

High-Speed Digital Controller - 1 or 2 loops HA Series



HA400 HA900 HA401 HA901



General Description

The HA series are digital PID controllers with a high speed sampling time of 25 ms (0.025 sec) with high-resolution thermocouple, RTD or current voltage input, supplied with parameters settable in 1/100 sec.

A difference between HA400/900 and HA401/901 is in the autotuning. If the process is less than 30 seconds to setpoint, the HA400/900 is best suited with factory default values pre-set for fast process.

Applications in RTP (Rapid Thermal Process), RTA (Rapid Thermal Anneal) and temperature control of semiconductor manufacturing can be controlled by the HA series. The high speed sampling function also makes it suitable for other applications requiring fast control such as pressure or flow rate.

Features

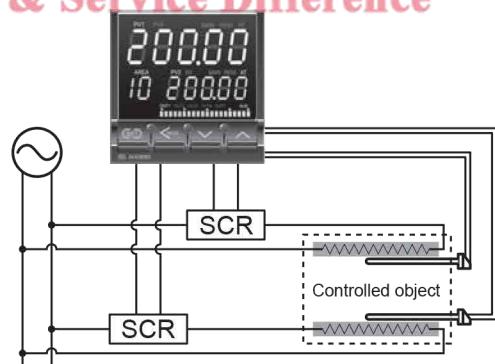


- ★ Ultra High Speed Sampling 0.025 sec
- ★ Two Channels in One Controller
- ★ Ramp / Soak Program Control
- ★ Cascade Control
- ★ Power Feed Forward Function
- ★ Communications

Two Channels in One Controller

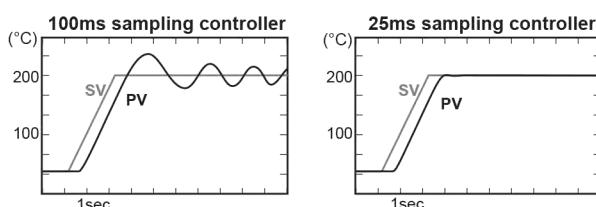
Dual loop control can be performed with a single controller.
All loops operate at 0.025ms sampling time.

Experiencing the Quality & Service Difference



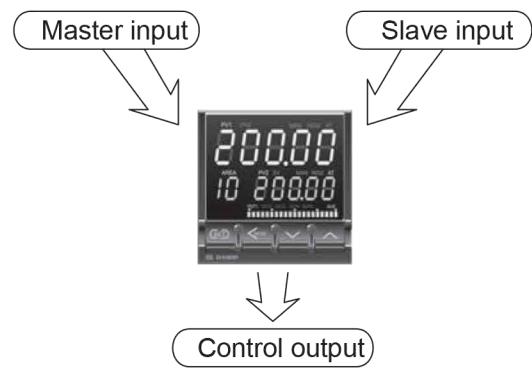
Ultra High Speed Sampling 0.025 sec

The HA series digital controller supplies feedback control 40 times in one second. It makes the HA series suitable for any application requiring fast control response and high accuracy. The PID parameters can be set in 1/100 unit which supports extremely fast and accurate control by the HA series.



Cascade Control in One Controller

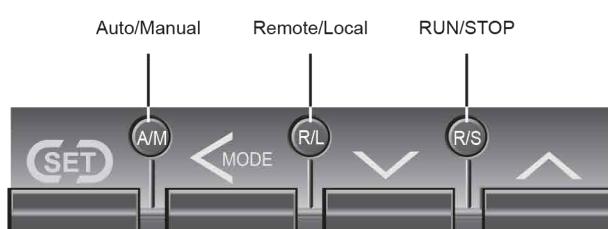
Cascade control can be performed with a single controller. Input type can be specified independently for each channel.



Direct Function keys

Direct function keys are marked for Auto/Manual, Remote/Local, and Run/Stop switching to eliminate error when entering changing patterns.

Used and Unused of each function key is also possible.



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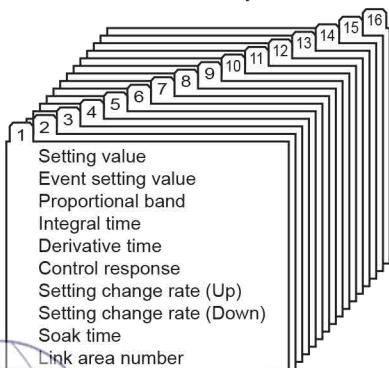
Features

Ramp / Soak Program Control

The HA Series high speed temperature controller has Multi-memory Area function which stores up to 16 sets of control parameters.

