



Instructions

**Uninterruptible
Power Supply (UPS)**

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Document Change Record

This page records changes to this document. The document was originally released as Revision 001.

Version Number	Date	Description of Change
003	03/2009	Corrected information in the installation section.
002	10/2006	Updated instructions with new information.

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About the Uninterruptible Power Supply (UPS)

An Uninterruptible Power Supply (UPS) (P/N 851-059-003) is a battery-operated power supply that is connected to a computer to keep the system running during a power failure. The UPS service for Windows XP and Windows CE detects and warns users of power failures and manages a safe system shutdown when the backup power supply is about to fail.

The UPS works with the Intermecc 5055 or CV60 computers.

Using the CV60 With the UPS

This section defines how the UPS works in the Smart Mode. See also to [“Connecting the UPS \(Smart Mode\)” on page 9](#) and [“Configuring the UPS Service” on page 13](#):

- During the time that the UPS has external power applied to it, the internal battery charges. Allow four hours for a complete charge.
- When external power is removed from the UPS:
 - the battery immediately reverts from a charge mode to a discharge mode. The output load maintains without interruption. The actual run time, where the load is supported, varies depending on load current, battery age, and state of charge.
 - the UPS issues a Primary Power Fail command via the RS-232 interface (negative signal polarity).
- When the battery voltage (under load) reaches approximately 11.2 volts, the UPS issues a Low Battery command (negative signal polarity) via the RS-232 interface. This signals the CV60 to begin safely shutting down its application.
- The CV60 turns off and the UPS has a small reserve of power. The red LED on the UPS may stay lit until a new lower voltage threshold is reached and the LED and UPS turns off.



Note: Do not allow the UPS to remain in this discharged state for more than two weeks or damage to the battery may occur.

Using the 5055 With the UPS



Note: The CV60 can also work in this configuration.

This section defines how the UPS works when in the Standard Mode. The RS-232 cable is not needed for this mode:

- During the time that the UPS has external power applied to it, the internal battery charges. Allow four hours for a complete charge.
- When external power is removed from the UPS, its battery immediately reverts from a charge mode to a discharge mode. The output load maintains without interruption. The actual run time (where the load is supported) varies depending on a number of factors such as load current, battery age, and state of charge.
- The UPS continues to support the load until the battery reaches a very low level of power. Since the 5055 is not capable of recognizing a low battery condition, there will be no means to determine when the UPS battery is almost at the point of no power. The 5055 (and a CV60 that is configured to work with Standard Mode) immediately powers down at point where the UPS battery is at zero charge. This is not a safe shut down.) However this can be avoided by either closing down Windows manually or by reapplying external power to the UPS prior to the battery reaching this point.



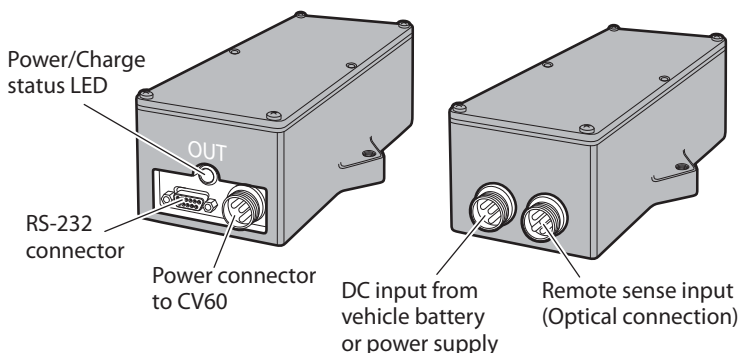
Note: Do not allow the UPS to remain in this discharged state for more than two weeks or damage to the battery may occur.

About the UPS Battery

In order to access the UPS battery (P/N 317-075-002), you must remove the six screws from the UPS cover.



Note: The battery is the only user-serviceable part and must be changed by trained service personnel or those familiar with forklift truck service and maintenance. Use only Intermec-approved replacement batteries for the UPS, since they are UL-approved.



