

# Thread repair with **Ensat®** and **Gripp®**

## Ensat®

is ideally suited for the fast repair of torn and damaged threads. The same screw size can be used again. This gives threads a markedly higher load capacity.

**Gripp®** is used for the repair of torn spark plug retaining threads in light alloy cylinder heads.

Gripp is installed in the same way as Ensat, but screwed in deeper until the upper rim comes to rest around 1.8 mm under the surface of the cylinder head. The sealing ring of the spark plug is then able to work effectively.

**Mini-packs** for minor repair requirements are available from tool retailers or from the manufacturer.

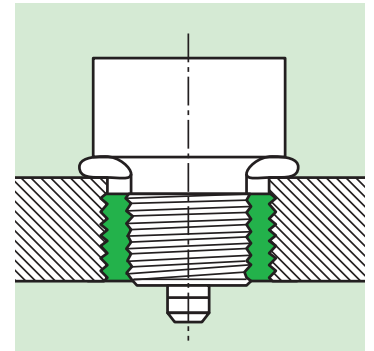


## The basic Ensat® kit

The basic kit contains 315 self-tapping threaded inserts Ensat-S 302 made of case-hardened, zinc-plated, yellow chromated steel with internal thread from M2,5 to M16.

## The Ensat® installation kit.

The installation kit contains 270 self-tapping threaded inserts Ensat-S 302 made of case-hardened, zinc-plated, yellow chromated steel with internal thread from M4 to M8 and the tools required for manual installation (for a more detailed description see page 22).



## The Gripp® kit

The Gripp kit was put together specifically for the repair of torn and damaged spark plug retaining threads and comes complete with tools for manual installation in two thread sizes:

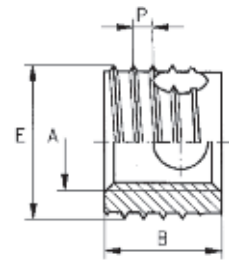
- Standard: M14 long and short
- Universal: additionally M18



### Application

The Ensat-Gripp threaded insert with cutting bores is a self-tapping fastener for the repair of torn and damaged spark plug retaining threads in cylinder heads.

The Ensat-Gripp is designed to enhance the pull-out strength of the thread.



Dimensions in mm

Article no.	Internal thread			External special thread		Length B	Hole size-diameter 1) L
	A	P	DIN	E	P		
304 000 140.160	M 14	1,25	72502	17,7	1,25	9	17,0
304 000 141.160	M 14	1,25	72502	17,7	1,25	15	17,0
304 000 180.160	M 18	1,5	72501	21,7	1,25	9	21,0

1) Guideline values for normal applications. Deviations, depending on the strength of the cylinder head alloy,  $\pm 0,1$  mm

### Example for finding the article number

Spark plug insert with internal thread A = M14 x 1,25 mm, length B = 9 mm made of hardened, zinc plated and yellow chromated steel: Ensat-Gripp 304 000 140.160

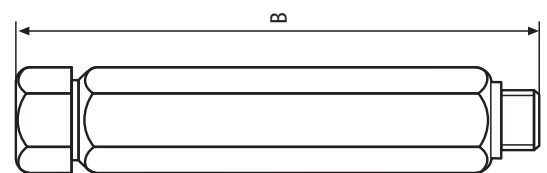
### Material

Hardened steel, zinc plated, yellow chromated

Dimensions in mm

Article no.	Suitable for Gripp	Tool SW D	Length
			B
619 000 140	304 000 140.160 304 000 141.160	22	97
619 000 180	304 000 180.160	22	97

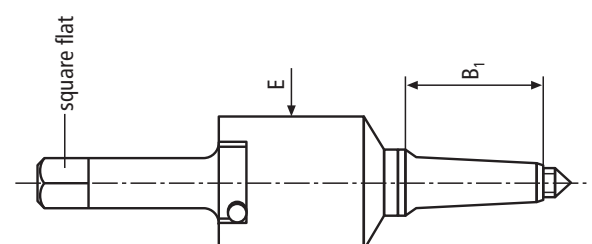
Installation tool 619 for manual installation



Dimensions in mm

Article no.	Suitable for Gripp	Maximal diameter E	Length
			B <sub>1</sub>
629 000 146	304 000 140.160 304 000 141.160	50	72
629 000 187	304 000 180.160	50	73

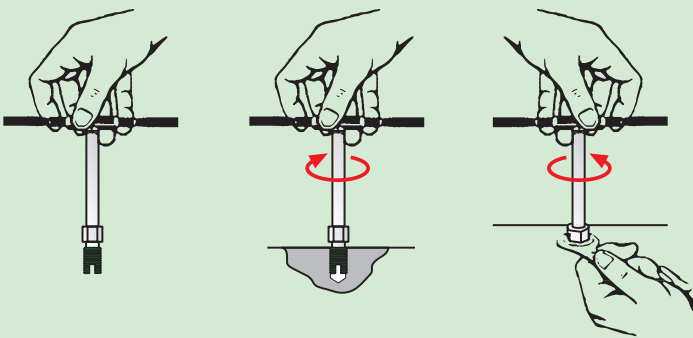
Installation tool 629 for machine installation



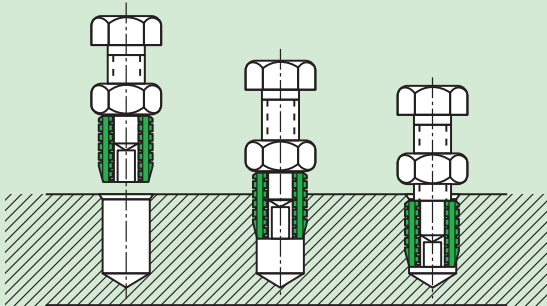
# Manual Ensats® Installation ...



