

Ball screw jacks

VMP-BS / VME-BS / VMH - BS series

Installation and maintenance

VME-BS serie



VMP-BS serie



VMP-BS serie



1.4 Ball screw jacks overview

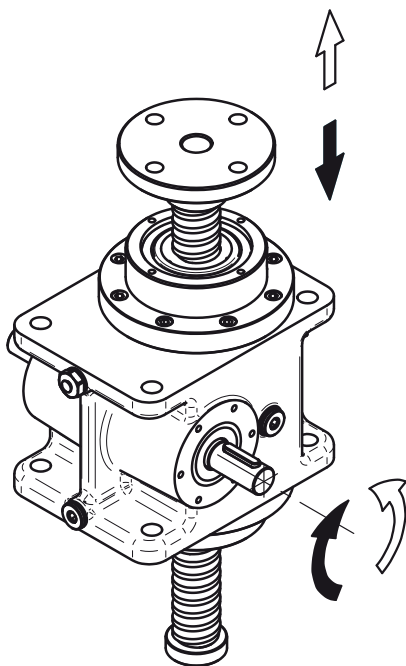
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Ball screw jacks

Models

Ball screw jacks are available in two different models:

- travelling screw (Model A)
- travelling nut (Model B)



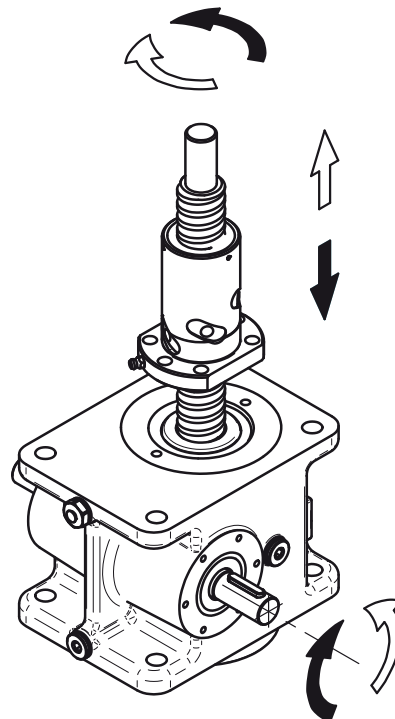
Model A - travelling screw

The ball nut is integral with the worm wheel.

The linear motion is performed by the ball screw being driven by the nut through the screw jack housing, therefore there must be enough space on both screw jack sides. In operation, the screw does not rotate and its translation is possible only if the reacting torque is applied.

Accessories:

- protective tube
- protective bellows
- safety nut
- various screw end attachments
- limit switches
- anti-turn device
- stop nut
- trunnion mount
- bronze guides



Model B - travelling nut

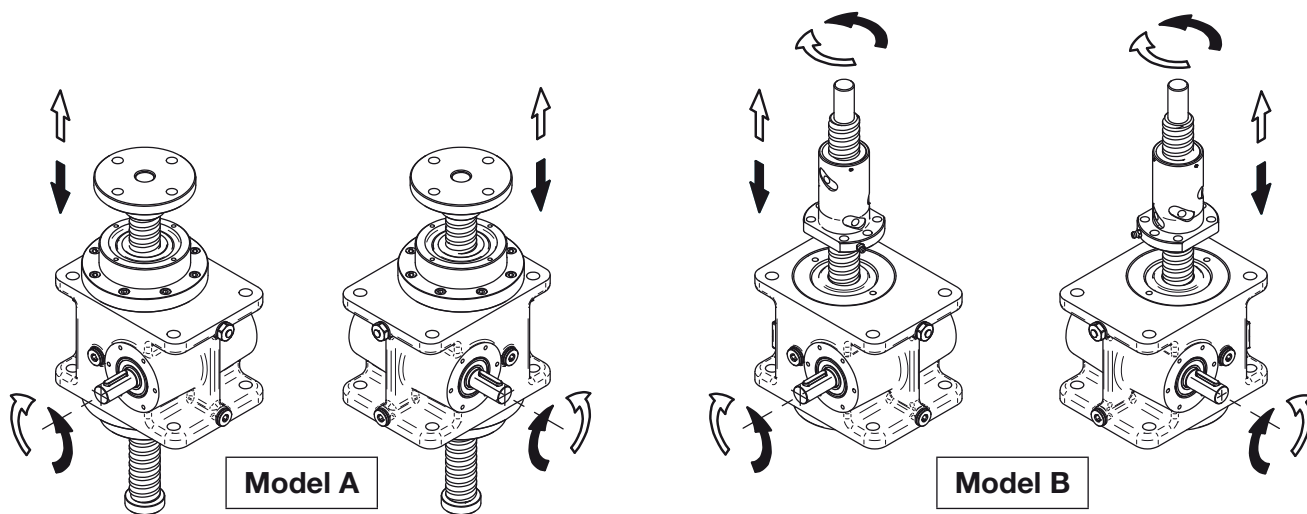
The ball screw is fixed to the worm wheel. In operation the screw rotates with the worm wheel at the same speed, driving the bronze nut up and down along the ball screw. The linear motion of the nut is possible only if the reacting torque is applied, avoiding the integral rotation with the ball screw.

Accessories:

- protective bellows
- safety nut
- nut support with pivoting pins
- nut at customer's drawing
- trunnion mount

Design – screw jacks VMP-BS Series and VME-BS Series

INPUT SHAFT ROTATION – SCREW OR NUT LIFTING DIRECTION

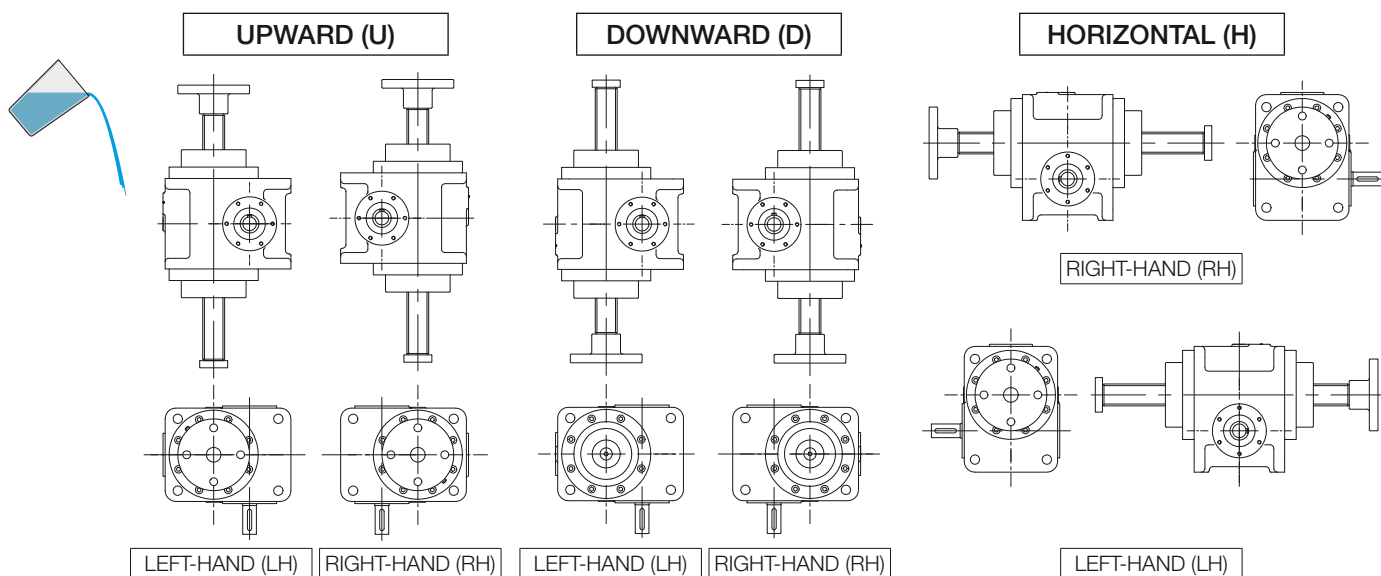


INPUT VERSIONS

Vers.1	Vers.2	Vers.3 / Vers.3 BM	Vers.4 / Vers.4 BM	Vers.5	Vers.6

- Vers.1: single input shaft
- Vers.2: double input shaft
- Vers.3 / Vers.3 BM: flange and hollow shaft for IEC/servo motor
- Vers.4 / Vers.4 BM: flange and hollow shaft for IEC/servo motor + second input shaft
- Vers.5: Vers.1 + bell housing and coupling for IEC motor
- Vers.6: Vers.2 + bell housing and coupling for IEC motor

