GV24 Modular Sequential Control System User Guide

smart hot runner solutions

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Precautions

	WARNING
	Use of this equipment in a manner not specified by the manufacturer may impair protection provided by the equipment.
	In addition to presenting a potential fire hazard, high voltage and high temperature can damage equipment and cause severe injury or death. When installing or using this instrument, follow all instructions carefully and use approved safety controls.
	Hazardous potentials exist on components inside the controller. Always disconnect AC power to the mainframe when servicing the controller.
	Because these controllers or associated equipment may not always fail safe, an approved safety control should be used for safe operation.
	Turn off power to the controller before cleaning the exterior of the controller.
	Failure to observe these precautions can result in exposure to a potentially lethal shock hazard.
	All wiring should be done by an experienced technician. The controller and wiring should be installed in accordance with national and local electrical codes. To avoid serious personal injury and damage to equipment, follow all warnings and cautions provided in the hardware setup instructions.

	CAUTION
	If a controller shows signs of having been damaged during shipping, do not power up or install the controller. Save all packing materials and report any damage to the carrier immediately.
	Do not locate this instrument where it may be subjected to excessive shock, vibration, dirt, moisture, oil, or other liquids.
	This is a Class A product. In domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

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1.1 Uses

The Sequential Controller GV24 provides a means of controlling the mould filling sequence when using Valve Gate Hot Runner Systems.

GV24 enables the Valve Gates of a Hot Runner System to be individually controlled to provide the following benefits.

1.1.1   Removal or Positioning of Weld Lines

Quality of the moulded part can be improved by removing or repositioning weld lines or visual surfaces or sections where a weld line would cause a weakness.

1.1.2   Regulation of the Injection Quantity by Gate Operation

Flash occurrence or short moulding is improved by the regulation of the Injection Quantity from each individual gate.

1.1.3   Reduction of Clamping Force

Injection is performed with minimum clamping force because all of the gates are not opened simultaneously.

1.1.4   Reduction of Flow Marks

Flow marks are minimised by being able to raise the injection rate of the gate.

2.0 Power Supply

Mains Power Supply (Timer case)		Single phase AC 220V (50/60 Hz)
Injection Signal Input Power Supply		24VDC, 110VAC, 220VAC
Solenoid Valve Voltage		24VDC, 110VAC, 220VAC
Operating Temperature Range		⁻10 °C - 50 °C
PCB Structure	POWER PCB	Timer power
	Main PCB	MPU out signal input / out injection
	Display	Switch signal input, condition display

3.0 Control Panel Layout
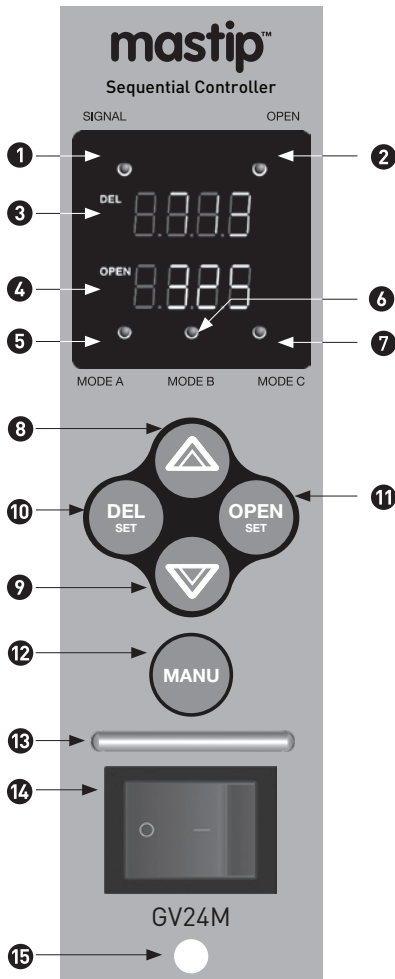
① **SIGNAL LED** – If injection signal is entered, LED is turned on.

② **OPEN LED** – If gate is opened, LED is turned on. When it is manually operated in **⑫**, LED is also turned on.

③ **DEL** –The time from when the gate is opened after receiving injection signal. Mode A, Mode B and Mode C operate in the same way. (Default: 3 seconds)

④ **OPEN** – The time when the gate is being opened. Counting continues in Mode A until the injection signal ends. Gate opens only during setting time in Mode B. (Default: 3 seconds)

⑤ **MODE A LED** – LED is turned on when it is set as A type. (Refer to mode setting method)

⑥ **MODE B LED** – LED is turned on when it is set as B type. (Refer to mode setting method)

⑦ **MODE C LED** – LED is turned on when it is set as C type. (Refer to mode setting method)

⑧ **UP** – Set up time by pressing DEL SET key or OPEN SET key.

