



April 15, 2021
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MECHANIC'S GUIDE

Solenoid Coil Activation Test (SCAT) Instructions



⚠ CAUTION

Read this manual before servicing the snowplow.

SAFETY INFORMATION

SAFETY DEFINITIONS

WARNING

Indicates a potentially hazardous situation that, if not avoided, could result in death or serious personal injury.

CAUTION

Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

NOTE: Indicates a situation or action that can lead to damage to your snowplow and vehicle or other property. Other useful information can also be described.

WARNING/CAUTION AND INSTRUCTION LABELS

Become familiar with and inform users about the warning/caution and instruction labels on the back of the blade.

NOTE: If labels are missing or cannot be read, see your sales outlet.

SAFETY PRECAUTIONS

Improper installation and operation could cause personal injury and/or equipment and property damage. Read and understand labels and the Owner's Manual before installing, operating, or making adjustments.

WARNING

Lower the blade when vehicle is parked. Temperature changes could change hydraulic pressure, causing the blade to drop unexpectedly or damaging hydraulic components. Failure to do this could result in serious personal injury.

WARNING

The driver shall keep bystanders clear of the blade when it is being raised, lowered, or angled. Do not stand between vehicle and blade or within 8 feet of a moving blade. A moving or falling blade could cause personal injury.

WARNING

Keep hands and feet clear of the blade and A-frame/T-frame when mounting or removing the snowplow. Moving or falling assemblies could cause personal injury.

WARNING

Do not exceed GVWR or GAWR including blade and ballast. The rating label is found on driver-side vehicle door cornerpost.

WARNING

To prevent accidental movement of the blade, always turn the control OFF whenever the snowplow is not in use. The power indicator light will turn OFF.

WARNING

Remove blade assembly before placing vehicle on hoist.

CAUTION

Refer to the current Power Match selection system for minimum vehicle recommendations and ballast requirements.

SAFETY INFORMATION

HYDRAULIC SAFETY

⚠ WARNING

Hydraulic fluid under pressure can cause skin injection injury. If you are injured by hydraulic fluid, get medical attention immediately.

- Always inspect hydraulic components and hoses before using. Replace any damaged or worn parts immediately.
- If you suspect a hose leak, DO NOT use your hand to locate it. Use a piece of cardboard or wood.

FUSES

The SnowEx® electrical and hydraulic systems contain several automotive-style fuses. If a problem should occur and fuse replacement is necessary, the replacement fuse must be of the same type and amperage rating as the original. Installing a fuse with a higher rating can damage the system and could start a fire. Fuse Replacement, including fuse ratings and locations, is located in the Maintenance section of the Owner's Manual.

PERSONAL SAFETY

- Remove ignition key and put the vehicle in PARK or in gear to prevent others from starting the vehicle during installation or service.
- Wear only snug-fitting clothing while working on your vehicle or snowplow.
- Do not wear jewelry or a necktie, and secure long hair.
- Wear safety goggles to protect your eyes from battery acid, gasoline, dirt, and dust.
- Avoid touching hot surfaces such as the engine, radiator, hoses, and exhaust pipes.
- Always have a fire extinguisher rated BC handy for flammable liquids and electrical fires.

FIRE AND EXPLOSION

⚠ WARNING

Gasoline is highly flammable and gasoline vapor is explosive. Never smoke while working on vehicle. Keep all open flames away from gasoline tank and lines. Wipe up any spilled gasoline immediately.

Be careful when using gasoline. Do not use gasoline to clean parts. Store only in approved containers away from sources of heat or flame.

VENTILATION

⚠ WARNING

Vehicle exhaust contains lethal fumes. Breathing these fumes, even in low concentrations, can cause death. Never operate a vehicle in an enclosed area without venting exhaust to the outside.

BATTERY SAFETY

⚠ CAUTION

Batteries normally produce explosive gases, which can cause personal injury. Therefore, do not allow flames, sparks, or lit tobacco to come near the battery. When charging or working near a battery, always cover your face and protect your eyes, and also provide ventilation.

- Batteries contain sulfuric acid, which burns skin, eyes, and clothing.
- Disconnect the battery before removing or replacing any electrical components.

SOLENOID COIL ACTIVATION TEST (SCAT)

This guide has been prepared to assist the trained mechanic in using the 29290-2 Diagnostic Harness Kit to test the solenoid coils on all models of SnowEx® snowplows.

