 ISO9001: 2000

# TW 700

SEQUENCE INJECTION TIMER

## User Manual

English



MODEL : TW 700

 **YUDO**

# TW 700

## User Manual

### Welcome

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## 1. Introduction

YUDO welcomes you to their TW family of sequence injection timer for hot runner injection molding tools.

This manual is intended for use with the TW-700 Sequence Injection Timer.

### 1) TW-700 Configurations

#### (1) Inspection

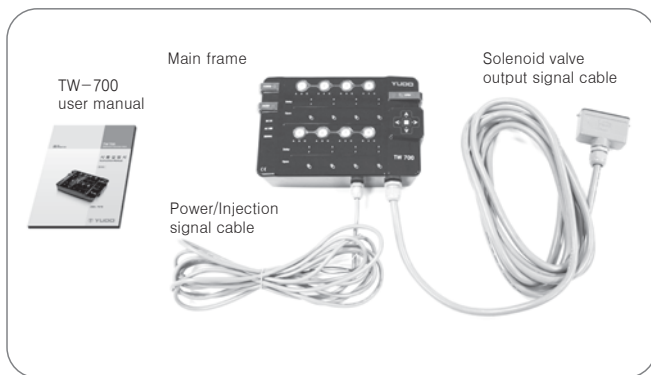
Contact supplier or YUDO sales office if you find any damaged or missing parts.

#### (2) Configurations Checkup

Contact supplier or YUDO sales office if you find actual timer received differences from contractual configurations.

#### (3) Components Checkup

TW-700 sequence injection timer contains four parts as below.



#### (4) Damaged Parts Claim

In case of damaged parts or missing parts, contact supplier or head office

### 2) General Safety Instructions

#### (1) About the User Manual

- ① Keep this user manual with processor so that he or she can refer to this manual.
- ② Only persons with a thorough knowledge of the system's operation and capabilities should operate the system.

- ③ Unless specifically explained in this manual or directed by a YUDO service technician, do not attempt to operate the system yourself. Doing so could result in damage to the system, or serious personal injury.
- ④ Whilst every effort has been made to avoid errors in the text, the author and publisher shall not be under any legal liability of any kind in respect of or arising out of the information contained herein.  
Please contact supplier or YUDO representatives to inquire any questions.
- ⑤ Our policy is one of continuous improvement and we reserve the right to alter product specifications at any time without giving any prior notice.

### (2) About the Timer

- ① Read all of these instructions before connecting power and turning on the system. Follow all warnings and instructions mentioned on this manual.
- ② Buyer shall indemnify the Seller if the action or inaction of the Buyer or its employees, customers or agents, or the Buyer's design specifications, were a material or proximate cause of injuries or damages giving rise to claims against the Seller.
- ③ Do not install any in genuine parts inside of system. If the safety equipment or device is required to install, then install them on outside of the system. The system must not be disassembled or modified. It may cause damage, malfunction or injury.
- ④ The system must not be disassembled or modified. It may cause damage, malfunction or injury.

### (3) About the Indemnification

- ① Buyer shall indemnify the Seller from any and all third party claims, damages, and expenses (including reasonable attorney fees) under theories of tort, product liability, negligence (ordinary or gross), warranty, contract, statute, or otherwise arising out of the use, storage, sale, processing or other disposition of the Goods, supplies or materials used in connection with the Goods, or parts manufactured with the Goods, if the action or inaction of the Buyer or its employees, customers or agents, or the Buyer's design specifications, were a material or proximate cause of injuries or damages giving rise to claims against the Seller.

