



Electraulic™
Actuators & Drives

Power Plant Overview

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A power plant environment presents many challenges to valves and dampers. Improvements in these mechanical elements may extend their life on damaging services, but improvements in control will only occur with better actuation. **REXA** actuators and drives provide to final control elements the capabilities to match the most sophisticated instrumentation and Distributed Control Systems.

START-UP VALVING

Combustion Engineering Combined Cycle Circulation Units

Supercritical boiler systems contain many applications that are well suited to **REXA** actuators. Because of commercial ties with Sulzer, a Swiss control valve manufacturer, many CE systems utilized "Sulzer" high press control valves. The **REXA** actuator is a great marriage to the Sulzer body. As part of a control system upgrade, we have replaced all of the Sulzer actuators at various generating stations. In other utilities the **Xpac** is the routine replacement for Sulzer actuator as they become inoperable. The typical valves involved are:

		<u>Typical Actuator Thrust</u>
BT	Boiler Throttle	80000
BE	Boiler Extraction Valve	40000
FWB	- Feedwater bypass valve	40000
SP	- Spill over valve	40000
ISPR	- Superheater injection PRV	40000
BTB	Boiler Throttle Bypass	20000
WD	- Water drain valve	20000
SD	- Steam drain valve	20000
IR	- Reheat injection valves	10000
IS	- Superheater injection valves	10000
IC	- Condensate Injector	4000

For more detailed information about the **Xpac** replacement actuators for Sulzer valves, see page 3.

B & W Once Through Boilers

Babcock and Wilcox specifies specialty valves for their start-up systems. Again, high pressure, high temperature, difficult operation are the norm. Here are a few of the key applications.

- a) **201 valve** - A high pressure (4000 psi) high temperature (800+ degrees F) pressure reducing valve. This is throttled open during turbine start-up and remains open during normal operation.
- b) **202 valve** - Primary superheater bypass. This unit operates as a pressure control valve (set @ about 3500 psi) during start-up and a pressure relief valve (set @ 4100 psi) during normal operation (ie: closed).
- c) **207 valve** - Secondary superheater bypass valve. Operates in conjunction with 201 valve and is closed during normal operation. Both the 202 and 207 valves type usually bypass to the flash tank.
- d) **210 valve** - Turbine bypass valve. Extremely high pressure drop high temperature steam application.

GENERAL VALVING

Feedwater Regulators

These units typically require very high rangeability and precise control.

Main Feedpump Recirculation Valves

Feedpump pressures for drum boilers is about 3100 psi and 4200 psi (for once through boilers). The recirculation valves discharge either back to the condenser or the deaerator. In either case, the pressure drop is extreme. Cavitation or flashing will occur resulting in potentially high vibration and high fluid dynamics through the valve. Perfect for the stiffness of the **REXA** actuator.

Deaerator Level Control Valves

This valve requires very high rangeability and precise control.

Attemperator Spray Valves

These valves are very active. Normal operation requires high precision and immediate response. **REXA** actuators are capable of 100% duty cycle and 0.1% deadband.

Cooling Towers

Cooling tower level control is often an opportunity because of their typical remote location. The lack of instrument air results in the use of electric actuators.

DAMPERS

Air dampers are used extensively on the combustion side of the utility power plant. Because of the continual quest for improved burner efficiency coupled with the ever increasing environmental pressures associated with stack emissions, precise damper control is now a critical problem. **REXA** drives are the solution. Stoichiometrically balanced, optimized air/fuel ratios can result in a highly efficient and clean burning process. This is one of the few examples where improved economics and a cleaner environment occur simultaneously. The drive will make it happen!

FD FANS - Forced Draft

These units handle cold clean air, producing upstream flow to the burners. This flow is regulated with dampers. An excellent application for our drive technology.

