

# SHICO. MODEL: SHC-2000 FURNACE SH/RH CLINKER MONITORING SYSTEM



## ■ INTRODUCTION

SHC-2000 is the system that surveys and analyzes the condition of build-up clinkers on the outside of heat exchanger pipes inside furnace in operation.

the CCTV camera unit attached to automatic retraction unit is inserted into furnace and rotates to provide overall view of the condition of clinkers during internal furnace operation.

The clinkers built up on the outside of heat exchanger pipe lines inside furnace are from melting and forming ashes generated during continuous operation of power plant.

When clinker occurs once it grows into accumulated condition and consequently reduces thermal efficiency of furnace, particularly built-up clinkers around air supply nozzle cause poor performance of power plant due to imperfect combustion caused by unstable air supply.

In order to maximize the efficiency and safety of generating plant, periodically preventive inspection is required.

SHC-2000 consists of camera unit, auto retraction unit, air cooling unit, control unit and accessories mounting lens tube of camera unit.

The camera unit requires protection against high temperature furnace condition which is provided by air or water circulation under controlled pressure through the lens tube and camera enclosure.



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## FURNACE SH/RH CLINKER MONITORING SYSTEM

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Air or water service is connected to the lens tube assembly from the pipe train, using flexible hose with quick-disconnect end fittings. Sealing air provides an isolation barrier for the lens tube to prevent entry of high temperature corrosive vapors. The lens tube attached to the camera enclosure, contains cooling air passage for the objective lens.

Air flow around the lens body provides cooling and minimizes dust accumulation by directional vanes, thus reducing cleaning needs. Auto retraction unit provides support for a camera enclosure and lens tube while wall sleeve protects the lens tube from high temperature when installed into a opening in the furnace wall.

Auto retraction unit contains a rodless cylinder which allows for necessary retraction.

The control unit provides both a visual and audible indication of a "failure" of a service supply.

The MANUAL/AUTO select switch normally remains in the "AUTO" position during system operation.

In this position, any failure will initiate automatic retraction. This results in movement of the camera and lens tube assembly from its position in the furnace wall to one of relative safety for the equipment.



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■ Specification

구 분		SH / RH Area	Bottom Slope Area	Superheater division Area
Camera	Image Sensor	1/2" EX-VIEW HAD CCD	1/2" EX-VIEW HAD CCD	1/2" EX-VIEW HAD CCD
	Effective Pixels	380K,768(H)x494(V)	380K,768(H)x494(V)	380K,768(H)x494(V)
	Signal Format	NTSC	NTSC	NTSC
	Horizontal Resolution	600 TV LINES	600 TV LINES	600 TV LINES
	Horizontal Frequency	15.734 kHz	15.734 kHz	15.734 kHz
	Vertical Frequency	59.94 Hz	59.94 Hz	59.94 Hz
Lenses	Iris Function	DC / VIDEO	DC / VIDEO	DC / VIDEO
	Speed Shutter	1/60~1/100,000	1/60~1/100,000	1/60~1/100,000
	Video Out	1.0Vp-p 75 OHMS	1.0Vp-p 75 OHMS	1.0Vp-p 75 OHMS
	Input Power	DC 12V	DC 12V	DC 12V
	Power Consumption	4.5W	4.5W	4.5W
	Overall Length	24"~	24"~	24"~
	Usable Length	22"~	22"~	22"~
	Diameter	1.496"~	1.496"~"	1.496"~"
	Field Of View	72°H x 54°V x 90°D~	60°H x 45°V(55,50) x 75°D~	72°H x 54°V x 90°D~
	Line Of Sight		Right Angle	
Other	Operating Temp	Max. 2000℃	Max. 2000℃	Max. 2000℃
	Auto Rotation Unit	Motor Control	Motor Control	Motor Control



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**Local Control Unit (Model: SALCU-3000)**

- ◊ Material : SS400
- ◊ Steel Plate Thickness : Front & Door : 3.2t / Others : 2.3t
- ◊ Painting Color : 5Y 7/1
- ◊ Enclosure Type : Water & Dust Tight
- ◊ Dimension : approximately W750 x D570 x H1720
- ◊ Local control panel provides the function of local/remote Selection, camera insert/retract, and camera rotation.
- ◊ Local control panel equipped with video line amplifier and RS232/422/485 converter can transmit furnace interior image.
- ◊ The distribution device of air supplied to camera, flow isolation valve, air regulator and protection pressure switch are attached.
- ◊ Local control panel installed around the boiler can protect the internal devices with cooling system

