UNIMEC
ACTUATORS

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DESCRIPTION

Ease of use, high dependability, and low maintenance all make worm gear screw jacks ideal for a wide variety of uses. They can be used to lift, pull, move, or align any load, even if highly unbalanced, with perfect synchronisation offered by no other movement method. UNIMEC mechanical jacks are absolutely IRREVERSIBLE, that is, they can support their loads with no need to employ brakes or other locking systems. The jacks can be deployed individually or in groups properly connected with shafts, joints, and/or bevel gear boxes. They can be driven by electrical motors, with either alternating or direct current, as well as hydraulic or pneumatic motors. They can be driven manually or with any other type of transmission. In addition to the models shown on the following pages, UNIMEC can produce jacks custom designed to meet the requirements of particular machines.
UNIMEC mechanical screw jacks are designed and built using innovative technology in order to satisfy the most demanding and sophisticated applications. The units are built with special care, and the outer surfaces completely finish machined, making mounting easier and facilitating the use of supports, flanges, rocking pins, or whatever else a project may require. DOUBLE GUIDES throughout the product line assure optimum performance even under the most strenuous operating conditions. Special sealing systems enable the WORM SCREW/WORM WHEEL group to operate in a bath of long-lasting lubricant.

MODELS

TP: a threaded spindle with axial movement. Rotation of the drive shaft turns the worm wheel and generates straight-line axial movement of the threaded spindle. THE THREADED SPINDLE MUST HAVE A ROTATIONAL LIMIT.
TPR: with threaded spindle and support nut. Rotation of the drive shaft turns the worm wheel, which is attached to the threaded spindle, thus turning the spindle as well. The external support nut (lead nut), fastened to the load, is what actually moves. THE SUPPORT NUT MUST HAVE A ROTATIONAL LIMIT.

END FITTINGS

To meet the widest possible range of needs, various types of end fittings are available, and can be custom made upon request.

CASINGS

Casings are made of various materials depending on the size of the jack. Those in the 183 series are made of cast aluminum, those between the 204 and 9010 series are made of high grade cast iron; and in the heavy duty series, models from 10012 to 16016, the casing is made of carbon steel.

WORM SCREWS

For the entire line of jacks, the worm screws are made of a special case-hardened steel, UNI 7846 18 Ni-Cr-Mo 5, and are tempered and thoroughly ground on both the threads and shaft.

WORM WHEEL AND SUPPORT NUT

The worm wheels and support nuts (lead nuts) are made of a special high-resistance UNI 5273 copperalloy bronze. The Acme threading meets the DIN 103 norms. The teeth on the worm wheels are designed especially for our jacks and can easily support heavy-duty use.

THREADED SPINDLES

The threaded spindles throughout the product line are made of hardened and tempered UNI 7845-C 40 carbon steel with Acme threading which complies with DIN 103 norms. Threaded spindles made of AISI stainless steel or other materials are available upon request.

PROTECTION

Protection can be added in order to keep dust and foreign matter from coming into contact with the threaded spindle and causing damage. For the TP series, the exposed lower part of the spindle is covered by a steel sleeve and the upper part by elastic bellows made of nylon and PVC. The TPR series is protected by this type of elastic bellows on both the top and bottom.

BEARINGS

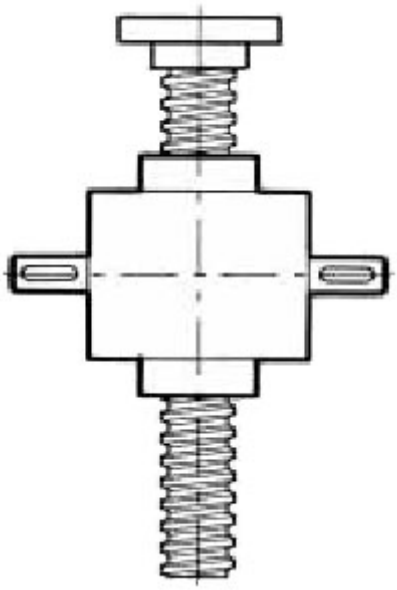
Top-quality taper ball-bearings are used on all sizes.
ORDERING DATA

	ORDERING DATA
TYPE (TP/TPR)	TP
SIZE	306
RATIO	1/5
TRAVEL [mm]	1000
END KITTING	TF
PROTECTION	PR-PE
MODEL	B
MOTOR FLANGE	MEC80B5
MODEL OPTION	SU-PO

PRODUCT LINE

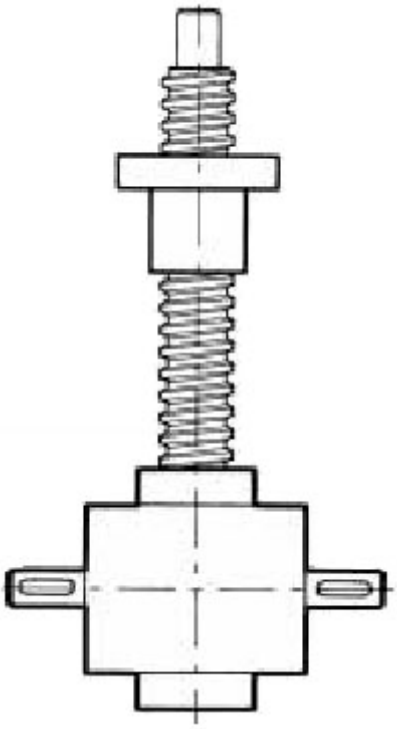
MODELS

TYPE: **TP**



Description: **THREADED SPINDLE WITH AXIAL MOVEMENT**
Rotation of the drive shaft turns the worm wheel and generates straight-line axial movement of the threaded shaft. THE THREADED SPINDLE MUST HAVE A ROTATIONAL LIMIT.

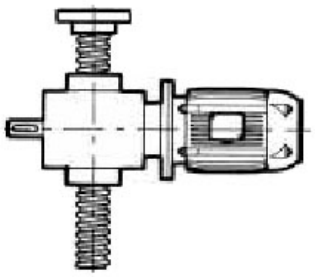
Type: **TPR**



Description: **THREADED SPINDLE WITH SUPPORT NUT**
Rotation of the drive shaft turns the worm wheel, which is attached to the threaded spindle, thus turning the spindle as well. The external support nut (lead nut), fastened to the load, is what actually moves. THE SUPPORT NUT MUST HAVE A
ROTATIONAL LIMIT

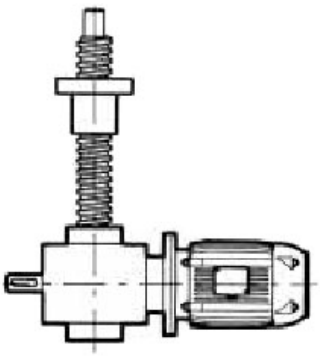
OPTIONS

M



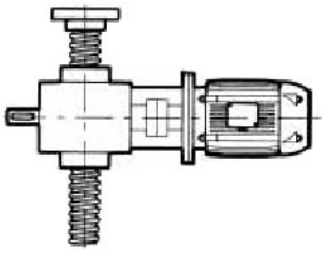
"TP" model screw jacks equipped for direct attachment to a motor: Single phase, three-phase, selfbraking, direct current, hydraulic, pneumatic.

M



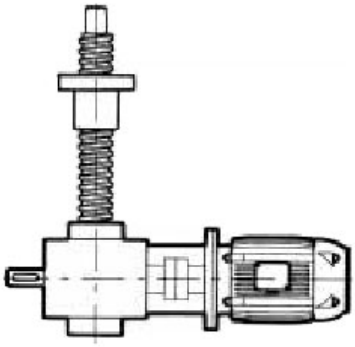
"TPR" model screw jacks equipped for direct attachment to a motor: Single phase, three-phase, selfbraking, direct current, hydraulic, pneumatic.

C



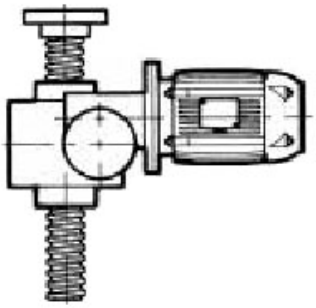
"TP" model screw jacks equipped for direct attachment to a motor by a housing and joint: Single phase, three-phase, self-braking, direct current, hydraulic, pneumatic.

C



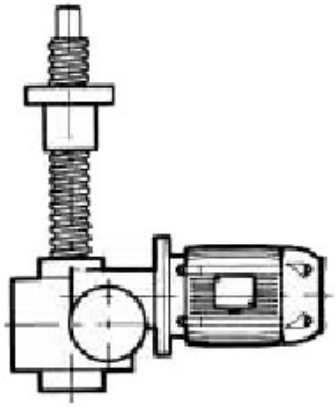
"TPR" model screw jacks equipped for direct attachment to a motor by a housing and joint: single phase, three-phase, self-braking, direct current, hydraulic, pneumatic.

R



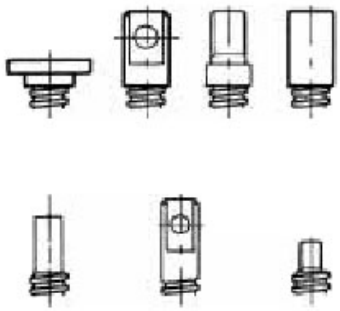
"TP" model jacks equipped for direct attachment to a reducer or motorized reducer: Worm screw, coaxial, etc.

R



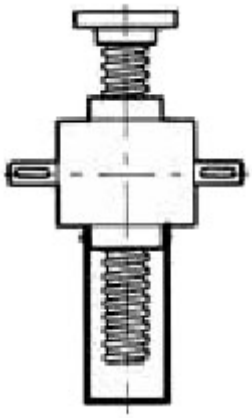
"TPR" model jacks equipped for direct attachment to a reducer or motorized reducer: Worm screw, coaxial, etc.

"TP" MODEL JACKS



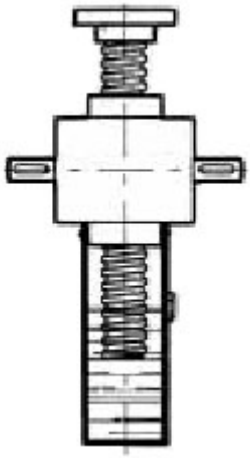
various end fittings

PR



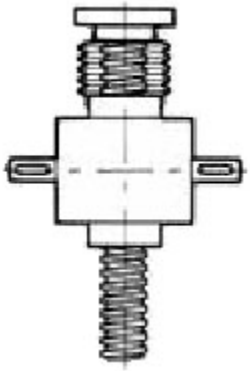
"TP" MODEL JACKS WITH RIGID PROTECTION

PRO



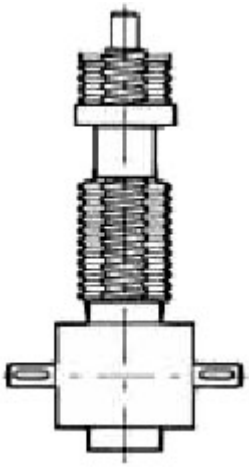
"TP" model jacks with rigid protection in an oil bath

PE



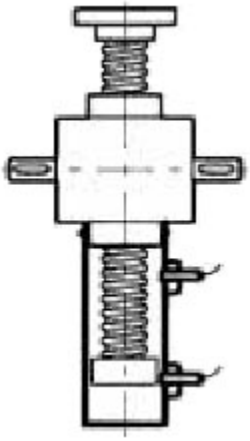
"TP" model jacks with elastic protection

PE



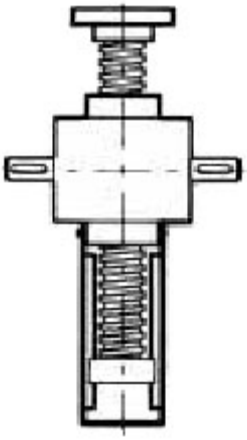
"TPR" model jacks with elastic protection

PRF



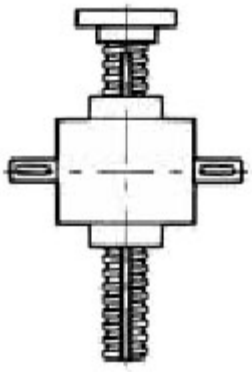
"TP" model jacks with rigid protection and rotation limits

PRA



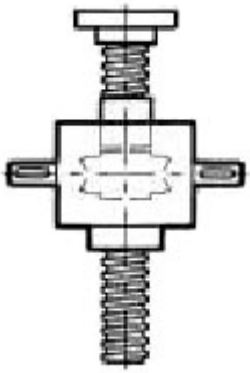
"TP" model jacks with rigid protection, dual-guide anti-rotation

AR



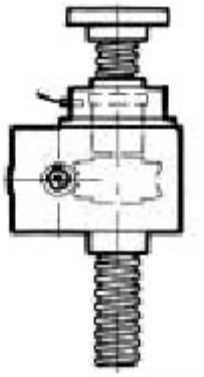
"TP" model jacks with channeled anti-rotation spindle

