

POSITION CONTROL

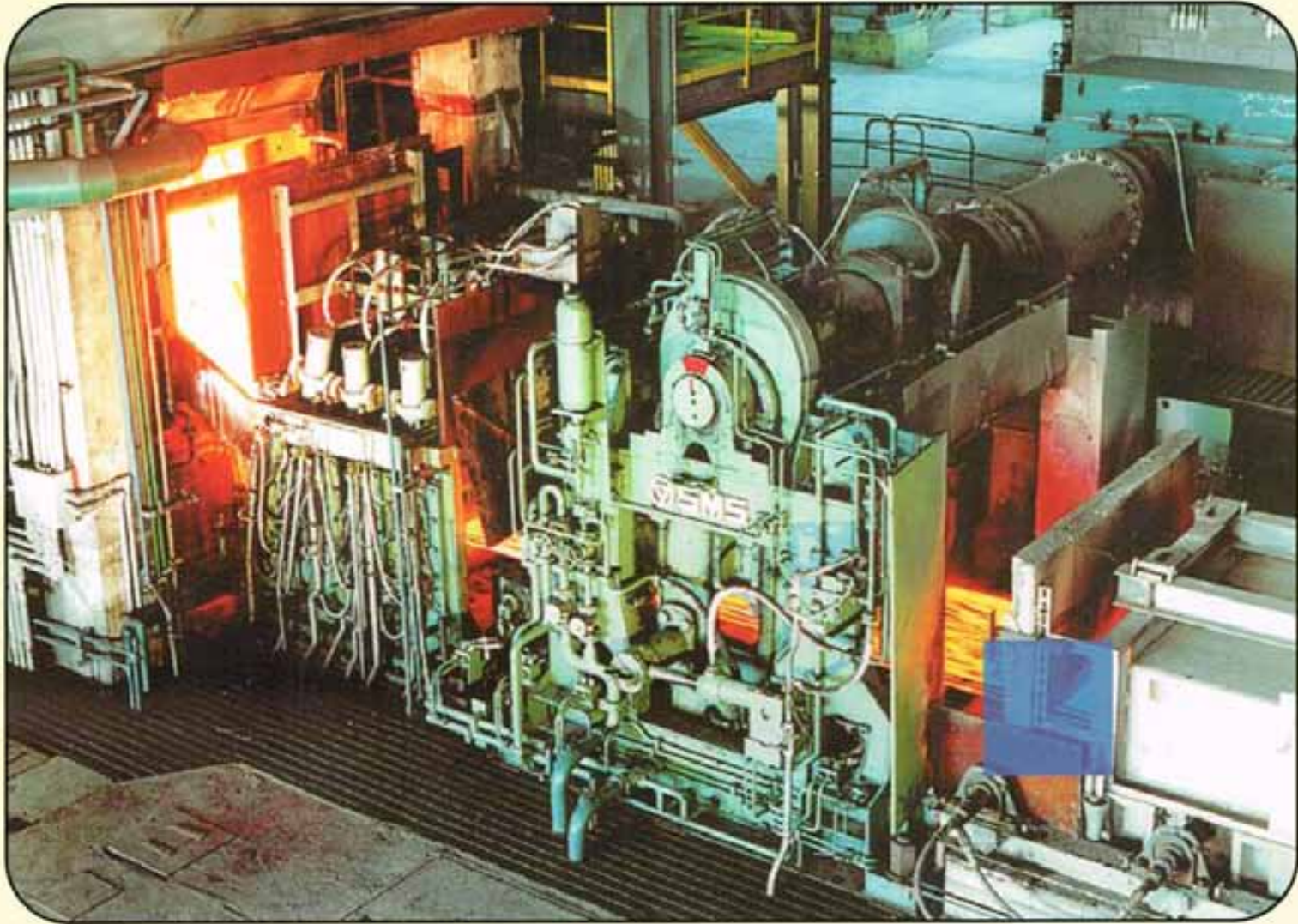
PRESSURE CONTROL

VELOCITY CONTROL

FORCE CONTROL

ULTIMATE MOTION CONTROL

STEEL MILLS



SERVOCONTROLS ELECTRO
HYDRAULIC ACTUATION SYSTEMS

SERVOCONTROLS ELECTRO
MECHANICAL ACTUATION SYSTEMS



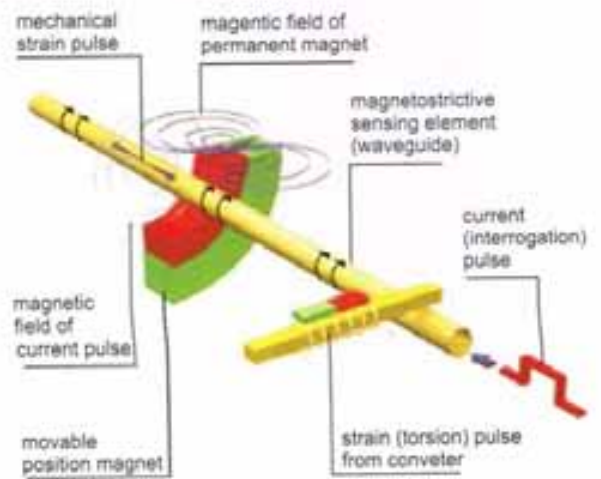
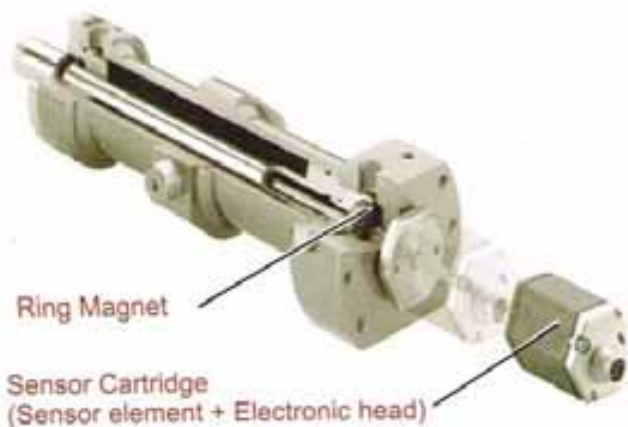
Your Best Partner

SERVOCONTROLS & Hydraulics (I) Pvt. Ltd.

Website : www.servocontrolsindia.com

SENSOR POSITION ERROR/LOAD CELL

FEEDBACK
TEMPERATURE/
RESOLVER/ENCODERS



MTS Temposonic Position Sensors for Steel mills GH & RH Series

In this application, the quality of sheet metal gauging depends on the performance of the position feedback and the continuous throughput of the rolling process, on the dependability of the position sensor, even in the harshest steel mill conditions. Because poor end product quality and machine downtime are costly in the industry, customers choose MTS temposonics position sensors to keep their processes running at peak efficiencies.



This illustration depicts an existing application. It does not represent all roller gap applications.

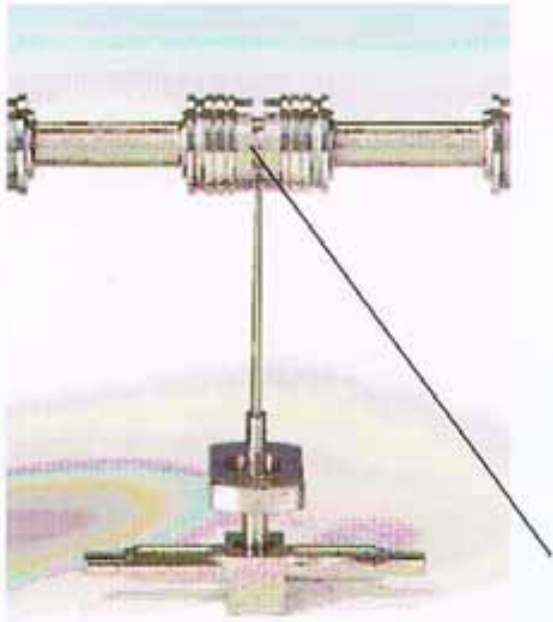
Application : Roll gap positioning & Roll bend application on a steel rolling mill

- Benefits :**
- ◆ Superior response and accuracy result in higher mill performance and optimized material flow control.
 - ◆ Accuracy also results in higher consistency from change over to change over as well as reduced setup time and prevention of roll damage.
 - ◆ Rugged, reliable construction allows for use in wide range of environmentally harsh conditions.
 - ◆ Superior EMI and noise immunity ensures trouble free operation in a wide variety of applications.
 - ◆ Fail safe Servovalves when electronics failure takes place.



Servo Valve - Technology

The Servocontrols - Star valve utilizes a Jewelled feedback ball on their feedback wire assembly so that valve will have longer span of operation before "Giltch" effect. Our feedback wire ball is made of SAPPHIRE this is much harder than diamond so there is no wear and tear on the ball and thus prevents null shift and null drifting. Even the end orifices are made of SHPPHIRE so their is no wear and tear inside the orifice and even contamination ie Micronic level is cut into still smaller level and thus can increase the life of the valve.



To our customer where servo - valve life, performance and reliability go, our objective is to offer highest quality products and services beyond that our competitors have tried to match.

Servo Valve Technology for the 21st Century.

