

Istruzioni per
l'assemblaggio

**Martinetti
meccanici
ad asta
trapezia**

Assembly
instructions

**Trapezoidal
screw jacks**

Notice
d'assemblage

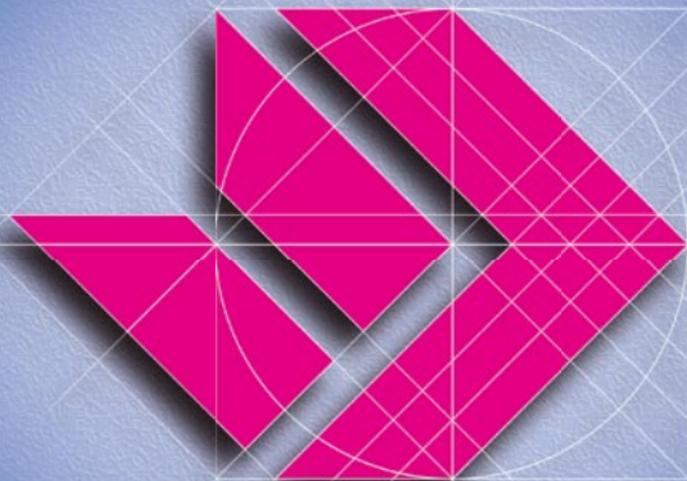
**Vérins
mécaniques
à vis
trapezoidale**

Instrucciones
para el montaje

**Martinetes
mecánicos
con husillo
trapezoidal**

Montageanleitung

**Hubelemente
mit trapezge-
winde**



**Direttiva
Europea
06/42/CE
Allegato VI**
ver. 1.0

**European
Directive
06/42/EC
Annex VI**
ver. 1.0

**Directive
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London

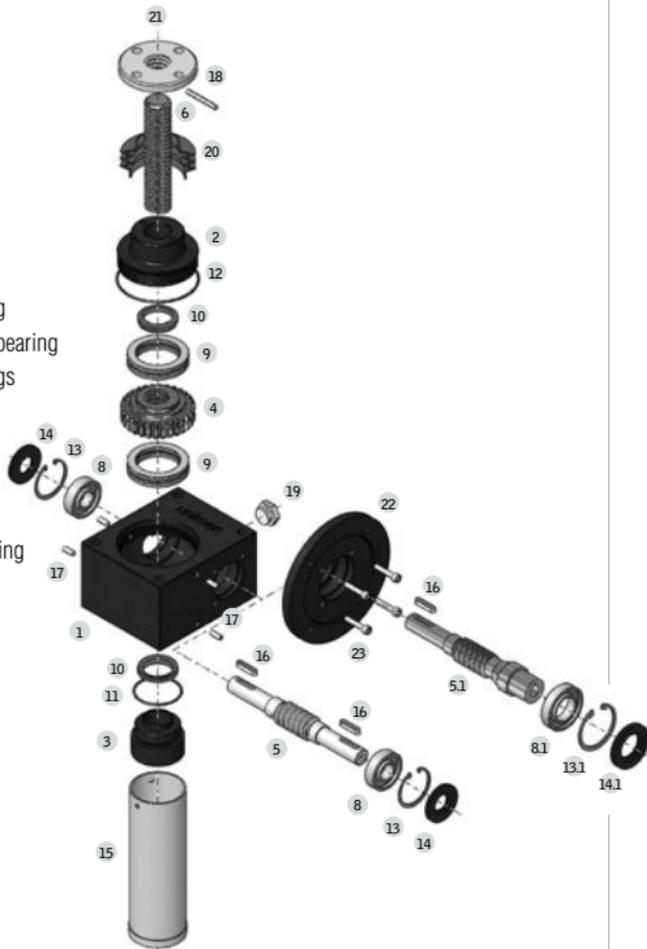
Translation of the original instructions edited according to annex I - 1.7.4.1

The jack is a mechanical transmission composed of a worm screw that engages a worm gear coupled to a trapezoidal spindle. In TP models the trapezoidal spindle translates; in TPR models it rotates and the translation is made by an external nut. In both cases it is necessary to provide an anti-rotation system.

