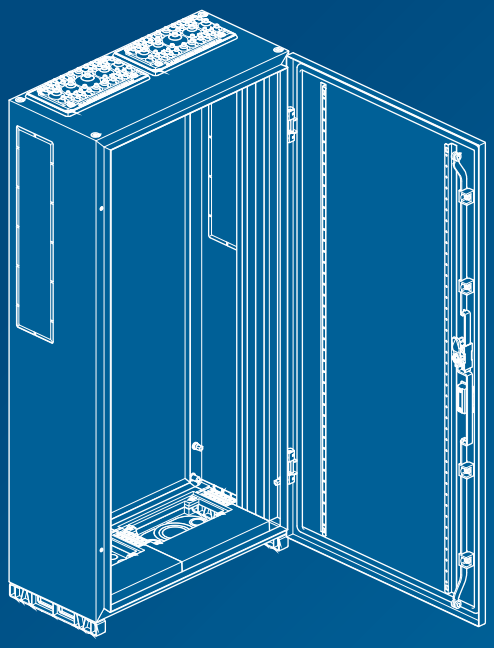
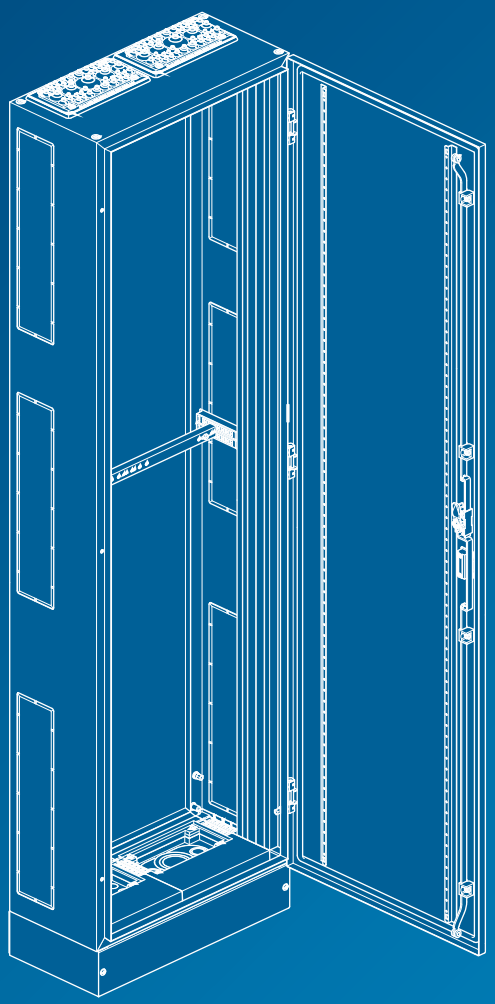
Manual
Distribution Enclosures FR Protection type IP55





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1 About this manual

This manual is part of the distribution enclosure FR.

1.1 Subject of the manual

This document is intended for users of the distribution enclosures FR from Hager. The manual conveys safety-relevant information for electrically skilled person and the operator concerning the lifecycle phases of the product.

- Read and observe this manual before you start working on the enclosure or the switchgear assembly.
- Also observe the supplied assembly manual for the respective enclosure or enclosure accessories.
- Store the manuals in a safe place. The authorised personnel must have access to the manuals at all times.

1.2 Warranty and Liability

The manual does not extend the Sales and Delivery Conditions of Hager. No new claims concerning the warranty and guarantee, which extend beyond the Sales and Delivery Conditions, can be derived from this manual.

Liability note

Hager reserves the right to modify or supplement the product or the documentation at any time without prior notice. Hager assumes no liability for typographical errors and any damage which may arise from them.

1.3 Used symbols and trademarks

Structure of warning messages

⚠ Signal word
Type and source of the danger! **Consequences if the danger is ignored** ➢ Measures for averting the danger

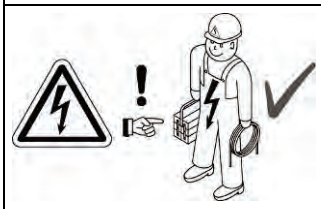
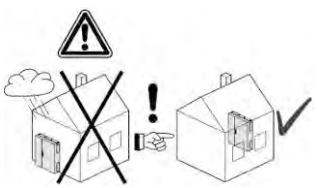
Danger levels in warning messages

Colour	Signal word	Consequences of non-compliance
	DANGER	Death, serious personal injury
	WARNING	Death or serious personal injury possible
	CAUTION	Personal injury
	ATTENTION	Property damage

Procedural instructions with a fixed order:

Step	Action
1	Procedural instruction step 1
2	Procedural instruction step 2

Additional symbols and their meaning:

Symbol	Meaning
	The work must only be performed by an electrically skilled person.
	The product is intended for indoor installation or indoor use.

Visual representation	Meaning
1., 2., 3., etc.	Numbered lists with a fixed order
-	Lists and procedural instructions without a fixed order
➢	Measure / procedural instruction for averting danger

2 For your safety

- Avoid dangers. Adherence to the safety-relevant information in this section is a precondition for the safe assembly and use of the distribution enclosure.
- Also observe the safety-relevant information provided in other sections.

2.1 Proper use

With the distribution enclosures FR, Hager offers a range of univers wall-mounted enclosures with protection type IP55 and univers floor standing enclosures with protection type IP55. The wall-mounted and floor standing enclosures are available with a depth of 275 mm or 400 mm in various heights and widths.

The Hager distribution enclosure FR can be expanded with the univers N internal extension system / univers N high current (univers HS) components up to maximum supply current of 800 A. With the type-tested distribution enclosure FR and the internal extension system from Hager, switchgear and controlgear assemblies can be implemented according to EN 61439 part 2 (power switchgear and controlgear assemblies / PSC) or EN 61439 part 3 (distribution boards to be operated by ordinary persons / DBO). Distribution enclosure FR can also be extended with the univers Z internal extension system from Hager.

Fixed indoor installation / wall mounting

The enclosed design of the distribution enclosure is intended for fixed indoor wall mounting. It is permanently fastened and operated at the assembly location. The floor standing enclosures must also be mounted on the wall. The operating conditions for indoor installation according to EN 61439 as well as the maximum ambient temperatures must be observed at the assembly location.

The distribution enclosure FR can achieve protection type IP55. When the door is closed, it is also protected against dust and water jets. The instructions in this manual regarding compliance with the protection type must be observed during assembly work.

The distribution enclosures FR are available in protection class CL I (earthed) as well as in protection class CL II (double insulated). The instructions in this manual regarding compliance with the protection class must be observed during assembly work.

For more detailed information, refer to the technical data.

Intended use also includes:

- Reading and observing this manual, the assembly manuals and the manuals on the internal extension system,
- Complying with the requirements for the authorised personnel.

Misuse

Any other or additional use as well as changes and modifications to the distribution enclosure is considered misuse. Hager does not assume any liability for damages resulting from misuse.

Limitation of operating areas

There are different areas where the distribution enclosure may not be used to prevent dangers or damage to the enclosure. The distribution enclosure is not suitable

- in areas that require a higher protection type,
- in areas where the ATEX directives must be observed,
- in operating sites at risk of fire.
- Do not use the distribution enclosure in the corresponding environments, in particular, environments that contain chlorine, sulphur, acid or saline, the enclosure and internal extension components may be damaged.

2.2 Requirements for the authorised personnel

- Only qualified electrically skilled persons may assemble, install, commission switchgear and controlgear assemblies, perform extensions, troubleshooting or maintenance and disassemble and dispose of them.
- The qualified electrically skilled persons must have appropriate experience in initial testing and subsequent commissioning, troubleshooting and maintenance.

Product lifecycle phase	**Minimum training, qualifications or competence**
Planning	Electrically skilled person
Internal extension system at the switchgear manufacturer	Switchgear manufacturer, electrically skilled person
Transport, assembly, installation	Switchgear manufacturer / electrically skilled person
Commissioning	Electrically skilled person with appropriate testing experience
Operation	- Power switchgear and controlgear assemblies according to EN 61439-2 (PSC): only allowed by electrically skilled person / electrically instructed person (under supervision of an electrically skilled person) / no operation by ordinary persons! - Short-circuit devices for operation by ordinary persons inside the distribution boards for operation by ordinary persons according to EN 61439-3 (DBO): Ordinary persons
Inspection and maintenance	Electrically skilled person with appropriate testing experience
Extensions	Electrically skilled person, planning required
Disassembly, disposal	Electrically skilled person, only for clearly defined mechanical and electrical work: electrically instructed person

An electrically skilled person by virtue of their professional training, skills and experience as well as knowledge of the relevant regulations can assess the work assigned to them and identify possible dangers.

An electrically instructed person must be sufficiently informed and supervised by an electrically skilled person. The instructed person must thus be capable of identifying risks and avoiding dangers as well as dangers due to electricity.

3 Technical data

Intended use

Observing the technical data is important for ensuring the intended use.

3.1 General technical data

Specifications for the switchgear and controlgear assemblies

The distribution enclosure FR is prepared for the univers N or univers N high current (univers N HS) internal extension system.
After corresponding extension, it is also suitable as switchgear and controlgear assemblies according to EN 61439-1/-2/-3 for:

- Rated voltage U_n = 400 V / 690 V
- Rated voltage U_n = 230 V / 400 V

In case of rated voltageU_n = 400 V / 690 V

- Rated peak withstand current
  U_{imp} = overvoltage category IV - 8 kV
- Mountable:
  - Main busbars suitable for 8 kV operating equipment
  - Alternative: Overvoltage protective device downstream of the incoming unit; with 4 kV, all devices can be used
- Rated insulation voltage U_i = 800 V
- CTI of the insulation material = 425; material group II
  - Minimum clearances = 8 mm
  - Minimum creepage distances = 11 mm

In case of rated voltage U_n = 230 V / 400 V

- Rated peak withstand current
  U_{imp} = overvoltage category III - 4 kV
- Rated insulation voltage U_i = 400 V
- CTI of the insulation material = 425; material group II
  - Minimum clearances = 3 mm
  - Minimum creepage distances = 5.6 mm
  - Hager also recommends using the clearances and creepage distances specified under U_n = 400 V / 690 V for U_n = 230 / 400 V (Minimum clearances = 8 mm, minimum creepage distances = 11 mm).

Rated current

I_{nA} max. 800 A

Short-circuit resistance I_{cc}

- 70 kA for busbars
- 70 kA for fused protection devices
- 25 kA for MCCBs

On request, individual values and complete overviews are available as appendices for the VDE certificate according to DIN EN 61439-1/-2 and DIN EN 61439-1/-3.

Application

- Fixed
- Indoor installation
- Protection against external mechanical influence IK10 (glass door IK07)
- Ordinary persons may not operate switchgear and controlgear assemblies designed according to EN 61439, part 2 (power switchgear and controlgear assembly / PSC).
- Ordinary persons may operate switchgear and controlgear assemblies designed according to EN 61439, part 3 (distribution boards to be operated by ordinary persons / DBO). Devices that cannot be operated by ordinary persons must be marked by the installer according to standards or must require the use of a key or tool; additional requirements according to standard EN 61439 must be observed.
- Prepared for use under normal operating conditions according to the standard series EN 61439. Deviations are possible after the installer consults with the planner taking into consideration precautions according to the standard series EN 61439.

Mechanical installation of devices / internal extension

- Prepared for univers N, univers N high current and univers Z internal extension system as well as a mounting plate
- For assembly on univers UN*A mounting rails (not included in the scope of delivery)
- Floor standing enclosures, including retaining rail for reinforcing the mounting rails

Protection classes

- CL I earthed
- CL II double insulated

Protection type

- IP55
- IP3X (after the door, in front of covers)

Note:

- Observe the operating equipment protection type.
- A Hager NH switch disconnector with fuse in bar design has the protection type IP2X.

Impact protection

- IK10 all round, except for flange (standard side excluded)
- IK07 for glass door

Colour

- Enclosure RAL 7035 (light grey) powder-coated and burned-in
- Base plinth RAL 9005 (black) powder-coated and burned-in

Doors

- Front-flush, overlay, stop on right or left
- Available with sheet metal doors or transparent doors
- With double door from an enclosure width of 1050 mm (≥ 4 fields)
- Opening angle 110°
- 3-point rod lock with swivelling lever with pushbutton and push rods
- Inside hinges, all-round foamed, temperature and oil-resistant seal
- Standard pushbutton in the swivelling lever can be replaced with Euro profile half-cylinder

Carcass

- 1.5 mm sheet steel (1 mm rear panel), powder-coated and burned-in
- Can be turned 180° (top / bottom)
- Pre-punches in the sides to the busbar gland for an enclosure to enclosure connection (pre-punches depending on the enclosure size 1-3)
- M8 rivet nuts in floor plate and cover plate (2x at the front and 2x at the rear)
- M8 rivets nuts in rear panel (2x at top and 2x at bottom)

Installation

For fixed indoor installation / wall mounting:

- Wall-mounted enclosure via supplied 4 wall mounting brackets on the wall
- Floor standing enclosure on base plinth, height 100 / 200 mm, as well as wall mounting via 2 supplied wall mounting brackets
- Levelling feet available for compensating height, as an alternative to the base plinth

- Possible enclosure combinations:
  - Individual enclosure
  - Assembled at the side in a row, enclosure connection possible at same depth (using connection set FZ721A / FZ721B)
  - Assembled vertically, enclosure connection possible at same width and depth (using connection set FZ77*A)

Cable entry openings

- 1x FZ402 at the top for each field ex works
- In the wall-mounted enclosure: 1x FZ408M at bottom ex works, remaining glands with FZ406M
- In the floor standing enclosure: Ppen at the bottom, without flange (to comply with protection type IP55 and protection class II, the insertion flange must be inserted at the bottom)
- Enclosure, with depth of 400 mm, with second row of flange openings (pre-punched)

Busbar gland of adjoining enclosures

- Via side pre-punches using connection set FZ721A / FZ721B). 1 to 3 pre-punches on the side depending on the enclosure height.
  - Pre-punches at top and bottom intended for routing busbars with a 40/60 mm distance between busbars.
  - Pre-punch in the centre of the enclosure intended for routing busbars with a 185 mm distance between busbars.

Standards and regulations

- Tested according to EN 61439-1/-2/-3
- Dimensions according to DIN 43780
- Protection type IP55 according to VDE 0470 part 1 (DIN EN 60529)
- Protection type IP3X when the door is open
- Clearances and creepage distances according to VDE 0110, part 1 and 2/1.89
- Rated insulation voltage AC 800 V
- Overvoltage category III/IV
- Degree of pollution 3
- Insulation class I

3.2 Order number code

The order number code contains

- The housing dimensions (inner height and width),
- The protection class, depth and door,
- Height of the base plinth for floor standing enclosures:

Order number code

		Order number					
Product group		F	R				
Hight of enclosure	450			3			
Inner dimensions* (mm)	600			4			
	750			5			
	900			6			
	1050			7			
	1200			8			
	1350			9			
	1500		(1)	0			
	1650		(1)	1			
	1800		(1)	2			
Width (mm)	250				1		
	500				2		
	750				3		
	1000				4		
	1250				5		
	1500				6		
Protection Class and depth (mm)	CL I & 275					E	
	CL I & 275 (Glazed door)					K	
	CL I & 400					G	
	CL I & 400 (Glazed door)					V	
	CL II & 275					S	
	CL II & 275 (Glazed door)					L	
	CL II & 400					H	
	CL II & 400 (Glazed door)					U	
Plinth** (mm)	100						1
	200						2

* Height and width: Inner dimensions; height without base plinth; the height of the floor standing enclosure varies with the height of the used base plinth.

** All floor standing enclosures are supplied with base plinth. Base plinth is available with a height of 100 mm or 200 mm. If necessary, two base plinths can be assembled on top of each other (with connection set for 2 plinth panels on top of each other FZ714).

Example of order number code: FR24G2

FR	2	4	G	2
FR series	Height 1800 mm - Inner dimension - Height without base plinth	Width 1000 mm - Inner dimension	Protection class CL I, depth 400 mm	Plinth 200 mm

3.3 Order references and housing dimensions

3.3.1 Wall-mounted enclosure

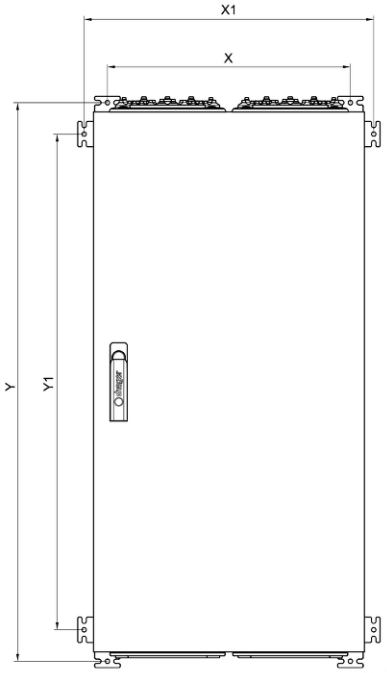
Wall-mounted enclosure (outer dimension, without base plinth)

Depth [mm]	Height [mm]	Width [mm]	mod.	Protection class CL I	Protection class CL II
275	500	300	36	FR31E	FR31S
		550	72	FR32E	FR32S
		800	108	FR33E	FR33S
		1050	144	FR34E	FR34S
		1300	180	FR35E	FR35S
275	650	300	48	FR41E	FR41S
		550	96	FR42E	FR42S
		800	144	FR43E	FR43S
		1050	192	FR44E	FR44S
		1300	240	FR45E	FR45S
275	800	300	60	FR51E	FR51S
		550	120	FR52E	FR52S
		800	180	FR53E	FR53S
		1050	240	FR54E	FR54S
		1300	300	FR55E	FR55S
275	950	300	72	FR61E	FR61S
		550	144	FR62E	FR62S
		800	216	FR63E	FR63S
		1050	288	FR64E	FR64S
		1300	360	FR65E	FR65S
275	1100	300	84	FR71E	FR71S
		550	168	FR72E	FR72S
		800	252	FR73E	FR73S
		1050	336	FR74E	FR74S
		1300	420	FR75E	FR75S
275	1250	300	96	FR81E	FR81S
		550	192	FR82E	FR82S
		800	288	FR83E	FR83S
		1050	384	FR84E	FR84S
		1300	480	FR85E	FR85S

Depth [mm]	Height [mm]	Width [mm]	mod.	Protection class CL I	CL II
275	1400	300	108	FR91E	FR91S
		550	216	FR92E	FR92S
		800	324	FR93E	FR93S
		1050	432	FR94E	FR94S
		1300	540	FR95E	FR95S
400	1550	300	108	FR01E	FR01S
		550	216	FR02E	FR02S
		800	324	FR03E	FR03S
		1050	432	FR04E	FR04S
		1300	540	FR05E	FR05S
400	650	550	96	x	FR42H
		800	144	x	FR43H
		1050	192	x	FR44H
400	1400	550	216	FR92G	FR92H
		800	324	FR93G	FR93H
		1050	432	FR94G	FR94H

Wall-mounted enclosure, assembly dimensions (see assembly manual)

Tiefe / Depth	Höhe / Height	Breite / Width	mod.	Ref	Ref	X	Y	X1	Y1
275	500	300	36	FR31E	FR31S	245	540	340	410
	500	550	72	FR32E	FR32S	495	540	590	410
	500	800	108	FR33E	FR33S	745	540	840	410
	500	1050	144	FR34E	FR34S	995	540	1090	410
	500	1300	180	FR35E	FR35S	1245	540	1340	410
	650	300	48	FR41E	FR41S	245	690	340	560
	650	550	96	FR42E	FR42S	495	690	590	560
	650	800	144	FR43E	FR43S	745	690	840	560
	650	1050	192	FR44E	FR44S	995	690	1090	560
	650	1300	240	FR45E	FR45S	1245	690	1340	560
	800	300	60	FR51E	FR51S	245	840	340	710
	800	550	120	FR52E	FR52S	495	840	590	710
	800	800	180	FR53E	FR53S	745	840	840	710
	800	1050	240	FR54E	FR54S	995	840	1090	710
	800	1300	300	FR55E	FR55S	1245	840	1340	710
	950	300	72	FR61E	FR61S	245	990	340	860
	950	550	144	FR62E	FR62S	495	990	590	860
	950	800	216	FR63E	FR63S	745	990	840	860
	950	1050	288	FR64E	FR64S	995	990	1090	860
	950	1300	360	FR65E	FR65S	1245	990	1340	860
	1100	300	84	FR71E	FR71S	245	1140	340	1010
	1100	550	168	FR72E	FR72S	495	1140	590	1010
	1100	800	252	FR73E	FR73S	745	1140	840	1010
	1100	1050	336	FR74E	FR74S	995	1140	1090	1010
	1100	1300	420	FR75E	FR75S	1245	1140	1340	1010
	1250	300	96	FR81E	FR81S	245	1290	340	1160
	1250	550	192	FR82E	FR82S	495	1290	590	1160
	1250	800	288	FR83E	FR83S	745	1290	840	1160
	1250	1050	384	FR84E	FR84S	995	1290	1090	1160
	1250	1300	480	FR85E	FR85S	1245	1290	1340	1160
	1400	300	108	FR91E	FR91S	245	1440	340	1310
	1400	550	216	FR92E	FR92S	495	1440	590	1310
	1400	800	324	FR93E	FR93S	745	1440	840	1310
	1400	1050	432	FR94E	FR94S	995	1440	1090	1310
	1400	1300	540	FR95E	FR95S	1245	1440	1340	1310
	1550	300	108	FR01E	FR01S	245	1590	340	1460
	1550	550	216	FR02E	FR02S	495	1590	590	1460
	1550	800	324	FR03E	FR03S	745	1590	840	1460
	1550	1050	432	FR04E	FR04S	995	1590	1090	1460
	1550	1300	540	FR05E	FR05S	1245	1590	1340	1460
400	1400	300	216	FR92G	FR92H	495	1440	590	1310
	1400	550	324	FR93G	FR93H	745	1440	840	1310
	1400	800	432	FR94G	FR94H	995	1440	1090	1310



