

SF₆ Gas Handling



DILO. Sustainably tight.

Table of contents

■ SF ₆ information / General	04 – 08
■ SF ₆ gas refilling and evacuating devices	09 – 26
■ SF ₆ gas service carts	27 – 81
■ Micro Series	31 – 34
■ Mini Series	35 – 46
■ Piccolo Serie	47 – 50
■ Compact Series	51 – 58
■ Economy Serie	59 – 65
■ Mega Series	67 – 81
■ Accessories for service carts	83 – 97
■ SF ₆ Accessories	99 – 119
■ Devices for SF ₆ gas monitoring	121 – 134
■ Purification and preparation of SF ₆ gas mixtures	135 – 140
■ SF ₆ Measuring devices	141 – 176
■ Devices for determination of the SF ₆ gas quality	142 – 156
■ SF ₆ gas detectors	157 – 164
■ Density monitor testing devices	165 – 170
■ Accessories for measuring devices	171 – 176
■ SF ₆ Valves and Couplings	177 – 178
■ SF ₆ Leak testing units	179 – 182
■ GIS production plants	183 – 185
■ Special plants	187 – 190
■ Training and certification	191 – 193
■ Services	195 – 201

General information



Everything from a single source

Our product range includes everything required for a professional and intelligent gas handling: from simple refilling devices to measuring devices and service carts to special fabrication plants.

In addition to product solutions complying with the latest state-of-the-art, we also offer comprehensive services. Thus fulfilling all customer's requirements in every respect.

DILO. We rely on quality and service.

■ SF₆ information / General

- | | |
|--|---------|
| ■ SF ₆ gas | 05 |
| ■ SF ₆ recovery and re-use | 06 |
| ■ International regulations and guidelines | 07 – 08 |

SF₆ Gas

SF₆ – A gas with unusual properties

SF₆ gas is a synthetically produced insulating and arc quenching gas with substantial **properties**.

- Colourless and odourless
- 5 times heavier than air
- Temperature-resistant up to 500 °C
- Chemically stable
- Non-toxic
- Non-inflammable
- Excellent dielectric properties



SF₆ gas molecule:

SF₆ consists of fluorine and sulphur. Six fluorinated atoms and one sulphur atom.

SF₆ gas in energy distribution

Thanks to its dielectric strength and excellent insulating properties SF₆ has been used as an insulating gas for medium and high voltage components for many years. Its excellent arc quenching properties (100 times faster than air) make it suitable as a proven medium in encapsulated medium and high voltage switchgear for decades.

The use of SF₆ gas allows more compact and material saving switchgear design combined with higher switching capacity and plant security.

Use in other sectors of industry

Moreover, SF₆ gas is also used in other industries such as semi-conductor industry, in display and micro-technology where it mainly serves as etching gas for the production of ultra-fine structures, the so-called "wafers".

In medical technology sulphur hexafluoride is for example used for ultrasonic testing and in ophthalmology. SF₆ is also used in X-ray equipment, radar systems and particle accelerators.

SF₆ recovery and re-use

Although SF₆ is an excellent insulating and quenching medium it is very important to know that:

- SF₆ is a fluorinated gas (F gas) with the highest global warming potential.
- It is one of the six gases subject to monitoring under the Kyoto protocol.
- Relating to the greenhouse effect, 1 kg SF₆ corresponds to a GWP value more than 22,800 times higher than of 1 kg CO₂.

Therefore SF₆ has to be used in closed systems in order to avoid emissions. This is exactly where our core competence - as the world wide leading manufacturer of emission-free gas handling products for medium and high voltage switchgear - lies.

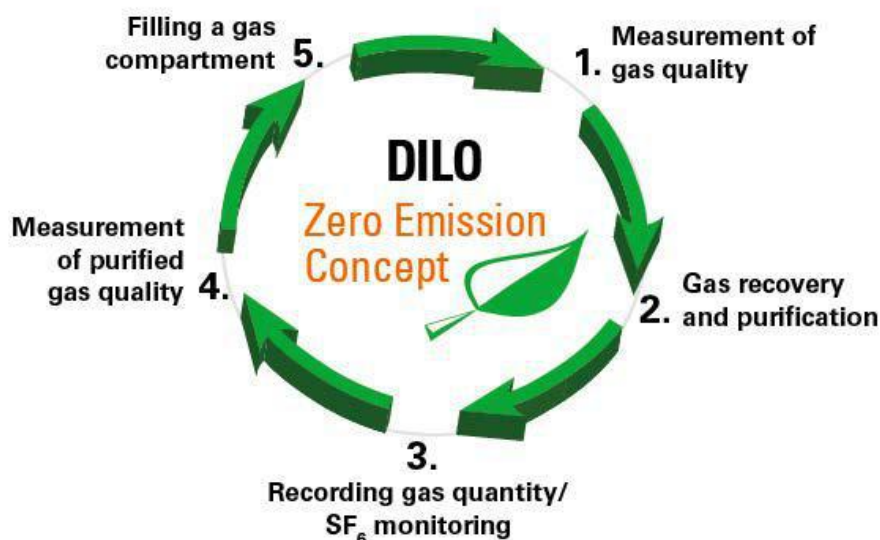
Our customers include renowned companies in the field of energy production and distribution.

Zero emissions and maximum gas re-use is our goal

Our philosophy is based on "Zero emission" and "Maximum gas reuse". Thus we pursue three central claims:

- Environmental protection
- Low running costs
- Compliance with legal regulations

Therefore we have created our "Zero Emission Concept" which defines a technological closed cycle to cover all gas handling processes with high reliability and without any emissions.



For this purpose, high-tech devices and equipment with the best efficiency are available.

In addition to innovative product solutions, we also offer comprehensive and product combined services, generating considerable added value for our customers. This is the reason why switchgear manufacturers and utility companies all over the world have been confident in DILO as a brand for decades.

International regulations and guidelines

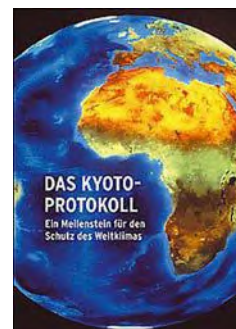
Nowadays, sustainable development and reduction of environmental influences are major topics in the energy industry. Manufacturers of high voltage plants as well as the end users equally admit their responsibility for the whole life time cycle of a plant - from construction until shutdown.

Summary on the most important guidelines:

■ Kyoto protocol / Paris Convention

SF₆ gas is listed in the Kyoto protocol as one the six greenhouse gases subject to monitoring. SF₆ has to be used in closed systems in order to avoid emissions. 194 member states agreed to extend the Kyoto protocol until 2020 with the aim of reducing the emission of greenhouse gases.

The Paris Convention agreed to reduce climate-damaging greenhouses gases under the United Nations Framework Convention on Climate Change (UNFCCC) as of 2020. 195 member states negotiated and adopted this agreement on the twenty-first session of the Conference of the Parties under the framework convention on climate change in Paris on 12 December 2015.



■ IEC 62271-4 directive

This directive stipulates reclaiming the SF₆ gas down to a final vacuum of < 20 mbar. **The IEC requirements are exceeded by far when using DILO devices as DILO service carts enable a final vacuum of < 1 mbar depending on the type of device.**



■ IEC 60480 guideline

This guideline stipulates the limit values for the re-use of SF₆ gas in medium and high voltage switchgear.

Limit values in accordance with the IEC 60480 guideline

Contamination	Specification
Air and / or CF ₄	< 3 Vol.-%
H ₂ O	95 mg / kg (ppm _w)*
Mineral oil	10 mg / kg (ppm _w)
Total amount of reactive, gaseous decomposition products	50 µl / l (ppm _v) total or 12 µl / l (ppm _v) for (SO ₂ + SOF ₂) or 25 µl / l (ppm _v) HF

*corresponds to -23 °C measured at ambient temperature on equipment under a pressure of < 2 bar_{abs} (medium voltage)

Contamination	Specification
Air and / or CF ₄	< 3 Vol.-%
H ₂ O	25 mg / kg (ppm _w)*
Mineral oil	10 mg / kg (ppm _w)
Total amount of reactive, gaseous decomposition products	50 µl / l (ppm _v) total or 12 µl / l (ppm _v) for (SO ₂ + SOF ₂) or 25 µl / l (ppm _v) HF

*corresponds to -36 °C measured at ambient temperature on equipment under a pressure of > 2 bar_{abs} (high voltage)

International regulations and guidelines

■ European guidelines and directives

The European Union issued further directives that aim to reduce or avoid emissions of fluorinated greenhouse gases, SF₆ gas included.



■ New F-gas regulation (EU) 517/2014

The current F-gas regulation (EU) 517/2014, valid as of 1 January 2015, shall replace the former F-gas regulation 842/2006. The new regulation shall be binding and directly applicable in all EU member states. It contains extended obligations which are relevant for switchgear manufacturers, maintenance companies and facility operators alike. The regulation still aims at the prevention of emissions.

The DILO delivery program comprises products and services which will support you in effectively implementing the current directive.

■ Certification in accordance with the (EU) 517/2014 F-gas regulation and (EU) 2015/2066 regulation

Article 10 of the new regulation (EU) no. 517/2014 refers to existing requirements and states that existing certificates and training attestations issued in accordance with regulation no. 842/2006 shall remain valid, according to the conditions under which they were originally issued. The minimum requirements for the certification of personnel are laid down in regulation (EU) 2015/2066.

Personnel carrying out gas handling works (such as filling, measuring and reclaiming of SF₆) shall still be certified.

DILO is an accredited certification company and is authorized to carry out training for the acquisition of the permission to carry out the recovery of SF₆ gas in accordance with this regulation. For more detailed information on our two day training courses at our premises we would be very pleased to provide you with our training leaflet.

■ Reporting in accordance with F-gas regulation (EU) 517/2014 and regulation (EU) 1191/2014

Article 19 of the new regulation (EU) no. 517/2014 stipulates that the manufacturers of SF₆ gas insulated switchgear shall report on the use of SF₆ gas to the European Commission by 31 March 2015 and every year thereafter. Placing 500 tons of CO₂ equivalents (approx. 22 kg SF₆) or more contained with their products on the market per year the manufacturer shall report to the European Commission the quantity of SF₆ contained in each product category.

For the registration of SF₆ gas consumption and its stock management, DILO offers different devices and the corresponding software (see the "devices for SF₆ gas monitoring" paragraph). Furthermore, the used SF₆ gas can be prepared. You will find more detailed information in our "Purification and preparation of SF₆ gas mixtures" chapter.

In addition, a voluntary self-commitment for SF₆ in the energy technology sector has been in force in Germany since 1998 signed by leading companies and associations in the energy sector, updated in 2005. Data processing and reporting commitment are regulated within it.

SF₆ gas refilling and evacuating devices



For evacuation of air and filling of gas compartments with SF₆ gas DILO offers a wide range of gas refilling devices, evacuating devices and mobile vacuum pumps to simplify practical handling.

■ SF₆ gas refilling and evacuating devices

■ 3-393-R001 SF ₆ gas refilling device	
■ 3-393-R002 SF ₆ gas refilling device	
■ 3-393-R115 SF ₆ gas refilling device	10 – 11
■ 3-001-R001 SF ₆ gas refilling device	
■ 3-001-R002 SF ₆ gas refilling device	12 – 13
■ 3-001-R021 SF ₆ gas refilling device	14 – 15
■ 3-001-4-R002 Evacuating and refilling device	
■ 3-001-4-R022 Evacuating and refilling device	16 – 18
■ 3-001-4-R122 Evacuating and refilling device	
■ B190R11 CommGuard Web	19 – 20
■ B046R03 Mobile vacuum pump unit	21 – 22
■ B046R20 Mobile vacuum pump unit	23 – 24
■ Z300R11 Mobile vacuum pump unit	
■ Z300R12 Mobile vacuum pump unit	25 – 26

3-393-R001 / R002 / R115

SF₆ gas refilling device

For reliable refilling of SF₆ gas by overpressure

3-393-R001

SF₆ gas refilling device for high voltage

Portable with rubber hose and couplings DN8 and DN20, Pressure range 0 up to 10 bar

3-393-R002

SF₆ gas refilling device for high voltage

Portable **in a case** with rubber hose and couplings DN8 and DN20, Pressure range 0 up to 10 bar

3-393-R115

SF₆ gas refilling device for medium voltage

Portable **in a case** with rubber hose and couplings DN8 und DN6, Pressure range 0 up to 2,5 bar

The handy devices allow filling of electrical equipment with SF₆ gas directly from the bottle by overpressure. The primary gauge of the pressure reducer displays the bottle pressure in bar, the secondary gauge indicates the desired filling pressure to be set easily by means of the handle. The bottle pressure can be reduced to the desired filling pressure by the integrated pressure reducer.



- Self-closing couplings for emission-free gas handling
- Available as accessories for the world's most commonly used bottle connections

3-393-R001 / 3-393-R002 / 3-393-R115

SF₆ gas refilling device

Technical data:

Case dimensions: L 500 mm, W 420 mm, H 180 mm
Weight: 7.5 kg

Standard equipment for 3-393-R001 and 3-393-R002

Pressure reducer for SF ₆ gas with W 21.8 x 1/14" thread
5 m long hose DN8
DILO coupling tongue parts DN8 and DN20
Gauge indication in bar
2 operating manuals in 3 languages (German / English / French)
Transport case (only for 3-393-R002)

Standard equipment for 3-393-R115

Pressure reducer for SF ₆ gas with W 21.8 x 1/14" thread
5 m long hose DN8
DILO coupling tongue parts DN8 and DN6
Gauge indication in bar
2 operating manuals in 3 languages (German / English / French)
Transport case

Optional accessories at an extra charge:

SF ₆ bottle connection with 0.96" Whitworth left-handed thread	3-245-R001 P
English SF ₆ bottle connection with G 5/8 thread	3-245-R002 P
SF ₆ bottle connection with G 5/8 thread	3-643-R001 P
Additional operating manual on CD-ROM	6-0004-R213

Packing:

Packing for 3-393-R001	3-948-R006
Packing for 3-393-R002 and 3-393-R115	05-1990-R003

Note:

Other versions are available on request.

3-001-R001 / R002

SF₆ gas refilling device

For reliable refilling of SF₆ gas by overpressure

3-001-R001

SF₆ gas refilling device

Mobile as cylinder cart with **wire-braided hoses**

3-001-R002

SF₆ gas refilling device

Mobile as cylinder cart with **rubber hoses**

Refilling device as cylinder cart for comfortable on board carrying of a gas bottle. The primary gauge of the pressure reducer displays the bottle pressure in bar, psi and kPa, the secondary gauge indicates the desired filling pressure to be set easily by means of the handle. The bottle pressure can be reduced to the desired filling pressure by the integrated pressure reducer. During the refilling process emissions are avoided by self-closing couplings.



- Stable frame
- Available as accessories for the world's most commonly used bottle connections
- Hose reel
- Self-closing couplings prevent emissions
- Change of couplings feasible without gas loss

3-001-R001 / 3-001-R002

SF₆ gas refilling device

Technical data:

Dimensions: L 480 mm, W 540 mm, H 1,360 mm
Weight: 30 kg

Standard equipment for both versions:

SF ₆ bottle connection W 21.8 x 1/14"
Ball valve with hand wheel
6 m long hose DN8
Pressure reducer for SF ₆ (0 up to 10 bar), indication in bar / psi / kPa
DILO coupling tongue parts DN8 and DN20
Paint: orange (RAL 2004)
2 operating manuals in German, English or French

Optional accessories at an extra charge:

American SF ₆ bottle connection with 0.96" Whitworth left-handed thread	3-334-R002 P
Chinese SF ₆ bottle connection with G 5/8 thread	3-643-R002 P
English SF ₆ bottle connection with G 5/8 thread	3-245-R004 P
Additional operating manual on CD-ROM	6-0004-R213

Packing:

Packing for 3-001-R001 / 3-001-R002	3-262-R001-C
-------------------------------------	--------------

3-001-R021

SF₆ gas refilling device

For refilling switchgear with SF₆ gas by overpressure

3-001-R021

SF₆ gas refilling device with electronic weighing scales 0 - 120 kg

Mobile as cylinder cart with **wire-braided hoses**

Refilling device as cylinder cart for comfortable on board carrying of a gas bottle. The primary gauge of the pressure reducer displays the bottle pressure in bar, psi and kPa. The secondary gauge indicates the desired filling pressure to be set easily by means of the handle. The bottle pressure can be reduced to the desired filling pressure by the integrated pressure reducer. Emissions during the refilling process are avoided by self-closing couplings.

The weight of the gas to be refilled can be registered easily by means of integrated weighing scales. The weight is indicated on the illuminated display which switches off automatically if the scales are not used for a certain time. Thanks to the tare function high precision quantification of gas inputs and outputs is possible.



- Stable frame
- Accuracy of the weighing scales ± 20 g, 10 g increments
- Integrated serial interface for data exchange or monitoring
- No emissions by self-closing couplings
- Available as accessories for the world's most commonly used bottle connections
- Hose reel
- Couplings can be exchanged without any gas loss

3-001-R021

SF₆ gas refilling device with electronic weighing scales 0 - 120 kg

Technical data:

Dimensions: L 720 mm, W 570 mm, H 1,360 mm
Weight: 40 kg
Weighing range: 0 - 120 kg with tare function / accuracy: ± 20g
Digital display with internal battery (IP65)
Integrated serial interface for data exchange or monitoring
Weight indication reversible from kg to lbs
Power supply: internal battery (12 V / 2.5 Ah) with battery charger / running time in continuous operation up to 20 hours
Protection class: IP65
Operating temperature: -10 to +40 °C

Standard equipment:

SF ₆ bottle connection W 21.8 x 1/14"
Ball valve with hand wheel
6 m long hose DN8
Pressure reducer for SF ₆ (0 up to 10 bar), indication in bar / psi / kPa
DILOR coupling tongue parts DN8 and DN20
Paint: orange (RAL 2004)
2 operating manuals in German, English or French

Optional accessories at an extra charge:

American SF ₆ bottle connection with 0.96" Whitworth left-handed thread	3-334-R002 P
Chinese SF ₆ bottle connection with G 5/8 thread	3-643-R002 P
English SF ₆ bottle connection with G 5/8 thread	3-245-R004 P
4 m long cable with M12 plug connectors for serial data exchange	05-1602-R304
Additional operating manual on CD-ROM	6-0004-R213

Packing:

Packing for 3-001-R021	3-262-R006-C
------------------------	---------------------

3-001-4-R002 / R022 / R122

Evacuating and refilling device

For evacuation of air and refilling of gas compartments from SF₆ gas bottles by overpressure

3-001-4-R002

Evacuating and refilling device

Mobile as cylinder cart

3-001-4-R022

Evacuating and refilling device with electronic weighing scales 0 - 120 kg

Mobile as cylinder cart

3-001-4-R122

Evacuating and refilling device with electronic weighing scales 0 - 150 kg

Mobile as cylinder cart

In practice the device covers two important functions. The integrated vacuum pump is the core component of the device. This vacuum pump evacuates the air down to < 1 mbar so that no air/gas mixture is produced during the subsequent filling process. The well proven DILO coupling principle ensures safe handling without emission.

Using the 3-001-4-R022 version, the filling weight can be registered comfortably by means of a weighing scale. The weight is indicated on the illuminated display which switches off automatically if the scales are not used for a certain time. Thanks to the tare function high precision quantification of gas inputs and outputs is possible.



- Stable frame
- Accuracy of the weighing scales ± 20 g (± 50 g only for 3-001-4-R122), 10 g increments
- Integrated serial interface for data exchange or monitoring
- No emissions by self-closing couplings
- Available as accessories for the world's most commonly used bottle connections
- Hose reel
- Couplings can be exchanged without any gas loss

3-001-4-R002 / 3-001-4-R022 / R122

Evacuating and refilling device

Technical data 3-001-4-R002:

Dimensions: L 540 mm, W 570 mm, H 1,360 mm
Weight: 63 kg
Operating voltage: 220 - 240 V / 50 - 60 Hz alternating current

Technical data 3-001-4-R022:

Dimensions: L 720 mm, W 570 mm, H 1,510 mm
Weight: 73 kg
Operating voltage: 220 - 240 V / 50 - 60 Hz alternating current
Weighing range: 0 - 120 kg with tare function / accuracy: ± 20 g (only for 3-001-4-R022)
Weighing range: 0 - 150 kg with tare function / accuracy: ± 50 g (only for 3-001-4-R122)
Digital display with internal battery (IP65)
Integrated serial interface for data exchange or monitoring
Weight indication reversible from kg to lbs
Power supply: internal battery (12 V / 2.5 Ah) with battery charger / running time in continuous operation up to 20 hours
Protection class: IP65
Operating temperature: -10 to +40 °C

Standard equipment:

16 m ³ /h vacuum pump for air, final vacuum < 1 mbar
Ball valve with hand wheel
Gauge 0 to -1,200 mbar
Two 6 m long wire-braided hoses DN8
DILO coupling tongue parts DN8 and DN20
SF ₆ bottle connection W 21.8 x 1/14"
Pressure reducer for SF ₆ (0 up to 10 bar), indication in bar / psi / kPa
Paint: orange (RAL 2004)
Electrical connecting cable 3 m
2 operating manuals in German, English or French

Optional equipment (mounted) at an extra charge:

Additional price for electrical special voltage 100 V / 50 - 60 Hz or 110 - 120 V / 60 Hz	6-0005-R030
Additional price for electrical special voltage 127 V / 50 Hz or 200 V / 50 - 60 Hz	6-0005-R138

Optional accessories at an extra charge:

American SF ₆ bottle connection with 0.96" Whitworth left-handed thread	3-334-R002 P
Chinese SF ₆ bottle connection with G 5/8 thread	3-643-R002 P
English SF ₆ bottle connection with G 5/8 thread	3-245-R004 P
4 m long cable with M12 plug connectors for serial data exchange	05-1602-R304
Electrical connecting cable 3 x 1.5 AWG 13 (available lengths 5 - 50 m)	6-1053-R001
Additional operating manual on CD-ROM	6-0004-R213

3-001-4-R002 / R022

Evacuating and refilling device

3-001-4-R002 / 3-001-4-R022 R122

Evacuating and refilling device

Spare parts kit:

Annual maintenance package for vacuum pump	6-1048-R111
--	--------------------

Packing:

Packing for 3-001-4-R002	3-262-R001-C
Packing for 3-001-4-R022 / R122	3-262-R006-C

B190R11

CommGuard Web

For the safe filling and refilling of porcelain insulators in outdoor switchgear

B190R11

Remote commissioning unit

Finest hairline cracks may occur on porcelain insulators for circuit breakers or other SF₆ insulated electrical equipment such as measuring or current transformers during transportation or as a result of material stress. Filling the gas compartment with SF₆ may lead to dangerous bursting of the insulator.

Thanks to the "CommGuard Web" filling unit it is now possible, for the very first time, to fill porcelain insulators in a controlled and safe way from a distance of up to 100 m. This unit enables the operator to control and monitor the fully automated filling process using a smartphone, tablet or laptop from outside the danger zone.

The device is equipped with an external temperature sensor and fills the gas compartment to a constant gas density. The temperature-compensated filling pressure is thus achieved with a precision of ± 50 mbar. Furthermore, there is the option of connecting DILOR weighing scales to the unit and the gas quantity filled in can be precisely recorded (e.g. K091R67, 3-001-R021 ± 20 g).

Different types of gas compartments can be added and recalled in the data base. Data recording completes the functions of the compact unit and sets new quality standards.



Safe and controlled filling of porcelain insulators by means of the "CommGuard Web" unit

- Robust and light portable unit
- Simple operation using smartphone, tablet or laptop via WLAN
- Visual and acoustic signalling of system conditions on site
- Temperature compensation of the filling pressure
- Recording of the SF₆ weight
- Data connection via FTP interface

B190R11**CommGuard Web**

B190R11

Remote commissioning unit**Technical data:**

Dimensions: W 355 mm, H 165 mm, D 290 mm
Weight: 6.5 kg
Operating temperature: 0 to 50 °C
Pressure range: max. 10 bar absolute
Max. WLAN range: up to 100 m depending on local conditions
Measurement accuracy: pressure ± 0.05 bar
Operating voltage: 110 - 240 V / 50 - 60 Hz alternating current

Standard equipment:

DILO couplings DN8 for storage cylinders and gas compartments
Gas compartment temperature recording: 0 to 50 °C
Weight recording via easy connection for WE100 scales (e.g. K091R67, 3-001-R021)
2 operating manuals in German or English

Optional accessories at an extra charge:

SF ₆ gas refilling device (for connection to storage cylinders)	3-393-R...
2 m long rubber hose DN8 with DILO coupling tongue part DN8 on both ends	6-1042-R020
Detached WLAN antenna with magnetic base	05-1850-R001
4 m long cable with M12 connectors for serial data exchange with WE100 scales	05-1602-R304
Additional operating manual on CD-ROM	6-0004-R213

Packing:

Packing for B190R11	05-1990-R003
---------------------	---------------------

B046R03 / R13

Mobile vacuum pump unit

For evacuation of air or nitrogen

B046R03

Mobile vacuum pump unit

B046R13

Mobile vacuum pump unit with solenoid valve instead of ball valve

This version is equipped with a solenoid valve instead of a ball valve. Therefore, operating errors are avoided since the valve is closed automatically in case of function end or interruption of circuit.

The mobile vacuum pump unit is convincing by its easy handling. The unit serves for evacuation of air or nitrogen from switchgear. The 40 m³/h vacuum pump enables a final vacuum of < 1 mbar. Thus it is guaranteed that no air / gas mixture is generated and the good insulation properties of SF₆ are retained.



- Steerable and fixing rollers allow comfortable transportation
- Use of self-closing couplings DN20
- Different performances are available (see options)
- Adapters for other nominal widths are available
- Protection of the vacuum pump against overpressure by a solenoid valve
- Digital vacuum indication in mbar

B046R03 / R13**Mobile vacuum pump unit**

B046R03 / B046R13

Mobile vacuum pump unit**Technical data for vacuum pump 40 m³/h, final vacuum < 1 mbar:**

Dimensions: L 910 mm, W 535 mm, H 1,075 mm
Weight: 115 kg
Operating voltage: 208 - 240 V / 380 - 460 V / 50 - 60 Hz 3-phase current

Standard equipment:

40 m ³ /h vacuum pump for air, final vacuum < 1 mbar
Digital vacuum indication in mbar
Ball valve DN20
5 m long hose DN20
DILO coupling tongue part DN20
Electric control
Fixing and steerable rollers
Different wrenches
Paint: orange (RAL 2004)
2 operating manuals in German, English or French

Optional equipment (mounted) at an extra charge:

Additional price for electrical special voltage 208 - 240 V / 50 Hz 3-phase current (40 m ³ /h, < 1 mbar)	6-0005-R039
63 m ³ /h vacuum pump, final vacuum < 1mbar, 3-phase current (208 - 240 V / 60 Hz, 380 - 460 V / 50 - 60 Hz)	6-0005-R050
63 m ³ /h vacuum pump, final vacuum < 1mbar, 3-phase current (208 - 240 V / 50 Hz)	6-0005-R167
100 m ³ /h vacuum pump, final vacuum < 1mbar, 3-phase current (208 - 240 V / 60 Hz, 380 - 460 V / 50 - 60 Hz)	6-0005-R051
100 m ³ /h vacuum pump, final vacuum < 1mbar, 3-phase current (208 - 240 V / 50 Hz)	6-0005-R168
Two-stage vacuum pump with exhaust filter, type RH0040, final vacuum 0.0067 mbar Nominal suction capacity at 50 Hz - 33 m ³ /h, at 60 Hz - 39 m ³ /h, Three-phase current (208-240 V / 50-60 Hz, 380-460 V / 50-60 Hz)	6-0005-R169
Two-stage vacuum pump with exhaust filter, type RH0060, final vacuum 0.0067 mbar Nominal suction capacity at 50 Hz - 55 m ³ /h, at 60 Hz - 65 m ³ /h, Three-phase current (208-240 V / 50-60 Hz, 380 -460 V / 50-60 Hz)	6-0005-R170
Other operating voltages are available on request	

Optional accessories at an extra charge:

SF ₆ gas refilling device	3-393-R001
Frame with crane eyelets and plastic cover	B089R04
Electrical connecting cable 5 x 2.5 AWG 13 (available lengths 5 - 30 m)	6-1053-R002
Additional operating manual on CD-ROM	6-0004-R213

Spare parts kits:

Annual maintenance package for standard vacuum pump (40 m ³)	6-1048-R112
Annual maintenance package for 6-0005-R050 / R051 vacuum pump (63 / 100 m ³)	6-1048-R113
Annual maintenance package for two-stage 6-0005-R169 vacuum pump (40 m ³)	6-1048-R115
Annual maintenance package for two-stage 6-0005-R170 vacuum pump (60 m ³)	6-1048-R116

Packing:

Packing for B046R03 / B046R13	3-748-R001-C
-------------------------------	---------------------

B046R20

Mobile vacuum pump unit

For evacuation of air or nitrogen

This vacuum pump unit is "powerful" - its nominal suction capacity is 200 m³/h at 50 Hz for quick and reliable evacuation of air to a final vacuum of 1 mbar. This unit is particularly suitable for the evacuation of large gas compartments.

Two coupling connections (DN20 and DN40) allow the evacuation of two gas compartments at the same time without any manifold that means more efficiency and higher productivity during operation.



- Steerable and fixing rollers allow comfortable transportation
- Use of self-closing couplings DN20 and DN40
- Protection of the vacuum pump against overpressure by a solenoid valve
- Different hose lengths are available as option
- Digital vacuum indication in mbar
- Tool box for hoses and accessories

B046R20**Mobile vacuum pump unit**

B046R20

Mobile vacuum pump unit**Technical data:**

Dimensions: L 1,310 mm, W 780 mm, H 1,140 mm
Weight: 332 kg
Operating voltage: 208 - 240 V / 380 - 460 V / 50 - 60 Hz 3-phase current

Standard equipment:

Vacuum pump for air, nominal suction capacity 200 m ³ /h (at 50 Hz), 240 m ³ /h (at 60 Hz), final vacuum < 1 mbar
Digital vacuum indication in mbar
Solenoid valve
DILO couplings DN20 and DN40
Electric control
Fixing and steerable rollers
Tool box
Different wrenches
Paint: orange (RAL 2004)
2 operating manuals in German, English or French

Optional equipment (mounted) at an extra charge:

Additional price for electrical special voltage	6-0005-R039
---	--------------------

Optional accessories at an extra charge:

5 m long rubber hose DN20 with coupling tongue part DN20 on both ends	6-1017-R050
10 m long rubber hose DN20 with coupling tongue part DN20 on both ends	6-1017-R100
5 m long wire-braided hose DN40 with coupling tongue part DN40 on both ends	6-1076-R050
10 m long wire-braided hose DN40 with coupling tongue part DN40 on both ends	6-1076-R100
5 m long wire-braided hose DN40 with coupling tongue part DN40 on one end and coupling tongue part DN20 on the other end	6-1080-R050
10 m long wire-braided hose DN40 with coupling tongue part DN40 on one end and coupling tongue part DN20 on the other end	6-1080-R100
Frame with crane eyelets and plastic cover	B089R19
Electrical connecting cable 5 x 2.5 AWG 13 for 380 - 600 V (available lengths 5 - 30 m)	6-1053-R002
Electrical connecting cable 5 x 6 AWG 9 for 200 - 240 V (available lengths 5 - 30 m)	6-1053-R003
Additional operating manual on CD-ROM	6-0004-R213

Spare parts kit:

Annual maintenance package for vacuum pump	6-1048-R121
--	--------------------

Packing:

Packing for B046R20	3-748-R017-C
---------------------	---------------------

Z300R11 / R12

Mobile vacuum pump unit

For evacuation of air or nitrogen

Z300R11

Mobile vacuum pump unit

Nominal suction capacity **160 m³/h** vacuum pump

Nominal suction capacity **250 m³/h** Roots pump

Z300R12

Mobile vacuum pump unit

Nominal suction capacity **200 m³/h** vacuum pump

Nominal suction capacity **500 m³/h** Roots pump

This series is very powerful and allows quick evacuation of large gas compartments. A vacuum pump combined with a Roots pump enables to obtain a final vacuum of 2×10^{-2} mbar. Thus not only air but also moisture is removed from the circuit breakers. Therefore the subsequent filling process is prepared perfectly.

Three coupling connections (DN20 and 2 x DN40) allow the evacuation of two gas compartments at the same time without any manifold that means more efficiency and higher productivity during operation.



