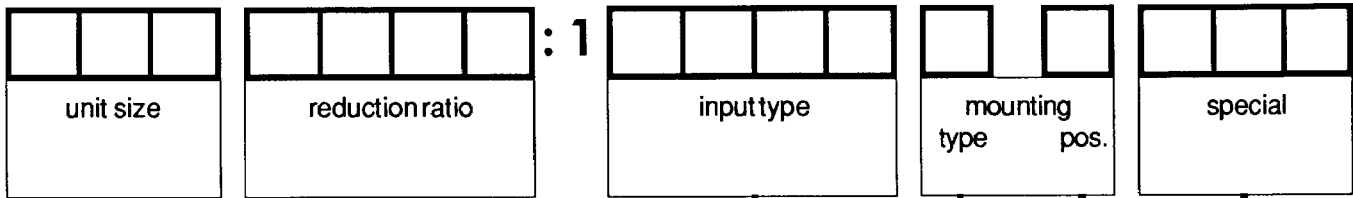


SHIMPO DRIVES

**Circulute® Series II
Speed Reducer**

**Service, Parts &
Instruction Manual**

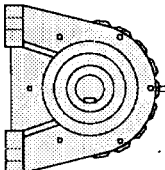
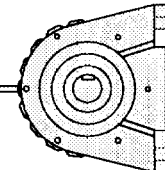
Circulate Series II Model Number Chart



INPUT TYPE	
input shaft SHFT	
C-face for motor size:	shovel base for motor size:
56C C-56	56 S-56
143TC & 145TC C140	143T & 145T S140
182TC & 184TC C180	182T & 184T S180
213TC & 215TC C210	213T & 215T S210
254TC & 256TC C250	254T & 256T S250
284TC & 286TC C280	284T & 286T S280
324TC & 326TC C320	324T & 326T S320
coupling adapter for motor size:	top mount for motor size:
56C A-56	56 T-56
143TC & 145TC A140	143T & 145T T140
182TC & 184TC A180	182T & 184T T180
213TC & 215TC A210	213T & 215T T210
254TC & 256TC A250	254T & 256T T250
284TC & 286TC A280	284T & 286T T280
324TC & 326TC A320	324T & 326T T320
C-face motor provided by Shimpo	
1/4 HP motor M.25	
1/2 HP motor M.50	
3/4 HP motor M.75	
1 HP motor M1.0	
1 1/2 HP motor M1.5	
2 HP motor M2.0	
3 HP motor M3.0	
5 HP motor M5.0	
7 1/2 HP motor M7.5	
10 HP motor M10.	
15 HP motor M15.	
20 HP motor M20.	
25 HP motor M25.	
30 HP motor M30.	
40 HP motor M40.	
50 HP motor M50.	

MOUNTING TYPE	
base (foot)	B
flange	F
ring	R

MOUNTING POSITION	
horizontal	H
vertical, output shaft down	D
vertical, output shaft up	U
ceiling (base mount)	C
wall, feet left (base mount)	L
wall, feet right (base mount) ...	R

position L
(viewed from the
output shaft)

position R
(viewed from the
output shaft)

SPECIAL MODIFICATIONS	
single phase motor supplied	1
3450 rpm motor supplied	2
1165 rpm motor supplied	6
870 rpm motor supplied	8
brake motor supplied	B
explosion-proof motor supplied	E
oil level gauge supplied	G
high temperature oil	H
high temperature grease	I
oil lubrication in place of standard grease lubrication ...	J
grease lubrication in place of standard oil lubrication ...	K
low temperature oil	L
low temperature grease	M
splined input shaft	S
splined output shaft	T
washdown modifications (a stainless steel sleeve under the output shaft seal, a V-ring deflector on the output shaft seal, and a washdown breather for oil-filled units)	W
white epoxy paint	X
washdown modifications with white epoxy paint	Y
reduced backlash	Z

WARRANTY

The Company warrants the Circulate Series II Speed Reducer to be free from defects in materials and workmanship under normal use and proper maintenance for the warranty period. If within such period any product shall be proved to the Company's reasonable satisfaction to be defective, such product shall be repaired or replaced at Seller's option. The Company's obligation and the Buyer's exclusive remedy hereunder shall be limited to such repair or replacement and shall be conditioned upon the Company receiving written notice of any alleged defect no later than 10 days after its discovery within the warranty period and, at the Company's option, the return of such product to the Company, transportation charges prepaid, when such return is feasible. The Company reserves the right to satisfy its warranty obligation in full by reimbursing the Buyer for all payments made and the Buyer shall thereupon return the product to the Company. Products manufactured by others and supplied by the Company as part of the Company's product are not warranted by the Company and the Buyer's sole recourse shall be under the warranty, if any, of such other manufacturer.

These warranties shall not be effective if the product has been subjected to overload, misuse, negligence or accident, nor if the product has been repaired or altered outside of our factory or authorized service station in any respect which in our judgment adversely affects its condition or operation.

THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES (EXCEPT OF TITLE INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, PERFORMANCE, OR OTHERWISE), and in no event shall the Company be liable for claims (based upon breach of express or implied warranty, negligence, or otherwise) for any other damages, whether direct, immediate, incidental, foreseeable, consequential, or special.

INSPECTION

Unpack the reducer and check to see that it is identical with what is specified in the purchase order. Check its model number using the chart on the inside front cover of this manual. Inspect for shipping damage. Notify the shipping agent immediately if any damage is discovered.

IDENTIFICATION

Circulate Reducers can be provided with single, double or triple reduction configurations.

For single reduction Circulate Reducers, the first digit of the reducer's model number indicates the reducer's size. The second digit of the model number of a single reduction Circulate Reducer is always "0".

For double reduction Circulate Reducers, the first digit of the model number indicates the size of the reducer's input stage. The second digit indicates the size of the output stage.

For triple reduction Circulate Reducers, the first digit of the model number is always "T". The input stage of these reducers is always a size "100". The second digit of the model number indicates the size of the middle stage and the third digit indicates the size of the output stage.

INSTALLATION

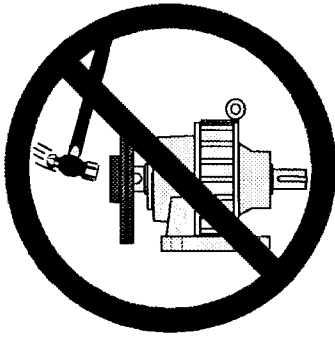
1. Remove the tape from the input and output shafts and remove the protective coating using a solvent. **Be careful, keyways are sharp!**
2. Install the unit in a clean, dry location with plenty of ventilation. A site in which rain or water is splashed around the unit should be avoided unless the reducer has been specifically modified for these conditions.
3. Proper ambient temperature is from 32° F to 104° F. (0° C to 40° C). If the unit must operate outside of this temperature range, contact Shimpo Drives.
4. Grease-lubricated reducers have no restriction on their mounting position. Oil lubricated reducers must be mounted in the position that is specified in the model number of the reducer. The nameplate of the reducer indicates the type of lubrication used. The lubrication section of this manual also describes the standard type of lubricant that is used in each reducer.

CAUTION

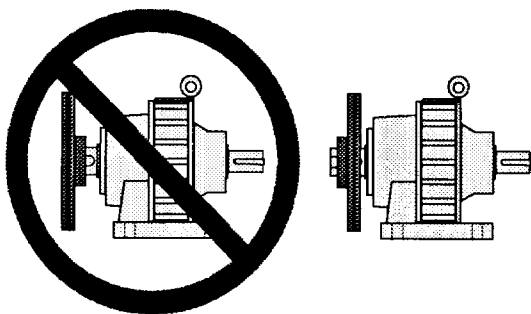
Do not mount an oil-lubricated reducer in other than its intended position. Doing this can cause damage to the reducer. Contact Shimpo Drives for information on mounting in a position other than the one indicated on the nameplate.

5. The reducer should be bolted down to a rigid, vibration-free base, such as a concrete foundation, sturdy cast iron beam, or steel framework.

- Gears, pulleys, or sprockets that are mounted to the input or output shafts should slide on easily. Do not pound on them or on the shafts of the reducer. Pounding devices into place on the shafts can damage bearings and other reducer components.



- Mount any gears, pulleys, or sprockets as close to the housing of the reducer as is practical. If the load will be centered beyond the middle of the shaft extension, contact Shimpo Drives with application details.



- Secure the gear, pulley or sprocket to the shaft. If a key and set screw are used for this, the top of the key should have .004" to .008" (0.1 mm to 0.2 mm) of clearance.
- The pitch circle diameter of the gear, pulley, or sprocket must be at least 3 times larger than the shaft diameter.
- All connected devices should be checked carefully for angular and parallel alignment.
- For oil lubricated units, check to ensure that the oil is filled to the center of the oil level plug.
- For oil lubricated reducers, if a separate breather was supplied, install it. If the breather was provided with a plug or cover, remove it. Be sure that the breather is not obstructed.

DIRECTION OF ROTATION

Circulate Series II Speed Reducers can be operated with either direction of input rotation. The input and output shafts of single and triple reduction units will rotate in opposite directions. The input and output shafts of double reduction units will rotate in the same direction.

LUBRICATION

Circulate Reducers are internally lubricated using either grease or oil. The table at the right describes the type of lubricant that is normally used with these reducers. Because different lubricants may be used for extreme environmental conditions, check the nameplate of the reducer to determine the type of lubricant that is being used. Lubrication quantities listed are approximate.

Follow the instructions below when adding lubricant to the reducer.

Grease lubricated reducers should be disassembled, cleaned and filled with new grease after every 20,000 hours of operation or after every 5 years, whichever comes first. Under extreme environmental conditions, the grease may need to be replaced more frequently. The grease should be packed into the reducer in a similar manner to the way that an anti-friction bearing is re-greased. Approximately a 20% air space should remain.

Oil lubricated units should receive an oil change after the first 500 hours of operation. After this initial oil change, the oil should be changed after every 5,000 hours of operation or annually, whichever comes first. Under extreme environmental conditions, the oil may need to be replaced more frequently. To drain the oil, remove the oil breather plug and the oil drain plug. The drain plug contains a magnet. Inspect the magnet and clean off any metal fragments. Excessive amounts of metal on the magnet after the initial oil change indicate that the reducer should be disassembled and inspected for possible internal damage. To refill the reducer, install the drain plug and remove the level plug. Add oil through the breather's fitting until oil overflows from the level plug opening. Replace the level plug and the breather.

Circulate Series II Lubrication Specifications

Single Reduction

Reducer Sizes	all mounting positions	
	standard backlash	reduced backlash
103 - 107 201 - 207 301 - 307	NLGI #0 grease	ISO VG100 oil
401 - 407 501 - 507 603 - 607		ISO VG220 oil (AGMA 5EP) *ISO VG320 oil

Double Reduction

Reducer Size	horizontal	vertical, output shaft up	vertical, output shaft down	
	input and output stages	input and output stages	input stage	output stage
125	NLGI #0 grease	NLGI #0 grease	NLGI #0 grease	NLGI #0 grease
135	NLGI #0 grease	NLGI #0 grease	NLGI #0 grease	NLGI #0 grease
145	ISO VG220 oil	ISO VG220 oil	NLGI #0 grease	ISO VG220 oil
245	ISO VG220 oil	ISO VG220 oil	NLGI #0 grease	ISO VG220 oil
255	ISO VG220 oil	ISO VG220 oil	NLGI #0 grease	ISO VG220 oil
355	ISO VG220 oil	ISO VG220 oil	NLGI #0 grease	ISO VG220 oil
365	ISO VG220 oil	ISO VG220 oil	NLGI #0 grease	ISO VG220 oil
465	ISO VG220 oil	ISO VG220 oil	ISO VG220 oil	ISO VG220 oil
475	ISO VG220 oil	ISO VG220 oil	ISO VG220 oil	ISO VG220 oil
575	ISO VG220 oil	ISO VG220 oil	ISO VG220 oil	ISO VG220 oil

Triple Reduction

Reducer Size	horizontal	vertical, output shaft up	vertical, output shaft down		
	all stages	all stages	input stage	middle stage	output stage
T24	ISO VG220 oil	ISO VG220 oil	NLGI #0 grease	NLGI #0 grease	ISO VG220 oil
T25	ISO VG220 oil	ISO VG220 oil	NLGI #0 grease	NLGI #0 grease	ISO VG220 oil
T36	ISO VG220 oil	ISO VG220 oil	NLGI #0 grease	NLGI #0 grease	ISO VG220 oil
T47	ISO VG220 oil	ISO VG220 oil	NLGI #0 grease	ISO VG220 oil	ISO VG220 oil

Lubricant Specifications

Lubricant Type	Generic Specification	Brand Reference		
		Shell	Mobil	Exxon
grease	NLGI No. 0 Grease	Darina EP No. 0	---	---
oil	ISO VG100 Gear Oil	Omala Oil 100	Mobil Gear 629	Spartan EP 150
oil	ISO VG220 Gear Oil	Omala Oil 220	Mobil Gear 630	Spartan EP 220
oil	ISO VG320 Gear Oil	Omala Oil 320	Mobil Gear 632	Spartan EP 320

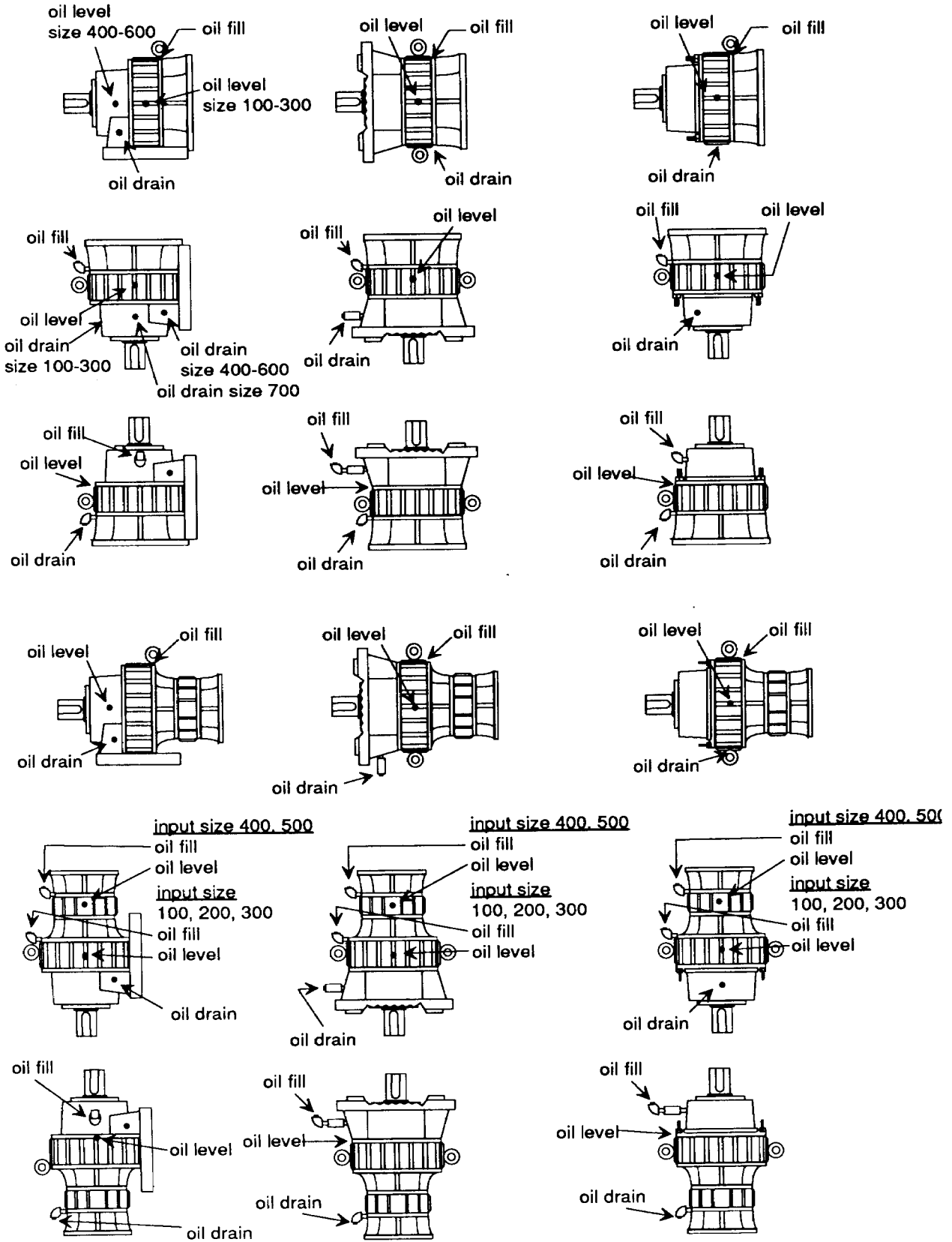
The above lubricants are for normal industrial service.