- ② Consequential, incidental, and other damages  
BUYER AND THIRD PARTIES SHALL NOT BE ENTITLED TO ANY CONSEQUENTIAL, PUNITIVE, EXEMPLARY, OR INCIDENTAL DAMAGES, AS DEFINED IN THE UCC OR OTHERWISE. This limitation shall be enforced regardless of whether Seller has defaulted in its warranty or other obligations. Any legal inability to limit or restrict the right of the Buyer or a third party to such damages shall not affect the right of Seller to indemnification hereunder, and under no circumstance shall Buyer recover more than the purchase price.
- ③ Disclaimer and limitation of express warranties  
There are no express warranties other than those contained in the Agreement. Any representations as to performance and other matters, except as contained in the Agreement, were for illustrative purposes only and do not constitute a warranty. Whether or not the Goods are to be used exclusively by Buyer, there shall be no third party beneficiaries to the express warranties contained herein. Seller does not warrant any portion of the Goods not manufactured by or not furnished by Seller (whether or not specified by Buyer), but Seller shall assign to Buyer upon request all assignable warranties of Seller's suppliers related to such Goods. All descriptions, shipping specifications and illustrations of the Goods or the Seller and its quality and other systems and capabilities in catalogues, brochures and price lists or otherwise provided by the Seller are intended for general guidance only and the Seller is not responsible for any errors or omissions therein or for any loss or damage resulting from reliance on them. Seller does not warrant that it or the Goods are in compliance with any entity, organization or industry standards, guidelines, or procedures unless specifically contained in the Agreement.

#### (4) Warranty

- ① Seller's warranties shall apply only if the Goods: (i) have been installed, maintained, and used in conformity with instructions furnished by Seller from time to time, if any; (ii) have been subjected to normal use for the purpose for which Goods were designed.
- ② The replacement cost shall be charged from one year after the date of shipment.
- ③ Because the Goods may be subject to a wide variety of use, installation, maintenance and cleaning, the warranty is only

against such defects and not against any other failures such as, but not limited to, those due to wear and tear, misuse, force majeure, transportation after installation, modification of timer, unstable power source and normal maintenance and perishable items are excluded from this warranty against defects.

- ④ To have your timer serviced or calibrated by YUDO, you should make arrangements to have it serviced in the country of purchase.

### (5) Installation Safety Instructions

- ① Only a licensed electrician should install the system.
- ② Check that the system is completely disconnected from the power source.
- ③ Clean up any water, oil, dirt, cleaning fluids etc. that may have spilled during a mold change or since the last production run. It may cause injury.
- ④ Do not connect earth/ground connection to gas pipe, phone line, and lightning rod. It may cause injury.
- ⑤ Be sure that the system is completely disconnected from the power source before the system is connected to Mold and IMM. It may cause damage.
- ⑥ If the main power source is not rated, it may cause damage or injury.
- ⑦ The control module must not be used in following environment.
  - Where people can touch cable terminals easily and unconsciously.
  - Where vibration and impact can be occurred.
  - In an explosive, corrosive or inflammable atmosphere.
  - Where the temperature varies severely.
  - Where it exceeds operating temperature :0℃ ~50℃ (32°F~122°F)
  - Under the sun.
  - Where the electromagnetic wave is emitted.
  - Where it exceeds operating humidity : 0%~90% RH, Non-condensing
  - Near inflammable materials.
  - In dirty and salty atmosphere.
  - Where equipment generates heat.
  - Where this equipment does not emit audible noise in excess of 10dBA.

## 2. A guide to Sequence Injection Timer

The TW-700 was designed as a processor's tool for hot runner molding. Filling the cavity in a sequence has the following potential benefits :

- 1) Improved Straightness  
Quality of the molded part can be improved by removing or repositioning of weld lines on visual surfaces, or sections where a weld line causes a weakness.
- 2) By opening valve gate sequentially, it can eliminate flash and short shot problem.
- 3) Flow marks are minimized by increasing the injection rate at the gate.
- 4) Knit line control
- 5) Lighter weight parts
- 6) Dimension improvement

