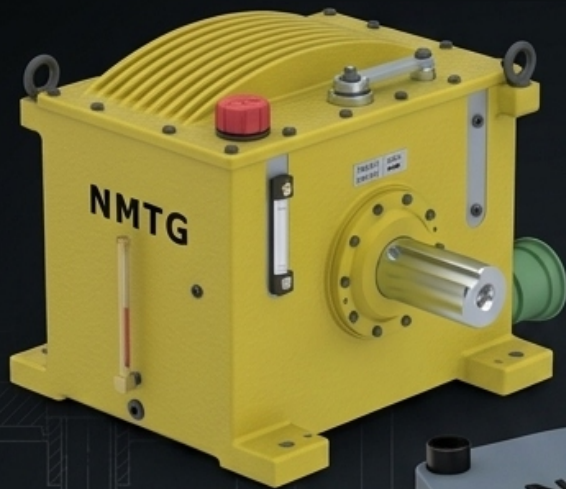


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Since 1975



Advanced Power Transmission Solutions

HOUSING FREEWHEEL CLUTCHES

FOOT MOUNTED TYPE - CONTINUOUS DUTY FOR DUAL DRIVE SYSTEMS

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HOUSING FREEWHEEL CLUTCHES

FOOT MOUNTED TYPE - CONTINUOUS DUTY FOR DUAL DRIVE SYSTEMS



NHFC Series

❖ Product Description

NMTG Housing Freewheel Clutches are specially designed, self-contained overrunning clutch units developed for continuous operation in demanding industrial applications. These units are primarily used in dual drive or standby drive arrangements, where one drive operates continuously while the other remains idle and automatically engages when required. The clutch is housed within a robust cast iron or fabricated steel enclosure, which ensures mechanical protection, effective heat dissipation, and reliable lubrication.

These clutches are engineered to operate continuously for 24 hours a day throughout the year, making them ideal for applications where system shutdown is not feasible. Their design makes them particularly suitable for harsh and dusty environments such as coal handling plants, cement industries, and mining operations.

