

Scope of Supply

Ingeteam Power Technology, S.A. Industrial Systems Division carried out the complete turn-key project:

- Total installed power 7.500 kVA
- Project coordination.
- Basic and detail engineering.
- Supply of Electrical Equipment, drives and process control system:

Low Voltage Distribution Boards.
Main Drive Motors - make **INDAR** -
Main Drive converters based on DC technique -MOTOCON DC-*.
Auxiliary Drives -MOTOCON AC-*.
AC Motor Control Center (MCC)
Peripheral devices.
Process Control PLC systems (-SISTEAM M-)*.
Operation and Monitoring systems (HMI) (-OPERATOR MT-)*.
Technological Control Systems (AGC and HGC).

- Electrical Installation.
- On site commissioning.

- The following special sensors for TCS have also been integrated by Arania:
 - Thickness gauges
 - Position and pressure gauges

(*) The Sisteam M, MOTOCON DC, MOTOCONAC and OPERATOR MT are equipment designed and manufactured by Ingeteam Power Technology, S.A.



Main Control Pulpit



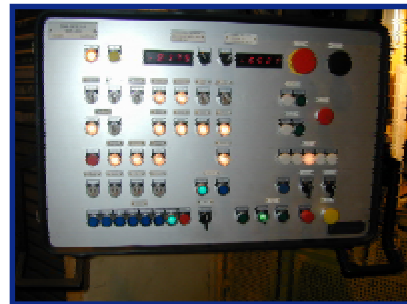
Coiler



Tandem Arrangement Motors (Mill Stand)



Process Control



Entry Pendant Panel

After Sales Services

- Hot-line service.
- Spare part availability in 24 hours.
- Direct dial to our engineers.
- Remote communication from our headquarters to plant automation system.

Ingeteam

Reversing Cold Strip Rolling Mill

ARANIA - Euba (Spain)



Process Description

ARANIA S.A. commissioned during the second semester of year 2000, a reversing cold rolling mill in its plant, located in Euba (Spain). The aim of this mill is the production of rolled strip for its finishing lines.

The rolling mill is designed for the reduction and elongation of the steel strip in order to reach the required coil quality, size and thickness.

SMS Demag / Sidernaval as main contractor and Ingeteam Power Technology, S.A. Industrial Systems Division as supplier of the electrical and automation equipment have succesfully fulfilled the major requirements of the rolling mill.

The mill comprises a quarto mill stand with working rolls of size $\varnothing 230 \times 900$ mm and Back-up rolls of size $\varnothing 800 \times 850$ mm, one first pass uncoiler and two reversing coilers.

The Main Drive Equipment is based on DC-motors and their associated thyristor converter units, digitally controlled. The automation system consists of a master control system for the mill setup, speed and torque setpoint generation, emergency strategy and auxiliary system control. Additionally, the AGC control system is in charge of the Hydraulic Gap Control (HGC) and the thickness control. Thickness control is realized by means of « Eberline » type gauges. Position transducers for HGC are integrated in the hydraulical cylinders.

The standard control panels along the mill together with visualization and supervision systems (HMI) provide easier handling and maintenance of the rolling mill .

Main Technical Characteristics

Type: **4-High Stand Reversing Mill (up to 5 passes)**

Mechanical Supplier: SMS DEMAG / SIDERNAVAL

Material: Carbon Steel

Operation:

Dry temper: Max. elongation: 0,5 %
Min. elongation: 2 %

Reduction: Max. reduction: 35 % per pass

Production:

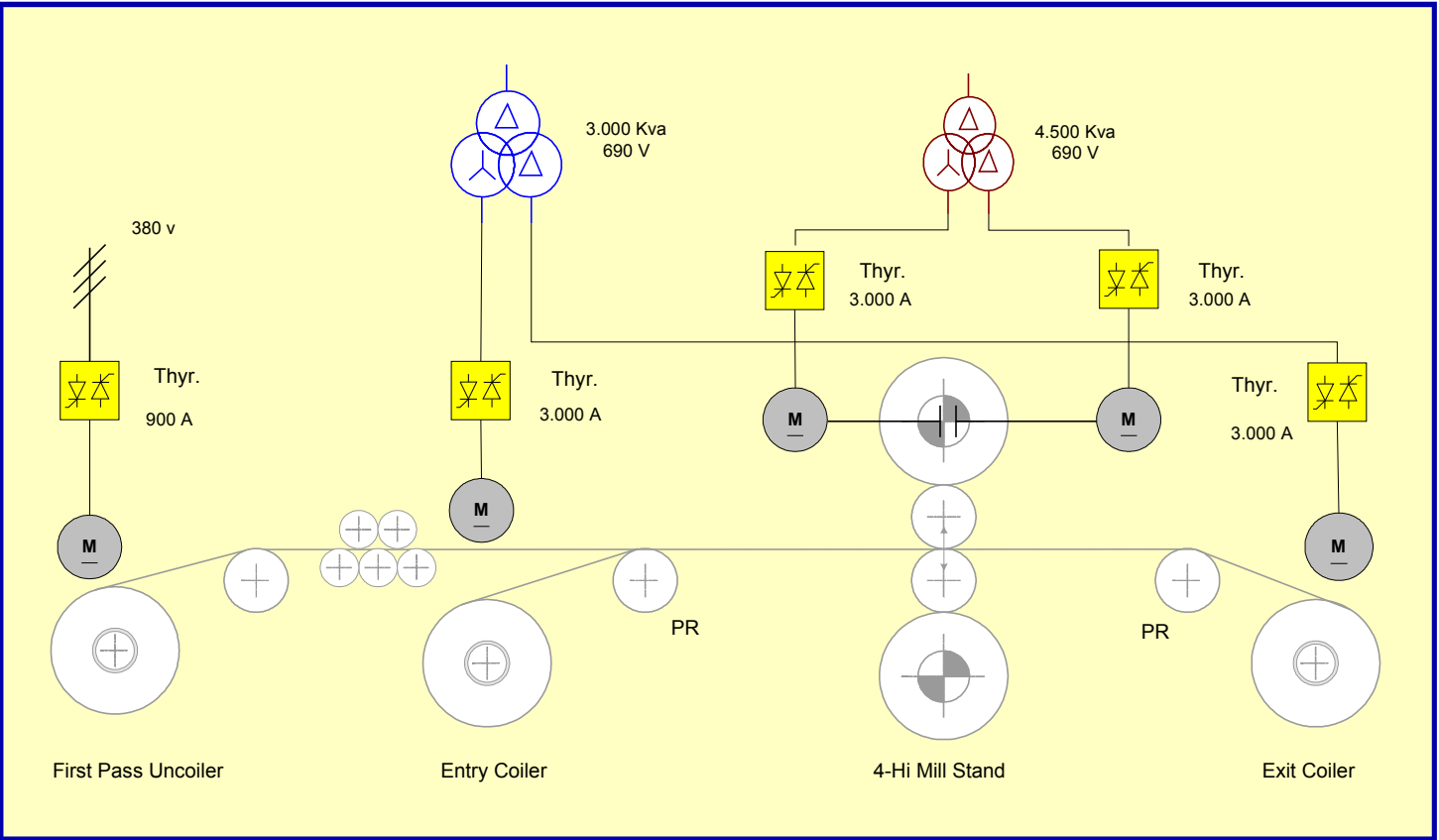
Reduction: 100.000 tpy - average thickness: 0,6 mm
- average width: 700 mm