Servocontrol - Star innovation
"Jewel in the Crown"

SAPPHIRE

End Orifices



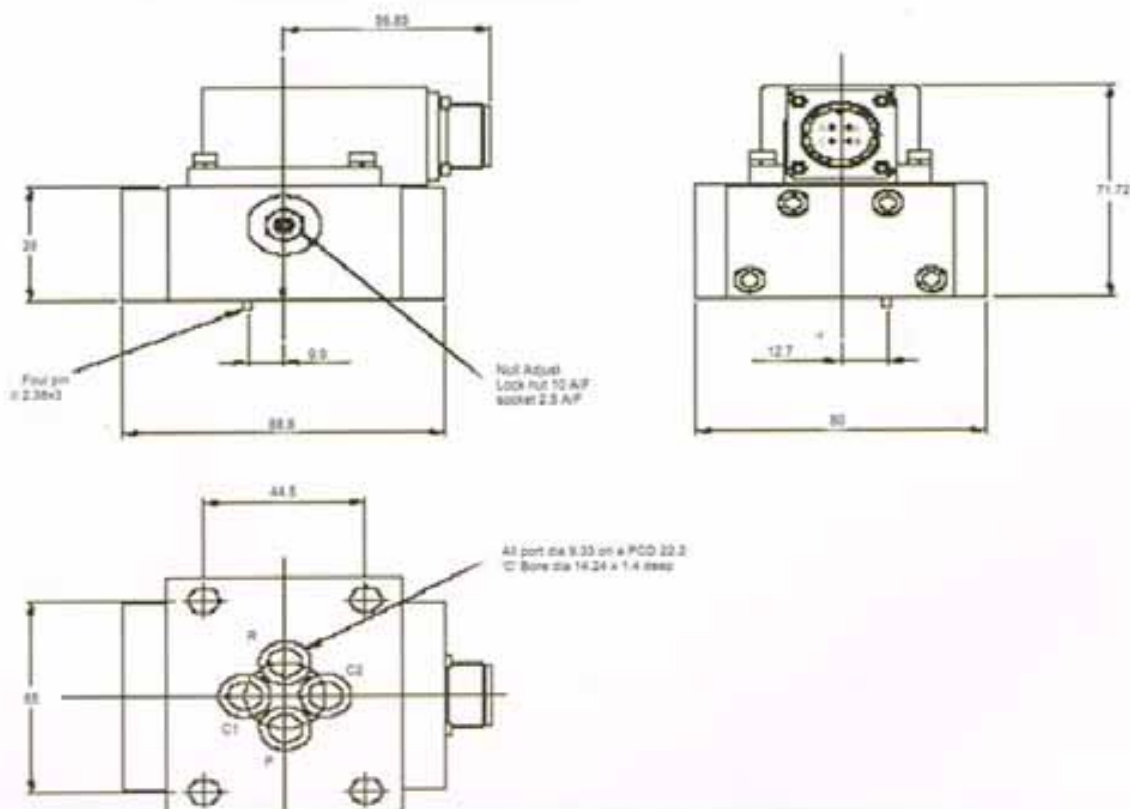
Sapphire at the end of feedback wire



Servovalves specially designed for STEEL MILL application with 350 bar pressure rating

Model 550

4 port configuration - 22,22mm PCD
 2 Stage Mechanical Feedback
 Medium / High Response
 Electrohydraulic Servovalve



Ordering Code :

Model Code	Nominal Flow at 70 Bar (lpm)
550-101	4
550-102	10
550-103	20
550-104	40
550-105	60
550-106	75

Flow Vs Pressure drop characteristics :

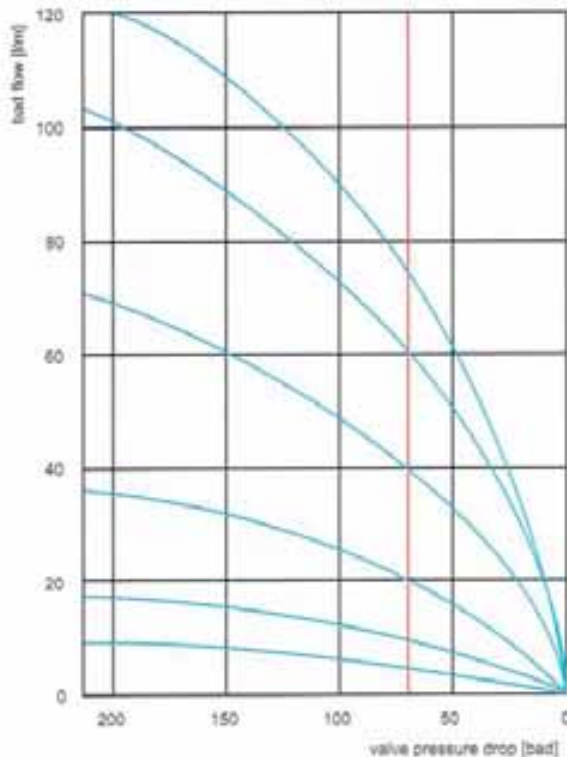


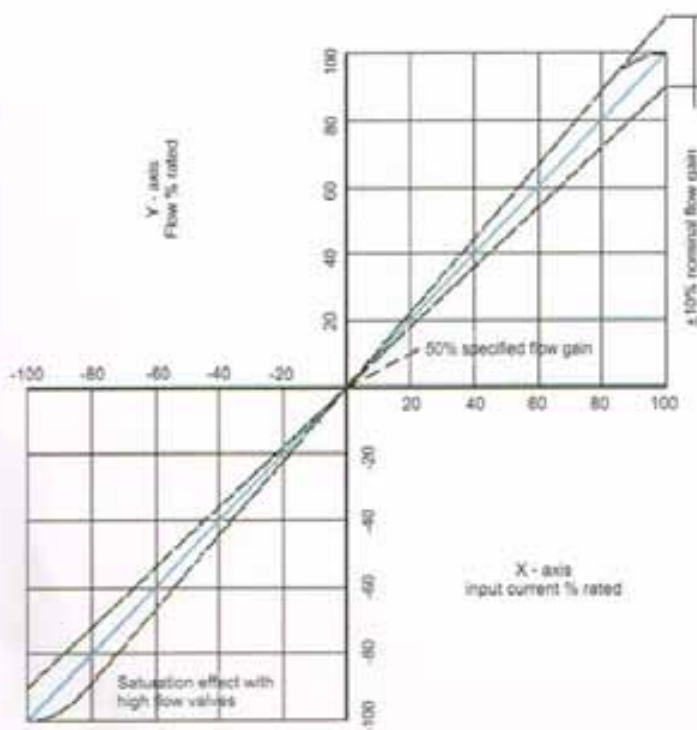
Figure - 1

The nominal rated flow of a servovalves is the load flow under conditions of 100% electrical input and 70 bar total valve pressure drop. The load flow pressure characteristic closely approximates the theoretical squareroot relationship of a sharp edged orifice (figure 1).

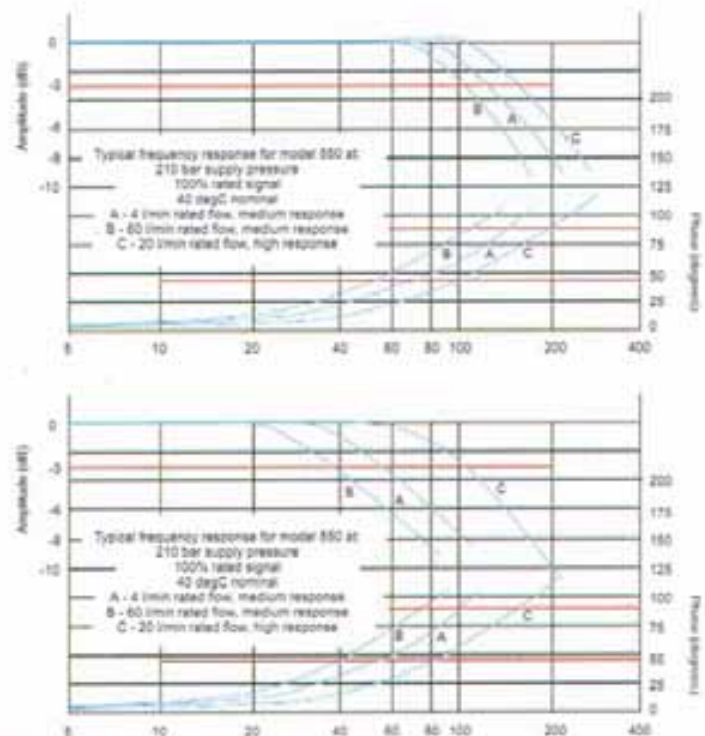
The flow tolerance for standard servovalves is $\pm 10\%$ of the nominal rated flow at + 100% input signal. Flow gain null is determined by the relationship of the spool and bushing metering edges and may vary with standard production tolerances, flow gain in the region of $\pm 5\%$ rated current from null may range 50% to 200% of the nominal flow gain.

The null leakage comprises of both pilot stage flow (tare leakage) and the second stage null leakage.

Flow Vs Input Current characteristics :



Frequency - Dynamic Response





DIRECT DRIVE VALVE (DDV) - SC 633 / SC 634

A Direct Drive flow control proportional valve with a high force level permanent magnet linear force motor directly driving the spool. A LVDT is attached to the spool to provide spool position feedback. An internal loop is closed around the spool position. This is one of the best DDV available in the world performance wise. You can directly replace the existing servovalve with this high performance DDV and get the same performance with added high resistance to contamination of oil. The unique feature of this valve is that "There is no null leakage" unlike other DDV's thus reducing power loss at null operation.



SC633 - XXX (Standard Valves)

± 10 Volts Input, lpm at 35 bar each land.

± 10 mA Input, lpm at 35 bar each land.

Model	Flow in LPM
SC633 - 101	5
SC633 - 102	10
SC633 - 103	20
SC633 - 104	40

Model	Flow in LPM
SC633 - 201	5
SC633 - 202	10
SC633 - 203	20
SC633 - 204	40

SC634 - XXX (Standard Valves)

± 10 Volts Input, lpm at 35 bar each land.

± 10 mA Input, lpm at 35 bar each land.

