

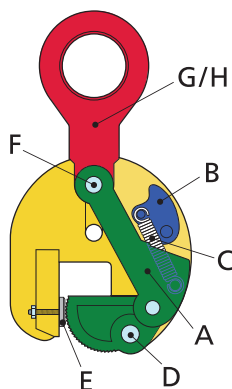


Extra hardened pivot and cam

All spare parts are available either separately or as repair sets. It is recommended when any parts are damaged to replace them straight away and not to take any risk.

When ordering spare parts always give:

- model
- lifting capacity
- jaw opening and serial number
- the needed spare parts.



Model	A	B	C	D	E	F	G/H
	Cam	Lock Lever Assembly	Spring	Cam Pin	Pivot	Shackle Pin	Lifting Shackle
0.75 TS-H	550020.5	550031	250000	550029	550019.5	550058	550050
1 TSE-H	550880.5	550831	250800	550829	550819.5	550858	550850
2 TSE-H	550920.5	550131	250100	550129	550119.5	550158	550150
3 TSE-H	550920.5	550131	250100	552929	550119.5	550158	550150
4.5 TSE-H	552220.5	550231	250200	550329	550219.5	550258	550250
6 TS-H	550320.5	550331	250300	550329	550219.5	550358	550350
7.5 TSE-H	552620.5	552531	250400	550529	550219.5	550458	550450
0.75 TSU-H	550020.5	550031	250000	550029	550019.5	550058	555050
1 TSEU-H	550880.5	550831	250800	550829	550819.5	550858	555850
2 TSEU-H	550920.5	550131	250100	550129	550119.5	550158	555150
3 TSEU-H	550920.5	550131	250100	552929	550119.5	550158	555150
4.5 TSEU-H	552220.5	550231	250200	550329	550219.5	550258	555250
6 TSU-H	550320.5	550331	250300	550329	550219.5	550358	555350
7.5 TSEU-H	552620.5	552531	250400	550529	550219.5	550458	555450
0.75 TSMP-H	550020.5	550031	250000	550029	550019.5	550058	550050
1 TSEMP-H	550880.5	550831	250800	550829	550819.5	550858	550850
2 TSEMP-H	550920.5	550131	250100	550129	550119.5	550158	550150
3 TSEMP-H	550920.5	550131	250100	552929	550119.5	550158	550150
4.5 TSEMP-H	552220.5	550231	250200	550329	550219.5	550258	550250
6 TSMP-H	550320.5	550331	250300	550329	550219.5	550358	550350
7.5 TSEMP-H	552620.5	552531	250400	550529	550219.5	550458	550450

Sparepart kits

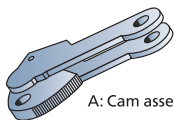
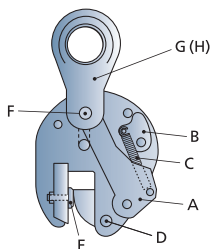
All spare parts are available either separately or as repair sets. It is recommended when any parts are damaged to replace them straight away and not to take any risk.

When ordering spare parts always give:

- model
- lifting capacity
- jaw opening and serial number
- the needed spare parts.



Vertical Clamp



A: Cam assembly



F: Shackle pin



B: Lock lever assembly



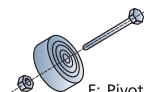
G: Lifting eye for TS, STS



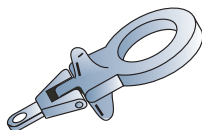
C: Lock spring



D: Cam pin

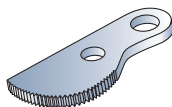
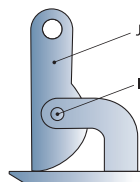


