

OGURA

Mobile Clutches



Introduction

Mobile Clutches

The Ogura Clutch Company was founded in 1938. Since that time, it has grown to be the largest manufacturer of electromagnetic clutches in the world. Ogura has technical and manufacturing representation worldwide.

Ogura's numerous quality awards reflect a desire for continuous improvement which we apply not only to our products; but, also to our personnel. We believe the cornerstone of quality begins with people. This is why our personnel are continually trained on the latest manufacturing techniques and design principles. Our plants currently conform to ISO9001 and some to QS9000 guidelines.

We welcome the opportunity to put our manufacturing and engineering skills to work for you. If for some reason, your requirement does not fit within the product lines shown in this catalog, please contact us directly. We may have other products available to meet your requirements.



II

Products In This Catalog

There are two basic models of clutches described in this catalog.



Mobile Clutches:

These are flange mounted, normally a two piece construction. These clutches are typically mounted on pumps.

Information contained in this catalog is as accurate as possible; however, we cannot be held responsible for errors and omissions.



III Mobile Clutches

Mobile clutches are made up of three major sub-assemblies. They are:

1. **Field assembly**- This is the coil and backing flange which provides the magnetic flux that makes the clutch engage.
2. **Rotor assembly**- This includes the pulley and the bearing and is normally the input of the clutch.
3. **Armature assembly**- This includes the armature disc, springs and hub and is normally the output.

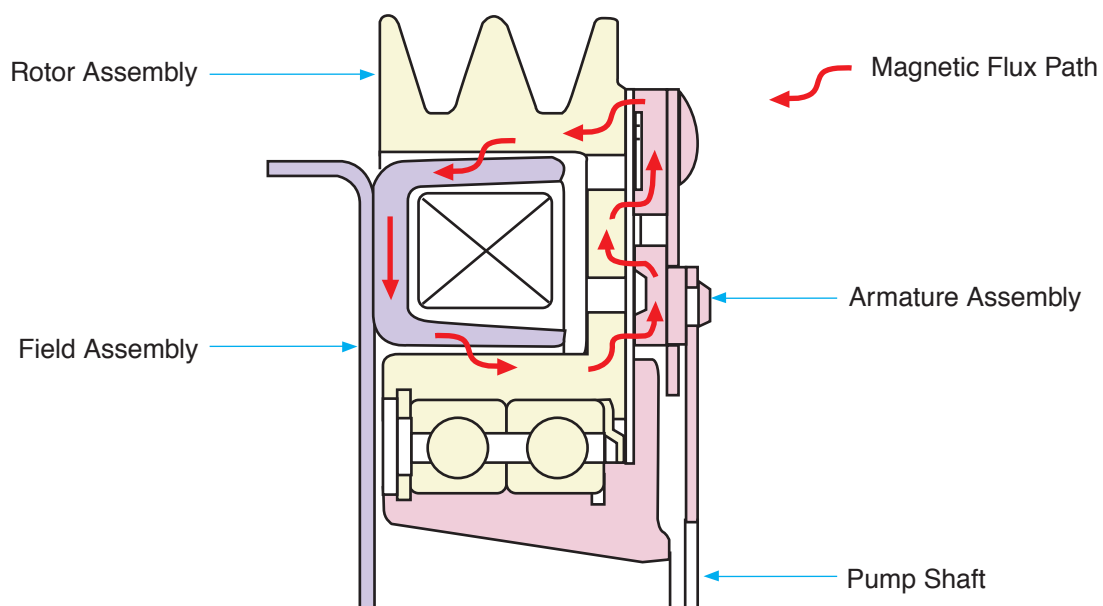
The field is mounted to a stationary member such as a support bracket of a pump. The rotor is driven by the belt from the engine and rotates constantly. When the clutch is energized, the armature pulls against the rotor and drives the shaft of the pump.

Engagement of the armature to the rotor is caused by the magnetic attraction

between these two elements. The section below shows how the magnetic field is created when direct current is applied to the field. The magnetic flux is transferred from the field into the rotor and then into the armature. The slots in the rotor and the armature are called banana slots. These slots allow the flux to contact the rotor and the armature in more than just two places. [A normal magnet has only two points (north and south) of attraction.] By making multiple points of flux connection, the torque of a clutch can be increased.

The picture below shows a standard mobile clutch. It has two flux paths. This is called a double flux, or a four-pole design.

To disengage the clutch, the voltage going to the coil is simply turned off. Once the voltage is released, the springs between the armature and the hub pull the armature away from the rotor, creating an air gap so no contact is made.



Reasons For Using Ogura Electromechanical Clutches On Mobile Applications

1. **Reduced horsepower consumption from the engine:**

Since the pump is not required to run all the time, especially over the road, there is less wasted power.

2. **Extended pump life:**

Since the clutch allows the pump to be disengaged, life is greatly extended because the pump is not rotating when it is not being used.

3. **Less cost:**

Since the pump only runs when needed, fuel is saved. Also, the pump does not need to be replaced as often.

4. **Simple installation:**

Since the clutch runs directly off the battery, all that is required is a basic switch to engage and disengage the clutch.

5. **Operator convenience:**

Rather than a mechanical linkage which can cause an additional force required by an operator to engage a clutch, an electric clutch is engaged by a simple flip of a switch. Because the clutch is engaged electrically, this switch can be incorporated into a control panel so the operator does not have to be in the same location as the clutch when it engages.

6. **Cold weather starting:**

By using a clutch, the load is not engaged at start up. This allows the engine to come up to full efficiency before engaging the clutch.

Ogura

Mobile Clutch Design Advantages

1. Solid forged rotor:

A one piece solid forged rotor means no chance of internal parts separation. Our rotors also have an even wall thickness around the coil which gives optimum flux distribution, maximizing torque.

2. Different coil voltages available:

Although 12 volt is the most common, 24 volts can also be made available. Depending upon the quantity, other specialty voltages can be made.

3. High temperature, longer life grease:

All models include our special long life grease which has shown a significant improvement in life over other standard high temp greases.

4. E-coating:

Where possible, all parts in the clutch are e-coated to give maximum corrosion protection.

5. High temperature epoxy coil:

To help prevent failure from both vibration and outside contaminants, all coils are sealed in the coil shell with a high temperature epoxy coating.

6. Forged machined pulley:

All models in this section use a heavy duty machined pulley. A stronger pulley resists damage due to abusive environments.



Typical Mobile Clutch Hydraulic Pump Applications

In a typical hydraulic pump application, the clutch is mounted on the input shaft of a hydraulic pump. Since the clutch has an integral pulley, a belt is used as the input to the clutch. This belt is normally driving directly from a gas or diesel engine. When there is no power to the clutch, the hydraulic pump does not engage; however, when power is activated the clutch drives the hydraulic pump giving hydraulic pressure.

In this type of application, the hydraulic pump and clutch are mounted together. Sometimes the clutch is mounted directly to the pump (there needs to be a special adapter face on the pump) or more commonly, a mounting bracket is used. This bracket has an SAE mounting on one side to hold the pump in place and four holes on the opposite side to hold the field coil of the clutch. The feet of the mounting bracket then mount to a bracket on the engine.



