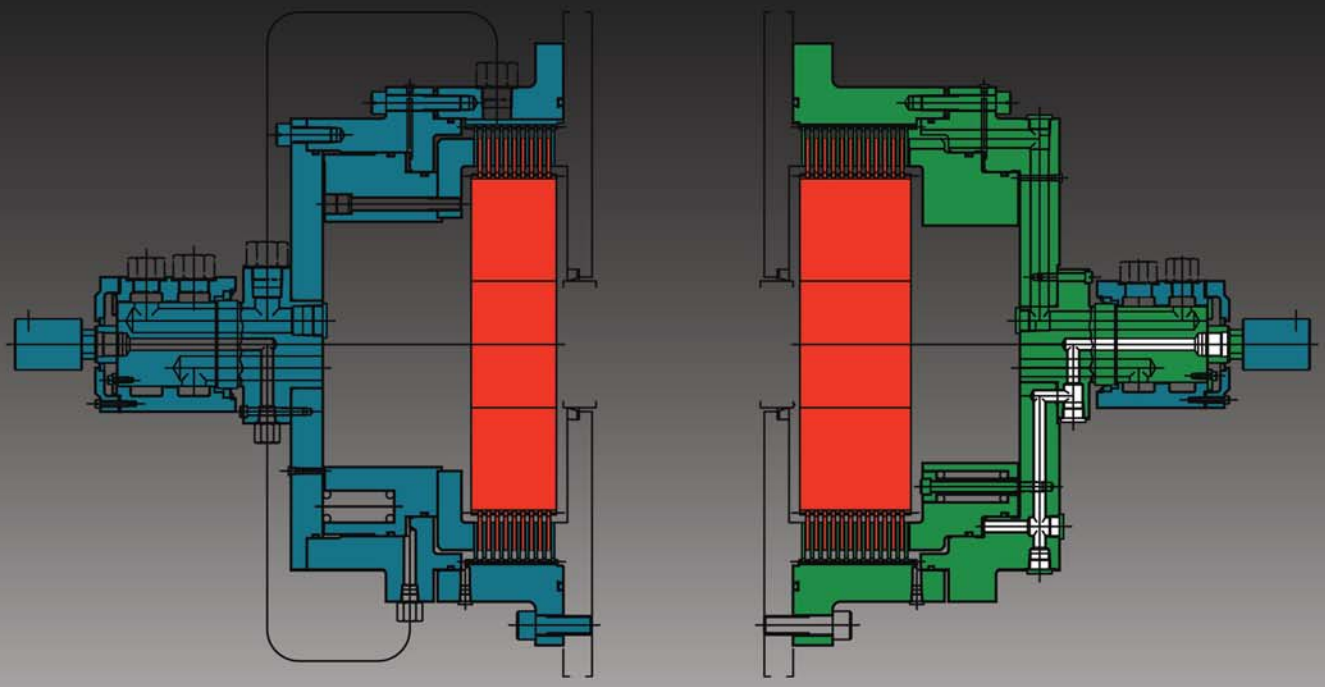
Press Pac 2200®

PRESS PAC® 2200 SERIES
HYDRAULIC ACTUATION / OIL COOLED PRESS DRIVES



High Performance Press Drives For Metal Forming Presses

MIDWEST® BRAKE

Press Pac® 2200 Series Separate Clutch and Brake Systems

Press Pac® Drives

The original Press Pac® Oil Shear Press Drive Systems were introduced in 1968. Since that time, our press drive systems are proven in the toughest applications where increased reliability and performance of press drive systems are necessary to meet rigorous production requirements.

Since 1968, Midwest Brake® has converted thousands of geared stamping presses to the Press Pac® drive system. Most presses are simply and easily converted to Press Pac® with only minor modification to the existing press parts.

Superior performance and ease of installation make the Press Pac® 2200 Series the preferred press drive for the metal forming industry. Automotive stamping, contract stamping and forging facilities world wide have discovered Press Pac® 2200 Series will increase machine uptime and reliability while decreasing repair costs over the life of your equipment.

Press Pac® 2232 Separate Clutch & Brake
Verson* 600 Ton Stamping Press Installation

Press Pac® 2200 Series – Proven and Reliable

Press Pac® 2200 Series is the 3rd generation of Press Pac® technology that includes advanced hydraulic actuation and oil cooling technology. Commercially introduced in 1991 after 5 years of field testing, our drive systems are the most rugged, durable press drives available on the market today. No other press drive matches the performance, durability and reduced life cycle cost of the Press Pac®.

Press Pac® Applications

- Stamping Presses
- Forging Presses
- Press Brakes
- N.C. Turret Punch Press
- Metal Forming Equipment

Press Pac® Benefits

- Increased Productivity
- Increased Reliability
- Reduced Life Cycle Costs
- Simple Installation
- Minimal Maintenance

Press Pac® Brake Only Application
Ajax* 1300 Ton Forging Press Application

Oil Shear Drives For Metal Forming Equipment

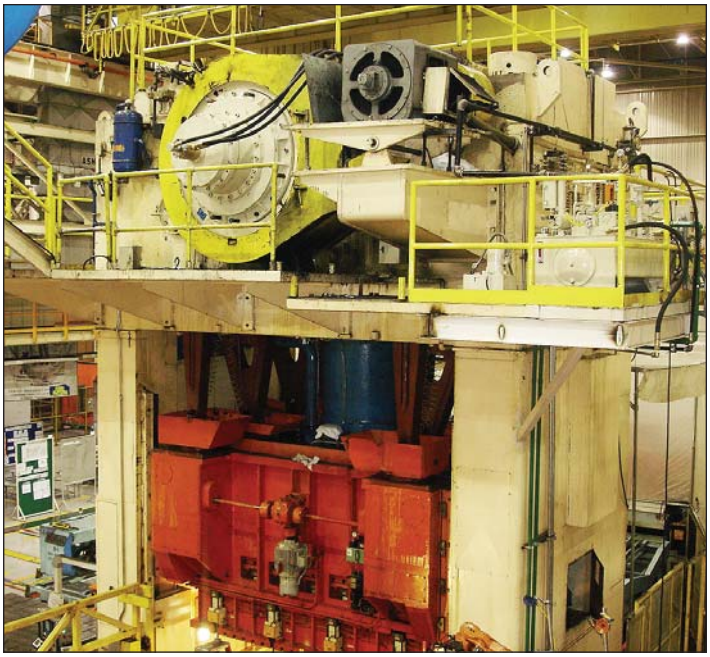
World Class Press Drive Engineering

Midwest Brake® develops, produces and delivers the latest high performance oil shear press drives that deliver innovation and performance to our customers.

Our press drive systems have successfully been in service worldwide for many years and are proven in many of the world's leading automotive facilities and stamping plants.

Midwest Brake® offers custom design and application engineering support, field service support and a network of sales engineers ready to assist you with your press drive requirements.

