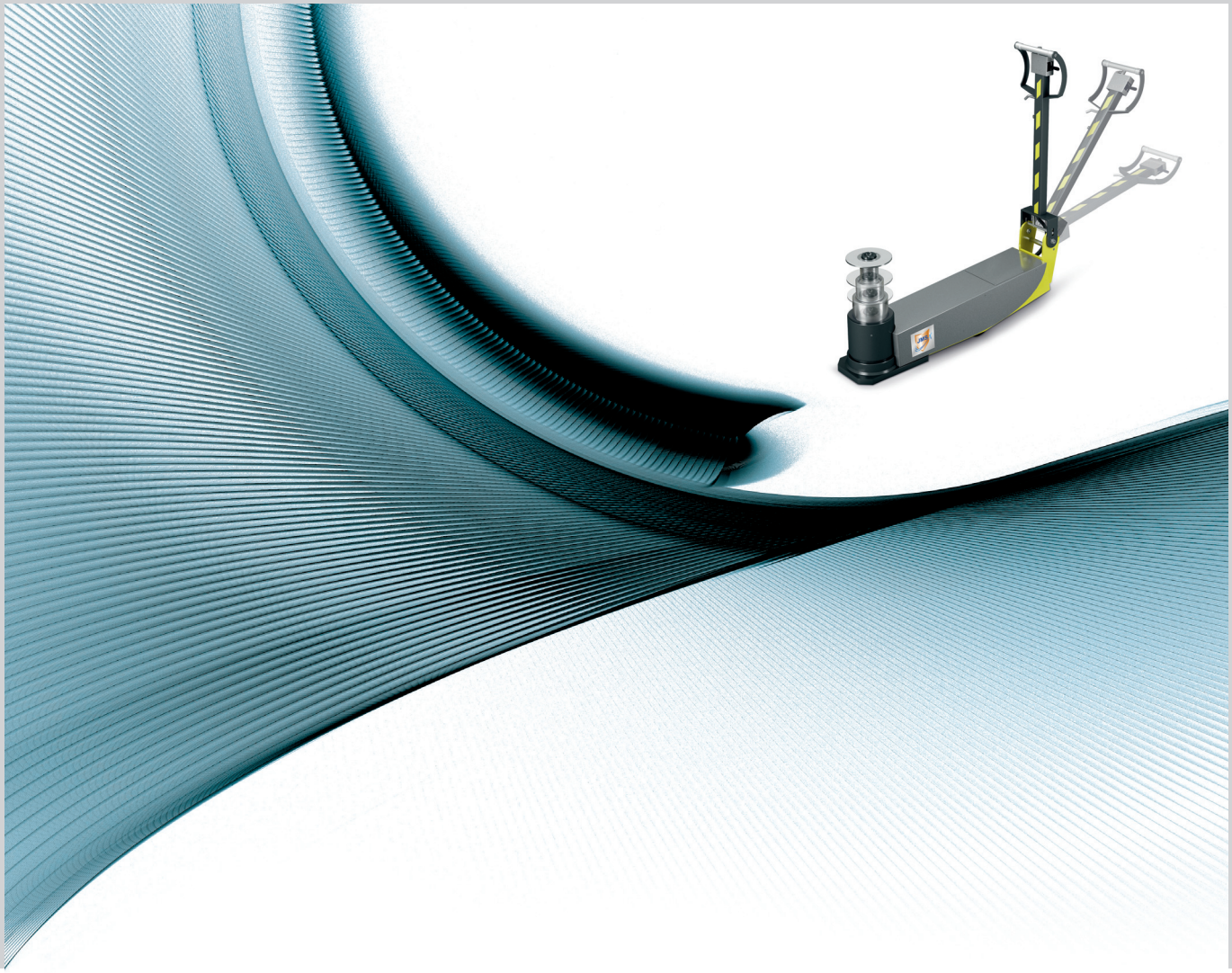

J M S . T H E N E W F L E X I B I L I T Y I N G S E .

Operating Manual

EC DECLARATION OF CONFORMITY

VAATIMUSTENMUKAISUUSVAKUUTUS. FIN
Me, JMS AG osoite Rainer-Haungs-Strasse 42, 77933 Lahr, GERMANY vakuutamme yksinomaan omalla vastuullamme,että seuraavat tuotteet, joihin tämä vakuutus liittyy, ovat seuraavien direktiivien vaatimusten mukaisia: 2006/42/EC, EN 1494: 2009, EN 1915-1: 2009, EN 1915-2: 2009, EN 12312-19: 2009.

DECLARATION DE CONFORMITE F
Nous, JMS AG adresse: Rainer-Haungs-Strasse 42, 77933 Lahr, GERMANY déclarons sous notre seule responsabilité que les produits auxquels se réfère cette déclaration sont conformes aux dispositions des Directives: 2006/42/EC, EN 1494: 2009, EN 1915-1: 2009, EN 1915-2: 2009, EN 12312-19: 2009.

DECLARACIÒN DE CONFORMIDAD E
JMS AG direcciòn: Rainer-Haungs-Strasse 42, 77933 Lahr, GERMANY declaramos bajo nuestra exclusiva responsabilidadla conformidad de los productos a los que refiereesta declaración, con las disposiciones de Directiva: 2006/42/EC, EN 1494: 2009, EN 1915-1: 2009, EN 1915-2: 2009, EN 12312-19: 2009.

ERKLÆRING OM OVERENSSTEMMELSE N
Vi, JMS AG adresse: Rainer-Haungs-Strasse 42, 77933 Lahr, GERMANY erklærer på eget ansvar, at følgende produkter som dek kes av denne erklæringen, er i overens stemmelse med bestemmelsene i Direktiv: 2006/42/EC, EN 1494: 2009, EN 1915-1: 2009, EN 1915-2: 2009, EN 12312-19: 2009.

DECLARATION OF CONFORMITY GB
We, JMS AG address: Rainer-Haungs-Strasse 42, 77933 Lahr, GERMANY declare under our sole responsibility that the following producs to which this declaration relates conform with the provisions of Directives: 2006/42/EC, EN 1494: 2009, EN 1915-1: 2009, EN 1915-2: 2009, EN 12312-19: 2009.

VERKLARING VAN OVEREENKOMST NL
Wij, JMS AG adres: Rainer-Haungs-Strasse 42, 77933 Lahr, GERMANY verklaren geheel onder eigen verantwoordelij kheid dat de volgende produkten, waaropdeze verklaring betrekking heeft in overeenstemming zijn met de bepalingen van Richtlijn: 2006/42/EC, EN 1494: 2009, EN 1915-1: 2009, EN 1915-2: 2009, EN 12312-19: 2009.

DECLARAÇÁO DE CONFORMIDADE. PL
Nós: JMS AG endereço: Rainer-Haungs-Strasse 42, 77933 Lahr, GERMANY declaramos, sob nossa única responsabilidade, que os seguintes produtos, incluídos nesta declaração estão em conformidade com o dispostona Directiva: 2006/42/EC, EN 1494: 2009, EN 1915-1: 2009, EN 1915-2: 2009, EN 12312-19: 2009.

ÖVERENSSTEMMELSESERKLÆRING DK
Vi, JMS AG adresse: Rainer-Haungs-Strasse 42, 77933 Lahr, GERMANY erklærer på eget ansvar, at følgende produkter som er omfattet af denne erklæring, er i overens stemmelse med bestemmelserne i Direktiv: 2006/42/EC, EN 1494: 2009, EN 1915-1: 2009, EN 1915-2: 2009, EN 12312-19: 2009.

ÜBEREINSTIMMUNGSERKLÄRUNG. D
Wir, die JMS AG, Anschrift: Rainer-Haungs-Strasse 42, 77933 Lahr, GERMANY erklären auf eigene Verantwortung, daß folgende Produkte, auf die sich diese Erklärung bezieht, mit den Bedingungen der Direktiven 2006/42/EG, EN 1494: 2009, EN 1915-1: 2009, EN 1915-2: 2009, EN 12312-19: 2009 übereinstimmen.

DICHIARAZIONE DI CONFORMITÀ. I
Noi, JMS AG Indirizzo: Rainer-Haungs-Strasse 42, 77933 Lahr, GERMANY dichiariamo sotto la nostra esclusiva responsabilità che i prodotti ai quali questa dichiarazione si riferisce sono conformi a quanto previsto dalle Direttive: 2006/42/EC, EN 1494: 2009, EN 1915-1: 2009, EN 1915-2: 2009, EN 12312-19: 2009.

FÖRSÄKRAN OM ÖVERESSTÄMMELSE S
Vi, JMS AG adress: Rainer-Haungs-Strasse 42, 77933 Lahr, GERMANY försäkrar under eget ansvar att följande produkter som omfattas av denna försäkran är i överensstämmelse med villkoren i direktiv: 2006/42/EC, EN 1494: 2009, EN 1915-1: 2009, EN 1915-2: 2009, EN 12312-19: 2009.

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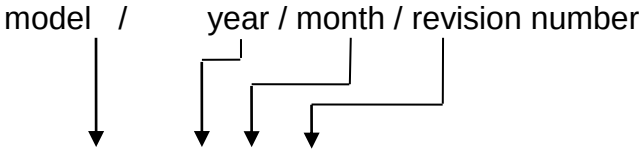
J-AXLE90A, J-AXLE90AHPA

JMS AG
Rainer-Haungs-Strasse 42
77933 Lahr/Germany
Tel. +49-7821-99469-0
Fax: +49-7821-99468100
sales@jms.aero

Matthias Korward
Chief Operating Officer, JMS AG

Record of Revisions

Rev. No.	Chapter	Revised Pages	Date	Inserted By	Note
01	-	-	03.2011	M. Korward	Initial issue
02	-	8,9,14,15	10.2011	M. Korward	Initial Operation, Air / Nitrogen Pressure Air Bleeding
03	-	1,13,18	01.2012	M. Korward	New jack type added on EC declaration, Update on pictures & cleaning agents, Re-certification inserted
04	-	13	05.2012	M. Korward	Maintenance jobs for the enduser/operator altered
05	-	12	06.2012	M. Korward	Operation of “Option HPA” included
06	All	All	01.2014	M. Mosbach	Complete revision
07	4, 5	25,26, 38- ..	01.2015	M. Mosbach	Several additions,
07a	5.1	40-42	06.2015	M. Korward	Illustrated parts list cylinder assy.
07b	5.2	41-42	07.2015	M. Korward	Item no. 29 inserted
07c	3.4	20	02.2016	M. Korward	Advice for lowering ram-set after use



