

# Involute Powergear Pvt. Ltd.

ISO 9001-2008 Certified Systems



**BT Series  
Shaft Mounted Gear Unit**



**POWERGEAR™**



**POULIGEAR<sup>fr</sup>**

The **POWERGEAR BT-Series Round Shaft Mounted Gear Unit** is a versatile gearbox developed on special demand from our customers worldwide.

The gear unit is compact in size mounting directly on to the driven shaft, thus eliminating the need of a foundation and coupling.

The torque arm anchors the gear unit and provides easy and quick method of adjustment of V-belts by means of a turnbuckle. All our units are supplied with a torque arms.

The units are available in **7** sizes from **BT40 to BT100** upto a torque ratings of 11,000 Nm with a reduction ratio of **15:1**.

Reduction ratios from 5:1 to 30:1 are available on special request.

**BT123** is a special size with reduction ratio of **5:1**, developed for high speed applications. The unit can be directly secured on the drive using 3 mounting holes.

A wider range of final speed ratios may be achieved by use of pulley combinations. The gearbox is suitable for both forward and reverse motion.

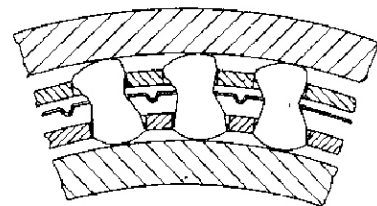
**Accessories:**

**Anti-Roll Back Adapters / Backstops:** A simple accessory that prevents reversal of the speed reducer and is ideal for inclined conveyors.



**Benefits:**

- \* *Hardened and Ground Gearing*
- \* *CNC Machined Cast Iron Housings*
- \* *Compact and Low Cost*
- \* *High Efficiency of 96%*
- \* *Multiple Bore Sizes*
- \* *Backstop Provision in All Models*
- \* *Interchangeable with Leading Brands*



Backstop Sprag Clutch

**Interchangeability Chart Based on Torque Ratings**

<b>POWERGEAR Round - BT Series</b>	<b>BONFIGLIOLI TA</b>	<b>SITI Rp2</b>
<b>BT123 (Single Reduction) Diameterφ: 35 / 40</b>	-	-
<b>BT40 Diameterφ: 35 / 40 / 45</b>	<b>TA40 Diameterφ: 40 / 45</b>	<b>RP2 91/2 Diameterφ: 30 / 38 / 40 / 45</b>
<b>BT45 Diameterφ: 45 / 50 / 55</b>	<b>TA45 Diameterφ: 45 / 50 / 55</b>	<b>RP2 111/2 Diameterφ: 40 / 45 / 50 / 55</b>
<b>BT50 Diameterφ: 50 / 55 / 60</b>	<b>TA50 Diameterφ: 50 / 55 / 60</b>	<b>RP2 131/2 Diameterφ: 50 / 55 / 60</b>
<b>BT60 Diameterφ: 60 / 65 / 70</b>	<b>TA60 Diameterφ: 60 / 70</b>	<b>RP2 151/2 Diameterφ: 50 / 55 / 60 / 65 / 70</b>
<b>BT70 Diameterφ: 70 / 75 / 80 / 85</b>	<b>TA70 Diameterφ: 70 / 85</b>	<b>RP2 181/2 Diameterφ: 60 / 70 / 75 / 80 / 85</b>
<b>BT80 Diameterφ: 80 / 85 / 100</b>	<b>TA80 Diameterφ: 80 / 100</b>	<b>RP2 221/2 Diameterφ: 80 / 100</b>
<b>BT100 Diameterφ: 85 / 100 / 125</b>	<b>TA100 Diameterφ: 100 / 125</b>	<b>RP2 260/2 Diameterφ: 100 / 125</b>



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# Selection Procedure

1. Determine Required Output Speed
2. Determine Power Absorbed by the Drive
 

$$\text{Absorbed Power (KW)} = \frac{\text{Absorbed Torque (Nm)} \times \text{Machine Speed (rpm)}}{9550}$$
3. Determine Service Factor from Table
4. Multiply the Absorbed Power by the Service Factor
5. Using the Table for Power Rating select the smallest gear unit that is suitable for transmitting this power at the Output Speed

