

3980 SERIES IP CONTROLLED ENVIRONMENTAL CAMERA INSTALLATION MANUAL



**Figure 1. iView II Ethernet Camera
Shown with Wiper Unit**

Technical Manual 6X-1074a

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COHU
Cohu Inc., Electronics Division

**Refer to <http://www.cohu-cameras.com>
for specifications and model index**

Camera Software Support

Controlling this camera and viewing its video requires software running on a PC. Currently, two options are available:

- 1. For operation of the camera during installation and setup, download WinMPC.Net from the Cohu website. This software both controls the camera and views its video.**
- 2. For the day-to-day operating software download the SDK (Software Development Kit) from the Cohu website. A programmer will then use this SDK to write the operating software for the camera.**

A third software download is available to update firmware in the camera. This download will include DOS upload /burn software and the actual firmware updates themselves.

[cohu-cameras.com](http://www.cohu-cameras.com)

1.0 GENERAL DESCRIPTION

The Model 3980 is an integrated camera/positioner unit that combines a high performance digital signal processing camera, pan-and-tilt, and control receiver for communications into one integrated package (figure 1). A 35x lens is provided.

It communicates with Ethernet TCP (Transmission Control Protocol) packets and supplies video via Ethernet UDP (User Datagram Protocol) packets.

An IP Camera is configured to connect to a hub, switch, or router. Connecting it directly to the NIC (Network Interface Card) in a computer will require use of a crossover cable or crossover adapter.

Throughout this manual the entire camera and pan/tilt assembly will typically be referred to as just the "Camera."

Camera specifications and the model index are available in the 3980 data sheet on the COHU web site www.cohu-cameras.com.

1.1 Electrical Characteristics

The camera uses digital signal processing. It has an internal source ID generator. Integration control plus a built-in video storage card provides full color continuous video even at very low light levels.

The standard Camera option operates in temperature ranges from -34° to +50° C. The TS2 compliant option operates in a broader temperature range: -34° to +74° C. An optional heater is available for the pan/tilt housing on 115 V ac cameras.

The enclosure protects internal components against environmental effects such as salt, blowing dirt, moisture, and other effects.

The integrated receiver/driver, contained within the Camera, communicates using Cohu protocol messages. These messages control camera DSP (digital signal processing) functions and also the pan, tilt, zoom functions of the positioner. All Camera functions are operable via Ethernet serial communications.

Up to 64 pre selected scene locations can be stored for later access. These Preset locations are available for use with the Tour functions. All 64 preset positions are stored in nonvolatile memory to preserve them in the event of a power failure.

Each Camera "address" within a surveillance system can be selected electronically from the Monitoring Center. There are no mechanical dip switches to set at the camera, and each unit responds to the central command only if addressed. This provides greater integration flexibility for the designer and more dynamic camera control for the operator.

Privacy zones can be set up using polygon shaped windows drawn with the Viewer/GUI software. These blanking windows are generated electronically within the DSP and provide positive control of such areas.

Electronic image stabilization (EIS) is a standard feature for the camera module used in this Camera. This EIS feature can be set to either 5 or 16 hertz to minimize the effects of slight vibrations on a Camera in certain mounting situations — such as when it is mounted on a tall pole.

1.2 Software Downloads

This camera is intended for computer control and that computer must be running control and viewing software dedicated to this camera.

Two software packages related to operating the camera are available for download from the cohu-cameras.com website. A third package is available to update the camera firmware. These downloads are:

1. WinMPC.Net
2. Software Development Kit (SDK)
3. Firmware Updates

These packages are described below. Section 1.2.4 gives a brief functional description of the camera in relation to this software requirement.

1.2.1 WinMPC.Net Installation and Setup Software

For installation and setup of a camera use Cohu WinMPC.Net software. This software is not intended for the day-to-day operation of the camera. It is intended to control a single camera during installation and maintenance operations.

1.2.2 Software Development Kit (SDK)

A software development kit is available for those desiring to write their own software to control the Camera and to view video from the camera. This software can be downloaded from the cohu-cameras.com website.

1.2.3 Firmware Update Software

Any available firmware updates available for this camera can be downloaded from the cohu-cameras.com website. This download will consist of three parts:

1. A DOS upload/burn program
2. Firmware for a 8051 micro controller
3. Firmware for a DM642 digital media processor.

1.2.4 Functional Description

Video generated by the camera is reduced in bandwidth using MPEG-4 compression. This compressed video is then sent via Ethernet packets on CAT-5 cable to the PC. Control commands to the camera and responses back use Ethernet communications over the same cable.

At the PC the video processing must be reversed. Ethernet packets are converted back to video and then run through MPEG-4 decompression. This decompressed video is then processed by viewer software and displayed on the screen of the computer.

In addition to this video processing in the PC, the software must send camera control commands over the Ethernet cable as previously mentioned. The PC control software must also process any responses returned from the camera.

Within the Camera are an 8051 microcontroller and a DM642 digital media processor. Both these devices can be updated with firmware.

1.3 Mechanical Characteristics

Dimensions are shown in figure 9. The Camera consists of a sealed, pressurized camera module mounted together with a high performance positioner (pan/tilt unit) that is sealed from rain, dust, dirt, and other undesirable contaminants. The pan/tilt assembly is environmentally sealed but not pressurized. Dry nitrogen is used to pressurize the camera housing.

Every camera has a sunshield and rainshield for weather protection.

Ethernet and power connections are made via a 34-inch pigtail cable permanently attached to the bottom of the Camera base. An 18-pin connector attaches to this cable to provide all electrical connections. Only 9 of these pins are used.

The optional wash/wipe unit connections are made to an MS type receptacle on the rear plate of the camera housing.

A Schrader valve (figure 16 — the car tire type air valve on the left) on the rear panel provides for pressurizing the housing with dry nitrogen. This valve can be used to occasionally add dry nitrogen as necessary to maintain pressure in the barrel at about 5 psig (35 kPa). (Note: psig refers to pounds square inch gauge — which designates pressure relative to the altitude above sea level at which it is being measured.)

During shipping, at which times high altitude might be encountered during aircraft transportation, a pressure relief valve on the rear panel (figure 16) may release some pressure. Back at low altitudes this would be experienced as a housing pressure below the standard 5 psig (35 kPa).

Dry nitrogen should be added to bring the pressure back up to 5 psig (35 kPa). During normal purging and pressurization, internal pressure should not be allowed to rise above a 5 to 8 psig (35 to 55 kPa) range to prevent stress on the seals.

The pressure relief valve should be lifted off its seat during purging of the camera. This aids in the

flow of gas through the housing while purging moisture laden air from inside.

The mounting base for the Camera has a four-hole pattern for attachment to a pedestal, mounting arm, or other suitable base. High quality (grade 316) stainless steel bolts and lock washers should be used. An optional base plate is available to provide larger diameter hole patterns (figure 18).

A Camera can be mounted in any one of six mechanical configurations depending on the mounting accessories supplied. The model number defines the mounting equipment supplied as part of the Camera. Table 1 shows the mounting items supplied for each of the mounting configurations available with a Camera.

1.3.1 Wiper Unit

An optional wiper assembly can be supplied with the camera. Figure 1 (front page) shows a camera with an optional wiper unit mounted. Figure 2 shows a rear view of a camera with the wiper unit. A flexible cable connects from the wiper unit to the rear plate of the camera module. The wiper unit draws two watts when running.

2.0 INSTALLATION

This section covers the general requirements of installing the Camera including cabling, power requirements, and pressurization considerations. In addition to the physical installation requirements, this section covers a number of other items including static discharge protection and proper shipping and handling of the Camera.

Section 4 at the rear of this manual covers the various mounting brackets, their dimensions, and general installation requirements of bolting the Camera in place. A prime consideration will be routing of the system cable to a Camera. This must be planned for during the initial consideration of an installation location.

These mounts should be installed only by qualified installers thoroughly familiar with the various code requirements and industry standard best practices for an installation.



Figure 2. Wiper Unit Rear View

2.1 Unpacking and Receiving Inspection

This item was thoroughly tested and carefully packed in the factory. Upon acceptance by the carrier, they assume responsibility for its safe arrival. Should you receive this item in a damaged condition, apparent or concealed, a claim for damage must be made to the carrier.

If a visual inspection shows damage upon receipt of this shipment, it must be noted on the freight bill or express receipt and the notation signed by the carrier's agent. Failure to do this can result in the carrier refusing to honor the claim.

When the damage is not apparent until the unit is unpacked, a claim for concealed damage must be made. Make a mail or phone request to the carrier for inspection immediately upon discovery of the concealed damage. Keep all cartons and packing materials.

Since shipping damage is the carrier's responsibility, the carrier will furnish you with an inspection report and the necessary forms for filing the concealed-damage claim.

To return the product to the factory for service, please contact the Customer Service Department for a Return Authorization (RA) Number.

2.2 Static Discharge Protection

Procedures in this manual do not require entry into the housing of the Camera. But in the event that a disassembled Camera is being handled, the following precautions should be followed:

CAUTION

This Camera contains sensitive devices that can be damaged by static discharge. Use appropriate static control methods when working inside the Camera.

Components used in modern electronic equipment, especially solid state devices, are susceptible to damage from static discharge. The relative susceptibility to damage for semiconductors varies from low with TTL to high with CMOS. Most other semiconductors fall between TTL and CMOS in susceptibility to static discharge. As a minimum, therefore, observe the following practices when working inside this or any other electronic equipment:

1. Use conductive sheet stock on the work bench surface.
2. Connect the sheet stock to ground through a 1 megohm or greater value resistor.
3. Use a wrist strap connected to ground through a 1 megohm or greater value resistor when working at the bench.
4. Maintain relative humidity of the room above 30 percent. This may require a room humidifier. Working on circuits with relative humidity below 30 percent requires extraordinary procedures not listed here.
5. Use antistatic bags to store and transport an exposed chassis, circuit boards, and components. Use new antistatic bags. Old, used bags lose their static protection properties.

This list serves as a reminder of the minimum acceptable practices. Be sure that all static discharge devices at the work bench are properly installed and maintained. Standard grounding mats and wrist straps purchased for use at work benches

are supplied with leads having current limiting resistors for safety. Never substitute with a grounding lead not having the resistor.