Model	Flow in LPM
SC634 - 101	60
SC634 - 102	100

Model	Flow in LPM
SC634 - 201	60
SC634 - 202	100

Moog and Servocontrols Servovalves Comparison

Sl No	Servocontrols	Filter	Moog	Filter
	Servovalves	(Replaceable)	Servovalves	(Replaceable)
1	454	SCF 41504	776	A02460 (Pencil Type)
			77 - 1	
2	455	SCF 41504	77 - 2	A02460
			772	
3	456	SCF 41504	77 - 5	A02460
			773	
4	500	SCF 41505	760HP	A02460
5	550	SCF 41501	E061	
		SCF 41501	62	25446 - 001(Orifice Type)
		SCF 41501	73	A02460
		SCF 41501	76	A01713 - 001
		SCF 41501	760	A02460
		SCF 41501	769	
		SCF 41501	G761	A67999 - 100 (Disc Type)
6	550 - 101	SCF 41501	G760 - 3001	A67999 - 100
7	550 - 102	SCF 41501	G760 - 3002	A67999 - 100
8	550 - 103	SCF 41501	G760 - 3003	A67999 - 100
9	550 - 104	SCF 41501	G760 - 3004	A67999 - 100
10	550 - 105	SCF 41501	G760 - 3005	A67999 - 100
11	590	SCF 41501	760 - 9	
12	650	SCF 41501	62	25446 - 001
				25446 - 002
13	1650	SCF 41501	631(NG10 Pattern)	A67999 - 100
14	1650 - 101	SCF 41501	G631-3001A	A67999 - 100
15	1650 - 102	SCF 41501	G631-3002A	A67999 - 100
16	1650 - 103	SCF 41501	G631 - 3003A	A67999 - 100
17	1650 - 104	SCF 41501	G631 - 3004A	A67999 - 100
18	1650 - 105	SCF 41501	G631 - 3005A	A67999 - 100
19	890 - 1XX	SCF41502 (Cartridge)	72(Internal Pilot /	B 36263 (Cartridge)
		SCF41503 (Tube)	Internal Drain)	A 40589 - 100(Tube)
20	890 - 2XX	SCF41502 (Cartridge)	72(External Pilot /	B 36263 (Cartridge)
		SCF41503 (Tube)	Internal Drain)	A 40589 - 100(Tube)
21	890 - 3XX	SCF41502 (Cartridge)	72(External Pilot /	B 36263 (Cartridge)
		SCF41503 (Tube)	External Drain)	A 40589 - 100(Tube)
			79 - 100	
22	200H		79 - 2XX	Pilot A40589

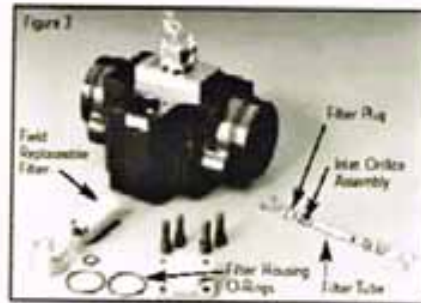


SERVOCONTROLS SERVO LAB - Repair & Servicing

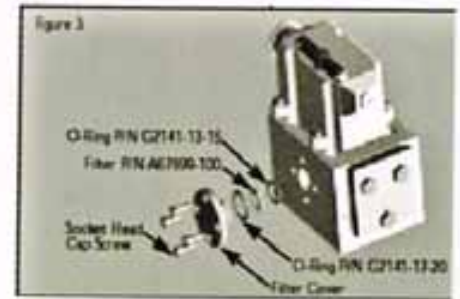
We have set up the state of art Servo system Lab and Toolroom at our works in Belgaum, Karnataka which is one of its kind in entire India. In this facility we have set up the assembly, service & repair center (level I, II and III) for all closed loop components like servovalves, Servoactuators position / velocity / pressure / force loop, electric controllers.



Moog 760 series



Moog 72 series



Moog 631 series



Oil Gear Servovalve



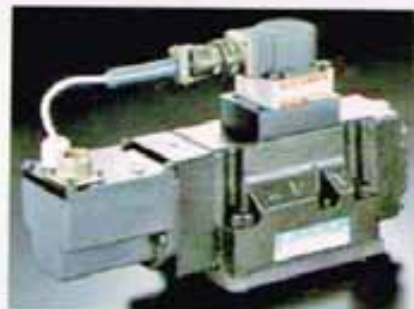
Moog 79 series



TSS - Servovalve



Moog 79 series



TSS Servo Valve



North American - Servovalve



Sopenem / LHC series



Torque motors and filters



Rexroth - Servovalve

Servocontrols - Hydraforce Proportional Valves



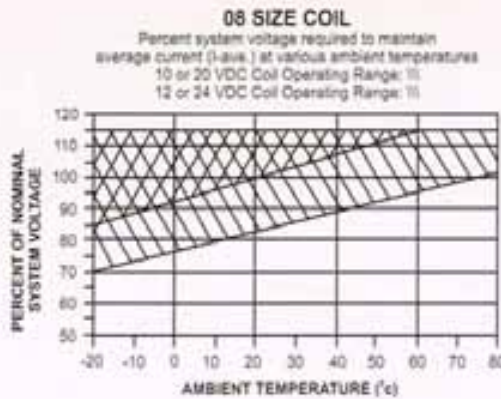
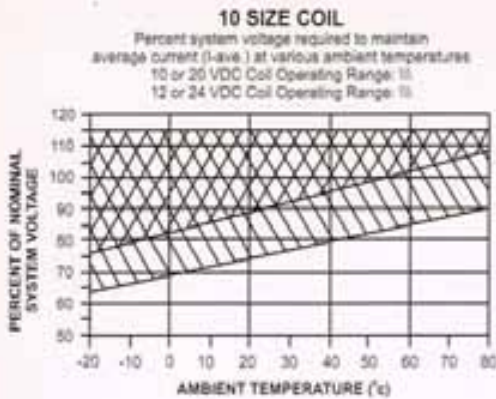
Proportional Valves



Electronic Controllers for Proportional Valves

We offer most wide range of Proportional valves for pressure, flow and directional controls. Our proportional valves works on Pulse Width Modulation (PWM) technology, which is the most advanced and highly sophisticated technique. We are catering to the needs of most Steel Mill Industries.

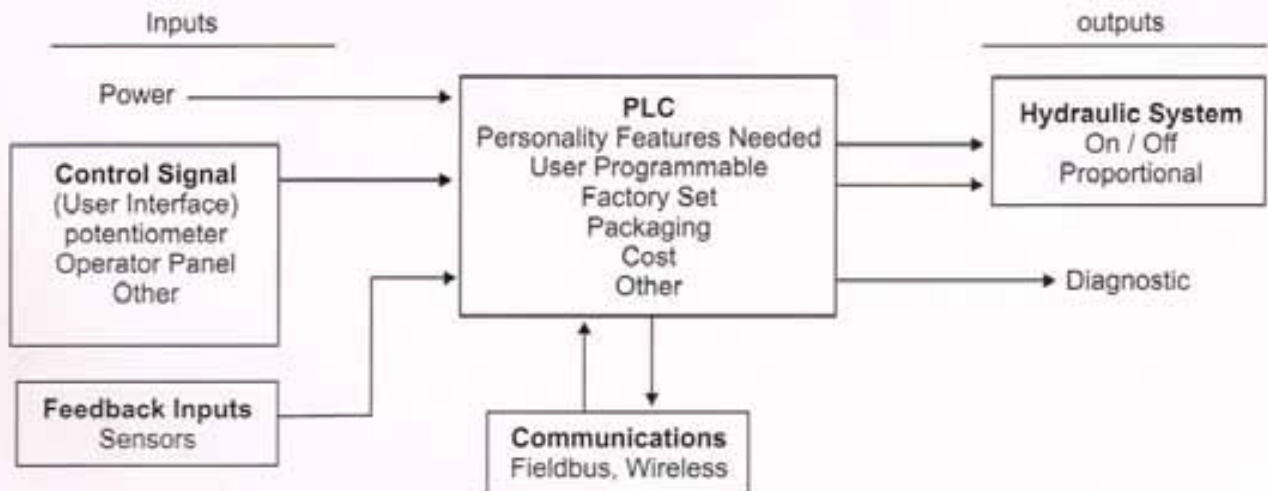
Coil Operating Parameters for Proportional Valves



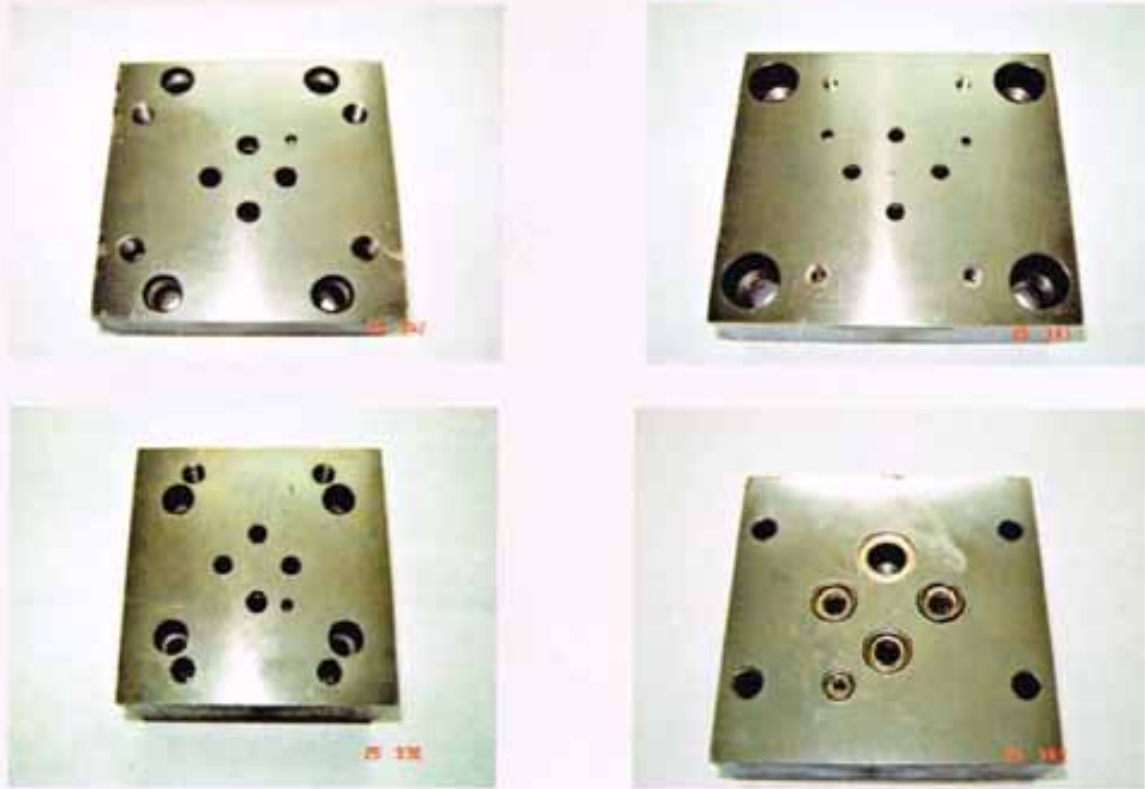
Coil Electrical Rating

Valve Size	Coil Voltage	Max. Control Current
08	10	1170 ± 115 mA
08	12	1000 ± 100 mA
10	10	1320 ± 120 mA
10	12	1100 ± 100 mA

