Retrofit of Air Starting Systems

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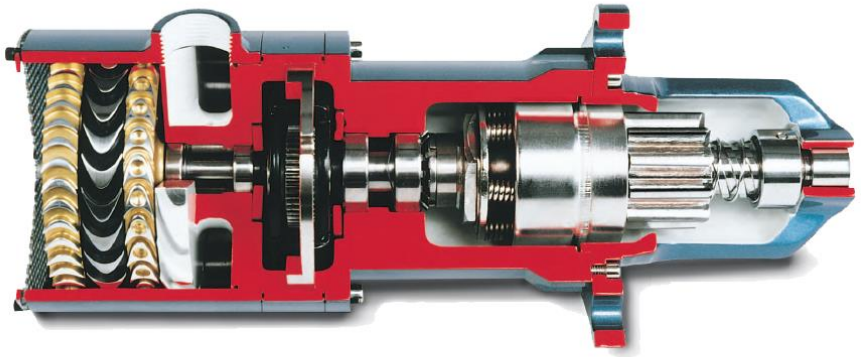
Low Pressure Starter Installation

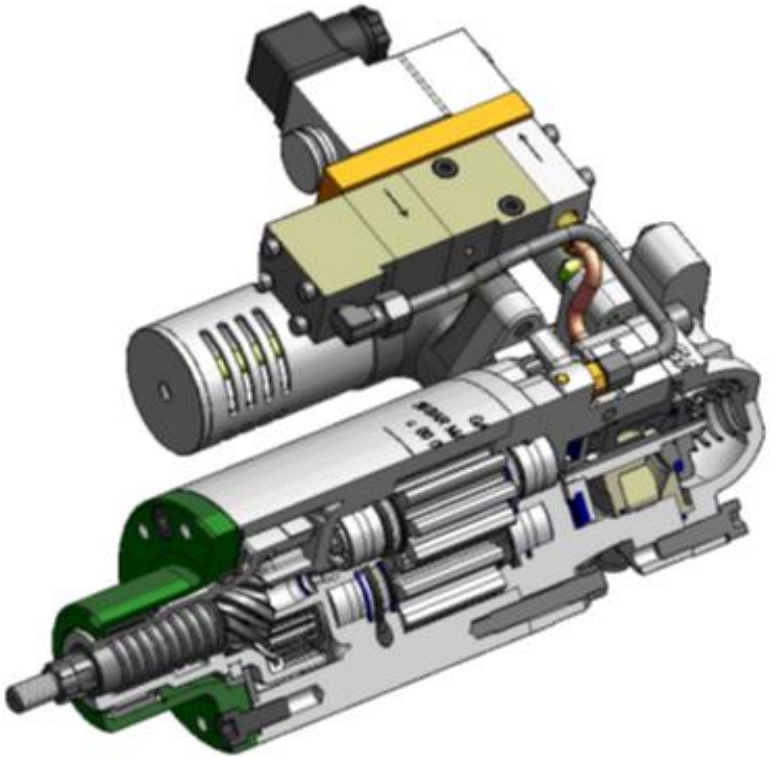
(turbine/vane starter system)

gali

What can we find in the market?



Turbine Design



GALI AIR STARTER – Rotors Design

LOW PRESSURE AIR STARTER
Turbine Design

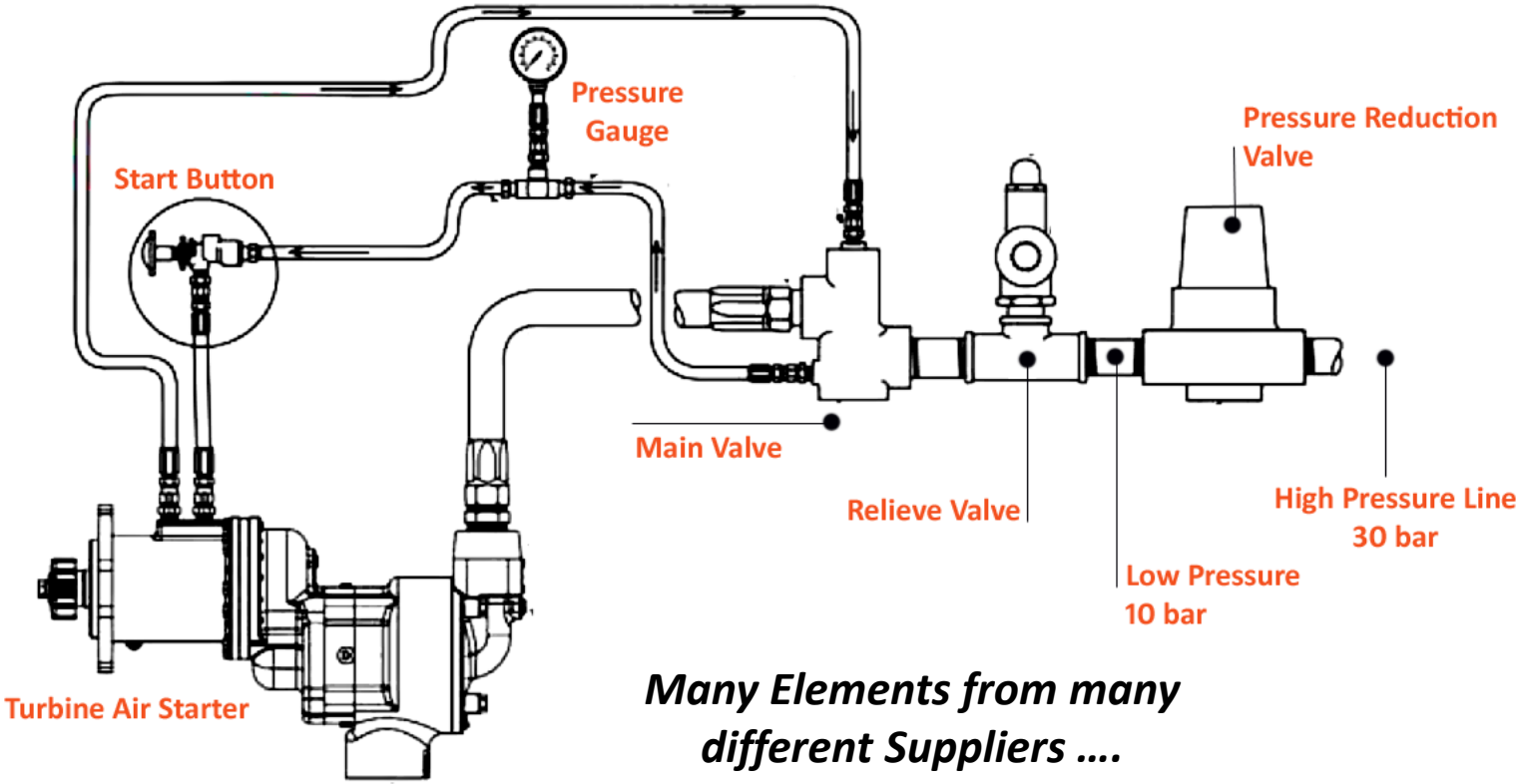
Gali

Low Pressure Starter Schema

(turbine system)

Main Elements

- Pressure Reduction Valve + Relieve Valve
- Main Air Valve
- Soft Engagement Valve (for Vane Starters)
- Turbine Air Starter



Many Elements from many different Suppliers ….

