

"Throttle valve" .



Repair-11x04x06x05-01x37-1-83-1.xml



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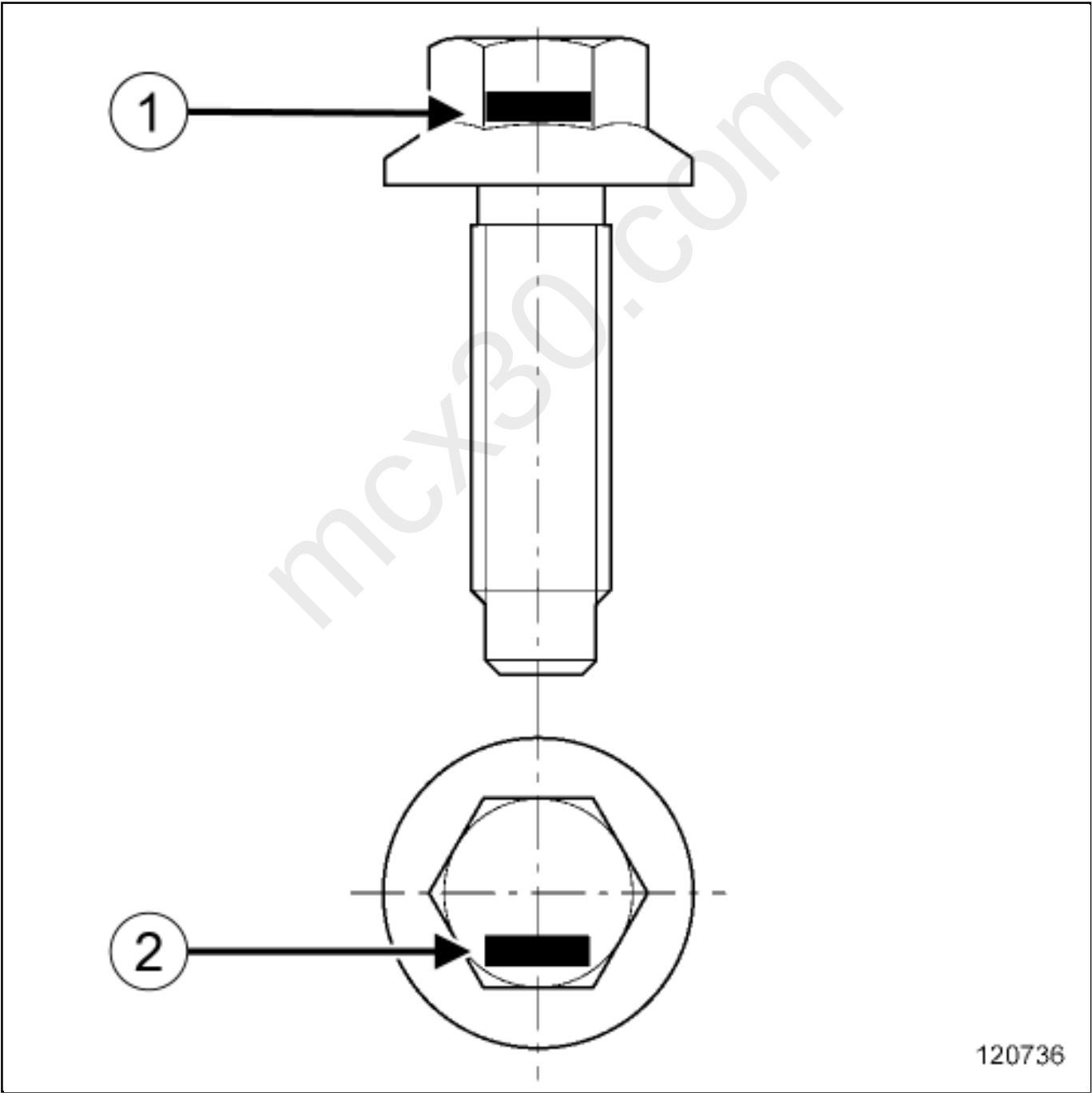
TIGHTENING TORQUES: GENERAL INFORMATION

1. TABLE OF STANDARD TORQUES

Fastenings		Standard tightening torque (N.m)
Diameter	Property class	
M6	8.8	10
M8	8.8	25
M10	8.8	50
M10	10.9	62
M12	10.9	105
M14	10.9	180
M16	10.9	280
M18	10.9	400