**Power Distribution Unit (Model: SAPDP-3000)**

- ◊ Material : SS400
- ◊ Steel Plate Thickness : Front & Door : 3.2t / Others : 2.3t
- ◊ Cable Entry : Bottom
- ◊ Color : 5Y 7/1
- ◊ Enclosure Type : Water & Dust Tight
- ◊ Dimension : W750 x D570 x H1200 (depending on user's request)
- ◊ It is configured to supply power to each of the local panel and displays whether or not supplying power with the signal lamp attached.
- ◊ In case of the interruption for main power supply, ATS circuit is configured to automatically switch into back-up supply power and displays switching condition with signal lamp.
- ◊ Cable: XHHW/SIS standard (main: minimum 5.5mm<sup>2</sup>, wiring: minimum 2.0mm<sup>2</sup> )
- ◊ Insulated ring type crimp terminal is used for the terminal of wiring cable and terminal junction shall include all numbering as well as using KS standard.

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FURNACE SH/RH CLINKER MONITORING SYSTEM

MODEL: SHC-2000

■ Clinker Monitoring System Cabinet (Model: SARCU-3000)

- ◊ Material : SS400(or 19" standard rack)
- ◊ Thickness : 2.3t
- ◊ Enclosure Type : Water & Dust Tight
- ◊ Color : 5Y 7/1
- ◊ Cable entry is located under panel.
- ◊ Installation of server computer, analyzer computer, DVR, etc, inside panel.

■ Server Computer (Model: SASC-3000)

- ◊ CPU : Intel XEON 5500(2.9GHz) and over
- ◊ CPU L3 Cache Memory : 4MB
- ◊ Memory : DDR3 RAM 2GB and more
- ◊ LAN Card : 10 / 100 / 1000 MB
- ◊ Operating System : Windows XP Pro
- ◊ Application Software : SHC-2000 Series
- ◊ Graphic Memory : 256MB and over
- ◊ HDD : 250GB, SATA 3Gb/s 7200RPM and more
- ◊ Optical Disk Drive : 16X DVD+RW and more
- ◊ Power Consumption : 575W



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## ■ Analyzer Computer (Model: SAAC-3000)

- ◊ CPU : Intel XEON 5500(2.9GHz) and over
- ◊ CPU L3 Cache Memory : 4MB
- ◊ Memory : DDR3 RAM 2GB and over
- ◊ Main Board Chipset : Intel 5000X
- ◊ LAN Card : 10 / 100 / 1000 MB
- ◊ Operating System : Windows XP Pro
- ◊ Application Software : MS SQL Server
- ◊ Graphic Card : SHC-2000 Series
- ◊ Graphic Memory : 256MB and more
- ◊ HDD : 250GB, SATA 3Gb/s 7200RPM and more
- ◊ Optical Disk Drive : 16X DVD+ RW more
- ◊ Power Consumption : 575W
- ◊ Graphic Capture Board : Video Input Channel : 4Channel  
Video Supported : NTSC & PAL  
Bus Interface : 64Bit PCI Interface  
Quantity : 2 set
- ◊ PCI Serial Board : Connector : Female DB62  
Input Channel : 8 Channel  
Bus Interface : 32Bit Universal PCI  
Input Signal : RS-232/422/485  
Baud rate : 50BPS ~ 921.6kBPS

## ■ Monitor (Model: SMT-1922)

- ◊ Type : TFT LCD
- ◊ Size : 19"~
- ◊ Pixel Pitch : 0.294mm
- ◊ Brightness : 250NITS
- ◊ Response Time : 2ms
- ◊ Resolution : 1280 x 1024
- ◊ Color : 16M Colors



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■ DVR(Digital Video Recorder) (Model: SVR-1670)

