

**Sumitomo Drive Technologies**

# **BUDDYBOX**

**Gear and Gearmotor**

## **Operating Manual**



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**04/2016**

# BUDDYBOX Operating Manual

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## 1. General information

Please observe the following warnings!



### Electrical hazard

Misapplication of the machine may be dangerous, risk of severe or fatal injury.



### Imminent danger

Misapplication of the machine may be dangerous and lead to severe injuries.



### Dangerous situation

Risk of physical injury.



### Damaging situation

Risk of machine damage.



### Helpful information



### Disposal

Please observe legal /environmental regulations.

## 2. Safety advice



Do not attempt to install or operate the CYCLO DRIVE until all of these instructions on assembly, operation, maintenance and inspection and hazards are read and thoroughly understood. Please keep these instructions next to the unit in operation to check at any time when necessary.



Transportation, assembly, lubrication, operation, maintenance and inspection should only be done by qualified personnel, so as to avoid personal injury or damage to property.

Do not touch moving mechanical components and make sure these parts are clear of obstructions. Failure to follow these instructions may result in personal injury, unit failure or damage to property.

Only operate the unit in the application it was intended. Misapplication may result in physical injury or damage to machinery.

## 3. Transportation recommendations



The units must be checked for any transportation damage immediately upon receipt. Any damages should be reported to the carrier without delay. If there is any evidence of damage which may put at risk the function of the CYCLO DRIVE, do not install the unit.



Lifting harnesses of suitable and adequate size are to be used; these are to be hooked into the eye bolts or laid round the flange connections. Eye bolts on the gearbox are dimensioned for the weight of the unit, no additional loads are allowed.



Caution: do not use the central bores in the shaft ends for lifting the drive with hooked bolts, etc. This could result in damage to the bearings.

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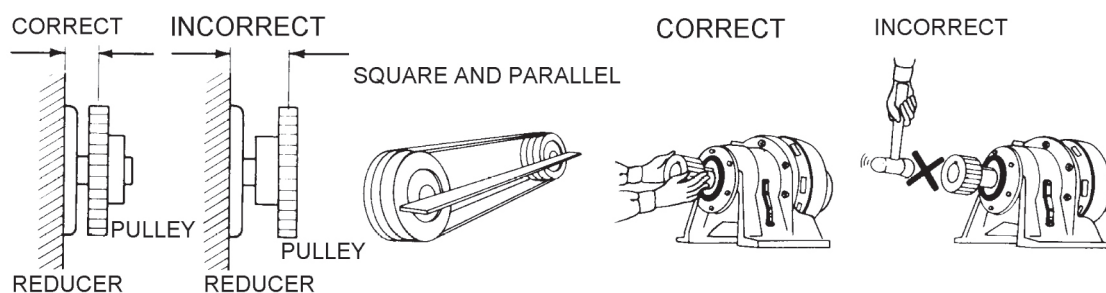
## 4. Connection of other transmission components



Assembly is carried out using the central bores in the ends of the shaft or by heating the parts to be mounted to a maximum of 100°C. The shafts have been fitted with keyways to DIN 6885, sheet 1. Bores of the parts to be fitted on the shafts should be according to the tolerances given in the respective catalogue. A locking screw or similar is to be used to prevent any axial movement. Chainwheels, discs or gear wheels must be located as close to the bearing as possible (see illustration below to keep the radial loads as small as possible). If pinions or chains etc. are used, the drive should be installed so that the unit location fastening act against the applied radial load. In the case of speed reducers with hollow high speed shafts, MoS2 paste or spray (e.g. Molykote) is to be applied to the motor shaft before it is connected.



It is the responsibility of the user to provide guards for all exposed input and output components such as pulley, couplings, etc.!



Clutches, discs, gear wheels, chains, etc. should be mounted on the reducer shafts carefully. Do not force them onto the shafts as this could damage the gearbox bearings.

## 5. Gear or gearmotor installation

### 5.1 Necessary tools



- Screw wrench set
- Torque wrench for fastening screws on foot or flange housing, motor adaptor, clamp coupling, etc.
- Pulling on device
- Mounting shims
- Corrosive protection (e.g. MoS2-Paste)



Lubrication fittings (air breather, oil sight glass) provided apart should be assembled as indicated prior installation of the gear.

### 5.2 Assembly tolerances for gear or gearmotor



Shafts		Flanges	
Input shaft	k6 for $\varnothing < 30 \text{ mm}$ h6 for $\varnothing \geq 30 \text{ mm}$	Centering shoulder tolerances according to DIN 42948	
Output shaft	k6 for $\varnothing \leq 50 \text{ mm}$ h6 for $\varnothing > 50 \text{ mm}$ H7 for slow speed hollow shaft	IEC-Input flange	H8
High speed hollow shaft F7 Centre boring according to DIN 332, Form DR		Output flange	h6

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## 5.3 To check before installation



- Data on name plate matches with other documents such as drawings, parts list, etc.
- In case of gearmotor, check if power is up to the motor requirements
- Inspect the gearbox for possible damage.
- Provide the recommended lubricants according to the environment of the installation.

## 5.4 Getting the unit ready for installation



The anti-corrosive agent (Valvoline Tectyl 846/K19) used for transportation and storage on the shaft-ends or hollow shafts, and on the central seats must be removed before start up. This anti-corrosive agent can be removed using an alkaline detergent; under no circumstances is it to be removed mechanically (abrasive etc.). The alkaline detergent must not come into contact with the seals.



When handling lubricants and anti-corrosive agents please observe the respective safety instructions for people and environment according to DIN 52 900.

## 5.5 Installation of gears with hollow shaft and torque arm



Clean and degrease all contact areas.

Apply molybdenum disulfide (MoS<sub>2</sub>) grease to the surface of the driven shaft and the inside of the hollow shaft.

Mount the Buddybox onto the driven shaft.

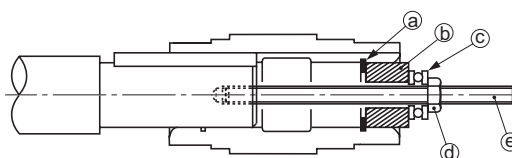


If engagement is tight, slightly strike the edge of the hollow shaft with a mallet. NEVER hammer the casing or oil seal. If the engagement is excessively tight, make a jig as shown in Fig. 1 for smooth insertion.

