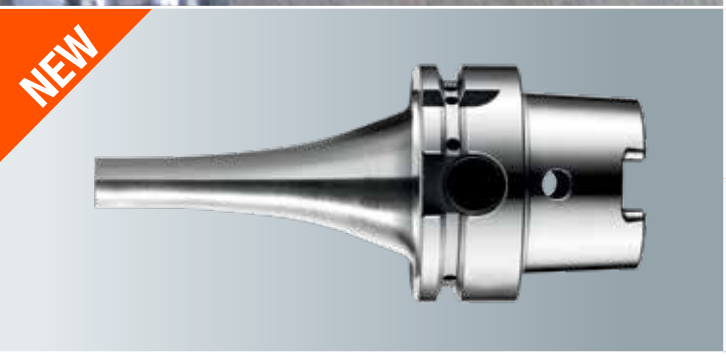
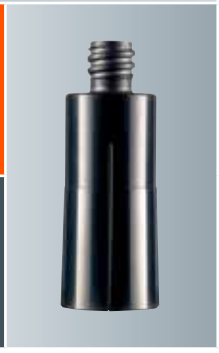
EMUGE FRANKEN

NEW
Micro Models
+ Fine Balancing Holes

NEW





FRANKEN

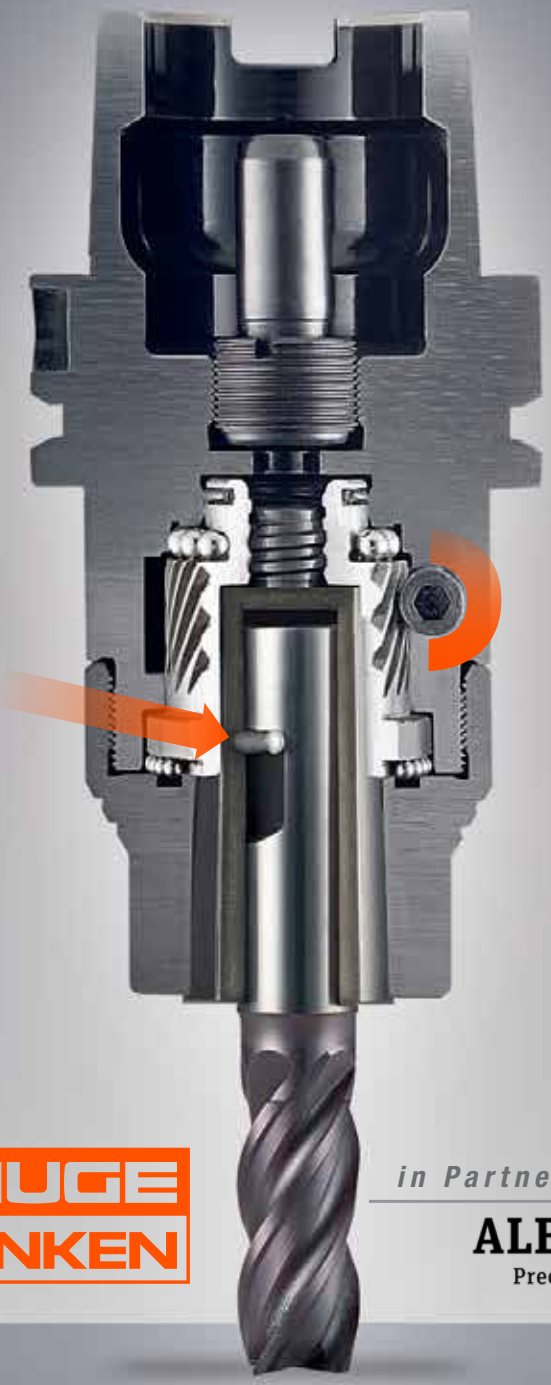
HIGH PRECISION
FPC MILLING/DRILLING CHUCKS

Introducing the
Ultimate Precision Chuck

1. World's only chuck with 1:16 worm gear, a patented design delivering 3 tons of traction force.

2. Optimal Pull-Out Protection via optional Pin-Lock Collet System.

3. High rigidity. Patented design and body provides 100% holding power.



4. Mechanical drive actuated with a hex wrench. Simple design, highly accurate.

5. Maximum dampening. Collet-cone assembly absorbs virtually all vibration.

EMUGE FRANKEN

in Partnership with

ALBRECHT
Precision Chucks

New Emuge high precision/performance FPC Mill/Drill Chucks provide unprecedented rigidity, vibration dampening, concentricity, machining speed, and tool life vs. conventional chuck technologies for milling and drilling applications. Available in a wide range of styles. Internal and peripheral coolant options, and MQL-adaptable.

Increase your machining speed and tool life to the highest possible levels.

Emuge FPC Chuck Advantages:

- **Reliability**
  Extremely high transferable torque provides maximum process reliability.
- **More accurate**
  With a 3XD tool length, concentricity is ≤ 3 µm, guaranteeing long tool life and quality surface finishes.
- **Longer tool life**
  Special holder design reduces vibration, dramatically improving work piece surface finishes and providing exceptionally long tool life.
- **Fast tool change**
  Simple, highly accurate design enables quick tool change in seconds, via hex wrench.

The Fastest Chuck in the West, east, north, and south.

In a speed comparison with four chuck technologies, using a 16mm end mill in the same material, the Emuge FPC Chuck is the clear winner.

Emuge FPC Chucks provide the longest tool life and highest safety compared to conventional technologies.

Emuge FPC Chucks – unbeatable performance, exceptionally long tool life.

Weldon
One-sided wear

Hydraulic
Large nicks

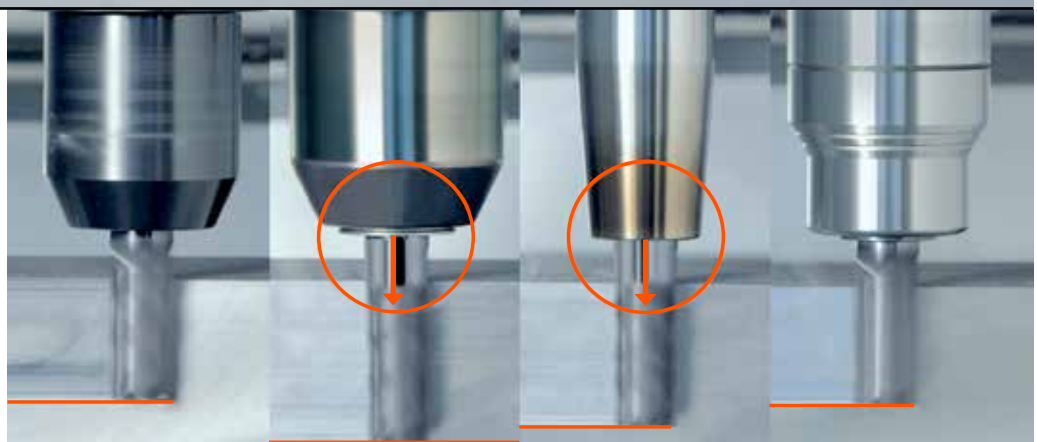
Shrink Fit
Micro nicks

Emuge FPC Chuck
No nicks and minimal rounding

Test using 4-fluted end mill with identical material, machining speed and other parameters.

Emuge FPC Chucks – a Safe Bet.

Strong holding force via collet and taper assembly.



Weldon

Safe clamping but minimal vibration dampening and poor runout.

Hydraulic
Possible pull-out

Soft clamping allows for higher deflection at high feed rates. No pull-out protection.

Shrink Fit
Possible pull-out

Clamping force dependent on tool shank tolerance. Limited vibration dampening.

