

Extraction Solutions



Extraction solution – find the perfect solution for any application

Solution finder

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Find the perfect solution for your application

The classical fat determination

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Soxhlet extraction after hydrolysis

Efficient hot extraction

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Efficient hot extraction to determine crude fat and total fat

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Residue and contaminants analysis

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The best possible solution for environmental applications

“This counts...”

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Select your application and take advantage of Buchi's Extraction Solutions to complete your task

Classical fat determination: analyze encased fat in food samples



Hot extraction: determine crude fat in foodstuff and feed samples



Chemical extractions: determine chemical substances in packaging and articles of daily use



Trace analysis: analyze residues and contaminants found in organic samples



Solution finder – find the best solution for your application

Which type of sample would you like to analyze?

Method applied:



Your task: Analyze encased and bound fat in foodstuff

Use a standard Soxhlet extraction after hydrolysis, for instance, Weibull-Stoldt Method, AOAC International Hydrolysis Method.

Go to page 6



Your task: Determine the crude fat content in feedstuff and processed food (with consistent composition)

Perform a direct hot extraction according to Goldfisch or Randall to determine crude fat. Some samples may require a hydrolysis prior to extraction for total fat determination.

Go to page 8



Your task: Determine ingredients in articles of daily use or packaging

Use a hot extraction technique according to Goldfisch or Randall or an automated Soxhlet extraction to determine softener in packaging, organic compounds in plant tissue, etc. Inert conditions, excellent process control and automation are our strong points.

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Your task: Analyze traces of pesticides in cereals

Extract residues and contaminants from food and feed samples or other organic materials under inert conditions. Required detection levels can be reached due to our high sample weights.

Go to page 12

Your instrument solution:

E-416



E-816 SOX



Hydrolysis Unit B-411 or E-416

The unit quickly and conveniently performs the hazardous hydrolysis process, including digestion and filtration. Choose between 4- or 6-place unit.

Extraction Unit E-812 SOX or E-816 SOX

Available as a 2- and 6-place unit; performs an automated Soxhlet extraction according to standardized methods (AOAC, § 64 LFBG).

E-816 HE



E-812 HE



Extraction Unit E-812 HE or E-816 HE

Choose the HE model, available as a 2- or 6-place unit, to run an automated hot extraction according to Randall or Goldfisch.

Alternative: Standard Soxhlet extraction with E-812 SOX or E-816 SOX.

Hydrolysis: This step can be skipped because the crude fat is accessible and can be easily extracted with a solvent.

B-811



Extraction System B-811

The best and most convenient solution – this system offers 4 different extraction techniques in one unit. Perform a Soxhlet Standard, a Soxhlet Warm, a Hot Extraction, or Continuous Flow – each process is fully automated and controlled. Additionally: work under completely inert conditions!

B-811 LSV



Extraction System B-811 LSV

This model is designed for large sample volumes (LSV) and allows you to determine traces of residues and contaminants in foodstuff, forage, soil, and plant tissue. Even difficult application tasks can be performed reliably due to a fully automated extraction process and the system's inert nature.

The classical fat determination – Soxhlet extraction after hydrolysis

The declaration of the total fat content is required by law for most foods and feeds. Time consuming procedures, use of hazardous chemicals, an increased workload, and a constant reduction of lab staff force today's laboratories to focus on ergonomic equipment. Buchi offers a complete solution to make this task easier and faster for everyday work.



milk products



meat

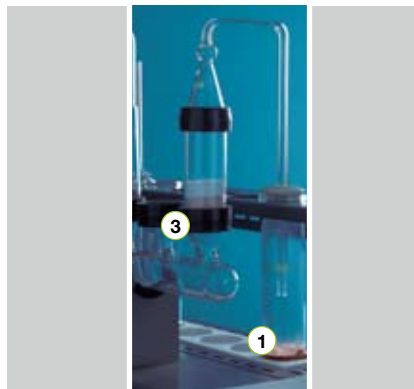


feed



biscuits

Hydrolysis



E-416



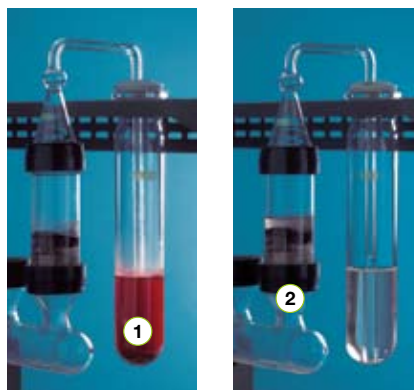
6-place unit offers more productivity

1.

Hydrolysis principle

Most often the fat is naturally encased in the food's and feed's cell matrix or is chemically bound. In this case, the hydrolysis step prior to extraction becomes necessary to separate the fat completely. When heat is applied, the hydrochloric acid breaks fatty acids from glycerides, glycol- and phospholipids, and sterol ester. It also breaks lipid-carbohydrate bonds, assists in the hydrolyzing of proteins and polysaccharides, and disrupts cell walls ①. The hydrolyzate ① of the digested sample is filtrated through a glass sample tube filled with sand and celite ③. The filter residue ② containing the fat is rinsed with water to become acid-free. Finally, the filter residue is dried and later extracted.

Filtration and rinsing



B-411



4-place unit

Why switch from manual handling to the E-416 or B-411?

- Simultaneous hydrolysis, filtration, and rinsing of four up to six samples
- Fast and efficient filtration/rinsing
- Clean and user-friendly operation
- No odour nuisance
- Glass sample tube with frit matches the extraction units
- Complies with standardized methods (§ 64 LFBG: Weibull-Stoldt; AOAC: Acid Hydrolysis Method)

The ideal complement to the Extraction Units E-812 and E-816

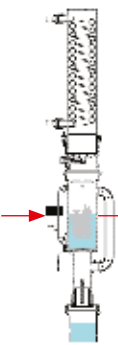
The Hydrolysis Unit B-411 and E-416 ensures a safe and fast acid digestion while handling four to six samples at the same time. The powerful IR-heating is level-controlled and allows for a fast heat transfer to the digestion vessel. Since the unit is equipped with a suction tube to work under vacuum, the time for filtration and neutralization is dramatically reduced. The glass sample tube is designed to be used directly in the Extraction Unit E-812/816.