The parallel bore tolerance is H7. If there is excessive impact or radial load, the engagement between the bore and shaft should be tight (A tolerance of js6 or k6 is recommended for the driven shaft).



Fig. 1 Coupling jig



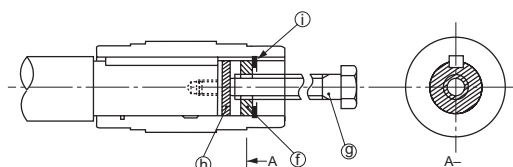
a = snap ring b = spacer c = thrust bearing d = nut e = bolt

### Removal of the Buddybox from the machine shaft



Ensure that no excessive forces are applied to the interface between case and hollow bore. Make a jig as shown in Fig. 2 for smooth removal.

Fig. 2 removal jig

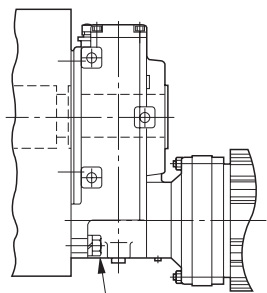


f = spacer g = upper bolt h = disc i = snap ring

Note: Coupling jig, removal jig and fixing parts to be provided by the customer.

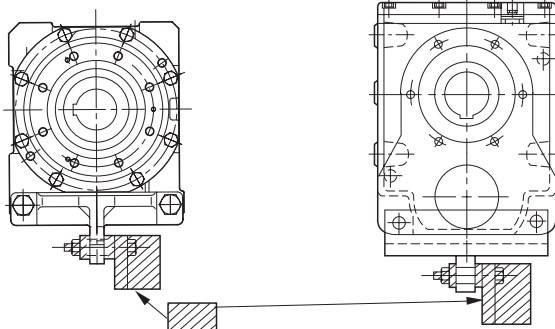
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## 5.5.1 Direct mounting method



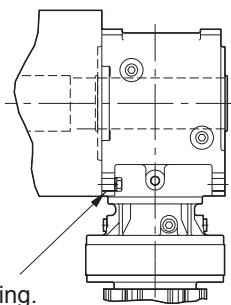
Hole in casing.  
Use two bolts.

## 5.5.2 Torque arm mounted to customer's machine

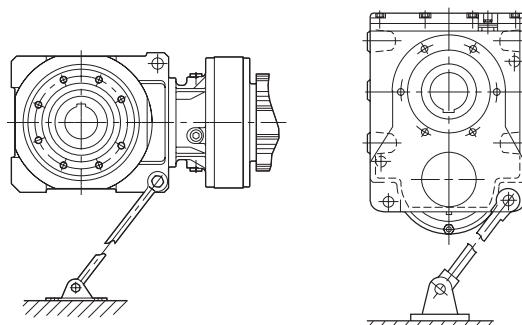


The shaded section should be prepared by the customer

## 5.5.3 Torque arm Tie-rod type (option)

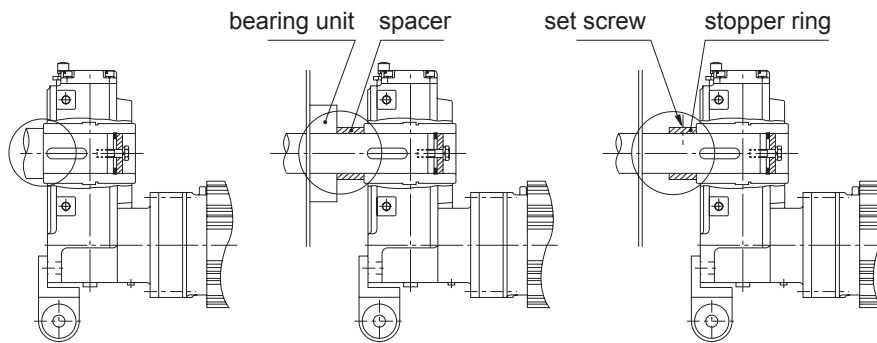


Hole in casing.  
Use two bolts.



## 5.5.4 Buddybox to be secured to driven shaft

### 5.5.4.1 How to secure Buddybox not to move to the machine side

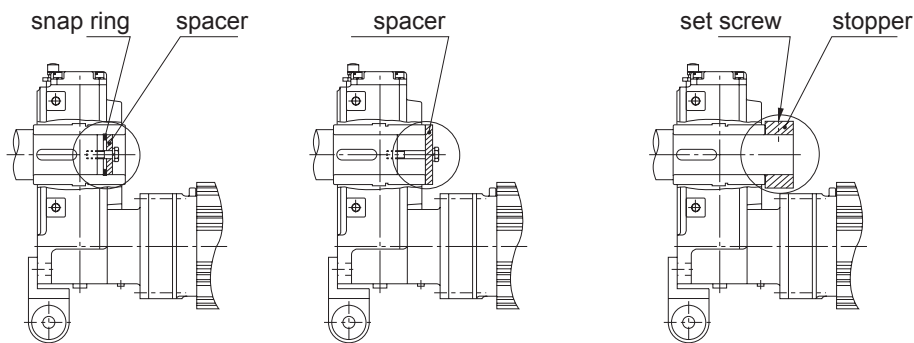


secured by staged shaft

secured by spacer(stageless  
driven shaft)

secured by a set screw and a stopper

### 5.5.4.2 How to secure Buddybox not to move off from the machine side



secured by spacer and a  
snap ring

secured by an end plate and  
tightening screw

secured by a set screw and a stopper



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## 5.6 Installation with Taper Grip® Bush