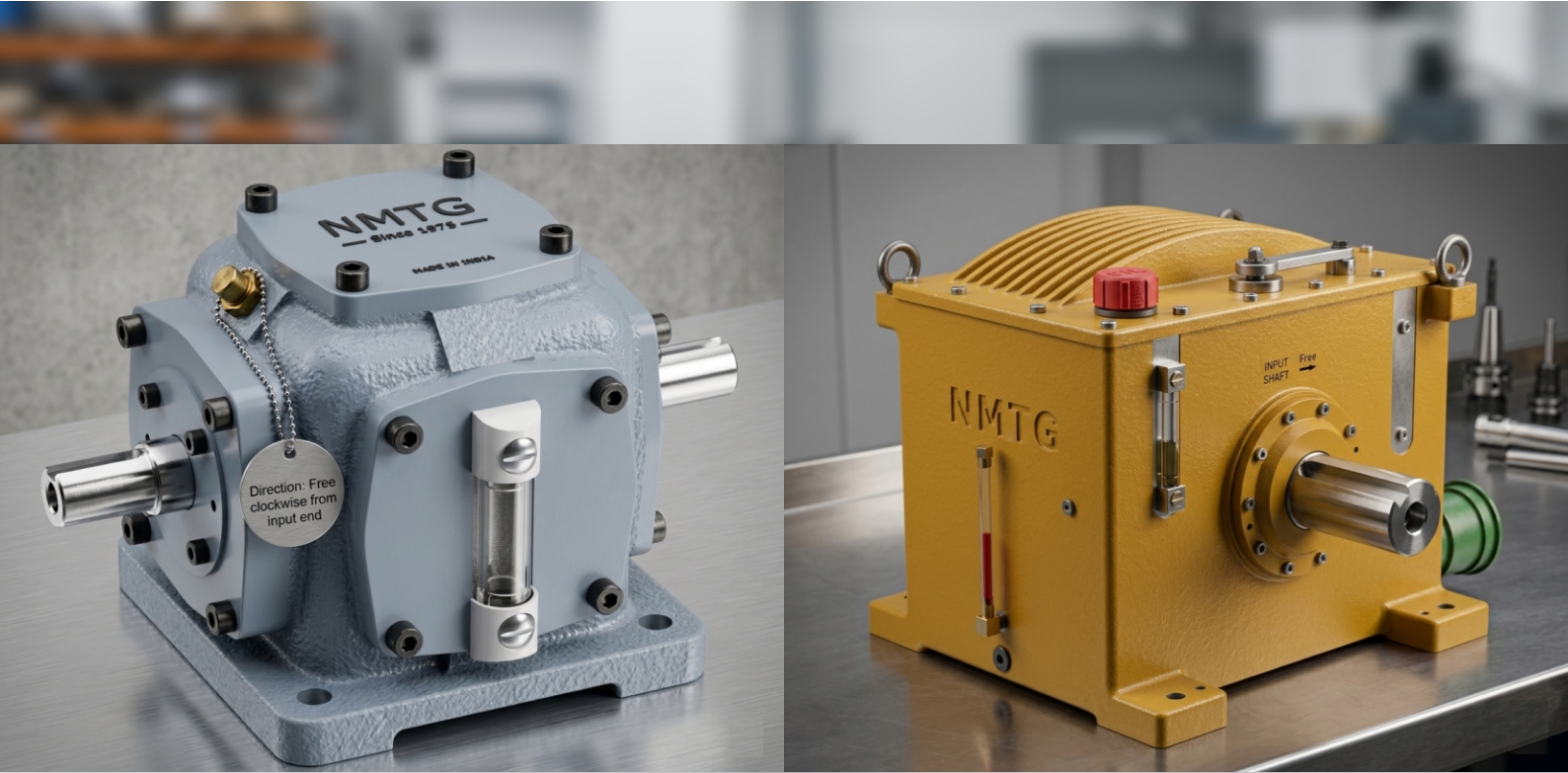
❖ Working Principle

Housing Freewheel Clutches operate on the principle of directional torque transmission. In one direction of rotation, the inner and outer races rotate freely without contact, allowing the clutch to operate in a freewheeling mode with negligible friction and wear. In the opposite direction, mechanical engagement occurs between the torque-transmitting elements (sprags or rollers) and the races, enabling efficient transmission of high torque.

This automatic engagement and disengagement mechanism allows seamless switching between driving and standby units without requiring any external control system, ensuring reliable and uninterrupted operation.

HOUSING FREEWHEEL CLUTCHES

FOOT MOUNTED TYPE - CONTINUOUS DUTY FOR DUAL DRIVE SYSTEMS



NHFC Series

❖ Design and Construction

The clutch is available in both **sprag type and roller type** configurations, depending on application requirements. The internal assembly is supported by bearings and enclosed within a fully sealed housing to prevent contamination from external elements.

The housing serves multiple functions, including acting as an oil reservoir, providing a cooling surface, and ensuring structural rigidity. The unit is designed for inline shaft arrangements and must be connected to the driving and driven equipment using flexible couplings to accommodate minor misalignments and ensure smooth operation.

❖ Lubrication System

An efficient oil lubrication system is a key feature of the Housing Freewheel Clutch. The unit is designed with a large oil reservoir that ensures continuous lubrication of all internal components during operation. This not only reduces friction and wear but also helps in dissipating heat generated during high-speed operation.

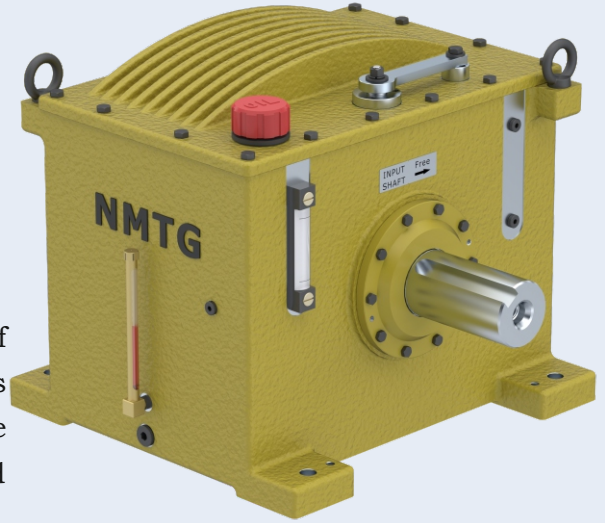
The clutch is equipped with oil fill and drain ports for easy maintenance, along with an oil sight gauge that allows operators to monitor the oil level without stopping the machine. A breather is provided to maintain pressure equilibrium inside the housing, preventing oil seal damage due to pressure build-up.

❖ Key Features of Lubrication System

- Large oil reservoir
- Grease barrier seals
- Oil sight gauge
- Breather system
- Oil fill & drain ports
- Foot mounted design
- Fully sealed construction

The grease barrier seals provide an additional layer of protection by preventing dust and abrasive particles from reaching the oil seals, thereby extending seal life and ensuring reliable performance in contaminated environments.

The foot-mounted design allows easy installation, removal, and maintenance without disturbing the connected equipment.



❖ Optional Features

- An optional **centrifugal lift-off sprag design** is also available, which eliminates contact between sprags and races during overrunning at high speeds. This significantly reduces wear, minimizes heat generation, and increases the overall service life of the clutch.
- For enhanced safety and performance, several optional features are available. A **mechanical brake** can be provided to prevent unintended rotation of the input shaft due to drag torque when the system is disengaged during maintenance or inspection. This ensures safe working conditions.
- **Handling of Brake (Drag Condition)**

The brake is provided to prevent unwanted rotation of the input shaft caused by drag torque from the output shaft during maintenance or inspection activities.

When the drive machine is disconnected from the clutch unit, the driven equipment may still rotate due to system conditions. This rotation can transfer drag torque back to the input shaft, causing it to rotate unintentionally. In such cases, the brake is used to stop the input shaft safely. The brake should only be used under maintenance conditions when the coupling is disconnected and the input shaft is stationary.

It must not be used to stop a running drive machine or to control normal operation. Using the brake during rotation or forcing the shaft movement while the brake is engaged can lead to excessive wear and possible damage to the brake components and clutch assembly.

Before operating the system, ensure that the brake is in the “Free” position. During maintenance, apply the brake only after confirming that the shaft is not rotating. After applying, the brake lever should be set to the “Locked” position. Proper use of the brake ensures safe maintenance and prevents unintended shaft movement due to drag forces.





NHFC Series

❖ Heater Arrangement

In certain applications where the clutch operates in low ambient temperature conditions, NMTG provides an optional heater arrangement for the Housing Freewheel Clutch. This feature is specially recommended for installations where low temperatures can affect the performance of the lubrication system.

