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MiNTEQ

FERROTRON
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Digital Electrode Control
MeltNet

One Standard Regulation for EAF as well as for LF, for Single or Twin Shell also.

The **MeltNet** is an universal electrode control system for electric arc furnaces (EAF) as well as for ladle heating furnaces (LF). The MeltNet is a further development of the Windows NT4.0 based DecNT, which is part of the equipment in many steel making furnaces around the world. Many years of experience have lead to the new **MeltNet**, which is developed for embedded system platform and based on new hardware technologies.

The adaptation to the respective furnace as well to operation is easy to feasible though parameter setting.

Benefits

The MeltNet is a powerful tool, which can:

- reduce the tap to tap time
- reduce the electrode consumption
- reduce the energy consumption
- reduce the refractory consumption
- reduce the commissioning times

  (Commissioning within 5 days)
- extend the maintenance intervals
- allow flexible visualisation

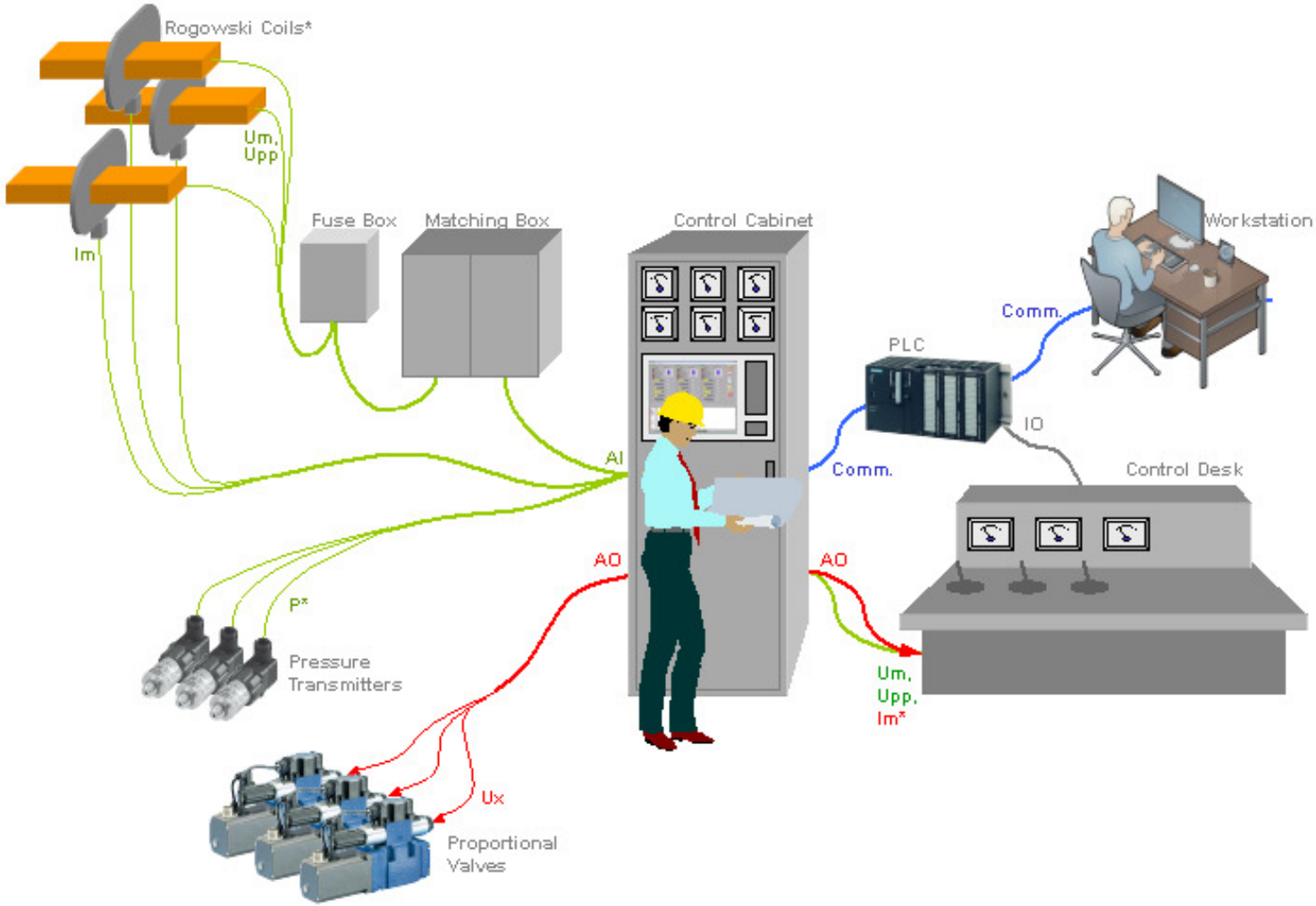
Under economical view the MeltNet can:

- reduce the production costs
- increase the productivity and efficiency

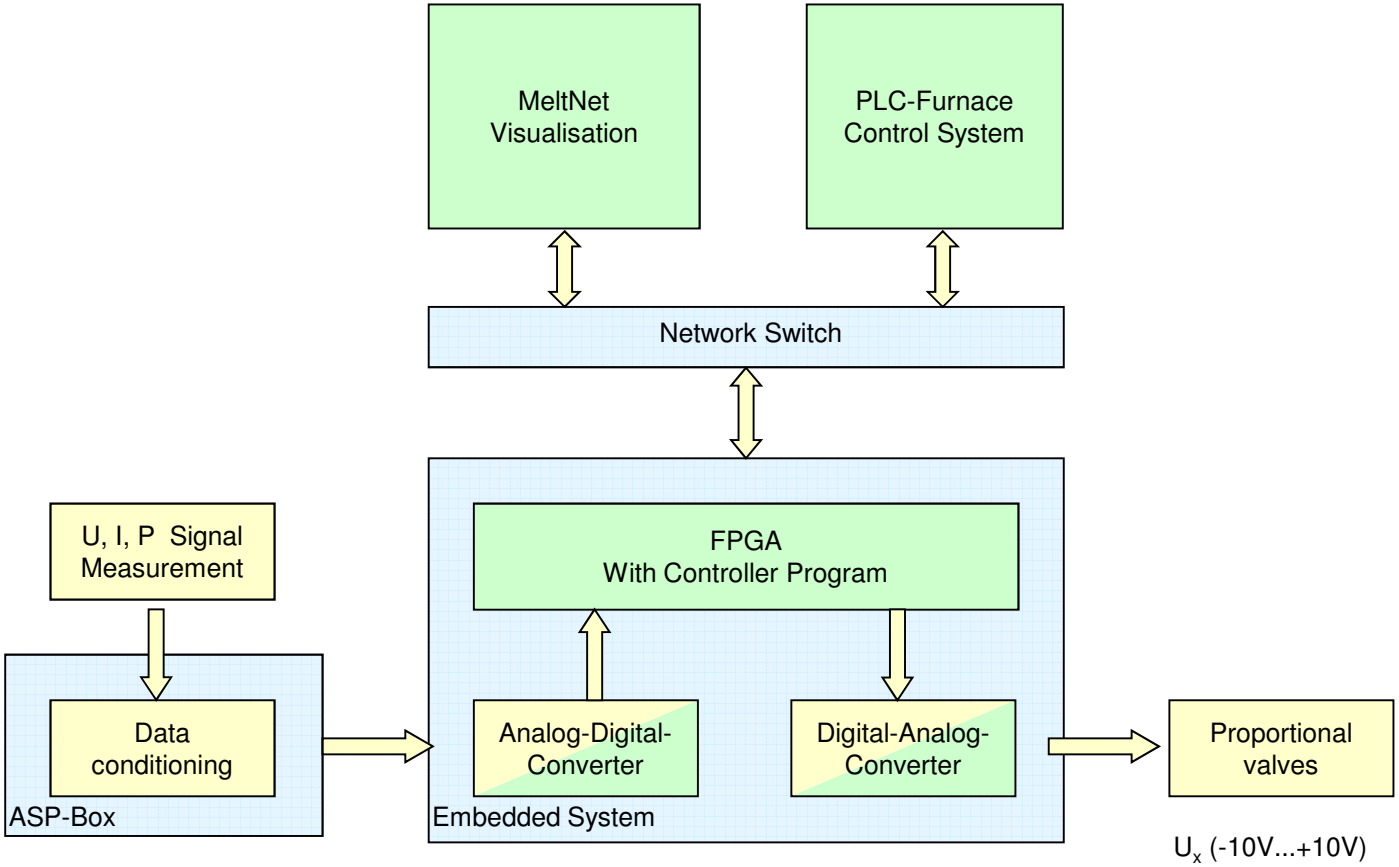
Technical Basics

MeltNet	
Visualisation system	Industrial-PC workstation consisting of: Industrial slot CPU-board with Intel C2D Desk 2,8GHz, 2GB RAM, 17” TFT touch screen 1280x1024 dot, touch pad, keyboard, hard disk 250GB, DVD-ROM, 2 Ethernet ports, Windows 7 Pro
Hardware controller	Embedded system with included FPGA, high accuracy 32 channel input, 4 channel output, analog signal processing module (ASP) for measuring signal treatment
Software	Windows 7 Pro 32 bit English DECTEQ™ MeltNet application, Acronis True Image, for back-up and recovery Slag module as optional application