SPECIAL NOTES ON ELECTRICAL EARTHS

Fastenings	Standard tightening torque (N.m)
Diameter	
M6	8
M8	21
M10	44

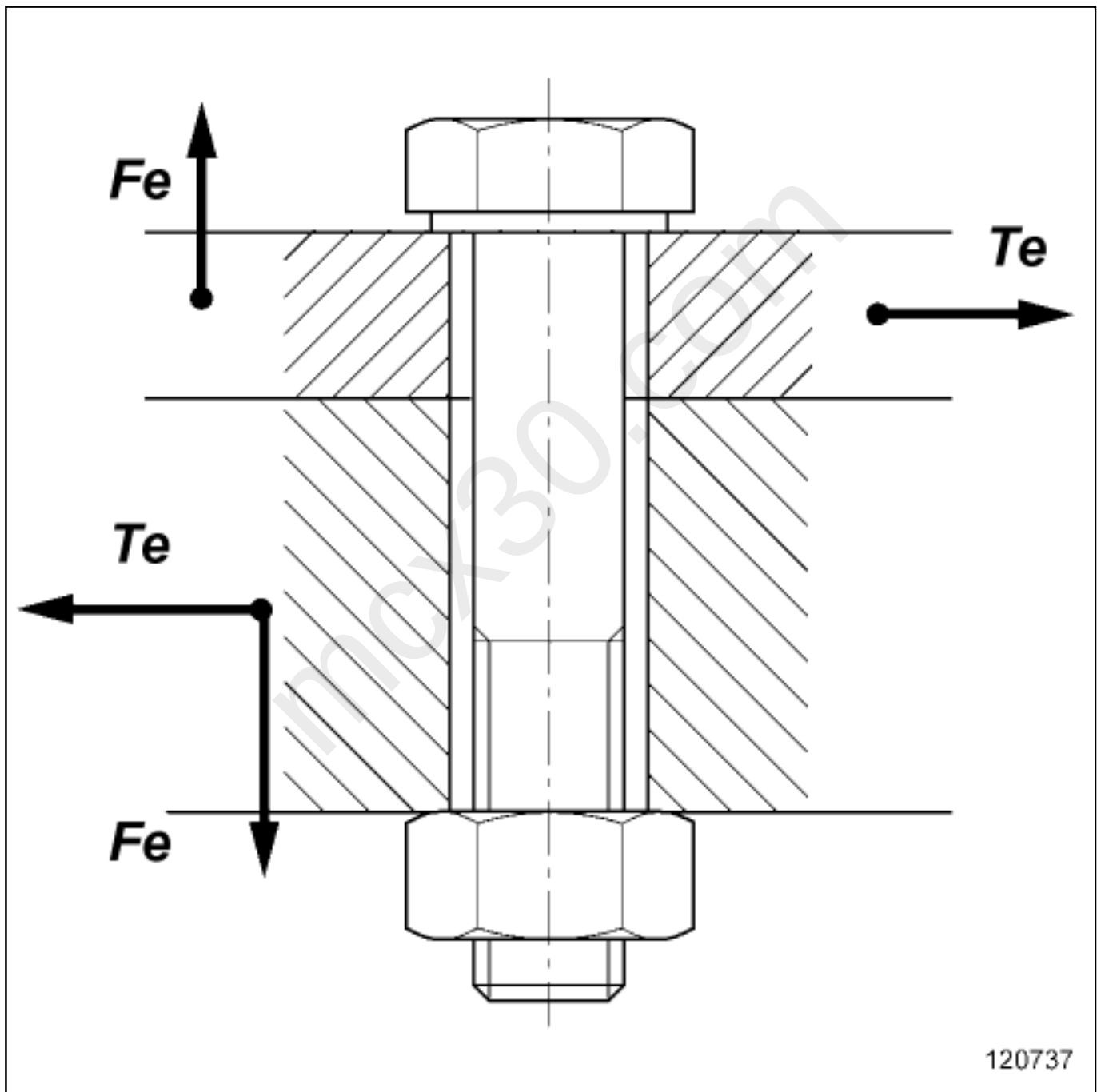


The property class is indicated on the bolt(1) or (2) .

2. FUNCTION OF A BOLTED ASSEMBLY

The bolting system connects parts of an assembly to prevent their separation or sliding when submitted to exterior forces.