	Order no.
Hydrolysis Unit E-416, 230 V	42870
Hydrolysis Unit E-416, 120 V	42871
Hydrolysis Unit E-416 V*, 230 V	44468
Hydrolysis Unit B-411, 230 V	37455
Hydrolysis Unit B-411, 120 V	37456
Hydrolysis Unit B-411 V*, 230 V	37461

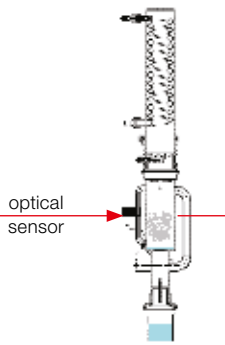
* Viton

The demand for easy and fast sample preparation in quantitative analysis has prompted Büchi to develop a new extraction unit, specially designed to be in accordance with standardized methods (AOAC Official Methods, Weibull-Stoldt). The Extraction Unit E-812 SOX and E-816 SOX guarantee an original, automated and accelerated Soxhlet extraction.

1. Extraction



2. Rinsing



Optical sensor



Glass valve



Two options are available based on sample throughput

3. Drying



4. Change samples



Important: Steps 1 through 3 show an automatic sequence.

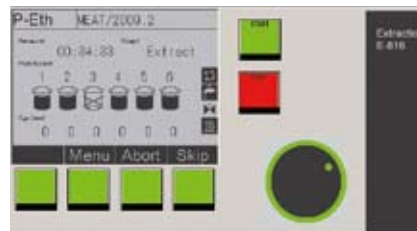
2.

Soxhlet extraction

After hydrolysis, the acid-free residue in the glass sample tube is dried and topped with a layer of sand. The glass sample tubes are extracted with the required solvent following the Soxhlet principle. This principle means that the solvent is evaporated, condensed, and collected in the Soxhlet glass chamber. Once the solvent level reaches the optical sensor line, the solvent is automatically released into the beaker and evaporated again.

Unique: Automated and accelerated Soxhlet extraction

Cycle and time monitoring allows for unattended operation and best reproducibility (RSD < 1%). The optical sensor is adjustable based on the sample level. Due to the level adjustment, the cycle throughput is increased, which makes a real Soxhlet extraction fast and efficient. Büchi is the only manufacturer that offers an automated Soxhlet extraction unit.



Close to the process at any time

The clearly arranged display with self-explanatory symbols informs the operator about all important functions. Individually adjustable heating positions offer enhanced flexibility.

E-812 SOX



2-place Soxhlet unit

E-816 SOX

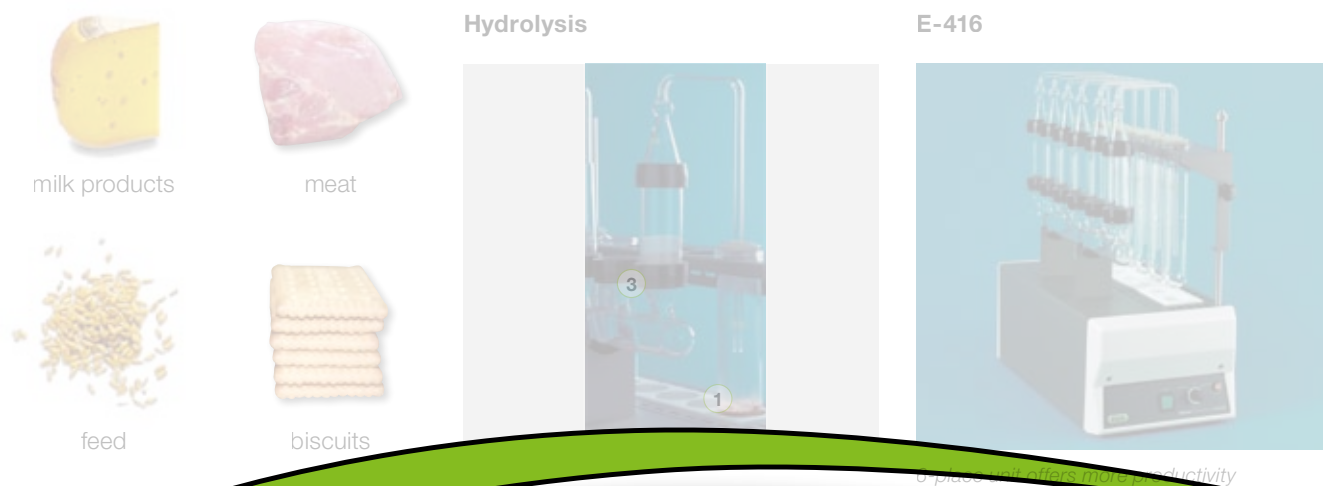


6-place Soxhlet unit

	Order no.
Extraction Unit E-812 SOX, 100–120 V/230 V	49111
Extraction Unit E-816 SOX, 100–120 V/230 V	47581

Efficient hot extraction to determine crude fat or total fat

Crude fat is a measure of the total oil or fat content estimated by extracting a ground feed sample with diethyl ether or another solvent. A hydrolysis step prior to extraction may not always be necessary. Some food samples, for instance potato chips and mayonnaise, do not require prior hydrolysis. If the fat is not chemically bound only a direct extraction following the Randall, Goldfisch or Soxhlet extraction methods is performed.

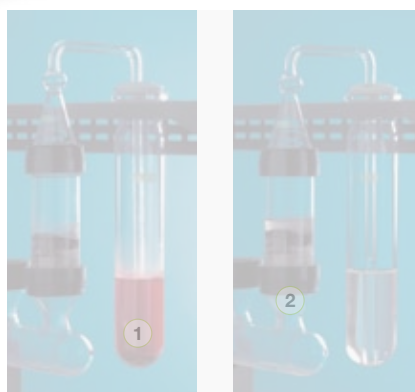


1.

Hydrolysis principle

Most often the fat is naturally encased in the food's and feed's cell matrix or is chemically bound. In this case, the hydrolysis step prior to extraction becomes necessary to separate the fat completely. When heat is applied, the hydrochloric acid breaks fatty acids from glycerides, glycol- and phospholipids, and sterol ester. It also breaks lipid-carbohydrate bonds, assists in the hydrolyzing of proteins and polysaccharides, and disrupts cell walls (1). The hydrolyzate (1) of the digested sample is filtrated through a glass sample tube filled with sand and celite (3). The filter residue (2) containing the fat is rinsed with water to become acid-free. Finally, the filter residue is dried and later extracted.

