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

What makes a Pulse Generator Assembly

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

The Pulser

The Pulser

- 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**

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°, 20° vane angles
  - Two marine bearings

1200 and 650 Systems

1200 and 650 Systems

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

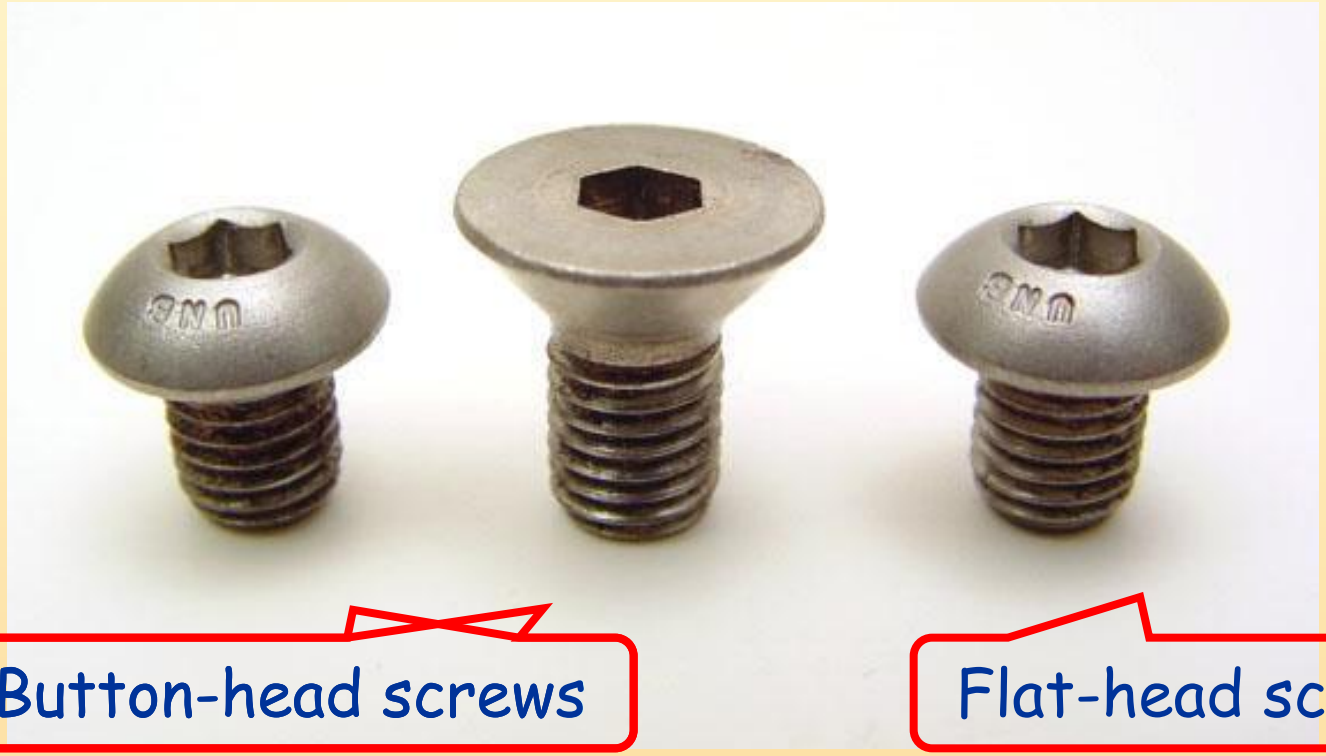