At low temperatures, the viscosity of the lubricating oil increases, which can lead to improper lubrication, higher starting resistance, and potential damage to internal components. The heater helps maintain the oil at an appropriate temperature level, ensuring smooth clutch operation and reliable performance during startup and continuous running.

The heater is integrated into the housing as per application requirements and is designed to maintain a stable temperature inside the clutch assembly. For detailed specifications such as heater rating, power supply, and installation arrangement, reference should be made to the NMTG approved drawings. Proper use of the heater improves lubrication efficiency, reduces wear, and enhances overall service life of the clutch in cold operating conditions.

Key Points

- Optional feature (on request)
- Suitable for low temperature conditions
- Maintains oil temperature
- Ensures proper lubrication
- Improves startup performance
- Reduces wear and damage
- Refer drawing for specifications

❖ Internal Component Design

NMTG Housing Freewheel Clutches are designed with high-quality internal components to ensure superior performance and durability.

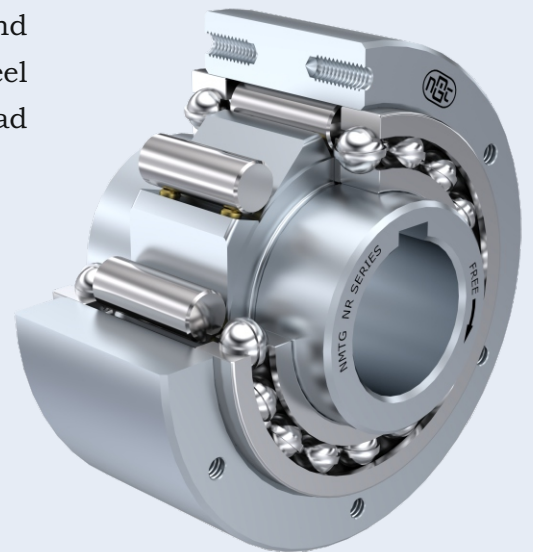
- **Cam / Sprags / Roller Assembly**
- **Outer Race**

The cam or sprags or Rollers are manufactured from high-grade alloy steel and are deep case hardened to provide excellent wear resistance and high torque capacity. The roller assembly is through-hardened and precision ground to enhance load carrying capacity while minimizing backlash and heat generation. The outer race is made from forged alloy steel and is designed to reduce stress concentration, improve load distribution, and provide higher torsional stiffness.

Advantages

- Wear-free overrunning
- Low noise operation
- Low power loss
- Continuous duty operation
- Built-in locking brake option
- Oil change without machine downtime
- Minimal maintenance
- Long service life with minimal maintenance

These clutches offer highly efficient performance with minimal energy loss and are capable of operating continuously under demanding conditions. Their robust design and optimized lubrication system ensure long operational life with reduced maintenance requirements.



❖ Applications

Housing Freewheel Clutches are designed for inline drive systems and are widely used in applications requiring continuous overrunning operation and reliable torque transmission.

- **Dual drive systems**
- **Standby drives**
- **Turning gear drives**
- **Creep / inching drives**
- **Energy recovery systems**

They are commonly used in industrial equipment such as induced draft fans, large mixers, belt conveyors, and kiln drives, where controlled low-speed operation and reliable backup drive systems are essential.

❖ Industries

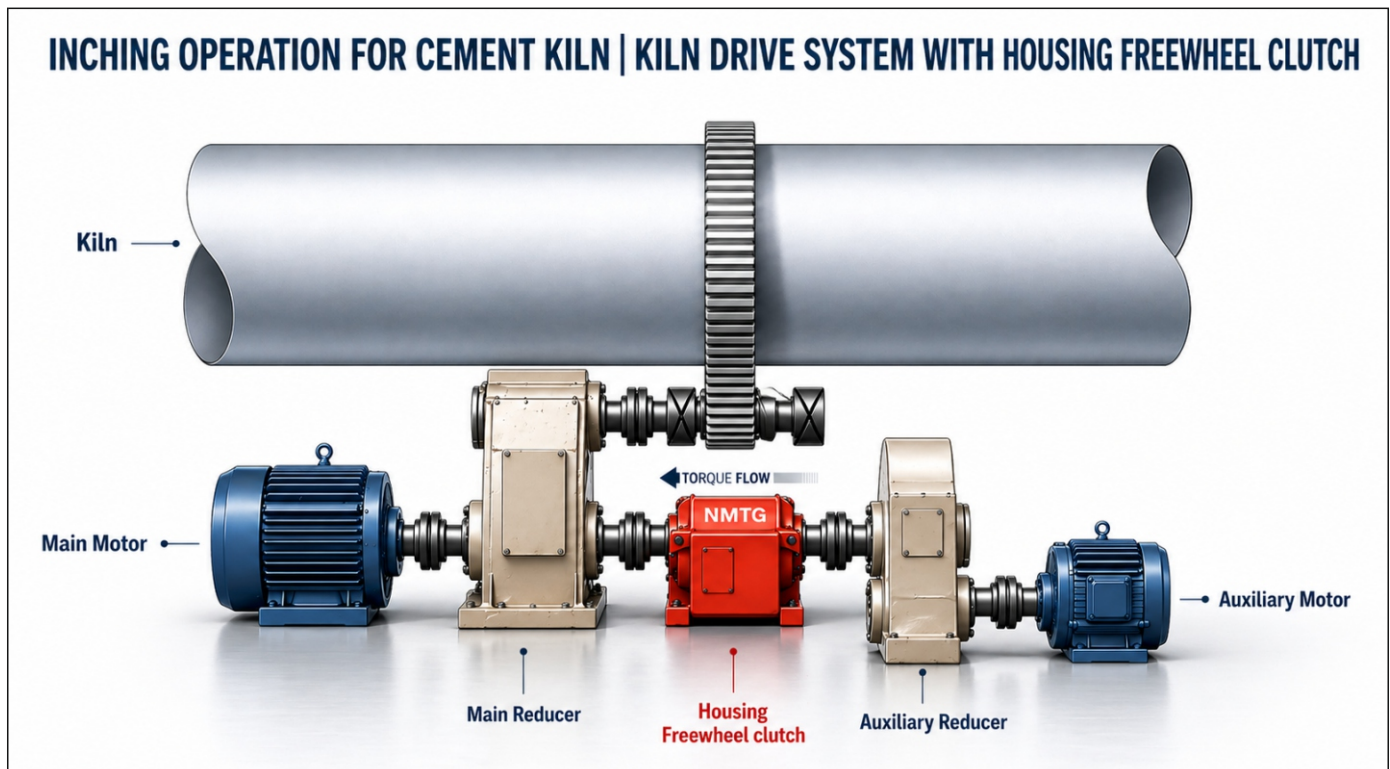
These clutches are extensively used across various industries where reliability and continuous operation are critical.

