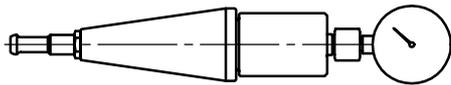


**ACCESSORI  
ACCESSORIES  
ZUSATZGERATE  
ACCESSOIRES**

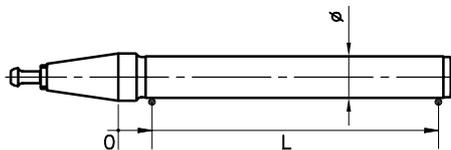
# STRUMENTI DI CONTROLLO TESTING INSTRUMENTS KONTROLLGERAETE INSTRUMENTS DE CONTROLE

Tipo  
Type



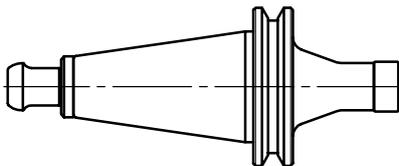
STRUMENTO CONTROLLO FORZA TIRANTE CON 4 INSERTI  
CLAMPING SPINDLE FORCE GAUGE WITH 4 PULL-STUDS  
PRUEFGERAET FUER ANZUGSSPINDELKRAFT MIT 4 SPANNBOLZEN  
CALIBRE FORCE TIRANT AVEC 4 TIRETTES  
Per-for-fuer-pour ISO V30-V40-V45-V50-50

050201



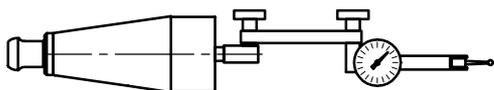
SPINA DI CONTROLLO  
TEST MANDREL  
KONTROLLDORN  
MANDRIN DE CÓNTRÔLE

ø30	L=20÷220	ISO V30	051309
ø40	L=20÷320	ISO V40	051109
ø45	L=20÷320	ISO V45	050609
ø50	L=24÷324	ISO V50	051409
ø40	L=24÷324	HSK-A63	050520



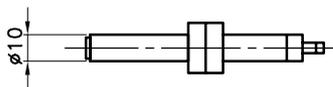
CALIBRO AZZERAMENTO  
SETTING GAUGE  
NULLSETZKALIBER  
CALIBRE MISE A ZERO

ISO V30	051320
ISO V40	051110
ISO V45	050645
ISO V50	051460
BT30	051330
BT40	051130
HSK63	050526

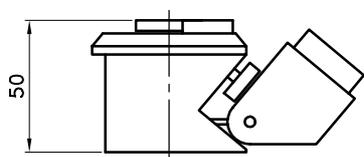


STRUMENTO CONTROLLO CENTRAGGIO  
Completo di comparatore centesimale  
CENTEREING ATTACHMENT  
With 0.01 mm dial gauge  
MESSUHRHALTER  
Messuhr, Hunderdstel  
APPAREIL A CENTRER  
Avec comparateur centésimal

ISO V30	050229
ISO V40	050230
ISO V45	050231
ISO V50	050232



TASTO CENTRATORE Testa palpatore, ø4 e ø10 CENTEREING STYLUS Feeler head ø4 and ø10	KANTENTASTER Tastkopf, ø4 & ø10 PALPEUR A CENTRER Tête palpateur, ø4 et ø10	050341
--	--	--------



ATTREZZO PER AZZERAMENTO UTENSILE/PEZZO  
Completo di comparatore 2 µm  
TOOL/PIECE SETTING GAUGE  
With 2 µm dial gauge  
GERAET FUER NULLSETZEN WERKZEUG/WERKSTUECK  
Komplett mit Messuhr 2 µm  
INSTRUMENT POUR LA MISE A ZERO OUTIL/PIECE  
Avec comparateur 2 µm

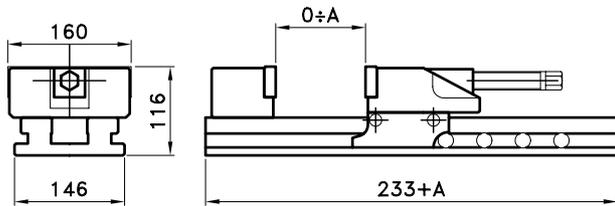
050187

# STRUMENTI CONTROLLO CONSIGLIATI MACCHINE PER PALETTE SUGGESTED TEST GAUGES MACHINES FOR BLADE MANUFACTURING

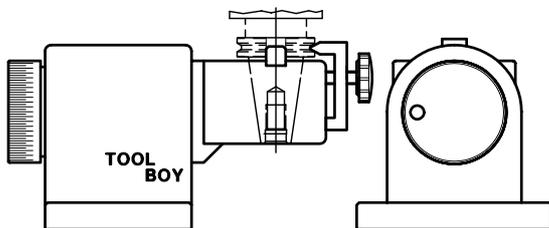
				Tipo Type	
	SPINA DI CONTROLLO TESTA	$\varnothing 40$	$L=20\div 320$	ISO V40	051109
	HEAD TEST MANDREL	$\varnothing 45$	$L=20\div 320$	ISO V45	050609
		$\varnothing 50$	$L=24\div 324$	ISO V50	051409
		$\varnothing 40$	$L=24\div 324$	HSK-A63	050520
	CALIBRO CONTROLLO TESTA CONTINUA			ISO V40	9180041
	CONTINUOUS HEAD TEST GAUGE	$\varnothing 20$	$L=100$	ISO V45	9180042
				ISO V50	9180078
				HSK-A63	9180059
	SPINA DI CONTROLLO DIVISORE	$\varnothing 50$	$L=24\div 324$	ISO 50	050809
DIVIDING HEAD TEST MANDREL					
	SPINA DI CONTROLLO CONTROPUNTA	$\varnothing 30$	$L=24\div 224$	MORSE 4	050009
TAILSTOCK TEST MANDREL					
	CALIBRO AZZERAMENTO ASSE DIVISORE			ISO 50	050858
DIVIDING HEAD AXIS SETTING GAUGE					
	SPINA ALLINEAMENTO CONTROPUNTA	$\varnothing 50 \times 310$			050245
TAILSTOCK ALIGNMENT BAR		$\varnothing 62 \times 510$			050246
	CILINDRO DI CONTROLLO TAVOLA	$\varnothing 63$	$B=200$	$L=310$	050285
TABLE TEST CYLINDER		$\varnothing 80$	$B=300$	$L=510$	050286

# ACCESSORI ACCESSORIES ZUSATGERATE ACCESSOIRES

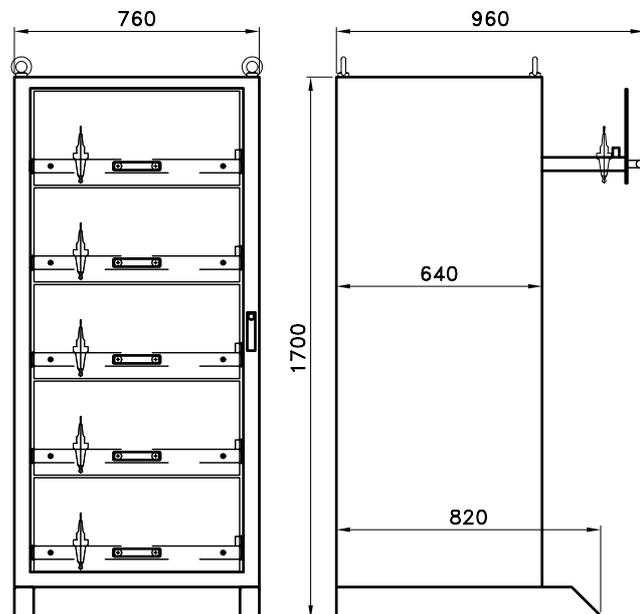
Tipo  
Type



MORSA DI PRECISIONE	A=300	050439
PRECISION VICE	A=400	050440
PRAEZISION-SCHRAUBSTOCK	A=500	050441
ETAU DE PRECISION	A=650	050442



ATTREZZO PRESA CONO	ISO V30	050446
HOLDING TAPER GAUGE	ISO V40	050447
GERAET FUER KONUSAUFNAHME	ISO V45	050448
INSTRUMENT POUR PRISE CONE	ISO 50	050449



ARMADIO COMPLETO DI CASSETTI PORTA UTENSILI  
CABINET COMPLETE WITH DRAWERS FOR TOOLS  
SCHRANK MIT SCHUBLADEN FUER WERKZEUGE  
ARMOIRE A TIRROIRS POUR RANGEMENT PORTE OUTILS

