

Operating and Maintenance Manual

ST-TEC

**EMPII 75/ 1,4-10 bis 7,2-10 and
EMPII 140/ 2,5-10 bis 7,2-10**



Contents

1	General	77
1.1	EBS numbers	77
1.2	Transport damage	77
1.3	Warranty coverage	77
1.4	Contact address / Manufacturer	77
2	Safety	78
2.1	Safety notes	78
2.2	Emphases	78
2.3	Enumerations	78
2.4	Special safety notes for maintenance and repair work	78
3	Delivery scope	79
3.1	Upgrade accessories for the EMP II E60 ^{PLUS}	79
4	Functional description	80
4.1	Mechanical functions	80
4.2	Electronic functions	80
4.2.1	Operation modes	80
4.3	Additional electronic functions on the EMP II E60 ^{PLUS}	80
5	Setup	81
5.1	EMP II E60	81
5.2	EMP II E60 ^{PLUS}	81
5.3	Indicators / Controls / Jacks	81
5.3.1	Versions EMP II E60 and EMP II E60 ^{PLUS}	81
5.3.2	"Dongle box" ports	81
6	Mounting	82
6.1	Mounting diagram	82
7	Device installation	83
7.1	Hydraulic installation	83
7.1.1	Installation examples	83
7.1.2	Connecting the suction pipe and pressure pipe	85
7.2	Electrical installation	85
7.2.1	Inputs and outputs	85
7.2.2	Connector assignments of Slot I (3-terminal) input for low-level advance warning and empty report	85
7.2.2.1	Installing the suction pipe with low-level advance warning and empty report	86
7.2.3	Connector assignment of slot II (5-terminal) input for pulse signal, standard signal, metering lock, batch and metering monitoring	86
7.2.3.1	Installing the pulse control (water meter)	86
7.2.3.2	Installing the standard signal control	87
7.2.3.3	Installing the control via the metering lock	87
7.2.3.4	Installing the batch function	87
7.2.3.5	Installing the metering monitoring	88
7.2.4	Connector assignments of slot III (4-terminal) output for alarm and stroke signal	88
7.2.4.1	Installing the alarm or fault report output	89
7.2.4.2	Installing the stroke signal output at 24 V / DC	89
7.2.4.3	Hardware migration for alarm contact	89
7.2.4.4	In the alarm output "ON" ● configuration setting	90
7.2.4.5	In the alarm output "OFF" ○ configuration setting	90
7.2.5	Connector assignments of slot IV, mains power supply	90
8	Upgrading the EMP II E60 to the EMP II E60^{PLUS}	91
8.1	Fitting of the Dongle Box respectively the MicroFlow-Box	91
8.2	Connector assignments of the slots	92
8.2.1	Connector assignments of slot V (5-terminal), Dongle-box	92
8.2.1.1	Installing the oval gear meter OGM ^{PLUS}	92
8.2.2	Connector assignments of Slot V, MicroFlow- Box	92
8.2.2.1	Installation MicroFlow Transducer	93
8.2.3	Connector assignments of Slot VII (5-terminal) Input for batch pulse and metering lock	93
8.2.3.1	Installing the batch pulse	94
8.2.3.2	Installing the metering lock (optional connector VII or VIII)	94
8.2.4	Connector assignments of Slot VIII (5-terminal) input for pulse, standard signal input and metering lock ..	95
8.2.4.1	Installing the pulse control (water meter)	95
8.2.4.2	Installing the standard signal (mA)	95
8.2.4.3	Installing the metering lock	95
9	Startup	96
9.1	Switching the pump on/off	96
9.2	Setting of the metering output (mechanical)	96
9.3	Venting the metering pump	96
9.4	Key functions	97
9.5	Description of display symbols	97
9.6	Software version display	97
9.7	Delivery condition	98
9.7.1	Basic setting of the mode of operation / display in the operating display	98
9.7.2	Basic settings in the configuration	98

10	Menu description.....	99
10.1	Main menu	99
10.1.1	Overview	99
10.2	Operation mode.....	99
10.2.1	Selecting	99
10.2.2	Operation mode / internal	100
10.2.2.1	Selecting	100
10.2.2.2	Display in the operating display/ Setting	101
10.2.3	Operation mode / pulse	101
10.2.3.1	Selecting	102
10.2.3.2	Display in the operating display / Setting	102
10.2.4	Operation mode / current (external standard signal)	102
10.2.4.1	Selecting	103
10.2.4.2	Setting operation mode / current / user defined	103
10.2.4.3	Display in the operating display	104
10.3	Configuration	104
10.3.1	Overview	104
10.3.2	"Scrolling the display"	104
10.3.3	Configuration / Language.....	104
10.3.3.1	Selecting	105
10.3.4	Configuration / Unit	105
10.3.4.1	Selecting	105
10.3.5	Configuration / Code	105
10.3.5.1	Selecting	105
10.3.5.2	Setting	106
10.3.6	Configuration / Autostart.....	106
10.3.6.1	Selecting	106
10.3.7	Configuration / Metering lock	106
10.3.7.1	Selecting	106
10.3.8	Configuration / Low-level contact	107
10.3.8.1	Selecting	107
10.3.9	Configuration / Alarm output	107
10.3.9.1	Selecting	107
10.3.9.2	Conversion from alarm relay mode to contact mode.	107
10.3.10	Configuration / pulse memory.....	107
10.3.10.1	Selecting	108
10.3.10.2	Display in the operating display with an active pulse memory	108
10.3.11	Configuration / Oval gear meter (only E60 ^{PLUS} & OGM ^{PLUS})	108
10.3.11.1	Selecting	109
10.3.12	Configuration / Metering controller (only E60 ^{PLUS} & OGM ^{PLUS})	109
10.3.12.1	Selecting	109
10.3.12.2	Display in the operating display with an active metering controller	110
10.3.13	Configuration / Metering monitoring	110
10.3.13.1	Selecting	110
10.3.13.2	Metering monitoring / Stop pump.....	111
10.3.13.3	Metering monitoring / Strokes.....	111
10.3.13.4	Metering monitoring / Deviation (only at E60 ^{PLUS} & OGM or OGM ^{PLUS})	111
10.3.13.5	Metering monitoring / Input (only at E60 WITHOUT Dongle box)	112
10.3.13.6	Oval gear meter pulse display (only E60 ^{PLUS}).....	112
10.3.14	Configuration / MicroFlow ^{PLUS}	112
10.3.14.1	Selecting	113
10.3.14.2	MicroFlow ^{PLUS} / Stop pump	113
10.3.14.3	MicroFlow ^{PLUS} / Strokes	113
10.3.14.4	MicroFlow ^{PLUS} / Deviation.....	114
10.3.14.5	MicroFlow ^{PLUS} / Metering break.....	114
10.3.14.6	MicroFlow ^{PLUS} / Metering delay	115
10.3.14.7	MicroFlow ^{PLUS} / Calibration	115
10.3.15	Configuration / Batch.....	115
10.3.15.1	Selecting	116
10.3.15.2	Batch / Quantity.....	116
10.3.15.3	Batch / Input (only at E60 WITHOUT Dongle-box)	117
10.3.15.4	Display in the operating display	117
10.3.16	Configuration Degas ^{PLUS}	117
10.3.16.1	Selecting	117
10.3.16.2	Degas ^{PLUS} / Degas strokes.....	118
10.3.16.3	Degas ^{PLUS} / Degas break	118
10.4	Calibration	118
10.4.1	Overview	118
10.4.2	Calibration / pump.....	119
10.4.2.1	Preparation.....	119
10.4.2.2	Calibration / Start.....	119
10.4.3	Calibration / pump with oval gear meter (OGM ^{PLUS}).....	119
10.4.3.1	Preparation.....	120
10.4.3.2	Calibration / Start.....	120
10.4.4	Calibration / Manual	121
10.4.4.1	Calibration data table.....	121

10.5	Operating data.....	121
10.5.1	Overview	122
10.5.2	Operating data / Operating hours	122
10.5.2.1	Selecting / Displaying / Deleting	122
10.5.3	Operating data / Litre	122
10.5.3.1	Selecting / Displaying / Deleting	122
10.5.4	Operating data / Amount of pulses.....	123
10.5.4.1	Selecting / Displaying / Deleting	123
11	Maintenance	124
11.1	Replacing the suction / pressure valve and metering cartridges.....	124
11.1.1	3 Ball-Valve (V3), 1,4 – 2,5 l/h for type: V3014 - V3025	124
11.1.2	2 Ball-Valves	125
11.1.3	Inserting the metering valves in the correct positions.....	125
11.1.4	Changing the valve cartridges, type V3.....	125
11.2	Replacing the diaphragm and pump head	126
11.3	Aligning the mechanical stroke adjustment.....	126
12	Operating faults	127
12.1	Metering warning messages (display).....	127
12.2	Alarm messages (display)	127
12.2.1	Deactivating of Dongle Box, OGM ^{PLUS} , MicroFlow ^{PLUS} in the pump software	128
12.3	Trouble shooting.....	128
13	Wearing parts and spare parts (standard version).....	129
13.1	Exploded drawing / list of parts type V3014, V3025, 00043, 00048, 00072 and type 00112	129
13.2	Wearing part set types V3014, V3025, 00043, 00048, 00072 and type 00112	130
13.3	Pump head – Service set “Higher pressure” (1.6 MPa / 16 bar)	130
13.4	Exploded drawing / list of parts, type 00240.....	131
13.5	Wearing part set – type 00240.....	131
14	Technical Specifications	132
14.1	Pump keys	132
14.1.1	Pump key 1	132
14.1.2	Pump key 2	133
14.1.3	Pump key definition.....	134
14.2	Dimensions.....	135
14.2.1	Type V3014, V3025, 00043, 00048, 00072 and type 00112	135
14.2.2	Type 00240	135
14.3	Technical specifications “Overview tables”	136
14.3.1	General data - Standard pumps.....	136
14.3.2	Deviant general data - Pumps in the “Higher Pressures (HP)” version	136
14.3.3	Materials	136
14.3.4	In-/ and output circuit	137
14.3.4.1	Connector I.....	137
14.3.4.2	Connector II.....	137
14.3.4.3	Connector III.....	137
14.3.5	Connector assignments	138
14.3.5.1	Pin assignment / conductor coloring Connector I (3-terminal)	138
14.3.5.2	Pin assignment / conductor coloring Connector II (5-terminal)	138
14.3.5.3	Pin assignment / conductor coloring Connector III (4-terminal)	138
14.4	Metering rates	138
14.5	Delivery capacity depending on the backpressure and stroke setting	139
14.5.1	Delivery capacity type V3014 / 1 MPa (10 bar)	139
14.5.2	Delivery capacity type V3014 / 1,6 MPa (16 bar) (special version: higher pressures).....	139
14.5.3	Delivery capacity type V3025 / 1 MPa (10 bar)	140
14.5.4	Delivery capacity type V3025 / 1,6 MPa (16 bar) (special version: higher pressures).....	140
14.5.5	Delivery capacity type 00043 / 1 MPa (10 bar).....	141
14.5.6	Delivery capacity type 00043 / 1,6 MPa (16 bar) / (special version: higher pressures)	141
14.5.7	Delivery capacity type 00048 / 0,4 MPa (4 bar).....	142
14.5.8	Delivery capacity type 00072 / 0,6 MPa (6 bar).....	142
14.5.9	Delivery capacity type 00072 / 1 MPa (10 bar).....	143
14.5.10	Delivery capacity type 00112 / 0,5 MPa (5 bar).....	143
14.5.11	Delivery capacity type 00240 / 0,2 MPa (2 bar).....	144
15	Declaration of Conformity	145

1 General

This operating instruction contains all of the instructions for installing, starting up, maintaining and repairing diaphragm metering pumps of the **ELADOS® EMP II E60** and **EMP II E60^{PLUS}**.

	IMPORTANT	Please note your pump's software version when using these operating instruction (see chapter 9.6).
	NOTE	The German sections of this manual constitute the ORIGINAL OPERATING MANUAL and take legal precedence. All other languages are translations of the ORIGINAL OPERATING MANUAL .

If you have any questions, please contact us under the contact details given in chapter [1.4](#) "Contact address / manufacturer"

1.1 EBS numbers

Within this operating instructions article numbers and EBS numbers are represented. EBS numbers are **Ecolab** internal article numbers and used only "concern internal".

1.2 Transport damage

	CAUTION	If there is discovered a transport damage while unpacking the pump, it must not be installed.
	WARNING	

1.3 Warranty coverage

Operational safety, reliability and performance of this model are only guaranteed by the manufacturer if the following conditions are met:

- Mounting, connections, adjustment, service and repair are performed by authorized and trained personnel.
- The diaphragm metering pump must be used according to the specifications in the operating instructions contained in the delivery scope.
- Only original spare parts must be used for repairs.
- The warranty claim is invalidated if the pump housing is opened.

In addition, the general warranty and service conditions of the company **ECOLAB Engineering GmbH** are applicable.

1.4 Contact address / Manufacturer

Ecolab Engineering GmbH

Raiffeisenstraße 7
D-83313 Siegsdorf
Telefon (+49) 86 62 / 61 0
Telefax (+49) 86 62 / 61 219
eMail: engineering-mailbox@ecolab.com



Fig. 1.1 QR-Code: Adresse **Ecolab Engineering**

2 Safety



CAUTION

WARNING

Safety notes and emphasized texts have to be observed in either case!

2.1 Safety notes

- Connection and repair work on the diaphragm metering pump must only be performed by authorized technical personnel.
- The power supply plug must always be disconnected before starting any work on electrical components.
- Appropriate protective clothing must be worn for any maintenance and repair work.
- The safety regulations for handling chemicals must always be observed.

2.2 Emphases

The emphases indicated in this maintenance guide have the following meanings:

	CAUTION	Used when improper compliance or non-compliance with the operating instructions, work instructions, prescribed working routines, et cetera, may result in injury or accidents.
	WARNING	Used when improper compliance or non-compliance with the operating instructions, work instructions, prescribed working routines, et cetera, may result in damage to the equipment.
	IMPORTANT	Used when particular attention is required in operating the equipment.
	NOTE	Used to draw attention to a noteworthy detail.

2.3 Enumerations

- ✕ Enumerations marked with this sign (✕) describe an activity which must only be performed by the installer / user.

2.4 Special safety notes for maintenance and repair work

	CAUTION	Prior to repair and maintenance work and metering of dangerous media, always rinse the metering head, relieve the pressure pipe and wear protective clothing (protective goggles, gloves and apron). Electronics repairs must only be performed by trained electricians, following the safety regulations of the professional association VB G 4 & ZH 1/11! When opening covers or removing parts, components carrying live voltages may be exposed. Connection points may also be under live voltages.
	IMPORTANT	Only original spare parts must be used for repairs.

3 Delivery scope

The delivery scope consists of:



- metering pump, version **EMP II E 60** including main power supply cable (2 m) with shock-proof plug and dummy plug for inputs and outputs

Fig. 3.1 Delivery scope: metering pump



- 5-terminal connector plug for pulsed or standard signal input

Fig. 3.2 Delivery scope: 5-terminal connector



- Adapters (for tube 4/6, 6/8, 6/12 (ID/AD) mm)

Fig. 3.3 Delivery scope: adapters

- Assembly sketch for tube connections (accessory)
- Connector assignment plan (accessory)



- Short description
Article no. 417101795
EBS No. on request
- CD – Operating Instructions
Article no. 417101793,
EBS No. on request

Fig. 3.4 Delivery scope: operating instructions

3.1 Upgrade accessories for the **EMP II E60^{PLUS}**



- Dongle box
Article no. 248606
EBS No. 10016094

Fig. 3.5 Upgrade accessories: Dongle box

4 Functional description

4.1 Mechanical functions

The metering pumps **ELADOS® EMP II E60** and **E60^{PLUS}** are diaphragm metering pumps driven by an electrical motor only suitable for use in commercial ranges.

The metering pumps are suitable for use with clean, non-abrasive metering media with a viscosity of up to 200 mPas (measuring manner: Brookfield).

They are powered by a synchronous motor which is jam-proof and runs at a continuous RPM.

An eccentric drive moves the diaphragm and thus drives the metering medium over the pressure valve (see chapter [5.1](#), Pos. **6**).

The diaphragm is repositioned by means of a retaining spring. In this way, the metering medium is sucked through the suction valve (see chapter [5.1](#), Pos. **1**) into the pump head (see chapter [5.1](#), Pos. **4**).

The discharge flow can be sleeplessly regulated during operation via the stroke setting (see chapter [5.3.1](#), Fig. 5.5, Pos. **1**). In this way, the resetting motion of the diaphragm is limited.



WARNING

To protect the metering device, the use of a suction pipe with an empty reporting device and dirt arrestor (available from our range of accessories) is highly recommended! The empty reporting device switches off the pump if it falls below a certain level (in container).

4.2 Electronic functions

The pump is operated using four keys (see chapter [5.3.1](#), Fig. 5.5, Pos. **2**, **3**, **4** and **5** and also chapter [9.4](#) "Key functions").

The operating indicator is shown on a graphical display (see chapter [5.3.1](#), Fig. 5.5, Pos. **6**).

4.2.1 Operation modes

The pump may be used in three different operation modes:

INTERNAL	Manual metering function (factory setting)
EXTERNAL	pulse control
EXTERNAL	standard signal control (mA)

The Configuration menu item can also be used to set batch metering (a specific quantity is metered on each start pulse).

4.3 Additional electronic functions on the **EMP II E60^{PLUS}**

- Oval gear meter connection / Oval gear meter evaluation
- Metering regulation with oval gear meter, type **OGM^{PLUS}**
- Automatic calibration is possible thanks to the oval gear meter, type **OGM^{PLUS}**
- Splitting of the metering lock/pulse/metering monitoring/oval gear meter inputs into multiple connections to simplify the external connections.

5 Setup

5.1 EMP II E60

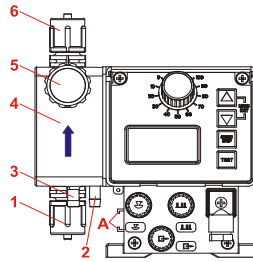


Fig. 5.1 EMP II E60 (front view)

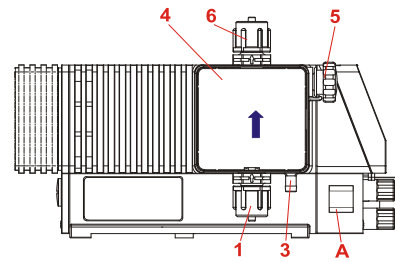


Fig. 5.2 EMP II E60 (side view)

5.2 EMP II E60^{PLUS}

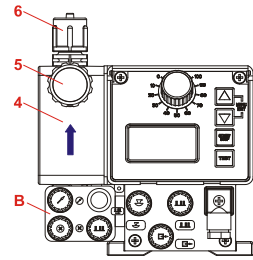


Fig. 5.3 EMP II E60 (front view)

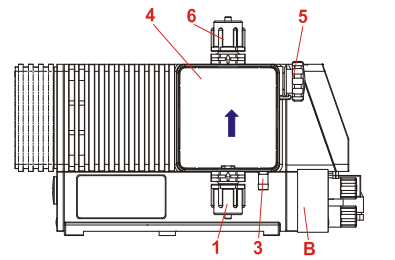


Fig. 5.4 EMP II E60 (side view)

Pos.	Description
1	Suction valve (connection on the suction side)
2	Diaphragm breakage sequence
3	Venting connection (refeeding into the container)
4	Pump head
5	Vent screw
6	Pressure valve (connection on the pressure side)
A	Rail for connecting the dongle box
B	Dongle box
	Flow direction of the metering medium

5.3 Indicators / Controls / Jacks

5.3.1 Versions EMP II E60 and EMP II E60^{PLUS}

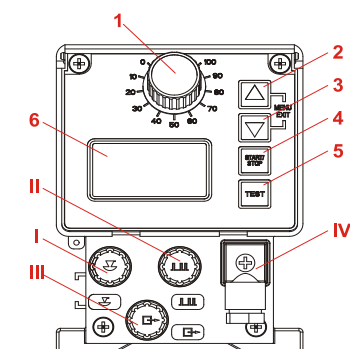


Fig. 5.5 Version EMP II E60 and EMP II E60^{PLUS}

Pos.	Description
1.	Control knob for setting the stroke length
2.	Menu/Exit, up arrow key
3.	Menu/Exit, down arrow key
4.	Start/Stop key (Enter function)
5.	Test key
6.	Graphical display
I	input for low-level advance warning and empty report (see chapter 7.2.2 & 14.3.5.1)
II	input for pulse- / standard signal and metering lock (see chapter 7.2.3 & 14.3.5.2)
III	empty report, fault report and stroke signal (see chapter 7.2.4 & 14.3.5.3)
IV	mains power supply (see chapter 7.2.5)

5.3.2 “Dongle box” ports

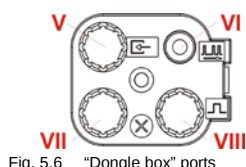


Fig. 5.6 “Dongle box” ports

Pos.	Description
V	input for oval gear meter
VI	connection for pulse input to EMP pump (input II)
VII	input for batch pulse and metering lock
VIII	input for pulse, standard signal input and metering lock

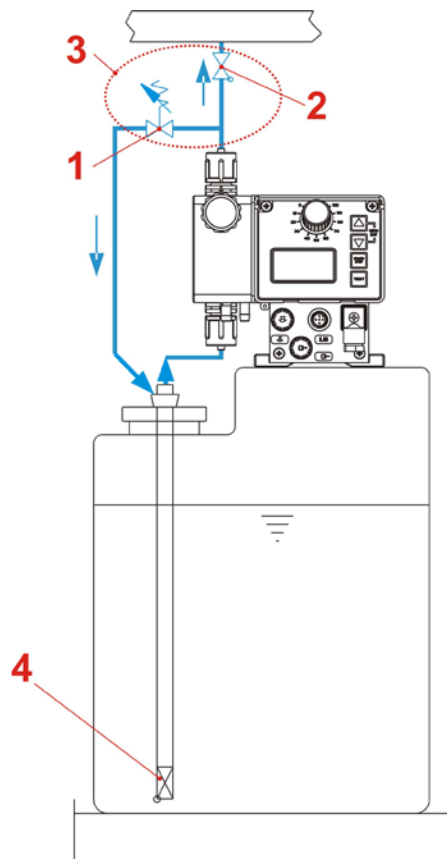
6 Mounting



WARNING The installation must only be performed by authorized personnel and the general guidelines and local installation regulations must be observed!