TOW TRUCK
(Hydraulics raises boom)



MARINE WINCH DRIVE
(Hydraulics run winch)



SNOW PLOW
(Hydraulics raises blade)



CHERRY PICKERS
(Hydraulics raises arm)

Typical Mobile Clutch Water Pump Applications

In a typical water pump application, the clutch is mounted on the input shaft of the water pump. Since the clutch has an integral pulley, a belt is used as the input to the clutch. This belt is normally driving directly from a gas or diesel engine. When there is no power to the clutch, the water pump does not engage; however, when power is activated the clutch drives the water pump giving water pressure.

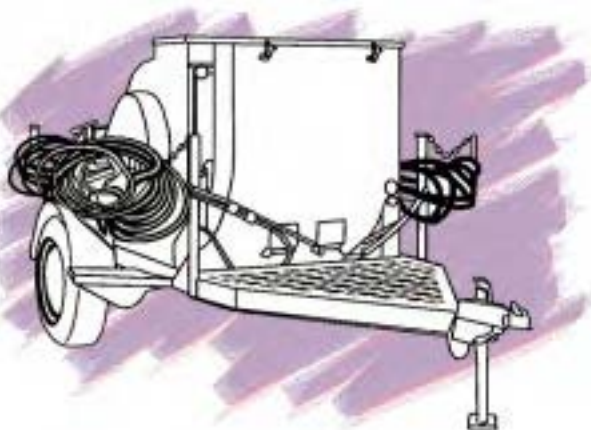
In this type of application, the water pump and clutch are mounted together. Sometimes the clutch is mounted directly to the pump (there needs to be a special adapter face on the pump) or more commonly, an adapter plate is used.



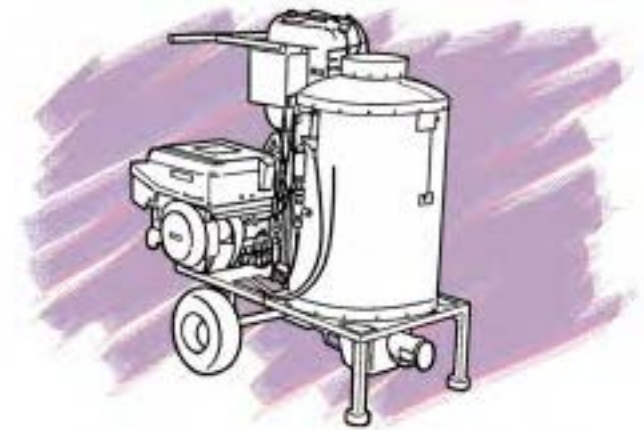
CARPET CLEANING
(Simple way for operator to get remote actuation)



STREET SWEEPER
(Clutch turns pump from engine)



TEXTURE SPRAY MACHINES
(Pump used only when needed)

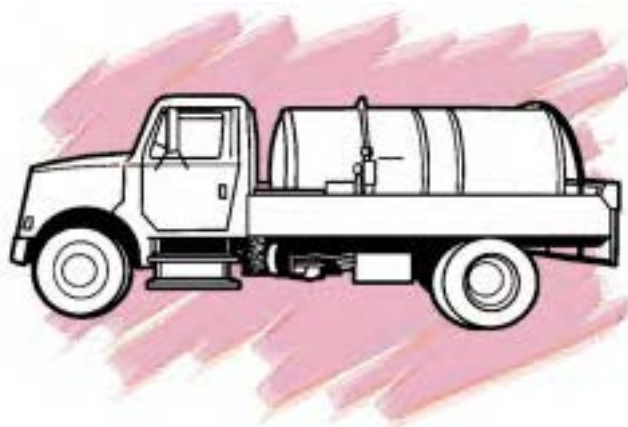


HIGH PRESSURE WATER PUMPS
(Clutch turns only when required,
no bypass valve needed)

Typical Mobile Clutch Compressor / Vacuum Pump Applications

In a typical compressor/vacuum pump application, the clutch is mounted on the input shaft of the compressor/vacuum pump. Since the clutch has an integral pulley, a belt is used as the input to the clutch. This belt is normally driving directly from a gas or diesel engine. When there is no power to the clutch, the pump does not engage; however, when power is activated the clutch drives the compressor/ vacuum pump giving pressure or a vacuum.

In this type of application, the compressor/ vacuum pump and clutch are mounted together. Usually the clutch is mounted directly to the pump (there needs to be a special adapter face on the pump); sometimes a mounting bracket or adapter plate is used.



WASTE REMOVAL TRUCK
(Vacuum pressure available on demand)



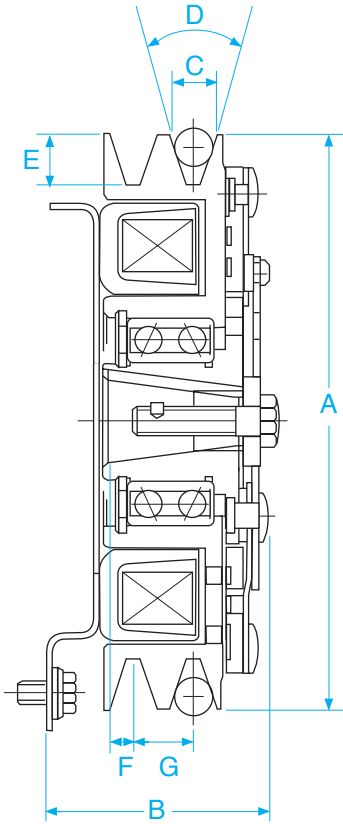
MOBILE SERVICE TRUCK
(Clutch automatically turns on compressor when needed through relief valve/switch)



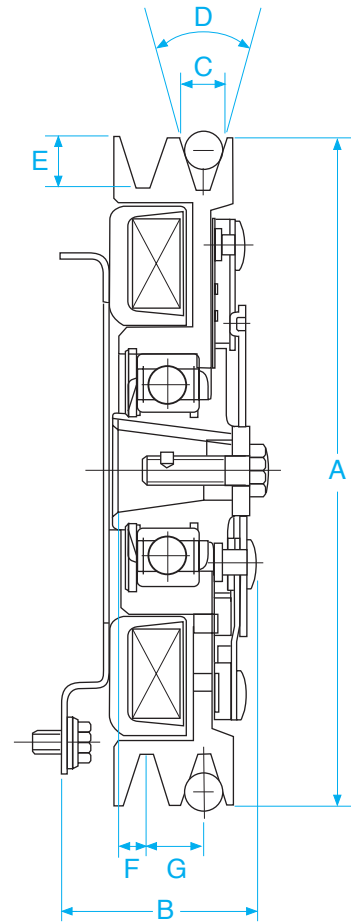
REFRIGERATION TRUCK
(Clutch provides cooling as needed)