- ◊ Video Input Type : NTSC/PAL
- ◊ Video Input : 16Channel
- ◊ Video output : 9 Composite, 1SHVS, 1VGA
- ◊ Live Screen Mode : 1, 4, 7, 10, 16
- ◊ Display Resolution : 800 x 600
- ◊ Display Speed : 480IPS
- ◊ Recording Resolution : Max. 720 x 480
- ◊ Compression Type : SHC-2000 Series
- ◊ Video Compression Rate : Standard 1~3kB(360 x 240)
- ◊ Operating System : Windows XP Pro
- ◊ Storage : 250GB HDD x 2
- ◊ Backup Device : DVD-RW
- ◊ Backup Type : JPG, BMP, AVI
- ◊ Network : LAN(10/100 Base Ethernet)
- ◊ Network Speed : Max. 120IPS
- ◊ Mounted Type : 19" Rack Mounted
- ◊ Power Consumption : Max. 660W

■ Switching Hub (Model: SFC4000A)

- ◊ Switching : 10/100/1000 Base-T
- ◊ Interface Port : 24Ports
- ◊ MAC Address : Max. 8000
- ◊ Input Power : AC 100 ~ 240V, 50/60Hz
- ◊ Power Consumption : 30W



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■ Video Equalizing Distribution Amplifier(Model: DVD-138)

- ◊ Video Input : Input Channel : 8 Channel  
Signal Form : 1Vp-p Composite NTSC  
Connection : BNC  
Load Impedance : 75Ω
- ◊ Video Output : Output Channel : 3Channel  
Signal Form : 1Vp-p Composite NTSC  
Connection : BNC  
Load Impedance : 75Ω
- ◊ Video Detection : Detector : Sync. Detection Circuit  
Display : LED(Green)
- ◊ Mounted Type : 19" Rack Mounted
- ◊ Input power : AC 110V/220V, 60Hz
- ◊ Power Consumption : Max. 15W

■ Monitor Switch (Model: SAMS-3000)

- ◊ Input port : 4 Port
- ◊ OSD : Built-In
- ◊ Video Resolution : 1920 x 1400
- ◊ Output Port : Monitor 1, Keyboard 1, Mouse 1
- ◊ Input Power : AC 110V/220V, 60Hz
- ◊ Power Consumption : 20W

■ KVM Extender #1(Tx) (Model: SAKE1-3000)

- ◊ Input Connection type : Computer : USB port  
Keyboard & Mouse : USB port
- ◊ Output port : Monitor : DB 15 Female  
Keyboard & Mouse : PS/2 Type  
Rx Connection : LAN Cable CAT5 & RJ-45 Connector  
Input power & Consumption : AC 9V, 800mA



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■ KVM Extender #2(Tx) (Model: SAKE2-3000)

- ◊ Input Connection type : Computer : DB 15 Female  
Keyboard & Mouse : 6pin Mini DIN Female
- ◊ Output port : Monitor : DB 15 Female  
Keyboard & Mouse : 6pin Mini DIN Female  
Rx Connection : LAN Cable CAT5 & RJ-45 Connector
- ◊ Input power & Consumption : AC 9V 2.7W

■ Aux. Signal I/O Module (Model: SAIO-3000)

- ◊ Digital Input Module : Input Channel & Type : 16Channel/Relay Contact  
Isolation : 1.5kV / Quantity : 3set  
Response Time : Max. 1ms
- ◊ Digital Output Module : Output Channel & Type : 16Channel/Dry Contact  
Contact Rating : 250V / 2A  
Isolation : 1.5kV / Quantity : 2set  
Response Time : Max. 1ms
- ◊ Control Board : CPU : SHC-2000 Series  
Interface : RS-232C,485  
Quantity : 1set
- ◊ Power Supply Board(DC 5V) : Input power : AC 100~240V, 50/60Hz  
Output power : DC 5V, 75W  
Quantity : 1set
- ◊ Power Supply Board(DC 12V) : Input power : AC 100~240V, 50/60Hz  
Output power : DC 12V, 75W  
Quantity : 1set
- ◊ Power Supply Board(DC 24V) : Input power : AC 100~240V, 50/60Hz  
Output power : DC 24V, 75W  
Quantity : 1set
- ◊ Terminal Board : Type : Pin Terminal  
Max. Connection Point : 96Points  
Quantity : 1set



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■ **Furnace CCTV camera mixer (Model: SAVM-3000)**

- ◊ Input Signal: 1Vp-p Composite, Impedance 75Ω, BNC Connector
- ◊ Output Signal: 1Vp-p Composite, Impedance 75Ω, BNC Connector
- ◊ Frequency Spec:  $\pm 0.3\text{dB}@0.1\text{MHz} \sim 4.1\text{MHz}$
- ◊ Remote Control: Serial 1 Port
- ◊ Power consumption: 10W@220Vac

■ Install clinker monitoring system cabinet in electronics equipment room.

