Control Systems for Timber Drying Kilns

Regelanlagen für Schnittholztrockner
Controllers for timber dry kilns

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Desktop controller for small timber dryers

GANN HYDROMAT TK-MP 101

This portable and handy controller has been designed especially for the fully automatic control of small conventional timber drying kilns as well as for small dehumidification dryers.

With its attractive price-performance ratio the Hydromat TK-MP 101 represents a progressive solution also for small drying kilns. It is available with a handle to conveniently position the controller on a table, or with fastening brackets for installation in another switch cabinet.

Control

Proportional or ON-OFF control selectable for the heating system and the venting according to the individual requirements. Control of humidification selectable for steam or water spraying. The software contains proven drying schedules for over 250 species of wood and for timber thicknesses from 20 mm to 140 mm. Control of the drying cycle can be governed by reading of any of the available wood moisture measuring points, or by the peak or average value of the selected measuring points.

Standard Equipment

- Illuminated 4-line LCD matrix readout.
- 16-key membrane keypad.
- Robust casing of aluminium, equipped with handle or fastening brackets.
- Signal amplifiers are incorporated in the control cabinet.
- 3 wood moisture measuring points and one each EMC and temperature measuring point.
- Manual control of all final control elements via keypad inputs possible.

Optional Equipment

- Interface for connection of a matrix printer to continually print the essential actual and nominal values as graphical and tabular representation of the drying run.
- Up to 4 wood temperature probes for heat treatment
- PC software TKMP4032_light for documentation and archival storage of the drying progress

Technical Specifications

Control cabinet: Height: 135 mm without handle,
Width: 450 mm,
Depth: 310 mm,
Weight: approx. 11 kg
Protection mode: IP 40

Power supply: 230 V AC 50 cycles, 60 VA.

[Technical modifications reserved]
Fully automatic control system in microprocessor technology

GANN HYDROMAT TK-MP 301

An intelligent and progressive solution for fully and semi-automatic control both of conventional and dehumidification-type timber drying kilns. The outstanding features of this proven dryer control system are its versatility, its unsurpassed procedure of controlling kiln-drying timber as dictated by the drying behaviour of the wood, its compact design, its very simple operation, and its competitive price.

Control
Proportional and ON-OFF control selectable for the heating system and the venting according to the individual requirements. Control of humidification selectable for steam or water spraying. The software contains proven drying schedules for over 250 species of wood and for timber thickness from 20 mm to 140 mm. Control of the drying cycle can be governed by reading of any of the available wood moisture measuring points, or by the peak or average value of the selected measuring points.

Standard Equipment
- Illuminated 4-line LCD matrix readout.
- 16-key membrane keypad.
- Control cabinet with lockable glazed front door.
- Separate signal amplifier casing for easy installation of the control cabinet away from the drying kiln in a control room or the operator's office.
- 4 wood-moisture and one each EMC and temperature measuring point.
- Manual control of all final control elements via keypad inputs possible in case of need.

Optional Equipment
- Package of four additional wood-moisture measuring points.
- Supplementary equipment for reversing type dryers, with the option to set fan reversal interval via keypad input.
- Interface for connection of a matrix printer.
- Interface for centralisation together with other computerized GANN controllers.
- Variable fan-speed control if the dryer has been equipped with a frequency converter.
- Supplementary equipment with up to four additional wood temperature measuring points for control and documentation of heat treatment of timber designed for packing purposes.

Technical Specifications
Control cabinet: Height 215 mm, width 600 mm, depth 41.5 mm,
Weight: approx. 25 kg

Amplifier casing: Length 300 mm, width 200 mm, height 85 mm,
Weight: 3.5 kg

[Technical modifications reserved]
GANN HYDROMAT TK-MP 501

This latest model of the Hydromat TK-MP series offers a wide range of facilities for optimising timber drying, as has been unknown so far in this variety from other controllers. It sets new standards in fully automatic control of the drying process.

The display and operating devices are combined in a modern LCD touch screen, which allows inputs by just touching the relevant part of the screen. Drying schedules for 250 species of wood and for a wood thickness from 20 mm to 140 mm are stored in the controller’s memory. They can be modified by the operator within preset safety limits, if this should be required according to the particular efficiency of the dryer.

