

### THE 4481 ADJUSTABLE TIMED OUTPUT MACHINE CONTROL

The 4481 control has all the anti-tiedown switch monitor features of the 4480 control with the added feature of a knob adjustable timed output. The 4481 can be configured to operate in one of the following ways:

**Timed Output** - After both start switches are pressed, the load will remain energized until the time cycle is completed or a start switch is released.

**Maintained Timed Output** - An optional "Hold" switch is wired to the control. When this switch is closed the load will remain energized even after the start switches are released. This switch must not be closed until after the pinch point is passed.

**Delayed Timed Output** - The load will remain energized until the time cycle is completed or a start switch is released. However, the time cycle will not begin until an optional "Delay" switch is opened.



<b>Part# 4481-5</b>	.5-5 Second Output
<b>Part# 4481-10</b>	1-10 Second Output

#### LIMITED ONE YEAR WARRANTY

Nolatron, Inc. warrants its products against defects in material and workmanship under normal and proper use for a period of one year from date of shipment. Nolatron's obligation under this warranty is limited to furnishing, without charge and at our discretion, either replacement or repair of any defective part. This warranty does not apply under the following conditions: (1) When the product has been operated at other than specified voltage or currents. (2) When the product has sustained contact damage due to improper load arc protection. (3) When the product has been subjected to abuse or has otherwise been tampered with. The foregoing warranty is exclusive and in lieu of all other warranties of quality whether written, oral, or implied. Nolatron is not liable for any damage or injury which may result from the use of these products.

#### WARNING

These controls are not intended for use without adequate "point of operation" safety guards, which must be provided for the operator's protection. The user must see that the control is properly installed, cared for, and operated to meet all applicable local, national and OSHA codes and requirements. The user must also determine the compatibility and safety of switching devices used with the switch monitor. Failure to comply could result in serious bodily injury and/or property damage.

## **USES REDUNDANT POSITIVE GUIDED RELAYS**

### **TWO HAND MACHINE CONTROLS ANTI-TIEDOWN TIMER SERIES 3380**

Nolatron's anti-tiedown controls are used in conjunction with two start switches to help protect machinery operators. The 3380 series helps to comply with OSHA, which requires a machine operator to have both hands on the start switches in order to start a machine cycle. This minimizes the possibility of the operator starting the machine while one hand is in the work area.

Both start switches must be activated within a fixed time interval to energize the output. This prevents an operator from "tying down" one of the switches while continuing to operate the machine.

The 3380 uses redundant positive guided output contacts which are cross-checked before every machine cycle. A single component failure will cause the control to shut down in a safe mode.

Features:

**Double "positive guided" output relays-** Each relay is checked for proper status prior to beginning a machine cycle.

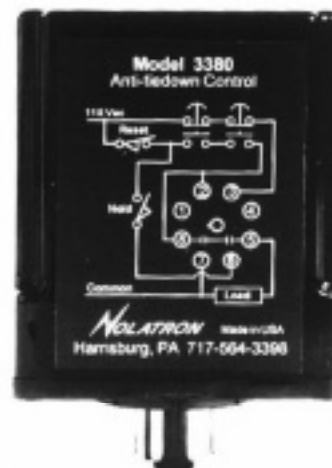
**Pin for pin compatibility-** The 3380 series can be used to replace the 3370 and 5570 series controls with no modification to wiring.\* This allows easy upgrading of existing machinery.

**Control reliable-** The 3380 series is designed to meet the OSHA classification of "control reliability" as defined in section 1910.217 (13).

\*Note: The 3380 series does not offer the normally closed output contact (pin number 4 of the 3370 series). Also, the switching output current rating of the 3380 is 8 amps, the 3370 series is rated for 10 amps).

