



ALLIED MACHINE & ENGINEERING

Holemaking Solutions for Today's Manufacturing



Drilling



Reaming



Burnishing



Threading



Specials



Wohlhaupter®

► *BORING*

Fine Boring Tools

WOHLHAUPTER®

SECTION

B10-B

Fine Boring

Wohlhaupter® Fine Boring

420 (410) | 465 (464) | 365 (364) | 565 (564) | 320 (310) | 538 (537)

► **Diameter Range:** 0.787" - 8.071" (20.00mm - 205.00mm)



NOTE: Imperial items pictured
NOTE: Adjustment accuracy of 0.0001"
or 0.002mm on diameter

Boring has never been more exciting.

Wohlhaupter's fine boring systems are offered in both vernier and easy-to-read digital readout boring heads and cassettes. The lightweight Alu-Line serrated tool bodies reduce weight on the machine spindle.

Unbalanced & Balanced Digital 3E^{TECH} Boring Heads

- 420 (410) / 465 (464) fine boring heads
- 420 (410) \varnothing 0.787" - 1.142" (20.00mm - 29.00mm)
- 465 (464) \varnothing 1.142" - 8.071" (29.00mm - 205.00mm)

Balanced Analog Boring Heads

- 365 (364) / 465 (464) fine boring heads
- 365 (364) \varnothing 0.787" - 1.161" (20.00mm - 29.50mm)
- 465 (464) \varnothing 1.142" - 8.071" (29.00mm - 205.00mm)

Balanced Digital Boring Heads

- 565 (564) fine boring heads
- \varnothing 1.969" - 8.071" (50.00mm - 205.00mm)

Unbalanced Analog Boring Heads

- 320 (310) fine boring heads
- \varnothing 0.787" - 8.071" (20.00mm - 205.00mm)

Analog and Digital Cassettes

- 538 (537) fine boring cassettes
- \varnothing 3.937" - 8.071" (100.00mm - 205.00mm)

Applicable Industries



Aerospace



Agriculture



Automotive



Firearms



General
Machining



Oil & Gas



Renewable
Energy

Your safety and the safety of others is very important. This catalog contains important safety messages. Always read and follow all safety precautions.



This triangle is a safety hazard symbol. It alerts you to potential safety hazards that can cause tool failure and serious injury.

When you see this symbol in the catalog, look for a related safety message that may be near this triangle or referred to in the nearby text.

There are safety signal words also used in the catalog. Safety messages follow these words.

WARNING

WARNING (shown above) means that failure to follow the precautions in this message could result in tool failure and serious injury.

NOTICE means that failure to follow the precautions in this message could result in damage to the tool or machine but not result in personal injury.

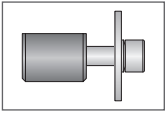
NOTE and **IMPORTANT** are also used. These are important that you read and follow but are not safety-related.

Visit www.alliedmachine.com for the most up-to-date information and procedures.

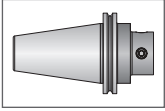
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Reference Icons

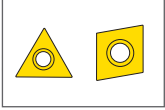
The following icons will appear throughout the catalog to help you navigate between products.



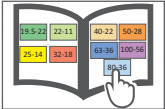
Clamping Elements
For use with insert holders and boring heads



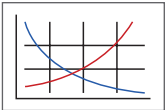
Shanks
A variety of shanks for different machines



Inserts
For use with insert holder boring heads and boring bars using indexable inserts



MVS Connection Color Guide
Detailed instructions and information regarding the MVS connection(s)



Recommended Cutting Data
Speed and feed recommendations for optimum and safe boring



Coolant-Through Option
Indicates that the product is coolant through

Digital 3E^{TECH} 420 (410) / 465 (464)

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Series	Diameter Range	
	Imperial (inch)	Metric (mm)
420 (410)	0.787 - 1.142	20.00 - 29.00
465 (464)	1.142 - 8.071	29.00 - 205.00
365 (364)	0.787 - 1.161	20.00 - 29.50
565 (564)	1.969 - 8.071	50.00 - 205.00
320 (310)	0.787 - 8.071	20.00 - 205.00
538 (537)	3.937 - 8.071	100.00 - 205.00

420 (410) and 465 (464) Product Overview

Digital 3E^{TECH} 420 (410) and 465 (464) FINE BORING

Make easy diameter adjustments with our 3E^{TECH} digital readout module.

Wohlhaupter® 420 (410) and 465 (464) digital boring heads are equipped with a 3E^{TECH} docking port for easy digital adjustments. Boring heads from 1.142" (29.00mm) and up offer precision boring with automatic balancing. Our boring heads are specifically engineered to minimize the residual imbalance produced by insert holder displacement. Wohlhaupter Alu-Line boring heads, ranging from 2.559" (65.00mm) and up, offer a lightweight aluminum design with a wear-resistant coating that reduces weight on the spindle up to 50%. The insert holder can also be rotated for reverse machining jobs.

- Unbalanced 420 (410) diameter range: 0.787" - 1.142" (20.00mm - 29.00mm)
- Balanced 465 (464) diameter range: 1.142" - 8.071" (29.00mm - 205.00mm)
- Balanced 465 (464) Alu-Line diameter range: 2.559" - 8.071" (65.00mm - 205.00mm)
 - Special coating on Alu-Line for wear-resistant surface
 - Alu-Line body reduces tool weight by 50%, reducing stress on the spindle
- Coolant through
- 3E^{TECH} and vernier diameter adjustment of 0.0001" (0.002mm)
- Internal balancing improves tool life and surface finish
- Insert holder can be rotated for back boring jobs
- Max cutting speed: 5,577 SFM (1,700 m/min)

Highly accurate adjustments through *vernier* scale



NOTE: Imperial items pictured

NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

Versatile 3E^{TECH} digital readout compatible with other boring tools

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-M: 12 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: 7611 | email: appeng@alliedmachine.com

WOHLHAUPTER® 420 (410) and 465 (464) 3E^{TECH} DIGITAL BORING HEADS

Wohlhaupter 3E^{TECH}

Improve productivity and quality with the Wohlhaupter 3E^{TECH} external digital readout module. The 3E^{TECH} docks onto boring heads and cassettes that offer the 3E^{TECH} port to make easy diameter adjustments at the machine.

- Make quick and easy micron-accurate diameter adjustments
- Easy-to-read digital display shows exact diameter adjustments
- Designed to be removed from boring tool before operation (if forgotten 3E^{TECH} will fall off at 500 RPM)
- Adjustments of 0.0001" (0.002mm) on diameter
- Available in imperial and metric
- Water and dust resistant IP 56
- Coolant and chip resistant
- 3E^{TECH} will automatically turn off after 30 seconds of not using
- WEEE-Reg.-Nr. DE 15820388

- ✓ High-production fine boring
- ✓ Easy diameter adjustment with 3E^{TECH}
- ✓ Self-balancing 465 (464) boring heads
- ✓ Imperial and metric

NEW 420 (410) & 465 (464) BORING HEADS WITH 3E ^{TECH}		
	Diameter Range	Part No.
i	0.787 - 0.965	COMING SEPTEMBER
	0.965 - 1.142	
	1.142 - 1.496	
	1.496 - 1.969	
	1.969 - 2.579	465005
	2.559 - 3.268	465006
	3.228 - 4.055	465007
	3.937 - 5.118	465008
	4.921 - 6.594	465009
	6.398 - 8.071	465010
m	20.00 - 24.50	COMING SEPTEMBER
	24.50 - 29.00	
	29.00 - 38.00	
	38.00 - 50.00	
	50.00 - 65.50	464005
	65.00 - 83.00	464006
	82.00 - 103.00	464007
	100.00 - 130.00	464008
	125.00 - 167.50	464009
	162.50 - 205.00	464010



NOTE: Imperial items pictured

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-M: 12 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
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420 (410) Unbalanced Boring Heads with 3E^{TECH}

Diameter Range: 0.787" - 1.142" (20.00mm - 29.00mm)



Form 101



Form 20

420 Unbalanced Boring Heads with 3E^{TECH}

MVS Connection	Boring Range	Boring Head				Part No.			
D ₁ D ₂	A	X ₁	L ₂	D ₃	Weight	Insert Form	Insert Holder	Boring Head	

COMING SEPTEMBER

*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)
NOTE: 3E^{TECH} module, insert holders, and inserts sold separately



3E^{TECH} Digital Readout Module

	Part No.
ⓘ	563010
Ⓜ	536010

NOTE: WEEE-Reg.-Nr. DE 15820388
NOTE: 3E^{TECH} sold separately

NOTE: Imperial item pictured
NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter



ⓘ = Imperial (in)
Ⓜ = Metric (mm)

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-M: 12 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
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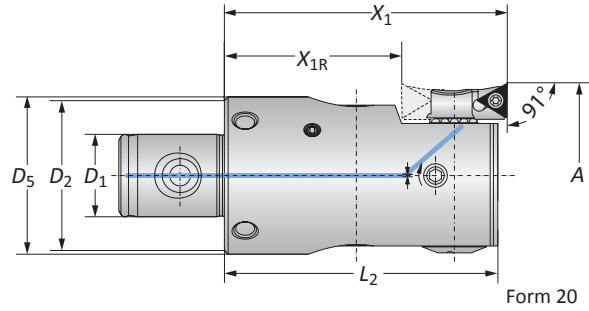
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465 (464) Balanced Boring Heads with 3E^{TECH}

Diameter Range: 1.142" - 2.579" (29.00mm - 65.50mm)



Form 101



Form 20

465 Balanced Boring Heads with 3E^{TECH}

	MVS Connection		Boring Range				Boring Head			Part No.	
	D_2 D_1	A	X_1	X_{1R}	L_2	D_5	Weight	Insert Form	Insert Holder	Boring Head	
i	25 - 14	1.142 - 1.496	2.205	–	2.106	1.063	0.463 (lbs)	20	210059	COMING SEPTEMBER	
	25 - 14	1.142 - 1.496	2.205	–	2.106	1.063	0.463 (lbs)	101	210069		
	32 - 18	1.496 - 1.969	2.598	1.496	2.500	1.339	0.904 (lbs)	20	264051		
	32 - 18	1.496 - 1.969	2.598	1.496	2.500	1.339	0.904 (lbs)	101	264077		
	40 - 22	1.969 - 2.579	2.953	1.850	2.854	1.654	1.764 (lbs)	20	210052		
	40 - 22	1.969 - 2.579	2.953	1.850	2.854	1.654	1.764 (lbs)	101	210062		

NOTE: X_{1R} = rotated insert holder for reverse machining
 NOTE: 3E^{TECH} module, insert holders, and inserts sold separately

464 Balanced Boring Heads with 3E^{TECH}

	MVS Connection		Boring Range				Boring Head			Part No.	
	D_2 D_1	A	X_1	X_{1R}	L_2	D_5	Weight	Insert Form	Insert Holder	Boring Head	
m	25 - 14	29.00 - 38.00	56.00	–	53.50	27.00	0.21 (kg)	20	210059	COMING SEPTEMBER	
	25 - 14	29.00 - 38.00	56.00	–	53.50	27.00	0.21 (kg)	101	210069		
	32 - 18	38.00 - 50.00	66.00	38.00	63.50	34.00	0.41 (kg)	20	264051		
	32 - 18	38.00 - 50.00	66.00	38.00	63.50	34.00	0.41 (kg)	101	264077		
	40 - 22	50.00 - 65.50	75.00	47.00	72.50	42.00	0.80 (kg)	20	210052		
	40 - 22	50.00 - 65.50	75.00	47.00	72.50	42.00	0.80 (kg)	101	210062		

NOTE: X_{1R} = rotated insert holder for reverse machining
 NOTE: 3E^{TECH} module, insert holders, and inserts sold separately

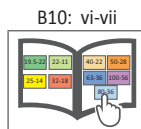
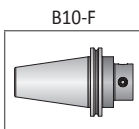
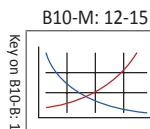