CS



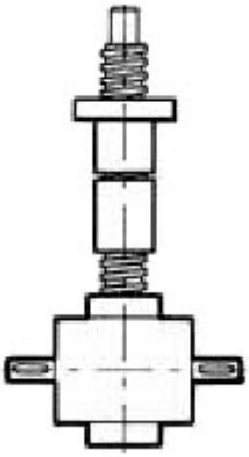
"TP" model jacks with safety nut

CSU



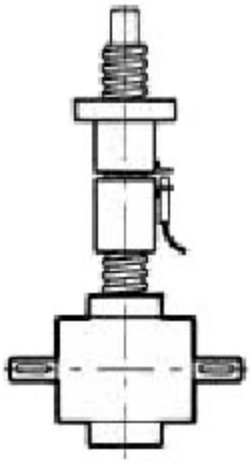
"TP" model jacks with monitored safety nut

CS



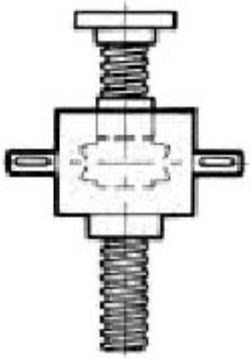
"TPR" model jacks with safety nut

CSU



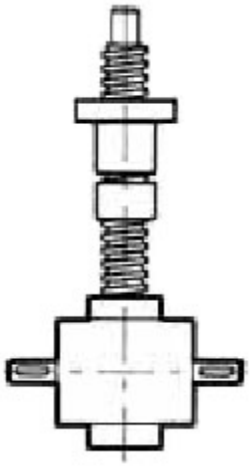
"TPR" model jacks with monitored safety nut

SU



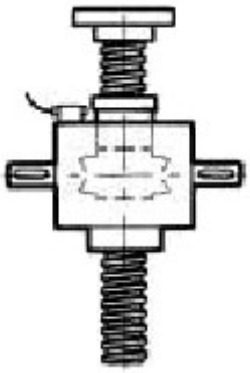
"TP" model jacks with wear indicator

SU



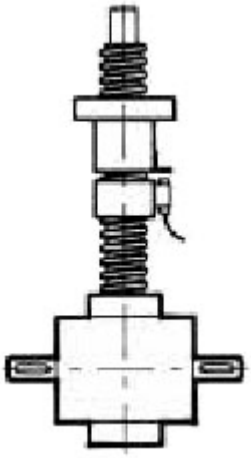
"TPR" model jacks with wear indicator

SUA



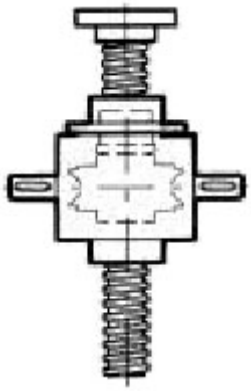
"TP" MODEL JACKS WITH AUTOMATIC WEAR INDICATOR

SUA



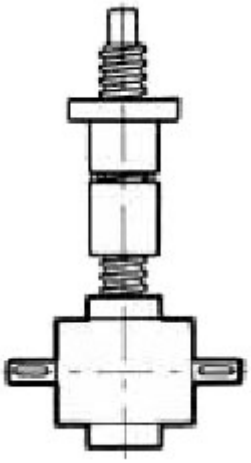
"TPR" model jacks with automatic wear indicator

RG



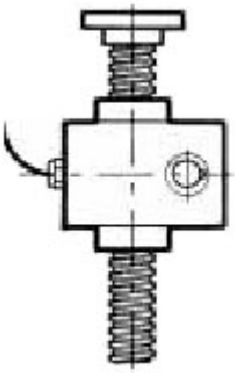
"TP" model jacks with backlash restriction

RG



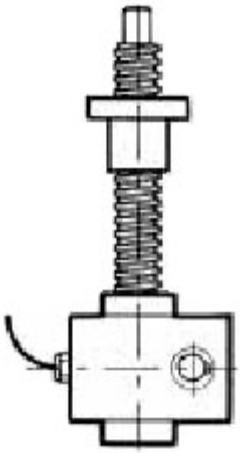
"TPR" MODEL JACKS WITH BACKLASH RESTRICTION

CR



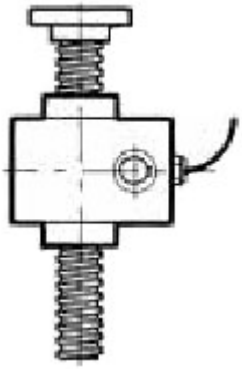
"TP" model jacks with rotation monitoring

CR



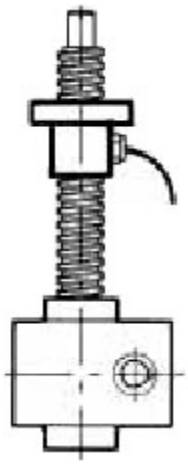
"TPR" model jacks with rotation monitoring

CT



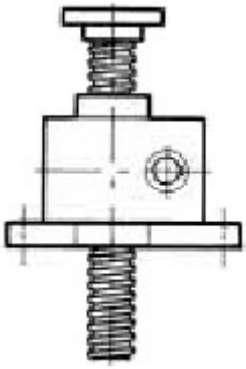
"TP" MODEL JACKS WITH CASE TEMPERATURE CONTROL

CTC



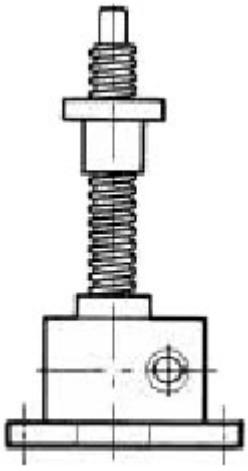
"TPR" model jacks with case temperature control

SP



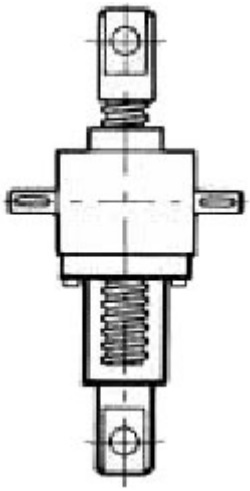
"TP" model jacks with supplemental mounting plate

SP



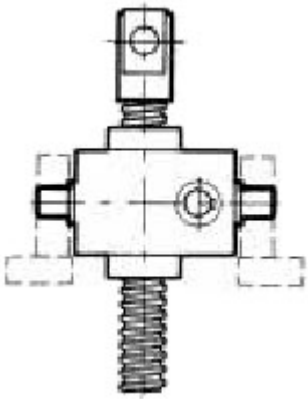
"TPR" model jacks with supplemental mounting plate

PO



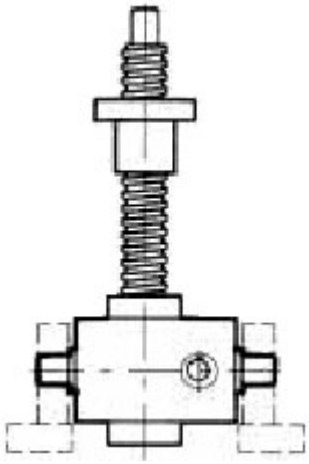
"TP" model jacks with eyelet rotation terminals

P



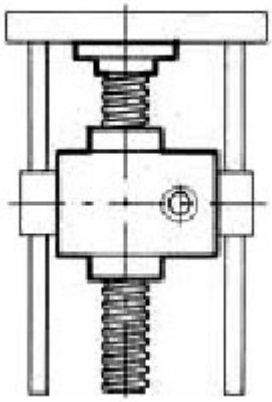
"TP" model jacks with rocking brackets

P



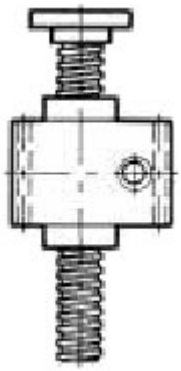
"TPR" model jacks with rocking brackets

AG



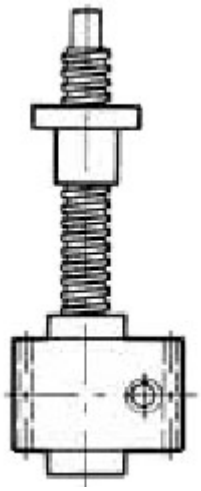
"TP" model jacks with supplemental guides

FP



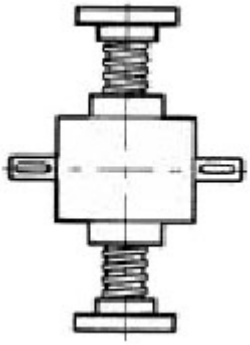
"TP" model jacks with holes through the case

FP



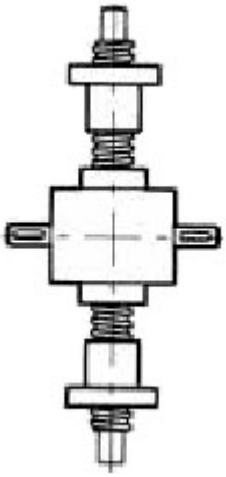
"TPR" model jacks with holes through the case

DA



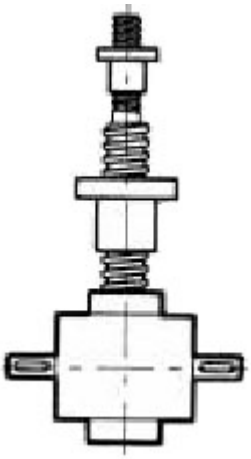
"TP" model jacks double action version

DA



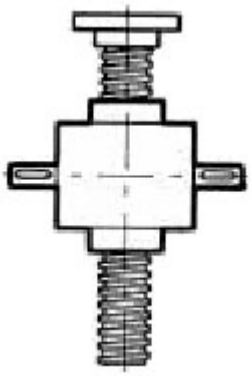
"TPR" model jacks double action version

DAR



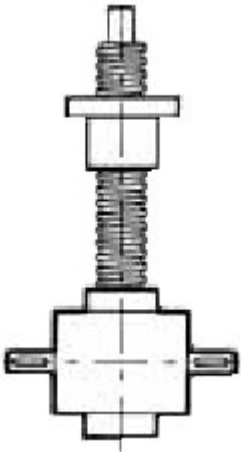
"TPR" model jacks staggered double action version

AM



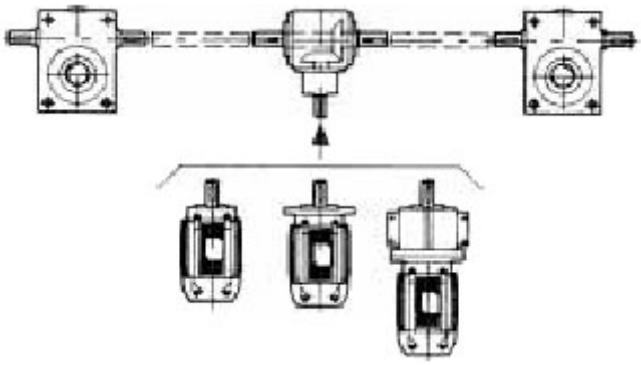
“TP” model jacks
with reinforced spindle

AM

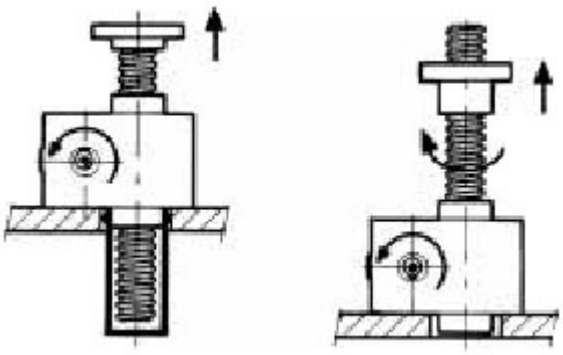


“TPR” model jacks with reinforced spindle

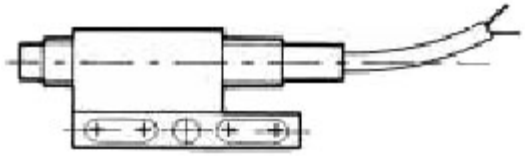
Threaded spindles and support nuts
Acme threading