ELECTRO-HYDRAULICS CONTROL



Manifold Block Systems



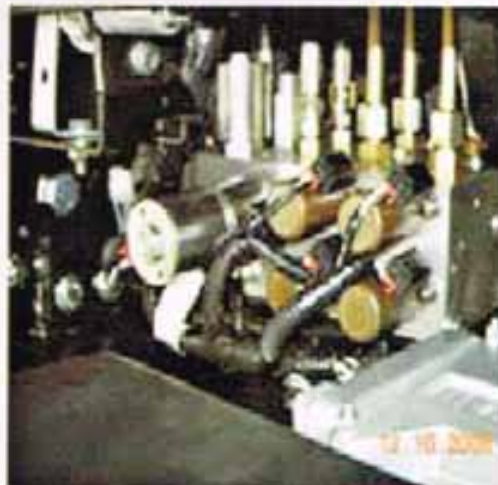
Flush plates and Adapter plates

Servocontrols custom integrated manifold block systems :

We offer one of the most comprehensive lines of high quality Electro - Proportional pressure, flow and directional control valves. We are designing high performance valves to meet virtually any need encountered by steel industry, for flow rates up to 450 lpm and pressure up to 350 Bar. Our electronic controllers with latest PWM (Pulse Width Modulation) technology offers precise control with constant output. We offer custom integrated manifolds with highest quality in the world.

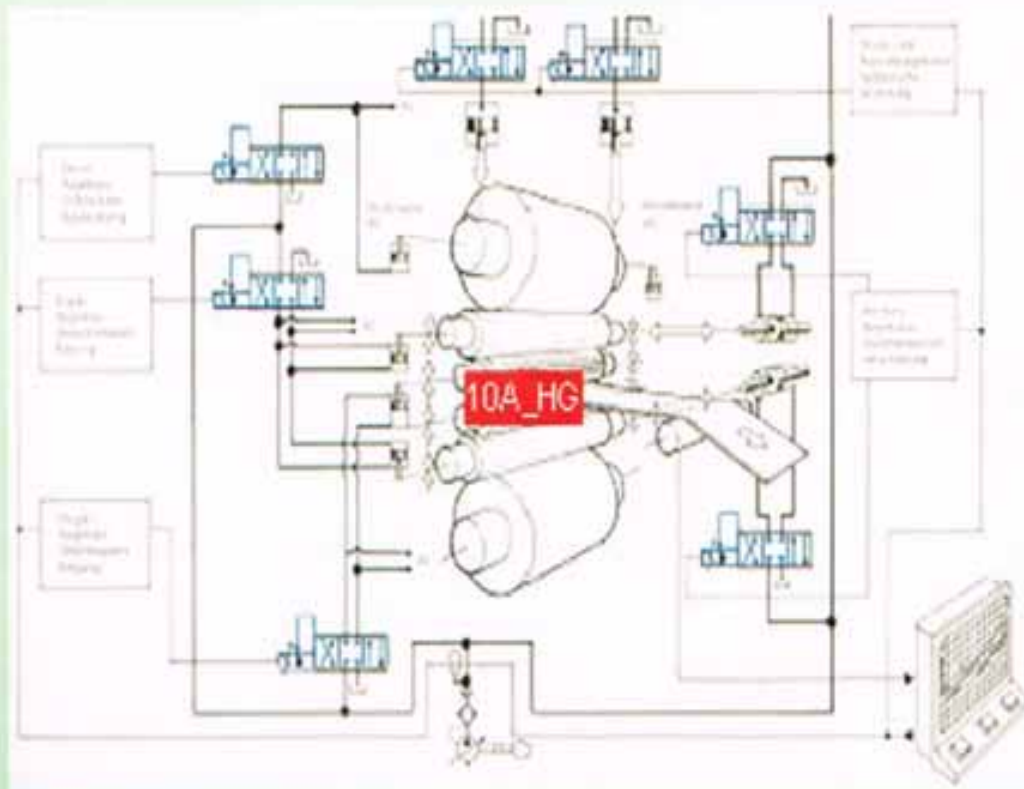
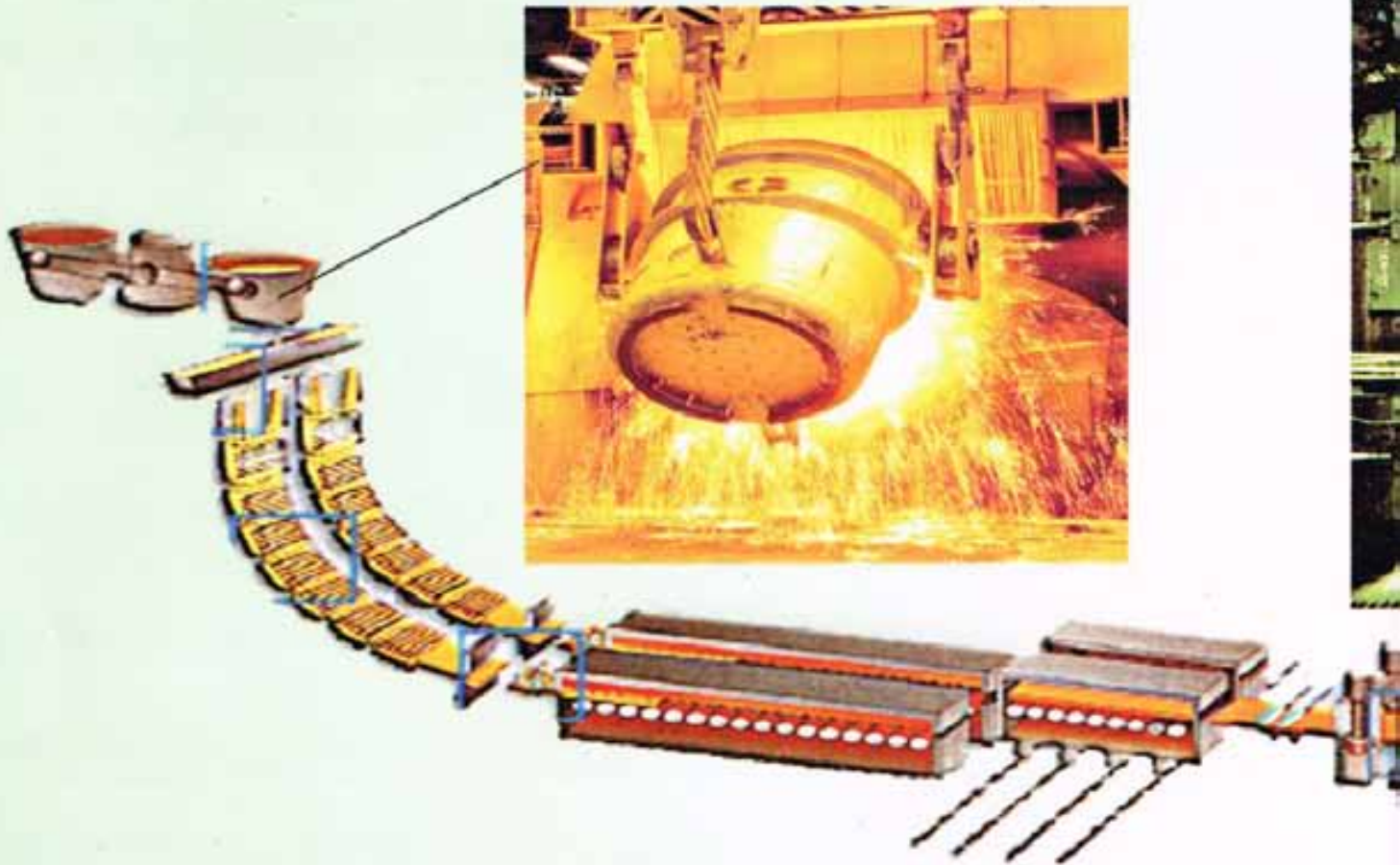
Our manifold block systems offer several advantages :

- ◆ Consolidates Hydraulic Control System, reduces plumbing. Installation costs are dramatically reduced.
- ◆ Avoid leakages.
- ◆ Reduced down time, components can be changed without disturbing the plumbing.
- ◆ Cartridge circuits in custom manifold offer unequalled flexibility.