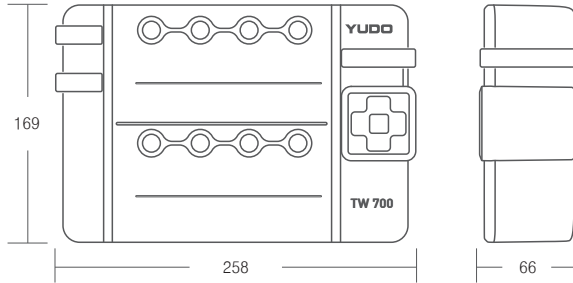
## 3. Installation

### 1) Specifications

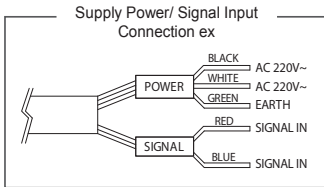
The following are general specifications. The actual timer supplied may have contractual variations and differ in some specified options.

MODEL NO	TW-700
Supply Voltage	1 Phase AC(100 ~ 250VAC), 50/60Hz
Voltage Bandwidth	Stable within $\pm 20\%$ supply voltage swing
Supply earth-leakage trip	10mA per individual zone ground fault monitoring (note: this is for tool protection)
Consumption current (idle state)	MAX. 11AV
Injection Signal Input Voltage	DC24V, AC220V (Free voltage)
Display Resolution Limit	0.01sec
No. of zones	8 zones
Relay Output Mode	Relay Arbeit Contact
Output (Solenoid) Capacity	2.5A @ DC24V (1A @ AC220V)
Output (Solenoid) Voltage	DC24V, AC220(Only for Pneumatic Solenoid) (*AC Solenoid Valve output voltage is up to AC input power.)
Consumption current (Solenoid)	Max 100mA per zone
Operating Temperature	0~50°C (32~122°F)
Operating Humidity	0~90% R.H(Non-condensing)

### 2) Dimensions



### 3) Wiring Standards

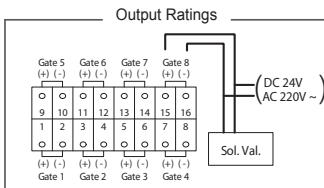


#### (1) Supply Power Connection

Connect POWER-BLACK and POWER-WHITE to AC220V and earth POWER-GREEN line.

#### (2) Signal Input Connection

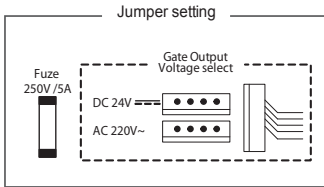
Connect SIGNAL RED and SIGNAL BLUE to Injection signal port of Injection Molding Machine.



#### (3) Solenoid Valve Connection

Connect Solenoid Valve output signal cable to connector of Solenoid valve.

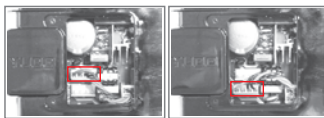
Caution! : Check the pin configurations before connection in case of DC24V Solenoid Valve.



#### (4) Change Gate Output Voltage

Jumper Setting Cover is located at rear of case. Default output voltage is DC24V.

If you want to use output voltage AC220V, pull out the jumper from DC24V pins and connect the jumper on AC220V pins.