- Press Drive System Engineering
- Clutch/Brake Design & Manufacture
- Application Engineering Support
- Field Service Support
- Turnkey Installation Services
- Controls & Systems Support



Press Pac® 2297 Separate Clutch & Brake
Danly* 1600 Ton Double Action Stamping Press Installation

Press Pac® For New Equipment

Midwest Brake® specializes in the design and manufacture of oil shear press drive systems for original equipment manufacturers and new equipment installations.

Our complete line of oil shear clutch/brakes are easily incorporated into new press designs and new equipment. Our team of professional application engineers, sales engineers and customer service personnel are dedicated to providing OEM customers the high level of service and support needed in today's manufacturing environment.

Press Pac® 2297 Separate Clutch & Brake
Danly* 1600 Ton Double Action Stamping Press Installation

Midwest Brake® Oil Shear Press Drive History

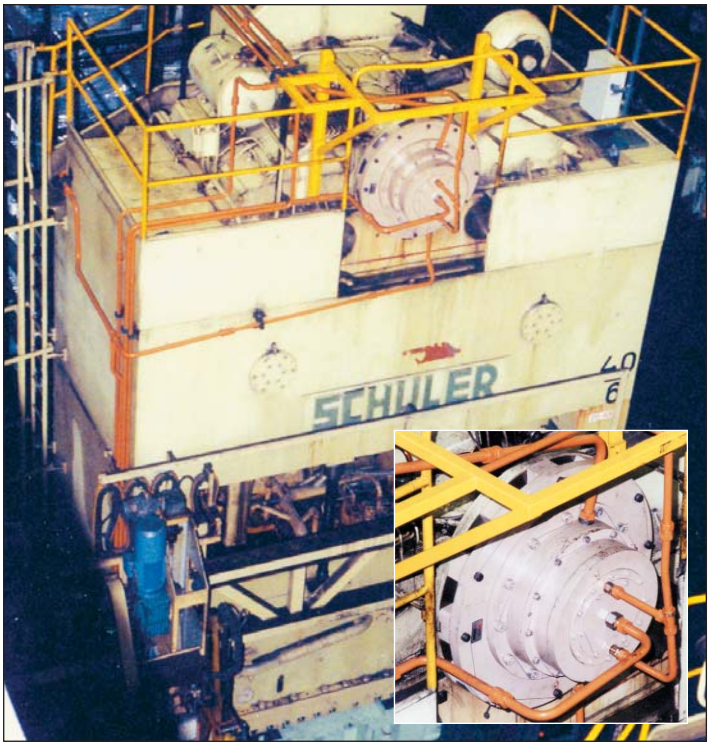
1962	1st Retrofit of a Stamping Press with an Oil Shear Press Drive
1968	Press Pac® 1600 Series – Commercial Introduction Oil Shear Press Drive Pneumatically Actuated/Oil Cooled
1986	Press Pac® 2000 – Field Test Oil Shear Press Drive Hydraulically Actuated/Oil Cooled
1991	Press Pac® 2100 Series – Commercial Introduction Oil Shear Press Drive Hydraulically Actuated/Oil Cooled
1994	500th Stamping Press – Retrofit
1997	Press Pac® 3200 Series – Commercial Introduction Oil Shear Clutch/Brake – OEM Design Hydraulically Actuated/Oil Cooled
2002	Over 4000 Stamping Press & Welding Press Drives Successfully Installed Worldwide

Press Pac® 2200 Series Separate Clutch and Brake Systems

Press Pac® 2200 Series Separate Clutch and Brake Mounted Units Hydraulically Actuated / Oil Cooled

The Press Pac® 2200 Series Oil Shear Clutch and Brake Drive System is a hydraulically actuated / oil cooled, multiple disc, separate clutch and brake for metalforming presses.

This unit is ideally suited for installation on both new equipment and the retrofit of existing equipment, including stamping and forging presses up to 4000 tons. These high performance drive systems offer precise control, are virtually maintenance free, and eliminate costly downtime by utilizing advanced oil shear design technology.



Press Pac® 2232 Separate Clutch & Brake Schuler* 800 Ton Stamping Press Installation

Press Pac® 2200 Series Features

- Hydraulic Actuation / Oil Cooling
- 9 Standard Clutch & Brake Models
- Torque Range 5000 Lb-ft thru 150,000 Lb-ft
- Soft Clutch / Soft Brake Control Package
- No Clutch & Brake Overlap or Slight Overlap Designs
- Mounted With Keys or Locking Assemblies
- Actuation Pressure of 700 PSI and Up
- Micro Inch Brake Design Available

Press Pac® 2200 Series Benefits

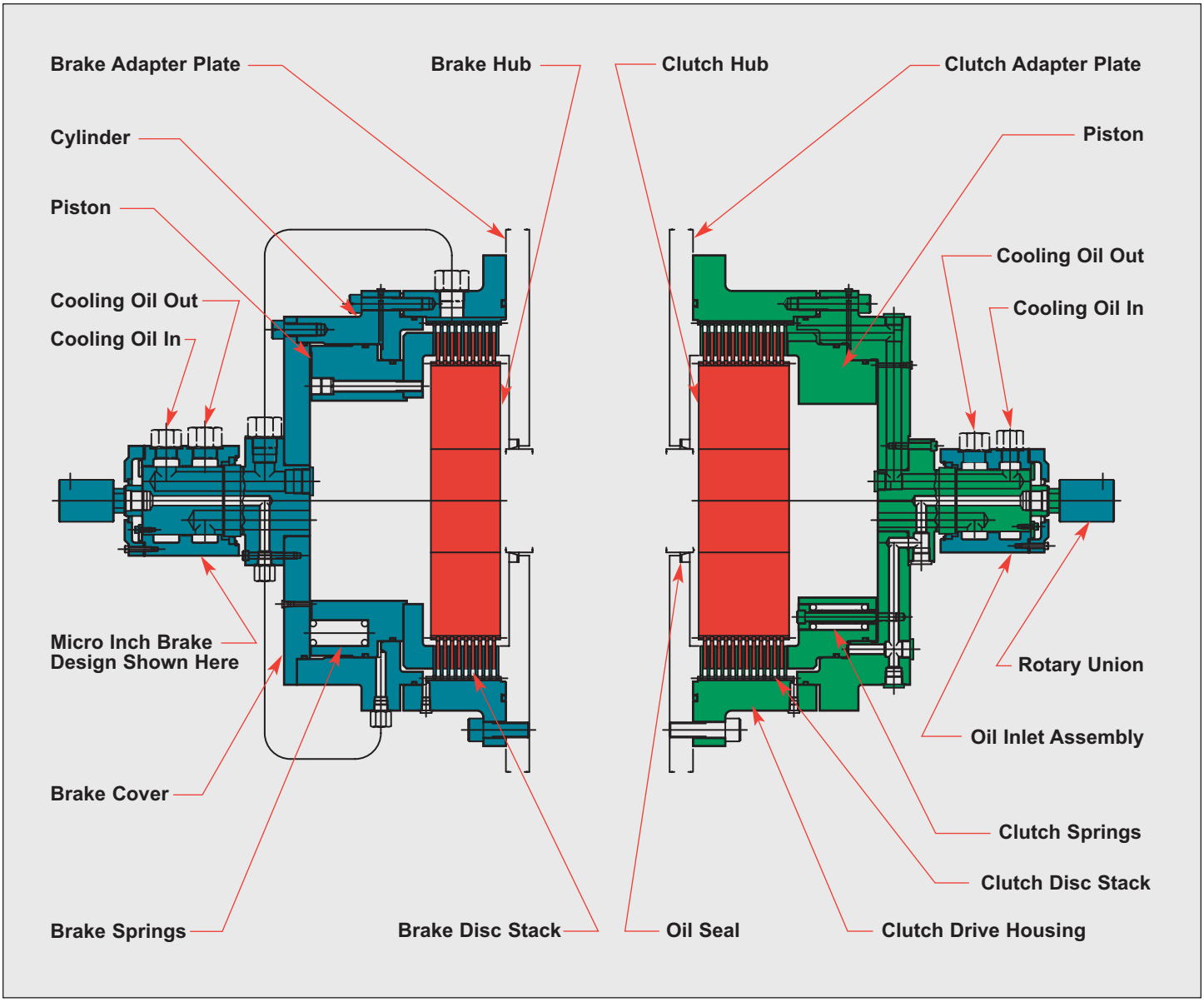
- **Longer Clutch/Brake Life** – High Cooling Capacity
  - Circulating Oil System – Dissipates Heat & Cools Oil
  - Friction Discs Are Continually Lubricated
  - Excellent Single Stroke Performance Rapid Stroke Rate
- **Maintenance Free**
  - No Clutch/Brake Adjustment
  - Virtually No Friction Disc Wear
  - Eliminates Press Downtime
- **Excellent Start / Stop Capability**
  - Consistent Braking Angles
  - Controlled Accel / Decel Available
- **Smooth, Quiet Engagement**
  - Extends Life of Press Parts
  - Cushioned Engagement of Oil Shear
  - Noise Free
  - No Hazardous Dust Lining Exhausted Into Atmosphere
- **Compact Design**
  - Low Inertia
  - High Torque In a Smaller Package

