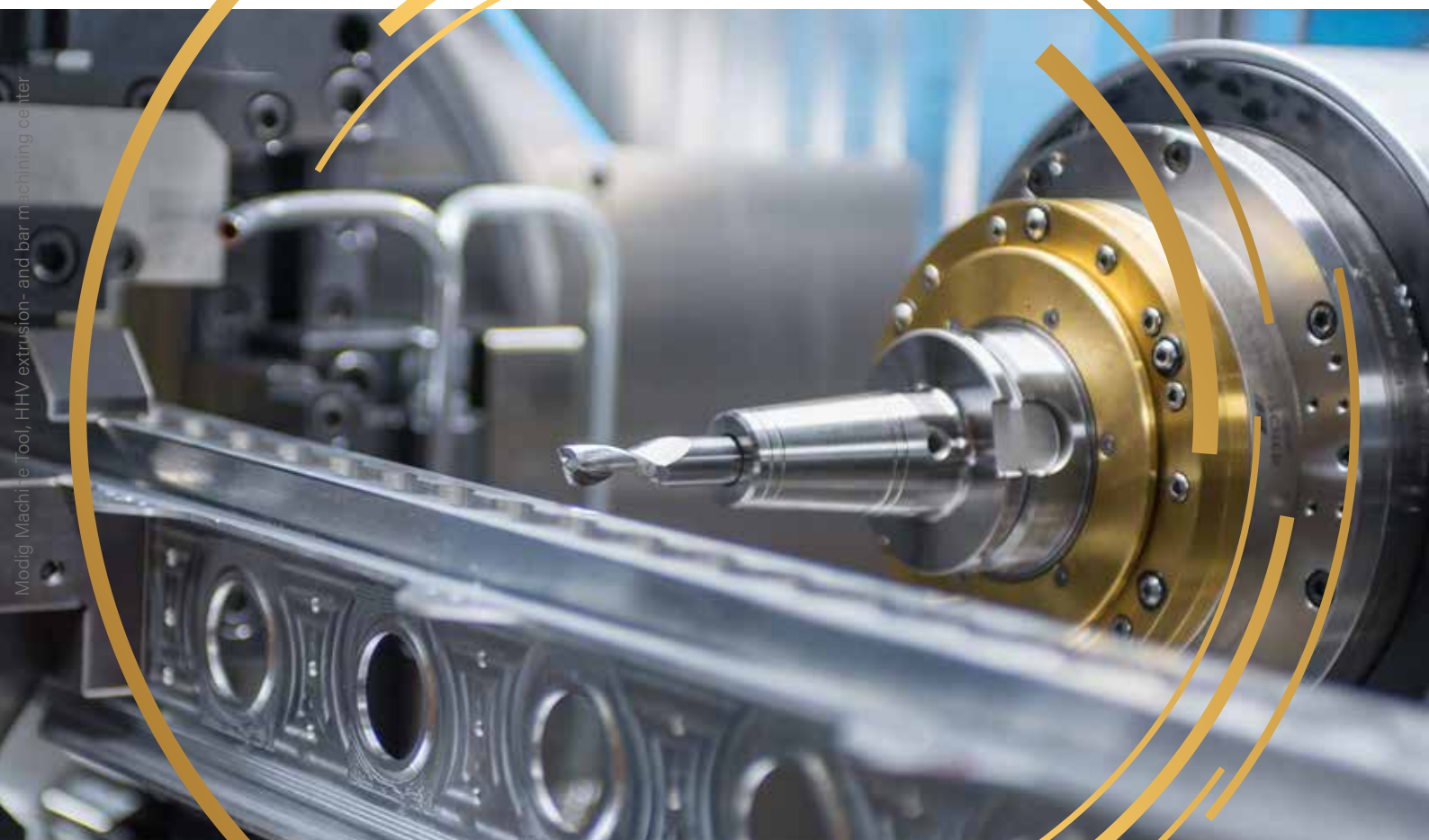


# AEROSPACE SPINDLES

**POWERFUL. ROBUST.**





# TECHNOLOGY LEADER

## FOR PRECISE, FAST AND POWERFUL ROTATION

We are the world leader in precise, fast and high-performance rotation. Our more than 85 years of experience is reflected in our technical innovations. As an international technology leader, we distinguish ourselves through our expertise in the areas of development, simulation, production and performance testing. Market leaders from all over the world rely on FISCHER products.

