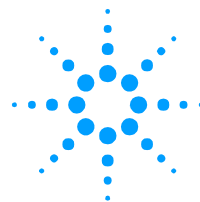


Agilent 5DX

Site Preparation Manual

October 2002



Agilent Technologies

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Manual Printing History And System Software Revisions:

This page lists this manual's printing history and the system's software revisions. If you receive manual updates or system software revisions, a new Printing History Page will accompany the updates and revisions. It is important that you insert the new Printing History Page in the manual and remove the old one.

Agilent 5DX Series 5000 Site Preparation Manual

Software Revision/Manual Revision

8.0	Rev. A.	June 2002
8.1	Rev. B.	October 2002

Disclaimer

In this manual, products such as HP 5DX may be mentioned. HP/Agilent Technologies developed these products. *Agilent Technologies* now has the rights to develop market and sell these products. *Agilent Technologies* has renamed these products, but in some cases it has not been possible to reflect these new names in the software and sample screens in this manual.

5DX Series 5000 Site Preparation

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Objectives

When you finish reading this manual, you should be able to:

- Understand the requirements for the installation of the Agilent 5DX
- Prepare your site for the installation of the Agilent 5DX

Introduction

Your Agilent sales representative or customer engineer has given you this manual so you can be sure your site is prepared for installation of the Agilent 5DX system.

Please read it carefully and make sure you understand the requirements for installation of the 5DX system. If you have any questions, contact your Agilent sales representative or customer engineer.

Overview

This document describes what needs to be done prior to the 5DX system delivery. A number of areas are addressed in this document. For example, included in this document is a description of electrical power requirements and a requirements page for the electrician performing the electrical installation.

Your site structural, electrical, environmental, and other required personnel should be consulted about the **Requirements** described on **page 5**. These requirements must be met prior to the 5DX system installation.

The 5DX system consists of the following components:

- Main unit
- Mobile workstation table (where the operator works)
- Electronics bay, which houses the system controller and various electronics to run the system

Depending on the configuration ordered, there may also be a test development workstation (TDW) in another location and/or Agilent Repair Tool (ART). The TDW is used for developing tests while the 5DX continues testing boards. ART is used by a repair operator near the 5DX to see the failure information online.

NOTE

The Agilent customer engineer must be on-site when the system is delivered, removed from the truck, and moved to the installation location.

CE Pre-Installation Checklist

The Customer Engineer should use this checklist to verify that a customer's site is ready for the installation. The customer's representative or installation expert should be called a few days before the installation and this checklist reviewed.

1 ELECTRICAL Is the electrical installation complete? ☐

- a** Voltage ☐
- b** Phase ☐
- c** Current ☐

2 COMPRESSED AIR Proper compressors in place ☐

- a** Clean and dry ☐
- b** >80 psi (5.6 kg/cm²) ☐

3 FLOOR ☐

- a** Capable of weight ☐
- b** Level ☐

4 LOCATION ☐

- a** There is enough space for transportation ☐
- b** There is enough space for placement ☐
- c** SMEMA (or other interface) is ready ☐

5 EQUIPMENT ☐

- a** Fork lift with sufficient capacity (or equivalent) ☐
- b** Fork lift has tines at least 74 inches ☐

6 COMMUNICATIONS ☐

- a** Phone line installed or ready ☐
- b** LAN ready (If TDW is planned) ☐

Requirements

■ Floor

The floor must be capable of supporting at least:

- 3400 kilograms (>7500 pounds) total system
- 317 kilograms per square meter (65 pounds per square foot) average loading

Maximum loading is:

- 776 kilograms on 152 mm diameter pad, on four pads on 127 x 107 centimeter centers (1710 lbs. on 6 inch diameter pad, 4 pads on 50 x 42 inch centers).

Include the weight of the fork lift used to move the system into place in floor support requirements.

The floor must also be reasonably level.

(It is recommended that your floor meet the 125 lbs. per square foot standard for manufacturing buildings.)

■ Electrical

The 5DX requires specific voltages and configurations. Voltages and various configurations are listed in the tables beginning on **page 11**. Additional standard local power outlets should also be provided on a separate circuit for devices such as a printer or other accessories.

■ Compressed Air

The compressed air must be at least 5.6 kilograms per square centimeter (552 kilo pascals, 80 pounds per square inch) and not more than 10.6 kilograms per square centimeter (150 pounds per square inch) @ 0.67 liters/second (1.4 SCFM). Air should be free of oil, moisture or other contamination and be delivered to the 5DX via a Hansen Series 3000 Push Tite 1/4 inch female connector (or equivalent).

■ Physical Space

The 5DX requires an area approximately 3 by 4 meters (~10 by 13 feet) to operate the system. (See [Figure 1.](#))

■ Regulatory

Contact your local Radiation Control Department for regulation requirements.

■ Moving the System

WARNING



Failure to follow the requirements described below could result in 5DX system damage and/or serious injury to personnel involved.

Moving the 5DX into position will require vertical clearance of at least 249 centimeters (98 inches) and horizontal clearance of at least 173 centimeters (68 inches) in all areas the 5DX will need to be moved through. Also consider the turning radius of the forklift or moving equipment.

A fork lift with tines of at least 153 centimeters (60 inches) and capable of lifting at least 4550 kilograms (10,000 pounds) at a load center of 114 centimeters (45 inches) is needed to unload and move the system. Such a forklift is recommended for all 5DX transportation. Other transportation can be used as long as the full weight of the main unit is fully and properly supported.

If a forklift is used, do not use one with shorter tines or load center than described above. (A forklift with tines longer than 211 centimeters (83 inches) cannot be used due to the 5DX pallet restrictions.)

The Electronics Bay will be located on the same pallet as the main unit. The unpacking instructions provide information on removal from the main Agilent 5DX pallet. The electronics bay is

tethered to the main unit, leave this tether in place even after installation.

CAUTION



Do not rely on the tether to move the electronics bay along with the main unit. Someone must push or pull the electronics bay while the main unit is being transported

■ Communications

You may need a local area network (LAN) connection depending on your system configuration. LAN will likely be needed for systems with a test development workstation.

■ Network Hub

5DX Test Systems are not supplied with a network hub. Agilent recommends using the following hub.

Note: The following companies, part numbers, and websites are current as of the printing of this document, but may become obsolete over time.

NetGear model EN108 is a direct replacement hub, which can use the same power pack that was supplied with the HP J3128A network hub. This power supply will operate off the 200-240 volts with which the 5DX operates. The Agilent part number for the NetGear model EN108 is E7200-60079, which includes all the mounting pieces for the 5DX Test System and the power adapter.