The built-in program editor permits to modify standard drying schedules by inserting or deleting drying steps. With timbers that are difficult to dry and tend to warping and splitting, periodical interim conditioning phases can be inserted. These serve to relieve stress that has built up and to improve the drying quality. Modified standard drying schedules can be stored in a register for easy reuse.

The microprocessor-operated signal amplifier digitally transfers the measured values to the controller. To ensure an optimum accuracy of the readings, the individual resistance curves of 250 species of wood are stored in the signal amplifier module. Furthermore, proper function of the measuring points is permanently verified by the controller.

Up to 16 wood-moisture measuring points can be connected to the controller. Eight measuring points can be used for core and for shell measurement. This permits automatic adaptation of drying control at too great a difference between core and shell moisture. This may cause too fast drying of the shell layer and may lead to case hardening. On request the controller can be equipped with radio based measuring points for wireless transmission of the readings.

Apart from control of the drying cycle as governed by the continuously measured wood moisture content, the user can also enter time-based drying programs of his own. Instead of real wood-moisture measuring points, a fictitious measuring point can be used for control of the drying process, too. A supplementary equipment permits variable control of the fan speed, also taking into consideration, besides species and thickness of the timber, the thickness of the stickers used.

Hardware
- Modular design with add-on I/O-modules for future applications.
- Modules are connected with the control unit via digital CAN-bus.
- Freely programmable switch functions as entered by the user.
- Up to 16 wood moisture measuring points, optionally in wireless design.
- Graphical user interface for easy programming.
- Connection port for colour inkjet printer to protocol the drying cycle.
- Device with up to 16 additional temperature measuring points for control and documentation of heat treatment of timber designed for packing purposes (optional equipment).

Software
- Standard drying schedules for 250 species of wood and for a wood thickness from 20 mm to 140 mm, considering thickness of the stickers and air speed.
- Standard drying schedules can be modified and stored for easy reuse.
- Program editor renders additional intermediate program steps possible.
- Drying process can be governed by the reading of a single or several wood moisture measuring points, with the option to select control by the peak or average moisture value.
- Facilities to monitor difference between core and shell moisture, with automatic adjustment of drying control if the difference exceeds a given value.
- Starting time of the drying process and of the fans programmable via incorporated clock.
- Possibility of programming intermediate conditioning phases of variable length and frequency.
- Recording of an error protocol file during every drying cycle.
- Drying time prediction as dictated by the entered drying parameters.
- Operator can choose among several dialogue languages without software modification.

**Main Menu**

The computer prompts the adequate drying parameters after entering only the code number of the species of wood, the thickness of the timber and the desired final moisture content. If the thickness of the stickers used deviates from the standard, the actual thickness can be entered for the necessary adjustments, which are carried out by the controller automatically.

**Measured Values Menu**

The readings from up to 16 wood-moisture measuring points and two each temperature and EMC measuring points are displayed.

A fictitious measuring point renders it possible to control the drying cycle even without real wood-moisture measuring points.

Different measuring points can be selected to govern drying control and to determine the end of the drying cycle.

**Visualisation of position of heat and spray valve and of the dampers**

Optional display of the degree of opening of the heat valve and of the venting dampers in percent of maximum opening (for each damper individually), with error message in case of non-uniform degree of opening of the dampers.

**Nominal Values Menu**

The drying process is divided into 17 phases:

- **Heating up phase**
- **Warming-through phase**
- **13 Drying phases** from 60 % wood moisture down to the final M.C. in small steps. They can be individually modified by the operator.
- **Equalising phase**
- **Cooling-down phase.**

The number of drying phases can be increased or reduced by the operator. The adaptation of temperature and EMC between the individual phases takes place in an infinitely variable way. Interim conditioning phases with selectable intervals and selectable duration can be inserted with higher EMC values.