3.3.2 Floor standing enclosure

Floor standing enclosure with base plinth 100 mm (outer dimensions)

Depth	Height[1]	Width	mod.	Protection class			
[mm]	[mm]	[mm]		CL I	CL I glass door	CL II	CL II glass door
275	1700	300	132	FR11E1		FR11S1	
		550	264	FR12E1		FR12S1	
		800	396	FR13E1		FR13S1	
		1050	528	FR14E1		FR14S1	
		1300	660	FR15E1		FR15S1	
		1550		x		x	
275	1850	300	144	FR21E1	x	FR21S1	x
		550	288	FR22E1	FR22K1	FR22S1	FR22L1
		800	432	FR23E1	FR23K1	FR23S1	FR23L1
		1050	576	FR24E1	FR24K1	FR24S1	FR24L1
		1300	720	FR25E1	FR25K1	FR25S1	FR25L1
		1550	864	FR26E1	FR26K1	FR26S1	FR26L1
400	1850	300	144	FR21G1	x	FR21H1	x
		550	288	FR22G1	FR22V1	FR22H1	FR22U1
		800	432	FR23G1	FR23V1	FR23H1	FR23U1
		1050	576	FR24G1	FR24V1	FR24H1	FR24U1
		1300	720	FR25G1	FR25V1	FR25H1	FR25U1
		1550	864	FR26G1	FR26V1	FR26H1	FR26U1

[1] Height specifications without base plinth

Floor standing enclosure with base plinth 200 mm (outer dimensions)

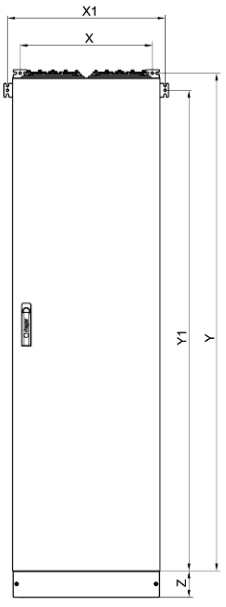
Depth	Height[1]	Width	mod.	Protection class			
[mm]	[mm]	[mm]		CL I	CL I glass door	CL II	CL II glass door
275	1700	300	132	FR11E2		FR11S2	
		550	264	FR12E2		FR12S2	
		800	396	FR13E2		FR13S2	
		1050	528	FR14E2		FR14S2	
		1300	660	FR15E2		FR15S2	
		1550		x		x	
275	1850	300	144	FR21E2	x	FR21S2	x
		550	288	FR22E2	FR22K2	FR22S2	FR22L2
		800	432	FR23E2	FR23K2	FR23S2	FR23L2
		1050	576	FR24E2	FR24K2	FR24S2	FR24L2
		1300	720	FR25E2	FR25K2	FR25S2	FR25L2
		1550	864	FR26E2	FR26K2	FR26S2	FR26L2
400	1850	300	144	FR21G2	x	FR21H2	x
		550	288	FR22G2	FR22V2	FR22H2	FR22U2
		800	432	FR23G2	FR23V2	FR23H2	FR23U2
		1050	576	FR24G2	FR24V2	FR24H2	FR24U2
		1300	720	FR25G2	FR25V2	FR25H2	FR25U2
		1550	864	FR26G2	FR26V2	FR26H2	FR26U2

[1] Height specifications without base plinth

Floor standing enclosure, assembly dimensions (see assembly manual)

Tiefe / Depth	Höhe / Height	Breite / Width	mod.	Ref	Ref	Ref	Ref	X	Y	X1	Y1	Z
275	1700	300	132	FR11E1		FR11S1		245	1721	340	1656	100
	1700	550	264	FR12E1		FR12S1		495	1721	590	1656	100
	1700	800	396	FR13E1		FR13S1		745	1721	840	1656	100
	1700	1050	528	FR14E1		FR14S1		995	1721	1090	1656	100
	1700	1300	660	FR15E1		FR15S1		1245	1721	1340	1656	100
275	1850	300	144	FR21E1		FR21S1		245	1871	340	1806	100
	1850	550	288	FR22E1	FR22K1	FR22S1	FR22L1	495	1871	590	1806	100
	1850	800	432	FR23E1	FR23K1	FR23S1	FR23L1	745	1871	840	1806	100
	1850	1050	576	FR24E1	FR24K1	FR24S1	FR24L1	995	1871	1090	1806	100
	1850	1300	720	FR25E1	FR25K1	FR25S1	FR25L1	1245	1871	1340	1806	100
	1850	1550	864	FR26E1	FR26K1	FR26S1	FR26L1	1495	1871	1590	1806	100
400	1850	300	144	FR21G1		FR21H1		245	1871	340	1806	100
	1850	550	288	FR22G1	FR22V1	FR22H1	FR22U1	495	1871	590	1806	100
	1850	800	432	FR23G1	FR23V1	FR23H1	FR23U1	745	1871	840	1806	100
	1850	1050	576	FR24G1	FR24V1	FR24H1	FR24U1	995	1871	1090	1806	100
	1850	1300	720	FR25G1	FR25V1	FR25H1	FR25U1	1245	1871	1340	1806	100
	1850	1550	864	FR26G1	FR26V1	FR26H1	FR26U1	1495	1871	1590	1806	100

Tiefe / Depth	Höhe / Height	Breite / Width	mod.	Ref	Ref	Ref	Ref	X	Y	X1	Y1	Z
275	1700	300	132	FR11E2		FR11S2		245	1721	340	1656	200
	1700	550	264	FR12E2		FR12S2		495	1721	590	1656	200
	1700	800	396	FR13E2		FR13S2		745	1721	840	1656	200
	1700	1050	528	FR14E2		FR14S2		995	1721	1090	1656	200
	1700	1300	660	FR15E2		FR15S2		1245	1721	1340	1656	200
275	1850	300	144	FR21E2		FR21S2		245	1871	340	1806	200
	1850	550	288	FR22E2	FR22K2	FR22S2	FR22L2	495	1871	590	1806	200
	1850	800	432	FR23E2	FR23K2	FR23S2	FR23L2	745	1871	840	1806	200
	1850	1050	576	FR24E2	FR24K2	FR24S2	FR24L2	995	1871	1090	1806	200
	1850	1300	720	FR25E2	FR25K2	FR25S2	FR25L2	1245	1871	1340	1806	200
	1850	1550	864	FR26E2	FR26K2	FR26S2	FR26L2	1495	1871	1590	1806	200
400	1850	300	144	FR21G2		FR21H2		245	1871	340	1806	200
	1850	550	288	FR22G2	FR22V2	FR22H2	FR22U2	495	1871	590	1806	200
	1850	800	432	FR23G2	FR23V2	FR23H2	FR23U2	745	1871	840	1806	200
	1850	1050	576	FR24G2	FR24V2	FR24H2	FR24U2	995	1871	1090	1806	200
	1850	1300	720	FR25G2	FR25V2	FR25H2	FR25U2	1245	1871	1340	1806	200
	1850	1550	864	FR26G2	FR26V2	FR26H2	FR26U	1495	1871	1590	1806	200



4 About the distribution enclosure FR

4.1 Important properties

Area of application for univers FR distribution enclosures

- Wall-mounted enclosure or floor standing enclosure
- Prepared for univers N / univers N high current internal extension system
- Rated voltage U_n = 400 V / 690 V or 230 V / 400 V
- Rated insulation voltage U_i to 800 V
- Rated current I_{nA} max. 800 A
- Enclosures can be combined side-by-side or on top of each other

Properties of univers FR distribution enclosures

- Protection type IP55, seals with high temperature and oil resistance

- Wall-mounted enclosures
  - Available depths: 275 mm / 400 mm
  - Available widths: 300, 550, 800, 1050 and 1300 mm
    Inner dimension 250 to 1250 mm
  - Available heights: 500, 600, 800, 950, 1100, 1250 and 1400 mm
  - With 4 wall mounting brackets that can be positioned horizontally and vertically
  - Wall-mounted enclosures equipped with transport feet

- Floor standing enclosures
  - Available depths: 275 and 400 mm
  - maximum width: 1550 mm,
    widths: 300, 550, 800, 1050, 1300 and 1550 mm,
    Inner dimension 250 to 1500 mm
  - Available heights: 1700 and 1850 mm
  - With 2 wall mounting brackets that can be positioned horizontally and vertically
  - Various base plinth heights available with the floor standing enclosure

- Flexible main busbar routing through pre-punched side openings
  (1 to 3 pre-punches)
- Flexible cable entry through pre-punched openings in the roof and base plate and knockout cable gland openings in the base plinth
- Double door from an enclosure width of 1050 mm
- Enclosure carcass manufactured in sheet steel 1.5 mm on all sides
- Interior trim consisting of sturdy plastic plates for the
  protection classes I and II,
  defective plates can be easily replaced.

4.2 Wall-mounted and floor standing enclosure designs

Wall-mounted enclosures

Example: Wall-mounted enclosure, earthed: Protection class CL I

Wall-mounted enclosure example, completely covered with protective insulation: protection class CL II

Available depths (outer dimensions)	275 and 400 mm
Available widths (outer dimensions)	300, 550, 800, 1050 and 1300 mm
Available heights (outer dimensions)	500, 600, 800, 950, 1100, 1250 and 1400 mm

Floor standing enclosures

Example of earthed floor standing enclosure: Protection class CL I, standard door

Example of earthed floor standing enclosure: Protection class CL I, transparent door

Available depths (outer dimensions)	275 and 400 mm
Available widths (outer dimensions)	300, 550, 800, 1050, 1300 and 1550 mm
Available heights (outer dimensions)	1700 and 1850 mm (without base plinth)

Example of floor standing enclosure with double door, fitted

4.3 Scope of delivery and delivery state

Observe type plate

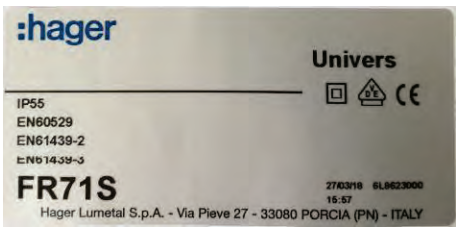
To facilitate reordering, the data of the type plate attached to the enclosure should be documented.

The enclosures are marked by Hager according to
EN 61439-1, section 6.1:

a) Name of the manufacturer of the switchgear and controlgear assemblies or its trademark
b) Type designation or ID number or another marking, which can be used to request the necessary information from the manufacturer of the switchgear and controlgear assembly
c) Marking for determining the date of manufacturer
d) Standard specifications

Example

a) :hager / Hager Lumetal S.p.A
b) FR25H1
   IP55
c) 08/02/18
d) EN 60529
   EN 61439-2
   EN 61439-3



The enclosure marking should be supplemented with information of the switchgear manufacturer in compliance with standards.

Delivery state

- Enclosure with assembled closed door, edge protection on door
- Wall-mounted enclosures with transport protection feet, floor standing enclosures upright on the base plinth
- Enclosures wider than a Euro pallet are delivered on suitable disposable pallets.
- Enclosures packaged upright on a Hager carton on a pallet, with Hager label 1 x at the top and 1 x on the side.

Scope of enclosure delivery

- Cable entry flanges of wall-mounted enclosures: FZ402 at top for each field / opening, 1 x FZ408M at bottom, other FZ406M
- Cable entry flanges of floor standing enclosures: FZ402 at top for each field / opening, lower openings without flange; insulated flanges must be used for protection class CL II applications
- Enclosures, with a depth of 400 mm, have a pre-punch for another cable entry opening for each field
- Enclosures from a width of 1050 mm (or ≥ 4 fields) have double doors.
- Floor standing enclosures from a width of 1700 (or ≥11 rows) are supplied, including a preassembled base plinth (base plinth according to the order).
- Doors are equipped with a swivelling lever ex works (pushbutton insert).

Supplied earthing cable

- Earthing cables are only supplied for enclosures with protection class CL I.
- The enclosures delivered with a transparent door are not supplied with the earthing cable for the door, since door fittings are not possible.
- There are two green and yellow cables, (which are 90 cm long) supplied in earthed enclosures of protection class CL I for connecting the enclosure carcass and, if necessary, other metal parts to the PE. Another green and yellow cable is intended for the conductive connection of the door with the door fittings to the carcass.

Protective insulation

- The inside of the enclosures with protection class CL II is completely lined with protective insulation.
- The door is not additionally insulated. When using the univers N internal extension system, there are covers between the devices and door covers. This ensures the protective insulation.

Note:

A double-insulated enclosure can be “built back” into an earthed enclosure by removing the insulation.

- Ensure a conductive connection of the carcass to the PE.

4.4 Base plinth and accessories

Floor standing enclosures from a width of 1700 mm (or ≥11 rows) are supplied, including a preassembled base plinth.

Base plinth

- Colour, black, RAL 9005
- Available height 100 or 200 mm
- Depth according to enclosures depths
- The front and rear panels can be unscrewed
- Knockout cable gland openings on side panels
- If necessary, base plinths can be ordered individually as accessories.
- Two base plinths can be combined on top of each other. The connection set FZ714 is used for this.

Dimensions and order numbers of the base plinth:

Plinth height	**100 mm**		**200 mm**	
Plinth depth	**275 mm**	**400 mm**	**275 mm**	**400 mm**
Enclosure width 300 mm	FZ631A	FZ651A	FZ641A	FZ661A
Enclosure width 550 mm	FZ632A	FZ652A	FZ642A	FZ662A
Enclosure width 800 mm	FZ633A	FZ653A	FZ643A	FZ663A
Enclosure width 1050 mm	FZ634A	FZ654A	FZ644A	FZ664A
Enclosure width 1300 mm	FZ635A	FZ655A	FZ645A	FZ665A
Enclosure width 1550 mm	FZ636A	FZ656A	FZ646A	FZ666A

Base plinth accessories consist of:

- 2 x side parts, 1 x front panel, 1 x rear panel and corresponding screws, disassembled
- Mounting accessories for connection to the enclosure

4.4.1 Cable gland in base plinth

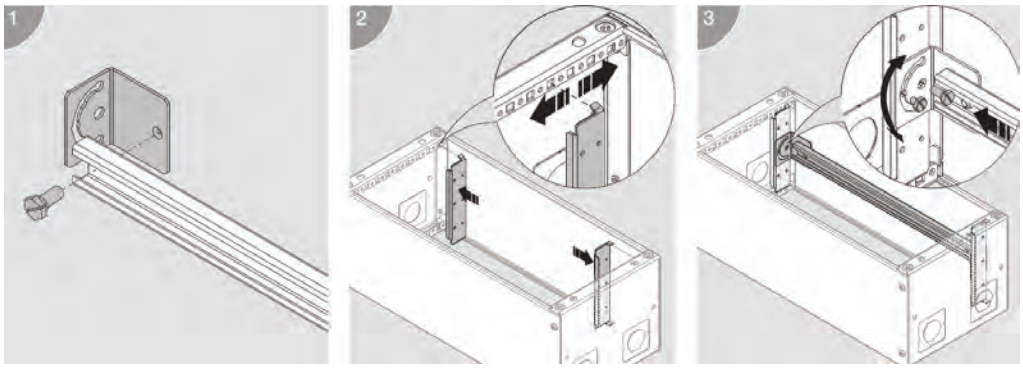
Pre-punches in the side plinth panels

The base plinth has two rectangular pre-punches on each of the two enclosure sides. The dimensions of the rectangular pre-punch are 65 x 65 mm and the inner circles has a diameter of 40 mm.

Strain relief rail as a plinth accessory

Strain relief rail / cable retaining rail and a corresponding mounting bracket can be ordered as accessories for installation in the base plinth.

The height, depth and angle of inclination of the strain relief rail can be adjusted using the mounting bracket:



Order number	Strain relief rail / mounting bracket
FZ7801	Strain relief rail / cable retaining rail, 1 field width
FZ7811	Strain relief rail / cable retaining rail, 2 fields width
FZ7821	Strain relief rail / cable retaining rail, 3 fields width
FZ8441	Strain relief rail / cable retaining rail, 4 fields width
FZ8451	Strain relief rail / cable retaining rail, 5 fields width
FZ8461	Strain relief rail / cable retaining rail, 6 fields width
FZ801A	Mounting bracket for strain relief rail in the 100 mm plinth
FZ801B	Mounting bracket for strain relief rail in the 200 mm plinth

4.4.2 Levelling feet available for compensating height

Instead of the base plinth, levelling feet FZ789 can be ordered in a set (4 units). The levelling feet are screwed into the rivet nuts in the floor plate.

4.5 Doors: Solid doors or transparent doors

Solid door

- Front-flush, overlay, stop on right or left
- Available with solid steel doors, steel plate, powder-coated and burned-in
- 3-point rod lock with swivelling lever with pushbutton and push rods
- Inside hinges, all-round foamed, temperature and oil-resistant seal
- Standard pushbutton in the swivelling lever can be replaced with Euro profile half-cylinder

Important notes

- Old FA/FT doors do not fit on the FR housing
- Doors are overlay doors and therefore cannot be opened without plinth / floor clearance.

Transparent doors

Wall-mounted and floor standing enclosures can be also be ordered with a transparent door instead of a solid door. Both cases offer protection type IP55. Single-pane safety glass (ESG) was installed in the transparent door. If it breaks, it shatters into small shards to reduce the risk of injury, compared to normal flat glass.

Transparent doors have a reduced impact resistance IK07.

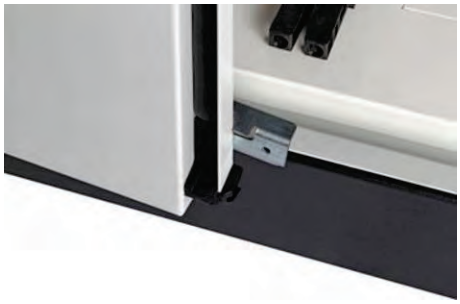
Enclosure with special door: Transparent door

Broken pane from the single-pane safety glass (ESG)

Double-door design from width 1050 mm

For enclosures starting from a width of 4 fields (≥ 1050 mm) the housing is supplied with double doors. For enclosures fitted with double doors, the doors are designed with different widths and are not symmetrical.

The left door (without lock) has an additional bolt for fixing it in the closed position.



Bolt for open door side

Door side closed with bolt

4.5.1 Locks and access protection

With all distribution enclosures, a 3-point rod lock and a swivelling lever with pushbutton insert is preassembled at the factory. This lock can be replaced with other locks (see the “Replacement part locks” section).

The enclosure door can be sealed using the swivelling lever, even from the outside.

- To do this, thread a sealing wire in the lower part of the handle.

4.5.2 Door wire profiles

The door wire profiles / reinforcement profiles on the inside of the solid door can be used for fastening the door wiring or diagram pockets.

Order number	Sealing profile, door width	Example figure
FZ739A	1 field, 250 mm door	
FZ739B	2 fields, 500 mm door	
FZ739C	3 fields, 750 mm door	

4.6 Cable entry openings

The distribution enclosure FR offers maximum flexibility for inserting cables.

Flange openings (cable entry openings) in the distribution enclosure

- The enclosure, with a depth of 275 mm, has one flange opening in the cover and floor plate for each field.
- The enclosure, with a depth of 400 mm, has one flange opening in the cover and floor plate for each field.
  The enclosure, with a depth of 400 mm, has one additional pre-punch in the cover and floor plate for each field. These pre-punches allow additional flange openings.

FR23K1 with a depth of 275 mm (protection class CL I)

- Each with a flange opening for each field at the top and bottom (here, 3x 2 flange openings)

FR23V1 with a depth of 400 mm (protection class CL I)

- Each with a flange opening for each field at the top and bottom (here, 3x 2 flange openings)
- Additional pre-punches for additional flange openings for each field at the top and bottom

Supplied cable entry flanges for flange openings

The following cable entry flanges are supplied ex works for the flange openings

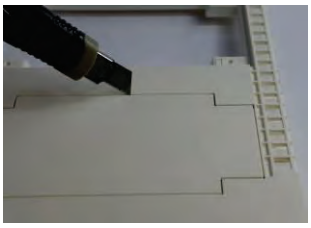
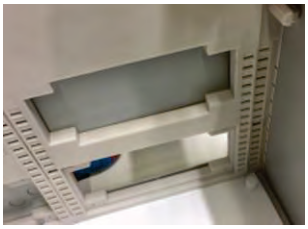
	Cable entries in enclosure roof	Cable entries in enclosure base
Wall-mounted enclosure	1x FZ402 at top for each field	1x FZ408M, remaining fields with FZ406M
Floor standing enclosure with base plinth	1x FZ402 at top for each field	No flange at bottom ex works[1]

[1] floor standing enclosure at bottom: To comply with protection type IP55 and protection class CL II, insulated insertion flanges or sealing plates FZ435A must be inserted at the bottom.

The cable entry flanges can be opened or closed by turning the sash lock by a ¼ revolution. The flanges can be locked against unauthorised opening using additional accessories.

Retrofitting flange openings for an enclosure depth of 400 mm

In addition to the flange openings, enclosures with an enclosure depth of 400 mm offer additional pre-punches at the top and bottom for creating additional flange openings as needed. These flange openings can be equipped with cable entry flanges. The same flanges can be used here as those used in the standard openings.

Step	Action
1	Cut out the plastic panels inside the enclosure using a cutter knife. Never knock out the plastic panels. 
2	Then, knock out the underlying pre-punch in the cover plate / floor plate using a hammer.  Make sure to precisely knock out the pre-punches to avoid damaging the housing. The high IK10 impact protection of the enclosure also requires a stable pre-punch. A certain degree of effort is therefore required for knocking out the pre-punches. **Result:** An additional flange opening is created. A cable entry flange can be used. 

4.6.1 Universal cable entry flange FZ402

Wall-mounted enclosures and floor standing enclosures are supplied with a flange opening at the top and a cable entry flange FZ402 for each field:

Order number	Description	Figure
FZ402	Universal cable entry flange	
FZ401	Repair set for closing opening cable entries, sealing plugs suitable for the openings in FZ402	

Open cable entries in flange FZ402 can be closed again with accessory FZ401 (sealing plugs) to restore the protection type.