When ordering a Network hub, the power source is very important. The power inside the 5DX Series 5000 rack is 200-240 volts. You must have the correct power adapter for the network hub. You may find that some companies do NOT supply a power adapter for 200-240 volts, in which case you can purchase the correct power adapter for your country and plug into a different power source than the 5DX rack.

Another issue to note is the type of connectivity that you will be using. RJ-45, BNC, and AUI can all be set for 10Mbps transfer rate. The RJ-45 can also be set for 100Mbps transfer rate, but not when you mix RJ-45 with BNC or AUI.

The NetGear model EN108 is a 10Mbps Ethernet hub with the following key features:

- Resource sharing
- Slim, metal case
- RJ-45 jacks with built in LED indicators
- BNC/AUI backbone support
- Uplink port for network expansion

For more information, visit the NetGear web site at:

<http://www.netgear.com/>

Or phone NetGear at 1-888-638-4327.

The EN108 web page is:

http://www.netgear.com/product_view.asp?xrp=2&yrrp=4&zrrp=65

If you need a 10/100Mbps Ethernet hub, you could use the NetGear model DS108. But be aware you will lose the capability of the BNC/AUI backbone support if your network requires it. The DS108 has the following key features:

- Auto-sensing dual speed ports
- Full connectivity among devices
- Compact, metal case
- RJ-45 jacks with built in LED indicators

The DS108 web page is:

http://www.netgear.com/product_view.asp?xrp=2&yrrp=6&zrrp=69

■ Network Protocols

For Series 5000 5DX systems, TCP/IP is a required protocol, and it must be installed by your system administrator. See **Additional Site Prep Considerations** on page 20. for details. After the controller is installed, you can get additional assistance by accessing the TCPIP help file at: **C:\WINNT\system32\tcpip.hlp.**

■ Environmental

The temperature where the 5DX will be installed should be between 16 and 30 degrees celsius (60 to 86 degrees Fahrenheit). Relative humidity should be between 20 and 60 percent.

System Delivery

When the Agilent 5DX Series 5000 is delivered, there will typically be one or two items.

■ 5DX main unit

The main unit will be on a pallet 220 centimeters wide by 226 centimeters long (87 x 89 inches). This pallet will require a fork lift with tines at least 153 centimeters long (60 inches) and 17.5 cm wide (6.75 inches). The fork lift must be rated to lift the full system weight of 4550 kilograms (10,000 pounds) at a load center of 114 centimeters (45 inches). The main unit on its pallet will be 241 centimeters (95 inches) high.

Also on the main pallet will be the electronics bay and a few additional items. Plan to have the 5DX delivered to the nearest receiving dock or door to minimize movement of the system after delivery. Make sure there is sufficient clearance throughout the movement path from dock to install site.

■ Accessories pallet

An additional pallet may be included and will contain various accessories needed for installation and use. It will be approximately 127 centimeters wide by 122 centimeters long (50 x 48 inches). Height and weight will vary depending on the system ordered. **(NOTE: If additional equipment was ordered, such as a test development workstation, it would be on this pallet.)**

Floor Plan

Figure 1 represents a typical overhead layout view of the 5DX Series 5000 system.

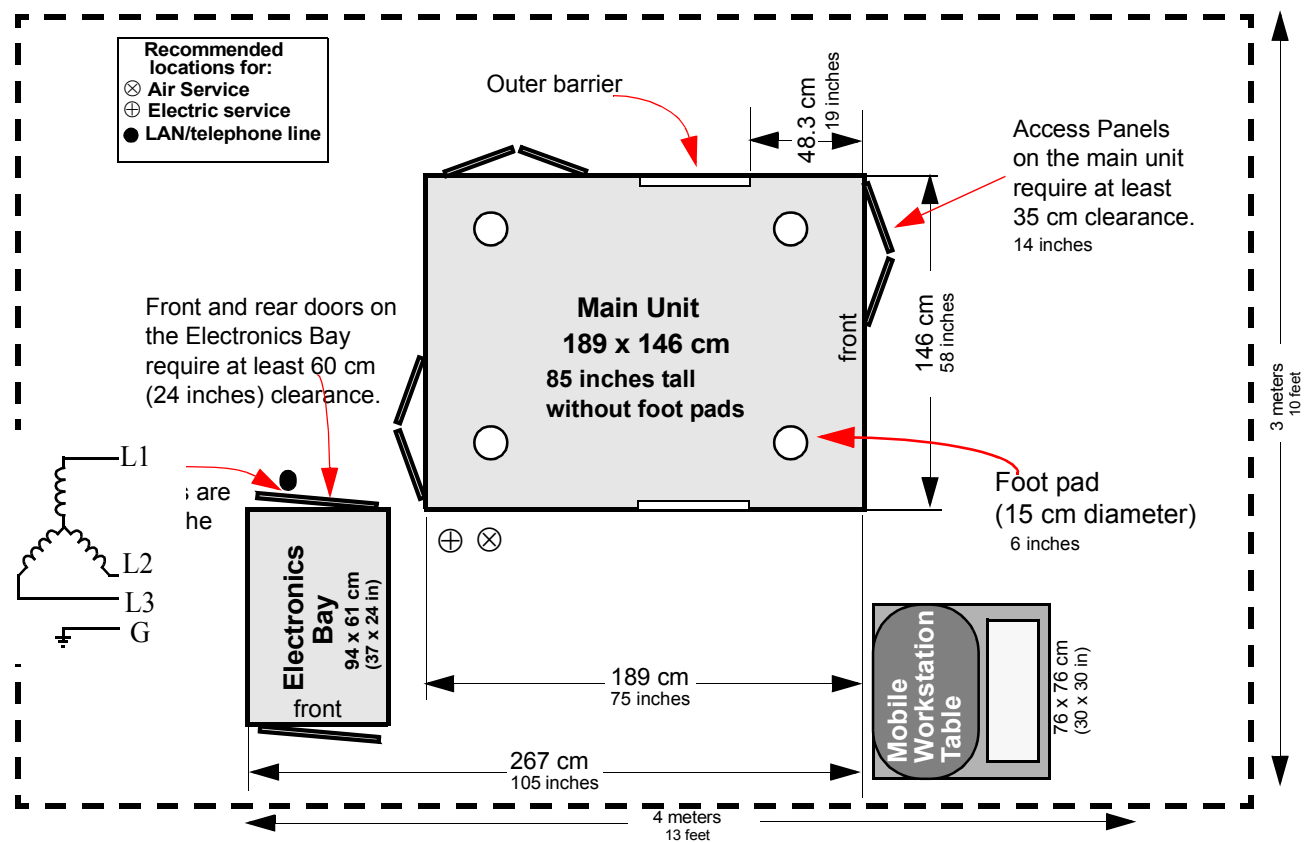


Figure 1 Overhead layout of the 5DX Series 5000 system

The electronics bay and mobile workstation table can be positioned in alternate locations depending on your needs.