⑨ **DOWN** – Turn down time setting by pressing DEL SET key or OPEN SET key.

⑩ **DEL SET** – Set gate closed time after injection signal. Setting Delay Time by pressing UP key or DOWN key. (Setting value will be saved 3 seconds after setting. If signal is turned on before saving setting value, it operates with the previous value not changed value. If you turn off and on AC input power during setting, the setting value is not saved).

⑪ **OPEN SET** – Set the time when gate is being opened by pressing UP key or DOWN key. (Save function is the same as DEL SET key).

⑫ **MANU** – Operate when opening gate manually. Gate is opened only when key is being pressed.

⑬ **Unit Handle**

⑭ **Power Switch**

⑮ **Module Securing Screw**

4.1 Functions

4.1.1   Operations after power is selected

1) When the power is initially connected, the system conducts self-diagnosis.

2) After the first self-diagnosis, the memory status is indicated.

4.2 Mode and Time Unit Setting

1) Convert the MODE setting, if you input power supply by pressing (MANU) MANU + (UP) UP key simultaneously.

   a)   ˝SET˝ is displayed in the DELAY time screen.

   b)   Saved unit of the setting time starts blinking in the OPEN time screen. (999, 99.9, 9.99)

2) Press (UP) UP key and MODE display LED indicates the selected mode by blinking. (MODE A, B, C)

3) Press (DOWN) DOWN key and the OPEN time screen moves DOWN.

4) Setting is completed when there are no more adjustments to the key-in process for 3 seconds.

4.3 Time Setting (No blinking)

4.3.1   Adjusting DELAY time:

1) You can set DELAY time by pressing (UP) UP key or (DOWN) DOWN key within 3 seconds after pressing (DEL SET) DEL SET key.

2) All MODE A, B, C can be set.

3) Setting range (DELAY time)

	1 second setting	0.1 seconds setting	0.01 seconds setting
Setting range	0 - 999 seconds	0 - 99.9 seconds	0 - 9.99 seconds

4) If there are no adjustments to the key-in process for 3 seconds, the setting is completed.

5) If INJECTION SIGNAL is input during setting time, it operates with values before the setting. (The system functions even during adjustment)

6) If (MANU) MANU is pressed during the period of setting, system operates manually. (It will not function during the period of adjustment)

7) If the adjustment key remains pressed, data can be entered continuously.

8) When data is saved from 1 second setting to the 999 seconds, 0.1 seconds setting is displayed as 99.9 seconds and 0.01 seconds setting as 9.99 seconds. (Even the saved time is changed according to the multiple of the time setting).

4.3.2   Adjusting OPEN time:

1) You can set OPEN time by pressing ⬆ UP key or ⬇ DOWN key within 3 seconds after pressing **OPEN SET** OPEN SET key.

2) Only MODE B, C can be set.

3) Setting range (OPEN time)

	1 second setting	0.1 second setting	0.01 second setting
MODE B	0 - 999 seconds	0 - 99.9 seconds	0 - 9.99 seconds
MODE C	0 - 999 seconds	0 - 99.9 seconds	0 - 99.9 seconds

4) If there are no adjustments to the key-in process for 3 seconds, the setting is completed.

5) If INJECTION SIGNAL is input during setting time, it operates with values before the setting. (The system functions even during adjustment)

6) If **MANU** MANU is pressed during the period of setting, system operates manually. (Will not function during the period of adjustment)

7) If the adjustment key remains pressed, data can be entered continuously.

8) When data is saved from 1 second setting to the 999 seconds, 0.1 seconds setting is displayed as 99.9 seconds and 0.01 seconds setting as 9.99 seconds.

9) To set DELAY time is available in MODE C (Delay Sequence)

4.4 Setting Output Voltage

1) Remove the power module.

2) Insert the OUT_V1, OUT_V2 cables of the PCB into desired voltage DC 24V. (Refer to the following figure).

3) Match the selected voltage with the Solenoid Valve voltage specifications. (Default setting : DC 24V)
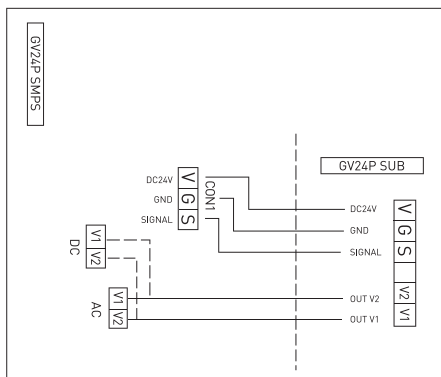
5.1 Mode Specification

GV24 may be set in three modes. The opening/closing operation of the gate differs according to the setting mode as illustrated below.

