Power.
Movement.
Dynamics.

HYDRAULIC SYSTEM SOLUTIONS

Operating instructions for telescopic cylinder (TZE) for installation in agricultural tippers

WEBER-HYDRAULIK

Change history

Revision	Description	Date	Author
0	First edition	2019/11/21	List Walter

These original operating instructions were compiled in German. Translations into other languages must be marked as translations in accordance with the Machinery Directive 2006/42/EC.

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Confirmation of proper design

As hydraulic cylinders are exempt from application of the Machinery Directive according to the Guide to application of the Machinery Directive 2006/42/EC, there is also technically no option to issue a CE Declaration of Conformity.[1]

In situations where you require an EU Declaration of Incorporation or a commented risk assessment for further use of our products, we can issue this on request. In these situations, please contact your Key Account Manager or our customer service department.

[1] Guide to application of the Machinery Directive 2006/42/EC, European Commission Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, 2nd Edition, June 2010, P.32

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Foreword

These operating instructions apply to all hydraulic cylinders manufactured by WEBER HYDRAULIK GMBH. Retain these instructions for later use. Enclose them with the cylinder if it is passed on to a third party. Please observe all warning notices and safety instructions.

Technical changes and mistakes reserved.

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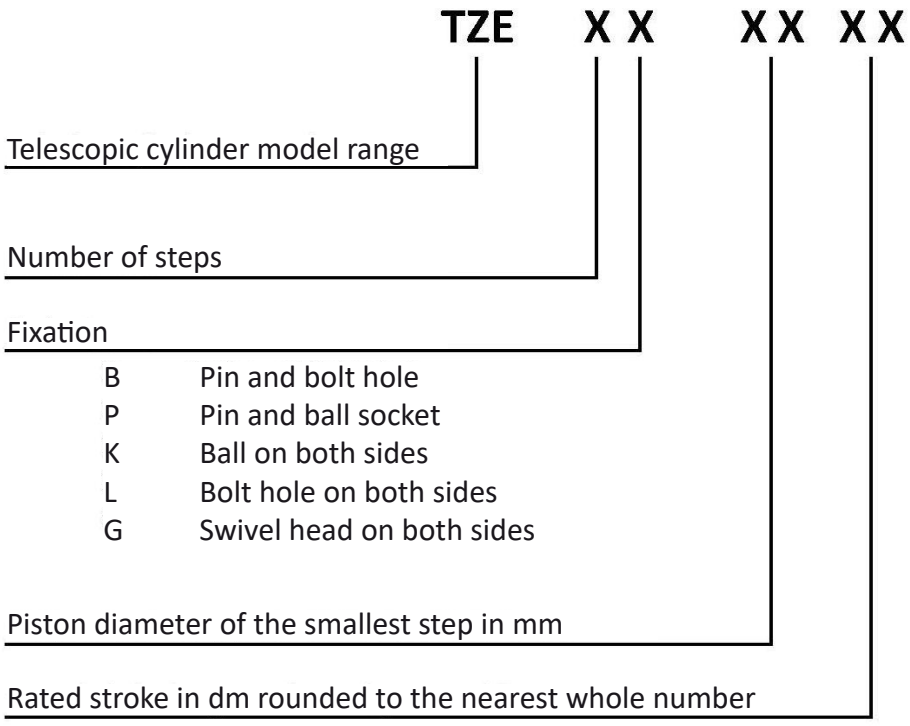
Designation of the device

The designation of your cylinder is located on the device in the location marked on the dimension sheet.



General description

Definition: A hydraulic cylinder is a linear motor driven by fluid and is one of the hydraulic consumers. It is the most important drive element in the hydraulic system. In it, the energy from the hydraulic fluid that is supplied by a hydraulic pressure accumulator or a hydraulic pump is converted to an easily controllable, linear force. There are countless designs of hydraulic cylinder.