- The metering pump should be fitted in an easy-to-access, frost-free location. The ambient temperature must not exceed +40° C.
- The mounting position of the device must be horizontal.
- The pump must be securely screwed to the bracket or the container using the drill holes provided (for information on the drill hole gap, see chapter [14.2](#) "Dimensions").

6.1 Mounting diagram



Pos	Designation
1	Overflow valve
2	Pressure control valve
3	Replacement method: Multifunction valve
4	Suction pipe / bottom admission valve

Fig. 6.1 Mounting diagram



NOTE

The metering valve, pressure control valve and pressure relief valve can be replaced by a multifunction valve (MFV) from our product range, which combines all of these functionalities.

7 Device installation

7.1 Hydraulic installation

7.1.1 Installation examples

 NOTE	The installation examples and applications provided here are of a functional nature. They give an overview of installation types which are correct or to be avoided for the correct functioning of the pump.
 WARNING	Specific measures and protection devices for the metering of dangerous or aggressive chemicals are not provided here. When using such chemicals, always observe the legal regulations and the relevant product datasheet.

- A) The arrangement of the metering pump should preferably be made on and/or over the metering container.

 NOTE	For media with a tendency towards sedimentation, the bottom admission valve or foot valve of the suction line / suction lance must be fitted above the anticipated layer of sludge.
---	--

- B) Between the back-pressure in the injection point and the pressure at the metering pump a positive difference of pressure must prevail of at least 0.1 MPa (1 bar). If this is not the case, a pressure control valve (Pos. 2) must be built into the metering line.

In addition it recommends to install itself for the avoidance of inadmissibly high pressures in the metering line an appropriate safety overflow valve (Pos. 3). The by-pass pipe of this valve should be led back pressure-free into the container.

 WARNING	The overflow line never be fed back into the suction line of the metering pump.
--	--

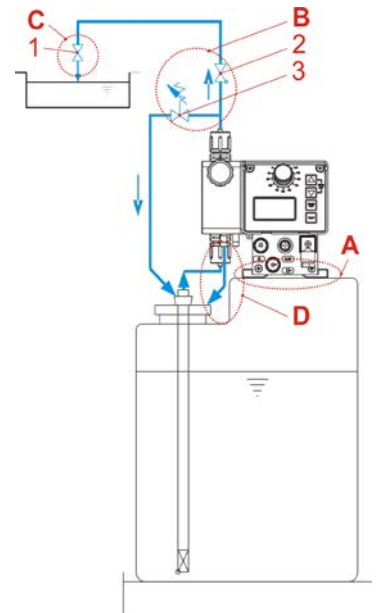


Fig. 7.1 Hydraulic installation: installation examples 1

 NOTE	In place of a pressure valve and an overflow valve also a multifunction valve (MFV) from our delivery program can be used.
---	---

- C) A spring-loaded injection or metering valve (Pos. 1) should be installed at the injection point (including with supplying metered amounts into depressurised systems).
D) For easy venting of the metering pump, the vent connection (see chapter 5, Fig. 5.1, Pos. 3) should be fed back into the metering medium container via a separate pipe.

 WARNING	The venting pipe must never be fed back into the suction side of the metering pump!
--	--

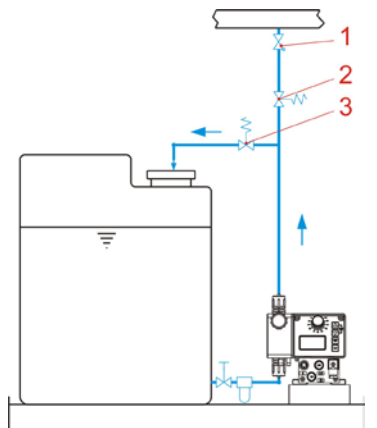
For outgassing media and products with a viscosity of > 100 mPas, flooded suction is recommended.

In using this method, however, ensure that the injection point is positioned over the discharge container and/or an appropriate pressure control valve (Pos 2) is installed.

These measures prevent the discharge container from being siphoned empty.

Pos	Description
1	Injector valve / Metering valve
2	Pressure control valve
3	Overflow valve

Fig. 7.2 Hydraulic installation: installation examples 2



For metering in pipelines with under pressure, a pressure control valve must be built into the metering pipe.

NOTE A pressure control valve or a metering valve is not an absolutely hermetically sealing shutoff device.

To prevent the running out of the metering medium when the pump is stopped, we also recommend the fitting of a solenoid valve which is approved for use with the pump.

Pos	Description
1	Injector valve / Metering valve
2	External release
3	Solenoid valve
4	Pressure control valve

Fig. 7.3 Hydraulic installation: installation examples 3

The metering point should not be positioned below the discharge container as this arrangement creates a risk of the discharge container being siphoned empty.

Pos	Description
1	Overflow valve
2	Injector valve / Metering valve

Fig. 7.4 Hydraulic installation: installation examples 4

The suction pipes must be kept as short as possible.

Long and twisted suction pipes may lead to air build-up in the system.

The max. suction height is 2 m and the max. flow velocity is 0.3 m/s! (see also chapter 14 "Technical Specifications")

Fig. 7.5 Hydraulic installation: installation examples 5

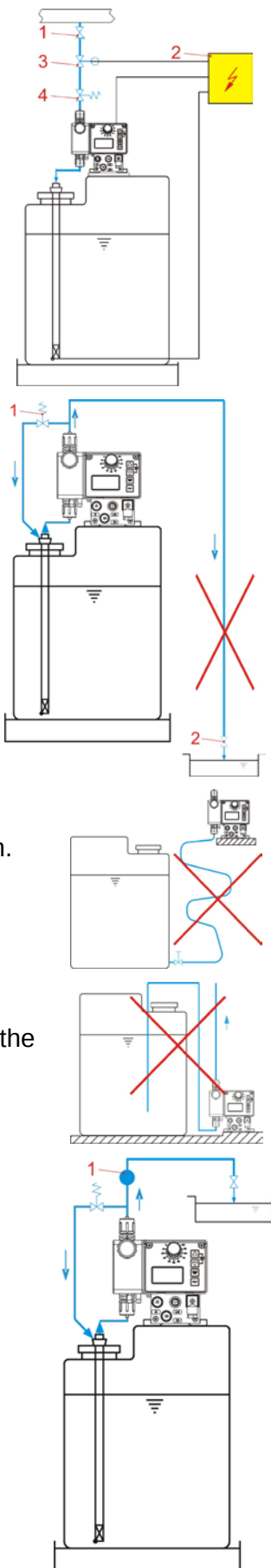
Always lay the suction pipe so that it ascends to the suction valve of the metering pump.

Fig. 7.6 Hydraulic installation: installation examples 6

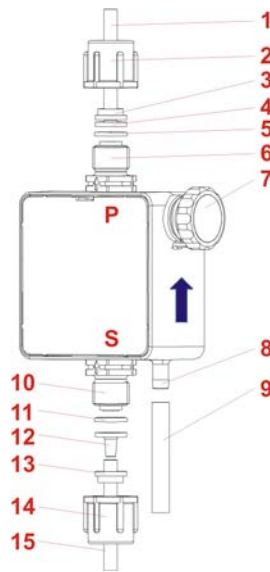
Installation of a metering monitoring system:

A metering monitoring system – oval gear meter (Pos.1) or flow indicator - has to be installed in the metering pipeline between the pressure relieve valve and the pressure control resp. metering valve.

Fig. 7.7 Hydraulic installation: installation examples 7



7.1.2 Connecting the suction pipe and pressure pipe



Pos.	Description
1	Metering tube
2	Union nut
3	Clamping piece
4	Tapered part
5	Pressure-side O-ring (metering)
6	Pressure valve
7	Vent screw
8	Vent connection
9	Vent hose (not supplied)
10	Suction valve
11	Suction-side O-ring
12	Tapered part
13	Clamping piece
14	Union nut
15	Metering hose
P	Pressure side
S	Suction side

Fig. 7.8 Connecting the suction pipe and pressure pipe

CAUTION When connecting the suction and pressure pipes, ensure that the O-rings (Pos. 5 and 11) are fixed to the connectors so as to achieve the required seal.

NOTE The use of an appropriate suction pipe from our product range is recommended.

- ✗ Trim the tube to the precise length
- ✗ Slide the union nut (Pos. 2 and 14) and clamping piece (Pos. 3 and 13) over the tube and attach the tube to the taper up to the stop collar (Pos. 4 and 12).
- ✗ Insert the O-ring (Pos. 5 and 11) into the valve groove and tighten the union nut.
- ✗ Place the suction pipe in the delivery bundle.

7.2 Electrical installation

7.2.1 Inputs and outputs

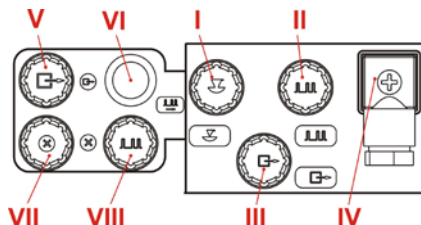


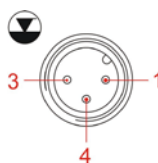
Fig. 7.9 Electrical installation: Inputs and outputs

The inputs and outputs in are equipped with protective caps in the as-delivered condition. These caps must be removed when necessary. (Pos. I-VIII)

NOTE Since the protective caps or connector plugs are coded, the respective images must be observed (I-III). Do not use force when inserting them.

WARNING To protect the electronics against contact with chemicals or humidity, never operate the metering pump without protective caps or connector cables, since the connectors can become oxidized. Mixing up the protective caps may result in malfunctions of the pump and/or damage to the connectors!

7.2.2 Connector assignments of Slot I (3-terminal) input for low-level advance warning and empty report



Pin	Conductor coloring (cable connection)	Assignment
1	brown	Input low-level warning
3	blue	Input empty report
4	black	GND (⊥)

(plug assignments: see also chapter 14 "Technical Specifications")

Fig. 7.10 Connector assignments of Slot I (3-terminal), input for low-level advance warning and empty report

7.2.2.1 Installing the suction pipe with low-level advance warning and empty report

NOTE Slot I must always be assigned, either through the mounted strapping plug (protective cap with corresponding symbol; see chapter 7.2.1, Fig. 7.10, Pos. I) or through connection to the empty report device (suction lance plug). The setup of low level contact is invertible. (see chapter 10.3.8 “Configuration Low level contact”)

1 + 4 = Input low-level warning
low-level advanced warning open:
 low-level advanced warning active (invertible circuit logic, see chapter 10.3.8), empty report symbol on display flashes, pump is not locked.

PIN	Assignment
1	Relay input
4	GND (⊥)

3 + 4 = Input empty report
Switch contact empty report open:
 empty report active (invertible circuit logic, see chapter 10.3.8), empty report symbol on display appears, pump is locked.

PIN	Assignment
3	Relay input
4	GND (⊥)

Fig. 7.11 Installing suction pipe with low-level advance warning and empty report

7.2.3 Connector assignment of slot II (5-terminal) input for pulse signal, standard signal, metering lock, batch and metering monitoring

Pin	Conductor coloring (cable connection)	Assignment
1	brown	output 5 V, DC (loadable with max. 50 mA)
2	white	pulse input (also as configurable batch / metering monitoring; see 10.3.13 & 10.3.15)
3	blue	metering lock (also as configurable batch / metering monitoring, see 10.3.13 & 10.3.15)
4	black	GND (⊥)
5	grey	Input standard signal 0/4...20 mA

Fig. 7.12 slot II (5-terminal) (plug assignments: see also chapter 14.3.5.2 “Pin assignment / conductor coloring Connector II (5-terminal)”)

- ✗ Remove the protective cap
- ✗ Mount the connector plug according to the connector assignment.

WARNING Only use a connector plug from our product range! (included in the delivery scope)

7.2.3.1 Installing the pulse control (water meter)

2 + 4 = Pulse input with potential-free contact

PIN	Assignment
2	Relay input
4	GND (⊥)

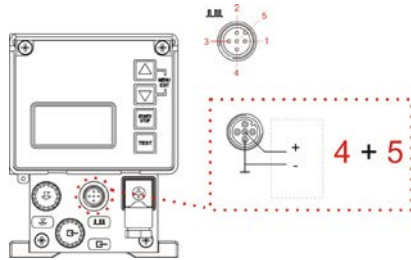
1 + 2 + 4 = Pulse input with electronic switch (NPN)

PIN	Assignment
1	5 V, DC
2	Relay input
4	GND (⊥)

The minimum pulse- or pause time is 15 ms.

Fig. 7.13 Installing the pulse control (water meter)

7.2.3.2 Installing the standard signal control



4 + 5 = Standard signal input 0/4 – 20 mA

PIN	Assignment
4	0/4-20 mA (-)
5	0/4-20 mA (+)

Fig. 7.14 Installing the standard signal control



WARNING Observe correct polarity during connection!

7.2.3.3 Installing the control via the metering lock



NOTE

The metering lock function must be activated in menu first. (see chapter: [10.3.7](#) Configuring the metering lock). The metering lock is available in all operation modes.

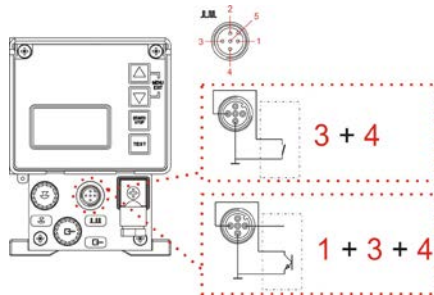


Fig. 7.15 Installing the control via the metering lock

3 + 4 = Input metering lock with potential-free contact

PIN	Assignment
3	Relay input
4	GND ($\perp$)

1 + 3 + 4 = Input metering lock with electronic switch (NPN)

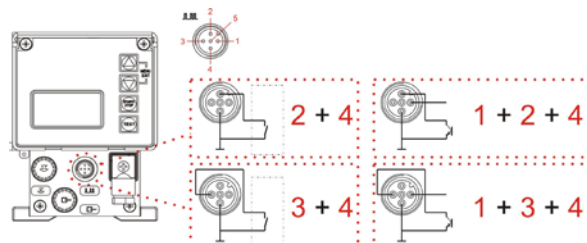
PIN	Assignment
1	5 V, DC
3	Relay input
4	GND ($\perp$)

7.2.3.4 Installing the batch function



NOTE

The batch function must be activated in menu first. The selection must also be made of whether the pins **2+4** (input “pulse”) or **3+4** (input “metering lock”) should be used for the batch metering start pulse (see chapter [10.3.15](#)).



2 + 4 = Input batch function with potential-free contact with selection input „pulse“ at configuration / batch (see chapter [10.3.15](#)).

PIN	Assignment
2	Relay input
4	GND ($\perp$)

Fig. 7.16 Installing the batch function

1 + 2 + 4 = Input batch function with electronic switch (NPN) with selection input „pulse“ at configuration / batch (see chapter [10.3.15](#)).

PIN	Assignment
1	5 V, DC
2	Relay input
4	GND ($\perp$)

or

3 + 4 = Input batch function with potential-free contact with selection input „metering lock“ at configuration / batch (see chapter [10.3.15](#)).

PIN	Assignment
3	Relay input
4	GND ($\perp$)

1 + 3 + 4 = Input batch function with electronic switch (NPN) with selection input „metering lock“ at configuration / batch (see chapter [10.3.15](#)).

PIN	Assignment
1	5 V, DC
3	Relay input
4	GND ($\perp$)

7.2.3.5 Installing the metering monitoring



NOTE

The metering monitoring function must be activated in menu first. The selection must also be made of whether the pins **2+4** (input “pulse”) or **3+4** (input “metering lock”) should be used for the metering monitoring input (see chapter [10.3.13](#)).

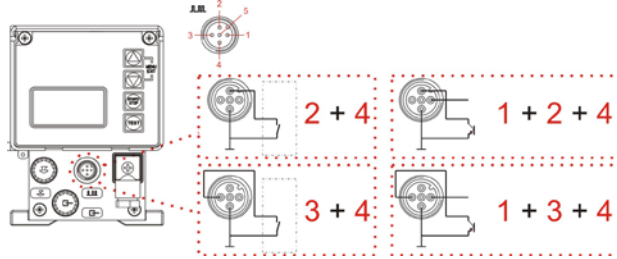


Fig. 7.17 Installing the metering monitoring

2 + 4 = Input metering monitoring function with potential-free contact with selection input „pulse“ at configuration / metering monitoring (see chapter [10.3.13](#)).

PIN	Assignment
2	Relay input
4	GND (⊥)

1 + 2 + 4 = Input metering monitoring function with electronic switch (NPN) with selection input „pulse“ at configuration / metering monitoring (see chapter [10.3.13](#)).

PIN	Assignment
1	5 V, DC
2	Relay input
4	GND (⊥)

or

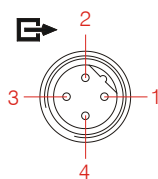
3 + 4 = Input metering monitoring function with potential-free contact with selection input „metering lock“ at configuration / metering monitoring (see chapter [10.3.13](#)).

PIN	Assignment
3	Relay input
4	GND (⊥)

1 + 3 + 4 = Input metering monitoring function with electronic switch (NPN) with selection input „metering lock“ at configuration / metering monitoring (see chapter [10.3.13](#)).

PIN	Assignment
1	5 V, DC
3	Relay input
4	GND (⊥)

7.2.4 Connector assignments of slot III (4-terminal) output for alarm and stroke signal



Pin	Conductor coloring (cable connection)	Assignment
1	brown	Output low-level warning, empty report and fault (+)
2	white	Output low-level warning, empty report and fault (-)
3	blue	Output stroke signal (+)
4	black	Output stroke signal (-)

(plug assignments: see chapter [14.3.5.3](#) “Pin assignment / conductor coloring Connector III (4-terminal)“)

Fig. 7.18 Connector assignments of slot III (4-terminal) output for alarm and stroke signal

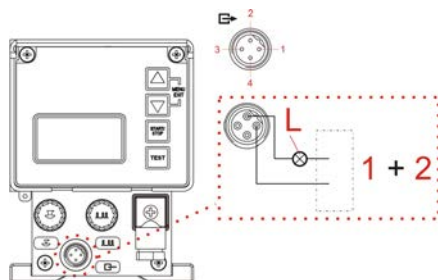
✖ Remove the protective cap

✖ Mount the connector plug according to the connector assignment.



WARNING Only use a connector plug from our product range! (included in the delivery scope)

7.2.4.1 Installing the alarm or fault report output



1 + 2 = Output low-level warning, empty report and fault

Input low-level warning active:
relay output connected

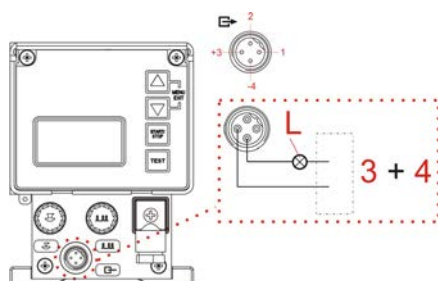
Input low-level warning active acc. fault container active:
relay output closed (function invertible see chapter [10.3.9](#) "Configuration/alarm output" or [7.2.4.3](#) "Hardware migration for alarm contact"), relay output = potential-free relay contact, load 24 V AC/DC 3 A ecc. 115/230V 3A

Fig. 7.19 Installing the alarm or default report output

PIN	Assignment
1	Relay output
2	GND (⊥)

! ATTENTION At 115V/230 V, a simultaneous connection of contact **1+2** (alarm output) and **3+4** (stroke signal output) is generally not permitted.

7.2.4.2 Installing the stroke signal output at 24 V / DC



3 + 4 = Stroke signal output

The contact is closed once with each stroke of the pump
Relay output = potential-free transistor output, load 24 V, DC, 300 mA

PIN	Assignment
3	Relay output
4	GND (⊥)

Fig. 7.20 Installing the stroke signal output at 24 V / DC

7.2.4.3 Hardware migration for alarm contact

After opening and removing the front of the pump (Fig. 7.21) you can see the alarm relay with switch contact (Fig. 7.20, Pos. **1**) at the board.

Depending on the position of the jumper, both the NC and the NO contact can be selected as the alarm contact.

To switch, set jumper 3 from Pin 1 & 2 up to Pin 2 & 3.

In the as-delivered condition, the normally closed contact is preset.