### For Example:

A torque of 500 Nm is required to be transmitted on the brick press at 70 rpm

The brick press is under heavy load and operates for 17 hours per day

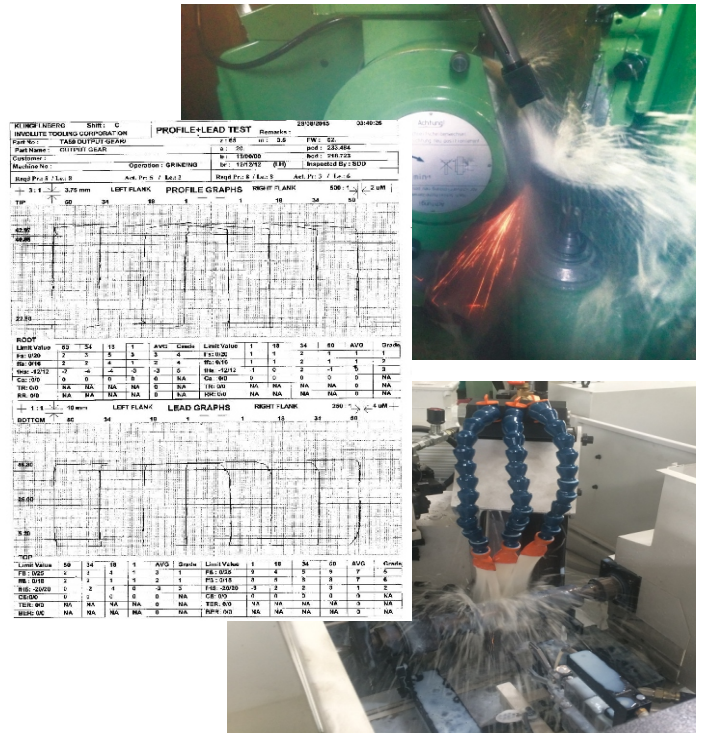
Absorbed Power =  $(500 \times 70) / 9550 = 3.66 \text{ kW}$   
 Service Factor from Table = 2.0  
 Selection Power =  $3.66 \times 2.0 = 7.33 \text{ kW}$

From Power Rating chart at 70 rpm size "BT45" double reduction speed reducer at 9.80 kW is the smallest for this application.

Driven Machine Types Service Factors	Daily Operating Hours		
	Below 10 Hours	Between 10-16 Hours	Above 16 Hours
<b>UNIFORM LOAD</b> Liquid And Semi Liquid Mixers Centrifugal Discharged Equipments Bottling Machine Fixed Load Carrier Ovens Washing Machines Centrifugal And Gear Pumps Wire Drawing Machines	1.0	1.12	1.25
<b>MODERATE SHOCK</b> Variable Density Mixers Variable Load Conveyors Cranes, Movable Carriers And Lifters Rolling Machines Heavy Load Elevators Drying Stoves Drying Machines Lifting Machines Piston Pumps With 3 Or More Cylinders Pulp Machines Drying Machines Homing Cylinders Wet Pressing Machines Small Mixers Rotary Screens Textile Machines	1.25	1.4	1.5
<b>HEAVY SHOCK</b> Brick Press Briquette Manufacturing Machine Conveyor Band Moving Forward /Backward And Shaking Breaking Machines Hammer Mill Piston Pumps With 1 Or 2 Cylinders Extruders Vibrators Forging Mills	1.6	1.8	2.0