Filtration and rinsing



Why switch from manual handling to the E-416 or B-411?

- Simultaneous hydrolysis, filtration, and rinsing of four up to six samples
- Fast and efficient filtration/rinsing
- Clean and user-friendly operation
- No odour nuisance
- Glass sample tube with frit matches the extraction units
- Complies with standardized methods (§ 64 LFBG: Weibull-Stoldt; AOAC: Acid Hydrolysis Method)

B-411



4-place unit

The ideal complement to the Extraction Units E-812 and E-816

The Hydrolysis Unit B-411 and E-416 ensures a safe and fast acid digestion while handling four to six samples at the same time. The powerful IR-heating is level-controlled and allows for a fast heat transfer to the digestion vessel. Since the unit is equipped with a suction tube to work under vacuum, the time for filtration and neutralization is dramatically reduced. The glass sample tube is designed to be used directly in the Extraction Unit E-812/816.

	Order no.
Hydrolysis Unit E-416, 230 V	42870
Hydrolysis Unit E-416, 120 V	42871
Hydrolysis Unit B-411, 230 V	37455
Hydrolysis Unit E-416 V*, 230 V	44468
Hydrolysis Unit B-411, 120 V	37456
Hydrolysis Unit B-414 V*, 230 V	37461

* Viton

The measurement of crude fat was an important part of the historical method of proximate analysis. Today, it is used to estimate the fat content of feeds to determine the total dietary fat level and to calculate non-fiber carbohydrate by difference.

Hot extraction process



1. Hot extraction (HE)
If no hydrolysis is required, the sample is either put into the glass sample tube with frit or in the appropriate paper thimble to be extracted by a specific solvent.

or

2. Hot extraction (HE)
When the extraction is performed as a second step after hydrolysis, the dried residue in the glass sample tube is inserted into the beaker and extracted by a specific solvent.

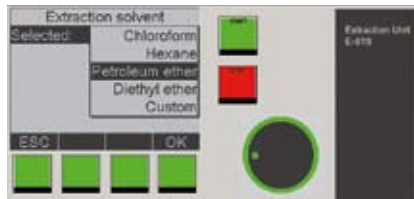
The hot extraction process always follows an AOAC approved method, which consists of three steps:

Extraction – this first step heats up the solvent, the sample, and glassware.

Rinsing – the glass sample tube or thimble is washed with fresh solvent. The optimization of rinse time, solvent volume, and time-dependent drain interval accelerates the process and cuts down the total extraction time including rinsing to just 35 minutes.

Drying – only a little solvent remains in the beaker which allows for a short drying time. The solvent is evaporated, condensed, collected beneath the condenser, and transferred to the solvent tank for re-use. The extract is slowly dried while the solvent is removed.

Operation panel



Solvent library
Utilize the implemented solvent library (chloroform, hexane, petroleum ether, diethyl ether). Select the required solvent, and all parameters for extraction, rinsing, and drying are automatically defined. No time-consuming method development is necessary.

State-of-the-art heating



New technology – one heating plate, but individually adjustable heating sources

Individual adjustability allows for greater flexibility. Quick cleaning process: wiping is all that is required!

Completely tight



No limitations under extreme conditions

The flexible z-seal-system ensures absolute tightness even under extreme conditions. In conjunction with an excellent cooling capacity, the unit reaches an average solvent recovery of better than 90%.

Two options are available based on sample throughput

E-812 HE



2-place Hot Extraction unit

E-816 HE

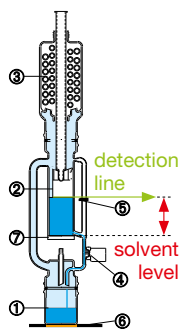


6-place Hot Extraction unit

	Order no.
Extraction Unit E-812 HE, 100–120 V/230 V	49100
Extraction Unit E-816 HE, 100–120 V/230 V	47580

Chemical and industrial extractions – the greatest flexibility you can get

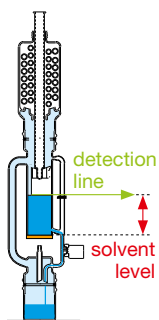
The Extraction System B-811 sets a new standard for solid-liquid extraction procedures. This system is highly suitable for demanding applications in chemical, industrial, and pharmaceutical analyses. Remarkable user-friendliness, practical working sequences, and time savings are the obvious strong points of this complete system solution.



Soxhlet Standard Real Soxhlet Extraction

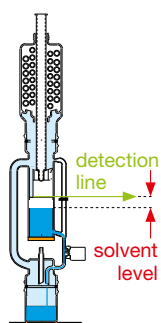
- The solvent in the beaker is evaporated by the lower heating element, condensed, and collected in the extraction chamber while the valve is kept closed. The glass sample tube, placed in the extraction chamber, is covered by the condensed solvent.
- Each time the solvent level reaches the optical sensor, the total solvent containing the extracted compounds is released into the beaker while the valve remains open, until the extraction chamber is fully empty. One single cycle is finished. The number of cycles and/or time defines the length of the extraction process.

Cycle and/or time monitoring allows for unattended operation and best reproducibility. The adjustable optical sensor detects the number of pre-defined cycles and controls the magnetic glass valve to release solvent. The cycle throughput is increased, which makes even a real Soxhlet extraction very fast and efficient.



Soxhlet Warm Real Soxhlet Extraction under enhanced conditions

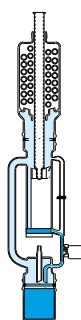
- The solvent in the beaker is evaporated by the lower heating element, condensed, and collected in the extraction chamber while the valve is kept closed. The glass sample tube, placed in the extraction chamber, is covered by the condensed solvent.
- Once the solvent level is detected by the optical sensor, the upper heating element is activated to heat up the solvent in the extraction chamber.
- Each time the solvent level reaches the optical sensor, the total solvent is released into the beaker while the valve remains open until the extraction chamber is empty.



Hot Extraction Extraction process known as Randall and Goldfisch Extraction

- The solvent in the beaker is evaporated, condensed at the condenser, and collected in the extraction chamber.
- The hot extraction process is carried out once the solvent level is detected by the optical sensor for the first time and the upper heating element is activated.
- As soon as the solvent reaches the optical sensor, the valve opens for a few seconds and the hot solvent is drained. In comparison to the Soxhlet process, the glass sample tube remains in the hot solvent during the entire extraction time. During extraction, the solvent level in the extraction chamber remains at the detection line.