### **Specifications:**

Physical	3 1/2"(88mm) High, 2 3/8" (60mm) Wide, 1 3/4" (45mm) Deep
Wiring Connection	Standard 8 pin octal base (socket sold separately)
Operating Voltage	115 VAC, 50/60Hz. (12 and 24VAC also available)
Power Consumption	.3 Watts (pin 3 energized) / 6 Watts (pin 2 energized)
Output Ratings	8 Amps @ 115 VAC (switching), 6 Amps @ 115 VAC(continuous)



## SUGGESTED WIRING FOR MODEL 3380

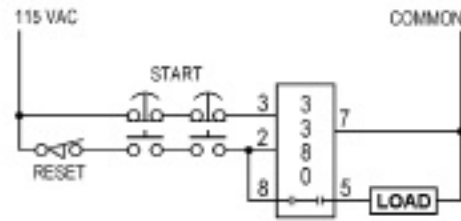
# 11

# CONTROLS & SENSORS

**MOMENTARY OUTPUT:** In order for a machine cycle to begin, both start switches must be pressed within .5 sec. (this time is internally adjustable). The output will remain energized as long as the start switches are depressed.

The optional Reset switch can be opened to end the machine cycle regardless of whether the start switches are depressed. In some applications the Reset switch is used as a means to provide a "single stroke" of the machine.

Both start switches must be released before another machine cycle can be started. If either start switch is "tied down", the cycle can not be repeated.

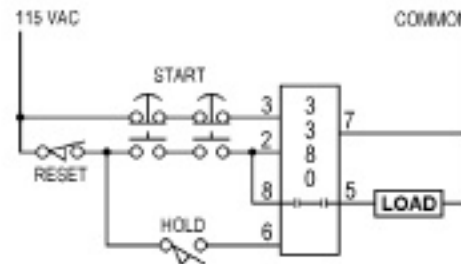


**MAINTAINED OUTPUT:** In order for a machine cycle to begin, both start switches must be pressed within .5 sec. (this time is internally adjustable). The output will remain energized as long as the start switches are depressed.

Closing the optional Hold switch will allow the load to remain energized after the start switches are released. The Hold switch must not be closed until the pinch point is passed. The Hold switch should stay closed for the rest of the machine cycle.

The Reset switch can be opened to end the machine cycle regardless of whether the Hold switch is closed or the start switches are depressed.

Both start switches must be released before another machine cycle can be started. If either start switch is "tied down", the cycle cannot be repeated.

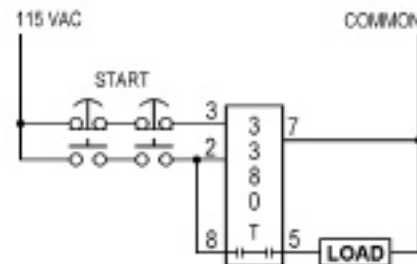


**Note: The Reset and Hold switches shown in the above wiring diagrams are optional and are not required for all applications.**

## SUGGESTED WIRING FOR MODEL 3380-T

**TIMED OUTPUT:** In order for a machine cycle to begin, both start switches must be pressed within .5 sec. (this time is internally adjustable). The output will energize the load for .5 sec. assuming that the start switches remain depressed. (The output time is internally adjustable with a range of .2 - 1 sec.).

Both start switches must be released before another machine cycle can be started. If either start switch is "tied down", another cycle cannot be repeated.



## USES REDUNDANT POSITIVE GUIDED RELAYS

### TWO HAND MACHINE CONTROLS ADJUSTABLE TIMED OUTPUT CYCLE

#### ANTI-TIEDOWN TIMER

#### SERIES 3381



The 3381 series contains all the anti-tiedown features of the 3380 series, with the addition of adjustable time output. The 3380 series is Pin for pin compatible with 3371 controls.

#### Specifications:

Voltage - 115 VAC, 50/60Hz (12 & 24VAC also available)

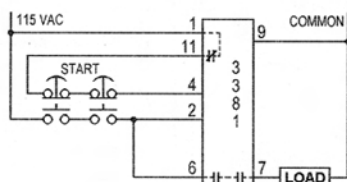
Output - relay SPST 8A. (resistive load) 1/6 HP @ 120 VAC

Physical - plug-in 11 pin, size: 4.75 x 2.375 x 1.75

Timer - solid state knob adjustable !1% repeatability

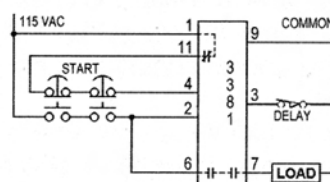
Part No.	Time Range
3381-5	.5 - 5 sec.
3381-10	1 - 10 sec.
3381-50	5 - 50 sec.
3381-100	10 - 100 sec.
3381-360	36 - 360 sec.

