

Omron Adept Hornet 565 Robot Quick Setup Guide



P/N: 14692-000, Rev A
July, 2015

Chapter 1: Hornet 565 Quick Setup Guide

1.1 Introduction

This Quick Setup Guide steps you through the installation and start-up of your Omron Adept Hornet 565 robot. The major steps are:

- **Preparation:** workcell layout and safety
- **Hardware Installation:** mounting the robot and system cable connections
- **Software Installation:** .NET Framework and Adept ACE
- **System Start-Up:** system configuration and turning on the robot

NOTE: This guide does not apply to Adept robot systems that include an Adept SmartController EX motion controller. Refer to the [Adept Hornet 565 Robot User's Guide](#) for those systems.

During the installation and start-up process, refer also to your Hornet 565 robot user's guide, shipped with each system, and available on the Adept support disk and the Adept Document Library, for more information.

Operation and Maintenance of an Adept Hornet 565 robot are not covered in this guide. Refer to the full user's guide for that information.

1.2 Safety



WARNING: Adept Technology strictly prohibits installation or operation of an Adept robot without adequate safeguards according to applicable local and national standards. See Workcell Layout on page 3 for a simple workcell layout.

You must read the [Adept Robot Safety Guide](#) and the Robot Installation and Operation chapters in the robot user's guide for information on safe operation of your robot system.

Refer to Installing User-Supplied Safety Equipment in the System Installation chapter of the Adept robot user's guide, which provides details on connecting a user-designed E-Stop system through the XUSR connector to the robot.

1.3 Workcell Layout

The following figure shows a simple workcell layout with a user-supplied safety barrier and E-Stops provided by the optional Front Panel and optional T20 pendant.



WARNING: If you do not purchase an Adept front panel, you must provide your own E-Stop circuit and button.