Ogura Mobile Clutch Types

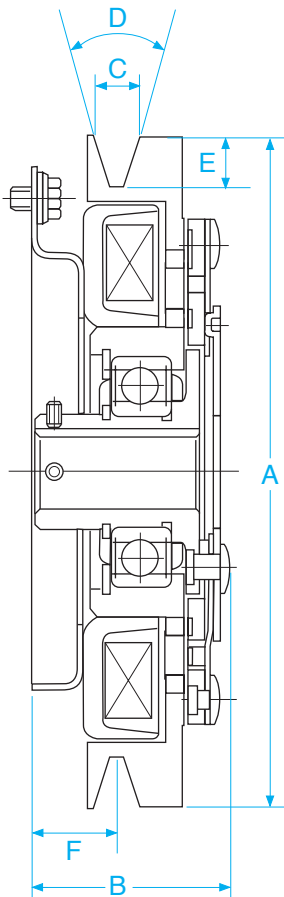
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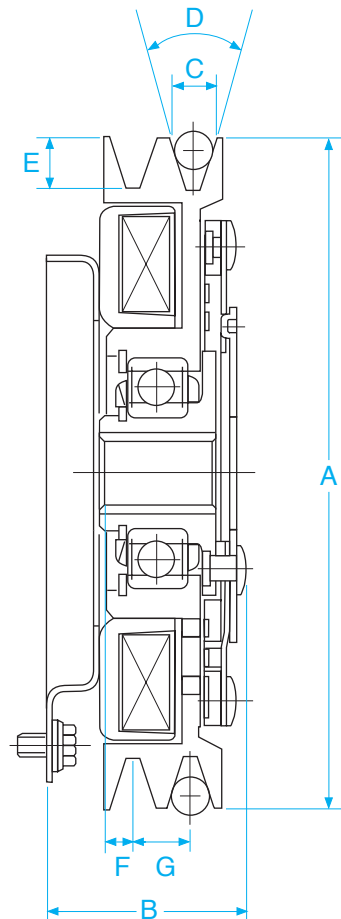
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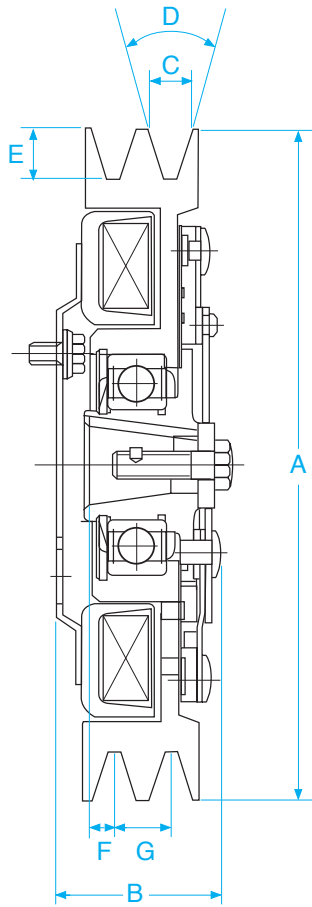


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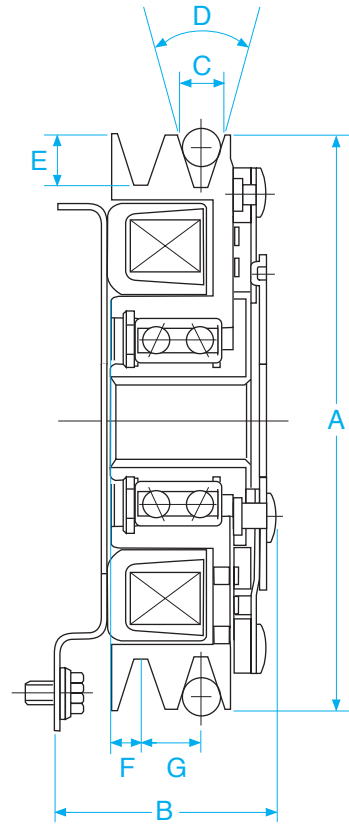


