

INNOVATIVE TECHNOLOGIES

Relative Scuffing Load Carrying Capacity Tester

TT-FZG



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The TT-FZG Relative Scuffing Load Carrying Capacity Tester conforms to ISO 14635-1 and ISO 14635-2, which specify the FZG test methods for evaluating the scuffing load-carrying capacity of lubricating oils and lubricants with extreme pressure (EP) performance.

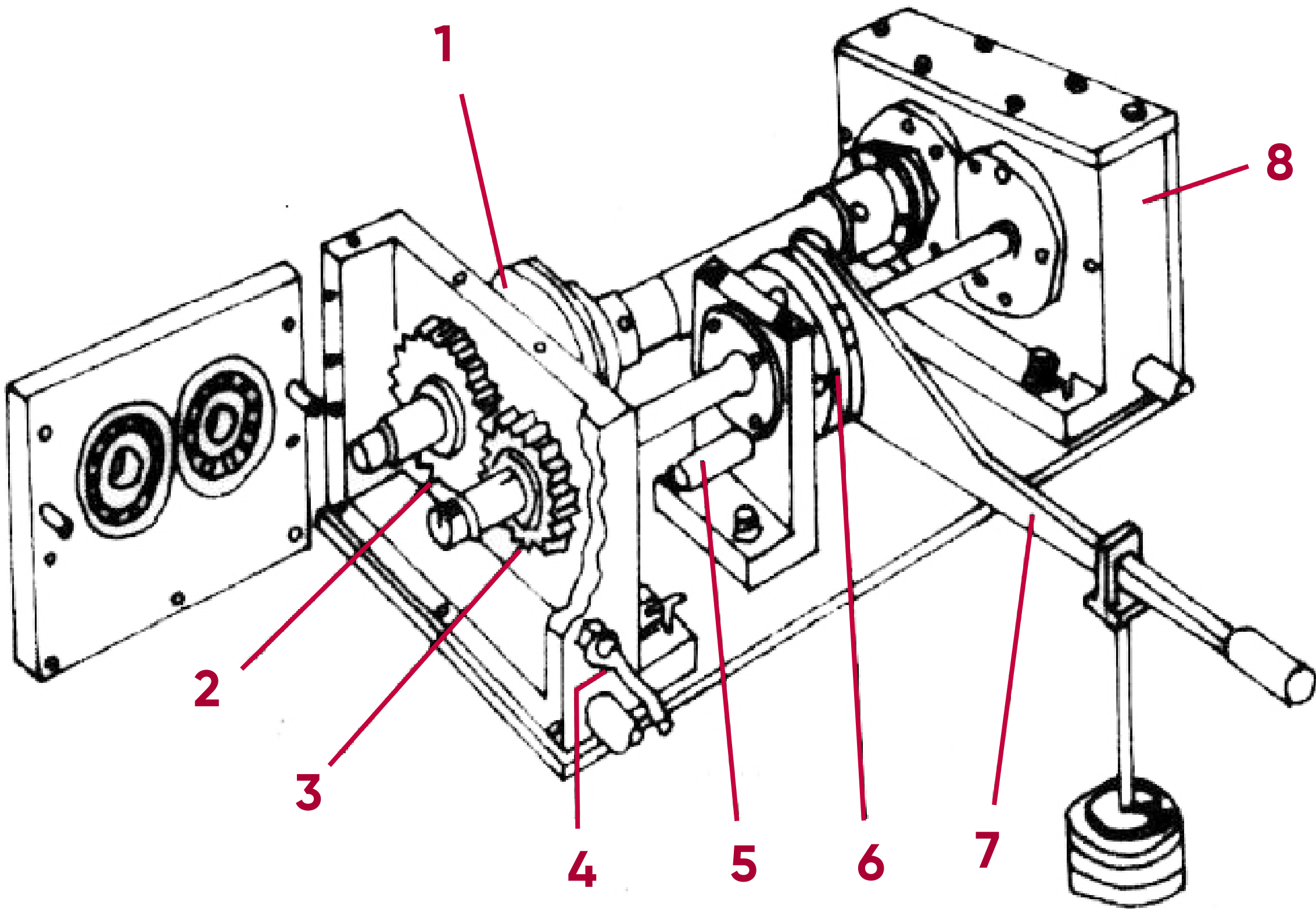
Gear failures influenced by lubricants, such as scuffing, low-speed wear, micropitting, and pitting, are critical concerns in gear design. The FZG test procedures help determine lubricant-related characteristic values, ensuring accurate selection for industrial and automotive applications.

