

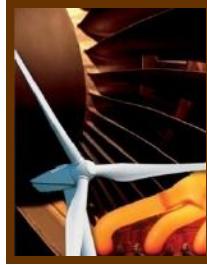


Industrial Servo Products



CONTROLLING *the power of* **ENERGY**

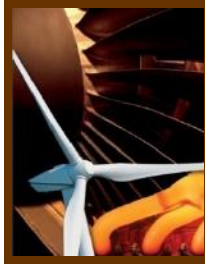
Industrial Products



- **Industrial product line introduced in 1994**
 - R-DDV® technology evolved from aerospace program (A-12)
- **Single-stage, direct-drive with integrated electronics**
 - Limited Angle DC Motor Driver
 - Rotary to Linear Design
- **Four models offering:**
 - Flows up to 60 gpm
 - 5000 psi capability
 - Up to 220 Hz bandwidth
 - Small size (low flows)
 - Low internal leakage
 - Contamination resistance
 - Compatibility with many fluids
- **EFB integrated pneumatic actuators:**
 - 1.0" & 2.0" bores, short strokes
- **Single-axis analog PID electronic controller**

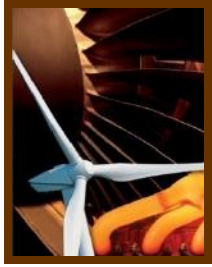


R-DDV[®] Servovalve Features & Benefits



- No small clearances so no internal filter
Continued operation with contaminated fluid
- No hydraulic first stage
Lower internal leakage
- No mechanical feedback wire
Valve insensitive to load-induced pressure spikes
- Rotary motor
Valve tolerant of shock and vibration
- Spool position controlled by electric motor
Valve operation is independent of supply pressure

Entertainment

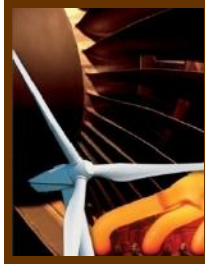


- **Applications**
 - Animatronics
 - Special effects
- **Markets**
 - Theme parks
 - Movie production
- **Customers**
 - Disney
 - Universal Studios
 - Advanced Animations
 - Garner Holt Productions
 - Applied Industrial
- **R-DDV[®] Servovalve Features & Benefits**
 - Rugged design – lower life-cycle costs, higher show quality
 - Small, light weight – easier packaging
 - Low leakage – energy efficient

