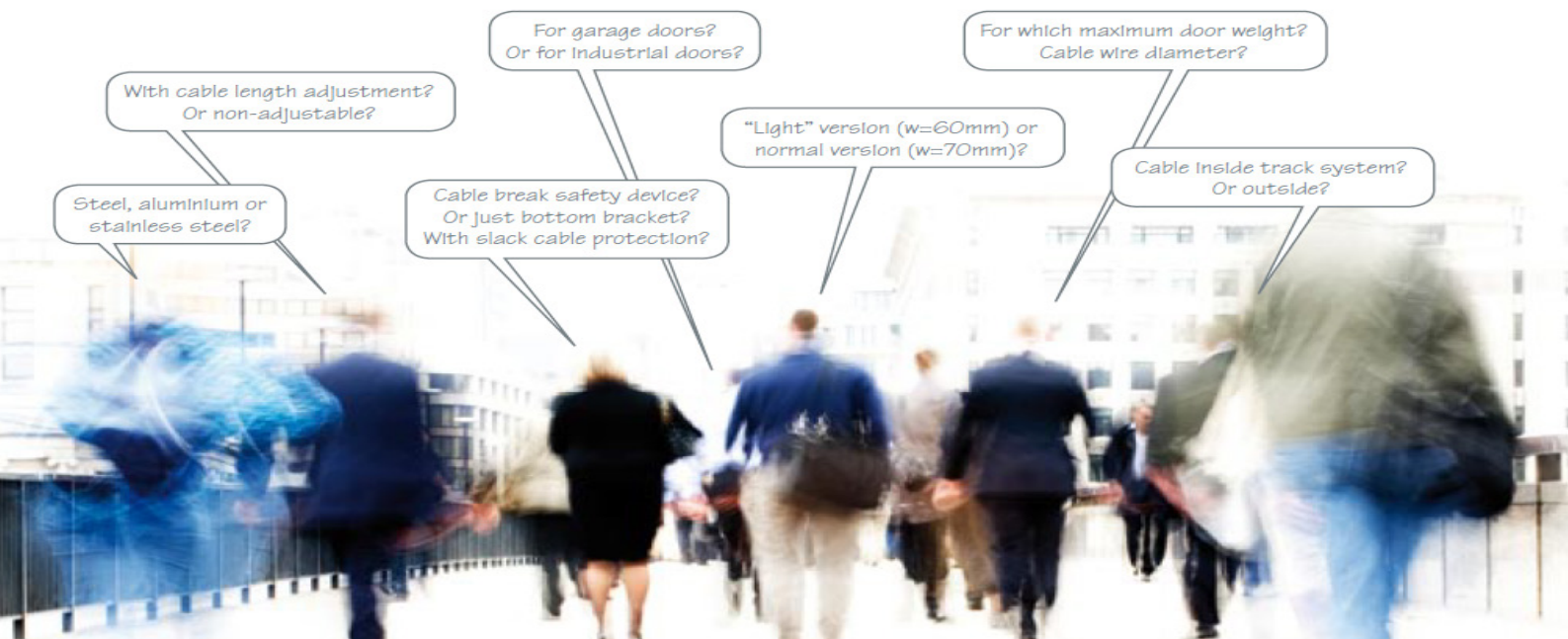


“The bottom line”



In this white paper Ton Peterse, R&D Manager explains an important part about sectional doors: **BOTTOM BRACKETS**.



The main function of the bottom bracket on sectional overhead doors is to secure the lifting cable to the bottom door section, thereby supporting the full door weight.

FlexiForce offers a wide range of different versions of bottom brackets, which can be selected based on these choices:

- For garage doors? Or industrial doors?
- With cable length adjustment? Or non-adjustable?
- For which maximum door weight? Cable wire diameter?
- “Light” version or normal version?
- Cable break safety device? Or just bottom bracket? With slack cable protection?
- Steel, aluminum or stainless steel?

Over the past 45 years, FlexiForce has expanded its range of bottom brackets to more than 16 standard versions — not including specific customer specials.

Based on the information above, selecting the right bottom bracket for your door may seem complex. In this white paper, we will show that there is a logical way to approach this selection process.

Performance (KG)

The total door weight is the starting point for selecting the cable diameter. In the door industry, the most commonly used cables are 7x19 steel ("aircraft") cable and 6x19+PP steel cable with a plastic core (6 strands of 19 wires with a central plastic core).

Depending on the cable type and quality, typical diameters of approx. 3, 4, 5 and 6 mm are used for maximum door weights of around 165, 295, 450 and 750 kg respectively. Cable breaking strength is defined by EU standards, which also specify how to install cable sleeves (aluminium or steel) correctly. Always follow these guidelines to ensure safe cable use and reliable connections.