UPS Front View and UPS Back View

Connecting the UPS (Smart Mode)



Note: Remove the dust cover from the serial port before connecting the cable.

- 1 Attach the RS-232 cable (P/N 321-593-002) to COM1 or COM2 on the CV60 and tighten the screws to the DB-9 connector.



Note: If you have a PicoLink radio installed, only COM1 may be used for the UPS connection.

- 2 Connect the other end of the RS-232 serial cable to the RS-232 connector on the UPS and tighten the screws.
- 3 Connect the cable from the UPS power OUT to the CV60 power input connector. Tighten the connector.
- 4 Connect the cable (P/N 226-341-005, six foot cable or P/N 226-341-006, three foot cable) from the DC-DC converter to the DC input connector on the UPS.

Connecting the UPS (Standard Mode)

- 1 Connect the cable (P/N 226-341-005, six foot cable or P/N 226-341-006, three foot cable) from the DC-DC converter to the DC input connector on the UPS.
- 2 Connect the cable from the UPS power OUT to the CV60 power input connector. Tighten the connector.

Understanding the Power/Charge Status LED

The LED lights when power is applied to the UPS.

- Amber: indicates UPS is charging
- Red: indicates UPS is discharging
- Green: indicates UPS is charged.



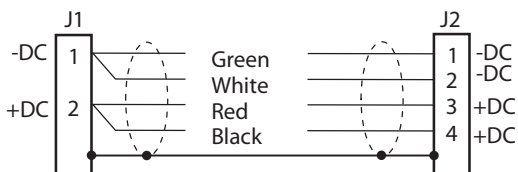
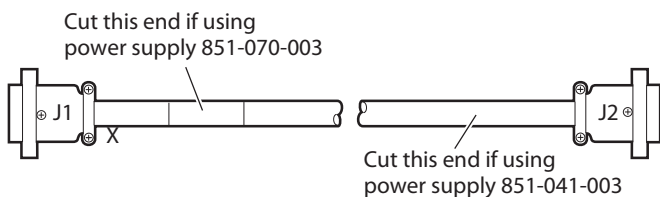
Note: Always have power to the UPS before booting the CV60. Failure to do so may cause the UPS to shut down.

Using the Remote Sense Input (Optional, CV60 Only)

This input can be used if you desire to manually force the UPS to send a shutdown signal to the CV60 via the Primary Power Fail and Low Battery lines. These two signals immediately cause the CV60 to begin the shut down process. The UPS should be configured in the Smart Mode for this operation. A switch/cable assembly needs to be assembled and attached to this input to use this capability.

To install the remote sense input

- 1 Cut the 2-pin connector end from the cable (P/N 226-340-003) and wire the toggle switch as shown.
- 2 Install the cable into the 4-pin connector.



Remote Sense Input Wiring Diagram



Note: New cables may not adhere to the Intermec current wiring scheme. Verify individual wire colors and their equivalent connection before proceeding with the UPS installation.



Note: The toggle switch for remote sense operation is not Intermec supplied. We recommend an SPST switch (single pole single throw) rated at 24 VDC at 1 mA or less for the remote sense option.

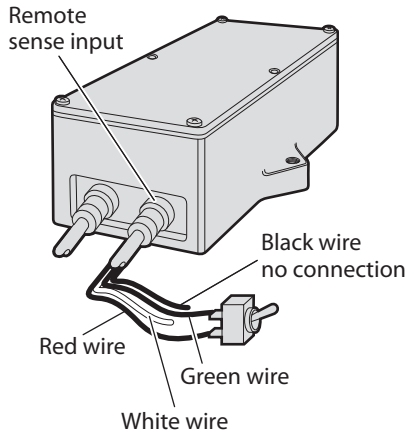


Note: Use a sealed switch for high humidity and dusty environments. Follow customary electrical wiring practices when wiring the switch.



Note: Remove the dust cover from the circular connector before installing the cable.

