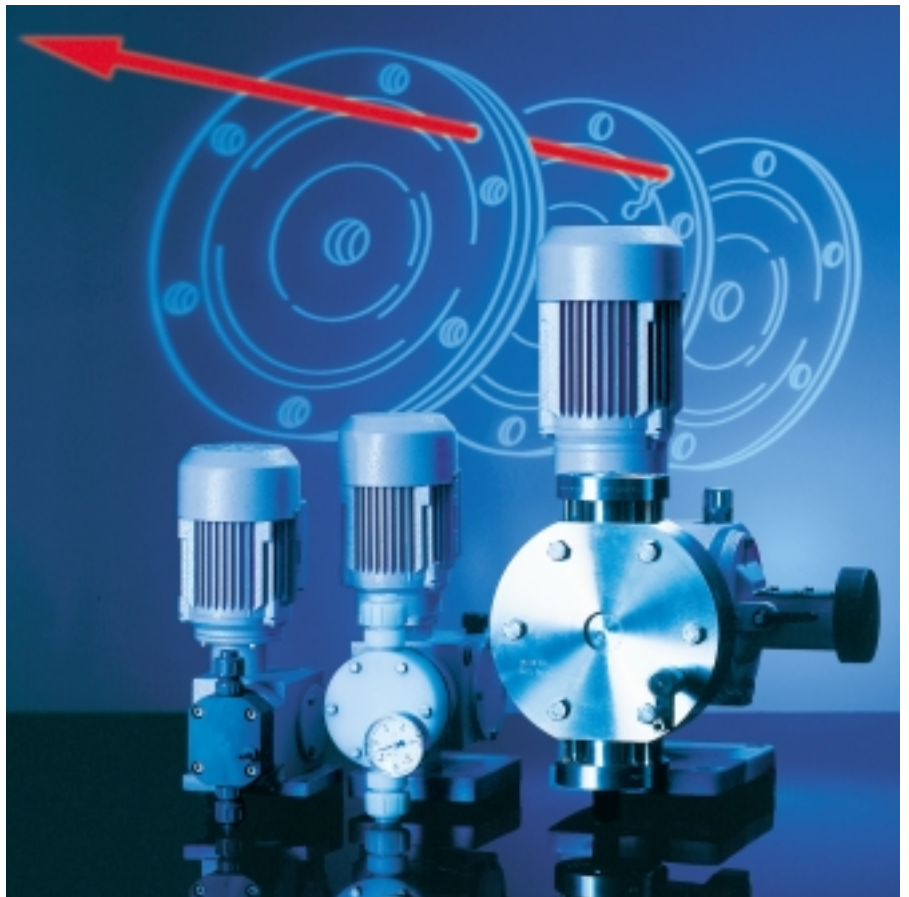


LEWA ecodos



The universal diaphragm metering pump
for the low pressure range up to 20 bar

- zero leakage
- safe dry operation
- low life cycle costs
- safe and reliable
- versatile

LEWA ecodos: Convincing advantages



*Whether used as single pump,
eg with CIP/SIP able heads ...*



*or as multiplex pump, eg
for recipe metering ...*



*or as conveying pump:
the outstanding features of the
LEWA ecodos series convince*

LEWA ecodos diaphragm pumps are a safe, economic and economical solution for nearly all metering and most conveying applications in the low pressure range. Due to their high basic design standard they can be adapted to the most different applications. The performance range extends from 0,4 to 1500 l/h per pump head. Multiplex pumps of up to six pump heads, even with different ratings, can be combined.

The patented four-layer PTFE sandwich diaphragm is mechanically actuated and delivers discharge pressures between 5 and 20 bar.

The following outstanding product advantages distinguish the LEWA ecodos:

- diaphragm service life of more than 16 000 operating hours in continuous operation
- 2 years warranty for the diaphragm
- hermetically tight diaphragm pump
- integrated diaphragm monitoring system
- no uncontrolled shut-down in case of diaphragm damage, emergency operation is still possible
- high metering accuracy, $\pm 1\%$ deviation
- simple and precise adjustment of the metered flow
- low maintenance
- low life cycle costs because of low initial investment and operating costs
- sturdy drive units and drives designed for continuous operation
- complete range can be multiplexed up to sixtuplex pumps
- low stocking and spare part costs as only 4 drive unit sizes and 6 pump head sizes are required