The four foot pads support the weight of the main unit. The dashed lines indicate the effective service area including operator space and space to unload a board on the right side of the system (for a pass through system)

Figure 2 show the fork lift requirements and system dimensions after installation.

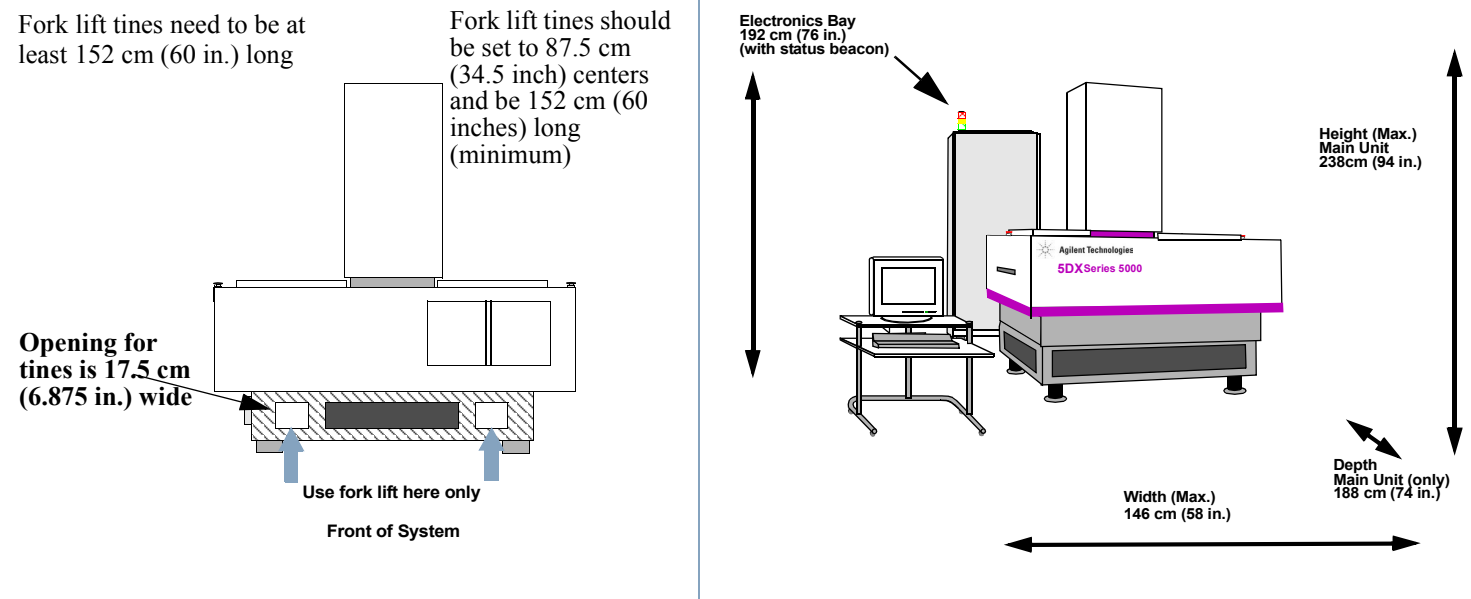


Figure 2 Fork lift requirements and system dimensions

Electrical

Table 1 shows the available power configurations, associated voltages (VAC), and power options for the 5DX.

Table 1 Agilent 5DX Power Configurations

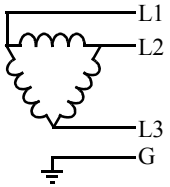
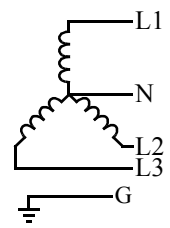
Wiring Configuration	Voltages Used	Power Option
Three Phase Delta 	• 200 V • 220 V • 230 V • 240 V	• 3PD
Three Phase Wye	• 120/208 V • 127/220 V	• 3PY
Three Phase Wye with Neutral 	• 220/380 V • 230/400 V • 240/415 V	• 3PN

Table 2 shows the wiring requirements for the 5DX.

Table 2 Agilent 5DX Wiring Requirements

Wiring Configuration	Full Load Amperes	Breaker Size / # Poles	3 meter SO Cord Type mm ² / # (AWG/#)	Plug Type (Domestic/International)
Three Phase Delta	17	30/3	• 6/4 • 6/4 (10/4) • 6/4 (10/4) • 6/4 (10/4)	• 32A IEC 309 International • L21-30/IEC309 • L21-30/IEC309 • L21-30/IEC309
Three Phase Wye	17	30/3	• (10/4) • 6/4 (10/4)	• L21-30 Domestic • L21-30/IEC309
Three Phase Wye w. Neutral	10	30/3	• 6/4 • 6/4 • 6/4	• 32A IEC 309 International • 32A IEC 309 International • 32A IEC 309 International

You should consult your electrical contractor or site electrician to make sure the option you have selected is available and they will provide that source of power before the installation.

NOTE

All electrical installation will be done by your electrical contractor or site electrician. The Agilent customer engineer will not do any wiring external to the 5DX. (See **For the Electrician** on page 14.)

NOTE

Some systems may have been pre-wired with a cord and plug. If this is the case, the local electrician will only need to install a suitable outlet where the plug can be inserted. Contact your Agilent representative to find out about the system you will receive.

■ **AC Primary Power Specifications**

• **Voltage Specifications:**

• **5DX Series I, II, and 2L**

200 to 240 VAC single phase or three phase, 380 to 415VAC three phase wye (+/- 5%) (50 or 60 Hz)

• **5DX Series 3, 5000**

200 to 240 VAC three phase; 380 to 415 VAC three phase wye (+/- 5%) (50 or 60 Hz)

• **Total Harmonic Distortion (THD):**

THD= less than 5%

Single Harmonic = less than 3%

• **Ground to Neutral Voltage:**

Voltage = less than 1 V rms

• **Momentary Voltage Interruptions:**

Defined as: voltage drops on one or more phase conductors below 180 VAC for greater than 10ms

• **Primary Power Rating:**

7.5 KVA (minimum)

• **Maximum inrush current:**

58 A rms

• **Circuit Breaker Rating:**

10,000 amps interrupting capacity (AIC) for voltages up to 240 VAC

14,000 Amps interrupting capacity (AIC) for voltages above 240VAC

• **5DX Wiring Requirements:**

Reference the Agilent 5DX Series Installation Guide for hookup wiring configurations, full load amperes, circuit breaker size/# poles and conductor size.