P/N: 226-340-003



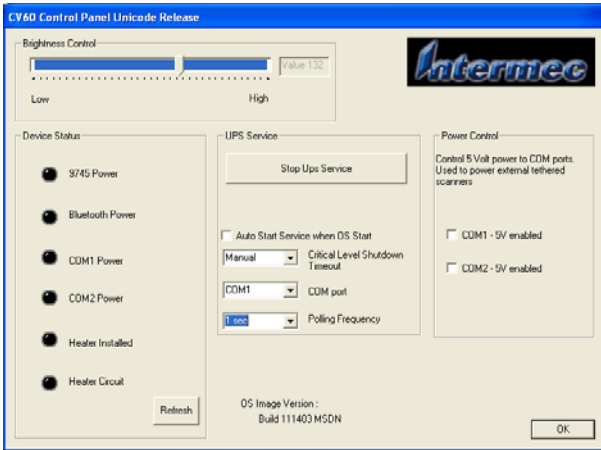
To operate the remote sense input

- 1 Close the switch (ON) to force the CV60 to shut down (after configuring the UPS service in software). A pop-up window on the CV60 indicates that Windows is closing down.
- 2 To remove the shutdown signal to the CV60, move the toggle switch back to the OFF position.

Configuring the UPS Service

Windows XP

- 1 Double-tap the CV60 Settings icon to open the control panel applet.
- 2 On the **UPS Service** button, click **Start UPS Service**.

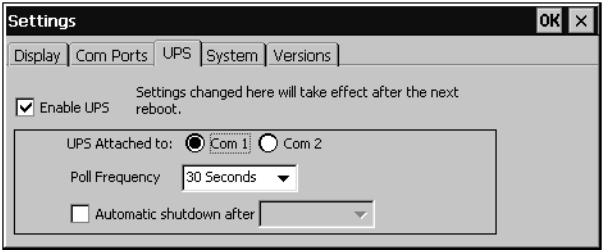


- 3 Check the **Auto Start Service when OS Start** check box if you want the UPS service to start at login.
- 4 In the **Critical Level Shutdown Time-out** field, select Manual, or 10, 20, 30 second intervals.
- 5 In the **COM Port** field, select the COM port where the UPS device is connected.
- 6 In the **Polling Frequency** field, set the intervals for 1 sec., 3 sec., or 5 sec.

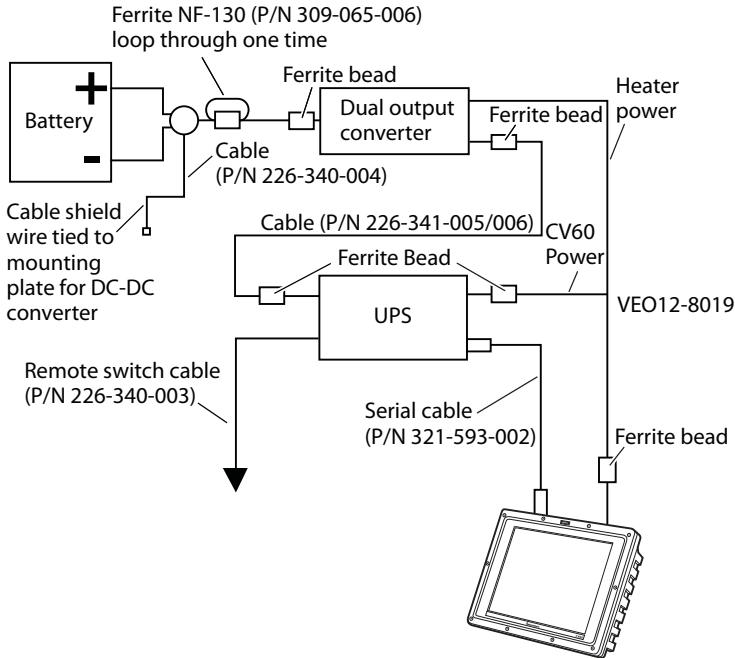
Windows CE

- 1 Double-tap the CV60 Settings icon to open the control panel applet.
- 2 Tap the **UPS** tab
- 3 Check the **Enable UPS** check box.
- 4 Click the drop-down arrow to reset the **Poll Frequency** value.