Performance table

Pressure	up to 20bar
Output	from 0,4l/h – 1.500l/h per pump head
Temperature	80°C
Viscosity	500 mPas (higher on request)

*LEWA ecodos:
safe, sturdy and
extremely versatile*

LEWA ecodos: the utmost concerning availability, safety and value for money



LEWA ecodos safety diaphragm:
2-layer working diaphragm,
monitoring diaphragm and pressure
resistant back-up diaphragm

The safest and most pressure stiff diaphragm in the low pressure range: the LEWA ecodos four-layer PTFE-safety diaphragm

The patented four-layer safety diaphragm of the LEWA ecodos series consists of four layers – two working diaphragms, one monitoring diaphragm and a pressure resistant back-up diaphragm – and offers optimum safety and long service life:

- made of pure PTFE
- resistant to most fluids, solvents and other diffusing fluids
- compared to similar diaphragm systems it has a far longer service life, is more pressure resistant, much more reliable and has a wider application range

Double safety: integrated diaphragm monitoring system

The integrated, standard, pressure controlled diaphragm monitoring system offers even more safety. Diaphragm rupture is signalled immediately and reliably. The following types of diaphragm condition monitoring sensors are available:

- pressure switch IE4
set pressure $\geq 1,5$ bar;
switch contact: normally closed;
max. load: 250V, 100VA, 2 A
- contact pressure gauge,
same as pressure switch IE4,
but with additional visual display;
adjustable contact:
inductive proximity switch acc. to
DIN 19234/NAMUR
- pressure gauge
- hoses nipples for non-problematic fluids
- remote signalling possible

Today availability and operational safety of the pumps and systems are decisive criteria – especially regarding the selection of a suitable pump. The LEWA ecodos series here offers a whole lot of decisive product advantages.

All advantages of the diaphragm pump: eg hermetically tight

Due to its design the LEWA ecodos series, as diaphragm pump, already offers many advantages:

- hermetically tight, no fluid conveyed can escape
- no contamination of the fluid conveyed by drive element oil possible
- very gentle conveying
- long service intervals due to long service life of the diaphragm
- absolutely safe dry operation



The integrated diaphragm monitoring system indicates diaphragm damages immediately, eg via IE4 pressure switch ...



... or via pressure gauge

Diaphragm service life in excess of 16 000 operating hours

The LEWA ecodos safety diaphragms can reach a service life of over 16 000 operating hours corresponding to a continuous operating time of more than 2 years. Therefore the diaphragms carry a two years warranty.

No "shut-down" of pump and production after diaphragm rupture

In case of diaphragm rupture – eg because of wear – it is possible to continue safe and hermetically tight operation with the LEWA ecodos pump up to the next scheduled diaphragm change. The pressure resistant back-up diaphragm then takes over the duty of the working diaphragm.

Long service intervals and low operating costs

Due to the long safety diaphragm service life of over 2 years and the sturdy and low wear drive elements the availability is very high. User of the LEWA ecodos can save considerable costs over the years because of the long service intervals.

Low pool and stocking costs

The whole performance range is covered by 4 drive element sizes and 6 pump head sizes only. This leads to a considerable price advantage for a pump pool and stocking costs for spare parts.

Low maintenance pump heads

The pump heads are hermetically tight and have low maintenance requirements. The diaphragm drive housing is sealed towards the drive element so that no drive element oil can leak out when the pump head is replaced.

Standard material selections are:

- stainless steel 1.4571
- PVC-hard
- PVDF

In addition to the standard connections (refer to table on page 9) following pump head connections are available:

- flanged connections acc. to DIN and ANSI (type 2 – 350 via 90° screwed pipe elbows)

For stainless steel pump heads:

- pipe connections to DIN 11851 (dairy fittings)
- Triclamp connections

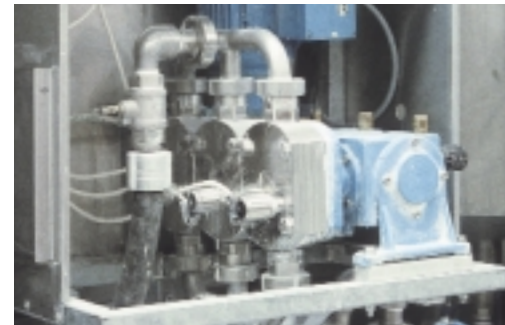
Temperature resistant and sterilizeable

The maximum operating temperature resistance of 80°C is dependent on pressure and material:

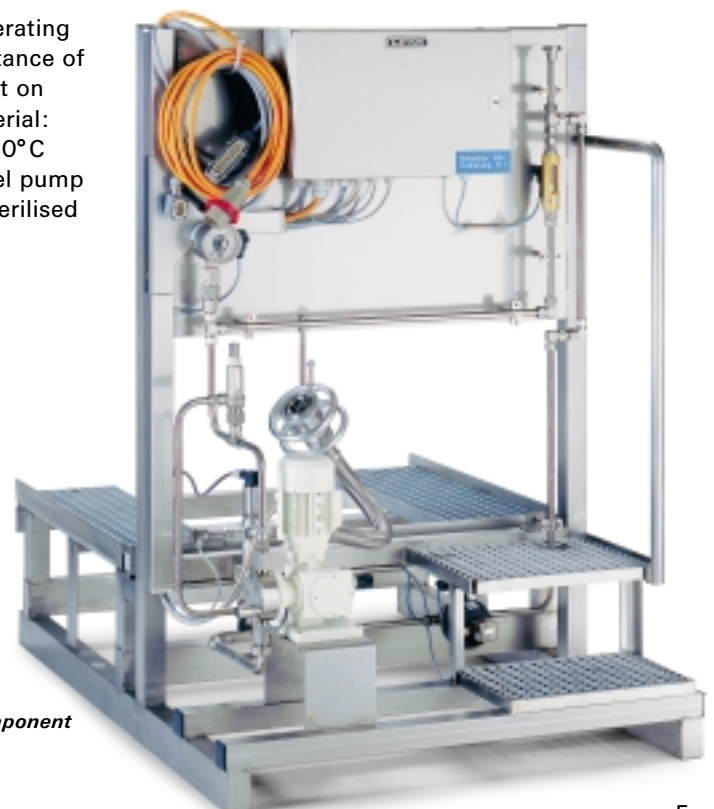
- stainless steel 80°C
- all stainless steel pump heads can be sterilised at up to 150°C
- PVDF 80°C
- PVC 60°C



The LEWA ecodos pumps are working accurately in continuous operation ...



... and this even under very difficult conditions



*LEWA ecodos:
the one reliable component
in your system*

LEWA ecodos: high precision, high adaptability



Adaptable to almost any application: LEWA ecodos, eg as multiplex pump for recipe metering

feed back of stroke length setting and limit position shut-off; up to LEWA ecodos 350 with integrated position controller, guide signal 4–20 mA (works setting) 0–20 mA as an option

- starting with LEWA ecodos 750 emergency operation via handwheel is also possible

Speed control via frequency inverter is possible without any problems

The adjustment range can be increased without problems by a variable speed motor with frequency inverter and so the metering pump can be integrated in control and automation processes. Easy commissioning because inverter and pump are supplied fully tested. Therefore time consuming, expensive optimisation and parameterising of the inverter in the system is not necessary. On request LEWA also supplies control cabinets with integrated speed control via frequency inverter. We would be pleased to provide with further information to you if desired.

- frequency inverters for motor ratings of 0,37 – 7,5 kW
- single-phase design (230V, 50 Hz) or 3-phase design (400/415 V, 50 Hz resp. 460/500V, 60 Hz)
- enclosure IP20

Sturdy drive units for continuous operation

The drive units of the LEWA ecodos series are designed for continuous operation. For an output of up to 550 l/h cam and spring return drive units are used. For higher outputs either multiplex pumps or variable eccentric drive units with harmonic kinematics are used.

High metering accuracy, variable adjustment of the metered flow

The metering accuracy of the LEWA ecodos diaphragm pump is very high. The variation in the metered flow – for fluids similar to water – is less than $\pm 1\%$ in a 5:1 stroke length range. The metered flow can be accurately adjusted by stroke length using a handwheel, or stroke actuator as well as by stroke frequency via an adequately designed motor with frequency inverter.

Recommended adjustment range by stroke length 5:1, this range can be increased to up to 10:1 via the stroke frequency.

Precise stroke adjustment: electrical or manual

The stroke adjustment is self-locking and precisely indicates the stroke length set.

