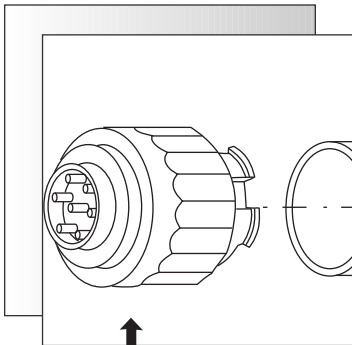
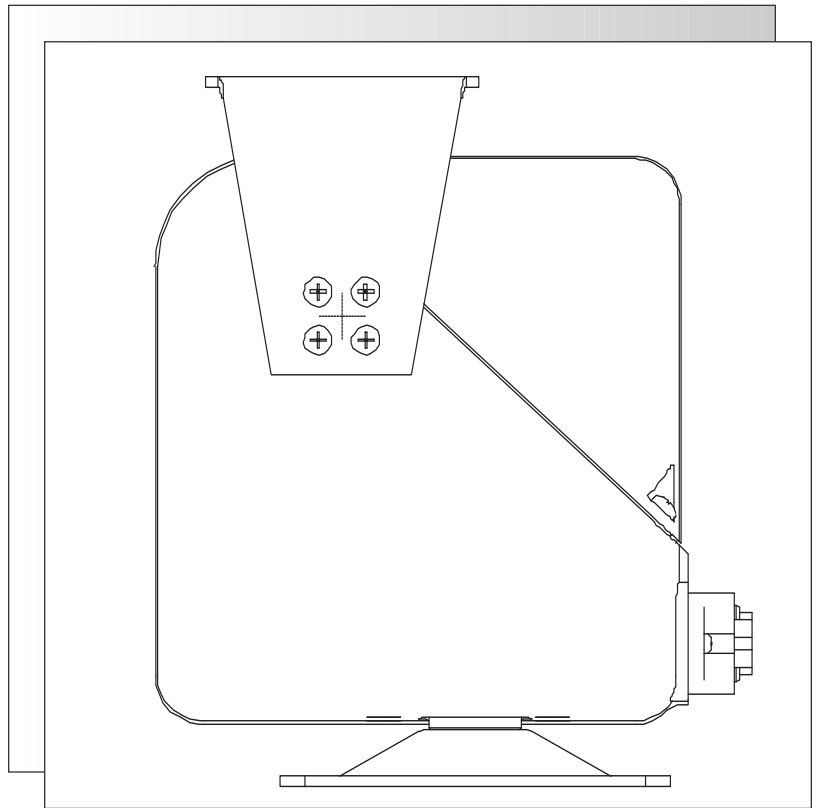
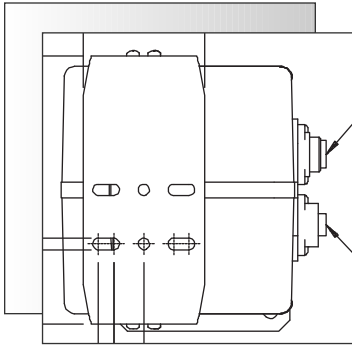
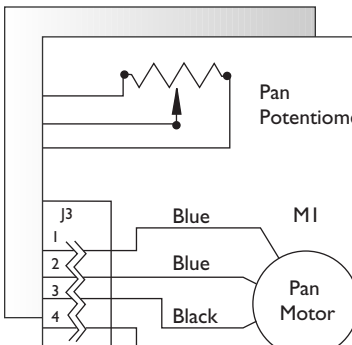


**WEATHERPROOF OUTDOOR  
PAN/TILTS**



**PT9409**



## IMPORTANT SAFEGUARDS

1. Read Instructions - All the safety and operating instructions should be read before the unit is operated.
2. Retain Instructions - The safety and operating instructions should be retained for future reference.
3. Heed Warnings - All warnings on the unit and in the operating instructions should be adhered to.
4. Follow Instructions - All operating and use instructions should be followed.
5. Cleaning - Unplug the unit from the outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
6. Attachments - Do not use attachments not recommended by the product manufacturer as they may cause hazards.
7. Accessories - Do not place this unit on an unstable stand, tripod, bracket, or mount. The unit may fall, causing serious injury to a person and serious damage to the unit. Use only with a stand, tripod, bracket, or mount recommended by the manufacturer or sold with the product. Any mounting of the unit should follow the manufacturer's instructions and should use a mounting accessory recommended by the manufacturer.



