BRITISH STANDARD

BS EN 4619:2010

Aerospace series — Inserts, MJ threads, self-locking, with self-broaching keys — Installation and removal procedure

ICS 49.030.30

National foreword

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Luft- und Raumfahrt - Gewindeeinsätze, MJ-Gewinden, selbstsichernd, mit selbsträumenden Stiften - Ein- und Ausbauverfahren

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Foreword

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After enquiries and votes carried out in accordance with the rules of this Association, this Standard has received the approval of the National Associations and the Official Services of the member countries of ASD, prior to its presentation to CEN.

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1 Scope

This standard specifies the installation and removal procedure (hole profile, tools) of self-locking, self-broaching key, MJ thread inserts defined by EN standards, for aerospace applications.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 4620, *Aerospace series — Inserts, MJ threads, self-locking, with self-broaching keys — Design standard*

EN 4622, *Aerospace series — Inserts, MJ threads, self-locking, with self-broaching keys, in heat resisting steel FE-PA2601 (A286), MoS_2 coated*

EN 4623, *Aerospace series — Inserts, MJ threads, self-locking, with self-broaching keys, in heat resisting nickel base alloy NI-PH2601 (Inconel 718), silver plated*

EN 4624, *Aerospace series — Inserts, MJ threads, self-locking, with self-broaching keys, in heat resisting nickel base alloy NI-PH1302 (Waspaloy), silver plate*

ISO 5855-1, *Aerospace — MJ threads — Part 1: General requirements*

ISO 5855-2, *Aerospace — MJ threads — Part 2: Limit dimensions for bolts and nuts*

3 Insert information

Tables 1 to 3 provide the cross reference between the insert codification, the related bolt thread and the tapped hole diameter.

Table 1 — Normal size insert

Insert reference	Bolt thread diameter [a, b]	Tapped hole diameter [b]	Tapped hole reference
EN 4622-050-0 EN 4624-050-0 EN 4623-050-0	MJ5×0,8	MJ9×1-4H5H	EN 4620-050-0
EN 4622-060-0 EN 4624-060-0 EN 4623-060-0	MJ6×1	MJ10×1-4H5H	EN 4620-060-0
EN 4622-070-0 EN 4624-070-0 EN 4623-070-0	MJ7×1	MJ11×1-4H5H	EN 4620-070-0
EN 4622-080-0 EN 4624-080-0 EN 4623-080-0	MJ8×1	MJ12×1-4H5H	EN 4620-080-0
EN 4622-100-0 EN 4624-100-0 EN 4623-100-0	MJ10×1,25	MJ14×1-4H5H	EN 4620-100-0

[a] According to ISO 5855-2.

[b] According to ISO 5855-1.

Table 2 — First repair size insert

Insert reference	Bolt thread diameter [a, b]	Tapped hole diameter [b]	Tapped hole reference
EN 4622-050-1 EN 4624-050-1 EN 4623-050-1	MJ5×0,8	MJ10×1-4H5H	EN 4620-050-1
EN 4622-060-1 EN 4624-060-1 EN 4623-060-1	MJ6×1	MJ11×1-4H5H	EN 4620-060-1
EN 4622-070-1 EN 4624-070-1 EN 4623-070-1	MJ7×1	MJ12×1-4H5H	EN 4620-070-1
EN 4622-080-1 EN 4624-080-1 EN 4623-080-1	MJ8×1	MJS13×1-4H5H	EN 4620-080-1
EN 4622-100-1 EN 4624-100-1 EN 4623-100-1	MJ10×1,25	MJ15×1-4H5H	EN 4620-100-1

[a] According to ISO 5855-2.

[b] According to ISO 5855-1 except MJS13×1 (see Table 4).

Table 3 — Second repair size insert

Insert reference	Bolt thread diameter [a, b]	Tapped hole diameter [b]	Tapped hole reference
EN 4622-050-2 EN 4624-050-2 EN 4623-050-2	MJ5×0,8	MJ11×1-4H5H	EN 4620-050-2
EN 4622-060-2 EN 4624-060-2 EN 4623-060-2	MJ6×1	MJ12×1-4H5H	EN 4620-060-2
EN 4622-070-2 EN 4624-070-2 EN 4623-070-2	MJ7×1	MJS13×1-4H5H	EN 4620-070-2
EN 4622-080-2 EN 4624-080-2 EN 4623-080-2	MJ8×1	MJ14×1-4H5H	EN 4620-080-2
EN 4622-100-2 EN 4624-100-2 EN 4623-100-2	MJ10×1,25	MJ16×1-4H5H	EN 4620-100-2

[a] According to ISO 5855-2.

[b] According to ISO 5855-1 except MJS13×1 (see Table 4).