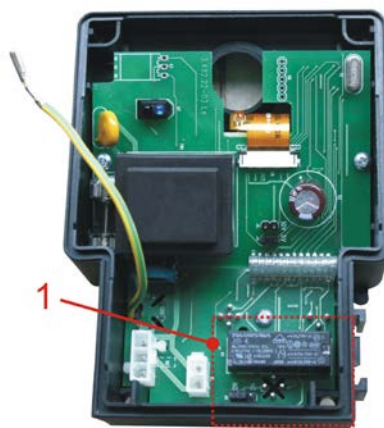


Fig. 7.21 Hardware immigration for alarm contact



(normally open)

Fig. 7.22 normally open contact



(normally closed)

Fig. 7.23 normally closed contact

! ATTENTION Changes to the circuit board may only be performed by service personnel or trained technical personnel!

7.2.4.4 In the alarm output "ON" ● configuration setting

(see Menu Description in chapter [10.3.9](#) "Configuration / Alarm output")

Jumper	If "No Alarm" (Alarm relay has not pulled in)	If "Alarm" (Alarm relay has pulled in)	Power Off (Alarm relay has not pulled in)
Closing function: (Default setting) 	contact open	contact closed	contact open
Opening function: 	contact closed	contact open	contact closed

7.2.4.5 In the alarm output "OFF" ○ configuration setting

(see Menu Description in chapter [10.3.9](#) "Configuration / Alarm output")

Jumper	If "No Alarm" (Alarm relay has pulled in)	If "Alarm" (Alarm relay has not pulled in)	Power Off (Alarm relay has pulled in)
Closing function: (Default setting) 	contact closed	contact open	contact open *
Opening function: 	contact open	contact closed	contact closed

* fail-safe function, (safe in the event of failure)

7.2.5 Connector assignments of slot IV, mains power supply

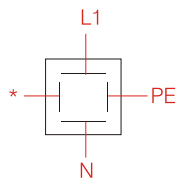


Fig. 7.24 Connector assignments of slot IV, mains power supply

The mains power supply enters through a four-terminal frontal plug connector. This already has a plug screwed into it in the factory.

Pin	Conductor coloring (cable connection)	Assignment
L1	black	Mains / external conductor
N	blue	Neutral wire
PE	yellow / green	Protective earth wire
*	-	Not assigned



NOTE

To ensure the imperviousness of the mains power connection to humidity, the gasket (contained in the delivery scope and already built-in in the as-delivered condition) must be inserted and the fixing screw tightened into the middle of the plug.

✂ Connect the mains power supply cable to the power grid.

8 Upgrading the EMPII E60 to the EMPII E60^{PLUS}

To upgrade the **EMP II E60** to the **EMP II E60^{PLUS}** and thus access the additional functions, obtain the **dongle box** or the **MicroFlow^{PLUS}** from our range of accessories.

The **dongle box** is a slot extension, as well as a means of connecting an oval gear meter for measuring the metering rate. If the **dongle box** is fitted and is activated by switching the pump off and then on again, "E60+" appears on the bottom left of the pump's display unit. If an **OGM^{PLUS}** (oval gear meter) is connected to slot V on the dongle box and is activated by switching the pump off and then on again, "E60++" appears on the pump's display unit, and the oval gear meter function is automatically enabled under Configuration in the Pump menu.

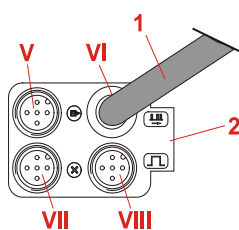
In addition to the slot expansion, the **MicroFlow^{PLUS}** enables a special flow rate monitoring sensor to be analysed via conductivity measurements. When the **MicroFlow box** is connected and is activated by switching the pump off and then on again, "E60+microflow" appears on the bottom left of the pump's display unit, and the MicroFlow function is automatically enabled in the appropriate sub-menu under Configuration in the Pump menu.

If the pump software recognises that there is a **dongle box**, **OGM^{PLUS}** or **MicroFlow box** connected, and the communication is then interrupted between the pump and the peripheral unit (through the removal of the unit, for example), an error message is displayed (see chapter [12.2](#) "Alarm signals (Display)").

To prevent this error message appearing repeatedly, the communication (connection) must be restored, or the analysis must be disabled in the pump software (see chapter [12.2.1](#) "Disabling a **dongle box**, **OGM^{PLUS}**, **MicroFlow^{PLUS}** in the pump software").

The only outward difference between a **dongle box** and a **MicroFlow box** is a sticker with the appropriate item number (**dongle box** Art. No. 248606, EBS No. 10016094, **MicroFlow box** Art. No. 248611, EBS No. on request)

8.1 Fitting of the Dongle Box respectively the MicroFlow-Box



Pos.	Description
V	input for oval gear meter or MicroFlow transducer
VI	Fixed connector cable for connecting the pulse input to the EMP pump (input II)
1	Connection lead for connection to input II of the pump
2	Dongle-box or MicroFlow-box
VII	input for batch pulse and metering lock
VIII	input for pulse, standard signal input (mA) and metering lock

Fig. 8.1 Fitting of the Dongle-Box respectively the MicroFlow-Box

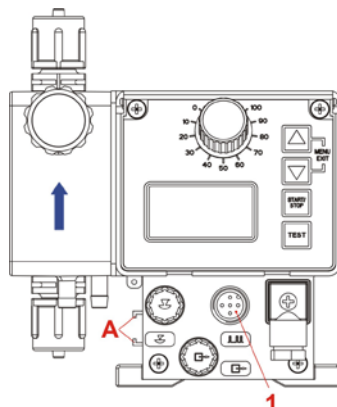


Fig. 8.2 Fitting of the Dongle-Box or the MicroFlow-Box 1

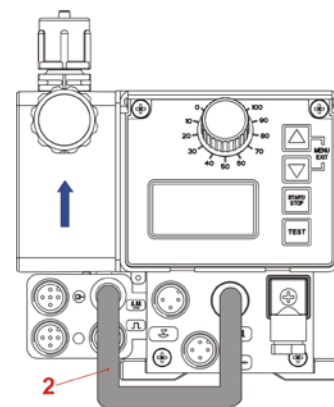


Fig. 8.3 Fitting of the Dongle-Box or the MicroFlow-Box 2

Fit the dongle- box or the MicroFlow- Box (Fig. 8.1) to the rails of the EMP pump provided for this purpose (Fig. 8.2, Pos. **A**):

- ✖ Slide the dongle box (Fig. 8.1) onto the rail on the left side of the EMP pump (Fig. 8.2, Pos. **A**), until it snaps into place.
- ✖ Connect the connection cable (Fig. 8.1, Pos. **3** and 8.3, Pos. **2**) to the input for pulse / standard signal (Fig. 8.2, Pos. **1**).
- ✖ Switch the pump off and afresh on.

The additional functions in the metering pump electronics can thus be activated and executed.

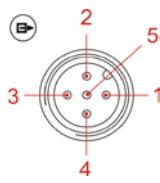


NOTE

If, before upgrading with a dongle box or a MicroFlow-box, a plug is connected to the input for pulse / standard signal (see Fig. 8.2, Pos. **1**), then this plug can be connected after the upgrade to plug VIII (see Fig. 8.1, Pos. **VIII**) of the dongle box or Microflow-box.

8.2 Connector assignments of the slots

8.2.1 Connector assignments of slot V (5-terminal), Dongle-box



Pin	Conductor coloring (cable connection)	Assignment
1	brown	Supply for oval gear meter 5 V DC (load with max. 50 mA)
2	white	Bus line for oval gear meter, type OGM ^{PLUS}
3	blue	Switch input
4	black	GND (⊥)
5	grey	Free for future use

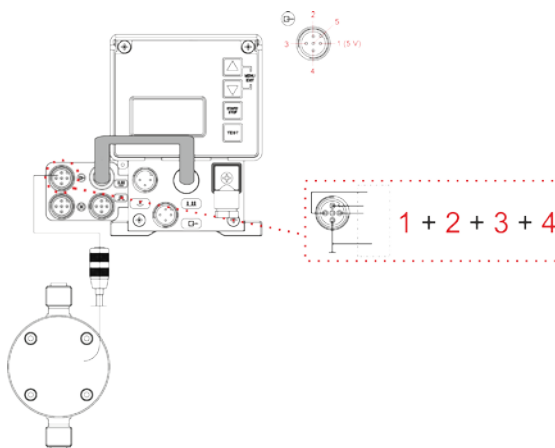
Fig. 8.4 Connector assignments of slot V (5-terminal), input for Dongle-box

- ✖ Remove the protective cap
- ✖ Mount the connector plug according to the connector assignment.



WARNING Only use a connector plug from our product range!

8.2.1.1 Installing the oval gear meter OGM^{PLUS}

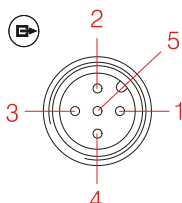


$$1 + 2 + 3 + 4 = \text{OGM}^{\text{PLUS}}$$

PIN	Assignment
1	5 V
2	Bus signal
3	Relay input
4	GND (⊥)

Fig. 8.5 Installing the oval gear meter OGM^{PLUS}

8.2.2 Connector assignments of Slot V, MicroFlow- Box



Pin	Conductor coloring (cable connection)	Assignment
1		not occupied
2		not occupied
3	blue	Signal input MicroFlow- Transducer
4	black	GND (⊥)
5		not occupied

Fig. 8.6 Connector assignments of slot V (5-terminal), MicroFlow-Box

8.2.2.1 Installation MicroFlow Transducer

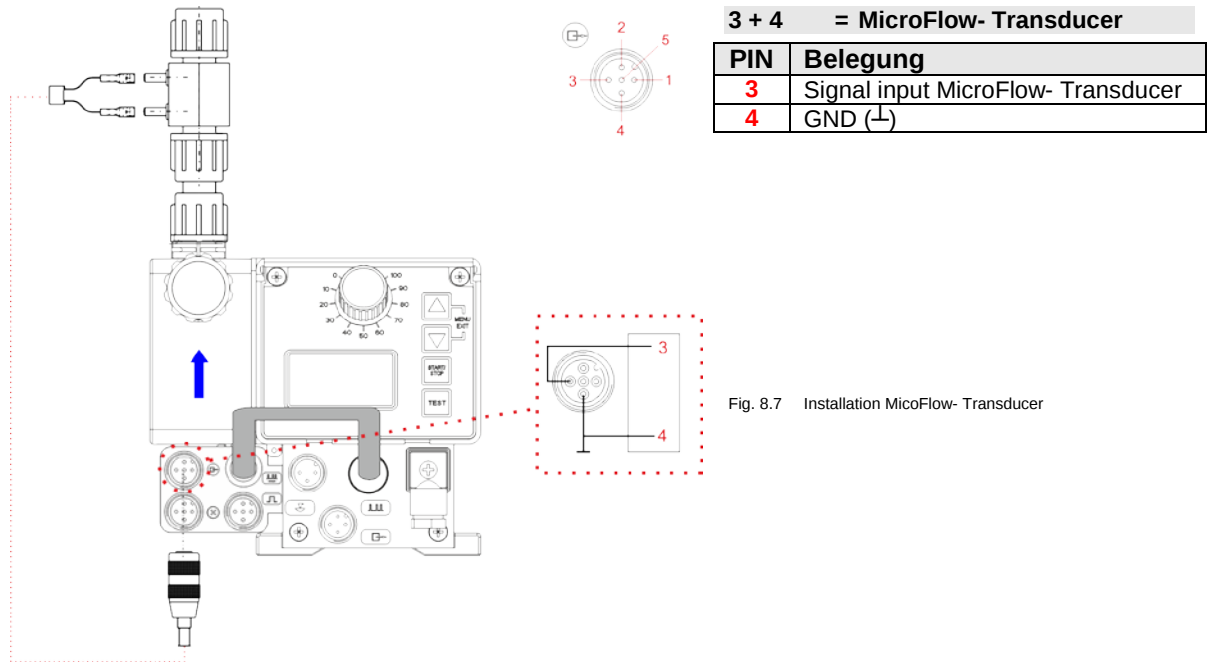
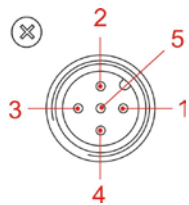


Fig. 8.7 Installation MicoFlow- Transducer

8.2.3 Connector assignments of Slot VII (5-terminal) Input for batch pulse and metering lock



Pin	Conductor coloring (cable connection)	Assignment
1	brown	Output 5 V, DC (load with max. 50 mA)
2	white	Input batch metering
3	blue	Input metering lock
4	black	GND (⊥)
5	grey	Free for future use

Fig. 8.8 Connector assignments of Slot VII (5-terminal), input for batch pulse and metering lock

✘ Remove the protective cap

✘ Mount the connector plug according to the connector assignment.



WARNING Only use a connector plug from our product range!

8.2.3.1 Installing the batch pulse



NOTE

The batch function must be activated in menu first. The selection must also be made of whether the pins **2+4** (input "pulse") or **3+4** (input "metering lock") should be used for the batch metering start pulse (see chapter [10.3.15](#) "Configuration / batch")

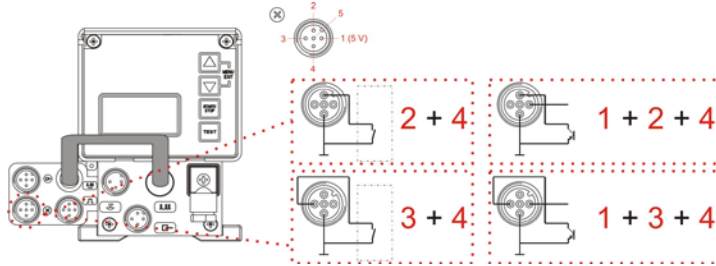


Fig. 8.9 Installing the batch impulse

2 + 4 = Input batch metering with potential-free contact with selection input „pulse“ at configuration / batch (see chapter [10.3.15](#)).

PIN	Assignment
2	Relay input
4	GND (⊥)

1 + 2 + 4 = Input batch metering with electronic switch (NPN) with selection input „pulse“ at configuration / batch (see chapter [10.3.15](#))

PIN	Assignment
1	5 V, DC
2	Relay input
4	GND (⊥)

or

3 + 4 = Input batch metering with potential-free contact with selection input „metering lock“ at configuration / batch (see chapter [10.3.15](#)).

PIN	Assignment
3	Relay input
4	GND (⊥)

1 + 3 + 4 = Input batch metering with electronic switch (NPN) with selection input „metering lock“ at configuration / batch (see chapter [10.3.15](#)).

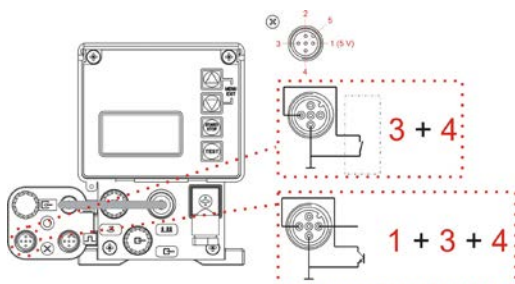
PIN	Assignment
1	5 V, DC
3	Relay input
4	GND (⊥)

8.2.3.2 Installing the metering lock (optional connector VII or VIII)



NOTE

The metering lock function must be activated in menu first. The selection must also be made of whether the pins **2+4** (input "pulse") or **3+4** (input "metering lock") should be used for the metering monitoring input (see chapter [10.3.13](#)).



3 + 4 = Input metering monitoring with potential-free contact, with selection „metering lock“ at configuration metering monitoring (see chapter [10.3.13](#)).

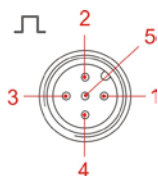
PIN	Assignment
3	Relay input
4	GND (⊥)

Fig. 8.10 Installing the metering lock (optional connector VII or VIII)

1 + 3 + 4 = Input metering monitoring with electronic switch (NPN) with selection input „metering lock“ at configuration metering monitoring (see chapter [10.3.13](#)).

PIN	Assignment
1	5 V, DC
3	Relay input
4	GND (⊥)

8.2.4 Connector assignments of Slot VIII (5-terminal) input for pulse, standard signal input and metering lock



Pin	Conductor coloring (cable connection)	Assignment
1	brown	Output 5 V, DC (load with max. 50 mA)
2	white	Input external pulse
3	blue	Input metering lock
4	black	GND ($\perp$)
5	grey	Input standard signal 0/4-20 mA

Fig. 8.11 Connector assignments of Slot VIII (5-terminal), input for pulse, standard signal and metering lock

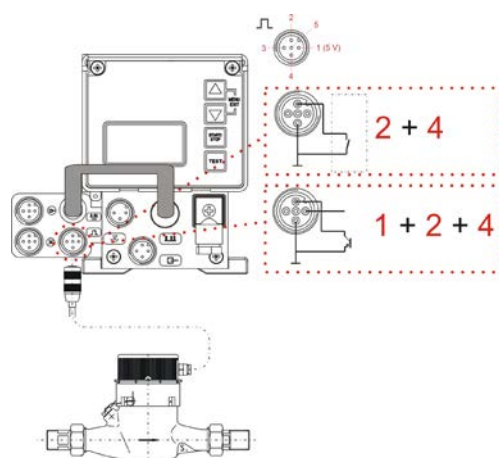
✘ Remove the protective cap

✘ Mount the connector plug according to the connector assignment.



WARNING Only use a connector plug from our product range!

8.2.4.1 Installing the pulse control (water meter)



2 + 4 = Pulse input with potential-free contact

PIN	Assignment
2	Relay input
4	GND ($\perp$)

1 + 2 + 4 = Pulse input with electronic switch (NPN)

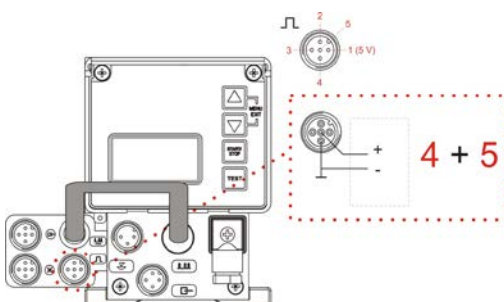
PIN	Assignment
1	5 V, DC
2	Relay input
4	GND ($\perp$)

The minimum pulse- or pause time is 15 ms.



Fig. 8.12 Installing the pulse control (water meter)

8.2.4.2 Installing the standard signal (mA)



4 + 5 = Standard signal input 0/4 – 20 mA

PIN	Assignment
4	0/4-20 mA (-)
5	0/4-20 mA (+)

Fig. 8.13 Installing the standard signal (mA)



WARNING Observe correct polarity during connection!

8.2.4.3 Installing the metering lock



NOTE

The metering lock function must be activated in menu first. (see chapter: [10.3.7](#) "configuration / metering lock") The metering lock is available in all operation modes.

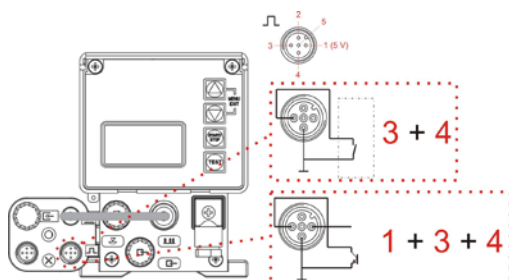


Fig. 8.14 Installing the metering lock

3 + 4 = Metering lock input with potential-free contact

PIN	Assignment
3	Relay input
4	GND ($\perp$)

1 + 3 + 4 = Metering lock input with electronic switch (NPN)

PIN	Assignment
1	5 V, DC
3	Relay input
4	GND ($\perp$)

9 Startup

	NOTE	On startup, vent the system as described in chapter 9.3 "Venting the metering pump"!
	CAUTION	If the metering pipe can be shut off, an overflow valve (safety valve) should be installed on the pressure side, which opens at the maximum permissible pressure level, in order to protect the metering line. This may prevent the metering pipe from bursting in the event of an operator error. Under unfavourable conditions, the pressure may rise to up to three times the nominal pressure.
	NOTE	After 24 hours of operation, the metering head screws are to be re-tightened diagonally with a torque of approximately 3-4 Nm.

9.1 Switching the pump on/off

	<u>Switching on</u> = 2 sec	✘ Press START/STOP key (min. 2 sec.).
	<u>Switching off</u> = 5 sec	✘ Press START/STOP key (min. 5 sec.).

Abb. 9.1 Inbetriebnahme: Ein- Ausschalten der Pumpe

9.2 Setting of the metering output (mechanical)

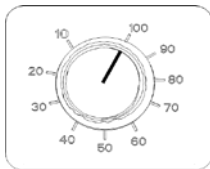


Fig. 9.2 Setting of the metering output (mechanical)

The metering rate is adjustable by means of mechanical stroke length setting between 100% and 30% of the pump's rated capacity (reproducible accuracy can no longer be guaranteed below 30%).

The adjustment is made via the stroke adjusting button and **can only be performed while the metering pump is in operation.**

	NOTE	The capacity of the pump must be calibrated in order to determine the metering capacity precisely. (see chapter 10.4 "Calibration")
---	-------------	---

9.3 Venting the metering pump

	WARNING	Particular caution is required when handling chemical metering media! Metering media may escape which may cause skin irritation, depending on their properties. Therefore, before venting, always observe the product datasheet of the metering medium to prevent any type of injury!
	NOTE	To ensure an optimal suction performance, the stroke length should be set to 100% and the maximum stroke frequency. In the event that pump has no suction or insufficient suction, the correct connection must be checked.
	WARNING	It is only possible to modify the stroke length setting when the pump is running.