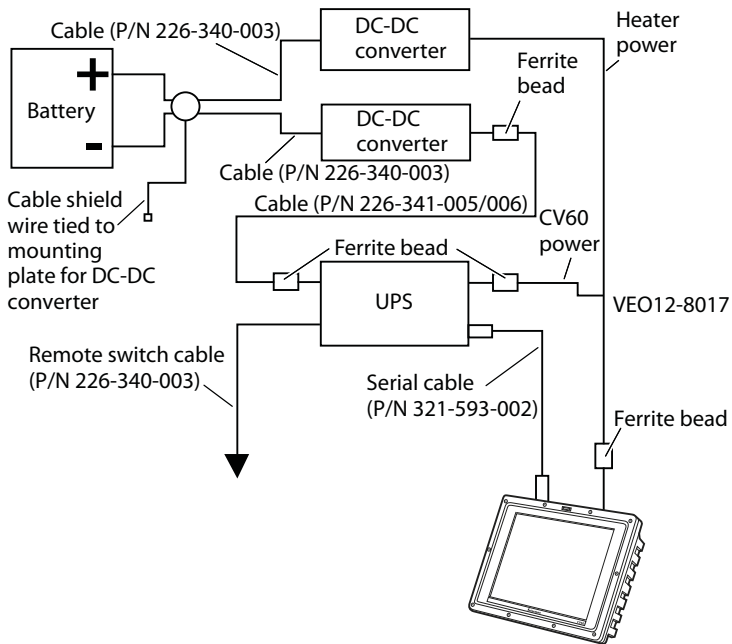
- 5 Check the **Automatic shutdown after** check box and then adjust its value by clicking the drop-down arrow.



Typical UPS Installation Configurations



Typical UPS Installation Configuration



Typical UPS Installation Configuration

Maintaining Your UPS

This section provides useful tips on the operation and care of your UPS (P/N 851-059-002 and P/N 851-059-003). There are a number of industrial material handling units in existence. This section refers to the equipment that the UPS is installed on as a lift truck.

Storing the UPS

UPS units have an internal lead acid battery. These batteries have characteristics that are well suited for demanding environments. However, like all energy storage devices, they have limitations.

By taking reasonable care of the battery, its performance can be optimized. However, failure to properly care for the battery can result in a much shortened life span. If at all possible, the UPS should be stored at temperatures less than 24°C (75 °F).

Optimally, it should be fully charged at the beginning of any length of storage period of several weeks or more. The following recommendations add to the life of the battery.

Storing New Units

UPS units shipped from the factory since the start of 2006 have a clear Mylar battery pull tab protruding from the side of the unit. This tab should be left in place until the UPS is deployed into service. Removing the tab energizes the UPS circuit and causes the battery to drain stored energy. Units with a pull tab may be stored up to four months before they require a recharge or deployed into service.

Storing Units Removed From Service

Units that have been removed from service should be recharged within two weeks from their removal date. Typically, these units will be very low in charge for the following reasons:

- Units may have been pulled out of service after they completed a discharge and were not allowed to recharge.
- Even units that are recharged in their installation will lose their charge after several days. This is the case when its red LED remains on after removal from the lift truck. This condition indicates that the UPS is available to supply power, but there is no load connected to it. This state causes the battery to become discharged within several days.

Charging/Shutting Down the UPS

An optional charger/shutdown kit (P/N 203-727-001) is available from Intermecc and can be used to charge freestanding UPS (those that are not installed). Included is a cable that functions as a means to shut down the UPS into a sleep mode which prolongs the length of time the unit can be stored without recharging. Units that have been properly charged and shut down can be stored up to three months without further maintenance. After that time, a recharge will be necessary to maintain the integrity of the battery.

Another means of extending the storage time of the battery is to allow it to be fully charged in the unit while installed (or outside of the installation by using the optional charger) and then remove the battery from the UPS unit (see [“Removing/Replacing the Battery” on page 17](#)). If the unit had only been used for a week or so, the battery will be able to be stored for up to four months after a full charge. If the usage exceeds that, its shelf life will be about three months before another recharge is required.

