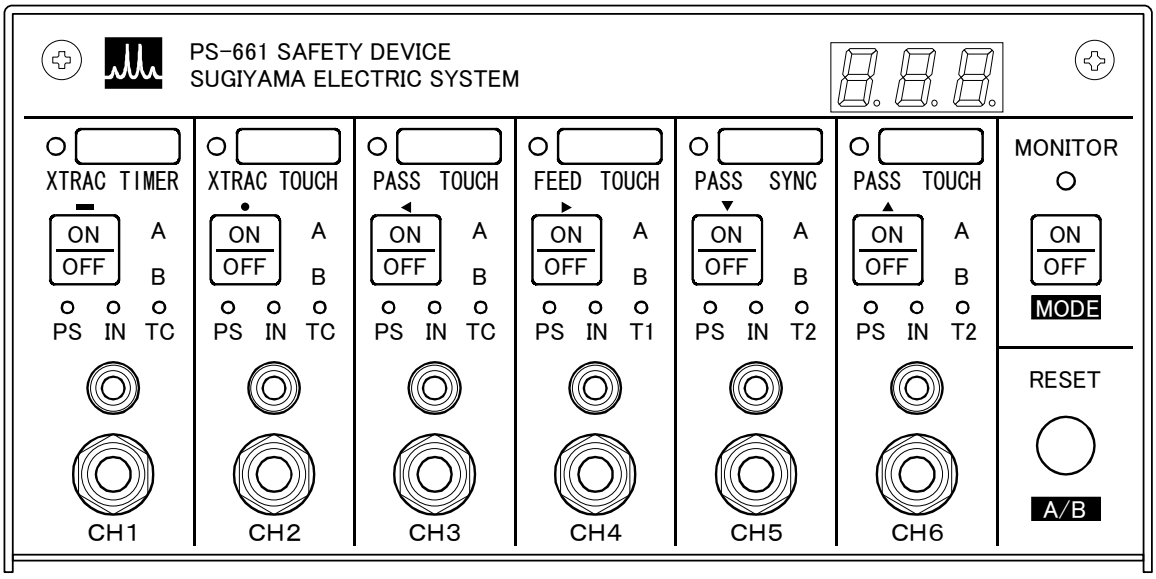
HI-PERFORMANCE MALFUNCTION DETECTOR

SAFETY DEVICE PS-661

INSTRUCTION MANUAL

Program version 1.0x



SUGIYAMA ELECTRIC SYSTEM INC.

Warning

This safety device is designed to reduce such failure as damage of the die and defects in production. It is not guaranteed that there are no damage and no defects of the die.

Use the voltage of the power source with AC100-240V.

The voltage exceeding a specified voltage may cause fire.

Do not touch the terminal block.

Electric shock may occur when coming into contact with a metal part of the terminal block.

Do not decompose, repair nor remodel the safety device. Decomposing, repairing, or remodeling is very dangerous.

In breaking down, turn the power source off immediately and stop the use.

In the case of abnormal situations such as heat, smoke and strange smell, turn the power source off immediately and stop the use.

The continuous use may cause fire or electric shock.

Caution

Make sure that this safety device has been firmly secured.

The safety device may drop if used under unsteady conditions, which may result in an injury.

Do not use the device exposed to water and other liquids.

Otherwise it may cause a breakdown, fire, and electric shock.

Check before use.

After turning the power source on, check that each function operates normally.

Contents

1. Description

The safety device PS-661 is a malfunction-detecting device to monitor stamping processes, such as material end, miss-feeding and miss-ejection in automatic press stamping.
PS-661 inspects the processing by utilization of sensor input connected to PS-661 and the detection-timing signal which synchronizes with the operation of the press machine. When the malfunction is detected, a stop signal is output to the press machine.

1-1. Features

○ The detection modes can be changed.
Two detection modes are built in each detection channel. The combination of the detection modes is different in each channel.

○ The sensor input polarity of each channel can be switched.

○ All detection channels have the pin jack and the 3-pole jack.
The contact type sensor is connected with the pin jack. The sensor (photo sensor and proximity sensor, etc.) which needs the power supply is connected with the 3-pole jack.

○ The detection channel under use is displayed.
The detection lamp illuminates green when the channel is in use. When a malfunction is detected, the detection lamp blinks red.

○ The operation stop of the safety device is made easy to confirm.
When the detection operation is stopped, some lamps are turned off.

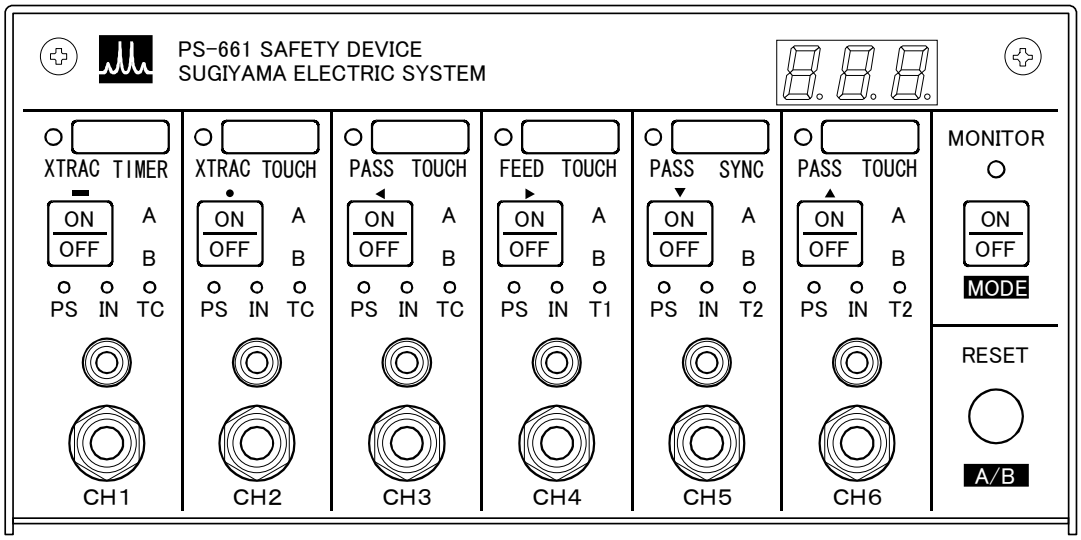
○ Unnecessary operation can be excluded.
When the operation inhibition input in the terminal block is turned on, other buttons than reset and monitor cannot be operated.

2. Explanation of each part

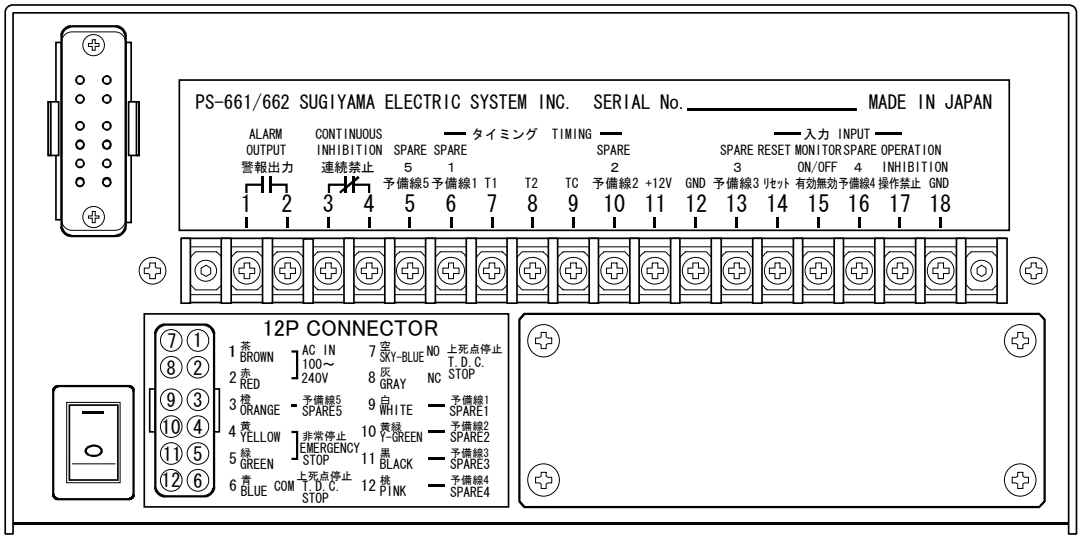
2-1. Panels

In the front panel, there are six detection channels, the reset button to release a stop signal, the monitor ON/OFF button to switch functions of the device on/off, and the digital display of three digits.

The back panel includes the output connector, the terminal block, and the power switch, etc.



PS-661 front panel



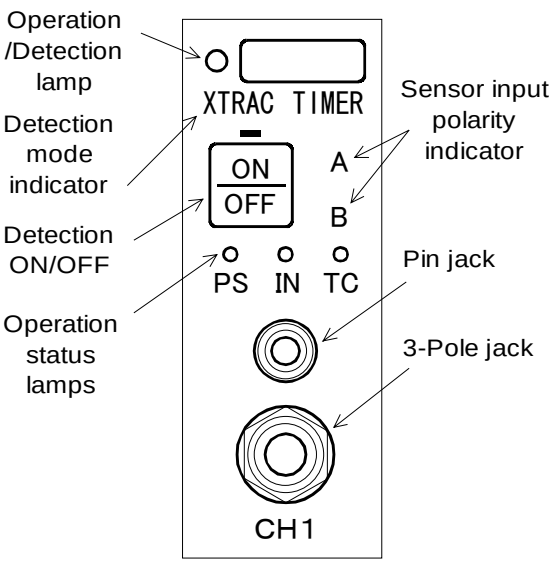
PS-661 back panel

2-1-1.Detection channel

The operation/detection lamp displays the state of the channel. When the detection of the channel is turned on, the lamp illuminates green. The lamp lights off when detection is turned off. When the malfunction is detected, the lamp blinks red. When the detection lamp blinks red, the stop signal is output. Push the reset button to release the stop signal.

Pushing the detection ON/OFF button can switch detection on/off.

