

# **LWD 1**

## **Pulse Generator Assembly Introduction 1200 and 650 Systems**

# Pulse Generator Assembly Objectives

**At the completion of this presentation you should be able to:**

- 1. Describe the functions of the pulse generator assembly.**
- 2. Name the parts required to build the pulse generator assembly.**
- 3. Describe the main difference in the assembly of the 1200/650 systems versus the Slimhole/Superslim systems.**

# This is a Pulse Generator Assembly



# What does a Pulse Generator Assembly do?

- **A mechanical assembly that uses the drilling fluid flow through the drillpipe to generate both electrical and hydraulic power and also to create pressure changes, or pulses, in that fluid.**

# What makes a Pulse Generator Assembly

- **The Pulsar**
- **The Flowgear (the parts that are installed on the pulsar to build a turbine, valve, and to resist erosion)**

# What makes a Pulse Generator Assembly

- **The Pulsar**
  - The central component of all four systems
  - The same pulser can be used on all four systems

# The Pulsar



# The Pulsar

- **Generates electrical and hydraulic power**
- **Extends poppet into orifice to create a positive pressure pulse**



# The Pulse Generator Assembly



# The Flowgear

- **Most of the flowgear comes in four sizes, related to the flow rate, and is used on one of the four systems.**
  - **1200 System**
  - **650 System**
  - **Slimhole System**
  - **Superslim System**
- **Some of the flowgear is common to two or more systems**

# Pulse Generator Assembly

- **The four systems can be divided into two groups that have similar assembly procedures**
  - **1200 and 650 Systems**
  - **Slimhole and Superslim Systems**

# Pulse Generator Assembly

- **1200 and 650 Systems**
- **Parts are fixed to the pulser on a Stator Support Tube Assembly**

# 1200 and 650 Systems

- **The Impeller Assembly**

Top Vane Impeller



Mid Vane Impeller



# 1200 and 650 Systems

- **The Mid Vane Impeller Assembly**
  - Rotates due to mud flow
  - Magnetically coupled to pulser's main shaft
  - Vane angle related to flow rate
    - 1200 System - 43°, 35°, 28° vane angles
    - 650 System - 35°, 30°, 20° vane angles
  - Two marine bearings

# 1200 and 650 Systems



# 1200 and 650 Systems



Mid Vane Impeller



# 1200 and 650 Systems

- **The Upper Bearing Sleeve**



# 1200 and 650 Systems

- **The Upper Bearing Sleeve**
  - Supports the impeller's upper bearing
  - Threaded onto the stator support tube

# 1200 and 650 Systems

- **The Flow Diverter**



# 1200 and 650 Systems

- **The Flow Diverter**
  - Directs flow toward the impeller vanes
  - Installed between the upper bearing sleeve and the stator support tube

# 1200 and 650 Systems

- **The Stator Support Tube**



# 1200 and 650 Systems

- **The Stator Support Tube**
  - **Screwed onto the pulser poppet shaft housing (3 screws)**
  - **Supports following components**
    - **Shrouded Stator (slide on)**
    - **Hub (slide on)**
    - **Nose Cap (threaded on)**