Process Structure

Mould oscillator
Furnace tilt control (DDV & SC 633)



Position control
DDV & SC 633

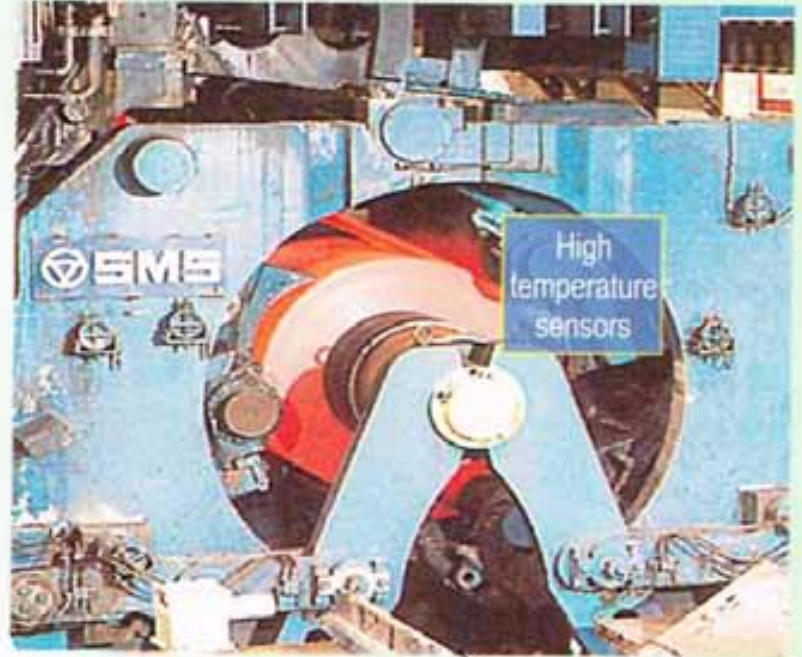


of a Steel Mill

(550 Servovalves, RH - SSI sensors
pressure transducer)



Step - Control function using 3 stage servovalve

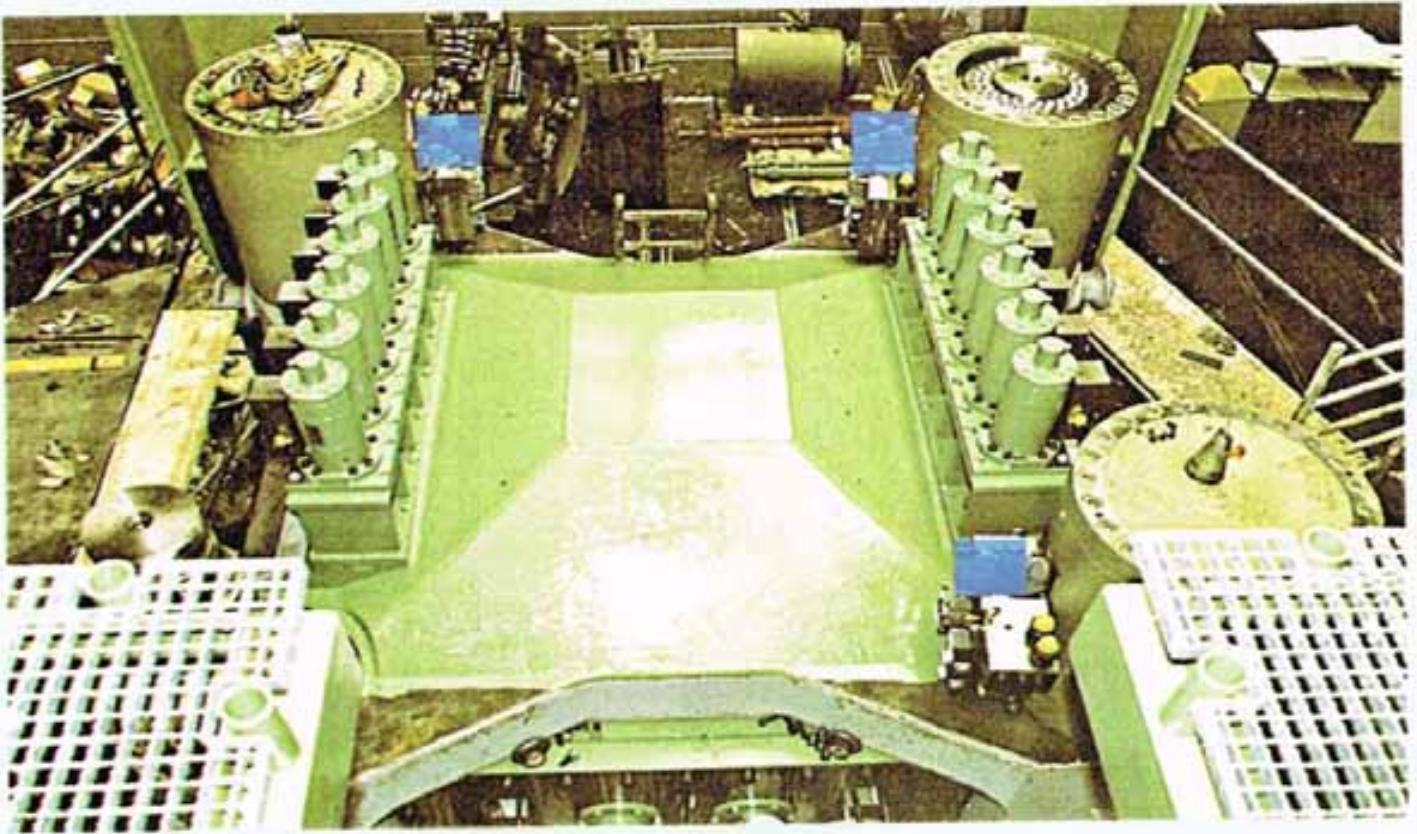


Wrapper Rollers (550 Servovalves
RH SSI and RP SSI sensors)