The detection mode indicator displays the detection method with lighting. The combination of the detection methods is different in each channel. Push the detection ON/OFF button with the mode (monitor ON/OFF) button pushed to change the detection modes.



Detection channel

The sensor input polarity indicator displays A or B with lighting. The polarity indicator is turned off at the detection OFF. Push the detection ON/OFF button while holding down the A/B (reset) button to change the input polarity.

The detection ON/OFF button is used for changing the detection on/off. Moreover, it is used to change the sensor-input polarity and the detection modes, etc.

The operation status lamps have three types; PS, IN, and Tx.

The PS lamp displays the passage-signal memory. The PS lamp does not illuminate in some detection modes.

The IN lamp indicates the state of the sensor-input signal. The IN lamp illuminates when the input signal is effective.

The Tx lamp displays the detection-timing signal. Tx is printed as T1, T2 or TC on the panel. The detection timing signal input is in the terminal block.

The sensor is connected with a pin jack and a 3-pole jack. The sensor such as the SPRING SENSOR and two wire type proximity switches is connected with the pin jack. The LIGHT SENSOR, the LOOP SENSOR, and three-wire type proximity switch are connected with the 3-pole jack.

Two sensor signals in one detection channel are connected internally. Neither pin jack nor 3-pole jack must be connected to the sensor at the same time.

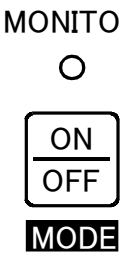
2-1-2.Monitor ON/OFF button, lamp

The monitor ON/OFF button switches detection function of the safety device on/off.

The monitor lamp illuminates green when detection function of the safety device becomes ON. The red lamp blinks by the detection function OFF.

In the detection function ON, the continuous inhibition output relay is turned on.

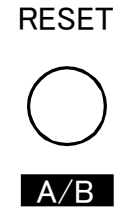
The monitor ON/OFF button is used as a shift button of the detection mode change operation. Pushing the detection ON/OFF button with the mode (Monitor ON/OFF) button pushed can change the detection modes.



Monitor ON/OFF
Button, lamp

2-1-3.Reset button

The stop output and the error of the safety device are released with the reset button. The reset button is used as a shift button of the sensor input polarity change operation. Pushing the detection ON/OFF button with the A/B (reset) button pushed can change the sensor-input polarity.



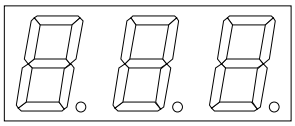
Reset button

2-1-4.Digital display

The digital display is used for display/change in the data of the detection mode function setting.

Moreover, when the memory backup battery voltage becomes low, the error (E-01) is displayed.

The data setting of the detection mode function includes the timer detection and the number of the extraction, etc. The content of the function setting is different depending on detection modes.



Digital display

2-1-5.Terminal block

The terminal block includes relay output, detection timing input, and spare wires, etc.

The alarm output (1, 2) is an output of the relay contact. The relay contact closes by output ON. The alarm output is turned on at the same time as the emergency stop or T.D.C. stopping. The buzzer and warning light are normally connected with the alarm output.

The continuous inhibition (3, 4) is an output of the relay contact. This relay contact output closes at the monitor ON. The continuous inhibition output is connected with the press control circuit that the press machine may become shutdown in the condition where the safety device is at the monitor OFF.

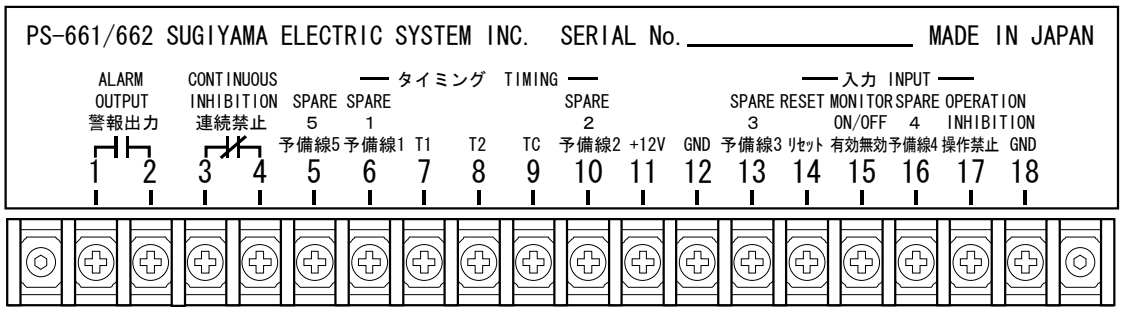
T1 (7), T2 (8), TC (9) are detection timing input. Connect the rotary cam and the timing sensor etc. of the press device with the detection timing input.

+12V (11) is a power source for the timing sensor. Use current of 100mA or less.

The safety device does not work when short-circuited between +12V terminal and other

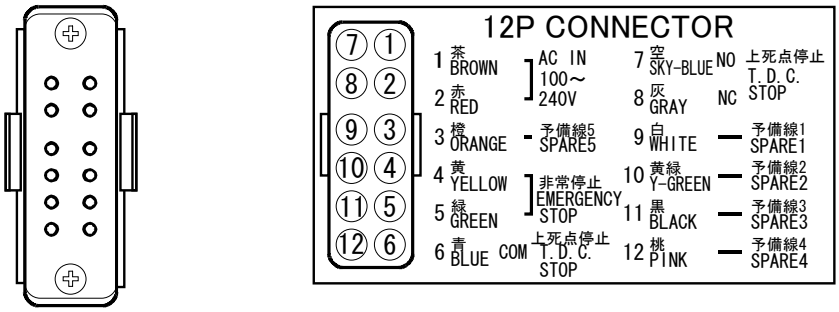
terminal. Avoid being short-circuited.
The spare wires (5, 6, 10, 13, 16) are connected with the output connector. Use the spare wires when connecting the signal of the terminal block through the power cable.
The reset input (14) is an input of the stop output release. When the stop output is released with the reset button in the panel, the input terminal temporarily becomes a reset output. The reset output is turned on for 0.2 seconds.
The monitor ON/OFF input (15) can turn the detection function of the safety device on/off.
The operation inhibition input (17) inhibits the panel operation. Connect the operation inhibition input with the GND of terminal block to inhibit the panel operation.
The GNDs (12, 18) are common terminals of the terminal block input. The GNDs are connected with the chassis internally.

Attention: Connect the contact or the contact-less signal of the no-voltage with the terminal block input. When the voltage is applied, an internal circuit might be damaged.



Terminal block

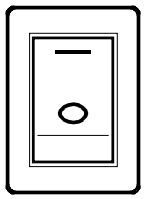
2-1-6.Output connector
In the output connector, there are power wires of the safety device, stop output, and spare wires. Connect the cable attached with a special connector.
Use supply of AC100 through 240V to the power input (1-Brown, 2-Red).
The emergency stop output (4-Yellow, 5-Green) are relay contact output. Connect the output with the emergency stop circuit of the press machine.
The T.D.C. stop output (6-Blue, 7-Sky-blue, 8-Gray) are relay contact output. Connect the output with the T.D.C. stop circuit of the press machine.
The spare wires (3-Orage, 9-White, 10-Yellow green, 11-Black, 12-Pink) are internally connected with the terminal block in the safety device.



Output connector

2-1-7.Power switch

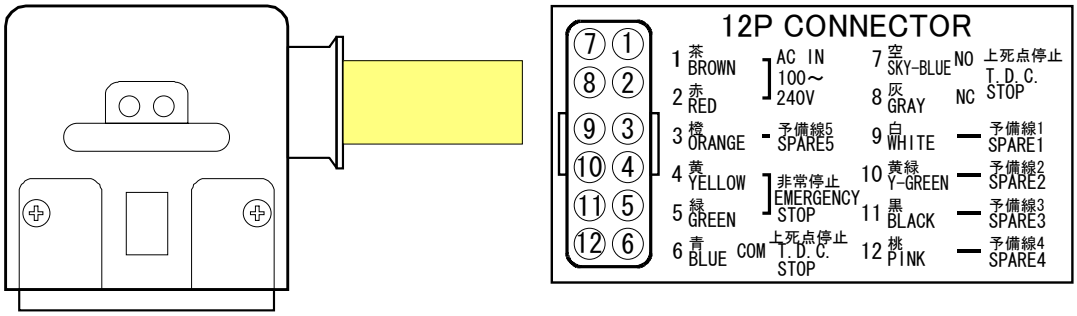
The power source switch is turned on when the switch is flipped. Avoid flipping the switch frequently.



Power switch

2-2. Power cable

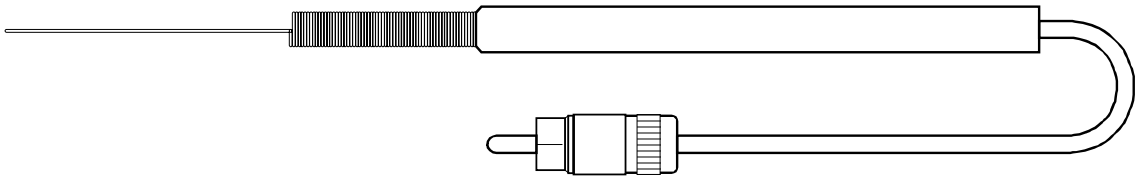
The power cable is attached with a connector so as to be connected with the output connector. The power cable is 5m in length by the standard.



Power cable

2-3. SPRING sensor

The six SPRING sensors are attached to PS-661. These are contact type sensors.



SPRING sensor

3. Functions

3-1. Malfunction detector

The malfunction detector consists of six detection channels. The detection channel monitors the processing of the press device by the sensor input and detection-timing signal. When the malfunction is detected, a stop signal is output.

To make the detection, turn the detection channel on and switch the monitor on. The continuous inhibition relay is turned off at the monitor OFF. To switch the monitor ON/OFF, push the monitor button in the panel or turn the monitor input of the terminal block on/off.

If the detection timing of the predetermined number is input at the monitor OFF, the safety device automatically becomes the monitor ON. The number of timing input, which automatically becomes monitor ON, is set in the device setting.