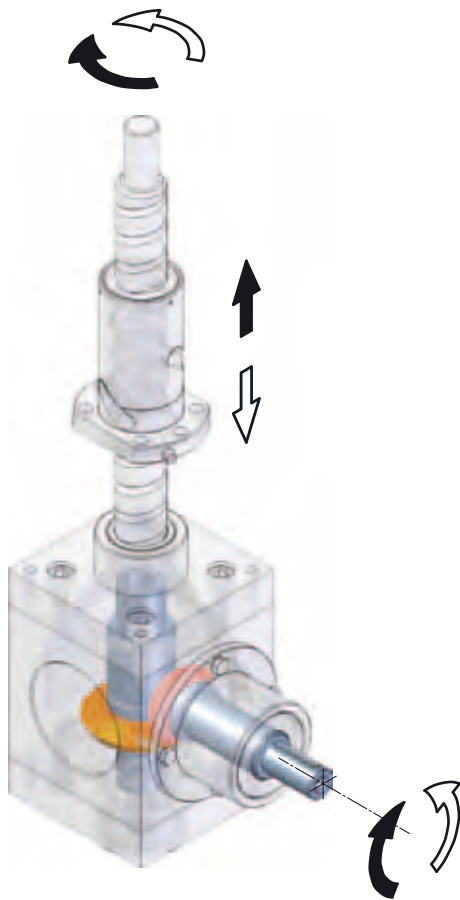
SCREW JACK MOUNTING POSITIONS



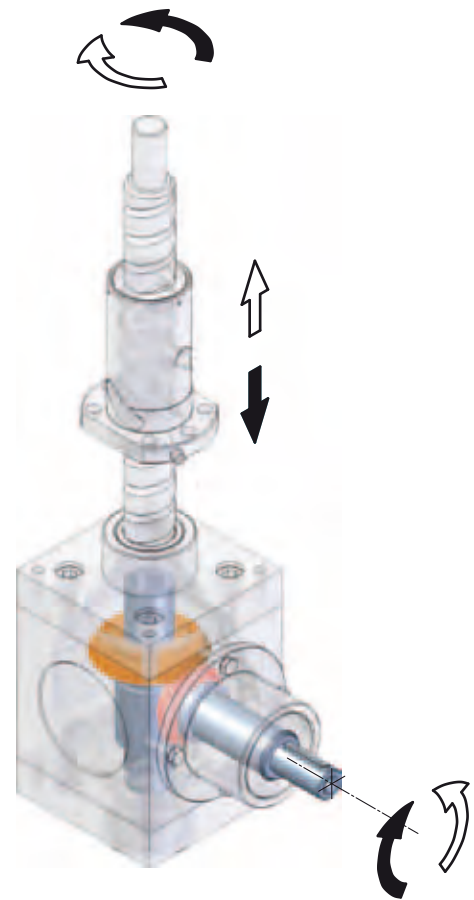
Ball screw jacks

Design – screw jacks VMH-BS Series

KINEMATICS SCHEME

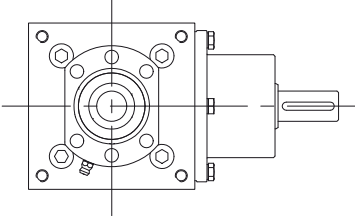
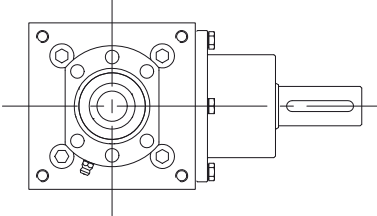
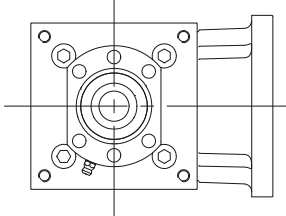


Scheme 10
Bevel gear wheel
on side opposite to nut



Scheme 20
Bevel gear wheel
on nut side

INPUT SHAFT

S	R	MF / MA
		

- Designation S: solid shaft with key, standard diameter
- Designation R: solid shaft with key, larger diameter
- Designation MF: flange and hollow shaft for IEC motor
- Designation MA: special flange for servo or hydraulic motor

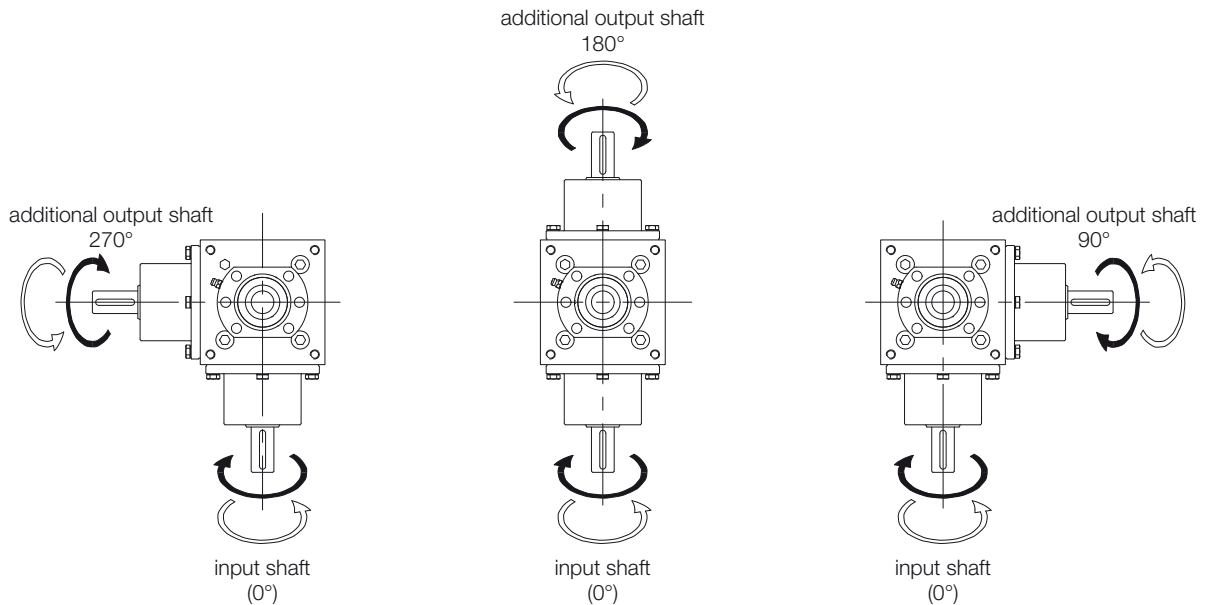
Design – screw jacks VMH-BS Series

ADDITIONAL OUTPUT SHAFT

Screw jacks HS Series can be equipped with one or more additional output shafts. Available versions are:

- S: solid shaft with key, standard diameter
- R: solid shaft with key, larger diameter

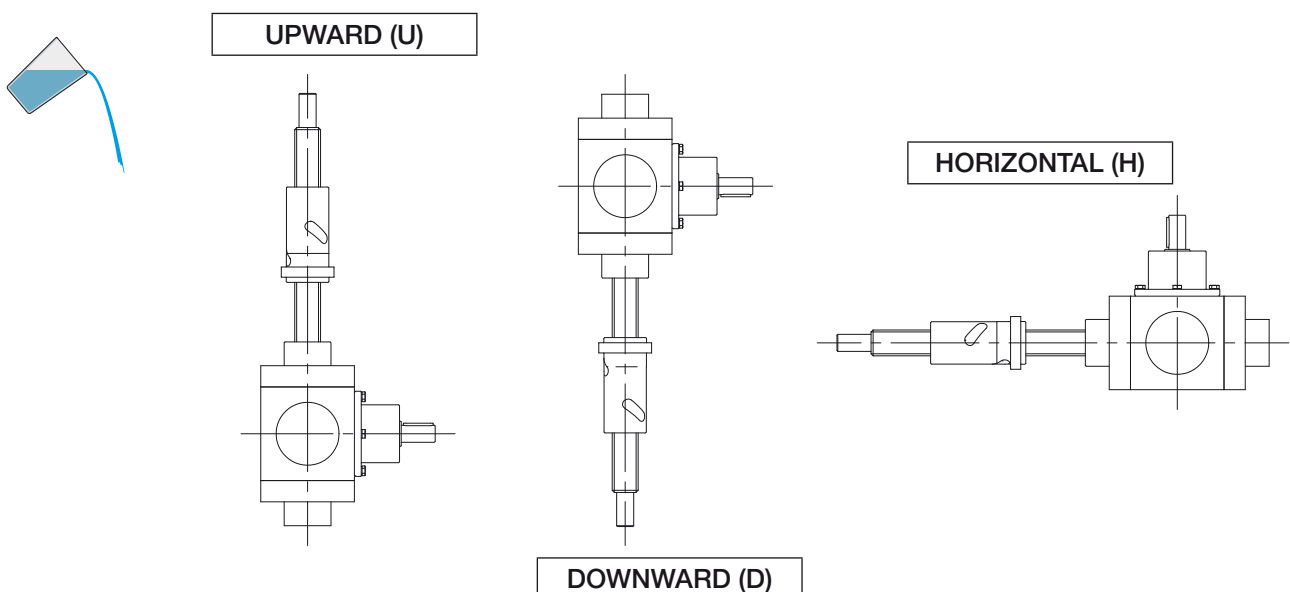
The shafts position refers to the main input shaft and is expressed by an angle with counter-clockwise positive direction and screw jack top view (ball nut side).



WARNING! The rotating speed of the additional output shaft is always the same as the input shaft rotating speed, independently from the screw jack ratio.