▲ DC 24V

▼ AC 220V

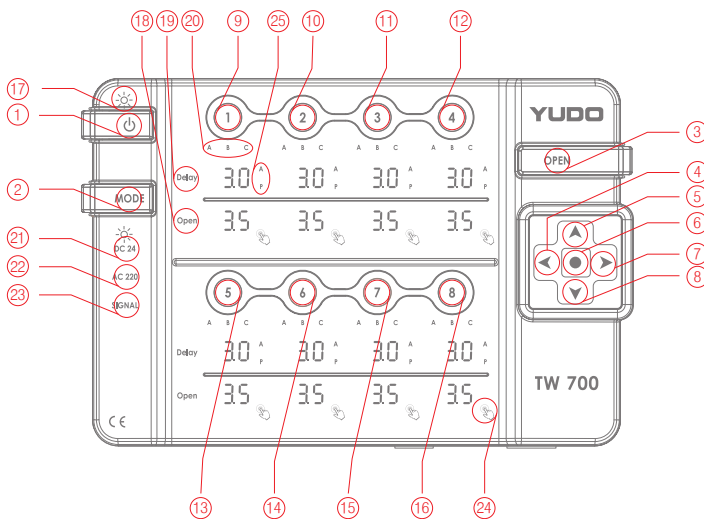
### (5) Input / Output Ratings

- Supply Power : AC 220V ~ 50Hz/60Hz
- Signal Input : DC24V  $\overline{\text{---}}$ , AC 220V~(\*Free)
- Gate Output 1 : DC 24V  $\overline{\text{---}}$  (100mA/Gate)
- Gate Output 2 : AC 220V~(100mA/Gate)

### 4) PCB Configurations (Printed Circuit Board) : Consists of 4 PCBs

- (1) Control PCB unit : Power, MPU (Micro Processor Unit), I/O (Input/Output)
- (2) Display PCB unit : FND (Flexible Numeric Display, 7 segments display unit)
- (3) Power PCB unit : Software power on/off button and operation mode button.
- (4) Keypad PCB unit : Manual Output and Arrow buttons, open valve gate manually and set the time

### 5) Operating Panel



BUTTON	FUNCTION
① Power Button	Switch on/off the power.
② MODE S/W	Select Mode A,B,C or Off.
③ Manual Output Button	Open the valve gate manually.
④ Left Arrow Button	Move gate and shift the digit of Open/Delay set time.
⑤ Up Arrow Button	Move gate, increase set time, and change time unit.
⑥ Enter Button	Select target gate and complete the function.
⑦ Right Arrow Button	Move gate and shift the digit of Open/Delay set time.

⑧ Down Arrow Button	Move gate, decrease set time, and change time unit.
⑨ ~ ⑯ Shortcut Button for Individual Zones	Select the specific zone directly.
⑰ Power Status LED	Display the Power On/Off status. a. Power On : LED is on b. Power Off : LED blinks every 0.5 second
⑱ Open Time Display FND	Display the set time for open or gate open time.
⑲ Delay Time Display FND	Display the set delay time or waiting time for gate open.
⑳ Mode Status LED	Display Modes (A,B,C, Off) for individual zones.
㉑ DC24V Output LED	LED is on when Solenoid valve output voltage is DC24V (default).
㉒ AC220V Output LED	LED is on when Solenoid valve output voltage is AC220V.
㉓ Injection Signal LED	LED is on while injection signal is on.
㉔ Output Status LED	LED is on while output is on.
㉕ Mode C A LED (1st Value), P LED (2nd Value)	A LED blinks when first conditions (Open, Delay time) activate. P LED blinks when second conditions (Open, Delay time) activate.

## 4. System Menu

### 1) Display Unit

- (1) Display individually the delay times and open times by FND (Flexible numeric display, 7 segments).
- (2) Display LED on while output on.
- (3) Display Mode A,B, and C of each gate with LED.
- (4) Display output voltage (DC24V or AC220V) to Solenoid Valve with LED.
- (5) Display LED on while signal on.

### 2) Timer Functions

#### (1) Software Power On/Off

- ① Power On  
Press Power Button to turn on the power.
- ② Power Off  
Press Power Button for 2 seconds to turn off the power.

#### (2) Select Mode (A,B,C, Off)

- ① Switch Mode amongst A,B,C and Off : Press Mode button for 4 seconds.
- ② Buzzer rings and Mode LED blinks
- ③ The set Mode LED of Gate No. 1 blinks.

- ④ Press Up and Down arrow to switch Modes.
  - ▲(Up Arrow button) : Mode A → B → C → Off
  - ▼(Down Arrow button): Mode Off → C → B → A
- ⑤ LED of selected Mode (A,B,C) blinks if selected mode is not Off. If selected Mode is Off, all LEDs blink.
- ⑥ Move target gate by pressing Left, Right arrow button. Move target gate directly by pressing shortcut button for individual gates.
- ⑦ When change the gate, LED of Mode A, B, or C blinks.
- ⑧ Press Enter button to save and complete the function. Or Waiting for 4 seconds does the same.