An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.

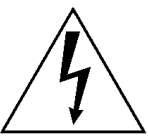
8. Ventilation - Openings in the enclosure, if any, are provided for ventilation, to ensure reliable operation of the unit, and to protect it from overheating. These openings must not be blocked or covered. This unit should not be placed in a built-in installation unless proper ventilation is provided or the manufacturer's instructions have been adhered to.
9. Power Sources - This unit should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply you plan to use, consult your appliance dealer or local power company. For units intended to operate from battery power or other sources, refer to the operating instructions.
10. Grounding or Polarization - This unit may be equipped with a polarized alternating-current line plug (a plug having one blade wider than the other). This plug will fit into the power outlet only one way. This is a safety feature. If you are unable to insert the plug fully into the outlet, try reversing the plug. If the plug should still fail to fit, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the polarized plug. Alternately, this unit may be equipped with a 3-wire grounding-type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the grounding-type plug.
11. Power Cord Protection - Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords and plugs, convenience receptacles, and the point where they exit from the appliance.

12. Power Lines - An outdoor system should not be located in the vicinity of overhead power lines or other electric light or power circuits or where it can fall into such power lines or circuits. When installing an outdoor system, extreme care should be taken to keep from touching such power lines or circuits as contact with them might be fatal. U.S.A. models only - refer to the National Electrical Code Article 820 regarding installation of CATV systems.
13. Overloading - Do not overload outlets and extension cords as this can result in a risk of fire or electric shock.
14. Object and Liquid Entry - Never push objects of any kind into this unit through openings, as they may touch dangerous voltage points or short out parts that could result in a fire or electric shock. Never spill liquid of any kind on the unit.
15. Servicing - Do not attempt to service this unit yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.
16. Damage Requiring Service - Unplug the unit from the outlet and refer servicing to qualified service personnel under the following conditions:
  - a. When the power supply cord or plug is damaged.
  - b. If liquid has been spilled or objects have fallen into the unit.
  - c. If the unit has been exposed to rain or water.
  - d. If the unit does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions, as an improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the unit to its normal operation.
  - e. If the unit has been dropped or the cabinet has been damaged.
  - f. When the unit exhibits a distinct change in performance--this indicates a need for service.
17. Replacement Parts - When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock, or other hazards.
18. Safety Check - Upon completion of any service or repairs to this unit, ask the service technician to perform safety checks to determine that the unit is in proper operating condition.
19. Coax Grounding - If an outside cable system is connected to the unit, be sure the cable system is grounded. U.S.A. models only--Section 810 of the National Electrical Code, ANSI/NFPA No.70-1981, provides information with respect to proper grounding of the mount and supporting structure, grounding of the coax to a discharge unit, size of grounding conductors, location of discharge unit, connection to grounding electrodes, and requirements for the grounding electrode.
20. Lightning - For added protection of this unit during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the cable system. This will prevent damage to the unit due to lightning and power line surges.


## SAFETY PRECAUTIONS



**CAUTION: TO REDUCE THE RISK OF ELECTRICAL SHOCK DO NOT OPEN COVERS. NO USER SERVICEABLE PARTS INSIDE.  
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.**



The lightning flash with an arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

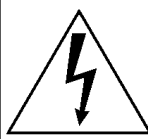


The exclamation point within an equilateral triangle is intended to alert the user to presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.


## SICHERHEITSVORKEHRUNGEN



**VORSICHT: UM EINEN ELEKTRISCHEN SCHLAG ZU VERMEIDEN, ABDECKUNG NICHT ENTFERNEN. WARTUNGEN ALLER ART QUALIFIZIERTEM PERSONAL ÜBERLASSEN.**



Das Blitzsymbol im gleichseitigen Dreieck soll den Benutzer auf nicht isolierte "Hochspannung" im Gehäuse aufmerksam machen, die eventuell stark genug ist, um einen elektrischen Schlag zu verursachen.




Das Ausrufezeichen im gleichseitigen Dreieck soll den Benutzer auf wichtige Bedienungs- und Wartungsanleitungen in der dem Gerät beigelegten Literatur aufmerksam machen.