E: Pivot complete



H: Lifting eye for TSU, TSEU

Horizontal Clamp



J: Cam for FHX, FHSX



I: Cam pin for FHX, FHSX

Revision Sets

Model	Reference No.	Lock Lever Assembly	Cam	Spring	Cam pin	Pivot
0.75 TS	RV650000	550031	550020	250000	550029	550019
1 TS	RV650801	550831	550820	250800	550829	550819
1 TSE	RV650811	550831	550880	250800	550829	550819
1.5 TS	RV650101	550131	550120	250100	550129	550119
2 TS	RV650901	550131	550920	250100	550129	550119
3 TS	RV650911	550131	550920	250100	552929	550119
4.5 TS	RV650201	550231	550220	250200	550329	550219
4.5 TSE	RV650221	550231	552220	250200	550329	550219
6 TS	RV650301	550331	550320	250300	550329	550219
6 TSE	RV650311	552431	552420	250300	550329	550219
7.5 T	RV650401	550431	550420	250400	550429	550219
7.5 TSE	RV650611	552531	552620	250400	550529	550219
9 T	RV650612	552531	552620	250400	551029	550219
12 T	RV650501	550531	550520	250400	550529	550219
15 T - 17 T	RV650601	550631	501520	250600	550629	550619
20 T - 25 T	RV650701	550731	502020	250700	550729	550719
30 T	RV650711	550731	502020	250700	550929	550719

Repair Sets - Extra hardened pivot and cam

Model	Reference No.	Jaw-opening (inches)	Cam	Spring	Cam pin	Pivot
.75 TS-H	RS650000.5	0 - .51	550020.5	250000	550029	550019.5
1 TS-H	RS650801.5	0 - .98	550820.5	250800	550829	550819.5
1 TSE-H	RS650811.5	0 - .98	550880.5	250800	550829	550819.5
1.5 TS-H	RS650101.5	0 - .79	550120.5	250100	550129	550119.5
2 TSE-H	RS650901.5	0 - 1.38	550920.5	250100	550129	550119.5
3 TSE-H	RS650911.5	0 - 1.38	550920.5	250100	552929	550119.5
4.5 TSE-H	RS650221.5	0 - 1.77	552220.5	250200	550329	550219.5
6 TS-H	RS650301.5	0 - 1.26	550320.5	250300	550329	550219.5
7.5 TSE-H	RS650611.5	0 - 2.17	552620.5	250400	550529	550219.5

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1 GENERAL

Congratulations with the acquisition of a Terrier safety plate lifting clamp. The quality systems of management and services of Terrier Lifting Clamps B.V. fully comply with ISO 9001 standards. The many years of vast experience are a guarantee of optimum quality and safety. Terrier Lifting Clamps are made of top quality steel and fully comply with European standards as laid down in Machine Directive 2006/42/EG.

2 OPERATING PRINCIPLE

Terrier's safety plate lifting clamps derive their name from the built-in safety mechanism, which consists of a locking device, a tension spring and a lever. Once the lever has been operated, the safety mechanism provides constant pre-tensioning of the cam on the steel plate, thereby ensuring that the clamp does not slip when lifting force is applied. When a load is being lifted the clamping force on the cam is increased by the weight of the load. The safety system also ensures that the clamp will not work itself loose from the plate as the load is being lowered.

Additional info for owners of a TSU-R lifting clamp

The TSU-R lifting clamp has been specifically designed for the lifting and handling of stainless steel plates. In order to prevent corrosion due to carbon contamination, this lifting clamp features stainless steel components and a nickel-plated body and lever. Due to these features, the contact area between the clamp's jaw and the stainless steel plate no longer has to be cleaned from possible carbon steel residues after lifting has taken place.

3 APPLICATION

Terrier plate lifting clamps have been designed solely for the lifting and transporting of steel plates and structures where it is possible to place the clamp on a flat point of contact.

The following notes apply to the Hardox clamp models

- These clamp models feature a specially developed "hard" segment and "hard" pin so that these lifting clamps can be used for lifting steel sheets and/or structures with a maximum hardness of 45 Hrc, (429 HB, 1450 N/mm²).



- The 1 TSHP and 1.5 TSHP have three pins for a solid grip and is therefore highly suitable for lifting "Holland Profiel" (flat bulb bar steel).

The following only applies to the TSU-R clamp model

The TSU-R clamp has been designed solely for lifting stainless steel plates and structures featuring a flat point of contact. Where the clamp is used to lift carbon steel plates, the clamp can no longer be used for lifting stainless steel plates, without the risk of carbon contamination.

Allowable operating positions

Depending on the clamp model the following operating positions are allowed:

- only vertical positions (TS, TSE)
- from both vertical and horizontal positions (TSU and MP models)
- from all positions (TSU, TSEU, STSU, TSU-R)

Notice: A reduced working load limit (W.L.L.) applies when lifting from other than vertical positions. See also the load diagram.