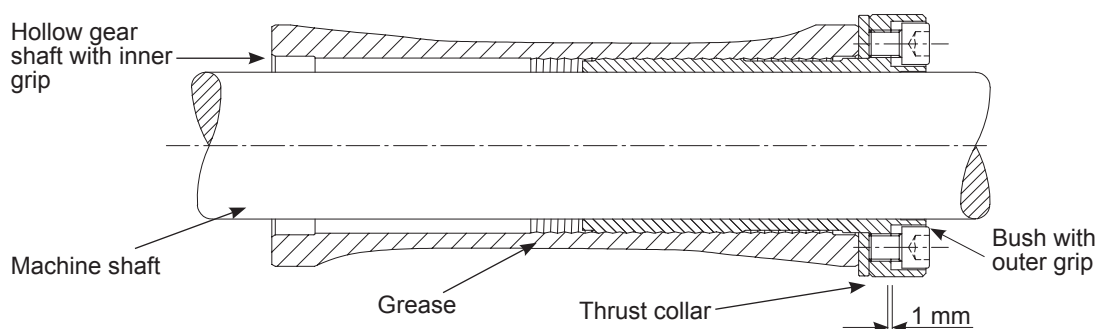


1. Check the size and condition of the shaft to which the reducer will be fitted. Maximum tolerance is h11 although this should be improved upon where possible. Ensure the shaft and Taper-Grip® Bush bore are free from burrs and corrosion. Clean both bore and shaft with solvent to remove all traces of grease and oil.
2. Lightly oil the screws and insert into the Taper-Grip® Bush ensuring they do not project beyond the rear face.
3. Fit the thrust collar onto the Taper-Grip® Bush, ensuring it is located on the spigot immediately behind the flange. Screw the Taper-Grip® Bush into the hub in a clockwise direction until the thrust collar is trapped between the flange and the reducer hub.
4. Unscrew the bush until a gap of approx. 1 mm is seen between the flange and the thrust collar (see diagram). Tighten all screws until they are finger tight. On reducers with a keyslot on the end of the hub, ensure that a screw is NOT positioned over the keyslot.
5. Slide the reducer onto the shaft at least as far as the counter bore, if present, in the Taper-Grip® Bush. Gradually tighten each screw in turn to the torque levels shown below. If the shaft has passed through the counter bore, grease fill the cavity at the shaft end to prevent the build up of corrosion.



6. After the reducer has been running for 20 or 30 hours, re-torque the screws to the values in the table below.

Screw torques should be subsequently checked at normal service intervals (i.e. every 6 months).



BBB3 Size	Taper-Grip® Size	Screw Qty x Size	Screw Torque [Nm]
3A	E	6 x M12	75
3B	F	6 x M12	140
3C	G	6 x M16	250
3D	H	6 x M16	300
3E	J	6 x M16	300

HBB Size	Taper-Grip® Size	Screw Qty x Size	Screw Torque [Nm]
Z	C	6 x M10	31
A	E	6 x M12	51
B	F	6 x M12	51
C	G	6 x M16	128
D	H	6 x M16	200
E	J	6 x M16	200

## 5.7 Removal of Taper-Grip® Bush



Slacken each screw gradually until they are free from the thrust collar. Give the Taper-Grip® bush a sharp tap with a mallet to break the taper, this will free the reducer. Finger tighten two of the screws against the thrust collar to prevent the Taper-Grip® bush locking in the opposite direction as the reducer is removed from the shaft.

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## 6. Electrical installation

### 6.1 Safety advice



Installation, start up and servicing should only be done by qualified personnel.

Before commencing upon the servicing of the motor or the gearmotor, particularly before opening covers to active parts, the main electrical supply must be discounted. Please follow the five safety rules according to DIN VDE 0105. The motors comply with the low voltage directives 2014/35/EG.

### 6.2 Range of use



The motors are totally enclosed fan cooled. Standard protection is IP55, and with brake IP 44. Ambient temperature: -10° ... +40°C  
Ground level: < 1000 m



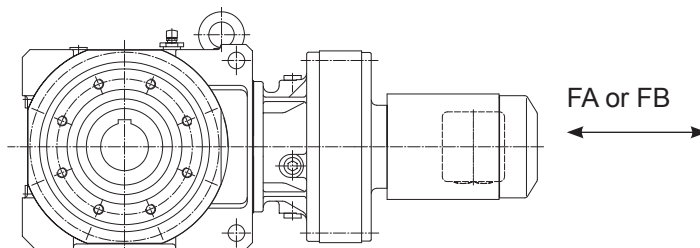
Winding is insulation class F (150°C). It is normal for the reducer to operate at a housing temperature of up to 100°C. Therefore, any contact with them must be prevented. Temperature sensitive parts must never be fastened to or be in contact with the motor.

### 6.3 Installation



Ventilation openings must be kept clear.

For correct cooling the distance FB is the minimum required between the fan cover and the wall. FA is the minimum clearance required for disassembling the fan cover.



Standard motor

Motor-Size:	63 - 71	80	90	100	112-132S	132M-160M	160L	180M	180L
FB (mm):	20	20	20	20	20	25	30	30	30
FA (mm):	48	49	52	56	60	75	130	155	170

Brake motor

Motor-Size:	63 - 71	80	90	100	112-132S	132M-160M	160L	180M	180L
FB (mm):	20	20	20	20	25	25	30	30	30
FA (mm):	61	93	115	121	132	170	220	367	370

### 6.4 Cable inlet threads sizes



The following thread sizes are suitable for the standard motors

Frame size	Conduit thread
63 - 71	1x M16 x 1,5 / 1x M25 x 1,5
80 - 132S	2x M25 x 1,5
132M - 160	2x M32 x 1,5
180	2x M40 x 1,5

Cable glands suitable for the motor protection level must be used.

Any unused cable entries must be closed, to the correct motor protection level.



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## 6.5 Electrical connection



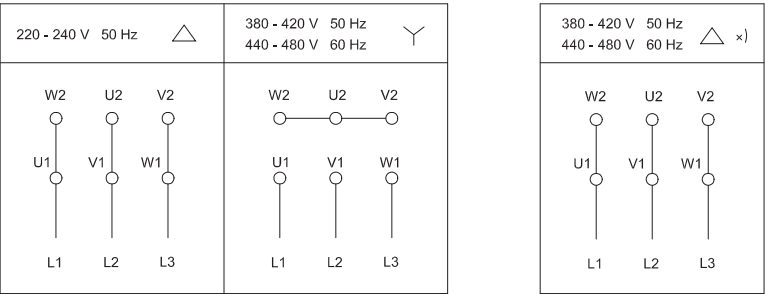
For technical characteristics and allowable range of application please check rating plate, data given in this manual or in the catalogue. In case of special applications, the order acknowledgement will give further details. If you have any questions, please contact Sumitomo Cyclo Europe, indicating type of motor and serial number.

Sumitomo (SHI) Cyclo Drive Germany, GmbH			
TYPE			
V		Hz	
A			
P		kW	
n		1/min	
I.CL		cos φ	
IP			
B		V	
Nm		KT(amb.) °C	
VDE 0530		201525	

Connect ground wire to this terminal



The terminal box shows a circuit diagram. The motors should be connected at the terminal block according to the main power supply as follows.