■ Wire: XHHW/SIS standard (power and control wire: minimum 1.5).

■ Insulated ring type crimp terminal is used for the terminal of wiring cable and terminal junction shall include all numbering as well as using KS standard.

■ Install cooling fan to expel the heat generated inside the panel.

■ Wire Color(DC circuit: blue , AC circuit: yellow)

■ **Client Unit (Model: SACU-3000)**

■ Monitor Unit

- ◊ Type : TFT LCD
- ◊ Size : 19~"
- ◊ Pixel Pitch : 0.270mm
- ◊ Brightness : 300 NITS
- ◊ Response Time : 2ms
- ◊ Interface : 15 Pin D-Sub, DVI-I
- ◊ Power : AC 100 ~ 240V, 50/60Hz
- ◊ Resolution : 1600 x 1200
- ◊ Color : 16.7M Color



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■ Computer Unit

- ◊ CPU : Intel core 4 (2.5GHz) and over
- ◊ Memory : DDR3 RAM 2GB and over
- ◊ LAN Card : Intel 82566DM Gigabit
- ◊ Operating system : Windows XP Pro
- ◊ Graphic Card : SHC-2000 Series
- ◊ Graphic Memory : 128MB and over
- ◊ HDD : 250GB SATA 3Gb/s 7200RPM and over

■ ASH Remote Monitoring Unit (Model: SACU-3000)

■ Computer Unit

- ◊ CPU : Intel core 4(2.5GHz) and over
- ◊ Memory : DDR3 RAM 2GB and over
- ◊ LAN Card : Intel 82566DM Gigabit
- ◊ Operating system : Windows XP Pro
- ◊ Graphic Card : SHC-2000 Series
- ◊ Graphic Memory : 128MB and over
- ◊ HDD : 250GB SATA 3Gb/s 7200RPM and over

■ ASH remote monitoring system is arranged to conduct remote surveillance in clinker treatment room.

■ Monitor

- ◊ Type : TFT LCD
- ◊ Size : 19"~"
- ◊ Pixel pitch : 0.270mm
- ◊ Brightness : 300 NITS
- ◊ Response Time : 2ms
- ◊ Interface : 15 Pin D-sub, DVI-I
- ◊ Power : AC 100 ~ 240V, 50/60hz
- ◊ Resolution : 1600 x 1200
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■ **Clinker Monitoring Software**

- ◊ Clinker monitoring software is used after installing on analysis computer within clinker monitoring system.
- ◊ Field digital input signals (sootblower contact, camera status, local/remote selection, air supply condition) are displayed on monitor.
- ◊ Outputs operation signals(camera rotation, insert/retract, purge air supply for pollution control, etc)
- ◊ With auto retraction function in case of pressure drop, allowing lens tube equipped with temperature sensor to protect camera and itself and blocking supply power as well as cool air,
- ◊ Monitoring the images transmitted from the camera installed in the field and analyzing the change of them according to building-up of clinkers.
- ◊ Possible to perform the trend analysis of transmitted images from camera.

■ **Video Distribution Software**

- ◊ Using with installing in DVR.
- ◊ Distributing images to server computer, analysis computer, client computer and ASH remote monitoring computer.
- ◊ Transmitting the images of flames and clinkers into monitors installed in the central control room, and displaying them.
- ◊ The holding period of images can be controlled according to the requirement of user(option)



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■ Scope of Supply

No.	Material	Unit	Quantity
1	<b>High Temperature Camera System</b>		
	Camera	EA	
	Lense	EA	
	Panel Cooler & Air Line	SET	
	Auto Rotation Unit	SET	
	Video Line Amplifier	SET	
	Auto Retraction Unit	SET	
	Wall Box Mount	SET	
2	<b>Local Control Panel</b>		
	Local Control Panel	SET	
3	<b>Power Distribution Panel</b>		
	Power Distribution Panel	SET	
4	<b>Monitoring System</b>		
	Panel Enclosure	SET	
	Server Computer	SET	
	Analyzer Computer	SET	
	Monitor	SET	
	Digital Video Recorder	SET	
	Remote Monitoring System	SET	
	Switching Hub	SET	
	Video Equalizing Distribution Amplifier	SET	
	Furnace CCTV Camera Mixer	SET	
	Monitor Switch	SET	
	KVM Extender(#1/#2)	SET	
	Aux. Signal I/O Module	SET	
Monitoring Software Package	SET		
5	<b>Client Unit</b>		
	Computer Unit	SET	
	Monitor	SET	
6	<b>Installation and Test</b>		
	(Cable, Air Piping, Vertical Board Monitor )		