Press Pac® Drive Package

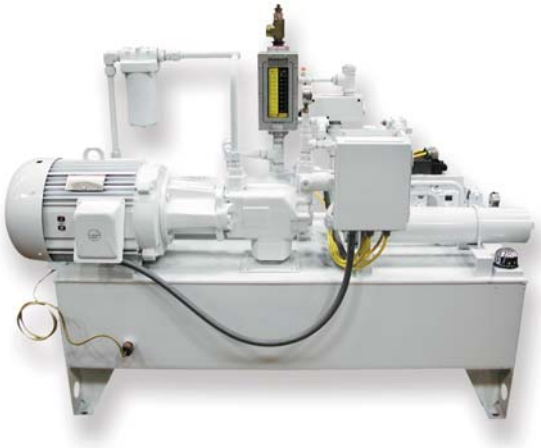
- Complete Drive System Engineering
- Clutch Assembly
- Brake Assembly
- Clutch and Brake Hub
- Clutch and Brake Adapters
- Rotating Union
- Hydraulic Oil Tank
- Midwest Brake Service Technician Check Out

Press Pac® 2232 – Erfurt* 1250 Ton Stamping Press Installation

Oil Shear Drives For Metal Forming Equipment



Circulating Oil System



Press Pac® 2200 Specifications

Model Number	Clutch Torque		Brake Torque	
Separate Mounted	Lb-ft	Nm	Lb-ft	Nm
2205	5,000	6,794	3,500	4,745
2212	10,000	13,589	6,000	8,135
2222	20,000	27,178	14,000	18,981
2232	30,000	40,767	18,077	24,509
2242	40,000	54,356	28,000	37,963
2262	60,000	81,534	42,000	56,944
2282	80,000	108,465	56,000	75,926
2292	105,000	135,890	73,500	99,653
2297	150,000	203,830	105,000	142,361

Circulating Oil System

Midwest Brake offers a complete controls package for precise control of the Press Pac® 2200 unit. This closed loop system includes a single tank with a single hydraulic pump, dual press safety valve, heat exchanger, valves, gauges, accumulators, temperature switch and oil filtering system. All the control components and gauges are mounted on a central tank for simple inspection and adjustment.

Midwest Brake can furnish the entire circulating oil system to the customer as a turnkey package, or the customer has the option to provide their own oil system using specifications provided by Midwest Brake.

Superior Heat Dissipation

Superior heat dissipation is an inherent feature in the oil shear design. The heat generated during engagement and disengagement of the disc stacks is dissipated in several ways.

First, since the flywheel is rotating continuously during press operation, heat is carried away through the housing and flywheel.

Second, oil is circulated from the tank through the drive cavity, through the friction discs and returned to tank where the oil is cooled through a heat exchanger.

Continuous oil flow through the unit keeps the temperature uniform through the whole system and eliminates “hot spots” where overheating might occur. Normal operating temperature of the unit is approximately 140°F - 180°F.

Over Temperature Switch

An over temperature switch monitors the oil temperature on the oil return line after the oil flows through the unit and returns to tank. Set at 210°F, the over temperature switch is interlocked with the main motor and will shut down the unit in the event of overheating, preventing damage to critical internal parts.

Flow Switch

A flow switch monitors the supply of oil to the unit. If the flow rate drops to a critical level, a signal is sent to shut down the unit to prevent overheating of the clutch/brake and prevent damage to critical components of the unit.

Filtering System

The system uses a 10 micron filtering system for both the actuation oil line and the cooling oil line. The high pressure filter is used to eliminate contaminants from reaching the dual press safety valve and the clutch/brake piston seals. The low pressure filter prevents contaminants from reaching the drive cavity and damaging critical internal components.

Hydraulic Actuation System

The hydraulic actuation system provides precise control and adjustment of the clutch/brake for fine tuning starting and stopping time performance. Precise, repeatable clutch engagement and improved stopping times can be achieved thru simple adjustments in control system. Faster cycle times and improved machine productivity can be achieved. This system is included on our standard circulating oil system.

