Instruction Manual for 70C, 70D 75C and 75D FLEXIDYNE® Couplings and Drives

These instructions must be read thoroughly before installing or operating this product.

DESCRIPTION

FLEXIDYNE dry fluid couplings and drives are unique concepts to provide soft start and momentary overload protection for all types of driven equipment. Standard EMAB motors with RPM base speeds of 1750, 1160 or 860 are commonly used with a FLEXIDYNE coupling or drive, yet other available power sources may be used with the FLEXIDYNE mechanism.

The dry "fluid" in the FLEXIDYNE housing 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, packs 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 full load speed, operating without slip and with 100% efficiency.

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

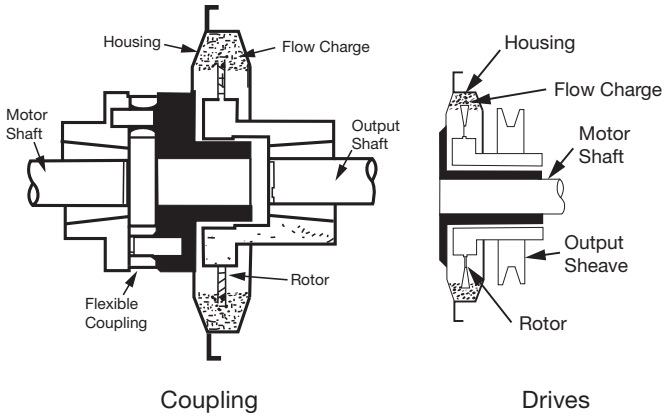


Figure 1 - Housing cross section

INSTALLATION

COUPLINGS:

Install coupling flange on motor shaft and drive housing mechanism on driven shaft in accordance with the instruction manual for the Taper-Lock® bushings.

NOTE: The coupling flange must be mounted on motor shaft (not driven shaft) to allow proper operation of the FLEXIDYNE coupling.

Shaft ends must not protrude beyond bushing ends. Install coupling disc over pins on drive housing mechanism. Position the motor and the driven unit so that the spacer buttons on the coupling disc slightly contact the coupling flange. Reference Dimension A on Parts Replacement Drawing.

(A = 5/8” on size 70C; A = 3/4” on size 75C)

For longest FLEXIDYNE coupling life, it is always desirable to align coupling as accurately as possible at initial installation. Check alignment by laying a straight edge across the coupling flange and drive housing at several points around the circumference.

NOTE: Driven shaft must not touch housing hub.

DRIVES:

Install the FLEXIDYNE special bolt-on sheave on the driven hub. Use screws and lock washers provided with the FLEXIDYNE drive. Torque screws to 160 inch-pounds.

Stake motor shaft key in place and slide FLEXIDYNE drive onto the motor shaft, with 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: The sheave is the output of the FLEXIDYNE drive, do not input power to the FLEXIDYNE drive through the sheave. In other words, do not mount the FLEXIDYNE drive on the driven shaft.

WARNING: Because of the possible danger to persons(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 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 provided, and are neither provided by Baldor Electric Company nor are the responsibility of Baldor Electric Company. This unit and its associated equipment must be installed, adjusted and maintained by 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.

DODGE®

START-UP

1. Remove the filler plug 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 threads. Torque filler plug to 35 inch-pounds.
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 as stated in Tables 1 and 2.

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

4. 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 1-1/2 seconds.
B. Acceleration amperage is above 200% of motor nameplate.

Once satisfactory operation has been obtained, record the following for future reference:

1. The amount of flow charge
2. Starting current
3. Acceleration Time

WARNING: The 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 and attached equipment.

