

StartSentry

UCS-80Kj

Ultra Capacitor

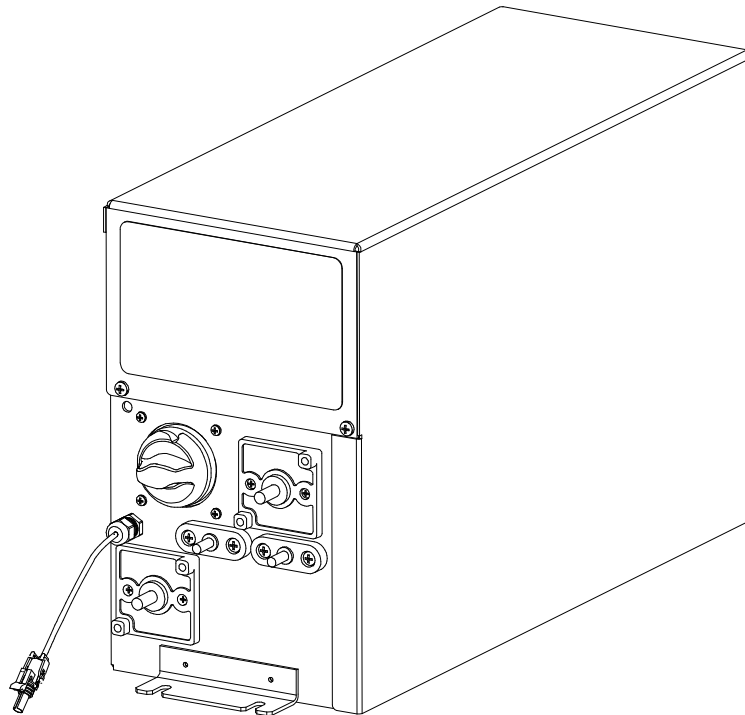


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Introduction

Thank you for purchasing a Vanner *StartSentry Ultra Capacitor*. We are confident that you will be very pleased with its performance. Vanner products are designed and manufactured by skilled professionals using the highest standards in workmanship. With minimum maintenance and care you can be assured of many years of trouble free service.

General Description

The Vanner *StartSentry Ultra Capacitor "UltraCap"* improves the reliability of the vehicle's starting system. Used in parallel with the vehicle's OEM starting batteries the UltraCap assists the starting batteries on every start. Parasitic loads do not affect the UltraCap since it disconnects from the batteries soon after the engine starts. The IS model supports engine starting with low batteries as long as the MUX (vehicle computer) can generate the STARTER SIGNAL. The GS model supports engine starting with battery voltage so low the MUX has shut down.

The UltraCap is shipped discharged. After installation into the vehicle the UltraCap automatically pre-charges with the first engine start. After that the UltraCap automatically maintains a full charge by remaining connected to the batteries for up to 20 minutes following each engine start.

Some configurations may allow the fleet operator to remove secondary starting batteries, saving weight and maintenance costs. Faster cranking during starting lowers exhaust emissions at engine start and relieves stress on the starter and other electrical system components.

Safety Precautions

The capacitors contained inside the UCS24-80KJ systems use the organic solvent Acetonitrile. Acetonitrile has a NFPA Health Hazard rating of Class 2 and a Flammability Hazard of Class 3. Although the capacitor itself is enclosed in a strong aluminum enclosure care should be taken to not physically damage the system. If the system does receive damage that results in an Acetonitrile leak proper care must be taken for clean up.

Spill:

Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, or earth), and place in a chemical waste container. Do not use combustible materials, such as sawdust. Do not flush to sewer.

