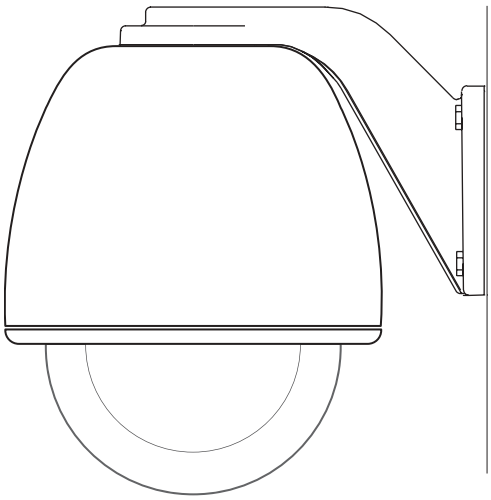
GE
Security

Legend
Installation Manual



Document number/revision: 1052026A.

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Contents

Preface

This is the GE *Legend Installation Manual*. It provides an overview of the product and detailed instructions explaining how to install all models. There is also information describing how to contact technical support if you have questions or concerns. For programming and operation instructions, refer to the *Legend User Manual*.

To use this document effectively, you should have the following minimum qualifications:

- a basic knowledge of CCTV systems and components; and
- a basic knowledge of electrical wiring and low-voltage electrical connections.

Read these instructions and all ancillary documentation entirely before installing or operating this product. The most current versions of this and related documentation may be found on our website. Refer to *Online publication library* on page 41 for instructions on accessing our online publication library.

Note: A qualified service person, complying with all applicable codes, should perform all required hardware installation.

Conventions used in this document

The following conventions are used in this document:

Bold	Menu items and buttons.
Italic	Emphasis of an instruction or point; special terms.
	File names, path names, windows, panes, tabs, fields, variables, and other GUI elements.
	Titles of books and various documents.
`Monospace`	Text that displays on the computer screen.
	Programming or coding sequences.
Blue italic	Hyperlinks to cross-references, related topics, and URL addresses.

Safety terms and symbols

These terms may appear in this manual:

CAUTION	*Cautions* identify conditions or practices that may result in damage to the equipment or other property.
WARNING	*Warnings* identify conditions or practices that could result in equipment damage or serious personal injury.

References

If you want to investigate related topics, these other documents may prove helpful:

- GE Security. *Legend User Manual (*1052027*)*
- GE Security. *KTD-405 Controller Keypad User Manual (*1036547*)*
- GE Security. *Networking Cable Types Technical Reference Guide* (1047213)
- GE Security. *ASCII Protocol Reference Manual* (1038010)

Introduction

The installation of domes has been made much easier with many of Legend's innovations. All coaxial and UTP connections are built into the housing, and programming and addressing are site-tied to the housing. Site-tied memory allows you to replace cameras or move them between housings without having to reprogram them for each new site, because the camera will operate using the housing memory. As you install the first dome, you will find many other enhancements that make installation easier and quicker.

The general steps for installing your dome include:

- preparing the mounting surface and installing the mount (if used) and housing;
- preparing the cables and wiring the housing;
- addressing the camera site, setting the protocol, and setting the termination;
- installing the camera assembly; and
- installing the bubble.

Product description

Legend is the next generation PTZ dome camera that maintains and enhances many of the features of CyberDome that you have come to rely on. The Legend protocol is backward compatible, so you can replace older domes in an existing analog system with Legend domes. The hardware, however, is not backward compatible. Other enhancements that relate to performance and operation include replacing gears and belts with SilkTrak™ direct-drive technology for smoother camera travel, replacing the text-based on-screen display (OSD) programming interface with an easy-to-use graphical programming interface, and providing passcode protection that prevents unauthorized personnel from changing programming settings while still allowing operator access. The dome also now offers an Ethernet connection to flash software upgrades over a standard IP network using a standard web browser. For additional details, refer to the data sheet and the user manual, which provides the programming instructions for all of the dome’s features.

Product contents

The Legend system consists of the following:

- 1 housing
- 4 connectors (one 2-pin for power, one 4-pin for data, one blue 12-pin for six alarms, and one green 12-pin for two alarms, two relays, UTP video, and small screw driver)
- 2 manuals (installation and user, which covers programming and operation)
- 1 PTZ camera assembly
- 1 bubble (mirror bubbles are shipped with cotton gloves for special handling)
- 1 mount (wall-mount and flush-mount versions only)

You may receive the package contents in one large carton containing three boxes (four with wall-mount versions), or if shipped individually, you may receive three (or four) separate boxes. One box will contain the housing, connectors, and manuals. The PTZ assembly, bubble, and mount (for wall-mount versions) are each shipped in separate boxes.

Inspect the package and contents for visible damage. If any components are damaged or missing, do not use the unit; contact the supplier immediately. If you need to return the unit, you must ship it in the original box.

Spare parts can be purchased for the domes. See *Spare parts list* on page 40.

System requirements

Operational requirements

Legend contains a built-in receiver that decodes commands originating from a compatible controller keypad. A minimum of one keypad is required for operation. See *Figure 1*. From the keypad, an operator can pan, tilt, and zoom the camera, find presets, and start macros and ShadowTours. A typical advanced system is shown in *Figure 2*. For additional details, refer to the data sheet, user manual, or application guide.

Figure 1. Basic system

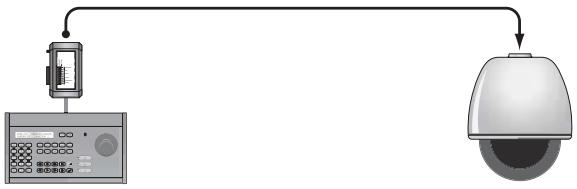
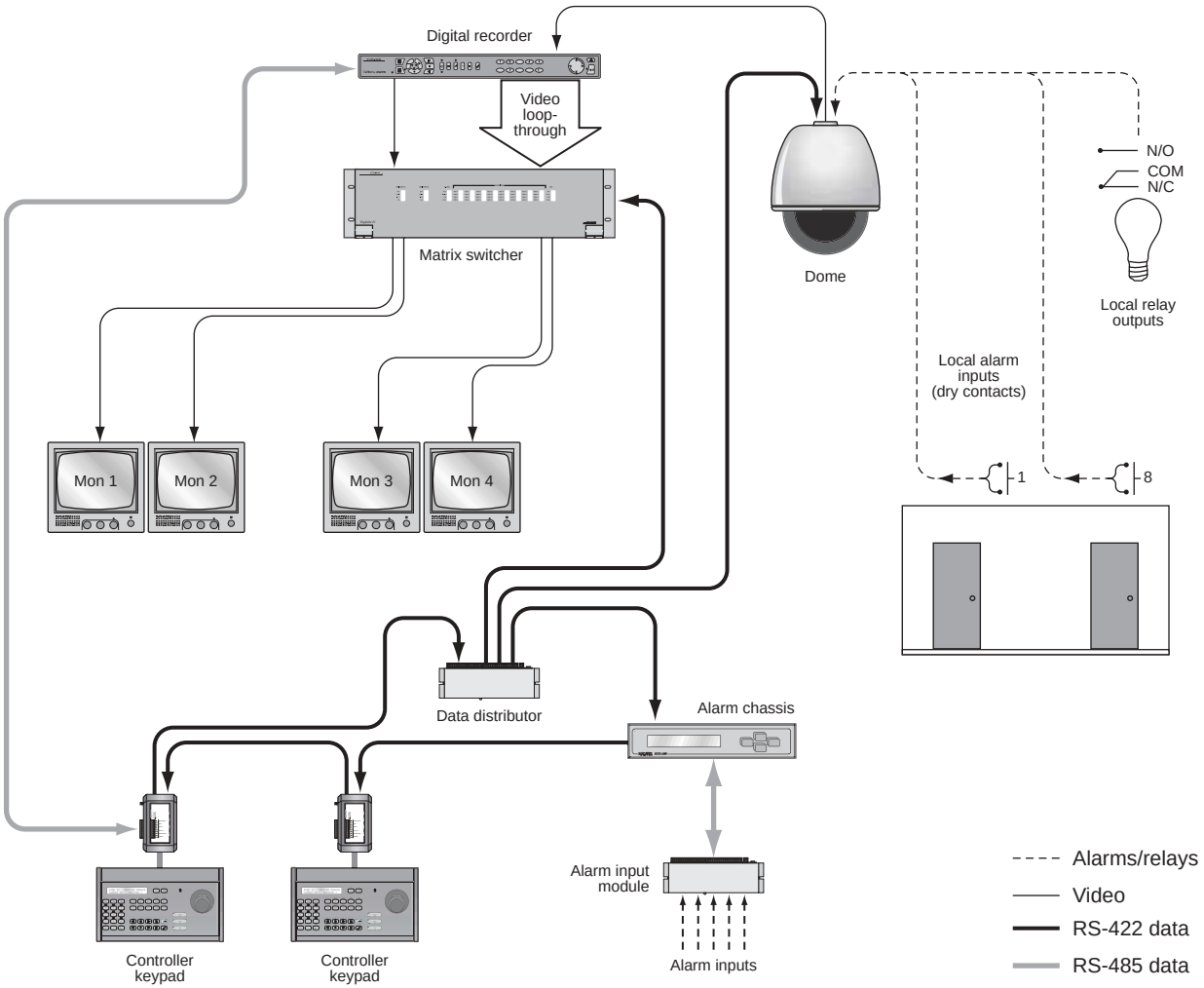


Figure 2. Typical advanced system



Minimum load requirements

Table 1 lists the load requirements for all Legend dome configurations.

CAUTION For safety, the mounting surface, hardware, and procedure used for securing the dome must support the weight of the dome, mount (if used), cables, and any structural or environmental vibration according to local codes.

Table 1. Minimum load requirements of dome configurations

Minimum load	Dome configuration
100 lb.	• Rugged, cast aluminum pendant-mount housing (with any mount) • Heavy duty housing (with any mount) • Pressurized housing (with any mount) • Swing-arm mount (with any dome)
50 lb.	All other dome and mount configurations

Cable requirements

Table 2 lists the requirements for the cables that connect to the dome.

CAUTION When flashing software upgrades to the dome over a standard IP network via the dome's Ethernet connection, ensure that the network is secured from unauthorized access. Like all Ethernet connections, the dome's Ethernet connection has no security against unauthorized access. You may consider connecting the Ethernet cable only when you are flashing the dome, unless you have the dome connected to a secure, isolated network.

Table 2. Cable requirements

Operation	Cable requirement	Length	
		feet	meters
Alarms and relays	22 to 26 gauge (0.64 to 0.4 mm) unshielded, two-conductor, twisted-pair (UTP) cable		
Data	For RS-422: 22 gauge (0.64 mm) *unshielded*, two-conductor, twisted-pair (UTP) cable	10,000	3,000
	For RS-485: 22 gauge (0.64 mm) *shielded*, two-conductor, twisted-pair (STP) cable	3,000	900
Ethernet (for flashing software upgrades)	CAT-5 Ethernet cable (without cable boots)	385	100
Power	24 VAC cable. To determine the size of cable needed for individual applications, see *Power cable size and length requirements* on page 6.		
Video	75 ohm coaxial cable; or 22 gauge (0.64 mm) unshielded, two-conductor, twisted-pair (UTP) cable Note: Use only crimp-on BNC connectors. Do not use screw-on connectors.		

Note: When using unshielded twisted-pair cable for video and data, the wires can share the same jacket but must remain separate twisted pairs.

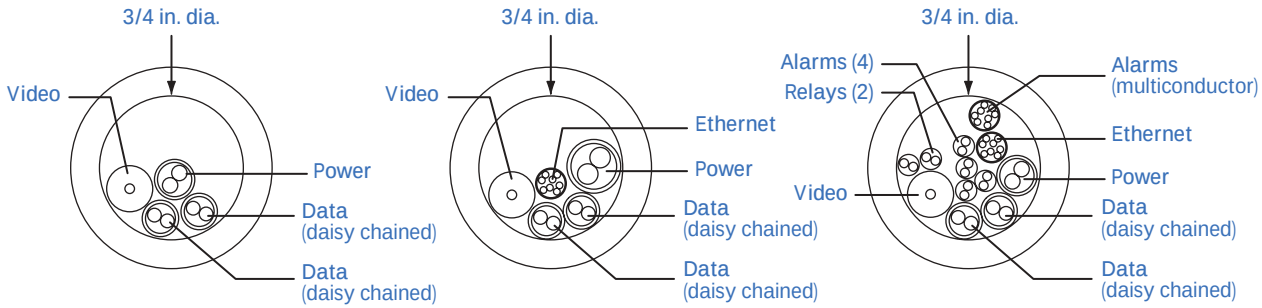
Cable management

Follow all local codes for cable management. As a general rule, you can fill a cable conduit to a maximum of 60% of its capacity. You must maintain 40% free space. A variety of factors will determine how many cables you can run into the dome. Capacity limitations include:

- number of cables
- size of the cables
- number of alarms and relays wired
- use of single-conductor or multiple-conductor cable
- use or lack of use of a junction box

Figure 3 provides an illustration of the cable capacity of three typical applications. *It is important to note that all cables of the same gauge are not of the same diameter.* Manufacturer, shielding, and rating affect the actual diameter of cables of the same gauge. GE leaves the selection of the appropriate cable to the discretion of the installer who is working with the local codes of the installation site.

