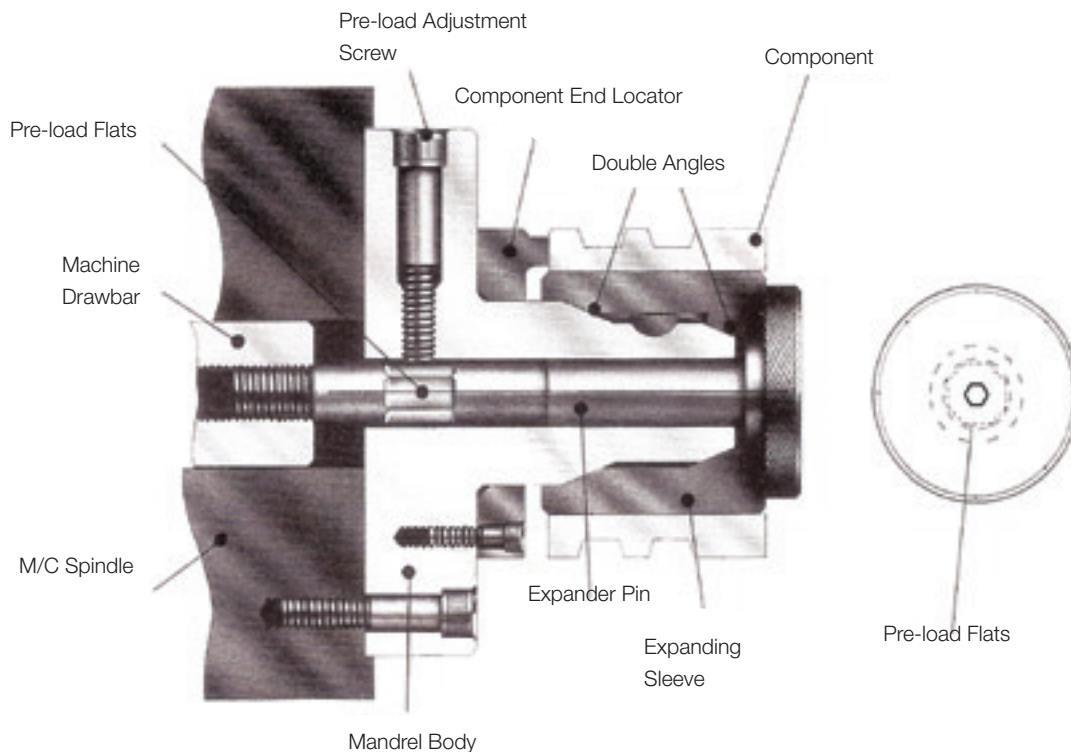




PTG
workholding limited
www.ptgworkholding.co.uk

WORKHOLDING SYSTEMS

INSTALLATION & PRE-LOADING INSTRUCTIONS



- Ensure the machine drawbar is fully forward.
- Load mandrel body to machine spindle (using clock register or double-angle form to check concentricity)
- Fit end-locator to mandrel body (if not already fitted).
- Ensure double-angles are clean on both the mandrel body and sleeve.
- Place expanding sleeve on mandrel body.
- Ensure pre-load adjustment screw is retracted, and place expander pin in mandrel body. Screw the pin clockwise into the drawbar until the head of the pin contracts with the sleeve, ensuring the pin does not expand the sleeve.
- Load component onto the mandrel assembly in its working position.
- Screw expander pin clockwise into the drawbar until the sleeve grips the component.
- Back-off expander pin anti-clockwise until first available pre-load flat is adjacent to pre-load adjustment screw.
- Remove component and check loading clearance to ensure easy loading.
- Tighten pre-load adjustment screw ensuring expander pin has slight radial movement, to allow pin to slide freely.
- Finally, check by loading the component and operating the drawbar, ensuring the component is satisfactorily held. Ensure that the drawbar pressure is sufficient to prevent slippage.
- The mandrel is now ready for operation.

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“The continuing advances in production methods in the metalworking industry has created a need for precision workholding devices capable of automatic clamping in component bores. In addition, the equipment must transmit the high accuracy of the latest machine tools and develop sufficient holding power to resist the cutting forces imposed on the work-piece.”

INTRODUCTION

PTG Workholding Ltd. is a leading supplier of workholding technology. We have the skills and expertise to meet the most exacting and demanding engineering tasks.

As modern manufacturing advances, and in response to customer demand, we now offer a full and versatile range of workholding equipment. Complementing the core business of expanding mandrels and sleeves, design and manufacture of all styles of fixture, special collet chucks are now available.

Our experienced CAD team will take account of all your particular requirements in preparing a proposal. Whilst most holding operations can be successfully obtained by using the modular system and good tool design, PTG are able to offer unmatched engineering knowledge that only years of experience can yield. We may have already solved the very problem you face for other manufacturers.

PTG Workholding Ltd. works in many existing markets, including organisations within the following sectors:

- Automotive
- Aerospace
- Machine tool manufacturing
- Sub-contract operations
- Electrical engineering
- Medical



MODULAR MANDREL SYSTEM

PTG produce and supply precision expanding mandrels capable of automatic clamping in component bores, achieving the highest accuracy and holding power to resist the cutting forces imposed on the work piece.