(3) Change Display Digits (999 / 99.9 / 9.99 )

- ① Move target gate by pressing arrow buttons or shortcut buttons. Then, press Mode button for 4 seconds to proceed next step.
- ② Buzzer rings.
- ③ Each DEL display unit displays "Unl". Each Open display unit displays "999 (or 99.9/9.99)".
- ④ Change the time unit by pressing Up/Down arrow buttons.
  - ▲(Up Arrow button) : 9.99 → 99.9 → 999
  - ▼(Down Arrow button) : 999 → 99.9 → 9.99

Set Unit	9.99 Sec	99.9 Sec	999 Sec
Set Range	0 ~ 9.99 Sec	0 ~ 99.9 Sec	0 ~ 999 Sec

- ⑤ Move target gate by pressing Left, Right Arrow button. Move target gate directly by pressing shortcut button for individual gates.
  - ⑥ Press Enter button to save and complete the function. Or Waiting for 4 seconds does the same.
- (4) Manual Open Output
- ① All gates open output
    - All gates keep open while Open button is pressed.
  - ② Selected gate open output
    - Select target gate by pressing arrow buttons or pressing shortcut button.
    - The selected gate keeps open while Open button is pressed.
    - \*\* Manual Open output function is not available when injection signal is on.
- (5) Set Delay Time

- ① Move the target delay display unit by pressing arrow button or shortcut button. After that, press the enter button.
- ② The right digit of the selected Delay display unit blinks.
- ③ Set the target time by pressing Up and Down arrow button.

- ④ Move required digit by pressing Left and Right arrow.
- ⑤ Press Enter button to save and complete the function.  
Or Waiting for 4 seconds does the same.

### (6) Set Open Time

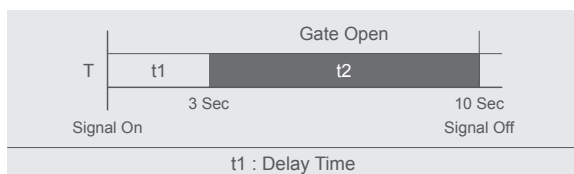
- ① Move the target Open display unit by pressing arrow button or shortcut button. After that, press the enter button.
- ② The right digit of the selected Open display unit blinks.
- ③ Set the target time by pressing Up and down arrow.  
(If the set time is minus on Mode B, the open signal keeps on for set time after injection signal is off.)  
Move required digit by pressing Left and Right arrow.
- ④ Press Enter button to save and complete the function.  
Or Waiting for 4 seconds does the same.

### (7) Set Mode C

- ① Mode C sets four different set values for delay times and open times.  
Therefore, Mode C looks like that operates Mode B1 and Mode B2
- ② Move the target Delay display unit by pressing arrow button or shortcut button. After that, press the enter button.
- ③ Switch the first set times (Delay, Open) and second set times (Delay, Open) by pressing Mode Button.
- ④ If First set time (Delay, Open) is selected, LED A turns on.  
If Second set time (delay, open) is selected, LED B turns on.

## 3) System Rules

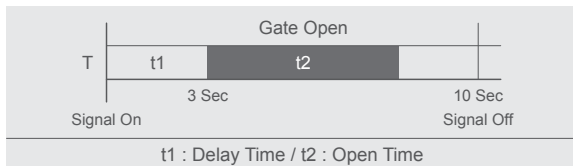
### (1) Mode A



- Example 1. Mode A (injection signal : 10 sec, Delay time : 3 sec)
- ① When injection signal is on, gate will be opened 3 seconds later.  
Gate keeps open until injection signal is off.
- ② For the delay time, it counts down. And Delay display unit shows delay time. Right after Delay time ends, gate opens.
- ③ If injection signal is off before delay time ends, the delay time returns to the set delay time.