Other oils may be specified for severe operating conditions.

Refer to the nameplate of the reducer for specific lubrication type.

*For high temperature application, ISO VG 320(AGMA 6EP) is available upon request.

Oil Fill, Level and Drain Locations For Oil-Lubricated Circulute Series II Reducers



Approximate Lubricant Quantities For Circulute Series II Reducers

single reduction

Reducer Sizes	mounting position	
	horizontal	vertical
103 - 107	5 oz	5 oz
201 - 207	7 oz	7 oz
301 - 307	14 oz	14 oz
401 - 407	0.25 gal	0.40 gal
501 - 507	0.50 gal	0.65 gal
603 - 607	0.85 gal	1.15 gal

double reduction

Reducer Size	Lube Quantity		
	Horiz.	Vert. Down	Vert. Up
125	10 oz	10 oz	10 oz
135	15 oz	15 oz	15 oz
145	0.32 gal	5 oz and 0.40 gal	0.46 gal
245	0.32 gal	6 oz and 0.40 gal	0.51 gal
255	0.58 gal	6 oz and 0.63 gal	0.84 gal
355	0.63 gal	12 oz and 0.63 gal	0.98 gal
365	1.00 gal	12 oz and 1.14 gal	1.53 gal
465	1.08 gal	2.06 gal	2.06 gal
475	2.11 gal	3.83 gal	3.83 gal
575	2.32 gal	4.07 gal	4.07 gal

triple reduction

Reducer Size	Lube Quantity		
	Horiz.	Vert. Down	Vert. Up
T24	0.40 gal	10 oz and 0.40 gal	0.57 gal
T25	0.66 gal	10 oz and 0.65 gal	0.90 gal
T36	1.08 gal	15 oz and 1.15 gal	1.59 gal
T47	2.22 gal	5 oz and 3.83 gal	3.89 gal

Grease quantities are given in oz.

Oil quantities are given in gal.

MAINTENANCE

In addition to replacing the lubricant periodically, the following checks should be performed on a regular basis. Depending on the application, it may be desirable to make such checks on a weekly or monthly basis.

1. Check the case temperature of the reducer. A temperature of up to 70 F° (40 C°) above ambient is acceptable.
2. Check to see if the unit is being overloaded. This can often be done by measuring the drive motor's current.
3. Be sure that the reducer is not making an abnormal or irregular noise.
4. Check the reducer for abnormal vibration.
5. Look for lubricant leaks around the reducer.
6. Check all power transmitting components for misalignment and excessive wear.
7. Check for loose bolts. This includes reducer body bolts and mounting bolts.

TROUBLESHOOTING

Most problems can be solved using the following procedures.

Condition	Problem	Possible Cause	Cure
Load does not rotate	Drive motor not operating	Overload tripped	Reset the overload. If this continues, check the motor and reducer sizing.
		Defective drive motor	Remove the motor from the reducer and apply power. Replace if it does not operate properly.
	Input jammed	Improper input drive train alignment or assembly	Check all portions of the input drive assembly for proper alignment and smooth operation.
	Reducer input shaft not driven	Broken or missing key	Inspect the keys on all input drive shafts.
		Defective input drive train	Check all input drive components for proper assembly and operation. Check the tension and condition of any input drive belts.
	Output mechanical problems	Broken or missing key	Inspect the keys on all output drive shafts.
		Defective output drive train	Check all output drive components for proper assembly and operation. Check the tension and condition of any output drive belts.
		Driven load jammed	Disconnect the reducer from the load and see if the load can be turned. Repair the cause of any jam.
	Overload	Load too large for the motor/reducer combination	Compare the size of the drive train with the size of the load. If necessary, replace with a larger motor/reducer combination. For an existing application, consider any changes that might have increased the load.
		Worn load components	Inspect all load components for damage or wear. Replace or repair as needed.
Damaged reducer	Damaged reducer components	Disconnect the reducer from the driven load. Operate it using the drive motor. Check for smooth, quiet operation. Disassemble and repair the reducer, if required.	
Load does not reach full speed	Drive motor turning too slowly	Motor overloaded	Check motor current to see if it is overloaded. Repair the cause of the overload or replace with a larger motor/drive combination.
		Motor connected to wrong power source	Compare the voltage and frequency of the power source to the motor's nameplate.
		Adjustable speed drive speed too low.	If the motor is driven by an adjustable speed drive, ensure that it is operating properly.
		Incorrect motor	Check the motor's nameplate for proper speed rating.
	Incorrect reducer selected	Reducer ratio too high	Replace the reducer with one with a smaller ratio. It may be necessary to change the sizes of the motor, the reducer, or both.

Condition	Problem	Possible Cause	Cure
Unusual noise	Damaged components	Damaged motor	Disconnect the motor and drive it separately. Replace if necessary.
		Damaged or misaligned drive train components	Check all drive train components for proper alignment and operation. Replace as necessary.
		Damaged reducer	Disconnect the reducer from the load and operate it. If necessary, disassemble and repair. Look for external causes of the damage.
	Vibration	Loose mounting	Check all mounting bolts and all reducer body bolts for tightness.
	Improper lubrication	Improper reducer lubrication type or quantity	Lubricate the reducer according to factory specifications.
Excessive temperature	Excessive load	Overload	Check motor current to determine if the drive is overloaded. Reduce the load or increase the motor/reducer size.
		Input/output misalignment or excessive overhung/thrust load	Check all input and output connections for proper alignment.
	Improper cooling	Restricted air flow	Inspect motor and reducer fans for proper air flow. Clean as required. Be sure that the reducer is in an area where air can flow freely around it.
	Improper ambient temperature	The ambient temperature is not in the range from 32°F to 104°F.	Contact Shimpo Drives.
	Improper lubrication	Improper reducer lubrication type or quantity	Lubricate the reducer according to factory specifications.
	Mechanical damage	Reducer damaged	Disassemble and repair the reducer as required.
Lubricant leaks	Excessive internal pressure	Plugged oil breather	Be sure that the oil breather is installed and functioning properly.
	Damaged or loose components	Damaged oil seals	Inspect all oil seals. Replace if necessary.
		Loose reducer body joints	Inspect all body joints for leaks. Tighten all body bolts. If necessary, disassemble the reducer and replace the gaskets.
	Cracked reducer body	Inspect the reducer for cracked body parts. Disassemble and replace as needed.	
Vibration	Excessive input speed	The input shaft of the Circulute is being driven at more than 1750 rpm	Reduce the input speed. Contact Shimpo Drives if an input speed greater than 1750 rpm is required.
	Improper assembly	The eccentrics are aligned in the same direction	Disassemble the reducer and ensure that the eccentrics are mounted opposite to each other.
	Improper mounting	Loose mounting bolts or structure or improper alignment of connected equipment	Ensure that the reducer is firmly mounted to a rigid base. Check the alignment of devices connected to the reducer's input and output.
	Damage	Internal damage to the reducer	Disassemble and inspect all reducer parts, particularly bearings.

EXPLODED VIEW DRAWINGS AND PARTS LISTS

The following pages provide exploded view drawings and parts lists for Circulate Series II Speed Reducers. These are grouped by "case size". Single reduction reducers use one case size. Double reduction reducers are built from two case sizes. A "coupler" and a "counter shaft", along with other support parts, are used to connect the two case sizes together. The connection parts are shown with the smaller, input case size reducer. In a similar way, a triple reduction reducer uses three individual case sizes. The charts below relate the model number of the complete reducer to the case sizes used.

single reduction case sizes		double reduction case sizes			triple reduction case sizes			
reducer size	case size	reducer size	input size	output size	reducer size	input size	middle size	output size
103, 105, 107	100	125	100	200	T24	100	200	400
201, 203, 205, 207	200	135	100	300	T25	100	200	500
301, 303, 305, 307	300	145	100	400	T36	100	300	600
401, 403, 405, 407	400	245	200	400	T47	100	400	700
501, 503, 505, 507	500	255	200	500				
603, 605, 607	600	355	300	500				
		365	300	600				
		465	400	600				
		475	400	700				
		575	500	700				

input and output ratios for double reduction reducers

output ratio	input ratio						
	11 : 1	17 : 1	29 : 1	35 : 1	47 : 1	59 : 1	71 : 1
11 : 1	121 : 1						
17 : 1	187 : 1	289 : 1					
29 : 1	319 : 1	493 : 1	841 : 1				
35 : 1	385 : 1	595 : 1	1015 : 1	1225 : 1			
47 : 1	517 : 1	799 : 1	1363 : 1	1645 : 1	2209 : 1		
59 : 1	649 : 1	1003 : 1	1711 : 1	2065 : 1	2773 : 1	3481 : 1	
71 : 1	781 : 1	1207 : 1	2059 : 1	2485 : 1	3337 : 1	4189 : 1	5041 : 1

Generic parts, such as oil seals, snap rings, keys and many bearings, are described in enough detail to allow you to purchase them locally. Examples of the numbering system for snap rings and oil seals are given

generic part number examples

S-50	external snap ring, 50 mm in diameter
R-47	internal snap ring, 47 mm in diameter
D456008	double lip oil seal, for a 45 mm shaft and 60 mm bore, 8 mm thick
S254008	single lip oil seal, for a 25 mm shaft and 40 mm bore, 8 mm thick

below. Other parts are self-explanatory.

When ordering parts from Shimpo Drives, provide the following information:

- the complete model number of the reducer**
- the serial number of the reducer, if available**
- the item number of the part**
- the part number of the part**
- the description of the part**

With the above information, we will be able to ensure that you are ordering the correct parts for your reducer.

If you find that it is necessary to return a part to Shimpo Drives, first contact us for complete shipping instructions and a return goods authorization number. *We will not accept returned parts or units without a return goods authorization number.*