- **Stator Support Tube Assembly**

1200 and 650 Systems

1200 and 650 Systems

1200 and 650 Systems

- **Stator Support Tube Screws**

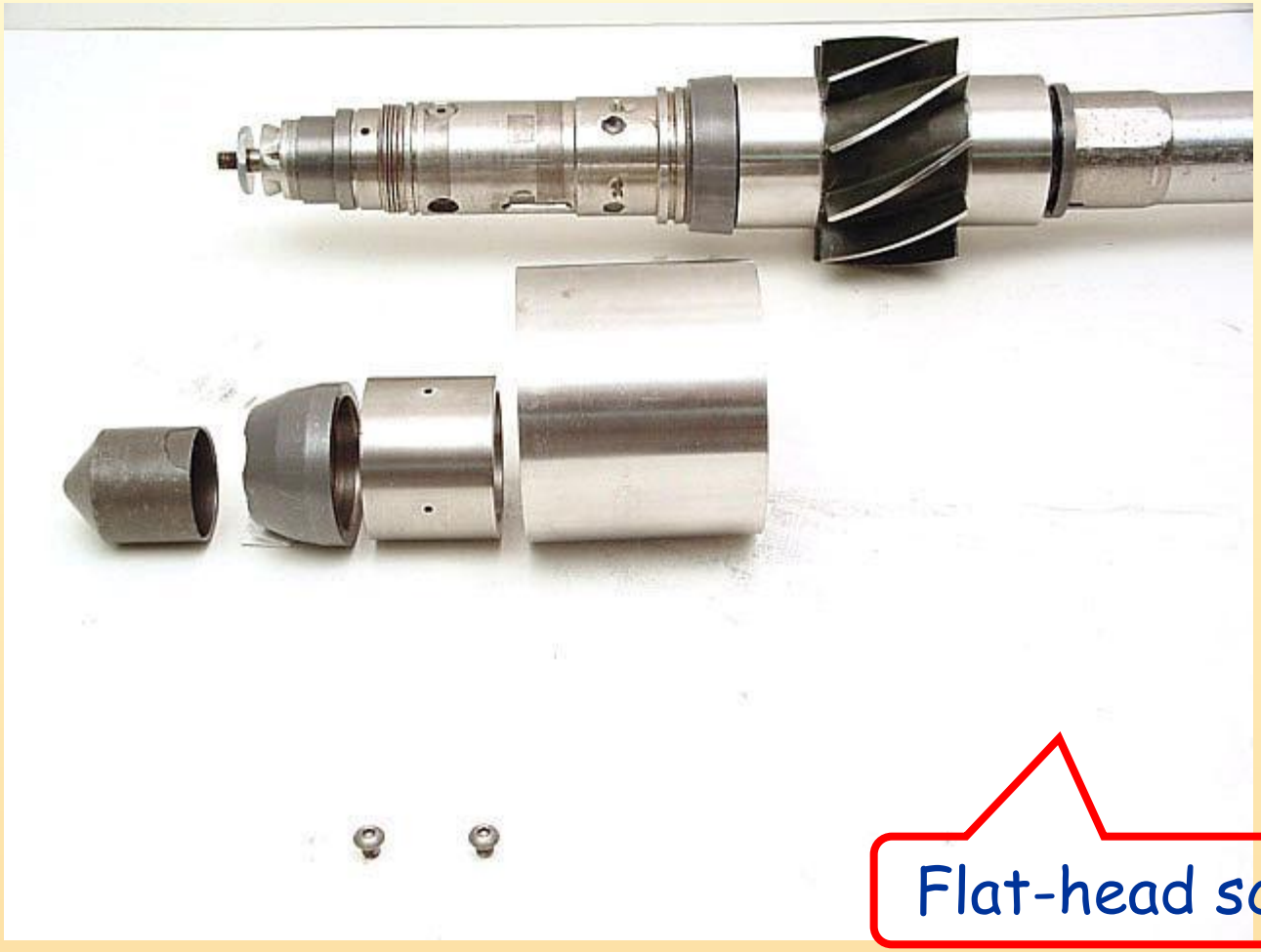


1200 and 650 Systems

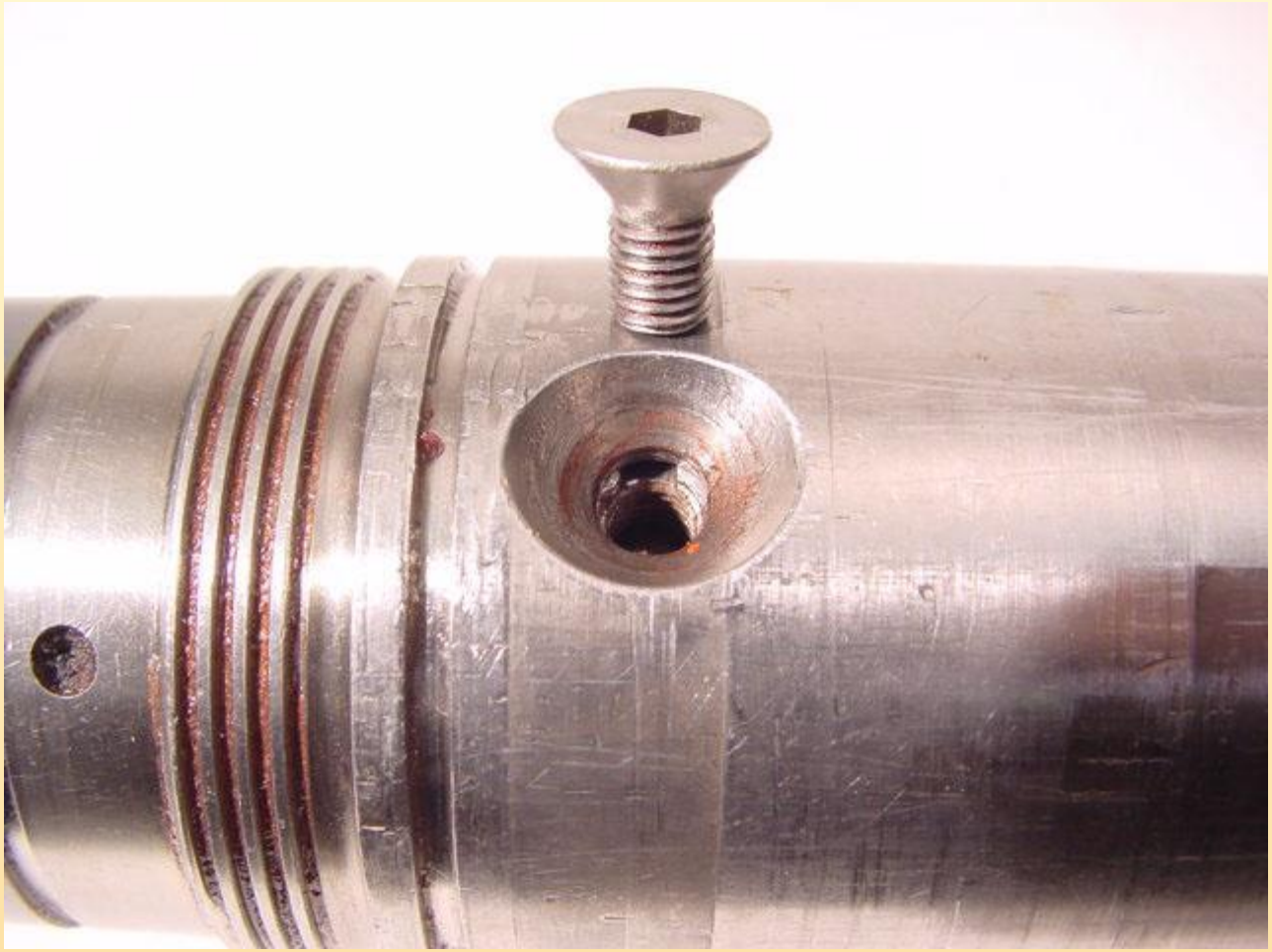
- Stator Support Tube Screws
  - Holds stator support tube in-place
  - Install flat-head screw first
    - Locates stator support tube in correct position
    - Aligns the remaining two screw holes
  - Install two button-head screws

