ISO 9001 CERTIFIED

502-CPB-003-00

INSTALLATION, OPERATION, MAINTENANCE MANUAL

FOR

Posistop Curing Press Brake

WARNING - Read this manual before any installation, maintenance or operation.

FORCE CONTROL

FORCE CONTROL INDUSTRIES, Inc.

MANUFACTURERS OF MECHANICAL AND ELECTRICAL POWER TRANSMISSION EQUIPMENT

Limited Warranty

Force Control Industries, Inc. ("Force Control") warrants its products to be free from defects in material and workmanship under normal and proper use for a period of one year from the date of shipment. Any products purchased from Force Control that upon inspection at Force Control's factory prove to be defective as a result of normal use during the one year period will be repaired or replaced (at Force Controls'option) without any charge for parts or labor. This limited warranty shall be void in regard to (1) any product or part thereof which has been altered or repaired by a buyer without Force Control's previous written consent or (2) any product or part thereof that has been subjected to unusual electrical, physical or mechanical stress, or upon which the original identification marks have been removed or altered. Transportation charges for shipping any product or part thereof that the buyer claims is covered by this limited warranty shall be paid by the buyer. If Force Control determines that any product or part thereof should be repaired or replaced under the terms of this limited warranty it will pay for shipping the repaired or replaced product or part thereof back to the buyer. EXCEPT FOR THE EXPRESS WARRANTY SET OUT ABOVE, FORCE CONTROL DOES NOT GRANT ANY WARRANTIES EITHER EXPRESSED OR IMPLIED, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR USE. The warranty obligation set forth above is in lieu of all obligations or liabilities of Force Control for any damages. Force Control specifically shall not be liable for any costs incurred by the buyer in disconnecting or reinstalling any product or part thereof repaired or replace under the limited warranty set out above. FORCE CONTROL EXPRESSLY EXCLUDES ALL LIABILITY FOR ANY INDIRECT OR CONSEQENTIAL DAMAGES THE BUYER MAY SUSTAIN IN CONNECTION WITH THE DELIVERY, USE, OR PERFORMACE OF FORCE CONTROL PRODUCTS. Under no circumstances shall any liability for which Force Control is held responsible exceed the selling price to the buyer of the Force Control products that are proven to be defective. This limited warranty may be modified only in writing signed by a duly authorized officer of the company. This limited warranty applies exclusively to Force Control products; warranties for motors and gear reducers and other component parts may be provided by their respective manufactures. Any legal action for breach of any Force Control warranty must be commenced within one year of the date on which the breach is or should have been discovered.

A Return Goods Authorization (RGA) number must be obtained from the factory and clearly marked on the outside of the package before any equipment will be accepted for warranty work. Force Control will pay the shipping costs of returning the owner parts that are covered by warranty.

Force Control believes that the information in this document is accurate. The document has been carefully reviewed for technical accuracy. In the event that technical or typographical errors exist, Force Control reserves the right to make changes to subsequent editions of this document without prior notice to holders of this edition. The reader should consult Force Control if errors are suspected. In no event shall Force Control be liable for any damages arising out of or related to this document or the information contained in it.

CPB Curing Press Motor Brake
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Section 1
DESCRIPTION AND OPERATION

1-1 THE OIL SHEAR PRINCIPLE

Conventional clutches and brakes depend on the friction between solid surfaces operating in air to transmit torque. Friction does the job, but produces a great amount of **Heat and Wear**, causing an increase in replacement parts, breakdown and maintenance time.

Oil Shear Technology was pioneered by **Force Control** in 1959 and resulted in one of the most energy efficient Brake/Clutch Variable Drive Systems available today.

In 1970 **Force Control** introduced an integral Oil Pump, which requires no additional parts. The oil pump forces a positive oil feed from the center of the brake disc stack to "Float" the friction surfaces in a continuously circulating bath of oil.

The oil molecules tend to cling to each other and also the the friction surfaces. As moving and stationary surfaces are brought together, a thin but positive film of oil is maintained between them and is controlled by the clamping pressure and grooves designed into the braking surfaces.