320Tools	ISO V30-V40	051080
184Tools	ISO V40-V45	051081
132Tools	ISO V40-V45-50	051082

# RISCALDATORE PORTA UTENSILI HSC HSC TOOL HOLDER HEATER ERHITZUNGSMASCHINE FUER HSC-SCHRUMPFUTTER MACHINE A FRETTER LES MANDRINS HSC

## TYPE "W"

400V/4kW

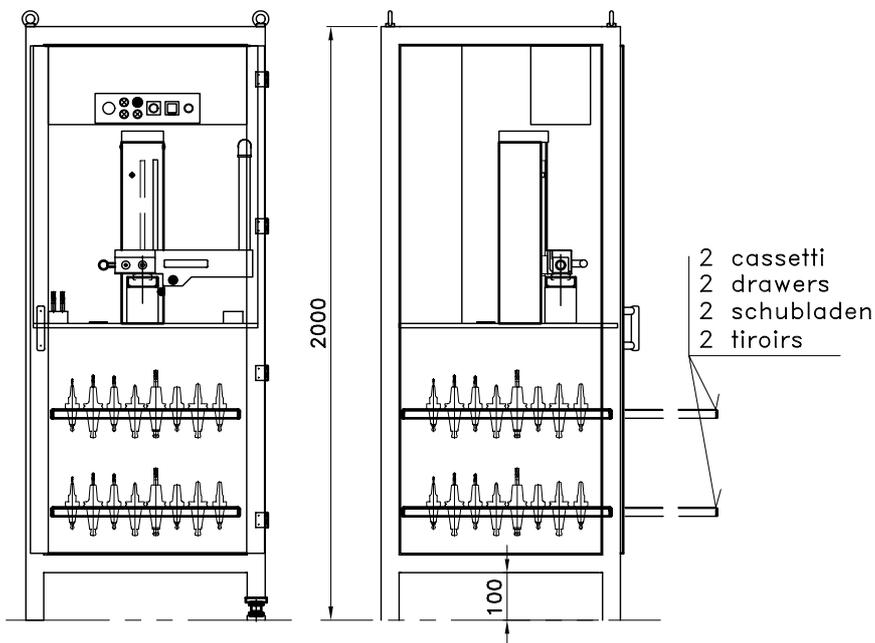
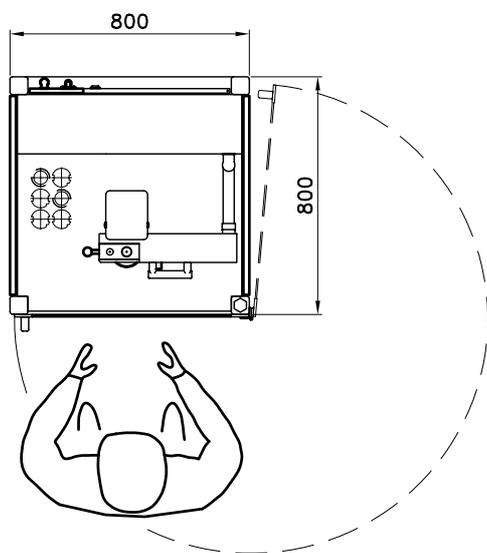
Tmax=700°C

7÷10bar

(450 NI/min.)

(60 l/min. / 7bar)

WEIGHT 400kg



Tipo  
Type

ARMADIO COMPLETO DI IMPIANTO ELETTRICO E RISCALDATORE	ad induzione	
CABINET COMPLETE WITH ELECTRICAL EQUIPEMENT AND HEATER MACHINE	induction	050002
SCHRANK MIT ELEKTROANLAGE UND ERHITZUNGSANLAGE	induktion	
ARMOIRE COMPLET AVEC IMPLANTATION ELECTRIQUE E MACHINE A FRETTER	induction	

ARMADIO COMPLETO DI IMPIANTO ELETTRICO E RISCALDATORE	ad aria calda	
CABINET COMPLETE WITH ELECTRICAL EQUIPEMENT AND HEATER MACHINE	heat-air	050000
SCHRANK MIT ELEKTROANLAGE UND ERHITZUNGSANLAGE	heissluft	
ARMOIRE COMPLET AVEC IMPLANTATION ELECTRIQUE E MACHINE A FRETTER	air chaud	

	64T	ISOV30-V40	050020
CASSETTI PORTA (ordinare 2 cassettei a scelta)	46T	ISOV40-V45	050021
DRAWERS FOR (to order 2 drawers as you like)	33T	ISOV40-V45-V50	050022
SCHUBLADEN FUER (bestellen 2 kisten nach belieben)	64T	HSK40 AE	050025
TIROIRS POUR (ordonner 2 tiroirs a choix)	64T	HSK50 AE	050026
	46T	HSK63 AE	050027

	ISOV30	050006
BUSSOLA PER CONO	ISOV40	050007
TOOL HOLDER SUPPORT	ISOV45	050008
KONUSKOMPASS	HSK40 AE	050031
COMPONENTS PORTE OUTILS	HSK50 AE	050032
	HSK63 AE	050033

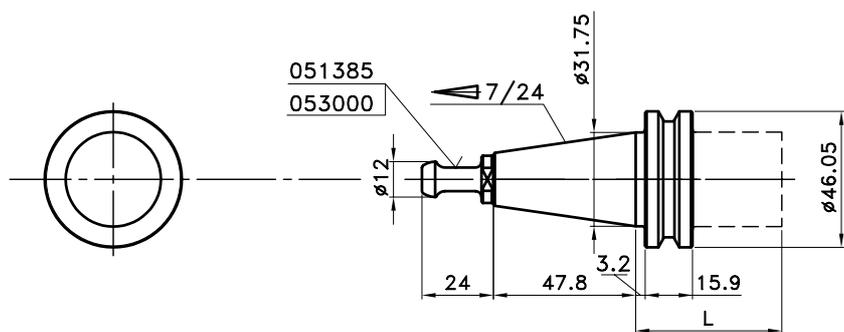
PINZA PRESETTING UTENSILE/ PRESETTING TOOL VICE		
PRESETTING WERKZEUGHALTER/PINCE PRESETTING OUTILS	ø3-12	050010

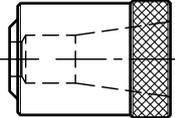
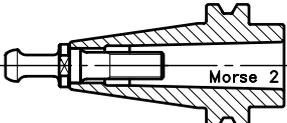
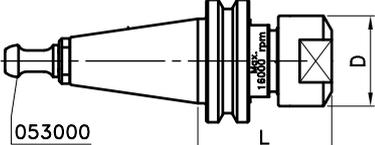
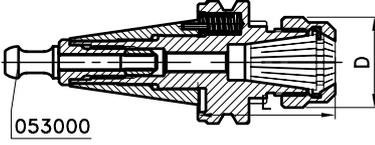
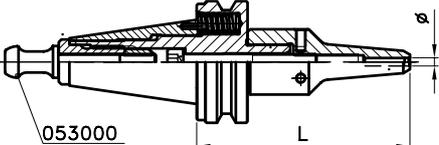
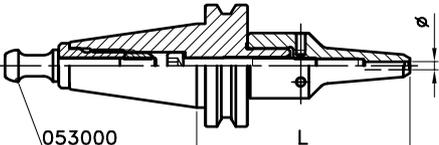
**PORTA UTENSILI  
WERKZEUGHALTER**