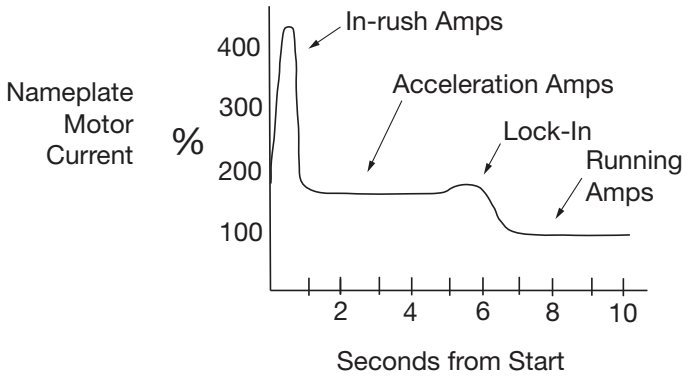


Figure 2 - Typical Motor Current vs. Time

OPERATION

The amount of flow charge in the housing determines the acceleration time for a given load. Slower 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.

The FLEXIDYNE mechanism 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 1, shut off power to the FLEXIDYNE mechanism immediately. Allow the FLEXIDYNE mechanism 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 mechanism can, without slipping, transmit overloads up to 130% of its pre-set starting torque. Should this breakaway torque be exceeded, the FLEXIDYNE mechanism will slip and generate heat (see Overload Protection). Although slippage usually indicates increased loads, it can also be caused by worn flow charge or a worn rotor especially if the FLEXIDYNE mechanism has been in operation for some time. The necessity to replace either a rotor or flow charge will be made evident by a loss in power transmitting capacity of the FLEXIDYNE mechanism.

MAINTENANCE

For average industrial applications involving 3 or 4 starts a day and 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. See page 8 for flow charge analysis. Visual inspections should continue until enough flow charge changes have been made to adequately establish a schedule for renewing FLEXIDYNE flow charge.

The FLEXIDYNE mechanism 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 mechanism 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 mechanism 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 mechanism 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.

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 mechanism 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.

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.

Table 1 - Flow Charge Recommendations

Based on % of Starting Torque for 1760 RPM NEMA Design B Motors													
Rated Motor HP	FLEXIDYNE Mechanism Size	100% @ 1760 RPM				125% @ 1750 RPM				150% @ 1740 RPM			
		Starting HP	Flow Charge		Max Time in Sec.	Starting HP	Flow Charge		Max Time in Sec.	Starting HP	Flow Charge		Max Time in Sec.
			Lbs.	Oz.			Lbs.	Oz.			Lbs.	Oz.	
3	70C, 70D	3.0	1	1	150	3.7	1	13	123	4.5	1	14	105
5	70C, 70D	5.0	1	14	94	6.2	2	1	79	7.5	2	4	67
7-1/2	75C, 75D	7.5	1	11	71	9.4	1	14	60	11.2	2	1	54
10	75C, 75D	10.0	1	15	58	12.5	2	3	53	14.9	2	6	48

Rated Motor HP	FLEXIDYNE Mechanism Size	175% @ 1700 RPM				175% @ 1700 RPM			
		Starting HP	Flow Charge		Max Time in Sec.	Starting HP	Flow Charge		Max Time in Sec.
			Lbs.	Oz.			Lbs.	Oz.	
3	70C, 70D	5.1	2	0	93	5.1	2	0	93
5	70C, 70D	8.5	2	8	60	8.5	2	8	60
7-1/2	75C, 75D	12.7	2	4	52	12.7	2	4	52
10	75C, 75D	17.0	2	9	43	17.0	2	9	43

Based on % of Starting Torque for 1175 RPM NEMA Design B Motors													
Rated Motor HP	FLEXIDYNE Mechanism Size	100% @ 1175 RPM				125% @ 1160 RPM				150% @ 1150 RPM			
		Starting HP	Flow Charge		Max Time in Sec.	Starting HP	Flow Charge		Max Time in Sec.	Starting HP	Flow Charge		Max Time in Sec.
			Lbs.	Oz.			Lbs.	Oz.			Lbs.	Oz.	
1	70C, 70D	1.0	1	10	500	1.2	1	12	400	1.5	1	14	33.
1-1/2	70C, 70D	1.5	1	13	300	1.9	2	1	260	2.2	2	3	210
2	75C, 75D	2.0	1	10	250	2.5	1	13	190	3.0	2	0	150
3	75C, 75D	3.0	1	15	150	3.7	2	3	125	4.5	2	7	100