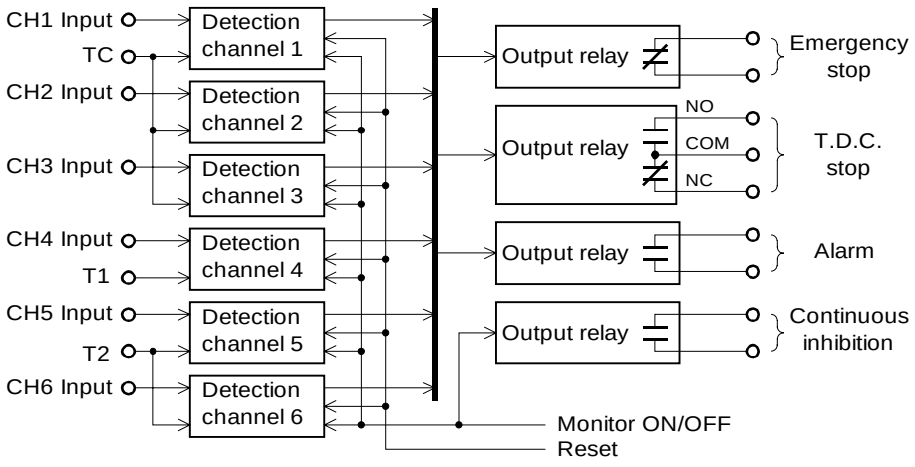
The detection channel outputs a stop signal through the emergency stop or the T.D.C. stop relay. To which relay the detection channel outputs a stop signal is decided by setting the detection modes. The alarm output relay is turned on at the same time as outputting the stop signal, too.

Perform the reset operation to release the stop output. Push the reset button of the panel or turn on the reset input of the terminal block.

The detection timing input has T1, T2, and TC. Combination of detection channel and timing has already been fixed. Channels 1 and 2 and 3 use TC. Channel 4 uses T1. Channels 5 and 6 use T2.

The functions of the detection channel can be partially altered by the function setting for each channel. The function setting data or the device setting data is stored in EEPROM. EEPROM can be memorized for a long time.

Input polarity, detection ON/OFF, and detection mode of the detection channel are backed up with the battery. When the voltage of the battery becomes low and the memory is lost, it is necessary to set the channel again. The channel (panel) setting is replaced by the data stored in EEPROM when the memory is lost. Moreover, panel setting memory operation can change the data of EEPROM. "E01" is displayed in the digital display at power ON when the memory is lost.



PS-661 block diagram

The contact closes to the emergency stop output relay and it opens to alarm and the continuous inhibition output relay when the power of the safety device is turned off. The T.D.C. stop output relay closes between COM-NC and opens between COM-NO. This state is not influenced by the output polarity setting of the device setting.

3-2. Detection channel

Operating the detection channel can change the detection ON/OFF, the sensor input polarity, and the detection modes. Pushing the detection ON/OFF button for each channel can turn the detection ON/OFF. The operation/detection lamp indicates that the safety device is at the monitor ON or OFF. When the lamp illuminates green, it is at the detection ON. When the lamp lights off, it is at the detection OFF.

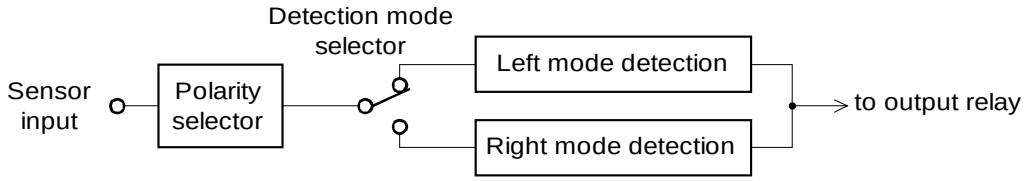
The input polarity specifies an effective signal level of the sensor. The input polarity is displayed by A or B. Push the detection ON/OFF button with the A/B (reset) button pushed to change the input polarity.

When the input polarity is A, the signal becomes effective when the input is 0V (GND level). At B, the signal is effective when the input enters the state of opening.

The IN lamp illuminates green when the input signal is effective. However, the IN lamp does not illuminate at the time of the detection OFF or monitor OFF, even if the input signal is effective.

There are two detection modes in the detection channel. Push the detection ON/OFF button with the mode (monitor ON/OFF) button pushed to change the detection modes. The combination of two detection modes is different in each detection channel.

The stop signal output destination of the detection result is decided by the detection modes. As for the same detection channel, when the detection mode is changed, the output destination might be different.



Detection channel

	Left detection mode (Output destination)	Right detection mode (Output destination)
Channel 1	XTRAC (T.D.C.)	TIMER (T.D.C.)
Channel 2	XTRAC (T.D.C.)	TOUCH (Emergency)
Channel 3	PASS (Emergency)	TOUCH (Emergency)
Channel 4	FEED (Emergency)	TOUCH (Emergency)
Channel 5	PASS (Emergency)	SYNC (Emergency)
Channel 6	PASS (Emergency)	TOUCH (Emergency)

(The function setting can change the output destination of the TOUCH detection.)

Allocation of detection mode

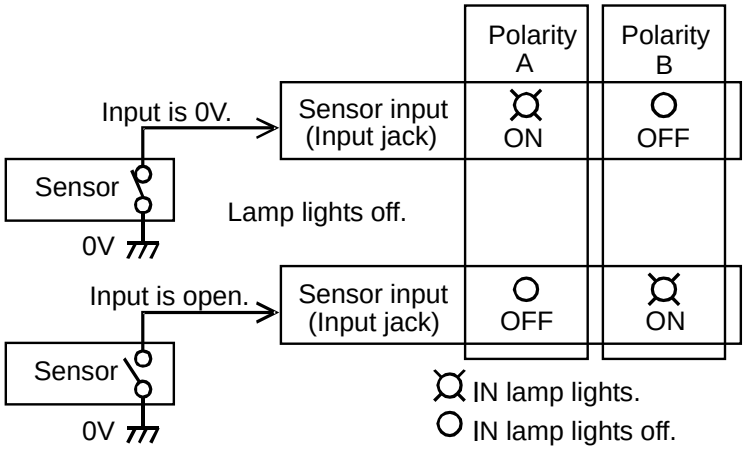
3-3. Sensor input

The sensor input can change the state of the input signal by setting the input polarity. When the input polarity is A, the signal becomes effective when the input is 0V (GND level). At B, the signal is effective when the input enters the state of opening.

The IN lamp illuminates green when the input signal is effective.

The response speed to the signal of the sensor input is about 100 microseconds. The input circuit does not respond occasionally when the sensor signal is shorter than 100 microseconds. Be careful when using the sensor that generates a short signal.

Connect the contact or the contact-less of the no-voltage with the sensor input. An internal circuit might be damaged when the voltage is applied to the input.



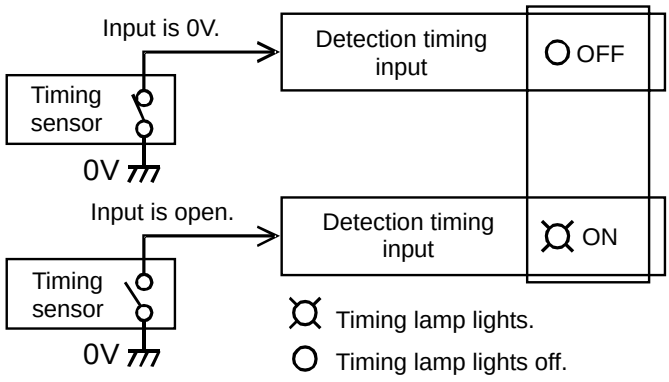
Input polarity and IN lamp

3-4. Detection timing input

As for the detection timing input, the input signal is turned on while opened.

The timing indicator lamps (T1, T2, TC) illuminate green when the detection timing is turned on. The detection timing needs a signal of two milliseconds or over in width. The device does not work normally when the signal with much chattering is input.

Connect the contact or the contact-less of the no-voltage with the input. An internal circuit might be damaged when the voltage is applied to the input.



Detection timing input and timing lamp

3-5. Function setting

The function setting is used to assist detection function. The setting data is different depending on detection modes.

Detection mode (Mark)	Set data
Touch (TOUCH)	Output destination
Synchronization (SYNC)	Output destination
Passage (PASS)	Timing extension time, input mask
Miss-feed (FEED)	Input delay time
Extraction (XTRAC)	Extraction number
Timer (TIMER)	Time of timer

Data of function setting

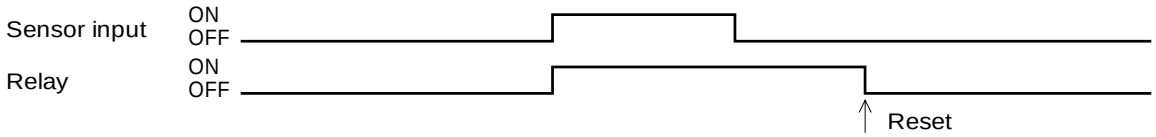
3-6. Detection mode

3-6-1.Touch detection

The touch detection always monitors the sensor input. When the input signal becomes effective, a stop signal is output.

The touch detection is used to detect coil end or bending during feeding of material. The stop output destination can be changed by the function setting.

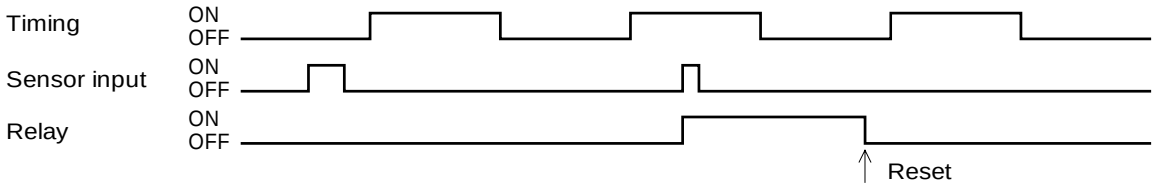
The PS lamp and the Tx lamp do not light in the touch detection.



Touch detection

3-6-2.Synchronization detection

When the detection timing is turned on and the input signal is effective, a stop signal is output. The synchronization detection is used to detect the coil end or bending feeding of material. At the detection timing ON, the synchronization detection is the same operation as the touch detection. The synchronization detection can change the stop output destination by the function setting.

