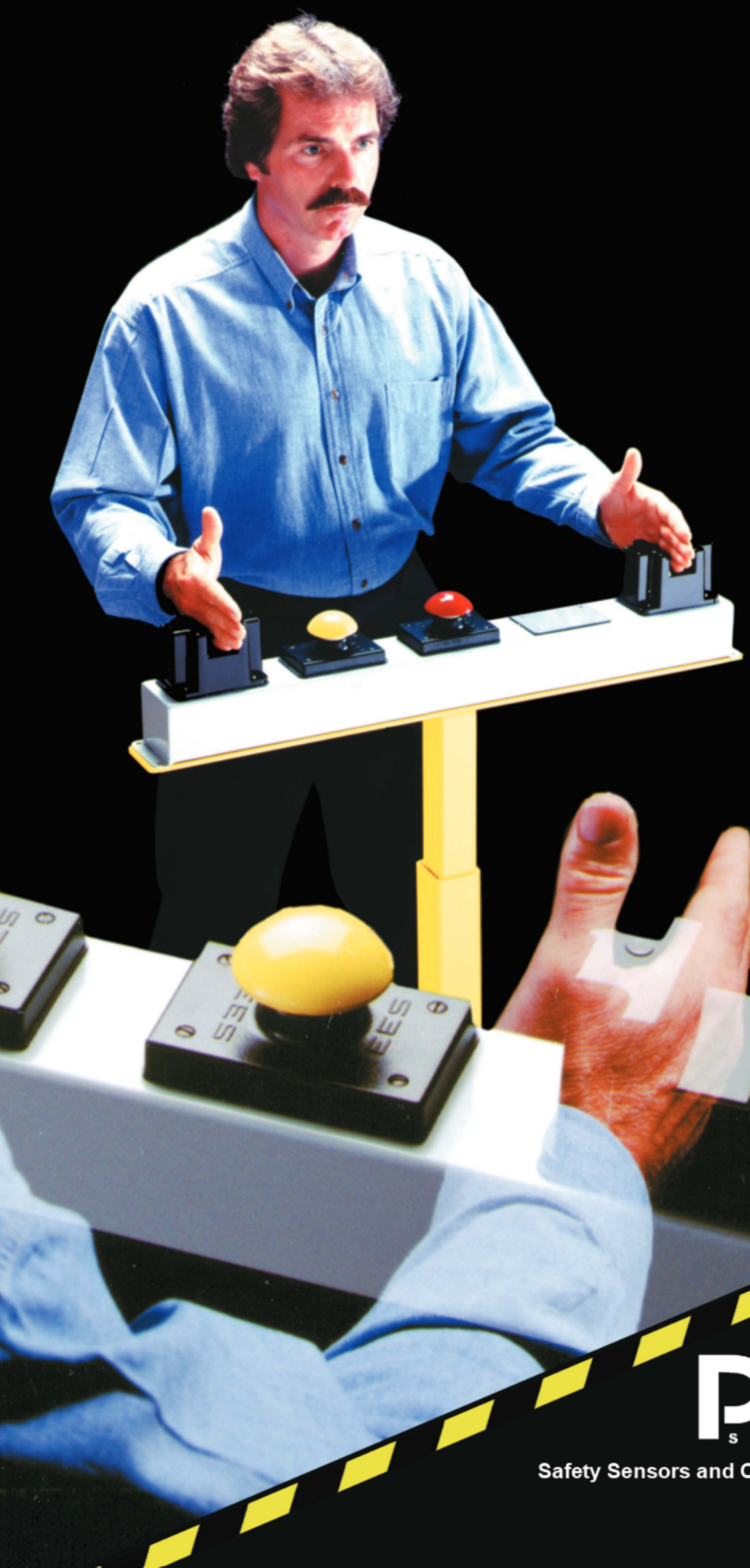
Advanced Ergonomic Engineering

UltraTouch®

The safest and only "control reliable" ergonomic zero force palm button that can be used as a two hand control device for operator safety.



CE

Press Control
UL 508

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42EL

UL Subject 491

PINNACLE SYSTEMS, INC.

Safety Sensors and Controls for Industrial Machine Guarding Systems

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The Industrial Problem of Cumulative Trauma Disorders (CTDs) and Carpal Tunnel Syndrome (CTS)

Cumulative Trauma Disorders (CTDs) is the most common term used to refer to the diseases related to the upper limbs. Similar terms used to describe these problem areas are:

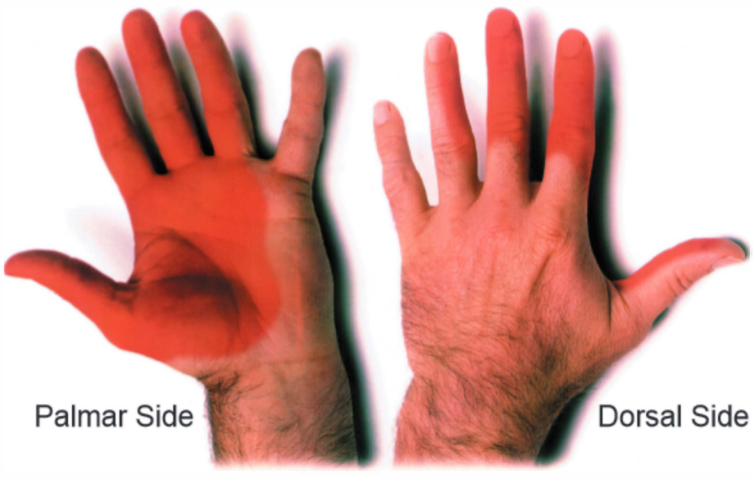
- repetitive strain injuries
- occupational cervicobrachial disorders
- occupational overuse syndromes

Cumulative Trauma Disorders are caused by repetitive stresses on a particular body part after periods of job related micro-trauma. Basically there are three types of injuries to the machine operator. These injuries include nerve disorders, tendon disorders or neuro-vascular disorders.

Nerve Disorders-Carpal Tunnel Syndrome (CTS)

Common Tendon Disorders-Tendinitis, Tenosynovitis, DeQuervain's disease, Stenosing Tendsynovitas, Stenosing Tenosynovitas Crepitans.

Neurovascular Disorders-Thoracic outlet syndrome.



What *UltraTouch*® Does For You

The patented sound ergonomic design criteria of *UltraTouch*® advances machine cycle initiation into the 21st century. The UltraTouch system has been designed so the machine operator can initiate the machine cycle with their hand and wrist area in the neutral position and with no exertion of force or pressure.

This minimizes hand, wrist, and arm stresses related to the potentially harmful extension and flexion positions of the hand required to activate conventional spring-loaded palm buttons. No flexing of the wrist is necessary with *UltraTouch*®.

Wrist and hand positions are most important as contributing elements of Carpal Tunnel Syndrome. Wrist position is important because it affects the length and tension relationship of contracting muscles. As the angle of the joint (wrist) increases or decreases beyond its midpoint (neutral position), there is a proportional decrease in the machine operators effective strength. This means that more exertion or tendon tension is required to do a task with a bent wrist than the same task with the wrist in the neutral position. Hand and wrist posture along with force required are base contributing elements to Carpal Tunnel Syndrome.

Benefits

Human Factor Engineering (Ergonomics)

UltraTouch® has been designed to interact with the operator, machine operation, and the work place in a safe and efficient way. This effective design of equipment will be most helpful in the controlling of Carpal Tunnel Syndrome and other Cumulative Trauma Disorders.

Productivity Increases

Increases in productivity are achieved by a reduction in operator fatigue and operator injury along with basic production line cycle time decreases.

Employee Morale

Easier job related actions and movements with both work methods analysis and ergonomic checklist analysis provide a healthier and more positive work environment.

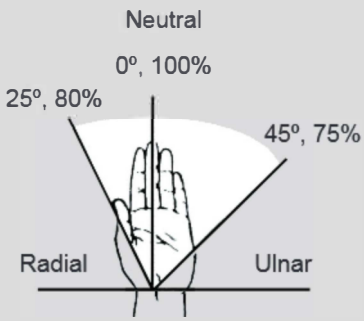
Fatigue Control

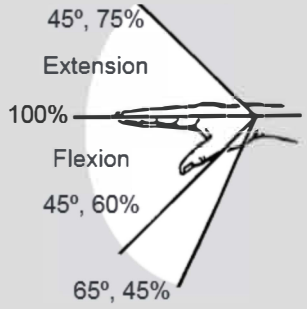
Ease of safe machine activation enables the machine operators to utilize their energy for more productive efforts. The reduction of fatigue is an essential element when trying to control Cumulative Trauma Disorders such as Carpal Tunnel Syndrome.

The *UltraTouch*® system negates these problems by permitting the machine operator to activate the machine with no force or pressure and with the operators hand and wrist in the premier ergonomic position of neutral, 0º deviation and 100% hand power position.

UltraTouch® eliminates the normal pressure required for machine activation with conventional palm buttons of the median, ulnar and radial nerve at the wrist and hand area.

UltraTouch® also permits the machine operator to activate the machine cycle with or without hand protection devices such as splints and even heavy metal fabrication work gloves.