1200 and 650 Systems

1200 and 650 Systems



1200 and 650 Systems



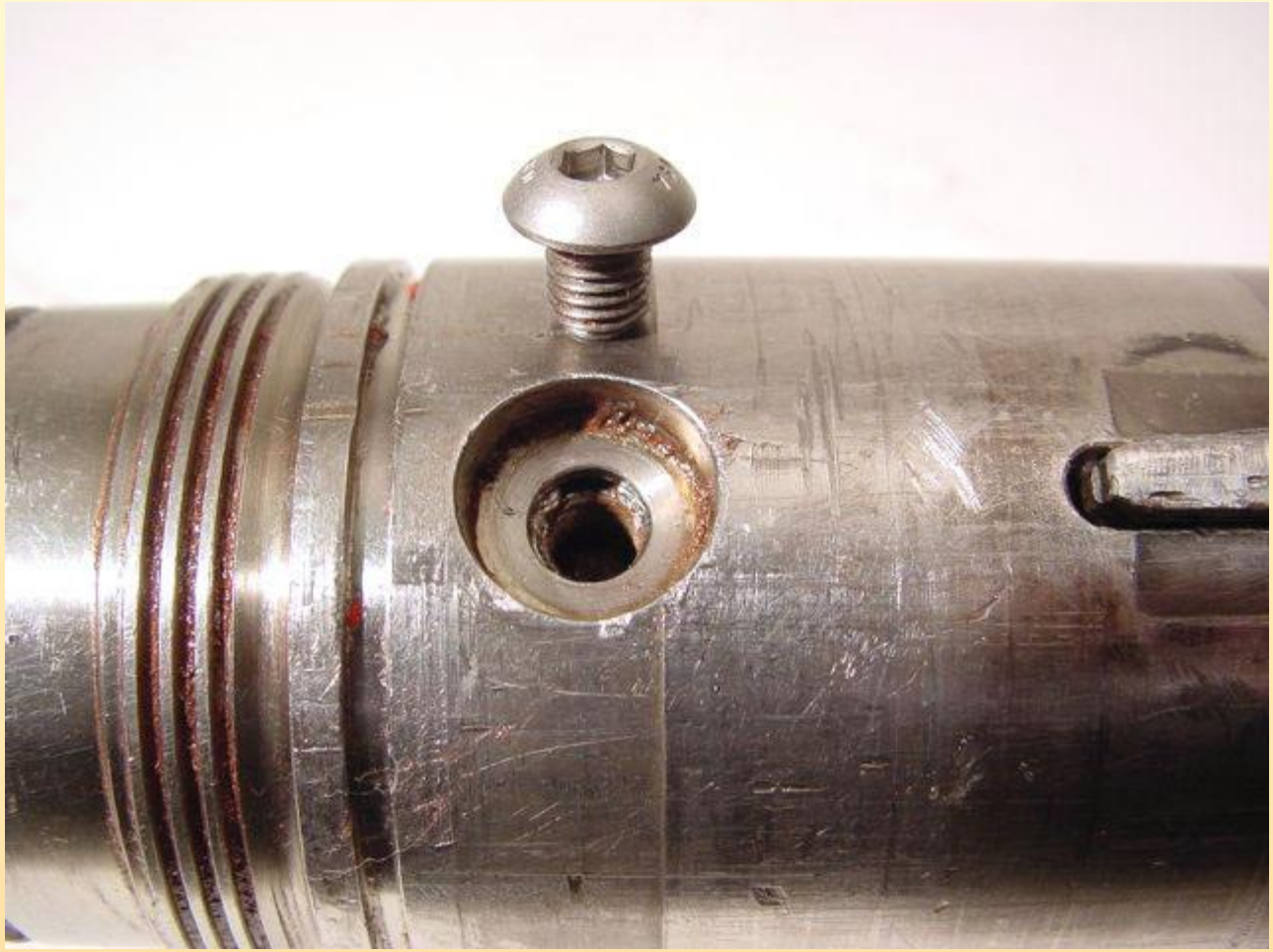
1200 and 650 Systems

1200 and 650 Systems

Button-head screws

1200 and 650 Systems

1200 and 650 Systems



1200 and 650 Systems

1200 and 650 Systems

