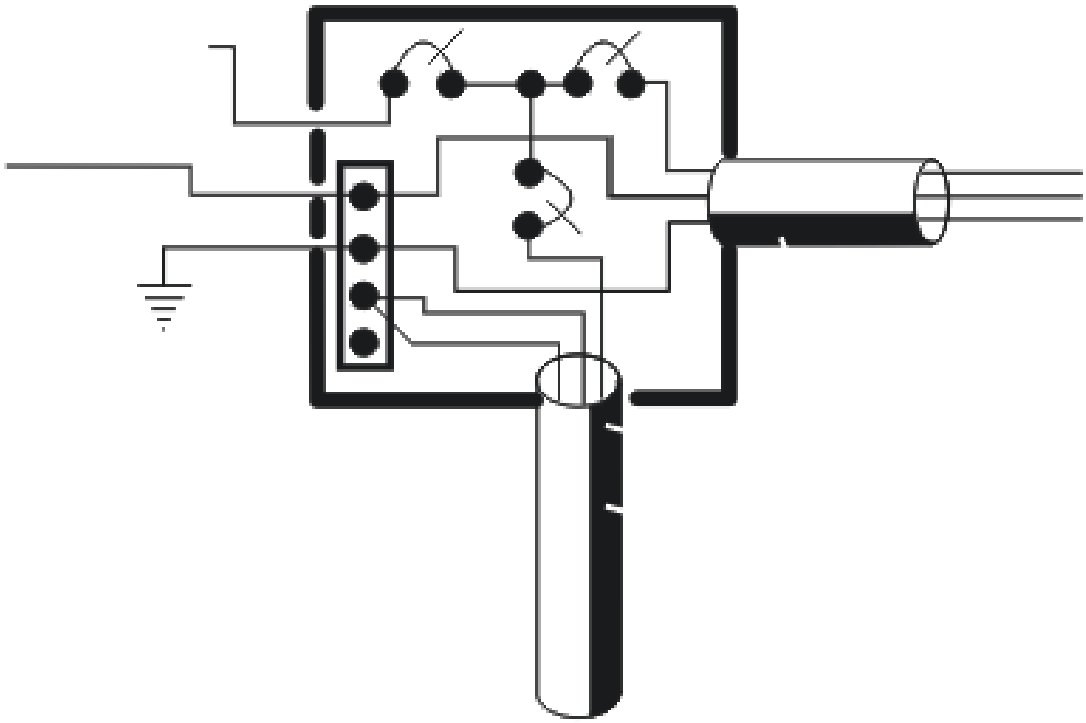
AC Wiring Guide

Workstation and Peripherals



BST0-2115-53
Issue E

The product described in this document is a licensed product of NCR Corporation.

NCR is a registered trademark of NCR Corporation. Other product names mentioned in this publication may be trademarks or registered trademarks of their respective companies and are hereby acknowledged.

The terms HDMI and HDMI High-Definition Multimedia Interface, and the HDMI Logo are trademarks or registered trademarks of HDMI Licensing LLC in the United States and other countries.

Where creation of derivative works, modifications or copies of this NCR copyrighted documentation is permitted under the terms and conditions of an agreement you have with NCR, NCR's copyright notice must be included.

It is the policy of NCR Corporation (NCR) to improve products as new technology, components, software, and firmware become available. NCR, therefore, reserves the right to change specifications without prior notice.

All features, functions, and operations described herein may not be marketed by NCR in all parts of the world. In some instances, photographs are of equipment prototypes. Software screen images are representative, and in some cases, may not match a customer's installed software exactly. Therefore, before using this document, consult with your NCR representative or NCR office for information that is applicable and current.

To maintain the quality of our publications, we need your comments on the accuracy, clarity, organization, and value of this book. Please use the link below to send your comments.

