

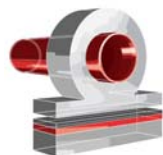
CONSTANT SPRING UNITS

TECHNICAL DESCRIPTION

incorporating

INSTALLATION and

OPERATING/MAINTENANCE INSTRUCTIONS



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pijpbevestigingstechniek

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Installation instructions for constant hangers Fig. 58 H / V

1. Application

Constant hangers are used *where vertical movements should not be restricted by rigid hangers and where spring hangers can not be used due to the high deviation* between installation load and operating load.

Constant hangers are also used where no great supporting load deviations are allowed in order to avoid additional loadings of the component connections or critical pipe components.

Constant hangers are normally used to reduce dead weight loads.

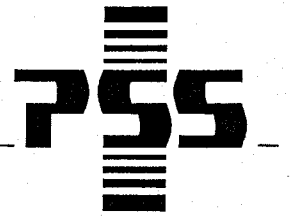
Features

- Constant load throughout the full load and travel range
- Load adjustment by load adjustment screw
- At least +/- 15% load adjustability without change of the total travel S_n
- Individual calibration to the requested load by electronic
- Load travel recorder
- Recording of the test data
- Hot-cold load marking
- Position indicator

2. Function

By means of the lever arms, lever arm geometries and the spring combinations a constant load at the point of suspension ensured throughout the full travel range. The spring moment (spring force X spring lever arm) and the load moment (supporting load X load arm) are turning around the main pivot.

At upward and downward movement the system variables spring force, spring lever arm and load lever arm ensure the balance of moments between spring moment and load moment in any position. This automatically generates a constant supporting load.



3. Constant hanger selection

Constant hangers are selected with the calculated supporting load F_S and the total travel S_N .

Besides the theoretically ascertained actual travel S_S , **P.S.S. Pipe Support Systems** recommends to provide an additional travel reserve S_R of 20% (at least 15 mm).

Given:

Operating load F_S of the constant hanger = 10000 N
Theoretical pipe expansion S_S = 130 mm
Movement direction (cold to hot position) = + upwards

Example:

Travel reserve S_R = 20% of actual travel S_S and in no case less than 15 mm
Total travel S_N = actual travel S_S + travel reserve S_R
Total travel S_N = 130 mm + 26 mm
Total travel S_N = 156 mm,
 S_N selected as per catalog = 165 mm

Result:

$F_S = 10000$ N
 $S_N = 165$ mm

From the load travel table it follows:

Group IV, size 37, B = 182 mm

Constant hangers can also be supplied for extremely long total travels.

4. PSS Pipe Support Systems GmbH offers the following constant hangers:

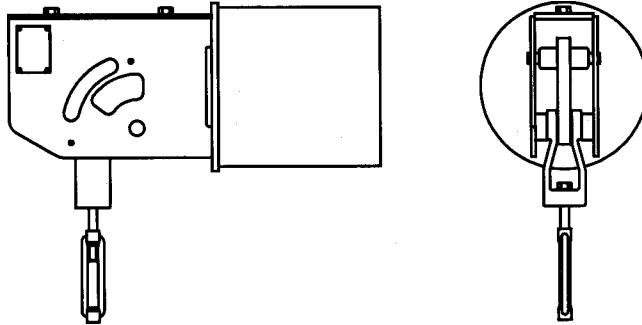
- Horizontal constant hanger Fig. 58 H
- Vertical constant hanger Fig. 58 V

5. Types

There are the following constant hanger types – depending on the structure connection.
All other dimensions are identical.

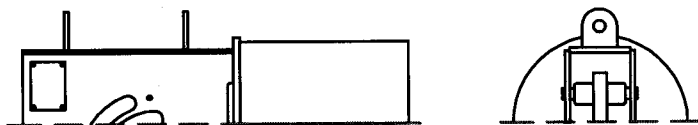
Horizontal constant hanger Fig. 58H

Type A



Structure connection with 2 threaded rods to the constant hanger frame.