ISO 14635-1 (FZG test method A/8, 3/90) is widely used for assessing industrial and marine gear oils, while ISO 14635-2 (FZG test method A10/16, 6R/90) focuses on high-EP lubricants for automotive driveline components. These tests provide essential data for lubricant formulation and performance evaluation, supporting reliable gear operation under varying load conditions.



FEATURES/ADVANTAGES

- **Dynamic Closed-Loop Structure with Precision Load Control**
The power flow closed-loop design ensures consistent load application, while the hanging weight system provides accurate and repeatable loading conditions.
- **High-Precision Gear Testing with Efficient Setup**
Equipped with high-accuracy test and transmission gears, allowing reliable performance evaluation. The removable left and top covers enable quick and easy gear installation and replacement.
- **Stable & Durable Horizontal Structure**
Designed with a strong machine base and deep groove ball bearings, ensuring smooth operation, reduced friction, and long-term durability.
- **Versatile Testing with Dual Gear Cases**
Features a test gear case for lubricant evaluation and a transmission gear case with precision torque measurement, making it suitable for various industrial and research applications.

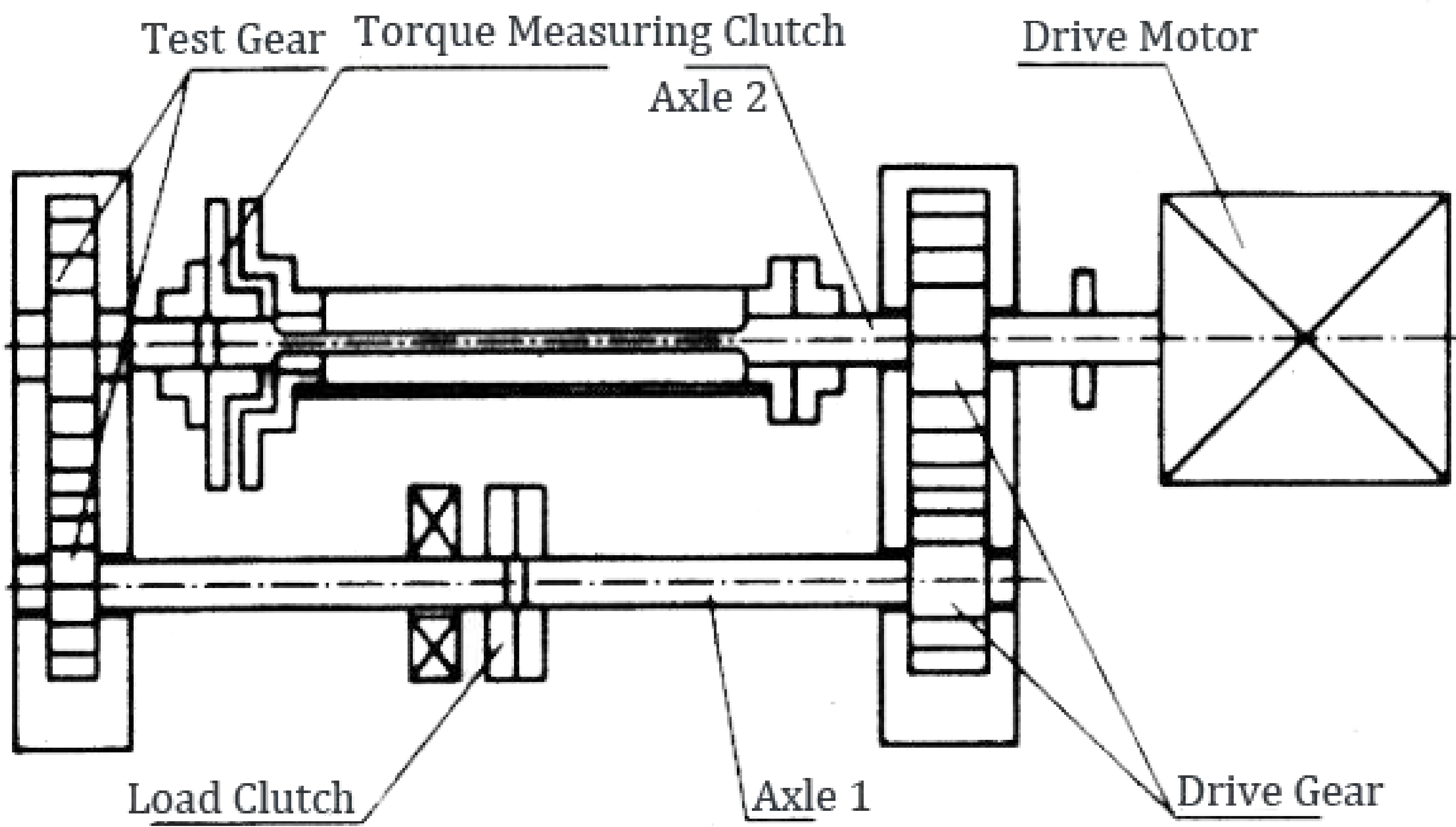


LABEL	NAME	LABEL	NAME
1	Torque Measuring Clutch	5	Fixed Pin
2	Big Test Gear	6	Loading Clutch
3	Small Test Gear	7	Level Arm With Weights