- Steerable and fixing rollers allow comfortable transportation
- Tool box for hoses and accessories
- Self-closing couplings
- Protection of the vacuum pump against overpressure by a solenoid valve
- Different hose lengths are available as option
- Digital vacuum indication in mbar

Z300R11 / R12

Mobile vacuum pump unit

Z300R11 / Z300R12

Mobile vacuum pump unit

Technical data:

Dimensions: L 1,250 mm, W 800 mm, H 1,500 mm
Weight: 450 kg
Operating voltage: 208 - 240 V / 380 - 460 V / 50 - 60 Hz 3-phase current

Standard equipment:

Roots pump, mounted on a vacuum pump, final vacuum 2×10^{-2} mbar
Solenoid valve DN50
DILO couplings DN20 and 2 x DN40
Digital vacuum indication in mbar
Electric control
Fixing and steerable rollers
Crane eyelets
Tool box for hoses
Different wrenches
Paint: orange (RAL 2004)
2 operating manuals in German, English or French

Optional equipment (mounted) at an extra charge:

Additional price for electrical special voltage	6-0005-R039
---	-------------

Optional accessories at an extra charge:

5 m long rubber hose DN20 with coupling tongue part DN20 on both ends	6-1017-R050
10 m long rubber hose DN20 with coupling tongue part DN20 on both ends	6-1017-R100
5 m long wire-braided hose DN40 with coupling tongue part DN40 on both ends	6-1076-R050
10 m long wire-braided hose DN40 with coupling tongue part DN40 on both ends	6-1076-R100
5 m long wire-braided hose DN40 with coupling tongue part DN40 on one end and coupling tongue part DN20 on the other end	6-1080-R050
10 m long wire-braided hose DN40 with coupling tongue part DN40 on one end and coupling tongue part DN20 on the other end	6-1080-R100
Tarpaulin	K029R55
Electrical connecting cable 5 x 6 AWG 9 for 380 - 600 V (available lengths 5 - 30 m)	6-1053-R003
Electrical connecting cable 5 x 10 AWG 7 for 200 - 240 V (available lengths 5 - 30 m)	6-1053-R005
Additional operating manual on CD-ROM	6-0004-R213

Spare parts kit:

Annual maintenance package for vacuum pump	6-1048-R131
--	-------------

Packing:

Packing for Z300R11 / Z300R12	3-1001-R015-C
-------------------------------	---------------

Note:

Vacuum pump units with larger capacities are available on request.

SF₆ gas service carts



■ SF₆ gas service carts

■ Micro Series	31 – 33
■ Mini Series	35 – 46
■ Piccolo Series	47 – 50
■ Compact Series	51 – 58
■ Economy Series	59 – 65
■ Mega Series	66 – 81

SF₆ gas service carts

Nowadays, most emissions are generated by inadequate SF₆ gas handling. But that can be avoided, since DILO offers emission-free and safe solutions for each individual process step.

All maintenance devices are equipped with **oilfree DILO compressors** to avoid the SF₆ gas from being contaminated by oil residues.

We continually combine the leading technology of our service carts developed with many years of experience with the latest customer or market requirements. No matter whether maintenance works are carried out on medium voltage switchgear, high voltage switchgear or on gas-insulated lines our service carts allow very easy, safe and economic maintenance.

DILO's product range is divided into different series with various performance parameters which are designed to meet the varying requirements in SF₆ gas handling.

Selection of service carts

Our specialists would be pleased to assist you with the selection of the right equipment for your application. No matter whether you are interested in small devices or large equipment DILO products will always give you the best technology, emission-free SF₆ gas handling and utmost economic efficiency.

The following list provides a first overview of our devices indicating the most important selection criteria for initial orientation. For the final selection of devices more detailed information is required.

		Example of calculation: recovery times (Filling pressure p _g 5 bar)				
Model	Volumes recommended	Example of device	Volume	Hose	Final vacuum	Recovery time
Mini modular	< 300 l	B095R12 / B093R30	300 l	DN8, 5 m	< 5 mbar	164 min.
Mini	< 300 l	B143R11	300 l	DN8, 5 m	< 5 mbar	144 min
Piccolo	200 - 800 l	L030R02	600 l	DN20, 5 m	< 1 mbar	145 min
Compact	800 - 1.000 l	B057R03	1,000 l	DN20, 5 m	< 5 mbar	185 min
Compact	800 - 1,000 l	B057R17	1,000 l	DN20, 5 m	< 1 mbar	117 min
Economy	800 - 1,200 l	L057R01	1,000 l	DN20, 5 m	< 1 mbar	117 min
Mega L170	1,000 - 2,000 l	L170R01	2,000 l	DN20, 5 m	< 1 mbar	118 min
Mega L170	1,000 - 2,000 l	L170R01	2,000 l	DN40, 5 m	< 1 mbar	93 min
Mega L600	> 2,000 l	L600R01	3,000 l	DN20, 5 m	< 1 mbar	135 min
Mega L600	> 2,000 l	L600R01	3,000 l	DN40, 5 m	< 1 mbar	72 min

The above mentioned examples of calculation refer to a gas compartment filled with p_g 5 bar. Regarding the Mega service carts with DN40 hose, the end of the hose is reduced to DN20.

Time calculation

Our web-based time calculator is a useful tool considerably facilitating the pre-selection of SF₆ service carts. After entering the maximum SF₆ gas quantity to be recovered and optionally the final recovery vacuum, all suitable devices are promptly displayed. Entry of further details and selection parameters for more precise searches is possible.



Time calculation

DILO service carts with TÜV SÜD certified performance data!

Previously, in the buying process, the nominal output of pumps and compressors was frequently compared to obtain a scale based on technical data. But that is a poor comparison, since a whole SF₆ service cart is greater than the sum of its parts. The efficient functional interaction of all components over a real time period required for the recovery of SF₆ gas, for evacuation of air and refilling of the gas compartment under defined conditions is the critical criterion.

DILO identified this lack from the customer's point of view. **This is why DILO, in addition to equipment safety, had the performance data of its SF₆ service carts approved by TÜV SÜD.** Under the supervision of an expert from TÜV SÜD, the following eight SF₆ service carts (representing the entire product range) were tested:

- B143R11** – Mini Series
- L030R02** – Piccolo Series
- B057R03** – Compact Series
- B057R17** – Compact Series
- L057R01** – Economy Series
- L170R01** – Mega Series
- L400R01** – Mega Series
- L600R..** – Mega Series



To guarantee for a sound and exhaustive comparison, the devices were subjected to the following testing conditions:

- Cold state of the device
- Ambient temperature, approx. 20 °C
- Connection from service cart to vessel: 5 m long wire-braided hose*
- Voltage: 400 V/50 Hz (Type B143R11: 230 V/50 Hz)
- Liquid gas storage

*When using a rubber hose the times are extended slightly.

The characteristic values stated below were determined through the test:

- **Actual recovery time for SF₆ gas**
- **Lead time required for evacuation of air**
- **Time required for filling the gas compartment with SF₆**

Thanks to our performance data confirmed by TÜV SÜD, you can benefit from objective, measurable parameters for the first time when purchasing a SF₆ service cart.

SF₆ gas service carts

The most important functions

DILO service carts allow easy and efficient SF₆ gas handling on SF₆ filled switchgear and equipment with the following functions:

■ Recovery of SF₆ gas

The gas is recovered from the gas compartment of the switchgear down to the desired final vacuum (mostly 1 mbar).

■ Purification and drying

When recovering and filling gas compartments the gas is automatically led in the service cart through dry and particles filters which retain decomposition products, moisture and solid particles effectively. For the reuse of SF₆ gas the limit values in accordance with IEC 60480 are to be observed.

■ Gas storage

When recovering SF₆ from the circuit breaker the gas is stored in gaseous or liquid form by means of a compressor which compresses the gas.

■ Evacuation of air or nitrogen

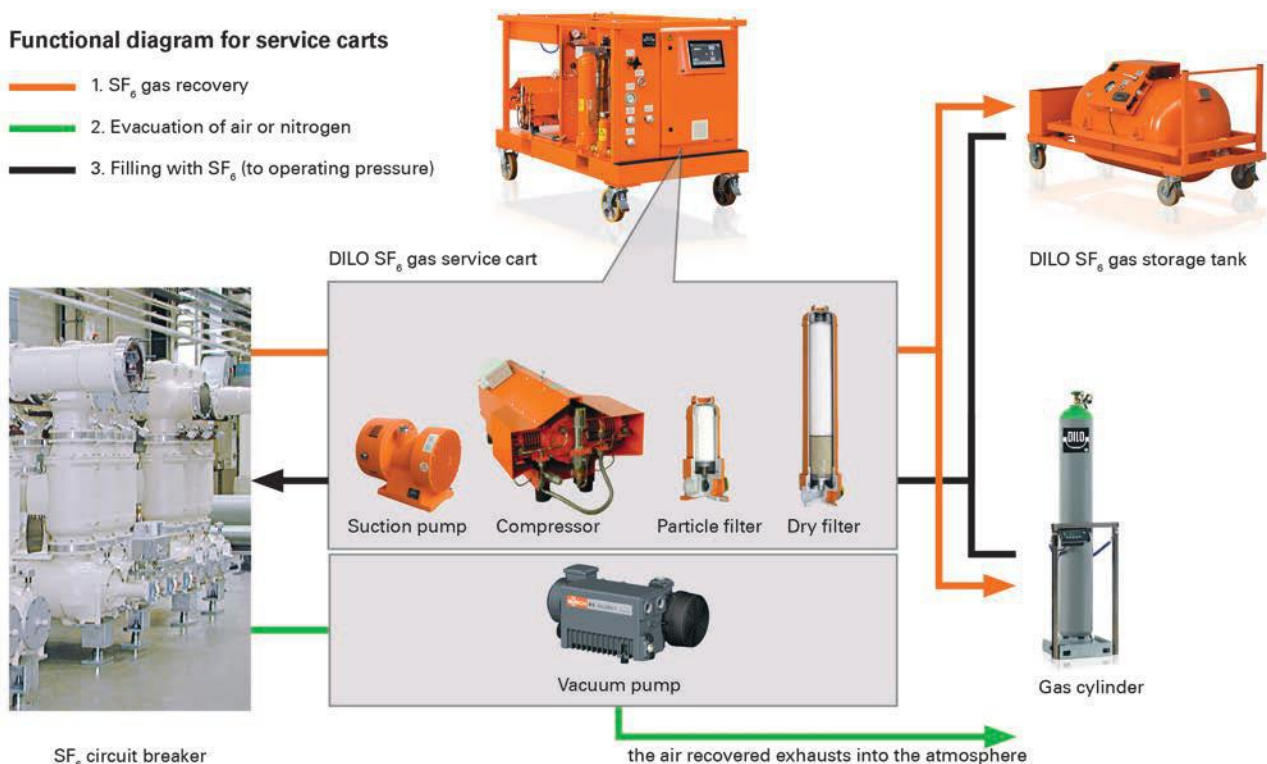
Before filling with SF₆ gas the gas compartments must be evacuated in order to avoid mixing with air. Therefore it is evacuated to < 1 mbar with an integrated vacuum pump.

■ Filling the gas compartments with SF₆

The purified gas is returned into the gas compartment with overpressure or by means of a compressor to the desired operating pressure. The SF₆ stored in liquid form is converted into gaseous form via the evaporator installed in the maintenance device.

Functional diagram for service carts

- 1. SF₆ gas recovery
- 2. Evacuation of air or nitrogen
- 3. Filling with SF₆ (to operating pressure)



Micro Series



■ Micro Series

■ B160R92 Small service unit

32 - 33

B160R92

Micro Series

**Portable service unit
for the handling of small SF₆ gas quantities**

B160R92S16:

Operating voltage: 220 – 240 V/50Hz

B160R92S15:

Operating voltage: 100 – 127 V/50-60 Hz and 220 V/60 Hz

This compact service unit has been specially designed for very small gas quantities and is perfectly suited for applications such as SF₆ gas handling on medical devices, electron microscopes or medium voltage components.

The device includes all functions required for professional and emission-free SF₆ gas handling such as: gas recovery down to < 10 mbar, purification during the recovery and filling process, gaseous storage in an internal vessel or external pressure tank, evacuation of air to < 10 mbar with automatic switch-off as well as automatic filling of the gas compartment until reaching the desired final pressure.

All functions run fully automated and can be easily set on the coloured touch panel.



The B160R92 unit is adapted to the requirements of small gas compartments. The photo shows the device during service works on a medical radiation unit.

- SF₆ recovery down to < 10 mbar
- Gaseous storage of SF₆
- Internal storage tank (capacity: 2 l)
- Menu navigation via 5.7" coloured touch panel
- Pressure and vacuum units can be changed
- Comfortable trolley version

B160R92

Portable service unit

Technical data:

Dimensions: L 625 mm, W 500 mm, H 297 mm
Weight: 30 kg

Standard equipment:

Oilfree DILO compressor (0.9 m ³ /h, final pressure p _e 9 bar)
Small diaphragm compressor (1.2 m ³ /h, final vacuum < 10 mbar)
Menu navigation via 5.7" coloured touch screen
Reversible units for pressure (bar abs./bar rel./psig/kPa/Mpa) and vacuum (mbar/torr)
Internal 2 l storage tank, max. p _e 9 bar (18 NI or 0.1 kg SF ₆)
Dry and Particle filters
Filling pressure reducer
Self-closing input and output miniature coupling
DILO coupling DN8 with hose connection
2 m long connecting hose with self-closing miniature coupling
Transport case (trolley)
1 operating manual (multilingual) on CD-ROM

Optional accessories at an extra charge:

2 m long storage connecting hose with self-closing miniature couplings	6-1116-R020
DILO coupling DN20 with hose connection	6-1161-R012
SF ₆ bottle connection with W 21.8 x 1/14" thread	6-1161-R007
American SF ₆ bottle connection with 0.96" Whitworth left thread	6-1161-R008
English SF ₆ bottle connection with G 5/8 thread	6-1161-R009
1" DIN 477 no. 8 bottle connection for reuse gas bottles	6-1161-R010
Storage bottle (volume: 10 l)	05-1144-R001
Storage bottle (volume: 20 l)	05-1144-R002
Additional operating manuals on CD-ROM	6-0004-R213

Customer-specific adapters for connecting service carts / measuring devices to gas compartments on request.

Spare part kit:

Exchange compressor for B100R20	B100R20-61
---------------------------------	------------

Packing:

Packing for B160R92	3-775-R024-C
Packing for storage bottle (volume: 10 l or 20 l)	3-763-R007-C

Mini Series



■ Mini Series

■ B095R12 Compressor unit	37
■ B093R30 Vacuum compressor unit	38
■ B093R51 Suction pump unit	39
■ B078R09 / R19 Portable vacuum pump unit	40
■ B077R11 Pre filter unit	41
■ B132R01 Operating panel for Mini Series	42 – 43
■ B143R11 Small service cart	44 – 46

Mini Series

For efficient SF₆ gas handling on small gas compartments

The Mini Series is perfectly suited for gas handling of small gas compartments and gas reclaiming to < 5 mbar. This series even exceeds the IEC directives which are in effect and can compete with the more powerful series. We recommend using this series for small gas quantities. Oilfree compressors allow gas handling without contamination by oil residues.



- Liquid gas storage
- Transport case to prevent the device from damage (available as option)
- Different hose lengths (available as option)

For liquid SF₆ storage

B095R12

Compressor unit

Operating voltage: 220 - 240 V / 50 - 60 Hz alternating current

B095R12S15

Compressor unit

Operating voltage: 110 - 127 V / 50 - 60 Hz alternating current



Technical data:

Dimensions: L 455 mm, W 310 mm, H 370 mm

Weight: 28 kg

Standard equipment:

Oilfree DILO compressor (1.6 m³/h [at 50 Hz], 50 bar; 1.9 m³/h [at 60 Hz], 50 bar)

Particle filter

Gauge

Filling pressure reducer

DILO couplings DN8

Electric control

3 m long electrical connecting cable

Paint: orange (RAL 2004)

2 operating manuals in German, English or French

Optional accessories at an extra charge:

Storage connection with 5 meter long rubber hose DN8, DILO coupling DN8, ball valve DN8 and five different SF ₆ bottle connections	6-1041-R050
2 m long rubber hose DN8 with DILO coupling tongue part DN8 on both ends	6-1042-R020
5 m long rubber hose DN8 with DILO coupling tongue part DN8 on both ends	6-1042-R050
2 m long wire-braided hose DN8 with DILO coupling tongue part DN8 on both ends	6-1130-R020
5 m long wire-braided hose DN8 with DILO coupling tongue part DN8 on both ends	6-1130-R050
Additional operating manual on CD-ROM	6-0004-R213
Aluminium transport case for B095R12	3-781-R021

Spare parts kit:

Spare parts kit for compressor	6-1081-R010
--------------------------------	--------------------

Packing:

Packing for B095R12 / B095R12S15	3-748-R003-C
----------------------------------	---------------------

Mini Series

For recovery of SF₆ gas down to 5 mbar in conjunction with the compressor

B093R30

Vacuum compressor unit (3.3 m³/h)

Operating voltage: 220 - 240 V / 50 / 60 Hz alternating current

B093R30S15

Vacuum compressor unit (3.3 m³/h)

Operating voltage: 110 - 127 V / 60 Hz alternating current



Technical data:

Dimensions: Length 510 mm, Width 325 mm, Height 290 mm
Weight: 24 kg

Standard equipment:

3.3 m ³ /h vacuum compressor for SF ₆ , final vacuum during gas recovery < 5 mbar
Solenoid valve
Pressure sensor
Digital vacuum indication (0 - 400 mbar)
DILO couplings DN8
Electric control
2 m long electrical connecting cable
Paint: orange (RAL 2004)
2 operating manuals in German, English or French

Optional accessories at an extra charge:

2 m long DN8 rubber hose with DILO coupling tongue part DN8 on both ends	6-1042-R020
2 m long DN8 wire-braided hose with DILO coupling tongue part DN8 on both ends	6-1130-R020
Additional operating manual on CD-ROM	6-0004-R213
Aluminium transport case	3-781-R017

Spare parts kit:

Spare parts kit for vacuum compressor	05-1647-R100
---------------------------------------	---------------------

Packing:

Packing for B093R30 / B093R30S15	3-748-R003-C
----------------------------------	---------------------

For recovery of SF₆ gas < 1 mbar in conjunction with the compressor

B093R51

Suction pump unit (3 m³/h)

Operating voltage: 220 - 240 V / 50 / 60 Hz alternating current

B093R51S15

Suction pump unit (3 m³/h)

Operating voltage: 110 - 127 V / 60 Hz alternating current



Technical data:

Dimensions: Length 510 mm, Width 325 mm, Height 290 mm
Weight: 24 kg

Standard equipment:

Oilfree suction pump for recovery of SF ₆ (3 m ³ /h, final vacuum < 1 mbar)
Solenoid valve
Pressure sensor
Digital vacuum indication (0 - 400 mbar)
DILO couplings DN8
Electric control
2 m long electrical connecting cable
Paint: orange (RAL 2004)
2 operating manuals in German, English or French

Optional accessories at an extra charge:

2 m long DN8 rubber hose with DILO coupling tongue part DN8 on both ends	6-1042-R020
2 m long DN8 wire-braided hose with DILO coupling tongue part DN8 on both ends	6-1130-R020
Additional operating manual on CD-ROM	6-0004-R213
Aluminium transport case	3-781-R017

Packing:

Packing for B093R51 / B093R51S15	3-748-R003-C
----------------------------------	---------------------

Vacuum pump units - Technical data from page 21

Mini Series

Portable vacuum pump unit for evacuation of air

B078R09 (with ball valve)

Operating voltage: 208 - 240 V / 50 - 60 Hz alternating current

B078R09S15 (with ball valve)

Operating voltage: 110 - 127 V / 60 Hz alternating current

B078R19 (with solenoid valve)

Operating voltage: 208 - 240 V / 50 - 60 Hz alternating current

B078R19S15 (with solenoid valve)

Operating voltage: 110 - 127 V / 60 Hz alternating current



Technical data:

Dimensions: L 435 mm, W 270 mm, H 370 mm
Weight: 29 kg

Standard equipment:

Vacuum pump for evacuation of air 16 m ³ /h, final vacuum < 1 mbar
DILO couplings DN20
Ball valve or solenoid valve DN20
Digital vacuum indication 0 - 400 mbar
3 m long electrical connecting cable
2 operating manuals in German, English or French

Optional accessories at an extra charge:

SF ₆ gas refilling device	3-393-R001
5 m long DN8 rubber hose, DN8 coupling tongue part on one end and DN20 coupling tongue part on the other end	6-1138-R050
5 m long DN20 rubber hose, DN8 coupling tongue part on one end and DN20 coupling tongue part on the other end	6-1120-R050
5 m long DN20 rubber hose, DN20 coupling tongue part on both ends	6-1017-R050
5 m long DN8 wire-braided hose, DN8 coupling tongue part on one end and DN20 coupling tongue part on the other end	6-1173-R050
5 m long DN20 wire-braided hose, DN8 coupling tongue part on one end and DN20 coupling tongue part on the other end PN 40 bar	6-1359-R050
5 m long DN20 wire-braided hose, DN20 coupling tongue part on both ends PN 40 bar	6-1024-R050
Additional operating manual on CD-ROM	6-0004-R213
Aluminium transport case	3-781-R024

Spare parts kit:

Maintenance package for vacuum pump	6-1048-R111
-------------------------------------	-------------

Packing:

Packing for B078R..	3-748-R003-C
---------------------	--------------

For adsorption of moisture, solid and gaseous decomposition products

B077R11

Pre filter unit (pe 10 bar)



Technical data:

Dimensions: L 180 mm, W 105 mm, H 360 mm
Weight: 4.0 kg

Standard equipment:

Dry filter
Particle filter
DILO coupling DN8
2 operating manuals in German, English or French

Optional accessories at an extra charge:

2 m long rubber hose DN8, with DILO coupling tongue part DN8 on both ends	6-1042-R020
2 m long wire-braided hose DN8, with DILO coupling tongue part DN8 on both ends	6-1130-R020
Spare filter cartridge for dry filter	B077-05
Spare filter cartridge for particle filter	B077-06
Additional operating manual on CD-ROM	6-0004-R213
Plastic case for B077R11	3-781-R022

Packing:

Packing for B077R11	3-948-R005
---------------------	-------------------

Mini Series

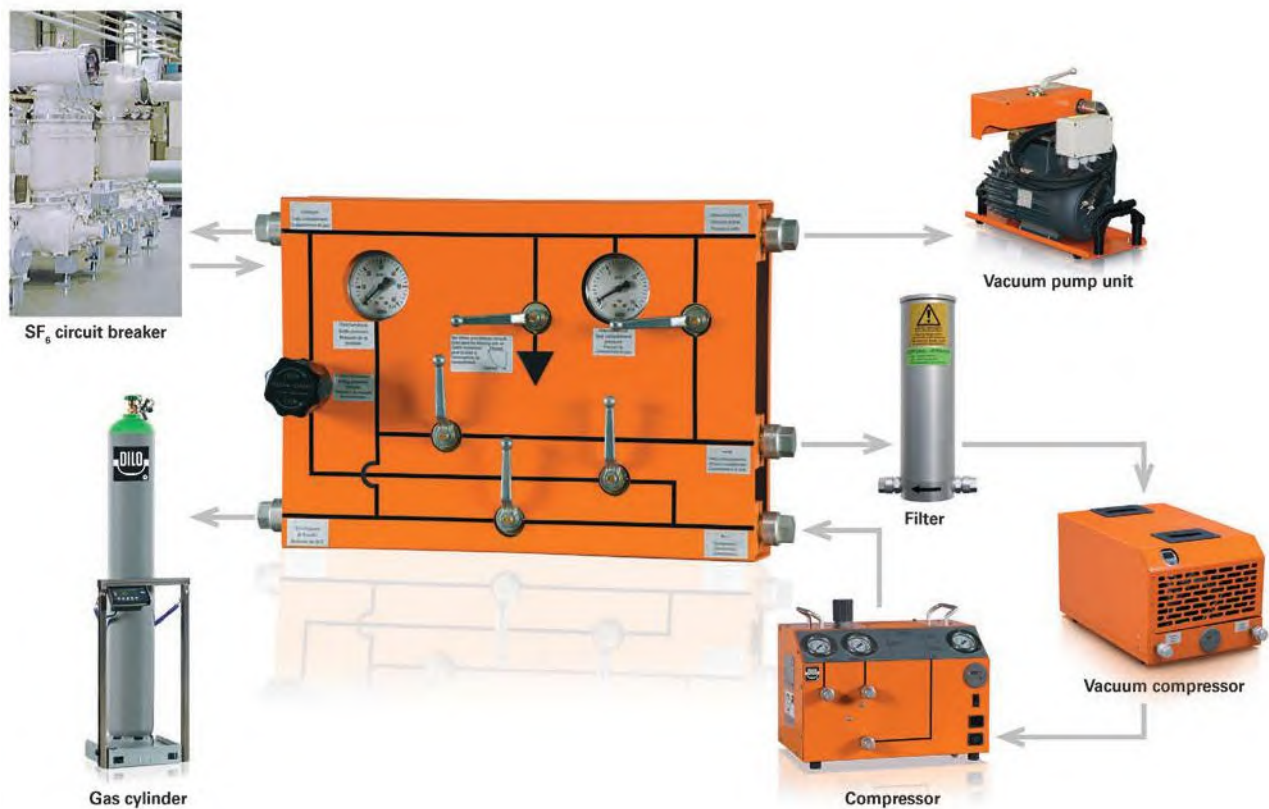
For easy handling of individual components

B132R01

Operating panel for Mini Series

The components of the Mini Series such as vacuum compressor unit, compressor unit and vacuum pump unit can be connected to the operating panel with hoses. Furthermore, an SF₆ bottle and the gas compartment can be connected as well.

Thus, a safe handling is guaranteed. The ball valves can be adjusted in such a way as to carry out the evacuation, filling and gas recovery function without disconnecting the hoses.



- Transport case to prevent the device from damage (available as option)
- Different hose lengths (available as option)

Mini series

B132R01

Operating panel for Mini Series

Technical data:

Dimensions: L 510 mm, W 320 mm, H 140 mm
Weight: 13 kg

Technical data aluminium transport case:

Dimensions: L 600 mm, W 400 mm, H 180 mm
Weight: 6.5 kg

Standard equipment:

Gauge
Ball valves DN8
Filling pressure reducer
DILO couplings DN8
2 operating manuals in German, English or French

Optional accessories at an extra charge:

Storage connection with 5 m long rubber hose DN8, DILO coupling DN8, ball valve DN8 and five different SF ₆ bottle connections	6-1041-R050
2 m long rubber hose DN8 with DILO coupling tongue part DN8 on both ends	6-1042-R020
5 m long rubber hose DN8 with DILO coupling tongue part DN8 on both ends	6-1042-R050
2 m long wire-braided hose DN8 with DILO coupling tongue part DN8 on both ends	6-1130-R020
5 m long wire-braided hose DN8 with DILO coupling tongue part DN8 on both ends	6-1130-R050
Additional operating manual on CD-ROM	6-0004-R213
Aluminium transport case	3-781-R008

Packing:

Packing for B132R01	3-775-R014-C
---------------------	---------------------

Packing for all components of the Mini Series: B095R12 / B093R30 / B078R09 / B078R19 / B077R11 / B132R01:

Packing if all components are packed together	3-748-R010-C
---	---------------------

Mini Series

For efficient SF₆ gas handling on small gas compartments

B143R11

Small service cart

The compact and mobile unit meets all requirements for efficient gas handling in the medium voltage range. Compact design and ergonomic aspects have been the main focus for its construction.

The maintenance unit allows gas recovery down to a final vacuum of < 5 mbar and keeps pace with large devices. All necessary functions are integrated including gas purification via dry filter and particle filters as well as gas storage in liquid form. Operation of the device via colour touch panel sets a new standard in this device category as icons are clearly displayed for a quick overview of the entire process.

Equipped with four solid tired wheels, the unit can be conveniently moved on uneven and gravel ground. The integrated tool box keeps hoses and accessories tidy. Thus the B143R11 is a compact, efficient and user-friendly device complying with the requirements in the MV field.



Device with 20 l storage cylinder (accessories)



B143R11 model with
TÜV SÜD confirmed
performance data

- Device for liquid storage of SF₆ gas
- SF₆ gas recovery down to < 5 mbar
- Semi-automatic control and 3.5" colour touch panel
- DN20 coupling for recovery, evacuation and filling operations
- Digital weighing scales for SF₆ bottles
- Residual gas recovery down to 5 mbar during filter change
- Reduction to transport pressure as integrated special function

B143R11

Small service cart

Technical data:

Dimensions: L 690 mm, W 750 mm, H 1,300 mm
Weight: 180 kg (without storage bottle)

Standard equipment:

Oilfree DILO compressor (1.6 m³/h [at 50 Hz], 50 bar; 1.9 m³/h [at 60 Hz], 50 bar)
Vacuum compressor for SF ₆ gas recovery (3.3 m³/h, final vacuum < 5mbar)
Vacuum pump for air (16 m³/h, final vacuum < 1 mbar)
Dry filter
Particle filter
Pressure reducer
Digital weighing scales for SF ₆ bottles (with automatic switching off), 0 - 120 kg with tare function, accuracy ± 20 g
Indication in bar / mbar, Pa, psi / torr (reversible on the touch panel)
SF ₆ bottle connection with W 21.8 x 1/14" thread
3.0 m long connecting cable
Paint: orange (RAL 2004)
2 operating manuals in German, English or French

Operating voltage:

220 - 240 V / 50 - 60 Hz alternating current
--

Optional accessories at an extra charge:

5 m long rubber hose DN8 with coupling tongue part DN8 on one end and coupling tongue part DN20 on the other end	6-1138-R050
5 m long rubber hose DN20 with coupling tongue part DN20 on one end and coupling tongue part DN8 on the other end	6-1120-R050
5 m long rubber hose DN20 with coupling tongue part DN20 on both ends	6-1017-R050
3 m long storage connection with rubber hose DN8, DILO coupling DN8, ball valve DN8 and 5 different SF ₆ cylinder connections / for carrying out special functions	6-1041-R030
Transition piece DN20 / DN8 / for carrying out special functions	6-1206-R001
5 m long wire braided hose DN8 with coupling tongue part DN8 on one end and coupling tongue part DN20 on the other end	6-1173-R050
5 m long wire braided hose DN20 with coupling tongue part DN20 on one end and coupling tongue part DN8 on the other end PN 40 bar	6-1359-R050
5 m long wire braided hose DN20 with coupling tongue part DN20 on both ends PN 40 bar	6-1024-R050
Storage bottle (volume: 20 l)	05-1144-R002
American SF ₆ bottle connection with 0.96" Whitworth left-hand thread	3-334-R002 P
English SF ₆ bottle connection with G 5/8 thread	3-245-R004 P
SF ₆ bottle connection with G 5/8 thread	3-643-R002 P
SF ₆ reuse cylinder connection with thread G1"	3-851-R002 P
Transformer for special voltage 100 - 127 V	3-829-R010
Tarpaulin	05-0885-R080
Additional operating manual on CD-ROM	6-0004-R213

Mini Series

B143R11

Small service cart**Spare parts kits:**

Annual maintenance package for SF ₆ dry filter, particle filter and vacuum pump (16 m ³ /h)	6-1048-R203
Spare parts kit for compressor	6-1081-R010
Spare parts kit for vacuum compressor	05-1647-R100
Spare part kit (SF ₆ dry and particle filter)	6-1101-R101

Packing:

Packing for B143R11	3-262-R008-C
---------------------	---------------------

Piccolo Series



■ Piccolo Series

■ L030R02 SF₆ gas service cart

48 - 50

L030R02

Piccolo series

For SF₆ gas handling on switchgear with reduced filling quantities

L030R02

SF₆ gas service cart

The L030R02 model of the Piccolo series has been specially designed for modern switchgear with small gas compartments. Due to its compact construction this device fits conveniently onto a euro pallet for transport and is easily manoeuvrable even in the very narrow passage ways of gas insulated switchgear.

The device is operated via a 3.5" colour touch panel where icons are clearly displayed and allow a quick overview of the entire process.

The L030R02 maintenance device is equipped with a compact but high capacity compressor which enables SF₆ reclaiming up to < 1 mbar – a value outperforming current IEC regulations by far. A smart device for "smart grids".



L030R02 model with
TÜV SÜD confirmed
performance data



Optional remote control via
mobile devices

- Device for liquid storage of SF₆ gas
- SF₆ gas recovery down to < 1 mbar
- Semi-automatic control and 3.5" colour touch panel
- Optional remote control via mobile devices
- Reversing switch for direction of rotation
- Digital weighing scales for SF₆ bottles
- Residual gas recovery down to 1 mbar during filter change
- Reduction to transport pressure as integrated special function

L030R02

SF₆ gas service cart

Technical Data:

Dimensions: L 1,200 mm, W 800 mm, H 1,170 mm
Weight: 300 kg

Standard equipment:

B100R40 oilfree DILO compressor (3.2 m ³ /h, [at 50 Hz], 50 bar; 3.8 m ³ /h [at 60 Hz], 50 bar)
Oilfree suction pump for recovery of SF ₆ (3 m ³ /h, final vacuum < 1 mbar)
Vacuum pump for evacuation of air (25 m ³ /h, final vacuum < 1 mbar)
Operation and indication of important process parameter via 3.5" colour touch panel with protective cover
Dry filter
Particle filter
Indication units in bar / mbar, kPa or psi / torr to be selected on the operating panel
Fork lift provisions
Digital weighing scales for SF ₆ bottles (with automatic switching off), 0 - 120 kg with tare function, accuracy ± 20 g
3 m long storage connecting hose DN8 with coupling tongue part DN20
Frame with crane eyelets
Tool box
Fixing and steerable rollers
Different wrenches
Paint: orange (RAL 2004)
2 operating manuals in German, English or French

Operating voltage:

208 - 240 V / 60 Hz 3-phase current	6-030SP-R011
380 - 440 V / 50 Hz or 380 - 480 V / 60 Hz 3-phase current	6-030SP-R012

Optional equipment (mounted) at an extra charge:

WIFI operation via mobile devices such as smartphone, tablet, iPad or laptop	on request
Dew point control for dry filter	6-030TF-R011
Tarpaulin	6-030KA-R001

L030R02**Piccolo series**

L030R02

SF₆ gas service cart**Optional accessories at an extra charge:**

5 m long rubber hose DN20 with coupling tongue part DN20 on both ends	6-1017-R050
10 m long rubber hose DN20 with coupling tongue part DN20 on both ends	6-1017-R100
5 m long wire braided hose DN20 with coupling tongue part DN20 on both ends PN 40 bar	6-1024-R050
10 m long wire braided hose DN20 with coupling tongue part DN20 on both ends PN 40 bar	6-1024-R100
5 m long wire braided hose DN20 with coupling tongue part DN20 on both ends PN 64 bar	6-1365-R050
10 m long wire braided hose DN20 with coupling tongue part DN20 on both ends PN 64 bar	6-1365-R100
Electrical connecting cable 5 x 2.5 AWG 13 for 200 - 600 V (available lengths 5 - 30 m)	6-1053-R002
Additional operating manual on CD-ROM	6-0004-R213

Spare parts kits:

Annual maintenance package for SF ₆ dry filter, particle filter and vacuum pump (25 m ³ /h)	6-1048-R302
Spare parts kit for compressor	6-1081-R020
Spare part kit (SF ₆ dry and particle filter)	6-1101-R111

Packing:

Packing for L030R02	3-751-R013-C
---------------------	---------------------

Compact Series



■ Compact Series

- B057R03 SF₆ gas service cart 53 – 55
- B057R17 SF₆ gas service cart 56 – 57

B057R..