NOTE: Local electrical wiring codes take precedence.

For the Electrician

- Voltage, phase and configuration must match the power option (see [Table 1](#) on page 11).
- Maximum current requirements and circuit breaker requirements are shown in [Table 2](#) on page 12. Overcurrent protection must exceed the maximum current according to local code.
- The power drop for the 5DX must be a dedicated circuit from the facility panel board or busway.
- The 5DX has a switch that can be locked in the off position, however, a mains disconnect switch or circuit breaker may be located adjacent to the 5DX if customer needs or local code require it.

It must be labeled “MAINS DISCONNECT” (or the local language equivalent) and the on and off positions must be marked “1” and “0” respectively. The switch must be designed so it can be locked in the off position but cannot be locked in the on position.

- If a circuit breaker is used for mains disconnect, it must be rated for a minimum of 10,000 amps interrupting capacity (AIC) for service voltages of up to 240 VAC, or 14,000 AIC for service voltages above 240 VAC.
- Connection to the 5DX may be either by a cord and plug or by permanent wiring (see [Table 2](#) on page 12). All wiring devices and cords must meet local electrical code.

NOTE

Some systems may have been pre-wired with a cord and plug. If this is the case, the local electrician will only need to install a suitable outlet where the plug can be inserted. Contact your Agilent representative to find out about the system you will receive.

- Plan to install a local power outlet box near the 5DX for extra accessories such as a printer or terminal. The 5DX ships with 200-240 AC outlets mounted. Accessories that require 120-140 AC will need a separate, local outlet box.
- Line conditioners and AVRs (automatic voltage regulators) may be used for sites where poor power quality causes voltage drops of <185 VAC rms (measure only with a true rms meter). A line conditioner or AVR must be rated at 7.5 KVA or greater.

One of the system power supplies has an inrush current of 58A rms, the line conditioner/AVR must be sized to accommodate this.

System Height

The 5DX belt height can be adjusted to match other equipment on your manufacturing floor using spacers on the foot pads.

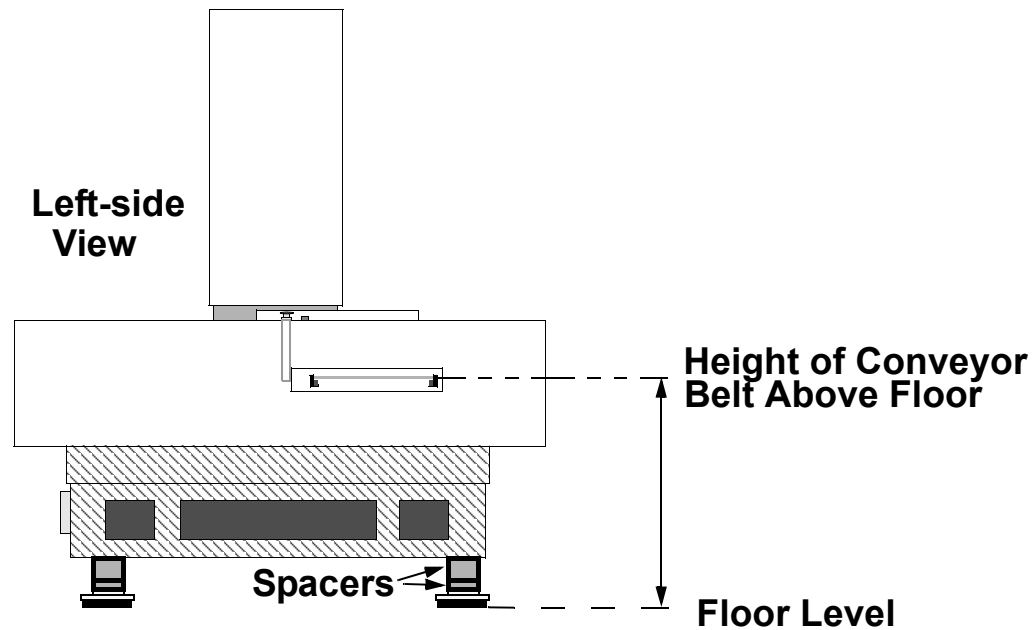


Figure 3 System height

Table 3 and **Table 4** show typical height values.
Spacers are provided with each system.

Table 3 Sample Spacer Combinations

Configuration #	Assembly Setup	Minimum Height Adjustment	Maximum Height Adjustment
1	Spacer A + B (inches)	84.1 cm (33.1)	86.0 cm (33.9)
2	Spacer B + C (inches)	90.1 cm (35.5)	92.0 cm (36.2)
3	Spacer A + B + C (inches)	91.7 cm (36.1)	93.6 cm (36.9)

Note: Not all combinations are included.

Table 4 Spacers Available

Spacer	Size (metric)	Size (non-metric)	Quantity
Spacer A (E7200-24715)	1.600 cm	0.63 in.	4
Spacer B (E7200-24717)	3.175 cm	1.25 in.	8
Spacer C (E7200-24716)	7.600 cm	3.00 in.	4

SMEMA
Specifications

Figure 4 shows the signals used by the 5DX to meet the SMEMA Electrical Equipment Interface Standard.