# 1200 and 650 Systems

- **Stator Support Tube Assembly**



# 1200 and 650 Systems

- **Stator Support Tube Assembly**

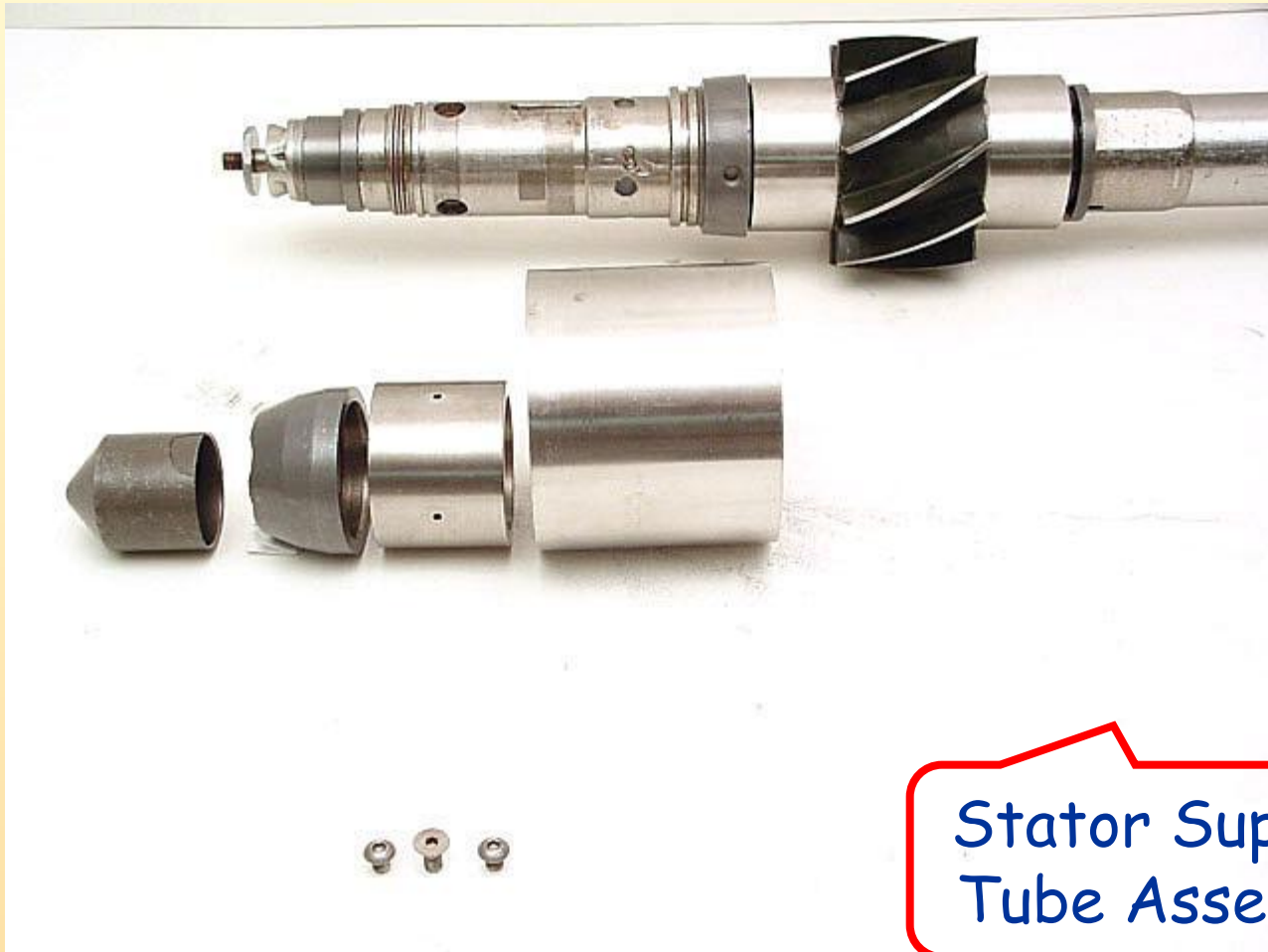




# 1200 and 650 Systems



# 1200 and 650 Systems



Stator Support  
Tube Assembly

# 1200 and 650 Systems

- **Stator Support Tube Screws**



Button-head screws

Flat-head screw

# 1200 and 650 Systems

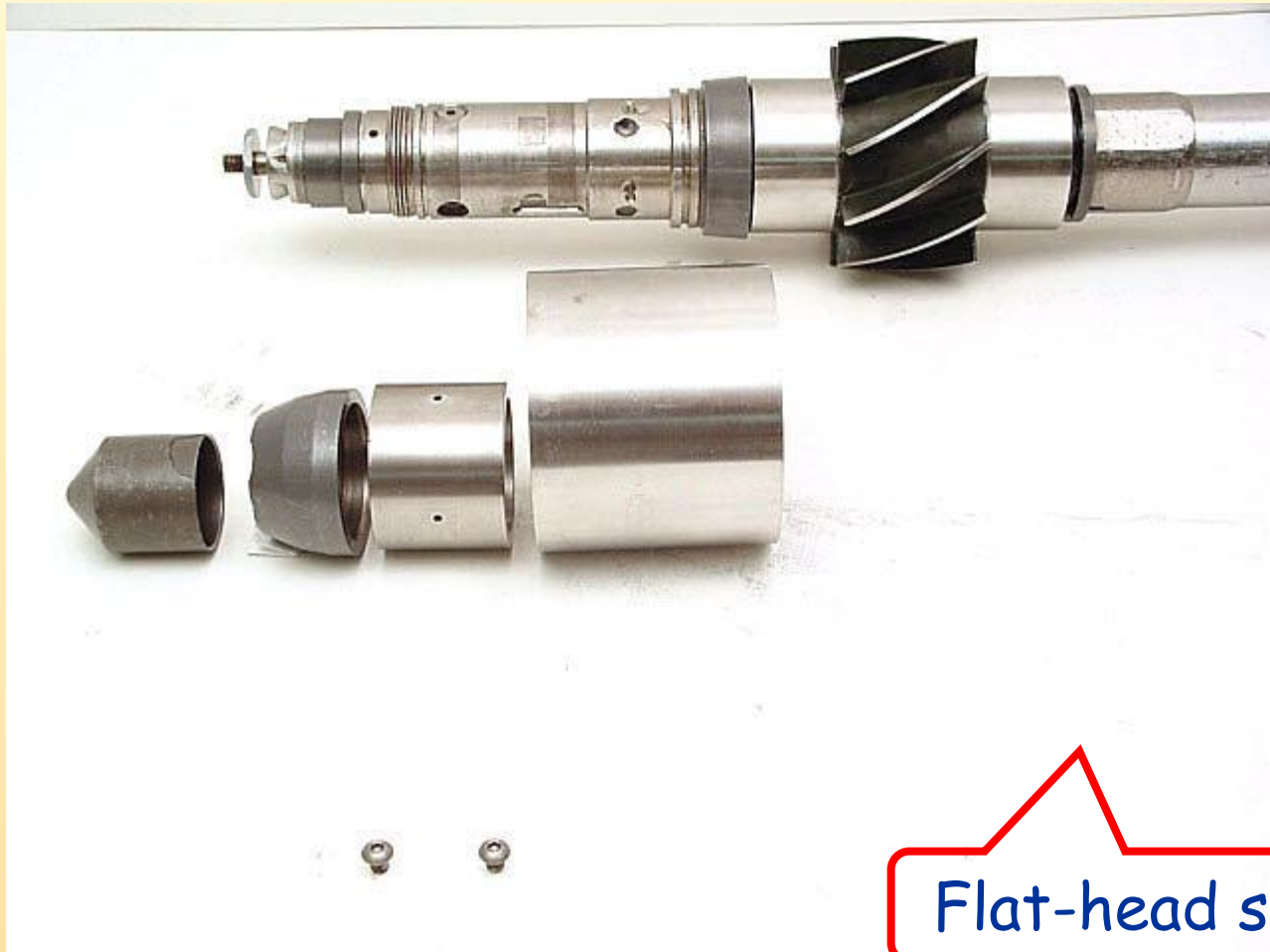
- **Stator Support Tube Screws**
  - Holds stator support tube in-place
  - Install flat-head screw first
    - Locates stator support tube in correct position
    - Aligns the remaining two screw holes
  - Install two button-head screws