Time monitoring allows for unattended operation. In terms of recovery and time savings, the interaction of condensation (= fresh solvent) and short drain intervals makes the hot extraction process very efficient and reproducible.



Continuous Flow Washing up under controlled conditions

- The magnetic valve is opened from the beginning.
- The solvent in the beaker is evaporated by the lower heating element and condensed. During the entire process, the sample is rinsed with fresh solvent (principle of "continuous flow").

Efficient rinsing process: rinse, concentrate, and dry under fully automated conditions.

① Solvent beaker
② Glass sample tube

③ Condenser
④ Glass valve

⑤ Optical sensor
⑥ Lower heating element

⑦ Upper heating element
■ Activated heating element

Unique – four different extraction techniques in one system without conversion of the glass assembly. Choose one of the four techniques based on your application!

Go beyond the limits and switch to B-811

- **The fully automated extraction process** (extraction – rinsing – drying) is designed for unattended operation and allows for minimum system handling for up to four samples at the same time.
- **B-811 provides the fastest extraction process and best mass transfer** resulting from cycle/time monitoring and high end heating elements with optimized heating capacity.
- **Flexibility** allows you to apply the desired extraction technique. Choose from four different extraction techniques in one system without conversion of the glass assembly.
- **Wide application spectrum** – even high boiling point solvents (up to +150 °C) can be used for the extraction process.

- **Soxhlet Standard**
- **Soxhlet Warm**
- **Hot Extraction**
- **Continuous Flow**



Order no.
 Extraction System B-811, 230 V 36680
 Extraction System B-811, 120 V 36681
 Extraction System B-811, 100 V 40550

Residue and contaminants analysis – the best possible solution for environmental applications

Environmental laboratories require excellent infrastructure for their analyses. Solvent extraction is the most commonly used sample preparation technique for determining different analytes in food, feed, soil, and sludge. In foodstuff, one differentiates between residues and contaminants. Residues usually remain after a special treatment on the foodstuff, e.g., pesticides or active pharmaceutical ingredients. However, environmental contaminants get into food products without intentional human involvement (e.g. PCBs, mycotoxins) or originate during food processing (e.g. PAH, nitrosamines).

Only Buchi offers a dedicated system that is designed for use with large sample sizes and gives the lowest detection levels of analytes – the LSV model. LSV stands for “Large Sample Volume”.

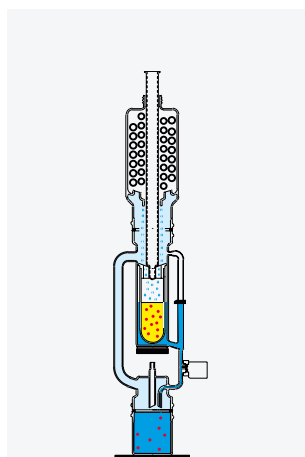


High sample throughput requirements –
unattended operation combined with full automation.

Three steps, but one sequence:

- Extraction
- Rinsing
- Drying

Step 1: Extraction

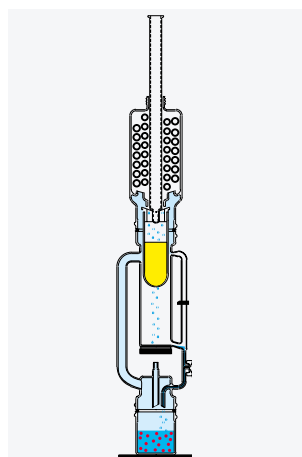


The sample is placed into the glass sample tube or thimble. One of the four possible extraction procedures is applied:

- Soxhlet Standard
- Soxhlet Warm
- Hot Extraction
- Continuous Flow

Please refer to page 10 for details

Step 2: Rinsing

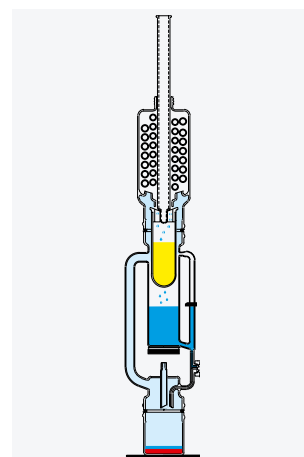


Once the extraction is completed, the glass valve opens and the glass sample tube is lifted up automatically. During the rinsing process, the condensed solvent washes final traces of soluble matter from the sample and from the interior of the extraction chamber.

During processing

Inert gas such as nitrogen and/or keeping solvent is supplied if the analyte is oxygen- or heat-sensitive.

Step 3: Drying



After the rinsing process is completed, the glass valve closes while the lower heating element remains activated. The solvent is evaporated, condensed at the condenser, and collected in the empty extraction chamber.

The application configuration is the primary task – various functions allow you to easily meet different requirements. Our system is clearly the best solution for residue and contaminant analyses that require very low detection limits.



- Optimize sample size** – with the LSV model, it is possible to increase the sample size to reach the required detection limit of the analyte. In the LSV model, main glass parts are expanded by almost 60%.

Beaker (Standard \leftrightarrow LSV): 150 ml \leftrightarrow 250 ml

Glass sample tube (Standard \leftrightarrow LSV): 130 ml \leftrightarrow 240 ml

- Work under fully inert conditions** – all instrument components in contact with the solvent/sample/analyte are inert. Residual effects (memory-effects) are fully eliminated. This ensures no alternating blank values from emitted analyte absorbed by components or components releasing extractable ingredients.

- Drying under inert gas** – in case of heat- and/or oxygen-sensitive analytes, inert gas is applied during processing for better recoveries.

- Suited for a wide spectrum of applications** – even high boiling point solvents (up to 150 °C) can be used for the extraction process. Toluene and xylene are often used solvents in the environmental area.



	Order no.
Extraction System B-811 LSV, 230 V	37900
Extraction System B-811 LSV, 120 V	37901
Extraction System B-811 LSV, 100 V	40549

“This counts...”

Benefit overview – Extraction Units E-812 and E-816

Develop an overall picture of key advantages of Buchi's extraction solution.



✓ **Flexible Viton® z-seal-system ensures absolute tightness** – adapts to the flange of the beaker and Soxhlet glass chamber; tolerances are perfectly compensated for.



✓ **Best solvent recovery rates** – insulated tank with condenser – no unpleasant odor even with petroleum ether.