Skin Contact:

Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

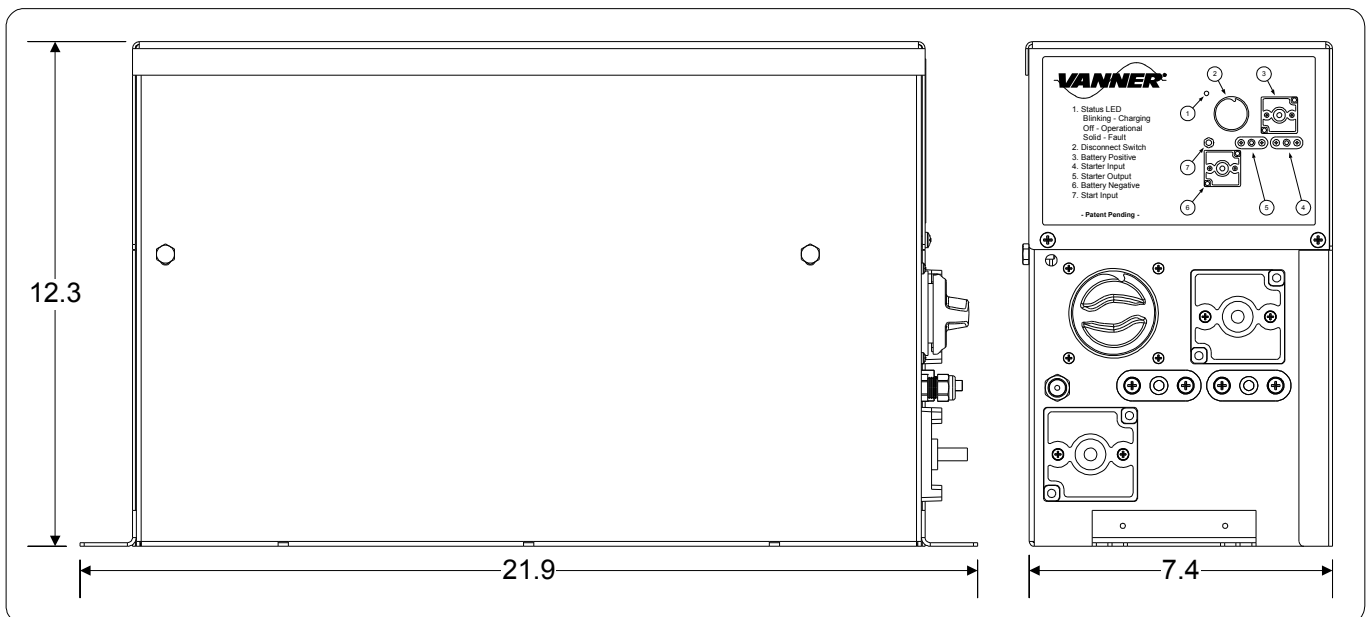
Inhalation:

If inhaled, remove to fresh air. If breathing is labored or with coughing, give 100% supplemental oxygen. Get medical attention immediately.

