

—INTECO—

APLAN

Process oriented automation

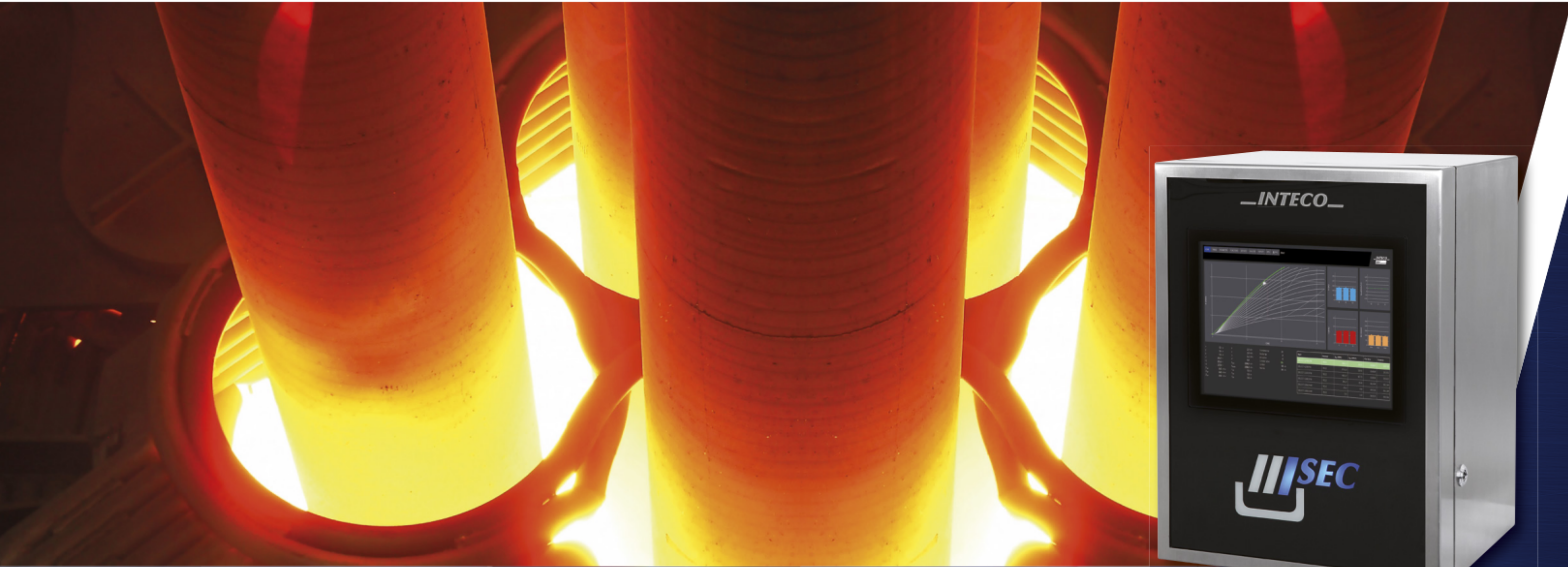
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—INTECO—

APLAN

Process oriented automation



CONSULTING, ENGINEERING, PROJECT MANAGEMENT AND TURNKEY SOLUTIONS FOR:

- > Process and factory automation
- > Integrated control system and HMI solutions
- > Electric-, measurement and control technology

REFERENCES IN THE FIELD OF THE STEEL INDUSTRY:

- | | | |
|--------------------------|-------------------------------|----------------------------|
| > Ladle furnace, VHD/VAD | > Alloy addition plant | > Electric arc furnace |
| > VD/VOD plant | > Automatic casting equipment | > Continuous casting plant |
| > Heat treatment furnace | > Annealing furnace | > Water treatment plant |

V01/2017

SEC

IntecoSmartElectrodeControl

Have an eye on our product ...
... and improve your furnace!



HAVE A LOOK ON OUR NEWEST TECHNOLOGY

ISEC – SMART ELECTRODE CONTROL – A STEP CLOSER TO YOUR SMART PROCESS

ISEC controls the electrode movement dynamically at an optimum working point to convert the electrical energy into heat in a most efficient way.