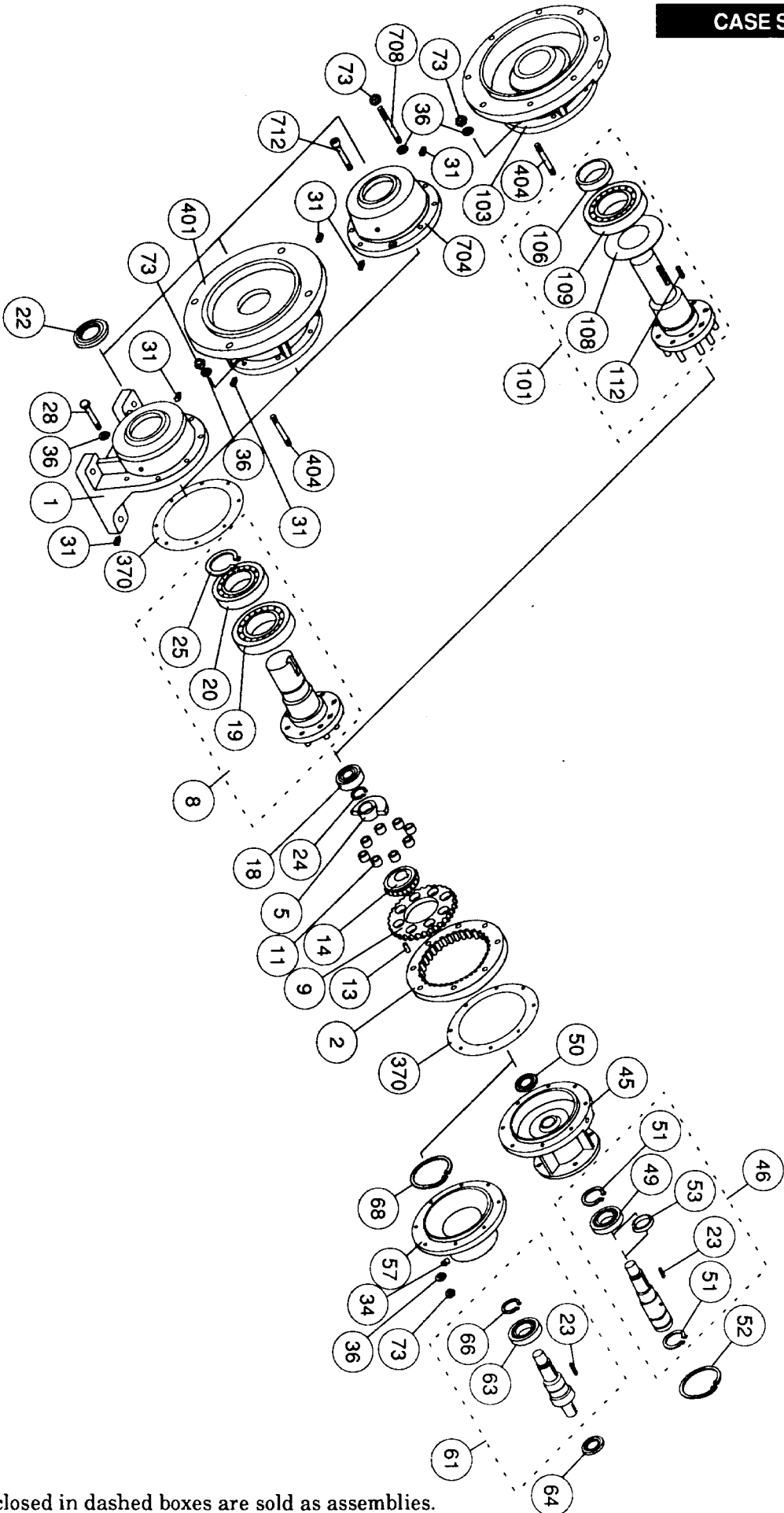
CASE SIZE 100 PARTS LIST

item	qty	part number	description	comments
1	1	BERA1100012	BASE A1	
2	1	BERA1100021	PIN HOUSING A1	11:1, 17:1, 35:1, 71:1
2	1	BERA4100020	PIN HOUSING A2	29:1, 59:1
2	1	BERA5100021	PIN HOUSING A3	47:1
5	1	BERA1100060	BALANCE WEIGHT A1	11:1
5	1	BERA2100061	BALANCE WEIGHT A2	17:1 - 71:1
8	1	KNZY1104000	SHAFT OUTPUT A1 W/BRG	11:1
8	1	KNZY2104000	SHAFT OUTPUT A2 W/BRG	17:1
8	1	KNZY3104000	SHAFT OUTPUT A3 W/BRG	29:1 - 71:1
9	1	BERA1100222	WHEEL A1	11:1
9	1	BERA2100222	WHEEL A2	17:1
9	1	BERA4100221	WHEEL A3	29:1
9	1	BERA3100223	WHEEL A4	35:1
9	1	BERA5100223	WHEEL A5	47:1
9	1	BERA6100221	WHEEL A6	59:1
9	1	BERA7100221	WHEEL A7	71:1
11	8*	BERA1100361	BUSHING A1	
13	**	BERA1100381	PIN INTERNAL A1	
14	1	BERA1100400	ECCENTRIC BEARING A1	11:1
14	1	BERA2100400	ECCENTRIC BEARING A2	17:1
14	1	BERA4100400	ECCENTRIC BEARING A3	29:1
14	1	BERA3100400	ECCENTRIC BEARING A4	35:1
14	1	BERA5100400	ECCENTRIC BEARING A5	47:1
14	1	BERA6100400	ECCENTRIC BEARING A6	59:1
14	1	BERA7100400	ECCENTRIC BEARING A7	71:1
18	1	RBBCA153212	BEARING, ROLLER NF153212	11:1
18	1	RBBA006201	BEARING, BALL 6201 OPEN	17:1 - 29:1
19	1	RBBCA006008	BEARING, BALL 6008ZZ	
20	1	RBBEA006206	BEARING, BALL 6206DD	
22	1	ROSPA304508	OIL SEAL STANDARD D304508	
23	1	RLKAA004024	KEY 4X4X24 KM1	11:1
23	1	RLKAA005032	KEY 5X5X32 KM2	17:1 - 71:1
24	1	RLSSA000013	SNAP RING S-13 EXTERNAL	11:1
24	1	RLSSA000016	SNAP RING S-16 EXTERNAL	17:1 - 29:1
25	1	RLSSA000030	SNAP RING S-30 EXTERNAL	
28	6	RSRAC008050	SCREW, HX, HD, CAP M8X50 11T	
31	2	RSTBG008012	SCREW, SET M8X12, SHARP	
34	1	RSPBB001018	PLUG HEADLESS HEX 1/8 PT	
36	**	RWLBA000008	WASHER, SPRING, DISK, PS, MB	
45	1	BNZY1101022	MOTOR FLANGE A1 56C/140TC	
46	1	KNZY1101050	SHAFT MOTOR A1 W/BRG 56C	11:1, 56C
46	1	KNZY2101050	SHAFT MOTOR A2 W/BRG 56C	17:1 - 71:1, 56C
46	1	KNZY1215050	SHAFT MOTOR A3 W/BRG 140	11:1, 140TC
46	1	KNZY2215050	SHAFT MOTOR A4 W/BRG 140	17:1 - 71:1, 140TC
49	1	RBBCA006206	BEARING, BALL 6206ZZ	
50	1	ROSAA254008	OIL SEAL STANDARD S254008	56C
50	1	ROSAA304007	OIL SEAL STANDARD S304007	140TC
51	2	RLSSA000030	SNAP RING S-30 EXTERNAL	
52	1	RLSRA000062	SNAP RING R-62 INTERNAL	
53	1	BNZY1290020	BEARING COLLAR 140TC A/B	140TC
57	1	BERA1100112	BRACKET INPUT A1	
61	1	KNZY1101061	SHAFT INPUT A1 W/BRG	11:1
61	1	KNZY2101061	SHAFT INPUT A2 W/BRG	17:1 - 71:1
63	1	RBBCA006204	BEARING, BALL 6204ZZ	
64	1	ROSPA253507	OIL SEAL STANDARD D253507	
66	1	RLSSA000020	SNAP RING S-20 EXTERNAL	
68	1	RLSRA000047	SNAP RING R-47 INTERNAL	
73	**	RSNAA000008	NUT, HEX M8 TYPE 1	

item	qty	part number	description	comments
101	1	KERB0001210	CTR SHFT ASSY NAB1 121NAB	SIZE 125, 121:1
101	1	KERB0001220	CTR SHFT ASSY NAB2 187NAB	SIZE 125, 187:1, 319:1, 385:1, 493:1, 517:1
101	1	KERB0001230	CTR SHFT ASSY NAB3 289NAB	SIZE 125, 17:1 INPUT
101	1	KERB0001240	CTR SHFT ASSY NAB4 841NAB	SIZE 125, 29:1 - 71:1 INPUT
101	1	KERB0001310	CTR SHFT ASSY NAC1 121NAC	SIZE 135, 121:1
101	1	KERB0001320	CTR SHFT ASSY NAC2 187NAC	SIZE 135, 187:1, 319:1, 385:1, 493:1, 517:1
101	1	KERB0001330	CTR SHFT ASSY NAC3 289NAC	SIZE 135, 17:1 INPUT
101	1	KERB0001340	CTR SHFT ASSY NAC4 841NAC	SIZE 135, 29:1 - 71:1 INPUT
101	1	KERB0001410	CTR SHFT ASSY NAD1 121NAD	SIZE 145, 121:1, NOT VERT. DOWN
101	1	KERB0001420	CTR SHFT ASSY NAD2 187NAD	SIZE 145, 187:1, 319:1, 385:1, 493:1, 517:1, NOT VERT. DOWN
101	1	KERB0001430	CTR SHFT ASSY NAD3 289NAD	SIZE 145, 17:1 INPUT, NOT VERT. DOWN
101	1	KERB0001440	CTR SHFT ASSY NAD4 841NAD	SIZE 145, 29:1 - 71:1 INPUT, NOT VERT. DOWN
101	1	KERB0001450	CTR SHFT ASSY NAD5 G-O	SIZE 145, 121:1, VERT. DOWN
101	1	KERB0001460	CTR SHFT ASSY NAD6 G-O	SIZE 145, 187:1, 319:1, 385:1, 493:1, 517:1, VERT. DOWN
101	1	KERB0001470	CTR SHFT ASSY NAD7 G-O	SIZE 145, 17:1 INPUT, VERT. DOWN
101	1	KERB0001480	CTR SHFT ASSY NAD8 G-O	SIZE 145, 29:1 - 71:1 INPUT, VERT. DOWN
103	1	BERB0001010	COUPLER CIRCULUTE NAB1	SIZE 125
103	1	BERB0002010	COUPLER CIRCULUTE NAC1	SIZE 135
103	1	BERB0003010	COUPLER CIRCULUTE NAD1	SIZE 145
106	1	PART OF #101	COUNTER SHAFT BUSHING	
108	1	PART OF #101	SHIM	VERT. DOWN
109	1	RBBEA006010	BEARING, BALL 6010DD	SIZE 125, 135
109	1	RBBA006010	BEARING, BALL 6010 OPEN	SIZE 145, NOT VERT. DOWN
109	1	RBBEA006010	BEARING, BALL 6010DD	SIZE 145, VERT. DOWN
112	1	RLKAA004024	KEY 4X4X24 KM1	SIZE 125, 121:1
112	1	RLKAA005032	KEY 5X5X32 KM2	SIZE 125, 187:1 - 5041:1
112	1	RLKAA005042	KEY 5X5X42	SIZE 135, 121:1
112	1	RLKAA007040	KEY 7X7X40	SIZE 135, 187:1 - 5041:1
112	1	RLKAA007040	KEY 7X7X40	SIZE 145, 121:1
112	1	RLKAA010038	KEY 10X8X38 KM7	SIZE 145, 187:1 - 5041:1
370	2	BRXA6060180	GASKET AT PIN HSG A, B, NB	
401	1	BERA1131160	FLANGE VERTICAL A1	
404	6	BERA1131180	BOLT, STUD M8X57	
704	1	BERA1100041	RING OUTPUT HSG A1	
708	4	BERA1100080	BOLT, STUD M8X71	C-FACE INPUT
708	4	RSRAC008065	SCREW, HX, HD, CAP M8X65 11T	SEPARATE INPUT
712	2	RSRBA008045	SCREW, HX, HD, CAP M8X45	

* indicates that these parts must be purchased in sets of this size

** indicates that the number of items per reducer varies



Items enclosed in dashed boxes are sold as assemblies.

CASE SIZE 200 PARTS LIST

item	qty	part number	description	comments
1	1	BERB1200010	BASE NB1	
2	1	BERA1200021	PIN HOUSING B1	11:1, 17:1, 35:1, 71:1, STANDARD BACKLASH
2	1	BERA4200020	PIN HOUSING B2	29:1, 59:1, STANDARD BACKLASH
2	1	BERA5200021	PIN HOUSING B3	47:1, STANDARD BACKLASH
2	1	AERA1221021	PIN HOUSING B41	11:1, 17:1, 35:1, 71:1, REDUCED BACKLASH
2	1	AERA4221020	PIN HOUSING B42	29:1, 59:1, REDUCED BACKLASH
2	1	AERA5221021	PIN HOUSING B43	47:1, REDUCED BACKLASH
2	1	BERB1200020	PIN HOUSING NB1	SIZE 125, 11:1, 17:1, 35:1, 71:1, STANDARD BACKLASH, BASE AND FLANGE
2	1	BERB4200020	PIN HOUSING NB2	SIZE 125, 29:1, 59:1, STANDARD BACKLASH, BASE AND FLANGE
2	1	BERB5200020	PIN HOUSING NB3	SIZE 125, 47:1, STANDARD BACKLASH, BASE AND FLANGE
2	1	BERB1200010	PIN HOUSING NB1	SIZE 125, 11:1, 17:1, 35:1, 71:1, STANDARD BACKLASH, RING MOUNT
2	1	BERB4200010	PIN HOUSING NB2	SIZE 125, 29:1, 59:1, STANDARD BACKLASH, RING MOUNT
2	1	BERB5200010	PIN HOUSING NB3	SIZE 125, 47:1, STANDARD BACKLASH, RING MOUNT
7	1	BERB1200470	BUSHING OUTPUT SHAFT NB1	
8	1	KNZY1221000	SHAFT OUTPUT NB1 W/BRG	11:1
8	1	KNZY2221000	SHAFT OUTPUT NB2 W/BRG	17:1
8	1	KNZY4221000	SHAFT OUTPUT NB3 W/BRG	29:1 - 71:1
9	2*	BERB1200220	WHEEL NB1	11:1
9	2*	BERB2200220	WHEEL NB2	17:1
9	2*	BERA4100221	WHEEL A3	29:1
9	2*	BERA3100223	WHEEL A4	35:1
9	2*	BERA5100223	WHEEL A5	47:1
9	2*	BERA6100221	WHEEL A6	59:1
9	2*	BERA7100221	WHEEL A7	71:1
10	1	BERB1200230	WHEEL SPACER NB1	11:1
10	1	BERB2200230	WHEEL SPACER NB2	17:1
10	1	BERA3200231	WHEEL SPACER B3	29:1 - 71:1
11	16*	BERB1200360	BUSHING NB1	11:1 - 17:1
11	16*	BERA1100361	BUSHING A1	29:1 - 71:1
13	**	BERA1200381	PIN INTERNAL B1	STANDARD BACKLASH
13	**	BERA1221290	PIN INTERNAL B41 REDUCED	REDUCED BACKLASH
14	2*	BERA1100400	ECCENTRIC BEARING A1	11:1
14	2*	BERA2100400	ECCENTRIC BEARING A2	17:1
14	2*	BERA4100400	ECCENTRIC BEARING A3	29:1
14	2*	BERA3100400	ECCENTRIC BEARING A4	35:1
14	2*	BERA5100400	ECCENTRIC BEARING A5	47:1
14	2*	BERA6100400	ECCENTRIC BEARING A6	59:1
14	2*	BERA7100400	ECCENTRIC BEARING A7	71:1
17	1	RBNGA121512	INNER RACE 121512 A1	11:1
18	1	RBRCA153212	BEARING, ROLLER NF153212	
19	1	RBBCA006209	BEARING, BALL 6209ZZ	
20	1	RBBEA006307	BEARING, BALL 6307DD	
22	1	ROSPA456008	OIL SEAL STANDARD D456008	
23	1	RLKAA004024	KEY 4X4X24 KM1	11:1
23	1	RLKAA005032	KEY 5X5X32 KM2	17:1 - 71:1
24	1	RLSSA0000316	SNAP RING S-16 EXTERNAL	17:1 - 71:1, SINGLE REDUCTION
28	6	RSRAC008070	SCREW, HX, HD, CAP M8X70 11T	
31	2	RSTBG008014	SCREW, SET, M8X14, SHARP	
34	1	RSPBB000108	PLUG HEADLESS HEX 1/8 PT	
36	**	RWLBA000008	WASHER, SPRING, DISK, PS, M8	C-FACE INPUT
45	1	BNZY1101022	MOTOR FLANGE A1 56C/140TC	
46	1	KNZY1101050	SHAFT MOTOR A1 W/BRG 56C	11:1, 56C
46	1	KNZY2101050	SHAFT MOTOR A2 W/BRG 56C	17:1 - 71:1, 56C
46	1	KNZY1215050	SHAFT MOTOR A3 W/BRG 140	11:1, 140TC
46	1	KNZY2215050	SHAFT MOTOR A4 W/BRG 140	17:1 - 71:1, 140TC

