

cobra[®]

Manual



cobra[®]



TREE CABLING HAS A NAME: **cobra**[®] – WORLDWIDE

Our cobra[®] tree cabling system has been very successful on the market since 1993 and impresses arborists all over the world with its easy handling, high quality and reliability. With cobra[®], we are making a valuable contribution to appropriate, modern tree care.



Find out more about cobra on YouTube!

Have a look at our YouTube channel **cobratreecabling**, which has many interesting videos and useful tutorials. Simply scan in the QR code or go directly to www.youtube.com/user/cobratreecabling.

Dear Arborist,

We are delighted that you have decided to make a valuable contribution to appropriate, modern tree care by choosing cobra tree cabling systems.

With pbs Baumsicherungsprodukte GmbH, you are placing your trust in a leading international company: Since 1993, our range of cobra products has been used successfully time and time again – all over the world and certainly also near you.

This handy booklet is designed to help you to install and use your cobra tree cabling systems correctly. We want you to work well with – and like using – our products. And we want our products to help you eliminate potential safety risks in trees as well as prolonging the life of endangered trees.

We wish you lots of fun and success using cobra,



Peter Göhner
Managing Director



You will find an overview of our dealer listing here.
Simply scan in the QR code or go directly using
your browser:
www.cobranet.de/de_DE/page/handler.

Note

We reserve the right to make product changes in the interest of technical progress; prices, mistakes and print errors subject to change without notice.

Overview of the **cobra**[®] systems

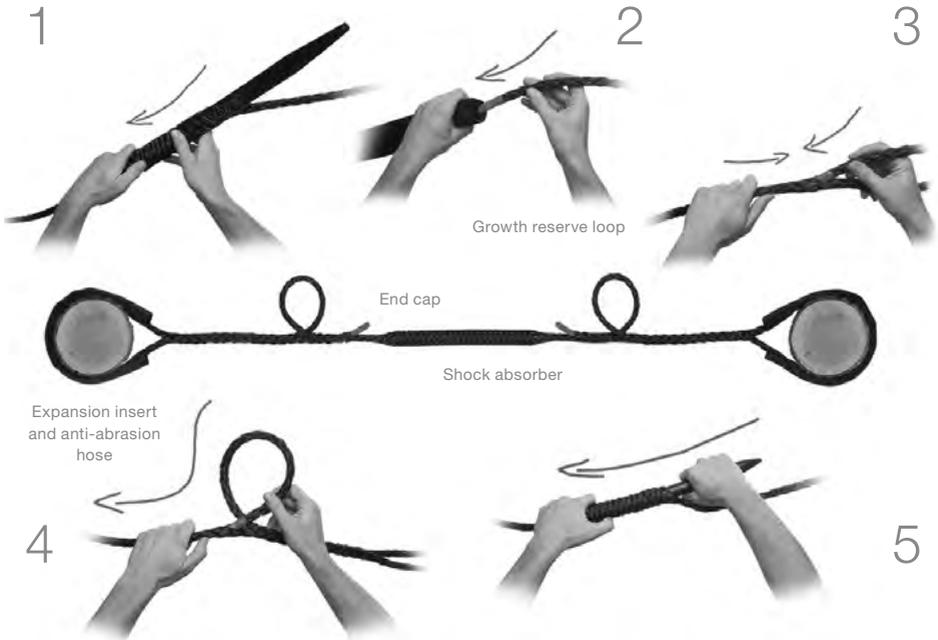
	APPLICATION AREA	INSTALLATION HEIGHT	NOTE
cobra 2t	<p>Dynamic breakage cabling up to branch base diameter of 40 cm (16 in.).</p> <p>Load/support cabling up to 30 cm (12 in.) branch base diameter.</p>	<p>Installation position as dynamic breakage cabling at 2/3 the height of the part of the tree to be supported.</p> <p>When used as load/support cabling, the cable should be installed as vertically as possible.</p>	<p>According to ZTV Baumpflege (the German tree care standard), cobra 2t is a tree cabling system with a minimum tensile strength of 2 tonnes (20 kN).</p> <p>Service life: 12 years</p>
cobra 4t	<p>Dynamic breakage cabling up to branch base diameter of 40 to 60 cm (16 to 24 in.).</p> <p>Static breakage cabling and load/support cabling up to branch base diameter of 40 cm (16 in.).</p>	<p>Installation position as dynamic breakage cabling at 2/3 the height of the part of the tree to be supported.</p> <p>When used as load/support cabling, the cable should be installed as vertically as possible.</p>	<p>According to ZTV Baumpflege, cobra 4t is a tree cabling system with a minimum tensile strength of 4 tonnes (40 kN).</p> <p>Service life: 12 years</p>
cobra 8t	<p>Dynamic breakage cabling up to branch base diameter of 60 to 80 cm (24 to 32 in.).</p> <p>Static breakage cabling and load/support cabling up to branch base diameter of 40 to 60 cm (16 to 24 in.). Double installation for branch base diameter of 60 to 80 cm (24 to 32 in.).</p>	<p>Installation position as dynamic breakage cabling at 2/3 the height of the part of the tree to be supported.</p> <p>When used as load/support cabling, the cable should be installed as vertically as possible.</p>	<p>According to ZTV Baumpflege, cobra 8t is a tree cabling system with a minimum tensile strength of 8 tonnes (80 kN).</p> <p>Service life: 8 years</p>
minicobra	Securing plants, fruit growing, crown correction	Installation position for crown correction as required	Service life: 8 years
cobra ultrastatic	Static breakage cabling and load/support cabling up to branch base diameter of 40 cm (16 in.).	<p>Installation position at 2/3 the length of the part of the tree to be supported. When installed at two levels, static cabling is fitted at 1/4 the length of the part of the tree to be braced.</p> <p>When used as load/support cabling, the cable should be installed as vertically as possible.</p>	<p>According to ZTV Baumpflege, cobra ultrastatic is a tree cabling system with a minimum tensile strength of 4 tonnes (40 kN).</p> <p>Service life: 8 years</p>