EXPLODED AND SPARE PARTS

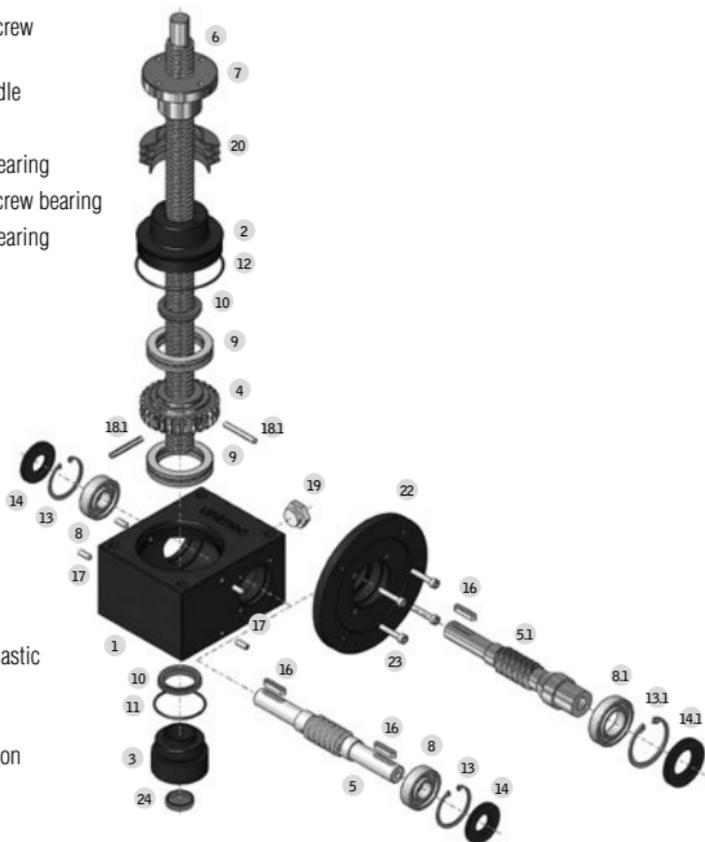
TP MODEL

- 1 Casing
- 2 Cover
- 3 Guide bushing
- 4 Worm wheel
- 5 Worm screw
- 5.1 Motor worm screw right-handed
- 6 Threaded spindle
- 8 Worm screw bearing
- 8.1 Motor worm screw bearing
- 9 Worm wheel bearings
- 10 Seal
- 11 Seal
- 12 Seal
- 13 Snap ring
- 13.1 Snap ring for motoring
- 14 Seal
- 14.1 Seal for motoring
- 15 Rigid protection
- 16 Key
- 17 Dowel
- 18 End fitting elastic fastening pin
- 19 Plug
- 20 Elastic protection
- 21 End fitting
- 22 Motor flange
- 23 Screws



EXPLODED AND SPARE PARTS TPR MODEL

- 1 Casing
- 2 Cover
- 3 Guide bushing
- 4 Worm wheel
- 5 Worm screw
- 5.1 Motor worm screw right handed
- 6 Threaded spindle
- 7 Lead nut
- 8 Worm screw bearing
- 8.1 Motor worm screw bearing
- 9 Worm wheel bearing
- 10 Seal
- 11 Seal
- 12 Seal
- 13 Snap ring
- 13.1 Snap ring for motoring
- 14 Seal
- 14.1 Seal for motoring
- 16 Key
- 17 Dowel
- 18.1 Worm wheel elastic fastening pin
- 19 Plug
- 20 Elastic protection
- 22 Motor flange
- 23 Screws
- 24 Seal



1.1.3 Materials and products

The trapezoidal screw jacks are made of metallic materials (bronze, cast-iron, aluminum and steel) and polymeric gaskets. In the case that the supply includes electromechanical components, compliance to the ROHS regulation is ensured for these components.

The whole range of TP-TPR models has long lasting internal grease lubrication; this lubricant does not report any R or S phrase on the safety sheet.

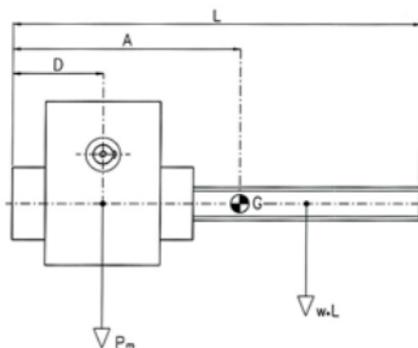
Even if the screw jack tightness is ensured, occasional lubricant leakages from the gaskets could occur.

Some accessories (PRO-CU-CS-CSU-SU-SUA-RG) may present endemic leakages. Refer to the general catalog for further information.

1.1.5 Design of the partly completed machinery to facilitate its handling

It is mandatory to verify the weight of the component to be transported on the transportation document. If the weight exceed the manual transport limits, it is necessary to arrange appropriate means of transportation that is capable of supporting this load.

