The HS Clutch has a very similar synchronizing mechanism to the MS Clutch, but instead of the main helical toothing, it has a spur gear power transmission toothing (straight gear). The synchronizing mechanism is used to find a clean “tooth to gap” position. The HS starts the screw like motion and a small front face toothing engages. Right then the hydraulic system is automatically activated and finishes the engagement by a pure axial shifting. As soon as the clutch is fully engaged the high pressure hydraulics are de-loaded and the HS Clutch works now like a classic gear coupling, which can transmit full positive and negative torque, without disengaging. Disengagement is carried out by the remote controlled hydraulic system, which pulls out the coupling star in a no-load situation in axial direction until it is fully disengaged and the clutch is free-wheeling.

The RENK-MAAG HS Clutch understands everything in the range of 0.5 to well over 200 MW!

RENK-MAAG Synchronous Clutch Couplings are used in a wide range of applications

**Power generation**
- Peaking power stations
  - Condensing plant
  - Power discharge
- Combined cycle power plants (CCPP)
- Combined heat and power (CHP) plants
- Compressed air energy storage (CAES)

**Energy recovery, combined cycle technologies, cogeneration and others**
- Connecting expander turbines to main drives in petrochemical plants or steel manufacturing (blast furnaces)
- Blower drives in nuclear power stations for use during starting sequence

**Marine applications**
- Combined propulsion systems such as CODOG, COGOG, CODAG, COGAG, CODAD, etc.
- Efficiency booster drives for diesel engine propulsion systems
**Design**

**Between flanges**

- Standard solution
- Easy assembly due to bolted connection
- Lube oil supply approx 2 bar
- Hydraulic system approx 5–10 bar

**Train arrangement**

**Possible operation modes**

- Peak power
- Condenser operation (grid stabilisation)
- Power discharge from the grid

**Input**

- Gas turbine (input)

**Output**

- Generator (output)

**Possible operation modes**

- Peak power
- Condenser operation (grid stabilisation)
- Power discharge from the grid

**Train arrangement**

- **Input** (gas turbine)
- Spool piece with synchronizing mechanism
- **Output** (generator)

**Summary**

More than 50 years of experience within RENK-MAAG! Over 450 Synchronous Clutch Couplings sold!

- Flexible with integrated gear coupling
- Engaging at low speeds < 500 rpm
- Gear coupling when engaged which allows full positive and negative torque
- Compact, long-lived and wear-free
- Retrofittable into existing plants
- Suitable for high torque and high speed
- Wide range of application
- Tailored for customer requirements
# Product portfolio

RENK-MAAG provides new products, services, inspections, repairs and spare parts (incl. complete couplings) for all types of MAAG/RENK-MAAG couplings.

## Gear couplings

### Non-shiftable

Various types used as flexible couplings.

*RENK-MAAG supplies services and spare parts for all MAAG couplings. RENK Rheine specializes in non-shiftable gear couplings.

### Shiftable

#### Synchronous Clutch Coupling

- **MS**
  - Automatically synchronizing
  - • flexible with integrated gear coupling
  - • engaging at any synchronous speed
  - • disengaging at any speed with negative torque
  - • various additional features
  - • small drag when disengaged
  - • e.g. Combined cycle power plants (CCPP)

- **HS**
  - Engaging on demand
  - • flexible with integrated gear coupling
  - • pure gear coupling when engaged which allows full positive and negative torque
  - • engaging at low speeds
  - • very small drag when disengaged
  - • e.g. GT – Generator: Peak Power/Synchronous Condenser Operation

- **ZD**
  - Completely disengageable
  - • flexible with integrated gear coupling
  - • pure gear coupling when engaged which allows full positive and negative torque
  - • engaging at standstill
  - • disengaging at no load
  - • no drag when disengaged
  - • e.g. Combined heat and power (CHP) plants

### Basic design

<table>
<thead>
<tr>
<th>Coupling size</th>
<th>MS</th>
<th>HS</th>
<th>ZD</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS 39</td>
<td>Q</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HS 88</td>
<td>E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ZD 50</td>
<td>H</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Additional features

- **M** Mechanical automatic disengagement/engagement
- **H** Hydraulically operated
- **S** Synchronous clutch coupling
- **Z** Gear coupling (Zahnkupplung)
- **D** Disengageable

### Additional features

- **A** for starter drives
- **E** encased
- **F** isolating device (pawl free)
- **H** hydraulically activated
- **L** lever activated (manually)
- **N** engagement at low speed
- **Q** quill-shaft arrangement
- **R** locking mechanism
- **T** for turning gears

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