EN



cobra® 2t, 4t, 8t and minicobra

Installation in six easy steps:



1. INSERT EXPANSION INSERT

Choose the appropriate expansion insert length (= at least 2/3 the circumference of the branch). Grasp the cable at the branch circumference distance plus 20 cm (8 inches) from the end of the cable and insert the expansion insert through the mesh.

2. FIT ANTI-ABRASION HOSE

Cut the anti-abrasion hose to the required length (minimum length = branch circumference) and slide it over the cable in the expansion insert area.

3. MAKE A QUICK SPLICE

Wrap the cable around the branch, then push the end of the cable approx. 40 cm/16 inches (mini, 2t and 4t) or 50 cm/20 inches (8t) into the cable (distance from branch = ½ its diameter) and guide it out again.

4. MAKE GROWTH RESERVE LOOP

Make a loop and insert the cable back in by about 10 cm/4 inches (mini, 2t, 4t) or about 15 cm/6 inches (8t). Then pull out the end of the cable.

5. INSERT SHOCK ABSORBER

Grasp the cable at any point and insert the shock absorber.

6. CREATE ABUTMENT

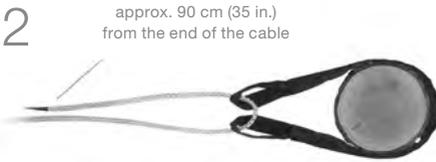
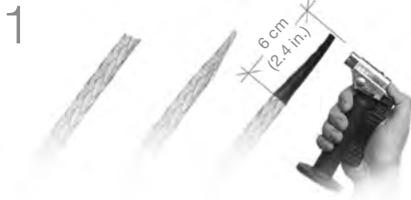
Repeat steps 1-4 on the abutment.