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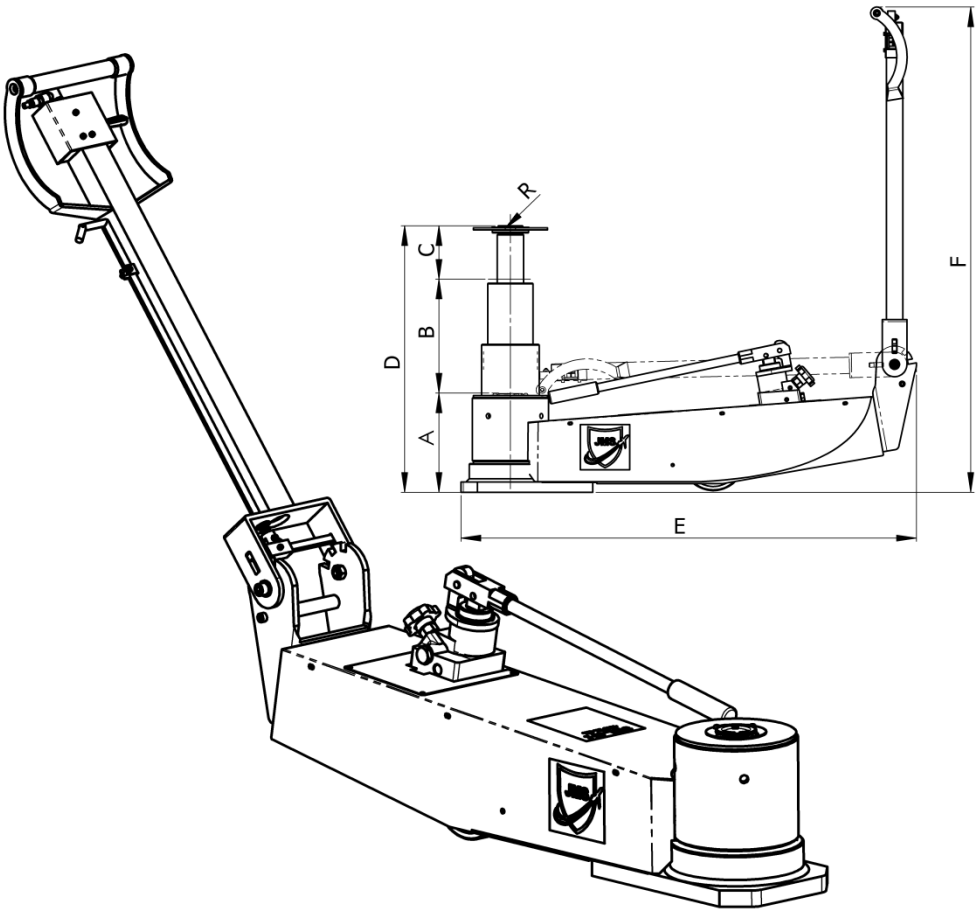
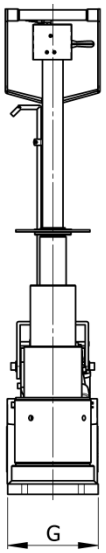
Datasheet: J-AXLE90A/J-AXLE90AHPA





Capacity:	**90 t / 99 tn.sh.**
Hydraulic lift cylinder:	
Min. height A:	262mm / 10.3”
Hydraulic lift B:	290mm / 11.4”
Screw extension C:	150mm / 5.9”
Max. height D:	702mm / 27.6
Jacking adapter: R	R19,05 / R3/4” / R31,75 / R1,25”
Operation:	
Working pressure:	from 8 to 15bar (116 to 217psi)
Operating temperature:	-30°C up to +60°C
Hydraulic fluid:	s. chapter 4.2.1
Max. ground pressure:	15,3 N/mm² / 2219 psi
General:	
Dimensions (ExGxF):	1150 x 240 x 1230mm
Weight:	139kg / 147kg with option HPA (handpump)

1 SAFETY

1.1 Basic symbols in this manual

	***DANGER!*** This symbol designates safety instructions whose non-observance may pose a hazard to individuals.
	***INTERDICTION!*** This symbol designates a distinct ban. Non-observance to these instructions may lead to people being injured or killed.
	***Check technical manual!***
	***Wear protective gloves / shoes!***
	***WARNING!*** This symbol designates important information and advice for proper handling and operation of the Jack. Non-observance to these instructions may result in damage to the Jack or in damage to its immediate surroundings.
	***ADVICE!*** This symbol designates advice for usage and other particularly useful information. This information helps you to optimally utilize all the features of the Jack.

1.2 General remarks

- These operating instructions are part of the equipment. They must always be accessible to the operator, allowing the operator to inform himself.
- If the Jack is sold, the operating instructions must be supplied with the equipment.
- The Jack may only be used for the purpose defined in the following paragraph.

1.3 Purpose/use according to intended purpose

The axle jack model **J-AXLE90A** has been designed and manufactured for use as a hydraulic lift device in oder to support various landing gears as listed in below's application table for the wheel and brake change on commercial and regional aircraft.

SWL 90 t

99.2 tn. sh.

J-AXLE90A - Aircraft application

NLG	MLG/WLG	CLG/BLG
A330/A340-200/-300	A300-B2/-B4/-600	A340-200/-300
A340-500/-600	A310-200/-300	A340-500/-600
A350-900	A318/A319/A320/A321	A380-800
A380-800	A330/A340-200/-300	
B727-100/-200	A340-500/-600	
B747-100/-200/-300/-SP	A350-900	
B747-400/-400ER/-F	A380-800	
B747-8/-8F	B707, KC-135, E-3/-6/-8	
B767-200/-300/-400ER	B727-100/-200	
B777-200/-200ER/-200LR	B737-100 to B737-900, BBJ	
B777-300/-300ER	B747-100/-200/-300/-SP	
B787-8/-9	B747-400/-400ER/-F	
Bombardier CS100, CS300	B747-8/-8F	
	B757-200/-300 *	
	B767-200/-300/-400ER	
	B777-200/-200ER/-200LR	
	B777-300/-300ER	
	B787-8/-9	
	AN-148/-158	
	Bombardier CS100, CS300	
	Embraer 190/195	
	DC-10/MD-11/-F	
	L1011-100/-200/-500	
	Sukhoi Superjet 100	

* = B757 Only with break rod pins installed with nut on break side

Any other use without the written consent of the manufacturer is considered improper use. JMS AG does reject liability for damages and injuries caused by improper handling, improper loading or due to structural changes of the equipment.

1.4 Responsibility of operators

Use of any equipment or components described in this manual is entirely the responsibility of the owner/operator of the equipment. JMS AG assumes no liability whatsoever regarding the use of equipment or components covered by this manual. Thorough training of personnel, careful, regular maintenance of aircraft servicing equipment, and proper usage procedures with such are entirely the responsibility of the owner/operator of such equipment. In the case of equipment which is unsafe to use, it is the exclusive responsibility of the owner/operator of such equipment to determine whether the equipment is in safe working order and whether it is safe to use for aircraft service. It is the responsibility of the owner/operator of this equipment to read and understand this manual prior to using related equipment. See the Safety section for more detailed information

- Only trained and instructed personnel may work with the Jack. The operating instructions are to be respected
- The personnel's responsibility for operation, maintenance and repair including periodic inspections of the Jack must be clearly defined

1.5 Safety instructions

- All safety instructions and warnings marked on the equipment and within these operating instructions are to be respected.

	***Read instructions before use!***

- In addition to these operating instructions, general as well as local regulations regarding accident prevention and environmental protection must be provided to the operator and be respected.
- All safety instructions and warnings on the equipment must be kept in a legible condition.

	***INTERDICTION!*** - No persons are allowed on the Jack during movement. DO NOT RIDE! - Do not stand onto the Jack. - Keep hands / fingers / feet away from moving parts - Never lift loads on sloping, uneven or soft ground. - Never tamper with the pressure relief valve which has been factory adjusted and sealed for warranty reasons. - Never use the jack in zones subject to explosion risks. - The max. admissible nominal load may not be exceeded at any time. - Extensions or conversions to the equipment are forbidden.

	***WARNING!*** - Only authorized personnel is allowed to operate the equipment. Every operator has to be trained and made aware of the contents of this operating and maintenance manual. - Position the jack precisely underneath the jacking point in order to have the load centered over the jack's adaptor cup. - If damages are detected, the equipment must not be operated. Damages have to be repaired immediately. - In addition to the operating instructions, the general as well as the local regulations regarding accident prevention and environmental protection have to be respected by the operator at any time.

1.6 Protection devices/safety devices

- All protective / safety devices must be checked before each use and at regular intervals regarding function and integrity.
- Protective devices and covers may only be removed if the Jack is out of operation and safety measures have been taken to prevent unintended use of the Jack during maintenance.
- After replacement of components and after repair/maintenance works (carried out with the manufacturer's consent), all protective devices and covers must be properly re-installed.

	***Wear protective gloves!***

1.7 Risks due to Hydraulic Energy

Hydraulic oil under pressure is a potential hazard in the form of stored energy. Accidents can occur when this energy is improperly handled. Be sure that all equipment used is compatible and designed to control the pressures encountered.

Special care has to be taken for the following:

- Maintenance works on the hydraulic system may only be carried out by persons with specific knowledge and experience in working with hydraulic systems and components!
- Hydraulic system pressure lines, which have to be opened for repair purposes, have to be drepressurized before starting any repair works
- Do not change any factory-set parameters, specifically on the systems' pressure relief valves

1.8 Modification of the Equipment

- Do not make any modifications to the equipment without the prior written consent of the manufacturer.
- Use only original manufacturer's spare parts.

1.9 Cleaning of Jack/Disposal of Cleaning Agents/Grease

Make sure to only environmentally safe dispose of

- consumables (e.g. oil, lubricants, grease)
- cleaning agents

1.10 Potential sources of danger

	**Area**	**Kind of danger**	**How preventable**
Mechanic	**Jack's Adapter / Aircraft's jacking point**	**Crushing** During connection risk of contusion for fingers/hands.	Watch for contusion points during connecting. Wear safety shoes / gloves! Keep hands / fingers away.
	Base plate of ramset	**Crushing** During positioning / lowering risk of contusion for feet (fingers/hands)	Watch for contusion points during lowering. Wear safety shoes / gloves! Keep feet / hands / fingers away.
Hydraulic	**Components**	**Accident** Squirting oil in case of damaged hydraulic components.	Check hydraulic components at periodic intervals and replace them if necessary.

Continued on next page

Continued from previous page

	**Area**	**Kind of danger**	**How preventable**
Other	**Underneath aircraft**	**Accident** due to falling parts	Don not stay under the aircraft while it is jacked. Wear helmet
	Jack	**Accident** Due to ride on the Jack during movement.	Do not ride!
	General	**Accident** due to poor lighting	Take care of a good Illumination, especially during night operations
	General	**Accident** due to rough / dirty ground or objects while jacking	Take care of a levelled jacking area free from any dirt / objects.
	General	**Accident** due to inadequate reassembly after repair works	Only traineed personal may carry out repair works.
	Lubricants, Oils, greases	**Contact** Absorption of this materials	Wear safety gloves!
	Inadequate Warning - / Safety-information	**Crushing, bumping, contact** Because of not readable informationsigns (labels)	Keep all warning and safety information legible and complete. In case of missing / not legible lables please order new labels (see Parts List)

1.11 Copyright

- The manufacturing company reserves the right to make modifications without prior notice and without incurring any sanctions whatsoever, without prejudice to the safety and main technical characteristics.