Email: FD230036@ncr.com

Preface

This document contains the information necessary for the preparation of a site conforming to NCR specifications. It is very important that the site complies with the requirements specified in the document, because, once the equipment has been installed, deficiencies in site preparation or the problems caused by these deficiencies are much more difficult to detect and correct. Further, failure to comply or to take proper steps to protect equipment against risks identified in this document may cause serious damage to the equipment and to the customer's business.

In addition to the need to comply with the requirements specified, electrical wiring, and mechanical systems must also comply with relevant codes, laws, and regulations.

It is important that the site be prepared by a customer or his agent who is fully conversant with the special requirements of electronic equipment. The responsibility of ensuring that the site is prepared in compliance with this document remains with the customer.

For information and guidance purposes only, a list is provided, in general terms, of those matters for which the customer is responsible. This list is not intended to be comprehensive, and in no way modifies, alters, or limits the responsibility of the customer for all aspects of adequate site preparation.

NCR staff will be available to answer questions relating to the contents of this document, except where:

A. The customer has been notified that a full or partial consulting service is available and/or that NCR will be willing to undertake a preliminary or final site survey, and

B. The customer shall have entered into a formal contract with NCR for provision of the same.

No comment, suggestion or advice offered or not offered about preparation of the site nor any inspection of the site whether before or after preparation is to be taken as approval of the location of the site and equipment or of its preparation and NCR will not be liable in respect of any comment, suggestion or advice given by its staff or in respect of any failure to give advice.

Finally, only the customer can know the full extent of the damage which may be caused to his business by reason of failure of the equipment which is to be installed. For this reason it is the customer's responsibility to ascertain the extent of any such possible damage to his existing or planned business, and to effect full insurance in respect of it.

Table of Contents

Revision Record

Issue	Date	Remarks
A	Mar 1991	First Issue
B	Jun 1992	Revised to reflect peripheral coverage.
C	Mar 2007	Updated to new format.
D	Oct 2010	Added Grounding Essentials section.
E	Sep 2019	• Updated dedicated AC power circuit statement in AC Power Circuit Wiring based on engineering feedback (*IPHW-22*). • Updated to new IP Template.

AC Wiring Guide

This document provides the information necessary to prepare a site to NCR specifications prior to the installation of NCR equipment. The site must be properly prepared before the NCR equipment is installed, because site preparation deficiencies may be difficult to detect and correct after installation.

Customer Responsibilities

Before the system can be installed, the customer must do or provide the following:

- When required by NCR, provide the NCR Customer Services representative with appropriate drawings that indicate:
  - Location of the equipment
  - Site wiring (power and communications, paths and lengths)
  - Location of other equipment that may generate electrical noise, electromagnetic interference, or heat.
- Make building alterations necessary to meet wiring and other site requirements
- Provide and install all communications cables, wall jacks, special connectors, and associated hardware
- Provide and install necessary power distribution boxes, conduits, grounds, lightning protection devices, and associated hardware
- Make sure all applicable codes, regulations, and laws (including, but not limited to, electrical, building, safety, and health) are met
- Provide and install auxiliary power or other equipment as required
- Provide storage or service areas as required
- Make sure all system/unit environmental requirements are met
- Provide and install floor coverings and environment systems that limit or control static electricity build-up and discharge
- In general, keep the NCR equipment area free from dust, smoke, lint, and other particles. Restrict smoking, eating, and drinking around the equipment. Avoid locating the equipment near other machines that generate ink, carbon, and paper dust particles.

AC Power Circuit Wiring

The AC power circuit requirements for the NCR equipment include those listed below:

1. For safety reasons, conduit shall never be used as the only ground.
2. Each circuit must consist of three conductors: hot, neutral, and an insulated, isolated ground to building load center.
3. Isolated-ground service outlets (Hubbell IG5362, or equivalent) must be provided at convenient locations near the NCR equipment.
4. The number of units per branch circuit must be determined by applicable national and local electrical codes, and by acceptable wiring practices.
5. An AC power circuit dedicated to the NCR equipment installation is recommended for each NCR SelfServ Checkout terminal. For more information, refer to the either of the following:
   - *Recommended AC Cabling for 110-120 VAC Service* on page 4.
   - *Recommended AC Cabling for 220 VAC Service* on page 5.
6. A panel which supplies power to inductive switching loads may not be used to power NCR equipment.
7. EMI filters may be required in installations where the building or store load center panel supplies circuits for the entire facility.