- ✘ Open the vent screw approximately 1 turn
- ✘ Hold a suitable collection vessel under the vent connection (see chapter [5](#), "Setup", Fig. 5.1, Pos. 3).
- ✘ Press the Test key until the metering medium escapes from the venting outlet. Hold down the Test key for a further 60 seconds to fill the pump head fully with the product.
- ✘ Reclose the vent screw.
- ✘ Press the Test Key again until the metering medium is visible through the metering pipe, until it reaches approximately 2 cm in front of the inoculation valve.
- ✘ Close the clear cover which protects the function keys, and seal it if necessary.

	NOTE	If no metering medium enters the metering pipe, repeat the venting.
---	-------------	---

9.4 Key functions

Description	
	MENU/EXIT function entry and exiting of the menu levels (keep keys pressed down together)
	(▲) Modify set values upwards
	(▼) Modify set values downwards
	Start the pump Stop the pump Confirmation key (ENTER) for set values
	Test function (endurance test)

Fig. 9.3 Menu/Exit

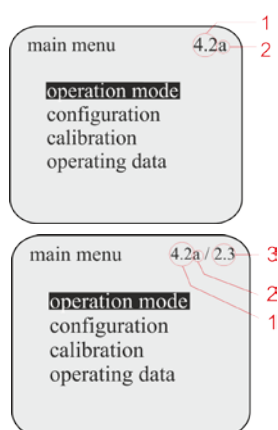
Fig. 9.4 Start/Stop

Fig. 9.5 Testfunktion

9.5 Description of display symbols

Display	Description
	Pump's operation mode: the top right indicator in the display  makes a full rotation with each stroke.
	Level report is active (flashing display = low level advance warning, display is permanently visible = empty report), see 7.2.2.1 Installing the suction pipe with low-level advance warning and empty report or 10.3.8 Configuration / Low-level contact
	Metering lock active, see 7.2.3.3 Installing the control via the metering lock or 10.3.7 Configuration / Metering lock
	Fault report, see 12.2 Alarm messages
Intern	Operation mode internal, see 10.2.2 Operation mode / internal
MUL	Operation mode pulse multiplication, see 10.2.3 Operation mode / pulse
DIV	Operation mode pulse division, see 10.2.3 Operation mode / pulse
x.xx mA	Operation mode current x – xx mA, see 10.2.4 Operation mode / current
Charge	Operation mode batch see 10.3.15 Configuration / Batch
xxx /min	Display strokes / min at Operation mode internal
xx %	Display % at Operation mode internal
x.xx l/h	Display l/h at Operation mode internal see 10.2.2.2 Display / setting operation mode internal
n = x	Display at operation mode pulse, see 10.2.3.2 Display / setting operation mode pulse
xx.x mA	Display at operation mode current, see 10.2.4.3 Display / operation mode current
f = xx.x %	Display of the current metering frequency in %
OFF	Pump is in operating state OFF (must be switched on)
E60+	Dongle box is connected, see 8 Upgrading to Version Chem-Ad® Serie B E60 ^{PLUS}
E60++	Dongle box and OGM ^{PLUS} are connected, see 8.2.1.1 Installing the oval gear meter or 10.3.11 Configuration / Oval gear meter
Alarm	Alarm operation mode, see 12.2 Alarm messages

9.6 Software version display



The current software version (Pos. 1) is displayed (Fig 9.6 & 9.7) in the top right of the main menu screen

Lowercase letters after the software number (Pos. 2) describe internal software modifications that do not affect the operation of the device.

Fig. 9.6 Software version display 1

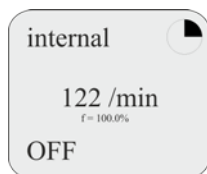
If a Dongle box or a MicroFlow^{PLUS} has been connected, the unit version (Pos. 3) is displayed to the right of the pump version.

Fig. 9.7 Software version display 1

9.7 Delivery condition

9.7.1 Basic setting of the mode of operation / display in the operating display

On delivery, the mode of operation internal is displayed in the version “display/ strokes”. Therefore, the following parameters are shown on the display when the main voltage is switched on.



Operating mode: internal
Metering frequency / - quantity: strokes / min (122 strokes / min at 50 Hz, 146 H strokes / min at 60 Hz)
Operating state: OFF (at V 4.1, „Standby“ at V4.0)
 (to start the pump press START / STOP key)

Fig. 9.8 Basic setting of the mode of operation / display in the operating display

NOTE With each stroke of the pump, the indicator in the upper right of the display rotates 1 turn.

9.7.2 Basic settings in the configuration

The following factory settings are defined in the configuration.

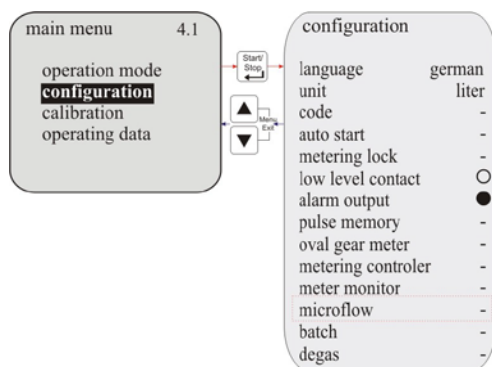


Fig. 9.9 Basic settings in the configuration

Configuration of	Standard	see Chapter
language:	German	10.3.3
unit:	litre	10.3.4
code:	not active (-)	10.3.5
auto start:	not active (-)	10.3.6
metering lock:	not active (-)	10.3.7
low level contact:	open (○)	10.3.8
alarm output:	off (●)	10.3.9
pulse memory:	not active (-)	10.3.10
oval gear meter:	not active (-)	10.3.11
metering controller:	not active (-)	10.3.12
meter monitor:	not active (-)	10.3.13
microflow:	not active (-)	10.3.14
batch:	not active (-)	10.3.15
degas:	not active (-)	10.3.16

microflow: Only appears on the display in conjunction with the MicroFlow^{PLUS} metering monitor, which is available as an accessory.

10 Menu description

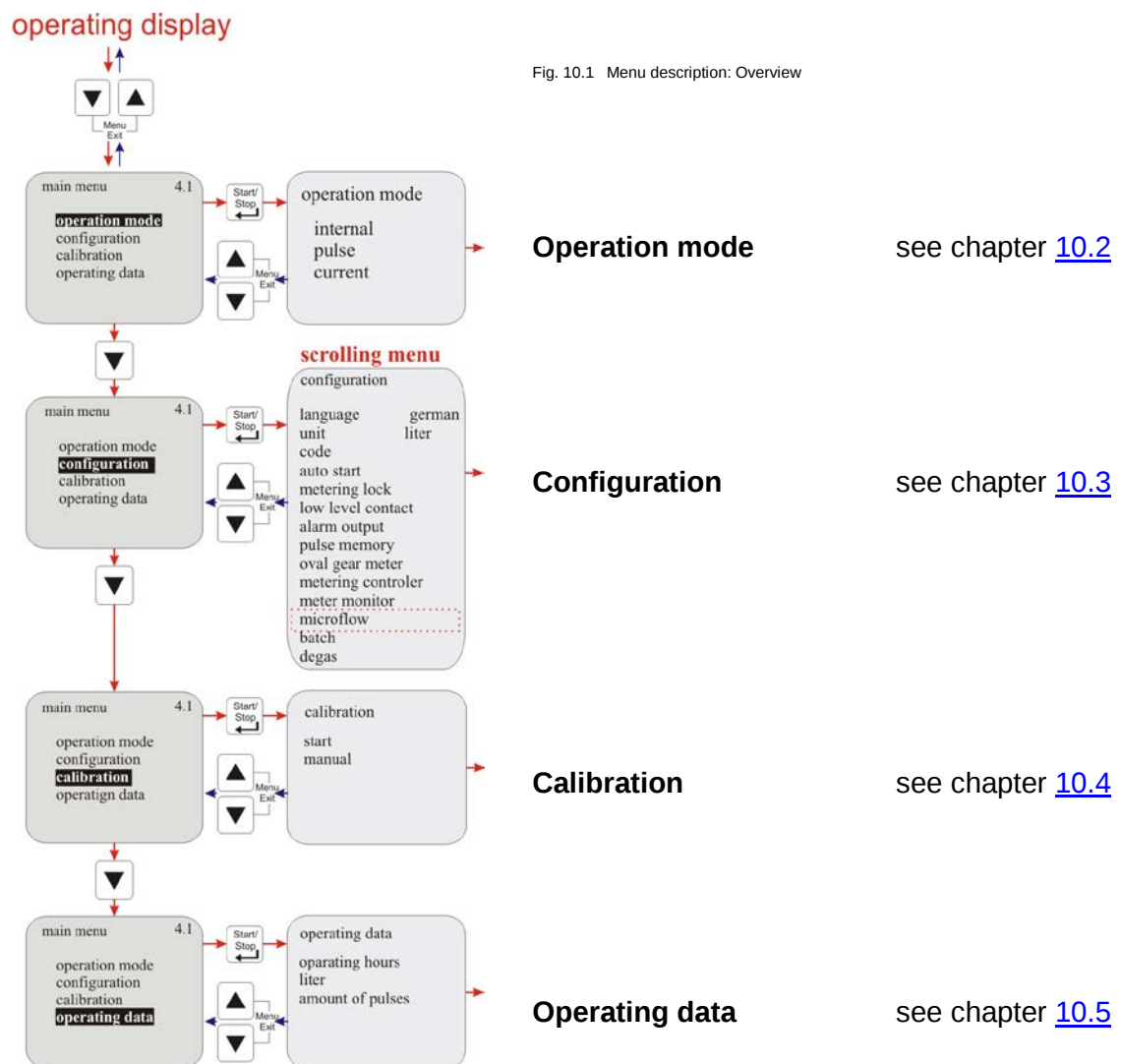
10.1 Main menu

The main menu can be accessed while the pump is operating.

It is started by simultaneously pressing the ▲ and ▼ keys.

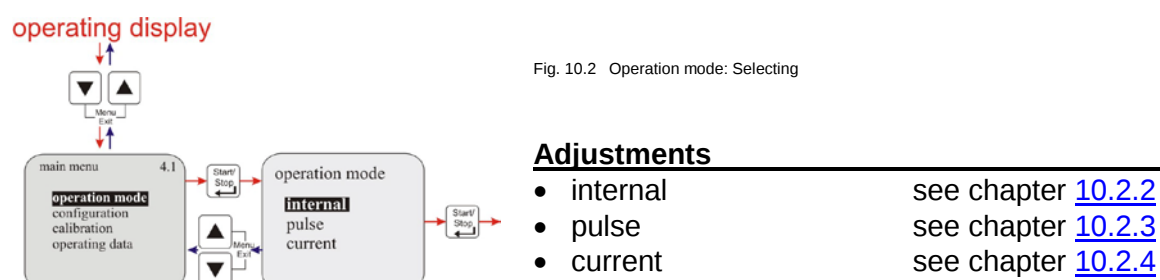
Simultaneously press the ▲ and ▼ keys again to return to the operating display.

10.1.1 Overview



10.2 Operation mode

10.2.1 Selecting



10.2.2 Operation mode / internal

The “internal” operation mode can be used to operate the metering pump without external signals.

The following display options can be selected:

- **Strokes/min** The configured metering speed (and thus the metering rate) is displayed in strokes/min. **(Default setting)**
- **Percent** The configured metering speed (and thus the metering rate) is displayed as a percentage.
- **Liter*** The configured metering rate is displayed in litres/h (optionally also in gallons/h).
For information on converting litres to gallons, see [10.3.4](#) “Configuration / unit”

10.2.2.1 Selecting

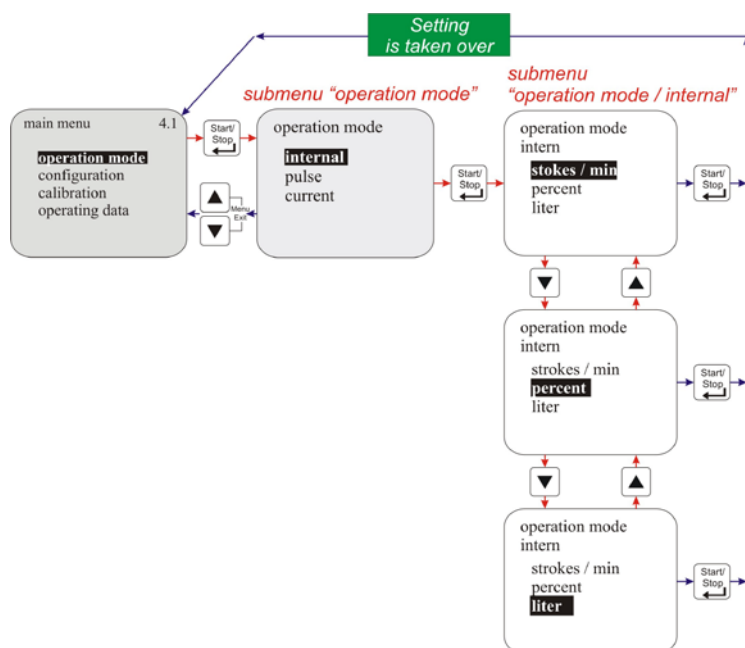


Fig. 10.3 Operation mode / internal: selecting

10.2.2.2 Display in the operating display/ Setting

The metering rate can be configured / adjusted in the operating display during operations.

NOTE If the newly set value is not confirmed within 10 seconds by pressing the START/STOP key, the system reverts to the primarily value.

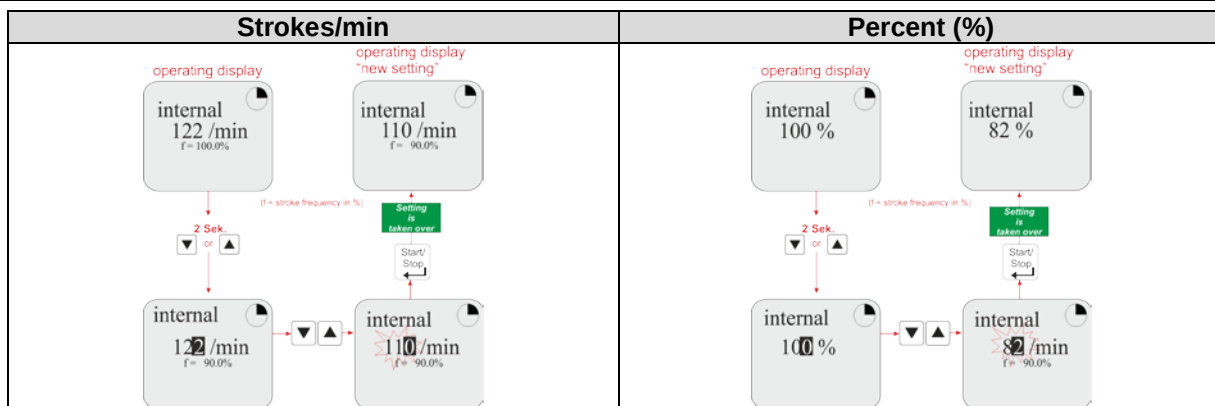


Fig. 10.4 Display in the operating display / Setting: Strokes

Fig. 10.5 Display in the operating display / Setting: Percent

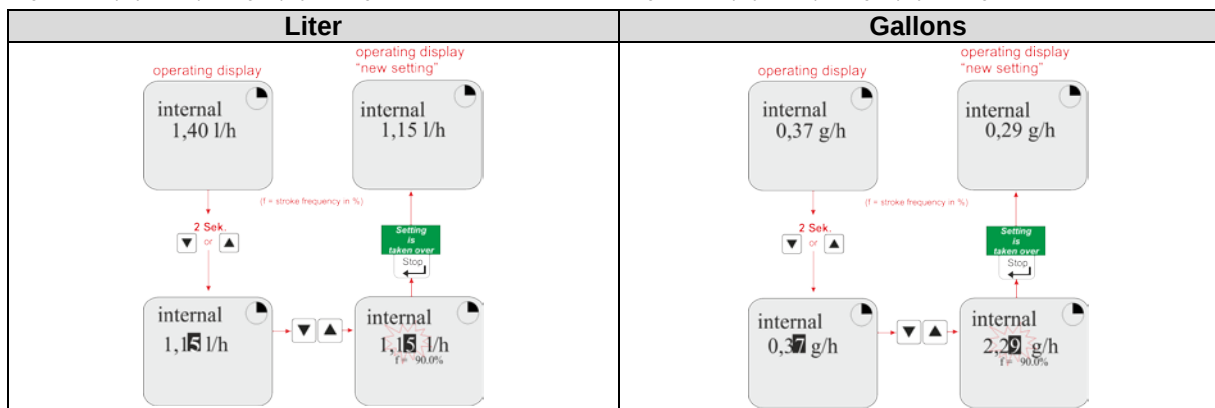


Fig. 10.6 Display in the operating display / Setting: Liter

Fig. 10.7 Display in the operating display / Setting: Gallons

10.2.3 Operation mode / pulse

For the “pulse” operation mode, the metering pump only works in conjunction with incoming pulses (e.g. from a contact water meter).

The following pulse processing options can be selected:

- **Multiplication** Incoming pulses are multiplied by a configurable factor (n):
1 pulse = n pump strokes (default setting)
- **Division** Incoming pulses are divided by a configurable factor (n):
n pulse = 1 pump stroke

10.2.3.1 Selecting

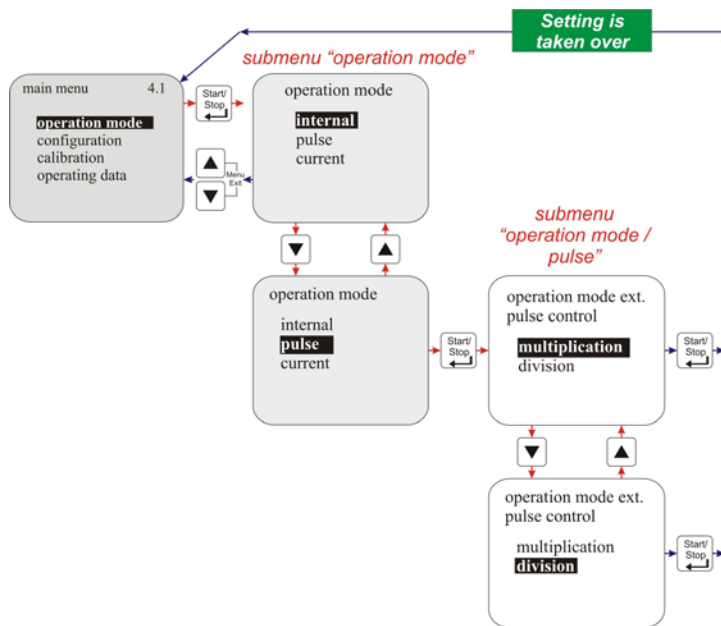


Fig. 10.8 Operating mode / pulse: Selecting

10.2.3.2 Display in the operating display / Setting

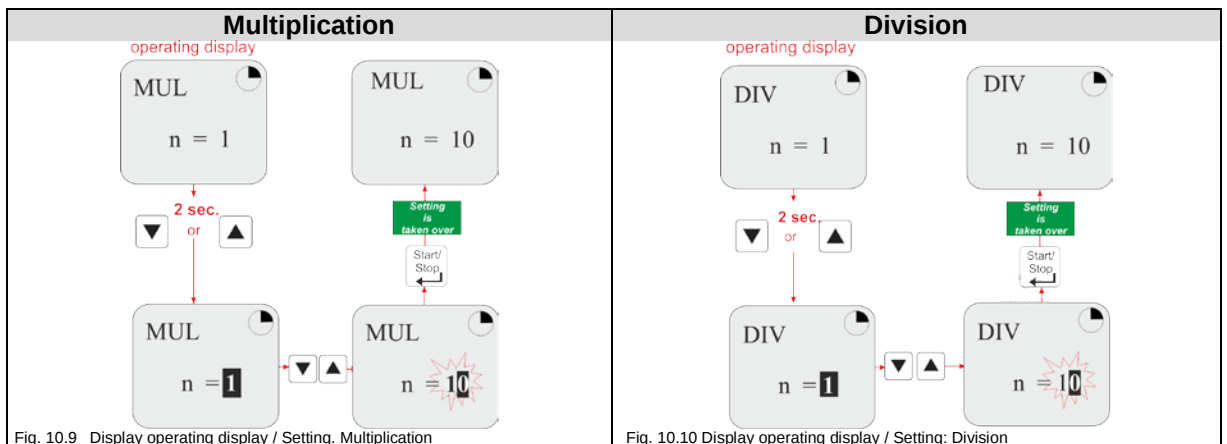


Fig. 10.9 Display operating display / Setting. Multiplication

Fig. 10.10 Display operating display / Setting: Division

The multiplication and division factors are configured / adjusted in the operating display. This Tcan take place while the pump is operating.

NOTE If the newly set value is not confirmed within 10 seconds by pressing the START/STOP key, the system reverts to the previously set running value.