The universal cable entry flange FZ402 offer the following options for inserting lines:

Number of lines	Cable diameters from .... to [mm]	Cable cross-sections from .... to [mm²]		
		NYM	NYY	H07RN-F
24	9 - 11.5	3x1.5 - 5x1.5	1x4 - 1x16	–
12	11 - 16	3x2.5 - 5x4	1x16 - 3x6	–
4	12.5 - 20	3x4 - 5x10	3x2.5 - 5x6	–
2	13 - 27.5	3x4 - 4x25	3x2.5 - 4x25	–
2	16 - 32	3x6 - 4x35	3x6 - 4x50	–
1	25 - 50	4x25 - 5x25	3x25 - 3x240	1x120 - 4x70

4.6.2 Additional cable entry flanges and accessories

Order number	Description	Figure / example figure
FZ404	- Cable entry without pre-punches - For openings to be customised	
FZ406M	Cable entry with pre-punches: 15x M20 or 13x M20 and 2x M25	 FZ406M
FZ407M	Cable entry with pre-punches: 13x M25 or 11x M25 and 2x M32	
FZ408M	Cable entry with pre-punches 2x M25 or M32 and 2x M50 or M63	 FZ408M
FZ422	Sheet metal cable cover with seal IP55; for protection class CL I Sheet metal cover for line opening; no pre-punches for openings to be customised*)	
FZ415E	Metal cable entry gland with two insertion grommets; protection class CL I - Stepped grommets for 2 cables with ø 23 to 55 mm - Protection type IP55 with supplied cable ties	
FZ415S	Plastic cable entry gland with two insertion grommets; protection class CL II - Stepped grommets for 2 cables with ø 23 to 55 mm - Protection type IP55 with supplied cable ties	

*) The sheet metal cover FZ422 is only suitable for enclosures with protection class CL I. The earth connection to the enclosure using the self-tapping screws supplied has been tested and is adequate. No additional earthing measures are necessary.

4.6.3 Close the flange openings with FZ435A

Close the lower cable entry openings with FZ435A for CL II

Closing plate FZ435A

Application: Double-insulated closure from the inside; essential for protection class CL II

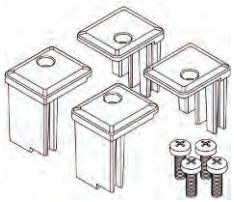
The lower flange openings (cable entry openings) in the floor standing enclosure can be closed from the inside with the closing plate FZ435A so that they are safe to touch and double-insulated. The closing plate accessories consist of a plastic plate that can be fixed in the roof panels or base panels using supplied screws.

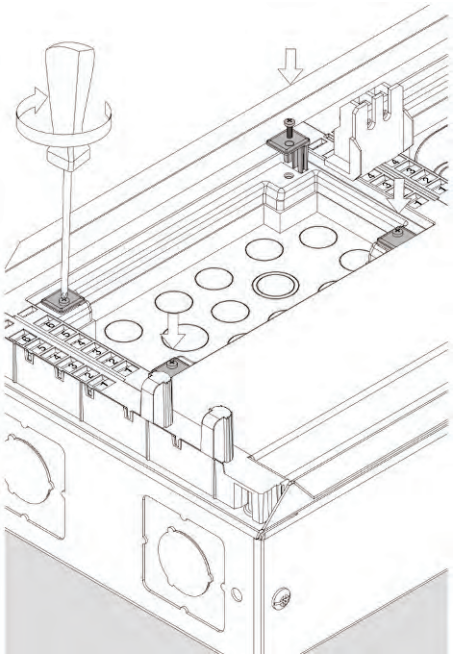
- Lower insertion flanges are not necessary in the enclosure for floor standing enclosure featuring protection class CL I and a base plinth.
- With protection class CL II applications, insulating insertion flanges or closing plate(s) FZ435A must be used.
- Observe the supplied assembly manual for the closing plate FZ435A.

4.6.4 Sealing / access protection

Locking inserts are used to protect against the unauthorised opening of the flange in the terminal compartment near unmetered current.

The locking set FZ421A can be used with all plastic cable entry flanges of the distribution enclosure accessories. When using the locking set FZ421A, the flange's locking bolt can no longer be turned without destroying it. This makes it possible to seal the enclosure.





Locking inserts	Installing the locking inserts in the terminal compartment

Enclosure seal order number:

Order number	Description
FZ421A	Enclosure seal, locking set

4.6.5 Enclosure ventilation

Ventilation dampers FZ417 can be installed in the flange FZ408M.

Notes:

- Install a ventilation damper at the top and bottom in the enclosure to achieve effective ventilation.
- Cut out the flange FZ408M for assembly on the pre-punch.
- Note: The protection type is reduced to IP2X.

Order number	Description	
FZ417	Ventilation damper for flange FZ408M Order reference contains 2 pieces	
FZ408M	Insertion flange suitable for expansion with FZ417 Observe the additional order: Ventilation damper at top and bottom in the enclosure	

4.6.6 Cable grommets and screw connections

Cable grommets / stepped grommets

There are suitable cable grommets for cable entry flanges FZ406M, FZ407M and FZ408M.

The cable grommets can be fastened by inserting them in the flanges without using lock nuts.

Order number	Size	Figure / figure example
FZ409M	M20	
FZ410M	M25	
FZ411M	M32	
FZ412M	M40	
FZ413N	Multi range cable grommet (stepped grommet) ø 30 to 72 mm	

Screwed cable glands / pressure compensating screw glands

Screwed cable glands with lock nut in different sizes, IP65, available as a built-in component:

Order number	Size [Ø in mm]	Example figure
VZ016M	M16	
VZ020M	M20	
VZ025M	M25	
VZ032M	M32	
VZ040M	M40	
VZ050M	M50	
VZ063M	M63	

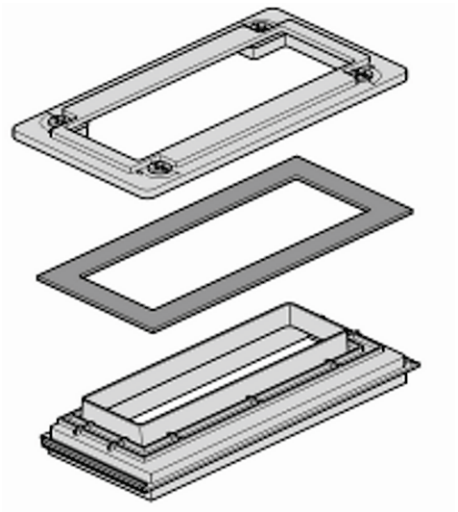
Pressure compensating screw glands:

Order number	Size [Ø in mm]	Example figure
VZ020D	M20	
VZ025D	M25	
VZ032D	M32	

4.7 Cable terminal box

The cable terminal box makes it easier to connect large cable cross-sections, since the cables can be inserted into the cable terminal box from the front. The cable inside the cable terminal box can be spliced and clamped; the connection in the enclosure is easier.

- It is not necessary to provide the wiring space necessary for connecting the cable in the enclosure.
- The cable terminal box can also be attached when wall mounting brackets are already mounted without requiring any adjustments.
- The cable terminal box cannot be flange-mounted on the side.

Order number	Description	
U84LU	Empty cable terminal box for bottom infeed	
U84LE	Expansion box for empty cable terminal box	
FZ420	Connection accessories for the IP55 enclosure	

4.8 Cable management duct

To mount the supply cables, the cable management duct can be attached above and below the distribution enclosure.

The long or short side can be screwed onto the wall here, which in turn swaps the height and width dimensions:

- 190 mm height and 150 mm depth or
- 150 mm height and 190 mm depth

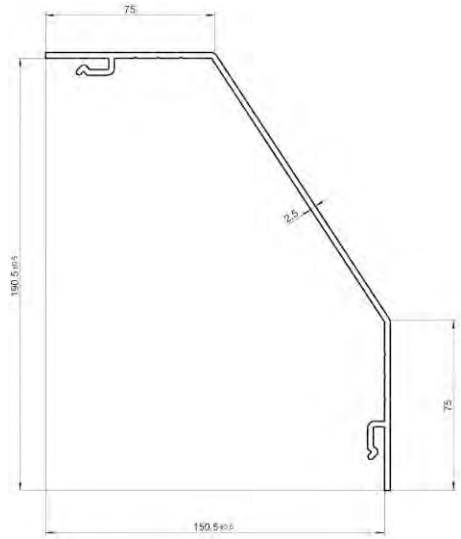
Colour RAL 7035

Order number	Size
FZ351	1-field
FZ352	2-field
FZ353	3-field
FZ354	4-field
FZ355	5-field

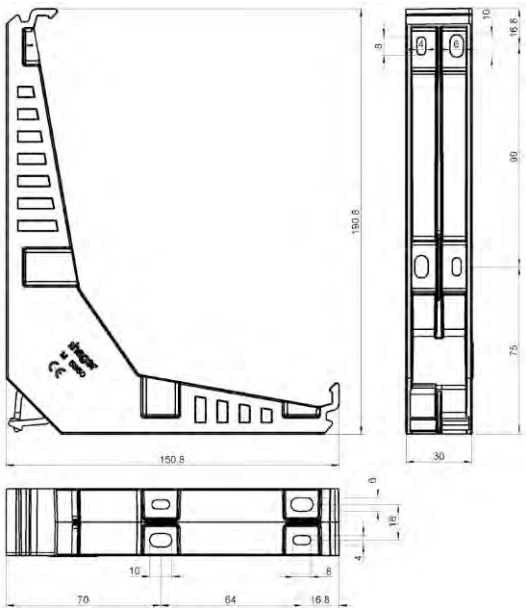
Colour RAL 9010

Order number	Size
FZ441	1-field
FZ442	2-field
FZ443	3-field
FZ444	4-field
FZ445	5-field

A cable management duct consist of the cable housing on the outside (cover) and 2 cable brackets on the inside, 3 from a size of 750 mm.

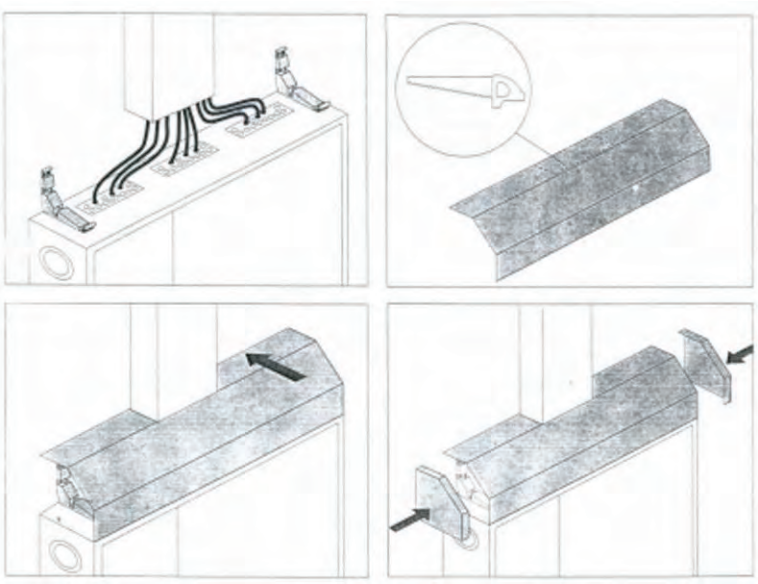


Cable management duct, cover



Cable management duct, bracket

Assembly example:



4.9 Accessories and spare parts for the enclosure expansion

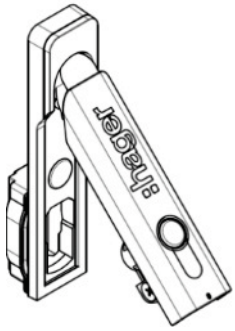
4.9.1 Spare part locks

With all distribution enclosures, a 3-point rod lock and a swivelling lever with pushbutton insert is preassembled at the factory.

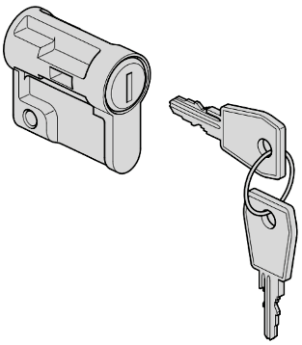
This lock can be replaced with other locking systems, e. g. other Euro profile half-cylinders, ratchet handles and swivelling lever handles.

The replacement locks listed below can be used in all enclosures of series FR*, FS*, FA*, FT*, FL*S/SP and FG*.

Accessories	Order number / description	Figure
Door locks Replacement locks	FZ530 Lever handle	
	FZ531 Lever handle, lockable	
	FZ532 Ratchet handle	
	FZ533 Ratchet handle, lockable	

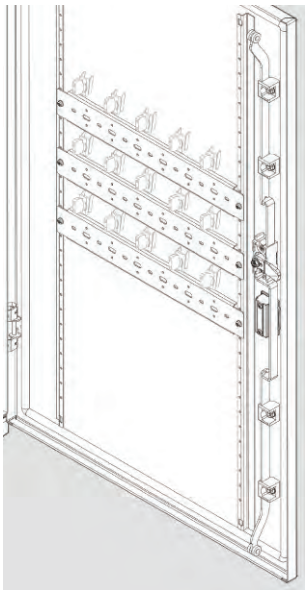
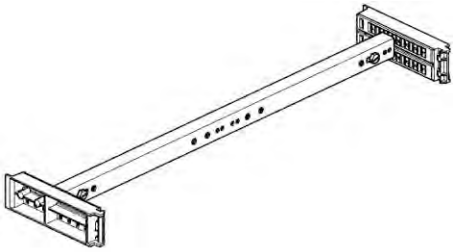
Accessories	Order number / description	Figure
Door locks Replacement locks	FZ537 Swivelling lever	

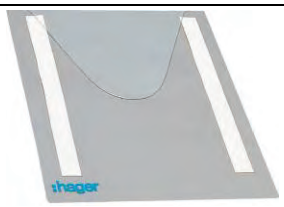
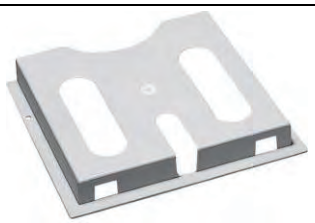
Euro profile half-cylinders are available for installation in the swivelling lever FZ537.
As a spare part, they must be replaced with the pushbutton:

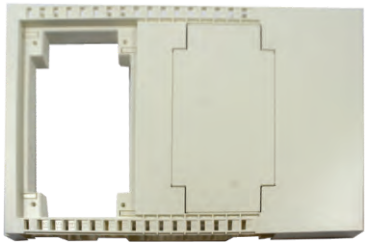
Accessories	Order number / description	Figure
Euro profile half-cylinder for swivelling lever	FZ506 Lock no. 1242E FZ519 Lock no. 405 FZ520 Lock no. 455 *)	
		
	MES-PHZ4K8	■ 8 mm
	MES-PHZ3K7	▲ 7 mm
	MES-PHZDB3	3 mm

*) Any 30/10 Euro profile half-cylinders according to DIN 18252 / EN 1303 can also be installed.

4.9.2 Standard supply of replacement parts and common accessories

Accessories	Order number	Figure / description
Mounting rail holder	UT90J	
Hinge pin	FZ797A (Pack of 10)	
Wall mounting brackets	FZ829 Set with 4 pieces	
Doors		Stop on right or left, doors including closures and hinges
Door wire profile (horizontal)	FZ739A FZ739B FZ739C depending on the door width	
Flange		Pass-through flange for insulation, edge protection and compliance of protection type.
Retaining rail (Retaining rail UT21* and fixing bolt FZ800* must be ordered separately)	FZ800 and UT21*	

Accessories	Order number	Figure / description
Set with cables and screws	- 770961600 Set with cable 300 mm, 4 mm², for door - 770961700 Set with cable 900 mm, 10 mm² for internal extension	
Diagram pockets (optional)	FZ710 DIN A4 sheet document holder for screw connection on door reinforcement profiles	
	FZ757 Reinforced diagram pocket with elastic pleat, glued, strong adhesion FZ757A4 in A4 FZ757A5 in A5	
	FZ757M DIN A4 plastic diagram pocket, magnetic	
	FZ794 Film pocket, glued	
	FZ795D Metal document holder DIN A4, glued or screwed	
	FZ818 Hard plastic document holder for glueing or screwing	

Accessories	Order number	Figure / description
Header/footer	FZ230A: Enclosure, 275 mm FZ230B: Enclosure, 400 mm	
Base plinth With plinth height 100 mm or 200 mm		Base plinth accessories consist of: - 2 x side parts, 2 x covers and corresponding screws, disassembled - Mounting accessories for connection to the enclosure
Connection set to mount two base plinths on top of each other	FZ714	4 fastening screws, 4 nuts, 4 spring rings
Levelling feet available for compensating height - For use without base plinth	FZ789	 4 units
Strain relief rail as a base plinth accessory,		Depth, angle and height-adjustable rail fixing possible
1 field wide	FZ7801	
2 fields wide	FZ7811	
3 fields wide	FZ7821	
4 fields wide	FZ8441	
5 fields wide	FZ8451	
6 fields wide	FZ8461	
Mounting bracket for strain relief rail	FZ801A in plinth, height 100 mm FZ801B in plinth, height 200 mm	

4.9.3 Replacement doors

Replacement doors for single-door enclosures IP55

For enclosure	Enclosure width	Replace-ment door	1 field wide	2 fields wide	3 fields wide
FR01*	300 mm	FZ001R	X		
FR11*		FZ011R	X		
FR21*		FZ021R	X		
FR31*		FZ031R	X		
FR41*		FZ041R	X		
FR51*		FZ051R	X		
FR61*		FZ061R	X		
FR71*		FZ071R	X		
FR81*		FZ081R	X		
FR91*		FZ091R	X		
FR02*	550 mm	FZ002R		X	
FR12*		FZ012R		X	
FR22*		FZ022R		X	
FR32*		FZ032R		X	
FR42*		FZ042R		X	
FR52*		FZ052R		X	
FR62*		FZ062R		X	
FR72*		FZ072R		X	
FR82*		FZ082R		X	
FR92*		FZ092R		X	
FR03*	800 mm	FZ003R			X
FR13*		FZ013R			X
FR23*		FZ023R			X
FR33*		FZ033R			X
FR43*		FZ043R			X
FR53*		FZ053R			X
FR63*		FZ063R			X
FR73*		FZ073R			X
FR83*		FZ083R			X
FR93*		FZ093R			X

Replacement doors are supplied, including hinges, rod lock and swivelling lever.

Replacement doors for enclosures IP55 with double doors

		Left door (without lock)			Right door (with swivelling lever)
For enclosure	**Replace-ment door**	**1 field wide**	**2 fields wide**	**3 fields wide**	**3 fields wide**
FR34*	FZ034R	X			X
FR35*	FZ035R		X		X
FR44*	FZ044R	X			X
FR45*	FZ045R		X		X
FR54*	FZ054R	X			X
FR55*	FZ055R		X		X
FR64*	FZ064R	X			X
FR65*	FZ065R		X		X
FR74*	FZ074R	X			X
FR75*	FZ075R		X		X
FR84*	FZ084R	X			X
FR85*	FZ085R		X		X
FR94*	FZ094R	X			X
FR95*	FZ095R		X		X
FR04*	FZ004R	X			X
FR05*	FZ005R		X		X
FR14*	FZ014R	X			X
FR15*	FZ015R		X		X
FR24*	FZ024R	X			X
FR25*	FZ025R		X		X
FR26*	FZ026R			X	X

Replacement doors are supplied, including hinges, rod lock and swivelling lever.

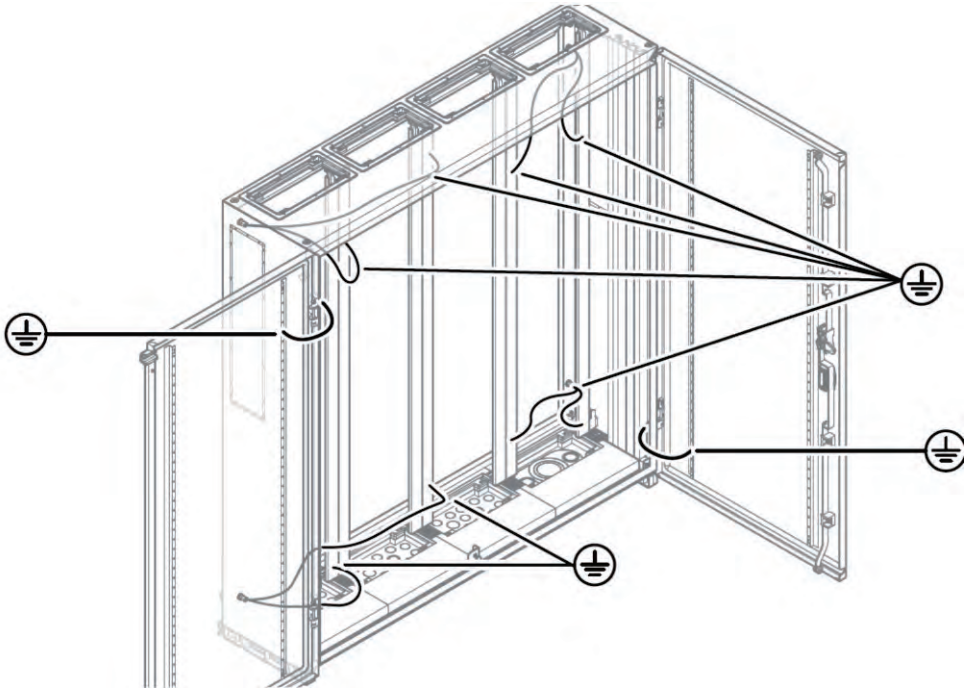
For enclosures fitted with double doors, the doors are designed with different widths and are not symmetrical.

5 Internal extension and assembly

Note:

- Observe the manuals about the univers N internal extension system from Hager.

5.1 Earthing concept for wall-mounted and floor standing enclosures, protection class CL I



- The housing and all other conductive parts in the *earthed* enclosures with protection class CL I must be connected to the equipotential bonding.
  The necessary cables are included in the scope of delivery for this:
  2 x 90 cm green / yellow cable with cable lug
- Since the mounting rails are fastened insulated in the enclosure, it must be ensured that all mounting rails are connected via conductive modules *or* cables *or* earthing accessories, such as UZ010 / UZ020.
  The continuity of the earth connection of the individual mounting rails have been tested via conductive modules (such as, uninsulated mounted DIN rail), is sufficient and permissible.