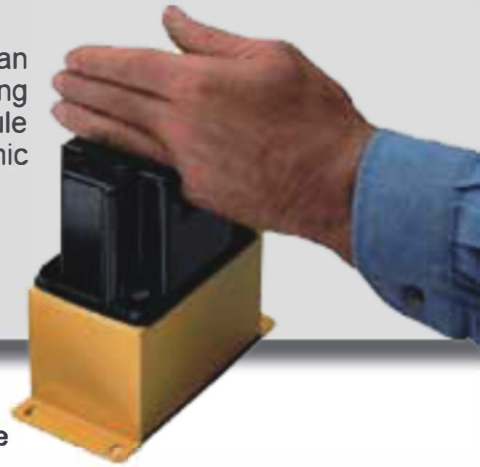
Reference - Hand and Wrist Positions

The machine operator's reference hand and wrist positions illustrate the degree of wrist deviation (bending) expressed as a percentage of hand power grip as measured in the neutral (natural) position. The *UltraTouch*® system utilizes the premier ergonomic position of neutral, 0º deviation and 100% hand power for the machine operator.

The photo shows an operator's hand actuating the *UltraTouch*® module with the correct ergonomic hand position.

The hand is at rest with no angle or bending at the wrist joint and the hand is at the "thumbs up" position. This is the same natural hand and wrist position that is maintained when ones arms are at rest hanging at their side. There is no need to cup and curl the fingers or to roll the wrist to actuate the *UltraTouch*® system.

This further illustrates the total advanced ergonomic engineering displayed by the *UltraTouch*® design.



Economic Justification

There are substantial costs related to Carpal Tunnel Syndrome versus the costs and benefits to prevent them. Various factors that can be incorporated into the analysis are reduced overhead costs, employee morale, reductions in non-productive time, and improved productivity. Factors involved with overhead expense may include: medical costs, compensation costs, lost productivity due to injuries, absenteeism, and labor turnover.

Workman's Compensation Cost Control

UltraTouch® can reduce the costs related to Cumulative Trauma Disorders in relation to Workman's Compensation Insurance claims. Both medical and disability costs can be reduced with the control of Carpal Tunnel Syndrome.

The actual costs of Cumulative Trauma Disorders and Carpal Tunnel Syndrome are actually higher than those covered by Workman's Compensation Insurance. Insurance does not cover medical treatments rendered directly by the employer, and many employees supplement the disability coverage provided by the insurance carrier. Additional costs are incurred when expenses are paid for by the injured worker or by comprehensive health insurance, which may be provided by the employer as a fringe benefit.

Reduced Maintenance

The solid state design of *UltraTouch*® assures long life when compared to conventional spring-loaded mechanical palm buttons. The only component with a moving part is the industrial grade captive contact safety relay, and it is rated for an excess of 10 million cycles and is easily replaceable.

The *UltraTouch*® module is designed to be a direct replacement into existing operator run bar stations which is a true maintenance and installation time saver.

Applications

The *UltraTouch*® system is designed to activate electric, pneumatic, air clutch, and hydraulic equipment such as punch presses, press brakes, molding machines, assembly equipment, tube benders, compacting presses, riveters, etc. Virtually any machine that is currently using conventional mechanical spring-loaded palm buttons can now utilize the sound ergonomic design of *UltraTouch*®.

UltraTouch® Design

The patented *UltraTouch*® system has been designed as a direct replacement for standard spring-loaded mechanical palm buttons and is designed to fit into existing operator palm button stations without modification.