Figure 3. Three acceptable typical cabling scenarios



Includes:
- Video: one 59U/6U coaxial (0.24 in. dia.)
- Data: two 20 AWG UTP (0.19 in. dia.)
- Power: one 18 AWG UTP (0.21 in. dia.)
- Ethernet: none
- Alarms: none
- Relays: none

Percentage conduit fill = 31%

Includes:
- Video: one 59U/6U coaxial (0.24 in. dia.)
- Data: two 20 AWG UTP (0.19 in. dia.)
- Power: one 16 AWG UTP (0.25 in. dia.)
- Ethernet: CAT-5 (0.16 in. dia.)
- Alarms: none
- Relays: none

Percentage conduit fill = 38%

Includes:
- Video: one 59U/6U coaxial (0.24 in. dia.)
- Data: one 20 AWG UTP (0.19 in. dia.)
- Power: one 18 AWG UTP (0.21 in. dia.)
- Ethernet: CAT-5 (0.16 in. dia.)
- Alarms: 24 AWG UTP (0.11 in. dia.)
- Relays: 24 AWG UTP (0.11 in. dia.)

Percentage conduit fill = 53%

Note: The diameters for cables of the same gauge will vary per manufacturer, rating, and shielding. So be aware that you may get more or fewer cables within the 60% conduit fill requirement depending on the cables that you select.

Power requirements

All Legend domes require a 24 VAC power supply to operate the domes' PTZ, camera, and heater/blower (if present). The start-up and running power requirements vary depending on the model (*Table 3*).

Table 3. Power requirements at 24 VAC (±4 VAC) operating voltage

Model	Start-up power	Running power
Dome without heater/blower	30 W	16 W
Dome with heater/blower	60 W	36 W
Rugged and HD dome with 25 W heater/blower	100 W	66 W

Power cable size and length requirements

Using the proper gauge of power cable will ensure proper operation and avoid voltage drops. See *Table 4* for the recommended cable gauge for varying maximum cable lengths for the different models of domes.

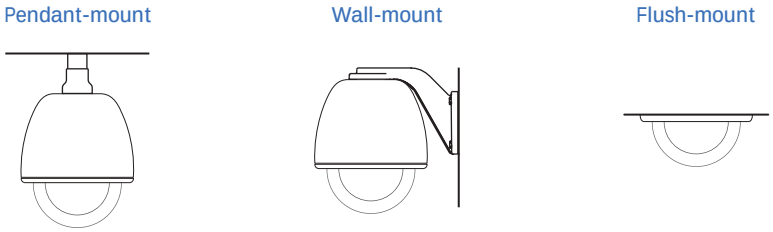
Table 4. Recommended power cable gauges based on maximum lengths for an operating voltage of 24 VAC (±4 VAC)

Wire gauge		Domes without heater/blower (30 W)		Domes with heater/blower (60 W)		HD domes with heater/blower (100 W)	
AWG	mm^2	feet	meters	feet	meters	feet	meters
10	2.60	1565	477	780	238	470	143
12	2.05	985	300	490	149	295	90
14	1.62	620	189	310	94	185	56
16	1.29	390	119	195	59	115	35
18	1.02	245	75	120	37	70	21
20	0.81	150	46	75	23	45	14
22	0.64	95	29	45	14	25	8

Installing the housing and cables

There are three basic mounting styles: pendant, wall, and flush. A pendant-mount lowers a dome from a ceiling, a wall-mount extends a dome from a wall, and a flush-mount raises a dome's bubble even with a ceiling. See *Figure 4*. This document provides the instructions for all mounting styles.

Figure 4. Basic mounting styles



Flush-mount housings

Preparing the mounting surface

Following are the steps for preparing the mounting surface if you are mounting the housing directly into a solid surface that does not require reinforcement. For step-by-step instructions for preparing the surface for the GEA-114 T-bar support kit, see *GEA-114 T-bar ceiling support kit* on page 35. If you are installing a GEA-113 T-bar ceiling panel, refer to the step-by-step instructions that came with the panel (1052914).

CAUTION

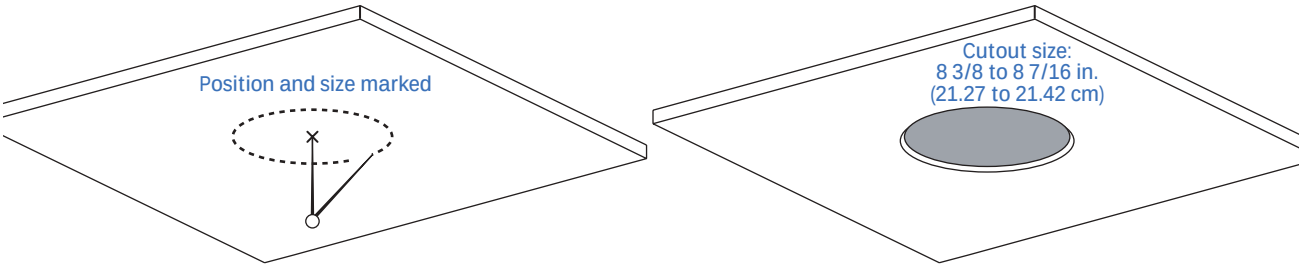
For all installations, heed these cautions:

- Complete all installation steps before supplying power to the dome.
- To ensure proper operation of a PTZ unit, install the mount level.
- For safety, the mounting surface, hardware, and procedure used for securing the dome must support the weight of the dome, mount, cables, and any structural or environmental vibration according to local codes. See *Table 1, Minimum load requirements of dome configurations* on page 4.

To prepare the mounting surface, see *Figure 5* and do the following:

1. Mark the position and size of the housing pass-through hole on the mounting surface. The size of the cutout for the pass-through must be 8 3/8 to 8 7/16 in. (21.27 to 21.42 cm).
2. Following all local codes, cut the housing pass-through hole.
3. Make sure that the facility cables (data, video, power, and alarm/relay) for the dome comply with the recommendations provided in *Cable requirements* on page 4.
4. Feed the facility cables through the housing pass-through hole in the mounting surface.
   - Pull enough cable to make connections. You can always cut off unneeded length later.
   - How many cables you have depends upon how many alarms and relays you are connecting in addition to the video, data, and power cables, and if you will be installing an Ethernet cable for flash upgrades. See *Wiring and addressing the dome* on page 14.

Figure 5. Preparing the mounting surface for flush-mount housings being mounted into solid surfaces not requiring reinforcement



Installing the housing

With the surface prepared and/or the mount now installed, install the housing.

To install the housing, see *Figure 6* on page 9 and do the following:

1. Remove either conduit knockout (side or top) in the housing.
2. Hold the housing up near the housing pass-through of the mount or cutout.
3. Connect a steel safety cable, if required by local codes.
   a. Obtain a steel safety cable of 0.125 in. (3.175 cm) maximum diameter that complies with local codes.
   b. Snip off the nipple that opens access to the safety cable clip.
   c. Feed your safety cable through the exposed hole.
   d. Secure one end of the safety cable into the safety clip surrounding the exposed hole inside the housing.
   e. Secure the other end of the safety cable to the building superstructure.

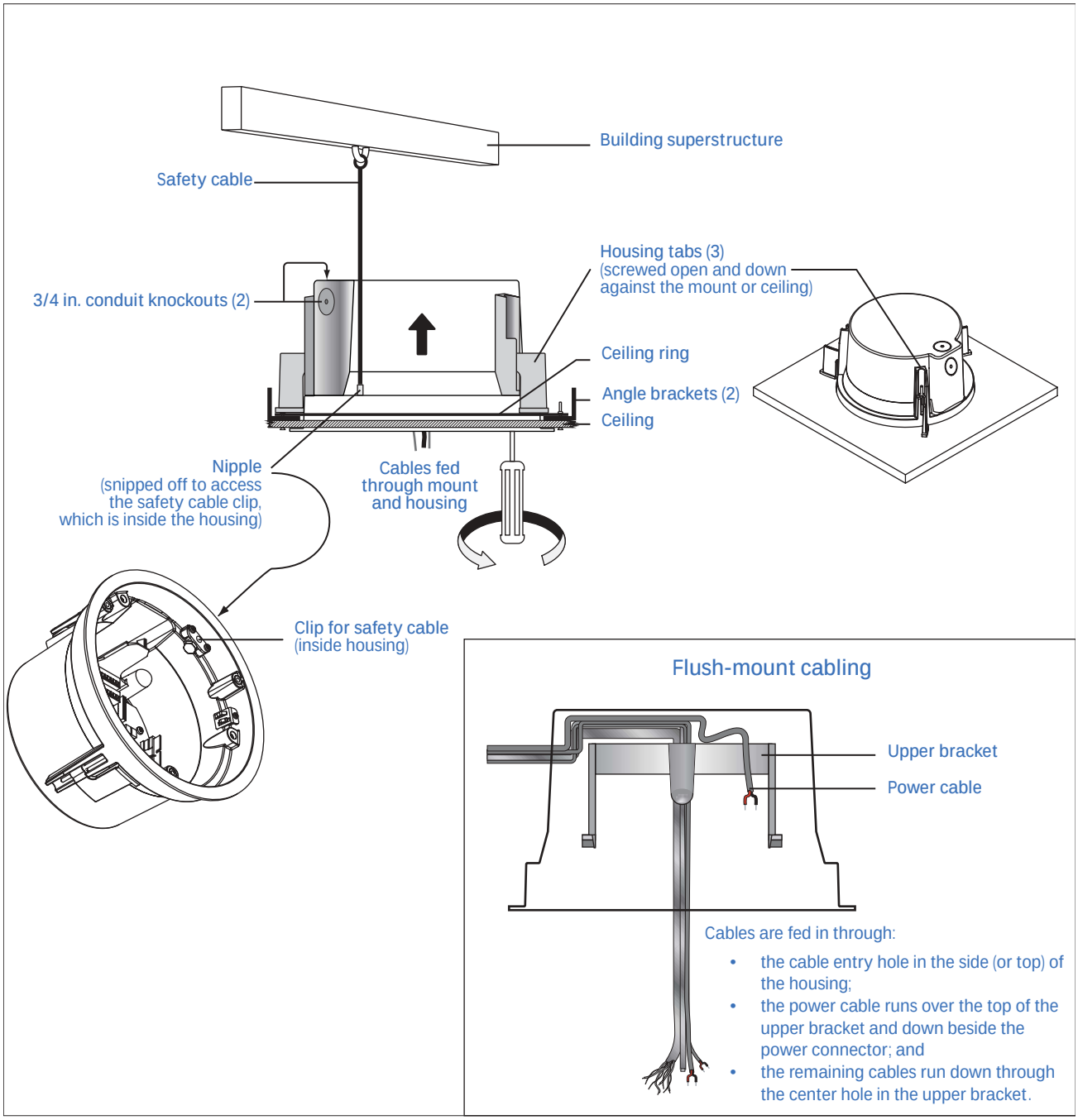
WARNING DO NOT run any cables next to the heaters. Doing so could damage the dome or cause an electrical fire.

4. Feed the facility cables through the conduit hole of the housing. Allow enough cable length to make connections. *Figure 6* on page 9 shows how the cables run through the housing.

CAUTION For safety, the mounting surface, hardware, and procedure used for securing the dome must support the weight of the dome, mount (if used), cables, and any structural or environmental vibration according to local codes. See *Table 1*, *Minimum load requirements of dome configurations* on page 4.

5. Attach the housing to the mount or ceiling by screwing the housing tabs open and down.

Figure 6. Installing the flush-mount housing



Pendant-mount housings

Pendant-mount housings can be mounted to a pipe to lower them from a ceiling or to a wall-mount arm to extend them from a wall. Instructions are provided in this document for both mounting methods.