Because of its variable length geometry, it is necessary to determine the location of center of gravity G in order to arrange for proper transport. The following formula allows approximate calculation, the distance A where the center of gravity is, measured from the bottom of the jack as outlined below.



$$A = \frac{w \cdot L^2 + 2 \cdot P_m \cdot D}{2 \cdot (P_m + w \cdot L)}$$

w = spindle weight [kg/m]
 P_m = jack body weight [kg]

L = spindle total length [m]
 A = center of gravity position [m]

	183	204	306	407	559	7010	8010
P_m [kg]	1,8	5,9	10	18	34	56	62
W [kg/m]	1,6	2,2	5	9	18	28	37
A [m]	0,035	0,055	0,070	0,95	0,115	0,128	0,128

	9010	10012	12014	14014	16016	20018	25022
P_m [kg]	110	180	180	550	550	2100	2100
W [kg/m]	56	56	81	110	140	220	350
A [m]	0,165	0,185	0,185	0,245	0,245	0,300	0,300

In the presence of asymmetrical engines or masses pay attention to the possible overturning movement.

There are different ways to transport a trapezoidal screw jack before its incorporation in a machine:

- Manual transport: avoid taking the screw jack by the worm screw projections, because an overturn can be triggered. In AR presence pay attention to sharp corners. Pay also attention to residual lubricants that can cause sliding. Pay attention to sharp corners (1.3.4).
- Transport hung by eye-bolts: fasten the eye-bolts on the screw jack fastening holes only. Pay attention to swinging during the transport.
- Transport hung by magnet: pay attention to swinging during the transport.

- d) Transport hung by bands: pay attention to swinging during the transport. Pay attention if you fasten the bands on the worm screw projections or on lateral P pins, because an overturn can be triggered. Pay attention to the possible change in momentum due to the presence of eye-bolt terminals and/or PO.
- e) Sustained transport: pay attention to residual lubricants on surfaces that can cause sliding, especially in acceleration and deceleration phases.

During the warehousing, the screw jacks must be protected so that dust or foreign bodies cannot be deposited. It is necessary to pay particular attention to the presence of corrosive or salty atmospheres. We also recommend:

- a) periodically rotating the worm screw to ensure the appropriate lubrication of the internal parts and to avoid the drying out of the gaskets causing lubricant leakages.
- b) lubricating and protecting the spindle, the worm screw and the unpainted components.
- c) holding the spindle up if the storage is horizontal.

1.2.1 Safety and reliability of control systems

Some accessories (CSU-SUA-CR) have an electric proximity whose calibration is taken during the mounting. CT accessory has a thermal probe. Connecting the wires according to the electric scheme provided with the supply is mandatory.

The eventual alarm signal either for the wear limit quota (CSU-SUA), for the non-rotation of the worm gear (CR) or for the reaching of the temperature limit, must be visible and understandable (paragraph 1.7.1.2).

1.2.3. Starting

As an irreversible transmission, the screw jacks can only be driven by worm screw rotation, which corresponds, respectively for TP and TPR models, to a translation of the spindle or the nut.

It is necessary to take some precautions during the first screw jacks movements:

- a) Lubricate the spindle and ensure the absence of foreign bodies on it.
- b) Check the calibration of any limit switches, keeping in mind the inertia of the driven masses.
- c) Take it gradually, if possible, to the operating conditions, in order to allow the breaking-in of the screw jacks.
- d) Pay close attention to the overheating of the components, avoiding continuous maneuvers and allowing all the time necessary to reach the thermal balance with the environment after use. Remember that only one temperature peak may cause wear and deformations capable of threatening the useful life of the partly completed machinery.

1.2.4.3 Emergency stop

For TP models, BU and PRF accessories have an anti-withdrawal bush as emergency stop, preventing the spindle from coming out. In the case of impact between this bush and the screw jack body, replacement of the transmission is recommended, because the collision may have damaged some internal component.

1.3.2 Risk of break-up during operation

The screw jack, if properly sized as required in the general catalog (taking care to never exceed the indicated maximum load values), may fail during the operation due to a deterioration of its constituent components, both fixed and mobile.

The causes of damage may be different:

- a) Deficiency or deterioration of the lubrication of the internal components: the grease used for the lubrication of the internal components is a long lasting one. In the presence of leakage (or in the case of full replacement, suggested every 5 years), it is necessary a top-off the lubricant, bringing quantity back to the factory values (in the table below).

	183	204	306	407	559	7010	8010
Internal lubricant quantity [kg]	0,06	0,1	0,3	0,6	1	1,4	1,4

	9010	10012	12014	14014	16016	20018	25022
Internal lubricant quantity [kg]	2,3	4	4	14	14	28	28

In the case of topping-off or replacement, it is necessary to use a lubricant having the characteristics listed in the catalog according to DIN 51502, in order to ensure the same performance capabilities. It is also necessary to verify the compatibility between basic oils and thickening agents, in order to avoid splitting of the grease.