Rated Motor HP	FLEXIDYNE Mechanism Size	175% @ 1130 RPM				200% @ 1100 RPM			
		Starting HP	Flow Charge		Max Time in Sec.	Starting HP	Flow Charge		Max Time in Sec.
			Lbs.	Oz.			Lbs.	Oz.	
1	70C, 70D	1.7	2	1	290	1.9	2	4	260
1-1/2	70C, 70D	2.5	2	6	190	2.8	2	9	170
2	75C, 75D	3.4	2	2	135	3.8	2	6	120
3	75C, 75D	5.1	2	10	89	5.7	2	12	82

Based on % of Starting Torque for 875 RPM NEMA Design B Motors													
Rated Motor HP	FLEXIDYNE Mechanism Size	100% @ 875 RPM				125% @ 870 RPM				150% @ 850 RPM			
		Starting HP	Flow Charge		Max Time in Sec.	Starting HP	Flow Charge		Max Time in Sec.	Starting HP	Flow Charge		Max Time in Sec.
			Lbs.	Oz.			Lbs.	Oz.			Lbs.	Oz.	
1/2	70C, 70D	.50	1	12	900	.62	1	15	850	.75	2	1	800
3/4	70C, 70D	.75	2	0	800	.94	2	3	570	1.1	2	6	500
1	75C, 75D	1.0	1	13	520	1.2	2	0	400	1.5	2	3	330
1-1/2	75C, 75D	1.5	2	2	330	1.9	2	7	300	2.2	2	10	250

Rated Motor HP	FLEXIDYNE Mechanism Size	175% @ 840 RPM				200% @ 820 RPM			
		Starting HP	Flow Charge		Max Time in Sec.	Starting HP	Flow Charge		Max Time in Sec.
			Lbs.	Oz.			Lbs.	Oz.	
1/2	70C, 70D	.85	2	4	750	.94	2	6	570
3/4	70C, 70D	1.3	2	8	400	1.4	2	12	350
1	75C, 75D	1.7	2	7	320	1.9	2	8	300
1-1/2	75C, 75D	2.5	2	11	220	2.3	2	12	200

Table 2 - Thermal Capacity

	Starting HP	Maximum Allowable Acceleration Time in Seconds For Standard Motor Speeds of Various Starting Cycles											
		2 Hours			1 Hour			30 Minutes			15 Minutes		
		870	1160	1750	870	1160	1750	870	1160	1750	870	1160	1750
70	.50	900	....	....	900	....	....	900	....	....	800	....	....
	.75	800	....	....	800	....	....	800	....	....	700	....	....
	1.0	550	500	....	550	500	....	550	500	....	500	450	....
	2.0	....	260	210	....	260	210	....	260	210	....	230	190
	2.5	....	190	180	....	190	180	....	190	180	....	165	160
	3.0	....	170	150	....	170	150	....	170	150	....	155	140
	4.0	....	130	110	....	130	110	....	130	110	....	118	100
	6.0	....	....	80	....	....	80	....	....	80	....	....	72
	8.0	....	....	63	....	....	63	....	....	63	....	....	56
	10.0	....	....	53	....	....	53	....	....	53	....	....	46

	Starting HP	Maximum Allowable Acceleration Time in Seconds For Standard Motor Speeds of Various Starting Cycles											
		10 Min			5 Minutes			2 Minutes			1 Minutes		
		870	1160	1750	870	1160	1750	870	1160	1750	870	1160	1750
70	.50	500	....	....	250	....	....	100	....	....	50	....	....
	.75	400	....	....	230	....	....	100	....	....	50	....	....
	1.0	330	320	....	210	200	....	100	80	....	50	45	....
	2.0	....	190	170	....	120	105	....	60	58	....	38	36
	2.5	....	143	140	....	88	85	....	49	45	....	33	29
	3.0	....	133	120	....	80	74	....	45	39	....	28	25
	4.0	....	90	83	....	60	54	....	36	30	....	23	19
	6.0	....	....	60	....	....	38	....	....	21	....	....	13
	8.0	....	....	41	....	....	29	....	....	16	....	....	10
	10.0	....	....	36	....	....	23	....	....	13	....	....	8