3E^{TECH} Digital Readout Module

Part No.	
i	563010
m	536010

NOTE: WEEE-Reg.-Nr. DE 15820388
 NOTE: 3E^{TECH} sold separately

NOTE: Imperial item pictured
 NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter



i = Imperial (in)
 m = Metric (mm)

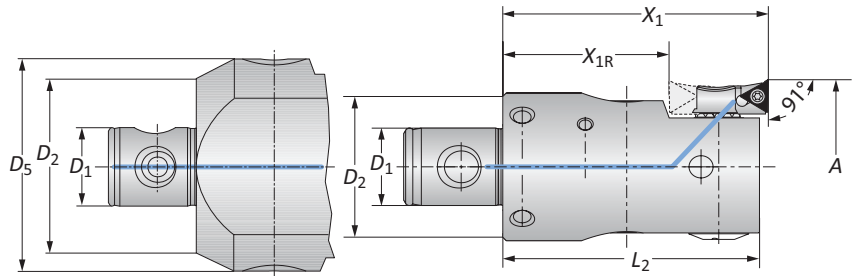
IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-M: 12 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
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465 Balanced Boring Heads with 3E^{TECH}

Imperial | Alu-Line | Diameter Range: 2.559" - 8.071"



Form 101



Form 20

465 Balanced Alu-Line Boring Heads with 3E^{TECH}

MVS Connection	Boring Range	Boring Head					Weight	Insert Form	Part No.	
		$D_2 D_1$	A	X_1	X_{1R}	L_2			D_5	Insert Holder
	50 - 28	2.559 - 3.268	2.953	1.535	2.874	-	1.323 (lbs)	20	210020	465006
	50 - 28	2.559 - 3.268	2.953	1.535	2.874	-	1.323 (lbs)	101	210063	465006
	50 - 28	2.559 - 3.268	2.953	1.535	2.874	-	1.323 (lbs)	103	210064	465006
	63 - 36	3.228 - 4.055	3.543	2.126	3.464	-	2.205 (lbs)	20	210020	465007
	63 - 36	3.228 - 4.055	3.543	2.126	3.464	-	2.205 (lbs)	101	210063	465007
	63 - 36	3.228 - 4.055	3.543	2.126	3.464	-	2.205 (lbs)	103	210064	465007
	80 - 36	3.937 - 5.118	3.543	2.126	3.464	-	3.307 (lbs)	20	210020	465008
	80 - 36	3.937 - 5.118	3.543	2.126	3.464	-	3.307 (lbs)	101	210063	465008
	80 - 36	3.937 - 5.118	3.543	2.126	3.464	-	3.307 (lbs)	103	210064	465008
	80 - 36	4.921 - 6.594	3.543	2.126	3.464	3.937	3.307 (lbs)	20	210020	465009
	80 - 36	4.921 - 6.594	3.543	2.126	3.464	3.937	4.189 (lbs)	101	210063	465009
	80 - 36	4.921 - 6.594	3.543	2.126	3.464	3.937	4.189 (lbs)	103	210064	465009
	80 - 36	6.398 - 8.071	3.543	2.126	3.464	5.315	4.189 (lbs)	20	210020	465010
	80 - 36	6.398 - 8.071	3.543	2.126	3.464	5.315	4.189 (lbs)	101	210063	465010
	80 - 36	6.398 - 8.071	3.543	2.126	3.464	5.315	5.512 (lbs)	103	210064	465010

NOTE: X_{1R} = rotated insert holder for reverse machining
 NOTE: 3E^{TECH} module, insert holders, and inserts sold separately



3E^{TECH} Digital Readout Module

Part No.
563010

NOTE: WEEE-Reg.-Nr. DE 15820388
 NOTE: 3E^{TECH} sold separately

NOTE: Imperial item pictured
 NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

Key on B10-B: 1

B10-M: 12-15

B10-F

B10: vi-vii

i = Imperial (in)
m = Metric (mm)

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-M: 12 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
 ext: 7611 | email: appeng@alliedmachine.com

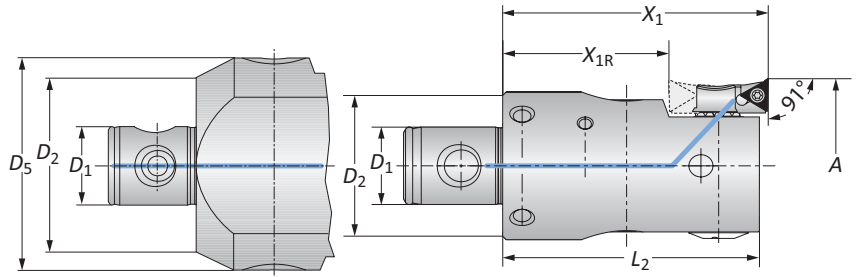


464 Balanced Boring Heads with 3E^{TECH}

Metric | Alu-Line | Diameter Range: 65.00mm - 205.00mm



Form 101



Form 20

464 Balanced Alu-Line Boring Heads with 3E^{TECH}

MVS Connection	Boring Range	Boring Head					Weight	Insert Form	Part No.	
		$D_2 D_1$	A	X_1	X_{1R}	L_2			D_5	Insert Holder
m	50 - 28	65.00 - 83.00	75.00	39.00	73.00	-	0.60 (kg)	20	210020	464006
	50 - 28	65.00 - 83.00	75.00	39.00	73.00	-	0.60 (kg)	101	210063	464006
	50 - 28	65.00 - 83.00	75.00	39.00	73.00	-	0.60 (kg)	103	210064	464006
	63 - 36	82.00 - 103.00	90.00	54.00	88.00	-	1.00 (kg)	20	210020	464007
	63 - 36	82.00 - 103.00	90.00	54.00	88.00	-	1.00 (kg)	101	210063	464007
	63 - 36	82.00 - 103.00	90.00	54.00	88.00	-	1.00 (kg)	103	210064	464007
	80 - 36	100.00 - 130.00	90.00	54.00	88.00	-	1.50 (kg)	20	210020	464008
	80 - 36	100.00 - 130.00	90.00	54.00	88.00	-	1.50 (kg)	101	210063	464008
	80 - 36	100.00 - 130.00	90.00	54.00	88.00	-	1.50 (kg)	103	210064	464008
	80 - 36	125.00 - 167.50	90.00	54.00	88.00	100.00	1.90 (kg)	20	210020	464009
	80 - 36	125.00 - 167.50	90.00	54.00	88.00	100.00	1.90 (kg)	101	210063	464009
	80 - 36	125.00 - 167.50	90.00	54.00	88.00	100.00	1.90 (kg)	103	210064	464009
	80 - 36	162.50 - 205.00	90.00	54.00	88.00	135.00	2.50 (kg)	20	210020	464010
	80 - 36	162.50 - 205.00	90.00	54.00	88.00	135.00	2.50 (kg)	101	210063	464010
	80 - 36	162.50 - 205.00	90.00	54.00	88.00	135.00	2.50 (kg)	103	210064	464010

NOTE: X_{1R} = rotated insert holder for reverse machining
 NOTE: 3E^{TECH} module, insert holders, and inserts sold separately

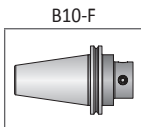
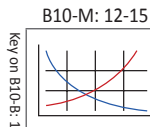


3E^{TECH} Digital Readout Module

Part No.
m 536010

NOTE: WEEE-Reg.-Nr. DE 15820388
 NOTE: 3E^{TECH} sold separately

NOTE: Imperial item pictured
 NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

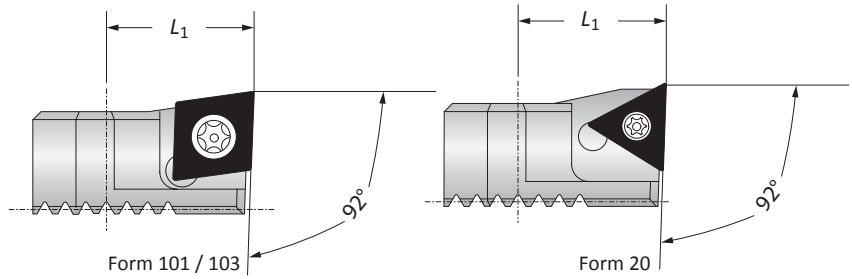


i = Imperial (in)
 m = Metric (mm)

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Insert Holders for Abrasive Materials

Diameter Range: 2.559" - 8.071" (65.00mm - 205.00mm)

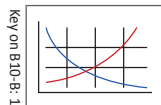


		Insert Holder			
Boring Range		L_1	Weight	Insert Form	Part No.
i	2.559 - 8.071	0.709	0.066 (lbs)	20	211061
	2.559 - 8.071	0.709	0.066 (lbs)	101	211063
	2.559 - 8.071	0.709	0.066 (lbs)	103	211065
m	65.00 - 205.00	18.00	0.03 (kg)	20	211061
	65.00 - 205.00	18.00	0.03 (kg)	101	211063
	65.00 - 205.00	18.00	0.03 (kg)	103	211065

NOTE: Insert holders used for abrasive materials to protect boring head against chip wash

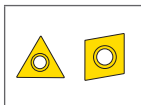
NOTE: When machining grey cast iron, we recommend using insert holders for abrasive materials with CBN inserts for optimized chip removal.

B10-M: 12-15

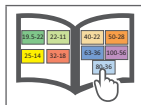


Key on B10-B: 1

B10-H



B10: vi-vii

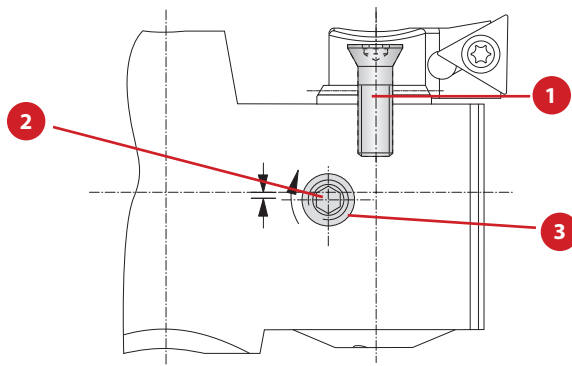


i = Imperial (in)
m = Metric (mm)

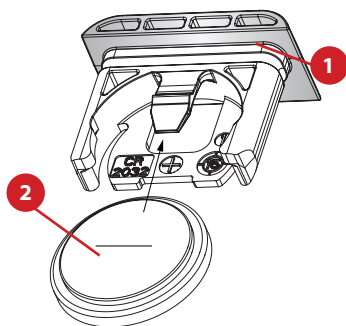
Inserts sold separately

Accessories

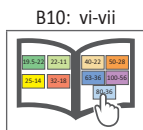
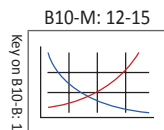
Screws | 3E^{TECH} Accessories



Boring Head	Part No.				
	1 Countersunk Screw	Countersunk Screw Service Key	2 Clamping Screw	Clamping Screw Service Key	3 Ball
420001 (410001)	215323	T15 / H	410151	S2 / A	364270
420002 (410002)	215338	T15 / H	410152	s2 / A	364270
465003 (464003)	215338	T15 / H	364138	s2.5 / A	364139
465004 (464004)	215338	T15 / H	115180	s2.5 / A	-
465005 (464005)	215338	T15 / H	115505	s3 / B	-
465006 (464006)	215462	T20 / H	315943	s4 / B	-
465007 (464007)	215462	T20 / H	515178	s4 / B	-
465008 (464008)	215462	T20 / H	515178	s4 / B	-
465009 (464009)	215462	T20 / H	515178	s4 / B	-
465010 (464010)	215462	T20 / H	515178	s4 / B	-



1 Sealing Ring	2 Battery CR2032
Part No.	Part No.
215483	515491



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365 (364) and 465 (464) Product Overview

Balanced Analog 365 (364) and 465 (464) FINE BORING

Analog fine boring tools for high-production jobs

Wohlhaupter® 365 (364) and 465 (464) analog balanced boring heads offer precision boring with automatic balancing. Our boring heads are specifically engineered to minimize the residual imbalance produced by insert holder displacement. Wohlhaupter Alu-Line boring heads offer a lightweight aluminum design with a wear-resistant coating that reduces weight on the spindle up to 50% yet remains durable in challenging boring applications. The insert holder can also be rotated for reverse machining jobs.