- b) Deficiency or deterioration of spindle lubrication: the user must lubricate the spindle and the operation must be repeated, depending of the type of work and environment, frequently so to ensure the presence of a clean lubricant layer between the surfaces in contact with each other. The use of adhesive and additive lubricants P or EP, according to the technical specifications listed in the catalog is mandatory. Because of the V-ring gasket nature (particular 10), the spindle lubricant may go inside the casing; for this reason it is necessary to verify the compatibility between the two lubricants, in order to avoid the splitting of the internal grease.
- c) Failure due to the wear of subject components: the constituent components subject to friction suffer the effects of wear. Bronze parts (4 and 7) are the most vulnerable to wear and the scraped material often settles on the worm gear and spindle (5 and 6) altering the contact geometry. The failures of the bearings (8 and 9) cause the transmission to stop, while the wear of the gaskets (10 and 14) favors the leaks.

- d) Lateral loads or misalignments: it is essential to ensure the orthogonality between the spindle and the casing support plate and to check the concentricity between the load and the spindle itself. The application of more screw jacks to the load movement requires further verification: it is necessary that the support points of the load, (terminals for TP models and the nuts for TPR models), be perfectly aligned, so that the load is divided evenly. If not, the misaligned screw jacks would act as contrast or brake. In the case of compression, the phenomena consequential to the peak load may trigger lateral loads and instability.
- e) Asynchronism: if several screw jacks are connected through transmission shafts the verification of their perfect alignment, in order to avoid overloads on the worm screws is suggested.
- The use of joints capable of absorbing alignment errors, without losing the torsion rigidity necessary to ensure the synchronization of the transmission is also recommended.
- f) Corrosion: it is necessary to verify the corrosion resistance of the constituent components depending on the work environment.

1.3.3 Risks due to falling or ejected objects

If appropriate measures are not taken, the mobile elements, spindle (6) and nut (7), respectively for TP and TPR models, can come off of the transmission fixed part.

1.3.4 Risks due to surfaces, edges or angles

The screw jacks have sharp edges that, even if blunted, can present both blunt and sharp residual risks.

1.3.7 Risks related to moving parts

Some constituent components are not in the casing; for this reason they can present residual risks regarding their movement. The following is a non-exhaustive list of moving parts.

TP MODEL

Rotating parts: worm screw, CS, SU, SUA.
Translating parts: spindle, BU, PRF, AR.

TPR MODEL

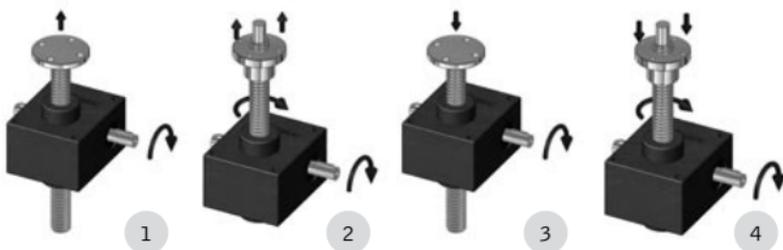
Rotating parts: worm screw, spindle
Translating parts: nut, CS, CSU, SU, SUA, RG.

The following accessories provide protection from moving parts as written in paragraph 1.4.1: PR, PRO, CU, PE, PRA, PO.

We recommend verifying the real transmission ratio on the descriptive tables in the general catalog in order to obtain the correct kinematics.

1.5.4 Errors of fitting

Rotation and translation directions are displayed on the casing in order to avoid mounting errors. However, it is recommended to check them before mounting. Unimec provides, as a standard, screw jacks with rotation and translation directions 1 and 2 (called "right"). If necessary, it is possible to provide the transmissions with a kinematic type 3 and 4 (called "left").



Pay particular attention in the case that several screw jacks are assembled on the same transmission. In this case, verifying the section regarding assembly diagrams in the general catalog is recommended. Keep in mind that these diagrams are valid for directions of right rotation.

1.5.5 Extreme temperatures

Because of its nature as an irreversible transmission, the screw jack tends to heat up quickly. Residual risks caused by hot surfaces remain during the operation and cooling stages.

1.5.8 Noise

Because of its nature as a mechanical transmission, the screw jack emits noise during the operation. Proper lubrication tends to reduce the phenomenon, even if residual risks remain.