### Power (kW) & Torque (Nm) Rating

RPM	BT40	BT45	BT50	BT60	BT70	BT80	BT100
20	2.0	3.1	5.1	7.9	8.9	14.0	24.0
30	3.1	4.8	7.7	13.0	11.2	21.0	38.0
40	3.4	5.9	9.2	14.9	18.0	28.0	45.0
50	4.4	6.8	11.0	18.2	20.0	35.0	55.0
60	5.3	8.3	12.9	22.0	25.0	42.0	66.0
70	6.1	9.8	14.8	25.0	30.0	46.0	72.0
80	6.9	11.0	16.9	28.5	34.0	52.5	83.0
90	7.7	12.3	19.0	32.0	39.0	59.0	94.0
100	8.1	13.5	21.0	35.4	44.0	65.0	105.3
Nm	950	1400	2300	3600	48.3	7000	11000

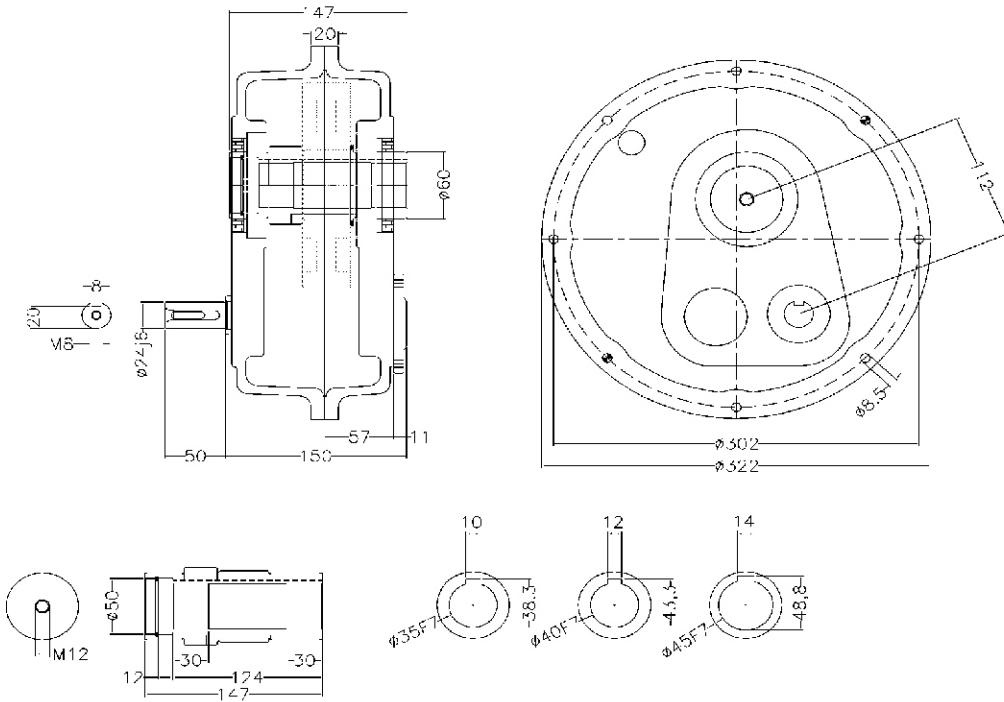


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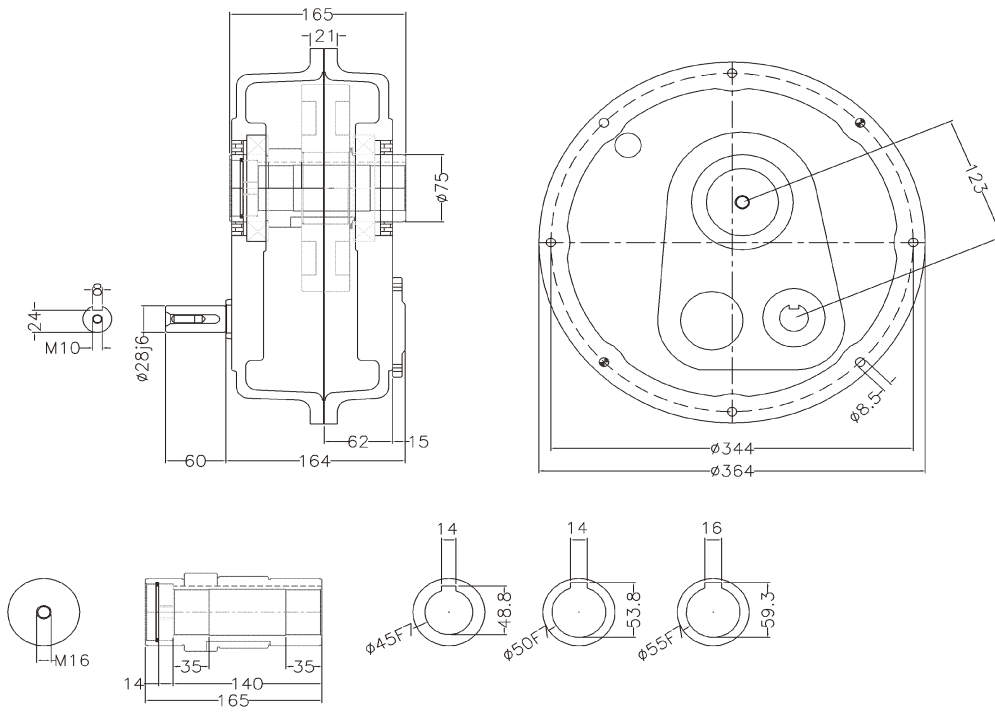
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# BT 40