Note on using the univers N internal extension system:

- The door is insulated against live parts by the covers. It is therefore not essential to earth it with a cable.
- An earthing cable for the door is supplied when the enclosure is delivered. It is used for installing devices in doors. The earthing cable, however, is not intended for use as a protective conductor.
- When installing devices in doors, protective conductors must be dimensioned according to the rated current of the installed devices, as prescribed in the relevant standard, once the protective extra-low voltage value is exceeded.

5.2 Protective insulation for enclosures with protection class CL II

In enclosures with protective insulation, the mounting rails are fixed with insulation ex works.

According to EN 61439, mounting rails and other metal parts (such as, the door, housing, mounting plates) *are not* connected to the PE/PEN via an earthing conductor.

Note:

Enclosures with protection class CL II can be built back into protection class CL I by removing the insulation to the enclosures.

- Ensure a conductive connection of the carcass to the PE.

Ensuring protective insulation for floor standing enclosures of protection class CL II

- Floor standing enclosures of protection class CL II must also be closed in the floor plate with plastic flanges or FZ435A closing plates to ensure the protective insulation. IP55 does not depend on this.

5.3 Comply with protection type IP55

IP55

- 1st code number 5 "Protection against dust deposits (dust protection)"
- 2nd code number 5 "Protection against water jets"

- Use the cable entries and accessories from the distribution enclosure series on the enclosure to ensure protection type IP55.
- Make sure that the cables are inserted correctly through the cable entry flanges in the enclosure.
- Make sure that the enclosure is assembled level / on a plane. The floor standing enclosure with the base plinth is supplied without a flange in the floor plate. The protection type IP55 is verified under standardised testing conditions and when the unit is installed with a base plinth on an even surface.
  - This result cannot be ensured on an uneven surface or with non-standardised air movement.
  - We thus strongly recommend using flanges or alternative locks

When the door is open, the enclosure achieves protection type IP3X when the univers N internal extension system and Hager devices are consistently used.

5.4 Disassembling and assembling the doors

The doors are equipped with

- edge protection against scratches. Disassembled doors can thus be temporarily stored without any damage. The edge protection is fixed to the enclosure with hot glue and can be removed without leaving any residue after final installation.
- Hinge pins for one-person door assembly. The hinge pins can be pulled without any tools and are locked into the top position by the red locking pin. This makes it possible for one person to assemble and disassemble the door.

Hinge pin for fast door assembly / disassembly.

Important notes:

- Before disassembling the door, secure the enclosure against tipping over.
- Secure the door against unintentional closing. The door is not stable without any hinge pins.
- After the door is assembled, make sure that the hinge pins are locked. If not all hinge pins are locked, the hinge may be damaged.

Changing the door stop

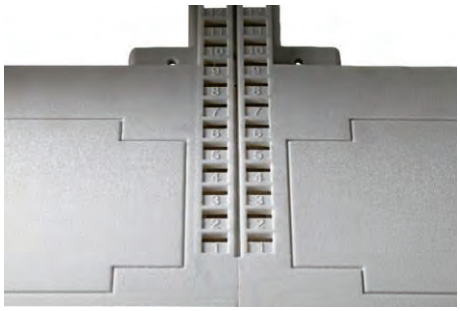
The door stop can be changed by unscrewing the hinge on the opposite side. The holes for the hinges are available on both side and closed with plastic caps.

- Insert the plastic caps on the unused side. This is essential for maintaining the protection type.

5.5 Mounting rails

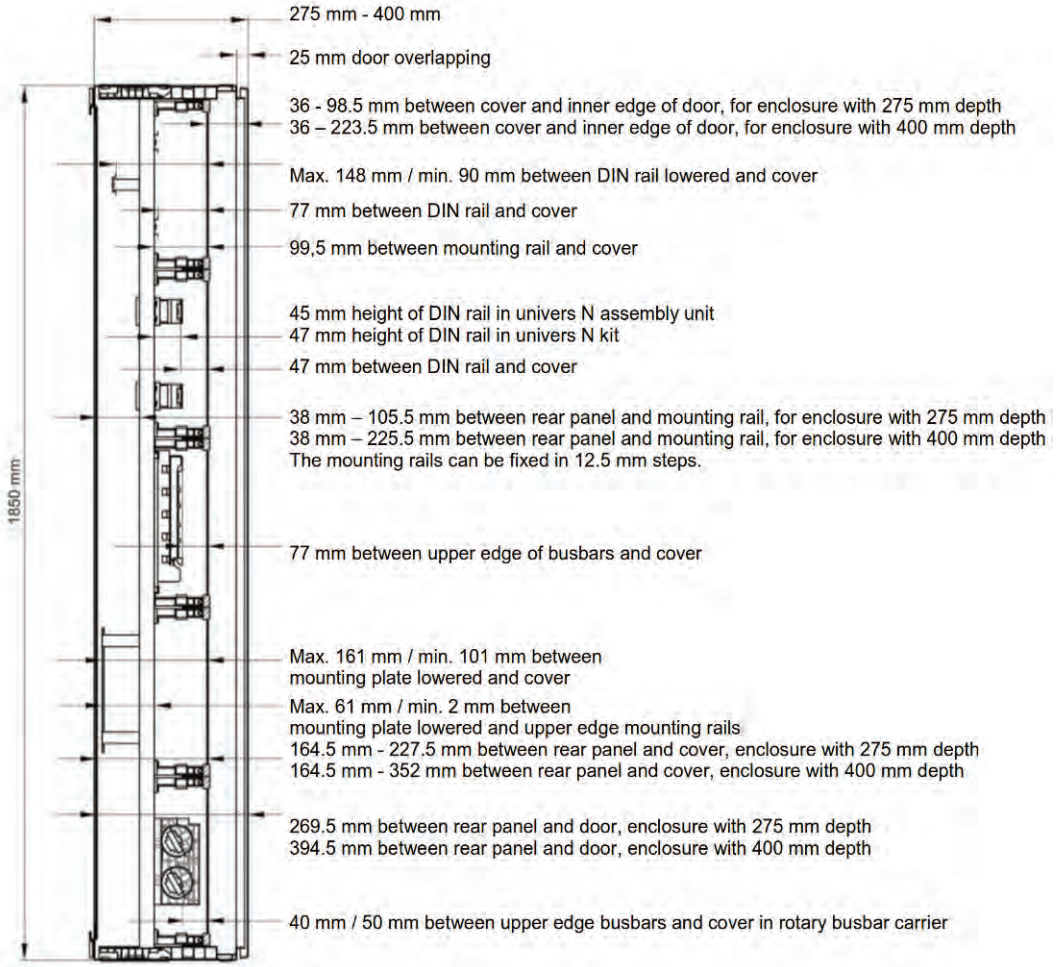
The mounting rails can be fastened in the grid dimension 12.5 mm

- In the enclosure with a depth of 275 mm, at 6 different depths,
- In the enclosure with a depth of 400 mm, at 16 different depths.



- To make it easier to arrange the mounting rails, the positions are marked in the plastic panels.

Enclosure dimensions for univers N internal extension system measured at the mounting rail in the front or rear position:



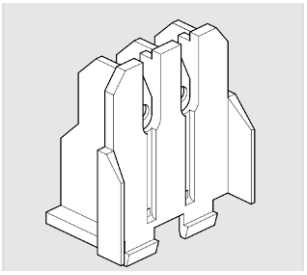
Assembling the mounting rails

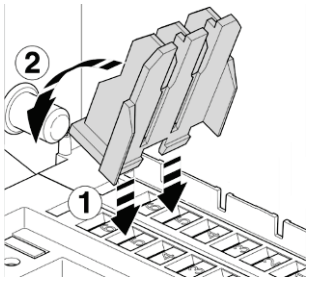
To use the mounting rails in the enclosure, the mounting rail fixings / mounts UT90J or UT90G must be used:

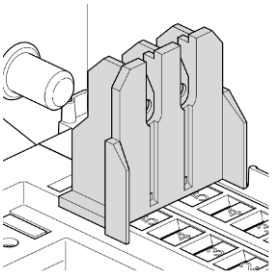
- UT90J: For fastening the mounting rails at the same level
- UT90G: For fastening the mounting rails at a different level

The mounting rail fixings / mounts can be moved to different depths without any tools.

Mounting rail fixings / mounts UT90J:

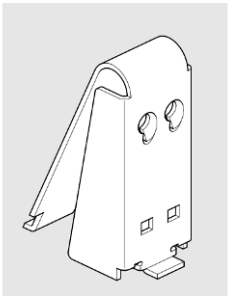


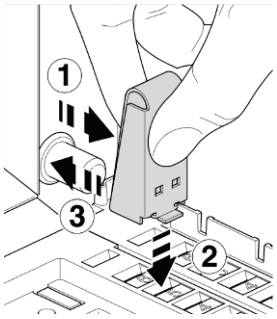


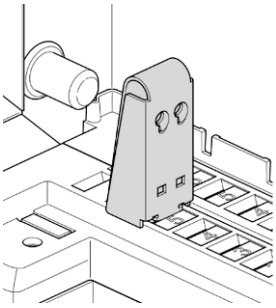


The UT90J mounts are fastened as standard at position 3 in the enclosure ex works.

Mounting rail fixings / mounts UT90G:

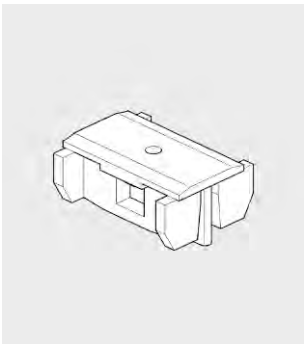


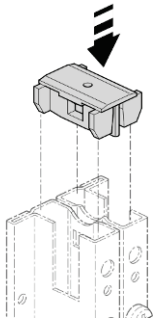




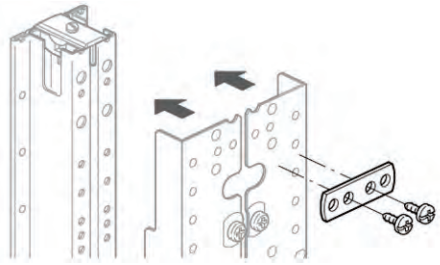
Connectors UT12L / earth connecting bracket UZ00VL

- Connectors UT12L are used to increase the stability of the mounting rails and establish the connection via the mounting rail connection set UT12HSV (U plates) or the earth connecting bracket UZ00VL:





Connector UT12L for connecting two mounting rails



Earth connecting bracket UZ00VL

- For the conductive connection of 2 mounting rails
- For increasing the mechanical stability

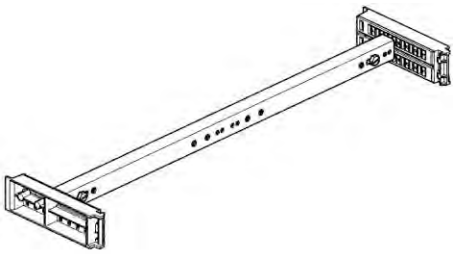
Ensure touch protection depending on the mounting rail position

- Extend the touch protection depending on the mounting rail position. The mounting rail fixing is assembled at position 3 or 4 for enclosures with of a depth of 400 mm. If the mounting rails are positioned lower in these enclosures, then accessory parts may be used for extending the lateral circumferential contact protection. Hager offers contact protection cover FZ851.

Order number	Description	Figure
FZ851	Later contact protection extension Protection class CL I	

5.6 Retaining rail and bracket

A retaining rail is supplied as standard in floor standing enclosures. The retaining rail is used for the additional reinforcement of the mounting rails and prevent the internal extension system from moving to the side as well as backwards and forwards.



Retaining rail accessory part UT21* incl. fixing bolt / bracket FZ800*

Retaining rail assembled in the enclosure. 1 retaining rail with the fixing bolts is supplied with the floor standing enclosure.

Order number	Designation	Example figure
FZ800A	Fixing bolt 275, CL I, IP55 Retaining rail bracket	
FZ800B	Fixing bolt 275, CL II, IP55 Retaining rail bracket	
FZ800C	Fixing bolt 400, CL I, IP55 Retaining rail bracket	
FZ800D	Fixing bolt 400, CL II, IP55 Retaining rail bracket	
UT21A	Retaining rail 250 mm	
UT21B	Retaining rail 500 mm	
UT21C	Retaining rail 750 mm	
UT21D	Retaining rail 1000 mm	
UT21E	Retaining rail 1250 mm	
UT21F	Retaining rail 1500mm	

- Select the retaining rails according to the enclosure width.
- Select the fixing bolt for the retaining rails according to the enclosure variant.

Assembling the retaining rail

There are always 3 holes in the middle of the mounting rails at different heights (1 x middle and ± 150 mm) for fastening the mounting rail on the retaining rail.

- Use the supplied countersunk screws for assembling the mounting rail on the retaining rail. (Normal screw heads would otherwise prevent the assembly of a module at this position.)

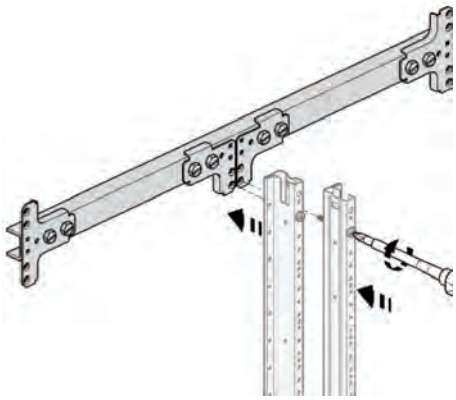
Observe the assembly order:

Step	Action
1	Position the retaining rail in the enclosure.
2	Fix the mounting rails on the retaining rail. Use the supplied countersunk screws.
3	Assemble the univers N modules on the mounting rails.

5.7 Crossbar

Crossbars are used to intersect vertical mounting rails for assembling multi-field modules. This makes it possible to use univers N modules with different widths on top of each other.

Assembled crossbar UT12PN

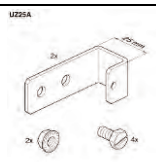
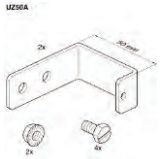
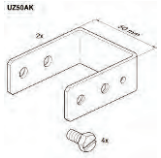


Assembling the crossbar

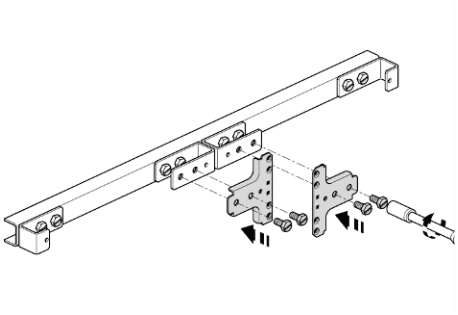
Order number	Designation
UT12PN	2-field crossbar, 500 mm wide with 12 M4 screws and assembly manual
UT12QN	3-field crossbar, 750 mm wide with 12 M4 screws and assembly manual

5.8 Lowering angle bracket for crossbar or retaining rail

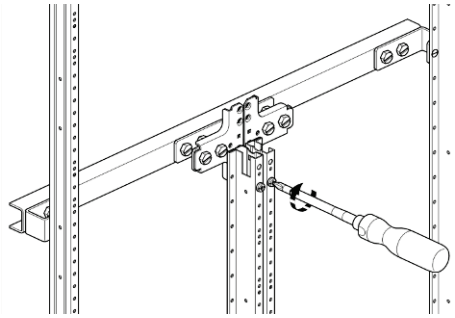
- for lowering the crossbar, retaining rail or U-rail, always order when using in combination with meter support plates or other lower modules

Order number	Lowering bracket designation	Figure
UZ25A	2 brackets, 25 mm wide with lock nuts 2 and 4 screws *	
UZ25AK	2 isosceles brackets, 25 mm wide with 4 screws *	
UZ50A	2 brackets 50 mm wide with 2 lock nuts and with 4 screws *	
UZ50AK	2 isosceles brackets, 50 mm wide with 4 screws *	

Assembling the lowering bracket on the crossbar:



After disassembling the T bracket supplied with the crossbar, the lowering bracket can be assembled on the crossbar.



Afterwards, the T brackets are screwed on the lowering bracket.

5.9 Mounting plates

One or more mounting plates can be assembled in the housing.

5.9.1 Mounting plate small UZ*M1

The mounting plates in kit size UZ*M1 are part of the univers N interior fitting system.

The mounting plates are fastened to two mounting rails using the supplied screws. The mounting plates feature integrated cut-outs, which enable univers covers to be fastened to the mounting rails. This allows you to freely select the position and size of the mounting plate in the cabinet.

- Material thickness 2.5 mm, galvanised

Order number	Height / width of mounting plate univers N
UZ31M1	450 mm / 1 field wide
UZ32M1	450 mm / 2 fields wide
UZ41M1	600 mm / 1 field wide
UZ42M1	600 mm / 2 fields wide
UZ51M1	750 mm / 1 field wide
UZ52M1	750 mm / 2 fields wide
UZ61M1	900 mm / 1 field wide
UZ62M1	900 mm / 2 fields wide

Installation of mounting plates UZ32M1 and UZ61M1, example:

- mounting plates UZ61M1 installed above
- mounting plate UZ32M1 installed below

5.9.2 Mounting plates up to enclosure height UZ*MP

The mounting plates UZ*MP are fastened directly in the enclosure using supplied screws, without any additional accessories. These mounting plates are adapted to the grid dimension of the mounting rails. You can therefore install these mounting plates in all univers-housings with 1800 mm height (inner dimensions).

Height UZ*MP	1800 mm
Width	From 250 to 1250 mm (1 to 5 fields)
Material	2 mm-thick, galvanised

Order number	**Dimensions of the mounting plate [mm]**
UZ21MP	1800x250
UZ22MP	1800x500
UZ23MP	1800x750
UZ24MP	1800x1000
UZ25MP	1800x1250

Installation of an mounting plate UZ2*MP, example:

- The mounting plate UZ*MP can be installed in the same housing next to a univers N field.
- A partition can be fastened between the field with the mounting plate and the univers N field.

5.10 Busbar gland

Example of the busbar gland

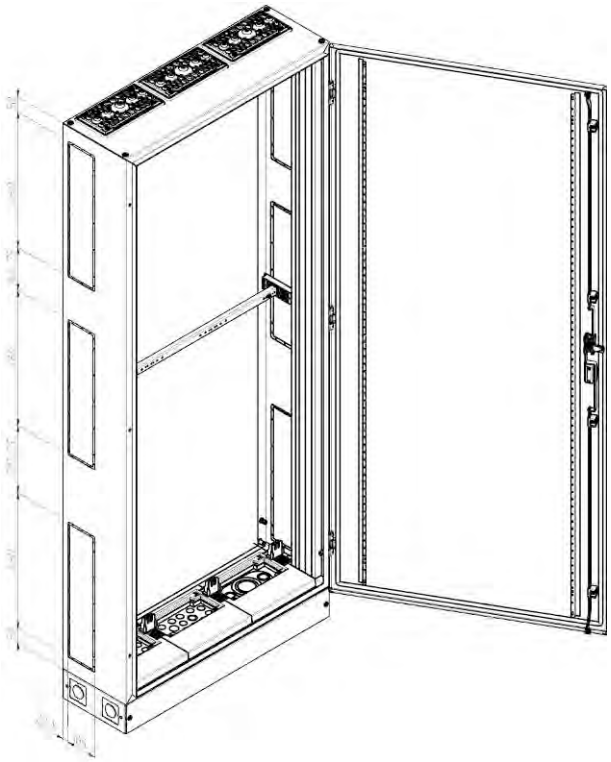
The side pre-punches of the distribution enclosures can be used to interconnect busbars through enclosures mounted side by side.

The position of the side pre-punches is selected as follows:

- The top and bottom pre-punches are suitable for the busbar gland on supports with a 40/60 mm distance between busbars.
- The centre pre-punch is suitable for the busbar gland on supports with a 185 mm distance between busbars.

5.10.1 Busbar gland: Arrangement and dimensions

Arrangement and dimensions of the pre-punches for busbar glands

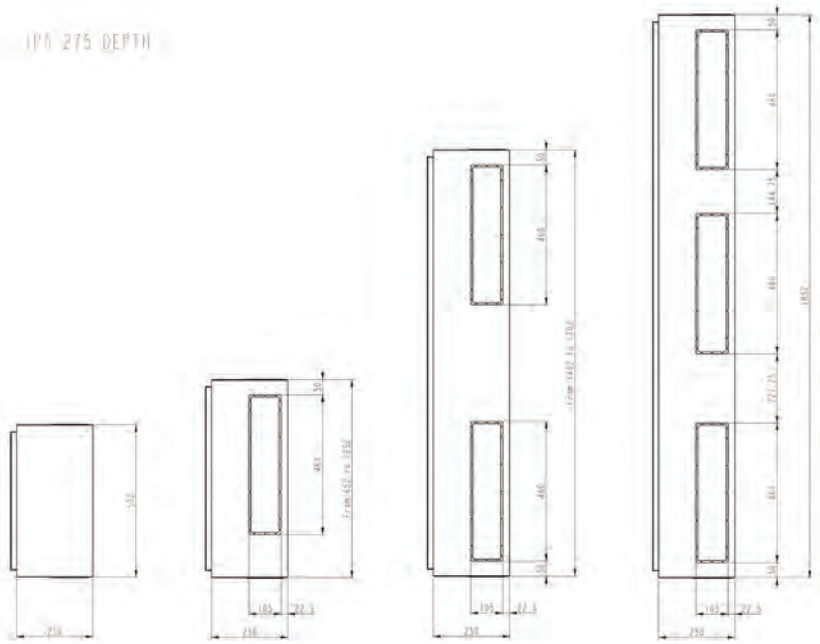


The distribution enclosures are equipped with side pre-punches for busbar glands.