- manual stroke adjustment
- electric stroke adjustment with



Variable stroke adjustment: electric stroke actuator EHV



Stroke frequency without problems: LEWA ecodos with frequency inverter

Drives without risk

Only IEC motors of major manufacturers are used as drives for the LEWA ecodos series. This also considerably increases the safety for the user.

Standard drives are:

- AC motors 230/400V, 50Hz or 460V, 60Hz
- enclosure IP55, insulation class F
- protection class EExeII T3 and EExdeII CT4 as an option
- other motors, voltages and enclosures are available on request

Complete controls

LEWA supplies various complete control systems eg for proportional or batch metering. We would be pleased to send you detailed information if desired.

Valve options

The valves made of wear resistant materials work very accurately over a long service life. For an optimum adaptation to the fluid different insert rings for the valve seats of the stainless steel pump heads are available.

- PTFE
- FPM (Viton)
- VU 90 (Vulkollan)
- valve seats of 1.4221 hardened

Instrumentation provides safety

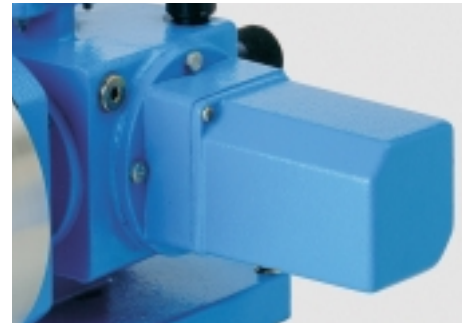
The contactors K1 (for LEWA ecodos 2 to 350) and K51 (for LEWA ecodos 750 to 1500) are mounted to the last drive element and signal each pump stroke for batch metering and inventory control.

- inductive proximity switch acc. to NAMUR (DIN 19234)
- Ex-protection EExi
- enclosure IP65

Accessories for many wishes

The numerous accessories of the LEWA ecodos series can be found in the catalogue "LEWA ecodos accessories" which will be sent to you on request. Among others the following are available:

- strainers
- pulsation dampers
- safety and pressure retaining valves
- injection points
- DIN and ANSI flanges
- wear part kits



Additional safety: contactors eg for batch metering or inventory control



Proven controls: eg for proportional or batch metering

Stroke actuator data

LEWA ecodos type	2 – 12	25 – 50	90 – 350	550	750 – 1500
Adjusting time at 50Hz approx.	40		90	-	60
motor	built-in single phase AC motor			-	IEC-AC motor
power [W]	15			-	120
mains	230V/50Hz 115V/60Hz		-	-	230/400V, 50Hz 460V, 60Hz
integrated position controller	yes			-	no
desired value input	4 – 20mA (works setting) option 0 – 20mA (please advise)			-	
actual value output	4 – 20mA option 0 – 20mA (please advise)			-	potentiometer 1000 Ω
enclosure	IP65			-	IP55 (motor)



The LEWA ecodos variable eccentric drive unit with harmonic kinematics for flow rates exceeding 350 l/h

LEWA ecodos: Close to unlimited applications



Adaptability to practically all requirements eg for the Life-Science-Industry

Life Science Industries demand very high standards and place complex requirements on the pumps used in this field.

Therefore LEWA continuously further developed the ecodos series – which already was well-established in the pharmaceutical and food stuff industry. The LEWA ecodos *hygienic* therefore meets all aseptic and sterile requirements without reducing the proven reliability and the high economical advantages. Due to the hermetically tight and leakage-free operation a contamination-free pumping and metering as well as a long-term sterile safety is assured.

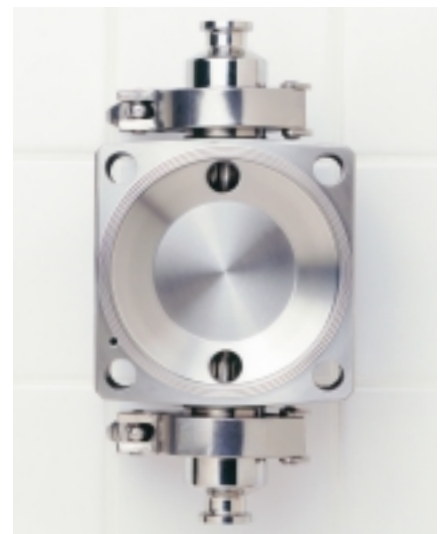
The average surface roughness of the dead-space optimised pump heads suitable for hygienic requirements for wetted parts is $\leq 0,5$ mm. They are absolutely smooth, without pores and feature a polished surface.