**TOOL-HOLDERS  
PORTE-OUTILS**

**V30**

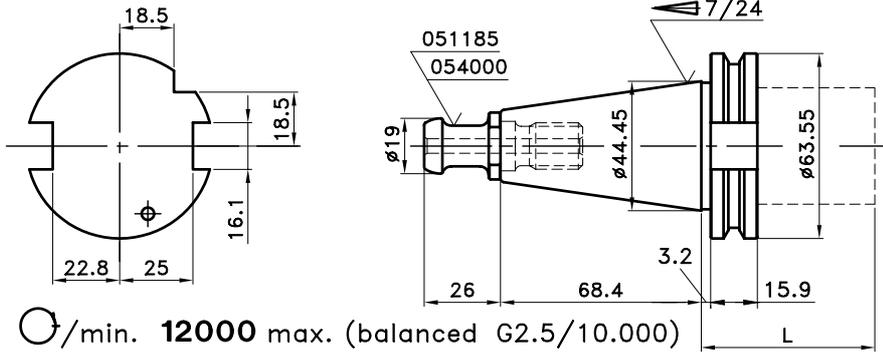
ISO 7388



		Tipo Type	
	INSERTI FILETTATI PULL-STUDS ANZUGSBOLZEN EMBOUTS DE TIRAGE	ISOV30-M12 BT30-M12 CAT30-1/2"-13 UNC	051385 051388 051387
	INSERTI ADATTATIVI SWIVEL PULL-STUDS ANPASSENDER SPANNBOLZEN EMBOUTS DE TIRAGE ADAPTATIF	ISOV30 BT30	053000
	CALIBRO CONTROLLO INSERTI TESTING PULL-STUDS SPANNBOLZEN-KALIBER CALIBRE POUR LES TIRETTES	ISOV30 CAT30 BT30	051386
$\varnothing$ /min. 16000 max. 	MANDRINO PORTA FRESE CODOLO MORSE MORSE TAPER CUTTERS MORSE TANG MORSEKEGELAUFNAHME MIT ANZUGSGEWINDE DOUILLE PORTE-FRAISES CONE MORSE Morse 2		051372
$\varnothing$ /min. 16000 max. 	MANDRINO PORTA PINZE COLLET HOLDER SPANNZANGENFUTTER MANDRIN PORTE-PINCES	D=34 L=50 ER20	051350
HSC $\varnothing$ /min. 32000 max. 	MANDRINO PORTA PINZE HSC COLLET HOLDER HSC SPANNZANGENFUTTER HSC MANDRIN PORTE-PINCES HSC	D=19 L=50 ER11 D=34 L=56 ER20 D=34 L=100 ER20	051345 051340 051343
HSC $\varnothing$ /min. 50000 max. (G2.5/30000) 	PORTA UTENSILI A RISCALDO WARM UP TOOL-HOLDERS SCHRUMPFUTTER PORTE-OUTILS FRETTE	$\varnothing$ L	
		3      85 4      85 5      85 6      85 8      100 10      100 12      100	053003 053004 053005 053006 053008 053010 053012
STANDARD $\varnothing$ /min. 16000 max. (G2.5/12500) 	PORTA UTENSILI A RISCALDO WARM UP TOOL-HOLDERS SCHRUMPFUTTER PORTE-OUTILS FRETTE	$\varnothing$ L	
		8      100 10      100 12      100	053108 053110 053112

**PORTA UTENSILI  
WERKZEUGHALTER**

**TOOL-HOLDERS  
PORTE-OUTILS**



**V40**

ISO 7388  
DIN 69871

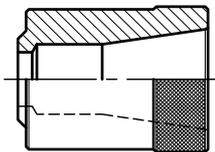
○/min. **12000** max. (balanced G2.5/10.000)

Tipo  
Type



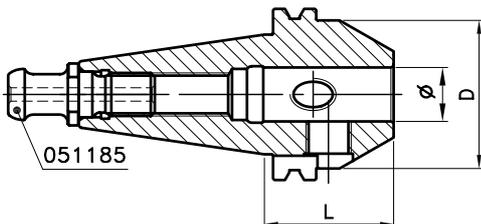
INSERTI FILETTATI  
PULL-STUDS  
ANZUGSBOLZEN  
EMBOUTS DE TIRAGE

ISOV40-M16	051185
BT40-M16	051190
CAT40-5/8"-11UNC	051187



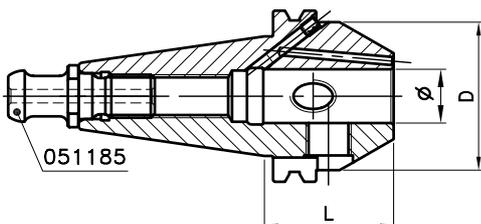
CALIBRI CONTROLLO INSERTI  
TESTING PULL-STUDS  
SPANNBOLZEN-KALIBER  
CALIBRE POUR LES TIRETTES

ISOV40	
CAT40	051186
BT40	



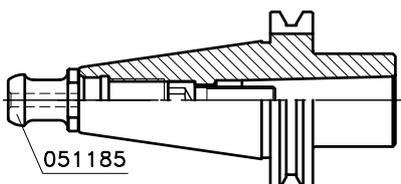
MANDRINI PORTA FRESE WELDON  
WELDON MILL HOLDERS  
WELDON-FRAESERHALTER  
DOUILLE PORTE-FRAISES WELDON

Ø20	D=48	L=50	051111
Ø25	D=52	L=50	051112
Ø32	D=55	L=50	051113



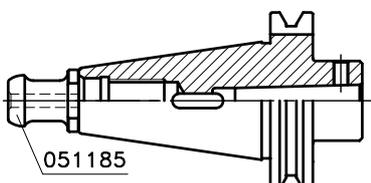
MANDRINI PORTA FRESE WELDON  
WELDON MILL HOLDERS  
WELDON-FRAESERHALTER  
DOUILLE PORTE-FRAISES WELDON

Ø20	D=48	L=50	051103
Ø25	D=52	L=50	051104
Ø32	D=55	L=50	051105



MANDRINI PORTA FRESE CODOLO MORSE  
DOUILLE PORTE-FRAISES CONE MORSE  
MORSEKEGELAUFNHME MIT ANZUGSGEWINDE  
MORSE TAPER CUTTERS MORSE TANG

Morse 2	051162
Morse 3	051163

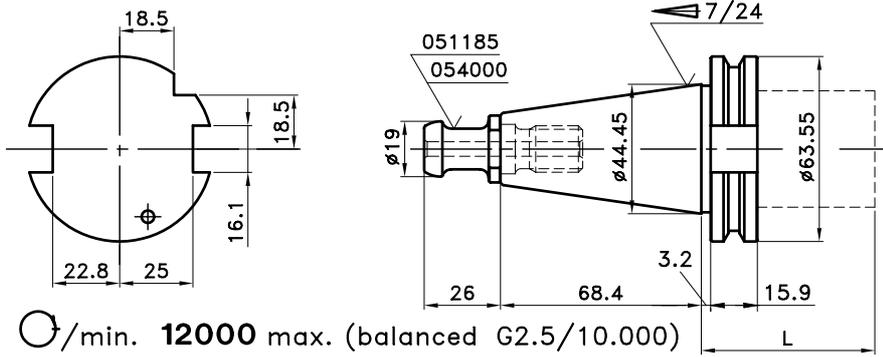


MANDRINI PORTA PUNTE CODOLO MORSE  
DOUILLES PORTE-FORETS CONE MORSE  
MORSEKEGELAUFNHME MIT AUSTREIBLAPPEN  
MORSE TAPER DRILLS MORSE TANG

Morse 2	051172
Morse 3	051173
Morse 4	051174

**PORTA UTENSILI  
WERKZEUGHALTER**

**TOOL-HOLDERS  
PORTE-OUTILS**

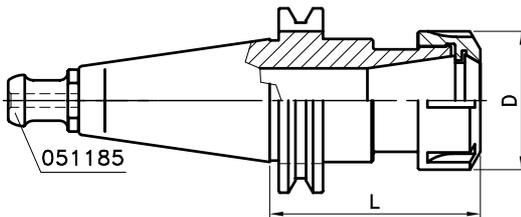


**V40**

ISO 7388  
DIN 69871

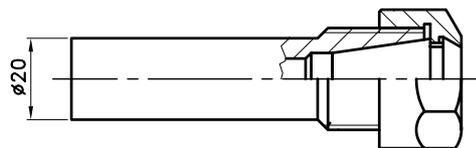
○/min. **12000** max. (balanced G2.5/10.000)

Tipo  
Type



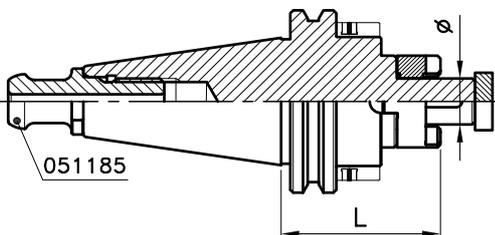
MANDRINI PORTA PINZE  
COLLET-HOLDERS  
SPANNZANGENFUTTER  
MANDRIN PORTE-PINCES

D50	L=70	ER32	051140
D50	L=100	ER32	051141
D34	L=63	ER20	051143
D34	L=100	ER20	051144



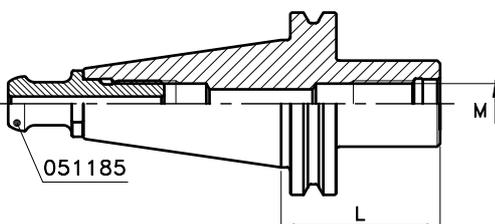
SPINA PER PINZE ER 20  
ER 20 COLLET-HOLDER  
SPANNZANGENFUTTER ER 20  
PORTE-PINCES ER 20