4 SAFETY INSTRUCTIONS

Safety First! Guarantee your personal safety by carefully reading the following safety instructions first.

Ensure your own safety and continue to benefit from our product safety by having the clamp inspected, tested and, if necessary, overhauled at least once a year by Terrier Lifting Clamps B.V. or another recognized mechanical repair and service center. See also Chapter 8

- Overhauling. Contact Terrier Lifting Clamps B.V. for further information.

AVOID SITUATIONS DANGEROUS TO LIFE

(see also the section 'How to correctly use vertical lifting clamps')

- Never work with an untested or disapproved lifting clamp.
- Always keep a safe distance when lifting and never stand under the load.
- Do not use the clamp if damaged; have the clamp repaired by Terrier Lifting Clamps B.V. or another recognized mechanical repair and service center. If in doubt consult your supplier.
- Never lift more than one plate at a time.
- Never lift plates heavier than the W.L.L., as indicated on the clamp and the test certificate.
- Never lift plates which have a weight less than 10% the W.L.L. indicated on the clamp and test certificate.
- Do not lift plates which are thicker or thinner than the jaw opening, as indicated on the clamp and the test certificate.
- Take care when lifting from a non-vertical position. The working load limit (W.L.L.) may be considerably reduced in these lifting situations.
- When using a number of lifting clamps at the same time, provide lifting slings or chains of a sufficient length to ensure that the angle between the slings or chains never exceeds 60 degrees.
- When simultaneously operating a number of lifting clamps side by side use a lifting beam (equalizer) and lifting slings or chains of sufficient length to ensure that the lifting shackles on the clamps are never subjected to lateral load.
- Do not place the clamp on tapered or conical shaped sections of the plate or structure to be lifted.

- Remove all grease, oil, dirt, corrosion and mill scale from the plate at the point where the clamp is to be attached.
- The surface hardness of the plate must not exceed 37HrC (345 Hb, 1166 N/mm²). With regard to the TSU-R lifting clamp please notice that the surface hardness of the plate must not exceed 30 HrC (283 Hb, 945 N/mm²).
- The clamp is only suitable for use in normal atmospheric conditions.

SAFETY PRECAUTIONS

- As far as applicable, make sure that the lifting shackle or MP fork is never subjected to lateral load.
- A free-fall or uncontrolled swaying at the crane hook resulting in objects being struck may cause damage to the clamp. If this happens check whether the clamp is in good working order before using it.
- Lifting clamps are not suitable for creating permanent joints.
- The clamp should be subjected to a regular maintenance interval on a monthly basis; see Chapter 6 - Maintenance.
- Do not modify the clamp (by welding, grinding, etc.), as this can adversely affect its operation and safety, thereby nullifying any forms of guarantee and product liability.
- For this reason, only make use of genuine Terrier components!
- Any improper use of the clamp and/or failure to observe any directions and warnings in these operating instructions concerning the use of this product may endanger the health of the user and/or bystanders.

Special note for TSU-R lifting clamp owners

Use the TSU-R lifting clamp solely for lifting stainless steel plates and structures. In spite of the considerable mechanical strength of the coating, the clamp must be handled with extreme care! Possible damage due to impacts such as knocks, falls, etc. must be avoided.

5 LIFTING

- Verify whether the working load limit (W.L.L.) of the clamp is sufficient for the load created in the lifting situation.
- Attach the lifting clamp to the hoisting mechanism:
 - directly to a crane hook by means of a safety shackle,
 - by means of a coupling link or D-type shackle,
 - by means of a sling or chain, if necessary, in conjunction with a coupling link or D-type shackle.
- Ensure that all attachments have been tested and are of the correct tonnage. Make sure that coupling links and shackles are large enough to allow the clamp to move freely in the hook.
- Check whether the clamp has any visible damage.
- Operate the lever to check whether the clamp opens and closes smoothly.
- Check whether the teeth of the cam are free from dirt and if necessary clean with a steel wire brush. Note: the cam of the TSU-R lifting clamp should only be cleaned with brass brush.
- Remove any grease, dirt and mill scale from the plate at the site of the lifting clamp.
- Use the lever to open the clamp.
- Place the jaws as far as they will go over the plate, making sure that the clamp is positioned so as to balance the load when it is being lifted.