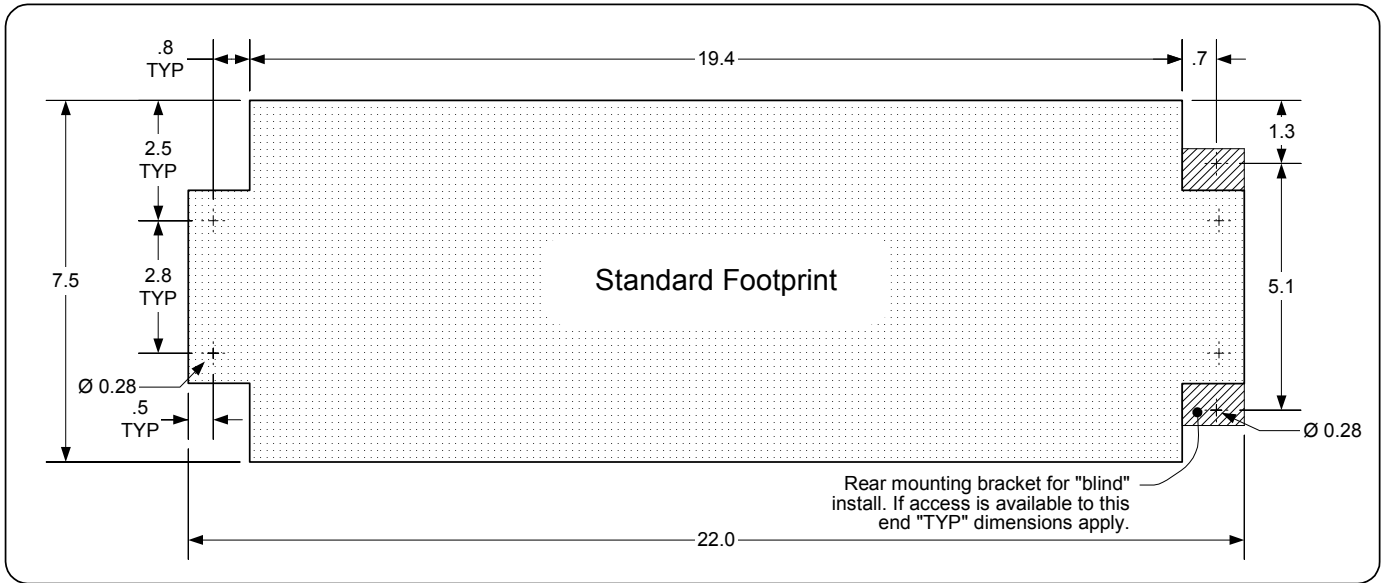
Specifications

UCS24-80Kj Ultra Capacitor		
Model Number	UCS24-80KJ-IS	UCS24-80KJ-GS
Rated Voltage	24V Nominal, 32V Maximum	
Rated Temperature	-40° C to +60° C, -40° F to +140° F	
Cranking Power	30kW at -18° C for 1.5 second	
Peak Cranking Power	50kW at -18° C for 1.5 second	
Cold Cranking Amps	1800A at -18° C for 1.5 second	
Cranking Support Range	10V to 30V	
Leakage Current	10mA	
Self Discharge Time	10 days to 80% voltage at 27° C	
START COMMAND (Activation Signal)	Ignition Signal (6-30V, less than 3ma)	Ground Signal (0-3V, less than 3ma)
STARTER SIGNAL	Interrupts/controls existing signal, 20a max continuous, thermally limited, auto-resetting	
Operation	Self Controlled	
Chassis	Powder Coated Aluminum	
Hardware	Stainless Steel	
Dimensions	12.5H x 22.0D x 7.5W	
Weight	40 lbs.	