- This technical manual is only intended for the operator and his personnel. Copyright of documentation:

JMS AG

Rainer-Haungs-Str. 42

77933 Lahr/Germany

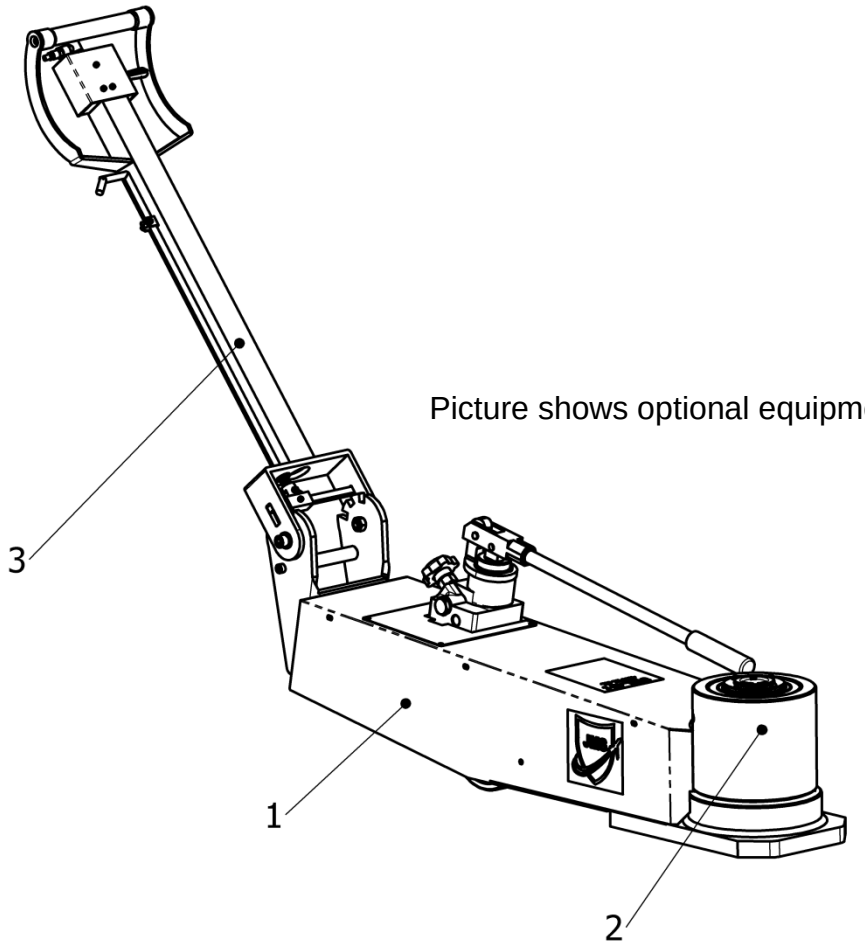
http://www.jms.aero

2 DESCRIPTION

2.1 General information

The Hydraulic Jack consists of the following components:

- Chassis (1)
- Cylinder/Ram set (2)
- Handle (3)



Picture shows optional equipment

2.2 Chassis

The chassis (1) contains all hydraulic components and the center wheels. A stainless steel cover protects all components.

2.3 Lift cylinder

The cylinder/Ram set (2) has a base plate, a spherical concave jacking adapter and a silicone protection disc.

2.4 Handle

With the adjustable handle (3) the jack can be easily moved. There is also a pneumatic control switch for up / down movement of the lift cylinder and the connection to the air supply

2.5 Optional equipment

-Option HPA

The hydraulic hand pump provides an emergency means of lifting in case of absolutely no compressed air/nitrogen is available. The release valve allows a sensitive lowering of the load at any desired height.

-Option “J-AXLE-PHA”

Tire connector hose with SCHRADER connector SMALL and LARGE bore to operate the axle jack with air / nitrogen out of a pressurized aircraft tire.

- Option “J-AXLE-TBA90”

Fly-away transportation box for storage of the axle jack in the aircraft cargo hold.

2.6 Safety

The oil circuit is provided with a safety valve, which protects the jack against overload. All hydraulic components are under a steel cover.

2.7 Warranty

The warranty for all parts of the Jack (except for parts which are subject to wear, e.g the wheels silicon protection disc on ram set and others) is three (3) years.

2.8 Spare parts service

Delivery of all spare parts manufactured by JMS is guaranteed for ten (10) years.

3 OPERATION

3.1 Unpacking

	***Wear protective gloves / shoes!***

- The complete jack is packed in a three-layer corrugated cardboard box with pallet; the operating and maintenance manual plus the quality/test certificate in a folder are also inside the box.
- The instruction “Keep Upright” is clearly visible on the cardboard box containing the jack. Check for claims.
- Either transpallets or forklift-trucks are used for handling.

3.2 Air source

	***This Jack can be operated either by compressed air from the hangar’s air-supply network, compressed nitrogen out of bottle or by using nitrogen supplied from a pressurized aircraft tire - see also optional equipment chapter 2.5***

- Compressed air / nitrogen enters into the jack circuit via a quick-coupling on top of the handle, it is therefore necessary to have a supply hose with a quick coupling mounted matching the one installed at the jack.
- With so many different quick coupling systems available on the market, it is impossible to equip the jack with exactly the coupling system available at customers.

  So, please use a quick coupling system of your choice / available at your hangar / workshop which fits the connecting bore - **internal thread G1/4”** - at the axle jack. Make sure that the air supply pipe has a usable passage / inside diameter of at least **6mm** and is not pinched or restricted at any position.

  Make sure to use Teflon tape as a sealant when installing the coupling.

	***Compressed air / nitrogen supply: 8 to 15bar (116 to 217psi)***

- Absolutely never put the following substances into the compressed air circuit: grease, hydraulic oil, SKYDROL or any other liquids.
- Install a filter dehumidifier-lubricator unit in the compressed air system.
- If you want to lubricate the compressed air circuit use exclusively:

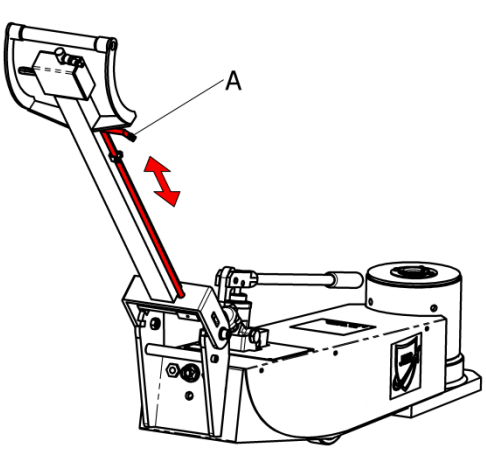
  - AGIP OSO 100
  - MOBIL DTE 27
  - ESSO TERESSO 100
  - SHELL TELLUS 100
  - BP ENERGOL HP 100

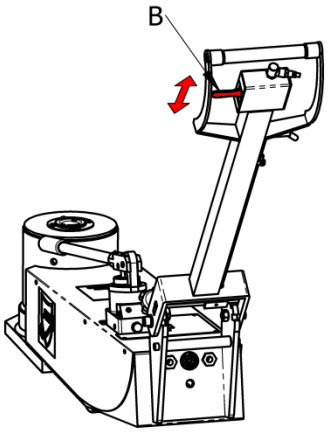
3.3 First use/after unpacking

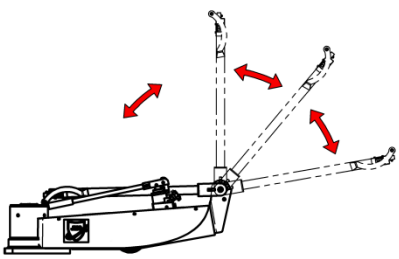
Before working with the axle jack for the first time, it is strongly recommended to perform a few dummy operations (i.e. with no load) in order to acquire the sensitivity to work safely with the jack.

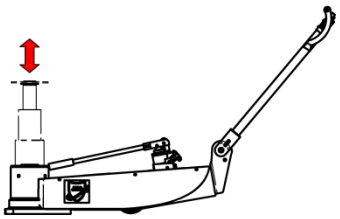
- The handle positioning lever (A) is on the right in relation to the operator; by pulling it upwards the user can choose one of several possible handle positions. (see illustration below left)
- By pulling the pneumatic control valve (B) handle upwards, the jack starts to extend its ram set and lifts the load. When pneumatic control valve (B) is in the central position, the jack is in the idle status. (see illustration below right)
- By pushing the pneumatic control valve (B) handle down, the jack starts to lower its ram set and the load descends (see privious illustration)

	***Extend and retract the jack completely several times with no stop by use of pneumatic pressure!***









3.4 Standard use

- Position the jack underneath the point of support (landing gear jacking dome) as described in the AMM (Aircraft Maintenance Manual)

	***Follow the instructions of the Aircraft Maintenance Manual (AMM), which describes the jacking process for changing wheels/brakes. Expressly observe the safety regulations already described in this manual.*** ***The manufacturing company rejects any liability for damages to equipment (incl. specifically the lifted aircraft) and/or personnel due to an incorrect/improper use of the axle jack!***

- Connect the axle jack to the air source: air / nitrogen or aircraft tire as described in chapter 3.2

	***Keep finger/hands away from the area between the hydraulic lift cylinder and the aircraft jacking point.***
	***Make sure that no other people are within the danger area underneath the aircraft landing gear.***

- By pulling the pneumatic control valve (B) handle upwards, the jack starts to extend its ram set and lifts the load. When control lever (B) is in the central position, the jack is in the idle status. (see right illustration chapter 3.3)
- By pushing the pneumatic control valve (B) handle down, the jack starts to lower its ram set and the load descends (see right illustration chapter 3.3)

	***It is recommended to always fully retract the ram-set after every use in order to protect the cylinders and ram-seals during storage.***

3.5 Emergency/manual function

There may occur situations, where no adequate air / nitrogen supply is available for lifting / lowering the aircraft landing gear.

To lift / lower the load without sufficient air / nitrogen supply, carry out following steps.

3.5.1 Use with handpump (OPTION HPA)

The handpump (Option HPA) allows the operation of the jack without (adequate) compressed air / nitrogen.

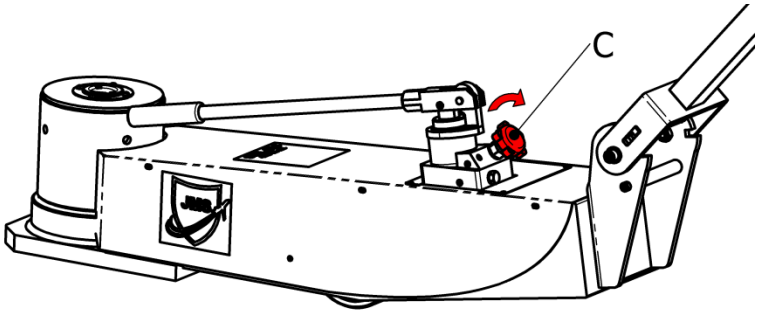
	***Please be aware that this mode of operation is only the second best choice. Regard this only as an emergency function as there are lots of pump strokes required to lift the aircraft landing gear, extending the time required for wheel/brake change dramatically.***

- Turn lever of handpump into a easy to operate position and position the jack underneath the point of support (landing gear jacking dome) as described in the AMM.

