ST-180

Addendum to Operator's Manual

P/N 4624-01
Revised 6/00

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ST-180 Description

The ST-180 standard features include an electromagnetic disc brake, an hour meter for maintenance scheduling, and a manual brake release for descent control. The wire rope is secured by a swaged cable drum hook and is collected neatly on the drum by Spider's level wind system. Each unit has a built in overload and secondary overspeed brake.

Voltage Options: 220 VAC single phase
208 VAC three phase

Gross Lifting Capacity: 1250 lbs.

Vertical Speed: Up to 30 ft/min

Dimensions: 28" x 36" x 72"

The ST-180 is available in the following models:

Model	Motor	Wire Rope Drum Capacity
ST-180	220 VAC, 1 Phase, 60 Hz	500 ft (152 m)
ST-180-1	220 VAC, 1 Phase, 60 Hz	1000 ft (305 m)
ST-180-4	208 VAC, 3 Phase, 60 Hz	500 ft (152 m)
ST-180-5	208 VAC, 3 Phase, 60 Hz	1000 ft (305 m)
ST-180-10	210 VAC, 1 Phase, 50 Hz	500 ft (152 m)
ST-180-11	210 VAC, 1 Phase, 50 Hz	1000 ft (305 m)
ST-180-14-460-60	460 VAC, 3 Phase, 60 Hz	500 ft (152 m)
ST-180-14-440-50	440 VAC, 3 Phase, 50 Hz	500 ft (152 m)
ST-180-14-380-50	380 VAC, 3 Phase, 50 Hz	500 ft (152 m)
ST-180-15	460 VAC, 3 Phase, 50 Hz	1000 ft (305 m)

Operating Instructions

The ST-180 operates in generally the same manner as the ST-18. Reference Operator's Manual for general operating instructions (P/N 400540).

Emergency Descent Control

To operate the manual release descent control, two release cords are provided. The cords are located on both sides of the stage at the mid-rail (see Figure 1). The emergency brake release must be pulled first to release the primary brake and must be held as long as descent is required. With this held, the pull start cord must be momentarily pulled to begin the descent. (This is necessary to overcome the starting friction of the transmission.) After descent is started, release the pull start cord slowly.

CAUTION

Use manual release only when power has been lost and all control switches are in off position. The brake release cord must be held tightly to avoid rubbing which could result in excessive brake wear.

To stop controlled descent, let go of the emergency brake release cord.

Hour Meter

The hour meter is mounted in the control box. On models ST-180, ST-180-1, -4, -5, -10, -11, the control box cover (see Figure 1) must be removed to view the hour meter.

NOTE: The hour meter is non-resettable

Emergency Manual Brake

The emergency manual brake sets the secondary brake, locking the drum. To set the brake, pull the pin located to the left of the control box (see Figure 1). To