Assembly schemes



Direction of rotation and movement of spindles and support nuts

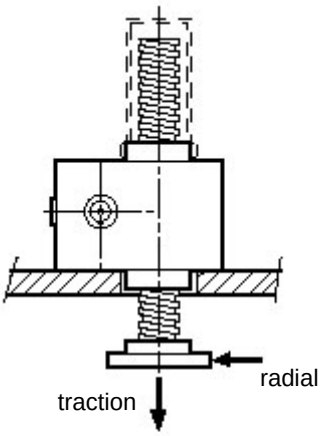


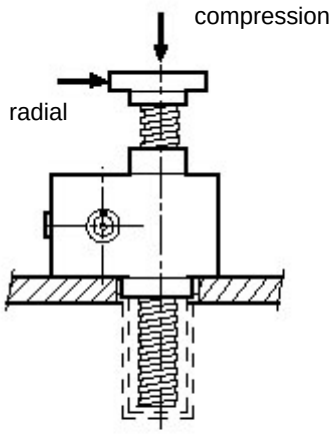
Proximity and support

SPECIFICATION

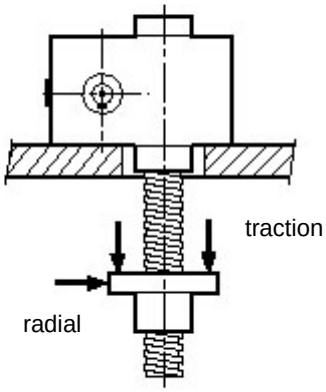
LOAD ANALYSIS AND COMPOSITION

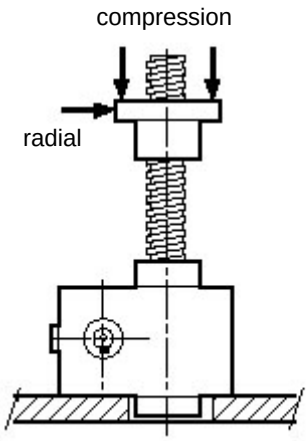
Choosing the right jack, and hence also its proper functioning, depends critically on identifying the real load acting on the jack. The real load is made-up of
different types of loads:
COMPRESSION, TRACTION AND RADIAL LOADS.
The loads can be defined as follows:
– STATIC loads
– DYNAMIC loads





They can be:
– Loads in TENSION
– Loads in COMPRESSION
– RADIAL loads
– Loads from single or bi-directional SHOCKS
– COMBINATION loads





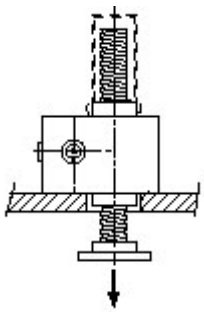
VIBRATIONS

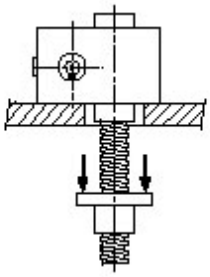
UNIMEC mechanical jacks with acme threaded spindles are absolutely IRREVERSIBLE by design and need no braking systems to maintain their position. We recommend contacting our Technical Office whenever jacks are installed in applications where there are strong vibrations.

STATIC LOADS

TRACTION

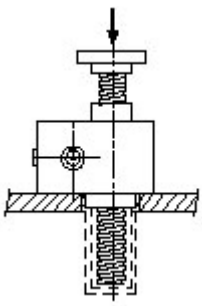
The maximum loads for all models and sizes are shown in the specification tables.
Shocks and/or radial loads reduce these maximum values.

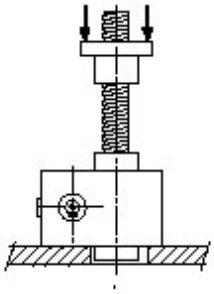




COMPRESSION

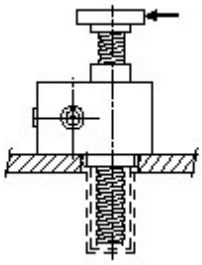
The maximum load is determined by the length of the threaded spindle. As a function of the limit of the jack and the Eulero/Tetmajer formulas.

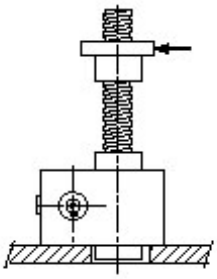




RADIAL

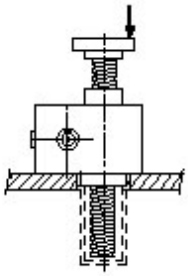
These loads in particular produce lateral movement of the threaded spindle, and induces bending which is damaging and limits the capacity of the jack. Graphs show the maximum load values as a function of spindle length. Our Technical Office is always available for further verification.

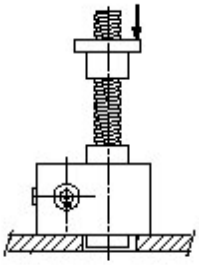




TILT

Tilting loads in static applications have the same effect as radial loads and thus the same considerations apply.





DYNAMIC LOADS

TRACTION

The maximum applicable tension is determined by several factors: thermal capacity, ambient temperature, service level, and any radial loads or shocks.
Power tables must be consulted.

COMPRESSION

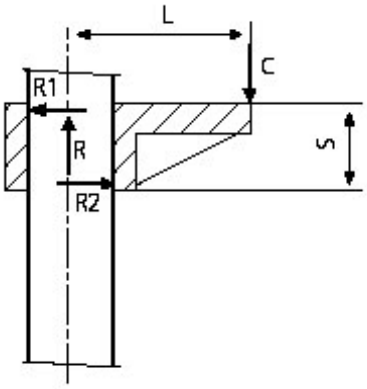
The maximum compression load is determined by several factors: The length of the threaded spindle, ambient temperature, service level, and any radial loads or shocks. It's important verify power tables. Furthermore, a load which causes the threaded spindle to bend requires additional examination. As a function of the limit of the jack and the Euler/Tetmajer formulas, the maximum load can be determined.

RADIAL

Radial loads ARE NOT ALLOWED in dynamic applications. Whenever a project absolutely must use jacks with radial loads, our Technical Office must be contacted.

TILT

Whenever the load being moved is radial and not perpendicular to the jack, an appropriate guiding mechanism must be used in order to not produce radial loads or tilt. The following formula gives the minimum length of the guide S in relation to the length L and the friction of the guide μ.



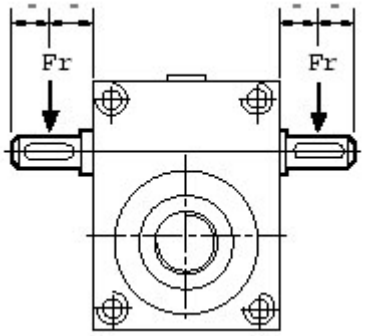
$$\left.\begin{aligned} R1 &= R2 \\ C = R &= (R1 + R2)\mu \\ R2 \bullet S &= C \bullet L \end{aligned}\right\} S = 2 \bullet L \bullet \mu$$

It is apparent that coarse play between the guide and the column could cause significant and detrimental lateral loads on the jack's threaded spindle.

LOADS ON THE DRIVE SHAFTS
(Worm Screw)

MAXIMUM RADIAL LOAD –

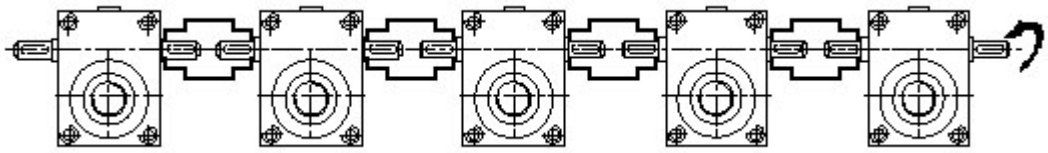
For proper operation of the screw jack, check that the radial loads from the drive source do not exceed the values shown in the table.



Size	183	204	306	407	559	7010	8010	9010	10012	12014	14014	16016
Fr (daN)	10	22	45	60	60	90	90	100	250	250	300	300

TORQUE MOMENT

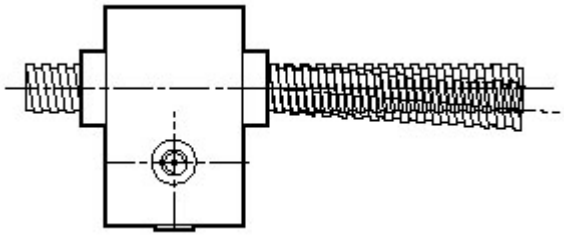
When mounting more than one jack in series, do not exceed the values in the following table.



Size	183	204	306	407	559	7010	8010	9010	10012	12014	14014	16016
fast ratio	2.3	5.43	6.9	49.06	49.06	84.78	84.78	-	-	-	-	-
normal ratio	2.3	5.43	15.43	12.86	12.86	84.78	84.78	202	522	522	823	823
slow ratio	-	4.18	18.31	15.43	15.43	49.06	49.06	202	441	441	984	984

LOADS ASSOCIATED WITH HORIZONTAL MOUNTING

The weight of the spindle itself causes it to bend and acts as a radial load. The degree of flexing, and thus the size of the radial load, is a function of the type of screw jack, the length of its spindle, its limits, and the way it is mounted.



RADIAL BACKLASH

UNIMEC jacks are made with DOUBLE GUIDES in order keep the radial backlash of the threaded shaft to a minimum. A slight backlash can nonetheless be detected at the end of the spindle, and its magnitude depends on the sizes of the jack and the threaded spindle.

PRECISION OF THE THREADED AXIS PITCH

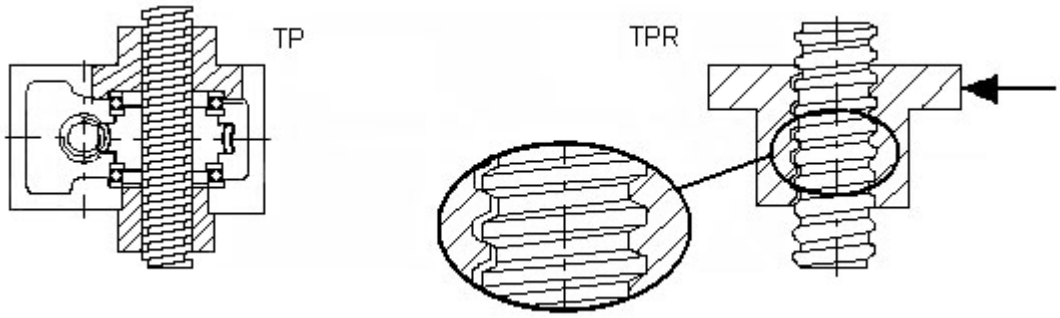
Special manufacturing processes allow the threaded axes to be made with great precision, enough to keep the maximum pitch error to within 0.05 to 0.08 mm over a length of 300 mm.

AXIAL BACKLASH

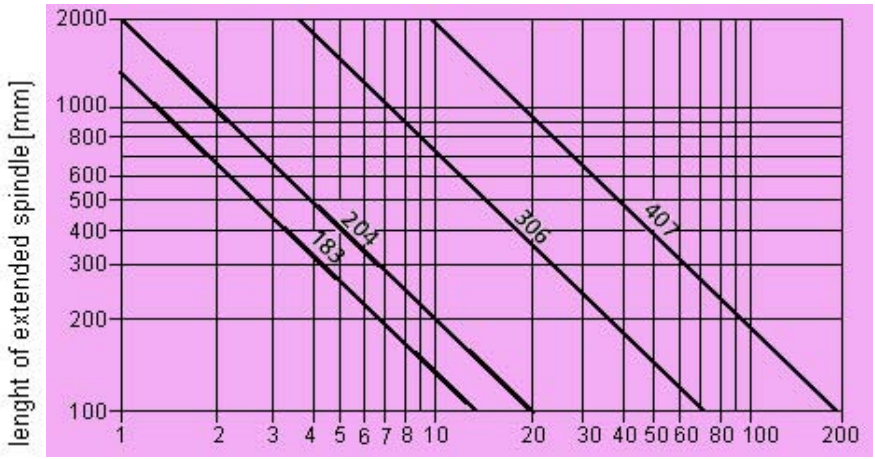
Axial backlash in the threaded spindle is caused by a natural and necessary operating tolerance between the threaded spindle and the worm wheel for TP models, and between the threaded spindle and the support nut (lead nut) for the TPR models. This backslash can be limited using a PLAY RETENTION nut.

ALLOWABLE RADIAL LOAD

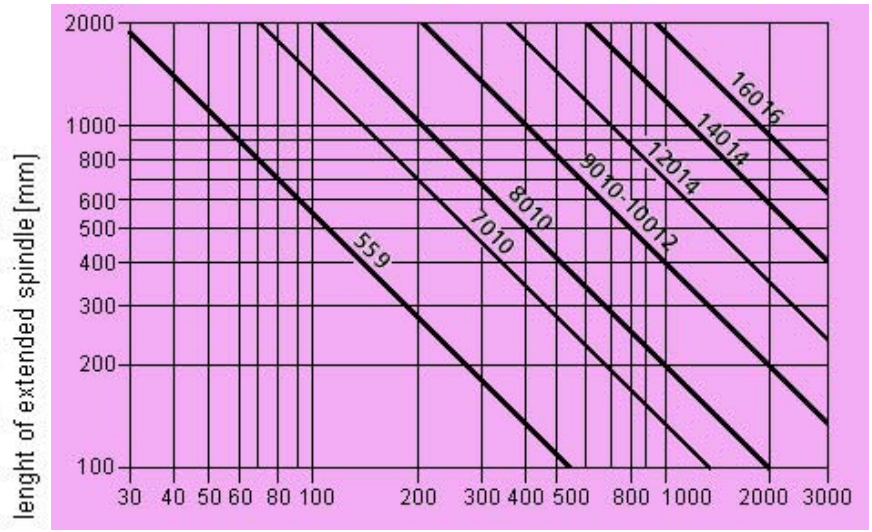
As stated above, RADIAL LOADS are damaging and the main cause of breakdowns. Besides being caused by misalignments between the threaded axis and the load, lateral loads can be caused by imprecise mounting that place the threaded spindle in an abnormal position. This results in poor contact between the screw shaft and support nut on TPR models, and between the screw shaft and worm wheel on TP models. DOUBLE GUIDES on TP models allow abnormal positions of the threaded spindle to be partially corrected before coming into contact with the worm wheel. In TPR models, it is the external support nut which comes into contact with the threaded spindle, hence making it impossible to make corrections except through the use of special mountings as explained in detail in the section on mounting the support nut. Next graphs show the allowable radial loads as a function of the length of the threaded spindle for STATIC applications. Our Technical Office must be contacted for dynamic applications.