	***Follow the instructions of the Aircraft Maintenance Manual (AMM), which describes the jacking process for changing wheels/brakes. Expressly observe the safety regulations already described in this manual.*** ***The manufacturing company rejects any liability for damages to equipment (incl. specifically the lifted aircraft) and/or personnel due to an incorrect/improper use of the axle jack!***

	***Keep finger/hands away from the area between the hydraulic lift cylinder and the aircraft jacking point.***

- Close the hand-release valve (C) on the hand-pump unit clockwise firmly (see illustration below)



- Screw out the jack ram's extension screw if and as far as possible to reduce the hydraulic lift required without load (dead lift).
- Start pushing/pulling the pump-handle up and down; the ram starts to extend and the aircraft landing gear is lifted; note that there is a valve automatically switching from low-pressure to high-pressure operation, accommodating the hand-force required; pump until wheel/tire is free from ground.
- Wheel/brakes can now be changed.

	***Make sure that no other people are within the danger area underneath the aircraft landing gear.***

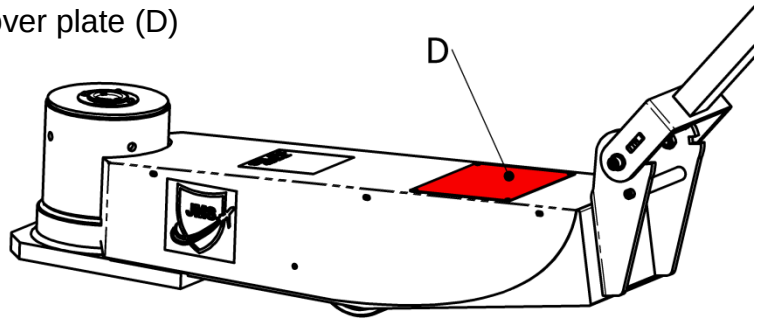
- For lowering of the landing gear / jack, **CAREFULLY** and **VERY SLOWLY** open the hand-release valve (C) on the hand-pump unit by turning the release-valve counter-clockwise. The ram will descent.

	***DANGER*** ***The manufacturing company rejects any liability for damages to equipment and / or personnel due to an incorrect / improper use of the axle jack by opening the hand-release valve TOO QUICKLY resulting in lowering the aircraft landing gear / ram set TOO FAST!***

3.5.2 Manual lowering with emergency valve

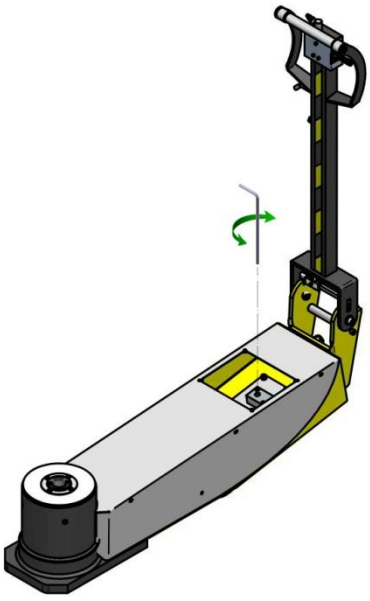
To be used without handpump/Option HPA

- Open the cover plate (D)



- Open the emergency valve **CAREFULLY** and **VERY SLOWLY** with help of an 3mm Allen key by turning the emergency release valve counter clockwise.

	DANGER ***The manufacturing company rejects any liability for damages to equipment and / or personnel due to an incorrect / improper use of the axle jack by opening the hand-release valve TOO QUICKLY resulting in lowering the aircraft landing gear / ram set TOO FAST!***



- After the load is lowered close the emergency release valve by turning it clockwise and refit the cover plate (D)

4 MAINTENANCE

4.1 Table of maintenance instructions

	***To ensure that the jack is always ready for operation, we recommend to carry out the following routine maintenance works.*** ***Please note that the intervals for preventive maintenance are depending on the usage frequency and must be done more often in case of high usage. It depends also on conditions of jacks storage.*** ***Be careful not to use aggressive solvents for cleaning as this may affect paint coatings and / or galvanic plated components!***

When	What	Remarks
Before and after every use	- Check general condition - Check hydraulic piston for significant dirt.	All parts existing?
Weekly or after **every 20 operating hours**	- Clean hydraulic pistons if necessary and grease them slightly.	For grease types see chapter 4.3.
Every 6 months or after **every 100 operating hours.**	- Grease all mobile parts - Check oil level - Clean hydraulic pistons. Then grease parts to avoid corrosion. **Caution: Risk of crusting** if not cleaned before greasing!	For grease types see chapter 4.3. Check oil level with compl. retracted pistons (for hydr.oil s. chapter 4.2.1) See chapter 4.3.

Continued on next page

When	What	Remarks
If necessary but latest **after 3 years**	- Carry out oil change - Clean hydraulic piston. Then grease parts to avoid corrosion.	See chapter 4.2.1 See chapter 4.3.

Note on change of cylinder / piston seals

The cylinder / piston seals installed in the present product are specifically designed for heavy-duty applications and a long service-life.

It is therefore not necessary to change cylinder / piston seals as a task of preventive maintenance if there is no obvious leakage on the ram-set

We strongly recommend not to change cylinder / piston seals for preventive maintenance if no leakage is occuring!

4.2 Hydraulic Fluid

4.2.1 Type & Quality of Hydraulic Fluid

Hydraulic fluid „ATF Dexron II D“

By standard the jacks are production pre-filled with automatic transmission hydraulic fluid as per “Dexron II D” standard. Reason is the wide availability of oils per this standard worldwide and from various brands.

What is “Dexron”?

[Dexron is the trade name for a group of technical specifications of automatic transmission fluids created by General Motors (GM). The name is a registered trademark of GM, which licenses the name and specifications to external companies which manufacture the fluid and sell it under their own brands. GM has upgraded the Dexron specifications over the years; newer fluids are generally but not always backward compatible with previous Dexron fluids…]. Source: Wikipedia.

Suppliers

Many suppliers worldwide do offer automatic transmission fluids (ATF) as per Dexron II D standard. The below list is indicative only and by far not exhaustive:

Manufacturer/Brand	***Product name***	***Website***
Eni S.p.A. (Agip)	ATF II D	www.eni.com
FUCHS Europe Schmierstoffe GmbH	Titan ATF 3000	www.fuchs-europe.de
Liqui Moly GmbH	ATF Dexron II D	www.liqui-moly.de
Total Deutschland GmbH	Fluide ATX	www.total.de

Local manufacturers/brands are available in almost any country worldwide.

Other approved oils:

- Hydraulic fluid according to MIL-H-5606 standard.

For reasons of a simplified spare fluid storage it is permissible to also use hydraulic fluid of the above mentioned specification.

However in this case, it is imperative to completely swap the whole fluid in the jack.

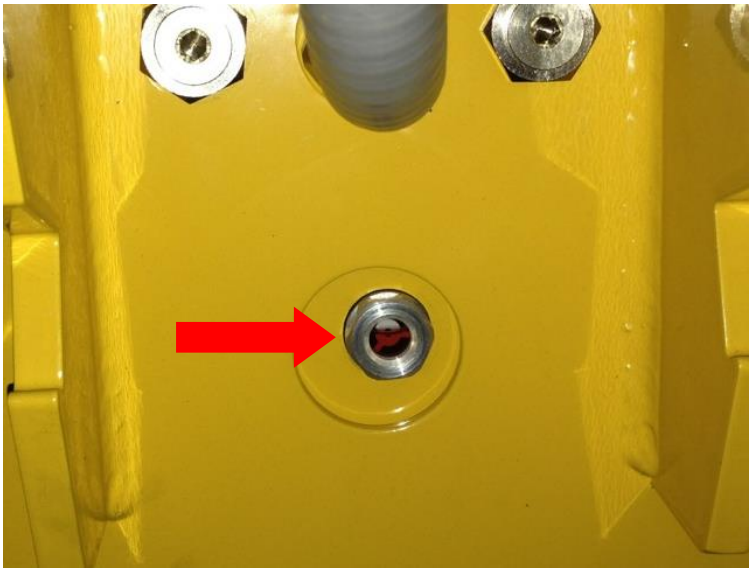
Other fluids (native or synthetic oils) may only be used after prior consultation of JMS AG.

	Never mix hydraulic fluids of different specifications as this might lead to system damage.

Drain jack completely before refilling with a different oil as per above specification.

4.2.2 Checking of Oil Level

- We recommend to check the oil level of the jack's hydraulic system as per maintenance- table (see chapter 4.1).
- When checking, make sure to have the piston fully in the DOWN position, i.e. the piston has to be completely rectracted. In this case, the oil level must at the middle of the oil level indicator.
- If the oil level is higher than it should be, even by only a little, the oil is expelled through the suction pump as mist. This phenomenon disappears on its own when the oil level has been restored to normal. If the oil inside the tank exceeds the standard level by a lot, it is recommended to remove the excess oil.



4.3 Grease requirements and grease

Clean all mobile parts and grease them.

We recommend to use greases according to specification KHC2N-50 / DIN 51502.
Following greases meet these requirements:

- Meguin Multi Temp Grease
- Mobil Mobilith SHC 100
- Shell Albida EMS 2

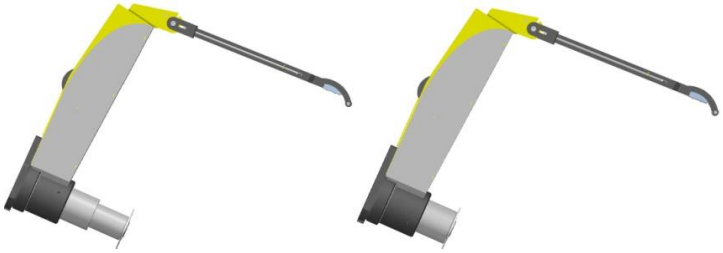
4.4 Air bleeding

Each time the jack is serviced, i.e. when removing and refitting parts connected to the tank and motor pump, it is recommended to bleed off all air inside the hydraulic system.

1. The ram set / pistons must be completely extended (Pic. A).
2. Turn the jack over on the piston, levering with the handle (Pic. A).
3. Start the lowering function until the piston moves back in properly (Pic. B).
4. Put the jack back into the working position (Pic. C).
5. Move the piston back in completely and check the oil level (Pic. D).
6. Try to operate the jack without any load and if the piston lowers in jerks repeat the procedure at least 2 or 3 times.