Table 4

Dimensions in millimetres

Thread designation	Major diameter	Pitch diameter		Minor diameter	
	max.	max.	min.	max.	min.
MJS13×1-4H5H	13,244	12,450	12,350	12,216	12,026

4 Inspection requirements before installation

Prior to installation check the installation hole to receive the insert are free from burrs and any foreign objects, grease, oil, etc.

Inspect insert to be installed and ensure that it is clean and free from protective grease, etc.

5 Installation tools

5.1 General

In order to facilitate the correct assembly of the inserts use the appropriate tools. It is necessary to use one tool by insert reference.

The tools and their methods of application described in this standard are not mandatory and show only the basic principles to be observed to achieve the satisfactory installation and subsequent broaching and the satisfactory removal of the inserts.

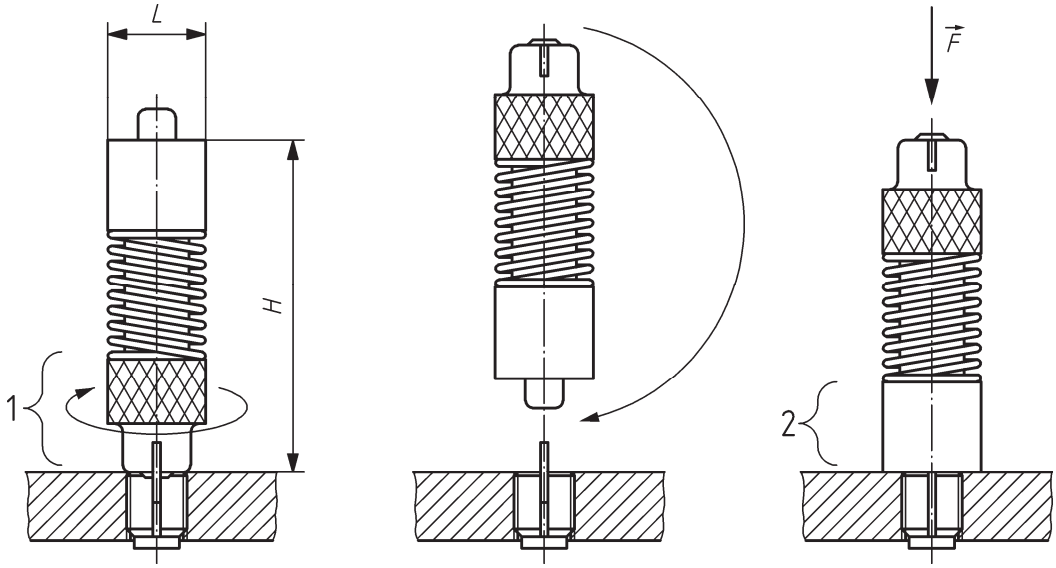
The maximum dimensional requirements provided shall be achieved and on no account shall the design of the tools or their methods of application be such that damage may occur to the threads or the locking zone of the insert or the component into which it is being installed.

5.2 Hand installation

5.2.1 Installation tool

Figure 1 illustrates a combined tool used for hand screwing and hand broaching and its overall dimensions.

Figure 1a) and Table 5 give the overall dimensions.



Key

1 Screwing nose
2 Broaching nose for keys setting

a) **b)** **c)**

Figure 1

Table 5

Dimensions in millimetres

Insert external thread	H	Ø L
MJ9×1	71	14,3
MJ10×1		15,9
MJ11×1		14,3
MJ12×1		17,5
MJS13×1		17,5
MJ14×1		19,0
MJ15×1		20,6
MJ16×1		20,6

5.2.2 Procedure

a) Lubricate the outer thread of the insert with the lubricant referenced on the assembly drawing. Inserts installed in aluminium or magnesium alloy components shall be lightly smeared externally with a suitable compound to prevent galvanic corrosion if required on the assembly drawing.

b) Fit into place and screw the insert by two turns into the component.

c) Fit into place the screwing nose of the tool onto the keys, then screw the assembly into the threaded hole until the screwing nose mates the component surface as shown in Figure 1a).

d) Adjust the insert position within the X limits given in Figure 3.

e) Turn the tool on the broaching nose side as showed in Figure 1b).

f) Apply a sufficient load in the direction indicated Figure 1c) to broach the keys by stamping or by pressing on the tool. The keys are fitted in the proper position corresponding to Y dimension given in Figure 3.

g) Remove the tool from the insert.