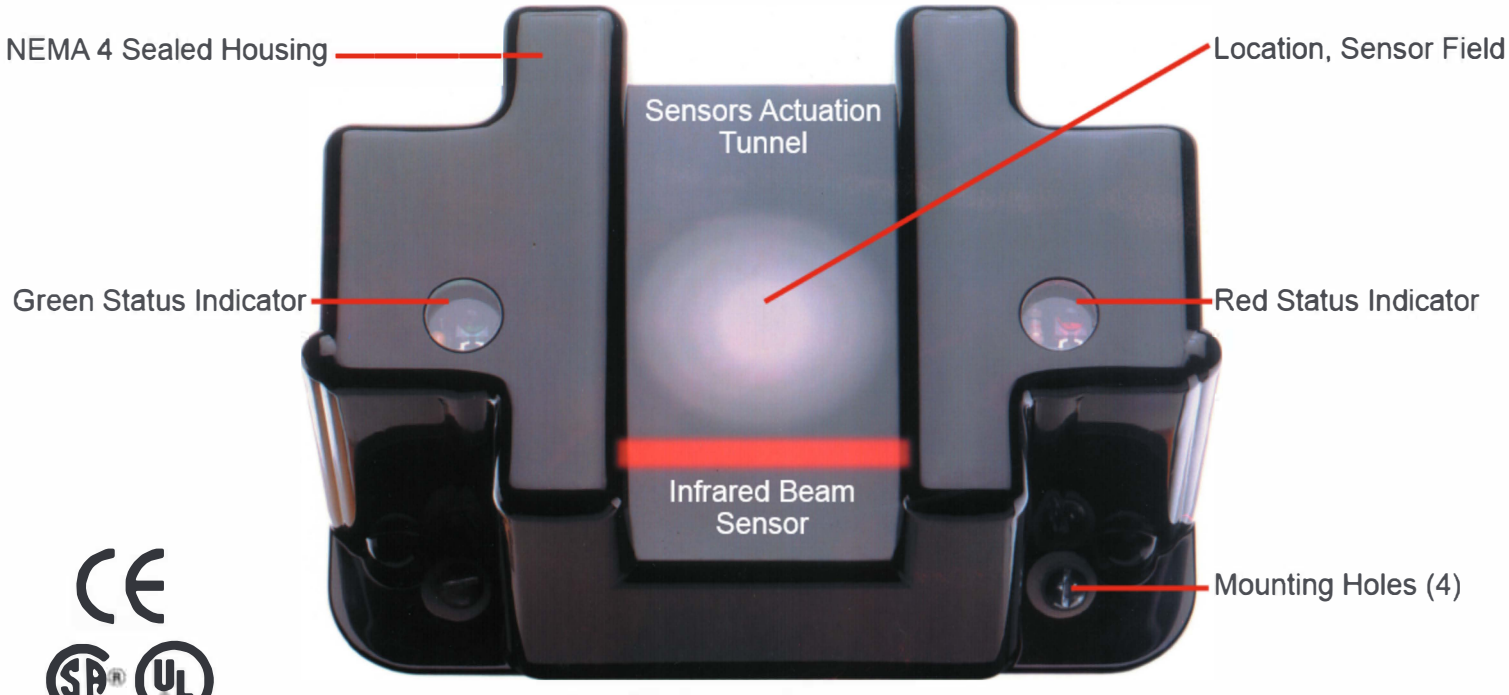
The *UltraTouch*® enclosure is a molded high strength NEMA 4 polycarbonate module designed to meet the high impact and vibration requirements of industry. The solid state electronics of the *UltraTouch*® switch incorporates an advanced redundant diverse sensor design. This means that each module has two different sensors with isolated circuits along with a monitoring redundant circuit. The circuitry of UltraTouch is also designed to provide second-order failure protection. This gives the *UltraTouch*® an unparalleled level of safety and assurance against inadvertent actuation, or failing in the "on" or conducting mode, which is a common problem found throughout industry with competitive ergonomic switch replacements. The *UltraTouch*® design is so safe against inadvertent actuation that two *UltraTouch*® modules when spaced and located properly in accordance to OSHA and ANSI hand control distance formulas (the same formula is used for mechanical palm buttons), permit its use as an operator safety two-hand control device. The *UltraTouch*® dual dissimilar sensor format is designed for the machine operator to actuate the switch, and that no inadvertent foreign objects such as sleeves, insects, broomsticks, playing cards, rags, mists or droplets can activate or trigger the switch. This gives UltaTouch an unparalleled level of safety while giving the operator the benefit of using the correct ergonomic hand position of neutral, 0º deviation and 100% hand power.

UltraTouch® Configuration

The *UltraTouch*® dual dissimilar sensor ergonomic palm switch is configured in the following manner:

A U-shaped sensors actuation channel (shown below) provides a triggering point for the machine operators hand. This is where the invisible infrared light beam is located and is crossing the channel. There is also a unique U-shaped location sensor mounted on the inside of the *UltraTouch*® enclosure that hugs the sensor channel and is insulated by the enclosure itself. When the machine operator inserts their hand into the sensor actuation tunnel, both the infrared sensor and the location sensor must be satisfied in order to energize an electromechanical relay to send a cycle

UltraTouch®



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Patent Number 5,410,148 - U.S. Patent and Trademark Office

UltraTouch® Design Cont.

start signal to the machine. Both individual sensors within each module are time interlocked, and if both sensors are not triggered concurrently by the operator's hand, the *UltraTouch*® output will be inhibited to the machine control. The module also contains two visible LED indicators which informs the status of the *UltraTouch*® module to the operator. A green LED indicates that the relay contacts are closed, both sensors have been activated, and no failures have been detected. The red LED indicates that the relay contacts are open and no satisfactory conditions were detected on both sensors. This advanced patented *UltraTouch*® design is not available on any competitive unit and gives the *UltraTouch*® user an unparalleled level of safety when using ergonomic zero force actuation devices. Additionally, the operator will be activating the machine properly by using the correct ergonomic hand position of neutral, 0º deviation, and 100% hand power.

Easy to Install

UltraTouch® installs with ease and comes with complete installation instructions.

Simple module design permits direct exchange for existing spring-loaded mechanical palm buttons and even utilizes the existing screw holes on the run bar. All systems have normally open (N.O.) and normally closed (N.C.) contacts, and are also available in a four pole wiring configuration depending on the machine control requirements. The ultimate in versatility!

New installations and retrofit projects are completely installed in minutes by a qualified electrician. Also supplied is a toll free 800 number if any questions should arise by your installation personnel.