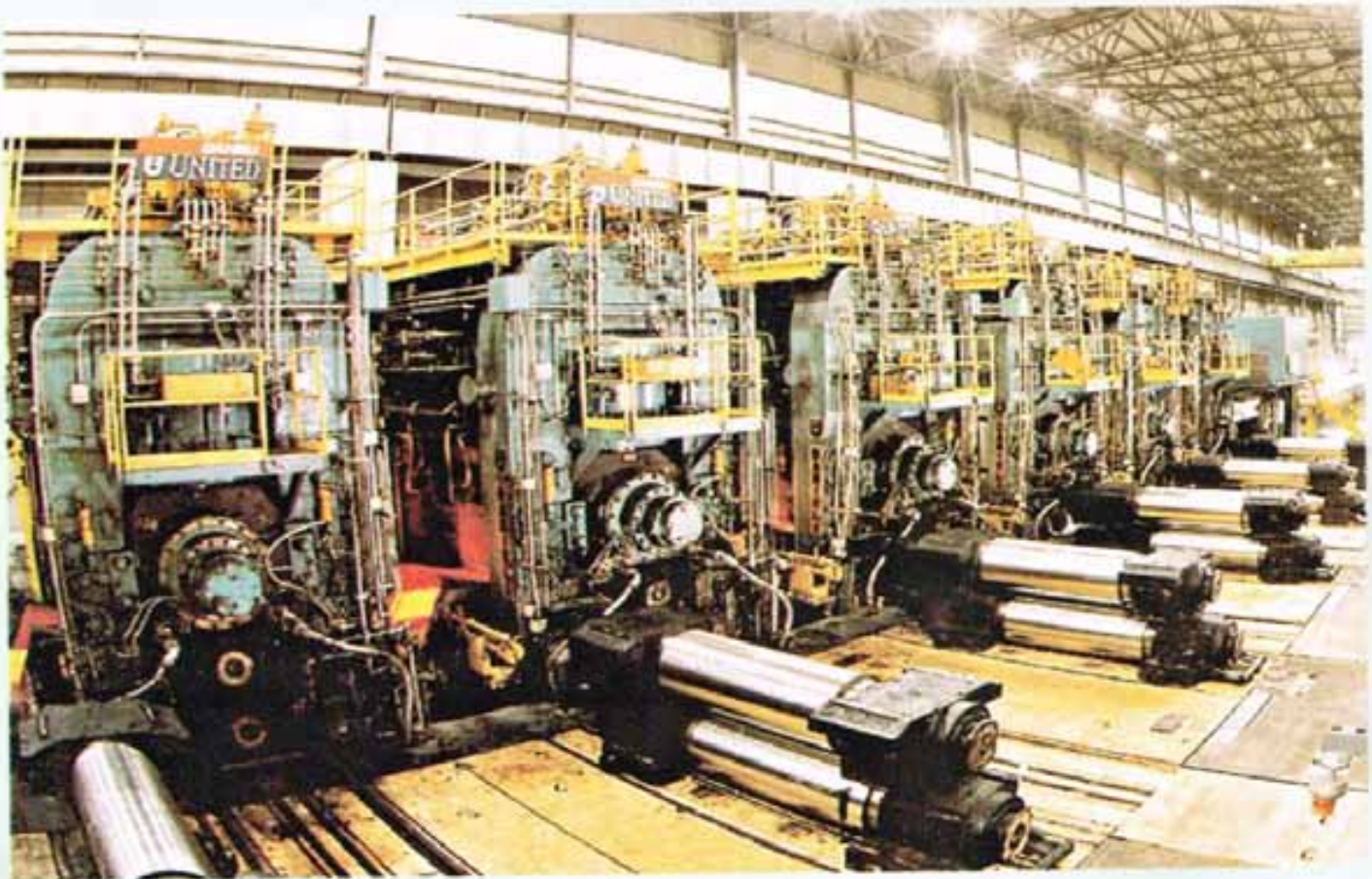


f Scalar Nozzle
GH Series Sensor

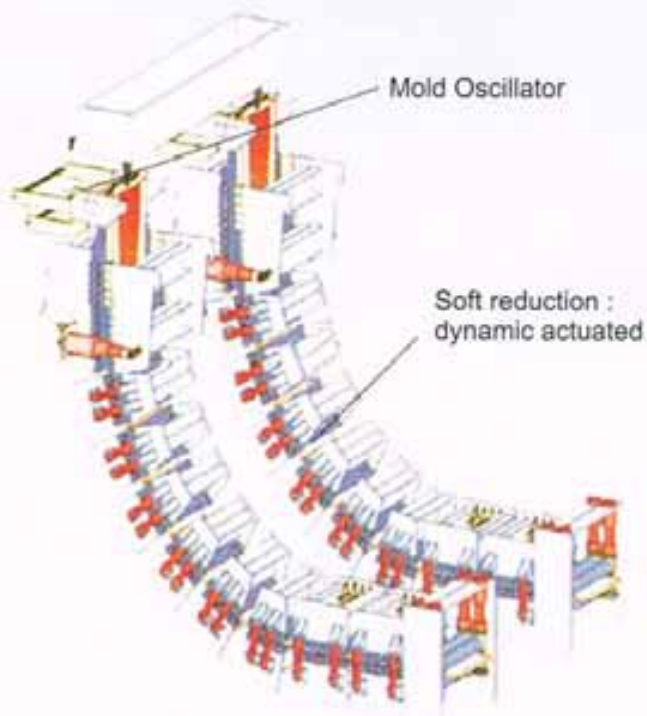




4 Hydraulic columns system installed with high dynamic servo valves for force / load and position control.



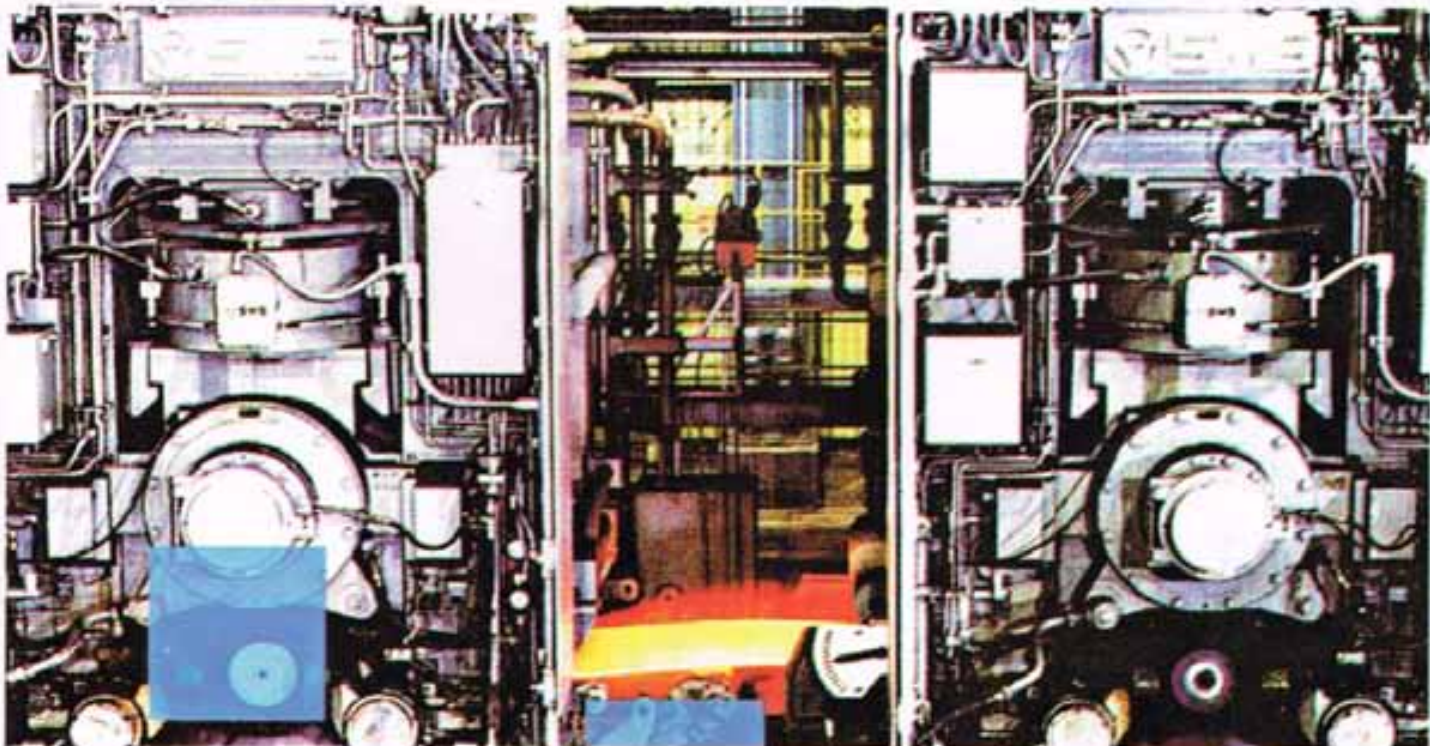
Stands of finishing mills : Automatic gauge control (AGC), loopers continuous variable crown (CVC) - axial shifting, positive / negative bending of intermediate and work rolls.



DDV SC 633, Temposonics RH series manifold block systems, sleek SMLC controllers

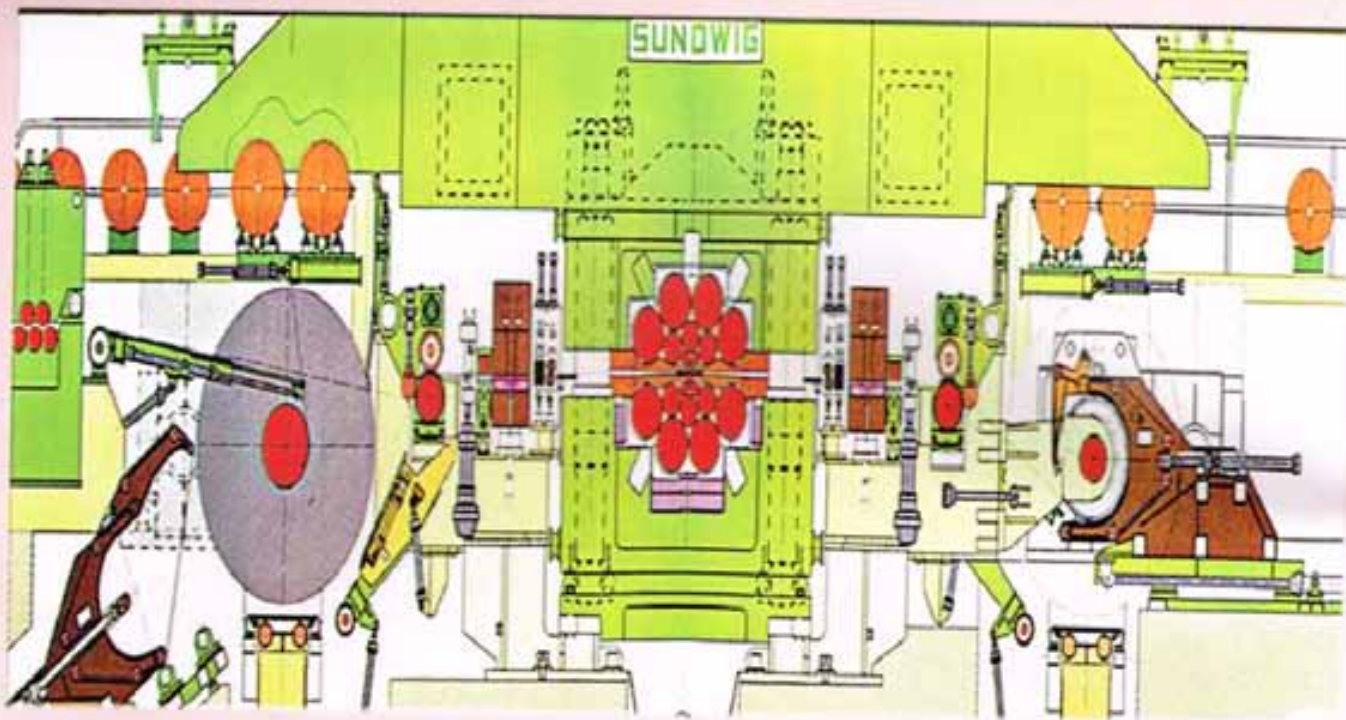


Self reduction : Individually adjustable 4 axis control design to achieve best condition on thin slabs.



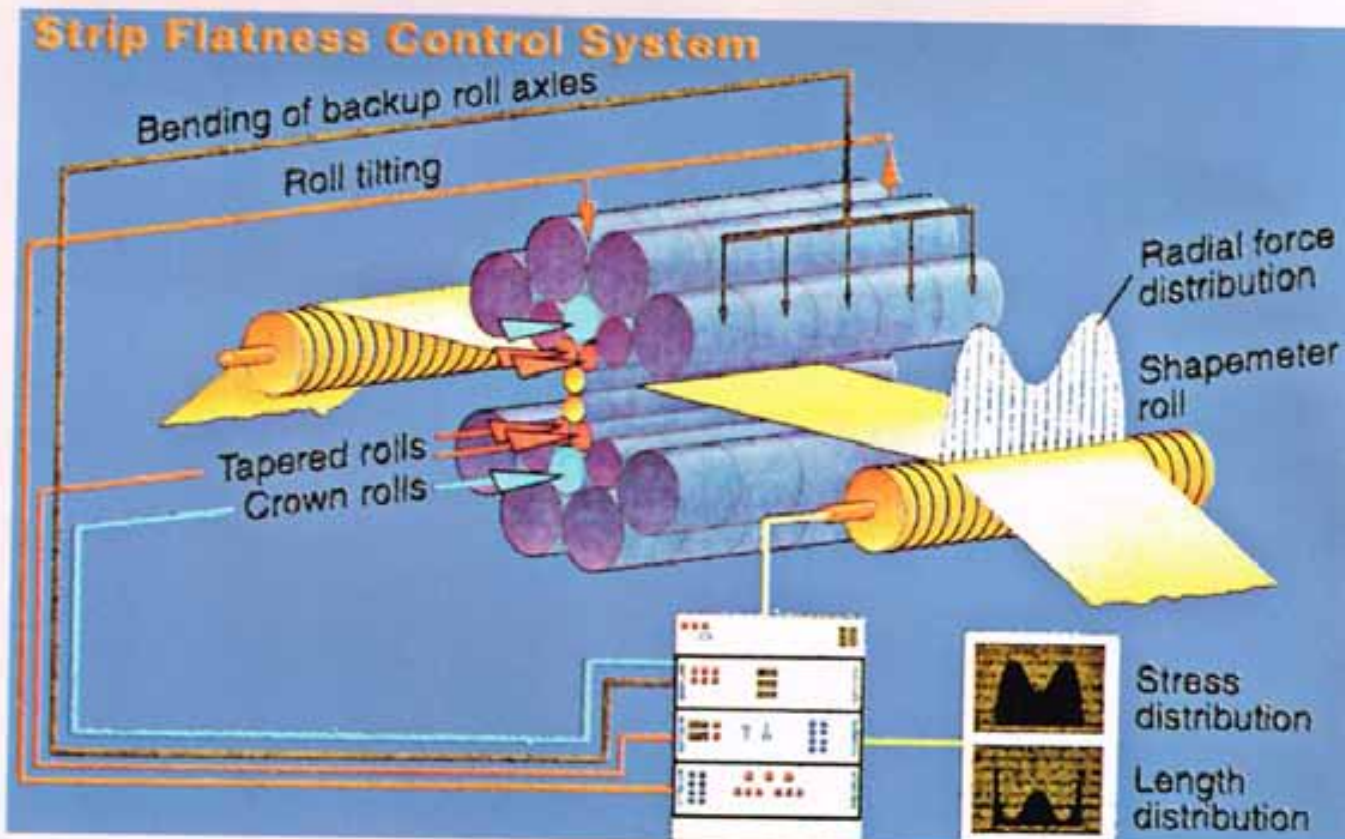
Stands of finishing mills : Automatic gauge control (AGC), Continuous variable crown (CVC) axial shifting, positive / negative bending of intermediate and work rolls.

