

# Air Turbine Start System Upgrade

for the UH/SH-60 and H-1 Helicopter Platforms

## Air Turbine Starter (PN 3505300-10) Starter Air Valve (PN 3213850-6)

Provides operators an optimized Air Turbine Start System with higher reliability, greater performance and reduced maintenance costs over the life cycle of the aircraft.



### Expertise

# 80%

of the World's Military and Commercial Aircraft use Honeywell Air Turbine Starters

We have pioneered virtually all Air Turbine Starter System technological advances

**160+**

Pneumatic Starter Models designed and produced since 1950

**200,000+**

Air Turbine Starters have been shipped

**140,000**

Daily main engine starts

**8 million+**

Starter operating hours logged per month

# Since 1938

Honeywell has been at the forefront of design and manufacturing of high performance pneumatic valves for aerospace applications

**1,500**

Pneumatic Valve Designs designed and produced by Honeywell

**200+ Applications**

Across military, commercial air transport, business and regional aircraft

**10+ years**

Demonstrated reliability of PN 3213850-6 Starter Air Valve on the S92 Helicopter

### Innovation

#### Air Turbine Starters

##### >14% Increased Light-off Torque

Imperative during engine start conditions with elevated resistance:

- Degraded aerodynamics
- Higher internal drag/resistance
- Colder temperatures



#### Quick Drain Oil Valve

- Allows maintainer to quickly and easily drain oil without removing starter from helicopter



#### Fill-to-Spill Oil Neck

- Ensures proper oil servicing every time; prevents overfilling the oil sump



#### Starter Configuration

- Redesigned lubrication system and output shaft
- Redesigned stator inlet duct
- Retains all safety features from previous design

#### Starter Air Valves



#### More Robust Design

- More compatible with high inlet temperatures and provides better support of steel duct clamps
- Addresses wear, corrosion and distortion failure modes associated with current valve



#### Increased Operational Capability

- Upgraded Position Indicator Switch is a more robust, high reliability design than current micro-switch
- Hermetically-sealed gold contact switch replaces silver contact position micro-switch
- Complies with explosive atmosphere test requirements and prevents oxidization at low currents



#### Excellent Wear Characteristics

- Provides excellent wear characteristics and low closing friction



#### High Inlet Temperatures

- Flow body and butterfly plate upgraded from Aluminum to Steel

### Proven Design

## Increased Mean Time Between Failure (MTBF)

Improved starter performance with lower cost of ownership:

**>4,000 hours** – Air Turbine Starter

Starter reliability proven over 4-year flight evaluation test

**>8,000 hours** – Starter Air Valve

Valve reliability proven over 10+ years flight operation



### Reduced Maintenance Costs



### Drop-in Replacement

No aircraft modifications required



### Global Service and Support Network

Knowledge and resources for all service needs – whenever and wherever maintenance and repair services are required