- Close the clamp by turning the lever fully back.
- Lift gently to allow lifting force to be applied; check whether the clamp is slipping.
- If the load is slipping, read this Chapter 5 - Lifting again.
- If the load continues to slip, refer to Chapter 6 - Maintenance.
- Make sure that the load is in a stable position before loosening the clamp from the plate.

6 MAINTENANCE

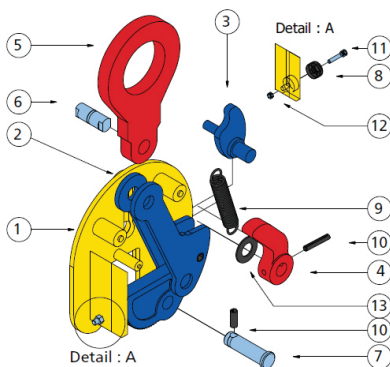
- Check the general condition of the clamp at least once a month, see also Chapter 7 - Disassembling/Assembling.
- Stop using the clamp if:
 - the body is split or deformed, in particular in way of the corners of the jaws,
 - the lifting shackle and/or connecting piece or MP fork (if applicable) are visibly deformed,
 - the cam and/or pivot teeth are no longer sharp,
 - the spring has become stretched or broken,
 - the lever locking mechanism has become inefficient or has ceased to work,
 - the shackle pins are visibly deformed,
 - any retaining pins are missing,
 - the keyway groove is dirty,
 - the marking on the clamp is no longer legible.

Depending on the defects/malfunctions noted:

- disassemble and clean the clamp (see Chapter 7 - Disassembling/Assembling or have the clamp overhauled by Terrier Lifting Clamps B.V. or another recognized mechanical repair center (see Chapter 8 - Overhauling).

7a DISASSEMBLING/ASSEMBLING TS, STS, TSE, TSHP CLAMP MODELS

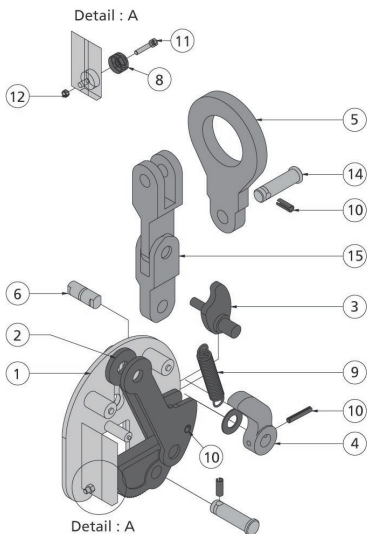
- Open the clamp to its full extent.
- Remove the tension spring (9); in the case of 0.75 TS, 1 TS(E), 1.5 TS, 2 & 3 TSE first remove the retaining pin in the cam assembly (10).
- Remove the retaining pin (10) and the cam pin (7).
- Push the lifting shackle (5) in until the shackle pin (6) can be removed via the mounting hole.
- Remove the lifting shackle (5) and the cam assembly (2).
- Dismantle the lever (4) by removing the retaining pin (10) and take the lock assembly (3) out of the clamp.
- Remove the pivot (8) using a socket and ring spanner.
- Clean all parts with a standard degreasant.
- Grease all shackle pins with a bearing grease.
- Oil the spring if necessary.
- Assemble all the parts in reverse order.



- Always insert new retaining pins (10) and do so with the aid of a hammer, combination pliers and pin punch.
- Always fit a new pivot bolt (11) and nut (12).
- When replacing parts always use original Terrier components.
- Remove any burr with a file.