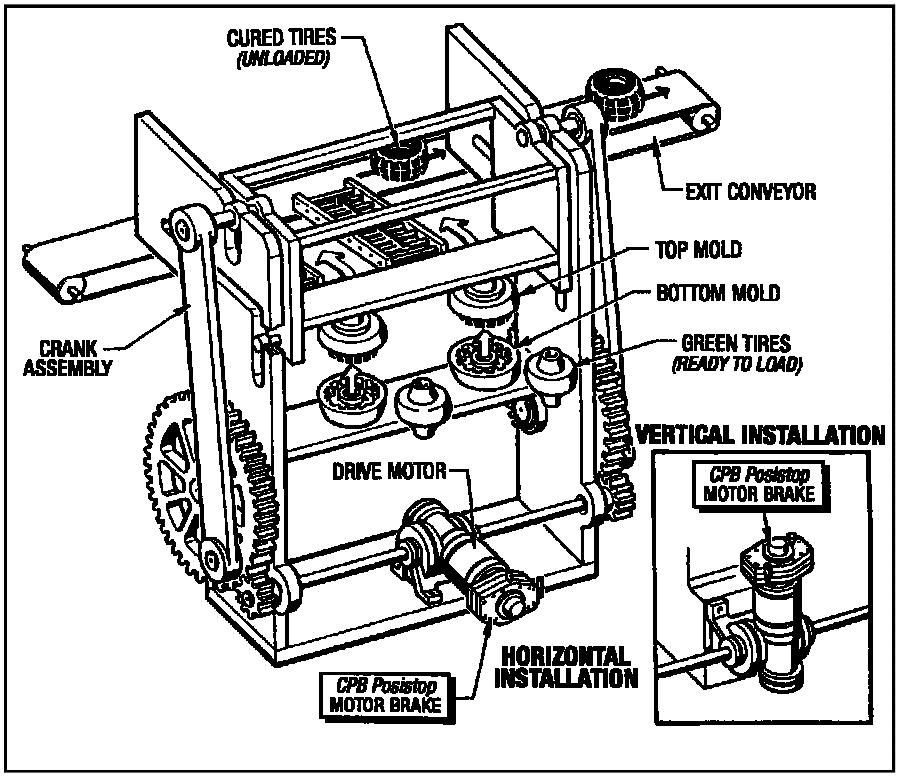


Figure 1.1 - Tire Curing Press

Torque is transmitted from one surface to the other through the viscous shear of the oil film. The braking surfaces are protected by this oil film, which reduces wear and also effectively transmits heat away from the braking surfaces.

...thus brake wear is greatly reduced along with all routine maintenance common to conventional dry motor brakes.

1-2 CURING PRESS MOTOR BRAKE DESCRIPTION AND TYPICAL APPLICATION

(See Figure 1.1)

The *Posistop Curing Press Motor Brake* is a multiple surface, spring set and pneumatic release motor brake that was designed specifically for the tire manufacturing plants.

The Curing Press has hot molds to shape and vulcanize the tire. A brake motor rotates the mold mechanism from a fully closed position to a fully open position and back. The purpose of this ***Posistop Curing Press Motor Brake*** is to provide a positive means of stopping the mold in either the open or closed position. The closed position is very critical. The mold needs to close at exactly the right moment or the mold can become damaged.

1-3 CURING PRESS MOTOR BRAKE FEATURES

The most important Feature is the fact that it will reduce maintenance time and provide a very long service life.

- Easy retro-fit on existing machinery.
- Totally enclosed design prevents contamination and corrosion.
- Heavy-duty housings combined with precision machined parts guarantee performance.
- Self adjusting, maintenance free.
- Internal integral oil pump to maintain the **Oil Shear Principle.**
- Multiple surface brake stack which distributes the braking torque along the whole hub rather than on a single braking surface, reducing the heat and wear on each braking surface.
- 60 Ft. Lbs. to 135 Ft. Lbs. braking torque.
- 7-1/4" Dia. or 9" Dia. mounting bolt circle.
- Vertical or horizontal mounting.

1-4 CURING PRESS MOTOR BRAKE OPERATION

The Curing Press Motor Brake Cross Section (Figure 1.2) shows the brake in the normally spring set braked position.

Compressed air, controlled by an external pneumatic control valve, enters the piston chamber which moves the piston to disengage the brake stack, allowing the drive motor to rotate freely.

When the air is released the piston, which is spring loaded, returns to the braking position.

