BlowControl

pc based solution

Up-to-date electronic control

for blow moulding machines

precise
flexible
efficient

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BlowControl

pc based solution

Overview

- IPC-control based on Windows CE.NET
- Function independent hardware from Beckhoff
- Control CPU integrated in the operator panel
- Operator panel with touch screen
- Extremly fast fieldbus over EtherCAT for the connection of the I/O signals
- PLC software, technology software and visualisation software on one pc
- Beckhoff TwinCAT control software with hard realtime
- Saving data on compact–flash, usb-stick or network server
- Remote diagnostic over LAN (Internet) or modem

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Advantages at a glance

- **Realtime operating system of latest generation: Microsoft Windows CE.NET**
- **Function independent hardware, all software modules are installed in one CPU**
- **Powerfull IPC without fan and rotating storage drive**
- **Exchange of programs by storage card**
- **Operation without UPS, low power usage, low heat development**
- **Support of many fieldbus systems like Profibus, CANopen, DeviceNET, SERCOS and Lightbus**
- **Small measurements of the system require little space within the switchboard or terminal box**
- **User friendly and easy to handle operation on the screens**

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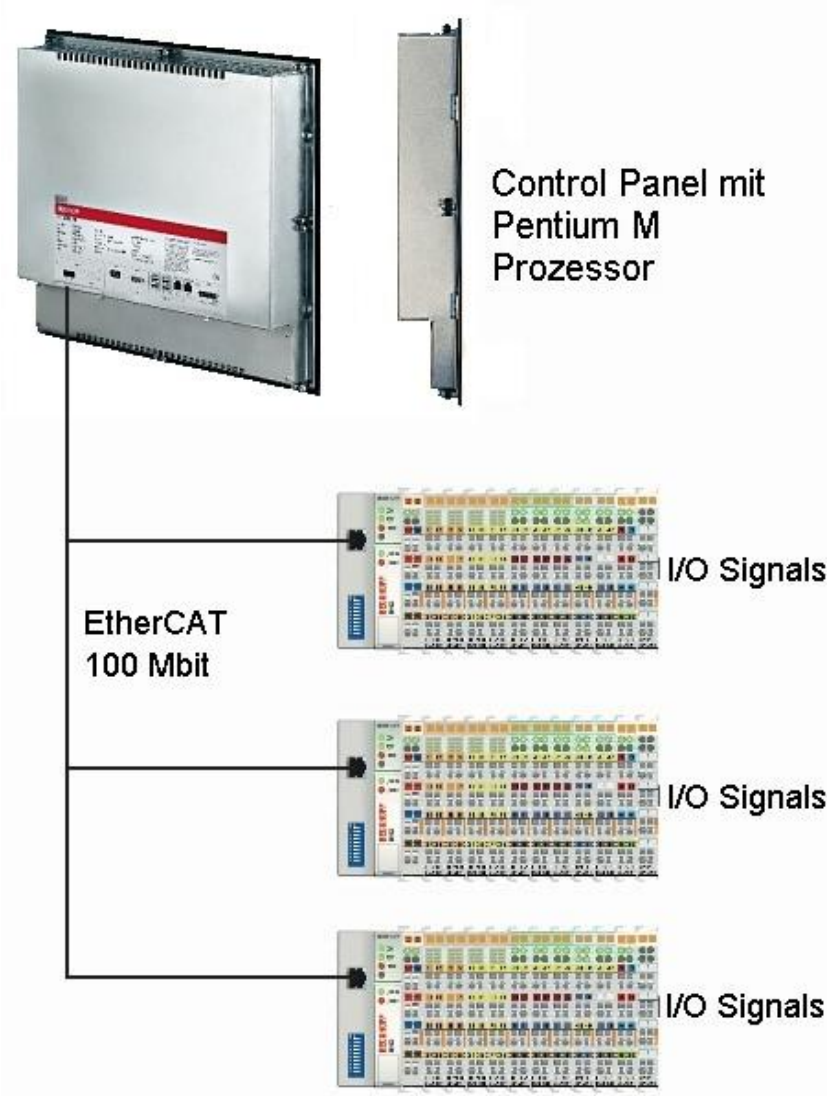
Concept of control



- In panel integrated IPC without fan and rotating storage drive
- Powerfull Pentium Processor
- 100MBit EtherCAT fieldbus for the connection of the I/Os
- Max. 100m distance between two I/O stations
- Optional fieldbus systems (Profibus, CAN-Open, Sercos, DeviceNET, SERCOS,…)
- USB interface (e.g. for USB-stick, additional keyboard, …)
- Network interface: 1GBit for the connection to a server
- Modem interface (RS232)

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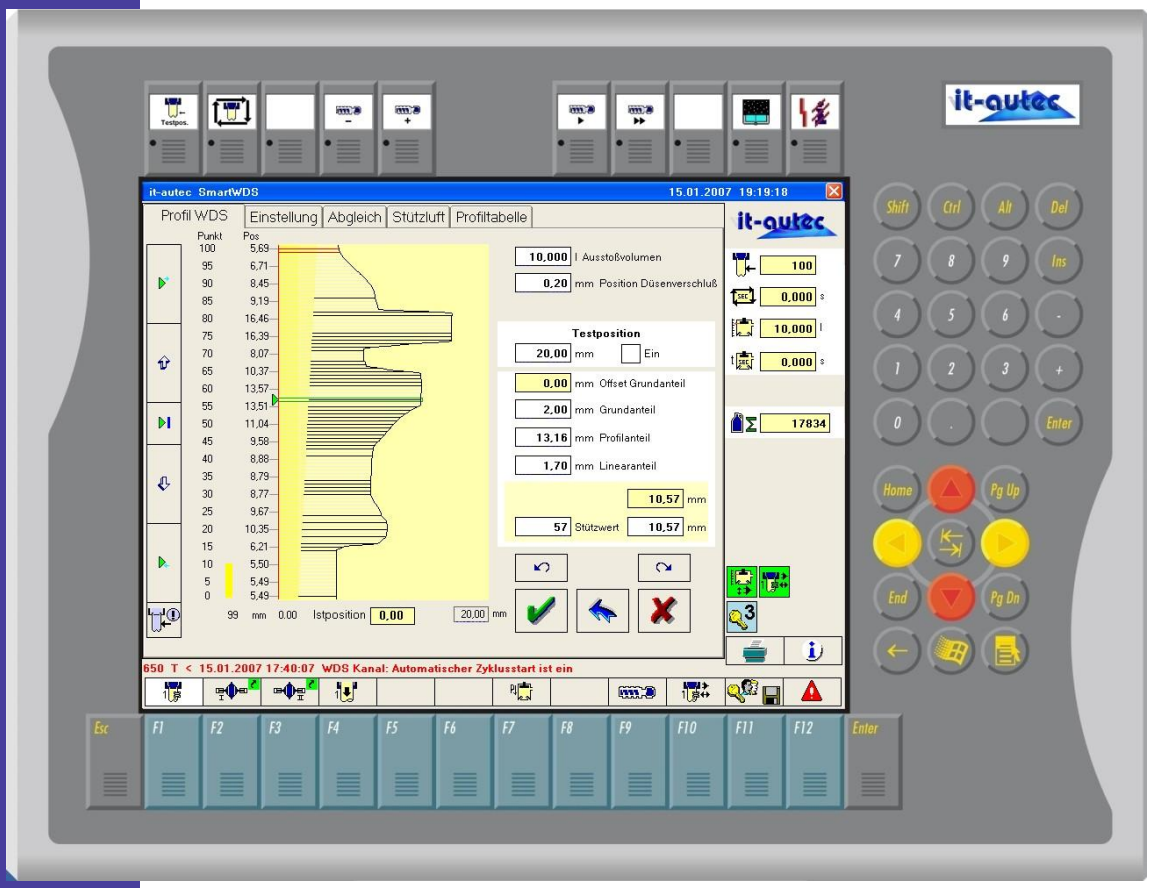
Operator panel



- 12 inch TFT display, resolution 800 x 600 pixel
- Touchscreen
- 12 function keys for screen selection
- Numerical keyboard for input of nominal values
- Cursorblock
- 10 PLC-keys with LED for activation of functions
- Installation in the wall of the switch board or hanging panel version
- Ethernet-interface 1GBit, USB-interface, RS232, DVI

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Function overview

Temperature control for extruder and head, 3- and 2 point controller, self tuning, heating power supervision	Wallthickness control up to 10 channels (hydraulic or electric control e.g. stepper or servo drive)	Accumulator head operation (constant ejection or profiled)
Extruder rpm control, synchronized adjustment when operating more than 1 extruder	Parison length control in case of continous extrusion	Filling level control and die adjustment during accumulator head operation
Distance cams for clamping unit, blowpin and mould transport	Motion control for hydraulic axis e.g.: Mould close and open, blowpin up and down, mould transport, core puller	Path-dependent switching to pressure control, position control, asynchronous mould closing , integrated scope function
Analog nominal values e.g.: blow pressure, support air, extruder lifting / lowering, core puller, …	Display of melt temperature, melt pressure, extruder speed, extruder torque	Monitoring of process parameters as e.g. melt temperature, melt pressure, cycle time, …
PLC – control – preselections, timers and counters shown on the display	Diagnostics, error message in plaintext and timestamp	Saving setting parameters on compact-flash, USB-stick or network server
Language and character set reversal for various languages	Access control via PIN-code, 3 user levels , optionally finger print system	Process data logging up to 120 values per cycle, logged internal for one week, optionally on network server, integrated chart

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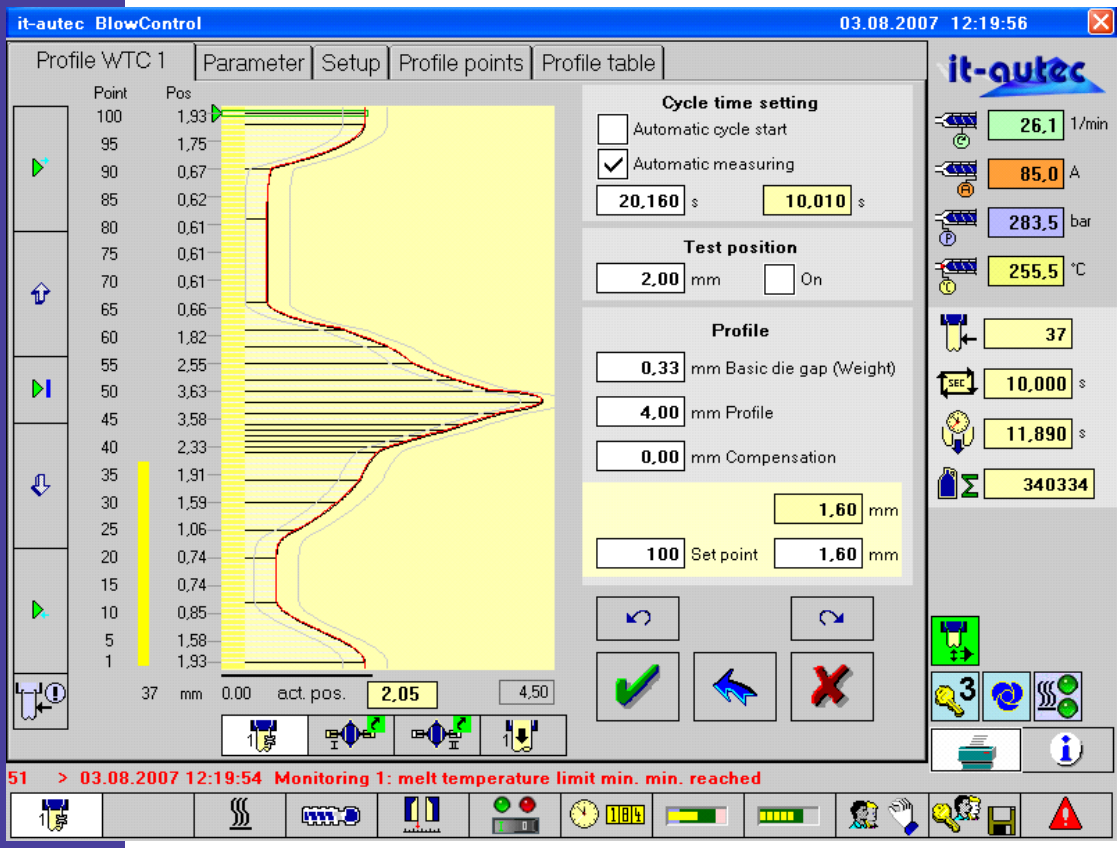
Wallthickness control



- Continuous or discontinuous extrusion
- 100 points or 400 points wallthickness profile
- Up to 10 channels synchron (wtc– pwtc – multiple extrusion head)
- 1 channel parison ejection
- Correction of parison elongation (linear proportion)
- Cycle time specification manually or automatically
- Path check marks (max. 2 at the same time) simply by setting of thick or thin places
- Test position
- Adjustable tolerance supervision of the actual value