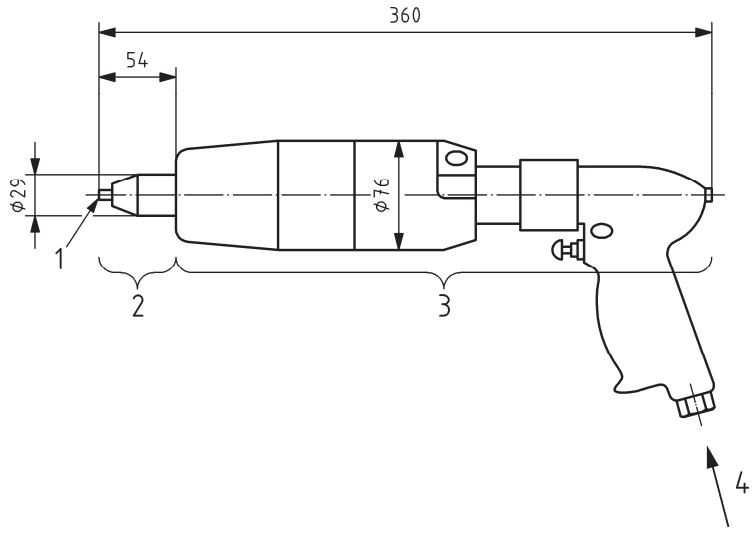
h) Remove excess sealing compound or lubricant if any.

5.3 Air pressure installation

5.3.1 Installation tool

Figure 2 illustrates a tool for screwing, broaching and unscrewing assembled on an air pressure gun. The overall dimensions are given in Figure 2.

Dimensions in millimetres



Key

1 Threaded mandrel
2 Interchangeable installation nose corresponding to the insert reference
3 Gun
4 600 kPa (6 bar) air pressure inlet

Figure 2

5.3.2 Procedure

The air pressure gun shall be previously adjusted in order to obtain the satisfactory installation of insert and of the keys as given in Figure 3.

a) Lubricate the outer thread of the insert with the lubricant referenced on the assembly drawing. Inserts installed in aluminium or magnesium alloy components shall be lightly smeared externally with a suitable compound to prevent galvanic corrosion if required on the assembly drawing.

b) Screw the insert on to the threaded mandrel until it is fully seated against the installation nose.

c) Using the tool, screw the insert into the tapped hole until positioned:

   The screwing/broaching tool comes into contact with the surface of the component, when operating the air gun. The insert comes in position as shown in Figure 3 below the surface of the casing.

d) Use the air gun in the percussion mode to broach the keys.

e) Unscrewing is automatic to extract the tool from the crimped insert.

f) Remove excess sealing compound or lubricant if any.

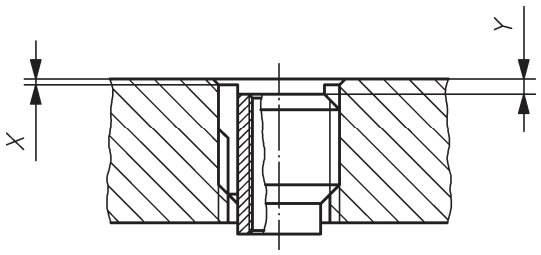
6 Checks of insert position and keys broaching

These checks shall be carried out with an inspection gauge common to all insert dimensions.

— Check dimensions X and Y which shall be in accordance with Figure 3.

— After broaching of keys, the component surface shall not show any distortion or cracks.

Dimensions in millimetres



Key

X Installation depth of the keys

$X = \begin{matrix} 0{,}13 \\ 0{,}75 \end{matrix}$

Y Installation depth of the insert

$Y = \begin{matrix} 0{,}25 \\ 0{,}75 \end{matrix}$

Figure 3

7 Inspection of minimum self-locking torque

The minimum self-locking torque for the installed insert shall conform to Table 6 and shall be checked using a low third pitch diameter passivated stainless steel test bolt (see Table 6). Bolts shall not be lubricated. The test bolts shall be periodically checked for wear and damage, any bolt falling outside the tolerances in Table 6 shall not be used for this check.

The sample size/frequency for this check shall be at the responsibility of the installer.

Table 6

Associated bolt thread	Part number			Test bolt pitch diameter		Self-locking torque
	Normal size insert	First repair size insert	Second repair size insert	mm max.	mm min.	Nm min.
MJ5×0,8	EN 4622-050-0 EN 4624-050-0 EN 4623-050-0	EN 4622-050-1 EN 4624-050-1 EN 4623-050-1	EN 4622-050-2 EN 4624-050-2 EN 4623-050-2	4,440	4,420	0,5
MJ6×1	EN 4622-060-0 EN 4624-060-0 EN 4623-060-0	EN 4622-060-1 EN 4624-060-1 EN 4623-060-1	EN 4622-060-2 EN 4624-060-2 EN 4623-060-2	5,303	5,279	0,7
MJ7×1	EN 4622-070-0 EN 4624-070-0 EN 4623-070-0	EN 4622-070-1 EN 4624-070-1 EN 4623-070-1	EN 4622-070-2 EN 4624-070-2 EN 4623-070-2	6,303	6,279	1,1
MJ8×1	EN 4622-080-0 EN 4624-080-0 EN 4623-080-0	EN 4622-080-1 EN 4624-080-1 EN 4623-080-1	EN 4622-080-2 EN 4624-080-2 EN 4623-080-2	7,303	7,279	1,4
MJ10×1,25	EN 4622-100-0 EN 4624-100-0 EN 4623-100-0	EN 4622-100-1 EN 4624-100-1 EN 4623-100-1	EN 4622-100-2 EN 4624-100-2 EN 4623-100-2	9,138	9,113	2,4