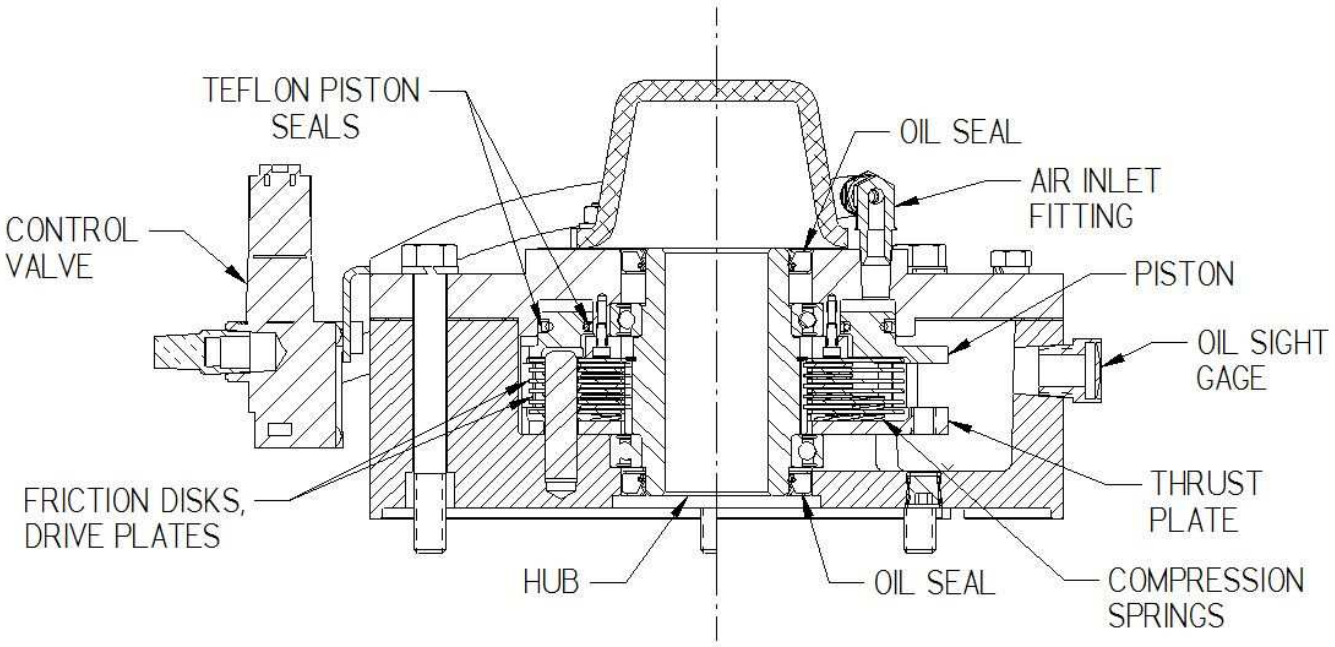
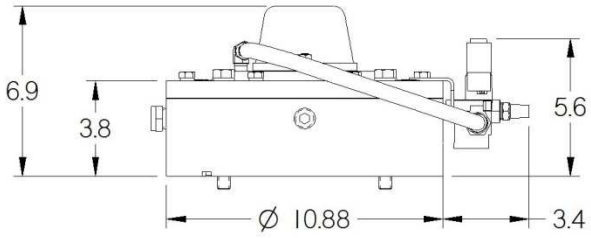