Preparing the mounting surface

Following are the steps for preparing the mounting surface if you are mounting the housing from a pipe. For step-by-step instructions for preparing the surface for the GEA-102 wall-mount arm, see *Installing the wall-mount arm* on page 32. If you are installing one of the other mounts, refer to the step-by-step instructions that came with that mount.

CAUTION

For all installations, heed these cautions:

- Complete all installation steps before supplying power to the dome.
- To ensure proper operation of a PTZ unit, install the mount level.
- For safety, the mounting surface, hardware, and procedure used for securing the dome must support the weight of the dome, mount, cables, and any structural or environmental vibration according to local codes. See *Table 1, Minimum load requirements of dome configurations* on page 4.

To prepare the mounting surface:

1. Following all local codes, install the pipe.
2. Make sure that the facility cables (data, video, power, and alarm/relay) for the dome comply with the recommendations provided in *Cable requirements* on page 4.
3. Feed the facility cables through the pipe in the mounting surface.
   - Pull enough cable to make connections. You can always cut off unneeded length later.
   - How many cables you have depends upon how many alarms and relays you are connecting in addition to the video, data, and power cables, and if you will be installing an Ethernet cable for flash upgrades. See *Wiring and addressing the dome* on page 14.

Installing the housing

With the pipe or mount now installed, install the housing.

CAUTION Avoid getting rain or moisture in the housing so that the electronic components on the PCBs are not damaged.

To install the housing to a pipe or mount, see *Figure 7* on page 12 and do the following:

1. If installing the housing onto a pipe:
   a. Spray soapy water on the pipe.
   b. For outdoor applications, slide the water-sealing rubber boot onto the pipe.
   c. Apply Teflon tape to the pipe threads.
2. Hold the housing up near the pipe or mount. If you installed the GEA-102 wall-mount arm, make sure that the safety chain is securely attached. See *GEA-102 wall-mount arm* on page 32 for details.

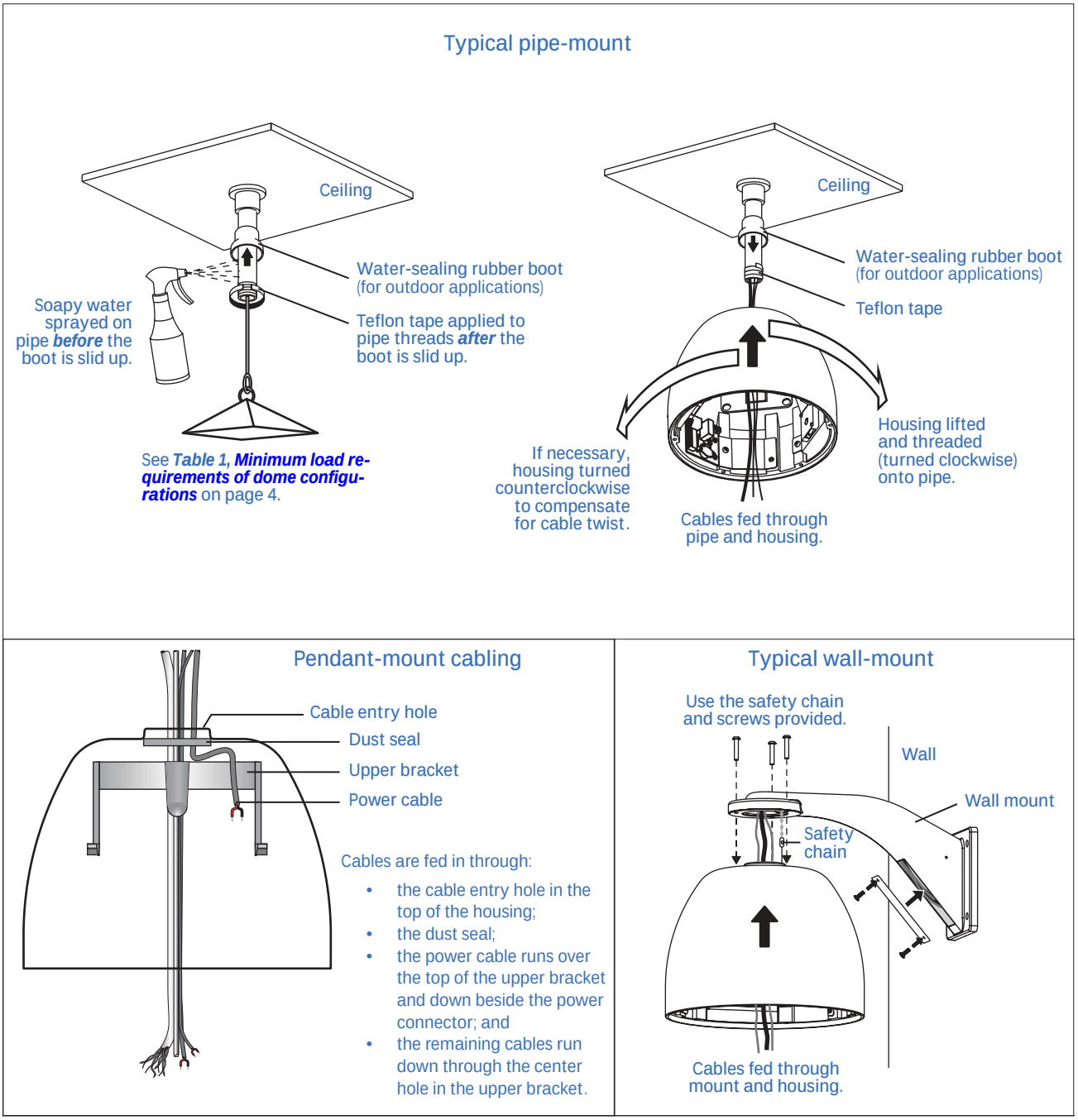
WARNING DO NOT run any cables next to the heaters. Doing so could damage the dome or cause an electrical fire.

3. Feed the facility cables through the dust seal in the top of the housing. Allow enough cable length to make connections. *Figure 7* on page 12 shows how the cables run through the housing.

CAUTION For safety, the mounting surface, hardware, and procedure used for securing the dome must support the weight of the dome, mount (if used), cables, and any structural or environmental vibration according to local codes. See *Table 1, Minimum load requirements of dome configurations* on page 4.

4. Attach the housing to the pipe or mount.
   - For pipe installations, thread the housing onto the pipe. If necessary, first turn the housing counterclockwise to compensate for the cable twisting.
   - For wall mount installations, use the fasteners that were provided with the mount.

Figure 7. Installing the pendant-mount housing

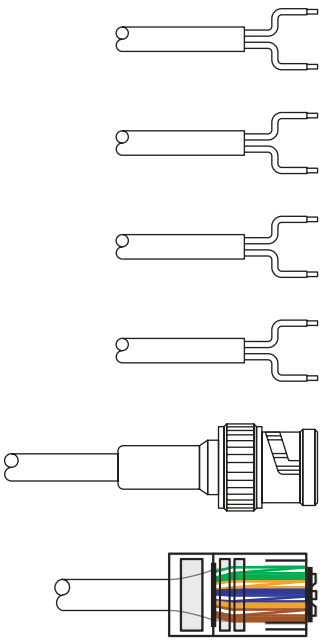


Preparing the cables

Which and how many cables you will be preparing depends upon whether you are setting up your dome to transmit video via its coaxial or UTP source, how many alarms and relays you are connecting in addition to the video, data, and power cables, and if you will be installing an Ethernet cable for flash upgrades.

To prepare the facility camera cables, terminate the cable ends as shown in *Figure 8*.

Figure 8. Prepared cables



Power: strip ends of wires

Alarms and relays: strip ends of wires

Data: strip ends of wires (UTP for RS-422 or STP for RS-485)

Note: Analog video and data wires can share the same jacket but must remain separate twisted pairs.

Video (UTP): strip ends of UTP wires

Note: Analog video and data wires can share the same jacket but must remain separate twisted pairs.

Video (coaxial): terminate coaxial cable with BNC connector

Note: Use only crimp-on BNC connectors. Do not use screw-on connectors.

Ethernet (for flashing software upgrades): terminate standard CAT-5 Ethernet cable with RJ-45 connector

Note: If you are making your cables, do not add a boot. If you are using ready-made cables that include a boot, cut off the boot and reterminate the cable.

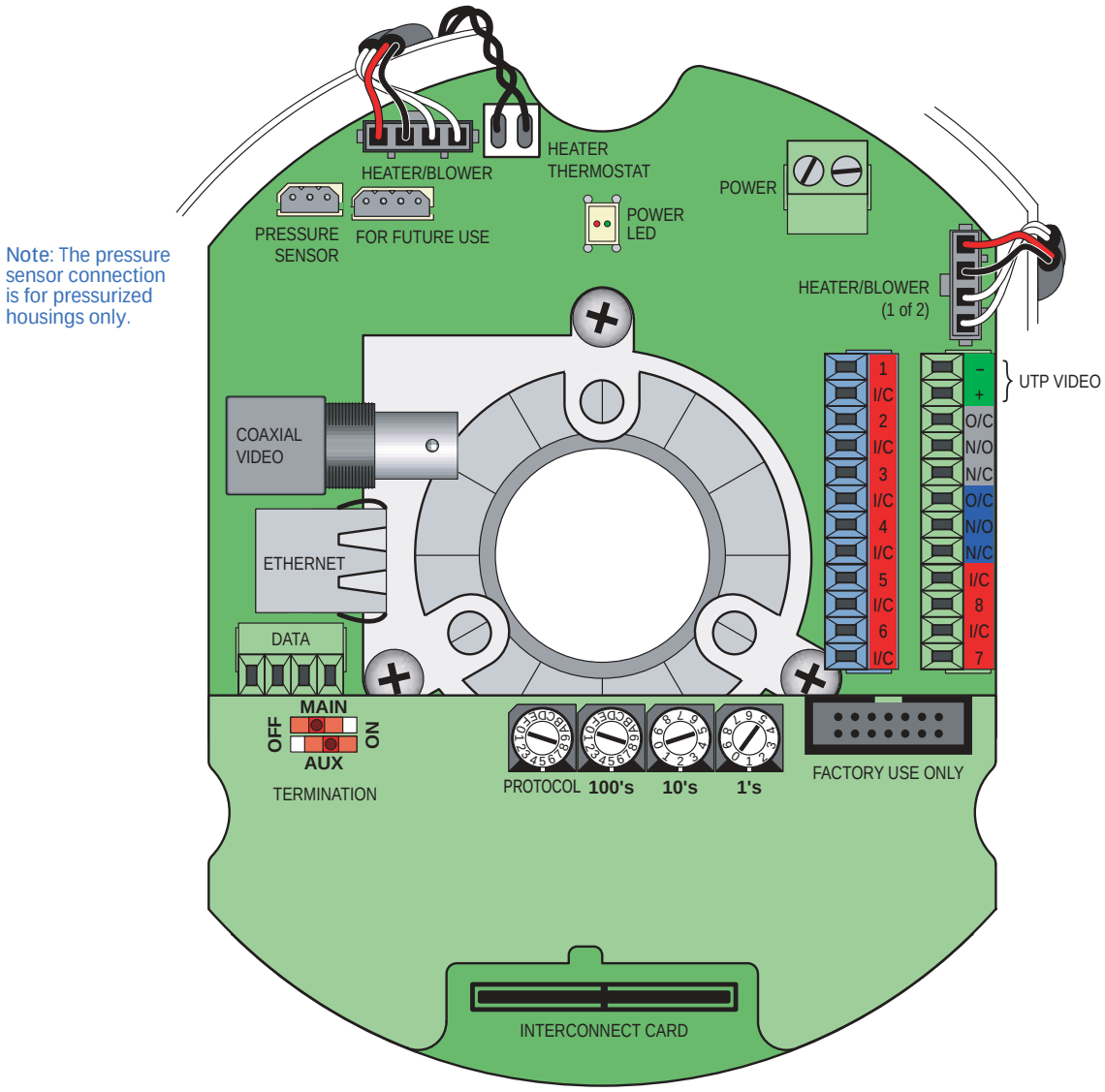
Wiring and addressing the dome

For basic operation, you will be connecting data, video, and power cables to the dome. For advanced operation, you can also connect any combination of Ethernet, alarm, or relay cables to the dome. How many cables you will be feeding into the housing depends upon how many alarms and relays you are connecting in addition to the video, data, and power cables, and if you will be installing an Ethernet cable for flash upgrades.