2.3 Equipment Supplied

The Camera assembly consists of a pressurized camera housing and environmentally sealed positioner (pan and tilt) assembly. The housing is fitted with an integral sun shield assembly that covers the camera module housing. This sun shield minimizes heat buildup inside the camera by shielding it from the direct rays of the sun. Table 4 lists the items supplied.

A cable connector kit (figure 15) is supplied as a loose part for mating with the connector on the pigtail. Beyond that, the model number of the camera determines what else is shipped with the camera. See table 4.

2.4 Equipment Required but Not Supplied

Table 5 is a list of equipment that may be required to install and make use of the Camera. As a minimum the Camera requires a source of operating power, a monitor on which to view the scene, an interconnection cable, and a computer running Graphical User Interface (GUI) software for control of the Camera if this is desired. *WinMPC.Net* is available as a download at no cost from Cohu Electronics:

www.cohu-cameras.com

2.5 Mounting Hardware

Installing the Camera will also require grade 316 stainless steel mounting bolts and a platform of some type on which to mount it. Gasket materials and sealing compounds may also be required to provide waterproofing of mounting holes in structures.

Be aware that stainless steel hardware is subject to galling of the threads when being fastened together.

Galling occurs when excessive friction between high spots on the threads results in localized welding. This leads to a further roughening of the threads and thus more galling.

MOUNT DESIGNATION	MOUNT DESCRIPTION	3980 CAMERA/ POSITIONER	SMALL BASE	LARGE BASE	ARM ASSEMBLY	POLE MOUNT ASSEMBLY	CORNER MOUNT ASSEMBLY	PARAPET MOUNT ASSEMBLY
PEDD	pedestal, small base	•	•					
LPEDD	pedestal, large base	•		•				
WALL	wall	•			•			
POLE	pole	•			•	•		
CORN	corner	•			•		•	
PARP	parapet	•			•			•

Note: A dot “•” designates an item supplied for each mounting configuration. Example: a PARP (parapet) mount configuration consists of the 3980 camera/positioner, an arm assembly, and a parapet mount assembly. Be aware that the LPEDD (large pedestal base) is an option that stacks with the small base when LPED is chosen as an option. This large plate has hole patterns typically used by other accessory mounts used with cameras.

Table 1. Mounting Configurations



Figure 4. Optional LPED Adapter Plate
(Mounts to the standard PEDD Adapter Plate)



Figure 5. Wall Mount Arm



Figure 6. Pole Mount

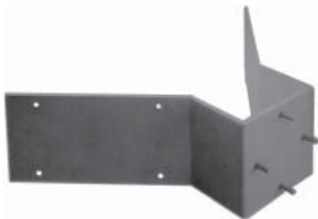


Figure 7. Corner Mount



Figure 8. Parapet Mount

In severe cases the bolts can actually be broken off when they seize during tightening. Galling is predominantly a problem with larger sized bolts — especially when using any kind of power driven fastening device that rapidly rotates the threads together.

This galling can be minimized by the use of anti seizing compound on the threads.

But putting any compound on the threads acts as a lubricant which can make it necessary to reduce the amount of torque applied as indicated by a torque wrench. When threads are lubricated a torque wrench setting intended for dry threads will lead to the bolt being stretched too much due to overtightened.

Any qualified installer will be aware of the need for anti seizing compound and the effect it will have on torquing the fasteners.

2.6 Cabling Requirements

All electrical connections for the Camera route through a permanently attached 34-inch cable. This cable is attached to the bottom of the Camera housing. An 18 pin connector is attached to the free-hanging end of the cable.

A mating connector kit (figure 15) is supplied for making system interconnections. This connector should not be attached to the system cable until it

is known that the cable can be routed through any narrow places (such as conduit) with the connector attached. Note that bends and turns in a routing can sometimes be difficult with an attached connector.

Figure 12 shows a typical test setup interconnection diagram for the Camera using a laptop PC running WinMPC.Net as the control point.

Always pre-plan all system cabling before starting an installation. Before a Camera is bolted in place, the system cable must be available to attach to the pigtail cable at the mounting location.

2.7 Power Requirements

Two considerations are the operating voltage of the specific model of camera to be installed and also the power consumption of that model considering any options that it may have.

2.7.1 Operating Voltage

There are two versions of the Camera related to voltage requirements:

- 24 V ac (Model 3984-590x / xxxx).
- 115 V ac (Model 3985-59xx / xxxx)

The model number label is attached to the back of the camera module housing.

Power connections to the Camera are made through a dedicated power cable. This cable and the Ethernet CAT5e cable both connect to the same 18 pin MS type plug for connection with the mating camera connector.

One version of the Camera is wired for 115 V ac. Pins “U” (high) and “T” (low) are used to provide 115 V ac Camera operating power. The AC ground is pin G.

A second version of the Camera is wired for 24 V ac. Pins “B” (high) and “T” (low) are used to provide 24 V ac Camera operating power. To provide power to the internal heaters, a separate 24 V ac input is used. Pin C is (high) and pin K is (low).

Ac ground for both heater power and camera power of the 24 V ac inputs is pin “G.”

In most situations standard unshielded twisted pair (UTP) CAT5e cable can be used for the Ethernet connection.

Table 2. Power Consumption

Usage	24 V ac Camera		115 V ac Camera	
	Basic	Optioned	Basic	Optioned
Basic Power	45 W	45 W	45 W	45 W
Camera Module Heater	18	18	18	18
Optional Wiper		2		2
Optional Pan/Tilt Heater				120
Total	63 W	65 W	63 W	185 W

Note: Either Camera can have the wiper option. Only the 115 V ac Camera can have the pan/tilt heater option. Heaters in the camera module head and the pan/tilt unit are each thermostatically controlled and can cycle on and off independently of each other.

Ethernet conductors are typically 26 or 24 gauge twisted pairs. With these data conductors it is desired to minimize capacitance loading and thus shielded type cables should not be used. However in problem installations with high interference levels, an overall outer shield can be used if desired. Individual shields over the twisted pairs should be the last choice.

The power conductors should be as heavy a gauge as possible. Cohu cables use paralleled 22 and 26 gauge conductors for the 24 V ac power cable and 18 gauge for the 115 V ac cables.

This voltage drop problem is especially acute with the 24 V ac version of the Camera since for the same configuration it draws over four times the current of the 115 V ac version.

Thus 24 V ac version has shorter allowable cable runs unless the power wiring is increased to a much larger size. To minimize this problem, operating power and heater power are supplied on separate inputs for a 24 V ac Camera and wires within the cable are paralleled to increase current carrying capacity. See figure 14 for an example of these 24 V ac paralleled power wires.

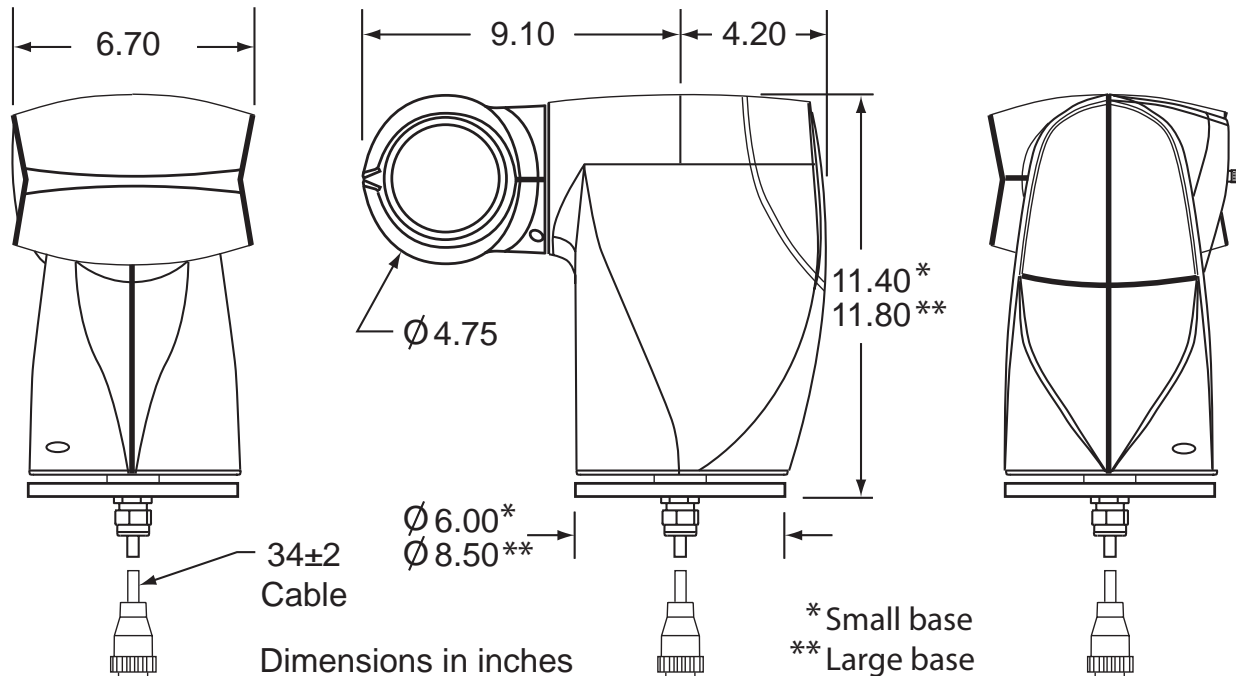


Figure 9. Dimensions, Model 3980

Maximum cable length for the Type CA-252G cable is 80 feet.

When the heaters turn on under thermostatic control during low ambient temperatures the voltage drops at the Camera due to resistance in the wires. With the 24 V ac version this does not decrease operating power since it is on a separate input, but for the 115 V ac version, operating voltage cannot be allowed to drop below the requirements of the Camera when heaters are energized by the thermostat.

Power wiring of greater sizes reduces this voltage drop when heaters cycle on and off. When designing a custom installation it is best to perform a few Ohm's Law calculations to determine what is the minimum allowable size for power wiring. Length of power wires both to and from the camera must be considered when doing these calculations.

And remember that the CAT5e Ethernet cable to the Camera cannot be longer than about 300 feet due to Ethernet timing considerations.