	Starting HP	Maximum Allowable Acceleration Time in Seconds For Standard Motor Speeds of Various Starting Cycles											
		2 Hours			1 Hour			30 Minutes			15 Minutes		
		870	1160	1750	870	1160	1750	870	1160	1750	870	1160	1750
75	1.0	520	....	....	520	....	....	520	....	....	520	....	....
	2.0	300	250	....	300	250	....	300	250	....	300	220	....
	3.0	200	120	....	200	150	....	200	150	....	200	130	....
	4.0	....	110	....	....	110	....	....	110	....	....	100	....
	5.0	....	90	85	....	90	85	....	90	85	....	85	80
	7.0	....	75	73	....	75	73	....	75	73	....	70	68
	8.0	....	....	70	....	....	70	....	....	70	....	....	64
	10.0	....	....	58	....	....	58	....	....	58	....	....	53
	15.0	....	....	48	....	....	48	....	....	48	....	....	43
	20.0	....	....	40	....	....	40	....	....	40	....	....	35

	Starting HP	Maximum Allowable Acceleration Time in Seconds For Standard Motor Speeds of Various Starting Cycles											
		10 Min			5 Minutes			2 Minutes			1 Minutes		
		870	1160	1750	870	1160	1750	870	1160	1750	870	1160	1750
75	1.0	420	....	....	260	....	....	100	....	....	50	....	....
	2.0	210	180	....	130	110	....	80	60	....	40	40	....
	3.0	150	110	....	100	65	....	52	40	....	30	22	....
	4.0	....	82	....	....	50	....	....	28	....	....	18	....
	5.0	....	70	65	....	45	40	....	24	22	....	16	15
	7.0	....	60	57	....	38	37	....	21	20	....	14	13
	8.0	....	....	54	....	....	35	....	....	18	....	....	11
	10.0	....	....	45	....	....	30	....	....	16	....	....	10
	15.0	....	....	34	....	....	21	....	....	11	....	....	8
	20.0	....	....	27	....	....	17	....	....	8	....	....	5

REPLACEMENT OF PARTS

COUPLINGS:

Disassembly:

1. Remove drive housing mechanism from driven shaft.
2. Remove filler plug and flow charge from FLEXIDYNE housing.
3. Remove housing screws, housing cover and cover seal.
4. Remove screws that attach driven hub to rotor retainer. Remove driven hub and rotor.
5. Remove bronze bushing retainer ring and slip bronze bushing off drive housing.
6. Remove ball bearing snap ring and ball bearing. In removing ball bearing, place 3 equal length pins in the 3 holes thru the end of the drive housing and press against the pins. For sizes 70 and 75 use to 9/64 diameter pins.
7. Remove rotor retainer.

Reassembly:

1. Install new seal felt and housing seal in drive housing.
2. Set rotor retainer in place in drive housing.
3. Press ball bearings onto drive housing. Note: Press against inner (not outer) race of bearing. Make sure rotor retainer is not cocked when bearing enters it. Check to see that rotor retainer rotates freely in housing seal.
4. Install ball bearing retaining ring.
5. Install bronze bushing and snap ring.
6. Install rotor and driven hub. Install and tighten screws.
7. Install cover seal in housing cover and place cover in position on drive housing. Install and tighten housing screws.
8. Replace flow charge and filler plug per STARTUP.