PTG's modular mandrel system provides the following benefits:

Our unique double-angle principle allows for fast loading and unloading of components.

A standard expansion range of 0.8mm (0.032").

Guaranteed accuracy of 0.013mm (0.0005") T.I.R., or closer if desired.

Greater holding power by applying pressure evenly along the length of the sleeve.

No need to hold the work to close bore tolerance.

One mandrel can accommodate a wide range of sleeve sizes.

Availability of multiple sleeves for work with greater length-to-diameter ratios, eliminating wobble and chatter.

Pull-back of component onto end locator for positive location.

PTG Workholding are generally able to recondition arbors by re-grinding the angles to return mandrels to their original accuracy.

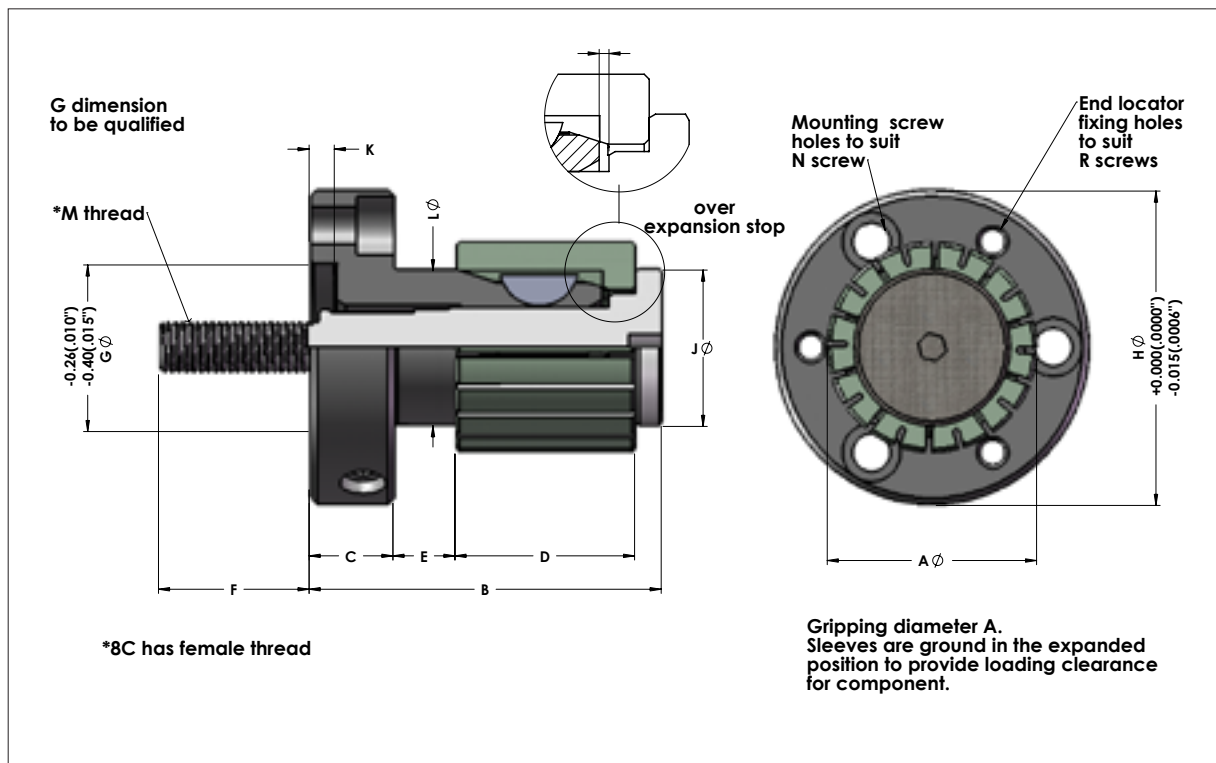
FACEPLATE DRAWBAR OPERATED MANDREL

The faceplate drawbar operated expanding mandrel can be used on any machine with drawbar facilities, for general turning and grinding operations.

Adaptor plates made to suit the machine mounting can be manufactured by PTG Workholding, or the customer. Component end-locators, solid type or compensating (for out of square locating faces) can also be manufactured to your requirements.

The natural pull-back action of the sleeve ensures the component is hard against the location face. There is an over-expansion stop built into the expander pin to avoid over-stressing the expanding sleeve.

For maximum efficiency, expansion sleeves should be pre-loaded to maintain contact with mandrel double-angles at all times.