050145



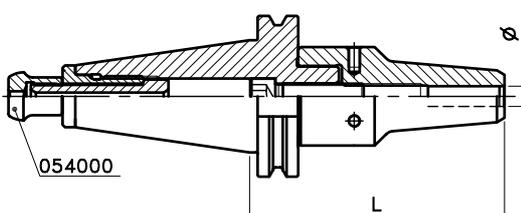
MANDRINI PORTA FRESE FRONTALI  
STUB ARBORS  
AUFSTECK-FRAESERDORNE  
ARBRES PORTE-FRAISES FRONTALES

Ø16	L=55	(Max. Tool Ø50)	051121
Ø22	L=55	(Max. Tool Ø63)	051122
Ø27	L=55	(Max. Tool Ø80)	051123



MANDRINI PER UTENSILI FILETTATI  
THREADED TOOL HOLDERS  
SPINDEL FOR WERZEUG GEWINDE  
MANDRINS POUR OUTILS TARAUDÉS

M10	L=55	051177
	L=115	051178
M12	L=55	051179
	L=115	051180
M16	L=55	051181
	L=115	051182

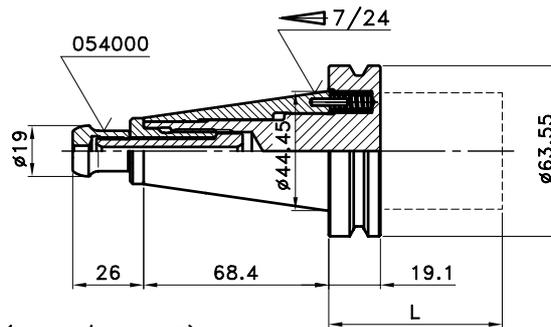
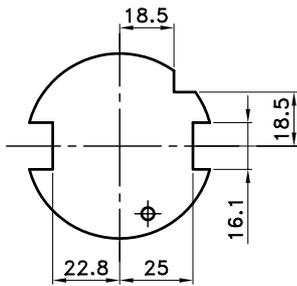


PORTA UTENSILI A RISCALDO  
WARM UP TOOL-HOLDERS  
SCHRUMPFUTTER  
PORTE-OUTILS FRETTE

Ø	L	
8	100	054108
10	100	054110
12	100	054112
16	105	054116
20	105	054120
8	200	054308
10	200	054310
12	200	054312
16	205	054316

**PORTA UTENSILI  
WERKZEUGHALTER**

**TOOL-HOLDERS  
PORTE-OUTILS**



**V40  
HSC**

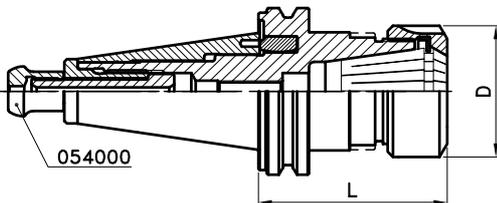
○/min. **25.000** max. (G2.5/20.000)

Typo  
Type



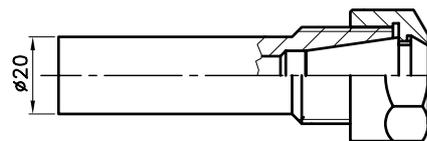
INSERTI ADATTATIVI  
SWIVEL PULL-STUDS  
ANPASSENDER SPANNBOLZEN  
EMBOUITS DE TIRAGE ADAPTATIF

ISOV40-M16 054000  
CAT40-5/8"-11UNC 054001



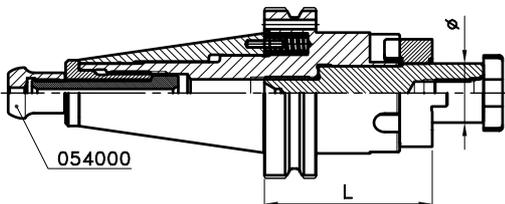
MANDRINI PORTA PINZE HSC  
COLLET-HOLDERS HSC  
SPANNZANGENFUTTER HSC  
MANDRIN PORTE-PINCES HSC

D34 L=63 ER20 051135  
D34 L=100 ER20 051136  
D50 L=70 ER32 051137



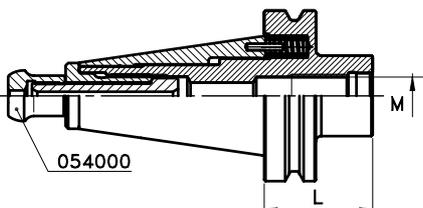
SPINA PER PINZE ER 20  
ER 20 COLLET-HOLDER  
SPANNZANGENFUTTER ER 20  
PORTE-PINCES ER 20

050145



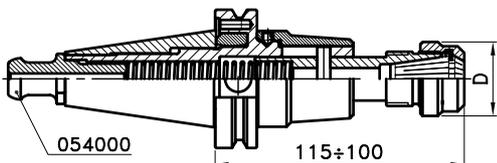
MANDRINI PORTA FRESE FRONTALI  
STUB ARBORS  
AUFSTECK-FRÄSERDORNE  
ARBRES PORTE-FRAISES FRONTALES

16 L=60 054030  
22 L=62 054031  
27 L=62 054032



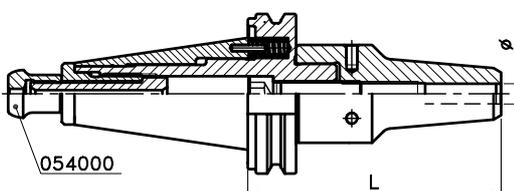
MANDRINI PER UTENSILI FILETTATI  
THREADED TOOL HOLDERS  
FRÄSERDORNE-FUER-EINSCHRAUB FRÄSER  
MANDRIN POUR OUTILS AVEC FILET

M12 L=40 054040  
M16 L=40 054041



MANDRINO ELASTICO PORTA PINZE HSC  
ELASTIC COLLET-HOLDER HSC  
ELASHSCHES SPANNZANGENFUTTER HSC  
MANDRIN ELASTIQUE PORTE-PINCES HSC

D34 ER20 051157

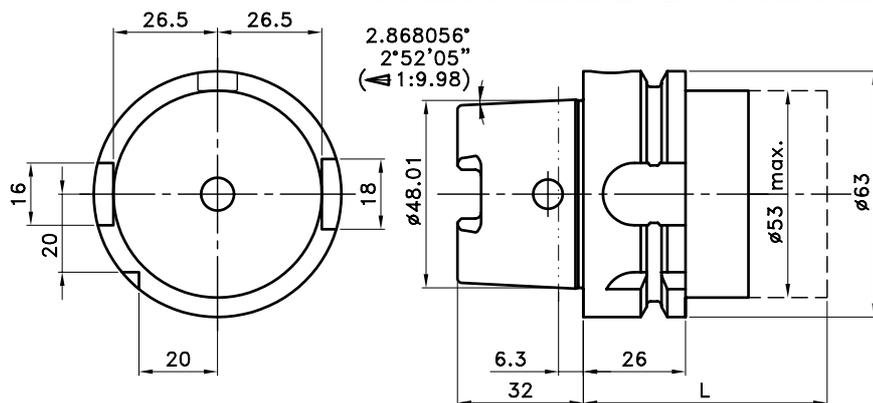


PORTA UTENSILI A RISCALDO  
WARM UP TOOL-HOLDERS  
SCHRUMPFUTTER  
PORTE-OUTILS FRETTE

Ø	L	
3	85	054003
4	85	054004
5	85	054005
6	85	054006
8	100	054008
10	100	054010
12	100	054012
3	185	054203
4	185	054204
5	185	054205
6	185	054206

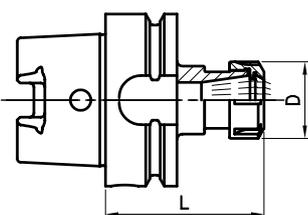
**PORTA UTENSILI  
WERKZEUGHALTER**

**TOOL-HOLDERS  
PORTE-OUTILS**



# HSK-A63

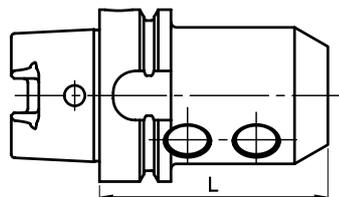
ISO 12164-1  
DIN 69893



MANDRINO PORTA PINZE  
COLLET-HOLDER  
SPANNZANGENFUTTER  
MANDRIN PORTE-PINCES

(G2.5/20.000)