Compact Series

For easy maintenance on high voltage switchgear

B057R..

SF₆ gas service carts

The model series in its robust design offers different versions with vacuum compressor or suction pump for liquid storage. SF₆ gas can be recovered to a final vacuum of < 5 mbar or 1 mbar and exceeds IEC 62271-4 regulations by far.

All devices of this type series are equipped with a semi-automatic control and are easy to operate: The functions are selected by means of a 3-way ball valve and a 7" multi-touch panel. The pressure units (bar/mbar, kPa or psi/torr) can be chosen on the operating panel.

The Compact series is the perfect choice in case a robust and user-friendly device is required for maintenance works on high voltage switchgear.



B057R17

- Devices for storage in gaseous or liquid form
- SF₆ gas recovery down to < 5 mbar or 1 mbar
- Semi-automatic control and 7" operating panel
- Residual gas recovery down to 5 or 1 mbar during filter change
- Reduction to transport pressure as integrated special function
- All versions are available with tanks which can be assembled under the device with CE marking also available with SQL and ASME approval

For the recovery of SF_6 < 5 mbar with liquid storage

B057R03

SF_6 gas service cart



B057R03 model with
TÜV SÜD confirmed
performance data

Technical data:

Dimensions: L 1,850 mm, W 950 mm, H 1,220 mm
Weight: 580 kg

Standard equipment:

TM 5.0 B oilfree DILOR compressor; delivery rate: 6.5 m ³ /h at medium suction pressure with SF_6
Vacuum compressor for recovery of SF_6 (4.8 m ³ /h, final vacuum < 5 mbar)
Vacuum pump for evacuation of air (40 m ³ /h, final vacuum < 1 mbar)
Evaporator
Dry filter
Particle filter
Indication units in bar / mbar, kPa or psi / torr to be selected on the operating panel
Fork lift provisions
Digital weighing scales for SF_6 bottles, 0 - 120 kg with tare function, accuracy ± 20 g
5 m long storage connecting hose DN8 with coupling tongue part DN20
Different wrenches
Paint: orange (RAL 2004)
2 operating manuals in German, English or French

Operating voltage:

208 - 240 V / 60 Hz 3-phase current	6-057SP-R011
380 - 440 V / 50 Hz or 380 - 480 V / 60 Hz 3-phase current	6-057SP-R012

B057R..**Compact Series**

B057R03

SF₆ gas service cart

Mounted on a pressure tank / stowage

**Optional equipment (mounted) at an extra charge:**

	Storage capacity	Length mm	Width mm	Height mm	Net weight	Article No.
300 l / 50 bar pressure tank in accordance with 2014/68/EU regulations and CE marked	280 kg	2,000	950	1,725	1,050 kg	B171R01B057
600 l / 50 bar pressure tank in accordance with 2014/68/EU regulations and CE marked	580 kg	2,000	950	1,935	1,270 kg	B171R02B057
Stowage including 5 SF ₆ -bottles with electronic weight indication and chassis with solid tired wheels	5 x 40 kg	2,500	1,050	2,015	1,320 kg	B175R01B057

B057R03

SF₆ gas service cart

Can be mounted on a trailer with the following accessories:



Technical data:

Dimensions: L 4,500 mm, W 1,700 mm, H 2,280 mm
Max. admissible total weight: 2,000 kg

2 axle car trailer TÜV approved, stowage with weighing device with 5 SF ₆ -bottles, tarpaulin, side and back walls opened by pneumatic springs	B175R11B057
2 axle car trailer TÜV approved, stowage with weighing device without SF ₆ -bottles, tarpaulin, side and back walls opened by pneumatic springs	B175R10B057

Standard equipment for both versions:

2 Supports for hoses and connecting cable
Tool cabinet with 3 drawers
LED lighting

Options for both versions:

Hose reel with 15 m long DN20 hose	K197R100
Pre-filter unit DN20	B007R11

B057R..

Compact Series

For recovery of SF₆ down to < 1 mbar with liquid storage**B057R17****SF₆ gas service cart**

B057R17 model with
TÜV SÜD confirmed
performance data

Technical data:

Dimensions: L 1,850 mm, W 950 mm, H 1,220 mm
--

Weight: 500 kg

Standard equipment:

TM 5.0 B oilfree DILO compressor; delivery rate: 6.5 m ³ /h at medium suction pressure with SF ₆
--

Oilfree suction pump for recovery of SF ₆ (15 m ³ /h, final vacuum < 1 mbar)
--

Vacuum pump for evacuation of air (25 m ³ /h, final vacuum < 1 mbar)

Dry filter

Particle filter

Indication units in bar / mbar, kPa or psi / torr to be selected on the operating panel

Fork lift provisions

Different wrenches

Paint: orange (RAL 2004)

2 operating manuals in German, English or French
--

Operating voltage:

208 - 240 V / 60 Hz 3-phase current	6-057SP-R011
-------------------------------------	--------------

380 - 440 V / 50 Hz or 380 - 480 V / 60 Hz 3-phase current	6-057SP-R012
--	--------------

B057R17

SF₆ gas service cart

Mounted on a pressure tank



When using the B057R17 device type the SF₆ gas is not taken from the storage tank in liquid form!

Optional equipment (mounted) at an extra charge:

Digital weighing scales for SF ₆ bottles, 0 - 120 kg with tare function, accuracy ± 20 g	K091R64
5 m long storage connecting hose DN8 with coupling tongue part DN20	6-1037-R050
Coupling tongue part DN20 with air filter	6-1281-R001

	Storage capacity	Length mm	Width mm	Height mm	Net weight	Article No.
300 l / 50 bar pressure tank in accordance with 2014/68/EU regulations and CE marked	280 kg	2.000	950	1.725	1.050 kg	B171R01XB057
600 l / 50 bar pressure tank in accordance with 2014/68/EU regulations and CE marked	580 kg	2.000	950	1.935	1.270 kg	B171R02XB057

B057R..**Compact Series**

B057R..

SF₆ gas service carts**Optional equipment (mounted) at an extra charge for all service carts of the Compact series:**

Additional price for electrical special voltage 440 - 480 V / 60 Hz 3-phase current	6-057SP-R014
Additional price for electrical special voltage 200 V / 50 - 60 Hz 3-phase current	6-057SP-R017
Additional price for electrical special voltage 210 - 240 V / 50 Hz 3-phase current	6-057SP-R018
Additional price for electrical special voltage 600 V / 60 Hz 3-phase current	6-057SP-R019
Tarpaulin (not for B175R.. trailer)	6-057KA-R001
Tool box	6-057AB-R001
Shelf plate	L057R01G14

Optional accessories at an extra charge for all Compact service carts:

5 m long rubber hose DN20 with coupling tongue part DN20 on both ends	6-1017-R050
7 m long rubber hose DN20 with coupling tongue part DN20 on both ends	6-1017-R070
10 m long rubber hose DN20 with coupling tongue part DN20 on both ends	6-1017-R100
5 m long wire-braided hose DN20 with coupling tongue part DN20 on both ends PN 64 bar	6-1365-R050
7 m long wire-braided hose DN20 with coupling tongue part DN20 on both ends PN 64 bar	6-1365-R070
10 m long wire-braided hose DN20 with coupling tongue part DN20 on both ends PN 64 bar	6-1365-R100
Electrical connecting cable 5 x 6 AWG 9 for 380 - 600 V (available lengths 5 - 30 m)	6-1053-R003
Electrical connecting cable 5 x 10 AWG 7 for 200 - 240 V (available lengths 5 - 30 m)	6-1053-R005
Additional operating manual on CD-ROM	6-0004-R213

Spare parts kits for B057R03:

Annual maintenance package for SF ₆ dry filter, particle filter and vacuum pump	6-1048-R401
Spare parts kit for TM 5.0 B compressor	6-1010-R011
Spare parts kit for vacuum compressor	05-1476-R101
Spare part kit (SF ₆ dry and particle filter)	6-1101-R121

Spare parts kits for B057R17:

Annual maintenance package for SF ₆ dry filter, particle filter and vacuum pump	6-1048-R401
Spare parts kit for TM 5.0 B compressor	6-1010-R011
Spare part kit (SF ₆ dry and particle filter)	6-1101-R121

Packing for all Compact service carts:

Packing for all devices without pressure tank	3-751-R010-C
Packing for devices with 300 l, 600 l pressure tank or stowage and weighing device	3-751-R001-C
Transport pallet for B057R03 mounted on a trailer	3-688-R004-C

Economy Series



■ Economy Series

■ L057R01 SF₆ gas service cart

60 – 65

L057R01**Economy Series****The range for universal applications**

L057R01

SF₆ gas service carts

L057 series is a real all-rounder convincing by its compact design, its user-friendly and automated gas handling. Everything is available: the practical tool box for hoses and accessories as well as the digital weighing scales integrated in the device. Thanks to the state-of-the-art control all functions run automatically and are displayed on a 10" multi-touch screen. A new software with intuitive user navigation makes operation very easy and comfortable. This service cart can optionally be operated via smartphone, tablet or laptop.

Precondition for the construction of this series which allows SF₆ gas recovery down to a final vacuum of < 1 mbar was emission-free gas handling. When using the gastight DILO couplings and connecting systems emissions will have no chance!

The device is equipped with many special functions facilitating the maintenance of the device. In case a filter cartridge has to be exchanged it is possible to recover the SF₆ gas from the filter unit by means of a special function. Afterwards the air can be evacuated.

SF₆ gas handling can be quite easy!



- Devices for liquid storage of SF₆ gas
- SF₆ gas recovery down to < 1 mbar
- Automatic control and high quality capacitive 10" multi-touch panel
- Optional remote control via mobile devices
- Reversing switch for direction of rotation
- Digital weighing scales for SF₆ cylinders
- Residual gas recovery down to 1 mbar during filter change
- Reduction to transport pressure as integrated special function
- All versions are available with tanks which can be assembled under the device with CE marking also available with SQL and ASME approval
- The service carts can be mounted on a trailer

For liquid storage

L057R01

SF₆ gas service cart

Operation, indication of most important process parameters and illustration of selected gas flow on 10" multi-touch panel

Indication units selectable on the touch panel (e. g. bar / mbar/ kg)



L057R01 model with
TÜV SÜD confirmed
performance data



A graphic-based software makes
operation easy and comfortable.

Technical data:

Dimensions: L 1,850 mm, W 950 mm, H 1,220 mm

Weight: 640 kg

L057R01**Economy Series**

L057R01

SF₆ gas service cart**Standard equipment:**

TM 5.0 B oilfree DILO compressor; delivery rate: 6.5 m ³ /h at medium suction pressure with SF ₆
Oilfree suction pump for recovery of SF ₆ (15 m ³ /h, final vacuum < 1 mbar)
Vacuum pump for evacuation of air (40 m ³ /h, final vacuum < 1 mbar)
Operating and indication of the most important process parameters via 10" multi-touch panel with protective cover
Evaporator
Dry filter
Particle filter
Pressure and vacuum units can be set
Digital weighing scales for SF ₆ bottles (with automatic switching off), 0 - 120 kg with tare function, accuracy ± 20 g
5 m long storage connecting hose DN8 with coupling tongue part DN20
Fork lift provision
Frame with crane eyelets
Tool box
Fixing and steerable rollers
Different wrenches
Paint: orange (RAL 2004)
2 operating manuals in German, English or French

Operating voltage for all service carts (3-phase current ranges to be selected):

208 - 240 V / 60 Hz	6-057SP-R011
380 - 440 V / 50 Hz or 380 - 480 V / 60 Hz	6-057SP-R012

L057R01

SF₆ gas service cart

Mounted on a pressure tank / stowage



L057R01 with 300 l pressure tank

Optional equipment (mounted) at an extra charge:

	Storage capacity	Length mm	Width mm	Height mm	Net weight	Article No.
300 l / 50 bar pressure tank in accordance with 2014/68/EU regulations and CE marked with electronic weight indication, fixing and steerable rollers	280 kg	1,850	950	1,725	1,050 kg	B171R01L057
600 l / 50 bar pressure tank in accordance with 2014/68/EU regulations and CE marked with electronic weight indication, fixing and steerable rollers	580 kg	2,000	950	1,935	1,270 kg	B171R02L057
300 l / 50 bar pressure tank in accordance with 2014/68/EU regulations and CE marked with electronic weight indication, chassis with solid tired wheels	280 kg	2,500	1,050	1,835	1,250 kg	B172R01L057
600 l / 50 bar pressure tank in accordance with 2014/68/EU regulations and CE marked with electronic weight indication, chassis with solid tired wheels	580 kg	2,500	1,050	2,015	1,550 kg	B172R02L057
Stowage including 5 SF ₆ -bottles with electronic weight indication, chassis with solid tired wheels	5 x 40 kg	2,500	1,050	2,015	1,320 kg	B175R01L057

L057R01**Economy Series**

L057R01

SF₆ gas service cart

Can be mounted on a trailer with the following accessories:



Device including stowage with weighing device
with 5 SF₆ bottles on a trailer B175R11L057

Technical data:

Dimensions: L 4,500 mm, W 1,700 mm, H 2,280 mm
Max. admissible total weight: 2,000 kg

2 axle car trailer TÜV approved, stowage with weighing device with 5 SF ₆ -bottles, tarpaulin, side and back walls opened by pneumatic springs included	B175R11L057
2 axle car trailer TÜV approved, stowage with weighing device without SF ₆ -bottles, tarpaulin, side and back walls opened by pneumatic springs included	B175R10L057

Standard equipment for both versions:

2 Supports for hoses and connecting cable
Tool cabinet with 3 drawers
LED lighting

Optionen für beide Varianten:

Hose reel with 15 m long DN20 hose	K197R100
Pre-filter unit DN20	B007R11

L057R01

SF₆ gas service carts

Optional equipment (mounted) at an extra charge for all service carts of the Economy series:

Additional price for electrical special voltage 200 V / 50 - 60 Hz 3-phase current	6-057SP-R017
Additional price for electrical special voltage 210 - 240 V / 50 Hz 3-phase current	6-057SP-R018
Additional price for electrical special voltage 600 V / 60 Hz 3-phase current	6-057SP-R019
63 m ³ /h vacuum pump, final vacuum < 1 mbar	6-057VP-R001
100 m ³ /h vacuum pump, final vacuum < 1 mbar	6-057VP-R002
Two-stage vacuum pump with exhaust filter, type RH0040, final vacuum 0.0067 mbar Nominal suction capacity at 50 Hz - 33 m ³ /h, at 60 Hz - 39 m ³ /h	6-057VP-R006
Automatic switch off function (evacuation, filling, recovery of SF ₆) when reaching the corresponding final values	K141R11
Dew point control for dry filter	K129R04
Tarpaulin	6-057KA-R001
Chassis with solid tired wheels Ø 400 mm	6-057FG-R001
Remote control via mobile devices	on request

Optional accessories at an extra charge for all Economy service carts:

5 m long rubber hose DN20 with coupling tongue part DN20 on both ends	6-1017-R050
10 m long rubber hose DN20 with coupling tongue part DN20 on both ends	6-1017-R100
5 m long wire-braided hose DN20 with coupling tongue part DN20 on both ends PN 64 bar	6-1365-R050
10 m long wire-braided hose DN20 with coupling tongue part DN20 on both ends PN 64 bar	6-1365-R100
Electrical connecting cable 5 x 6 AWG 9 for 380 - 600 V (available lengths 5 - 30 m)	6-1053-R003
Electrical connecting cable 5 x 10 AWG 7 for 200 - 240 V (available lengths 5 - 30 m)	6-1053-R005
Additional operating manual on CD-ROM	6-0004-R213

Spare parts kits for L057R01:

Annual maintenance package for L057R01 with standard vacuum pump (40 m ³)	6-1048-R401
Annual maintenance package for L057R01 with 6-057VP-R001 / R002 vacuum pump (63 / 100 m ³)	6-1048-R421
Annual maintenance package for L057R01 with 2-stage 6-057VP-R006 (40 m ³ /h) vacuum pump	6-1048-R423
Spare parts kit for compressor	6-1010-R011
Spare part kit (SF ₆ dry and particle filter)	6-1101-R121

Packing for L057R01:

Packing for L057R01	3-751-R010-C
Packing for L057R01 with 6-057FG-R001 as option (chassis)	3-788-R023-C
Packing for L057R01 with 6-057BL-R001 as option (sheet metal covering)	3-788-R024-C
Packing for L057R01 with pressure tank (steerable and fixing rollers)	3-751-R001-C
Packing for L057R01 with pressure tank (chassis)	3-788-R011-C
Packing for L057R01 with stowage and weighing device	3-788-R011-C
Transport pallet for L057R01 mounted on a trailer	3-688-R004-C

Mega Series



■ Mega Series

- | | |
|--|---------|
| ■ L170R01 SF ₆ gas service cart | 68 – 74 |
| ■ L400R01 SF ₆ gas service cart | 75 – 78 |
| ■ L600R.. SF ₆ gas service cart | 79 – 81 |

L170R01**Mega Series****Maintenance devices for large and extra large gas compartments**

L170R01

SF₆ gas service cart

The L170 service cart has been developed as entry-level model of the Mega Series for the gas handling on large gas compartments. Thanks to the state-of-the-art control all functions run automatically and are displayed on a 10" multi-touch screen. A new software with intuitive user navigation makes operation very easy and comfortable. This service cart can optionally be operated via smartphone, tablet or laptop.

Precondition for the construction of this series which allows SF₆ gas recovery down to < 1 mbar was emission-free gas handling. When using the totally gastight DILO couplings and connecting systems emissions will have no chance! Short gas recovery and evacuating times are obtained by using a coupling DN40.

The L170 series is available with a second DN20 connecting coupling (as option) so that two work steps can be carried out simultaneously. Thus it is possible to evacuate air from a gas compartment while filling SF₆ at the same time or recovering gas from another gas compartment. Multitasking in practice.



- Devices for liquid storage of SF₆ gas
- SF₆ gas recovery down to < 1 mbar
- Automatic control and high quality capacitive 10" multi-touch panel
- Optional remote control via mobile devices
- Reversing switch for direction of rotation
- Digital weighing scales for SF₆ cylinders
- Residual gas recovery down to 1 mbar during filter change
- Reduction to transport pressure as integrated special function
- All versions are available with tanks which can be assembled under the device with CE marking also available with SQL and ASME approval
- The service carts can be mounted on a trailer

For liquid storage

L170R01

SF₆ gas service cart



L170R01 model with
TÜV SÜD confirmed
performance data



Additional DN20 connecting coupling for evacuation and filling or gas recovery (K177R01 option)



A graphic-based software makes operation easy and comfortable.

Technical data:

Dimensions: L 2,250 mm, W 1,050 mm, H 1,220 mm

Weight: 890 kg

L170R01**Mega Series**

L170R01

SF₆ gas service cart**Standard equipment:**

B110R11 oilfree DILO compressor; delivery rate: 19 m ³ /h at medium suction pressure with SF ₆
Oilfree suction pump for recovery of SF ₆ gas(35 m ³ /h, final vacuum < 1 mbar)
Vacuum pump for evacuation of air (63 m ³ /h, final vacuum < 1 mbar)
Operating and indication of the most important process parameters via 10" multi-touch panel with protective cover
DILO couplings DN20 and DN40
Evaporator
Dry filter
Particle filter
Pressure and vacuum units can be set
Digital weighing scales for SF ₆ bottles (with automatic switching off), 0 - 120 kg with tare function, accuracy ± 20 g
5 m long storage connecting hose DN8 with coupling tongue part DN20
Fork lift provision
Frame with crane eyelets
Tool box
Fixing and steerable rollers
Different wrenches
Paint: orange (RAL 2004)
2 operating manuals in German, English or French

Operating voltage for service carts (3-phase current ranges to be selected):

208 - 240 V / 60 Hz	6-170SP-R011
380 - 440 V / 50 Hz	6-170SP-R012
380 - 480 V / 60 Hz	6-170SP-R013

L170R01

SF₆ gas service cart

Mounted on a pressure tank / stowage



L170R01 with 5 SF₆-bottles



L170R01 with 600 l pressure tank

Optional equipment (mounted) at an extra charge:

	Storage capacity	Length mm	Width mm	Height mm	Net weight	Article No.
300 l / 50 bar pressure tank in accordance with 2014/68/EU regulations and CE marked with electronic weight indication, chassis with solid tired wheels	280 kg	2,500	1,050	1,835	1,500 kg	B172R01L170
600 l / 50 bar pressure tank in accordance with 2014/68/EU regulations and CE marked with electronic weight indication, chassis with solid tired wheels	580 kg	2,500	1,050	2,015	1,800 kg	B172R02L170
Stowage including 5 SF ₆ -bottles with electronic weight indication, chassis with solid tired wheels	5 x 40 kg	2,500	1,050	2,015	1,570 kg	B175R01L170

L170R01**Mega Series**

L170R01

SF₆ gas service cart

Can be mounted on a trailer with the following accessories:



Device including stowage with weighing device
with 5 SF₆ bottles on a trailer B175R11L057

Technical data:

Dimensions: L 4,500 mm, W 1,700 mm, H 2,280 mm
Max. admissible total weight: 2,500 kg

2 axle car trailer TÜV approved, stowage with weighing device with 5 SF ₆ -bottles, tarpaulin, side and back walls opened by pneumatic springs included	B175R11L170
2 axle car trailer TÜV approved, stowage with weighing device without SF ₆ -bottles, tarpaulin, side and back walls opened by pneumatic springs included	B175R10L170

Standard equipment for both versions:

2 Supports for hoses and connecting cable
Tool cabinet with 3 drawers
LED lighting

Optionen für beide Varianten:

Hose reel with 15 m long DN20 hose	K197R100
Pre-filter unit DN20	B007R11

L170R01

SF₆ gas service cart

Optional equipment (mounted) at an extra charge for all service carts of the L170R01 series:

Additional price for electrical special voltage 200 V / 50 Hz 3-phase current	6-170SP-R016
Additional price for electrical special voltage 200 V / 60 Hz 3-phase current	6-170SP-R017
Additional price for electrical special voltage 210 - 240 V / 50 Hz 3-phase current	6-170SP-R018
Additional price for electrical special voltage 600 V / 60 Hz 3-phase current	6-170SP-R019
100 m³/h vacuum pump, final vacuum < 1 mbar	6-170VP-R001
200 m³/h vacuum pump, final vacuum < 1 mbar	6-170VP-R002
Two-stage vacuum pump with exhaust filter, type RH0040, final vacuum 0.0067 mbar Nominal suction capacity at 50 Hz - 33 m³/h, at 60 Hz - 39 m³/h	6-170VP-R007
Two-stage vacuum pump with exhaust filter, type RH0060, final vacuum 0.0067 mbar Nominal suction capacity at 50 Hz - 55 m³/h, at 60 Hz - 65 m³/h	6-170VP-R008
Automatic control with switching off of the individual functions (evacuation, filling, recovery of SF ₆) when reaching the corresponding final values	K141R11
Dew point control for dry filter	K129R04
Removable sheet metal cover for complete service cart	6-170BL-R001
Tarpaulin	6-170KA-R001
Chassis with solid tired wheels Ø 400 mm	6-170FG-R001
Additional DN20 coupling for evacuation and gas recovery or filling at the same time (available for 63 m³/h < 1mbar standard vacuum pump)	K177R01
Remote control via mobile devices	on request

Optional accessories at an extra charge for all service carts of the L170R01 series:

5 m long rubber hose DN20 with coupling tongue part DN20 on both ends	6-1017-R050
7 m long rubber hose DN20 with coupling tongue part DN20 on both ends	6-1017-R070
10 m long rubber hose DN20 with coupling tongue part DN20 on both ends	6-1017-R100
5 m long wire braided hose DN20 with coupling tongue part DN20 on both ends PN 64 bar	6-1365-R050
10 m long wire braided hose DN20 with coupling tongue part DN20 on both ends PN 64 bar	6-1365-R100
5 m long wire braided hose DN40 with coupling tongue part DN40 on both ends	6-1076-R050
10 m long wire braided hose DN40 with coupling tongue part DN40 on both ends	6-1076-R100
5 m long wire braided hose DN40 with coupling tongue part DN40 on one end and coupling tongue part DN20 on the other end	6-1080-R050
10 m long wire braided hose DN40 with coupling tongue part DN40 on one end and coupling tongue part DN20 on the other end	6-1080-R100
Triple manifold, coupling DN40 to 3 x coupling DN20 with ball valve	3-718-R006
Coupling tongue part DN40 with transition piece to 2 x DN20 2 rubber hoses DN20 (10 m long) with coupling tongue part DN20	6-1235-R001
Electrical connecting cable 5 x 10 AWG for 380 - 600 V (available lengths 5 - 30 m)	6-1053-R005
Electrical connecting cable 5 x 16 AWG 5 for 200 - 240 V (available lengths 5 - 30 m)	6-1053-R004
Additional operating manual on CD-ROM	6-0004-R213

L170R01**Mega Series**

L170R01

SF₆ gas service cart**Spare parts kits for L170R01:**

Annual maintenance package for L170R01 with standard / 6-170VP-R001 vacuum pump (63 / 100 m ³)	6-1048-R501
Annual maintenance package for L170R01 with 6-170VP-R002 vacuum pump (200 m ³)	6-1048-R502
Annual maintenance package for L157R01 with 2-stage 6-170VP-R007 (60 m ³ /h)	6-1048-R504
Annual maintenance package for L170R01 with 2-stage 6-170VP-R008 (60 m ³ /h)	6-1048-R505
Spare parts kit for compressor	6-1091-R111
Spare part kit (SF ₆ dry and particle filter)	6-1101-R131

Packing for L170R01:

Packing for L170R01	3-788-R010-C
Packing for L170R01 with 6-170FG-R001 as option (chassis)	3-788-R013-C
Packing for L170R01 with 6-170BL-R001 as option (sheet metal covering)	3-788-R024-C
Packing for L170R01 with pressure tank	3-788-R011-C
Packing for L170R01 with stowage and weighing device	3-788-R011-C
Transport pallet for L170R01 mounted on a trailer	3-688-R005-C

L400R01 / L600R..

Mega Series

Maintenance devices for large and extra large gas compartments

L400R01 / L600R..

SF₆ gas service cart

These service carts are our most powerful devices and guarantee quick maintenance of gas compartments. Thanks to the state-of-the-art control all functions run automatically and are displayed on a 10" multi-touch screen. A new software with intuitive user navigation makes operation very easy and comfortable. This service cart can optionally be operated via smartphone, tablet or laptop.

Precondition for the construction of this series which allows SF₆ gas recovery down to a final vacuum of < 1 mbar was emission-free gas handling. When using the gastight DILO couplings and connecting systems emissions will have no chance! Short gas recovery and evacuating times are obtained by using a coupling DN40.

All types are available with additional connecting couplings DN20 and DN40 (as option) for simultaneous operation. Thus it is possible to evacuate air from a gas compartment while filling SF₆ at the same time or recovering gas from another gas compartment. Multitasking in practice.



L600 with sheet metal covering
available as option



- Devices for liquid storage of SF₆ gas
- SF₆ gas recovery down to < 1 mbar
- Automatic control and high quality capacitive 10" multi-touch panel
- Optional remote control via mobile devices
- Reversing switch for direction of rotation
- Digital weighing scales for SF₆ cylinders
- Residual gas recovery down to 1 mbar during filter change
- Reduction to transport pressure as integrated special function
- All versions are available with tanks which can be assembled under the device with CE marking also available with SQL and ASME approval
- The service carts can be mounted on a trailer

L400R01 / L600R..

Mega Series

For liquid storage

L400R01

SF₆ gas service cart



L400R01 / L600R.. model
with TÜV SÜD confirmed
performance data



A graphic-based software makes
operation easy and comfortable.

Technical data:

Dimensions: L 2.600 mm, W 1.400 mm, H 1.500 mm

Weight: L400R01: approx. 1350 kg

L400R01

SF₆ gas service cart

Standard equipment for L400R01:

B200R.. oilfree DILO compressor (40 m ³ /h, 50 bar)
Oilfree suction pump for recovery of SF ₆ (35 m ³ /h, final vacuum < 1 mbar)
Vacuum pump for evacuation of air (63 m ³ /h, final vacuum < 1 mbar)
Operating and indication of the most important process parameters via 10" multi-touch panel with protective cover
DILO couplings DN20 and DN40
Evaporator
Dry filter
Particle filter
Pressure and vacuum units can be set
Digital weighing scales for SF ₆ cylinders (with automatic switch off), 0 - 120 kg with tare function, accuracy ± 20 g
5 m long storage connecting hose DN8 with coupling tongue part DN20
Frame with crane eyelets
Tool box
Fixing and steerable rollers
Different wrenches
Paint: orange (RAL 2004)
2 operating manuals in German, English or French

Operating voltage for all service carts of the L400R01 series (3-phase current ranges to be selected):

380 - 440 V / 50 Hz or 380 - 480 V / 60 Hz	6-400SP-R001
Additional price for electrical special voltage 220 - 240 V / 60 Hz	6-400SP-R002
Additional price for electrical special voltage 220 - 240 V / 50 Hz	on request
Additional price for electrical special voltage 200 V / 50, 60 Hz	on request
Additional price for electrical special voltage 600 V / 60 Hz	on request

Optional equipment (mounted) at an extra charge for all service carts of the L400R01 series:

	Storage capacity	Length mm	Width mm	Height mm	Net weight	Article No.
300 l / 50 bar pressure tank in accordance with 2014/68/EU regulations and CE marked with electronic weight indication, chassis with solid tired wheels (width 105 mm)	280 kg	3.070	1.400	2.070	2.000 kg	B177R01

L400R01 / L600R..**Mega Series**

L400R01

SF₆ gas service cart**Optional equipment (mounted) at an extra charge for all service carts of the L400R01 series:**

100 m ³ /h vacuum pump, final vacuum < 1 mbar	6-400VP-R001
200 m ³ /h vacuum pump, final vacuum < 1 mbar	6-400VP-R002
60 m ³ /h two-stage vacuum pump with exhaust filter, final vacuum < 0,0067 mbar	6-400VP-R004
Automatic switch off function (evacuation, filling, recovery of SF ₆) when reaching the corresponding final values	K141R11
Dew point control for dry filter	K129R04
Tarpaulin	K029R27
Sheet metal covering	on request
Chassis with solid tired wheels Ø 400 mm (for service carts without storage tank)	K088R17
Additional DN20 and DN40 coupling for evacuation and gas recovery or filling at the same time	K177R61
Remote control via mobile devices	on request

Optional accessories at an extra charge for service carts of the L400R01 series:

5 m long rubber hose DN20 with coupling tongue part DN20 on both ends	6-1017-R050
7 m long rubber hose DN20 with coupling tongue part DN20 on both ends	6-1017-R070
10 m long rubber hose DN20 with coupling tongue part DN20 on both ends	6-1017-R100
5 m long wire braided hose DN20 with coupling tongue part DN20 on both ends PN 64 bar	6-1365-R050
10 m long wire braided hose DN20 with coupling tongue part DN20 on both ends PN 64 bar	6-1365-R100
5 m long wire braided hose DN40 with coupling tongue part DN40 on both ends	6-1076-R050
10 m long wire braided hose DN40 with coupling tongue part DN40 on both ends	6-1076-R100
5 m long wire braided hose DN40 with coupling tongue part DN40 on one end and coupling tongue part DN20 on the other end	6-1080-R050
10 m long wire braided hose DN40 with coupling tongue part DN40 on one end and coupling tongue part DN20 on the other end	6-1080-R100
Triple manifold, coupling DN40 to 3 x coupling DN20 with ball valve	3-718-R006
Coupling tongue part DN40 with transition piece to 2 x DN20 2 rubber hoses DN20 (10 m long) with coupling tongue part DN20	6-1235-R001
Electrical connecting cable 5 x 10 AWG 7 for 380 - 600 V (available lengths 5 - 30 m)	6-1053-R005
Electrical connecting cable 5 x 16 AWG 5 for 200 - 240 V (available lengths 5 - 30 m)	6-1053-R004
Additional operating instruction on CD-ROM	6-0004-R213

Spare parts kits for L400R01:

Annual maintenance package for L400R01 with standard vacuum pump (63 m ³ /h) / (100 m ³)	on request
Annual maintenance package for L400R01 with vacuum pump (200 m ³ /h)	on request
Annual maintenance package for L400R01 with two-stage vacuum pump (60 m ³ /h)	6-1048-R505
Spare parts kit (valves and piston rings) for compressor	6-1341-R111
Spare parts kit (SF ₆ dry filter and particle filter)	6-1101-R131

Packing for L400R01:

Packing for L400R01	3-761-R141-C
Packing for L400R01 with chassis (as option)	3-761-R142-C
Packing for L400R01 with pressure tank	3-761-R143-C

L600R..