**Optional Equipment**

- Up to totally 16 wood measuring points.
- Equipment for reversing-type drying kilns.
- Equipment for up to 16 wood temperature probes for heat treatment according to ISPM-15
GANN HYDROMAT MPP-5

With the exception of the missing touch-screen display, this slave computer controller is completely identical with the Hydromat TK-MP 501. Programming of the drying process and display of the drying data are only possible via the Hydromat MPC 4032 central computer.

Standard Equipment

- Separate amplifier box for easy installation of the controller away from the dryer in a control room.
- 8 wood moisture measuring points and one each EMC and temperature measuring point in standard design.
- Cable 5 m long for connection to the central computer MPC 4032.

Optional Equipment

- Package of four additional wood-moisture measuring points, up to totally 16 measuring points.
- Equipment for reversing-type drying kilns, consisting of one each additional EMC and temperature measuring point.
- Equipment for up to 16 wood temperature probes for heat treatment according to ISPM-15.

Technical Specifications

Control cabinet: Height: 250 mm, width: 600 mm, depth: 250 mm
Weight: approx. 18 kg

Signal amplifier box: Length: 300 mm, width: 200 mm, height: 85 mm

Special Accessory for use with TK-MP501 and MPP5

Wireless measuring points can optionally be used with the Hydromat TK-MP 501 and MPP-5. Two receivers are to be installed diagonally inside the kiln to ensure flawless operation. One transmitter is required for each MC, EMC, and temperature measuring point.

Each wood moisture measuring point consists of 1 transmitter and 2 stainless steel electrodes with teflon insulation 15 mm, 25 mm and 40 mm long.

Each EMC and temperature measuring point consists of 1 transmitter, 1 EMC electrode holder with wall connector and one package of 50 EMC sensors.
Central computer for programming and monitoring up to 32 individual controllers

**GANN HYDROMAT MPC 4032**

Central computer for programming and monitoring up to 32 independently working controllers of the following models: Hydromat TK-MP 250, TK-MP 301, TK-MP 501, being individually programmable themselves, or slave computers Hydromat MPP-3 and MPP-5. It can be supplied with an interface for connecting 2, 8, 16, 24 or 32 of these individual controllers, even in mixed configuration.

The Hydromat MPC 4032 central computer offers the opportunity to memorize some 100 user-altered standard or custom-made drying schedules for reuse with every individual controller connected to it.

The current drying state in each kiln can be displayed in the form of a bar chart. Sections that have already been completed can be displayed through a graph showing the drying progress in the form of individual curves of the various measuring points.

Additional subroutines, e.g. for continuously recording all drying data in a data base for future statistical evaluation and calculations on efficiency, or for programming time or drying-based changes of the fan speed, are optionally available. The installation of a modem further permits remote supervision via internet in case of a malfunction of the system owing to a faulty component or operating error.

The optional subroutine „Kiln Balance“ renders it possible to memorize the history of the individual drying cycles run in all kilns in the form of a data base for future calculations of profitability and for accounting purposes.

**Basic Equipment of Hydromat MPC 4032**

- Connection device for up to 8 peripheral Hydromat computers of the TK-MP and MPP series.
- Central input of time and date for all peripheral units.
- Display of permanently updated curves representing the measured MC, EMC and temperature data, with additional display of the nominal value for EMC and temperature.
- Display of the current drying state as a bar graph, with individual display of all measuring points and nominal values for each dryer connected to the system.
- Memorizing all data documenting the drying progress in each kiln, for printing tabular and graphical representations of the course of the drying cycle.
- Periodical printout of the current drying state in all kilns.
- Centralized querying of all peripheral controllers about errors or malfunctions occurred.
- Possibility of memorizing custom made drying schedules or user-altered standard drying schedules for reuse with any peripheral controller.
- 17 inch TFT colour monitor.

**Optional Equipment**

- Extension for connection of up to 32 peripheral controllers, types TK-MP 250, TK-MP 301, TK-MP 501 and MPP-5.
- Modem for remote programming and data display.
- Subroutine for controlling heat supply to favoured individual dryers during temporary overload conditions of the boiler.
- Subprogram supervising management and efficiency for memorizing all essential data of the drying cycles completed in the individual drying kilns in a data base.
- Facility for network operation with other PCs as well as for data input and display via other terminals.

[Technical modifications reserved]