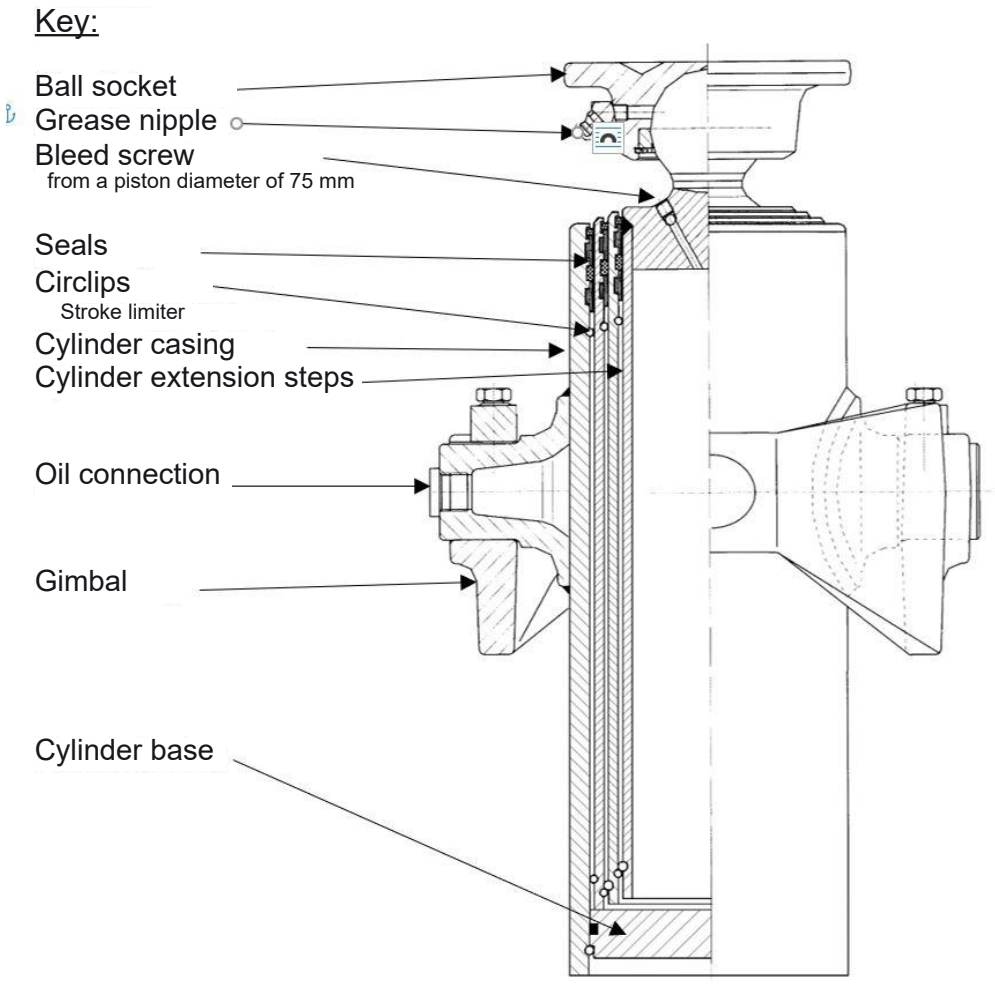


Figure: Schematic representation of a telescopic cylinder with key

The image can only provide a schematic overview of the individual components of a hydraulic cylinder.

Proper and safe use

According to the manufacturer's declaration provided by WEBER HYDRAULIK GMBH, our hydraulic cylinders may only be started up once it has been verified that the application into which our cylinder is installed complies with the technical regulations, standards and laws that are to be applied.

Our hydraulic cylinders are developed, designed and built exclusively for the application specified in the specification, order or delivery note. Any other use is not intended and is to be classified as "improper use". The cylinder design and specifications are provided on the enclosed data sheet or the enclosed dimension sheet.

The order, specification and dimension sheets are integrated parts of these operating instructions. You can request these documents from our service department if necessary.

Any technical modification to our products causes a loss of warranty and other claims.

Area of application

The TZE model range was developed especially for use in agricultural tippers and tailored to the corresponding operating parameters (working pressure, load change, etc.). Any other use, e.g. in the commercial vehicle area is considered improper use and requires appropriate testing and manufacturer approval, since otherwise, we cannot accept any warranty claims.

WARNING NOTICES

Proper use

Hydraulic cylinders may only be operated in an environment intended for them after ensuring proper installation and corresponding acceptance by the operating company. They must never be actuated using compressed air or other gases. Due to the high level of static friction on hydraulic cylinders, there is a risk that the piston rod extends suddenly and at high speed if gases are used. There is an immediate danger to life and limb.

Hydraulic cylinders move heavy loads. If they are not shut down properly, they therefore pose significant hazards. Any use other than the use described in the order is “improper use” as defined by the EU framework directive.

During stoppages, suspended loads must always be secured mechanically to prevent unintended movement.

Qualifications of staff

Hydraulic systems can pose significant dangers to life and limb. Work on hydraulic devices may therefore only be performed by employees who are trained to handle hydraulic devices, have corresponding experience and can evaluate the dangers posed by hydraulic systems. In order to prevent incorrect piping, lines must be connected based on the circuit diagrams to be used.

Installation and assembly conditions

Information on safe handling

Hydraulic cylinders are partly heavy devices. Depending on the weight, it may therefore be necessary to use appropriate lifting equipment. Pay attention to locally applicable laws and regulations on industrial safety for this. Ensure that loosening during handling and damage to the hydraulic cylinder are prevented. Piston rods must also be secured to prevent unintended movement.

Storage and packaging

To store our hydraulic cylinders for less than 1 month, the oil film that occurs as part of our functional inspection is sufficient. However, it must be ensured that the storage room is

- Dry,
- Free of aggressive gases and vapors or corrosive substances,
- Has a room temperature of more than +7°C (no condensing atmosphere).

If longer storage is intended (e.g. from 6 months), the cylinders must be filled completely with hydraulic oil and sealed with blank plugs. All bare parts must be protected with long-term preservation accordingly.

Storage durations beyond this and their storage conditions must be clarified in individual cases.

Base coats of paint are basically oil-proof or designed according to the agreed specifications.

For increased corrosion protection during storage and operation, please contact our customer service department.

Packaging materials are valuable. Dispose of packaging that is no longer required properly.

Initial assembly

The cylinder must be protected from damage during initial assembly and later work. Suitable covers must be attached for welding, grinding and painting work. Retrospective welding work on the cylinder is generally prohibited. When performing welding work, note that fault currents can cause irreparable damage to cylinders and seals.

Quality of the fastening screws

The screws used for fastening/installation on/in the machine must be designed in accordance with the generally applicable regulations for engineering design of screw connections. Incorrectly designed fastening screws may cause serious accidents.

Installation position and accessibility

The installation position should be selected so that good accessibility for later maintenance is always available.

Exceeding the permitted pivot angle (see dimension sheets) can cause damage to the cylinder, gimbal or ball socket. Suitable structural measures must be taken to avoid this. In individual cases, it may be functionally necessary to comply with defined installation positions. If in doubt, contact our customer service department.

Always observe the notices on the dimension sheets and comply with the maximum permissible nominal pressure, the maximum load of the gimbal and the operating temperature according to the last valid WEBER-HYDRAULIK dimension sheet.

Safety instructions for installation in tippers and other applications

The hydraulic system must be equipped properly with an oil filter, hydraulic stroke limiter, tipper truck arresting cable and a pressure limiting valve (max. setting depth ≤ nominal pressure). The stroke limiter must be designed so that the last step cannot be moved onto the inner stop (spare stroke of 30 to 50 mm).