The dome uses RS-422 for data communication. It is compatible with RS-485 systems. Remember that STP cable is used for RS-485 and UTP cable is used for RS-422. See *Cable requirements* on page 4.

Be sure to never let any cables get next to the heaters.

Figure 9. View of housing board attached to upper bracket as viewed from below the housing (cables shown are factory-installed)



Wiring the housing board

To wire the housing board, see *Figure 10* on page 16 and *Figure 11* on page 17 and do the following:

1. Connect the facility *data* cables to the MAIN connections. The AUX connections are for future use. If you are installing RS-485 data, float the shield at the dome and ground it at the keypad.

   Get the provided green 4-pin terminal block and connect the cable to the marked terminals. The MAIN data connections on the terminal block are for control wires that are coming in from the keypad. You may also daisy chain the data signal on to additional domes. The AUX data connections are *for future use*.

2. Connect the facility *video* cable.

   - If you are installing UTP video, use the provided green 12-pin UTP terminal block. It provides connections for UTP video, in addition to alarms 7 and 8 and relays 1 and 2.
   - If you are installing coaxial video, locate the BNC connector.

   Note: Use only crimp-on BNC connectors. Do not use screw-on connectors.

3. Connect the facility *power* cable. Make sure that the power cable is fed over the top of the upper bracket and down beside the power connector. Use the provided 2-pin power terminal block. If you are using a heavier gauge cable, ensure that it is properly seated in the connector. Power in the Legend domes is not polarity sensitive.

   When power is received by the housing board through the power connection, the housing board's diagnostic power LED will appear orange. It appears orange because the red and green internal LEDs both illuminate. There are additional diagnostic LEDs that indicate the proper installation of the camera assembly (see *Installing the camera assembly* on page 20).

4. If you are installing alarms and relays, connect the *alarm* and *relay* cables to the two provided 12-pin terminal blocks. One is blue and one is green.

   - Use dry contacts for alarms.
   - Use relays with a maximum operating voltage of 30 VAC, 30 VDC at 0.5 A.

   Note: Because of space constraints, if you are installing more than five alarms and/or relays, use a multiconductor cable instead of individual single-pair cables.

When flashing software upgrades to the dome over a standard IP network via the dome's Ethernet connection, ensure that the network is secured from unauthorized access. Like all Ethernet connections, the dome's Ethernet connection has no security against unauthorized access. You may consider connecting the Ethernet cable only when you are flashing the dome, unless you have the dome connected to a secure, isolated network.

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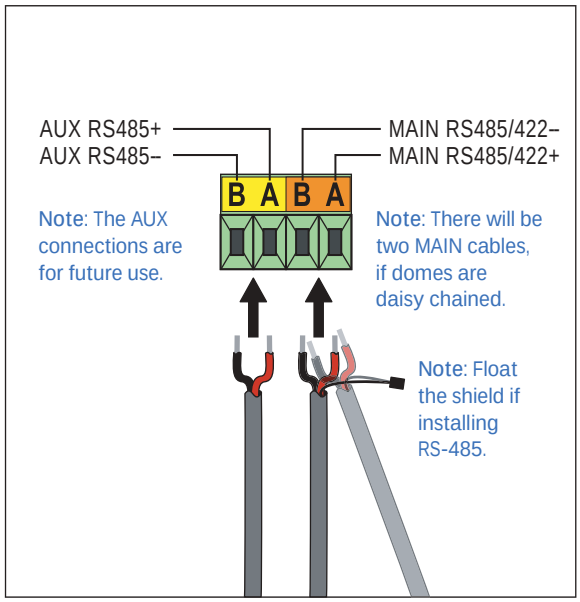
5. If you want to flash software upgrades to the dome, connect the Ethernet cable.

Figure 10. Connecting the data, video, power, and alarm/relay cables

Note: You can also connect the Ethernet cable to flash software upgrades to the dome (see *Figure 11* on page 17).

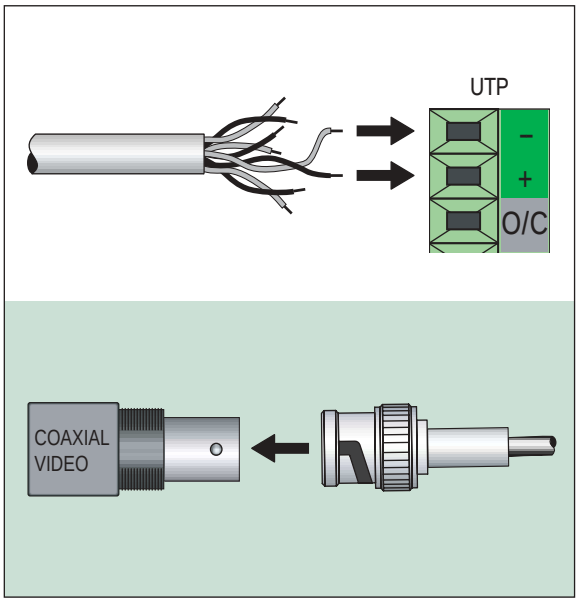
Data connections

For data, you have the choice of connecting UTP for RS-422 or connecting STP for RS-485.

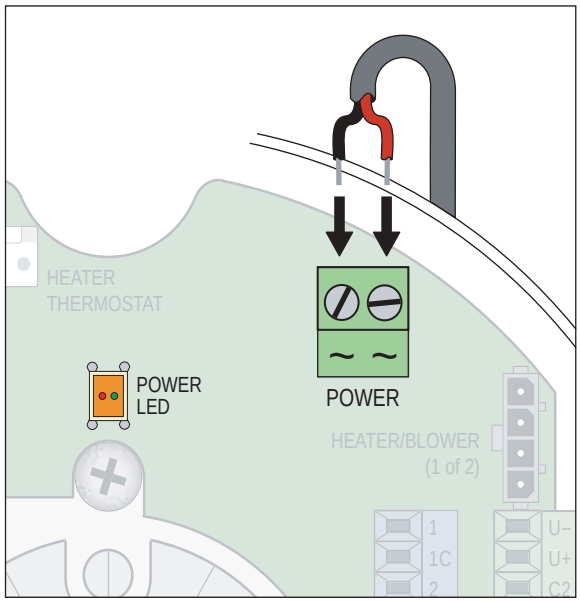


Video connections

For video, you have the choice of connecting UTP or coaxial.



Power connections



Alarm/relay connections

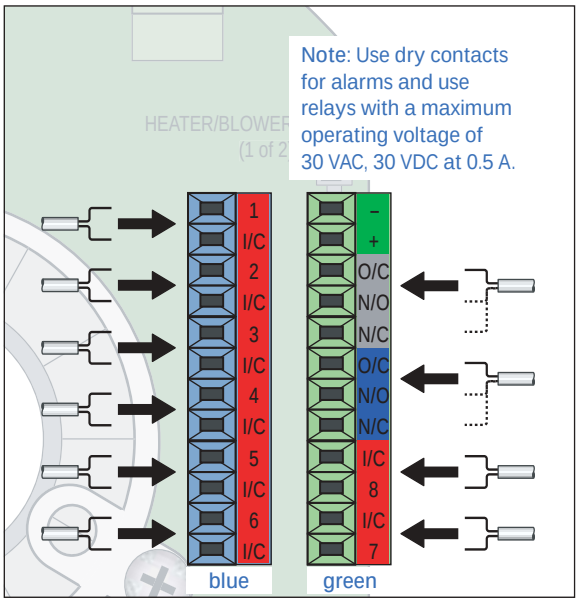
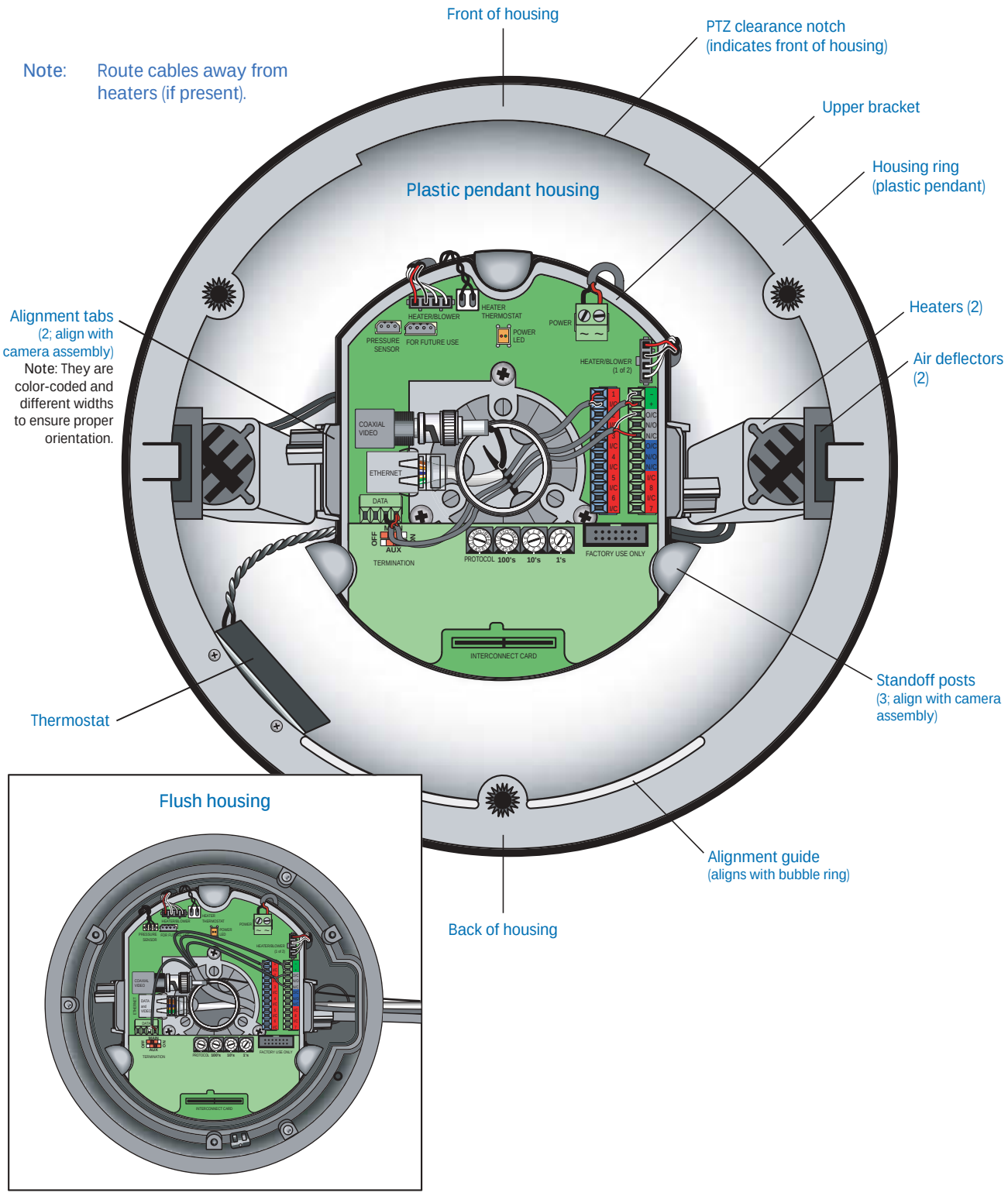


Figure 11. Completed wiring in housings



Addressing the camera site and setting the protocol

The dome provides rotary switches for setting the camera's site address and communication protocol. Site addresses can be numbered from 0 to 1599.

To set the camera's site address and protocol, see *Figure 12* and *Table 5* and do the following:

1. Locate the rotary switches. They are on the smallest and lowest board that is attached to the upper bracket.
2. Determine which position numbers or letters on the three rightmost switches must be added together to equal the site number.
3. Determine which position number or letter on the leftmost switch is needed to set the protocol.
4. Align the needed characters on each switch with the switch's white marker. Be careful that any tool you use to turn the rotary switches does not slip and damage any board components.