item	qty	part number	description	comments
47	1	BERA1100430	COLLAR DISTANCE NB1	11:1
47	1	BERA0201030	COLLAR DISTANCE NB2	DOUBLE REDUCTION OUTPUT STAGE, 17:1 - 71:1
49	1	RBBCA006206	BEARING, BALL 6206ZZ	
50	1	ROSA0254008	OIL SEAL STANDARD S254008	56C
50	1	ROSA0304007	OIL SEAL STANDARD S304007	140TC
51	2	RLSSA000030	SNAP RING S-30 EXTERNAL	
52	1	RLSRA000062	SNAP RING R-62 INTERNAL	
53	1	BNZY1290020	BEARING COLLAR 140TC A/B	140TC
57	1	BERA1100112	BRACKET INPUT A1	
61	1	KNZY1101061	SHAFT INPUT A1 W/BRG	11:1
61	1	KNZY2101061	SHAFT INPUT A2 W/BRG	17:1 - 71:1
63	1	RBBCA006204	BEARING, BALL 6204ZZ	
64	1	ROSPA253507	OIL SEAL STANDARD D253507	
66	1	RLSSA000020	SNAP RING S-20 EXTERNAL	
68	1	RLSRA000047	SNAP RING R-47 INTERNAL	
73	**	RSNAA000008	NUT, HEX M8 TYPE 1	
101	1	KERB0002410	CTR SHFT ASSY NBD1 121NBD	SIZE 245, 121:1, NOT VERT. DOWN
101	1	KERB0002420	CTR SHFT ASSY NBD2 187NBD	SIZE 245, 187:1, 319:1, 385:1, 493:1, 517:1, NOT VERT. DOWN
101	1	KERB0002430	CTR SHFT ASSY NBD3 289NBD	SIZE 245, 17:1 INPUT STAGE, NOT VERT. DOWN
101	1	KERB0002440	CTR SHFT ASSY NBD4 841NBD	SIZE 245, 29:1 - 71:1 INPUT STAGE, NOT VERT. DOWN
101	1	KERB0002450	CTR SHFT ASSY NBD5 G-O	SIZE 245, 121:1, VERT. DOWN
101	1	KERB0002460	CTR SHFT ASSY NBD6 G-O	SIZE 245, 187:1, 319:1, 385:1, 493:1, 517:1, VERT. DOWN
101	1	KERB0002470	CTR SHFT ASSY NBD7 G-O	SIZE 245, 17:1 INPUT STAGE, VERT. DOWN
101	1	KERB0002480	CTR SHFT ASSY NBD8 G-O	SIZE 245, 29:1 - 71:1 INPUT, VERT. DOWN
101	1	KERB0002510	CTR SHFT ASSY NBE1 121NBE	SIZE 255, 121:1, NOT VERT. DOWN
101	1	KERB0002520	CTR SHFT ASSY NBE2 187NBE	SIZE 255, 187:1, 319:1, 385:1, 493:1, 517:1, NOT VERT. DOWN
101	1	KERB0002530	CTR SHFT ASSY NBE3 289NBE	SIZE 255, 17:1 INPUT STAGE, NOT VERT. DOWN
101	1	KERB0002540	CTR SHFT ASSY NBE4 841NBE	SIZE 255, 29:1 - 71:1 INPUT, NOT VERT. DOWN
101	1	KERB0002550	CTR SHFT ASSY NBE5 G-O	SIZE 255, 121:1, VERT. DOWN
101	1	KERB0002560	CTR SHFT ASSY NBE6 G-O	SIZE 255, 187:1, 319:1, 385:1, 493:1, 517:1, VERT. DOWN
101	1	KERB0002570	CTR SHFT ASSY NBE7 G-O	SIZE 255, 17:1 INPUT STAGE, VERT. DOWN
101	1	KERB0002580	CTR SHFT ASSY NBE8 G-O	SIZE 255, 29:1 - 71:1 INPUT, VERT. DOWN
103	1	BERB0003010	COUPLER CIRCULUTE NAD1	SIZE 245
103	1	BERA0006011	COUPLER CIRCULUTE NBE1	SIZE 255
106	1	PART OF #101	COUNTER SHAFT BUSHING	
108	1	PART OF #101	SHIM	VERT. DOWN
109	1	RBBA006010	BEARING, BALL 6010 OPEN	SIZE 245, NOT VERT. DOWN
109	1	RBBEA006010	BEARING, BALL 6010DD	SIZE 245, VERT. DOWN
112	1	RLKAA007040	KEY 7X7X40	SIZE 245, 121:1
112	1	RLKAA010038	KEY 10X8X38 KM7	SIZE 245: 187:1 - 5041:1
112	1	RLKAA010038	KEY 10X8X38 KM7	SIZE 255, 121:1
112	1	RLKAA012058	KEY 12X8X58 KM10	SIZE 255: 187:1 - 5041:1
370	2	BRXA6060180	GASKET AT PIN HSG A,B,NB	
401	1	BERB1231160	FLANGE VERTICAL NB1	
404	6	BERA1231181	BOLT, STUD M8X78	
704	1	BERA1200041	RING OUTPUT HSG B1	SINGLE REDUCTION
704	1	BERB1200040	RING OUTPUT HSG NB1	MULTIPLE REDUCTION
708	**	BERA1200080	BOLT, STUD M8X90	
712	2	RSSA0080055	SCREW SCKT HD CAP M8X55	

* indicates that these parts must be purchased in sets of this size

** indicates that the number of items per reducer varies

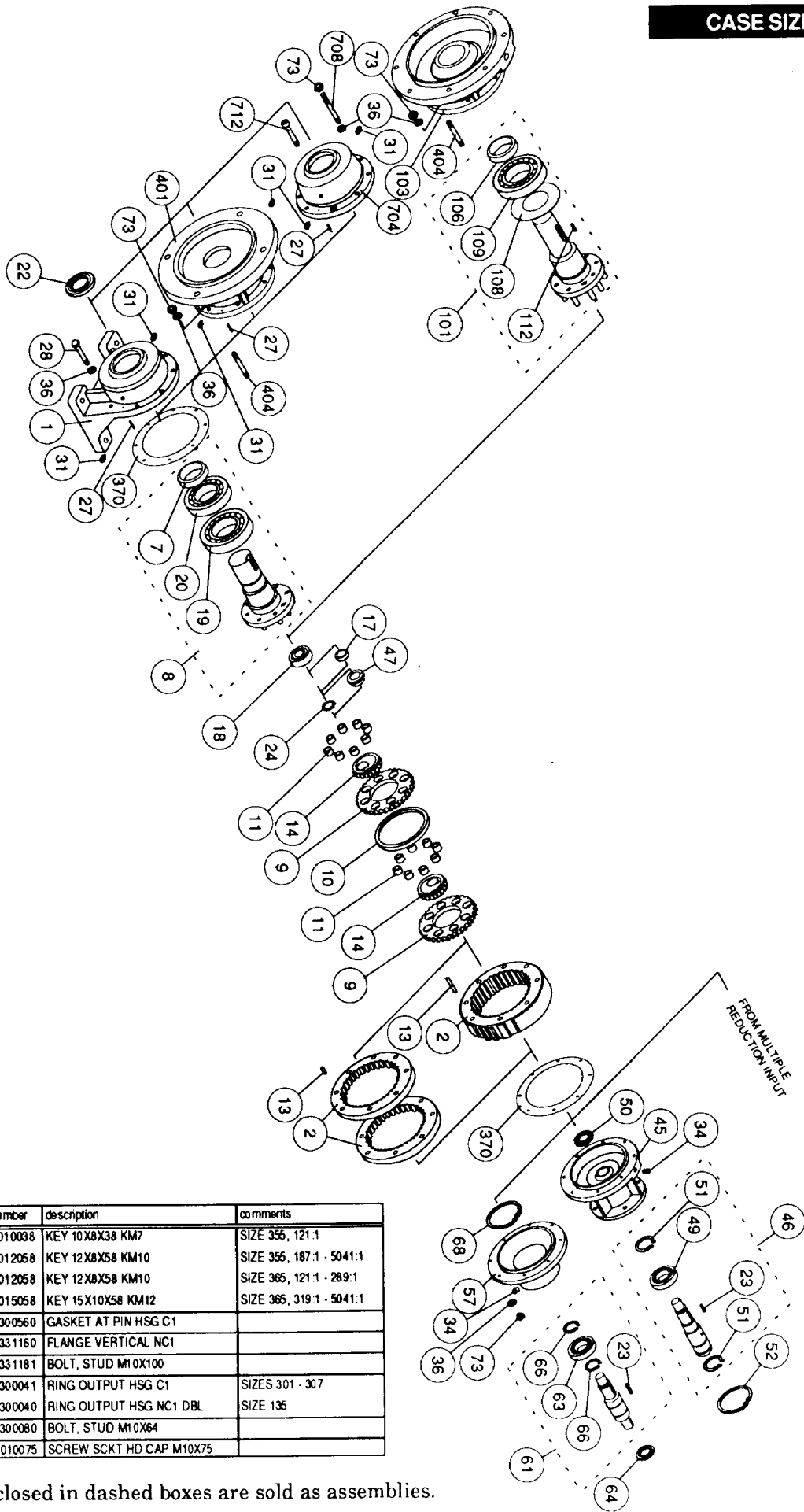
CASE SIZE 300 PARTS LIST

item	qty	part number	description	comments
1	1	BERB1300010	BASE NC1	
2	1	BERA1300021	PIN HOUSING C1	11:1, 17:1, 35:1, 71:1, STANDARD BACKLASH
2	1	BERA4300020	PIN HOUSING C2	29:1, 59:1, STANDARD BACKLASH
2	1	BERA5300021	PIN HOUSING C3	47:1, STANDARD BACKLASH
2	1	AERA1321021	PIN HOUSING C41	11:1, 17:1, 35:1, 71:1, REDUCED BACKLASH
2	1	AERA4321020	PIN HOUSING C42	29:1, 59:1, REDUCED BACKLASH
2	1	AERA5321021	PIN HOUSING C43	47:1, REDUCED BACKLASH
2	1	BERB1300020	PIN HOUSING NC1	SIZE 135, 11:1, 17:1, 35:1, 71:1, STANDARD BACKLASH, BASE AND FLANGE
2	1	BERB4300020	PIN HOUSING NC2	SIZE 135, 29:1, 59:1, STANDARD BACKLASH, BASE AND FLANGE
2	1	BERB5300020	PIN HOUSING NC3	SIZE 135, 47:1, STANDARD BACKLASH, BASE AND FLANGE
2	1	BERB1300100	PIN HOUSING NC1 RING DOUB	SIZE 135, 11:1, 17:1, 35:1, 71:1, STANDARD BACKLASH, RING MOUNT
2	1	BERB4300100	PIN HOUSING NC2 RING DOUB	SIZE 135, 29:1, 59:1, STANDARD BACKLASH, RING MOUNT
2	1	BERB5300100	PIN HOUSING NC3 RING DOUB	SIZE 135, 47:1, STANDARD BACKLASH, RING MOUNT
7	1	BERB1300470	BUSHING OUTPUT SHAFT NC1	
8	1	KNZY1321000	SHAFT OUTPUT NC1 W/BRG	11:1
8	1	KNZY2321000	SHAFT OUTPUT NC2 W/BRG	17:1
8	1	KNZY4321000	SHAFT OUTPUT NC3 W/BRG	29:1 - 71:1
9	2"	BERB1300220	WHEEL NC1	11:1
9	2"	BERB2300220	WHEEL NC2	17:1
9	2"	BERA4300221	WHEEL C3 29:1	29:1
9	2"	BERA3300222	WHEEL C4	35:1
9	2"	BERA5300222	WHEEL C5	47:1
9	2"	BERA6300222	WHEEL C6	59:1
9	2"	BERA7300221	WHEEL C7	71:1
10	1	BERB1300230	WHEEL SPACER NC1	11:1
10	1	BERB2300230	WHEEL SPACER NC2	17:1
10	1	BERA3300231	WHEEL SPACER C3	29:1 - 71:1
11	16*	BERB1300360	BUSHING NC1	
13	**	BERA1300381	PIN INTERNAL C1	STANDARD BACKLASH
13	**	BERA1321380	PIN INTERNAL C41	REDUCED BACKLASH
14	2"	BERA1300400	ECCENTRIC BEARING C1	11:1
14	2"	BERA2300400	ECCENTRIC BEARING C2	17:1
14	2"	BERA4300400	ECCENTRIC BEARING C3	29:1
14	2"	BERA3300400	ECCENTRIC BEARING C4	35:1
14	2"	BERA5300400	ECCENTRIC BEARING C5	47:1
14	2"	BERA6300400	ECCENTRIC BEARING C6	59:1
14	2"	BERA7300400	ECCENTRIC BEARING C7	71:1
17	1	RBNGA172016	INNER RACE 172016 NC1	11:1
18	1	RBRCA002204	BEARING, ROLLER NF2204	
19	1	RBBCA006212	BEARING, BALL 6212ZZ	
20	1	RBBEA006308	BEARING, BALL 6309DD	
22	1	ROSPA557009	OIL SEAL STANDARD D557009	
23	1	RLKAA005042	KEY 5X5X42	11:1
23	1	RLKAA007040	KEY 7X7X40	17:1 - 71:1
24	1	RLSSA000022	SNAP RING S-22 EXTERNAL	17:1 - 71:1, SINGLE REDUCTION
27	1	RLPAA010030	SPRING PIN M10X30	MULTIPLE REDUCTION OUTPUT
28	6	RSRAC010085	SCREW, HX, HD, CAPM10X85 11T	
31	2	RSTBG008014	SCREW, SET, M8X14, SHARP	
34	1	RSPBB000108	PLUG HEADLESS HEX 1/8 PT	
36	**	RWLBA000010	WASHER, SPRING, DISK, PS, M10	

item	qty	part number	description	comments
45	1	BNZY1315022	MOTOR FLANGE C1 56C/140TC	56C AND 140TC
45	1	BNZY1322022	MOTOR FLANGE C2 180TC	180TC
46	1	KNZY3307050	SHAFT MOTOR C5 W/BRG 56C	17:1 - 71:1, 56C
46	1	KNZY1315050	SHAFT MOTOR C1 W/BRG 140	11:1, 140TC
46	1	KNZY2315050	SHAFT MOTOR C3 W/BRG 140	17:1 - 71:1, 140TC
46	1	KNZY1322050	SHAFT MOTOR C2 W/BRG 180	11:1, 180TC
46	1	KNZY2322050	SHAFT MOTOR C4 W/BRG 180	17:1 - 71:1, 180TC
47	1	BERA1300430	COLLAR DISTANCE NC1	11:1 AND SIZE 135, 121:1
47	1	BERB0202030	COLLAR DISTANCE NC2 11X17	SIZE 135, 187:1 - 5041:1
49	1	RBBCA006208	BEARING, BALL 6208ZZ	56C AND 140TC
49	1	RBBCA006209	BEARING, BALL 6209ZZ	180TC
50	1	ROSAA005808	OIL SEAL STANDARD S405808	
51	2	RLSSA000040	SNAP RING S-40 EXTERNAL	56C AND 140TC
51	2	RLSSA000045	SNAP RING S-45 EXTERNAL	180TC
52	1	RLSRA000080	SNAP RING R-80 INTERNAL	56C AND 140TC
52	1	RLSRA000085	SNAP RING R-85 INTERNAL	180TC
57	1	BERA1300111	BRACKET INPUT C1	
61	1	KNZY1315060	SHAFT INPUT C1 W/BRG	11:1
61	1	KNZY2315060	SHAFT INPUT C2 W/BRG	17:1 - 71:1
63	1	RBBCA006206	BEARING, BALL 6206ZZ	
64	1	ROSPA304508	OIL SEAL STANDARD D304508	
66	2	RLSSA000030	SNAP RING S-30 EXTERNAL	
68	1	RLSRA000062	SNAP RING R-62 INTERNAL	
73	**	RSNA0000010	NUT, HEX M10 TYPE 1	
101	1	KERB0003510	CTR SHFT ASSY NCE1 121NCE	SIZE 355, 121:1, NOT VERT. DOWN
101	1	KERB0003520	CTR SHFT ASSY NCE2 187NCE	SIZE 355, 187:1, 319:1, 385:1, 493:1, 517:1, NOT VERT. DOWN
101	1	KERB0003530	CTR SHFT ASSY NCE3 289NCE	SIZE 355, 17:1 INPUT, NOT VERT. DOWN
101	1	KERB0003540	CTR SHFT ASSY NCE4 841NCE	SIZE 355, 29:1 - 71:1 INPUT, NOT VERT. DOWN
101	1	KERB0003550	CTR SHFT ASSY NCE5 G-O	SIZE 355, 121:1, VERT. DOWN
101	1	KERB0003560	CTR SHFT ASSY NCE6 G-O	SIZE 355, 187:1, 319:1, 385:1, 493:1, 517:1, VERT. DOWN
101	1	KERB0003570	CTR SHFT ASSY NCE7 G-O	SIZE 355, 17:1 INPUT, VERT. DOWN
101	1	KERB0003580	CTR SHFT ASSY NCE8 G-O	SIZE 355, 29:1 - 71:1 INPUT, VERT. DOWN
101	1	KERB0003610	CTR SHFT ASSY NCF1 121NCF	SIZE 365, 121:1, NOT VERT. DOWN
101	1	KERB0003620	CTR SHFT ASSY NCF2 319NCF	SIZE 365, 187:1, 319:1, 385:1, 493:1, 517:1, NOT VERT. DOWN
101	1	KERB0003630	CTR SHFT ASSY NCF3 289NCF	SIZE 365, 289:1, NOT VERT. DOWN
101	1	KERB0003640	CTR SHFT ASSY NCF4 493NCF	SIZE 365, 493:1, 595:1, 799:1, 1207:1, NOT VERT. DOWN
101	1	KERB0003650	CTR SHFT ASSY NCF5 841NCF	SIZE 365, 29:1 - 71:1 INPUT, NOT VERT. DOWN
101	1	KERB0003660	CTR SHFT ASSY NCF6 G-O	SIZE 365, 121:1, VERT. DOWN
101	1	KERB0003670	CTR SHFT ASSY NCF7 G-O	SIZE 365, 187:1, 319:1, 385:1, 493:1, 517:1, VERT. DOWN
101	1	KERB0003680	CTR SHFT ASSY NCF8 G-O	SIZE 365, 289:1, VERT. DOWN
101	1	KERB0003690	CTR SHFT ASSY NCF9 G-O	SIZE 365, 493:1, 595:1, 799:1, 1207:1, VERT. DOWN
101	1	KERB0003700	CTR SHFT ASSY NCF10 G-O	SIZE 365, 29:1 - 71:1 INPUT, VERT. DOWN
103	1	BERA0008011	COUPLER CIRCULUTE NCE1	SIZE 355
103	1	BERA0011011	COUPLER CIRCULUTE NCF1	SIZE 365
106	1	PART OF #101	COUNTER SHAFT BUSHING	
108	1	PART OF #101	COUNTER SHAFT SHIM	VERT. DOWN
109	1	RBBAA006212	BEARING, BALL 6212 OPEN	

