

# Logan Self-Adjusting™ Bell Housing PTO Clutches

Hydraulic / Pneumatic



- Mobile Equipment
- Oil & Gas
- Marine
- Agriculture
- Hybrid Vehicles
- Industrial



 **Logan Clutch Corporation®**  
manufacturers of clutches and brake products

Family owned and operated since 1975, Logan offers a complete line of fluid / air actuated multiple disc clutches, brakes, PTO Clutches and clutch discs for a variety of wet and dry clutch and brake applications.

**Markets include:** Machine Tool, Industrial, Marine, Irrigation, Rail, Oil Field, and Off-Highway industries.

**Applications include:** Pump Drives, Trenchers, Tunnel Boring and Snow Removal Equipment, Single and Multi-Speed Transmissions, Marine Transmissions, Work Boats, Escort Vessels, Marine Z-drives, Machine Tools, Screw Machines, Conventional and High Performance friction and steel clutch discs.

Logan Sales, Engineering and Customer service personnel are available to answer questions regarding catalog specs, parts and service details, and inquiries regarding your specific design requirements. We certainly thank you for your interest, and look forward to being of further service.

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# Logan Self-Adjusting™ Bell Housing PTO™ Clutches

## Bell Housing Series Description:

Logan Air / Fluid actuated Bell Housing PTO™ clutches are Self-Adjusting™ and designed to mount directly to a diesel or gasoline engine's flywheel.

The friction disc packs are designed for dry operation. Actuation is accomplished through either a stationary cylinder-piston arrangement, or through internal shaft and clutch passages.

The clutch is bored and keyseated for shaft mounting. Torque is transferred from the disc pack to a geared drive ring which is attached to the engine's flywheel.

## Logan Clutches – How They Work

Pressurizing the cylinder, forces the piston to clamp and lock the friction and steel separator discs. When pressure is removed, release springs separate the friction and steel discs, maintaining a running clearance when disengaged.

## Push Button Actuation - Eliminates Mechanical Linkages

Self-Adjusting™ piston travel compensates for any disc wear, eliminating the need for mechanical adjustment (i.e. levers, linkages, and yokes). The amount of hydraulic or pneumatic pressure applied regulates the amount of torque transmitted through the clutch. Push-button, remote activation from a control panel, marine wheelhouse or cab is now possible.

## Standard Specifications:

Standard Logan Bell Housing PTO's are available in No. 00 to No. 7 Size SAE Bells with input torque ratings from 159 lb. ft. (216Nm) to over 7,473 Lb. Ft. (10133 Nm). Logan uses a 1.4 factor of safety in our torque specifications.

Air / Fluid operating pressures range from 100 (6,9 bar) to 200 psi (13,8 bar) for Generation I and Generation III models; and 320 psi. (23 bar) for Generation II Models.

Operating speeds range from 1 to 3,000 RPM.

## Modified Standards:

Higher horsepower, torque ranges, speeds, actuation pressures, and design configurations are available to meet customer's specific design requirements.



U.S. patent no. 7,225,909 other patents pending

Standard LC-311 with pilot bearing, and over shaft actuation for in-line or side load applications



LC-318 Generation III without pilot bearing, and over shaft actuation for in line or side load applications

## Where used:

- Hybrid Drive Systems
- Industrial Drives / Gensets
- Mobile Equipment
- Blowers, Vacuums, Fans
- Snow Removal Equipment
- Marine Propulsion / Auxiliary Drives
- Tree and Brush Chippers

## Advantages:

- Air or Fluid Actuated for Remote Activation
- Self-Adjusting™ Disc Pack – Flow Control Engagement
- Eliminates Mechanical Linkages, Hand Levers, and Yokes
- Available with or without Pilot Bearing
- Heavy-Duty Side Load Models Available
- Modified Standards Available



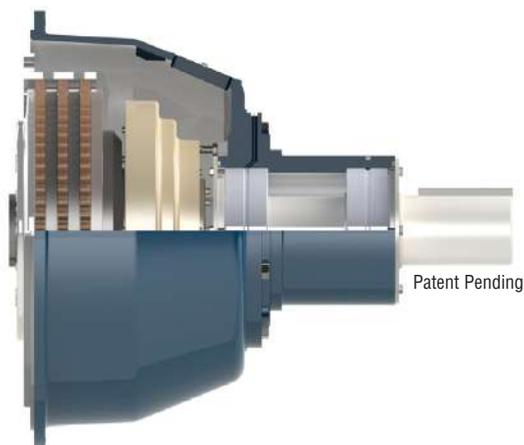


## Generation III For in-line or side load applications

### Advantages:

- Air or Fluid Actuated
- No Pilot Bearing
- Self-Adjusting™ Disc Pack
- Ideal for In-Line and Side Load Applications
- Release Springs in Disc Pack Maintain Running Clearance During Disengagement
- Remote Actuation

### Generation III – Over Shaft Actuation

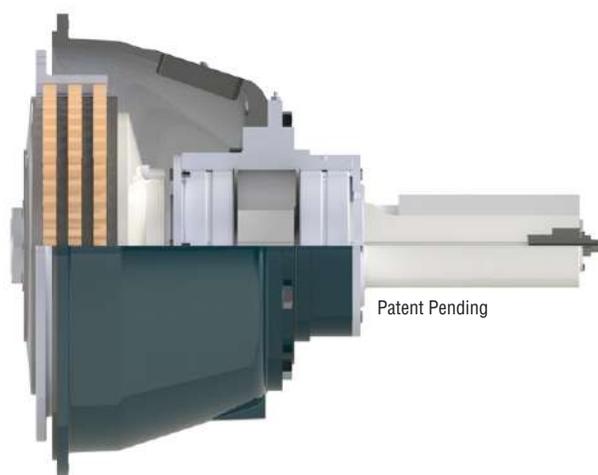


## Generation II For heavy duty side load applications

### Advantages:

- Air or Fluid Actuated
- No Pilot Bearing
- Self-Adjusting™ Disc Pack
- Increased Torque via Higher Actuation Pressure
- Ideal for Heavy-Duty Side Load Applications
- Release Springs in Disc Pack Maintain Running Clearance During Disengagement
- Remote Actuation

### Generation II – Through Shaft Actuation

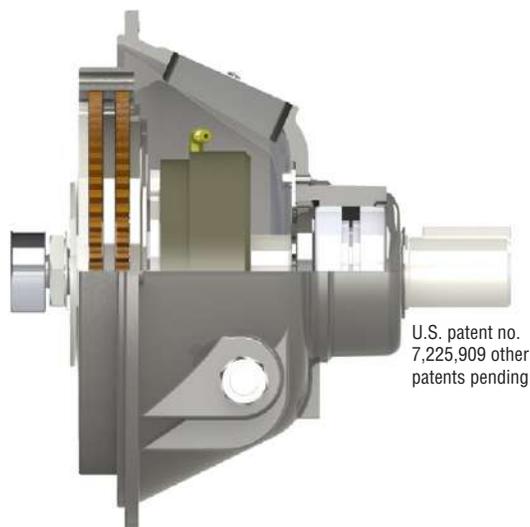


## Generation I For in-line or side load applications

### Advantages:

- Air or Fluid Actuated
- Self-Adjusting™ Disc Pack
- High Torque, Small Envelope
- Remote Actuation
- Field Retrofits w/ Existing Mechanical PTO's

### Generation I – Over Shaft Actuation



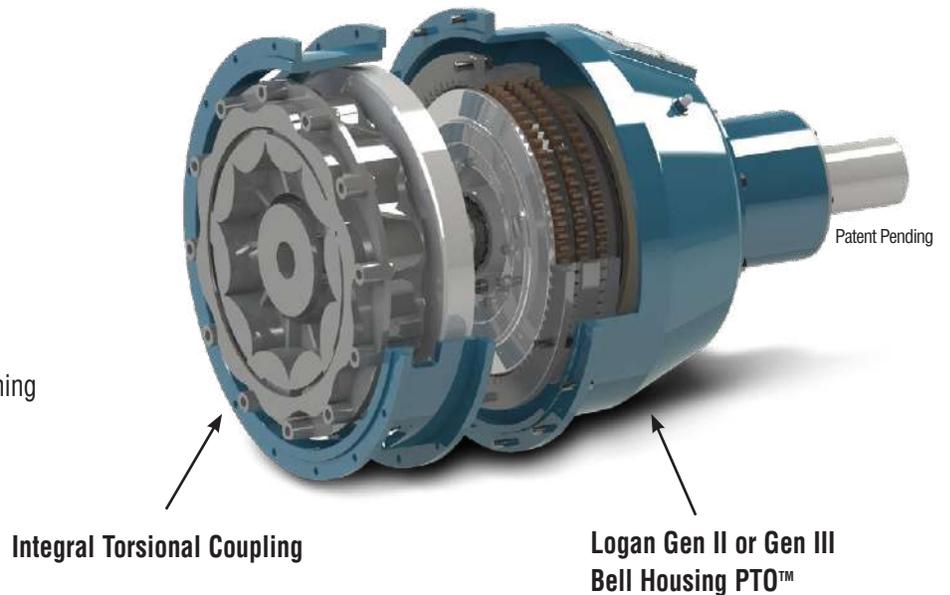
# Bell Housing PTO – Series Description

## Generation II and III For applications requiring an integral torsional coupling

### Advantages:

- Air or Fluid Actuated
- No Pilot Bearing
- Self-Adjusting™ Disc Pack
- Ideal for In-Line and Side Load Applications
- Release Springs in Disc Pack Maintain Running Clearance During Disengagement
- Remote Actuation
- Integral Torsional Coupling

Pictured: Generation III – Over Shaft Actuation

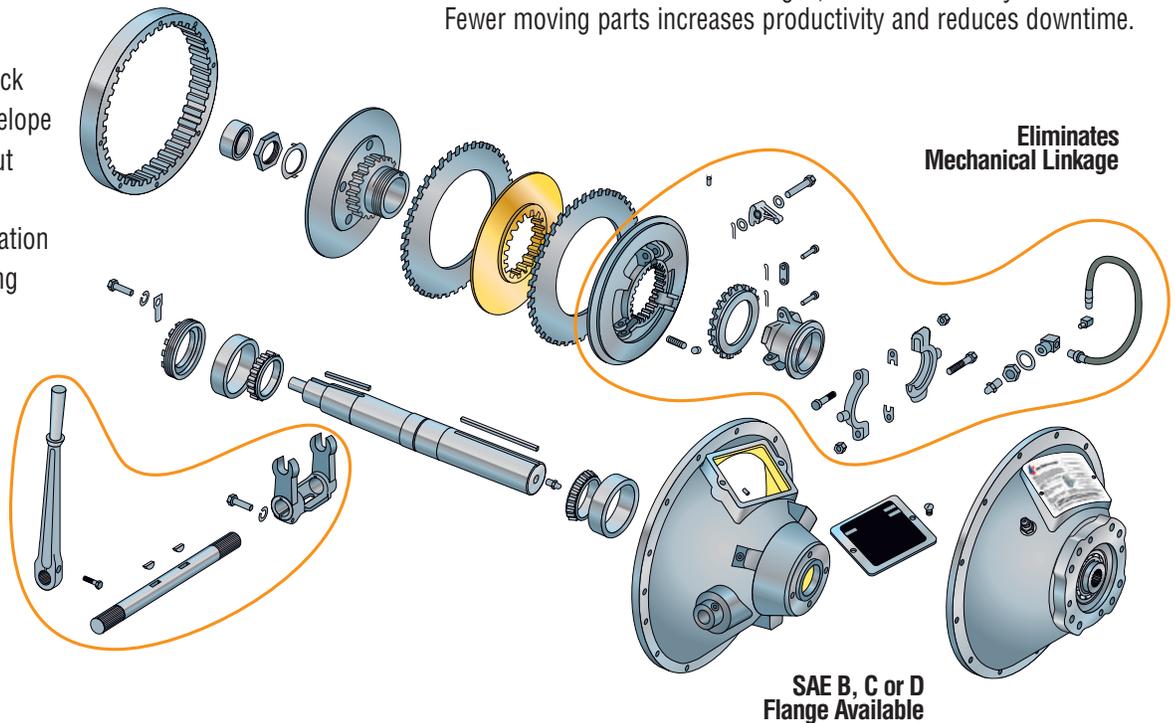


## Logan vs. Mechanical

### Logan Features:

- Air or Fluid Actuated
- Self-Adjusting™ Disc Pack
- High Torque, Small Envelope
- Available with or Without Pilot Bearings
- Remote Softstart™ Actuation
- Field Retrofits w/ Existing Mechanical PTO's

**Advantages:** Logan clutch engagement is smooth and positive, and eliminates mechanical linkages, hand levers and yokes. Fewer moving parts increases productivity and reduces downtime.