- **Power plants**
- **Cement plants**
- **Steel plants**
- **Mining industry**
- **Coal handling systems**

❖ Application Examples

1. Inching Operation for Cement Kiln

In cement plants, rotary kilns require a reliable system for slow rotation during shutdown, maintenance, or emergency conditions. NMTG Housing Freewheel Clutches are used as part of the turning or inching drive system to ensure safe and controlled kiln movement.



During normal operation, the kiln is driven by the main motor through the main gearbox, and the freewheel clutch remains in overrunning condition without transmitting torque. In case of main drive failure or planned shutdown, the auxiliary (turning) motor is activated. At this stage, the clutch automatically engages and transmits torque to rotate the kiln at a very low speed.

This arrangement eliminates the need for manual clutch engagement, allowing operation from a remote control system. It ensures uniform cooling of the kiln shell, prevents deformation, and improves safety during maintenance activities.

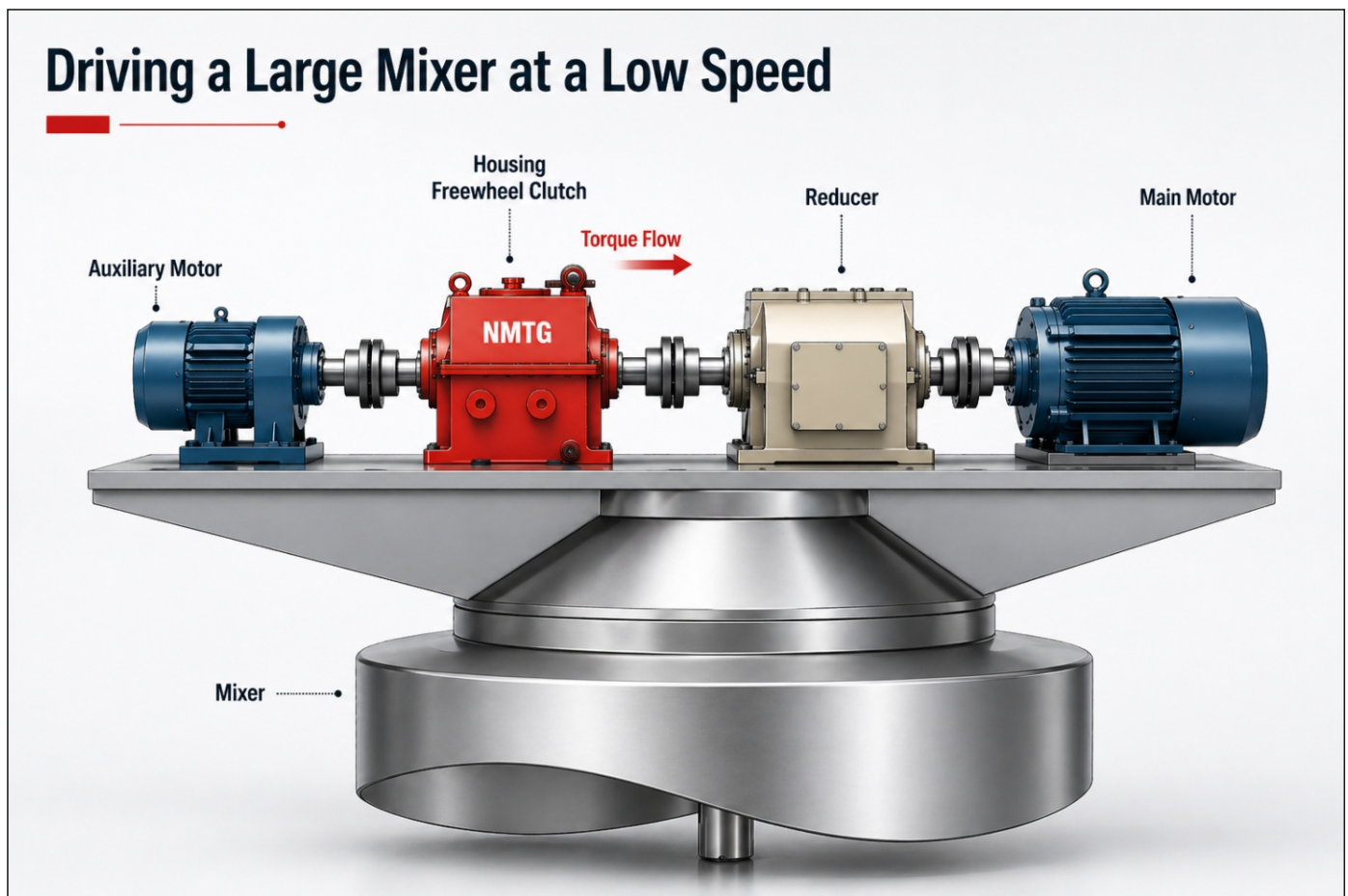
Key Points:

- **Automatic engagement during emergency**
- **Remote operation capability**
- **Prevents kiln deformation**
- **Smooth low-speed rotation**

❖ Application Examples

2. Driving a Large Mixer at Low Speed

In many industrial processes, large mixers operate under varying speed conditions. Typically, the mixer is driven by a main motor during production, while a secondary drive is used for low-speed operation such as inspection or material handling. When the main motor is running, the Housing Freewheel Clutch remains in freewheeling mode and does not transmit torque to the auxiliary drive side. When low-speed operation is required, the auxiliary motor is started, and the clutch automatically engages to transmit torque to the mixer. This automatic transition ensures smooth operation without the need for manual intervention, providing flexibility in operation and improving process control.

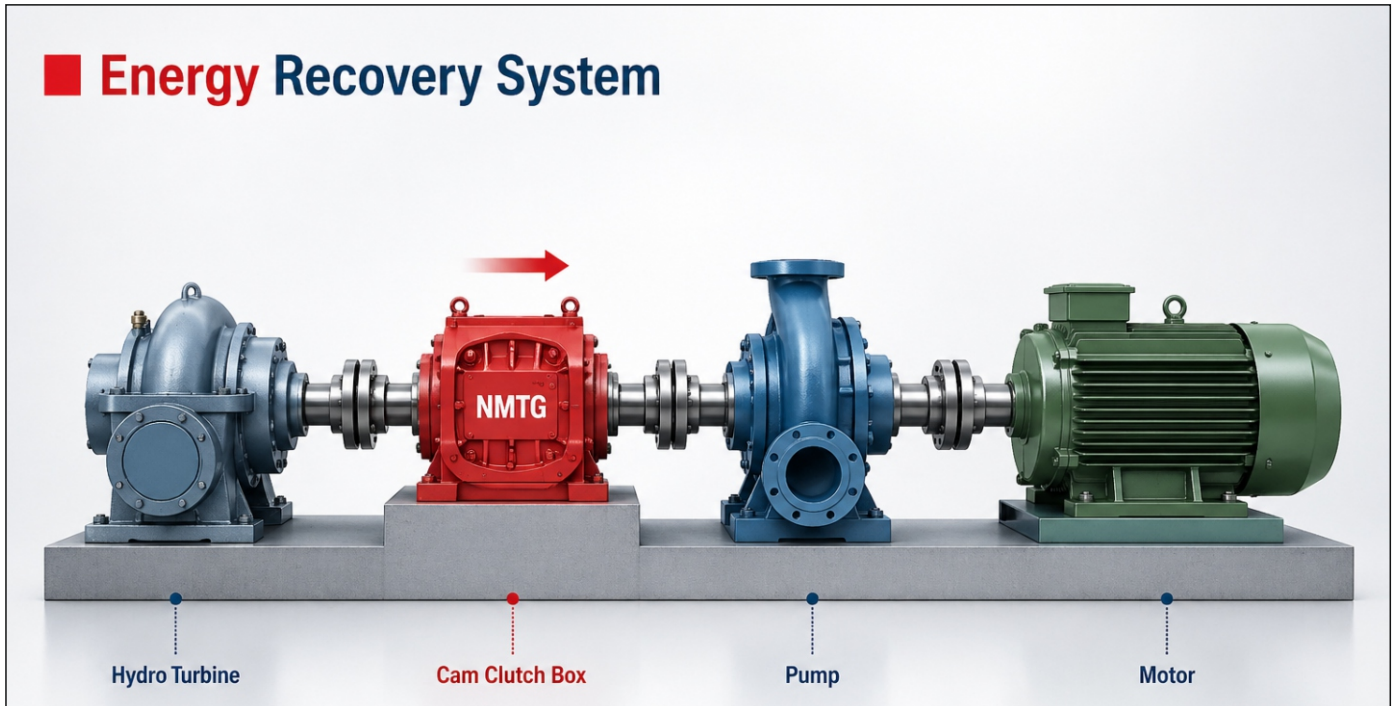


3. Energy Recovery System

In systems where excess energy is available, such as from pressurized fluid flow, NMTG Housing Freewheel Clutches can be used to improve overall system efficiency through energy recovery. In this application, a pump driven by a motor circulates high-pressure fluid. The returning fluid is used to drive a turbine, which assists in driving the pump. At startup or when fluid pressure is low, the turbine rotates at a lower speed and the clutch remains in overrunning condition. Once the turbine reaches sufficient speed, the clutch engages automatically, allowing the turbine to contribute to driving the pump. This reduces the load on the motor and lowers overall power consumption. This system provides an efficient way to utilize otherwise wasted energy and improve plant energy efficiency.