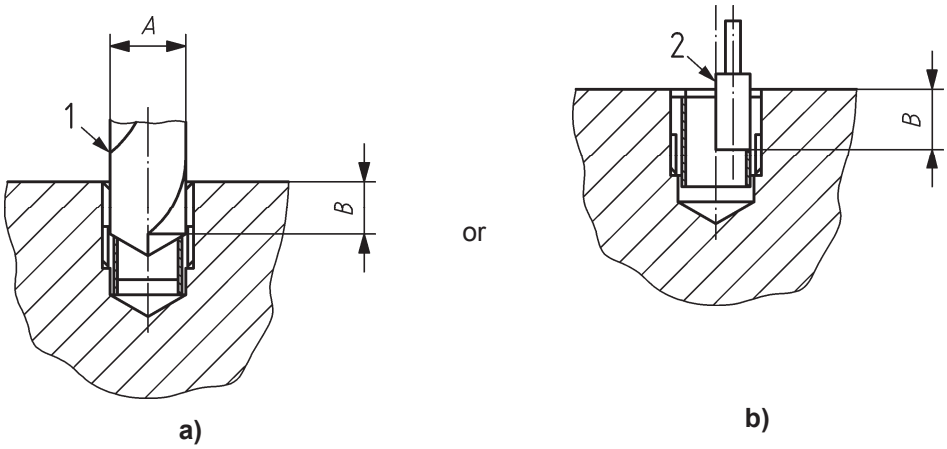
8 Insert replacement

8.1 Insert removal

When repairing, the self-broaching key inserts can be removed as follows:

a) Drill using a diameter A drill to depth B as shown in Figure 4 and Table 7 or pilot spot facing cutter.

Material may also be ground or milled away locally in the key area as shown in Figure 4, so that keys can be removed.



Key

1 Drill
2 Mill or grinder

Figure 4

b) Deflect the keys inward to clear the tapped hole as shown in Figure 5.

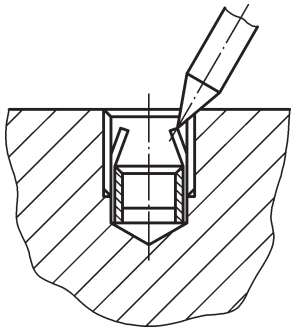


Figure 5

c) Unscrew the insert with the extraction tool as shown in Figure 6.

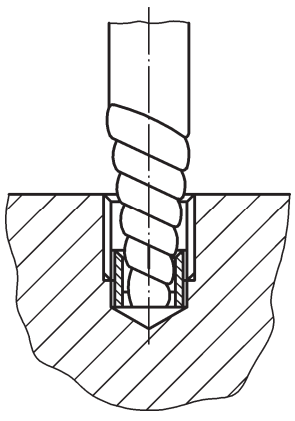


Figure 1

d) After machining, remove the part fragments of the insert using the appropriate tool.

Table 7

Dimensions in millimetres

Tapped hole		*A*	*B*
reference	**diameter**	max.	max.
EN 4620-050-0	MJ9×1	7,8	3,0
EN 4620-050-1 EN 4620-060-0	MJ10×1	8,8	3,1
EN 4620-050-2 EN 4620-060-1 EN 4620-070-0	MJ11×1	9,8	3,4
EN 4620-060-2 EN 4620-070-1 EN 4620-080-0	MJ12×1	10,8	3,6
EN 4620-070-2 EN 4620-080-1	MJS13×1	11,8	4,0
EN 4620-080-2 EN 4620-100-0	MJ14×1	12,8	
EN 4620-100-1	MJ15×1	13,8	4,2
EN 4620-100-2	MJ16×1	14,8	4,5

8.2 Repair

8.2.1 General rules

After removal of the insert, check for cleanliness of tapped hole and check tapped hole dimensions using a threaded plug gauge. If correct and damage free, it is possible to install a new insert of same part number. Otherwise install a repair size insert (first or second repair as applicable), if the design makes it possible (see EN 4620) following 8.2.2.

When installing a new insert, the keys shall not be aligned with the housing of the previous insert keys. The dimensions specified in Figure 3 shall be met.

8.2.2 First and second repair size installation

First and second repair size part numbers and their installation and removal methods are given:

— Tables 2 and 3 respectively for first and second repair size part numbers selection;

— Figure 3 for the under-flushing of the insert and of the keys;

— See Clause 8 for the replacement of the insert.

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