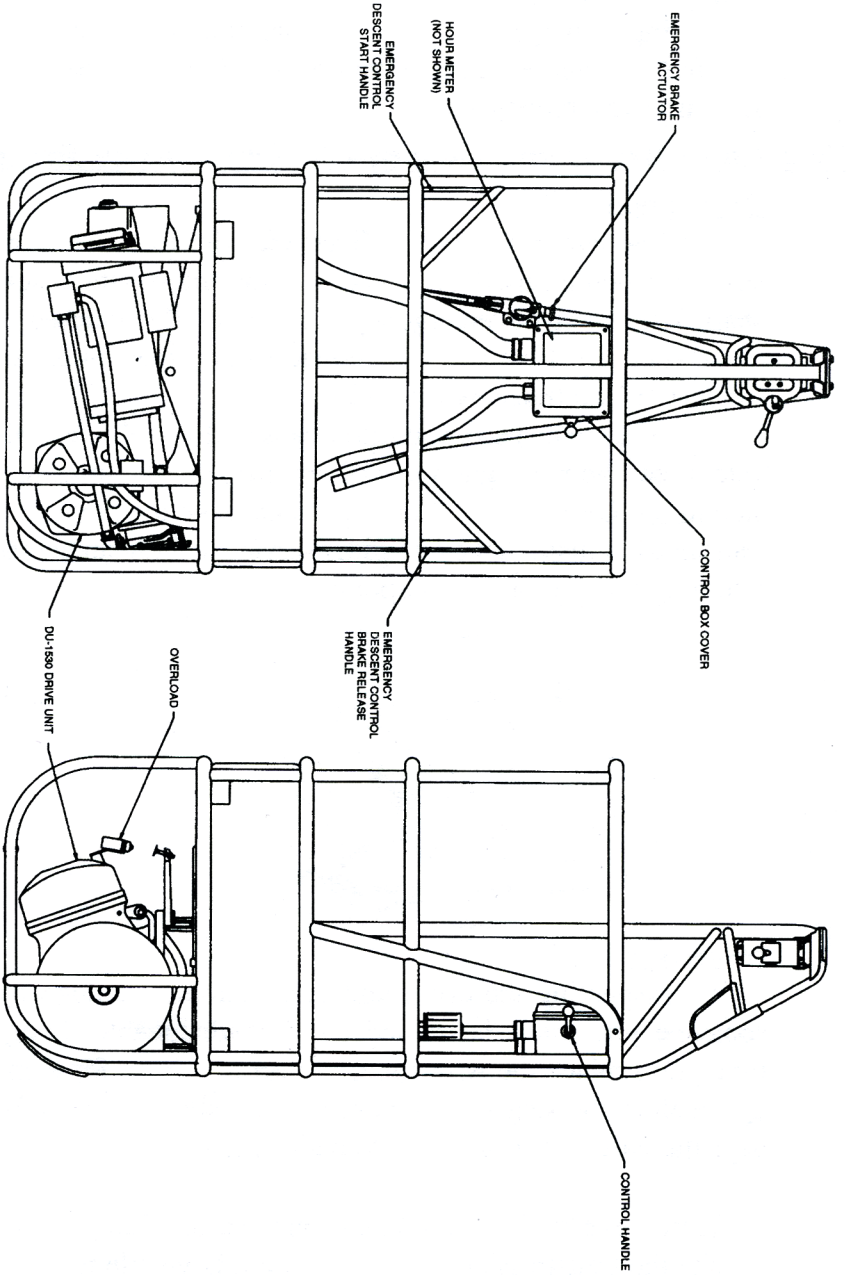


FIGURE 1. ST-180

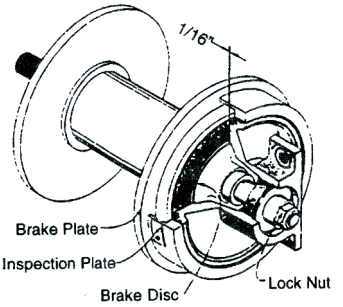
reset the actuator, pull the handle upward and insert pin up to the ring. Engage hoist in the up direction, a minimum of five feet, to release the secondary brake. Hoist must be serviced after emergency use.

Wire Rope Drum and Automatic Emergency Brake

Description

The wire rope drum collects the wire rope while the staging is being raised. It is made of aluminum with a steel shaft. The automatic emergency brake is totally enclosed in one end of the drum and is designed to stop the descent of the stage if the transmission fails.

If an overspeed condition causes the brake to activate, it can be reset automatically by running the transmission in the UP direction. You must then have the brake and transmission inspected by a Spider service technician before returning the equipment to operation.



Inspection

Inspecting the drum and brake should be done by someone you know is trained and knowledgeable. Every time you replace the wire rope, inspect the drum for damage. Before the staging is sent to the job site and every 30 days thereafter, inspect the automatic brake.

1. Remove the inspection plate on the drum flange opposite the transmission. The brake drum is visible inside.

2. Move the disc back and forth to make sure it moves freely. As the brake plate is turned in one direction, it will move laterally toward the bearing housing. When released, it should automatically return to its seated position. It should be about 1/16" away from the bearing housing when properly seated. You can use the inspection hole cover as a feeler gauge, but be sure to clean off excess paint or contaminates first. Be sure to replace the cover and gasket with the two screws when the inspection is completed.

3. Inspect the seal between the bearing housing and the cable drum to make sure it is in place. Inspect the locknut on the end of the drum shaft to see that it is in place and secure.

Service

If the drum or automatic brake need service, contact your local Spider representative.

Wire Rope Level Wind System

Description

The level wind spools the wire rope evenly on the drum when staging is suspended. It keeps the wire rope perpendicular to the drum by allowing the drum to tilt. A spring controls the amount of drum tilt.

The wire rope must be evenly spooled on the drum before ascent to ensure level winding.

Inspection

Every day the operator should inspect the wire rope spooling on the drum to make sure it is stored neatly. If the wire rope is allowed to go slack or become unevenly wound, the level wind system will not function properly.

Every 30 days (sooner if necessary) inspect the drum base for damage. Check the two pivot pins for wear and make sure they are properly secured with the snap rings. Check the tilt control spring assembly to ensure it

resists the tilting of the drum.

If the drum base or tilt control spring assembly need service, contact your local Spider representative.