ID FANS - Induced Draft

These fans have a much more severe working environment. They are downstream of the combustion process, handling hot flue gasses. They require more power and are subject to fly ash erosion and corrosion. So too are the dampers and often the drives that control them. The ID fans maintain a suction pressure to prevent leakage of flue gasses thru joints and crevices.

SECONDARY AIR DAMPERS

These provide further refinement to the burning process. Secondary dampers usually require much smaller actuators.

BURNER TILTS

In corner fired burners, the mixing of fuel and air takes place in the furnace. The burner tips can be tilted to control the fire ball. We have had success with long stroke pivot mounted linear actuators on these applications.

Xpac Replacement Actuators for Sulzer Valves

SERVICE	ITEM	VALVE TYPE	STROKE (INCH-MM)	VALVE STEM (INCH - MM)	SULZER ACTUATOR	Xpac ACTUATOR	RATED THRUST (LBS)	STROKE SPEED (SEC/INCH)
Feedwater Bypass	FWB	SWB 63	3.2-80	1.56-40	SMR 16	L40000-4-2C-P	40,000	20
		SWB 80				L40000-4-D-P	HIGHER SPEED ALT.	10
Boiler Extraction	BE	SWB 80A	3.2-80	1.56-40	SMR 16	L80000-4-D-P	80,000	20
		SWB 90				L80000-4-2D-P	HIGHER SPEED ALT.	10
		BE 45	1.6-40	1.25-32	SMR 6.3	L20000-2-C-P	20,000	20
Boiler Throttle	BT	BE 50				L20000-2-2C-P	HIGHER SPEED ALT.	10
		BE 56						
Boiler Throttle Bypass	BTB	BT 140	3.2-80	2.-50	SMR 16	L80000-4-D-P	80,000	20
		BP 45	1.6-40	1.25-32	SMR 6.3	L80000-4-2D-P	HIGHER SPEED ALT.	10
Steam Drain	SD	BP 50				L20000-2-C-P	20,000	20
		BP 56				L20000-2-2C-P	HIGHER SPEED ALT.	10
		SD 32	1.-25	.87-22	SMR 2.5	L10000-2-C-P	10,000	10
Spillover	SP	SD 45	1.6-40	1.25-32	SMR 6.3	L20000-2-C-P	20,000	20
		SD 50				L20000-2-2C-P	HIGHER SPEED ALT.	10
		SD 56						
		NR 100-100	1.6-40	1.25-32	SMR 6.3	L20000-2-C-P	20,000	20
Water Drain	WD	NR 100-150	3.2-80	1.56-40	SMR 16	L20000-2-2C-P	HIGHER SPEED ALT.	10
		NR 100-200	3.2-80	2.-50	SMR 16	L40000-4-2C-P	40,000	20
		NR 100-80	1.6-40	.87-22	SMR 2.5	L40000-4-D-P	HIGHER SPEED ALT.	10
Superheater Injection	ISPR	NR 100-125	2.4-60	1.56-40	SMR 6.3	L80000-4-D-P	80,000	20
		NR 200-125				L80000-4-2D-P	HIGHER SPEED ALT.	10
		SW 100 D	3.2-80	1.25-32	SMR 6.3	L10000-2-C-P	10,000	10
Superheater Injection	IS	SWB 63	3.2-80	1.56-40	SMR 16	L20000-4-C-P	20,000	20
		SWB 80				L20000-4-2C-P	HIGHER SPEED ALT.	10
HP Reheater Injection	HPIR	SWB 90				L40000-4-D-P	HIGHER SPEED ALT.	10
		E 32	1.6-40	.87-22	SMR 1	L10000-2-C-P	10,000	10
		E 45	2.-50	.87-22	SMR 2.5			
LP Reheater Injection	LPIR	E 22	1.6-40	.87-22	SMR 1	L10000-2-C-P	10,000	10
		E 32						
Condenser Injection Cooling	IC	E 45	2.-50	.87-22	SMR 2.5			
		NR 100-50	1.2-30	.6-15	SMR 1	L4000-2-C-P	4,000	4