✓ **No “burn risk”** due to heating control. Operational safety: software displays “risk of burning” message after extraction process is finished!

1

✓ **Protection shield and smart sensors** – shield sensor controls shield position, rack must be retracted and in a down-position, and only then is it possible to begin operation. Operating errors are immediately displayed.

3

✓ **Huge, open cooling system** and excellent ventilation limits explosion risk.

2

✓ **Cooling water valve with flow sensor** and follow-up time.

4

✓ **Operating display** is completely solvent-resistant



✓ **Soxhlet rack acts like a drawer** – mobile rack allows for easy sample placement. All Soxhlet glass chambers can be moved at the same time.

5

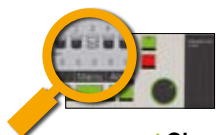
✓ **High speed heating** – every individual heating plate reaches boiling point within five minutes.



✓ **New heating technology with individual heating means one set point, one sensor, and one activation for each position** – maloperation of one heating position does not effect the others. The abort function also works for individual positions.

6

✓ **Tank level sensor** monitors solvent level – a full tank is detected by the sensor and the user receives instructions on the display.



✓ **Clever menu navigation** – easy to understand from the beginning.



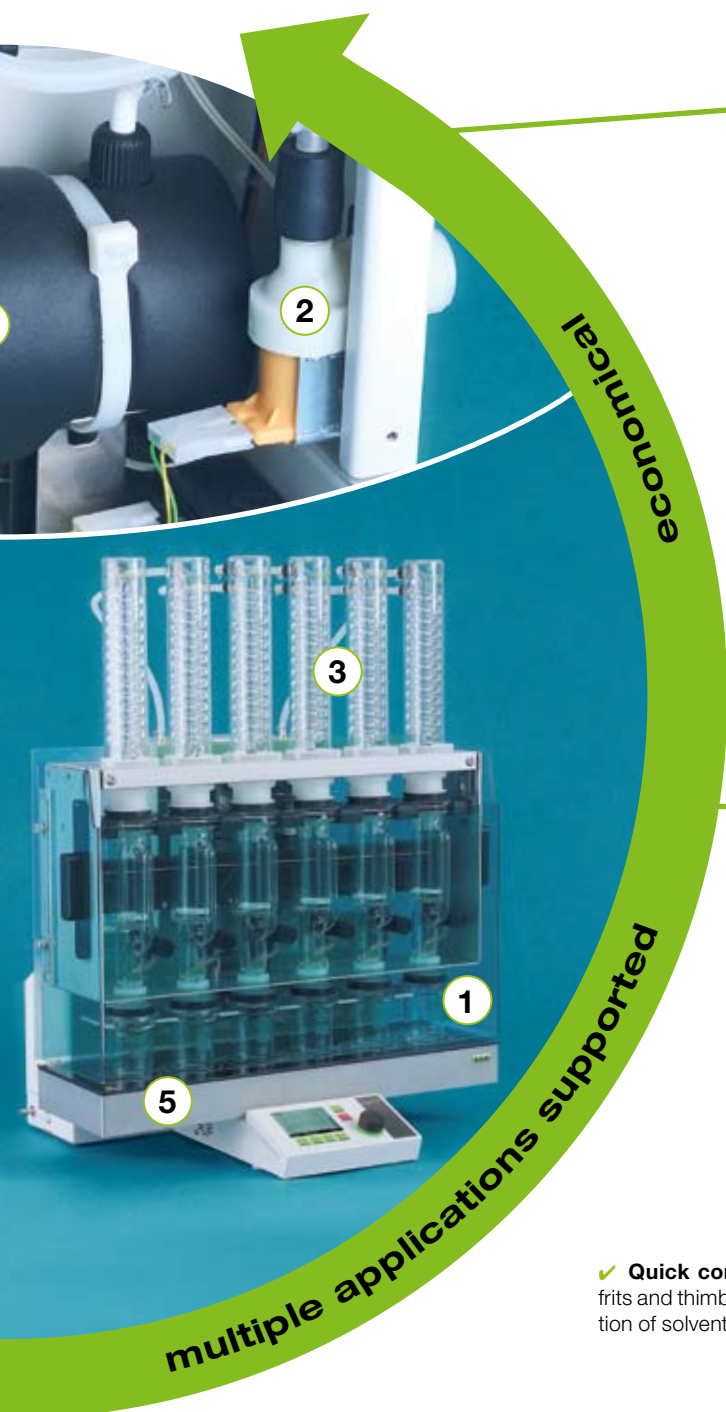
✓ **“Skip” function** – accelerate the process whenever needed or manually intervene for fast method improvement.

✓ **40 customized methods** can be stored.

Confidence through safety

Speed up your process





✓ **Ceramic surface with integrated individual heating zones** – high speed, easy cleaning, no splices.



✓ **Re-use glass sample tubes** and save money compared to using thimbles.



✓ **Highly shock-resistant beakers** – even small fissures are compensated for by an intelligent z-seal-system.



✓ **Large cooling surface** – solvent losses are minimized for best recovery rates.

3

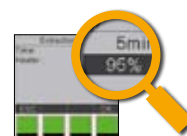
✓ **Increased efficiency in an economical manner.** Best solvent recovery rates (90%+) due to tank cooling and tank insulation.

7

✓ **Solvent library** – choose your solvent and respective settings are loaded. No time-consuming application work necessary.



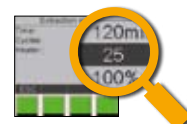
✓ **Adapt heating power** according to your geographical data. Less power for places of high altitude, e.g. Mexico City, and more power for locations of lower altitude regions, e.g. Japan.



✓ **Quick connectors made out of PVDF** allow one to attach glass frits and thimbles which supports high sample throughput. No reabsorption of solvent when compared to PTFE.



✓ **Use the E-812/816 SOX for true and automated Soxhlet extractions** with cycle and/or time monitoring.



✓ **All parts are made of borosilicate glass 3.0 from SCHOTT.**

“This counts ...”

Benefit Overview – Extraction Systems B-811 and B-811

1 ✓ **Main power switch off** – in the event of a power supply overload or a short circuit, the main power switch turns off automatically.

2 ✓ **Overheat protection** for the lower and upper heating element.

3 ✓ **Cooling water monitoring** – if the cooling water is disconnected or the water flow is interrupted, all processes are stopped.