Overload Switch

Description

The overload shutoff switch limits the amount of load that can be applied to the wire rope. This keeps a safety factor on the wire rope and rigging and prevents over loading the hoist motor.

Located underneath the staging floor, the overload switch automatically stops the upward movement of an electric powered staging anytime the load on the wire rope exceeds 1250 pounds (568 kg). As the load approaches this limit, the gear housing pivots on the drum shaft, compressing the torsion spring. When the gear housing pivots, it makes contact with the elevator bolt causing the overload switch to be activated. The activated overload switch shuts off the electricity, stopping upward movement of the staging.

Inspection

Every 30 days, or before installation on a new job, the overload shutoff switch should be inspected for proper operation by someone you or your employer know is trained and knowledgeable.

1. With all the wire rope stored neatly on the drum and the free end rigged to a beam of adequate strength, load the staging with the rated working load as shown on the load rating plate.

2. When connected to a proper voltage supply, the staging should lift the load.

3. With the addition of another 100 pounds, the overload shutoff should prevent upward travel of the stage.

Overload Test Fixture

The overload test fixture has two strong springs that apply a load against the wire rope. While the overload test fixture will tell the weight at which the overload shutoff will acuate, it will not tell if the staging itself is capable of lifting that amount of load. Actual staging capability must be determined using actual weights.

1. With all the wire rope on the drum, except approximately 1-1/2 feet (460 mm) of wire rope left out above the guide, thread the wire rope through the bottom of the fixture between the two cylinders.

2. Place the wire rope eye pin in the eye and set the pin in the saddles of the fixture.

3. With the wire rope tight, hold the fixture by its top half directly above the wire rope guide.

4. Turn the staging on in the up position until the bottom of the fixture is pulled down onto the guide. The cylinders will fit over the two bolts on the guide.

5. Turn the staging on again and allow the fixture to collapse while reading the pounds of pull on the scale. The numbers represent hundreds of pounds. Stop the staging at 1150 pounds (532 kg) and jog the load onto the scale. Otherwise, the inertia of the motor armature will affect the load setting.

6. If the staging continues to run past 1250 pounds (12.5 on the scale), shut off the motor and adjust the elevator bolt.

Adjustment

1. Adjust the elevator bolt. If the staging shuts off before lifting the rated load, turn the bolt clockwise. If the staging lifts more than the rated load before shutting off, turn the bolt counter-clockwise.

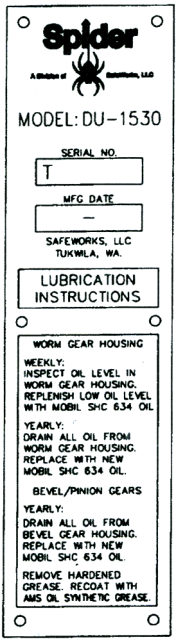
2. Retighten the locknut.

NOTE: A "click" sound indicates microswitch has activated.

Transmission

Description

The DU-1530 transmission is equipped with a two stage gear reduction that couples the motor directly to the winch drum shaft. The primary reduction is a steel worm on a worm shaft, driving a bronze worm gear. The final drive is a set of steel bevel gears. The worm gears run in synthetic oil and the bevel pinion gears run with synthetic grease and in synthetic oil (see lubrication plate for instructions). Periodic inspection of oil level is important. The serial number of each unit will be found stamped on the lubrication plate.



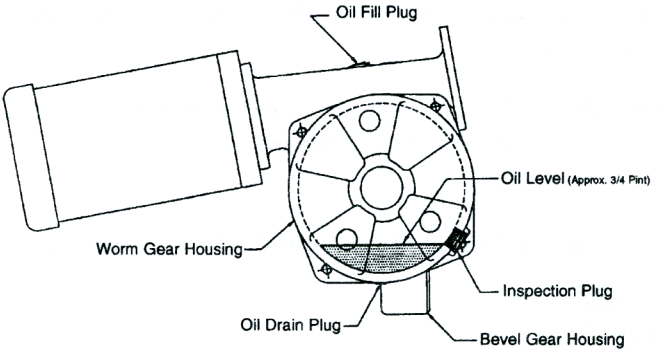
Inspection

Every 30 days (sooner if there are oil leaks) inspect the oil level and fill if required with Mobil SHC 634. Use no substitutes. At the same time inspect the worm and worn gear.

Every 12 months (sooner, if needed) drain the oil from both sections of the transmission and replace with new Mobil SHC 634 cylinder oil. Use no substitutes.