NCR's installation experience indicates that NCR equipment may function satisfactorily with existing wiring configurations if the explicit and implicit safety requirements outlined in this publication are met. The customer is ultimately responsible for providing an adequate circuit.

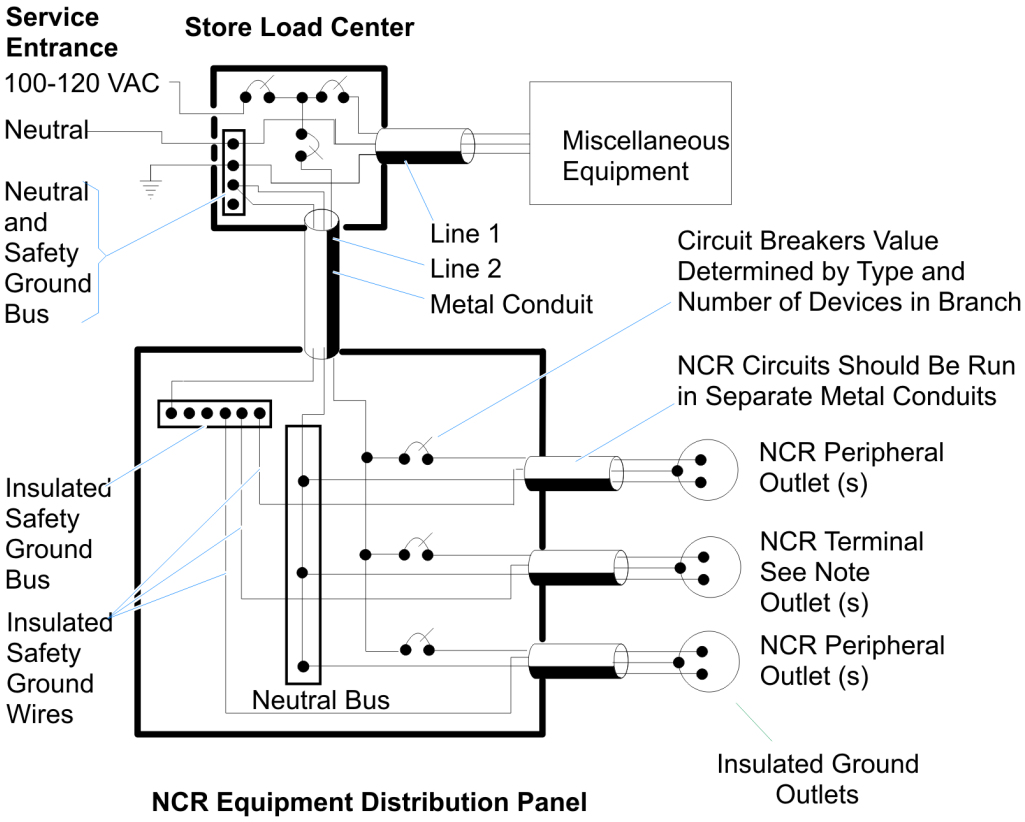
Grounding Essentials

An equipment ground is the physical connection to earth of non-current carrying metal parts. This type grounding is done so that all metal parts of equipment that personnel can come into contact with are always at or near zero (0) volts with respect to ground. All metal parts must be interconnected and grounded by a conductor in such away as to ensure a path of lowest impedance for flow of ground fault current. Grounding for electronic equipment is a special case in which the equipment ground and the system ground are combined and applied in unity. Electronic equipment grounding systems must not only provide a means of stabilizing input voltage levels, but also act as the zero (0) voltage reference point. Grounding systems for the modern electronics installation must be able to provide effective grounding and bonding functions well into the high frequency megahertz range.

