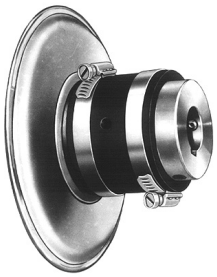
No. 5C and 5D Flexidyne® Couplings and Drives
Instruction Manual

These instructions must be read thoroughly before installation or operation. This instruction manual was accurate at the time of printing. Please see **dodgeindustrial.com** for updated instruction manuals.

WARNING: To ensure the drive is not unexpectedly started, turn off and lock-out or tag power source before proceeding. Failure to observe these precautions could result in bodily injury.



DESCRIPTION

Flexidyne dry fluid couplings and drives are a unique concept to provide soft start and momentary overload protection for all types of driven equipment. Standard NEMA-B motors with rpm base speeds of 1750, 1160 or 860 rpm are commonly used with a Flexidyne unit.

The dry “fluid” in the Flexidyne unit is heat treated steel shot. A measured amount, referred to as flow charge, is added into a housing which has been keyed to the motor shaft. When the motor is started, centrifugal force throws the flow charge to the perimeter of the housing, packing it between the housing and the rotor which in turn transmits power to the load.

After the starting period of slippage between housing and rotor the two become locked together and achieve motor full load speed, operating without slip and with 100% efficiency.

WARNING: Because of the possible danger to person(s) or property from accidents which may result from the improper use of products, it is important that correct procedures be followed. Products must be used in accordance with the engineering information specified in the catalog. Proper installation, maintenance and operation procedures must be observed. The instructions in the instruction manuals must be followed. Inspections should be made as necessary to assure safe operation under prevailing conditions. Proper guards and other suitable safety devices or procedures as may be desirable or as may be specified in safety codes should be provided, and are neither provided by Dodge® nor are the responsibility of Dodge. This unit and its associated equipment must be installed, adjusted and maintained by qualified personnel who are familiar with the construction and operation of all equipment in the system and the potential hazards involved. When risk to persons or property may be involved, a holding device must be an integral part of the driven equipment beyond the speed reducer output shaft.

WARNING: All products over 25 kg (55 lbs) are noted on the shipping package. Proper lifting practices are required for these products.

Consequently, the motor accelerates instantly to base speed, while the load starts gradually and smoothly.

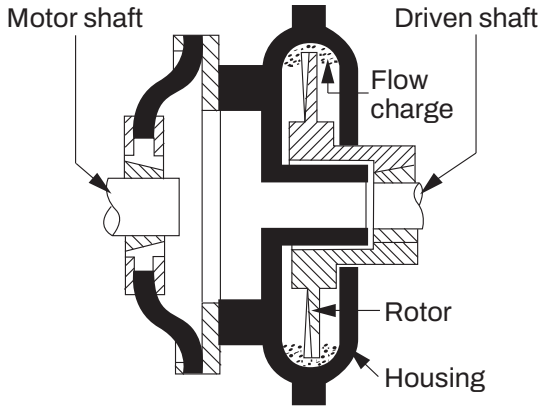


Figure 1 - Housing Cross Section

INSTALLATION

FLEXIDYNE DRIVE

Stake motor shaft key in place and slide Flexidyne Drive onto the motor shaft with the collar as close to the motor as possible. Tighten key set screw securely against motor shaft key. Tighten shaft set screw securely against motor shaft.

Note that drive hub housing must be installed on motor shaft (or on other installations must be the first part of the Flexidyne unit to receive power from the power source) to permit proper operation of the Flexidyne unit.

FLEXIDYNE COUPLING

Stake motor shaft key in place and slide large end of coupling onto motor shaft as close to motor as possible. Note that large end of coupling must be on motor shaft (or on other Installations must be the first part of the Flexidyne unit to receive power from the power source) to permit the Flexidyne unit to operate. Rotate the flexible rubber element until setscrew is visible in access hole. Tighten setscrew securely. It is important that the setscrew bottoms on the key. In a similar manner locate and tighten second setscrew on shaft.

Install driven hub on shaft to be driven. Tighten the two setscrews in this hub. Locate and align motor and driven machine, spacing hubs 5/32 apart.

The clamp located at the large end of the coupling around the rubber element was tightened at the factory. Locate other clamp flush with the end of the rubber element. In order to provide proper balance, position the clamp tightening screws so that they are on opposite sides (180° apart) of rubber element. Tighten clamp screw snugly.

START-UP

1. Remove one of the filler plugs and install the proper amount of flow charge specified in Table 1. Replace and tighten filler plug, making sure that no flow charge is trapped in the threads. Tighten filler plug to the recommended torque of 35 inch-lbs.
2. Attach AC ammeter (conventional clamp-on or equivalent) to one line of the AC motor. Set range to cover 200% of motor nameplate current.
3. Note the maximum allowable acceleration time for Flexidyne unit as stated in Tables 1 and 2.

   Note: Table lists starting time capacity for starting cycles occurring more than once every 2 hours.