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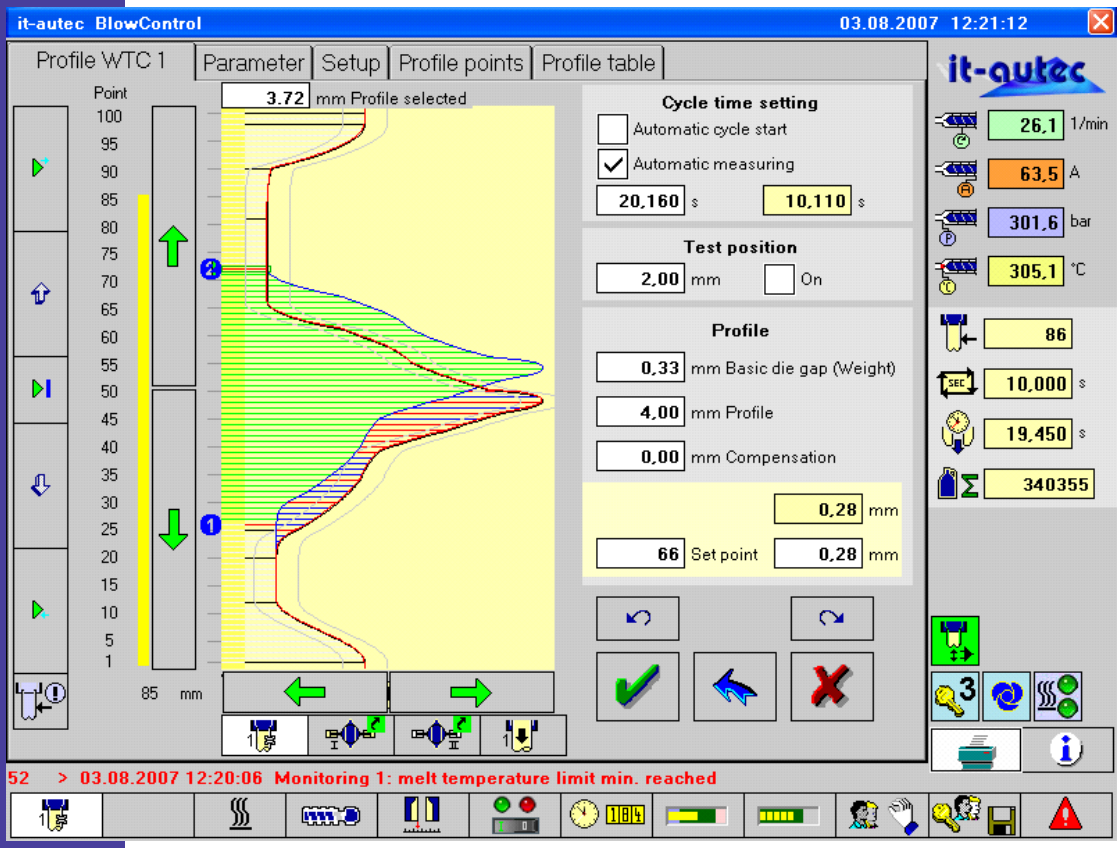
Wallthickness control



- Single points or curve segments can be vertically or horizontally scrolled
- The whole curve can be rotated
- Curve memory up to 10 curves per channel (UNDO-, REDO function)
- The profile part of a curve segment can be changed separately
- Automatically start cycle for setup and test

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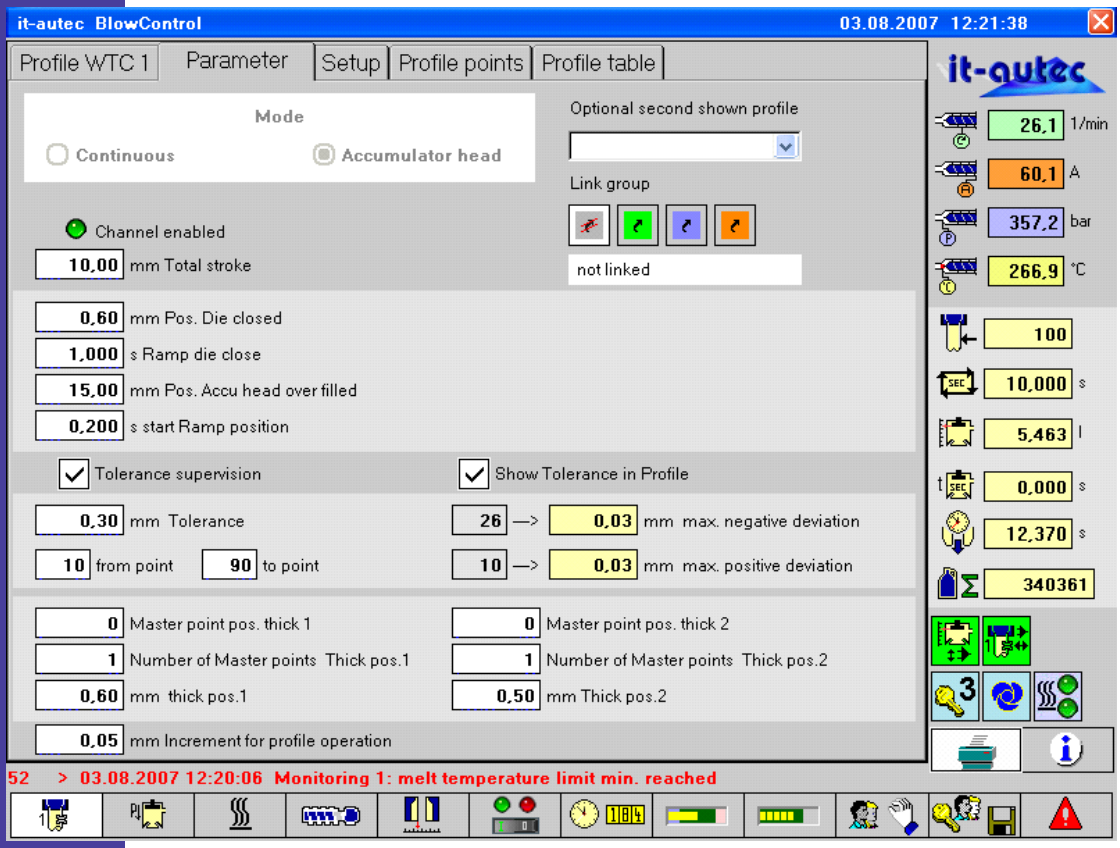
Wallthickness parameter



- Paramters are visible only for preselected functions
- Profiles can be linked together, i.e. one profile can be diverted to several channels
- Width and length of thick places can be preselected
- Increments of graphic curve adjustments can be adjusted in mm
- Tolerance supervision with monitoring of minimum and maximum deviation and appendant profile points

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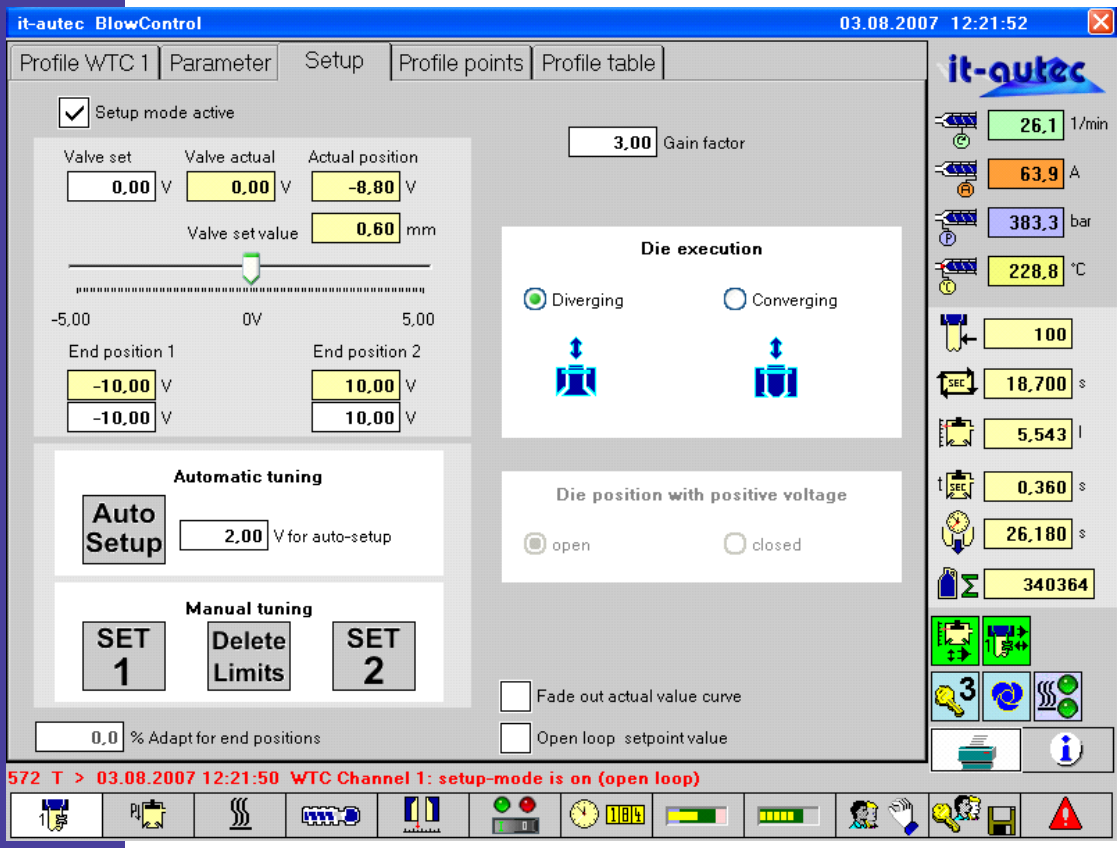
Wallthickness calibration



Automatic or manual calibration of the analog actual value transmitter (LVDT)

Identification of polarisation, i.e. actual- and nominal value have different directions

Distance form the mechanical stoppers can be adjusted

Switching of die geometrie (diverging, converging)

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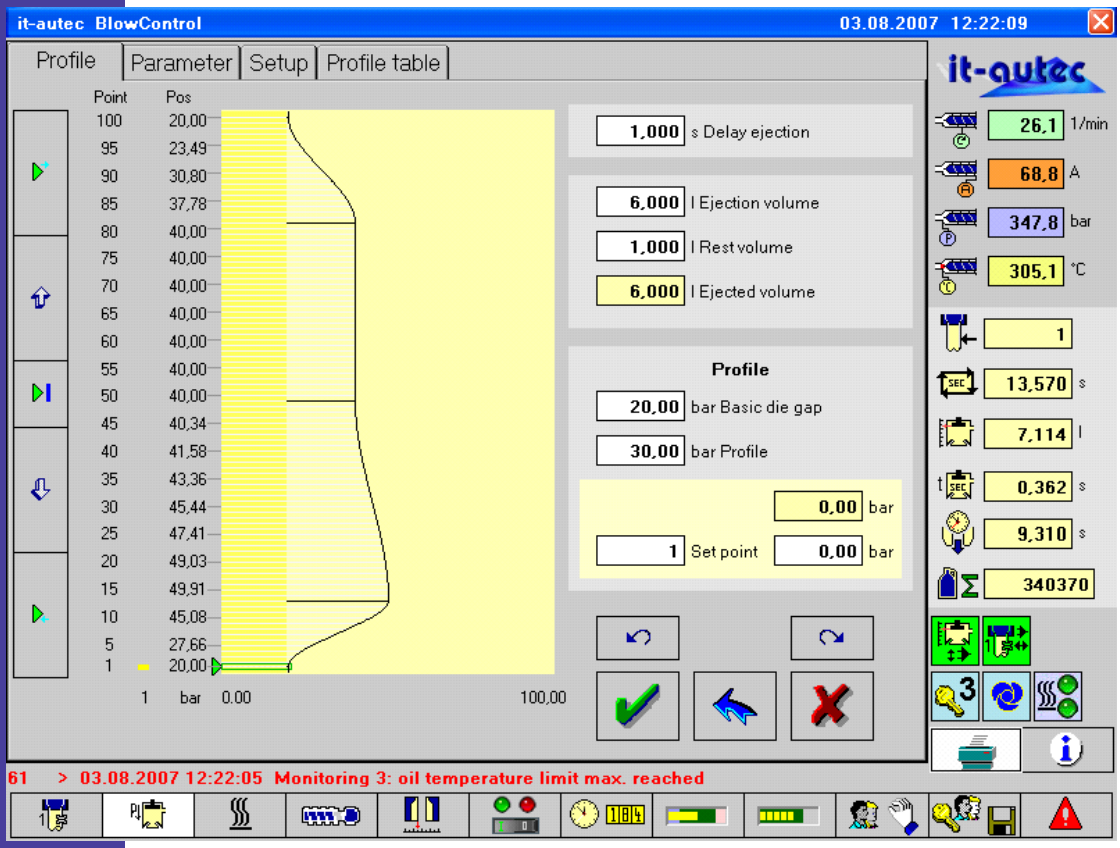
Accumulator head operation