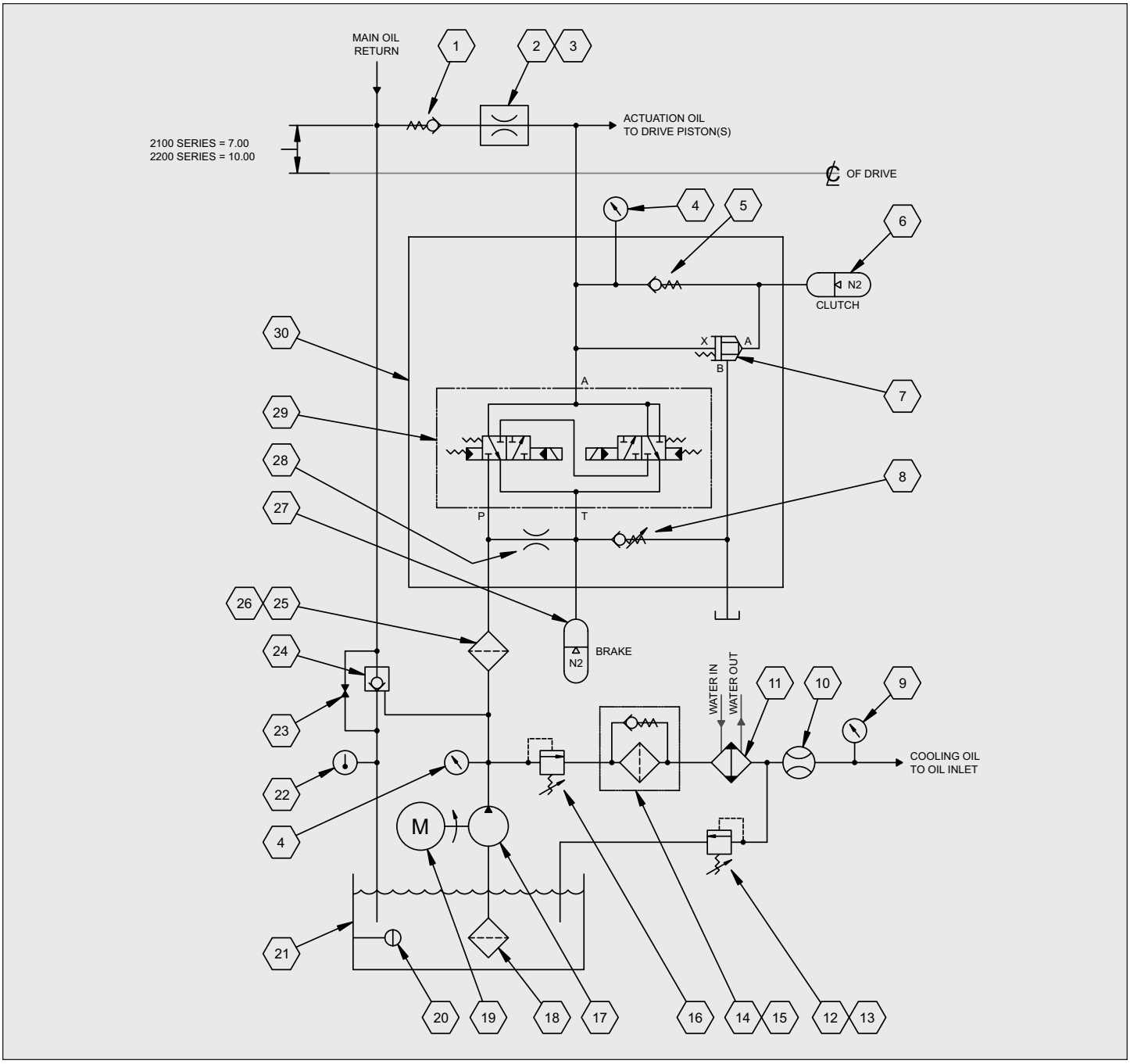
Item 1	Check Valve
Item 2	Orifice Manifold
Item 3	Orifice
Item 4	Gauge
Item 5	Check Valve
Item 6	Accumulator
Item 7	Seat Valve
Item 8	Back Pressure Valve
Item 9	Gauge
Item 10	Flow Switch (Cooling Oil)
Item 11	Heat Exchanger (Oil To Water)
Item 12	Relief Valve (Cooling Oil)
Item 13	Relief Valve Spring
Item 14	Low Pressure Filter
Item 15	Low Pressure Filter Element
Item 16	Relief Valve
Item 17	Vane Pump
Item 18	Strainer
Item 19	TEFC Pump Motor
Item 20	Level Switch
Item 21	Oil Tank
Item 22	Temperature Switch
Item 23	Ball Valve
Item 24	Pilot Check Valve
Item 25	High Pressure Filter
Item 26	High Pressure Filter Element
Item 27	Accumulator
Item 28	Orifice
Item 29	Dual Press Safety Valve
Item 30	Manifold

Soft Start / Soft Stop Valve Package

A soft start / soft stop valve package is offered as an option if enhanced control of the clutch and brake is required. This valve package allows for the clutch to be finely tuned for a soft engagement, then apply full pressure for the working portion of the stroke.

Likewise, it will provide a reduced brake torque for smooth, then apply full braking torque for quick stops that can be easily adjusted to meet your operating requirements. In the case of an emergency stop condition, the system is set to provide full brake torque in order to stop the press safely and quickly.

The soft start / soft stop valve package provides superior performance for press builders or stampers who want to extend the life of press parts through the cushioned engagement of hydraulically controlled clutch/brakes. This is an optional package that should be specified during the inquiry process.



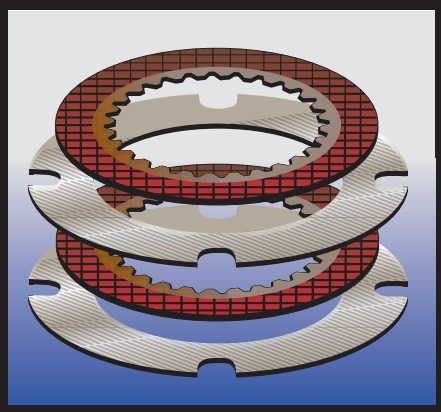
Oil Shear Principle

Press Pac® 2200 transmits torque through the shearing of oil molecules between alternating sintered bronze friction discs and steel wear discs. The viscous shearing of the oil (automatic transmission fluid) dissipates the heat generated from the operation of the Press Pac® and is carried away by the continuous circulation of the oil.

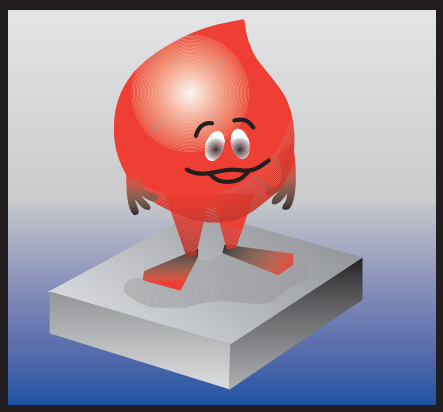
The oil shear principle is the primary reason oil shear clutch/brakes offer extremely long service life and superior reliability.

Press Pac® drive systems incorporate a true oil shear into the design where the friction discs are continuously flooded with oil to lubricate and cool friction disc surfaces. A true oil shear actually cuts across the film of oil molecules that is maintained between the alternating disc surfaces.