10.2.4 Operation mode / current (external standard signal)

In the "current" operation mode, the pump functions on the basis of an incoming standard signal. The incoming signal (0/4-20 mA; 20-0/4 mA or adjustable) is converted into a metering frequency 0-100 % (stroke/pause ratio), e.g.:

The following operating options can be selected:

- **0 – 20 mA** 0 mA = 0% metering frequency, 20 mA = 100 % metering frequency
- **4 – 20mA** 4 mA = 0% metering frequency, 20 mA = 100 % metering frequency
- **20 – 0 mA** 20 mA = 0% metering frequency, 0 mA = 100 % metering frequency
- **20 – 4 mA** 20 mA = 0% metering frequency, 4 mA = 100 % metering frequency
- **User defined** n (adjustable) mA = 0 % metering frequency,
n (adjustable) mA = 100 % metering frequency

10.2.4.1 Selecting

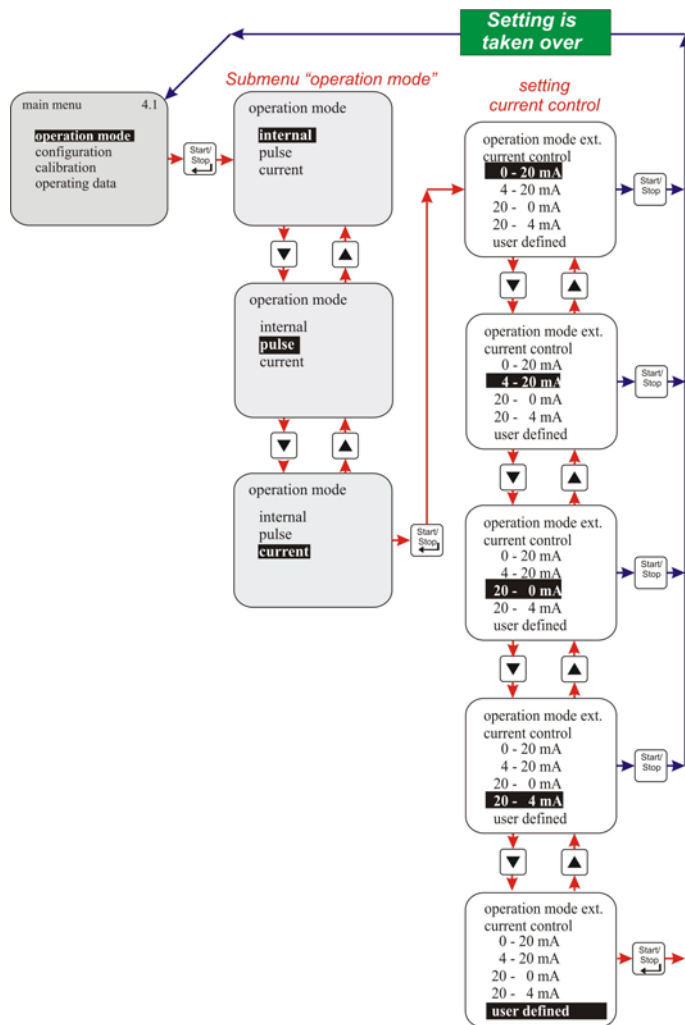


Fig. 10.11 Operating mode / current (external standard signal): Selecting

10.2.4.2 Setting operation mode / current / user defined

NOTE The difference in the set values must be greater than or equal to 5. (e.g. min 10 max 15).

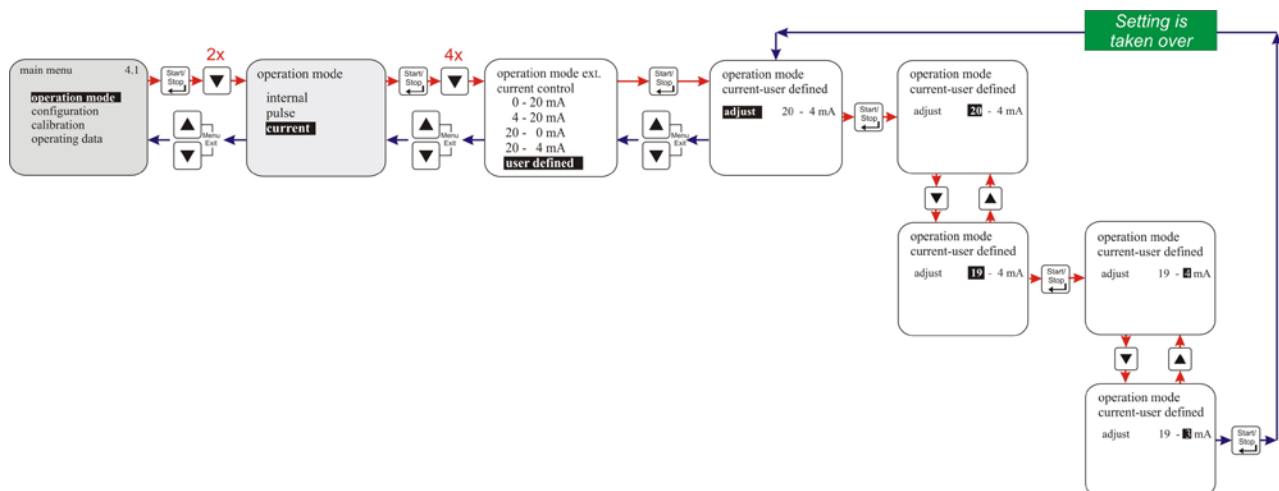


Fig. 10.12 Setting operating mode / current / user defined

10.2.4.3 Display in the operating display

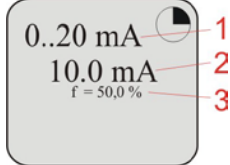
Display	Pos.	Description
	1	Range of input signal, preset in the menu
	2	Actual connected current value
	3	Stroke frequency in %

Fig. 10.13 Display in the operating display

10.3 Configuration

10.3.1 Overview

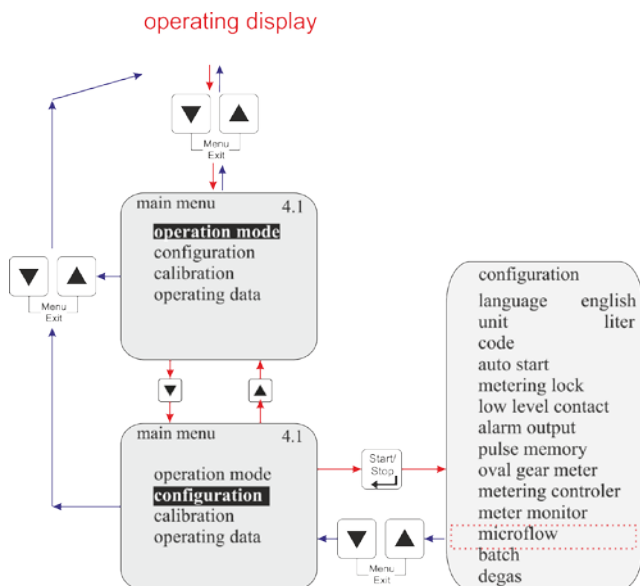


Fig. 10.14 Configuration overview

Configuration of: see chapter:

- Menu language [10.3.3](#)
- Units [10.3.4](#)
- Code entry [10.3.5](#)
- Startup settings [10.3.6](#)
- Metering lock [10.3.7](#)
- Low-level contact [10.3.8](#)
- Alarm output [10.3.9](#)
- Pulse memory [10.3.10](#)
- Oval gear meter [10.3.11](#)
- Metering controller [10.3.12](#)
- **Metering monitoring** [10.3.13](#)
- **MicroFlow** [10.3.14](#)
- **This menu item only appears in conjunction with the MicroFlow metering monitor, which is available as an accessory, and replaces the menu item "metering monitoring".**
- Batch [10.3.15](#)
- Degas [10.3.16](#)

10.3.2 "Scrolling the display"

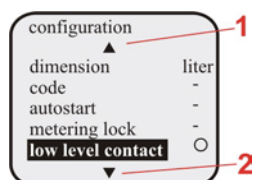


Fig. 10.15 Configuration "Scrolling the display"

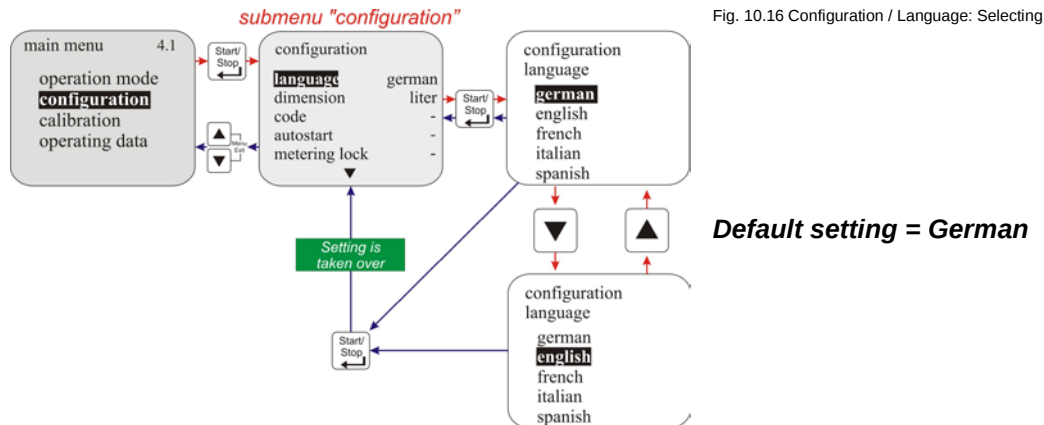
The display possesses a "scroll function", i.e. some menu items are only shown on the display when the end of the menu is reached on the display. Using the symbols ▲ (Pos. 1) or ▼ (Pos. 2) on the display, you can see which direction you can scroll in.

- 1 = (▲)scroll the display upwards
- 2 = (▼)scroll the display downwards

10.3.3 Configuration / Language

This is used to select the menu language.

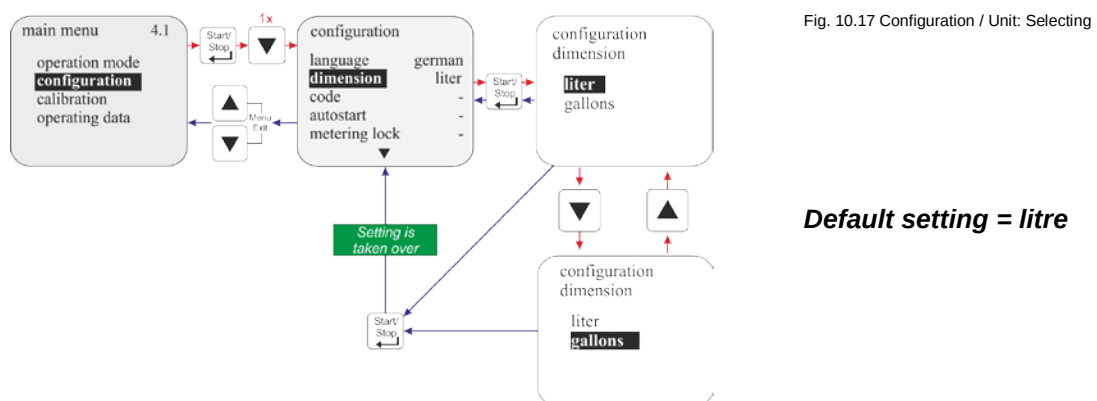
10.3.3.1 Selecting



10.3.4 Configuration / Unit

If 'litre' is selected for the 'internal' operation mode (see chapter [10.2.2.2](#)), this can be used to change the display from litres/h to gallons/ h (1 gallon = 3,785 litres).

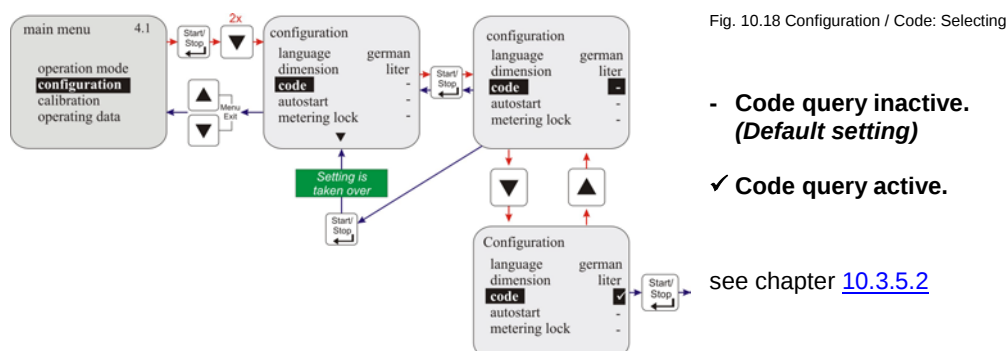
10.3.4.1 Selecting



10.3.5 Configuration / Code

With this setting, a four-digit number combination can be assigned to secure the setting against unauthorized adjustment. If 'code' has been activated, the four-digit code must be entered before configured values can be amended or the main menu can be accessed.

10.3.5.1 Selecting



10.3.5.2 Setting

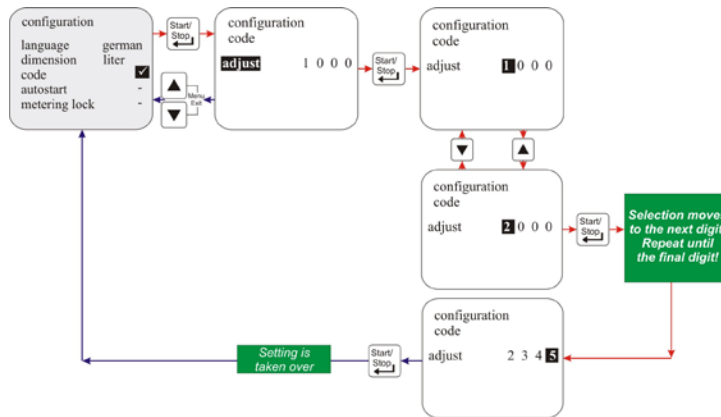


Fig. 10.19 Configuration / Code: Setting

10.3.6 Configuration / Autostart

This function determines whether the pump is set to 'OFF' ("Standby" in V 4.0) when the mains connection is re-established following a power cut or if the pump should immediately recommence functioning in the configured operation mode.

10.3.6.1 Selecting

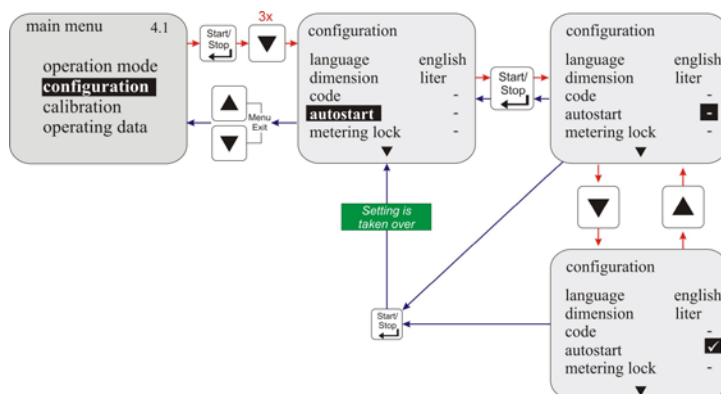


Fig. 10.20 Configuration / Autostart: Selecting

- **autostart is inactive.**
When the mains voltage is connected, the pump always enters the "OFF" ("Standby" in V 4.0) operating state.
(Default setting)
- ✓ **autostart is active.**
When the mains voltage is connected, the pump starts functioning in the configured operation state.

10.3.7 Configuration / Metering lock

If the metering lock is enabled, the pump only functions if an external enable contact is connected to plug II (or at plug VII or plug VIII, if a dongle box is used) between PINS 3+ 4 and an external enable contact is connected (electrical connection see chapter [7.2.3.3](#), [8.2.3.2](#) and [8.2.4.3](#)). The selected operating mode does not affect the use of the metering lock.

10.3.7.1 Selecting

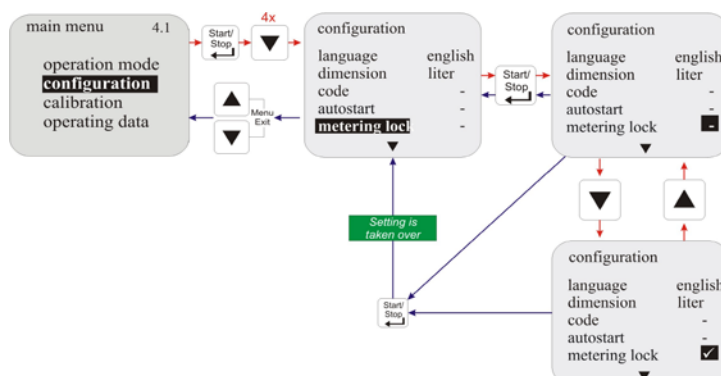


Fig. 10.21 Configuration / Metering lock: Selecting

- **Interrogation of the metering lock is inactive. (Default setting)**
- ✓ **Interrogation of the metering lock is active.**

10.3.8 Configuration / Low-level contact

This function specifies whether an open or a closed contact at the level input (plug I, see chapter 7.2.2) is regarded as level OK.

10.3.8.1 Selecting

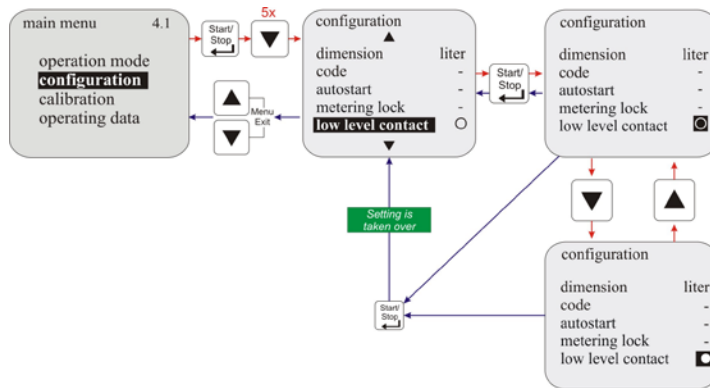


Fig. 10.22 Configuration / Low-level-contact: Selecting

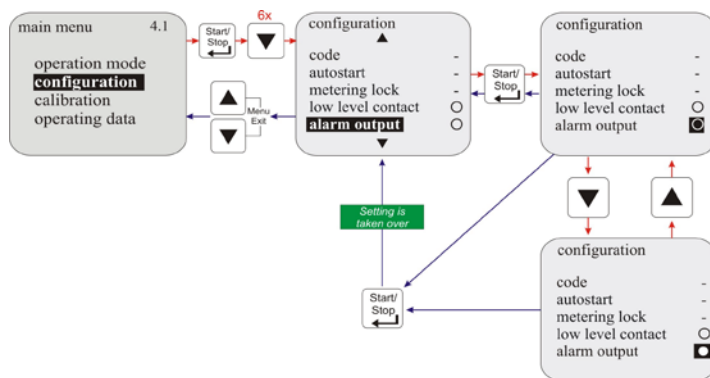
○ = **contact open:**
level not OK (empty)
contact closed:
level OK (full)
(Default setting)

● = **contact closed:**
level not OK (empty)
contact open:
level OK (full)

10.3.9 Configuration / Alarm output

This option permits the inversion of the alarm output (alarm output relay has pulled in or not pulled in when the alarm was triggered).

10.3.9.1 Selecting



● = **When an alarm is triggered, the relay is pulled in for the alarm output. (Default setting)**

○ = **When an alarm is triggered, the relay is not pulled in for the alarm output.**

In addition to the function mode of the relay, it is also possible to select whether the alarm output relay contact is closed (closing function on, default setting) when the relay is pulled in or open (opening function) (see chapter 7.2.4.3 "Hardware migration for alarm contact" conversion from alarm relay mode to contact mode).

Fig. 10.23 Configuration / Alarm output: Selecting

10.3.9.2 Conversion from alarm relay mode to contact mode.

See chapter 7.2.4.3 "Hardware migration for alarm contact".

10.3.10 Configuration / pulse memory

If the incoming pulse rate is higher than the maximum pulse rate that the pump can process (max. pump frequency e.g. 122 strokes/min at 50 Hz), the pulses that cannot be processed can be stored.



WARNING

The stored pulses are processed once no further external pulses are received. This means that the pump continues to function even though there is no external running condition. In the worst case, this can lead to metering taking place into a closed system and resulting in impermissibly high pressure in the system. This must be prevented through appropriate safety measures.

The memory content is erased by activating the metering lock or switching off the pump.

10.3.10.1 Selecting

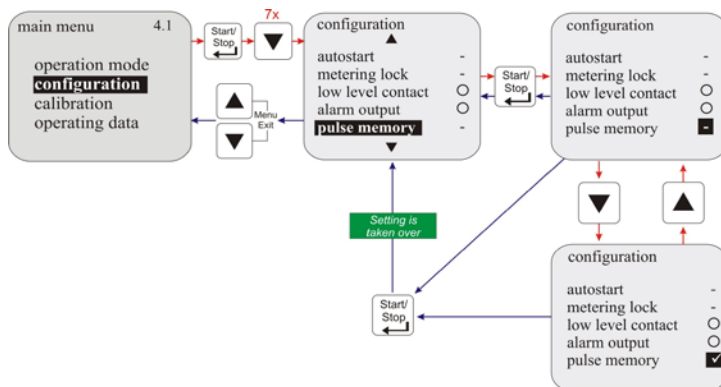


Fig. 10.24 Configuration / pulse memory: Selecting

- pulse memory is inactive. (Default setting)
- ✓ pulse memory is active.

10.3.10.2 Display in the operating display with an active pulse memory

Display in operation	Meaning	Pos	Description
	Pulse multiplication (Example: 10 external pulses become 20 strokes)	1	Pulse memory active
		2	Number of pulses received
		3	Set factor
	Pulse division (Example: 10 external pulses become 20 strokes)	1	Pulse memory active
		2	Number of pulses received
		3	Set factor

Fig. 10.25 Display in the operating display with an active pulse memory: pulse multiplication

Fig. 10.26 Display in the operating display with an active pulse memory: pulse division

10.3.11 Configuration / Oval gear meter (only E60^{PLUS} & OGM^{PLUS})

The oval gear meter function makes it possible to record a “real” value in the operating data/liter menu item (see chapter 10.5.3). Furthermore, this menu item must be enabled to use the metering controller function (see chapter 10.3.12).

