HEAT MANAGER CONTROL SYSTEM

INTRODUCTION

The HEAT MANAGER is a new and important development in the heat treatment field in temperature control, temperature recording and system management. Thermal Hire has now had twenty years experience in the design and manufacture of reliable equipment for electrical resistance and gas-fired heating. This product brings a radical new dimension to the practice of electrical resistance heating and embraces not only temperature control but also addresses other aspects of improving heat treatment practice by the introduction of failure alarms and external communication. It is a multi-language system.

The special features of the Heat Manager are identified below.

KEY FEATURES OF THE HEAT MANAGER

- Like most automatic temperature controllers, it is possible to pre-set the familiar heat treatment parameters such as heating/cooling rates, hold time and temperatures for multi segments. The Unit permits this to be undertaken by touch screen for up to six routines, all of which can be common or independent. Separate routines are therefore possible for individual channels of control. The Thermal Hire Heat Manager has an ideal screen size of 190mm (7.5").

- It is possible to store more than 100 separate heat treatment routines with up to 16 programme steps. Once stored, the routines may be recalled so reducing programming time and the risk of error. Heat treatment profiles can also be exchanged, copied and modified.

- The unit provides protection against the incorrect polarity connection of thermocouple conductor wires. It also detects any breaks in the thermocouple conductors or hot junction. The circuitry is designed to have powerful immunity to noise – important for the low voltages generated by thermocouples.

- The unit can be fitted with a special filter as protection of the unit when spark discharge welding of thermocouples.

- Alarms for a variety of conditions, including circuit current measurement are an integral part of the design. The communication of alarm conditions is possible by direct audible means, SMS and e-mail.

- Time-temperature data and charts may be stored on USB, network or securely with the on-line DataServer together with other important process information. Internal data storage is sufficient for a 25-year span on the basis of 1-minute interval recording.

- The unit is compatible with standard input thermocouple types as well as with infrared temperature measurement devices. The camera may be placed up to 1000 m away from the unit.

The Heat Manager

- Each control channel can be used in several ways –
    - As a as a basic programmer
    - As a slave channel to another channel
    - As a set-point controller
    - Manual control
    - For data record (measurement) only

- The data recording and storage function provides the opportunity to relay temperature data during and after a heat treatment operation. This offers the opportunity to undertake temperature record and dissemination of the data as a paperless and efficient option.

- The Heat Manager is available as an integral part of the proven Thermal Hire 6-channel heat treatment transformer unit, so reducing the number of connections between the items of equipment.

    Alternatively, it is available as a standalone desktop unit, which can be connected externally to the Thermal Hire proven 6-channel heat treatment transformer units.

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INTEGRAL TRANSFORMER UNIT

The Heat Manager is available as an integrated unit, based on the Thermal Hire 50 or 65 kVA heat treatment transformers proven in the field over 25 years. These robust units are constructed to provide power to electrical resistance heaters at a safe 65V, suitable for site and shop working.

The output from the unit is split into six individual heating circuits for temperature control. Each output circuit has 8.3 kW of power, which is sufficient capacity for three standard ceramic pads rated at 2.7 kW and connected in parallel. This is ideal for incorporating the singular control and management features of the Heat Manager.

The Heat Manager provides full control possibilities of the heat treatment processes and also offers options for the detection of heater failure by current measurement, detection for thermocouple failure or incorrect connection as well as the means for paperless temperature recording that starts and stops automatically. Of course the integrated unit has the clear advantage of eliminating the need for external connections with the Heat Manager module.

Integrated Heat Treatment Transformer

Desktop Unit

STAND ALONE DESKTOP UNIT

The Heat Manager is also available as a Desktop Unit that may be connected externally to the standard 50kVA or 65kVA 6-channel heat treatment transformer units. Individual connections are therefore required between the transformer unit for each control channel and thermocouple and for the electrical supply. It does, however, increase the amount of flexibility in use.

- The construction of the unit is robust, being housed in a lightweight a lightweight red powder-coated textured Zintex steel or a type 316 stainless steel protective casing.

- By virtue of the construction, the unit can be readily accessed to provide good access for maintenance.

- The design permits storage and transportation in all positions without damage to the power and control connections or to the screen. There are top and front protection bars for easy transportation.