Pic. A

Pic. B



Pic. C

Pic. D

4.5 Periodic inspections

Aviation ground support equipment has to be examined at least once every year by a technical expert with regards to its operational safety.

It is under the operator's sole responsibility to ensure that ground support equipment and aviation facilities are checked regarding operational safety prior to first use, however at least once every year, by a technical expert. Refer to "rules and regulations for accident prevention in aviation", BGV C10, § 88.

A technical expert is considered a person, who – by adequate technical training and experience – has sufficient knowledge in the field of aviation ground support equipment. This person has to be familiar with the relevant state-of-the-art health and safety regulations, accident prevention regulations, guidelines and generally accepted engineering standards (e.g. DIN standards, VDE regulations, technical rules of other member states of the European Union or other parties to the agreement of the European Economic Area), enabling him/her to assess the safe condition of aviation ground support equipment.

Note:
Local rules and regulations apply for the operation of aviation ground support equipment outside the jurisdiction of the Federal Republic of Germany respectively the European Union, especially for recurring inspections and examinations.

The operator of the jack is responsible to conduct inspections and safety examinations strictly and evidently on an annual basis (respectively periodically as required and in accordance with local regulations). The examination is to be documented in writing, containing at least the following details:

- Date of inspection/examination
- Scope of inspection
- Details on repeated inspection requirements
- Result of inspection
- Indications regarding any defects found
- Assessment for continuing the operation
- Name/address of examining company / department / expert

4.6 Re-certification

Re-certification of the axle jack has to be executed on a periodic basis strictly in accordance with locally applicable/country-specific health and safety regulations (i.e. according to equipment classification by the local authorities) within the country of usage.

Besides those mandatory local health & safety requirements, JMS AG recommends re-certification under the following conditions:

- After the jack's integrity has been compromised (e.g. due to improper application/usage with visible damages)
- After damage repair on structural/load carrying components (such as the base plate and/or ram set) as well as on all hydraulic parts (valves, tubes etc.)
- After seal replacement of the ram set.

For re-certification, the following parameters have to be observed/checked:

1. ***Functional check of all components***

2. ***Overpressure check:***

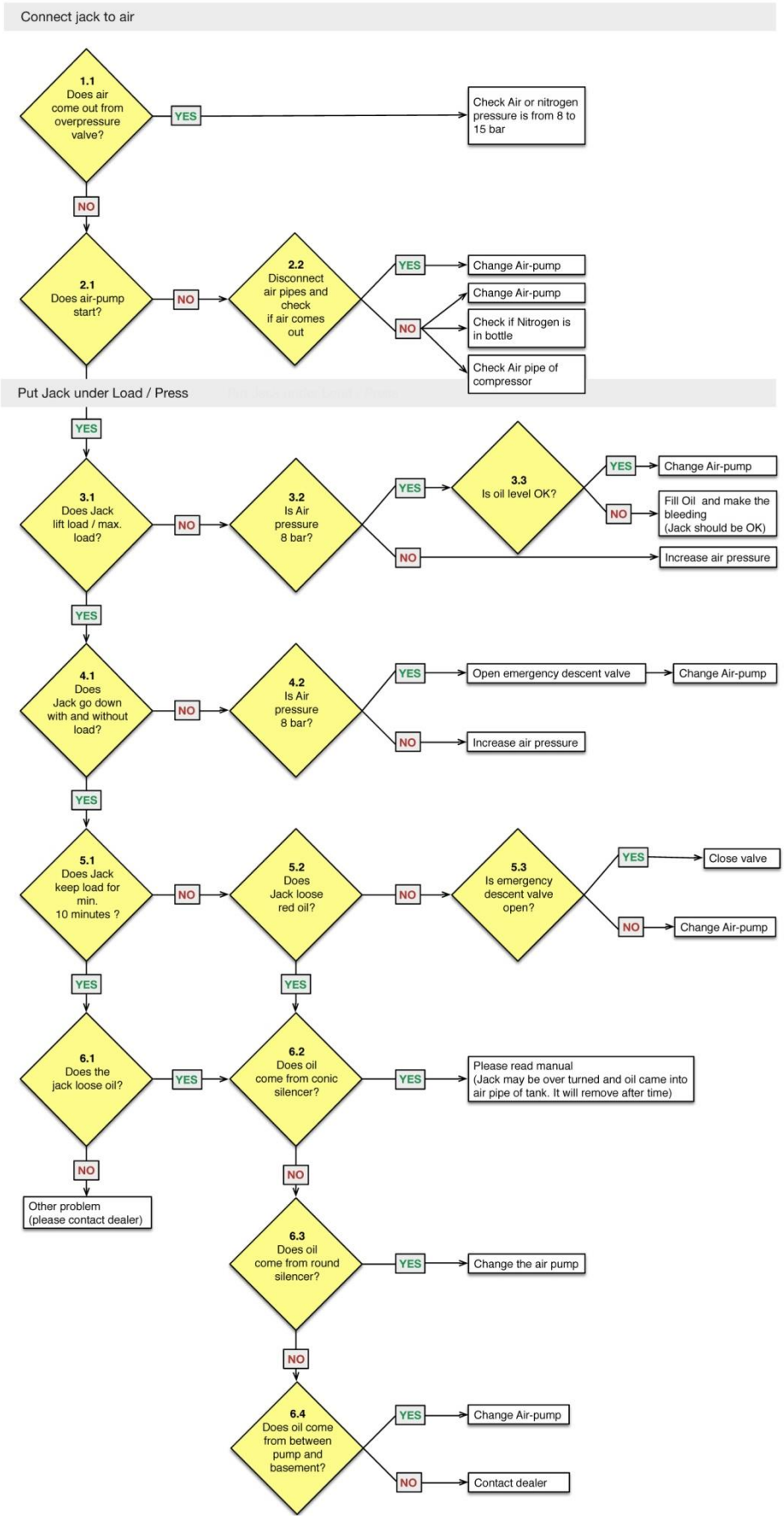
   Check of overpressure valve which has to engage between 110-125% of the jack's nominal capacity. Check to be done by driving the ram-set via the jack's motor-pump (air-hydraulic pump) against a suitable test stand with a load measuring device between the ram-set and the test stand. Re-set overpressure valve on motor-pump if found outside the a.m. parameters.

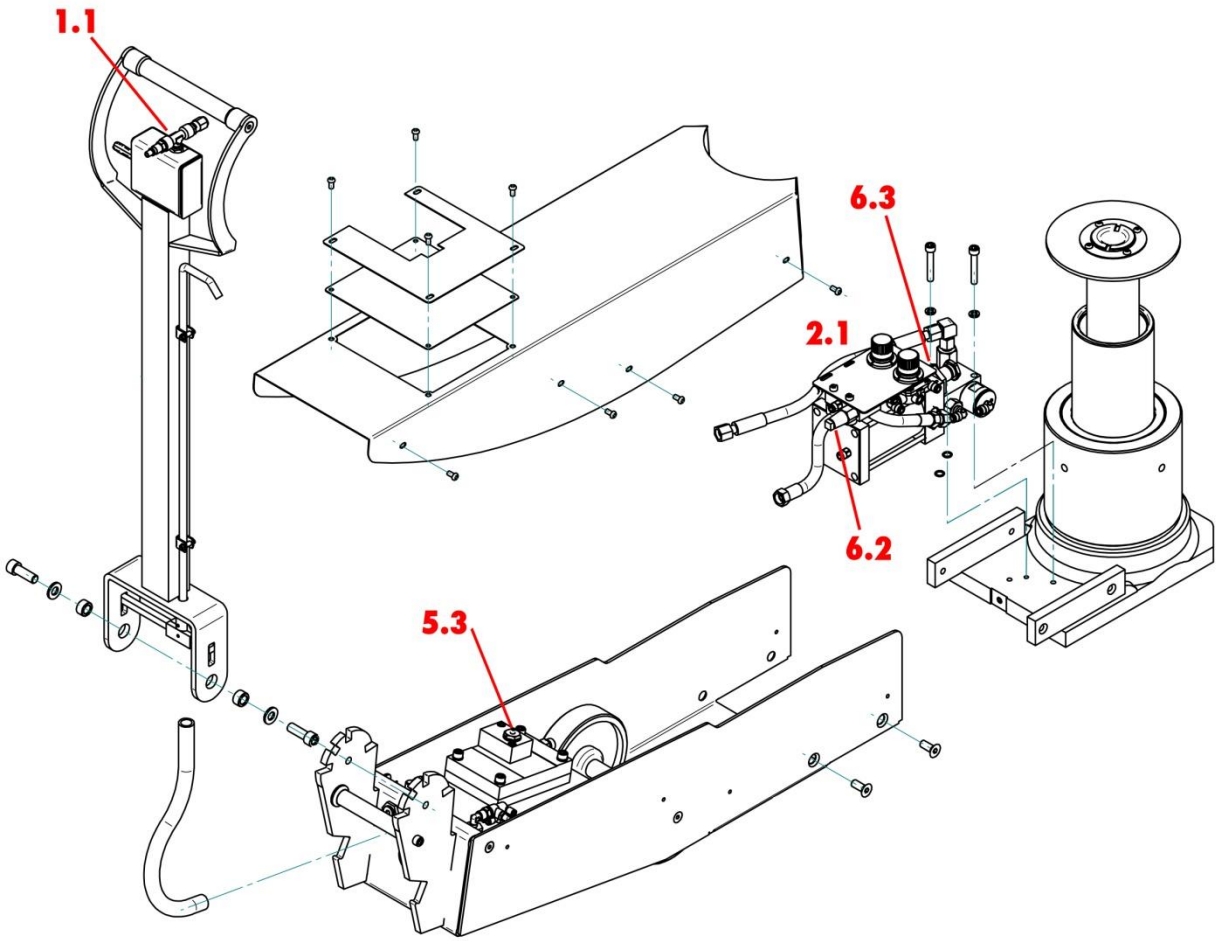
3. ***Hydraulic system/tightness check:***

   Check tightness of hydraulic system by driving the ram-set via the jack's motor-pump (air-hydraulic pump) against a suitable test stand with a load measuring device between the ram-set and the test stand up to the jack's nominal capacity only. Leave system without running the motor-pump for minimum 10 minutes and observe the test stand's load measuring device. Jack is OK when the load/pressure drop of the jack is less than 2% of the jack's nominal capacity within the 10 min. range.