5.2 MODE A (Continuous Sequence)

Selecting Mode A - After the injection signal has been received, the gate remains closed during the DEL time. After the DEL time has elapsed, the gate opens and remains open until the end of the injection signal.

Example: Injection time 10 seconds/DEL time : 3 seconds gate opens 3 seconds after receiving the injection signal and remains open for 7 seconds and then closes.
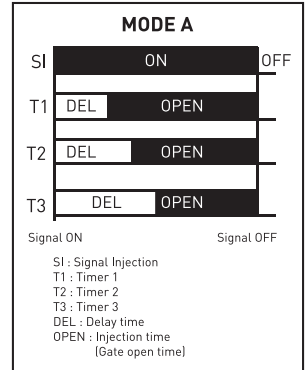
5.3 MODE B (Intermittent Sequence)

Selecting Mode B - After injection signal has been received, the gate remains closed during the DEL time. After the DEL time has elapsed, the gate opens for the OPEN time setting. After the OPEN time has elapsed, the gate closes and remains closed.

Example: Injection time 10 seconds/DEL time 3 seconds/ OPEN time 4 seconds. Gate opens 3 seconds after receiving the injection signal and remains in the open condition for 4 seconds and then closes.
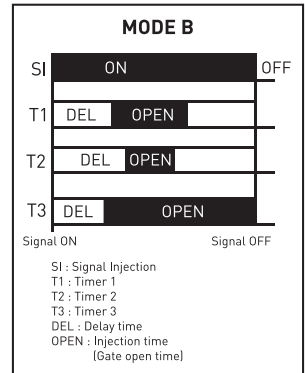
5.4 Mode C (Delay Sequence)

Selecting Mode C - After the injection signal has been received, the nozzle gate remains closed for the duration of the delay time. Opening of the nozzle gate can then be initiated and held beyond the end of the injection signal.
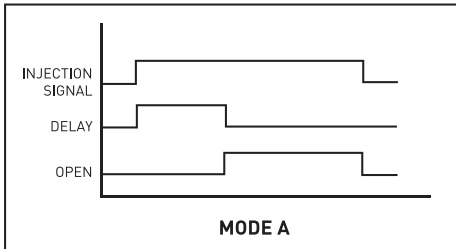
Timer Programming
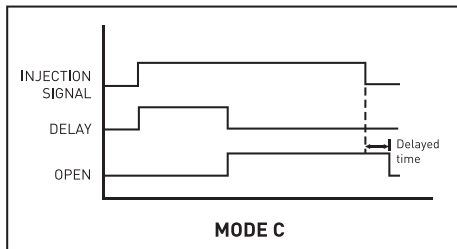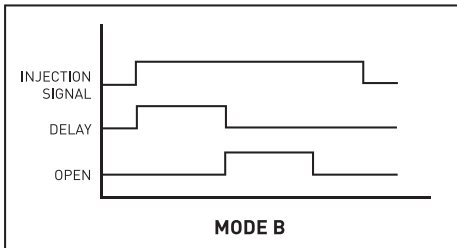
- Increment 0.1 seconds
- Range 0 seconds to 99.9 seconds

MODE C

S1 : Signal Injection
T1 : Timer 1
T2 : Timer 2
T3 : Timer 3
DEL : Delay time
OPEN : Injection time
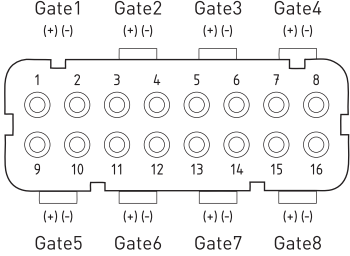(Gate open time)

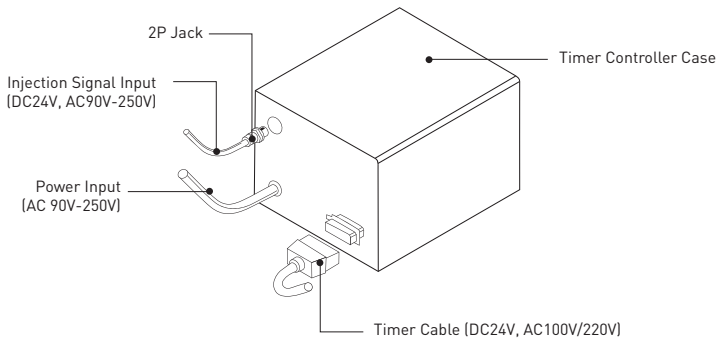## 5.5 Gate Opening by Mode Type Selection