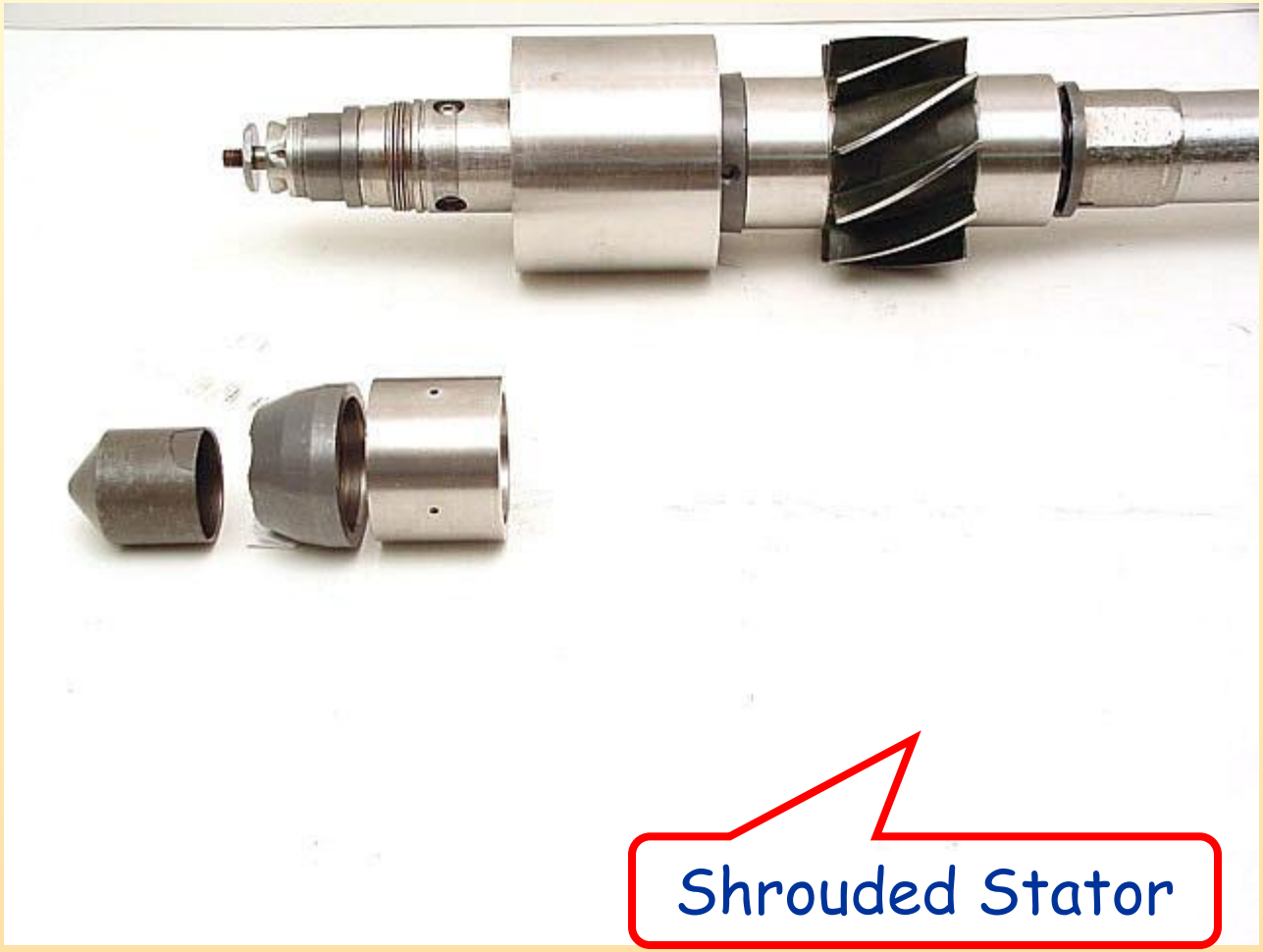
- The Shrouded Stator

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



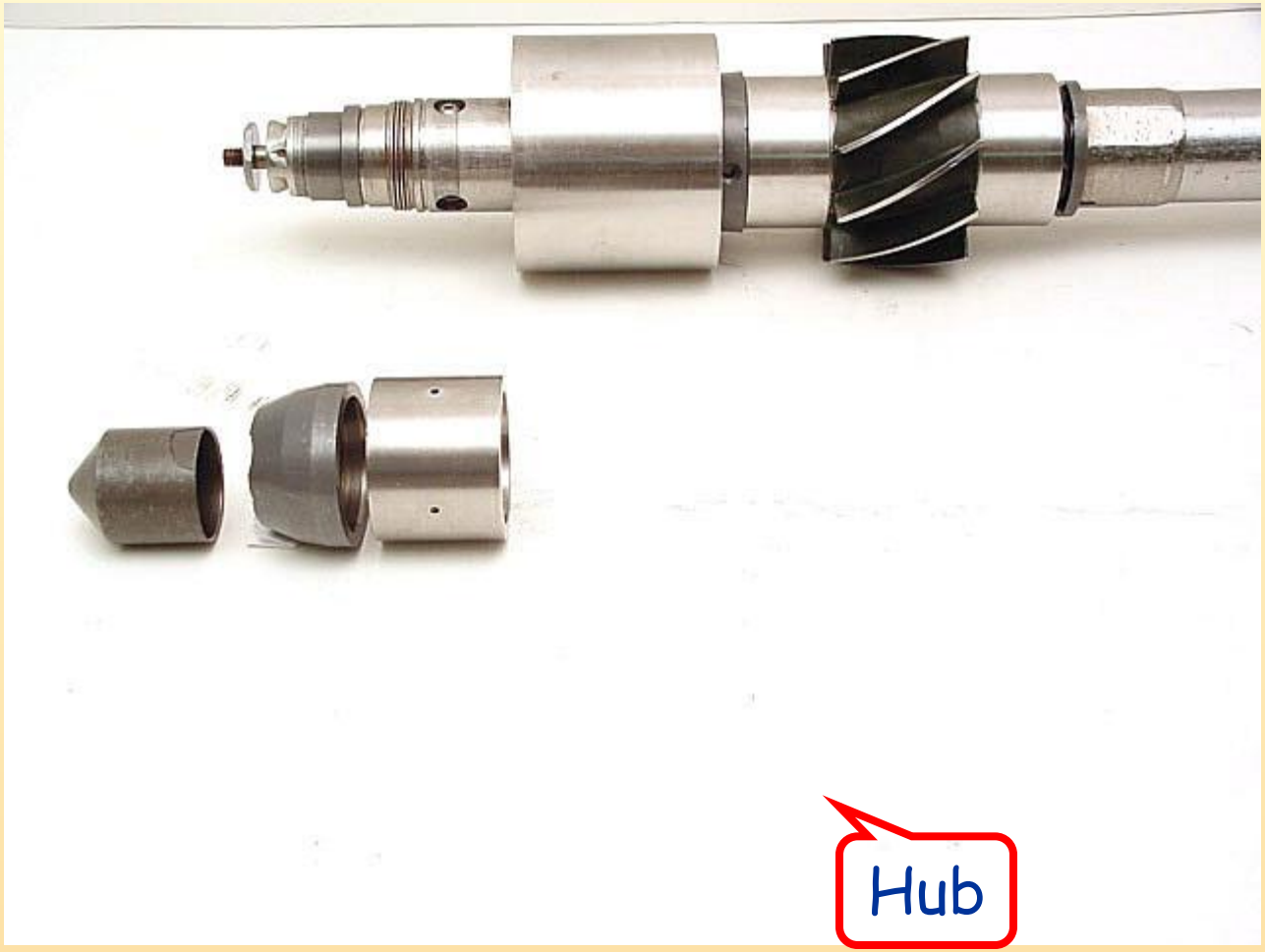
1200 and 650 Systems

- The Hub

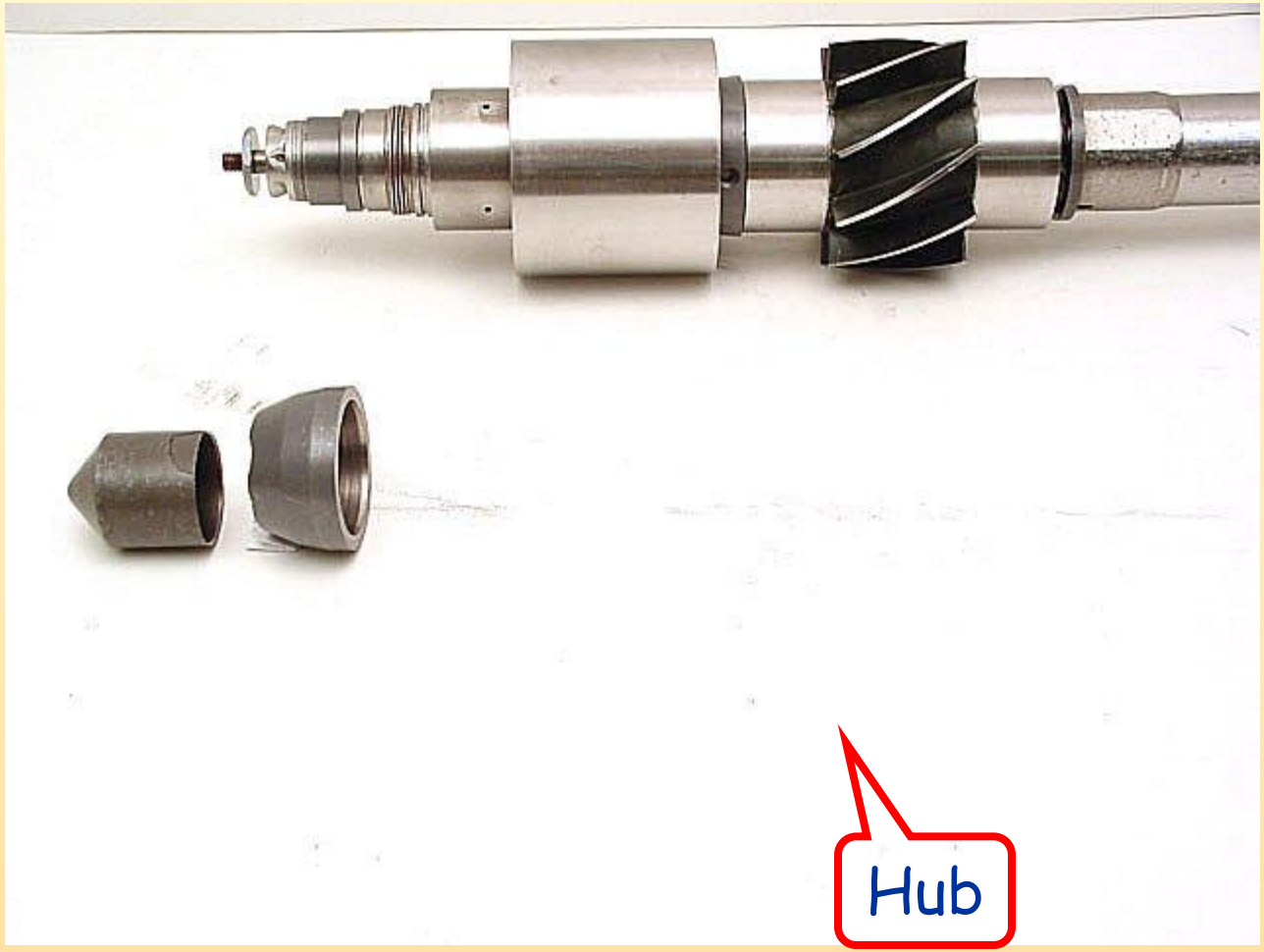
1200 and 650 Systems

- 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