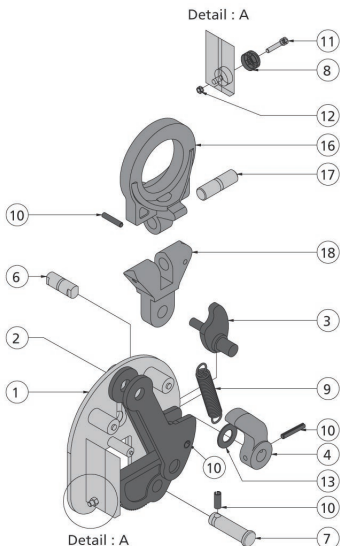
7b DISASSEMBLING/ASSEMBLING TSMP, STSMP, TSEMP CLAMP MODELS

- Open the clamp to its full extent.
- Remove the tension spring (9); in the case of the 0.75 TSMP, 1 TS(E)MP, 1.5 TSMP, 2 & 3 TSEMP first remove the retaining pin (10) in the cam assembly.
- Remove the retaining pin (10) and the cam pin (7).
- Remove the retaining pin (10) and the link pin (14).
- Remove the lifting shackle (5).
- Push the fork (15) in until the shackle pin can be removed via the mounting hole (6).
- Remove the fork (15) and the cam assembly (2).
- Disassemble the lever (4) by removing the retaining pin (10) and take the lock assembly (3) out of the clamp.
- Remove the pivot (8) using a socket and ring spanner.
- Clean all parts with a standard degreasant.
- Grease all shackle pins with bearing grease
- Oil the spring if necessary.
- Assemble all the parts in reverse order.
- Always insert new retaining pins (10) and do so with the aid of a hammer, combination pliers and pin punch.
- Always fit a new pivot bolt (11) and nut (12).
- When replacing parts always use original Terrier components.
- Remove any burr with a file.



7c DISASSEMBLING/ASSEMBLING TSU, STSU, TSEU, TSU-R, TSHPU CLAMP MODELS

- Open the clamp to its full extent.
- Remove the tension spring (9) in the case of the 0.75 TSU, 1 TS(E)U, 1.5 TSU, 2 & 3 TSEU first remove the retaining pin (10) in the cam assembly (2).
- Remove the retaining pin (10) and the cam pin (7).
- Take the retaining pin (10) out of the connecting piece (18) and remove the link pin (17).
- Remove the lifting shackle (16).
- Push the connecting piece (18) in until the shackle pin (6) can be removed through the mounting hole.
- Remove the connecting piece (18) and the cam assembly (2).
- Disassemble the lever (4) by removing the retaining pin (10) and take the lock assembly (3) out of the clamp.
- Remove the pivot (8) using a socket and ring spanner.
- Clean all parts with a standard degreasant.
- Grease all shackle pins with bearing grease.
- Oil the spring if necessary.
- Assemble all the parts in reverse order.
- Always insert new retaining pins (10) and do so with the aid of a hammer, combination pliers and pin punch.
- Always fit a new pivot bolt (11) and nut (12).
- Always use original Terrier components when replacing parts.
- Remove any burr with a file.



8 OVERHAULING

At least once a year, or if occasioned by damage to the clamp, the lifting clamp should be inspected, tested and if necessary overhauled by Terrier Lifting Clamps B.V. or another recognized mechanical repair and service center. If in doubt refer to your supplier.

9 DISPOSAL

Once it has reached the end of its useful life, the clamp can be treated as scrap iron, provided that the clamp is rendered unfit for use.

10 TROUBLESHOOTER'S CHECKLIST

Failure/malfunction	Possible Cause	Action
Load slipping	Load dirty Pivot dirty Pivot and/or cam blunt Jaws bent open	Clean load Clean clamp Overhaul clamp Reject clamp
Lifting shackle pivoting badly	Lifting shackle overloaded	Reject clamp
Fork is pivoting badly	Fork overloaded	Reject clamp
Body bent	Clamp overloaded	Reject clamp
Lifting shackle oval shape	Clamp overloaded	Reject clamp
Spring defective	Spring worn out	Overhaul clamp
Shackle pins bent	Clamp overloaded	Reject clamp
Retaining pins missing	Incorrectly assembled	Fit new retaining pins
Clamp difficult to open/close	Key way slot dirty Clamp worn out Clamp contaminated	Clean clamp Reject clamp Clean clamp

11 WARRANTY

Terrier Lifting Clamps provides a 5 year warranty on its lifting clamps. This warranty is applicable to the original end user of the lifting clamps. Only if the clamp has been inspected, checked and maintained by this instructions and by an official dealer. This warranty period of 5 years is valid from the day of purchase, and is liable to all conditions and measurements stated in this document.