Figure 12. Setting the camera's site address and protocol (diagram shows address 521 with ASCII protocol)

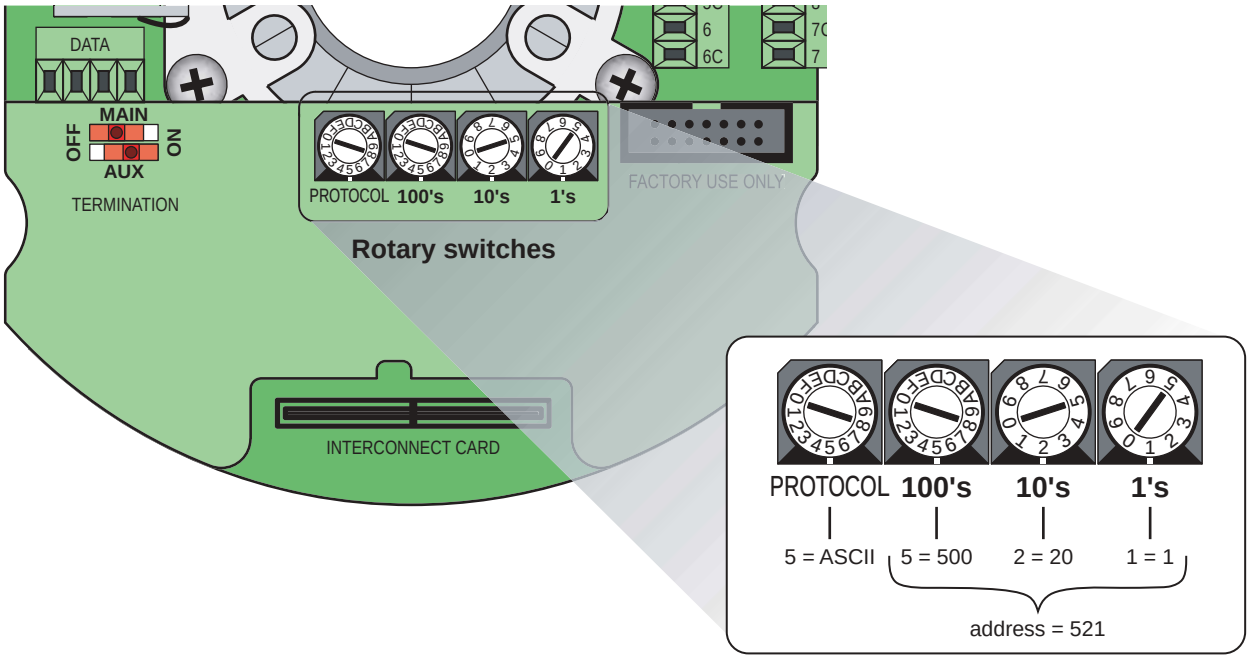


Table 5. Equivalent values for the characters on the rotary switches

Protocol switch		100s switch		10s switch		1s switch	
Switch	Value	Switch	Value	Switch	Value	Switch	Value
0	Digiplex (RS-422) @ 4800 baud	0	000	0	00	0	0
1	Impac (RS-485) @ 9600 baud	1	100	1	10	1	1
2	For future use	2	200	2	20	2	2
3	For future use	3	300	3	30	3	3
4	For future use	4	400	4	40	4	4

Table 5. Equivalent values for the characters on the rotary switches

Protocol switch		100s switch		10s switch		1s switch	
Switch	Value	Switch	Value	Switch	Value	Switch	Value
5	ASCII @ 9600 baud	5	500	5	50	5	5
6	Pelco D @ 2400 baud	6	600	6	60	6	6
7	Ultrak @ 9600 baud (even parity)	7	700	7	70	7	7
8	Factory use only	8	800	8	80	8	8
9	Factory use only	9	900	9	90	9	9
A	For future use	A	1000				
B	For future use	B	1100				
C	For future use	C	1200				
D	For future use	D	1300				
E	For future use	E	1400				
F	For future use	F	1500				

Setting the termination

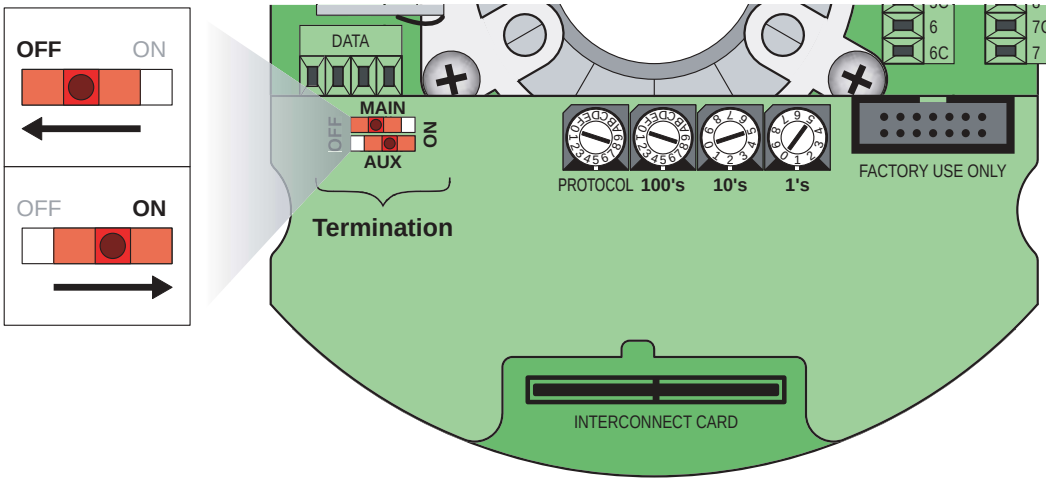
You must set the termination of the data signal in each dome (or device) to on or off. There are two termination switches. MAIN is for the dome input and AUX is for an auxiliary device output.

Note: The AUX termination switch is for future use along with the AUX data cable connections. In the future, you will need to set both switches, but currently it does not matter whether the AUX termination switch is on or off.

To set the termination, see *Figure 13* and do the following:

- Set the termination to ON if the dome or device is the final receiver location for the data signal.
- Set the termination to OFF if the dome or device is the final receiver location for the data signal.

Figure 13. Termination switches



Installing the camera assembly

Most people can install the camera assembly with one hand. If you need to use two hands, do so. After installation, there is a pause for about 30 seconds, then the drive mechanism performs a PTZ self-test and initializes. DO NOT move the camera while it is self-testing and initializing. After the self-test, the drive mechanism operates continuously.

You do not need to remove power from the dome or stop the camera's movement before removing the camera assembly. Just remember that the heaters may be hot, so comply with the caution label and do not touch them.

Be prepared for the PTZ self-test that immediately follows the installation of the camera assembly.

- After the camera assembly is installed, it will pause for about 30 seconds before the self-test begins.
- The self-test takes from 3 to 5 seconds.
- During the self-test, the PTZ will travel to find its reference points to initialize itself.

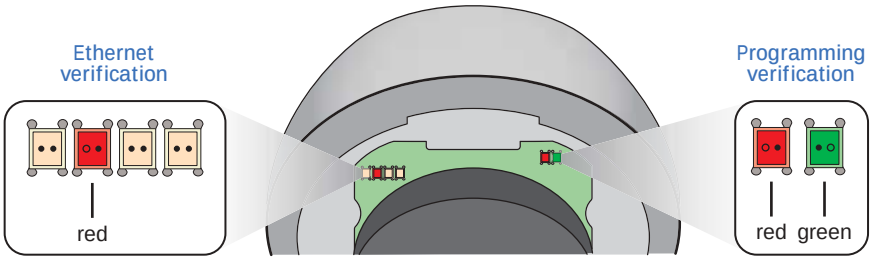
To install the camera assembly, see *Figure 15* on page 21 and do the following:

1. To protect the lens, leave the lens cap on the camera until you have finished the installation.
2. Attach the safety lanyard to the camera assembly to suspend it safely while you continue working.
3. Align the camera assembly with the housing.
   - Align the two color-coded alignment tabs with the two color-coded alignment slots.

     Note: The alignment tabs are color-coded and of two different widths to help prevent reversed installation.

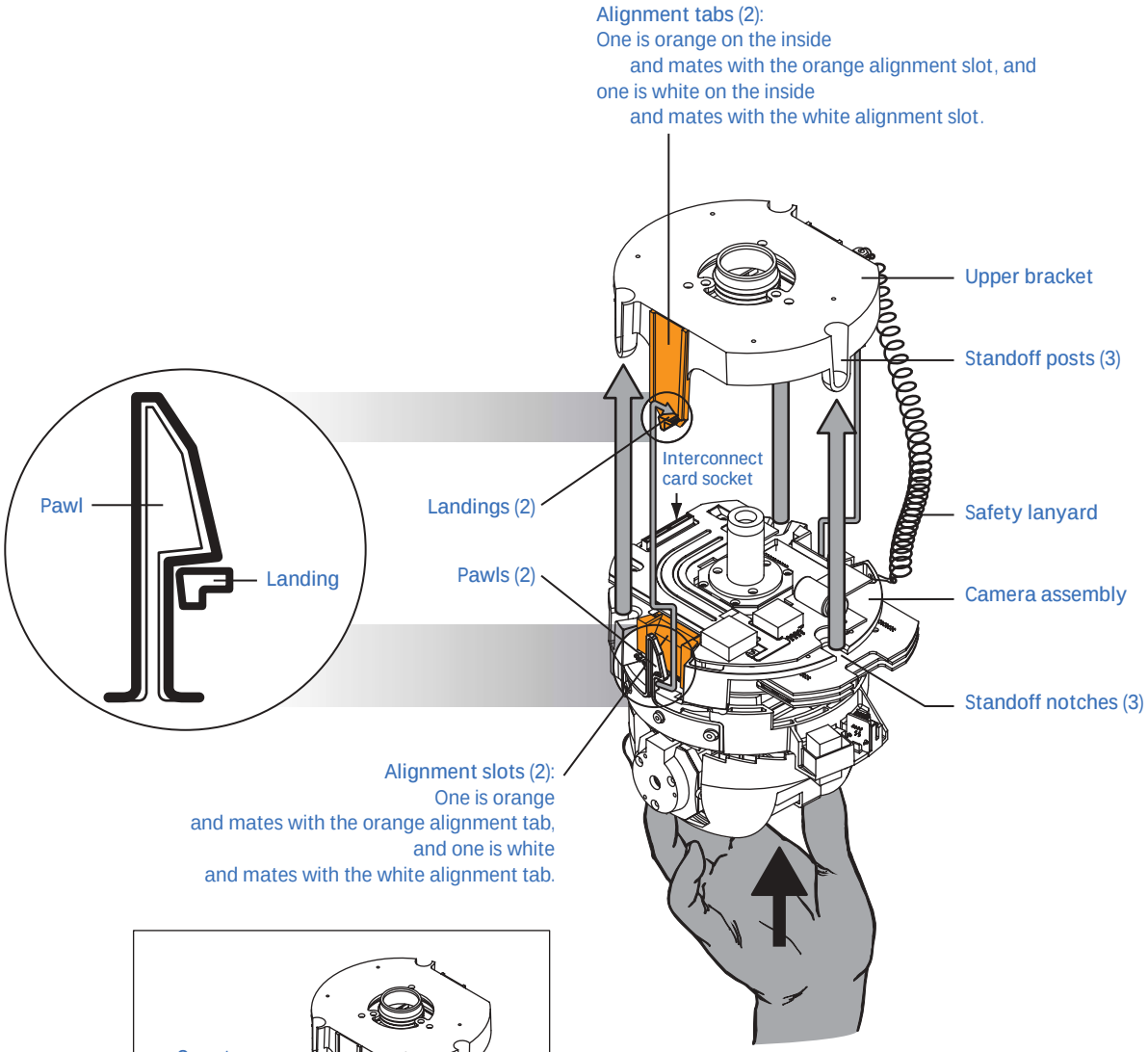
   - Align the three standoff posts with the three standoff notches.
4. Push the camera assembly straight up so that the interconnect card slips easily into its socket and each of the two pawls (one on either side of the camera assembly) comes to a solid rest on the landing of each of the two alignment tabs. If the camera assembly is not level, remove and reinstall it.
5. If the dome is powered, observe the diagnostic LEDs shown in *Figure 14* to verify that the camera assembly has been properly plugged in and powered. The LEDs on the right should be red (left) and green (right, and blinking once per second), showing that the dome's programming has started and is running. If you have an Ethernet connection, the second LED in the group of four on the left should be red. If the LEDs are not appropriately lit, reseat the camera assembly for a proper connection.