MODE A

MODE B

MODE C

It is possible to set various conditions by selecting the DEL and OPEN timer setting as below.
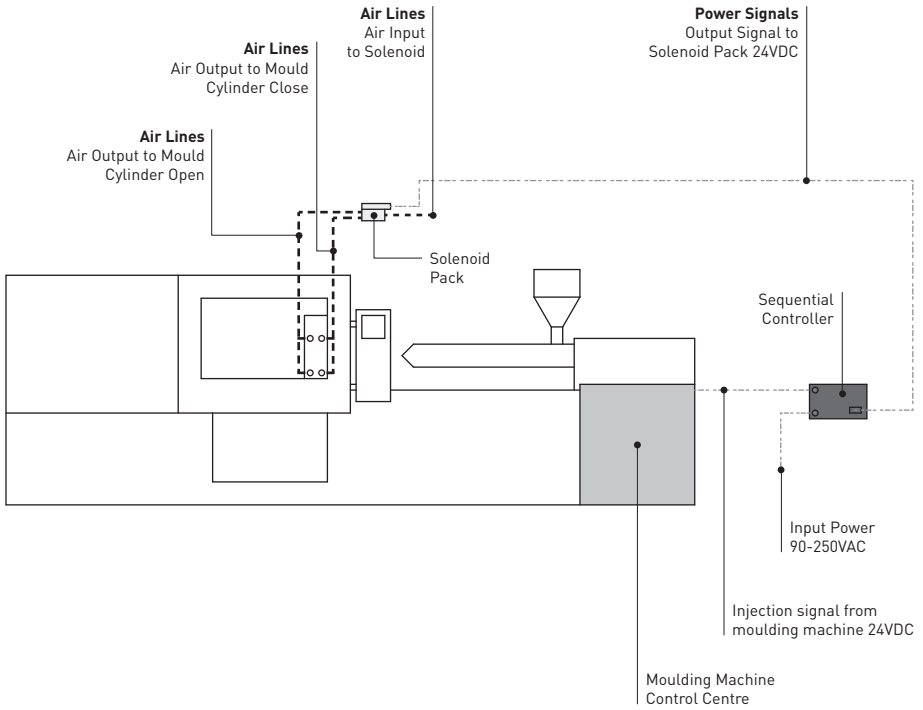
6.1 Wiring Connectors

Connector Pin No.		Solenoid Valve No.	Gate Output Connection
+	–		
1 (Black)	2 (Black+Stripe)	No. 1 Solenoid	HAN 16A (250V 16A) MALE P/N:09 20 016 2612 FEMALE P/N:09 20 016 2812
3 (Brown)	4 (Brown+Stripe)	No. 2 Solenoid	
5 (Red)	6 (Red+Stripe)	No. 3 Solenoid	
7 (Orange)	8 (Orange+Stripe)	No. 4 Solenoid	
9 (Yellow)	10 (Yellow+Stripe)	No. 5 Solenoid	
11 (Green)	12 (Green+Stripe)	No. 6 Solenoid	
13 (Blue)	14 (Blue+Stripe)	No. 7 Solenoid	
15 (Purple)	16 (Purple+Stripe)	No. 8 Solenoid	

Gate1 (+) (-)   Gate2 (+) (-)   Gate3 (+) (-)   Gate4 (+) (-)

1 2   3 4   5 6   7 8
9 10 11 12 13 14 15 16

(+) (-) Gate5   (+) (-) Gate6   (+) (-) Gate7   (+) (-) Gate8

7.0 Composition

2P Jack

Injection Signal Input (DC24V, AC90V-250V)

Power Input (AC 90V-250V)

Timer Controller Case

Timer Cable (DC24V, AC100V/220V)

8.0 General Schematic

Air Lines
Air Input
to Solenoid

Power Signals
Output Signal to
Solenoid Pack 24VDC

Air Lines
Air Output to Mould
Cylinder Close

Air Lines
Air Output to Mould
Cylinder Open

Solenoid
Pack

Sequential
Controller

Input Power
90-250VAC

Injection signal from
moulding machine 24VDC

Moulding Machine
Control Centre

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