- 365 (364) diameter range: 0.787" - 1.161" (20.00mm - 29.50mm)
- 465 (464) diameter range: 1.142" - 8.071" (29.00mm - 205.00mm)
- 465 (464) Alu-Line diameter range: 2.559" - 8.071" (65.00mm - 205.00mm)
 - Special coating on Alu-Line for wear-resistant surface
 - Alu-Line body reduces tool weight by 50%, reducing stress on the spindle
- Internal balancing improves tool life and surface finish
- Coolant through
- Vernier diameter adjustment of 0.0001" (0.002mm)
- Insert holder can be rotated for back boring jobs
- Max cutting speed: 3,281 SFM (1,000 m/min)



IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-M: 12 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: 7611 | email: appeng@alliedmachine.com

WOHLHAUPTER® 465 (464) BALANCED ANALOG BORING HEADS

ANALOG BORING HEAD PART NUMBER CONVERSION			
Diameter Range	Old Part No.	<i>NEW</i> Part No.	
i	0.787 - 0.965	365030	No Change
	0.965 - 1.161	365031	No Change
	1.142 - 1.516	365032	COMING SEPTEMBER
	1.496 - 1.988	365033	COMING SEPTEMBER
	1.969 - 2.579	365034	465035
	2.559 - 3.268	365045	465036
	3.228 - 4.055	365046	465037
	3.937 - 5.118	365047	465038
	4.921 - 6.594	365048	465039
6.398 - 8.071	365049	465040	
m	20.00 - 24.50	364030	No Change
	24.50 - 29.50	364031	No Change
	29.00 - 38.50	364032	COMING SEPTEMBER
	38.00 - 50.50	364033	COMING SEPTEMBER
	50.00 - 65.50	364034	464035
	65.00 - 83.00	364045	464036
	82.00 - 103.00	364046	464037
	100.00 - 130.00	364047	464038
	125.00 - 167.50	364048	464039
162.50 - 205.00	364049	464040	

✓ High-production fine boring

✓ Easy diameter adjustment

✓ Self-balancing

✓ Imperial and metric

FEATURES AN **ENHANCED** CLAMPING MECHANISM FROM OUR TRUSTED LINE OF 565 (564) DIGITAL FINE BORING HEADS

Aluminum bodies with *wear-resistant* coating from 2.559" - 8.071" (65.00mm - 205.00mm)



Highly accurate adjustments through *vernier* scale



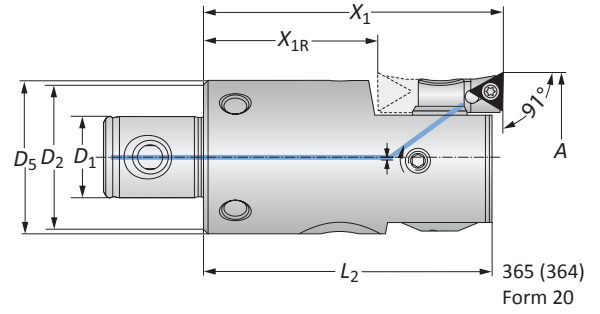
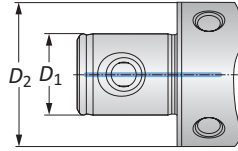
Equipped with *self-balancing* mechanism

365 (364) / 465 (464) Analog Boring Heads

Diameter Range: 0.787" - 2.579" (20.00mm - 65.50mm)



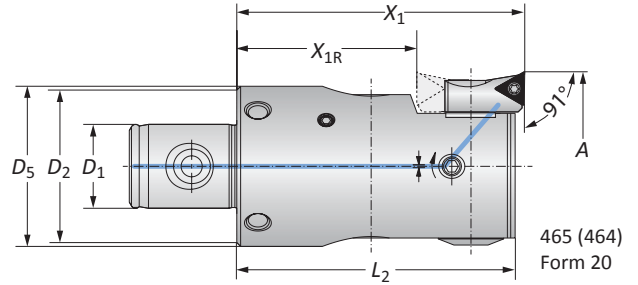
365 (364)
Form 101



365 (364)
Form 20



465 (464)
Form 101



465 (464)
Form 20

365/465 Boring Heads

MVS Connection	Boring Range	Boring Head					Weight	Insert Form	Part No.		
		$D_2 D_1$	A	X_1	X_{1R}	L_2			D_5	Insert Holder	Boring Head
	19 - 11	0.787 - 0.965	1.811	-	1.693	-	0.198 (lbs)	20*	364077	365030	
	22 - 11	0.965 - 1.161	1.811	-	1.713	0.906	0.331 (lbs)	20	210059	365031	
	22 - 11	0.965 - 1.161	1.811	-	1.713	0.906	0.331 (lbs)	101	210069	365031	
	25 - 14	1.142 - 1.516	2.205	-	2.106	1.063	0.441 (lbs)	20	210059	COMING SEPTEMBER	
i	25 - 14	1.142 - 1.516	2.205	-	2.106	1.063	0.441 (lbs)	101	210069		365032
	32 - 18	1.496 - 1.988	2.598	1.496	2.450	1.339	0.882 (lbs)	20	264051		365033
	32 - 18	1.496 - 1.988	2.598	1.496	2.450	1.339	0.882 (lbs)	101	264077		365033
	40 - 22	1.969 - 2.579	2.953	1.850	2.854	1.654	1.764 (lbs)	20	210052		465035
	40 - 22	1.969 - 2.579	2.953	1.850	2.854	1.654	1.764 (lbs)	101	210062	465035	

*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)

NOTE: X_{1R} = rotated insert holder for reverse machining

NOTE: Insert holders and inserts sold separately

364/464 Boring Heads

MVS Connection	Boring Range	Boring Head					Weight	Insert Form	Part No.		
		$D_2 D_1$	A	X_1	X_{1R}	L_2			D_5	Insert Holder	Boring Head
	19 - 11	20.00 - 24.50	46.00	-	43.00	-	0.09 (kg)	20*	364077	364030	
	22 - 11	24.50 - 29.50	46.00	-	43.50	23.00	0.15 (kg)	20	210059	364031	
	22 - 11	24.50 - 29.50	46.00	-	43.50	23.00	0.15 (kg)	101	210069	364031	
	25 - 14	29.00 - 38.50	56.00	-	53.50	27.00	0.20 (kg)	20	210059	COMING SEPTEMBER	
m	25 - 14	29.00 - 38.50	56.00	-	53.50	27.00	0.20 (kg)	101	210069		365032
	32 - 18	38.00 - 50.50	66.00	38.00	63.50	34.00	0.40 (kg)	20	264051		365033
	32 - 18	38.00 - 50.50	66.00	38.00	63.50	34.00	0.40 (kg)	101	264077		365033
	40 - 22	50.00 - 65.50	75.00	47.00	72.50	42.00	0.80 (kg)	20	210052		464035
	40 - 22	50.00 - 65.50	75.00	47.00	72.50	42.00	0.80 (kg)	101	210062	464035	

*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)

NOTE: X_{1R} = rotated insert holder for reverse machining

NOTE: Insert holders and inserts sold separately

B10-M: 12-15

B10-F

B10: vi-vii

Key on B10-B: 1

i = Imperial (in)
m = Metric (mm)

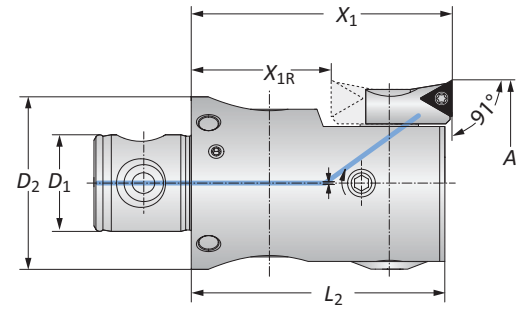
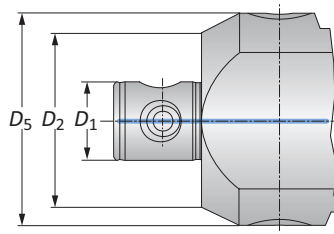
IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-M: 12 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: 7611 | email: appeng@alliedmachine.com

465 (464) Analog Boring Heads

Alu-Line | Diameter Range: 2.559" - 8.071" (65.00mm - 205.00mm)



Form 101



Form 20

465 Alu-Line Boring Heads

MVS Connection	Boring Range	Boring Head				Weight	Insert Form	Part No.		
		$D_2 D_1$	A	X_1	X_{1R}			L_2	D_5	Insert Holder
	50 - 28	2.559 - 3.268	2.953	1.535	2.854	-	1.323 (lbs)	20	210020	465036
	50 - 28	2.559 - 3.268	2.953	1.535	2.854	-	1.323 (lbs)	101	210063	465036
	50 - 28	2.559 - 3.268	2.953	1.535	2.854	-	1.323 (lbs)	103	210064	465036
	63 - 36	3.228 - 4.055	3.543	2.126	3.445	-	2.205 (lbs)	20	210020	465037
	63 - 36	3.228 - 4.055	3.543	2.126	3.445	-	2.205 (lbs)	101	210063	465037
	63 - 36	3.228 - 4.055	3.543	2.126	3.445	-	2.205 (lbs)	103	210064	465037
	80 - 36	3.937 - 5.118	3.543	2.126	3.445	-	3.307 (lbs)	20	210020	465038
	80 - 36	3.937 - 5.118	3.543	2.126	3.445	-	3.307 (lbs)	101	210063	465038
	80 - 36	3.937 - 5.118	3.543	2.126	3.445	-	3.307 (lbs)	103	210064	465038
	80 - 36	4.921 - 6.594	3.543	2.126	3.445	3.937	4.189 (lbs)	20	210020	465039
	80 - 36	4.921 - 6.594	3.543	2.126	3.445	3.937	4.189 (lbs)	101	210063	465039
	80 - 36	4.921 - 6.594	3.543	2.126	3.445	3.937	4.189 (lbs)	103	210064	465039
	80 - 36	6.398 - 8.071	3.543	2.126	3.445	5.315	5.512 (lbs)	20	210020	465040
	80 - 36	6.398 - 8.071	3.543	2.126	3.445	5.315	5.512 (lbs)	101	210063	465040
	80 - 36	6.398 - 8.071	3.543	2.126	3.445	5.315	5.512 (lbs)	103	210064	465040

NOTE: X_{1R} = rotated insert holder for reverse machining

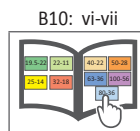
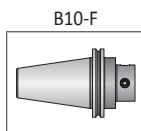
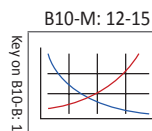
NOTE: Insert holders and inserts sold separately

464 Alu-Line Boring Heads

MVS Connection	Boring Range	Boring Head				Weight	Insert Form	Part No.		
		$D_2 D_1$	A	X_1	X_{1R}			L_2	D_5	Insert Holder
	50 - 28	65.00 - 83.00	75.00	39.00	72.50	-	0.60 (kg)	20	210020	464036
	50 - 28	65.00 - 83.00	75.00	39.00	72.50	-	0.60 (kg)	101	210063	464036
	50 - 28	65.00 - 83.00	75.00	39.00	72.50	-	0.60 (kg)	103	210064	464036
	63 - 36	82.00 - 103.00	90.00	54.00	87.50	-	1.00 (kg)	20	210020	464037
	63 - 36	82.00 - 103.00	90.00	54.00	87.50	-	1.00 (kg)	101	210063	464037
	63 - 36	82.00 - 103.00	90.00	54.00	87.50	-	1.00 (kg)	103	210064	464037
	80 - 36	100.00 - 130.00	90.00	54.00	87.50	-	1.50 (kg)	20	210020	464038
	80 - 36	100.00 - 130.00	90.00	54.00	87.50	-	1.50 (kg)	101	210063	464038
	80 - 36	100.00 - 130.00	90.00	54.00	87.50	-	1.50 (kg)	103	210064	464038
	80 - 36	125.00 - 167.50	90.00	54.00	87.50	100.00	1.90 (kg)	20	210020	464039
	80 - 36	125.00 - 167.50	90.00	54.00	87.50	100.00	1.90 (kg)	101	210063	464039
	80 - 36	125.00 - 167.50	90.00	54.00	87.50	100.00	1.90 (kg)	103	210064	464039
	80 - 36	162.50 - 205.00	90.00	54.00	87.50	135.00	2.50 (kg)	20	210020	464040
	80 - 36	162.50 - 205.00	90.00	54.00	87.50	135.00	2.50 (kg)	101	210063	464040
	80 - 36	162.50 - 205.00	90.00	54.00	87.50	135.00	2.50 (kg)	103	210064	464040