Note

For long cabling paths (more than 8 m/26 ft), we recommend that you do not use a shock absorber.

cobra® ultrastatic

Installation in four easy steps:



cobra ultrastatic was specifically developed for use for cracked branches. Its very low cable expansion of 0.2 % per tonne makes this system ideal for immobilising branches in such situations. It is installed as follows:

1. PREPARE ENDS OF THE CABLE

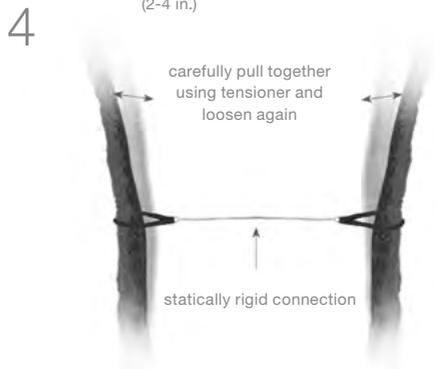
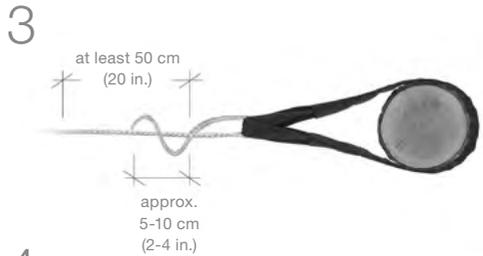
Slice off the end of the cobra ultrasonic cable at an angle of 15° along the filament. Slide a cobra ultrastatic end cap over the end of the cable and heat-shrink it.

2. JOIN CABLE AND LOOP

Wrap the cobra ultrastatic loop around the branch and feed the end of the cable through both end loops.

3. MAKE A QUICK SPLICE

Insert the cable fully through the cable twice at about 90 cm (35 inches) from the end of the cable. Then open up the mesh at one point with your finger and push the tip of the cable at least 50 cm (20 inches) through this into the inside of the cable and do not pull it out again. Smoothen the quick splice and tension it.



4. CONNECT BRANCHES

Using a tensioner, carefully pull the branches to be secured together slightly. Cut cobra ultrastatic to length and fit it on the second branch as described above (step 1-3). Install the cable as tightly as possible. Then, carefully loosen the tensioner. The cobra ultrastatic cable is tensioned even more and forms a static connection between the two branches.

Installation height

Breakage cabling is installed in accordance with "ZTV Baumpflege" at 2/3 the length of the crown part to be secured. When installing cabling on two levels, a static connection is fitted at 1/4 of the length and a dynamic connection is fitted at 2/3 of the length.

Planning, tendering and using **cobra**® in accordance with "ZTV Baumpflege"

"ZTV Baumpflege" defines tree cabling systems as connections between crown parts that are in danger of breaking. They are designed to prevent one or more crown parts from breaking and falling off.

The advantage of using tree cabling systems to restore the break resistance of an older or badly compartmentalised tree is that there is no need to cut the tree back to any great extent, thereby retaining the leaf mass, which is absolutely vital for photosynthesis and for building up compensation wood on a weakened tree.

The type of tree cabling system used and its material must be adapted to the individual conditions on the tree and must meet the following requirements in accordance with ZTV:

- non-invasive fitting and use
- lasts for at least 8 years
- can be adjusted according to tree/branch growth
- must not cut into or chafe the tree/branch
- must distribute the pressure on the anchor point as the tree/branch gets wider

In addition to having the system installed by professionals, it is also important that the required degree of supported and the expected strength are described as precisely as possible from the planning and tendering stage.

An accurate and correct description also makes it easier to monitor and approve completed work and involves the following points, features and options:

1. USE AND REQUIRED DEGREE OF BRACING:

- a) Required degree of supported and type of tree cabling system:
 - dynamic breakage cabling
 - static breakage cabling
 - load/support cabling
- B) Service life
 - permanent use
 - temporary use

2. ARRANGEMENT:

- a) Connection type:
 - Simple cabling
 - Triangular cabling
- b) Number and diameter of branches to be supported
- c) Number of tree cabling systems
- d) Number of levels
- e) Orientation: horizontal or vertical

3. CONNECTION:

- a) Description of main features:
 - Type: Single-component or multi-component system
 - Elasticity
 - Tensile strength
 - Durability

4. FASTENING:

- Non-invasive connection that can be adjusted as the tree/branch grows thicker (must not become ingrown or chafe the surface and must allow adequate distribution of pressure)
- Positioning (must not slip out of position)

5. DOCUMENTATION, INSPECTION, MAINTENANCE:

- Type and scope of documentation
- Type and scope of inspection and maintenance

6. INSTALLATION:

The installer must be competent in order to decide how the defined required degree of supported can be achieved in the tree.