UltraSafe Design

Each *UltraTouch*® switch module incorporates the following safety design features:

- Two dissimilar sensors
    a) Infrared sensor
    b) Positive location sensor
- Redundant circuitry
- Chatterfree design circuit
- Anti-noise circuit
- No false trip on power up circuit
- Captive contact safety relays
- Operator status indicators
- Interlock circuit between the diverse sensors
- Immune to EMI and RFI noise
- Immune to weld field interference
- Control reliable design

OSHA, ANSI & CSA Standards

The mounting locations of *UltraTouch*® must conform to all State, Province, and Federal codes and all regulations pertaining to the subject machine on which the *UltraTouch*® is to be applied.

Point of Operation Guarding

The *UltraTouch*® system is a machine cycle initiation component that is designed to be a two-hand control device for the machine operator. If a point of operation guarding device is desired or required, please contact your local distributor or the factory for devices to comply with ANSI B11.1 or the various OSHA regulations.

References for Proper Installation

Please refer to the following ANSI (American National Standards Institute) Standards for the proper installation location for "two hand control devices" for your specific machine and application.

ANSI Standard B11.19-2003 Annex D Safety Distance (Informative)

ANSI Standard B11.1-2009 Annex C Safety Distance (Informative)

Ergonomic Palm Button Replacement Grid Checklist

"Compare the Difference"

Design Criteria

	UltraTouch		
• Diverse dual sensor design	YES		
• *Control reliable* design of sensor circuits	YES		
• Redundant circuitry	YES		
• Incorporates second-order circuit failure protection	YES		
• Internal self-checking of infrared sensor and system circuits	YES		
• Built-in timed interlock within each module for the two diverse sensors	YES		
• Utilizes captive contact safety relays	YES		
• Diagnostics of sensor circuits and diverse sensors interlock circuit	YES		
• Not affected by external infrared light sources	YES		
• Built-in hysteresis	YES		
• No false trip on power up	YES		
• Anti-noise circuitry built-in	YES		
• Chatter free design built in	YES		
• Weld field immune	YES		
• EMI and RFI immune	YES		
• Completely self-contained unit, requires no additional relays or interface boards	YES		
• Operator status indicator lights– A. Red – Ready to cycle B. Green – Cycle initiated	YES		
• Fast reacting–Less than 20 ms	YES		
• NEMA 4 enclosure	YES		
• Designs available for all machines: 110 VAC – 2 pole or 4 pole configuration 24 VDC – 2 pole or 4 pole configuration	YES		
• Directly interchangeable with existing mechanical palm buttons: A. Electrically B. Mechanically	YES		
• Requires correct ergonomic hand position for zero force machine actuation of neutral, 0° deviation, and 100% hand power	YES		
• Cannot be actuated by screwdrivers, playing cards, rags, sleeves, broomsticks, mists or droplets	YES		
• Tactile feedback feel requires the operator to have the proper hand location for both safety and ergonomics	YES		
• Cannot be actuated by the operator's elbows	YES		
• Can be used as an operator two-hand safety control device*	YES		
• Complies with all applicable sections of OSHA, ANSI and CSA standards for operator two-hand control devices	YES		
• Repairable unit–not a disposable design	YES		
• Captive screws and gaskets supplied to ease installation	YES		
• Two-year warranty	YES		
• Made in USA	YES		

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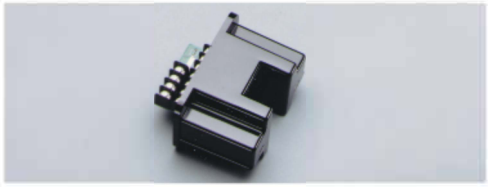
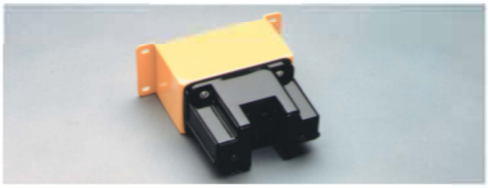
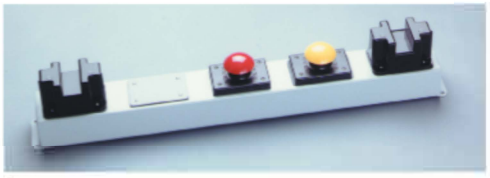
* Requires two *UltraTouch* modules spaced and mounted in accordance with current OSHA and ANSI standards. OSHA and ANSI standards also require machines to have "control reliable" control circuitry.