Ogura Mobile Clutch Types

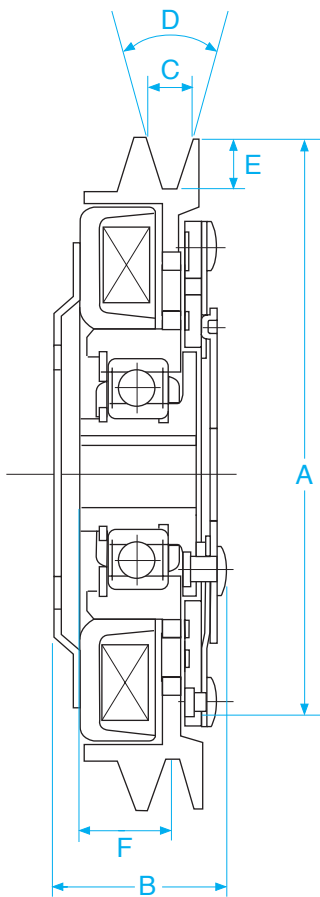
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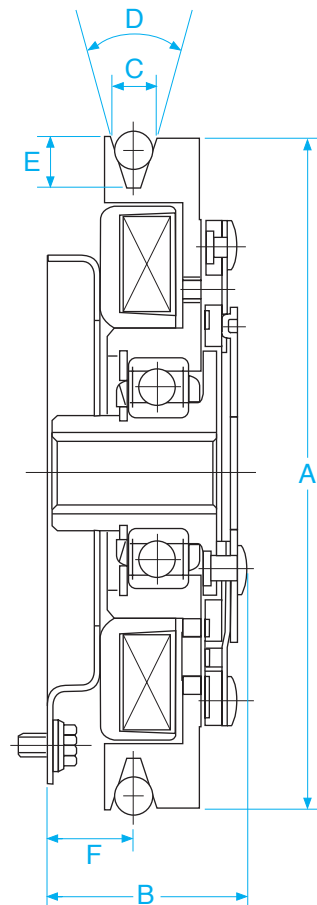
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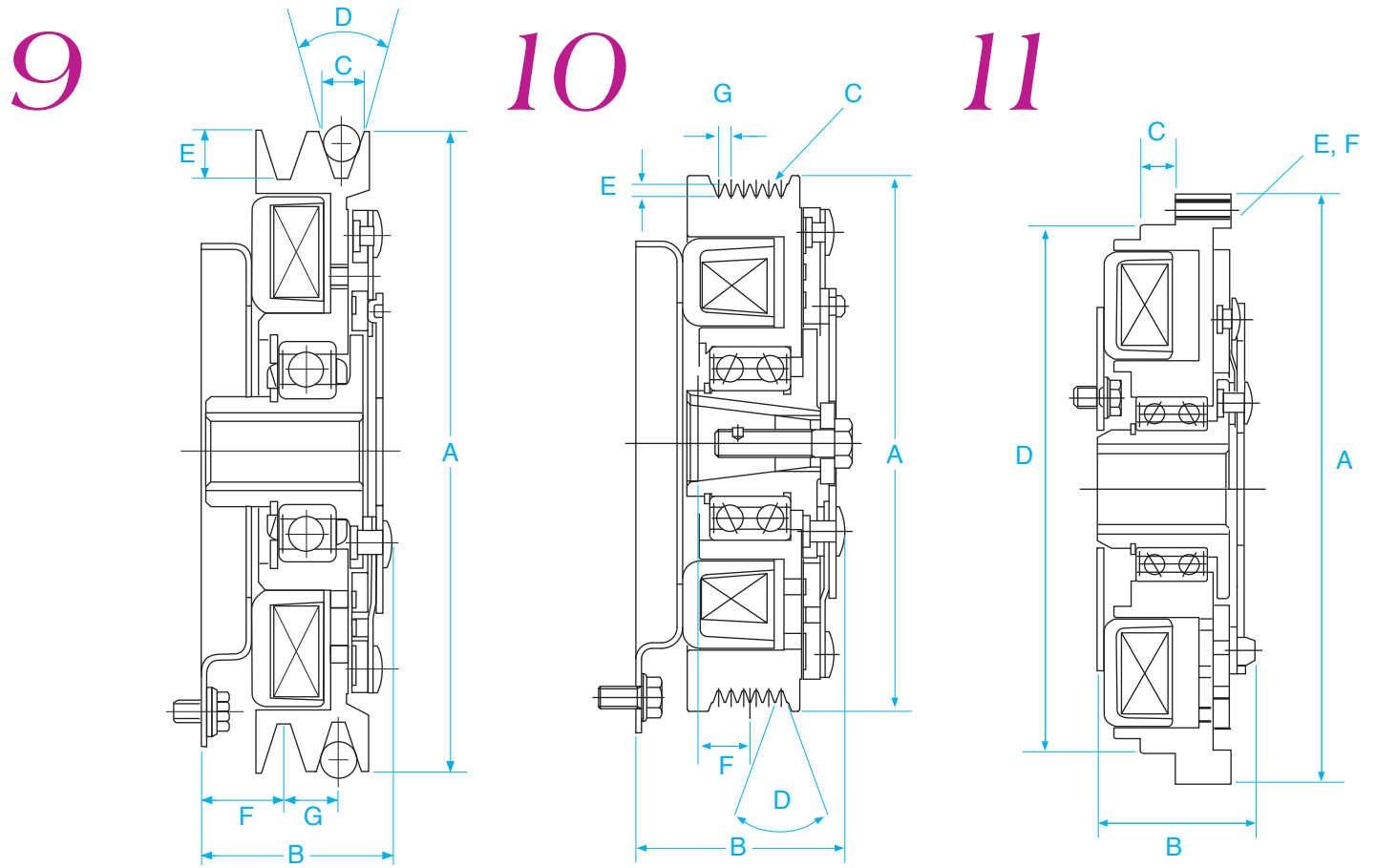
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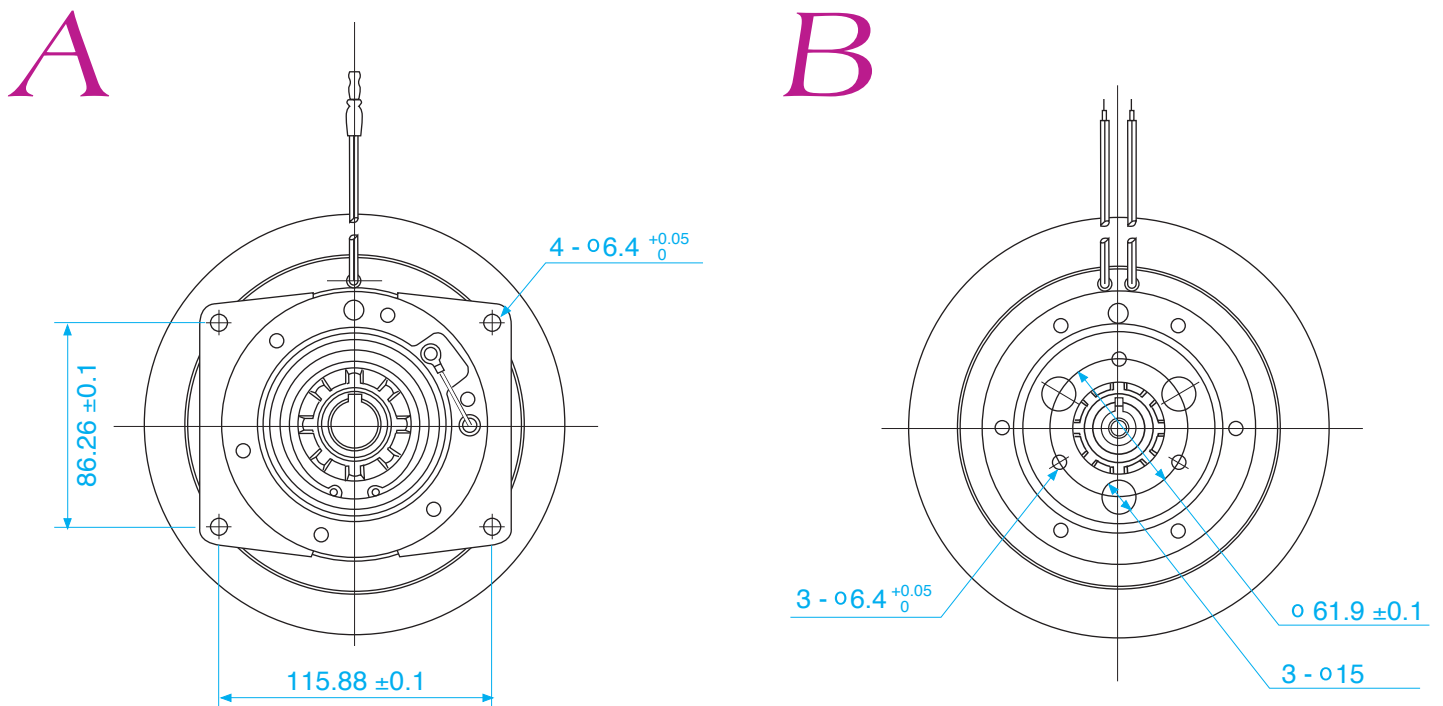
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Ogura Mobile Clutch Types



Mobile Clutch Field Types



Mobile Clutch Dimensions (in inches, except as noted)

OGURA PART NO.	STATIC TORQUE (lb. ft.)	CLUTCH TYPE	FIELD TYPE	BORE SIZE	KEY WAY	VOLTAGE & WATT (V/W)	A pulley diameter	B clutch width	C groove width	D angle degrees	E groove height	F groove to gauge	G groove to groove	WEIGHT (lbs)
521792	58	4	A	5/8"	3/16x3/32	12/45	5.00	2.56	0.50	36	0.52	1.01	0.62	6
503272	58	1	A	*Taper	.16x.11(w)	12/46	5.00	2.44	0.50	36	0.52	0.192	0.62	6
512368	75	7	B	16.5mm	5mmx2.3mm	12/44	7.00	1.81	0.50	36	0.54	0.949	-	9
520886	75	8	A	16.5mm	5mmx2.3mm	12/44	7.00	2.05	0.50	36	0.56	0.868	-	9
520888	75	9	A	16.5mm	5mmx2.3mm	12/44	7.00	2.05	0.50	36	0.56	0.868	0.62	9
520887	75	8	A	20mm	6mmx2.8mm	12/44	7.00	2.05	0.50	36	0.56	0.868	-	9
520889	75	9	A	20mm	6mmx2.8mm	12/44	7.00	2.05	0.50	36	0.56	0.868	0.62	9
**522850	75	9	A	24mm	8mmx4.3mm	12/47	7.00	2.09	0.50	36	0.54	0.675	0.62	9
521491	75	5	A	24mm	8mmx4.3mm	12/47	7.00	2.03	0.50	36	0.54	0.868	-	9
502286	75	4	A	5/8"	3/16x3/32	12/40	6.00	2.35	0.50	36	0.52	0.311	0.62	7
517166	75	4	A	3/4"	3/16x3/32	12/40	6.00	2.35	0.50	36	0.52	0.311	0.62	7
513297	75	5	A	3/4"	3/16x3/32	12/44	7.00	2.08	0.50	36	0.56	0.868	-	8
332639	75	1	A	*Taper	.16x.11(w)	12/40	6.00	2.35	0.50	36	0.52	0.192	0.62	7
526531	75	10	A	*Taper	.16x.11(w)	12/48	6.00	2.48	K-6	40	0.12	0.483	0.14	9
502001	75	7	B	*Taper	.16x.11(w)	12/43.3	7.00	1.79	0.61	35	0.56	0.502	-	9
501999	75	3	B	*Taper	.16x.11(w)	12/43.3	7.00	1.79	0.50	36	0.54	0.181	0.62	11
332334	75	2	A	*Taper	.16x.11(w)	12/40	7.00	2.08	0.50	36	0.56	0.192	0.62	8
520441	75	3	B	*Taper	.16x.11(w)	12/44	7.37	1.79	0.50	36	0.56	0.192	0.62	11
511645	90	4	A	3/4"	3/16x3/32	12/47	6.00	2.35	0.50	36	0.52	0.311	0.62	7
515376	90	10	A	*Taper	.16x.11(w)	12/47	5.47	2.31	K-8	40	0.124	0.440	0.14	8
526299	90	10	A	*Taper	.16x.11(w)	12/47	5.91	2.32	K-8	40	0.12	0.574	0.14	9
520226	90	10	A	*Taper	.16x.11(w)	12/47	6.00	2.36	K-6	40	0.124	0.580	0.14	9
512010	90	1	A	*Taper	.16x.11(w)	12/47	6.00	2.35	0.50	36	0.52	0.192	0.62	7
517162	95	6	A	3/4"	3/16x3/32	12/47	7.00	2.08	0.50	36	0.56	0.328	0.62	8
512606	95	2	A	*Taper	.16x.11(w)	12/47	7.00	2.08	0.50	36	0.56	0.192	0.62	8
509191	100	3	B	*Taper	3/16x3/32	12/60	7.37	2.30	0.50	36	0.56	0.192	0.62	11
523543	175	11	B	24mm	8mmx4.3mm	12/50	7.81	2.09	0.47	7.0	7.41	6x1/4-20UNC	-	15
509190	175	***11	B	*Taper	.16 x .11(w)	12/50	7.82	2.06	0.47	7.0	7.41	6x1/4-20UNC	-	15