Reduction+SKP: 60.000 tpy - average thickness: 0,6 mm
- average width: 700 mm

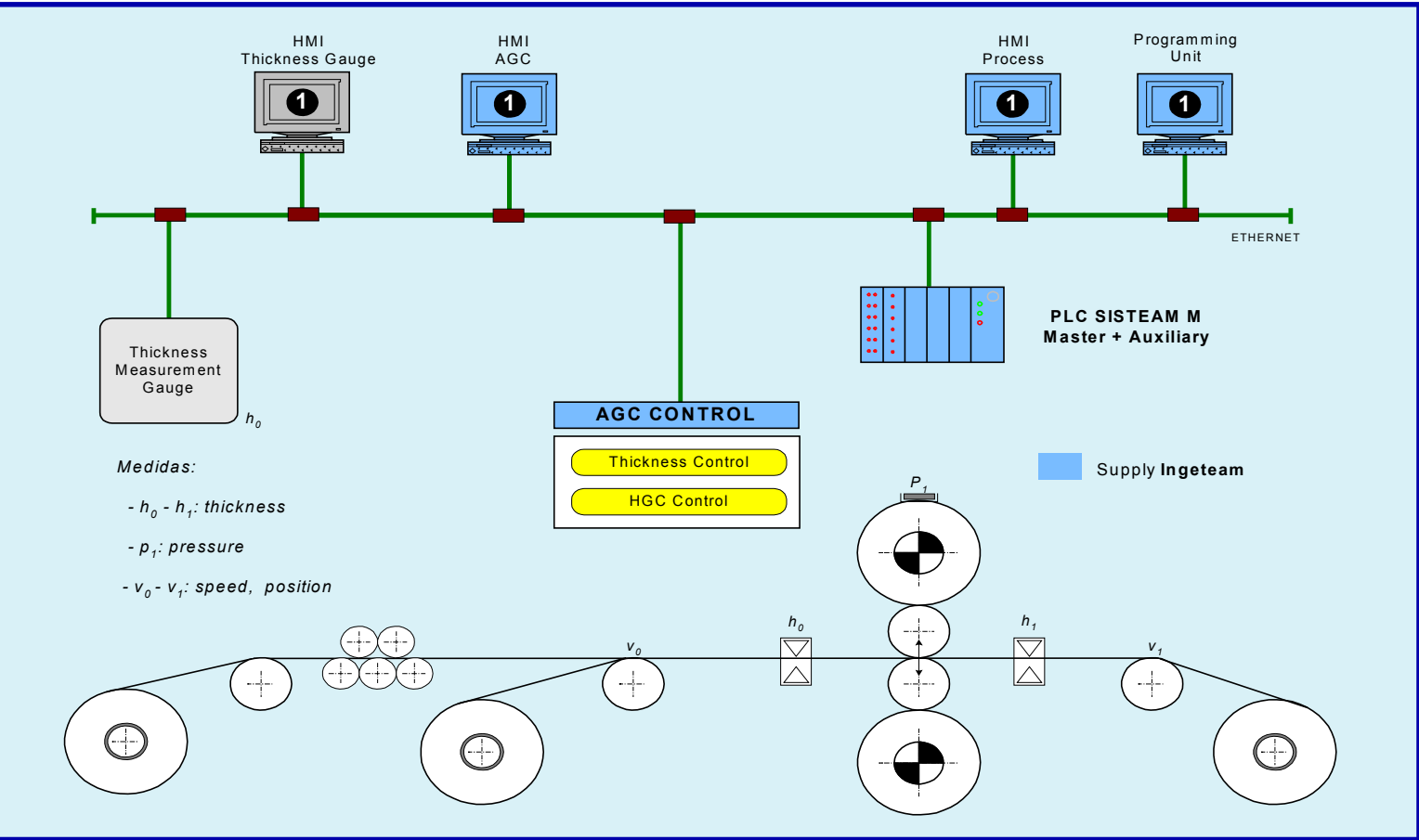
Coil characteristics:

Coil width: 350 - 750 mm
Entry thickness: 0,51- 6 mm
Exit thickness: 0,5 mm
Inner diameter: 508 mm
Outer diameter: 1.800 mm
Max. weight: 13,5 t

Main Drive Equipment Diagram



Control Diagram



	1st pass uncoiler	Entry Coiler	Pinch Roll	4-Hi Mill Stand	Pinch Roll	Exit Coiler
Pn (kW)	170/170/170	1050/1050/1050	5.5	2 x 1200/1200/1200	5.5	1050/1050/1050
rpm	450/520/1600	320/435/1100	1500	2 x 450/525/1100	1500	320/435/1100
Un (V)	355/400/400	550/725/725	400	2 x 630/725/725	400	550/725/725
In (A)	545/472/472	2090/1537/15437	10.4	2 x 2048/1757/1757	10.4	2090/1537/1537
Mn (Nm)	3608/3122/1015	31340/23054/9117	35	2 x25470/21831/10419	35	31340/23054/9117
J (Kgm2)	14.06	320	2.5	2 x 650	2.5	320
Ø (mm)	508/1800	508/1800	250	WR 210/230 / BUR 720/800	250	508/1800
i	7.1/14.2	1.8/3.6		0.725		1.8/3.6
VL (m/min)	350	1000	1000	1000	1000	1000

The DC motors are driven by modular MOTOCON DC TPS (Thyristor power supply) units.

These TPS converters, which are completely designed and manufactured by Ingeteam Industry, feature a fully digital control in conjunction with 3-phase thyristor converters, regenerative type, with current ratings ranging from 1000A to 3400A, for 400 Vdc to 690 Vac input voltage. Main characteristics are as follows:

Type: MOTOCON DC
Power rating: up to 2.8 MW
Voltage: 400 to 690 Vca
Rectifier type: Thyristors (antiparallel bridges)



DC-Motor Control Center