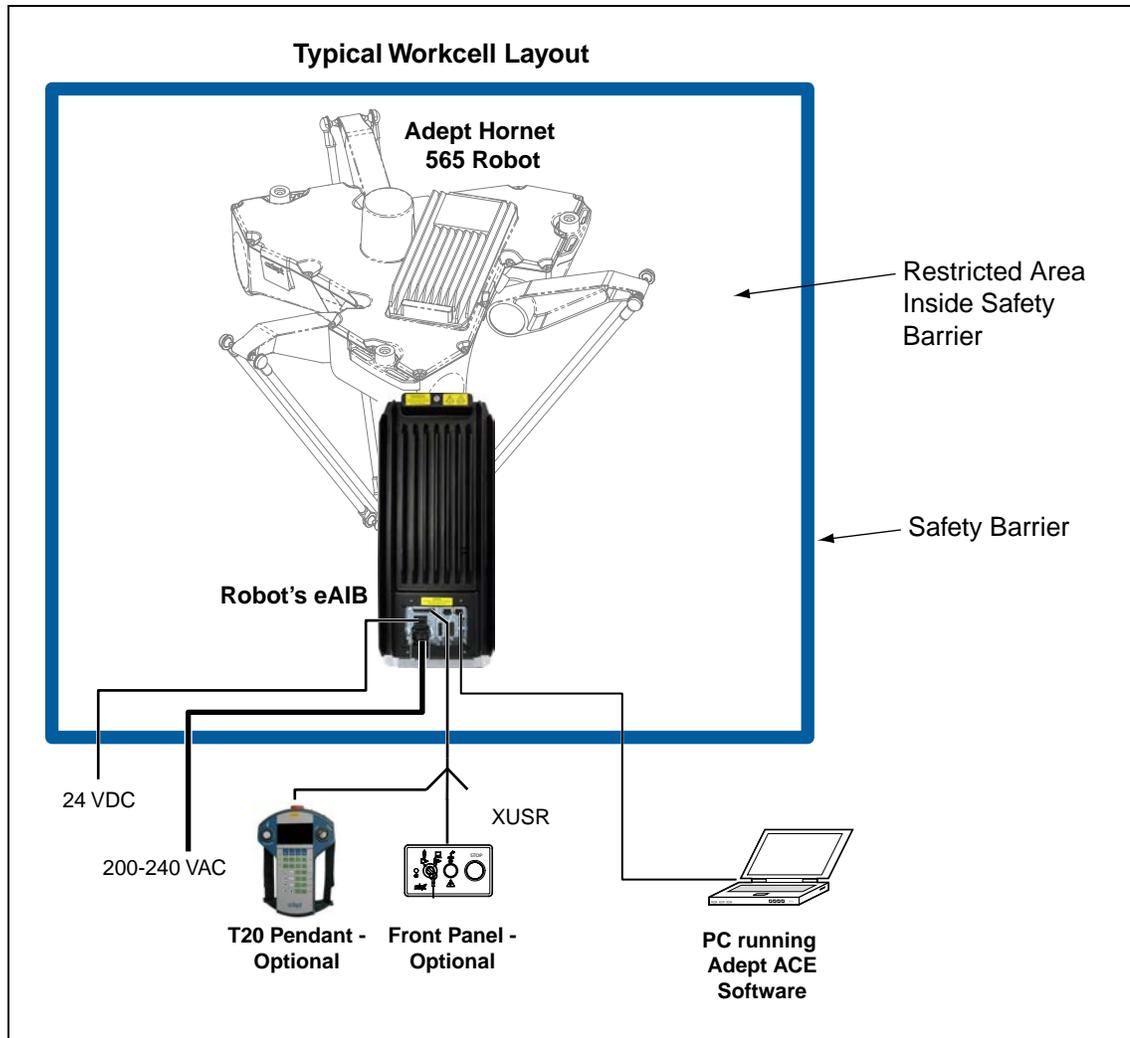


Figure 1-1. Simple Workcell Layout

1.4 Installation

Frame

The Adept Hornet 565 robot is mounted in a user-supplied frame, so that it hangs over the workspace. A sample frame design is given, with dimensions, in the user's guide. See the following figure.

Ensure that the robot is oriented such that the Status Display panel faces away from the conveyor, if your system has a conveyor. This will give you the best view of the display panel, and provide the best cross-belt movement of the robot's platform.

Mounting the Robot

1. Position the robot under the mounting frame.

The pallet will not fit in most frames, so the robot will need to be unstrapped from the pallet and moved manually.

2. Put nylon slings through the six lifting slots. See the following figure.

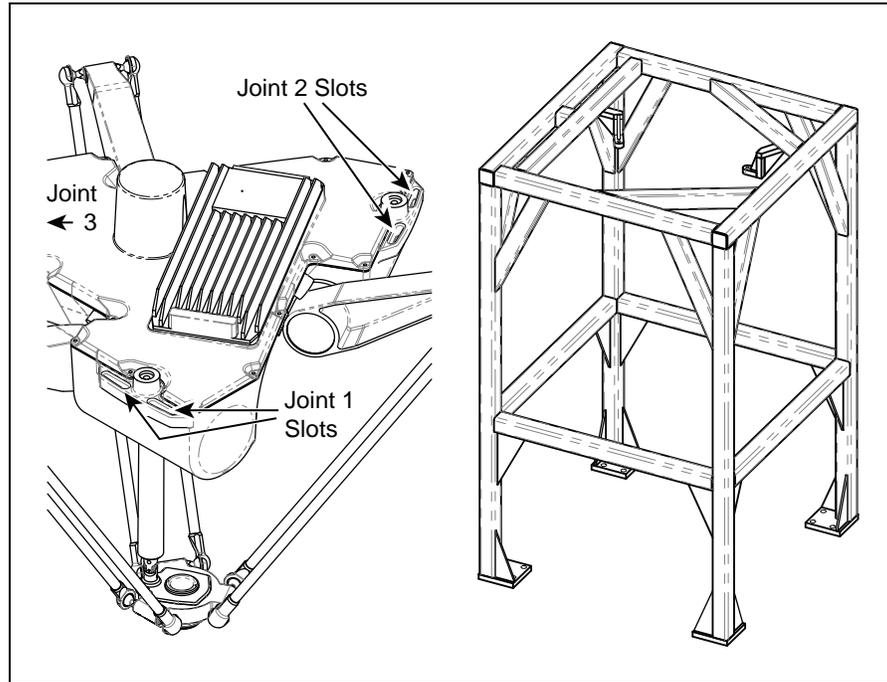


Figure 1-2. Four of Six Lifting Slots, Sample Frame (not to scale)

3. Take up the slack in the slings.
4. Lift the robot up to the mounting pads on the frame.
5. Mount the robot with 3 M12 x 1.75 screws. Mounting screws are user-supplied; the length is determined by your frame design.

The screws should be stainless or zinc-plated steel.

Lock washers are not needed, as the robot base has spring-lock Heli-Coil[®] inserts.

6. Use an external-tooth star washer, under one of the mounting screw heads, to ground the robot base to the frame.

If the frame is painted where the star washer makes contact with it, use a ring terminal under the star washer, and connect the other end of the wire from the terminal to a suitable grounding surface on the frame.

If the frame is not painted where the M12 screw makes contact with it, you do not need to use a ring terminal - just put an external-tooth star washer under the mounting screw head.