SF₆ gas service cart

Technical data:

Dimensions: L 2.600 mm, W 1.400 mm, H 1.500 mm
Weight L600R01: approx. 1.350 kg
Weight L600R02: approx. 1.430 kg

L600R01:

Oilfree suction pump for recovery of SF ₆ (35 m ³ /h, final vacuum < 1 mbar)
--

L600R02:

Oilfree suction pump for recovery of SF ₆ (100 m ³ /h, final vacuum < 1 mbar)

Standard equipment for L600R01 and L600R02:

B200R.. oilfree DILO compressor (60 m ³ /h, 50 bar)
Vacuum pump for evacuation of air (63 m ³ /h, final vacuum < 1 mbar)
Operating and indication of the most important process parameters via 10" multi-touch panel with protective cover
DILO couplings DN20 and DN40
Evaporator
Dry filter
Particle filter
Pressure and vacuum units can be set
Digital weighing scales for SF ₆ cylinders (with automatic switch off), 0 - 120 kg with tare function, accuracy ± 20 g
5 m long storage connecting hose DN8 with coupling tongue part DN20
Frame with crane eyelets
Tool box
Fixing and steerable rollers
Different wrenches
Paint: orange (RAL 2004)
2 operating manuals in German, English or French

L400R01 / L600R..**Mega Series**

L600R..

SF₆ gas service cart**Operating voltage for service carts of the L600R01 series (3-phase current ranges to be selected):**

380 - 440 V / 50 Hz or 380 - 480 V / 60 Hz	6-600SP-R001
Additional price for electrical special voltage 220 - 240 V / 60 Hz	6-600SP-R002
Additional price for electrical special voltage 200 V / 50, 60 Hz	on request
Additional price for electrical special voltage 220 - 240 V / 50 Hz	on request
Additional price for electrical special voltage 600 V / 60 Hz	on request

Operating voltage for service carts of the L600R02 series (3-phase current ranges to be selected):

380 - 440 V / 50 Hz	6-600SP-R011
Additional price for electrical special voltage 220 - 240 V / 60 Hz	6-600SP-R012
Additional price for electrical special voltage 380 - 480 V / 60 Hz	6-600SP-R013
Additional price for electrical special voltage 200 V / 50, 60 Hz	on request
Additional price for electrical special voltage 220 - 240 V / 50 Hz	on request
Additional price for electrical special voltage 600 V / 60 Hz	on request

Optional equipment (mounted) at an extra charge for all service carts of the L600R.. series:

	Storage capacity	Length mm	Width mm	Height mm	Net weight	Article No.
300 l / 50 bar pressure tank in accordance with 2014/68/EU regulations and CE marked with electronic weight indication, chassis with solid tired wheels (width 105 mm)	280 kg	3.070	1.400	2.070	2.000 kg	B177R01

Optional equipment (mounted) at an extra charge for all service carts of the L600R.. series:

100 m ³ /h vacuum pump, final vacuum < 1 mbar	6-600VP-R001
200 m ³ /h vacuum pump, final vacuum < 1 mbar	6-600VP-R002
60 m ³ /h two-stage vacuum pump with exhaust filter, final vacuum < 0,0067 mbar	6-600VP-R005
Second dry filter	K119R22
Second evaporator	6-600VD-R001
Automatic switch off function (evacuation, filling, recovery of SF ₆) when reaching the corresponding final values	K141R11
Dew point control for dry filter	K129R04
Tarpaulin	K029R27
Sheet metal covering	on request
Chassis with solid tired wheels Ø 400 mm (for service carts without storage tank)	K088R17
Additional DN20 and DN40 coupling for evacuation and gas recovery or filling at the same time	K177R61
Remote control via mobile devices	on request

L600R.. SF₆ gas service cart

Optional accessories at an extra charge for service carts of the L600R.. series:

5 m long rubber hose DN20 with coupling tongue part DN20 on both ends	6-1017-R050
7 m long rubber hose DN20 with coupling tongue part DN20 on both ends	6-1017-R070
10 m long rubber hose DN20 with coupling tongue part DN20 on both ends	6-1017-R100
5 m long wire braided hose DN20 with coupling tongue part DN20 on both ends PN 64 bar	6-1365-R050
10 m long wire braided hose DN20 with coupling tongue part DN20 on both ends PN 64 bar	6-1365-R100
5 m long wire braided hose DN40 with coupling tongue part DN40 on both ends	6-1076-R050
10 m long wire braided hose DN40 with coupling tongue part DN40 on both ends	6-1076-R100
5 m long wire braided hose DN40 with coupling tongue part DN40 on one end and coupling tongue part DN20 on the other end	6-1080-R050
10 m long wire braided hose DN40 with coupling tongue part DN40 on one end and coupling tongue part DN20 on the other end	6-1080-R100
Triple manifold, coupling DN40 to 3 x coupling DN20 with ball valve	3-718-R006
Coupling tongue part DN40 with transition piece to 2 x DN20 2 rubber hoses DN20 (10 m long) with coupling tongue part DN20	6-1235-R001
Electrical connecting cable 5 x 10 AWG 7 for 380 - 600 V (available lengths 5 - 30 m)	6-1053-R005
Electrical connecting cable 5 x 16 AWG 5 for 200 - 240 V (available lengths 5 - 30 m)	6-1053-R004
Additional operating instruction on CD-ROM	6-0004-R213

Spare parts for L600R..:

Annual maintenance package for L600R.. with standard vacuum pump (63 m ³ /h) / (100 m ³ /h)	on request
Annual maintenance package for L600R.. with vacuum pump (200 m ³ /h)	on request
Annual maintenance package for L600R.. with two-stage vacuum pump (60 m ³ /h)	6-1048-R505
Spare parts kit (valves) for compressor	6-1341-R111
Spare parts kit for second 6-550TR-R001 dry filter	3-899-06
Spare part kit (SF ₆ dry and particle filter)	6-1101-R131

Packing for L600R..:

Packing for L600R..	3-761-R141-C
Packing for L600R.. with chassis (as option)	3-761-R142-C
Packing for L600R.. with pressure tank	3-761-R143-C

Accessories for service carts



A complete range of accessories for perfect SF₆ gas handling

Besides gas reclaimers, measuring instruments and SF₆ fittings DILO offers a wide range of accessories needed for comprehensive SF₆ gas handling operations.

■ Accessories for service carts

■ SF ₆ gas storage tanks	84 – 88
■ Gas cylinder	89 – 90
■ Filter units	91 – 93
■ Manifolds	94
■ Oilfree suction pump units	95 – 97

B176R..

SF₆ gas storage tanks

These tanks offer sufficient volume to store or withdraw even large gas quantities in gaseous or liquid form – special feature of this type series: for withdrawal of liquid gas, the entire gas content can be withdrawn all at once without having to heat the tank.

The tanks are equipped with digital weighing scales. These weighing scales enable to determine the filling weight with an accuracy of ± 500 g, thus facilitating considerably the SF₆ gas monitoring and the registration of the gas quantities in accordance with the EU directives.



View on the operating panel

- For liquid or gaseous storage or withdrawal of gas
- Digital weighing scales (measuring accuracy ± 0.4 kg)
- Pressure indication in bar, MPa, psi
- Discharge of the weighing system for transportation is not required
- Additional tool box for hoses and accessories
- Stable frame with driving rod
- Steerable and fixing rollers for comfortable transportation
- Max. operating overpressure 50 bar
- Version in accordance with 2014/68/EU pressure equipment directive
ASME and SQL approval are available as option

B176R01

SF₆ gas storage tank - Storage volume 300 l



Technical data:

Dimensions: L 2,000 mm, W 950 mm, H 1,020 mm
Weight: 442 kg
Storage volume: 300 l
Max. operating overpressure: 50 bar
Max. filling weight: 280 kg SF ₆
Operating temperature: -10 °C to +50 °C

Standard equipment:

Digital weighing scales with tare function, indication reversible from kg to lb, digit increment 0.2 kg, measuring accuracy ± 0.4 kg, illuminated LCD display, accumulator system with integrated power supply unit and load indicator
Ball valve DN20 / DN8
DILO coupling groove part DN20
Gauge NG 100
Safety valve
Paint: orange (RAL 2004)
2 operating manuals in German, English or French

B176R..

SF₆ gas storage tanks

B176R02

SF₆ gas storage tank - Storage volume 600 l



Technical data:

Dimensions: L 2,000 mm, W 950 mm, H 1,020 mm
Weight: 688 kg
Storage volume: 600 l
Max. operating overpressure: 50 bar
Max. filling weight: 580 kg SF ₆
Operating temperature: -10 °C to +50 °C

Standard equipment:

Digital weighing scales with tare function, indication reversible from kg to lb, digit increment 0.2 kg, measuring accuracy ± 0.4 kg, illuminated LCD display, accumulator system with integrated power supply unit and load indicator
Ball valve DN20 / DN8
DILO coupling groove part DN20
Gauge NG 100
Safety valve
Paint: orange (RAL 2004)
2 operating manuals in German, English or French

B176R03

SF₆ gas storage tank - Storage volume 1.000 l



Technical data:

Dimensions: L 2,720 mm, W 950 mm, H 1,020 mm
Weight: 938 kg
Storage volume: 1,000 l
Max. operating overpressure: 50 bar
Max. filling weight: 980 kg SF ₆
Operating temperature: -10 °C to +50 °C

Standard equipment:

Digital weighing scales with tare function, indication reversible from kg to lb, digit increment 0.2 kg, measuring accuracy ± 0.4 kg, illuminated LCD display, accumulator system with integrated power supply unit and load indicator
Ball valve DN20 / DN8
DILO coupling groove part DN20
Gauge NG 100
Safety valve
Paint: orange (RAL 2004)
2 operating manuals in German, English or French

B176R..**SF₆ gas storage tanks**

B176R..

SF₆ gas storage tank**Optional equipment (mounted) at an extra charge for all SF₆ gas storage tanks:**

Special pressure indication	6-0005-R006
-----------------------------	--------------------

Optional accessories at an extra charge for all SF₆ gas storage tanks:

5 meter long wire-braided hose DN20 with coupling tongue part on both ends PN 64 bar	6-1365-R050
7 meter long wire-braided hose DN20 with coupling tongue part on both ends PN 64 bar	6-1365-R070
10 meter long wire-braided hose DN20 with coupling tongue part on both ends PN 64 bar	6-1365-R100
5 meter long rubber hose DN20 with coupling tongue part on both ends	6-1017-R050
7 meter long rubber hose DN20 with coupling tongue part on both ends	6-1017-R070
10 meter long rubber hose DN20 with coupling tongue part on both ends	6-1017-R100
Additional operating manual on CD-ROM	6-0004-R213

Packing:

Packing for B176R01 / B176R02	3-750-R007-C
Packing for B176R03	3-751-R007-C

Gas cylinder for new gas (without filling)

New SF₆ as well as used SF₆ with a SO₂ content of ≤ 499 ppm_v**

Manufactured according to technical regulations for compressed gases with TÜV certificate.

Gas cylinder labelling in accordance with DIN EN 1089



Photo: Solvay



Valve for new SF₆** as well as used SF₆ with a SO₂ content of ≤ 499 ppm_v in accordance with DIN 477 no. 6
W21.8 x 1/14"
Brass

Important note

Use:

The use of new gas cylinders (green marked with green label) is admissible for

- new SF₆**
- as well as used SF₆ with a SO₂ content of ≤ 499 ppm_v

Attention: If the gas quality cannot be defined or the gas contains decomposition products it is stipulated to use reuse cylinders (yellow marked with orange label) for transportation on roads in accordance with ADR (=The European Agreement concerning the International Carriage of Dangerous Goods by Road).

Repeated inspection:

The user of the gas cylinders is responsible to carry out the repeated inspections on pressure vessels for transportation of gases with the 2A classification code in accordance with ADR every 10 years. Please observe local rules and regulations.

ADR regulations for the transportation on roads:

Label for new SF₆**: UN 1080

Label for used SF₆ with a SO₂ content of ≤ 499 ppm_v: UN 3163

Classification code: 2A

Hazard label: 2.2

Volume	Outside diameter	Length without valve	Empty weight	Max. filling ratio	Max. filling pressure*	Test pressure	Article number
10 l	approx. 140 mm	approx. 820 mm	approx. 15.6 kg	1.3 kg/l	200 bar	300 bar	05-1144-R001
20 l	approx. 204 mm	approx. 825 mm	approx. 31.6 kg	1.3 kg/l	200 bar	300 bar	05-1144-R002
40 l	approx. 204 mm	approx. 1,520 mm	approx. 46.1 kg	1.3 kg/l	150 bar	250 bar	05-1144-R004
600 l	approx. 770 mm	approx. 2,120 mm	approx. 460 kg	1.04 kg/l	20 bar	70 bar	05-1144-R006

* at 15°C ambient temperature

** SO₂ content: 0 ppm_v and no other decomposition products

Gas cylinders for used gas

Used SF₆ with a SO₂ content of $\geq 500 \text{ ppm}_v$

Manufactured according to technical regulations for compressed gases with TÜV certificate.

Gas cylinder labelling in accordance with DIN EN 1089



Photo: Solvay



Valve for used SF₆ with a SO₂ content of $\geq 500 \text{ ppm}_v$ in accordance with DIN 477 no. 8 - 1" Stainless steel

Important note

Use:

The SF₆ gas is to be stored in reuse cylinders (yellow marked with orange label) if:

- with a SO₂ content of $\geq 500 \text{ ppm}_v$
- the SF₆ gas quality is undefined

Repeated inspection:

The user of the cylinders is responsible to carry out the repeated inspections on pressure vessels for transportation of gases with the 2T and 2TC classification code in accordance with ADR every 5 years. Please observe local rules and regulations.

ADR regulations for the transportation on roads:

Label for used SF₆ with a SO₂ content of $\geq 500 \text{ ppm}_v$:

Toxic and non-corrosive: **UN 3162**

Toxic and corrosive: **UN 3308**

If the gas quality is undefined we recommend using the UN 3308 label.

Classification code: 2T / 2TC

Hazard label: 2.3 / 2.3 + 8

Volume	Outside diameter	Length without valve	Empty weight	Max. filling ratio	Max. filling pressure*	Test pressure	Article number
10 l	approx. 204 mm	approx. 455 mm	approx. 17 kg	0.8 kg/l	200 bar	250 bar	05-1630-R001
20 l	approx. 204 mm	approx. 775 mm	approx. 22 kg	0.8 kg/l	150 bar	250 bar	05-1630-R002
40 l	approx. 204 mm	approx. 1,520 mm	approx. 46 kg	0.8 kg/l	150 bar	250 bar	05-1630-R004
600 l	approx. 770 mm	approx. 2,120 mm	approx. 615 kg	0.8 kg/l	64 bar	100 bar	05-1630-R060

* at 15°C ambient temperature

Packing for gas cylinders:

Packing for gas cylinder 10 l	3-763-R007-C
Packing for gas cylinder 20 l	3-763-R007-C
Packing for gas cylinder 40 l	3-763-R002-C
Packing for pressure tank 600 l	3-1001-R300-C

B007R11 / B071R11

Filter unit

For adsorption of moisture and gaseous or dusty decomposition products

B007R11

Portable pre-filter unit (p_e 25 bar)

Dry filters filled with molecular sieve and aluminium oxide Al_2O_3

For adsorption of oil-aerosols, moisture and gaseous or dusty decomposition products

B071R11

Portable separating filter unit (p_e 25 bar)

Separating filters filled with activated carbon granulates and aluminium oxide Al_2O_3



Technical data:

Dimensions: L 440 mm, W 170 mm, H 690 mm

Weight: 35 kg

Standard equipment:

5 m long rubber hose DN20 with coupling tongue part DN20 on both ends

2 DILO coupling groove parts DN20 at the filter unit

Paint: orange (RAL 2004)

2 operating manuals in German, English or French

Optional accessories at an extra charge:

2 meter long rubber hose DN20 with coupling tongue part on both ends	6-1017-R020
2 meter long wire braided hose DN20 with coupling tongue part on both ends PN 40 bar	6-1024-R020
Spare filter cartridge (for dry filter B007R11)	3-899-06
Spare filter cartridge activated carbon / Al_2O_3 for B071R11	3-906-06
Spare filter cartridge (for particle filter)	3-377-08
Additional operating manual on CD-ROM	6-0004-R213

Packing:

Packing for B007R11 / B071R11	3-763-R001-C
-------------------------------	---------------------

3-537-R001**Mobile pre-filter unit**

For adsorption of gaseous and dusty decomposition products in large gas compartments

(p_e 25 bar)

**Technical data:**

Dimensions: L 800 mm, W 600 mm, H 850 mm
Weight: 81 kg

Standard equipment:

2 dry filters (filled with molecular sieve and aluminium oxide Al ₂ O ₃)
2 Particle filters
2 DILO coupling groove parts DN20
Ball valves DN20 for switching over
5 m long rubber hose DN20 with 2 DILO coupling tongue parts DN20
Paint: orange (RAL 2004)
2 operating manuals in German, English or French

Optional accessories at an extra charge:

2 m long rubber hose DN20 with coupling tongue part on both ends	6-1017-R020
2 meter long wire braided hose DN20 with coupling tongue part on both ends PN 40 bar	6-1024-R020
Spare filter cartridge (dry filter)	3-899-06
Spare filter cartridge (particle filter)	3-377-08
Additional operating manual on CD-ROM	6-0004-R213

Packing:

Packing for 3-537-R001	3-671-R001-C
------------------------	---------------------

B148R03 / R04

Mobile pre-filter unit

For adsorption of gaseous and dusty decomposition products in large gas compartments

B148R03

Mobile pre-filter unit DN20 (p_e 16 bar)

B148R04

Mobile pre-filter unit DN40 (p_e 16 bar)



Technical data:

Dimensions: L 750 mm, W 700 mm, H 1,400 mm
Weight: 140 kg

Standard equipment:

Dry filter 40 l (filled with 15 kg molecular sieve and 15 kg aluminium oxide Al_2O_3)
Particle filter
2 DILO coupling groove parts DN20
2 DILO coupling groove parts DN40 (only for B148R04)
Paint: orange (RAL 2004)
2 operating manuals in German, English or French

Optional accessories at an extra charge:

2 m long rubber hose DN20 with coupling tongue part on both ends	6-1017-R020
2 meter long wire braided hose DN20 with coupling tongue part on both ends PN 40 bar	6-1024-R020
5 m long wire-braided hose DN40 with coupling tongue part DN40 on one end and coupling tongue part DN20 on the other end	6-1080-R050
Spare filter cartridge (dry filter)	K077-03
Spare filter cartridge (particle filter)	3-377-08
Additional operating manual on CD-ROM	6-0004-R213

Packing:

Packing for B148R03 / B148R04	3-671-R104-C
-------------------------------	---------------------

Note:

Other versions are available on request.

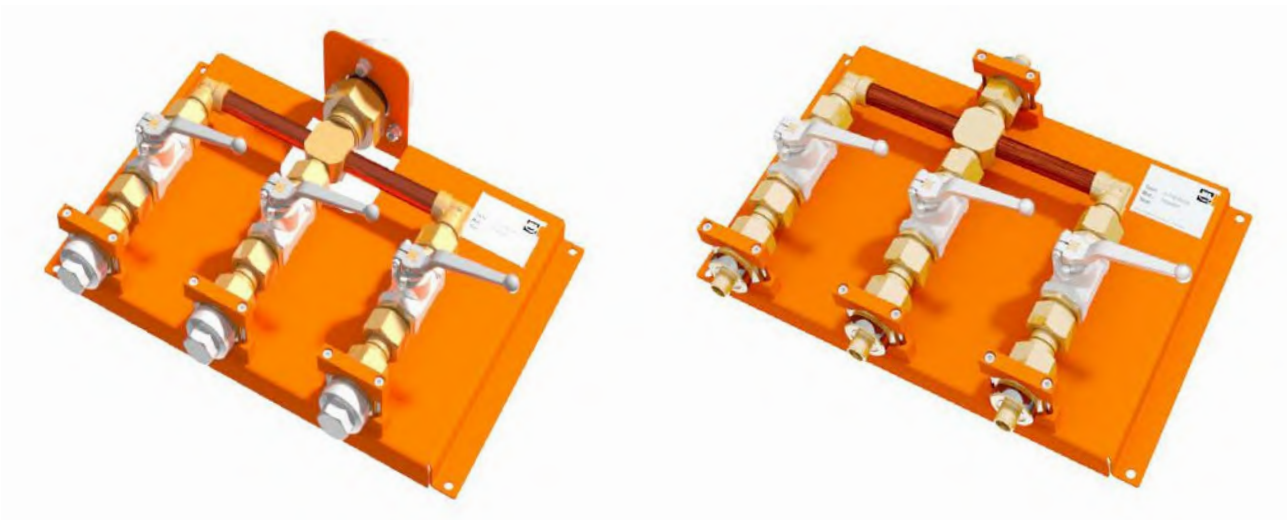
3-718-R006 / 3-718-R036 / 3-718-R002

Manifolds

For gas handling on several gas compartments at the same time

The DILO manifolds help to significantly increase the efficiency of gas handling with service carts in the GIS unit production or at utility companies.

The standard DILO manifolds are equipped with three DN20 connections as well as a DN20 or DN40 connection to the service cart. Thus, it is possible to recover, to evacuate or to fill three gas compartments at the same time.



3 x DN20 / 1 x DN40

Order no.: 3-718-R006

4 x DN20

Order no.: 3-718-R036

- Gas-tight version
- Self-closing couplings
- Ball valves individually lockable
- Suitable for wall assembly

Upon request manifolds with solenoid valves as well as standalone panels are available.



4 x DN20 without couplings

Order no.: 3-718-R002

Packing:

Packing for 3-718-R002 / 3-718-R006	3-775-R013-C
Packing for 3-718-R036	3-775-R014-C

B131R41

Mobile oilfree suction pump unit

The mobile suction pump allows upgrading old SF₆ maintenance devices. Thus it is possible to recover the SF₆ gas from the gas compartment to a final vacuum of 1 mbar by connecting in series the mobile suction pump.

Mobile oilfree suction pump unit 15 m³/h

Final vacuum < 1 mbar



- Separate electric control
- Self-closing couplings for emission-free gas handling
- Digital vacuum indication (0 - 400 mbar)
- Steerable and fixing rollers for comfortable handling
- Different wrenches are available as accessories

Other performances are available upon request:

Mobile oilfree suction pump unit 35 m³/h B131R13

Mobile oilfree suction pump unit 100 m³/h B131R61

B131R41**Mobile oilfree suction pump unit**

B131R41

Mobile oilfree suction pump unit 15 m³/h**Technical data:**

Dimensions: L 550 mm, W 430 mm, H 800 mm
Weight: 80 kg
Operating voltage: 220 - 240 V / 50 - 60 Hz alternating current

Standard equipment:

DILO couplings DN20 and DN40
Vacuum indication (0 - 400 mbar)
Fixing and steerable rollers
Different wrenches
3 m long electrical connecting cable
Paint: orange (RAL 2004)
2 operating manuals in German, English or French

Optional equipment (mounted) at an extra charge:

Additional price for electrical special voltage for B131R41 100 V / 50 - 60 Hz or 110 - 127 V / 60 Hz or 200 V / 50 - 60 Hz	6-0005-R046
--	--------------------

Optional accessories at an extra charge:

Protective cover for suction pump unit B131R41	B131R41G08
5 m long rubber hose DN20 with coupling tongue part DN20 on both ends	6-1017-R050
7 m long rubber hose DN20 with coupling tongue part DN20 on both ends	6-1017-R070
10 m long rubber hose DN20 with coupling tongue part DN20 on both ends	6-1017-R100
5 m long wire-braided hose DN20 with coupling tongue part DN20 on both ends PN 40 bar	6-1024-R050
7 m long wire-braided hose DN20 with coupling tongue part DN20 on both ends PN 40 bar	6-1024-R070
10 m long wire-braided hose DN20 with coupling tongue part DN20 on both ends PN 40 bar	6-1024-R100
5 m long wire-braided hose DN40 with coupling tongue part DN40 on both ends	6-1076-R050
10 m long wire-braided hose DN40 with coupling tongue part DN40 on both ends	6-1076-R100
5 m long wire-braided hose DN40 with coupling tongue part DN40 on one end and coupling tongue part DN20 on the other end	6-1080-R050
10 m long wire-braided hose DN40 with coupling tongue part DN40 on one end and coupling tongue part DN20 on the other end	6-1080-R100
Additional operating manual on CD-ROM	6-0004-R213

Packing:

Packing for B131R41	3-671-R001-C
---------------------	---------------------

Z788R..

Retrofit kit for suction pumps for SF₆ gas recovery < 1 mbar

In case a mobile unit is not your preferred choice, it is also possible to install suction pumps in an existing service cart to be able to reclaim gas in accordance with the IEC 62271-4 regulation. For more detailed information please contact us indicating the following details:

- Type
- Year of construction
- Commission number
- Working hours



Retrofit kit for the gas recovery
(suction pump) < 1 mbar

SF₆ Accessories



■ SF₆ Accessories

- Pressure measuring devices 100 – 103
- Other accessories 104 – 119

3-558-R001

Precision gauge

For precise pressure control in gas compartments

3-558-R001

Precision gauge with hose

Indication unit in bar, kPa, psi

Indication range: 0 - 10 bar / 0 - 1000 kPa / 0 - 145 psi

The digital precision gauge allows precise determination of pressure in gas compartments.

The connecting hose for measuring devices is equipped with a self-closing coupling so that no SF₆ gas can escape into the atmosphere during the testing process. The device can be transported comfortably and safely in the handy plastic case.

**Technical data:**

Case dimensions: L 500 mm, W 420 mm, H 180 mm
Weight: 4.0 kg

Standard equipment:

Precision gauge NG 160 / class 0.6
1 m long Teflon hose with connecting coupling for measuring devices
Handy transport case
2 operating manuals in 3 languages (German / English / French)

Optional accessories at an extra charge:

Coupling tongue part DN8	6-1161-R011
Coupling tongue part DN20	6-1161-R012
Additional operating manual on CD-ROM	6-0004-R213

Other transition pieces are available on request.

Packing:

Packing for 3-558-R001	05-1990-R003
------------------------	---------------------

3-558-R010/...

Digital precision gauge

For pressure control in gas compartments

3-558-R010/A

with 5 point certificate

3-558-R010/B

with 11 point certificate

3-558-R010/C

with DKD certificate

Indication range -1 to 10 bar / 0 - 10 bar / 0 - 1000 kPa / 0 - 145 psi

Indication in bar, kPa, psi (reversible) / class 0.1

This is a useful tool when precise pressure indication is required.

The connecting hose for measuring devices is equipped with a self-closing coupling so that no SF₆ gas can escape into the atmosphere during the testing process. The device can be transported comfortably and safely in the handy plastic case.



Technical data:

Case dimensions: L 390 mm, W 310 mm, H 150 mm

Weight: 3.5 kg

Standard equipment:

Digital precision gauge -1 to 10 bar /class 0.1

1 m long Teflon hose with connecting coupling for measuring devices

Handy transport case

2 operating manuals in 3 languages (German / English / French)

Optional accessories at an extra charge:

Coupling tongue part DN8

6-1161-R011

Coupling tongue part DN20

6-1161-R012

Additional operating manual on CD-ROM

6-0004-R213

Other transition pieces are available on request.

Packing:

Packing for 3-558-R010

05-1990-R004

Z619R01**Digital vacuum gauge****For vacuum control in gas compartments**

Battery-operated (2 x 9 V)

Indication range: 0 - 400 mbar / class 0.1

After having evacuated the air or after the recovery of SF₆ gas the device allows precise determination of the vacuum in gas compartments. The device is protected against overpressure up to p₀ 9 bar.

**Technical data:**

Case dimensions: W 360 mm, H 290 mm, D 165 mm

Weight: 5.0 kg

Standard equipment:

DILO coupling tongue part DN20

DILO coupling tongue part DN8

Elbow and intermediate piece DN8

Handy transport case

2 operating manuals in 3 languages (German / English / French)

Optional accessories at an extra charge:

Additional operating manual on CD-ROM

6-0004-R213**Packing:**

Packing for Z619R01

05-1990-R004**Attention:**

For the operation of the device two 9-V batteries are necessary which are **not** included in the scope of supply.

K040R01

Gauge Tee piece

For pressure control of SF₆ gas

Indication range: -1 to 15 bar

This gauge is provided as connection between switchgear and service cart, particularly as completion for the Piccolo Series. As the gauge is equipped with two connecting couplings on both ends it can be connected easily.



Technical data:

Dimensions: L 140 mm, W 60 mm, H 182 mm

Standard equipment:

DILO coupling tongue part DN20

DILO coupling groove part DN20

Gauge NG 100

Note:

Other pressure ranges and nominal lengths are available on request.

Z340R21**Adapter kit****For connection to SF₆ switchgear**

Adapters in a portable plastic case for all application ranges including all gas compartment connections for SF₆ switchgear used all over the world such as DN6, DN7, DN8, DN12 and DN20. Furthermore, this kit includes self-closing and open transition pieces in different versions.

**Technical data:**

Case dimensions: W 500 mm, H 420 mm, D 180 mm

Weight: 8.3 kg

Standard equipment:

Coupling groove part DN20 to ASEA adapter	6-1033-R001
Coupling groove part DN20 to coupling tongue part DN8	6-1092-R007
Plug-in coupling tongue part DN12	6-1002-R001
Transition piece DN20 / DN8	3-251-R001 P
Transition piece DN8 / DN20	3-240-R001 P
Plug-in coupling tongue part DN7	6-1001-R001
Coupling tongue part DN12 / PN10	3-888-R001 T
Coupling groove part DN8 to coupling tongue part DN6	6-1240-R004
Coupling groove part DN8 to Michelin valve	6-1155-R001
Coupling groove part DN20 to Siemens adapter G1 1/4"	SK-279-R003 P
Coupling groove part DN8 to coupling tongue part DN20	6-1206-R001

Packing:

Packing for Z340R21	05-1990-R003
---------------------	---------------------

Z340R40

Adapter kit DN8

For connection to SF₆ switchgear

The practical adapter kit contains DILO DN8 transition pieces for the most commonly used SF₆ gas compartment connections. The self-closing sealing principle of the couplings ensures that no SF₆ is released into the atmosphere during coupling and uncoupling.



Technical data:

Case dimensions: W 500 mm, H 420 mm, D 180 mm

Weight: 6.5 kg

Standard equipment:

Coupling groove part DN8 to plug-in coupling tongue part DN7	6-1045-R002
Coupling groove part DN8 to plug-in coupling tongue part DN12	6-1045-R003
Coupling groove part DN8 to coupling tongue part DN20	6-1206-R001
Coupling groove part DN8 to coupling tongue part DN6	6-1240-R004
Coupling groove part DN8 to coupling tongue part DN12	6-1240-R005
Coupling groove part DN8 to Michelin valve	6-1155-R010
Coupling groove part DN8 to ASEA adapter	6-1033-R003

Packing:

Packing for Z340R40	05-1990-R003
---------------------	---------------------

Z340R41**Adapter kit DN20****For connection to SF₆ switchgear**

The practical adapter kit contains DILO DN20 transition pieces for the most commonly used SF₆ gas compartment connections. The self-closing sealing principle of the couplings ensures that no SF₆ is released into the atmosphere during coupling and uncoupling.

**Technical data:**

Case dimensions: W 500 mm, H 420 mm, D 180 mm

Weight: 9.4 kg

Standard equipment:

Coupling groove part DN20 to plug-in coupling tongue part DN7	6-1045-R004
Coupling groove part DN20 to plug-in coupling tongue part DN12	6-1045-R005
Coupling groove part DN20 to coupling tongue part DN8	6-1092-R007
Coupling groove part DN20 to coupling tongue part DN6	6-1240-R014
Coupling groove part DN20 to coupling tongue part DN12	6-1240-R006
Coupling groove part DN8 to Michelin valve	6-1155-R010
Coupling groove part DN20 to Siemens adapter G1/4"	SK-279-R003 P
Coupling groove part DN20 to ASEA adapter	6-1033-R001

Packing:

Packing for Z340R41	05-1990-R003
---------------------	---------------------

Z340R42

Adapter kit

For measuring devices

The practical adapter kit includes self-closing connecting couplings for all DILO measuring devices. This ensures that no SF₆ is released into the atmosphere during coupling and uncoupling. A pressure reducer with metal membrane for verification of the gas quality in cylinders and containers is included as well.



Technical data:

Case dimensions: W 500 mm, H 420 mm, D 180 mm
Weight: 5.5 kg

Standard equipment:

Pressure reducer for SF ₆	3-974-R003
Hose connection DN6 (3-389-R018 P + 3-408-R001)	6-1161-R013
Hose connection DN12 (3-389-R009 P + 3-888-R001)	6-1161-R014
Hose connection DN7 (3-389-R008 P + 3-308-R002)	6-1161-R015
Hose connection DN12 (3-389-R009 P + 3-307-R002)	6-1161-R016
ASEA adapter – miniature quick coupling	6-1033-R004
1" connection for gas cylinder (reuse gas)	3-851-R003 P

Packing:

Packing for Z340R42	05-1990-R003
---------------------	--------------

3-1121-R003**DN20 Quick coupling****For easy coupling and uncoupling of hoses**

The quick coupling is very useful in all fields of application where hoses have to be frequently loosened and reconnected e. g. during final tests of completely mounted GIS fields. Thanks to the clamp lock the DN20 hoses can easily be connected without any loss of SF₆ gas. Thus the handling times in GIS production are shortened and productivity is increased considerably.



closed coupling



open coupling



Fixing facility for safe wall assembly and dust protection
Article-no. 3-1121-R093

Important note:

The quick coupling is only compatible with DILO coupling groove parts of version 2 (additional "V2" stamp on the flange or wrench size).

