YAMATAKE

International Business Headquarters

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Date: April 21, 2003
To: Those listed
Issued by: CC Chang
Subject: SDC15 Small Single Loop Controller

Purpose: To announce the availability of the SDC15 48x48mm size single loop controller.

Summary: The SDC10 was released seven years ago, and has succeeded in having a certain share on the 48x48mm size controller market. As a next step to capture this market, the SDC15 with a miniature body and differential specifications is released. The brochure CP-PC-1404E is attached.

Features:

- The depth of body is only 60mm, the shortest on the market today. This short body will greatly contribute to the user to downsize the control panel using 48x48mm controllers in locations where panel size is often restricted by the depth of controllers.
- The thickness of front panel is only 2mm, with stylish design to view when mounted on equipment.
- Easy-to-operate, as the SDC15 has a key to perform arithmetic shift, a Mode key to define function, and a Para key to assign the functions used by user only.
- PC loader is applicable, the first debut on 48x48mm controller markets.
- The loader is not just a setup tool, but has such unique functions as event configuration and trend monitoring.
- 3 event outputs available, but not available on any 48x48mm controllers of competition.
- 4 to 20mAdc current output available, which has been requested and can also be used as an auxiliary output.
- 2nd control output selectable, enabling a heat/cool control.
- Highly accurate control at low cost, realized by advanced algorithms of Ra-PID (Rational PID) and Just-Fitter.
- 2 current transformer inputs available, allowing individual detection of each three phase heater line break.

Target Markets for the SDC15

1. Semiconductor and LCD manufacturing equipment
(Wire bonders, cleaning equipment and molders)

1) **Demand:** End users require process temperatures to be controlled for easier confirmation.

・**Solution:** The 48x48mm compact controller (SDC15 size) is widely used to meet this demand.

2) **Demand:** Requests for accurate control results.

・**Solution:** The SDC15 offers great controllability with its Ra-PID and Just-Fitter advanced algorithms. Additionally, control results can be easily monitored with the use of a PC loader.

3) **Demand:** Reduction of equipment size is widely requested.

・**Solution:** The only 60mm body depth of the SDC15, the shortest body on the market today, can help in reducing the space required for equipment.

2. Furnaces and ovens

1) **Demand:** Users want to use a 48x48mm controller also as an alarm.

・**Solution:** The SDC15 is a 48x48mm controller that meets this demand.

2) **Demand:** Data logging upon equipment start up is widely requested.

・**Solution:** The PC loader function of the SDC15 can be effectively used for this.

3) **Demand:** Hot air generator market has huge potential for compact controllers.

・**Solution:** The SDC15 with short depth and timer function has advantages over other products on the market.

3. Electric and electronic parts manufacturing equipment
(Kilns, taping machines and reflow)

1) **Demand:** Alarm or density control are performed by a temperature controller on equipment with a small number of loops such as taping machines or reflow.

・**Solution:** The short depth of the SDC15 will be a big asset in this market.

4. Packing machines

1) **Demand:** Small control panel is requested.

・**Solution:** The short depth of the SDC15 is a strong advantage for this market.

2) **Demand:** Good controllability, especially stable control against disturbance, is largely requested as the temperature control result is directly connected with the results of packing operation.

・**Solution:** The SDC15 has stronger differentiation by the external shape and the great controllability than other competition products.

5. Laboratory and testing equipment (L/T)

1) **Demand:** 48x48mm controllers are widely used. A simple program pattern control having ramp and soak operation is frequently requested for compact L/T equipment.

・**Solution:** Set point in time progress can be changed by combining SPU (set point up), SPD (set point down) and event operation function for this request, enabling the strong differentiation against competition.

6. Food machinery

(Kitchen and heat insulating equipment)

1) **Demand:** 48x48mm controllers are widely used in this market. A socket model is generally requested but high functionality is not necessarily required.

・**Solution:** The short depth of the SDC15 is a strong advantage as a controller is mounted on flat and compact equipment in this market. Simple operation is also a key point since this equipment is used by general end users.

7. Plastics

1) **Demand:** Temperature controllers are widely used for applications of less than 10 loops.

・**Solution:** The SDC15 compact controller is suitable for these kind of applications. Furthermore, the SDC15 features a heat/cool function and an auto-tuning function for a system having long dead times.