The primary goal of the grounding system throughout any facility is SAFETY. Secondary are effective lightning protection, diminishing electromagnetic coupling (EMC), and the protection against electromagnetic pulses (EMP). Grounding is implemented to ensure and to prevent hazardous voltage that can cause fires and personnel injuries.

Recommended AC Cabling for 110-120 VAC Service

FOR REFERENCE ONLY

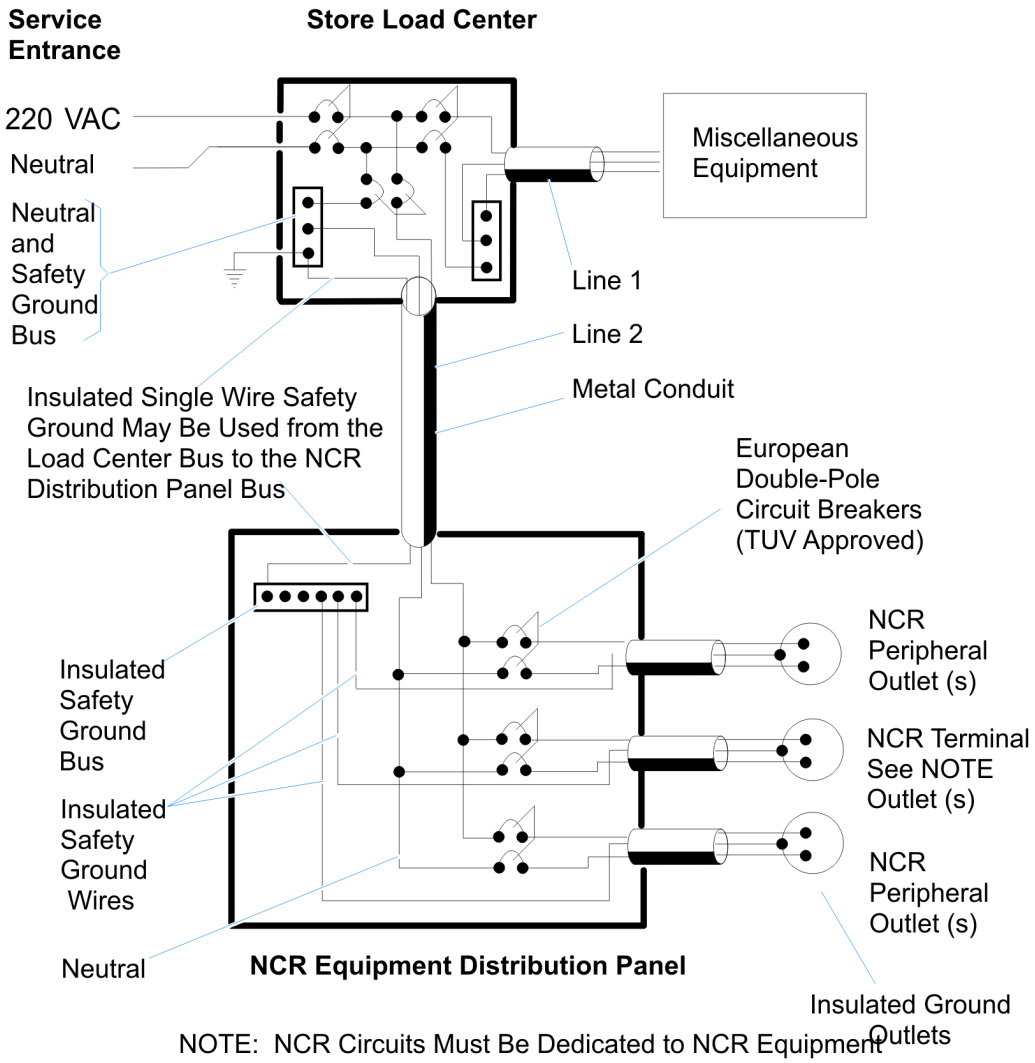


NOTE: NCR Circuits Must Be Dedicated to NCR Equipment or Other Logically Connected Electronic Equipment (Modems, DAA, Bridges, Etc.)

