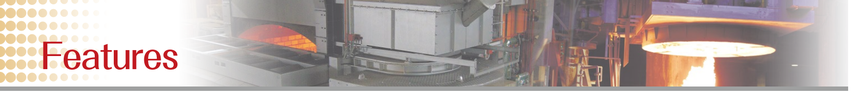


Features

1 Easy Operation via Touch Panel

The main feature of smart furnace is that various performances can be easily operated by using a touch panel. The recorders, controllers, and setting devices are integrated on the touch panel screen. The operating process becomes easier without referring to the manual nor requiring special operation skills. Smart Furnace can be fully controled by your fingertip. Please touch and experience.

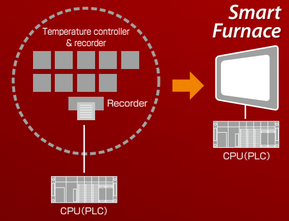
2 Automatic Recording Furnace Operation Results

Recording the operation results is indispensable for production control. Smart Furnace can automatically record various data per batch (batch furnaces) or for the specified time zone (continuous furnaces). Automatically record data of fuel consumption in standard units, start/end time and duration of operation etc. By using the math function, complex calculations can also be recorded. Specific consumption per production item, squad, month, etc. can automatically be summed up using an optional function, which helps to collect the data for quality control.

Checking operation records at a glance

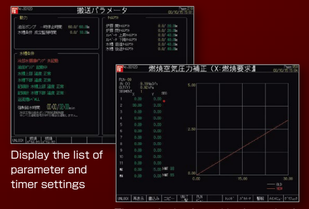
3 All-in-one Setting Interface

Smart Furnace is an all-in-one system that can be applied to any industrial furnace, which enables monitoring and recording of temperature control and operating statuses, as well as operations even from a remote place. And above all, Smart Furnace can get the best performance from each furnace simply configuring parameters and making adjustments on the touch panel screen with your finger.



4 Flexible Advanced Controls

Recently, energy-saving burners have been introduced in industrial furnaces, which require advanced and complicated controls. Smart Furnace realizes control capabilities equivalent to a costly DCS (distributed control system) but at a reasonable cost. You can freely control whatever you want. Not just the furnace temperature, but also the pressure and oxygen concentration.



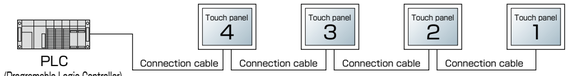
Display the list of parameter and timer settings

The vertical axis and horizontal axis are configurable freely

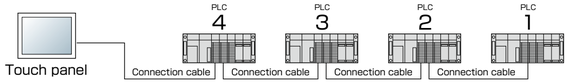
Basic Specifications

System configuration

Combination of Mitsubishi PLC and touch panels



Four touch panels connected to one PLC



If multiple furnaces of the same type are used, they can be simply monitored on one touch panel by switching between screens.

PLC type

Select from three types of PLCs according to the capacity and the number of loops.

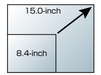
Model	Capacity	Loops
Large-scale model	128Kstep	65LOOP
Medium-scale model	64Kstep	40LOOP
Small-scale model	30Kstep	10LOOP

* "Loops" denotes the number of analog input/output points.

Touch panel type

Select from four sizes of touch panels based on the screen size.

Screen size	Pixels	Displayable colors
8.4-inch	800 × 600	65535 colors
10.4-inch	800 × 600	65535 colors
12.1-inch	800 × 600	65535 colors
15.0-inch	1024 × 768	65535 colors



MIYAMOTO KOGYOSHO www.miyamoto-k.co.jp/

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Hiroshima Branch Office, Shikoku Branch Office, Kyushu Branch Office, Kurobe Factory