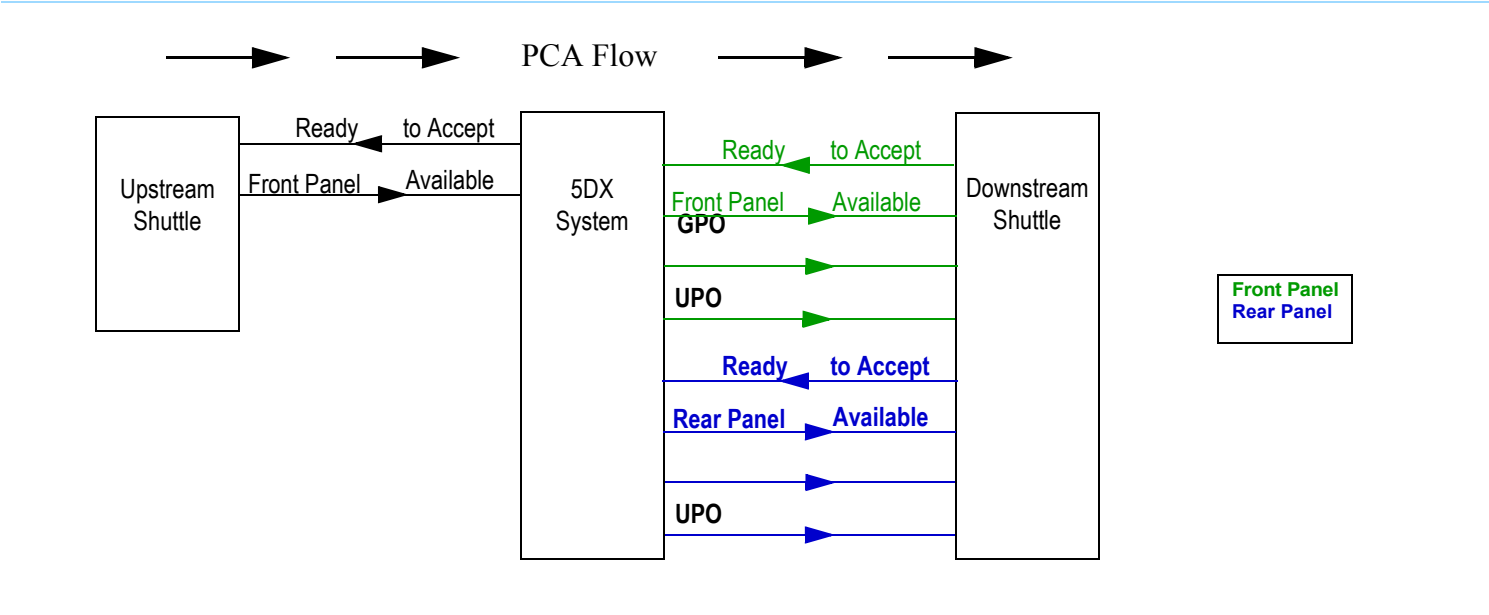


Figure 4 SMEMA signals used by the 5DX

In Figure 4, GPO stands for Good Panel Output and UPO stands for Untested Panel Output.

The SMEMA protocol uses low-true logic. True is defined as a logic level 0, with a potential that must not exceed 0.8 volts at 1 mA. False is a logic level 1, and correlates to a voltage level not more than 30 volts at 10 mA.

Table 5 shows all possible test results on a 5DX.

Table 5 Possible Test Results for the 5DX

Test Result	GPO	UPO
Untested	True (1)	False (0)
Good	False (0)	True (1)
Bad	True (1)	True (1)

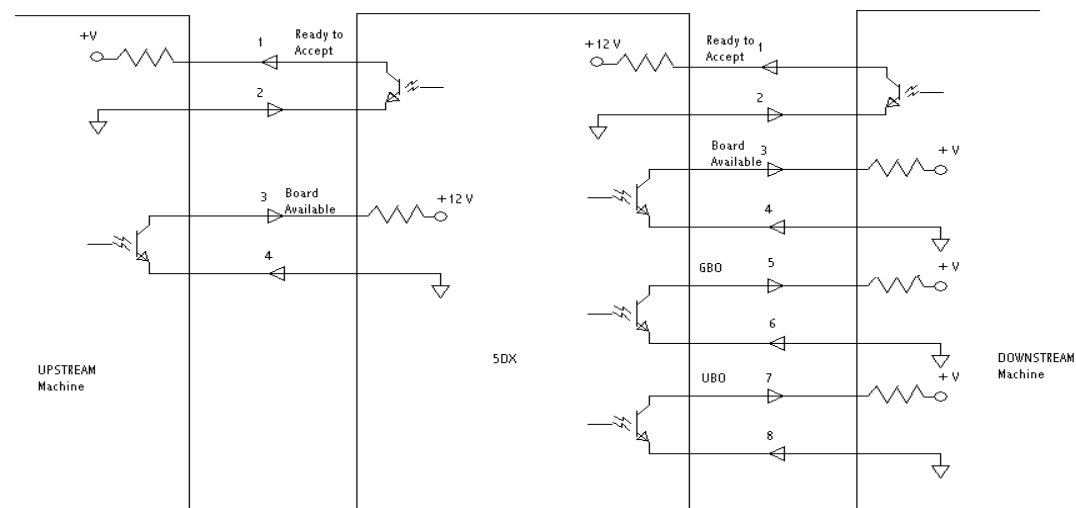


Figure 5 Electrical interface schematic

Figure 5 shows the electrical interface schematic for the 5DX.

Figure 6 shows a connector with all pin numbers labeled, and **Table 6** shows the pin number and signal description for the 5DX SMEMA connectors.

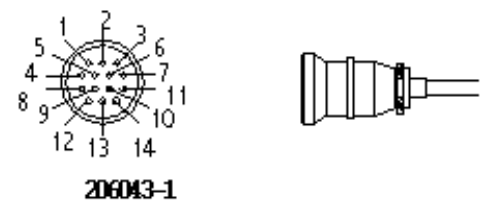


Figure 6 Male connector pin label

Table 6 SMEMA Connector Information

Connector	Pin#	Signal Description
Upstream SMEMA	1	Ready to Accept - 5DX is ready to receive a panel.
	2	Floating signal return for (1)
	3	Panel Available - Upstream equipment is ready to send a panel.
	4	Electrical ground
	5-13	N/A
	14	Grounded shield
Downstream SMEMA	1	Ready to Accept - Downstream equipment is ready to received panel.
	2	Electrical ground
	3	Panel Available - 5DX is ready to send a panel.
	4	Floating signal return for (3)
	5	GPO - Good panel out. PCA has been tested and considered good with no defects.
	6	Floating signal return for (5)
	7	UPO - Untested panel out. PCA being transferred was not tested.
	8	Floating signal return for (7)
	9-13	N/A
	14	Grounded shield

Additional Site Prep Considerations

■ TCP/IP Protocol Setting

Computers need to be networked into your local system and these systems need to be communicating with each other across the network. Please advise your computer system administrator that the 5DX (and TDW, Multilinks, where applicable) require network connectivity settings. No matter what the site network protocols are, the 5DX systems require TCP/IP. In choosing TCP/IP, you have two choices: Static IP or DHCP (Dynamic Host Control Protocol). Log on to the 5DX controller as Administrator.