* Taper is standard automotive 1" : 4" ratio. Gauge line diameter is .841". Weight is approximate.

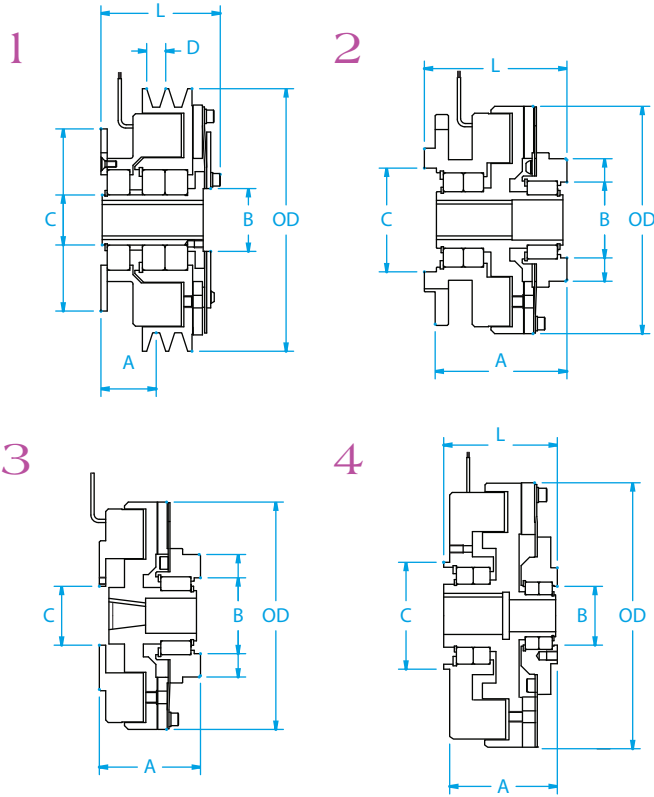
** Same as type 9 but has two setscrews (one over the key, one at 90°) and a double ball bearing.

*** Tapered bore drawing not shown.

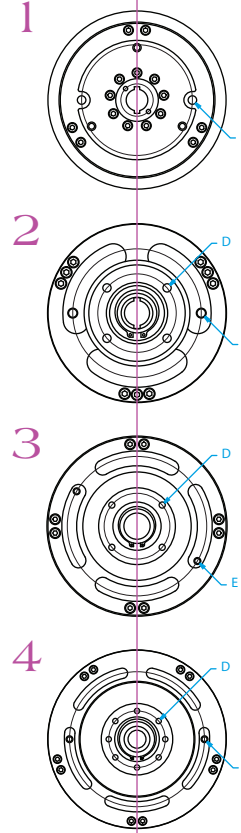
Ogura has many other modified standards available. Contact us if the above clutches do not meet your design requirements.