NOTE: X_{1R} = rotated insert holder for reverse machining

NOTE: Insert holders and inserts sold separately



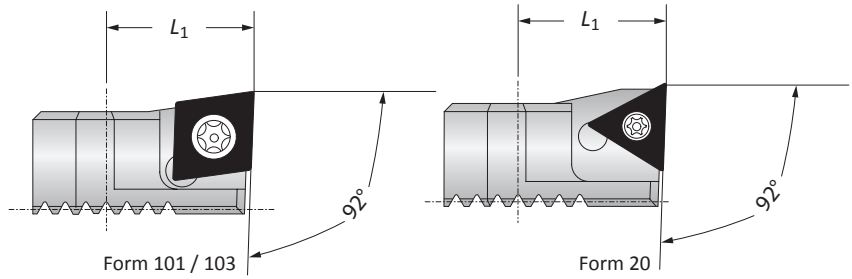
Key on B10-B-1

i = Imperial (in)
m = Metric (mm)

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-M: 12 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: 7611 | email: appeng@alliedmachine.com

Insert Holders for Abrasive Materials

Diameter Range: 2.559" - 8.071" (65.00mm - 205.00mm)

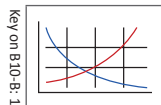


		Insert Holder			
Boring Range		L_1	Weight	Insert Form	Part No.
i	2.559 - 8.071	0.709	0.066 (lbs)	20	211061
	2.559 - 8.071	0.709	0.066 (lbs)	101	211063
	2.559 - 8.071	0.709	0.066 (lbs)	103	211065
m	65.00 - 205.00	18.00	0.03 (kg)	20	211061
	65.00 - 205.00	18.00	0.03 (kg)	101	211063
	65.00 - 205.00	18.00	0.03 (kg)	103	211065

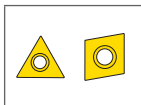
NOTE: Insert holders used for abrasive materials to protect boring head against chip wash

NOTE: When machining grey cast iron, we recommend using insert holders for abrasive materials with CBN inserts for optimized chip removal.

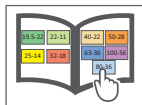
B10-M: 12-15



B10-H



B10: vi-vii



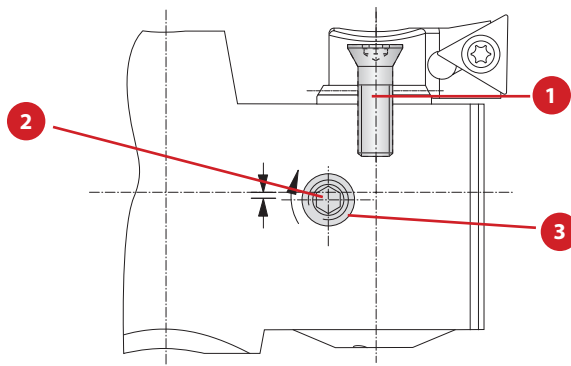
Key on B10-B: 1

i = Imperial (in)
m = Metric (mm)

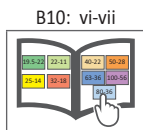
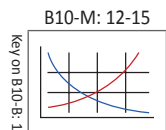
Inserts sold separately

Accessories

Screws



Boring Head	Part No.				
	1 Countersunk Screw	Countersunk Screw Service Key	2 Clamping Screw	Clamping Screw Service Key	3 Ball
365030 (364030)	215323	T15 / H	364260	s2 / A	364270
365031 (364031)	215338	T15 / H	364138	s2.5 / A	364139
465033 (464033)	215338	T15 / H	364138	s2.5 / A	364139
465034 (464034)	215338	T15 / H	115180	s2.5 / A	-
465035 (464035)	215338	T15 / H	115505	s3 / B	-
465036 (464036)	215462	T20 / H	315943	s4 / B	-
465037 (464037)	215462	T20 / H	515178	s4 / B	-
465038 (464038)	215462	T20 / H	515178	s4 / B	-
465039 (464039)	215462	T20 / H	515178	s4 / B	-
465040 (464040)	215462	T20 / H	515178	s4 / B	-



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Balanced Digital 565 (564) Product Overview

Balanced Digital 565 (564) FINE BORING

Adjustable diameter for precise machining.

Wohlhaupter® Balance Digital 565 (564) boring heads feature automatic balancing with an easy-to-read digital display. For diameter ranges above 2.559" (65.00mm), 565 (564) boring heads are made of lightweight aluminum. 565 (564) boring heads are specifically engineered to minimize the residual imbalance produced by insert holder displacement. Reverse boring applications can be achieved by rotating the insert holders.

Test the *engineered lightweight* boring head today.

- Diameter range: 1.969" - 8.071" (50.00mm - 205.00mm)
- Alu-Line diameter range: 2.559" - 8.071" (65.00mm - 205.00mm)
 - Special coating on Alu-Line for wear-resistant surface
 - Alu-Line body reduces tool weight by 50%, reducing stress on the spindle
- Digital readout advantage for diameter adjustments of 0.0001" (0.002mm)
- Coolant through
- Internal balancing improves tool life and surface finish
- Insert holder can be rotated for back boring jobs
- Max cutting speed: 6,562 SFM (2,000 m/min)
- Max coolant pressure: 580 PSI (40 bar)



Aluminum Boring Head
2.559" - 8.071"
(65.00mm - 205.00mm)



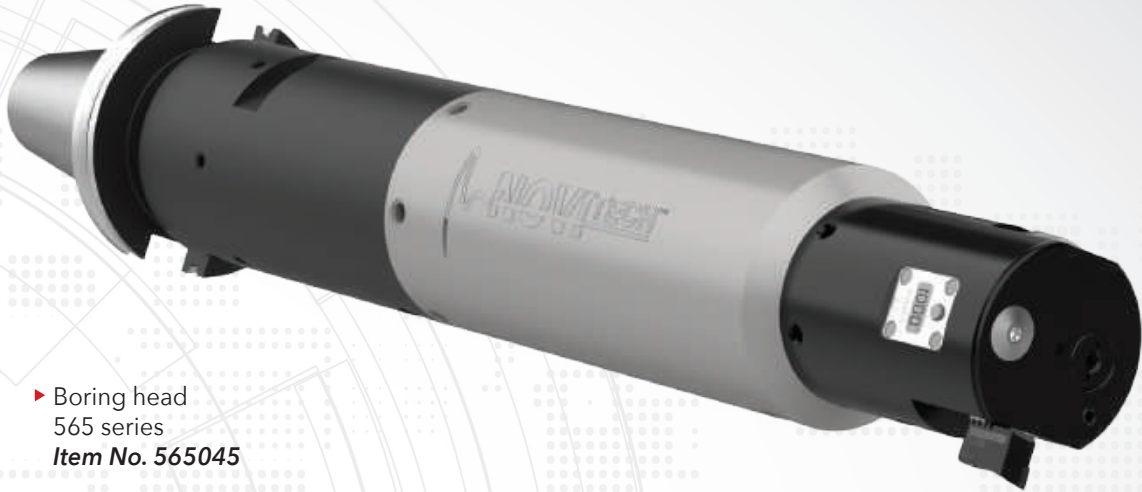
Steel Boring Head
1.969" - 2.579"
(50.00mm - 65.50mm)

NOTE: Imperial items pictured

NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-M: 12 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: 7611 | email: appeng@alliedmachine.com

WOHLHAUPTER® 565 BORING HEAD with NOVI^{TECH}™



- ▶ Boring head
565 series
Item No. 565045
- ▶ NOVI^{TECH} vibration dampening
intermediate module
Item No. 519005

NOTE: Imperial item pictured

NOTE: Adjustment accuracy of 0.0001"
or 0.002mm on diameter

*The Wohlhaupter 565 boring head with the
NOVI^{TECH} vibration dampening module provided:*



Excellent surface finish



Eliminated vibration and chatter

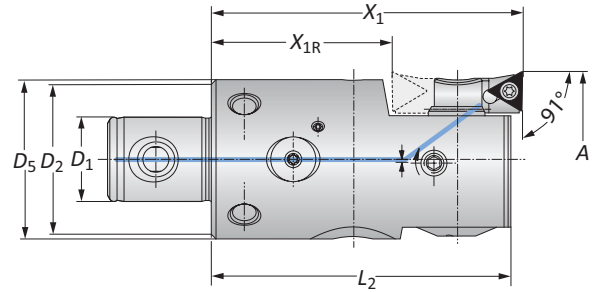
		Measure	565 Boring Head with NOVI ^{TECH}
Product:	Wohlhaupter 565 Boring Head with NOVI ^{TECH}	RPM	430 RPM
Objectives:	0.002" concentricity over the length of two bores spaced 14" apart	Speed Rate	352 SFM (107.28 m/min)
Material:	Cast iron	Feed Rate	0.003 IPR (0.08 mm/rev)
Hole Ø:	3.125"	Penetration Rate	1.29 IPM (33 mm/min)
Depth:	7xD	Cycle Time (per hole)	3 min 32 sec
		Hole Finish	155 Ra µin. (3.8 Ra µm)

Boring Heads

Diameter Range: 1.969" - 2.579" (50.00mm - 65.50mm)



NOTE: Imperial item pictured
NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter



565 Digital Boring Heads

Form 101

Form 20

	MVS Connection	Boring Range	Boring Head				Weight	Insert Form	Part No.	
	D ₂ D ₁		A	X ₁	X _{1R}	L ₂			D ₅	Insert Holder
i	40 - 22	1.969 - 2.579	2.953	1.850	2.854	1.654	1.764 (lbs)	20	210052	565034
	40 - 22	1.969 - 2.579	2.953	1.850	2.854	1.654	1.764 (lbs)	101	210062	565034

NOTE: X_{1R} = rotated insert holder for reverse machining
NOTE: Insert holders and inserts sold separately

564 Digital Boring Heads

	MVS Connection	Boring Range	Boring Head				Weight	Insert Form	Part No.	
	D ₂ D ₁		A	X ₁	X _{1R}	L ₂			D ₅	Insert Holder
m	40 - 22	50.00 - 65.50	75.00	47.00	72.50	42.00	0.80 (kg)	20	210052	564034
	40 - 22	50.00 - 65.50	75.00	47.00	72.50	42.00	0.80 (kg)	101	210062	564034

NOTE: X_{1R} = rotated insert holder for reverse machining
NOTE: Insert holders and inserts sold separately

B10-M: 12-15

B10-F

B10: vi-vii

Key on B10-B: 1

i = Imperial (in)
m = Metric (mm)

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-M: 12 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: 7611 | email: appeng@alliedmachine.com

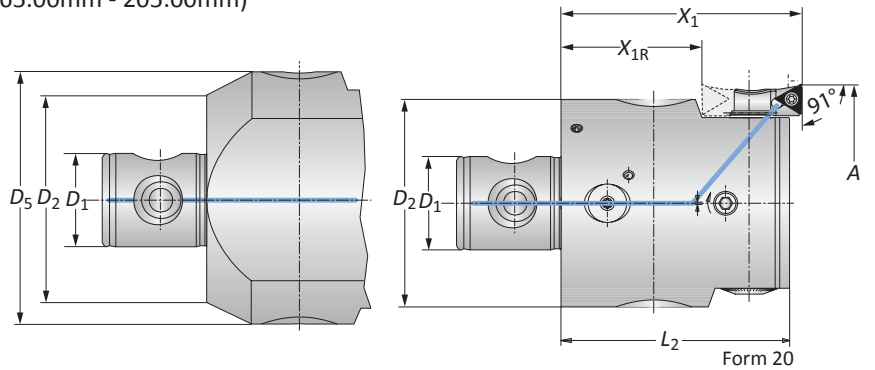


Boring Heads

Alu-Line | Diameter Range: 2.559" - 8.070" (65.00mm - 205.00mm)



