

Scope of Supply

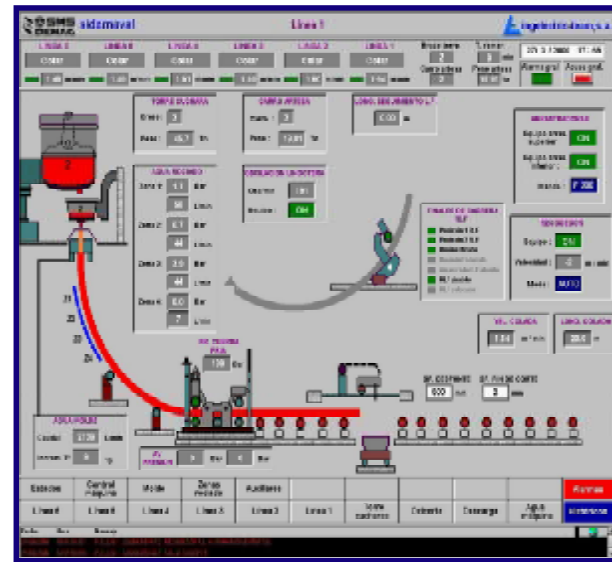
Ingeteam Power Technology, S.A Industrial Systems Division was responsible for the complete turnkey electrical and automation project:

- Project management
- Basic and detail engineering
- Supply of:
 - ✓ Low-voltage distribution center
 - ✓ AC MCC and VVVF MCC (Motor Control Centers)
 - ✓ AC main and auxiliary motors - MOTOCON AC*
 - ✓ Peripheral devices
 - ✓ Main control desks and pulpits
 - ✓ Basic automation for general purposes and for the six lines.
 - ✓ Communication networks (Level I and 0):
 - Level I: Bus Ethernet TCP/IP (10 Mbits/sec., DS-BUS protocol) to connect the different PLCs and HMI (OPERATOR MT)
 - Level 0: Interbus-S (500 Kbits/sec) to connect the different motor control equipment and PLCs)
 - ✓ Level II
 - ✓ Mould level control
 - ✓ Weighing system: 2 x ladle turret and 2 x tundish
 - ✓ Spray water control
- Training
- Electrical Installation
- Commissioning

(*) MOTOCON AC and the OPERATOR MT is equipment designed and manufactured by Ingeteam Power Technology, S.A.