2.7.2 Power Consumption

The total power required by a Model 3980 can depend on its consumption in five different areas:

1. Basic Power draw of Electronic circuits
2. Pan/tilt motors when they are activated
3. Camera module housing heater
4. Window Wiper motor (optional)
5. Pan/tilt housing heater (115 V ac optional)

The electronic circuits draws current all the time, but the other four areas of consumption listed above do not. In table 2 the pan/tilt motors are included in the 45 watts under Basic Power because these functions are inherent to operation of the Camera.

The pan motor and the tilt motor only draw current when the camera is being repositioned. Both these motors typically will be energized at the same time when this occurs.

Table 3. Cable CA-252 Cable Connectors

CABLE	VOLT AC	MAIN CONNECTOR	IP VIDEO CONNECTION	POWER CONNECTION
CA-252A	115	Cohu Type 1310230-017 <i>Note 1 and Note 2</i>	stripped leads	stripped leads
CA-252B	115		RJ-45	115 V ac Plug
CA-252G	24		RJ-45	stripped leads
<p><i>Note 1. Equivalent types: MS3116F-14-18S and Amphenol/Bendix PT06E-14-18S(SR)</i> <i>Note 2. Main Connector mates with connector on permanently attached camera cable.</i> <i>Note 3. Maximum length of CA-252G is 80 feet. All others are maximum of 250 feet.</i></p>				

Table 4. Items Supplied

Item	Description	Cohu Part No.
1	Camera/Positioner	398x
2	Mating Cable Connector [MIL MS3116F-14-18S] [Amp/Bendix PT06E-14-18S(SR)]	1310230-011

Table 5. Items Required but Typically not Supplied

Item	Description	Characteristics
1	Support base, wall, etc	The camera/positioner mounting base or an optional mounting arm, etc must have something to bolt to: a wall, etc.
2	Cable	An interconnection cable with Cat5e type Ethernet twisted pairs and also power wires. Power wiring must be sufficient to prevent excessive voltage drop
3	Source of Power	Either 115 V ac or 24 V ac, depending on the model of the camera. A 24 V ac or 115 V ac camera with the wiper option draws 65 watts. A 115 V ac camera with the wiper option and the pan/tilt heater option draws 165 watts. (Wiper requires 2 watts when operating)
4	Conduit	Conduit, sweeps, pull boxes, and junction boxes may be required for the cable run up to the camera/positioner
5	Computer (PC)	A computer with an Ethernet port and sufficient processor speed, motherboard RAM, and video card RAM to support MPEG-4 decoding and viewing
6	GUI control software	Control software using the Cohu protocol
7	Viewer Software	Viewing/decoding software able to provide usable video from the compressed video sent via the Ethernet packets
8	Software Development Kit (SDK)	An SDK is available from Cohu for those intending to write their own graphical user interface software for controlling this camera/positioner
9	Hardware	High quality grade 316 stainless steel nuts, bolts, and lockwashers should be used. Larger sized hardware should be coated with antiseizing compound.
10	Coax Seal	If the pigtail connector and any other connectors are likely be exposed to weather elements, it is best to wrap them with Coax Seal or an equivalent product.

Table 6. 3980 Connector & Mating Cable Plug

PART NUMBER REFERENCE	CAMERA PIGTAIL CONNECTOR	MATING SYSTEM CABLE PLUG
Cohu Part No.	1310230-017	1310230-011
MIL No.	MS3111F-14-18P	MS-3116F-14-18S
Amp/Bendix No.	PT01E-14-18P(SR)	PT06E-14-18S(SR)

Heaters cycle on and off in response to their thermostats during cold weather. The heater in the camera module housing and the heater in the pan/tilt housing (when this option is installed) each have their own thermostat and cycle on and off independent of each other.

The wiper motor draws current only when it is turned on; however, in inclement conditions this can be for a lengthy period of time.

For a basic Model 3980 without options the maximum running power draw with pan/tilt motors operating is 45 watts.

The optional window wiper motor would add 2 watts when it was running for a total, then, of 47 watts.

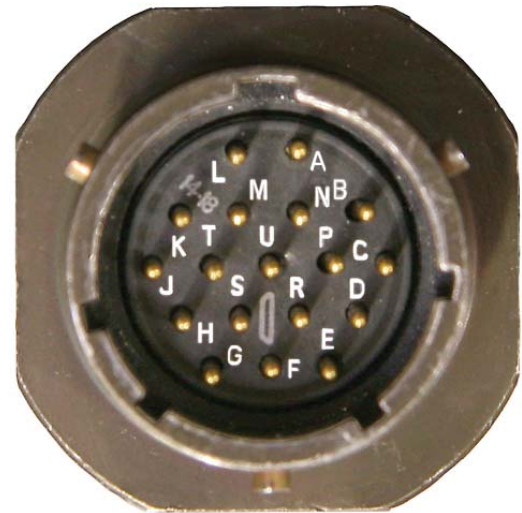
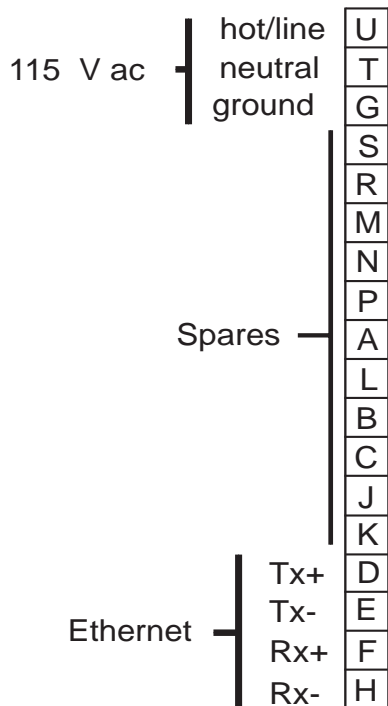


Figure 11. Pin Location Diagram, 3980 Pigtail Connector (1310230-017)

MODEL 3985 (115 VAC)



MODEL 3984 (24 VAC)

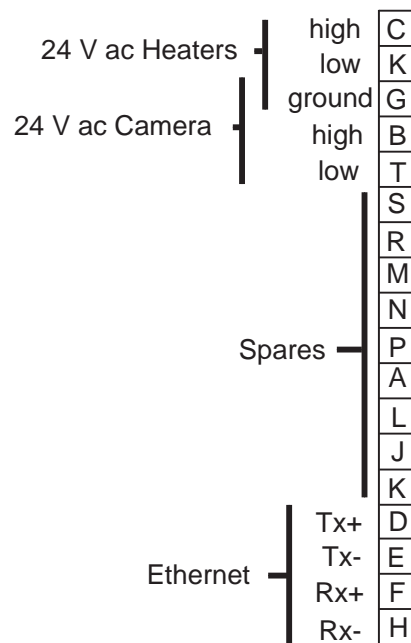


Figure 10. Camera Pigtail Cable Connector Pinouts

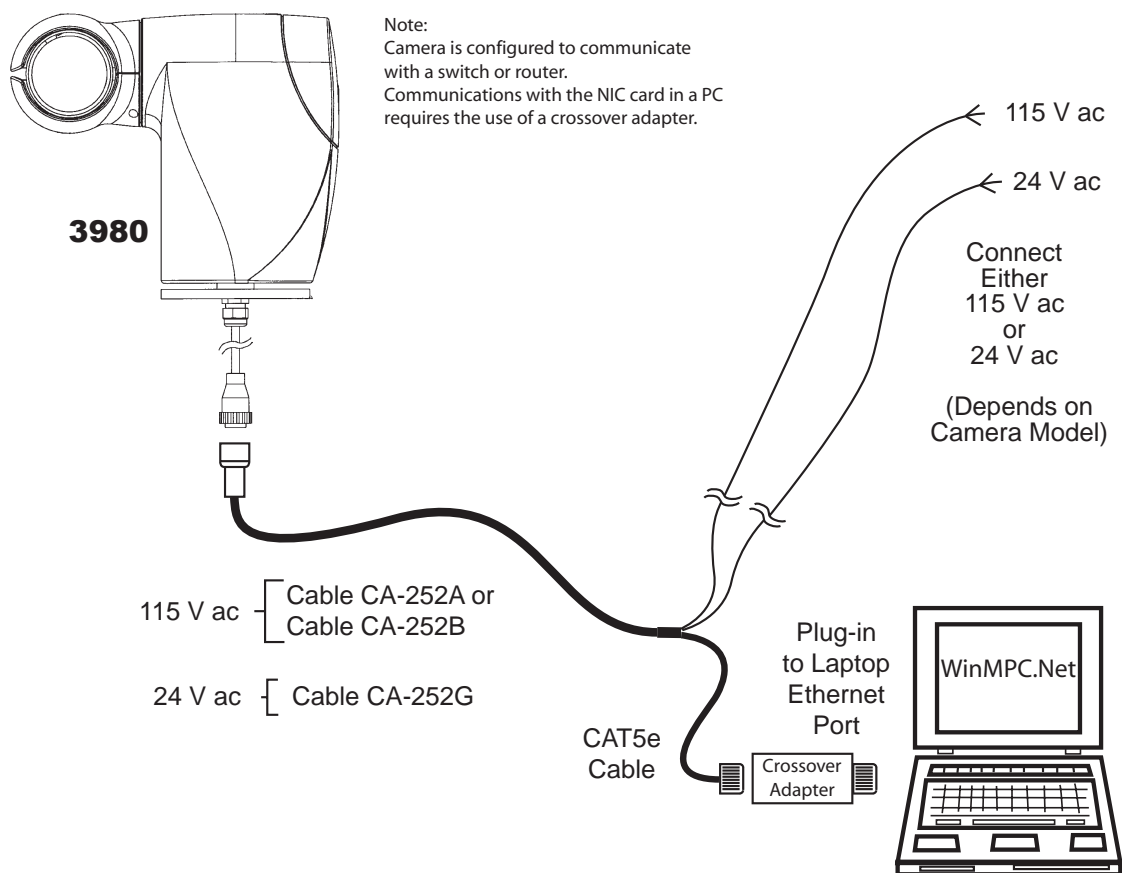


Figure 12. Interconnection Diagram, Typical Test Setup

Every time the heater in the camera module housing cycles on during cold weather, it draws 18 watts.