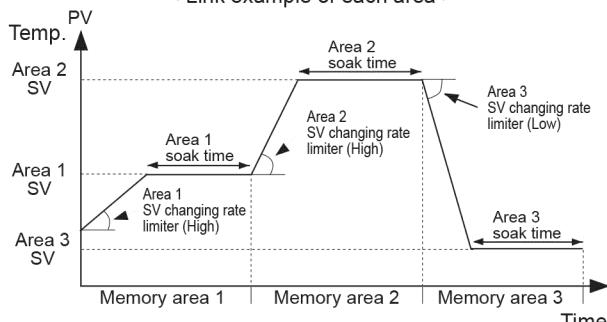
Parameters stored in each memory area are the control set value, event set value, PID values, control response, ramp-to-setpoint UP and DOWN, soak time, and link area number.

< Multi-memory area >



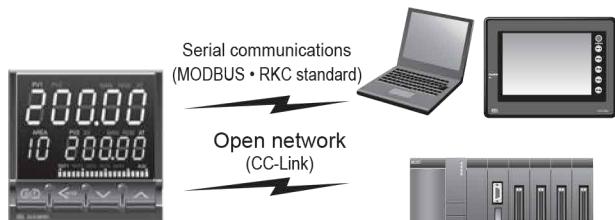
Up to 32-segment ramp/soak control is available by using the memory area function (ramp-to-set point UP and DOWN, soak time, link area number).

< Link example of each area >



Communications (Optional)

The HA Series incorporates a maximum of two communication ports. The communication method can be selected from serial communication (RS-485, RS-422A, RS-232C) and Open network (DeviceNet, Profibus, CC-Link).



Numerous Inputs and Outputs

A maximum of two measuring inputs (one input can be used as a remote setpoint signal) and seven event inputs can be specified. A maximum of five outputs can be specified, and various output functions (control output, analog retransmission, event up to 4) can be allocated in output logic operation.

- Available inputs and outputs depend on the specifications.

IN1	DO1
Measured input (ch1)	Control output (ch1)
IN2	Analog retransmission
Measured input (ch2) or Remote setpoint signal	
DI1 to DI4 Area No. switching	DO2
DI5 to DI7 Area No. switching	Control output (ch2)
Run/Stop	Analog retransmission
Auto/Manual	
Remote/Local	
	DO3
	Event 3,4 Heater break alarm
	Analog retransmission
	DO4
	Event 1,2,3,4 Heater break alarm
	DO5
	Event 1,2 FAIL
	LBA (Assignable to event outputs 3 and 4.)

- Sensor power supply output is also available.
24V DC \pm 5% (Max. 20mA)

- Output from OUT3.
- When sensor power supply output is specified, OUT4 and OUT5 can not be added.

Suitable for Various Process Control

Using industry standard DC inputs (current and voltage), the HA Series can be used in process control applications including pressure, flow rate and levels.

Autotuning

The Autotuning used on HA400/900 is suitable for a control system with a fast response. PID values can also be manually adjusted so that they may be further optimized for the processes.

Just for your information, this Autotuning is performed well for control systems in which temperature rises up to the set point in 30 seconds or faster. If the application is slower (e.g. 5 minutes to reach the set point), HA401/901 are recommended.

Model and Suffix Code

1 channel control type

Specifications	Model and Suffix Code							
Model	HA400 (48 x 96mm 1/8 DIN size) HA900 (96 x 96mm 1/4 DIN size) HA401 (48 x 96mm 1/8 DIN size) HA901 (96 x 96mm 1/4 DIN size)							
Input (IN1 : No 1 input)	See Input and Range code table							
Non isolated type remote set value	Not supplied See Remote input code table	0						
Output 1 (Main output)	1 3 Relay contact output Voltage pulse output : 0/12V DC DC voltage : 0 to 5V DC voltage : 0 to 10V DC voltage : 1 to 5V DC current : 0 to 20mA DC current : 4 to 20mA SSR (Triac) output	M V 4 5 6 7 8 T						
Output 2 (Main output) * Not isolated from OUT1.	1 3 No output from OUT2 Relay contact output Voltage pulse output : 0/12V DC DC voltage : 0 to 5V DC voltage : 0 to 10V DC voltage : 1 to 5V DC current : 0 to 20mA DC current : 4 to 20mA SSR (Triac) output	N M V 4 5 6 7 8 T						
Power supply	24V AC/DC 100 to 240V AC	3 4						
Output 3 (Main output)	2 3 No output from OUT3 Relay contact output Voltage pulse output : 0/12V DC DC voltage : 0 to 5V DC voltage : 0 to 10V DC voltage : 1 to 5V DC current : 0 to 20mA DC current : 4 to 20mA SSR (Triac) output Sensor power supply output (Output 4 and 5 can not added)	N M V 4 5 6 7 8 T P						
Output 4, 5 (OUT4, 5 : Sub output)	2 OUT4 : Relay contact output, No output from OUT5 OUT4 and OUT5 : Relay contact output	N 1 2						
Event input 1 to 5	Not supplied Event input : 5 points (DI 1 to DI5)	N 1						
CT input, Power feed forward (PFF) input, Feedback resistance	Not supplied CT input 1 point (CTL-6-P-N) CT input 1 point (CTL-12-S56-10L-N) CT input 2 points (CTL-6-P-N) CT input 2 points (CTL-12-S56-10L-N) PFF input (Within transformer 100 to 120V AC type) PFF input (Within transformer 200 to 240V AC type) CT input 1 point (CTL-6-P-N) + PFF input (Within transformer 100 to 120V AC type) CT input 1 point (CTL-6-P-N) + PFF input (Within transformer 200 to 240V AC type) CT input 1 point (CTL-12-S56-10L-N) + PFF input (Within transformer 100 to 120V AC type) CT input 1 point (CTL-12-S56-10L-N) + PFF input (Within transformer 200 to 240V AC type) Feedback resistance input	N P S T U 1 2 3 4 5 6 F						
Communication 1 or Event input 6 to 7	Not supplied RS-232C (ANSI/RKC standard) RS-485 (ANSI/RKC standard) RS-485 (MODBUS) RS-232C (MODBUS) Event input : DI6 and DI7	N 1 5 6 8 D						
Communication 2	Not supplied RS-232C (ANSI/RKC standard) RS-422A (ANSI/RKC standard) RS-485 (ANSI/RKC standard) RS-485 (MODBUS) RS-422A (MODBUS) RS-232C (MODBUS) CC-Link	N 1 4 5 6 7 8 C						
Waterproof/Dustproof	Not supplied Waterproof/Dustproof protection	N 1						
Body color	White Black	N A						
Instrument version	Version symbol	Y						

