

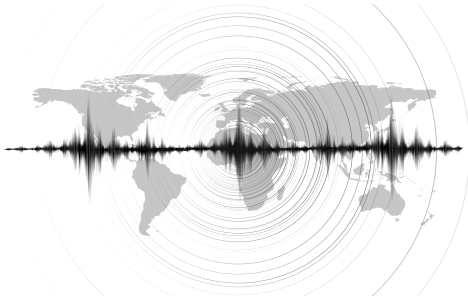


fischer 

Seismic product range.

Seismic bracing elements –
for a secure installation in seismic areas.

Necessity of seismic bracing elements.



In recent years, the necessity of preventing negative impacts on equipment and systems caused by seismic activity has become more important worldwide. The risk of damage from earthquakes has increased significantly due to denser populations in cities and towns, and a high concentration of assets in industrial countries. This risk affects not only “classic” earthquake-prone regions, but central Europe as well, an area where, in some cases, the threat of earthquakes has been underestimated in the past. Large investments and specialised equipment are required to protect technical equipment and systems in buildings from the seismic effects of earthquakes.



This brochure provides practical information on installing seismic bracing equipment (non load-bearing components). Looking at infrastructure systems and buildings such as hospitals, water utility and telecommunications systems, for instance, which must continue operating after an earthquake, it is clear that preventing property and subsequent damages, as well as operational disruptions and interruptions caused by earthquake damage to non-structural facilities is vital to human survival. Despite the severe consequences caused by earthquakes, the practical information and materials available to engineers and planners on

this topic are limited. These documents provide information on and solutions for the planning and installation of seismic bracing devices. They offer easy to understand design examples and solutions for seismic restraint devices and installations. These examples allow consulting engineers and planners to identify effective seismic safety mechanisms and ensure better safety in buildings and public facilities.



What is seismic bracing?

During an earthquake, seismic forces place stress on the building and its contents. These forces act horizontally on the construction of the building itself, as well as on pipelines, cable trays, air ducts and other building systems installed inside. Typical brackets used to hold pipelines, cable paths and other equipment are designed for a standard weight force or for vertical loads; however, they do

not account for the horizontal loads caused by an earthquake. Seismic anchors (such as braces) resist horizontal forces and keep the systems securely in place. The most important purpose of seismic anchoring is safety - to avoid the loss of human life due to an earthquake.

Requirements for seismic bracing:

Rules and requirements governing seismic anchoring are published in model building codes, standards or Eurocodes:

Each code includes a chapter on structural forces, defining the strength of the seismic force that occurs when measuring seismic anchors. The amount of seismic force (specified by the regulation) is indicated as a percentage of the value of the weight of the components or as a g-force. For example, if the horizontal force

is 50 percent for a pipeline, then the seismic force is 0.5g. The seismic "g-value" can vary widely, depending on the type of project. Critical buildings in zones with high seismic activity, for instance, have higher requirements for g-value than a warehouse in zone 1.

Factors that influence seismic g-values include:

- Seismic zone
- Soil type
- Building type
- Height within the building
- Type of anchor
- Anchorage of the system

Planners must use these factors and applicable building code requirements for their specific project and region to determine the correct g-values.

Seismic product range.

For earthquake-safe anchoring of installation systems.



S-VA

Threaded rod brace connector S-VA with maximum installation flexibility for seismic bracing with threaded rods; allows the installation on the channel profile as well as to the wall or ceiling.



S-VB

Channel brace connector S-VB with maximum installation flexibility for seismic bracing with channel profiles; allows the installation on the channel profile as well as to the wall or ceiling surface.



S-ROD

Threaded rod brace connector with increased angle adjustability to install threaded rods for seismic bracing.



SAE

Shaped reinforcement strut SAE for bracing of channel profiles FUS and cantilever arms FCA.



S-FAF

90° angle connector for the connection of two channel profiles and holes for attaching brace connectors S-VA and S-VB.