7. Tighten all mounting screws to 61 N-m (45 ft-lbf).

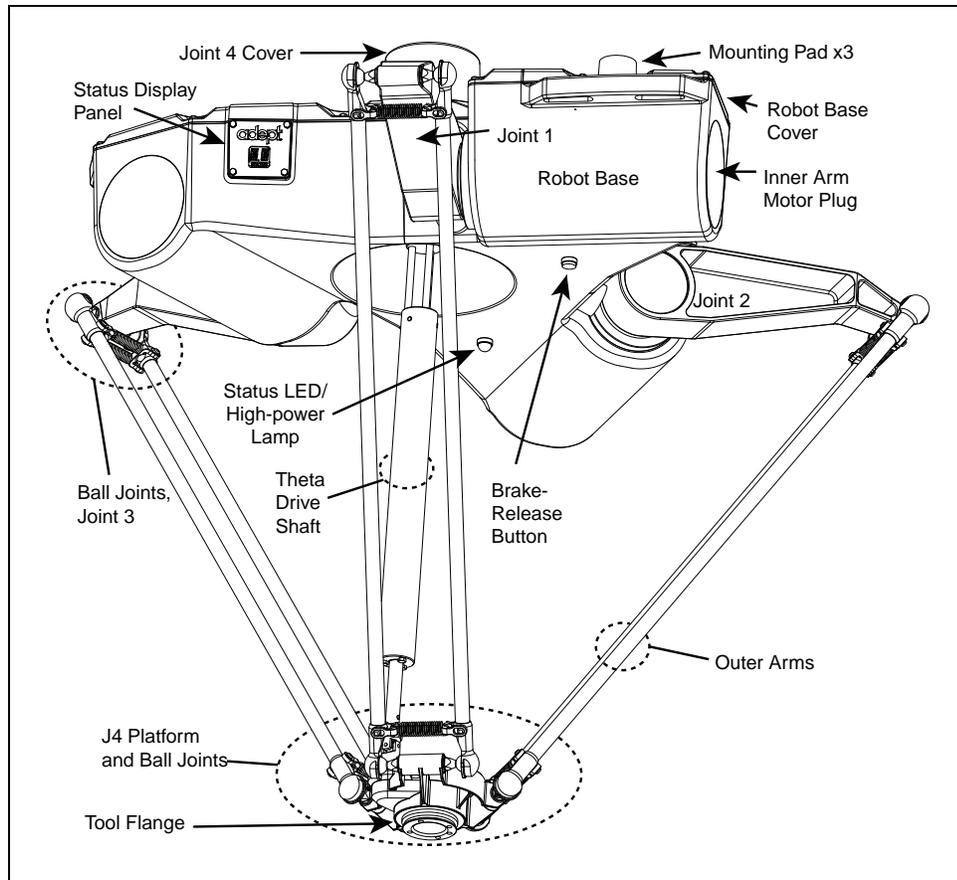


Figure 1-3. Labeled Drawing of Hornet Components, J4 Platform Shown

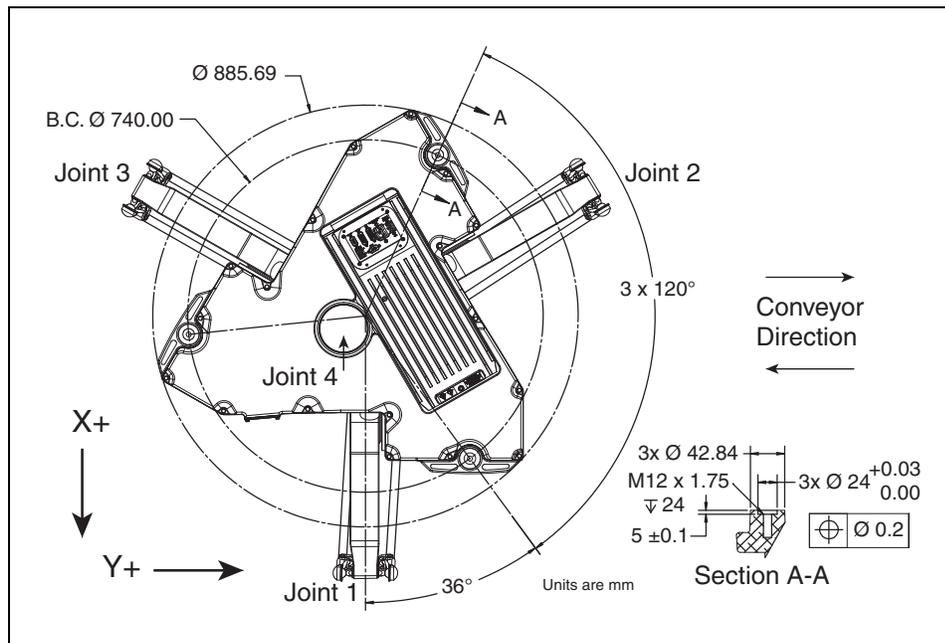


Figure 1-4. Hornet 565 Robot Base Mounting Pattern

Attaching the Outer Arms and Platform

The Adept Hornet 565 robot is available with either a rotating platform (J4) or a fixed platform. The fixed platform model does not use a J4 motor or a theta drive shaft.

The Adept Hornet 565 robot platform gets attached to the inner arms by the outer arms.

NOTE: Except for attaching the outer arms and, for the J4 platform, the theta drive shaft, the platform is shipped fully assembled.