## 2-Position Pump Drive System For Engines up to 730 HP (554 kW)

The Logan 2-Position Pump Drive is outfitted with up to four (4) PTI / PTO pads, and can accommodate up to 730H (544 kW) Engines, with maximum Speeds up to 2600 RPM, and a maximum of 160 HP (120kW) per tower under continuous duty.

- **Input Housing SAE No. 1 – No. 3**
- **Output Housing SAE No. 3**
- **Pump Pads SAE A – SAE C**
- **Continuously Rated – Total 300Hp (225Kw)**
- **Continuously Rated – Per Tower 160Hp (120Kw)**
- **Integrated Reservoir**
- **SAE J1939 Compatible**
- **Modified Standards, With 5-positions and Up to 3000 HP (3700kW) Available**

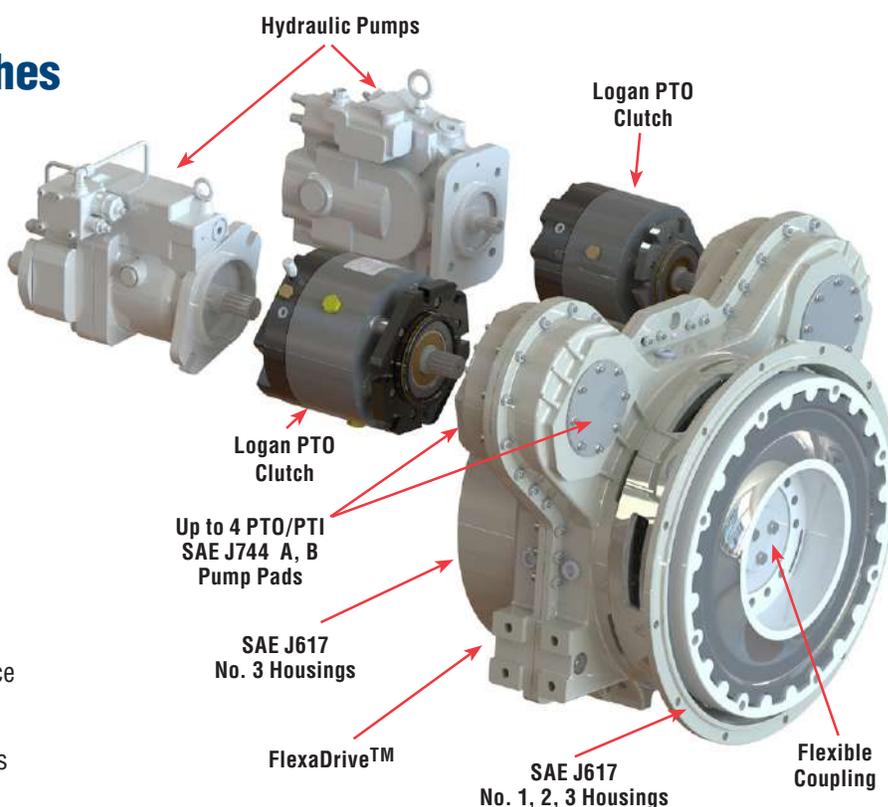


Logan 700-2 FlexaDrive with  
Logan 1150 Series Clutch

## Logan Direct Drive Power Take-off (PTO) Clutches

### PTO Clutch Advantages:

- Reduces fuel consumption and CO2 emissions by engaging drives and pumps only when required
- Faster Starts: Lowers horsepower draw and cranking power required during machine start-up by disconnecting the hydraulic system from the engine
- Reduced ambient noise through intermittent use of pumps and equipment
- Cooler running hydraulic systems: Heat is generated whenever oil dumps from high to low pressure without producing work. Disconnecting the PTO Clutch reduces the destructive effects of heat – lowering maintenance costs and hydraulic oil requirements
- Extends the life of drive systems and components





# Logan Self-Adjusting™ Bell Housing PTO™ Clutches with Microprocessor Controls

## Microprocessor Control Solutions with LockUp Detection

Logan offers simple clutch controls for mobile equipment. Control capabilities range from monitoring the overall condition of the clutch: i.e. input speed, output speed, temperature, pressure, lock-up detection – to real time access to clutch condition and data via laptops, USB's, and smart phones with WiFi capabilities. An optional color LCD display is available for machines not equipped with a machine-operator interface.



The LC-318 transmits over 7500 lb. ft. (10,170 Nm) of torque @200 psi (13.8 bar)



Logan LCL-709 Color Display

## Logan Control System Advantages



### LCL-709 Color Display:



Logan LCL-709 Color Display

The optional LCL-709 is a solid-state color graphical microcontroller based display. Display provides communication messages through the J1939 network to equipment and to the display screen for simple man-machine interface.

### LCL-442 I/O Module:

The LCL-442 is a solid-state microprocessor based module. Delivered in a clear enclosure, this unit provides 10 inputs and 4 outputs I/O in a compact and economical package.



Logan LCL-442 I/O Module

Designed for use as a stand-alone unit or with the display, the LCL-442 is offered with LED indicators for each input, which simplifies troubleshooting in the field.

#### INPUTS / MONITORING:

- Input Speed
- Output Speed
- Temperature
- Thermal Overload Detection
- Pressure Transducer Status
- Local/Remote Engage/Disengage
- External Fault/Prevent Run

#### COMMUNICATION:

- J1939 Communication
- WiFi Capable

#### OUTPUTS:

- Clutch Status: engaging, engaged, and disengaged
- CAN Messages
- Clutch Status Indicator
- Clutch ON/OFF with SoftStart™
- Brake ON/OFF

### LCL-T07 WiFi Module:

The LCL-T07 is a solid-state microprocessor based module, delivered in a Deutsch enclosure, with a WiFi wireless interface.



Logan LCL-T07 WiFi Module

LoganNet WiFi feature allows for monitoring the location, movement, status and health of a vehicle or fleet of vehicles. The data and parameter settings are available via any WiFi enabled smart phone, tablet or PC, without having to download a single piece of software. Also, download any data to your PC or USB memory device.

The LCL-T07 is configured with 2GB of data storage, enabling it to handle most OEM data logging applications.

# Bell Housing PTO's for Single and Double Pump Drives



Logan PTO clutches are designed to retrofit within existing bell housings of popular pump drive manufacturers such as:

- Funk
- Twin Disc®
- Durst
- Gear Products
- Marco

Complete Logan PTO clutches are available as original equipment or as a field retrofit.

Twin Disc is registered trade mark of Twin Disc Inc.



Funk 2800 series, single direct drive pump SAE#3 housing and B pad (retrofitted with Logan LC-110 hydraulic clutch)



Funk 2800 series, double direct drive pump SAE#3 housing and B pad (retrofitted with Logan LC-211 hydraulic clutch)

## Logan Bell Housing PTO's – Gear Boxes / Drop Boxes



Logan LC-211 Generation III Bell Housing PTO Attached to Gearbox / Drop Box

Logan PTO Clutches can be incorporated into a gearbox or drop box application. Clutches are used to engage drive systems on the fly, or in situations where pumping or work stations require periodic, intermittent activation.

### Features:

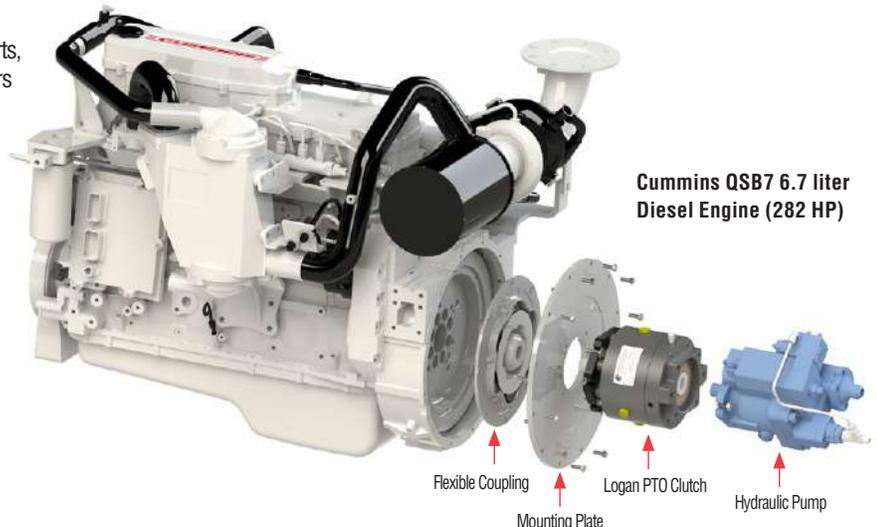
- Connect – disconnect for mobile equipment
- Air / Fluid actuation
- Self-Adjusting™ disc pack eliminates linkages, yokes, lever arms
- SAE # 00 to SAE # 4 Housings

## Direct Drive PTO's – Flywheel Mounted with Integral Torsional Coupling

Power on demand – engage pump only when required. Ideal for cold starts, and connect - disconnect applications. Reduces fuel consumption, Lowers emissions, and reduces torsional vibration from the engine to the pump.

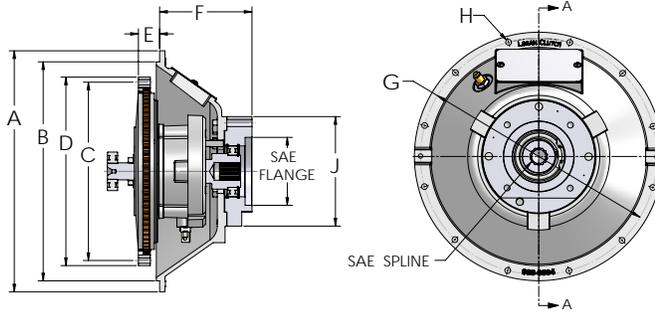
### Features:

- Connect – disconnect for hydraulic pumps
- Air / Fluid actuation
- Self-contained, corrosion resistant design
- SAE A thru F splines / ISO mounting flanges /bore and keyway configurations
- Torque ranges from 50 -2550 lb. ft. (pump flange and spline dictate size)
- Integrated torsional isolation coupling



Cummins QSB7 6.7 liter Diesel Engine (282 HP)

# Bell Housing PTO - Pump Mount Series



## Pump Mount Series Description:

Bell Housing pump-mount PTO's are air or fluid actuated and designed to mount on to an SAE No. 1 to No. 3 flywheel. Torque ranges are from 200 to 1,620 lb. ft. Horsepower Ranges from 100 to 375 HP.

## Standard Specifications:

Single pump units are available in No. 1 to No. 3 size SAE Bells with input torque ranges from 200 lb. ft. (271 Nm) to over 1620 lb. ft. (2196 Nm).

Air/Fluid operating pressures range from 100 (6,9 bar) to 200 psi (13,8 bar) for standard models.

Operating speeds are up to 2,850rpm.

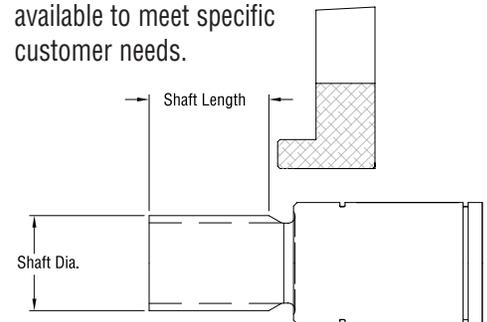
## Pump Mount Flanges:

Pump mount PTO's are available from SAE B to SAE D flanges.

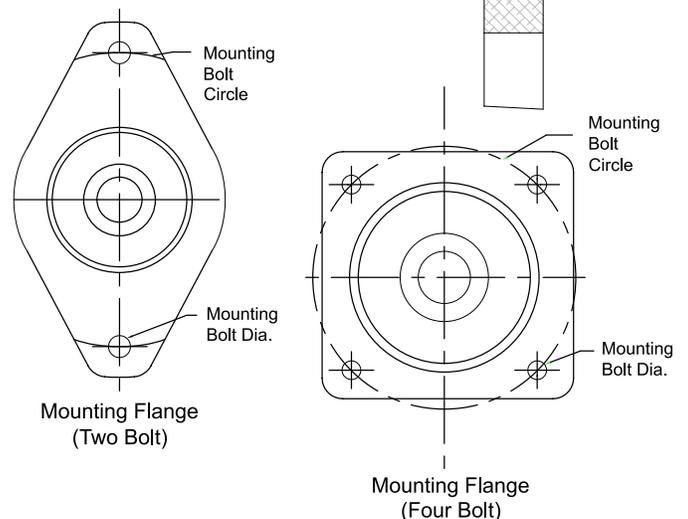
## Pump Mount Shafts:

PTO shafts are available in B, B-B, C, C-C, D,E, and F configurations.