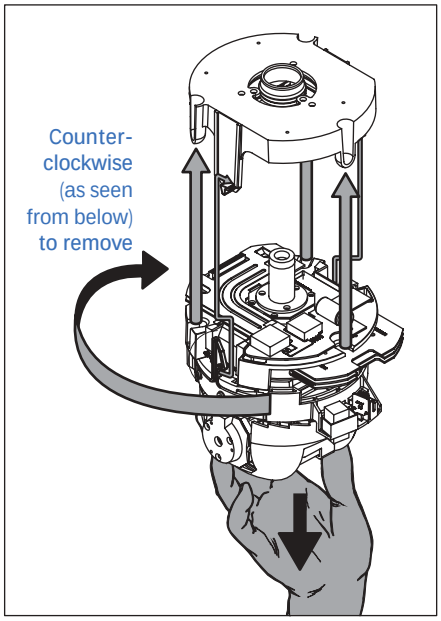
Figure 14. Diagnostic LEDs that show that the camera assembly is properly plugged in and powered



6. Observe the PTZ self-test for proper operation. The camera assembly will pause for about 30 seconds before beginning the self-test, then perform the self-test in 3 to 5 seconds. You will see the PTZ traveling to find its reference points, while initializing itself. DO NOT move the camera until it is done initializing itself.

Figure 15. Installing the camera assembly





CAUTION Heaters are hot. Do not touch.

To remove the camera assembly:
Just push up, twist the camera assembly counterclockwise, and lower it when the pawls are released from their landings.

Note: You need not stop the camera's movement before reaching up and removing the camera assembly.

Installing the bubble

There are a variety of bubbles and housings. The interlocking clips and safety cables may vary, but all bubbles have them.

CAUTION To prevent damage, do not touch the bubble with your bare hands, do not place the bubble face down on any surface, and protect the bubble from dust. Oil and acid residue from your hands can etch some bubble surfaces and is difficult to remove. Use a scratch-resistant cloth or gloves when handling the bubble.

To attach the bubble to the housing, do the following and see *Figure 16* on page 23:

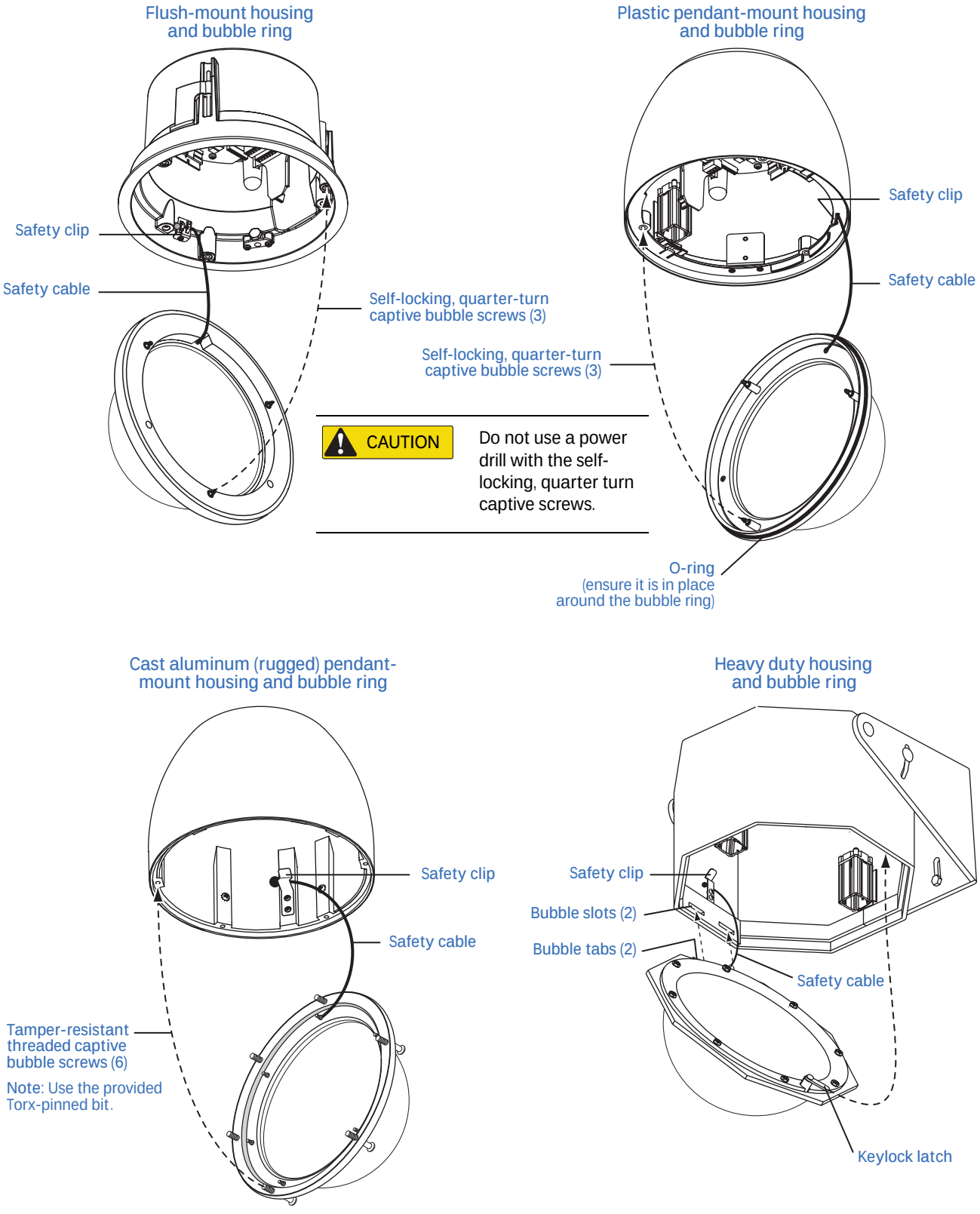
1. Fasten the bubble safety cable to the housing's safety clip.
2. Swing the bubble up to the housing and align the bubble's screws with the housing's bubble screw holes.

   If you are installing a plastic pendant-mount housing, there are alignment guides on the housing ring that straddle the rear-facing screw hole of the bubble ring.
3. Use the following guidelines for tightening the bubble screws.
   - If you are installing a plastic pendant-mount or flush-mount housing, the bubble screws are self-locking, quarter-turn captive screws and *require only a quarter turn to tighten*.

     CAUTION Do not use a power drill with the self-locking, quarter turn captive screws. A power drill can strip the heads of the screws or the inside of the screw inserts (in the housing) enough to necessitate replacing the housing.

   - If you are installing a flush-mount housing, the bubble ring contains a foam pad that requires you to push up while turning the screws.
   - If you are installing the bubble on a rugged vandal-resistant housing, the screws are tamper-resistant and require the provided Torx-pinned bit for tightening. Do not tighten those screws to more than 0.196 kgm (1.42 lb/ft) torque.
4. Clean any fingerprints off of the bubble. See *Cleaning the bubble* on page 29.

Figure 16. Attaching the bubble to the housing (cameras not shown to show safety clips clearly)



Turning on the passcodes

The last task of installing the dome is turning on the passcodes, if desired, before going to the user manual to program the dome. The passcodes control who has access to the features of your dome. Only the installer through the installer passcode has permission to turn on, turn off, or change the passcodes.

The dome ships with no default passcodes. When you enter the programming interface for the first time during installation and go to Setup | Passcode, the passcode fields are blank. Blank passcode fields mean the passcodes are turned off (disabled). You can choose to enter passcodes into the blanks. This turns passcodes on (enables them) and a passcode will be required to enter the programming interface the next time you access it.

CAUTION If using passcodes, record them in a secure place. If you forget the passcodes for a dome, you will need to send the dome back to the factory so that it can be reset by the factory with no passcodes.

If no passcodes are programmed, all users are given installer access and are not required to log on. If only the Admin and Operator passcodes are programmed, then anyone can still access the entire programming interface as an installer, since the Installer passcode was not programmed.

You can turn on one installer passcode, one admin passcode, and one operator passcode. They have the following permissions:

Installer: The installer passcode allows access to all dome features.

Admin: The admin passcode allows access to all dome features, except passcodes and firmware upgrades.

Operator: The operator passcode allows no access until it is granted access to specific features on an area-by-area basis.

To access the programming interface and turn on passcodes, do the following:

1. At the normal display, press and hold the **set** (↵) key on the keypad until you hear a beep and the programming code display appears on the keypad's LCD.

2. At the enter programming code display, enter the programming access code by pressing the **9**, **5**, **1**, and **seq** keys.

   This code is the same for all GE keypads.

Figure 17. Normal display (visible before programming interface accessed)

```
CAMERA 1
MONITOR 1
```

Figure 18. Enter programming code display

```
ENTER PROGRAMMING
CODE: _
```

3. At the equipment selection display, press **3** to select CAMERA on keypads of version 1.2.09 or later (*Figure 19*) or CAMERA/RCVR on keypads of version 1.1.06 or earlier (*Figure 20*).

   If you have an older keypad (version 1.1.06 or earlier), you will have a second equipment selection display, at which you need to press **1** for CYBERDOME.

Figure 19. Equipment selection display for keypad versions 1.2.09 or later

```
1=SWITCHER/MPLX 2=ALARMS
3=CAMERA          EXIT ▶▶
```

Figure 20. Equipment selection display for keypad versions 1.1.06 or earlier

```
1=SWITCHER/MPLX 2=ALARMS
3=CAMERA/RCVR     EXIT ▶▶
```

4. At the enter site number display, enter the number for the camera site you are programming. This is a 3-digit number (e.g., 007, 021, 243).

   You can enter the three digits (e.g., 007), or enter one (e.g., 7) or two (e.g., 21) digits and press the **set** (↵) key.

5. Continue entering commands with the joystick.

6. Since passcodes are turned off by default, upon initial installation you can directly access the programming interface without a passcode.

   Note: For complete instructions for navigating and programming the programming interface, refer to the *Legend User Manual* (1052027).

Figure 21. Second equipment selection display for older keypads

```
1=CYBERDOME 2=PTZ
3=AUXILIARY      ◀◀BACK
```

Figure 22. Enter site number display

```
ENTER CAMERA SITE
NUMBER ___        ◀◀BACK
```

Figure 23. See Monitor For Menus display

```
 SEE MONITOR FOR MENUS
HOLD SEQ (3 SEC) TO EXIT
```

Figure 24. First screen of programming interface when passcodes are turned off

7. Turn on the desired passcodes:
   a. Select **Setup** and **Passcode**.
   b. Select the **ab** (keyboard) icon next to the Installer passcode.
   c. Select the digits for a unique passcode. There is an 4-digit limit.
   d. Select **Done**.
   e. Record the passcode in a secure location.
   f. Program other passcodes as desired.
   g. Select **OK**.

The next time users access the programming interface, they will have to enter the appropriate passcode to program those features that they have been given permission to program.

Figure 25. Passcode screen of the programming interface

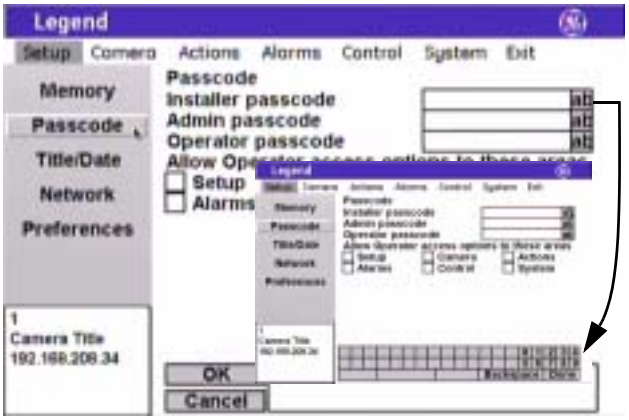


Figure 26. First screen of programming interface when passcodes are turned on

Troubleshooting, maintenance, support

This section provides information to help you diagnose and solve various problems that may arise while configuring or using your GE Security product and offers technical support contacts in case you need assistance. (See *Contacting technical support* on page 31.)

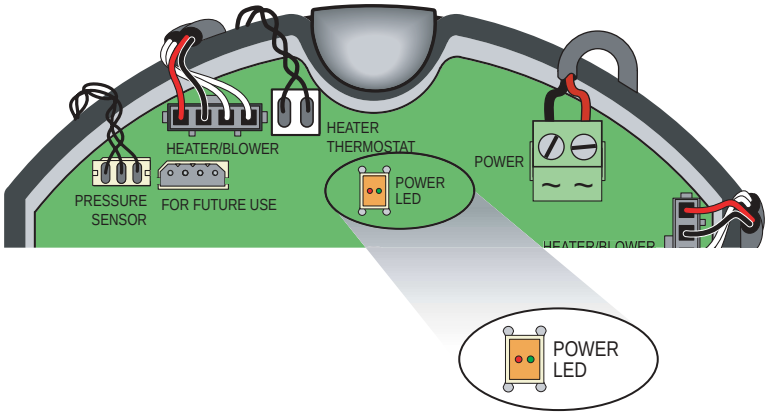
Troubleshooting your Legend dome

Diagnostic LEDs

Housing board power indication

When power is received by the housing board through the power connection, the housing board's diagnostic power LED will appear orange. It appears orange because the red and green internal LEDs both illuminate. The housing board power LED is located on the PC board that is attached to the underside of the upper bracket. It can be seen before the camera assembly is installed. See *Figure 27*.