The optimised hygienic valves are integrated in the process connection and have a low dead space. They are easy to dismantle for cleaning or inspection.



Variety also regarding the valves: the LEWA ecodos hygienic valve

Due to its adaptability the LEWA ecodos series meets nearly all customer requirements in almost all industries. Therefore it is not possible to show the variety of applications here and only one example of the Life-Science-Industry is shown. If you tell us your specific requirements we are sure that we can select and offer a metering or conveying pump optimised acc. to your requirements! Just send us your enquiry without obligation. The data required can be found on page 10.



Also the pump heads are adapted: diaphragm pump head for the pharmaceutical industry

LEWA ecodos: the transparent programme

LEWA ecodos – technical data

LEWA ecodos	type	2	4	6	12	25	50	90	180	350	550	750	1100	1500	
identical symbols can be combined			●	◆	●	◆	●	◆	◆		■	■	■		
output eff. (Q_{max} at p_{max}) [l/h]		2	4	6	12	25	50	90	180	350	550	750	1100	1500	
viscosity max. perm. [mPa.s]		500			400	500	400	500	300	500					
stroke frequency at 50 Hz [min ⁻¹]		27	54	80	160	80	160	80	160		145	113	170	228	
performance simplex pump [kW]		0,18	0,25	0,18	0,25	0,18	0,25	0,18 ¹⁾	0,55		0,75		1,5		
operating pressure [bar] S		20				10				7,5		5 [7,5 bar ²⁾]			
operating temperature perm. [°C]		-10 – 40/80 ³⁾													
operating pressure [bar] P		12				10				7,5		5 [7,5 bar ²⁾]			
operating temperature perm. [°C]		0 – 40 ³⁾													
operating pressure [bar] F		12				10				7,5		5 [7,5 bar ²⁾]			
operating temperature perm. [°C]		-10 – 40/80 ³⁾													
pump head material S		S = stainless steel 1.4571, diaphragm PTFE, valve balls oxide ceramics / 1.4301, sealing rings Gylon													
kind of valve		ball													plate
connections* (standard)		G3/8 int.thread							G1/2		flange DN 25 PN 40				
pump head material P		P = PVC-H, diaphragm PTFE, valve balls oxide ceramics / sealing rings Gylon													
kind of valve		ball													plate
connections* (standard)		ø 12 ⁴⁾ (G5/8" ext. thread)				ø 20 ⁴⁾ (G1" ext. thread)				flange DN 25 PN 40					
pump head material F		F = PVDF, diaphragm PTFE, valve balls oxide ceramics / sealing rings Gylon													
kind of valve		ball													plate
connections* (standard)		G3/8 int.thread							ø 20 ⁴⁾ (G1" ext. thread)		flange DN 25 PN 40				
weights	approx. value (in kg)	the weight is increased by bigger motors (eg for operation with frequency inverter, EExde design, multiplex pumps) as well as stroke actuators													
simplex pump	S	15				23				30	60	76			
complete with motor	P	13				20				25	52	71			
	F	13				20				25	52	71			
Each additional pump element incl. support	S	7				12				19	40	62			
	P	6				10				15	36	58			
for multiplex pumps	F	6				10				15	36	58			

Material combinations: **S** = stainless steel 1.4571, **P** = PVC-H, **F** = PVDF (fluoride plastics)

1) = p_{max} 8 bar (10 bar = 0,37 kW)

2) = for drive elements without stroke adjustment

3) = for operating temperature > 40°C reduced operating pressures

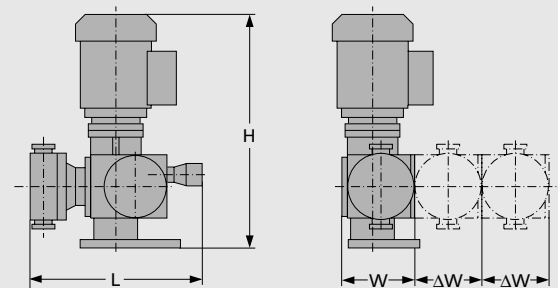
4) = socket and hose nipples

* = options: **S** = dairy fitting, Triclamp, DIN+ANSI flanges, **P + F** = DIN+ANSI flanges

** = valve springs of Hastelloy

LEWA ecodos – mounting dimensions

LEWA ecodos	L	W	ΔW	H
Type	[mm]	[mm]	[mm]	[mm]
2 – 50	360	220	85	480
90 – 350	425	220	120	570
550	595	270	175	660
750 – 1500*1	500	400	–	800
750 – 1500*2	500	900	250	450



*1 = vertical motor mounting

*2 = horizontal motor mounting (for multiplex pumps or simplex pumps with accessories)
(electric stroke actuator and/or contactor)

The dimensions differ acc. to the pump head, motor and instrumentation used.