Modified Standards are available to meet specific customer needs.



30° Involute Spline



QUICK REFERENCE CHART						
Model Number	SAE Housing Size	Max. Input Speed (RPM)	Torque Capacity @100 PSI (Lbs.-Ft.)	Torque Capacity @200 PSI (Lbs.-Ft.)	HP Range	Max. Pump Capacity @1500 PSI (GPM)
LC-110-PM	3	2850	200	400	100	100
LC-111-PM	3	2850	225	455	175	175
LC-111-PM	2	2850	225	455	175	175
LC-211-PM	3	2850	450	900	300	300
LC-211-PM	2	2850	450	900	300	300
LC-311-PM	2, 3	2850	665	1330	375	375

Dimensions ( Inches)								
Model No.	A	B	C	D	E	F	G	H
LC-110-PM	17.75	16.125	11.625	12.375	2.125	6.79	16.875	12 x .406
LC-111-PM	17.75	16.125	13.125	13.875	1.56	6.79	16.875	12 x .406
LC-111-PM	19.25	17.625	13.125	13.875	1.56	10.16	18.375	12 x .406
LC-211-PM	17.75	16.125	13.125	13.875	1.56	10.16	16.875	12 x .406
LC-211-PM	19.25	17.625	13.125	13.875	1.56	10.16	18.375	12 x .406
LC-311-PM	17.75	16.125	13.125	13.875	1.56	10.16	16.875	12 x .406

Pump Mount Flanges SAE J744 / ANSI B96.6-1972					
SAE Flange Code	Pilot Dia.	Mounting Bolt Circle	Mtg. Holes	Mount Hole Dia.	ANSI Flange Code
SAE B	4.000	5.000	4	0.562	101-2
SAE B	4.000	5.750	2	0.562	101-2
SAE C	5.000	6.375	4	0.562	127-4
SAE C	5.000	7.125	2	0.688	127-2

Pump Mount Shafts SAE J744 / ANSI B96.6-1972					
SAE Shaft Code	Shaft Dia.	Shaft Length	Spline Specifications		ANSI Shaft Code
B	0.875	1.312	13T	16/32 DP	22-4
B-B	1.000	1.500	15T	16/32 DP	25-4
C	1.250	1.875	14T	12/24 DP	32-4
C-C	1.500	2.125	17T	12/24 DP	38-4
F	2.000	3.125	15T	8/16 DP	50-4



## Calculated by Driven Load Requirements:

1. Calculate the torque requirement for the application using one of the following formula

$$\text{Torque (Lb./Ft.)} = \frac{\text{HP} \times 5250}{\text{RPM}} \quad \text{or} \quad \text{Tc (Nm.)} = \frac{\text{HP} \times 9550}{\text{RPM}}$$

2. Identify the service factor which best identifies your application from the duty service classification tables (see page 9, bottom right, and page 10).

3. Adjust the torque requirement using the selected service factor.

$$\text{Clutch Torque Capacity (Tc)} = \frac{\text{Gross Torque Capacity (T)}}{\text{Safety Factor (SF)}}$$

$$T = \text{Tc} \times \text{SF}$$

4. Identify maximum side-load requirements using formula (see page 15).

5. Determine if the model will:
  - 1) Accommodate the shaft and key
  - 2) Operate at the required speed
  - 3) Fit within the available space

6. Determine the Drive Ring Mounting

7. Determine existing source of actuation pressure and if clutch will use air or hydraulic pressure for actuation. If there is no source of actuation pressure, select power pack options (see page 14).

8. Determine engine control system voltage, (Usually 12 or 24VDC)

9. Complete Application Fact Sheet online at [www.loganclutch.com](http://www.loganclutch.com). Call, e-mail, or fax your application data, and place your order.

## Torque & Horsepower Formulas

$$\text{HP} = \frac{\text{T(Lb./Ft.)} \times \text{RPM}}{5250} \quad \text{Torque (Lb./Ft.)} = \frac{\text{HP} \times 5250}{\text{RPM}}$$

$$\text{HP} = \frac{\text{T(Lb./In.)} \times \text{RPM}}{63025} \quad \text{Torque (Lb./In.)} = \frac{\text{HP} \times 63025}{\text{RPM}}$$

$$\text{kW} = \frac{\text{T(Nm.)} \times \text{RPM}}{9550} \quad \text{Torque (Nm.)} = \frac{\text{kW} \times 9550}{\text{RPM}}$$

HP	=	Horsepower
RPM	=	Clutch shaft speed
T	=	Required Torque (Lb./ Ft., Nm, Lb./in)
Tc	=	Clutch Torque (Lb./ Ft., Nm, Lb./in)
t	=	Time to stop (seconds)
SF	=	Service Factor
PSI	=	Pressure (Air/Hydraulic)
GPM	=	Gallons Per Minute

## Calculated by Engine Capacity:

1. Determine engine bell, flywheel size, and drive ring mounting.
2. Determine engine maximum peak torque capacity (from OEM's engine data sheet).
3. Determine required safety factor using table (see below and on page 12).
4. Identify minimum clutch static breakaway torque using formula below:  
Engine Maximum Peak Torque x Safety Factor = Min. Clutch static breakaway torque.
5. Select a clutch that fits the engine bell and flywheel, and has the calculated static breakaway torque or greater (see page 12).
6. Determine engine control system voltage, (Usually 12 or 24VDC).
7. Determine existing source of actuation pressure and if clutch will use air or hydraulic pressure for actuation. If there is no source of actuation pressure, select hydraulic pressure and use Logan Power Pack, (see page 16).
8. Complete Application Fact Sheet online at [www.loganclutch.com](http://www.loganclutch.com). Call, e-mail, or fax your application data, and place your order.

### Torque Conversion Calculators

Newton meters (Nm.) to Pound inches (lb. in.)	<b>Multiplier</b>	8.851
Pound inches (lb. in.) to Newton meters (Nm.)		0.113
Newton meters (Nm.) to Pounds feet (lb. ft.)		0.738
Pounds feet (lb. ft.) to Newton meters (Nm)		1.356

### Horsepower Conversion Calculators

Horsepower (HP) to kW (Kilowatt)	<b>Multiplier</b>	.7457
Kilowatt (kW) to Horsepower (HP)		1.341

### Volume

Gallons (G) to Liters (L)	<b>Multiplier</b>	3.785
Liters (L) to Gallons (G)		.2642

### Measurement Conversion Table

Millimeters (mm) to Inches (in)	<b>Multiplier</b>	.03937
Inches (in) to Millimeters (mm)		25.4

### Weight Conversion Table

Pounds (lbs.) to Kilograms (Kg.)	<b>Multiplier</b>	0.453
Kilograms (Kg.) to Pounds (lbs.)		2.205

### Pressure Conversion Table

Bar to pounds per square inch (psi)	<b>Multiplier</b>	14.5
Pounds per square inch (psi) to Bar		0.068

## Suggested Safety Factor Table

Duty	SF
Small Inertia Low Cycle Rate Non-pulsating Load	1.3 to 1.7
Large Inertia Low Cycle Rate Non-pulsating Load	1.7 to 2.2
Small Inertia High Cycle Rate Pulsating Load	2.2 to 3.2

## Power Train Efficiency Service Factor Table

Gear Belt	0.98
V Belt	0.97
Gearbox	0.96



# Logan Bell Housing PTO Specifications

Logan Quick Reference Chart. Consult factory for other sizes.

Clutch Model Number	Clutch Size Flywheel Diameter (in)	SAE Bell Housing Size	In-Line or Side Load	No. of Clutch Discs	Pneumatic Actuation Nominal Rated Input Torque @ 100 PSI (6.9 Bar)		Hydraulic Actuation Nominal Rated Input Torque @ 200 PSI (13.8 Bar)		Maximum Breakaway Torque		HP Range	
					Lbs. - Ft.	Nm	Lbs. - Ft.	Nm	Lbs. - Ft.	Nm	CLASS 4	
											HP	kW
LC-107	7.5	6, 5, 4	BOTH	1	242	328	242	328	346	469	32	24
LC-110	10	4, 3, 2, 1	BOTH	1	434	589	434	589	620	841	55	41
LC-111	11.5	3, 2, 1	BOTH	1	480	650	480	650	685	929	61	45
LC-211	11.5	3, 2, 1	BOTH	2	963	1305	963	1305	1375	1865	122	91
LC-311	11.5	3, 2, 1	BOTH	3	1446	1960	1446	1960	2065	2800	183	136
LC-211 Gen II	11.5	3, 2, 1	SIDE LOAD	2	1610*	2183*	1610*	2183*	2300*	3119*	184	137
LC-211 Gen III	11.5	3, 2, 1	SIDE LOAD	2	963	1305	963	1305	1375	1865	122	91
LC-311 Gen III	11.5	3, 2, 1	BOTH	3	1446	1960	1446	1960	2065	2800	183	136
LC-114	14	1, 0	BOTH	1	900	1220	900	1220	1285	1742	99	74
LC-214	14	1, 0	BOTH	2	1799	2439	1799	2439	2570	3485	197	147
LC-314	14	1, 0	BOTH	3	2702	3664	2702	3664	3860	5234	296	221
LC-214 Gen II	14	1, 0	SIDE LOAD	2	2062**	2796**	2062**	2796**	2949**	3999**	206	153
LC-314 Gen II	14	1, 0	SIDE LOAD	3	3094**	4195**	3094**	4195**	4420**	5993**	309	231
LC-314 Gen III	14	1, 0	BOTH	3	2702	3664	2702	3664	3860	5234	296	221
LC-218 Gen III	18	0, 00	BOTH	2	4977	6749	4977	6749	7117	9650	450	336
LC-318 Gen III	18	0, 00	BOTH	3	7473	10,133	7473	10,133	10,675	14,475	676	504
LC-318 Gen II	18	0, 00	SIDE LOAD	3	7838**	10,628**	7838**	10,628**	11,208**	15,198**	709	529

\* 320 PSI ACTUATION PRESSURE \*\* 435 PSI ACTUATION PRESSURE

Clutch Model Number	Maximum Operating Speed (RPM)	DUTY SERVICE CLASSIFICATION Maximum Clutch Ratings Based On Maximum Torque @ 200 PSI								Maximum Net Weight	
		CLASS 1		CLASS 2		CLASS 3		CLASS 4		Lbs.	Kg
		HP	kW	HP	kW	HP	kW	HP	kW		
LC-107	3000	129	96	65	48	43	32	32	24	73	33
LC-110	2850	219	163	110	82	73	54	55	41	115	52
LC-111	2850	242	180	121	90	81	60	61	45	141	64
LC-211	2850	486	362	243	181	162	121	122	91	155	70
LC-311	2850	730	544	365	272	243	181	183	136	185	84
LC-211 Gen II	2600	736	549	368	274	245	183	184	137	190	86
LC-211 Gen III	2700	486	362	243	181	162	121	122	91	209	95
LC-311 Gen III	2700	730	544	365	272	243	181	183	136	237	108
LC-114	2500	394	294	197	147	131	98	99	74	255	116
LC-214	2500	788	588	394	294	263	196	197	147	340	154
LC-314	2500	1184	883	592	441	395	294	296	221	388	176
LC-214 Gen II	2300	825	615	412	307	275	205	206	153	430	195
LC-314 Gen II	2300	1238	923	619	461	413	308	309	231	475	216
LC-314 Gen III	2400	1184	883	592	441	395	294	296	221	410	186
LC-218 Gen III	2100	1801	1343	900	671	600	447	450	336	765	347
LC-318 Gen III	2100	2704	2016	1352	1008	901	672	676	504	842	382
LC-318 Gen II	2100	2837	2116	1419	1058	946	705	709	529	820	372

\* 320 PSI ACTUATION PRESSURE \*\* 435 PSI ACTUATION PRESSURE

## Duty Service Classifications

### Class 1: Light Duty

The Clutch is used as a connect/disconnect clutch for light loads with minimum slip.

**Engagement cycle:** ranges from 1 to 10 times per hour. The clutch operates at an ambient temperature.

**Applications:** machines with uniform loads. For example: generators, blowers, vacuums, pumps, feeders, etc. Refer to input torque from Class 1 table.

### Class 2: Normal Duty

The Clutch is used as a connect/disconnect clutch for light to medium loads with a maximum 2-second slip prior to engagement.

**Engagement cycle:** ranges from 1 to 10 times per hour. A normal duty application may increase the external surface temperature of the clutch 50°F / 28°C above ambient.

**Applications:** machines with moderate, pulsating loads. For example: Centrifugal or reciprocating compressors (3 or more cylinders), reciprocating pumps, hoists, rotary kilns, dryers, etc. Reference input torque from Class 2 table.