### SUGGESTED WIRING FOR MODEL 3381



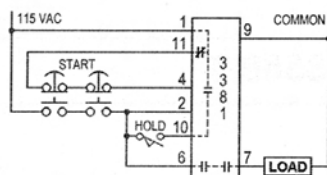
#### TIMED OUTPUT

Both start switches must be pressed within a fixed time to operate. The load will remain energized until the timer runs out or one or both switches are released.



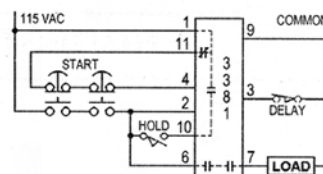
#### DELAYED TIMED OUTPUT

This circuit has the feature of time delay. When the two start buttons are activated, the load will stay energized until the timer runs out. However, the timer will not time out while the delay switch is closed. The control will reset if either start switch is released or upon time out.



#### MAINTAINED TIMED OUTPUT

This circuit has the added feature of maintained output. When the two start buttons are activated and the hold switch is closed, the load will stay energized after the start buttons are released. When the timer runs out, the control will reset.



#### MAINTAINED AND DELAYED TIME OUTPUT

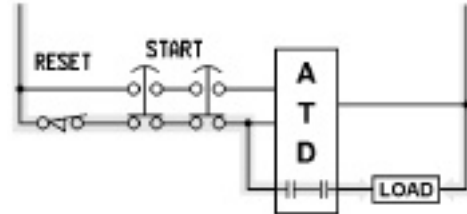
This circuit has the feature of maintained output in addition to delayed operation. The operation is identical to the delayed circuit above but the control will continue to energize the load even if one or both start switches are released. The control will reset when the timer times out.

Series 3381E - Same as series 3381, but with remote output adjustment capability. The supplied potentiometer should be connected from pin 3 to pin 8. Time ranges are the same as 3381.

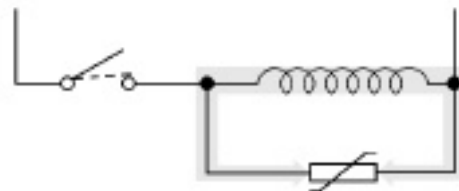
## APPLICATION NOTES

**HAND SWITCHES** - The 3380 and 3381 series are designed to operate with mechanical hand switches only. The normally closed and normally open contact of each switch must be isolated and of the "break before make" type. The user must determine the compatibility and safety of the hand switches. These controls are not designed to be interfaced with electronic hand sensors (request information on series 4480 & 4481).

**LOAD CIRCUIT** - Whenever possible, the load should receive power through the start switches as shown to the right. In this circuit if either start switch or the reset switch is opened, the power to the load will be interrupted by the switch as well as the output relay contacts. This circuit will offer additional safety when de-energizing the load.



**LOAD TRANSIENT DAMAGE** - If the load is a solenoid, a motor, a relay coil or a transformer, it will have inductive properties. When a relay contact breaks the current to an inductor, a high voltage will result across the contact. This high voltage may damage the contacts when they begin to separate. Good transient suppression (placed across the load) can greatly reduce this damaging high voltage and increase operating life. Order Nolatron Part # 30165 - Load Suppressor



**LIMITED ONE YEAR WARRANTY:** Nolatron, Inc. warrants its products against defects in material and workmanship under normal and proper use for a period of one year from date of shipment. Nolatron's obligation under this warranty is limited to furnishing, without charge and at our discretion, either replacement or repair of any defective part. This warranty does not apply under the following conditions: (1) When the product has been operated at other than specified voltage or currents. (2) When the product has sustained contact damage due to improper load transient protection. (3) When the product has been subjected to abuse or has otherwise been tampered with. The foregoing warranty is exclusive and in lieu of all other warranties of quality whether written, oral or implied. Nolatron is not liable for damage or injury which may result from the use of these products.