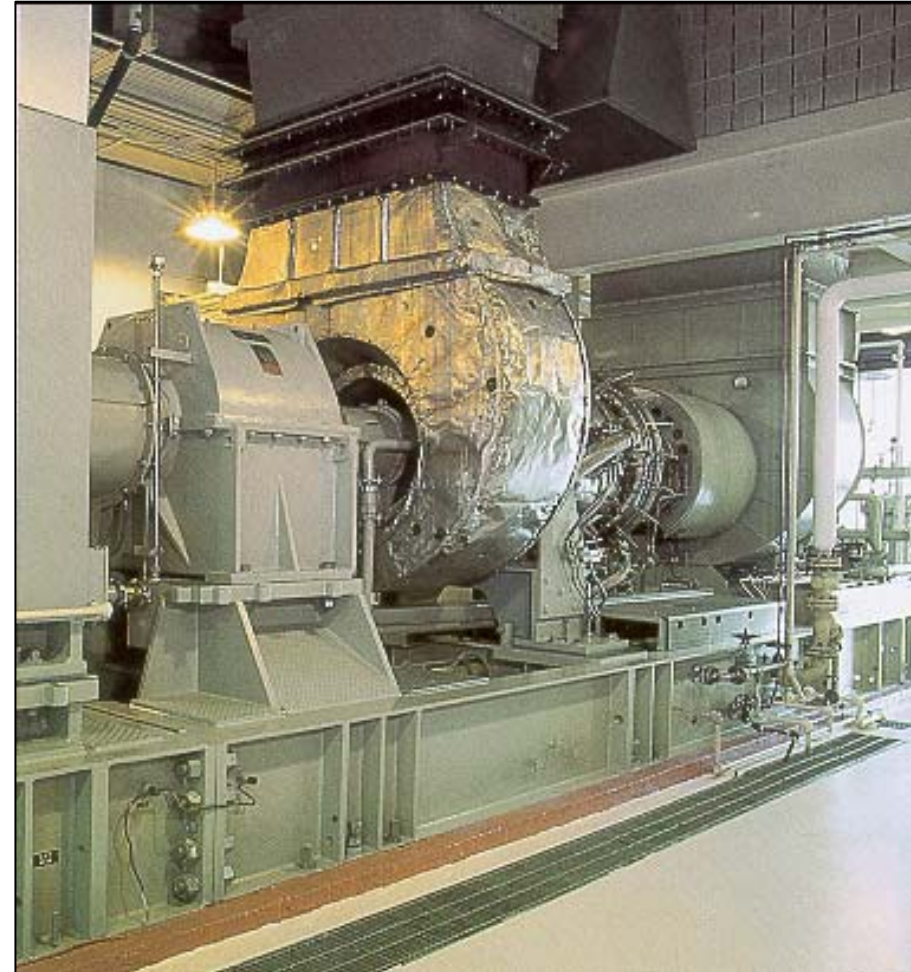


Universal Studios Revenge of the Mummy - Advanced Animations

Industrial Turbines



- **Applications**
 - Fuel metering
 - Guide vane actuation
- **Markets**
 - Powergen
 - Oil/Gas
- **Customers**
 - Solar Turbines
 - ABB
 - Rolls-Royce
- **R-DDV[®] Servovalve Features & Benefits**
 - Precise metering – high efficiency, low emissions
 - Operates at low pressure – lube oil system
 - Compatible with a wide range of fluids – oil, air, fuel
 - Robust design – low life-cycle costs, reliability



Solar Turbines Mars 90 - 9 MW turbine/generator

Oil and Gas

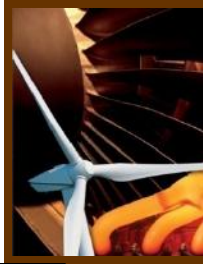


- **Applications**
 - Draw works pneumatic brake
 - Down-hole tool
- **Markets**
 - Oil & gas exploration and production
- **Customers**
 - National Oilwell Varco
 - Helmerich & Payne
 - Omron
 - Halliburton
- **R-DDV[®] Servovalve Features & Benefits**
 - **Tolerant of harsh environment - Lower life-cycle costs**
 - ✓ High temperature
 - ✓ Contaminated fluid
 - ✓ Shock
 - ✓ Vibration
 - **High reliability – Less down time**



Draw Works Application

Wood/Paper Processing



- **Applications**

- Log/saw positioning
- Paper tension/nip control

- **Markets**

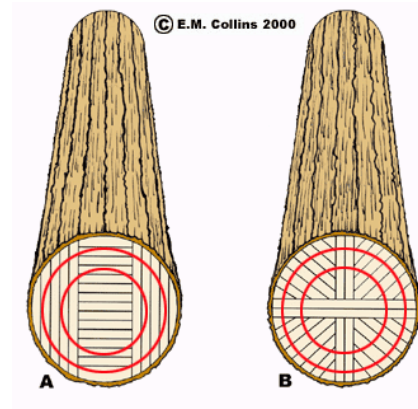
- Saw mills
- Paper mills

- **Customers**

- Peerless
- Magneto
- Hydra-Power Systems

- **R-DDV[®] Servovalve Features & Benefits**

- **Tolerant of harsh environment – Longer life, lower costs**
 - ✓ Contaminated fluid
 - ✓ Shock/Vibration
 - ✓ Pressure spikes
- **High performance – quality, high yield**
- **Dynamic performance – low cycle time**



Sawmill Application

Plastic Processing



- **Applications**

- Blow molding parison control
- Sheet plastic gap control

- **Markets**

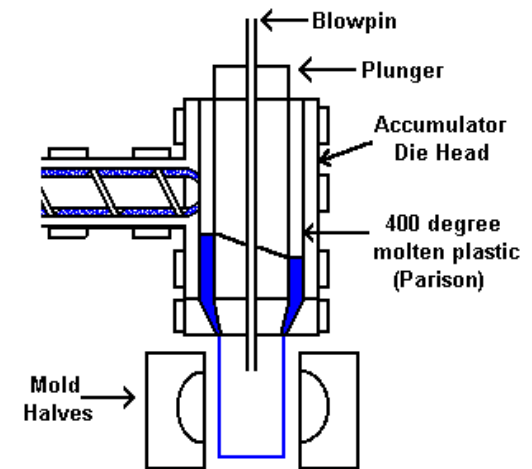
- Packaging
- Automotive
- Consumer products