Thus the total possible power draw is 63 watts for a camera without any options.

The wiper option would add 2 watts to this when it is turned on during inclement weather for a total power draw of 65 watts.

However, if the optional pan/tilt heater is installed in a 115 V ac version of the Model 3980, power consumption increases by 120 watts every time it cycles on.

The maximum possible power draw for a 115 V ac Camera with all options, then, is 185 watts.

The 24 V ac version of a Model 3980 cannot have the pan/tilt heater option, thus its maximum power draw will be either 65 watts if it has the optional wiper option or 63 watts without the wiper installed.

2.7.3 Optional Wiper Unit Power

When the optional wiper unit is installed on a camera it draws two watts when running.

2.7.4 Optional Positioner (Pan/Tilt) Heater Power

If the optional pan/tilt heater is installed the camera it will draw an additional 120 watts each time it cycles on during cold weather. This option is only available for a 115 V ac version of the Camera.

2.8 Mounting Requirements

The dimensions shown in figure 9 related to mounting the Camera. The Camera can be optioned for six different mounting configurations:

1. Direct mounting to the small base plate (PEDD) on the Camera. See section 4.1 for details about this standard mounting base.

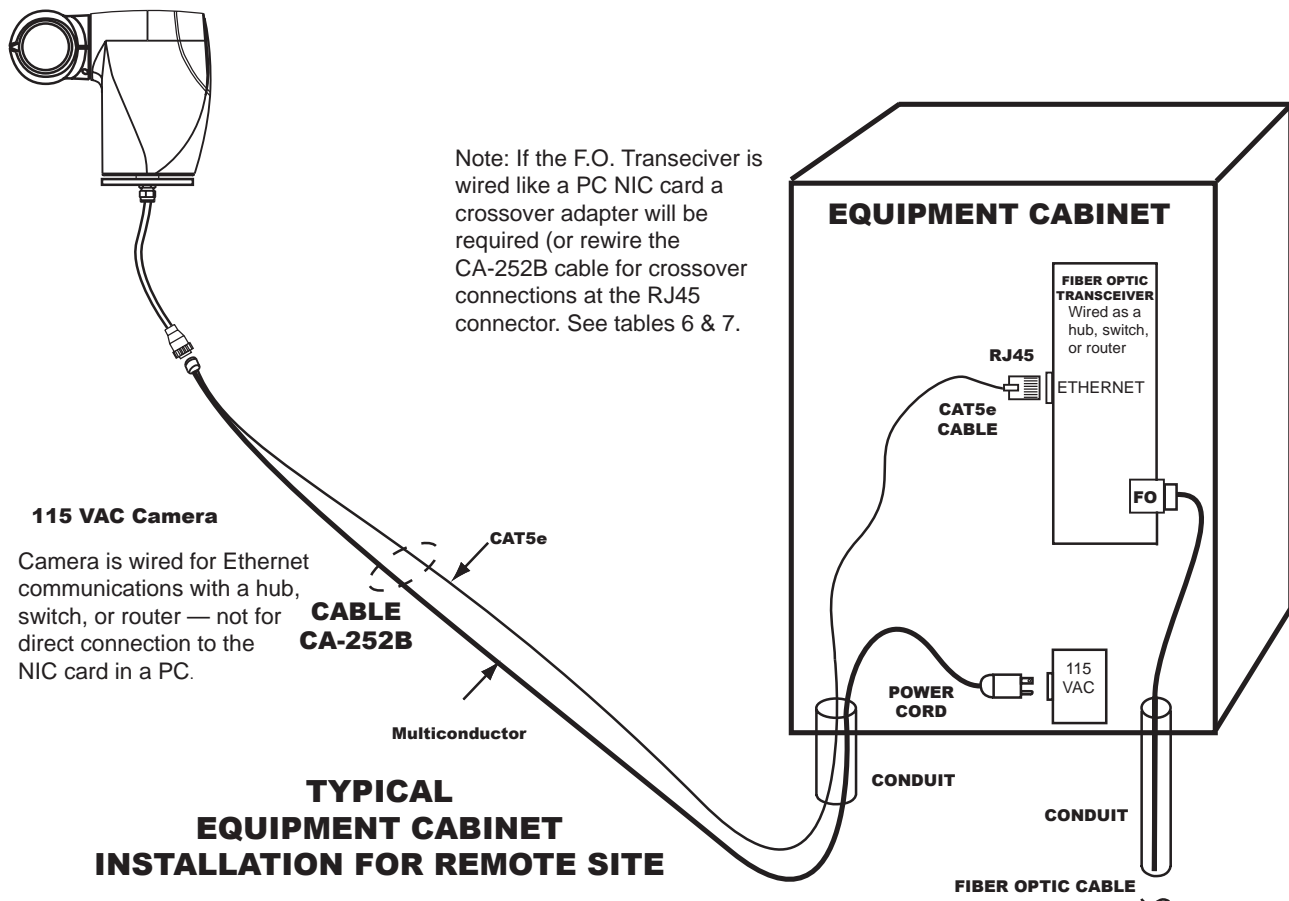


Figure 13. Interconnection Diagram, Typical Field Site

2. Mounting to the optional larger circular mounting base (LPED) which then mounts to a suitable surface. See section 4.2 for mounting with this option.
3. Wall Mount Arm (for direct mounting to a suitable wall surface or for mounting to items 4, 5, or 6 below)
4. Pole Mount. Clamps to a pole using stainless steel straps. The wall mount arm then attaches to this pole mount.
5. Corner Mount. Bolts to the corner of a building or other structure. The wall mount arm then attaches to this corner mount.
6. Parapet Mount. Bolts to the inside of a parapet on a roof of a building or other structure. The wall mount arm then attaches to the parapet.

All mounting hardware should be of high quality stainless steel — preferably of grade 316. This will ensure high strength fasteners resistant to corrosion.

All mounting hole patterns discussed in this section are four holes 90 degrees apart at the diameters noted unless otherwise mentioned.

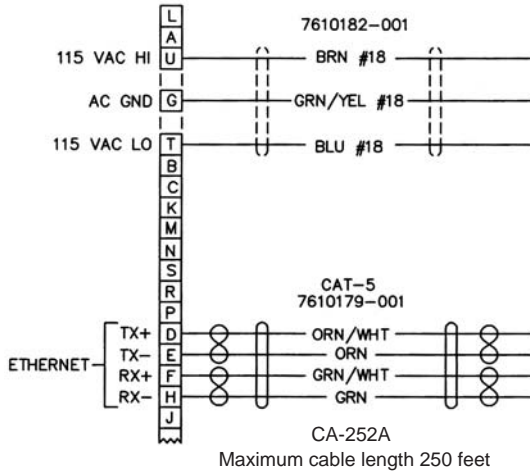
Mechanically indexing to a home position should not be required since the Camera will return to the last position at shut down when turned on again.

Refer to section 4 at the back of this manual for additional details concerning these various methods of mounting a Camera to a pole, building, or other type of structure.

The following paragraphs describe some of the features of the Camera related to the installation process.

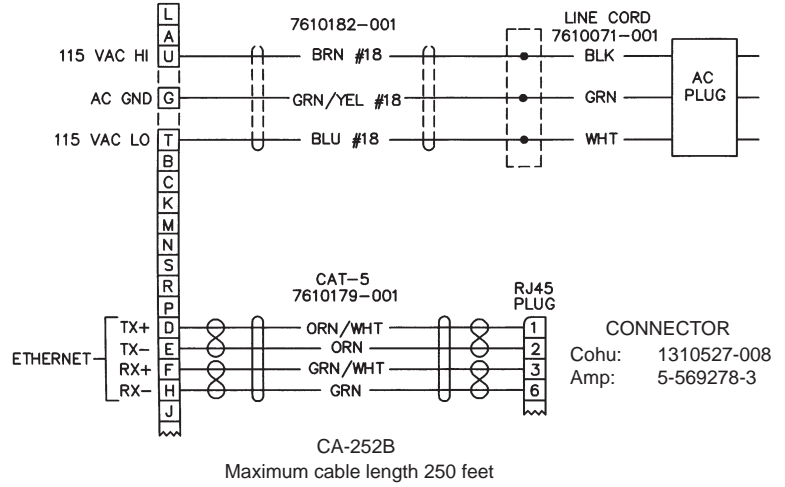
CONNECTOR

Cohu: 1310230-011
 Mil: MS 3116F-14-18S
 Amp: PT06E-14-18S(SR)



CONNECTOR

Cohu: 1310230-011
 Mil: MS 3116F-14-18S
 Amp: PT06E-14-18S(SR)

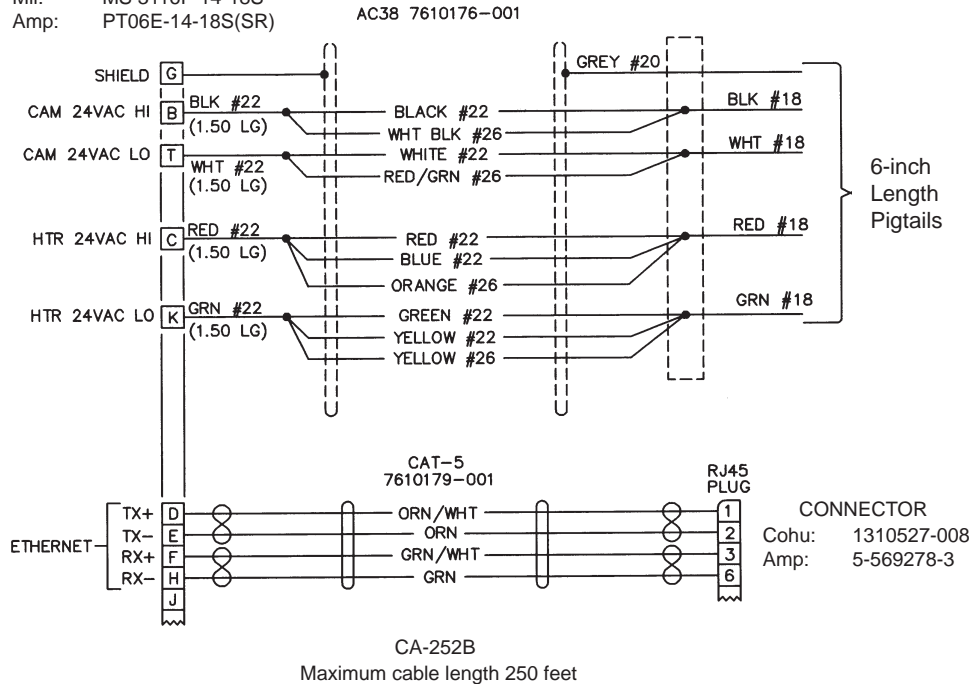


CA-252A (115 V ac)