EXTERIOR FORCES



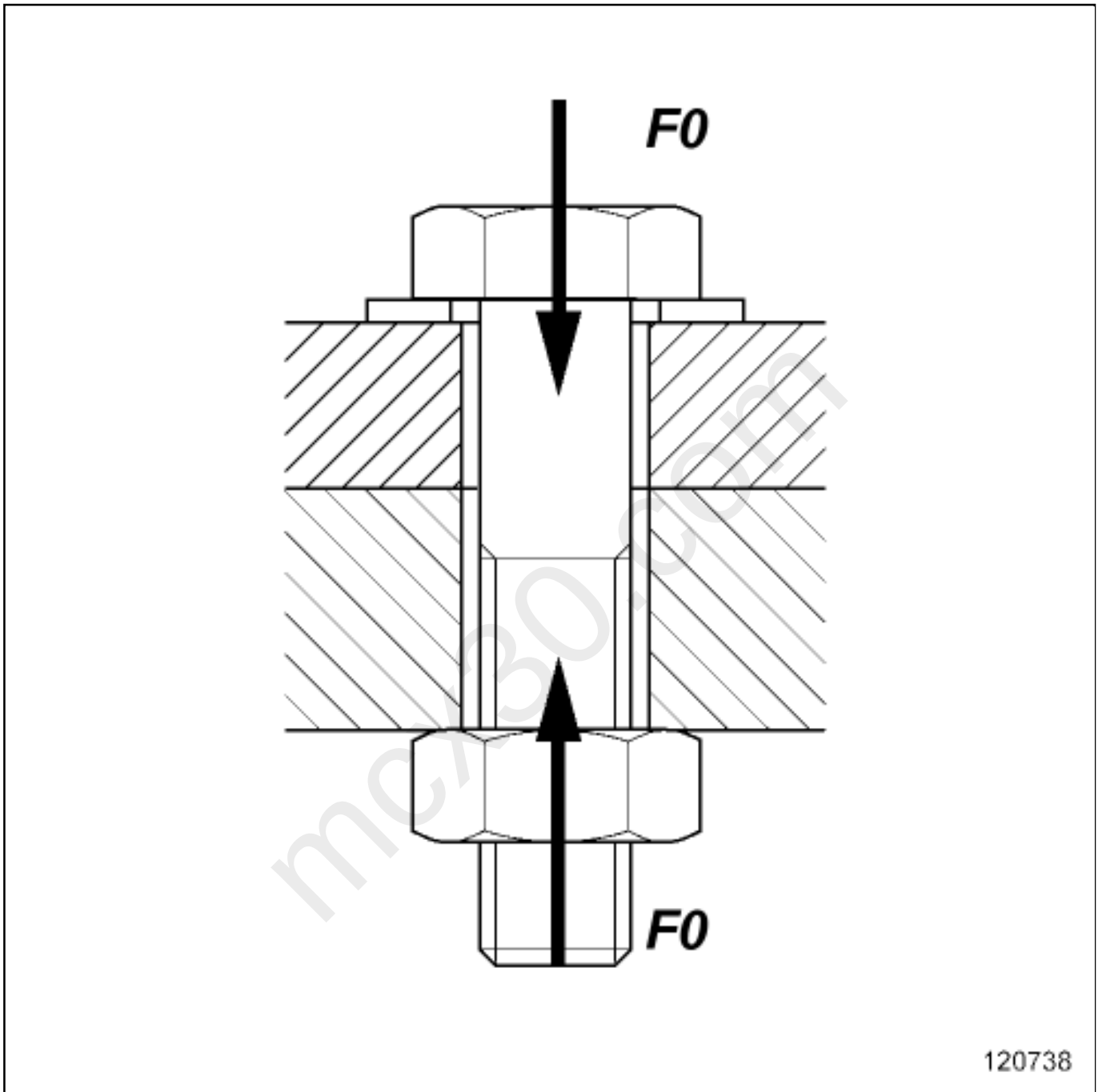
■ The assembly is submitted to forces that are:

- static and / or dynamic,
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■ simple (e.g. simple traction),

multiple (traction + flexion + torsion).