WARNING

The teeth on a new worm and worm gear are approximately 1/8 inch (3.2 mm) wide. Replace both gears if either gear has teeth that are 1/16 inch (1.6 mm) or less in width. The worm and worm gear must be replaced as a set. Failure of the worm or worm gear could result in an uncontrolled descent. Contact your local Spider Representative.



Lubrication

Worm Gear Housing

Weekly: Inspect oil levels in worm gear housing. Replenish low oil levels with Mobil SHC 634.

Yearly: Drain all oil from worm gear housing. Replace with new Mobil SHC 634.

Bevel Gear / Pinion Gear

Yearly: Drain oil & remove hardened grease. Replace with new Amsoil synthetic grease and Mobil SHC 634.

Maintenance

Interval	Procedure
Monthly or at Service	Inspect worm and worm gear for wear or damage. Replace if necessary.
	Examine transmission for signs of leakage. If signs of leakage exists, dissemble and inspect immediately.
	Check oil level in worm gear housing. Replenish with Mobil SHC 634.
Annually	Inspect worm and worm gear for wear and damage. Replace if necessary.
	Drain worm gear housing and refill with Mobil Oil SHC 634. On bevel gear / pinion gear, remove hardened grease, and recoat gear faces with Amsoil Synthetic Grease. Drain oil and replenish with Mobil Oil SHC 634.

Correct oil levels must be maintained to avoid damaging transmission.

Do not attempt to service or remove power unit without:

- Proper instruction and training
- Proper tools

Contact your local Spider representative.

Primary Brake

Description

The primary brake on the ST-180 is a self contained electromagnetic D.C. brake. A.C. current is converted to D.C. through a rectifier. The brake is automatically engaged when the control handle is in it's neutral position. The control handle is attached to a positive centering rotary drum switch. The electromagnetic brake stops the rotation of the electric motor and prevents drifting. The brake is designed to self engage in case of an electrical power failure.

Because the brake is released by the presence of current, it is very important that full voltage reach the staging at all times. If the voltage is low the reduced electromagnetic force will not overcome the spring force. The brake will constantly be clamped on the motor. The increased motor load will eventually burn out the motor windings, and damage the electromagnetic brake.

CAUTION

To prevent the motor windings from burning out, provide a heavy enough gauge of wire, and provide a dependable power supply.

The St-180 stage has emergency descent control. This provides a way to release the primary brake manually, while providing a controlled descent speed below that required to set the overspeed brake.

Inspection

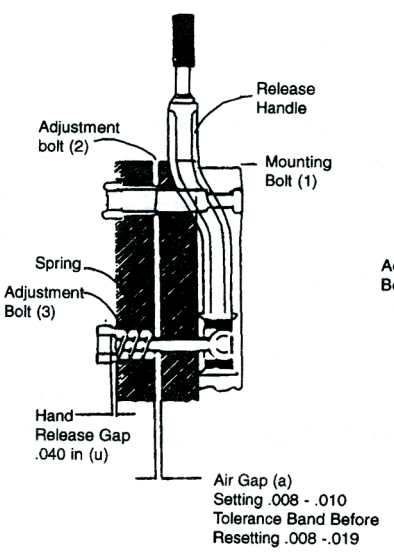
Daily The operator should be aware of any unusual conditions that might occur during the operation of the stage. If the unit is making a buzzing sound or if the stage requires 1-1/2 inches (38.1 mm) or more of travel before stopping, this is an indication that corrective maintenance is necessary. DO NOT CONTINUE TO USE THE STAGING IF AN UNUSUAL CONDITIONS EXISTS.

1. Operate the control lever and listen for the click of the brake. If a distinct buzzing sound should come from the brake when it is energized (brake released) the brake is not releasing properly and this could cause excessive wear.

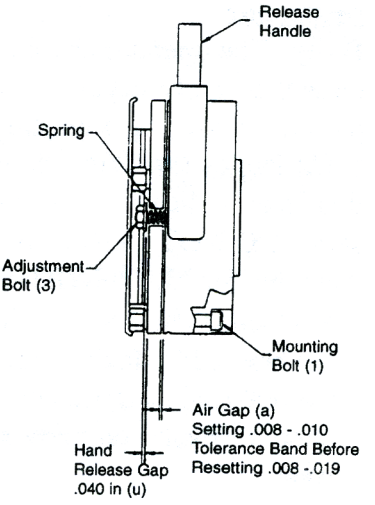
2. With the stage off the ground four feet, move the control lever to DOWN, travel down for roughly one (1) foot (305 mm) then release control lever to apply brake. Check to see if stage requires 1-1/2 inches (38.1 mm) or more to stop, and/or further drifts occurs. If this occurs the brake is not clamping properly.