CA-252B (115 V ac)

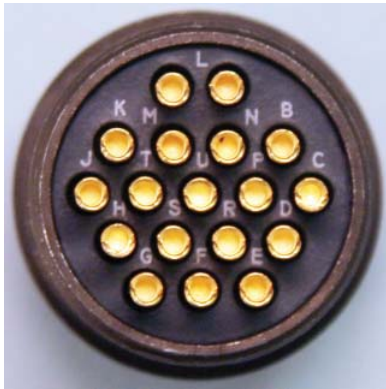
CONNECTOR

Cohu: 1310230-011
 Mil: MS 3116F-14-18S
 Amp: PT06E-14-18S(SR)

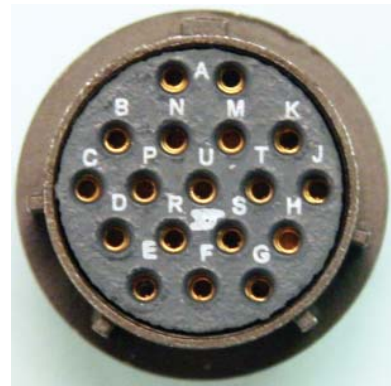


CA-252G (24 V ac)

Figure 14. CA-252 Series Interconnection Cables



Wiring Side - Solder Cups



Front Side - Mating Sockets



Connector Kit Contents



Typical Connector Kit as Packaged

Figure 15. Type 1310230-011 Mating Cable Connector Kit



Figure 16. Camera Module Rear Panel Shown for the Wiper Option

2.9 Installation Procedure

It is important to carefully plan for all cable routing before starting an installation. In some situations cables will have to be pulled through conduit or other narrow places before adding a connector to the end of a system cable. Any through-wall holes may require weatherproofing.

Installing the Camera is straightforward. It is only necessary to mount the Camera to a suitable base, mate the cable connector to the system cable and apply power. This assumes the other end of the cable is properly connected to a source of power, a TV monitor, a graphical user interface (GUI), and any other required equipment. Figure 13 shows a basic setup of the Camera in a test setup as would be used in a test facility. This diagram should give some idea of a typical installation. Each installation site, though, will have its own unique requirements.

2.9.1 Camera Module Rear Panel Features

Two features appear on the rear panel of the camera module of a Camera without wiper. And three with wiper (figure 16). One is a Schrader valve

for applying dry nitrogen to the interior of the Camera module housing, another is a 20 psi (138 kPa) pressure relief (safety) valve, and the third is an optional MS type connector for the wash/wipe option.

2.9.1.1 Schrader Valve

A Schrader valve is functionally identical to those used for car tires. But this valve should be used only to introduce dry nitrogen to a camera. During assembly cameras are purged of normal room air (which typically has a high relative humidity) by flowing dry nitrogen into the Schrader valve and out the pressure relief valve. This relief valve should be held open to aid in the flow of nitrogen out of the camera.

This purging process removes moist room air from inside the camera and provides an internal relative humidity of five percent or less. A camera is typically pressurized to 5 psig (34 kPa). Pressure can be allowed to go below this — even down to one or two pounds so long as the pressure does not ever become zero. An occasional recharge of dry nitrogen can be used to maintain pressure near 5 psig (34 kPa).

If pressure continually drops it is an indication of a slow leak. These pressure references are gauge pressures (psig). They are relative to the altitude above sea level at which they are being measured.

2.9.1.2 Pressure Relief Valve

The pressure relief valve opens at about 20 psig (138 kPa). This relief pressure allows the Camera to be taken to high altitude during transportation without excess bleed off of dry nitrogen from the camera housing. If the camera module should lose some dry nitrogen during high altitude transportation (as indicated by a pressure reading below about 5 psig) then some additional dry nitrogen may be added to replenish the lost nitrogen.

This valve should be manually lifted off its seat or pushed slightly to the side when it is desired to flow dry nitrogen through the camera to purge moisture laden atmospheric air from the camera module.

Regularly applying pressure above 5 to 8 psig (35 to 55 kPa) may cause seals to weaken and

Table 7. Cable Wiring to a Hub, Switch, or Router

Ethernet Function	Camera Connector Ethernet Pins	Corresponding RJ-45 Ethernet Pins
Tx+	D	1
Tx-	E	2
Rx+	F	3
Rx-	H	6

This Ethernet wiring is intended to connect directly to a hub, switch, or router. For connection directly to a PC it will be necessary to use either a crossover cable or a crossover adapter See table 6.

Table 8. Cable Wiring to a PC (Crossover Wiring)

Ethernet Function	Camera Connector Ethernet Pins	Corresponding RJ-45 Ethernet Pins
Tx+	D	3
Tx-	E	6
Rx+	F	1
Rx-	H	2

This Ethernet wiring is intended to connect a Camera to the NIC card in a PC..

leak.

2.9.2 18-pin Connector

This connector is attached to the 34 inch (86 cm) long cable that is permanently attached to the base of the Camera. The camera model number identifies whether it is configured for 115 V ac or 24 V ac operation.

Figure 11 is the pin location diagram of this connector. It is a view from the mating side of the connector. This view is identical to the wiring view of a mating connector (supplied) for the system cable that plugs into this Camera connector.

The connector supplied for the system cable should not be installed until it is verified that the cable can be pulled through any conduit or other restricted

passage on its way to the mounting location of the Camera.

2.10 Camera Cabling Requirements

Table 3 lists typical cables available for use with the Camera. This table summarizes the characteristics of each cable. "Stripped" in the table indicates that the wire leads are stripped and pre tinned with solder for attachment to a terminal strip or similar device.

Note that two of these cables are listed for use with 115 V ac Cameras only.

Cable CA-252G is for the 24 V ac versions of the Camera. Note that the maximum length of this cable is 80 feet due to power demands of the heaters, but longer lengths could become an issue for the camera power, too.

Assembly/wiring diagrams for the cables are shown in figure 14. These illustrations shows connector pin assignments related to both 115 and 24 V ac versions of the Camera.

A cable connected to the Camera usually routes to equipment in a nearby junction box or equipment cabinet from where another cable continues back to the system control station (figure 13). Fiber optic cable is often used for this link back to a central location.

Pre-plan all system cabling for an installation. Before an Camera is bolted in place, the cable from the junction box or cabinet must be available to attach to the Camera at its mounting location.

To install a 115 V ac Camera use either cable CA-252A or cable CA-252B. (figure 14). The pinout configuration for 115 V ac is shown in the two top illustrations on figure 14.

To install a 24 V ac Camera, use cable CA-252G The pinout configuration for 24 V ac, is shown at the bottom illustration in figure 14.

Some basic things to consider for typical cables are:

- 1 . Degradation of signal quality on the Ethernet cable due to interference signals and
2. Voltage drop on power wiring.

Use of a properly installed CAT5e Ethernet cable should eliminate any problems with that cable. It is important not to use more than 40 pounds pulling tension on the CAT5e cable when pulling through conduit, raceways, or any other location. Stretching the cable changes its characteristic. Note that when using locally purchased CAT5e cable the maximum pulling tension may be 26 pounds or lower. Check the data sheet.

Also, tight radius bends and routing the cable near sources of interference can cause a decreased rate of successful Ethernet packets on the cable. The bend radius for this cable should be at least 0.3 inch.

The power cable must have sufficient gauge wires (or wires paralleled) to maintain a voltage level at the Camera for both camera power circuits and for the heater circuits.

Figure 10 shows pin functions of both the 24 V ac Camera and the 115 V ac Camera. Be sure to know which operating voltage a Camera requires before preparing the cable and providing power.

A model number sticker on the back of the camera module housing can be used to determine its operating voltage.

Also, Cameras operating from 24 V ac use pin B as the camera circuits “high” input and pin “T” as the low input. Heater power for a 24 V ac Camera connects to pins “C” (high) and “K” (low). The heater draw 54 watts when it is cycled on.

When connecting camera power and heater power to the same 24 V ac source be sure to connect both high leads and both low leads to their respective terminals on the power supply.

Figure 15 shows a connector kit for the cable plug. It shows both sides of the connector. On the rear are solder cups for attaching wires and on the front are the mating pins.

When wiring to the Ethernet pins, be sure to

consider whether they should be wired for the NIC card in a PC or for system connections to a hub, switch, router, or similar device. See tables 7 and 8.

The solder cup wiring side of this system cable plug has the same pin orientation the Camera pigtail connector when looking at the mating pins on the end of the cable.

2.10.1 115 V ac Video Cables

Two cables are available for Cameras operating from 115 V ac power. The maximum length of either cable should not exceed 250 feet.

Figure 14 (CA-252A) shows a cable with stripped leads for on-site wiring of 115 V ac power and Ethernet as required.

Figure 14 (CA-252B) shows a cable providing a standard 115 V ac power plug and an Ethernet RJ-45 connector. When wired as shown, this RJ-45 connector should only be connected to a hub, switch, or router. Connecting it to a PC will require the use of a crossover adapter.

2.10.2 24 V ac Video Cables

Cable CA-252G (figure 14 bottom) is for use with the 24 V ac version of the Camera.

Camera operating power is provided on one pair of wires and heater power on a second pair. Cable length is limited to 80 feet due to the current draw of the heaters.

2.10.3 Connector Sealing

Even though the connector used with this camera is designed to maintain a weather tight seal with its mating system cable plug, it is recommended that for additional protection against moisture in severe conditions a sealing wrap be used on the connectors.