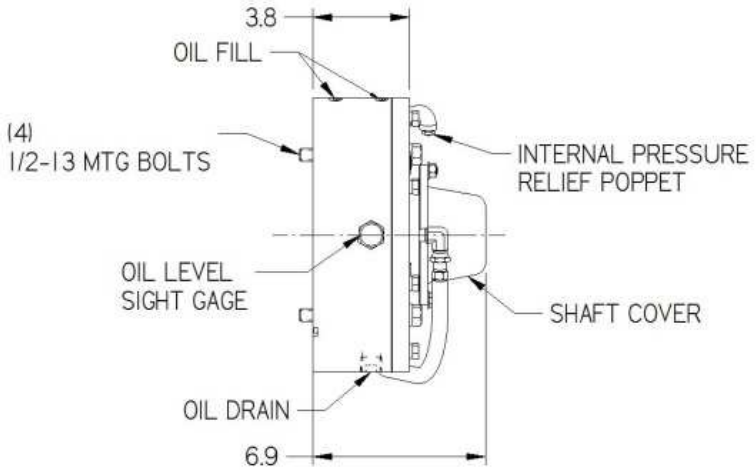
Figure 1.2 - Curing Press Brake Section

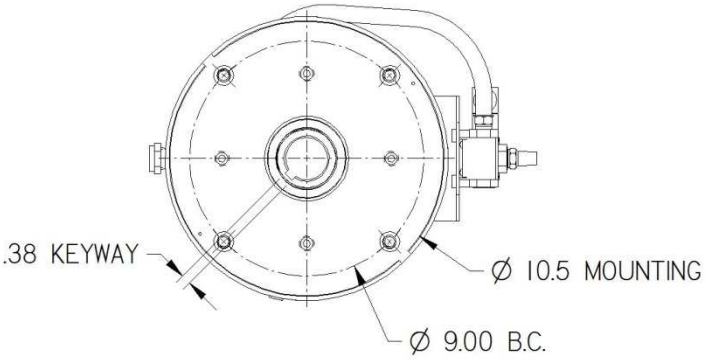
Section 2

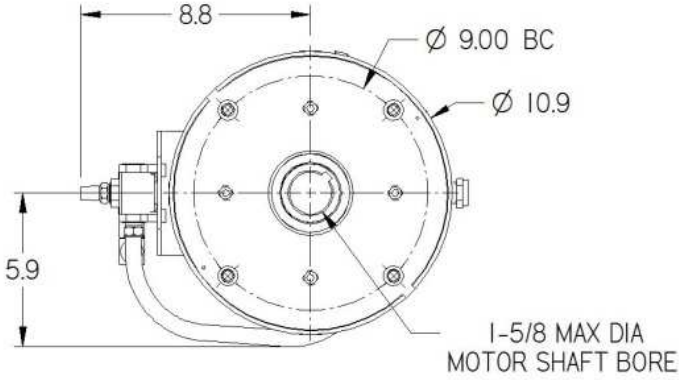
SPECIFICATIONS

2-1 DIMENSIONAL SPECIFICATIONS





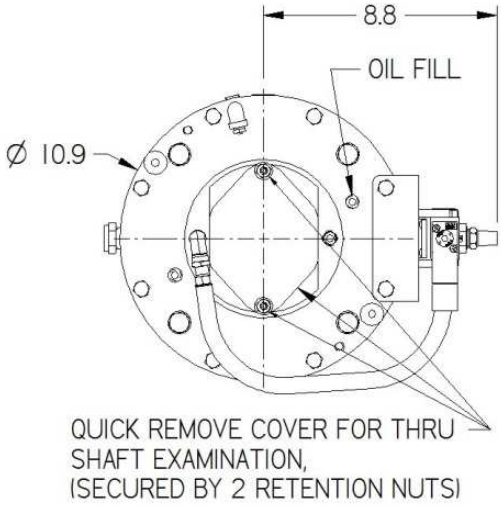




2-2 - TORQUE SPECIFICATIONS

STATIC TORQUE (FT. Lbs.)	MIN. RELEASE PRESSURE (PSI)	CYCLIC INERTIA (Lb FT^2)	KINETIC ENERGY PER STOP (Ft. Lbs.)	PISTON VOLUME (IN^3)
60	29	.0465	7,400	13
75	36			
90	43			
105	50			
120	57			
135	65			

Max. Operating Speed - 1800 RPM
Approx. Fluid Capacity - 1 Quart



SECTION 3
INSTALLATION

IMPORTANT SAFETY PRECAUTIONS

The Curing Press Motor Brake described in this manual must not be installed in any manner except as specified and must not be operated at speeds, torque loads or temperatures other than those specified. Failure to limit operation of the brake to the conditions specified could damage the unit and may cause malfunction or damage to interconnecting equipment.

WARNING

The following precautions must be taken if the installation of the Curing Press Motor Brake is to be a retrofit for an existing application. Before attempting installation, open the motor disconnect, shut off the control electrical supply and lock them out to avoid any possibility of personal injury. Be sure that any mechanisms holding inclined or vertical loads are locked mechanically with cribbing or other means.

