

MILITARY AIRCRAFT | F/A-18



# F/A-18

SUSTAINMENT SERVICES

MOOG



U.S. Navy photo/MC3 Wilyanna Harper

Moog Inc. is a worldwide designer, manufacturer, and integrator of precision motion control products and systems. Over the past 60 years, we have developed a reputation for delivering innovative solutions for the most challenging motion control applications. As a result, we have become a key supplier to the world's leading aircraft manufacturers and are positioned on virtually every platform in the marketplace – supplying reliable actuation systems that are highly supportable and add significant value for our customers.

A key element of our success has been our customer focus. With Moog, you will find a team of people ready to deliver quality products and support services, all while being flexible and responsive to your needs. Our superior products and services directly reflect the creativity, work ethic and remarkable attention to purpose of our people. We exhibit our commitment by supporting our products throughout the life cycle of a platform, from idea conception and design of original parts, to aftermarket support and service.

With Moog, you will find a wide spectrum of products, services and support from a dedicated and trustworthy organization. Our culture, coupled with our commitment to our customers, process control and product innovation, will continue to drive the success of our company and yours.

## SUPPORTING WORLDWIDE READINESS

Moog provides motion control systems to the world's most advanced aircraft, including the F/A-18 Leading Edge Flap Actuation System and Wingfold Mechanical Drive Group. We maintain our leadership position in the repair, overhaul and modification of the F/A-18 LEFAS and Wingfold Systems by providing the highest quality product support available.

## LEADING EDGE FLAP DRIVE SYSTEM (LEFDS) – TECHNICAL DESCRIPTION

The function of the leading edge flap mechanical drive group system is to position the leading edge flap panels in accordance with commands from the aircraft flight controls electronics set (FCES). The starboard and port systems operate independent of each other. With all hydraulic and electrical systems operating, the brake in the hydraulic drive unit (HDU) is disengaged. The FCES will signal the electrohydraulic servovalve (EHSV) to direct hydraulic power to the proper motor port, depending on the desired panel deflection direction. The hydraulic motor drives the HDU gearbox and all of the system torque transmission members to position the leading edge flaps. The flap transmissions act as both an actuator and a hinge. Position sensors in the HDU and asymmetry control unit indicate to the FCES when the panel has reached the desired position, and the FCES commands the EHSV to close. This cycle is repeated as frequently as necessary to achieve proper scheduling of the leading edge flaps.

## WINGFOLD TRANSMISSION UPGRADE PROGRAM

As a land and sea - based weapons system, the F/A-18 is deployed in a variety of challenging environmental and operational conditions. The current F/A-18A-D wingfold transmission has experienced corrosion in the lug bores and adjacent areas used for attachment to the inner and outer wing panels. Dissimilar metal contact wears away the protective cadmium plating in and around the lug bores.

Utilizing a more damage tolerant proprietary Low Hydrogen Embrittlement Cadmium electro-plating process and the installation of stainless steel bushings in all 76 lug bores, the Upgrade Program provides a transmission that is more tolerant to the operating environment (improved corrosion protection and wear resistance); has enhanced reliability, and will result in less frequent removal actions.

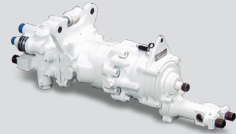


# THE F/A-18 LEADING EDGE FLAP DRIVE SYSTEM AND WINGFOLD MECHANICAL DRIVE GROUP



U.S. Navy Photographer/Liz Goettee

1



Hydraulic Drive Unit

2



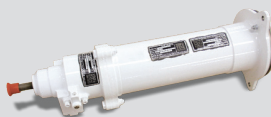
Torque Bar

3



Inboard Transmission Unit

4



Torque Limiter/Stop Module Retrofit

5



Torque Tube

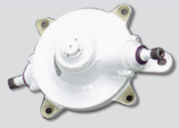
6



Bearing Support Unit



7



Geared Universal Joint

8



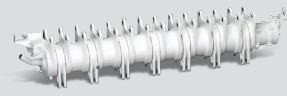
Outboard Transmission Unit

9



Assemetry Control Unit

10



Wingfold Transmission

11



Torque Shaft

12



Electric Drive Unit

\*F variant shown.