24423

Recommended AC Cabling for 220 VAC Service

FOR REFERENCE ONLY



NOTE: NCR Circuits Must Be Dedicated to NCR Equipment or Other Logically Connected Electronic Equipment (Modems, DAA, Bridges, Etc.)

24424

Power Transient Considerations

Protective devices may be required for proper operation of the equipment (see Appendix A) if any of the following AC power conditions exist:

- Voltage transients
- Line noise
- Surges
- Sags
- Impulses
- Spikes

An AC power circuit (as shown in Figure 1 or 2), dedicated to NCR equipment, is recommended. However, NCR's experience indicates that NCR equipment may function satisfactorily with existing wiring configurations when:

1. Each circuit consists of three conductors: hot, neutral, and an insulated, isolated ground to building load center.
2. An isolated ground receptacle, such as Hubbell IG5362 (or equivalent) is provided.
3. The number of devices per branch circuit is determined by acceptable wiring practices and applicable national and local electrical codes.
4. Recommended circuit breaker capacities are shown below.

Recommended Circuit Breaker Capacities

Wire Size	Breaker Capacity for 120 VAC Circuits	Breaker Capacity for 220 VAC Circuits
14 Gauge	15 Amperes	15 Amperes
12 Gauge	20 Amperes	15 Amperes

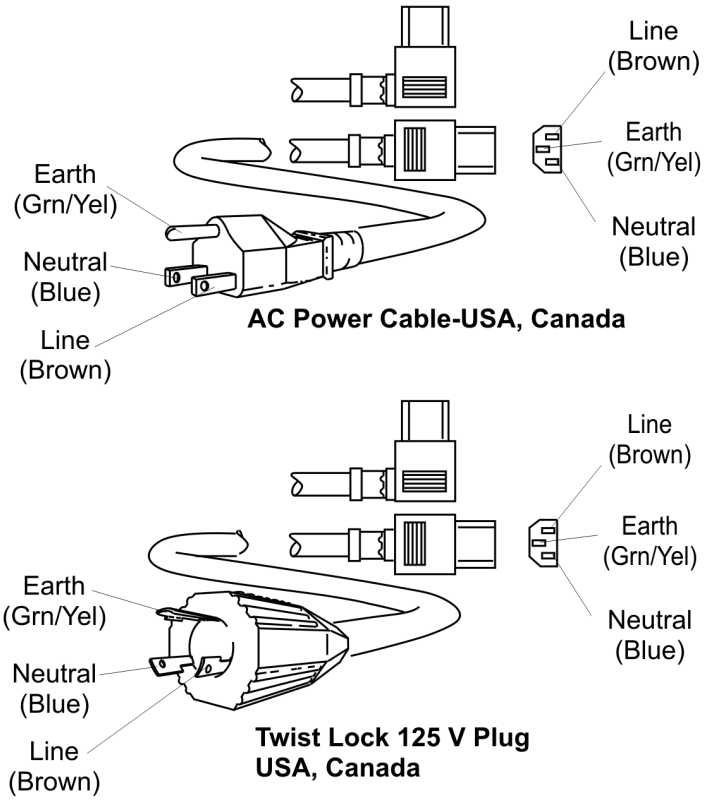
AC Power Cord Requirements

In all NCR equipment installations, the AC power cord must be either UL or TUV approved, as appropriate for the country of installation. Normally, the proper AC power cord is supplied with the NCR equipment, and installed at installation time. In any case, however, the AC power cord for NCR equipment must always conform to the appropriate UL or TUV requirements.