UltraTouch® Models

	Model #	Description
	**UL-101-2P**	One *UltraTouch* module--Direct replacement into most existing operator stations into existing mechanical palm buttons space and screw configurations. Excellent for retrofit projects.
	**UL-102-2P**	One *UltraTouch* module with a complete self-contained NEMA 12 enclosure. Dimensional configuration of NEMA 12 enclosure of 3.50" (89mm) x 6.375" (162mm) x 2.95" (75mm). Excellent for installations when the *UltraTouch* system must be mounted individually due to space limitations.
	UL-301-2P	Two *UltraTouch* modules mounted on a NEMA 12 operator station run bar. The *UltraTouch* modules are mounted in accordance to OSHA, ANSI, and CSA standards in regards to run button spacing.
	UL-401-2P	Two *UltraTouch* modules mounted on a NEMA 12 operator station run bar with a red mushroom emergency stop button located in the center. Excellent for installations requiring an emergency stop button for the operator. All the modules are mounted in accordance to OSHA, ANSI, and CSA standards in regards to run button spacing.
	**UL-501-2P**	Two *UltraTouch* modules mounted on a NEMA 12 operator station run bar with a red mushroom emergency stop button located in the center and a yellow mushroom top button located off center. Ideal for the metal stamping/metal fabrication industry. All the modules are mounted in accordance to OSHA, ANSI, and CSA standards in regards to run button spacing.
	UL-601 **Specify** **AC or DC**	Anti-tie down/concurrent operation module. This assembly supplies the control that, when added to two *UltraTouch* devices, assures that the operator occupies both hands and must initiate both *UltraTouch* devices within a preset period of time. The anti-tie down/concurrent module comes in a NEMA 12 enclosure and can be added to any of the styles. NEMA 12 enclosure 6" (152mm) x 8" (203mm) x 6" (152mm). This is required on all machines that do not have this capability in the machine control. (Available without control box. Part #UL-601-NB module. Requires 4" (102mm) x 5" (127mm) space.)
	8500	The Model 8500 adjustable pedestal mount can be utilized for mounting the operator stations or the *UltraTouch* modules off the machine. These adjustable height pedestals are painted OSHA yellow and are of heavy angle construction with a floor mounting plate that can be lagged to the floor. The adjustable height feature assures the correct ergonomic position for various size operators. This will help control stretching and pulling strains of the operator.

Specifications

NEMA 4 Sealed Housing
Solid State Circuitry
Dual Sensor Sources--Infrared/Capacitive
Response Time <20 ms
CSA Approved, UL Listed
Module requires a 2" (51mm) mounting depth in run bar

Current Requirements
110 VAC 2 pole -- 50 mA
4 pole -- 60 mA
24 VDC 2 pole -- 150 mA
4 pole -- 250 mA

Operator Status Indicator -- LED's
A. Red -- Ready to cycle
B. Green -- Cycle initiated

Relay Type -- Captive Contact Safety Relay
Relay Rating -- 8 amp @ 220 VAC; 8 amp @ 120 VAC

Relay Cycle Life
Mechanical -- 50 million cycles
Electrical -- 100,000 cycles at 220 VAC, 4 amp

Voltage Range -- +/- 10%
Warranty -- 2 years

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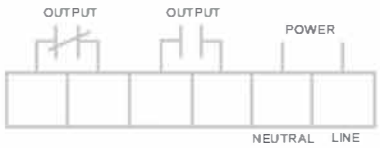
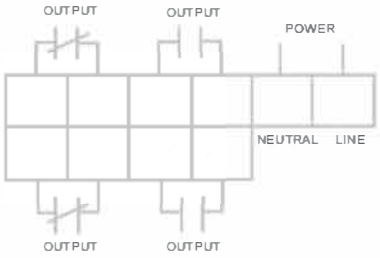
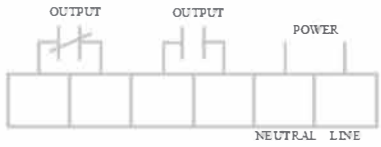
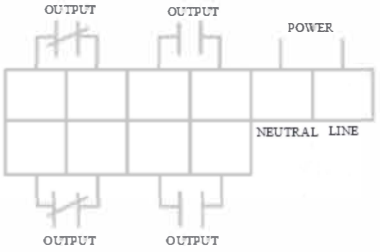
Ordering Procedure

UltraTouch®

		Wiring Configuration	Ordering Procedure
2 Pole Double Throw Relay 120 VAC **Model #** UL-101-2P	Relay Contact Rating 16 amps	 Relay operates when hand is inserted into sensors actuation tunnel.	If customized assemblies are required, please consult the factory. When ordering, please specify quantity required.
4 Pole Double Throw Relay 120 VAC **Model #** UL-101-4P	Relay Contact Rating 8 amps	 Relay operates when hand is inserted into sensors actuation tunnel.	When ordering, please specify quantity desired and Model Number shown on preceding page. Add the suffix 4P to the Model Number to designate the UltraTouch Model to be supplied with a 4 pole double throw relay configuration. Examples: UL-101-4P, UL-102-4P, UL-301-4P, UL-401-4P, UL-501-4P
24VDC Voltage System 2 Pole Double Throw Relay **Model #** UL-101-2P-DC	Relay Contact Rating 8 amps	 Relay operates when hand is inserted into sensors actuation tunnel.	When ordering, please specify quantity desired and Model Number shown on preceding page. Add the suffix 2P-DC to the Model Number to designate the Model to be supplied with a 24VDC 2 pole system. Examples: UL-101-2P-DC, UL-102-2P-DC, UL-301-2P-DC, UL-401-2P-DC, UL-501-2P-DC
24VDC Voltage System 4 Pole Double Throw Relay **Model #** UL-101-4P-DC	Relay Contact Rating 8 amps	 Relay operates when hand is inserted into sensors actuation tunnel.	When ordering, please specify quantity desired and Model Number shown on preceding page. Add the suffix 4P-DC to the Model Number to designate the Model to be supplied with a 24VDC 4 pole system. Examples: UL-101-4P-DC, UL-102-4P-DC, UL-301-4P-DC, UL-401-4P-DC, UL-501-4P-DC