The main purpose of the SCAT test is to identify a problem as being either electrical or hydraulic.

NOTE: See the "Operating Your Snowplow" section of the Owner's Manual for details on control time-outs and blade functions.

1. Verify that harness B is properly attached to the solenoid coils. Refer to the labels on the hydraulic unit and the electrical schematics in this guide for details.
2. Install the Diagnostic Harness (PN 29290-2) according to the instructions in the kit.

NOTE: The 29290-2 Diagnostic Harness Kit can be used with or without the snowplow connected to a vehicle. Follow the appropriate instructions for each testing situation.

3. When instructed to do so, perform the SCAT test by activating the control for each function and checking for magnetic pull at all coils specified in the following tables. A solenoid coil is magnetized if a screwdriver held nearby is attracted.

Testing double-stacked coils. Only one coil at a time can be tested for magnetism.

- a. Remove the thin nut that holds the stacked coils on the valve stem. Verify that the steel spacer washer is in place between the coils.
- b. Separate the coils by approximately 1/2" and hold them in that position. Activate the function that uses one of the coils. If the coil has magnetism, the steel washer will be drawn to that coil. Activate the function for the second coil. If that coil has magnetism, the steel washer will be drawn to that side.
- c. After testing, retighten the coil nut to 48–60 in-lb.

NOTE: If a control function times out before the desired coil activation is complete, release the button and press it again (hand-held control), or release the lever to the center position, then move it back into the desired function (joystick control).

4. Compare the SCAT test results with the coil activation data in the tables on the following page.

If the motor relay LED is not illuminating when it should, no output from plow module to motor relay is being detected.

If one or more coils are not magnetizing when they should be, you have an electrical problem. Using a test light, check the ground wires (not red) attached to the improperly acting coil(s) for switched ground while activating the function that should energize the coil(s).

If switched ground is not present, check control and harness for damage or poor connection. Check plow module for damage or blown fuse.

If switched ground is present, use an ohmmeter to test coils. A good coil will draw approximately 1.5A.

If the motor relay and all coils are working properly, you have a hydraulic problem.

SOLENOID COIL ACTIVATION TEST (SCAT)

SPEEDWING™ and Straight Blade Snowplows	
Control Function	Solenoid Coil(s) Activated
Raise	S2C1, S4, motor relay
Lower/Float	S1, S4
Detach	S2C1, S4, motor relay
Attach	S1, S2C2, motor relay
Down-Pressure On	S1, S2C2, motor relay
Angle Right	S3C2, motor relay
Angle Left	S3C1, motor relay

POWER PLOW™ Snowplow	
Control Function	Solenoid Coil(s) Activated
Raise	S2C1, S4, motor relay
Lower/Float	S1, S4
Detach	S2C1, S4, motor relay
Attach	S1, S2C2, motor relay
Down-Pressure On	S1, S2C2, motor relay
Angle Right	S3C2, motor relay
Angle Left	S3C1, motor relay
R Wing Extend	S5C2, motor relay
R Wing Retract	S5C1, motor relay
L Wing Extend	S6C2, motor relay
L Wing Retract	S6C1, motor relay
Scoop	S5C2, S6C2, motor relay
Retract	S5C1, S6C1, motor relay

HDV™ Snowplow	
Control Function	Solenoid Coil(s) Activated
Raise	S2C1, S4, motor relay
Lower/Float	S1, S4
Detach	S2C1, S4, motor relay
Attach	S1, S2C2, motor relay
Down-Pressure On	S1, S2C2, motor relay
Angle Right	S6, S9, S11, motor relay
Angle Left	S5, S7, S10, motor relay
R Wing Extend	S9, S12, motor relay
R Wing Retract	S3, S9, S11, motor relay
L Wing Extend	S5, S8, motor relay
L Wing Retract	S3, S5, S7, motor relay
Scoop	S5, S8, S9, S12, motor relay
Vee	S3, S5, S7, S9, S11, motor relay