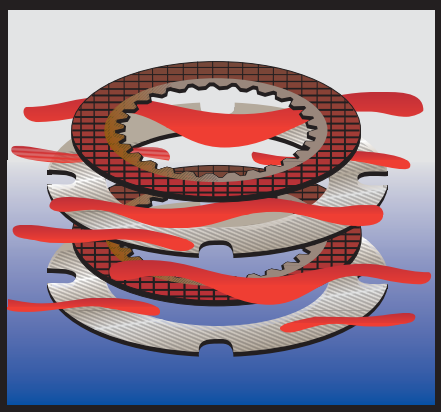
The oil itself acts as efficient power transmission medium, which relieves the mechanical friction surfaces of much of the work. The oil effectively absorbs and dissipates heat while lubricating the clutch / brake.



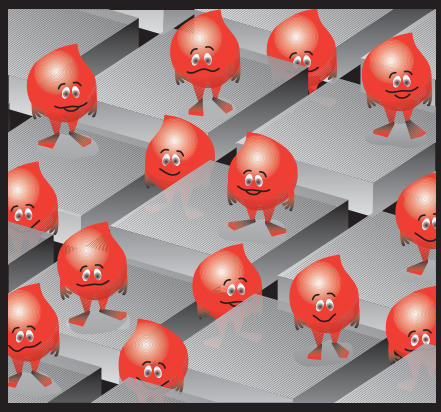
The Press Pac® Clutch/Brake contains a stack of alternating discs. Press Pac® utilizes advanced composite sintered bronze friction discs and steel disc wear plates.



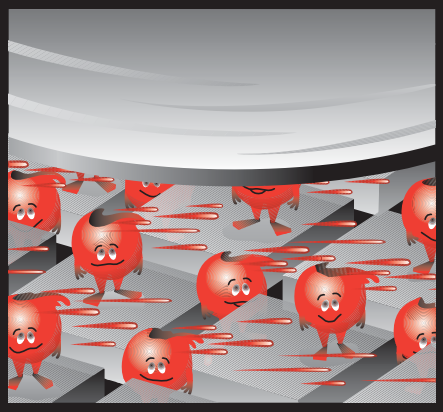
Operation of the Press Pac® Clutch/Brake begins with an oil film which is made up of multiple oil molecules. Molecules of oil are attracted to one another, giving oil defined viscosity.



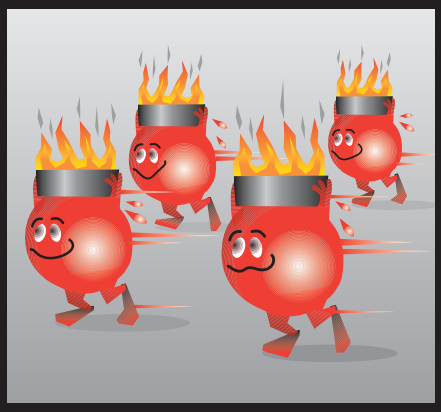
The Press Pac® Clutch/Brake maintains a film of oil between the friction surfaces, through which torque is transferred.



Oil molecules ride on and between the friction discs and act like small hydro dynamic bearings.



As the friction discs begin to rotate, the opposing drive cuts across the film of oil molecules.



The kinetic energy (heat) generated during operation of the Press Pac® Clutch/Brake is carried away by the continuous circulation of the oil molecules.

Oil Shear Press Drives For Metal Forming Equipment

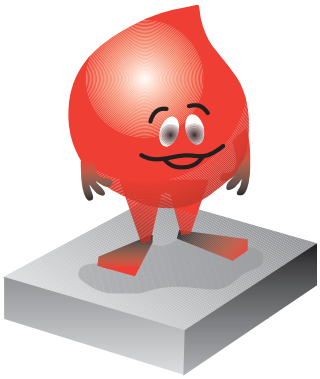
Oil Shear Principle – Press Pac® Drive System

The Press Pac® clutch/brake utilizes a circulating oil system that keeps the housing completely full of oil and continually pumps oil through the clutch/brake system and back to tank. All working parts of the Press Pac® are immersed in a bath of continuously circulated Type F – Automatic Transmission Fluid.

Power from the main motor is transferred from the belt driven flywheel to the drive shaft through a clutch disc stack, which is comprised of an alternating series of sintered bronze friction discs and steel wear discs.

Starting torque initiates the viscous shear of the oil film between the sintered bronze friction discs, which are constantly rotating with the flywheel, and the steel wear discs which are splined to the hub. The hub is mounted on the drive shaft or quill, depending on clutch/brake model, using keyways or a locking assembly.

At the instant of oil shear, rotation of the steel wear friction discs impels the oil film, setting the sintered bronze friction discs in motion. Within a split second, synchronous speed is attained. As the hydraulically actuated clutch becomes fully engaged, the discs are firmly clamped together by over 700 PSI of hydraulic pressure. During the lock up of the clutch disc stack, residual oil is expelled from between the alternating discs, eliminating slippage and creating positive power transmission.



Over 90% of the starting inertia is absorbed by a thin, positive oil film between the alternating discs. The oil itself acts as the power transmission medium, which results in very little wear on the sintered bronze friction disc surfaces. During the first "wear in" of approximately one million cycles, there is approximately .001 (.0245mm) per surface wear. After the first wear in is completed, further wear is almost non existent.

Similarly, braking torque is initiated by the viscous shearing of the oil film. However, the brake pressure is achieved through spring applied pressure, rather than hydraulic applied pressure that is used in clutch actuation.

Oil Shear Principle Advantage

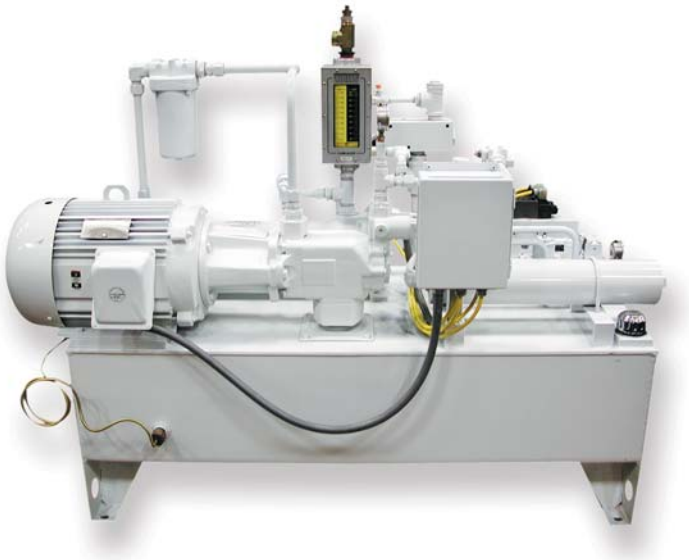
The primary advantage of oil shear technology is to dramatically extend the life of friction surfaces. Friction creates heat, which is inherent in any clutch/brake operation. Direct friction surface contact, which is required for positive torque transfer, causes abrasion and wear on the disc surfaces. Friction discs that are coated with a film of oil are far better suited to withstand the heat and wear because the oil efficiently absorbs heat and protects surfaces from contact abrasion.