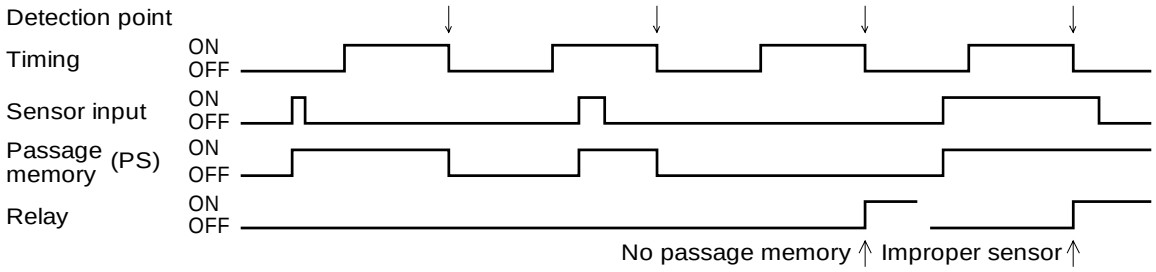


Synchronization detection

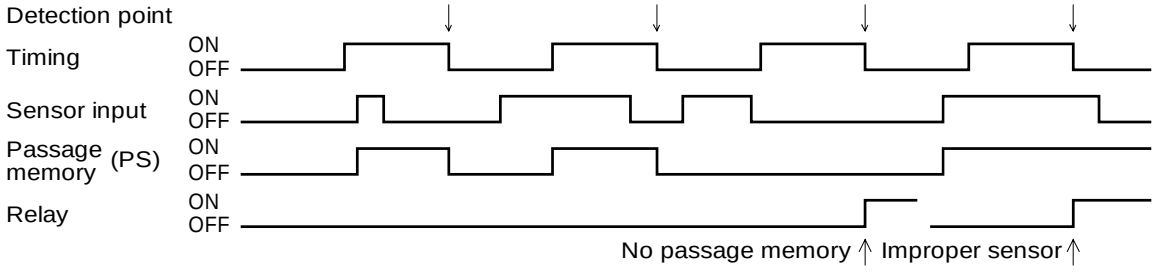
3-6-3.Passage detection

When the detection timing changes from turning on to turning off, the passage detection monitors the sensor input and the passage memory. In the cases where the input signal is effective or the passage memory is not set at the detection timing OFF, a stop signal is output. After the check, the passage memory is reset.

The passage memory is set when the sensor input is effective. In the case where the input mask is not released by the function setting, the passage memory is set when the sensor input becomes effective regardless of the detection timing. If the input mask is set, the passage memory can be set only during the period of timing ON. The PS lamp illuminates when the passage memory is set.



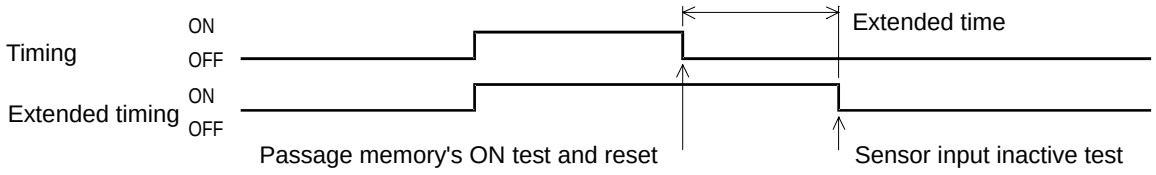
Passage detection where input mask is released



Passage detection where input mask is set

The function setting of the passage detection can set the extension time of the timing. The extension time of the timing can be set from 0 to 999 milliseconds. The sensor input must be invalid by the time the extended timing is turned off. The display of the Tx lamp and the confirmation and reset of the passage memory are performed according to the source timing.

Large value setting at the extension time of the timing causes the detection failure. Do not set a large value. Set the small value as much as possible for the extension time of the timing.



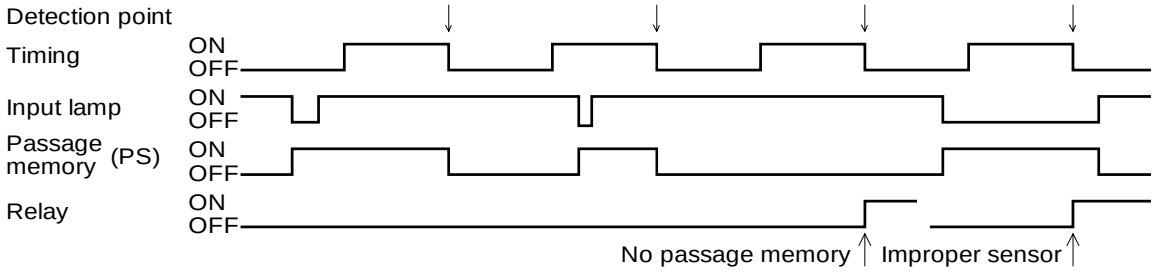
Extended timing

3-6-4.Miss-feed detection

When the detection timing changes from turning on to turning off, the miss-feed detection monitors the sensor input and the passage memory. In the cases where the input signal is effective or the passage memory is not set when the detection timing is turned off, a stop signal is output.

The passage memory is set when the sensor signal is effective.

In the miss-feed detection, the IN lamp illuminates when the sensor input becomes invalid. Note that the input display method is different from other detection modes.



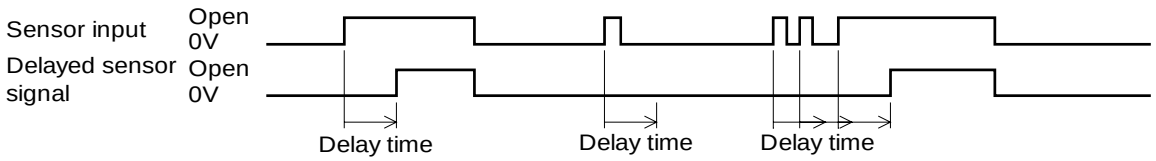
Miss-feed detection

In the miss-feed detection, the function setting can set the input delay time. The input delay time can be set from 0 to 255 milliseconds.

In the input delay time of the miss-feed detection, the input response time of when sensor-input terminal is opened from GND level is set. There is no delay when the sensor input becomes 0V from opening.

In the miss-feed detection by the method of contacting the SPRING sensor to the end of the material, it is likely to fail in detection from the uncertainty of the continuance contact due to vibration of the materials. For this case, setting the input delay time can decrease the failure of detection.

When the input delay time is mistakenly set, normal detection cannot be made. Set the small value as much as possible for the input delay time.

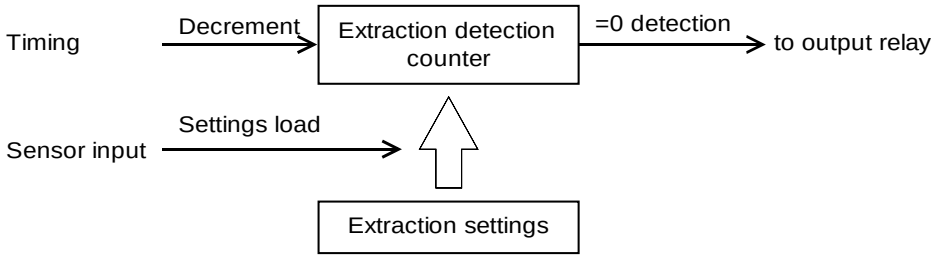


Input delay time of miss-feed detection

3-6-5.Extraction detection

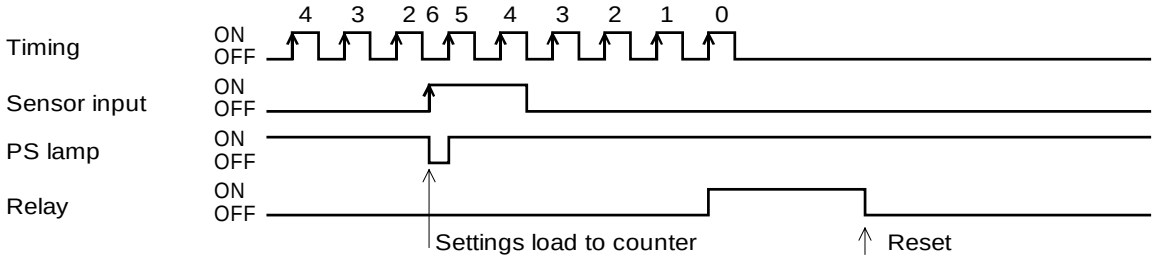
The extraction detection is performed by the use of the counter. When the sensor-input changes effectively from invalidity, the number of extraction is loaded into the counter.

When the detection timing gets turned on from turning off, the value of the counter decreases by 1. When the count of the counter becomes 0 after reduction due to timing, a stop signal is output.



Extraction detection block diagram

The value of the extraction detection counter cannot be displayed. The PS lamp illuminates when the count was reduced. The function setting sets the number of extraction detection. The number of extraction detection can be set from 2 to 999.



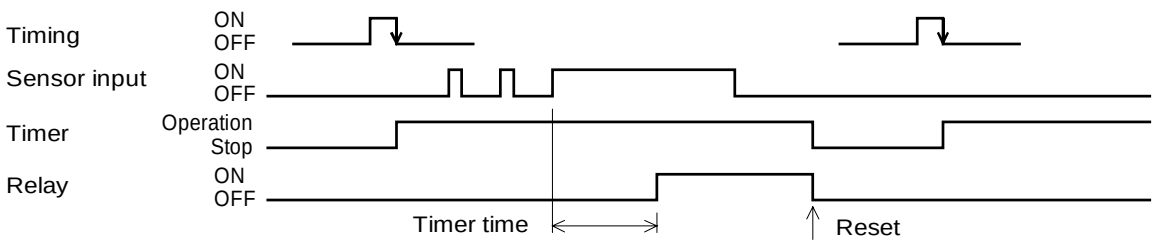
Extraction detection

3-6-6.Timer detection

In the timer detection, when the sensor input has been continuously turned on for the timer set time or over, the timer detection outputs a stop signal.