	**A formal re-certification can only executed by a professionally qualified and trained engineer. Locally applicable/country-specific regulations on health & safety are always to be respected!**

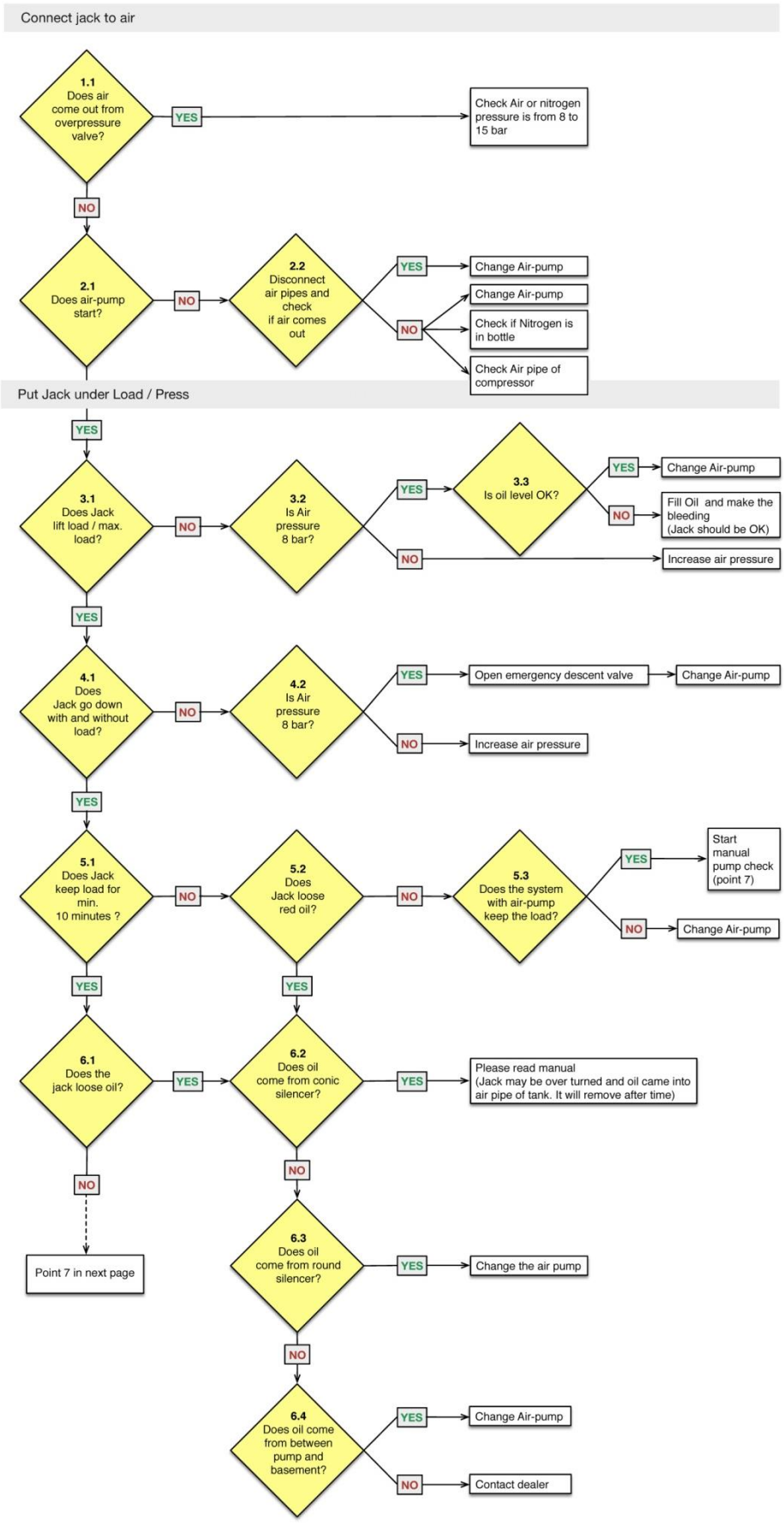
4.7 Trouble Shooting Matrix: J-AXLE90A

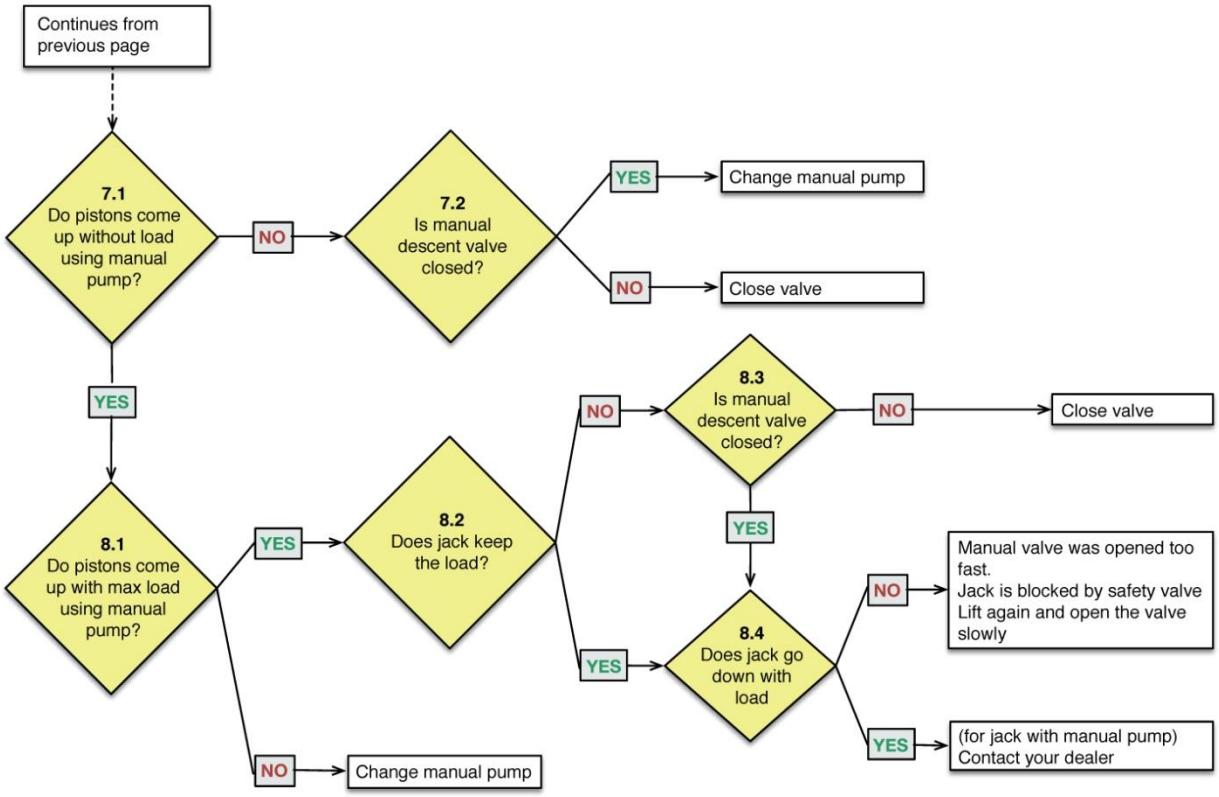




Trouble shooting component reference: J-AXLE90A

4.8 Trouble Shooting Matrix: J-AXLE90AHPA

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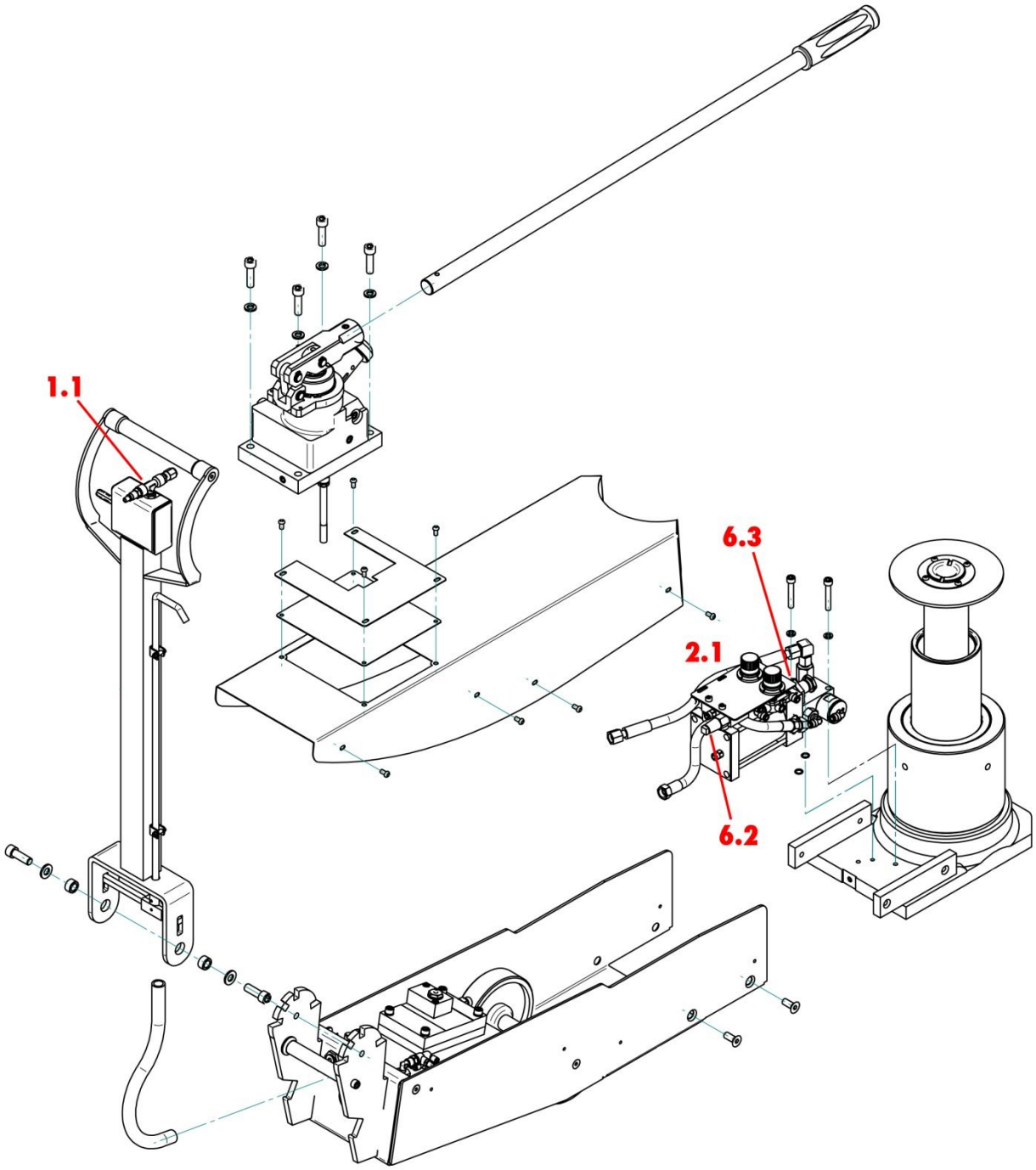
7.1
Do pistons come up without load using manual pump?
NO
7.2
Is manual descent valve closed?
YES
Change manual pump
NO
Close valve
YES
8.1
Do pistons come up with max load using manual pump?
YES
8.2
Does jack keep the load?
NO
8.3
Is manual descent valve closed?
NO
Close valve
YES
8.4
Does jack go down with load
NO
Manual valve was opened too fast.
Jack is blocked by safety valve
Lift again and open the valve slowly
YES
(for jack with manual pump)
Contact your dealer
NO
Change manual pump
YES