Type B



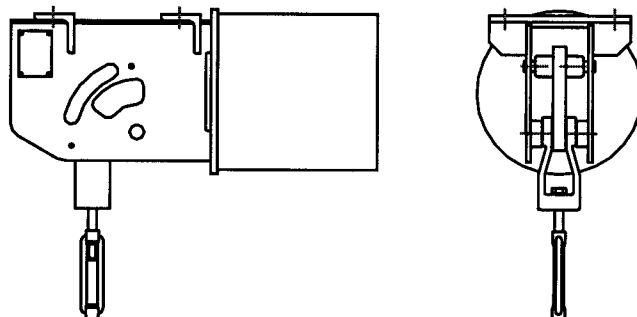
Structure connection with Fig. 66 beam attachment and pin.

Type C



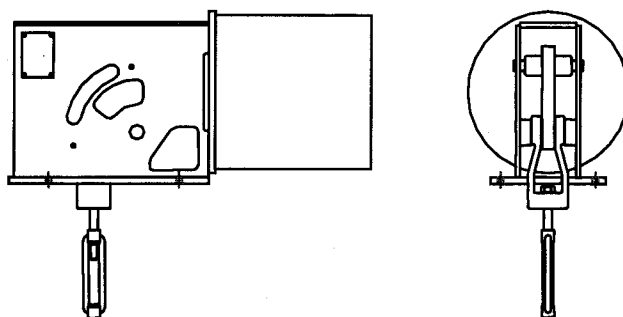
Structure connection with Fig. 55 lug and pin.

Type D



Bolted under the existing structure.

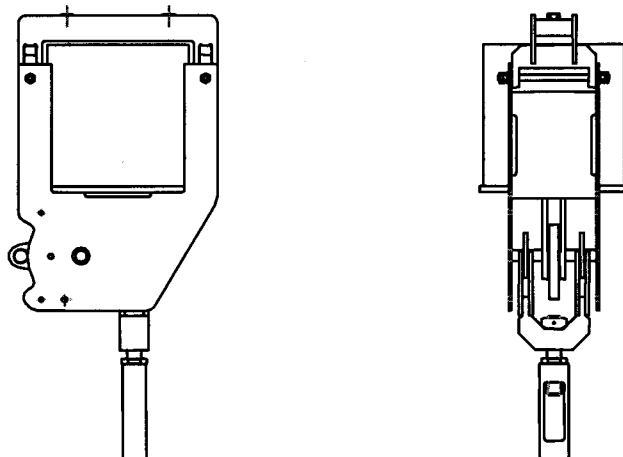
Type E



Bolted on the top of the existing structure or CSH-saddle.

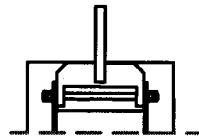
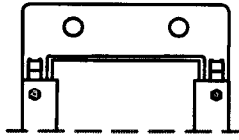
Vertical constant hanger Fig. 58 V

Type A



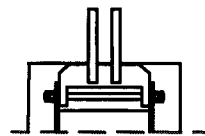
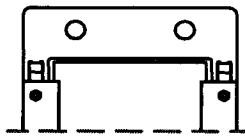
Structure connection with 2 threaded rods to the constant hanger frame.

Type B



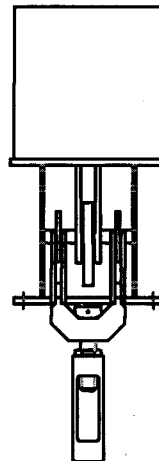
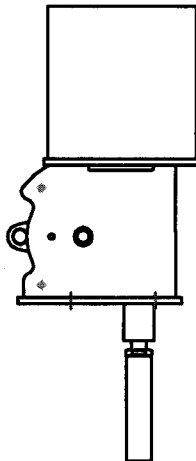
Structure connection with Fig. 66 beam attachment and pin.

Type C



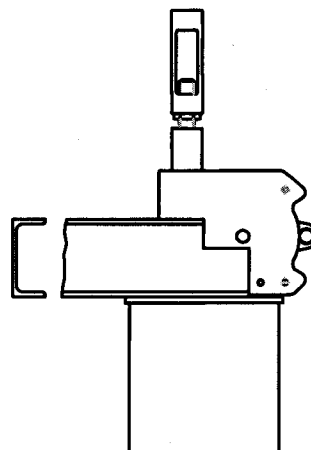
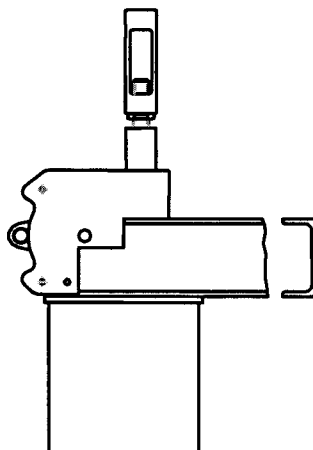
Structure connection with Fig. 55 and pin.