CREATING TENSION (OR PRELOAD) F_0

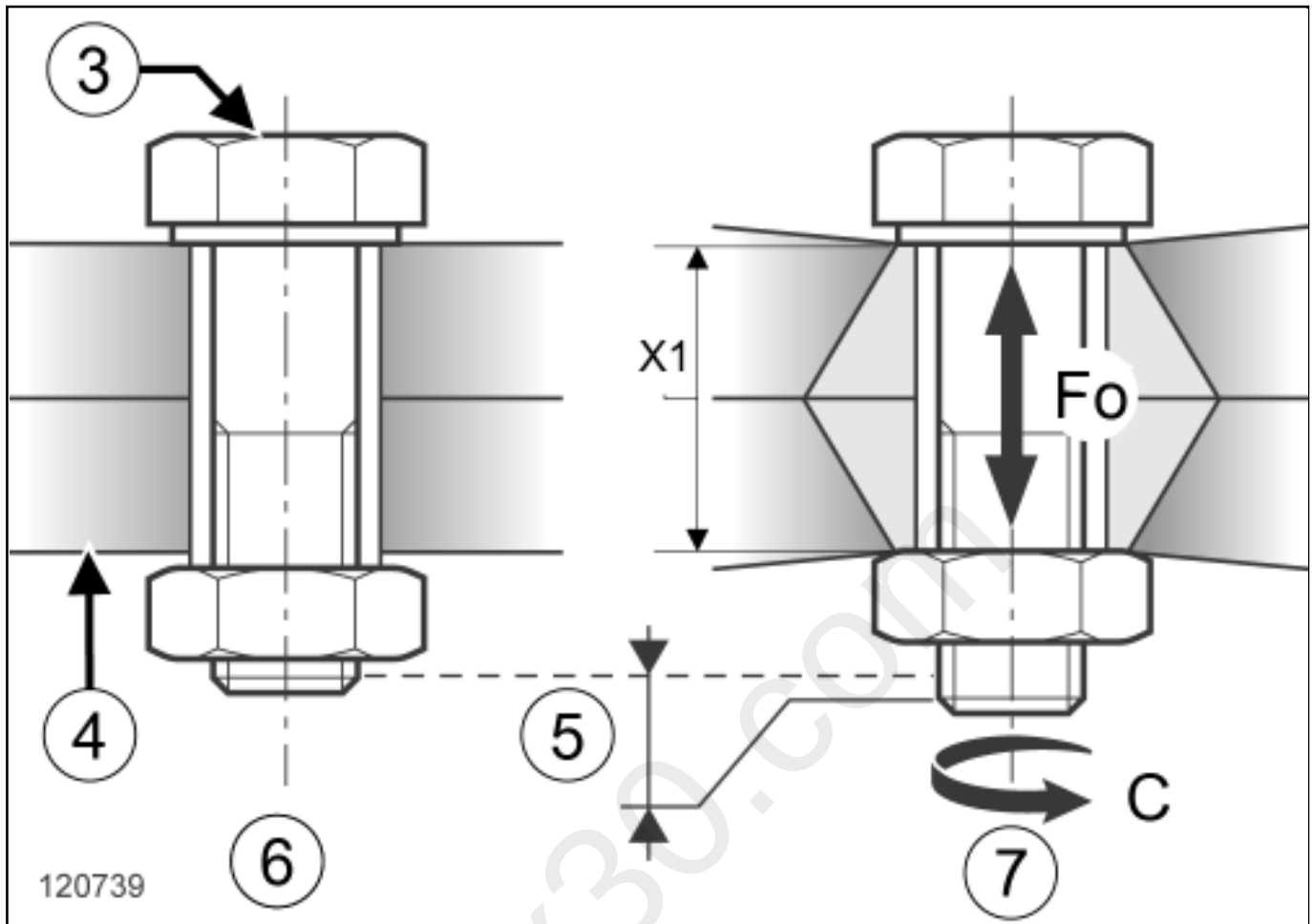


The assembly is held together by the tension created in the bolt when it is tightened.

■ A reliable assembly is only possible if the correct tension is used:

insufficient tension: risk of loosening,

too much tension: risk of deformation of the parts to be assembled, or shearing of the bolt.



- (3) Bolt
- (4) Assembled components
- (5) Extension of the bolt
- (6) Non-tightened assembly
- (7) Tightened assembly
- (X1) Compression of the assembly
- (Fo) Sensor
- (C) Tightening torque

Customer complaints resulting from incorrect tightening may be, following assembly, a safety issue (fire, loss of control of the vehicle etc.), an immobilising fault or a noise.

3. TIGHTENING PROCEDURES

The two controlled tightening procedures adapted to automotive repairs because of their low cost and simple operation are torque tightening and angle tightening (also called torque and angle).

1- TORQUE TIGHTENING

This is the most commonly used procedure. It consists of tightening until a given resisting torque is reached, known as tightening torque.

The tightening torque is distributed in a large part as friction torque (under the head and in the thread) and in a small part as useful torque (to create the tension).

This practice spreads the tension significantly due to the variation in the friction coefficients from one assembly to another and the uncertainty of the tightening procedures and methods.

2- ANGLE TIGHTENING

The principle consists of putting the parts of the assembly in contact using a mating torque (approximately 25 to 30% of the final torque) then to tighten to a determined angle.

This method, which is not dependent on the friction of the tightened assembly, gives more precise results than torque tightening.