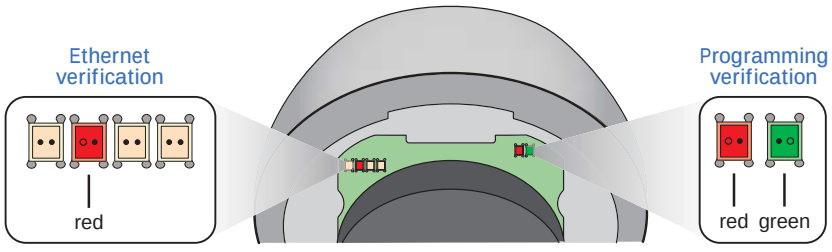
Figure 27. Housing board power indication



Camera assembly power indication

After the camera assembly has been installed and powered, there are two sets of diagnostic LEDs visible from below the camera. The LEDs on the right should be red (left) and green (right, and blinking once per second), showing that the dome's programming has started and is running. If you have an Ethernet connection, the second LED in the group of four on the left should be red. If the LEDs are not appropriately lit, reseat the camera assembly for a proper connection.

Figure 28. Diagnostic LEDs that show that the camera assembly is properly plugged in and powered



Common installation issues

Following are the solutions to the most common issues users have with installation. Solutions are given in the order of most to least likely cause.

Note: For programming and operating issues, refer to the *Legend User Manual* (1052027) and the user manual for your controller keypad.

Is the dome resetting during power-up, not powering up at all, or powering up but not operating as expected?

Verify that you are supplying sufficient power for your model of dome. See *Power requirements* on page 6.

Are the diagnostic LEDs not illuminating?

- First, look at and feel the camera assembly to make sure that it is fully engaged with the upper bracket. Remember that the alignment tabs and slots are color coded. Is orange engaged with orange and white with white? Are the pawls seated on their corresponding landings? Is the interconnect card fully seated into its socket? If not, remove and reinstall the camera assembly. See *Installing the camera assembly* on page 20.
- If that doesn't work, then check the power cable and verify that it is properly connected. See *Wiring the housing board* on page 15.

Is video not appearing on the monitor screen?

- First, look at the LEDs that are visible below the dome and verify that the unit is powered and that the programming is running. See *Camera assembly power indication* on page 27. If the dome is not powered or the programming is not running properly, remove and reinstall the camera assembly. See *Installing the camera assembly* on page 20.
- If the video still does not appear, then check the video cable and verify that it is properly connected. For UTP video, ensure that the + and - ends of the cable are correctly connected to maintain the polar sensitivity of the UTP video cable. See *Wiring the housing board* on page 15.

Do you have video but no PTZ control?

- First, verify the address of the dome. You can do this easily by pressing and holding the ***view*** key on the KTD-405 keypad. The dome's information will be displayed on the monitor screen. If necessary, correct the address
and/or protocol using the procedure in *Addressing the camera site and setting the protocol* on page 18.
- If you still don't have control of the video, verify that the data cable is properly connected. See *Wiring the housing board* on page 15.
- Finally, try resetting (cycling) the power to the dome by turning the power off then on.

Maintenance

Resetting the dome

You can reset the dome whether or not you have valid communication between the keypad and the dome.

To reset the dome, cycle the power to the dome by turning the power off then on.

Rebooting the dome

If you have valid communication between the keypad and the dome, then you can reboot the dome.

If the dome needs to be rebooted, do the following from the KTD-405 keypad:

1. At the normal display, press and hold the **set** (⏎) key on the keypad until you hear a beep and the programming code display appears on the keypad's LCD.
2. At the ENTER PROGRAMMING CODE: display, enter the reset access code by pressing the **1**, **4**, **7**, **6**, and **seq** keys.
3. At the RESET TO DEFAULTS? display, press **iris +** for yes.
4. At the reset which display, press **3** to select CAMERA.
5. At the RESET CAMERA #? ARE YOU SURE? display, press **iris +** to select yes.

The camera will reboot in 3 to 5 seconds. You will see the RESETTING CAMERA # display on the keypad LCD and the splash screen and color bars on the monitor screen as the camera reinitializes itself.

Cleaning the bubble

Use the following procedures for cleaning the bubble. Be aware that the interior of the bubble requires extra care in cleaning. Use only the procedures provided below.

CAUTION

For warranty protection, comply with this section's bubble handling procedures.

To prevent damage, do not touch the bubble with your bare hands, do not place the bubble face down on any surface, and protect the bubble from dust. Oil and acid from your hands can etch some bubble surfaces and are difficult to remove. Use a scratch-resistant cloth or gloves when handling the bubble.

Cleaning the exterior of the bubble

To clean the exterior of the bubble:

Use any nonabrasive cleaning cloth and a cleaning agent that is safe for use on polycarbonate or acrylic plastic. Liquid or spray cleaner/wax suitable for fine furniture is acceptable.

Do not use this procedure for cleaning the interior of the bubble. See *Cleaning the interior of the bubble*.

Cleaning the interior of the bubble

To clean the interior of the bubble:

- To remove dust and other surface contaminants, first use clean, dry, pressurized air to gently blow off loose material.
- To remove heavier contaminants, rinse the bubble with water and immediately dry it with clean, dry, pressurized air to prevent water spots.
- To remove stubborn contaminants, use a “wick” to clean the bubble’s surface. To make the wick:
  a. Use a high-quality, soft paper towel.
  b. Roll a section of the paper towel into a tightly wound tube, tear the tube in half, and wet a fuzzy end with 75% standard rubbing or isopropyl alcohol.
  c. Hold the bubble with its opening facing downward and wipe the interior with the wick (held at its dry end) using a circular motion starting from the outside and spiraling into the center.
  d. Use a new wick for each of two additional passes over the bubble.

Spare parts list

Table 6 provides a listing of all parts that can be replaced or retrofitted for the dome.

Table 6. Purchasable spare parts

Part name	Item number
Bracket, upper	1048840
Heater/fan kit with bracket (12 watt for plastic pendant-mount housing)	1053068
Heater/fan kit with bracket (23 watt for rugged, cast aluminum pendant-mount housing)	1053069
Housing, flush-mount	IDH-5101
Housing, pendant-mount, plastic	IDH-5201
Housing, pendant-mount, plastic with heater/fan	IDH-5202
Housing, pendant-mount, cast aluminum (rugged)	IDH-5401
Housing, pendant-mount, cast aluminum (rugged) with heater/fan	IDH-5402
Housing, pendant-mount, pressurized with sensor and heater/fan	IDH-5603
Housing, heavy duty, wall-mount	IDH-5501
Housing, heavy duty, wall-mount with heater/fan	IDH-5502
Housing, heavy duty, parapet-mount with heater/fan	IDH-5504
O-ring for bubble ring (only for the plastic pendant-mount housing)	1048938
PCB, interconnect (kit with clip)	1053110
PCB, housing	1047470
PCB, active housing	1047473
Thermostat (18 awg, 55° – 65°)	1052019

Contacting technical support

For assistance installing, operating, maintaining, and troubleshooting this product, refer to this document and any other documentation provided. If you still have questions, you may contact technical support and sales during normal business hours (Monday through Friday, excluding holidays, between 6 a.m. and 5 p.m. Pacific Time).

Table 7. Sales and support contact information

	Sales	Technical support
Phone:	Toll-free: 888.437.3287 (US, including Alaska and Hawaii; Puerto Rico; Canada) Outside the toll-free area: 503.885.5700	
E-mail	cvovideosales@ge.com	generaltech@ge.com
Fax	541-754-7162	541-752-9096 (available 24 hours a day)

Note: Be ready at the equipment before calling for technical support.

Online publication library

Another great resource for assistance with your GE Security products is our online publication library, available to all of our customers on our website. To access our publication library, go to our website at the following location:

`http://www.gesecurity.com`

In the **Tools** area at the top, click the *Publication Library* link then select *Video Surveillance*. After you register and log on, you may search through our online library for the documentation you need.[1]

1. Many GE Security documents are provided as PDFs (portable document format). To read these documents, you will need Adobe Acrobat Reader, which can be downloaded free from Adobe's website at `www.adobe.com`.

Appendix. Installing the individual mounts

All mounts (arms, adapters, and brackets) are shipped with installation instructions. This manual provides the installation instructions for only those mounts that are shipped with dome kits, which includes the wall-mount arm and the T-bar support kit.

GEA-102 wall-mount arm

The cast aluminum wall-mount arm is used to mount a dome to a vertical surface. It is for indoor or outdoor use and mates with both the plastic indoor and cast aluminum outdoor pendant housings. It can be attached directly to a vertical surface or mated with a bracket (corner-mount, pole-mount, or roof-mount). Instructions for mating this mount to the various brackets are provided in the instructions for those brackets. The following instructions explain how to install the wall-mount arm directly to a vertical surface.

Installing the wall-mount arm

See the corresponding figures and do the following:

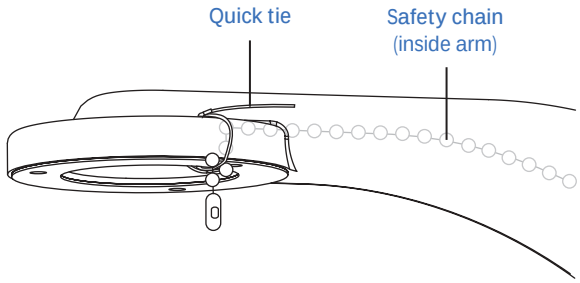
CAUTION

For all installations, heed these cautions:

- Complete all installation steps before supplying power to the dome.
- To ensure proper operation of a PTZ unit, install the mount level.
- For safety, the mounting surface, hardware, and procedure used for securing the dome must support the weight of the dome, mount, cables, and any structural or environmental vibration according to local codes. See *Table 1, Minimum load requirements of dome configurations* on page 4.

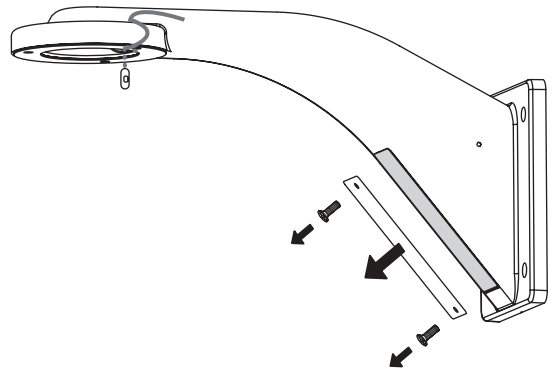
1. The facility cables usually come out of the mounting surface and enter the arm through the rear opening in the base. If the cables are attached externally to the mounting surface and need to enter the arm through the side, open the conduit hole in the side of the arm with the instructions given in *Opening a conduit hole* on page 35.
2. The factory secures the end of the safety chain to the collar opening with a quick tie. To keep the safety chain from slipping into the arm, leave the safety chain tied until you attach the dome to the arm.

Figure 29. Leaving the safety chain tied



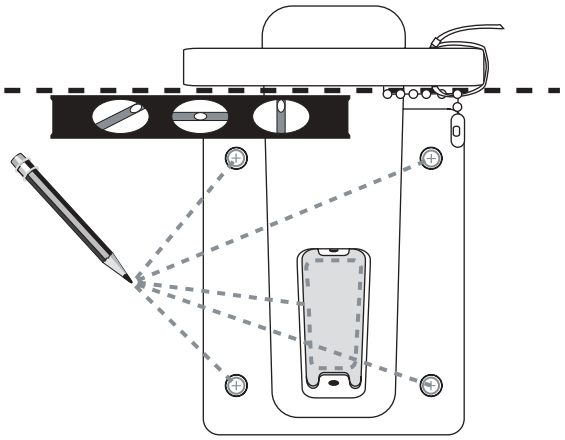
3. Remove the access cover.