Setup of the MeltNet System

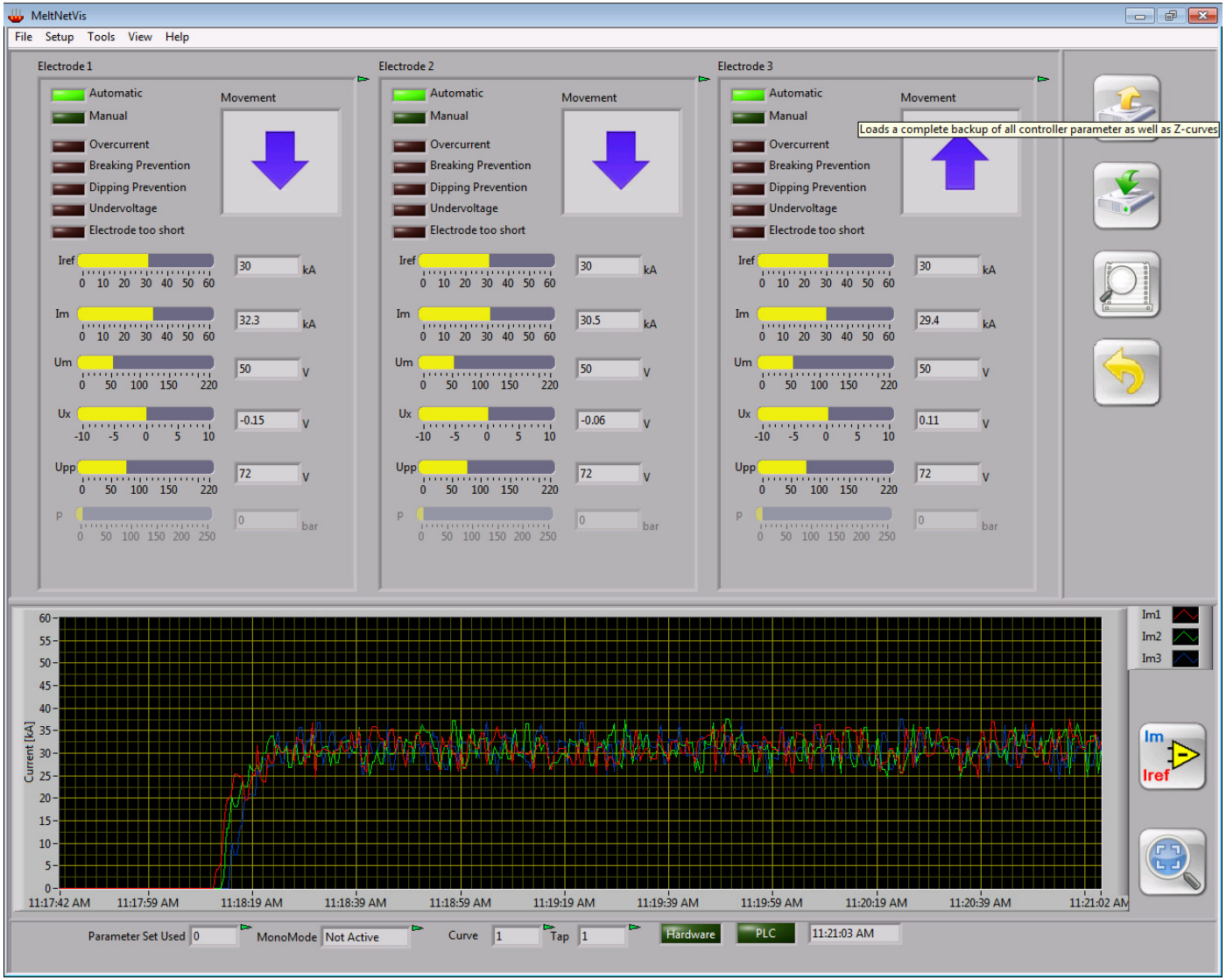


Setup of the MeltNet System



MeltNet Workstation

Selectable Main Screen



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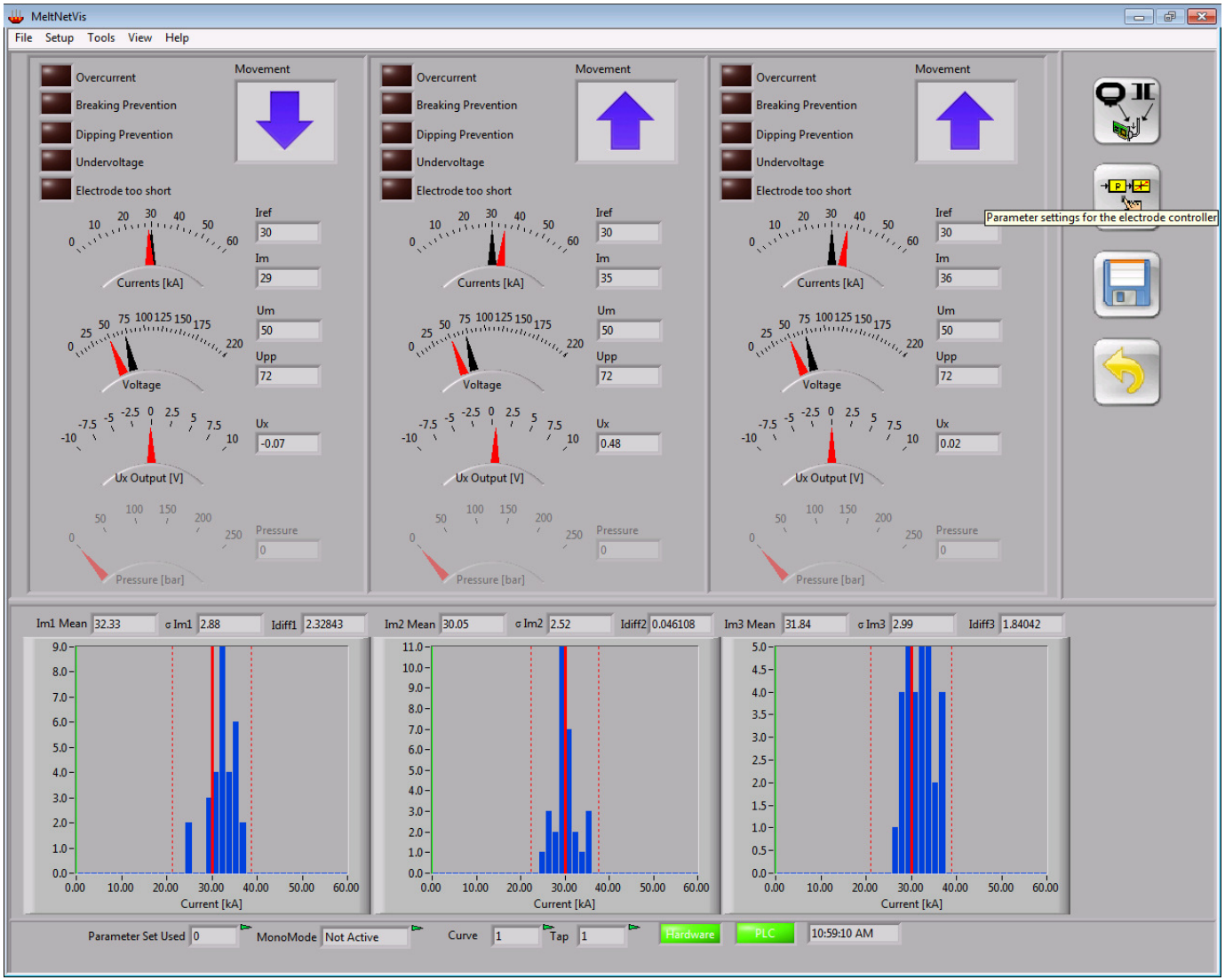
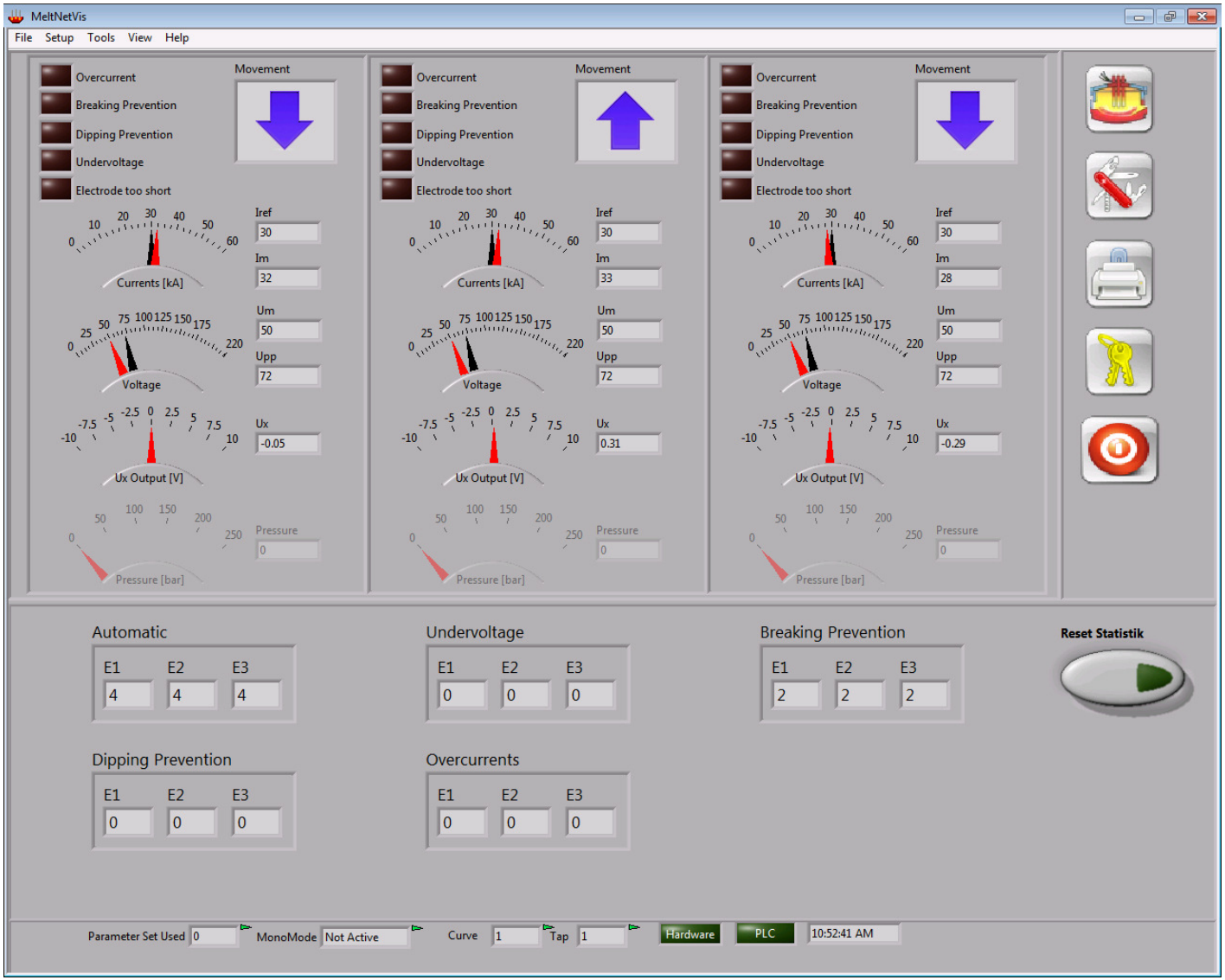
Alternative Main Screens