	A.		B	C	D	E	F	G	H	J	K	L	M	N		R		F Max (daN)	Tool #
	Min	Max												DP	Ø	DP	Ø		
3A	12.5	16.0	60	20.0	22.0	14.6	20	40	75	11.0	6	12.6	M4	58	M8	28	M4	700	90.800.210.1
2C	16.0	22.0	66	20.0	27.0	15.0	22	40	75	15.0	6	14.1	M8	58	M8	28	M4	1000	90.800.215.1
1C	22.0	28.5	72	20.0	32.0	15.5	30	40	75	20.0	6	20.7	M8	58	M8	58	M6	1200	90.800.221.1
18C	28.5	41.0	79	20.0	38.0	15.3	31	40	75	26.5	6	26.3	M10	58	M8	58	M6	1800	90.800.227.1
4C	41.0	63.5	84	20.0	43.0	14.8	36	40	75	37.5	6	37.0	M12	58	M8	58	M6	2300	90.800.234.1
5C	63.5	76.2	109	25.0	51.0	25.3	36	60	120	55.0	6	57.3	M20	94	M10	94	M8	2800	90.800.241.1
6C	76.2	89.0	118	25.0	57.0	24.7	37	60	120	74.5	6	71.1	M20	94	M10	94	M8	3200	90.800.248.1
7C	89.0	130.0	133	30.0	63.5	25.2	47	100	180	86.5	6	84.1	M24	150	M12	150	M10	2700	90.800.253.1
8C	130.0	178.0	153	30.0	79.5	24.6	22	100	180	124.0	6	123.0	M36	150	M12	150	M10	5500	90.800.259.1

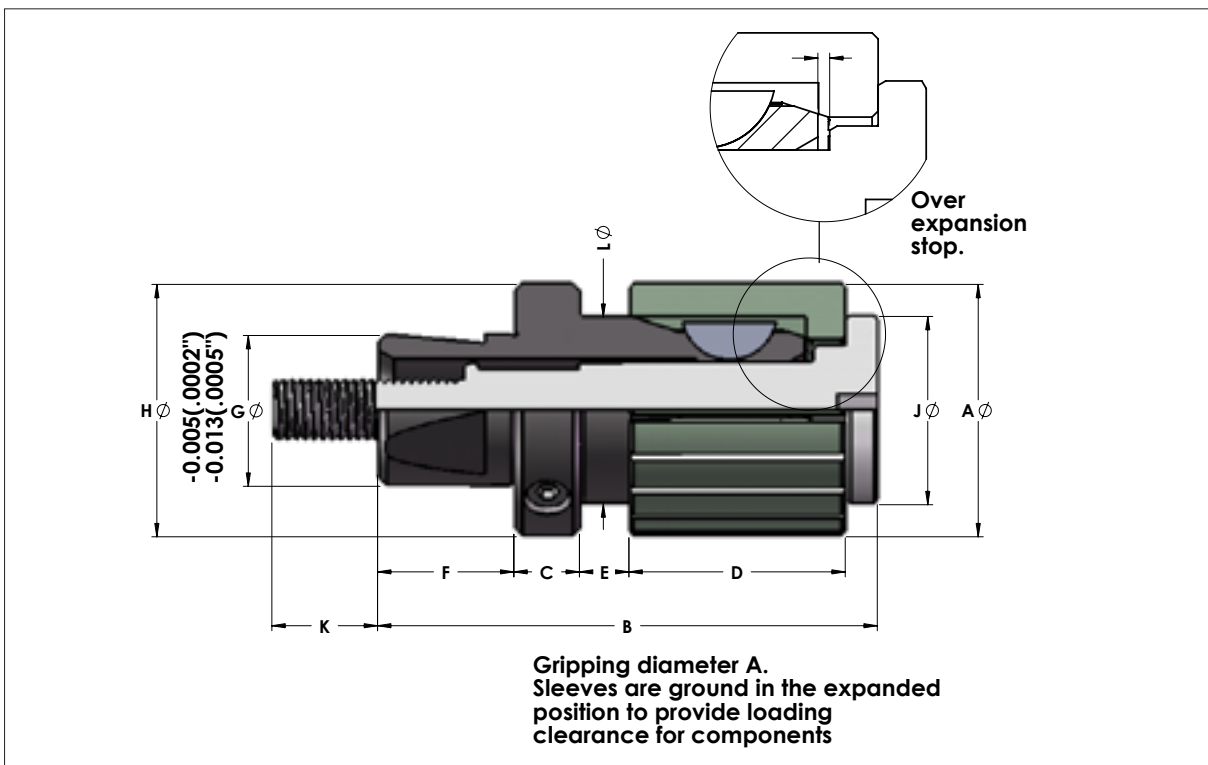
SPIGOT DRAWBAR OPERATED MANDREL

The spigot drawbar operated expanding mandrel can be used on any machine with drawbar facilities, for general turning and grinding operations.

Adaptor plates made to suit the machine mounting can be manufactured by PTG Workholding, or the customer. Component end-locators, solid type or compensating (for out of square locating faces) can also be manufactured to your requirements.

The natural pull-back action of the sleeve ensures the component is hard against the location face. There is an over-expansion stop built into the expander pin to avoid over-stressing the expanding sleeve.

For maximum efficiency, expansion sleeves should be pre-loaded to maintain contact with mandrel double-angles at all times.