### Class 3: Moderate to Heavy Duty

The Clutch is used as a connect/disconnect for medium loads, with a maximum 3-second slip prior to engagement.

**Engagement cycle:** ranges from 1 to 10 times per hour. A medium duty application may increase the external surface temperature of the clutch 100°F / 56°C above ambient.

**Applications:** machines with moderate, pulsating loads. For example: Centrifugal or reciprocating compressors (single or 2 cylinder), reciprocating pumps, hoists, rotary kilns, dryers etc. Refer to input torque from Class 3 table.

### Class 4: Heavy Duty

The Clutch is used as a connect-disconnect for heavy duty, large inertia loads. Maximum allowable slip time is 4-seconds to start a heavy load and no more than 10-seconds of slip time prior to full engagement.

**Engagement cycle:** is 1 to 5 times per hour. A heavy duty application may increase the external surface temperature of the clutch 150°F / 83°C above ambient.

**Applications:** machines with heavy loads. For example: Mud Pumps, Crushers, Brush Chippers and severe impact loads or speed vibrations and reversing type machinery. Refer to input torque from Class 4 table.

**Note:** Logan Controls can moderate engagement loads and cycles, thereby reducing engine horse power requirements.

- (A.)** Horsepower (Kw) ratings can be increased using modified friction discs.
- (B.)** Contact Logan if your application requires a higher speed.
- (C.)** Complete a Logan application fact sheet and submit to Logan to confirm your application requirements.

# Bell Housing PTO - Dimensional Data

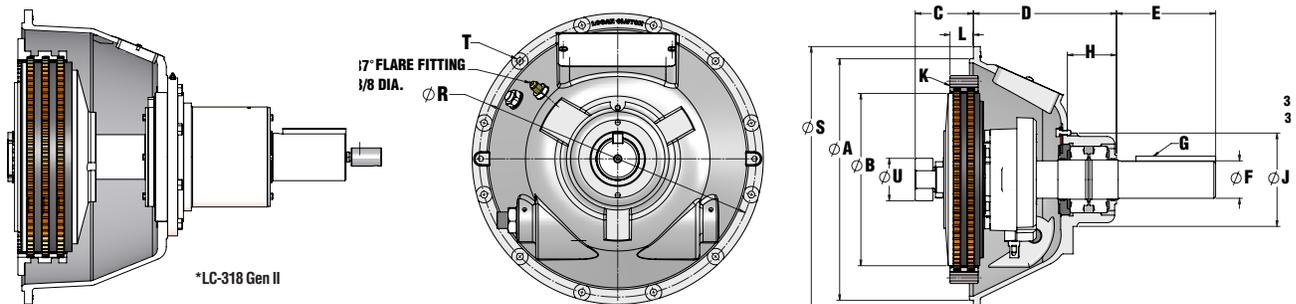


## Envelope Dimensional Details - Generation I and II

Model No.	Units	D Housing Length	SHAFT			B Clutch Dia.	C	H	J	Pilot Bearing "U"		L	K Drive Ring No.
			Dia. F + 0.000 - 0.001	E Length	G Keyway					Dia. +0.0000 +0.0005	Width +0.000 +0.005		
LC-107	in mm	7.06 179.3	1.438 36.5	3.40 86.4	.375 x 1875 9.53 x 4.8	9.50 241.3	2.81 71.3	2.57 65.3	4.71 119.6	2.05 52.0	0.59 15.0	1.19 30.2	016-0341
LC-110	in mm	8.625 219.1	2.250 57.2	5.500 139.7	.625 x .312 15.8 x 7.9	10.000 254.0	3.938 100.0	3.750 95.3	5.750 146.1	2.8346 72.0	1.1825 30.0	2.125 54.0	016-0335
LC-111	in mm	9.250 235.0	2.250 57.2	6.500 165.1	.625 x .312 15.8 x 7.9	11.500 292.1	3.938 100.0	3.750 95.3	5.750 146.1	2.8346 72.0	1.1825 30.0	1.563 39.7	016-0312
LC-211	in mm	9.625 244.5	2.500 63.5	6.500 165.1	.625 x .312 15.8 x 7.9	11.500 292.1	3.938 100.0	3.000 76.2	6.500 165.1	2.8346 72.0	1.1825 30.0	1.563 39.7	016-0320
LC-211 Gen II	in mm	10.500 266.7	2.500 63.5	5.500 139.7	.625 x .312 15.8 x 7.9	11.500 292.1	2.650 67.3	5.560 141.2	6.700 170.2	Does Not Require Pilot Bearing		1.563 39.7	016-0320
LC-311	in mm	9.625 244.5	2.500 63.5	6.500 165.1	.625 x .312 15.8 x 7.9	11.500 292.1	3.938 100.0	3.000 76.2	6.500 165.1	2.8346 72.0	1.1825 30.0	1.563 39.7	016-0359
LC-114	in mm	12.125 308.0	3.000 76.2	8.500 215.9	.750 x .375 19 x 9.5	14.000 355.6	3.938 100.0	3.438 87.3	6.656 169.1	3.1496 80.0	1.3700 34.8	1.000 25.4	016-0343
LC-214	in mm	13.750 349.3	3.500 88.9	10.000 254.0	.825 x .437 20.9 x 11.1	14.000 355.6	3.938 100.0	3.375 85.7	7.500 190.5	3.1496 80.0	1.3700 34.8	1.000 25.4	016-0344
LC-314	in mm	14.500 368.3	3.938 100.0	10.000 254.0	1 x .500 25.4 x 12.7	14.000 355.6	3.938 100.0	3.375 85.7	7.500 190.5	3.1496 80.0	1.3700 34.8	1.000 25.4	016-0345
LC-314 Gen II	in mm	114.215 14.215	3.937 3.937	10.000 10.000	1 x .500 1 x .500	14.000 14.000	2.200 2.200	4.337 4.337	8.500 8.500	Does Not Require Pilot Bearing		1.000 1.000	016-0345
LC-318	in mm	23.52 597.4	4.50 114.3	7.00 177.8	1"x1" 25.4x25.4	18.00 457.2	1.57 39.9	8.43 214.2	9.50 241.3	Does Not Require Pilot Bearing		0.63 15.9	016-0478
LC-318 Gen II	in	22.77	4.50	7.00	1"x1"	18.00	1.57	9.68	9.84	Does Not Require		0.63	016-0478

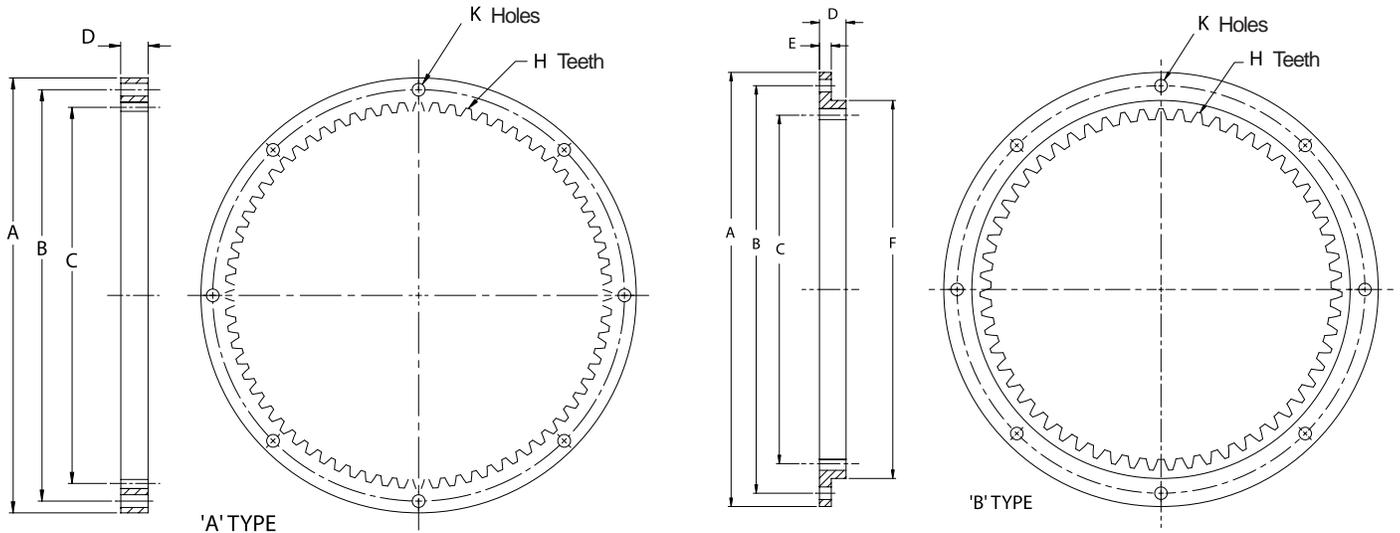
## Housing Specifications

SAE Housing No.	Units	A + 0.000 - 0.005	R B.C.	S Dia.	T Holes	
					No.	Dia.
4	in	14.250	15.00	15.875	12	0.406
	mm	362	381	453.2		
3	in	16.125	16.875	17.750	12	0.406
	mm	409.6	428.6	450.9		
2	in	17.625	18.375	19.250	12	0.406
	mm	447.7	466.7	489.0		
1	in	20.125	20.875	21.750	12	0.469
	mm	511.2	530.2	552.5		
0	in	25.500	26.750	28.000	16	0.531
	mm	647.7	679.5	711.2		
00	in	31.00	33.50	35.00	16	0.531
	mm	767.4	850.9	889.0		





# Bell Housing PTO - Dimensional Data



## Drive Ring Dimensional Data

Model No.	Units	Type Ring	A +0.000 -0.001	B	C (Nominal)	D	E	F	K Holes		H Teeth		Approx. Weight Lb./Kg.
									No.	Size	No.	P	
LC-106	in	A	8.500	7.875	7.000	0.625			6	0.328	42	6/8	2.750
	mm		215.9	200.0	177.8	15.9							
LC-107	in	A	9.500	8.750	7.813	0.625			8	0.328	47	6/8	3.375
	mm		241.3	222.3	198.4	15.9							
LC-108	in	A	10.375	9.625	8.500	0.625			6	0.406	51	6/8	4.250
	mm		263.5	244.5	215.9	15.9							
LC-110	in	A	12.375	11.625	10.500	0.875			8	0.406	63	6/8	7.000
	mm		314.3	295.3	266.7	22.2							
LC-111	in	A	13.875	13.125	12.000	0.875			8	0.406	72	6/8	8.000
	mm		352.4	333.4	304.8	22.2							
LC-211 Gen I. & Gen II.	in	A	13.875	13.125	12.000	1.875			8	0.406	72	6/8	18.000
	mm		352.4	333.4	304.8	47.6							
LC-211	in	A	13.875	13.125	12.000	1.875			8	0.406	72	6/8	18.000
	mm		352.4	333.4	304.8	47.6							
LC-311	in	A	13.875	13.125	12.000	2.750			8	0.406	72	6/8	26.000
	mm		352.4	333.4	304.8	69.9							
LC-114	in	B	18.375	17.250	14.750	1.125	0.500	16.000	8	0.531	59	4/5	16.500
	mm		466.7	438.2	374.7	28.6	12.7	406.4					
LC-214	in	B	18.375	17.250	14.750	2.375	0.500	16.000	8	0.531	59	4/5	3.4
	mm		466.7	438.2	374.7	60.3	12.7	406.4					
LC-314 Gen I. & Gen II.	in	B	18.375	17.250	14.750	3.375	0.500	16.000	8	0.531	59	4/5	32.625
	mm		466.7	438.2	374.7	85.7	12.7	406.4					
LC-314	in	B	18.375	17.250	14.750	3.375	0.500	16.000	8	0.531	59	4/5	32.625
	mm		466.7	438.2	374.7	85.7	12.7	406.4					
LC-318 Gen.III	in	B	22.500	21.375	18.750	4.250	0.625	20.125	6	0.656	75	4/5	56.750
	mm		571.5	542.9	476.3	108.0	15.9	511.2					
LC-318 Gen II.	in	B	22.500	21.375	18.750	5.750	0.625	20.125	6	0.656	75	4/5	61.000
	mm		571.5	542.9	476.3	146.1	15.9	511.2					

### Adapter Rings for Housing / Drive Ring / Flywheel

From SAE Engine Housing	To SAE Engine Housing
1	2
2	3
0	1
00	0

From SAE Flywheel	To SAE Flywheel
18"	14"
21"	18"

# Standard PTO's - Allowable Side Pull Loads / Load Classifications



THE FOLLOWING GENERAL FORMULA SHOULD BE USED AS A GUIDELINE FOR DETERMINING THE ACTUAL APPLIED LOAD:

$$\text{SIDE LOAD} = \frac{126,000 \times \text{Horsepower}}{\text{Shaft RPM} \times \text{Sheave Diameter}} \times \text{Load Factor}$$

WHERE LOAD = Actual Applied Load (Lbs.)  
 SHAFT RPM = Shaft Speed (Rev./Min.)  
 DIAMETER = Pitch Dia. (in.) of Sheave, etc.