Info



For more information, see "ZTV Baumpflege" (FLL e.V., Bonn) or visit www.fll.de

Using the **cobra**[®] system

DYNAMIC BREAKAGE CABLING:

To prevent breakage caused by oscillation-induced overstretching, install cobra with a shock absorber as dynamic breakage cabling. The natural oscillations of the crown are not impeded, yet load peaks from strong gusts are softly dampened. You should dimension the tree cabling system so that it is relatively slack. Because the higher the tensile strength, the less flexible the system and the stronger the load peaks when impact forces occur.

STATIC BREAKAGE CABLING:

If the branch is already damaged (i.e. cracks have formed), we recommend that you install a cobra tree cabling system without a shock absorber or low-expansion cobra ultrastatic, which was developed specifically for this purpose, in order to install a

static breakage cabling system. This will immobilise the critical point, preventing the crack from opening further and preventing the branch from breaking off.

LOAD/SUPPORT CABLING:

To ensure that the broken branch will not fall to the ground and endanger passing traffic, pedestrians or cyclists, install a so-called static load/support cabling system. Fit a cobra tree cabling system without a shock absorber or cobra ultrastatic as vertically as possible for this purpose. Immediately after it breaks, the secured branch will then remain hanging in the cable and will only fall as far as cable expansion allows with little or no impact force. The cable and anchor point must be able to bear the weight of the branch.

Installation rules in accordance with "ZTV Baumpflege"

DYNAMIC BREAKAGE CABLING:

To optimally reduce the forces that occur, install a dynamic cobra breakage cabling system at a point at least 2/3 the length of the branch to be secured because this is more or less where the centre of gravity of the load will be when there are strong winds. This keeps the swaying forces that occur as low as possible and ensures low loading of the cable. You then achieve optimal dynamic efficiency of the system with the lowest possible tensile strength (see tensile strength table on page 25), protecting the supported crown parts from overstretching and breaking. Installation at a lower point requires higher dimensioning. Install cobra cabling without tension and slack in the summer. Install cobra with a slight amount of slack in the winter (max. 10 % of its length) to prevent any continuous load in the summer.

STATIC BREAKAGE CABLING:

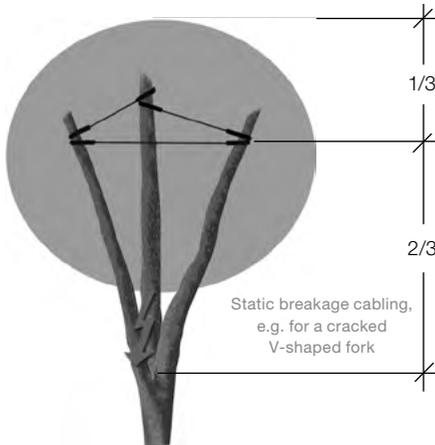
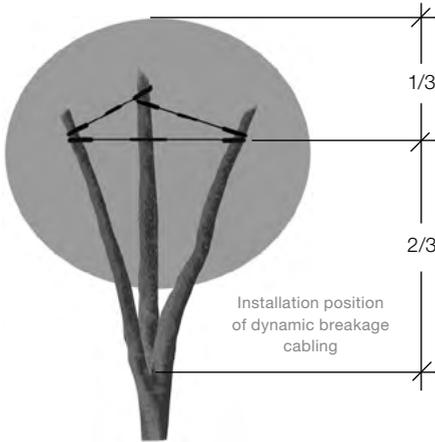
Install a static breakage cabling system at a point at least 2/3 the length of the branch to be braced for the same reasons as outlined for dynamic breakage cabling. In this case, however, you do not want any elasticity because further movement can make an existing crack even bigger. According to "ZTV Baumpflege", twice the values specified in the tensile strength table (see page 25) therefore apply to static breakage cabling systems.

SERVICE LIFE:

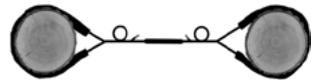
Permanent risk minimisation is necessary in sensitive areas, e.g. on main streets. If a tree is damaged, e.g. a branch breaks, a temporary installation may give you time to better assess the damage and the reaction of the tree.