- The rubber feet allow firm and secure placement on the heat treatment unit or working surface.

- The unit can be plugged directly into the rear of the standard heat treatment transformers.

- The desktop unit provides flexibility in use - for example, when used for control and recording of gas heating systems.

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BUILT-IN RECORDER & ALARM FUNCTIONS

No independent temperature-recording instrument is required when using the Heat Manager system. The unit already has this function, which starts automatically and stops when the temperature falls below a selected value. This facility permits paperless temperature recording and minimises the number of thermocouple parallel connections from instrument to instrument. The same thermocouple is used both for control and temperature recording.

The trend charts, which can be used for control purposes, can also be printed directly from the USB interface or saved in MS Excel format for processing. It is also possible to communicate through the Internet in real time through the LogOnline web site as a heat treatment progresses.

The recording interval can be set from 1 to 3600 seconds. Temperature settings can be in °C or °F for types K or S thermocouples.

Calibration data is automatically stored.

SAVE TIME PROGRAMMING

The Heat Manager loads, saves and stores heat treatment time-temperature profiles on command. This provides for error-free selection of a desired profile for future use – it can be reloaded in seconds. Any stored programme can be repeated on command. Automatic assistance is available at setup if this is required.

A separate profile can be stored for individual channels or one profile can be selected for all channels. Any combination of these alternatives is possible. Profiles can be changed whilst running.

When in operation, a programme will go into a 'hold' condition when any channel temperature is outside the set band. This can be enabled/disabled in any programme step. Manual holding is also possible. Up to 100 programmes can be stored using the USB port.

UNIVERSAL INPUT AND OUTPUT

The input of temperature data is possible for types K and S standard thermocouple conductor wires. It is also possible to connect non-contact infrared cameras for measurement from a radiant heat source. The used current loop of 4-20 mA permits a camera to be placed up to 1000 metres from the base station.

The outputs can readily be configured, both actively and passively, in a format to that is compatible with all known software that is available on the market, such as Microsoft Excel etc.
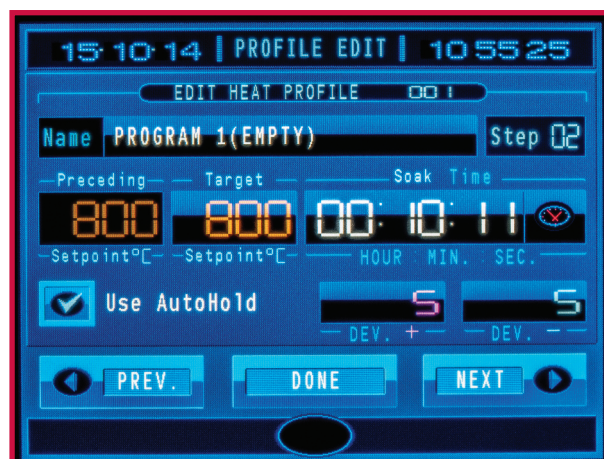
On-Screen Chart & Data

SYSTEM CONNECTIVITY

Heat Manager allows an external interface in a number of ways:

The **WiFi** or **Ethernet** cabled network gives the Heat Manager with connection to any remote PC, server or laptop. An HASP administrator package allows for multiple units to be remotely operated and monitored. This will generate features such as real-time data-acquisition, trend chart export, configuration tools.

A **modem** will give remote wireless connection to the available and secure LogOnline data server. Using the GSM/GPRS network, this provides global coverage.

The **USB** port accepts memory sticks for direct use and also the facility for compatible inkjet or laser printers.

Pincode protection with 4 levels is available in order to prevent unauthorised operation of the Heat Manager.

THERMOCOUPLE FAULTS

Heat Manager detects incorrect polarity thermocouple connection. The incorrectly wired channel is identified and provides an alarm for the heat treatment operative while deenergising the circuit. When the Heat Manager detects a break in the thermocouple circuit, the system can be pre-set to give rise to an audible alarm, screen message or e-mail/SMS to suit the system.

The start of a heat treatment operation is automatically prevented when a thermocouple fault is detected.

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EASY MODE OF PROGRAMMING

Only one simple time-temperature profile, from the main menu, all that is necessary is to set the profile or click on one pre-set programme and five slave channels to follow the a set programme. If a new programme is set, set 'STORE' and then 'OPERATION'.