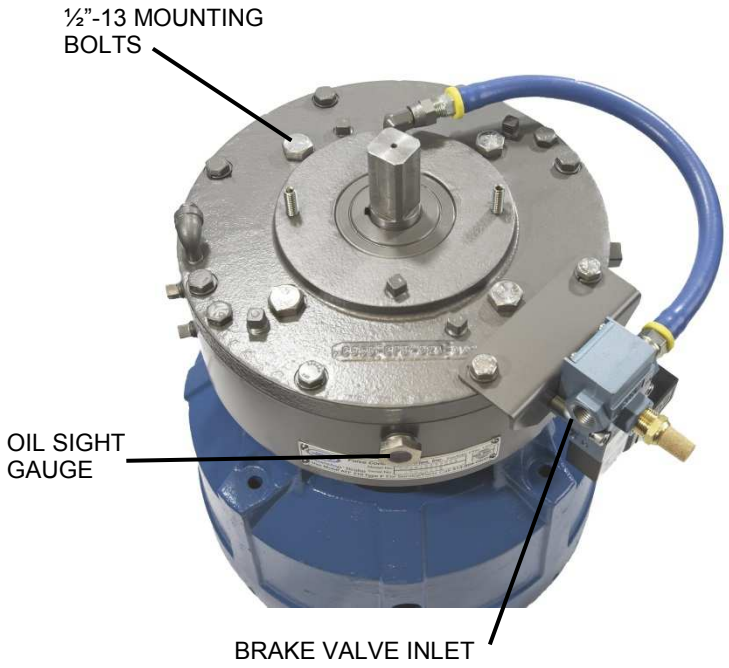
The Curing Press Motor Brake is assembled at the factory for ease of shipment and installation.

3-1 INITIAL MOUNTING AND ALIGNMENT OF THE BRAKE TO THE DRIVE MOTOR

(See Figure 3.1)

Make sure the motor shaft and motor mounting surface is clean and free of any nicks or burrs. Lightly coat the motor shaft with an anti-seize compound before any further installation.

1. Place the Brake on the Press Motor shaft until the housing rests on the Press mounting face**.**
2. Temporarily, connect an air supply to the Brake valve. Use the valve manual operator to release the brake. This will allow the brake housing to be aligned with the Press mounting holes.
3. Using a feeler gauge, check the angular alignment between the Input Housing (#8) and the motor mounting surface. Use U-Shaped Motor Shims, which are not furnished, to correct any angular misalignment.
4. Install the mounting screws and lock- washers. Tighten down and torque to **60 Ft. Lbs.**
5. Permanently, attach the air supply to the brake valve. Set the air pressure to the listed release pressure for brake model being installed.
6. Connect the valve to an approved electrical supply following all Nation, State and local codes.
7. Energize the brake valve. Verify the brake releases using the square drive on the end of the press motor.
8. Install the shaft cover on to the brake. Tighten the cover nuts to **15 Ft. Lbs.**



Section 4
LUBRICATION

4-1 CHECKING THE OIL LEVEL

Check the oil level when the brake is initially installed and weekly thereafter or until experience dictates otherwise. Always check the oil with the brake stationary (not running). The oil level should be centerline of the sight gauge.

4-2 CHANGING THE OIL

IMPORTANT - Always open the disconnects to the drive motor and lock them out before changing the oil.

Completely change the oil in your brake every 12 months. Change the oil more frequently in harsh environments or high cyclic applications.

A. Vertical Mounted Brakes

1. Remove the Drain Plug and drain the oil from the brake. Replace this plug when all of the oil is drained out.
2. Remove the Pipe Plug from the fill port located in the End Housing (#10).
3. Fill the brake to the proper level. The oil level should be centerline of the sight gauge.

CAUTION - Do not overfill the brake. Excess oil will cause the brake to overheat.

B. Horizontal Mounted Brakes

1. Remove the Drain Plug and drain the oil from the brake. Replace this plug when all of the oil is drained out.
2. Remove the Pipe Plugs located in the top of the End Housing (#10).
3. Fill the brake to the proper level. The oil level should be centerline of the sight gauge.

CAUTION - Do not overfill the brake. Excess oil will cause the brake to overheat.

4-3 TYPE OF OIL

Use only **Mobil Automatic Transmission Fluid ATF-210 (Type "F").**

Always use the type of fluid specified on the Name Plate. If the Name Plate is missing or there is any doubt about the proper fluid to use contact Force Control Industries, Inc.

Section 5
OPERATIONAL CHECKS

CAUTION - Make these Operational Checks only when the brake is shut down. Open the motor disconnects and lock them out to avoid any personal injury.

5-1 BRAKE OPERATIONAL CHECKS

Provisions for manual operation is to be made if the brake has been removed for repair. Set up a temporary manually controlled air supply with a quick-acting shut-off valve and a pressure gauge. (See Figure 5.1)

1. Apply the air pressure to the brake and quickly shut the air off. Observe the pressure gauge to see if there is a significant pressure drop.

If there is a pressure drop of 5 PSI or more within a 30 Second time, the brake is not operating correctly.