Detection is made while the timer is operating. When the detection timing gets turned off from turning on, the timer begins operating. The timer stops operating by the reset operation.

The function setting sets the time of the timer. The time of the timer can be set from 0 to 9.99 seconds.



Timer detection

3-7. Automatic monitor ON

If the detection timing of the predetermined number is input at the monitor OFF, the safety device automatically becomes monitor ON. By the device setting, set the number of detection timing which has been input by the time it automatically becomes automatic monitor ON. As for the number, 30 times is set for a standard value. A stop signal is frequently output due to unsteady input status, immediately after automatic monitor ON.

3-8. Panel setting memory

Panel setting memory is to memorize setting operator control panel.

Sensor input polarity, detection channel ON/OFF, and detection modes can be memorized in EEPROM by panel setting memory operation.

The panel setting is backed up with the battery. The panel setting used previously is reproduced when turning on the power.

If the power supply has not been turned on for two weeks or more, the voltage of the battery becomes low and then the memory is lost.

If turning on the power with the memory lost, the data memorized in EEPROM becomes panel setting.

By the device setting, the memory of EEPROM can be used as the panel setting every time power is turned on.

3-9. Device setting

The function setting of the device such as input/output polarity can be changed in the device setting. Refer to the device setting for details.

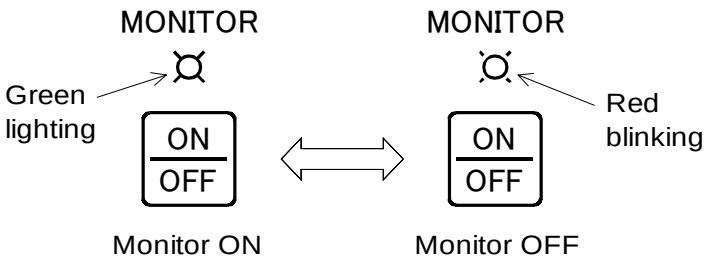
4. Operation

4-1. Monitor ON/OFF

The monitor ON/OFF changes the detection state of the safety device. When the monitor ON/OFF button is pushed, monitor ON or OFF is changed. Moreover, it can be changed by turning on/off the monitor input in the terminal block.

It is impossible to change into the monitor OFF even by pushing the monitor ON/OFF button when the operation/detection lamp blinks red at the monitor ON in some channels.

Perform the monitor ON/OFF operation after reset operation when the operation/detection lamp blinks red.

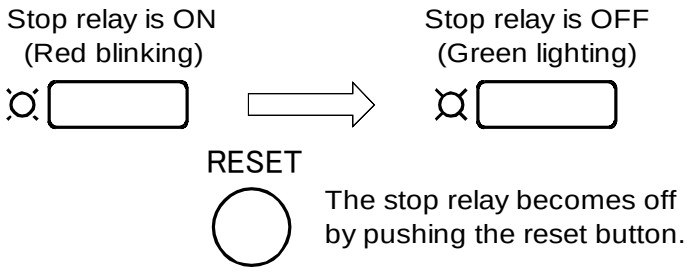


Monitor ON/OFF operation

4-2. Release of stop output

The operation/detection lamp of the channel detecting the malfunction blinks red. A stop signal is output at this time. Push the reset button to release the stop output. Moreover, the reset input in the terminal block can be released about turning on.

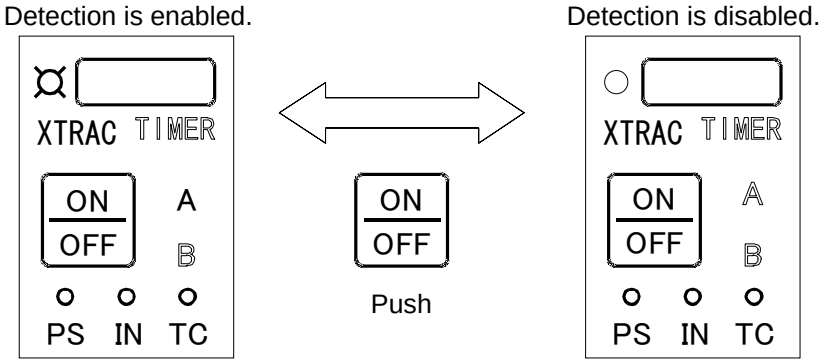
However, the detection channel used by touch detection or synchronization detection might not be able to release the stop output depending on the input conditions. Push the reset button after invalidating the sensor input.



Release of stop output

4-3. Detection ON/OFF of channel

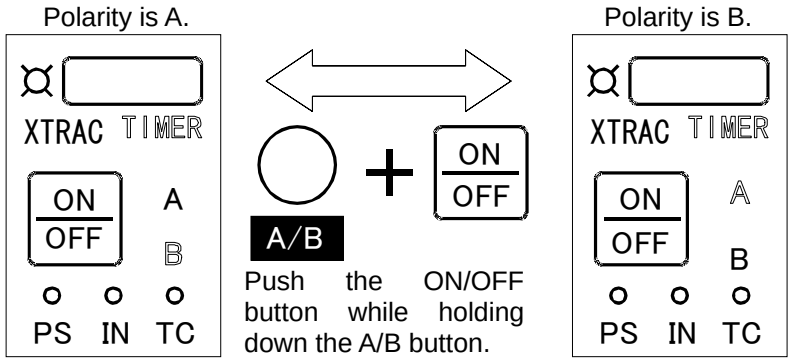
Push the detection ON/OFF button to turn the detection ON/OFF for each channel. At the monitor ON, the operation/detection lamp illuminates green when becoming detection ON. However, the lamp does not illuminate at the detection OFF.



Detection ON/OFF of channel

4-4. Change of input polarity

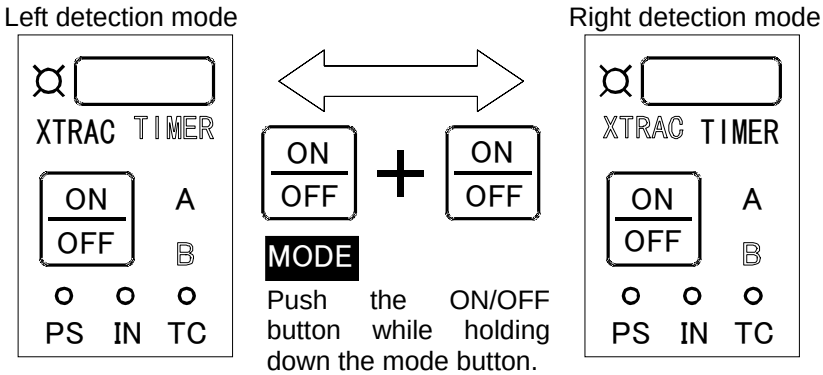
Push the detection ON/OFF button with the A/B (reset) button pushed to change the sensor input polarity.



Change of input polarity

4-5. Change of detection mode

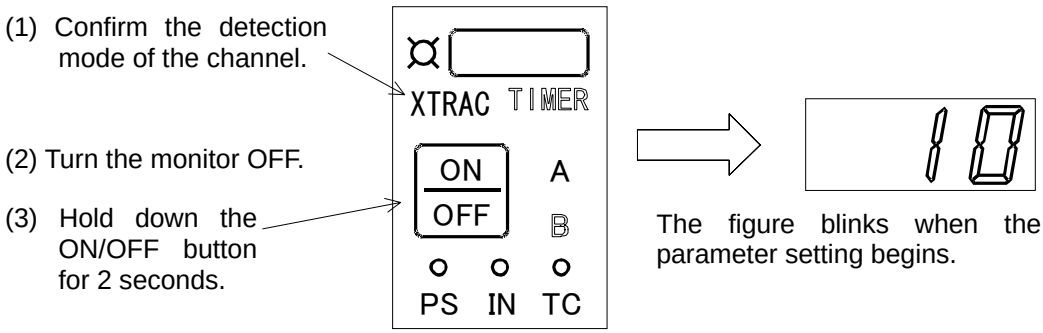
Push the detection ON/OFF button with the mode (monitor ON/OFF) button pushed to change the detection mode.



Change of detection mode

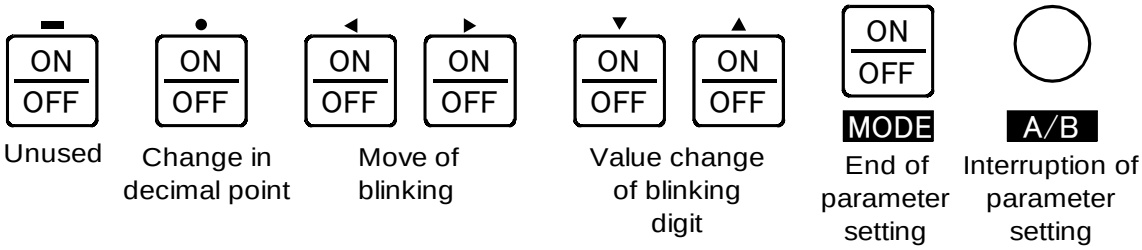
4-6. Function setting

Select the detection mode of the detection channel to make a function setting. Turn the monitor OFF and hold down the detection ON/OFF button of the channel for two seconds. The figure is displayed when the function setting is available.



Start of function setting

The function of the buttons in the panel is changed during making the function setting.
The ON/OFF button of channels 5 and 6 is used for changing a numeric value.
The ON/OFF button of channels 3 and 4 is used to move the blinking position.
The ON/OFF button of channel 2 is used to change in the decimal point.
The ON/OFF button of channel 1 is not used.
To end the setting, the monitor button is pushed. When the setting is ended, the detection operation is restarted.
To interrupt the setting, the reset button is pushed. The detection is restarted without changing the set point when setting is interrupted.



The function of the button in the function setting

4-6-1.Touch and synchronization detection

The function setting of touch and synchronization detection can change the stop output destination. 0 or 1 is displayed in the digital display. Setting 0 makes the emergency stop the output destination, while setting 1 makes the T.D.C. stop an output destination.