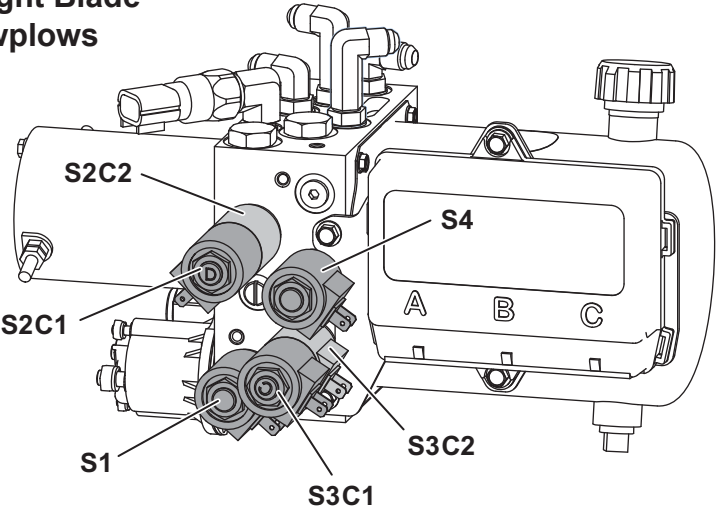
UTV V-Plow	
Control Function	Solenoid Coil(s) Activated
Raise	S5, motor relay
Lower/Float	S1
Angle Right	S2, S4C2, motor relay
Angle Left	S2, S4C1, motor relay
R Wing Extend	S3C1, motor relay
R Wing Retract	S3C2, motor relay
L Wing Extend	S4C2, motor relay
L Wing Retract	S4C1, motor relay
Scoop	S3C1, S4C2, motor relay
Vee	S3C2, S4C1, motor relay

See following pages for solenoid coil identification diagrams.

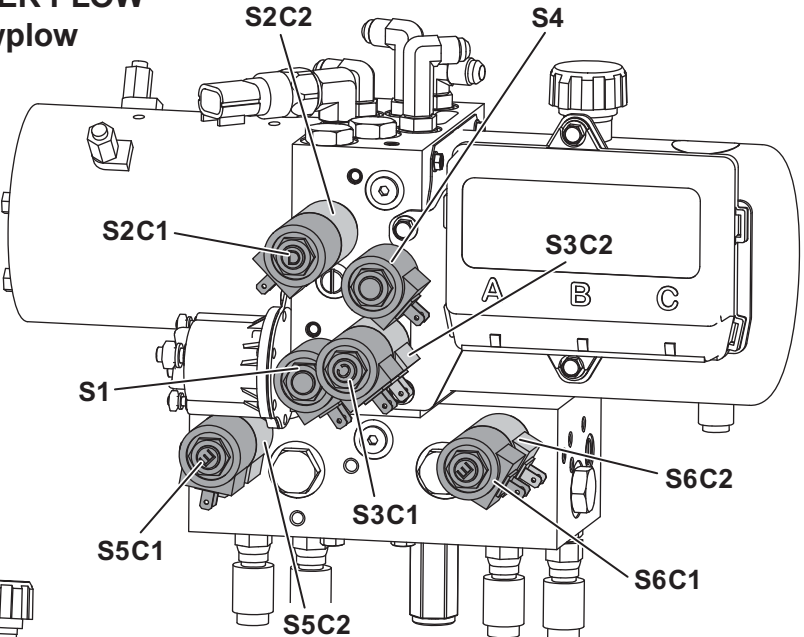
SOLENOID COIL ACTIVATION TEST (SCAT)