4 ✓ **Beaker monitoring** – at least one beaker must be in contact with the lower heating element for the position to be activated and to run an extraction. Otherwise the process cannot be started or is stopped immediately if there is no contact. If a beaker breaks, the system's software closes the valve and terminates the affected position.

4 ✓ **Dry beaker monitoring** – if one of the beakers dries out during the extraction or rinsing process, the software turns off the related position.

5 ✓ **Protection shield** on all sides protects the operator from injury.



✓ **Conversion** of “Standard” to LSV is possible and easily accomplished by simply exchanging the glass assembly. No tools needed.



✓ **The process can be suspended at any time**, for instance, to release solvent into the beaker, to apply inert gas, or to extend the extraction time.

6 ✓ **Process control and reliable results** – the four heating elements work **independently**. If one heating element malfunctions or one of the processes needs to be suspended, all other heating elements continue to operate.

✓ **Fully automated extraction process** (extraction – rinsing – drying) allows for unattended operation of four samples at the same time.

Confidence through safety

speed up your process



LSV

economical

multiple applications supported

3

8

5

1

6

✓ **Ceramic surface with integrated individual heating elements** – high speed and easy cleaning.

✓ **Re-use of glass sample tube** with frit helps to reduce costs compared to disposable paper thimbles.

✓ **Large cooling surface on each position** – solvent losses are minimized.

7

✓ **Optimized sample size** – with the LSV model, it is possible to increase sample sizes to reach the required detection limit of the analyte. In the LSV model, main glass parts are expanded by almost 60% (see page 23 for details).

✓ **Wide application spectrum** – even high boiling point solvents (up to +150 °C) can be used for the extraction process. Method settings for more than 200 solvents are available.

✓ **Drying under inert gas** – in case of heat- and oxygen-sensitive analytes, apply inert gas for better recoveries during all steps.

8

✓ Perform **true and automated Soxhlet** with cycle and/or time monitoring.

8

✓ **Inert instrument** – all instrument components in contact with the solvent/sample/analyte are inert. Residual effects (memory effects) are fully eliminated.

✓ **Fastest extraction process and best mass transfer** resulting from cycle/time monitoring and high-end heating elements with optimized heating capacity.

✓ **Unique** – flexibility allows you to apply the desired extraction technique.

Choose from four different extraction techniques in one system without conversion of the glass assembly.

- **Soxhlet Standard**
- **Soxhlet Warm**
- **Hot Extraction**
- **Continuous Flow**

Accessories

Hydrolysis Unit B-411 and E-416



Set of digestion vessels, 300 ml (4 pcs.)

Order no. 37377



Set of glass sample tubes with frit for B-811 (4 pcs.)

Order no. 37281



Set of glass sample tubes with frit for E-812/816 (2 pcs.)

Order no. 49430



Suction tube B-411

Order no. 37387



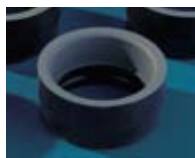
Suction tube E-416

Order no. 42868



Sample aspiration tube

Order no. 37380



Rubber coupling, Standard

Order no. 37381



Set of stoppers Ø 45mm; blind plug (4 pcs.)

Order no. 37725



Set of caps for digestion vessel; rinsing (4 pcs.)

Order no. 37463



Upper insulation plate B-411

Order no. 37416



Upper insulation plate E-416

Order no. 26736



Pair of glass tongs

Order no. 02004

Set of rubber couplings, Viton (4 pcs.)

Order no. 44422



Holder for digestion vessels (6 pos.)

Order no. 43039



Holder for digestion vessels (12 pos.)

Order no. 43041



Holder for glass sample tubes, PP (4 pos.)

Order no. 37462



Holder for glass sample tubes, PTFE, micro-wavable (6 pos.)

Order no. 51903



Water jet pump, plastic (not scope of delivery)

Order no. 02913



Vacuum hose D 10/20

Order no. 4125



Quartz sand, fat free, fire-dried at 750°C, 0.3 – 0.9 mm, 2.5 kg

Order no. 37689

Extraction Unit E-812 SOX and E-816 SOX



Set of beakers, SOX (2 pcs.)

Order no. 49427



Soxhlet glass chamber

Order no. 47549



Valve unit, cpl. for E-812/816

Order no. 47590



Membrane with anchor for valve unit

Order no. 37534



Expansion element, PTFE for reduction of solvent volume (1 pcs.)

Order no. 51957

Extraction Unit E-812 HE and E-816 HE



Set of beakers, HE
(2 pcs.)

Order no. 49426

**only to be performed by authorized service technician*

Extraction Units E-812/816 SOX and HE



Condenser

Order no. 47604



Condenser cover
E-812

Order no. 51198



Condenser cover
E-816

Order no. 51822



Beaker holder
(6 pos.)

Order no. 47643



Set of glass sample
tubes with frit for
E-812/816 (2 pcs.)*

Order no. 49430



Set of holders for glass
sample tubes with frit
for E-812/816 (6 pcs.)

Order no. 49432



Pack of paper thimbles
25 x 100 mm (4 pcs.)

Order no. 41882



Pack of paper thimbles
33 x 94 mm (4 pcs.)

Order no. 41883



Set of thimble holders,
25 x 100 mm (6 pcs.)

Order no. 49428



Set of thimble holders,
33 x 94 mm (6 pcs.)

Order no. 49429



Z-seal-system:

① Seal holder, PVDF
Order no. 47610

② Set of z-seals, Viton
(2 pcs.)
Order no. 49431

③ Set of seals, PTFE
(6 pcs.)
Order no. 49433



Holder for glass sample
tubes, PP (4 pos.)

Order no. 37462



Holder for glass sample
tubes, PTFE, micro-
wavable (6 pos.)