4-6-2.Extraction detection

The function setting of the extraction detection sets the extraction number.
Set the extraction number from 2 to 999. The safety device does not work normally when 0 or 1 is set for the extraction number.

4-6-3.Timer detection

The time of the timer is set in the function setting of the timer detection.

The time of the timer can be set from 0.00 to 9.99. The unit is a second.

4-6-4.Miss-feed detection

Set the input delay time in the function setting of the miss-feed detection.

The input delay time can be set from 0 to 255. When the value exceeding 255 for the input delay time is set, 255 is set. The unit is a millisecond.

4-6-5.Passage detection

Set extension time of the timing and effectiveness of the input mask in the function setting of the passage detection.

Set the small value as much as possible for the extension time of the timing.

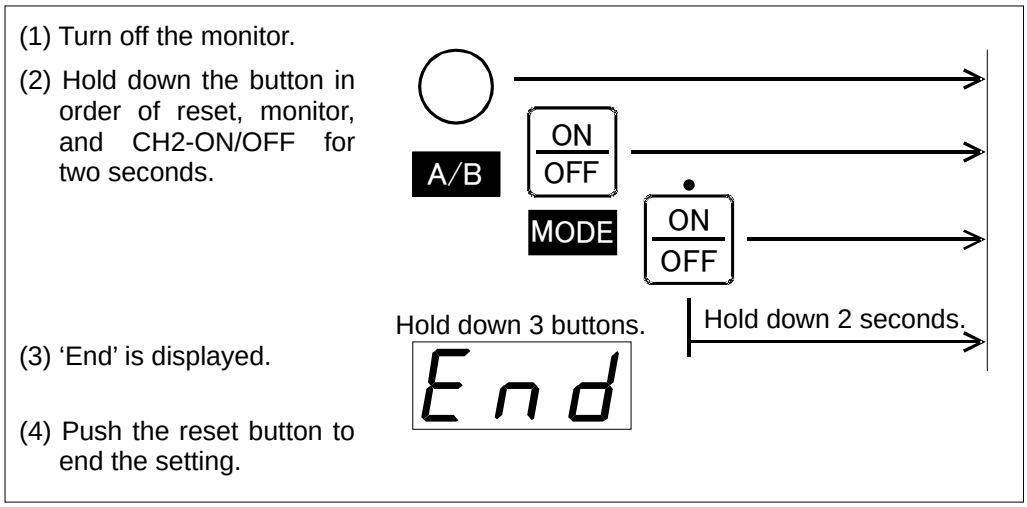
The extension time of the timing can be set from 0 to 999. The unit is a millisecond.

The decimal point shows whether the input mask is set or not. The input mask is effective when there is a decimal point. When the decimal point goes out, the input mask is ineffective.

4-7. Panel setting memory

Hold down in order of reset, monitor ON/OFF, and channel 2 ON/OFF button simultaneously for two seconds, after turning the monitor OFF.

When the internal processing of the panel setting memory is completed, "End" is displayed in the digital display. Then, when the reset button is pushed, the operation is completed.



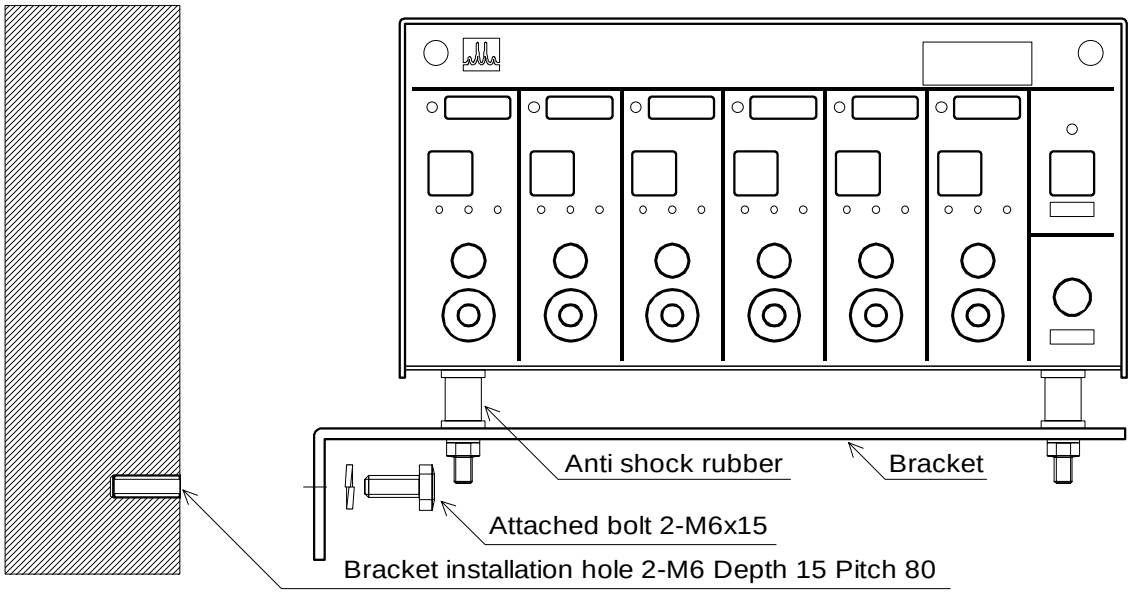
Panel setting memory

5. Installation

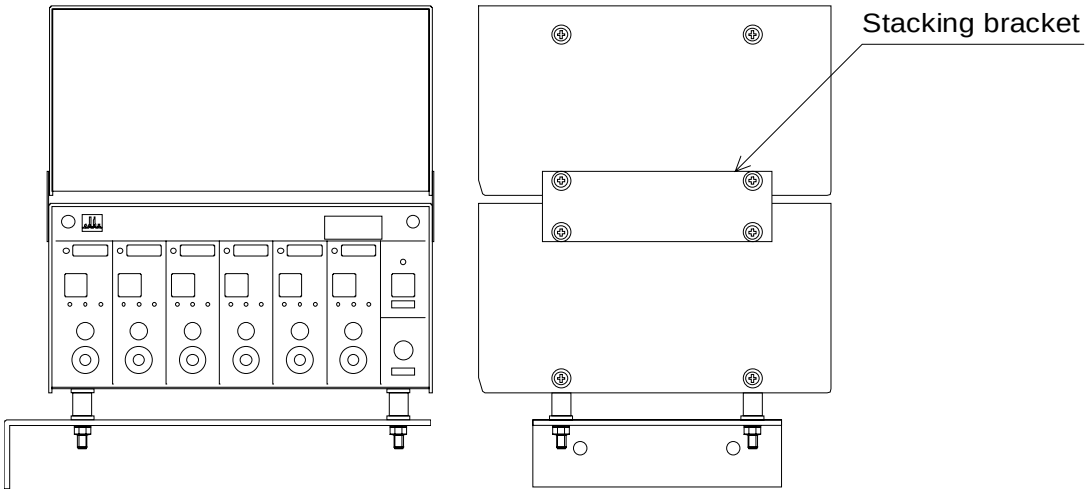
5-1. Installation of safety device

Install the safety device by the use of a special bracket. Using the stacking bracket can pile safety device and other products of our company. Select an installation place with less vibration and dust. Avoid a place exposed to oil and metal powder.

Be sure to ground the safety device chassis. If grounding is incomplete, the contact type sensor does not work.



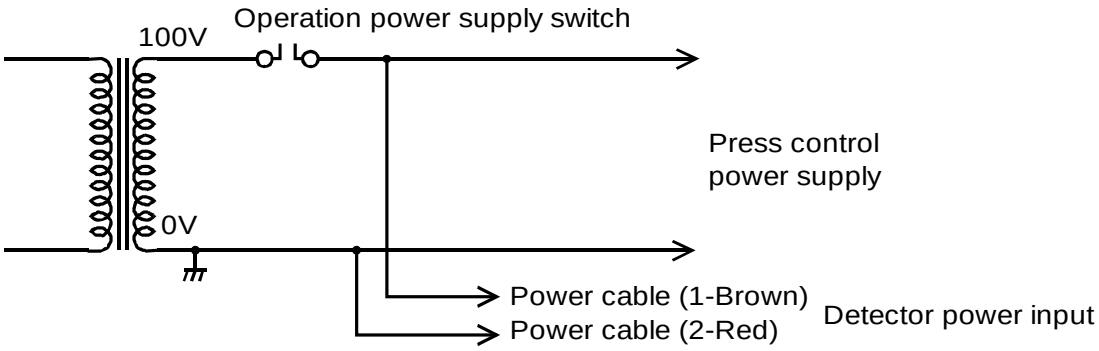
Installation of safety device



Installation with stacking brackets

5-2. Connection of power supply

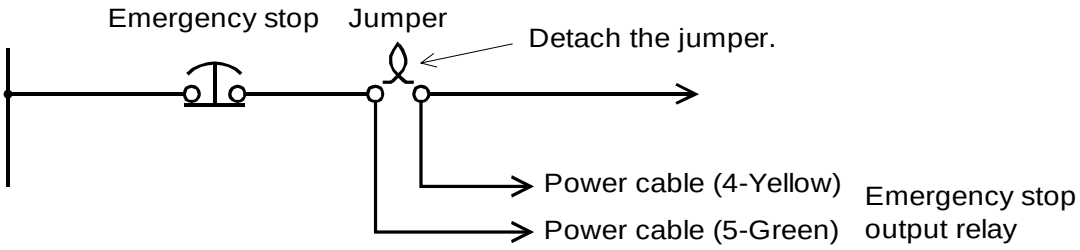
Connect the operation power of the press machine to power cable 1 (Brown) and 2 (Red).



Connection of power supply

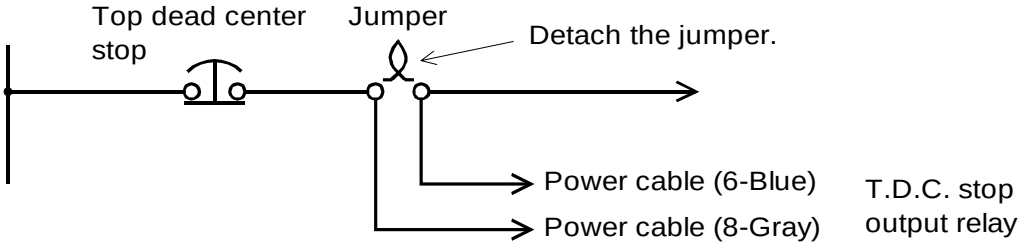
5-3. Connection of stop output

Connect 4 (Yellow) and 5 (Green) of power cable to the emergency stop circuit of press machine.