4. Turn on power.
5. Push start button. Observe motor current during load acceleration and number of seconds required to reach full speed (Fig. 2).

Increase amount of flow charge if:

A. Acceleration time reaches maximum allowable before load is up to speed. Turn off power immediately if this time is reached.
B. Acceleration amperage is below motor nameplate.

Decrease amount of flow charge if:

A. Acceleration time is less than 1½ seconds.
B. Acceleration amperage is above 200% of motor nameplate.

The amount of flow charge in the Flexidyne unit determines the acceleration time for a given load. Longer acceleration times will occur when less flow charge is used and faster acceleration, from stop to full speed, will be observed with greater amounts of flow charge.

CAUTION: The Flexidyne rotor must slip during acceleration to allow flow charge to become evenly distributed in the Flexidyne housing. Therefore, do not allow Flexidyne mechanism to run "free" (that is, without a load on the driven end), otherwise an out-of-balance condition may result, damaging mechanism.

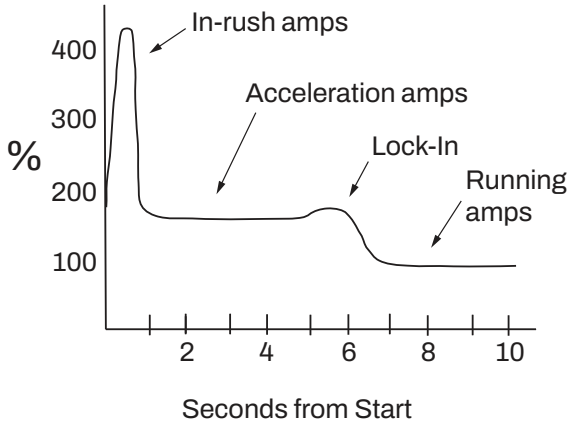


Figure 2 - Flow Charge Ratio

OPERATION

The Flexidyne unit should start the load smoothly and without delay provided the proper amount of flow charge has been used. Should the acceleration time exceed the maximum allowable in Table 2, shut off power to the Flexidyne unit immediately. Allow the Flexidyne unit to cool, then add small amounts of flow charge until proper acceleration is observed.

Vibration is an indication of accelerating too rapidly and not allowing flow charge to become evenly distributed in the Flexidyne housing. This can be corrected by removing small amounts of flow charge until vibration subsides. Other causes of vibration are, undersize shafting, unit not installed far enough on shaft or worn bore in the unit.

Slippage—The Flexidyne unit can, without slipping, transmit overloads up to 130% of its pre-set starting torque. Should this breakaway torque be exceeded the Flexidyne unit will slip and generate heat. Although slippage usually indicates increased loads, it can also be caused by worn flow charge or a worn rotor especially if the Flexidyne unit has been in operation for some time. The necessity to replace flow charge will be made evident by a loss in power transmitting capacity of the Flexidyne unit.

MAINTENANCE

For average industrial applications involving 3 or 4 starts a day of not more than 6 seconds acceleration time each, the flow charge should be changed every 10,000 hours of operation. For more severe conditions, visually inspect flow charge at more frequent intervals; it should be changed when it has deteriorated to a half powder, half granular condition. Visual inspections should continue until enough flow charge changes have been made to adequately establish a schedule for renewing Flexidyne flow charge.

The Flexidyne unit has been lubricated at the factory and no further lubrication is required. Never apply grease, oil or any other foreign material to the flow charge.

THERMAL CAPACITY

Since there is slippage within the flow charge during acceleration, heat is generated from friction. The thermal capacity of the Flexidyne unit is based on balancing this heat generated during acceleration against the cooling time between accelerations. The amount of heat generated is determined by the amount of horsepower dissipated by slipping and the duration of each acceleration. If the flow charge weight is light, the heat generated will not be as great as that which would be generated with a heavier flow charge, when compared at the same acceleration time. A longer time between starts will dissipate more heat; therefore, higher starting horsepowers may be transmitted, or longer acceleration times may be allowable (see Starting Cycle).

Acceleration times shown in Table 1 are for starting frequencies of one start per hour or less. If starting frequency is more than once per hour, use acceleration time for actual starting cycle shown in Table 2.

Acceleration times listed in Tables 1 and 2 are the MAXIMUM permissible for the various starting frequencies listed. The MINIMUM acceleration time required for proper Flexidyne unit operation is 1 to 1½ seconds. This is the time required for the flow charge to be uniformly distributed around the housing cavity before the unit "locks in." Any acceleration time between the minimum and maximum listed is acceptable, although a shorter acceleration time will generally provide longer wear life. For applications requiring a specific acceleration time (within these limits) flow charge may be added or removed to produce the required results.

Stalled — If a jam-up stalls the drive, the motor continues to run and the Flexidyne unit slips. This causes heat to be generated at twice the rate of normal acceleration. Therefore, the allowable slipping time, when stalled, is half the allowable acceleration time given in Table 1.