MAXIMUM RADIAL LOAD ALLOWED IN **STATIC APPLICATIONS**



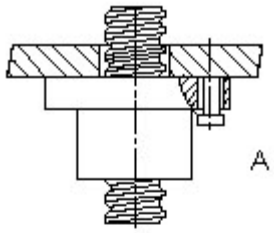
maximum radial load [daN]



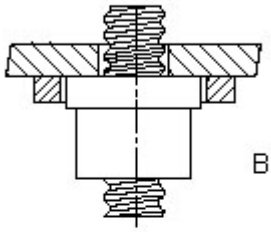
maximum radial load [daN]

MOUNTING THE SUPPORT NUT

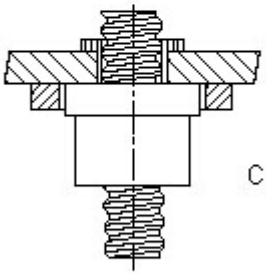
Drawing A. The support nut is fastened to the load with special screws which allow the support nut to adapt to the position of the threaded spindle.



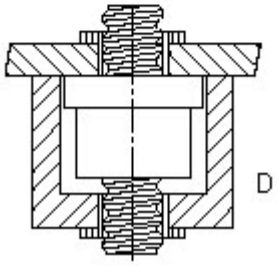
Drawing B. The support nut is fastened to the load with brackets which prevent rotation but still allowing the support nut to adapt to the position of the threaded spindle.



Drawing C. The support nut is fastened to the load with brackets which prevent rotation. An upper guide ring provides additional support.



Drawing D. Double guide rings deliver greater dependability than system C.



APPLICATIONS

TRAVEL –

The maximum values for the travel are determined by the lengths of the commercial steel rods (normally 4 to 6 meters). Spindles with longer travels are available upon request.

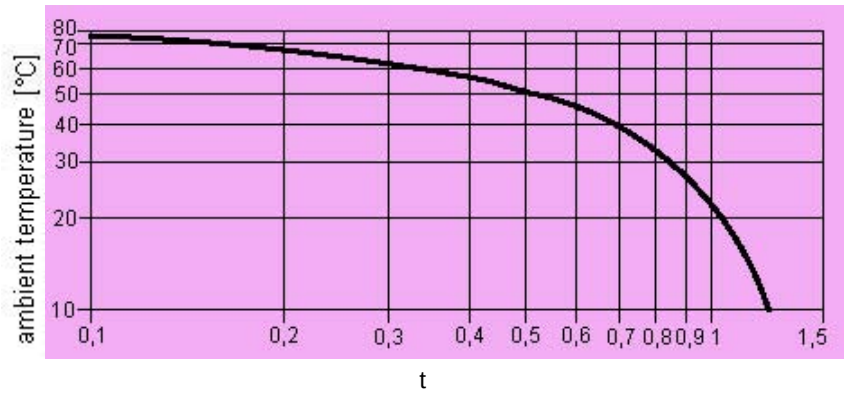
SPEED –

The allowable linear velocity of a jack is determined by several factors:
- JACK TYPE and transmission RATIO
- THERMAL CAPACITY
- DYNAMIC LOAD
- ENVIRONMENTAL TEMPERATURE
- SERVICE

The power tables show the power and pair necessary – and the maximum speed – as a function of the load.

AMBIENT TEMPERATURE

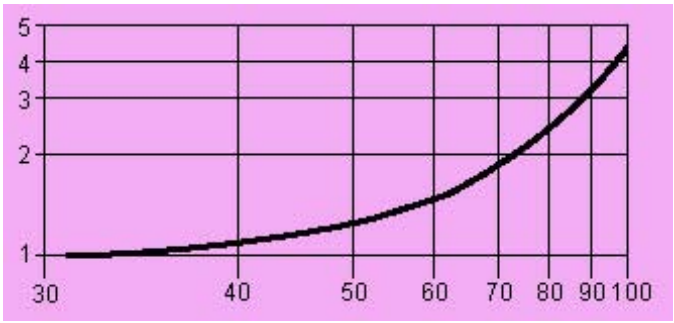
All values shown in this catalogue are for an ambient temperature of 20 °C. For operation in different temperatures, the corrective factor “t” must be calculated. To determine the actual load capacity of the jack, the capacity of the jack must be multiplied by the corrective factor “t”.



SERVICE LOAD

The power tables refer to 30% service over 10 minutes, or 20% service over 60 minutes, and an environmental temperature of 20 °C. To determine the correct load for different service loads, the dynamic load must be multiplied by the ED coefficient given in the diagram below.

ED



% service over 10 minutes

ED

% service over 60 minutes

MANUAL OPERATION

All jacks in the series can be operated manually. The following table gives the maximum load that can be moved for different jack ratios, given a force of 5 daN on a handwheel with a radius of 250 mm.Greater loads can be moved by applying furtherreductions to the jack or by increasing the radius of the handwheel.

Size	**183**	**204**	**306**	**407**	**559**	**7010**	**8010**	**9010**	**10012**	**12014**	**14014**	**16016**
fast ratio	500	1000	2000	1500	1000	900	860	-	-	-	-	-
normal ratio	500	1000	2500	2900	2000	1600	1500	1200	1100	1000	1000	900
slow ratio	-	1000	2500	5000	4300	3200	3200	2400	2300	1800	2000	1600

MOTORIZED OPERATION

Motors can be used for all jacks in the series. The power tables give the motor power and the input torque moment as a function of the ratio, dynamic load, and linear velocity, under service loads of 30% over 10 minutes up to 20% over 60minutes.

EMERGENCY OPERATION

In the absence of electrical power, individual jacks or complete installations of jacks can be operated manually using a crank placed over the free end of the jack's shaft. When self-braking motors or wormscrew reducers are used, the brake must be released or the reducer made reversible. Important: It is advisable to equip the emergency operation mechanism with a device to cut the electric circuit.

EFFICIENCY

The efficiency of the jacks is given in the descriptive tables. When more than one jack is mounted together, the calculation for the overall efficiency must take into account the efficiencies of the coupling devices. Normally, the following values apply:

– Two jacks 95%

– Three jacks 90%

– Each additional jack decreases the value an additional 5%.

HEAT

Since a mechanical screw jack is an irreversible device, it has relatively low heat output. The energy output will not heat the jack to over 80 °C under proper operating conditions.

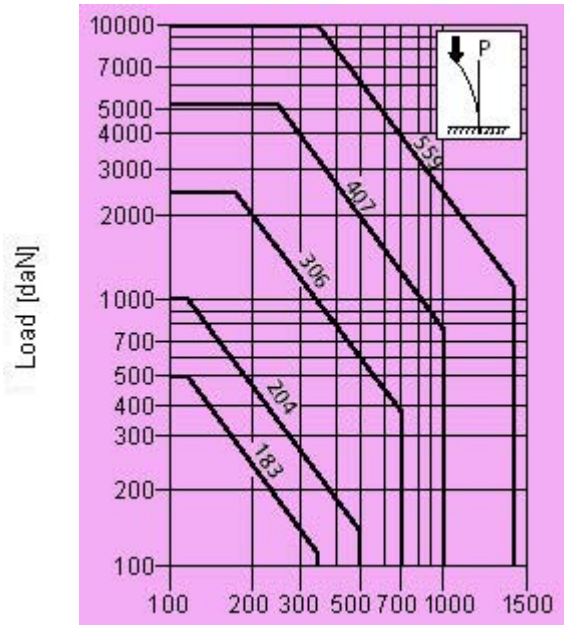
DESCRIPTIVE TABLES

Size		183	204	306	407	559	7010	8010	9010	10012	12014	14014	16016
Maximum load [daN]		500	1000	2500	5000	10000	20000	25000	35000	40000	60000	80000	100000
Acme threading Diameter x pitch		18x3	20x4	30x6	40x7	55x9	70x10	80x10	100x12	100x12	120x14	140x14	160x16
Screw travel for each turn of the lead nut [mm]		3	4	6	7	9	10	10	12	12	14	14	16
Theoretical ratio	fast	1/5	1/5	1/5	1/5	1/5	1/5	1/5	-	-	-	-	-
	normal	1/20	1/10	1/10	1/10	1/10	1/10	1/10	1/10	1/10	1/10	1/12	1/12
	slow	-	1/30	1/30	1/30	1/30	1/30	1/30	1/30	1/30	1/30	1/36	1/36
Real ratio	fast	4/20	4/19	4/19	6/30	6/30	5/26	5/26	-	-	-	-	-
	normal	1/20	2/21	3/29	3/30	3/30	3/29	3/29	3/30	3/31	3/31	3/36	3/36
	slow	-	1/30	1/30	1/30	1/30	1/30	1/30	1/30	1/30	1/30	1/36	1/36
Travel of the threaded spindle for each turn of the worm screw [mm]	fast	0.6	0.8	1.2	1.4	1.8	2.0	2.0	-	-	-	-	-
	normal	0.15	0.4	0.6	0.7	0.9	1.0	1.0	1.2	1.2	1.4	1.16	1.33
	slow	-	0.13	0.2	0.23	0.3	0.33	0.33	0.4	0.4	0.47	0.38	0.44
Efficiency %	fast	29	31	30	28	25	23	22	-	-	-	-	-
	normal	24	28	26	25	22	21	20	18	18	17	16	15
	slow	-	20	18	18	17	14	14	12	12	11	10	9
Operating temperature		-10 / 80 °C (For conditions outside this range, contact our Techincal Office)											
Lubrification		FINA CERAN AD or equivalent											
Acme screw weight per 100 mm [kg]		0.16	0.22	0.5	0.9	1.8	2.8	3.7	5.6	5.6	8.1	11	14
Weight of jack (without screw) [kg]		1.8	5.9	6.5	18	34	56	62	110	180	180	380	380

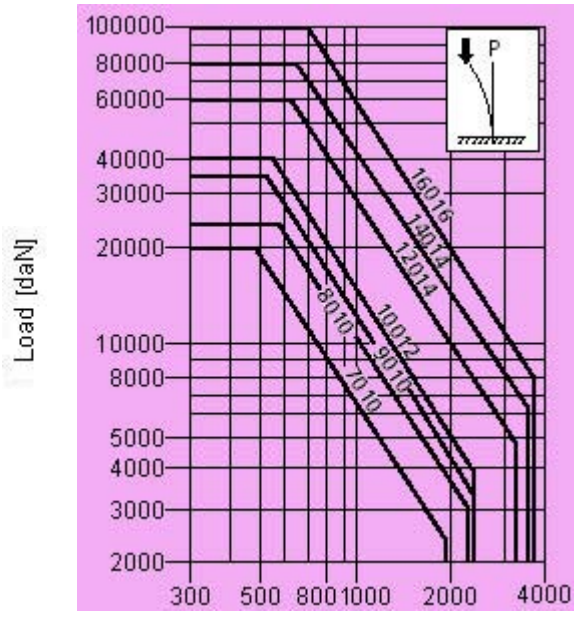
COLUMN LOAD

The following graphics show the maximum load, calcualted with Eulero-Tetmajer formulas with a safety coefficient of 4, avaiable for different jack size under three different constraints.