NOTE: Imperial item pictured
NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter



565 Digital Alu-Line Boring Heads Form 101

MVS Connection	Boring Range	Boring Head					Weight	Insert Form	Part No.	
		$D_2 D_1$	A	X_1	X_{1R}	L_2			D_5	Insert Holder
50 - 28	2.559 - 3.268	2.953	1.535	2.874	-	1.323 (lbs)	20	210020	565045	
50 - 28	2.559 - 3.268	2.953	1.535	2.874	-	1.323 (lbs)	101	210063	565045	
50 - 28	2.559 - 3.268	2.953	1.535	2.874	-	1.323 (lbs)	103	210064	565045	
63 - 36	3.228 - 4.055	3.543	2.126	3.464	-	2.205 (lbs)	20	210020	565046	
63 - 36	3.228 - 4.055	3.543	2.126	3.464	-	2.205 (lbs)	101	210063	565046	
63 - 36	3.228 - 4.055	3.543	2.126	3.464	-	2.205 (lbs)	103	210064	565046	
80 - 36	3.937 - 5.118	3.543	2.126	3.464	-	3.307 (lbs)	20	210020	565047	
80 - 36	3.937 - 5.118	3.543	2.126	3.464	-	3.307 (lbs)	101	210063	565047	
80 - 36	3.937 - 5.118	3.543	2.126	3.464	-	3.307 (lbs)	103	210064	565047	
80 - 36	4.921 - 6.594	3.543	2.126	3.464	3.397	3.307 (lbs)	20	210020	565048	
80 - 36	4.921 - 6.594	3.543	2.126	3.464	3.937	4.189 (lbs)	101	210063	565048	
80 - 36	4.921 - 6.594	3.543	2.126	3.464	3.937	4.189 (lbs)	103	210064	565048	
80 - 36	6.398 - 8.071	3.543	2.126	3.464	5.315	4.189 (lbs)	20	210020	565049	
80 - 36	6.398 - 8.071	3.543	2.126	3.464	5.315	4.189 (lbs)	101	210063	565049	
80 - 36	6.398 - 8.071	3.543	2.126	3.464	5.315	5.512 (lbs)	103	210064	565049	

NOTE: X_{1R} = rotated insert holder for reverse machining
NOTE: Insert holders and inserts sold separately

564 Digital Alu-Line Boring Heads

MVS Connection	Boring Range	Boring Head					Weight	Insert Form	Part No.	
		$D_2 D_1$	A	X_1	X_{1R}	L_2			D_5	Insert Holder
50 - 28	65.00 - 83.00	75.00	39.00	73.00	-	0.60 (kg)	20	210020	564045	
50 - 28	65.00 - 83.00	75.00	39.00	73.00	-	0.60 (kg)	101	210063	564045	
50 - 28	65.00 - 83.00	75.00	39.00	73.00	-	0.60 (kg)	103	210064	564045	
63 - 36	82.00 - 103.00	90.00	54.00	88.00	-	1.00 (kg)	20	210020	564046	
63 - 36	82.00 - 103.00	90.00	54.00	88.00	-	1.00 (kg)	101	210063	564046	
63 - 36	82.00 - 103.00	90.00	54.00	88.00	-	1.00 (kg)	103	210064	564046	
80 - 36	100.00 - 130.00	90.00	54.00	88.00	-	1.50 (kg)	20	210020	564047	
80 - 36	100.00 - 130.00	90.00	54.00	88.00	-	1.50 (kg)	101	210063	564047	
80 - 36	100.00 - 130.00	90.00	54.00	88.00	-	1.50 (kg)	103	210064	564047	
80 - 36	125.00 - 167.50	90.00	54.00	88.00	100.00	1.90 (kg)	20	210020	564048	
80 - 36	125.00 - 167.50	90.00	54.00	88.00	100.00	1.90 (kg)	101	210063	564048	
80 - 36	125.00 - 167.50	90.00	54.00	88.00	100.00	1.90 (kg)	103	210064	564048	
80 - 36	162.50 - 205.00	90.00	54.00	88.00	135.00	2.50 (kg)	20	210020	564049	
80 - 36	162.50 - 205.00	90.00	54.00	88.00	135.00	2.50 (kg)	101	210063	564049	
80 - 36	162.50 - 205.00	90.00	54.00	88.00	135.00	2.50 (kg)	103	210064	564049	

NOTE: X_{1R} = rotated insert holder for reverse machining
NOTE: Insert holders and inserts sold separately

B10-M: 12-15

B10-F

B10: vi-vii

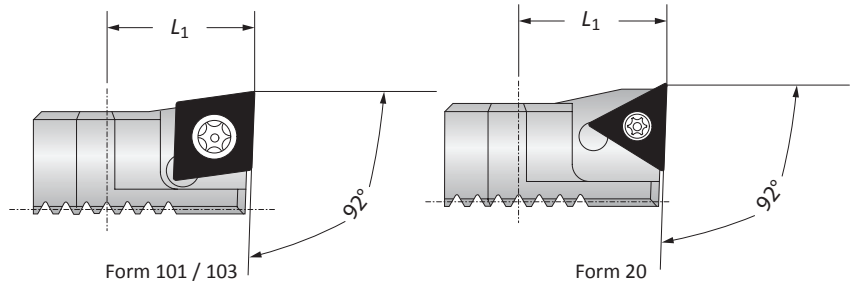
Key on B10-B-1

i = Imperial (in)
m = Metric (mm)

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-M: 12 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
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Insert Holder for Abrasive Materials

Diameter Range: 2.559" - 8.071" (65.00mm - 205.00mm)

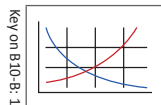


		Insert Holder			
		L_1	Weight	Insert Form	Part No.
i	Boring Range				
	2.559 - 8.071	0.709	0.066 (lbs)	20	211061
	2.559 - 8.071	0.709	0.066 (lbs)	101	211063
	2.559 - 8.071	0.709	0.066 (lbs)	103	211065
m	Boring Range				
	65.00 - 205.00	18.00	0.03 (kg)	20	211061
	65.00 - 205.00	18.00	0.03 (kg)	101	211063
	65.00 - 205.00	18.00	0.03 (kg)	103	211065

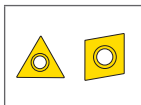
NOTE: Insert holders used for abrasive materials to protect boring head against chip wash

NOTE: When machining grey cast iron, we recommend using insert holders for abrasive materials with CBN inserts for optimized chip removal.

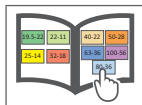
B10-M: 12-15



B10-H



B10: vi-vii

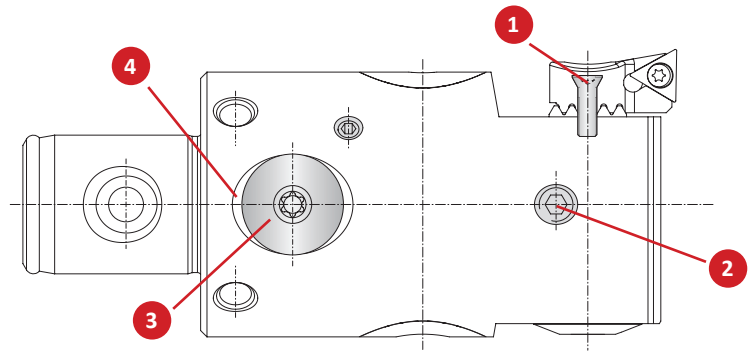


i = Imperial (in)
m = Metric (mm)

Inserts sold separately

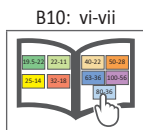
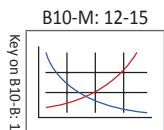
Accessories

Screws | Battery Cover | Batteries



Boring Head	Part No.							
	1 Countersunk Screw	Service Key	2 Clamping Screw	Service Key	3 Battery Cover	Service Key	4 Sealing Ring	Battery*
565034 (564034)	215338	T15 / H	115505	s3 / B	501016	T20 / H	415895	415896
565045 (564045)	215462	T20 / H	315943	s4 / B	501016	T20 / H	415895	415896
565046 (564046)	215462	T20 / H	515178	s4 / B	501016	T20 / H	415895	415896
565047 (564047)	215462	T20 / H	515178	s4 / B	501016	T20 / H	415895	415896
565048 (564048)	215462	T20 / H	515178	s4 / B	501016	T20 / H	415895	415896
565049 (564049)	215462	T20 / H	515178	s4 / B	501016	T20 / H	415895	415896

*Replace both batteries



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320 (310) Product Overview

320 (310) FINE BORING

Engineered with wear and tear in mind.

320 (310) Wohlhaupter boring heads are made from steel for \varnothing 0.787" - 4.055" (20.00mm - 103.00mm) and coated Alu-Line material for \varnothing 3.937" - 8.071" (100.00mm - 205.00mm) boring heads to protect against corrosion and wear. The insert holder can be rotated quickly for reverse machining.

- Diameter range: 0.787" - 8.071" (20.00mm - 205.00mm)
- Alu-Line diameter range: 3.937" - 8.071" (100.00mm - 205.00mm)
 - Special coating on Alu-Line provides hard, durable surface
 - Alu-Line body reduces tool weight by 50%, reducing stress on the spindle
- Coolant through
- Vernier diameter adjustment of 0.0001" (0.002mm)
- Max cutting speed: 3,281 SFM (1,000 m/min)



IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-M: 12 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
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WOHLHAUPTER® 320 BORING HEAD with NOVI^{TECH}

Time is money, so make it count.

If you want to improve your machining processes, cycle time is a key factor to examine. After all, the longer it takes you to produce a part, the fewer parts you can produce in a given time. Our customer was experiencing lengthy cycle times while machining pumps from grey cast iron. The parts required 3 bored holes, each with a 12" (304.8mm) depth and a 22" (558.8mm) reach.



In order to free up machine time, the customer questioned if their process could be more efficient. The main objectives were to decrease the current cycle time and to maintain a 160 Ra finish, which was required to perform the burnishing process that followed.

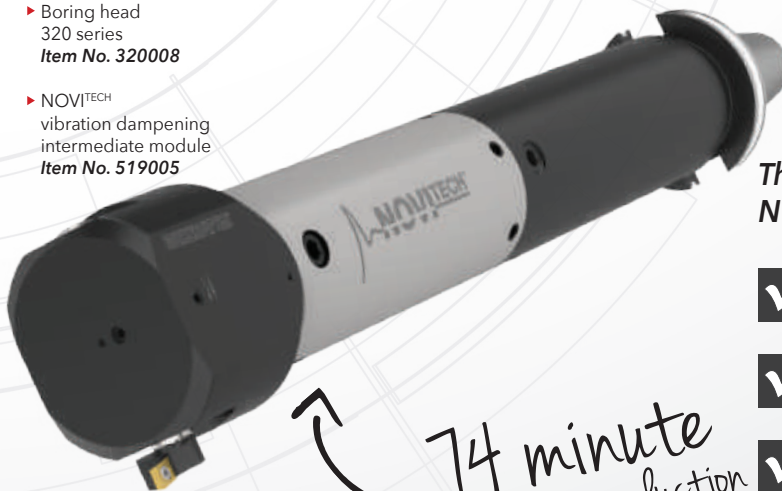
The previous tooling ran at a slow 0.47 IPM (11.938 mm/min) and a paint-drying 84-minute cycle time to bore the three holes on each part. With our **Wohlhaupter 320 boring head** utilizing the **NOVI^{TECH} vibration dampening module**, the customer increased to a more efficient 3.75 IPM (95.25 mm/min) and slashed the cycle time to 10.5 minutes (an 87% decrease). Along with the increased speed, the Wohlhaupter tooling also achieved a 155 Ra finish, accomplishing everything the customer needed.