KG  
30

# BT 45



KG  
40

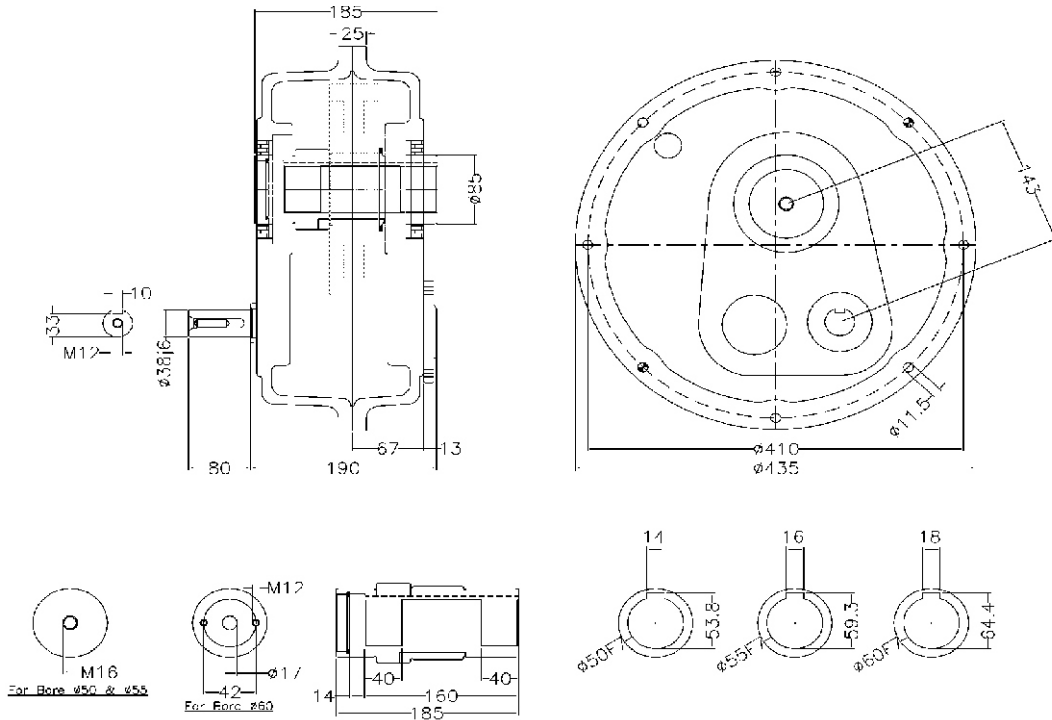


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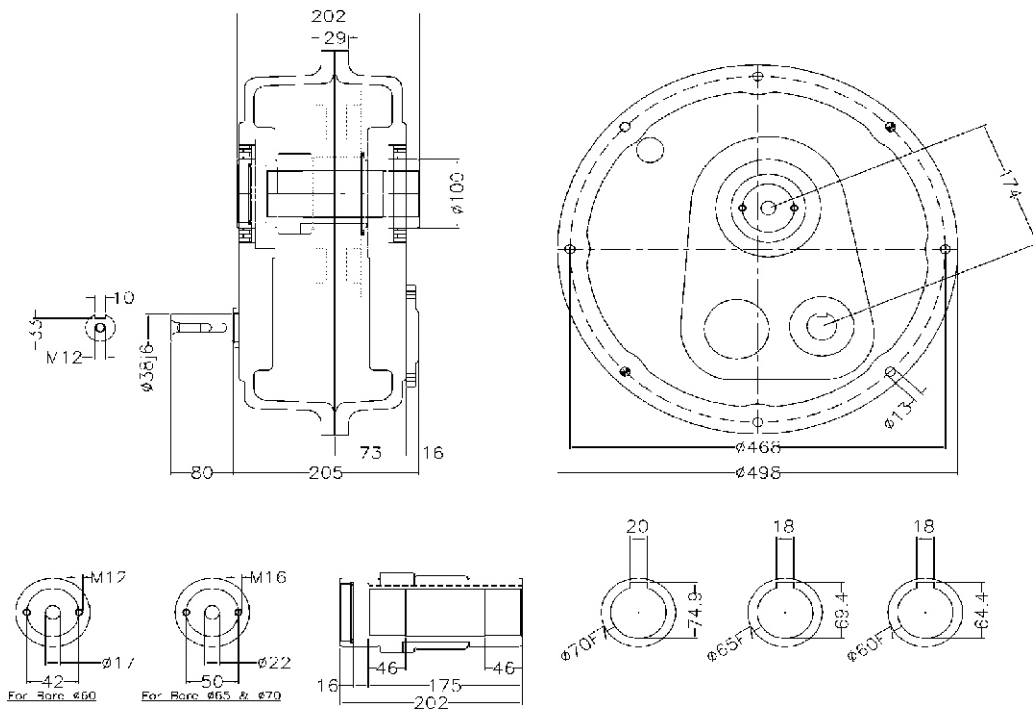
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# BT 50