For Static IP, enter this information into the TCP/IP section of Settings/Control Panel/Networking on the Windows NT desktop:

- 1) Static IP address, subnet specific
- 2) Default Gateway IP address
- 3) Subnet Mask
- 4) DNS (domain name servers) #1 & #2 (optional)
- 5) WINS #1 & #2 (optional)

OR

For DHCP IP, enter this information into the TCP/IP section of Settings/Control Panel/Networking on the Windows NT desktop:

- 1) Select DHCP radio button
- 2) Deselect all DNS and WINS information

■ LAN

If you already have a facility Local Area Network, work with your facility LAN expert to plan the installation of a Test Development Workstation (TDW).

If you do not have a facility LAN and are planning to install a TDW, you will need to have a LAN installation completed prior to installation of the 5DX. Time spent before installation of the 5DX will help prevent problems later. If you need help, contact your Agilent field sales representative to put you in touch with an Agilent LAN expert.

■ Telephone Lines

A voice phone line near the system is recommended so the service personnel can communicate verbally with support people.

■ Production Line Installations

If you are planning an in-line installation of the 5DX, planning ahead of time will minimize down time to your production line.

It is recommended that you understand the space requirements of the 5DX and be ready to adjust your production line accordingly. The 5DX supports SMEMA devices and requires SMEMA protocol to use a bar code reader.

■ **Anti-virus software**

Agilent recommends that the 5DX customer's information technology (IT) department procure and install an Agilent-qualified virus protection software package on the 5DX Automated X-ray Inspection System and associated workstations. With the customer's site IT department being responsible for procuring virus protection software and supporting the latest update definitions, customers are ensured of the best possible protection for the 5DX system's data and operating system software. Agilent has qualified the Symantec "Norton Anti Virus Corporate Edition Rev 7.6" virus protection software with the 8.0 5DX software release.

■ **Bar Code reader**

If you intend to install the optional bar code reader with the 5DX system, you will need the hardware (brackets, nuts and bolts) required to install it on your conveyor (or other type) system. Agilent will only supply the bar code reader(s) and interface device(s) and not the hardware specific to your application.

The 5DX system supports the following types of bar codes:

- Code 39

- Code 128
- Codabar
- Interleaved 2 of 5
- EAN/UPC

NOTE

The 5DX does not currently support any other types of bar codes except for those listed in this document.

Shuttle Specifications (Optional Component)

If you have ordered a 5DX with the optional Dual Panel Loading, please read the following specifications.

The Dual Panel Loading option requires that panels are loaded and unloaded using a dual lane shuttle. Therefore, upstream and downstream dual lane shuttles are required for each 5DX with the Dual Panel Loading

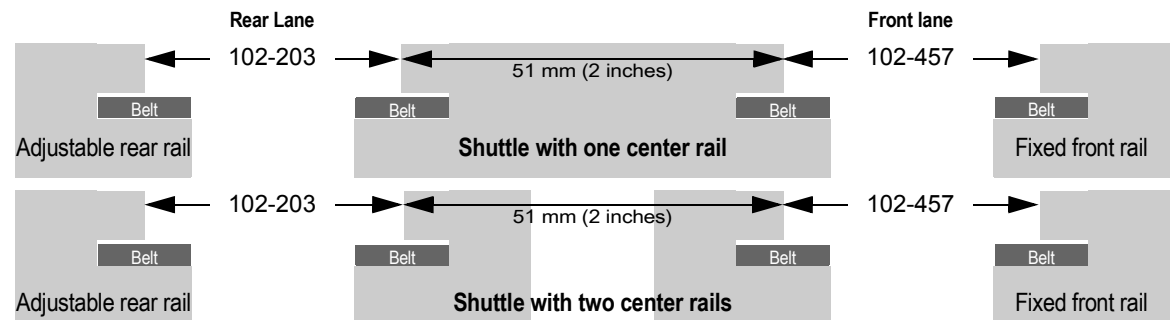
option. Agilent Technologies doesn't manufacture shuttles for the 5DX, so a third party shuttle is recommended.

Specifications

Dual lane shuttles that meet the following specifications are compatible with the 5DX.

Table 7 Dual lane shuttle specifications

Feature	Requirement
Width adjustability of rails	102 - 457 mm (4 - 18 inches) for the width of the front lane 102 - 203 mm (4 - 8 inches) for the width of the rear lane The front rail must be fixed. The center rail(s) and the rear rail must be adjustable. The center rail(s) must separate the lanes by 51 mm (2 inches)



This diagram assumes the shuttle is on the left side of the 5DX.

Conveyor height	940 - 965 mm (37 - 38 inches), adjustable
------------------------	---

Table 7 Dual lane shuttle specifications (continued)

Feature	Requirement
Maximum conveyor speed	330 mm/second (13 inches/second)
Location of panel stop position	Less than 51 mm (2 inches) from right edge in a left-to-right system
Minimum shuttle stroke	254 mm (10 inches)
Programmable stop positions	3 stop positions minimum
Minimum shuttle speed	51mm/second (2 inches/second)
Overall time to shuttle two panels	20 seconds
Single and dual lane mode	Mode must be customer selectable. Single lane mode should use front shuttle only.
Dimensions of window opening	508 mm (20 inches) minimum, starting at the edge of the front rail when the shuttle is shifted 254 mm (10 inches) from the front home position
Bar code reader mounting locations (if applicable)	2 mounting locations required The reader mounting must be adjustable to the full width and length of the shuttle. The distance of the bar code reader from the shuttle must be adjustable. The bar code readers must be mounted in the same orientation, and if the reader mounting is not attached to the shuttle, loading the rear panel first is recommended.

Table 7 Dual lane shuttle specifications (continued)

Feature	Requirement
Load and unload sequence	The front or the rear lane can load first. The order for unloading the panels must be the same as the order in which they are loaded. For an outline of the sequences, see Load and Unload sequence requirements on page 24
Output equipment signal specification	In dual lane mode, the upstream shuttle must wait to send the Panel Available signal until two panels are ready to be sent. The downstream shuttle must read the 5DX test result signals (good panel, bad panel, or untested panel) through the SMEMA connector and pass the information down the line with the appropriate board. For additional SMEMA Specifications, see Load and Unload sequence requirements.

Load and Unload sequence requirements

Load sequence

- 1 The shuttle moves to the first position.
- 2 The first panel transfers onto the first lane of the upstream dual lane shuttle.
- 3 The belts on first lane turn until first sensor is tripped.
- 4 The belts on first lane stop.
- 5 The shuttle moves to the second position.
- 6 The second panel transfers onto the second lane.
- 7 The belts on second lane turn until second sensor is tripped.
- 8 The shuttle waits for 5DX to be ready.