The cylinder must be installed so that the smallest step is extended by around 30 mm when the loading platform is lowered completely.

After installing and hydraulically connecting the tip cylinder, it must be bled properly so that no sudden movement occurs when extending, which could cause damage to the cylinder's limit stop.

The lifted traveling bridge with tipping stage – required to thread the ball into the ball socket – must be supported so that unintended bridge lowering is prevented reliably.

The support (whether it is removable or installed permanently on the vehicle) must be designed so that it cannot "fall out" if the bridge is fully lifted unintentionally.

>>This applies to both new vehicles and repair work. <<

Improper support of the traveling bridge with tipping stage can cause serious injuries (potentially even resulting in death).

Remark: This support can be designed, e.g. so that when tipping sideways and tipping backwards, it supports itself on the frame – hanging freely and loosely due to its own weight → folded up and secured in the transport position.

The vehicle manufacturer who puts the hydraulic cylinder into circulation in their vehicles must ensure that all installation work can be performed safely and that safe operation of the hydraulic cylinders in the vehicle is guaranteed.

The manufacturer must mark the danger zone in accordance with the Machinery Directive 2006/42/EC.

The manufacturer must perform all required approvals and tests for the vehicle at the usage location.

Permitted loads and permitted load equipment

Our hydraulic cylinders may only be installed so that the design would not exceed the underlying loads without exception. Loads beyond this, piston rod or cylinder tensions are not permitted. If tensioned or in the event of an overload, expect the guide bushings, cylinder walls and seals to fail prematurely and therefore expect a loss of any form of warranty!

On double-acting cylinders with throttling on the discharge side (e.g. throttle non-return valve), it must be ensured that the pressure transmission and special operating states cannot cause pressure higher than the nominal pressure to occur. Differential cylinders are always designed so that the hydraulic fluid can flow away freely and that no pressure higher than the nominal pressure can occur on the piston rod side due to pressure transmission. On all single-acting cylinders, it must be ensured that the unpressurized side is connected to the hydraulic tank via a suction hose. Oiled air should be taken in if possible.

The highest permitted operating parameters must be complied with. Ultra high pressures must be prevented by suitable measures to limit pressure. The permitted values are provided in the specification and the dimension sheets.

If necessary, suitable structural measures are required on the machine side to avoid these impermissible operating conditions.

Set up

Information on safe set up

Set up may only be performed once it has been ensured that

- All fasteners and connections have been installed properly.
- The components have been filled with the correct oil.
- The laid pipelines have been cleaned on the inside and outside, and rinsed properly before screwing to the hydraulic cylinder.
- The machine or system into which the cylinder will be installed has been checked for safety according to the regulations and accepted.

Note that hydraulic components may be under high pressure. Always depressurize before performing work. Note that unintended movements due to external forces (e.g. gravity for machine booms) resulting from depressurizing must be prevented.

Rinsing, filling and bleeding the cylinder

To operate hydraulic cylinders properly, they must be rinsed, filled and bled properly. Use the bleed screw in the piston rod to bleed the hydraulic system several times when the cylinder is extended prior to starting up. Cylinders with a piston diameter of < 75 mm must be bled via the hydraulic connections.

The cylinder may only be filled and operated using the hydraulic fluids specified in the specification.

Before the application may be started up initially at full working pressure and full operating speed, all parts must have been rinsed thoroughly and all fasteners checked for tightness.

ATTENTION: Skin and eye contact with the operating media must be avoided for health reasons (consult a physician if necessary).

Initial inspection of the cylinder

After initial start up, our hydraulic cylinders must be subjected to an initial inspection. As soon as the application's operating temperature is reached, stop the system and check all

- Pipe screw connections and
- All brackets

for tightness, and retighten correctly if necessary.

Operation

Moving the vehicle with the tip cylinder extended is strictly prohibited. The raised center of gravity poses a risk of accidents and damage.

Remaining in the danger zone of the raised traveling bridge with tipping stage is prohibited.

Piping and screw connections

The lines and fittings that are used must always be designed according to the working pressure of the hydraulic cylinder. Always observe the specifications on dimension sheets, type plates and similar. The hydraulic cylinder’s piping should be as short and straight as possible.

Please observe the installation instructions from the relevant manufacturer to install the hydraulic screw connections.

Set up and operation

Qualifications of staff

All work on hydraulic cylinders may only be performed by trained hydraulic specialists.

Stoppages

During extended stoppages, ensure that the cylinders are protected sufficiently against corrosive and mechanical attacks. Remove any preservation if necessary before setting up again. If there is a risk that lowering loads can cause damage, suspended loads must be secured appropriately during stoppages.

Visual inspection

Rectifying minor faults in good time can prevent a spontaneous failure of hydraulic cylinders. Hydraulic cylinders must therefore be inspected visually at regular intervals. Oil traces on cylinders may indicate leaks.

Ongoing monitoring of the oil temperature on the cylinder

The oil temperature on the cylinder during operation must not leave the range defined in the specification. Standard usage temperatures are from -20°C - 70°C. Leaving the permitted temperature range can cause seals to spontaneously fail or to wear out prematurely. Operation outside the specified operating temperature results in a loss of warranty claims.

Regular inspection of the operating medium

The operating media has a major influence on the service life of hydraulic components. It should therefore be inspected for contamination or aging at regular intervals and should be replaced in good time. The cleanliness of the oil must be ensured by appropriate filtering, regular replacement or other suitable measures.

Use quality oils in accordance with the specific load. Only use bio oils after prior consultation.

The oil purity during operation must comply with at least purity class 19/17/14 in accordance with ISO 4406 (1999).

Regular inspection of the screw connections and sealing leaks

Movements, vibrations or other effects can cause screw connections to come loose. Sealing any leaks and re-tightening screw connections are classic maintenance tasks. The operating company is responsible for a good condition.