The Wohlhaupter solution reduced the process cycle time by 74 minutes. Improvements in speed and cycle time can free up machine hours, which means more throughput and higher profit for your company. **Are you losing money on applications with substantially long cycle times?**

		Measure	Competitor Boring Head	320 Boring Head w/ NOVI ^{TECH}
Product:	Wohlhaupter 320 Boring Head with NOVI ^{TECH}	RPM	39	469
Objectives:	(1) Decrease cycle time (2) Maintain 160 Ra hole finish	Speed Rate	56 SFM (17.069 M/min)	675 SFM (205.74 M/min)
Industry:	Oil & gas/petrochemical	Feed Rate	0.012 IPR (0.305 mm/rev)	0.008 IPR (0.203 mm/rev)
Part:	Pump	Penetration Rate	0.47 IPM (11.938 mm/min)	3.75 IPM (95.25 mm/min)
Material:	Grey cast iron	Cycle Time (per hole)	27 min 54 sec	3 min 32 sec
Hole Ø:	5.500" (139.7mm)	Hole Finish	160 Ra µin. (4 Ra µm)	155 Ra µin. (3.8 Ra µm)
Hole Depth:	12.000" (304.8mm)			

▶ Boring head
320 series
Item No. 320008

▶ NOVI^{TECH}
vibration dampening
intermediate module
Item No. 519005



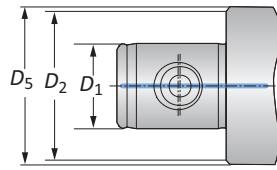
The Wohlhaupter 320 boring head with the NOVI^{TECH} vibration dampening module provided:

- ✓ Increased penetration rate
- ✓ Decreased cycle time
- ✓ Excellent finish in deep hole application

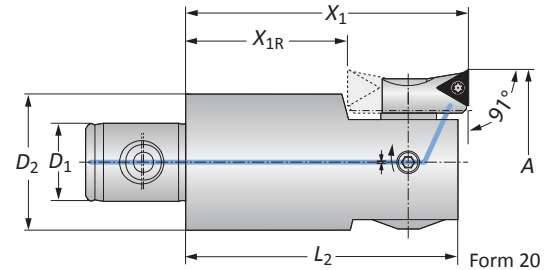
74 minute
cycle time reduction

Boring Heads

Diameter Range: 0.787" - 4.055" (20.00mm - 103.00mm)



Form 101 / 103



Form 20

320 Boring Heads

MVS Connection	Boring Range	Boring Head				Weight	Insert Form	Part No.		
		$D_2 D_1$	A	X_1	X_{1R}			L_2	D_5	Insert Holder
19 - 11	0.787 - 0.965	1.810	-	1.693	-	0.221 (lbs)	20*	364077	320010	
22 - 11	0.965 - 1.161	1.810	-	1.713	0.906	0.331 (lbs)	20	210059	320020	
22 - 11	0.965 - 1.161	1.810	-	1.713	0.906	0.331 (lbs)	101	210069	320020	
25 - 14	1.142 - 1.457	2.200	-	2.106	1.024	0.441 (lbs)	20	210059	320001	
25 - 14	1.142 - 1.457	2.200	-	2.106	1.024	0.441 (lbs)	101	210069	320001	
25 - 14	1.417 - 1.732	2.200	1.100	2.106	1.024	0.441 (lbs)	20	210052	320001	
25 - 14	1.417 - 1.732	2.200	1.100	2.106	1.024	0.441 (lbs)	101	210062	320001	
32 - 18	1.693 - 2.126	2.590	1.490	2.500	-	0.882 (lbs)	20	210052	320003	
32 - 18	1.693 - 2.126	2.590	1.490	2.500	-	0.882 (lbs)	101	210062	320003	
40 - 22	2.087 - 2.598	2.950	1.530	2.854	-	1.543 (lbs)	20	210020	320004	
40 - 22	2.087 - 2.598	2.950	1.530	2.854	-	1.543 (lbs)	101	210063	320004	
40 - 22	2.087 - 2.598	2.950	1.530	2.854	-	1.543 (lbs)	103	210064	320004	
50 - 28	2.559 - 3.268	2.950	1.530	2.854	-	2.646 (lbs)	20	210020	320005	
50 - 28	2.559 - 3.268	2.950	1.530	2.854	-	2.646 (lbs)	101	210063	320005	
50 - 28	2.559 - 3.268	2.950	1.530	2.854	-	2.646 (lbs)	103	210064	320005	
63 - 36	3.228 - 4.055	3.540	2.120	3.445	-	4.850 (lbs)	20	210020	320006	
63 - 36	3.228 - 4.055	3.540	2.120	3.445	-	4.850 (lbs)	101	210063	320006	
63 - 36	3.228 - 4.055	3.540	2.120	3.445	-	4.850 (lbs)	103	210064	320006	

*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)

NOTE: X_{1R} = rotated insert holder for reverse machining

NOTE: Insert holders and inserts sold separately

310 Boring Heads

MVS Connection	Boring Range	Boring Head				Weight	Insert Form	Part No.		
		$D_2 D_1$	A	X_1	X_{1R}			L_2	D_5	Insert Holder
19 - 11	20.00 - 24.50	46.00	-	43.00	-	0.10 (kg)	20*	364077	310010	
22 - 11	24.50 - 29.50	46.00	-	43.50	23.00	0.15 (kg)	20	210059	310020	
22 - 11	24.50 - 29.50	46.00	-	43.50	23.00	0.15 (kg)	101	210069	310020	
25 - 14	29.00 - 37.00	56.00	-	53.50	26.00	0.20 (kg)	20	210059	310001	
25 - 14	29.00 - 37.00	56.00	-	53.50	26.00	0.20 (kg)	101	210069	310001	
25 - 14	36.00 - 44.00	56.00	28.00	53.50	26.00	0.20 (kg)	20	210052	310001	
25 - 14	36.00 - 44.00	56.00	28.00	53.50	26.00	0.20 (kg)	101	210062	310001	
32 - 18	43.00 - 54.00	66.00	38.00	63.50	-	0.40 (kg)	20	210052	310003	
32 - 18	43.00 - 54.00	66.00	38.00	63.50	-	0.40 (kg)	101	210062	310003	
40 - 22	53.00 - 66.00	75.00	39.00	72.50	-	0.70 (kg)	20	210020	310004	
40 - 22	53.00 - 66.00	75.00	39.00	72.50	-	0.70 (kg)	101	210063	310004	
40 - 22	53.00 - 66.00	75.00	39.00	72.50	-	0.70 (kg)	103	210064	310004	
50 - 28	65.00 - 83.00	75.00	39.00	72.50	-	1.20 (kg)	20	210020	310005	
50 - 28	65.00 - 83.00	75.00	39.00	72.50	-	1.20 (kg)	101	210063	310005	
50 - 28	65.00 - 83.00	75.00	39.00	72.50	-	1.20 (kg)	103	210064	310005	
63 - 36	82.00 - 103.00	90.00	54.00	87.50	-	2.20 (kg)	20	210020	310006	
63 - 36	82.00 - 103.00	90.00	54.00	87.50	-	2.20 (kg)	101	210063	310006	
63 - 36	82.00 - 103.00	90.00	54.00	87.50	-	2.20 (kg)	103	210064	310006	

*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)

NOTE: X_{1R} = rotated insert holder for reverse machining

NOTE: Insert holders and inserts sold separately

i = Imperial (in)

m = Metric (mm)

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-M: 12 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.

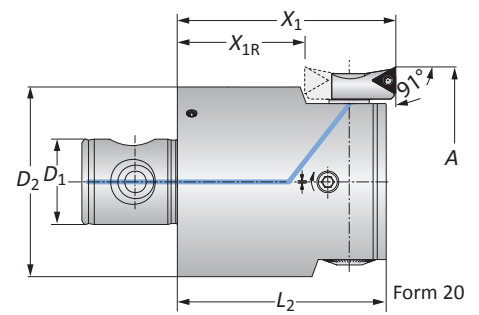
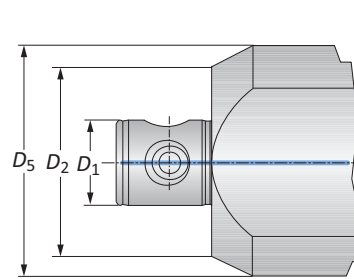
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Boring Heads

Alu-Line | Diameter Range: 3.937" - 8.071" (100.00mm - 205.00mm)



Form 101 / 103



Form 20

Alu-Line 320 Boring Heads

	MVS Connection	Boring Range	Boring Head				Weight	Insert Form	Part No.	
			D_2 D_1	A	X_1	X_{1R}			L_2	D_5
i	80 - 36	3.937 - 5.118	3.543	2.126	3.445	-	3.086 (lbs)	20	210020	320007
	80 - 36	3.937 - 5.118	3.543	2.126	3.445	-	3.086 (lbs)	101	210063	320007
	80 - 36	3.937 - 5.118	3.543	2.126	3.445	-	3.086 (lbs)	103	210064	320007
	80 - 36	4.921 - 6.594	3.543	2.126	3.445	3.937	3.968 (lbs)	20	210020	320008
	80 - 36	4.921 - 6.594	3.543	2.126	3.445	3.937	3.968 (lbs)	101	210063	320008
	80 - 36	4.921 - 6.594	3.543	2.126	3.445	3.937	3.968 (lbs)	103	210064	320008
	80 - 36	6.397 - 8.071	3.543	2.126	3.445	5.315	5.291 (lbs)	20	210020	320009
	80 - 36	6.397 - 8.071	3.543	2.126	3.445	5.315	5.291 (lbs)	101	210063	320009
	80 - 36	6.397 - 8.071	3.543	2.126	3.445	5.315	5.291 (lbs)	103	210064	320009

NOTE: X_{1R} = rotated insert holder for reverse machining

NOTE: Insert holders and inserts sold separately

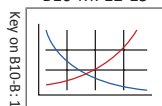
Alu-Line 310 Boring Heads

	MVS Connection	Boring Range	Boring Head				Weight	Insert Form	Part No.	
			D_2 D_1	A	X_1	X_{1R}			L_2	D_5
m	80 - 36	100.00 - 130.00	90.00	54.00	87.50	-	1.40 (kg)	20	210020	310007
	80 - 36	100.00 - 130.00	90.00	54.00	87.50	-	1.40 (kg)	101	210063	310007
	80 - 36	100.00 - 130.00	90.00	54.00	87.50	-	1.40 (kg)	103	210064	310007
	80 - 36	125.00 - 167.50	90.00	54.00	87.50	100.00	1.80 (kg)	20	210020	310008
	80 - 36	125.00 - 167.50	90.00	54.00	87.50	100.00	1.80 (kg)	101	210063	310008
	80 - 36	125.00 - 167.50	90.00	54.00	87.50	100.00	1.80 (kg)	103	210064	310008
	80 - 36	162.50 - 205.00	90.00	54.00	87.50	135.00	2.40 (kg)	20	210020	310009
	80 - 36	162.50 - 205.00	90.00	54.00	87.50	135.00	2.40 (kg)	101	210063	310009
	80 - 36	162.50 - 205.00	90.00	54.00	87.50	135.00	2.40 (kg)	103	210064	310009

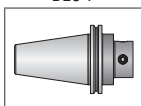
NOTE: X_{1R} = rotated insert holder for reverse machining

NOTE: Insert holders and inserts sold separately

B10-M: 12-15



B10-F



B10: vi-vii



i = Imperial (in)

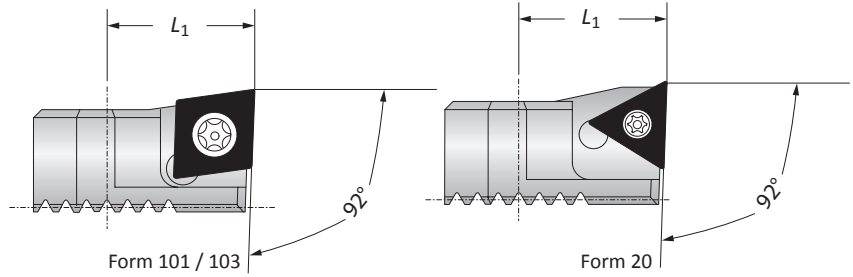
m = Metric (mm)

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-M: 12 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.

