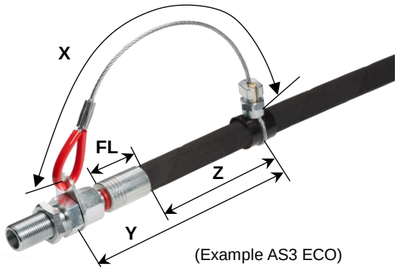
H) Installation/Positioning of the Cablelock AS retaining system:
Before starting please read and consider the information on the cover page and in the standard BGI 5100 carefully! Avoid chafing on adjacent components!



(Example AS3 ECO)

Basic formula for the radius of tear-out:
X-Y = min. FL+20mm, max. FL+170mm
'Length of the cable bow minus shortest distance of the fixation points'

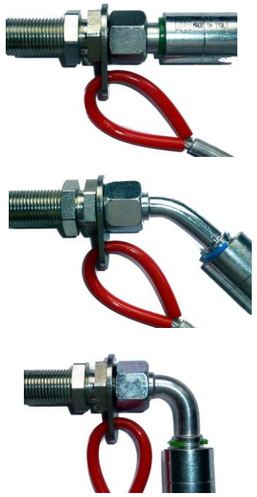
Position of the tensioner lock 'basic':
Z = min. 50mm, max. 100mm

ATTENTION: If the hose is lead in a bend, NEVER install the tensioner locks 'basic' in the outer region of the bending radius!

Assembly steps:
1) Enlarge the pre-mounted cable sling by hand and place it moveable on the hose.
2) Attach the bracket and screw down the end of the hose tightly (union nut/external thread or flange plate).
3) Push the hose-sided tensioner lock 'basic' including the cable sling towards the hose.
The hose-sided fixpoint has to be located 50mm to 100mm behind the end of the crimping ferrule.
4) If the hose-sided fixation point is chosen according to 3) attach the Cablelock AS-Tape if desired.
Afterwards install the tensioner lock 'basic' according to the enclosed installation manual starting at point D4).
5) Please make sure that the brackets of the 'E' series are able to rotate even after final assembly (after union nut has been tightened firmly).
6) The brackets of the 'S' and 'P' series always have to be installed with the appropriate screws (not too small and at least 8.8). Furthermore they have to be installed with the torque recommended in the DIN, so that the head of the screw presses against the bracket with this torque.

Machine-sided fixation points for Cablelock AS (see also text above):

E-bracket



Attention:
only use the shown fixation options if the tensioner locks are positioned in the inner region of the bending radius. Otherwise turn the tensioner locks around.

S-bracket

P-bracket

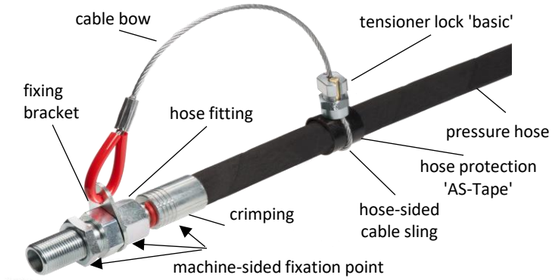
Mounting method:
free, sufficiently stable fastening point with screw (with installation lengths as described in the above formula on this page)

I) Storage/Maintenance/Care/Warranty/Manufacturer/Conformity/Sample images:
- Cablelock AS retaining system should be stored in a dry and dust free area and they should NOT be dismounted completely* (see page 2)
- Cablelock protection devices of this series are rust-protected, but NOT suitable for use in moist conditions! For more information see: www.cablelock.de - important information - exclusion of liability/corrosion
- Do not replace individual components. In case of damage or a retaining action (=hose tear-out) completely replace Cablelock.
- Before reuse (if there was no tear-out) check whether the retaining system (especially the cable) is in a functional condition.
- Limited warranty in case of vibration load, see also the CE label safety catch information sheet at www.cablelock.de
- Check the retaining system regularly for damage and firm fixation (e.g. during the annual pressure inspection as required in DGUV-113-020). In case of excessive vibrations etc. shorten the checking intervals!
- If there are signs of corrosion or damage precautionary replace the retaining system!
- Manufacturer: Hydraulik Schmitz Siegen GmbH - Seelbacher Weg 17 - 57072 Siegen
- All images show safety catches with 3 mm wire rope diameter (4+5 mm types may differ slightly).
- An EC declaration of conformity is available at www.schmitzsiegen.de.