Order no. 51903



Pair of glass tweezers

Order no. 02004



Pliers for glass sample
tube with frit

Order no. 47609



Adapter for cooling
media input

Order no. 49151

**not scope of delivery*

Chiller line

Solvent	B.p.	F-100/108/114 adjustment T (Tmax. = B. p. -25 °C)	
Chloroform	61 °C	10 °C	(36 °C)
Hexane	69 °C	10 °C	(44 °C)
Diethylether ¹⁾	34 °C	5-10 °C	(9 °C)
Petrolether	40-60 °C	10 °C	(15-35 °C)

¹⁾ Chiller required



Recirculating Chiller F-100
with a cooling capacity
of 400 W at 10°C; cools
to a fixed temperature of
10°C (to be used with
one E-812 or E-816)

Order no.
230V, 50/60 Hz
11056460
120 V, 60Hz
11056461



Recirculating Chiller F-108
with a cooling capacity of
800 W at 15°C; cools to
temperatures of 0 to 25°C
(to be used with two
E-812 or one E-816)

Order no.
220-240V, 50/60 Hz
11056464
110-120V, 60 Hz
11056465



Recirculating Chiller F-114
with a cooling capacity of
1400 W at 15°C; cools to
temperatures of -10 to
25°C (to be used with
two E-816)

Order no.
220-240V, 50/60 Hz
11056466
110-120V, 60 Hz
11056467



Distribution adapter
for operating two
extraction units with
chiller

Order no. 37742

Accessories, continued

Extraction System B-811



Set of solvent beakers
(4 pcs.)

Order no. 37276



Set of glass sample tubes with frit
(4 pcs.)

Order no. 37281



Extraction chamber,
Ø 52 mm

Order no. 36710



Sample holder, PTFE
Ø 39 mm

Order no. 36559



Condensation tube,
length 312 mm

Order no. 37482



Condenser B-811

Order no. 36711

Extraction System B-811 LSV



Set of solvent beakers,
LSV
(4 pcs.)

Order no. 38597



Set of glass sample tubes with frit, LSV
(4 pcs.)

Order no. 37563



Extraction chamber,
Ø 60 mm, LSV

Order no. 37902



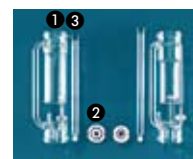
Sample holder, PTFE
Ø 49 mm, LSV

Order no. 37904



Condenser B-811, LSV

Order no. 36711



LSV upgrade kit for the conversion of a B-811 into a B-811 LSV; consists of:

1 Extraction chamber, LSV (4 pcs.)

Order no. 37902

2 Holder for glass sample tubes with frit, LSV (4 pcs.)

Order no. 37904

3 Condensation tube, LSV (4 pcs.)

Order no. 37903

Set of solvent beakers, LSV

Order no. 38597

Set of glass sample tubes with frit, LSV

Order no. 37563

LSV upgrade kit, cpl.

Order no. 37910



Condensation tube,
length 291 mm

Order no. 37903



Holder basket for thimbles; to be used with holder, order no. 37904, Ø 53 mm, length 120 mm, LSV (1 pcs.)

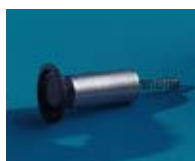
Order no. 37905

Additional accessories



Magnetic valve for B-811

Order no. 36687



Membrane with anchor for valve unit

Order no. 37534



Holder ring for extraction chamber

Order no. 36709



Set of seals for extraction chamber, PTFE (4 pcs.)

Order no. 37388



Inert gas supply connection, cpl.

Order no. 37496



Set of screw caps for nitrogen supply, GL10 (4 pcs.)

Order no. 37368



Set of seals for extraction chamber, Viton (4 pcs.)

Order no. 42654



Adapter for cooling media input

Order no. 49151

Thimble holders



① Set of thimble holders 43 x 123 mm (4 pcs.)
Order no. 37280



② Set of thimble holders 33 x 94 mm (4 pcs.)
Order no. 37279



③ Set of thimble holders 22 x 80 mm (4 pcs.)
Order no. 37278



④ Set of thimble holders 25 x 100 mm (4 pcs.)
Order no. 37277

Printer and accessories for B-811 and B-811 LSV



Star printer 512, serial
Order no. 48258



Printer cable IDP-460
Order no. 28468



Adapter for printer cable IDP-460
Order no. 31411



Ribbon for printer IDP-460
Order no. 38683



Ribbon for Star printer 512
Order no. 44306



Paper roll for IDP-460, Star printer 512
Order no. 38684

Chiller line

Solvent selection	B.p.	F-100/108/114 adjustment T (T _{max.} = B. p. -25 °C)
Chloroform	61 °C	10 °C (36 °C)
Hexane	69 °C	10 °C (44 °C)
Diethylether ¹⁾	34 °C	5-10 °C (9 °C)
Petrolether	40-60 °C	10 °C (15-35 °C)

¹⁾ Chiller required



Recirculating Chiller F-100 with a cooling capacity of 400 W at 10°C; cools to a fixed temperature of 10°C (to be used with one B-811 or B-811 LSV)

Order no.
230V, 50/60 Hz 11056460
120 V, 60Hz 11056461



Recirculating Chiller F-108 with a cooling capacity of 800 W at 15°C; cools to temperatures of 0 to 25°C (to be used with one B-811 or one B-811 LSV)

Order no.
220-240V, 50/60 Hz 11056464
110-120V, 60 Hz 11056465



Recirculating Chiller F-114 with a cooling capacity of 1400 W at 15°C; cools to temperatures of -10 to 25°C (to be used with two B-811 or two B-811 LSV)

Order no.
220-240V, 50/60 Hz 11056466
110-120V, 60 Hz 11056467



Distribution adapter for operating two extraction units with chiller

Order no. 37742

Technical data

Extraction Unit	E-812 SOX	E-816 SOX
Mains voltage	100–120 V/220–240 V \pm 10 %	100–120 V/220–240 V \pm 10 %
Power consumption	700/1200 Watt	1950/1200 Watt
Frequency	50/60 Hz	50/60 Hz
Ambient conditions	For indoor use only	For indoor use only
Temperature	5–40 °C	5–40 °C
Altitude	up to 2000 m	up to 2000 m
Humidity	maximum relative humidity 80% for temperatures up to 31 °C decreasing linearly to 50% relative humidity at 40 °C.	
Installation category	II	II
Degree of protection	IP20	IP20
Degree of pollution	2	2
Beaker volume	130 ml	130 ml
Volume of glass sample tube	115 ml	115 ml
Volume of Soxhlet glass chamber	190 ml	190 ml
Max. cooling water consumption	72 l/h	72 l/h
Max. water pressure	4 bar	4 bar
Dimensions (W x H x D)	275 x 776 x 456 mm	635 x 776 x 456 mm
Weight	21 kg	36 kg