ISEC was developed with regard to modern furnace operation requirements for electric arc and ladle furnaces in the iron and steel making industry (EAF, LF, VHD/VAD). Additional ISEC can control submerged arc operation, which extends the range of application to all kind of electric furnaces for non-ferrous metals, ferro-alloys and slag heating.

ISEC the new digital electrode control system is based on a state of the art embedded controller which allows sampling and precise computations of all electric values in real time. For flexible operation and fast diagnostics a modern web based visualization system is integrated.

YOUR BENEFIT

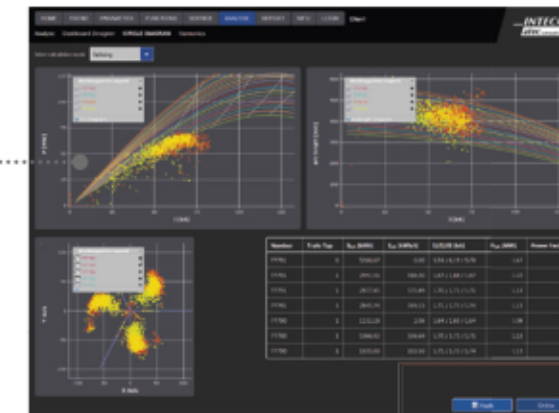
- > increase of **productivity**
- > best **energy efficiency**
- > less **electrode- and refractory consumption**
- > fast **return on investment**
- > individual customized **reporting & analyze tool**



IMPROVE YOUR FURNACE – OPTIMIZE YOUR PROCESS BASED ON ACTUAL & HISTORICAL DATA

All relevant furnace information at a glance

- > working point
- > voltages
- > currents
- > velocities
- > arc lengths
- > energy input



Be informed – No matter where you are

- > The user interface works natively in any web browser, without the need for any additional software installations or plugins. It can be operated via devices like desktop and industrial PCs, tablets or smartphones.
- > access to all functions via web based HMI

SPECIAL FEATURES

- > automatic dip test procedure with plausibility check of the measured data
- > automatic valve scaling procedure
- > adaptive set point and deadband control
- > foaming slag control via fuzzy logic
- > historical database for 24 hours with a sampling rate of 0,1 s and one year with a sampling rate of 1s
- > historical database of statistical values for the whole furnace life time

Have an eye on our product and improve your furnace!



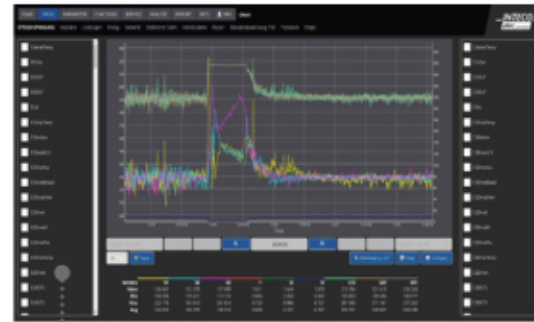
HAVE A LOOK ON OUR NEWEST TECHNOLOGY

ISEC – SMART ELECTRODE CONTROL: NOT ONLY A CONTROLLER BUT ALSO A DATABASE SERVER, THAT ALLOWS A COMPLETE INTEGRATION INTO YOUR SMART FACTORY – INDUSTRY 4.0 READY



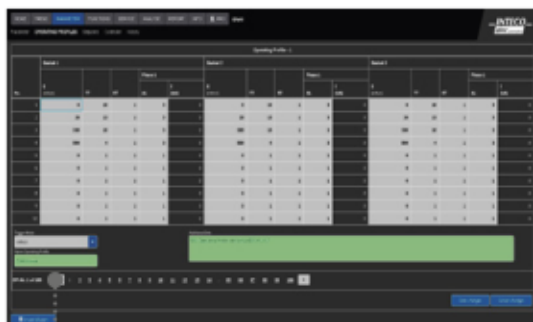
The proper working point of the furnace is essential for an optimal electric power input. To figure out this point ISEC offers several diagrams.