1.5.9 Vibrations

Because of its nature as a mechanical transmission, the screw jack, during operation, may be active source of vibration, especially in large structures and in presence of several transmission parts. It should be noted that, as for smaller sizes and in presence of insignificant loads, active vibrations impacting the screw jack may trigger a partial reversibility of the transmission.

1.6.1 Partly completed machinery maintenance

Because of that which was mentioned in paragraph 1.3.2, in the standard use conditions (ambient temperature 20°C, working without shock, screw jack checked to equivalent load and power as reported on the general catalog), it is necessary to arrange periodic inspections at least once every month. During these inspections it is necessary to ensure the absence of lubricant leaks from the gaskets, the absence of foreign bodies on the spindle as well as its proper lubrication. If necessary, restore the proper quantities of lubricant on the spindle and inside the casing.

At least once a year it is necessary to check the transmission status more thoroughly: wear phenomena, grease splitting status, presence of scraped bronze parts on the spindle, full replacement of the lubricant, and replacement of critical components.

These inspections should be more frequent under more demanding conditions of use.

Maintenance operations must be made when the transmission is not in use and by qualified persons. If necessary, please check on the website for the nearest contact and call for assistance.

1.7.3 Marking of partly completed machinery

Every screw jack is marked with a metallic plate showing the Unimec name and logo, a contact reference, model, size, constructive form and the transmission serial number. With the latter, it is possible to trace every detail regarding this component life, from the supply issue to its delivery. Screw jacks, because of their partly completed nature, cannot be marked "CE". Also, for this reason, they cannot be marked according to the ATEX regulations, even if, they can be considered "components suitable for the application in potentially explosive atmospheres", after completing the related questionnaire and after the favorable opinion of the technical office.

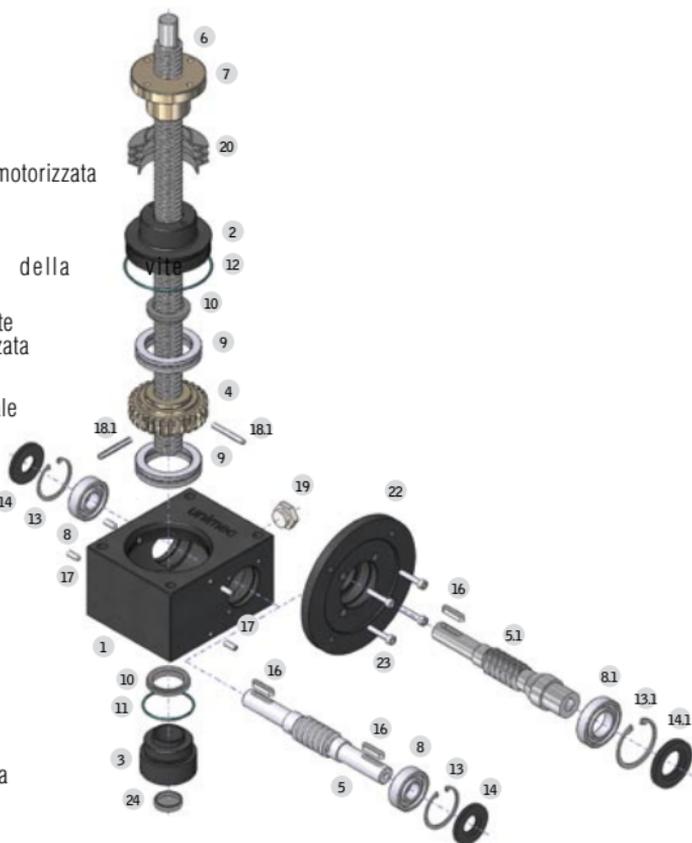
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ESPLOSI E RICAMBI

MODELLO TPR

- 1 Carter
- 2 Coperchio
- 3 Bussola di guida
- 4 Ruota elicoidale
- 5 Vite senza fine
- 5.1 Vite senza fine dx motorizzata
- 6 Asta filettata
- 7 Chiocciola
- 8 Cuscinetto della vite senza fine
- 8.1 Cuscinetto della vite senza fine motorizzata
- 9 Cuscinetto della ruota elicoidale
- 10 Anello di tenuta
- 11 Anello di tenuta
- 12 Anello di tenuta
- 13 Seeger
- 13.1 Seeger per motorizzazione
- 14 Anello di tenuta
- 14.1 Anello di tenuta per motorizzazione
- 16 Chiavetta
- 17 Grano
- 18.1 Spina elastica ruota
- 19 Tappo
- 20 Protezione elastica
- 22 Flangia motore
- 23 Viti
- 24 Tappo



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