Alternatively constant ejection or push out using printed profile

Sliding route synchronisation for ejection

Rest volume

Measuring and monitoring of ejection time

Filling pressure default for filling procedure

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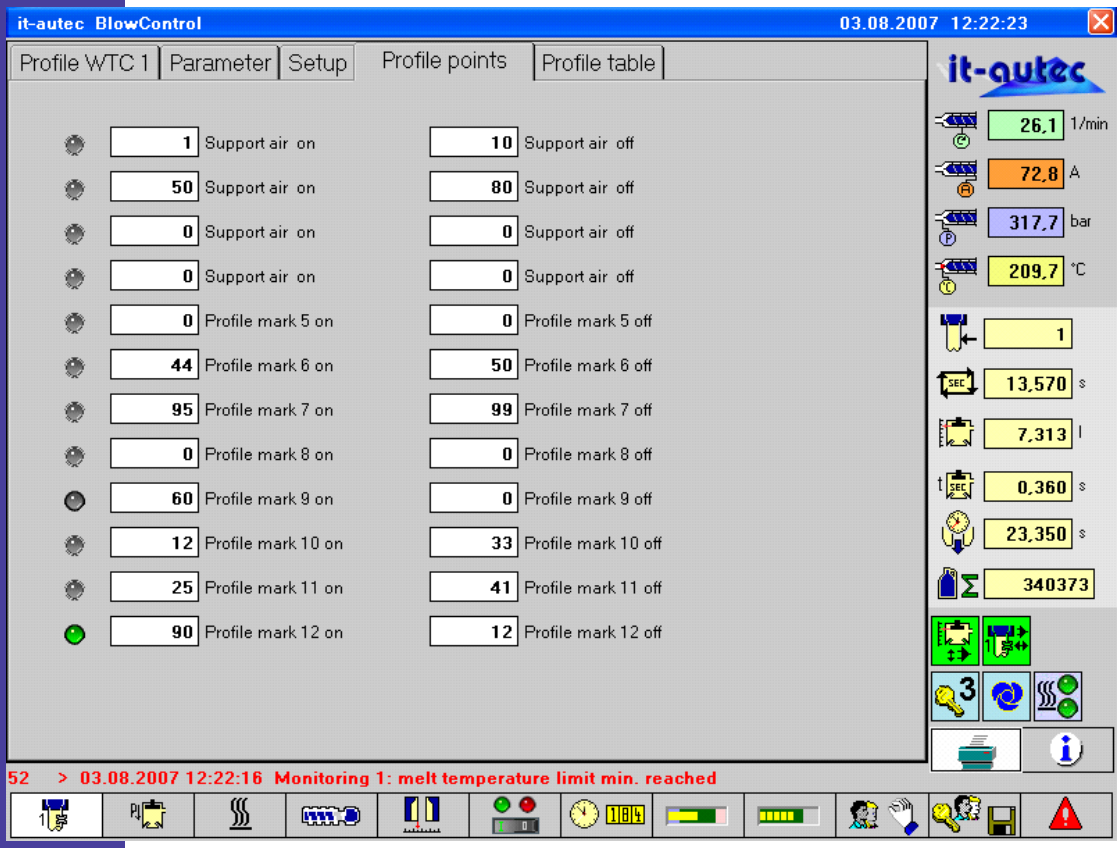
Profile marks parison



Up to 12 profile marks on the parison length

On- and off switchpoints separatly adjustable

Switchpoint also possible when exceeding the cycle (e.g. from point 80 up to point 20)

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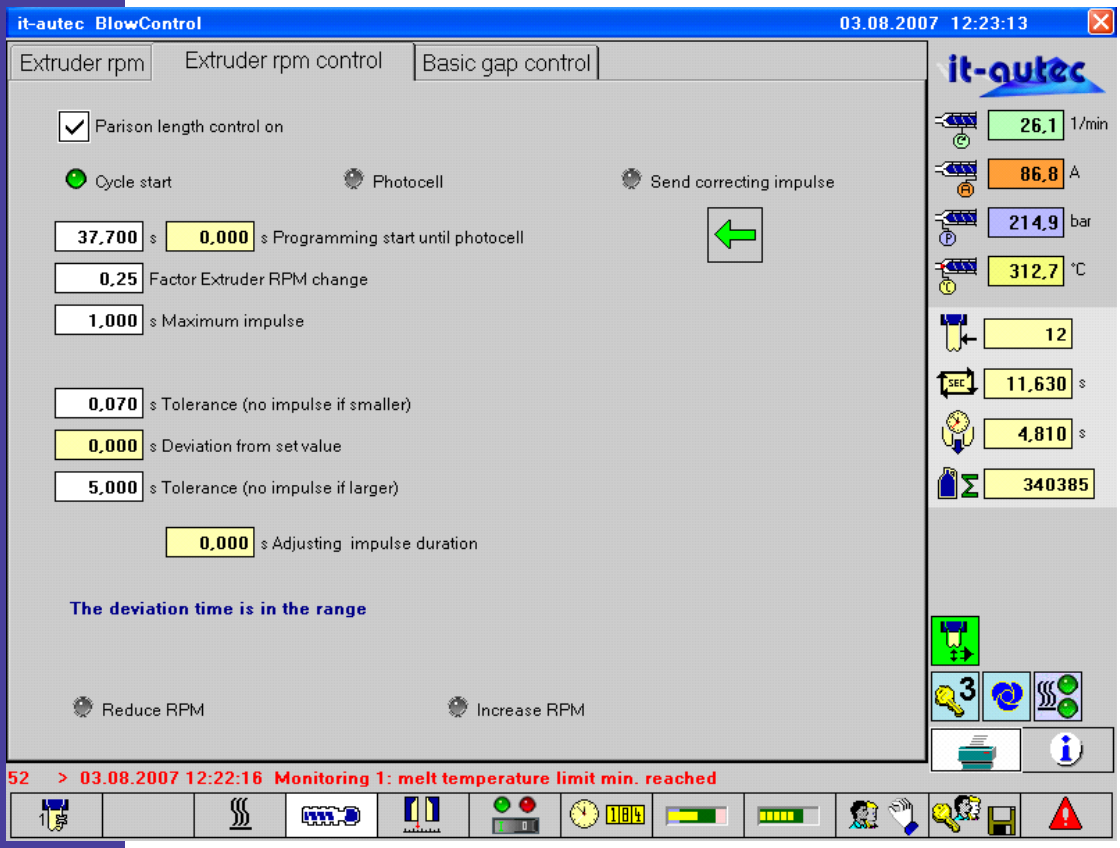
Extruder speed correction



Correction of extruder speed with signal photo cell in case of continuous process

Filling level control of accumulator head at discontinuous process

Control of parison length using a photo cell and die adjustment using accumulator head process

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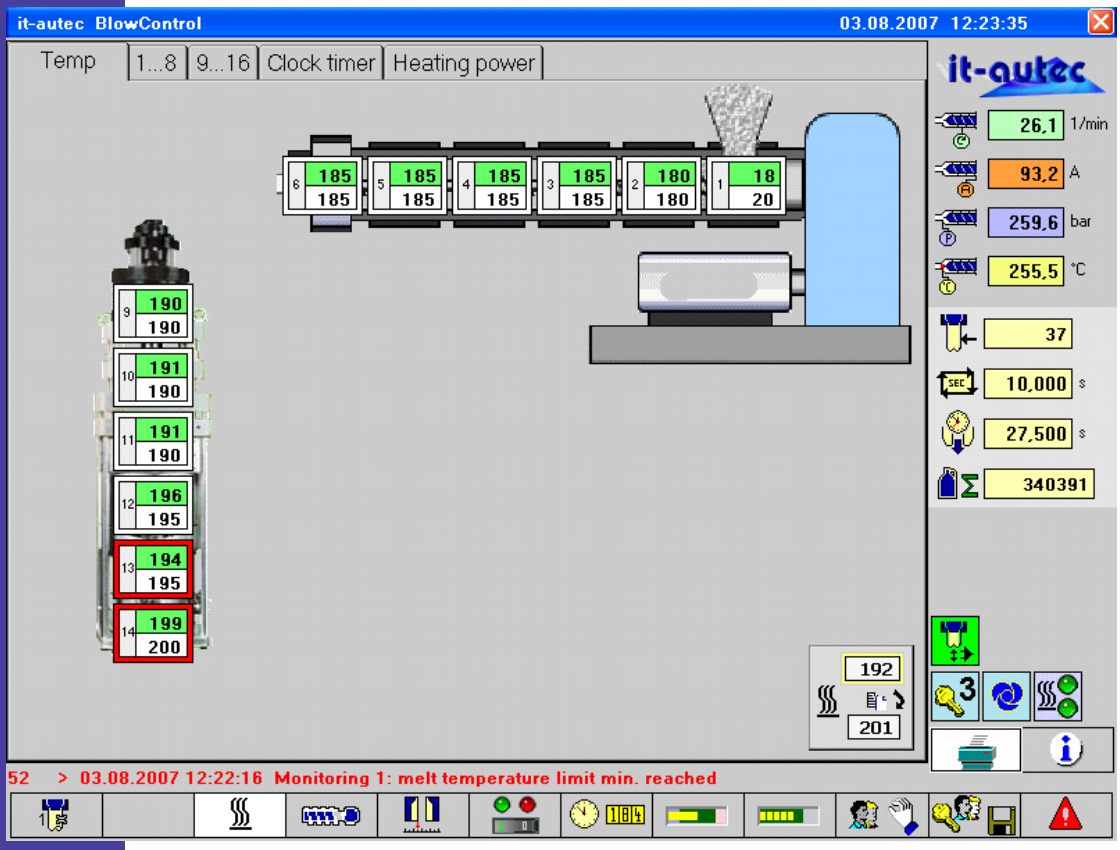
Temperature control



Summary page of temperature zones with operation of set point value display of:

- Zone number
- Operating condition (heating, cooling on or off)
- Actual and nominal value
- Tolerance control (excess –resp. Insufficient temperature)
- Thermocouple supervision
- Mode of operation (automatic or manual operation by manual setting)

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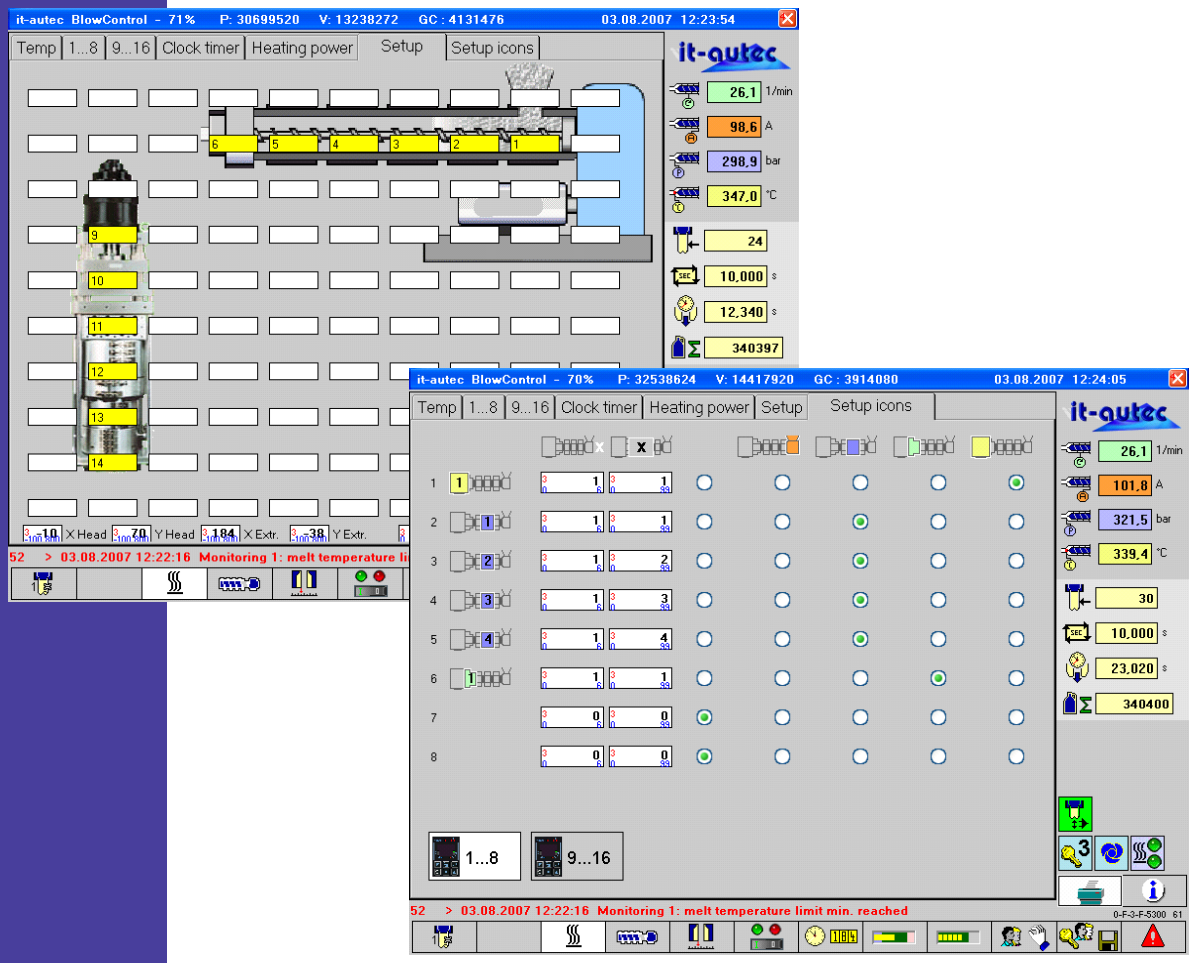
Temperature control