	A.		B	C	D	E	F	G	H	J	K	L	M	F Max (daN)	Tool #
	Min	Max													
3A	12.5	16.0	66	11.0	22.0	9.8	20	20	26	11.0	14	9.5	M4	700	90.810.210.1
2C	16.0	22.0	70	11.0	27.0	8.0	20	20	26	15.0	18	14.1	M8	1000	90.810.215.1
1C	22.0	28.5	85	11.0	32.0	10.0	27	30	40	20.0	17	20.7	M8	1200	90.820.221.1
18C	28.5	41.0	92	11.0	38.0	10.5	27	30	40	26.5	18	26.3	M10	1800	90.820.227.1
4C	41.0	63.5	99	13.0	43.0	9.5	27	30	50	37.5	21	37.0	M12	2300	90.820.234.1

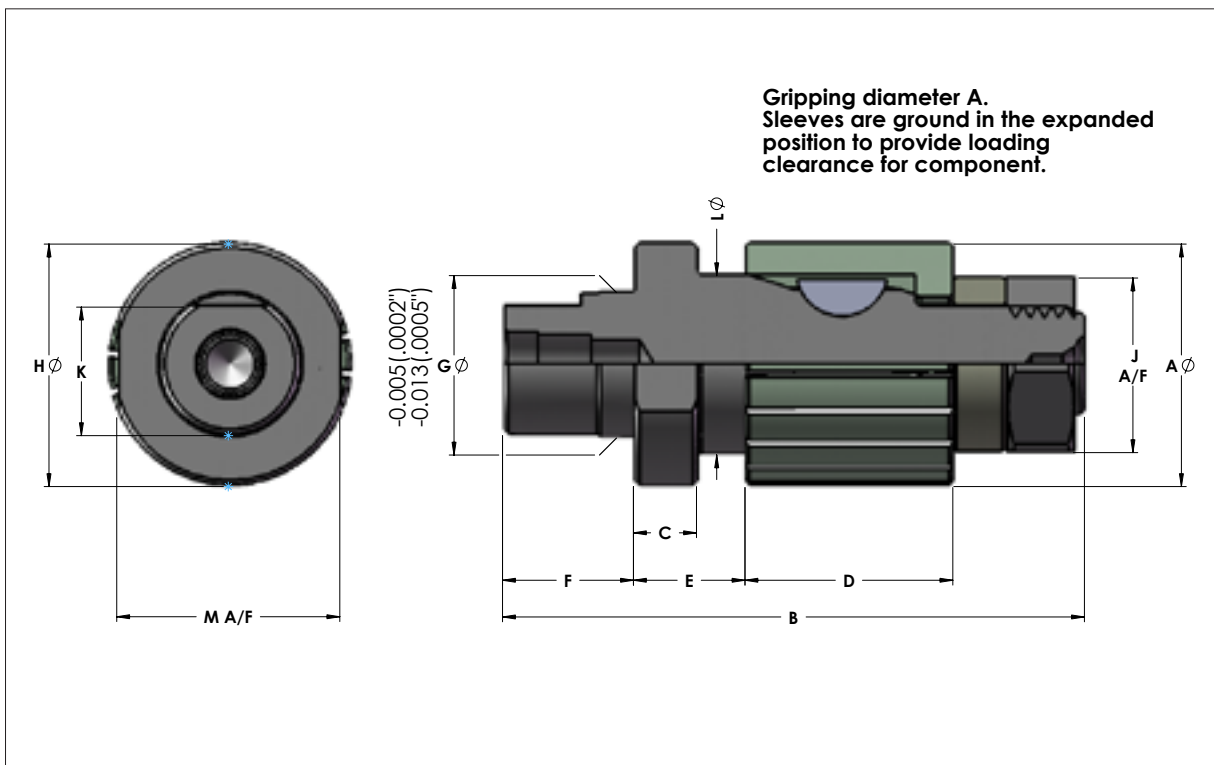
BETWEEN CENTRES MANDREL

The nut operated between-centres expanding mandrel is generally mounted between 60 degree centres, and can be driven from the drive flat with a carrier or drive plate. It is possible to attach a simple component end locator, if required, at diameter L.

There is a ground diameter G to adapt this mandrel to face-plate mounted, if required, by use of an adaptor plate. Adaptor plates made to suit the machine mounting can be manufactured by PTG Workholding Ltd., or the customer. Component end locators, solid-type or compensating (for out-of-square locating faces) can also be supplied, or manufactured by the customer.

These mandrels are generally used for small-batch grinding operations. These mandrels are hand-operated by use of conventional spanners, and are often used for inspection purposes.

For maximum efficiency, expansion sleeves should be pre-loaded to maintain contact with mandrel double-angles at all times.



	A.		B	C	D	E	F	G	H	J A/F	K	L	M	Tool #
	Min	Max												
3A	12.5	16.0	77	11.0	22.0	21.0	20	20	26.0	10	18	9.5	22	90.811.110.1
2C	16.0	22.0	83	11.0	27.0	20.0	20	20	26.0	13	18	14.1	22	90.811.115.1
1C	22.0	28.5	99	11.0	32.0	21.5	27	30	40.0	19	27	20.7	36	90.821.121.1
18C	28.5	41.0	107	11.0	38.0	21.2	27	30	40.0	24	27	26.3	36	90.821.127.1
4C	41.0	63.5	120	13.0	43.0	23.0	27	30	50.0	36	27	37.0	46	90.821.134.1
5C	63.5	76.2	145	-	51.0	26.0	35	40	57.3	55	35	57.3	50	90.831.141.1
6C	76.2	89.0	155	-	57.0	26.3	35	50	71.1	65	45	71.1	60	90.841.148.1
7C	89.0	130.0	205	-	63.5	44.0	50	60	84.1	85Ø	55	84.1	70	90.851.153.1
8C	130.0	178.0	205	-	79.5	55.5	50	80	123.0	124Ø	73	123.1	105	90.861.159.1