EULERO 1

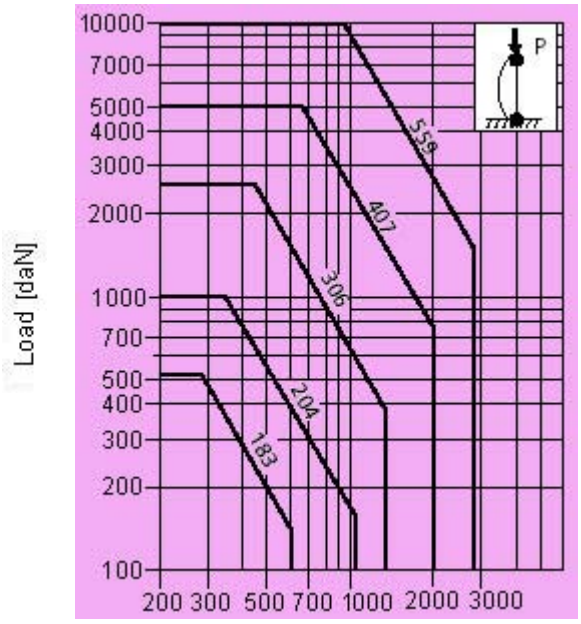


spindle lenght [mm]

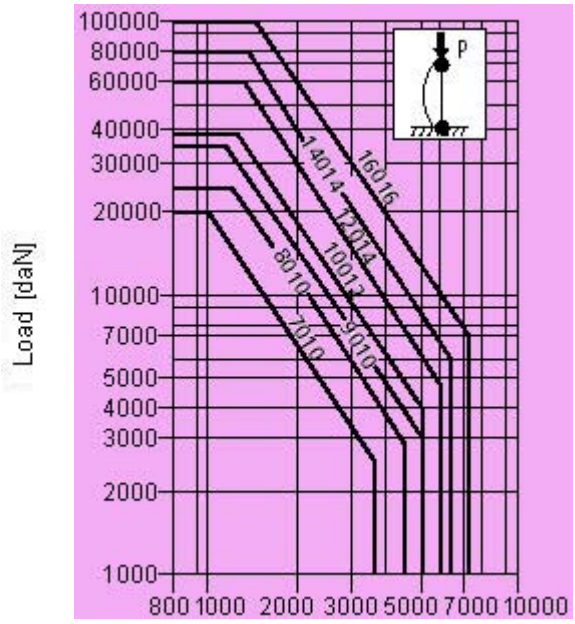


spindle lenght [mm]

EULERO 2

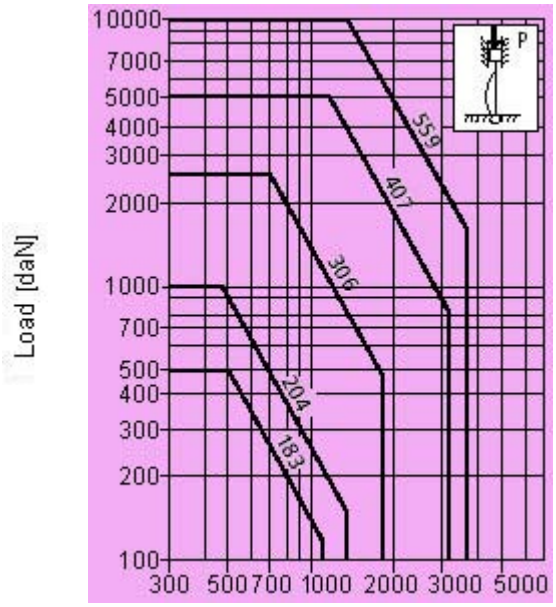


spindle lenght [mm]

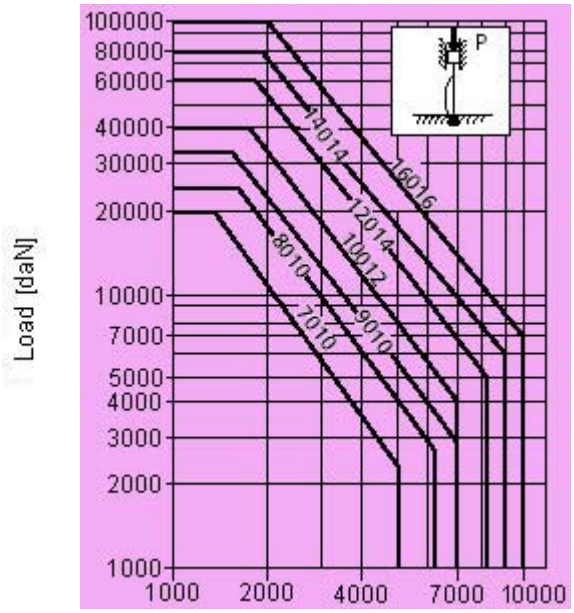


spindle lenght [mm]

EULERO 3



spindle lenght [mm]



spindle lenght [mm]

POWER

The nominal power PN required by the jack is given by the formula below:

$$PN = \frac{C \bullet V}{6120 \bullet \eta 1}$$

P = Power requirement [kW]
C = Total load to be moved (inclused correction dued to service factor)[daN]
V = Linear speed of the load [m/min]
$\eta 1$ = Efficiency of the jack
The corrected nominal power PNC is the actual power to apply to a jack or a group of jacks and is given by the formula below which includes the following coefficients:

$\eta 2$ = Efficiency of the configuration (based on the number of jacks connected)
$\eta 3$ = Efficiency of the transmission devices (belts, chains, bevel gear boxes, reducers, etc.)
$\eta 4$ = Efficiency of the structure (caused by the resistance of guides, sliding parts, etc.)
So the formula for the corrected nominal power PNC is given by:

$$PNC = \frac{C \bullet V}{6120 \bullet \eta 1 \bullet \eta 2 \bullet \eta 3 \bullet \eta 4}$$

TORQUE MOMENT DETERMINATION

The above information for determining the power also applies to determining the nominal torque MtN and the corrected torque MtC given by the formulas below.

Mt = Input torque moment [daNm]
C = Total load to be moved (inclused correction dued to service factor)[daN]
V = Linear speed of the load [m/min]
n = Input rpm [rpm]
$\eta 1 - \eta 2 - \eta 3 - \eta 4$ = Efficiency factors (see “Power calculation”)

$$MtN = \frac{C \bullet V}{6,29 \bullet n \bullet \eta 1}$$

$$MtC = \frac{C \bullet V}{6,29 \bullet n \bullet \eta 1 \bullet \eta 2 \bullet \eta 3 \bullet \eta 4}$$

Check that the values given by the formulae, in light of the number of jacks deployed, are less than or equal to the values given in the following tables. In order for the jack to function properly it is CRITICAL to remember that **if the values obtained fall in the shaded area the jack cannot be used**. In such a case, check into the possibility of using a larger jack.

POWER TABLES

SIZE 183

Load [daN]			500		400		300		200		100		50	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/5	1500	900	0.25	0.17	0.21	0.14	0.15	0.1	0.1	0.07	0.07	0.03	0.07	0.03
	1000	600	0.17	0.17	0.14	0.14	0.1	0.1	0.07	0.07	0.07	0.03	0.07	0.03
	750	450	0.13	0.17	0.1	0.14	0.08	0.1	0.07	0.07	0.07	0.03	0.07	0.03
	500	300	0.09	0.17	0.07	0.14	0.07	0.1	0.07	0.07	0.07	0.03	0.07	0.03
	300	180	0.07	0.17	0.07	0.14	0.07	0.1	0.07	0.07	0.07	0.03	0.07	0.03
	100	60	0.07	0.17	0.07	0.14	0.07	0.1	0.07	0.07	0.07	0.03	0.07	0.03
	50	30	0.07	0.17	0.07	0.14	0.07	0.1	0.07	0.07	0.07	0.03	0.07	0.03

Load [daN]			500		400		300		200		100		50	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/20	1500	225	0.08	0.06	0.07	0.05	0.07	0.04	0.07	0.04	0.07	0.04	0.07	0.04
	1000	150	0.07	0.06	0.07	0.05	0.07	0.04	0.07	0.04	0.07	0.04	0.07	0.04
	750	112.5	0.07	0.06	0.07	0.05	0.07	0.04	0.07	0.04	0.07	0.04	0.07	0.04
	500	75	0.07	0.06	0.07	0.05	0.07	0.04	0.07	0.04	0.07	0.04	0.07	0.04
	300	45	0.07	0.06	0.07	0.05	0.07	0.04	0.07	0.04	0.07	0.04	0.07	0.04
	100	15	0.07	0.06	0.07	0.05	0.07	0.04	0.07	0.04	0.07	0.04	0.07	0.04
	50	7.5	0.07	0.06	0.07	0.05	0.07	0.04	0.07	0.04	0.07	0.04	0.07	0.04

SIZE 204

Load [daN]			1000		800		600		400		300		200		100	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/5	1500	1200	0.64	0.42	0.51	0.33	0.38	0.25	0.26	0.17	0.19	0.13	0.13	0.09	0.07	0.05
	1000	800	0.43	0.42	0.34	0.33	0.26	0.25	0.17	0.17	0.13	0.13	0.09	0.09	0.07	0.05
	750	600	0.32	0.42	0.26	0.33	0.19	0.25	0.13	0.17	0.1	0.13	0.07	0.09	0.07	0.05
	500	400	0.21	0.42	0.17	0.33	0.13	0.25	0.09	0.17	0.07	0.13	0.07	0.09	0.07	0.05
	300	240	0.13	0.42	0.11	0.33	0.11	0.25	0.07	0.17	0.07	0.13	0.07	0.09	0.07	0.05
	100	80	0.07	0.42	0.07	0.33	0.07	0.25	0.07	0.17	0.07	0.13	0.07	0.09	0.07	0.05
	50	40	0.07	0.42	0.07	0.33	0.07	0.25	0.07	0.17	0.07	0.13	0.07	0.09	0.07	0.05

Load [daN]			1000		800		600		400		300		200		100	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/10	1500	600	0.36	0.23	0.3	0.19	0.22	0.14	0.14	0.09	0.11	0.07	0.08	0.05	0.07	0.03
	1000	400	0.24	0.23	0.2	0.19	0.14	0.14	0.09	0.09	0.07	0.07	0.07	0.05	0.07	0.03
	750	300	0.18	0.23	0.15	0.19	0.11	0.14	0.07	0.09	0.07	0.07	0.07	0.05	0.07	0.03
	500	200	0.12	0.23	0.1	0.19	0.07	0.14	0.07	0.09	0.07	0.07	0.07	0.05	0.07	0.03
	300	120	0.07	0.23	0.07	0.19	0.07	0.14	0.07	0.09	0.07	0.07	0.07	0.05	0.07	0.03
	100	40	0.07	0.23	0.07	0.19	0.07	0.14	0.07	0.09	0.07	0.07	0.07	0.05	0.07	0.03
	50	20	0.07	0.23	0.07	0.19	0.07	0.14	0.07	0.09	0.07	0.07	0.07	0.05	0.07	0.03

Load [daN]			1000		800		600		400		300		200		100	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/30	1500	200	0.17	0.11	0.13	0.08	0.11	0.07	0.07	0.05	0.07	0.03	0.07	0.03	0.07	0.03
	1000	133	0.12	0.11	0.08	0.08	0.07	0.07	0.07	0.05	0.07	0.03	0.07	0.03	0.07	0.03
	750	100	0.08	0.11	0.07	0.08	0.07	0.07	0.07	0.05	0.07	0.03	0.07	0.03	0.07	0.03
	500	67	0.07	0.11	0.07	0.08	0.07	0.07	0.07	0.05	0.07	0.03	0.07	0.03	0.07	0.03
	300	40	0.07	0.11	0.07	0.08	0.07	0.07	0.07	0.05	0.07	0.03	0.07	0.03	0.07	0.03
	100	13	0.07	0.11	0.07	0.08	0.07	0.07	0.07	0.05	0.07	0.03	0.07	0.03	0.07	0.03
	50	6.7	0.07	0.11	0.07	0.08	0.07	0.07	0.07	0.05	0.07	0.03	0.07	0.03	0.07	0.03

SIZE 306

Load [daN]			2500		2000		1500		1000		750		500		250	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/5	1500	1800	2.45	1.6	1.96	1.28	1.47	0.69	0.98	0.64	0.74	0.48	0.49	0.32	0.25	0.17
	1000	1200	1.64	1.6	1.31	1.28	0.98	0.69	0.65	0.64	0.49	0.48	0.33	0.32	0.17	0.17
	750	900	1.23	1.6	0.98	1.28	0.74	0.69	0.49	0.64	0.37	0.48	0.25	0.32	0.13	0.17
	500	600	0.82	1.6	0.66	1.28	0.49	0.69	0.33	0.64	0.25	0.48	0.17	0.32	0.1	0.17
	300	360	0.49	1.6	0.4	1.28	0.3	0.69	0.2	0.64	0.15	0.48	0.1	0.32	0.1	0.17
	100	120	0.17	1.6	0.13	1.28	0.1	0.69	0.1	0.64	0.1	0.48	0.1	0.32	0.1	0.17
	50	60	0.1	1.6	0.1	1.28	0.1	0.69	0.1	0.64	0.1	0.48	0.1	0.32	0.1	0.17

Load [daN]			2500		2000		1500		1000		750		500		250	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/10	1500	900	1.43	0.93	1.14	0.74	0.86	0.56	0.57	0.37	0.43	0.28	0.29	0.19	0.16	0.1
	1000	600	0.96	0.93	0.76	0.74	0.58	0.56	0.38	0.37	0.29	0.28	0.2	0.19	0.1	0.1
	750	450	0.72	0.93	0.57	0.74	0.43	0.56	0.29	0.37	0.22	0.28	0.15	0.19	0.1	0.1
	500	300	0.48	0.93	0.38	0.74	0.28	0.56	0.19	0.37	0.15	0.28	0.1	0.19	0.1	0.1
	300	180	0.28	0.93	0.23	0.74	0.18	0.56	0.12	0.37	0.1	0.28	0.1	0.19	0.1	0.1
	100	60	0.1	0.93	0.1	0.74	0.1	0.56	0.1	0.37	0.1	0.28	0.1	0.19	0.1	0.1
	50	30	0.1	0.93	0.1	0.74	0.1	0.56	0.1	0.37	0.1	0.28	0.1	0.19	0.1	0.1