In addition to the cable, the bottom bracket must be strong enough and provide a secure cable connection. When the cable is guided before being attached to the bracket, the quality of this guidance is important to reduce wear. Aluminium die-cast brackets generally allow better cable guidance than stamped parts.

The well-known principle "a chain is only as strong as its weakest link" also applies here. After selecting the right cable and ensuring a solid connection to the bracket, the next step is fixing the bottom bracket to the door section. This depends on the bracket design, fixation materials, door section design and correct installation by a qualified technician.

The strength of the fixation surface depends on the panel, end caps and bottom aluminium profile. In large, heavy doors, this combination can become a weak point. This can be improved by using a bottom bracket with an additional flange that supports the bottom section.

For very heavy doors, 3" track systems are used, including 3" rollers and dedicated 3" bottom brackets or cable break devices. As these doors are less common, the number of available 3" bracket versions is limited.

Over time, the wide variety of bottom bracket designs has also resulted in different hole patterns. It is therefore important to always follow the installation manual when fixing the bracket to the panel. For safety, door manufacturers should clearly indicate—using labels—that no bolts or screws may be loosened after installation.



Cutting the bottom section is not allowed. The forces acting on cable break devices and bottom brackets are very high. Cutting weakens the door construction at this critical point. If cutting is required, the strength of the construction must be ensured.