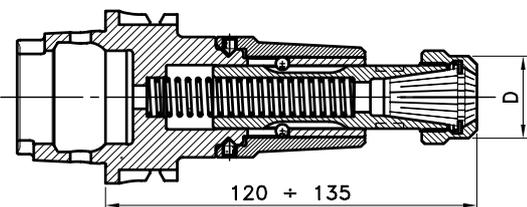
D	L	Tipo Type	
50	100	ER32	054260
50	160	ER32	054261



MANDRINI PORTA FRESE WELDON  
WELDON MILL HOLDERS  
WELDON-FRAESERHALTER  
DOUILLE PORTE-FRAISES WELDON

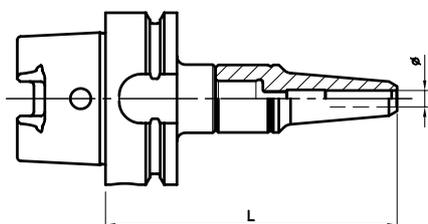
(G2.5/10.000)

20	68	054211	
25	83	054212	



MANDRINO ELASTICO PORTA PINZE HSC HSK-A63  
ELSTIC COLLET-HOLDER HSC HSK-A63  
ELASHCHES SPANNZANGENFUTTER HSC HSK-A63  
MANDRIN ELASTIQUE PORTE-PINCES HSC HSK-A63

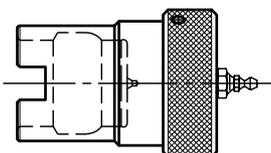
D34	ER20	054290
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PORTA UTENSILI A RISCALDO  
WARM UP TOOL-HOLDERS  
SCHRUMPFUTTER  
PORTE-OUTILS FRETTE

(G2.5/20000)

ø	L	
3	105	054220
4	105	054221
5	105	054222
6	105	054223
8	120	054224
10	120	054225
12	120	054226
16	125	054227
20	125	054228
3	195	054240
4	195	054241
5	195	054242
6	195	054243
8	200	054244
10	200	054245
12	200	054246
16	205	054247
20	205	054248



INGRASSATORE PER PINZE TIRANTE  
COLLET LUBRICATOR  
SCHMIERER FÜR ZANGE ZUGSTANGE  
GRAISSEUR POUR PINCES TIRANT

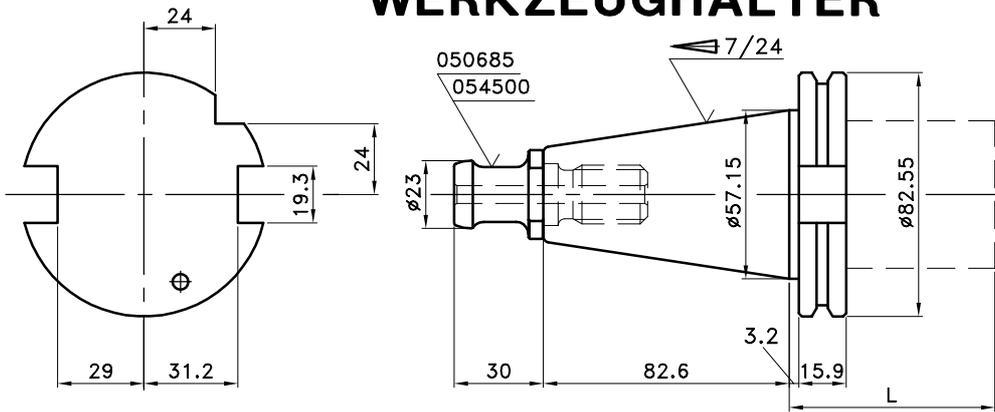
4531247

**PORTA UTENSILI  
WERKZEUGHALTER**

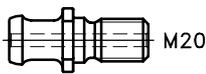
**TOOL-HOLDERS  
PORTE-OUTILS**

**V45**

ISO 7388  
DIN 69871



Tipo  
Type



INSERTI FILETTATI  
PULL-STUDS  
ANZUGSBOLZEN  
EMBOUTS DE TIRAGE

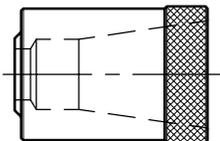
ISOV45-BT45-M20  
CAT45-3/4"-10 UNC

050685  
050687



INSERTI ADATTATIVI  
SWIVEL PULL-STUDS  
ANPASSENDER SPANNBOLZEN  
EMBOUTS DE TIRAGE ADAPTATIF

054500

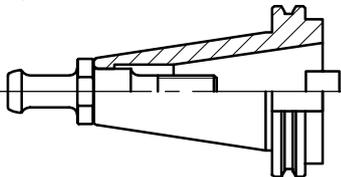


CALIBRO CONTROLLO INSERTI  
TESTING PULL-STUDS  
SPANNBOLZEN-KALIBER  
CALIBRE POUR LES TIRETTES

ISOV45  
CAT45  
BT45

050686

○/min. 10000 max.

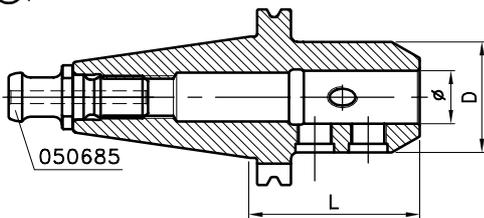


MANDRINI RIDUZIONE  
DOUILLE DE REDUCTION  
REDUZIERHUELSEN  
ADAPTERS  
(Solo inserto - Pull stud only)

ISO V45 → ISO 40/ISO V40  
ISO V45 → CAT 40

050640  
050642

○/min. 10000 max.

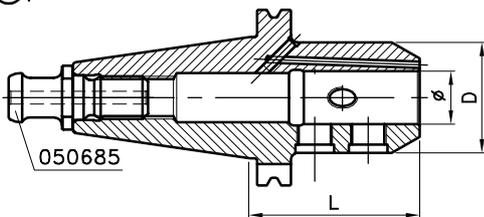


MANDRINI PORTA FRESE WELDON  
DOUILLE PORTE-FRAISES WELDON  
WELDON-FRAESER HALTER  
WELDON MILL HOLDERS

Ø20 D=48 L=80  
Ø25 D=52 L=80  
Ø32 D=55 L=80  
Ø32 D=55 L=125  
Ø40 D=63 L=80

050620  
050615  
050616  
050617  
050618

○/min. 10000 max.

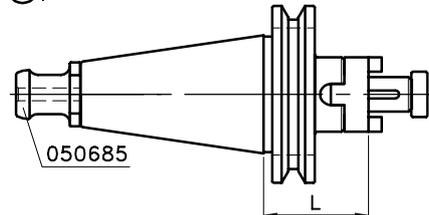


MANDRINI PORTA FRESE WELDON  
DOUILLE PORTE-FRAISES WELDON  
WELDON-FRAESER HALTER  
WELDON MILL HOLDERS

Ø20 D=48 L=80  
Ø25 D=52 L=80  
Ø32 D=55 L=80  
Ø32 D=55 L=125  
Ø40 D=63 L=80

050634  
050635  
050636  
050637  
050638

○/min. 10000 max.

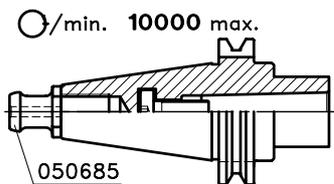


MANDRINI PORTA FRESE FRONTALI  
ARBRES PORTE-FRAISES FRONTALES  
AUFSTECK-FRAESERDORNE  
STUB ARBORS

Ø16 L=55 (Max. Tool Ø50)  
Ø22 L=55 (Max. Tool Ø63)  
Ø27 L=55 (Max. Tool Ø80)  
Ø32 L=55 (Max. Tool Ø100)  
Ø40 L=55 (Max. Tool Ø125)

050621  
050622  
050623  
050624  
050625

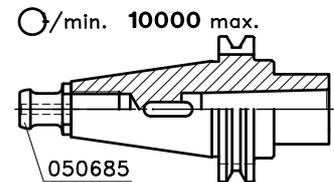
Ø/min. 10000 max.



MANDRINI PORTA FRESE CODOLO MORSE  
DOUILLE PORTE-FRAISES CONE MORSE  
MORSEKEGELAUFNHME MIT ANZUGSGEWINDE  
MORSE TAPER CUTTERS MORSE TANG

Morse 2	050662
Morse 3	050663
Morse 4	050664

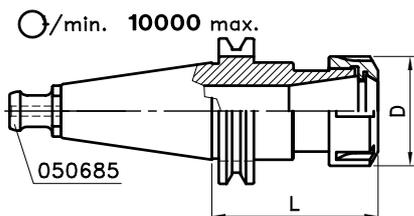
Ø/min. 10000 max.