Low Pressure Starter Usual Problems

(turbine system)

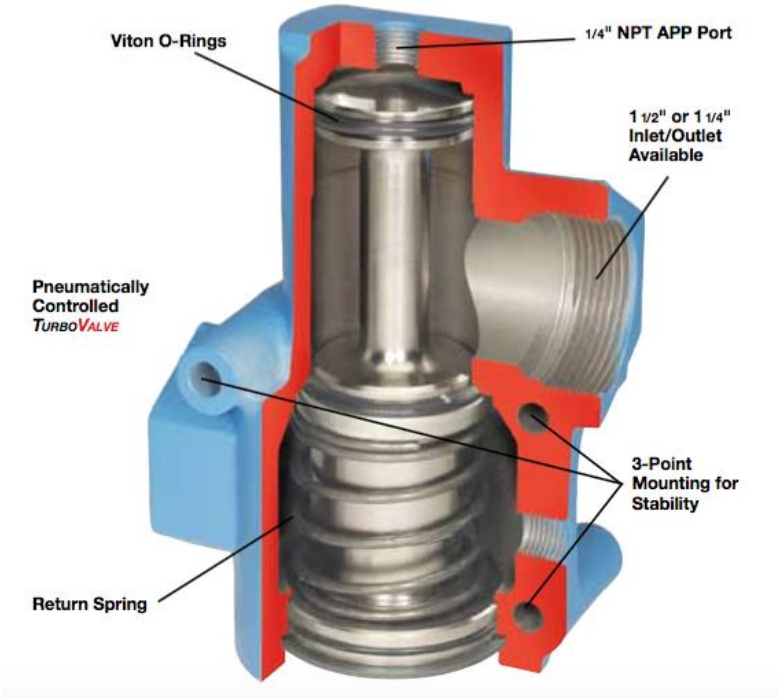
Some of the usual problems with Low Pressure Starters

- **Pressure Reduction Valve**: when it gets damaged does **not Supply enough air to the starter** or there is a pressure change on the other side that **avoids the correct starter function.**
- In case of malfunction, the pressure fluctuation makes the pinion to **reengage repeatedly.**
- This situation may cause **collision of starter pinion with flywheel** (posible damage of the same), **sparks…**

Low Pressure Starter Usual Problems
(turbine system)

Some of the usual problems with Low Pressure Starters

- **Main Air Valve**: malfunction doesn't allow the starting system to engage



Features

- Maximum Operating Pressure = 225 psi (15.5 bar)
- Operating Temperature Range = -20 to 250°F (-29 to 121°C)
- Flow/ Pressure Drop shown on CSR-352:Cv= 28.5

Low Pressure Starter Usual Problems

(turbine system)

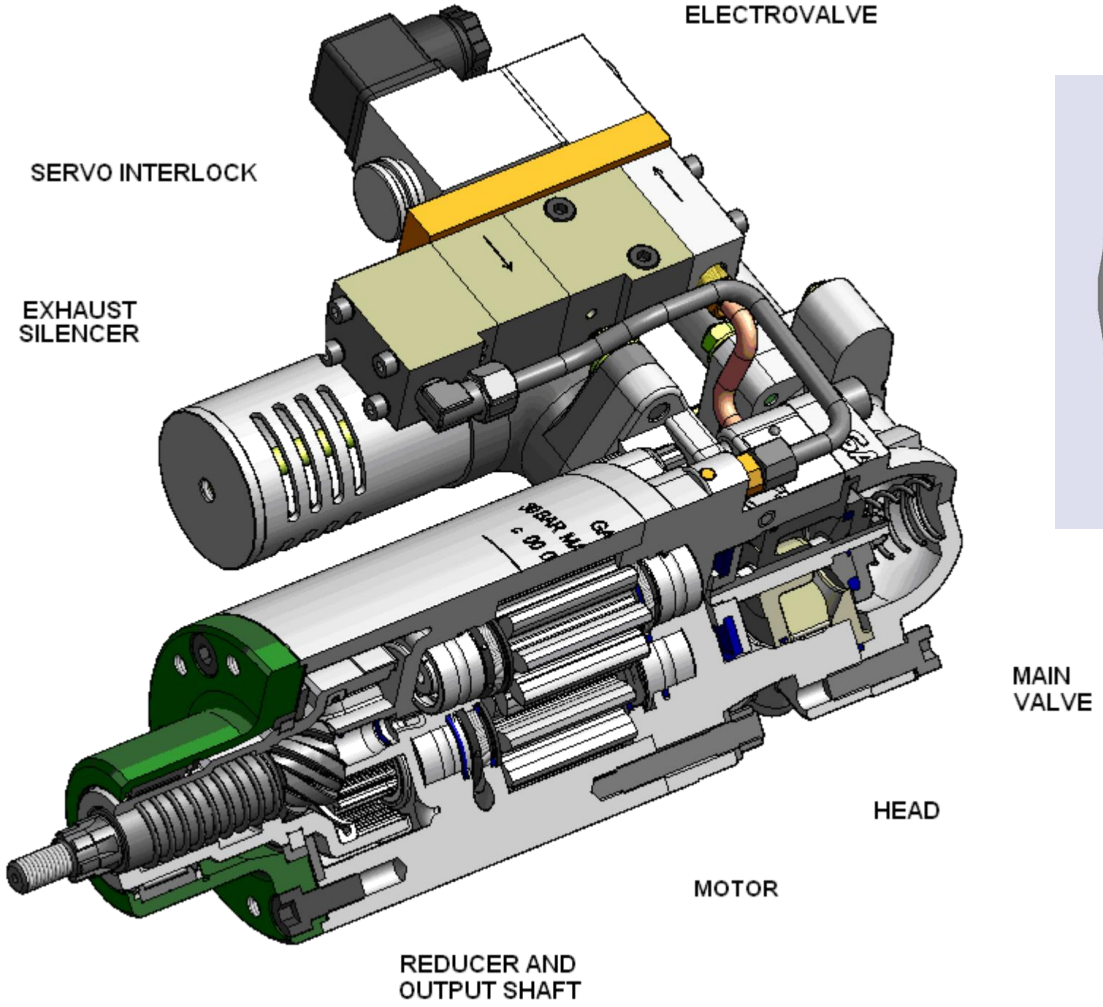
Some of the usual problems with Low Pressure Starters

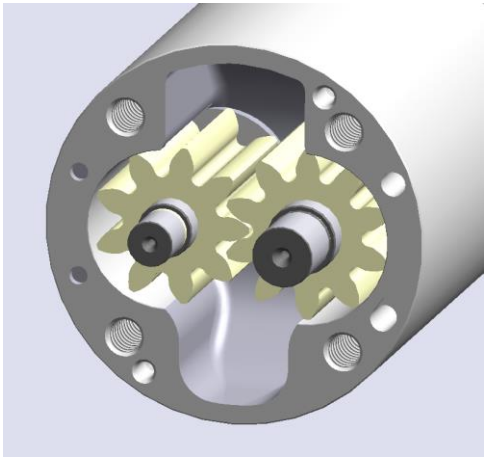
- **Soft Engagement Valve**:

Necessary element when they work with no pre-engaged starters (vane starters). It is needed to **slow down the engagement process** of the pinion to the flywheel. When damaged it is also dangerous for the flywheel.

HIGH PRESSURE AIR STARTER ROTOR Design – by GALI

GALI AIR STARTER – Rotors Design





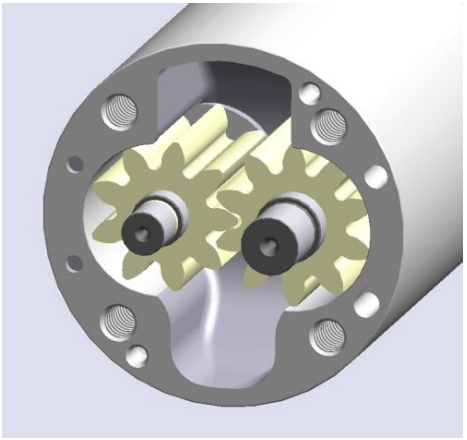
Compact Design

All the elements needed for the right run of the system **are included on the same body** (main valve, solenoid valve, etc.)