- **Customers**

- Liquid Container/Servcon
- Graham Packaging
- PTI
- Davis Machinery/Fluid Power Products

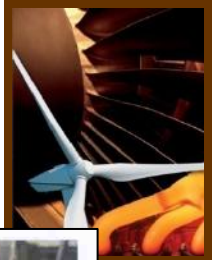
- **R-DDV[®] Servovalve Features & Benefits**

- **Tolerant of harsh environment – Longer life, lower costs**
 - ✓ Contaminated fluid
 - ✓ Shock/Vibration
- **High performance – part quality, low cycle time**

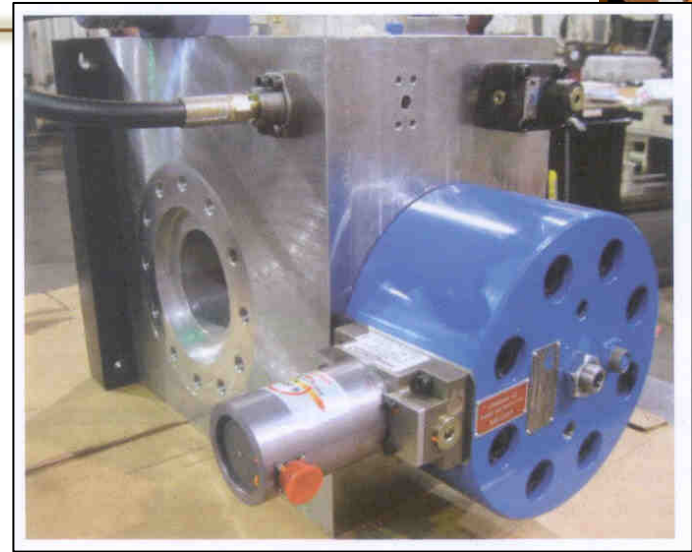


Blow Molding Application

Metal Processing

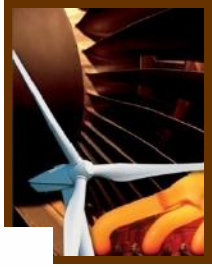


- **Applications**
 - Shot control – Die Casting
 - Press control
 - Bending
 - Hydro-forming
 - Automatic Gap Control in rolling operations
- **Markets**
 - Automotive
 - Aerospace
 - Consumer products
- **Customers**
 - Visi-Trak
 - Babson
 - Olaer
 - Intellicass
- **R-DDV® Servovalve Features & Benefits**
 - **Tolerant of harsh environment – Longer life, lower costs**
 - ✓ Contaminated fluid
 - ✓ Shock/Vibration
 - ✓ Pressure spikes
 - **High performance – part quality, low cycle time**

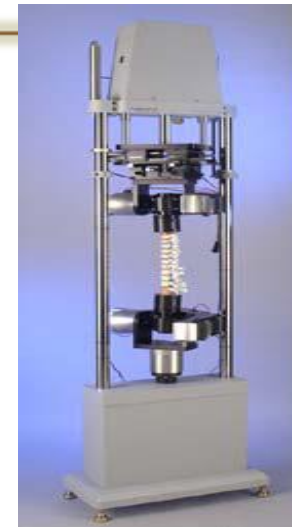


Die Casting Machine

Test and Simulation



- **Applications**
 - Displacement, force & pressure control
- **Markets**
 - Aerospace
 - Automotive
 - Biomedical
 - Consumer products
- **Customers**
 - Bose/Enduratec
 - MTS
 - Bell
 - Tema Concept
- **R-DDV[®] Servovalve Features & Benefits**
 - High performance – precise control
 - Small size, light weight
 - Low leakage – energy efficient



SmartTest
6-DOF Full Spine
Simulator

SmartTest™
SP Actuators



SmartTest™ SP



TestBench™ SP

EnduraTEC Systems