Alternative Main Screens



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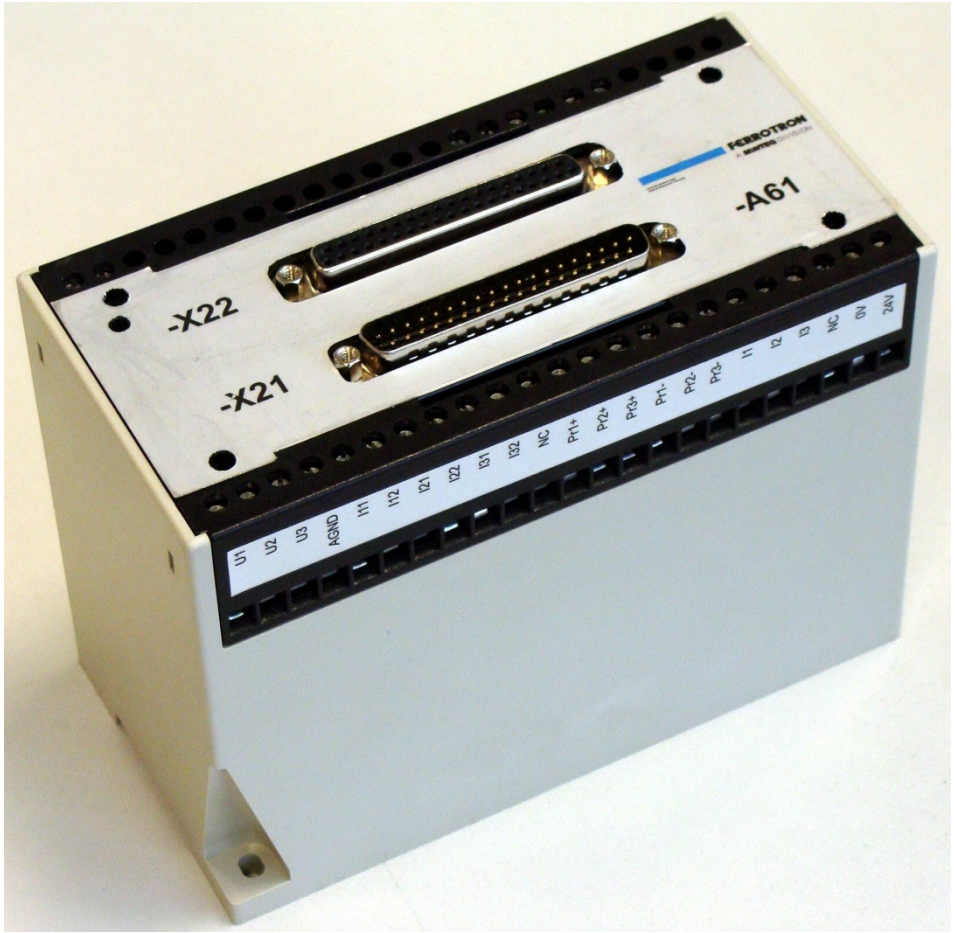
Analog Signal Processor
for signal treatment and conditioning

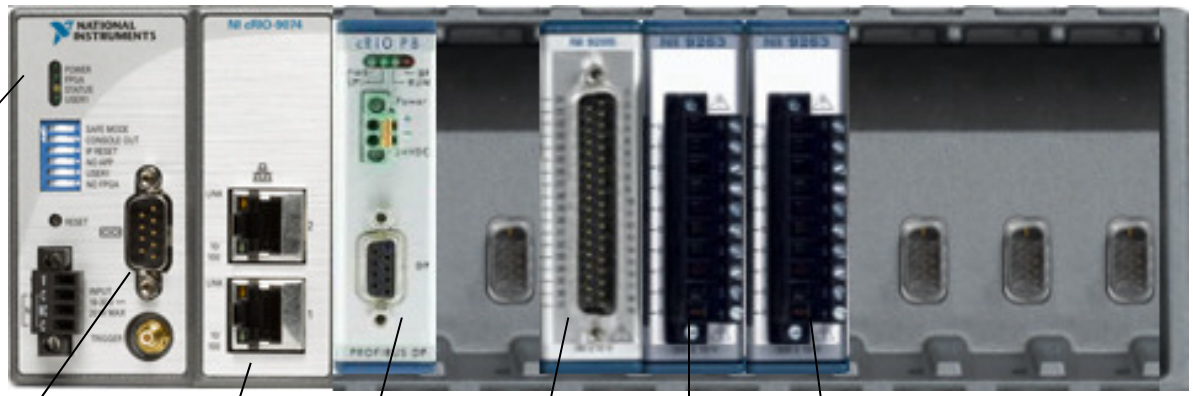


Digital Signal Processor
- Controller latency < 5ms
- Input sampling rate 2.5kHz
- Real time signal processing (FFT, TRMS, control algorithms)

Analog Inputs
- Electrode voltages U1, U2, U3
- Electrode currents I1, I2, I3
- Hydraulic pressures p1, p2, p3

Analog TRMS Outputs
-Electrode voltages
-Electrode currents
-Electrode pressure

Embedded System



Control Cabinet

Indicator Valve Feed Back

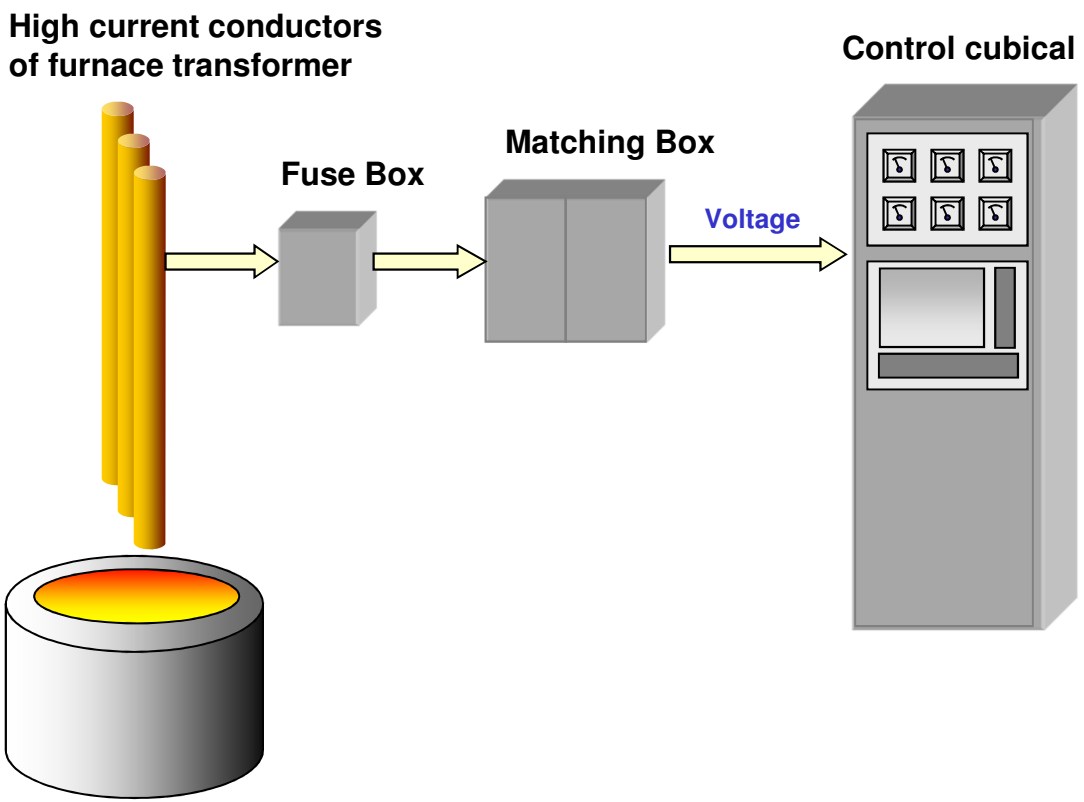
Indicator Cylinder Pressure

MeltNet Visualization Workstation

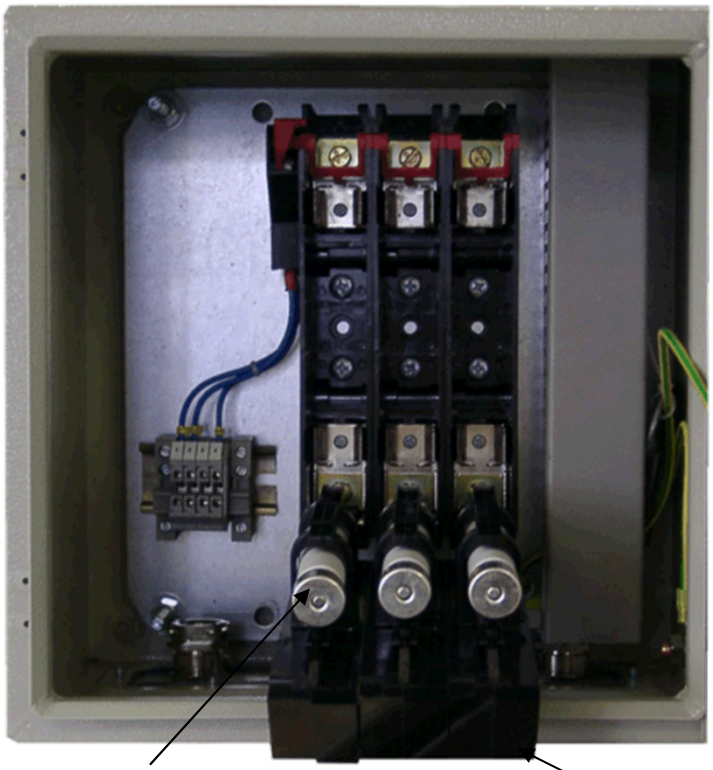
Mounting Plate with:
Embedded System,
ASP-Box,
Circuit Breakers,
Terminals, etc.