Arrangement of **cobra**[®] tree cabling systems

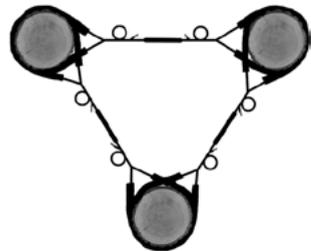
You can install cobra breakage cabling systems in accordance with the connection types specified in "ZTV Baumpflege".



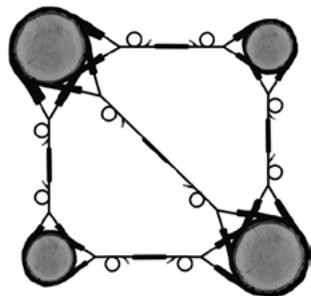
Simple cabling



Triangular cabling



Triangular cabling of 4 branches/limbs



INSTALLATION LEVELS:

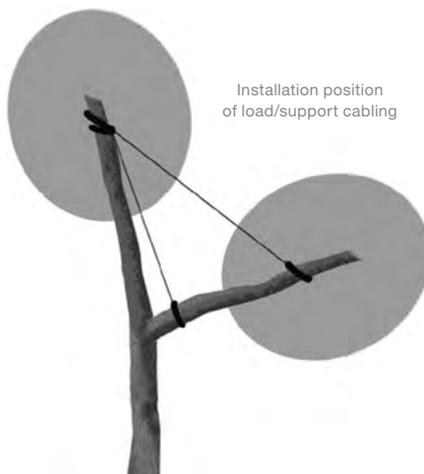
Installation at two levels may be appropriate for a cracked fork or branch. In this case, a static cabling system is installed at 1/4 the height and a dynamic cabling system is installed at 2/3 the height of the branch to be supported.

Note

Installation in the form of one or more interlinked triangles is ideal for preventing branches from moving in all load directions.

LOAD/SUPPORT CABLING:

For a load/support cabling system, use a low-expansion cable and install it as vertically and tightly as possible to prevent the branch from falling into the cable when it breaks and to minimise impact force. Impact force puts unnecessary high strain on the cable and the supporting part of the crown and will cause them to break in many cases, depending on how overstrained they become. The tensile strength of the cobra tree cabling system and the anchor point on the supporting part of the crown must be able to bear the weight of the branch and prevent abrupt strain. The tensile strength can be dimensioned in accordance with the "ZTV Baumpflege" recommendation (see tensile strength table below).



Tensile strength recommendation of "ZTV Baumpflege"

FOR DYNAMIC BREAKAGE CABLING:

Basic diameter of branch/limb	Minimum tensile strength* ¹
up to 40 cm (16 in.)	cobra 2t
up to 60 cm (24 in.)	cobra 4t
up to 80 cm (32 in.)* ²	cobra 8t

FOR STATIC BREAKAGE CABLING AND LOAD/SUPPORT CABLING:

Basic diameter of branch/limb	Minimum tensile strength* ¹
up to 30 cm (12 in.)	cobra 2t
up to 40 cm (16 in.)	cobra 4t
up to 60 cm (24 in.)	cobra 8t
up to 80 cm (32 in.)* ²	cobra 8t (doubled)

*¹ Minimum tensile strength of the system

For the promised service life, when installed at a point at least 2/3 the length of the part of the crown to be supported.

*² Basic diameter greater than 80 cm (32 in.)

A special measure is used for basic branch diameters greater than 80 cm (32 in.). In this case, a decision relating to sizing must be made on a case-by-case basis.

Description of **cobra**[®] cabling

TENDER SPECIFICATION TEXT (TEMPLATE)

cobra tree cabling system

Supply and install a non-invasive, shock-absorbing breakage cabling system, e.g. cobra[®] or a similar system, in accordance with the manufacturer's specifications for basic branch diameters up to 40/60/80 cm (16/24/32 in.) with a minimum tensile strength of 2t/4t/8t and a service life of 8/12 years.