Coax Seal is the recommended product:

www.coaxseal.com

sales@coaxseal.com

United States: 1-800-241-8171

or international: 1-828-293-2222

This product is available from a variety of com-

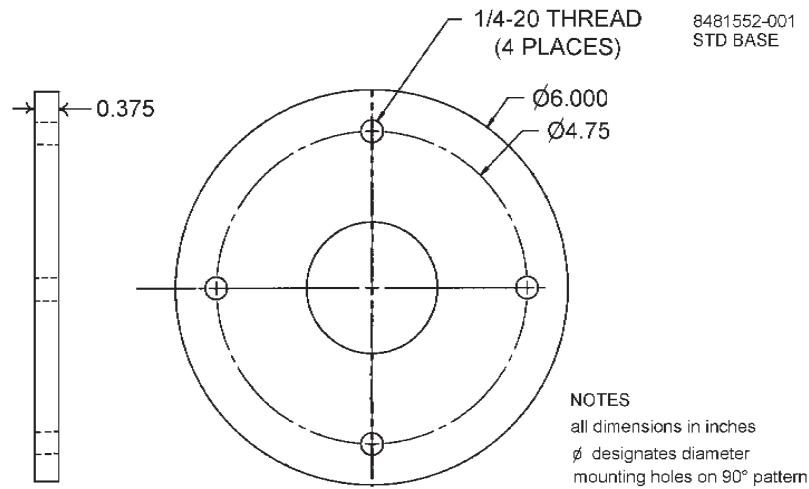
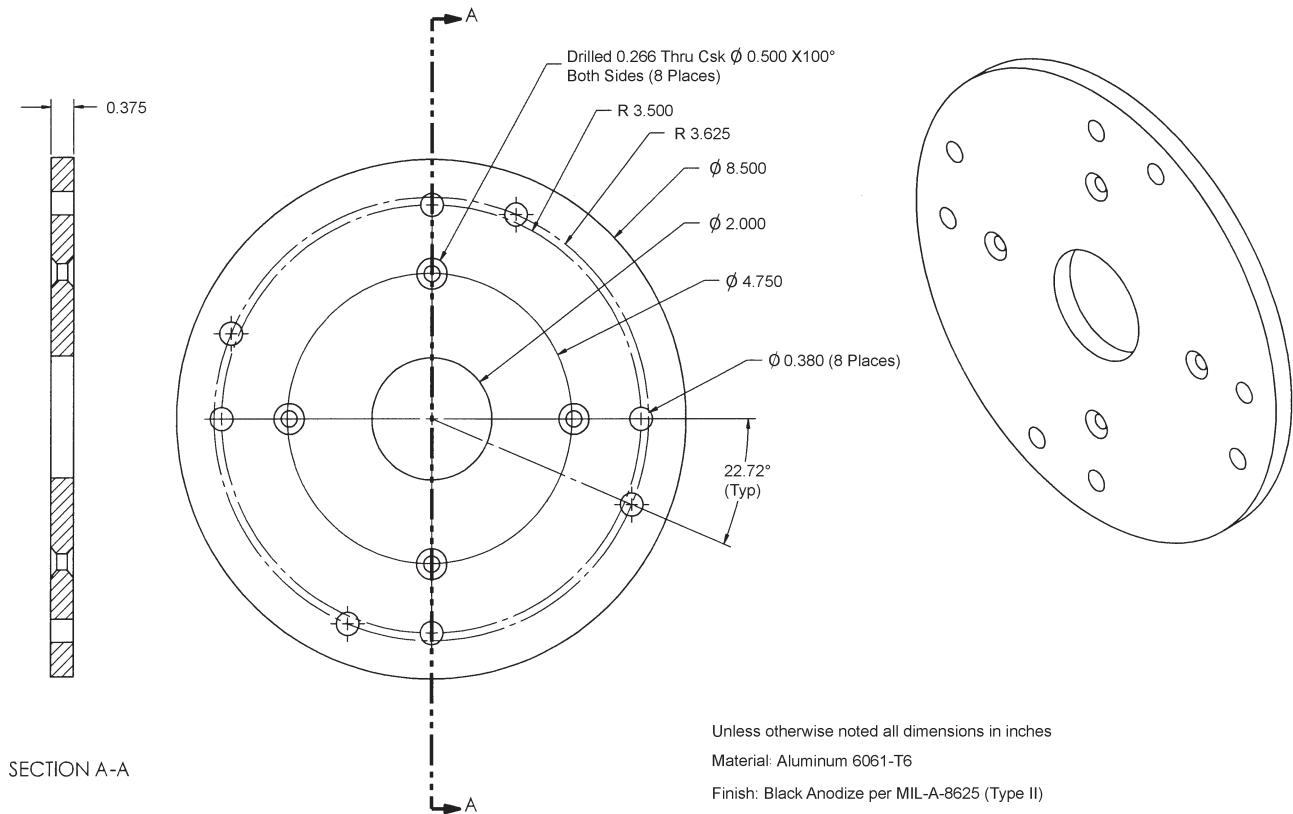


Figure 17. Dimensions, 3980 Standard Base (PEDD)



When ordered as a separate item, four 1/4-20 x 3/4 Flathead Nylon Screws Included (Cohu P.N. 0310010-093)

When the LPED option is ordered with Camera, this base is attached below the Standard base shown in figure 17 using these four screws.

Figure 18. Dimensions, 3980 Large Base (LPED)

mercial supply houses, consumer stores, and in the U.S. Government supply channels as GSA Schedule GS-07F-5739R

This product is a plastic tape-like material separated by a paper divider in its roll to prevent bonding to itself before use. After this material is wrapped around a connector, it forms a permanent weather-tight seal.

The cable and connectors should be clean and dry before wrapping with Coax-Seal.

Use a full wrap of this tape on the cable at the beginning. Then continue with a diagonal half overlap wrap up to the Camera housing. Then add a full wrap at the end of the coverage.

Squeeze together the wrapping so that it forms a tight bond both to itself and the mating connectors.

The web site for Coax-Seal has complete information about this product.

2.11 Preparation for Shipment and Storage

Maintain the Camera storage environment within a range of -34 to 85 °C (-29 to 185 °F).

For shipment, package with enough foam padding or other packing material to prevent damage that can occur during shipping. The original shipping carton is a good container if it has not been damaged or subjected to excessive moisture. For shipping to the factory by Common Carrier, use the following address:

**Cohu Electronics
12367 Crosthwaite Circle
Poway, CA 92064**

Please contact the Customer Service Department for a Return Authorization (RA) number before sending any shipments to the factory:

cst@cohu.com

Prominently display the RA number on the outside of the shipping container(s) and on paperwork contained inside. Give a brief description of why the equipment is being returned and list the symptoms

of any problems being experienced with the equipment.

3.0 OPERATION

3.1 IP Control and Viewing of Camera

Installation and testing of the camera should be performed with the Cohu WinMPC.NET software. This is available as a download at no cost from the Cohu website.

3.2 Checkout Procedure

After communications has been established with the Camera various functions should be tested to verify proper operation. Use the Win MPC.Net interface to perform tests and setups.

Check all the Momentary functions: zoom, focus, iris, color, and integration. Latch commands also should be tested: Camera power, lens fast, manual iris, and color balance. Several presets should be set and then re-established to verify their operation.

After presets are established, the tour function should be tested for proper operation. Once it has been verified that the Camera is operating properly it can be released for use.

4.0 MOUNTING METHODS

Since installation of a Camera may require that it be mounted to any of a variety of structures, different types of mounting assemblies are required. This section is a generic description of typical installations for each of the mounting assemblies that can be optioned with the Camera. Each mounting site will likely have its own unique requirements.

A Camera can be ordered with any one of six mounting arrangements. Two of these are related to base plates for the Camera and the remaining four are actual mounting arms and brackets for an installation.

Before preparing to mount a Camera it is important to have either pre-installed the system cable or to have verified that the cable can be routed to the location of the mounting assembly. This often requires pulling cable through conduit and other