11a CONDITIONS

This warranty only covers failures in the lifting tools which is the consequence of production errors which occur during normal use. The warranty covers no wear to components such as pivots, cam assemblies, lock springs etc. Should there be any kind of failure within this guarantee period, the lifting tool will be replaced or repaired to insight of the producer.

No warranty is given to clamps due to the following failures:

- Regular wear
- Overload.
- Wrong and/or careless use
- Damages
- Not following procedures and measures
- Hoisting differing material other than indicated on clamp or stated in the user-manual
- Adapting and/or modifying of the Terrier clamp.
- The injudicious use of the clamp, and not succeeding all indications which are stated in the users manual.
- When maintenance and/or revision has not been carried out by an authorized Terrier distributor.



The producer is not responsible for incidental damage or damage due to use of the lifting tools as well as from violation of this manual.

11b PROCEDURE SAFETY INSPECTION

All inspections and reparings must be written down in the maintenance diagram.

This counts not only for your own inspections but also for inspections which are carried out by your authorized Terrier distributor. When the clamp is handed in for maintenance and inspection you always must provide the maintenance diagram.

Defective Lifting Clamps

When a form of wear or damage is indicated, you must take the following measures.

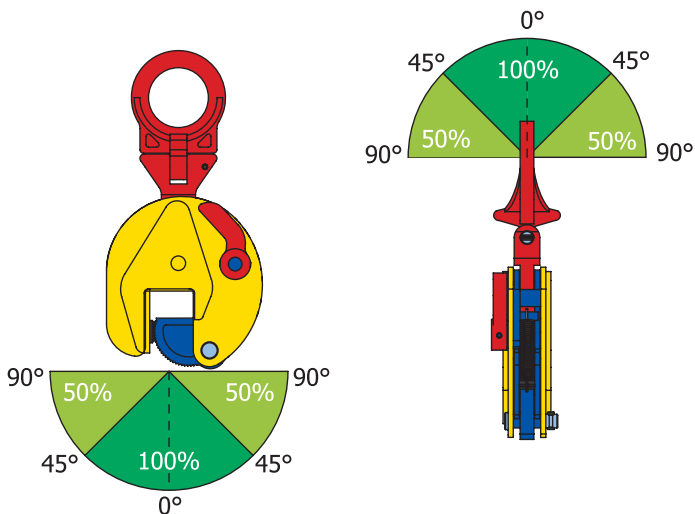
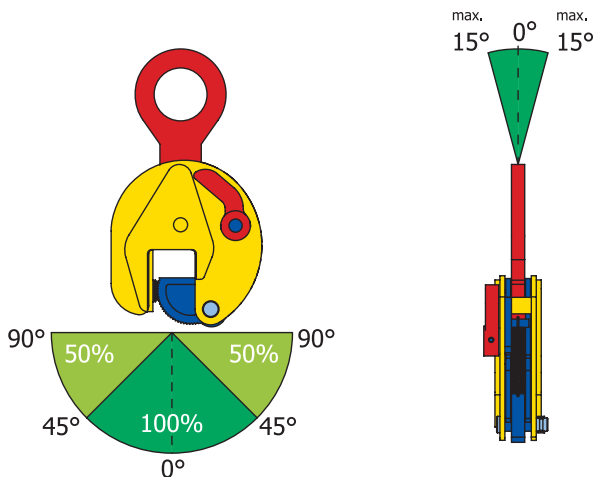
- 1 Take the lifting clamp out of use. (Note the date of failure of the lifting clamp)
- 2 Try to recover the cause of the failure, for example (complete list is available in chapter 1):
 - Overload
 - Wrong and/or careless use
 - etc

These claims stated in no.2 do not fall under the guarantee! To guarantee the security of you and your colleagues you are obliged to follow up this procedure.

- 3 Return your lifting clamp (with the maintenance history) to your authorized Terrier distributor.
- 4 If the lifting clamp has been revised / repaired by your distributor, you can safely use your clamp again. Note down the date of re-commissioning in the maintenance table.

11c INSPECTION SCHEDULE

Months	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
Years	1			2			3			4			5		
Safety inspections by your own inspector	■	■		■	■		■	■		■	■		■	■	
Maintenance by an official Terrier distributor			■						■						■
Revision by an official Terrier distributor						■						■			



SAFELY LIFTING