Ink Printer

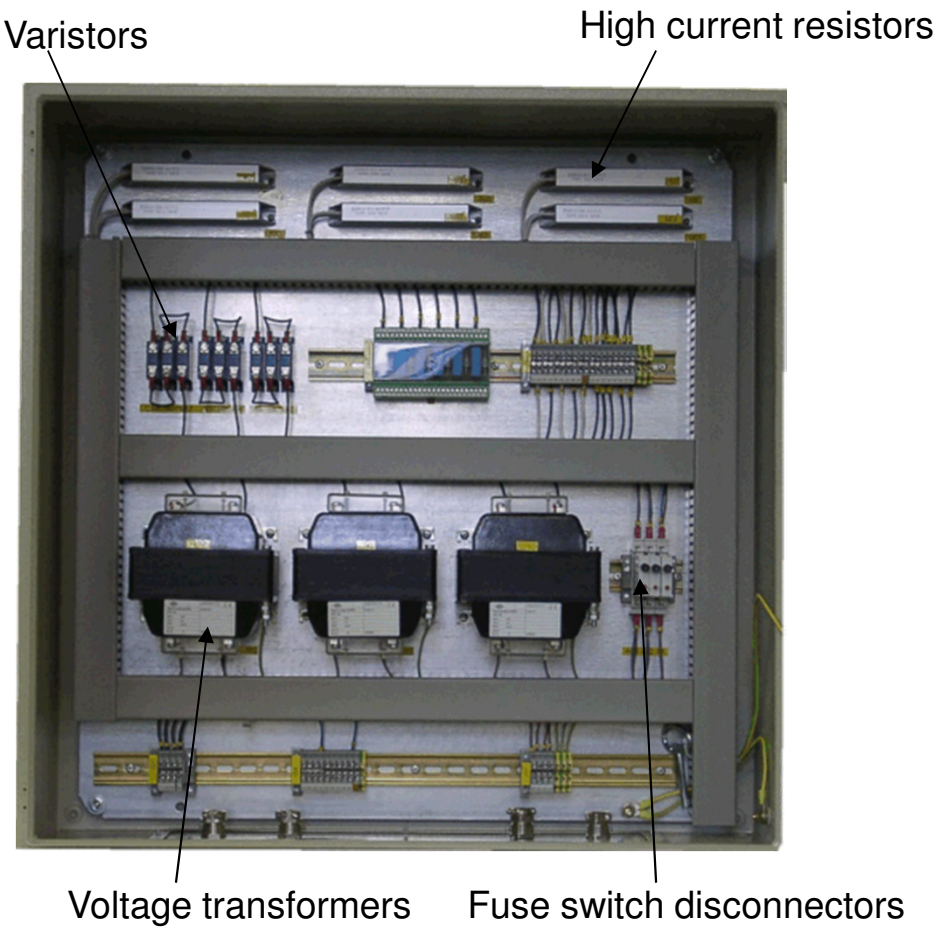
Voltage Measuring



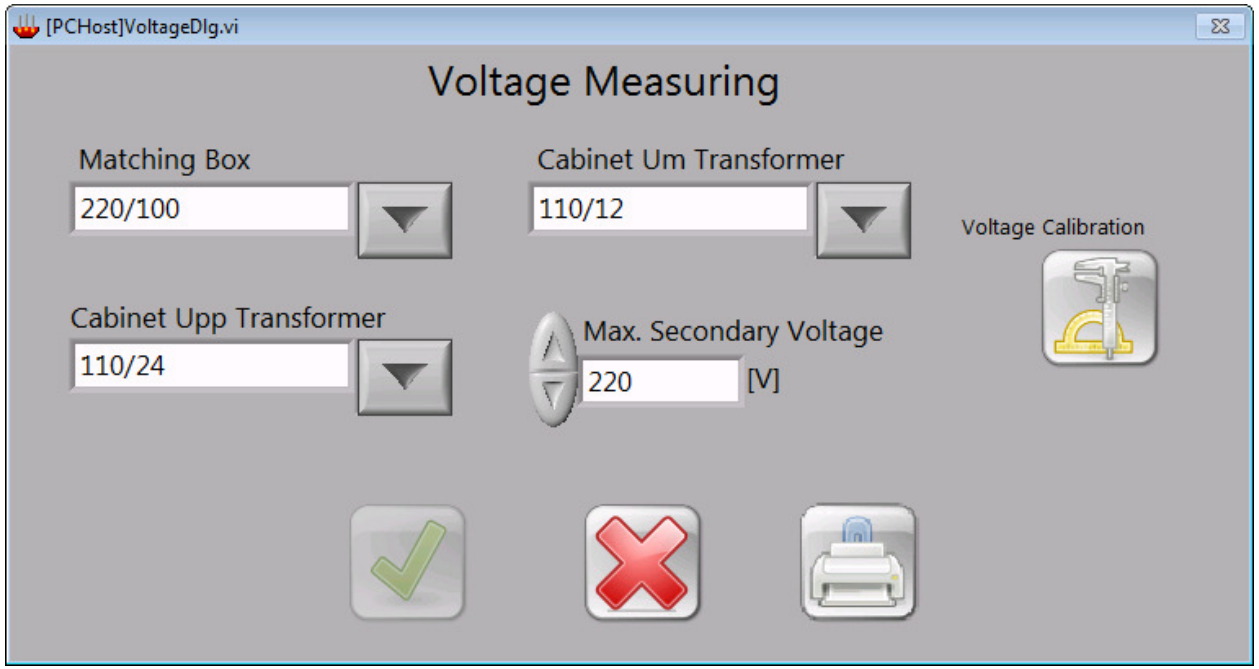
Fuse Box



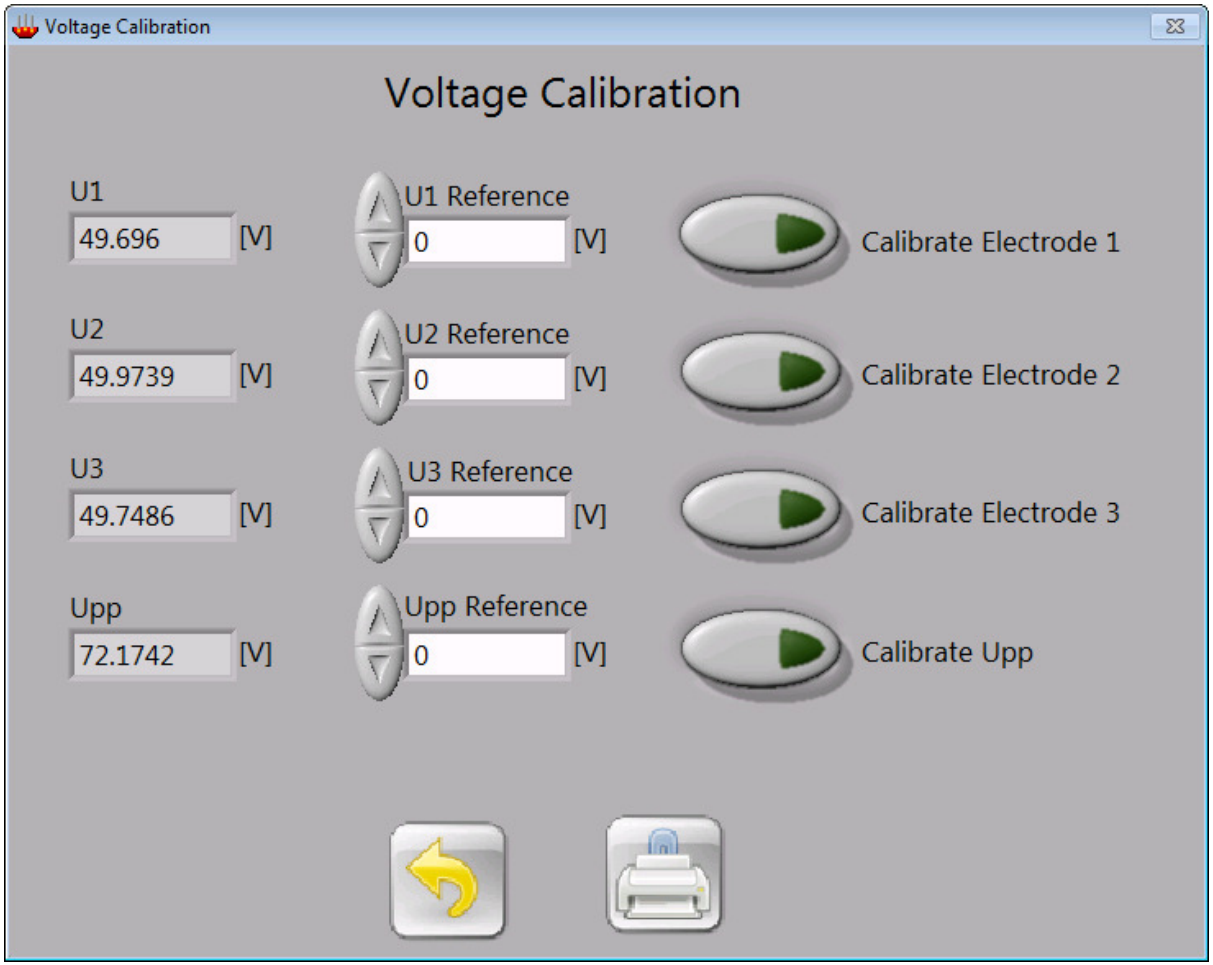
Matching Box



Voltage setup dialog



Voltage calibration dialog



FT manufactured Rogowski coils

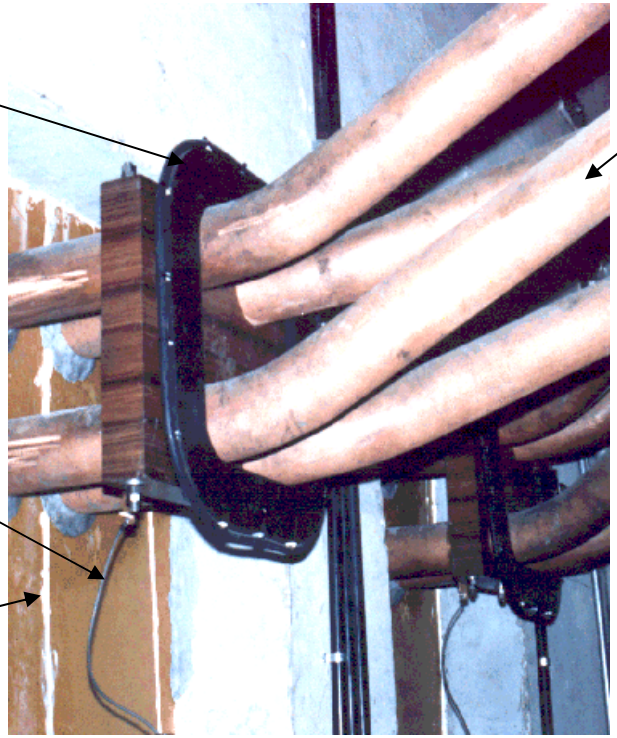
Inline busbars

Symmetrical busbars

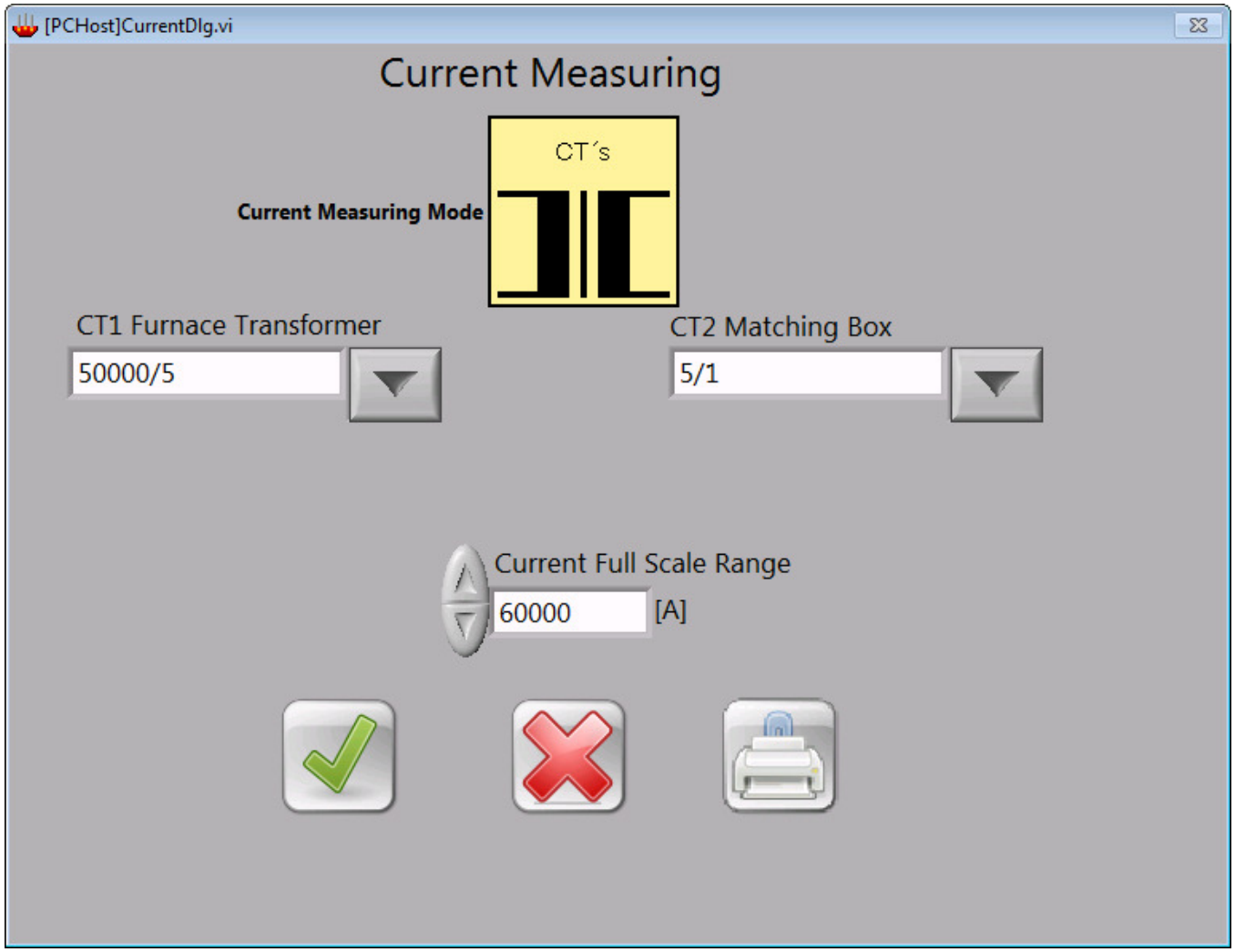
Rectangular conductors

Rogowski coil current transducers are used for the high precision measurement of alternating currents. They consists of a toroidal winding on a non-magnetic core, fitting around the current conductors to be measured. The output of the Rogowski coil is a voltage proportional to the changing rate of the current. This voltage is integrated electronically on the measurement card to get a signal proportional to the current. Rogowski coils have many advantages compared to conventional current transmitters with iron core.