Recirculating Chiller	F-100	F-108	F-114
Power consumption (max.)	850W	1350W	1850W
Supply voltage	230 VAC \pm 10% 115 VAC \pm 10%	230 VAC \pm 10% 115 VAC \pm 10%	230 VAC \pm 10% 115 VAC \pm 10%
Frequency	50/60 Hz	50/60 Hz	50/60 Hz
Display	No Display	Digital, Resolution 0.1 K	Digital, Resolution 0.1 K
Overvoltage category	II	II	II
Dimensions W x H x D [mm]	280 x 400 x 500	400 x 500 x 580	400 x 500 x 660
Weight	29 kg	40 kg	42 kg
Cooling at 15 °C	500 W	500 W	500 W
Temperature range	Fix +10 °C	-10 °C ... +25 °C	-10 °C ... +25 °C
Working range	Fix +10 °C	+ 0 °C ... +25 °C	-10 °C ... +25 °C
Refrigerant	R134	R134	R134
Hysteresis	\pm 2 K	\pm 1 K	\pm 1 K
Tank volume	3 l	5 l	8 l
Hose connection	9.5 mm	9.5 mm	13.5 mm
Pump capacity	0.6 bar	0.6 bar	1 bar
Flow rate	2.5 l/min	3 l/min	11 l/min

Extraction Unit	E-812 HE	E-816 HE
Mains voltage	100–120 V/220–240 V $\pm 10\%$	100–120 V/220–240 V $\pm 10\%$
Power consumption	700/1200 Watt	1950/1200 Watt
Frequency	50/60 Hz	50/60 Hz
Ambient conditions	For indoor use only	For indoor use only
Temperature	5–40 °C	5–40 °C
Altitude	up to 2000 m	up to 2000 m
Humidity	maximum relative humidity 80% for temperatures up to 31 °C decreasing linearly to 50% relative humidity at 40 °C.	
Installation category	II	II
Degree of protection	IP20	IP20
Degree of pollution	2	2
Beaker volume	260 ml	260 ml
Volume of glass sample tube	115 ml	115 ml
Max. cooling water consumption	72 l/h	72 l/h
Max. water pressure	4 bar	4 bar
Dimensions (W x H x D)	275 x 596 x 456 mm	635 x 596 x 456 mm
Weight	18 kg	30 kg

Recirculating Chiller	F-100	F-108	F-114
Power consumption (max.)	850W	1350W	1850W
Supply voltage	230 VAC $\pm 10\%$ 115 VAC $\pm 10\%$	230 VAC $\pm 10\%$ 115 VAC $\pm 10\%$	230 VAC $\pm 10\%$ 115 VAC $\pm 10\%$
Frequency	50/60 Hz	50/60 Hz	50/60 Hz
Display	No Display	Digital, Resolution 0.1 K	Digital, Resolution 0.1 K
Overvoltage category	II	II	II
Dimensions W x H x D [mm]	280 x 400 x 500	400 x 500 x 580	400 x 500 x 660
Weight	29 kg	40 kg	42 kg
Cooling at 15 °C	500 W	500 W	500 W
Temperature range	Fix +10 °C	-10 °C ... +25 °C	-10 °C ... +25 °C
Working range	Fix +10 °C	+ 0 °C ... +25 °C	-10 °C ... +25 °C
Refrigerant	R134	R134	R134
Hysteresis	± 2 K	± 1 K	± 1 K
Tank volume	3 l	5 l	8 l
Hose connection	9.5 mm	9.5 mm	13.5 mm
Pump capacity	0.6 bar	0.6 bar	1 bar
Flow rate	2.5 l/min	3 l/min	11 l/min

Technical data

Hydrolysis Unit	B-411	E-416
Power consumption	1100 Watt	1100 Watt
Mains voltage	230 V = ±10 %, 50/60 Hz 120 V = ±10 %, 50/60 Hz	230 V = ±10 %, 50/60 Hz 120 V = ±10 %, 50/60 Hz
Ambient conditions	For indoor use only	For indoor use only
Temperature	10–40 °C	10–40 °C
Altitude	up to 2000 m	up to 2000 m
Humidity	maximum relative humidity 80 % for temperatures up to 30 °C	
Installation category	II	II
Degree of pollution	2	2
Dimensions (W x H x D)	275 x 570 x 600 mm	275 x 570 x 600 mm
Weight	approx. 13.5 kg	approx. 13.5 kg

Extraction System	B-811	B-811 LSV
Capacity	1250 W	1250 W
Mains voltage	230 V = ±10 %, 50/60 Hz	230 V = ±10 %, 50/60 Hz
	120 V = ±10 %, 50/60 Hz	120 V = ±10 %, 50/60 Hz
	100 V = ±10 %, 50/60 Hz	100 V = ±10 %, 50/60 Hz
Beaker volume	150 ml	250 ml
Volume of glass sample tube	130 ml	240 ml
Volume of extraction chamber	250 ml	340 ml
Length of condenser tube	312 mm	291 mm
Diameter of sample holder	39 mm	49 mm
Max. cooling water consumption	60 l/hour	60 l/hour
Max. water pressure	6 bar	6 bar
Dimensions (W x H x D)	600 x 290 x 980 mm (with extended condenser holder)	600 x 290 x 980 mm (with extended condenser holder)
	600 x 290 x 830 mm (during operation)	600 x 290 x 810 mm (during operation)
Weight	32 kg	32.5 kg
Interface	RS 232	RS 232

Recirculating Chiller	F-100	F-108	F-114
Power consumption (max.)	850W	1350W	1850W
Supply voltage	230 VAC ±10%	230 VAC ±10%	230 VAC ±10%
	115 VAC ±10%	115 VAC ±10%	115 VAC ±10%
Frequency	50/60 Hz	50/60 Hz	50/60 Hz
Display	No Display	Digital, Resolution 0.1 K	Digital, Resolution 0.1 K
Overvoltage category	II	II	II
Dimensions W x H x D [mm]	280 x 400 x 500	400 x 500 x 580	400 x 500 x 660
Weight	29 kg	40 kg	42 kg
Cooling at 15°C	500 W	500 W	500 W
Temperature range	Fix +10°C	-10°C ... +25°C	-10°C ... +25°C
Working range	Fix +10°C	+ 0°C ... +25°C	-10°C ... +25°C
Refrigerant	R134	R134	R134
Hysteresis	±2 K	±1 K	±1 K
Tank volume	3 l	5 l	8 l
Hose connection	9.5 mm	9.5 mm	13.5 mm
Pump capacity	0.6 bar	0.6 bar	1 bar
Flow rate	2.5 l/min	3 l/min	11 l/min

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