The retaining system for high pressure hoses

A) Functional description:
The 'AS' retaining system prevents the pressure hose from uncontrolled whipping into the surrounding area in case of a tear-out from the crimping ferrule. This is possible as the Cablelock 'basic' tensioner lock is fixed to the hose and the fixing bracket to the fixation point through the cable (the fixation point consists of the crimping ferrule and the hose fitting). The length of the cable has to be dimensioned in that way that there is a possibility for the hose to slip out of the crimping ferrule (to ensure a pressure release).

Component overview (example AS3-ECO):



B) Sizes and dimensions of the different types: *Compatible for all standard fittings of the corresponding diameter nominal 'DN' according to DIN 20066*

for hydraulic hose (OD in mm)*	cable-Ø	machine sided bracket IDxt**	Ident. No. E-bracket
DN5-8 (AD11-19)	3mm	**12,5** x 2,0	CL-AS-E125
DN5-8 (AD11-19)	3mm	**14,5** x 2,0	CL-AS-E145
DN5-8 (AD11-19)	3mm	**17,0** x 2,0	CL-AS-E170
DN8-10 (AD14-23)	3mm	**18,5** x 2,0	CL-AS-E185
DN8-10 (AD14-23)	3mm	**20,5** x 2,0	CL-AS-E205
DN10-12 (AD17-28)	3mm	**22,5** x 2,5	CL-AS-E225
DN10-12 (AD17-28)	3mm	**24,5** x 2,5	CL-AS-E245
DN16-20 (AD23-35)	4mm	**27,0** x 2,5	CL-AS-E270
DN16-20 (AD23-35)	4mm	**30,5** x 3,0	CL-AS-E305
DN20-25 (AD26-44)	4mm	**34,0** x 3,0	CL-AS-E340
DN20-25 (AD26-44)	4mm	**36,5** x 3,0	CL-AS-E365
DN20-25 (AD26-44)	4mm	**42,5** x 3,0	CL-AS-E425.1
DN32 (AD43-52)	5mm	**42,5** x 3,0	CL-AS-E425.2
DN32-40 (AD43-61)	5mm	**45,5** x 3,0	CL-AS-E455
DN40-50 (AD50-74)	5mm	**49,0** x 3,0	CL-AS-E490
DN32-40 (AD43-61)	5mm	**52,5** x 3,0	CL-AS-E525
DN40-50 (AD50-74)	5mm	**61,0** x 3,0	CL-AS-E610

for hydraulic hose (OD in mm)*	cable-Ø	machine sided bracket IDxt**	Ident. No. S-bracket
DN12-16 (AD19-31)	4mm	**8,5** x 4,0	CL-AS-S085
DN20-25 (AD26-44)	4mm	**10,5** x 4,0	CL-AS-S105.1
DN32 (AD43-52)	5mm	**10,5** x 4,0	CL-AS-S105.2
DN20-25 (AD26-44)	4mm	**12,5** x 4,0	CL-AS-S125.1
DN32-50 (AD43-74)	5mm	**12,5** x 4,0	CL-AS-S125.2
DN25 (AD34-44)	4mm	**14,5** x 4,0	CL-AS-S145.1
DN32 (AD43-52)	5mm	**14,5** x 4,0	CL-AS-S145.2
DN32-40 (AD43-61)	5mm	**16,5** x 4,0	CL-AS-S165
DN40-50 (AD50-74)	5mm	**20,5** x 4,0	CL-AS-S205

for hydraulic hose (OD in mm)*	cable-Ø	machine sided bracket IDxt**	Ident. No. P-bracket
DN5-12 (AD11-28)	3mm	**9,0** x 3,0	CL-AS-P090
DN16-25 (AD23-44)	4mm	**11,0** x 4,0	CL-AS-P110
DN32-50 (AD43-74)	5mm	**13,0** x 4,0	CL-AS-P130