## SECURITE



**DANGER: POUR ÉVITER TOUT RISQUE D'ÉLECTROCUTION, NE PAS OUVRIR LE BOÎTIER. IL N'Y A PAS DE PIÈCES REMPLAÇABLES À L'INTÉRIEUR. POUR TOUTE RÉVISION, S'ADRESSER À UN TECHNICIEN SPÉCIALISÉ.**



L'éclair fléché dans un triangle équilatéral, avertit l'utilisateur de la présence d'une "tension dangereuse" non isolée à l'intérieur de l'appareil et d'une valeur suffisante pour constituer un risque d'électrocution.




Le point d'exclamation contenu dans un triangle équilatéral, avertit l'utilisateur de la présence, dans la documentation qui accompagne l'appareil, de consignes d'utilisation et de maintenance importantes.


## PRECAUCIONES DE SEGURIDAD



**PRECAUCION: PARA REDUCIR EL RIESGO DE CHOQUE ELÉCTRICO, FAVOR NO ABRIR LA CUBIERTA. ESTE EQUIPO NO CONSTA DE PIEZAS O PARTES QUE REQUIEREN SERVICIO O MANTENIMIENTO. PARA REPARACIONES FAVOR REFERIRSE A UN TÉCNICO CALIFICADO.**



El símbolo representado por un relámpago con punta de flecha dentro de un triángulo equilátero, se muestra con el objetivo de alertar al usuario que existen "voltajes peligrosos" sin aislamiento, dentro de la cubierta de la unidad. Dichos voltajes pueden ser de tal magnitud que constituyen un riesgo de choque eléctrico a personas.



El símbolo de exclamación dentro de un triángulo equilátero, se muestra con el objetivo de alertar al usuario de que instrucciones de operación y mantenimiento importantes acompañan al equipo.

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## 1 UNPACKING

Unpack carefully. This is electro-mechanical equipment and should be handled with care.

Check for the following items:

- Model number of unit.

If an item appears to have been damaged in shipment, replace it properly in its carton and notify the shipper. If any items are missing, notify Aigis Mechtronics. The shipping carton is the safest container in which the unit may be transported. Save it for possible future use.

## 2 SERVICE

If the unit ever needs repair service, the customer should contact Aigis Mechtronics.

## 3 DESCRIPTION

The PT9409 Series Weatherproof Outdoor Pan/Tilts are low profile, economical, compact units constructed with corrosion-resistant hardware. These remote positioning devices are fully system compatible with CCD cameras, lenses, and housing combinations.

## 4 INSTALLATION

This installation should be made by a qualified service person and conform to all local codes.

Always disconnect power to unit at controller prior to connecting or disconnecting Pan/Tilt electrical connector. The Pan/Tilt is to be mounted away from unauthorized access [3 meters (10 ft) high minimum].

The PT9409 Series units are designed for either upright or inverted installations. To maintain weatherproof integrity when mounting outdoors in an inverted position, the unit must be installed in a weatherproof enclosure (e.g., weatherproof domed housing) or a protected outside area.

Pan/Tilts and associated equipment should be tested prior to field installation to verify proper wiring and operation of components.

The combined weight of the enclosure/camera/lens should be centered equally, front to back on the tilt table surface for best Pan/Tilt operation.

## 4.1 Model Designation

Model No. <sup>1</sup>	Rated Motor Voltage Range	Operational (No fixed Stop)	Total Pan Angle
Standard Models			
PT9409-6	115 VAC, 60 Hz	103 to 126	15° to 355°
PT9409-2	24 VAC, 60 Hz	21.6 to 26.4	15° to 355°
PT9409-1	24 VAC, 50 Hz	21.6 to 26.4	15° to 355°
PT9409-5 <sup>2</sup>	230 VAC, 50 Hz	198 to 265	15° to 355°
Pre-Position Models			
PT9409-6P	115 VAC, 60 Hz	103 to 126	15° to 355°
PT9409-2P	24 VAC, 60 Hz	21.6 to 26.4	15° to 355°
PT9409-1P	24 VAC, 50 Hz	21.6 to 26.4	15° to 355°
PT9409-5P	230 VAC, 50 Hz	198 to 265	15° to 355°

1. The total power for all models, with both motors running, is 18 W. 2. Single phase power sources only.

**Do not exceed 30 VAC** on 24 VAC models. Operation above 30 VAC violates low voltage operation (Class 2 Specifications). Normal operation is 24 VAC.