# 1200 and 650 Systems

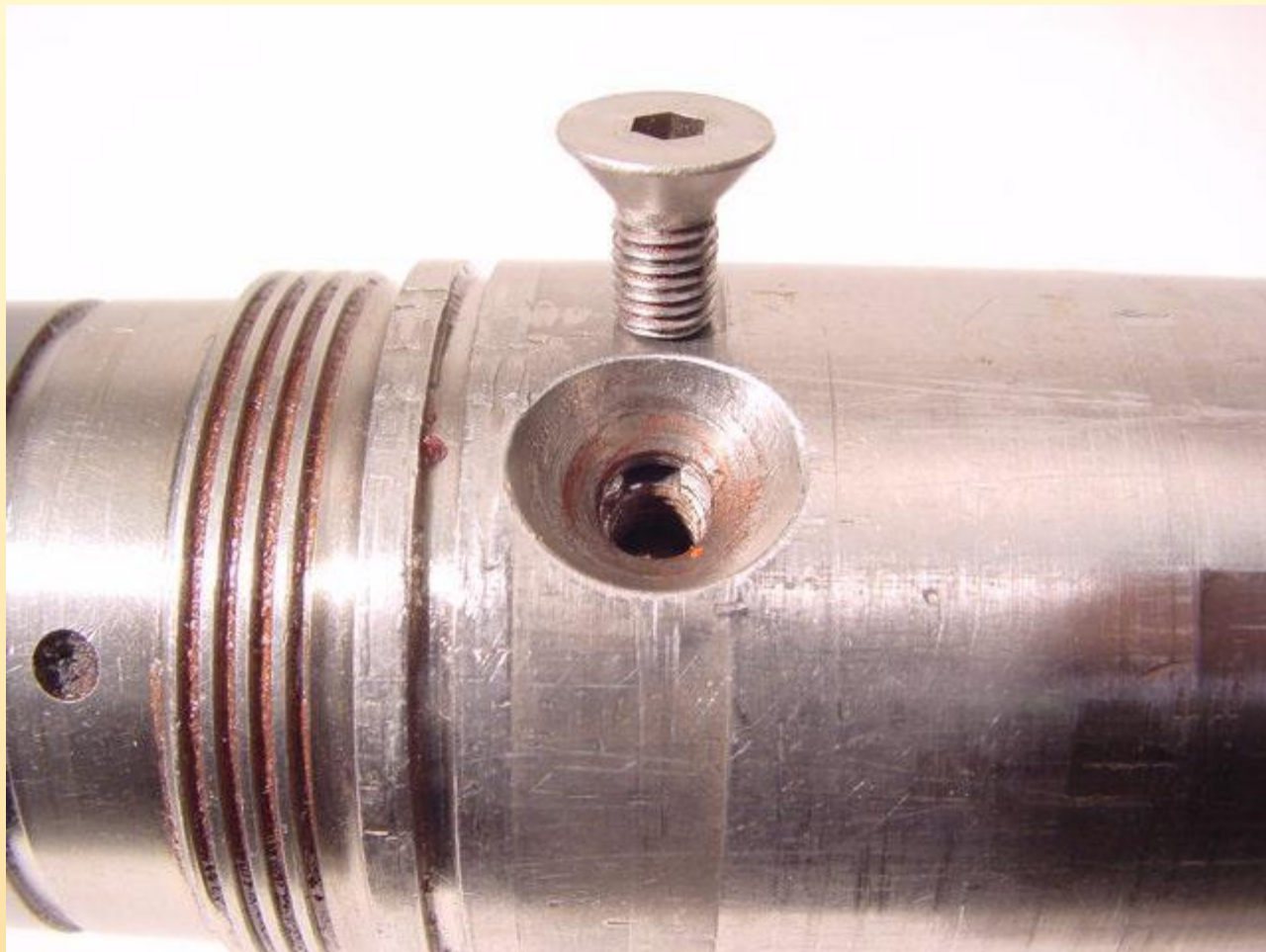


~~Flat-head screw~~

# 1200 and 650 Systems



# 1200 and 650 Systems

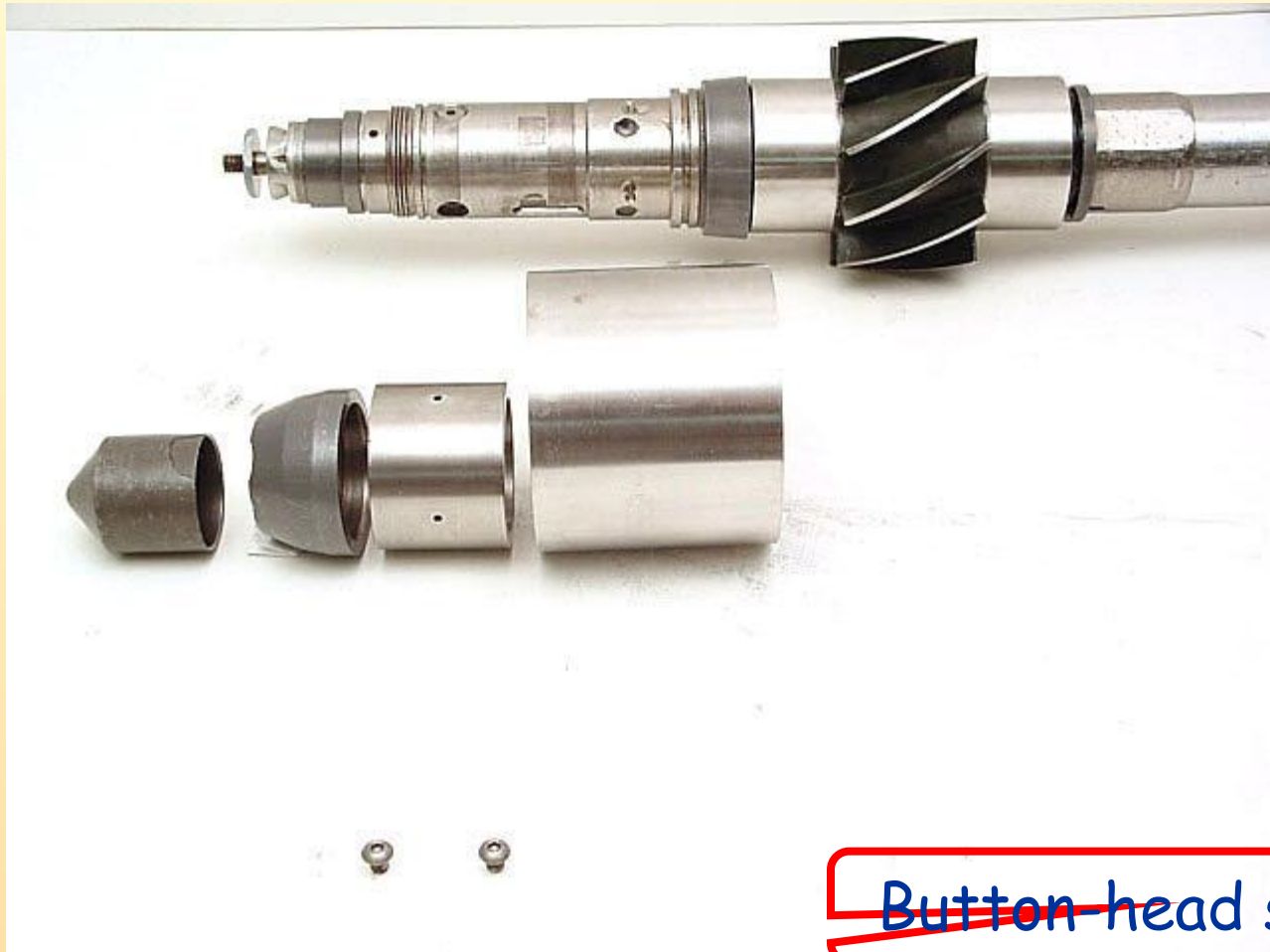


# 1200 and 650 Systems



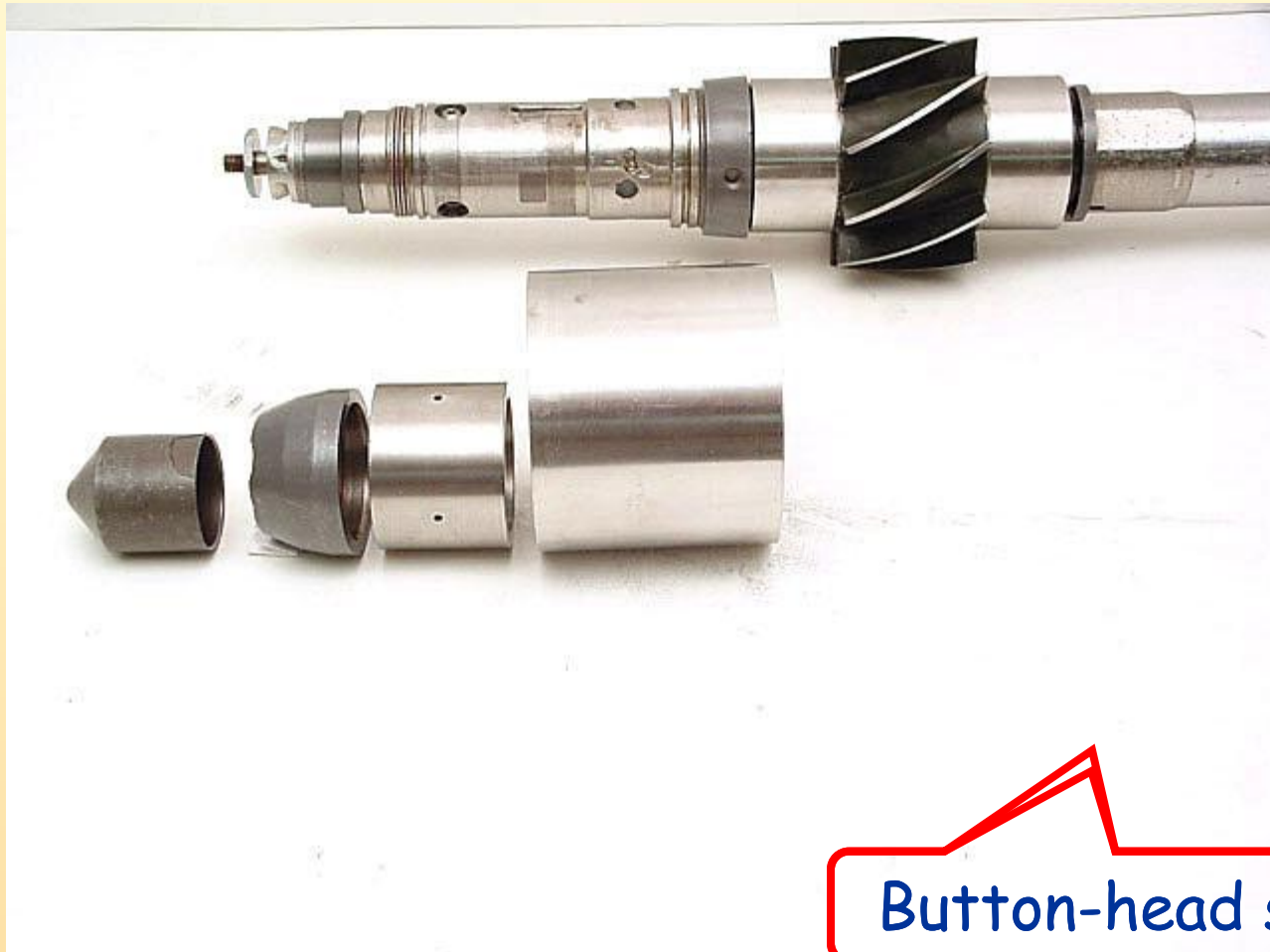


# 1200 and 650 Systems

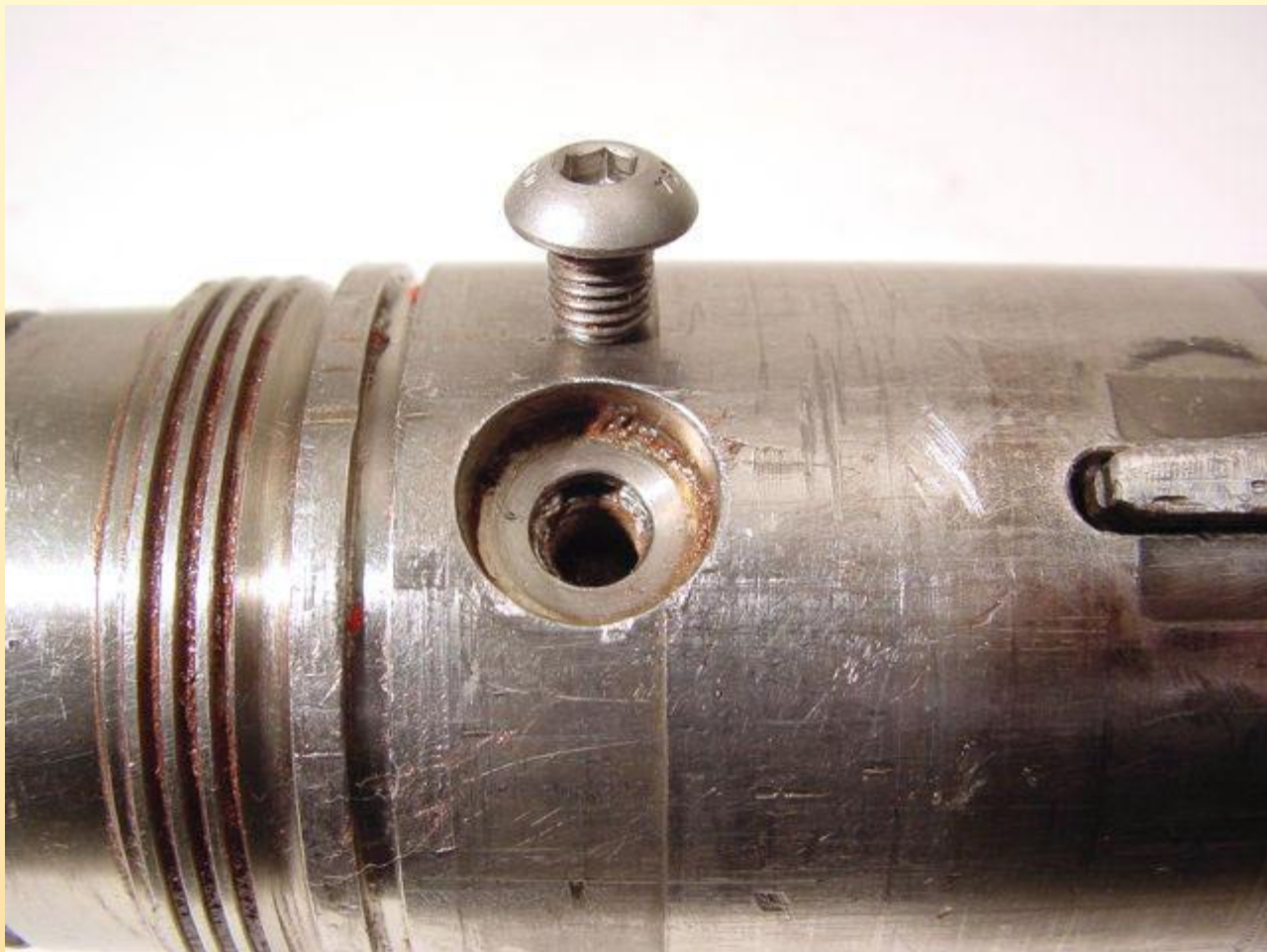


~~Button-head screws~~

# 1200 and 650 Systems



# 1200 and 650 Systems



# 1200 and 650 