¹ Only OUT1 can be used for control outputs. (Only OUT1 and OUT2 can be used for position proportioning control.)

² Event (alarm) outputs, heater break alarm outputs are assignable to OUT3 - OUT5.

³ Analog output (PV, SV, etc) are assignable to OUT1 - OUT3.

Caution

- If two isolated analog outputs are required, use OUT1 (or OUT2) and OUT3. OUT1 and OUT2 are not isolated.
- To use as a position proportioning controller, two or more outputs must be supplied.
- If heater break alarm is assigned to event function, current transformer (sold separately) is required.

Autotuning

The Autotuning used on HA400/900 is suitable for a control system with a fast response. PID values can also be manually adjusted so that they may be further optimized for the processes.

Just for your information, this Autotuning is performs well for control systems in which temperature rises up to the set point in 30 seconds or faster. If the application is slower (e.g. 5 minutes to reach the set point), HA401/901 are recommended.

High-Speed Digital Controller - 1 or 2 loops HA Series

Model and Suffix Code

2 channel control type

Specifications	Model and Suffix Code	
Model	HA400 (48 x 96mm 1/8 DIN size) HA900 (96 x 96mm 1/4 DIN size) HA401 (48 x 96mm 1/8 DIN size) HA901 (96 x 96mm 1/4 DIN size)	
Input 1 (IN1 : No 1 input)	See Input and Range code table	
Input 2 (IN2 : No 2 input)	See Input and Range code table	
Output 1 (Main output)	1 3 Relay contact output Voltage pulse output : 0/12V DC DC voltage : 0 to 5V DC voltage : 0 to 10V DC voltage : 1 to 5V DC current : 0 to 20mA DC current : 4 to 20mA SSR (Triac) output	M V 4 5 6 7 8 T
Output 2 (Main output) * Not isolated from OUT1.	1 3 No output from OUT2 Relay contact output Voltage pulse output : 0/12V DC DC voltage : 0 to 5V DC voltage : 0 to 10V DC voltage : 1 to 5V DC current : 0 to 20mA DC current : 4 to 20mA SSR (Triac) output	N M V 4 5 6 7 8 T
Power supply	24V AC/DC 100 to 240V AC	3 4
Output 3 (Main output)	2 3 No output from OUT3 Relay contact output Voltage pulse output : 0/12V DC DC voltage : 0 to 5V DC voltage : 0 to 10V DC voltage : 1 to 5V DC current : 0 to 20mA DC current : 4 to 20mA SSR (Triac) output Sensor power supply output (Output 4 and 5 can not added)	N M V 4 5 6 7 8 T P
Output 4, 5 (OUT4, 5 : Sub output)	2 No outputs from OUT4 and OUT5 OUT4 : Relay contact output, No output from OUT5 OUT4 and OUT5 : Relay contact output	N 1 2
Event input 1 to 5	Not supplied Event input : 5 points (DI 1 to DI5)	N 1
CT input, Power feed forward (PFF) input, Feedback resistance	Not supplied CT input 1 point (CTL-6-P-N) CT input 1 point (CTL-12-S56-10L-N) CT input 2 points (CTL-6-P-N) CT input 2 points (CTL-12-S56-10L-N) PFF input (Within transformer 100 to 120V AC type) PFF input (Within transformer 200 to 240V AC type) CT input 1 point (CTL-6-P-N) + PFF input (Within transformer 100 to 120V AC type) CT input 1 point (CTL-6-P-N) + PFF input (Within transformer 200 to 240V AC type) CT input 1 point (CTL-12-S56-10L-N) + PFF input (Within transformer 100 to 120V AC type) CT input 1 point (CTL-12-S56-10L-N) + PFF input (Within transformer 200 to 240V AC type) Feedback resistance input	N P S T U 1 2 3 4 5 6 F
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Waterproof/Dustproof	Not supplied Waterproof/Dustproof protection	N 1
Body color	White Black	N A
Instrument version	Version symbol	Y