MANDRINI PORTA PUNTE CODOLO MORSE  
DOUILLES PORTE-FORETS CONE MORSE  
MORSEKEGELAUFNHME MIT AUSTREIBLAPPEN  
MORSE TAPER DRILLS MORSE TANG

Morse 2	050672
Morse 3	050673
Morse 4	050674
Morse 5	050675

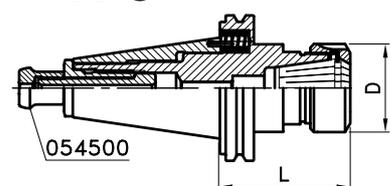
Ø/min. 10000 max.



MANDRINO PORTA PINZE ER 32  
MANDRIN PORTE-PINCES ER 32  
SPANNZANGENFUTTER ER 32  
ER 32 COLLET-HOLDER

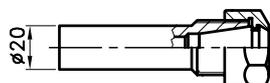
D=50 L=70	050650
D=50 L=160	050653

HSC Ø/min. 16000 max.



MANDRINO PORTA PINZE HSC ER32  
COLLET-HOLDER HSC ER32  
SPANNZANGENFUTTER HSC ER32  
MANDRIN PORTE-PINCES HSC ER32

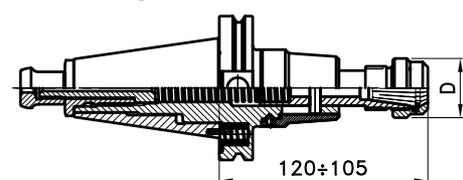
D=50 L=70	050630
D=50 L=125	050631



SPINA PER PINZE ER 20  
PORTE-PINCES ER 20  
SPANNZANGENFUTTER ER 20  
ER 20 COLLET-HOLDER

050145

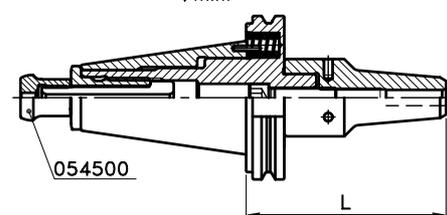
HSC Ø/min. 16000 max.



MANDRINO ELASTICO PORTA PINZE HSC  
ELASTIC COLLET-HOLDER HSC  
ELASHSCHES SPANNZANGENFUTTER HSC  
MANDRIN ELASTIQUE PORTE-PINCES HSC

D34	ER20	050657
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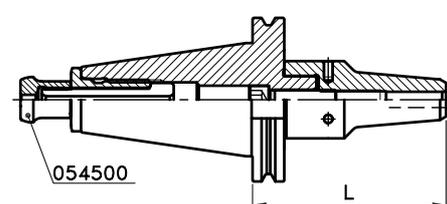
HSC Ø/min. 20000 max. (G2.5/16000)



PORTA UTENSILI A RISCALDO  
WARM UP TOOL-HOLDERS  
SCHRUMPFUTTER  
PORTE-OUTILS FRETTE

Ø	L	
3	105	054503
4	105	054504
5	105	054505
6	105	054506
8	100	054508
10	100	054510
12	100	054512
3	205	054703
4	205	054704
5	205	054705
6	205	054706

STANDARD Ø/min. 10000 max. (G2.5/8000)

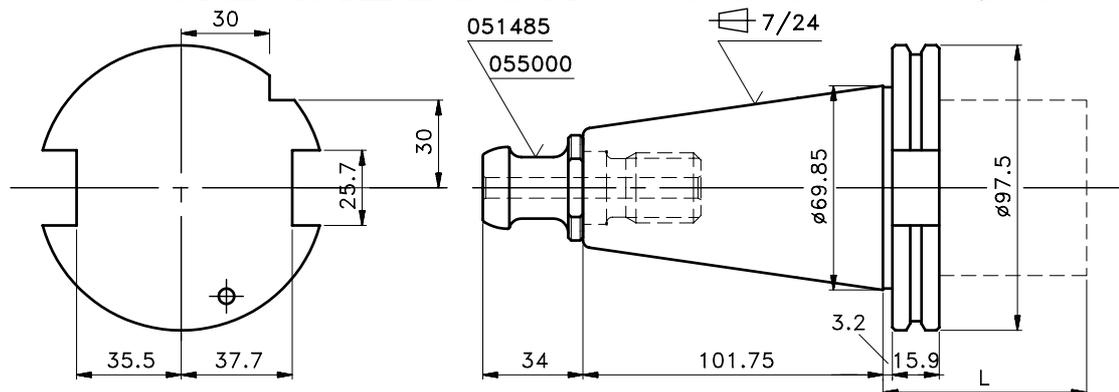


PORTA UTENSILI A RISCALDO  
WARM UP TOOL-HOLDERS  
SCHRUMPFUTTER  
PORTE-OUTILS FRETTE

Ø	L	
8	100	054608
10	100	054610
12	100	054612
16	105	054616
20	105	054620
8	200	054808
10	200	054810
12	200	054812
16	205	054816
20	205	054820

# PORTA UTENSILI WERKZEUGHALTER

# TOOL-HOLDERS PORTE-OUTILS

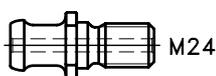


# V50

ISO 7388  
DIN 69871

## V50

Tipo  
Type



INSERTI FILETTATI  
PULL-STUDS  
ANZUGSBOLZEN  
EMBOUITS DE TIRAGE

ISOV50  
BT50

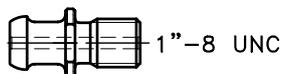
051485



INSERTI ADATTATIVI  
SWIVEL PULL-STUDS  
ANPASSENDER SPANNBOLZEN  
EMBOUITS DE TIRAGE ADAPTATIF

ISOV50  
BT50

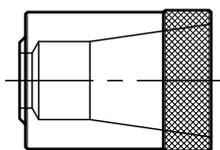
055000



INSERTI FILETTATI  
PULL-STUDS  
ANZUGSBOLZEN  
EMBOUITS DE TIRAGE

CAT50

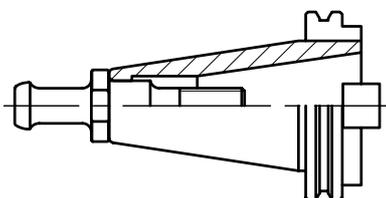
051487



CALIBRO CONTROLLO INSERTI  
TESTING PULL-STUDS  
SPANNBOLZEN-KALIBER  
CALIBRE POUR LES TIRETTES

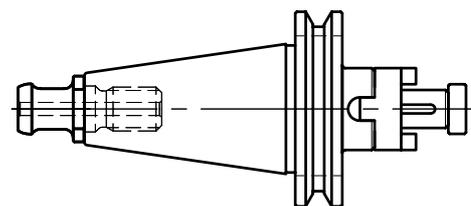
ISOV50  
CAT50  
BT50

051486



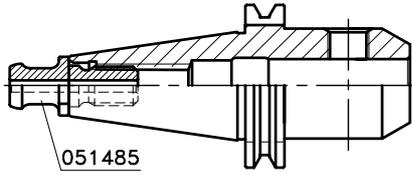
MANDRINI RIDUZIONE  
DOUILLE DE REDUCTION  
REDUZIERHUELSEN  
ADAPTERS  
ISO V50 → ISO V45  
ISO V50 → ISO 40/ISO V40  
(Solo inserto - Pull stud only Euro 20)

051440  
051441



MANDRINI PORTA FRESE FRONTALI  
ARBRES PORTE-FRAISES FRONTALES  
AUFSTECK-FRAESERDORNE  
STUB ARBORS  
ø22 (Tool ø63)  
ø27 (Tool ø80)  
ø32 (Tool ø100)  
ø40 (Tool ø125)

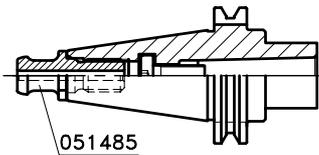
051421  
051422  
051423  
051424



MANDRINI PORTA FRESE WELDON  
DOUILLE PORTE-FRAISES WELDON  
WELDON-FRAESERHALTER

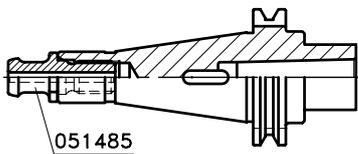
WELDON MILL HOLDERS

∅20 (L=95)	051411
∅25 (L=100)	051412
∅32 (L=105)	051413
∅40 (L=125)	051414



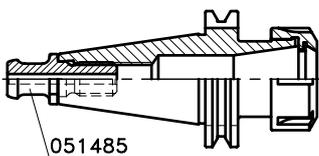
MANDRINI PORTA FRESE CODOLO MORSE  
DOUILLE PORTE-FRAISES CONE MORSE  
MORSEKEGELAUFNÄHME MIT ANZUGSGEWINDE  
MORSE TAPER CUTTERS MORSE TANG