Leveraging our expertise, experience, and long-standing partnerships with major aerospace companies, we have developed a specialized spindle portfolio that precisely meets the unique and diverse requirements of the aerospace industry

Where maximum performance and precision are required, FISCHER motor spindles set new standards. Their high torque, robust bearings and exceptionally high power density combine dynamics and compactness – the ideal basis for high-performance milling heads and record-breaking machining processes. Their high rigidity and powerful motor enable machining at the highest level, even with materials that are difficult to machine.

# SPINDLE FEATURES

## CUSTOMER FOCUSED SOLUTIONS

### COMPOSITE MACHINING

Our technologies enable the milling, trimming and drilling of composite components. High-torque and high-speed: With grease-lubricated bearings, our spindles are ideal for oil-free CFRP machining.

### HIGH-PERFORMANCE MILLING

WORLD RECORD! FISCHER sets new standards in the aerospace industry. With a world record of 16.4 l/min, we offer maximum productivity – around the clock, 24/7. Our high-performance spindles, such as the HSK-A63 with up to 30'000 rpm and the HSK-A100 with up to 20'000 rpm, delivering an impressive 150 kW of S1 power.

### HIGH-TORQUE MILLING MACHINES FOR TURBINE BLADES

FISCHER offers high-performance solutions for the machining of turbine blades and blisk in aviation and power generation. Our spindles master difficult-to-machine materials such as titanium, Inconel and high-alloy steels with ultra-dynamic precision – even with long-cantilevered tools. With torques of up to 1'000 Nm, robust bearings and high rigidity at the tool interface, we guarantee maximum efficiency and reliability.

### RIVET HOLE DRILLING FOR AEROSPACE PARTS

FISCHER offers innovative solutions for drilling rivet holes in demanding applications. Our compact spindles with HSK-E32 interface or larger variants impress with high axial stiffness and integrated systems. Maximum precision and efficiency – perfectly tailored to the requirements of the aerospace industry.



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# AEROSPACE SPINDLES

## HIGHEST PERFORMANCE IN A COMPACT DESIGN

TYPE		MFW-1406/24	MFW-1704/15	MFW-1709/24	MFW-1709/24	MFW-1709/30
Outer diameter	D [mm]	140	170	170	170	170
Tool interface		HSK-E50	HSK-A63	HSK-A63	HSK-A63	HSK-A63
Max. speed	nmax [min <sup>-1</sup> ]	24'000	15'000	24'000	24'000	30'000
Lubrication		Grease	Grease	Grease	Grease	DLS
Direction of rotation		left & right	left & right	left & right	left & right	left & right

Power S1 / S6 40%	P [kW]	15.0 / 18.7	25.0 / 31.0	20.0 / 25.0	34.0 / 40.5	20.0 / 22.0
Torque S1 / S6 40%	M [Nm]	23.1 / 28.8	59.7 / 74.0	21.5 / 27.0	39.3 / 49.0	21.5 / 23.7
Nominal speed	nN [min <sup>-1</sup> ]	6'200	4'000	9'000	8'260	9'000
Motor frequency	[Hz]	800	1'000	800	800	1'000
Motor technology		SYN	SYN	ASYN	SYN	ASYN
Voltage	[V]	490	593	350	525	350
Current S1	[A]	60	83	56	83	56

Length	L [mm]	455	500.1	500.1	500.1	500.1
Weight	[kg]	38.0	55.0	52.0	56.0	51.0

Shaft cooling system		-	-	-	-	-
Coolant Through Unit		Yes	Yes	Yes	Yes	Yes
Encoder		Yes	Yes	Yes	Yes	Yes

Options						
Shaft clamping		-	-	-	-	-
Dilation sensor		Yes	Yes	Yes	Yes	Yes
Vibration sensor		Yes	Yes	Yes	Yes	Yes