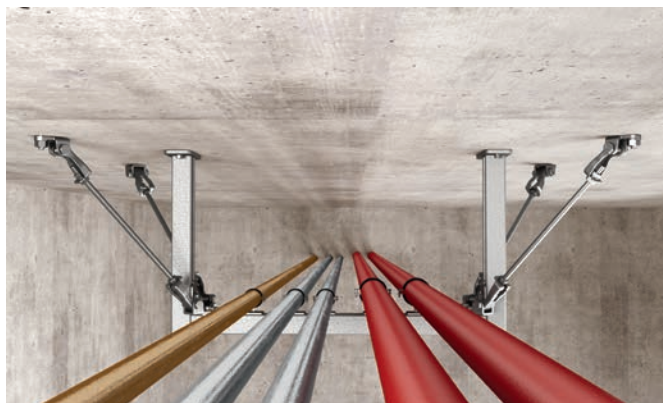
FTRC

Rod stiffener for seismic bracing of threaded rods in FUS channels under compressive load.

ADVANTAGES

- The FM approval of the FSSC and FSF products guarantees objectively tested functional safety.
- The possibility of installing the bracings at different angles ensures a high degree of flexibility in the application.
- The horizontal forces occurring in the event of seismic activity are safely absorbed.
- A subsequent installation of the bracing elements on already existing constructions is possible without any problems.

Applications



S-VA
Bracing of frame construction with threaded rods



S-VB
Bracing of frame construction with channel profiles



S-ROD
Bracing of pipeline with threaded rods



SAE
Bracing of cantilever construction



S-FAF
Connection of channel profiles and bracing elements

Assortment

Product range



FTRC M 12

Article description	Art.-No	Description	Sales unit [pcs]
FTRC M 12	577054	FTRC M12	50

Product range



S-VA



S-ROD



S-VB



S-FAF



SAE 300/500

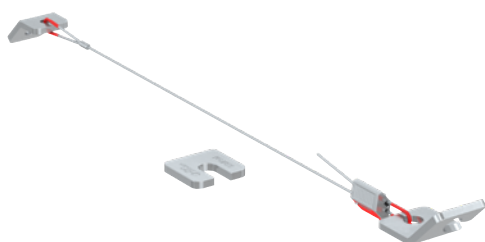
Article description	Art.-No	Sales unit [pcs]
S-VA	552360	10
S-ROD	552361	10
S-VB	552362	10
S-FAF	552363	10
SAE 300	512114	10
SAE 500	512115	10

Wire cable system FWI-S.

For earthquake-proof fastening of installation systems.

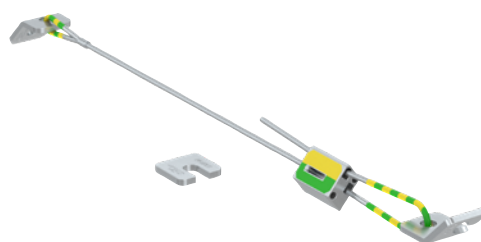
The advantages at a glance

- The system protects non-structural components from damage caused by horizontal forces resulting from earthquakes.
- The FWI-S wire cable system provides a safe and reliable method of securing services equipment, to maintain their integrity during an earthquake.
- The FWI-S wire cable system can minimise damage to non-structural components, resulting in lower repair costs and less downtime.
- Easy installation with pre-assembled sets in two, three and five-metre lengths with wire cable diameters of two, three and five millimetres to absorb any forces that may occur.
- The selection of sets includes wire cable diameters of two, three and five millimetres for a wide range of forces that may occur.
- Suitable for new builds or retrofits. Each set includes a retrofit plate that allows for particularly easy installation on existing installations.
- Each set includes a colour code for easy identification on the construction site. Red corresponds to the 2mm, blue to the 3mm and green/yellow to the 5mm wire cable diameter.



