

# Injection moulding: total control at your fingertips

## Touch-screen for convenient hot-runner control

The HRC 800 hot-runner control system from PMA in Kassel, Germany, features several new functions that have been developed especially for demanding, continuous operation, and fast mould changes during every-day running. The system consists of the well-proven KS 800 multi-controller modules linked to an industrial PC with a convenient touch-screen for intuitive operation. Installed in a robust, mobile housing, the HRC 800 provides a practical solution for use with complex moulds that can have up to 160 zones for hot runners and manifold blocks. The operator is supported by innovative process graphics and a novel design for operational screen displays, with clear visualization and fast access via simple touch-screen control.

### Stand-alone multi-controller with a reliable heart: KS 800

The main features of the multi-controller KS 800 are its eight independent loop controllers in a particularly compact module, and robust control algorithms developed by PMA.

For day-to-day operation, the rapid automatic adaptation of control parameters during start-up with a new mould is an important function. Also with very fast heating cartridges, PMA's long experience with adaptive multi-controllers enables the loop characteristics to be determined reliably, with the interaction of neighbouring zones taken into account by means of zone blocks. Also worthy of mention is the fully automatic comparison with the set-point value, whereby the parameters

are checked for excessive deviations from the process value, but without interfering with the process. The defined values are subsequently stored, with a reference to the relevant mould.

Additional standard features are:

- Intelligent start-up function for careful drying of high-power heating cartridges.
- Controlled warm-up to ensure even heating (mechanical expansion), particularly with large molds

- "Boost function" by means of a brief increase in temperature to clear any blocked runners, e.g. after a break in production.
- Differentiated set-point lowering keeps manifold blocks and runners at an optimum standby temperature, to ensure a quick re-start.
- Built-in heating current monitors detect actuator faults or defective heating cartridges.

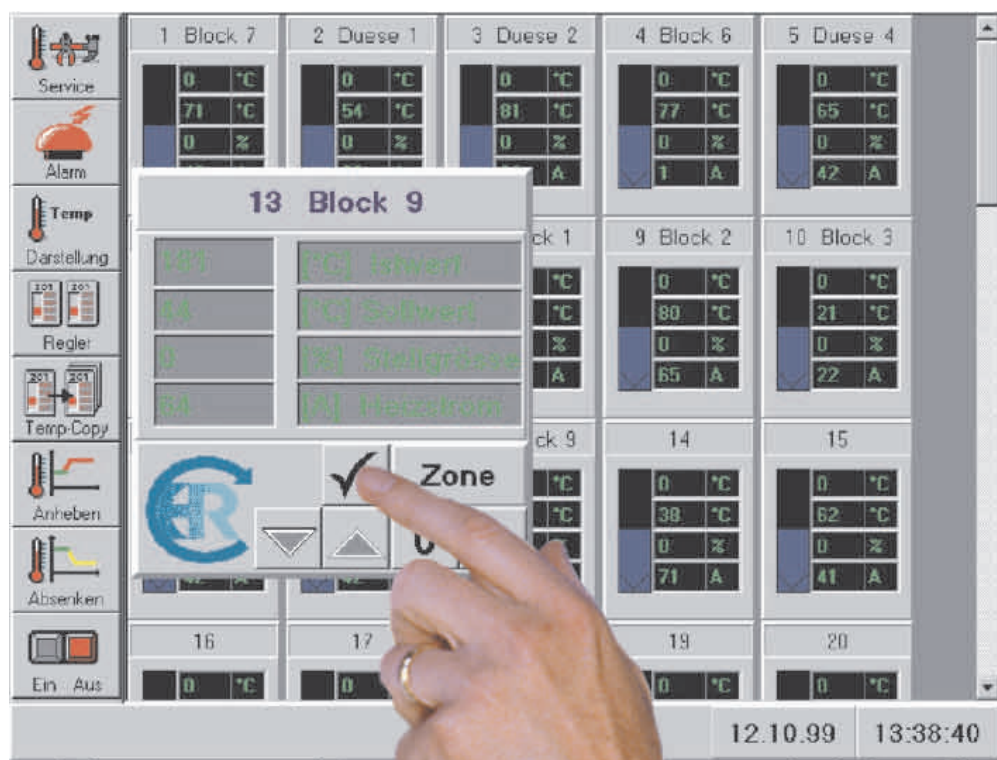


Fig. 1: Fingertip control: fast access and a clear overview

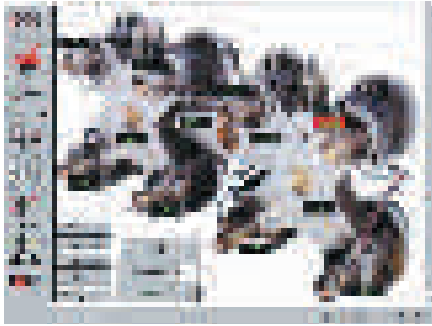


Fig. 3: Mould zones are visualised in their true locations using “drag and drop”