### 4.1.1 Recommended Mounting Equipment

MT9216 Medium duty wall mount designed to support up to 45.3 kg (100 lb).

MT9222 Heavy duty wall mount designed to support up to 90.6 kg (200 lb).

MT9214 Heavy duty column mount for ceiling or pedestal use.

## 4.2 Wall Mounting

Follow the instructions provided with mounts. Mount and mounting surface must be able to support the weight of the Pan/Tilt, camera/lens, and enclosure (if used). The camera/lens/enclosure must be properly mounted and balanced on the Pan/Tilt bracket.

**CAUTION: The PT9409 Series Pan/Tilts are to be mounted upright or inverted, never horizontally.**

Mount the camera/lens/enclosure to the Pan/Tilt bracket as follows:

1. Mount the camera/lens/enclosure, in either of the two sets of slots. (Dome mounting: Use the set of slots centered on the Pan/Tilt mounting base.)

2. Balance the camera/lens/enclosure on the camera bracket, adjust to align with mounting holes, fasten with a minimum of (2) 1/4-20 x 1/2-inch long fasteners and lock washers.

3. Make all electrical connections, leave sufficient loops of cable between camera/enclosure and Pan/Tilt to allow for tilting and panning.

## 4.3 Electrical Connections

1. Cable must be wired according to Connector Assembly and Recommended Maximum Cable Lengths.

2. Use separate shielded cables for camera power, enclosure power, and Pan/Tilt control. Combining lens control wiring and video coax within a common cable is acceptable if required. The use of a common multiconductor cable to combine all functions is not recommended. The use of shielded cable is recommended for pre-position wiring.

3. Use color coded conductors to aid wiring and future identification.

4. Retain wiring diagram for later reference.

### 4.3.1 Recommended Maximum Cable Lengths<sup>1</sup>

Model Voltage	Wire Size		Distance	
	mm <sup>2</sup>	AWG	Feet	Meters
24 VAC	0.5	20	190	58
	1	18	300	91
	1.5	16	475	145
	2.5	14	775	236
115 VAC	4	12	1250	381
	0.5	20	4600	1402
	1	18	7400	2256
	1.5	16	11600	3537
	2.5	14	18900	5762
	4	12	30000	9146
230 VAC	6	10	46600	14146
	0.5	20	25000	7622
	1	18	39500	12043
	1.5	16	59600	18172
	2.5	14	100700	30701
	4	12	160300	48872

1. Values calculated at 20 °C (68 °F) using stranded tinned copper wire, a single conductor Pan/Tilt common (neutral) wire, and with both PAN and TILT motors operating simultaneously.

## 4.4 Grounding Connection

Grounding is provided via pin 7 on the power Connector (P1). See Wiring Instructions and WIRING DIAGRAM.

## 4.5 Connector Assembly

Included with the unit are a mating connector and a sealing boot or strain relief. Solder connections are required. Make the electrical connection as shown in Wiring Instruction.

### 4.5.1 Wiring Instructions

#### Power Connector (P1)

Pin <sup>4</sup>	Connection <sup>2</sup>
1:	Common (White)
2:	Pan Left (CCW) (Black)
3:	Pan Right (CW) (Brown)
4:	Tilt Up (Blue)
5:	Tilt Down (Red)
6:	NC <sup>1</sup>
7:	Ground (Green/Yellow)

#### Positioning Connector (P2)<sup>3</sup>

Pin <sup>4</sup>	Connection <sup>2</sup>
1:	PP Supply (+5 VDC) (Orange)
2:	Pan Position (Yellow)
3:	PP Return (-5 VDC) (Green)
4:	Tilt Position (Grey)
5:	NC <sup>1</sup>
6:	NC <sup>1</sup>
7:	NC <sup>1</sup>

#### Notes:

1. No Connection, do not use.
2. Color codes indicate wiring harness colors inside unit.
3. P2 not found on non pre-position models.
4. Pin numbers are molded in the connector.