Advantages

- Little to no wear of plates in the disc stack
- No brake fade
- More precise operation of the clutch/brake
- Increased clutch/brake reliability
- Increased machine uptime

Oil Shear – Increased Thermal Capacity

A large capacity hydraulic reservoir tank is mounted below the drive unit to pump oil through the clutch/brake and returned to tank where it is cooled and reused. The heat generated from the start/stop inertia of the Press Pac® is absorbed into the oil, circulated from the unit back to the tank where the heat is rapidly dissipated. The Press Pac® circulating oil system uses a state of the art heat exchanger to provide heat dissipation and cool the oil for reuse.



Oil Shear vs. Dry Friction

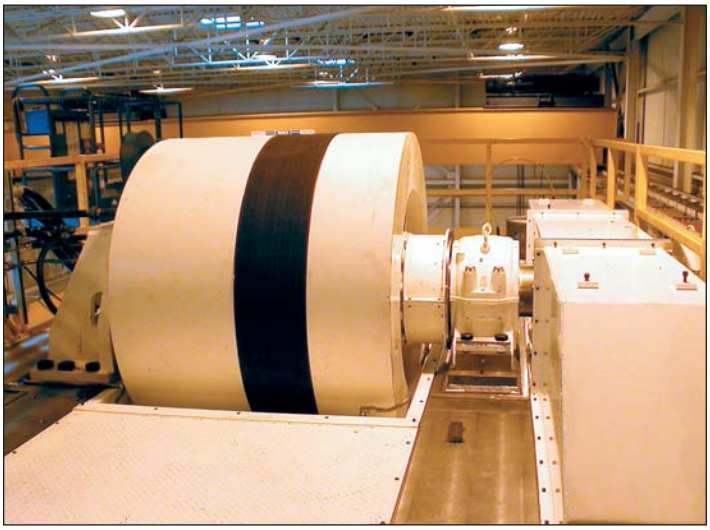
Press Pac® oil shear clutch/brake will outlast dry friction pneumatic clutch/brakes in some cases up to 10 to 1. Dry friction pneumatic clutches utilize the slippage of dry friction surfaces against wear surfaces to absorb inertia and generate torque. Full engagement of the dry friction surface occurs only after considerable slippage and wear occur. This causes wear of both friction material and wear plate surfaces. Without adequate heat dissipation, the friction surface degrades rapidly, requiring frequent adjustment and disc replacement of both friction discs and wear surfaces.

Some dry friction pneumatic clutch/brakes used on presses are mechanically interlocked; meaning one piston both releases the spring set brake and applies clamping force for the clutch. These mechanically interlocked units have most of the clutch/brake mass mounted on the drive shaft and often represent 80 percent of the total inertia of the press that the clutch/brake must stop and start.

Press builders introduced “low inertia” clutch/brake design in the 1940’s in an effort to reduce the start-stop inertia. This type of design requires separate pistons to release the brake and engage the clutch. The start-stop inertia with this type of design is still usually 60 percent or more of the total inertia.

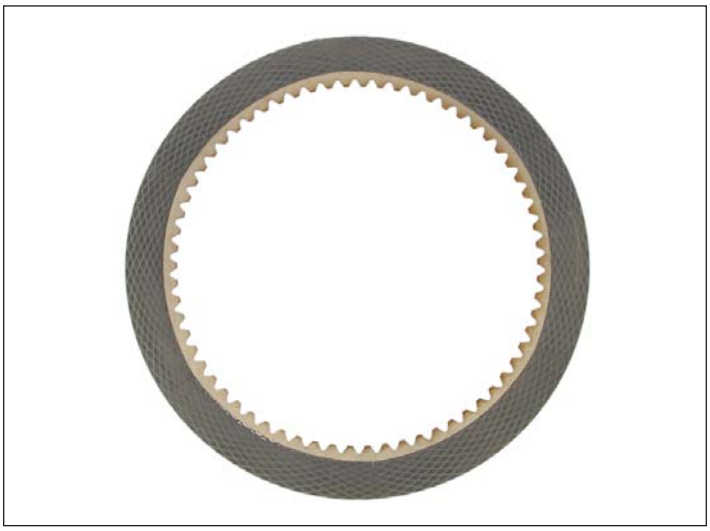
The trip rate of a press equipped with a dry friction clutch/brake is limited because the mass of the unit determines its heat dissipation capacity, but if this mass is increased, the inertia that must be started and stopped is increased. These factors define a closed loop format from which it is impossible to escape when trying to increase the performance of a dry friction clutch/brake system.

Press Pac® 2200 is a compact, very low inertia design that provides superior stopping time performance with precise repeatable performance.



