



R319 ELECTRICAL SYSTEM GUIDE

About this guide

This document describes the electrical system for the following R319 models:
XCV-R319-B1-XXXX-01-2024

Last Revision: 10AUG2024

Precautions

Most Digital Multimeters (DMM) are able to read up to 10 amps for short periods of time. Consider using a DC shunt or a clamp on type meter to prevent meter damage.

Electrical sparks may ignite oils, fuel and fuel vapors.

Improper use of the battery and charger can result in an explosion and burn hazard. Follow the instructions provided by the battery and battery charger:

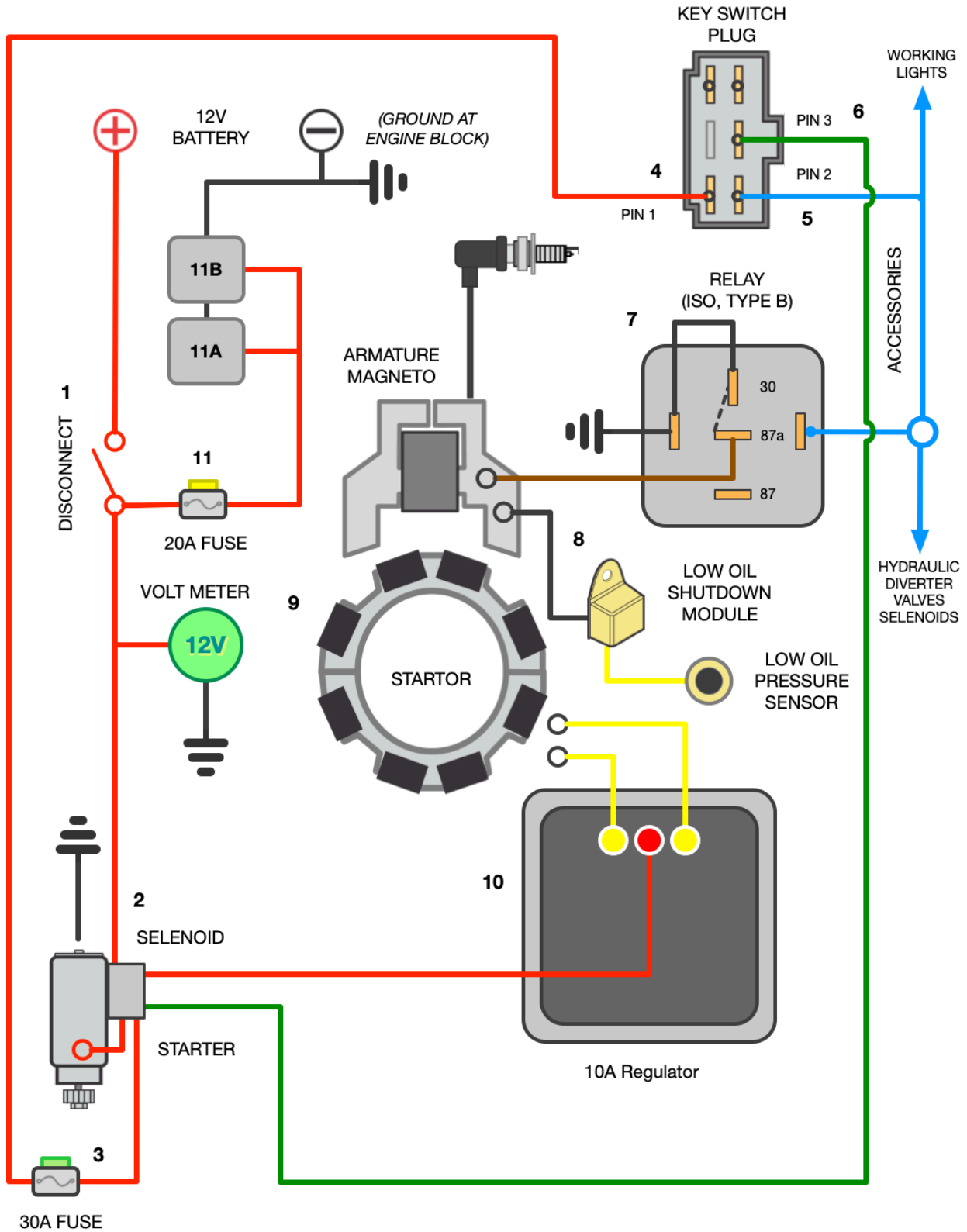
Electrical System Overview

The electrical system on this mini-excavator follows design requirements from Briggs & Stratton and their XT 25 engine. The reference electrical design is commonly used in small outdoor equipment, land and garden tractors, lawn mowers and generators. You can reference official maintenance guides published by Briggs & Stratton for servicing and ordering replacement parts for your electrical system. Your local small engine mechanic should be able to service the electrical system in this machine without any complications.

The following illustration shows the overall electrical system of the machine.