## 4.6 Pan/Tilt Stops

To access the pan and tilt stops, remove the rear cover from the unit. Remove the cover by removing the four Phillips head screws and pulling the cover outward. The pan and tilt stops on this unit are hand adjustable. No tightening or loosening of any fasteners (other than removing the cover) is required. The stops are located on the gear motor output shafts near the printed circuit boards. Adjustment of the stops can be made by hand turning the stops or with the use of a small screw driver. The upper pan stop controls the pan left limit; the lower pan stop, the pan right limit. The left tilt stop controls the tilt down limit; the right tilt stop, the tilt up.

**CAUTION: Disconnect P1 (Power Connector) when making any adjustments to the pan or tilt stops.**

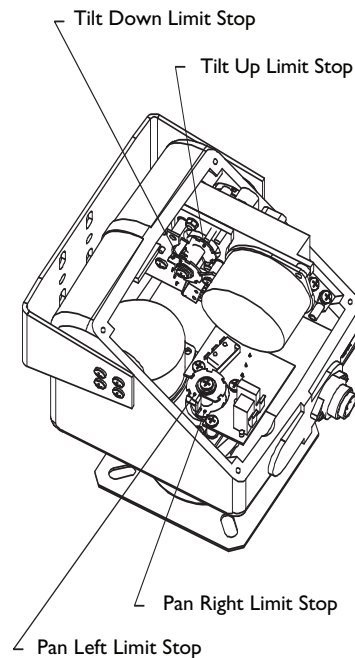


Figure 1: Pan and Tilt Stop Locations

## 5 OPERATION

### 5.1 Manual Pan Operation

The pan stops establish the limits for manual pan. The maximum pan range is when the limit switches are contacting each other.

### 5.2 Auto-Pan Operation

Use of the auto-pan function requires connecting the unit to a Pan/Tilt controller equipped with special current sensing circuitry. The auto-pan function is achieved by the controller unit sensing changes in current flow through the pan motor. When a stop is reached, current flow stops, and the internal circuitry in the controller reverses the auto-pan direction.

Note: The Pan/Tilt unit must be properly wired for the function to operate correctly (see Wiring Instructions).

### 5.3 Pan Stop Adjustment

1. Adjust the Pan/Tilt unit into a direction approximately in the center of the area to be panned.
2. Adjust the upper and lower pan stops until they contact and are opposite the limit switches.
3. Pan the unit left to the desired maximum location. Adjust the upper pan stop CCW until contact with the switch is made.
4. Pan the unit right to the desired maximum location. Adjust the lower pan stop CW until contact with the switch is made.
5. Operate the unit from the controller to confirm that the limits are set properly. Re-adjust if required.

### 5.4 Tilt Adjustments

1. Adjust the tilt stops until both stops contact the stop pin on the tilt gear motor output shaft.
2. Tilt the unit down to the desired maximum location. Adjust the left tilt stop CCW until contact is made with the limit switch.
3. Tilt the unit up to the desired maximum location. Adjust the right tilt stop CW until contact is made with the limit switch.
4. Operate the unit from the controller to confirm that the limits are set properly. Re-adjust if required.

Note: The camera mounting bracket may inhibit access to the up tilt stop, if necessary use the following procedure to adjust the stop:

1. Perform steps 1 and 2 under Tilt Adjustment.
2. Adjust the up tilt stop slightly to a location believed to be near the desired stopping point.
3. Tilt the unit up to the stop and observe the results. Tilt unit down.
4. If a higher tilt stopping point is needed, adjust the right tilt stop CCW. If a lower tilt stopping point is needed, adjust the right tilt stop CW.
5. Repeat steps 3 and 4 until the desired location is obtained.

If the camera bracket blocks access to the opening at both the up and down limit, contact Aigis Mechtronics for instructions on tilt stop adjustments.

### 5.5 Pre-Position Models

The models with pre-position capability (P suffix) will require connection of the Position Connector (P2) to a controller or receiver/driver with the pre-position function (see Wiring Instructions).

