

AUXILIARIES CONTROL

- 32-bit multiprocessor to control the following subsystems:
 - hydraulic and pneumatic subsystems.
 - greasing subsystems.
- Communication with other control systems is carried out by:
 - TCP/IP local bus for communication with other control systems belonging to level 0 and communication with level 2.
 - Interbus S field bus for the communication with the drive control systems.
 - Interbus S field bus for the communication with the inputs/ outputs remotes.

SUPERVISION SYSTEM

Man machine interface for process control and supervision based on compatible PC's. It realizes the following functions:

- process data handling and visualization.
- process diagnosis.
- start-up condition displays.
- alarm display and management.
- trending of process variables.

DRIVES CONTROL SYSTEM

Ingeteam Industry has developed a family of products for controlling drives:

- MOTOCON DC for d.c. motors
- MOTOCON AC - frequency inverters with scalar and vectorial control - for asynchronous a.c. motors.
- MOTOCON Direct for cycloconverter control of very large a.c. motors.

MOTOCON products carry out the following standard functions: speed, current and torque control.

These functions are subordinated to others in the master control and auxiliaries control.

SCOPE OF SUPPLY

Ingeteam Industry supply includes:

- electrical equipment:
 - Motors.
 - Drive control.
 - Auxiliary electrical equipment.
 - Master control system.
 - Technological control system.
 - Auxiliaries control (PLCs).
 - Supervision system.
- and also:
 - Engineering.
 - Erection.
 - Commissioning.
 - Project coordination.
 - Documentation (EPLAN and AUTOCAD).
 - Training.

Ingeteam Industry

Ingeteam

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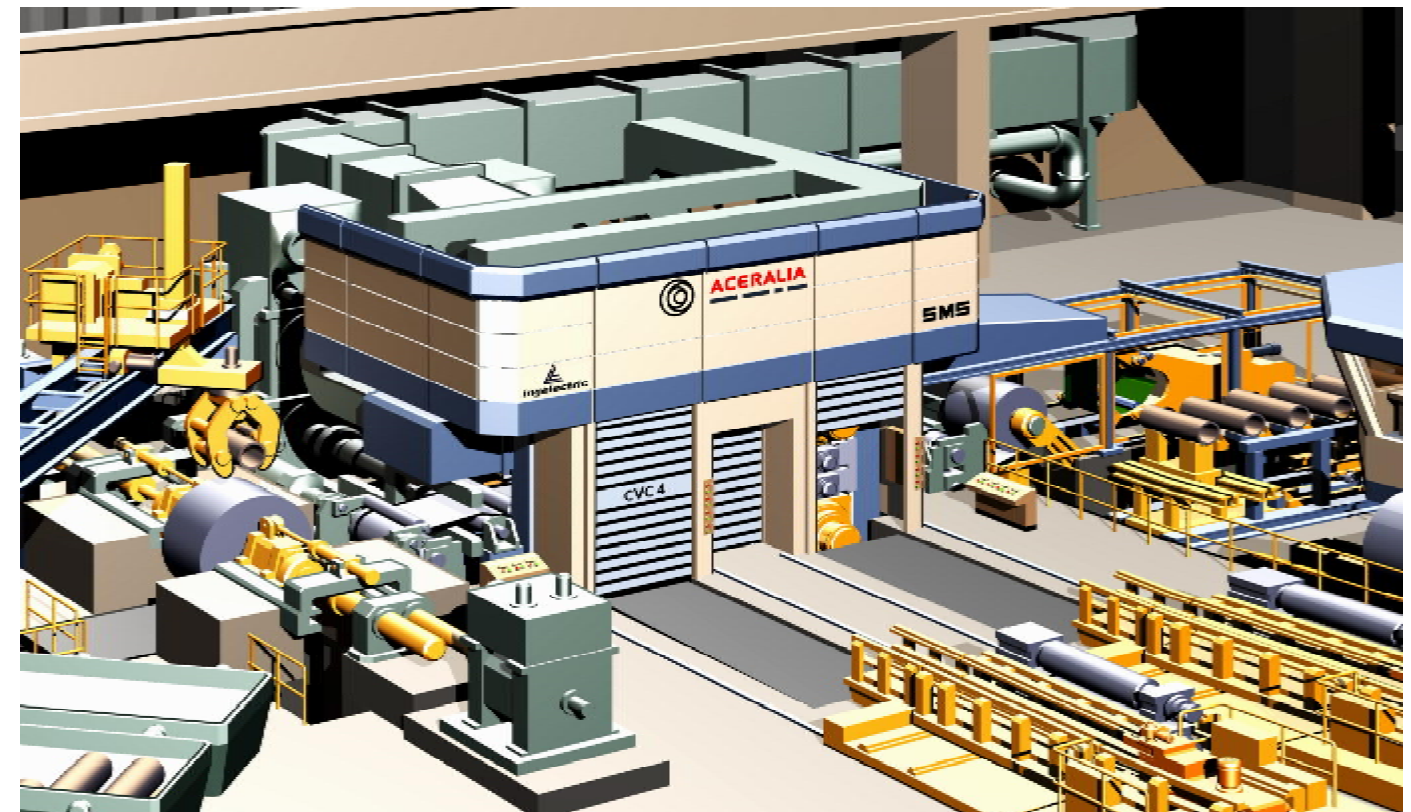
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COLD ROLLING MILL