Load [daN]			2500		2000		1500		1000		750		500		250	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/30	1500	300	0.68	0.44	0.56	0.36	0.42	0.27	0.28	0.18	0.22	0.14	0.14	0.09	0.07	0.045
	1000	200	0.45	0.44	0.37	0.36	0.28	0.27	0.19	0.18	0.14	0.14	0.1	0.09	0.07	0.045
	750	150	0.34	0.44	0.28	0.36	0.21	0.27	0.14	0.18	0.11	0.14	0.07	0.09	0.07	0.045
	500	100	0.23	0.44	0.19	0.36	0.14	0.27	0.1	0.18	0.07	0.14	0.07	0.09	0.07	0.045
	300	60	0.14	0.44	0.11	0.36	0.08	0.27	0.07	0.18	0.07	0.14	0.07	0.09	0.07	0.045
	100	20	0.07	0.44	0.11	0.36	0.08	0.27	0.07	0.18	0.07	0.14	0.07	0.09	0.07	0.045
	50	10	0.07	0.44	0.11	0.36	0.08	0.27	0.07	0.18	0.07	0.14	0.07	0.09	0.07	0.045

SIZE 407

Load [daN]			5000		4000		3000		2000		1500		1000		500	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/5	1500	2100	6.13	3.98	4.9	3.18	3.68	2.39	2.45	1.59	1.84	1.2	1.23	0.8	0.62	0.4
	1000	1400	4.09	3.98	3.27	3.18	2.15	2.39	1.64	1.59	1.23	1.2	0.82	0.8	0.41	0.4
	750	1050	3.06	3.98	2.45	3.18	1.8	2.39	1.23	1.59	0.92	1.2	0.62	0.8	0.31	0.4
	500	700	2.04	3.98	1.64	3.18	1.23	2.39	0.82	1.59	0.62	1.2	0.41	0.8	0.21	0.4
	300	420	1.23	3.98	0.98	3.18	0.74	2.39	0.49	1.59	0.37	1.2	0.25	0.8	0.13	0.4
	100	140	0.41	3.98	0.33	3.18	0.25	2.39	0.17	1.59	0.13	1.2	0.1	0.8	0.1	0.4
	50	70	0.21	3.98	0.17	3.18	0.13	2.39	0.1	1.59	0.1	1.2	0.1	0.8	0.1	0.4

Load [daN]			5000		4000		3000		2000		1500		1000		500	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/10	1500	1050	3.6	2.3	2.8	1.8	2.1	1.34	1.4	0.9	1.05	0.67	0.7	0.45	0.35	0.23
	1000	700	2.4	2.3	1.85	1.8	1.38	1.34	0.92	0.9	0.69	0.67	0.46	0.45	0.23	0.23
	750	525	1.77	2.3	1.4	1.8	1	1.34	0.7	0.9	0.52	0.67	0.35	0.45	0.18	0.23
	500	350	1.18	2.3	0.92	1.8	0.69	1.34	0.46	0.9	0.35	0.67	0.23	0.45	0.12	0.23
	300	210	0.71	2.3	0.56	1.8	0.42	1.34	0.28	0.9	0.21	0.67	0.14	0.45	0.1	0.23
	100	70	0.24	2.3	0.19	1.8	0.14	1.34	0.1	0.9	0.1	0.67	0.1	0.45	0.1	0.23
	50	35	0.12	2.3	0.1	1.8	0.1	1.34	0.1	0.9	0.1	0.67	0.1	0.45	0.1	0.23

Load [daN]			5000		4000		3000		2000		1500		1000		500	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/30	1500	350	1,69	1,1	1,26	0,82	0,95	0,62	0,63	0,41	0,48	0,31	0,32	0,21	0,17	0,11
	1000	233	1,13	1,1	0,84	0,82	0,64	0,62	0,42	0,41	0,32	0,31	0,21	0,21	0,11	0,11
	750	175	0,85	1,1	0,63	0,82	0,48	0,62	0,32	0,41	0,24	0,31	0,16	0,21	0,08	0,11
	500	117	0,56	1,1	0,42	0,82	0,32	0,62	0,21	0,41	0,16	0,31	0,11	0,21	0,07	0,11
	300	70	0,34	1,1	0,25	0,82	0,19	0,62	0,13	0,41	0,1	0,31	0,07	0,21	0,07	0,11
	100	23	0,12	1,1	0,08	0,82	0,07	0,62	0,07	0,41	0,07	0,31	0,07	0,21	0,07	0,11
	50	11,7	0,07	1,1	0,07	0,82	0,07	0,62	0,07	0,41	0,07	0,31	0,07	0,21	0,07	0,11

SIZE 559

Load [daN]			10000		7500		5000		4000		3000		2000		1000	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/5	1500	2700	17.7	11.5	13.3	8.6	8.83	5.74	7.06	4.58	5.3	3.44	3.53	2.29	1.77	1.15
	1000	1800	11.8	11.5	8.83	8.6	5.89	5.74	4.71	4.58	3.53	3.44	2.36	2.29	1.18	1.15
	750	1350	8.83	11.5	6.62	8.6	4.42	5.74	3.53	4.58	2.36	3.44	1.77	2.29	0.89	1.15
	500	900	5.88	11.5	4.42	8.6	2.94	5.74	2.36	4.58	1.77	3.44	1.18	2.29	0.59	1.15
	300	540	3.53	11.5	2.65	8.6	1.77	5.74	1.42	4.58	1.06	3.44	0.71	2.29	0.36	1.15
	100	180	1.18	11.5	0.88	8.6	0.59	5.74	0.47	4.58	0.36	3.44	0.24	2.29	0.12	1.15
	50	90	0.57	11.5	0.44	8.6	0.3	5.74	0.24	4.58	0.18	3.44	0.12	2.29	0.1	1.15

Load [daN]			10000		7500		5000		4000		3000		2000		1000	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/10	1500	1350	10	6.5	7.5	4.9	5	3.25	4	2.6	3.1	2	2	1.3	1	0.65
	1000	900	6.7	6.5	5	4.9	3.4	3.25	2.7	2.6	2.1	2	1.35	1.3	0.67	0.65
	750	675	5	6.5	3.77	4.9	2.5	3.25	2	2.6	1.54	2	1	1.3	0.5	0.65
	500	450	3.3	6.5	2.5	4.9	1.67	3.25	1.33	2.6	1.03	2	0.67	1.3	0.33	0.65
	300	270	2	6.5	1.5	4.9	1	3.25	0.8	2.6	0.62	2	0.4	1.3	0.2	0.65
	100	90	0.67	6.5	0.5	4.9	0.33	3.25	0.27	2.6	0.2	2	0.13	1.3	0.1	0.65
	50	45	0.33	6.5	0.25	4.9	0.17	3.25	0.13	2.6	0.1	2	0.1	1.3	0.1	0.65

Load [daN]			10000		7500		5000		4000		3000		2000		1000	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/30	1500	450	4.3	2.8	3.3	2.1	2.2	1.4	1.73	1.12	1.3	0.84	0.86	0.56	0.43	0.28
	1000	300	2.9	2.8	2.16	2.1	1.44	1.4	1.15	1.12	0.86	0.84	0.58	0.56	0.29	0.28
	750	225	2.16	2.8	1.62	2.1	1.08	1.4	0.86	1.12	0.65	0.84	0.43	0.56	0.22	0.28
	500	150	1.44	2.8	1.1	2.1	0.72	1.4	0.58	1.12	0.43	0.84	0.29	0.56	0.15	0.28
	300	90	0.86	2.8	0.65	2.1	0.43	1.4	0.35	1.12	0.26	0.84	0.18	0.56	0.09	0.28
	100	30	0.29	2.8	0.22	2.1	0.15	1.4	0.12	1.12	0.09	0.84	0.07	0.56	0.07	0.28
	50	15	0.14	2.8	0.11	2.1	0.07	1.4	0.07	1.12	0.07	0.84	0.07	0.56	0.07	0.28

SIZE 7010

Load [daN]			20000		17500		15000		10000		7500		5000		2500	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/5	1500	3000	42.6	27.7	37.7	24.3	32	20.8	21.3	13.8	16	10.4	10.7	6.95	5.33	3.46
	1000	2000	28.4	27.7	24.9	24.3	21.3	20.8	14.2	13.8	10.7	10.4	7.1	6.95	3.55	3.46
	750	1500	21.3	27.7	18.7	24.3	16	20.8	10.7	13.8	8	10.4	5.33	6.95	2.66	3.46
	500	1000	14.2	27.7	12.4	24.3	10.7	20.8	7.1	13.8	5.33	10.4	3.55	6.95	1.78	3.46
	300	600	8.53	27.7	7.46	24.3	6.39	20.8	4.26	13.8	3.2	10.4	2.13	6.95	1.07	3.46
	100	200	2.84	27.7	2.49	24.3	2.13	20.8	1.42	13.8	1.07	10.4	0.71	6.95	0.36	3.46
	50	100	1.42	27.7	1.24	24.3	10.7	20.8	0.71	13.8	0.53	10.4	0.36	6.95	0.18	3.46

Load [daN]			20000		17500		15000		10000		7500		5000		2500	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/10	1500	1500	23.4	15.2	20.5	13.3	17.6	11.4	11.7	7.6	8.8	5.7	5.86	3.8	2.93	1.9
	1000	1000	15.6	15.2	13.7	13.3	11.7	11.4	7.8	7.6	5.9	5.7	3.9	3.8	1.95	1.9
	750	750	11.7	15.2	10.2	13.3	8.8	11.4	5.9	7.6	4.4	5.7	2.92	3.8	1.46	1.9
	500	500	7.8	15.2	6.8	13.3	5.9	11.4	3.9	7.6	2.92	5.7	1.95	3.8	0.98	1.9
	300	300	4.68	15.2	4.1	13.3	3.5	11.4	2.34	7.6	1.75	5.7	1.17	3.8	0.58	1.9
	100	100	1.56	15.2	1.37	13.3	1.17	11.4	0.78	7.6	0.59	5.7	0.39	3.8	0.2	1.9
	50	50	0.78	15.2	0.68	13.3	0.58	11.4	0.39	7.6	0.29	5.7	0.2	3.8	0.1	1.9

Load [daN]			20000		17500		15000		10000		7500		5000		2500	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/30	1500	500	11.7	7.6	10.3	6.7	8.8	5.7	5.9	3.8	4.5	2.9	2.9	1.9	1.46	0.95
	1000	333	7.8	7.6	6.9	6.7	5.9	5.7	3.9	3.8	3	2.9	2	1.9	1	0.95
	750	250	5.85	7.6	5.16	6.7	4.4	5.7	2.93	3.8	2.23	2.9	1.46	1.9	0.73	0.95
	500	167	3.9	7.6	3.44	6.7	2.92	5.7	1.95	3.8	1.49	2.9	0.98	1.9	0.49	0.95
	300	100	2.34	7.6	2.06	6.7	1.76	5.7	1.17	3.8	0.89	2.9	0.58	1.9	0.29	0.95
	100	33	0.78	7.6	0.69	6.7	0.59	5.7	0.39	3.8	0.3	2.9	0.2	1.9	0.1	0.95
	50	16.7	0.39	7.6	0.34	6.7	0.3	5.7	0.2	3.8	0.14	2.9	0.1	1.9	0.07	0.95

SIZE 8010

Load [daN]			25000		20000		15000		10000		7500		5000		2500	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/5	1500	3000	55.7	36.2	44.6	29	33.4	21.7	22.3	14.5	16.7	10.9	11.2	7.24	5.57	3.62
	1000	2000	37.2	36.2	29.7	29	22.3	21.7	14.9	14.5	11.2	10.9	7.43	7.24	3.72	3.62
	750	1500	27.9	36.2	22.3	29	16.7	21.7	11.2	14.5	6.68	10.9	5.57	7.24	2.79	3.62
	500	1000	18.6	36.2	14.9	29	11.2	21.7	7.43	14.5	5.57	10.9	3.72	7.24	1.86	3.62
	300	600	11.2	36.2	8.92	29	6.68	21.7	4.46	14.5	3.34	10.9	2.23	7.24	1.12	3.62
	100	200	3.72	36.2	2.97	29	2.23	21.7	1.49	14.5	1.12	10.9	0.75	7.24	0.38	3.62
	50	100	1.86	36.2	1.79	29	1.12	21.7	0.75	14.5	0.56	10.9	0.38	7.24	0.19	3.62

Load [daN]			25000		20000		15000		10000		7500		5000		2500	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/10	1500	1500	30.8	20	24.5	16	18.4	12	12.3	8	9.2	6	6.2	4	3.1	2
	1000	1000	20.5	20	16.4	16	12.3	12	8.2	8	6.02	6	4.1	4	2.05	2
	750	750	15.4	20	12.3	16	9.24	12	6.16	8	4.62	6	3.08	4	1.54	2
	500	500	10.3	20	8.2	16	6.16	12	4.1	8	3.08	6	2.05	4	1.03	2
	300	300	6.16	20	4.9	16	3.7	12	2.5	8	1.85	6	1.23	4	0.62	2
	100	100	2.06	20	1.65	16	1.24	12	0.82	8	0.62	6	0.41	4	0.21	2
	50	50	1.02	20	0.82	16	0.61	12	0.41	8	0.31	6	0.21	4	0.11	2