UltraTouch machine actuation devices are not to be used on full revolution power presses or on machinery utilizing restraints or pull-out devices as the point of operation guarding systems.

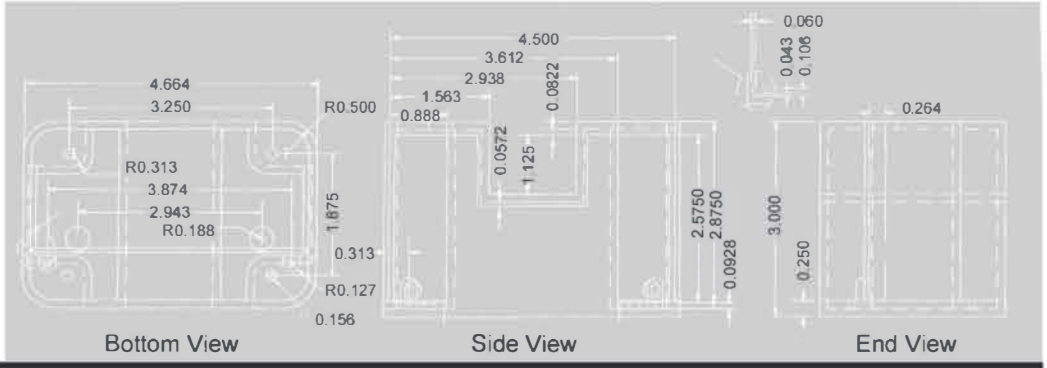
Mounting Dimensions

Dimensions in Inches

UltraTouch®

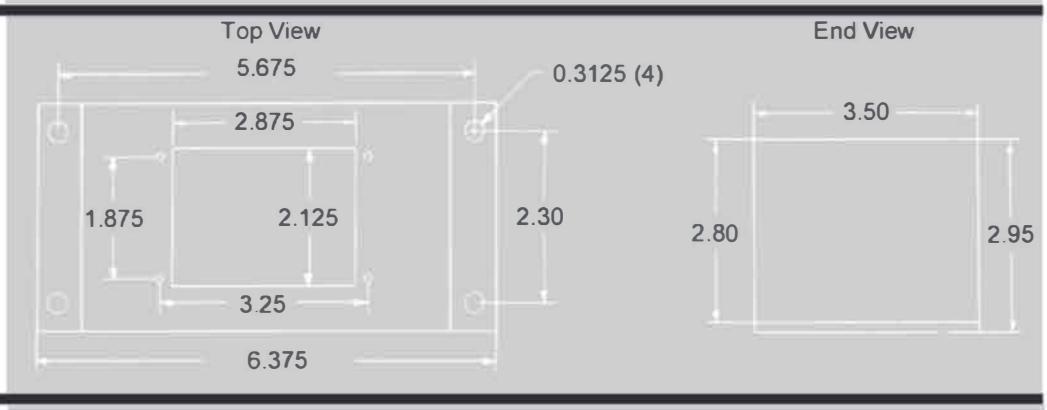
UL-101 UltraTouch® Module

Enclosure Specifications
- Material 0.125 in plastic



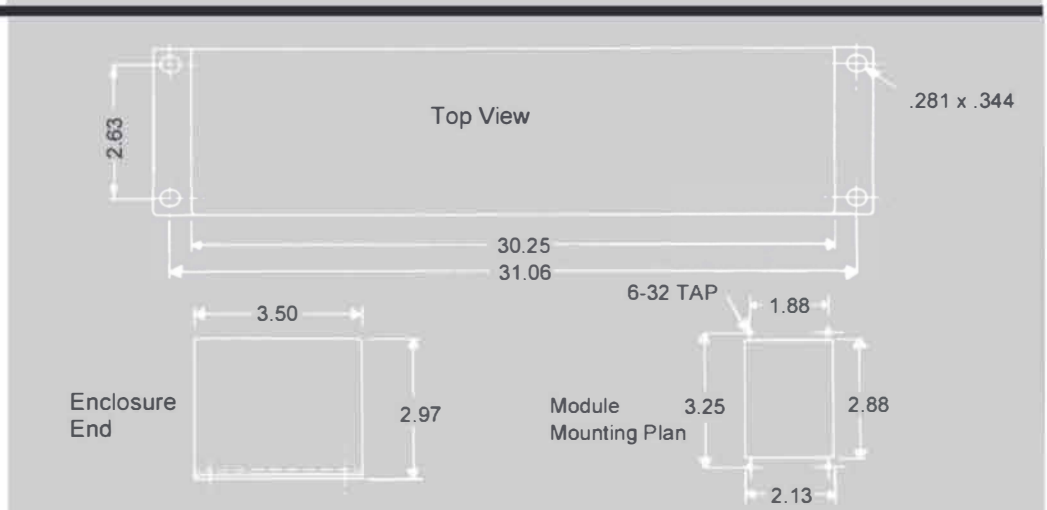
UL-102 Module Base All Styles

Enclosure Specifications
- NEMA 13
- 14 Gauge
- Steel Enclosure



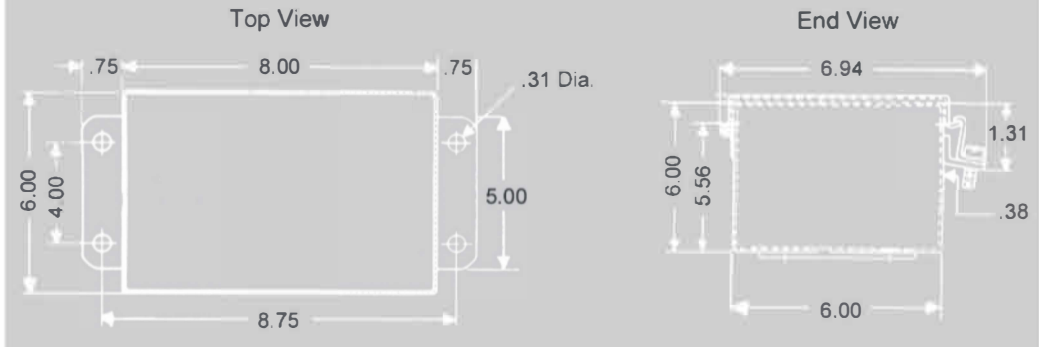
UL-301 UL-401 UL-501 All Styles

Enclosure Specifications
- NEMA 13
- 14 Gauge
- Steel Enclosure



UL-601

Enclosure Specifications
- NEMA 12 & 13
- UL 50 Type 12 & 13
- JIC Std. EGP-1967
- CSA Enclosure 5
- IEC 529, IP65
- 14 Gauge
- Steel Enclosure



Specials 1. Stainless steel module bases. 2. Cast malleable iron module bases.

Press Controls and Guarding for the Metal Stamping / Forming Industry

- Punch Press Clutch / Brake Controls
- Resolver Based Clutch / Brake Controls
- Rotary Cam Based Clutch / Brake Controls
- Punch Press Automation Controls
- Time Based Brake Monitor
- Die Protection Systems
- OSHA and ANSI Compliant Controls
- Programmable Limit Switches
- Tonnage Monitoring
- Servo Feed Interface
- Customized Punch Press Controls
- Press Brake Guarding for Mechanical, Air Clutch and Hydraulic Press Brakes
- Stainless Steel Enclosures Available
- LazerSafe™- Safeguarding system for Hydraulic Press Brakes

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NOTES

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- Universal Safety Controller HUB / Safety PLC
- Safety Mat Systems and Controls