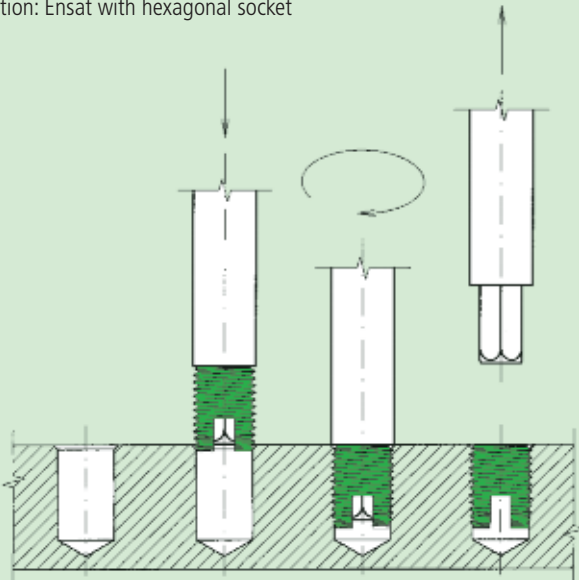
Manual installation with driving tool and tap wrench:



Emergency installation using screw and nut:



Installation: Ensats with hexagonal socket



## Manual installation

Manual driving takes place using the driving tools 620, 621 or 610 and a tap wrench:

1. Drill the hole: see page 6 for the correct diameter, countersink if necessary.
2. Screw the Ensats onto the driving tool with the cutting slot or cutting bore pointing downwards.
3. Drive in the Ensats until appr. 0,1 - 0,2 mm below the surface of the workpiece. Ensure that it does not tilt! When using tool 620 and 621, the rotatable shell must rest against the externally visible stop pins in such a way that it is driven round clockwise by the pins.
4. Back out the driver tool. During this process, tool 620 or 621 is automatically released from the Ensats. Tool 610: Hold the hex nut using a spanner until the lock breaks.

## Driving into steel

### With Ensats®-S 302:

Pre-cut the thread using the drill (max. centre cutter), set the threaded stud of the tool to the full Ensats length (tool 610 cannot be adjusted).

### With Ensats®-SB 307 / 308:

In steel up to medium strength, pre-cutting is not required.

Up to M12, we recommend for high-strength steel the use of **Mubux®-M**.

## Mubux®-M installation

Pre-cut the retaining thread with customary thread tapping tool, then drive in as for the Ensats.





# Machine installation ...

## Machine driving process

1. Precisely position the workpiece to ensure that the hole and machine spindle are in exact alignment (do not tilt). Set the machine to the precise driving depth (appr. 0,1 – 0,2 mm below the surface of the workpiece).
2. Turn the machine to clockwise rotation. At the start of the driving process, the rotatable external shell of the tool must be resting against the external visible stop pins in such a way that it is driven by the pins in the clockwise direction.
3. Feed the Ensats towards the tool (**slot or cutting hole facing downwards**) and grip for the duration of 2 to 4 revolutions.
4. Actuate the operating lever of the machine until the Ensats cuts into the borehole. The remainder of the driving process takes place without actuating the feed.
5. Switch on the reversing function. Always avoid setting the tool down hard on the workpiece, as this can lead to breaking both the tool and the Ensats.

Excessively hard contact of the tool can damage the play-free fit of the Ensats and so reduce the pull-out strength. If necessary, the driving speed may have to be adapted in line with the necessary reversal time.

Machine installation takes place with production tool 620 or 621, integrated in a:

1. **Thread tapping machine**
  2. **Use a drill press** fitted with a reversing tapping attachment or a tapping machine which is not pitch controlled.  
Important: Never exceed the maximum admissible driving torque.
  3. **Special manual machine** with bit stop and reversing system.
- For large-scale series:
4. **Single or multiple installation machines** with pneumatic or electric drive, semi or fully automatic (CNC). Attention of different pitches.

## Recommended speed values for light alloys:

Ensats® Internal thread	Speed [min <sup>-1</sup> ]
M 2,5 / M 3	650 - 900
M 4 / M 5	400 - 600
M 6 / M 8	280 - 400
M 10 / M 12	200 - 300
M 14 / M 16	150 - 200
M 18 / M 20	120 - 200
M 22 / M 24	100 - 160
M 27 / M 30	80 - 140

## Guideline value for installation torque

Ensats® M 2,5	1,5 Nm
Ensats® M 3	2,5 Nm
Ensats® M 4	5,5 Nm
Ensats® M 5	10 Nm
Ensats® M 6	15 Nm
Ensats® M 8	28 Nm
Ensats® M 10	40 Nm
Ensats® M 12	60 Nm

## Lubrication

Only in the case of materials with difficult cutting properties.

## For medium-hard light alloys:

Cutting oil, spirit or petroleum.

## For tough light alloys and cast iron:

Cutting oil with appr. 5 – 8% molybdenum sulphide.

## Torque M

The maximum admissible torque depends on:

1. The axial load capacity of the tool stud
2. The pressure resistance capacity of the Ensats® in the axial direction.