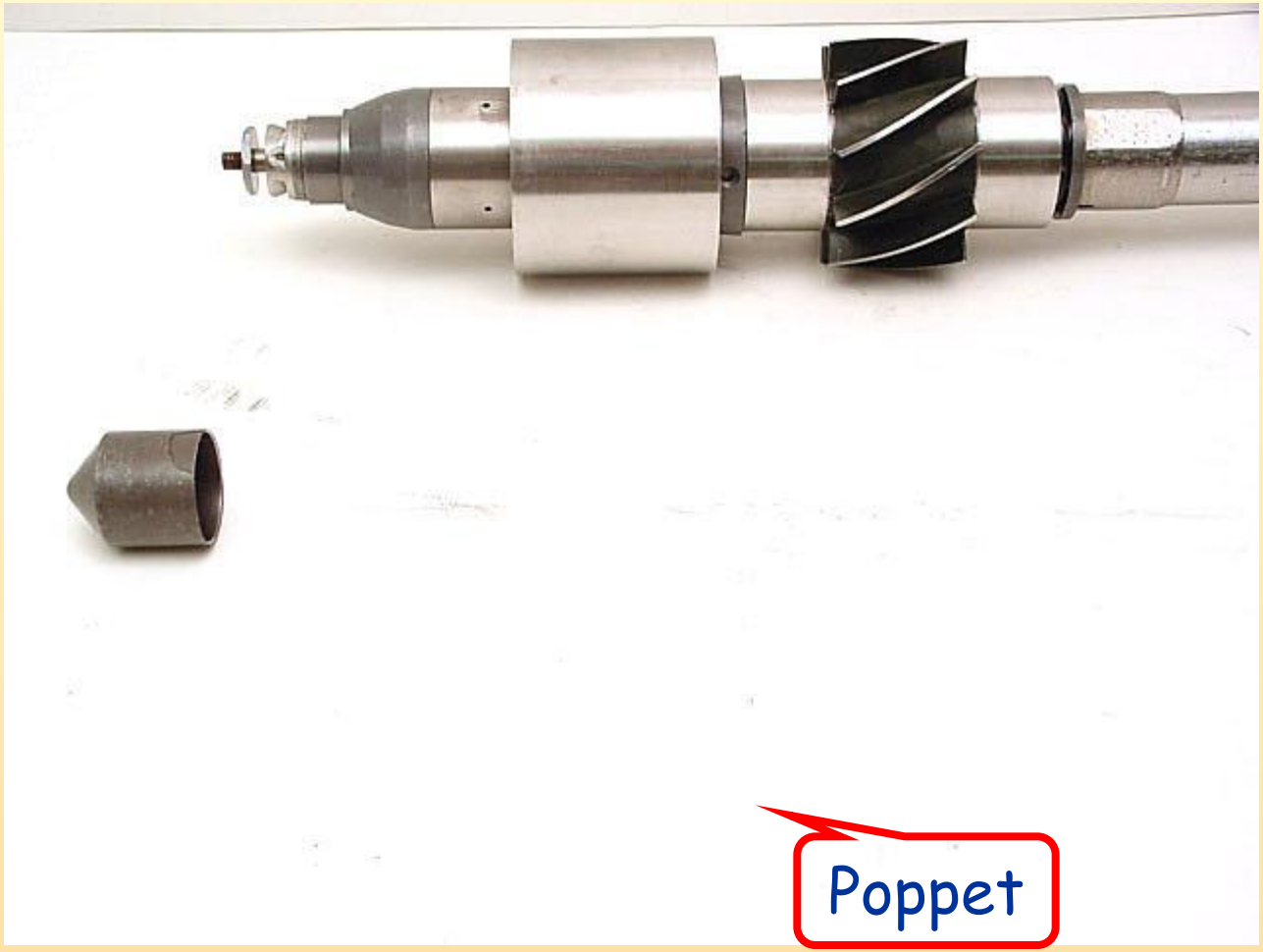
1200 and 650 Systems

- The Poppet

1200 and 650 Systems

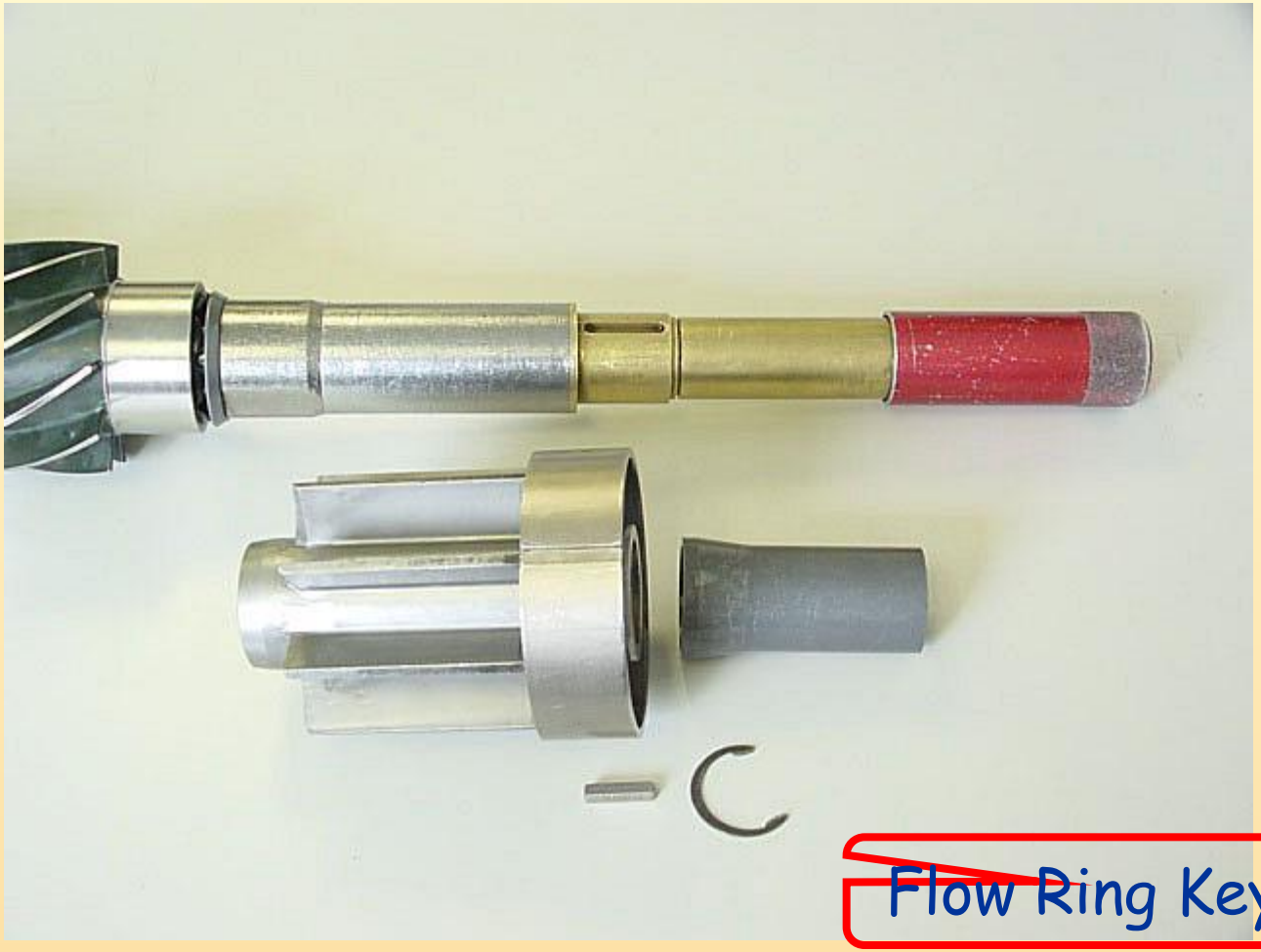
- The Poppet
  - Threads onto poppet shaft
  - Causes fluid flow restriction when extended into the orifice