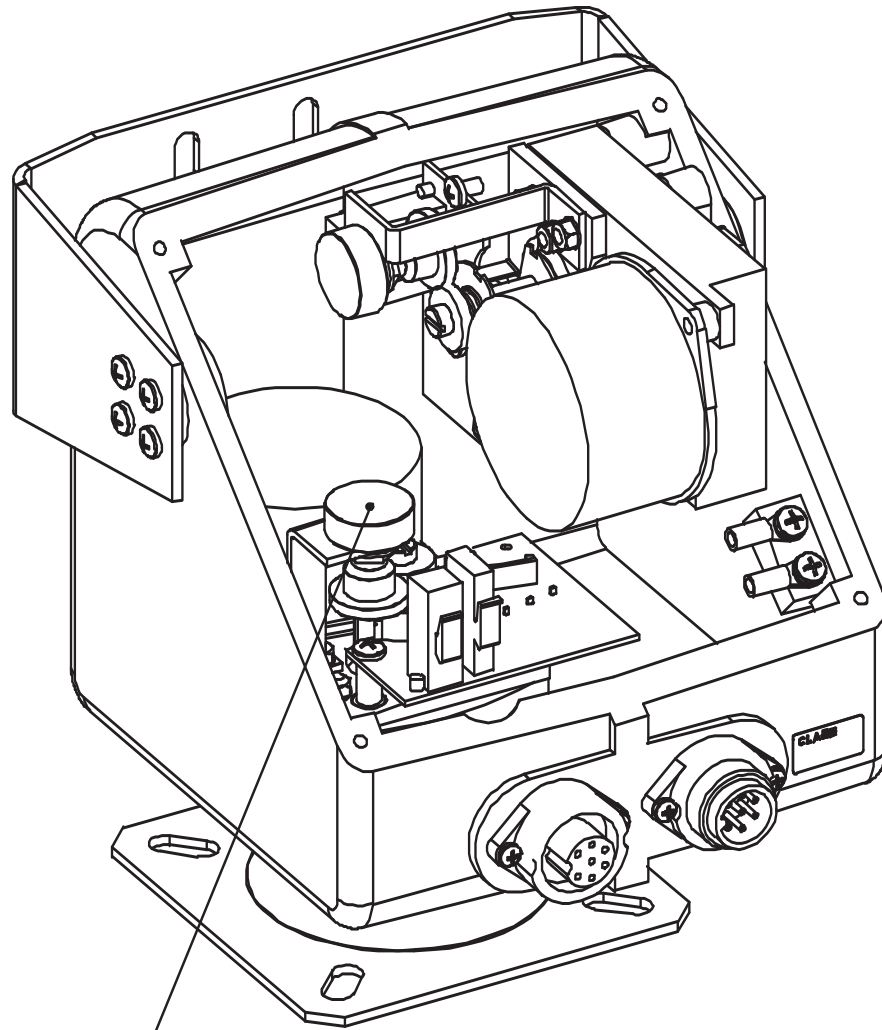
Pan/Tilt operation and limit stop adjustment will function as previously described.

If upon installation the unit is found to have an open circuit across the pan potentiometer in the pan range (as measured across P2, pins 1 and 2), the unit will require a potentiometer "Dead Zone" adjustment.

The following procedure will accomplish this task.

1. Pan the unit to the left pan stop.
2. Disconnect P1 and P2. Remove the rear cover.
3. Locate the pan potentiometer. Loosen the nut on the underside of the potentiometer support so the potentiometer can be rotated.
4. Locate the "Dead Zone" by rotating the potentiometer CW or CCW and measuring the resistance across P2, pin 1 and pin 2. The "Dead Zone" will be measured as an open circuit. Do not rotate the potentiometer more than 180° CW or 180° CCW from the original position.
5. With the potentiometer in the "Dead Zone", rotate the potentiometer CW until a resistive value is measured across P2, pins 1 and 2.
6. Tighten the potentiometer nut. Replace the cover and reconnect P1 and P2.

