Scope of Supply

Ingeteam Power Technology, S.A. Industrial System Division is responsible for the complete “Turnkey” electrical project:

- Project management
- Basic and detail engineering
- Supply of electrical equipment, drives and process control systems:
  - Low voltage distribution centre
  - Main DC drives - MOTOCON DC*
  - Auxiliary equipment - MOTOCON DC*
  - AC motor control centre
  - Field sensors
  - Integrated control equipment - SISTEAM OCS*
  - Supervision and control equipment - OPERATOR OCS*
- Installation supervision.
- Commissioning.

(*) MOTOCON DC, SISTEAM OCS and OPERATOR OCS is equipment designed and manufactured by Ingeteam Technology.

Lusosider supplied the following measuring equipment:

- Strip thickness gauges

4 High Reversing Cold Rolling Mill

LUSOSIDER - Paio Pires (Portugal)
Lusosider, the Portuguese steel producer, shared by USINOR and CORUS, carried out the electrical modifications of two of the three existing cold rolling mills at its plant in Paio Pires (Portugal).

Lusosider commissioned Ingeteam Power Technology, S.A. Industrial Systems Division to design and install the state-of-the-art electrical and automation equipment.

The aims of these modifications are the following: to increase the production of cold rolled coils, to improve the coils’ quality, to replace obsolete equipment and to centralize the different units of production by the installation of latest generation visualization and control systems.

The modifications carried out by Ingeteam Power Technology, S.A. include:

Quarto Mill Nr. 1
- Speed master control
- Automatic thickness control AGC
- Hydraulic gap control HGC
- Operation and visualization systems and data logger
- Fault system

Quarto Mill Nr. 2
- Speed master control
- Automatic thickness control AGC
- Hydraulic gap control HGC
- Mill drives control
- Supply of thyristor converters for DC motors
- Supply of starters for AC motors
- Supply of programmable logic controllers (PLCs)
- Supply of operation and visualization systems (HMIs) and data logger
- Fault system

### Automation Control Diagram

**MILL NR. 1 AND 2 SPECIFICATIONS**

<table>
<thead>
<tr>
<th></th>
<th>Mill Nr. 1</th>
<th>Mill Nr. 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydraulic cylinder:</td>
<td>780</td>
<td>780</td>
</tr>
<tr>
<td>Diameter (mm)</td>
<td>780</td>
<td>780</td>
</tr>
<tr>
<td>Stroke max. (mm)</td>
<td>85</td>
<td>85</td>
</tr>
<tr>
<td>System pressure (bar)</td>
<td>240</td>
<td>280</td>
</tr>
<tr>
<td>Capsule pressure (bar)</td>
<td>210</td>
<td>245</td>
</tr>
<tr>
<td>Maximum force (Tn)</td>
<td>1000</td>
<td>1150</td>
</tr>
<tr>
<td>Maximum speed (mm/s)</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Servovalve type</td>
<td>Moog E760574</td>
<td>Moog E760574</td>
</tr>
<tr>
<td>(2 per capsule)</td>
<td>65 l/min to 70 bar</td>
<td>65 l/min to 70 bar</td>
</tr>
<tr>
<td>Position transducer</td>
<td>Sony Magnescale</td>
<td>Sony Magnescale</td>
</tr>
<tr>
<td>Linear</td>
<td>100 mm</td>
<td>100 mm</td>
</tr>
<tr>
<td>Pressure transducer</td>
<td>Schaeftig 791</td>
<td>Schaeftig 791</td>
</tr>
<tr>
<td>0-5V to 0-5000 psi</td>
<td>0-5V to 0-5000 psi</td>
<td></td>
</tr>
<tr>
<td>Deflector roll diameter (mm)</td>
<td>200</td>
<td>250</td>
</tr>
<tr>
<td>X-ray gauge</td>
<td>Eberline, 0.15 – 5 mm</td>
<td>Eberline, 0.15 – 5 mm</td>
</tr>
<tr>
<td>10 ms response</td>
<td>10 ms response</td>
<td>10 ms response</td>
</tr>
</tbody>
</table>

### Power Distribution

![Power Distribution Diagram]