4	Temperature Sensor	8	Transmission Gear Case

LOADING METHOD

The loading rod is hung on the sheave of the loading clutch. After adding weights, tighten the two sheaves by securing the nut on the loading clutch. Then, remove the weights and the loading rod. The torque value can be read from the torque measuring clutch.

The YD132M-4/2 two-speed motor drives the transmission gear through the shaft, transmitting torque to the test gear. The test gear case holds the test gear and can contain different liquid test mediums. During testing, the test gear part is immersed in the test medium for evaluation.



ELECTRIC CABINET AND CONTROL PANEL

The electric control cabinet consists of four main parts:

- **Control Cabinet Body** – The structural frame housing the system.
- **Control Panel** – Positioned above the cabinet for easy operation.
- **Strong Current System** – Powers the main operational components.
- **Weak Current System** – Handles control and signal processing.

A rear door provides access to the internal system, making installation, debugging, and maintenance convenient.

The control panel is divided into three sections:

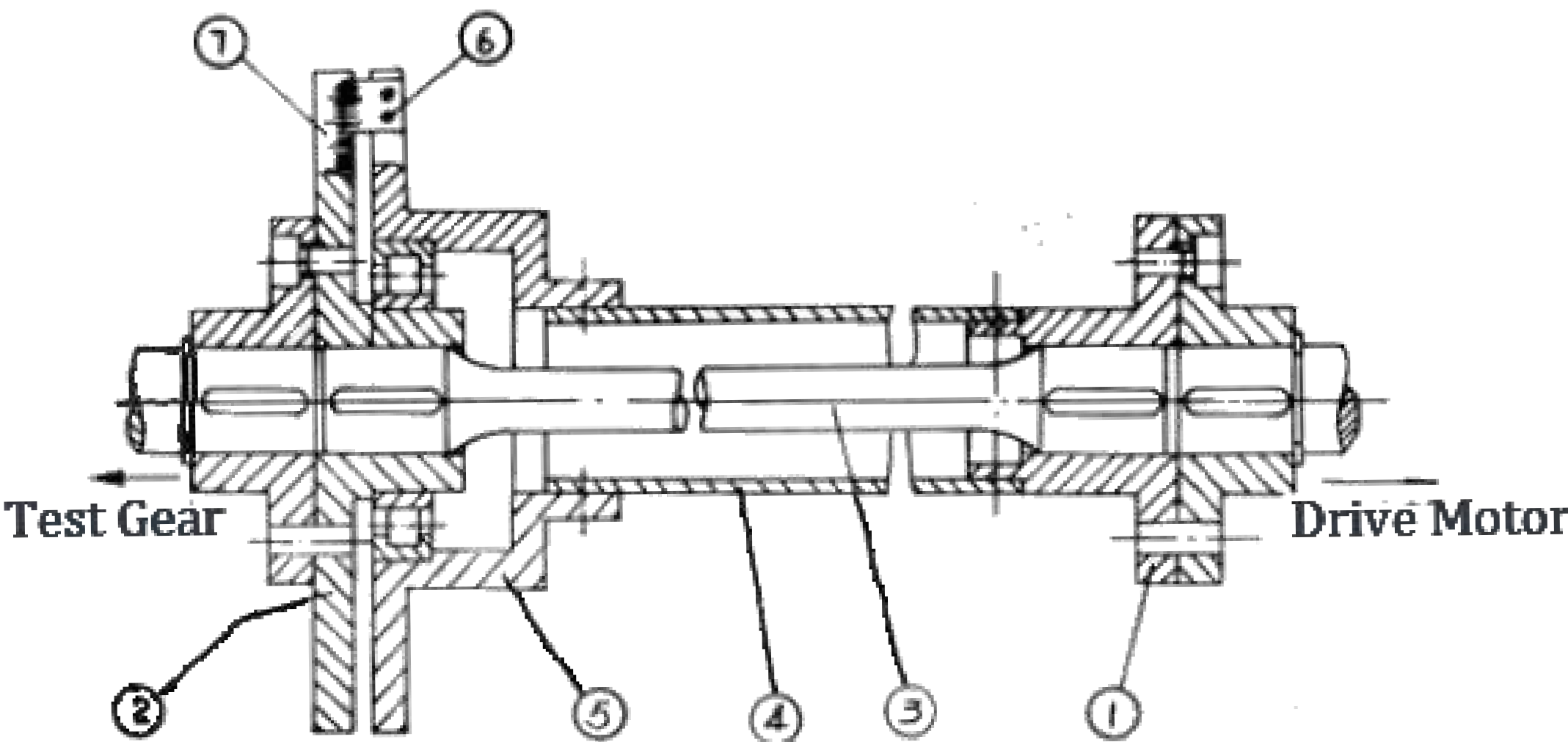
- **Lower Section:** Includes the control switch and alarm.
- **Middle Section:** Features heating, cooling, and motor speed selection switches.
- **Upper Section:** Equipped with a temperature controller, time controller, and revolution controller.