Emuge FPC Chuck

Strong clamping force via collet and taper assembly and Pin-Lock System ***provides guaranteed holding power and pull-out protection.***

- Taper shank acc. ASME B5.50-2009
- Taper quality AT3
- Concentricity ≤ 3 µm at projection length of 3 x dia.
- Internal coolant supply

CAT

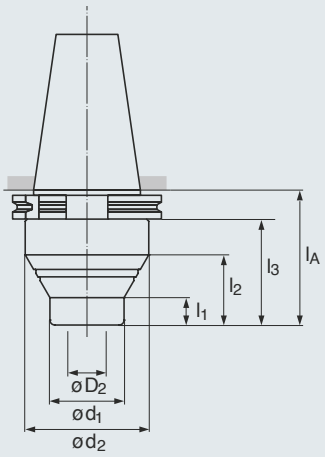
FPC

≤3µm

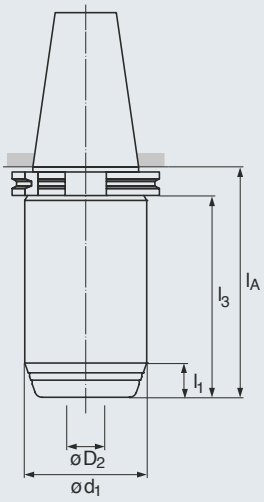
AT3

G2.5
20,000 min-1

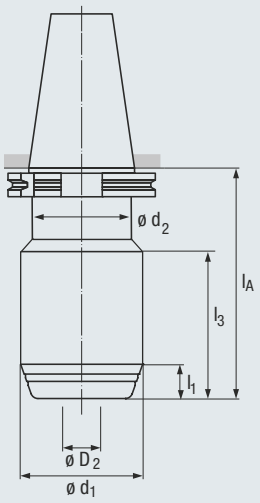
Design A



Design B



Design C



Icon descriptions (see page 21)

CAT 40

SIZE	D2 (Range)		Design	d_1	d_2	l_1	l_2	l_3	l_A	EDP no.
FPC14	1/8" - 9/16"	2 mm - 14 mm	A	30	50	11	28	43	62	6494.401406*
FPC14	1/8" - 9/16"	2 mm - 14 mm	A	30	50	61	78	93	112	6494.401411
FPC14	1/8" - 9/16"	2 mm - 14 mm	A	30	50	85	103	129	148	6494.401414*
FPC20	1/8" - 3/4"	2 mm - 20 mm	A	40	50	20	28	43	62	6494.402006*
FPC20	1/8" - 3/4"	2 mm - 20 mm	A	40	50	69	78	93	112	6494.402011*
FPC20	1/8" - 3/4"	2 mm - 20 mm	A	40	50	94	103	129	149	6494.402014
FPC25	5/8" - 1 1/4"	16 mm - 32 mm	C	63	50	14	-	61	102	6494.402510

CAT 50

SIZE	D2 (Range)		Design	d_1	d_2	l_1	l_2	l_3	l_A	EDP no.
FPC20	1/8" - 3/4"	2 mm - 20 mm	A	40	63	18	38	43	62	6494.502006
FPC20	1/8" - 3/4"	2 mm - 20 mm	A	40	63	84	104	129	149	6494.502014
FPC25	5/8" - 1 1/4"	16 mm - 32 mm	B	70	-	15	-	83	102	6494.502510

NOTE: Mechanical drive torque wrench must be set at max. 10 Nm / 7.38 ft-lbs

FPC Collets and Accessories (see pages 16, 17 and 19, please order separately)

Pull stud threads are UNC standard

*** Caution: tool does not have a safety zone.**
Be sure to check for tool changer interference before using.

- Taper shank acc. ASME B5.50-2009
- Taper quality AT3
- Concentricity ≤ 3 µm at projection length of 3 x dia.
- Internal coolant supply

CAT

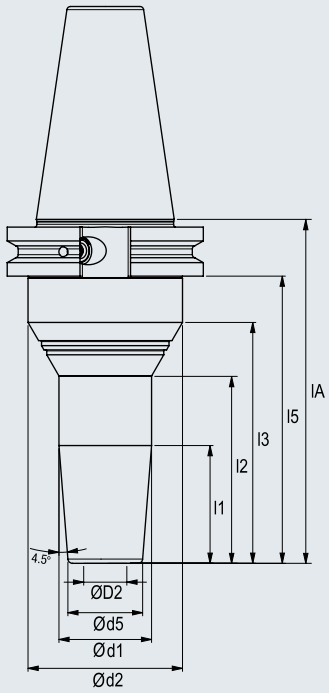
Slim line

FPC

≤3µm

AT3

G2.5
20,000 min-1



Slim Line Design
Ideal for 5-Axis

Icon descriptions (see page 21)

CAT 40 SLIM LINE

SIZE	D2 (Range)		d_1	d_2	d_5	l_1	l_2	l_3	l_5	l_A	EDP no.
FPC14	**1/8" - 9/16"**	**2 mm - 14 mm**	30	50	24	38	61	78	93	112	**6494S.401411**

NOTE: Mechanical drive torque wrench must be set at max. 10 Nm / 7.38 ft-lbs

FPC Collets and Accessories (see pages 16, 17 and 19, please order separately)

- Hollow taper shank acc. DIN 69893-1
- Concentricity ≤ 3 µm at projection length of 3 x dia.
- Internal coolant supply

NEW
with Fine Balancing Holes

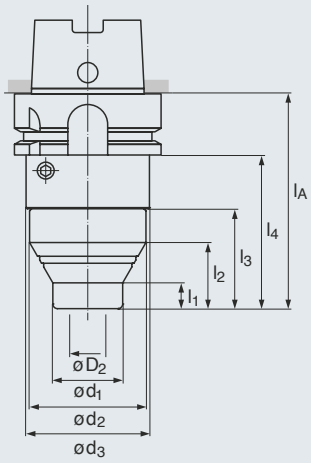
HSK-A

FPC

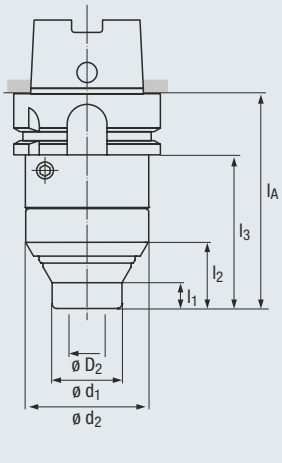
≤3µm

G2.5
20,000 min^{-1}

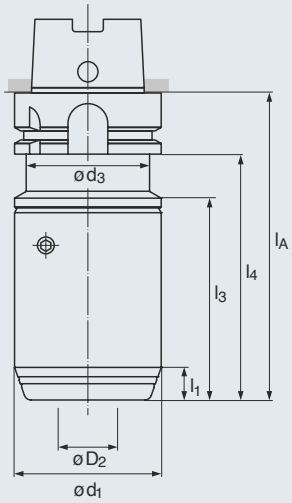
Design A



Design B



Design C



Icon descriptions (see page 21)

HSK-A63 – NEW Fine Balancing Holes with 6xM6 Threads

SIZE	D2 (Range)		Design	d_1	d_2	d_3	l_1	l_2	l_3	l_4	l_A	EDP no.
FPC14	1/8" - 9/16"	2 mm - 14 mm	A	30	50	53	11	28	43	66	92	6476.631409
FPC14	1/8" - 9/16"	2 mm - 14 mm	A	30	50	53	61	78	93	116	142	6476.631414
FPC14	1/8" - 9/16"	2 mm - 14 mm	A	30	50	53	85	103	129	152	178	6476.631417
FPC20	1/8" - 3/4"	2 mm - 20 mm	B	40	53	-	20	31	66	-	92	6476.632009
FPC20	1/8" - 3/4"	2 mm - 20 mm	B	40	53	-	69	81	116	-	142	6476.632014
FPC20	1/8" - 3/4"	2 mm - 20 mm	B	40	53	-	94	105	152	-	178	6476.632017
FPC25	5/8" - 1 1/4"	16 mm - 32 mm	C	63	-	53	14	-	87	106	132	6476.632513

HSK-A80 – NEW Fine Balancing Holes with 6xM6 Threads

SIZE	D2 (Range)		Design	d_1	d_2	d_3	l_1	l_2	l_3	l_4	l_A	EDP no.
FPC20	1/8" - 3/4"	2 mm - 20 mm	B	40	63	-	18	38	72	-	98	6476.802009
FPC25	5/8" - 1 1/4"	16 mm - 32 mm	C	63	-	-	14	-	-	111	137	6476.802513