Table: Advantages and Disadvantages of OMRON and RKC Models

Series	Advantage	Disadvantage
OMRON E5CN	1. PV display color changes from red to green when control temperature reaches a certain set point or an event condition has satisfied. 2. The red PV display color enables viewing even in bright sunlight.	1. PC loader cannot be used resulting in having to setup with manual key operation. The arithmetic shift key and the key for user functions are not available. ・ All the above functions are possible with Yamatake'sSDC15. 2. Out-of-date design ・ Display for Yamatake's SDC15 is wider and easier to view. 3. Body depth of 78mm. ・ The depth of the SDC15 is only 60mm. 4. Number of event outputs is only 2 points. ・ The SDC15 has 3 points. 5. Number of event types is few. Functions such as control loop diagnosis are available only with more expensive models. ・ SDC15 has approx. 30 event types. 6. Only one current transformer input ・ The SDC15 has 2 inputs.

Table: Advantages and Disadvantages of OMRON and RKC Models

Series	Advantage	Disadvantage
RKC CB100	1. Body color available in either black or white. (Body color selectable for any RKC controller) 2. The initial setting is basically unnecessary, since major specifications are determined by model number to minimize setup work on the user's end. 3. Good control results can be obtained, particularly from auto-tuning of control systems such as heat/cool or metal die which does not easily cool.	1. Range and event type must be specified when ordering. User must stock spare units for each model number. ・ Yamatake's SDC15 has group-multi range and can also be supported by a PC loader. Event types are selectable. 2. Body depth of 100mm. ・ The depth of the SDC15 is only 60mm. 3. Heat/cool control model is costly. ・ Every SDC15 model has a heat/cool control function since the control output can be assigned to the event output.

Competition Guide

Manufacturer			Yamatake	OMRON	
External view					
Series			SDC15	E5CN	E5CK
PV Input	Input type	Thermocouple	K, J, E, T, and others	K, J, E, T, and others	K, J, E, T, and others
		DC voltage	0 to 1Vdc, 0 to 5Vdc, 0 to 10Vdc, 1 to 5Vdc	0 to 50mVdc	0 to 1Vdc, 0 to 5Vdc, 0 to 10Vdc, 1 to 5Vdc
		DC current	4 to 20mAdc, 0 to 20mAdc	None	4 to 20mAdc, 0 to 20mAdc
	Full multi-input		Group multi-range	Group multi-range	Full multi-range
	Accuracy		±0.5%FS±1digit	±0.5%RD±1digit	±0.2%RD+1digit (T/C: ±0.3%RD+1digit)
	Sampling cycle		500ms	500ms	250ms（Linear input: 100ms）
Control Outputs	Control output 1		Relay contact Voltage pulse Current	Relay contact Voltage pulse Current	Relay contact Voltage pulse Current
	Control output 2		Relay contact (Assignable to event output) Voltage pulse Current (Auxiliary output)	None	Relay contact Voltage Current (Auxiliary output)
	MANUAL mode		Available	None	None
	RUN/READY		Available	Digital inputs	Digital inputs
Options	Event outputs	Number of outputs	3	2	1
		Latch	Available	Available	None
		Delay	Available	None	None
		Logic operation	Available	None	None
		Number of CT input	2	1	None
	Digital inputs	RSW type	SP changeover, RUN/READY, AUTO/MANUAL, Auto-tuning stop/start, and others	SP changeover, RUN/READY	SP changeover, RUN/READY
		Number of inputs	2	2	1
		Logic operation	Available	None	None
Communication		Protocol	RS-485	None (Other model)	RS-232C, RS-485
		Transmission speed	MAX. 38400bps	None	MAX. 19200bps
Others	Body depth		60mm	78mm	100mm
	Sealing on front panel		IP66	IP66 equivalent	IP66 equivalent
	Socket mount type		Available	Available	None
	PC loader		Applicable	None	None
	Applicable standards		CE, UL (soon available)	CE, UL, CSA	CE, UL, CSA

Manufacturer			RKC INSTRUMENT		KEYENCE
External view					(Same as TTM-004 of TOHO ELECTRONICS)
Series			CB100	CB103	TF4-10(V)
PV Input	Input type	Thermocouple	K, J, E, T, and others	K, J, E, T, and others	K, J, R, T, N, S, B
		DC voltage	0 to 5Vdc, 1 to 5Vdc	0 to 5Vdc, 1 to 5Vdc	None
		DC current	0 to 20mAdc, 4 to 20mAdc (Resister must be connected.)	0 to 20mAdc, 4 to 20mAdc (Resister must be connected.)	None
	Full multi-input		Specified by model No.	Specified by model No.	Multi-range (Only T/C and Pt)
	Accuracy		±0.3%RD+1digit	±0.3%RD+1digit	±0.3%RD+1digit
	Sampling cycle		500ms	500ms	500ms
Control Outputs	Control output 1		Relay contact Voltage pulse Triac Current	Relay contact Voltage pulse Triac Current	Relay contact Voltage pulse
	Control output 2		None	Current (Option. Cannot be selected with EV3)	None
	MANUAL mode		None	None	None
	RUN/READY		Available	Available	Available
Options	Event outputs	Number of outputs	2	2+Option 1 (Cannot be selected with auxiliary output)	2
		Latch	None	None	Available (Cancelled upon power reset)
		Delay	None	None	Available
		Logic operation	None	None	OR operation with the alarm available
		Number of CT input	1	1	1
	Digital inputs	RSW type	None	SP changeover, RUN/READY	None
		Number of inputs	None	1	None
		Logic operation	None	None	None
Communication		Protocol	RS-485	None	None
		Transmission speed	MAX. 19200bps	None	None
Others	Body depth		100mm	100mm	77mm
	Sealing on front panel		IP66 equivalent	IP66 equivalent	IP66
	Socket mount type		None	None	None
	PC loader		None	None	None
	Applicable standards		CE, UL, CSA	CE, UL, CSA	CE, UL