- ④ If injection signal is on after Delay time ends, gate opens until injection signal is off.
- ⑤ When injection signal is off, delay set time will be displayed in Delay Time display unit. Open time display unit displays counted open time until next injection signal starts.

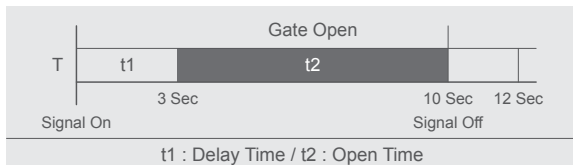
(2) Mode B



– Example 2. Mode B (injection signal : 10 sec, Delay time : 3 sec, Open time : 5 sec)

- ① When injection signal is on, gate will open 3 seconds later. Gate keeps open for 5 seconds.
- ② For the delay time, it counts down. And Delay display unit shows delay time. Right after Delay time ends, gate opens for Open Time (5 sec). Open time display unit shows down counted time
- ③ If injection signal is off before delay or open time ends, the delay and open times return to the set delay and open times
- ④ When injection signal is off, delay and open set times will be displayed in display units

(3) Mode B (Injection Signal Retardant Function)

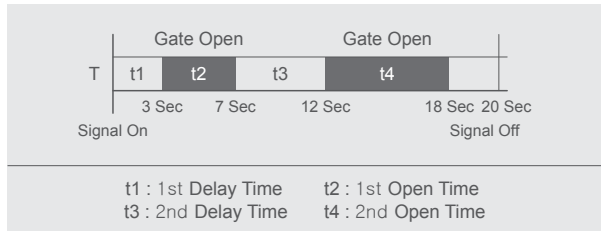


– Example 3. Mode B (Retardant Function) (injection signal : 10 sec, Delay time : 3 sec, Open time : -1 sec)

- ① When injection signal is on, gate will open 3 seconds later. Gate keeps open for 1 second after injection signal ends.

- ② For the delay time, it counts down. And Delay display unit shows delay time. Right after Delay time ends, gate opens for Open Time (6 sec) until injection signal end. Open time display unit shows up counted time
- ③ After injection signal ends, gate remains open for set open time (minus value).
- ④ If injection signal is off before delay or open time ends, the delay and open times return to the set delay and open times.
- ⑤ When injection signal ends, delay and open set times will be displayed in display units

#### (4) Mode C



- Example 4. Mode C (Injection time 20 sec, 1st Delay time : 5 sec, 1st Open time : 5 sec, 2nd Delay time : 4 sec, 2nd Open time : 4 sec)
- ① Mode C sets four different set values for delay times and open times. Therefore, Mode C looks like that operates Mode B1 and Mode B2.
  - ② If injection signal is off before delay or open time ends, the delay and open times return to the set delay and open times.
  - ③ When injection signal is off, first delay and first open set times will be displayed in display units

### 5. Timer Specifications

#### 1) Supply Power Specifications

Supply Voltage	1 Phase AC (100V ~ 250V)
Voltage Bandwidth	Stable within $\pm 20\%$ supply voltage swing
Supply Frequency	50 / 60Hz
Consumption Current	MAX. 11AV(idle state)
Supply earth-leakage trip	10mA per individual zone ground fault monitoring (note: this is for tool protection)

#### 2) Injection Signal Specifications

Injection Signal Input Voltage	DC 24V, AC220V (Free voltage)
Allowable Frequency	25Hz ~ 120Hz
Scan Rate	20ms

#### 3) Solenoid Valve Output Signal Specifications

Display Resolution Limit	0.01sec
No. of zones	8ZONE / UNIT
Output (Solenoid) Voltage	DC24V, AC220V
Output (Solenoid) Capacity	100mA per zone @ DC24V / AC220V

#### 4) Environment Recommendations

Operating Temperature	0 ~ 50°C (32~122°F)
Operating Humidity	20~90% RH(Non-condensing)
Dimensions(WxHxD)	258 x 169 x 66 mm

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