KG  
62

# BT 60



KG  
97

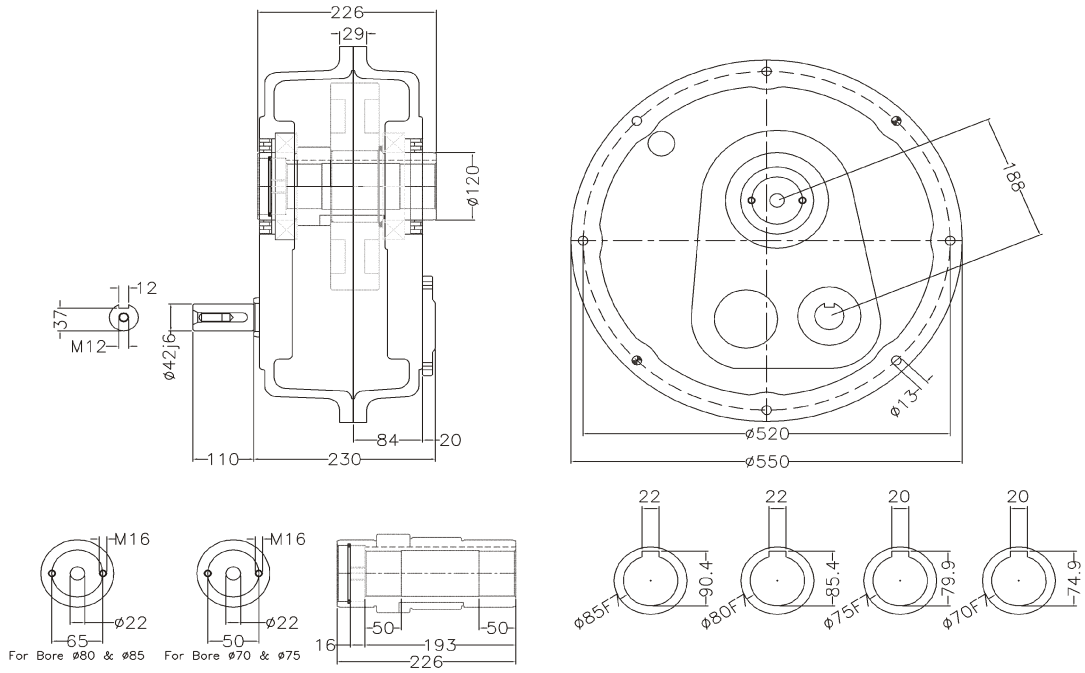


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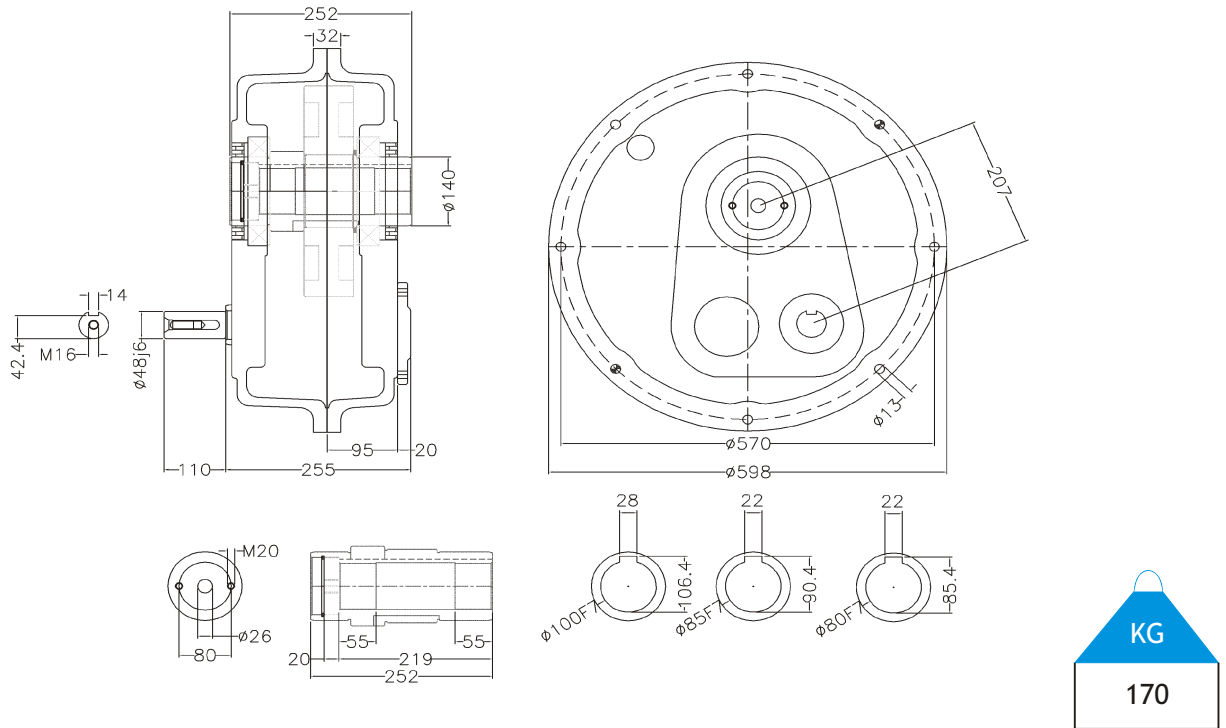