This would indicate that the piston seals or gaskets are worn or damaged and would need to be replaced.

2. Exhaust the air pressure and attempt to manually turn the hub. The hub should be locked in position. If the hub can be turned then the pistons did not return to the normal brake position.

Section 6
TROUBLESHOOTING

6-1 TROUBLE SHOOTING CHART

TROUBLE	*POSSIBLE CAUSE*	*REMEDY*
A. Brake fails to engage properly.	Pistons sticking or binding.	Disassemble to the extent necessary and inspect for damaged parts.
	Worn Friction Discs.	Replace brake stack.
	Weak or broken springs.	Replace as needed.
	Air pressure not exhausting or slow in exhausting.	Check control valve or muffler and clean or replace as necessary.
B. Brake engages too quickly.	Low oil level.	Check oil level and correct.
C. Noise and vibration.	Improper or loose mounting on motor.	Check mounting bolts and alignment. If partial disassembly is required refer to Section 3 - Installation.
D. Brake fails to disengage properly.	Low air pressure.	Increase air pressure. (See Section 2)
	Piston sticking or binding	Disassemble to the extent necessary and inspect for damaged parts.
	Control valve not functioning properly.	Check valve operation and replace if necessary.
E. Brake overheats (Over 225° F.)	Brake not engaging or disengaging properly causing excessive slippage.	Refer to troubles A and D.
	Improper oil level.	Check oil level and correct.
F. Oil leakage.	Oil seal lip or wear sleeve damaged.	Check for oil leaking around shaft. Replace if necessary.
	Bad alignment.	Check and correct alignment.
	External bolts not tight.	Tighten all external bolts.
	Gaskets damaged.	Check and replace if necessary.
G. Oil leakage at breather.	Oil level too high.	Drain excess oil.
H. Brake does not repeat.	Air pressure changed.	Check and adjust air pressure.
	*Oil temperature changed.	Check temperature.
	Inconsistent stopping signal.	Check control circuit.

* - **NOTE:** For installations requiring precise starting and stopping, operating temperatures are very important. Operating temperatures between 116° F. and 165° F. are recommended.

Section 7
ILLUSTRATED PARTS LIST

7-1 GENERAL INFORMATION

This section illustrates, lists and describes all parts for the **Curing Press Motor Brake**. Parts are identified on the exploded views with Part Reference Numbers. These Numbers correspond to the Part Reference Number given in the Parts Lists.The Part Name and Quantity Used is also given in the Parts List. This Part Reference Number, Part Name and Quantity should be used when ordering Replacement Parts.

7-2 FACTORY REBUILDSERVICE

Reconditioning Service is offered by Force Control Industries, Inc. at the factory. A complete factory rebuild will be 50% the cost of a new unit if the housings are reusable. If housings need to be replaced , there will be an additional cost.

Contact **Force Control Industries, Inc.** for authorization and shipping instruction before returning a drive unit for this service. Force Control cannot be responsible for units returned to the factory without prior notice and authorization.

Care must be given to the packing of returned brakes. Always protect mounting surfaces by attaching to a skid. Shipment-damaged brakes always delays repairs. It is usually impossible to recover damage costs from the carrier. When possible, describe the problem experienced on your shipping papers.

Return to: **Force Control Industries, Inc.**
3660 Dixie Highway
Fairfield, Ohio 45014

Phone: (513) 868-0900
Fax: (513) 868-2105
E-Mail: info@forcecontrol.com

7-3 ORDERING REPLACEMENT PARTS

When ordering replacement parts, please specify all of the following information:

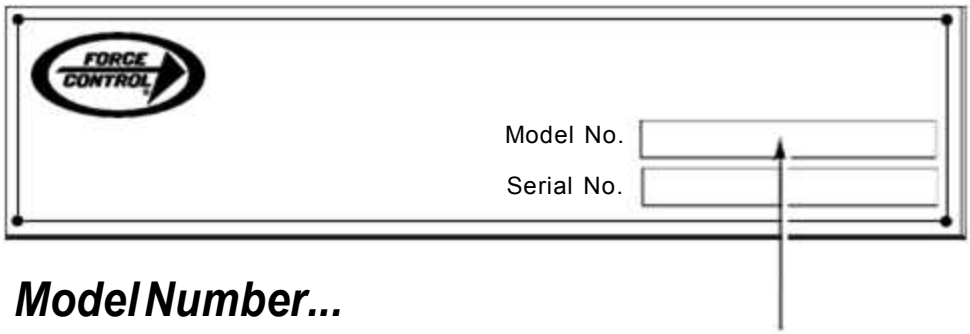
1. Brake Model Number *(On the Name Plate.) (See next page.)*
2. Brake Serial Number *(On the Name Plate.)*
3. Part Reference Number *(From the parts list or exploded view drawing.)*
4. Part Name *(From the parts list.)*
5. Quantity *(From the parts list.)*
6. Complete Shipping Information.