Servocontrols Servovalves, Temposonics (position sensors), Heavy Duty Pressure Sensors, Servo Actuators and Manifold Block Systems & Electronic Controllers are used in these closed loop applications.



Cold rolling mill for high grade steel.
 Example : 20 high rolling mill with high pass reduction.

(550 Servovalves, SC 633 DDV's, Temposonics RH & GH series, Pressure sensors, Servoactuators for CVC & closed loop controllers are used.)



Structure of processes to achieve limited strip tolerances and surface quality.

Servocontrols systems are also used in Colour Coating Plants and Galvanizing plants.

Servocontrols - Senstronics Pressure Transducers

(Which are most compact using the state of the art ASIC technology)

Pressure transducers used in steel mill industry for pressure control are built on Thin Film Technology. The Servocontrols - Senstronics thin film technology and its manufacturing process have no equals a just reward for six years dedication and research for uncompromised perfection. Manufacturing process is called TCAS which means "Thermal Compensation at Source". TCAS with thin film technology ensures a staggering thermal accuracy of 0.005% / degree C and compensate for any ambient change in temperature & also to withstand the pressure spikes which are typical in steel mills, with special snubbers.



Ordering code for Pressure Transducers

SCP	X	G	XX	X	X	3	U	A
Pressure Transducer								Performance Code
Output Voltages								A - 0.25% / 2%
1	0.5 - 4.5 Volts							U - No cable
3	0 - 5 Volts							Approval and Protection
4	0 - 10 Volts							3 - CE
5	4 - 20 mA							Electrical Connection
6	1 - 6 Volts							1 DIN 43650 (IP65)
7	1 - 5 Volts							3 Bayonet DIN 72585 (IP69K)
8	0.5 - 4.5							4 AMP (Superseal) (IP67)
	Ratiometric							5 M12 X 1.75 4 Pin (IP67) with Pigtail and 3 feet long cable
9	MV 10 - 25 MV							6 Deutsch DTD 4 - 4P
Pressure datum								Pressure Connection
G - Gauge								1 G 1/4"
Pressure range in bar								2 1/4" NPTF
1	6							3 1/8" NPTF
2	10							4 M12 X 1.5 = 600 Bar with Spigot
3	16							5 7/16" - 20 UNF
4	25							6 G 1/4" External S/S
5	40							7 G 1/4" External Manometer
6	60							8 M12 X 1.5 = 1000 Bar
7	100							
8	160							
9	250							
10	350							
11	400							
12	600							
13	1000							
14	1500							
15	2200							

Note 1 : Pressure output available with voltage output and electrical connectors 1,3,5 and 8 only.

Note 2 : mV unit available with Electrical connector "E" only.

Note 3 : Ranges 1000 bar and above available with "8" pressure port only.



SERVOCONTROLS - DELTA Closed Loop Controllers

Servocontrols - Delta Computer offers Motion Controllers for servo-hydraulic and servo - motor applications featuring fieldbus communications, Ethernet, PROFIBUS - DP, Modbus Plus, Serial and Digital I/O (25 + Protocol). Connect I/O with Mix and Match transducer modules allowing more than 500 configurations. Use powerful RMC win software (earlier used with Cegelac Controllers in Steel Mills) to easily setup, tune and diagnose your applications.

Open communications :

Any PLC, Any Computer, Any System Control motion and transfer real-time SPC motion data over a distributed fieldbus or use just a few pushbuttons in a standalone application.

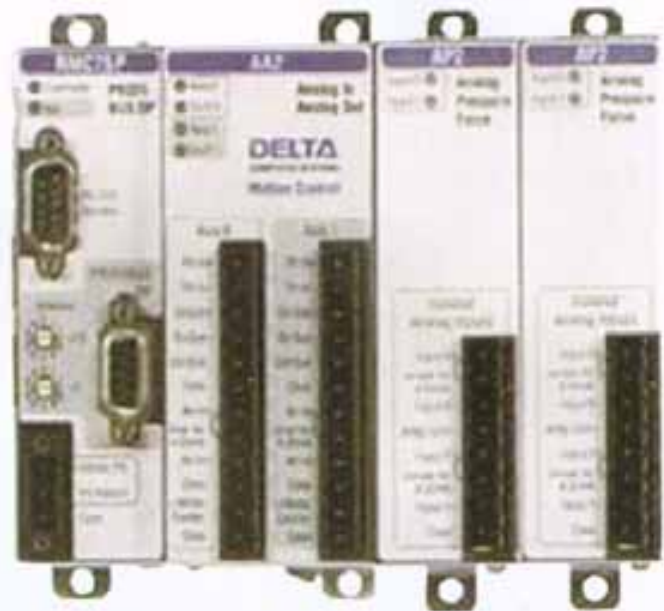
PROFIBUS - DP

Ethernet

Modbus I/O

Discrete I/O

RS - 232/422/485 Serial



RMC - 70 CONTROLLER

High Performance Motion Control. Flexible. Optimised

Long years of experience in Servo hydraulic and motor control bring your algorithm that do more than simply work well they squeeze performance out of your system.

PID with extend and retract feed forwards for both velocity and acceleration synchronizing, gearing superimposed mover Trapezoidal, S-Curve and spline profiling. Profiles changable on the fly teach modes.



SERVOCONTROLS - DELTA Computer Systems

MDT (Magnetostrictive Displacement Transducer) Interface. Connects directly to all major magnetostrictive linear displacement transducer brands like MTS - Temposonics and different types, including multi magnet.

12 and 16 bit analog :

Bring in position, Velocity, pressure or analog reference use the 16 bit version for motion control with analog feedback, or for high resolution force control.



Connect, Control, Optimize



Quadrature Interface : hook up with encoders and glass scales Control servo motors or stepper or bring in for gearing.

SSI Interface : Use with MDTs, resolvers, and absolute encoders equipped with a synchronus serial interface.

RMC Companion Products



Voltage to Current Converter : High Performance & High Bandwidth V to I converters are designed for converting a voltage drive o/p to a current drive output in order to control a servo valve application.

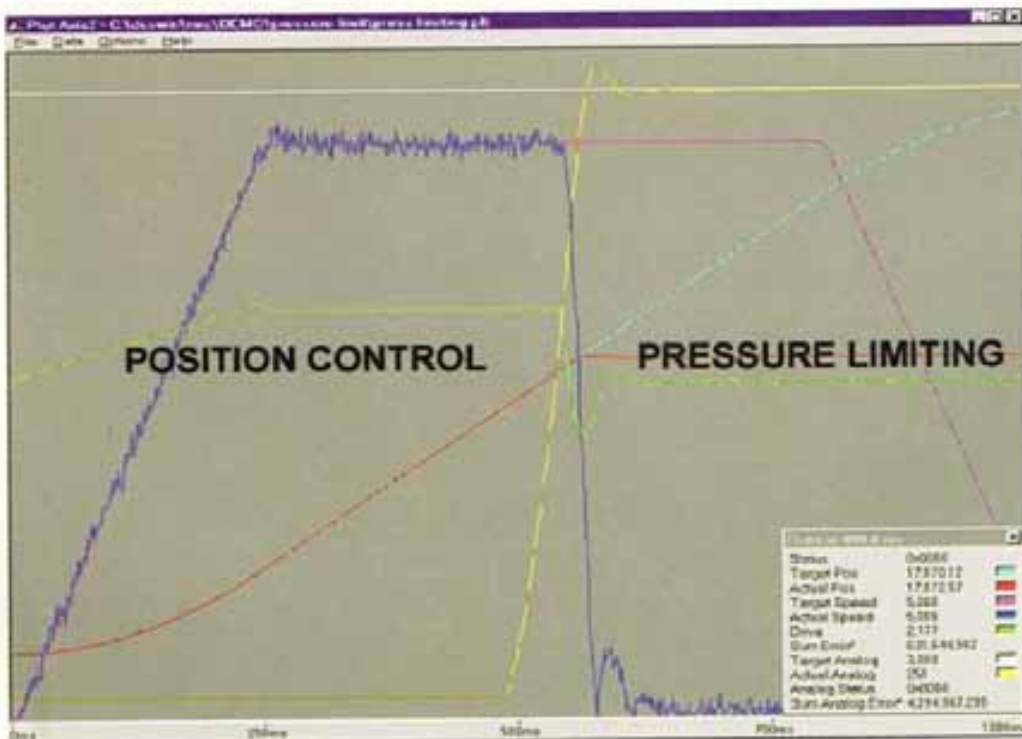
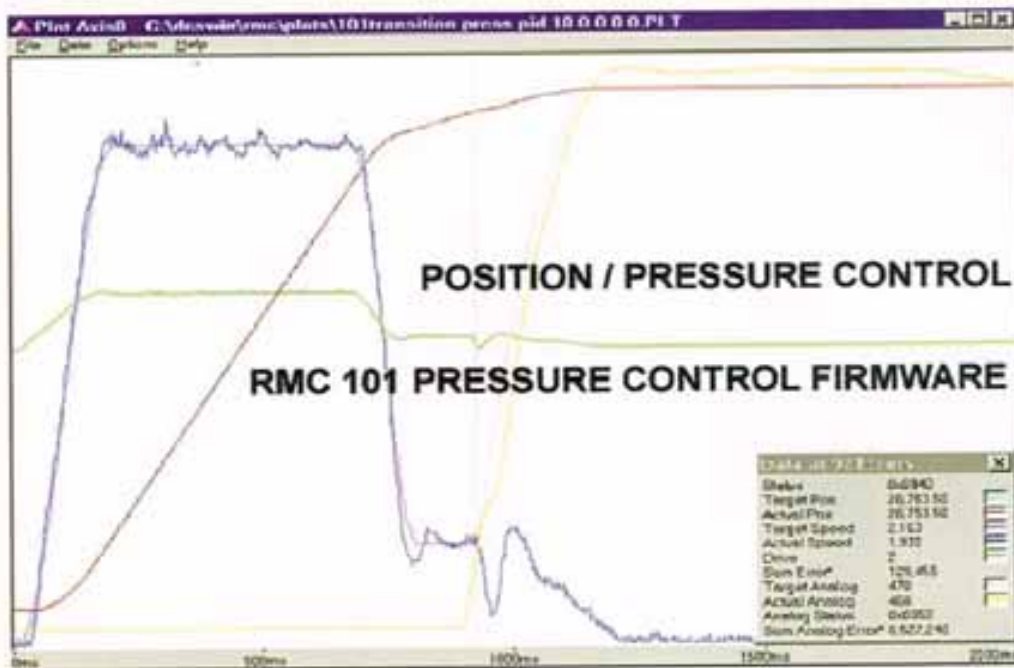
Features :

- ◆ Two channels of Voltage to Current conversion.
- ◆ Full scale output current switch selectable from (0 to ± 10 Volts) ± 10 mA to ± 100 mA.
- ◆ Input and outputs can be paralled for output current.
- ◆ LED to indicate input polarity and amplitude.
- ◆ LED to indicate output saturation.
- ◆ Compact DIN - rail mount package.