Systems



# 1200 and 650 Systems

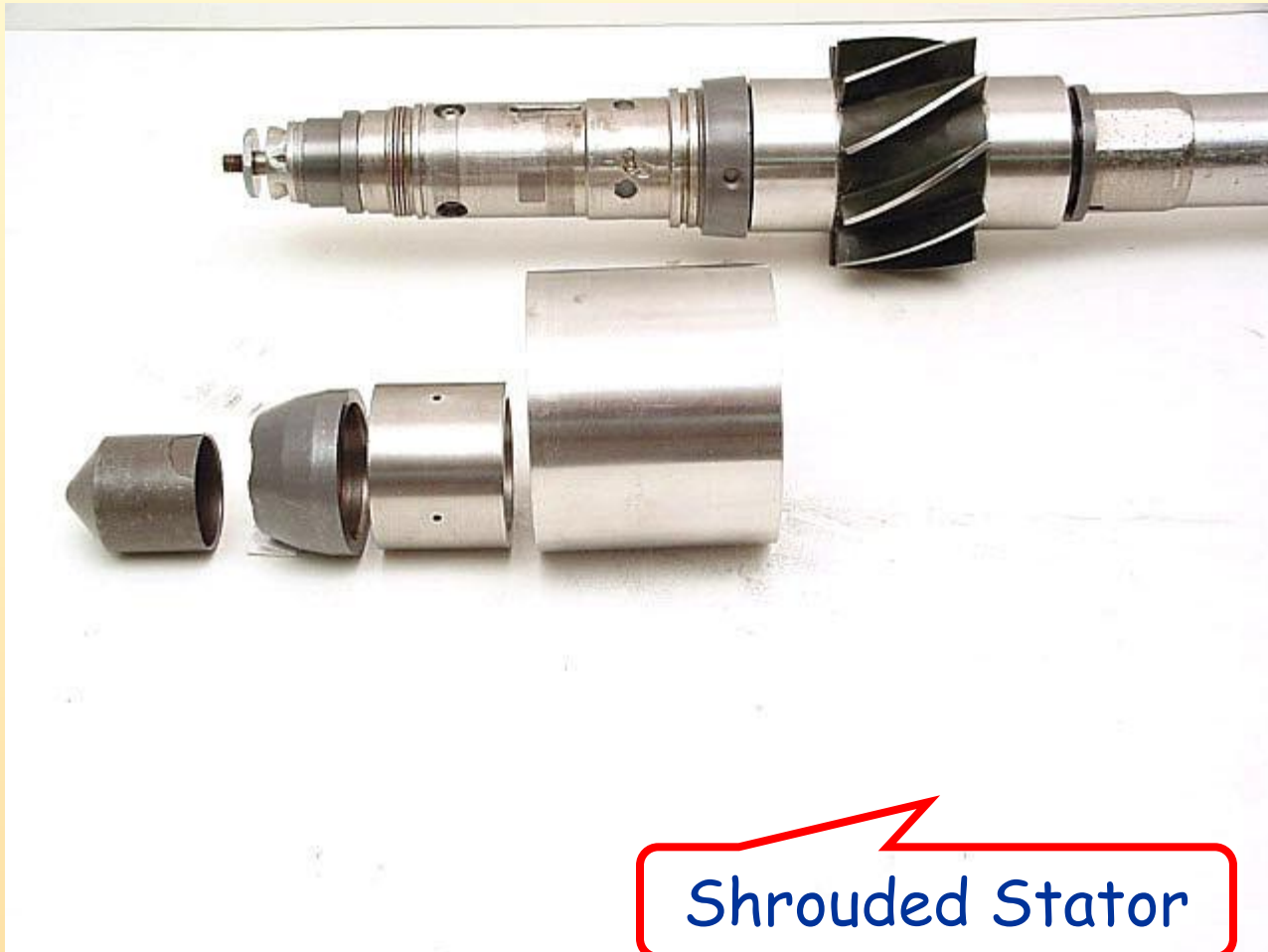
- **The Shrouded Stator**



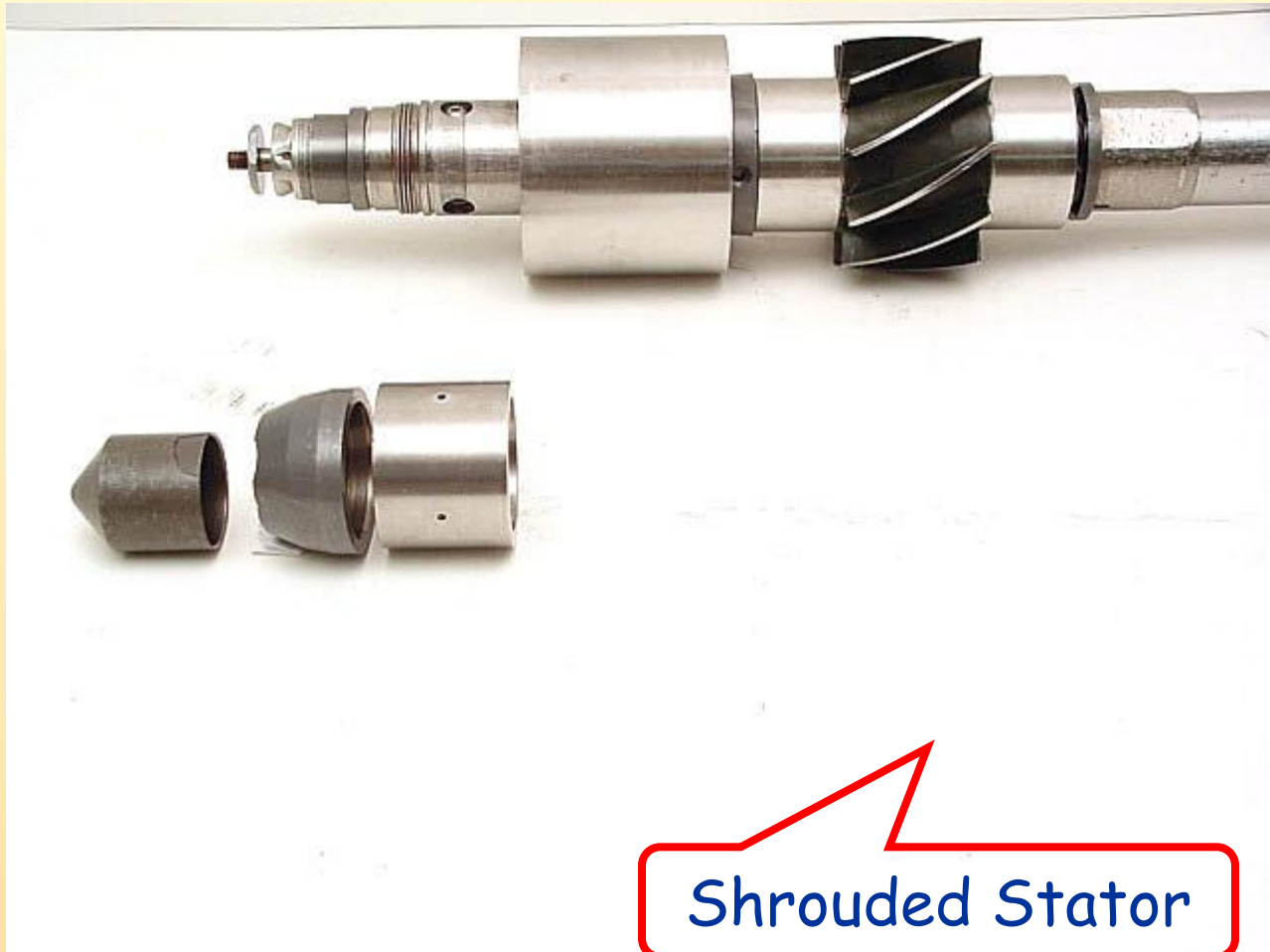
# 1200 and 650 Systems

- **The Shrouded Stator**
  - Slides over key on stator support tube
  - Angled vanes deflect fluid flow
  - Different vane exit angles dependent on flow rate
  - Shroud centralizes assembly in flowtube
  - Shroud limits erosion in flowtube