Connection of emergency stop output

Connect 6 (Blue) and 8 (Gray) of power cable to T.D.C. (continuous) stop circuit of press machine.

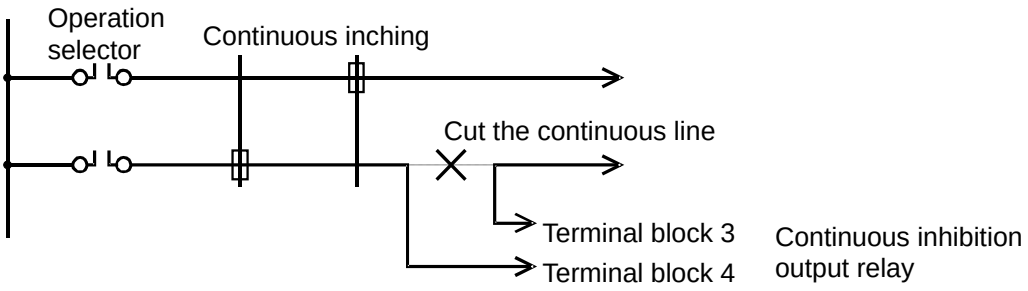


Connection of T.D.C. stop output

5-4. Connection of continuous inhibition output

The continuous inhibition output is turned on when the safety device is monitor ON.

By connecting the continuous inhibition output with the circuit of the operation selector, continuous running of the press machine can be limited to the time when the safety device is monitored ON.



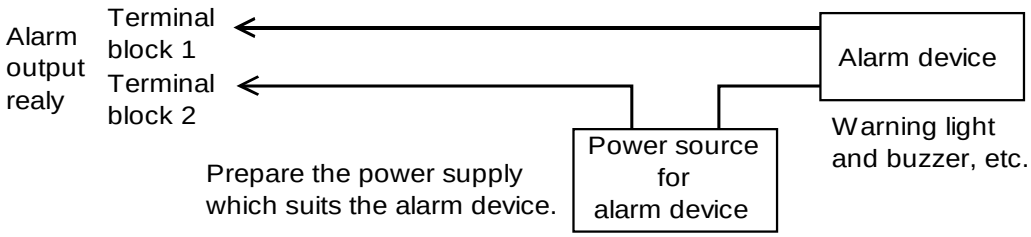
Connection of continuous inhibition output

5-5. Connection of alarm output

Alarm output can operate the alarm device such as buzzer and the warning light.

The alarm output has been turned on while the stop output is output.

Prepare the power supply which suits the alarm device when the alarm output is used.

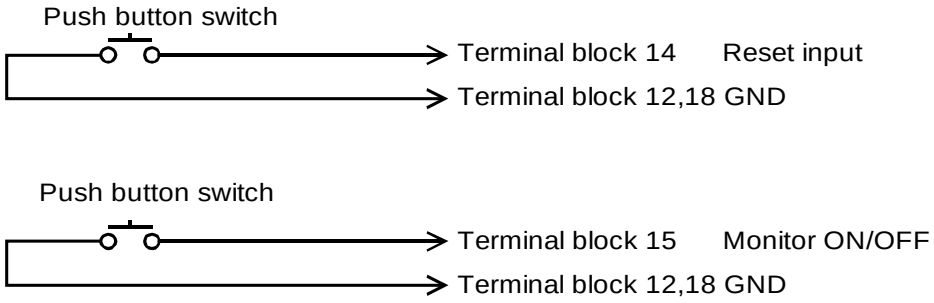


Connection of alarm output

5-6. Connection of external reset and monitor ON/OFF switches

The device can operate from the remote place by connecting the switches for external reset and the monitor ON/OFF with the terminal block input, which will be convenient.

Connecting the switches is not specially required.

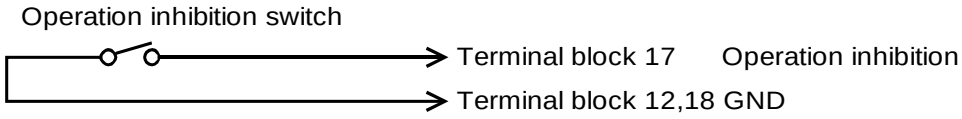


Connection of external switches

5-7. Connection of operation inhibition switch

The switch for turning the operation inhibition function on/off can be connected. Connecting the switch is not specially required.

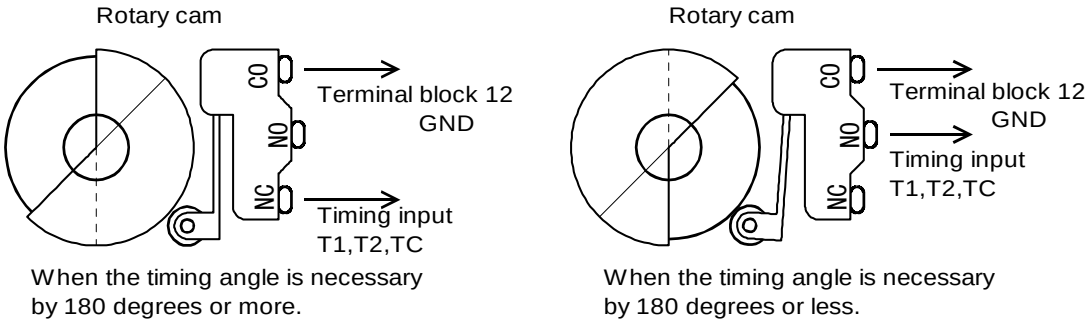
When the switch is turned on, the button of safety device cannot be operated.



Connection of operation inhibition switch

5-8. Connection of detection timing input

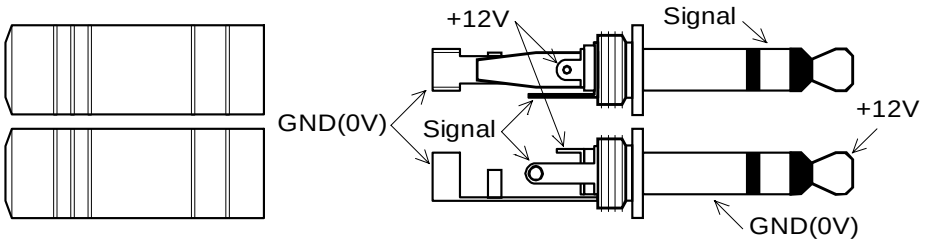
Connect the contact or the contact-less of the no-voltage signal with detection timing input (T1, T2, and TC) in the terminal block.



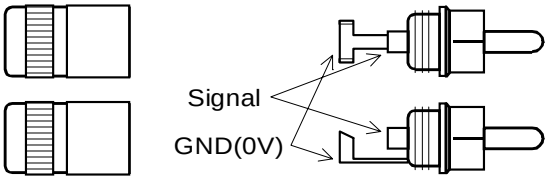
Example of detection timing connection

5-9. Connection of sensors

Install the pin plug or 3-pole plug as for sensors on the market.



Three pole plug



Pin plug

6. Device setting

The device setting can change a part of specification of the safety device such as operation and detection. Make the device setting after switching from the normal operation to the device setting mode.

Attention: Perform the device setting after confirming the program version displayed in the digital display at power ON is the same as the version of the cover of this manual. When the version is different, the set data may also be different. The safety device does not work normally when setting is changed without confirming the version.

6-1. Switch to device setting mode

Turn the safety device to monitor OFF by the normal operation. Hold down three buttons in order of reset, monitor ON/OFF and channel 1 ON/OFF simultaneously for two seconds.
The figure ('01', item number) is displayed in higher two digits of the digital display when changing into the device setting mode.

6-2. Item number setting, display and change in set data

Set the item number by pushing the arrow button. The blinking numerical value can be changed with the upper and lower arrow button. The blinking position can be changed with the right and left arrow button.
Push the monitor ON/OFF button after setting the item number. If the monitor ON/OFF button is pushed, the digital display turns to show its data, changing from the item number. The set data can be changed with the arrow button as well as setting of the item number. Setting is values of three digits or 1/0 of three items. Confirm the set data for each item number before operation.
When the monitor ON/OFF button is pushed again with the set data displayed, the setting is stored. When the reset button is pushed instead of the monitor ON/OFF button, the setting is not stored. The digital display returns to the item number.

6-3. End of device setting mode

Push the channel 1 ON/OFF (-) button with the item number displayed to end the device setting mode and then the safety device returns to the normal operation.

6-4. Initialization of setting

Set the item number in 00, 99 or 98 and keep pushing the channel 2 detection ON/OFF button for two seconds.
In item number 00, the device setting and the panel setting returns to the factory setting. Note that the panel setting also returns to the factory setting.
In item number 99, the data that can be changed by the function setting returns to the factory setting.
In item number 98, the backup with the battery is released.