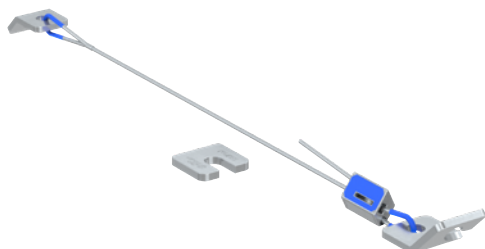
FWI-SR 2.0

The wire cable system, with a diameter of two millimetres, is suitable for bracing light structures. The set is available in lengths of two, three and five metres and allows the absorption of horizontal forces due to earthquakes in both the longitudinal and lateral direction.



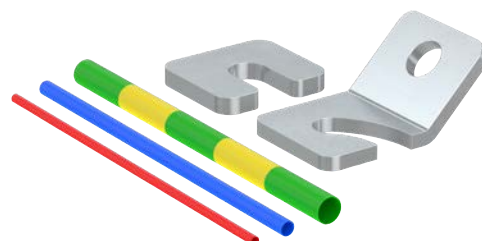
FWI-SGY 5.0

The wire cable system with a diameter of five millimetres is suitable for bracing medium to heavy structures. The set is available in lengths of two, three and five metres and allows the absorption of horizontal forces due to earthquakes in both the longitudinal and lateral direction.



FWI-SB 3.0

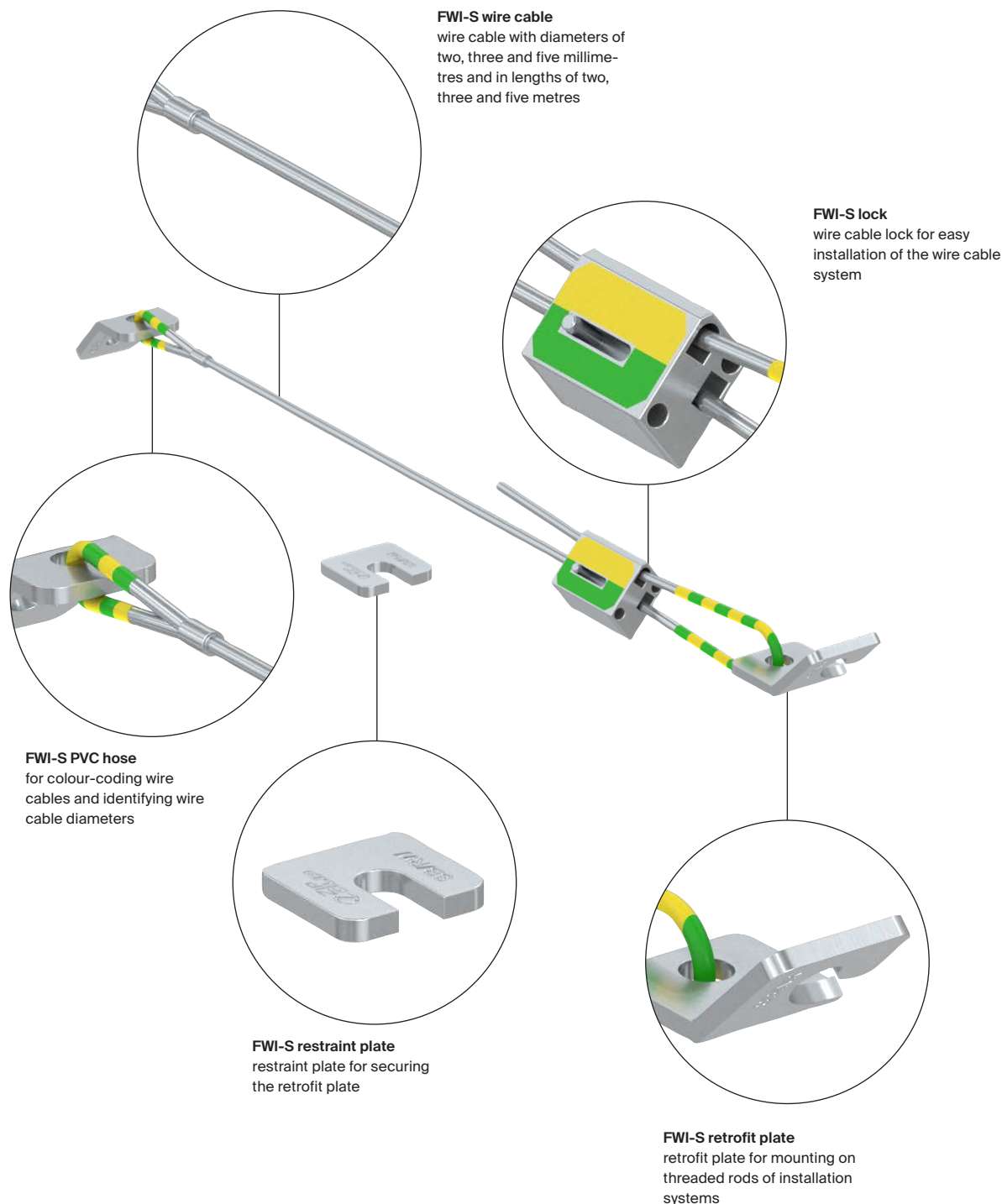
The wire cable system, with a diameter of three millimetres, is suitable for bracing light to medium-weight structures. The set is available in lengths of two, three and five metres and allows the absorption of horizontal forces resulting from earthquakes in both a longitudinal and lateral direction.