# 1200 and 650 Systems



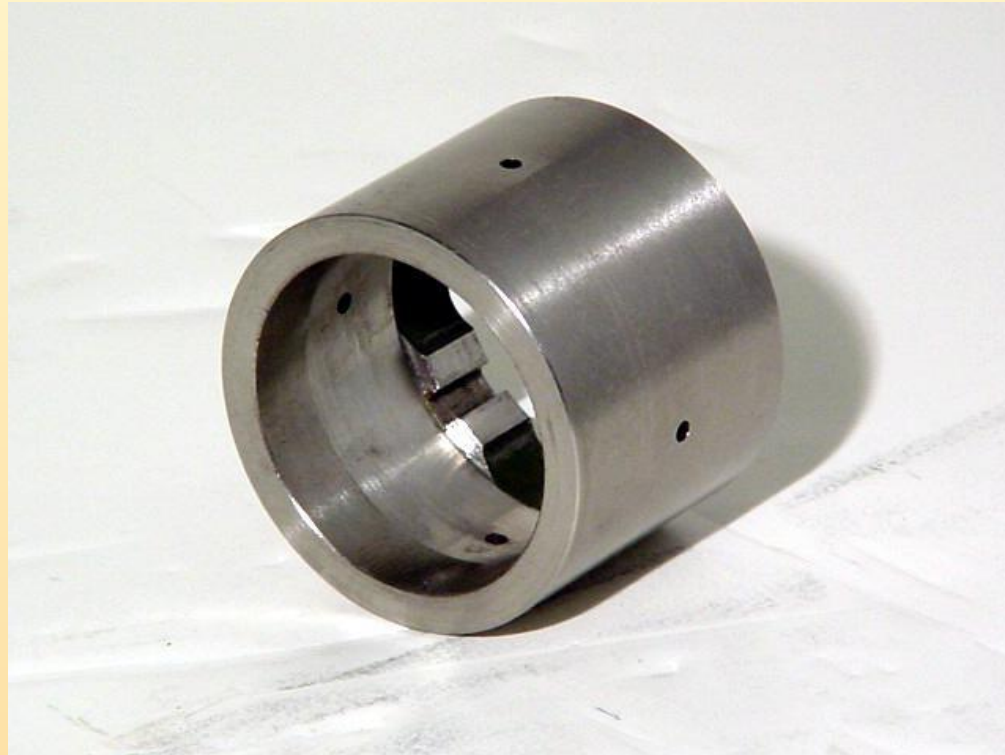
# 1200 and 650 Systems





# 1200 and 650 Systems

- **The Hub**

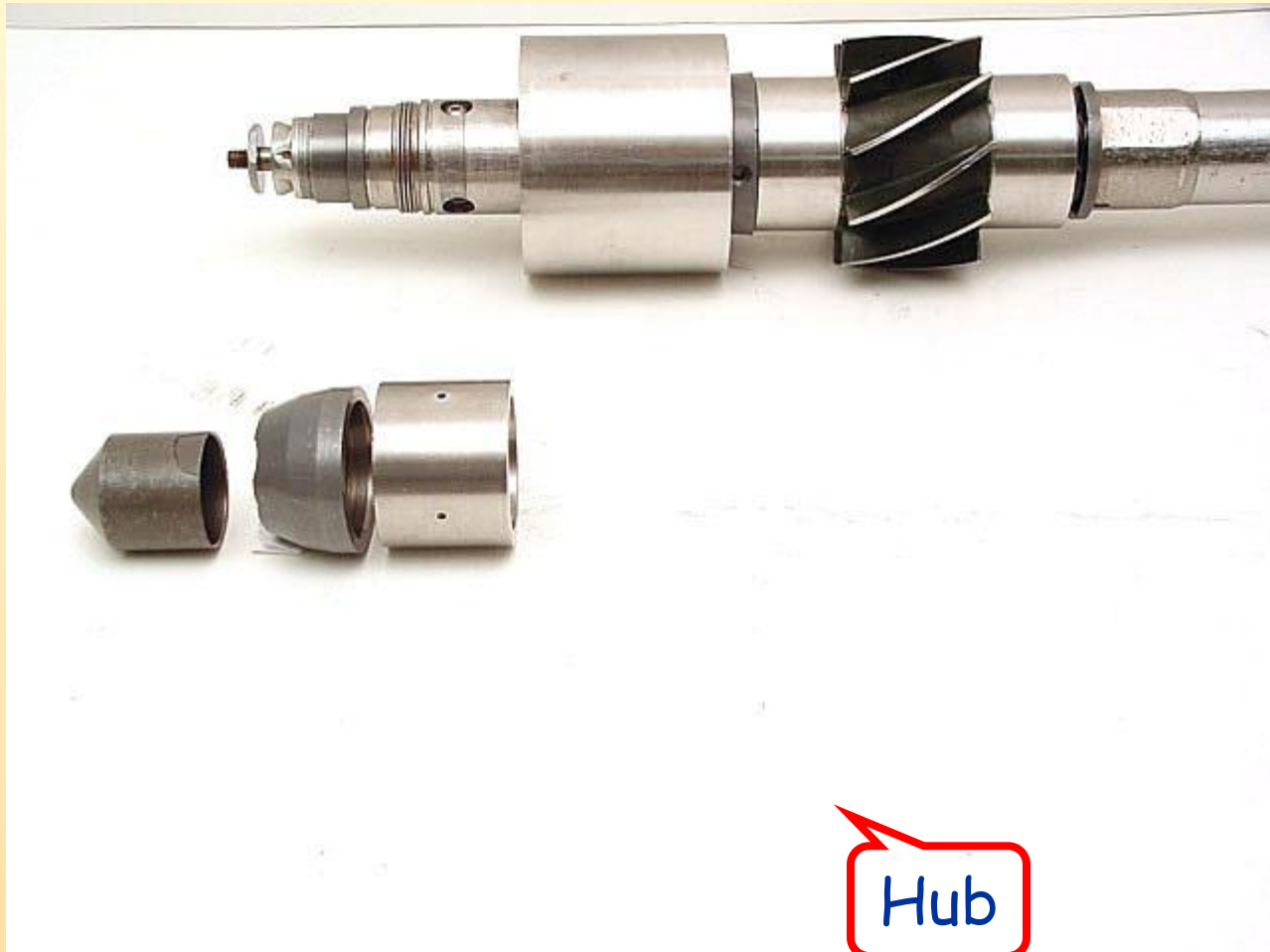


# 1200 and 650 Systems

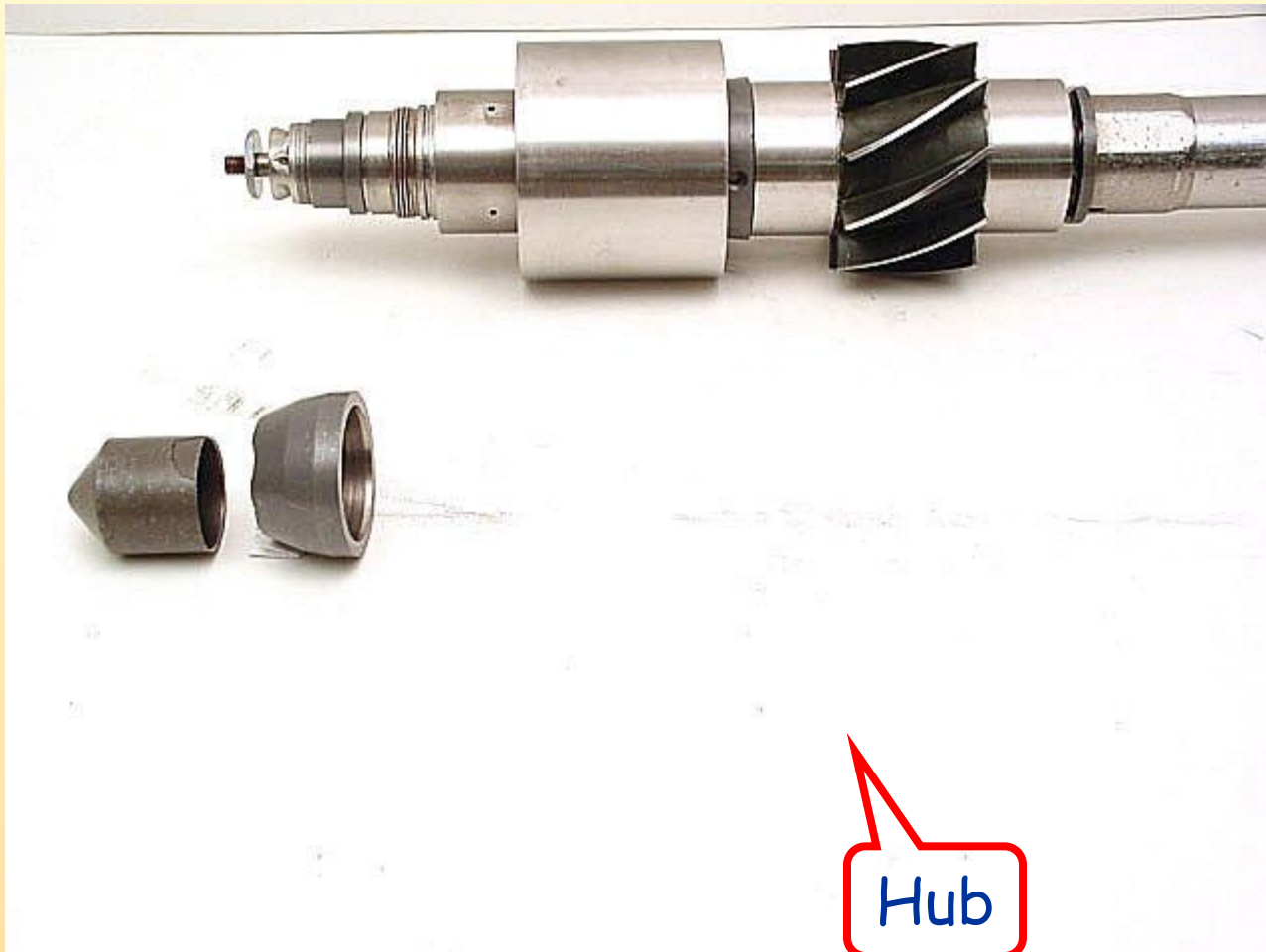
- **The Hub**

- **Slides over key on stator support tube**
- **Provides a location to place a back-up wrench when tightening some parts**
- **Acts as spacer between shrouded stator and nose cap**

# 1200 and 650 Systems



# 1200 and 650 Systems



# 1200 and 650 Systems

- **The Nose Cap**



# 1200 and 650 Systems

- **The Nose Cap**
  - Threads onto stator support tube
  - Locks shrouded stator and hub onto stator support tube
  - Acts as transition from poppet outer diameter to hub outer diameter