Removing/Replacing the Battery

Should the battery need replacement or if it needs to be removed, this should only be done by trained personnel or those familiar with fork-lift service and maintenance. A replacement battery can be obtained from Intermecc by ordering P/N 203-705-001.

Only qualified personnel may remove or replace the battery from the UPS.

To remove the battery

- 1 Disconnect the cables from the UPS.
- 2 Remove the six screws from the battery access cover.
- 3 Remove the cover. Grasp the pull tabs firmly and pull to remove battery.
- 4 Lift up the battery and remove the battery cable end clip.

To install a new battery or to reconnect the original one

- 1 Connect the battery cable end clip to the battery.
- 2 Place battery in UPS, making sure the pull straps are properly positioned across the top of the battery.
- 3 Press firmly to fully seat the battery.
- 4 Replace the cover, making sure the pull straps remain correctly positioned across the top of the battery.
- 5 Secure the cover with the six screws removed earlier.
- 6 Reconnect the cables to the UPS.

Installing the UPS

Make sure that you mount the UPS on the same metal surface as the DC-DC converter so that it has good heat transfer and airflow around it. Intermec also recommends that you mount the UPS away from other heat sources. The installation location is important as excessive heat is a primary cause of battery failure. The mounting location should allow visibility of the status LED and easy access to the battery compartment.



Note: The UPS should always be mounted so that the lid (battery cover) is oriented above the body of the device. (When the lid surface is level or has an angle up to 30 degrees with respect to the horizontal axis, this is considered acceptable.) This mounting orientation is needed should the battery ever go into a venting condition. If this should occur, any battery leakage would be contained by the UPS.

After the UPS is installed onto a lift truck, the pull tab (if present) should be removed. Input power to the UPS must be present for at least four hours prior to any attempt to rely on the UPS as a source of backup power. This allows the battery to charge properly. Failure to allow for a full charge may result in the computer terminal turning off before the lift truck battery is replaced.

Operating the UPS

Allow a newly installed UPS unit to charge on the lift truck for four hours prior to using. This allows the battery to charge adequately. When the main power to the UPS is removed, the internal battery allows the computer terminal to run for 15 minutes or more. Actual run time varies depending on the terminal features that are activated, age of the battery, and the care given to it.

New lead acid batteries are formed during the first few cycles of use. Therefore, the initial 3 to 4 times that it is powered from its internal battery, the UPS run time may be shortened by up to several minutes.

The number of times a UPS unit can be used (battery cycle life) for lift battery changes is dependent on a number of factors:

- Condition of battery
- Current load presented by the computer terminal
- Time required to change the lift battery
- Ambient temperature

As the battery ages, the run time (time the UPS powers the computer terminal without external power) slowly decreases. The UPS is designed to operate in a temperature range of -30 °C to 50 °C (-22 °F to 122 °F). However, it is recommended that charging be done within the temperature range of -15 °C to 40 °C (5 °F to 104 °F).

Troubleshooting the UPS

Troubleshooting Tips

Problem	Possible Cause
Green LED on DC-DC Converter not on.	Cabling problem or defective DC-DC Converter. In-line fuse or resistor may be damaged.
Terminal doesn't indicate that the UPS battery is low or doesn't shut down the CV60 with a low battery.	Defective serial cable between the UPS and CV60.
UPS and DC-DC Converter LEDs are both flashing about once per second and the computer terminal doesn't power up.	Fault condition. Disconnect power to UPS and reconnect. If problem persists, remove power to UPS and momentarily disconnect battery inside UPS.
UPS only powers the CV60 for a few minutes before lift truck battery is removed.	UPS battery wasn't charged sufficiently prior to use or battery may be defective and should be replaced.
UPS works fine until lift truck battery connection is removed and then computer terminal turns off.	UPS battery is low. May need charging or replacement.
Computer terminal will not turn on or only stays on for a short time during computer boot up. Then it continuously attempts to restart.	UPS Control Panel may be configured incorrectly in Windows. Reference Configuring the UPS Service section of this guide. UPS may be defective.



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