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Insert Holders for Abrasive Materials | Serrated Shims

Diameter Range: 2.087" - 8.071" (53.00mm - 205.00mm)

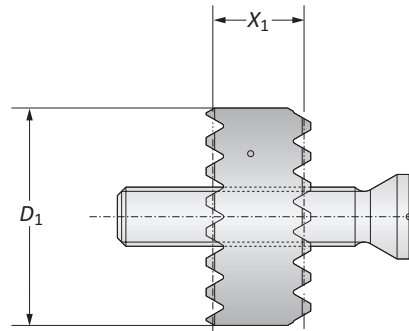


Insert Holders

Boring Range		Insert Holder	Weight	Insert Form	Part No.
		L_1			
i	2.087 - 8.071	0.709	0.066 (lbs)	20	211061
	2.087 - 8.071	0.709	0.066 (lbs)	101	211063
	2.087 - 8.071	0.709	0.066 (lbs)	103	211065
m	53.00 - 205.00	18.00	0.03 (kg)	20	211061
	53.00 - 205.00	18.00	0.03 (kg)	101	211063
	53.00 - 205.00	18.00	0.03 (kg)	103	211065

NOTE: Insert holders used for abrasive materials to protect boring head against chip wash

NOTE: When machining grey cast iron, we recommend using insert holders for abrasive materials with CBN inserts for optimized chip removal.



Serrated Shims

	Boring Range	Additional Boring Range	Serrated Shim		Weight	Part No.	
			X_1	D_1		Serrated Shim & Screw	Replacement Screw
i	1.141 - 2.126	0.315	0.157	0.472	0.022 (lbs)	310070	415360
	1.141 - 2.126	0.472	0.236	0.472	0.022 (lbs)	310071	415342
	2.087 - 8.071	0.394	0.196	0.708	0.022 (lbs)	310074	515595
	2.087 - 8.071	0.590	0.295	0.708	0.022 (lbs)	310075	515596
m	29.00 - 54.00	8.00	4.00	12.00	0.01 (kg)	310070	415360
	29.00 - 54.00	12.00	6.00	12.00	0.01 (kg)	310071	415342
	53.00 - 205.00	10.00	5.00	18.00	0.01 (kg)	310074	515595
	53.00 - 205.00	15.00	7.50	18.00	0.01 (kg)	310075	515596

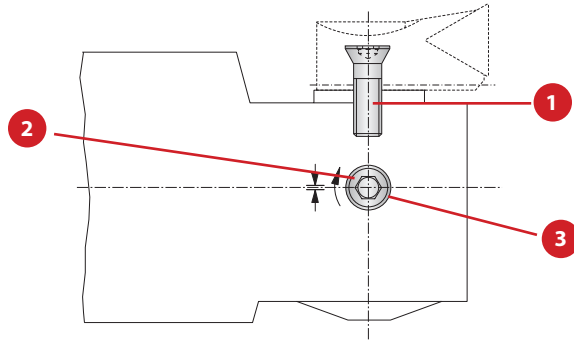
B10-M: 12-15 | B10-H | B10: vi-vii

Key on B10-B: 1

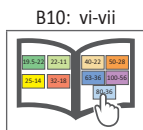
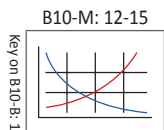
i = Imperial (in)
m = Metric (mm)
Inserts sold separately

Accessories

Screws



Boring Head	1 Countersunk Screw		2 Clamping Screw		3 Ball
	Part No.	Service Key	Part No.	Service Key	Part No.
320010 (310010)	215323	T15 / H	364260	s2.0 / A	364270
320020 (310020)	215338	T15 / H	364138	s2.5 / A	364139
320001 (310001)	215338	T15 / H	115136	s2.5 / A	-
320003 (310003)	215338	T15 / H	115180	s2.5 / A	-
320004 (310004)	215462	T20 / H	115249	s4 / B	-
320005 (310005)	215462	T20 / H	115185	s4 / B	-
320006 (310006)	215462	T20 / H	315279	s4 / B	-
320007 (310007)	215462	T20 / H	115186	s4 / B	-
320008 (310008)	215462	T20 / H	115186	s4 / B	-
320009 (310009)	215462	T20 / H	115186	s4 / B	-



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538 (537) Product Overview



538 (537) Cassettes FINE BORING

Engineered for easy precision.

538 (537) fine boring cassettes offer high accuracy and are available in an easy-to-use digital or analog version. The digital version features a docking port to attach the 3E^{TECH} digital readout module for μ -accurate diameter adjustments while the analog cassettes provide highly accurate adjustments through the vernier scale. 538 (537) cassettes are made of hardened steel and can be used on serrated tool bodies and slides from 3.937" - 128.150" (100.00mm - 3255.00mm). The insert holder can be rotated easily for reverse machining applications.

Experience **digital precision boring** for yourself.

- Diameter range: 3.937" - 8.071" (100.00mm - 205.00mm)
- Cassette can be used on large diameter serrated slides (pg. B10-G: 8): 7.874" - 128.150" (200.00mm - 3255.00mm)
- Coolant through
- 3E^{TECH} module provides a simple digital readout
- Analog version with a vernier scale
- Max cutting speed: 2,953 SFM (900 m/min)



NOTE: Imperial items pictured

NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-M: 12 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: 7611 | email: appeng@alliedmachine.com

538 (537) BORING CASSETTES



NEW vernier scale
on both analog
and digital cassettes

NEW digital 538 (537)
cassettes with 3E^{TECH}
docking port

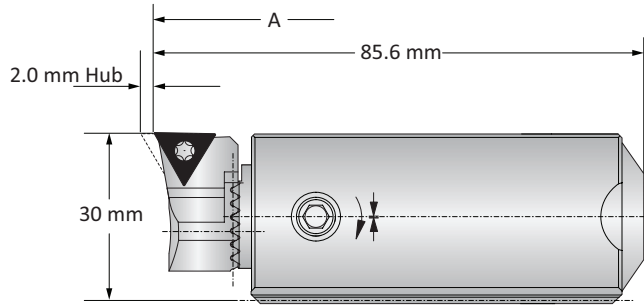
- ✓ Convenient tool handling
- ✓ Large range of applications
- ✓ Hardened steel bodies

538 (537) Analog Cassettes

Diameter Range: 3.937" - 8.071" (100.00mm - 205.00mm)



Form 101 / 103



Form 20

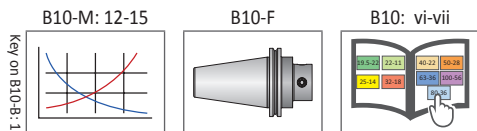
Analog 538 (537) Cassettes

	Boring Range	Weight	Insert Form	Part No.		
				Insert Holder	Clamping Piece	Cassette*
i	3.937 - 8.071	1.323 (lbs)	20	210020	137026	538051
	3.937 - 8.071	1.323 (lbs)	101	210063	137026	538051
	3.937 - 8.071	1.323 (lbs)	103	210064	137026	538051
m	100.00 - 205.00	0.60 (kg)	20	210020	137026	537051
	100.00 - 205.00	0.60 (kg)	101	210063	137026	537051
	100.00 - 205.00	0.60 (kg)	103	210064	137026	537051

*Required serrated tool body sold separately

NOTE: Cassette and insert holder can be used on large diameter serrated slides (B10-G: 8)

NOTE: Insert holders, inserts, and clamping pieces **sold separately**



i = Imperial (in)
m = Metric (mm)

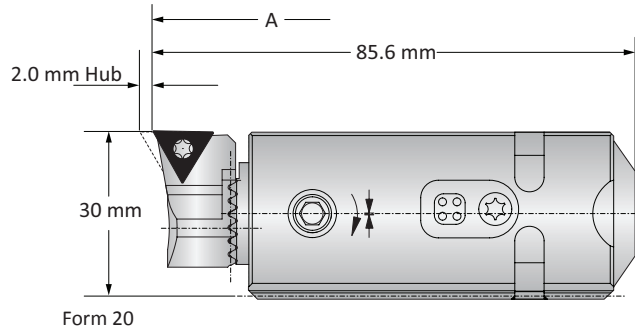
IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-M: 12 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: 7611 | email: appeng@alliedmachine.com

538 (537) Cassettes with 3E^{TECH}

Diameter Range: 3.937" - 8.071" (100.00mm - 205.00mm)



Form 101 / 103



Digital 538 (537) Cassettes

	Boring Range	Weight	Insert Form	Insert Holder	Part No.	
					Clamping Piece	Cassette*
i	3.937 - 8.071	1.323 (lbs)	20	210020	137026	538052
	3.937 - 8.071	1.323 (lbs)	101	210063	137026	538052
	3.937 - 8.071	1.323 (lbs)	103	210064	137026	538052
m	100.00 - 205.00	0.60 (kg)	20	210020	137026	537052
	100.00 - 205.00	0.60 (kg)	101	210063	137026	537052
	100.00 - 205.00	0.60 (kg)	103	210064	137026	537052

*Required serrated tool body sold separately

NOTE: Cassette and insert holder can be used on large diameter serrated slides (B10-G: 8)

NOTE: 3E^{TECH} digital readout module, insert holders, inserts, and clamping pieces **sold separately**



3E^{TECH} Digital Readout Module

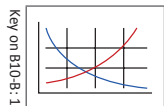
	Part No.
i	563010
m	536010

NOTE: WEEE-Reg.-Nr. DE 15820388

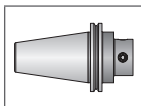
NOTE: 3E^{TECH} sold separately

NOTE: Imperial item pictured
NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

B10-M: 12-15



B10-F



B10: vi-vii



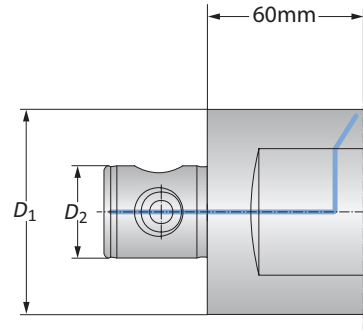
i = Imperial (in)
 m = Metric (mm)

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-M: 12 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
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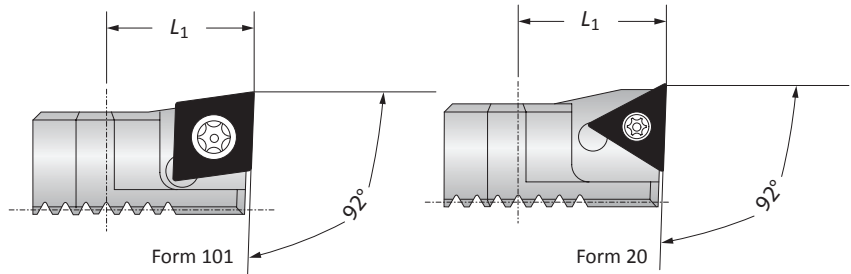
Serrated Tool Bodies | Insert Holders for Abrasive Materials

Diameter Range: 3.937" - 8.071" (100.00mm - 205.00mm)



Serrated Tool Bodies

MVS Connection		Serrated Tool Body	
	$D_2 D_1$	Boring Range	Part No.
i	80 - 36	3.937 - 6.102	148007
	80 - 36	5.906 - 8.071	148009
m	80 - 36	100.00 - 155.00	148007
	80 - 36	150.00 - 205.00	148009



Insert Holders for Abrasive Materials

Insert Holder		Insert Holder		Insert Holder	
Boring Range	L_1	Weight	Insert Form	Part No.	
i	3.937 - 8.071	0.709	0.066 (lbs)	20	211061
	3.937 - 8.071	0.709	0.066 (lbs)	101	211063
	3.937 - 8.071	0.709	0.066 (lbs)	103	211065
m	100.00 - 205.00	18.00	0.03 (kg)	20	211061
	100.00 - 205.00	18.00	0.03 (kg)	101	211063
	100.00 - 205.00	18.00	0.03 (kg)	103	211065

NOTE: Insert holders used for abrasive materials to protect boring head against chip wash

NOTE: When machining grey cast iron, we recommend using insert holders for abrasive materials with CBN inserts for optimized chip removal.