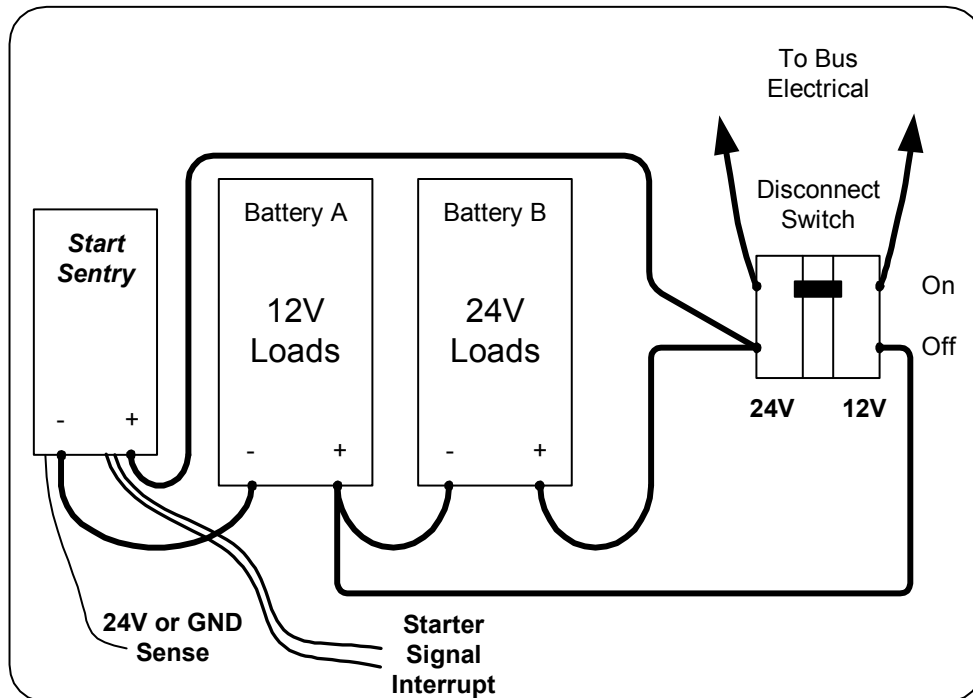
UCS24-80KJ Dimensional Specifications



Mounting Requirements



Typical Transit Bus Wiring



Installation Instructions

Do not exceed the specified torque when connecting cables to the terminal posts of the UltraCap. Torque values higher than specified may damage the product, reduce performance, and/or create hazardous conditions. Torque the positive and negative 24Vdc terminals to 100 lb-in max. Torque the STARTER SIGNAL IN and STARTER SIGNAL OUT terminals to 50 lb-in max. Products damaged by improper torque are not covered by the warranty.

Mounting Location –The UltraCap should be mounted on a flat mounting surface suitable to support the UltraCap during application.

Environmental Protection – Your UltraCap has been designed to withstand exposure to rain and moisture. The UltraCap has been tested for exposure to direct pressure spray but continual exposure to direct pressure spraying may reduce the UltraCap serviceable life. Damage due to water contamination from high pressure spray may not be covered under warranty.

Activation signal START COMMAND input wire – This wire accepts the activation signal to “wake up” the control board prior to receiving the STARTER SIGNAL.

Model UCS24-80KJ-IS requires a momentary or maintained 6V to 30V signal be supplied to the START COMMAND input wire. This signal should originate from the Engine Start circuit.

Model USC24-80KJ-GS requires a momentary (recommended) or maintained ground signal be supplied to the START COMMAND input wire. This signal should originate from a switched chassis ground.

DC cable wiring – DC Cables should be 4/0 minimum. If the vehicle’s battery disconnect switch is a circuit breaker, connect the UltraCap positive to the vehicle side of the breaker to prevent nuisance trips.

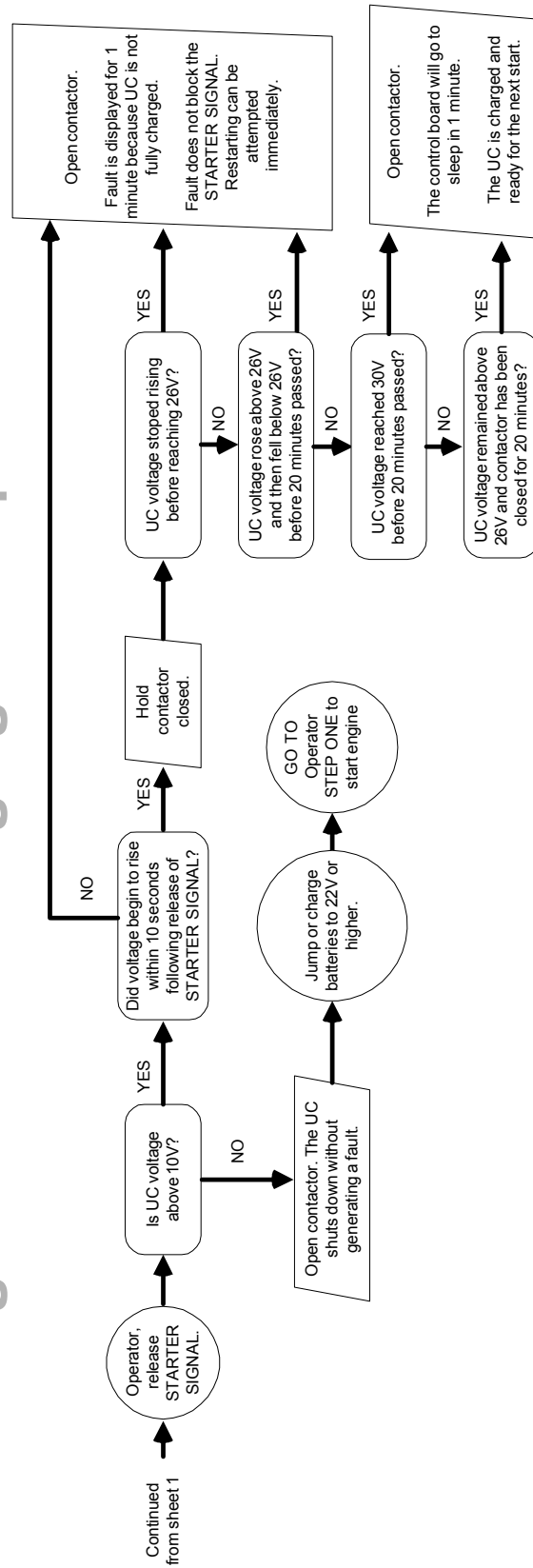
Disconnect Switch – The UltraCap has a built-in DC Disconnect Switch which disconnects the internal capacitor from the negative DC terminal. Turn the built-in Disconnect Switch OFF when installing or removing the UltraCap. Keep the built-in Disconnect Switch OFF when the vehicle DC disconnect switch is OFF. Keep the built-in Disconnect Switch ON when the vehicle DC disconnect switch is ON. Do not leave the UltraCap Disconnect Switch OFF while the vehicle disconnect is ON, or vice versa.