The function oval gear meter can only be activated if the pump is upgraded with a **Dongle-Box** (Art. No.248606, EBS No. 10016094) to the **E60^{PLUS}** and an **OGM^{PLUS}** (oval gear meter see Accessories) is connected.

To activate the Dongle-Box in connection with the oval gear meter, the power supply has to be switched off and on again! (Unplug power plug or switch the pump off and back on again!)

If the dongle box is fitted and is activated by switching the pump off and then on again, “E60+” appears on the bottom left of the pump's display unit. If an **OGM^{PLUS}** (oval gear meter) is connected to slot V on the **dongle box** and is activated by switching the pump off and then on again, “E60++” appears on the pump's display unit, and the oval gear meter function is automatically enabled under “Configuration” in the pump menu and the function dosing regulator can be selected now.

If the pump software recognises that there is a **dongle box** or an **OGM^{PLUS}** connected, and the communication is then interrupted between the pump and the periphery unit (e.g. through the removal of the unit), an error message is displayed (see chapter 12.2 “Alarm messages (display)”). To prevent this error message appearing repeatedly, the communication (connection) must be restored, or the analysis must be disabled in the pump software. (see chapter 12.2.1 „Deactivating of the **dongle box** or **OGM^{PLUS}** in the pump software“).

10.3.11.1 Selecting

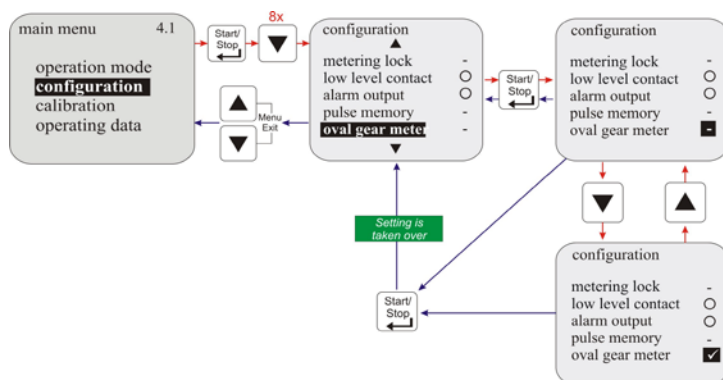


Fig. 10.27 Configuration / Oval gear meter (only E60^{PLUS} & OGM bzw. OGM^{PLUS}): Selecting

- oval gear meter is inactive. (Default setting)
- ✓ oval gear meter is active.

10.3.12 Configuration / Metering controller (only E60^{PLUS} & OGM^{PLUS})

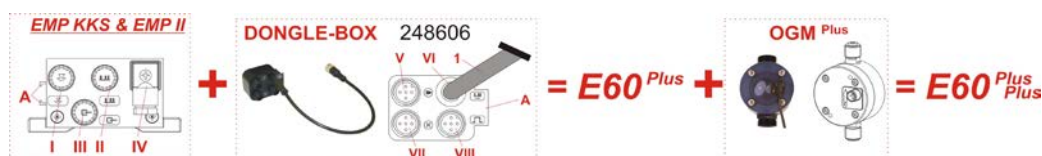


Fig. 10.28 Configuration / Metering controller (only E60^{PLUS} & OGM^{PLUS})

If an OGM^{PLUS} is connected, when the metering controller function is activated, the dosage quantity measured by the OGM is compared with a pre-defined dosage quantity target value. If there is a discrepancy between the values, the metering frequency of the pump is automatically increased or decreased. Since metering frequency can only be adjusted within the performance limitations of the pump, setting the dosage quantities higher than 80 or 90% of the maximum possible metering frequency is not recommended. This will ensure that the metering controller retains sufficient reserves to react to negative control deviations.

The metering controller function can only be used in the 'internal' and 'current' operating modes. If the operating mode 'pulse' is selected, the metering controller function will not work.



NOTE

The metering controller function can only be activated if the pump is upgraded with a dongle box to the E60^{PLUS} and oval gear meter, type OGM^{PLUS} (see Accessories) is connected. To activate the Dongle-Box in connection with the oval gear meter, the power supply has to be switched off and on again!

10.3.12.1 Selecting

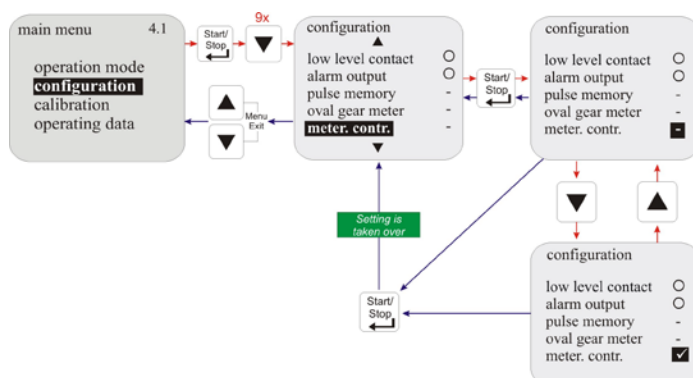


Fig. 10.29 Configuration / Metering controller: Selecting

- controller function is inactive. (Default setting)
- ✓ controller function is active.

10.3.12.2 Display in the operating display with an active metering controller

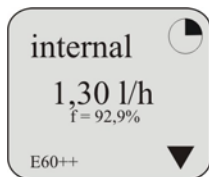


Fig. 10.30 Display in the operating display with an active metering controller: Downward metering divergence

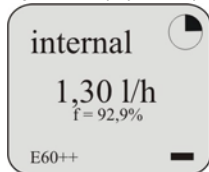


Fig. 10.31 Display in the operating display with an active metering controller: no metering divergence

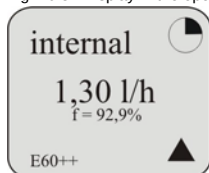


Fig. 10.32 Display in the operating display with an active metering controller: Upward metering divergence

▼ = Downward metering divergence

The pump is currently delivering less than the preset stroke frequency (here 100/min for example) requires.

Metering frequency is increased automatically until the actual value matches the target value.

- = No metering divergence

The pump delivers exactly the preset flow (here 100/min for example). No correction is necessary.

▲ = Upward metering divergence

The pump is currently delivering more than the preset stroke frequency (here 100/min for example) requires.

Metering frequency is reduced automatically until the actual value matches the target value.

NOTE

→ Dongle-box mounted.

→ Oval gear meter OGM^{PLUS} mounted.

Fig. 10.33 Mounting note

10.3.13 Configuration / Metering monitoring

If the metering monitoring function is enabled, the pump strokes are compared to the incoming pulses using a connected external metering monitor (e.g. oval gear meter). If a configurable tolerance threshold is breached, an alarm is triggered.

The metering monitoring system can be connected at plug II (or plug V if a dongle box is used) at Pin 2+4 (input pulse) or at Pin 3+4 (input metering lock) (assortment of inputs see chapter [10.3.13.5](#) "Metering monitoring / Input (only at E60 WITHOUT Dongle box)", electrical connection see chapter [7.2.3.5](#) "Installing the metering monitoring" and [8.2.1.1](#) "Installation oval gear meter (OGM or OGM^{PLUS})").

NOTE

If an oval gear meter is connected as a metering monitoring unit and should be correspondingly evaluated, then the configuration/oval gear meter function must be enabled in addition to the configuration/metering monitoring function (see chapter [10.3.11](#)).

10.3.13.1 Selecting

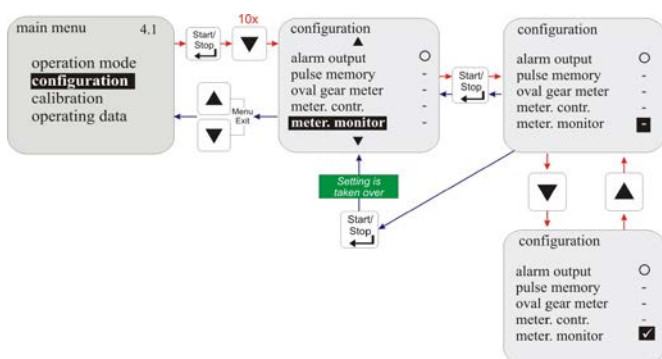


Fig. 10.34 Configuration / Metering monitoring: Selecting

- **metering monitoring is inactive.**
(Default setting)

✓ **metering monitoring is active.**

On activating metering monitoring, a submenu appears with the following menu items:

Menu item	see chapter
• Stop pump	10.3.13.2
• Strokes	10.3.13.3
• Deviation	10.3.13.4
• Input	10.3.13.5

10.3.13.2 Metering monitoring / Stop pump

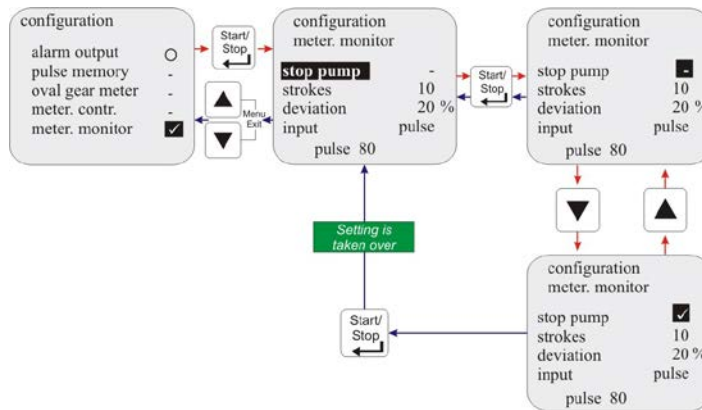


Fig. 10.35 Metering monitoring / Stop pump

The “stop pump” function is used to set whether or not the pump should be stopped if a “metering monitoring alarm” is triggered.

- Pump is not stopped when a “metering_monitoring alarm” is triggered. (Default setting)
- ✓ Pump is stopped when a “metering_monitoring alarm” is triggered.

10.3.13.3 Metering monitoring / Strokes

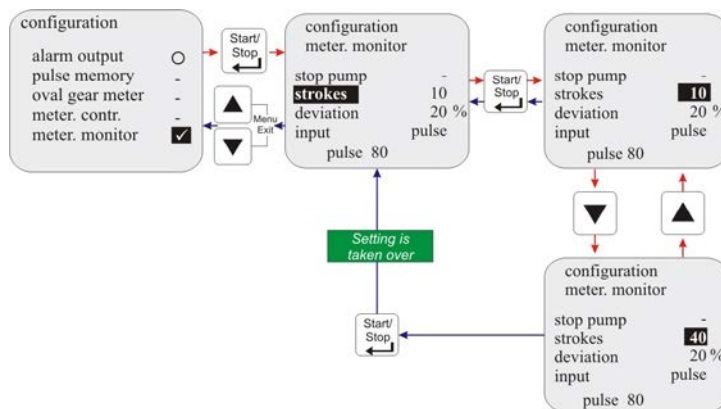


Fig. 10.36 Metering monitoring / Strokes

The “strokes” option indicates the stroke interval to be monitored.

Setting range: 0 – 100

Default setting = 10

10.3.13.4 Metering monitoring / Deviation (only at E60^{PLUS} & OGM or OGM^{PLUS})

A tolerance in % is set under “deviation”.

The actual incoming pulse rate recorded by the oval gear meter within the pump interval to be monitored (see chapter 10.3.13.3 “Configuration/Strokes”) is compared with the target pulse rate defined during calibration.

If this comparison results in a deviation that is greater than the % value configured under “deviation”, a “metering monitoring alarm” is triggered.



NOTE

This function can only be selected if a dongle box is connected and configuration/oval gear meter (see chapter 10.3.11) has been activated.

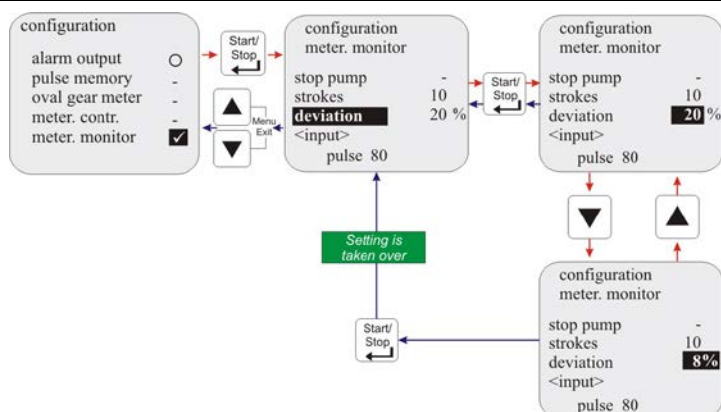


Fig. 10.37 Metering monitoring / Deviation (only at E60^{PLUS} & OGM or OGM^{PLUS})

Setting range: 0-100%

Default setting = 20 %

10.3.13.5 Metering monitoring / Input (only at E60 WITHOUT Dongle box)

The "Input" setting is used to determine which input (pulse input or metering lock) at plug II (or at plug V if a dongle-box is used) of the pump should be used to evaluate the incoming pulses from the metering monitoring unit.

The flow monitor connection depends on the selected input:

Input pulse: = plug II Pin 2+4 (or plug V) see chapter 7.2.3.5.
 Input metering lock: = plug II Pin 3+4 (or plug V)

NOTE This function can only be selected if no dongle box is connected.
 In this case, the original function (e.g. pulse input) can no longer be used.

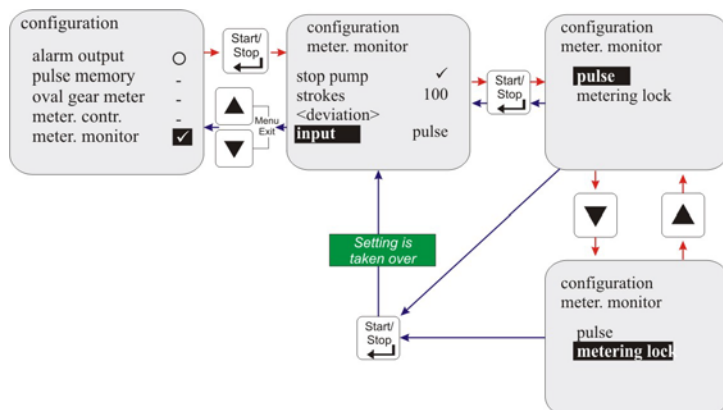


Fig. 10.38 Metering monitoring / Input
 (only at E60 WITHOUT dongle box)

10.3.13.6 Oval gear meter pulse display (only E60^{PLUS})

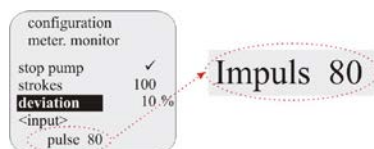


Fig. 10.39 Display of the oval gear meter pulse (only E60^{PLUS})

This display shows the number of pulses recorded during the last calibration process (running time during calibration = 1 min).

If the value shown is less than 60, metering monitoring using an oval gear meter is only possible to a limited extent.

10.3.14 Configuration / MicroFlow^{PLUS}

Micro Flow^{PLUS} is a system for monitoring the dosing rate. It consists of a flow rate sensor (Art. No. 288413, EBS No. 10005481), a connecting cable (Art. No. 284412, EBS No. on request) and an analysis box (Art. No. 248611, EBS No. on request). Once the **MicroFlow box** has been connected (see chapter 8.1) and is activated by switching the pump off and then on again, "E60+microflow" appears on the bottom left of the pump's display unit, and the menu option Dosage Monitoring is automatically replaced by the MicroFlow function with the appropriate sub-menu under Configuration in the Pump menu.

If the pump software recognises that there is a **MicroFlow box** connected, and the communication is then interrupted between the pump and the MicroFlow (through the removal of the **MicroFlow box**, for example), an error message is displayed (refer to chapter 12.2).

NOTE Please refer to the relevant operating instructions (Art. No. 417101314, EBS No. on request) when installing / commissioning the **MicroFlow^{PLUS}** dosage monitoring system.
 The standard settings saved for "Strokes", "Deviation", "Metering break" and "Metering delay" may only be viewed as defaults.
 Depending on the design of the system, the sensitivity of the MicroFlow system (for instance, type of chemicals, metering rate, cross-sections, line lengths...) must be adapted individually to the local conditions by modifying the parameters mentioned above.

10.3.14.1 Selecting

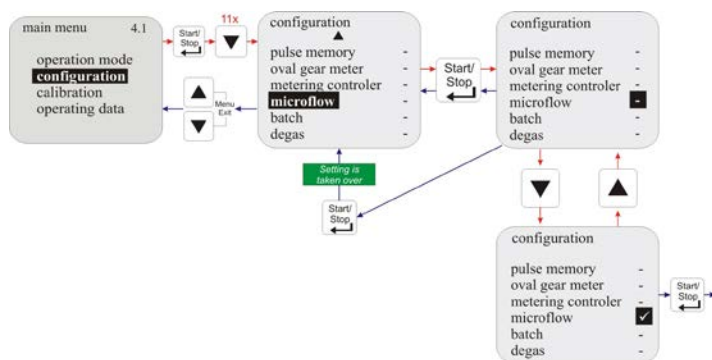


Fig. 10.40 Configuration MicroFlow^{PLUS}: Selecting

- MicroFlow^{PLUS} is inactive.
(Default setting)

✓ MicroFlow^{PLUS} is active.

On activating MicroFlow^{PLUS}, a submenu appears with the following menu items:

Menu item	see chapter
• Stop pump	10.3.14.2
• Strokes	10.3.14.3
• Deviation	10.3.14.4
• Metering break	10.3.14.5
• Metering delay	10.3.14.6
• Calibration	10.3.14.7

10.3.14.2 MicroFlow^{PLUS} / Stop pump

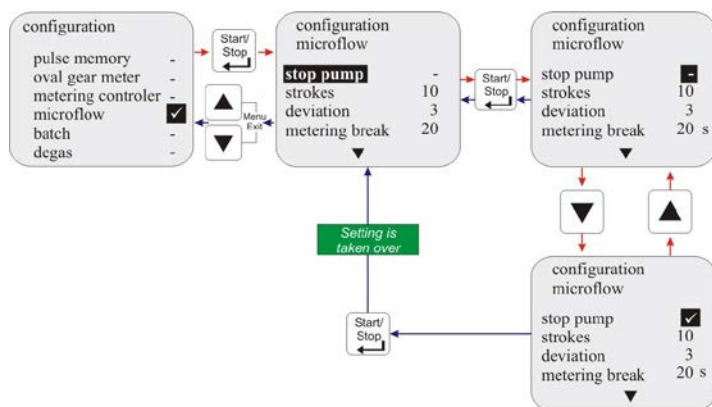


Fig. 10.41 Configuration MicroFlow^{PLUS} / Stop pump

The “stop pump” function is used to set whether or not the pump stops if a “metering monitoring alarm” is triggered.

- Pump is not stopped in the event of an „Alarm metering monitor function“
(Default setting)

✓ Pump is stopped in the event of an „Alarm metering monitor function“

10.3.14.3 MicroFlow^{PLUS} / Strokes

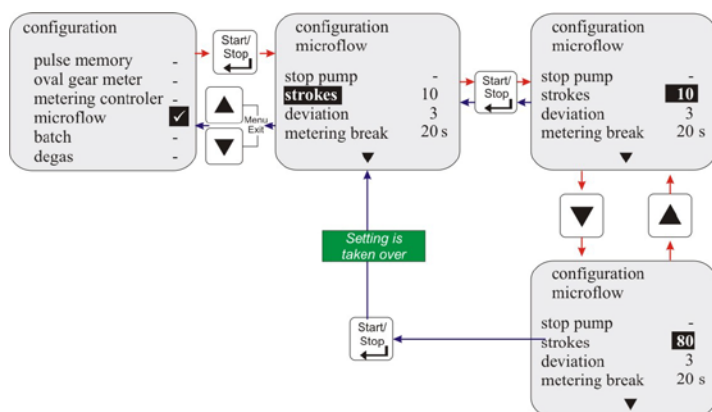


Fig. 10.42 Configuration MicroFlow^{PLUS} / Strokes

The “Strokes” option is used to specify the interval of strokes to be monitored.

Setting range: 0-100

Default setting = 10 strokes

10.3.14.4 MicroFlow^{PLUS} / Deviation

The "Deviation" option is used to specify the number of undetected strokes permitted during the stroke interval to be monitored (see chapter [10.3.14.3 "MicroFlow^{PLUS} / Strokes"](#)) before the metering monitoring function issues an alarm.

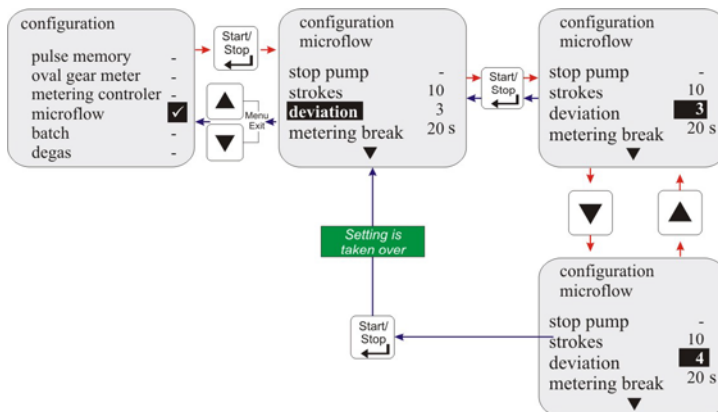


Fig. 10.43 Configuration MicroFlow^{PLUS} / Deviation

Example: Strokes 40, deviation 20

This example accepts 20 undetected strokes in an interval of 40 strokes. An alarm is issued if 21 strokes are undetected.