## 6 ILLUSTRATIONS



Pan Potentiometer

Figure 2: Pan Potentiometer Location



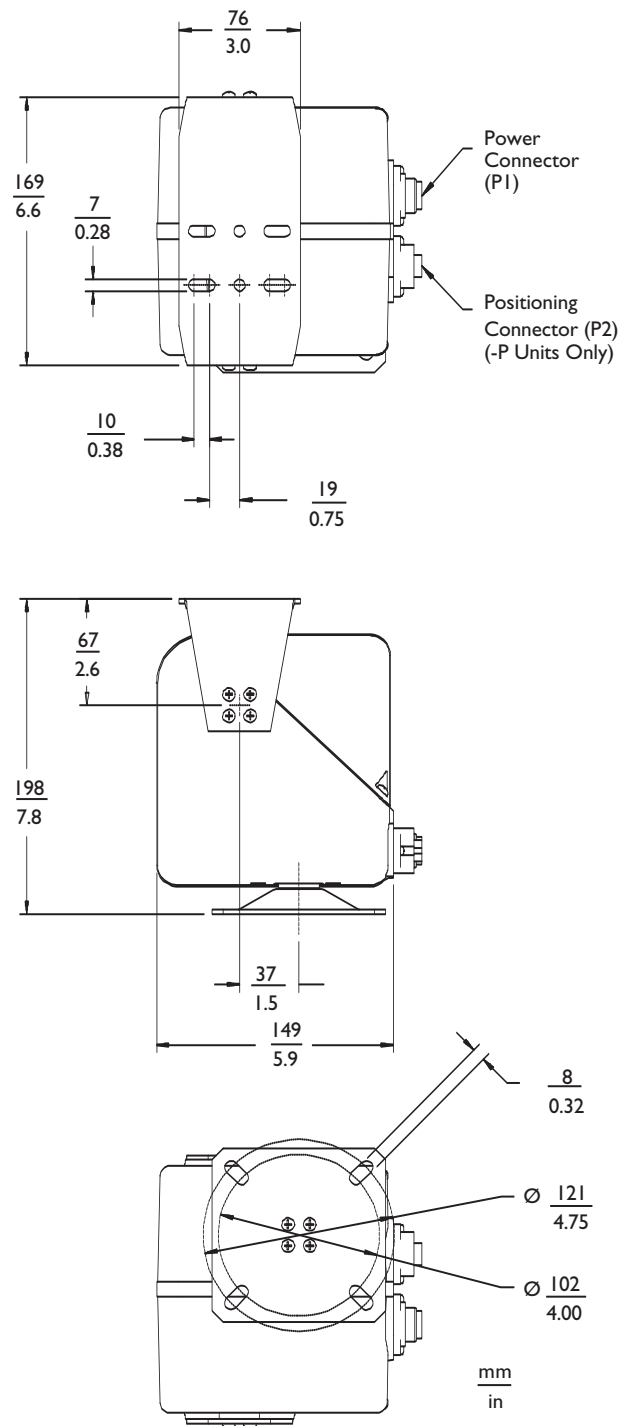


Figure 3: Dimensional Outline

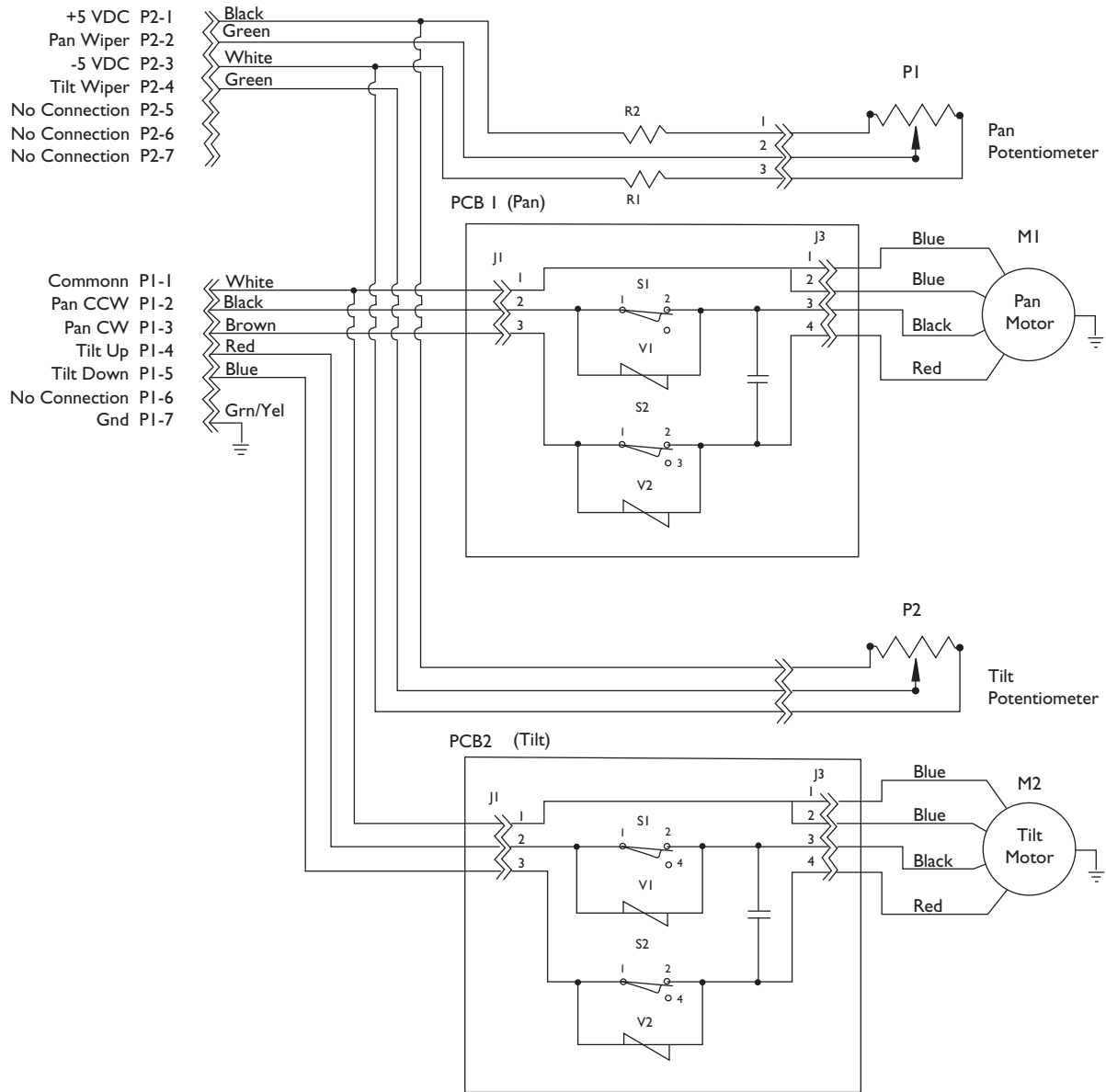