Monthly or at Service (Lenze brake described, Warner similar) When air gap "a" exceeds .019 inches (.5mm) the air gap must be adjusted back to .008 inches (.2 mm). The air gap should be checked in three positions using a feeler gauge. Loosen mounting bolts (1), rotate the adjustment tubes (2) approximately 1/4 turn, retightened bolts (1) and remeasure the air gap. Repeat this procedure with 1/4 turn intervals until .008 inch value is reached in each of three measuring positions. Next check gap "u" for the manual release. It should be adjusted to .040 inches (1 mm) in order to be sure the brake fully disengages when pressure is applied. Gap "u" can be set by adjusting nuts (3).

(See Figure 2.)



Lenze Brake



Warner Brake

Troubleshooting

Symptom	Check
Buzzing sound/brake will not release or stage not stopping	a. Proper voltage at the brake terminals (96 VDC)
	b. Correct unit voltage matched to power supply (208-230 VAC)
	c. Coil continuity if proper voltage is at the brake leads.
	d. Spline for binding. Friction disc must be able to move freely on mating spline.
	e. Air gap "a", "u" in accordance with monthly inspection procedure
Primary brake manual release not working.	a. Wire rope
	b. Pull cord
	c. Pull cord mechanism
	d. Air gaps "a", "u" in accordance with monthly inspection procedure

Motors, Single Phase and Three Phase

Description

The single phase motors are capacitor start/capacitor run motors designed for continuous operation. The single phase and three phase motors are totally enclosed with an external fan to offer maximum efficiency, while keeping water, sand, paint, and other foreign material away from moving parts.

Power Requirements

The single phase motors require an on-site power supply of 230 volts. The Three phase motors require an on-site power supply of 208 - 230 volts.

CAUTION

Inadequate power supply could burn out the motor. See model designation plate for voltage and current requirements. Power supply must be able to provide a steady voltage and current level.

The model designation plate, located just below the control switch, indicates the voltage required for that staging. The voltage should not vary by more than ± 10%. A 10% reduction in voltage will result in a 20% reduction in power. Too high or too low of voltage can cause the motor to burn out. Current should not exceed the value indicated on the model-designation plate. No other machines should be drawing from the power supply, because the fluctuations in current and voltage could cause the motor to burn out.

Use supply cord no thinner than 10 gauge. The further the current must travel, the heavier the necessary gauge. Protect the stage with a 30 amp fuse or circuit breaker. 20 amp fuse for single basket application.

A portable generator may be used, in places where the power supply is unsatisfactory. If running the stage with a motor generator, a minimum of 10 KVA is necessary. For a two line stage, avoid starting both motors simultaneously. For a single basket a 5 KVA generator must be used.

Maintenance

Interval	Procedure
Monthly	Inspect transmission worm and worm gear for wear or damage. Replace if necessary.
	Check that the plugs on the stage and supply cord are the proper NEMA standard for the voltage being supplied. Plugs should be rated at 20 amps.
	Examine the plugs and rubber boots for any signs of damage.
	Check the voltage and current at the control switch with the motor running. Voltage and current should not vary by more than $\pm$ 10% from rating.

Troubleshooting

If a malfunction occurs, conduct a visual inspection of the equipment. If the possible source is apparent from the visual inspection, correct the trouble. If the trouble is not apparent refer to table or contact your local Spider representative.

Item Malfunction	Probable Cause	Corrective Action
1. Staging will not run up or down.	Inadequate power supply	Check supply cord for breaks or improper connection. Cord should be No. 10 AWG or larger. Voltage should be within 10% of rating on nameplate with the motor running under load.
	Motor burnt out. Short or open circuit	Check the outside of the motor for discoloration or signs that the motor has been hot.
	Weak or burnt capacitor	Check for oil leaking from capacitor on motor. Check mfd's with meter, must be to rating. Change capacitor.
	Improper brake adjustment	Check air gap. Check rectifier.
2. Unit will run down, but not up.	Overload switch	Check unit for overloading. Check adjustment of overload switch.
	Reversing switch	Check for disconnected wire or signs that a contact is burnt.
	Inadequate power supply	Check current and voltage at the reversing switch lug. They should be within 10% of rating. If not, then a transformer or other corrective measure will have to be implemented.
3. Motor runs, but will not shut off, or shuts off while running.	Weak or burnt capacitor	Check for oil leaking from capacitor on motor. Check mfd's with meter, must be to rating. Change capacitor.
	Drum Switch	Check for arcing and welded contacts.