E bracket for union nuts; S bracket for SAE flanges; P bracket for a free fastening point. See the illustration below & point F

Other technical data to be complied with regarding the hose line to be secured				
Size	max. BD***	min. BR 1+2 wire	min. BR 4 wire	max. kg/m
DN5	450bar	60mm	-	0,40
DN6	450bar	75mm	150mm	0,65
DN8	450bar	85mm	-	0,70
DN10	450bar	90mm	150mm	0,85
DN12	450bar	130mm	200mm	1,15
DN16	420bar	150mm	240mm	1,40
DN20	420bar	180mm	240mm	1,80
DN25	380bar	230mm	300mm	2,30
DN32	325bar	420mm	460mm	3,35
DN40	290bar	500mm	560mm	3,90
DN50	250bar	630mm	660mm	5,30

min. BR = 'Minimum bend radius': Lowest permissible hose bend radius
1+2 wire=1&2SN/SC; 4-wire=4SP&4SH
When using this securing series, do not secure any heavy hoses NOR lay them in a small bend radius! (Exceptions only permitted after all individual parameters have been tested and upon the express written consent of the safety catch manufacturer).

The last characters of the ID no. are stamped on the CE label. E.g.: "E224"

* When correctly installed for hose types 1 & 2SN, 1 & 2SC, 4SP & 4SH (up to DN25 and also for R13 & R15). ATTENTION: Do not use any type for hoses with 6 steel inlays; see also the information below. The above hose types meet the standards below.
** The inner diameter specifications may deviate slightly, but they are suitable for the intended DIN EN connections.
The strap thickness "t" is generally suitable for conventional standard fittings without terminals, but always under reservation.
*** Cablelock retention systems are exclusively tested for liquid media. All pressure specifications refer exclusively to applications using liquid media! In addition to the max. OP (max. operating pressure incl. pressure spikes), the limit values must also always must also always comply with the right hose data table (values in accordance with the standard or the data of leading hose manufacturers). Pressure specifications refer to the hose ID, e.g.: type E225-DN10 = r^2 x p x 450 bar, i.e. 5 mm x 5 mm x 3.14 x 450 bar.

C) Application/Operating conditions and IMPORTANT safety Instructions:
Cablelock retaining systems are supposed to protect against uncontrolled whipping of hydraulic hose assemblies. The information and instructions in this operating manual must be followed carefully. Failure to comply can lead to failure of the retaining system an possibly to further risks due to whipping or flying parts of Cablelock! Cablelock retaining systems have been developed and tested in compliance with the following standards: DIN 20066, DIN EN 853, DIN EN 854, DIN EN 855, DIN EN 856, DIN EN 857 and ISO 3862 - for more information concerning the hose types see above. If the maximum operating pressure is exceeded, Cablelock retaining system does not ensure a sufficient protection. In accordance to the company standards reference retaining systems have been dynamically tested in quasi-static pressure tests with at least 150% of the maximum operating pressure and have been able to stop the end of the hose reliably. Protection provided by Cablelock retention systems shall only be guaranteed if the installation requirements in accordance with DIN 20066 are complied with and at least the lowest bend radius in accordance with the above standard is used! ⚠ The maximum operating temperature is -40°C up to +150°C. Before installing Cablelock AS it has to be checked that the hose and machine can move safely with the protection. It has to be assured that no trapping during movement can occur. Keep away from children! A safety distance must be adhered to regardless of the attached safety catch (see point F)! The suitability in explosive environments or other special environments (Pharma, foods, radiation etc.) should be agreed with the manufacturer in each individual case. The retaining systems neither protect from the leaking fluid in case of the tear-out of the crimping ferrule, nor from any other fitting parts or the crimping ferrule tearing off in addition to the hose. Cablelock AS is designed for 4-5 assemblies/disassemblies; more frequent applications might damage components. It has to be ensured that the selected machine fixpoint contains enough stability. Residual risks may remain regardless of the safety catch; the file "possible residual risks", which includes important information, is available at www.cablelock.de. Cablelock retaining systems are not suitable for use in moist conditions, see also point I). Cablelock retaining systems have are not tested for gaseous media - see information in catalogue. This series must NOT be used for 6-layer hoses (e.g. R13/R15 fromDN32). The increased weight-per-metre of these hose types compared to 4-layer hoses as well as the increased bending stress at the lowest bend radius may result in the safety catch being overloaded! ⚠ It is also extremely important that the Cablelock locks are always sufficiently secured - see section D). The meanings of the terms used in these operating instructions are to be understood in the context of DIN EN ISO 8330. In the event of the hose being torn off, no part of the safety lock must strike any other components (otherwise the cables may become torn, etc.).