Rated operational voltage for the voltages are according to DIN EN 60 034-1 with ± 5% tolerance.

Tightening torques for the terminal block bolts:

Connecting bolt thread:	tightening torque in Nm
M4	1,2
M5	2,5
M6	4,0
M8	7,5

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## 6.6 Brake motor



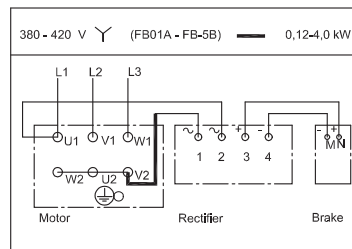
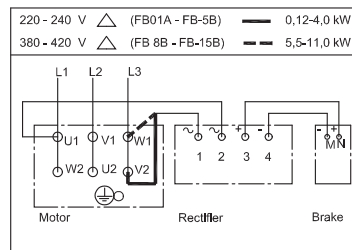
Connection of brake motors should be according to the following circuit diagrams.

The brake is already wired to the motor at delivery. For a separate power supply to the brake please disconnect the U1 - 2 and V2 - 1.

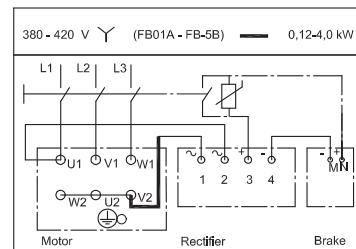
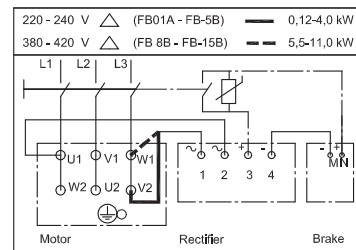
The control voltage for the brake is indicated at the rating plate.

For a fast acting brake (de-switching) a separate cable to an external contact is necessary. The contact must be protected with a varistor.

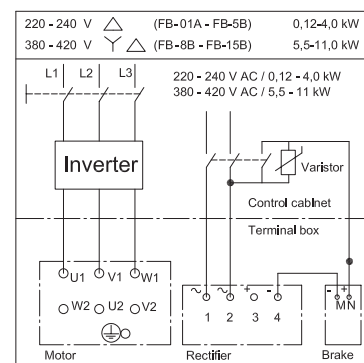
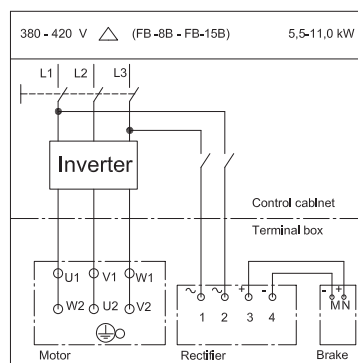
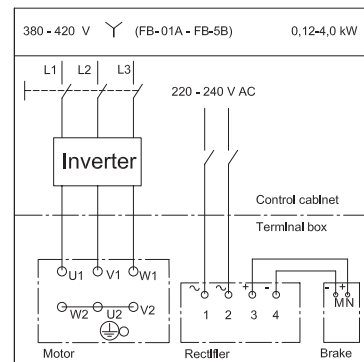
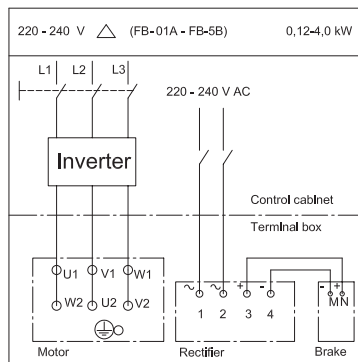
Standard brake



Fast acting brake



For motors driven by an inverter, the brake must be supplied separately, as shown below:



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## 6.7 Installation with frequency inverter



For operating motors with a frequency inverter please follow EMC instructions of the frequency inverter.

Screened cable and metal cable glands are required.

The output torque of the motor depends on the type of frequency inverter in use.

The rectifier of the brake requires a separate power supply.

The motor must be protected against overheating by PTC resistor, thermal contacts or forced ventilator.

## 6.8 Motor protection



Motor protection switches (overload circuit breaker) must be adjusted to the current according to the voltage indicated at the rating plate.

Thermal contacts are break contacts (NC) as standard.

The resistance of PTC thermistors at 20°C can vary from 90  $\Omega$  to maximum 750  $\Omega$ .

## 6.9 Forced ventilator



Connect the forced ventilator at the terminal box located on the ventilator cover.

A separate power supply should be provided for the ventilator motor.

CAUTION: Depending on the control in use, the ventilator may be running even when the motor is at standstill.

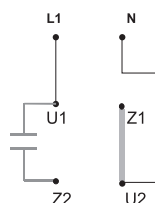


Rating plates and circuit diagrams for forced ventilators are in the terminal box.

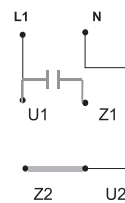
They vary according to the size. The ventilator motor can be configured as follows:



- Shaded pole motor: connection, L1 and N (reversal of rotation direction is not possible)
- Single phase motor:



left-hand motion  
CCW



right-hand motion  
CW

- Three-phase-motor: Star-connection or delta-connection, depending on voltage as indicated in 6.5 electrical connection.

## 7. Start up



Before starting the motor, check once again all safety instructions.

Make sure that the power supply is in accordance with the characteristics indicated at the rating plate. For additional devices, e.g. heater, see more details in the terminal box.

Connection cable diameters must be selected according to the motor power.



Installation is subject to all regulations and must be done by qualified personnel.



Before starting the motor review all safety regulations, check if the unit is properly installed and aligned. Check all fastening parts and review if grounding is properly tightened. Also check additional devices for proper function and connections and in the case of a second shaft end, make sure that the key is secure.

If possible, start the gearmotor without load. If the gearmotor operates smoothly and without any strange noise, connect to the machine. During the initial run-in check the motor input current under load for possible over-current or phase asymmetry.