Configuration of the summary page of the temperature zones

Free choice of positioning of symbols for extruder and parison head

Free choice of accllocation of temperature zones to the symbols

The bitmap files for extruder and head are stored on the compact flash

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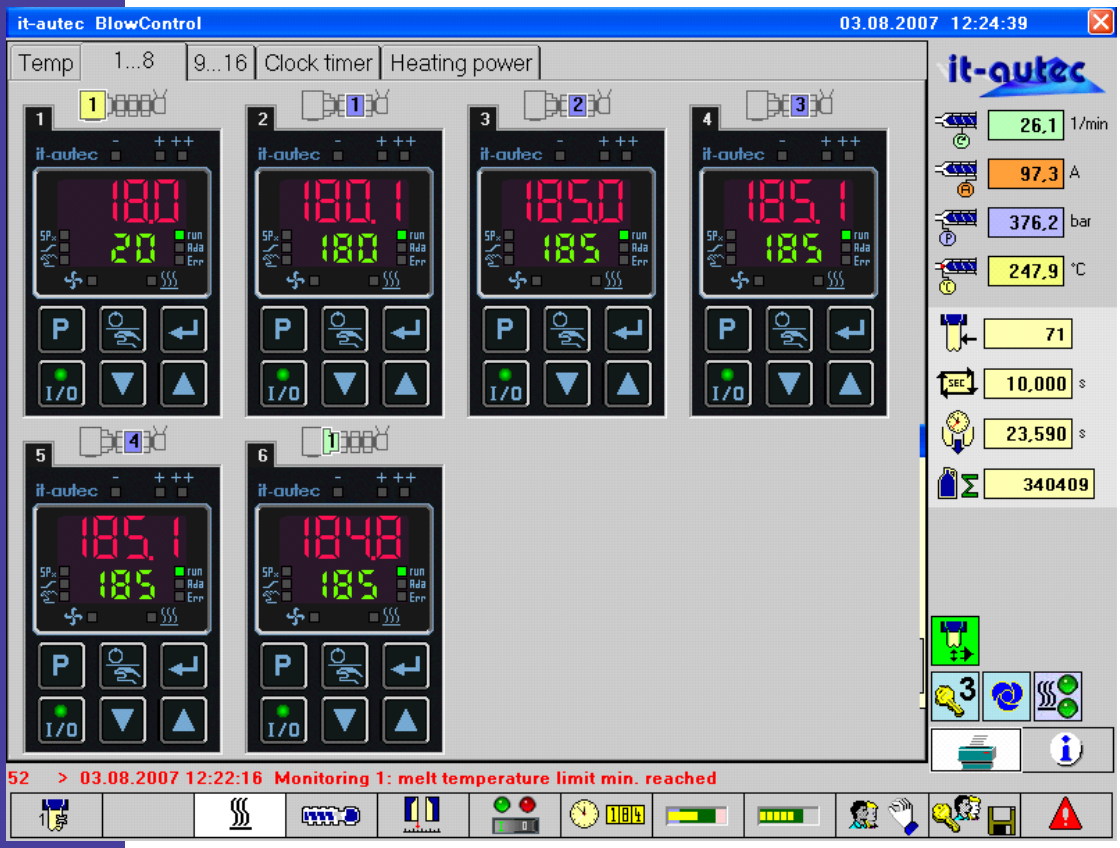
Temperature control



- Self tuning temperature controller
- Two- and three step controller (pulse width modulated)
- Nominal value-, lowered nominal value
- Manual mode via manual set value
- Tolerance supervision
- Absolute value supervision
- Thermocouple supervision

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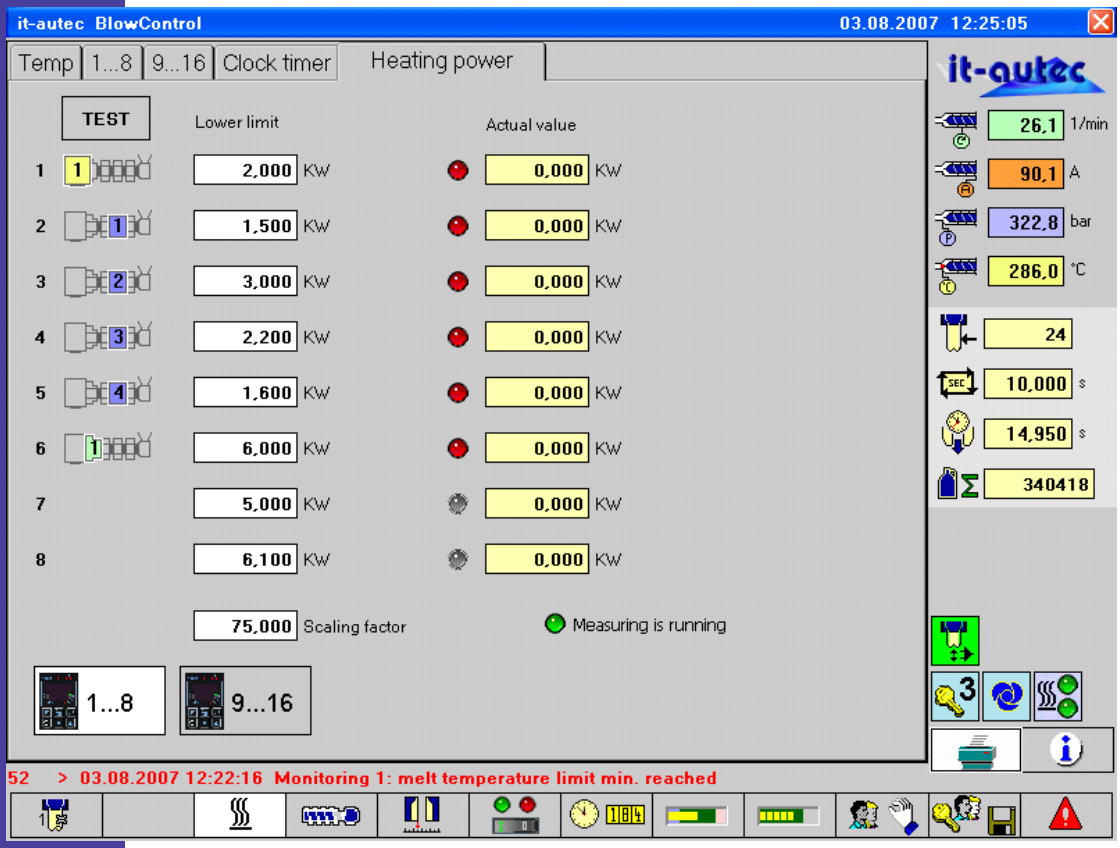
Heating power



Supervision of the heating power

Display of the heating power per zone

Test mode

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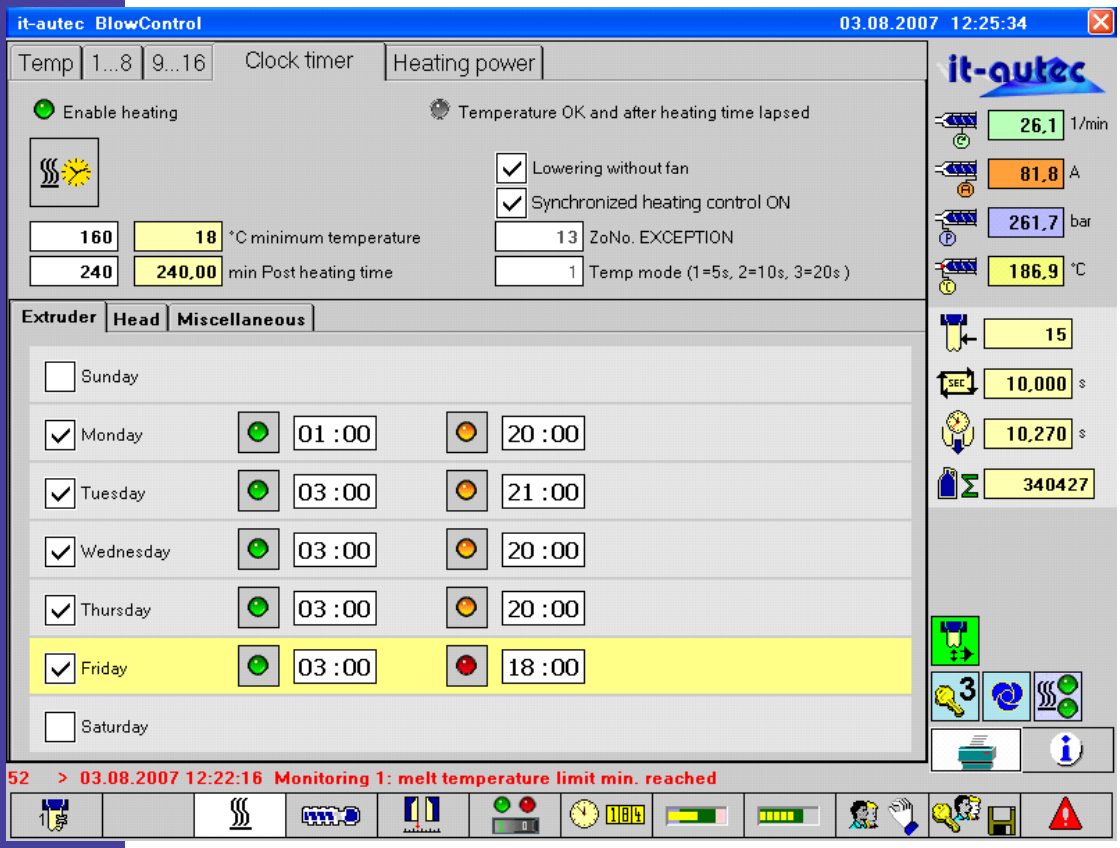
Clock timer



- Alternately one or three clock timer for one week
- Post heating time and minimum temperature to provent cold starts
- Lowering temperature without fans
- Synchonous heaating up of the temperature zones
- Adjustable controller cycle time to prevent mechanical contactors

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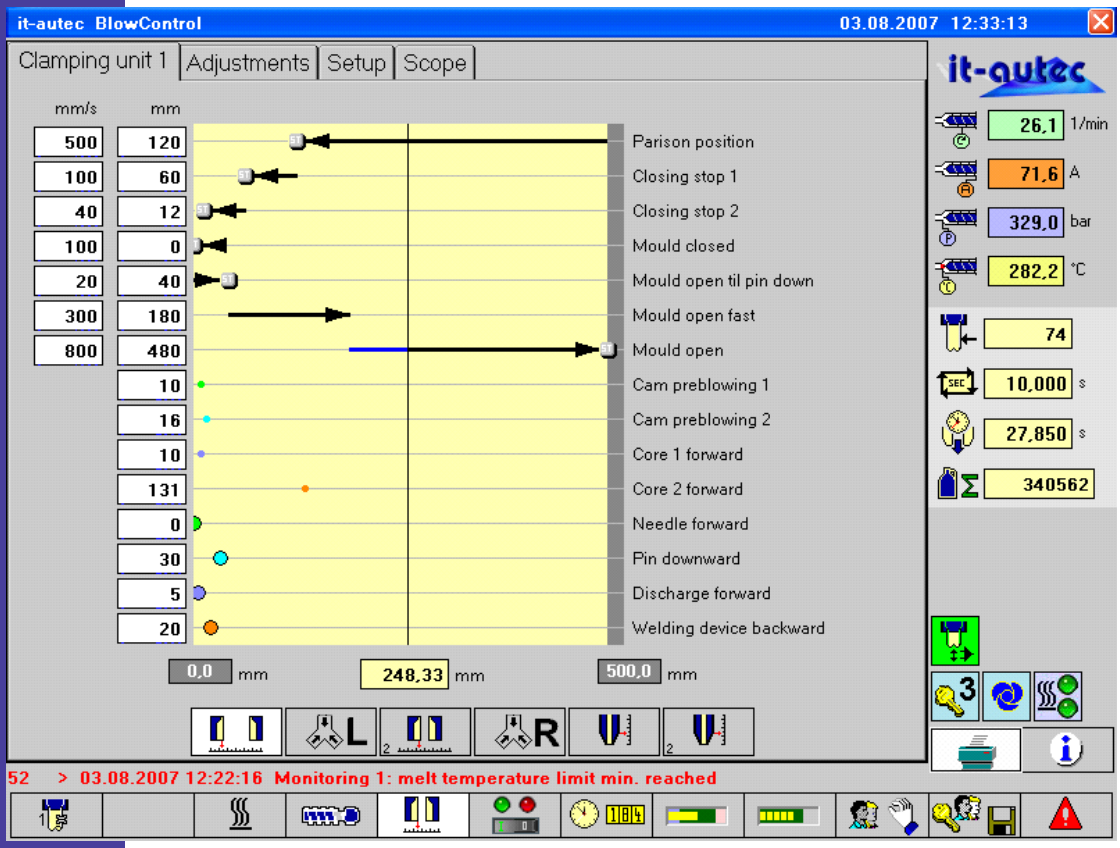
Motion control



- Up to 16 channels motion control e.g. for mould open/close, blowpin up/down, mould transport, core puller, article discharge, …
- Up to 8 speed reshift, movement arrows can be adjustetd independant by direction
- Up to 8 cams for route dependant control of machine functions
- A stop can be parameterised for each movement arrow
- Controlled setpoint at the final psoitions can be parameterised
- Closed loop linear pressure acceleration in the final positions
- Path dependant switching to closed loop pressure control