- 9 Both panels transfer simultaneously into the 5DX.

Unload sequence

- 1 The shuttle moves to the first position.
- 2 Both panels are transferred simultaneously onto the downstream dual lane shuttle.
- 3 When both sensors are tripped, the shuttle moves to the second position.
- 4 The first panel in the first lane transfers to the downstream equipment.
- 5 The shuttle moves to the third position.
- 6 The second panel in the second lane transfers to the downstream equipment.

5DX Country Specific Electrical Information

Table 8 5DX Country Specific Electrical Information

Country	Agilent Country Code	Agilent Power Option	Nominal Voltage	Nominal Frequency	Number of Phases	Number of Wires*
Afghanistan	531	3PN	220/380	50	3	5
Albania	481	3PN	220/380	50	3	5
Algeria	721	3PY	127/220	50	3	4
Algeria	721	3PN	220/380	50	3	5
Angola	762	3PN	220/380	50	3	5
Argentina	357	3PN	220/380	50	3	5
Australia	602	3PN	240/415	50	3	5
Austria	433	3PN	220/380	50	3	5
Bahamas	236	3PD	240	60	3	4
Bahamas	236	3PY	120/208	60	3	4
Bahrain	525	3PN	230/400	50	3	5
Bahrain	525	3PD	240	50	3	5
Bangladesh	538	3PD	220	60	3	4
Barbados	272	3PY	200	50	3	4

Table 8 5DX Country Specific Electrical Information

Country	Agilent Country Code	Agilent Power Option	Nominal Voltage	Nominal Frequency	Number of Phases	Number of Wires*
Barbados	272	3PD	230	50	3	4
Belarus	017	3PN	220/380	50	3	5
Belgium	423	3PN	230/400	50	3	5
Belize	208	3PD	220	60	3	4
Benin	761	3PN	220/380	50	3	5
Bermuda (Dependent Territory of the UK)	232	3PD	240	60	3	4
Bermuda (Dependent Territory of the UK)	232	3PY	120/208	60	3	4
Bolivia	335	3PD	230	50	3	5
Bolivia	335	3PN	230/400	50	3	5
Botswana	793	3PN	230/400	50	3	5
Brazil	351	3PD	230	60	3	4
Brazil	351	3PY	127/220	60	3	4
Brazil	351	3PN	220/380	60	3	5
Brunei	561	3PN	240/415	50	3	5
Bulgaria	487	3PN	220/380	50	3	5
Burkina Faso	760	3PN	220/380	50	3	5
Burma (Myanmar)	546	3PN	230/400	50	3	5
Burundi	767	3PN	220/380	50	3	5
Cambodia	555	3PY	120/208	50	3	4

Table 8 5DX Country Specific Electrical Information

Country	Agilent Country Code	Agilent Power Option	Nominal Voltage	Nominal Frequency	Number of Phases	Number of Wires*
Cambodia	555	3PN	230/400	50	3	5
Cameroon	742	3PY	127/220	60	3	4
Cameroon	742	3PN	230/400	50	3	5
Canada	122	3PD	240	60	3	4
Cape Verde		3PN	220/380	50	3	5
Cayman Islands (Dependent Territory of the UK)	244	3PD	240	60	3	4
Central African Republic	754	3PN	220/380	50	3	5
Chad	756	3PN	220/380	50	3	5
Chile	337	3PN	220/380	50	3	5
China, People's Republic of	570	3PN	220/380	50	3	5
Colombia	301	3PY	120/208	60	3	4
Colombia	301	3PD	230	60	3	4
Congo, Democratic Republic of the (Zaire)	766	3PN	220/380	50	3	5
Congo	763	3PN	220/380	50	3	5
Costa Rica	223	3PD	240	60	3	4
Cyprus	491	3PN	240/415	50	3	5
Czech Republic	435	3PN	220/380	50	3	5
Denmark	409	3PN	220/380	50	3	5
Djibouti	777	3PN	220/380	50	3	5

Table 8 5DX Country Specific Electrical Information

Country	Agilent Country Code	Agilent Power Option	Nominal Voltage	Nominal Frequency	Number of Phases	Number of Wires*
Dominican Republic	247	3PD	220	60	3	4
Ecuador	331	3PD	240	60	3	4
Ecuador	331	3PY	127/220	60	3	4
Egypt	729	3PN	220/380	50	3	5
El Salvador	211	3PD	230	60	3	4
Fiji	055	3PN	240/415	50	3	5
Finland	405	3PN	230/400	50	3	5
France	427	3PD	230	50	3	4
France	427	3PY	127/220	50	3	4
France	427	3PN	220/380	50	3	5
Gabon	755	3PN	220/380	50	3	5
The Gambia	750	3PN	220/380	50	3	5
Germany	428	3PN	230/400	50	3	5
Ghana	749	3PN	230/400	50	3	5
Gibraltar	472	3PN	240/415	50	3	5
Greece	484	3PN	220/380	50	3	5
Greenland	101	3PN	220/380	50	3	5
Grenada	063	3PN	230/400	50	3	5
Guatemala	205	3PD	240	60	3	4

Table 8 5DX Country Specific Electrical Information

Country	Agilent Country Code	Agilent Power Option	Nominal Voltage	Nominal Frequency	Number of Phases	Number of Wires*
Guinea	746	3PN	220/380	50	3	5
Guinea-Bissau	764	3PN	220/380	50	3	5
Guyana	312	3PD	220	50	3	4
Haiti	245	3PD	220	60	3	4
Honduras	215	3PD	220	60	3	4
Hong Kong	582	3PN	220/380	50	3	5
Hungary	437	3PN	220/380	50	3	5
Iceland	400	3PN	220/380	50	3	5
India	533	3PN	230/400	50	3	5
Indonesia	560	3PN	220/380	50	3	5
Indonesia	560	3PY	127/220	50	3	4
Ireland	419	3PN	220/380	50	3	5
Israel	508	3PN	230/400	50	3	5
Italy	475	3PN	220/380	50	3	5
Italy	475	3PY	127/220	50	3	4
Ivory Coast (Cote d'Ivoire)	748	3PN	220/380	50	3	5
Jamaica	241	3PD	220	50	3	4
Japan	588	3PD	200	50 or 60	3	4
Jordan	511	3PN	220/380	50	3	5