SKIN PASS AND REVERSING ROLLING MILL



Ingeteam
industry

Reducing maintenance and operating cost, increasing productivity and improving product quality are the imperatives of today's iron and steel industry, which INGETEAM INDUSTRY fully shares with its customers.

MAIN FEATURES OF THE CONTROL SYSTEM

Ingeteam Industry automation system for cold rolling mills presents the following characteristics:

Functionally hierarchized

- Level 0: functions for drive control
- Level 1: functions for control of all actuators according to level 2 setpoints in order to obtain a high quality product.
- Level 2: functions for optimization and presetting of mill conditions, pass schedules, data logging, reports ...
- Level 3: functions for production management.

Flexible

Decentralized and distributed control as well as modular architecture.

Standard

Based on open systems with interfaces to other control systems.

Powerful

Integrated of 32-bit multiprocessors.

Ergonomic

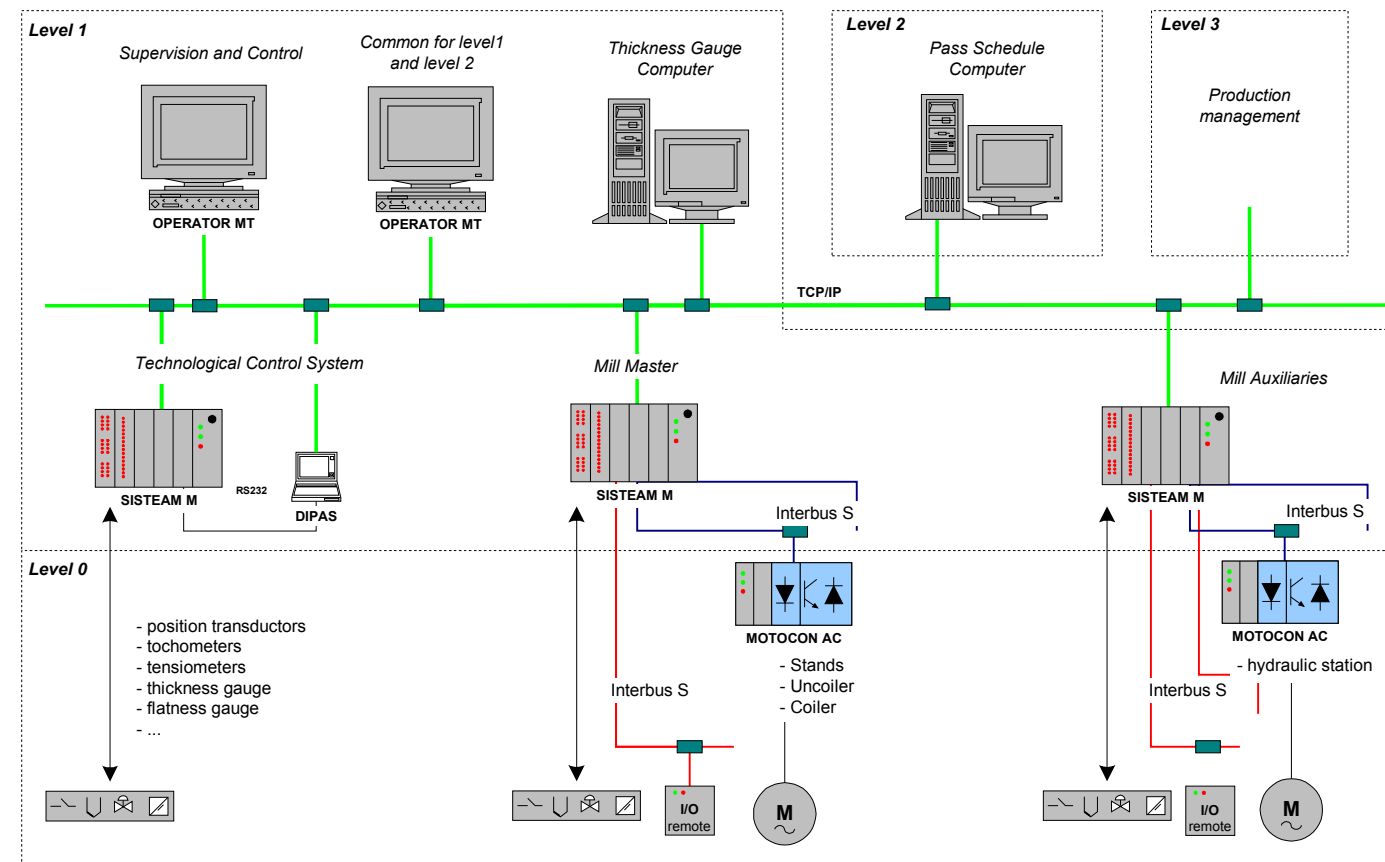
Operation graphic interfaces based on Windows. Programming according to IEC 1131-3 standard languages.