Type E



Bolted on the top of the existing steel structure or supported by special constant hanger saddles.
(Cat.alog 95, page 17)

Type G



Connected with 2 threaded rods to the constant hanger turnbuckle.

6. Qualification

Besides the indicated design specifications like **ASME III SUBSECTION NF and KTA 3205.3**, the constant hangers were subjected to an experimental test program.

The deviation from the indications of the manufacturer before and after the tests was lower than +/- 5% at vertical tension and lower than +/- 6% at diagonal tension. **The constant hangers met all test requirements without any damage.**

7. Travel stop

The functional design of the constant hanger permits the incorporation of a travel stop that will **lock the hanger against upward and downward movement** for temporary conditions of underload or overload, such as may exist during erection, hydrostatic test or chemical clean-out.

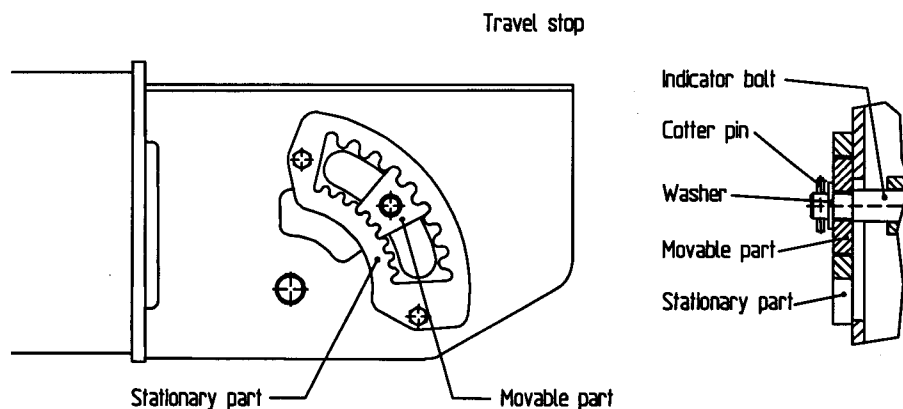
The travel stop consists of two parts with matched serrations attached to the hanger frame with two or more cap screws and with a movable part which engages the indicator bolt.

The travel stop is installed at the factory to hold the hanger in the "installation" position. A series of serrations can be engaged to lock the hanger at any position along the total travel range.

The travel stop is painted red. **The stop must be removed before the piping system is put into operation, but not before the hanger is installed and fully loaded.**

This is done by installing the constant hanger to the building and by connecting the piping with the constant hanger by means of the accessories (pipe clamps, rods etc...).

The threaded rod with all accessories connected to the pipe is to be turned into the constant hanger turnbuckle until the threaded rod is loaded by a force.



By turning the turnbuckle the movable part has to be positioned in the matching serrations until no further load is transferred to the stationary part of the travel stop, i. E. the movable part can be moved by hand at the indicator bolt.

The constant hanger has now taken over the load transfer from the piping to the building. Now cotter pins and washers of both sides can be removed.

After removal of the two small "movable parts" and the large "stationary parts" the complete travel stops should be stored to a safe place.

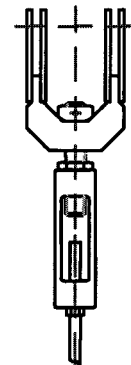
If required (E. G. repair, pressure tests etc...) the travel stops can be installed again and do not get lost.

A red tag marked "CAUTION" and containing instructions for remove all of the travel stop in English language is attached to the hanger.

8. Load coupling with turnbuckle

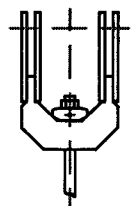
Regular design

The threaded rod must be threaded in the turnbuckle the entire "Y" dimension and then locked with a lock nut. Before the adjustment the hex nut must be loosened and tightened again after completion.