SCREW JACK MOUNTING POSITION

The mounting position refers to the output axis with ball screw.

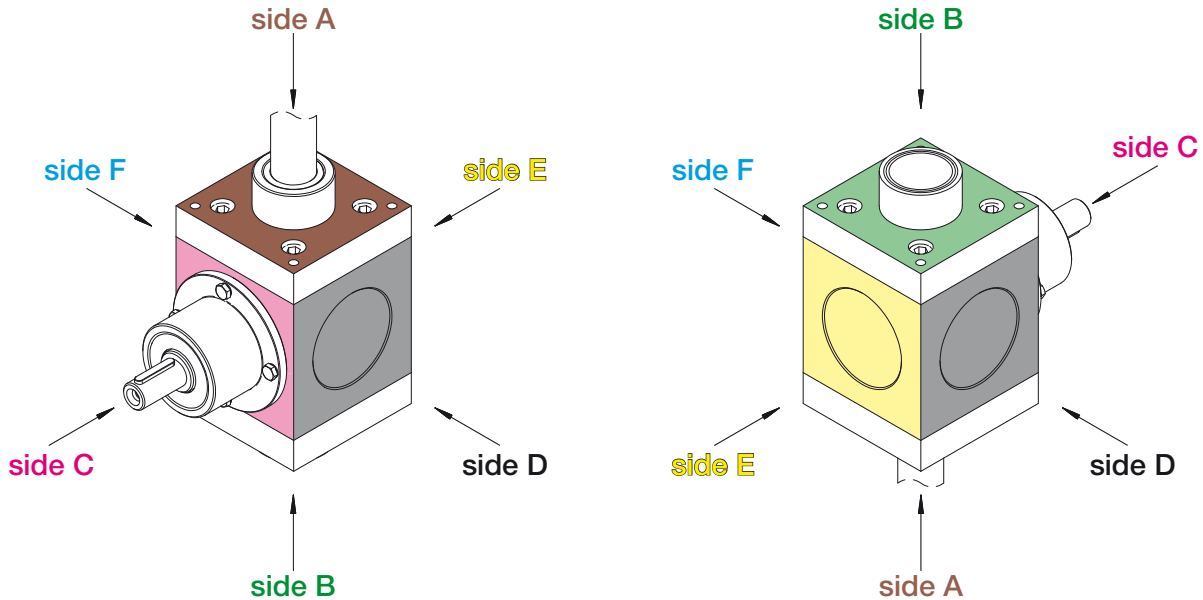


Ball screw jacks

Design – screw jacks VMH-BS Series

SCREW JACK MOUNTING SIDE

The screw jack is fixed on a surface of the supporting structure by means of proper threaded holes. It is essential to precisely define the fixing surface of the screw jack since this determines a specific position of the fixing holes.



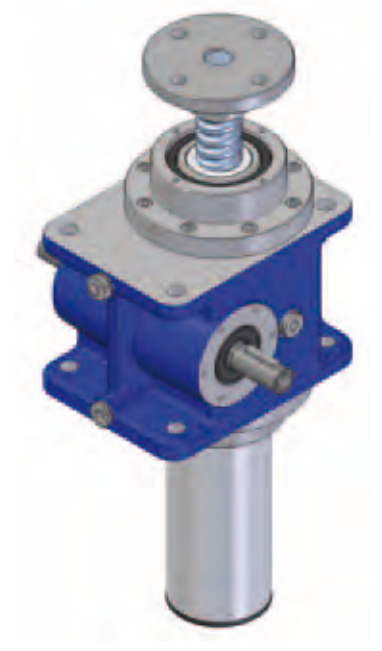
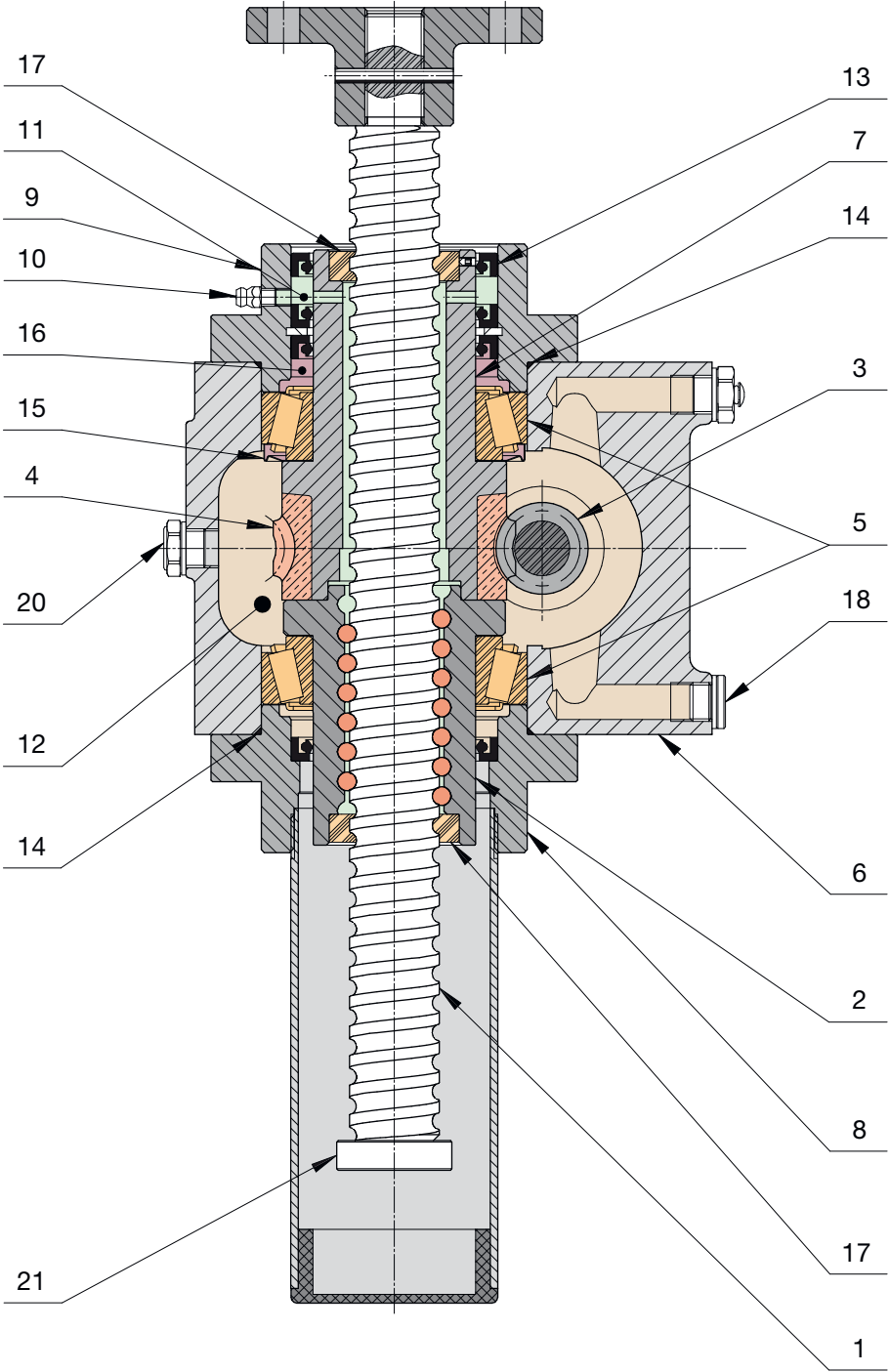
Side C is the side of the **main input** (solid shaft or IEC motor coupling).

Side A and **side B** correspond to the **ball screw** axis, on ball nut side and opposite side respectively.

Side D, **side E** and **side F** are the sides where it is possible to mount an **additional output** shaft, in version 90°, 180° or 270° respectively.