Failure to include information for items 1 through 6 will only delay your parts order. Unless another method is specified for item 6, parts weighing less than 150 Lbs. will be shipped United Parcel Service. Parts weighing more than 150 Lbs. will be shipped Motor Freight. Air freight and other transportation services are available but only if specified on your order.

7-4 NAME PLATE INFORMATION

The Name Plate will be located on the main Housing (#8). *(See next page.)*

7-5 MODEL NUMBER INFORMATION



Example:

CPB-120-9-5-U-1

Curing Press Brake with 120 Ft. Lbs. Torque, 9' B.C., 1-5/8" Dia. Bore, Vertical Mounting, Control Valve-Preplumbed & Mounted.

Model Number...

0	1	–	C	P	B	–	1	2	3	–	4	–	5	–	6	–	7

Curing Press Brake

Revision (7)

Torque (1,2,3)

0	6	0	= 60 Ft. - Lbs.
0	7	5	= 75 Ft. - Lbs.
0	9	0	= 90 Ft. - Lbs.
1	0	5	= 105 Ft. - Lbs.
1	2	0	= 120 Ft. - Lbs.
1	3	5	= 135 Ft. - Lbs.

Bolt Circle (4)

7	= 7-1/4" Dia.
9	= 9" Dia.

Bore Dia. (5)

1	= 1-1/8" Dia.
2	= 1-1/4" Dia.
3	= 1-3/8" Dia.
5	= 1-5/8" Dia.
S	= Special

Mounting (6)

H	= Horizontal
U	= Vertical,Brake Up
S	= Universal Mnt

Repair Parts List
Curing Press
Motor Brake

Ref. No.	PART NAME	Qty
2	HUB	1.00
3	PISTON	1.00
5	THRUST PLATE - BRAKE	1.00
6	PISTON RETAINER	1.00
8	END HOUSING - INPUT	1.00
10	PISTON HOUSING	1.00
*12	DRIVE PLATE	6.00
*13	FRICTION DISC	5.00
16	RETAINING RING	1.00
*17	SPRING	A/R
*20	BEARING	1.00
*21	BEARING	1.00
*35	OIL SEAL	2.00
*36	SPRING	14.00
*39	O'RING	1.00
*40	O'RING	1.00
*42	O RING LINER	1.00
*43	O RING LINER	1.00
*45	BREATHER	1.00
*46	SIGHT GAUGE	1.00
61	FITTINGS PIPE FLANGE PIPE ACC	1.00
62	FITTINGS PIPE FLANGE PIPE ACC	7.00
73	FITTINGS PIPE FLANGE PIPE ACC	2.00
75	FITTINGS PIPE FLANGE PIPE ACC	4.00

Ref. No.	PART NAME	Qty
100	FITTINGS PIPE FLANGE PIPE ACC	1.00
121	GASKET	1.00
122	GASKET	1.00
124	COVER	1.00
127	WASHER	8.00
129	WASHER	4.00
135	LOCKNUTS	2.00
150	HEX HEAD BOLT	8.00
151	HEX HEAD BOLT	4.00
152	CAPSCREW SOC HEAD	8.00
153	HEX HEAD BOLT	2.00
159	SPACER PIN	8.00
177	ROLL PIN	1.00
179	DOWEL PIN	4.00
193	WASHER	2.00
233	OIL	1.00
303	SET SCREW	2.00
304	SET SCREW	2.00
*310	SHIM	1.00
*320	SHIM	1.00