Screw connections, locking screws and other attachments must be screwed to the specified tightening torques. The prescribed tightening torques are specified in the corresponding dimension sheet.

ATTENTION: This type of work is the responsibility of the operating company and is not performed by us even after re-installation as part of warranty or guarantee services.

When refilling or topping up missing operating media, always ensure that no incompatible media is used.

Residual risks

Despite careful maintenance and observing all warning instructions, a residual risk cannot be ruled out when operating hydraulic systems. Therefore, always ensure that you work with the utmost care and constantly comply with all safety regulations during operation and particularly when performing maintenance work.

Servicing and troubleshooting

Qualifications of maintenance staff

All maintenance work on hydraulic cylinders may only be performed by trained hydraulic specialists.

Remedying faults during operation/the workflow

Despite careful planning, installation and set up, faults can occur on hydraulic applications. Always refer to the hydraulic circuit diagram to determine the cause of the fault, since only precise circuit diagram details enable us as a service organization to take fast fault remedying measures.

Fault	Cause	Remedy
Leak	Leak above the piston rod surface.	Check the piston rod for damage, new piston rod, new seal set.
	Mechanical tension (joint bearing mobility limited, etc.).	Remedy mechanical tension (e.g. replace the joint bearing) and replace the seal set.
	Leak above the start-up valve or damping valve.	Replace the faulty valve.
	Leak between the cylinder pipe and cylinder base or between the cylinder pipe and cylinder head.	Dismantle, replace the O-ring + backup ring.
Cylinder does not move or moves too slowly (loss of power)	Pressure on the cylinder too low.	Cause of pressure reduction.
	Moving parts are blocked.	Remedy the blockage.
	Leak (potentially “invisible” above the piston seal).	Replace the seal set, check the surface quality of the pipe when doing so, new pipe if necessary.

We generally strongly recommend always installing the cylinder with a new seal set after dismantling it.

Maintenance

Replacing the operating medium

Replacing the operating media depends on many operating factors for the application and is mainly based on the media's degree of contamination and aging.

In general, the media should be changed completely

- After 1,500 operating hours at the latest on small systems and
- After 3,000 operating hours at the latest on large systems.

Also observe the manufacturer's instructions for your hydraulic fluid.

Attention: An initial media change must take place no later than after 50 to 200 operating hours (depending on the ratio of flow rate to tank volume).

Furthermore, all filter inserts must be replaced and bleed valves, etc. cleaned carefully each time the media is changed.

Lubrication and maintenance of swivel bearings and swivel heads

Depending on the design principle, joint bearings are installed on our hydraulic cylinders, which require regular lubrication. Check the condition of the joint bearings after 500 operating hours or no later than ½ a year and regrease them with suitable greases if required.

The ball socket must be relubricated with acid-free grease during set up, after an extended stoppage but no later than every 3 months.

Sufficient preservation of the extended area of the pressure steps must be performed at least every six months or as required if operated continuously. New cylinders have a very heavy grease film due to the oils used during installation.

Always replace the entire seal set when replacing step pipes.

Step pipes that are not moved for an extended period and are subjected to environmental influences without protection must be preserved with acid-free grease.

Cleaning

Stubborn dirt and adhered ice must be removed carefully from piston rods and other moving parts before actuating the cylinder. Using a high pressure cleaner can cause damage on certain scrapers, result in internal contamination and must be approved separately. All bearing points must be relubricated after cleaning and unpainted areas must be preserved.

- Cleaning the hydraulic circuit (e.g. after work on the system) before set up is a prerequisite for faultless operation. Aggressive media may never be used for cleaning. Cylinders that have been removed and had their interiors cleaned must be rinsed sufficiently with the corresponding operating media.
- Stubborn dirt and ice must be removed carefully before actuating the cylinder. In order to prevent dirt penetrating, cover the seal area when cleaning. Using a high pressure or steam jet device is not permitted. Trunnions and the ball socket must be relubricated each time after cleaning.

ATTENTION: Cleaning piston rods with high pressure cleaners and/or alkaline cleaning agents can impair the independent corrosion protection of the chrome layer significantly and cause premature corrosion.

Spare parts

We keep a comprehensive stock of spare and replacement parts for you. For fast delivery of spare and replacement parts, please always specify the

- Type designation,
- Serial number
- And the required part according to the spare parts list.

Please contact our customer service department for information on installing spare parts.

Only original spare parts may be used.

Replacing seals

The seals on our cylinders are designed for a long service life. However, operation over a long period can case wear to the seals. Visible indicators of seal wear include small leaks on the guide piece. They can be recognized by oil escaping from the piston rod. Internal leaks, i.e. wear to the piston seal, can be recognized by cylinders lowering when at a standstill. However, this can also be completely normal behavior for some seal models. In many cases, replacing seals also remedies the leak. However, there are cases where leaks are due to other causes. The limits of these effects overlap so much that it makes sense to consult our customer service experts to determine seal damage. Expert knowledge and very careful and cleaning working methods are required to replace seals. In these situations, please contact our customer service department.

If you have the required specialist knowledge and tools, you can of course replace the seal yourself. In this case, please only use original spare parts to ensure a long service life. You can order the original seals from our customer service department.

Disposal

Please contact us directly for disposal of hydraulic cylinders. We're happy to help with proper dismantling and disposal of individual parts.

If you initiate disposal yourself, please consider the following:

Hydraulic cylinders are not normal waste. Due to the high metal portion of the hydraulic cylinders, their materials can largely be reused. Therefore, never dispose of hydraulic cylinders in normal household waste/residual waste. Hydraulic cylinders and hydraulic fluids must be disposed of in accordance with the national regulations in the relevant country.

Careless disposal of hydraulic cylinders can cause environmental damage. Correct disposal makes an important contribution to protecting our environment.