Load coupling short

This type is used for short installation lengths. The turnbuckle and the tension rod of the regular design are not necessary. The threaded rod is threaded through the load coupling. The loaded nut is locked by means of a lock nut.



9. Load adjustment

When the hanger is installed, its supporting force should be in balance with the portion of the piping weight assigned to it. Each hanger is individually calibrated before shipment to support the exact load specified.

Special instructions for this field recalibration of individual hangers may be obtained from **P.S.S. Pipe Support Systems** representatives. No less than 15% of this adjustability is provided either side of the calibrated load for plus or minus field load adjustment. The percentage increase or decrease from the factory calibrated load should be carefully calculated.

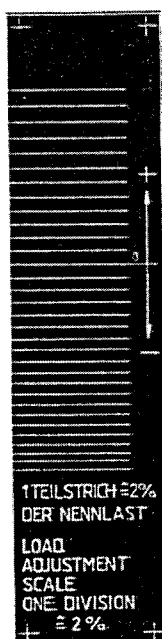
The calibrated load setting of each hanger is indicated by an arrow, die-stamped in the load adjustment scale. Decisive is the bottom edge of the load adjusting block in the lever arm, I. E. before the minus – marking. All load adjustments should be made from this reference point with each division on the patented scale equal to 2%. The load adjustment is made by turning the load adjustment bolt.

For example: calibrated load = 1359 daN
 revised load = 1250 daN

Load is decreased 109 daN or $109/1359 = 8\%$.

Turn the load adjustment bolt until arrow moves in decrease direction 4 divisions.

Field adjustments are generally to be controlled by P.S.S Pipe Support Systems experts.



Load adjustment scale

10. Position indicator

The constant hanger is provided with a travel scale indicating the installation position (**white marking**) and the operating position (**red marking**). One division of the marking is equal to 1/10 of the total travel of the constant hanger ($S_N = \text{total travel}$)

The constant hanger position is indicated by the indicator bolt. In the installation condition the indicator bolt must be in the erection position (white marking). During operation the indicator bolt must be in the operating position (red marking).

In general the constant hanger bears the constant load **if the indicator bolt is between the H- and -L mark of the travel scale.**

If the indicator bolt is in one the end positions, it reacts as follow:

Final position near H-position:

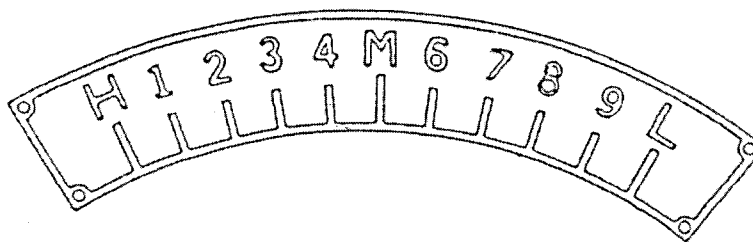
The constant hanger does not take over any load (I. E. the load is transferred to the elbows, anchor points, rigid hangers etc...), which are then overloaded. The threaded rod assembly at the constant hanger is loose (without tension load).

Final position near L-position:

The constant hanger operates as a rigid hanger with undefined tension load. The piping movement is restricted, I. E. **the piping system and/or the constant hanger can be damaged.**

P.S.S. Pipe Support Systems recommends to control and to document the indicator bolt position of each constant hanger in operation and in shut down / erection position.

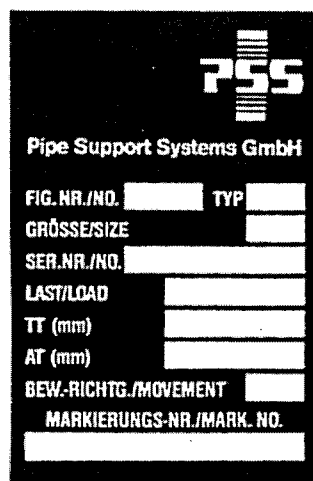
EVTL. Necessary adjustments are performed by turning the constant hanger turnbuckle. It must be ensured that the whole thread length of the threaded rod is threaded into the turnbuckle.