LOAD FACTOR:  
 1.0 For Chain or Gear Drive  
 2.5 For all V-Belts  
 3.5 For Flat Belts  
 For Reciprocating Compressors and Other Severe Shock Drives, MULTIPLY ABOVE FACTORS by 2.1

Note: Modified Standards Available. See Page 11.

## Load Classifications Based Upon AGMA Load Characteristics:

Prime Mover	Duration of Service	Driven Machine Load Classifications		
		Uniform	Moderate Shock	Heavy Shock
Electric Motor	Up to 3 hours per day	1.00	1.25	1.50
	3-10 hours per day	1.00	1.25	1.75
	Over 3 hours per day	1.25	1.50	2.00
Multi-cylinder internal combustion engine	Up to 3 hours per day	1.00	1.25	1.75
	3-10 hours per day	1.25	1.50	2.00
	Over 3 hours per day	1.50	1.75	2.25
Multi-cylinder internal combustion engine with high torque rise	Up to 3 hours per day	1.50	1.75	2.25
	3-10 hours per day	1.75	2.00	2.50
	Over 3 hours per day	2.00	2.25	2.75
Single cylinder internal combustion engine	Up to 3 hours per day	1.25	1.50	2.00
	3-10 hours per day	1.50	1.75	2.25
	Over 3 hours per day	1.75	2.00	2.50

All clutch engagements to be with prime mover below 1000 RPM. High inertia loads may require a larger clutch.

## Maximum Allowable Side Load (lbs.) At "X" Distance, Inches (See Sketch)

PTO	RPM	1	2	3	4	5	6	7	8	9	10	11	12	13																																	
LC-106	1000	835	625	475																																											
	2000	665	595	475																																											
	3000	585	525	475																																											
LC-107	3000	1495	1110	885											735	630																															
	LC-110	1000	2790	2600											2240	1840									1570																						
LC-111		1200	2630	2450											2240	1840									1570																						
LC-110	1800	2330	2170	2030											1840	1570																															
	2400	2140	1990	1865											1750	1570																															
	LC-211	1000	4540	3395											2710	2255																	1930	1690													
LC-311		1200	4370	3395											2710	2255																	1930														
1800		3900	3395	2710											2255	1930																	1690														
LC-311	2400	3550	3395	2710											2255	1930																	1690														
	LC-114	1000 - 2200	3390	2600											2120	1780																	1535									1350	1210	1090			
LC-214		1000 - 2200	5980	4700	3880	3290	2870	2540	2270	2060																																					
	LC-314	1000	6170	5120	4200	3570	3100	2740	2460	2220	2035																																				
1500		5350	5120	4200	3570	3100	2740	2460	2220	2035																																					
2000		5025	4750	4200	3570	3100	2740	2460	2220	2035																																					
2200		4850	4650	4200	3570	3100	2740	2460	2220	2035																																					
LC-218	1000	13450	12380	11480	10690	10010	9410	8880	8400	7900	7580					7240	6900	6620																													
	1500	12800	11790	10930	10180	9530	8960	8450	8000	7600	7220					6890	6590	6310																													
	2000	12140	11180	10360	9650	9030	8500	8010	7580	7200	6850					6530	6240	5980																													
	2200	11600	10680	9900	9220	8630	8110	7650	7240	6880	6540					6240	5970	5710																													
LC-211 Gen II.	1000 - 2600	4830	4500	3850	3350	2700	2220	2020																																							
LC-214 Gen II.	1500		7700	7200	6760	6390	6080	5810								5550	5300	5040																													
	1800		7450	7000	6615	6250	5950	5680								5420	5180	4920																													
	2100		7140	6710	6340	5990	5700	5440								5200	4970	4720																													
	2300		6980	6560	6200	5860	5580	5330								5090	4860	4620																													
LC-218 Gen II.	1000	13450	12380	11480	10690	10010	9410	8880							8400	7900	7580	7240				6900	6620																								
	1500	12800	11790	10930	10180	9530	8960	8450							8000	7600	7220	6890				6590	6310																								
	2000	12140	11180	10360	9650	9030	8500	8010							7580	7200	6850	6530				6240	5980																								
	2200	11600	10680	9900	9220	8630	8110	7650							7240	6880	6540	6240				5970	5710																								



# Logan Bell Housing PTO Hydraulic and Pneumatic Power Packs

## Logan Hydraulic or Pneumatic Start-up Kits

The Logan Hydraulic or Pneumatic Start-up kits are designed to simplify Logan clutch installation and to ensure reliable and accurate engagement of the Logan PTO.

**Hydraulic Power Packs:** For vehicles that are not equipped with an air or fluid source, Logan does offer a power pack kit. Consult Logan factory for more details.

**Pneumatic Valving:** Logan offers a solenoid activated, normally closed, 3-way directional control valve with a 3/64" inlet and outlet port. Valves are available in 12 or 24 volt DC.

**The Logan Softstart™** feature is available for engagement speeds above engine idle speed.

## Pneumatic Power Packs

The Logan Pneumatic Start-up kits are designed to simplify Logan clutch installation and to ensure reliable and accurate engagement of the Logan PTO.

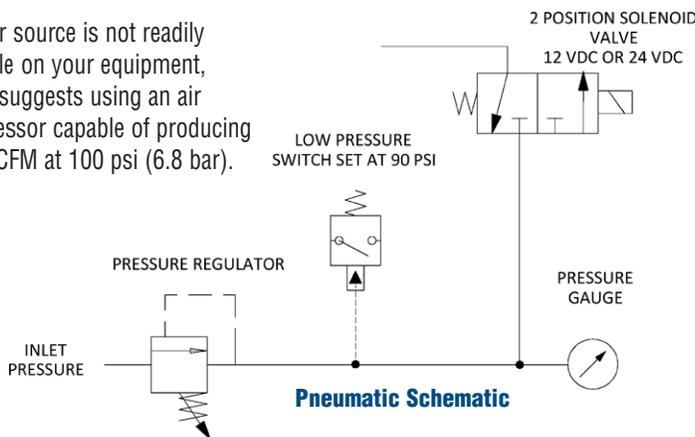


Pneumatic Power Pack

## Pneumatic Actuation

**Operation:** Logan Bell Housing PTO's require a 3-way normally closed operating valve to function properly, (if the solenoid is not activated, air will not pass through the valve). A pressure switch must be installed in the inlet line to ensure that a minimum of 100 psi (6.8 bar) is available prior to clutch engagement. A 20-micron filter element should also be installed before the switch to minimize excessive dirt, oil and moisture.

If an air source is not readily available on your equipment, Logan suggests using an air compressor capable of producing 0.14 SCFM at 100 psi (6.8 bar).



Pneumatic Schematic

## Hydraulic Power Packs

Logan Hydraulic Power Packs are available for machines not equipped with a fluid source, and can be operated by a 12 or 24 VDC power supply.



Hydraulic Power Pack with SoftStart™ Manifold

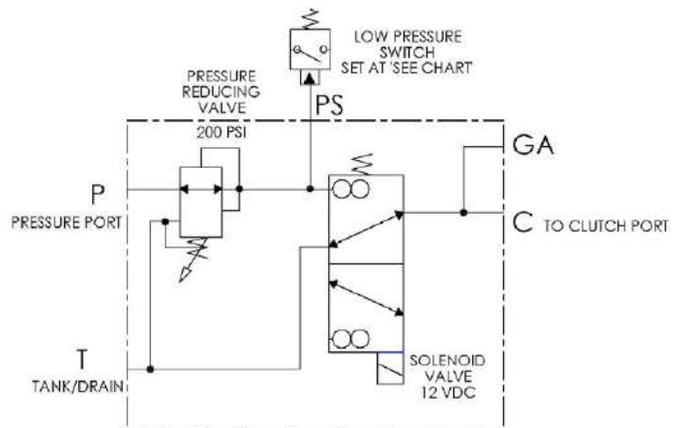
## Hydraulic Actuation

**Operation:** Logan Bell Housing PTO's require a 3-way normally closed operating valve with a system flow rate of 2 gpm (7.5 liters) to ensure proper response time during clutch actuation; (if the solenoid is not activated, fluid will not pass through the valve).

**Gen. I and Gen. III Actuation:** A pressure switch must be installed in the inlet line to ensure that a minimum of 150 psi (10.3 bar) and a maximum of 250 psi (17.2 bar) is available prior to clutch engagement. Pressures exceeding 250 psi (17.2 bar) may cause back plate deflection and premature clutch failure. A 20-micron filter element should also be installed in the supply line, before the valve, to minimize excessive dirt, oil and moisture.

**Gen. II Actuation:** A pressure switch must be installed in the inlet line to ensure that a minimum of 275 psi (10.3 bar) and a maximum of 350 psi (17.2 bar) is available prior to clutch engagement.

**Note:** If a hydraulic source is not readily available on your equipment, Logan suggests using a hydraulic pump capable of producing 2 gpm at 250 psi (17.2 bar) for Gen I and Gen II clutches. For Gen. II Clutches we recommend a 2 gpm pump at 350 psi. (24 bar).



## Logan SoftStart™ Manifolds

Logan offers fluid and air actuated valve manifolds complete with gauge and pressure switch to ensure reliable and accurate engagement of the Logan PTO





## System Pressure: Over or Under Pressurization

The catalog rated torque capacity of Logan Clutches is directly proportional to the operating pressure.

Maintaining the lowest pressure possible to transmit the desired torque will enable the clutch to run cooler and extend the lifespan of the internal working bearings (if applicable) and other components. A pressure regulating valve should be specified in the system to prevent over or under-pressurization of any Logan Clutch PTO. The Logan warranty does not cover clutch failure due to over or under-pressurization.

The highest pressure values in the torque tables are the suggested maximum ratings for Logan Clutches.

**Clutch Shaft Bearing Lubrication:** Consult your maintenance manual for correct service intervals. Main clutch shaft carrier bearings are factory greased for the first 100 hours of operation. A small amount of grease at the inner & outer bearing shaft seals of the clutch shaft carrier bearings is normal.

After 100 hours of operation, remove cover plate, pump in approximately 5 ½ cu in./ 90ml of fresh No. 2 Lithium based grease. Rotate the shaft (by hand if possible) until fresh grease is seen coming thru seals covering bearings on main shaft. Use a cloth to clean up any excess grease. Re-install the cover plate and run the clutch for 10 minutes at 50% of rated speed. Remove cover plate and clean up any extra grease from inside of housing. Replace cover plate and operate normally.

**CAUTION:** Do not over-grease bearings. Excessive grease may cause bearing overheating and premature failure. In addition, discs and opposing surfaces must also be free of any grease in order to avoid clutch slippage or reduced torque.

**Clutch Break-in:** For initial start up, with the power source operating at 700 to 1000 rpm, cycle/engage the clutch at a rate of once every 10-15 seconds for 10-20 cycles, not exceeding 50% of rated torque capacity. In severe duty applications, allow additional clutch engagements at moderate loads and reduced RPM's before applying maximum torque and RPM. Torque values are based upon dry disc packs having full contact between surfaces.

**Torsional Damping Devices for Logan Products:** Special consideration should be given to torsional compatibility when incorporating any Logan product into an application.

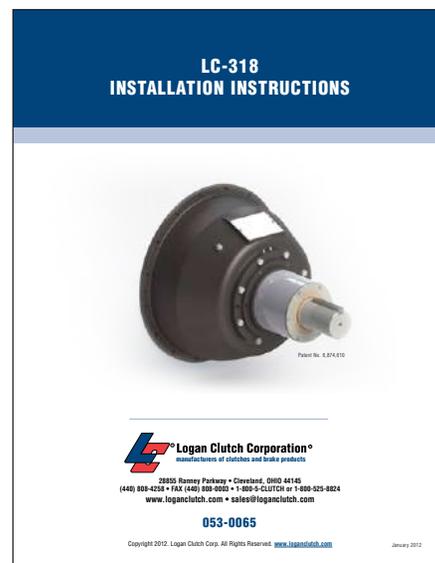
Noise, vibration, damage and premature failure of Logan PTO's can be directly attributed to incorrectly specified torsional damping devices. It is the buyer's responsibility to specify this option, which can result in additional cost and a possible increase in installation length. Logan accepts no liability for torsional clutch failure. Finite element analysis or field testing for torsional compatibility rests solely with the assembler and user.