Appendix

Type index

WEBER-HYDRAULIK

Telescopic cylinder TZE

TYPE INDEX

ATL - SV / Ai
Dimension sheet
60003600

Type		Stroke in mm	Lifting force at 200 bar Steps - Ø in mm 1.6 t	3.2 t	5.7 t	8.8 t	12.7 t	17.3 t	22.6 t	30.8 t	40.2 t	Gimbal no.	Oil volume in l	Weight in kg	WEBER ID number
2-step			Ø32	Ø45	Ø60	Ø75	Ø90	Ø105	Ø120	Ø140	Ø160				
TZE 2B	4505	500										1	1.70	13.80	1808710
TZE 2B	6005	500										2	2.20	19.95	1808770
TZE 2B	7505	500										4	3.20	24.93	1808796
3-step			Ø32	Ø45	Ø60	Ø75	Ø90	Ø105	Ø120	Ø140	Ø160				
TZE 3P	3208	760										3	2.00	15.53	1808931
TZE 3P	3210	1020										3	2.60	18.10	1808974
TZE 3P	4507	750										3	2.70	19.83	1808990
TZE 3P	4510	1000										3	3.60	23.53	1809016
TZE 3P	6010	1000										4	5.40	37.22	1809032
TZE 3P	6012	1200										4	6.40	41.17	1809059
TZE 3P	6014	1400										4	7.40	45.10	1809075
TZE 3P	6016	1600										4	8.20	49.93	1810731
TZE 3P	7512	1200										4	10.40	39.51	1809113
TZE 3P	7514	1400										4	11.90	43.11	1809130
TZE 3P	7516	1600										4	13.90	47.81	1809172
TZE 3P	7518	1800										4	15.50	50.46	1809199
TZE 3P	9014	1400										5	16.20	54.41	1809237
4-step			Ø32	Ø45	Ø60	Ø75	Ø90	Ø105	Ø120	Ø140	Ø160				
TZE 4P	3210	1000										3	3.00	19.27	1810170
TZE 4P	3213	1350										3	4.00	22.92	1809458
TZE 4P	4510	1000										4	4.60	29.78	1809490
TZE 4P	4513	1350										4	6.10	34.39	1809512
TZE 4P	6013	1350										4	8.80	44.10	1809571
TZE 4P	6016	1600										4	10.40	48.96	1809598
TZE 4P	6019	1850										4	11.90	53.66	1810162
TZE 4P	7513	1350										5	13.10	48.00	1809636
TZE 4P	7516	1600										5	15.40	52.96	1809652
TZE 4P	7519	1850										5	17.80	58.31	1810146
TZE 4P	7524	2400										5	22.90	69.21	1809717
TZE 4P	9016	1600										6	20.90	72.31	1809733
TZE 4P	9019	1850										6	24.10	78.51	1809750
TZE 4P	9021	2150										6	27.70	87.10	1810154
TZE 4P	9024	2400										6	31.00	91.66	1809792
5-step			Ø32	Ø45	Ø60	Ø75	Ø90	Ø105	Ø120	Ø140	Ø160				
TZE 5P	3208	850										4	3.40	23.97	1809814
TZE 5P	6018	1850										5	14.50	59.71	1809830
TZE 5P	7530	3000										6	33.00	99.96	1809857

Parts marked in gray only after prior consultation regarding minimum quantities and delivery date.

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Subject to changes, issue date May 2017, replaces edition from June 2014

Standard 2-step product range

WEBER-HYDRAULIK

2-step telescopic cylinder

STANDARD PRODUCT RANGE

Dimension sheet no.

60003600

Preferred areas of application:
The single-acting telescopic cylinders are mainly designed as tip cylinders for farm truck 2-sided tip equipment. A stroke limit must be provided, which prevents the cylinders moving to the limit stop. Each pivot angle max. 27°-30°

Design principle:

The listed telescopic cylinder types have a plunger design with a piston rod-side seal. Suspension pivots with a gimbal are located on the cylinder sheath. The last piston step is provided with a hole. A tried and tested circlip design combined with low-wear scraping and sealing elements made of polyurethane guarantee reliability and a thin lubricating film.

Lifting speed range:
Up to 0.1 m/s

Seal equipment:
Tried and tested standard grooved rings and scrapers made of polyurethane guarantee a thin lubricating film and a good scraping effect.

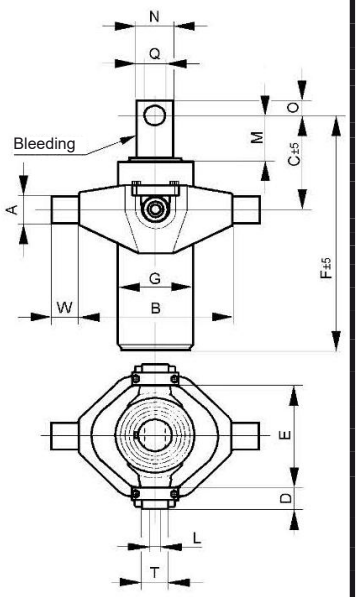
Temperature range:
From -10 to + 80° Celsius.

Hydraulic fluid:
Mineral or bio oils (only after prior consultation).
Viscosity 10 to 300 cst.

Nominal pressure:
Nominal pressure 200 bar.
Test pressure 220 bar.

Permitted pushing force:
The permitted pushing force corresponds to the gimbal's maximum load and must not be exceeded (page 5)

Piston rod design:
The extending piston steps are dimensionally hard chrome plated.



The installation, operating and maintenance instructions must be observed!
Benefits: Certificate in accordance with ISO 9001, surface primed, step pipes chrome plated, high nominal pressure
Bleed screw from a piston diameter of 75 mm and up.