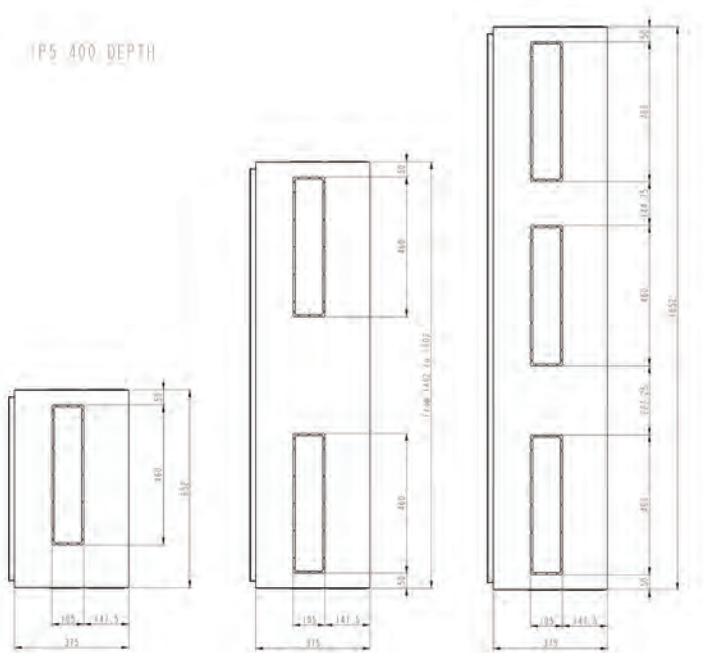
Example on figure on the left:

- Enclosure height 1850 mm:
- Enclosure depth 275 mm

The number and position of the side pre-punches vary depending on the enclosure depths and height:



Enclosure depth 275 mm: Side pre-punches for busbar glands



Enclosure depth 400 mm: Side pre-punches for busbar glands

Opening pre-punches: Assembly instructions

Pre-punches for the busbar gland must be knocked out as needed. The high IK10 impact protection of the enclosure also requires a stable pre-punch. A certain degree of effort is therefore required for knocking out the pre-punches.

- With the enclosure featuring protection class CL II, open the protective insulation on the pre-punches inside before knocking them out. You thus avoid damaging the side insulation.
- Make sure to precisely knock out the pre-punches to avoid bending the side panel.

5.10.2 Plastic cover for busbar opening

Open side busbar glands can be closed again using a plastic or steel cover. Hager offers the plastic cover for busbar opening under the order number FZ448 for this.

Order number	Description	Figure
FZ448	Plastic cover for busbar opening	

- The plastic cover is suitable for enclosures of protection class SK I and protection class SK II.
- The plastic cover is suitable for easy processing on a workbench, for example, for attaching screwed cable glands before fastening to the enclosure.

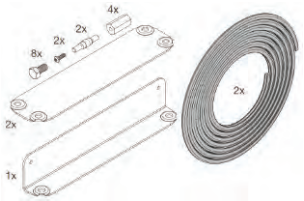
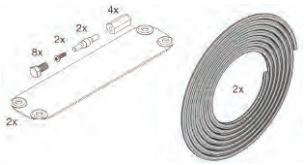
5.11 Enclosure to enclosure connection

5.11.1 Side-by-side connection of 2 enclosures

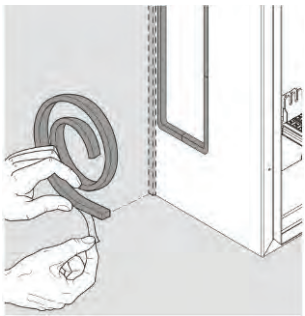
- Distribution enclosures FR with the same depth can be fitted side by side. When using the Hager accessories, the IP55 protection as well as the mechanical stability is still ensured.
- FR enclosures with the same depth that are assembled side by side can have different heights. The suitable connection set / assembly kit must be used here.
- Enclosures with different depths (1x 275 mm and 1x 400 mm) cannot be connected on the side.

The respective connection set is intended for connecting two FR enclosures assembled side by side (FZ721A, FZ721B). The connection set consists of edge protection tape, 4 m sealing tape, screw-on plate / sheet metal angle bracket.

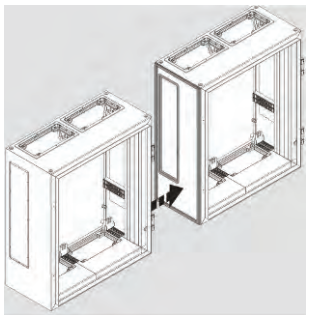
Connection sets for 2 adjacent enclosures / assembly kit FZ721*

Order number	Description	
FZ721A	Assembly kit / connection set 2 adjacent enclosures for enclosures FR/FS with an enclosure depth of 275 mm	
FZ721B	Assembly kit / connection set 2 adjacent enclosures for enclosures FR/FS with an enclosure depth of 400 mm	

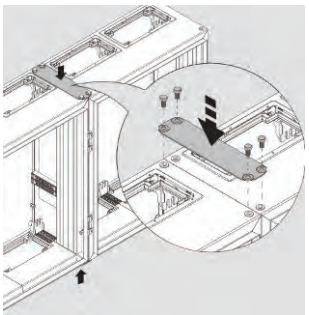
Assembly notes (manual is supplied with the connection set)



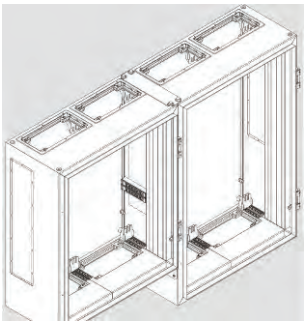
Edge protection: For the knocked out lateral pre-punch



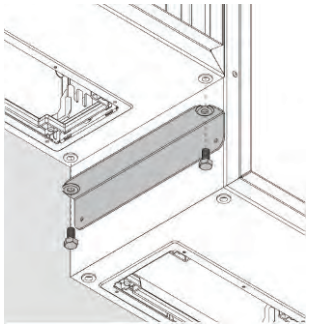
Sealing strip approx. 4 m: Glue all around the side edge of the enclosure



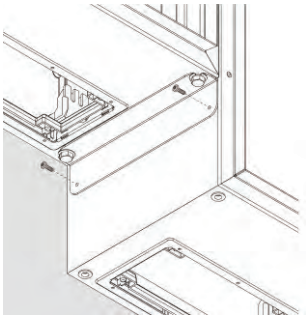
Flat plate: On the top of the enclosure, screwed on for the mechanical connection (also at the bottom with the wall-mounted enclosure)



Combination of enclosures with different heights



Fasten sheet metal angle bracket at the bottom on the first enclosure



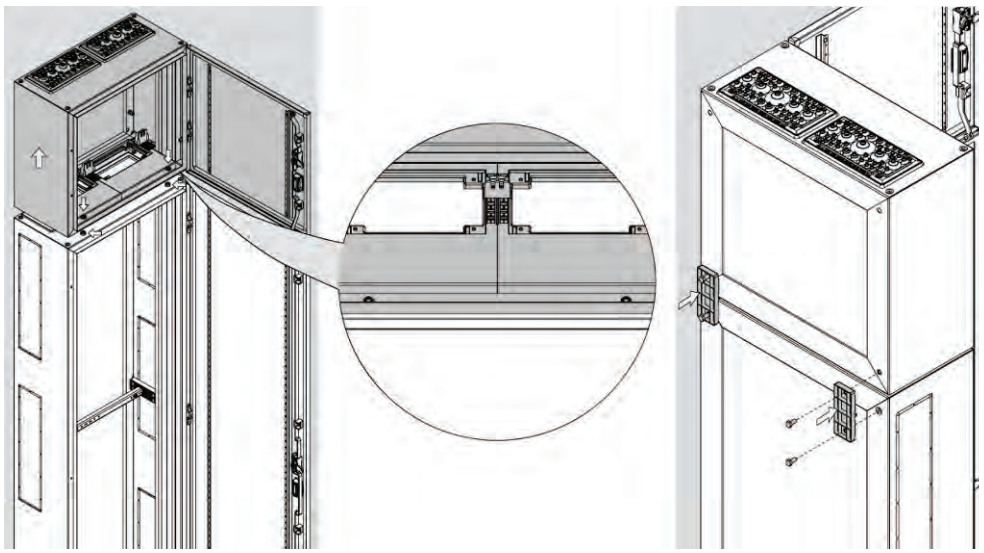
Fasten sheet metal angle bracket at the bottom on the second enclosure

Comment:
The two enclosures assembled side by side must have a small distance between them:

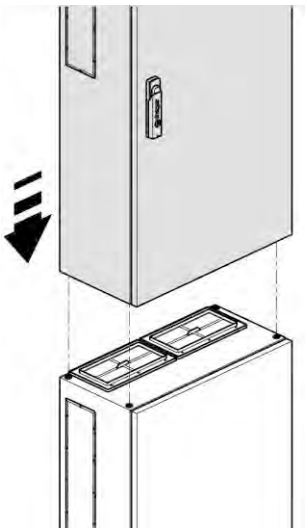
- 6 mm when using FZ721A/B
- 20 mm when using FZ722A/B

5.11.2 Connection of 2 enclosures on top of each other

- Enclosures with the same width can be combined on top of each other at the assembly location.
  When using the suitable Hager connection set for the vertical combination, the protection type IP55 and mechanical stability are still ensured.
- Enclosures with protection classes CL I and CL II are connected on top of each other, since the connection set is insulated.
- Enclosures with different widths *cannot* be combined on top of each other with standard accessories.



Connection set for vertical combination:



Vertical combination of FR enclosures with the same width with connection set FZ77*A

Pass-through flange, brackets and fastening elements

Order number	Connection set width
FZ771A	1 field wide
FZ772A	2 fields wide
FZ773A	3 fields wide
FZ774A	4 fields wide
FZ775A	5 fields wide
FZ776A	6 fields wide

The following is available in the connection set:

- Pass-through flanges for insulation, edge protection and stability, can be cut out as needed
- Brackets for the rear for the insulated, mechanical connection at the rear
- Fastening element for the insulated, mechanical connection on the front side

Observe the assembly manual

- Drill the front side of the enclosure according to the manual supplied with the connection set and connect the enclosures with the supplied screws / spacers.

6 Assembly at the installation site

6.1 Assembly safety instructions

⚠ WARNING	
	**Risk of crushing if the enclosure falls or tips over at the assembly site.** ➢ Observe weight, dimensions and load distribution ➢ Only perform assembly work with suitable tools, lifting tools and mounting material ➢ Secure the load and mount the enclosure immediately

Risk of accident due to the enclosure tipping or falling!

Uneven load distribution, insufficient tools and mounting results in dangers due to the enclosure tipping or falling. Personnel may be seriously injured or killed.

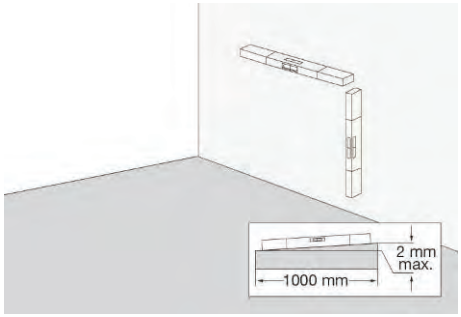
- ➢ The enclosure may only be assembled by electrically skilled persons.
- ➢ Assembly only via wall mounting brackets FZ829 on all designated attachment points (observe the dimensions).
- ➢ Never use the enclosure as a climbing aid, for support or storage space. Suitable ladders and scaffolding must be used to ascend to the appropriate height for performing work above the enclosure.
- ➢ Use protective equipment (safety shoes, gloves).

6.2 Assembly conditions at the installation location

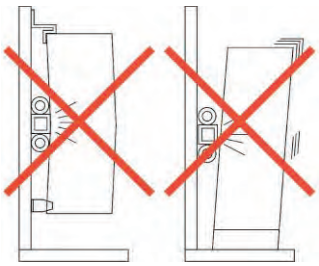
Notes about the assembly requirements:

- Observe the intended use and in particular, the ambient conditions in the technical data.
- The distribution enclosure must be securely mounted on a load-bearing wall. A wall mount must also be used in addition to the floor mount for floor standing enclosures.

6.2.1 Preparing the assembly location for wall assembly



Wall assembly: Load-bearing, even and non-flammable surface required



Do not assemble objects in the rear of the distribution enclosure

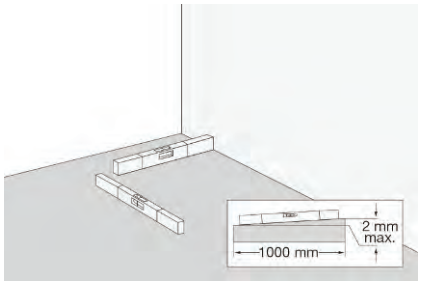
Ensure an even, load-bearing assembly location

- The unevenness on the wall may be maximum +/- 2 mm per metre.
- Offset it with support material as necessary.
- No objects may be assembled at the rear.
- Check the load-bearing strength of the wall and ensure secure mounting options and a non-flammable surface.
- Observe the weight of the equipped enclosure here.

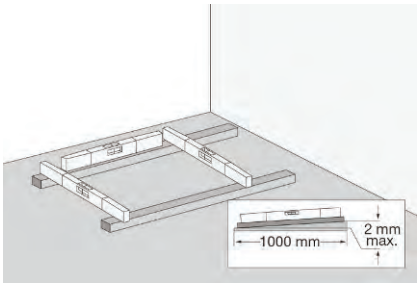
Additional requirements for the assembly location

- Clean, dry
- Not in a dirty, dusty or excessively damp environment
- Not in corrosive atmospheres, for suitable for ambient conditions
- Protected against dangers due to liquids entering the unit (e.g. water entering the unit after pipe damage)

6.2.2 Preparing the floor standing enclosure



Even surface for floor mount and wall mount necessary



Maximum tolerance: +/- 2 mm/m

Ensure an even, load-bearing assembly location

- Ensure that the location is clean and dry.
- The unevennesses on the wall and on the base / surface may be maximum +/- 2 mm per metre. In case of considerable unevennesses, the protection type IP55 cannot be ensured.
- Offset it with support material as necessary. Alternatively to the base plinth, Hager also offers levelling feet as accessories (use cable entry flanges).
- No objects may be assembled at the rear of the enclosure (toward the wall).
- Check the load-bearing strength of the wall and ground and ensure secure mounting options and a non-flammable surface.
- Observe the weight of the equipped enclosure here.

Additional requirements for the assembly location

- Clean, dry
- Not in a dirty, dusty or excessively damp environment
- Not in corrosive atmospheres, for suitable for ambient conditions
- Protected against dangers due to liquids entering the unit (e.g. water entering the unit after pipe damage)

6.2.3 Maintaining free spaces

Observe the clearances

- For incoming cables (also take permissible bending radii into consideration).
- For operation, maintenance and for emergencies.

Ensure escape routes

- Observe safety clearances to ensure escape routes are available in emergencies.
- Minimum gangway width in front of the enclosure: 700 mm. If the doors open against the escape direction, the necessary escape route of 500 mm must also be available when the doors are opened at 90°.

Observe maximum assembly heights

- Readable displays: Ideally, at eye level between 0.2 m and 2.2 m above the standing area
- Main switch (if installed): Can be reached in a range between 0.8 m and 1.6 m above the standing area
- Operating elements: In centre line between 0.2 m and 2 m above the standing area

6.3 Wall mounting brackets for suspending the enclosure

- The wall-mounted enclosures are supplied with 4 wall mounting brackets.
- The floor standing enclosures are supplied with 2 wall mounting brackets.

- The enclosure can be suspended on the assembly rail using the wall mounting brackets.
- Using the wall mounting brackets creates clearance between the wall and the enclosure rear wall.

The wall mounting brackets can be assembled vertically or horizontally

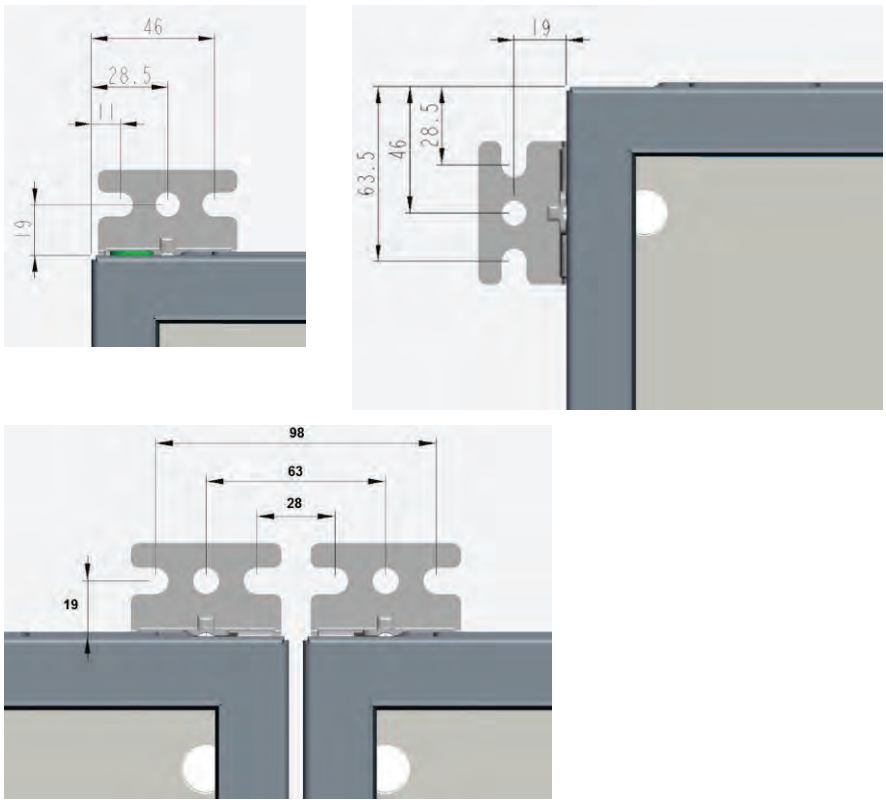
Wall mounting brackets can be screwed on vertically or horizontally:

Wall mounting bracket as a replacement part

Order number	Wall mounting brackets
FZ829	Set = 4 pieces

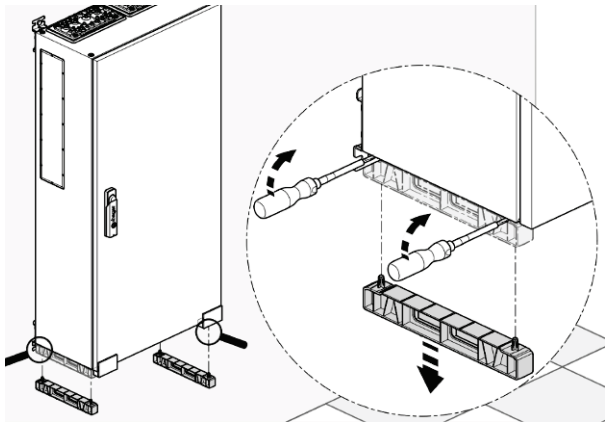
6.3.1 Wall mounting bracket dimensions

Dimensions of assembled wall mounting brackets



6.4 Assembly notes for wall-mounted enclosures

- Observe the univers IP5 assembly manual

Step	Action
1	Select the assembly position of the wall-mounted enclosure. Observe the assembly conditions.
2	Select the assembly direction of the wall mounting brackets and mark the assembly position of the wall mounting brackets according to the dimensional drawings / tables in the univers IP5 assembly manual.
3	Drill assembly holes suitable for the fastening material.
4	Preassemble the assembly dowel.
5	Fasten the enclosure with assembly screws. Tighten the assembly screws.
6	Remove the transport feet. 

Note about transport feet

To set down the enclosure temporarily, the transport feet of the wall-mounted enclosures can be used. The enclosure is equipped with these feet ex works. The transport feet, however, are not suitable as a replacement plinth due to the weight of the extended enclosure.

- After the unit has been assembled on the wall, remove the transport feet.

6.5 Assembly notes for floor standing enclosures

- Observe the univers IP5 assembly manual

Observe the transport notes

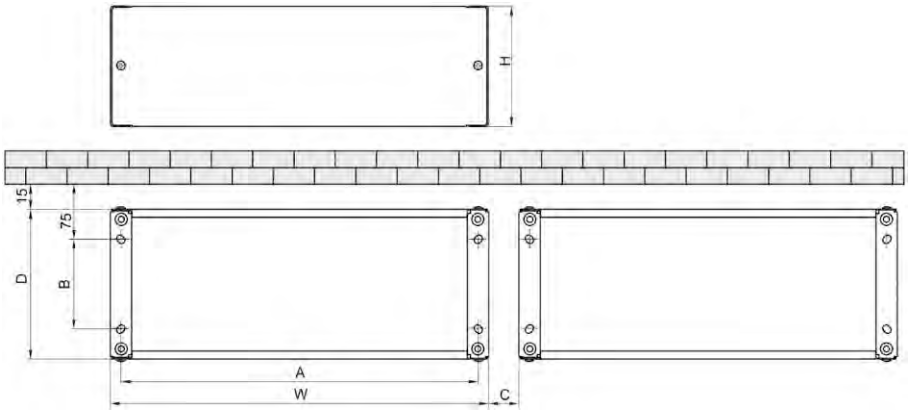
- Observe the transport notes in this manual. In particular, observe the notes about the base plinth and moving the pallet truck under the unit after removing the front panel and rear panel of the base plinth.

Step	Action
1	Select the assembly position of the floor standing enclosure. Observe the assembly conditions.
2	Select the assembly direction of the wall mounting brackets and mark the assembly position of the wall mounting brackets according to the dimensional drawings / tables (image 08 in the univers IP5 assembly manual).
3	Mark the assembly holes for assembling the base plinth on the floor according to the dimensional drawings / tables (image 09 in the univers IP5 assembly manual / section "Floor mounting via base plinth" on the following page in this manual).
4	Drill assembly holes suitable for the fastening material.
5	Preassemble the assembly dowel.
6	Position the enclosure and then mount it on the wall immediately. Tighten the assembly screws.
7	Fasten the enclosure to the floor with the assembly screws. Tighten the assembly screws.