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# BT 70



# BT 80

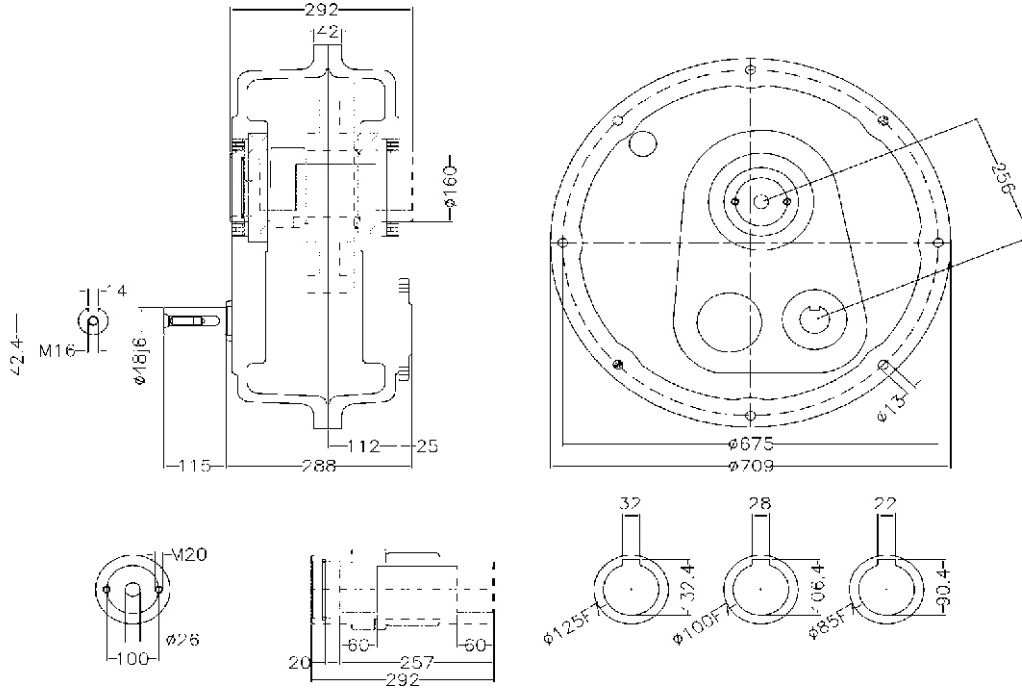


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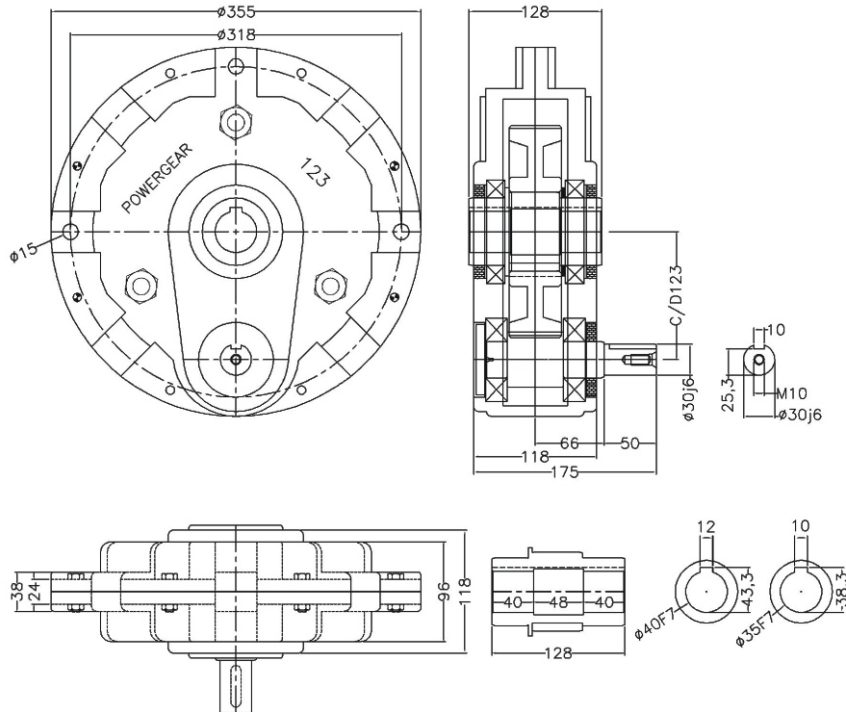
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# BT 100