- *UL-Approved AC Power Cord for NCR Equipment* below.
- *TUV-Approved AC Power Cord for NCR Equipment* on the next page.

UL-Approved AC Power Cord for NCR Equipment

The image below shows the UL-Approved AC power cords for NCR equipment.



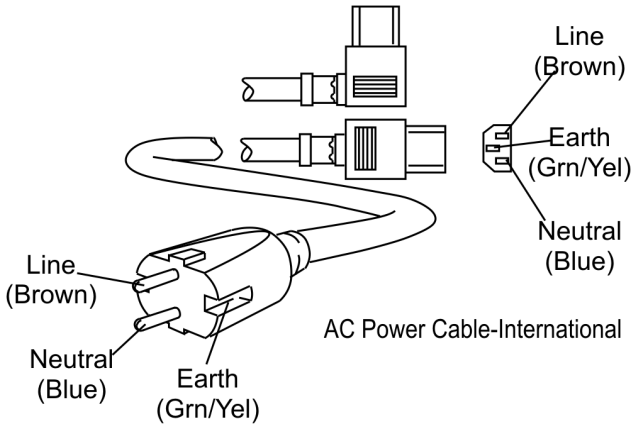
00625

TUV-Approved AC Power Cord for NCR Equipment

The international power supply cord used must be as follows:

- Minimum H05VV-F or H05VVH2-F
- Minimum 0.75 Square Millimeters Cross-sectional Area
- Two Conductor Terminated on one end with an IEC 320 connector and on the other end with a plug suitable for the country where the equipment is being used (See International Plug Chart, NCR P/N 006-1084399).

The image below shows the TUV-Approved AC power cord that is supplied by NCR for international applications.



00626

Transient Protection

This section provides recommendations for using the following protection devices:

- *AC Power Line Transient Protection* below.
- *Data Line Transient Protection* on the next page.

AC Power Line Transient Protection

In the process of power distribution, transient electrical energy (including, but not limited to, lightning strikes, intermittent short circuits, and switching transients) can be introduced onto power lines. Such transient energy can be very damaging to electronic hardware, and can also cause data corruption. Under these circumstances, NCR recommends the use of AC power transient suppressors. Such protection devices are intended to guard against power line transients that can result in hardware damage and various system or program errors.

Improvement of any deficiencies in power quality is a customer responsibility. Malfunction and/or component failure as a result of power quality problems are/is not covered by the NCR Maintenance Agreement. NCR accepts no liability for any such occurrence nor for its consequences.

When power transient suppression is required, the suppressors used should meet the following minimum requirements:

- Dissipate energy to match the appropriate application categories as defined by IEEE Standard 587.
- Be of the voltage limiting (clipping), or tracking filter type. The suppressor must not clamp the voltage to zero, and must self-recover after the passage of the transient. The suppressor may be of the hybrid type construction that makes use of various technologies in order to meet speed and dissipation requirements.
- Upon failure, exhibit a positive indication of its failure such as a blown fuse or tripped breaker.
- Be listed by the accepted safety organization for the country involved (UL, CSA, VDE, ETL, and so on) and the installation must conform to local, state, and national electrical codes and regulations.

Data Line Transient Protection

The nature of the transient phenomenon may extend to the data communication lines connected to this equipment. It is the responsibility of the customer to install and connect a data line transient suppression system to correct or prevent any deficiencies. Such systems must meet the following minimum requirements:

- Be of the voltage limiting type and must self-recover after passage of the transient.
- Insert less than 5 ohms resistance and minimal inductive and capacitive loading at the operating frequency for data lines, in order to avoid signal degradation.
- Be installed in accordance with all applicable local, state, and national electrical codes and regulation.

Note: In certain countries, NCR is able to supply both power and data line transient suppressors as well as a comprehensive line of power conditioning equipment. For application data, contact your NCR Customer Services Division Representative.