HSK-A100 – NEW Fine Balancing Holes with 6xM6 Threads

SIZE	D2 (Range)		Design	d_1	d_2	d_3	l_1	l_2	l_3	l_4	l_A	EDP no.
FPC20	1/8" - 3/4"	2 mm - 20 mm	A	40	63	70	18	38	43	71	100	6476.102010
FPC20	1/8" - 3/4"	2 mm - 20 mm	A	40	63	70	48	68	93	121	150	6476.102015
FPC20	1/8" - 3/4"	2 mm - 20 mm	A	40	63	70	84	104	129	157	186	6476.102018
FPC25	5/8" - 1 1/4"	16 mm - 32 mm	C	70	-	-	15	-	-	110	139	6476.102513

HSK-F63 – NEW Fine Balancing Holes with 6xM6 Threads

SIZE	D2 (Range)		Design	d_1	d_2	d_3	l_1	l_2	l_3	l_4	l_A	EDP no.
FPC20	1/8" - 3/4"	2 mm - 20 mm	B	40	53	-	20	31	66	-	92	6478.632009

NOTE: Mechanical drive torque wrench must be set at max. 10 Nm / 7.38 ft-lbs

FPC Collets and Accessories (see pages 16, 17 and 19, please order separately)

Coolant tubes and assembly wrenches available upon request

- Hollow taper shank acc. DIN 69893-1
- Slim line for 5-Axis operation
- Concentricity ≤ 3 µm at projection length of 3 x dia.
- Internal coolant supply

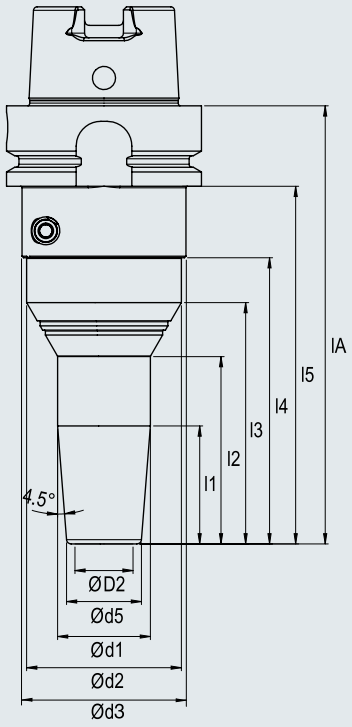
HSK-A

Slim line

FPC

≤3µm

G2.5
20,000 min^{-1}



NEW
with Fine Balancing Holes

Slim Line Design
Ideal for 5-Axis

Icon descriptions (see page 21)

HSK-A 63 SLIM LINE – NEW Fine Balancing Holes with 6xM6 Threads

SIZE	D2 (Range)		d_1	d_2	d_3	d_5	l_1	l_2	l_3	l_4	l_5	l_A	EDP no.
FPC14	**1/8" - 9/16"**	**2 mm - 14 mm**	30	50	53	24	38	–	56	71	94	120	**6476S.631412**
FPC14	**1/8" - 9/16"**	**2 mm - 14 mm**	30	50	53	24	38	61	78	93	116	142	**6476S.631414**

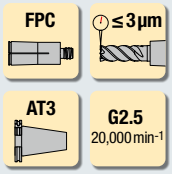
NOTE: Mechanical drive torque wrench must be set at max. 10 Nm / 7.38 ft-lbs

FPC Collets and Accessories (see pages 16, 17 and 19, please order separately)

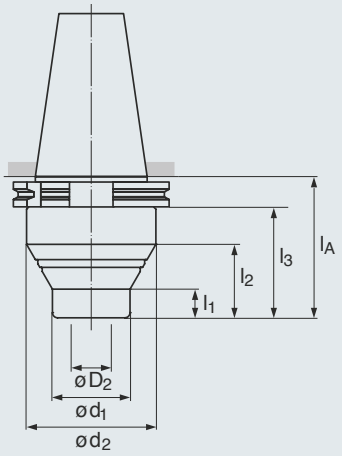
Coolant tubes and assembly wrenches available upon request

- ISO taper shank acc. DIN ISO 7388-1 (formerly DIN 69871)
- Taper quality AT3
- Concentricity ≤ 3 µm at projection length of 3 x dia.
- Internal coolant supply

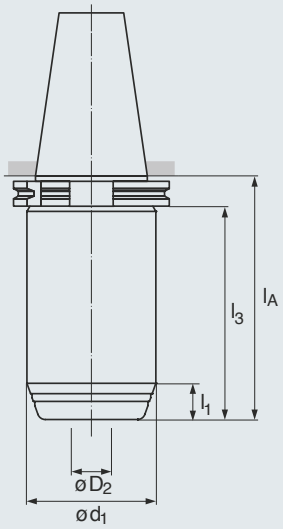
SK (ISO)



Design A



Design B



Icon descriptions (see page 21)

SK30

SIZE	D2 (Range)		Design	d_1	d_2	l_1	l_2	l_3	l_A	EDP no.
FPC14	1/8" - 9/16"	2 mm - 14 mm	A	30	53	11	28	73	92	6491.301409
FPC20	1/8" - 9/16"	2 mm - 20 mm	A	40	53	20	28	73	92	6491.302009

SK40

SIZE	D2 (Range)		Design	d_1	d_2	l_1	l_2	l_3	l_A	EDP no.
FPC14	1/8" - 9/16"	2 mm - 14 mm	A	30	50	11	28	43	62	6491.401406
FPC14	1/8" - 9/16"	2 mm - 14 mm	A	30	50	61	78	93	112	6491.401411
FPC14	1/8" - 9/16"	2 mm - 14 mm	A	30	50	85	103	129	149	6491.401414
FPC20	1/8" - 3/4"	2 mm - 20 mm	A	40	50	20	28	43	63	6491.402006
FPC20	1/8" - 3/4"	2 mm - 20 mm	A	40	50	69	78	93	112	6491.402011
FPC20	1/8" - 3/4"	2 mm - 20 mm	A	40	50	94	103	129	149	6491.402014
FPC25	5/8" - 1 1/4"	16 mm - 32 mm	B	63	-	14	-	83	102	6491.402510*

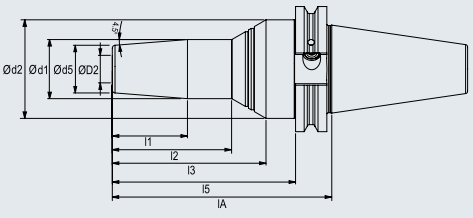
*** Caution: tool does not have a safety zone. Be sure to check for tool changer interference before using.**

SK50

SIZE	D2 (Range)		Design	d_1	d_2	l_1	l_2	l_3	l_A	EDP no.
FPC20	1/8" - 3/4"	2 mm - 20 mm	A	40	63	18	38	43	62	6491.502006
FPC20	1/8" - 3/4"	2 mm - 20 mm	A	40	63	84	104	129	149	6491.502014
FPC25	5/8" - 1 1/4"	16 mm - 32 mm	B	70	-	15	-	83	102	6491.502510

SK (ISO)

Slim line



Slim Line Design
Ideal for 5-Axis

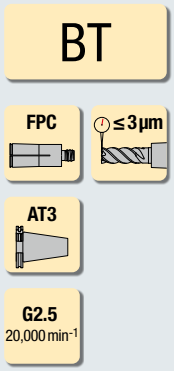
SK40 & SK50 SLIM LINE

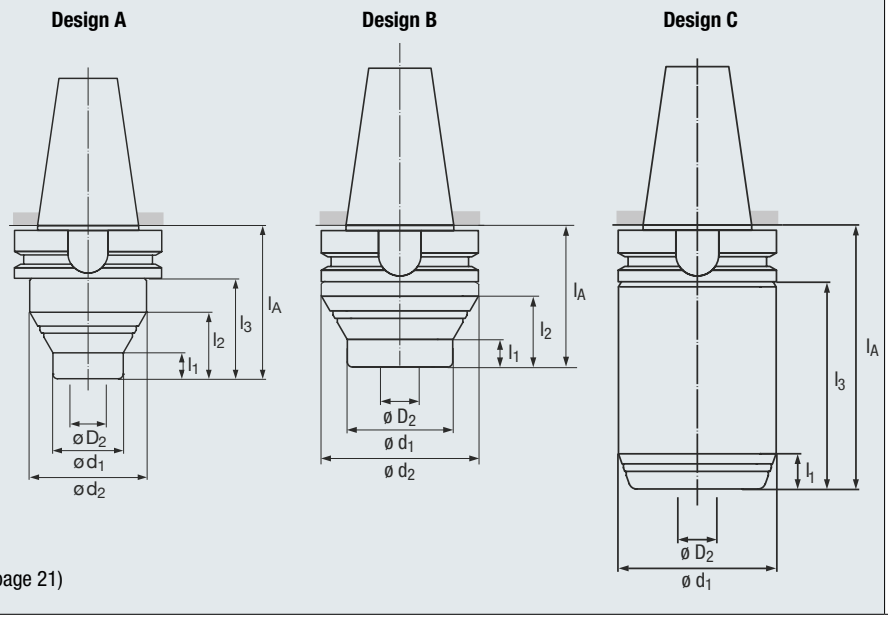
SIZE	D2 (Range)		d_1	d_2	d_5	l_1	l_2	l_3	l_5	l_A	EDP no.
FPC14 SK40	1/8" - 9/16"	2 mm - 14 mm	30	50	24	38	–	56	71	91	6491S.401409
FPC14 SK50	1/8" - 9/16"	2 mm - 14 mm	30	50	24	38	61	78	93	112	6491S.401411