Floor mounting via base plinth

The distribution enclosure can be easily mounted to the floor using the offset elongated holes in the base plinth.

Dimensions of and positioning the base plinth:



Enclosure width [mm]	**Plinth width** **W** [mm]	**Depth** **D** [mm]	**A** [mm]	**B** [mm]
300	302	275	272	150
550	552	275	522	150
800	802	275	772	150
1050	1052	275	1022	150
1300	1302	275	1272	150
1550	1552	275	1522	150

Dimension **H:** the plinth height is either 100 or 200 mm

Dimension **C:** the enclosure spacing depends on the enclosure connection set:

- FZ721A/B: 6 mm
- FZ722A/B: 20 mm

7 Transportation and storage

7.1 Safety notes for transportation

⚠ WARNING	
	**Risk of crushing if the enclosure falls or tips over.** ➢ Transport only by qualified personnel. ➢ When transporting using a crane, transport the enclosure only as a single unit. ➢ Observe the weight, dimensions and load distribution. ➢ Ensure secure transportation using suitable auxiliary equipment and lifting tools. The load must be secured at all times. ➢ Fasten or secure the enclosure immediately after transportation.

Risk of accident due to the enclosure tipping or falling!

Uneven load distribution, insufficient tools and mounting results in dangers due to the enclosure falling, tipping or falling. People may be seriously injured or killed due to crushing.

- ➢ Transport the enclosure upright, secured / fixed.
- ➢ Only transport connected distribution enclosures when they fixed and secured on pallet.
- ➢ Never use the enclosure as a climbing aid, for support or storage space.
- ➢ Use protective equipment (safety helmet, safety shoes, gloves).

Observe the principles of safe transportation

Observe the principles of safe transportation and storage:

- Are sufficiently maintained and suitable transportation aids available?
- Is an even, solid and clean surface available for the transportation or storage / installation?
- Is the surface suitable for the weight of the enclosure?
- Avoid inclinations. Is it possible to brake or coast?
- Are the transportation routes illuminated and secured?
- Are any unauthorised persons in the danger zone?
- Are personnel wearing personal protective equipment and high-visibility clothing if necessary?
- Are the protection objectives secured during transportation:
  - Head protection,
  - Foot protection,
  - Hand protection.

Observe the weight and centre of gravity and make sure that the load is secured

- Determine the weight of the enclosure.
- Observe the centre of gravity of the individual enclosure. The centre of gravity of the individual enclosure depends on the expansion state.
- Make sure that the load is secured as required during transportation. This also includes sufficient labelling of the load and the warnings of hazards (centres of gravity, attachment points, security measures).

Transporting the enclosure in a secured and fixed manner

- When the enclosure is transported with installed equipment, it must be transported upright and adequately secured and fixed.
- Never transport the enclosure horizontally if the equipment is installed.

Secured unloading

- When unloading or transporting the enclosure with a forklift, secure it to the forklift using retaining straps. Observe the weight and centre of gravity of the enclosure. The centre of gravity of the enclosure depends on the expansion.

Fixing the enclosure immediately after transportation

- Visually inspect the exterior of the enclosure for transportation damage.
- After transportation, immediately fasten the enclosure. In case of temporary storage, make sure that enclosures are firmly positioned and secure them against slipping or tipping.
- During assembly, make sure that the enclosures are aligned perpendicularly.

7.2 Transporting the distribution enclosure

The distribution enclosures can be lifted using 2 methods:

- Using a crane and lifting individual enclosures from above,
- Through ground transportation with a forklift, pallet truck or roller devices from below.

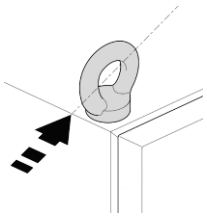
7.2.1 Crane transportation of individual distribution enclosures

- Never suspend the lifting equipment/lifting cables from the enclosure frame. Instead, only suspend it from the eye bolts / ring bolts.
- The total weight of the enclosure when lifting it using a crane is max. 240 kg.
- We recommend transporting the enclosure with a crane: Use lifting straps or round slings, enclosure upright on pallet.
- The crane eye threads on the enclosure are intended for steady, jerk-free transportation to the workshop. Do not lift the enclosure overhead!

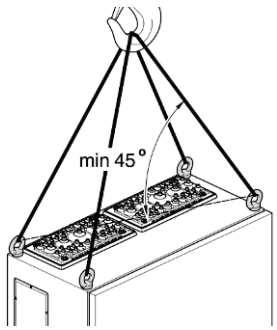
Crane eyes / ring screws FZ831

To transport the enclosure using a crane, the enclosure can be lifted via M8 crane eyelets, which are screwed into the designated openings in the enclosure frame on the enclosure roof.

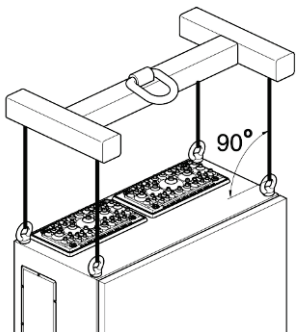
Order number	Crane eyes / ring screws M8	Figure
FZ831	4 x M8 crane eyelets, - Max. total enclosure weight: 240 kg - Load capacity for each crane eyelet: 140 kg - Thread size M8; cast iron	



- The ring screws must point diagonally toward the enclosure centre so that the direction of force created by lifting cable is applied diagonally.
- The rings of the screws must not run parallel to an enclosure wall.

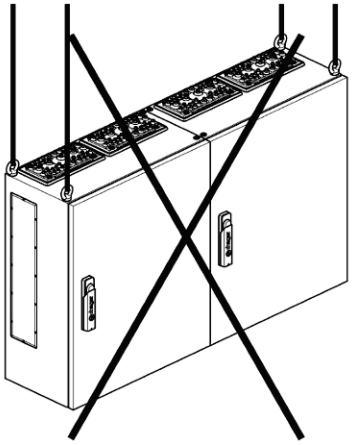


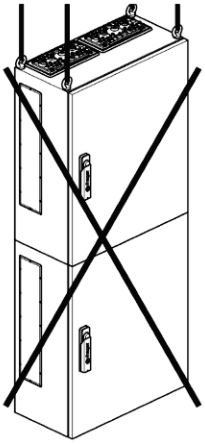
The crane hook is positioned over the centre of gravity. When lifting a enclosure with a crane, the enclosure hangs in a balanced position on 4 lifting cables, each with the same length where possible, at an angle of at least 45° to the enclosure surface (angle of inclination may be maximum 45°).
The smaller the angle of inclination, the higher the maximum load.



Transportation on the crane eyelets / ring screws with load support. When lifting an enclosure with a crane, the enclosure hangs in a balanced position on 4 lifting cables, each with the same length where possible, at an angle of at least 90° to the enclosure surface.

Using a crane to transport connected enclosure is prohibited:





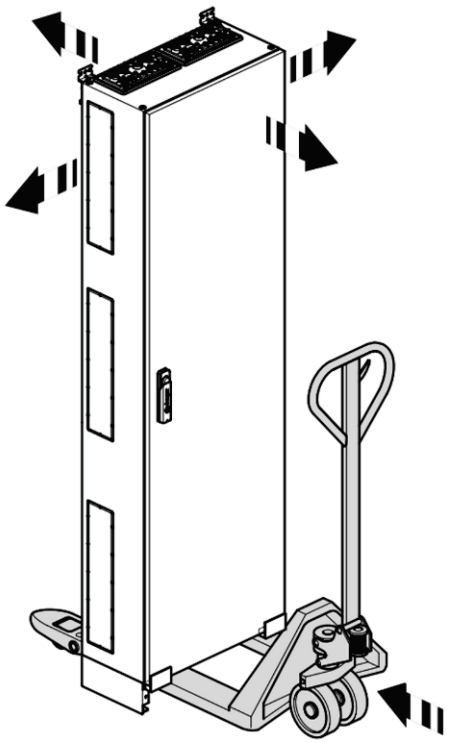
7.2.2 Ground transportation with a forklift or pallet truck

- When transporting the fitted floor standing enclosure, the centre of gravity must be taken into consideration.
- To make sure that the enclosure cannot tip over or slip, it must be fastened as specified by the transportation device manufacturer, e.g. using tensioning straps. Observe the transportation device manufacturer's manuals.

Transporting floor standing enclosures with base plinth

Floor standing enclosures are supplied as standard with assembled base plinth.

- The base plinths have two side parts that are load-bearing. They are fastened to the enclosure via screws.
- The front panel and rear panel of the base plinth are *not load-bearing*. They are fastened to the side parts via screws. The front panel and rear panel thus stabilise the base.



- Before moving the pallet truck under the unit, unscrew the front panel and rear panel of the base plinth.
  With double plinth panels, all front panels and rear panels must be unscrewed.
- Observe the weight and centre of gravity of the enclosure.
- Secure the enclosure against tipping over or slipping and transport it in a secured and fixed manner.
- Only use the minimum possible lifting height.

Never move the floor standing enclosures with the plinth panel removed.

The enclosure may only be moved if the front and rear plinth panel have been tightened. Only then is the stability of the lateral plinth panels ensured against twisting.

Ground transportation of connected enclosures on a pallet

When transporting connected enclosures on the ground:

- Transport the enclosures upright, fixed and secured on a pallet to the installation site. Use the pallet for lifting it.
- Do *not* lift the enclosure from below using a forklift or pallet truck.

7.3 Storage / Temporary Storage

Ensuring safe storage

- Take into account the ambient conditions
- Protected against moisture and extreme temperatures (storage temperatures -5°C - 40°C)
- Protected against dust, sand, chemicals and other causes of damage
- Do not store in a corrosive atmosphere.
- Store the distribution cabinet separately on a free-standing palette:
  - Place wall cabinets on transport safety feet,
  - Place floor-standing cabinets on a base,
  - Protected against slipping or falling,
  - The stability is secured on a stable, solid surface or by fixing against falling. The following must be observed: The weight and centre of gravity of the cabinets.

The user determines special requirements for the storage packaging according to DIN EN 61439-1 supplementary sheet 1, section 10.5, if there are special application requirements.

- Hager recommendations: Use undamaged transport packaging until the final assembly at the installation site.

Precautionary measures prior to subsequent transport

During subsequent transport:

- Prior to transport, perform a visual inspection for foreign objects left behind.
- Check the stability of the components and the entire cabinet.
- If necessary, clean the cabinet exterior and replace any missing parts.
- Observe the instructions for safe transport.
- For crane transport, have the ring screws checked by an expert before transporting the cabinet again:
  - For mechanical damage, such as deformations, indentations,
  - For cracks in the material,
  - For fixed, correct positioning.
  - In case of preliminary damage, the ring screws must be replaced.

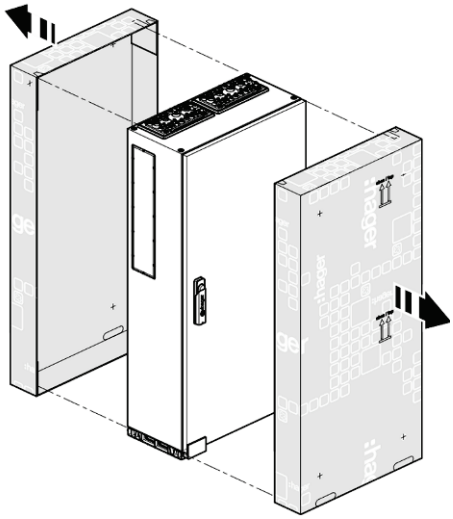
7.4 Reusing packaging

The packaging consists of a Hager cardboard box with a label on the top and on the side, which is strapped and packed on a pallet.

The enclosures themselves are protected above and below with a cap and with a circumferential sheet of cardboard.

Note:

- The switchgear manufacturer makes it easy to reuse the cardboard box.



8 Inspection and maintenance

Important for safe operation

Regular preventative maintenance is important for the safe operation of switchgear and controlgear assemblies.

Checks and maintenance only by electrically skilled persons with appropriate testing experience

- Tests and maintenance must be carried out by electrically skilled persons who have experience in testing switchgear and controlgear assemblies.

8.1 Testing intervals for recurring tests

In the interest of ensuring a high level of operational safety, the switchgear and controlgear assembly should be tested every 4 years by an electrically skilled person and verified that it is in perfect working order (recommendation by German Social Accident Insurance regulation 3 (DGUV) (formerly BGV A3)). National or insurer regulations may extend or shorten the test interval. Shortened intervals may be defined to ensure proper functionality and safe operation due to:

- the demands on the operating equipment,
- external influences,
- changes to the operating parameters and ambient conditions,
- Special kinds of compartments and systems according to DIN VDE 100 group 700,
- In case of complicated operating conditions, special circumstances, such as shocks, exposure to moisture,
- According to the specifications of the device or operating equipment manufacturer set forth in their instructions,
- According to applicable national standards and regulations.

Hager recommends performing a test at least once a year:

- A visual inspection (external inspection),
- Switching operations of the individual protection devices and switchgear.
- Document all tests, for example, in an inspection book.

Recommended recurring tests

System / operating equipment	Test interval	Type of test	Inspector
Electrical systems and stationary operating equipment	4 years 5 years in Switzerland	For perfect working order	Electrically skilled person
Electrical systems and stationary operating equipment in operating sites, special kinds of spaces and systems according to DIN VDE 100 group 700	1 year	For perfect working order	Electrically skilled person

System / operating equipment	Test interval	Type of test	Inspector
- Enclosure, jacketing and protective devices	1 year Recommen-dation	- External visual inspection - Switching operation / functional testing	Electrically skilled person

8.2 Minimum inspection / maintenance measures

At least the maintenance conditions below must be maintained for switchgear and controlgear assemblies with distribution enclosures FR (based on VDE 0100 , part 610 for switchgear and controlgear assemblies):

The recurring tests during commissioning, changes, after faults or in suitable intervals include:

- Inspections,
- Measurements,
- Testing,
- Documenting test results,
- Eliminating the identified defects, for example, by replacing the faulty operating equipment or devices,
- Documenting the performed work and changes.

Tests through inspection

The inspection step includes checking the perfect working order of the electrical switchgear, including its operating equipment and devices. It includes an outside inspection and an inspection of the internal expansion.

- Check the protection against the direct and indirect contact of active parts.
- Check the basic protection and the basic insulation.
- Check the additional insulation for fault protection.
- Check all necessary covers for personal protection.
- Check for signs of ageing effects.
- Check for mechanical, chemical, electrical and thermal stress.

External inspections, tests	Test values, comments, remedy
Test the ambient conditions	- Effectiveness of the ventilation system and heating of operating space - Room temperature, relative humidity, aggressive air components, dust
Accessibility, minimum distances	Escape routes, clearances
Visual inspection of covers and jacketings	Damage that adversely affect the type of protection, such as: - Missing parts - Locks of doors, enclosure walls - Paintwork damage - Ventilation openings - Roof plate

Inspections	Remarks
Condition of jacketing, roof plate, fastening	If necessary, improve, replace housing parts, clean contamination, fix the fastening, observe the assembly manuals here
Check for corrosion traces	- Repair damage with a suitable touch-up stick MES-LSTI7035 for RAL 7035. For more significant damage, grind, clean (e.g. with white spirit, spot-removing spirit, universal thinners) and then paint - Check the operating conditions and ambient conditions
Hinge pin lock	Lock, replace missing hinge pins
Check that the door hinges can be moved easily	If necessary, spray anhydrous lubricant that protects against corrosion
Check that the lock and locking parts can be moved easily	Spray anhydrous lubricant on moving locking parts and replace sealing device if necessary
Seals, flange, contact hazard protection covers	Replace if damaged
Check according to protection class and protection type	- Earth for protection class CL I - Protective insulation for protection class CL II
Type plate / marking of the switchgear and controlgear assembly for legibility	If necessary, clean and ensure legibility
Documentation / documentation for completeness / legibility	Ensure completeness and legibility

8.3 Clean

For operational safety reasons, contamination or pollution must be removed. During cleaning, observe at least the following safety points:

- Cleaning performed only by electrically skilled persons on system free of voltage
- Only perform cleaning work with suction air (vacuum cleaner) and dry towels. During cleaning work, an electrostatic charge in the jet nozzle may result in direct and indirect hazards to personnel.
- Do not use compressed air for cleaning.
- No wet cleaning.
- Remove all contamination on housing, also observe the roof plate.
- Hager offers a cleaning agent for plastic surfaces under the order number VZ404.

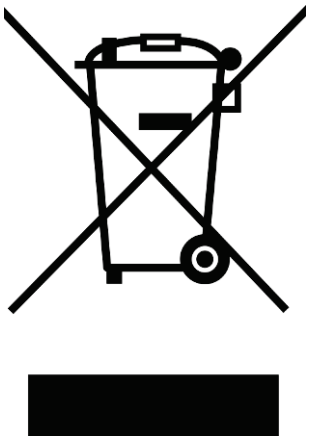
9 Decommissioning, disassembly and disposal

Decommissioning

- Decommissioning only by electrically skilled persons
- Switch off the system
- Observe the residual energies, residual voltages and residual heat
- Disconnect the system and supply lines from all poles and on all sides
- Secure against reconnection
- Ensure that no voltage is present
- Disconnect the supply line / incoming unit
- Securely lock the system
- Attach a sign indicating decommissioning

Disassembly and disposal

- Disassembly only by electrically skilled persons
- Check the disconnection and absence of voltage
- Disassemble the system in reverse order of the assembly and installation procedure.

	- Devices marked with this symbol are subject to European directive 2012/19/EU for WEEE (Waste Electrical and Electronic Equipment). Electrical and electronic equipment may not be disposed of in domestic waste.
	- Dispose of them according to the local applicable regulations.
	- Separate the available raw materials of the system by disposal type and material:
	  - Parts containing copper, such as busbars and lines
	  - Electrical scrap: Terminals, short circuit devices
	  - Available NH fuses: NH fuse recycling (AVV 160216)
	  - Metal scrap: Jacketing, mounting plates

10 Appendix: Weight specifications and power loss

10.1 Weight specifications for enclosure types

- Enclosure depths and enclosure widths: Outer dimensions
- Height of floor standing enclosures: Specifications about enclosure heights, including base plinth
  (outer height dimensions of enclosure + 100 mm / + 200 mm)

Housing	Depth[1] [mm]	Width[1] [mm]	Height[2] [mm]	Volume [cm³]	Net weight [kg]	Gross weight [kg]
FR01E	275	300	1550	127,875	33.128	33.956
FR01S	275	300	1550	127,875	33.128	33.956
FR02E	275	550	1550	234,437.5	43.578	44.668
FR02S	275	550	1550	234,437.5	43.578	44.668
FR03E	275	800	1550	341,000	54.029	55.379
FR03S	275	800	1550	341,000	54.029	55.379
FR04E	275	1050	1550	447,562.5	66.107	67.759
FR04S	275	1050	1550	447,562.5	66.107	67.759
FR05E	275	1300	1550	554,125	76.557	78.471
FR05S	275	1300	1550	554,125	76.557	78.471
FR11E1	275	300	1800	148,500	40.275	41.282
FR11E2	275	300	1900	156,750	43.425	44.511
FR11S1	275	300	1800	148,500	40.275	41.282
FR11S2	275	300	1900	156,750	43.425	44.511
FR12E1	275	550	1800	272,250	55.987	57.387
FR12E2	275	550	1900	287,375	59.137	60.616
FR12S1	275	550	1800	272,250	55.987	57.387
FR12S2	275	550	1900	287,375	59.137	60.616
FR13E1	275	800	1800	396,000	71.699	73.492
FR13E2	275	800	1900	418,000	74.849	76.720
FR13S1	275	800	1800	396,000	71.699	73.492
FR13S2	275	800	1900	418,000	74.849	76.720
FR14E1	275	1050	1800	519,750	89.196	91.426
FR14E2	275	1050	1900	548,625	92.346	94.655
FR14S1	275	1050	1800	519750	89.196	91.426
FR14S2	275	1050	1900	548,625	92.346	94.655
FR15E1	275	1300	1800	643500	93.600	94.600
FR15E2	275	1300	1900	679250	97.600	100
FR15S1	275	1300	1800	643500	95.500	97.900
FR15S2	275	1300	1900	679250	99.500	101.900
FR21E1	275	300	1950	160875	42.908	43.981
FR21E2	275	300	2050	169125	46.058	47.209
FR21G1	400	300	1950	234000	46.942	48.115
FR21G2	400	300	2050	246000	50.092	51.344
FR21H1	400	300	1950	234000	46.942	48.115

Housing	Depth[1] [mm]	Width[1] [mm]	Height[2] [mm]	Volume [cm³]	Net weight [kg]	Gross weight [kg]
FR21H2	400	300	2050	246000	50.092	51.344
FR21K1	275	300	1950	160875	40.763	41.782
FR21K2	275	300	2050	169125	43.913	45.010
FR21L1	275	300	1950	160875	40.763	41.782
FR21L2	275	300	2050	169125	43.913	45.010
FR21S1	275	300	1950	160875	42.908	43.981
FR21S2	275	300	2050	169125	46.058	47.209
FR21U1	400	300	1950	234000	44.769	45.916
FR21U2	400	300	2050	246000	47.946	49.145
FR21V1	400	300	1950	234000	44.796	45.916
FR21V2	400	300	2050	246000	47.946	49.145
FR22E1	275	550	1950	294937.5	59.366	60.851
FR22E2	275	550	2050	310062.5	62.516	64.079
FR22G1	400	550	1950	429000	63.848	65.444
FR22G2	400	550	2050	451000	66.998	68.673
FR22H1	400	550	1950	429000	63.848	65.444
FR22H2	400	550	2050	451000	66.998	68.673
FR22K1	275	550	1950	294937.5	56.398	57.808
FR22K2	275	550	2050	310062.5	59.458	61.037
FR22L1	275	550	1950	294937.5	56.398	54
FR22L2	275	550	2050	310062.5	59.548	61.037
FR22S1	275	550	1950	294937.5	59.366	60.851
FR22S2	275	550	2050	310062.5	62.516	64.079
FR22U1	400	550	1950	429000	60.880	62.402
FR22U2	400	550	2050	451000	64.030	65.631
FR22V1	400	550	1950	429000	60.880	62.402
FR22V2	400	550	2050	451000	64.030	65.631
FR23E1	275	800	1950	429000	75.825	77.720
FR23E2	275	800	2050	451000	78.975	80.949
FR23G1	400	800	1950	624000	80.755	82.774
FR23G2	400	800	2050	656000	83.905	86.002
FR23H1	400	800	1950	624000	80.755	82.774
FR23H2	400	800	2050	656000	83.905	86.002
FR23K1	275	800	1950	429000	72.033	73.834
FR23K2	275	800	2050	451000	75.183	77.063
FR23L1	275	800	1950	429000	72.033	73.834
FR23L2	275	800	2050	451000	75.183	77.063
FR23S1	275	800	1950	429000	75.825	77.720
FR23S2	275	800	2050	451000	78.975	80.949
FR23U1	400	800	1950	624000	76.964	78.888
FR23U2	400	800	2050	656000	80.114	82.116
FR23V1	400	800	1950	624000	76.964	78.888
FR23V2	400	800	2050	656000	80.114	82.116