# 1200 and 650 Systems



# 1200 and 650 Systems





# 1200 and 650 Systems

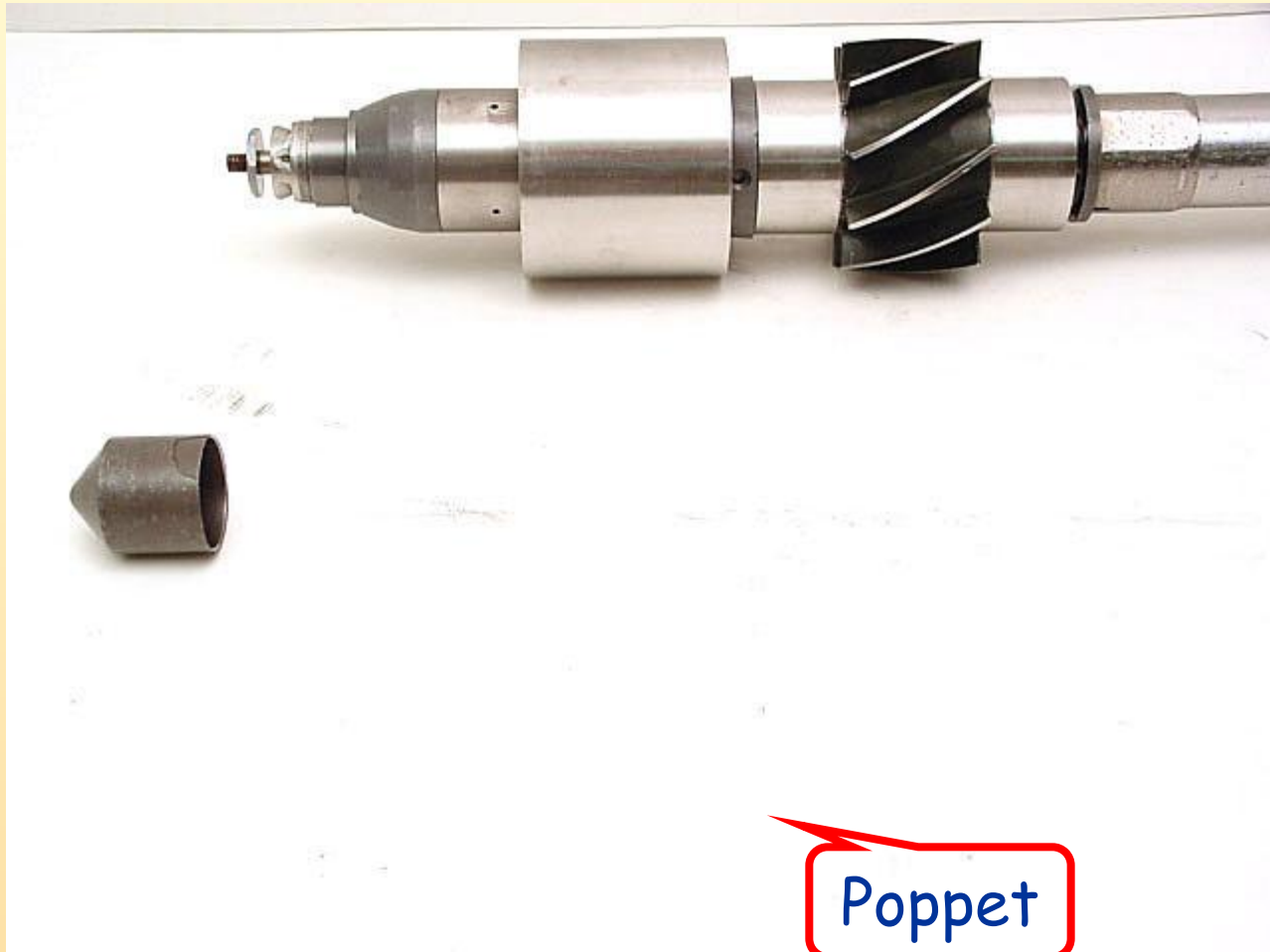
- **The Poppet**



# 1200 and 650 Systems

- **The Poppet**
  - Threads onto poppet shaft
  - Causes fluid flow restriction when extended into the orifice