Logan Clutch Corporation reserves the right to modify product specifications and designs without notice and without incurring obligations. All rotating components present a potentially hazardous condition and should be guarded in accordance with OSHA requirements and other applicable laws, regulations and industrial standards.

Logan can accept no liability for personal injury, loss of life, or damage or loss of property due to the failure of the buyer or user to improperly apply Logan Products.

## Logan Installation and Operator's Maintenance Manuals:

Routine maintenance helps keep your Logan Clutch in the best possible condition. Maintenance helps your clutch last longer and run more efficiently. Always reference your Logan Operator's manual to help preserve your clutches performance, value, and reliability. - See more at [www.loganclutch.com](http://www.loganclutch.com)



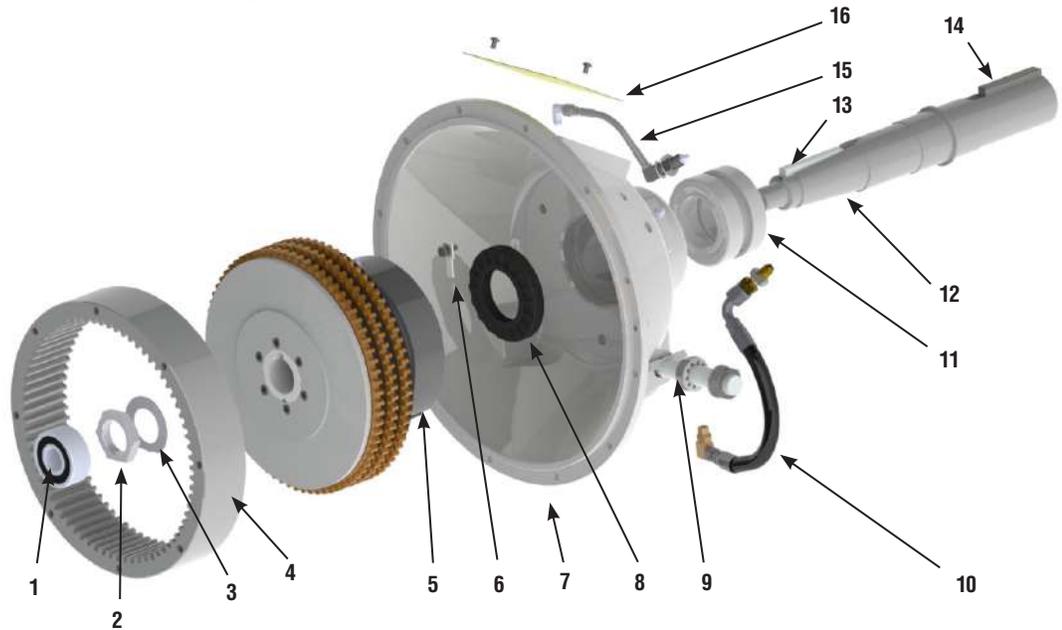


# Bell Housing PTO Models/Component Parts

## Generation I Design for in-line or side load applications

ITEM NO. QTY. DESCRIPTION

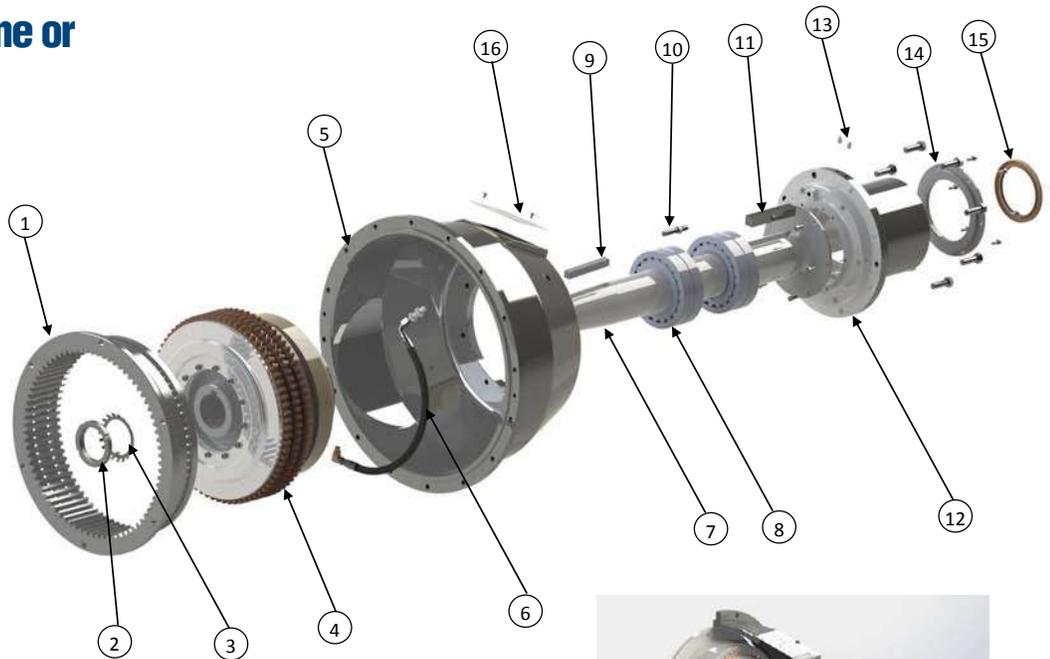
ITEM NO.	QTY.	DESCRIPTION
1	1	Pilot Bearing
2	1	Locknut
3	1	Lock Washer
4	1	Drive Ring
5	1	Clutch Assembly
6	1	Lock Bracket
7	1	Bell Housing
8	1	Bearing Nut
9	1	Anti-Rotation Pin
10	1	Actuation Hose Assembly
11	2	Tapered Roller Bearing
12	1	Shaft
13	1	Clutch Key
14	1	Shaft Key
15	1	Lubrication Hose Assembly
16	1	Name Plate Assembly



## Generation III Design for in-line or side load applications

ITEM NO. QTY. DESCRIPTION

ITEM NO.	QTY.	DESCRIPTION
1	1	Drive Ring
2	1	Locknut
3	1	Lock Washer
4	1	Clutch Assembly
5	1	Bell Housing
6	1	Actuation Hose Assembly
7	1	Shaft
8	2	Spherical Roller Bearing
9	1	Clutch Key
10	1	Anti-Rotation Pin
11	1	Shaft Key
12	1	Bearing Housing
13	2	Lube Fitting
14	1	Housing Plate
15	1	Shaft Seal
16	1	Name Plate Assembly



Generation II with support bracket

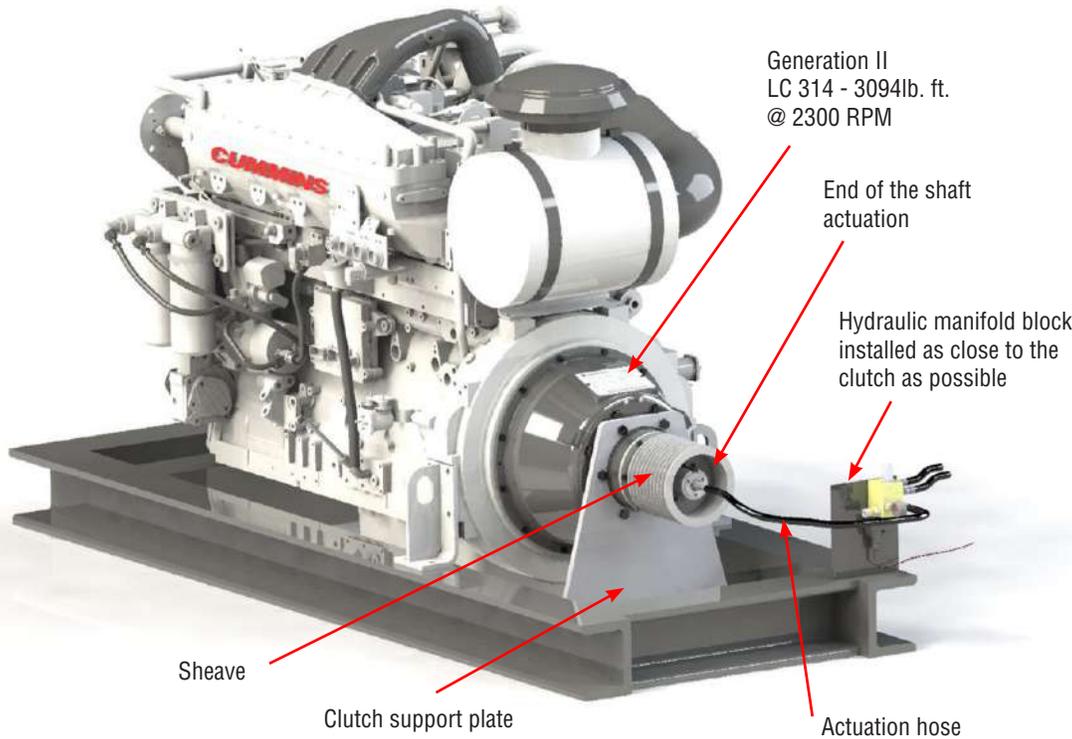
## Generation II Design for heavy duty side load applications, with through shaft activation

\* Clutch body components not shown.

# Logan Bell Housing PTO's – Typical Applications



## LC 314 Generation II Hydraulic Actuation Layout



In this example, the customer has developed a skid mounted drive system, with a Heavy-duty side load requirement. Logan Engineers specified a Generation II LC-314 due to its spread bearing design. The Logan Gen. II handles 50% more side load than a standard Gen. I 314 Design. Also, the Gen II does not require a pilot bearing, which is prone to failure in heavy duty side-load applications.

The Logan Gen. II LC-314 transmits a maximum 4420 lb. ft. of torque (5993 Nm) @ 435 psi. (30 bar), providing ample safety factor in this application which only requires 3094 lb. ft. (4195 Nm).

## Bell Housing PTO's - Power Generation

Standard Logan Bell Housing PTO's are available in No. 00 to No.7 size SAE Bells. This application required a Logan LC-314 (No. 01 Size Bell), Clutch for main propulsion and a Logan SAE Direct Drive PTO (1000 series) to drive an auxiliary pump with an SAE C spline off the front of the engine.



Scania D13 Series 650 HP (478 kW) pictured with Logan LC-314 Bell PTO 2702 lb. ft. (3664 Nm) for main propulsion and Logan front PTO 1000 series clutch, 1000 lb. ft. (1356 Nm) to drive an auxiliary pump



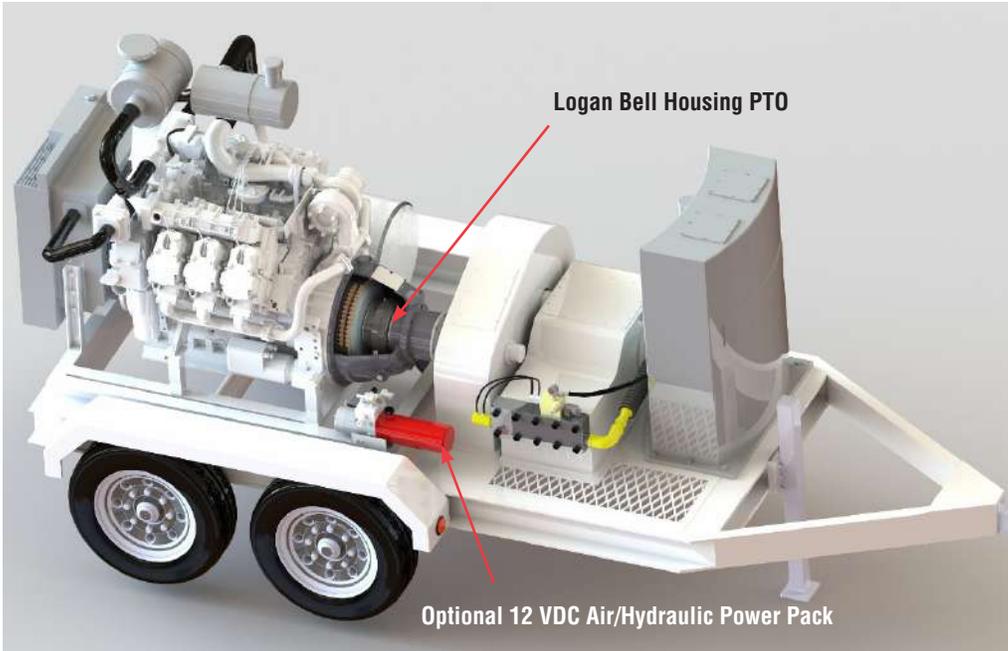
Fluid /Air Actuated, and Self Adjusting



Logan Front PTO's act as connect/disconnect for auxiliary pumps



# Bell Housing PTO's - Waterblasting Systems



Trailer mounted waterjet system outfitted with 200 HP engine and LC 311 PTO  
1446 lb. ft. (1960 Nm) @ 200 psi (13.8 bar)



Cut away view of Logan LC-311 disc pack

Trailer or skid mounted blasting systems can range in size from 50 to 500 HP, with required speeds up to 3,000 RPM on smaller units. With SAE size bells from No. 7 up to No. 0, and torque ranges from 159 lb. ft. (216 Nm) to over 7,838 lb. ft. (10,628 Nm) Logan Bell Housing PTO's are properly sized to handle even the toughest demands in system torque and HP.