Housing	Depth[1] [mm]	Width[1] [mm]	Height[2] [mm]	Volume [cm³]	Net weight [kg]	Gross weight [kg]
FR24E1	275	1050	1950	563062.5	94.226	96.581
FR24E2	275	1050	2050	591937.5	97.376	99.810
FR24G1	400	1050	1950	819000	99.604	102.094
FR24G2	400	1050	2050	861000	102.754	105.323
FR24H1	400	1050	1950	819000	99.604	102.094
FR24H2	400	1050	2050	861000	102.754	105.323
FR24K1	275	1050	1950	563062.5	89.514	91.752
FR24K2	275	1050	2050	591937.5	92.664	94.981
FR24L1	275	1050	1950	563062.5	89.514	91.752
FR24L2	275	1050	2050	591937.5	92.664	94.981
FR24S1	275	1050	1950	563062.5	94.226	96.581
FR24S2	275	1050	2050	591937.5	97.376	99.810
FR24U1	400	1050	1950	819000	94.893	97.265
FR24U2	400	1050	2050	861000	98.043	100.494
FR24V1	400	1050	1950	819000	94.265	94.893
FR24V2	400	1050	2050	861000	98.043	100.494
FR25E1	275	1300	1950	697125	106.169	108.823
FR25E2	275	1300	2050	732875	109.319	112.052
FR25G1	400	1300	1950	1014000	111.995	114.795
FR25G2	400	1300	2050	1066000	115.145	118.024
FR25H1	400	1300	1950	1014000	111.995	114.795
FR25H2	400	1300	2050	1066000	115.145	118.024
FR25K1	275	1300	1950	697125	100.861	103.382
FR25K2	275	1300	2050	732875	104.011	106.611
FR25L1	275	1300	1950	697125	100.861	103.382
FR25L2	275	1300	2050	732875	104.011	106.611
FR25S1	275	1300	1950	697125	105	106.169
FR25S2	275	1300	2050	732875	109.319	112.052
FR25U1	400	1300	1950	1014000	106.687	109.354
FR25U2	400	1300	2050	1066000	109.837	112.583
FR25V1	400	1300	1950	1014000	106.687	109.354
FR25V2	400	1300	2050	1066000	109.837	112.583
FR26E1	275	1550	1950	831187.5	118.112	121.065
FR26E2	275	1550	2050	873812.5	121.262	124.294
FR26G1	400	1550	1950	1209000	124.387	127.497
FR26G2	400	1550	2050	1271000	127.537	130.725
FR26H1	400	1550	1950	1209000	124.387	127.497
FR26H2	400	1550	2050	1271000	127.537	130.725
FR26K1	275	1550	1950	831187.5	112.207	115.012
FR26K2	275	1550	2050	873812.5	115.357	118.241
FR26L1	275	1550	1950	831187.5	112.207	115.012
FR26L2	275	1550	2050	873812.5	115.357	118.241
FR26S1	275	1550	1950	831187.5	118.112	121.062

Housing	Depth[1] [mm]	Width[1] [mm]	Height[2] [mm]	Volume [cm³]	Net weight [kg]	Gross weight [kg]
FR26S2	275	1550	2050	873812.5	124	124.294
FR26U1	400	1550	1950	1209000	118.481	121.443
FR26U2	400	1550	2050	1271000	121.631	124.672
FR26V1	400	1550	1950	1209000	118.481	121.443
FR26V2	400	1550	2050	1271	121.631	124.672
FR31E	275	300	500	41.250	14.700	15.068
FR31S	275	300	500	41.250	14.700	15.068
FR32E	275	550	500	75.625	19.925	20.423
FR32S	275	550	500	75.625	19.925	20.423
FR33E	275	800	500	110	25.150	25.779
FR33S	275	800	500	110	25.150	25.779
FR34E	275	1050	500	144.375	30.901	31.673
FR34S	275	1050	500	144.375	30.901	31.673
FR35E	275	1300	500	178.750	36.126	37.029
FR35S	275	1300	500	178.750	36.126	37.029
FR41E	275	300	650	53.625	17.333	17.799
FR41S	275	300	650	53.625	17.333	17.766
FR42E	275	550	650	98312.5	23.304	23.887
FR42H	400	550	650	143	24.900	25.522
FR42S	275	550	650	98312.5	23.304	23.887
FR43E	275	800	650	143000	29.276	30.008
FR43S	275	800	650	143000	29.276	31.000
FR44E	275	1050	650	187687.5	35.930	36.828
FR44H	400	1050	650	273	38.000	38.950
FR44S	275	1050	650	187687.5	35.930	39.000
FR45E	275	1300	650	232375	41.902	42.949
FR45S	275	1300	650	232375	41.902	42.949
FR46H	400	1550	650	0.403	48.000	49.200
FR51E	275	300	800	66000	19.965	20.464
FR51S	275	300	800	66000	19.965	20.464
FR52E	275	550	800	121000	26.683	27.350
FR52S	275	550	800	121000	26.683	27.350
FR53E	275	800	800	176000	33.401	34.236
FR53S	275	800	800	176000	33.401	34.236
FR54E	275	1050	800	231000	40.960	41.894
FR54S	275	1050	800	231000	40.960	41.894
FR55E	275	1300	800	286000	47.678	48.870
FR55S	275	1300	800	286000	47.678	48.870
FR61E	275	300	950	78375	22.598	23.163
FR61S	275	300	950	78375	21.000	22.598
FR62E	275	550	950	143687.5	30.062	30.814
FR62S	275	550	950	143687.5	30.062	30.500
FR63E	275	800	950	209000	37.527	38.465

Housing	Depth[1] [mm]	Width[1] [mm]	Height[2] [mm]	Volume [cm³]	Net weight [kg]	Gross weight [kg]
FR63S	275	800	950	209000	37.527	38.465
FR64E	275	1050	950	274312.5	45.989	47.139
FR64S	275	1050	950	274312.5	45.989	48.500
FR65E	275	1300	950	339625	53.454	54.790
FR65S	275	1300	950	339625	53.454	54.790
FR71E	275	300	1100	90750	25.230	25.861
FR71S	275	300	1100	90750	25.230	24.000
FR72E	275	550	1100	166375	33.441	34.277
FR72S	275	550	1100	166375	33.441	34.277
FR73E	275	800	1100	242000	41.652	42.694
FR73S	275	800	1100	242000	41.652	42.694
FR74E	275	1050	1100	317625	51.018	52.294
FR74S	275	1050	1100	317625	51.018	52.294
FR75E	275	1300	1100	393250	59.230	60.710
FR75S	275	1300	1100	393250	59.230	62.500
FR81E	275	300	1250	103125	27.863	28.559
FR81S	275	300	1250	103125	27.863	28.559
FR82E	275	550	1250	189062.5	36.820	37.741
FR82S	275	550	1250	189062.5	36.820	38.250
FR83E	275	800	1250	275000	45.778	46.922
FR83S	275	800	1250	275000	45.778	48.000
FR84E	275	1050	1250	360937.5	56.048	57.449
FR84S	275	1050	1250	360937.5	56.048	57.449
FR85E	275	1300	1250	446875	56.005	66.631
FR85S	275	1300	1250	446875	56.055	66.631
FR91E	275	300	1400	115500	30.495	31.258
FR91S	275	300	1400	115500	30.495	31.258
FR92E	275	550	1400	211750	40.199	41.204
FR92G	400	550	1400	308000	43.695	44.788
FR92H	400	550	1400	308000	43.695	44.788
FR92S	275	550	1400	211750	40.199	41.204
FR93E	275	800	1400	308000	49.903	51.151
FR93G	400	800	1400	448000	53.847	55.194
FR93H	400	800	1400	448000	53.847	62.000
FR93S	275	800	1400	308000	49.903	51.151
FR94E	275	1050	1400	404250	61.077	62.604
FR94G	400	1050	1400	588000	65.470	67.106
FR94H	400	1050	1400	588000	65.470	78.000
FR94S	275	1050	1400	404250	61.077	62.604
FR95E	275	1300	1400	500500	70.781	72.551
FR95S	275	1300	1400	500500	70.781	72.551

[1] Enclosure depths and enclosure widths: Outer dimensions

[2] Height of floor standing enclosures: Specifications of enclosure heights, including base plinth

10.2 Power loss specifications

Thermal / power loss specifications

- The permissible power loss P_{ZUL} is specified for all sides of the enclosed housing without ventilation openings and without horizontal separating walls, for example, with the even distribution of the thermal load.
- The overtemperature of the air in the housing Δt is specified in 75% and in 50% of the housing height.
- The values are measured in compliance with EN 61439-1/-2, section 10.10.4.2.2.
- Make sure that the permissible overtemperature of the air in the switchgear and controlgear assembly does not exceed the maximum operating temperature of the devices.

10.2.1 Power loss for wall-mounted devices

Permissible power loss P_{ZUL}: Height 500 mm, depth* 275 mm

Housing		Overtemperature Δt					
	Width	10 K	15 K	20 K	25 K	30 K	% housing height
Mod.	mm	W	W	W	W	W	
FR31…	300	10.3	17.1	24.4	32.2	40.4	75
		13.5	22.3	31.9	42.1	52.8	50
FR32…	550	16.5	27.3	39.0	51.5	64.6	75
		20.1	33.2	47.5	62.7	78.7	50
FR33…	800	23.0	38.1	54.5	71.9	90.2	75
		26.5	43.8	62.6	82.7	103.7	50
FR34…	1050	29.3	48.6	69.5	91.7	115.0	75
		32.7	54.1	77.4	102.1	128.1	50
FR35…	1300	33.8	56.0	80.1	105.8	132.7	75
		39.2	64.9	92.8	122.6	153.7	50

* At enclosure depths of 275 mm: Installation compartment depth 150 mm

Permissible power loss P_{ZUL}: Height 650 mm, depth* 275 mm

Housing		Overtemperature Δt					
	Width	10 K	15 K	20 K	25 K	30 K	% housing height
Mod.	mm	W	W	W	W	W	
FR41…	300	12.5	20.7	29.5	39.0	48.9	75
		16.5	27.3	39.1	51.6	64.7	50
FR42…	550	19.3	32.0	45.8	60.4	75.8	75
		24.5	40.5	57.9	76.5	95.9	50
FR43…	800	26.9	44.6	63.7	84.1	105.5	75
		32.2	53.2	76.1	100.5	126.1	50
FR44…	1050	33.6	55.7	79.7	105.2	131.9	75
		40.5	67.0	95.8	126.4	158.6	50
FR45…	1300	43.2	71.5	102.3	135.0	169.4	75
		51.1	84.6	121.1	159.8	200.5	50

* At enclosure depths of 275 mm: Installation compartment depth 150 mm

Permissible power loss P_{ZUL}: Height 800 mm, depth* 275 mm

Housing		Overtemperature Δt					
	Width	10 K	15 K	20 K	25 K	30 K	% housing height
Mod.	mm	W	W	W	W	W	
FR51…	300	14.7	24.3	34.7	45.8	57.5	75
		19.5	32.3	46.2	60.9	76.4	50
FR52…	550	22.3	36.8	52.7	69.5	87.3	75
		28.8	47.6	68.1	89.9	112.8	50
FR53…	800	29.9	49.4	70.7	93.3	117.1	75
		37.8	62.6	89.5	118.2	148.3	50
FR54…	1050	40.9	67.7	96.8	127.8	160.3	75
		50.4	83.4	119.3	157.5	197.6	50
FR55…	1300	52.6	87.1	124.6	164.5	206.3	75
		63.3	105.3	150.7	198.9	249.5	50

* At enclosure depths of 275 mm: Installation compartment depth 150 mm

Permissible power loss P_{ZUL}: Height 950 mm, depth* 275 mm

Housing		Overtemperature Δt					
	Width	10 K	15 K	20 K	25 K	30 K	% housing height
Mod.	mm	W	W	W	W	W	
FR61…	300	16.8	27.9	39.9	52.6	66.0	75
		22.4	37.1	53.1	70.1	87.9	50
FR62…	550	25.2	41.8	59.7	78.8	98.9	75
		33.0	54.7	78.2	103.2	129.5	50
FR63…	800	35.1	58.1	83.2	109.8	137.7	75
		45.6	75.5	108.0	142.6	178.9	50
FR64…	1050	48.2	79.7	114.0	150.5	188.8	75
		60.7	100.5	143.8	189.8	238.1	50
FR65…	1300	62.1	102.8	147.0	194.0	243.8	75
		76.6	126.9	181.4	239.5	300.4	50

* At enclosure depths of 275 mm: Installation compartment depth 150 mm

Permissible power loss P_{ZUL}: Height 1100 mm, depth* 275 mm

Housing		Overtemperature Δt					
	Width	10 K	15 K	20 K	25 K	30 K	% housing height
Mod.	mm	W	W	W	W	W	
FR71…	300	19.0	31.5	45.0	59.4	74.5	75
		25.3	41.9	60.0	79.1	99.3	50
FR72…	550	26.9	44.5	63.6	84.0	105.4	75
		37.1	61.4	87.8	115.8	145.3	50
FR73…	800	40.5	67.0	95.8	126.4	158.6	75
		53.7	88.9	127.1	167.8	210.5	50
FR74…	1050	55.4	91.8	131.3	173.3	217.4	75
		71.4	118.3	169.1	223.2	280.0	50
FR75…	1300	71.5	118.4	169.4	223.6	280.5	75
		90.0	149.1	213.3	281.5	353.1	50

* At enclosure depths of 275 mm: Installation compartment depth 150 mm

Permissible power loss P_{ZUL}: Height 1250 mm, depth* 275 mm

Housing		Overtemperature Δt					
	Width	10 K	15 K	20 K	25 K	30 K	% housing height
Mod.	mm	W	W	W	W	W	
FR81…	300	21.1	35.0	50.1	66.1	82.9	75
		28.2	46.7	66.7	88.1	110.5	50
FR82…	550	31.1	51.4	73.6	97.1	121.8	75
		42.9	70.9	101.5	133.9	168.0	50
FR83…	800	45.9	76.0	108.7	143.5	180.0	75
		62.0	102.7	146.9	193.8	243.2	50
FR84…	1050	62.8	103.9	148.7	196.2	246.2	75
		82.4	136.5	195.2	257.7	323.2	50
FR85…	1300	81.9	134.2	191.9	253.2	317.7	75
		103.9	172.1	246.1	324.8	407.4	50

* At enclosure depths of 275 mm: Installation compartment depth 150 mm

Permissible power loss P_{ZUL}: Height 1400 mm, depth* 275 mm

Housing		Overtemperature Δt					
	Width	10 K	15 K	20 K	25 K	30 K	% housing height
Mod.	mm	W	W	W	W	W	
FR91…	300	23.3	38.5	55.1	72.7	91.2	75
		31.0	51.3	73.4	96.9	121.6	50
FR92…	550	35.4	58.6	83.8	110.6	138.7	75
		48.8	80.8	115.6	152.5	191.3	50
FR93…	800	51.2	84.7	121.2	159.9	200.6	75
		70.6	116.8	167.1	220.6	276.7	50
FR94…	1050	70.2	116.3	166.3	219.5	275.4	75
		93.8	155.2	222.0	293.0	367.6	50
FR95…	1300	90.6	150.0	214.5	283.1	355.1	75
		118.1	195.6	279.7	369.2	463.2	50

* At enclosure depths of 275 mm: Installation compartment depth 150 mm

Permissible power loss P_{ZUL}: Height 1550 mm, depth* 275 mm

Housing		Overtemperature Δt					
	Width	10 K	15 K	20 K	25 K	30 K	% housing height
Mod.	mm	W	W	W	W	W	
FR01…	300	25.4	42.0	60.0	79.3	99.4	75
		33.8	56.0	80.0	105.6	132.5	50
FR02…	550	40.3	66.8	95.5	126.0	158.1	75
		54.9	90.9	130.0	171.6	215.3	50
FR03…	800	58.3	96.5	138.0	182.1	228.5	75
		79.3	131.3	187.8	247.9	311.0	50
FR04…	1050	78.1	129.4	185.0	244.2	306.3	75
		105.3	174.4	249.5	329.3	413.1	50
FR05…	1300	97.8	161.9	231.5	305.6	383.3	75
		129.0	213.5	305.4	403.1	505.7	50

* At enclosure depths of 275 mm: Installation compartment depth 150 mm

Permissible power loss P_{ZUL}: Height 1700 mm, depth* 275 mm

Housing		Overtemperature Δt					
	Width	10 K	15 K	20 K	25 K	30 K	% housing height
Mod.	mm	W	W	W	W	W	
FR11…	300	27.4	45.4	65.0	85.8	107.6	75
		36.6	60.6	86.6	114.3	143.4	50
FR12…	550	44.9	74.4	106.3	140.4	176.1	75
		61.1	101.2	144.8	191.1	239.7	50
FR13…	800	64.8	107.4	153.6	202.7	254.3	75
		88.3	146.2	209.0	275.9	346.1	50
FR14…	1050	86.1	142.5	203.9	269.1	337.6	75
		117.2	194.0	277.5	366.3	459.5	50
FR15…	1300	103.1	170.7	244.1	322.1	404.1	75
		137.7	228.0	326.1	430.4	540.0	50

* At enclosure depths of 275 mm: Installation compartment depth 150 mm

Permissible power loss P_{ZUL}: Height 1850 mm, depth* 275 mm

Housing		Overtemperature Δt					
	Width	10 K	15 K	20 K	25 K	30 K	% housing height
Mod.	mm	W	W	W	W	W	
FR21… FS21…	300	29.0	48.0	68.7	90.7	113.7	75
		40.0	66.2	94.7	125.0	156.9	50
FR22… FS22…	550	48.9	81.0	115.9	152.9	191.9	75
		67.5	111.7	159.8	210.9	264.6	50
FR23… FS23…	800	70.6	116.9	167.2	220.7	276.9	75
		97.4	161.3	230.7	304.5	382.0	50
FR24… FS24…	1050	92.0	152.3	217.9	287.6	360.8	75
		126.9	210.1	300.5	396.6	497.6	50
FR25… FS25…	1300	107.9	178.6	255.5	337.2	423.0	75
		146.3	242.3	346.5	457.3	573.7	50
FR26…	1550	124.3	205.7	294.3	388.4	487.2	75
		165.0	273.2	390.7	515.7	646.9	50

* At enclosure depths of 275 mm: Installation compartment depth 150 mm

Permissible power loss P_{ZUL}: Height 1400 mm, depth* 400 mm

Housing		Overtemperature Δt					
	Width	10 K	15 K	20 K	25 K	30 K	% housing height
Mod.	mm	W	W	W	W	W	
FR92…	550	50.6	83.8	119.8	158.1	198.4	75
		67.2	111.2	159.1	210.0	263.4	50
FR93…	800	72.3	119.7	171.2	226.0	283.5	75
		92.3	152.8	218.6	288.5	362.0	50
FR94…	1050	95.9	158.8	227.1	299.7	376.0	75
		118.9	196.8	281.5	371.5	466.1	50

* At enclosure depths of 400 mm: Installation compartment depth 290 mm

Permissible power loss P_{ZUL}: Height 1850 mm, depth* 400 mm

Housing		Overtemperature Δt					
	Width	10 K	15 K	20 K	25 K	30 K	% housing height
Mod.	mm	W	W	W	W	W	
FR21…	300	60.4	99.9	142.9	188.7	236.7	75
FS21…		44.3	73.4	105.0	138.6	173.9	50
FR22…	550	67.5	111.7	159.8	210.9	264.6	75
FS22…		91.9	152.1	217.6	287.1	360.2	50
FR23…	800	93.9	155.5	222.4	293.5	368.2	75
FS23…		124.7	206.5	295.3	389.8	489.0	50
FR24…	1050	112.8	186.7	267.0	352.4	442.1	75
FS24…		145.5	241.0	344.7	454.9	570.7	50
FR25…	1300	131.2	217.2	310.7	410.0	514.4	75
FS25…		165.5	274.1	392.0	517.4	649.1	50
FR26…	1550	149.3	247.2	353.5	466.6	585.4	75
		184.8	306.0	437.6	577.6	724.7	50

* At enclosure depths of 400 mm: Installation compartment depth 290 mm

10.2.2 Power loss for wall-mounted units

Permissible power loss P_{ZUL}: Height 500 mm, depth* 275 mm

Housing		Overtemperature Δt					
	Width	10 K	15 K	20 K	25 K	30 K	% housing height
Mod.	mm	W	W	W	W	W	
FR31…	300	8.2	13.6	19.4	25.6	32.1	75
		10.7	17.7	25.4	33.5	42.0	50
FR32…	550	13.7	22.7	32.4	42.8	53.7	75
		16.7	27.6	39.5	52.2	65.4	50
FR33…	800	19.5	32.3	46.2	61.0	76.5	75
		22.4	37.2	53.1	70.1	88.0	50
FR34…	1050	25.2	41.7	59.6	78.7	98.7	75
		28.0	46.4	66.4	87.6	109.9	50
FR35…	1300	30.7	50.8	72.7	95.9	120.4	75
		33.5	55.5	79.3	104.7	131.4	50