- Clamp lock for quick coupling and uncoupling
- Suitable for hoses DN20
- Pressure range up to 10 bar
- Robust version

Please see our product video



B174R..

Hose reel with spring balancer

Stationary unit for wall assembly

B174R10

Hose reel with spring balancer

With abrasion-proof 10 m long (GS1020L1000) rubber hose DN20 and coupling tongue part DN20

B174R15

Hose reel with spring balancer

With abrasion-proof 15 m long (GS1020L1500) rubber hose DN20 and coupling tongue part DN20

The useful tool has been specially adapted to customer requirements in GIS production areas to keep hoses tidy. Therefore these practical accessories allow quick hose installation in GIS production to have everything neat and clean.

The hose reel can easily be mounted and enables convenient reeling and unreeling of the desired hose length. Its optional holder can be swivelled in both directions. The integrated gastight rotary feedthrough ensures that no SF₆ gas escapes into the atmosphere.



Hinge swivelling in both directions
05-1805-R011 (accessories)

- Stable steel frame, ready for wall assembly
- Abrasion-proof rubber hose (GS1020) with surface coating
- Equipped with DN20 connection
- Pressure range -1 up to 60 bar
- Gastight rotary feedthrough
- Comfortable reeling and unreeling of the desired hose length
- Adjustable reel up force
- Hinge swivelling in both directions (available as option)
- Different hose lengths are available

B174R..

Hose reel with spring balancer

B174R..

Hose reel with spring balance**Technical data:**

Dimensions: W 435 mm, H 500 mm, D 470 mm
Gewicht: 31 kg

Optional accessories at an extra charge:

Swivelling hinge for wall assembly	05-1805-R011
1 m long angled rubber hose DN20 (from gas handling plant to hose reel)	GS0320L01000
1.5 m long angled rubber hose DN20 (from gas handling plant to hose reel)	GS0320L01500
1 m long rubber hose DN20 (from gas handling plant to hose reel)	GS0120L01000
1.5 m long rubber hose DN20 (from gas handling plant to hose reel)	GS0120L01500
DN20 quick coupling	3-1121-R003

Packing:

Packing for B174R..	3-748-R020-C
---------------------	--------------

Upon request we also supply customer-specific devices such as multiple stationary or mobile hose reels with or without distribution panel.



Hose reel for three gas compartment hoses with spring balancer and valve connections (on left side)

Z446R..

Hose reel

Mobile unit for hose reeling

Z446R04

Hose reel for three gas compartment hoses

Z446R06

Hose reel for six gas compartment hoses

Z446R05

Hose reel for eight gas compartment hoses

The hose reel has been specially designed for optimising SF₆ gas handling and for keeping hoses tidy in GIS production. The hose distributor allows to connect several gas compartments at the same time which can be treated by means of an SF₆ maintenance device.

As the unit is equipped with four steerable rollers it can easily be transported to the desired location. The hose reel is of robust construction and can store up to eight hoses.



- Stable steel frame
- Steerable rollers allow easy transport
- With 3, 6 or 8 DN20 hoses available as option
- DN40 connecting hose to gas handling plant
- Different hose lengths are available

Z446R..

Hose reel

Z446R..

Hose reel**Technical data:**

Dimensions: L 700 mm, W 700 mm, H 1,100 mm
Weight: 100 kg

Standard equipment:

Reel with four steerable rollers
Optionally available with hoses

Optional accessories at an extra charge:

5 m long wire braided hose DN40 (from gas handling plant to hose reel)	SM0140L05000
10 m long wire braided hose DN40 (from gas handling plant to hose reel)	SM0140L10000
Coupling tongue part DN40 (for DN40 hose)	VK/F-01/40 E
2 m long rubber hose DN20 (from hose reel to gas compartment)	GS0120L02000
3 m long rubber hose DN20 (from hose reel to gas compartment)	GS0120L03000
4 m long rubber hose DN20 (from hose reel to gas compartment)	GS0120L04000
5 m long rubber hose DN20 (from hose reel to gas compartment)	GS0120L05000
6 m long rubber hose DN20 (from hose reel to gas compartment)	GS0120L06000
2 m long wire braided hose DN20 (from hose reel to gas compartment) PN 40 bar	SM0120L02000
3 m long wire braided hose DN20 (from hose reel to gas compartment) PN 40 bar	SM0120L03000
4 m long wire braided hose DN20 (from hose reel to gas compartment) PN 40 bar	SM0120L04000
5 m long wire braided hose DN20 (from hose reel to gas compartment) PN 40 bar	SM0120L05000
6 m long wire braided hose DN20 (from hose reel to gas compartment) PN 40 bar	SM0120L06000
Coupling tongue part DN20 (for DN20 hose)	VK/F-02/20 P
DN20 quick coupling	3-1121-R003

Packing:

Packing for Z446R..	3-1001-R005-C
---------------------	----------------------

3-442-R001

Working protection kit

For decomposed SF₆ gas (with neutralization)

After arc quenching in the circuit breaker solid or gaseous decomposition products are generated the operators have to be protected from effectively. This kit offers effective protection of the staff against toxic decomposition products.



Technical data:

Dimensions aluminium trolley: L 915 mm, W 465 mm, H 485 mm

Gross weight: 28 kg

Standard equipment:

Piece	Designation	Order No.
1	Aluminium trolley	05-0452-R008
2	Disposable overall	3-442-02*
5 pairs	Disposable overshoes	3-442-03*
1	Breathing half mask	05-0453-R101*
1	Protective goggles	05-0453-R111*
1 kit	Gas and particle filter and filter cover for breathing half mask	3-442-31*
1 kit	Valves (breathe in and out) for half breathing mask	3-442-32*
2 pairs	Safety gloves	3-442-06*
5 pairs	Gloves made of cotton stockinet	3-442-07*
1	Plastic barrel	05-0442-R001*
1 pack	Refuse sacks 120 liters	05-0594-R001*
2 rolls	Sucking and wiping cloths	05-0595-R001*
1 kg	Sodium carbonate	05-0443-R001*
1	Vessel for solvent	05-0285-R005*
10	Spoon	3-442-17*
1 pack	Indicator paper	05-0780-R001*
1	Safety helmet EN 397, orange	05-1612-R001
1	1 operating manual (multilingual) on CD-ROM	

For removal of solid decomposition products please use the dry vacuum cleaner!

* spare material

Optional accessories at an extra charge:

Additional operating manual on CD-ROM	6-0004-R213
---------------------------------------	-------------

Packing:

Packing for 3-442-R001	3-748-R025-C
------------------------	--------------

3-442-22 / -25

Dry vacuum cleaner

For recovery of solid decomposition products from the circuit breaker

3-442-22

Dry vacuum cleaner (230 V / 50 - 60 Hz)

3-442-25

Dry vacuum cleaner (120 V / 60 Hz)

For removal of solid decomposition products in switchgear dry vacuum cleaners with dust class H or higher are admissible. Even finest dust particles can be removed with this dry vacuum cleaner to exclude any risk to the operating personnel.



- Dust class H
- Aluminium trolley for comfortable transportation
- Easy filter exchange

Technical data:

Dry vacuum cleaner (aluminium trolley included): L 800 mm, W 600 mm, H 410 mm

Weight with aluminium trolley: 21 kg

Standard equipment:

1 operating manual (multilingual) on CD-ROM

Optional accessories at an extra charge:

1 piece spare inlet filter for dry vacuum cleaner (dust class H)	05-0451-R002
1 spare hose, 5 m long with connecting sleeve	05-0450-R020
Additional operating manual on CD-ROM	6-0004-R213

Packing:

Packing for 3-442-22 / 3-442-25	3-748-R026-C
---------------------------------	---------------------

Z415R04 / R03

Gas tight cutting device

For recovery of SF₆ gas from firmly welded metallic gas compartments "sealed for life"

Z415R04

Gas tight cutting device

Z415R03

Gas tight cutting device with stud welding machine

This cutting device allows reliable recovery of SF₆ gas in case gas compartments - sealed for life - are to be shut down and the circuit breaker has to be disposed of in an environmentally acceptable manner. Thus SF₆ gas is prevented from escaping into the atmosphere.

In practice, the recovery device is to be mounted on the housing of the circuit breaker to be disposed of and is drilled then. After that it is possible to recover the SF₆ gas contained in the circuit breaker by means of an appropriate service cart. The recovery device is equipped with a DN20 coupling so that the service cart can be connected easily. The large cross-section enables quick recovery of the SF₆ gas. An integrated sinter filter prevents solid particles from entering the service cart during the recovery process.

The recovery device is a useful tool particularly for companies specialized in the disposal of GIS plants.



Z415R04



Z415R03

- Self-closing DILO coupling DN20 with integrated sinter filter
- Operation of the hard metal cutter with accumulator or hand drill
- Storage in a robust case

Z415R04 / R03**Gas tight cutting device**

Z415R04 / R03

Gas tight cutting device**Technical data:**

Dimensions of Z415R04: length: 360 mm, width: 295 mm, height: 165 mm
Dimensions of Z415R03: length: 665 mm, width: 570 mm, height: 250 mm
Weight of Z415R04: 4.8 kg
Weight of Z415R03: 24 kg
Operating voltage of the stud welding machine: 115 / 230 V / 50 - 60 Hz

Standard equipment:

Recovery device with coupling DN20, integrated sinter filter and aluminium covering cap
Stencil
5 hard metal cutters Ø 16 mm
Screw driver
Stud welding machine (only for Z415R03)
2 operating manuals in German or English

Example for use

Fixation of welded stud before assembly on surface



Gas recovery device mounted on the surface – ready for drilling

Note:

The gas tight cutting device is supplied without connecting hose.
The connecting hose has to be ordered separately.

Optional accessories at an extra charge:

5 m long rubber hose DN20 with coupling tongue part DN20 on both ends	6-1017-R050
---	--------------------

Packing:

Packing for Z415R03	05-1990-R001
Packing for Z415R04	05-1990-R004

Z415R05

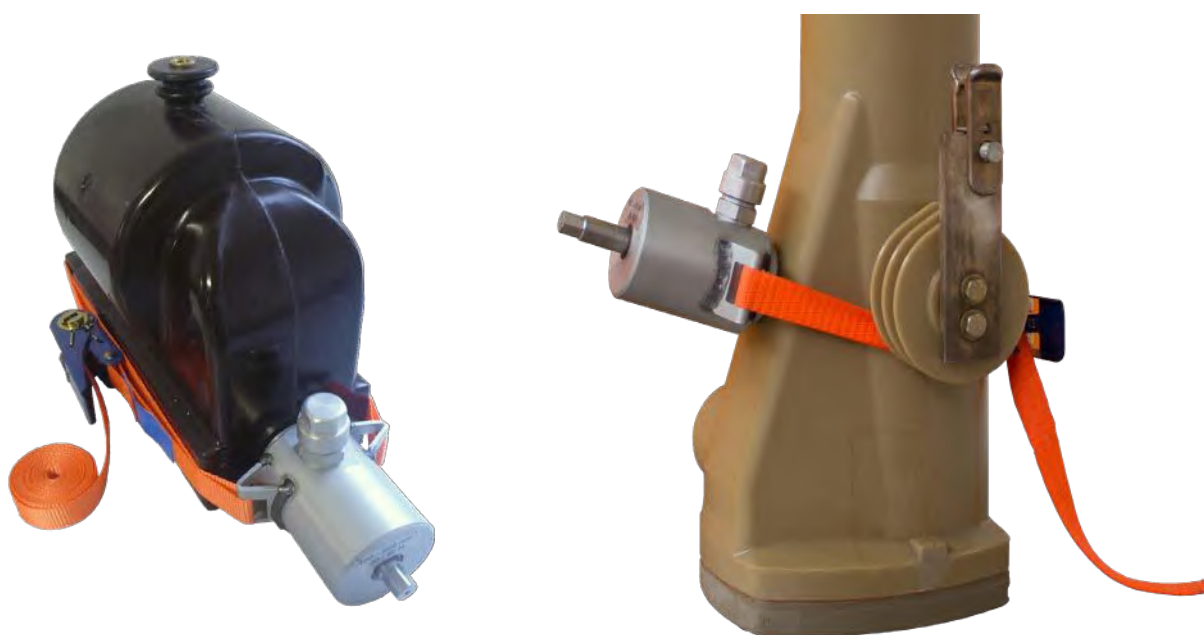
Gas tight cutting device with lashing straps

**For SF₆ gas recovery
from non-metallic gas compartments "sealed for life"**

This version has been specially designed for emission-free SF₆ gas recovery from non-metallic gas compartments - sealed for life - (e. g. medium voltage components of epoxy resin) often with uneven, convex or round surface.

The cutting device can be mounted easily on the components to be disposed of by means of lashing and ratchet straps to allow drilling the epoxy resin part without any problems. For gas recovery the service cart is connected via a DILO coupling. A sinter filter integrated in the cutting device prevents solid particles from entering the service cart during the gas recovery process.

This device configuration is particularly interesting for companies specialized in the disposal and recycling of medium voltage components.



Prior to the gas recovery process the gastight cutting device can be mounted on the medium voltage components by means of a ratchet strap.

- Operation of the device with accumulator or hand drill
- Self-closing DILO coupling as connection to the service cart
- Device with lashing and ratchet strap
- Integrated sinter filter
- Storage in a stable transport case

Further versions are available on request.

Z415R05

Gas tight cutting device with lashing straps

Z415R05

Gas tight cutting device with lashing straps

Technical data:

Dimensions: length: 360 mm, width: 295 mm, height: 165 mm
Weight: 4.8 kg

Standard equipment:

Recovery device with coupling DN8, integrated sinter filter and aluminium covering cap
4 m long ratchet strap
Tool and spare parts box
Spiral drill
2 operating manuals in German or English

Packing:

Packing for Z415R05	05-1990-R004
---------------------	--------------

3-429-R021 / R022

SF₆ Cylinder heater blanket

For heating SF₆ gas bottles

3-429-R021

SF₆ Cylinder heater blanket (900 W) 220 - 240 V 1~ 50 / 60 Hz

3-429-R022

SF₆ Cylinder heater blanket (900 W) 110 - 127 V 1~ 50 / 60 Hz

When removing large quantities of SF₆ gas the gas might be frozen. No problem, we offer the perfect solution.

The handling of the heater blanket is easy: it is wrapped around the SF₆ cylinder, fastened with wire springs and connected to the power supply.

A thermostatically controlled heater blanket heats the lower part of the gas bottle to prevent the SF₆ gas from freezing. An integrated thermostat prevents the gas bottle from being overheated.



Technical data:

Applicable for cylinder diameter: 205 - 230mm
Height: 300 mm
Heater performance: 900 W
Operating voltage: 220 - 240 V 1~ / 50 - 60 Hz, 110 - 127 V 1~ / 50 - 60 Hz

Standard equipment:

Connecting line: 1.5 m
2 operating manuals in 3 languages (German / English / French)

Optional accessories at an extra charge:

Additional operating manual on CD-ROM	6-0004-R213
---------------------------------------	-------------

Packing:

Packing for 3-429-R... (cardboard box)	3-948-R002
--	------------

Devices for SF₆ gas monitoring



For recording of SF₆ gas consumption rates DILO offers different devices with PC interface allowing easy and comfortable SF₆ stock management in connection with a database driven-software.

■ Devices for SF₆ gas monitoring

■ K091R.. Electronic bottle scales	122 – 123
■ K091R54 Weighing scales	124
■ B152R41 Mass flow measuring system	
B152R51 Mass flow measuring system (battery-operated)	125 – 126
■ B152R90 / R91 Mass flow meter with integrated filling device	127 – 128
■ B195R01 / R02 Weighing unit for "SF ₆ Monitoring Manager"	129 – 130
■ B195R30 Operating unit for "SF ₆ Monitoring Manager" Software	131 – 132
■ B195R10 / R11 "SF ₆ Monitoring Manager"	133 – 134

K091R65 / R67

Electronic bottle scales

For determination of the fill quantity of gas bottles

K091R65 (Standard)

Electronic bottle scales

Digital display with battery compartment (IP54)

K091R67 (Comfort)

Electronic bottle scales

Digital display with internal rechargeable batteries (IP65)

Integrated serial interface for data exchange or monitoring

The electronic bottle scales allow quick and easy determination of the filling capacity of a gas bottle. The large weighing platform and the supporting chain provide additional stability of the gas bottle. The weight is indicated on the illuminated display which switches off automatically if the scales are not used for a certain time. Thanks to the tare function high precision quantification of gas inputs and outputs is possible. The bottle scales can be folded easily and compactly in one step after use.



- Weighing range: up to 120 kg with tare function
- Digit increment: 10 g
- Accuracy: ± 20 g
- Weight indication reversible from kg to lbs

K091R65 / K091R67

Electronic bottle scales

Technical data K091R65:

Dimensions (if device is ready for operation): L 390 mm, W 450 mm, H 790 mm
Dimensions of weighing platform: L 300 mm, W 310 mm
Dimensions (if device is folded up): L 790 mm, W 450 mm, H 85 mm
Weight: approx. 15.8 kg
Power supply: a) Plug 100 - 240 V / 50 - 60 Hz with 2 meter long cable (only K091R65) b) Batteries (4 x 1.5 V AA) / Not included in the delivery
Protection class: IP54
Operating temperature: -10 to +40 °C

Technical data K091R67:

Dimensions (if device is ready for operation): L 390 mm, W 450 mm, H 790 mm
Dimensions of weighing platform: L 300 mm, W 310 mm
Dimensions (if device is folded up): L 790 mm, W 450 mm, H 118 mm
Weight: approx. 15.8 kg
Power supply: internal battery (12 V / 2.5 Ah) with battery charger / running time in continuous operation up to 20 hours
Protection class: IP65
Operating temperature: -10 to +40 °C

Standard equipment:

Surface: electrogalvanizing
2 operating manuals in German, English or French
Plug 100 - 240 V / 50 - 60 Hz with 2 meter long cable (only K091R65)

Optional accessories at an extra charge:

4 m long cable with M12 plug connectors for serial data exchange (only K091R67)	05-1602-R304
Additional operating manual on CD-ROM	6-0004-R213

Packing:

Packing for K091R65 / K091R67	3-775-R033-C
-------------------------------	--------------

K091R54

Weighing scales

For control of the fill quantity in 600 l gas containers

K091R54

Weighing scales

The weighing scales have been developed specially for large containers used for example in GIS production or in large substations. The weighing range of the device is up to 2,500 kg. The determined weight is indicated on the display immediately.

The integrated serial interface is a special feature allowing data communication with other DILO devices. Thus, not only the weight can be read on the service cart, but the recovery process can also be stopped via the DILO service cart after having reached the provided filling weight. Furthermore, the data can also be transmitted to the laptop or to special monitoring software. There is no easier way of SF₆ monitoring.



- Weighing range: up to 2- 2,500 kg with tare function
- Serial interface
- Digit increment: 0,1 kg
- Accuracy: ± 0,3 kg
- Weight indication reversible from kg to lbs
- Easy unloading of the weighing system during transport

Technical data:

Dimensions: L 1.150 mm, W 950 mm, H 775 mm
Net weight: about 107 kg
Operating voltage: 100 - 240 V / 50 - 60 Hz
Power supply unit and internal battery operation up to 20 hours
Protection class: IP65

Standard equipment:

Fixing and steerable rollers
Paint: orange (RAL 2004)
2 operating manuals in German, English or French

Optional accessories at an extra charge:

4 m long cable with M12 plug connectors for serial data exchange	05-1602-R304
Additional operating manual on CD-ROM	6-0004-R213

Packing:

Packing for K091R54	3-1001-R005-C
---------------------	----------------------

B152R41 / R51

Mass flow measuring system

For recording gas quantities from and to the circuit breaker

B152R41 / B152R41S15

Mass flow measuring system

with an additional resettable, adding and subtracting counter

B152R51

Mass flow measuring system (battery-operated with charge indicator)

Battery operation enables an application independent of the power supply.

With this device, gas monitoring is just that simple. Gas quantities which are filled in and recovered are registered and can be transferred to a computer. The system displays the current mass flow as well as the total mass. It is also equipped with an additional meter which can be reset, add and subtract the gas quantity. Thus, the SF₆ gas monitoring is very easy.



- System can be wall or table mounted
- Max. flow rate: 400 kg/h
- Coupling groove part DN20
- Measuring accuracy for gases: 0.50 % ± 0.1 kg/h
- PC-Hart modem with PC interface cable (available as option)
- Indication in kg, optionally in lbs

B152R41 / R51

Mass flow measuring system

B152R41 / B152R51

Mass flow measuring system

Technical data:

Dimensions: L 400 mm, D 280 mm, H 540 mm
Weight: 20 kg
System can be wall or table mounted
Indication in kg, optionally in lbs
Operating temperature: 0 to 50 °C
Operating voltage of B152R41 : 220 - 240 V / 50 - 60 Hz alternating current
Operating voltage of B152R41S15 : 110 - 127 V / 50 - 60 Hz alternating current

Standard equipment:

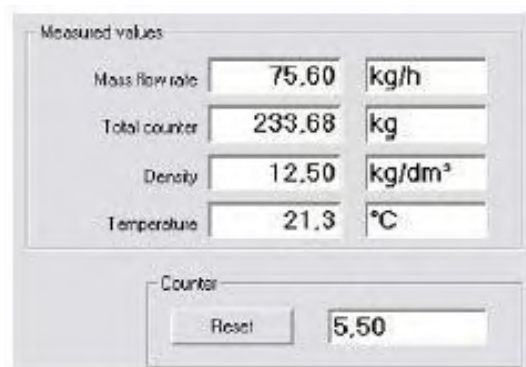
Coupling groove part DN20
Installed in a metal housing
Paint: orange (RAL 2004)
2 operating manuals in German, English or French

Optional accessories at an extra charge:

2 m long rubber hose DN20 with coupling tongue part DN20 on both ends	6-1017-R020
HART modem (USB cable) with visualization software for PC	6-1110-R002
Indication in lbs I lbs/h	6-0005-R130
Aluminium case	3-781-R018
Additional operating manual on CD-ROM	6-0004-R213

Packing:

Packing for measuring device without aluminium case	3-775-R024-C
Packing for measuring device with aluminium case	3-748-R018-C



Visualization software on the PC
(6-1110-R002)



HART modem with
USB interface cable

B152R90 / R91

Mass flow measuring system

B152R90 / B152R90S15

Mass flow meter with automatic filling function

B152R91 / B152R91S15

**Mass flow meter with automatic filling function
and wireless data transmission**

The unique combination of mass flow meter and filling device facilitates the SF₆ gas monitoring considerably. This device does not only enable the registration of the quantities filled in, but allows the automatic filling of a gas compartment at the same time. Thus the operator can select the indication of the gas quantity required or the preset filling value.

After having pressed the start key, the filling quantity required flows from the gas vessel into the gas compartment automatically.



B152R91

- System can be wall or table mounted
- Easy handling via the 5.7" coloured touch screen
- Indication in kg / lbs, bar rel. / bar abs. / kPa / MPa / psi selectable on the operating panel
- Data storing of up to 100 measuring values with names
- Indication on the meter in kg, in 5 g increments, optionally in lbs
- Data transmission via USB or wireless (B152R91 / B152R91S15)

B152R90 / R91**Mass flow measuring system**

B152R90 / B152R91

Mass flow meter with automatic filling function**Technical data:**

Dimensions: L 400 mm, D 280 mm, H 540 mm
Weight: 29 kg
Operating temperature: 0 to 50 °C
Measuring accuracy for gases: 0.50 % ± 0.1 kg/h
Operating voltage of B152R90 : 230 V / 50 - 60 Hz alternating current
Operating voltage of B152R90S15 : 100 - 127 V / 50 - 60 Hz alternating current
Operating voltage of B152R91 : 230 V / 50 - 60 Hz alternating current
Operating voltage of B152R91S15 : 100 - 127 V / 50 - 60 Hz alternating current

Standard equipment:

DILO coupling DN20
Installed in a metal housing
Paint: orange (RAL 2004)
2 operating manuals in German, English or French

Optional accessories at an extra charge:

SF ₆ gas refilling device (for connection to storage bottle)	3-393-R...
2 m long rubber hose DN20 with coupling tongue part DN20 on both ends	6-1017-R020
Indication on the meter in lbs / lbs/h	6-0005-R130
Aluminium case	3-781-R018
Additional operating manual on CD-ROM	6-0004-R213

Packing:

Packing for measuring device without aluminium case	3-775-R024-C
Packing for measuring device with aluminium case	3-748-R018-C

B195R01 / R02

Weighing unit for “SF₆ Monitoring Manager”

Mobile as cylinder cart

B195R01

With thermal transfer label printer

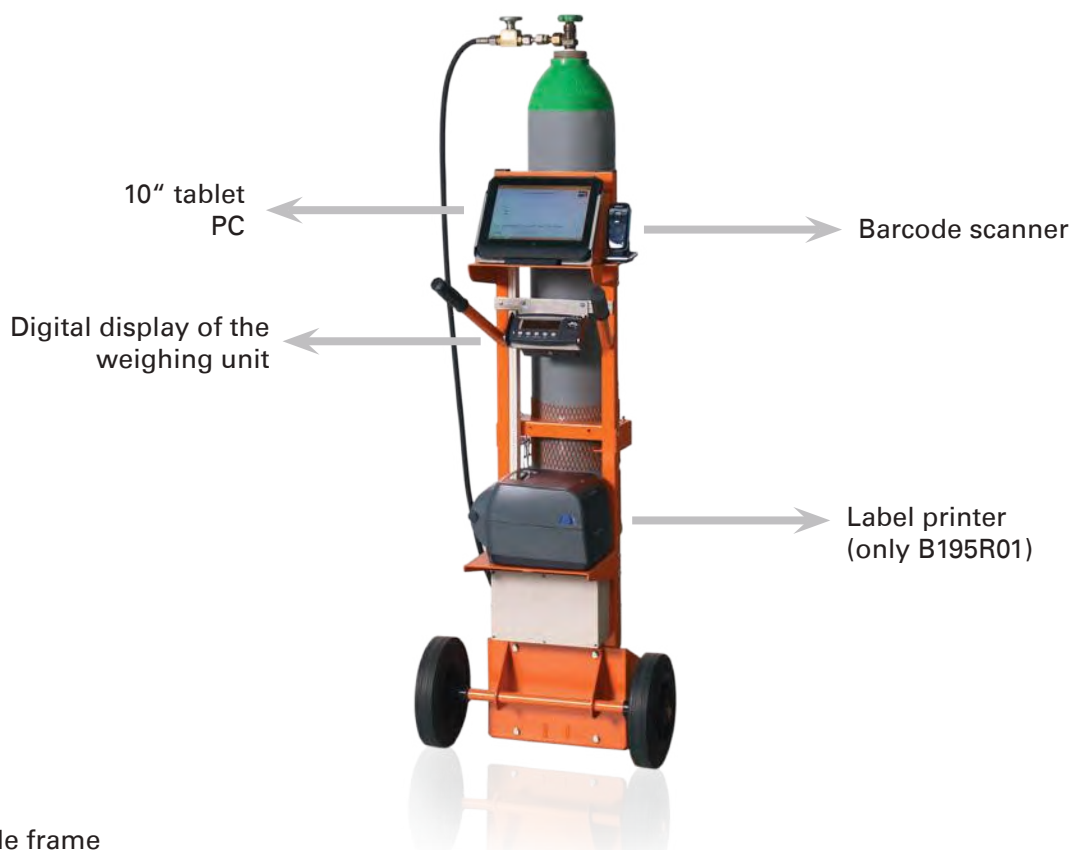
B195R02

Without thermal transfer label printer

This weighing unit is a useful tool for the stock management of SF₆ cylinders in connection with the “SF₆ Monitoring Manager” database software. The quantity of SF₆ stored in gas bottles is precisely determined by means of electronic scales, incoming and outgoing gas vessels are identified by means of the integrated barcode scanner. The required barcode labels can be printed on site with the label printer (only B195R01).

Gas quantities being filled or withdrawn are registered by the weighing unit and are allocated to the corresponding storage location or customer location via the computer tablet. This unit also enables the registration of the gas quality (e. g. new gas or reuse gas). In filling mode any gas quantities can be withdrawn from the bottle and transferred to other gas vessels. Its difference is immediately registered in the database.

For detailed information on the “SF₆ Monitoring Manager” database software please see our B195R10 / R11 data sheet.



- Stable frame
- Electronic weighing unit: digit increment 10 g, accuracy ± 20 g
- Network independent by Li-Ion battery operation
- 10" tablet computer with database connection via LAN/WLAN
- 2D capable cordless barcode scanner with Bluetooth interface

B195R01 / R02**Weighing unit for “SF₆ Monitoring Manager”**

B195R01 / R02

Weighing unit for “SF₆ Monitoring Manager”**Technical data:**

Dimensions: L 650 mm, W 570 mm, H 1.320 mm
Dimensions of weighing platform: L 300 mm, W 310 mm
Weight: 45 kg
Operating voltage: 100 - 240 V / 50 - 60 Hz alternating current (for battery charger)

Standard equipment:

10" tablet computer with database connection via LAN/WLAN
Only for B195R01: Thermal transfer printer for label width to 100 mm, mounting plate included in the scope of supply
Electronic weighing unit
Battery operation with Li-Ion battery
2D capable cordless barcode scanner with Bluetooth interface
Paint: orange (RAL 2004)
2 operating manuals in German, English or French

Important note:

The device can only be operated in connection with the “SF₆ Monitoring Manager” software.

SF₆ Monitoring Manager:

Web-based data software for SF₆ gas monitoring (cloud solution or installation on internal server)

Initial installation	B195R10
Annual user fee including updates and online support	B195R11

Optional accessories at an extra charge:

Additional operating manual on CD-ROM	6-0004-R213
---------------------------------------	--------------------

Packing:

Packing for B195R01 / B195R02	3-262-R006-C
-------------------------------	---------------------

B195R30

Operating unit for "SF₆ Monitoring Manager" Software

Monitoring system for connection to digital weighing scales and filling devices with portable case

This operating unit is a useful tool for the stock management of SF₆ cylinders and containers in connection with the "SF₆ Monitoring Manager" database software. The integrated interface allows the connection of the operating unit to all DILo weighing scales and gas refilling devices equipped with a serial interface for data exchange or monitoring.

The device is portable and can therefore be used on different sites and allows access to the central monitoring database via LAN/WLAN connection.

Incoming and outgoing gas vessels are identified by means of the integrated barcode scanner. The barcode labels for clear identification of the vessels can be printed on site with the label printer.

The monitoring system considerably simplifies the stock management of gas quantities currently in use for switchgear production or at utility companies. Thus, the time-consuming manual registration of SF₆ gas quantities in use is no longer an issue.

For more information on the "SF₆ Monitoring Manager" software please see our separate data sheet.



The operating unit can be easily connected to digital DILo weighing scales or gas refilling devices.



- 10" tablet computer with database connection via LAN/WLAN
- Interface for electronic weighing units and gas refilling devices
- 2D capable cordless barcode scanner with Bluetooth interface
- Thermal transfer printer for label width to 100 mm
- Stable plastic case

B195R30

Operating unit for “SF₆ Monitoring Manager” Software

B195R30

Operating unit for “SF₆ Monitoring Manager” Software

Technical data:

Dimensions: L 610 mm, W 470 mm, H 280 mm
Weight: 17 kg
Operating voltage: 100 - 240 V / 50 - 60 Hz alternating current

Standard equipment:

10" tablet computer with database connection via LAN/WLAN
Thermal transfer printer for label width to 100 mm
2D capable cordless barcode scanner with Bluetooth interface
Black transport case
2 operating manuals in German, English or French

Important note:

The device can only be operated in connection with the “SF₆ Monitoring Manager” software.

SF₆ Monitoring Manager:

Web-based data software for SF₆ gas monitoring (cloud solution or installation on internal server)

Initial installation	B195R10
Annual user fee including updates and online support	B195R11

Optional accessories at an extra charge:

Additional operating manual on CD-ROM	6-0004-R213
---------------------------------------	-------------

Packing:

Packing for B195R30	3-775-R027-C
---------------------	--------------

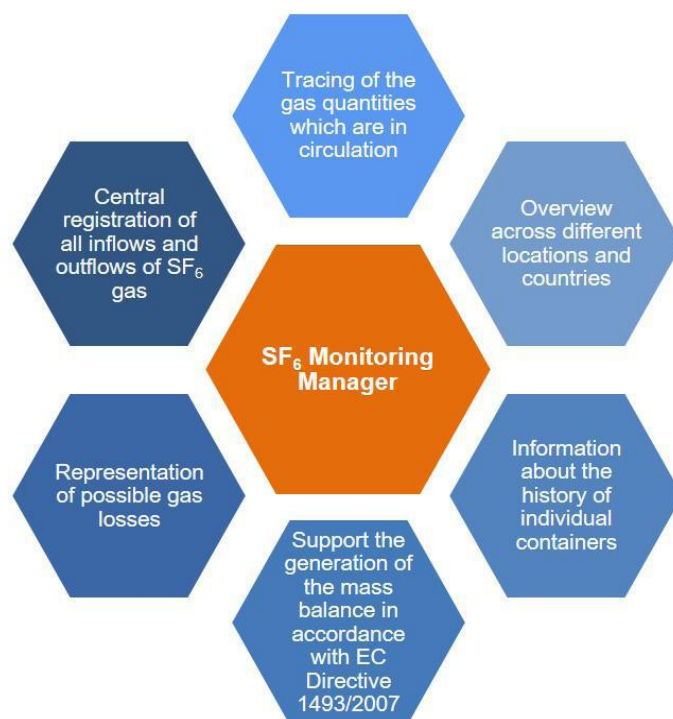
B195R10 / R11

„SF₆ Monitoring Manager“ Software

Software for the central stock management of SF₆ gas

The "SF₆ Monitoring Manager" is a database-driven software tool for the intelligent stock management of SF₆ gas in switchgear production and for utility companies. All DILO weighing systems and gas refilling devices as well as mass flowmeters with digital interfaces can be connected to the database.