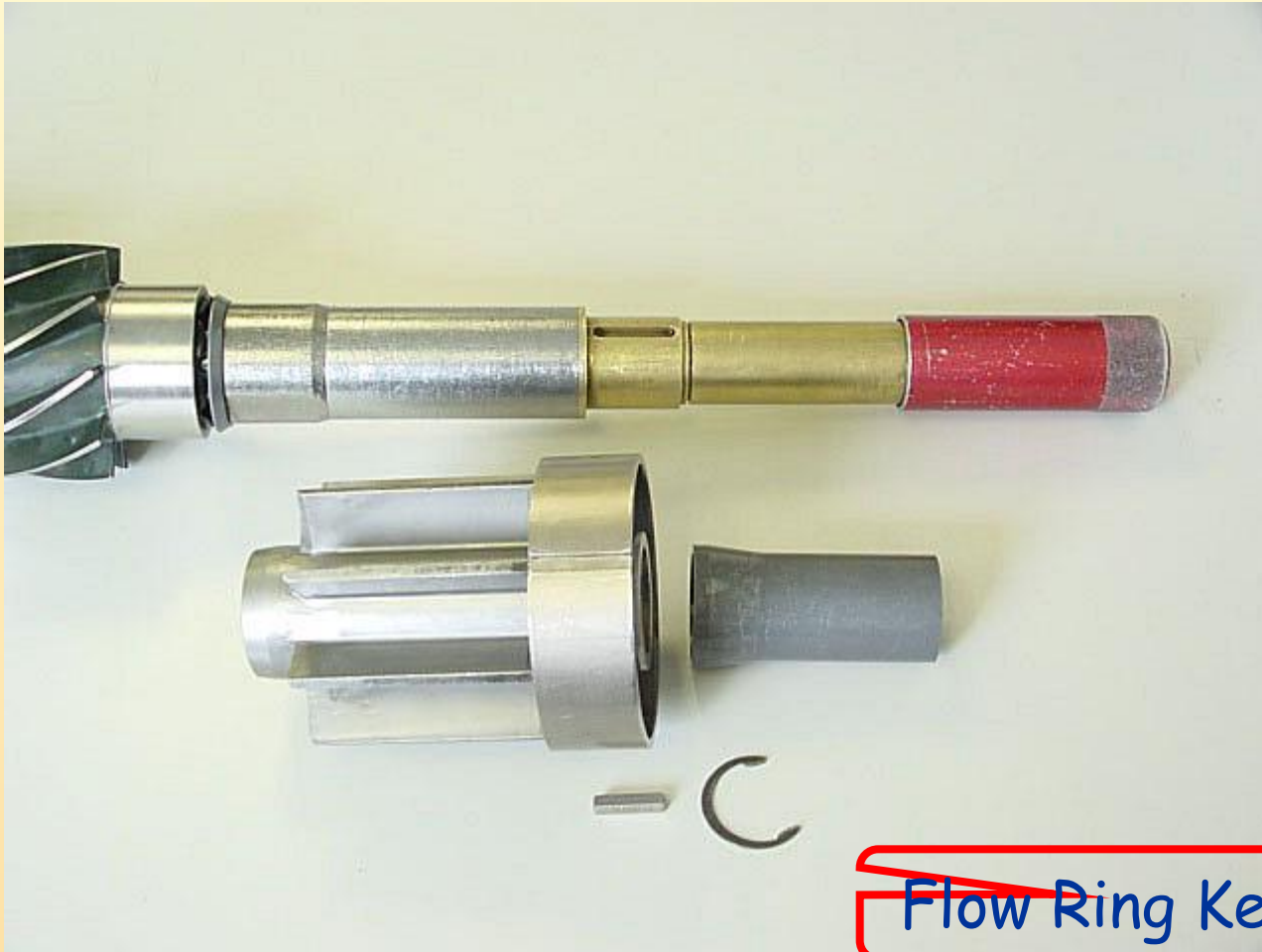
# 1200 and 650 Systems



# 1200 and 650 Systems



# 1200 and 650 Systems



# 1200 and 650 Systems

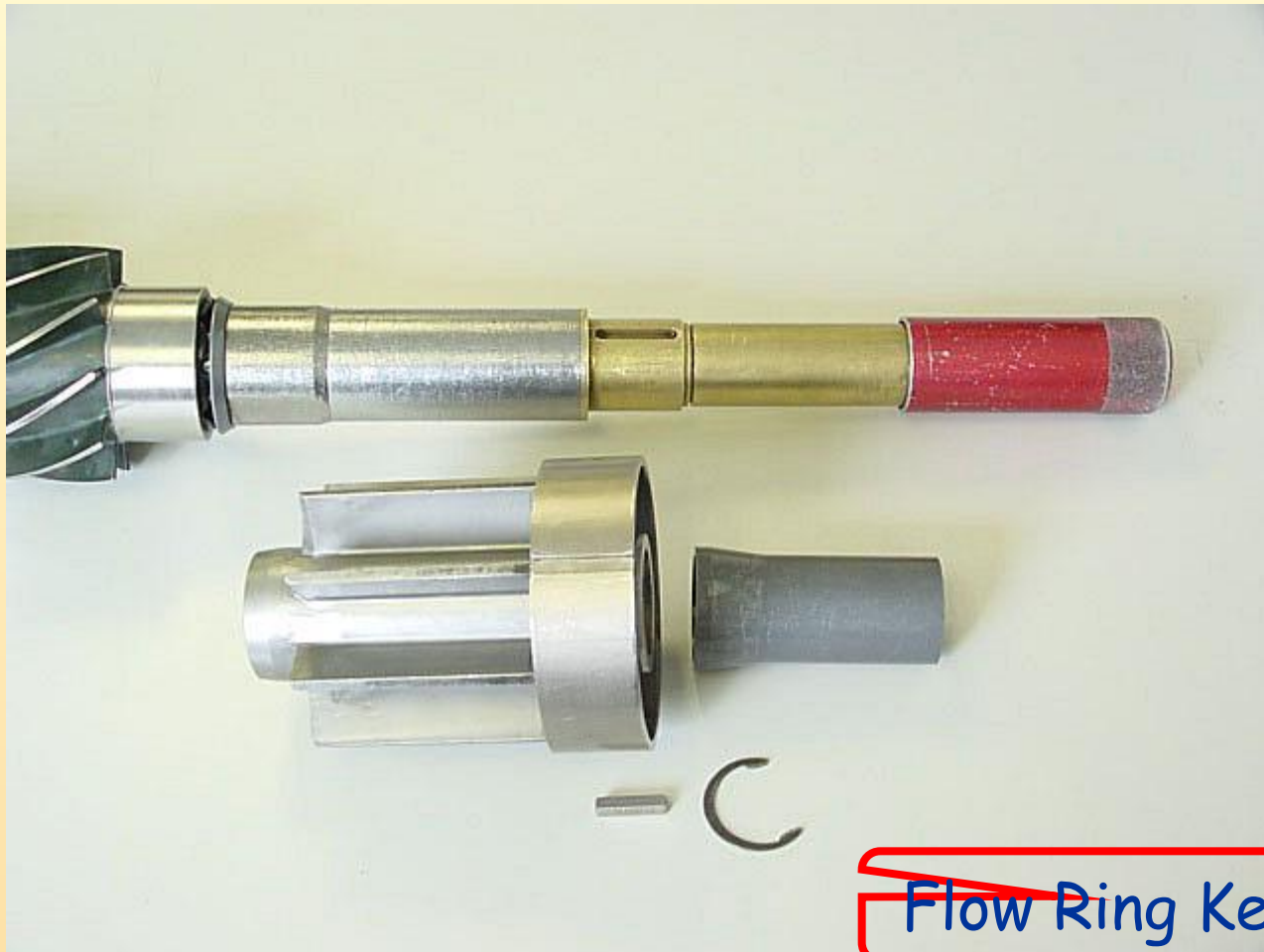
- **The Flow Ring Key**



# 1200 and 650 Systems

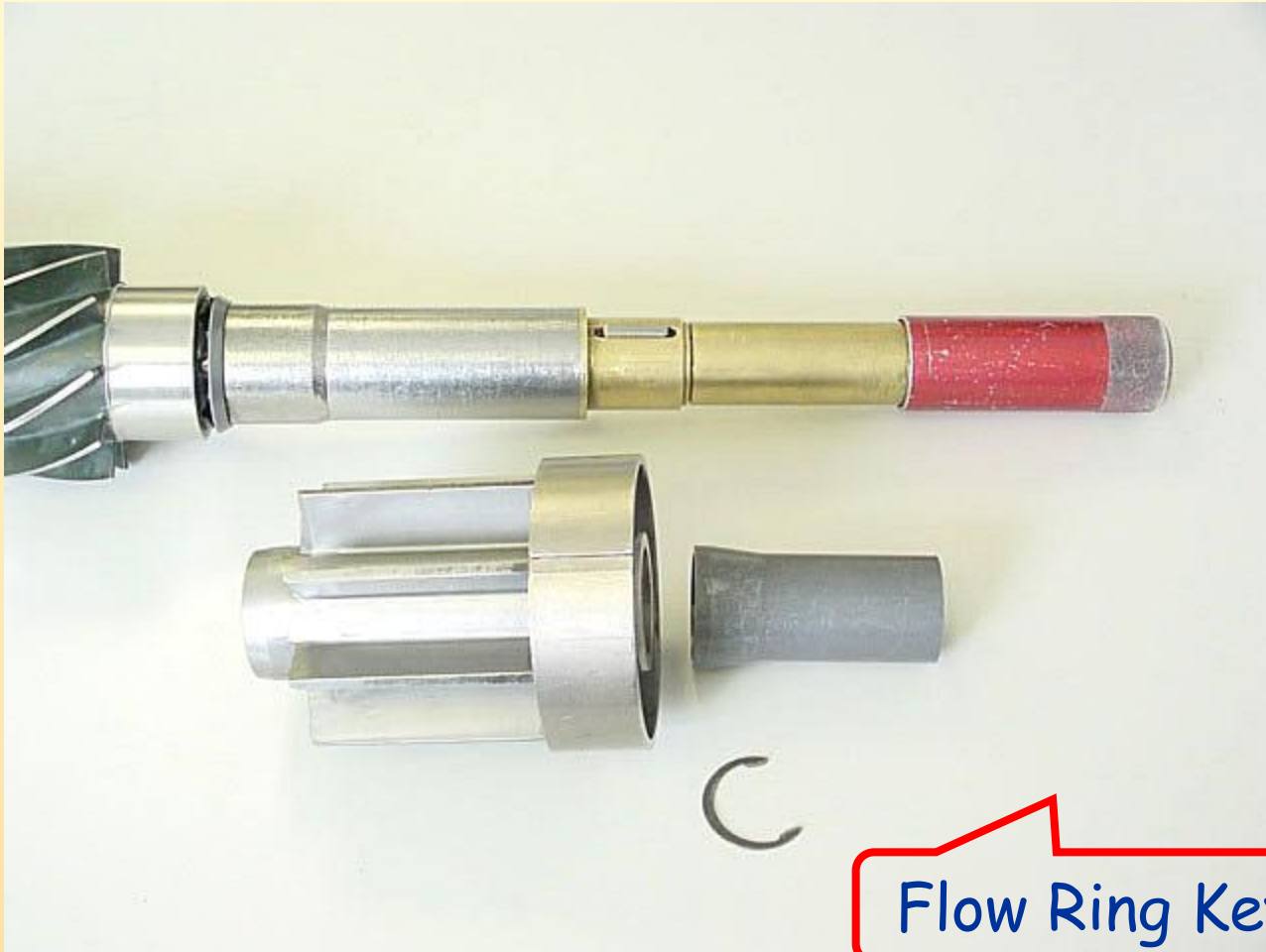
- **The Flow Ring Key**
  - Prevents pulser from rotating
  - Maintains highside alignment
  - Installed into notch in pulser bulkhead