DRIVES:

Disassembly:

1. Loosen set screws in collar and remove FLEXIDYNE drive from motor shaft.
2. Remove filler plug and drain flow charge from FLEXIDYNE housing.
3. Remove sheave from FLEXIDYNE mechanism.
4. Remove housing screws and remove housing cover. Remove cover seal.
5. Remove collar. Remove the six rotor screws and slide driven hub off drive hub. Remove rotor.
6. Remove needle bearing snap ring and needle bearing inner race.
7. Remove the six drive hub screws and remove the drive hub housing. Remove housing seal.
8. Remove rotor retainer and seal felt.
9. Remove ball bearing snap ring and remove ball bearing.
10. Remove needle bearing and seal from driven hub by placing a plug in the left hand end (as viewed in the drawing) of driven hub bore and pressing against the plug.

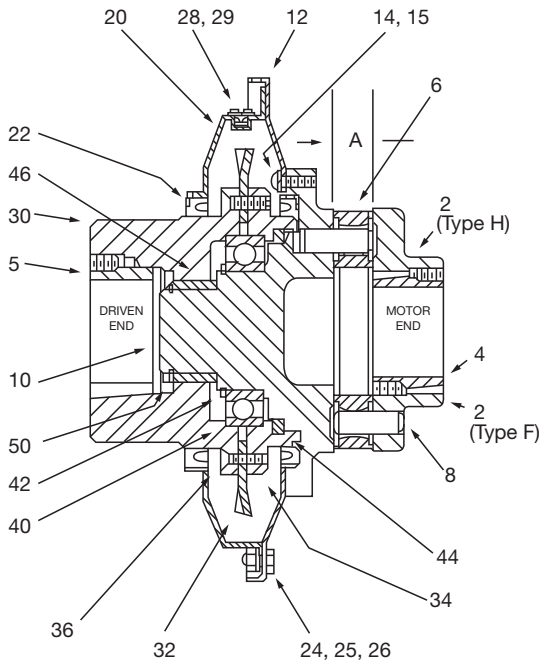
Reassembly:

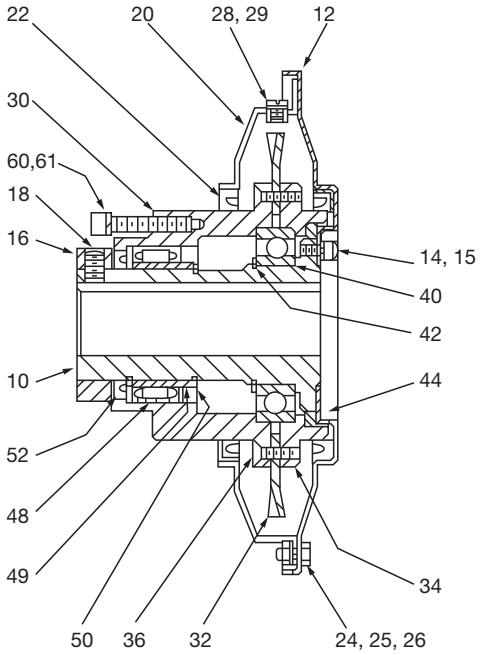
1. Press roller bearing into right hand end of driven hub. Make sure left hand end of bearing is ¼ from left hand end of driven hub. Roller bearing should be filled with high temperature roller bearing grease. Tap roller bearing seal into place, flush with left hand end of driven hub.
2. Install housing seal in drive hub housing and attach drive hub housing to drive hub with six screws. Install seal felt on drive hub and rotor retainer in position in drive hub housing, making sure that housing seal is properly seated in drive hub housing.
3. Press ball bearing onto drive hub. Press against inner (not outer) race of bearing. Rotor retainer must not be cocked when bearing enters it. Check, after pressing by making certain rotor retainer rotates freely in seal. Install ball bearing snap ring. Install needle bearing inner race and snap ring on drive hub.
4. Place rotor in position. Slide driven hub over drive hub. Install and tighten the six rotor screws.
5. Install cover seal. Install housing cover on drive hub housing so filler plug hole lines up with relief on the flange of drive hub housing. Install and tighten housing screws.
6. Install motor shaft collar and filler plug. Place bolt-on sheave in position and install and tighten six sheave bolts.