The user-friendly software makes it possible to monitor and log the SF₆ stock – even across different locations and countries. All incoming and outgoing SF₆ vessels can be recorded and logged by means of the software. The history of vessels is thus traceable via an automatically assigned ID number. Vessels can also be freely defined, e.g. cylinders, containers, stationary tanks or GIS components. The supervisor can make changes and manual entries.



The key monitoring parameters at a glance:

- Type of vessel and ID number
- Date of addition and withdrawal
- Net weight
- Tare weight
- Storage location
- Supplier
- Type of gas (new gas, reuse gas, gas for disposal)
- Gas quality (moisture, SF₆ percentage)
- Recipient address

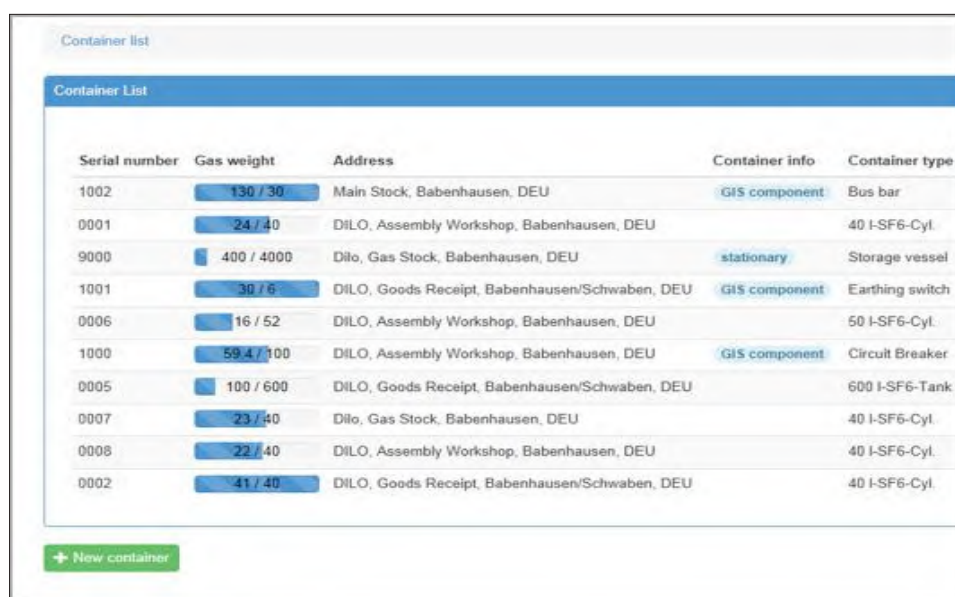
Other customer-specific data can be added. There are four more fields available for this purpose.

B195R10 / R11**„SF₆ Monitoring Manager“ Software**

B195R10 / R11

„SF₆ Monitoring Manager“ Software

The statistics centre provides information about the total gas quantity, broken down by countries and sites. Any gas leaks can likewise be "tracked" within a specified time period per vessel. Finally, the user gets a so-called "at a click" overview of the current SF₆ stock, even at different locations, whereby the generation of the SF₆ mass balance in accordance with 1191/2014 EU Directive and the compliance and asset management is considerably simplified.



Serial number	Gas weight	Address	Container info	Container type
1002	130 / 30	Main Stock, Babenhausen, DEU	GIS component	Bus bar
0001	24 / 40	DILO, Assembly Workshop, Babenhausen, DEU		40 I-SF6-Cyl.
9000	400 / 4000	Dilo, Gas Stock, Babenhausen, DEU	stationary	Storage vessel
1001	30 / 6	DILO, Goods Receipt, Babenhausen/Schwaben, DEU	GIS component	Earthing switch
0006	16 / 52	DILO, Assembly Workshop, Babenhausen, DEU		50 I-SF6-Cyl.
1000	59.4 / 100	DILO, Assembly Workshop, Babenhausen, DEU	GIS component	Circuit Breaker
0005	100 / 600	DILO, Goods Receipt, Babenhausen/Schwaben, DEU		600 I-SF6-Tank
0007	23 / 40	Dilo, Gas Stock, Babenhausen, DEU		40 I-SF6-Cyl.
0008	22 / 40	DILO, Assembly Workshop, Babenhausen, DEU		40 I-SF6-Cyl.
0002	41 / 40	DILO, Goods Receipt, Babenhausen/Schwaben, DEU		40 I-SF6-Cyl.

+ New container

The software can also be upgraded for other gases upon request.

Software features

- Web-based front-end
- Windows operating system
- Cloud or network solution
- Able to deal with multiple clients
- User and authorisation management
- Data collection terminal connection via LAN/WLAN
- Encrypted data transmission
- Central software update in the Cloud

Initial installation	B195R10
Annual user fee including updates and online support	B195R11

The DILO license terms and the general terms and conditions for software use apply.

Purification and preparation of SF₆ gas mixtures



SF₆ Recycling and reuse

There is no need to dispose of used SF₆ gas containing an unacceptably high percentage of nitrogen or air.

The DILO separating units allow SF₆ gas mixtures to be purified up to the desired quality level.

■ Preparation of SF₆ gas

- SF₆/N₂ separating plant B121R12 137 – 139
- Preparation of SF₆ gas as a service 140

Purification and preparation of SF₆ gas mixtures

In practice, it often happens that the used SF₆ gas is contaminated with air by inadequate evacuation or improper gas handling. Used SF₆ gas containing an unacceptably high percentage of nitrogen and air can be prepared by DILO separating units to the desired quality level.

The advantages of gas preparation:

- Minimization of waste disposal costs
- Lower costs for new gas
- Less expenses for transportation
- Reduced storage costs

The purity degree of the prepared SF₆ gas fully complies with IEC 60480 directive for used SF₆ gas. The values achieved as to

- Humidity
- SF₆ volume
- Decomposition products (SO₂)

are far below the reference values of IEC 60480 directive and are even lower than the values stipulated by **IEC 60376** (regulation for new SF₆ gas) and Chinese regulation **GB/T 12022/2006** (Chinese standard for new SF₆ gas).

B121R12

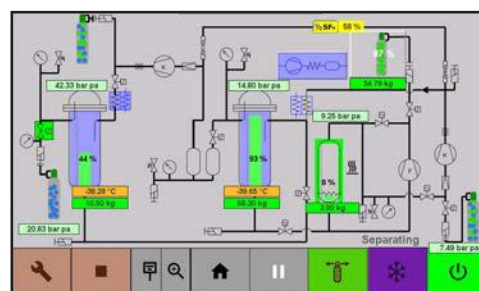
SF₆/N₂ separating plant

For purification and preparation of SF₆ gas mixtures

This unit allows the preparation of used SF₆ gas containing an inadmissibly high percentage of nitrogen or air to the desired quality so that the SF₆ can be reused in gas compartments. Consequently, costs for storage, disposal and transportation can be reduced considerably and the expenses of new gas can be minimised.

The purification technology of the separating unit is based on the SF₆ condensation under pressure at low temperature principle. We recommend using this unit where large SF₆ quantities have to be purified and prepared.

The purity degree of the prepared SF₆ gas corresponds to the **IEC 60480** guideline for used SF₆ gas. The values measured regarding moisture, SF₆ percentage and decomposition products (SO₂) are considerably lower than the **IEC 60376** guideline for new SF₆ gas and the **GB/T 12022/2006** Chinese standard for new SF₆ gas.



View of the operating interface. The process is permanently displayed on the screen.

- Purity degree of the reclaimed SF₆ gas: ≥ 99 %
- Gas mixtures with a SF₆ concentration of ≥ 40 % can be separated
- Automatic analysis of the gas mixture
- Optimisation of the separation process
- Integrated gas measurement with gas return system
- Separation capacity approx. 10 – 30 kg/h
- Automatic filtration process to eliminate contamination (pore size < 1 µm))
- User friendly configuration easy to maintain
- Web-based remote control is available

On request we also supply special versions for the preparation of SF₆/CF₄ gas mixtures.

B121R12**SF₆/N₂ separating plant****Process cycle:**

The gas mixture is compressed by a compressor, pre-cooled via a heat exchanger and purified from moisture and dust particles by a filter unit before passing into the separating tank.

The gas separation is based on the SF₆ condensation at low temperature principle and is carried out in two stages resulting in high gas purity and low loss of SF₆.

The residual gases containing only low SF₆ quantities are stored in an external buffer tank for disposal.

The reclaimed liquid SF₆ is filled into external tanks. When using the corresponding DILO weighing scales the filling process is stopped automatically once the tank is full.

The complete process runs automatically by means of a programmable control. The touch screen allows comfortable and menu-driven operation. The most important process parameters are displayed on the touch screen. This unit allows to set priority on highest separation capacity or on best possible gas purity.

Technical data:

Dimensions: L 3,000 mm, B 1,500 mm, H 1,900 mm
Weight: 2,300 kg
Operating voltage: 380 - 420 V / 50 Hz 3-phase current (special voltages are available)
Power consumption: approx. 15 kW

Standard equipment:

TM 2.5 oilfree DILO compressor (15 m ³ /h [at 50 Hz], 23 bar)
TM 5.0 B oilfree DILO compressor (5.7 m ³ /h [at 50 Hz], 50 bar)
Liquid pump (125 l/h [at 50 Hz], 35 bar)
Refrigeration unit with closed cooling circuit
Low pressure and high pressure tank
Buffer tank
Dry filter and particle filter unit
Electric control with automatic process control
10" touch panel
Connecting hose for SF ₆ bottles or storage vessels
Fork lift provisions, crane eyelets
Paint: orange (RAL 2004)
2 operating manuals in German, English or French

Optional equipment (mounted) at an extra charge:

Additional price for electrical special voltage of the separating plant ... V / ... Hz	6-0005-R042
--	--------------------

B121R12

SF₆/N₂ separating plant

Optional accessories at an extra charge:

Weighing scales for LGB 600 I container	K091R54
Electronic bottle scales (comfort version)	K091R67
5 m long rubber hose DN20 with coupling tongue part on both ends	6-1017-R050
7 m long rubber hose DN20 with coupling tongue part on both ends	6-1017-R070
10 m long rubber hose DN20 with coupling tongue part on both ends	6-1017-R100
4 m long cable with M12 plug connectors for weighing device and cylinder scales	05-1602-R304

Packing:

Packing for B121R12	3-762-R103-C
---------------------	---------------------

Preparation of SF₆ gas as a service

The measured SF₆ quality does not fulfil the required purity standards?

No problem! The SF₆ quality not complying with the corresponding specification can be prepared or reclaimed for reuse on site. For such applications we can offer our services to be performed by our certified staff.

For larger gas quantities it is recommended to handle separation works on site. For this purpose the following options can be offered:

- Rental of a SF₆/N₂ separating unit and our technicians carry out the separation of the SF₆-/air mixture on site.
- Rental of a device including instruction of the operating personnel. Then the separation works are executed by the customer.
- The preparation of gas is done in our premises. The SF₆-gas is either returned to the customer or reclaimed by DILO. The quality of the reclaimed and purified gas can be determined by means of the supplied weighing device. A certificate on the gas quality and reclaimed gas quantity is issued (F-gas monitoring).

Comprehensive gas management with DILO.

Service Hotline

Our technical aftersales service is available:

Phone: +49 (0) 83 33 - 302-94

E-Mail: service@dilo-gmbh.com

SF₆ Measuring devices



A range for all requirements

DILO offers a complete range of measuring devices for all applications including: room monitoring systems, leak detectors, measuring devices to determine the SF₆ quality as well as relevant accessories for simple on-site measurement and retrofit kits for old measuring devices.

■ SF₆ Measuring devices

■ Devices for determination of the SF ₆ gas quality	142 – 156
■ SF ₆ gas detectors	157 – 164
■ Density monitor testing devices	165 – 170
■ Accessories for measuring devices	171 – 176

SF₆ Measuring devices

Measuring instruments are used to monitor ambient air, trace leaks and to measure the SF₆ quality of electrical operating equipment.

The SF₆ gas must always be pure since humidity and toxic or corrosive decomposition products in circuit breakers impair the insulating properties of the gas.

The gas quality has to be monitored in accordance with the EC 517/2014 directive on fluorinated gases. The IEC 60480 directive also stipulates the limit values for the re-use of SF₆ gas.

It is absolutely necessary to know the gas quality before carrying out maintenance works on a circuit breaker in order to be able to decide on preparation, re-use or disposal of the SF₆ gas.

The essential **quality criteria** for SF₆ gas in circuit breakers are as follows:

- Humidity (dew point)
- Decomposition products
- Gas purity in %



Devices for determination of the SF₆ gas quality

For verification of several parameters with only one measurement

3-035R-R...

MIRROR-ANALYSER^{SF6}

This multi-functional device allows the determination of up to three quality parameters with only one measurement:

- Moisture concentration (frost point / dew point)
- SF₆ volume percentage
- SO₂ concentration

The MIRROR-ANALYSER^{SF6} uses the physical dew point mirror measuring principle which is characterised by its high precision and utmost reliability in order to measure the moisture content. By cooling the integrated mirror the moisture content of the gas is determined by measuring the temperature depending on the condensation or icing of the mirror. The other parameters of SF₆ quality are determined by measuring the speed of sound (SF₆ volume percentage) and electrochemical reaction (SO₂ concentration).



- High accuracy and reliability in moisture determination (dew point mirror measuring principle)
- No emissions of measuring gas (integrated gas return system)
- Modular interchangeability of the sensors
- Low maintenance due to self-test functions
- Easy and user-friendly menu navigation via high quality 7" capacitive colour touch screen
- Results of up to 500 measurements can be stored with name, date and time
- USB- and LAN connection
- Adjustable user languages: DE, EN, FR, ES
- Compact design, easy handling and transportation (installed in a trolley case)

Devices for determination of the SF₆ gas quality

3-035R-R...

MIRROR-ANALYSER SF₆

The "MIRROR-ANALYSER SF₆" is a compact, user- and maintenance-friendly device which guarantees high measuring precision. The unit allows different kinds of measurements and treatment of the measuring gas in one of the following ways:

- The measuring gas can be stored in an internal storage vessel and pumped back into the gas compartment (up to 10 bar p_e)

- External storage of the measuring gas into a cylinder

For measurements on cylinders, vessels or gas compartments with higher pressure (max. inlet pressure 35 bar p_e) or if the measuring gas should not be pumped back into the unit, a cylinder can be connected directly to the outlet (max. 10 bar p_e). It is not necessary to use a pressure reducer and to separate the device from the gas cylinder or the gas compartment.

- External storage of the measuring gas into a gas collecting bag

An external gas collecting bag can be connected allowing continuous measurements (inlet pressure max. 35 bar p_e) without pumping the gas back. Afterwards it is possible to empty the external bag by using the MIRROR-ANALYSER SF₆, a service cart or compressor unit.

Precise and correct results for subsequent measurements can be guaranteed by rinsing the measuring hose prior to each measurement. The device is very maintenance-friendly. The residual lifetime of the SO₂ electrochemical sensor is indicated automatically. The dew point mirror has self-test functions.

A very practical and useful device.

Technical data:

Dimensions: Length 500 mm, Width 625 mm, Height 297 mm
Weight: approx. 27.5 kg
Inlet pressure: p _e 0.2 – 35 bar
Operating temperature: -10 °C to +40°C
Ambient moisture: max. 90 % relative moisture, non-condensing during operation
Operating voltage: 100 - 240 VAC 50/60 Hz
Number of measured values to be stored: max. 500
Interface: USB/LAN
Measuring time: variably calculated by the system (5-7 min; max. 10 min)
Limit value dew point: adjustable from -50°C to +20°C
Limit value vol.-%: adjustable from 0.0 to 99.9%
Limit value SO ₂ : adjustable from 0.0 to 499.9 ppm _v
Indication of moisture concentration in dew point °C or °F, referred to atmospheric or inlet pressure, reversible to indication in ppm _v , ppm _M
Inlet pressure indication in pa or p _e , psi, kPa, MPa

Standard equipment:

Transport case; 6 m long connecting hose with DILO couplings DN8 and DN20; 2 m long connecting cable
USB stick with data evaluation and reading out of measured data
1 operating manual (multilingual)

3-035R-R...

MIRROR-ANALYSER ^{SF₆}

Sensor data:

	Frost- /Dew point	Volume percentage	SO ₂
Measuring principle	Dew point mirror (physical measuring principle)	Velocity of sound	Electrochemical reaction
Measuring range	-50 °C to +20 °C	0 - 100.0 vol.-% SF ₆	0 - 20 ppm _v 0 - 100 ppm _v 0 - 500 ppm _v
Measuring accuracy	±0.5 °C	±0.5 %	< 2 % of the measuring range
Reproducibility	±0.2 °C	±0.3 %	< 4 % / year or < 2 % / month
Long-term stability			< 2% signal loss / month
Recommended calibration interval	2 years	2 years	2 years

Ordering designation of the MIRROR-ANALYSER ^{SF₆}:

Single measuring device for moisture: -50 to +20°C	3-035R-R102
Two-in-one measuring device for moisture: -50 to +20°C, percentage 0-100 vol.-%	3-035R-R201
Three-in-one measuring device for moisture: -50 to +20°C, percentage 0-100 vol.-%, SO ₂ with 0-20 ppm _v	3-035R-R301
Three-in-one measuring device for moisture -50 to +20°C, percentage 0-100 vol.-%, SO ₂ with 0-100 ppm _v	3-035R-R302
Three-in-one measuring device for moisture -50 to +20°C, percentage 0-100 vol.-%, SO ₂ with 0-500 ppm _v	3-035R-R303

Options (please inquire separately): All devices with percentage measuring system are additionally available for SF₆ concentrations in SF₆/CF₄ gas mixtures (measuring accuracy: ±2.0 vol.-%). Thus it is possible to switch over between the SF₆/N₂ and SF₆/CF₄ measurement.

Optional accessories at an extra charge:

External compressor for increase of pressure for application of the MIRROR-ANALYSER ^{SF₆} in medium voltage switchgear with a pressure < 0.2 bar pe	3-826-R003
Discharge gas collecting bag	B151R95
Adapter case for measuring devices	Z340R42
6 m long connecting hose with self-closing couplings (as extension hose)	3-531-R060

Packing:

Packing for 3-035R-R...	3-775-R024-C
-------------------------	---------------------

Devices for determination of the SF₆ gas quality

For verification of several parameters in one operation

3-038R-R...

SF₆-Multi-Analyser with return system

This multi-functional device allows the determination of up to six quality parameters with only one measurement:

- SF₆ concentration (%)
- Moisture concentration
- SO₂ concentration (ppm_v)
- Options: HF concentration, H₂S concentration, CO concentration (in ppmv each)

The SF₆-Multi-Analyser is a battery operated, compact, user and maintenance-friendly device which guarantees high measuring accuracy. The unit allows different kinds of measurements and treatment of the measuring gas in one of the following ways:

- The measuring gas can be stored in an internal storage vessel and pumped back into the gas compartment (up to 10 bar p_e).
- For measurements at cylinders, vessels or gas compartments with higher pressure (max. inlet pressure 35 bar p_e) or if the measured gas should not be pumped back, a cylinder can be connected to the outlet (max. 10 bar p_e). It is not necessary to use a pressure reducer and to separate the device from the cylinder or the gas compartment.
- An external gas collecting bag can be connected allowing continuous measurements (inlet pressure max. 35 bar p_e) without pumping the gas back. Afterwards it is possible to empty the external bag by using the SF₆-Multi-Analyser, a service cart or compressor unit.



If the sensors have to be calibrated they can easily be exchanged by the operator on site. The device is immediately ready for use without loss of time based on the "Plug & Play" principle.

- No emissions of measuring gas
- Modular interchangeability of the sensors
- Easy and user friendly menu navigation via high quality 7" capacitive colour touch screen
- Results of up to 500 measurements can be stored with name, date and time
- Battery and external power supply
- USB and LAN connection
- Adjustable user languages: DE, GB, FR, ES, IT, PT, CZ, PL, CN, JPN, RUS
- Compact design, easy handling and transportation (installed in trolley case)

3-038R-R...

SF₆-Multi-Analyser

Precise and correct results for subsequent measurements can be guaranteed by purging the measuring hose prior to each measurement.

Another big advantage of the SF₆-Multi-Analyser is its high precision. SF₆ humidity is measured at operating pressure. Thus very precise results are obtained during a short measuring time even in the critical dew point range (< -40 °C). The dew point at ambient temperature will be calculated.

The device is very maintenance friendly. The residual lifetime of the SO₂ electrochemical sensors is indicated automatically. A very practical and useful device.

Note:

Devices with gas return system:

The measuring gas is collected and can be stored in an internal or external storage vessel by means of a compressor.

After the measurement the stored measuring gas can be pumped back from the internal and external storage vessel (depressurised) into the gas compartment or a connected cylinder.

No SF₆ gas is released into the atmosphere!

Technical data:

Dimensions: L 406 mm, W 538 mm, H 269 mm
Weight with gas return system: approx. 25 kg
Input pressure: p _e 0.2 - 35 bar
Operating temperature: -10 °C to +50 °C
Ambient moisture: up to 90 % relative moisture, non condensing during operation
Operating voltage: 100-240 VAC, 50/60Hz
Number of measured values to be stored: max. 500
Interface: USB/LAN
Measuring time: variably calculated by the system, max. 15 minutes
Limit value vol.-%: adjustable from 0.0 to 99.9 vol.-%
Limit value dew point: adjustable from -60 °C to +20 °C
Limit value SO ₂ : adjustable from 0.0 to 499.9 ppm _v
Indication of moisture concentration in dew point °C or °F, referred to atmospheric or input pressure, reversible to indication in ppm _v , ppm _M
Input pressure indication in bar p _a or p _e , psi, kPa, MPa

Standard equipment:

Transport case; 6 m long connecting hose with DILO couplings DN8 and DN20; 2 m long connecting cable
USB stick with data file for evaluation and reading out of measured data
CD-ROM
1 operating manual (multilingual) on CD-ROM

Devices for determination of the SF₆ gas quality

3-038R-R...

SF₆-Multi-Analyser

Sensor data:

	Vol. %	Moisture	SO ₂	Option: HF	Option: H ₂ S	Option: CO
Measuring principle	Velocity of sound	Electronic moisture measurement (capacitive)	Electrochemical reaction	Electrochemical reaction	Electrochemical reaction	Electrochemical reaction
Measuring range	0 - 100 vol.-%	-60 to +20 °C	0 - 20 ppm _v 0 - 100 ppm _v 0 - 500 ppm _v	0 - 10 ppm _v	0 - 100 ppm _v	0 - 500 ppm _v
Measuring accuracy	±0.5 vol.-%	±2 °C (at > -40 °C) ±3 °C (at < -40 °C)	< ±2 % of measuring range	< ±10 % of measuring range	< ±2 % of measuring range	< ±2 % of measuring range
Measuring gas pressure	atm. pressure	gas compartment pressure	atm. pressure	atm. pressure	atm. pressure	atm. pressure
Flow rate	0.3 - 0.5 l/h	16 - 17 l/h	1 - 3 l/h	1 - 3 l/h	1 - 3 l/h	1 - 3 l/h
Reaction time	< 2 min	< 5 min	< 20 s	< 5 min	< 20 s	< 20 s
Recommended calibration interval	every two years	every two years	every two years (lifetime)	every two years (lifetime)	every two years (lifetime)	every two years (lifetime)
Long term sensitivity drift			< 2 % per month	< 5 % per month	< 2 % per month	< 2 % per month
Overload protection	automatic	automatic	automatic	automatic	automatic	automatic

Ordering designations of the SF₆-Multi-Analyser:

Device with gas return system

3-038R-

Single measuring device for percentage measurement 0 - 100 vol. -%	R101
Single measuring device for moisture measurement -60 °C to +20 °C dew point temperature	R102
Two-in-one measuring device for percentage and moisture measurement	R201
Three-in-one measuring device for measurement of percentage, moisture and SO ₂ with 0 - 20 ppm _v	R301
Three-in-one measuring device for measurement of percentage, moisture and SO ₂ with 0 - 100 ppm _v	R302
Three-in-one measuring device for measurement of percentage, moisture and SO ₂ with 0 - 500 ppm _v	R303
Four-in-one measuring device for measurement of percentage, moisture, SO ₂ with 0 - 20 ppm _v and HF with 0 - 10 ppm _v	R401
Four-in-one measuring device for measurement of percentage, moisture, SO ₂ with 0 - 100 ppm _v and HF with 0 - 10 ppm _v	R402
Four-in-one measuring device for measurement of percentage, moisture, SO ₂ with 0 - 500 ppm _v and HF with 0 - 10 ppm _v	R403
Six-in-one measuring device for measurement of percentage, moisture, SO ₂ with 0 - 100 ppm _v , HF with 0 - 10 ppm _v , H ₂ S with 0 - 100 ppm _v and CO with 0 - 500 ppm _v	R602

Options (please inquire separately):

All devices with percentage measuring system are additionally available for SF₆ concentrations in SF₆/CF₄ gas mixtures (measuring accuracy: ±2.0 vol. -%). Thus it is possible to switch over between the SF₆/N₂ and SF₆/CF₄ measurement.

Optional accessories at an extra charge:

External compressor for increase of pressure for application of the SF ₆ -Multi-Analyser in medium voltage switchgear with a pressure of < 0.3 bar p _e	3-826-R003
Discharge gas collecting bag	B151R95
Adapter kit for measuring devices	Z340R42
6 m long connecting hose with self-closing couplings (as extension hose)	3-531-R060
Additional operating manual on CD-ROM	6-0004-R213

Packing:

Packing for 3-038R-R...	3-775-R104
-------------------------	-------------------

For determination of moisture

3-037-R001

Electronic moisture measuring device with dew point indication

Moisture is the most important criteria for the determination of the gas quality. This device has been designed specially for SF₆ moisture measurements. It also shows a higher resistance against contamination and SF₆ decomposition products than conventional moisture sensors and even minimises the usual long time drifting.

The integrated electronic flow meter supports the minimisation of the gas sample quantity and works independently of its position which is the optimum for gas sampling from circuit breaker. Pressure and temperature influences on the measuring result can be excluded. It is a reliable instrument which is indispensable.



- Indication in °C dew point, quick conversion into ppm values
- Measurement is possible under atmospheric or plant pressure
- Mains operation or operation by NiMH accumulators

Devices for determination of the SF₆ gas quality

3-037-R001

Electronic moisture measuring device with dew point indication

Technical data:

Dimensions (without handle): W 210 mm, H 85 mm, D 250 mm
Dimensions (transport case): W 360 mm, H 290 mm, D 165 mm
Weight: 2.8 kg
Measuring principle: Electronic moisture measurement (capacitive)
Measuring range: -60 to +20 °C dew point
Measuring accuracy: ±2 °C (from -40 to +20 °C), ± 3 °C (from -60 to -40 °C)
Input pressure: p _e 0.5 - 10 bar
Operating temperature: 0 - 50 °C
Ambient moisture: up to 90 % relative moisture, non condensing during operation
Operating voltage: 100 - 240 V / 50 - 60 Hz

Standard equipment:

Moisture measuring device with digital display
2 precise regulating valves and electronic flowmeter
Operation: mains-operated or by NiMH batteries (battery charger is integrated)
2 m long connecting hose with couplings DN8 and DN20
Robust housing with handle for placing and transportation
2 m long connecting cable with mains plug
Black plastic transport case
1 operating manual (multilingual) on CD-ROM

Optional accessories at an extra charge:

Discharge gas collecting bag (for emission-free measurement)	B151R95
Additional operating manual on CD-ROM	6-0004-R213

Packing:

Packing for 3-037-R001	05-1990-R004
------------------------	---------------------

For measurement of the volume percentage in air and nitrogen mixtures

3-027-R002

SF₆ Volume percentage measuring device

This device serves for measuring the gas purity necessary to maintain the dielectric property for arc quenching in circuit breakers. Thanks to the speed of sound measurement developed by DILO it provides results immediately. The microprocessor installed converts the values measured into the SF₆ volume percentage.

Easy rinsing after the measuring process - and the device can be used again for another gas compartment immediately.

The device can be deployed for measurements of pure SF₆ gas or SF₆ gas mixtures containing N₂ or CF₄.

In this case we kindly ask you to contact DILO.



- Easy handling
- Measurement independent of the air pressure and its position
- Response time about 1 minute
- Digital indication of the measuring values

Devices for determination of the SF₆ gas quality

3-027-R002

SF₆ Volume percentage measuring device

Technical data:

Dimensions (with handle): W 415 mm, H 155 mm, D 450 mm
Dimensions (transport case): W 535 mm, H 180 mm, D 470 mm
Weight: 10.5 kg
Weight with transport case: 14 kg
Measuring media: SF ₆ / N ₂ or SF ₆ / air-gas mixtures
Measuring principle: Velocity of sound
Measuring range: 0 - 100 volume-% SF ₆
Measuring accuracy: ± 0.5 volume-% for SF ₆ / N ₂ -gas mixture or SF ₆ / air-gas mixture
Operating pressure: input pressure of the device without pressure regulation p _a (absolute) = 1.7 to 10 bar (p _e [effective] = 10.2 to 130.5 psi). At a pressure of p _a (absolute) = 1.2 to 1.7 bar (p _e [effective] = 2.9 to 10.2 psi) the function is still guaranteed. However, the response time increases.
Measuring pressure: The measuring process is effected under atmospheric pressure.
Operating temperature: temperature compensation of -20 °C to +50 °C (-4 °F up to +122 °F) ambient temperature
Ambient moisture: up to 90 % relative moisture, non condensing during operation
Response time: Approx. 1 min. with a rinsed connecting hose. The response time as well as the rinsing of the connecting hose depend on the supply pressure. In the most unfavourable case at p _a (absolute) = 1.7 bar (p _e [effective] = 10.2 psi) the time to get an exact measurement is 5 min. if the rinsing valve is not operated.
Flow rate: max. 1.2 g / min. (0.04 oz / min) at 100 % SF ₆ gas and an operating pressure of p _a (absolute) = 10 bar (p _e [effective] = 130.5 psi)
Electrical connection: 220 V - 240 V / 50 - 60 Hz reversible to 110V - 127V / 50 - 60 Hz
Interface: RS232

Standard equipment:

Volume percentage measuring device with digital display
Measuring cell with electronic part
2 m long connecting hose with coupling DN8 and DN20
Housing with front and back covering with big handle for transportation and placing of the device
Mains plug with 2 m long connecting cable
Transport case
1 operating manual (multilingual) on CD-ROM

Optional accessories at an extra charge:

Data cable for RS232 interface and CD-ROM with computer indicating programme	6-1106-R001
Discharge gas collecting bag (for emission-free measurement)	B151R95
Additional operating manual on CD-ROM	6-0004-R213

Retrofit kit for discharge gas collecting bag is available upon request (only for devices with delivery date until mid of 2014).

Packing:

Packing for 3-027-R002	3-775-R009-C
------------------------	--------------

For measurement of the SO₂ concentration in gas mixtures

3-032-R...

Portable SO₂ measuring device with LED indication

Before maintenance works are carried out it is absolutely necessary to know the gas quality. This special equipment allows precise measurement of SO₂ in gas mixtures. Furthermore this device is very resistant against contamination and SF₆ decomposition products and is therefore a reliable instrument for each revision of circuit breakers.



- Minimization of the usual long term drifting
- No pressure and temperature influences on the measuring result
- Indication in ppm_v

Devices for determination of the SF₆ gas quality

3-032-R...

Portable SO₂ measuring device with LED indication

Technical data:

Dimensions (without handle): W 170 mm, H 85 mm, D 260 mm
Dimensions (with handle): W 210 mm, H 85 mm, D 315 mm
Dimensions (transport case): W 360 mm, H 165 mm, D 290 mm
Weight: 2.9 kg
Weight with transport case and accessories: 5.1 kg
Measuring principle: Chemical reaction
Available measuring ranges: R101 = 0 - 20 ppm _v R102 = 0 - 100 ppm _v R103 = 0 - 500 ppm _v
Measuring accuracy: < ± 2 % of the measuring range
Operating temperature: 0 - 40 °C
Ambient moisture: up to 90 % relative moisture, non condensing during operation
Input pressure: p _e 0.5 - 10 bar
Operating voltage: 100 - 265 V / 50 - 60 Hz
Connection: quick coupling
Response time: < 15 s (90 % of the final value)
Measuring time: < 2 minutes
Lifetime of the sensor: 6 months when storing in protective foil; 24 months operating life in air
Long term sensitivity drift: < 2 % of the SO ₂ sensor per month
Flow rate: 1 - 3 l _N / h
Rinsing function: automatic rinsing of the measuring cell with ambient air when switching off
Indication: digital LED display (24 x 48 mm)
Batteries: NiMH batteries rechargeable

Standard equipment:

SO ₂ measuring device with digital display
Operation: mains-operated or with batteries (with integrated battery charger with deep discharge protection and battery charge level indicator), automatic switchover
Automatic rinsing of measuring cell when switching off
2 m long connecting cable with mains plug
4 m long connecting hose with quick couplings DN8 and DN20
Output coupling for connecting a gas collecting unit
Robust housing with handle for placing and transportation
Black plastic case
1 operating manual (multilingual) on CD-ROM

Optional accessories at an extra charge:

Discharge gas collecting bag (for emission-free measurement)	B151R95
Additional operating manual on CD-ROM	6-0004-R213

Packing:

Packing for 3-032-R...	05-1990-R004
------------------------	---------------------

For precise measurement

3-032-R003

Measuring device for different decomposition products and gas residues

During the operation of gas insulated switchgear decomposition products might occur after a breakdown which has a negative impact on the gas quality in the circuit breaker as well as on the insulation properties.