GALI AIR STARTER – Rotors Design

Why to use Rotors?

- ROTORS to obtain the maximum POWER

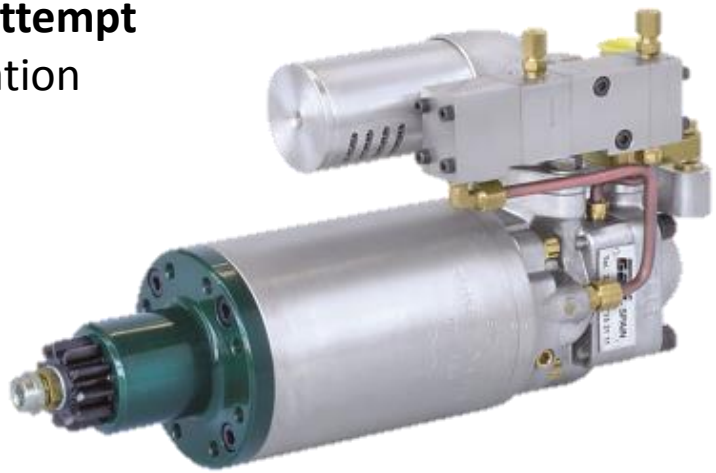


How we get the maximum power?

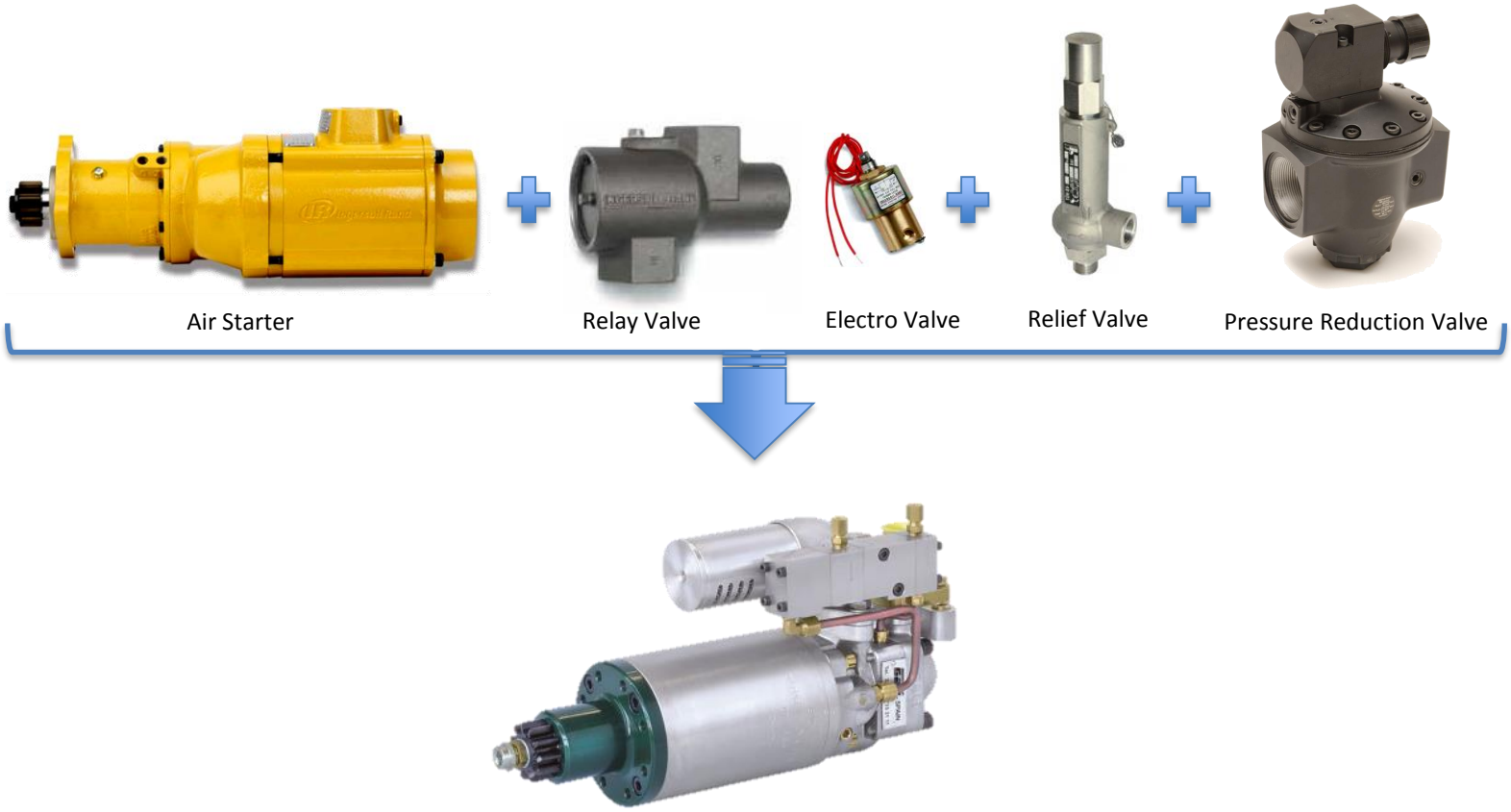
- Taking advantage of the **30 bar** pressure in air bottles
- Obtain the **maximum torque at 0 rpm**
- Less sensible to low air quality

What advantages do we get?

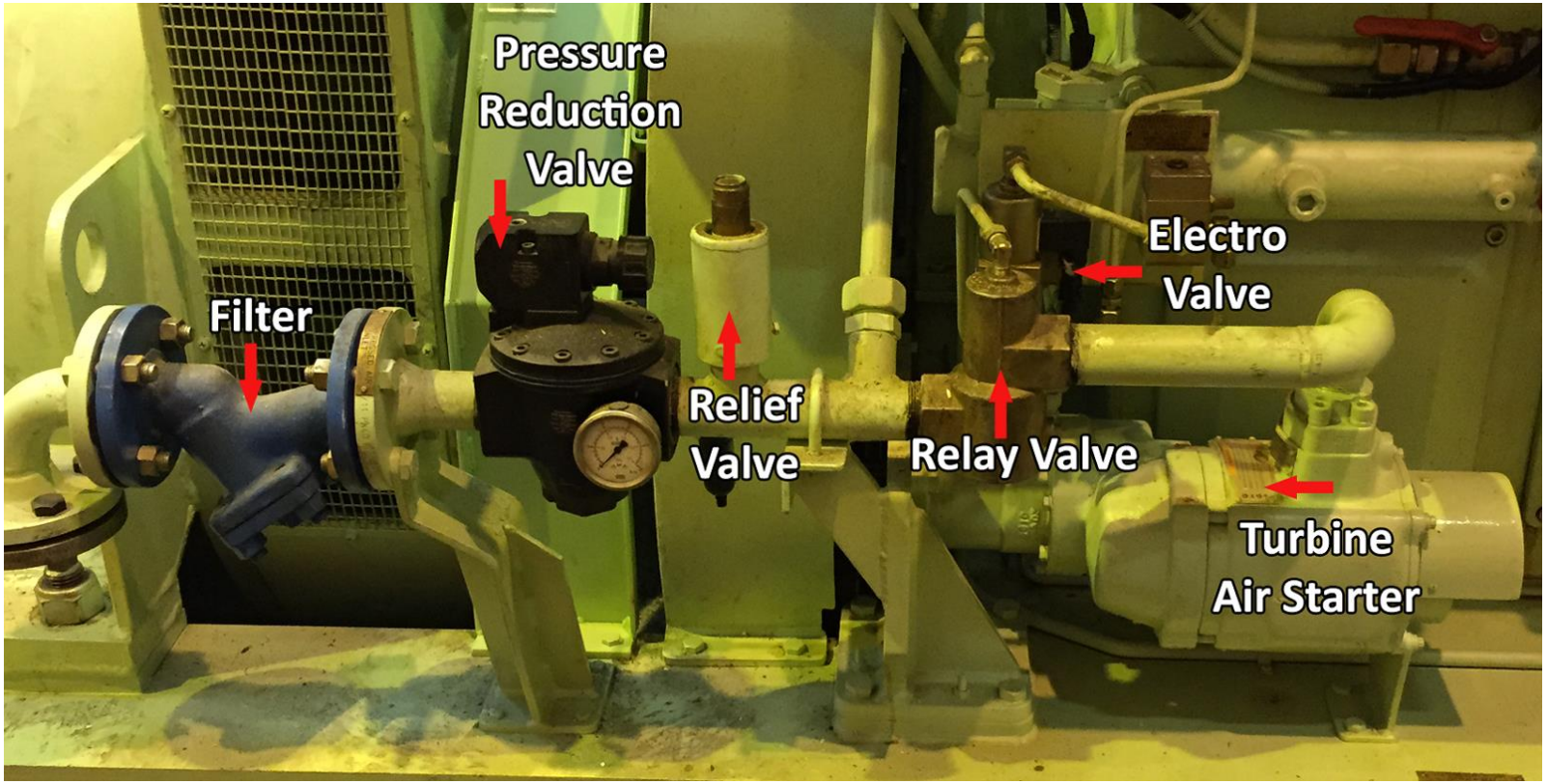
- Guaranteed the start in the **first starting attempt**
- **No need of additional elements** in installation
- Has a reliable **effect on the engine**
- Minimum starting time (save air)