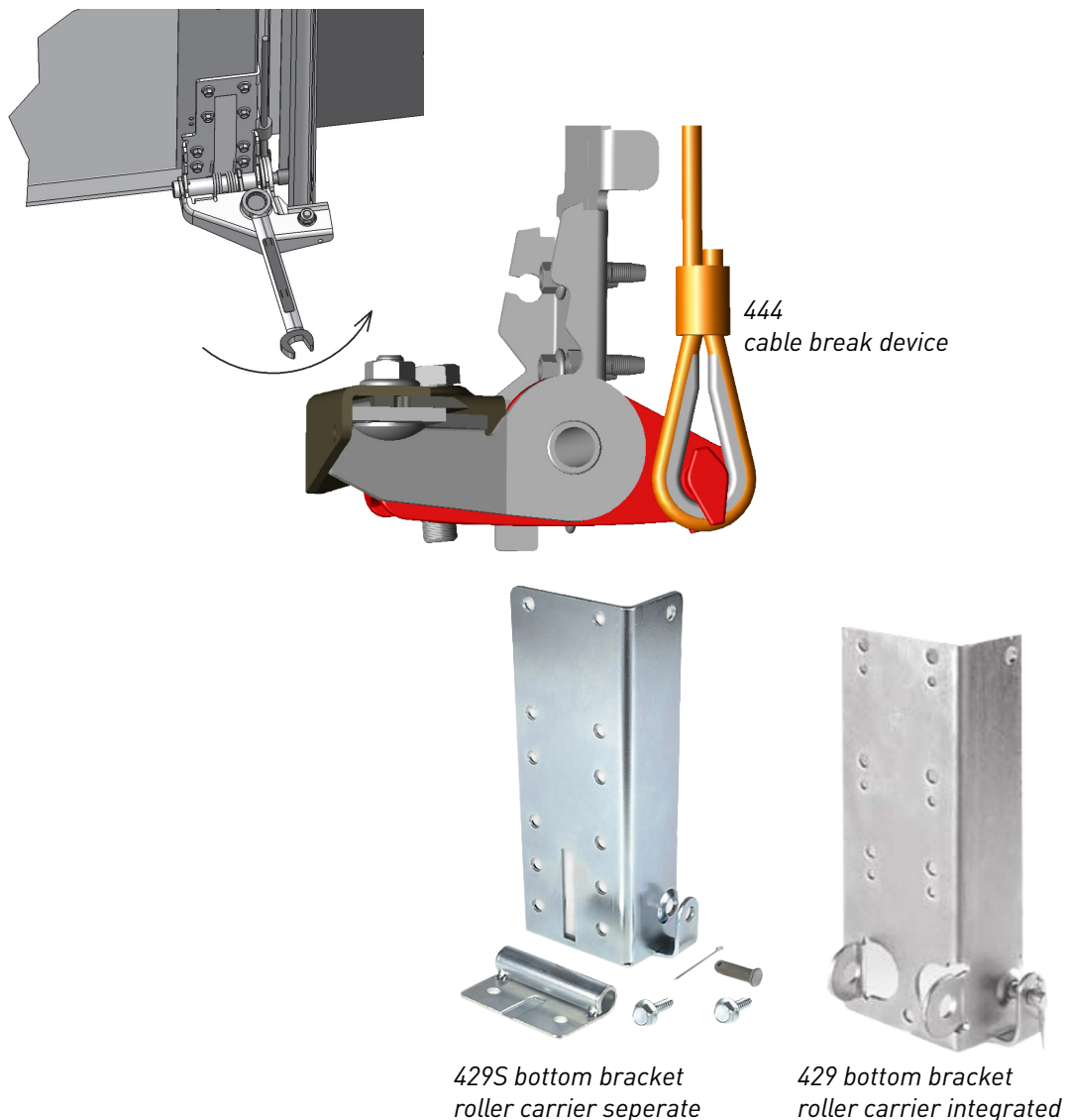
Cable adjustment

The door sections have to be installed “water level”. To achieve this, the cable length needs to be adjusted. This can be done at the bottom bracket. If not, adjustment must be done at the cable drum or by using an adjustable shaft coupler.

In most cases, the cable is guided and connected to an eye bolt with an open or closed eye. This bolt can be adjusted in height. The cable is fitted with a thimble and sleeve (for example 428TAI(-S)). Another option is to fix an end sleeve to the cable after guiding it through an adjustable hollow bolt, such as the 440REGL-1040 and 440S.

The most effective solution, however, is to fix the cable directly to the bracket using a thimble, without additional guidance. This solution is used in our cable break device (type 444). It includes a cable connector that works as a lever, allowing precise cable adjustment in two directions.

For doors with a Normal Lift or Low Headroom system (typically garage doors), the position of the bottom roller is important. It determines whether the door sections stay within the door opening during operation. The correct roller position depends on the cable fixation point and the height of the bottom seal. The roller carrier can be integrated into the bottom bracket or installed separately.



Safety devices

European safety standards (EN13241) require that doors are protected against falling in case of cable break. To limit the drop distance to a maximum of 300 mm, a cable break device can be used.

Working principle of cable break devices

All cable break devices work in a similar way: when the cable breaks, a mechanism is activated that clamps into the vertical track, stopping the door.

A widely used solution, introduced by FlexiForce with the 440-600 series, is a knife mounted on a U-bracket. In case of cable break, the knife cuts into the front of the track. This principle is still used today in models such as 440, 440S, 440-600, 440REGL(-1040), 440-3", 440HD and the newer 444.

Knife-type cable break devices can have a risk in Normal Lift (NL) systems, where the knife may touch the curve during door opening. Correct installation will prevent this. (see FlexiForce installation manuals)

Are cable break devices always required?

A common question is whether cable break devices are required for garage doors. In many cases, they are not. If the cables are designed with a safety factor of six, one cable can still carry the full door weight if the other fails. This applies to most garage door installations.

There should always be a proper risk assessment of the complete door system and application.

Risk of slack cable

When closing a power-operated door, there can be a short delay between shaft rotation and door movement. This can result in low cable tension, known as "slack cable". This is a risk, because continued rotation can cause the cable to run off the drum, leading to the door dropping.

To prevent this, slack cable systems are used.

There are two main types:

- detection systems
 - By software in operator
 - Switch monitoring cable
- detection + correction system.

The detection system is typically used in combination with cable break devices and bottom brackets. An electrical switch on the eye bolt (6901SCHA) or U-bracket (445SW or 440SWL/R) is activated when cable tension drops. This sends a signal to the operator, which stops the system.

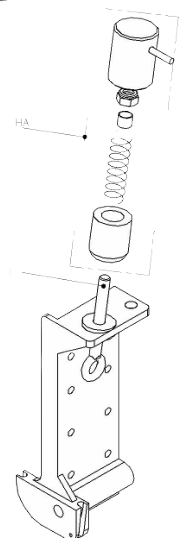
The slack cable system must be installed correctly, so that small variations in cable tension do not unnecessarily stop the operator.



444 cable break device incl. cover



6901SCHA Switch



“ To ensure max 300mm drop distance, a cable break device is the solution ”

EU Standards

The EU standards have significantly changed the design of overhead doors. Cables outside the track (unprotected) are no longer allowed, and protruding parts must be covered (for example, type 444 with cover).

In addition, strict requirements apply to cable break forces and the performance of cable connections.

**Selecting the right bottom bracket requires a clear understanding of the complete system.
From cable and connection to installation and safety.**

**With a structured approach, this process becomes straightforward and reliable.
Looking for support in your specific application?
Our specialists are ready to help you find the right solution.**



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