**WARNING:** These anti-tiedown controls are not intended for use without adequate point of operation safety guards. It is the user's responsibility to assess all potential hazards when installing safety equipment. The user must see that these controls are properly installed, cared for and operated to meet all applicable local, national and OSHA codes and requirements. Failure to comply could result in serious bodily injury and/or property damage.

***USES REDUNDANT POSITIVE GUIDED RELAYS***

## **TWO-HAND MACHINE CONTROLS ANTI-TIEDOWN SWITCH MONITOR SERIES 4480**

Nolatron's 4480 Switch Monitor is designed for use with single-pole hand sensing devices, such as optical touch buttons. It provides two hand control for presses, welders, molders, and various production machines. The 4480 also helps to comply with OSHA, which requires an operator to have both hands on start switches in order to begin a machine cycle. This minimizes the possibility of an operator having one hand in the work area when a machine cycle is started. If one or both start switches are "tied-down", the control will not allow a new machine cycle to begin. The 4480 series can be used to replace the Nolatron 4470 series with no modification to wiring.



### **MODEL 4480**

- I COMPATIBLE WITH SINGLE POLE HAND SENSING DEVICES
- I USES REDUNDANT POSITIVE GUIDED RELAYS
- I MEETS THE OSHA CLASSIFICATION OF 'CONTROL RELIABILITY'
- I USES A DETACHABLE TERMINAL STRIP FOR EASY INSTALLATION AND REMOVAL

The 4480 meets the OSHA classification of "control reliability" as defined in section 1910.217 (13). It uses redundant output contacts which are cross-checked before every machine cycle. The failure of any component will cause the control to shut down in a safe mode. One year full warranty.



## FEATURES OF THE 4480 SERIES

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# CONTROLS & SENSORS

### *Redundant Output Contacts*

The 4480 series uses double "positive guided" output relays. Each relay is checked for proper status prior to beginning a machine cycle.

### *Hand Switch Inputs*

The 4480 switch monitor is designed to interface with dry contact, single pole hand switches and electronic hand sensing devices with relay output. The 4480 features a hand switch delay which requires each hand switch to be closed for a set amount of time (factory set at .075 seconds) in order to activate. When in the open position, 24-40 volts DC will be across the hand switches. When in the closed position, 60-80 milliamps will flow through each hand switch.

### *Anti-tiedown*

Model 4480 is activated by depressing the two hand switches within a fixed period of time (factory set at .5 sec.). The load will remain energized until one or both start switches are released or the reset switch is opened. If one or both switches are tied-down, the 4480 monitor will not operate.

### *Universal Power Configuration*

The 4480 series allows 115 or 230 volt operation at 50 or 60 Hz.

### *Control Reliability*

The 4480 series is designed to meet the OSHA classification of "control reliability" as defined in section 1910.217 (13).

### *Low Voltage Detector*

The low voltage detector inhibits operation and causes the control to reset if power supply voltage drops below 90VAC (115V application). The 4480 will also reset on brief dips in supply voltage. (Note: Some hand detection devices will operate erratically under low voltage conditions. Therefore, these devices should be connected to the same power source as the 4480 so they can be monitored).

### *System Check Cycle*

When the power is turned on, the 4480 will begin a 5 second system check cycle. During this check, the output is disabled and a machine cycle cannot be initiated. If the operator's hands are on the start switches during the system check, the output will not be energized until both hands are removed and reapplied.

### *Detachable Terminal Strip*

The 4480 is wired using a detachable terminal strip, which makes installation and removal of the 4480 much easier.