NOTE: Mechanical drive torque wrench must be set at max. 10 Nm / 7.38 ft-lbs

FPC Collets and Accessories (see pages 16, 17 and 19, please order separately). Pull stud threads are metric and available upon request.

- ISO taper shank acc. DIN ISO 7388-2 (formerly JIS B 6339 / MAS 403 BT)
- Taper quality AT3
- Concentricity ≤ 3 µm at projection length of 3 x dia.
- Internal coolant supply





Icon descriptions (see page 21)

BT30

SIZE	D2 (Range)	Design	d_1	d_2	l_1	l_2	l_3	l_A	EDP no.
FPC14	1/8" - 9/16" 2 mm - 14 mm	A	30	53	11	28	56	82	6493.301408
FPC20	1/8" - 3/4" 2 mm - 20 mm	A	40	53	20	31	56	82	6493.302008

BT40

SIZE	D2 (Range)	Design	d_1	d_2	l_1	l_2	l_3	l_A	EDP no.
FPC14	1/8" - 9/16" 2 mm - 14 mm	A	30	50	11	28	43	70	6493.401407
FPC14	1/8" - 9/16" 2 mm - 14 mm	A	30	50	61	78	93	120	6493.401412
FPC14	1/8" - 9/16" 2 mm - 14 mm	A	30	50	85	103	129	156	6493.401415
FPC20	1/8" - 3/4" 2 mm - 20 mm	B	40	63	18	38	-	70	6493.402007
FPC20	1/8" - 3/4" 2 mm - 20 mm	B	40	63	48	68	-	120	6493.402012
FPC20	1/8" - 3/4" 2 mm - 20 mm	B	40	63	84	104	-	156	6493.402015
FPC25	5/8" - 1 1/4" 16 mm - 32 mm	C	63	-	14	-	-	110	6493.402511

BT50

SIZE	D2 (Range)	Design	d_1	d_2	l_1	l_2	l_3	l_A	EDP no.
FPC20	1/8" - 3/4" 2 mm - 20 mm	A	40	63	18	38	43	81	6493.502008
FPC20	1/8" - 3/4" 2 mm - 20 mm	A	40	63	84	104	129	167	6493.502016
FPC25	5/8" - 1 1/4" 16 mm - 32 mm	C	70	-	15	-	83	121	6493.502512

NOTE: Mechanical drive torque wrench must be set at max. 10 Nm / 7.38 ft-lbs

FPC Collets and Accessories (see pages 16, 17 and 19, please order separately)

Pull stud threads are metric and available upon request

- ISO taper shank acc. DIN ISO 7388-2 (formerly JIS B 6339 / MAS-403BT)
- Slim line for 5-Axis operation
- Concentricity ≤ 3 µm at projection length of 3 x dia.
- Internal coolant supply

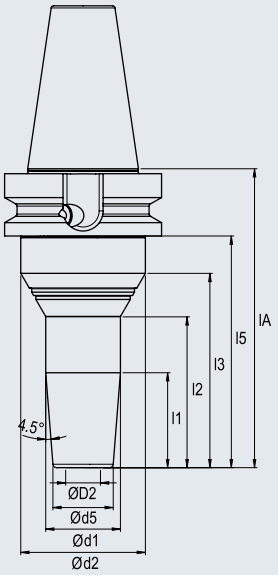
BT

Slim line

FPC ≤3µm

G2.5 20,000 min^{-1}

Icon descriptions (see page 21)



Slim Line Design
Ideal for 5-Axis

BT40 SLIM LINE*

SIZE	D2 (Range)		d_1	d_2	d_5	l_1	l_2	l_3	l_5	l_A	EDP no.
FPC14	1/8" - 9/16"	2 mm - 14 mm	30	50	24	38	–	56	71	98	6493S.401409
FPC14	1/8" - 9/16"	2 mm - 14 mm	30	50	24	38	61	78	93	120	6493S.401412

NEW

- Polygon shank acc. ISO 25623-1
- Slim line for 5-axis operation
- Concentricity ≤ 3 µm at projection length of 3 x dia.
- Internal coolant supply

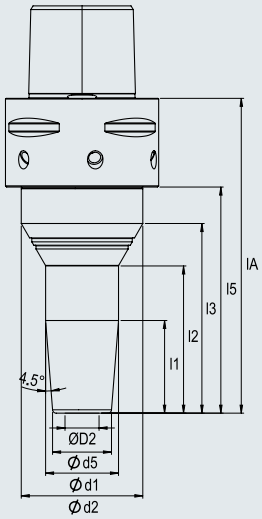
PSC

Slim line

FPC ≤3µm

G2.5 20,000 min^{-1}

Icon descriptions (see page 21)



Slim Line Design
Ideal for 5-Axis

PSC63 SLIM LINE – NEW Fine Balancing Holes with 6xM6 Threads

SIZE	D2 (Range)		d_1	d_2	d_5	l_1	l_2	l_3	l_5	l_A	EDP no.
FPC14	1/8" - 9/16"	2 mm - 14 mm	30	50	24	38	–	56	71	108	6496S.061410
FPC14	1/8" - 9/16"	2 mm - 14 mm	30	50	24	38	61	78	93	130	6477S.061413

NOTE: Mechanical drive torque wrench must be set at max. 10 Nm / 7.38 ft-lbs

FPC Collets and Accessories (see pages 16, 17 and 19, please order separately)

Coolant tubes and assembly wrenches available upon request

* Pull stud threads are metric and available upon request

- Polygon shank acc. ISO 26623-1
- Concentricity ≤ 3 µm at projection length of 3 x dia.
- Internal coolant supply

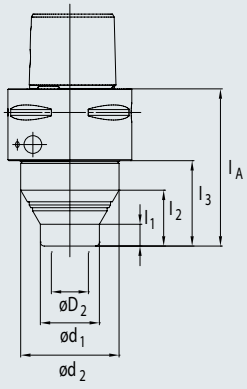
NEW
with Fine Balancing Holes

PSC

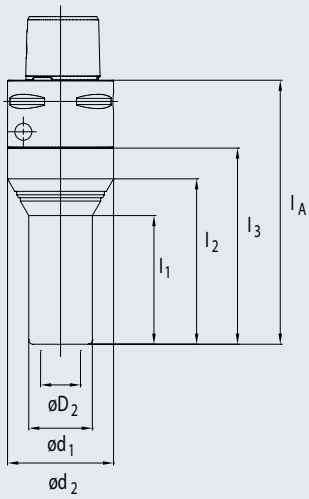
≤ 3 µm

G2.5
20,000 min^{-1}

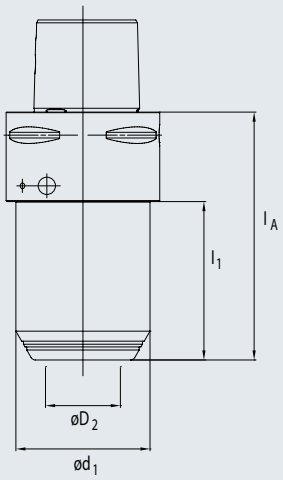
Design A



Design B



Design C



Icon descriptions (see page 21)