Type: TZE 2B	Stroke in mm ±25 mm	Lifting force at 200bar				Dimensions																		
		Steps Ø in mm				Gimbal					Cylinder													
		3.2 t	5.7 t	8.8 t	12.7 t	Gimbal no.	Max. load in tons.	A pin Ø ± 1.5	B pin dist.	W pin length	C pin pos.	D pin length	E pin dist. ± 2	F overall length	G sheath Ø	L connection	M hole dist.	N bolt Ø	O hole dist.	Q bolt Ø	T pin Ø - 2	kg weight	Oil volume in l	Weber ID. no. with gimbal
		45	60	75	90																			
4505	500					1	4	25	152	20	100	25	98	372	80	M 16x1.5	27	41.5	20	25.5	25	13.8	1.7	1808710
6005	500					2	5	30	165	25	120	25	114	400	95	M 16x1.5	45	53.5	25	30.5	30	20.0	2.2	1808770
7505	500					4	8	40	230	40	120	38	140	402	110	M 16x1.5	47	65.5	25	30.5	40	24.9	3.2	1808796

Parts marked in gray only after prior consultation regarding minimum quantities and delivery date.

Subject to changes. Issue date May 2017, replaces edition from June 2014

Standard 3-step product range

WEBER-HYDRAULIK

3-step telescopic cylinder

STANDARD PRODUCT RANGE

Dimension sheet no.

60003600

Preferred areas of application:
The single-acting telescopic cylinders are mainly designed as tip cylinders for farm truck 3-sided tip equipment. A stroke limit must be provided, which prevents the cylinders moving to the limit stop. Each pivot angle max. 30°

Design principle:

The listed telescopic cylinder types have a plunger design with a piston rod-side seal. Suspension pivots with a gimbal are located on the cylinder sheath. The last piston step is provided with a hole. A tried and tested circlip design combined with low-wear scraping and sealing elements made of polyurethane guarantee reliability and a thin lubricating film.

Lifting speed range:
Up to 0.1 m/s

Seal equipment:
Tried and tested standard grooved rings and scrapers made of polyurethane guarantee a thin lubricating film and a good scraping effect.

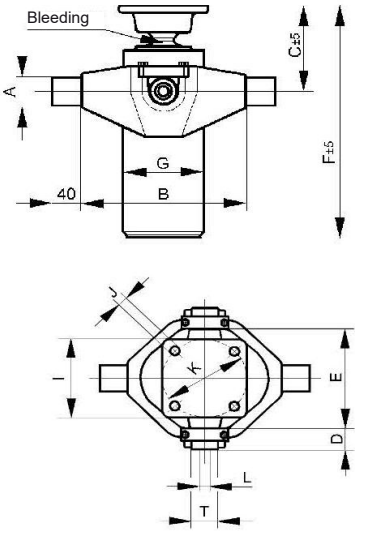
Temperature range:
From -10 to + 80° Celsius.

Hydraulic fluid:
Mineral or bio oils (only after prior consultation).
Viscosity 10 to 300 cst.

Nominal pressure:
Nominal pressure 200 bar.
Test pressure 220 bar.

Permitted pushing force:
The permitted pushing force corresponds to the gimbal's maximum load and must not be exceeded (page 5)

Piston rod design:
The extending piston steps are dimensionally hard chrome plated.



The installation, operating and maintenance instructions must be observed!
Benefits: Certificate in accordance with ISO 9001, surface primed, step pipes chrome plated, high nominal pressure
Bleed screw from a piston diameter of 75 mm and up.

Type: TZE 3P....	Stroke in mm ± 25 mm	Lifting force at 200 bar – Steps Ø in mm: 1.6 t / 32	3.2 t / 45	5.7 t / 60	8.8 t / 75	12.7 t / 90	17.3 t / 105	22.6 t / 120	30.8 t / 140	Dimensions – Gimbal: Gimbal no.	Max. load in tons.	A pin Ø ± 1.5 mm	B pin dist.	Cylinder: C pin pos.	D pin length	E pin dist. ± 2	F overall length	G sheath Ø	I socket width	J hole Ø ± 0.5	K hole circle Ø ± 0.4	L connection	T T pin Ø - 2	kg weight	Oil volume in l	Weber ID. no. with gimbal
3208	760									3	6	40	230	170	23	127	408	80	95	13.5	100	M16x1.5	40	15.5	2.0	1808931
3210	1020									3	6	40	230	170	23	127	493	80	95	13.5	100	M16x1.5	40	18.1	2.6	1808974
4507	750									3	6	40	230	170	23	127	417	95	95	13.5	100	M16x1.5	40	19.8	2.7	1808990
4510	1000									3	6	40	230	170	23	127	503	95	95	13.5	100	M16x1.5	40	23.5	3.6	1809016
6010	1000									4	8	40	230	180	38	141	514	110	125	14.5	125	M16x1.5	40	37.2	5.4	1809032
6012	1200									4	8	40	230	180	38	141	578	110	125	14.5	125	M16x1.5	40	41.2	6.4	1809059
6014	1400									4	8	40	230	180	38	141	641	110	125	14.5	125	M16x1.5	40	45.1	7.4	1809075
6016	1600									4	8	40	230	180	38	141	641	110	125	14.5	125	M16x1.5	40	49.9	8.2	1810731
7512	1200									4	8	40	230	180	38	155	578	125	125	14.5	125	M16x1.5	40	39.5	10.4	1809113
7514	1400									4	8	40	230	180	38	155	641	125	125	14.5	125	M16x1.5	40	43.1	11.9	1809130
7516	1600									4	8	40	230	180	38	155	721	125	125	14.5	125	M16x1.5	40	47.8	13.9	1809172
7518	1800									4	8	40	230	180	38	155	786	125	125	14.5	125	M16x1.5	40	50.5	15.5	1809199
9014	1400									5	12	45	230	180	38	169	641	145	125	14.5	125	M22x1.5	40	54.4	16.2	1809237

Parts marked in gray only after prior consultation regarding minimum quantities and delivery date.