**NOTE: All units are shipped without oil, for safety reasons. Please make sure gears are properly supplied with oil before starting up.**

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## 8. Lubrication

### 8.1 Grease Lubrication

#### 8.1.1 Lubrication for standard units



Bevel Buddybox	Helical Buddybox	Output stage (Bevel/Helical)	Input stage (CYCLO)	
			Horizontal input stage	Vertical input stage
3A10*; 3A11* 3A12*; 3B12*	Z609*; A610*, B612*		Grease (maintenance free)	Grease (maintenance free)
3A14*; 3B14*; 3C14* 3B16*; 3C16*; 3D16* 3C17*; 3D17*, 3E17*	C614* D616* E617*	Oil bath	Oil bath	Grease

\* Cyclo Drive type 0 or 5

### 8.2 Grease in use



Grease lubricated CYCLO-Drive stages are filled with grease before shipment. The type of the grease is shown in the table below.

Ambient temperature [°C] -10 ... 40	Bevel Buddybox Size	Helical Buddybox Size	Type of grease
	3A10*; 3A11* 3A12*; 3B12*	Z609*, A610*, B612*	ESSO Unirex N2
	3A14*; 3B14*; 3C14* 3B16*; 3C16*; 3D16*	C614*, D616*	
	3C17*; 3D17*, 3E17*	E617*	SHELL Gadus S2 V220 2

\* Means type 0 or 5

#### 8.2.1 Grease quantity (g) for grease change Bevel Buddybox



Size	6100 6105	6100DA 6105DA	6110 6115	6120 6125	6120DA 6125DA	6120DB 6125DB	6140 6145	6140DA 6145DA	6140DB 6145DB	6140DC 6145DC	6160 6165	6160DA 6165DA	6160DB 6165DB	6170 6175	6170DA 6175DA	6170DB 6175DB	6170DC 6175DC
Mounting position 1,3,5,6	140	165	200	330	350	420	oil	475	540	590	Öl	840	890	oil	1090	1140	1330
Mounting position 2,4	140	165	200	330	350	420	640	475	540	590	1120	840	890	1440	1090	1140	1330

#### 8.2.2 Grease quantity (g) for grease change Helical Buddybox



Size	6095 6095	6095DA 6095DA	6100 6105	6100DA 6105DA	6120 6125	6120DA 6125DA	6120DB 6125DB	6140 6145	6140DA 6145DA	6140DB 6145DB	6140DC 6145DC	6160 6165	6160DA 6165DA	6160DB 6165DB	6170 6175	6170DA 6175DA	6170DB 6175DB	6170DC 6175DC
Mounting position 1,2,3,4	90	115	140	165	330	350	420	Öl	475	540	590	Öl	840	890	Öl	1090	1140	1330
Mounting position 5,6	90	115	140	165	330	350	420	640	475	540	590	1120	840	890	1440	1090	1140	1330

### 8.3 Recommended types of oil

All lubricant oils complying with the standard DIN 51517 part 3 are suitable. The correct viscosity class must be selected depending on the ambient and operating temperature according to standard DIN 51519.



lubricant as per DIN 57517 part 3	possible operating temperatures °C						
	ambient temperature °C						
	-20°C	0°	+20°	+40°	+60°	+80°	+100°
CLP 68							
CLP 100							
CLP 150							
CLP 220							
CLP 320							

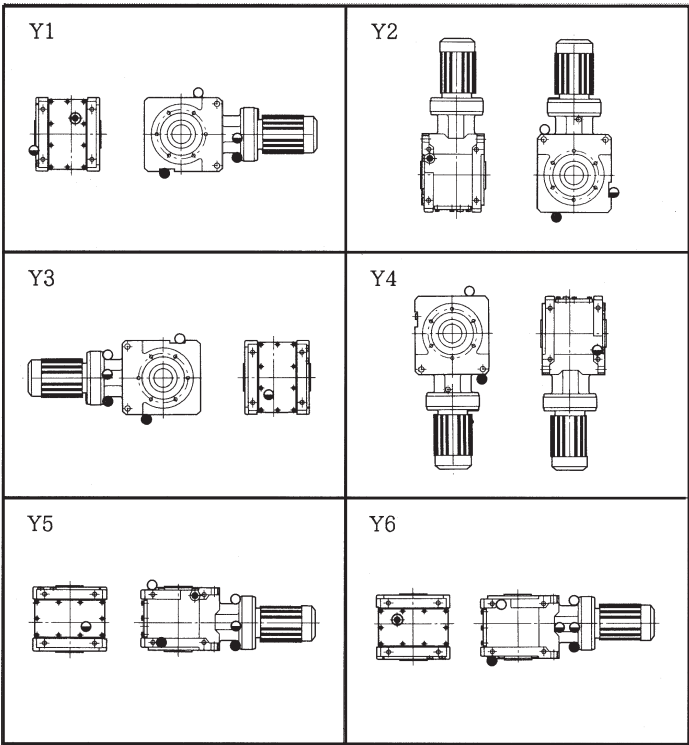
Manufacture	Type of oil	Manufacture	Type of oil
AVIA	Gear RSX	MOBIL	Mobilgear 600XP
CASTROL	Alpha EP	SHELL	Omala
DEA	Falcon CLP	TOTAL	Carter EP / XEP
KLÜBER	Klüberoil GEM1		



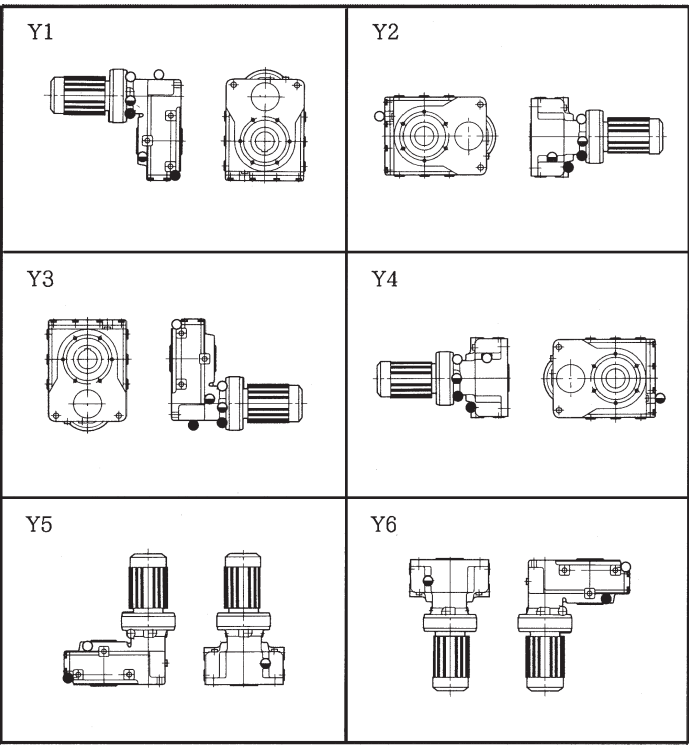
Some units need to be supplied with oil in two distinct locations, output side (Bevel Buddybox portion) and input side (Cyclo portion). For oil quantities and lubricant devices please refer to graphs 8.4 and 8.5.