One pair of outer arms attaches between each inner arm and the platform. No tools are needed.

For the J4 platform only: Both the theta drive shaft attachment on the J4 motor and the platform are offset by about 2 in. from the centers of the robot base and tool flange. The platform should be attached so that its shaft aligns between the Joint 1 and Joint 3 ball studs on the robot base. Joint 1 should connect to motor 1, which is immediately to the right of the Status Display panel on the robot base. See the preceding figure.

- Each outer arm has a ball joint socket at each end.
 - The inner arms and the platform have corresponding pairs of ball studs.
 - The procedure for attaching the outer arms is the same for both platforms.
1. Attach one pair of outer arms to each inner arm.

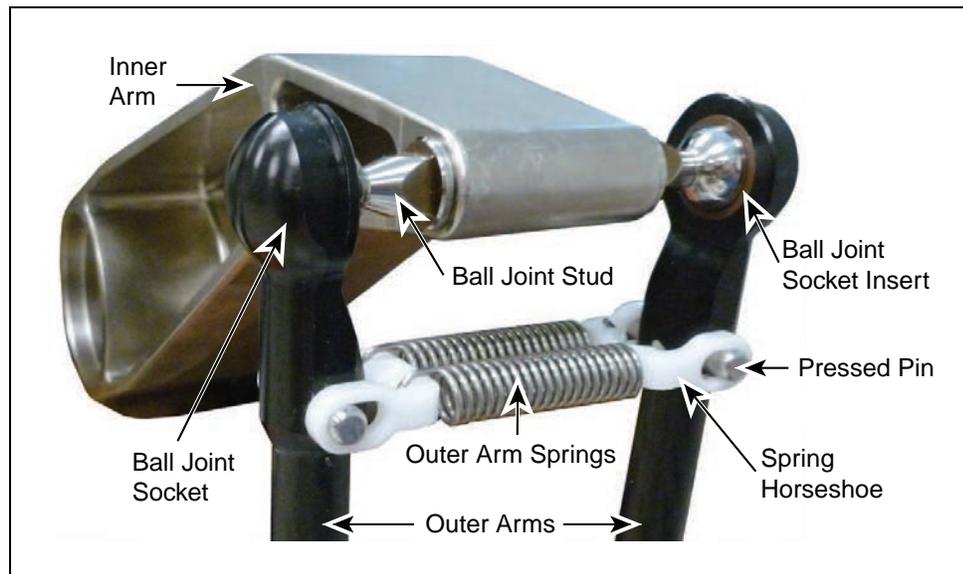


Figure 1-5. Ball Joint Assembly, Inner Arm

- a. Pivot the two arms away from each other lengthwise. This requires the least stretching of the spring to attach the ball joints.
- b. Slip one ball joint socket over the corresponding ball stud.

- c. Swing the bottom end of the outer arm pair sideways as you slip the other ball joint socket over the corresponding ball stud.



CAUTION: Do not overstretch the outer arm springs. Separate the sockets only enough to fit them over the ball studs.

2. Attach one pair of outer arms to each of the three pairs of ball studs on the platform.

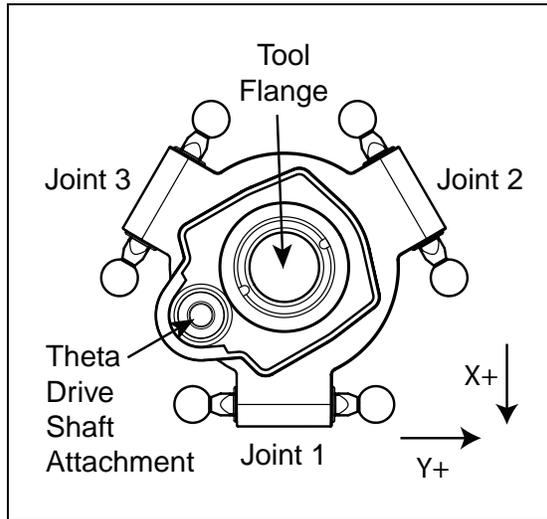


Figure 1-6. Top View of J4 Platform

- a. Swing the bottom end of the outer arm pair to the right, as far as possible.
 - b. Slip the right ball joint socket over the right ball stud. (Move the platform as needed to do this.)
 - c. Move the platform and outer arm pair to the left as you slip the left ball joint socket over the corresponding ball stud.
3. Ensure that all spring hooks are fully-seated in the grooves of the horseshoes. See the following figure.



Figure 1-7. Ball Joint Assembly, Showing Springs and Horseshoes

Attaching the Theta Drive Shaft (J4 Platform Only)

NOTE: The fixed platform does not use a theta drive shaft, so this section does not apply to robots with a fixed platform.

Each U-joint has two identical ends. When the theta drive shaft is shipped, it will have one end of a U-joint attached to each end. Attach the top end of the drive shaft to the J4 motor shaft, labeled Top, first. This requires using a 3 mm hex key, with its short end shortened to 10 - 15 mm. A normal hex key will not fit in the space available.