GALI Starters – Simplicity



RETROFIT EXAMPLE 1:
Low Pressure Starter Installation (turbine system)



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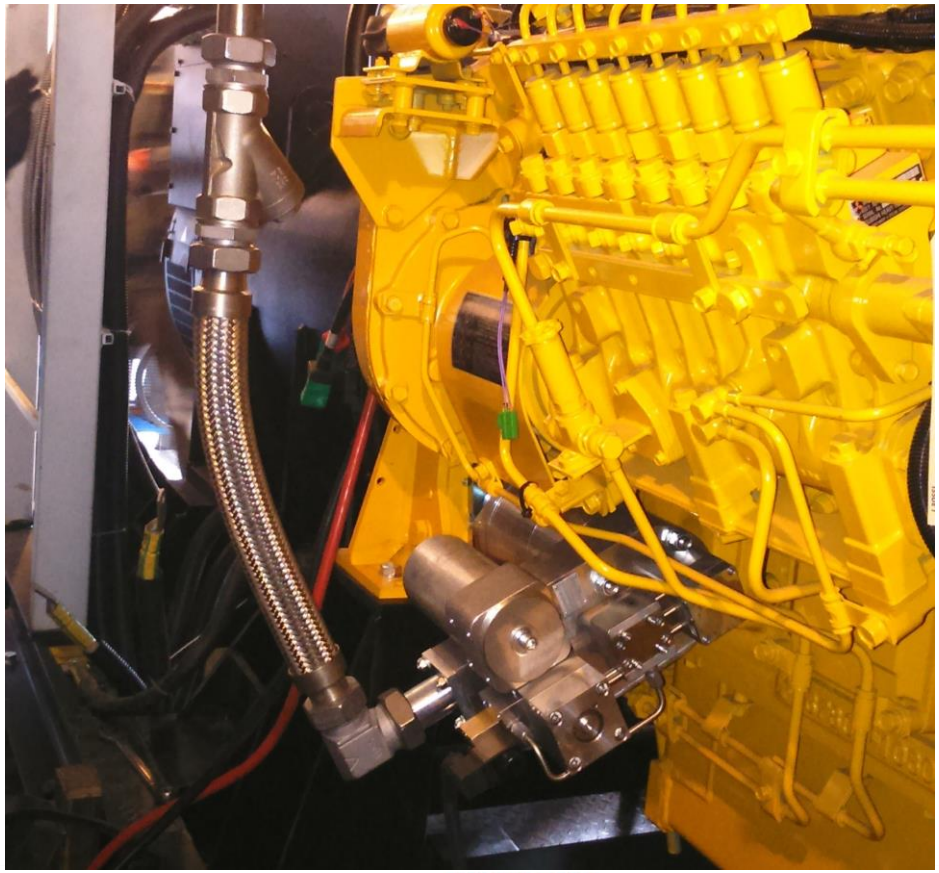
EXAMPLE 1: RETROFITED



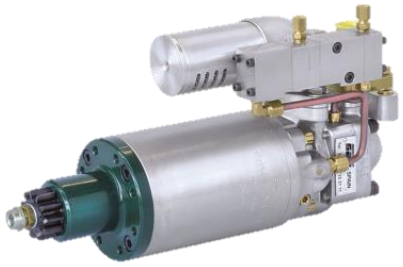
Gali Starter – Plug & Play

Choosing the right GALI starter

Air starter retrofit? Tell us your Engine Brand and model

Then we determine:

- Gali Air Starter model
- Pinion
- Coupling Flange (between Starter and Engine)