* Indicates Parts Included in Overhaul Kit

CURING PRESS MOTOR BRAKE

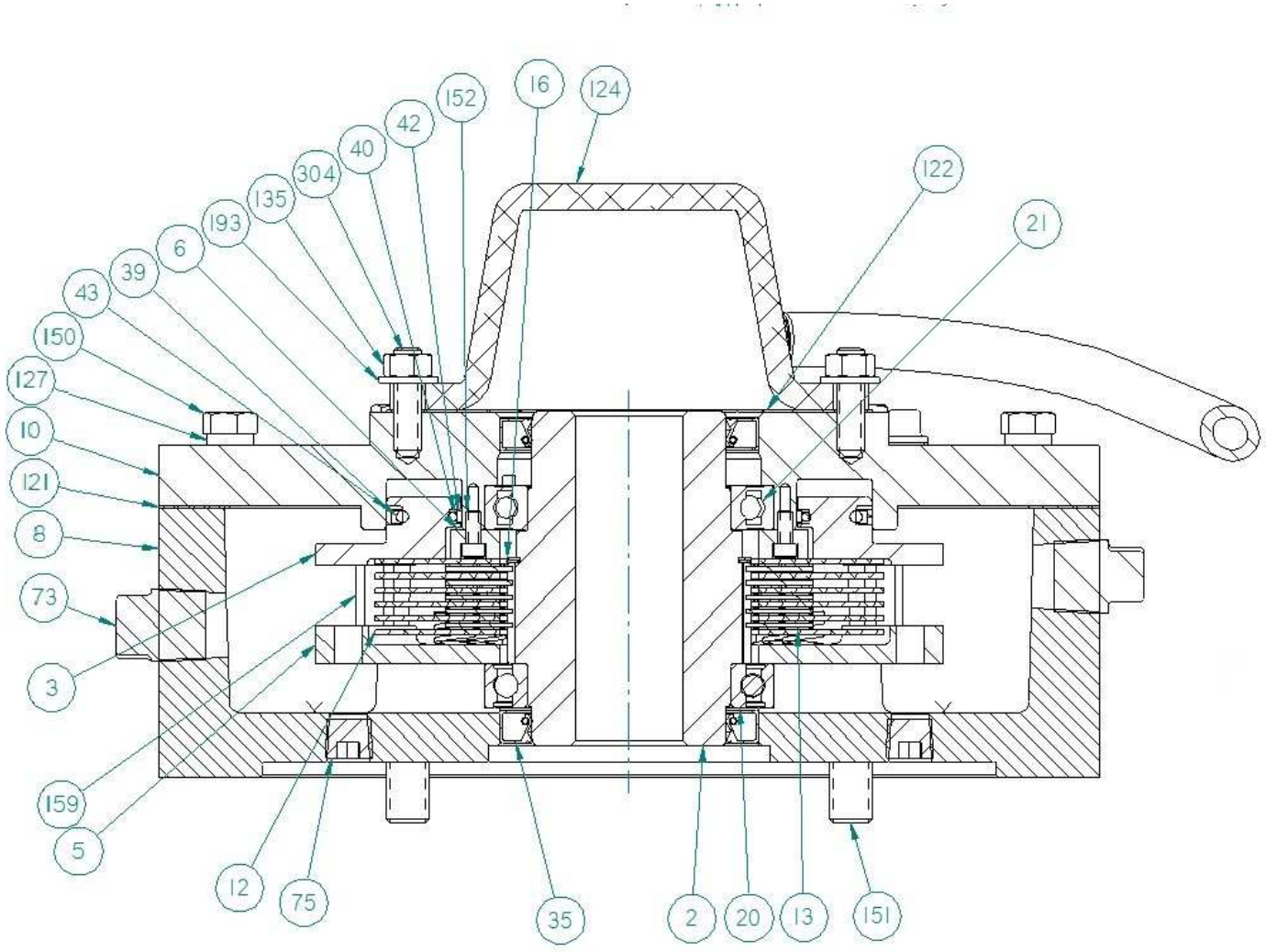


Figure 7.1 Curing Press Brake Part Numbers

FORCECONTROL INDUSTRIES, Inc.

Providing today's industries
with Oil Shear Clutch and
Brake Drives that delivers:
Flexibility • Efficiency
Endurance • Performance
Dependability

"Built to Last - Guaranteed to Perform"

FORCECONTROL INDUSTRIES, Inc.

MAIN OFFICE
P.O. Box 18366
Fairfield, Ohio 45018

3660 Dixie Highway
Fairfield, Ohio 45014

Tel: (513) 868-0900
Fax: (513) 868-2105
E-Mail: info@forcecontrol.com

DETROIT OFFICE
24419 Sorrentino Court
Clinton Twp., Mich. 48035

Tel: (810) 792-5710
Fax: (810) 792-7329
E-Mail: info@forcecontrol.com