Figure 30. Removing the access cover



4. Using the arm as a template, place it level against the mounting surface and mark the position of the mounting holes, and if needed, the cable entry hole.

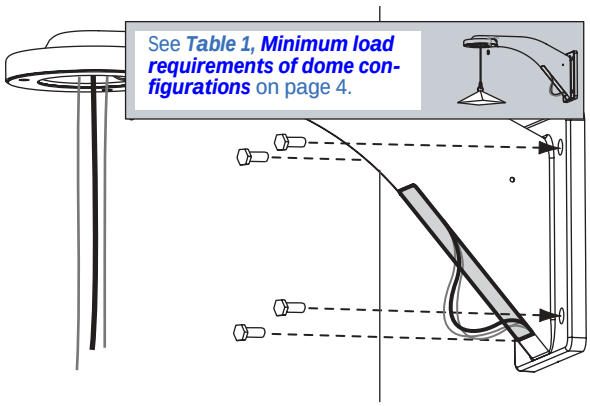
Figure 31. Marking the mounting and cable entry holes



5. Following all local codes, drill and prepare the mounting holes, and if needed, cut the cable entry hole.
6. Feed the cables through the cable entry hole in the mounting surface or through the conduit attached to the opened conduit hole, and up through the arm.
    - Pull enough cable to make connections. You can always cut off unneeded length later.
    - Do not terminate the cables yet. Otherwise, they will not fit through the dust seal of the housing.
    - How many cables you pull depends upon how many alarms and relays you are connecting in addition to the video, data, and power cables, and if you will be installing an Ethernet cable for flash upgrades. See *Wiring and addressing the dome* on page 14.

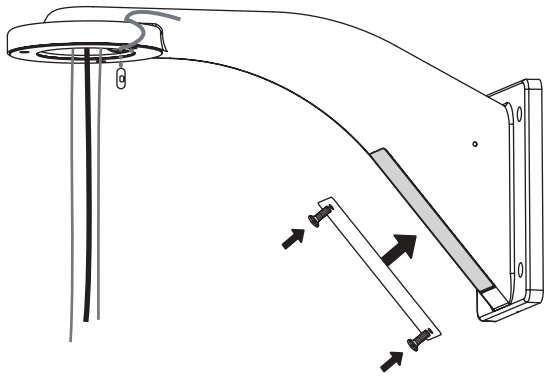
7. Securely fasten the arm to the mounting surface with the appropriate fasteners. Again, ensure that it is level.
8. If needed, seal all mounting holes so that no moisture can leak into the mounting surface.

Figure 32. Fastening the arm to the mounting surface



9. Push inside the arm or pull taut any looped cables that are extending out of the access area.
10. Reattach the cover.

Figure 33. Reattaching the access cover

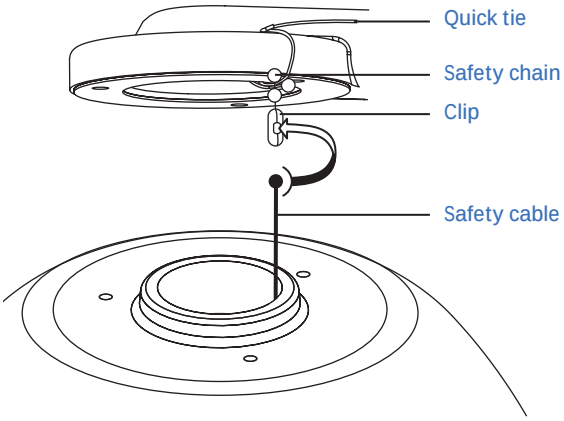


11. Before you attach the housing to the arm, attach the housing safety cable to the arm safety chain.

    Note: The safety cable for rugged housings is metal and for plastic housings is a beaded cord.

    a. Cut the quick tie on the safety chain.
    b. Hold the housing near the arm's collar.
    c. Slide the ball of the safety cable into the clip of the safety chain.
    d. Ensure that the safety chain and cable bears the housing's weight.
    e. Lower the housing until the safety chain and cable are taut.

Figure 34. Attaching the housing safety cable to the arm safety chain



12. Return to *Installing the housing* on page 8 to finish installing the dome.

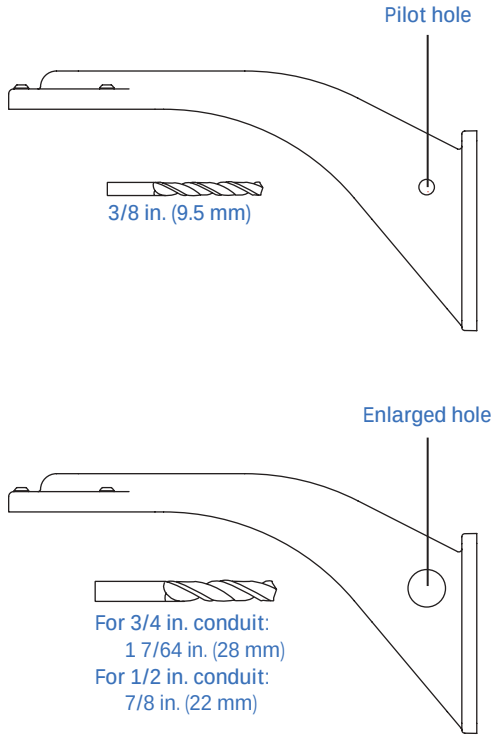
Opening a conduit hole

Open the conduit hole for a 3/4 in. or 1/2 in. conduit connector, if you need to bring the facility cables in through the side of the arm.

See *Figure 35* and do the following:

1. Locate the dimple on the side of the arm.
2. Drill a 3/8 in. (0.95 cm) pilot hole through the dimple.
3. Enlarge the pilot hole to 1 7/64 in. (28 mm) for a 3/4 in. conduit connector or to 7/8 in. (22 mm) for a 1/2 in. conduit connector.
4. Return to step 2 of *Installing the wall-mount arm* on page 32.

Figure 35. Opening a conduit hole



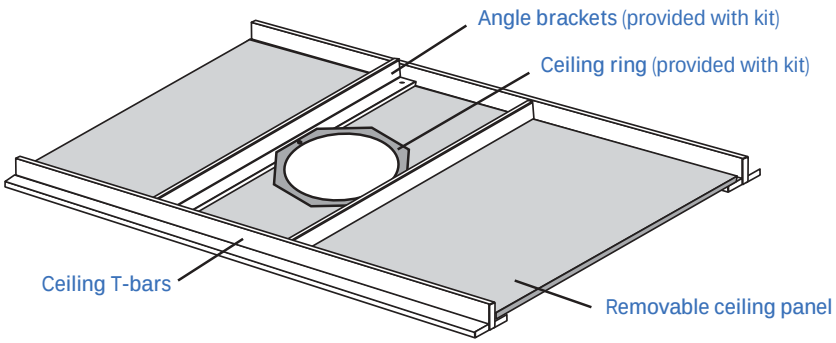
GEA-114 T-bar ceiling support kit

The T-bar support kit is used to install a flush-mount dome into a paneled T-bar ceiling (*Figure 36* on page 36). T-bar ceilings consist of a grid of metal T-bars that support removable panels. The kit distributes the weight of the dome between the T-bars of the ceiling, instead of resting it on a panel.

Product contents

- 1 ceiling ring
- 2 angle brackets
- mounting hardware (six 6-32 x 2-in. flathead screws)
- installation instructions

Figure 36. Parts of a supported T-bar ceiling



Installing the T-bar ceiling support kit

One side of the ceiling ring is flat. The other side has two press nuts. Orient the ceiling ring as directed in the instructions.

CAUTION

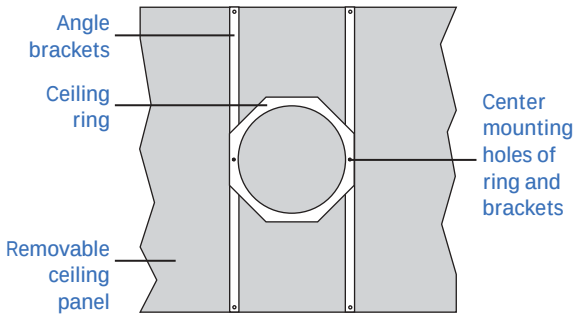
For all installations, heed these cautions:

- Complete all installation steps before supplying power to the dome.
- To ensure proper operation of a PTZ unit, install the mount level.
- For safety, the mounting surface, hardware, and procedure used for securing the dome must support the weight of the dome, mount, cables, and any structural or environmental vibration according to local codes.

See the corresponding figures and do the following:

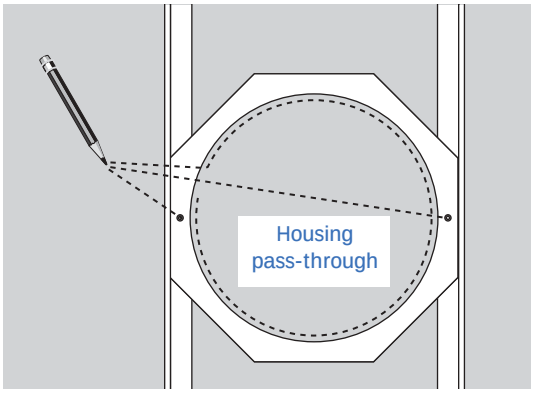
1. Remove the removable ceiling panel where the flush housing will be installed.
2. Center the angle brackets and ceiling ring (flat side to the brackets) on the removable ceiling panel aligning their center mounting holes.

Figure 37. Aligning the angle brackets and ceiling ring on the panel



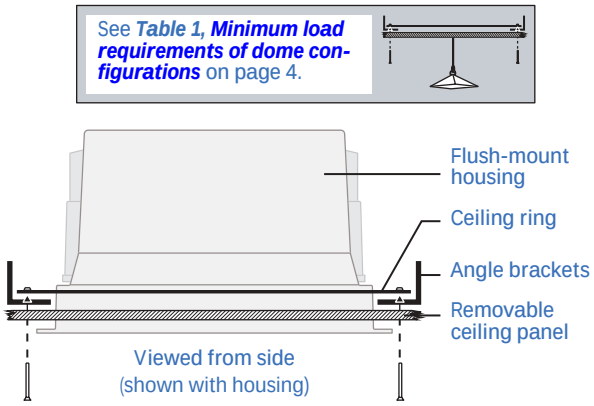
3. Using the ceiling ring as a template, mark the position of the center mounting holes and the housing pass-through hole on the removable ceiling panel.

Figure 38. Marking the mounting holes and housing pass-through hole



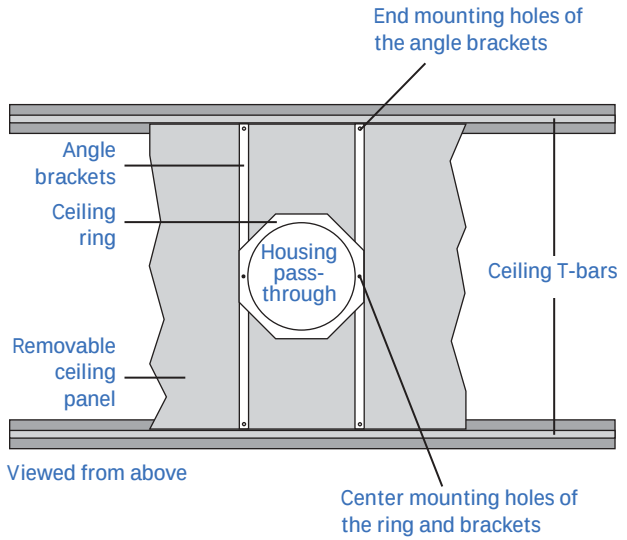
4. Following all local codes, drill the mounting holes (use a 3/16 in. drill bit) and cut the housing pass-through hole. Drill/cut all holes perpendicular to the panel and be careful not to overcut the housing pass-through hole.
5. Reset the angle brackets and ceiling ring on the removable ceiling panel aligning the center mounting holes of the brackets and ring with the drilled holes in the panel. Remember that the flat side of the ceiling ring lays on the angle brackets.
6. Using two of the fasteners provided, fasten the ceiling ring and the brackets to the panel through the center mounting holes. Tighten until snug, but not overtight.

Figure 39. Fastening the support kit onto the removable ceiling panel



7. Using the last four of the fasteners provided, fasten the ends of the angle brackets to the ceiling panel.
8. Reinstall the panel in the ceiling.

Figure 40. Installed T-bar support kit



9. Return to *Installing the housing* on page 8 to finish installing the dome.

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