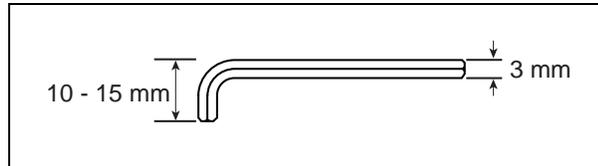


Figure 1-8. Shortened Hex Key

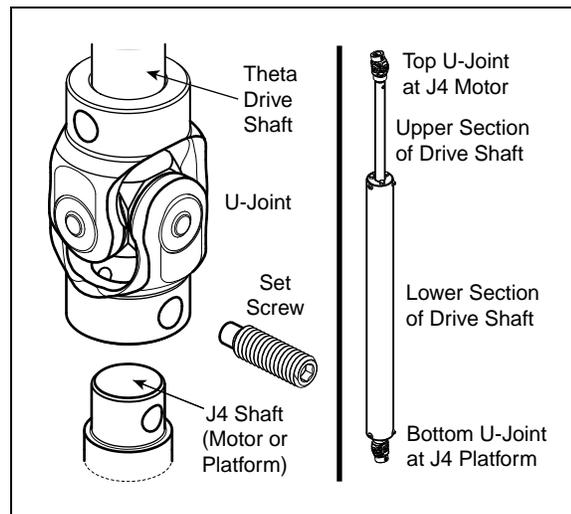


Figure 1-9. U-Joint, Set Screw, J4 Shaft | Drive Shaft

To attach the free end of the U-joint:

1. Slide the end of the U-joint over the shaft (platform or J4 motor).
The fit will be fairly tight.
The hole in the side of the U-joint needs to line up with the hole in the shaft.
2. Screw an M6 x 20 dog point set screw (included) through the shaft, going through the hole in the side of the U-joint, and into the blind hole on the opposite side of the U-joint. The U-joint is not threaded.

Use Loctite 242, and tighten to 5 N-m (3.7 ft-lbf) of torque. The head of the set-screw should be flush with the outer surface of the U-joint.

NOTE: The platform and J4 motor will need to be aligned after the ACE software has been installed, and the robot has been powered-on.

1.5 System Cable Connections

Cable Diagram

Open the Accessory box and locate the eAIB XSYSTEM cable. Connect the cables and peripherals as shown in the following figure. Parts and steps are covered in the following two tables. Refer to the System Installation chapter in your [Adept Hornet 565 Robot User's Guide](#) for more detail.