C5

SIZE	D2 (Range)		Design	d_1	d_2	l_1	l_2	l_3	l_A	EDP no.
FPC14	1/8" - 9/16"	2 mm - 14 mm	A	30	53	61	78	93	127	6496.051412
FPC20	1/8" - 3/4"	2 mm - 20 mm	B	40	53	20	31	-	78	6496.052007

C6 – NEW Fine Balancing Holes with 6xM6 Threads

SIZE	D2 (Range)		Design	d_1	d_2	l_1	l_2	l_3	l_A	EDP no.
FPC14	1/8" - 9/16"	2 mm - 14 mm	A	30	50	11	28	43	80	6477.061408
FPC14	1/8" - 9/16"	2 mm - 14 mm	A	30	50	61	78	93	130	6477.061413
FPC14	1/8" - 9/16"	2 mm - 14 mm	A	30	50	85	103	129	166	6477.061416
FPC20	1/8" - 3/4"	2 mm - 20 mm	B	40	63	18	38	-	80	6477.062008
FPC20	1/8" - 3/4"	2 mm - 20 mm	B	40	63	48	68	-	130	6477.062013
FPC20	1/8" - 3/4"	2 mm - 20 mm	B	40	63	84	104	-	166	6477.062016
FPC25	5/8" - 1 1/4"	16 mm - 32 mm	C	63	-	-	-	-	119	6477.062511

C8 – NEW Fine Balancing Holes with 6xM6 Threads

SIZE	D2 (Range)		Design	d_1	d_2	l_1	l_2	l_3	l_A	EDP no.
FPC20	1/8" - 3/4"	2 mm - 20 mm	B	40	63	18	38	43	90	6477.082009
FPC20	1/8" - 3/4"	2 mm - 20 mm	B	40	63	48	68	93	140	6477.082014
FPC25	5/8" - 1 1/4"	16 mm - 32 mm	C	70	-	83	-	-	129	6477.082512

NOTE: Mechanical drive torque wrench must be set at max. 10 Nm / 7.38 ft-lbs

FPC Collets and Accessories (see pages 16, 17 and 19, please order separately)

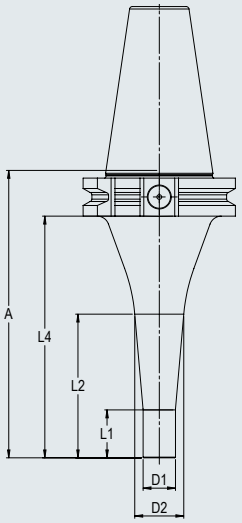
- ASME B5.50-2009
- Slim design for hard to access areas
- High gripping torque and accuracy
- Special coated collets
- Operation from behind with included hex-key

CAT

Micro

≤3µm G2.5 20,000 min^{-1}

Icon descriptions (see page 21)



NEW
Micro Chucks

CAT MICRO

SIZE	Tool Shank Diameter Range	Design	d_1	d_2	l_1	l_2	l_4	A	EDP no.
CAT40	**1 mm - 6 mm**	A/AD	13.5	16.6	20	38	71	90	**6394.400609**
CAT40	**1 mm - 6 mm**	A/AD	13.5	20.5	20	60	101	120	**6394.400612**

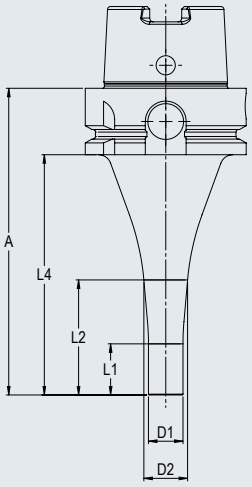
- DIN 69893
- Slim design for hard to access areas
- High gripping torque and accuracy
- Special coated collets
- Operation from behind with included hex-key

HSK

Micro

≤3µm G2.5 20,000 min^{-1}

Icon descriptions (see page 21)



NEW
Micro Chucks

HSK MICRO

SIZE	Tool Shank Diameter Range	Design	d_1	d_2	l_1	l_2	l_4	A	EDP no.
HSK 50-A	**1 mm - 6 mm**	A	13.5	16	20	33.5	59	85	**6392.500608**
HSK 50-A	**1 mm - 6 mm**	A	13.5	18	20	45	94	120	**6392.500612**
HSK 63-A	**1 mm - 6 mm**	A	13.5	15	20	30	64	90	**6392.630609**
HSK 63-A	**1 mm - 6 mm**	A	13.5	17	20	45	94	120	**6392.630612**
HSK 40-E	**1 mm - 6 mm**	E	13.5	16	20	35	55	75	**6399.400607**
HSK 50-E	**1 mm - 6 mm**	E	13.5	17	20	40	59	85	**6399.500608**
HSK 50-E	**1 mm - 6 mm**	E	13.5	18	20	45	94	120	**6399.500612**

NOTE: Mechanical drive torque wrench must be set at 3.0 - 4.4 Nm

FMC Collets and Accessories (see pages 15, 18 and 19, please order separately)

Coolant tubes and assembly wrenches available upon request

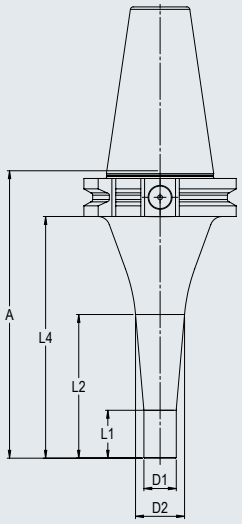
- ISO 7388-1
- Slim design for hard to access areas
- High gripping torque and accuracy
- Special coated collets
- Operation from behind with included hex-key

SK (ISO)

Micro

≤3µm G2.5 20,000 min-1

Icon descriptions (see page 21)



NEW *Micro Chucks*

SK MICRO

SIZE	Tool Shank Diameter Range	Design	d_1	d_2	l_1	l_2	l_4	A	EDP no.
SK30	**1 mm - 6 mm**	A/AD	13.5	16	20	32	56	75	**6391.300607**
SK40	**1 mm - 6 mm**	A/AD	13.5	17	20	38	71	90	**6391.400609**
SK40	**1 mm - 6 mm**	A/AD	13.5	21	20	60	101	120	**6391.400612**

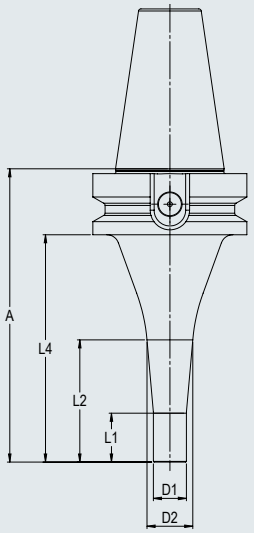
- ISO 7388-2
- Slim design for hard to access areas
- High gripping torque and accuracy
- Special coated collets
- Operation from behind with included hex-key

BT

Micro

≤3µm G2.5 20,000 min-1

Icon descriptions (see page 21)



NEW *Micro Chucks*

BT MICRO

SIZE	Tool Shank Diameter Range	Design	d_1	d_2	l_1	l_2	l_4	A	EDP no.
BT30	**1 mm - 6 mm**	A/AD	13.5	15	20	30	53	75	**6393.300607**
BT40	**1 mm - 6 mm**	A/AD	13.5	15	20	30	63	90	**6393.400609**
BT40	**1 mm - 6 mm**	A/AD	13.5	19	20	50	93	120	**6393.400612**

NOTE: Mechanical drive torque wrench must be set at 3.0 - 4.4 Nm

FMC Collets and Accessories (see pages 15-19, please order separately)

Coolant tubes and assembly wrenches available upon request

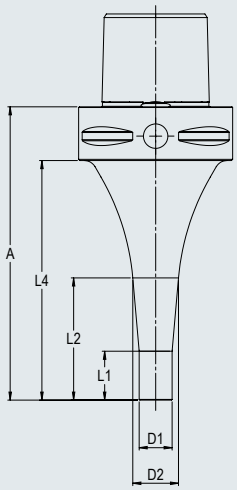
- ISO 26623-1
- Slim design for hard to access areas
- High gripping torque and accuracy
- Special coated collets
- Operation from behind with included hex-key