B10-M: 12-15

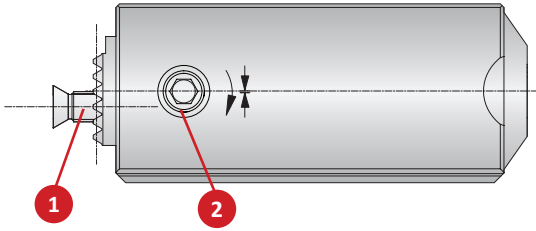
Key on B10-B: 1

B10-H

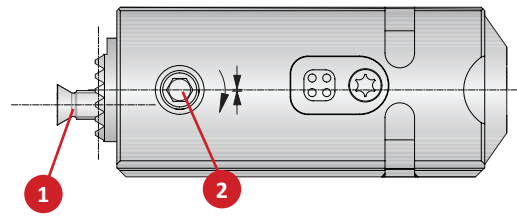
B10: vi-vii

i = Imperial (in)
m = Metric (mm)

538 (537) Accessories | 3E^{TECH} Accessories | Clamping Pieces



538 (537) Analog Cassette



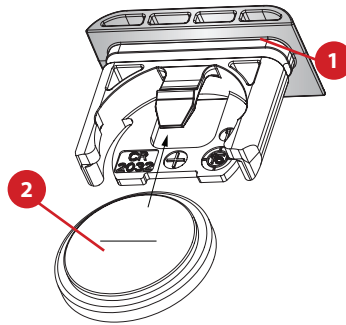
538 (537) Cassette

538 (537) Accessories

Cassette Part No.	1 Countersunk Screw		2 Clamping Screw	
	Part No.	Service Key	Part No.	Service Key
i 538051 538052	215462	T20 / H	115249	s4 / F
	215462	T20 / H	315789	s4 / F
m 537051 537052	215462	T20 / H	115249	s4 / F
	215462	T20 / H	315789	s4 / F

3E^{TECH} Accessories

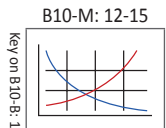
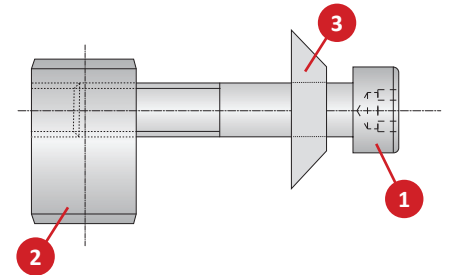
1 Sealing Ring	2 Battery CR2032
Part No.	Part No.
215483	515491



538 (537) Clamping Pieces

Slide Type	Complete Part No.	Service Key	Replacement Components		
			1 Cap Screw	2 Clamping Nut	3 Disk Spring
Serrated Tool Bodies	137026	115578 s6 / B	215101	140118	337105
Basic and Eco Slides	137027		215102	215105	337105
Flex Slides	137019		415900	215105	337105

NOTE: Clamping pieces sold separately



i = Imperial (in)
m = Metric (mm)
Inserts sold separately

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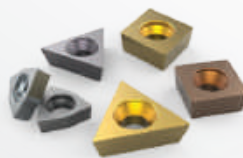
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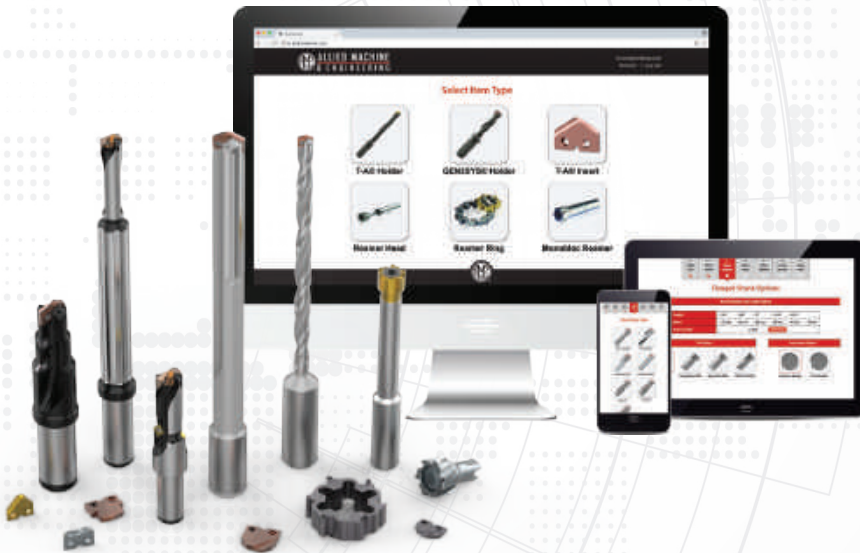
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 - GEN3SYS® XT Holders
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- Quickly look up product information
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Machinist Tool App

Quickly convert cutting tool parameters for the machine inputs you need.

- Input data to calculate the RPM and speed and feed rates
- Also features the Boring Insert Selector
- Access product literature right at your fingertips



Customer Support

Support You Can Count On

Allied Machine has many lines of support to ensure we're available to assist you at all times. It's important to establish relationships with new customers, but we also know it's equally important to strengthen and support relationships with existing customers. Whether you need help with an order or you need someone to come assist you at the spindle, we have the right people to get you what you need.



1

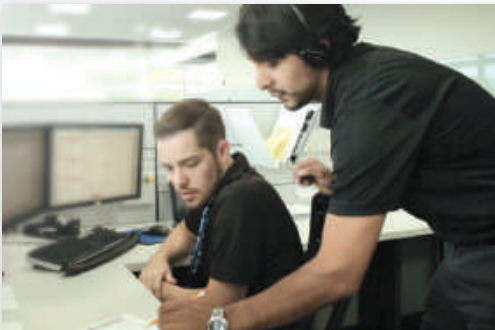
Inside Sales Support

Our inside sales team is trained to handle your account information and general inquiries. We are happy to assist you and find the answers to your questions.

☎ 1.330.343.4283 ext. 8610

☎ 1.800.321.5537 (toll free United States and Canada)

✉ insidesales@alliedmachine.com



2

Engineering Support

Our highly trained and skilled Application Engineers are here to assist you. If you are experiencing technical difficulties, our engineers will recommend the best solutions to the problem. Speeds and feeds, coolant pressure, and other machining components all affect the performance of our tooling. Our AEs are experienced in working with difficult materials in many different environments. Give us a call and put our knowledge to the test.

☎ 1.330.343.4283 ext. 7611

☎ 1.800.321.5537 (toll free United States and Canada)

✉ appeng@alliedmachine.com

3

Field Support

Allied Machine provides local engineering support all over the world. Our Field Sales Engineers (FSEs) spend months training in-house before going to the field. This support line allows us to provide assistance to our customers right at the spindle. They are available to visit your facility, run demos and tests, and work hand-in-hand with machine operators and engineers to find the best possible tooling solutions.

Visit www.alliedmachine.com/fse to get in touch with your local Field Sales Engineer.

☎ 1.330.343.4283

☎ 1.800.321.5537 (toll free United States and Canada)

✉ info@alliedmachine.com





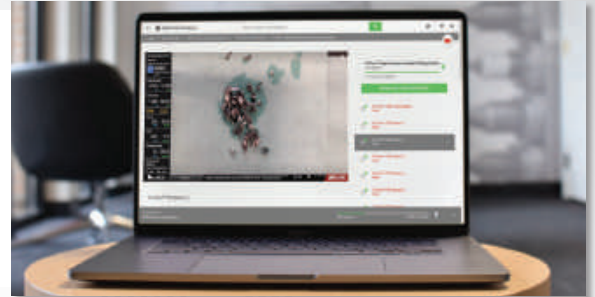
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- On YOUR schedule



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Join us for **LIVE broadcast** training events where you will have the ability to learn about our tooling, watch live demos, and ask our trainers questions.


- Online
- Quick brief presentation provides basic knowledge of our products
- Watch live demos of tools at the spindle at different speeds and feeds

On-site Technical Education Seminar (TES)

Allied Machine's **Technical Education Seminar (TES)** puts the attendees in front of the machines. When you attend our three day TES program, you'll gain first-hand experience in **real-life** application situations. Test and experiment with different speeds and feeds, observe the results, and discover the best solution.

- Training Lab: In-depth training at the spindle allows you to choose speeds and feeds
- Learning Lab: Quick, brief sessions provide basic knowledge of our products
- Facility Tours: Take guided tours of our two manufacturing facilities located in Dover, Ohio



 Register online today:
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Allied Machine
Training Facility
485 West 3rd Street
Dover, OH 44622

Guaranteed Test / Demo Application Form

Distributor PO # _____

The following must be filled out completely before your test will be considered

IMPORTANT: For processing, send Purchase Order to your Allied Field Sales Engineer (FSE). Please clearly mark the paperwork as "Test Order."

Distributor Information

Company Name: _____
 Contact: _____
 Account Number: _____
 Phone: _____
 Email: _____

End User Information

Company Name: _____
 Contact: _____
 Industry: _____
 Phone: _____
 Email: _____

Current Process List all tooling, coatings, substrates, speeds and feeds, tool life, and any problems you are experiencing

Test Objective List what would make this a successful test (i.e. penetration rate, finish, tool life, hole size, etc.)

Application Information

Hole Diameter: _____ in/mm	Tolerance: _____	Material: _____ (4150 / A36 / Cast Iron / etc.)
Preexisting Diameter: _____ in/mm	Depth of Cut: _____ in/mm	Hardness: _____ (BHN / Rc)
Required Finish: _____ RMS	State: _____	(Casting / Hot rolled / Forging)

Machine Information

Machine Type: _____ (Lathe / Screw machine / Machine center / etc.)	Builder: _____ (Haas, Mori Seiki, etc.)	Model #: _____
Shank Required: _____ (CAT50 / Morse taper, etc.)	Power: _____ HP/KW	Thrust: _____ lbs/N
Rigidity: _____	Orientation: _____	Tool Rotating: _____
<input type="checkbox"/> Excellent	<input type="checkbox"/> Vertical	<input type="checkbox"/> Yes
<input type="checkbox"/> Good	<input type="checkbox"/> Horizontal	<input type="checkbox"/> No
<input type="checkbox"/> Poor		

Coolant Information

Coolant Delivery: _____ (Through tool / Flood)	Coolant Pressure: _____ PSI / bar
Coolant Type: _____ (Air mist, oil, synthetic, water soluble, etc.)	Coolant Volume: _____ GPM / LPM

Requested Tooling

QTY	Item Number	QTY	Item Number



Allied Machine & Engineering
 120 Deeds Drive
 Dover, OH 44622

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 Toll Free USA & Canada: (800) 321-5537
 Fax: (330) 602-3400
 Email: info@alliedmachine.com

Warranty Information



Allied Machine & Engineering ("Allied Machine") warrants to original equipment manufacturers, distributors, industrial and commercial users of its products for one year from the original date of sale that each new product manufactured or supplied by Allied Machine shall be free from defects in material and workmanship.

Allied Machine's sole and exclusive obligation under this warranty is limited to, at its option, without additional charge, replacing or repairing this product or issuing a credit. For this warranty to be applied, the product must be returned freight prepaid to the plant designated by an Allied Machine representative and which, upon inspection, is determined by Allied Machine to be defective in material and workmanship.

Complete information as to operating conditions, machine, setup, and the application of cutting fluid should accompany any product returned for inspection. This warranty shall not apply to any Allied Machine products which have been subjected to misuse, abuse, improper operating conditions, improper machine setup or improper application of cutting fluid or which have been repaired or altered if such repair or alteration, in the judgement of Allied Machine, would adversely affect the performance of the product.

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