

## 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

INGETEAM, A.S.  
Technologická 371/1  
70800 OSTRAVA-PUSTKOVEC  
REPUBLICA CHECA  
Tel.: 420 59 732 68 00  
E-mail: czech@ingeteam.com

INGETEAM GmbH  
Stielerstrasse, 3  
80336 MUNICH - ALEMANIA  
Tel.: 49 89 99653855  
E-mail: deutschland@ingeteam.com

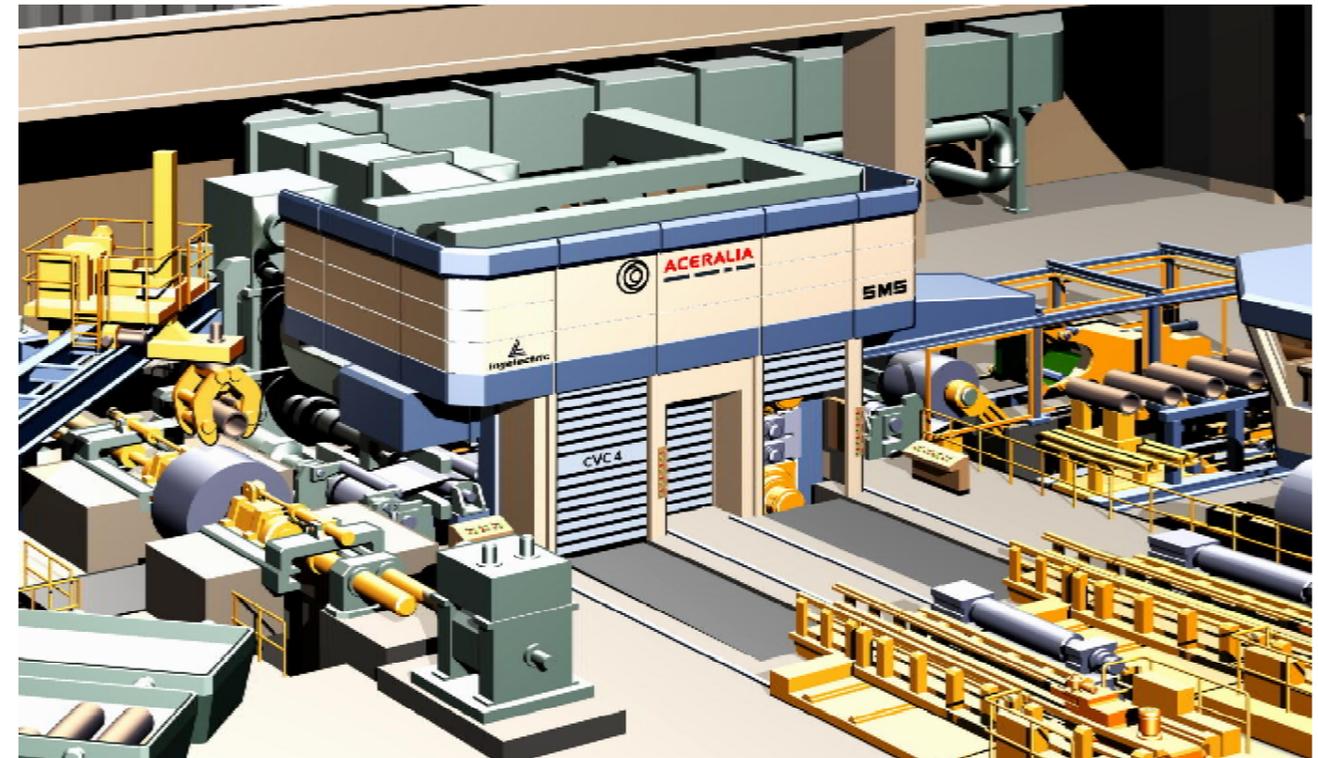
INGETEAM INDUSTRY, S.A.  
Parque Tecnológico. 106  
48170 ZAMUDIO (BIZKAIA) - ESPAÑA  
Tel.: (+34) 94 4039720 Fax.: 94 4039688  
E-mail: industry@ingeteam.com  
www.ingeteam.com

INGETEAM, LTDA  
Rua Luiz Carlos Brunello, 286  
Chácara Sao Bento  
13278-074-Valinhos SP-BRAZIL  
Tel.: 55 19 30 37 37 73  
E-mail: brazil@ingeteam.com

ENSILECTRIC, S.A.  
Parque Tecnológico Asturias  
Edif. Centroleña nº 46-2ª planta  
33428 Llanera (ASTURIAS) - ESPAÑA  
Tel.: (+34) 98 5268012  
E-mail: ensilectric@ensilectric.com