PSC

Micro

≤3µm

G2.5
20,000 min^{-1}



NEW
Micro Chucks

Icon descriptions (see page 21)

PSC MICRO

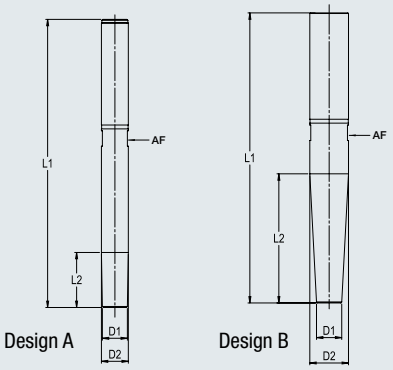
SIZE	Tool Shank Diameter Range	Design	d_1	d_2	l_1	l_2	l_4	A	EDP no.
PSC40	**1 mm - 6 mm**	A	13.5	16	20	35	55	75	**6396.400607**
PSC63	**1 mm - 6 mm**	A	13.5	15	20	30	68	90	**6396.630609**
PSC63	**1 mm - 6 mm**	A	13.5	19	20	50	98	120	**6396.630612**

NOTE: Mechanical drive torque wrench must be set at 3.0 - 4.4 Nm

FMC Collets and Accessories (see pages 15, 18 and 19, please order separately)

Coolant tubes and assembly wrenches available upon request

- Straight shank
- Concentricity < 8 micron
- Internal coolant supply



NEW
Collet Extensions

COLLET EXTENSIONS

SIZE	Design	L_1	L_2	d_1	d_2	AF	Design A EDP no.	Design B EDP no.
4"	A	100	29	13	14	13	**6395.14100**	**–**
4"	B	100	45	13	20	13	**–**	**6395.20100**
6"	A	150	29	13	14	13	**6395.14150**	**–**
6"	B	150	67	13	20	19	**–**	**6395.20150**

NOTE: Mechanical drive torque wrench must be set at 3.0 - 4.4 Nm

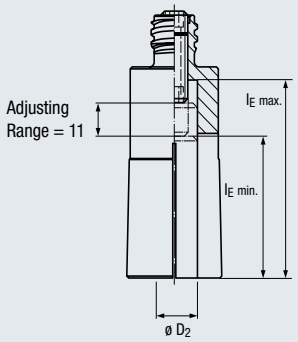
FMC Collets and Accessories (see pages 15, 18 and 19, please order separately)

Coolant tubes and assembly wrenches available upon request

- Length stop adjustable from both sides
- Standard version for coolant supply via slots in the collet
- Sealed version for tools with internal coolant supply

FPC

For accessories (see pages 15 and 17)



INCH					Standard	Sealed
SIZE	D_2	l_E min	l_E max	Adjusting range	EDP no.	EDP no.
FPC14	1/8"	17	48	11	6638.140125	6639.140125
	3/16"	17	48	11	6638.140188	6639.140188
	1/4"	25	48	11	6638.140250	6639.140250
	5/16"	25	48	11	6638.140313	6639.140313
	3/8"	29	48	11	6638.140375	6639.140375
	7/16"	34	48	11	6638.140438	6639.140438
	1/2"	34	48	11	6638.140500	6639.140500
	9/16"	34	48	11	6638.140563	6639.140563
FPC20	1/8"	17	48	11	6638.200125	6639.200125
	3/16"	17	48	11	6638.200188	6639.200188
	1/4"	25	48	11	6638.200250	6639.200250
	5/16"	25	48	11	6638.200313	6639.200313
	3/8"	29	48	11	6638.200375	6639.200375
	7/16"	34	48	11	6638.200438	6639.200438
	1/2"	34	48	11	6638.200500	6639.200500
	9/16"	34	48	11	6638.200563	6639.200563
	5/8"	37	48	11	6638.200625	6639.200625
	11/16"	37	48	11	6638.200688	6639.200688
	3/4"	39	48	11	6638.200750	6639.200750
FPC25	5/8"	37	60	11	6638.250625	6639.250625
	3/4"	39	60	11	6638.250750	6639.250750
	1"	45	60	11	6638.251000	6639.251000
	1 1/4"	48	60	11	6638.251250	6639.251250
METRIC						
FPC14	2	17	48	11	6638.1402	6639.1402
	3	17	48	11	6638.1403	6639.1403
	4	17	48	11	6638.1404	6639.1404
	5	17	48	11	6638.1405	6639.1405
	6	25	48	11	6638.1406	6639.1406
	7	25	48	11	6638.1407	6639.1407
	8	25	48	11	6638.1408	6639.1408
	9	29	48	11	6638.1409	6639.1409
	10	29	48	11	6638.1410	6639.1410
	11	34	48	11	6638.1411	6639.1411
	12	34	48	11	6638.1412	6639.1412
	14	34	48	11	6638.1414	6639.1414
FPC20	2	17	48	11	6638.2002	6639.2002
	3	17	48	11	6638.2003	6639.2003
	4	17	48	11	6638.2004	6639.2004
	5	17	48	11	6638.2005	6639.2005
	6	25	48	11	6638.2006	6639.2006
	8	25	48	11	6638.2008	6639.2008
	10	29	48	11	6638.2010	6639.2010
	11	34	48	11	6638.2011	6639.2011
	12	34	48	11	6638.2012	6639.2012
	14	34	48	11	6638.2014	6639.2014
	15	37	48	11	6638.2015	6639.2015
	16	37	48	11	6638.2016	6639.2016
	18	37	48	11	6638.2018	6639.2018
	20	39	48	11	6638.2020	6639.2020
FPC25	16	37	60	11	6638.2516	6639.2516
	18	37	60	11	6638.2518	6639.2518
	20	39	60	11	6638.2520	6639.2520
	22	39	60	11	6638.2522	6639.2522
	25	45	60	11	6638.2525	6639.2525
	32	48	60	11	6638.2532	6639.2532

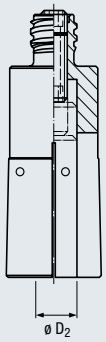
Minimum quantity lubrication (1-channel or 2-channel MQL systems) possible by exchanging the length stop, available on request

l_E min. = Minimum clamping length of the tool with length stop
l_E max. = Maximum clamping length of the tool without length stop

NOTE: FPC Collets torque value 10 Nm

- Use with straight shank standard tools according to DIN 6535 HB or DIN 1835 B (with Weldon flat)
- Available for FPC20 and FPC25 Chucks
- Standard version for coolant supply via slots in the collet
- Sealed version for tools with internal coolant supply
- Includes 3 pins

FPC



PIN-LOCK COLLETS INCH

SIZE	D_2	Standard EDP no.	Sealed EDP no.
FPC20	1/4"	6637.200250	6633.200250
	5/16"	6637.200313	6633.200313
	3/8"	6637.200375	6633.200375
	7/16"	6637.200438	6633.200438
	1/2"	6637.200500	6633.200500
	5/8"	6637.200625	6633.200625
FPC25	1/2"	6637.250500	6633.250500
	5/8"	6637.250625	6633.250625
	3/4"	6637.250750	6633.250750
	7/8"	6637.250875	6633.250875
	1"	6637.251000	6633.251000

PIN-LOCK COLLETS METRIC

SIZE	D_2	EDP no.	EDP no.
FPC20	6	6637.2006	6633.2006
	8	6637.2008	6633.2008
	10	6637.2010	6633.2010
	12	6637.2012	6633.2012
	14	6637.2014	6633.2014
	16	6637.2016	6633.2016
	18	6637.2018	6633.2018
FPC252	16	6637.2516	6633.2516
	18	6637.2518	6633.2518
	20	6637.2520	6633.2520
	22	6637.2522	6633.2522
	25	6637.2525	6633.2525

NOTE: FPC Collets torque value 10 Nm

STORAGE TRAY FOR FPC COLLETS

SIZE	Dimensions (mm)	for # of collets	EDP no.
FPC14	345 x 250 x 30	24	6665.051
FPC20	345 x 250 x 30	21	6665.052
FPC25	345 x 250 x 30	10	6665.053