❖ Application Examples

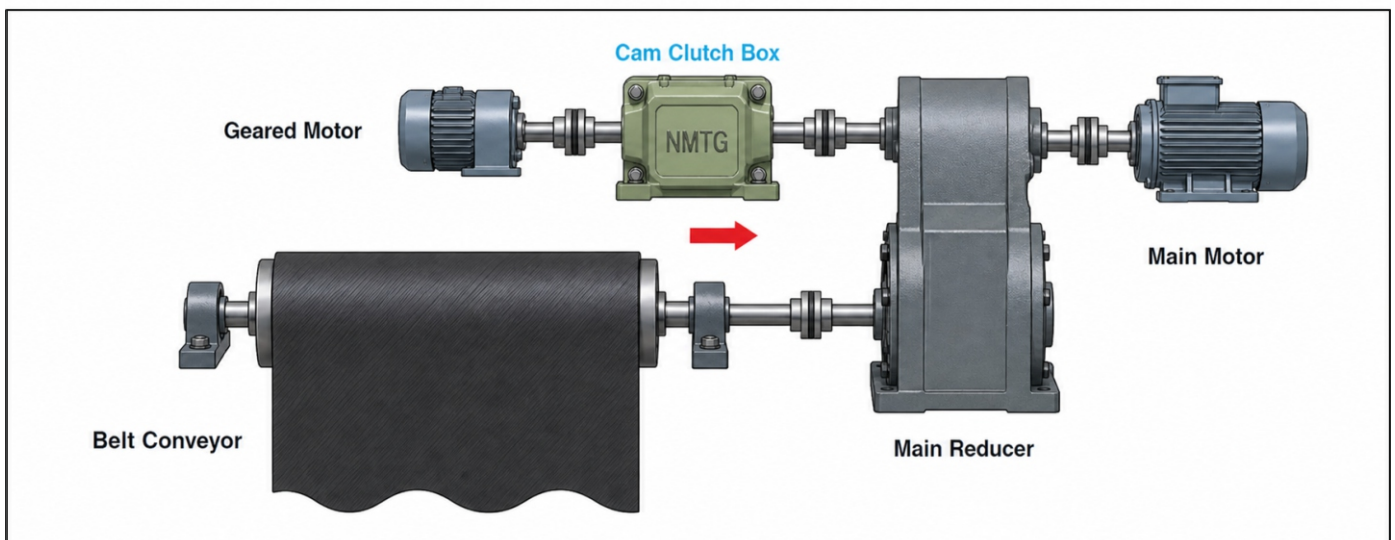
■ Energy Recovery System



4. Driving a Belt Conveyor at Low Speed

In conveyor systems, low-speed operation is often required for inspection, maintenance, or alignment. NMTG Housing Freewheel Clutches enable smooth switching between high-speed main drive and low-speed auxiliary drive. During normal operation, the conveyor is driven by the main motor, and the clutch remains in overrunning mode to prevent reverse torque transmission to the auxiliary drive. When low-speed operation is needed, the auxiliary geared motor is activated. At this stage, the clutch engages automatically and allows controlled low-speed movement of the conveyor. The transition between engagement and overrunning occurs automatically based on speed difference, ensuring smooth and reliable operation.