The time display and control unit allow users to set the control time between 1s to 9999 minutes. A CLEAR button is located below the control unit to reset the digital display. The revolution display and control unit can adjust the control revolution speed within a range of 1 to 99,999,999.



The temperature controller regulates the test oil temperature inside the test gear case and controls the cooling water valve, ensuring stable testing conditions.

TORQUE MEASURING CLUTCH



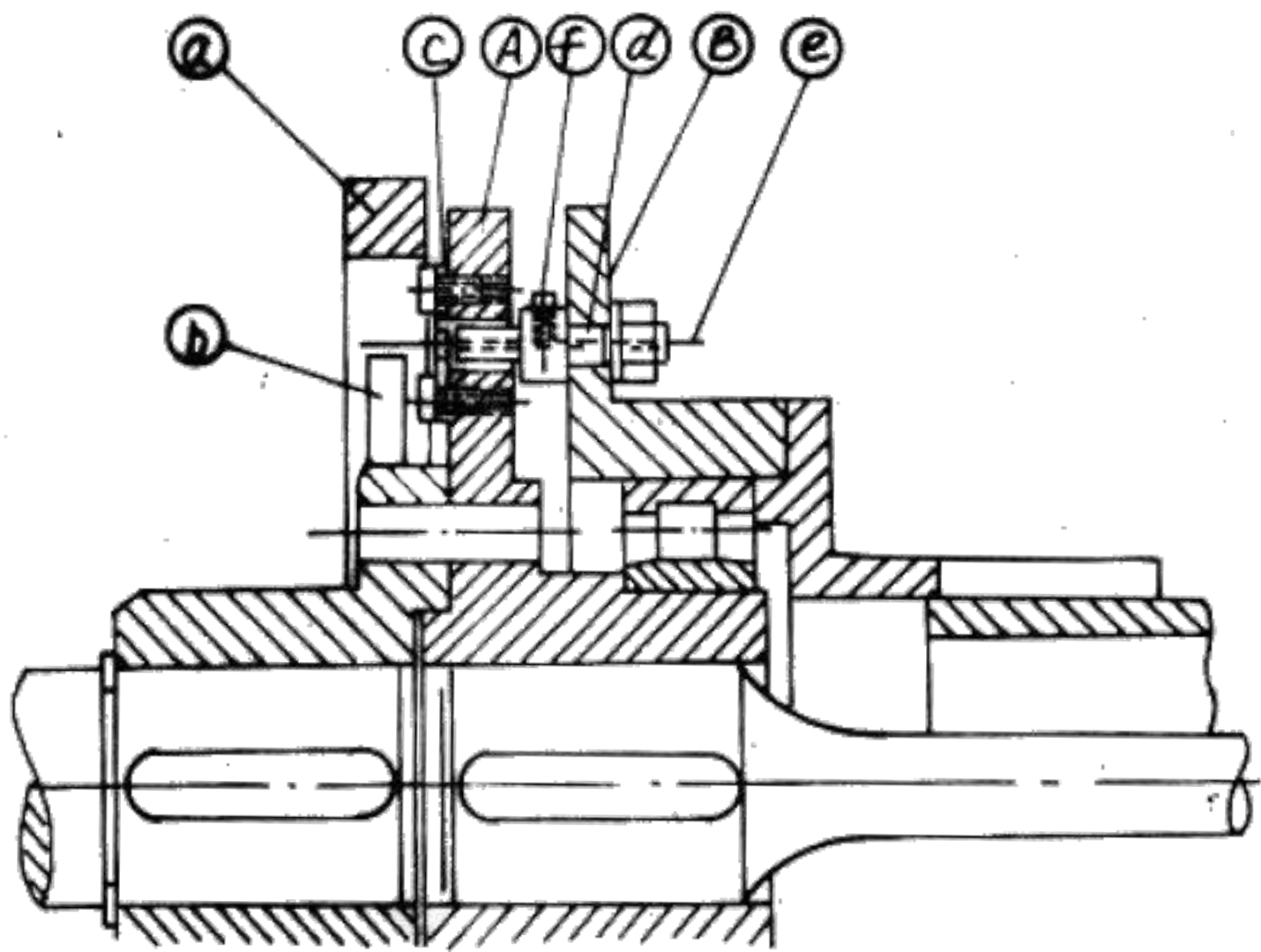
LABEL	NAME
1	Small Flange
2	Large Flange
3	Torsion Bar
4	Outer Tube
5	Indicating Flange with Vernier Caliper
6	Vernier Caliper
7	Scale