A cobra tree cabling system consists of:

- 1 hollow braid polypropylene cable
- 2 end caps
- 2 expansion inserts
- 2 anti-abrasion hoses
- 1 shock absorber*

* Do not use for static breakage cabling systems, load/support cabling systems or connection lengths of more than 8 m (26 ft.)!

Note

All components of the system must be designed specifically according to the needs of the tree and the situation-related requirements.

	mini	2t	4t	8t	ultrastatic
Cable break load	600 daN	3,450 daN	5,300 daN	10,900 daN	9,000 daN
Material	Hollow braid polypropylene rope	Hollow braid polypropylene rope	Hollow braid polypropylene rope	Hollow braid polypropylene rope	Dyneema hollow braid rope
Cable diameter	8 mm (0.32 in.)	14 mm (0.55 in.)	18 mm (0.71 in.)	28 mm (1.1 in.)	10 mm (0.39 in.)
Elongation at break (cable)	17 %	17 %	17 %	17 %	2 %
Service ductile yield (cable) at load of between 10-60 %	Not specified	3-9 %	2-9 %	3-10 %	0.25-0.85 %
Service life	8 years	12 years	12 years	8 years	8 years
Tensile strength of system when installed with shock absorber	500 daN (0.5 t)	3,030 daN (3.0 t)	4,800 daN (4.8 t)	10,000 daN (10 t)	7,000 daN (7.0 t)
Ageing	2-3 % per year	2-3 % per year	2-3 % per year	2-3 % per year	Not specified
Areas of application	Guying young trees, fruit growing	dynamic breakage cabling up to 40 cm (16 in.) branch diameter, load/support cabling up to 30 cm (12 in.) branch diameter	dynamic breakage cabling for 40-60 cm (16-24 in.) branch diameter, static breakage cabling up to 40 cm (16 in.) branch diameter, load/support cabling for 30-40 cm (12-16 in.) branch diameter	dynamic breakage cabling for 60-80 cm (24-32 in.) branch diameter, static breakage cabling for 40-60 cm (16-24 in.) branch diameter, load/support cabling for 40-60 cm (16-24 in.) branch diameter	static breakage cabling up to 40 cm (16 in.) branch diameter, load/support cabling for 30-40 cm (12-16 in.) branch diameter
Standards met	Manufacturer's specifications	ZTV, ANSI A300, ÖNORM	ZTV, ANSI A300, ÖNORM	ZTV, ANSI A300, ÖNORM	ZTV, ANSI A300, ÖNORM

Installation, documentation, inspection and maintenance

INSTALLATION

Tree cabling systems must be installed by professional installers as a thorough understanding of tree stability and dynamic wind loads is required for installation.

DOCUMENTATION

The installation of a crown tree cabling must be documented by specifying the location, installation date and reason as well as the type of system used and its tensile strength and durability.

INSPECTION

To guarantee the long-term efficiency of tree cabling systems, regular visual checks as well as regulatory

control in the form of a visual inspection by qualified individuals are essential.

The inspection interval depends on the condition of the tree and the safety standards that can reasonably be expected for the affected traffic and is usually 2 years.

MAINTENANCE

Defects discovered during inspection must be corrected promptly. This is usually done together with other tree maintenance work, e.g. cutting and trimming. Serious defects, insufficient splice length or chafing problems must be fixed immediately.

Note

There is no absolute break prevention solution or 100 % guarantee that crown parts of trees will not fall down even using tree cabling/crown cutting measures.

YEARLY COLOUR-CODED END CAPS

There is a different colour for every year. This colour together with the actual year printed on the end caps is used to indicate the installation year.



green	yellow	red	blue	brown	purple	orange	grey
1993	1994	1995	1996	1997	1998	1999	2000
2001	2002	2003	2004	2005	2006	2007	2008
2009	2010	2011	2012	2013	2014	2015	2016
2017	2018	2019	2020	2021	2022	2023	2024
2025	2026	2027	2028	2029	2030	2031	2032

cobra[®]

pbs Baumsicherungsprodukte GmbH
Rotebühlstraße 88 B · 70178 Stuttgart · Germany
Telefon +49 (0)711 23 56 61 · Fax +49 (0)711 23 56 62
www.cobranet.de · pbs@cobranet.de