CLOSED LOOP POSITION AND PRESSURE TESTING/DIAGNOSTICS

Online diagnostics and data acquisition using our closed loop controllers will help you to tune your gains. Our controllers are inbuilt with special algorithm to take care of null shift of servo valves. Irrespective of change in null position of servo valves the controller adjust itself to overcome the null changes in servo valves thus reducing valuable downtime of Steel Mills. This is the unique algorithm developed by Servocontrols for Steel Mills, HRM's, CRM's and any closed loop applications.



SERVOCONTROLS - ELECTROMECHANICAL ACTUATORS



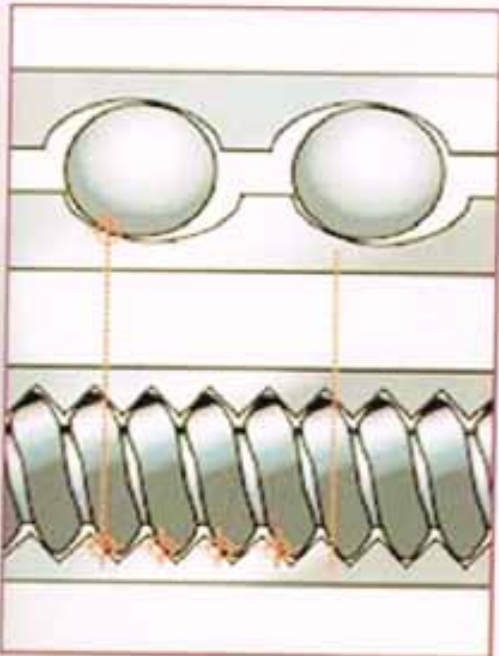
At Servocontrols - Exlar, we are very proud of our innovation and development of quality products. With our unique product offering, we have pushed the limits of conventional motion control to provide more speed and more force with less space and less maintenance. Our core competency is our patented roller screw technology which differentiates us from every other actuators supplier. Now we have expanded our competency to rotary motors and gear motors. This product breadth, combined with solid engineering and product quality allowed us to succeed in our business. We have assembled an extensive support network of highly trained professionals and earned the confidence of our customers. Servocontrols - Exlars unique products could be incorporated into your design for more efficient motion control. We would welcome the opportunity to discuss your motion requirements, specially where you dont want oil and want to replace hydraulic cylinders.

Roller Screw Advantages

Roller screw design provides high speeds, stiffness and shock load resistance and **"Is having 15 times more life than Ball Screw technology actuators.**

- ◆ Large static loads 0 up to 35.0 M Tonnes.
- ◆ High screw speeds - 5000 rpm and above.
- ◆ Up to 15 times longer life. Ideally suited for heavy duty steel mill applications.
- ◆ Preloaded nut options for zero backlash.

Unique Design



This robust roller screw design is composed of rollers that are manufactured with precisely the same thread angle as the nut. This construction is particularly well suited to applications that require very high loads and high speeds. This is possible because Sevocontrols - Exlars planetary roller screw designs provide many more contact points than possible on comparably sized ball screws. This result in higher stiffness, higher load capacity and 15 times the travel life of similarly sized ball screws. The diagram on left shows number of contact points in ball screw as compared to the number of contact points in a roller screw.

For detailed specifications visit our website www.servocontrolsindia.com and go to products and then to electromechanical actuators, or contact our experts at electromechanical@servocontrolsindia.com

Servocontrol - Ormec SMLC Sleak Controller



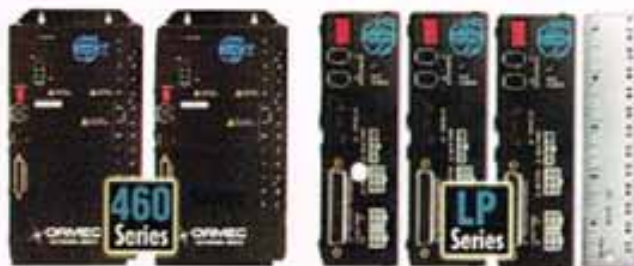
Servocontrol - Ormec's Servowire Motion and Logic Controller is at the center of complete machine control solution that can meet all of your motion, I/O and networking needs. With Pentium processor, Firewire Drive networking and Ethernet connectivity, SMLC allows to focus on solving application instead of integrating control components. The SMLC Servowire drive network and Modbus/TCP provide state of art I/O and motion control up to 16 axes, programmed using IEC 61131 - 3 standard language including relay ladder logic.

The Servowire Motion & Logic Controller features high performance computing capability combined with true real time operating systems (RTOS). This system is cost effective and having robust computing power for multi-axes motion and I/O control applications.

Servocontrol - Ormec motors and drives



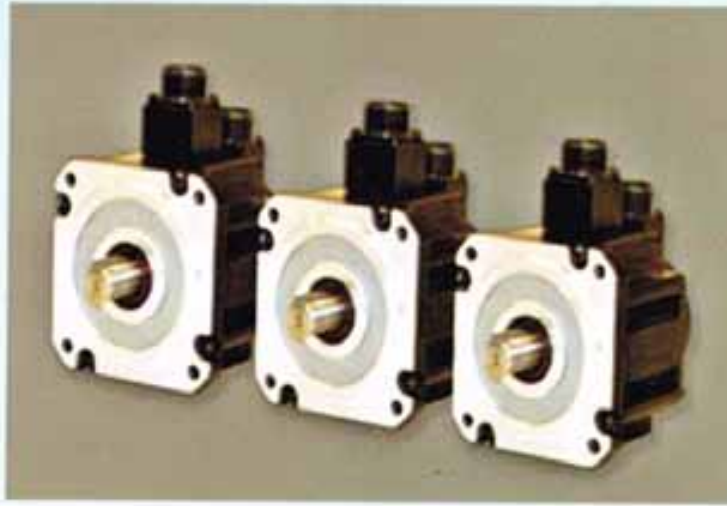
3 PH, 230 Volts Inputs 3 PH, 460 Volts Input +/- 10 Volts Input & 230 Volts Input



Servo Motors

Servowire SM drives provide high performance servo operation utilizing digital networking technology based on IEEE - 1394 (Fire Wire). Each servo drive supports a variety of high performance encoder based servomotors. All servowire drives utilize IGBT based intelligent power modules and provide cost effective solution for motor control applications. Servowire SM drives combine all digital operation with DSP technology to produce fast updates and correspondingly high performance. The high bandwidth control loops in Servowires along with high resolution motor feedback combine quick and accurate torque velocity and position control. Position, velocity and torque loops are all closed in Servowire SM drives.

Servocontrol - Ormec motors



Servocontrols - Ormec brushless motors provide high torque to inertia ratios and excellent continuous torque and peak torque performance in a compact design. These industrial quality servomotors incorporate high energy, rare earth, neodymium - iron - boron magnets and a highly efficient stator winding design which results in excellent power density. These servomotors also completely eliminate brushwear, Maintenance problems, extremely durable construction, rugged MS connectors provide reliable interconnections to both motor and optical encoder.

Features :

- ◆ Continuous stall torques from 0.3 to 75 Nm.
- ◆ High peak toques from 0.96 to 113 Nm.
- ◆ Output power from 0.13 to 15 HP.
- ◆ High maximum speeds up to 5000 rpm.
- ◆ Class B or F insulation providing long winding life under rated operating conditions.
- ◆ Minimum torque ripple and cogging for smooth low speed performance.
- ◆ Totally Enclosed Non Ventilated (TENV) standard (IP 67).
- ◆ Optional fail safe holding brake.

Accessories :



WAGO I/O's



HMI Screens

SERVO LAB



Indias Best Servovalve Repair Lab.

We have a huge inventory of Servovalves, Tube Filters, Cartridge filters, Disc filters, Last chance filters, Torque motors, Seal kits, O-ring sets, Connectors, Coils, Electronic cards. We repair/service Proportional, Servo-Proportional and Servo valves.

All Brands, All types, All configurations.

Abex, Atchely, Cincinnati, Dowty, Dyval, EMG, Heroin, Hydromatic, Kawasaki, LHC, Moog, Oilgear, Olsen, Parker, Pegauses, Plasser, Rexroth - Bosch, Schneider, Sopelem, Towler, TSS, Ultra, Vickers.

Procedure and Testing

- Evaluation** : Visual inspection is coupled with installing the valve on an evaluation test stand for initial comparison to manufacturers specification.
- Disassemble** : The valve is totally disassembled into individual parts. Every part is chemically cleaned with solvents.
- Inspection** : Every part including onboard electronics is inspected and checked for original tolerance. Those that fail are replaced with original manufacturers components.
- Testing** : After reassembly, the valve is tested to 100% of the performance specification set down by manufacturer. A test report and computer plot can be included along with the repair, and if any replaced parts.

Contact

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