Position indicator

11. Nameplate

The following information are given by it:



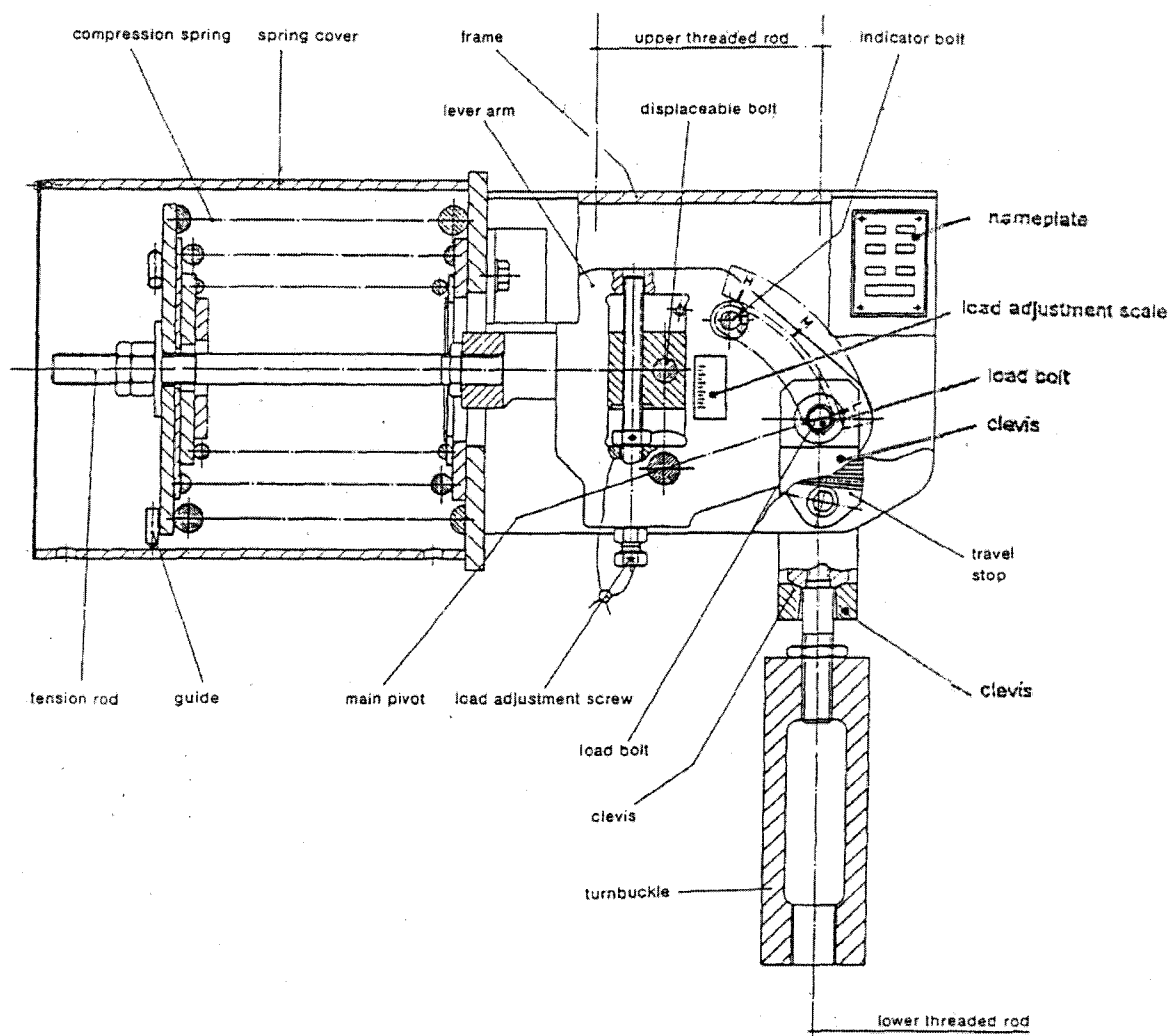
Nameplate

Fig. No.	= Figure number
Type	= Constant hanger type
Size	= Size
Ser. No.	= Serial number
Load	= Operating load F_s
TT	= Total travel S_N
AT	= Actual travel S_s
Movement	= movement direction (from cold to hot) - downward + upward
Mark No.	= Position number

Improper treating of the constant hanger ***may lead to damages at the constant hanger.***

General arrangement drawing

Horizontal constant hanger type 58H



Vertical constant hanger type 58 V

Base model (with frame for Type A)