Bracket forms:


E-bracket


S-bracket


P-bracket

D) Installation tensioner lock 'basic' - overall positioning see backside

D1) Advanced information 'Cable protection disk'

- In the delivery status the clamping ferrule of AS-ECO' is loosely tightened on the basic screw. Please unscrew it at first (it will be reinstalled later on, see D2/D3).
- Please note the adjacent picture as an advanced information: A cable protection disk is located under the locking screw. In case of a complete disassembly (not recommended) insert the cable protection disk as shown in the picture.

Also useful: Our assembly video at www.cablelock.de: Videos - assembly"

D2) Place

Attention: Before starting the installation we highly recommend the use of Cablelock AS-Tape as a protection against pulsation/vibration.

Please order the AS-Tape separately!

- Push the basic screw including the clamping ferrule over the cable (with external hex showing in direction of the basic screw, see picture).
- Place the end of the cable with the limiter ferrule around the installation point.

D3) Preinstallation

- Push the end of the cable including the limiter ferrule through the CLAMPING FERRULE AGAIN and fixate it in the insert slot (the cable builds a sling).
- Pull the cable so that the cable sling tightens itself and the limiter ferrule fits completely into the blind hole of the basic screw.
- <u>Screw the CLAMPING FERRULE COMPLETELY onto the BASIC SCREW (G1/4" or G3/8")!</u>

D4) Fastening

- Move the turnbuckle to the desired fastening position (please refer to D7) and also observe the back page of these operating instructions!).
- Firmly tighten the cable by hand (sling gets smaller) and prefixate it. Fasten the hand fixated Cablelock with the locking screw (AS3 with 2,5Nm; AS4 with 3,0Nm; AS5 with 4,5Nm).
  AS3=3mm cable; AS4=4mm cable; AS5=5mm cable
  Attention: PRECISELY position the Allen key, otherwise there is the risk of the Allen wrench skidding the grub screw.
- ATTENTION: firmly tightening 'by hand' supports the later tightening with an open-end wrench. This assembly step could require some exercise.
- The Cablelock tensioner lock has now reached the status 'fastened'

D5) Tightening

- Tighten the Cablelock tensioner lock with an open-end wrench by screwing the clamping ferrule (buffer ferrule) in direction of the sling.
- Tighten the clamping sleeve until the required strength has been achieved. For information regarding the "required strength", see point D7).
  Secure the base screw against rotation either by hand or with a wrench.
- Noises and the production of chips during assembly are harmless.
- the maximum clamping distance (the visible length of the external thread of the basic screw) is 8mm.
- If the required strength is not achieved (see D7), loosen the fixing screw*, screw the clamping sleeve counter-clockwise and begin again from point D4).