# BUDDYBOX Operating Manual

## 8.4 Lubrication devices Bevel Buddybox



## 8.5 Lubrication devices Helical Buddybox



○ Oil filler port      ◐ Oil level      ● Oil drain port

# BUDDYBOX Operating Manual

## 8.6 Oil quantities approximately for Bevel Buddybox

For lubricant devices and mounting position please refer to 8.4.



Bevel Buddybox Size	Mounting position											
	1		2		3		4		5		6	
	Bevel	Cyclo	Bevel	Cyclo	Bevel	Cyclo	Bevel	Cyclo	Bevel	Cyclo	Bevel	Cyclo
3A10*	1,1	G	1,0	G	1,1	G	1,0	G	1,7	G	1,6	G
3A10*DA		G		G		G		G		G		G
3A11*		G		G		G		G		G		G
3A12*		G		G		G		G		G		G
3A12*DA		G		G		G		G		G		G
3A12*DB		G		G		G		G		G		G
3A14*		0,3		G		0,3		G		0,3		0,3
3B12*	1,8	G	1,4	G	1,8	G	1,8	G	2,3	G	2,5	G
3B12*DA		G		G		G		G		G		G
3B12*DB		G		G		G		G		G		G
3B14*		0,45		G		0,45		G		0,45		0,45
3B14*DA		G		G		G		G		G		G
3B14*DB		G		G		G		G		G		G
3B16*		0,75		G		0,75		G		0,75		0,75
3C14*	3,3	0,45	3,5	G	3,3	0,45	4,4	G	3,6	0,45	5,3	0,45
3C14*DA		G		G		G		G		G		G
3C14*DB		G		G		G		G		G		G
3C14*DC		G		G		G		G		G		G
3C16*		0,75		G		0,75		G		0,75		0,75
3C16*DA		G		G		G		G		G		G
3C17*		1,05		G		1,05		G		1,05		1,05
3D16*	4,4	0,7	5,0	G	4,4	0,7	4,2	G	5,6	0,7	6,0	0,7
3D16*DA		G		G		G		G		G		G
3D16*DB		G		G		G		G		G		G
3D17*		0,9		G		0,9		G		0,9		0,9
3D17+DA		G		G		G		G		G		G
3D17*DB		G		G		G		G		G		G
3D17*DC		G		G		G		G		G		G
3E17*	7,4	0,9	7,3	G	7,4	0,9	6,0	G	7,2	0,9	10,6	0,9
3E17*DA		G		G		G		G		G		G
3E17*DB		G		G		G		G		G		G
3E17*DC		G		G		G		G		G		G

## 8.7 Oil quantities approximately for Helical Buddybox

For lubricant devices and mounting position please refer to 8.5.



Helical Buddybox Size	Mounting position											
	1		2		3		4		5		6	
	Helical	Cyclo	Helical	Cyclo	Helical	Cyclo	Helical	Cyclo	Helical	Cyclo	Helical	Cyclo
Z609*	0,6	G	0,6	G	0,5	G	0,6	G	1,1	G	1,0	G
Z609*DA		G		G		G		G		G		G
A610*	0,8	G	0,9	G	0,7	G	0,9	G	1,5	G	1,4	G
A610*DA		G		G		G		G		G		G
B612*	1,0	G	1,5	G	1,0	G	1,5	G	2,0	G	1,8	G
B612*DA		G		G		G		G		G		G
B612*DB		G		G		G		G		G		G
C614*	1,7	0,4	2,1	0,4	1,3	0,4	2,1	0,4	4,7	G	3,5	G
C614*DA		G		G		G		G		G		G
C614*DB		G		G		G		G		G		G
D616*	2,7	0,7	3,5	0,7	2,0	0,7	3,5	0,7	7,0	G	5,5	G
D616*DA		G		G		G		G		G		G
D616*DB		G		G		G		G		G		G
E617*	3,5	0,9	4,2	0,9	2,5	0,9	4,2	0,9	9,0	G	7,0	G
E617*DA		G		G		G		G		G		G
E617*DB		G		G		G		G		G		G



# BUDDYBOX Operating Manual

## 8.8 Regreasing and oil change intervals

### 8.8.1 Oil change intervals



Oil level must be checked every 5,000 hours. If the oil is contaminated, burned or waxed, change the oil immediately, and flush the gear if necessary.

The oil level can be checked by the oil level control device (refer to 8.4 and 8.5).

Under normal operating conditions oil should be changed every 10,000 hours or after 2 years at the latest. A shorter oil change (every 3,000 or 5,000 hours) will increase the gear lifetime.

We recommend to change the oil after the first 500 hours of operation.

The recommendations above do not apply to abnormal operating conditions, i.e., high temperature, high humidity or corrosive environments. If any of these situations exist, the lubricant may have to be changed more frequently.

### 8.8.2 Grease lubrication



All types with ESSO Unirex N2 are maintenance free for 20,000 hrs or 4-5 years.