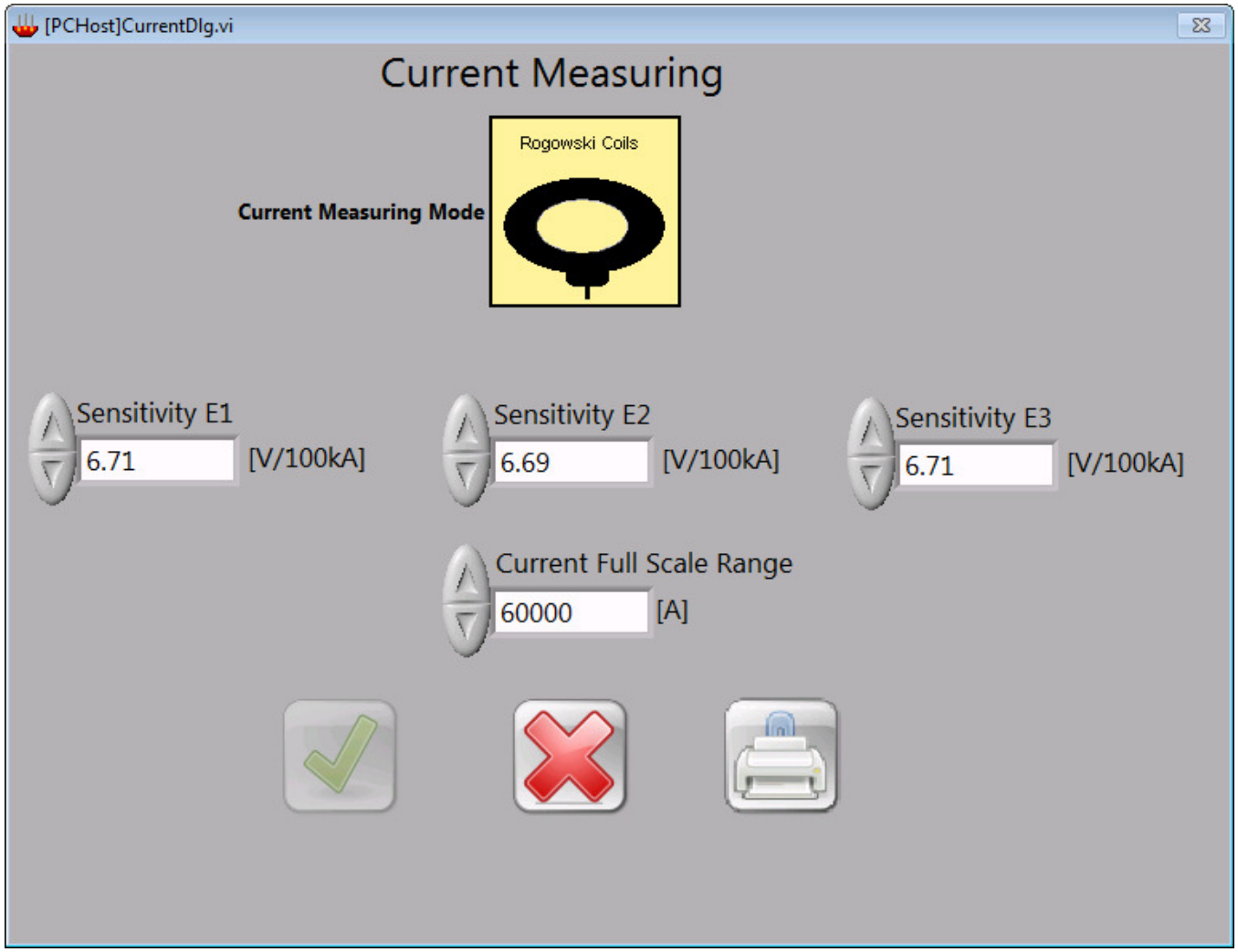
Mounting of Rogowski Coils



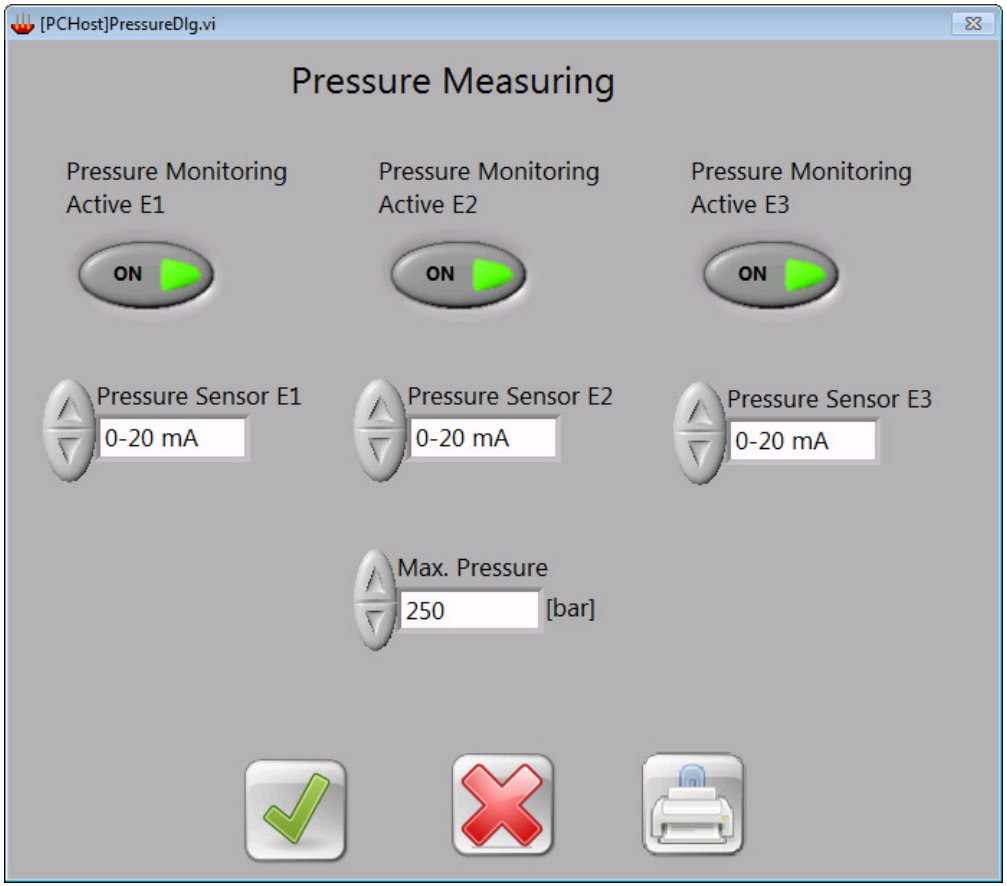
Current calibration dialog



Current calibration dialog

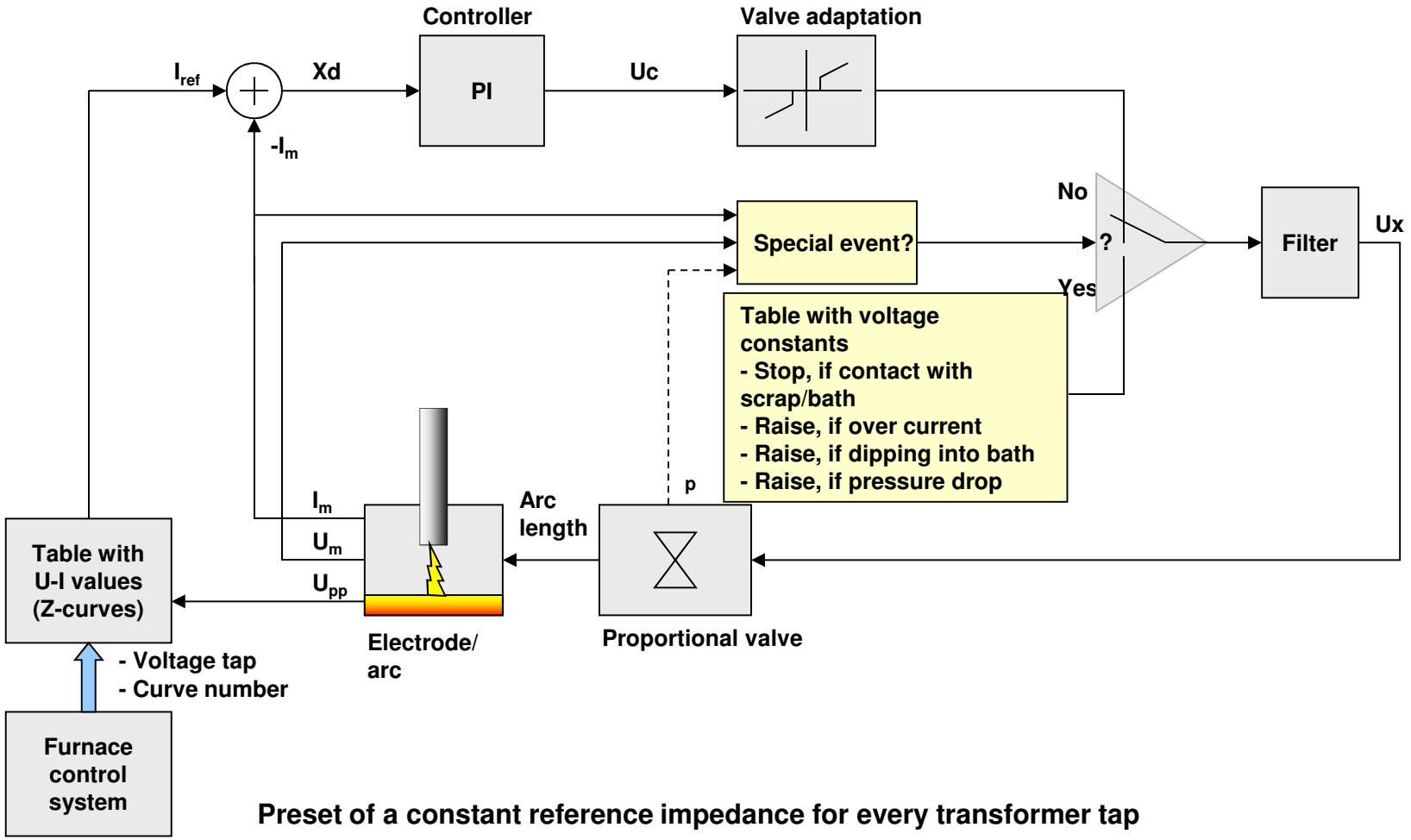


Pressure Monitoring



Hardware Configuration

Impedance Control Mode



Preset of a constant reference impedance for every transformer tap

To keep the impedance constant, the reference current changes with the voltage

Controller Functions of the MeltNet

- **Keeping the set points by use of ...**
  - Current control mode
  - Impedance control mode
- **Reaction on special events**
  - Start of arc ignition (scrap or bath contact)
  - Overcurrent
  - Dipping into the bath
  - Touch down on non conducting material
- **Individual adaptation of electrode reference-currents**

  Thermal symmetry to avoid hot spots
- **Adaptation of the controller gain to the valve characteristic**
- **Reduction of the reference-current when the transformer tap is changed**

Commissioning, Maintenance and Analysis Tools

- **Automatic calibration of the electrode velocities**

  Fast and simple finding of the correlation between electrode velocity and setting voltage (valve characteristic)

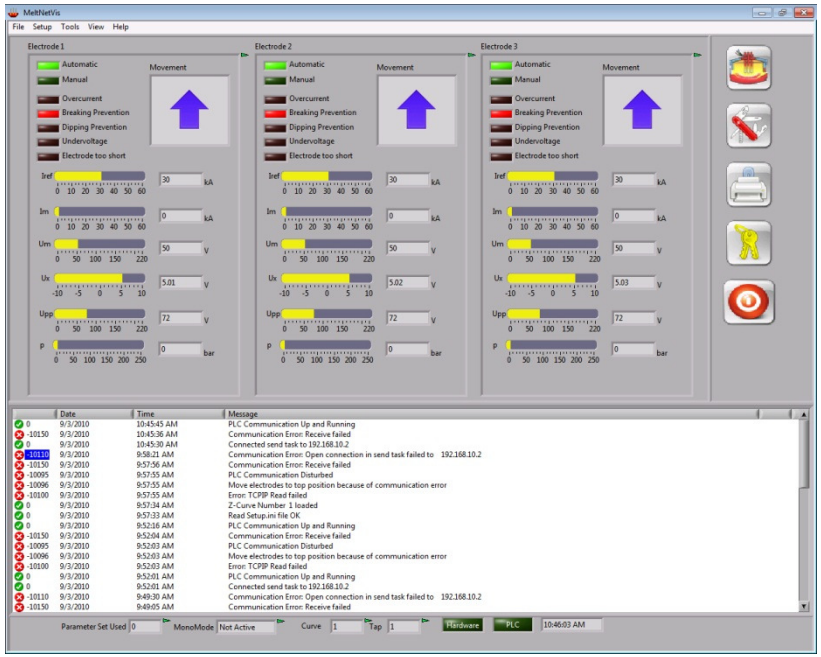
- **Online process analysis**

  Statistical analysis of process data (minima, maxima, mean values, standard deviations)

- **Recording of process data**

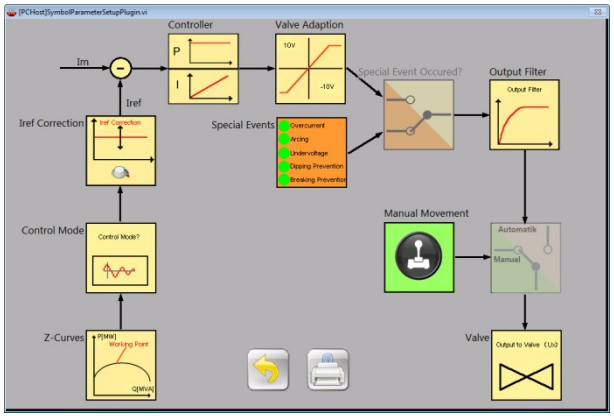
  Use of standardized Microsoft® Access databases
  Numerical and graphical view
  Integrated database viewer