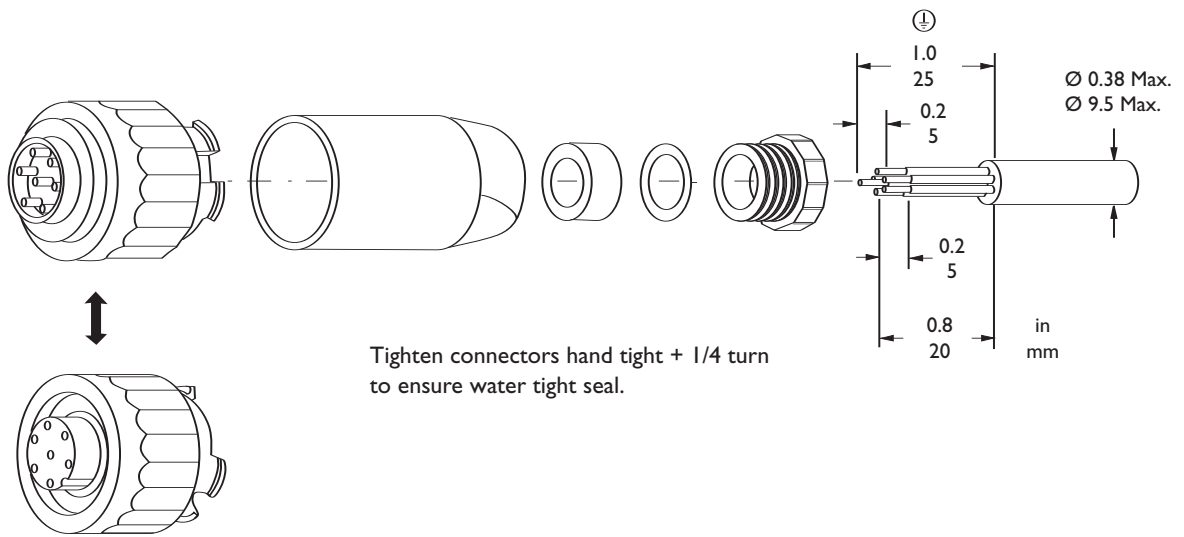


Figure 4: Wiring Diagram



Tighten connectors hand tight + 1/4 turn to ensure water tight seal.

Figure 5: Connector Assembly



mechtronics

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