Take advantage of LEWA's know-how



You can profit from LEWA's know-how at an early stage, at the design stage and during operation

LEWA not only is a supplier of metering pumps, metering systems, and process diaphragm pumps, LEWA is also the close partner of the customer for all activities connected to these products. Our services include consulting before or after an order was placed, service including repair, supply of spare parts as well as maintenance and training.

Our services extend from comprehensive documentation for the products through fast spare parts supply and expert maintenance to rapid repair services on site. This is further increasing the availability of LEWA pumps and packages and assures trouble-free operation.

We would be pleased to present additional information on our scope of supply, our services and competent advice to you. Our over 40 years of experience in the range of fluid metering is part of this service and any design support required will be provided.

In addition we offer:

- sound pipeline calculation
- fluid evaluation by the expert
- world-wide, competent service
- maintenance by the manufacturer
- seminars held by experts
- spare parts supply with 24/48 h service

Enquiry data for the selection of a pump

For selecting your special pump we need the information on the right from you.

Please fax to:

LEWA Herbert Ott GmbH + Co.

Fax-No. **+49 (71 52) 14-1434**

Your enquiry will be answered immediately.

Metered fluid

Flow rate required	[l/h]
Operating pressure at discharge flange	[bar] abs
Operating pressure at suction flange	[bar] abs
Operating temperature (OT) max./min.	[°C]
Density at (OT)	[g/cm ³]
Viscosity at (OT)	[mPa · s = cP]
Solids content / density / description	[% / g / cm ³]
Solids particle size / solids hardness	[mm / Mohs]

Motor data

Ex-protection
Enclosure
Voltage
Current type
Rated frequency

A wide range of supply

In addition to the LEWA ecodos series LEWA offers other metering pumps, process diaphragm pumps, metering systems and metering packages. If you are interested in our complete scope of supply we would be pleased to send comprehensive information and leaflets to you.

■ LEWA modular

The metering pump series in modular design which can be applied universally is an optimum technical and economic solution for the middle and high pressure range. Drive units and pump heads as well as drives and the accessories can be combined to build simplex or multiplex pumps even with different sizes.

Performance range

Flow rate	from 1 l/h to 50 m ³ /h per pump head
Discharge pressure	up to 1200 bar

■ LEWA process diaphragm pumps

LEWA leakage-free process diaphragm pumps for high flow rates are the standard for tightness in the high pressure range. No process fluid can escape into the atmosphere. LEWA triplex in space saving monoblock design and LEWA modular in variable element design assure zero-leakage, low maintenance operation.

Performance range

Flow rate	up to 180 m ³ /h
Discharge pressure	up to 1200 bar

■ LEWA metering systems

LEWA metering systems are modular combinations of pump with actuator for stroke length and / or speed, flowmeter (volume or mass flow) and controller. The metered flow is closed loop controlled.

■ Standard metering packages

LEWA has developed standard metering packages for different metering and mixing applications. Examples for this are the standard packages for acid dilution, gas odorizing, cold sterilisation, polyethylene cross-linking and solar powered chemical injection packages.

■ Tailor made metering packages

LEWA metering and mixing package support process automation and are designed and built to meet specific customer requirements. LEWA supplies complete turn key solutions for the corresponding applications. The performance range covers the supply of standard, turn key metering packages up to the engineering and commissioning of complex metering and mixing packages with tailor made process controls. Process displays, recording of operating data and external interfaces to the process guiding system.

■ LEWA lab

Micro-metering pumps with hydraulically actuated metal diaphragm, used predominately in the laboratory and process research duties in pilot plants.