V Heavy Duty Mobile Clutches

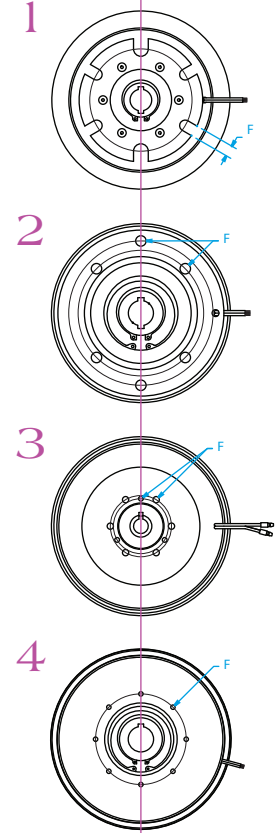
OGURA Clutch Types



Clutch Hub Types



Clutch Field Types



OGURA PART NO.	Static Torque (ft-lbs)	Clutch Type	Hub Type	Field Type	Bore ID (in)	Keyway (in)	Voltage & Watage [V/W]*	OD [OD]	Overall Length [L]	Alignment [A]	Hub Side Pilot [B]	Flange Side Pilot [C]	Hub Mount / Groove Width & [D]	Hub Bolt	I/O Lockup Bolts [E]	Field Mount [F]	Field Bolt PCD
80001708	200	1	1	1	1	1/4 (x2)	12/66	8.230"	3.740"	1.73"	1.970" ID	1.570" OD 5.710" OD	0.597" / 36°	-	2x3/8-16UNC	2x0.68" slots 4x0.50" slots	4.75"
80001709	200	1	1	1	1	1/4 (x2)	24/66	8.230"	3.740"	1.73"	1.970" ID	1.570" OD 5.710" OD	0.597" / 36°	-	2x3/8-16UNC	2x0.68" slots 4x0.50" slots	4.75"
80002658	200	2	2	1	1	1/4 (x2)	12/66	7.125"	4-15/32"	4.13"	2.375" ID 3.840" OD	3.250" ID	4x3/8-24UNFx1/2	3.125"	2x3/8-16UNC	6x7/16" slots	4.75"
80002712	200	2	2	2	1	1/4 (x2)	12/66	7.125"	4-15/32"	4.11"	2.375" ID 3.840" OD	4.000" ID	4x3/8-24UNFx1/2	3.125"	2x3/8-16UNC	6x1/2-13UNC-2B	5.00" 5.75"
80004270	200	2	2	2	spline	-	12/66	7.125"	4-15/32"	4.11"	2.375" ID 3.840" OD	4.000" ID	4x3/8-24UNFx1/2	3.125"	2x3/8-16UNC	6x1/2-13UNC-2B	5.00" 5.75"
80004265	200	3	2	3	taper	5/32	12/66	7.125"	3.17"	3.17"	2.375" ID 3.840" OD	1.845" ID	4x3/8-24UNFx9/16	3.125"	2x3/8-16UNC	3x0.190" holes 6x0.250" holes	2.188" 2.437"
80002309	400	4	3	4	1.75	3/8	12/68	10.28"	4.66"	4.38"	2.750" ID	5.000" OD	4x7/16-20UNFx1/2	3.75"	2x3/8-16UNC	8x3/8-16UNCx5/8	6.25"
80002310	400	4	3	4	1.75	3/8	12/68	10.28"	4.66"	4.38"	2.750" ID	5.000" OD	4x7/16-20UNFx1/2	3.75"	2x3/8-16UNC	8x3/8-16UNCx5/8	6.25"
80004243	400	4	3	4	spline	-	12/68	10.28"	4.66"	4.38"	2.750" ID	5.000" OD	4x7/16-20UNFx1/2	3.75"	2x3/8-16UNC	8x3/8-16UNCx5/8	6.25"
80004231	400	4	3	4	1.25	5/16	12/68	10.28"	4.66"	4.38"	2.750" ID	5.000" OD	4x7/16-20UNFx1/2	3.75"	2x3/8-16UNC	8x3/8-16UNCx5/8	6.25"
80002327	1000	4	3	4	1.75	3/8	12/100	12.44"	5.31"	5.03"	2.750" ID	5.000" OD	4x7/16-20UNFx1/2	3.75"	2x3/8-16UNC	8x3/8-16UNCx5/8	6.25"
80002328	1000	4	3	4	1.75	3/8	12/100	12.44"	5.31"	5.03"	2.750" ID	5.000" OD	4x7/16-20UNFx1/2	3.75"	2x3/8-16UNC	8x3/8-16UNCx5/8	6.25"
80002332	1000	4	3	4	spline	-	12/100	12.44"	5.31"	5.03"	2.750" ID	5.000" OD	4x7/16-20UNFx1/2	3.75"	2x3/8-16UNC	8x3/8-16UNCx5/8	6.25"
80002333	1000	4	3	4	1.25	5/16	12/100	12.44"	5.31"	5.03"	2.750" ID	5.000" OD	4x7/16-20UNFx1/2	3.75"	2x3/8-16UNC	8x3/8-16UNCx5/8	6.25"
80004213	1500	4	4	4	spline	-	12/170	15.00"	5-13/16 "	5.53"	3.750" ID 6.000" OD	6.000" OD	8x1/2-20UNFx1.0	4.75"	2x3/8-16UNC	8x7/16-14-2Bx1.0	7.125"

* 24 volt coils are also available.

Installation

For A Two Piece Mobile Clutch

This installation assumes the most common form of mounting which is the clutch mounted to the pump. The pump type can be hydraulic, vacuum, water or a compressor. These mobile clutches consist of two assemblies: the field assembly ⑥ and the rotor ④/armature ③ assembly. Installation assumes that the clutch will be mounted to a mounting bracket for a pump or directly to the pump face.

Step 1: Attach the field (coil) ⑥ to the mounting bracket (customer supplied) or pump face. Use the four 1/4" x 20 cap screws ⑤ supplied. Tighten to 8lb. ft. per screw, taking care not to strip the heads. The flange should be square with the shaft of the pump within .003" TIR at a 6" diameter.

Step 2: Install the key (customer supplied) into the pump shaft keyway.

Step 3A: If taper bore or there are set screws on the clutch hub, skip to (3B). For a straight bore you first need to establish a clearance between the rotor and the field. A proper clearance of .695" +/- .010" is required between the end of the rotor hub (this assumes a standard hub) and the field mounting surface. Some models with straight bores have the hub aligned with the face of the mounting flange. In this case, no clearance is required. A step in the shaft or a spacer will be required to set this proper distance.

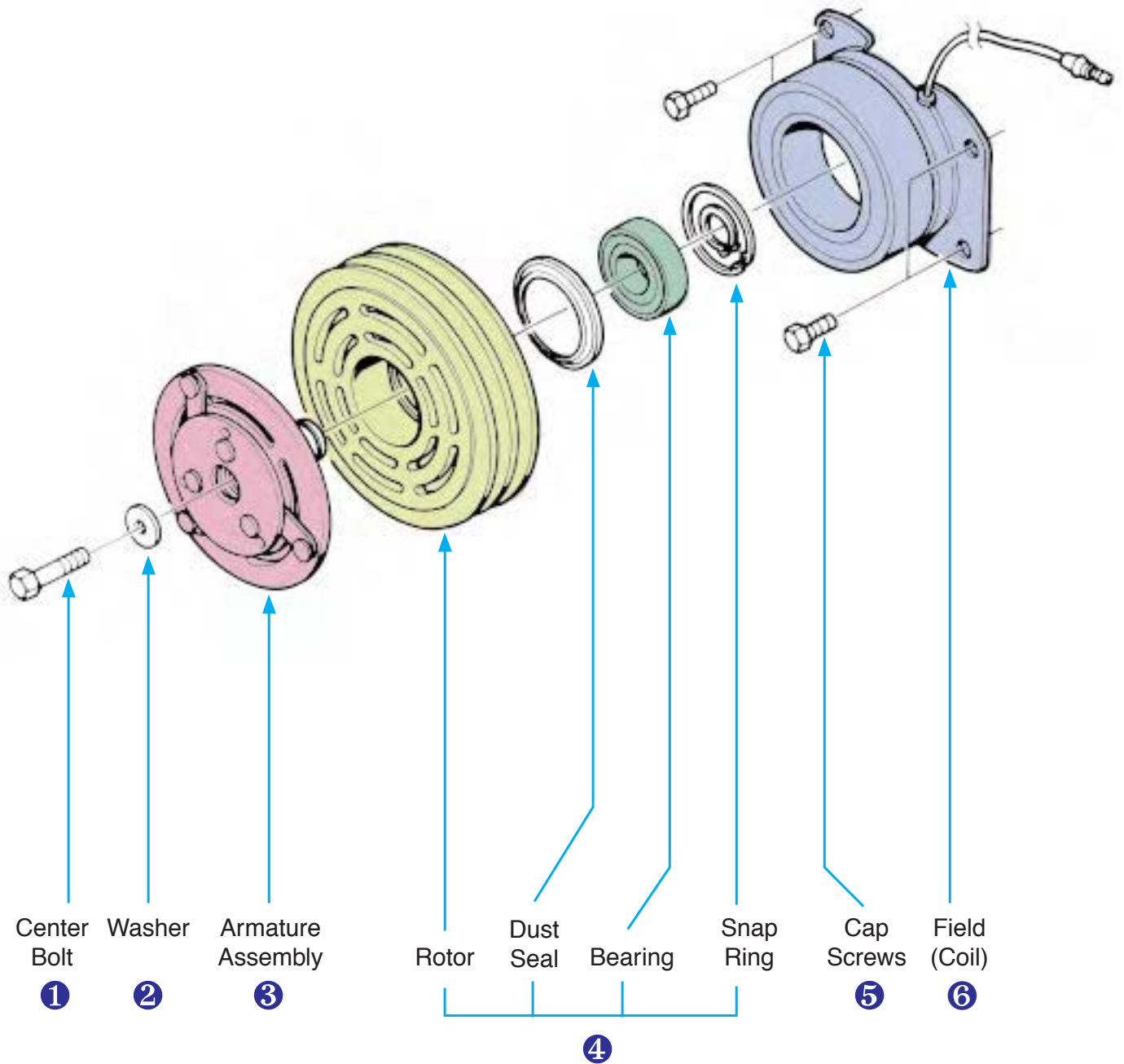
Step 3B: Slide the rotor ④ /armature ③ assembly onto the shaft and key, taking care to properly align both the shaft and hub keyways.