■ Driving a Belt Conveyor at a Low Speed

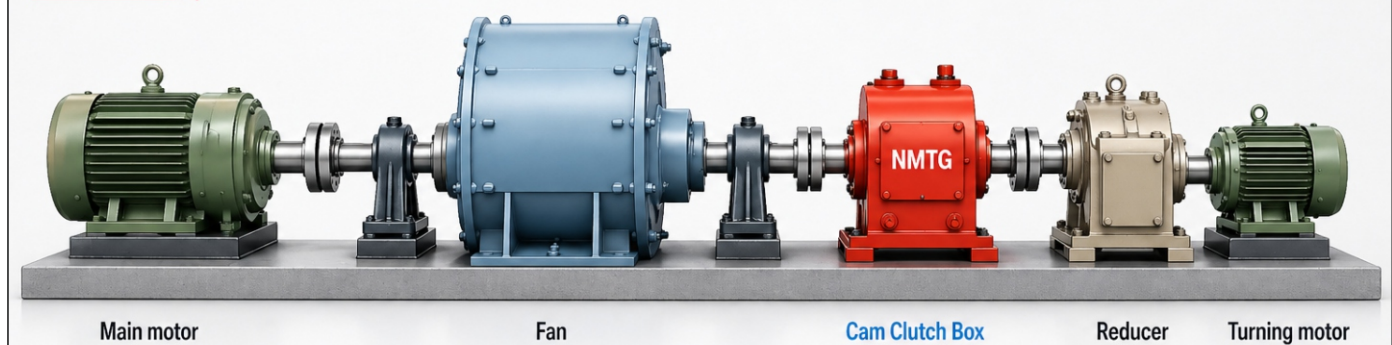


❖ Application Examples

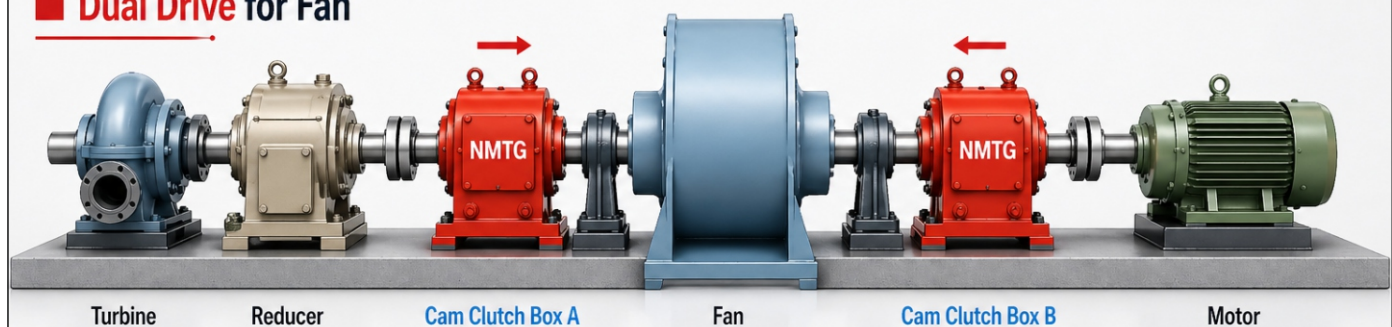
5. Turning Operation for Induced Draft Fan

Induced draft fans operate in high-temperature environments and require controlled cooling after shutdown to prevent damage. NMTG Housing Freewheel Clutches are used in turning gear systems to achieve this. After the main motor is stopped, the fan may develop uneven temperature distribution, leading to thermal distortion. To avoid this, a turning motor is used to rotate the fan slowly. In this condition, the clutch engages and transmits torque for low-speed rotation. When the main motor is started again, the clutch automatically shifts to overrunning mode. This ensures smooth transition between operating modes and protects the fan from thermal stress and deformation.

■ Turning Operation for Induced Draft Fan



■ Dual Drive for Fan

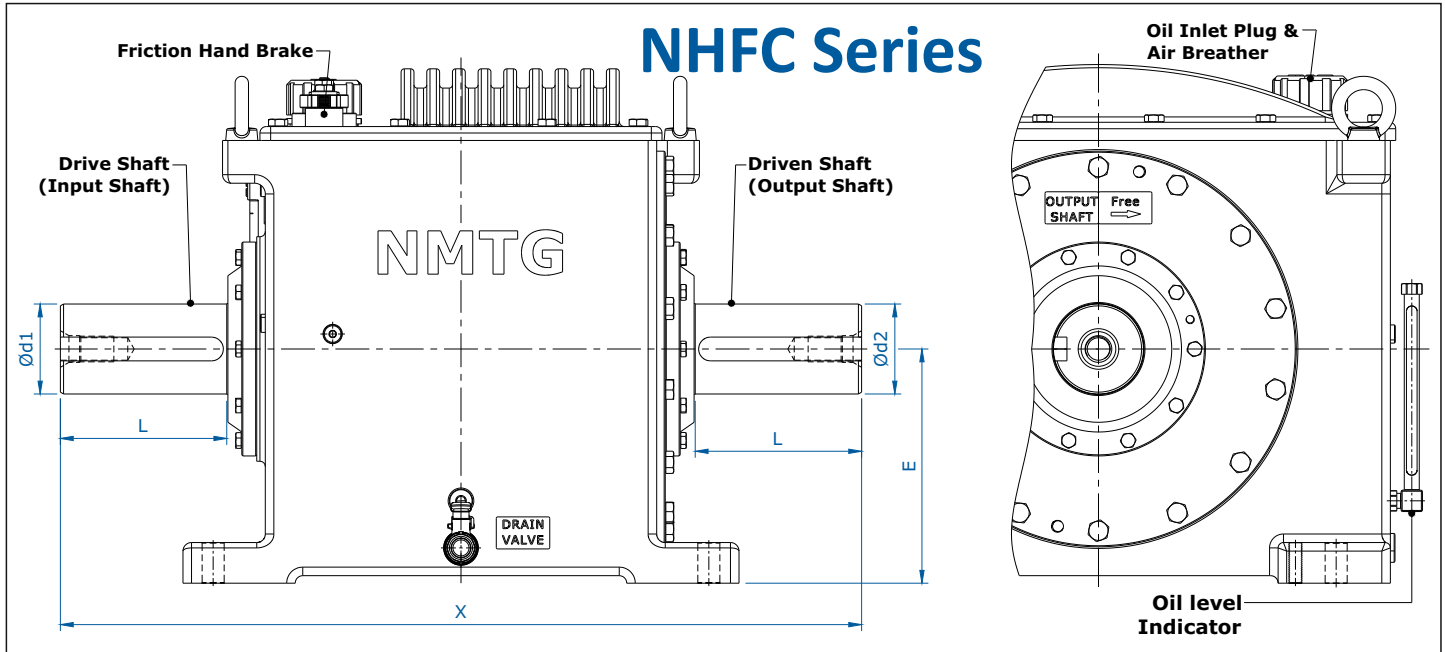


6. Dual Drive System for Fan

In industrial fan systems, especially in power plants, dual drive arrangements are used to improve reliability and energy efficiency. Typically, the fan can be driven by both a motor and a turbine. NMTG Housing Freewheel Clutches are installed on both drive paths to enable automatic switching between the motor and turbine. When the turbine operates at higher speed, it drives the fan, and the motor side clutch overruns. When turbine power is insufficient or during startup, the motor takes over, and the turbine side clutch overruns. This automatic selection ensures that the fastest rotating drive always transmits power, without requiring manual switching. It also allows effective utilization of available energy sources, reducing overall power consumption.