FWI-S Spare Kit

Includes a replacement PVC hose with colour coding in red, blue and yellow/green for the corresponding labelling of the FWI-S wire cable systems on site, as well as a retrofit and restraint plate.

FWI-S components



Seismic Test Procedures:

The rules and requirements for seismic bracing are published in the model building regulations, standards or Eurocodes:

- IEEE 344-2013 IEEE Standard for Seismic Qualification of Equipment for Nuclear Power Generating Stations
- ASCE 7-10:ICC ES AC 156 Seismic Certification by Shake-table Testing of Non-structural Components
- IEEE 693-2005 Recommended Practice for Seismic Design of Substations
- EN 60068-3-3:1993 Environmental testing; seismic test methods for devices

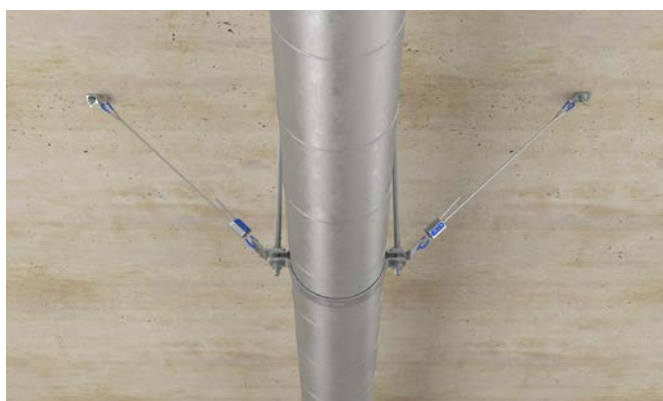
Applications



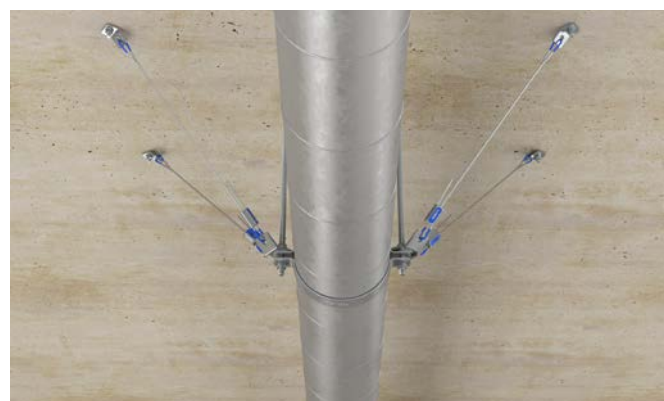
FWI-S
Lateral bracing of pipes



FWI-S
Longitudinal and lateral bracing of pipes



FWI-S
Lateral bracing of spiral-seam pipes



FWI-S
Longitudinal and lateral bracing of spiral-seam pipes



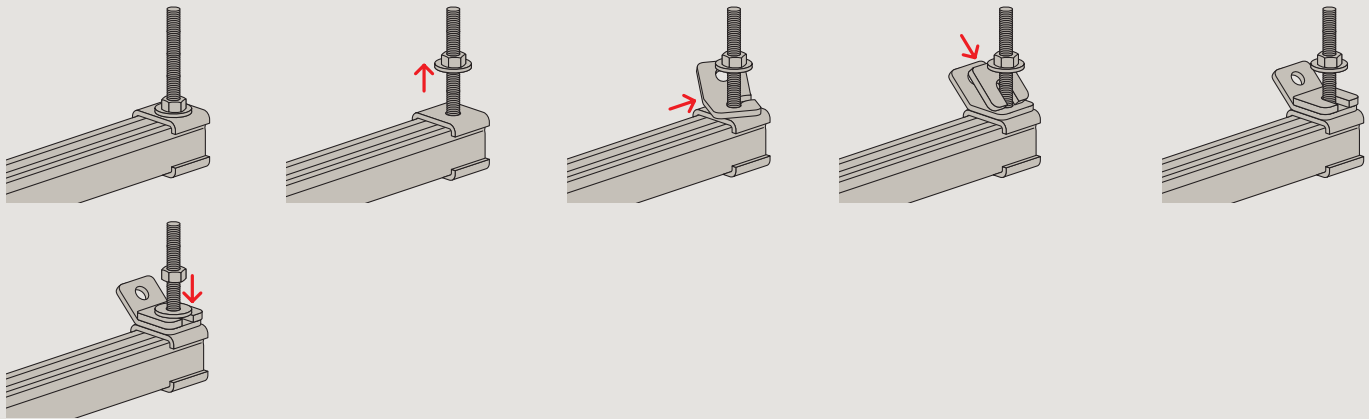
FWI-S
Longitudinal and lateral bracing of cable trays



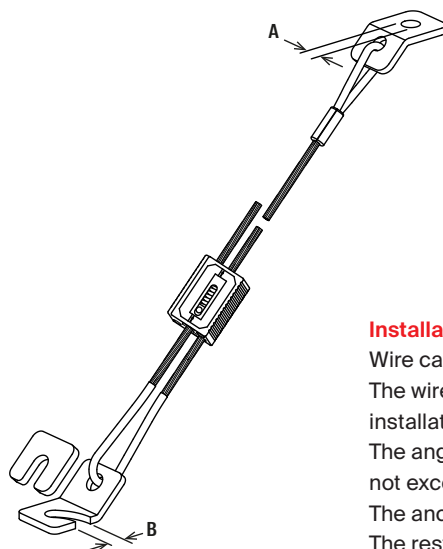
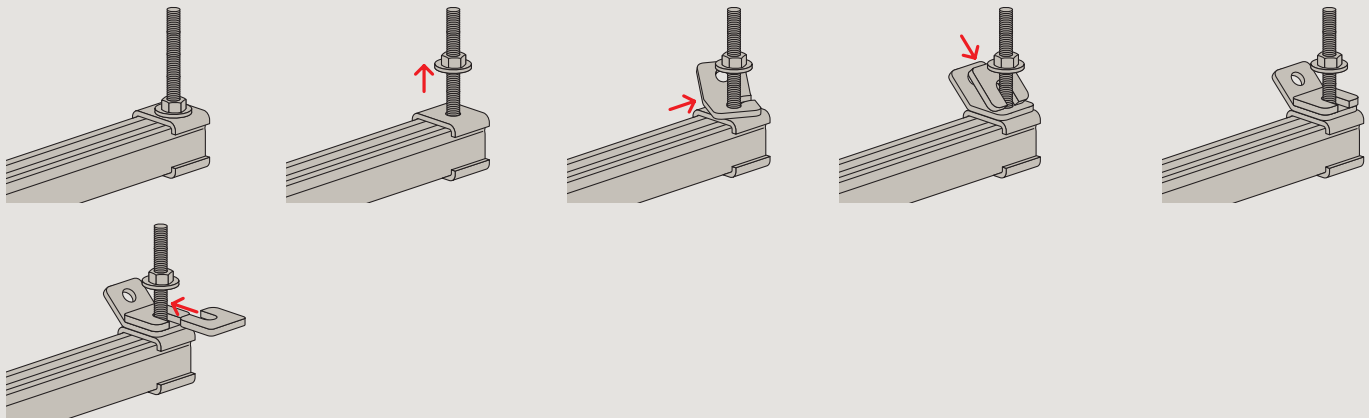
FWI-S
Lateral bracing of air ducts