  - Area Guarding Systems
  - NSD Safety Mat Systems
  - STTS Safety Mat Systems
  - Direction of Travel Mats
  - High-Temp Welding Mats
- Ergonomic Palm Buttons
  - UltraTouch Palm Buttons
- Safety Interlock Switches (including explosion proof)
- Customized "control reliable" controls for dual solenoid activated pneumatic and hydraulic valve applications
- Fencing with Interlocks
- E-Stop Buttons
- Stack Lights
- Energy Isolation and Single Point Lockout Systems
- Plant Surveys, Risk Assessment & Installation Services
- Customized Control Panels; Stainless Steel enclosures available for all products

Punch Press / Metal Stamping Industry

- Resolver or Rotary Cam Based Clutch / Brake Controls - OSHA/ANSI Compliant
- Punch Press Automation Controllers
- Time-Based Brake Monitors
- Programmable Limit Switches
- Die Protection & Tonnage Monitoring Systems
- Servo Feed Interfaces

Press Brake Guarding and Controls

- Press Brake Guarding for Mechanical, Air Clutch and Hydraulic Press Brakes
- Press Brake Control Systems

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service@pinnaclesystems.com

We have designed our equipment to the very highest performance and safety standards known to the current technological state of the art, as evidenced by our U.S.A. and foreign patents issued and pending. However, the installation, usage, and suitability, and fitness of our equipment for any purpose, known or unknown,is interdependent upon the performance of other equipment not manufactured, installed, secured or maintained by Pinnacle Systems, Inc.

We cannot and do not accept responsibility for any overall system performance when factors such as these, are beyond our control.