Screw Jacks with travelling ball screw (Mod.A)

VMP-BS Series - STRUCTURAL ELEMENTS



DESIGN PATENTED

Screw Jacks with travelling ball screw (Mod.A)

VMP-BS Series - STRUCTURAL ELEMENTS

- 1 - ball screw in quenched and tempered alloy steel
- 2 - ball nut in case-hardened and ground steel with frontal recirculation system that ensures higher performances compared to the radial system, because of greater number of balls which transmit the load
- 3 - worm with ground ZI involute thread profile (UNI 4760) in case-hardened steel
- 4 - bronze wormwheel with true involute profile ZI (UNI 4760)
- 5 - taper roller bearings that provide system high stiffness and allow to maximize the ball screw diameter thanks to the minimum radial size
- 6 - gear box shape which allows effective heat dissipation and 100 % duty cycle
- 7 - cast iron support of the worm wheel rim
- 8 - bottom cover with outer diameter in tolerance **g7**, it can be used for the screw jack centring
- 9 - top cover with re-lubrication system for the ball screw: through the grease nipple (10) it is possible to put in grease which goes through the lubrication pipe (11) and reaches the ball nut. The radial lubricant seals (13) and the sealing scrapers (17) ensure the seal and create a lubricant reserve for the ball nut. This system allows to keep the ball nut constantly lubricated increasing its life.
- 10 - grease nipple
- 11 - lubrication pipe
- 12 - synthetic oil lubricated worm gearbox for a better heat dissipation; this allows higher input speed, improved efficiency and a longer life
- 13 - radial lubricant seal
- 14 - O-ring as lubricant seal
- 15 - NILOS seal which allows to create a chamber for the lubricant (16) of the upper bearing, that would otherwise be sparsely lubricated because not reached by the gear oil; the seal is used only in case of vertical mounting position
- 16 - bearing lubricant chamber
- 17 - sealing scraper
- 18 - oil drain plug
- 19 - breather
- 20 - oil level plug
- 21 - ball screw stop nut

Screw Jacks with travelling ball screw (Mod.A)

Anti-turn device

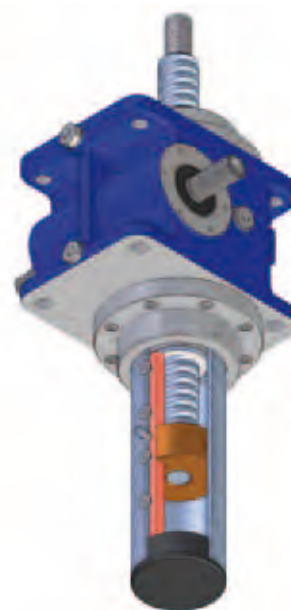
The anti-turn device is necessary when the load to be lifted is not guided and therefore the ball screw rotation is not prevented, or in case the application does not properly allow the screw reaction to permit the translation.

Functioning: a steel key is fitted along the protective tube, and a keyed bronze washer is fixed at the end of the ball screw; this prevents the screw rotation and forces the screw translation.

Up to screw jack size 50 (ball screw BS 40 × P_h) included, the anti-turn device has only one key; from size 100 (ball screw BS 50 × P_h) on, it has two keys mounted on opposite sides.

The bronze washer also acts as a stop nut against ball screw unthreading.

Ordering code: **AR**



Magnetic limit switches

Available for screw jacks size 5, 10 or 25 only. Not supplied with anti-turn device AR.

Functioning: magnetic limit switches are sensors with reed contact and are fitted with a clamp on the aluminium, or other non-magnetic metal, protective tube T. They are activated by the magnetic field generated by a magnetic ring fitted on the travelling ball screw end.

In case the screw jack is not stopped after the sensor activation, without magnetic field the sensor restores the original state. In case the limit switches are used to stop the screw jack, we recommend to provide an electric connection in order to latch the signal and prevent the screw jack from moving again in the same direction.

Screw jacks with magnetic limit switches are supplied with two sensors for the ball screw extreme positions. On request, extra switches for intermediate positions can be supplied.

The position of the sensors along the tube is adjustable.

Technical details:

Contact:	normally CLOSED (NC)	normally OPEN (NO)
Voltage range:	(3 ... 130) Vdc / (3 ... 130) Vac	
Switching capacity:	20 W / 20 VA	
Max. switching current at 25°C:	300 mA (resistive load)	
Max. inductive load:	3 W (simple coil)	—
Wires:	2 × 0.25 mm ²	
Cable length:	2 m	



Ordering code: **FCM-NC** for screw jacks with normally closed magnetic switches FCM

Ordering code: **FCM-NO** for screw jacks with normally open magnetic switches FCM

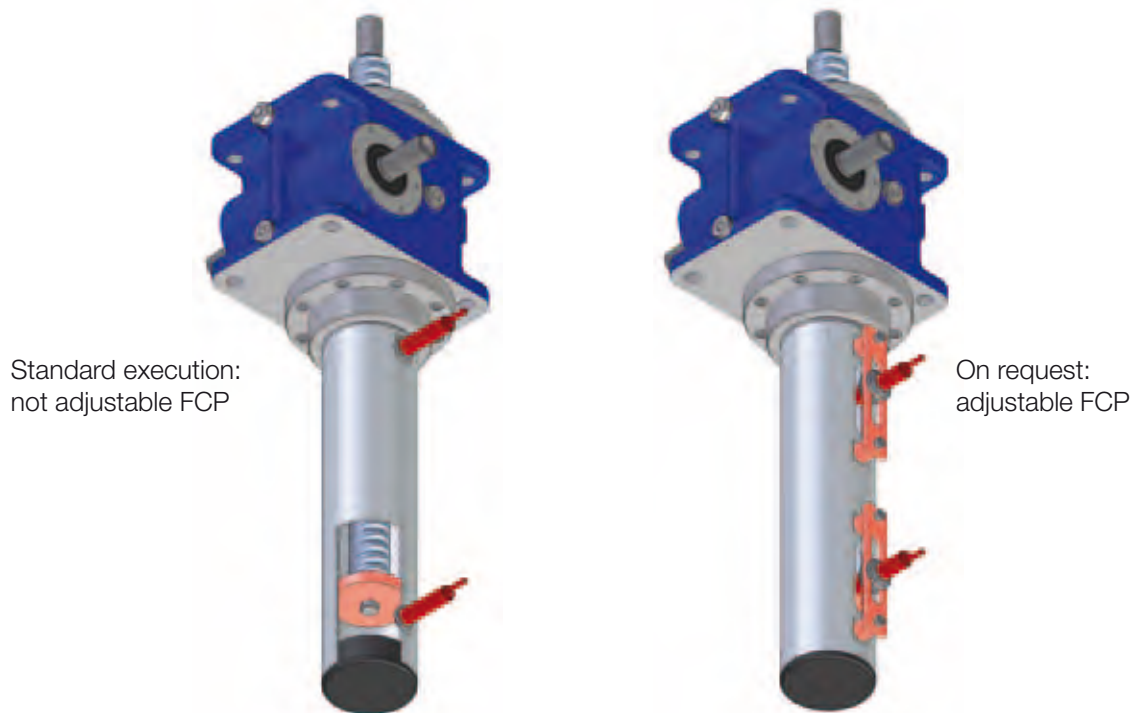
Screw Jacks with travelling ball screw (Mod.A)

Inductive proximity limit switches

Functioning: the limit switches are proximity sensors fixed on the protective tube and activated by the metallic ring placed on the ball screw end.

In case the screw jack is not stopped after the sensor activation, when the metallic ring moves away the sensor restores the original state (is deactivated). In case the limit switches are used to stop the screw jack, we recommend to provide an electric connection in order to latch the signal and to prevent the screw jack from moving again in the same direction.

Screw jacks with proximity limit switches are supplied with two sensors for the ball screw extreme positions. Extra switches for intermediate positions available on request.



By standard execution, the sensors position along the tube is not adjustable and it is not angularly fixed. On request, it can be supplied with angular position at customer's requirement.

Execution with axial adjustment of the sensors position available on request.

Technical details:

Type:	inductive, PNP
Contact:	normally CLOSED (NC)
Voltage range:	(10 ... 30) Vdc
Max. output current:	200 mA
Voltage drop (activated sensor):	< 1.8 V
Wires:	3 × 0.2 mm ²
Cable length:	2 m

Ordering code: **FCP** (standard, not adjustable)
FCPR (on request, adjustable)

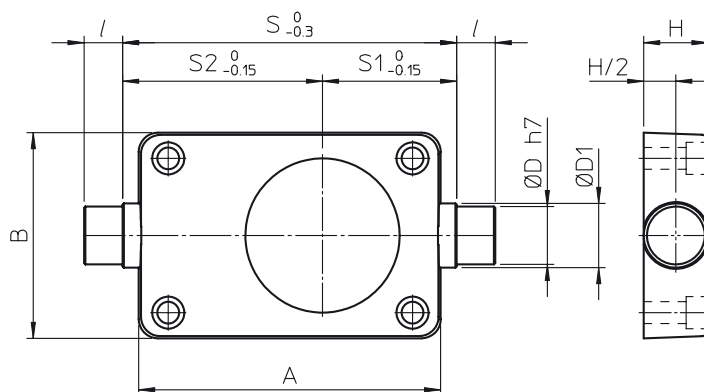
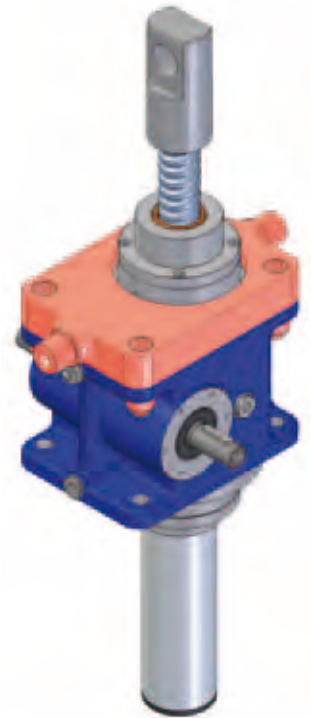
Screw Jacks with travelling ball screw (Mod.A)

Trunnion mount

The trunnion mount is bolted to either the top or the bottom of the screw jack housing and allows the screw jack pivoting around the axis defined by the trunnion mount's lateral pins.

NOTE: the attachment of the travelling ball screw must have a cylindrical hole with axes parallel to the trunnion mount pivots axis.