Morse 2	051462
Morse 3	051463
Morse 4	051464
Morse 5	051465



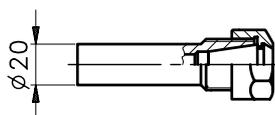
MANDRINI PORTA PUNTE CODOLO MORSE  
DOUILLES PORTE-FORETS CONE MORSE  
MORSEKEGELAUFNÄHME MIT AUSTREIBLAPPEN  
MORSE TAPER DRILLS MORSE TANG

Morse 2	051472
Morse 3	051473
Morse 4	051474
Morse 5	051475



MANDRINO PORTA PINZE  
MANDRIN PORTE-PINCES  
SPANNZANGENFUTTER  
COLLET-HOLDER

L=80 - ER 32	051450
L=60 - ER 60	051453

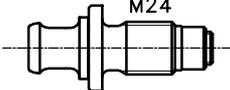
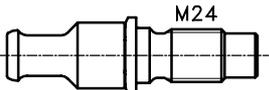
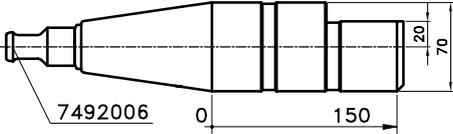
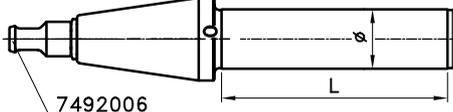
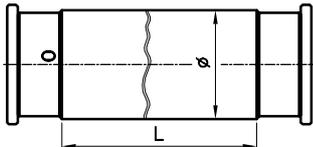
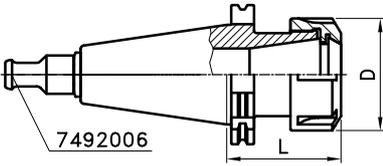
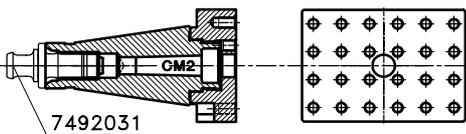
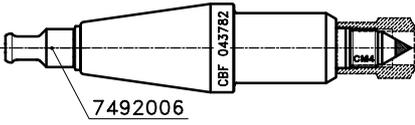
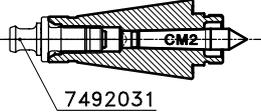
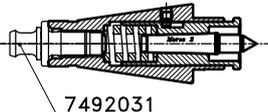


SPINA PER PINZE ER 20  
PORTE-PINCES ER 20  
SPANNZANGENFUTTER ER 20  
ER 20 COLLET-HOLDER

050145

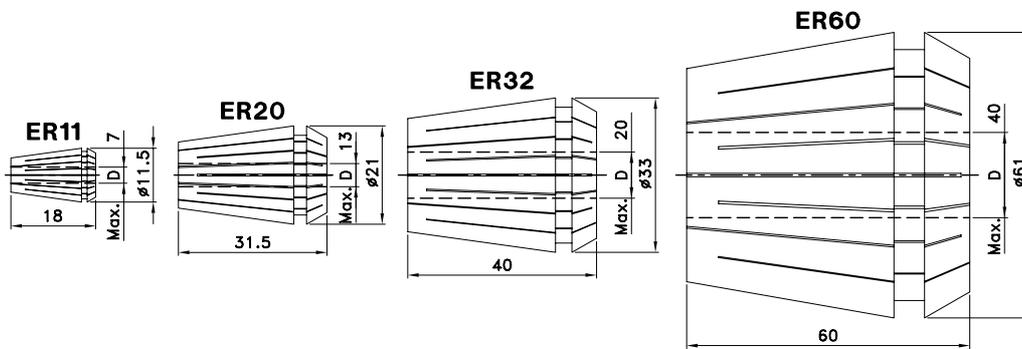
# ACCESSORI PORTA PEZZI PER DIVISORI PIECES HOLDER ACCESSORIES FOR DIVIDING HEADS

## ISO 50 ISO2583 - DIN2080 ISO V50 ISO7388 - DIN69871 BT 50 MAS403BT

		Tipo Type		
	INSERTO ADATTATIVO SWIVEL PULL-STUD	ISO 50	7492031	
	INSERTO ADATTATIVO SWIVEL PULL-STUD	ISOV 50 - BT 50 CAT50	7492006 7492033	
	CALIBRO AZZERAMENTO ASSE AXIS SETTING GAUGE	ISO 50	050858	
	SPINA DI CONTROLLO TEST MANDREL	∅50x310 ∅30x200	ISO 50 MORSE 4	050809 050009
	SPINA ALLINEAMENTO CONTROPUNTA TAILSTOCK ALIGNMENT BAR	∅50x310 ∅62x510	050245 050246	
	MANDRINO PORTA PINZE COLLET-HOLDER	D=50 L=80 ER 32 D=83 L=70 ER 60	050850 050853	
	PALLETS CON CONO PALLETS WITH TAPER	98x145	ISO 50	033410
	PUNTA CON DADO CENTRE WITH BOLT	MORSE 2 MORSE 4	4698008 4698001	
	CONO CON PUNTA MORSE 4 TAPER WITH MORSE 4 CENTRE PER DIVISORE SINISTRO FOR LEFT DIVIDING UNIT	ISO 50	043782	
	CONO CON PUNTA MORSE 2 TAPER WITH MORSE 2 CENTRE	ISO 40 ISO 50	043770 043780	
	CONTROPUNTA A MOLLE SENZA ARRESTO ASSE SPRING TAILSTOCK WITHOUT AXIS STOP PER DIVISORE SINISTRO FOR LEFT DIVIDING UNIT	MORSE 2 - ISO 50 720÷4400 N	043740	

# PINZE COLLETS SPANNZANGEN PINCES

DIN6499-B



Taglia Size	D	Tipo Type	Qta Qty	D	Tipo Type	Qta Qty
<b>ER11</b>	7 – 6.5	034360		4 – 3.5	034366	
	6.5 – 6	034361		3.5 – 3	034367	
	6 – 5.5	034362		3 – 2.5	034368	
	5.5 – 5	034363		2.5 – 2	034369	
	5 – 4.5	034364		2 – 1.5	034370	
	4.5 – 4	034365		1.5 – 1	034371	
<i>12 Collets Set D=1.5÷7</i>					034357	
<b>ER20</b>	13 – 12	034380		6 – 5	034387	
	12 – 11	034381		5 – 4	034388	
	11 – 10	034382		4 – 3	034389	
	10 – 9	034383		3 – 2.5	034390	
	9 – 8	034384		2.5 – 2	034391	
	8 – 7	034385		2 – 1.5	034392	
7 – 6	034386		1.5 – 1	034393		
<i>14 Collets Set D=1.5÷13</i>					034377	
<b>ER32</b>	20 – 19	034410		11 – 10	034419	
	19 – 18	034411		10 – 9	034420	
	18 – 17	034412		9 – 8	034421	
	17 – 16	034413		8 – 7	034422	
	16 – 15	034414		7 – 6	034423	
	15 – 14	034415		6 – 5	034424	
	14 – 13	034416		5 – 4	034425	
	13 – 12	034417		4 – 3	034426	
12 – 11	034418					
<i>17 Collets Set D=4÷20</i>					034407	
<b>ER60</b>	40	034435		25	034443	
	32	034439		20	034447	

## INDICAZIONI PER L'EQUILIBRATURA DEI PORTAUTENSILI HSC

### 1. Cause di squilibrio

- Asimmetrie di carattere geometrico per necessità di progetto o di costruzione (cave per chiavette, riferimenti per cambio utensile);
- Tolleranze di lavorazione e di montaggio producenti eccentricità;

### 2. Effetti degli squilibri

- Usura dei cuscinetti del mandrino e delle parti meccaniche direttamente interessate dalle vibrazioni;
- Deterioramento della qualità delle lavorazioni eseguite dalla macchina sia a livello estetico che dimensionale;
- Riduzione della durata del tagliente.