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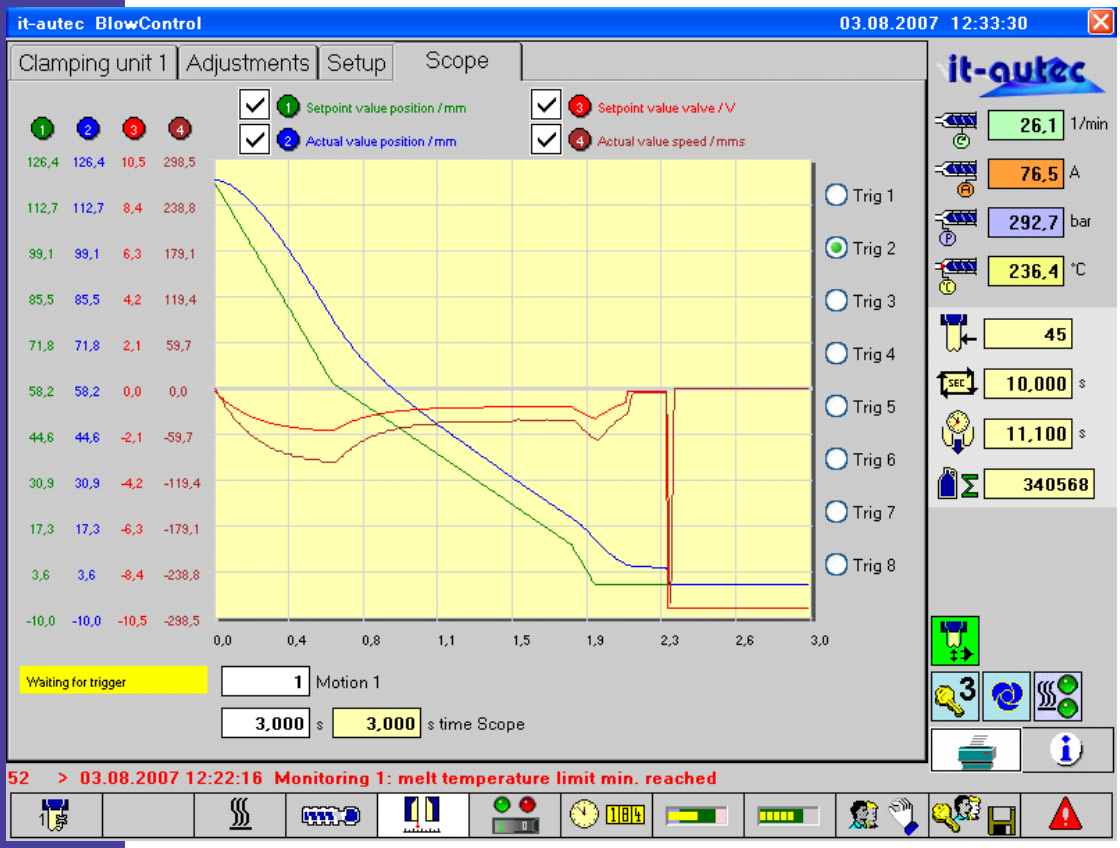
Scope function



Scope funtions for aid to set up the motion control axis

Measurement of path in (actual and nominal value), actual speed in mm/s and valve output in V

Trigger point adjustable for each movement arrow

Time of measurement adjustable

Automatically scaling of measured values

Not used values can be hide out

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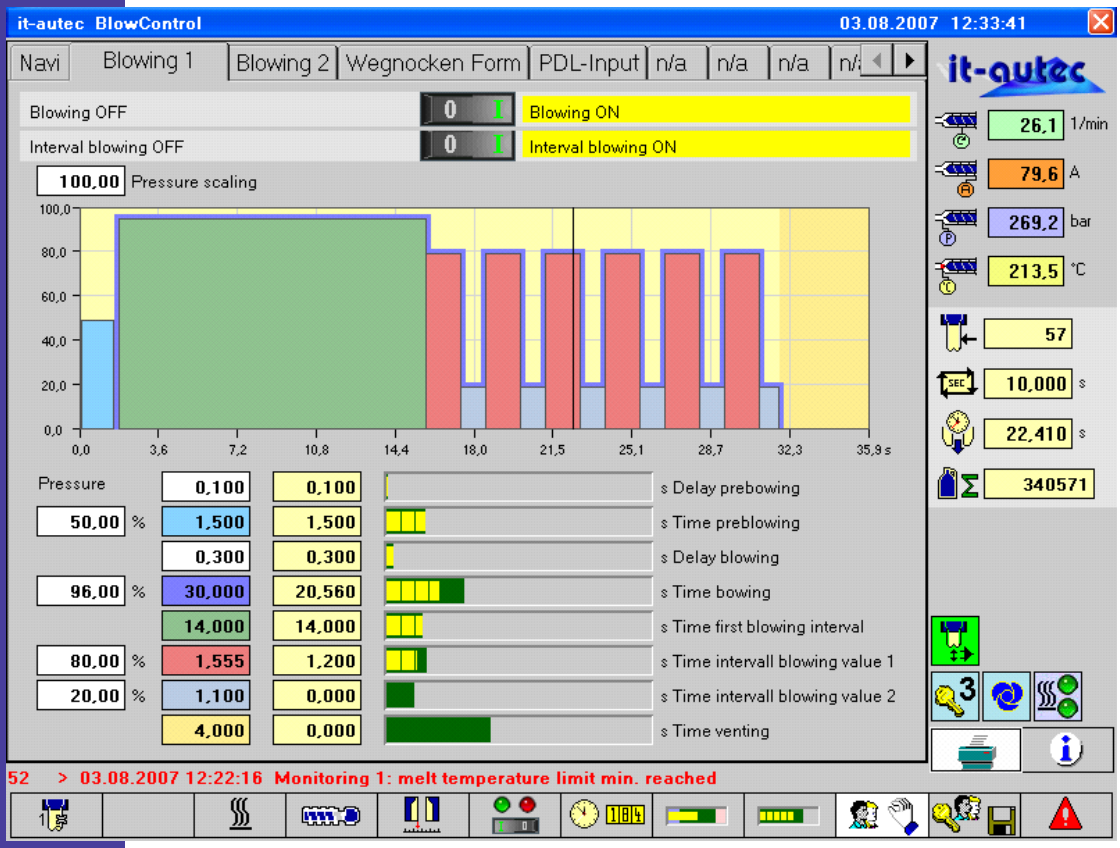
Proportional blowing



Display of blowing devolution in a diagram

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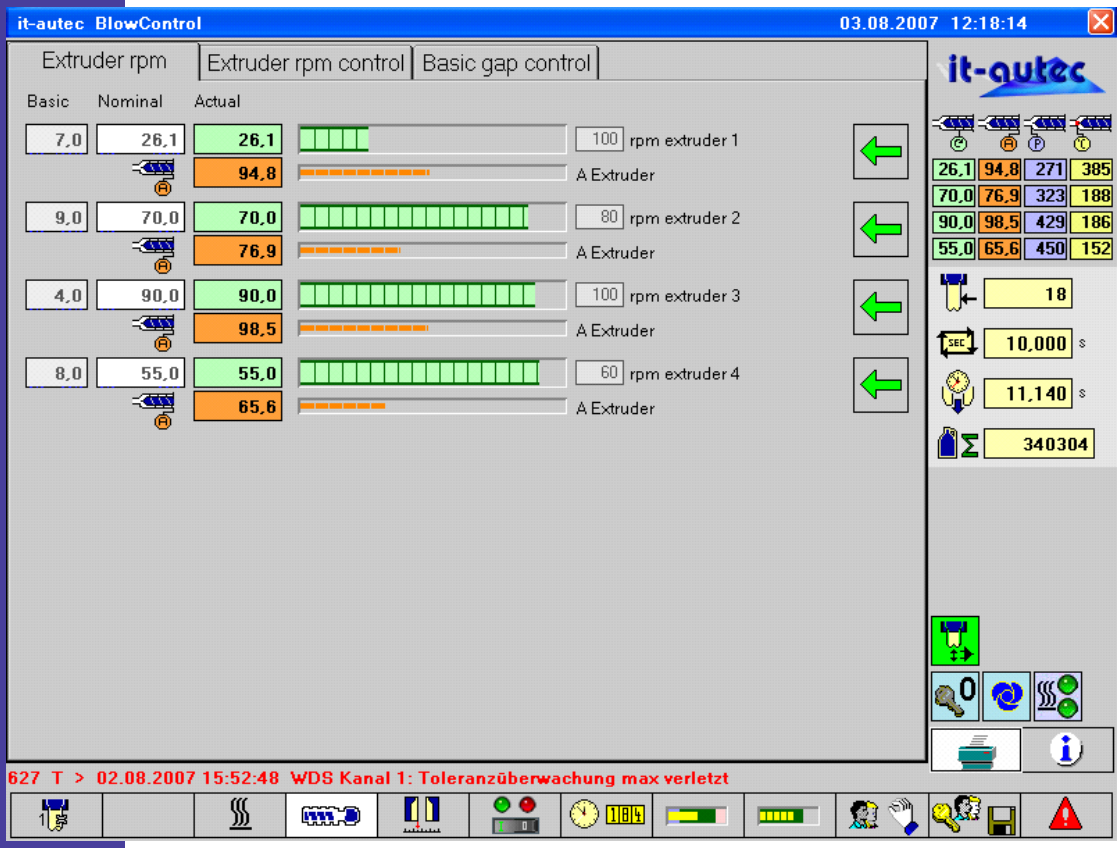
Extruder speed control



Extruder speed control for 1 to 8 extruder

- Analog set poit revolution
- Display of revolution actual value and torque (electric current)
- Synchronized adjustment when using more than 1 extruder
- Basic rpm / production rpm
- Take over the actual rpm to production rpm by pushing a button

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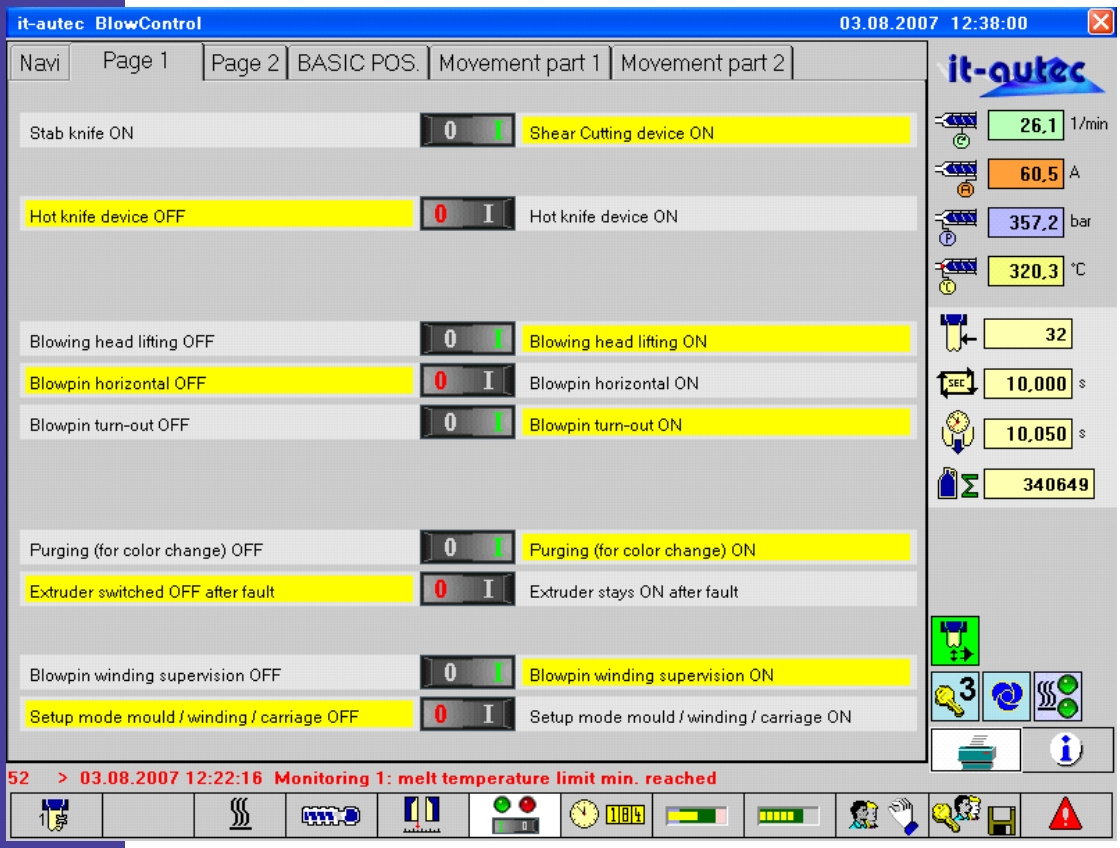
Preselectors