In applications with trunnion mount, bronze guides are absolutely necessary!



	VMP5 - BS	VMP10 - BS	VMP25 - BS	VMP50 - BS	VMP100 - BS	VMP150 - BS	VMP200 - BS	VMP350 - BS
A	134	155	199	260	301	301	360	465
B	90	120	154	185	225	225	260	350
ØD	15	20	25	45	50	50	70	80
ØD ₁	20	25	30	50	60	60	80	90
H	20	25	30	50	60	60	80	90
l	15	20	20	30	40	40	45	60
S	140	160	225	285	330	330	390	490
S ₁	55.5	64	92	117	132	132	147	206.5
S ₂	84.5	96	132	168	198	198	243	283.5
mass [kg]	1.4	2.6	5.1	14.8	23.5	23.5	45.5	81.9

Ordering code: TO (CAV side) screw jacks with TO fixed on the screw attachment side

Ordering code: TO (opposite CAV side) screw jacks with TO fixed on side opposite to the screw attachment

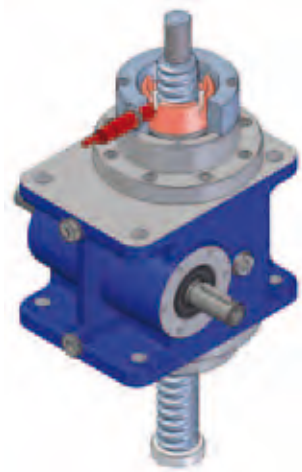
Screw Jacks with travelling ball screw (Mod.A)

Worm wheel rotation detector

Some applications require the possibility to verify if the worm wheel rotates while the worm shaft is moving in order to get information about the good condition and functioning of the worm wheel tothing.

A cylindrical element, machined in order to have a “crown” of empty and full spaces, is fixed to the worm wheel creating a phonic wheel that, while rotating, activates a corresponding proximity switches. As output of such proximity switch, activated and deactivated by the alternation of empty and full spaces, a “train” of impulses is generated which confirms the rotation of the worm wheel. On the contrary, the constant output signal of the proximity switch means the stop of the worm wheel.

The puls generator can be mounted on the screw end side or on the opposite side.



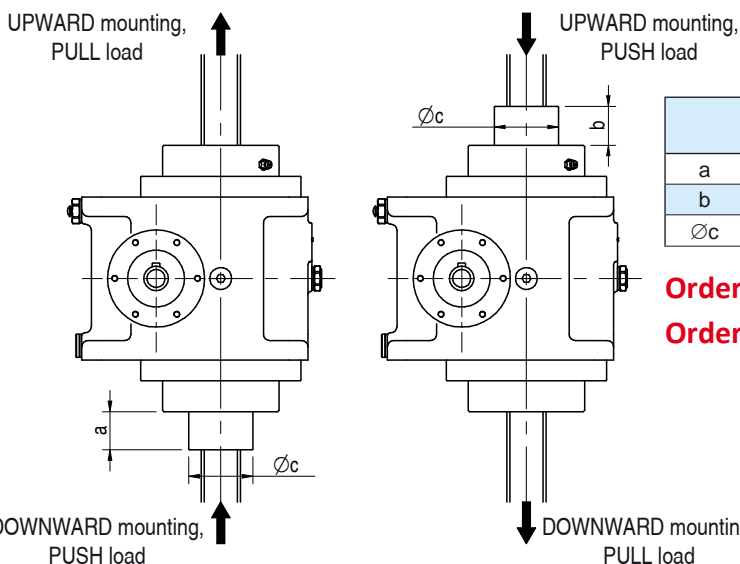
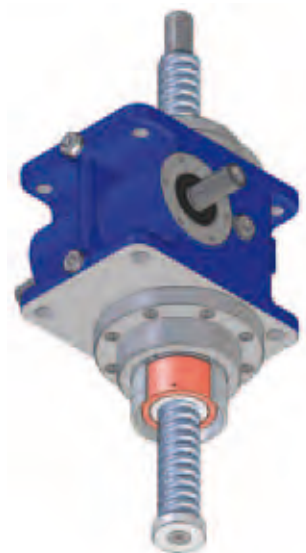
Safety nut

The safety nut is a back-up feature to prevent the load dropping in an uncontrolled manner in case of working nut balls failure. This can be caused by overload or by achieving a critical wear level.

The safety nut is an extension to the main nut and changes the screw jack overall dimensions. It works with one particular load direction only. Its position as regards the main nut is therefore conditioned by the load direction: with pull load the safety nut is on the opposite side of the screw end, with push load it is on the screw end side.

The safety nut does not have balls inside, but a helical thread that traces the ball truck on the screw. With a not worn out main nut, the thread of the nut does not touch the screw; in case the balls of the main nut should fail, the safety nut will touch the screw and sustain the load, causing a slithering between the screw and the safety nut threads. The safety nut is made in steel and therefore, in case it is activated, it is then necessary to replace both screw and main nut.

Since the safety nut is a rotating component, if the screw jack is not provided with the protective tube, a protective device is supplied as standard.



	MA 5 BS	MA 10 BS	MA 25 BS	MA 50 BS	MA 100 BS	MA 150 BS	MA 200 BS	MA 350 BS
a	3.5	18	30	40	0	18.5	0	3
b	14.5	24	30	40	18	18.5	0	18
Øc	28	40	50	63	75	90	105	150

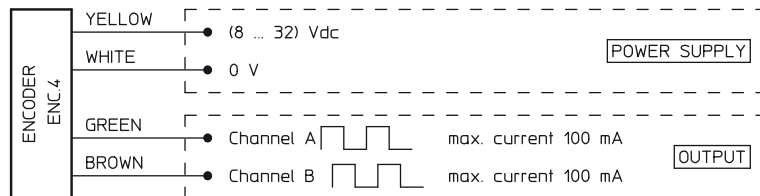
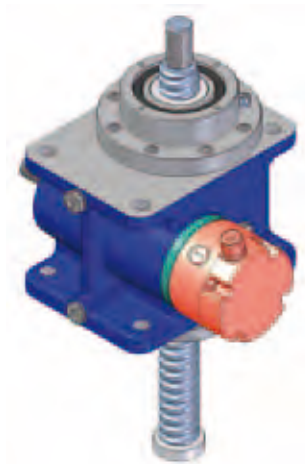
Ordering code: ESA push safety nut for push load

Ordering code: ESA pull safety nut for pull load

Screw Jacks with travelling ball screw (Mod.A)

ROTARY ENCODER Code ENC.4

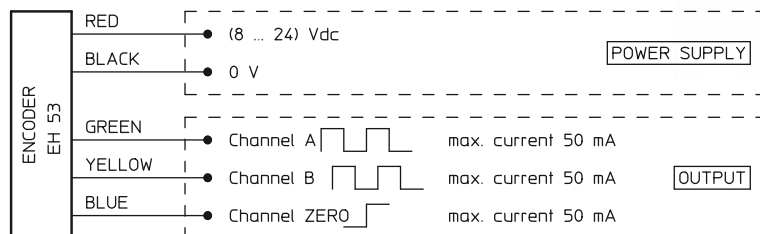
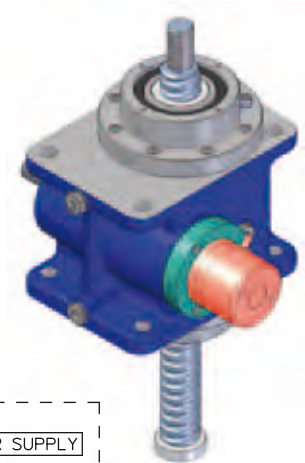
Hall-effect encoder, incremental, bi-directional
 Resolution: 4 pulses per revolution
 Output: PUSH-PULL
 2 channels (A and B, phase difference 90°)
 Input voltage: (8 ... 32) Vdc
 Max. commutable current (I_{out}): 100 mA
 Max output voltage drop:
 with load connected to 0 and $I_{out} = 100$ mA: 4.6 V
 with load connected to + V and $I_{out} = 100$ mA: 2 V
 Protection:
 against short circuit
 against input polarity inversion
 against any incorrect output connection
 Cable length: 1.3 m
 Protection: IP 55



Ordering code: **ENC.4**

ROTARY ENCODER Code EH53

Optical encoder, incremental, bi-directional
 Resolution: 100 or 500 pulses per revolution
 Output: PUSH-PULL
 2 channels (A and B, phase difference 90°)
 channel ZERO
 Input voltage: (8 ... 24) Vcc
 No-load current: 100 mA
 Max. commutable current: 50 mA
 Cable length: 0.5 m
 Protection: IP 54