For this reason the measurement of decomposition products is very important. The measurement can be carried out easily by means of test tubes and plastic bags. The following concentrations can be measured:

- Sulphur dioxide SO_2 : 1 to 500 ppm_v
- Hydrogen fluoride HF: 1.5 to 15 ppm_v
- Oil mist: 1 to 10 mg/m^3 (0.16 to 1.6 ppm_{mass})



- The device is supplied in a handy plastic case. Gastight couplings DN8 and DN20 are also included in the scope of supply.

Devices for determination of the SF₆ gas quality

3-032-R003

Measuring device for different decomposition products and gas residues**Technical data:**

Dimensions: W 198 mm, H 115 mm, D 165 mm
Case dimensions: W 360 mm, H 290 mm, D 165 mm
Weight without case: 2.4 kg
Measuring principle: Chemical reaction

Standard equipment:

Measuring device for decomposition products with flowmeter and needle valve
Safety valve
Mounting for test tubes
DILO connecting couplings in DN8 and DN20
Tube opener
Connecting piece with connecting hose
2 spare O-rings
2 m long flexible connection
Black plastic transport case
1 operating manual (multilingual) on CD-ROM

Optional accessories at an extra charge:

10 pieces test tubes for sulphur dioxide SO ₂ type 1/a; measuring range 1 to 25 ppm _v Plastic bags with a volume of 1 litre are needed (3-032-21)	05-1026-R001
10 pieces test tubes for sulphur dioxide SO ₂ type 20/a; measuring range 20 to 220 ppm _v Plastic bags with a volume of 1 litre are needed (3-032-21)	05-1026-R002
10 pieces test tubes for sulphur dioxide SO ₂ type 50/b; measuring range 50 to 500 ppm _v Plastic bags with a volume of 1 litre are needed (3-032-21)	05-1026-R003
10 pieces test tubes for hydrogen fluoride HF type 1.5/b; measuring range 1.5 to 15 ppm _v Plastic bags with a volume of 2 litres are needed (3-032-20)	05-1026-R010
10 pieces test tubes for detection of oil mist type 1/a; measuring range 1 to 10 mg/m ³ (0.16 to 1.6 ppm _{mass}) Plastic bags with a volume of 10 litres are needed (3-032-22)	05-1026-R015
10 pieces plastic bags with a volume of 1 litre	05-1025-R001
10 pieces plastic bags with a volume of 2 litres	05-1025-R002
3 pieces plastic bags with a volume of 10 litres	05-1025-R004
Adapter for emptying the discharge gas collecting bag	3-969-R005
Additional operating manual on CD-ROM	6-0004-R213

Packing:

Packing for 3-032-R003	05-1990-R004
------------------------	--------------

SF₆ gas detectors

For quick detection and quantification of small SF₆ leaks

3-033-R200

SF₆-LeakSpy (Sensor length 300 mm)

The cordless battery-operated SF₆ LeakSpy precisely measures SF₆ concentration in air by means of a non dispersive infrared sensor (NDIR sensor) and indicates the value on a graphic display in ppm_v. The device allows precise localisation of leaks by searching the highest SF₆ concentration. Thanks to the high accuracy and the low detection limit it is possible to carry out integral measurements as well as measurements for determination of leakage rates.

To protect the device from particles the sensor is equipped with a filter which can be cleaned and/or exchanged easily by the operator. In case there is SF₆ contamination already existing, the LeakSpy can be adjusted to this value. Thus it is possible to detect leakages even in already contaminated areas. The SF₆ concentration is indicated in ppm_v as well as by an audible signal.



The measuring sensor extension (included in the scope of supply), which can be installed between the device and the measuring sensor, if necessary allows measurements on measuring points difficult to access.

- Detection of SF₆ leakages up to 3 g / year
- Quick response time
- No cross sensitivity to moisture and most volatile organic compounds (VOCs)
- Small, lightweight, easy to use
- A shoulder belt facilitates mobile and ergonomic working
- Battery-operated (operating time > 12 hours)
- Exchangeable accumulator (parallel loading of a second accumulator in separate charging unit possible)

SF₆ gas detectors

3-033-R200

SF₆ LeakSpy

Technical data:

Dimensions 3-033-R200 : W 125 mm, H 142 mm, L 280 / 555 mm (without / with sensor)
Sensor length: 300 mm
Weight: 1,580 g
Power supply: lithium ion batteries (operating time > 12 hours)
Measuring principle: non-dispersive infrared sensor (NDIR)
Measuring range: 0 – 1.000 ppm _v SF ₆
Detection limit: 3 ppm _v SF ₆
Sensitivity: 3 g SF ₆ / year
Accuracy: < 50 ppm _v : ±4 % (v. 50 ppm _v) ±2 ppm _v ; 50 - 100 ppm _v : ±5 % (v. 100 ppm _v) ±5 ppm _v ; 100 - 1000 ppm _v : ±2 % (v. 1000 ppm _v) ±20 ppm _v
No cross sensitivity to moisture (0 - 100 % relative moisture, non condensing) and volatile organic compounds
Indication accuracy: 1 ppm _v
Indication unit: ppm _v , g/y, cc/s
Operating temperature: 0 °C to +50 °C
Storage temperature: -10 °C to +60 °C
Response time: T90: < 1s
Temperature and pressure compensated
Indication: graphic display + audible signal

Standard equipment:

Shoulder belt
Measuring sensor extension (Length: 1 m)
Carrier case
Battery charger
1 accumulator
Separate charging unit
1 operating manual (multilingual) on CD-ROM

Optional accessories (spare parts) at an extra charge:

Shoulder belt	5009904
Measuring hose	5007237
Sensor	3-033-R200-20
Particle filter	5008928
Transparent cap	5008933
Additional accumulator	5008922
Carrier case (for replacement) without foam lining	5006807
Foam lining for carrier case	5009110
Additional operating manual on CD-ROM	6-0004-R213

Packing:

Packing for 3-033-R200	05-1990-R002
------------------------	--------------

For quick tracing of small SF₆ leaks

3-033-R002

SF₆-LeakPointer

The cordless battery operated device measures in seven levels of sensitivity within a short response time. Even after the detection of large leaks the device returns to zero position quickly.

The SF₆ LeakPointer is easy to operate with one hand. Leakages can be easily detected via the clearly visible LED display or the audible signal (can be switched off). Continuous operation of the device is possible.



- Quick response time
- Quick "Reset" time
- Detection of leaks of up to 5 g / year
- Comfortable single-handed operation
- Battery-operated (with capacity check)
- Temperature-compensated

SF₆ gas detectors

3-033-R002

SF₆-LeakPointer**Technical data:**

Dimensions with case: W 65 mm, H 229 mm, D 65 mm
Weight with case and accessories: 560 g
Power supply: 2 x 1.5 V alkaline batteries C LR14 (Not included in the delivery)
Measuring principle: high voltage ionisation
Sensitivity: 5 g SF ₆ / year
Operating temperature: 0 °C to +52 °C
Ambient moisture: max. 90 % relative moisture, non condensing during operation
Response time T90: approx. 1 second
Reset time: approx. 1 second
Indication: 7 LED measuring range indication and acoustic signal (disconnectable)
Sensor length: 355 mm

Standard equipment:

Carrying case
Spare sensor
1 operating manual (multilingual) on CD-ROM

Optional accessories at an extra charge:

Spare sensor kit (3 pieces)	5002016
Spare case	5010354
Additional operating manual on CD-ROM	6-0004-R213

Packing:

Packing for 3-033-R002	6-0004-R039
------------------------	--------------------

For monitoring the air of SF₆ indoor plant in permanent operation

3-026-R115

SF₆ Air Sensor

The device even detects smallest SF₆ concentrations and displays the current measuring values permanently. For the operating personnel it is absolutely necessary to know that no radioactive source is used. Therefore no special measures must be taken during operation.

The SF₆ Air Sensor guarantees a quick reaction time. Furthermore, there is no cross sensitivity to moisture and unaffected by background contamination and the measuring result remains constant. Parameters for warning messages and alarm tripping are freely configurable.



- Measuring range: 0 up to 1,500 ppm_v SF₆
- High longtime stability
- No maintenance and consumables are required
- Indication of the measuring value via LCD on the front of the device
- Air pressure compensated
- Analogous and serial interface

SF₆ gas detectors

3-026-R115

SF₆ Air Sensor

Technical data:

Dimensions: W 80 mm, H 150 mm, D 60 mm
Weight: 250 g
Measuring principle: NDIR (double beam)
Measuring range: 0 up to 1,500 ppm _v SF ₆
Measuring accuracy: < ±2 % of measured value
Long-time stability / drift: < ±2 % of measured value / year
Warming time: < 2 min (run-up), 15 min. (full specification)
Response time: < 2 min
Indication: directly via LCD
Operating voltage: 24 V DC, 160 mA, 3.9 W
Ambient moisture: max. 95 % relative humidity, non condensing during operation
Protection class: IP 41
Recommended monitoring range per sensor: 250 m ²
Calibration / Maintenance: is not required due to the life time of sensor (about > 10 years)
Operating temperature: -10 to 40 °C

Standard equipment:

1 operating manual (multilingual) on CD-ROM

Optional accessories at an extra charge:

Additional operating manual on CD-ROM	6-0004-R213
---------------------------------------	-------------

Packing:

Packing for 3-026-R115	3-948-R001
------------------------	------------

Important note:

The device can only be used together with the SF₆ Network Monitor. It cannot be operated autonomously.

The device can also be connected with other devices to the SF₆ Network Monitor directly in order to build up monitoring points for SF₆ gas in the room via a network for monitoring.

Central monitoring and indication of measuring values

3-026-R114

SF₆ Network Monitor

The SF₆ Network Monitor is the central control unit from up to five SF₆ Air Sensors to be connected. Warning and alarm thresholds can be set for each SF₆ Air Sensor.

The plug-and-play operating concept makes the handling very comfortable. Measuring values can be stored and called on the 5.7" coloured touch screen, if necessary.



- Different acoustic warning, alarm and malfunction signals
- Own names for each SF₆ Air Sensor connected
- Connection between SF₆ Air Sensors and Network Monitor via bus cable with plug connectors

SF₆ gas detectors

3-026-R114

SF₆ Network Monitor

Technical data:

Dimensions: W 250 mm, H 218 mm, D 120 mm
Weight: 2.0 kg
Indication: coloured 14.5 cm (5.7") touch screen
Connection: max. 5 SF ₆ Air Sensors via bus system / 2 connecting lines
Max. length of power and bus cable: 150 m (per connecting line)
Operating voltage: 100 V - 240 V AC, 50 / 60 Hz, max. 30 VA
Ambient moisture: max. 95 % relative moisture, non condensing during operation
3 relay contacts max. charge: 2.5 A / 230 VAC
Protection class: IP 42
Sound pressure signal: > 75 dbA, 1m

Standard equipment:

1 operating manual (multilingual) on CD-ROM

Optional accessories at an extra charge:

External visual and acoustic alarm transmitter 230 V	05-1093-R001
External visual and acoustic alarm transmitter 115 V	05-1093-R003
2 m long power and bus cable	05-1602-R302
10 m long power and bus cable	05-1602-R310
25 m long power and bus cable	05-1602-R325
50 m long power and bus cable	05-1602-R350
Power and bus cable per meter	05-1602-R300
Connecting parts power and bus cable	3-026-89
Bus-Repeater up to 1,200 m bus length	3-026-85
Additional operating manual on CD-ROM	6-0004-R213

Packing:

Packing for 3-026-R114	3-948-R004
------------------------	------------

Note:

For each SF₆ Air Sensor (3-026-R115) to be connected a power and bus cable is necessary.

The power and bus cable leads from the SF₆ Network Monitor to the first SF₆ Air Sensor and then to the next SF₆ Air Sensor until the last SF₆ Air Sensor is connected.

Density monitor testing devices

For automatic testing of switching points in density monitors

B178R01

DensiControl DA

The F-gas regulation (EU) 517/2014 stipulates regular verification of density monitors installed in switchgear. The DensiControl DA allows quick checking to see whether the density monitor switching points are triggered in time.

This device allows precise, quick and easy verification of the switching points. The density monitor type to be checked is selected in the data base and is then installed on the device with a quick clamping mechanism. After starting the measurement the pressure is automatically increased to filling pressure, the switching points are activated and recorded. The switching points can be stored in the system with serial number and temperature indication allowing a data file to be produced for documentation.



- Automatic test process
- Simple installation and removal of the density monitors by quick clamps
- Easy handling and menu navigation via colour touch panel (7")
- Storage of 50 density monitor types with their corresponding switching points
- Storage of up to 200 measuring results
- Data transmission to USB stick and data output as a test report
- Indicating pressure units can be selected
- Adjustable user languages: DE, GB and FR
- Trolley for comfortable transportation

Density monitor testing devices

B178R01

DensiControl DA

Technical data:

Dimensions: L 406 mm, W 538 mm, H 269 mm
Weight: 17 kg
Operating temperature: 0 °C to +45 °C
Operating voltage: 100 - 240 V / 50 - 60 Hz
Mains fuse: 2 x 3.15 A/T (time delay)
Number of density monitors to be stored: max. 50
Number of measuring values to be stored: max. 200
Interface: USB and Ethernet
Automatic measuring process
Pressure indication in bar pa / pe, kPa pa / pe, psi pa / pe, MPa pa / pe
Accuracy of the pressure sensor (0 - 50 °C): ≤ 0.1 % FS

Standard equipment:

Transport case
Basic device with test vessel and adapter plate with quick coupling
5-measuring point certificate for pressure sensor
USB stick with file for evaluating and reading out the measuring data
1 operating manual (multilingual) on CD-ROM

Optional accessories at an extra charge:

Different connecting sets are available on request	
Additional operating manual on CD-ROM	6-0004-R213

Packing:

Packing for B178R01	3-775-R104
---------------------	------------

Device for automatic verification of switching points of installed density monitors

B178R51

DensiControl IN with connecting kit and 6 m long measuring hose

The (EU) F-gas regulation 517/2014 stipulates regular verification of density monitors installed in switchgear. In combination with a DILO lock valve it is possible to quickly check whether the density monitor switching points are triggered in time without disassembling the density monitor. Thus, the DensiControl IN allows very quick, easy and precise verification of the switching points without SF₆ emission.

The density controller to be verified is selected in the database and is separated from the gas compartment with the lock valve. After starting the measurement the gas in the density monitor is slowly released and collected in the internal storage vessel. During that procedure, the switching points are activated and recorded automatically. Furthermore, the switching points can be stored in the system with serial number and switchgear temperature and downloaded for documentation later on. After the measurement, the collected gas is pumped back into the switchgear.



In combination with a special lock valve the DensiControl IN density monitor testing device allows reliable verification of density monitors directly on the gas compartment.

- Automatic test process
- Test of density monitor without disassembly and without SF₆ emission (assembly of density monitor on lock valve is necessary)
- Easy handling and menu navigation via colour touch panel (7")
- Storage of 50 density monitor types with their corresponding switching points
- Storage of up to 200 measuring results
- Data transmission to USB stick and data output as a test report
- Indicating pressure units can be selected
- Adjustable user languages: German, English and French
- Trolley for comfortable transportation

B178R51

DensiControl IN**Technical data:**

Dimensions: L 406 mm, W 538 mm, H 269 mm
Weight: 21 kg
Operating temperature: 0 °C to +45 °C
Operating voltage: 100 - 240 V / 50 - 60 Hz
Mains fuse: 2 x 3.15 A/T (time delay)
Number of density monitor types to be stored: max. 50
Number of measuring values to be stored: max. 200
Interface: USB and Ethernet
Automatic measuring process
Pressure indication in bar pa / pe, kPa pa / pe, psi pa / pe, MPa pa / pe
Accuracy of the pressure sensor (0 - 50 °C): ≤ 0.1 % FS

Standard equipment:

Transport case
Basic device with internal storage vessel
Connecting kit and 6 m long measuring hose
5-measuring point certificate for pressure sensor
USB stick
DILO connecting couplings DN8 and DN20
1 operating manual (multilingual) on CD-ROM

Optional accessories at an extra charge:

Different connecting cables on request	
6 m long measuring hose extension	B178R51-02
Additional operating manual on CD-ROM	6-0004-R213
Angle piece for DILO connecting couplings	3-817-R008

Packing:

Packing for B178R51	3-775-R104
---------------------	-------------------

For emission-free disassembly or verification of density monitors

3-1150-R...

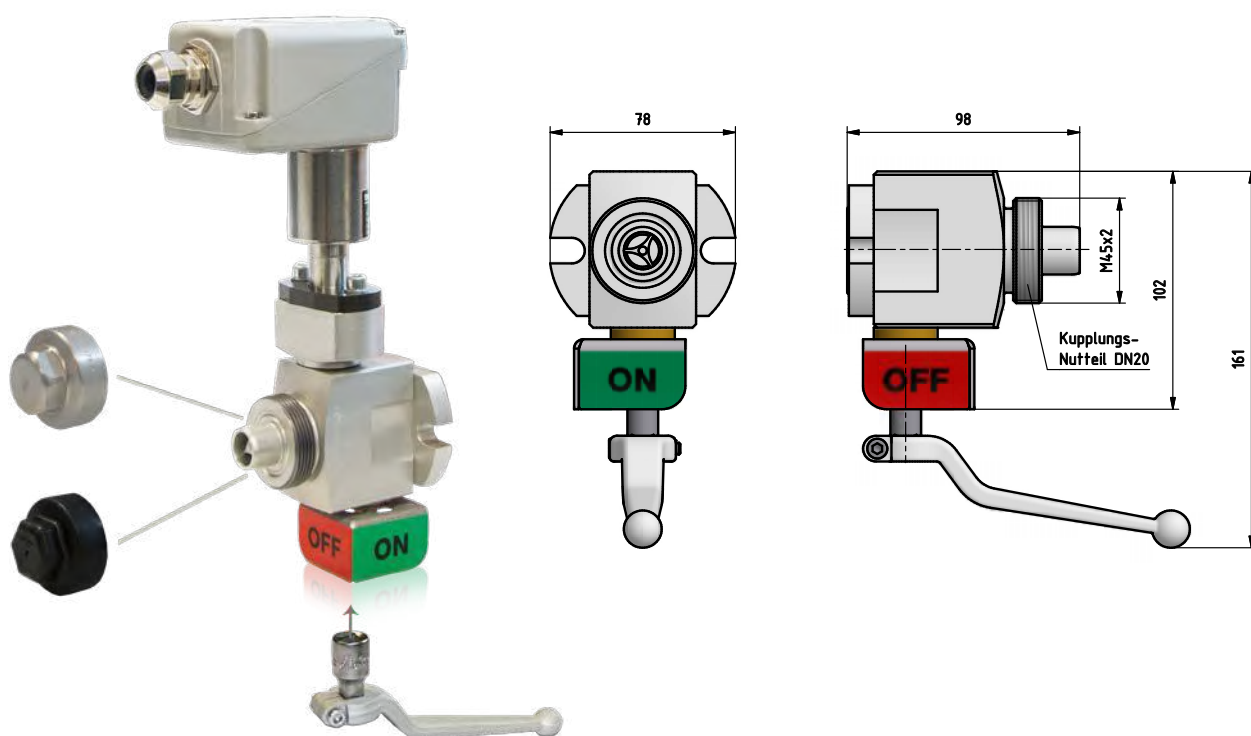
Lock valve for density monitors PN16 DN20

Density monitors can be verified directly at the gas compartment or disassembled for external tests without having to recover the gas from switchgear by means of these lock valves. The valve securely separates the assembled density monitor from the gas compartment. In combination with the Densi-Control IN (B178R51) density monitor testing device it is also possible to quickly and easily verify the density monitor switching points on switchgear completely free of emissions in accordance with the (EU) 517/2014 directive (F-gas regulation).

For separating the density monitor from the gas compartment just put a lever on the valve and turn it by 90°. The switching position of the valve is indicated by a red/green label.

For connecting the gas compartment different connection are available; the connecting side of the valve is equipped with a connecting coupling DN20. The gas handling can also be carried out via this integrated DN20 coupling – a useful “Two-in-one solution” which is perfectly suited for retrofitting as well.

The 3-1150-R... type is the perfect match for tight installation conditions. If more variety in arranging the density monitors is desired, we recommend the 3-1190-R... version with different connections (see separate data sheet).



Lock valve with mounted density monitor

Optional accessories at an extra charge:

Lever for ball valve	3-1150-11
Covering cap (aluminium)	VK/KN-04/20 T
Covering cap (plastic)	VK/KN-04/20 PA
Different adapters for density monitor are available on request	

Density monitor testing devices

For emission-free disassembly or verification of density monitors

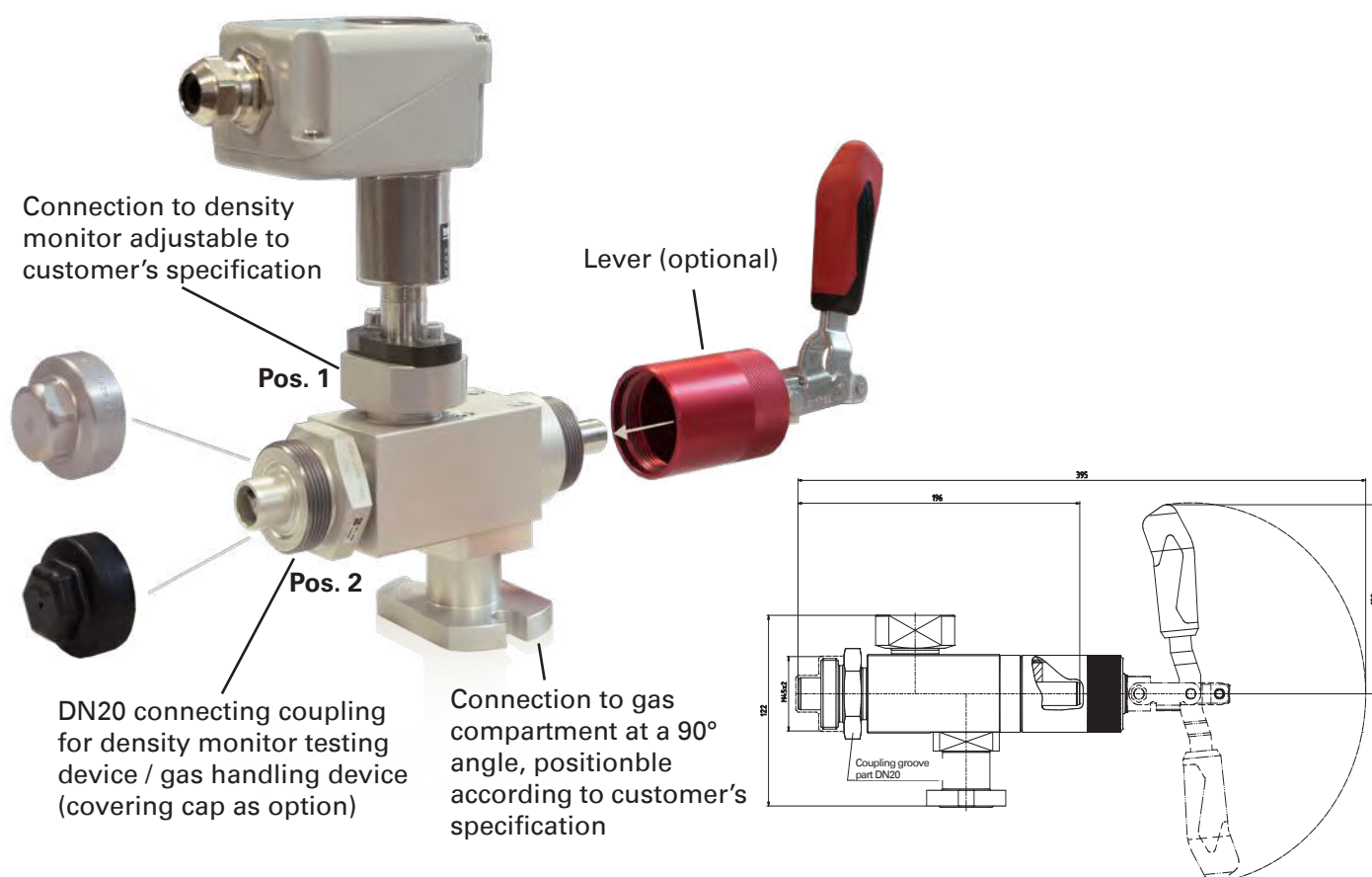
3-1190-R...

Lock valve for density monitors PN16 DN20

Density monitors can be verified directly at the gas compartment or disassembled for external tests without having to recover the gas from switchgear by means of these lock valves. The valve securely separates the assembled density monitor from the gas compartment. In combination with the Densi-Control IN (B178R51) density monitor testing device it is also possible to quickly and easily verify the density monitor switching points on switchgear completely free of emissions in accordance with the (EU) 517/2014 directive (F-gas regulation).

For separating the density monitor from the gas compartment just screw on the separate lever and turn it by 180°.

The user benefits from the design's high variety. Thus, customer-specific connections on the units can be realised. The couplings and density monitor connections can be arranged according to customer's requirements. Furthermore, the complete gas handling can be carried out directly via the integrated DN20 coupling with the lock valve – a useful „Two-in-one solution“ which is perfectly suited for retro-fitting.



Connection to density monitor (pos. 1) and connecting coupling (pos. 2) are exchangeable – the positioning is carried out according to customer's requirement!

Optional accessories at an extra charge:

Lever	3-1190-04
Covering cap (aluminium)	VK/KN-04/20 T
Covering cap (plastic)	VK/KN-04/20 PA
Different adapters for density monitor according to customer's specification	

Accessories for measuring devices

Emission-free reclamation and storage of gases

B151R40 / Discharge collection unit 220 - 240 V / 50 / 60 Hz

B151R40S15 / Discharge collection unit 110 - 127 V / 50 / 60 Hz

This device allows the intermediate storage of measuring gas in gaseous or liquid form. It is thus the perfect complement for measuring devices without automatic gas return system (return pump function).

The discharge gas collection unit features by its easy and user-friendly handling. The gas compartment and the measuring device are connected to the discharge gas collection unit. It is possible to control the measurement via the 3.5" colour touch panel. The measuring gas is collected automatically during the measuring process and is stored in the internal vessel by means of the integrated compressor. After completion of the measurement the gas can either be pumped back into the gas compartment or stored in an external cylinder.

An additional feature: SF₆ gas stored in external bags can easily be stored into a gas cylinder without the use of another gas handling device.

Thanks to the self-closing couplings the SF₆ gas is not released into the atmosphere neither while measuring nor when pumping the gas back.

The maximum storage capacity depends on the flow rate of the connected measuring device and the measurement time. With a flow rate of 30 l/h and a measuring time of 15 minutes per measuring process it is possible to store a total of 40 measurements in the internal vessel.



- Automated process
- Easy handling via 3.5" colour touch panel
- User-friendly menu navigation
- Indication pressure units can be freely selected
- Adjustable user languages: DE, GB, FR
- Trolley for comfortable transportation

Accessories for measuring devices

B151R40

Discharge collection unit

Technical data:

Dimensions: Length: 625 mm, Width: 500 mm, Height: 297 mm
Weight: 40.8 kg

Standard equipment:

Transport case
Oilfree DILO compressor 1.6 m³/h, 50 bar
Particle filter
Self-closing couplings for gas compartment and measuring device
Connecting hoses and socket for measuring device
Automatic control
1 operating manual (multilingual) on CD-ROM

Optional accessories with additional price:

SF ₆ cylinder connection W 21.8 x 1/14" with coupling	6-1161-R007
American SF ₆ cylinder connection with 0.96" left-hand thread with coupling	6-1161-R008
Chinese SF ₆ cylinder connection with G5/8" thread with coupling	6-1161-R036
English SF ₆ cylinder connection with G5/8" thread with coupling	6-1161-R009
Reuse-gas cylinder connection G1"	6-1161-R010
Adapter case for measuring devices	Z340R10
Additional operating manual on CD-ROM	6-0004-R213

Packing:

Packing for B151R40	3-775-R024-C
---------------------	--------------

For increase of pressure level

3-826-R003 / R004 / R005

Compressor unit for SF₆ measuring devices

The test pressure for gas analysis in medium voltage switchgear is often too low. For this reason the compressor unit is needed to compress the gas to be measured so that there is sufficient pressure for the gas measuring devices connected downstream from the compressor unit.

As the device is leak-tested there are no SF₆ emissions. The oilfree compression avoids the SF₆ test gas from being contaminated with oil mist. Any contamination of the measuring gas e. g. caused by traces of moisture can therefore be excluded.

The small compressor is almost maintenance-free and easy to handle.



The diaphragm compressor is connected between the medium voltage breaker and the measuring device by means of the corresponding connecting hose.

- Suitable for all DILO SF₆ measuring devices
- Oilfree DILO compressor
- Gas-tight and emission-free
- Simple operation
- Low maintenance

Accessories for measuring devices

3-826-R003 / R004 / R005

Compressor unit for SF₆ measuring devices

Technical data:

Dimensions: L 200 mm, W 100 mm, H 170 mm
Weight: 2.3 kg
Operating voltage: 3-826-R003: 230 V / 50 Hz, 3-826-R004: 120 V / 50 -60 Hz, 3-826-R005: 110 - 127 V / 50 - 60 Hz
Mains fuse (2 pieces each): at 230 V: 1,0 A (T) / at 120 V: 3,15 A (T) / at 110-127 V: 3,15 A (T)
Motor capacity: 65 W
Protection class: IP20
Final vacuum: < 100 mbar
Final pressure: p _e = 2,5 bar, max.
Ambient temperature in service: +5 °C to +40 °C
Delivery rate: 5.5 l / min

Standard equipment:

ON / OFF switch
Thermo switch
Mains fuse
Connecting cable
Connecting hose
2 operating manuals in German, English or French

Optional accessories at an extra charge:

Black transport case for compressor unit	3-781-R023
Additional operating manual on CD-ROM	6-0004-R213

Packing:

Packing for 3-826-R003 / 3-826-R004 / 3-826-R005 (without transport case)	3-712-R002-C
Packing for 3-826-R003 / 3-826-R004 / 3-826-R005 (with transport case)	05-1990-R004

For mobile and preliminary storage of SF₆ measuring gas

B151R95

Discharge gas collecting bag

This bag is a simple and cost-effective system for collecting measuring gas in case it cannot be returned directly into the circuit breaker. Its handling is very easy: Connect the bag with the hose included in the scope of supply to the measuring device.

The discharge gas collecting bag allows collecting the SF₆ from up to 25 measurements. The gas can be removed from the discharge gas collecting bag with any service cart and by means of the supplied hose and coupling. When using this system no SF₆ is released into the atmosphere. It is light, practical and environmentally friendly.

Folded discharge gas collecting bag



Filled discharge gas collecting bag



- 52 l capacity
- Light folding bag for comfortable transportation
- Integrated safety valve ($p_e = 100$ mbar)
- Self-closing miniature couplings
- DILO coupling DN8 with hose connection (to recover the bag)

Accessories for measuring devices

B151R95

Discharge gas collecting bag

Technical data:

Dimensions folded: L 300 mm, W 600 mm, H 80 mm
Dimensions filled: L 600 mm, W 900 mm, H 300 mm
Weight: 1.2 kg

Standard equipment:

Integrated safety valve (pe = 100 mbar)
1 m long connecting hose with self-closing miniature coupling
DILO coupling DN8 with hose connection
2 operating manuals in German, English or French

Optional accessories at an extra charge:

DILO coupling DN20 with hose connection (between service cart and bag)	6-1161-R023
Adapter case for measuring devices	Z340R10
Additional operating manual on CD-ROM	6-0004-R213

Packing:

Packing for B151R95	3-948-R007
---------------------	-------------------

Note:

All DILO measuring devices equipped with a gas return system can be connected to the discharge gas collecting bag (see data sheets of the SF₆ Measuring devices).

SF₆ Valves and Couplings

The perfect connection to the gas compartment

Are you looking for pressure and vacuum tight valves and couplings for SF₆ gas use? DILO is the right choice! We offer the largest range of products worldwide. Whether for medium voltage switchgear, high voltage switchgear or gas-insulated lines (GIL) our products always meet your requirements.

The DILO sealing principle prevents the loss of SF₆ gas and moisture from penetrating the SF₆ gas system. DILO couplings will eliminate the loss of SF₆ gas by incorrect gas handling. Thanks to their reliability, quality and durability DILO couplings are the world's most widely used connecting system for SF₆ switchgear.