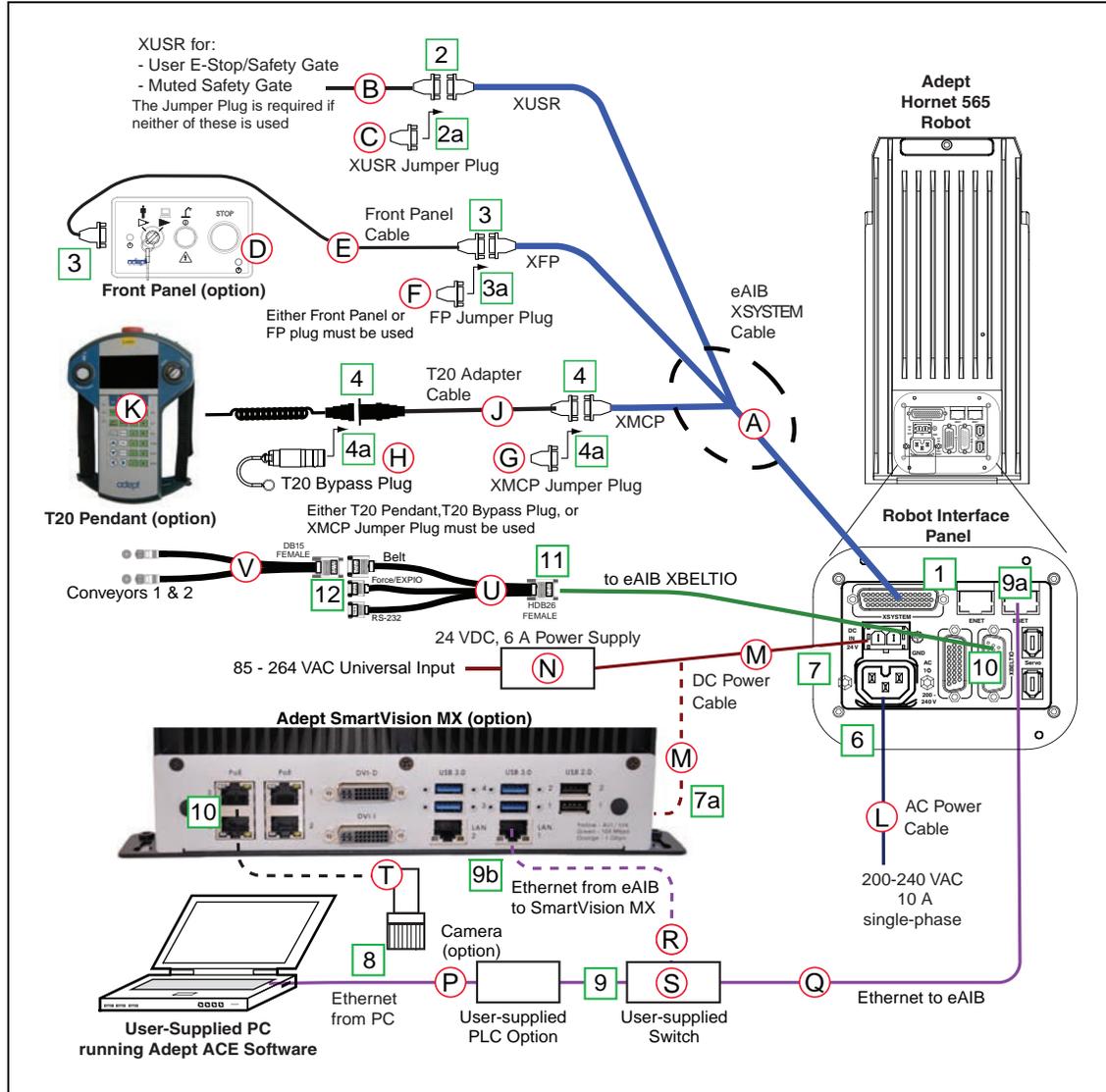


Figure 1-10. System Cable Diagram, with SmartVision MX, Front Panel, and T20 Pendant Options



WARNING: If you do not purchase an Adept front panel, you must provide your own E-Stop circuit and button.

Parts Table

Part	Cable and Parts List	Part #	Part of:	Notes
A	eAIB XSYSTEM Cable Assembly	13323-000		standard, eAIB
B	User E-Stop, Safety Gate	n/a	n/a	user-supplied
C	XUSR Jumper Plug	04736-000	13323-000	standard, eAIB
D	Front Panel	90356-10358		or user-supplied
E	Front Panel Cable	10356-10500	90356-10358	or user-supplied
F	Front Panel Jumper Plug	10053-000	13323-000	standard, eAIB
G	XMCP Jumper Plug	04737-000	13323-000	standard, eAIB
H	T20 Bypass Plug	10048-000	10055-000	standard, T20
J	T20 Adapter Cable	10051-003	10055-000	standard, T20
K	T20 Pendant (option)	10055-000		option
L	AC Power Cable (option)	04118-000	90565-010	or user-supplied
M	24 VDC Power Cable (option)	04120-000	90565-010	or user-supplied
N	24 VDC, 6 A Power Supply (option)	04536-000	90565-010	or user-supplied
P	Ethernet Cable - PC -> PLC (Only while programming PLC)	n/a	n/a	user-supplied
Q	Ethernet Cable - switch -> eAIB	n/a	n/a	user-supplied
R	Ethernet Cable - switch -> SmartVision MX	n/a	n/a	user-supplied
S	Ethernet switch, cable for SmartVision MX.	n/a	n/a	option, user-supplied
T	Camera and cable	n/a	n/a	option
U	eAIB XBELTIO cable	13463-000		option
V	Y-adapter cable	09443-000		option

The XUSR, XMCP, and XFP jumpers intentionally bypass safety connections so you can test the system functionality during setup.



WARNING: Under no circumstances should you run an Adept system, in production mode, with all three jumpers installed. This would leave the system with no E-Stops.

Connection Steps Table

Step	Connection	Part
1	Connect eAIB XSYSTEM cable to XSYSTEM on eAIB.	A
2	Connect a user E-Stop or Muted Safety Gate to the eAIB XSYSTEM cable XUSR connector or	B
2a	verify XUSR jumper plug is installed in eAIB XSYSTEM cable XUSR connector.	C
3	If you purchased an Adept Front Panel, connect Front Panel cable to Front Panel and eAIB XSYSTEM cable XFP connector or	D, E
3a	if using user-supplied Front Panel, connect Front Panel to eAIB XSYSTEM cable XFP. See warning after table.	A, E
4	Connect T20 adapter cable to eAIB XSYSTEM cable XMCP connector or	J, K
4a	if no T20, install XMCP jumper or T20 Adapter Cable with T20 bypass plug.	G or H
5	Connect user-supplied ground to robot.	n/a
6	Connect 200-240 VAC to AC Input on eAIB Interface Panel; secure with clamp.	L
7	Connect 24 VDC to DC Input on Interface Panel.	N, M
7a	Connect 24 VDC and shield ground to SmartVision MX, if used. See SmartVision MX user's guide for location.	N, M
8	Connect Ethernet cable from PC to PLC, if a PLC is used.	P
9	Connect Ethernet cable from PLC to switch, if a PLC is used.	S
9a	Connect Ethernet cable from switch to eAIB.	Q, S
9b	Connect Ethernet cable from SmartVision MX, if used, to switch.	R, S
10	Connect optional camera and cable to SmartVision MX, if used.	T
11	Connect optional eAIB XBELTIO cable to the XBELTIO port on eAIB.	U
12	Connect the Y-adapter cable to the eAIB XBELTIO cable, Belt branch	V



WARNING: If you do not purchase an Adept front panel, you must provide your own front panel with equivalent circuits to be able to enable power and have an E-Stop button.