Manufacturer			TOHO ELECTRONICS	Matsushita Electric Works	Yokogawa M&C
External view					
Series			**TTM-004**	**AKT4**	**UT150**
PV Input	Input type	Thermocouple	K, J, R, T, N, S, B	K, J, E, T, and others	K, J, E, T, and others
		DC voltage	None	0 to 5Vdc, 1 to 5Vdc, 0 to 1Vdc, 0 to 10Vdc	0 to 100mVdc, 0 to 5Vdc, 1 to 5Vdc, 0 to 10Vdc
		DC current	None	4 to 20mAdc, 0 to 20mAdc (Resister must be connected.)	None
	Full multi-input		Multi-range (Only T/C and Pt)	Full multi-range	Full multi-range
	Accuracy		±0.3%RD+1digit	±0.2%FS+1digit	T/C: ±0.2 RTD: ±0.1 ±1digit Linear: ±0.3%
	Sampling cycle		500ms	250ms	500ms
Control Outputs	Control output 1		Relay contact Voltage pulse Current	Relay contact Voltage pulse Current	Relay contact Voltage pulse Current
	Control output 2		None	Voltage pulse (Cannot be selected with EV2)	Relay contact Voltage pulse Current (Cannot be selected with auxiliary output)
	MANUAL mode		None	None	None
	RUN/READY		Available	None	Available
Options	Event outputs	Number of outputs	2	1+Option 1 (Cannot be selected with control output 2)	2
		Latch	Available (Cancelled upon power reset)	Available (Cancelled upon power reset)	None
		Delay	Available	Available	None
		Logic operation	OR operation with the alarm available	None	None
		Number of CT input	1	1	1
	Digital inputs	RSW type	SP changeover, RUN/READY, AUTO/MANUAL, Auto-tuning stop/start, etc.	None	SP changeover, RUN/READY, Timer stop/start
		Number of inputs	1	None	2
		Logic operation	None	None	None
Communication		Protocol	RS-485	None	RS-485
		Transmission speed	MAX. 19200bps	None	MAX. 9600bps
Others	Body depth		77mm	95mm	100mm
	Sealing on front panel		IP66	IP66	IP65
	Socket mount type		None	None	None
	PC loader		None	None	None
	Applicable standards		CE, UL	CE, UL, CSA	CE, UL, CSA

Manufacturer			Fuji Electric Instruments	CHINO
External view				
Series			**PXR4**	**LT230**
PV Input	Input type	Thermocouple	K, J, E, T, and others	K, J, E, T, and others
		DC voltage	1 to 5Vdc	1 to 5Vdc
		DC current	4 to 20mAdc (Resister must be connected.)	4 to 20mAdc (Resister must be connected.)
	Full multi-input		Group multi-range	Full multi-range
	Accuracy		±0.5%RD±1digit	±0.25%FS±1digit
	Sampling cycle		500ms	500ms
Control Outputs	Control output 1		Relay contact Voltage pulse Current	Relay contact Voltage pulse Current
	Control output 2		Relay contact	Relay contact
	MANUAL mode		None	Available (Preset output available in READY mode)
	RUN/READY		Available	Available
Options	Event outputs	Number of outputs	2+Heater Break 1	2
		Latch	Available	None
		Delay	Available	None
		Logic operation	None	None
		Number of CT input	1	1
	Digital inputs	RSW type	SP changeover, RUN/READY, Timer stop/start SP ramp-soak start/reset etc.	SP changeover, RUN/READY, Timer stop/start
		Number of inputs	2	2
		Logic operation	None	None
Communication		Protocol	RS-485	RS-485
		Transmission speed	MAX. 9600bps	Unknown
Others	Body depth		78.8mm	100mm
	Sealing on front panel		IP66 equivalent	IP66 equivalent
	Socket mount type		None	None
	PC loader		None	Soon applicable
	Applicable standards		CE, UL, C-UL	CE, UL, CSA