JUMO

Industrial furnaces
Innovative solutions for your success

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Dear Reader,

Glass, ceramic, clay and steel are materials we encounter every day. As an industrial furnace manufacturer, however, you know what requirements are placed on furnaces that are used to manufacture these materials and must withstand extreme process conditions.

Your reliable partner JUMO is always at your side to help when you have questions and to provide quick solutions, whether the temperature in furnaces you manufacture needs to be controlled, regulated, monitored, recorded or visualized.

So how do we do it? By applying years of experience and professional expertise. JUMO has been a leading manufacturer of measurement and control systems for more than sixty years. This has helped us become a competent partner for industrial furnace construction.

We place special importance on regular new development cycles, continuous improvements in existing products and continually making production methods more economical. This way we achieve the highest level of innovation.

JUMO also offers you a wide range of solutions for the most diverse applications in industrial furnaces.

This brochure will give you an overview of JUMO products and systems for industrial furnace construction. Of course we would also be happy to develop individual solutions for you, completely customized to your requirements.

The ultimate result of these solutions is: consistently high quality!

Regards Toni Pappert

P.S.: Detailed information about our products can be found under the specified type/product group number at **www.industry.jumo.info**

Contents

Temperature

The most important measurement variable in industrial furnaces is the temperature.
It affects the materials being manufactured and must be precisely controlled and monitored to prevent deviations in quality in the final product. JUMO has first-rate products to help you in these areas.

Temperature sensors for industrial furnaces

The high temperatures in industrial furnaces make it necessary to use thermocouples with the wires Fe-CuNi, types "L" and "J"; NiCr-Ni, type "K"; Pt10Rh-Pt, type "S", and Pt30Rh-Pt6Rh, type "B".

Depending on the location of the application, metal or ceramic protection tubes are installed. The metal protection tubes consist steels, in some cases with a high proportion of nickel and chromium for reducing and oxidizing atmospheres. The following materials are used for protection tubes:

Steel X18CrNi 28 mat. no. 1.4749 and steel X15CrNiSi 2520 mat. no. 1.4841. They are suitable for use at temperatures up to +1150°C.

Temperature sensors with ceramic protection tubes are used for temperature measurements of gaseous media up to +1600°C. Materials for the tubes include gastight C610 ceramics with a high content of aluminum oxide (for temperatures up to +1300°C) and C799 ceramics (extremely fire-resistant, for temperatures up to +1600°C).

JUMO Mineral-insulated thermocouple
as per DIN 43710 and DIN EN 60584
Type 901250

JUMO Push-in thermocouples
with terminal head form B
Type 901120

JUMO Push-in thermocouples
with terminal head form A
Type 901110

Control

To guarantee solutions for industrial furnaces requires a suitable sensor and proper control of measurement variables. JUMO systems are ideal in this respect.

Control – Accurate and efficient

Precise temperature profiles are absolutely mandatory for the often highly complex processes involved in firing, annealing and hardening of different materials.

JUMO PID control algorithms have proved their worth in industrial furnaces and can be used either in continuously operating furnaces or in those that work with batch operation, and with any type of heating, for example oil or gas firing or electrical heating. Profile programs can be used to provide exact representations of firing curves or the process image.

Field bus interfaces provide connections with the SVS3000 visualization program, making it possible to record and evaluate batch-related measurement data.

JUMO process controllers ensure energy-optimized control of your processes.

JUMO IMAGO 500

Multi-channel Process and Program Controller
Type 703590

JUMO dTRON 304/308/316

Compact controller with program function
Type 703041/42/43/44

JUMO mTRON T –
Central unit

Measuring, control, and automation system
with controller module and input/output modules
Type 705000

JUMO mTRON T –
Multifunction panel 840

Measuring, control, and automation system
Type 705060

Recording

Are you familiar with the JUMO LOGOSCREEN series?
With the instruments of this paperless recorder range, you are best
equipped to record, archive and evaluate the measurement values that
require verification in an easy and tamper-proof way.

Recording, archiving and evaluating

Paperless recorders from the JUMO LOGOSCREEN family of instruments are used to record process data quickly with no errors and to archive data so it is protected against tampering. The data can either be evaluated directly at the instrument or on a PC, using the JUMO PCA3000 evaluation software.

JUMO paperless recorders are divided into three output levels, starting with the simple 3/6-channel instruments with type designation LOGOSCREEN 500cf, continuing through instruments with 6/12 measurement inputs in types LOGOSCREEN cf/es and culminating (for now) in the 18-channel LOGOSCREEN nt. The new generation of paperless recorder, the JUMO LOGOSCREEN nt, offers an online process data visualization option, as well as various limit monitoring procedures, a remote alarm in the event of a fault, and the option of simultaneous recording of three totally independent batch processes.

JUMO paperless recorders offer you maximum security for recording, archiving and evaluating measurement data.

This security in recording and evaluating data allows you to optimize process parameters and guarantee consistent product quality.

JUMO LOGOSCREEN 500cf

Paperless recorder with CompactFlash® card
and life-cycle data management
Type 706510

JUMO LOGOSCREEN nt

Paperless recorder with TFT-Display, CompactFlash® card
and USB interfaces
Type 706581

JUMO mTRON T –
Central unit

Measuring, control, and automation system
with controller module and input/output modules
Type 705000

JUMO mTRON T –
Multifunction panel 840

Measuring, control, and automation system
Type 705060

Monitoring

The safety of people, machines and products plays an important role in furnaces. The manufacturing process in the furnace depends significantly on the temperature.
JUMO offers you a wide variety of state-of-the-art products for monitoring temperature.