Fig. 4: HRC control cabinet

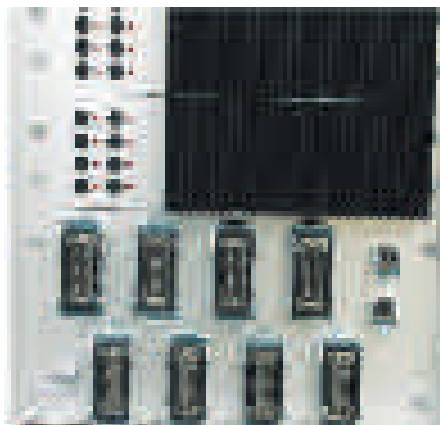


Fig. 5: Cable connections

- Intelligent input circuit monitoring with “output hold” function in case of a sensor fault.
- Quality monitoring by means of individually adjustable upper and lower limits for a tolerance band per zone, with alarm signaling.

### Operation made simple

The manufacturer has placed particular importance on large display characters and simple, clear graphics. The terminal can be used by an operator wearing gloves. To ensure that stray light and wide viewing angles have a minimum effect on readability a 14-inch TFT display was selected, which can be combined with an industrial PC.

The most significant operator features and benefits are summarised as:

- Intelligent mould diagnosis recognises wrongly connected sensors and heating cartridges after a mould change.
- Fast and clear overview. All the zones are displayed on one side, with colour changes to indicate control deviations or faults.
- All the details of a zone under fingertip control, with the proven, convenient “3-key operation” as used in PMA’s KS 50 single-loop controller.
- Using “drag and drop” the individual zones (cartridges, nozzles, blocks) can be moved to their correct positions on a photo of the mould, making it quick and easy to localise and define a fault as, for example, “third from top left”!
- Alarm logbook with alarm type, date and time.
- Graphic trend-display of the control parameter deviations by zone.
- Storage of messages or details of corrective measures in plain text: for this, an alpha keyboard (even in foreign languages) is displayed on-screen. Network connections: CANopen field bus port is fitted as standard for hook-up to an automation cell (i.e. injection moulder). Ethernet and TCP/IP are also available using PC technology and standard Windows software, allowing complete integration into