# 1200 and 650 Systems





# 1200 and 650 Systems



# 1200 and 650 Systems

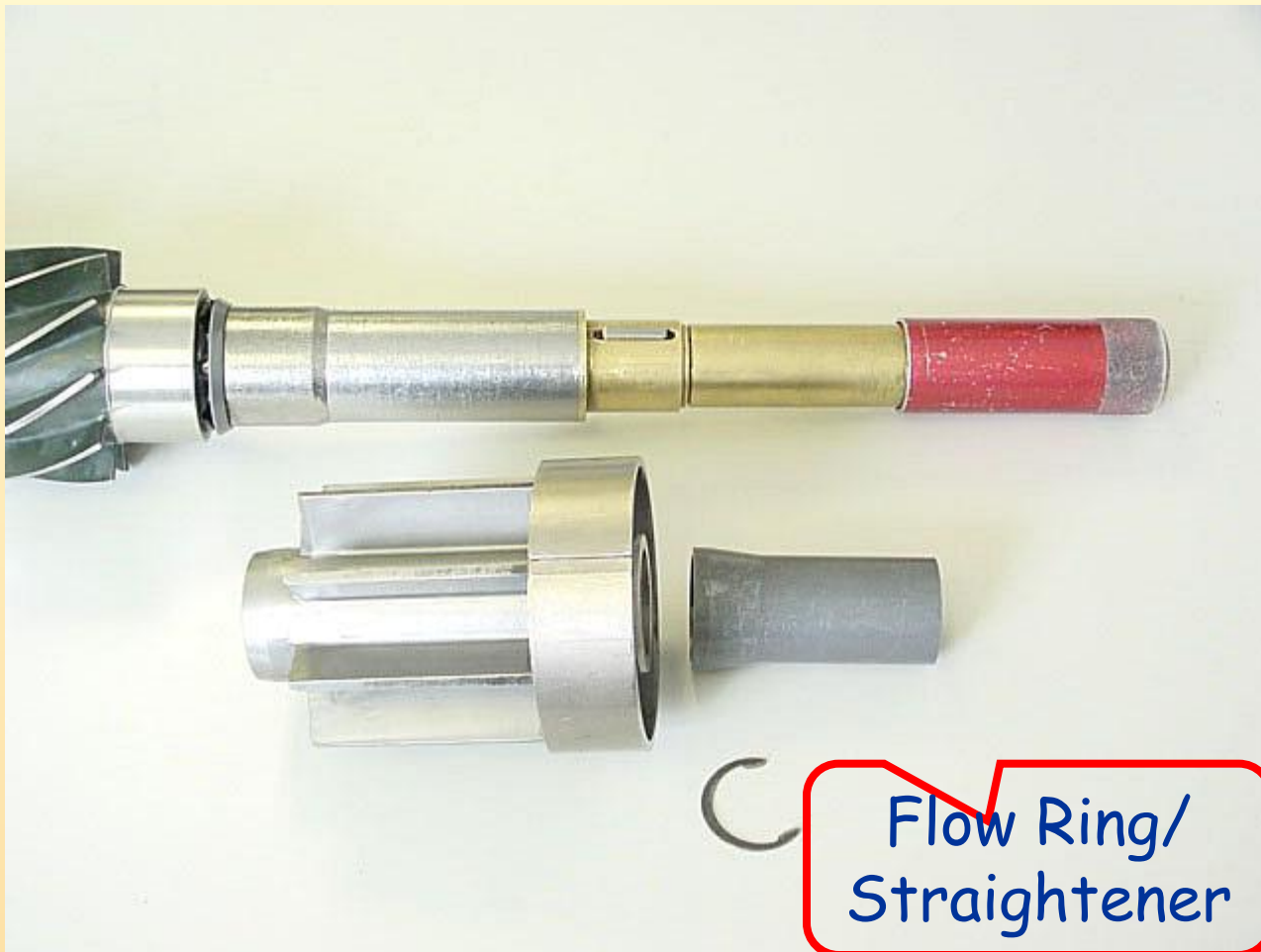
- **The Flow Ring/Straightener**



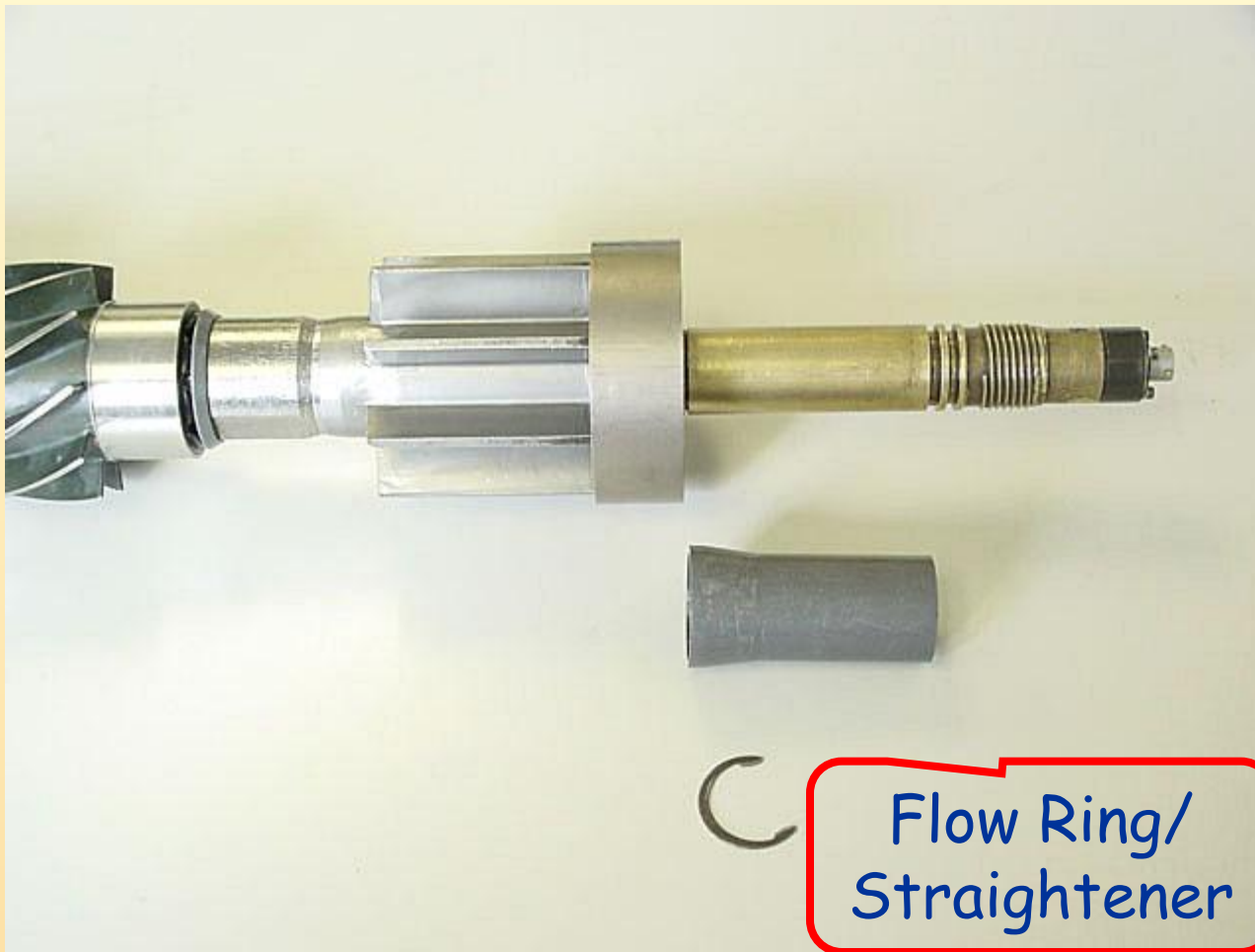
# 1200 and 650 Systems

- **The Flow Ring/Straightener**
  - Slides over key on pulser
  - Vanes change rotational fluid flow from impeller to linear
  - Outer ring centralizes assembly in flowtube
  - Groove on outer ring locks onto key in wear sleeve retainer

# 1200 and 650 Systems



# 1200 and 650 Systems



# 1200 and 650 Systems

- **The Snap Ring**



# 1200 and 650 Systems

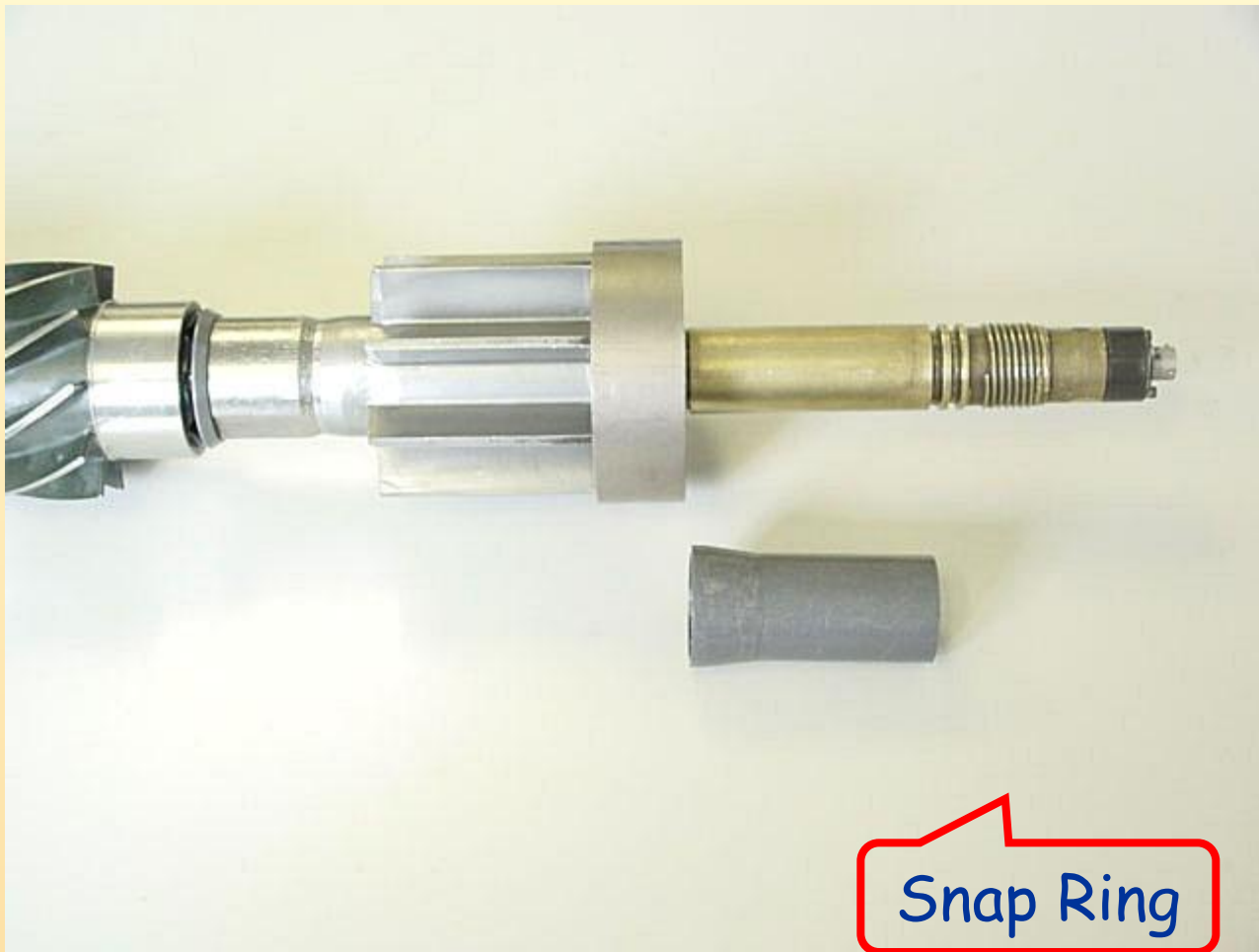
- **The Snap Ring**
  - Holds flow ring straightener in place during assembly

# 1200 and 650 Systems





# 1200 and 650 Systems



# 1200 and 650 Systems

- **The Spacer Sleeve**



# 1200 and 650 Systems

- **The Spacer Sleeve**
  - Provides transition from large outer diameter on pulser to 1.75 inch outer diameter of pressure case below pulser

# 1200 and 650 Systems



# 1200 and 650 Systems



# 1200 and 650 Systems

- **Pulse Generator Assembly**