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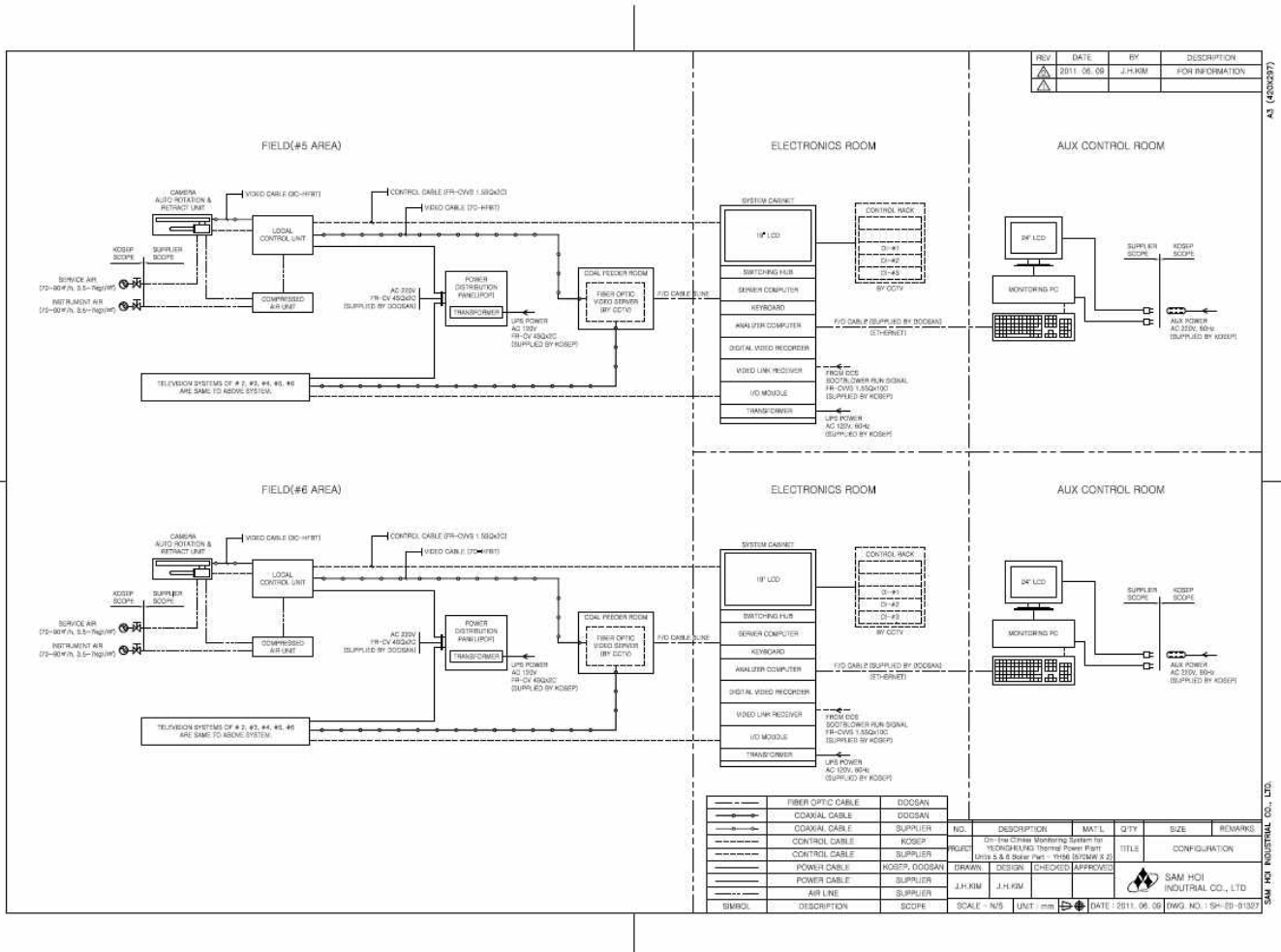
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## SYSTEM COMPOSITION



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