Trouble shooting component reference: J-AXLE90AHPA

5 ILLUSTRATED SPARE PARTS LISTS

When ordering spare parts, please indicate:

- Year of manufacturing
- Serial number
- Part number
- Designation of part
- Quantity

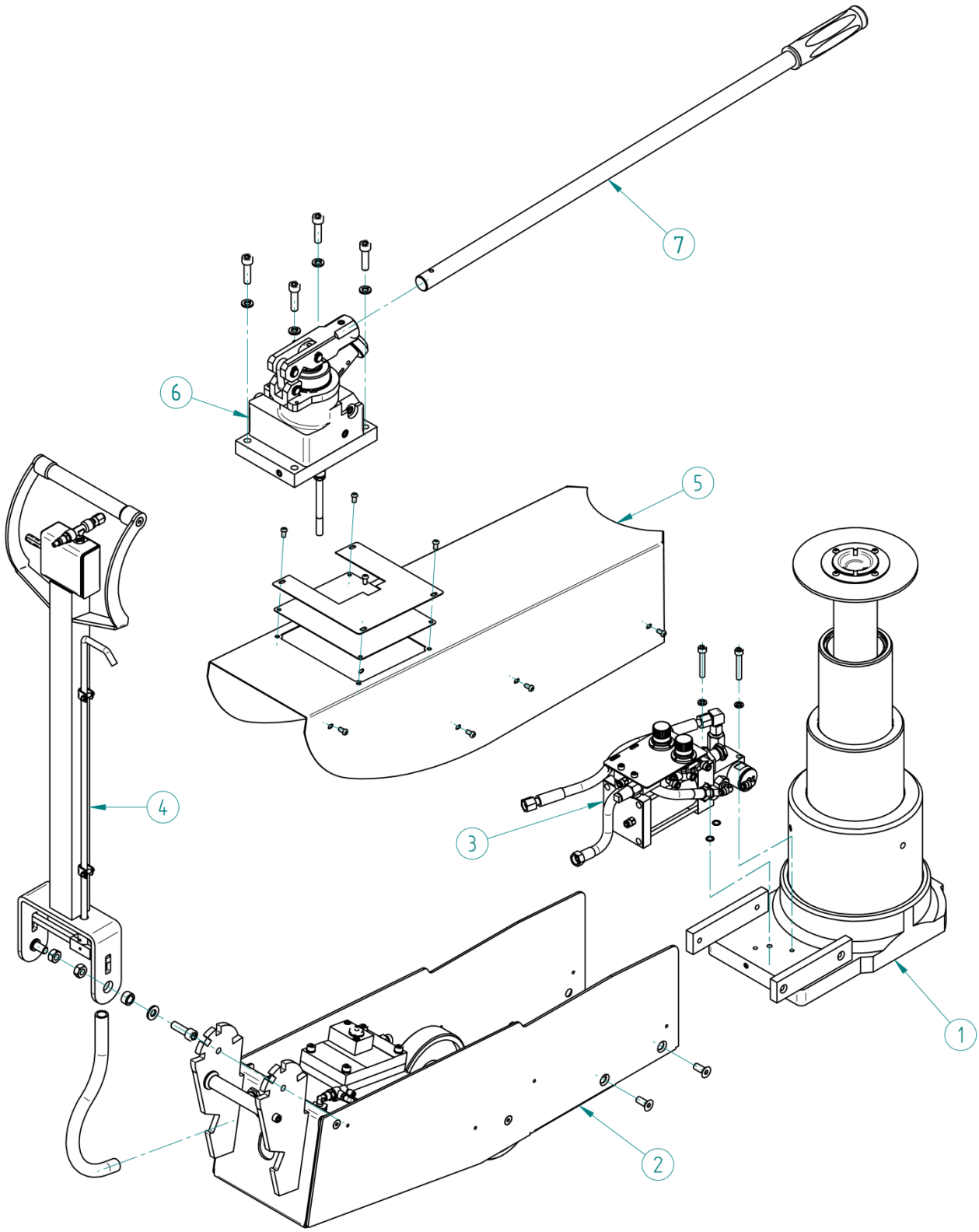
Parts can be ordered at:

JMS AG
Rainer-Haungs-Strasse 42
77933 Lahr/Germany

Tel.: +49 (78 21) 9 94 69 - 0
Fax: +49 (78 21) 9 94 69 - 100
E-mail: sales@jms.aero
URL: www.jms.aero

5.1 Spare Parts – Main Jack Assembly

Item no.	Part no.	Description	Qty
1	A03604	Cylinder assembly	1
2	A03614	Chassis assembly	1
3	A03665	Motorpump and depressor unit	1
4	A03606	Handle assembly	1
5	A03615	Casing assembly	1
6	A03672	Manual pump assembly (lever not included)	1
7	A03673	Manual pump lever	1



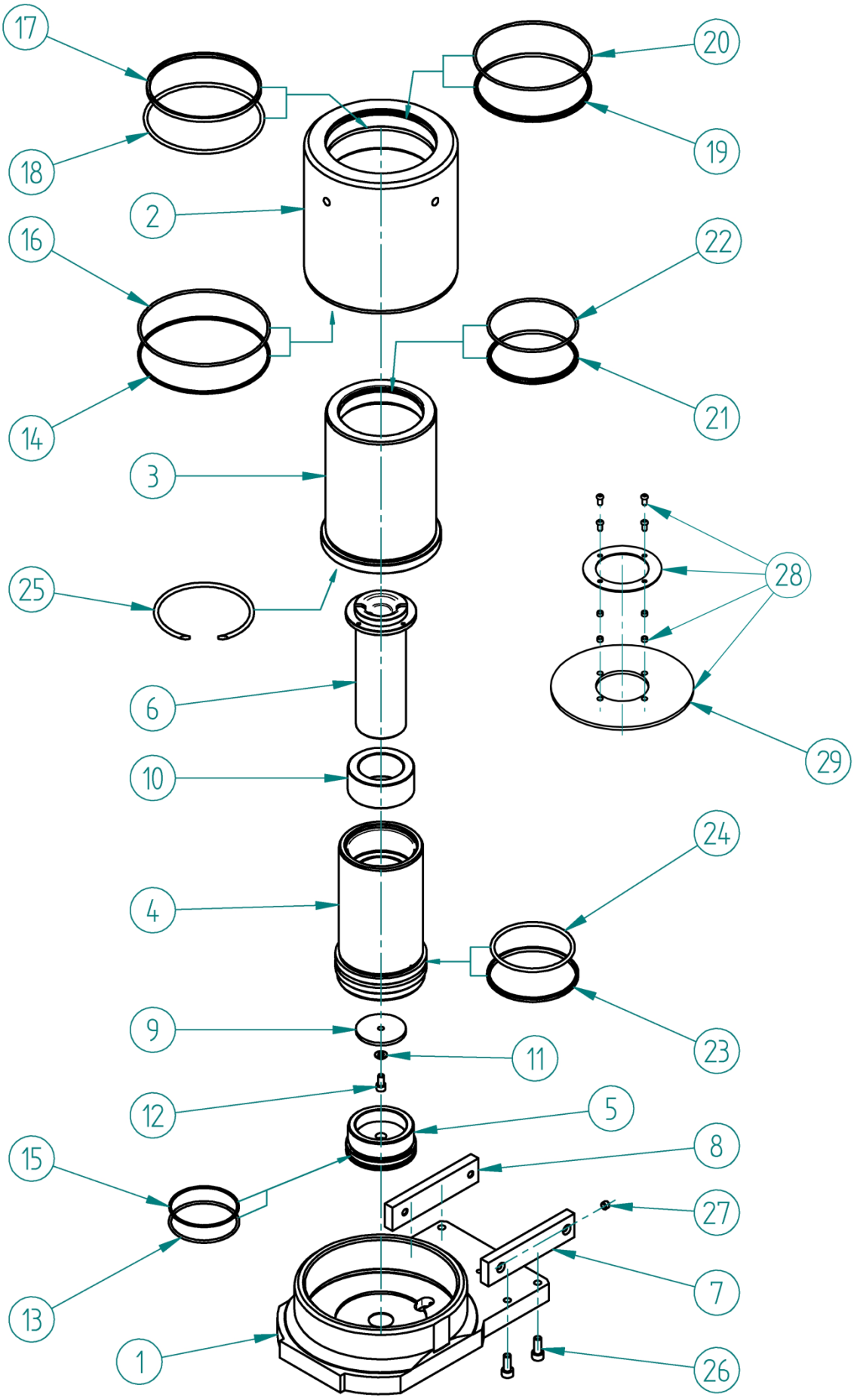
5.2 Spare Parts – Cylinder/Ram set Assembly

Item no.	Part no.	Description	Qty.
1	A01140	Base plate	1
2	A01243	Cylinder tube	1
3	A01537	Piston I	1
4	A01531	Piston II	1
5	A02613	Cap piston II	1
6	A01644	Extension Screw	1
7	A01690	Fixation plate, LHS	1
8	A01691	Fixation plate, RHS	1
9	A01958	Disc	1
10	A01150	Screw Nut	1
11	A02850	Washer	1
12	A03433	Screw	1
13	A01063	O-Ring (Support for cap seal piston II)	1
14	A03377	Seal	1
15	A03366	Static seal (cap piston II)	1
16	A01095	O-Ring	1
17	A03318	Seal	1
18	A01090	O-Ring	1
19	A02875	Seal	1
20	A01091	O-Ring	1
21	A02873	Seal	1

Item no.	Part no.	Description	Qty.
22	A01077	O-Ring	1
23	A03359	Seal, piston II	1
24	A01070	O-Ring	1
25	A00116	Retaining ring	1
26	A03443	Screw	4
27	A00323	Dowel pin	2
28	A03632	Top cover (disc) assembly	1
29	A01951	Top cover (rubber disc only)	(1)