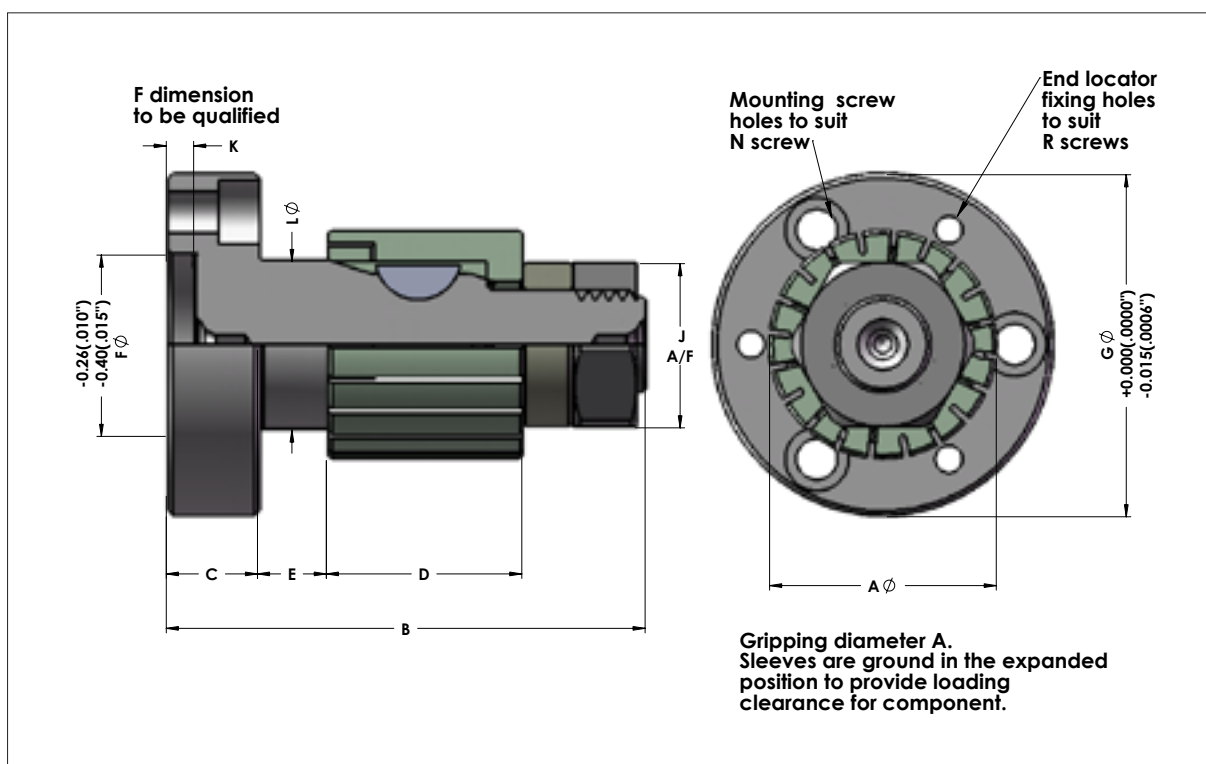
FACEPLATE NUT OPERATED MANDREL

The face-plate nut operated expanding mandrel can be used on any machine with no drawbar facility, for general turning and grinding operations. These are a popular choice for milling fixture locators.

Adaptor plates made to suit the machine mounting can be manufactured by PTG Workholding Ltd., or the customer. Component end locators, solid-type or compensating (for out-of-square locating faces) can also be manufactured by the customer.

The natural pullback action of the sleeve ensures the component is hard against the location face.

For maximum efficiency, expansion sleeves should be pre-loaded to maintain contact with mandrel double-angles at all times.



	A.		B	C	D	E	F	G	J A/F	K	L	N		R		Tool #
	Min	Max										DP	Ø	DP	Ø	
3A	12.5	16.0	73	20.0	22.0	15.0	40	75	10	6	12.6	58	M8	28	M4	90.800.110.1
2C	16.0	22.0	79	20.0	27.0	15.0	40	75	13	6	14.1	58	M8	28	M4	90.800.115.1
1C	22.0	28.5	86	20.0	32.0	15.5	40	75	19	6	20.7	58	M8	58	M6	90.800.121.1
18C	28.5	41.0	94	20.0	38.0	15.2	40	75	24	6	26.3	58	M8	58	M6	90.800.127.1
4C	41.0	63.5	105	20.0	43.0	15.0	40	75	36	6	37.0	58	M8	58	M6	90.800.134.1
5C	63.5	76.2	134	25.0	51.0	25.0	60	120	55	6	57.3	94	M10	94	M8	90.800.141.1
6C	76.2	89.0	144	25.0	57.0	25.0	60	120	65	6	71.1	94	M10	94	M8	90.800.148.1
7C	89.0	130.0	166	30.0	63.5	25.0	100	180	85Ø	6	84.1	150	M12	150	M10	90.800.153.1
8C	130.0	178.0	185	30.0	79.5	25.0	100	180	124Ø	6	123.1	150	M12	150	M10	90.800.159.1