### 3. Equilibratura su un piano (statica)

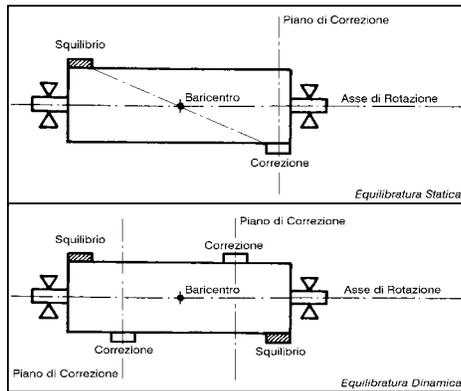
Le macchine di equilibratura su un piano realizzano solamente la misura e la correzione di uno squilibrio statico (il baricentro del portautensile viene spostato sull'asse di rotazione).

Nel caso in esame la posizione del piano di correzione è imposta da esigenze di carattere geometrico, ed in genere non coincide col piano dello squilibrio.

### 4. Equilibratura su due piani (dinamica)

La macchina di equilibratura su due piani consente la misura e la correzione di uno squilibrio dinamico (il baricentro del portautensile viene spostato sull'asse di rotazione e vengono eliminati eventuali squilibri di coppia) agendo su due piani di compensazione comunque predefiniti.

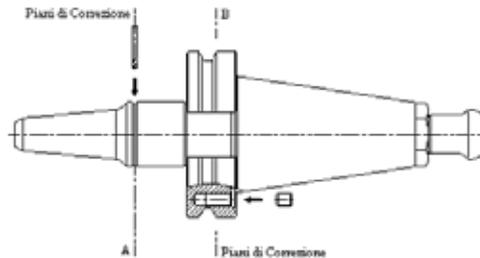
Valutata sperimentalmente l'influenza non trascurabile degli squilibri di coppia sui portautensili per alta velocità, C.B.Ferrari consiglia di eseguire esclusivamente un'equilibratura su due piani (dinamica).



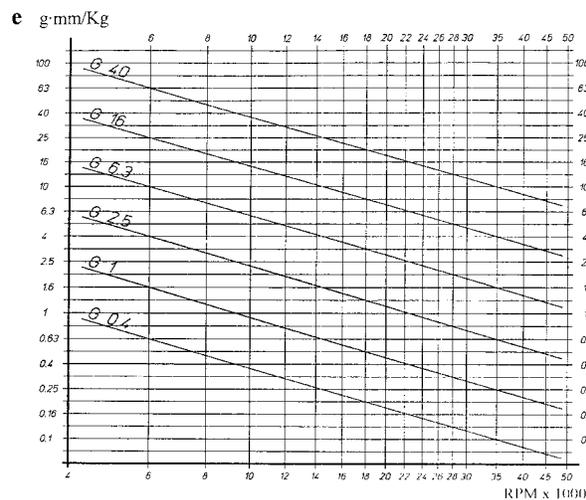
### 5. Metodo di compensazione

I portautensili per alta velocità C.B.Ferrari sono dotati di una corona di fori assiali filettati situata all'interno della flangia e da una cava circolare posta anteriormente che individuano rispettivamente i due piani di correzione.

In fase di equilibratura è relativamente semplice raggiungere le tolleranze previste aggiungendo, dove necessario, grani calibrati che possono essere assicurati tramite opportune colle all'interno della flangia (B), e/o forando con punte di diametro opportuno in corrispondenza della cava circolare (A).



### 6. Tolleranza di equilibratura



Per quanto riguarda la tolleranza di equilibratura si fa riferimento alla norma ISO 1940 "Balance Quality of Rotating Rigid Bodies": ad ogni classe di rotanti corrisponde un grado di equilibratura  $G$ , fornito dall'esperienza, che è matematicamente legato allo squilibrio  $U$  dalla:

$$G = \frac{U}{M} \omega = \frac{mr}{M} \omega = e\omega$$

L'unità di misura del grado di equilibratura  $G$  è  $mm/s$  (velocità baricentrica).

Affinché un portautensile appartenga ad una certa classe di equilibratura, occorre che, in funzione della sua velocità angolare massima di servizio, il suo squilibrio specifico residuo  $e$  sia tale da soddisfare la relazione:  $e \leq \frac{G}{\omega}$

Si riporta in proposito il diagramma fornito dalla ISO 1940 con cui è possibile ricavare lo squilibrio specifico residuo in funzione del grado di equilibratura e della velocità di rotazione massima del portautensile.

I portautensili HSC C.B.Ferrari sono equilibrati in grado  $G2.5$  (ISO 1940) alla velocità di rotazione massima.

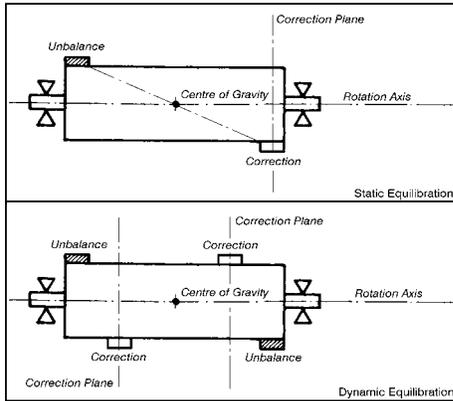
## BALANCING INSTRUCTIONS FOR HSC TOOLHOLDERS

### 1. Causes of unbalance

- a) Geometric asymmetries derived from design or construction requirements (slots, references for tool change).
- b) Eccentricity derived from machining and mounting tolerances.

### 2. Unbalance effects

- a) Wear of spindle bearings and wear of the mechanical parts directly involved by the vibrations.
- b) Aesthetic and dimensional deterioration of the finishing quality.
- c) Tool life reduction.



### 3. Single plane balancing (static)

Single plane equilibrator equipment allows only to measure and correct a static loss of balance (the toolholder centre of gravity is moved on the rotation axis). In this case, the correction plane position is imposed by geometric requirements and usually not coincident with the plane where you have the loss of balance.

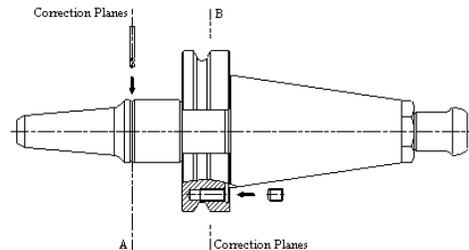
### 4. Two plane balancing (dynamic)

Two plane equilibrator equipment allows to measure and correct a dynamic loss of balance (the toolholder centre of gravity is moved on the rotation axis and some eventual couple unbalances are removed) by acting on two predefined compensation planes.

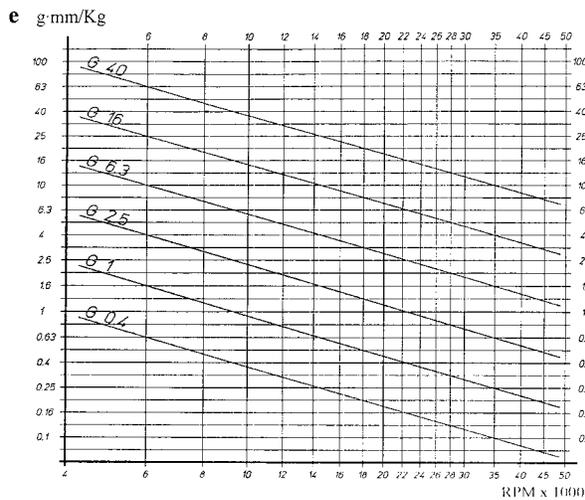
After experimental evaluation of the unbalance error effects on the HSC toolholders, C.B. Ferrari advise that only a two plane balancing operation (dynamic) should be used.

### 5. Compensation method

The C.B. Ferrari's high-speed toolholders have two correction planes. At plane (A) balancing is achieved by drilling to remove material. At plane (B), balancing is achieved by adding the correct calibrated screw as required.



### 6. Equilibration tolerance



About the equilibration tolerance, we use the ISO 1940 normative "Balance Quality of Rotating Rigid Bodies".

For each class or rotating objects, there is an equilibration grade  $G$ , given by the experience, that is mathematically linked with the unbalance error  $U$  by the equation :

$$G = \frac{U}{M} \omega = \frac{mr}{M} \omega = e \omega$$

The unit of measure for  $G$  is  $mm/s$  (centre of gravity speed).

A toolholder belonging to a particular class only if, in function of its maximum useful angular velocity, its specific residual  $e$

value, satisfy the relation :  $e \leq \frac{G}{\omega}$

In the above picture, you can see the ISO 1940 diagram. From this diagram you can calculate the residual specific unbalance as function of the equilibration grade  $e$  and the maximum rotation speed of the toolholder.

The C.B. Ferrari's HSC toolholders are balanced under a  $G2.5$  (ISO 1940) grade at the maximum rotation speed.