Samples of Screen Shots

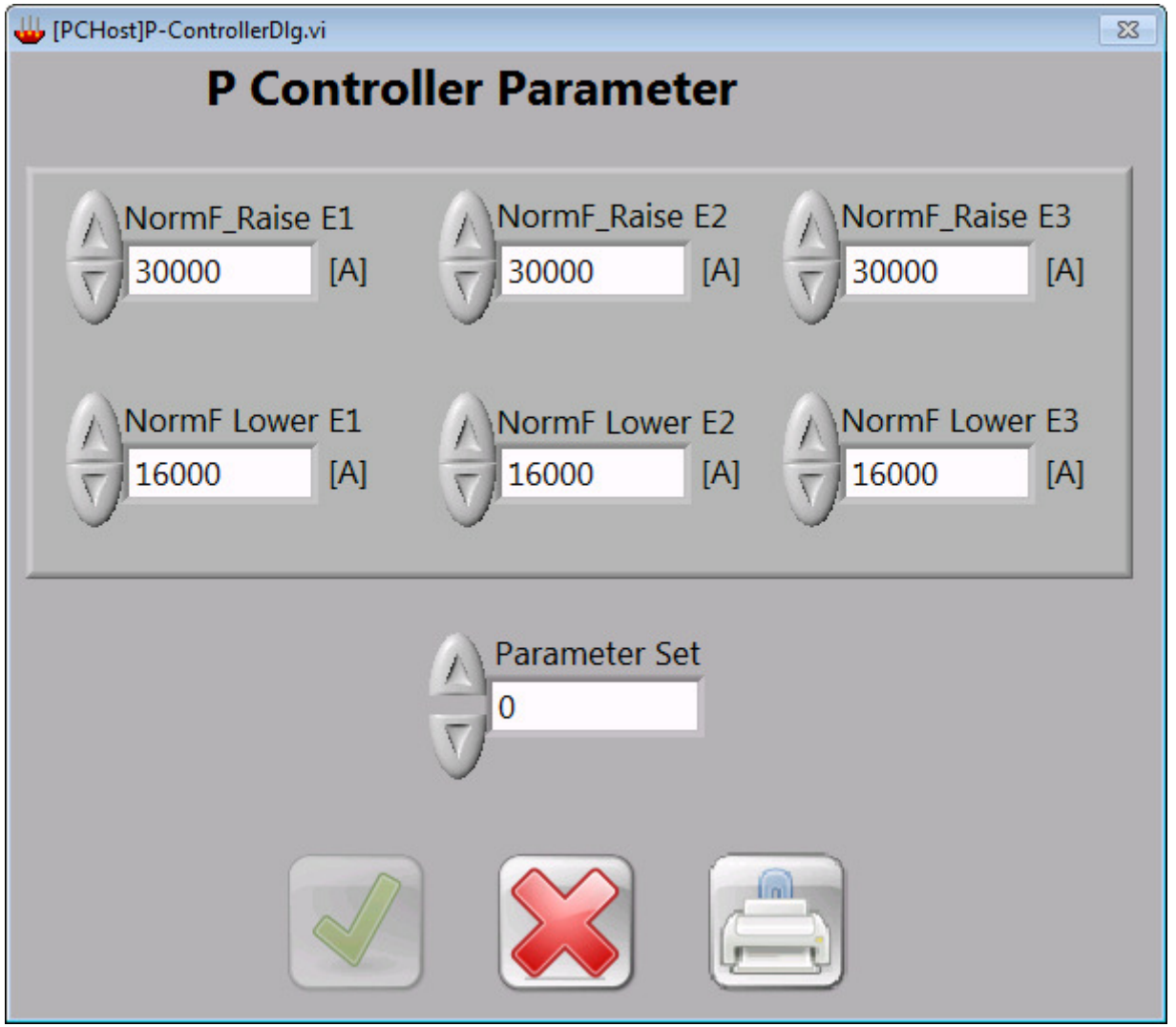


The controller program on an embedded system is designed as a real-time software with all necessary supports for the communication to the furnace PLC. With a reaction time of less than 5 ms it is possible to recognize and process external tie-critical signals.

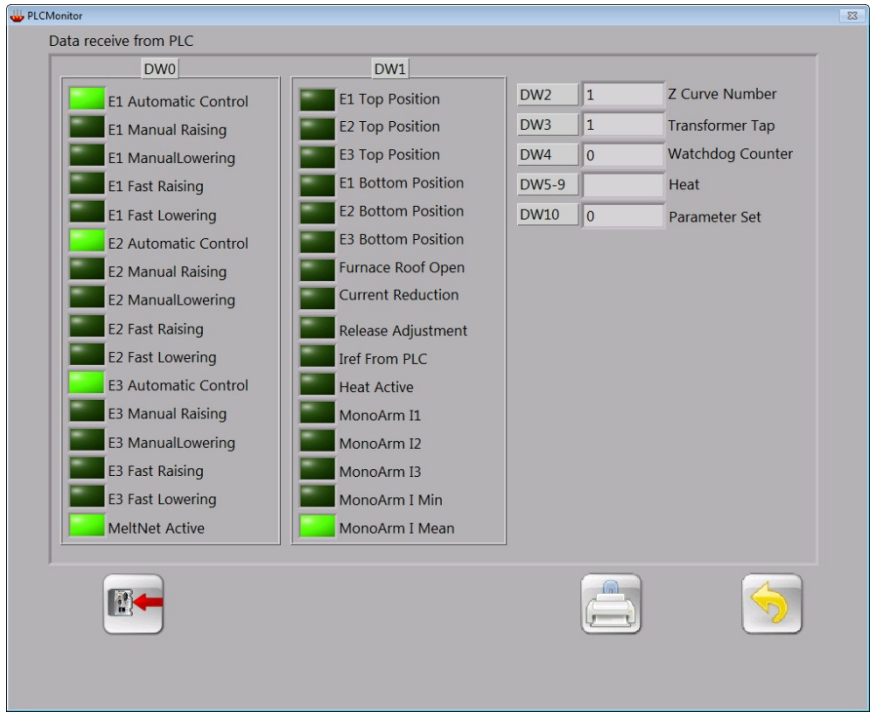
The Windows based visualisation program equipped with setup, analyse and maintenance tools allows an easy handling of the DECTEQ regulation.