4. OBSERVING THE TIGHTENING TORQUES AND ANGLES

Bolted assemblies whose tightening torques and angles are explicitly specified in the removal / refitting procedures must be observed using the appropriate tools (torque wrench, angle measuring disc). Failure to observe this can lead to safety risks, immobilising faults or unwanted noises.

For other bolted assemblies, non-measured tightening (using standard spanners) is acceptable. Nevertheless, the corresponding tightening torque is indicated in the table of standard tightening torques.

5. RECOMMENDED TIGHTENING TOOLS

For measured tightening, the repairer must have available torque wrenches to tighten from 4 to 400 N.m as well as an angle measuring disc.

The torque wrenches used may be click type or electronic.



For example:

- 1 torque wrench 4 - 40 N.m,

- 1 torque wrench 20 - 100 N.m,

- 1 torque wrench 80 - 400 N.m,

- 1 angle measurement disc.

The torque wrenches used must comply with the ISO 6789 standard. They must be calibrated regularly following the supplier's recommendations using the appropriate procedures.

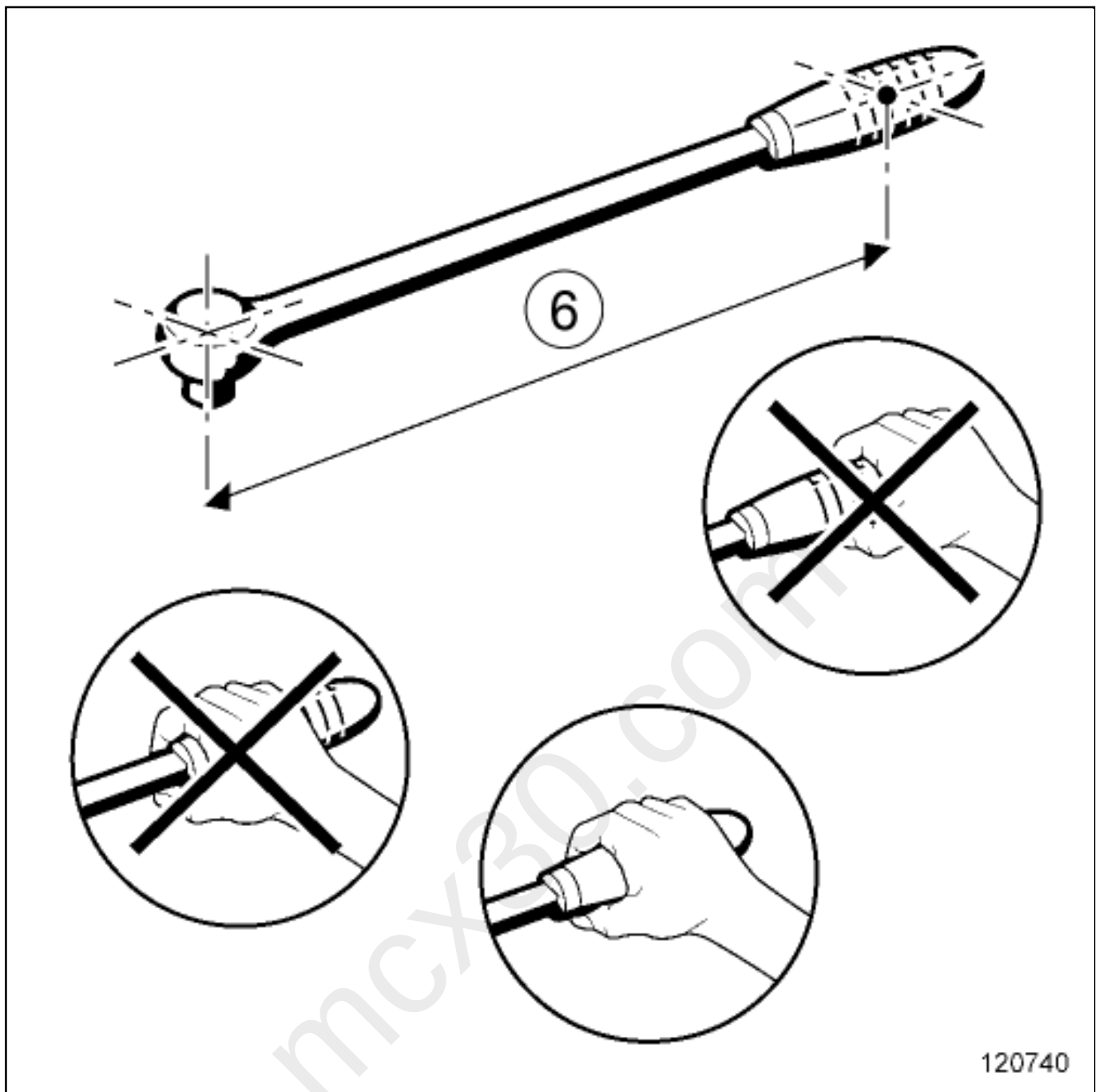
6. PRECAUTIONS WHEN USING A CLICK TYPE TORQUE WRENCH

A click type torque wrench is a manual tightening tool. The trigger mechanism causes a break or disengagement of the wrench past a force threshold.