Preselectors for selection and deselection of machine functions

Display for on- and off functions in clear text

Not used selectors can be hide out

Preselector for 1 from n selections can be linked to a group

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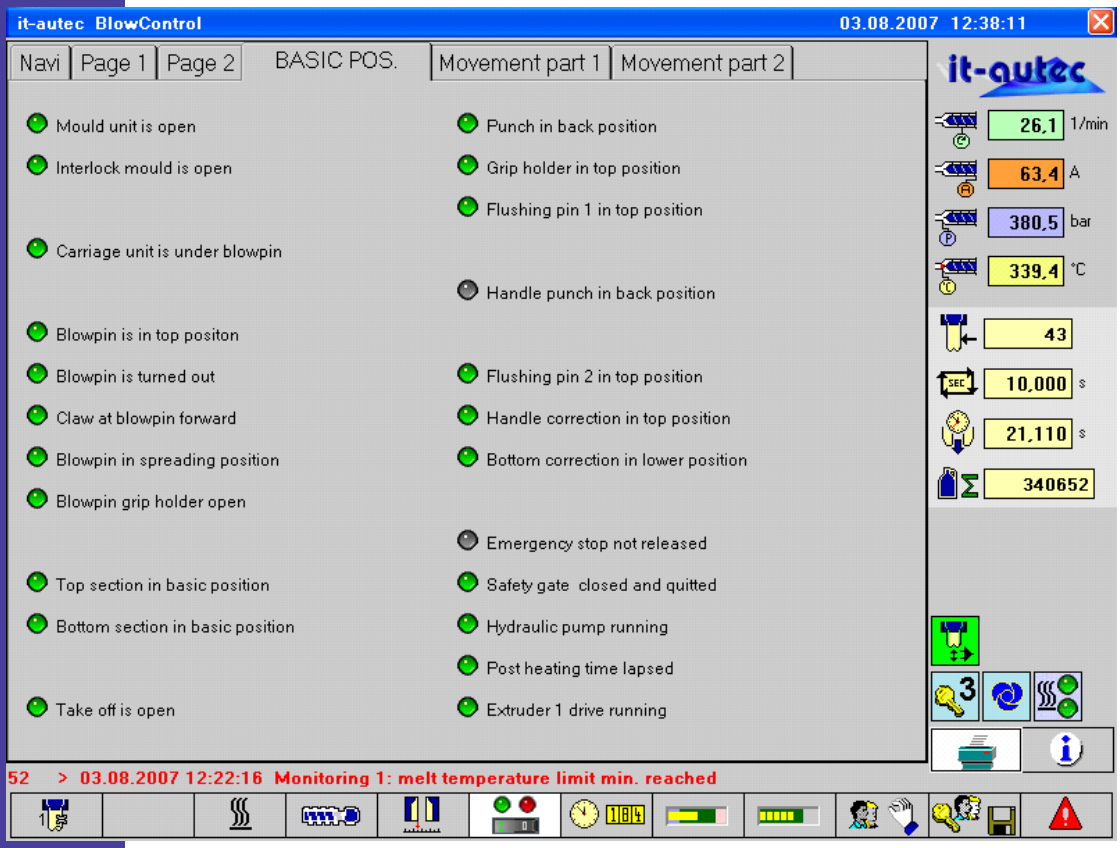
Status of the machine



Displays of machine situations (e.g. display of limit positions)

Not used elements can be hide out

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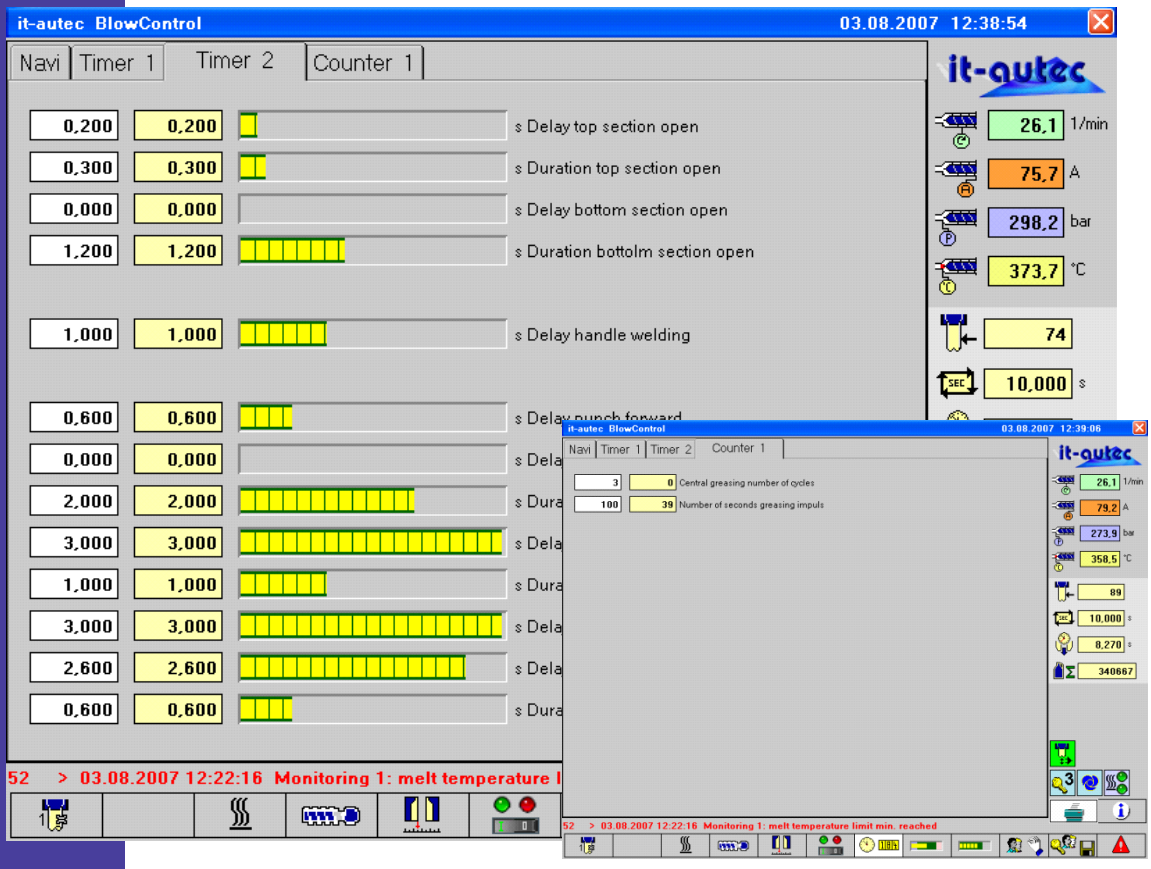
Timer and counter



- **Time nominal values for adjusting the machine sequence**
- **Display of time actual values**
- **Time measurements of the main movements**
- **Cycle time supervision**
- **Counter nominal values**
- **Display of counter actual values**
- **Not used timers or counters can be hide out**

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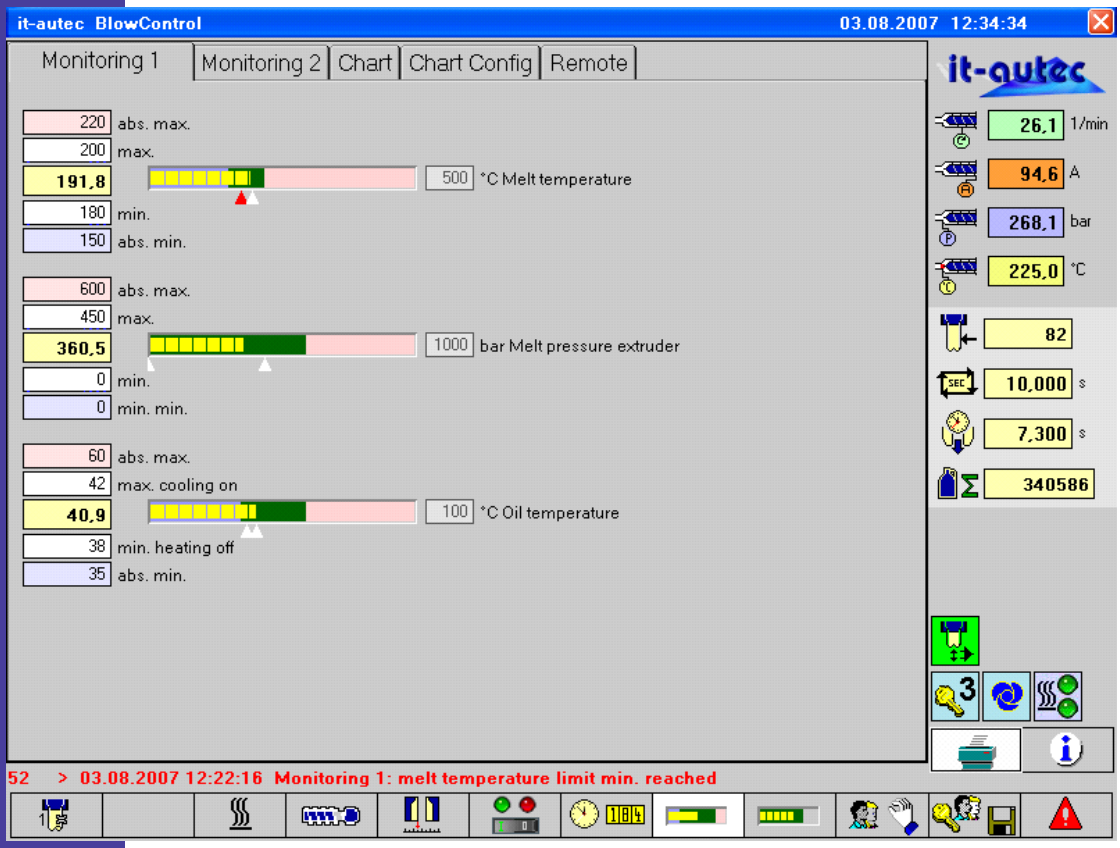
Monitoring of process parameters



Display of process parameters for e.g. melt temperature, melt pressure, oil temperature, oil pressure

Supervision of process parameters like melt temperature, melt pressure, oil temperature, oil pressure for upper limit, upper warning, lower limit and lower warning

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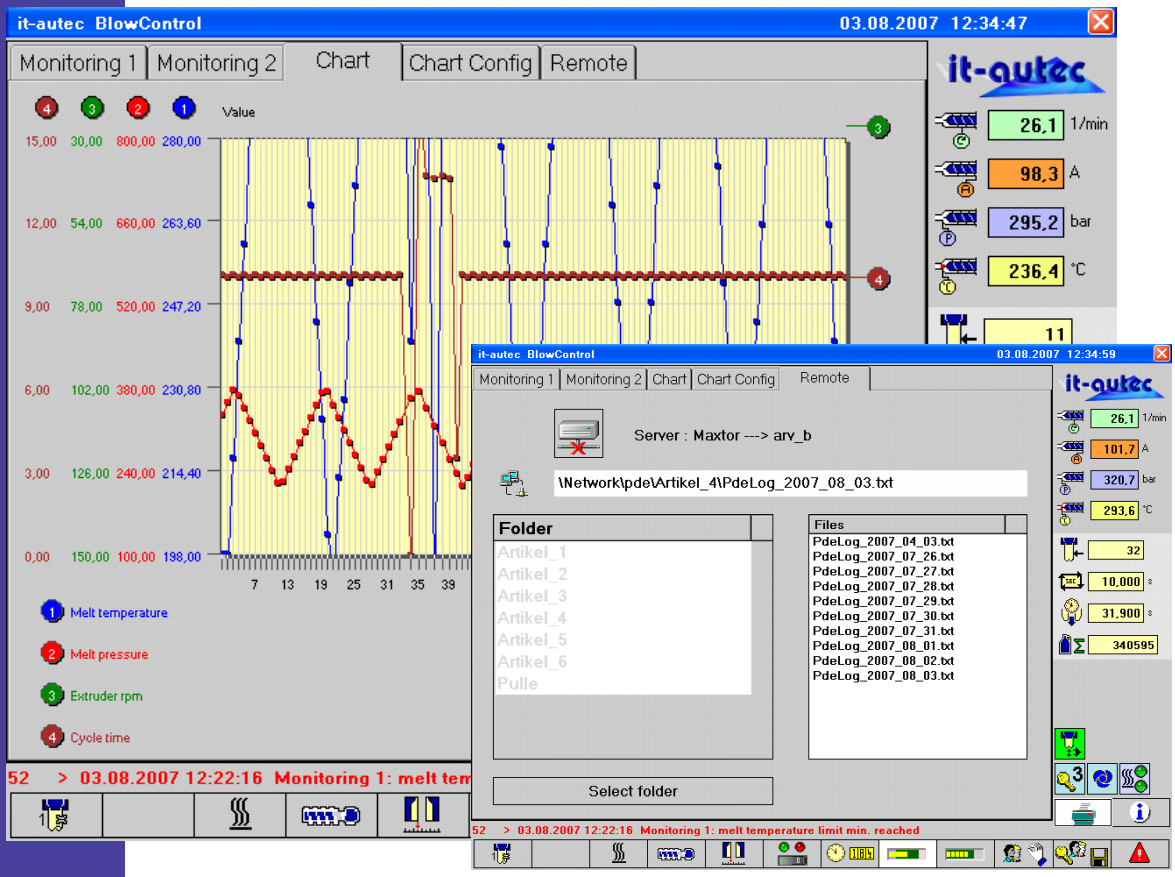
Process data logging



Up to 120 actual process values can be logged each cycle on internal flash card or directly to a network server

Data protocol: ASCII file (can be imported in EXCEL), optionally xml-file or connection to SQL-server database