Step 4: Install and securely tighten the rotor with the center bolt ① and washer ② supplied with most models (Recommended torque: 20-30 ft. lbs.) (If clutch has a straight bore with set screws, access set screws through the slot in the back of the field. Push rotor assembly all the way on until it contacts the step in the shaft. If there is no step in the shaft, slide the rotor on until it contacts the field and then back off the rotor assembly approximately 0.1" and tighten down the two set screws.) After installing and tightening the center bolt, turn the pulley by hand to make sure there is no rubbing between the pulley portion and the field (coil). If contact is noticed, refer to Noisy Clutch section in the Troubleshooting Section.

Step 5: Connect the lead wire to the electric circuit. If clutch coil has diode, (only possible on two wire field) check lead wire polarity. In single wire coils, the field is grounded at the factory; if there is not a good ground returned through the field support, it is a good practice to attach a wire from the ground terminal on the field to the equipment to provide a sure ground. (Possible interference with proper grounding is a painted surface in the connection, possibly between the clutch and the bracket and/or the bracket and the engine.)

Step 6: Engage and disengage the clutch several times to ensure it is functioning properly. If full torque will be required from the pump immediately, the pump should be properly burnished. (Burnishing involves cycling the clutch at a reduced speed not more than 4 times per minute so the surfaces can mate together. In most applications, 20-50 cycles are required for burnishing.)

Ogura Mobile Clutch Components



Troubleshooting Guide

CLUTCH WILL NOT DISENGAGE

Potential Problem	Possible Reasons	Fix
Voltage not releasing.	Faulty switch.	Replace switch.
Rotor and armature locked together.	The clutch has been severely galled and has locked up. (Galling is the condition whereby a piece of metal is trapped between the armature and the rotor and melts due to high pressure and heat, spot welding the surfaces together.)	If rotor and armature cannot be separated, replace the clutch. If they do separate, follow burnishing procedure.
Pulley bearing locked.	Bearing lost grease due to seal problem, temperature or water contamination.	Replace clutch.
▲ Brake plate clamped down too tightly.	If the brake nuts are screwed down too tight, the armature will be pressed against the rotor all the time. This should be evident by discoloration of the brake plate. If the unit ran long enough, the brake plate and the clutch would be destroyed.	Loosen brake nuts and reset air gap according to recommendations. If clutch is destroyed, replace clutch.

CLUTCH WILL NOT ENGAGE

Potential Problem	Possible Reasons	Fix
No voltage going to the clutch.	Wiring connector not seated properly.	Pull apart and re-seat connector.
	No voltage or low voltage coming from the battery.	Check with voltmeter, battery should be 8-16 volts. (Assuming 12 volt battery.)
	Defective charging system.	Fix charging system.
	Lead wire cut or broken internally.	Fix or replace lead wire. If destroyed, replace clutch.
	Fuse blown.	Replace fuse.
	Defective switch operating clutch.	Replace the switch.

Troubleshooting Guide

CLUTCH WILL NOT ENGAGE (continued)

Potential Problem	Possible Reasons	Fix
If voltage is going to the clutch, but the clutch will still not engage.	Coil open or shorted.	Check coil with ohmmeter. A range close to 3 to 4 ohms should be present at an ambient coil temperature of 70°F. Replace coil.
	Check coil voltage to make sure it is compatible with the voltage coming in. (If voltage is too high, this could cause the coil to burn out.)	Change battery or coil to meet your requirement.
	Burnt out coil caused by frictional contact (flange mounted clutches, rotor strike). If so, coil will be discolored, can be cracked, burnt or epoxy can be melted.	Replace coil.
	■ Rotor/armature air gap too large.	If straight bore, air gap can be readjusted. If unit has set screws, bottom out armature hub against field then back off to .1" and retighten set screws. If spacer on straight bore, reduce width of the spacer. If taper bore clutch, tap on armature cover to close gap.
	▲ Rotor/armature air gap too large.	Re-adjust according to air gap adjustment procedure.
Clutch engages, but load will not engage.	Rivets or springs broken.	Replace clutch.
	Key missing.	Put in key.
	Armature could be warped because of heat due to slippage. This means it will pull in, but will slip when a load is supplied. Clutch should show signs of heat.	Replace clutch and determine why it slipped.

▲ PTO Clutch/Brakes Only

■ Mobile Clutches Only

Troubleshooting Guide

CLUTCH SLIPS

Potential Problem	Possible Reasons	Fix
Low voltage going into the clutch.	Defective battery.	Replace battery
	Lead wire cut which could be intermittently grounding out the lead wire causing the clutch to turn on and off or not to give full voltage.	Fix or replace lead wire.
Erratic engagement.	If lead wire is kinked or pinched and the break is internal, the clutch operation may show up as being erratic engagement.	Fix or replace lead wire.
Clutch is contaminated.	Oil or other lubricant has been sprayed on the clutch surface. Sometimes this shows up after the clutch is disassembled. Physical evidence is either burnt oil or a greasy metallic surface showing oil still present.	Clean off surfaces with solvent and reburnish. Replace the clutch if damage is severe enough.
Clutch overloaded.	Output torque required is greater than what the clutch can handle. If input torque going into clutch is greater than the output torque required, the clutch will slip. If it slips too long, the clutch surfaces will be galled.	Size clutch correctly for the application. Replace clutch.
Output stalled.	If output is stalled, clutch could slip to the point where it will burn up and destroy either bearings or the field.	Replace clutch.
Clutch not burnished.	If full torque is required immediately and clutch is not burnished, it will slip and could become galled.	Try to reburnish clutch. If slipping is to severe, clutch will have to be replaced.

NOISY CLUTCH

Potential Problem	Possible Reasons	Fix
If clutch is able to move on the shaft:	Check center bolt and washer to make sure it is tight. If it is tight, make sure that the shaft is not too long. Clutch shaft should end before the end of the clutch to allow some deflection in the center bolt and washer to keep clutch on tightly.	Retighten center bolt or change spacer or shaft length

Troubleshooting Guide

NOISY CLUTCH (continued)

Potential Problem	Possible Reasons	Fix
Noise from pulley bearing.	Check if bearing feels rough. Check belt load to make sure pulley and bearings are not over loaded.	Reduce belt load.
	High temperature can be caused by either operating environment or due to slippage. If slippage, clutch should be discolored. Refer to slippage section for potential reasons.	Reduce the heat or eliminate slippage.
<p>Pinging or scraping noise noticed when clutch is disengaged</p> <p>■ Noise is evident when the clutch is first installed and rotated by hand.</p>	Air gap too close.	Increase air gap.
	Surface is heavily galled.	Re-burnish the clutch.
	Possible causes are bolts in field not tightened down properly.	Tighten bolts.
	Key in keyway not seated properly. This could cause it to cock to one side.	Remove rotor assembly and reseal keyway.
	Lead wire pinched between mounting face and field bracket cocking field assembly.	Loosen the bolts, remove wire and retighten field mounting bolts.
	If set screw version, this could be because of improper air gap between pulley/armature and field.	Loosen set screw, push together, then back off .1", and retighten setscrew.
	Mounting face not concentric with the shaft.	Re-machine mounting holes or switch mounting face (by switching you will be able to verify if mounting holes on the clutch are the problem or the mounting holes on the face are the problem.)
<p>■ Mounting bracket has come loose from back of field assembly.</p>	Check to see if projection welds are broken. If they are, check to see if rotor strike has occurred. Possible misalignment in combination of belt side load has broken projection welds.	Replace the clutch.