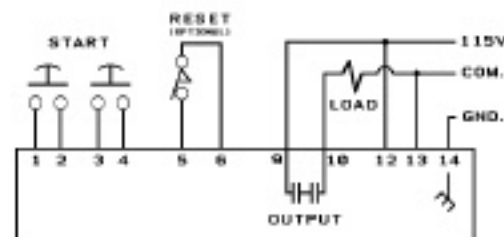
### **Specifications**

Physical Dimensions:	4.7" x 4.3" x 2.0" (l x w x d)
Weight:	1.25 lbs
Power Requirements:	115 VAC, 50/60Hz @ .1 A or 230 VAC, 50/60Hz @ .05A (24v model also available).
Power Line Monitor:	Resets if supply drops below 90V RMS (120V application) or 180V RMS (240V application) for more than 15 ms.
Output Load Rating:	8 Amps @ 115/230VAC (switching), 6 Amps @ 115/230VAC (continuous).
Output Life:	10 million mechanical operations (minimum).
Hand Switch Delay:	.05 to .15 seconds (factory set at .075 seconds).
Hand Switch Concurrency:	0 to .7 seconds (factory set at .5 seconds).
Delay on Power-up:	5 seconds (approximate).
Temperature Range:	0 - 140 F.
Origin:	Made in the U.S.A.

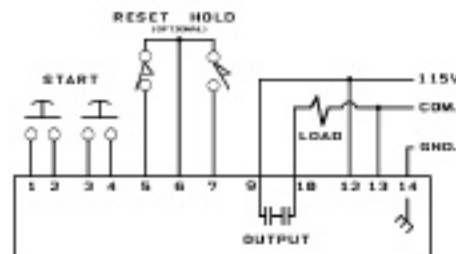
## SUGGESTED WIRING FOR THE 4480 SERIES

### MODEL 4480

**MOMENTARY OUTPUT** - In order for a machine cycle to begin, both switches must be activated within .5 seconds. The load will remain energized until one or both start switches are released or the Reset switch is opened momentarily.

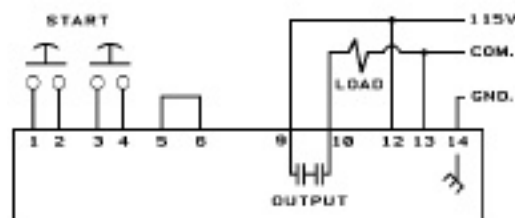


**MAINTAINED OUTPUT** - An optional Hold switch can be wired into the circuit of the 4480 to provide a maintained output. When the Hold switch is closed, the load will stay energized even after the start switches are released. The Hold switch must not close until the pinch-point is passed, and should remain closed for the rest of the machine cycle.



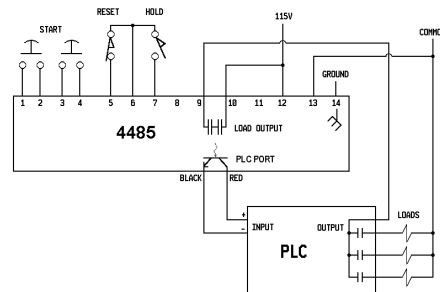
### MODEL 4480-T

**TIMED OUTPUT** - This model has the added feature of an adjustable timed output. When both start switches are activated, the output will remain energized until the time cycle is completed or one or both start switches are released. The output time is factory set at .5 second, and is internally adjustable from .2 to 1 second.



### MODEL 4485

**PLC INTERFACE** - Model 4485 has all the anti-tiedown features of the 4480 plus the ability to interface with programmable controllers that have DC inputs of the sinking or sourcing configuration. When a PLC is used to start a machine cycle, an anti-tiedown control must be used to help prevent an unwanted energizing of a machine load due to PLC failure.



**Note:** The Reset & Hold switches shown in the above wiring diagrams are optional and are not required for all applications.

### LOAD TRANSIENT DAMAGE

If the load is a solenoid, a motor, a relay coil, or a transformer, it will have inductive properties. When a relay contact breaks the current to an inductor, a high voltage will result across the contact. This high voltage may damage the contacts when they begin to separate. Good transient suppression (placed across the load) can greatly reduce this damaging high voltage and increase operating life.

**Order Nolatron Part#: 30165 - LOAD SUPPRESSOR**