- > furnace circle diagram and arc length diagram with actual and historical working point data
- > current phase-symmetry



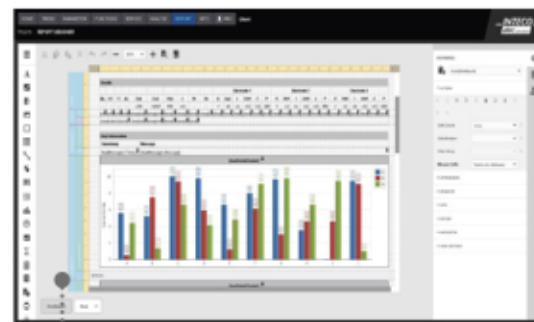
Individual customized analysis

- > trend analysis
- > key performance indicators (e.g. power consumption, power on time, tap to tap time, ...)
- > adaptable analysis via dashboard designer



Operating profiles

- > possibility to use up to 100 operating profiles
- > intuitive operator handling
- > monitoring of the actual process step



Individual customized reporting

- > heat reports
- > adaptable via report designer

ISEC – FUNCTIONALTY OVERVIEW



- > compact size
- > standard state of the art hardware components
- > Peltier cooling system for internal hardware components
- > plug and play philosophy
- > web browser based HMI



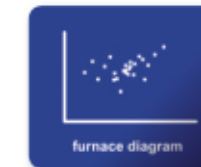
- > signal processing and visualization of process relevant parameters e.g. I, U, P, Q, S, Pf, X, Z, R ...
- > calculation and analysis of harmonics and THD
- > compensation of neutral point displacement
- > data acquisition @ 2,5 kHz
- > data base recording



- > controller for EAF, LF, VHD and non-ferrous furnaces
- > advanced impedance control
- > fine control range
- > dead zone range
- > melt current set point
- > adaptive set point control
- > adaptive deadband control



- > possibility to use up to 100 operating profiles
- > intuitive operator handling
- > monitoring of actual process step



- > automatic calculation of furnace diagram
- > monitoring of actual working point
- > circuit diagram (P, Q) or power diagram (P, I)
- > single electrode value or total average value



- > I,Z set point table
- > transformer, reactor and grid data
- > storing and loading different data sets



- > automatic dip test procedure with calculation of high current system parameter with plausibility check
- > synchronized start procedure
- > over current protection
- > nonconductive material detection
- > automatic valve scaling procedure
- > foaming slag control via fuzzy logic