Subject to changes. Issue date May 2017, replaces edition from June 2014

Standard 4-step product range

WEBER-HYDRAULIK

4-step telescopic cylinder

STANDARD PRODUCT RANGE

Dimension sheet no.

60003600

Preferred areas of application:
The single-acting telescopic cylinders are mainly designed as tip cylinders for farm truck 3-sided tip equipment. A stroke limit must be provided, which prevents the cylinders moving to the limit stop. Each pivot angle max. 30°

Design principle:
The listed telescopic cylinder types have a plunger design with a piston rod-side seal. Suspension pivots with a gimbal are located on the cylinder sheath. The last piston step is provided with a hole. A tried and tested circlip design combined with low-wear scraping and sealing elements made of polyurethane guarantee reliability and a thin lubricating film.

Lifting speed range:
Up to 0.1 m/s

Seal equipment:
Tried and tested standard grooved rings and scrapers made of polyurethane guarantee a thin lubricating film and a good scraping effect.

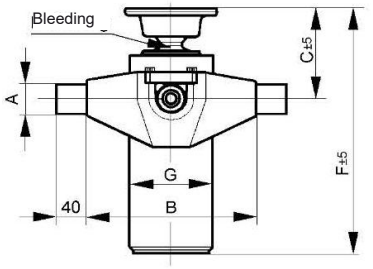
Temperature range:
From -10 to + 80° Celsius.

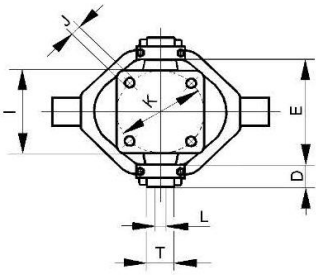
Hydraulic fluid:
Mineral or bio oils (only after prior consultation).
Viscosity 10 to 300 cst.

Nominal pressure:
Nominal pressure 200 bar.
Test pressure 220 bar.

Permitted pushing force:
The permitted pushing force corresponds to the gimbal's maximum load and must not be exceeded (page 5)

Piston rod design:
The extending piston steps are dimensionally hard chrome plated.





The installation, operating and maintenance instructions must be observed!
Benefits: Certificate in accordance with ISO 9001, surface primed, step pipes chrome plated, high nominal pressure
Bleed screw from a piston diameter of 75 mm and up.

Type: TZE 4P....	Stroke in mm ± 25 mm	Lifting force at 200 bar – Steps Ø in mm: 1.6 t / 32	3.2 t / 45	5.7 t / 60	8.8 t / 75	12.7 t / 90	17.3 t / 105	22.6 t / 120	30.8 t / 140	40.2 t / 160	Gimbal: Gimbal no.	Max. load in tons.	A Pin Ø ± 1.5 mm	B Pin dist.	Cylinder: C Pin pos.	D Pin length	E Pin dist. ± 2	F Overall length	G Sheath Ø	I Socket width	J Hole Ø ± 0.5	K Hole circle Ø ± 0.4	L Connection	T T pin Ø - 2	kg Weight	Oil volume in l	Weber ID. no. with gimbal
3210	1000										3	6	40	230	170	23	127	421	95	95	13.5	100	M16x1.5	40	19.3	3.0	1810170
3213	1350										3	6	40	230	170	23	127	506	95	95	13.5	100	M16x1.5	40	23.0	4.0	1809458
4510	1000										4	8	40	230	170	38	141	421	110	95	13.5	100	M16x1.5	40	19.8	4.6	1809490
4513	1350										4	8	40	230	170	38	141	506	110	95	13.5	100	M16x1.5	40	34.4	6.1	1809512
6013	1350										4	8	40	230	180	38	155	517	125	125	14.5	125	M16x1.5	40	44.1	8.8	1809571
6016	1600										4	8	40	230	180	38	155	581	125	125	14.5	125	M16x1.5	40	49.0	10.4	1809598
6019	1850										4	8	40	230	180	38	155	644	125	125	14.5	125	M16x1.5	40	53.7	11.9	1810162
7513	1350										5	12	45	230	180	38	169	517	145	125	14.5	125	M22x1.5	40	48.0	13.1	1809636
7516	1600										5	12	45	230	180	38	169	581	145	125	14.5	125	M22x1.5	40	53.0	15.4	1809652
7519	1850										5	12	45	230	180	38	169	644	145	125	14.5	125	M22x1.5	40	58.3	17.8	1810146
7524	2400										5	12	45	230	180	38	169	789	145	125	14.5	125	M22x1.5	40	69.2	22.9	1809717
9016	1600										6	16	45	280	180	40	189	581	165	125	14.5	125	M22x1.5	40	72.3	20.9	1809733
9019	1850										6	16	45	280	180	40	189	644	165	125	14.5	125	M22x1.5	40	78.5	24.1	1809750
9021	2150										6	16	45	280	180	40	189	724	165	125	14.5	125	M22x1.5	40	87.1	27.7	1810154
9024	2400										6	16	45	280	180	40	189	789	165	125	14.5	125	M22x1.5	40	91.7	31.0	1809792

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Subject to changes. Issue date May 2017, replaces edition from June 2014

Standard 5-step product range

WEBER-HYDRAULIK

5-step telescopic cylinder

STANDARD PRODUCT RANGE

Dimension sheet no.

60003600

Preferred areas of application:
The single-acting telescopic cylinders are mainly designed as tip cylinders for farm truck 3-sided tip equipment. A stroke limit must be provided, which prevents the cylinders moving to the limit stop. Each pivot angle max. 30°

Design principle:
The listed telescopic cylinder types have a plunger design with a piston rod-side seal. Suspension pivots with a gimbal are located on the cylinder sheath. The last piston step is provided with a hole. A tried and tested circlip design combined with low-wear scraping and sealing elements made of polyurethane guarantee reliability and a thin lubricating film.