1200 and 650 Systems



1200 and 650 Systems

1200 and 650 Systems



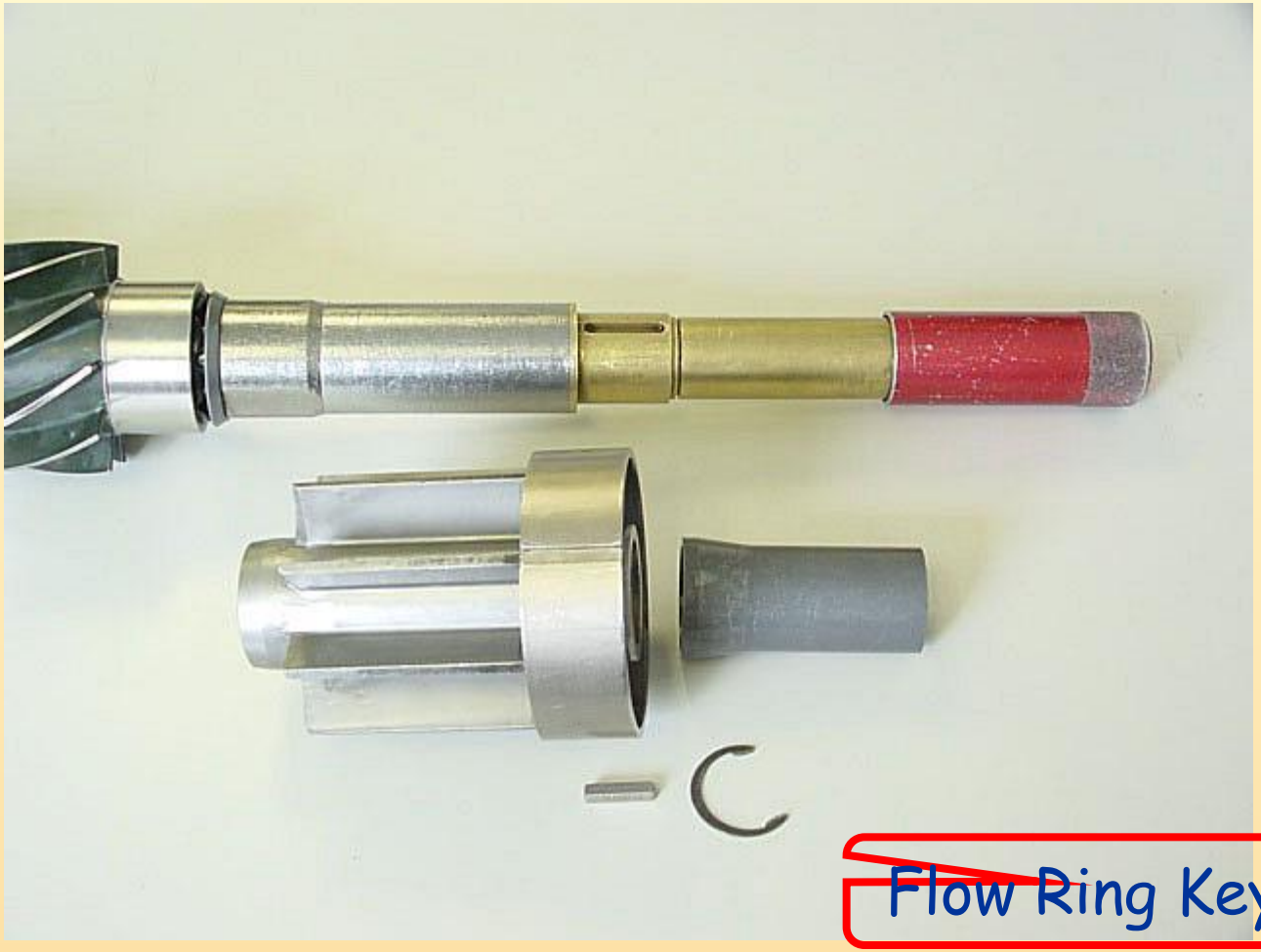
1200 and 650 Systems

- **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

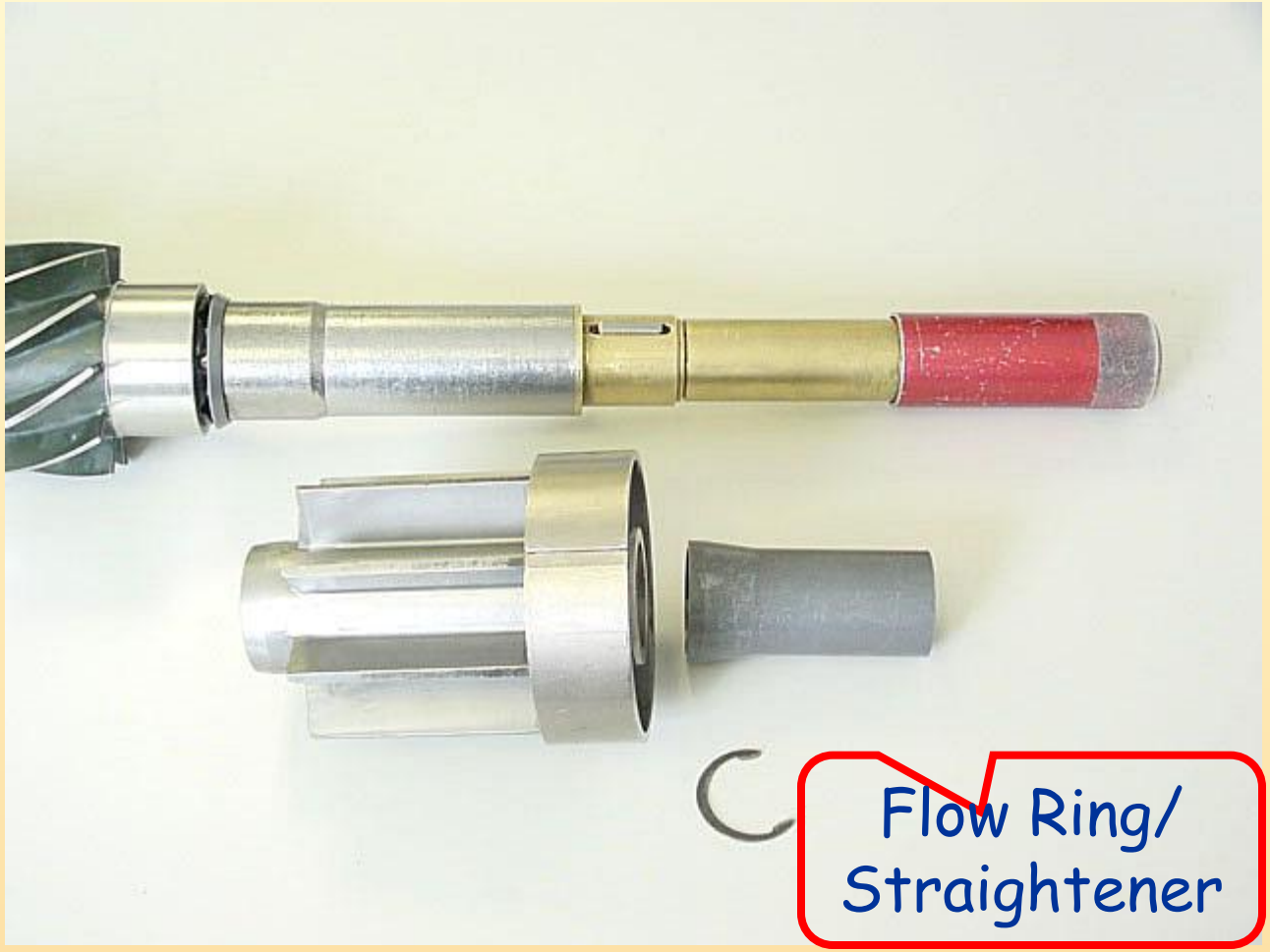