The torque shaft (3) is enclosed within the outer tube (4), forming a closed-loop system. When the tester is loaded, the elastic shaft (torsion bar) twists and deforms, allowing the torque value to be read using the vernier caliper on the indicating flange. The scale on the large flange provides precise torque measurement for analysis.

GEAR TOOTH BREAKAGE PROTECTION DEVICE

The tester is equipped with a gear tooth breakage control device (Fig. 5) to ensure operational safety. If the gear breaks or the load on the gear increases abnormally, the automatic overload protection device will immediately stop the test.

The protection mechanism consists of:



LABEL	NAME
A	Copper Ring
B	Flat Spring
C	Shear Sheet
D	Pinhole
E	Shear Pin

The copper ring is mounted on the bottom plate of the testing machine but is insulated from it. After loading, the pinhole is adjusted on the torque measuring clutch groove to align with the shear hole. In this position, the shear pin passes through the shear plate and pinhole. While adjusting, the flat spring (b) is pressed with the needle to keep the shear pin in place using a screw (f).

If there is an abnormal torque fluctuation, the indicating flange (5) and large flange of the torque measuring clutch rotate relative to each other, causing the shearing needle to break. This action makes the flat spring (b) hit the copper ring (a), triggering the control circuit to open, immediately stopping the drive motor.

TECHNICAL SPECIFICATIONS

SPECIFICATION	VALUE	
Maximum torque	1 k.Nm	
Maximum load class	Grade 13	
Temperature accuracy	±2°C	
Drive motor power	6.5 kW (8 kW)	
Revolution speed	1450 rpm / 2880 rpm	
Test gear case capacity	1.25 L	
Heating power	0.5 kW × 3 = 1.5 kW	
Test time control range	1s ~ 9999 min	
Number of revolution range	9999999	
Main host dimensions	1390 × 750 × 1082 mm	
Control cabinet dimensions	510 × 510 × 1040 mm	
Test Gear	Modules	4.5
	Number of teeth	$Z_b = 24, Z_s = 16$
	Modification coefficient	$X_b = -0.5, X_s = 0.08532$
	Engaging angle	22°26'
	Central moment	91.5 mm
	Accuracy grade	5

SPECIFICATION	VALUE
Main host	1 set
Control cabinet	1 set
Dedicated tools	1 set
Lever arm and weights	1 set
Oil spray source	Optional
Cooling system	Optional
A-type test gear	Optional



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