STARTER SIGNAL IN and STARTER SIGNAL OUT: Terminals labeled Starter IN and Starter OUT provide the connections to interrupt the existing starter signal. This can be the low current (approx 1 amp) signal that controls the starter relay, or the medium current (approx 10 amps) output from the starter relay to the starter solenoid, mounted on the starter.

When installation is complete, refer to the troubleshooting section in this manual and start the engine.

UCS24-80Kj Operation Flow Chart

Cranking ends and charging takes place.



Status LED

LED OFF – The LED will be OFF during normal operation, whether assisting or at rest.

LED Blinking – The capacitor is pre-charging. The LED will turn OFF when pre-charge is complete. The UltraCap automatically pre-charges when capacitor voltage is lower than battery voltage at the time the STARTER SIGNAL is received. Pre-charge will finish in approximately 15 minutes after initial installation and thereafter in a few seconds or a few minutes. The STARTER SIGNAL is blocked during pre-charge. A new STARTER SIGNAL is required (the operator must release and press the start button again) after pre-charge is complete. The unit will fault if pre-charge is not complete in 30 minutes.

LED ON Solid – The UltraCap faulted. Faults are caused by battery voltage being too low or too high, capacitor voltage too low or not increasing. Low and high voltage faults block the STARTER SIGNAL. Faults automatically reset in 1 minute, or 1 minute after the STARTER SIGNAL is removed. (If the engine won't crank during a fault, the STARTER SIGNAL is being blocked. Wait 1 minute for the fault to reset. Do not press the start button again during the fault as this will only extend the fault.) If the UltraCap faults repeatedly and battery voltage is below 20 volts, the fault probably is caused by capacitor voltage being too low. Correct the problem by jumping or charging the batteries.

Troubleshooting

The following are the most likely questions that may be asked. If your situation does not apply to the following categories, please contact Vanner Inc Customer Service Department: 1-800-AC-POWER (1-800-227-6937). Please have your model and serial number before calling.

Tools Required:

Clamp-On Amp Meter, Fluke Model 337 or equal, rated 1000 amps DC and with "Peak Hold" feature.
Multi-meter, Fluke Model 87 or equal.

BATTERY OUTPUT AMP TEST verifies the UltraCap is working.