Suitable milling head		-	D17	D17	D17	D17
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TYPE		MFW-2106/24	MFW-2310/30	MFW-2318/30	MFW-2303/10	MFW-2304/15
Outer diameter	D [mm]	210	230	230	230	230
Tool interface		HSK-A63	HSK-A63/80	HSK-A63/80	HSK-A100	HSK-A100
Max. speed	nmax [min <sup>-1</sup> ]	24'000	30'000	30'000	10'000	15'000
Lubrication		DLS	DLS	DLS	DLS	DLS
Direction of rotation		left & right	left & right	left & right	left & right	left & right

Power S1 / S6 40%	P [kW]	54.0 / 90.0	74.0 / 78.0	125.0 / 156.0	63.0 / 74.0	70.0 / 85.5
Torque S1 / S6 40%	M [Nm]	85.8 / 145.2	73.0 / 92.0	66.0 / 82.4	200.0 / 240.0	167.1 / 229.4
Nominal speed	nN [min <sup>-1</sup> ]	6'120	9'690	18'090	3'015	4'000
Motor frequency	[Hz]	1'200	1'000	1'000	667	750
Motor technology		ASYN	SYN	SYN	SYN	SYN
Voltage	[V]	420	617	598	588	779
Current S1	[A]	118	180	229	187	149

Length	L [mm]	593	581.2	581.8	606.8	606.8
Weight	[kg]	103.0	122.0	120.0	145.0	145.0

Shaft cooling system		-	-	-	-	-
Coolant Through Unit		Yes	Yes	Yes	Yes	Yes
Encoder		Yes	Yes	Yes	Yes	Yes

Options*						
Shaft clamping		-	-	-	-	-
Dilation sensor		Yes	Yes	Yes	Yes	Yes
Vibration sensor		Yes	Yes	Yes	Yes	Yes

Suitable milling head		D21	D23 coming soon	D23 coming soon	D23 coming soon	D23 coming soon
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\* The **dilation sensor** is a spindle-integrated length measuring sensor, which determines the axial shaft expansion and enables length compensation on the machine.

The **vibration sensor** integrated into the spindle can be used to detect imbalance and provides the signals essential for process and spindle monitoring.

MFW-1709/30	MFW-1718/30	MFW-1906/24	MFW-1920/30	MFW-2102/16	MFW-2102/20	MFW-2104/24
170	170	190	190	210	210	210
HSK-A63	HSK-A63	HSK-A63	HSK-A63	HSK-A63	HSK-A63	HSK-A63
30'000	30'000	24'000	30'000	20'000	20'000	24'000
DLS	DLS	DLS	DLS	Grease	DLS	DLS
left & right	left & right	left & right	left & right	left & right	left & right	left & right

34.0 / 40.5	42.0 / 55.0	42.0 / 50.0	63.0 / 81.0	25.0 / 31.0	25.0 / 31.0	29.0 / 38.0
39.3 / 49.0	22.5 / 29.4	66.9 / 83.8	30.7 / 39.5	119.4 / 148.0	119.4 / 148.0	69.2 / 90.7
8'260	18'000	6'000	19'800	2'000	2'000	4'170
1'000	1'000	1'200	1'000	800	1'000	800
SYN	ASYN	SYN	ASYN	SYN	SYN	ASYN
612	350	724	380	656	814	350
83	103	108	128	131	131	66

500.1	500.1	491.2	491.2	558.1	558.1	558.1
56.0	55.0	72.0	70.0	104.0	104.0	94.0

-	-	Yes	-	-	-	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes

-	-	-	-	-	-	-
Yes	Yes	Yes	Yes	Ja	Yes	Yes
Yes	Yes	Yes	Yes	Ja	Yes	Yes

D17	D17	D19	D19	D21	D21	D21
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MFW-2309/20	MFW-2314/20	MFW-2401/18	MFW-2702/08	MFW-2701/15	MFW-2715/20	MFW-3601/08
230	230	240	275	275	275	360
HSK-A100	HSK-A100	HSK-A63 HSK-A80	HSK-A100	HSK-A100	HSK-A100	HSK-A100 HSK-A125
20'000	20'000	18'000	8'000	15'000	20'000	8'000
DLS	DLS	DLS	DLS	DLS	DLS	DLS
left & right	left & right	left & right	left & right	left & right	left & right	left & right