A selection of 4 of the 120 values can be displayed in a chart

The internal logged values are stored for one week

The values on the server are logged in daily reports

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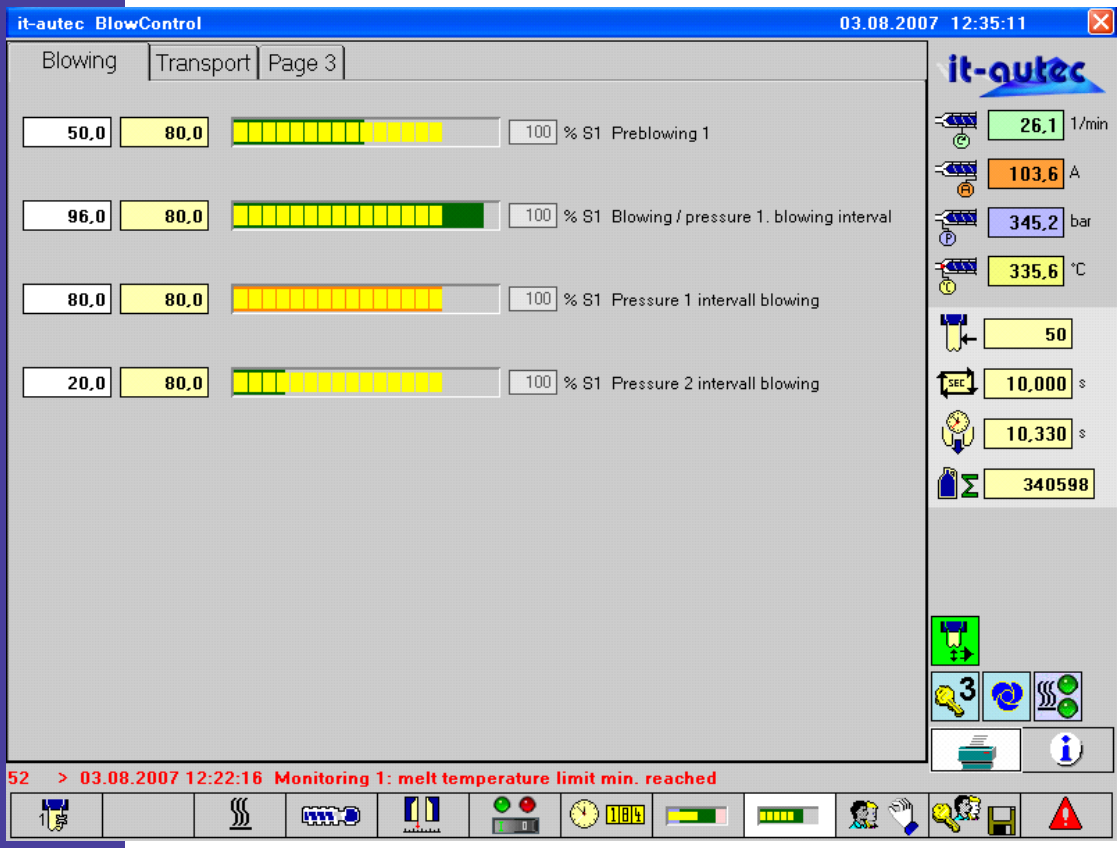
Setpoint values



Analog nominal values width adjustable ramps and positiv / negativ output values as well configurable positioning of channels e.g. :

- Blow pressure via proportional valve
- Support air via proportional valve
- Exruder lifting / lowering
- Set value for oil pressure
- Open loop core puller via proportional valve

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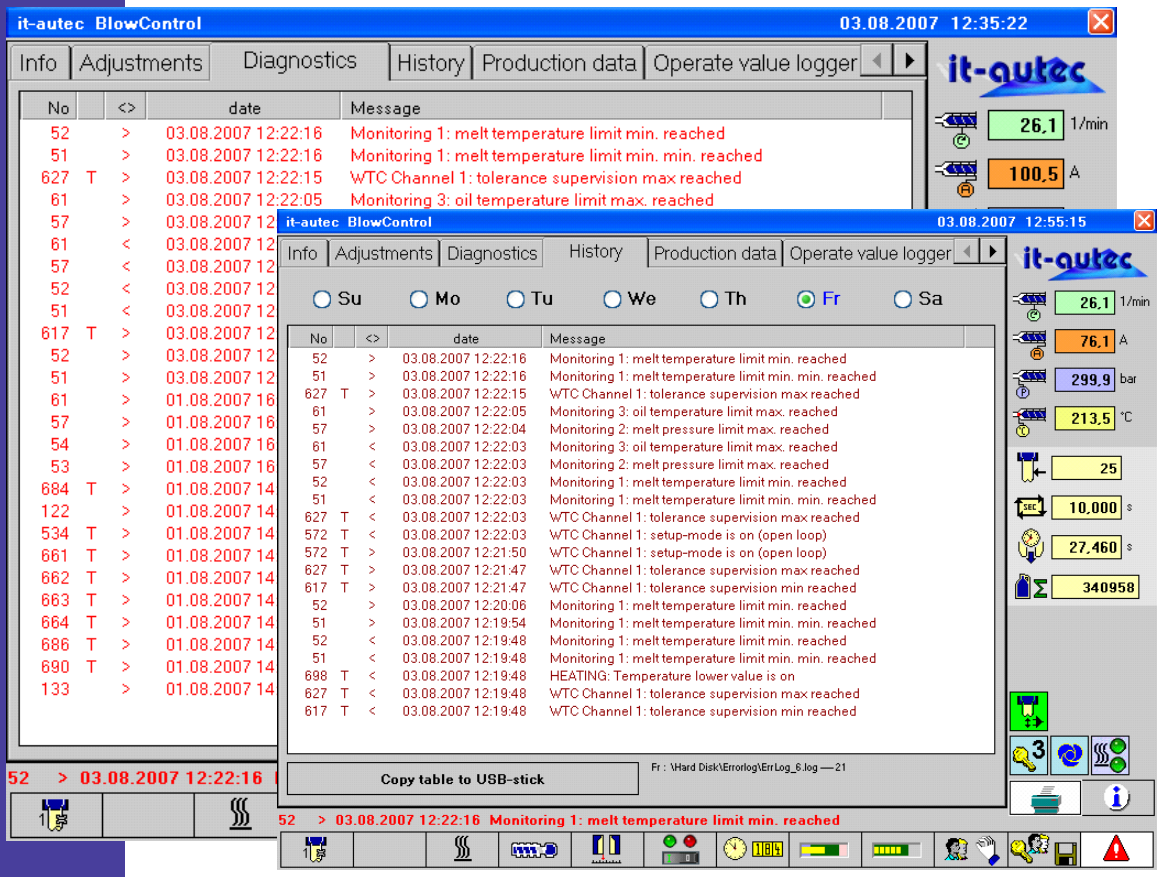
Diagnostics



Error message and status message are shown in clear text

Timestamp for message „appear“ and message „disappear“

History for one week in internal memory

Optionally histroy on network server in daily reports

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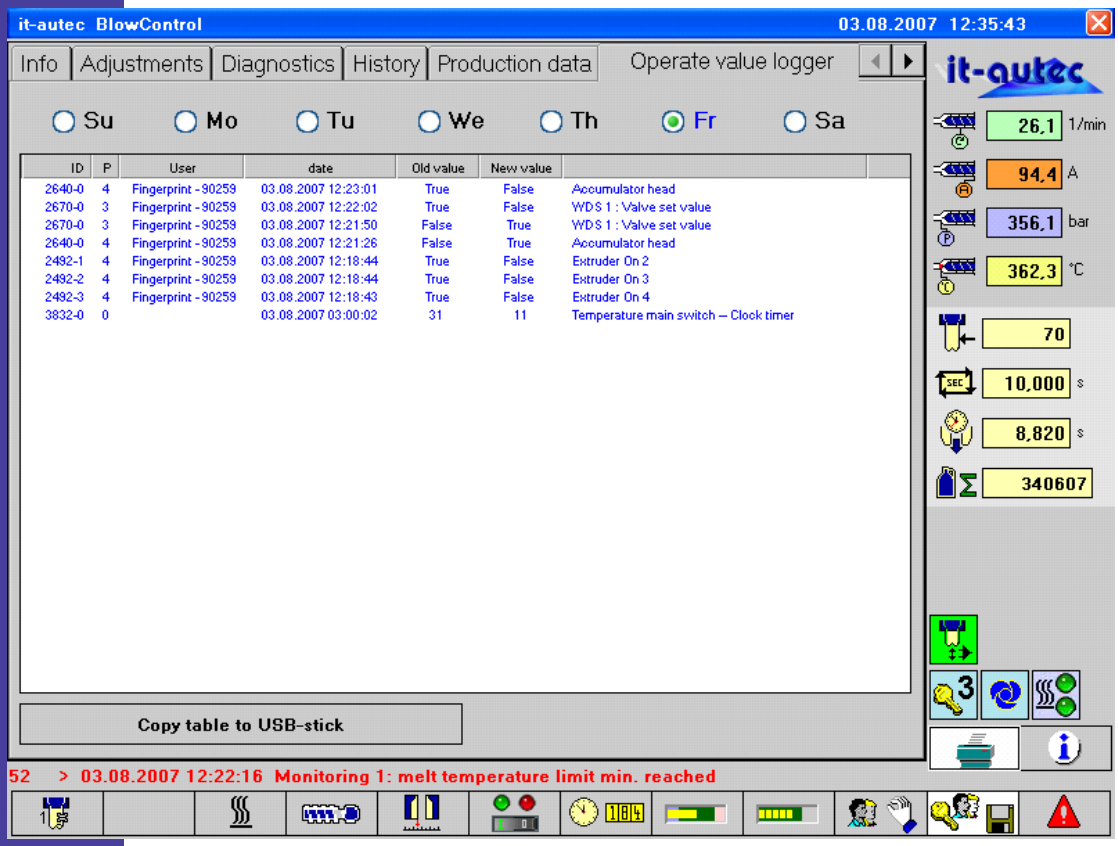
Operator protocol



Each change of value by the user is logged in the operator protocol (with following information: timestamp, user, level, old value, new value)

This protocol is stored on the internal flash card for one week

If process data looging to network is activated, this protocal will also be stored on the server as daily report

Herewith down time by faulty operation can be proved

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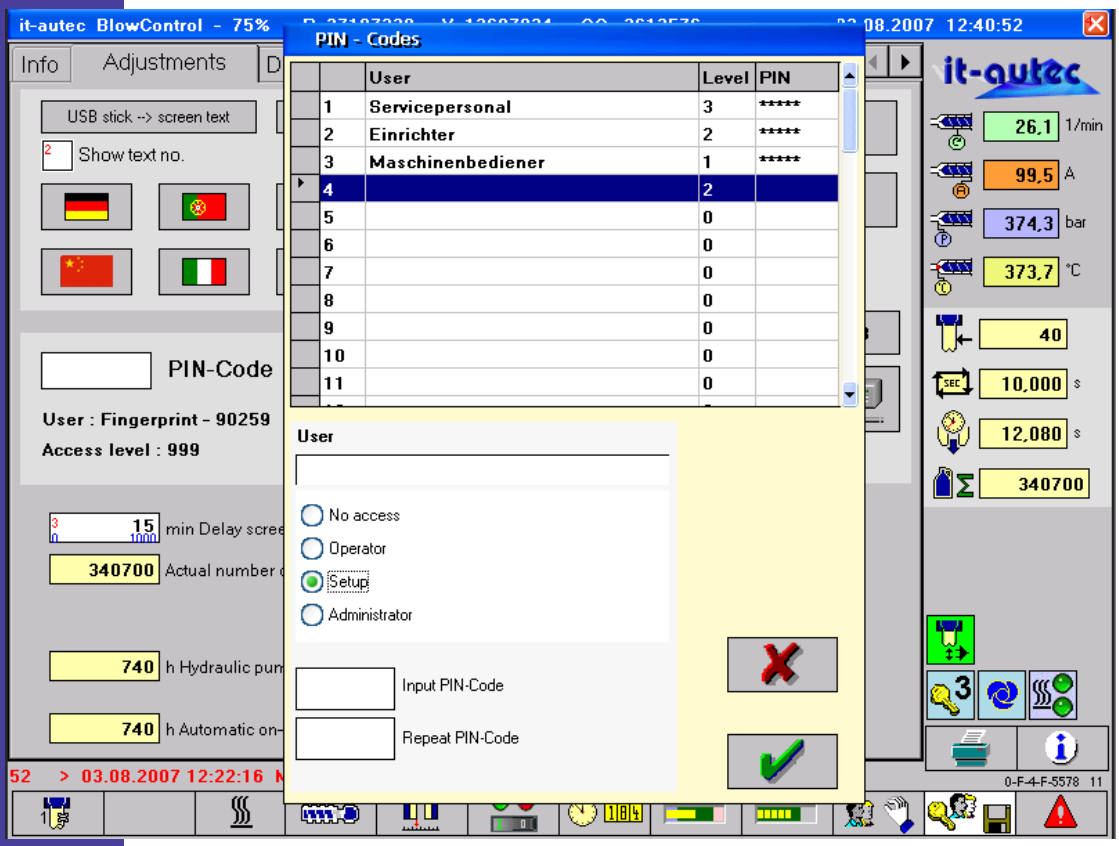
User management