Installation

FWI-SR / FWI-SB



FWI-SGY



Installation instructions:

Wire cables must always be installed as opposing pairs.

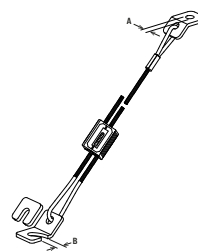
The wire cable must not come into contact with the surrounding installations at any point.

The angle of the wire cables' tensioning from the horizontal must not exceed 60°.

The anchor plate must be in line with the tensioning direction.

The restraint plate must always be used above the retrofit plate.

Assortment



Seismic Assortment



FWI-SR-Kit 2.0

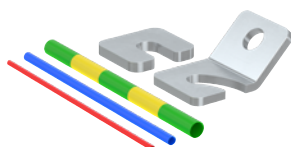
FWI-SB-Kit 3.0

FWI-SGY-Kit 5.0

Item	Item no.	Cable length [mm]	Wire- ϕ [mm]	Diameter anchor bracket A [mm]	Diameter retrofit bracket B [mm]	Max. recom- mended load * [kN]	Colour	Sales unit [pcs]
FWI-SR-Kit 2.0 2m	569504	2.000	2,0	11,0	13,0	1,4	red	2
FWI-SR-Kit 2.0 3m	569505	3.000	2,0	11,0	13,0	1,4	Red	2
FWI-SR-Kit 2.0 5m	569506	5.000	2,0	11,0	13,0	1,4	red	2
FWI-SB-Kit 3.0 2m	569507	2.000	3,0	11,0	13,0	3,7	blue	2
FWI-SB-Kit 3.0 3m	569508	3.000	3,0	11,0	13,0	3,7	blue	2
FWI-SB-Kit 3.0 5m	569509	5.000	3,0	11,0	13,0	3,7	blue	2
FWI-SGY-Kit 5.0 2m	569510	2.000	5,0	13,0	13,0	8,5	green / yellow	2
FWI-SGY-Kit 5.0 3m	569511	3.000	5,0	13,0	13,0	8,5	green / yellow	2
FWI-SGY-Kit 5.0 5m	569512	5.000	5,0	13,0	13,0	8,5	green / yellow	2

The load indicated here refers to a static load without taking into account the angle of installation of the wire rope. The actual load acting on the wire rope must be determined by calculation and taking into account the angle of installation of the wire rope.

Seismic wire cable system FWI-S spare-kit



FWI-S spare kit

Item	Item no.	Contents	Sales unit [pcs]
FWI-S spare kit	569513	1 x PVC hose red 1 x PVC hose blue 1 x PVC hose green/yellow 1 x Restraint washer 1 x Retrofit bracket	1

Dealer:

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fischer stands for

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