Press Pac Oil Shear Press Drive – Hydraulic Actuation

Dry Friction Pneumatic Clutch/Brake



Sintered Bronze Friction Disc

Dry Friction Clutch Disc

Oil Shear Press Drives For Metal Forming Equipment

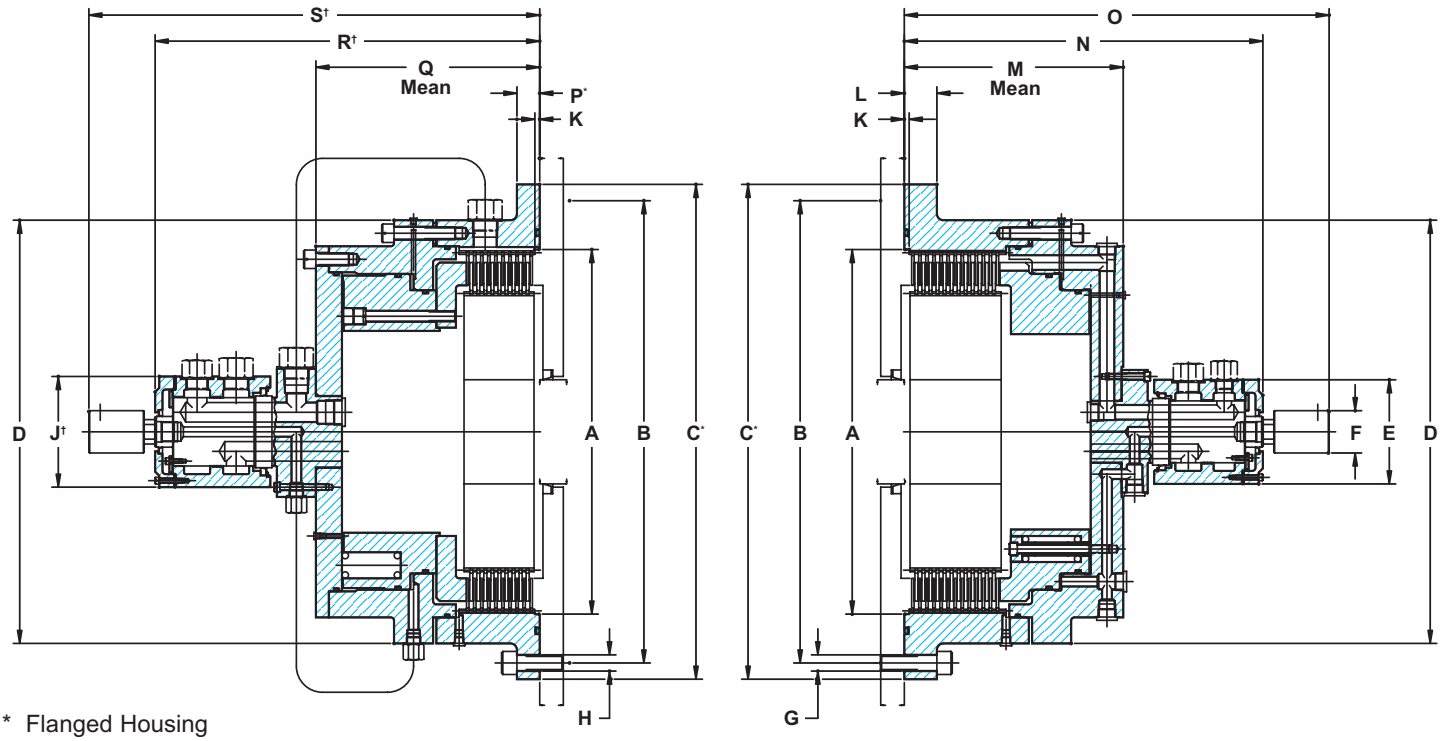
	Oil Shear	Dry Friction
Transmission of Starting Torque From Flywheel to Drive Shaft	Viscous Oil Shear Between Discs	Slippage of Dry Friction Surfaces Against Each Other
Full Operation	Lockup of Discs – After Most of Work is Done by Oil Shear (Drive Shaft is in Motion Before Discs Engage)	Lockup of Discs – After They Have Slipped For Considerable Time Putting Drive Shaft In Motion
Braking Action	Viscous Oil Shear Between Discs	Slippage of Dry Friction Surfaces Against Each Other
Full Stop of Press	Lockup of Brake Discs – After Press has Decelerated Through Oil Shear	Lockup of Brake Discs – After Disc Slippage has Decelerated Press
Dissipation of Heat	Circulating Oil System with Heat Exchange Flushes Discs Continually	Air Circulation
Maintenance	Little to No Maintenance	Constant Maintenance
Adjustment of Clutch/Brake	Self Adjusting Clutch / Brake	Constant Adjustment Needed
Friction Discs	Sintered Bronze – Long Lasting	Dry Friction – Frequent Reline Needed
Brake Fade	No Brake Fade	Constant Brake Fade
Flywheel Bearings	Self Lubrication – Integral to Flywheel	Manual Lubrication
SPM - Cycle Rate	**Up to 90% Single Stroke Rate**	**Up to 50% Single Stroke Rate**
Inching / Jogging	Unlimited	Limited to Heat Dissipation of Friction Material
Installation	Simple Installation Little to No Machining/Modification	Difficult Installation Major Changes to Press Components Machining Needed On Site
Installation Time	7-10 Days	2-4 Weeks
Controls	Accel / Decel Adjustment	Air Is On / Off – Less Controllable
Environment	No Dirty Air Expelled Into Atmosphere No Friction Lining Expelled Into Air	Air Expelled Into Atmosphere Friction Lining is Expelled Into Air
Noise	Quiet Engagement of Clutch/Brake	Noisy, Squealing Engagement of Clutch/Brake
Testing	Unit Fully Tested Before Installation	Press Used as Test Stand During Installation
Responsibility	One Company, One Responsibility	Clutch Manufacturer & Machine Repair Co. Dual Responsibility

Press Pac® 2200 Series Separate Clutch and Brake Systems

Standard Clutch / Standard Brake – Hydraulic Actuation / Oil Cooled

Midwest Brake Model No.			2212	2222	2232	2242	2262	2282	2292	2297
Torque Clutch (Lb-ft)			10,000	20,000	30,000	40,000	60,000	80,000	105,000	150,000
Torque Brake (Lb-ft)			6,000	14,000	18,077	28,000	42,000	54,444	70,000	101,111
Operating Pressure Non-Overlap (psi)			697	757	840	847	827	804	799	802
Operating Pressure Slight Overlap (psi)			940	969	773	769	753	728	722	725
Diameter	A	+.002	16.000	20.000	20.000	26.000	26.000	28.000	28.000	28.000
	B	(B.C.)	18.,000	23.500	23.500	28.000	28.000	35.500	35.500	35.500
	C*		~	~	~	~	~	38.00	38.00	38.00
	D		19.25	25.25	25.25	30.00	30.00	32.50	32.50	32.50
	E		4.63	5.75	5.75	5.75	5.75	8.00	8.00	8.00
	F		2.88	2.88	2.88	2.88	2.88	3.25	3.25	3.25
	G		M16x2 (12)	M24x3 (12)	M24x3 (12)	M24x3 (12)	M24x3 (18)	1.25 (20)	1.25 (20)	1.25 (20)
	H		M16x2 (12)	M24x3 (10)	M24x3 (10)	M24x3 (10)	M24x3 (12)	1.25 (16)	1.25 (16)	1.25 (16)
	J	(Inching Only)	4.63	8.25	8.25	8.25	8.25	8.50	8.50	8.50
Length Dimensions	K		0.28	0.28	0.28	0.40	0.40	0.38	0.38	0.38
	L*		~	~	~	~	~	2.50	2.50	2.50
	M	(Mean)	7.65	9.71	10.38	12.19	14.19	15.19	16.81	19.52
	N		15.06	18.40	19.07	20.88	22.88	25.91	27.53	30.24
	O		20.00	22.60	23.66	25.07	27.07	31.00	32.62	35.33
	P*		~	~	~	~	~	1.75	1.75	1.75
	Q	(Mean)	6.22	8.16	8.48	13.48	15.48	16.11	17.19	19.35
	R	(Inching only)	14.25	21.13	21.44	26.42	28.42	28.45	29.53	31.70
	S	(Inching only)	19.47	25.29	25.61	30.61	32.61	33.54	34.62	36.79