This threshold depends on the setting of the wrench but also depends on the way the wrench is handled.

When used following best practises, the accuracy of the tightness when using a click type torque wrench is $\pm 15\%$.

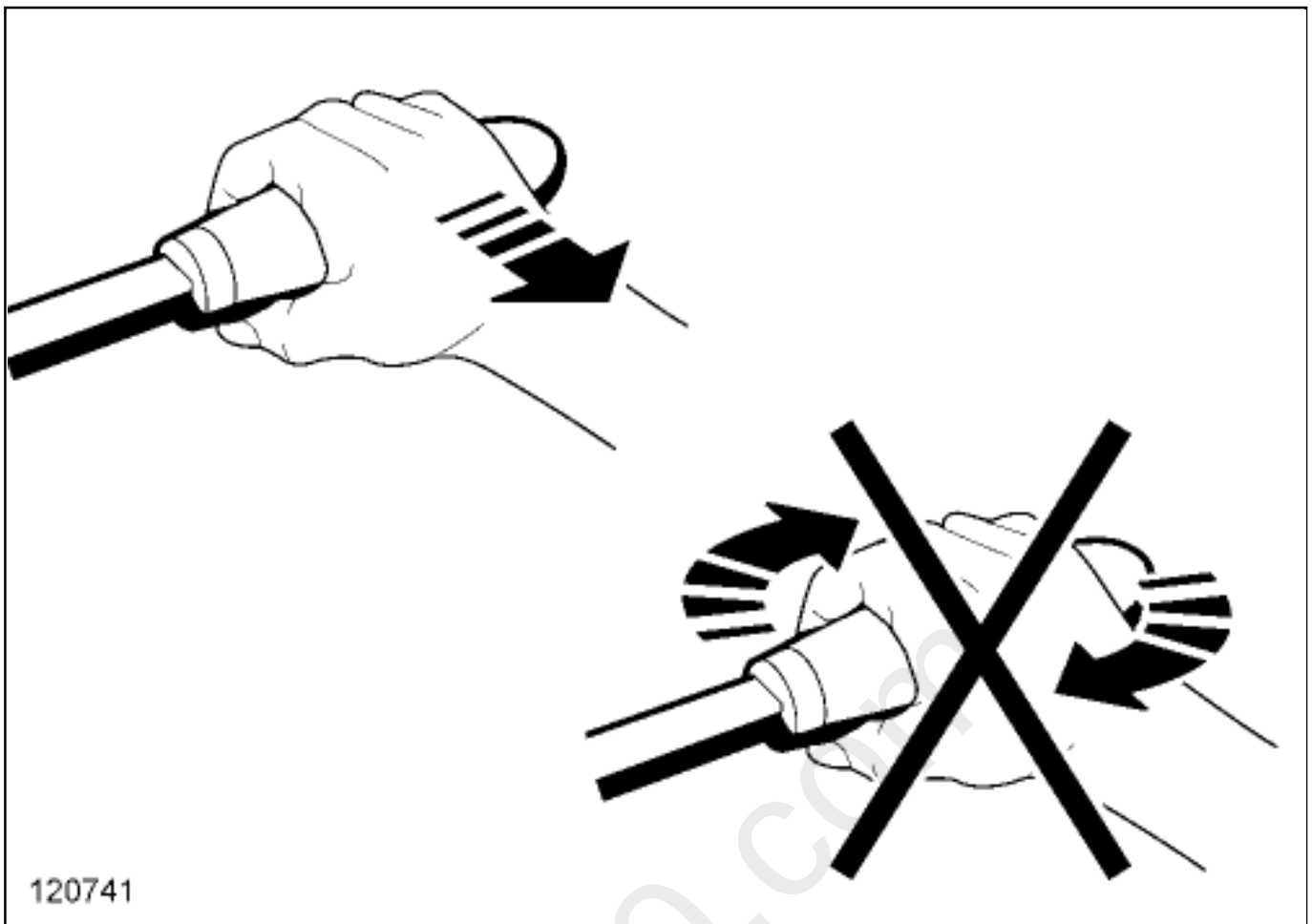
The instructions to be observed are:



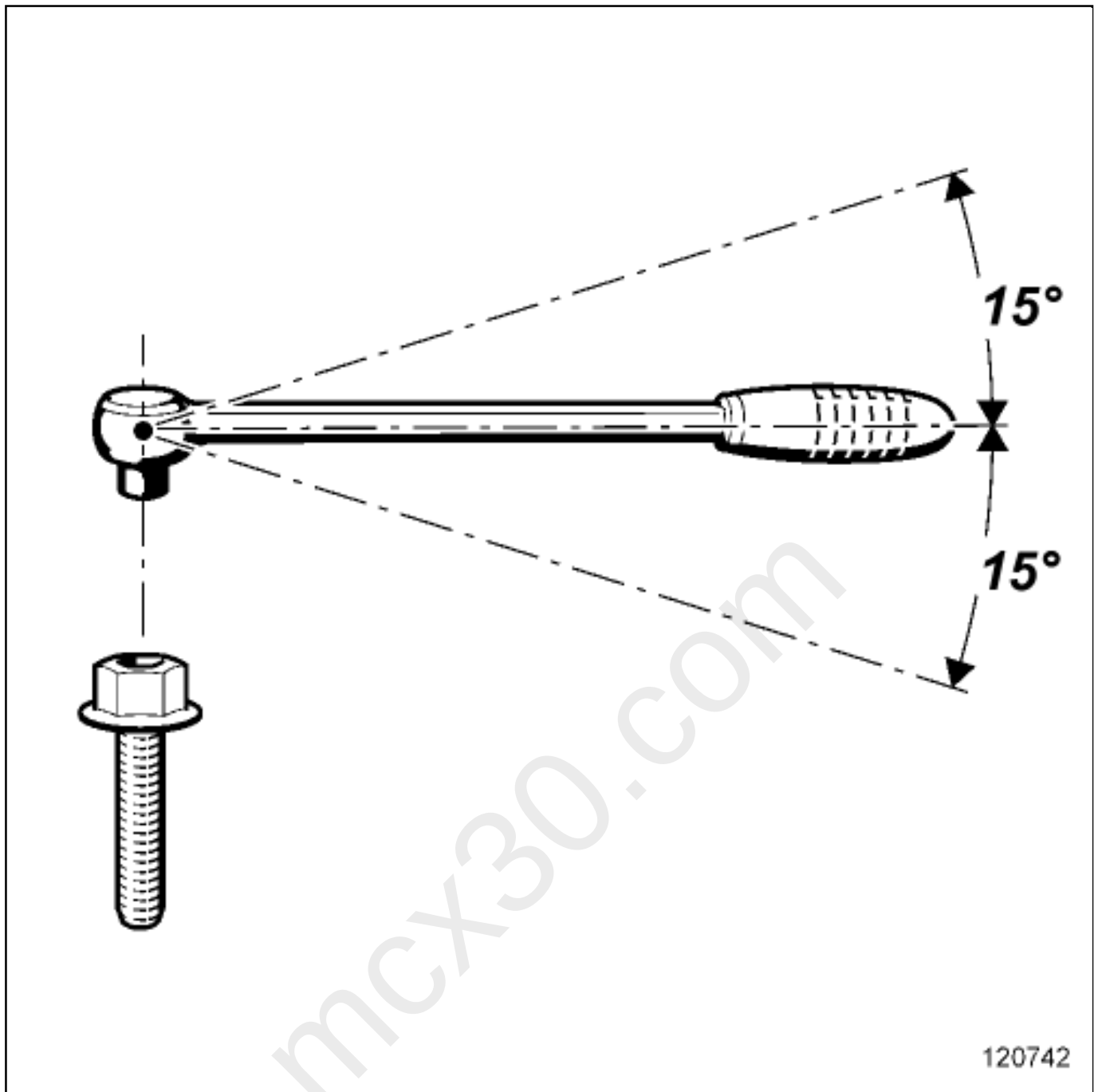
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(6) lever arm