Table 8 5DX Country Specific Electrical Information

Country	Agilent Country Code	Agilent Power Option	Nominal Voltage	Nominal Frequency	Number of Phases	Number of Wires*
Kazakhstan	021	3PN	220/380	50	3	5
Kenya	779	3PN	240/415	50	3	5
Korea, Republic of (South Korea)	580	3PD	220	60	3	4
Korea, Republic of (South Korea)	580	3PN	220/380	60	3	5
Kuwait	513	3PN	240/415	50	3	5
Laos	553	3PN	220/380	50	3	5
Lebanon	504	3PN	220/380	50	3	5
Lesotho	799	3PN	220/380	50	3	5
Liberia	765	3PY	120/208	60	3	4
Liberia	765	3PD	240	60	3	4
Luxembourg	045	3PN	230/400	50	3	5
Macedonia	029	3PN	220/380	50	3	5
Malawi	797	3PN	230/400	50	3	5
Malaysia	557	3PN	240/415	50	3	5
Mali	745	3PN	220/380	50	3	5
Malta and Gozo	473	3PN	240/415	50	3	5
Mauritania	741	3PN	220/380	50	3	5
Mauritius	785	3PN	230/400	50	3	5
Mexico	201	3PY	127/220	60	3	4

Table 8 5DX Country Specific Electrical Information

Country	Agilent Country Code	Agilent Power Option	Nominal Voltage	Nominal Frequency	Number of Phases	Number of Wires*
Monaco	015	3PY	127/220	50	3	4
Monaco	015	3PN	220/380	50	3	5
Morocco	714	3PY	127/220	50	3	4
Morocco	714	3PN	220/380	50	3	5
Mozambique	787	3PN	220/380	50	3	5
Myanmar (Burma)	546	3PN	230/400	50	3	5
Namibia	792	3PN	230/400	50	3	5
Nepal	536	3PN	220/380	50	3	5
Netherlands	421	3PN	220/380	50	3	5
Netherlands Antilles	277	3PN	220/380	50	3	5
Netherlands Antilles	277	3PY	127/220	50	3	5
Netherlands Antilles	277	3PD	220	50	3	5
New Zealand	614	3PN	230/400	50	3	5
Nicaragua	219	3PD	240	60	3	4
Niger	751	3PN	220/380	50	3	5
Nigeria	753	3PN	230/400	50	3	5
Norway	403	3PN	220/380	50	3	5
Norway	403	3PD	230	50	3	5
Oman	523	3PN	240/415	50	3	5

Table 8 5DX Country Specific Electrical Information

Country	Agilent Country Code	Agilent Power Option	Nominal Voltage	Nominal Frequency	Number of Phases	Number of Wires*
Pakistan	535	3PN	230/400	50	3	5
Palau	683	3PD	240	60	3	4
Panama	225	3PD	230	60	3	4
Paraguay	353	3PN	220/380	50	3	5
Peru	333	3PD	220	60	3	4
Peru	333	3PN	220/380	60	3	5
Philippines	565	3PD	230	60	3	4
Philippines	565	3PY	127/220	60	3	4
Poland	455	3PN	220/380	50	3	5
Portugal	471	3PN	220/380	50	3	5
Puerto Rico	903	3PY	120/208	60	3	4
Puerto Rico	903	3PD	240	60	3	4
Qatar	518	3PN	240/415	50	3	5
Romania	485	3PN	220/380	50	3	5
Russia	462	3PN	220/380	50	3	5
Rwanda	769	3PN	220/380	50	3	5
Saudi Arabia	517	3PY	127/220	60	3	4
Senegal	744	3PY	127/220	50	3	4
Serbia and Montenegro	479	3PN	220/380	50	3	5

Table 8 5DX Country Specific Electrical Information

Country	Agilent Country Code	Agilent Power Option	Nominal Voltage	Nominal Frequency	Number of Phases	Number of Wires*
Seychelles	780	3PN	240/415	50	3	5
Sierra Leone	747	3PN	230/400	50	3	5
Singapore	559	3PN	230/400	50	3	5
Slovakia (Slovak Republic)	030	3PN	220/380	50	3	5
Somalia	770	3PN	220/380	50	3	5
Somalia	770	3PD	230	50	3	5
South Africa	791	3PN	230/400	50	3	5
Spain	470	3PY	127/220	50	3	4
Spain	470	3PN	220/380	50	3	5
Sri Lanka	542	3PN	230/400	50	3	5
Sudan	732	3PN	240/415	50	3	5
Suriname	315	3PY	127/220	60	3	4
Swaziland	795	3PN	230/400	50	3	5
Sweden	401	3PN	230/400	50	3	5
Switzerland	441	3PN	220/380	50	3	5
Syria	502	3PN	220/380	50	3	5
Tahiti, Society and Marquesas Islands	641	3PY	127/220	60	3	4
Taiwan	583	3PD	220	60	3	4
Tajikistan	023	3PN	220/380	50	3	5

Table 8 5DX Country Specific Electrical Information

Country	Agilent Country Code	Agilent Power Option	Nominal Voltage	Nominal Frequency	Number of Phases	Number of Wires*
Tanzania	783	3PN	230/400	50	3	5
Thailand	549	3PN	220/380	50	3	5
Togo	752	3PY	127/220	50	3	4
Togo	752	3PN	220/380	50	3	5
Trinidad and Tobago	274	3PD	230	60	3	4
Trinidad and Tobago	274	3PN	230/400	60	3	5
Tunisia	723	3PY	127/220	50	3	4
Tunisia	723	3PN	220/380	50	3	5
Turkey	489	3PN	220/380	50	3	5
Turkmenistan	024	3PN	220/380	50	3	5
Uganda	778	3PN	240/415	50	3	5
Ukraine	018	3PN	220/380	50	3	5
United Arab Emirates	520	3PN	230/400	50	3	5
United Kingdom - England Scotland Wales N. Ireland	412	3PN	240/415	50	3	5
United States	000	3PD	240	60	3	4
United States	000	3PY	120/208	60	3	4
Uruguay	355	3PN	220/380	50	3	5
Uzbekistan	025	3PN	220/380	50	3	5
Venezuela	307	3PD	240	60	3	4

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Country	Agilent Country Code	Agilent Power Option	Nominal Voltage	Nominal Frequency	Number of Phases	Number of Wires*
Vietnam	552	3PY	127/220	50	3	4
Vietnam	552	3PN	220/380	50	3	5
Western Samoa	615	3PN	230/400	50	3	5
Yemen	521	3PN	230/400	50	3	5
Zambia	794	3PN	220/380	50	3	5
Zimbabwe	796	3PN	220/380	50	3	5

* Number of Conductors includes Safety Grounding Conductor

Notes



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