July 2020

Industrial furnace total control system

Smart Furnace®

【Smart Furnace®】

Pursuing Thermal Technology and a Green Future
MIYAMOTO

Smart Furnace®

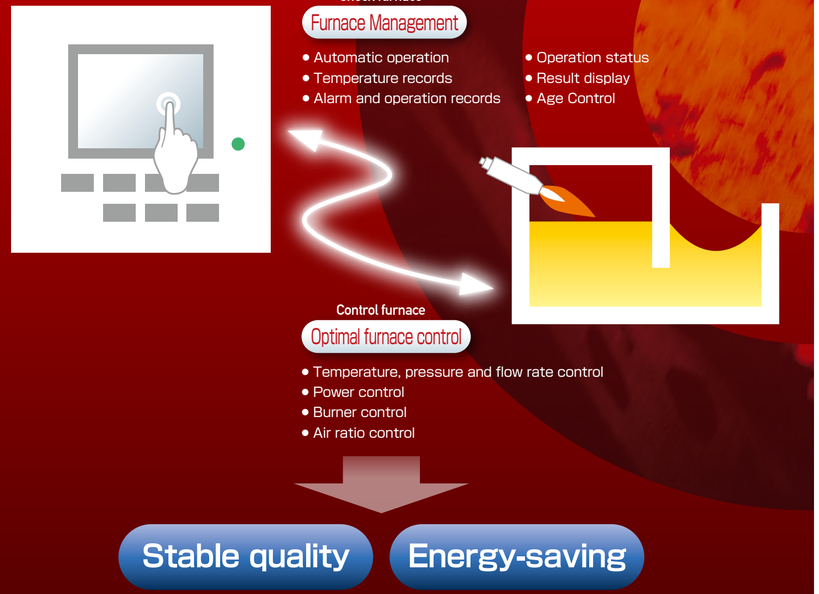
From small- to large-scale furnaces, Smart Furnace can implement to "Automatic Furnace"/"Thinking Furnace".

Smart Furnace utilizes advanced technology to maximize the effectiveness of industrial furnace which adapting all-in-one touch panel control - 1st in the industry, and users can easily perform the works.
In addition, based on this overall control system, it helps to operate effective and optimal. Our industrial furnace can ensure the stable quality, energy-saving which are called Smart Furnace.

Conventionally, high accuracy furnace control was achieved by a DCS (distributed control system) which is highly efficient but expensive, and due to its specialized application, the engineers who can handle the software are limited. On the other hand, Smart Furnace utilizes general-purpose control devices and offers the capabilities equal to DCS at a low cost.

Industrial furnaces evolve from the age of hardware to software. Smart furnaces are flexible evolution from conventional industrial furnaces to self-operated furnaces.

Smart Furnace is a registered as a trademark of MIYAMOTO KOGYOSHO.



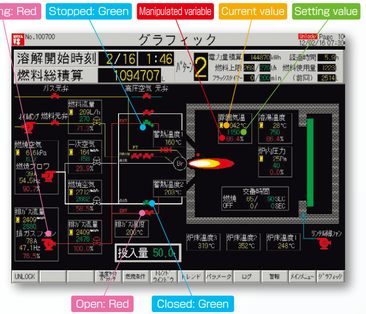
Various functions to maximize the performance of industrial furnaces

Graphic Function Standard

The Smart Furnace operation screen is made to order by combining the customer's requirements and the number of furnace burners actually used to maximize its productivity. The temperature status, burner ignition status, door open/close status, etc. can be reviewed quickly based on the experiences we earned in industrial furnaces through the years. In case you want to record the screen status, you can save the display graphics screen in use as an image in a jpg format.


Intuitive Menus


Burner igniting statuses on one screen

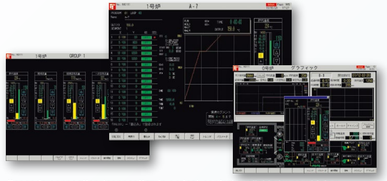


Temperature Controller Function Standard

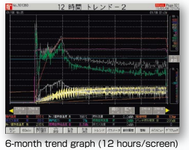
□Temperature setting function
Analog input/output points equivalent to 65 temperature controllers are provided as standard. In addition to the temperature controllers, 40 patterns for program controllers are pre-installed.

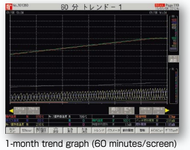
□Controller function
- ●Loops: 65
- ●Cascade connection supported
- ●Trend graph function for adjustment as a standard feature
- ●PV/SV/MV trends recorded over the past six months
- ●Data in the past can be searched for by time.

□Program function
- ●Registered programs: 40 patterns
- ●Trend lines: 15 lines / program
- ●Setting time: 0 to 999 hours
- ●In addition to GS (Guarantee soak), many standard functions are integrated.