* indicates that these parts must be purchased in sets of this size

** indicates that the number of items per reducer varies



item	qty	part number	description	comments
112	1	RLKAA010038	KEY 10X8X38 KM7	SIZE 355, 121.1
112	1	RLKAA012058	KEY 12X8X58 KM10	SIZE 355, 187.1 - 5041:1
112	1	RLKAA012058	KEY 12X8X58 KM10	SIZE 365, 121.1 - 289:1
112	1	RLKAA015058	KEY 15X10X58 KM12	SIZE 365, 319.1 - 5041:1
370	2	BERB1300560	GASKET AT PIN HSG C1	
401	1	BERB1331160	FLANGE VERTICAL NC1	
404	6	BERA1331181	BOLT, STUD M10X100	
704	1	BERA1300041	RING OUTPUT HSG C1	SIZES 301 - 307
704	1	BERB1300040	RING OUTPUT HSG NC1 DBL	SIZE 135
708	**	BERB1300080	BOLT, STUD M10X64	
712	2	RSSAA010075	SCREW SCKT HD CAP M10X75	

Items enclosed in dashed boxes are sold as assemblies.

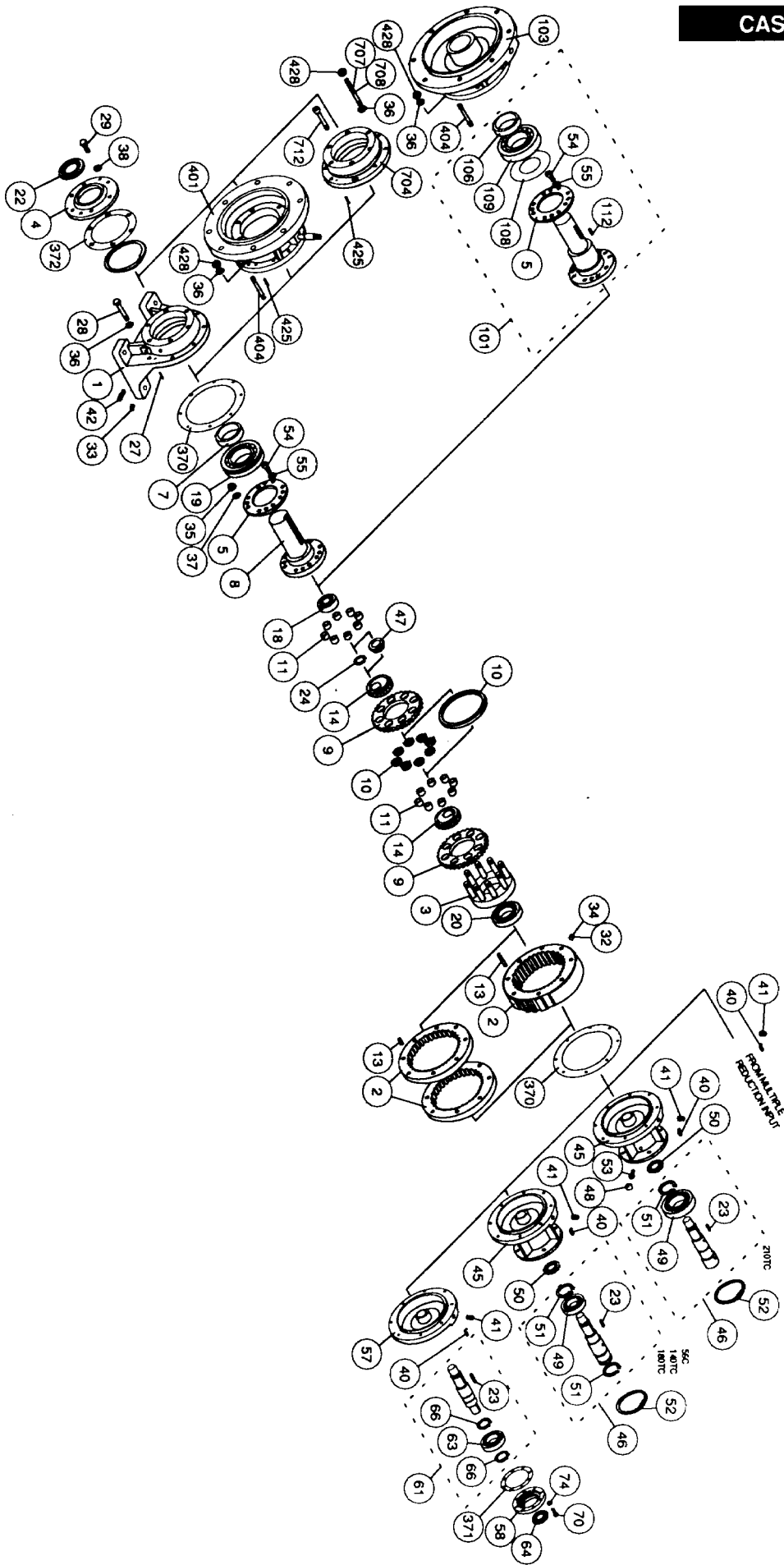
CASE SIZE 400 PARTS LIST

item	qty	part number	description	comments
1	1	BNZY1400011	BASE ND1	
2	1	BERA1400101	PIN HOUSING D1	11:1, 17:1, 35:1, 71:1, STANDARD BACKLASH
2	1	BERA4400101	PIN HOUSING D2	29:1, 59:1, STANDARD BACKLASH
2	1	BERA5400101	PIN HOUSING D3	47:1, STANDARD BACKLASH
2	1	AERA1421021	PIN HOUSING D41	11:1, 17:1, 35:1, 71:1, REDUCED BACKLASH
2	1	AERA4421020	PIN HOUSING D42	29:1, 59:1, REDUCED BACKLASH
2	1	AERA5421021	PIN HOUSING D43	47:1, REDUCED BACKLASH
2	1	BERB1466020	PIN HOUSING ND1	SIZE 145 AND 245, 11:1, 17:1, 35:1, 71:1, STANDARD BACKLASH, BASE AND FLANGE
2	1	BERB4466020	PIN HOUSING ND2	SIZE 145 AND 245, 29:1, 59:1, STANDARD BACKLASH, BASE AND FLANGE
2	1	BERB5466020	PIN HOUSING ND3	SIZE 145 AND 245, 47:1, STANDARD BACKLASH, BASE AND FLANGE
2	1	BERB1400100	PIN HOUSING ND1 RING DOUB	SIZE 145 AND 245, 11:1, 17:1, 35:1, 71:1, STANDARD BACKLASH, RING MOUNT
2	1	BERB4400100	PIN HOUSING ND2 RING DOUB	SIZE 145 AND 245, 29:1, 59:1, STANDARD BACKLASH, RING MOUNT
2	1	BERB5400100	PIN HOUSING ND3 RING DOUB	SIZE 145 AND 245, 47:1, STANDARD BACKLASH, RING MOUNT
3	1	KERB1400030	HOLDER WITH PINS ND1 11	11:1
3	1	KERB2400030	HOLDER WITH PINS ND2 17	17:1
3	1	KERB4400030	HOLDER WITH PINS ND3	29:1 - 71:1
4	1	BERB1400051	BEARING COVER A ND1	
5	1	BERB1400480	LOCATING SPACER ND1	11:1
5	1	BERB2400480	LOCATING SPACER ND2	17:1
5	1	BERB4400480	LOCATING SPACER ND3	29:1 - 71:1
7	1	BERB1400470	BUSHING OUTPUT SHAFT ND1	
8	1	BNZY1437040	SHAFT OUTPUT D1 11:1	11:1
8	1	BNZY2437040	SHAFT OUTPUT D2 17:1	17:1
8	1	BNZY3422041	SHAFT OUTPUT D3	29:1 - 71:1
9	2*	BERB1400220	WHEEL ND1	11:1
9	2*	BERB2400220	WHEEL ND2	17:1
9	2*	BERB4400220	WHEEL ND3	29:1
9	2*	BERB3400220	WHEEL ND4	35:1
9	2*	BERB5400220	WHEEL ND5	47:1
9	2*	BERB6400220	WHEEL ND6	59:1
9	2*	BERB7400220	WHEEL ND7	71:1
10	1	BERB1400230	WHEEL SPACER ND1	
10	8*	BERB2400230	WHEEL SPACER ND2	
10	8*	BERB4400230	WHEEL SPACER ND3	
11	16*	BERB1400360	BUSHING ND1	
13	**	BERA1400381	PIN INTERNAL D1	STANDARD BACKLASH
13	**	BERA1421380	PIN INTERNAL D41	REDUCED BACKLASH
14	2*	BERA1400400	ECCENTRIC BEARING D1	11:1
14	2*	BERA2400400	ECCENTRIC BEARING D2	17:1
14	2*	BERA4400400	ECCENTRIC BEARING D3	29:1
14	2*	BERA3400400	ECCENTRIC BEARING D4	35:1
14	2*	BERA5400400	ECCENTRIC BEARING D5	47:1
14	2*	BERA6400400	ECCENTRIC BEARING D6	59:1
14	2*	BERA7400400	ECCENTRIC BEARING D7	71:1
18	1	RBRC A002204	BEARING, ROLLER NF2204	11:1
18	1	RBRC A002305	BEARING, ROLLER NF2305	17:1 - 71:1
19	1	RBBGA006213	BEARING, BALL 6213NR	WITH SNAP RING, NOT VERT. UP
19	1	RBBKA006213	BEARING, BALL 6213LLNR	VWITH SNAP RING, VERT. UP
20	1	RBBAA006010	BEARING, BALL 6010 OPEN	11:1
20	1	RBBAA006210	BEARING, BALL 6210 OPEN	17:1 - 71:1
22	1	ROSPA750013	OIL SEAL STANDARD D750013	
23	1	RLKAA007040	KEY 7X7X40	11:1
23	1	RLKAA010038	KEY 10X8X38 KM7	17:1 - 71:1
24	1	RLSSA000024	SNAP RING S-24 EXTERNAL	11:1, SINGLE REDUCTION
24	1	RLSSA000028	SNAP RING S-28 EXTERNAL	17:1 - 71:1, SINGLE REDUCTION

item	qty	part number	description	comments
27	1	RLPAA010035	SPRING PIN M10X35	MULTIPLE REDUCTION
28	8	RSRAC010030	SCREW, HX, HD, CAP M10X90 11T	
29	6	RSRAA010035	SCREW, HX, HD, CAP M10X35	
32	1	RSPBB000104	PLUG HEADLESS HEX 1/4 PT	
33	3	RSPAA000104	PLUG 1/4 PT PG2 SQUARE	
34	1	RSPBB000108	PLUG HEADLESS HEX 1/8 PT	
35	8	RSNBA000012	NUT, HEX M12 TYPE 3 JAM	
36	**	RWLBA000010	WASHER, SPRING, DISK, PS, M10	
37	8	RWLBA000012	WASHER, SPRING, DISK, PS, M12	
38	8	RWSAA000010	WASHER, LOCK, SPLIT, M10	
40	1	ROTA0000004	PLUG RUBBER 4MM DIA RED	
41	1	SSOBA0000308	PLUG BREATHER 3/8 PT BC3	
42	1	SSOAA000104	PLUG MAGNETIC 1/4 PT MP1	
45	1	BNZY5415020	MOTOR FLANGE D3 56C/140TC	56C AND 140TC
45	1	BNZY1437020	MOTOR FLANGE D1 180TC	180TC
45	1	BNZY1455020	MOTOR FLANGE D2 210TC	210TC
46	1	KNZY7407050	SHAFT MOTOR D6 W/BRG 56C	17:1 - 71:1, 56C
46	1	KNZY5415050	SHAFT MOTOR D5 W/BRG 140	17:1 - 71:1, 140TC
46	1	KNZY1437050	SHAFT MOTOR D1 W/BRG 180	11:1, 180TC
46	1	KNZY2437050	SHAFT MOTOR D3 W/BRG 180	17:1 - 71:1, 180TC
46	1	KNZY1455030	SHAFT MOTOR D2 W/BRG 210	11:1, 210TC
46	1	KNZY2455030	SHAFT MOTOR D4 W/BRG 210	17:1 - 71:1, 210TC
47	1	BERB0103030	COLLAR DISTANCE ND1 11X11	SIZE 145 AND 245, OUTPUT RATIO 11:1
47	1	BERB0203030	COLLAR DISTANCE ND2 11X17	SIZE 145 AND 245, OUTPUT RATIO 17:1 - 71:1
48	1	SOBAA000025	PLUG RUBBER 25MM DIA LP2	210TC
49	1	RBBCA006209	BEARING, BALL 6209ZZ	140T AND 180TC
49	1	RBBCA006310	BEARING, BALL 6310ZZ	210TC
50	1	ROSA3355008	OIL SEAL STANDARD S355008	
51	2	RLSSA000045	SNAP RING S-45 EXTERNAL	56C, 140TC AND 180TC
51	1	RLSSA000050	SNAP RING S-50 EXTERNAL	210TC
52	1	RLSRA000085	SNAP RING R-85 INTERNAL	56C, 140TC AND 180TC
52	1	RLSRA000110	SNAP RING R-110 INTERNAL	210TC
53	1	RSSAA006014	SCREW SCKT HD CAP M6X14	210TC
54	4	RSSAA008020	SCREW SCKT HD CAP M8X20	11:1
54	4	RSSAA010020	SCREW SCKT HD CAP M10X20	17:1 - 71:1
55	4	RWADB000008	WASHER, LOCK, RIBBED M8	11:1
55	4	RWADB000010	WASHER, LOCK, RIBBED M10	17:1 - 71:1
57	1	BERA1400110	BRACKET INPUT D1	
58	1	BERA1400120	BEARING COVER B D1	
61	1	BNZY1437060	SHAFT INPUT D1 11:1	11:1
61	1	BNZY2437060	SHAFT INPUT D2 17:1:1	17:1 - 71:1
63	1	RBBCA006307	BEARING, BALL 6307ZZ	
64	1	ROSPA3355008	OIL SEAL STANDARD D355008	
66	2	RLSSA000035	SNAP RING S-35 EXTERNAL	
70	4	RSRAA006025	SCREW, HX, HD, CAP M6X25	
74	4	RWSAA000006	WASHER, LOCK, SPLIT, M6	
101	1	KERB0004610	CTR SHFT ASSY NDF1 121NDF	SIZE 465, 121:1
101	1	KERB0004620	CTR SHFT ASSY NDF2 319NDF	SIZE 465, 187:1, 319:1, 385:1, 493:1, 517:1
101	1	KERB0004630	CTR SHFT ASSY NDF3 289NDF	SIZE 465, 17:1 INPUT
101	1	KERB0004710	CTR SHFT ASSY NDG1 187NDG	SIZE 475, 187:1, 319:1, 385:1, 493:1, 517:1
101	1	KERB0004720	CTR SHFT ASSY NDG2 289NDG	SIZE 475, 17:1 INPUT
101	1	KERB0004730	CTR SHFT ASSY NDG3 841NDG	SIZE 475, 29:1 - 71:1 INPUT
103	1	BERA0012011	COUPLER CIRCULUTE NDF1	SIZE 465
103	1	BERA0016011	COUPLER CIRCULUTE NDG1	SIZE 475
106	1	PART OF #101	COUNTER SHAFT BUSHING	
108	1	PART OF #101	COUNTER SHAFT SHIM	VERT. DOWN
109	1	RBBAA006213	BEARING, BALL 6213 OPEN	SIZE 465
109	1	RBBAA006214	BEARING, BALL 6214 OPEN	SIZE 475
112	1	RLKAA012058	KEY 12X8X58 KM10	SIZE 465, 11:1 - 289:1
112	1	RLKAA015058	KEY 15X10X58 KM12	SIZE 465, 319:1 - 504:1
112	1	RLKAD018076	KEY 18X11X76 KM13	SIZE 475
370	2	BERB1400560	GASKET AT PIN HSG D1	BASE AND FLANGE MOUNT
370	2	BERB1400570	GASKET RING MT PIN HSG ND	RING MOUNT, MULTIPLE REDUCTION
371	1	BERA1400550	GASKET AT BRG COVER B D1	
372	1	BERB1400540	GASKET AT BRG COVER A ND1	
401	1	BERB1431160	FLANGE VERTICAL ND1	
404	8	BERA1331181	BOLT, STUD M10X100	
425	1	RLPAA010030	SPRING PIN M10X30	MULTIPLE REDUCTION
428	**	RSNAA000010	NUT, HEX M10 TYPE 1	
704	1	BERA1400042	RING OUTPUT HSG ND1 SINGL	SINGLE REDUCTION
704	1	BERB1400040	RING OUTPUT HSG ND1 DBL	MULTIPLE REDUCTION
707	8	BERB130008	BOLT, STUD M10X118	MULTIPLE REDUCTION
709	6	BERA1300080	BOLT, STUD M10X118	
712	2	RSSAA010075	SCREW SCKT HD CAP M10X75	