* Flanged housing on Models: 2282, 2292 & 2297

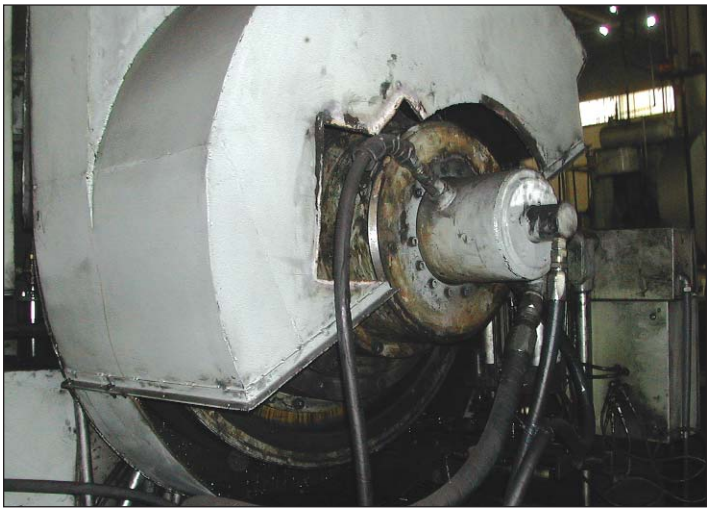


* Flanged Housing
† Inching Only

Installation Examples

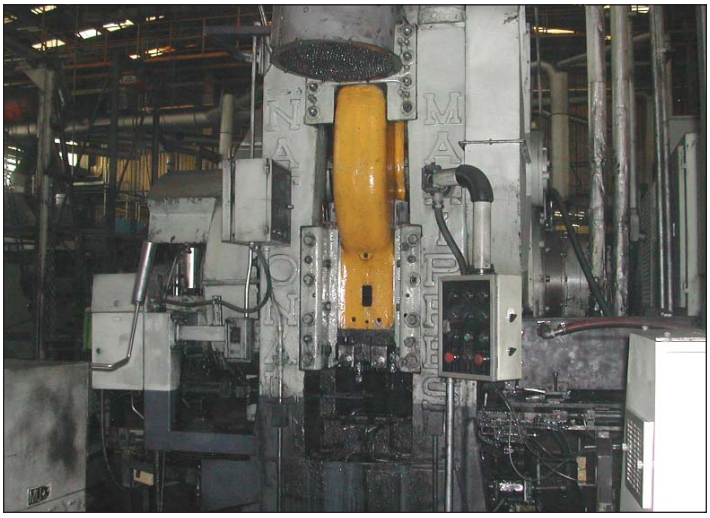
Press Pac® 2232 Separate Clutch & Brake
Danly* 800 Ton Stamping Press Installation

Press Pac® 2232 Separate Clutch & Brake
Danly* 800 Ton Stamping Press Installation



Press Pac® 2222 Clutch
National* 500 Ton Forging Press Installation

Press Pac® 2222 Brake
National* 500 Ton Forging Press Installation



Press Pac® 2222 Separate Clutch and Brake
National* 500 Ton Forging Press Installation

Automotive Stamping Plant
Tandem Line Retrofitted With Press Pac® 2165 Units

Field Service Support

Midwest® Brake maintains a staff of highly skilled and trained technical personnel including field service supervisors and application engineers ready to provide customer support and service.

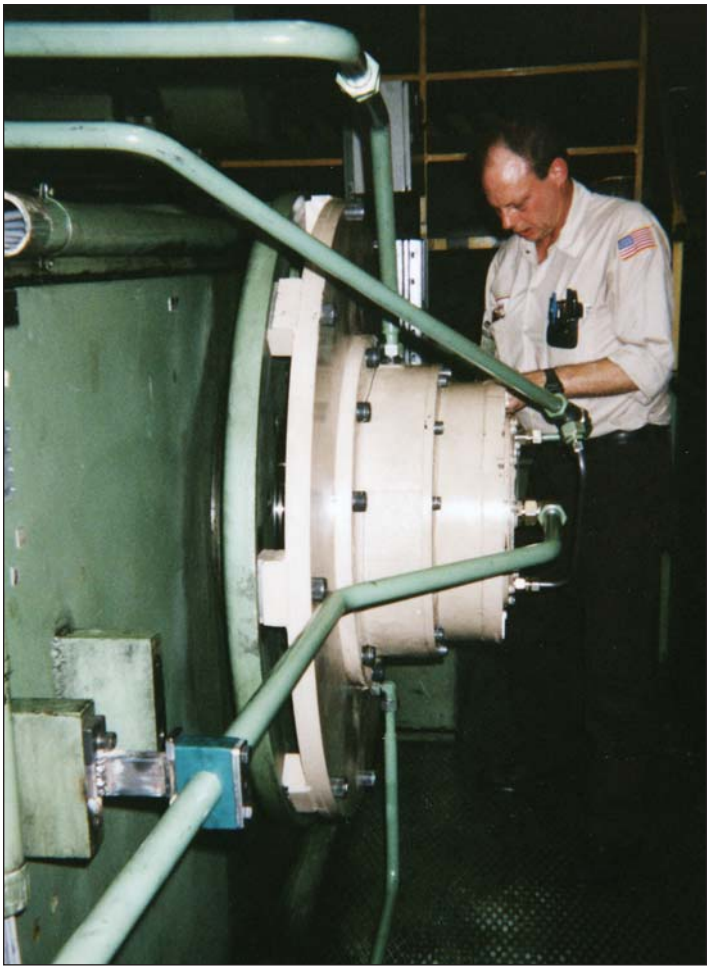
- Installation & Start Up Services
- Field Service Support
- Troubleshooting & Consultation

Our personnel have many years of experience in the installation, repair, and maintenance of metal stamping presses and the related component assemblies. With this experience, Midwest Brake offers unequaled customer support and field service support that will maximize the uptime and reliability of your press drive systems. We offer the following support services:

- Clutch & Brake Inspections
- Hydraulic & Pneumatic Systems Inspection
- Press Inspections
- Preventative Maintenance Programs

Additionally, our state of the art manufacturing facility provides our customers with high quality repair service, assembly and machining on site in the event repairs or clutch/brake rebuilds are required.

- Clutch/Brake Repair & Rebuild
- Service Parts & Service Support
- Machining & Fabrication Services



Clutch and Brake Inspection

Hydraulic and Pneumatic Systems Inspection

Press Pac® 2200 Series Application Data Sheet

Request for Quotation

Midwest Brake® is able to provide a quotation of the Press Pac® drive system with a few basic, simple pieces of information.

This standard form is to be filled out. Using this information, torque requirements can be calculated and the proper model will be selected.

Please visit our website to download brochures and application data sheets.

Contact Information:

Midwest Brake®
26255 Groesbeck Hwy.
Warren, MI 48089

Phone: 586.775.3000
Fax: 586.775.3040

E-mail:

sales@midwestbrake.com

Website:

www.midwestbrake.com

Company

Address

City State Zip

Contact Title

Phone Fax

Press Manufacturer* Date of Manufacture

Type of Press*

☐ Single Action ☐ Top Drive ☐ Knuckle Joint
☐ Double Action ☐ Bottom Drive ☐ Forging Press

Press Model Number

Press Serial Number

Tonnage* Rated Tonnage Distance*

Stroke of Slide*

Continuous Strokes Per Minute*

Press Gear Ratio

Length of Connection (Pitman Length)

Flywheel – Outside Diameter*

Sheave – Outside Diameter*

Main Motor HP*

Main Motor RPM*

Other information that may be useful:

***Required Information**

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