Product range

- Couplings available in DN6 to DN40 nominal diameters with different flange shapes, screw-in versions or as plug-in couplings
- Soldering unions, screw-in stubs and gauge connections for gas tight piping
- Ball valves in different versions and pressure ranges
- Pressure and vacuum-tight rubber and wire-braided hoses in different nominal diameters, lengths and finishes
- Transition pieces and adapters for different nominal diameters
- Connections for SF₆ gas cylinders
- Distribution panels and piping as well as customer specific special solutions

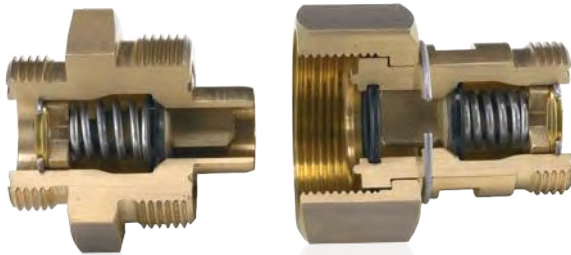
Our special catalogue "Valves and connections for SF₆ gas" is available as download from our website.

<http://www.dilo-gmbh.com/downloads/>



SF₆ Valves and Couplings

DILO sealing principle



open coupling



closed coupling

DILO couplings allow a connection to be made by simply screwing the two coupling parts together. Before the metal-to-metal seal closes, the pressure and vacuum tight coupling is sealed inside by means of an O-ring. When loosening the coupling parts again, the same O-ring prevents gas loss whilst the self seal valves close.

Advantages of application

- Self-closing coupling system
- Pressure and vacuum-tight even when coupling and uncoupling
- Permanent tightness even when frequently connected and disconnected
- Applicable up to PN 64 bar
- Suitable for temperatures from -40 °C to +80 °C
- Direct connection to DILO service carts without adapter
- Available in different materials even for outdoor switchgear

Approvals and certifications provided by DILO:

- Certification according to ISO 9001:2008
- HP0 approval as pressure equipment manufacturer
- Production control in accordance with 2014/68/EU regulations

SF₆ Leak testing units



Integral leak measurement using SF₆ gas

The integral and automated leakage measurement on serial components and assemblies is the proven strength of these systems. Even the smallest leaks are detected quickly and reliably.

■ SF₆ Leak testing units

- Model range LeakScanner

180 – 182

Model range LeakScanner

Laser-optic test method

Conventional test methods are often time consuming with the results sometimes not being precise enough or not reproducible. With leak testing units by DILO with a laser-optic measurement system and SF₆ test gas, imprecise and complicated test methods are no longer an issue. The laser-optic test method delivers fast and reproducible measurement results. It is particularly suited for quality testing and manufacturing control in the production of sophisticated serial components.

System's benefits:

- Detectable leaks to $1 \cdot 10^{-9}$ mbar l/s (dependent on chamber volume and test time)
- Detection limit of laser system < 1 ppb (0.001 ppm)
- Test results are displayed within a few minutes
- As only rough vacuum (10 - 20 mbar) is needed no expensive stainless steel chambers are required
- Degassing components, moisture and heat do not impair the test result
- In case of SF₆-filled components no handling of additional test gas is required
- The leak test can be carried out under vacuum or atmospheric pressure

Model range "LeakScanner SV" - from S to XXL

DILO builds SF₆ leak testing units for integral leak measurement using SF₆ gas in various sizes - from around 50 l to approx. 50,000 l.

The integral and automated leakage measurement on serial components and assemblies is the proven strength of these systems. Even the smallest leaks are detected quickly and reliably.

We always manufacture the systems according to customer specifications while focussing on a user and maintenance-friendly configuration. We exclusively use hermetically sealed components which do not allow emissions into the environment.

To ensure an optimal workflow, the system design is always adjusted to the customer's production environment.



Download leaflet (in English)

Vacuum test chambers

Vacuum testing of smaller components (without gas handling)

This model range with a chamber volume of approx. 50 - 500 l is the ideal solution for testing smaller components where gas handling can take place outside the test chamber.



Example
Model range "LeakScanner SV"
without gas handling

Vacuum testing of larger components (with or without integrated gas handling)

We manufacture systems of this model range with a chamber volume of 500 l to approx. 20,000 l. We recommend this model range where larger components need to be tested or where integrated gas handling in the test chamber is required. In this case, the test objects are filled with SF_6 in the chamber. Gradual evacuation and filling of the test objects is also possible in order to avoid an inadmissible differential pressure between the test object and chamber.



Example
Model range "LeakScanner SV"
with integrated gas handling

Model range LeakScanner

Atmospheric test chamber

Type "LeakScanner SA"

With atmospheric test chambers it is not necessary to evacuate air before the test process. Test chambers of this construction type can be manufactured at significantly lower cost with a significantly larger volume than vacuum chambers. We build these chambers with a chamber volume of up to 50 m³. This allows for reliable testing of even larger units and assemblies.

However, we also recommend atmospheric testing when delicate, vacuum-sensitive components such as devices with touch screens need to be tested for their leak tightness.

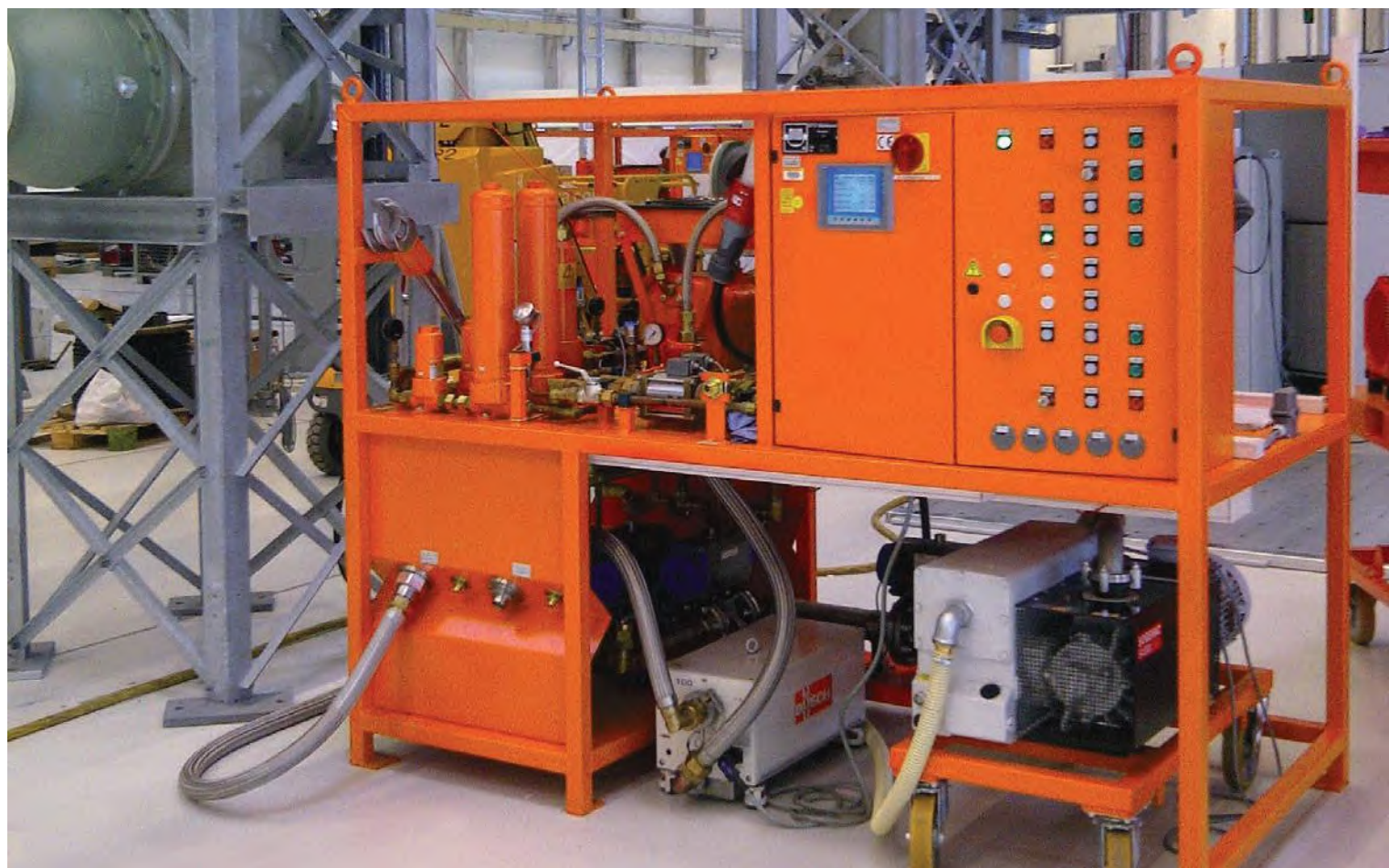
This system configuration also allows the filling of the test objects with SF₆ gas in the test chamber and subsequent recovery of the gas. However, with atmospheric pressure, the test duration is on average 10 - 30 times longer as the increase in concentration for atmospheric pressure is significantly lower.



Example

Atmospheric test chamber with automatic roller shutter

GIS production plants



Individual complete solutions

Reliable, environmentally friendly and cost effective production prevents emissions in both GIS production and during operation.

Since 1967, DILO has been manufacturing solutions for SF₆ gas handling and has been known as the leading manufacturer worldwide of gas handling plants covering the requirements in each GIS production process.

■ GIS production plants

- GIS production plants

184 – 185

GIS production plants

Automated production process with permanent monitoring of the SF₆ quality requires intelligent and innovative SF₆ gas handling to achieve the highest economic efficiency and exemplary environmental protection. We offer high-performance, customer-specific special equipment for GIS, GIL and GIT applications.

Tailored to customers' needs:

- SF₆ gas handling equipment with automatic process control for the production of SF₆ filled plant and components
- Leak testing units for quick and precise leak detection on GIS components
- Complete product range for gas handling on gas-insulated lines (GIL)
- Accessories for gas handling plants e. g. such as hose reels, quick couplings for DN20 hoses or large filter units
- Measuring and weighing units with special software for quantifying SF₆ gas on different sites
- Separation plants for the preparation of SF₆ gas mixtures with separation efficiency of $\geq 99\%$
- Cooling systems for SF₆ insulated transformers (GIT)
- High capacity storage vessels and pressure tanks for gaseous storage of SF₆ from 1,000 to 20,000 litres
- Construction of complete shop floor piping for GIS production

You will find an overview of our SF₆ gas handling equipment and services for switchgear production in our "SF₆ Units for GIS production" leaflet. The leaflet is available for you to download.



Download leaflet

Individual complete solutions

Reliable, environmentally friendly and cost-effective production prevents emissions in both GIS production and during operation.

Together with you, DILO analyses the current situation and the desired workflow in order to develop an appropriate zero emissions solution which convinces by its high efficiency. For this purpose you receive all process elements from a single source - from the planning and project development to the assembly and training.

For switchgear production DILO offers two solutions: The stand alone unit and the complete line solution for an SF₆ network for punctual gas handling of the test stations of the produced GIS units. Thus building up a production line can easily be achieved.



Complete line solution with central unit, storage tank and several work stations.



Powerful stand alone unit with 10 parallel ports for evacuating air, filling the gas chamber and recovery of SF₆ gas.

Special plants



Special application

Technically mature and long term experiences are the basis for individual solutions. We supply a wide range of special plants for emission-free SF₆ gas handling - exactly adapted to the requirements of our customers. We consider each new requirement as an exciting challenge we are pleased to meet.

■ Special plants

- | | |
|--|-----|
| ■ Units for gas insulated lines (GIL) | 188 |
| ■ Refrigeration units for gas insulated transformers (GIT) and accelerators plants | 189 |
| ■ SF ₆ units for accelerators | 190 |

Units for gas insulated lines (GIL)

For this special application we supply different high performance devices. Thus efficient handling of large volume GIL lines is no problem.

Product range:

- Compressed-air preparation plants for pressure tests on GIL
- Powerful vacuum pump units with Roots blower for evacuation of air (final vacuum < 1 mbar)
- Mixing and filling plants for homogenous gas mixture with an SF₆ percentage of 10 to 80 %
- High pressure recovery units (final vacuum < 1 mbar) for storage of gas mixtures up to 250 bar
- Large mobile filter units for drying gas
- Cylinder bundles for storage of gas mixtures



SF₆/N₂ mixing plant

Refrigeration units for gas insulated transformers (GIT) and accelerator plants

The essential advantage of our refrigeration units is that the cooling is carried out by means of water outside the transformer. This is to prevent the transformer from being damaged if leaks occur. The cooling systems can be connected to the gas insulated transformer directly and are optimally suited for continuous operation.

Components:

- Circulating pump: 30.0 m³/min
- 30 l dry filter with compressor
- Cooling capacity: ~ 45 kW



Refrigeration unit for cooling the SF₆ gas in gas insulated transformers (GIT) and accelerators

SF₆ units for accelerators

We also deliver custom-tailored solutions for the SF₆ gas handling of electron accelerators. Compared to the "normal" gas handling in the energy sector, larger SF₆ gas volumes - usually several tons - have to be handled in the field of electron accelerators. Therefore, high-performance system components as well as large supply lines (up to DN 100) are needed, so that the gas volume can quickly and effectively be filled from the storage tank into the accelerator and recovered again. The SF₆ gas is filtered during operation by aid of large filter units and dried at the same time.

On customer request we connect several accelerator units over the hall piping on the central gas handling plant.

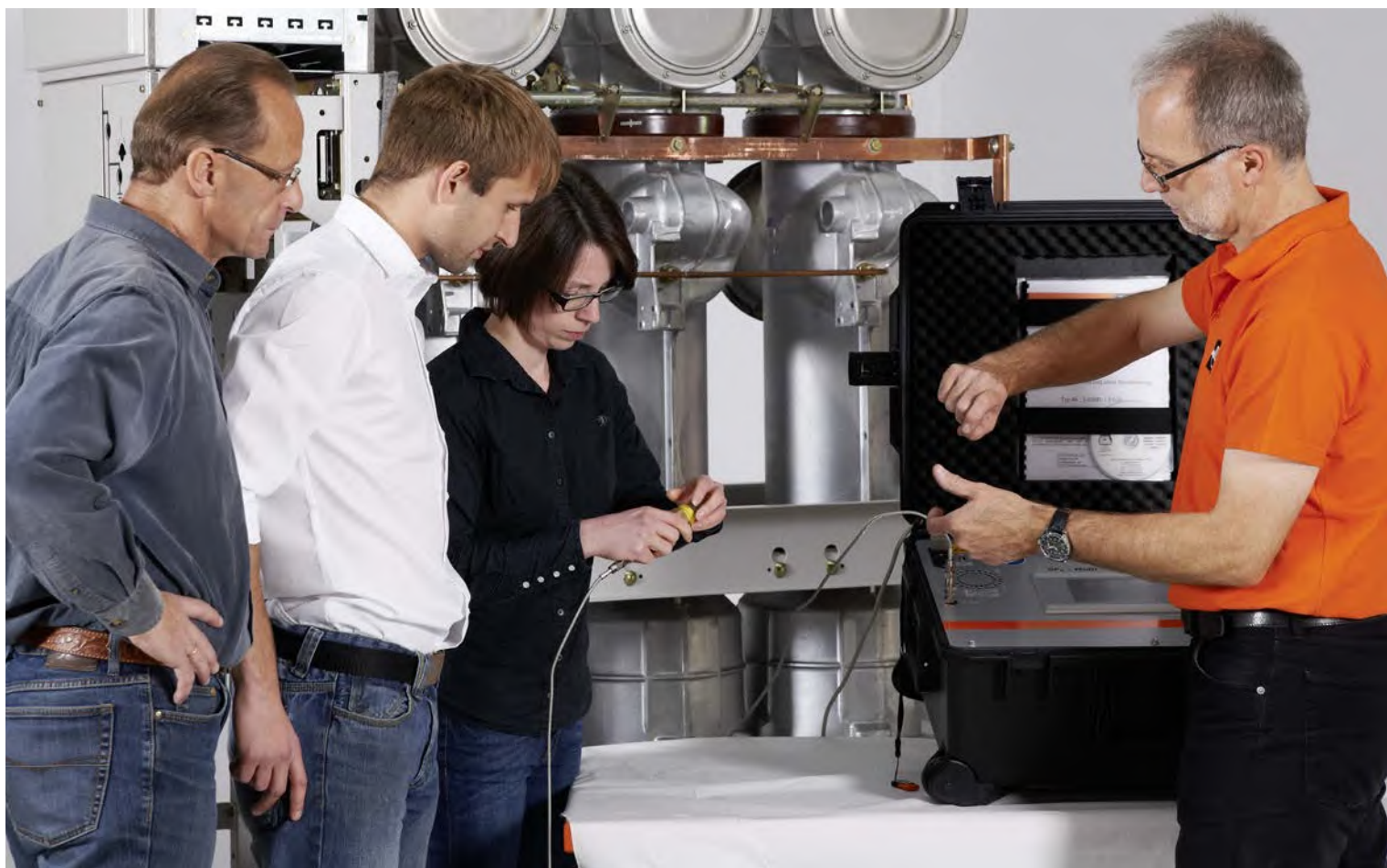


SF₆ gas handling plant for an electron accelerator



Download leaflet (in English)

Training and certification



Training at DILO

For efficient and particularly emission-free SF₆ gas handling well-trained personnel is required. Our modern and well-equipped training center offers best conditions for effective knowledge transfer.

■ Training and certification

■ SF ₆ training and certification	192
■ Customer specific trainings	192
■ E-Learning	193

Training and certification

■ SF₆ training and certification

In addition to our general trainings we also carry out trainings for the acquisition of the permission to carry out the recovery of SF₆ in accordance with the EC regulation no. 517/2014 and 2015/2066 as DILO is a state accredited SF₆ certification company.

A large number of participants from power utilities and switchgear manufacturers have been qualified for the recovery of SF₆ gas in our company's training center.

Contact: training@dilo-gmbh.com



Download „SF₆ training and certification“ leaflet



■ Customer specific trainings

Training is also carried out at our customers on site, if desired or in our training center.

The training program is adapted to individual or specific customer requirements. Training can be held on site, in the DILO training center or in the service centers of our authorized foreign agents. The following topics are included: safety, transport regulations, gas handling, environmental protection and practical work.

Contact: training@dilo-gmbh.com



■ SF₆ E-Learning

In cooperation with our partner, Nine Lanterns, we have developed a training concept that enables participants to learn about SF₆ or to build on their existing knowledge of SF₆ at any time or place - on your personal timetable.

The English programme consists of a total of four modules:

Module 1 - Understanding SF₆ gas

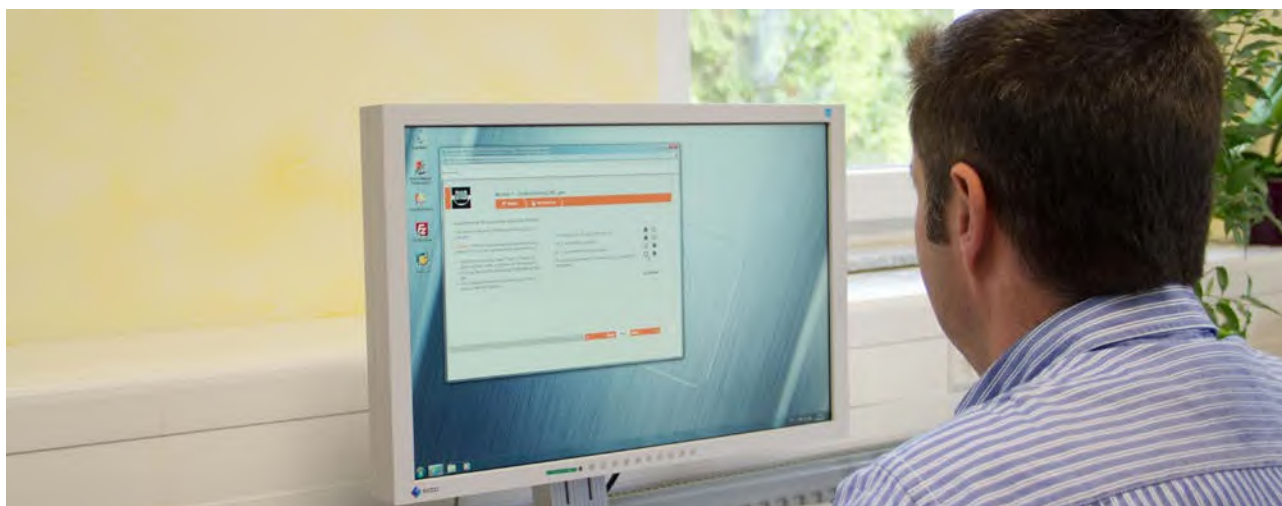
Module 2 - Working with SF₆ gas

Module 3 - Monitoring SF₆ gas

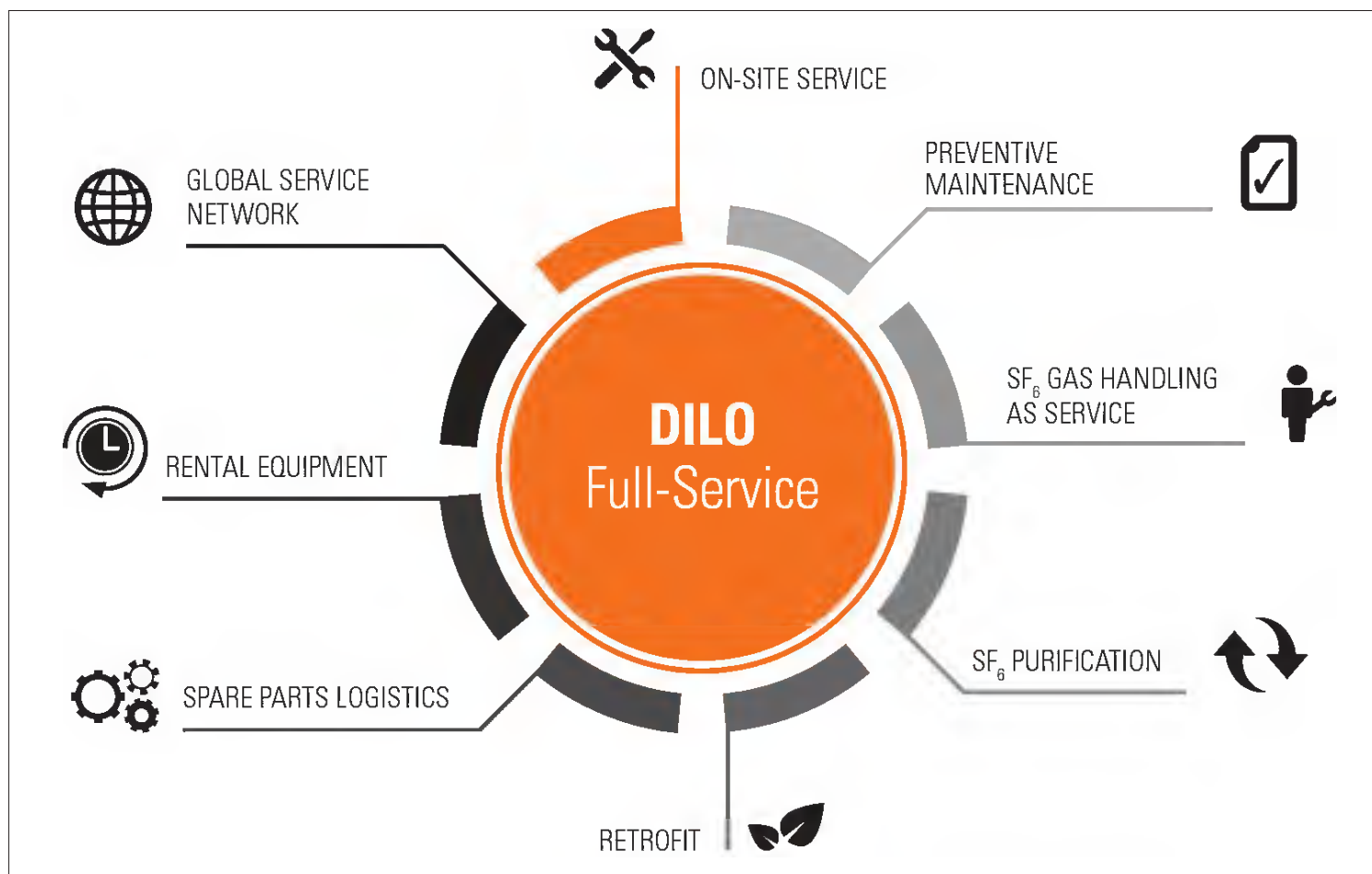
Module 4 - Assessment

Important: This online training is not a substitute for SF₆ certification and can only be passed in English language.

If you require further information or a 12-month company licence do not hesitate to contact us via:
e-learning@dilo-gmbh.com



Services



In addition to technical services we have systematically enlarged our offer of customer specific training and certification training in the past few years.

In summary, we offer solutions perfectly adapted to each customer's requirements, generating additional benefits for you as our customers and partners.

Services

- Rental equipment
- Aftersales services

196

193 – 197

Rental equipment

In case service and measuring devices are only needed for a short period of time it is possible to rent our devices. The complete equipment fulfils the necessary requirements of the IEC 62271-4 directive (recovery of SF₆ gas to min. 20 mbar). Almost all rental devices allow SF₆ gas recovery down to < 1 mbar.

The advantages of a rental are as follows:

- Fast availability of the devices
- Possibility for our customers to become familiar with the devices before buying them
- Delivery of the devices with suitable adapters for connecting the gas compartment

Our customers can choose rental equipment from a wide selection of units which include:

- Measuring devices for tracing leaks
- Measuring devices for determination of the SF₆ gas quality
- Pre-filter units
- Devices for automatic testing of switching points of density monitors
- Vacuum pump unit and suction pump units
- Service carts for liquid gas storage
- Gas mixing units for SF₆/N₂
- Storage tanks, bottles for reuse gas
- Weighing scales and flow meters
- SF₆/N₂ separating units

We also carry out training of operating personnel on site or can propose complete gas handling work to be carried out by qualified DILO personnel.

For providing service carts or other SF₆ units such as vacuum pumps for rental, a declaration of contamination of devices and components needs to be completed by the customer and returned to us. You will find the form for download on our website.

Aftersales services

■ On-site services

Our competent and experienced engineers and technicians will offer you advice and information. Repairs will be carried out either in our factory or at the customer site dependent on the effort required.

Furthermore, our SF₆ certified personnel will also put new devices into service if desired. This start up includes all functional tests as well as detailed instructions and training of the operating personnel.

Our service team is supported by specially trained personnel at our agents all over the world. This is to allow quick and efficient troubleshooting on site.

Our international service team includes more than 30 authorized service centers.

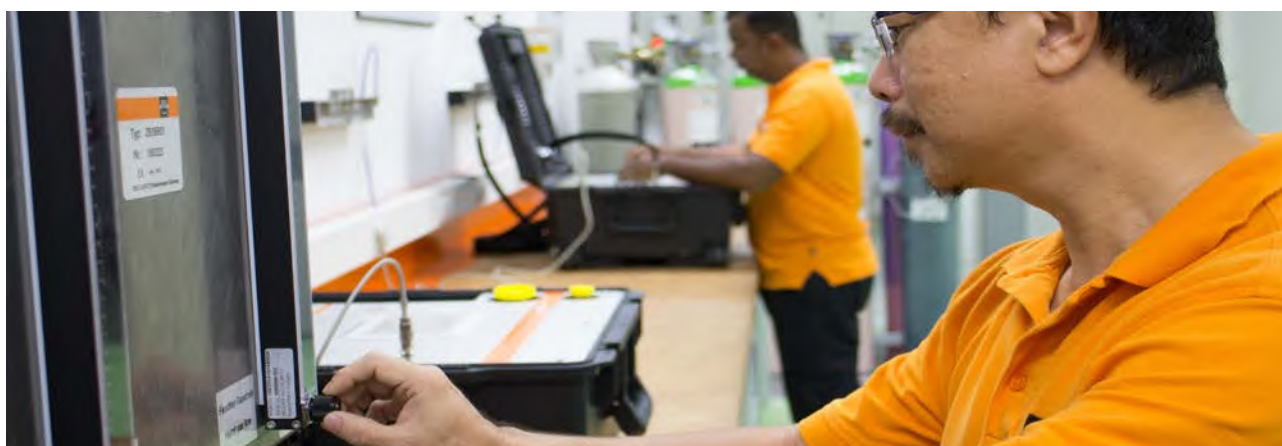


■ Preventative maintenance works

As we only use tested components which correspond to our strict quality standards maintenance requirements are minimised. To ensure a high reliability of operation we recommend preventive maintenance at regular intervals.

Special spare part kits, e. g. for overhauling compressors, vacuum pumps or filter units are part of preventative maintenance.

Regular maintenance works ensure that the devices meet the strict requirements on site. The recommended maintenance and calibration intervals are indicated in the corresponding operating manual of the devices. The measuring devices are calibrated in our works as well as in our service center DILO Asia-Pacific Pte. Ltd. in Singapore and by DILO Company, our North American agency.



Aftersales services

■ Maintenance contracts

It is, however, often recommended to conclude a maintenance contract, especially if a number of devices and installation units can be included. In this case the maintenance works are carried out by our qualified specialised staff. Advantage for our customers: Your own personnel can be deployed elsewhere and your devices are always “up-to-date”.

■ Repair at DILO

Generally, comprehensive maintenance works are carried out in our premises. In case it is necessary to repair service carts or components, such as compressors or vacuum pumps, the customer has to complete a declaration on the contamination of the devices and components returned to DILO.

■ Flexible spare parts logistics

In case of a breakdown or preventive maintenance works being carried out, spare parts can be made available immediately without any problems. Standard parts such as filter cartridges, gaskets or valves are always in stock and can be sent to the customer within a short time. Furthermore, important spare parts are in store at the service centers of our agents abroad.

Spare parts for DILO devices are available for a period of at least 10 years after purchase.



■ SF₆ gas handling on site

Our service package includes comprehensive services. Within Europe we also carry out SF₆ gas handling as a service. Our personnel certified in accordance with the regulation EC no. 2015/2066 carry out all works required on site.

This includes measurement of the gas quality, recovery, purification and drying the gas with our service carts, intermediate storage in gas tanks and return to the gas compartment after previous measurement.

We offer our services in case

- the purchase of gas handling devices is generally unviable,
- devices are already available, but no personnel is available (where help or support is needed),
- personnel certified in accordance with the CE 2015/2066 regulation are not yet available,
- the SF₆ gas handling should generally be carried out by a specialist.

We certainly comply with the EC regulation on certain fluorinated greenhouse gases 517/2014. The gas is completely reclaimed without loss of gas. Our principle is: "Zero Emission".

■ Preparation of SF₆ gas

Practically SF₆ gas is quite often contaminated with air by inadequate evacuation or incorrect gas handling. Consequently it is absolutely necessary that the SF₆ gas complies with the purity specification (IEC 60480) which means the other gases such as air or nitrogen must be removed. For such applications we can offer the corresponding services.

For larger gas quantities it is recommended to carry out separation works on site. For this purpose the following options can be offered:

1. Rental of a SF₆ / N₂ separating plant and our technicians carry out the separation of the SF₆-air mixture on site.
2. Rental of a device including instruction of the operating personnel. Then the separation works are carried out by the customer.
3. The preparation of gas is carried out in our premises. The SF₆ gas is either returned to the customer or reclaimed by DILO. A certificate on the gas quality and reclaimed gas quantity is issued (F-gas monitoring).



■ Leak tests

Leak tests of components are also carried out in our factory, if desired. This service is advantageous in case only a few parts are to be tested and the purchase of a plant is unviable.

The results measured are reported in a test certificate.

Aftersales services

■ Retrofit

Our guideline is to "save money and protect our environment". Special modules allow the retrofit of old service and maintenance devices in accordance with the IEC directives (recovery to min 20 mbar).

In this way the maintenance of switchgear is carried out in accordance with the latest requirements without any emissions to the environment. Service carts are mostly retrofitted so that gas recovery to < 1 mbar is possible and the value recommended by the IEC is even exceeded.

■ Online registration of device

The online registration enables DILO customers to have new equipment registered so that all relevant information and spare parts are made available in no time, if necessary!



Here you can register your device online

■ Global service

Our service organisation consists of the main DILO service centre in Babenhausen (Germany) as well as the two service centres (DILO USA and DILO Asia-Pacific (Singapore)) and other national service points.

More than 30 agents worldwide are qualified and authorised DILO service points.

Thus quick trouble shooting on site can be guaranteed.



Standard wear parts are always available immediately in our stock as well as in our local service centres. For the calibration of measuring devices the service point is also the right contact.

You will find the addresses of our international service partners on our website www.dilo-gmbh.com under "[Contact/Representatives around the world](#)".



Agents worldwide

■ **DILO main service centre in Babenhausen (Germany)**

Our service centre in Babenhausen is available:

Monday - Thursday: from 07:00 h - 16:00 h CET

Friday: from 07:00 h - 12:00 h CET

Phone: +49 (0) 83 33 - 302-94

E-Mail: service@dilo-gmbh.com



You can also request for our assistance online.

You will find our online form on our website www.dilo-gmbh.com under "[SF₆ service > Aftersales services](#)".



We will take care of your request immediately!

The type of device, order number and operating hours of service carts and the serial number of measuring devices are very important for our service team to support you immediately.



For your notes

To keep you always up-to-date:

Our newsletter informs you about latest products and topics covering SF₆ gas. Just subscribe online!



High pressure tube unions

High pressure tube unions are DILO's second core competence. For more information on high pressure tube unions please visit our website and download our special leaflet.



Subject to change without notice.
© Copyright DILO SG_GB_10



DILO
Armaturen und Anlagen GmbH

Frundsbergstrasse 36
D-87727 Babenhausen

Phone: +49 (0) 83 33 - 302-0
Fax: +49 (0) 83 33 - 302-52
E-mail: info@dilo-gmbh.com