Ordering code: **EH 53**

Fixing attachments in stainless steel

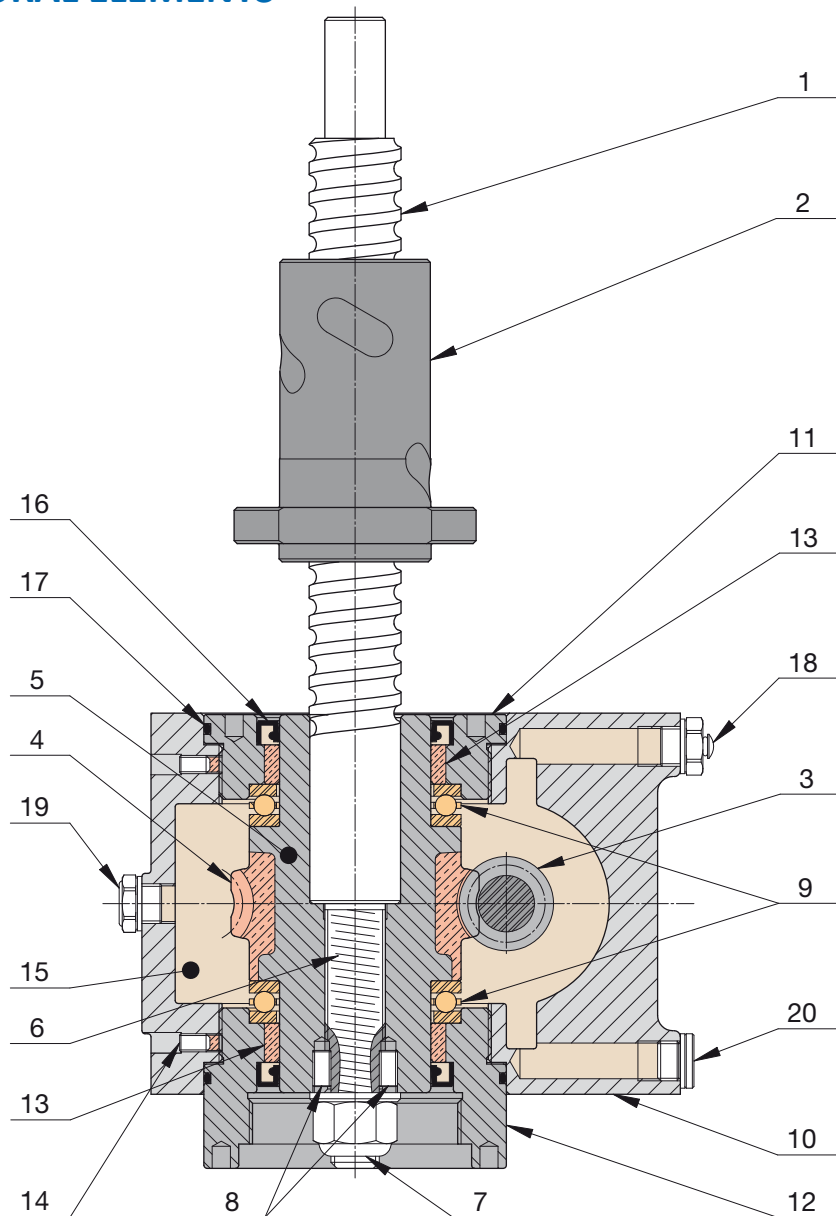
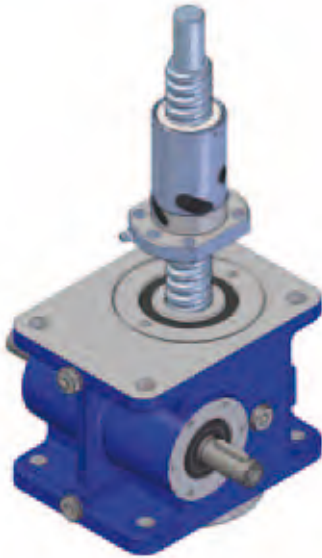
For applications in particular environment conditions or in food industry, on request screw jacks can be supplied with end attachment in stainless steel. Available standard steels are AISI 303, AISI 304, on request AISI 316.

Ordering code: P inox stainless steel flange end P, for screw jacks Mod.A

Ordering code: CAV inox stainless steel rod end TF, for screw jacks Mod.A

Screw jacks with travelling ball nut (Mod.B)

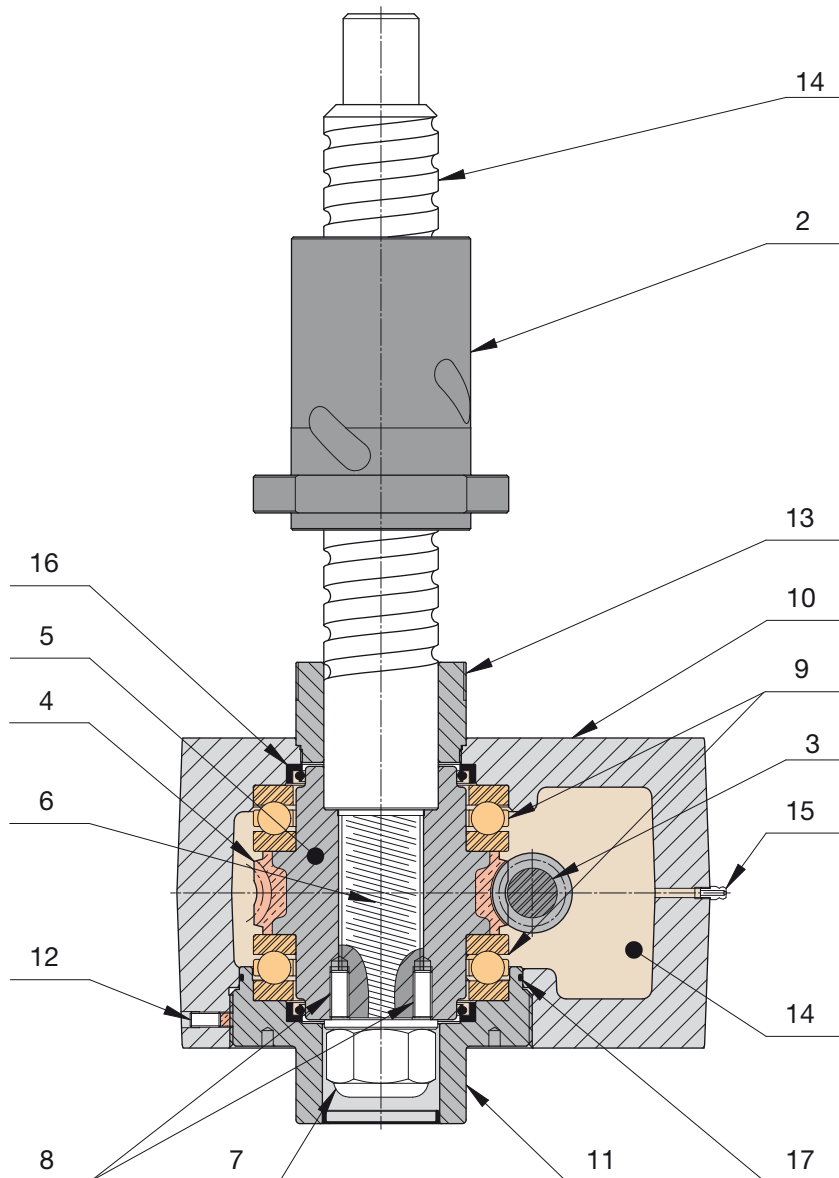
VMP-BS Series - STRUCTURAL ELEMENTS



- | | |
|--|---|
| 1 - ball screw in quenched and tempered alloy steel | 11 - low cover |
| 2 - ball nut in case-hardened steel with flange according to DIN 69051 (available also with cylindrical flange), with grease nipple and end seals | 12 - raised cover; may also be used as a centring diameter |
| 3 - worm with ground ZI involute thread profile (UNI 4760) in case-hardened steel | 13 - wormwheel radial bronze guide for higher stiffness and better efficiency |
| 4 - bronze worm wheel with true involute profile ZI (UNI 4760) | 14 - grub screw to prevent the threaded cover unscrewing |
| 5 - cast iron support of the bronze worm wheel rim (size 5 and 10: entire wormwheel in bronze) | 15 - long-life synthetic oil lubricated worm gearbox |
| 6 - ball screw fixed to the worm wheel through the cylindrical centring part and metric thread LEFT-HAND for PUSH load or RIGHT-HAND for PULL load | 16 - radial lubricant seal |
| 7 - lock nut with opposite metric thread direction to ensure a safe ball screw fixing | 17 - O-ring |
| 8 - ball screw – wormwheel pins against unscrewing | 18 - breather |
| 9 - thrust ball bearing for high load capacity | 19 - oil level plug |
| 10- gear box | 20 - oil drain plug |

Screw jacks with travelling ball nut (Mod.B)