HOUSING FREEWHEEL CLUTCHES

FOOT MOUNTED TYPE - CONTINUOUS DUTY FOR DUAL DRIVE SYSTEMS



Model	Nom. Torque Capacity (TN)	Max. Engaging Speed of Drive (Input) Shaft	Max. Overrunning Speed of Driven (Output) Shaft	Shaft Diameter & its Shaft Length (In Inch Series)	Shaft Diameter & its Shaft Length (In Metric Series)	Shaft Center Height from Foot	Shaft End to Shaft End Distance
(Series)	Nm	RPM	RPM	Ød1/Ød2 x L Inch (mm)	Ød1/Ød2 x L mm	E Inch (mm)	X Inch (mm)
NHFC 500	685	6000	6000	Ø1-9/16" x 3-3/16" (Ø39.69 x 81.03)	Ø38 x 80 TL	4-3/4" (120.65)	17" (431.8)
NHFC 1000	1360	5600	5600	Ø1-3/4" x 3-7/8" (Ø44.45 x 98.43)	Ø42 x 95 TL	5-3/4" (146.05)	19-5/8" (498.48)
NHFC 2000	2725	4200	4200	Ø2-5/16" x 4-5/8" (Ø58.74 x 117.48)	Ø55 x 115 TL	6-7/8" (174.63)	23-1/4" (590.55)
NHFC 4000	5450	3600	3600	Ø2-3/4" x 5-3/8" (Ø69.85 x 136.53)	Ø65 x 135 TL	7-3/4" (196.85)	25-5/8" (650.88)
NHFC 8000	11000	3000	3000	Ø3-5/16" x 6-1/8" (Ø84.14 x 155.58)	Ø80 x 155 TL	8-5/8" (219.08)	29-1/2" (749.30)
NHFC 12000	16500	2500	2500	Ø3-7/8" x 6-15/16" (Ø98.43 x 177)	Ø95 x 175 TL	9-5/8" (244.48)	34-1/8" (866.80)
NHFC 18000	24800	2300	2300	Ø4-5/16" x 7-11/16" (Ø109.54 x 195.26)	Ø105 x 195 TL	11-1/4" (285.75)	37-7/8" (962.00)
NHFC 30000	41000	2000	2000	Ø5-1/16" x 8-5/8" (Ø128.59 x 220)	Ø125 x 220 TL	12-3/4" (323.85)	42" (1066.80)
NHFC 42000	57000	1700	1700	Ø5-7/8" x 9-1/8" (Ø149.23 x 232)	Ø145 x 230 TL	14-1/2" (368.30)	45-3/4" (1162.00)
NHFC 60000	81400	1400	1400	Ø7" x 10-5/8" (Ø177.80 x 270)	Ø175 x 270 TL	16" (406.40)	49-1/2" (1257.30)

❖ **Ordering Information:** When ordering, please specify the complete model designation with Shaft diameter (Metric or Inch). For example, in **NHFC 500 - 38 mm Shaft Diameter (Metric) or 39.69 mm Shaft Diameter (Inch)**, If a different shaft Diameter or length is required, kindly specify it at the time of inquiry; customized lengths can be manufactured as per requirement.

NMTG Products

- | | |
|---|--|
| 1 Freewheel One-Way Clutches Holdbacks Backstops | 9 Keyless Rigid Couplings |
| 2 Locking Assemblies | 10 Shrink Disc Flange Couplings |
| 3 Shrink Discs | 11 Torque Limiting Backstop |
| 4 Clamping Sleeve | 12 Taper Lock Bushes |
| 5 Tensioner Nuts & Bolts | 13 Torque Limiter |
| 6 Locknuts | 14 Cam Follower |
| 7 Hydraulic Tensioner Nut-Bolt | 15 Hydraulic Turning Motor |
| 8 Hydraulic Shrink Disc | 16 Timing Pulleys |

We Offer Our Product Solutions For



1. Core Industrial Sectors (End-Use Industries)



Heavy & Core Industries

- Cement Industry
- Steel Industry
- Mining Industry
- Power Generation Industry (Thermal / Hydro / Nuclear)
- Oil & Gas Industry
- Shipbuilding & Marine Industry
- Construction Industry



Energy & Renewable

- Solar Energy Industry
- Wind Energy Industry
- Hydro Power Plants
- Steam Power Applications



Manufacturing Industries

- Automotive Industry
- Aerospace Industry
- Textile Industry
- Pulp & Paper Industry
- Wood Industry
- Printing Industry

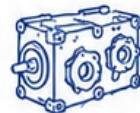


Process Industries

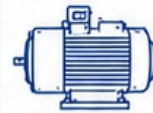
- Food Processing Industry
- Pharmaceutical / Medical Industry
- Chemical Industry



2. Industrial Equipment / Product Categories



Industrial Gearboxes



Industrial Motors



Pumps



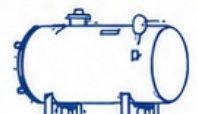
Ventilation Fans / Blowers



Gas Compressors



Switchgear (Circuit Breakers)



Pressure Vessels

Manufacturing Machinery



Machine Tools



Packaging Machines



Printing & Textile Machines



Bag Making Machines



Press Industry Machines



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