Air starter

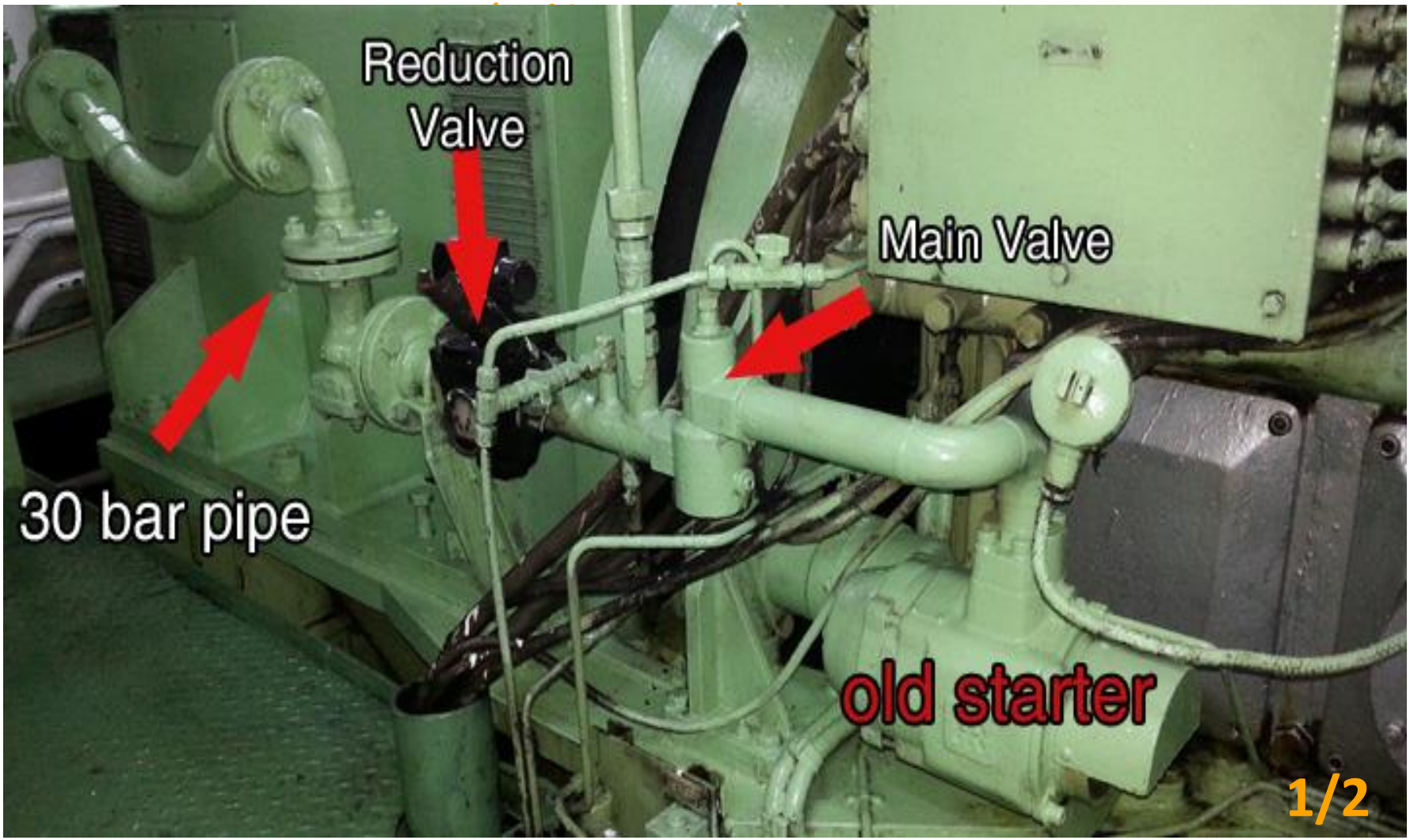
Retrofit Installation

- Checking the current installation we can plan the correct connection.
- We can use flexible pipe to connect the main air line with the starter.
- We can manufacture a tee in case we have to share the main air line with other engine controls.
- We can make a special coupling flange if needed