Power Requirements

The 24 VDC power supply is user-supplied. In general, 6 A will provide enough power for the Hornet 565 robot alone. You will need to build your own 24 VDC cable. The mating connector

to the eAIB is included with the robot. Use shielded cable, with the shield grounded at each end.

The AC power cord is user-supplied. The mating connector to the eAIB is included with the robot. Power is 200 - 240 VAC, 50/60 Hz, single phase. Use a 10 A circuit breaker.

Grounding the System

The following ground connections need to be made:

- End effector-to-robot base, if hazardous voltage is present on the end-effector
- Robot base-to-frame
- Frame-to-Earth
- 24 VDC cable shield to power supply and eAIB

1.6 Installing Adept ACE™ Software

User-supplied PC

You load the Adept ACE software onto the PC and connect the PC to the eAIB via an Ethernet cable. Depending on the other equipment in the system, there may be an Ethernet switch between the two.

The Adept ACE disk will display a ReadMe file when inserted in your PC. This contains hardware and software requirements for running Adept ACE software.

Adept ACE

You install Adept ACE from the Adept Software disk. Adept ACE needs the Microsoft .NET Framework. The Adept ACE Setup Wizard scans your PC for .NET, and installs it automatically if it is not already installed.

1. Insert the disk into the disk drive of your PC.

If Autoplay is enabled, the Adept software disk menu is displayed. If Autoplay is disabled, you will need to manually start the disk.

NOTE: The online document that describes the installation process opens in the background when you select one of software installation steps below.

2. From the Adept ACE software disk menu, click Read Important Information.
3. From the Adept ACE software disk menu, select:

Install the Adept ACE Software

The Adept ACE Setup wizard opens.

4. Follow the online instructions as you step through the installation process.
5. When the installation is complete, click Finish.
6. After closing the Adept ACE Setup wizard, click Exit on the disk menu to close the menu.

NOTE: You will have to restart the PC after installing the Adept ACE software.

1.7 Start-up Procedure

1. Turn on the 200-240 VAC power. See Connecting 200-240 VAC Power to Robot in the [Adept Hornet 565 Robot User's Guide](#) for details.



WARNING: Make sure personnel are skilled and instructed—refer to the [Adept Robot Safety Guide](#).

2. Turn on the 24 VDC power to the robot. The Status Panel displays OK. The Robot Status LED will be off. See Figure 1-3.

See the Hornet 565 robot user's guide for details on 24 VDC connections.

3. If present, verify the Auto/Manual switch on the Front Panel is set to Auto Mode.
4. Turn on the user-supplied PC and start Adept ACE.
 - Double-click the Adept ACE icon on your Windows desktop, or
 - From the Windows Start menu bar, select:
Start > Programs > Adept Technology > Adept ACE > Adept ACE.
5. On the Adept ACE Getting Started screen:
 - Select Create New Workspace for Selected Controller to make the connection to the eAIB on the robot.
 - Select the IP address of the controller you wish to connect to, or manually type in the IP address.
6. Click OK. You will see the message "Working, please wait".

Enabling High Power

After you have started the Adept ACE software and connected to the robot, enable high power to the robot motors:

1. From the Adept ACE main menu, click the Enable High Power icon: 
2. If the High Power button on the optional Front Panel is blinking, press and release it. See the following figure.

If the button stops blinking before you press it, you must Enable Power again.

NOTE: The use of the blinking High Power button can be configured (or eliminated) in software. Your system may not require this step.

This step turns on high power to the robot motors and calibrates the robot.

- The Robot Status LED glows amber.
- The code on the robot Status Display Panel displays ON (see Labeled Drawing of Hornet Components, J4 Platform Shown on page 6).