1 Only OUT1 and OUT2 can be used for control outputs.

2 Event (alarm) outputs, heater break alarm outputs are assignable to OUT3 - OUT5.

3 Analog output (PV, SV, etc) are assignable to OUT1 - OUT3.

Caution

- If two isolated analog outputs are required, use OUT1 (or OUT2) and OUT3. OUT1 and OUT2 are not isolated.
- To use as a position proportioning controller, two or more outputs must be supplied.
- If heater break alarm is assigned to event function, current transformer (sold separately) is required.

Autotuning

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Range and Input Table

Thermocouple, RTD, Low voltage and Current group

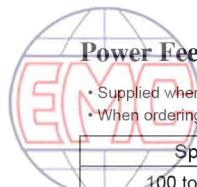
Input	Code	Range	Resolution
K	K	-200 - 1372°C	-328 - 2501°F
J	J	-200 - 1200°C	-328 - 2192°F
T	T	-200 - 400°C	-328 - 752°F
E	E	-200 - 1000°C	-328 - 1832°F
PLII	A	0 - 1390°C	32 - 2534°F
N	N	0 - 1300°C	32 - 2372°F
S	S	-50 - 1768°C	-58 - 3214°F
R	R	-50 - 1768°C	-58 - 3214°F
W5Re/W26Re	W	0 - 2300°C	32 - 4172°F
B	B	0 - 1800°C	32 - 3272°F
Pt100 (3 wire)	D	-200 - 850°C	-328 - 1562°F
JPt100 (3 wire)		-200 - 600°C	-328 - 1112°F
Pt100 (4 wire)	C	-200 - 850°C	-328 - 1562°F
JPt100 (4 wire)		-200 - 600°C	-328 - 1112°F
0 - 10mV DC	3		
0 - 100mV DC			
0 - 1V DC			
0 - 20mA DC			
4 - 20mA DC	8	-19999 - 99999 (Programmable)	1, 0.1, 0.01, 0.001, 0.0001 (Programmable)
High voltage group			
0 - 5V DC	6	-19999 - 99999 (Programmable)	1, 0.1, 0.01, 0.001, 0.0001 (Programmable)
0 - 10V DC			
1 - 5V DC			

Remote Signal Code Table

Not isolated from the No.1 input [IN1]

Input type	Code
Low voltage group	0 - 10mV DC
	0 - 100mV DC
	0 - 1V DC
High voltage group	0 - 5V DC
	0 - 10V DC
	1 - 5V DC
Current group	0 - 20mA DC
	4 - 20mA DC
	Y

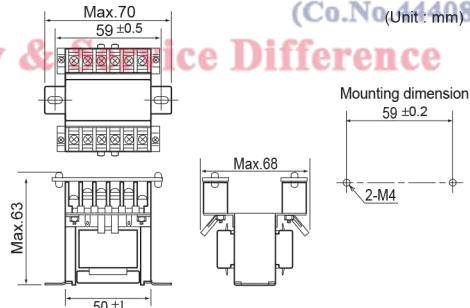
Power Feedback Transformer (for Power Feed Forward Input)



Experiencing the Quality & Service Difference (Co.No.444981-W)

- Supplied when power feed forward function is specified.
- When ordering transformer for replacement, please specify one of the following model codes :

Specification	Model Code
100 to 120V AC type	PFT-01
200 to 240V AC type	PFT-02



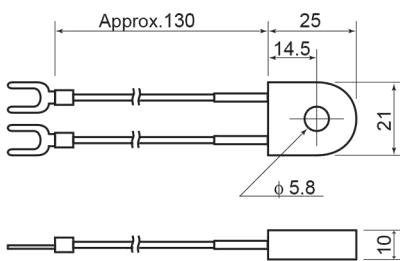
Current Transformer (CT)

- Sold separately.

Name	Range	Model Code
Current transformer for heater break alarm	0 - 30A	CTL-6-P-N
	0 - 100A	CTL-12-S56-10L-N

(Unit : mm)

CTL-6-P-N



CTL-12-S56-10L-N