1200 and 650 Systems

- **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

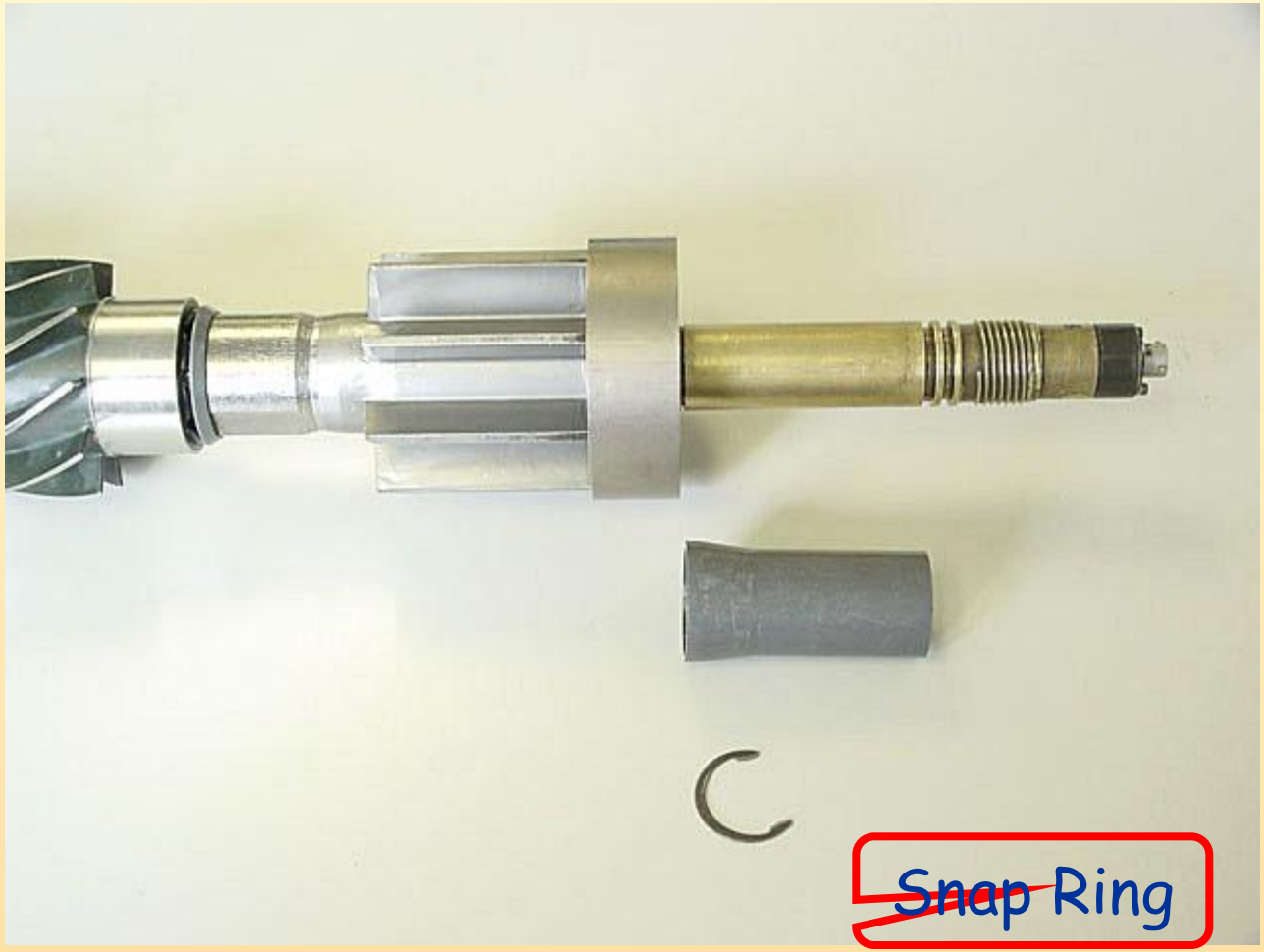
1200 and 650 Systems

- **The Snap Ring**

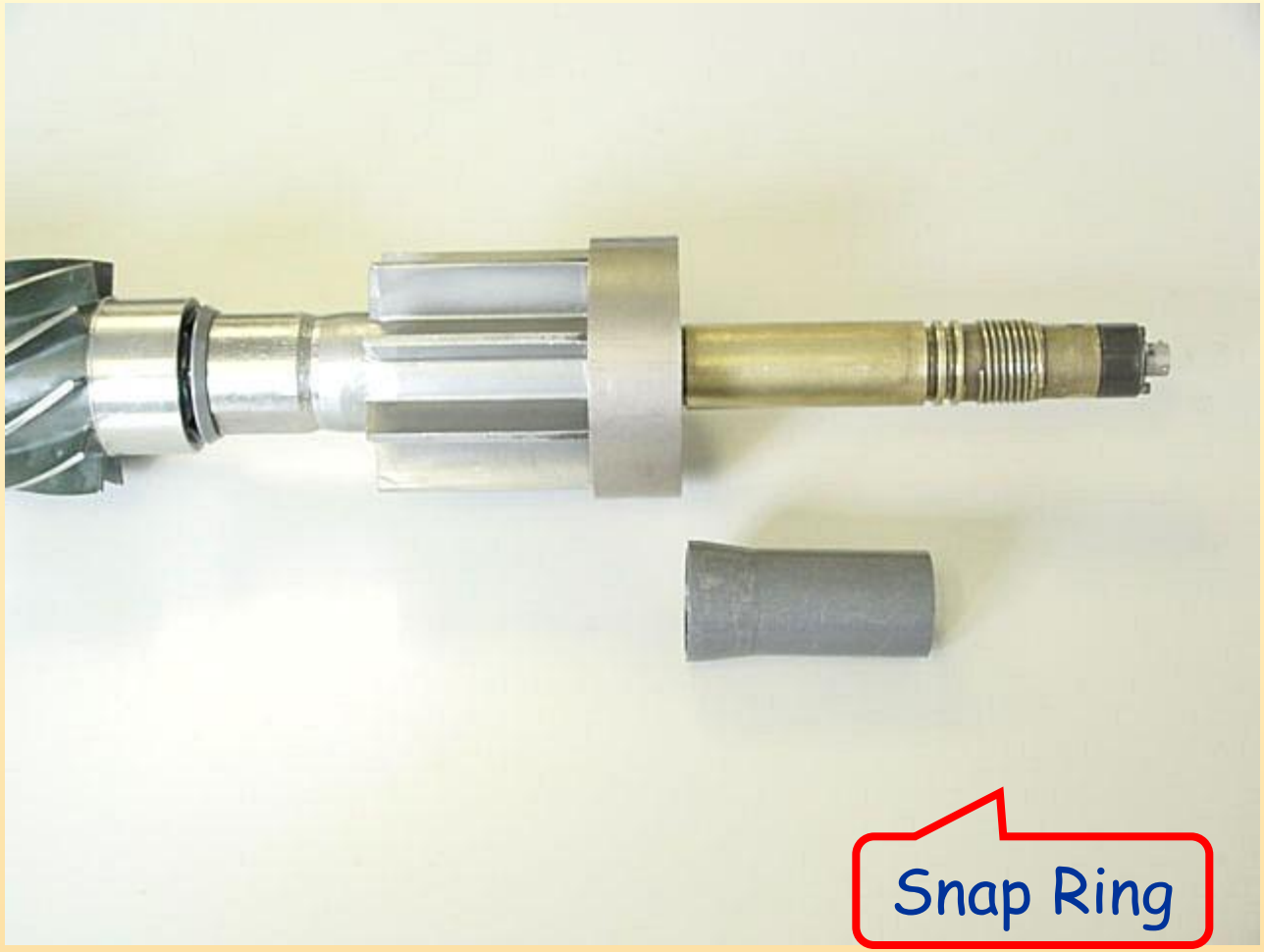
1200 and 650 Systems