Total supervision

Displays for complete control and supervision of the process.

Diagnosis

Displays for troubleshooting.



TECHNOLOGICAL CONTROL SYSTEM

The technological control system has a direct impact in the product quality and process efficiency.

In addition to its **fast loop control**, it integrates in a very precise and efficient manner the sensors and actuators utilized in the process considering compensation functions.

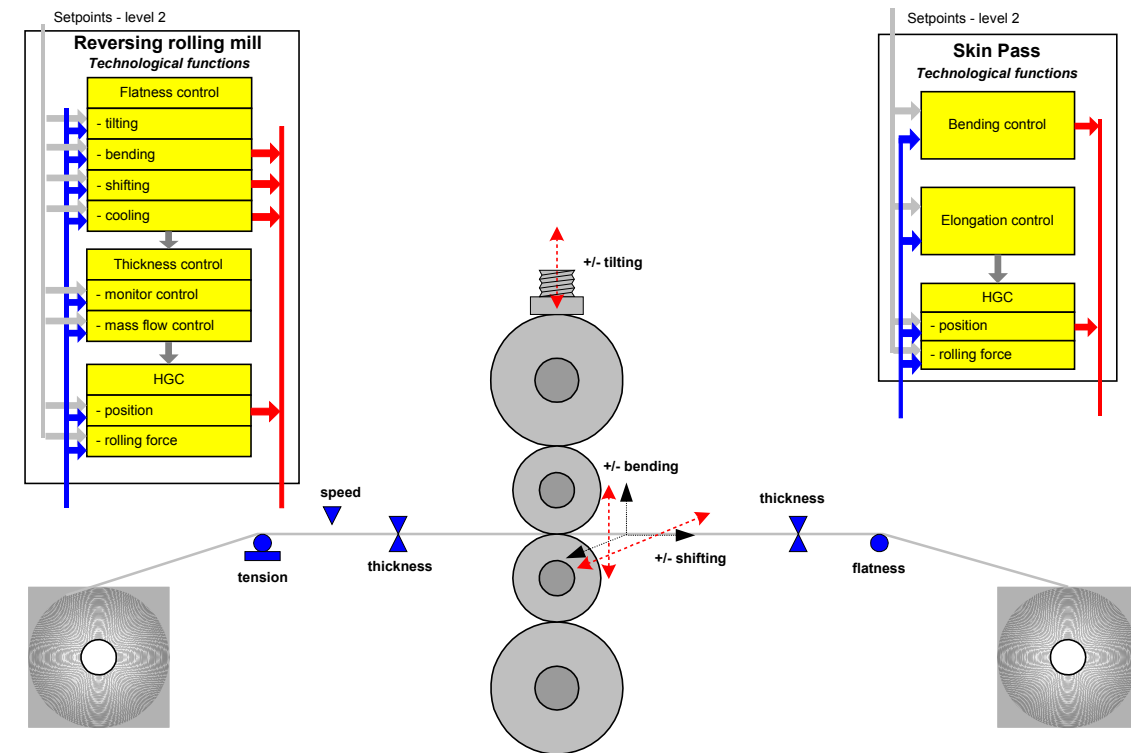
The main features are the following:

- 32-bit multiprocessor control system to perform the **thickness** fast closed loop control:
 - position control.
 - rolling force control.
 - "feedback" control.
 - "feedforward" control.
 - "mass flow control".
 - tension control.
 - compensation functions: bending, eccentricity and oil film.
 - DCR control: elongation control.

- 32-bit multiprocessor control system to perform the **flatness** fast closed loop control:
 - tilting control.
 - bending control.
 - shifting control.
 - cooling control.

- **Interfaces** to transducers:
 - position.
 - pressure.
 - thickness.
 - speed.
 - flatness.

- **Communication** with other control systems is carried out by:
 - TCP/IP local bus for communication with other control systems belonging to level 0 and communication with level 2.
 - RS232/RS485 for communication with the diagnostic and parametrization system - DIPAS -.



MASTER CONTROL

The multiprocessor control system ensures a good digital control of both the tension and the speed of the strip.

- It realizes the following **functions**:
 - generation of setpoints and ramps for speed and torque.
 - additional regulation fast loops.
 - automatic sequences.

- **Communication** with other control systems is carried out by:
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