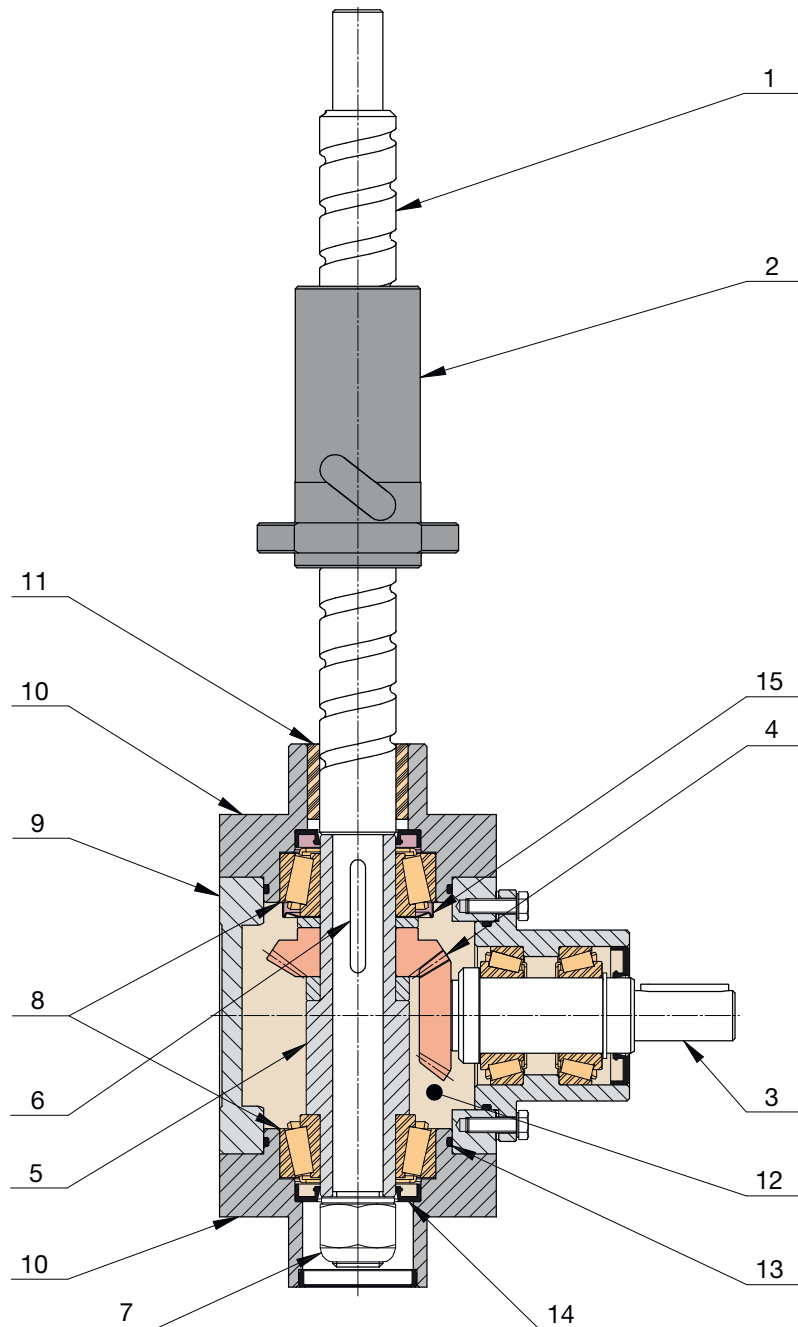
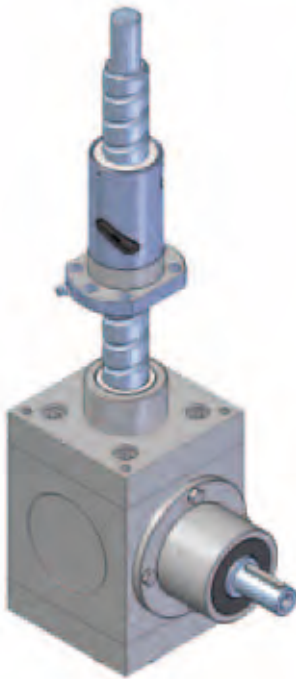
VME - BS Series - STRUCTURAL ELEMENTS



- | | |
|--|--|
| 1 - ball screw in quenched and tempered alloy steel | 10 - gear box |
| 2 - ball nut in case-hardened steel with flange according to DIN 69051 (available also with cylindrical flange), with grease nipple and end seals | 11 - threaded cover; may also be used as a centring diameter |
| 3 - worm with ground ZI involute thread profile (UNI 4760) in case-hardened steel | 12 - grub screw to prevent the threaded cover unscrewing |
| 4 - bronze worm wheel with true involute profile ZI (UNI 4760) | 13 - guide bush for ball screw, may be used as a spigot diameter |
| 5 - cast iron support of the bronze worm wheel rim (size 5 ... 100: entire wormwheel in bronze) | 14 - long-life synthetic grease lubricated worm gearbox |
| 6 - ball screw fixed to the worm wheel through the cylindrical centring part and metric thread LEFT-HAND for PUSH load or RIGHT-HAND for PULL load | 15 - grease nipple |
| 7 - lock nut with opposite metric thread direction to ensure a safe ball screw fixing | 16 - radial lubricant seal |
| 8 - ball screw – wormwheel pins against unscrewing | 17 - O-ring |
| 9 - thrust ball bearing for high load capacity | |

Screw jacks with travelling ball nut (Mod.B)

VMH-BS Series - STRUCTURAL ELEMENTS



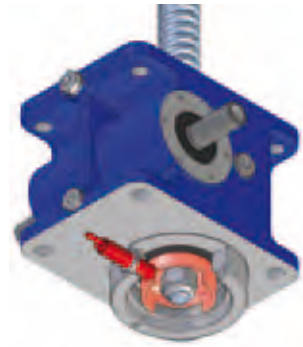
- 1 - ball screw in quenched and tempered alloy steel
- 2 - ball nut in case-hardened steel with flange according to DIN 69051 (available also with cylindrical flange), with grease nipple and end seals
- 3 - solid input shaft with key (or flange and hollow shaft for motor coupling)
- 4 - bevel gear in case-hardened and tempered steel
- 5 - output hollow shaft in hardened and tempered steel
- 6 - key to transmit the torque to the output shaft
- 7 - key to transmit the torque to the output shaft
- 8 - thrust ball bearing for high load capacity
- 9 - gear box
- 10- square covers with centring diameter for screw jack positioning
- 11 - plastic guide bush
- 12 - long-life synthetic oil lubricated worm gearbox and bearings
- 13 - O-ring
- 14 - radial lubricant seal
- 15 - NILOS seal which allows to create a chamber for the lubricant of the upper bearing; used only in case of vertical mounting position

Worm wheel rotation detector

Available for screw jacks MA BS and SJ BS Series only (not for HS Series).

Some applications require the possibility to verify if the worm wheel rotates while the worm shaft is moving in order to get information about the good condition and functioning of the worm wheel toothing.

A cylindrical element, machined in order to have a “crown” of empty and full spaces, is fixed to the worm wheel creating a phonic wheel that, while rotating, activates a corresponding proximity switches. As output of such proximity switch, activated and deactivated by the alternation of empty and full spaces, a “train” of impulses is generated which confirms the rotation of the worm wheel. On the contrary, the constant output signal of the proximity switch means the stop of the worm wheel.



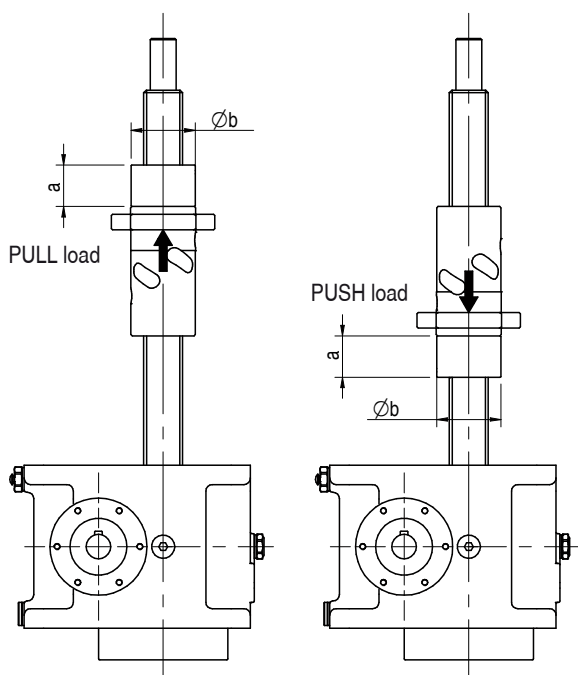
Safety nut

The safety nut is a back-up feature to prevent the load dropping in an uncontrolled manner in case of working nut balls failure. This can be caused by overload or by achieving a critical wear level.

The safety nut is an extension to the main nut and changes the screw jack overall dimensions. It works with one particular load direction only. Its position as regards the main nut is therefore conditioned by the load direction.

The safety nut does not have balls inside, but a thread helix that traces the ball truck on the screw. With a not worn out main nut, the thread of the nut does not touch the screw; in case the balls of the main nut should fail, the safety nut will touch the screw and sustain the load, causing a slithering between the screw and the safety nut threads. The safety nut is made in steel and therefore, in case it is activated, it is then necessary to replace both screw and main nut.

The safety nut is available for all screw jack series (MA BS, SJ BS, HS).