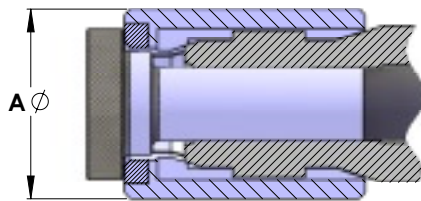
Order online at www.ptgworkholding.co.uk

STANDARD SLEEVES

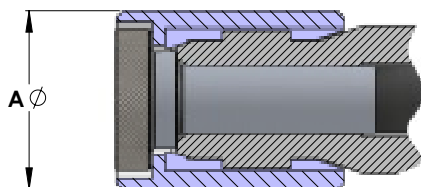
Our standard length sleeves can be used with all types of mandrel, and are interchangeable within the diameter range of each type. For example, the 3A drawbar operated mandrel will accept a 3A1 standard-type or a 3A2 flush-type sleeve, which may have been originally used on a 3A thread-operated mandrel.

PTG Workholding can supply bonded sleeves to keep swarf away from the double-angle form, helping to prolong the sleeve's life and accuracy.

Standard Type Sleeve



Flush Type Sleeve



Ordering Information

To order easily the correct sleeve to meet your requirements, please place your order online at www.ptgworkholding.co.uk.

If not ordering via our web site, we would recommend customers' orders specify the type and model number of the mandrel.

All sleeve orders must specify the type and model number, the component bore and tolerance to be gripped.

e.g. 1 off type 18C1 bonded sleeve to grip 38.10mm diameter bore = 92.150.210.3810

Bond

Standard Type Sleeve

Model	Gripping Diameter		Length	Expanded Position	Tool #
	Min	Max			
3A1	12.5	16.0	22.0	0.13	92.000.200.XXXX
2C1	16.0	22.0	27.0	0.13	92.050.200.XXXX
1C1	22.0	28.5	32.0	0.13	92.100.200.XXXX
18C1	28.5	41.0	38.0	0.13	92.150.200.XXXX
4C1	41.0	63.5	43.0	0.26	92.200.200.XXXX
5C1	63.5	76.2	51.0	0.26	92.250.200.XXXX
6C1	76.2	89.0	57.0	0.26	92.300.200.XXXX
7C1	89.0	130.0	63.5	0.39	92.350.20X.XXXX
8C1	130.0	178.0	80.0	0.39	92.400.20X.XXXX

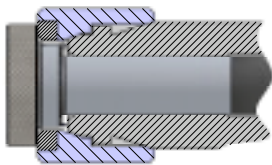
Flush Type Sleeve

Model	Gripping Diameter		Length	Expanded Position	Tool #
	Min	Max			
3A2	16.5	22.0	26.0	0.13	92.001.200.XXXX
2C2	22.0	28.5	32.0	0.13	92.051.200.XXXX
1C2	28.5	40.0	38.0	0.13	92.101.200.XXXX
18C2	40.0	51.0	45.0	0.13	92.151.200.XXXX
4C2	51.0	73.0	50.0	0.26	92.201.200.XXXX
5C2	73.0	89.0	60.0	0.26	92.251.200.XXXX
6C2	89.0	102.0	69.0	0.26	92.301.200.XXXX
7C2	101.0	143.0	78.5	0.39	92.351.20X.XXXX
8C2	143.0	178.0	99.5	0.39	92.401.20X.XXXX

SPECIAL SLEEVES AND MANDRELS

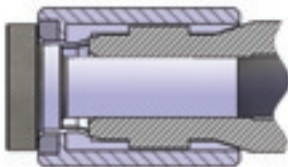
We have available a comprehensive range of special sleeves, that have been developed to accommodate the varying conditions and the more difficult workholding problems, that modern industry is faced with today. PTG design engineer's can use any combination of the following to provide the ideal clamping solution.

All of the expanding sleeves below can be supplied with their expansion slots bonded with silicone as specials. This is recommended to keep swarf away from the double angle form. This will prolong the life and accuracy of the expanding mandrel assembly.



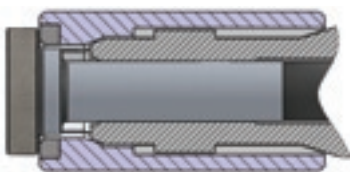
Short length (1/2C1)

There are many situations where the customers component is too short for our standard sleeve. We therefore have a full range of short sleeves.



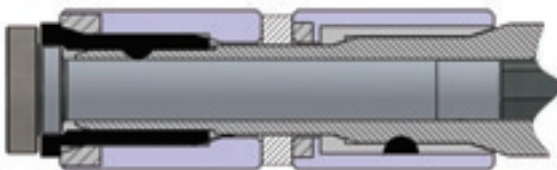
Standard length (C1)

The standard sleeve has its double angles spaced at their optimum position to provide positive clamping and accuracy.