Caster Panel



Strand Data



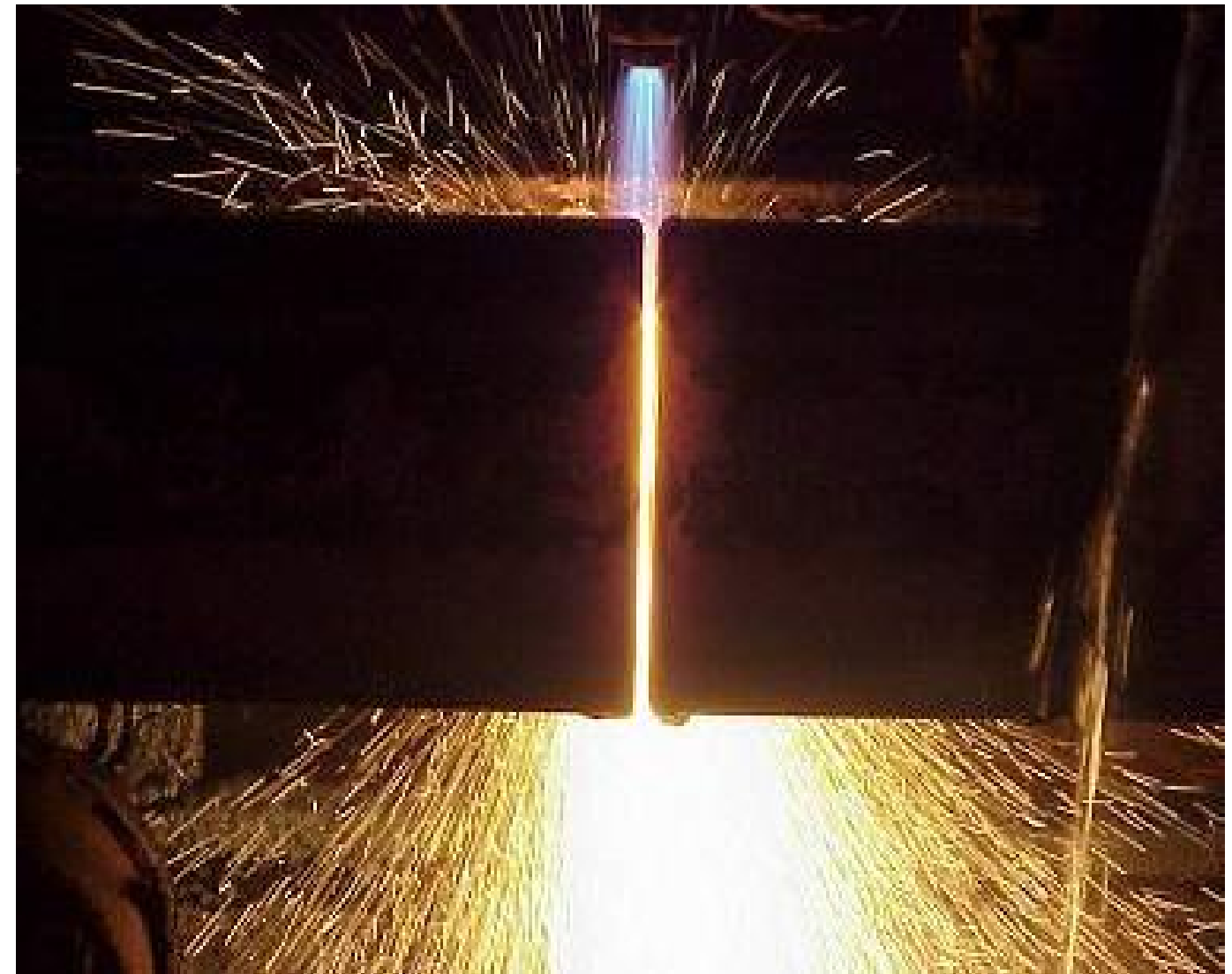
VVVF Motor Control Center

After-Sales Services

- Hotline
- Spare parts in 24 hours
- Direct line with our technical staff
- Remote communication from our offices to the factory automation network

Ingeteam

6 Strand Billet Caster SIDENOR-Basauri (Spain)



The Equipment

In early 1999, the company **SidernaVal-Demag** commissioned Ingeteam Industry to provide the turnkey supply of the Electrical and Automation Equipment for a 6 Strand Billet Caster.

The end user was **Sidenor**, Spain's leading steel forming and casting specialist. This company completed the construction of its Basauri steel shop in Spain in January 2000 taking the first step towards manufacturing sufficient steel to supply the company's two rolling mills at Basauri and Vitoria from a single shop.

The project envisages the manufacture of 750.000 ton per year of useful billet, approximately equal to the amount that was produced by both plants. Plans were made for the modernisation of the steel-manufacturing process, which would facilitate higher efficiency as a result of lower cost in energy, labour and maintenance.

The main drives' electrical equipment is composed of AC motors and converters with digital control. The line is automated using PLCs: 6 PLCs as strand control system, 1 PLC for the common drives.

The caster also includes HMIs (Human Machines Interfaces) in control pulpit, which make easy to the user the caster adjustment, control and tracking. These systems incorporate the application and monitoring software.