**Never unscrew the safety and locking screws completely, just loosen them! Otherwise the cable protection disks, located under the locking screws can drop out and damage the functional reliability!*

D6) Secure

- After reaching the required strength (see D7), you have to tighten the safety screw a) and at least one of the safety screws b) or c) (M3 slightly, i.e. with maximum 0,05 Nm), so that the Cablelock tensioner lock cannot loosen itself.
  ATTENTION: Don't tighten the safety screw b) or c) if it is located above the insert slot of the basic screw. In this case either tighten the safety screw on the opposite side or turn the clamping ferrule (buffer ferrule) into another position and then you can tighten the safety screw.
- The installation of the Cablelock tensioner lock 'basic' is finished.

D7) Required strength of the <u>clamping ferrule</u> for the clamping procedure

Extremely high strengths can be achieved with Cablelock retaining systems. When the clamping ferrule is used for hose securing, the following tightening torques are correct:

AS3: 2Nm **AS4: 3Nm** **AS5: 4Nm**

Info: AS3 = 3mm wire cables ***AS4 = 4mm wire cables*** ***AS5 = 5mm wire cables***

The required strength is approximately achieved when the wire cable sling can no longer be moved in the axial direction even with relatively high physical effort.

The sling is automatically tightened further if the hose tears off!

E) Disassembly of Cablelock tensioner lock 'basic'

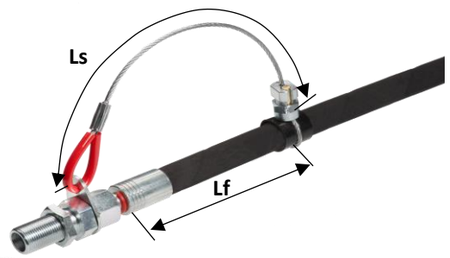
For disassembling the Cablelock tensioner lock please first loosen the safety screws a), b) and c)*(*see page 2). Afterwards loosen the locking screw* and open the cable sling by pulling the tensioner lock. Now follow the steps in the installation manual from D2) to D1) in REVERSE order.

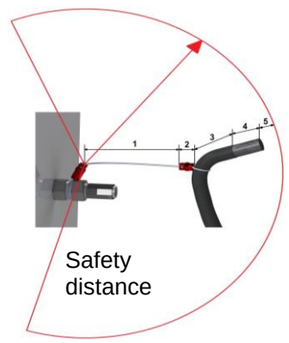
F) Safety distance

A safety distance must be adhered to regardless of the attached retention system! This safety distance must be determined by each user in accordance with the prevailing conditions in their circumstances, and a simple rule of thumb will be provided below. When additional information is required, please refer to our information sheet 03) Safety distance table' at www.cablelock.de - important information.

<u>Rule of thumb for the safety distance:</u>

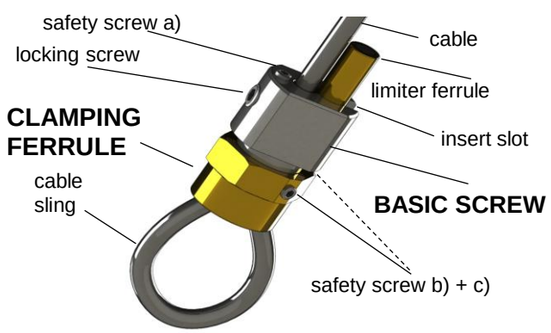
minimum safety distance= (LS+LF)x1,2





<u>'Ls' always has to be measured from the middle of the little hole for the cable in the bracket to the position of the tensioner lock!</u>

G) Component overview of the tensioner lock 'basic':



MATERIALS:
Clamping ferrule: bright brass
Basic screw: galvanized steel
Locking screw: galvanized steel
Safety screws: galvanized steel
Limiter ferrule: light metal or bright brass
Cable: galvanized steel
Cable protection disk: stainless steel
(The cable protection disk is located hidden under the locking screw).