Performance range

Flow rate	up to 40 l/h
Discharge pressure	up to 560 bar



LEWA modular



*LEWA triplex
process metering pumps*

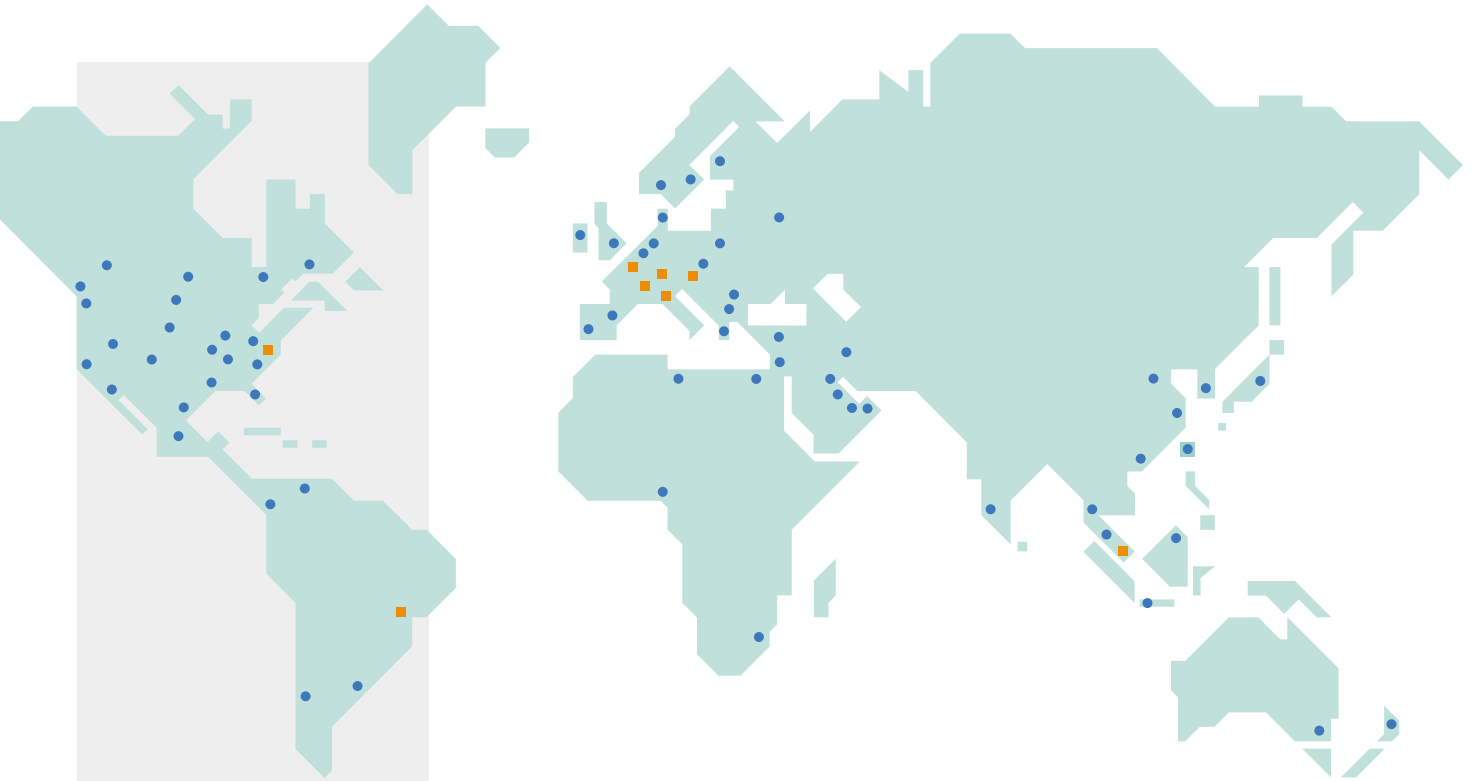


*LEWA metering systems and
metering packages*



LEWA lab

LEWA always close to you



LEWA and the HERBERT OTT-GROUP:

The Herbert Ott-Group consists of the OTT HOLDING INTERNATIONAL GMBH, the LEWA producing company in Leonberg and eight affiliated sales companies in the USA, Singapore, Brazil, Germany, Austria, France and Italy. Parallel and of equal status these sales companies market equipment complementary to LEWA products from other, leading manufacturers, stock complete machines and spare parts. Also they offer competent consultation and qualified service locally.

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