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

1200 and 650 Systems



1200 and 650 Systems



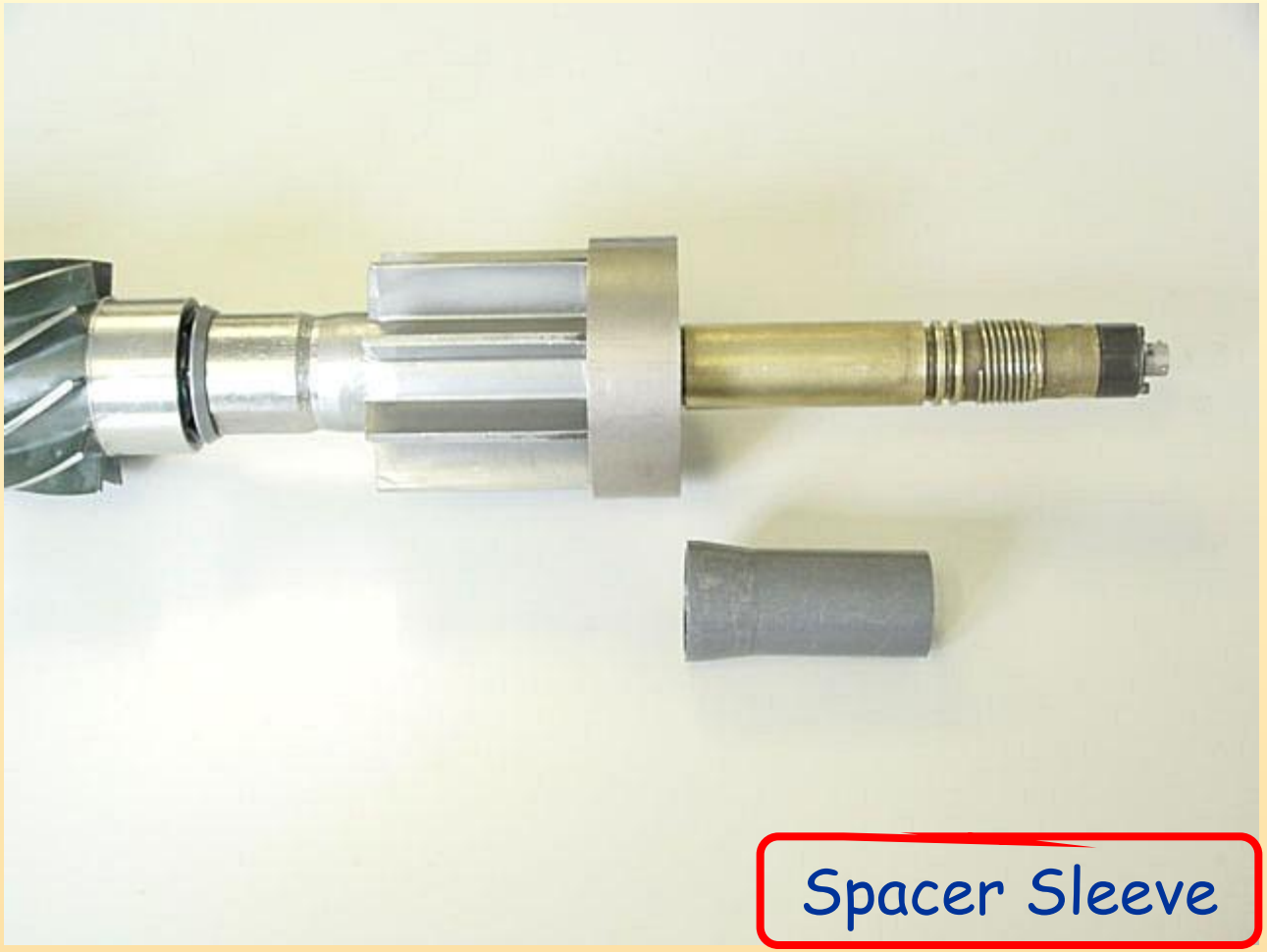
1200 and 650 Systems

- 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**