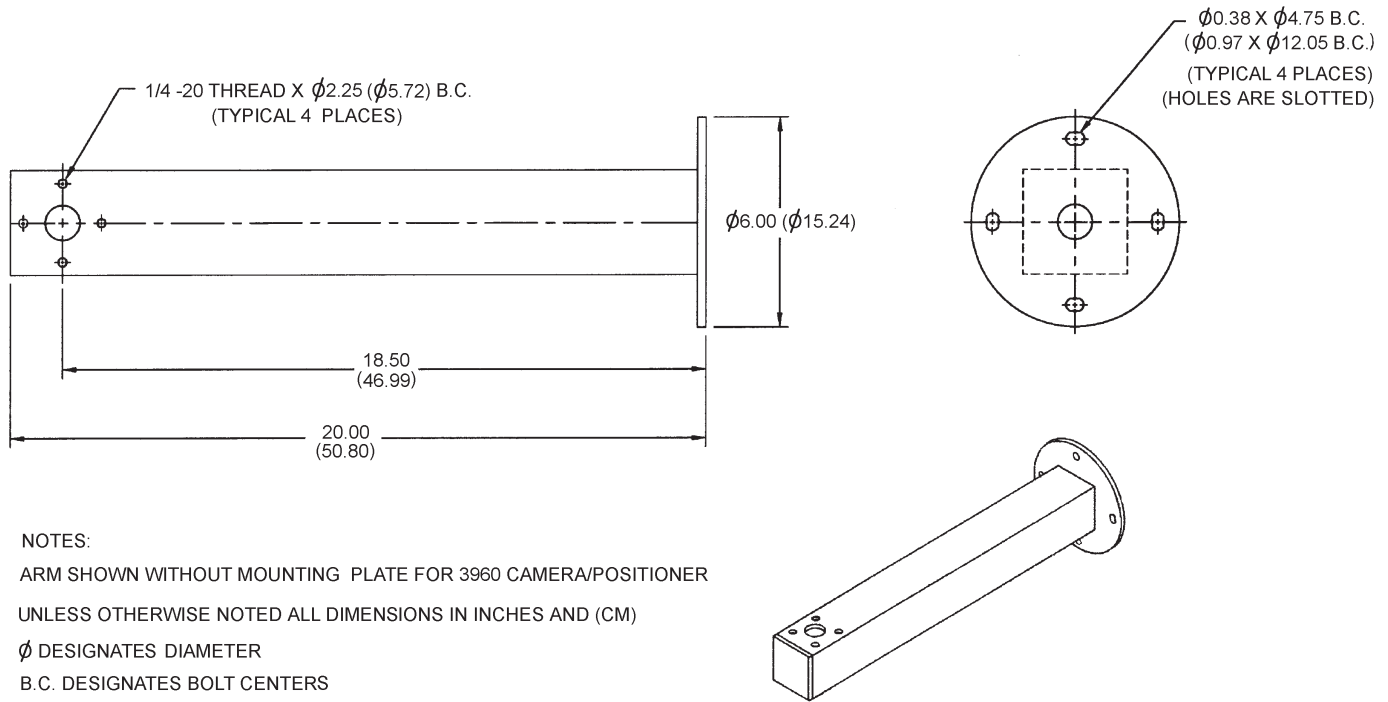


Figure 19. Dimensions, Wall Mount Arm

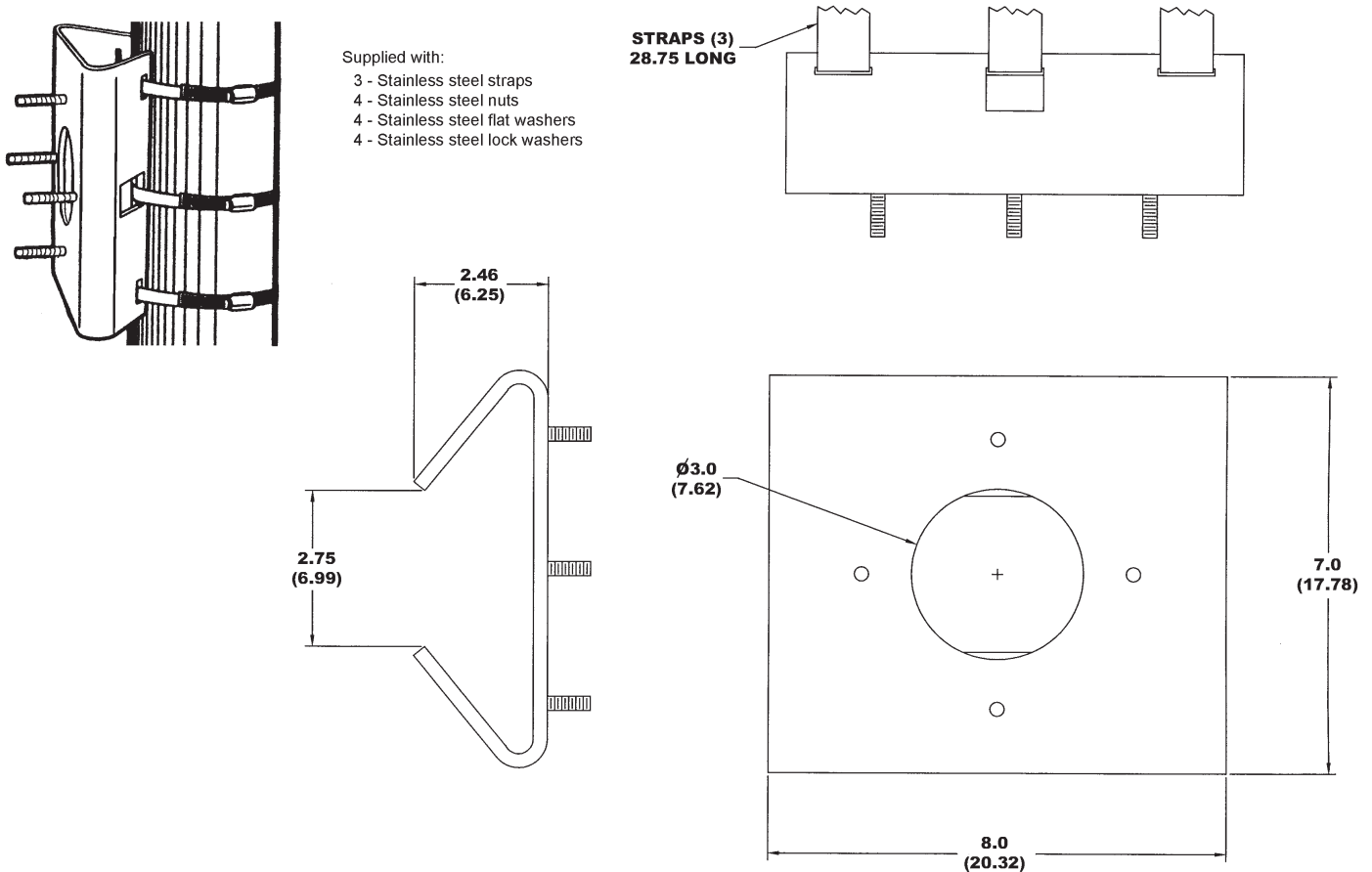


Figure 20. Dimensions, Pole Mount

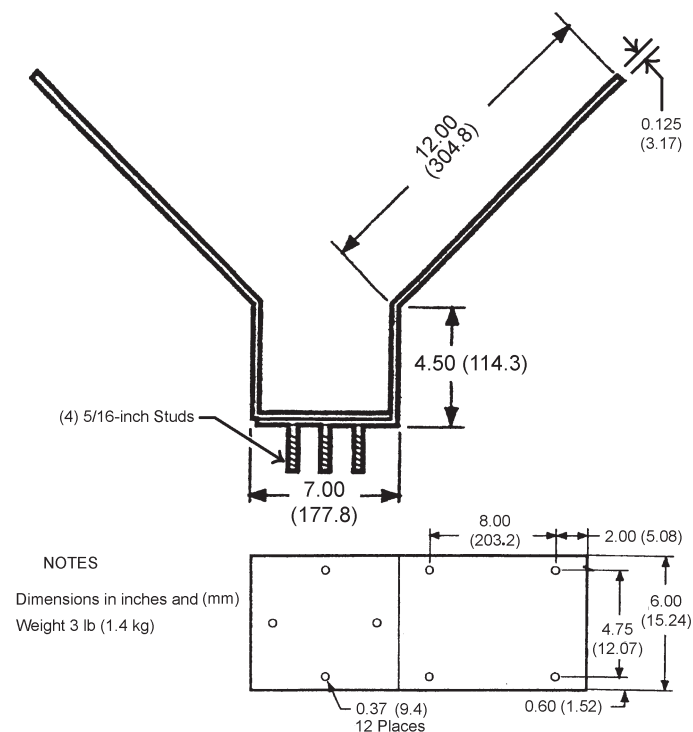


Figure 21. Dimensions, Corner Mount

tight places. It is also necessary to plan for weather-proofing any through-wall holes

4.1 Pedestal Mount Installation -- Small Base Plate

This is the simplest configuration. Only the Camera is supplied. It bolts directly onto the top of a site-supplied pedestal having the correct hole pattern or to an adapter plate providing the proper hole pattern.

Figure 17 is a dimensional diagram of the hole pattern on this plate. This base is a 6-inch diameter 0.375-inch plate permanently mounted to the Camera.

It provides four 1/4-20 threaded bolt holes spaced 90° apart on a 4.75-inch diameter hole pattern.

The 1/4-20 fasteners threaded into these holes must not protrude through the base more than 0.1 inch.

The Camera can be directly mounted to the

wall mount arm (section 4.3 below) or to any other base that matches the 4.75-inch diameter hole pattern on the Camera Base.

Proceed as follows to install the Camera on a pedestal:

1. Route the cable pigtail down into the pedestal. This cable should be secured by a strain relief and not allowed to hang free within the pedestal if there is a long cable run hanging underneath. (If an access plate is not available at the top of the pedestal, the system cable must first be connected to the pigtail connector.)
2. Bolt the Camera to the pedestal using stainless steel hardware.
3. Attach the pigtail connector to the system connector. This often is done through a removable access plate. Be sure these cables are secured with a strain relief so that they do not hang free with long cable runs.
4. Verify that the Camera will have a full range of movement without striking any nearby structure.
5. Refer to section 3 to set up and check out the Camera.

4.2 Large Base Plate (LPED) Installation

This plate is not required for any of the Cohu supplied mounting arms and brackets covered in this manual. It is an optional 8.5 inch diameter base plate that attaches to the Camera base plate to provide additional mounting hole options.

Figure 18 is the dimensional diagram of this optional base.

It attaches to four threaded holes on the Camera standard base with flathead 1/4-20 x 3/4 mounting screws. Use of flathead screws maintains the entire surface of the adapter plate flat for placing on an existing on-site mounting base

These holes are on the 4.750 diameter pattern. If site-supplied flathead screws are used they must not protrude through the standard base plate by more than 0.1 inch. More than this would jam into the Camera housing.

This optional base has two four-hole patterns for mounting to a pedestal or other type mount. One pattern is on a 7-inch diameter and the other on a

7.25-inch diameter pattern. Holes on each pattern are spaced 90° from each other. These patterns are offset from each other by 22.72°.

All support mounting holes are 0.380 diameter. They are intended for 3/8-inch hardware. Use high quality fasteners made from grade 316 stainless steel when mounting to support pedestals and arms.

4.3 Wall Mount Installation

Figure 5 shows the wall mount arm. For a wall-mount installation, the support arm bolts directly to a wall. An adapter plate on the end of the arm matches the hole pattern of a Camera base. The Camera is placed on the arm and is then bolted to it. This arm is also used with the remaining three mounting methods (pole, corner, and parapet).

Figure 19 shows dimensions of the basic wall mount arm. The 0.38-inch diameter holes (slotted) are suitable for use with 5/16-inch mounting hardware. All mounting hardware should be of high quality and made from grade 316 stainless steel.

This diagram does not show the adapter plate on the end of the arm to which the Camera fastens.

This adapter plate has four 1/4-20 threaded holes on a 4.75-inch diameter hole pattern to match the baseplate of the Camera.