Load [daN]			25000		20000		15000		10000		7500		5000		2500	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/30	1500	500	14.5	9.4	11.7	7.6	8.8	5.7	5.9	3.8	4.5	2.9	2.9	1.9	1.46	0.95
	1000	333	9.7	9.4	7.8	7.6	5.9	5.7	3.9	3.8	3	2.9	2	1.9	1	0.95
	750	250	7.3	9.4	5.85	7.6	4.4	5.7	2.93	3.8	2.23	2.9	1.46	1.9	0.73	0.95
	500	167	4.8	9.4	3.9	7.6	2.92	5.7	1.95	3.8	1.49	2.9	0.98	1.9	0.49	0.95
	300	100	2.9	9.4	2.34	7.6	1.76	5.7	1.17	3.8	0.89	2.9	0.58	1.9	0.29	0.95
	100	33	0.96	9.4	0.78	7.6	0.59	5.7	0.39	3.8	0.3	2.9	0.2	1.9	0.1	0.95
	50	16.7	0.48	9.4	0.39	7.6	0.3	5.7	0.2	3.8	0.14	2.9	0.1	1.9	0.07	0.95

SIZE 9010

Load [daN]			35000		25000		20000		15000		10000		5000	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/10	1500	1800	57.2	37.2	40.8	26.5	32.7	21.2	24.5	15.9	16.4	10.6	8.2	5.3
	1000	1200	38.2	37.2	27.4	26.5	21.8	21.2	16.4	15.9	10.9	10.6	5.5	5.3
	750	900	28.6	37.2	20.4	26.5	16.4	21.2	12.3	15.9	8.2	10.6	4.1	5.3
	500	600	19.1	37.2	13.6	26.5	10.9	21.2	8.2	15.9	5.5	10.6	2.8	5.3
	300	360	11.5	37.2	8.2	26.5	6.6	21.2	4.9	15.9	3.3	10.6	1.7	5.3
	100	120	3.9	37.2	2.8	26.5	2.2	21.2	1.7	15.9	1.1	10.6	0.6	5.3
	50	60	1.9	37.2	1.4	26.5	1.1	21.2	0.9	15.9	0.6	10.6	0.3	5.3

Load [daN]			35000		25000		20000		15000		10000		5000	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/30	1500	600	28.6	18.6	20.4	13.3	16.4	10.7	12.3	8	8.2	5.4	4.1	2.7
	1000	400	19.1	18.6	13.6	13.3	10.9	10.7	8.2	8	5.5	5.4	2.8	2.7
	750	30	14.3	18.6	10.2	13.3	8.2	10.7	6.2	8	4.1	5.4	2.1	2.7
	500	200	9.6	18.6	6.9	13.3	5.5	10.7	4.1	8	2.8	5.4	1.4	2.7
	300	120	5.8	18.6	4.1	13.3	3.3	10.7	2.5	8	1.7	5.4	0.9	2.7
	100	40	1.9	18.6	1.4	13.3	1.1	10.7	0.9	8	0.6	5.4	0.3	2.7
	50	20	1	18.6	0.7	13.3	0.6	10.7	0.5	8	0.3	5.4	0.2	2.7

SIZE 10012

Load [daN]			40000		30000		25000		20000		15000		10000		5000	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/10	1500	1800	65.4	42.5	49	31.8	40.8	26.5	32.7	21.2	24.5	15.9	16.4	10.6	8.16	5.3
	1000	1200	43.6	42.5	32.7	31.8	27.2	26.5	21.8	21.2	16.4	15.9	10.9	10.6	5.45	5.3
	750	900	32.7	42.5	24.5	31.8	20.4	26.5	16.4	21.2	12.3	15.9	8.16	10.6	4.08	5.3
	500	600	21.8	42.5	16.4	31.8	13.6	26.5	10.9	21.2	8.16	15.9	5.45	10.6	2.73	5.3
	300	360	13.1	42.5	9.8	31.8	8.17	26.5	6.54	21.2	4.9	15.9	3.27	10.6	1.64	5.3
	100	120	4.36	42.5	3.27	31.8	2.72	26.5	2.18	21.2	1.64	15.9	1.09	10.6	0.55	5.3
	50	60	2.18	42.5	1.64	31.8	1.36	26.5	1.09	21.2	0.82	15.9	0.55	10.6	0.28	5.3

Load [daN]			40000		30000		25000		20000		15000		10000		5000	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/30	1500	600	32.7	21.3	24.5	15.9	20.4	13.3	16.4	10.7	12.3	7.99	8.17	5.32	4.09	2.66
	1000	400	21.8	21.3	16.4	15.9	13.6	13.3	10.9	10.7	8.17	7.99	5.45	5.32	2.72	2.66
	750	300	16.4	21.3	12.3	15.9	10.2	13.3	8.17	10.7	6.13	7.99	4.09	5.32	2.05	2.66
	500	200	10.9	21.3	8.17	15.9	6.81	13.3	5.45	10.7	4.09	7.99	2.72	5.32	1.36	2.66
	300	120	6.54	21.3	4.9	15.9	4.08	13.3	3.27	10.7	2.45	7.99	1.64	5.32	0.82	2.66
	100	40	2.18	21.3	1.64	15.9	1.36	13.3	1.09	10.7	0.82	7.99	0.55	5.32	0.28	2.66
	50	20	1.09	21.3	0.82	15.9	0.68	13.3	0.55	10.7	0.41	7.99	0.28	5.32	0.14	2.66

SIZE 12014

Load [daN]			60000		50000		40000		30000		20000		15000		10000	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/10	1500	2100	121	78.6	101	65.6	80.7	52.4	60.6	39.3	40.4	26.2	30.3	19.7	20.2	13.1
	1000	1400	80.7	78.6	67.3	65.6	53.8	52.4	40.4	39.3	26.9	26.2	20.2	19.7	13.5	13.1
	750	1050	60.1	78.6	50.5	65.6	40.4	52.4	30.3	39.3	20.2	26.2	15.2	19.7	10.1	13.1
	500	700	40.3	78.6	33.6	65.6	26.9	52.4	20.2	39.3	13.5	26.2	10.1	19.7	6.73	13.1
	300	420	24.2	78.6	20.2	65.6	16.1	52.4	12.1	39.3	8.07	26.2	6.06	19.7	4.04	13.1
	100	140	8.07	78.6	6.73	65.6	5.38	52.4	4.04	39.3	2.69	26.2	2.02	19.7	1.35	13.1
	50	70	4.04	78.6	3.36	65.6	2.69	52.4	2.02	39.3	1.35	26.2	1.01	19.7	0.67	13.1

Load [daN]			60000		50000		40000		30000		20000		15000		10000	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/30	1500	700	62.5	40.5	52	33.8	41.6	27	31.2	20.3	20.8	13.5	15.6	10.2	10.4	6.75
	1000	466	41.5	40.5	34.6	33.8	27.7	27	20.8	20.3	13.9	13.5	10.4	10.2	6.92	6.75
	750	350	31.2	40.5	26	33.8	20.8	27	15.6	20.3	10.4	13.5	7.8	10.2	5.2	6.75
	500	233	20.8	40.5	17.3	33.8	13.8	27	10.4	20.3	6.92	13.5	5.2	10.2	3.46	6.75
	300	140	12.5	40.5	10.4	33.8	8.32	27	6.24	20.3	4.16	13.5	3.12	10.2	2.08	6.75
	100	46	4.1	40.5	3.42	33.8	2.73	27	2.05	20.3	1.37	13.5	1.03	10.2	0.68	6.75
	50	23	2.05	40.5	1.71	33.8	1.37	27	1.03	20.3	0.69	13.5	0.52	10.2	0.34	6.75

SIZE 14014

Load [daN]			80000		60000		40000		30000		20000		10000		5000	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/12	1500	1750	143	92.9	107	69.6	71.5	46.5	53.6	34.8	35.8	23.3	17.9	11.7	8.94	5.81
	1000	1166	95.3	92.9	71.5	69.6	47.6	46.5	35.7	34.8	23.9	23.3	11.9	11.7	5.96	5.81
	750	875	71.5	92.9	53.6	69.6	35.8	46.5	26.8	34.8	17.9	23.3	8.94	11.7	4.47	5.81
	500	583	47.6	92.9	35.7	69.6	23.8	46.5	17.9	34.8	11.9	23.3	5.96	11.7	2.98	5.81
	300	350	28.6	92.9	21.5	69.6	14.3	46.5	10.8	34.8	7.15	23.3	3.58	11.7	1.79	5.81
	100	116	9.48	92.9	7.11	69.6	4.74	46.5	3.56	34.8	2.37	23.3	1.19	11.7	0.6	5.81
	50	58	4.73	92.9	3.56	69.6	2.37	46.5	1.78	34.8	1.19	23.3	0.6	11.7	0.3	5.81

Load [daN]			80000		60000		40000		30000		20000		10000		5000	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/36	1500	583	76.1	49.4	57.1	37.1	38.1	24.8	28.6	18.6	19.1	12.4	9.51	6.18	4.76	3.1
	1000	388	50.6	49.4	38	37.1	25.3	24.8	19	18.6	12.7	12.4	6.33	6.18	3.17	3.1
	750	291	38.1	49.4	28.6	37.1	19.1	24.8	14.3	18.6	9.51	12.4	4.76	6.18	2.38	3.1
	500	194	25.4	49.4	19.1	37.1	12.7	24.8	9.51	18.6	6.34	12.4	3.17	6.18	1.59	3.1
	300	116	15.2	49.4	11.4	37.1	7.59	24.8	5.69	18.6	3.8	12.4	1.9	6.18	0.95	3.1
	100	38	4.97	49.4	3.73	37.1	2.49	24.8	1.87	18.6	1.25	12.4	0.63	6.18	0.32	3.1
	50	19	2.49	49.4	1.87	37.1	1.25	24.8	0.94	18.6	0.63	12.4	0.32	6.18	0.16	3.1

SIZE 16016

Load [daN]			100000		80000		60000		40000		30000		20000		10000	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/12	1500	2000	218	141	17.4	113	131	85	87	56.5	65	42.5	43.6	28.3	21.8	14.2
	1000	1333	145	141	116	113	87	85	58	56.5	43.6	42.5	29	28.3	14.5	14.2
	750	1000	109	141	87	113	65.4	85	43.6	56.5	32.7	42.5	21.8	28.3	10.9	14.2
	500	667	72.6	141	58.1	113	43.6	85	29	56.5	21.8	42.5	14.5	28.3	7.26	14.2
	300	400	43.6	141	34.9	113	26.1	85	17.4	56.5	13.1	42.5	8.71	28.3	4.36	14.2
	100	133	14.5	141	11.6	113	8.71	85	5.81	56.5	4.36	42.5	2.9	28.3	1.45	14.2
	50	66.6	7.26	141	5.81	113	4.36	85	2.9	56.5	2.18	42.5	1.45	28.3	0.73	14.2

Load [daN]			100000		80000		60000		40000		30000		20000		10000	
Ratio	Round in [rpm]	Screw travel [mm/min]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]	Pn [kW]	Mt [daNm]
1/36	1500	666	121	78.6	96.8	62.8	72.6	47.2	48.4	31.5	36.3	23.6	24.2	15.7	12.1	7.86
	1000	444	80.7	78.6	64.5	62.8	48.4	47.2	32.3	31.5	24.2	23.6	16.1	15.7	8.07	7.86
	750	333	60.5	78.6	48.5	62.8	36.3	47.2	24.2	31.5	18.2	23.6	12.1	15.7	6.05	7.86
	500	222	40.4	78.6	32.3	62.8	24.2	47.2	16.1	31.5	12.1	23.6	8.07	15.7	4.03	7.86
	300	133	24.2	78.6	19.4	62.8	14.5	47.2	9.68	31.5	7.26	23.6	4.84	15.7	2.42	7.86
	100	44	8.06	78.6	6.45	62.8	4.84	47.2	3.22	31.5	2.42	23.6	1.61	15.7	0.81	7.86
	50	22	4.03	78.6	3.22	62.8	2.42	47.2	1.61	31.5	1.21	23.6	0.81	15.7	0.41	7.86

LUBRICATION

Standard internal lubrication of the jacks is provided by a synthetic long-lasting lubricant such as FINA CERAN-AD. All sizes are equipped with an oil plug for changing or topping-up the oil. The average amount of lubricant in the jack is given on the next table.

QUANTITY OF OIL FOR VARIOUS JACKS

Size	183	204	306	407	559	7010	8010	9010	10012	12014	14014	16016
kg	0.06	0.1	0.3	0.6	1	1.4	1.4	2.3	4	4	14	14

LUBRICANT SELECTION TABLE:

FINA	CERAN-AD
KLÜBER	STRUCTOVIS P00
AGIP	GRMU EP 0
BP	GREASE LTX EP 0
CASTROL	SPHEEROL EPL 0
ESSO	BEACON EP 0
SHELL	TIVECA CONPOLIMB 4
IP	ATHESIA EP 0

Lubricating the threaded spindle is the responsibility of the customer and must be done using one of the following lubricants:

ROTHEN	2000/P SPECIAL
FINA	EBLAN SPD
KLÜBER	STRUCTOVIS CHD
MOBIL	SHC 629

Lubricating the threaded spindle is an important and determining factor in the proper functioning of the jack. It must be done in intervals that assure a constant coat of clean lubricant between the contact parts. Insufficient or improper lubrication leads to increased heat and wear. which naturally reduces the operating life and promotes breakdown. For workloads more rigorous than those given in relative tables. an automatic or semi-automatic lubrication system is recommended.