Ball screw diameter	16	20	25	32	40
a	16	20	25	32	40
Øb	28	36	40	50	63

Ball screw diameter	50	63	80	100	120
a	20	20	20	20	20
Øb	75	90	105	150	190

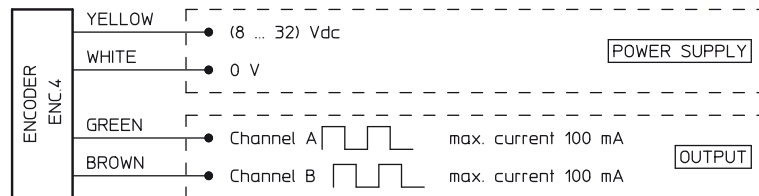
Ordering code: ESB push safety nut for PUSH load

Ordering code: ESB pull safety nut for PULL load

Screw jacks with travelling ball nut (Mod.B)

ROTARY ENCODER Code ENC.4

Hall-effect encoder, incremental, bi-directional
 Resolution: 4 pulses per revolution
 Output: PUSH-PULL
 2 channels (A and B, phase difference 90°)
 Input voltage: (8 ... 32) Vdc
 Max. commutable current (I_{out}): 100 mA
 Max output voltage drop:
 with load connected to 0 and $I_{out} = 100$ mA: 4.6 V
 with load connected to + V and $I_{out} = 100$ mA: 2 V
 Protection:
 against short circuit
 against input polarity inversion
 against any incorrect output connection
 Cable length: 1.3 m
 Protection: IP 55

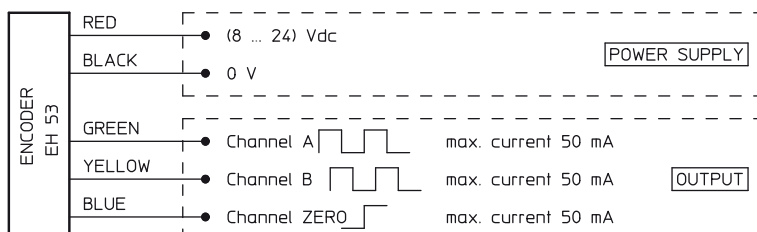


The encoder ENC.4 is available for all screw jack series (MA BS, SJ BS, HS).

Ordering code: **ENC.4**

ROTARY ENCODER Code EH53

Optical encoder, incremental, bi-directional
 Resolution: 100 or 500 pulses per revolution
 Output: PUSH-PULL
 2 channels (A and B, phase difference 90°)
 channel ZERO
 Input voltage: (8 ... 24) Vcc
 No-load current: 100 mA
 Max. commutable current: 50 mA
 Cable length: 0.5 m
 Protection: IP 54



The encoder ENC.4 is available for all screw jack series (MA BS, SJ BS, HS).

Ordering code: **EH 53**

Installation – Maintenance – Lubrication

Transport and handling

Screw jacks with mounted ball screw and all accessories can be often difficult to handle because of their overall dimensions. Therefore, it is recommended to handle the products with care during transport and handling to avoid damages on mechanical parts and/or fittings and also to prevent any risk for the person-nel in charge of such operations. Screw jack supporting points should be previously identified and used during transport or to raise it by handling. In case of doubts, please contact us for support to prevent any possible damage!

Storage

During storage, screw jacks shall be protected against atmospheric agents thus to prevent dust or other contaminants to settle on ball screw and other moving parts.

In case of long storage periods, for example more than 6 months, it is necessary to move the input shafts to avoid damaging of the ring seals. Furthermore, keep all not painted parts properly lubricated to prevent oxidation.

Installation

The screw jack must be installed to work with push or pull axial load only, avoiding lateral and radial load. The correct perpendicularity between ball screw axis and screw jack fixing side shall be checked carefully.

The installation of many screw jacks for synchronized lifting movement requires particular attention on two different factors:

- alignment of load support points: screw ends in case of travelling ball screw; bronze nut in case of travelling nut;
- use of connecting shafts and couplings with high torsional stiffness, to assure a perfect synchronism of all lifting points.

Commissioning and use

Before screw jack commissioning and activation, the following checks must be carried out:

- input shaft turning direction and related ball screw or nut linear motion direction;
- stroke end limit switches position cannot exceed the given limits;
- proper connection of the mechanical transmission and electric motor (rotating direction and motor supply voltage).

Lubrication and maintenance

Screw jacks are supplied with lubricant type and quantity as indicated in the lubricants table. For the proper lubrication of all screw jack components, please always specify in your order the screw jack mounting position.

Scheduled maintenance shall be carried out on screw jacks depending on the relevant use and environment conditions.

Ball nuts must be periodically greased every 1000 working hours, with lubricant quantity and type as stated in the table or an equivalent one. For this operation it is recommended to use the specific re-lubrication systems, consisting of grease nipples placed on the cover in case of screw jack *Mod.A* (travelling screw), or directly on the nut in case of *Mod.B* (travelling nut).

Worm gears are long-life lubricated. Additional lubrication can be done only in case of verified lubricant leakage. In such a case, use the lubricant type indicated in the table or an equivalent one.

General information

4.1 Installation – Maintenance – Lubrication

Lubricants for **screw jacks Model A (travelling screw)**:

SCREW JACK	GEARBOX		NUT	
VMP5-BS	grease: AGIP Grease SLL 00	0.07 kg	grease: LUBCON Thermoplex ALN 1001	10 g
VMP10-BS		0.14 kg		15 g
VMP25-BS	oil: AGIP BLASIA S 220	0.35 litre		25 g
VMP50-BS		0.75 litre		50 g
VMP100-BS		1.5 litre		200 g
VMP150-BS		1.5 litre		200 g
VMP200-BS		2.3 litre		250 g
VMP350-BS		4 litre		400 g

Lubricants for screw jacks Model B (travelling nut):

SCREW JACK	GEARBOX		NUT
VMP5-BS	grease: AGIP Grease SLL 00	0.07 kg	grease: LUBCON Thermoplex ALN 1001 ⁽¹⁾
VMP10-BS		0.14 kg	
VMP25-BS	oil: AGIP BLASIA S 220	0.35 litre	
VMP50-BS		0.75 litre	
VMP80-BS		0.75 litre	
VMP150-BS		1.5 litre	
VMP200-BS		2.3 litre	
VMP350-BS		4 litre	
VME5-BS	grease: AGIP Grease SM2	0.07 kg	
VME10-BS		0.14 kg	
VME25-BS		0.23 kg	
VME50-BS	grease: AGIP Grease SLL 00	0.6 kg	
VME100-BS		0.5 kg	
VME150-BS		1.5 kg	
VME200-BS		2 kg	
VME250-BS		2 kg	
VME300-BS		2 kg	
VME400-BS		3 kg	
VMH10-BS		oil: AGIP BLASIA S 220	
VMH25-BS	0.45 litre		
VMH50-BS	0.55 litre		
VMH100-BS	1.1 litre		
VMH150-BS	2.8 litre		
VMH200-BS	5.5 litre		

⁽¹⁾ - for the lubricant quantity necessary for each type of nut, please refer to the table on page 21

4.1 Installation – Maintenance – Lubrication

Lubricants for **nuts of screw jacks Model B (travelling nut)**:

Ball screw $BS\ d_0 \times P_h$	Nut code	number of circuits <i>i</i>	Lubricant quantity	
			mass [g]	volume [cm ³]
BS 16 × 5	SFN-_.16.05.3R	3	2	
BS 16 × 10	SFN-_.16.10.3R	3	2	
BS 16 × 16	SFN-_.16.16.2R-2	2	1	
BS 20 × 5	SFN-_.20.05.3R	3	2	
	SFN-_.20.05.5R	5	3	
BS 20 × 10	SFN-_.20.10.3R	3	3	
BS 20 × 20	SFN-_.20.20.2R-2	2	2	
BS 25 × 5	SFN-_.25.05.3R	3	3	
BS 25 × 10	SFN-_.25.10.3R	3	4	
BS 25 × 25	SFN-_.25.25.2R-2	2	2	
BS 32 × 5	SFN-_.32.05.4R	4	4	
BS 32 × 10	SFN-_.32.10.3R	3	11	
	SFN-_.32.10.4R	4	12	
	SFN-_.32.10.5R	5	13	
BS 32 × 20	SFN-_.32.20.3R	3	12	
BS 32 × 32	SFN-_.32.32.2R-2	2	6	
BS 40 × 10	SFN-_.40.10.5R	5	17	
BS 40 × 20	SFN-_.40.20.3R	3	16	
BS 40 × 40	SFN-_.40.40.2R-2	2	9	
BS 50 × 10	SFN-_.50.10.5R	5	26	
BS 50 × 20	SFN-_.50.20.4R	4	27	
BS 63 × 10	SFN-_.63.10.5R	5	34	
BS 63 × 20	SFN-_.63.20.4R	4	60	
BS 80 × 10	SFN-_.80.10.6R	6	48	
BS 80 × 16	SFN-_.80.16.5R	5	81	
BS 80 × 20	SFN-_.80.20.5R-F	5	56	
BS 80 × 20	SFN-_.80.20.4R	4	115	
BS 100 × 16	SFN-_.100.16.5R	5	110	
BS 100 × 20	SFN-_.100.20.5R	5	170	
BS 120 × 20	SFN-_.120.20.7R	7	370	



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