All other grease lubricated types must be topped up after 500 hrs, or after 2 months in operation at the latest. For further regreasing intervals please refer to the tables below

#### Regreasing intervals

Operating conditions	Regreasing interval	Comments
up to 10 hours/day	every 3 - 6 months	regreasing intervals must be shortened in the case of use in difficult conditions
10 - 24 hours/day	every 500 - 1000 hours	

#### Grease change intervals

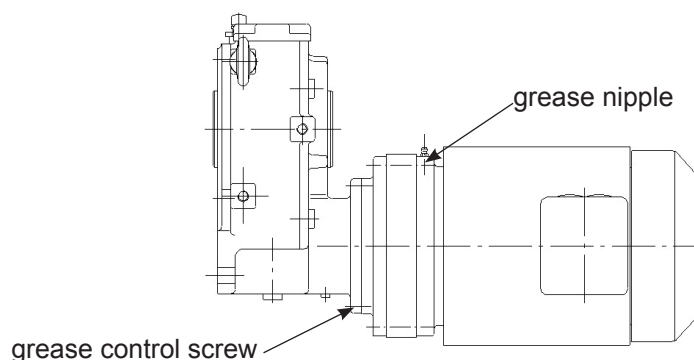
Section	Grease change intervals	Comments
High speed & speed reducer section	every 2 - 3 years	regreasing intervals must be shortened in the case of use in difficult conditions
Output	every 3 - 5 years	

## 9. Inspection and maintenance

### 9.1 Re-greasing of grease lubricated CYCLO Drive units



Unfasten the grease control screw and replenish with a grease gun through the grease nipple at the flange on the input part or the motor flange



Continue re-greasing with the gear unit in operation to provide proper circulation of the grease.



For each re-greasing use about one third to half of the quantity shown by the graph in 8.2.1 and 8.2.2. If too much grease is applied, the operating heat can lead to a rise in the lubricant temperature or grease might be forced into the motor or escape through the seals.



Remove grease residuals on the control screw and dispose of as required by environmental regulations

# BUDDYBOX Operating Manual

## 9.2 Oil level check



The oil level can be checked by the oil level indicator (see lubrication devices 8.4 and 8.5)

## 9.3 Oil check



- Before checking the oil, the main electrical supply must be disconnected.
- **Wait for the unit to cool to prevent burns!**



- Collect an oil sample at the oil drain.
- Check oil condition and viscosity.
- If the oil is contaminated, change the oil even if the intervals according to 8.2.4 are not due.
- Dispose of the oil sample according to environmental protection instructions.

## 9.4 Oil change



- First, the main electrical supply must be disconnected.
- **Wait for the unit to cool to prevent burns!**



- Change oil with the gear still warm, as this is beneficial for draining.
- Place a collector under the oil drain.
- Remove the oil level indicator, any breather plug, breathing valve and oil drain screw.
- Drain oil completely.
- Replace the oil drain plug and fasten it.
- Fill with new oil according to the oil recommendations. In case you wish to use another oil type, please contact Sumitomo Cyclo Europe.
- For oil quantities, see 8.2.3 "oil quantities". Check oil level at the indicator.
- Fasten oil breather.



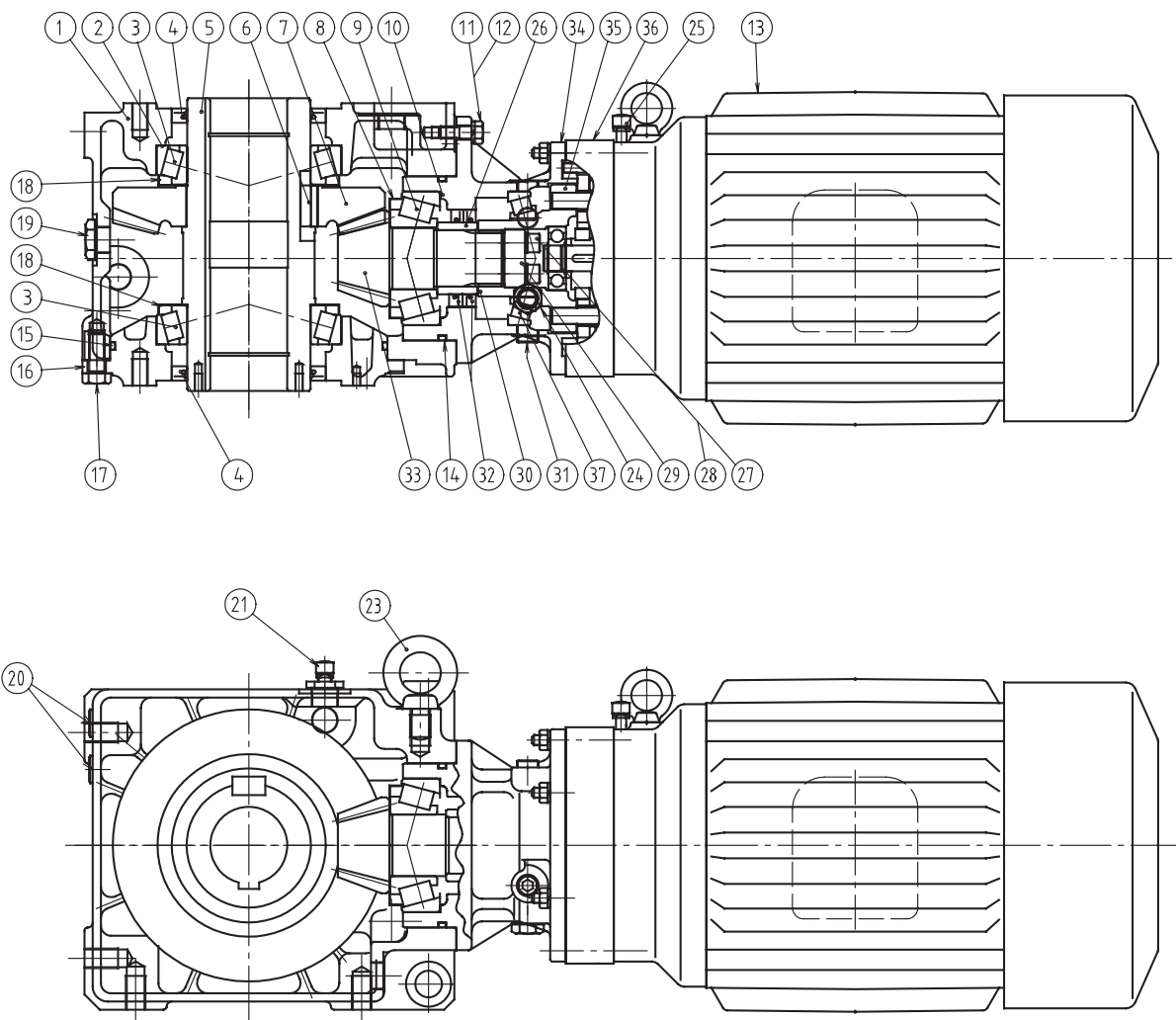
Dispose of the oil according to environmental protection instructions.