Monitoring systems with the safetyM series

Using this compact and freely configurable temperature limiter/monitor or safety temperature limiter/monitor, you can detect hazards that could lead to injuries, damage to the environment or destruction of production systems and materials – reliably and in time to prevent the incident.

The primary task of the instruments is to monitor thermo-technical processes, and bring systems to a safe operating state in the event of a fault. The basis of these requirements is DIN EN 14597.

To ensure compliance with safety regulations worldwide, we meet the requirements of DIN EN 61 508, SIL 3 and DIN EN ISO 13 849-1 PL e (performance level) for safety temperature limiters/monitors

The safetyM series offers you clear advantages: The alarm relay switches the furnace to the safe state in case of error. The limiter function can be used to re-enable the furnace with an internal or external reset button.

Process values from the furnace can also be transferred via the analog output to a recorder, controller or higher-level control system.

JUMO safetyM TB/TW 08

Temperature limiter, temperature monitor as per DIN EN 14 597
Type 701170

JUMO safetyM TB/TW

Temperature limiters, monitor as per DIN EN 14 597 with LCD for mounting
Type 701160

JUMO safetyM STB/STW

Safety temperature limiter, safety temperature monitor as per DIN EN 14 597
Type 701150

Automation and visualization

Problem-free processes must run on systems that are reliable in every
detail, down to the actuators. Given the many different types of furnaces
and thermal treatment processes, it is important for you to meter energy
safety and reliably so that the power is received where it is needed.
To ensure the smoothest possible interaction between a wide variety of
components in a process, you also need to be able to see all the important
data. That is the purpose of JUMO's powerful plant visualization software.

Power under control with JUMO thyristor power switches and actuators

When heating electrically operating industrial furnaces, for example furnaces used for case hardening and electric arc furnaces as well as melting furnaces, the maximum achievable temperature depends on the heat sources.

JUMO offers you thyristor power switches and actuators suitable for resistive or resistive-inductive loads for this purpose. This allows you to control heating elements with a ratio R_{cold}/R_{hot} of 1:16, as well as a wide range of infrared radiators (for example in drying processes).

Plant visualization software JUMO SVS3000

The SVS3000 plant visualization software with batch-related data logging and evaluation in the network offers you effective operation, visualization and documentation. Especially when connecting JUMO instruments, programmed graphical elements are available for you in a library. This shortens software project planning time considerably. Batch reports, a list of alarms and events as well as recipes, group pictures and flow charts, 8 weekly schedules (timetables) and 16 trend graphs are available. You can also export your report data to other programs (for example Excel) with an export function.

JUMO TYA-201/TYA-202

Thyristor power controller
Type 709061/709062

JUMO TYA 432-45

Thyristor power switches
Type 709010

JUMO TYA 432-100

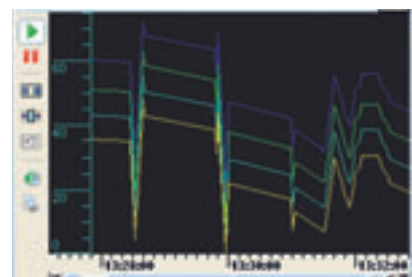Thyristor power switches
Type 709020

JUMO SVS3000

Plant visualization software with batchrelated data report and evaluation in a network
Type 700755

Integrated batch reporting

Clear Group diagrams

Maximizing the Trend displays

JUMO mTRON T – Your System

The scalable measuring, control, and automation system

System layout

JUMO mTRON T is modularly designed and uses an Ethernet-based system bus and integrated PLC, even for non-centralized automation tasks. The universal measuring, control and automation system combines JUMO's extensive process know-how with a simple, application-oriented and user-friendly configuration concept.

The core element of JUMO mTRON T is the **central Processing Unit** with a process image for up to 30 input/output modules. The CPU has higher-level communication interfaces including web server. The system has a PLC (CoDeSys V3) for individual control applications, program generator and limit value monitoring functions as well as math and logic modules.

The following components are available as **input/output modules**: The 4-channel analog input module with four electrically isolated universal analog inputs for thermocouples, resistance thermometers and standard signals. This makes it possible to record and digitize process variables precisely with the same hardware, which simplifies planning, resource management and stockkeeping. Multichannel controller modules support up to four independent PID control loops with a fast cycle time and proven control algorithm, without placing any load on the central unit. The system allows for simultaneous operation of up to 120 control loops and meets the needs of demanding control processes. Optional slots can be used to extend and adapt the inputs and outputs of each controller module individually.

The **multifunction panel** provides visualization of data as well as convenient operation of the controller and program generators. User-dependent access to parameter and configuration data of the overall system is also possible. Recording functions of a high-quality paperless recorder including web server are implemented as a special feature. Proven PC programs with standard predefined screen templates are available for reading and evaluating historical data.

A setup program is used for **hardware and software configuration** as well as project design for control tasks and recording measurement values. Users can create their own highly efficient automation solutions with CoDeSys editors in accordance with IEC 61131-3. The entire application is recorded in a single project file.

Com 1
RS422/485 or RS232,
Modbus master/slave

Com 2
RS422/485 or RS232,
Modbus master/slave
or PROFIBUS-DP slave

Expansion of
system bus

Systembus

LAN

- Web browser
- Setup program
- PCA3000 PC evaluation software
- PCA communication software PCC
- Plant visualization software SVS3000
- CoDeSys programming system

Com 1
RS422/485 or RS232,
Modbus master/slave
Connection
Barcode scanner

Com 2
RS422/485 or RS232,
Modbus master/slave

USB
Host and device

Expansion of
system bus

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