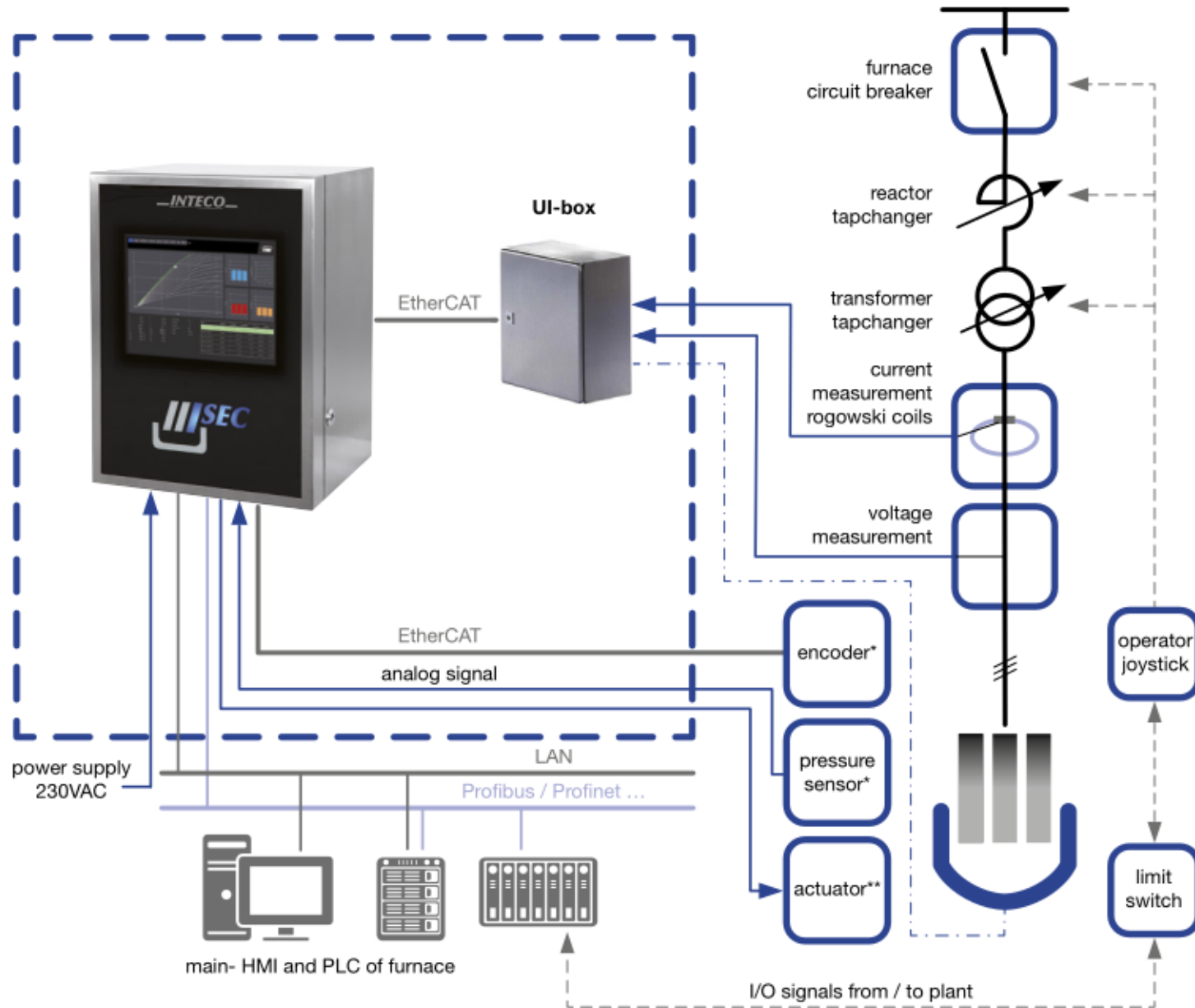
- > remote access service
- > with our team – consisting of electrical-, automation- and metallurgy-engineers we can offer a special service to evaluate and optimize your furnace operation

Have an eye on our product ...
... and improve your furnace!



HAVE A LOOK ON OUR NEWEST TECHNOLOGY

ISEC SYSTEM CONFIGURATION



*optional components **proportional valve / linear drive

ISEC SYSTEM DATA

Technical data

| item | data |
|---------------------|---|
| ISEC cabinet | stainless steel, 480 x 690 x 330mm (wxhxd) approx. 40kg |
| UI-box | stainless steel, 500 x 500 x 300mm (wxhxd) approx. 20kg |
| power supply | 230 VAC (1A) |
| monitor | multi-touch, 17" |
| main cycle time | <10ms |
| current measurement | Rogowski coils or current transformer (primary or secondary) |
| voltage measurement | protected voltage transformer |
| control output | -10V.....+10V standard, different configuration e.g. +/- 300mA or +/- 200 mA are available on request |
| ambient temperature | -10.....+45°C |
| relative humidity | 5.....90% |

Interfaces

| technology | protocol |
|-----------------|---|
| ethernet | OPC Server, Profinet, EtherCAT, TCP/IP |
| fieldbus-system | Profibus DP, DeviceNet, Modbus, CANopen ... |

IFOB - INTECO FURNACE OPTIMIZATION BOX

IFOB is a platform for an overall process control for electrode arc furnaces.

- > knowledge based system with an integrated inference engine
- > enables dynamic process control
- > costs & time saving
- > extends the lifetime of your furnace
- > improves your process & steel quality
- > report- & analysis-tool

electrode-consumption
gas-analysis shell-temperature
lime pressure refractory-wear
metallic-yield temperature cooling water
burner carbon dedusting
time voltage harmonics
arc current
optical-emission
melting-condition steel-composition
foaming-slag-index oxygen