R319 ELECTRICAL SYSTEM GUIDE





R319 ELECTRICAL SYSTEM GUIDE

Diagram Details	
1	Battery + terminal connects to the Battery Disconnect Switch.
2	Battery source connects to the starter's solenoid terminal.
3	Battery source is protected with a 30A ATO Blade Fuse
4	Battery source is connected to PIN 1 of the Key Switch.
5	When the Key position is ON. Power is fed to accessories on Pin 2.
6	When the Key position is START. Power is fed to the starter's solenoid and the starter on Pin 3.
7	An ignition relay acts like the engine ignition switch. When the Key position is OFF the N.C. terminal 87a of the relay feeds GROUND to the magneto effectively preventing spark plug ignition. When the Key position is not OFF terminal 87a is disconnected allowing normal operation of magneto.
8	The Low Oil Shutdown Module is connected to the Oil Sensor. When the oil pressure is low the module closes and makes a path for GROUND to the magneto effectively preventing spark plug ignition.
9	The stator (PN 715798) provides up to 10A of AC current to the regulator module using the two yellow cables for the phases.
10	The regulator provides a 12V DC current of up to 10A which is connected back to the solenoid terminal thus charging the battery.
11	Appliances like the cabin's heater and cabin's fan are connected directly to the solenoid terminal by means of a 20A ATO Blade Fuse. These appliances have their own ON-OFF switches.

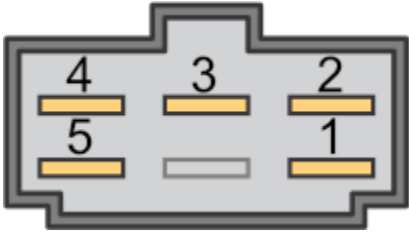


R319 ELECTRICAL SYSTEM GUIDE

Ignition Key Switch, Model JK425-2

This machine uses a common 5-wire ignition key switch used in generators and other diesel equipment.

Ignition Key Switch True Table					
	1	2	3	4	5
OFF					
ON					
START					



Ignition Key Switch Pin Legend	
Pin 1	White, Positive from battery disconnect, protected with 30A fuse
Pin 2	Grey, To accessories
Pin 3	Red, To starter solenoid
Pin 4	Ground, Not Connected
Pin 5	Yellow, Not Connected

Testing the key switch.

Using the true table as reference, test the ON and START positions by measuring the continuity on the corresponding pins of the key switch.

Pins 4 and 5 are not connected.

Replacing the key switch.

Aftermarket 5-wire replacements can be found using the model number JK425-2.



R319 ELECTRICAL SYSTEM GUIDE

When replacing the key switch make sure to compare a proper pinout diagram of the replacement switch with the information provided in this document to determine pin-out compatibility.

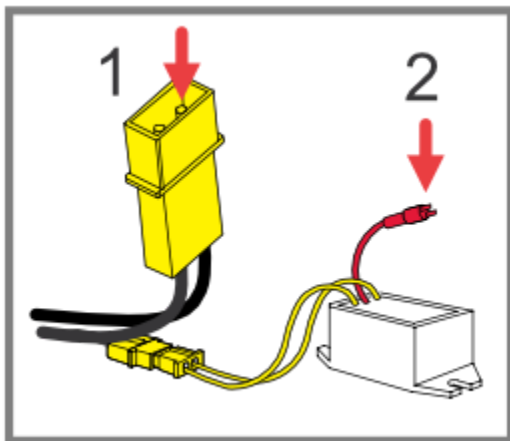
Check for a dead battery

If your mini excavator battery won't hold a charge, verify connections are clean and tight the battery terminals.

Fully charge the battery at 2 amps. If it isn't fully charged within 8 hours, or the charger displays an error, your battery is dead and you'll need to replace it.

If the battery does charge fully, the charge should not drain if it is not in use. Troubleshoot ghost loads to see if your battery drains power while not in use. If it holds the charge through testing, you may have an issue with the alternator.

Check the alternator (stator)



Turn the engine on.

Set the multimeter to measure AC volts.

Connect the black meter lead to the engine block.

Connect the red meter lead to one of the stators output.

Let the engine run for a couple of minutes. Set the engine speed to high by adjusting the throttle lever. To properly conduct this test you may want to use a tachometer to ensure the engine is at 3600 RPM.

Measured both ends of the stator connector as shown on illustration (1). The measured AC voltage should be a minimum of 20 VAC. If the results do not match, replace the alternator.

If voltage is good measure the DC voltage from the voltage regulator (rectifier). The DC voltage must be at minimum one volt higher than the battery voltage. If the battery voltage does not increase, replace the regulator.



R319 ELECTRICAL SYSTEM GUIDE

Check the engine low-oil sensor

A malfunctioning low oil sensor will prevent the engine from starting.

If the engine is not starting, disconnect the oil sensor from the low oil sensor module. If the engine starts you need to test the sensor and the low oil module.

Before testing ensure that the engine has the proper amount of oil and that the oil caps are not leaking.

Disconnect the sensor from the low oil module. Using a multimeter test the continuity between the engine block and the sensor connector. If you have continuity the sensor is malfunctioning and must be replaced. If there is no continuity then replace the low oil sensor module.