Setting range: 0-100

Default setting = 40

10.3.14.5 MicroFlow^{PLUS} / Metering break

When handling media with a tendency to emit gas, gas bubbles form in the system after extended downtimes, resulting in corrupted volume values of the quantity to be metered and subsequently to the non-detection of the metering strokes by the MicroFlow^{PLUS} and the issuance of an alarm.

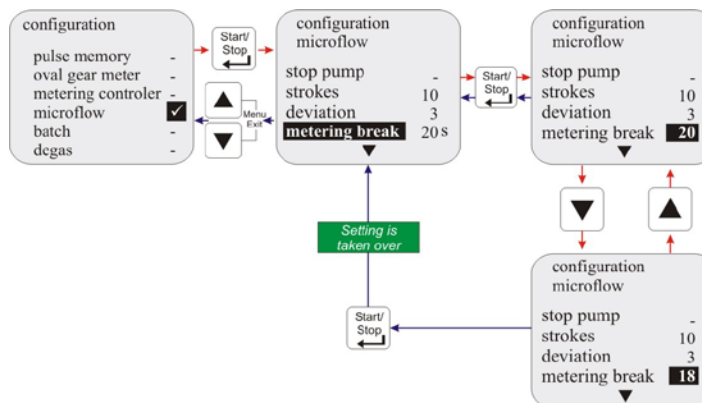


Fig. 10.44 Configuration MicroFlow^{PLUS} / Metering break

"Metering break" is used to set the period without metering after which the monitoring system is deactivated for a specific time (see chapter [10.3.14.6 "MicroFlow^{PLUS} / Metering delay"](#)) to prevent the undesired activation of the monitoring system.

Setting range: 2 - 3600s

Default setting = 240 sec.

10.3.14.6 MicroFlow^{PLUS} / Metering delay

Use the "Metering delay" option to specify the time during which the metering monitoring function is disabled when handling outgassing media to allow time for degassing the system. Once the metering pause time has expired, the "Metering delay" is activated as soon as the next metering is initiated (see chapter [10.3.14.5](#)).

Example: Metering pause = 240 s, metering delay = 40 s

This example has a metering pause of 20 seconds during which metering is stopped. The metering delay of 40 seconds is initiated with the next metering request during which the metering monitoring of the MicroFlow^{PLUS} is interrupted.

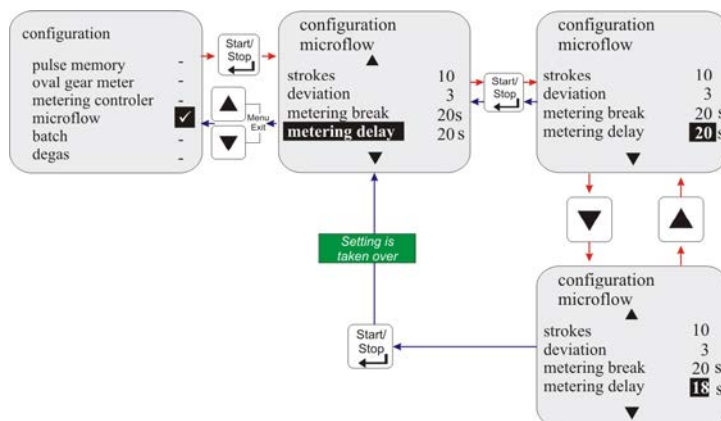


Fig. 10.45 Configuration MicroFlow^{PLUS} / Metering delay

Any gas bubbles can be removed from the system without triggering an alarm during this time.

Setting range: 2 - 3600s

Default setting = 40 sec.

10.3.14.7 MicroFlow^{PLUS} / Calibration

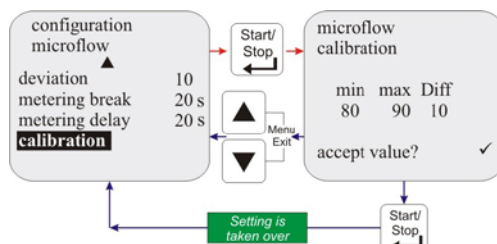
Use the "Calibration" option to newly calibrate the transducer during initial installation or when changing the product.



IMPORTANT

The pump must be running and the metering medium must flow through the transducers without any bubbles before starting the calibration process.

On activating the "calibration" function, the values for min. conductivity (electrical connection between the sensor pegs in the measuring sensor disrupted) and max. conductivity (electrical connection) are determined.



These values are then used to calculate and display a difference.

To monitor the system well, the difference should be greater than 3..4.

Fig. 10.46 Configuration MicroFlow^{PLUS} / Calibration

10.3.15 Configuration / Batch



NOTE

The pump must be calibrated before using batch metering (see chapter: [10.4](#) "Calibration").

When activating batch mode with a signal to the metering lock/pulse input (plug II) (or at plug VII if a dongle box is used) pin 2+4 (input pulse) or pin 3+4 (input metering lock), a previously defined quantity is metered with 100 % stroke frequency (assortment of inputs see chapter [10.3.15.3](#), electrical connection see chapter [7.2.3.4](#) and [8.2.3.1](#) "Installing the batch pulse").

The batch metering can be interrupted by deactivating the release (metering lock) or switching off the pump.

10.3.15.1 Selecting

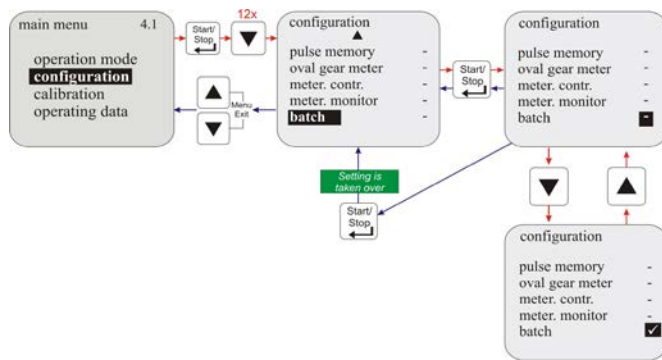


Fig. 10.47 Configuration / Batch: Selecting

- **Batch is inactive**
(Default setting)

✓ **Batch is active**

If batch metering is active, the following items appear in the submenu:

Menu item	see chapter
• Quantity	<u>10.3.15.2</u>
• Input	<u>10.3.15.3</u>

10.3.15.2 Batch / Quantity

“Quantity” is used to establish the desired metering quantity (in µl, ml, l or G) per batch metering process. Setting range: 0 – 99999

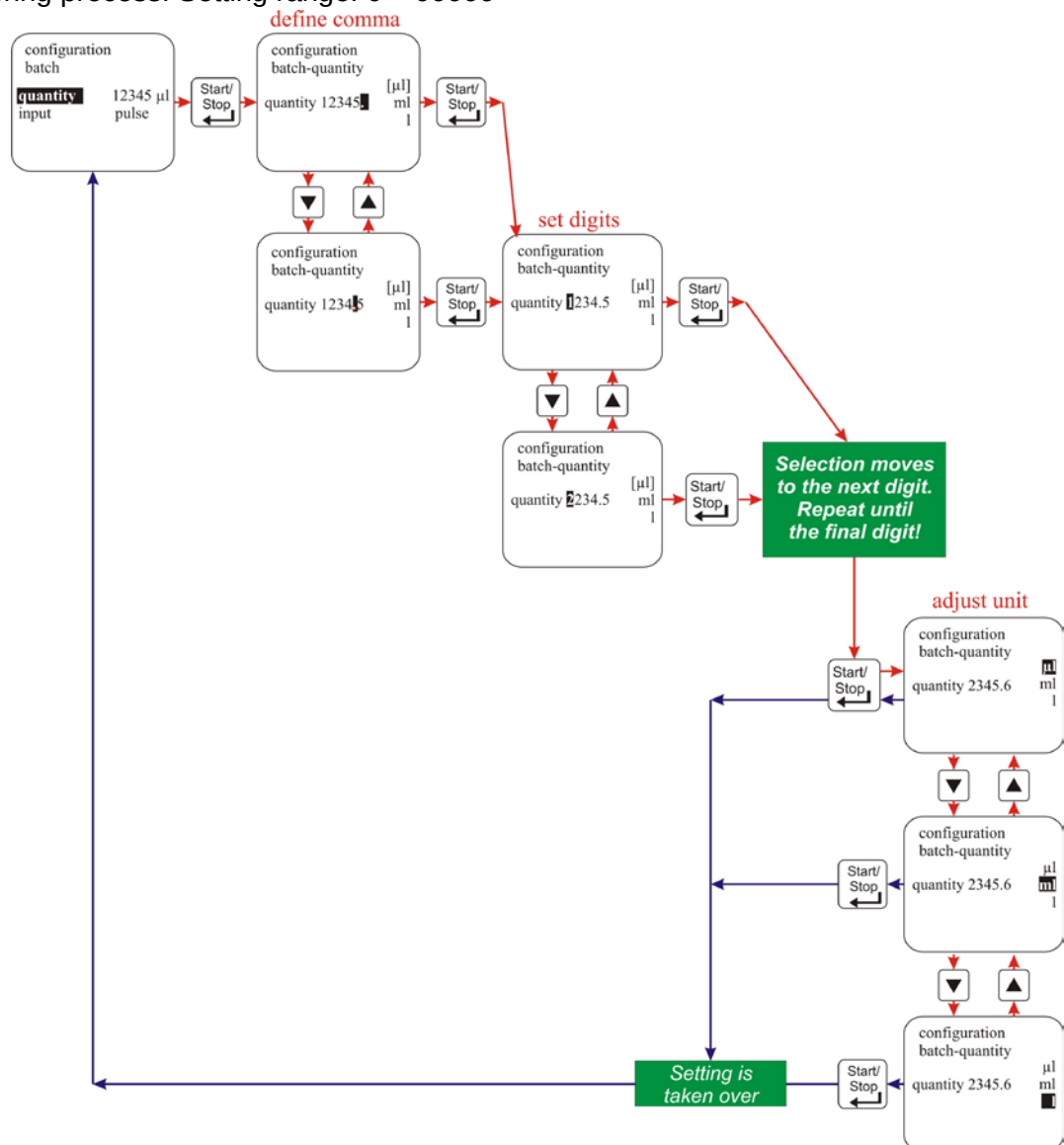


Fig. 10.48 Configuration Batch / Quantity

10.3.15.3 Batch / Input (only at E60 WITHOUT Dongle-box)

The “Input” setting is used to determine which input (pulse input or metering lock) at plug II (or at plug V if a dongle-box is used) of the pump should be used to evaluate the start pulse for the batch metering.

The start pulse cable connection depends on the selected input:

Input pulse = plug II (or plug VII) Pin 2+4 see chapter 7.2.3.4 “Installing the batch function” and 8.2.3.1 “Installing the batch pulse”.

Input metering lock = plug II (or plug VII) Pin 3+4

NOTE In this case, the original function (e.g. pulse) can no longer be used. When using a dongle box, a separate input is available.

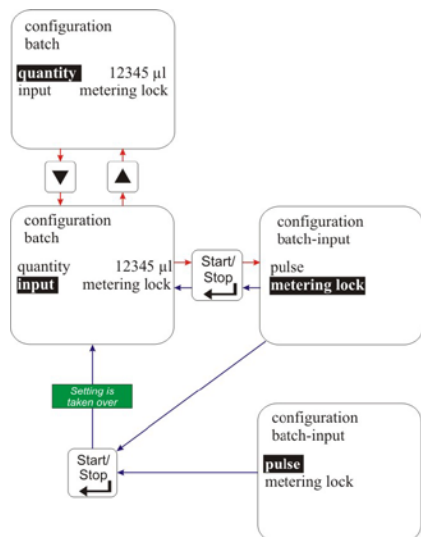


Fig. 10.49 Configuration Batch / Input (only at E60 WITHOUT Dongle-box)

Default setting = Metering lock

10.3.15.4 Display in the operating display



Pos	Description
1	Operation mode
2	Quantity remaining to be metered
3	Strokes remaining to be executed

Fig. 10.50 Configuration Display in the operating display

10.3.16 Configuration Degas^{PLUS}

On activating the “Degas^{PLUS}” function and connecting an appropriate degassing valve, this function enables the metering system to be degassed for a controlled time period. When installing/commissioning the degassing valve, please consult the appropriate operating instructions, art no. 417101377, EBS no on request.

10.3.16.1 Selecting

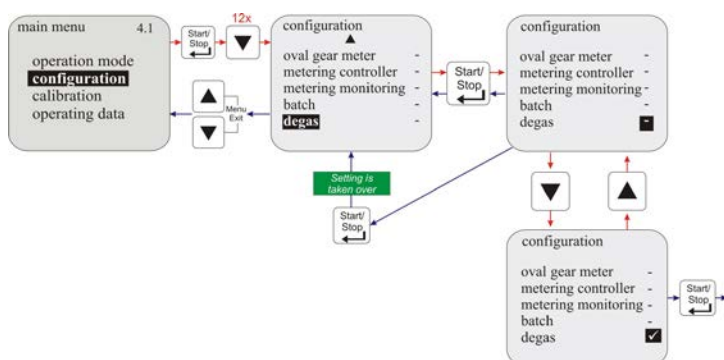


Fig. 10.51 Configuration Degas^{PLUS} Selecting

- “Degas^{PLUS}” is inactive
(Default setting)

✓ “Degas^{PLUS}” is active

If degassing control is active, the following items appear in the submenu:

Menu item	see chapter
• Degas strokes	10.3.16.2
• Degas break	10.3.16.3

10.3.16.2 Degas^{PLUS} / Degas strokes

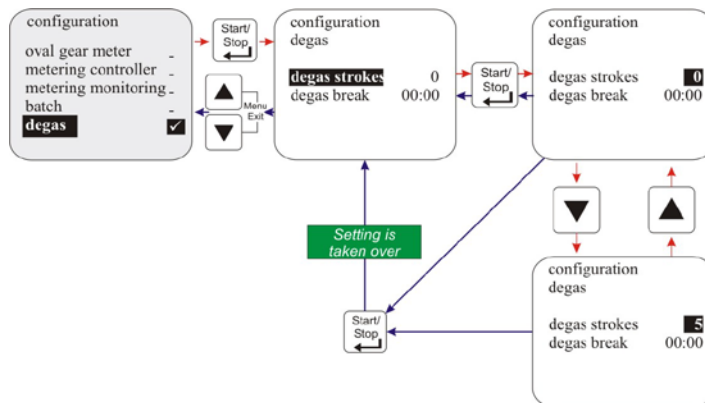


Fig. 10.52 Configuration Degas^{PLUS} / Degas strokes

The number of strokes that should be processed during a degassing interval is recorded under “degas strokes”.

Setting range: 1-100

Default setting = 0

10.3.16.3 Degas^{PLUS} / Degas break

The time between two degassing intervals is set under “degas break”.

If a metering request is submitted during this period, this is processed and the Degas^{PLUS} break time is reset and restarted.

Setting range:

hours	00 - 23
minutes	00 - 59
total	00.01 - 23.59h

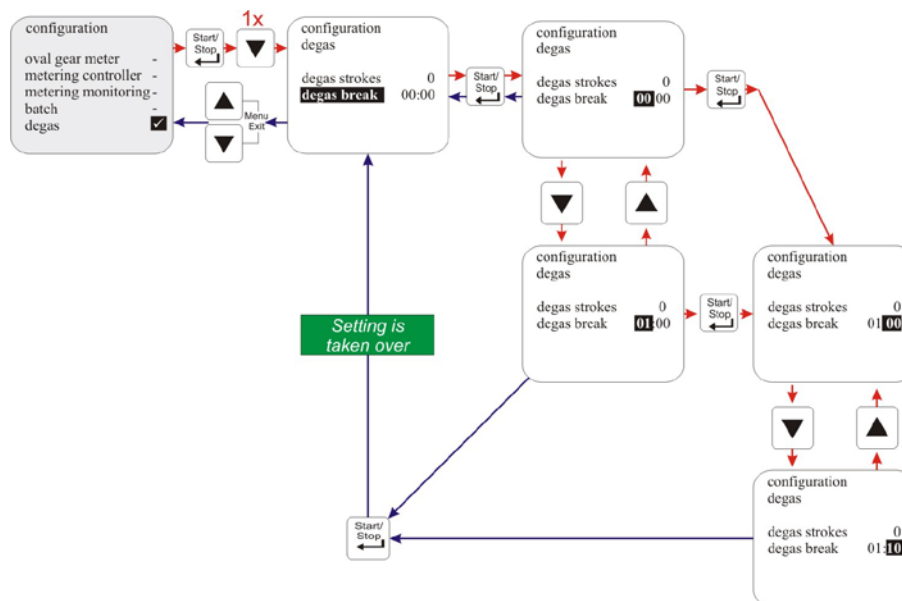


Fig. 10.53 Configuration Degas^{PLUS} / Degas break

Default setting = 00:00

10.4 Calibration

10.4.1 Overview

The procedure and display during the calibration process differ depending on whether or not an oval gear meter is connected.

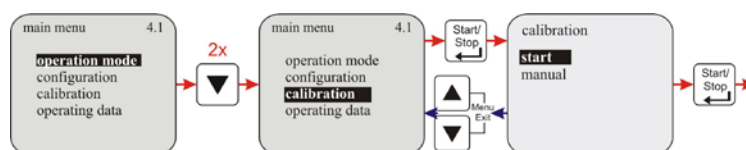


Fig. 10.54 Calibration Overview

Calibration pump:

- see chapter [10.4.2](#)

Calibration pump with oval gear meter:

- see chapter [10.4.3](#)

10.4.2 Calibration / pump

The specified metering capacities in metering pumps are always determined under ideal conditions (metering of water at 20 °C, short suction and metering pipes, rated back-pressure, no pressure-boosting valves in the metering line).

As these conditions never occur in practice, you are advised to calibrate the actual metering rate of the metering pump under prevailing local conditions.

10.4.2.1 Preparation

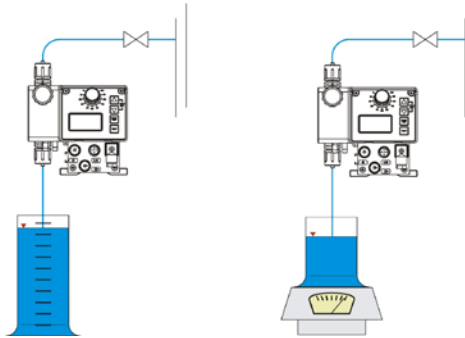


Fig. 10.55 Calibration / pump: Preparation

- ✘ Connect the pump ready for operation on pressure side (see chapter 7 “Installing the device”).
- ✘ Fill a suitable measuring cylinder and insert the suction line.



NOTE

The volume of the measuring cylinder should be 1/50 of the metering pump rate in litres/h. During this process, the suction line must not change its position. The calibration of the metering pump is only valid for the currently set stroke length setting. After changing the stroke length, the calibration must be performed again.

10.4.2.2 Calibration / Start

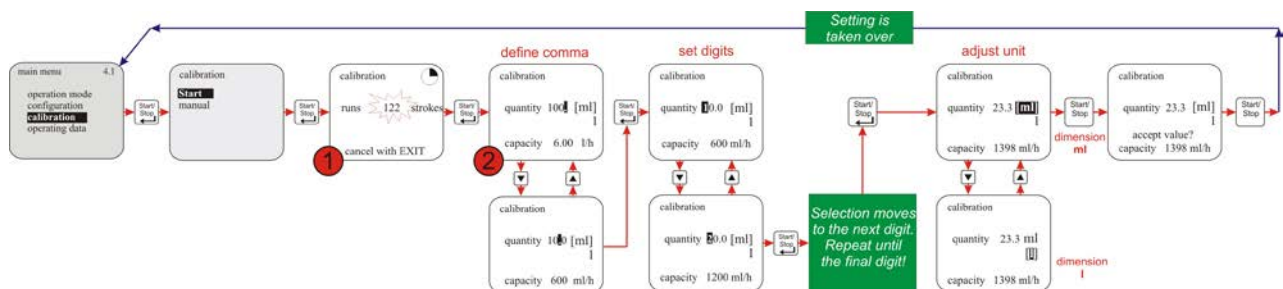


Fig. 10.56 Calibration / Start

- to 1:** The pump runs 122 strokes (ca. 1 min). The strokes are counted down from 122 to 0.



NOTE

By activating the 'Menu/Exit' function, the running calibration can be interrupted.

- to 2:** After the running process, the amount removed from the measuring cylinder (see chapter 10.4.2.1 “Preparation”) must be read off. This quantity is then entered as the calibration value (in ml or l).

10.4.3 Calibration / pump with oval gear meter (OGM^{PLUS})

If a dongle box and an oval gear meter are connected and the “oval gear meter” function (see chapter 10.3.11) is activated, the oval gear meter pulse rate recorded is automatically displayed at the end of the calibration process.

This is offset against the specified calibration value. A correlation thus occurs between the oval gear meter pulses and the metered quantity.

10.4.3.1 Preparation

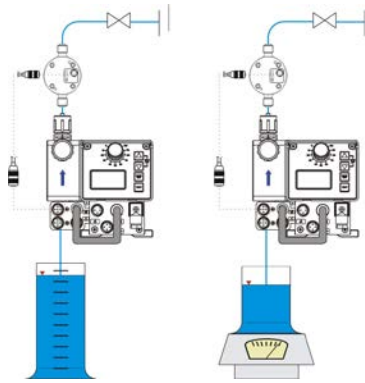


Fig. 10.57 Calibration /pump with oval gear meter (OGM^{PLUS}): Preparation

- ✘ Connect pump ready for operation on pressure side (see chapter [7](#) “Installing the device”).
- ✘ Fill a suitable measuring cylinder and insert the suction line.