User access by PIN-Code

3 different levels (machien operatorm setter, service people) + system administrator

Optionally user access by finger print system

The user levl for each set value, preselector and button on the screen is adjustable by the system administrator

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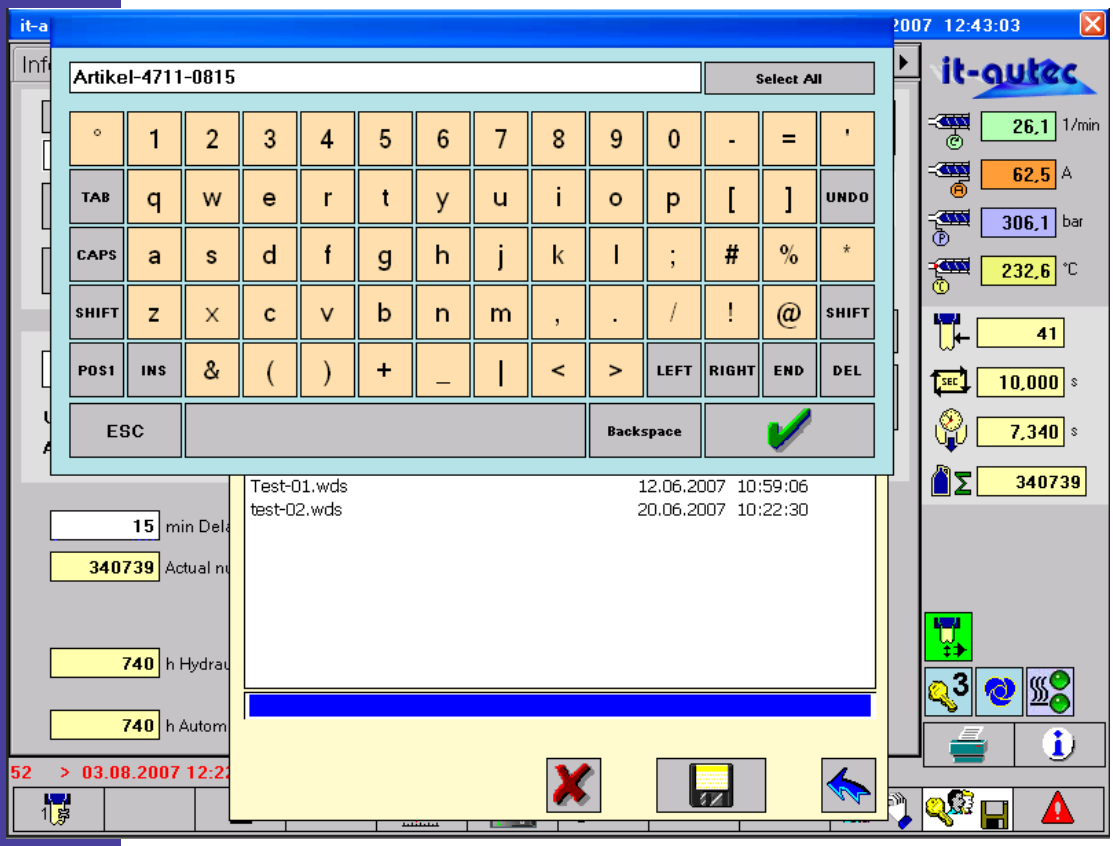
Management of recipes



All set parameters can be stored and reloaded in an internal memory or on an USB.stick

Optionally the recipes can be stored and reloaded on a network server

The whole set of parameters can be stored or set of paramaters like Wallthickness, Temperatures, ...

To use the parameters in a another machine it is possible to reload the paramenters without the machine specific paramter from a data set

To each data set can be added a discription in clear text

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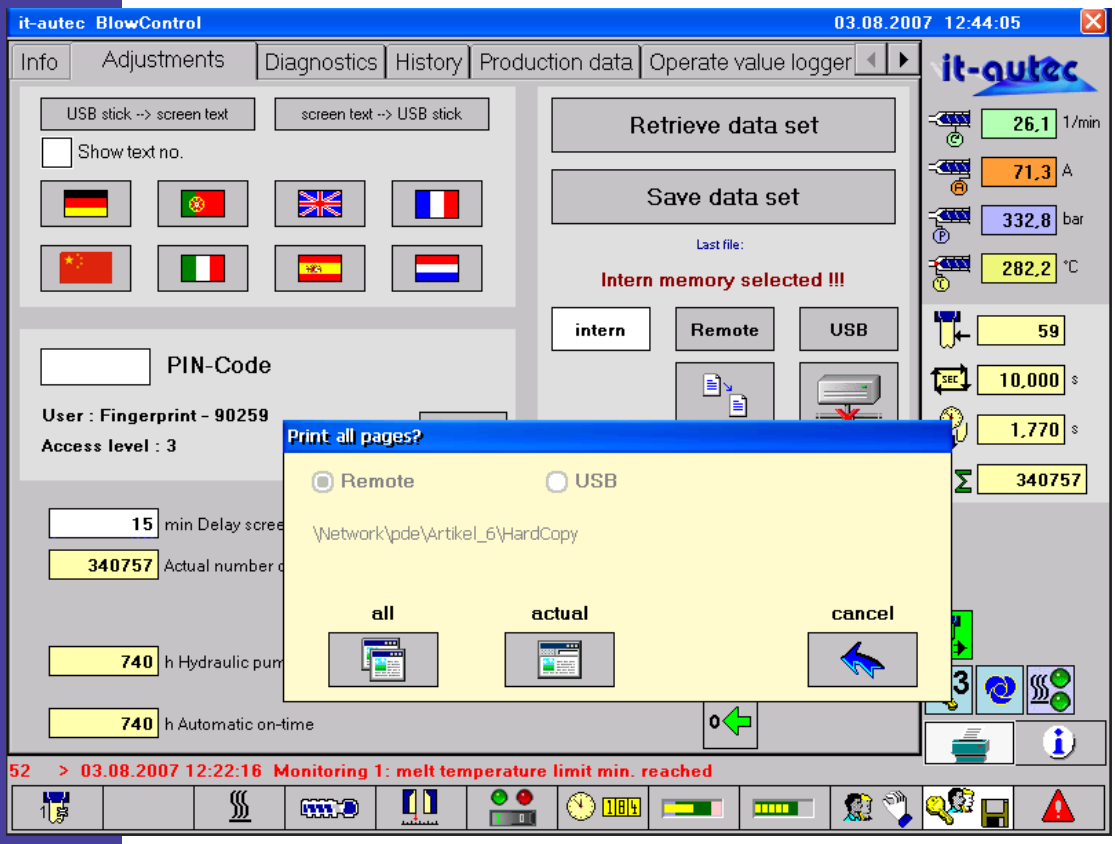
BlowControl

pc based solution

Screen copy



The actual screen or all screen can be print out to USB-stick or network server

precise
flexible
efficient

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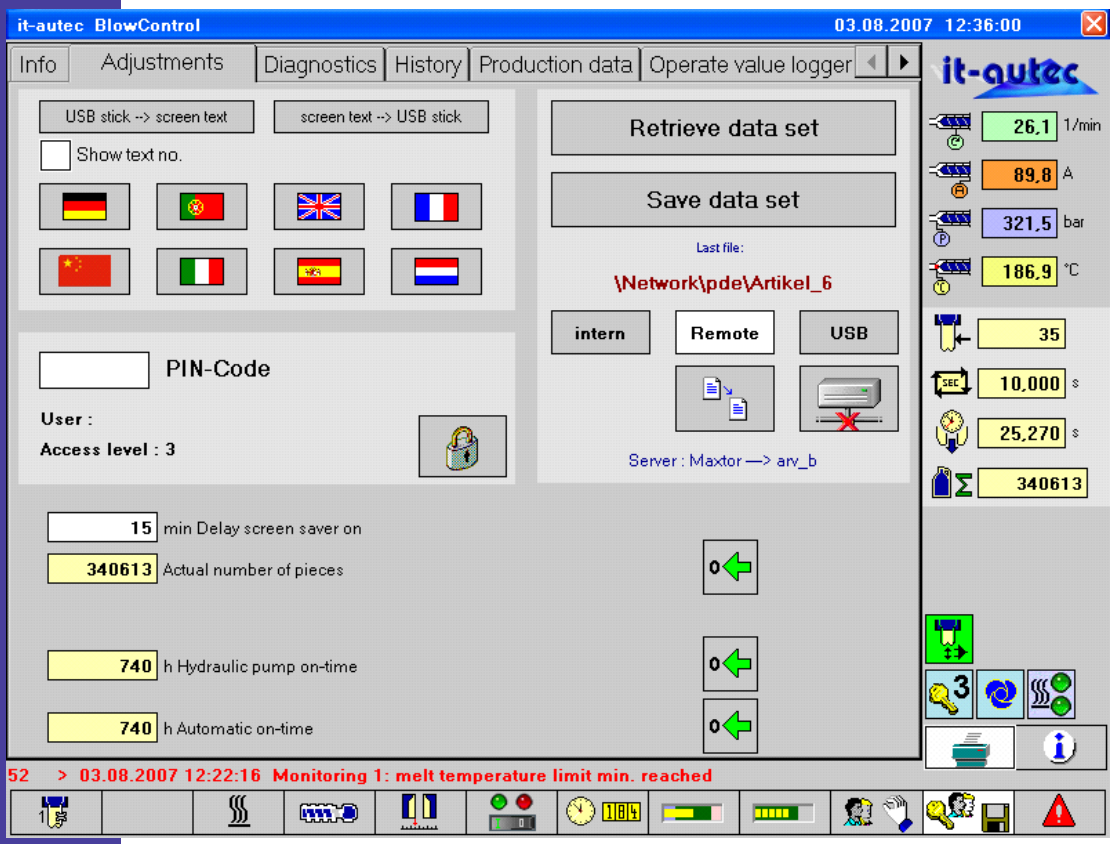
BlowControl

pc based solution

Miscellaneous



- Reversal of language for user interface
- The text files for screen- and error text can be updated by USB-stick
- Screen saver
- Hydraulic pump on time
- Automatic mode on time

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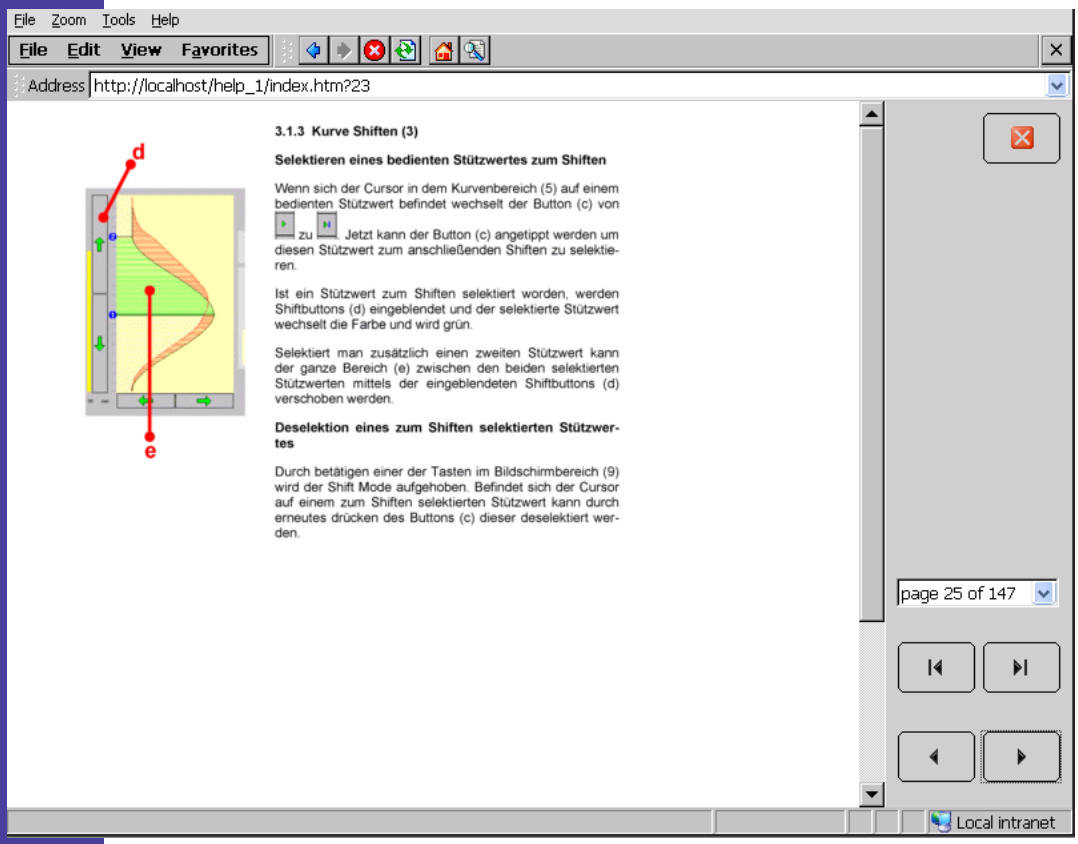
BlowControl

pc based solution

HTML Online Help System



Help button: At each page the help button display the html online help system in the local browser.

The complete manual is disposited in html files

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