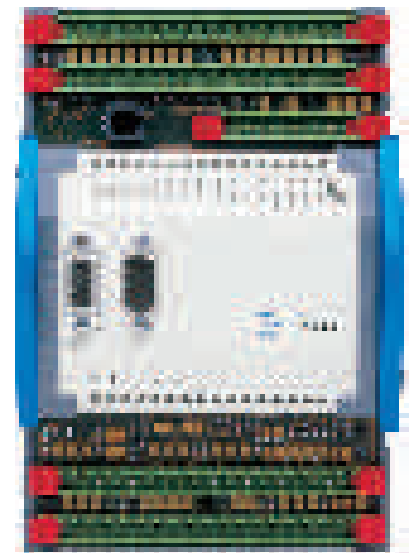
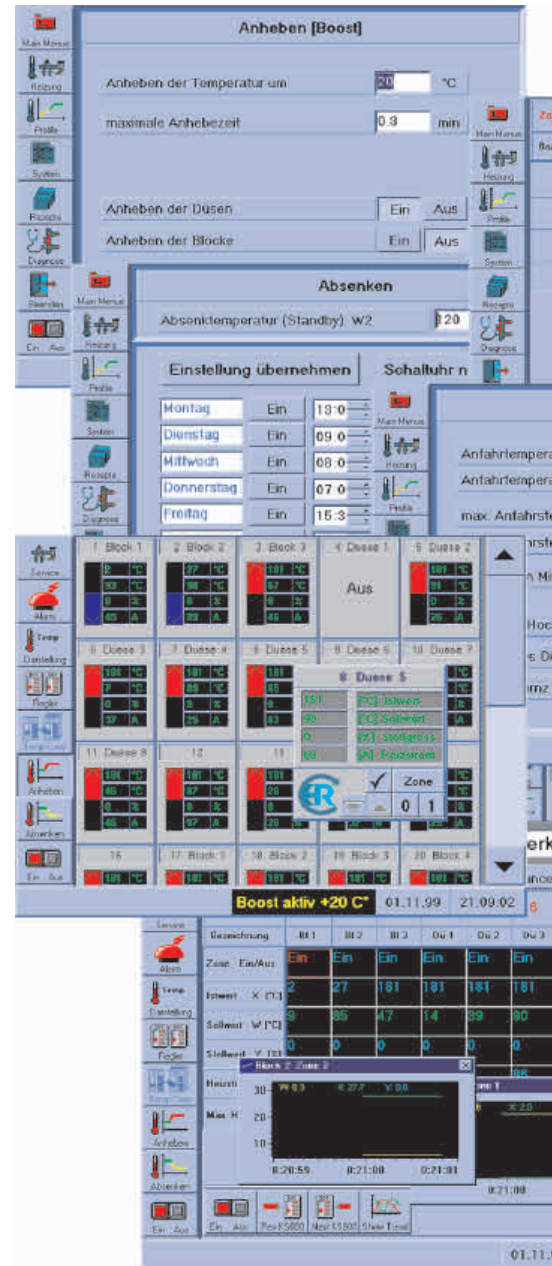
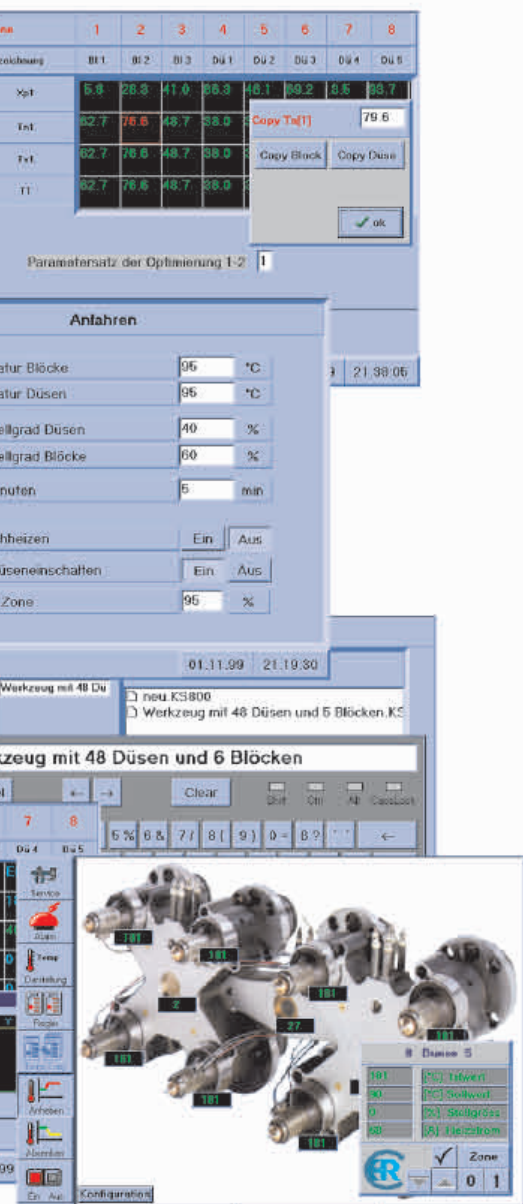


Fig. 6: KS 800 multi-controller module with 8 control loops, the heart of the HRC 800

Fig. 2: All information is presented conveniently on just a few display pages



HRC 800 to be positioned in the most suitable position close to the machine. Fast-acting safety cutouts permit a rapid restart after a short circuit has been rectified. The DIN “top-hat” rail mounting and the compact KS 800 modules ensure optimum use of space, and future extensions for up to 160 zones.

All the special features of the HRC 800 – intelligent start-up func-

tion, operator messages in plain text, automatic self-tuning – are designed to contribute to an extended working life of the heating elements, a reduction in downtime, plus faster commissioning and start-up. The HRC 800 is claimed to be an ideal device for the high-performance moulds used to make PET bottles.

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a production unit and the company intranet.

- Remote diagnosis: using a direct modem link, remote diagnosis and service can be carried out from the desk of the machine setter, the office of the mould supplier or by a system specialist; practically worldwide.

## Hard shell – intelligent core

Standard connector cables are plugged directly into the hot-runner mould. The easily maneuvered mobile housing with locking wheels and swing-out terminal allows the