■ Mobile Clutches Only

Troubleshooting Guide

NOISY CLUTCH (continued)

Potential Problem	Possible Reasons	Fix
Noise from field bearing (Noisy field bearing has failed or is about to fail.) In general purpose and PTO brakes	Check to see if the clutch is discolored to see if it shows signs of slippage.	Refer to slippage section.
	Check for damage to both the outer race and inner race of the bearing. Make sure key is not too tight forcing pressure on the inner race. In the outer race area, check for marks or damage that could have caused the clearances to close up.	Replace clutch.
	Check temperature if shaft clutch is mounted on to make sure it is under 300°F.	Reduce reason for the high temperature overloading on the engine.
	Check torque tab or backing plate to make sure that there is freedom of movement of 1/16 of an inch axially and radially. Check to see if any marks are evident that would indicate axial forces applied.	Loosen torque tab to make sure it has freedom of movement both axially and radially.
▲ Pinging or scraping noise noticed when clutch is engaged.	Brake shroud and air gap set too close. This means that the armature is contacting the brake while the clutch is engaged.	Back off the air gap to the higher end of the air gap range.
▲ Brake plate rattles.	In a heavy vibration application, the pin holding the backing plate can become worn because of vibration opening up clearance. This can then generate noise because of the additional movement in the braking plate.	Change the method of securing the clutch to allow for a greater surface area of contact so force is more spread out and less wear takes place.

▲ PTO Clutch/Brakes Only

Formulas to Determine Selection

The following formulas will help you arrive at the required torque for your application. Most mobile clutches accelerate in .2 seconds. Please use this as the time required in section #3.

1) How to calculate torque when horsepower and speed are known

$$\text{torque ft lb} = \frac{5252 \times \text{horsepower} \times \text{service factor}}{\text{speed}}$$

$$T = \frac{5252 \times \text{hp} \times k}{n}$$

2) Inertia - How to determine inertia when material and shape are known.

(Total system inertia is total inertia of all the components. If the components are not simple shafts or flanges, break down each of the components into its basic shape and calculate inertia of that individual component. When inertia is being calculated in relation to the clutch or brake, remember to adjust for reflected inertia amounts which may have a significant increase or decrease on the inertia that the clutch has to handle based upon a speed differential.

(Inertia constants lb. in.³)

(aluminum) = 0.924

(bronze) = 0.321

(cast iron) = 0.26

(steel) = 0.282

Values

$wk^2 = \text{lb. ft.}^2$

D, D_o, D_i, L = in.

Formula to determine inertia of a solid shaft

$$wk^2 = .000681 \times p \times \text{Length} \times \text{Diameter}^4$$

$$wk^2 = .000681 \times p \times L \times D^4$$

Formula to determine inertia of a hollow shaft

$$wk^2 = .000681 \times p \times \text{length} \times (\text{outer diameter}^4 - \text{inner diameter}^4)$$

$$wk^2 = .000681 \times P \times L \times (D_o^4 - D_i^4)$$

Reflected inertia via gears, chain or belt

reflected inertia = load inertia divided by the square of the speed ratio

$$wk^2_R = \frac{wk^2_L}{r^2}$$

3) How to calculate the amount of torque required to accelerate or decelerate a load when inertia value is known (t = time to speed or time to stop depending if you are using a clutch or a brake.)

$$\text{torque ft lb} = \frac{(\text{inertia} \times \text{the change in rpm})}{308 \times \text{the time required}}$$

$$T = \frac{wk^2 \times \text{rpm}}{308t}$$

Mobile Application Data Fax Sheet

Date: _____

TO: Ogura Industrial Corp. 400 Cottontail Lane P.O. Box 5790 Somerset, NJ 08875-5790 Phone: (732) 271-7361 Fax: (732) 271-7580 E-mail: info@ogura-clutch.com Web: http://ogura-clutch.com	FROM: _____ _____ _____ _____ _____ _____
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The answers to the following questions will help us suggest a clutch for your application using our standard products customized to fit your exact needs.

This application is for: Cost estimating only
 Current production requirement
 New product requirement

Application Type: Pump (hydraulic or water/vacuum) PTO clutch/brake for mower
 Other _____

Application Description: _____

Clutch Mounted On: Pump shaft Engine shaft Other

Torque required from clutch _____ Clutch to handle _____ horsepower

Shaft Diameter: Taper _____ Straight _____

Engagement speed of the clutch _____ **Running speed of the clutch** _____

Clutch pulley rotation (from the pulley side): Clockwise Counterclockwise

Inertia required for clutch to accelerate: _____

If you do not know inertia, please refer to web site: <http://ogura-clutch.com>

Life: Target cycle life _____ Target hours of life _____

Pulley required: Number of grooves _____, pitch diameter _____ belt type _____

What is the estimated annual quantity _____, cost target _____ ?
(This is important to determine if a "special" is possible based upon your quantity).

When do you require your first prototype _____? How many do you require _____?

When does production begin _____?

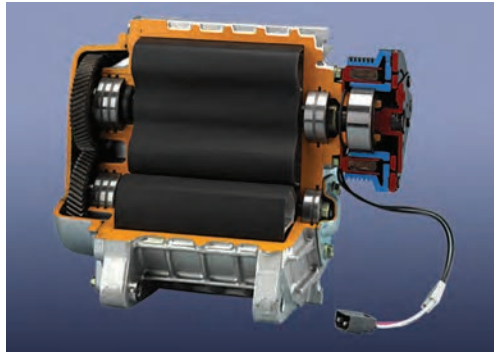
Mobile Clutches

OGURA WARRANTY

Products are warranted against defects in material and workmanship for a period of 12 months from date of shipment, when applied in proper applications within specified ratings. This warranty covers repair or replacement, F.O.B. Somerset, New Jersey. There is no further warranty or implied representation as to any product. The company shall not be liable for any consequential damage caused by improper application or installation of its product.



Other Products Available From Ogura



1 ▶



◀ 2



3 ▼



◀ 4

5 ▼



6 ▼



- 1 **Ogura Supercharger:** For increased gas and diesel horsepower and performance and decreased engine emissions.
- 2 **Spring Applied Brakes:** Used to stop or to hold an electric motor from rotating when there is no electrical power applied.
- 3 **Tooth Clutches:** Deliver high torque in a small diameter.
- 4 **Multi Disk:** Deliver a high torque in a small diameter and can engage and disengage while rotating (used in multispeed gearboxes).
- 5 **Marine:** Heavy duty, compact marine clutches require minimal space while providing high torque.
- 6 **Industrial:** Ogura manufactures a wide variety of friction, magnetic particle and hysteresis clutches for a variety of industrial and office automation applications.



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