To run the programme, press 'run programme' for 2 seconds. To obtain a digital display for channels 1-6 go again to the main menu - 'PROFILE SET' – channel number – 'OPERATION'.

Limits can be set also from the main menu and 'LIMITS SET'. This must be done before running the programme.

Temperature History is easily accessed from the main menu by pressing the 'HISTORY' button then 'TREND' 1-6.

ADVANCE MODE OF PROGRAMMING

This has access to 100 previously stored profiles. The advance mode can be accessed from the main menu through 'SETTINGS' – 'SYSTEM' – 'GENERAL' – then switch to advanced.

From 'PROFILE SET', select a programme and tailor it to the requirement and add the details of the work in hand. Set the channel functions as for the easy mode, select the profile, store it and return to operations.

Limits can be set and temperature history accessed in the same way as for the Easy Mode.

The programme can be adjusted whilst running by returning and adjusting the 'PROFILE SET' and 'CHANNEL SET' procedures from the main menu.
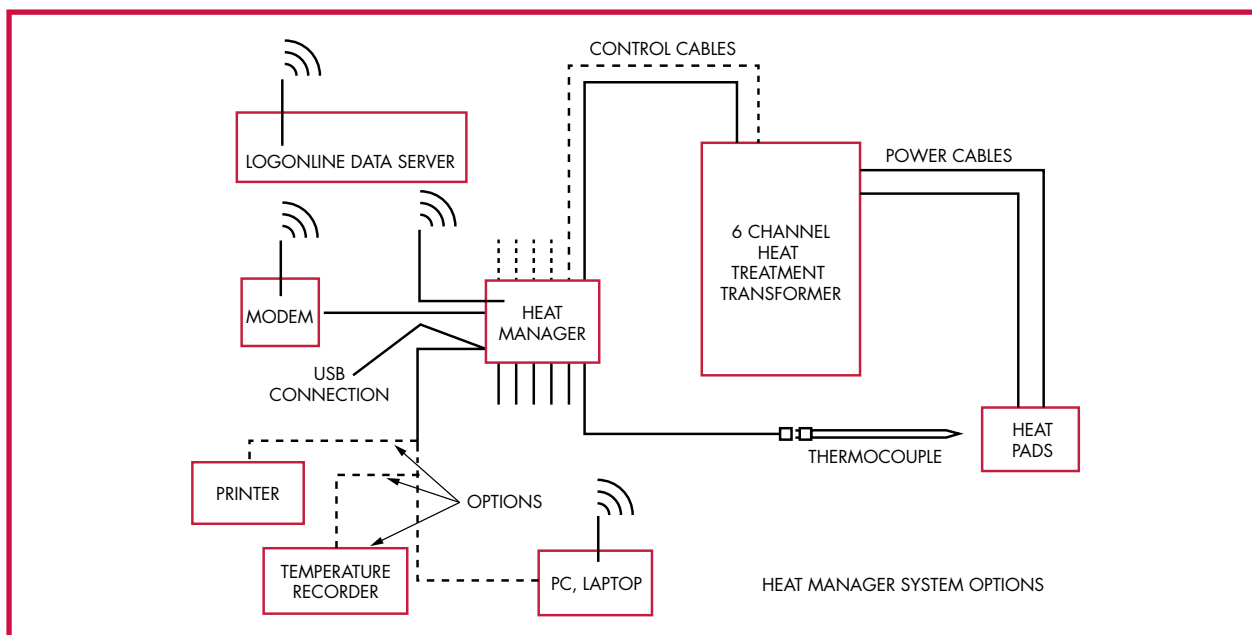
SPECIFICATION

Dimensions	68cmWx70.5cmDx107cmH
Weight	50 kVA at 312 kg / 65 kVA at 404 kg
Screen Size	190mm (7.5")
Programmers	6 combined or independent
Thyristor power control	Optional; heater protection
Burner control	4-20mA optional output
Storage	100 profiles
Temperature	°C or °F

Thermocouple	Type K or S
Data logging	Multiple profiles
Recording	Paperless option
Wi-Fi	Optional
Storage process data	Included
LogOnline	Optional
Language	English/Dutch/German; others optional