ASSEMBLY TOOL

Width across flats

SIZE	Clamping Diameter D_2	D		EDP no.
FPC20	6mm -16 / 20 mm	2	SW4	6665.055
	18mm	1	SW4	6665.056
FPC25	16mm-25mm	2	SW5	6665.057

SPARE PINS

SIZE	D_2	EDP no.
FPC20	1/2" 6mm-14mm	6665.041
	5/8" 16mm	6665.040
	18mm	6665.044
FPC25	3/4" 1mm-20mm	6665.043
	1" 22mm-25mm	6665.042

Minimum quantity lubrication (1-channel or 2-channel MQL systems) possible by exchanging the length stop, available on request

$l_{E\ min.}$ = Minimum clamping length of the tool with length stop

$l_{E\ max.}$ = Maximum clamping length of the tool without length stop

FMC Collets

- Standard version for coolant supply via slots in the collet
- Sealed version for tools with internal coolant supply

FMC

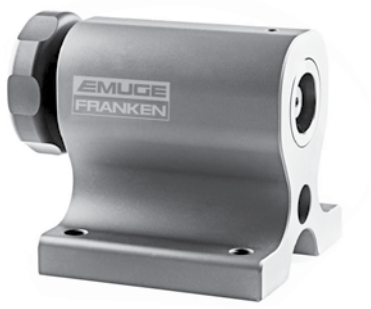
	ø D_2	Standard EDP no.	Sealed EDP no.
[inch]	1/8"	6648.060125	6649.060125
	3/16"	6648.060188	6649.060188
	1/4"	6648.060250	6649.060250
[mm]	1	6648.0601	6649.0601
	2	6648.0602	6649.0602
	3	6648.0603	6649.0603
	4	6648.0604	6649.0604
	5	6648.0605	6649.0605
	6	6648.0606	6649.0606

BALANCING SCREW SET

SIZE	# of screws	EDP no.
M6 T x 15 (Set with case)	180	6665.M6

BALANCING SCREWS

SIZE	# of screws	EDP no.
M6 x 4	20	6665.M604
M6 x 4.5	20	6665.M6045
M6 x 5	20	6665.M605
M6 x 5.25	20	6665.M6052
M6 x 6	20	6665.M606
M6 x 6.5	20	6665.M6065
M6 x 7	20	6665.M607
M6 x 7.2	20	6665.M6072
M6 x 8	20	6665.M608



FPC MOUNTING SYSTEM - Base

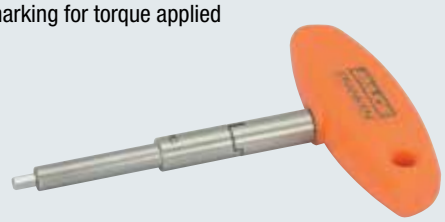
Description	EDP no.
Base Unit	6915.01

FPC MOUNTING SYSTEM - Adaptors

Description	EDP no.
Adapter SK30 & BT30	6915.02
Adapter SK40, BT40 & CAT40	6915.03
Adapter SK50, BT50 & CAT50	6915.04
Adapter HSK 50	6915.05
Adapter HSK 63	6915.06
Adapter HSK 80	6915.07
Adapter HSK 100	6915.08
Adapter PSC50	6915.09
Adapter PSC63	6915.10
Adapter PSC80	6915.11

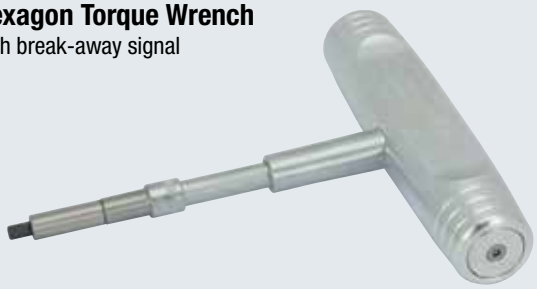
FPC Accessories

Hexagon Torque Wrench
with marking for torque applied



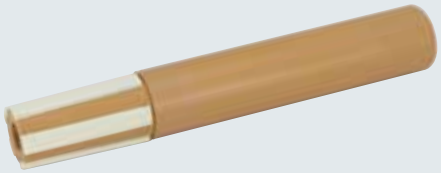
Width across flats	Torque	EDP no.
SW4 (4mm)	10 Nm	6665.014

Hexagon Torque Wrench
with break-away signal



Width across flats	Torque	EDP no.
SW4 (4mm)	10 Nm	6665.011

Taper Cleaners
For cleaning the inside cone of FPC Collet Holders

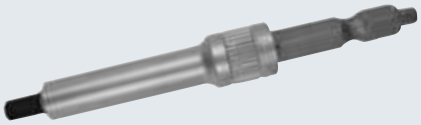


For size	EDP no.
FPC 14	6665.030
FPC 20	6665.031
FPC 25	6665.032

Spare Bit
with guidance tube

Width across flats	EDP no.
SW4 (4mm)	6665.018

Hex bit
for cordless shut-off screwdriver EXACT ION



Width across flats	EDP no.
SW4 (4mm)	6665.026

Torque Limiter for use with power tool with 4mm hex bit. The mounting system locks the toolholder during operation.

Torque	EDP no.
10 Nm	6665.027

Additional Torque Wrenches

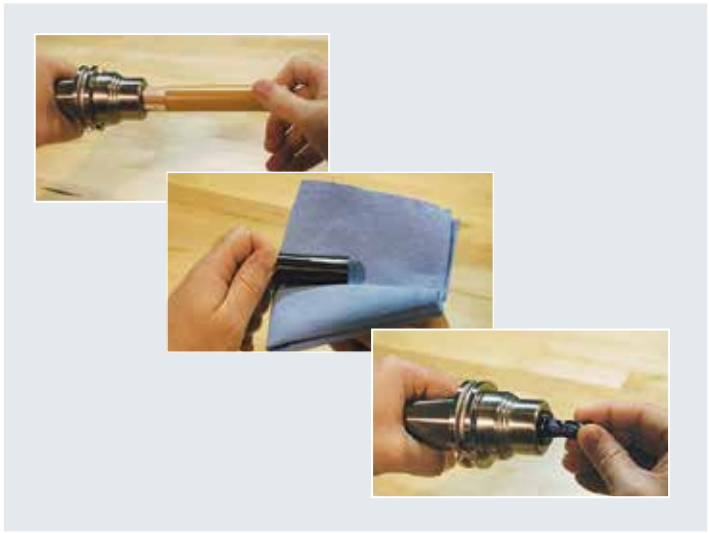
	Torque	EDP no.
FMC Extension Wrench	1.5 - 3 Nm	6665.020
Micro Holder Wrench	3.0 - 5.4 Nm	6665.021

FPC Chuck Operation

1. Inserting the collet:

Clean the inner taper of the FPC (for cleaning the inner cone we recommend our special taper cleaners, pg.17).

Manually screw the clean collet with the tool into the chuck until the collet connects with the taper. In order to achieve maximum clamping forces we recommend to degrease tool shank, inner and outer collet cone, as well as the inner cone of the FPC.



2. Clamping:

The clamping procedure starts by engaging the screw on the side of the FPC and rotating the hex key clockwise.

<u>Caution:</u> Insert the hex key as far as possible. Only use hex key with torque measurement. Max 10 Nm / 7.38 ft-lbs for torque

3. Loosening:

Loosen the collet by inserting the hex key and turning it counter clockwise. Full torque will be applied. Turn until the collet can be unscrewed manually.

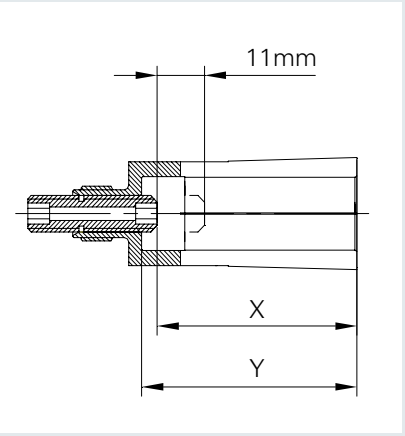
4. Length stop:

A length stop screw is located in the collet and can be adjusted with the hex key.