## Runway Cleaning / Airport and Roadway Marking Removal Equipment



Waterblasting truck equipped with 375 HP Diesel Engine and an air / fluid actuated Logan LC-314 Bell Housing PTO for smooth engagement.

Water blasting trucks quickly and completely remove all types of durable traffic markings from asphalt and concrete applications on roadways, airports, parking lots, with up to 40,000 psi. (2700 bar) of water pressure. The simultaneous jetting and vacuuming of the remnant material, minimizes damage to surfaces and eliminates secondary clean-up. Logan flywheel mounted, hydraulically actuated, Bell Housing PTO clutches are an ideal option, and available in No. 00 – No. 5 size flywheel; fitting engines with HP ranges from 50 – 1000 HP. Self-adjusting, smooth engagement and disengagement, as well as remote activation, make the Bell Housing PTO ideal for diesel and spark ignited engines for mobile applications.



Medium Duty surface preparation truck equipped with Logan LC-211 Bell Housing PTO powered by a 200 HP Diesel engine.



Heavy duty airport marking removal truck equipped with a Logan LC-311 Bell Housing PTO, with SAE No. 3 flywheel mount, powered by a 240 HP diesel engine.



## Tree and Brush Chippers

Frequent mechanical PTO clutch overhauls can take a chipper out of service for several hours or an entire day, resulting in lost revenue and increased operating expenses.

Logan Self-Adjusting™ PTO's eliminate the need for mechanical adjustment, ensuring more uptime and less downtime since mechanical linkages, lever arms, yokes and collars are no longer required.

### Features:

- Air or Fluid Actuated
- High Torque, Small Envelope
- Available with or without Pilot Bearings
- Remote Actuation

### Advantages:

- Smooth Engagement – Quick Release
- Self-Adjusting™ Disc Pack
- Eliminates Mechanical Linkages, Hand Levers and Yokes
- Reduces Downtime - Fewer Moving Parts



Logan PTO Clutch mounts directly to engine's SAE flywheel



LC-311 PTO transmits 1,446 lb. ft. (1960 Nm) @ 200 psi (13,9 bar)



Feed / discharge system has 20" (50.8 cm) chipping capacity



Shredder driven by 170 hp John Deere 6068T with Logan LC-211 transmits 963 lb. ft. (1305 Nm) @ 200 psi (13,8 bar)

## Wood Shredders / Recycling

Since shredder /recyclers are capable of processing pallets, brush, logs, bark, sawmill waste, scrap framing lumber, plywood and drywall – right at the work site; you need a tough clutch to handle the diverse operating conditions. And, since Logan clutches are designed to transmit maximum torque within a very small envelope, shredding and processing is simple and efficient - bringing projects in on time and within competitive operating budgets.

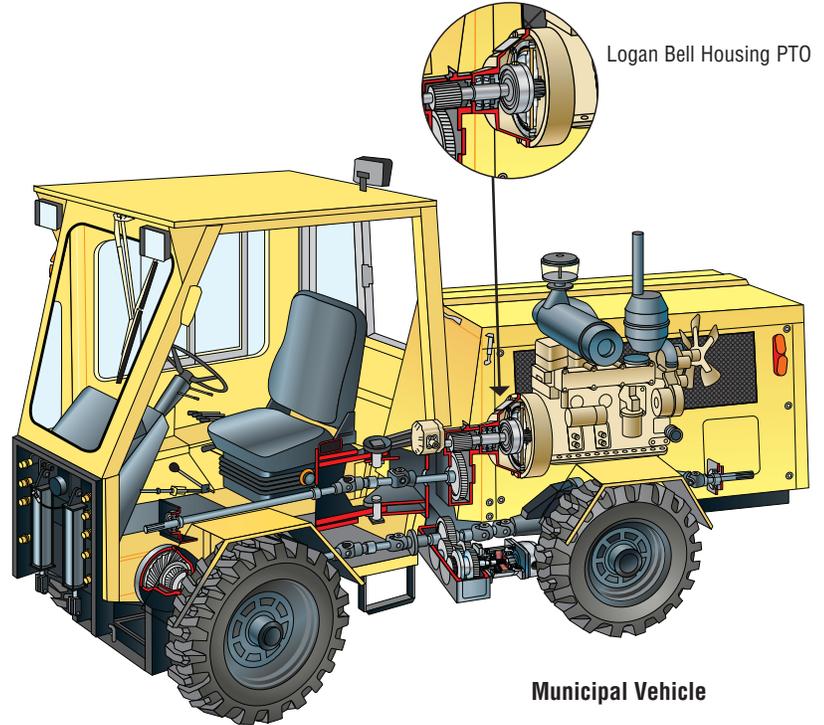
**Municipal Service Vehicles**



**Flail cutter attachment for clearing brush and small trees**



**Snow Thrower Attachment powered by Logan PTO**



**Municipal Vehicle**

With 480 lb. ft. of torque (650 Nm) @ 200 psi (13,8 bar), the Logan LC-111 Bell Housing PTO transmits almost twice the typical torque required 262 lb. ft. (355 Nm) to power this Municipal service vehicle / tractor and its attachments.

**Cold Planers /Grinding Attachments for Wheel Loaders and Backhoes**

Cold Planers are designed to cut asphalt and concrete on streets and highways during the repair or resurfacing process.

With engine ranges from 122 to 468 HP, a Logan LC-211 is up to the task by transmitting up to 963 lb. ft. of torque (1305 Nm) @ 200 psi (13,8 bar).



**Milling machine equipped with 200 hp engine and LC211 PTO shown mounted on a wheel loader**



**Road grinding cutting depths may go up to 12 inches (30.48 cm) deep and widths up to 72" (182.88 cm) wide**

# Bell Housing PTO's – Heavy Duty Snow Blowers



## Bell Housing PTO's for Airport Snow Blowers

Clearing airport runways is a top priority during winter storms. This heavy-duty snow blower, powered by a CAT C-18 Engine, and a Logan LC-314 Bell Housing PTO as part of the blower system – can cast 5,000 tons (4.535e6 Kg.) of snow per hour, over 200 ft. (60.96 meters). That's approximately 1.4 tons (1,270 kg) per second.



Logan LC-314 Bell Housing PTO transmits 2,702 lb. ft. (3664Nm) of torque @ 200 psi



Airport Snow Blower Attachment powered by Logan PTO

## Bell Housing PTO's – Commercial Snow Blowers



This Airport 700 HP Snow Blower is equipped with a Logan LC-318 Bell Housing PTO and is capable of clearing a 120" wide path of snow, moving 6000 tons of snow per hour



View of Logan LC-318 PTO and hydraulic

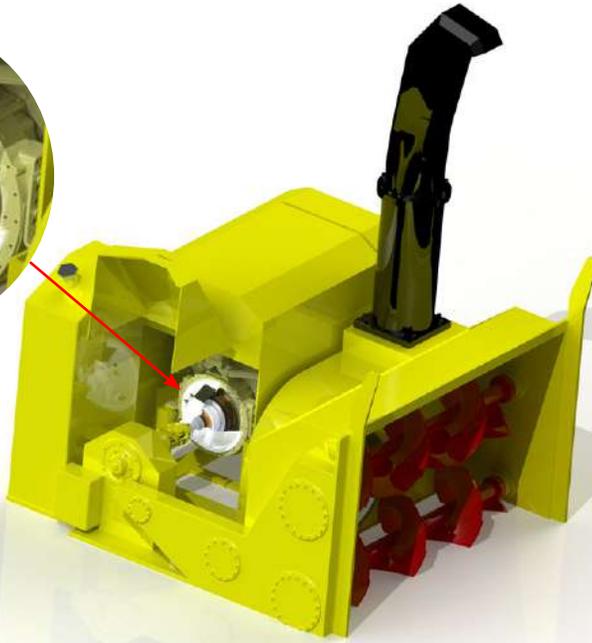


The LC-318 transmits over 7473 lb. ft. (10,133 Nm) of torque @200 psi. (13.8 bar)

# Municipal and Highway Loader Mount Snow Blowers



**Logan LC-311 Bell Housing PTO**  
1446 lb. ft. (1960 Nm)



Close-up view of a typical single or two-stage Loader Mounted Snow Blower, which uses a Logan Bell PTO for the Direct drive. Since Logan Clutch engagement is smooth and positive, minimal break-in periods are required, enabling maximum torque transfer required to move heavy, wet snow up to a 175 ft. / 53 meter casting distance.



Municipal Loader using a Logan LC-314 Bell Housing PTO, which transmits 2702 lb. ft. (3664 Nm) of torque



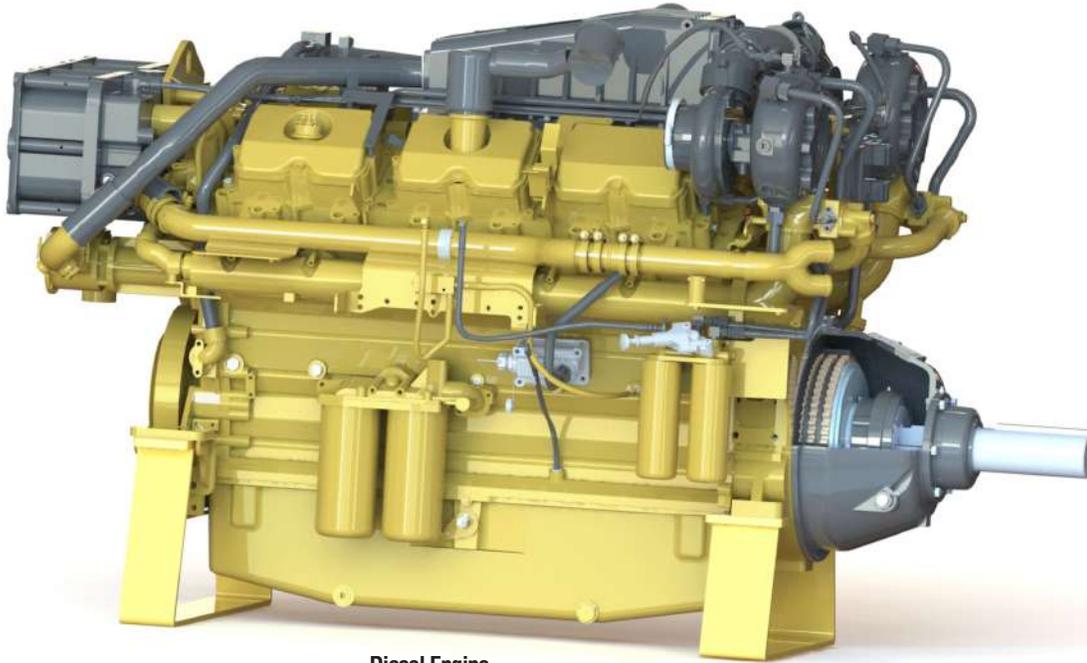
Wheel Loader equipped with a Logan Bell PTO clears a parking lot



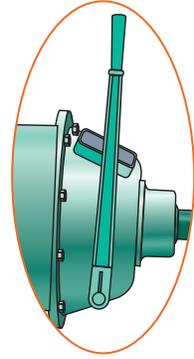
Two-Stage 3-Ribbon Snow Blower, which typically uses either a CAT C13 (415HP) or Cummins QSL-9 (350HP) style engine connected to a Logan LC-311 Bell Housing PTO enables up to 112" (2484.48 cm) cutting widths.



Wheel Loader Retrofitted with a Self-Adjusting™ Logan Bell PTO, originally used a mechanical, lever activated over center PTO



Diesel Engine



Old Technology



Available with keyed shaft or SAE pump pad

## Bell Housing PTO's – Marine Applications

Logan Air / Fluid actuated Bell Housing PTO's mount directly to a diesel engine's flywheel and are used as a connect / disconnect drive for main propulsion, or for generator sets which control fixed displacement or variable displacement pumps. Logan PTO's are suitable for tug boats, workboats, fishing boats, jet boats, patrol boats and pleasure craft.