KG  
290

# BT 123



KG  
35

RPM	150	125	100	Tourqe(Nm)
Power (kW)	20.20	16.75	13.50	1400



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# BT Series - Shaft Mounted Gear Unit - Installation

**BT Series Shaft Mounted Gear Units** are supplied **without oil** and must be filled with the recommended quantity of lubricant before use. Correct quantity and type of oil being used is essential to ensure correct operation and long life of the gear unit.

The **recommended tolerance** for the drive shaft for installing the gear unit is “h7”

A **breather plug** must be used to ensure no pressure builds up inside the gear unit such that subsequent oil seal failure does not occur. A breather plug is always supplied with the gear unit.

Make sure that the gear unit is securely installed on the drive to avoid sudden shocks and vibrations. The **torque arm must be installed in tension** to avoid sudden jerks on drive start-up.

Viscosity of oil for various ambient temperatures and reducer **input** speeds are shown below:-

Ambient Temp deg. C	Viscosity (mm <sup>2</sup> /s (cSt) at 40 deg. C)	
	Input speed r.p.m.	
	500 to 1,000 r.p.m.	1,000 to 2,000
-10 to + 5	VG 100	VG 100
0 to + 40	VG 320	VG 220
+35 to + 45	VG 460	VG 320

## Recommended Synthetic Oils :-

BP EnerSyn HTX	Castrol AlphaSyn T - range	Esso	Kluber Klubersynth Gh6	Mobil SHC SHC-XMP	Shell Tivela WA / WB
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## Recommended Mineral Oils :-

BP Energol GR-XP	Castrol Alpha ZN / SP	Esso Spartan EP	Kluber Kluberoil GEM 1	Mobil Mobilgear	Shell Omala
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## Maintenance:-

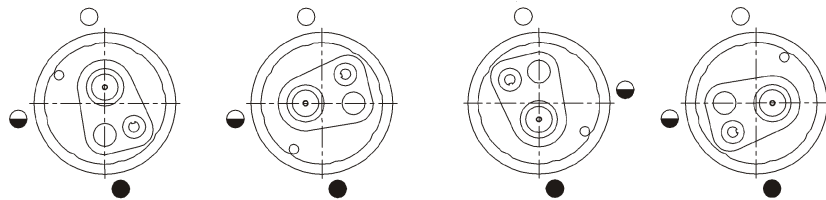
- Running in Period : After 500 hours drain oil and refill.  
 Synthetic Oil : Replace every 12,000 hours use.  
 Mineral Oil : Replace every 2,500 hours use.

Casing Bolt Size	M8	M10	M12	M16
Tightening Torque (Nm)	25 Nm	50 Nm	85 Nm	215 Nm

Quantity of lubricant and position of breather, sight glass and drain plug are shown in diagrams and table below:-

### Key

- Filling / Breather Plug
- Sight Glass
- Drain Plug



## Mounting Positions

Oil Quantity (Liters)							
BT40	BT45	BT50	BT60	BT70	BT80	BT100	BT123
1.8	3.5	7.2	10	14	11	18	0.5

## Comprehensive Shaft Mount Range



## Backstop Installation

- \* Drain off oil from gear unit, if filled.
- \* Remove backstop cover on the intermediate stage.
- \* Fit the bush on the intermediate pinion shaft with a key.
- \* Gear Unit sizes BT40 to BT50 require a hardened ring to be fitted into the backstop cover. Other sizes have hardened backstop covers, supplied separately in the backstop kit.
- \* Take the sprag clutch and fit it in the backstop cover. Use a gasket on the backstop cover.
- \* Feed assembly into the intermediate stage while rotating the input shaft.
- \* Determine the direction of rotation while inserting the assembly.

## Involute Powergear Pvt. Ltd.

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