Lifting speed range:
Up to 0.1 m/s

Seal equipment:
Tried and tested standard grooved rings and scrapers made of polyurethane guarantee a thin lubricating film and a good scraping effect.

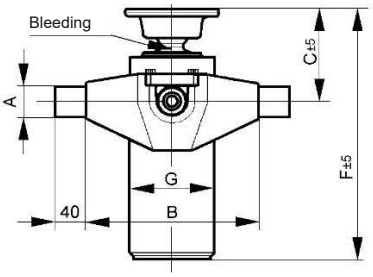
Temperature range:
From -10 to + 80° Celsius.

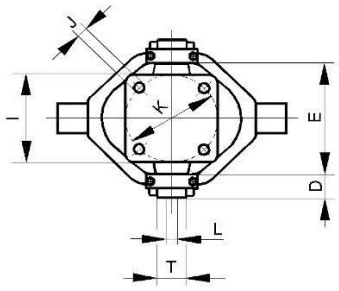
Hydraulic fluid:
Mineral or bio oils (only after prior consultation).
Viscosity 10 to 300 cst.

Nominal pressure:
Nominal pressure 200 bar.
Test pressure 220 bar.

Permitted pushing force:
The permitted pushing force corresponds to the gimbal's maximum load and must not be exceeded (page 5)

Piston rod design:
The extending piston steps are dimensionally hard chrome plated.





The installation, operating and maintenance instructions must be observed!
Benefits: Certificate in accordance with ISO 9001, surface primed, step pipes chrome plated, high nominal pressure
Bleed screw from a piston diameter of 75 mm and up.

Type: TZE 5/6P....	Stroke in mm ± 25 mm	Lifting force at 200 bar – Steps Ø in mm: 1.6 t / 32	3.2 t / 45	5.7 t / 60	8.8 t / 75	12.7 t / 90	17.3 t / 105	22.6 t / 120	30.8 t / 140	40.2 t / 160	Dimensions – Gimbal: Gimbal no.	Max. load in tons.	A Pin Ø ± 1.5 mm	B Pin dist.	Cylinder: C Pin pos.	D Pin length	E Pin dist. ± 2	F Overall length ± 1.5mm	G Sheath Ø	I Socket width	J Hole Ø ± 0.5	K Hole circle Ø ± 0.4	L Connection	T Pin Ø	kg Weight	Oil volume in l	Weber ID. no. with gimbal
3208	850										4	8	40	230	230	38	141	328	110	95	13.5	100	M16x1.5	40	24.0	3.4	1809814
6018	1850										5	12	45	230	180	38	169	559	145	125	14.5	125	M22x1.5	40	59.7	14.5	1809830
7530	3000										6	16	45	280	180	40	189	792	165	125	14.5	125	M22x1.5	40	100	33.0	1809857

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Subject to changes. Issue date May 2017, replaces edition from June 2014

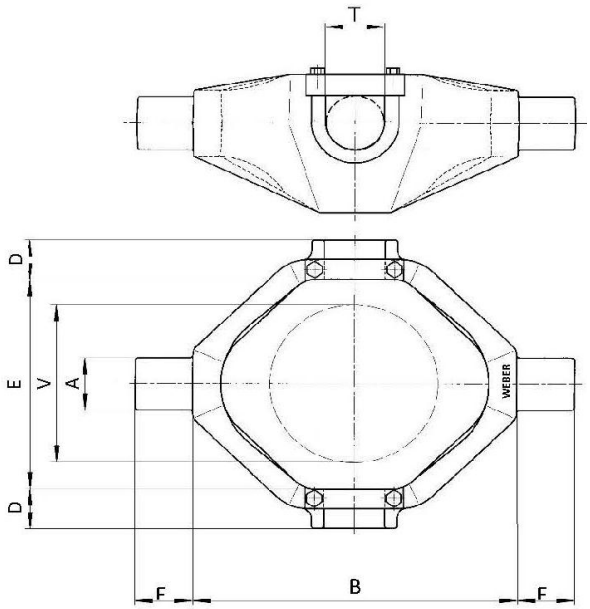
Gimbal, ball socket

WEBER-HYDRAULIK

Gimbal
Ball socket

Dimension sheet no.
60003600

Gimbal

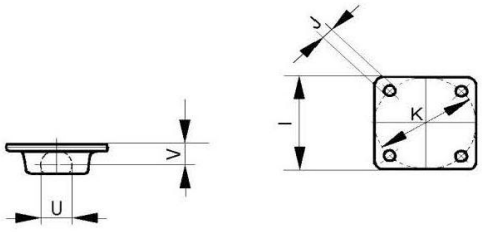


Free dimensional tolerance B in accordance with DIN 1685
Non-dimensioned tapers in accordance with DIN 1511
Non-dimensioned radii R 2.5

Gimbal no.	Dimensions in mm							Load bearing capacity in t	Pivot angle	Order no.
	ØA ± 1.5	B -3	D	E	F	ØT	Ø V max.			
1	25	152	20	100	20	25	80	4	27°	568538
2	30	165	20	116	25	30	95	5	30°	29386
3	40	230	23	130	40	40	130	6	30°	29823
4	40	230	38	160	40	40	130	8	30°	29602
5	45	230	34	174	40	40	146	12	30°	17736
6	45	280	40	194	40	40	174	16	30°	2823772

Ball socket

St 52 / C22 / Ck 45



Ball socket no.	Dimensions					Load bearing capacity in t	Pivot angle	Order no.
	I	ØJ	ØK	V	ØU			
1	95	13.5	100	22.5	39	8	30°	315516
2	125	14.5	125	28	50	16	30°	315001

Subject to changes, issue date May 2017, replaces edition from June 2014