This test will verify the UltraCap is working and supporting the batteries during starting. Use the DC clamp-on meter's Peak Hold function to measure peak cranking amps on the 24V BATTERY positive cable. With the UltraCap **Disconnect Switch ON**, start the engine and capture the BATTERY peak output amps. Record the reading. With the UltraCap **Disconnect Switch OFF**, start the engine and capture the BATTERY peak output amps. Record the reading. Shut the engine off and then turn the Disconnect Switch back ON. (Starting the engine while UltraCap Disconnect Switch is OFF may cause the unit to fault. Other than during this test, always keep both disconnects ON or OFF together.)

Compare the two readings. Battery output amps should be several hundred amps LOWER when the Disconnect is ON.

If the UltraCap does not seem to be working, continue with the trouble shooting below. If a problem is found and is corrected, allow the UltraCap to pre-charge and then perform the Battery Output Amp Test again.

CHECK THE FOLLOWING FIRST:

- Verify the built-in Battery Disconnect Switch and vehicle battery disconnect switch are both ON.
- Verify electrical connections are connected, properly torqued, and free of corrosion.
- Verify proper battery voltage is present at the UltraCap DC terminals.
- Verify UltraCap is receiving START COMMAND.
- Verify UltraCap is receiving STARTER SIGNAL.

Symptom	LED is flashing after pushing the Engine Start switch. Engine will not crank.
Cause	The UltraCap is pre-charging. The STARTER SIGNAL is being blocked until pre-charge is complete. This is normal and will occur anytime capacitor voltage is BELOW battery voltage when a start is attempted.
Solution	Wait until the LED goes out. The LED will go out when pre-charge is complete. The UltraCap is shipped with the capacitor completely discharged. Following initial installation, at the first attempt to start the engine, pre-charge may last for approx 15 minutes. Subsequently, the need to pre-charge should be infrequent and should be complete in a few seconds or a few minutes.
Symptom	LED ON SOLID after pushing the Engine Start switch. Engine will not crank.
Comment	The starter signal is being blocked due to low or high voltage on the battery or on the capacitor. The fault will automatically reset in 1 minute. Do not turn the built-in disconnect switch OFF in an attempt to clear the fault. It will not clear the fault and an additional fault may be created by doing so. If the starter signal is being blocked, wait 1 minute. The fault will reset. Do not press the start button during the fault as this will only extend the fault.
Cause	Battery voltage and capacitor voltage both below 20V.
Solution	Charge or jump batteries. UltraCap will pre-charge when start is attempted.
Cause	Battery voltage above 32V.
Solution	Find and correct the high voltage charging problem.
Cause	Battery voltage below 3V.
Solution	Batteries may be disconnected or connected backwards. Correct battery problem.
Symptom	LED ON SOLID after engine starts or after engine is shut down. Starting is OK.
Cause	Capacitor voltage did not increase within 10 sec following release of STARTER SIGNAL.
Solution	Alternator not charging. Address charging problem.
Cause	Capacitor is not fully charged. Voltage stopped rising before reaching 26V. Capacitor is not fully charged. Voltage was above 26V but fell to 26V before the contactor had been closed for 20 minutes.
Solution	This is normal when the vehicle is shut down before running for 20 minutes. This fault does NOT block the STARTER SIGNAL. Restart can be attempted immediately.
Symptom	Bus will not start and the LED is not ON or flashing.
Solution	Internal temp above 90°C (194°F) will cause complete shut down. Allow unit to cool/reset.
Solution	The UltraCap is suspected to be defective. Bypass the UltraCap and verify the engine will start from battery power with UltraCap bypassed. Bypass the UltraCap as follows: <ol style="list-style-type: none">1. Turn the built-in Disconnect Switch OFF.2. Remove the STARTER SIGNAL IN wire and the STARTER SIGNAL OUT wire from the ultracap. Do not allow wires to remain on the ultracap Starter Signal IN or Starter Signal OUT terminals. Connect the two wires together using a ¼" bolt.3. Verify the bus will start with the UltraCap bypassed.

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