing motors and rectangle plastic oil tanks.



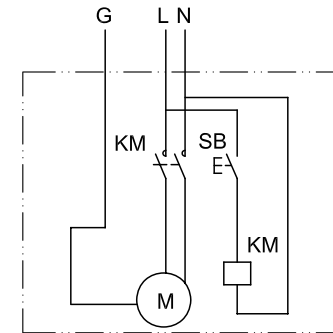
Section A-A
(with manual release valve)

Section A-A
(with electric release valve)

1	Breather	2	Manual release valve	3	Throttle valve	4	Manifold
5	Relief valve	6	Check valve	7	Electric release valve	8	End Head
9	Emergency release valve	10	Suction filter	11	Suction tube	12	Tank
16	AC motor	13	Return tube	14	Buffer valve	15	Gear pump
		17	Start button				

8. Electrical schematic

8.1 Single-phase electrical schematic

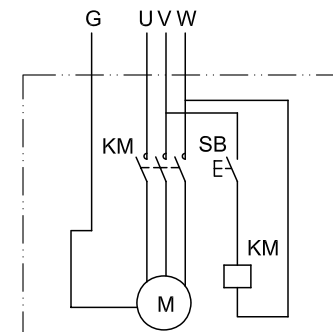


- ▶ Parts description:
KM--Contactor
SB--Start Button

- ▶ Start up
Pressing the start button switch SB will energize the coil of the contactor, thus close the main contact of KM and get the motor running at the same time. The motor has only one rotating direction.

- ▶ Stop
Releasing the start button switch will de-energize the coil of the contactor, thus open the main contact of KM and get the motor stopped at the same time.

8.2 Three-phase electrical schematic



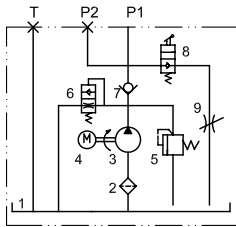
- ▶ Parts description:
KM--Contactor
SB--Start Button

- ▶ Start up
Pressing the start button switch SB will energize the coil of the contactor, thus close the main contact of KM and get the motor running at the same time.

- ▶ Stop
Releasing the start button switch will de-energize the coil of the contactor, thus open the main contact of KM and get the motor stopped at the same time.

9. Hydraulic schematic

9.1 Manual release valve hydraulic schematic



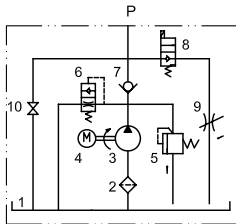
► **Parts description:**

- | | |
|-------------------|-------------------------|
| 1--Reservoir | 6--Buffer valve |
| 2--Suction filter | 7--Check valve |
| 3--Gear pump | 8--Manual release valve |
| 4--Motor | 9--Throttle valve |
| 5--Relief valve | |

► **Lift cycle**

When AC motor [part 4] is started, the air in the pump [part 3] and tube will be released through buffer valve [part 6] reducing the amount of load the motor will start against and then the buffer valve [part 6] will close. Meanwhile, the oil flows past the check valve [part 7] and port P1 to the lift cylinder, thus raising the car on the lift. When the motor stops, the check valve [part 7] and manual release valve [part 8] will hold the pressure in the cylinder, keeping the cylinder in the position it is. If the cylinder rises to the limited position or the load is above the preset pressure of the relief valve [part 5], it will overflow and prevent the machine from working overload. Pushing the handle of the manual release valve [part 8] will lower the cylinder. The lowering speed is controlled by the throttle valve [part 9] in the return line.

9.2 Electric release valve hydraulic schematic



► **Parts description:**

- | | |
|-------------------|------------------------------|
| 1--Reservoir | 7--Check valve |
| 2--Suction filter | 8--Electric release valve |
| 3--Gear pump | 9--Throttle valve |
| 4--Motor | 10--Emergency lowering valve |
| 5--Relief valve | |
| 6--Buffer valve | |

► **Lift cycle**

When AC motor [part 4] is started, the air in the pump [part 3] and tube will be released through buffer valve [part 6] reducing the amount of load the motor will start against and then the buffer valve [part 6] will close. Meanwhile, the oil flows past the check valve [part 7] and port P1 to the lift cylinder, thus raising the car on the lift. When the motor stops, the check valve [part 7] and electric release valve [part 8] will hold the pressure in the cylinder, keeping the cylinder in the position it is. If the cylinder rises to the limited position or the load is above the preset pressure of the relief valve [part 5], it will overflow and prevent the machine from working overload. Pushing the handle of the electric release valve [part 8] will lower the cylinder. The lowering speed is controlled by the throttle valve [part 9] in the return line.

When the cylinder rises to a high position but the power supply is cut, release the oil in P port through the emergency lowering valve [part 10], thus lowering the cylinder.