85.0 / 97.8	125.0 / 156.3	20.0 / 22.0	93.0 / 106.0	63.0 / 82.0	150.0 / 187.0	100.0 / 123.0
77.0 / 96.3	86.7 / 108.4	166.1 / 182.7	444.0 / 614.0	300.8 / 391.6	96.0 / 119.0	1'001.1 / 1'239.1
10'540	13'770	1'260	2'000	2'100	15'000	975
667	667	600	667	1'000	667	533
SYN	SYN	ASYN	SYN	ASYN	SYN	ASYN
443	468	380	853	400	467	420
200	231	115	200	172	228	191

606.8	607	874.7	702.4	702.4	573	930
145.0	152.0	185.0	244.0	235.0	180.0	550.0

-	-	-	-	-	-	-
Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes

-	-	-	-	-	-	-
Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes

D23 coming soon	D23 coming soon	-	D27	D27	D27	-
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ASYN = Asynchronous motor  
SYN = Synchronous motor  
DLS = Direct Lubrication System  
CSC = Compact Shaft Cooling

Product overview not exhaustive. Other products / data on request.



# PERIPHERALS

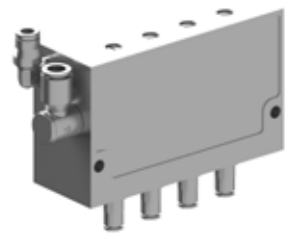
## PERFECT FOR YOUR SPINDLE



### Oil-air central lubrication unit

Pre-assembled central lubrication unit on aluminium base plate with the following components:

- Lubrication pump with level control
- Main shut-off valve
- Ultra-fine filter for oil
- Air treatment for central lubrication unit and sealing air



### Oil-air dosing unit

- Used for oil metering in spindles with oil-air bearing type
- 100 % tested and certified



### Exhaust air filter

- For collecting waste oil coming out of spindle oil return path
- Dampens the air noise of the lubrication system



### Frequency converter

The correct design of the converter is decisive for the smooth running, power development and heat generation of your spindle unit. FISCHER has been working closely with the leading converter manufacturers for years and regularly exchanges experience. As a result, we offer you optimum conditions when defining the inverter and are happy to support you in choosing the suitable supplier.



### Filter choke

When using pulse width modulating (PWM) frequency inverters in the low-cost price segment, the interposition of a motor choke is mandatory. The FISCHER test center supports you in the design of the motor choke.

The ideal frequency inverter/choke combination results in less heat loss in the rotor and stator and higher power output. Results were measured and documented on the FISCHER test bench.



### Operating fluids

Proven auxiliary and operating materials such as lubricating oil, hydraulic oil, coolant and coolant additives for maximum service life of FISCHER products.



### Accessories

Our accessories can be found on our website at: [www.fischerspindle.com/accessories](http://www.fischerspindle.com/accessories)

# SERVICE AND REPAIRS

## THE RIGHT OFFER FOR EVERY NEED

### SERVICE AND SUPPORT

- Support for commissioning of spindle systems
- Maintenance training and application consulting
- Service visits for minor repairs or optimizations
- Vibration and bearing analysis
- Individualized Trainings

### REPAIR OF FISCHER SPINDLES AND MILLING HEADS

- FISCHER Spindle Group has service centers and production facilities around the world
- Repair FISCHER spindles with original parts
- Refurbish key components as needed
- Bring spindle to like new condition
- Express repairs
- Repair of FISCHER milling heads

### THIRD PARTY SPINDLE REPAIRS

- We repair all brands of spindles in our worldwide group companies
- Analysis, repairs and retrofits of all your spindles
- FISCHER quality, service and advice
- All from one source

### SERVICES

#### Spindle hotel

Your spindle is stored at FISCHER and checked for proper function at regular intervals. The warranty begins with the call-off and delivery of the spindle.