* indicates that these parts must be purchased in sets of this size

** indicates that the number of items per reducer varies

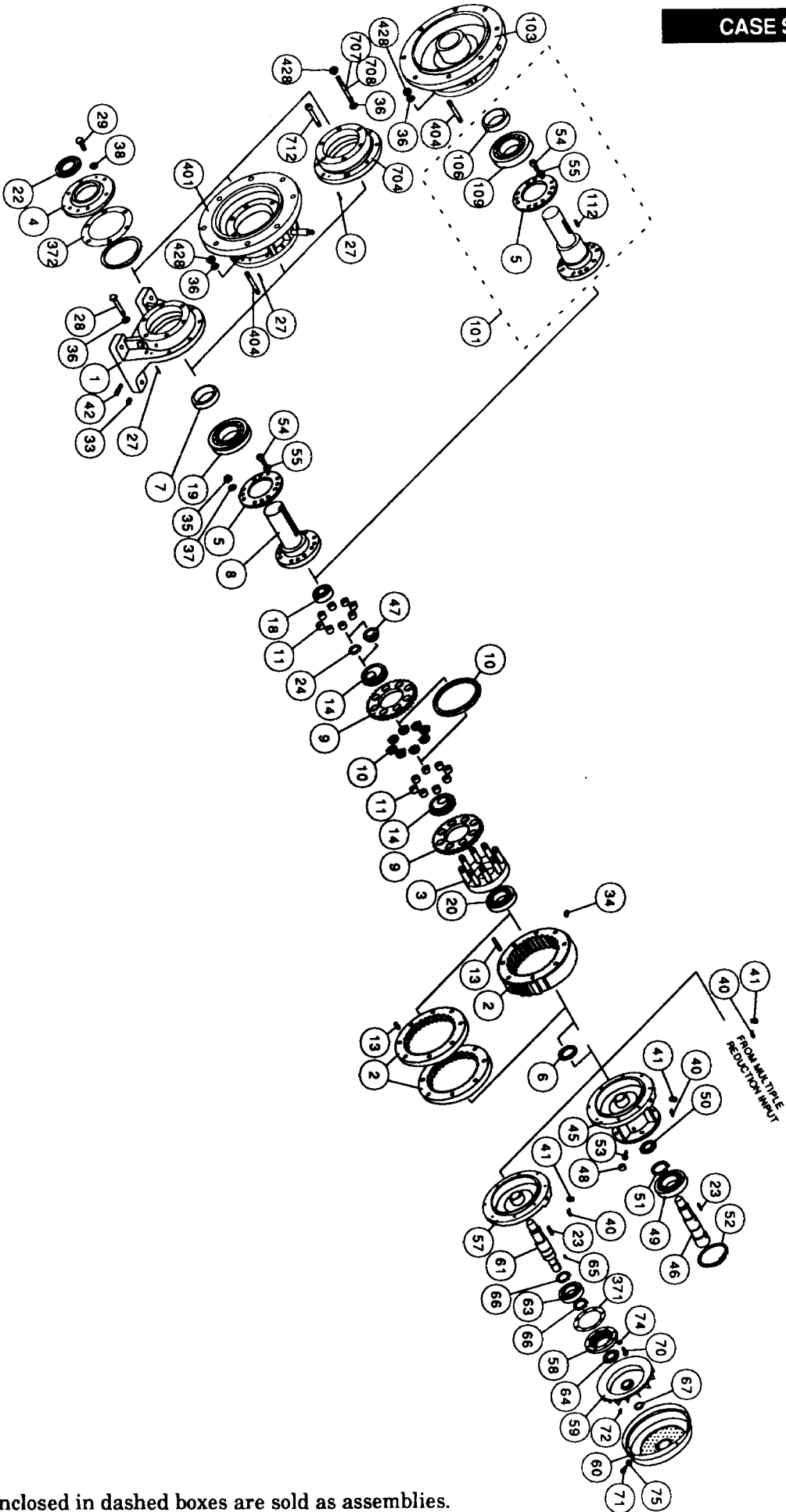


CASE SIZE 500 PARTS LIST

Item	Qty	Part Number	Description	Comments
1	1	BNZY1500011	BASE NE1	
2	1	BERB1566020	PIN HOUSING NE1	11:1, 17:1, 35:1, 71:1, STANDARD BACKLASH, BASE AND FLANGE
2	1	BERB4566020	PIN HOUSING NE2	29:1, 59:1, STANDARD BACKLASH, BASE AND FLANGE
2	1	BERB5566020	PIN HOUSING NE3	47:1, STANDARD BACKLASH, BASE AND FLANGE
2	1	BERB1500100	PIN HOUSING NE1 RING DOUB	11:1, 17:1, 35:1, 71:1, STANDARD BACKLASH, RING MOUNT
2	1	BERB4500100	PIN HOUSING NE2 RING DOUB	29:1, 59:1, STANDARD BACKLASH, RING MOUNT
2	1	BERB5500100	PIN HOUSING NE3 RING DOUB	47:1, STANDARD BACKLASH, RING MOUNT
2	1	AERA1521020	PIN HOUSING E41	11:1, 17:1, 35:1, 71:1, REDUCED BACKLASH
2	1	AERA4521020	PIN HOUSING E42	29:1, 59:1, REDUCED BACKLASH
2	1	AERA5521020	PIN HOUSING E43	47:1, REDUCED BACKLASH
3	1	KERB1500030	HOLDER WITH PINS NE1 11	11:1
3	1	KERB2500030	HOLDER WITH PINS NE2 17	17:1
3	1	KERB4500030	HOLDER WITH PINS NE3	29:1 - 71:1
4	1	BERB1500050	BEARING COVER A NE1	
5	1	BERB1500480	LOCATING SPACER NE1	11:1
5	1	BERB2500480	LOCATING SPACER NE2	17:1
5	1	BERB4500480	LOCATING SPACER NE3	29:1 - 71:1
6	1	BERA1500070	SPACER E1 11E FOR HOLDER	11:1
7	1	BERB1500470	BUSHING OUTPUT SHAFT NE1	
8	1	BNZY1500212	SHAFT OUTPUT NE1 11:1	11:1
8	1	BNZY2500213	SHAFT OUTPUT NE2 17:1	17:1
8	1	BNZY4500211	SHAFT OUTPUT NE3	29:1 - 71:1
9	2*	BERA1500221	WHEEL E1	11:1
9	2*	BERA2500221	WHEEL E2	17:1
9	2*	BERA4500221	WHEEL E3	29:1
9	2*	BERA3500221	WHEEL E4	35:1
9	2*	BERA5500221	WHEEL E5	47:1
9	2*	BERA6500221	WHEEL E6	59:1
9	2*	BERA7500221	WHEEL E7	71:1
10	1	BERA1500230	WHEEL SPACER E1	11:1
10	8*	BERA2500231	WHEEL SPACER E2	17:1
10	8*	BERA3500230	WHEEL SPACER E3	29:1 - 71:1
11	16*	BERA1500360	BUSHING E1	11:1 - 17:1
11	16*	BERA3500360	BUSHING E2	29:1 - 71:1
13	**	BERA1500380	PIN INTERNAL E1	STANDARD BACKLASH
13	**	BERA1521380	PIN INTERNAL E41	REDUCED BACKLASH
14	2*	BERA1500400	ECCENTRIC BEARING E1	11:1
14	2*	BERA2500400	ECCENTRIC BEARING E2	17:1
14	2*	BERA4500400	ECCENTRIC BEARING E3	29:1
14	2*	BERA3500400	ECCENTRIC BEARING E4	35:1
14	2*	BERA5500400	ECCENTRIC BEARING E5	47:1
14	2*	BERA6500400	ECCENTRIC BEARING E6	59:1
14	2*	BERA7500400	ECCENTRIC BEARING E7	71:1
18	1	RBRCA002305	BEARING, ROLLER NF2305	11:1
18	1	RBRCA002306	BEARING, ROLLER NF2306	17:1 - 71:1
19	1	RBBGA006315	BEARING, BALL 6315NR	WITH SNAP RING, NOT VERT. UP
19	1	RBBKA006315	BEARING, BALL 6315LLNR	WITH SNAP RING, VERT. UP
20	1	RBBAA006015	BEARING, BALL 6015 OPEN	
22	1	ROSPA851013	OIL SEAL STANDARD D851013	
23	1	RLKAA010038	KEY 10X8X38 KM7	11:1
23	1	RLKAA012058	KEY 12X8X58 KM10	17:1 - 71:1

Item	Qty	Part Number	Description	Comments
24	1	RLSSA000028	SNAP RING S-28 EXTERNAL	11:1, SINGLE REDUCTION
24	1	RLSSA000038	SNAP RING S-38 EXTERNAL	17:1 - 71:1, SINGLE
27	**	RLPAA013040	SPRING PIN M13X40	
28	8	RSRAC012122	SCREW, HX, HD, CAP M12X12211T	
29	6	RSRAA010035	SCREW, HX, HD, CAP M10X35	
33	3	RSPA000308	PLUG 3/8 PT PG3 SQUARE	
34	2	RSPB000308	PLUG HEADLESS HEX 3/8 PT	
35	8	RSNAA000012	NUT, HEX M12 TYPE 1	11:1 - 17:1
35	8	RSNAA000016	NUT, HEX M16 TYPE 1	29:1 - 71:1
36	**	RWSAA000012	WASHER, LOCK, SPLIT, M12	
37	8	RSNAA000012	WASHER, SPRING, DISK, PS, M12	11:1 - 17:1
37	8	RWLBA000016	WASHER, SPRING, DISK, PS, M16	29:1 - 71:1
38	6	RWSAA000010	WASHER, LOCK, SPLIT, M10	
40	1	ROTA000004	PLUG RUBBER 4MM DIA RED	
41	1	SSOBA000304	PLUG BREATHER 3/4 PT BC5	
42	1	SSOAA000308	PLUG MAGNETIC 3/8 PT MP2	
45	1	BNZY1575020	MOTOR FLANGE E1 210/250TC	
46	1	BNZY5537030	SHAFT MOTOR E5 180TC	17:1 - 71:1, 180TC
46	1	BNZY1575030	SHAFT MOTOR E1 210TC	11:1, 210TC
46	1	BNZY2575030	SHAFT MOTOR E3 210TC	17:1 - 71:1, 210TC
46	1	BNZY1591030	SHAFT MOTOR E2 11:1 250TC	11:1, 250TC
46	1	BNZY2591030	SHAFT MOTOR E4 250TC	17:1 - 71:1, 250TC
47	1	BERB020203	DISTANCE COLLAR	11:1, MULTIPLE REDUCTION OUTPUT
47	1	BERB020703	DISTANCE COLLAR	17:1 - 71:1, MULTIPLE REDUCTION OUTPUT
48	1	SOBAA000025	PLUG RUBBER 25MM DIA LP2	
49	1	RBBCA006312	BEARING, BALL 6312ZZ	
50	1	ROSAA506809	OIL SEAL STANDARD S506809	
51	1	RLSSA000060	SNAP RING S-60 EXTERNAL	
52	1	RLSRA000130	SNAP RING R-130 INTERNAL	
53	1	RSSAA008016	SCREW SCKT HD CAP M8X16	
54	4	RSSAA010025	SCREW SCKT HD CAP M10X25	
55	4	RWADB000010	WASHER, LOCK, RIBBED, M10	
57	1	BERA1500110	BRACKET INPUT E1	
58	1	BERA1500120	BEARING COVER B E1	
59	1	BERA1500130	FAN E1	
60	1	BERA1500140	FAN COVER E1	
61	1	BNZY1500320	SHAFT INPUT E1 11:1	11:1
61	1	BNZY2500320	SHAFT INPUT E2 17:1-71:1	17:1 - 71:1
63	1	RBBCA006310	BEARING, BALL 6310ZZ	
64	1	ROSPA506809	OIL SEAL STANDARD D506809	
65	1	RLKAA012022	KEY 12X8X22	
66	2	RLSSA000050	SNAP RING S-50 EXTERNAL	
67	1	RLSSA000042	SNAP RING S-42 EXTERNAL	
70	4	RSRAA008030	SCREW, HX, HD, CAP M8X30	
71	4	RSRAA006010	SCREW, HX, HD, CAP M6X10	
72	1	RSTAA008010	SCREW, SET, M8X10, CUP POINT	
74	4	RWSAA000008	WASHER, LOCK, SPLIT, M8	
75	4	RWSAA000006	WASHER, LOCK, SPLIT, M6	
101	1	KERB00005710	CTR SHFT ASSY NEG1 187NEG	SIZE 575, 11:1 INPUT
101	1	KERB00005720	CTR SHFT ASSY NEG2 289NEG	SIZE 575, 17:1 INPUT
103	1	BERA0017011	COUPLER CIRCULUTE NEG1	
106	1	PART OF #101	COUNTER SHAFT BUSHING	
109	1	RBBAA006314	BEARING, BALL 6314 OPEN	
112	1	RLKAD018076	KEY 18X11X76 KM13	SIZE 575
371	1	BERB1500550	GASKET AT BRG COVER B E1	
372	1	BERB1500540	GASKET AT BRG COVER A NE1	
401	1	BERB1531160	FLANGE VERTICAL NE1	
404	8	BERA1531181	BOLT, STUD M12X138	
428	**	RSNAA000012	NUT, HEX M12 TYPE 1	
704	1	BERB1500040	RING OUTPUT HSG NE1	
707	8	BERB1500080	BOLT, STUD M12X82	
708	6	BERA1500080	BOLT, STUD M12X160	
712	2	RSSAA012110	SCREW SCKT HD CAP M12X110	

- * indicates that these parts must be purchased in sets of this size
- ** indicates that the number of items per reducer varies



Items enclosed in dashed boxes are sold as assemblies.