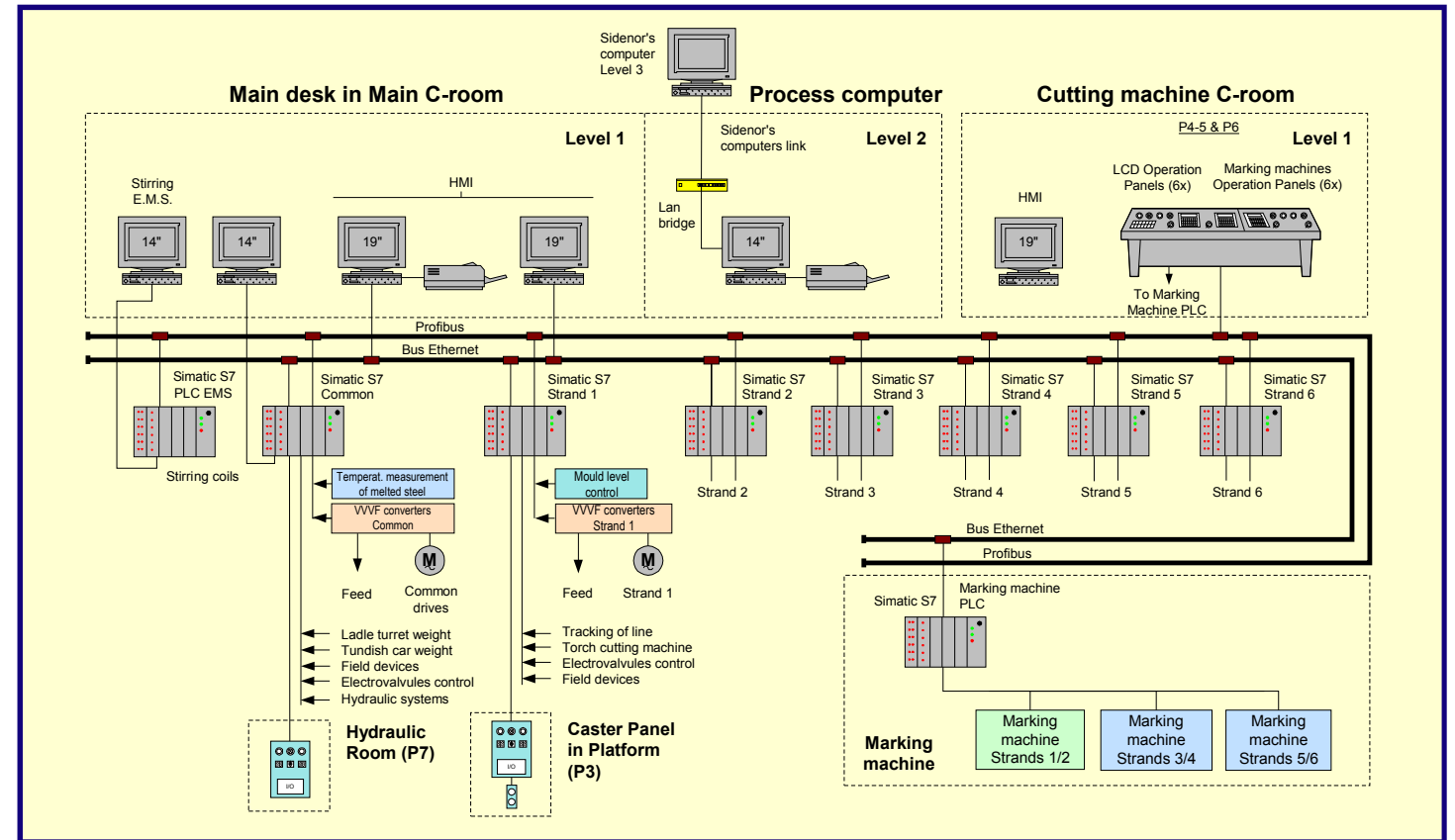


AC Drives

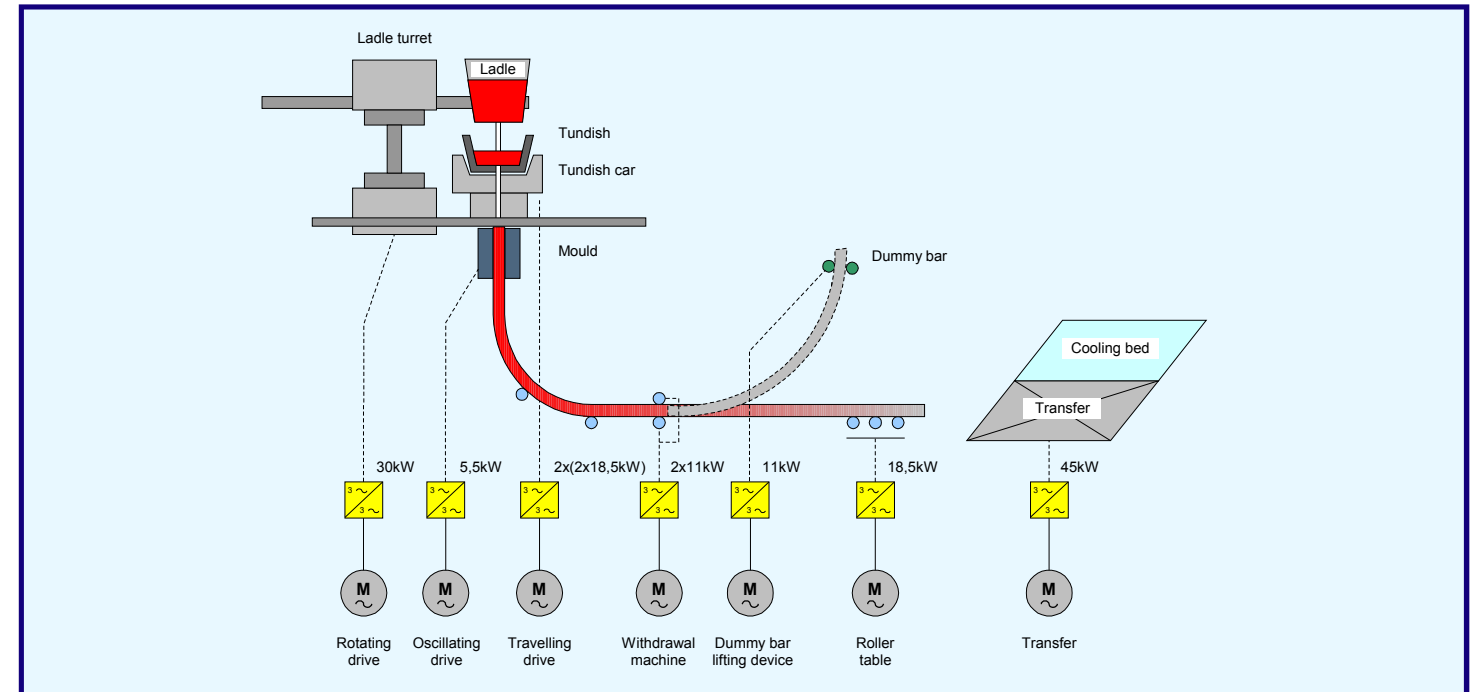
Technical Features

- Caster Type:** 6 Strand Billet Caster
- Machine builder:** SIDERNAVAL-DEMAG
- Base Material:** Special carbon steels for automobile industry
- Production:** 750.000 Ton/year
- Normal billet size:** 120 x 120 mm
155 x 155 mm
185 x 185 mm
- Minimum billet length:** 4,5 m (double discharge banking)
- Lineal speed:** 0.2 3 m/m
- Cooling zones:** 4 (3 controlled, 1 uncontrolled)
- Curvature radius:** 9 m
- Mould length:** (for 185 x 185 size): 1 m
- Ladle capacity:** 140 Tn (load cells: 250 Tn)
- Tundish capacity:** 45 Tn (load cells: 70 Tn)

Control Diagram



Single Line Diagram



The MOTOCON AC is a high performance frequency converters equipment with intermediate voltage circuit. The supply consists of a variable voltage and frequency three-phase output that permit to vary with great precision the three-phase asynchronous motors speed and torque. The control system is entirely digital with the consequent reliability increase.

Main features:

- Type: MOTOCONAC
- Power: for 5,5 to 45 kW
- Voltage: 380 Vac
- Rectifier: Diode type
- Inverter: IGBTs

	LADLE TURRET	MOULD OSCILLATING	TUNDISH CAR TRAVELLING	WITHDRAWAL MACHINE	D.B. LIFTING	ROLLER TABLE # 3	CARS TRANSFER
Pn (kW)	22	3	2x (2x7.5)	2 x 11	11	3 x 5.5	37
rpm	975	1000/1250	1500	1460	1460	1450	1000/2000
Un (V)	380	380	380	380	380	380	380
In (A)	46	6.1	15.5	21.5	21.5	11.5	75