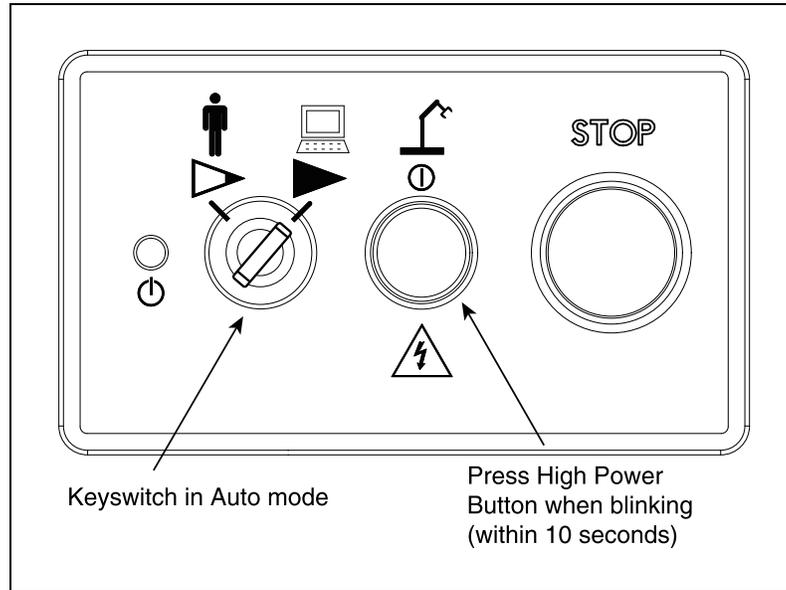


Figure 1-11. High Power Button on Optional Adept Front Panel

Verifying E-Stop Functions

Verify that all E-Stop devices are functional (Front Panel, pendant, and user-supplied). Test each mushroom button, safety gate, light curtain, etc., by enabling high power and then opening the safety device. The High Power push button/light on the Front Panel should go out for each.



WARNING: If you do not purchase an Adept front panel, you must provide your own E-Stop circuit(s) and button(s).

Verify Robot Motions

Use the pendant (if purchased) to verify that the robot moves correctly. Refer to the [Adept T20 Pendant User's Guide](#) for complete instructions on using the pendant.

The Hornet 565 robot is a parallel-arm robot and, as such, individual joint motions are not allowed. If you attempt to move a joint in Joint mode, you will get an error message:

JOINT <n> OUT OF RANGE

where <n> is the joint that you attempted to move. Joints are identified in Labeled Drawing of Hornet Components, J4 Platform Shown on page 6.

- If one joint must be moved separately, release the brakes (while supporting the platform) and move the joint manually.

- If the optional pendant is not installed in the system, you can move the robot using the Robot Jog Control  in the Adept ACE software. See the [Adept ACE User's Guide](#).

Aligning the Platform and J4 Motor

It is possible for either the motor shaft or the platform shaft to be turned, manually, before the theta drive shaft is connected to both. If not detected, the software may assume the robot's tool flange is at a different angle than it really is. To ensure that the software knows the actual rotation of the tool flange with respect to the J4 motor, you need to use the ACE software to establish this alignment.

1. Within the ACE software, open the Hornet robot object.
2. In the Configure tab, click Adjust J4 Zero.
This will launch a utility for aligning the theta drive shaft.
3. Follow the instructions in the utility.

Contact Adept Service for more information on this procedure. Refer to the [How to Get Help Resource Guide](#) (Adept P/N 00961-00700) for details on getting assistance.

NOTE: Once the theta drive shaft is installed, the J4 motor and the tool flange will always rotate together, so the software will know the orientation of the tool flange.

1.8 How Can I Get Help?

Refer to the [How to Get Help Resource Guide](#) (Adept P/N 00961-00700) for details on getting assistance with your Adept software and hardware. Additionally, you can access information sources on Adept's corporate website:

<http://www.adept.com>

Related Manuals

This manual covers the installation and startup of an Adept Hornet 565 robot system. There are additional manuals that cover programming the system, reconfiguring installed components, and adding optional components. See the following table. These manuals are available on the Adept software media shipped with each system.

Table 1-1. Related Manuals

Manual Title	Description
Adept Robot Safety Guide	Contains safety information for Adept robots.
Adept Hornet 565 Robot User's Guide	Describes the installation, configuration, operation, and user maintenance of the Adept Hornet 565 robot.
Adept ACE User's Guide	Describes the installation and use of Adept ACE.
Adept T20 Pendant User's Guide	Describes the use of the optional Adept T20 manual control pendant.
Adept SmartVision MX User's Guide	Instructions for use of the optional Adept SmartVision MX industrial PC.
How to Get Help Resource Guide	Provides information for getting assistance with your Adept software and hardware.

Adept Document Library

The Adept Document Library (ADL) contains documentation for Adept products. You can access the ADL from the Adept website. Select:

Support > Document Library

from the Adept home page. To go directly to the Adept Document Library, type the following URL into your browser:

http://www.adept.com/Main/KE/DATA/adept_search.htm

To locate information on a specific topic, use the Document Library search engine on the ADL main page, or select one of the available menu options. To view a list of available product documentation, use the menu links located above the search field.



Omron Adept Technologies, Inc.

Tel: 925-245-3400 Email: info@adept.com

omron247.com

Specifications subject to change without notice.

©2016 Omron. ALL RIGHTS RESERVED. Pub Number R68I-E-01

P/N: 14692-000, Rev A