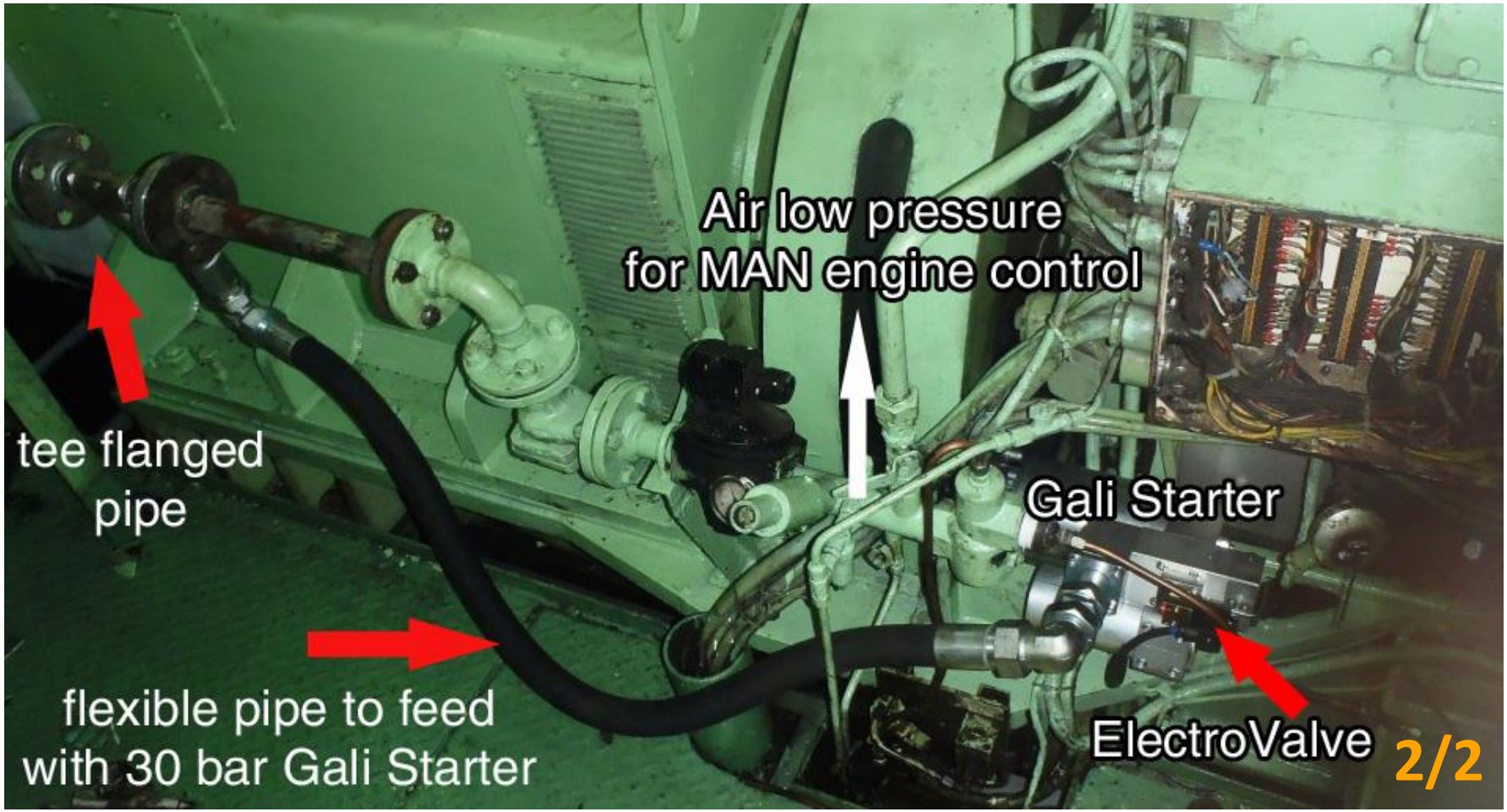
Pinion

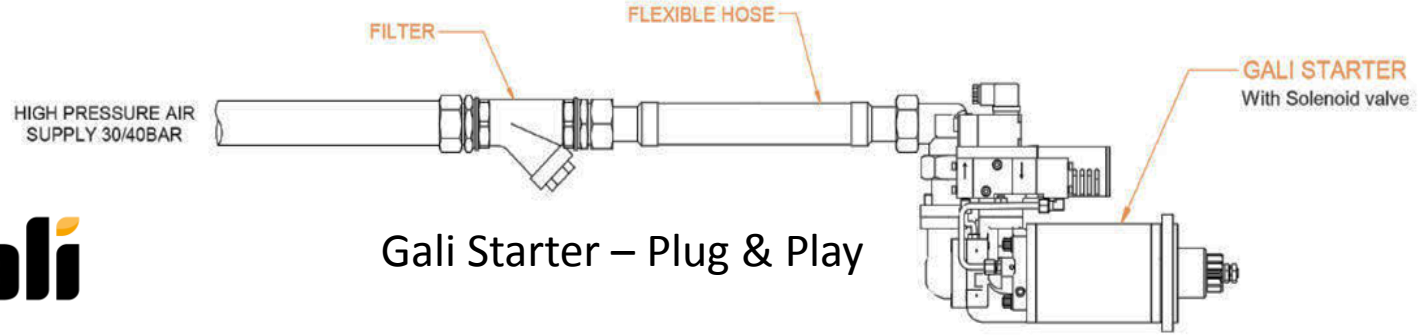
Coupling flange

RETROFIT EXAMPLE 2:
Low Pressure Starter Installation + Jet Assistant



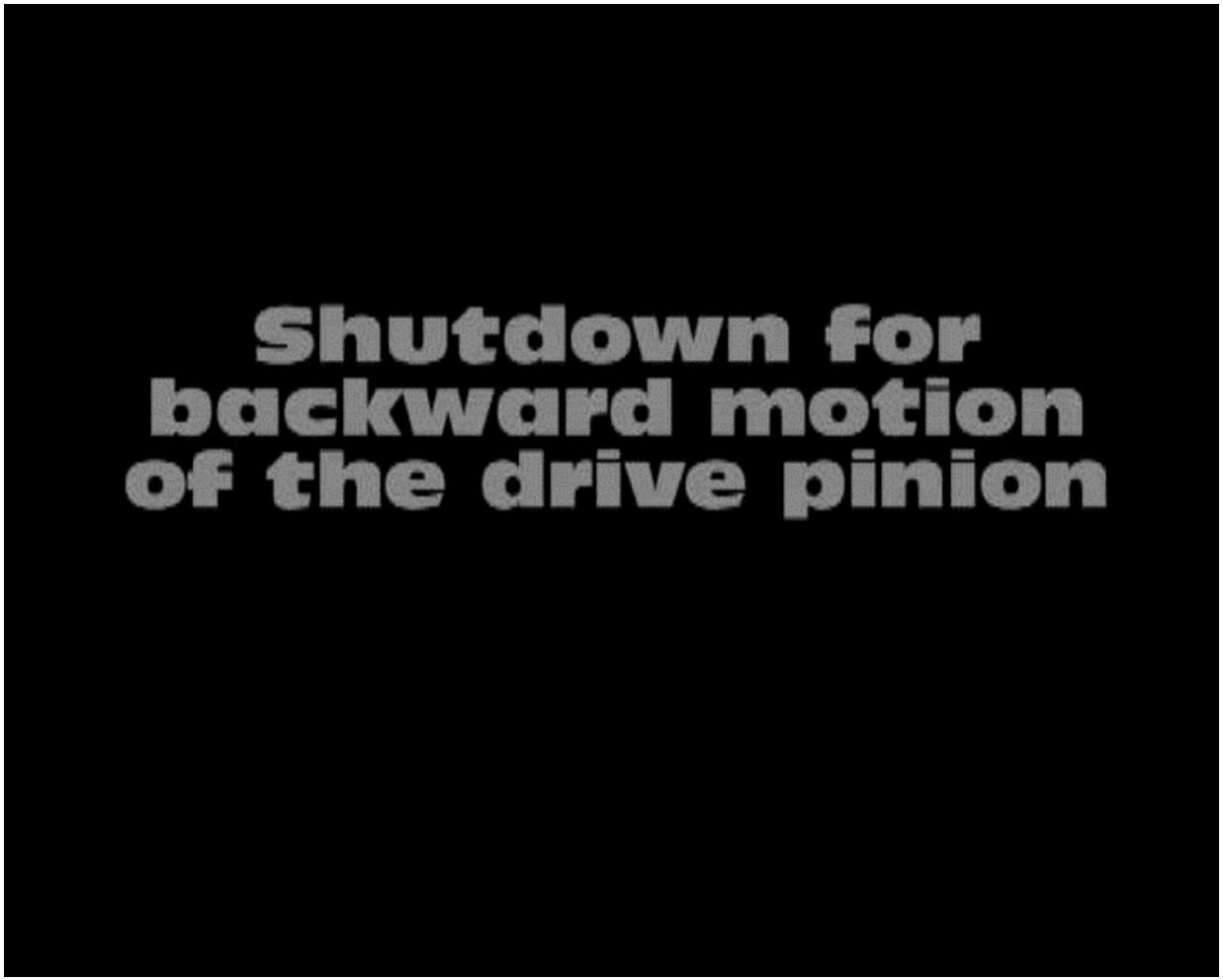
RETROFITED EXAMPLE 2: GALI Air Starter + Jet Assistant





Gali Starter – Plug & Play

The Smart Starter – GALI Starters

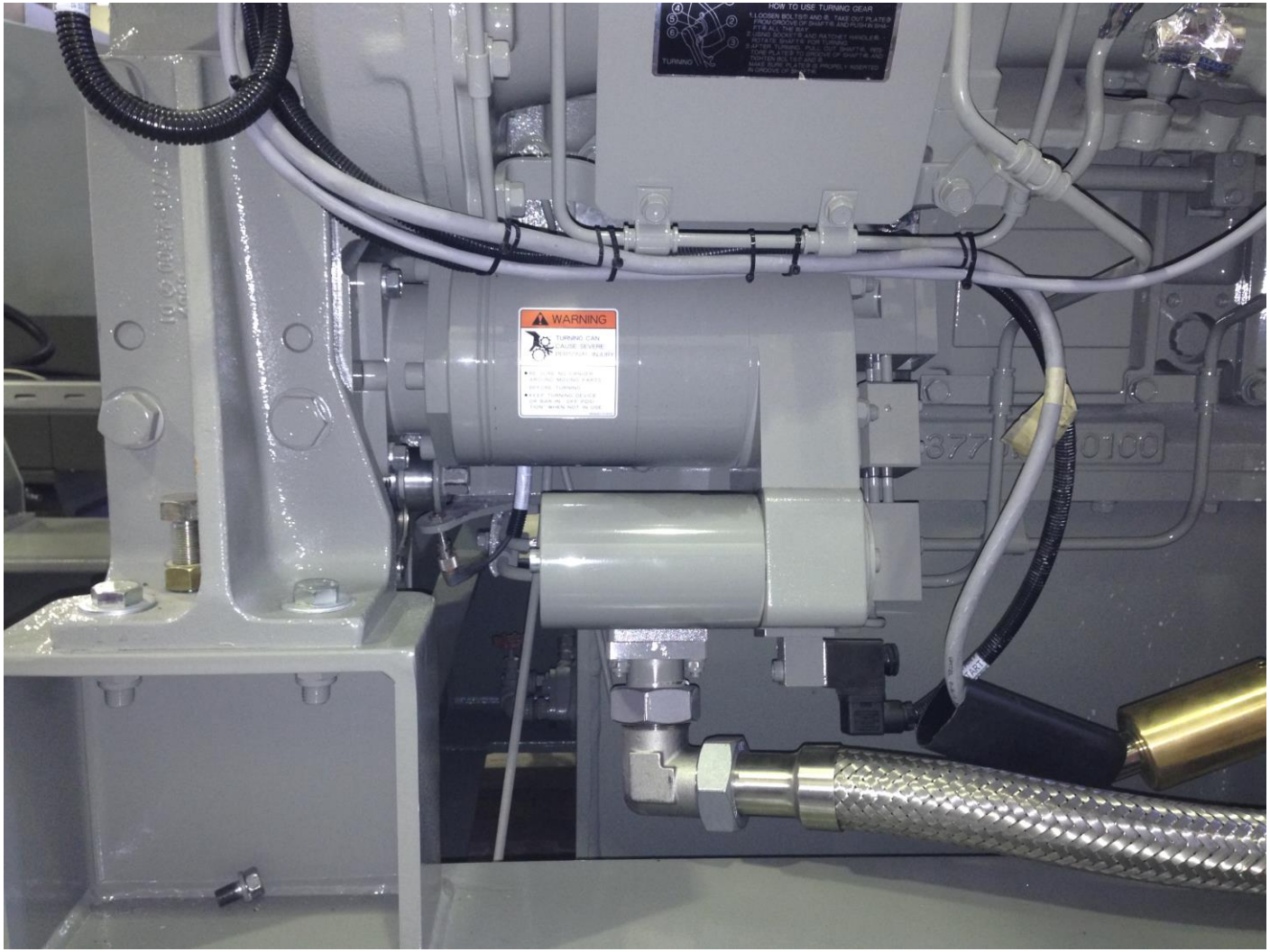


Secure – Safety – The Smart Starter:

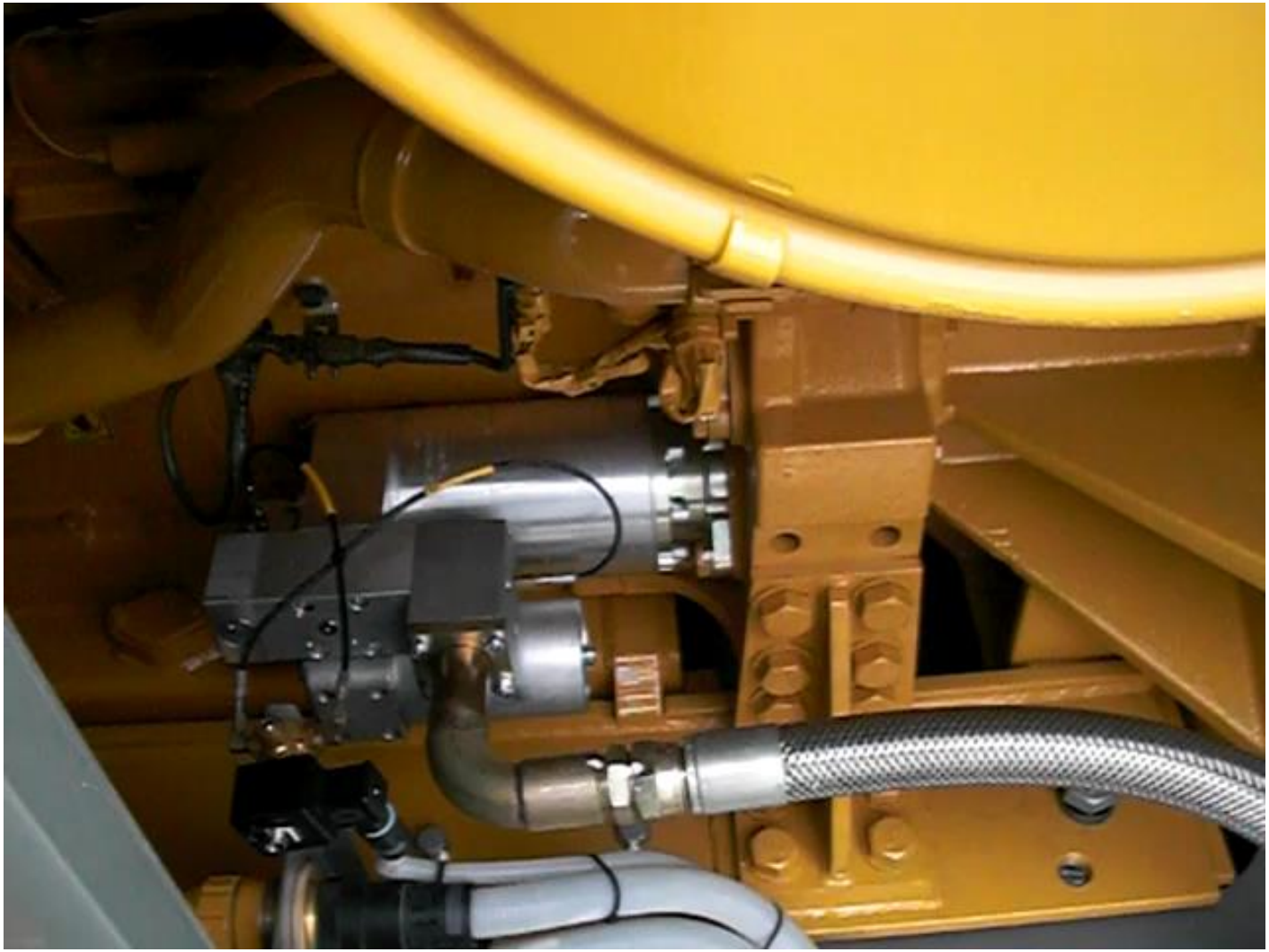
- In case the engagement does not succeed, **the starter retrieves and stops automatically.**
- Once the engine starts, and the pinion is not making any effort to move the flywheel will automatically retract and shut down the starter.

High Pressure Starter Installation

(Rotors system)



GALI INSTALLATIONS



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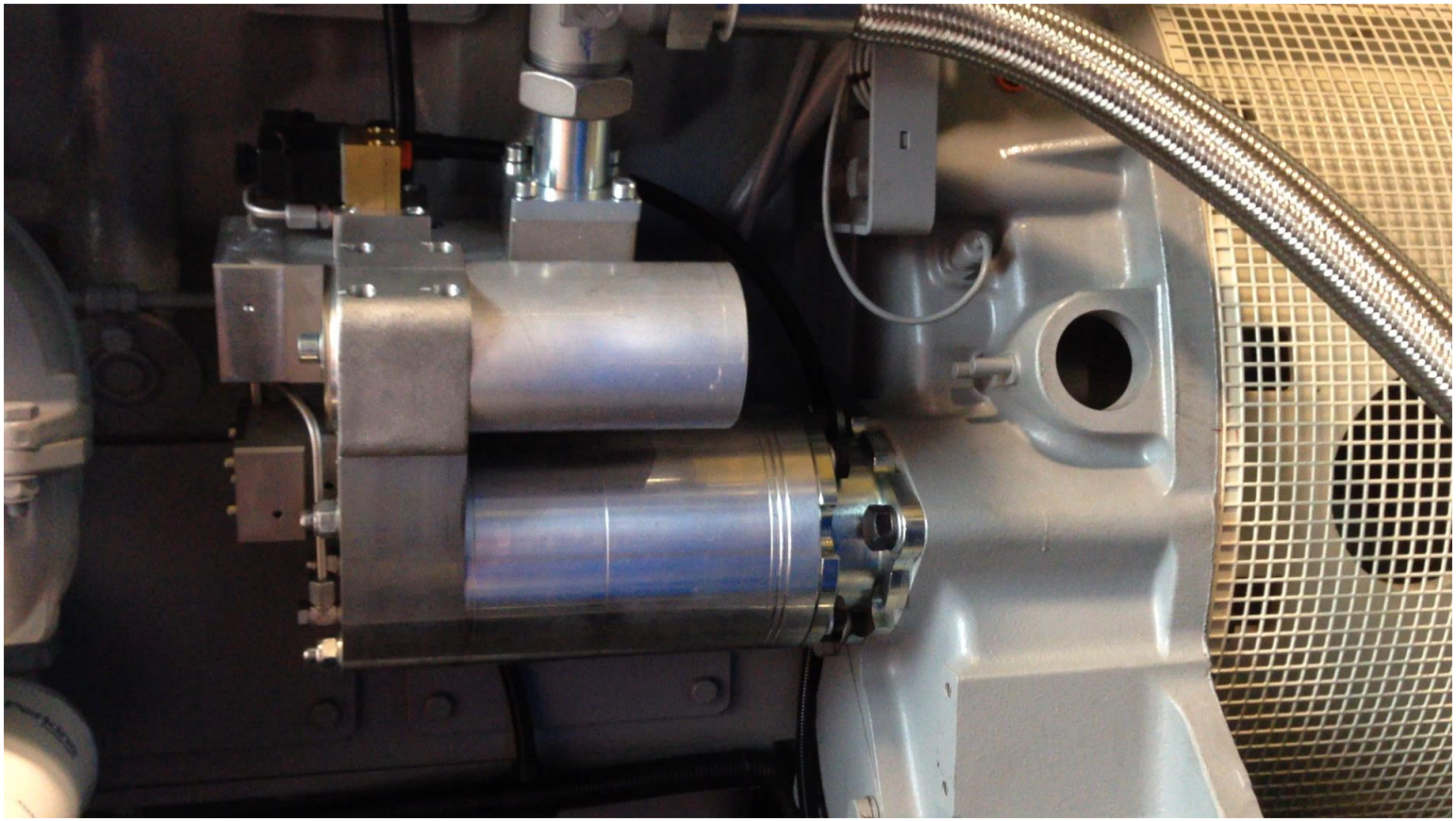