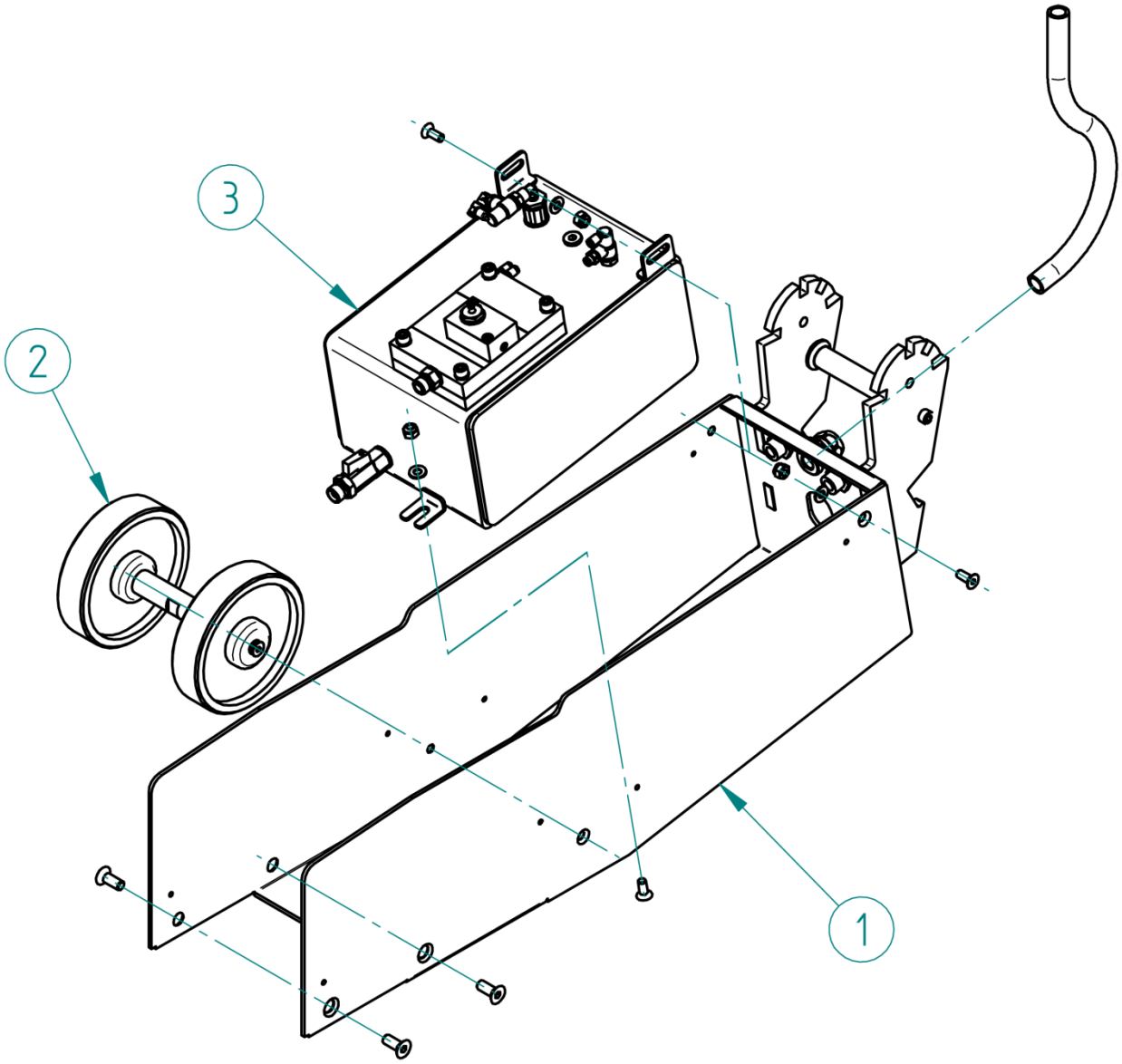
Sealkit + Tools:

N.N.	A00632	Seal Kit, complete (all seals)	(1)
N.N.	A00149	Pin Spanner Cylinder Tube	1
N.N.	A00150	Pin Spanner cap piston II	1



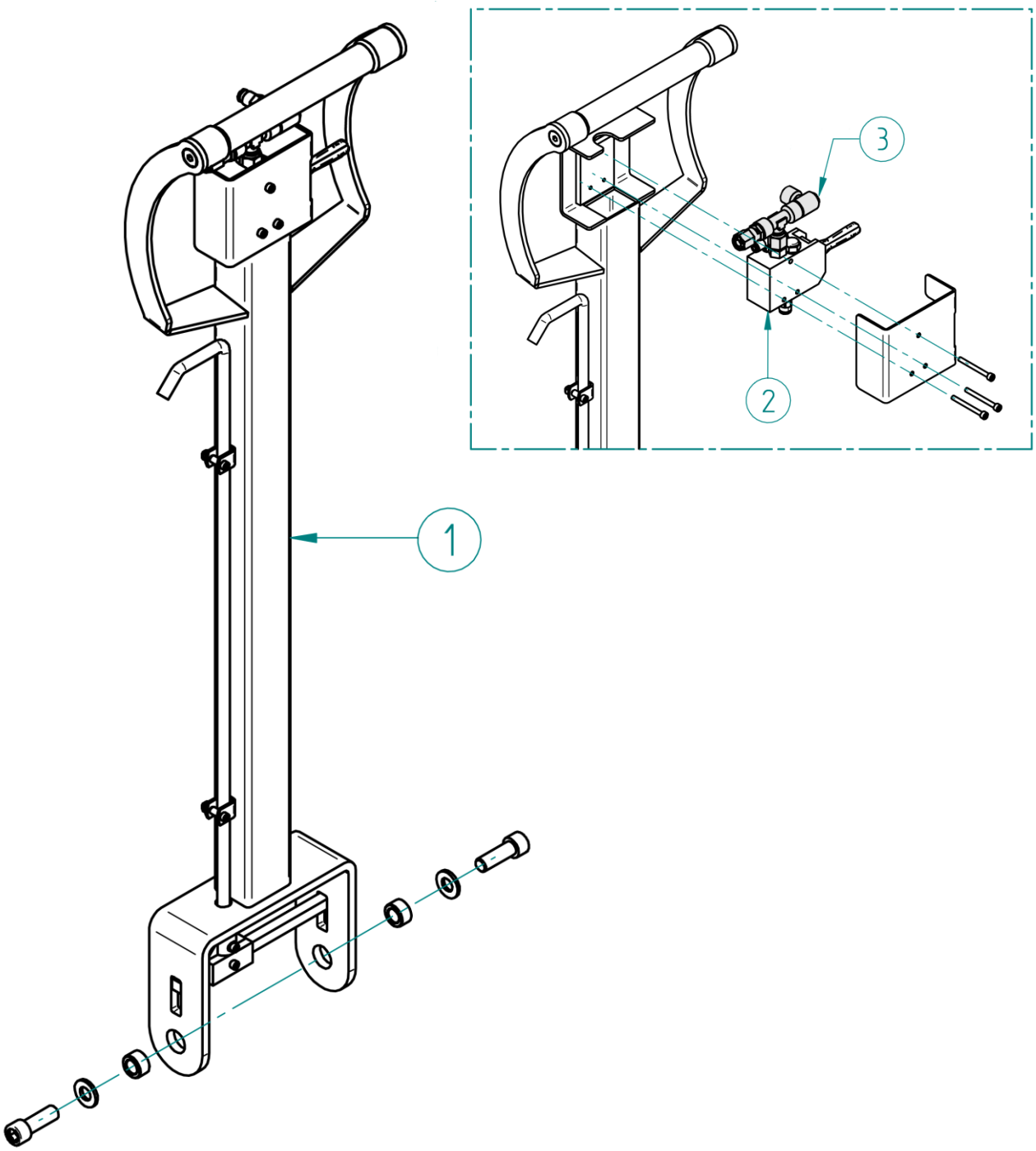
5.3 Spare Parts – Chassis Assembly

Item no.	Part no.	Description	Qty
1	A03618	Chassis assembly	1
2	A03617	Wheel assembly	1
3	A03616	Tank assembly	1



5.4 Spare Parts – Handle Assembly

Item no.	Part no.	Description	Qty
1	A03606	Handle assembly (includes item no. 2)	1
2	A03623	Distributor (includes item no. 3)	1
3	A04007	Air-Connector with pressure relief valve	1

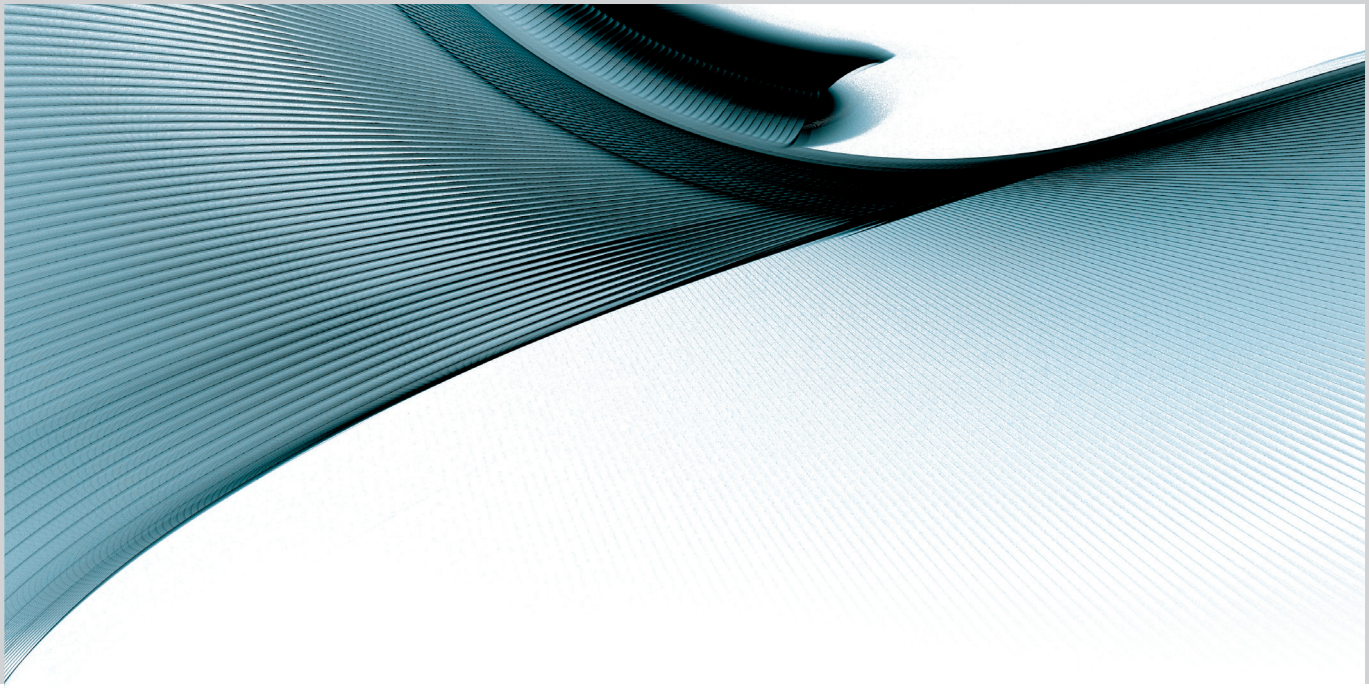


List of fastening torques

All bolts have to be tightend using standard tightening torques as per table after replacing components.

Bolt size	Tightening torque * [Nm]		Tightening torque * [lb ft.]	
	class 8.8	class 10.9	class 8.8	class 10.9
M8	23,1	33	17,0	24,3
M10	46	66	33,9	48,6
M12	80	115	59	84,8
M16	194	280	143	206,5
M20	391	550	288	405,6

*coefficient of friction μ = 0,12 (lightly oiled) / 90% of screws yield strength



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www.jms.aero