Cascade connection (connection in series) control available by combining two controller loops

Temperature Recorder Function Standard


6-month trend graph (12 hours/screen)


1-month trend graph (60 minutes/screen)


Data can be exported in a CSV file any time.


Date & time can be specified with the cursor.

Ordinary recorders can record only measured temperature or flow rate values. Smart Furnace can also record setting values (SV) and manipulated variables (MV: 0-100%) that are changing according to the situation.

□Electronic recorder specifications
- ●Registered pens: 96 pens (12 pens / screen x 8 screens)
- ●Data type: Measured value, setting value, manipulated variable, alarm value, integrated value, etc.
- ●Sampling interval: 5 seconds (for 1-month graph), 1 minute (for 6-month graph)
- ●Data format: CSV (saved on a compact flash card)
- ●Display time span: 60 minutes or 12 hours per screen, four screens at one time
- ●Call function: By date or time, by moving the cursor

Operating Condition Display Function Standard

Safety comes first for industrial furnaces. To operate furnaces safely, various operating conditions need to be satisfied. For example, if the door of the furnace is open, which is the operating condition of the conveyor, in case the operator can not confirm the open/closed status, the "operating condition display function" solves it. The blue light is on when the conveyor's requirements are met, otherwise, it shows red light. Therefore, you can immediately check which requirement has failed.


Instant display the operating requirements that are not satisfied

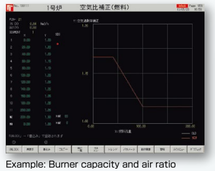
Parameter and Timer Setting Function Standard

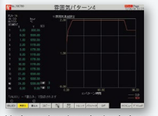
Display a lists of various parameters (setting values) and timers required for operation of the industrial furnaces. When pressing the setting value button, the "numeric keypad" is displayed, and you can quickly change the setting value by entering the desired value (※The values can be protected by the password lock function on the maintenance screen if necessary.) By display both the current value and setting value, the current status of the industrial furnace can be easily predictable.


It is also possible to set the pre-purge time and the cutting temperature of the pilot burner.

Trend Graph Setting Function Standard

By standard function to perform the advanced function control of Smart Furnaces, it is possible to set a horizontal axis item, a vertical axis item, setting value and time span as required. 40 trend graph formats, including preset trend graphs, are pre-installed as a standard feature.
Example: Burner capacity and air ratio
When the combustion quantity is large, the flame is stable so that the air ratio can be close to 1.0. However, when it is small, the air ratio must be increased to achieve stable combustion. Such settings can be made with ease using the trend graph function.

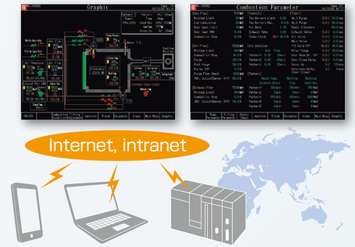

Example: Burner capacity and air ratio


Horizontal and vertical axis items can be set freely.

Communication Function (docomo, intranet)

* Option

The Smart Furnace operation screen can be viewed on a remote computer screen. This enables real-time monitoring of the furnaces with the same operations on the computer screen as on the Smart Furnace screen. The communications are available even from oversea by connecting to the internet using docomo communication card, or LAN, etc.



Other Functions

● Running hour (times) integration Standard
The running hours or usage times of all devices (burners, blowers, solenoid valves, conveyors, etc.) on each furnace are summed up and recorded automatically. The alarm function is also provided so that the maintenance timing can be notified according to the settings for replacement or greasing intervals.

● Backup/restore function Standard
Even if the software or parameters lost due to a power outage (usually a backup battery), the latest information could be restored with the data backed up automatically.

● Alarm records Standard
In case the alarm occurs, a pop-up window appears to notify the cause of the alarm. All alarms that occurred are saved in logs and can be viewed at any time.

● Bilingual function * Option
The interface language on the touch panel screen can be switched over with ease so that local employees in overseas factories can operate and control furnace equipment (English, Chinese, etc.).

● Pushbutton operation records Standard
To ensure reliability of crucial operations such as for igniting or extinguishing, hardware pushbuttons are provided, instead of buttons on the touch panel screen. Furthermore, all operations of these pushbuttons are recorded in the same way as alarm records. In the event that any trouble occurs to the furnace, these records are helpful to identify the problem of the devices or operation errors in order to prevent recurrence.