Perkins 4008

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GALI INSTALLATIONS

MITSUBISHI DIESEL ENGINES **MITSUBISHI S16R**

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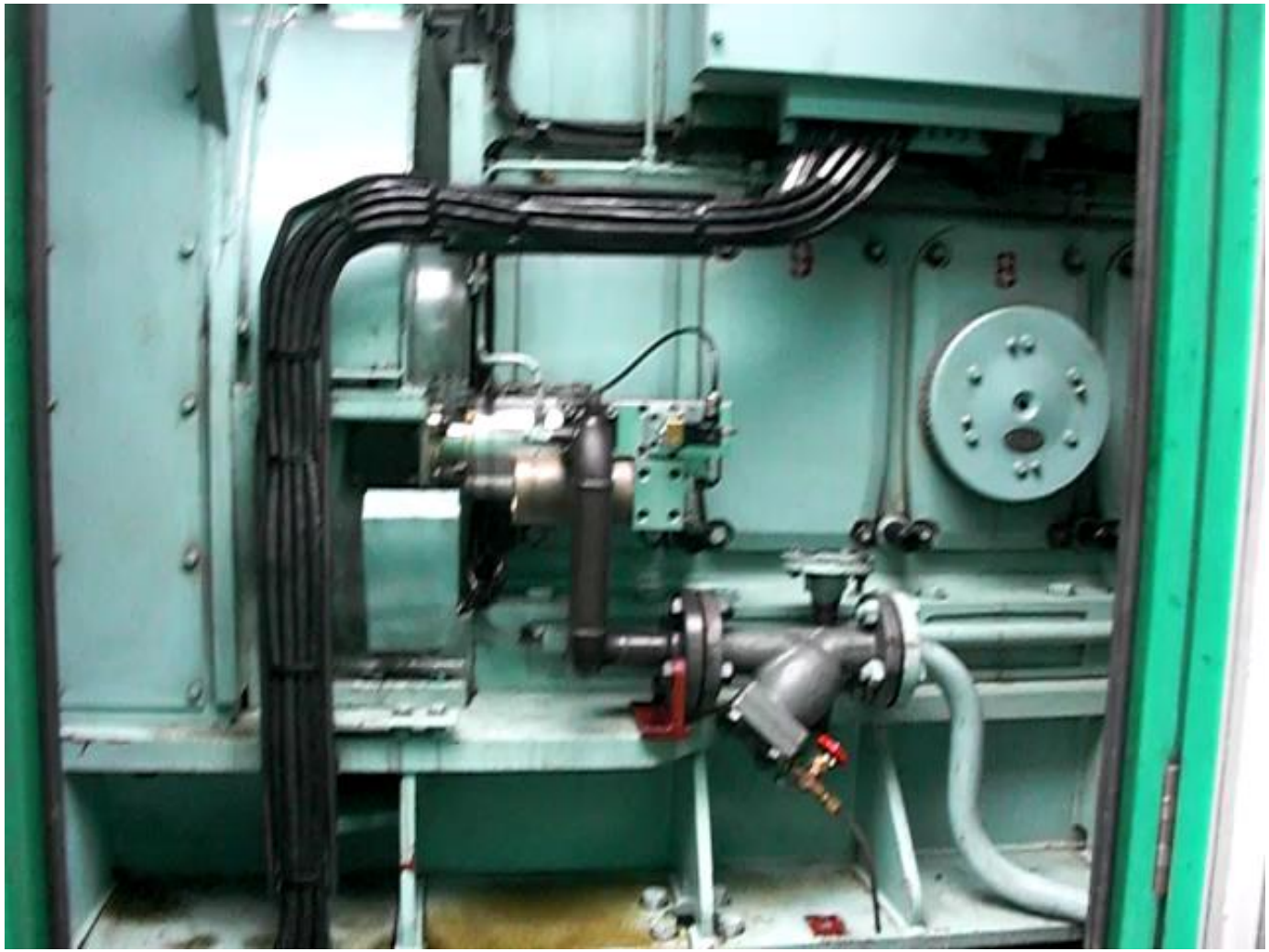
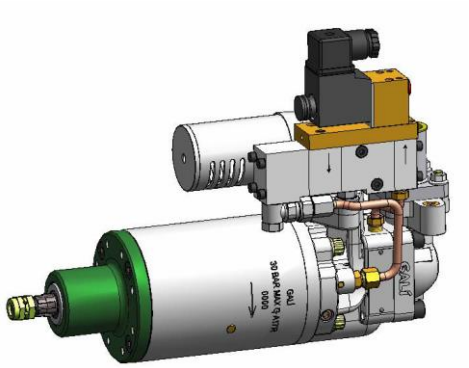
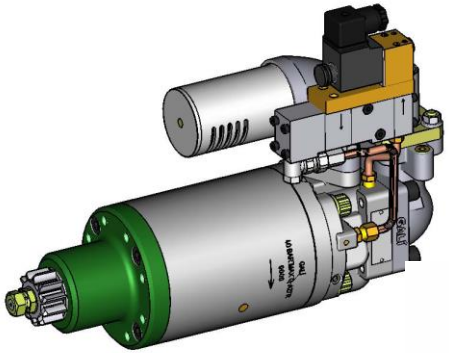
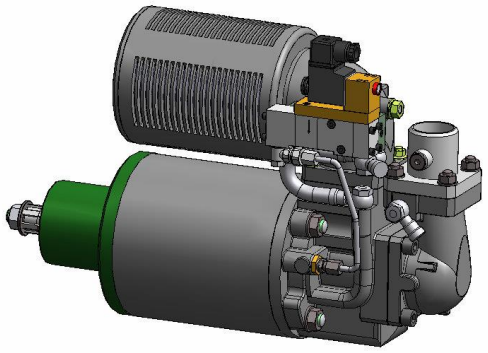
GALI INSTALLATIONS









Call your Gali Distributor

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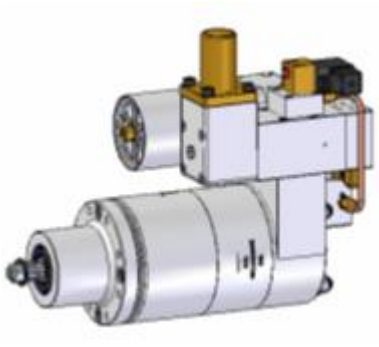

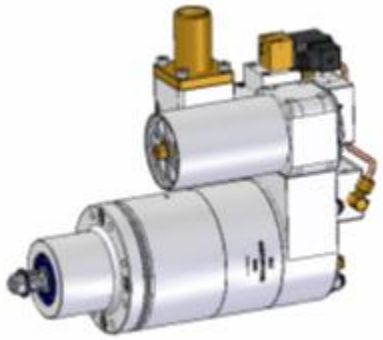

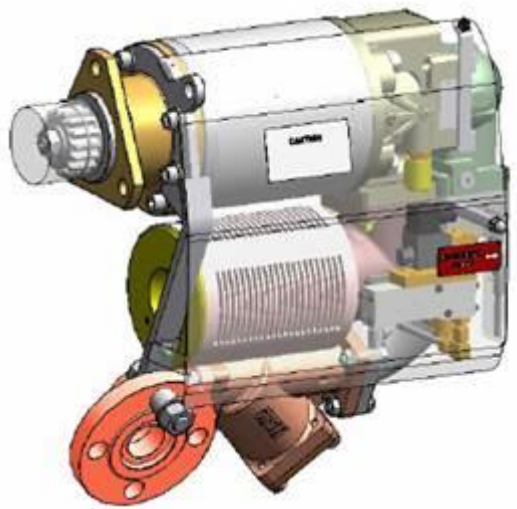

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Thank you for your attention

www.galigrup.com