## 10. Troubleshooting

Operating problem	Possible reasons	Trouble shooting
Unusual, constant running noise	1. Meshing/grinding noise: bearing damage 2. Knocking noise: irregularity in the reducer	1. Check oil (see inspection and maintenance) replace bearing 2. Contact customer service
Unusual, not constant running noise	Foreign substance in the oil	Check oil (see 9.) Stop drive, contact customer service
Oil leakage 1) - from the gear cover - from the motor flange - from the motor shaft sealing - from the gear flange - from the output flange seal ring	1. Sealing at gear cover not functioning properly 2. Sealing damaged 3. Gear not vented	1. Tighten gear cover screws and observe the unit. If leakage continues, contact customer service 2. Contact customer service 3. Check oil breather
Öl tritt aus am Entlüftungsventil	Oil level too high - Incorrect mounting position - Repeated cold start (oil foams) and / or oil level too high	Adjust oil level (see 9.2) Check breather and oil level (see 9.2)
Slow speed shaft does not rotate while motor is running or high speed shaft is rotating	Shaft to collar connection interrupted	Return gear / gearmotor to Sumitomo Drive Technologies for servicing

# BUDDYBOX Operating Manual

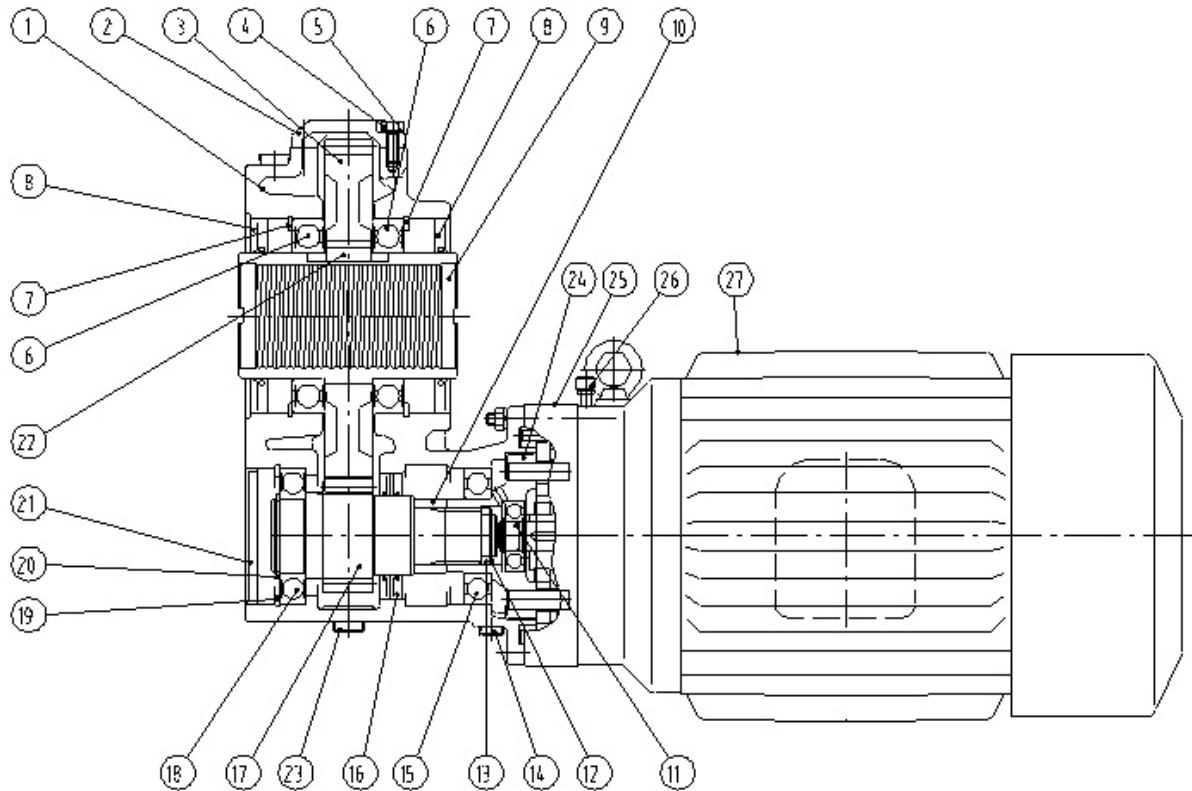
## 11. Spareparts Bevel Boddybox



- |                        |                          |                                |
|------------------------|--------------------------|--------------------------------|
| 1 Casing               | 13 Motor                 | 26 Collar                      |
| 2 Shim                 | 14 O-ring                | 27 fillister socket head screw |
| 3 Taper roller bearing | 15 O-ring                | 28 Nord lock washer            |
| 4 Oil seal             | 16 Output cover          | 29 End plate                   |
| 5 Hollow output shaft  | 17 Hex. head bolt        | 30 Shim                        |
| 6 Key                  | 18 Nilos ring            | 31 Hex. socket head plug Oil   |
| 7 Bevel gear           | 19 Oil gauge             | 32 seal                        |
| 8 Nilos ring           | 20 Hex. socket head plug | 33 Bevel pinion shaft          |
| 9 Taper roller bearing | 21 Air breather          | 34 Flanged casing Pin          |
| 10 Shim                | 23 Eye bolt              | 35 carrier                     |
| 11 Hex. head bolt      | 24 Oil gauge             | 36 Ring gear housing           |
| 12 Spring washer       | 25 Air breather          |                                |

# BUDDYBOX Operating Manual

## 12. Spareparts Helical Boddybox



- |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|
| 1 Casing                 | 10 Pinion shaft spacer   | 19 Retaining ring        |
| 2 Cover                  | 11 Motor shaft           | 20 Retaining ring        |
| 3 Gear                   | 12 Retainig ring         | 21 Seal cap              |
| 4 Hex.head bolt          | 13 Pinion shaft distance | 22 Key                   |
| 5 Spring washer          | 14 Hex. socket head plug | 23 Hex. socket head plug |
| 6 Ball bearing           | 15 Ball bearing          | 24 Pin carrier           |
| 7 Retaining ring         | 16 Oil seal              | 25 Ring gear housing     |
| 8 Oil seal               | 17 Pinion shaft          | 26 Air breather          |
| 9 Taper Grip® output hub | 18 Ball bearing          | 27 Motor                 |

BUDDYBOX Operating Manual

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