FPC Chuck Operation (continued)

5. Insertion depth of tool:

FPC type	Clamping Diameter/		X	Y
	mm	inch	mm	mm
FPC14/FPC20	2 - 5	1/8"-3/16"	28	48
FPC14/FPC20	6	1/4"	36	
FPC14/FPC20	7-8.5	5/16"	36	
FPC14/FPC20	9	3/8"	40	
FPC14/FPC20	10		40	
FPC14/FPC20	11-14	7/16"-9/16"	45	
FPC20	15-18	5/8"-11/16"	48	
FPC20	20	3/4"	50	
FPC25	16-18		48	60
FPC25	20-22		50	
FPC25	25		56	
FPC25	32	1 1/4"	60	



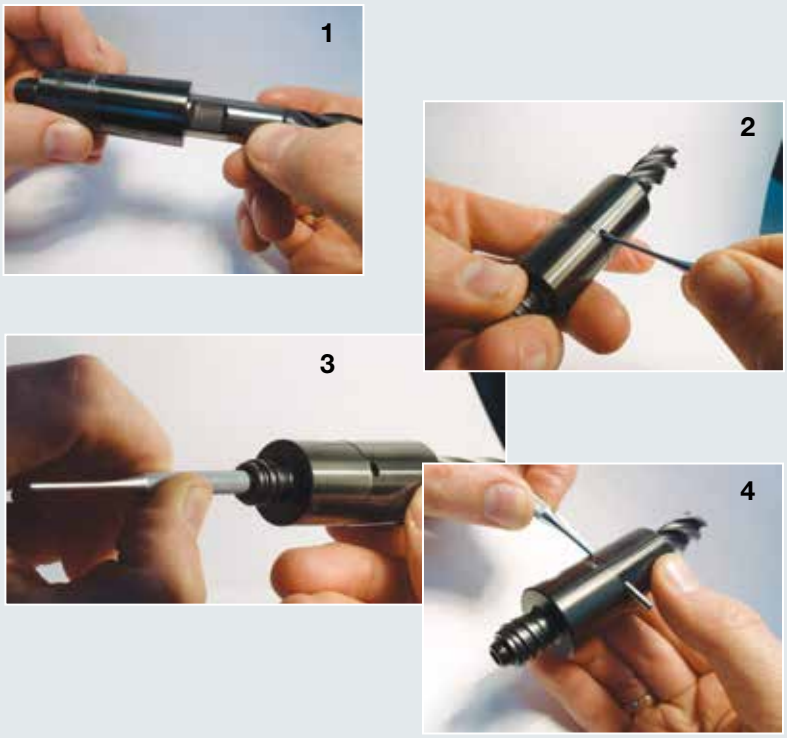
FPC Pin-Lock Operation

1. Positioning tool: Remove the length setting screw, then position the Weldon-clamping surface on the side of the bore. Now insert the tool into the collet until the Weldon-clamping surface lies in the range of the bore.

2. Positioning pin: The locking-pin has to be inserted with the help of the pin punch into the bore of the collet up to the block. Caution: The Pin must not stick out of the collet.

3. Free from backlash: With the assembly tool, the length stop screw must be set forward, pushing the Weldon flat of the cutting tool against the locking pin. Caution: Mounting without axial pressure can result in tool pullout. The collet with the secured tool can now be placed into the FPC chuck (see FPC operation manual).

4. Removing the tool: The length setting screw has to be unscrewed. The pin can be pressed out of the bore with the smallest diameter in the direction of the large diameter. Then the tool can be removed.



Icon Descriptions

FPC — For use with FPC Collets only

≤3µm — ≤ 3µm (micron) runout at 3x diameter length

G2.5 20,000 min-1 — Balanced to G2.5, 20,000 RPM

AT3 — Taper quality AT3

Assessment of Tool Holder Performance in Roughing

The dynamic vibrational behavior of different clamping mechanisms was evaluated using tool holders of similar dimensions. Analysis of the sensor data and optical analysis of the manufactured surface reveal a significant influence of the particular clamping mechanism, superimposed by certain geometrical variations of the tool holders.

Findings:

- Chatter frequencies occuring during milling tests seem independent of the clamping mechanism and the particular tool holder, and are caused by the tool or machine tool components.
- Chatter intensity and spindle speeds, at which chatter occurs, are influenced by the tool holders.
- The occurrence of chatter vibrations correlates with a significant drop in the surface quality of the workpiece.
- High resonance frequencies of the tool holder excited by chatter and low frequency waviness observed on the machine surface are related.

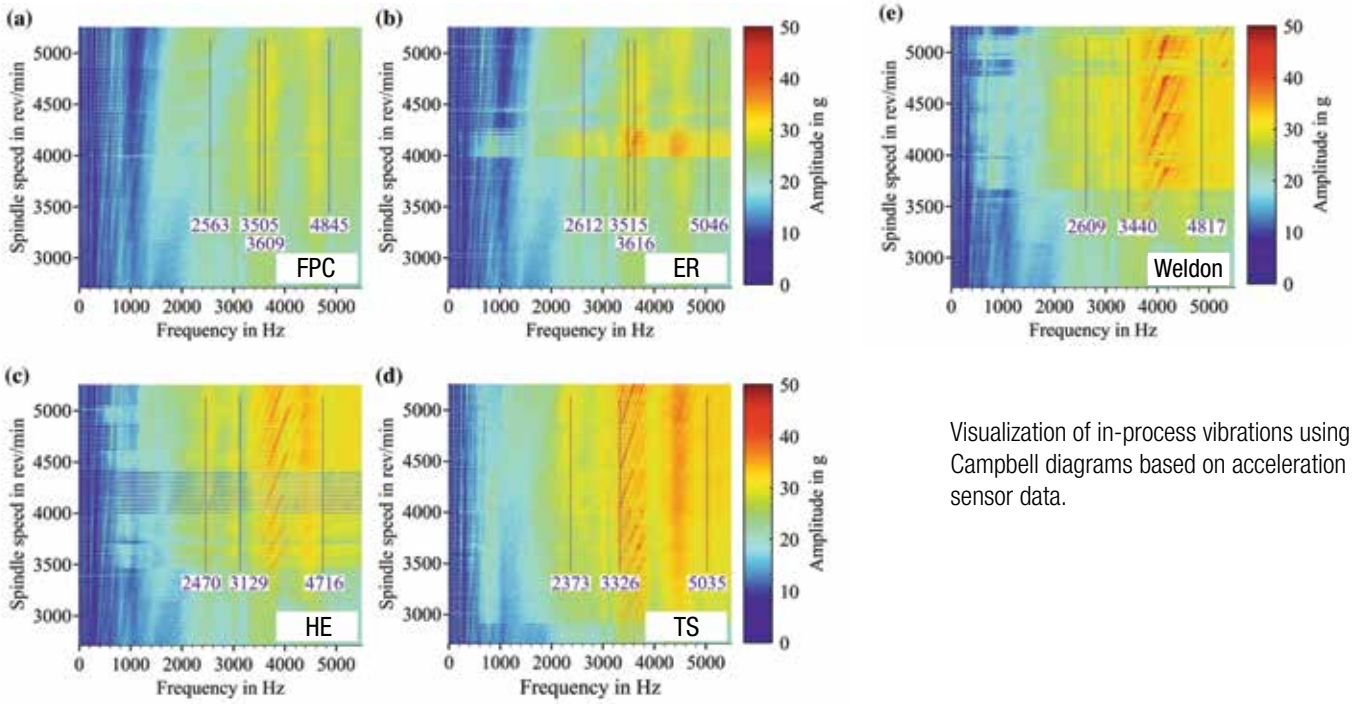
Evaluated tool holder systems:

Test setup:

Machine: MC12 by Gebr. Heller
Tool: torus cutter, D=12, number of teeth=4
Material: Steel, 42CrMo4 (1.7225)

Cutting Parameters:
n= 3979 rev/min, fz= 0.04 mm/rev/tooth, ae= 7mm, ap= 18mm

FPC had the best results in comparison to the other tool holders



Visualization of in-process vibrations using Campbell diagrams based on acceleration sensor data.

Case study conducted by: Rosenthal O. / Hintze W. / Möller C. (Published 08.01.2020 https://doi.org/10.1007/s11740-019-00944-w . Assessment of tool holder performance in roughing with end mills. Institute of Production Management and Technology, Hamburg University of Technology. Springer Nature)

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