■ Wingfold Mechanical Drive Group Hardware

# MOOG HARDWARE FOR THE F-18 LEADING EDGE FLAP DRIVE SYSTEM

## F/A-18 C/D Aircraft

Part Number	NSN	Unit	Qty Per Shipset
2048130-1-1	1650-01-186-1672	Hydraulic Drive Unit	1
2022202-2-1	3010-01-190-3751	Inboard Angle Drive	2
2022182-2-1	3010-01-191-4377	Outboard Angle Drive	2
2022250-1-1	3130-01-131-7686	Bearing Support Unit	2
2022218-2-1	3130-01-135-9564	Bearing Support Unit	1
2022637-103	1680-01-540-1756	Torque Limiter (Inboard Transmission)	1
CA60722-001	1680-01-676-7664	Torque Limiter/Stop Module Retrofit	2
2022636-3-4	1680-01-240-5702	Left Hand Inboard Transmission	1
2022636-4-4	1680-01-236-4963	Right Hand Inboard Transmission	1
2048098-4-1	3040-01-186-1568	Torque Tube	1
2048098-5-1	3040-01-186-1569	Torque Tube	1
2048098-6-1	1680-01-186-1570	Torque Tube	2
2022620-2-3	6695-01-301-0814	Asymmetry Control Unit	2
2022638-2-2	1680-01-144-0225	Outboard Transmission	2
2022168-4-1	1680-01-144-0066	Stop Module	2
2022616-8-3	1680-01-424-3589	Torque Tube	2
2022616-9-2	3040-01-156-0828	Torque Tube	2
2022616-10-2	3040-01-156-0824	Torque Tube	2
2022400-2-1	3040-01-125-8352	Torque Bar	2
2022128-1-4	3010-01-447-4621	Wingfold Coupling	2

## F/A-18 E/F Aircraft

Part Number	NSN	Unit	Qty Per Shipset
2022250-1-1	3130-01-131-7686	Bearing Support Unit	2
2741152-3-3	2520-01-590-6296	Left Hand Inboard Transmission	1
2741152-4-3	2520-01-591-9736	Right Hand Inboard Transmission	1
2741154-1-1	5340-01-455-2531	Stop Module	2
2741158-2-2	3010-01-455-2527	Geared Universal Joint	2
2741160-3-1	2520-01-509-3311	Outboard Transmission	2
2741162-2-2	6695-01-486-0387	Asymmetry Control Unit	2
2741164-1-1	3040-01-455-2629	Telescoping Torque Tube	2
2741164-2-2	3040-01-455-2630	Torque Tube	4
2741296-1-1	3040-01-455-4487	Torque Shaft	2
2741434-3-4	1650-01-472-6137	Hydraulic Drive Unit/Servo Assembly	2

# MOOG HARDWARE FOR THE F-18 WINGFOLD MECHANICAL DRIVE GROUP

## F/A-18 C/D Aircraft

Part Number	NSN	Unit	Qty Per Shipset
2022308-7-5	1680-01-548-7754	Left Hand Wingfold Transmission	1
2022308-8-5	1680-01-548-7756	Right Hand Wingfold Transmission	1
2022190-4-1	1680-01-271-4485	Electric Drive Unit	2
2022186-1-1	3040-01-135-1354	Torque Shaft	2

## F/A-18 E/F Aircraft

Part Number	NSN	Unit	Qty Per Shipset
2741390-5-1	1680-01-518-1731	Left Hand Wingfold Transmission	1
2741390-6-1	1680-01-518-1734	Right Hand Wingfold Transmission	1
2741392-2-2	1680-01-455-2537	Electric Drive Unit	2
2741394-1-1	3040-01-455-2543	Torque Shaft	2
2741446-3-3	5895-01-518-1730	Left Hand Lock & Flag Unit	1
2741446-4-3	5895-01-507-0596	Right Hand Lock & Flag Unit	1



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