SOLENOID COIL IDENTIFICATION

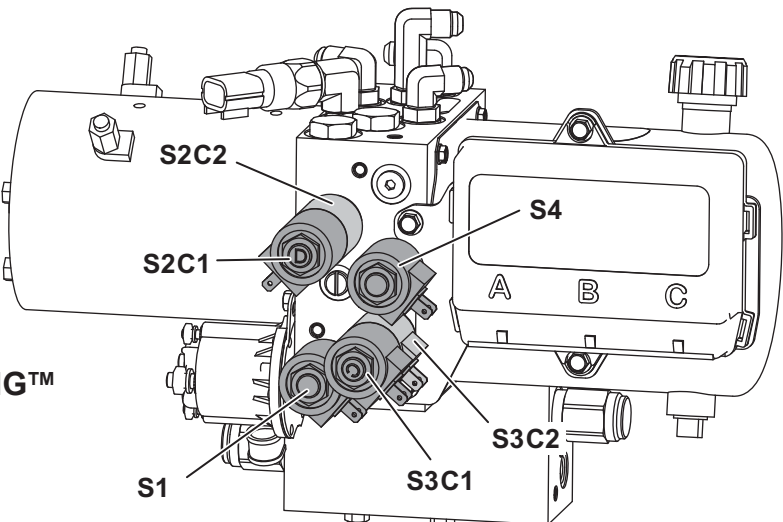
Straight Blade
Snowplows



POWER PLOW™
Snowplow



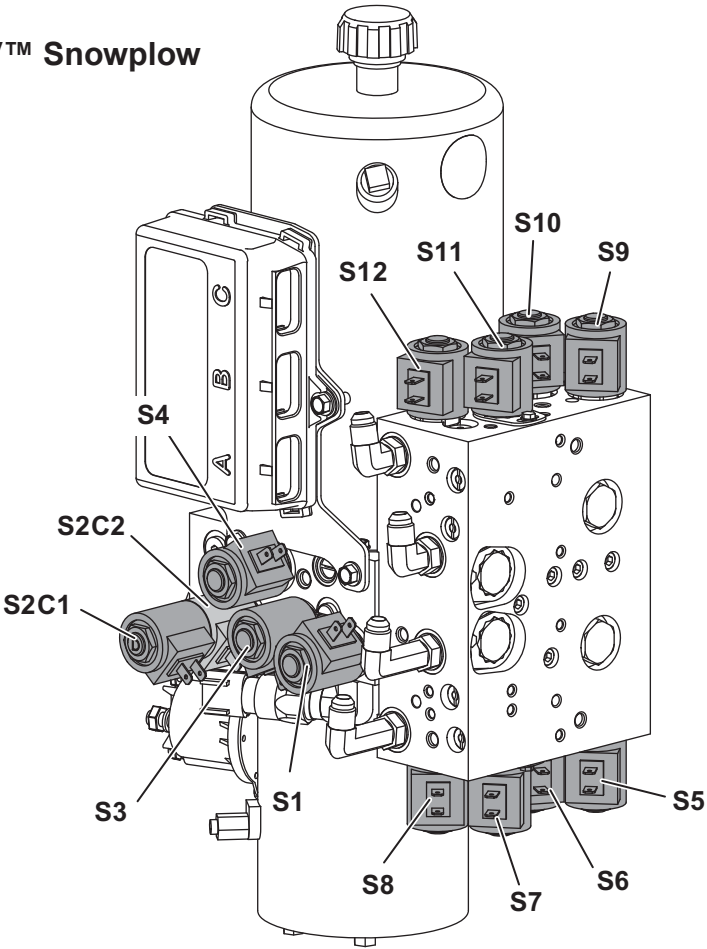
SPEEDWING™
Snowplow



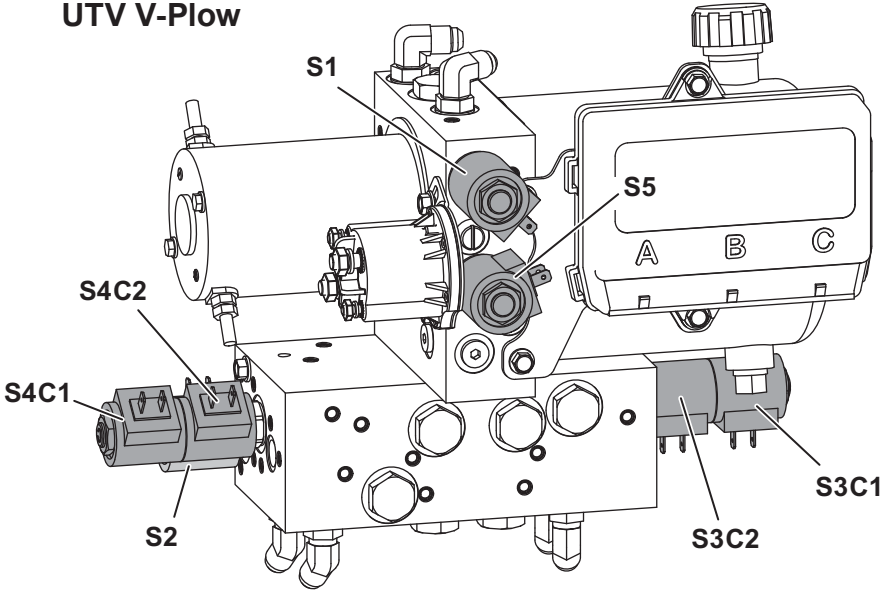
SOLENOID COIL ACTIVATION TEST (SCAT)

SOLENOID COIL IDENTIFICATION

HDV™ Snowplow



UTV V-Plow





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