### Typical applications include:

- Generator sets
- Deck and cargo winches
- Bow thrusters
- Drag net reels
- Deck pressure washers
- FiFi pumps

### Advantages:

- Aids in the reduction of emissions, energy and fuel costs, and wear and tear on auxiliary attachments.
- The Logan PTO is perfect for mounting on the front and/or rear of the engine and provides more torque capacity than electromagnetic style clutches.
- Easily retrofits during repowering of vessels

### Logan PTO Features:

- Air or Fluid actuated for maximum torque capacity
- Self adjusting disc pack – minimizes slippage
- Fast engagement – Quick release
- Eliminates Mechanical Linkages, Hand Levers, and Yokes
- Drive flange SAE or DIN

### Remote Actuation:

Since Logan clutches are Fluid or Air operated, and Self-Adjusting™, actuation from a control panel, wheelhouse or bridge is now possible.

### Mounting:

Logan PTO's are available with a keyed shaft or an SAE B, C, or D pump pad mount. Modified input / output splines are also available to meet customer's specific design requirements.

Agency Certification Available.



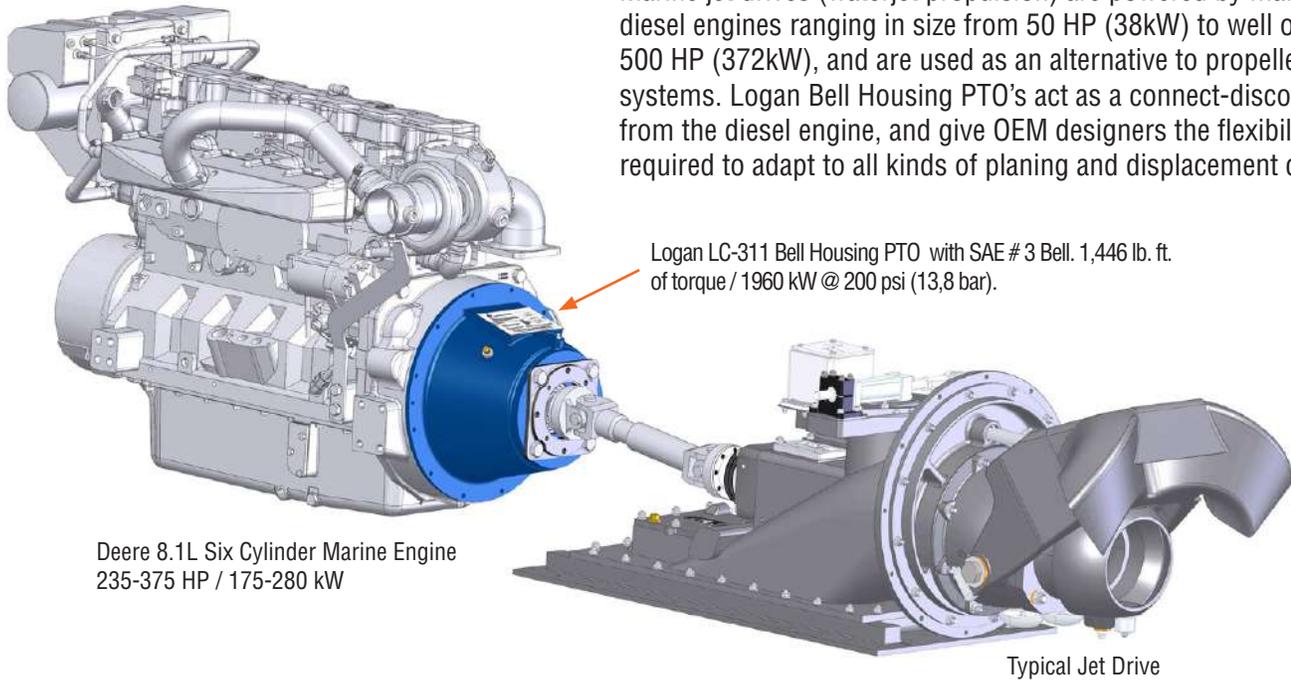
Short axial length for confined space



Operate pumps on-demand vs. continuously

## Bell Housing PTO's – Marine Jet Drives

Marine jet drives (waterjet propulsion) are powered by marine diesel engines ranging in size from 50 HP (38kW) to well over 500 HP (372kW), and are used as an alternative to propeller systems. Logan Bell Housing PTO's act as a connect-disconnect from the diesel engine, and give OEM designers the flexibility required to adapt to all kinds of planing and displacement craft.



Deere 8.1L Six Cylinder Marine Engine  
235-375 HP / 175-280 kW

Logan LC-311 Bell Housing PTO with SAE # 3 Bell. 1,446 lb. ft. of torque / 1960 kW @ 200 psi (13,8 bar).

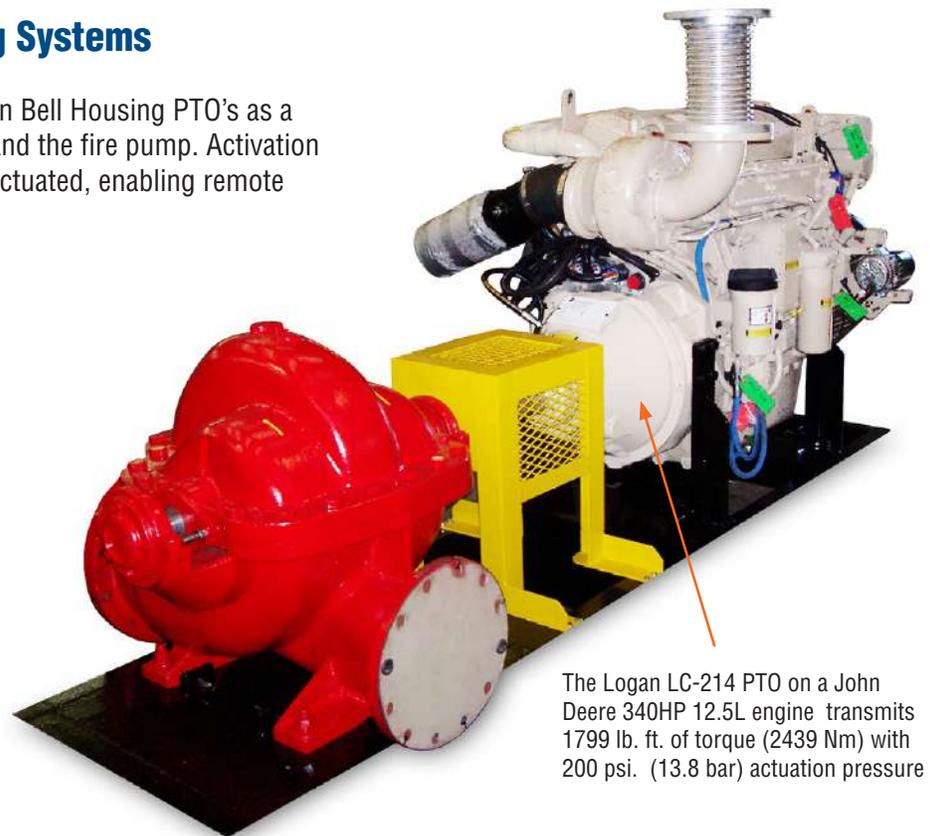
Typical Jet Drive

## Bell Housing PTO's – Fire Fighting Systems

Fire pumps on Tugs and Workboats utilize Logan Bell Housing PTO's as a connect-disconnect between the diesel engine and the fire pump. Activation is simplified since Logan PTO's are fluid or air actuated, enabling remote engagement from the bridge or wheelhouse.

### Logan PTO Features:

- Air / Fluid Actuated
- Eliminates Linkages, Yokes and Mechanical Hand Levers
- Self-Adjusting™ Disc Pack



The Logan LC-214 PTO on a John Deere 340HP 12.5L engine transmits 1799 lb. ft. of torque (2439 Nm) with 200 psi. (13.8 bar) actuation pressure

The pump system is capable of transmitting a 4" / 10cm diameter stream of water as far as 400 ft / 122 meters



Logan LC-211 Bell Housing PTO transmits 963 lb.ft. (1350Nm) @ 200 psi. Logan 034 series Softstart™ manifold controls pressure to the clutch.

## The City of Amsterdam Fire Department (Netherlands) – Jan van der Heyde IV

The 58 ft. / 17.6 meter Jan van der Heyde IV Fireboat is powered by Twin Volvo D13-500 Marine Diesel engines with No. 3 flywheels, and has a maximum speed of 15 km / 8 knots per hour. The vessel is equipped with two dedicated water pumps, driven by two Logan hydraulically actuated LC-211 PTO clutches providing a maximum torque transfer of 963 lb. ft. (1305Nm) @ 200 psi (13,8 bar), giving the vessel 443, 000 gallons / 1,680 m<sup>3</sup> - cubic meters per hour of water pumping capacity.



443,000 gallons per hour /  
1,680 m<sup>3</sup> cubic meters



Low profile design to pass  
underneath bridges



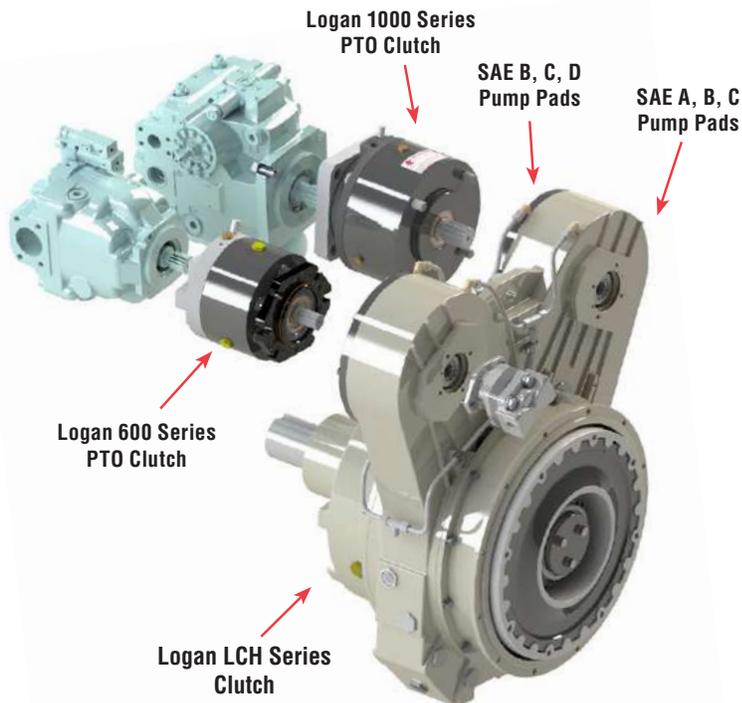
Amsterdam Canals span  
46 miles / 75 kilometers

# Logan FlexaDrive™ Multiple Pump Drive Systems

## 2-Position Pump Drive System For Engines up to 1000 HP (745 kW)

The Logan 2-Position Pump Drive is outfitted with up to four (4) PTI / PTO pads, and can accommodate up to 1000 HP (745 kW) Engines, with maximum Speeds up to 2200 RPM, and a maximum of 160 HP (120kW) per tower under continuous duty.

- Input Housing SAE No. 1 – No. 3
- Output Housing SAE No. 1 - No. 3
- Pump Pads SAE A – SAE D
- Continuously Rated – Total 300 HP (225Kw)
- Continuously Rated – Per Tower 160 HP (120Kw)
- Integrated Reservoir - Eliminates need for secondary tank
- Pump Drive Towers can be positioned up to 45° in either direction



## Logan LVC Series Clutches for Well Service Rigs / Oil & Gas



### Maximum Torque – Minimum Envelope – Reverse Compatibility

Air actuated, multiple disc, dry disc pack design for maximum torque transmission within short, axial envelope. Simplified cylinder-piston, o-ring design, eliminates air tube or bladder type leaks.

### For Draw Works Applications

The Logan LVC clutch cylinder-piston, and disc pack design provides more clamping force and torque transfer than competitor clutches – all within a design envelope that is reverse compatible and significantly lighter in weight than Twin Disc™, Wichita and WPT type PO Clutches.

### Lightweight Design – Ideal for overall rig weight reduction requirements

The Logan LVC design can reduce overall rig weight by several hundred pounds, which goes a long way when complying with state and federal on-highway load regulations during rig transport from job to job.

## Logan SAE Direct Drive PTO Clutches

Logan PTO Series Clutches are designed to mount between the power take-off of an engine, multi-station pump drive, hydraulic motor or pump. OEM and Aftermarket designers can take advantage of energy savings and component longevity by utilizing Logan PTO's to drive Auxiliary attachments only when required.

### PTO Applications:

- Single and Multi-station Pumps
- Mobile or Stationary Auxiliary Drives
- Connect-Disconnect Direct Drives
- Municipal Fire Trucks
- Air Rescue Fire Fighting Vehicles
- Marine Fishing Boats/Work Boats/Winches



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