Grouped Starts — For several starts grouped together followed by uninterrupted running, add the acceleration times of all starts and consider it as the time for one start. The starting cycle would be the time from the beginning of one group of starts to the beginning of the next group.

Starting Cycle is the time from the beginning of one acceleration to the beginning of the next. Allowable acceleration times in Table 2 are based on the assumption that the Flexidyne unit will be running continuously except for a momentary stop before the next start. If the stop is more than momentary, decrease the actual starting cycle by one-half the stopped time before using Table 2; for example, with a 50 minute actual starting cycle of which 20 minutes is stopped time, decrease 50 by half of 20 to give 40 minutes as the starting cycle time to use for Table 2.

Replacement Parts (5C Only)

Description	Quantity	Part Number
Rubber Element	1	305246
Element Clamp	2	42115

Table 1 - Flow Charge Recommendations

1760 RPM NEMA Design B Motors					
Rated Motor HP	% Starting Torque	Starting HP	Flow Charge		Maximum Time In Seconds.
			Lbs.	Oz.	
1/2	100% @ 1760 RPM	.50	0	8	220
	125% @ 1750 RPM	.62	0	9	190
	150% @ 1750 RPM	.75	0	9-1/2	160
	175% @ 1700 RPM	.85	0	10	138
	200% @ 1650 RPM	.94	0	10-1/2	138
3/4	100% @ 1760 RPM	.75	0	9	160
	125% @ 1750 RPM	.94	0	10-1/2	128
	150% @ 1740 RPM	1.1	0	11	116
	175% @ 1700 RPM	1.3	0	1-1/2	104
	200% @ 1650 RPM	1.4	①	①	①

① Selection not available for this exact torque

Table 2 - Thermal Capacity

Starting RPM	Maximum Allowable Acceleration Time in Seconds for Standard Motor Speeds at Various Starting Cycles											
	2 Hours			1 Hour			30 Min.			15 Min.		
	870	1160	1750	870	1160	1750	870	1160	1750	870	1160	1750
.3	.....	.....	330	.....	.....	330	.....	.....	330	.....	.....	330
.5	.....	.....	220	.....	.....	220	.....	.....	220	.....	.....	220
.7	.....	.....	170	.....	.....	170	.....	.....	170	.....	.....	170
.9	.....	.....	128	.....	.....	128	.....	.....	128	.....	.....	128
1.1	.....	.....	116	.....	.....	116	.....	.....	116	.....	.....	116
1.3	.....	.....	104	.....	.....	104	.....	.....	104	.....	.....	104
	10 Min.			5 Min.			2 Min.			1 Min.		
	870	1160	1750	870	1160	1750	870	1160	1750	870	1160	1750
.3	.....	.....	300	.....	.....	170	.....	.....	70	.....	.....	34
.5	.....	.....	200	.....	.....	116	.....	.....	47	.....	.....	23
.7	.....	.....	150	.....	.....	88	.....	.....	35	.....	.....	18
.9	.....	.....	116	.....	.....	66	.....	.....	27	.....	.....	14
1.1	.....	.....	105	.....	.....	62	.....	.....	25	.....	.....	12
1.3	.....	.....	94	.....	.....	55	.....	.....	22	.....	.....	11

Flexidyne Mechanism Trouble Analysis		
Symptom	**Cause**	**Cure**
Vibration	1. Misalignment 2. Bent shaft 3. Excess flow charge 4. Fused flow charge 5. Improper installation – Output shaft jammed against housing	1. Realign drive or coupling. 2. Replace or straighten. 3. Remove small amount of flow charge. 4. Correct the overload. Replace flow charge 5. Readjust spacing between shafts and Flexidyne unit.
Erratic Acceleration	1. Breakdown of flow charge 2. Caked flow charge	1. Replace flow charge. 2. Moist environment – use stainless flow charge.
Flexidyne unit doesn't slip	1. Improper installation – Output shaft jammed against housing 2. Flow charge in bearings – causing bearing seizure	1. Readjust spacing between shafts and Flexidyne housing. 2. Replace Flexidyne unit.
Excessive Slippage	1. Not enough flow charge 2. Overload 3. Worn flow charge	1. Add flow charge. 2. Relieve overload 3. Replace flow charge.
Poor or short flow charge life	1. Excessive slip at start up 2. Excessive inching or jogging of machine	1. Add flow charge to reduce starting time. 2. Install time delay in motor control circuit.

Flexidyne Mechanism Flow Charge Analysis	
Condition	**Cause**
1. Red oxide color, granular consistency	1. Normal after some usage.
2. Red oxide color, powdery consistency, possibly with powdery flakes	2. Worn-out, can cause Flexidyne unit damage.
3. Black, powdery	3. Rotor worn, excessive slip and heat.
4. Red oxide, powdery and chunky	4. Worn-out and moisture present.
5. Clumping of flow charge	5. Moisture present, use stainless flow charge.

Dodge Industrial, Inc.
1061 Holland Road
Simpsonville, SC 29681
+1 864 297 4800

4030-0224

MN4030 REV-A 02/24