Extended length (C11)

There are many situations where the customers component is too long for our standard sleeve. We therefore have a full range of long sleeves.



Dual Sleeve

There are many situations where the customers component is too long for our extended sleeve. We can then mount dual combinations of the above sleeves. This provides a rigid method of clamping a long component.



Dual Sleeve Mandrel Arrangement



Special Drawbar Operated Grinding Mandrel

Contact us Today on
+44 (0)117 970 1101

For a No-Obligation Quotation

Order online at www.ptgworkholding.co.uk



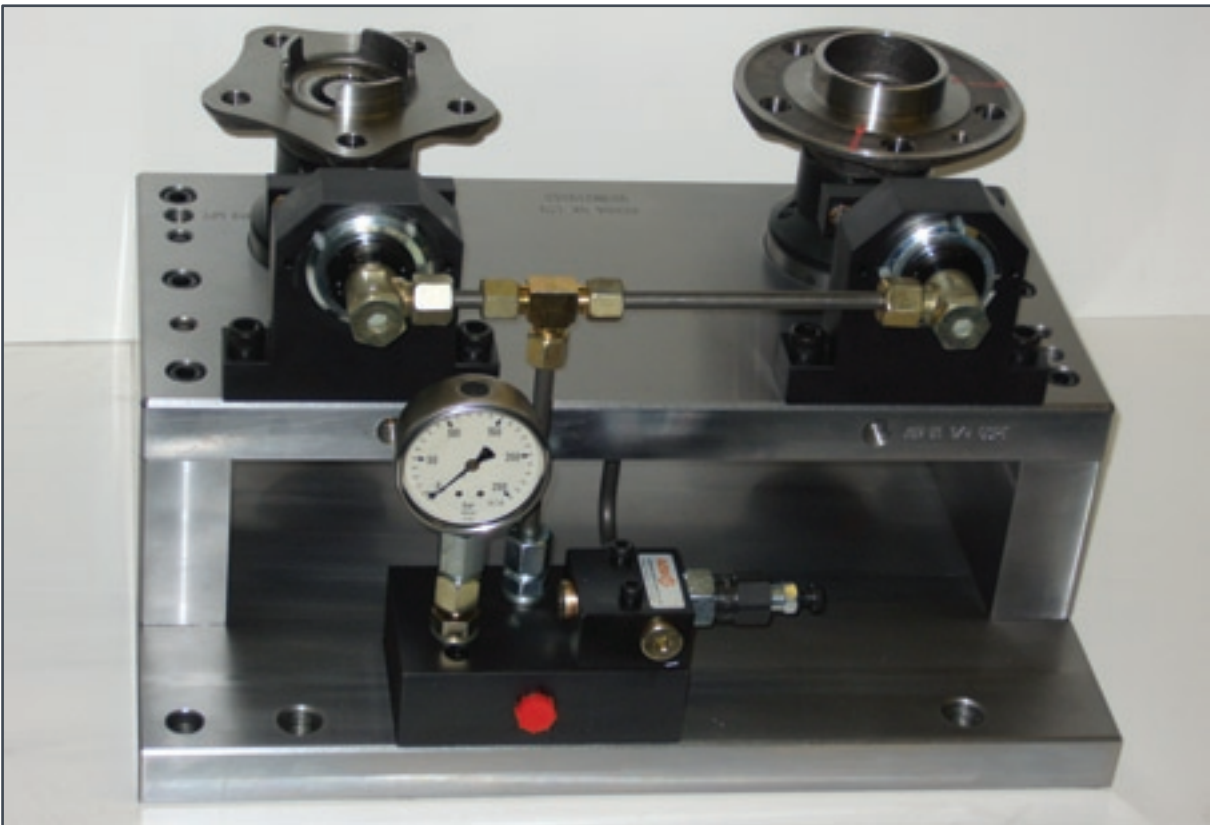
Fail-Safe Spring Actuated Mandrel

SPECIAL APPLICATIONS

SPECIAL APPLICATION ENGINEERING

We have at our disposal a highly experienced engineering design team. Over many years, our team has provided countless solutions to customers requiring special workholding solutions. The very problem you face may have been solved by us for an existing customer.

Not all applications are used on lathes or grinding machines. The mandrel system can be used on all types of fixtures for production on both vertical and horizontal machining centres.



Twin station hydraulically operated mandrel CNC fixture for automotive production.