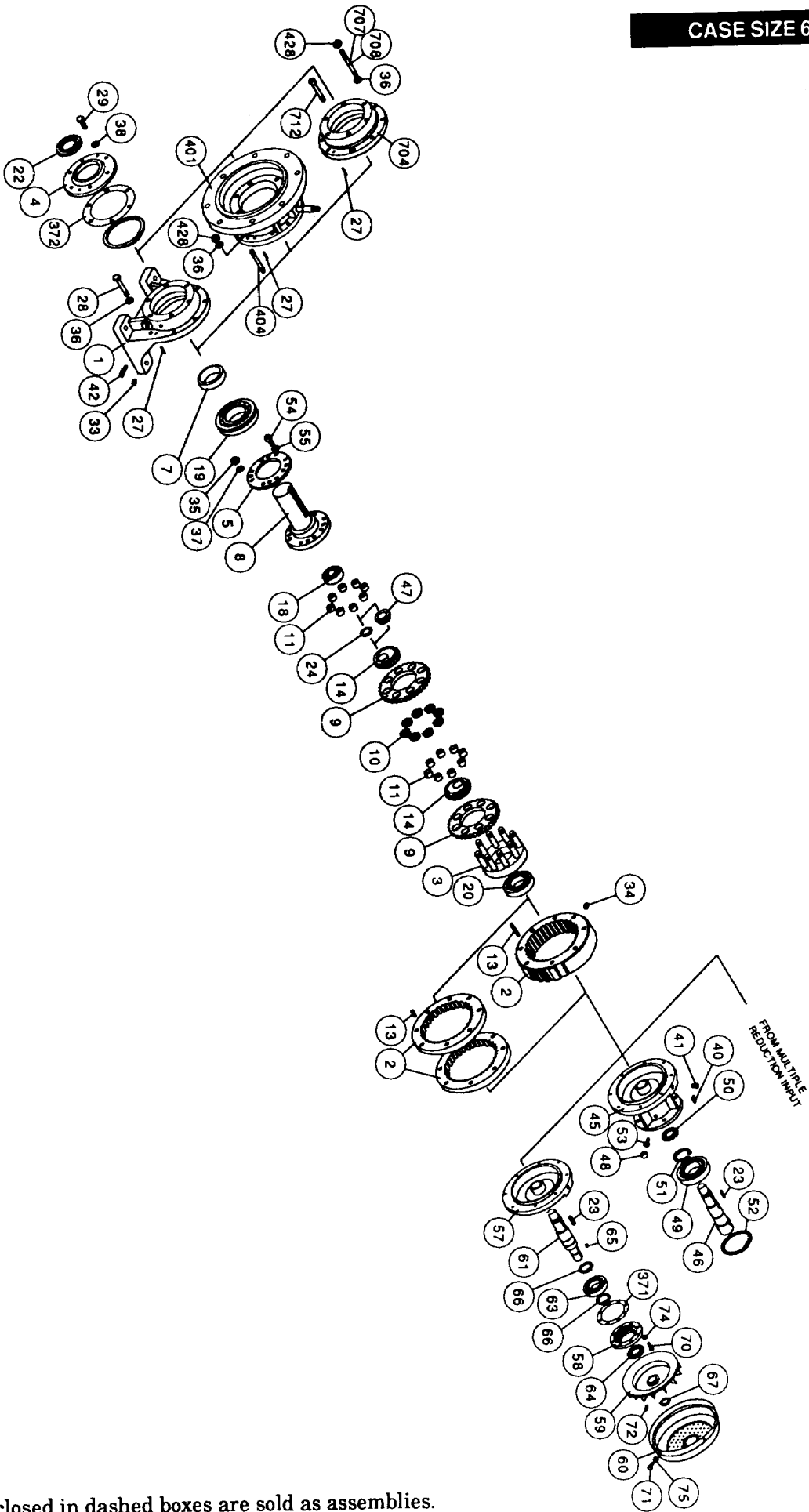
CASE SIZE 600 PARTS LIST

item	qty	part number	description	comments
1	1	BNZY1600011	BASE NF1	
2	1	BERB1666020	PIN HOUSING NF1	11:1, 17:1, 35:1, 71:1, STANDARD BACKLASH, BASE AND FLANGE
2	1	BERB4666020	PIN HOUSING NF2	29:1, 59:1, STANDARD BACKLASH, BASE AND FLANGE
2	1	BERB5666020	PIN HOUSING NF3	47:1, STANDARD BACKLASH, BASE AND FLANGE
2	1	BERB1600100	PIN HOUSING NF1 RING DOUB	11:1, 17:1, 35:1, 71:1, STANDARD BACKLASH, RING MOUNT
2	1	BERB4600100	PIN HOUSING NF2 RING DOUB	29:1, 59:1, STANDARD BACKLASH, RING MOUNT
2	1	BERB5600100	PIN HOUSING NF3 RING DOUB	47:1, STANDARD BACKLASH, RING MOUNT
2	1	AERA1621020	PIN HOUSING F41	11:1, 17:1, 35:1, 71:1, REDUCED BACKLASH
2	1	AERA4621020	PIN HOUSING F42	29:1, 59:1, REDUCED BACKLASH
2	1	AERA5621020	PIN HOUSING F43	47:1, REDUCED BACKLASH
3	1	KERB1600030	HOLDER WITH PINS NF1	11:1 - 17:1
3	1	KERB4600030	HOLDER WITH PINS NF2	29:1 - 71:1
4	1	BERB1600050	BEARING COVER A NF1	
5	1	BERB1600480	LOCATING SPACER NF1	11:1 - 17:1
5	1	BERB4600480	LOCATING SPACER NF2	29:1 - 71:1
7	1	BERB1600470	BUSHING OUTPUT SHAFT NF1	
8	1	BNZY1600212	SHAFT OUTPUT NF1 11-17:1	11:1 - 17:1
8	1	BNZY4600211	SHAFT OUTPUT NF2	29:1 - 71:1
9	2*	BERA1600221	WHEEL F1	11:1
9	2*	BERA2600221	WHEEL F2	17:1
9	2*	BERA4600221	WHEEL F3	29:1
9	2*	BERA3600221	WHEEL F4	35:1
9	2*	BERA5600221	WHEEL F5	47:1
9	2*	BERA6600221	WHEEL F6	59:1
9	2*	BERA7600221	WHEEL F7	71:1
10	8*	BERA3500230	WHEEL SPACER E3	11:1 - 17:1
10	8*	BERA3600230	WHEEL SPACER F1	29:1 - 71:1
11	16*	BERA3500360	BUSHING E2	11:1 - 17:1
11	16*	BERA3600360	BUSHING F1	29:1 - 71:1
13	**	BERA1600380	PIN INTERNAL F1	STANDARD BACKLASH
13	**	BERA1621380	PIN INTERNAL F41	REDUCED BACKLASH
14	2*	BERA1600400	ECCENTRIC BEARING F1	11:1
14	2*	BERA2600400	ECCENTRIC BEARING F2	17:1
14	2*	BERA4600400	ECCENTRIC BEARING F3	29:1
14	2*	BERA3600400	ECCENTRIC BEARING F4	35:1
14	2*	BERA5600400	ECCENTRIC BEARING F5	47:1
14	2*	BERA6600400	ECCENTRIC BEARING F6	59:1
14	2*	BERA7600400	ECCENTRIC BEARING F7	71:1
18	1	RBRC4002306	BEARING, ROLLER NF2306	11:1
18	1	RBRC4002308	BEARING, ROLLER NF2308	17:1 - 71:1
19	1	RBBGA006319	BEARING, BALL 6319NR	WITH SNAP RING, NOT VERT. UP
19	1	RBBKA006319	BEARING, BALL 6319LLNR	WITH SNAP RING, VERT. UP
20	1	RBBCA006216	BEARING, BALL 6216ZZ	

item	qty	part number	description	comments
22	1	ROSPA104014	OIL SEAL STANDARD D104014	
23	1	RLKAA012058	KEY 12X8X58 KM0	11:1 - 17:1
23	1	RLKAA015058	KEY 15X10X58 KM12	29:1 - 71:1
24	1	RLSSA000038	SNAP RING S-38 EXTERNAL	11:1 - 17:1
24	1	RLSSA000048	SNAP RING S-48 EXTERNAL	29:1 - 71:1
27	**	RLPAA013045	SPRING PIN M13X45	
28	8	RSRAC012130	SCREW, HX, HD, CAPM12X13011T	
29	6	RSRAC012045	SCREW, HX, HD, CAPM12X45 11T	
33	3	RSPAA000308	PLUG 3/8 PT PG3 SQUARE	
34	2	RSPBB000308	PLUG HEADLESS HEX 3/8 PT	
35	8	RSNAA000016	NUT, HEX M16 TYPE 1	11:1 - 17:1
35	8	RSNAA000018	NUT, HEX M18 TYPE 1	29:1 - 71:1
36	**	RWSAA000012	WASHER, LOCK, SPLIT, M12	
37	8	RWLBA000016	WASHER, SPRING, DISK, PS, M16	11:1 - 17:1
37	8	RWLBA000018	WASHER, SPRING, DISK, PS, M18	29:1 - 71:1
38	6	RWSAA000012	WASHER, LOCK, SPLIT, M12	
40	1	ROTA0000004	PLUG RUBBER 4MM DIA RED	
41	1	SSQBA000304	PLUG BREATHER 3/4 PT BCS	
42	1	SSQAA000308	PLUG MAGNETIC 3/8 PT MP2	
45	1	BNZY1695020	MOTOR FLANGE F1 210250TC	210TC & 250TC
45	1	BNZY1696020	MOTOR FLANGE F2 280TC	280TC
46	1	BNZY5675030	SHAFT MOTOR F4 210TC	29:1 - 71:1, 210TC
46	1	BNZY1695030	SHAFT MOTOR F1 250TC	11:1 - 17:1, 250TC
46	1	BNZY3691030	SHAFT MOTOR F3 250TC	29:1 - 71:1, 250TC
46	1	BNZY1696030	SHAFT MOTOR 280TC	11:1 - 17:1, 280TC
46	1	BNZY4696030	SHAFT MOTOR 280TC	29:1 - 71:1, 280TC
47	1	BERB0207030	COLLAR DISTANCE NF1 11X11	11:1 - 17:1, 280TC AND MULTIPLE REDUCTION
47	1	BERB4511030	COLLAR DISTANCE NF2	29:1 - 71:1, 280TC AND MULTIPLE REDUCTION
48	1	SOBAA000025	PLUG RUBBER 25MM DIA LP2	
49	1	RBBCA006312	BEARING, BALL 6312ZZ	210TC AND 250TC
49	1	RBBCA006215	BEARING, BALL 6215ZZ	280TC
50	1	ROSAA608212	OIL SEAL STANDARD S608212	
51	1	RLSSA000075	SNAP RING S-75 EXTERNAL	280TC
51	1	RLSSA000060	SNAP RING S-60 EXTERNAL	210TC AND 250TC
52	1	RLSRA000130	SNAP RING R-130 INTERNAL	
53	1	RSSAA008014	SCREW SCKT HD CAP M8X14	
54	4	RSSAA012025	SCREW SCKT HD CAP M12X25	
55	4	RWADB000012	WASHER, LOCK, RIBBED, M12	
57	1	BERA1600110	BRACKET INPUT F1	
58	1	BERA1600120	BEARING COVER B F1	
59	1	BERA1600130	FAN F1	
60	1	BERA1600140	FAN COVER F1	
61	1	BNZY1600320	SHAFT INPUT F1 11-17:1	11:1 - 17:1
61	1	BNZY3600320	SHAFT INPUT F2 29-71:1	29:1 - 71:1
63	1	RBBCA006312	BEARING, BALL 6312ZZ	
64	1	ROSPA608212	OIL SEAL STANDARD D608212	
65	1	RLKAD014022	KEY 14X9X22	
66	2	RLSSA000060	SNAP RING S-60 EXTERNAL	
67	1	RLSSA000048	SNAP RING S-48 EXTERNAL	
70	4	RSRAA008035	SCREW, HX, HD, CAP M8X35	
71	4	RSRAA006010	SCREW, HX, HD, CAP M6X10	
72	1	RSTAA008010	SCREW, SET, M8X10, CUP POINT	
74	4	RWSAA000008	WASHER, LOCK, SPLIT, M8	
75	4	RWSAA000006	WASHER, LOCK, SPLIT, M6	
371	1	BERB1600550	GASKET AT BRG COVER B F1	
372	1	BERB1600540	GASKET AT BRG COVER A NF1	
401	1	BERB1631160	FLANGE VERTICAL NF1	
404	8	BERA1531181	BOLT, STUD M12X138	
428	**	RSNAA000012	NUT, HEX M12 TYPE 1	
704	1	BERB1600040	RING OUTPUT HSG NF1	
707	8	BERB1500080	BOLT, STUD M12X82	
708	6	BERA1500080	BOLT, STUD M12X160	
712	2	RSSAA012110	SCREW SCKT HD CAP M12X110	