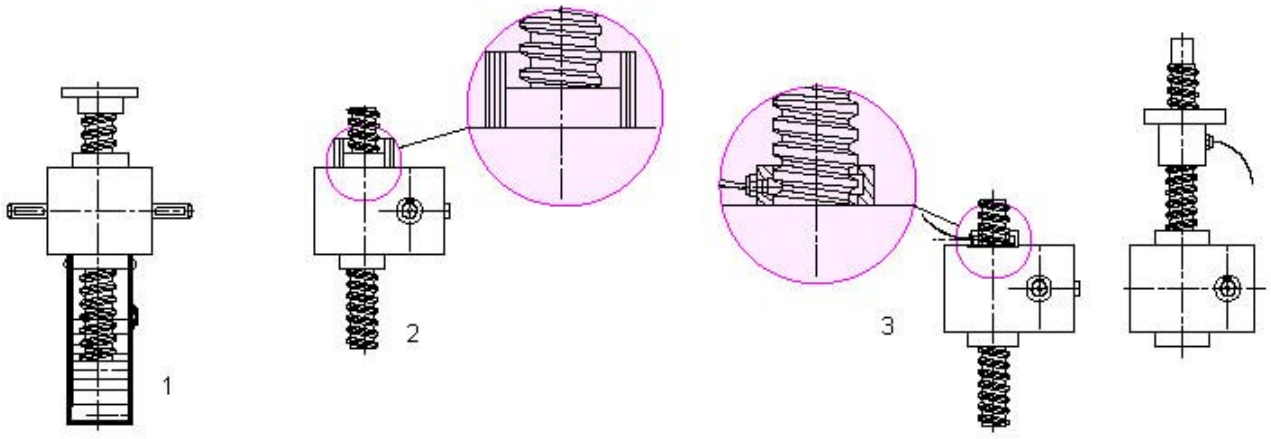
SEMI-AUTOMATIC LUBRICATION

Many different systems are feasible. here we list only the most common:

1 - For TP model jacks mounted vertically. it is possible to provide protection through the use of an oil reserve.

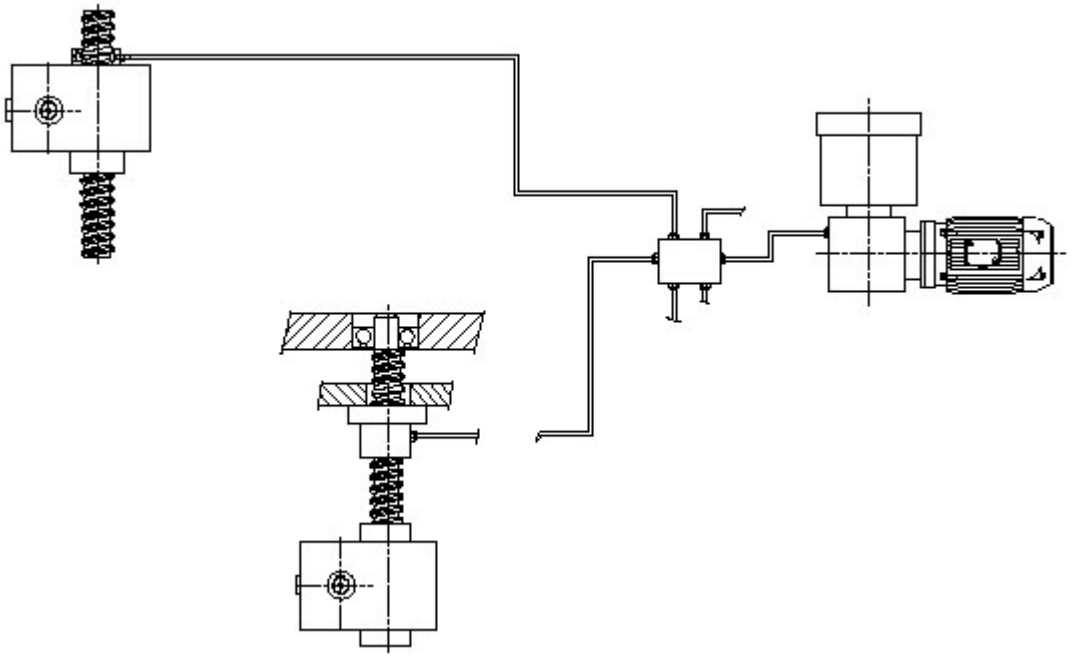
2 - Add an additional holding ring and make a backoil tank.

3 - Use a lubricant drop-applicator to apply oil to the guides of the TP models. and to the support nut of TPR models.



CENTRALIZED LUBRICATION

Many automatic lubrication systems are possible. The design below shows a representative scheme with a central pump and various distribution points. The amount of lubricant required depends on the service and work environment. Whenever the jacks are not visible or the threaded spindles have protective coverings. the lubrication must be checked even when employing an automatic lubrication system.



INSTALLATION AND MAINTENANCE

INSTALLATION

The jack must be installed in a manner that does not create radial loads. Great care must be taken to ensure that the threaded spindle is square to the mounting plane. and that the load and threaded spindle are on the same axis. Deploying multiple jacks (look at mounting schemes) on the same load requires further verifications. It is critical that the support points. the end fittings for TP type jacks and the support nuts for TPR type jacks. are perfectly aligned in a way that uniformly distributes the load and. above all. to avoid having misaligned jacks act as a counter-load or brake. Whenever several jacks have to be connected with transmission shafts. it is recommended that they be perfectly aligned in order to avoid distorting the input shafts of the jacks. It is advisable to use joints capable of absorbing alignment errors but that have rigid torsion so as not to disrupt the synchronization of the transmission. The assembly or disassembly of the joints or input shaft pulleys of the jacks must be done with tie rods or extractors. using the threaded holes on the shafts of all the jacks for connection. Striking or hammering can damage the bearings. For heat-shrinking joints or pulleys. we recommend a temperature between 80-100 °C. Installations in rugged environments with dust. water. vapors. etc. require precautions to protect the threaded spindle. This can be done by using elastic protection (bellows) or rigid protective sleeves.

PREPARING FOR SERVICE

Each jack in this catalog comes filled with longlasting lubricant which assures perfect lubrication of the worm gear/worm wheel group and all the internal parts. All jacks are equipped with a lubricant plug for topping-up or changing the lubricant as necessary. As clearly explained on relative chapter. lubrication of the threaded spindle is the responsibility of the user and must be done periodically depending on the service conditions and the operating environment. Special systems are available for holding the jacks in any position without creating lubrication problems. VERTICAL mounting is required for all TP type jacks with the following optional accessories:

– Rigid protective oil bath sleeve
– Play retention
– Visual or automatic wear control
– Visual or automatic safety nut.

START-UP

All units undergo a careful quality examination before being delivered to the client. and are dynamically tested load-free. When starting-up a machine where jacks are installed. it is critical to check for the lubrication of the threaded spindle and for the absence of foreign material. Check the travel limiters and be sure to take inertia into consideration. for vertical loads it will be less in ascent and greater in descent. Start the machine with the smallest load possible to make sure all components are working properly. then assume regular operation.
Especially at startup. it is critical to follow the instructions found in th eprevious chapter. Continuous testing maneuvers could lead to overheating and cause irreparable damage to the jacks. ONE TEMPERATURE EXCESS IS ALL THAT IS NECESSARY TO CAUSE PREMATURE WEAR OR BREAKDOWN OF THE JACK.

ROUTINE MAINTENANCE

Jacks must be periodically inspected. depending on the level of use and work conditions. Check for losses of lubricant from the case. and when this occurs. eliminate the cause and refill the lubricant to the correct level. Carefully monitor the lubrication on the threaded spindle and check for the presence of any foreign material.

STORAGE

The jacks must be protected from deposits of dust and foreign matter during storage. Particular attention must be paid to saline or corrosive atmospheres. We also recommend that:

– The input shaft be rotated periodically to assure proper lubrication of internal parts.
– The threaded spindle and input shafts are lubricated and protected.
– When the jack is stored horizontally. special effort is made to support the threaded spindle to prevent flexing and possible distortion.

GUARANTEE

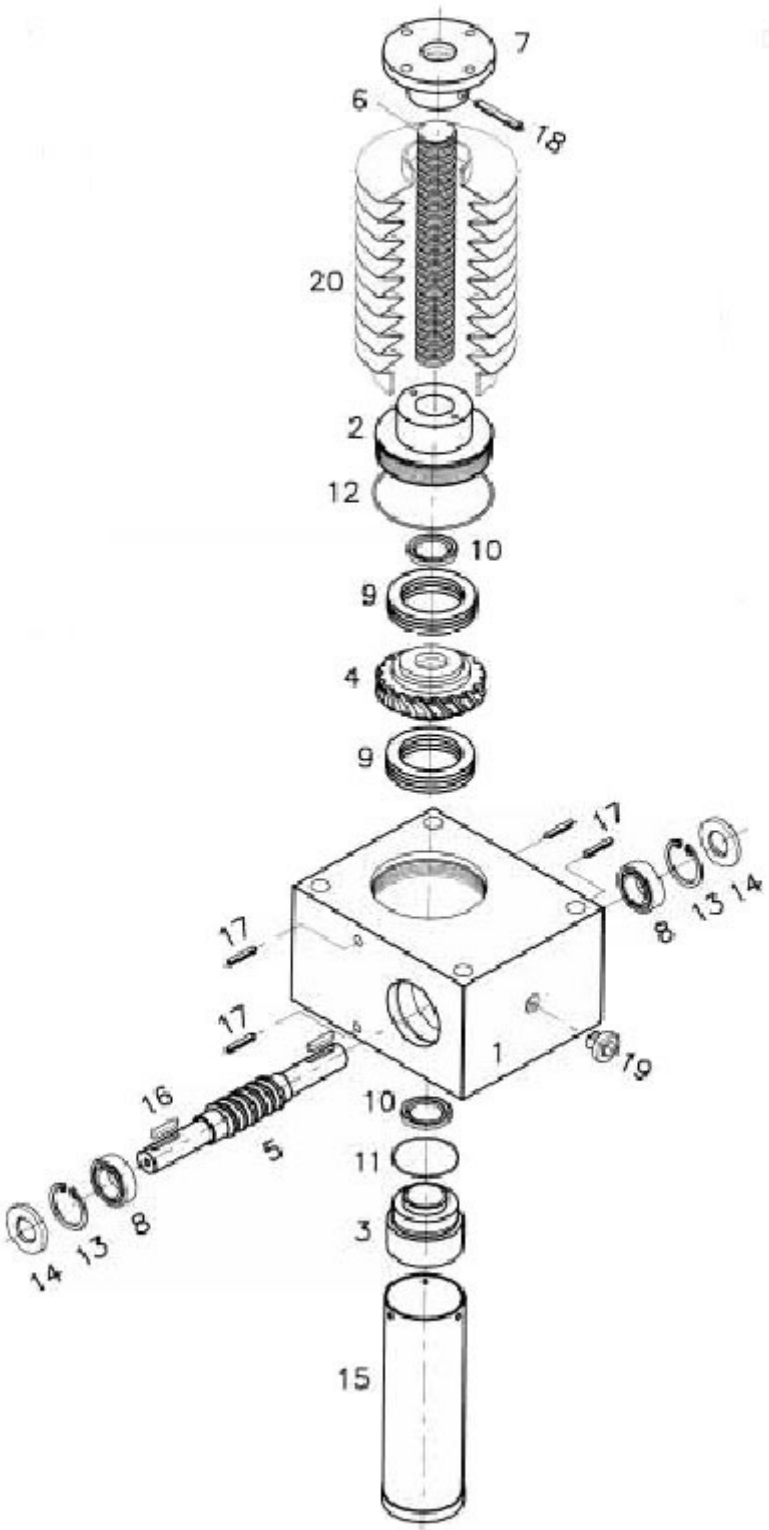
The guarantee is valid only when our instructions are followed in every detail.

SPARE PARTS

When ordering spare parts. specify: size. ratio. model. length of the threaded shaft. and type of end fitting.

"TP" MODEL

1. Case
2. Cover
3. Guide bushing
4. Worm wheel
5. Worm screw
6. Threaded spindle
7. End fitting
8. Bearings
9. Bearings
10. Lip seal
11. Holding ring
12. Holding ring
13. Circlip
14. Lip seal
15. Rigid protective sleeve
16. Key
17. Dowel
18. Fastening pin
19. Oil plug
20. Elastic protective sleeve



"TPR" MODEL

1. Case
2. Cover
3. Guide bushing
4. Worm wheel
5. Worm screw
6. Threaded spindle
7. Support nut
8. Bearings
9. Bearings
10. Holding ring
11. Holding ring
12. Holding ring
13. Circlip
14. Lip seal
15. Cap
16. Key
17. Dowel
18. Fastening pin
19. Oil plug
20. Elastic protective sleeve