# 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

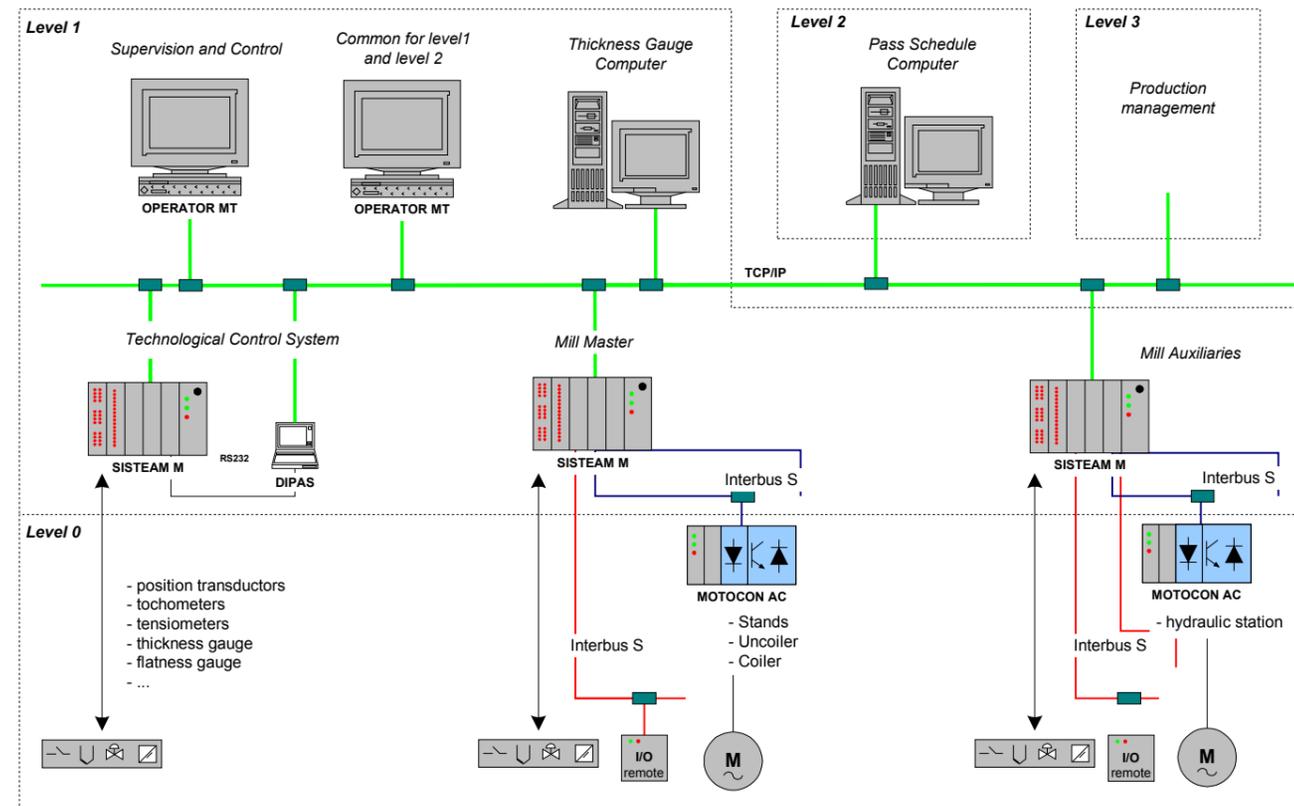
Operation graphic interfaces based on Windows. Programming according to IEC 1131-3 standard languages.

#### 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.

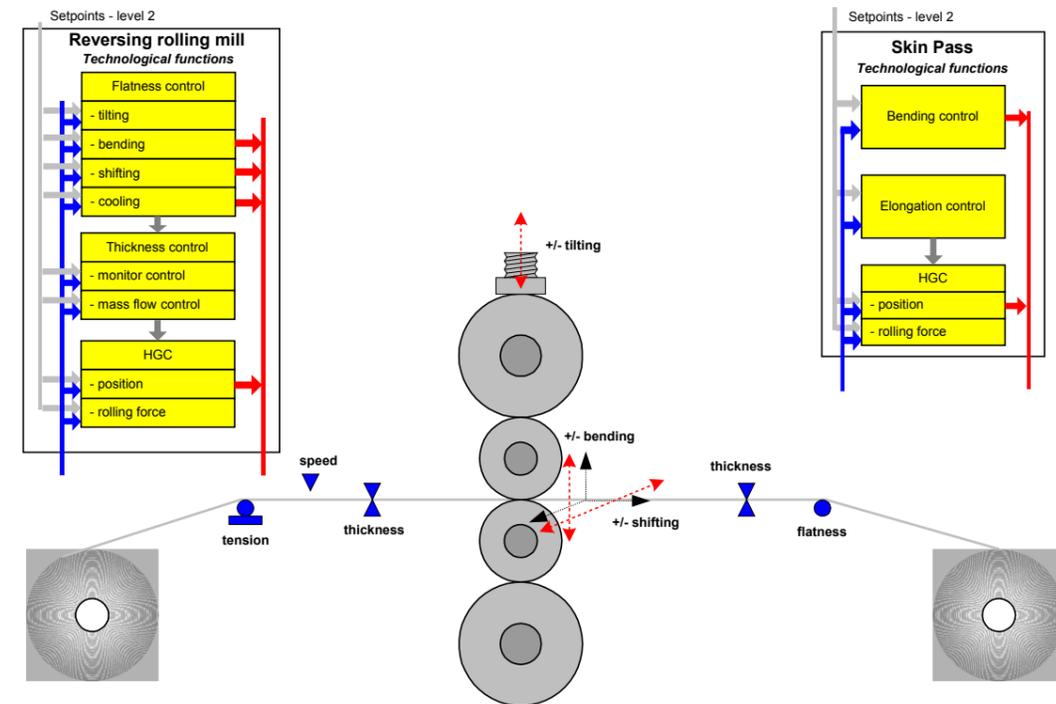
The main features are the following:

- 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:
  - 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.