* indicates that these parts must be purchased in sets of this size

** indicates that the number of items per reducer varies



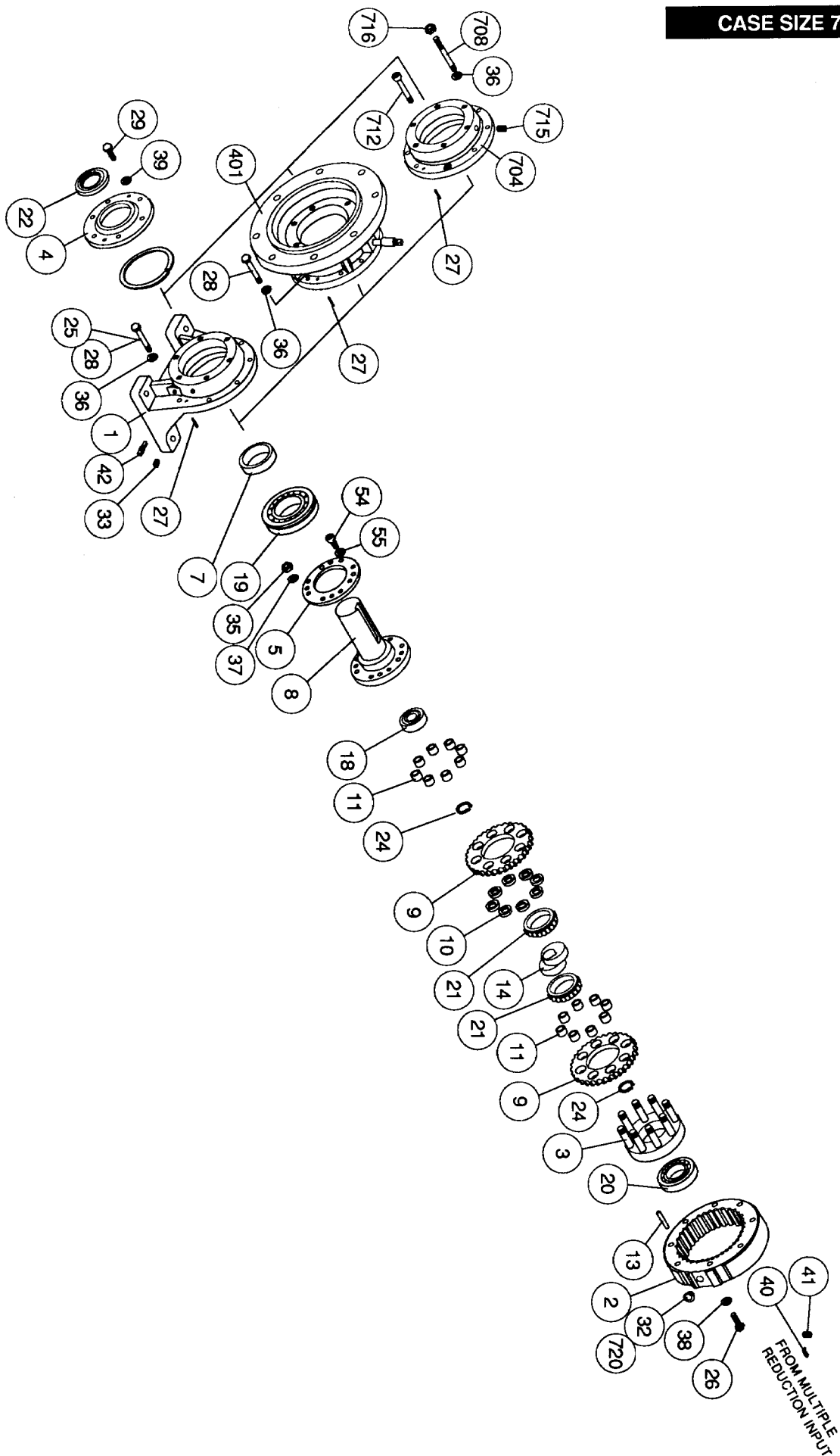
Items enclosed in dashed boxes are sold as assemblies.

CASE SIZE 700 PARTS LIST

item	qty	part number	description	comments
1	1	BERB2700010	BASE NG1	
2	1	BERB2700020	PIN HOUSING NG1	17:1, 35:1, 71:1, BASE AND FLANGE
2	1	BERB4700020	PIN HOUSING NG2	29:1, 59:1, BASE AND FLANGE
2	1	BERB2700100	PIN HOUSING NG1 RING DOUB	SIZE 475 AND 575, 17:1, 35:1, 71:1, RING MOUNT
2	1	BERB4700100	PIN HOUSING NG2 RING DOUB	SIZE 475 AND 575, 29:1, 59:1, RING MOUNT
3	1	KERB2700030	HOLDER WITH PINS NG1	17:1
3	1	KERB4700030	HOLDER WITH PINS NG2	29:1 - 71:1
4	1	BERB2700050	BEARING COVER A NG1	
5	1	BERB2700480	LOCATING SPACER NG1	
7	1	BERB2700470	BUSHING OUTPUT SHAFT NG1	
8	1	BNZY2700212	SHAFT OUTPUT NG1 17NG	17:1
8	1	BNZY4700211	SHAFT OUTPUT NG2	29:1 - 71:1
9	2*	BERA2700221	WHEEL G2 17G	17:1
9	2*	BERA4700221	WHEEL G3 29G	29:1
9	2*	BERA3700221	WHEEL G4 35G	35:1
9	2*	BERA6700221	WHEEL G6 59G	59:1
9	2*	BERA7700221	WHEEL G7 71G	71:1
10	8	BERA2700231	SPACER, WHEEL G1 17G	17:1
10	8	BERA4700231	SPACER, WHEEL G2 29-71G	29:1 - 71:1
11	16*	RBNGA303530	BUSHING 17:1	17:1
11	16*	BERA2700360	BUSHING G1 29G-71G	29:1 - 71:1
13	**	BERA2700380	PIN INTERNAL G1	
14	1	BERA2700391	ECCENTRIC BUSHING G1	17:1
14	1	BERA4700391	BUSHING ECCENTRIC G2	29:1
14	1	BERA3700391	ECCENTRIC BUSHING G3	35:1
14	1	BERA6700391	ECCENTRIC BUSHING G3 59G	59:1
14	1	BERA7700391	ECCENTRIC BUSHING 71G	71:1
18	1	RBRDA000311	BEARING, ROLLER NJ311	
19	1	RBGA023126	BEARING, ROLLER 23126BNR	WITH SNAP RING
20	1	RBBAA006220	BEARING, BALL 6220 OPEN	
21	2*	BERB2700400	BEARING, ROLLER	17:1
21	2*	BERB4700400	BEARING, ROLLER SKF3N18NJ	29:1 - 71:1
22	1	ROSPC457514	OIL SEAL ACRYLIC D457514	
24	2	RLSSA000100	SNAP RING S-100 EXTERNAL	17:1
24	2	RLSSA000090	SNAP RING S-90 EXTERNAL	29:1 - 71:1
25	2	RSRAC016110	SCREW, HX, HD, CAPM16X11011T	
26	12	RSRAC012045	SCREW, HX, HD, CAPM12X45 11T	
27	**	RLPAA013045	SPRING PIN M13X45	
28	10	RSRAC016060	SCREW, HX, HD, CAP M16X60	
29	8	RSRAA010040	SCREW, HX, HD, CAP M10X40	
32	2	ROGAA025007	OIL GAUGE 25 X 7 MM	BASE AND FLANGE
33	1	RSPAA003308	PLUG 3/8 PT PG3 SQUARE	
35	8	RSNAA000024	NUT, HEX M24 TYPE	
36	12	RWLBA000016	WASHER, SPRING, DISK, PS, M16	
37	8	RWLBA000024	WASHER, SPRING, DISK, PS, M24	
38	12	RWSAA000012	WASHER, LOCK, SPLIT, M12	
39	8	RWLBA000010	WASHER, SPRING, DISK, PS, M10	
42	1	SSOAA000308	PLUG MAGNETIC 3/8 PT MP2	
54	4	RSSAA012030	SCREW SCKT HD CAP M12X30	
55	4	RWADB000012	WASHER, LOCK, RIBBED, M12	
401	1	BERB2731160	FLANGE VERTICAL NG1	
704	1	BERB2700040	RING OUTPUT HSG NG1	
708	12	BERA2700080	BOLT, STUD M16X105	
712	2	RSSAA016040	SCREW SCKT HD CAP M16X40	
715	1	RSPBB000304	PLUG HEADLESS HEX 3/4 PT	
716	12	RSNAA000016	NUT, HEX M16 TYPE 1	
720	1	RSPAA000102	PLUG 1/2 PT PG4 SQUARE	RING MOUNT

* indicates that these parts must be purchased in sets of this size

** indicates that the number of items per reducer varies



REPAIR INSTRUCTIONS

The following notes, in combination with the exploded view assembly drawings, are provided to assist in the inspection and repair of the reducer.

DANGER

The keyways of all shafts are extremely sharp. Care should be exercised when working with all shafts.

CAUTION

The reducer should be worked on only by a person who is familiar with mechanical assembly and disassembly techniques, including the proper handling of bearings. The reducer can be damaged by improper disassembly and assembly techniques.

Disassembly Guidelines

1. Disassembly always starts from the output side of the reducer.
2. Jack screw holes are provided between many sections to assist in the disassembly.
3. The output shaft bearing on reducers whose case size is 100 through 300 is held in place using two cone point set screws (item 31). These must be backed out in order to remove the output shaft assembly.
4. Reducers whose case size is 400 and larger have a snap ring around the outside of the output shaft bearing (item 19). This snap ring must be removed in order to separate the output housing from the pin body.

Inspection Guidelines

1. Inspect all oil seals for damage. Also inspect the shaft surfaces on which they ride.
2. Inspect the oil or grease for signs of metal flakes. On oil lubricated units, also check the magnetic drain plug. While some amount of metal is normal, a large amount indicates a problem.
3. Check all bearings to ensure that they rotate freely and do not have excessive free play.
4. Inspect the housing and all torque transmitting components for cracks and excessive wear.

Assembly Guidelines

1. Assembly always starts at the input side of the reducer.
2. Anaerobic gasket compound or gaskets should be used between all mating housing parts.
3. Removable thread locking compound should be used on all bolts and nuts.
4. When reassembling a reducer whose case size is 200 or larger, be sure that the two eccentric roller bearings (item 14) are installed in opposite directions. For case size 100 reducers, be sure that the cam on the balance weight (item 5) is pointing in the opposite direction of the large lobe on the eccentric roller bearing (item 14). Failure to do this will result in excessive vibration when the reducer is returned to operation.
5. On case size 200 and larger reducers, the two wheels (item 9) must be installed exactly 180° opposite to each other. Match marks are provided on the wheels for this purpose. Failure to do this will result in a reducer that will not turn.
6. It is generally easier to install the wheel (item 9) first and then its eccentric bearing (item 14). In this way, the rollers can be easily pushed into the inner race of the bearing, so that they do not interfere with the hole in the wheel that forms the bearing's outer race.
7. On case size 100 through 300 reducers, it is important to ensure that the bushings (item 11) remain seated in the wheel (item 9) as the output shaft assembly is installed. It is often useful to use some grease to hold the bushings in position on the wheels.
8. When a size 100 through 300 reducer is reassembled, the cone point set screws (item 31) should be alternately tightened to pull the output shaft in place. Each should be loosened a quarter of a turn after the output shaft is completely seated in the output housing.
9. Reduced backlash Circulute Reducers use a split pin body. Proper adjustment of this is essential for proper operation of the reducer. See page 27 for adjustment instructions.

REDUCED BACKLASH ADJUSTMENT

Standard Circulate Series II Speed Reducers have an output shaft backlash of approximately 1° . When extremely accurate control of the output shaft's position is required, the reduced backlash option allows the output shaft backlash to be adjusted to 0.1° or less.

Because of the low internal wear inherent in the Circulate Series II Speed Reducer, its backlash remains essentially constant. It therefore should not be necessary to routinely adjust the reducer's backlash. It will, however, be necessary to adjust the backlash if the reducer has been disassembled.

CAUTION

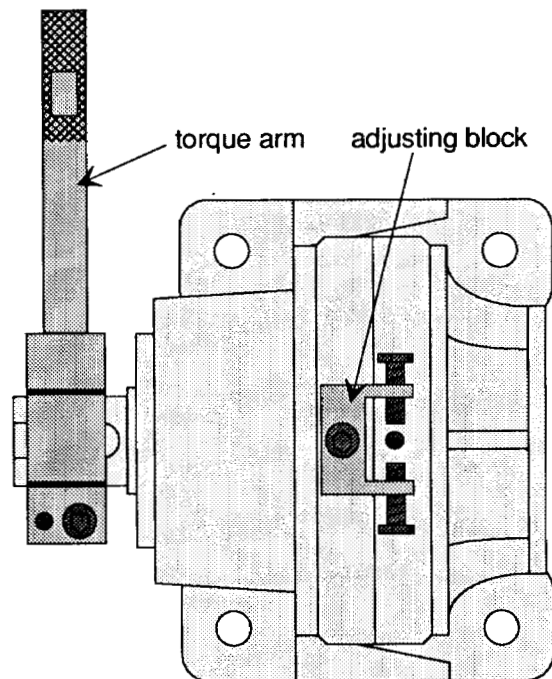
Improper adjustment of the backlash can decrease the reducer's efficiency and damage the reducer.

In order to make these adjustments, it is necessary to have some way of rotating the two pin housing halves with respect to each other. The "adjusting block", a special service tool, is designed to do this. It is bolted onto one of the pin housing halves while a pin is placed in the opposite hole on the other pin housing half. Turning a bolt on the adjusting block presses on the pin and so moves its pin housing.

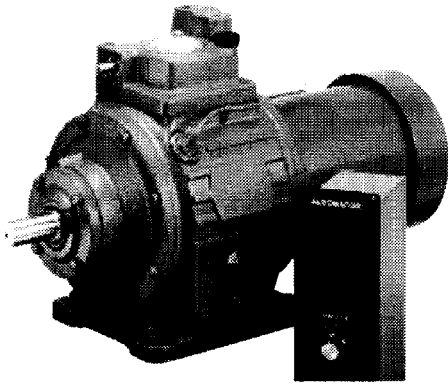
To measure the output shaft backlash, a torque arm is clamped onto the reducer's output shaft. It is important to clamp this securely to the shaft, so that it does not contribute to the measured backlash. A flat spot is ground at a known radius on the torque arm. A dial indicator is used to measure the linear free play at this point. This can be used to calculate the reducer's backlash. For example, a free play of 0.01 inches at a radius of 6 inches represents a backlash of 0.1° .

Adjustment Procedure

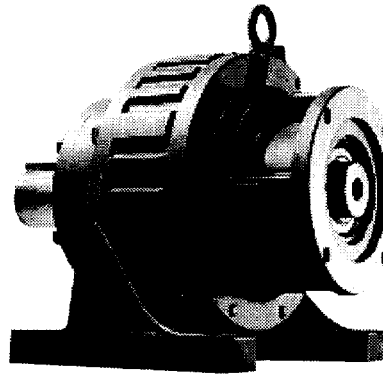
1. Assemble the reducer, but do not completely tighten the bolts that go through the pin housings.
2. Lock the input shaft in place so that it cannot rotate.
3. Mount the torque arm onto the output shaft and the adjusting block assembly onto the pin housing assembly.
4. Measure the output shaft backlash.
5. Loosen one bolt on the adjusting block and tighten the other to adjust the reducer's backlash.
6. Turn the input shaft through a few complete revolutions to ensure that it turns smoothly, with no binding. If it binds, use the adjusting block to increase the backlash.
7. Repeat steps 4 through 6 in order to obtain a low output shaft backlash while allowing the reducer to turn smoothly.
8. Tighten the pin housing bolts and check the reducer's operation once more.
9. Remove the adjusting block and the torque arm from the reducer.



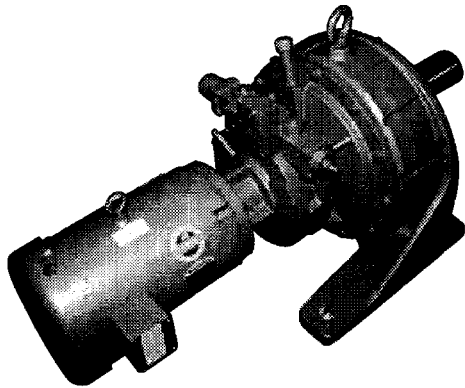
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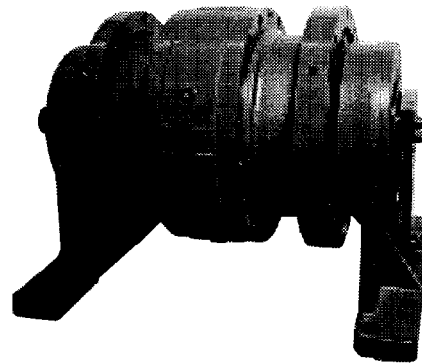
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