Table 3 - Manufacturer's Part Numbers for Replacement Ball Bearings

FLEXIDYNE Mechanism Size	Dodge Part Number	SKF Part Number	NEW DEPARTURE Part Number
70C & 70D	391200	6010 2RS/ME	Z4993L10XIV
75C & 75D	391200	6010 2RS/ME	Z4993L10XIV

Parts Replacment for 70C, 70D 75C and 75D FLEXIDYNE® Couplings and Drives





Reference	Name of Part		No. Required	Part Number			
				70C	75C	70D	75D
2	Coupling Flange	Type H Type F	1	008041 008040	008043 008042	. . . .	. . . .
4	Taper-Lock Bushing w/screws (Motor End)		1	1215	1615	. . . .	. . . .
5	Taper-Lock Bushing w/screws (Driven End)		1	1610	1610	. . . .	. . . .
6	POLY-DISC® Coupling Element		1	008032	008033	. . . .	. . . .
8	Flange Pin		4	409122	409123	. . . .	. . . .
10	Drive Hub		1	305076	305077	③	④
12	Drive Hub Housing		1	305078	305078	305079	305079
14	Drive Hub Screw		6	415100	415100	417020	417020
15	Lockwasher		6	419007	419007	419043	419043
16	Drive Hub Collar		1	.....	.....	305135	305135
18	Drive Hub Collar Set Screw		1	.....	.....	②	②
①	Drive Hub Key			.....	.....	.....	443390
20	Housing Cover		1	305091	305091	305091	305091
22	Housing Seal		2	305138	305138	305138	305138
24	Housing Screw		6	411296	411296	411296	411296
25	Lockwasher		6	419007	419007	419007	419007
26	Hex Nut		6	407082	407082	407082	407082
28	Filler Plug		1	305018	305018	305018	305018
29	Lockwasher		1	419190	419190	419190	419190
30	Driven Hub		1	305075	305075	305073	305074
32	Rotor		1	305094	305095	305094	305095
34	Rotor Retainer		1	305096	305096	305096	305096
36	Rotor Screw		6	415052	415052	415052	415052
40	Ball Bearing		1	391200	391200	391200	391200
42	Retaining Ring		1	421150	421150	421150	421150
44	Duct Seat		1	308024	308024	308024	308024
46	Bronze Bearing		1	426070	426070	.....	.....
48	Needle Bearing		1	.....	.....	426022	426022
49	Needle Bearing Inner Race		1	.....	.....	426039	426039
50	Retaining Ring		⑥	421004	421004	421145	421145
52	Bearing Seal		1	.....	.....	305139	305139
60	Sheave Screw		4	.....	.....	417047	417050
61	Lockwasher		4	.....	.....	419045	419045

① Not shown on parts drawing.
② Size 70D × 7/8 – 400062, 2 required; Sizes 70D × 11/8 & 75D × 11/8 – 400054, 1 required & 400058, 1 required; Size 75D × 13/8 – 400054, 2 required.
③ 305069 required on Size 70D × 7/8; 305070 required on Size 70D × 1-1/8.
④ 305071 required on Size 75D × 1-1/8; 305072 required on Size 75D × 1-3/8.
⑤ 1 required on Size 75D × 1-3/8 only.
⑥ 1 required on FLEXIDYNE Coupling units; 2 required on FLEXIDYNE Drive units

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. 5. Readjust spacing between shafts and Flexidyne housing.
Erratic Acceleration	1. Breakdown of flow charge 2. Caked flow charge 3. Below minimum amount of flow charge	1. Replace flow charge. 2. Moist environment – use stainless flow charge. 3. Add flow charge.
Flexidyne Mechanism 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 seals, bearings and flow charge or replace Flexidyne mechanism.
Excessive Slippage	1. Not enough flow charge 2. Overload 3. Worn flow charge 4. Worn rotor	1. Add flow charge. 2. Relieve overload 3. Replace flow charge. 4. Replace rotor.
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 mechanism 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.

BALDOR®

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