6-5. Details of setting

6-5-1.Automatic return count (item number 1)
Set the detection timing input count, from monitor OFF to turning to monitor ON in the automatic return count.
Setting can be made from 0 to 255. If 256 or more is set, setting becomes 255.
It is impossible to return automatically when setting is adjusted to 0.
Initial value 30

6-5-2.Reset output time (item number 2)
Set the time output from the reset input terminal of the terminal block at the reset output time. If the reset button in the panel is pushed, the reset input of the terminal block is temporarily output.
Setting can be set from 0 to 999. A set unit is a millisecond. When setting is adjusted to 0, the input terminal is not output.
The reset output can notify other devices that the reset button of the panel has been pushed.
Initial value 200

6-5-3.Monitor ON/OFF output time (item number 3)
Set the time output from the monitor input terminal of the terminal block at the monitor ON/OFF output time. If the monitor ON/OFF button in the panel is pushed, the monitor input of the terminal block is temporarily output.
Setting can be set from 0 to 999. A set unit is a millisecond. When setting is adjusted to 0, the input terminal is not output.
The monitor output can notify other devices that the monitor ON/OFF button of the panel has been pushed.
Initial value 0

6-5-4.Output polarity 1 (item number 4)
Set the polarity of the relay output in output polarity 1. Each data is set by 0/1.
The set data is displayed from a right digit in order of emergency stop, T.D.C. stop, and alarm.
The relay contact opens because of output ON when setting is adjusted to 0. It closes when the settings is adjusted to 1.
Initial value 011

6-5-5.Output polarity 2 (item number 5)
Set the polarity of the continuous inhibition output relay in output polarity 2. Each data is set by 0/1.
Set only the rightmost digit in the display though it is three digits. Two digits of the remainder are the reserves.
Initial value 000

6-5-6.Input polarity 1 (item number 6)
Set the detection timing input polarity in input polarity 1. Each data is set by 0/1.
The set data is displayed from a right digit in order of T1, T2, and TC.
If 1 is set, the detection timing is turned on when the input terminal is opened.
Initial value 111

6-5-7.Input polarity 2 (item number 7)
Set the operation inhibition input polarity in input polarity 2. Each data is set by 0/1.
Set only the rightmost digit in the display among three digits.
Two digits of the remainder are the reserve.
Initial value 000

6-5-8.System setting (item number 8)
The set data in the system setting is displayed from a right digit in order of monitor ON/OFF at power ON, all PS reset, and panel setting at system setting. Each data is set by 0/1.
The monitor ON/OFF at power ON specifies whether to turn the monitor ON or OFF when the power supply is turned on. When 0 is set, the monitor OFF is selected. When 1 is set, the monitor ON is selected.
The all PS reset specifies 'do not reset' or 'reset' the passage memory by the reset operation. When 0 is set, ‘do not reset; when 1 is set, 'reset' is selected.
The panel setting specifies making the panel setting 'from back up memory' or 'from EEPROM' at power ON. When 0 is set, 'from back up memory' is selected. When 1 is set, 'from EEPROM' is selected.
Initial value 001

6-5-9.Reservation item (item number 9)
Do not change this reservation item. Initial value 000

6-5-10.Option output (item number 10)
Set the option output to add the parallel output unit.

6-5-11.Operation inhibition setting 1 (item number 11)
Set operations inhibited by the operation inhibition function in the operation inhibition setting 1. Each data is set by 0/1. When 0 is set, operation is allowed; When 1 is set, operation is inhibited. The set data is displayed from a right digit in order of detection ON/OFF, input polarity change, and detection mode selection.
Initial value 111

6-5-12.Operation inhibition setting 2 (item number 12)

Set the operation inhibited by the operation inhibition function in setting operation inhibition setting 2. Each data is set by 0/1. When 0 is set, the operation is allowed; When 1 is set, the operation is inhibited.

The set data is displayed from a right digit in order of monitor ON/OFF, reset, and reserve. Do not change the reserve.

Initial value 000

6-5-13.Input signal processing time (item number from 13 to 18)

Set the processing time of the signal of the terminal block input in the input signal processing time. Setting the each item is from 0 to 255. The set unit is a millisecond.

Item number 13	T1	initial value 20
Item number 14	T2	initial value 20
Item number 15	TC	initial value 20
Item number 16	reset	initial value 20
Item number 17	monitor ON/OFF	initial value 20
Item number 18	operation inhibition	initial value 20

6-6. Set item list (V1.0x)

Item No.	Function	Setting	Initial value	
01	Automatic return count	0-255	30	
02	Reset output time	0-999	200mS	
03	Monitor ON/OFF output time	0-999	0mS	
04	Output polarity 1	0/1	011	alarm, T.D.C., emergency
05	Output polarity 2	0/1	000	reserve, reserve, cont. inhibit
06	Input polarity 1	0/1	111	TC, T2, T1
07	Input polarity 2	0/1	000	OPIH, reserve, reserve
08	System setting	0/1	001	panel, PS reset, monitor on/off
09	Reservation item	0/1	000	
10	Option output		0	
11	Operation inhibition setting 1	0/1	111	mode, A/B, ON/OFF
12	Operation inhibition setting 2	0/1	000	reserve, reset, monitor on/off
13	processing time T1	0-255	20mS	
14	processing time T2	0-255	20mS	
15	processing time TC	0-255	20mS	
16	processing time Reset	0-255	20mS	
17	processing time Monitor	0-255	20mS	
18	processing time Inhibition	0-255	20mS	

00	Device item initialization
99	Panel setting initialization
98	Back up memory release

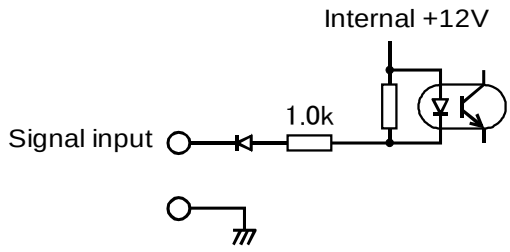
7. Specification and performance

7-1. Detection

Detection channels	6
Detection timings	3
Power source for sensor	DC12V 600mA max.
Detection style	
Channel 1	extraction (XTRAC), timer (TIMER)
Channel 2	extraction (XTRAC), touch (TOUCH)
Channel 3	passage (PASS), touch (TOUCH)
Channel 4	miss-feed (FEED), touch (TOUCH)
Channel 5	passage (PASS), synchronization (SYNC)
Channel 6	passage (PASS), touch (TOUCH)

7-2. Input circuit

Input specification	Internal volt system (12VDC)
H level	9.0V or over / 1mA or below
L level	3.0V or below / 8mA or over (max 12mA)
Input circuit	



7-3. Output circuit

Output	Emergency, T.D.C., alarm, continuous inhibition
Output device	Relay contact (no voltage)
Voltage (max)	250VAC, 30VDC
Current (max)	2.0A (inductive load)

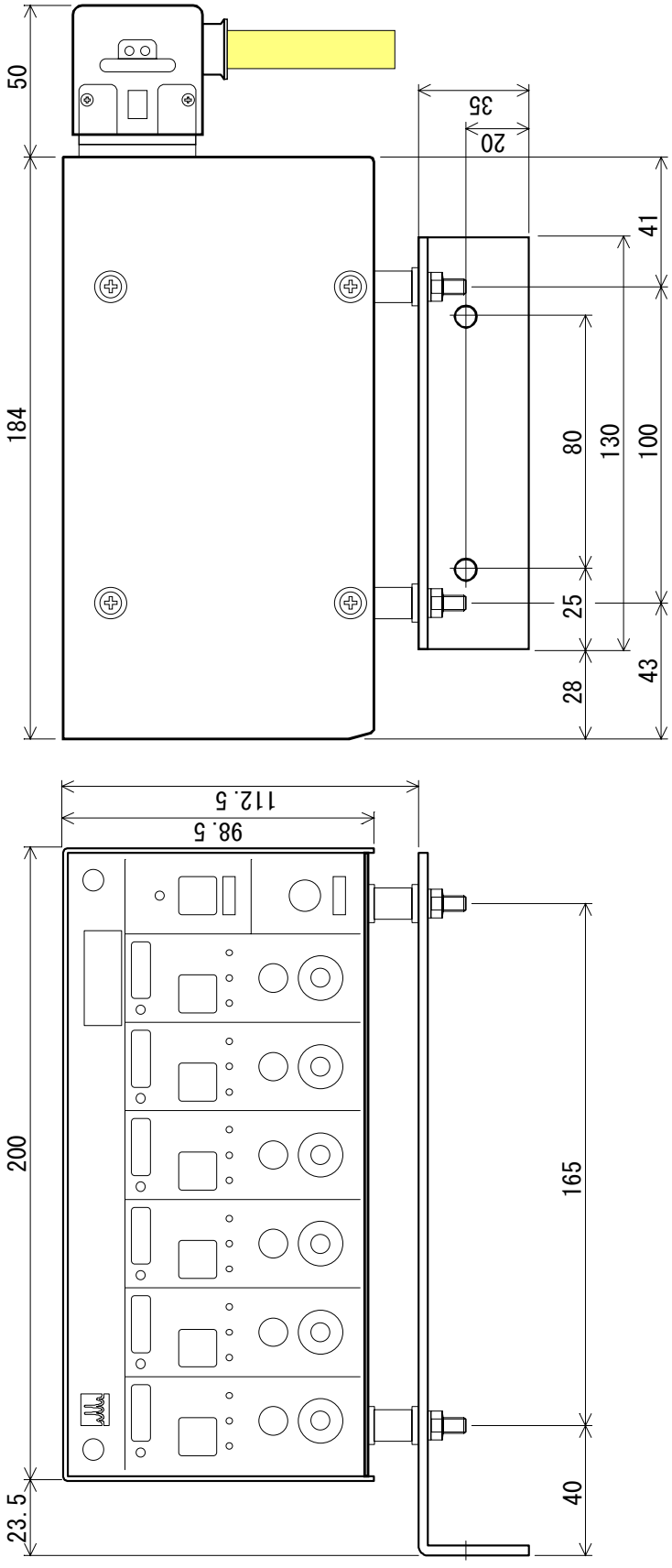
7-4. Power supply

Power voltage	AC100 to 240V +/-10% 50/60Hz
Power consumption	20VA (max)

7-5. Other specifications

Memory backup	2 weeks (min) 5 hours after the continuous duty
Weight	2.4kg
Dimensions (W/H/D)	200 x 98.5 x 184 mm Projection is not included.
Environmental temperature	0 to 55 degree C
Environmental humidity	35 to 85%
Environmental atmosphere	Free from corrosive gas and dust

8. Dimensions



WARRANTY

All Sugiyama Electric products are warranted against defects in material or workmanship under normal use or service for a period of one year after purchase. Any question with respect to the warranty should be taken up with your Sugiyama Electric System Inc. field engineers or agents.

All requests for repairs and replacement parts should be directed to the Sugiyama Electric System Inc. office or agents in your area. This will assure the fastest possible service. Please have your instrument Type Number or Part Number and Serial Number available when contacting us.

Specifications and price change privileges reserved.

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