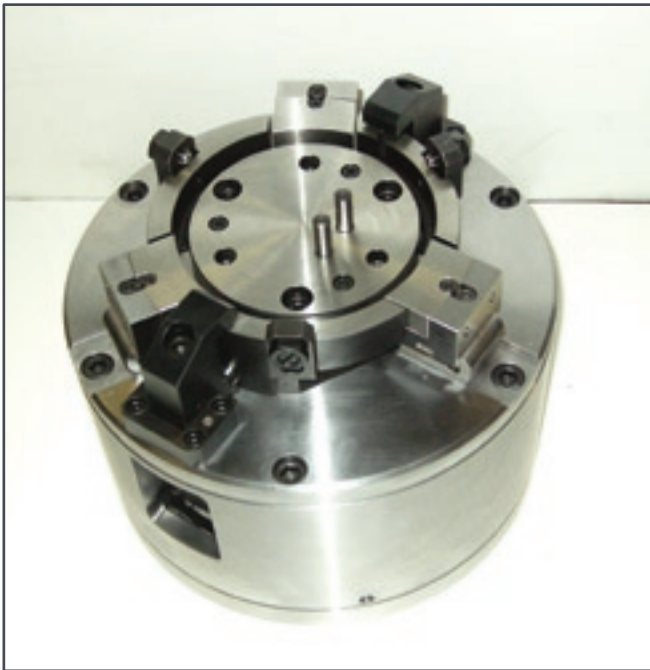


Special mandrel assemblies used in aircraft assembly.

CHUCKING APPLICATIONS

PTG Workholding Limited can also design and manufacture special application chucks for use on a wide variety of CNC or manual lathes and grinding machines.

Examples of special chucks manufactured include: diaphragm chucks, compensating spring-jaw chucks, gear pitch line chucks and twist finger chucks.



Compensating spring jaw grinding chuck



Turbo gear hobbing chuck

FREQUENTLY ASKED QUESTIONS

How do I place an order?

Orders can be placed quickly and easily by registering with our web site at **www.ptgworkholding.co.uk**. Alternatively, you can contact us by telephone on +44 (0)117 970 1101 or fax on +44 (0)117 970 1181.

What is the accuracy of the workholding system?

Our system delivers a guaranteed accuracy of 0.013mm, which is maintained constantly as mating surfaces wear to a gauge fit.

What is the expansion range?

Our sleeves have a standard expansion range of 0.80mm.

Are mandrels designed to fit only one sleeve?

No, one mandrel is able to accommodate a wide range of sleeve sizes.

What is the mandrel's clamping power?

Thanks to 360-degree clamping along the entire sleeve length, our mandrels' deliver greater clamping power. This is further enhanced by the pull-back action on to the locator.

Is it easy to release the component after machining?

Yes, our double-angle system guarantees the automatic self-release of a component, enabling quick loading and unloading.

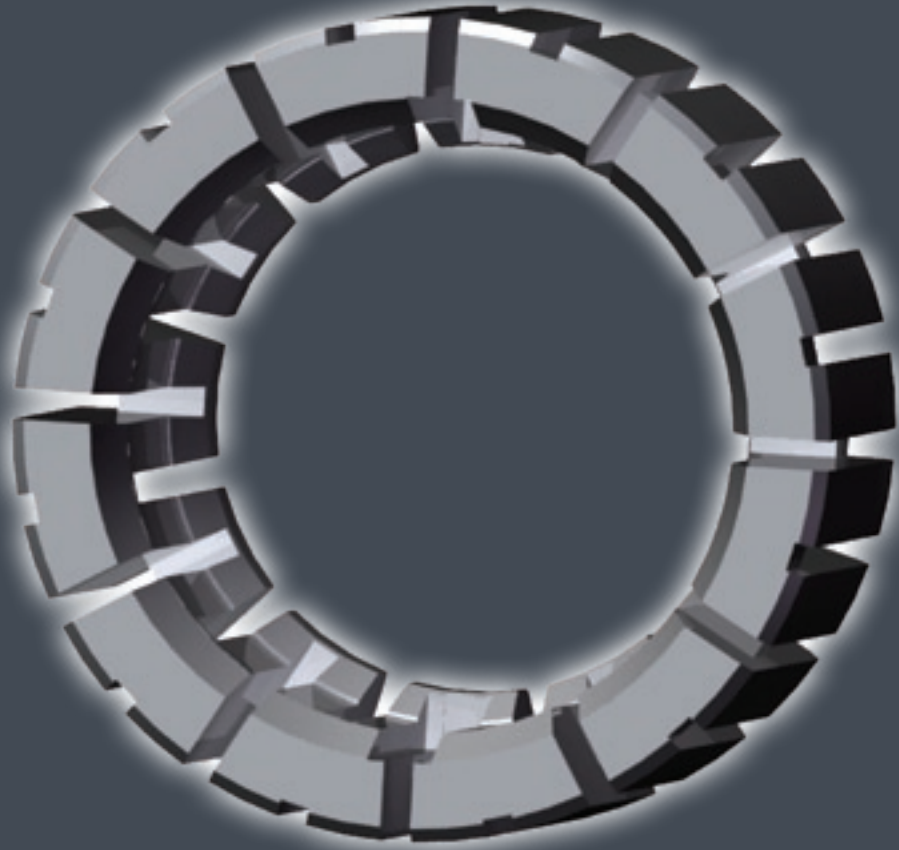
What about repairs and replacement?

All our mandrels can generally be reconditioned by having the expansion angle re-ground. All replacement sleeves will maintain the original accuracy of the unit.

Can PTG Workholding provide a workholding solution for my problem?

Yes, PTG Workholding can customise to the customer's requirements upon receipt of machine and component data.

Please see the **Special Sleeves and Applications** form for more information. The form is online at **www.ptgworkholding.co.uk**.



PTG
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