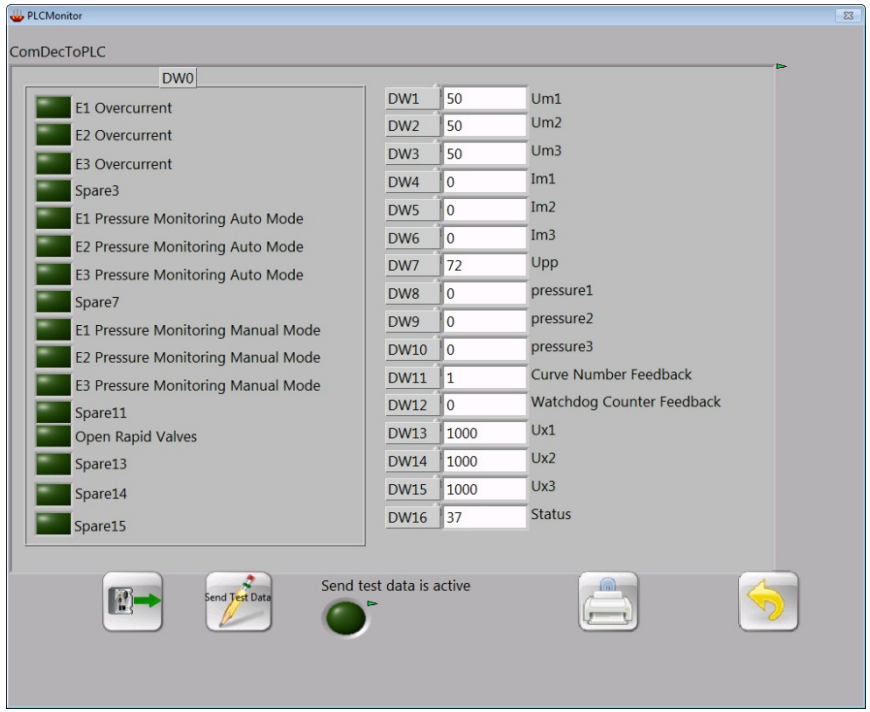
Controller Parameter



Communication Monitor

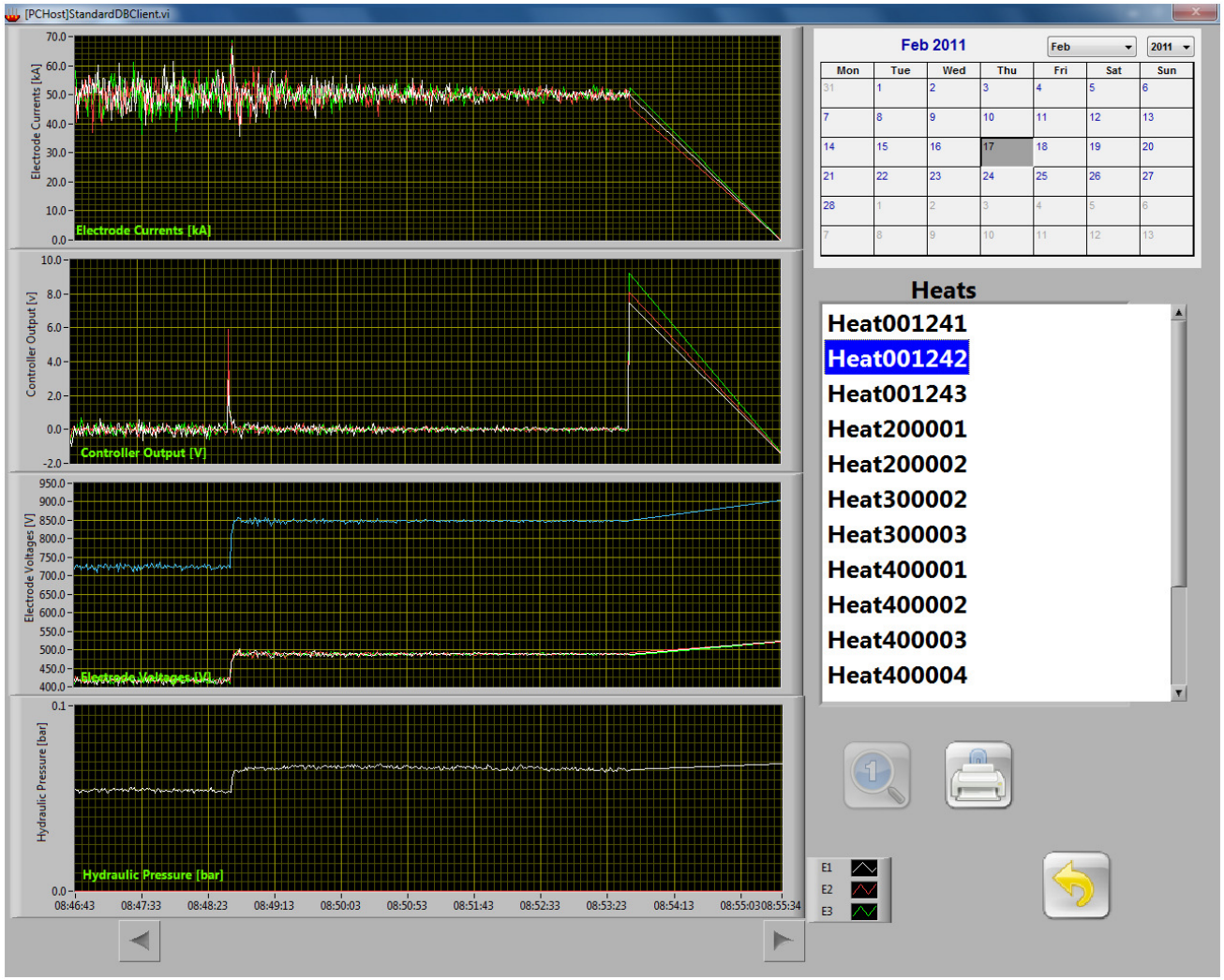


Receive Data



Sent Date

Data Base Viewer

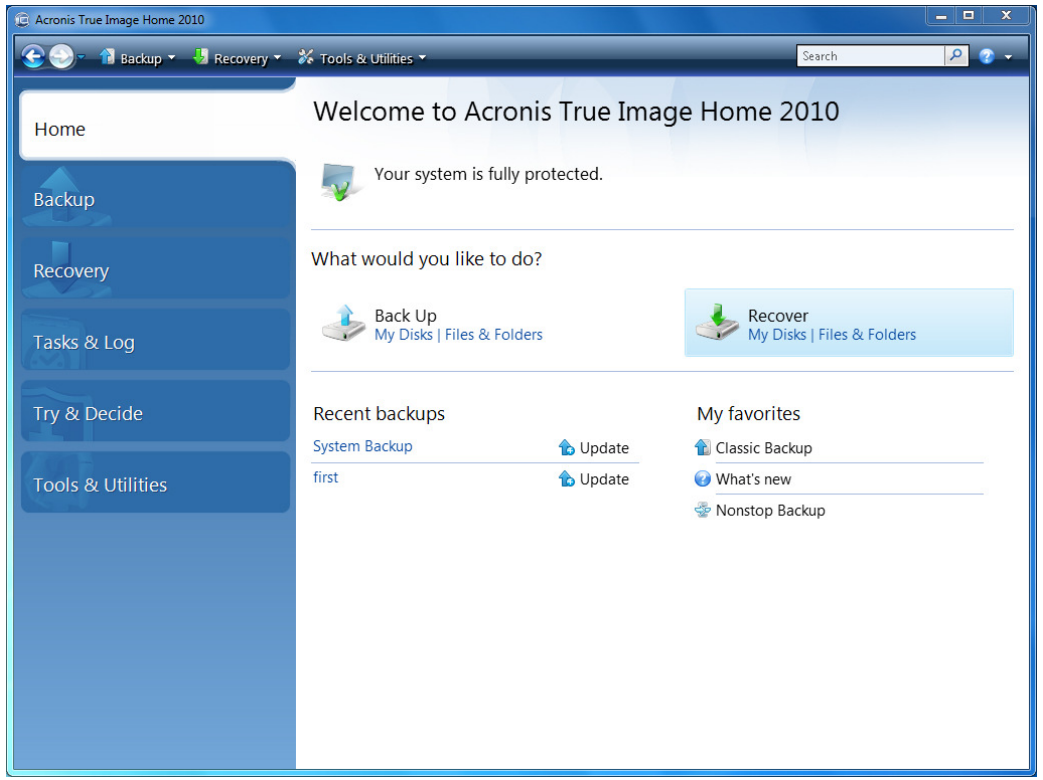


Back and Recovery

As Backup and Recovery Tool for MeltNet visualization workstation we supply Acronis True Image.

The bootable USB stick allows to fix the MeltNet system in acceptable time. Also if the hard disk is replaced to a brand new one.

If necessary for maintenance the access to the embedded system happens browser based directly from the MeltNet workstation.



Worldwide more than 220 applications

The Americas

Brazil
Chile
USA
Venezuela

Europe

Belgium
Germany
Finnland
France
Italy
Luxembourg
Netherlands
Poland
Romania
Russia
Spain
Czech Republic
Turkey
Ukraine

Pacific Asia

China
India
Indonesia
Malaysia
South Korea
Taiwan
Thailand
Australia

Africa

Algeria
South Africa
Zimbabwe

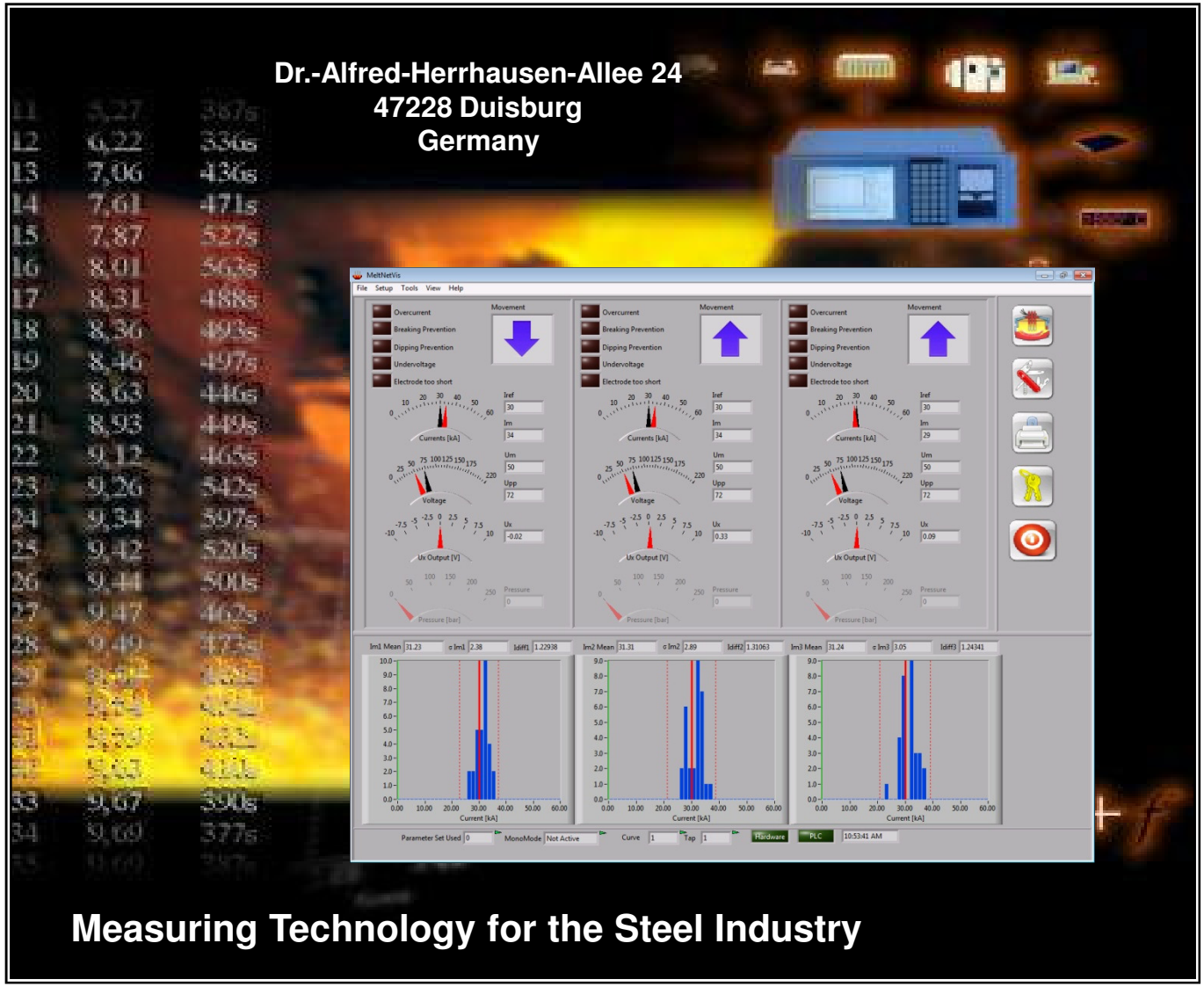
Specification of DECTEQ™ MeltNet

Scope of supply	
1 control panel	Rittal type TS8806 if requested with socket, dim. 800x2200x600mm (WxHxD), 19”-Industial Workstation in swing frame, 9 units height, completely wired to terminal strip
1 fuse box	Rittal type AE1033, dim. 300x300x210mm
1 matching box	Rittal type AE1073 or AE1130, dim. 760/1000x760x300mm, completely wired to terminal strip
3 Rogowski coils	size and design depend on high current bus bar

1 selector switch	electrode voltage (phase- phase, off, phase-ground)
3 V-meter	electrode voltage
3 A-meter	electrode current
1 software package	applications and operation system
4 manuals	drawings and description in German and English language
excludes	cables, mounting material and hydraulic parts (proportional valves, valve amplifier, pressure transmitter), etc.
options (extra charges)	1. Slag module for EAF 2. InkJet printer 3. UPS, 230VAC, 620VA 4. second workstation 5. redundant system 6. PROFIBUS-DP module 7. coupling PLC SIEMENS S7-300

Technical data	
colour of panels	RAL7035, mounting plate zinc-plated
power supply	230V or 115V AC, 1000VA
	internal 24V DC, 10A for proportional valves etc.
data interface	with furnace control PLC via Ethernet link, optional via PROFIBUS-DP
supported protocols	native TCP/IP via Ethernet, optional PROFIBUS-DP

voltage acquisition	secondary side of furnace transformer with Matching Box
current acquisition	secondary side of furnace transformer with Rogowski Coils or with CT's (range 5A/1A requested)
pressure acquisition	pressure transmitter (0)4. . .20mA (supply of hydraulic)
control output	+/-10V for proportional valves to move the electrodes, optional (0)4 to 20mA
sec. voltage indication	3 V-meter range 100V AC loose for main control desk
sec. current indication	3 A-meter range 4 to 20mA loose for main control desk
prop. valve indication	3 V/A-meter range +/-10V / 4 to 20mA for valve feedback signal
pressure indication	3 A-meter range (0)4 to 20mA in case of option electrode safety device only



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