#### Spindle pool for machine manufacturers

While your spindle is being repaired, you can benefit from one of our pool spindles. You can continue adding value without interruption and keep production going.

#### Exchange spindles for end customers

We offer exchange spindles available in short notice with your defective spindle. This depends on the spindle type and availability.

#### Spindle repair service

We offer a professional and binding repair service. On request we provide a detailed analysis of the defective spindle as well as individual quotations.

#### Spindle Taxi

Your spindle will be picked up free of charge in Europe.

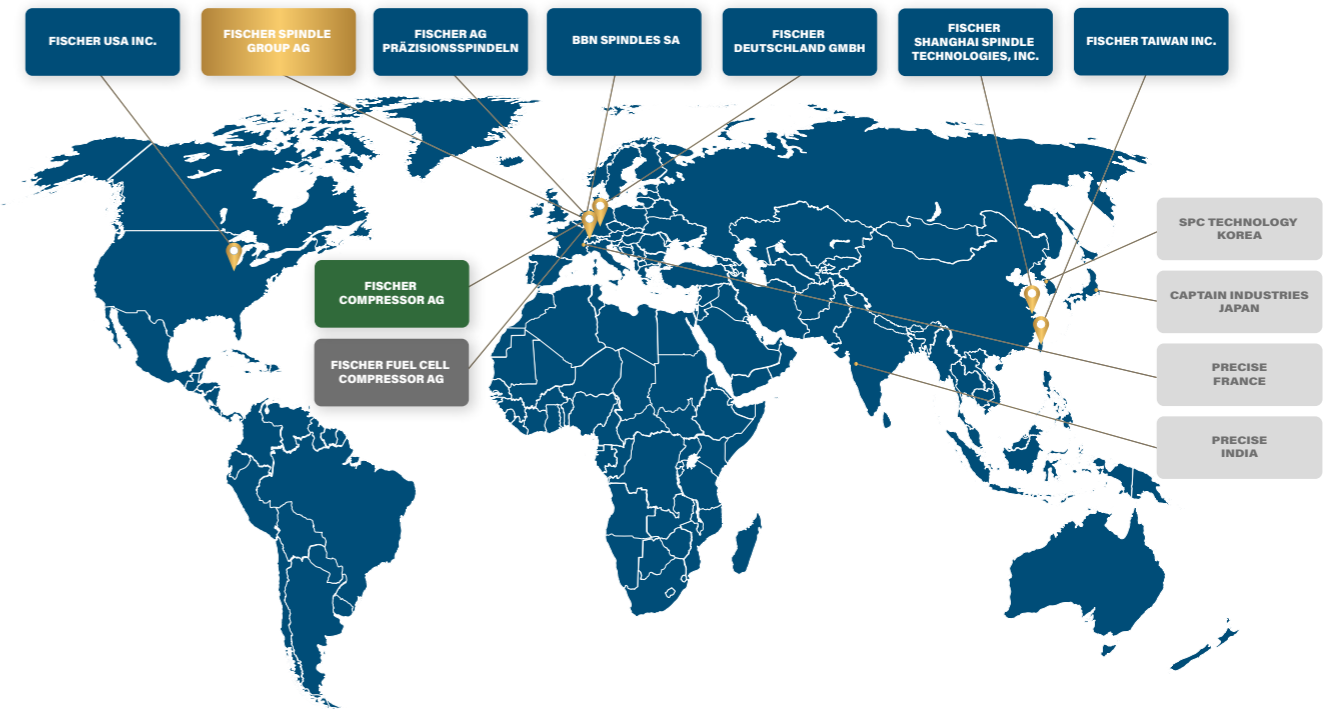
#### Spindle periphery

We support you in the selection and design of the appropriate periphery for a safe operation of the spindle.

# LOCATIONS WORLDWIDE

## OF THE FISCHER GROUP

The FISCHER family is present at six locations worldwide and employs over 450 people. A strong global team with the greatest enthusiasm for technology, ensuring customer satisfaction through successful, innovative products and outstanding service.



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**Precision.**



**Speed.**



**Power.**

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