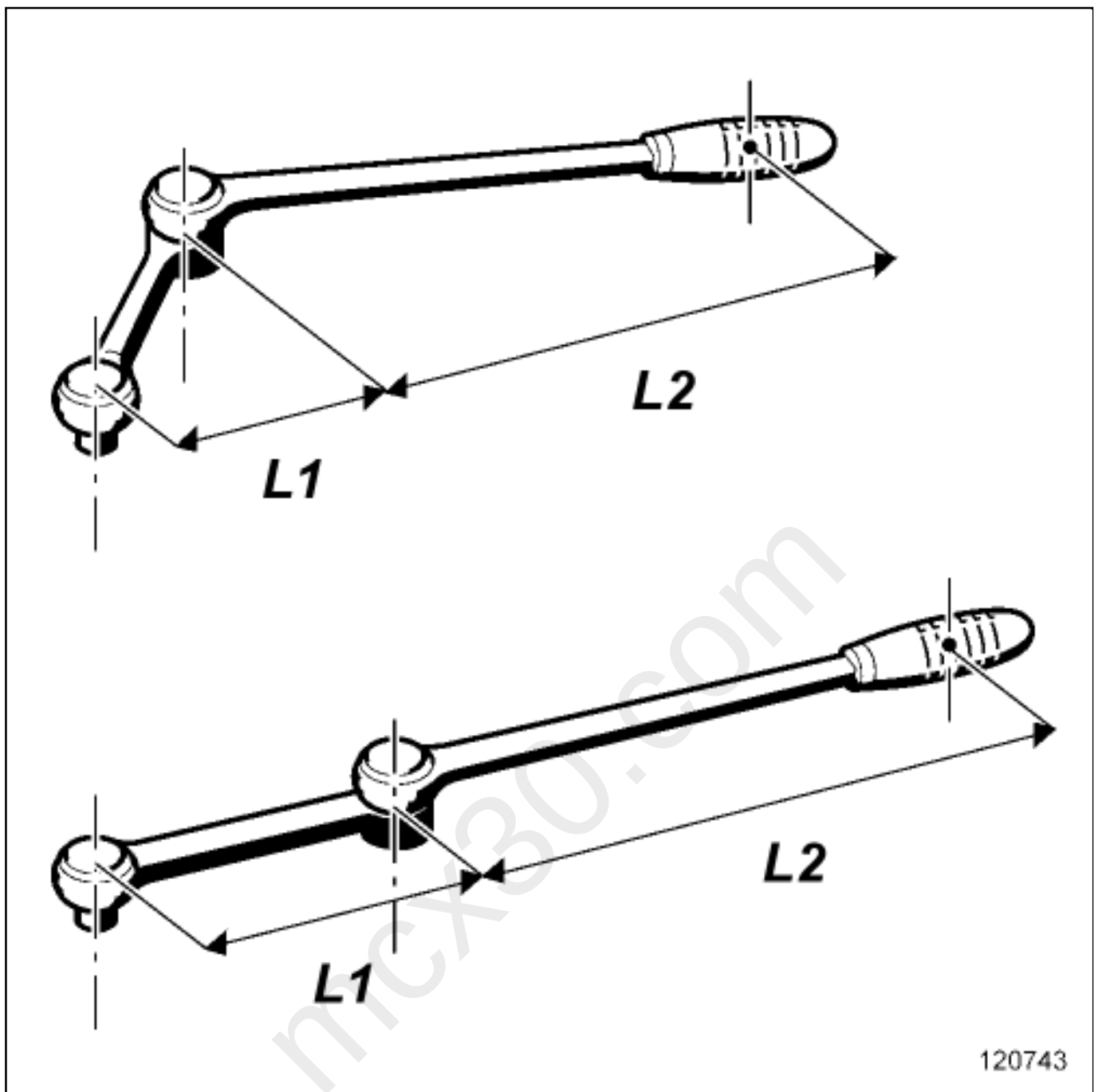
- Place the hand in the centre of the handle. An incorrectly positioned hand on the handle will alter the trigger threshold.



- Pull the wrench gently and steadily, without applying any torsion. Excessive tightening speed as well as jerkiness are major causes of overtightening. Any torsion applied to the wrench will alter the trigger threshold.
- Hold the wrench on the bolt using a minimum of effort. Any effort applied to the wrench head will alter the trigger threshold.



- Apply the tightening effort perpendicular to the mounting observing a tolerance of $\pm 15^\circ$ relative to the perpendicularity. If the wrench is not perpendicular to the mounting axis, this will result in insufficient tightening.
- Stop tightening as soon as the wrench is triggered. Continued tightening after the wrench is triggered will lead to overtightening.



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If the length of the wrench is modified (extending the handle, adapting an end piece) it is essential to recalibrate the wrench to its new configuration.

Modifying the length of the wrench will modify its trigger threshold.

Use the formula: $C1 = CO \times L2 / (L1 + L2)$

CO: torque to apply,

C1: adjustment torque to be displayed on the wrench,