The basic installation procedure is:

1. Verify that the system cable is accessible for connection to the Camera pigtail cable at the mounting location.
2. Install a connector to the end of the system cable (if not already installed).
3. Attach the adapter plate to the wall mount arm (if not already attached).
4. Install a weather tight gasket between the arm and the surface of the wall (if this is required).
5. Route the Camera pigtail cable down into the arm and out the back. Note that plastic plugs can be removed to aid in this process.
6. Position the Camera on the arm adapter plate and secure it with the hardware.
7. Connect the pigtail connector to the system cable connector.

8. Pull the system cable back into place so the arm can be positioned to the wall.
9. Bolt the Arm to the wall.
10. Verify that the Camera will have a full range of movement without striking any nearby structures.
11. Refer to section 3 to set up and check out the Camera.

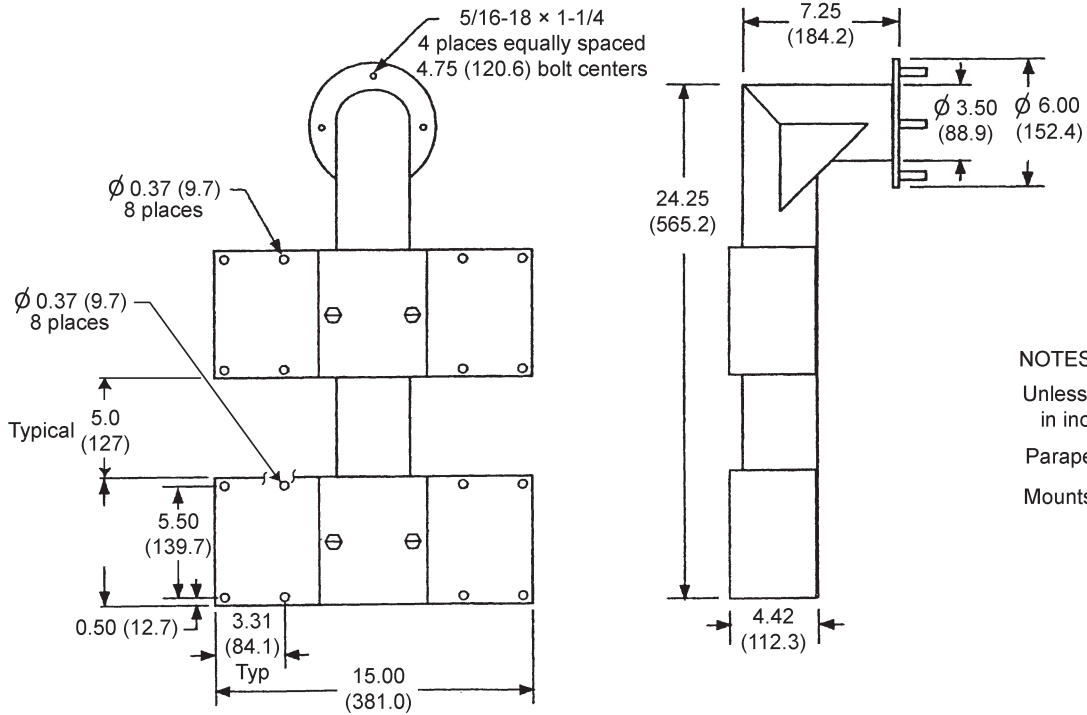
4.4 Pole Mount Installation

Figure 6 shows the pole mount bracket. This mounting arrangement provides a pole mount bracket to which the wall mount arm attaches. The bracket attaches to the pole using stainless steel straps.

Provisions must be made for routing the system cable up to the Camera location on the pole. Cables often route up through the pole and exit at an access port near where the pole mount bracket will attach. Provisions may have to be made to support the cable inside the pole so that the full cable weight is not supported solely at the top.

A pole mount installation is similar to the wall mount installation except that the arm fastens to a pole mount bracket instead of directly to a wall.

1. Verify that the system cable has been properly routed to a location where the pole-mount bracket will be attached. Plan the routing before doing any installation.
2. Attach the connector to the system cable (if not already installed).
3. Fasten the pole-mount bracket to the pole – being sure that the system cable is routed so that it is available for the wall-mount arm.
4. Attach the adapter plate to the wall mount arm (if not already attached).
5. Route the Camera pigtail cable down into the arm and out the back. Note that plastic plugs can be removed to aid in this process.
6. Position the Camera on the arm adapter plate and secure it with the hardware.
7. Connect the pigtail connector to the system cable connector.



NOTES
 Unless otherwise noted all dimensions in inches and (mm)
 Parapet mounting plates symmetrical
 Mounts to inside of parapet

Figure 22. Dimensions, Parapet Mount

8. Pull the system cable back so the arm can be slid over the pole mount threaded studs..
9. Install lock washers and nuts to secure the arm to the bracket.
10. Verify that the Camera will have a full range of movement without striking any nearby structures.
11. Refer to section 3 to set up and check out the Camera.

4.5 Corner Mount Installation

Figure 7 shows the corner mount bracket). A corner mount attaches to the corner of a building or other structure to provide viewing on two sides of the structure. The wall mount arm attached directly to the corner mount. Figure 21 shows dimensions of the corner mount assembly.

A corner mount installation is similar to the wall mount installation except that the arm fastens to a pole mount bracket instead of directly to a wall.

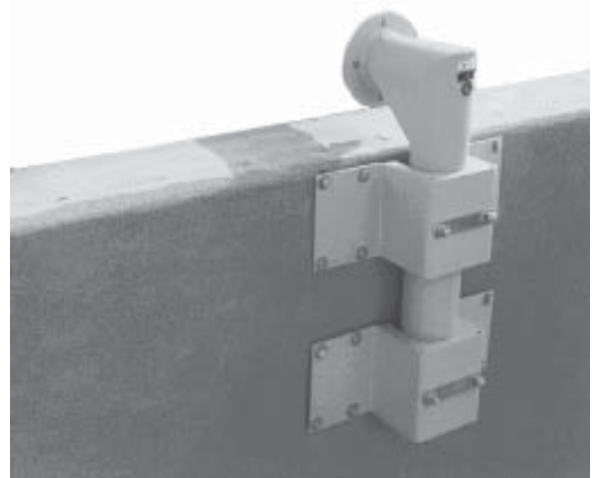


Figure 23. Installed Parapet Mount

1. Verify that the system cable has been properly routed to a location where the corner-mount bracket will be attached. Plan the routing before doing any installation.
2. Attach the connector to the system cable (if not already installed).
3. Fasten the corner mount bracket to the structure – being sure that the system cable is routed so that it is available for the wall-mount arm.
4. Attach the adapter plate to the wall mount arm (if not already attached).
5. Route the Camera pigtail cable down into the arm and out the hole at the bottom near the back. Note that plastic plugs can be removed to aid in this process.
6. Position the Camera on the arm adapter plate and secure it with the hardware.
7. Connect the pigtail connector to the system cable connector.
8. Pull the system cable back so the arm can be slid over the corner mount threaded studs..
9. Install lock washers and nuts to secure the arm to the bracket..
10. Verify that the Camera will have a full range of movement without striking any nearby structures.
11. Refer to section 3 to set up and check out the Camera.

4.6 Parapet Mount Installation

Figure 8 shows the parapet mount. A parapet is the wall that rises above the flat roof of a typical commercial building. This mount typically attaches

inside this raised wall and the vertical mounting surface faces out toward the surrounding area. The wall mount arm bolts directly to the parapet mount.

Figure 23 shows a parapet mount installed on the roof of a building. Dimensions are shown in figure 22.

1. Verify that the system cable has been properly routed to a location where the parapet-mount bracket will be attached. Plan the routing before doing any installation.
2. Attach the connector to the system cable (if not already installed).
3. Fasten the parapet mount bracket to the structure – being sure that the system cable is routed so that it is available for the wall-mount arm.
4. Attach the adapter plate to the wall mount arm (if not already attached).
5. Route the Camera pigtail cable down into the arm and out the back. Note that plastic plugs can be removed to aid in this process.
6. Position the Camera on the arm adapter plate and secure it with the hardware.
7. Connect the pigtail connector to the system cable connector.
8. Pull the system cable back so the arm can be slid over the parapet mount threaded studs..
9. Install lock washers and nuts to secure the arm to the bracket..
10. Verify that the Camera will have a full range of movement without striking any nearby structures.
11. Refer to section 3 to set up and check out the Camera.

-end-

WARRANTY

Cohu, Inc., Electronics Division warrants equipment manufactured to be free from defects of material and workmanship. Any such defective part or parts will be repaired or replaced when confirmed by Cohu examination to have become defective within two years from the date of shipment to the original purchaser for standard CCD, CMOS and one year from date of shipment to the original purchaser for IR un-cooled thermal cameras, image intensified cameras, and all other Cohu manufactured products.

Pressurized Housings: Pressurized camera products include a lifetime pressurization warranty. Cohu will re-pressurize, at no charge, returned environmental cameras not exhibiting evidence of physical damage due to misuse. All warranty repairs will be performed at the Cohu factory or as otherwise authorized by Cohu in writing. Purchaser shall prepay transportation charges to Cohu.

Extended IR Cameras: Cameras utilizing extended infrared (extended IR) sensors found to exceed acceptable white blemish specifications within one month of delivery shall be repaired or replaced without charge.

This Warranty does not extend to Cohu equipment subjected to misuse, accident, neglect, improper application, or repaired or altered other than by Cohu, or unless authorized by Cohu in writing. Cameras utilizing extended IR sensors are not warranted for use in areas of elevated levels of cosmic radiation.

Television image pickup tubes, image intensifiers, lenses, and products manufactured by companies other than Cohu are warranted by their original manufacturers. This Warranty is in lieu of all other warranties, express, implied, or statutory, including warranties of fitness for a particular purpose and merchantability, and this Warranty sets forth the purchaser's sole remedy in connection with such warranties. Whether as a result of breach of contract or warranty, tort (including negligence) or otherwise, Cohu shall not be liable for any penalties regardless of reason, including but not limited to collateral, consequential, incidental, or exemplary damages, including without limitation, any loss of profit or revenues, loss of use of any equipment or goods, or removal or re-installation of equipment without prior written approval.

A Return Authorization (RA) Number must be obtained from Cohu prior to returning any item for warranty repair or replacement.

A270 (04/08)