*At enclosure depths of 275 mm: Installation compartment depth 150 mm

Permissible power loss P_{ZUL}: Height 650 mm, depth* 275 mm

Housing		Overtemperature Δt					
	Width	10 K	15 K	20 K	25 K	30 K	% housing height
Mod.	mm	W	W	W	W	W	
FR41…	300	10.0	16.6	23.8	31.4	39.4	75
		13.3	22.0	31.5	41.5	52.1	50
FR42…	550	16.3	27.0	38.6	51.0	63.9	75
		20.6	34.2	48.9	64.5	81.0	50
FR43…	800	23.2	38.4	55.0	72.5	91.0	75
		27.7	45.9	65.7	86.7	108.8	50
FR44…	1050	30.2	49.9	71.4	94.3	118.3	75
		34.6	57.3	82.0	108.2	135.8	50
FR45…	1300	36.6	60.6	86.6	114.3	143.4	75
		42.9	71.0	101.6	134.1	168.2	50

*At enclosure depths of 275 mm: Installation compartment depth 150 mm

Permissible power loss P_{ZUL}: Height 800 mm, depth* 275 mm

Housing		Overtemperature Δt					
	Width	10 K	15 K	20 K	25 K	30 K	% housing height
Mod.	mm	W	W	W	W	W	
FR51…	300	11.9	19.7	28.2	37.2	46.6	75
		15.8	26.2	37.4	49.4	62.0	50
FR52…	550	19.0	31.4	44.9	59.3	74.4	75
		24.5	40.6	58.1	76.7	96.2	50
FR53…	800	26.6	44.0	62.9	83.0	104.2	75
		32.9	54.5	78.0	102.9	129.1	50
FR54…	1050	34.8	57.6	82.3	108.7	136.3	75
		42.5	70.4	100.6	132.8	166.7	50
FR55…	1300	45.3	75.0	107.2	141.6	177.6	75
		54.3	89.9	128.6	169.7	212.9	50

*At enclosure depths of 275 mm: Installation compartment depth 150 mm

Permissible power loss P_{ZUL}: Height 950 mm, depth* 275 mm

Housing		Overtemperature Δt					
	Width	10 K	15 K	20 K	25 K	30 K	% housing height
Mod.	mm	W	W	W	W	W	
FR61…	300	13.7	22.7	32.5	42.9	53.8	75
		18.3	30.3	43.3	57.2	71.7	50
FR62…	550	21.6	35.8	51.3	67.7	84.9	75
		28.3	46.9	67.1	88.6	111.1	50
FR63…	800	29.6	49.1	70.2	92.6	116.2	75
		38.2	63.2	90.4	119.4	149.8	50
FR64…	1050	41.4	68.6	98.0	129.4	162.3	75
		51.8	85.8	122.7	162.0	203.2	50
FR65…	1300	54.0	89.5	128.0	168.9	211.9	75
		66.2	109.6	156.8	206.9	259.6	50

*At enclosure depths of 275 mm: Installation compartment depth 150 mm

Permissible power loss P_{ZUL}: Height 1100 mm, depth* 275 mm

Housing		Overtemperature Δt					
	Width	10 K	15 K	20 K	25 K	30 K	% housing height
Mod.	mm	W	W	W	W	W	
FR71…	300	15.6	25.8	36.8	48.6	61.0	75
		20.7	34.3	49.1	64.8	81.3	50
FR72…	550	24.3	40.3	57.6	76.1	95.5	75
		32.1	53.2	76.0	100.3	125.9	50
FR73…	800	34.4	57.0	81.5	107.6	135.0	75
		45.3	75.1	107.3	141.7	177.7	50
FR74…	1050	48.1	79.6	113.9	150.3	188.5	75
		61.5	101.8	145.6	192.2	241.1	50
FR75…	1300	62.8	104.0	148.8	196.4	246.4	75
		78.5	130.0	185.9	245.4	307.9	50

*At enclosure depths of 275 mm: Installation compartment depth 150 mm

Permissible power loss P_{ZUL}: Height 1250 mm, depth* 275 mm

Housing		Overtemperature Δt					
	Width	10 K	15 K	20 K	25 K	30 K	% housing height
Mod.	mm	W	W	W	W	W	
FR81…	300	17.4	28.7	41.1	54.3	68.1	75
		23.1	38.3	54.8	72.3	90.7	50
FR82…	550	27.0	44.8	64.0	84.5	106.0	75
		35.8	59.3	84.8	112.0	140.4	50
FR83…	800	39.4	65.2	93.2	123.0	154.4	75
		52.7	87.2	124.8	164.7	206.6	50
FR84…	1050	54.8	90.8	129.9	171.4	215.0	75
		71.4	118.3	169.2	223.3	280.2	50
FR85…	1300	71.7	118.7	169.7	224.0	281.0	75
		91.2	151.1	216.1	285.2	357.8	50

*At enclosure depths of 275 mm: Installation compartment depth 150 mm

Permissible power loss P_{ZUL}: Height 1400 mm, depth* 275 mm

Housing		Overtemperature Δt					
	Width	10 K	15 K	20 K	25 K	30 K	% housing height
Mod.	mm	W	W	W	W	W	
FR91…	300	19.1	31.7	45.3	59.9	75.1	75
		25.5	42.3	60.4	79.8	100.1	50
FR92…	550	29.9	49.5	70.8	93.4	117.2	75
		40.2	66.6	95.3	125.8	157.8	50
FR93…	800	44.5	73.7	105.4	139.2	174.6	75
		60.3	99.8	142.7	188.3	236.3	50
FR94…	1050	61.7	102.2	146.1	192.9	242.0	75
		81.7	135.3	193.5	255.4	320.4	50
FR95…	1300	80.6	133.4	190.8	251.9	316.0	75
		104.3	172.7	247.0	326.0	409.0	50

*At enclosure depths of 275 mm: Installation compartment depth 150 mm

Permissible power loss P_{ZUL}: Height 1550 mm, depth* 275 mm

Housing		Overtemperature Δt					
	Width	10 K	15 K	20 K	25 K	30 K	% housing height
Mod.	mm	W	W	W	W	W	
FR01…	300	20.9	34.6	49.5	65.4	82.0	75
		27.9	46.2	66.0	87.2	109.3	50
FR02…	550	33.8	55.9	80.0	105.6	132.5	75
		45.4	75.2	107.6	142.0	178.2	50
FR03…	800	50.6	83.7	119.8	158.1	198.3	75
		68.0	112.6	161.1	212.6	266.7	50
FR04…	1050	69.2	114.6	163.9	216.3	271.4	75
		92.2	152.7	218.4	288.2	361.6	50
FR05…	1300	90.3	149.6	214.0	282.4	354.3	75
		117.7	194.9	278.8	367.9	461.6	50

*At enclosure depths of 275 mm: Installation compartment depth 150 mm

Permissible power loss P_{ZUL}: Height 1700 mm, depth* 275 mm

Housing		Overtemperature Δt					
	Width	10 K	15 K	20 K	25 K	30 K	% housing height
Mod.	mm	W	W	W	W	W	
FR11…	300	22.7	37.5	53.7	70.9	88.9	75
		30.2	50.0	71.6	94.5	118.5	50
FR12…	550	37.7	62.5	89.3	117.9	147.9	75
		50.7	84.0	120.2	158.6	199.0	50
FR13…	800	56.5	93.5	133.7	176.5	221.4	75
		76.0	125.8	179.9	237.4	297.9	50
FR14…	1050	76.5	126.7	181.3	239.3	300.2	75
		103.0	170.5	243.8	321.8	403.7	50
FR15…	1300	97.1	160.8	230.0	303.6	380.8	75
		128.2	212.3	303.6	400.7	502.7	50

*At enclosure depths of 275 mm: Installation compartment depth 150 mm

Permissible power loss P_{ZUL}: Height 1850 mm, depth* 275 mm

Housing		Overtemperature Δt					
	Width	10 K	15 K	20 K	25 K	30 K	% housing height
Mod.	mm	W	W	W	W	W	
FR21… FS21…	300	24.4	40.4	57.8	76.3	95.7	75
		32.5	53.9	77.1	101.7	127.6	50
FR22… FS22…	550	47.2	78.2	111.9	147.6	185.2	75
		56.2	93.0	133.0	175.6	220.3	50
FR23… FS23…	800	62.4	103.4	147.9	195.2	244.8	75
		84.1	139.2	199.1	262.8	329.6	50
FR24… FS24…	1050	83.8	138.8	198.5	262.0	328.6	75
		113.9	188.6	269.8	356.1	446.7	50
FR25… FS25…	1300	101.6	168.2	240.6	317.5	398.4	75
		136.5	226.0	323.2	426.6	535.1	50
FR26…	1550	118.0	195.4	279.5	368.9	462.8	75
		154.8	256.3	366.6	483.9	607.0	50

*At enclosure depths of 275 mm: Installation compartment depth 150 mm

Permissible power loss P_{ZUL}: Height 1400 mm, depth* 400 mm

Housing		Overtemperature Δt					
	Width	10 K	15 K	20 K	25 K	30 K	% housing height
Mod.	mm	W	W	W	W	W	
FR92…	550	37.9	62.8	89.8	118.5	148.7	75
		49.7	82.3	117.8	155.4	195.0	50
FR93…	800	56.7	93.9	134.3	177.3	222.4	75
		71.5	118.4	169.3	223.5	280.4	50
FR94…	1050	77.4	128.1	183.2	241.8	303.3	75
		94.7	156.7	224.2	295.9	371.2	50

* At enclosure depths of 400 mm: Installation compartment depth 290 mm

Permissible power loss P_{ZUL}: Height 1850 mm, depth* 400 mm

Housing		Overtemperature Δt					
	Width	10 K	15 K	20 K	25 K	30 K	% housing height
Mod.	mm	W	W	W	W	W	
FR21… FS21…	300	30.7	50.8	72.7	96.0	120.4	75
		41.3	68.4	97.8	129.1	162.0	50
FR22… FS22…	550	51.2	84.8	121.2	160.0	200.7	75
		68.9	114.0	163.1	215.2	270.0	50
FR23… FS23…	800	75.3	124.7	178.4	235.4	295.3	75
		98.8	163.6	234.0	308.8	387.4	50
FR24… FS24…	1050	100.2	165.9	237.3	313.2	392.9	75
		127.7	211.5	302.5	399.2	500.9	50
FR25… FS25…	1300	118.1	195.5	279.6	369.0	462.9	75
		147.1	243.5	348.3	459.7	576.7	50
FR26…	1550	135.6	224.5	321.1	423.8	531.6	75
		165.7	274.3	392.3	517.8	649.6	50

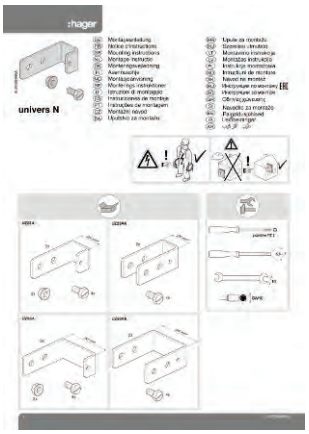
*At enclosure depths of 400 mm: Installation compartment depth 290 mm

10.3 Assembly instructions: Overview

- Observe the assembly manuals for the enclosure and components
  - For internal extension and
  - when assembling at the installation site.

6LE002892*

Assembly manual for univers enclosure IP55 FR (IP41 FS)

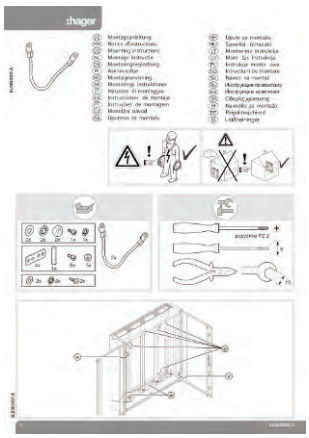


6LE000999*

Lowering kit for lowering the crossbar / retaining rail

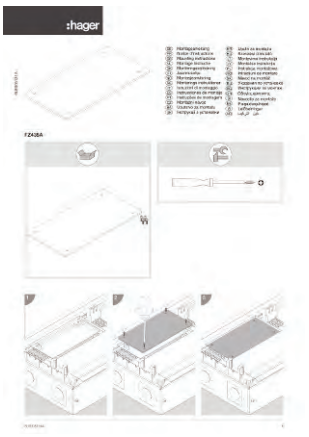
6LE003001*

univers N mounting plate



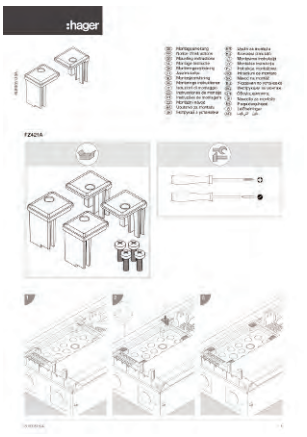
6LE003357*

Earth for protection class I



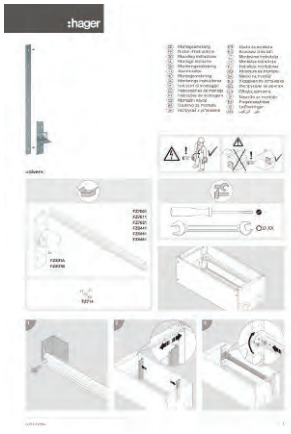
6LE005131*

Sealing plates for protection class II

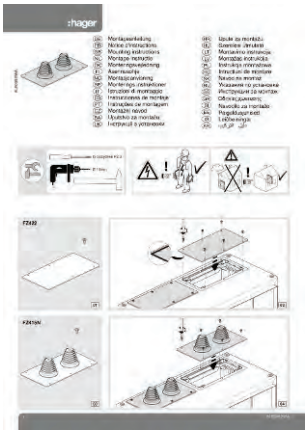


6LE005130*

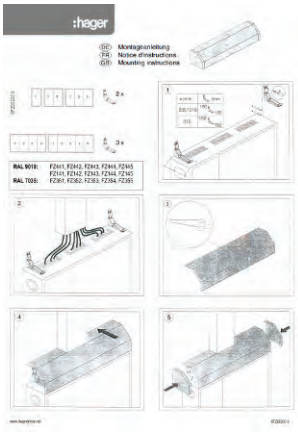
Cable gland locking set



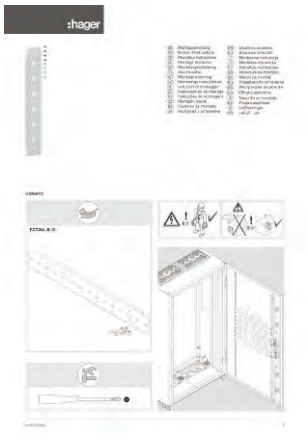
6LE005258*
Retaining rail and bracket



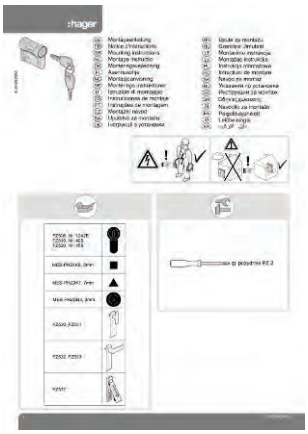
6LE005256*
Cable entry flange



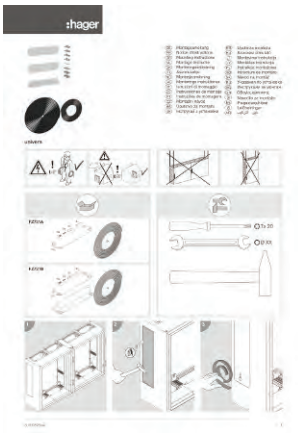
6FZ00200*
Cable management duct



6LE005259*
Door sealing profile FZ 739x



6LE005255*
Locking cylinder / locks



6LE005260*
Connection set for
2 enclosures side-by-side
FZ721x

11 Glossary

Degree of pollution

The degree of pollution defines the ambient conditions of a switching device. If the switching device is installed in an enclosure, the ambient conditions within the enclosure apply. The degree of pollution according to EN 61439 refers to the ambient conditions that are intended for the switchgear and controlgear assembly.

The four defined degrees of pollution are used to assess the clearances and creepage distances in the microenvironment. The degree of pollution 3 is defined as conductive pollution or dry, non-conductive pollution, which is expected to become conductive due to condensation. The degree of pollution 2 is defined only as non-conductive pollution in which, however, temporary conductivity can be expected due to condensation.

Distribution boards for operation by ordinary persons (DBO) according to EN 61439-3

DBO. According to EN 61439-3, a DBO is a distribution boards for operating by ordinary persons (Distribution Board intended to be operated by ordinary persons). This is a switchgear and controlgear assembly for distributing electrical energy for applications in residential areas and other locations where operation is intended by ordinary persons.

The distribution boards are manufactured and tested for operation by ordinary persons (DBO) according to EN 61439 Part 1 and Part 3. Part 3 of the standard 61439 defines the specific requirements for distribution boards for operation by ordinary persons (DBO).

A switchgear and controlgear assembly that allows operation by ordinary persons must include a type plate that specifies the standard EN 61439-3 (VDE 0660-600-3) as the applied standard.

Characteristic features of such a switchgear and controlgear assembly:

❶ They are intended for operation by ordinary persons, including switching operations and changing fuse inserts. They are applications in residential areas or similar household applications in a functional building.

❷ The outgoing circuits contain short circuit devices that are intended for operation by ordinary persons. Additional information is provided in section 8 of EN 61439-3.

❸ The rated voltage against earth is maximum 300 V alternating current.

❹ The rated current (I_{nc}) of the outgoing circuit is maximum 125 A; the rated current of the switchgear and controlgear assembly (I_{nA}) is maximum 250 A.*)

❺ The switchgear and controlgear assembly is intended for distributing electrical energy and may also contain controlling and signalling devices to do this.

❻ The switchgear and controlgear assembly is closed and fixed.

❼ The switchgear and controlgear assembly can be provided for indoor or outdoor installation (for distribution enclosures FR and FS: indoor installation). The protection type of a DBO for indoor installation must be at least IP2XC. The IK code against mechanical influence must correspond to at least IK05 for indoor installation. At least the degree of pollution 2 applies.

Additional information is provided in EN 61439 Part 1 as well as Part 3.

*) About the characteristic feature 4 (rated current of outgoing circuit max. 125 A / rated current of switchgear and controlgear assembly max. 250 A):

The current standard EN 61439-3 only defines the maximum rated currents I_{nc} and I_{nA}. No determinations have been made about the rated currents of the operating equipment in the incoming unit of a DBO. The maximum permissible I_{nA} of 250 A can thus also be routed via a 400 A circuit breaker. The following requirements apply:

- The rated current of the switchgear and controlgear assembly (I_{nA}) must be limited to 250 A.
- Operation of the circuit breaker by ordinary persons must be effectively prevented (use locking devices).
- The setting or calibration of the circuit breaker must be visible. The calibration cannot be changed without the deliberate use of a tool / key.

EN 61439 / IEC 61439 / VDE 0660-600

The EN 61439 standard series replaced the EN 60439 standard series. The EN 61439 standard series has the goal of harmonising the rules and requirements for low-voltage switching equipment combinations.

The valid part of the EN 61439 standard series is always the applicable part of the standard, e.g. EN 61439-6 for busbar trunking systems (busways) together with Part 1 of the standard (EN 61439-1).

Connection between European standard and International standard

European standard	International standard	German standard	Classification VDE specifications
EN 61439 (all parts)	IEC 61439 (all parts)	DIN EN 61439 (VDE 0660-600) (all parts)	VDE 0660-600 (all parts)

Parts of EN 61439 standard

Part of European standard	Content
EN 61439-1	Low-voltage switchgear and controlgear assemblies - Part 1: General rules
EN 61439-2	Low-voltage switchgear and controlgear assemblies - Part 2: Power switchgear and controlgear assemblies (PSC)
EN 61439-3	Low-voltage switching controlgear assemblies - Part 3: Distribution boards intended to be operated by ordinary persons
EN 61439-4	Low-voltage switchgear and controlgear assemblies - Part 4: Particular requirements for assemblies for construction sites (ACS)
EN 61439-5	Low-voltage switchgear and controlgear assemblies - Part 5: Assemblies for power distribution in public networks
EN 61439-6	Low-voltage switchgear and controlgear assemblies - Part 6: Busbar trunking systems (busways)
EN 61439-7	Low-voltage switchgear and controlgear assemblies - Part 7: Assemblies for specific applications such as marinas, camping sites, market squares, electrical vehicles charging stations

Supplements for parts of the EN 61439 standard

Part of European standard	Content
EN 61439-1 Supplement 1	General rules: Guidance to specifying switchgear and controlgear assemblies
EN 61439-1 Supplement 2	General rules: A method of temperature-rise verification of low-voltage switchgear and controlgear assemblies by calculation
EN 61439-2 Supplement 1	Power switchgear and controlgear assemblies: Guide for testing under conditions of arcing due to internal fault

Power switchgear and controlgear assembly (PSC) according to EN 61439-2

PSC power switchgear and controlgear assembly. As a low-voltage switchgear and controlgear assembly, it distributes and controls electrical energy for all load types according to EN 61439-2. Intended for industrial, commercial and similar applications, which are not intended to be operated by an ordinary person.

It is not prohibited, however, to install in an area that can be accessed by ordinary persons. It must, however, be ensured that operation by ordinary persons is prevented.

Protection type / IP degree of protection

For each switchgear and controlgear assembly, the protection type with the IP code is specified according to IEC 60529 and verified according to EN 61439

- with regard to protection against contact with active parts and preventing solid foreign bodies from entering the system,
- with regard to preventing water from entering the system.

The protection type is important for ensuring protection against electrical shock. The protection type applies to jacketings, covers and housings. The protection type is specified by two code numbers of the IP protection type and optionally an additional letter.

- The first code number (0-6) indicates the protection against solid foreign objects from entering the system and the protection against contact with dangerous parts.
- The second code number (0-8) indicates the protection against water from entering the system.
- The additional letter (A-D) indicates the protection against contact with dangerous parts.

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