NOTE

The volume of the measuring cylinder should be 1/50 of the metering pump rate in litres/h.
During this process, the suction line must not change its position.
The calibration of the metering pump is only valid for the currently set stroke length setting.
After changing the stroke length, the calibration must be performed again.

10.4.3.2 Calibration / Start

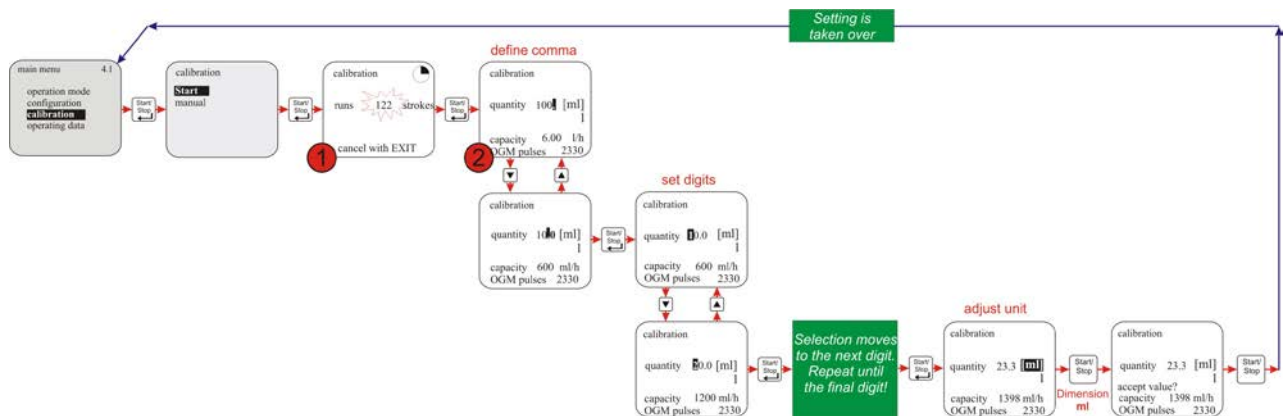


Fig. 10.58 Calibration / Start

to 1: The pump runs 122 strokes (ca. 1 min).
The strokes are counted down from 122 to 0.
The oval gear meter pulses (OGM pulses) are counted upwards from 0.



NOTE

By activating the 'Menu/Exit' function, the running calibration can be interrupted. If the OGM pulses are not displayed, check all the connections to the pump!

to 2: After the running process, the amount removed from the measuring cylinder (see chapter [10.4.2.1](#) "Preparation") must be read off.
This quantity is then entered as the calibration value (in ml or l).



Fig. 10.59 Calibration / Start: calibration process

During the calibration process, the oval gear pulses determined appear on the display.

10.5.1 Overview

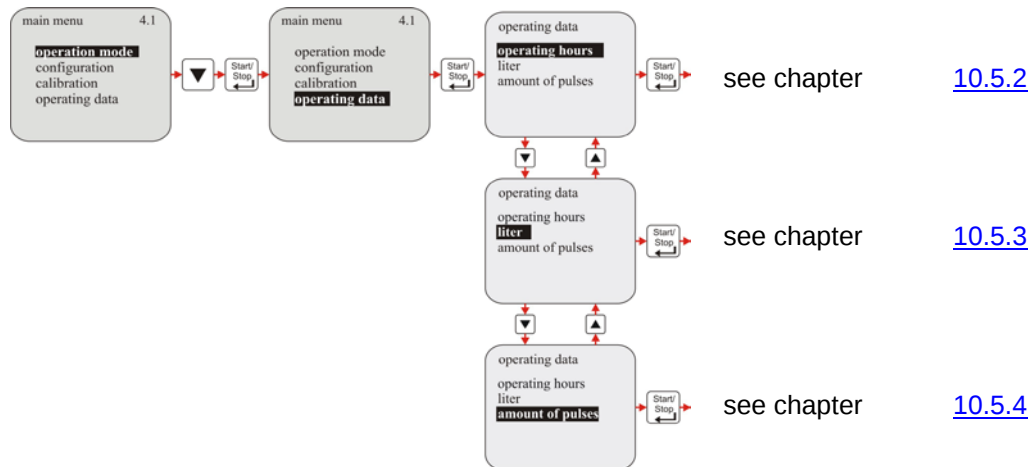


Fig. 10.62 Operating data: Overview

10.5.2 Operating data / Operating hours

The pump running time (number of strokes x 480 ms) is displayed since it was first commissioned or last reset.

10.5.2.1 Selecting / Displaying / Deleting

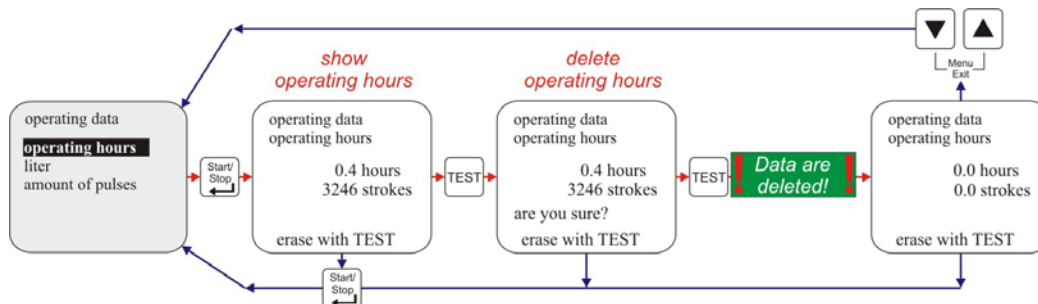


Fig. 10.63 Operating data / Operating hours: Selecting / Displaying / Deleting

10.5.3 Operating data / Litre

The metered quantity in litres since the pump was first commissioned or last reset is displayed. On operating the pump without an oval gear meter, this value is calculated (ml/stroke x number of metered strokes). If an oval gear meter is connected, the measured quantity is displayed (determined from the number of oval gear meter pulses).

10.5.3.1 Selecting / Displaying / Deleting

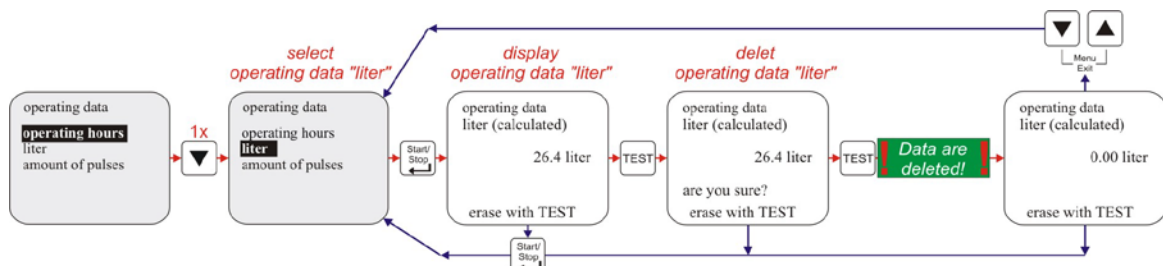


Fig. 10.64 Operating data / litre: Selecting / Displaying / Deleting

10.5.4 Operating data / Amount of pulses

The number of pulses received via the pump's pulse input (plus II pins 3+4, see chapter [7.2.3](#) "Plug II connection details") since it was first commissioned or last reset is displayed.

10.5.4.1 Selecting / Displaying / Deleting

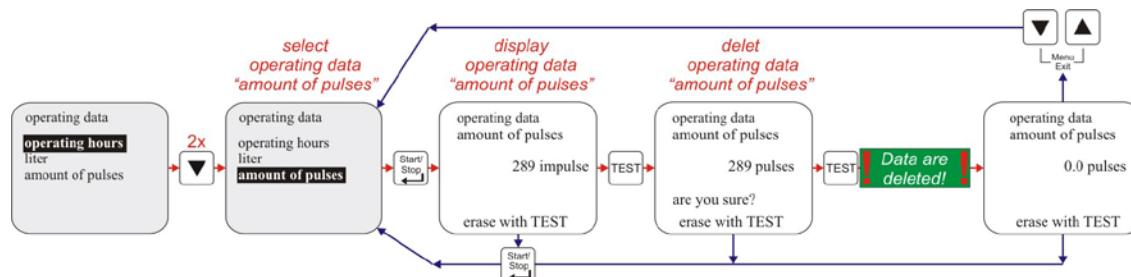


Fig. 10.65 Operating data / Amount of pulses: Selecting / Displaying / Deleting

11 Maintenance



CAUTION

Prior to repair and maintenance work and metering of dangerous media, always rinse the metering head, relieve the pressure pipe and wear protective clothing (protective goggles, gloves and apron).

Electronics repairs must only be performed by trained electricians, following the safety regulations of the professional association VB G 4 and ZH 1/11!



CAUTION

When opening the covers or removing parts, except when this is possible without tools, voltage-carrying parts may be exposed. Connection points may also be under live voltages.

Before calibration, maintenance, repairs or replacement of parts, the device must be disconnected from all voltage sources if it is necessary to open up the device.



NOTE

The maintenance interval is half-yearly. Shorter intervals are recommended in the event of heavy loads (e.g. continuous use).

The following inspections are recommended:

- ✘ suction pipes and pressure pipes for leak-free connections
- ✘ suction valve and pressure valve (chapter [11.1](#) "Replacing the suction / pressure valve and metering cartridges") for dirt and tightness.
- ✘ discharge connection (chapter [5.1](#) "EMPII E60") on the pump head (for diaphragm breakage).
- ✘ correct metering
- ✘ metering head screws (chapter [11.2](#) "Replacing the diaphragm and pump head") (stable seat, 3 - 4 Nm)



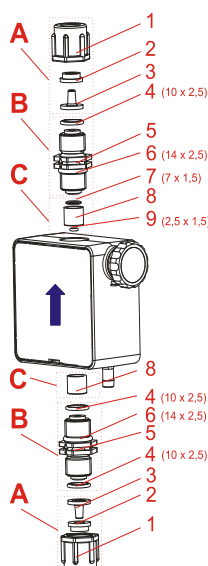
NOTE

The life of the diaphragm depends on the: backpressure, operating temperature and metering medium. It is recommended to inspect the diaphragm more frequently in extreme operating conditions or if abrasive substances are metered.

11.1 Replacing the suction / pressure valve and metering cartridges

- ✘ Disassemble the suction valve and pressure valve with a crescent wrench (SW 22).
- ✘ Assemble all the O-rings.
- ✘ Assemble the metering cartridges (on valve version V3).
- ✘ Screw in the suction valve and pressure valve in the correct position (torque of 2-3 Nm)

11.1.1 3 Ball-Valve (V3), 1,4 – 2,5 l/h for type: V3014 - V3025



Pos.	Designation
A	CONNECTION SET
	1 Union nut
	2 Clamping piece
B	3 Tapered part
	SUCTION-/PRESSURE VALVE
	4 O-Ring, Ø 10 x 2,5
C	5 Suction-/ Pressure valve
	6 O-Ring, Ø 14 x 2,5
	METERING CARTRIDGE V3
	7 O-Ring, Ø 7 x 1,5
	8 Metering cartridges
	9 O-Ring, Ø 2,5 x 1,5

Fig. 11.1 Maintenance: 3 Ball Valve (V3), 1,4 – 2,5 l/h for type: V3014 – V33025

11.1.2 2 Ball-Valves

1,4 – 11,2 l/h for type: 00014 - 00112

Pos.	Designation
CONNECTION SET	
1	Union nut
2	Clamping piece
3	Tapered part
SUCTION-/PRESSURE VALVE	
4	O-Ring, Ø 10 x 2,5
5	Suction-/Pressure valve
6	O-Ring, Ø 14 x 2,5
7	O-Ring, Ø 4,47 x 1,78

Fig. 11.3 Maintenance: 2 Ball Valve (V3), 1,4 – 11,2/l/h for type: 0014 – 00112

24 l/h for type: 00240

Pos.	Designation
CONNECTION SET	
1	Union nut
2	Clamping piece
3	Tapered part
PRESSURE VALVE	
4	O-Ring, Ø 12 x 2,5
5	Pressure valve
6	O-Ring, Ø 18 x 2,5
7	O-Ring, Ø 16 x 2,5
8	O-Ring, Ø 7,65 x 1,78
SUCTION VALVE	
4	O-Ring, Ø 12 x 2,5
5	Suction valve
6	O-Ring, Ø 18 x 2,5
7	O-Ring, Ø 16 x 2,5

Fig. 11.2 Maintenance: 2 Ball Valve, 24/l/h for type: 00240

11.1.3 Inserting the metering valves in the correct positions



On the suction valves and pressure valves, the flow direction is marked with an engraved arrow.

When inserting it, always ensure that the valves are inserted according to the flow direction!

Fig. 11.4 Inserting the metering valves in the correct positions

11.1.4 Changing the valve cartridges, type V3

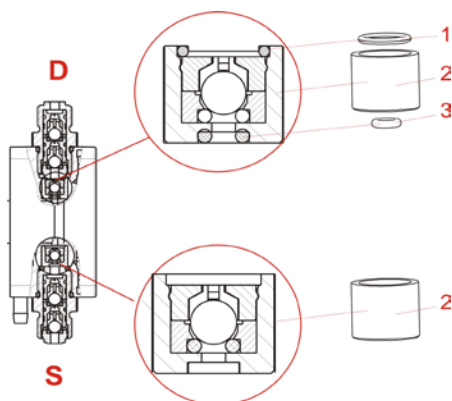


Fig. 11.5 Changing the valve cartridges, type V3

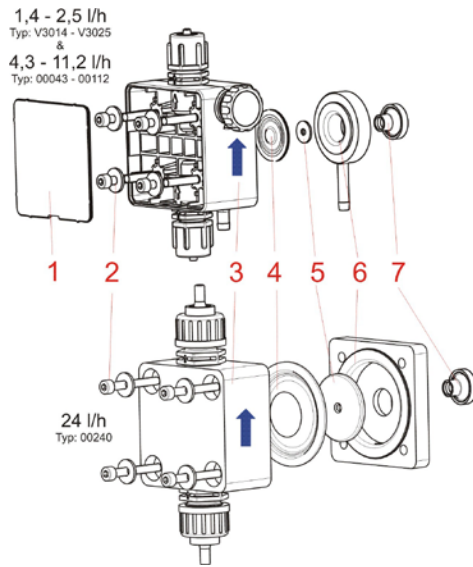
When replacing the V3 valve cartridges, ensure that they are inserted in the correct position.

The small O-ring (Pos. 3) must be inserted so that it points downwards (in the direction of the pump head)

Pos	Description
Upper valve cartridge consists of:	
1	Valve cartridge V3
2	O-Ring Ø 7 x 1,5
3	O-Ring Ø 2,5 x 1,5
P	Pressure side -> Pressure valve
S	Suction side -> Suction valve

The lower valve cartridge is inserted without O-rings. However, its location corresponds to the upper valve cartridge. Therefore, the groove must point in the direction of the pump head in which the large O-ring (Pos. 2) would fit.

11.2 Replacing the diaphragm and pump head



Pos:	Description
1	Cover plate
2	Metering head screws (4 x)
3	Pump head
4	Diaphragm
5	Supporting disk (not for 2.5 l/h)
6	Sandwich plate
7	Bellow

- ✘ Remove the cover plate (Pos. 1) on the metering head,
- ✘ Loosen the metering head screws (Pos. 2).
- ✘ Remove the pump head (Pos. 3).
- ✘ Unscrew the diaphragm (Pos. 4), sandwich plate (Pos. 6) and supporting disk (Pos. 5).
- ✘ Pull the bellows (Pos. 7) off the push rod.
- ✘ Insert the new bellows in the correct position (see illustration).

Fig. 11.6 Replacing the diaphragm and pump head

- ✘ Insert the sandwich plate in the correct position (see illustration).
- ✘ Slide the supporting disk in the correct position (curved side in the direction of the diaphragm) over the thread of the diaphragm.
- ✘ Insert the new diaphragm with the supporting disk.



WARNING Only screw in the diaphragm by hand. (Do not use a tool!)

- ✘ Turn the sandwich plate clockwise until the diaphragm breakage outlet points downwards
- ✘ Affix the pump head (observe the flow direction, see Fig. 11.6)
- ✘ Screw in the pump head screws by hand
- ✘ Tighten the pump head screws alternately on the right and left sides



NOTE Torque of the metering head screws = 3 - 4 Nm.

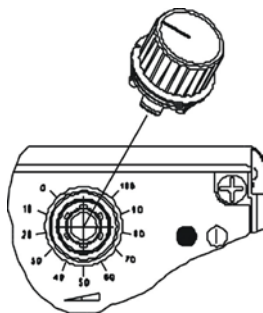


WARNING Check the torque of the metering head screws after 24 hours!

- ✘ Fit the cover plate to the pump head.

11.3 Aligning the mechanical stroke adjustment

The metering pump is set in the factory at the rated pressure in accordance with the metering curves. If the actual metering rate does not match the value shown on the % scale (for example, after pulling out the adjusting button and reinserting it elsewhere), the basic setting can be created as follows:



- ✘ Switch on the metering pump
- ✘ Set the button at 100 % and, with the pump in operation, rotate the adjusting screw clockwise until tension becomes apparent.
- ✘ If no resistance is achieved, pull the button out at the "0" setting and repeat process 2.
- ✘ Then pull the button out and reinsert the adjusting notch and marking at the "0" setting on the scale and set the required metering capacity.

Fig. 11.7 Maintenance: Aligning the mechanical stroke adjustment



NOTE The pump capacity has to be measured in order to determine the metering capacity accurately (see chapter 10.4 "Calibration").

12 Operating faults

12.1 Metering warning messages (display)

Display	Meaning	Effect	Cause	Remedy
	reserve report (flashing) Fig. 12.1 Operating faults: Metering warning messages (display): reserve report	pump continues running	low-level advance warning active	Refill the metering medium
	empty report Fig. 12.2 Operating faults: Metering warning messages (display): empty report	pump is stopped	empty report active	Refill the metering medium
	metering lock (only possible if this is configured) Fig. 12.3 Operating faults: Metering warning messages (display): metering lock	pump is stopped	no external enable of the pump	Activate external enable or deactivate the metering lock in the configuration menu. (see chapter 10.3.7)
	Indicator in operation mode 4..20mA flashes standard signal monitoring responds Fig. 12.4 Operating faults: Metering warning messages (display): indicator in operation mode	pump is stopped	standard signal is under 3mA or cable to standard signal connection is broken	check the standard signal or cable
	standard signal is above 23.0 mA Fig. 12.5 Operating faults: Metering warning messages (display): standard signal	pump runs in continuous operation	standard signal exceeds the display range	reduce the standard signal

12.2 Alarm messages (display)

 **NOTE** Appearing alarm messages can be quit by pressing the Start/Stop button.

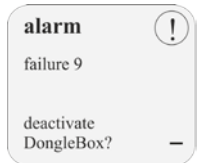
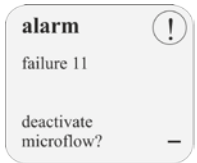
Display	Meaning	Effect	Cause	Remedy
failure 1 permanent stroke	Motor runs uncontrolled in continuous operation Fig. 12.6 Operating faults: Alarm messages (display) failure 1	over dosage	power electronic failure	replace PC-Board
failure 2 no stroke	Motor is not running despite of rotating dosing symbol. Fig. 12.7 Operating faults: Alarm messages (display) failure 2	no metering	backpressure too high valve closed at pressure side Motor overheated/damaged power electronic failure	reduce pressure open valve cool of the motor, or. change replace PC-board
failure 3 motor control	motor in continuous operation without request Fig. 12.8 Operating faults: Alarm messages (display) failure 3	continuous metering	optical sensor polluted PC-board fault Plug connection from gear to PC-Board interrupted	send in pump control optical sensor connection
failure 4 meter. monitor	error in evaluating the metering monitoring or oval gear meter Fig. 12.9 Operating faults: Alarm messages (display) failure 4	pump meters too little or too much	tube fault diaphragm fault backpressure too high or too low	check the tubes check the diaphragm check the backpressure
failure 9 DongleBox not found	The dongle box is not detected the next time the pump is switched on Fig. 12.10 Operating faults: Alarm messages (display) failure 9	Pump is being stopped	Connection between DongleBox and pump interrupted	Restore the connection or disable the dongle box in the software (see chapter 12.2.1)
failure 10 OGM PLUS not found	The OGM ^{PLUS} is not detected the next time the pump is switched on Fig. 12.11 Operating faults: Alarm messages (display) failure 10	Pump is being stopped	Connection between OGM PLUS and DongleBox interrupted	Restore the connection or disable the dongle box in the software (see chapter 12.2.1)
failure 11 microflow not found	The MicroFlow is not detected the next time the pump is switched on Fig. 12.12 Operating faults: Alarm messages (display) failure 11	Pump is being stopped	Connection between MicroFlow Box and pump interrupted	Restore the connection or disable the dongle box in the software (see chapter 12.2.1)
failure 12 Communication DongleBox	No communication between DongleBox and pump Fig. 12.13 Operating faults: Alarm messages (display) failure 12	Pump is being stopped	Transmission of data from the dongle box to the pump has been disrupted during operation	Check the connection and replace the dongle box if necessary
failure 13 Communication microflow	No communication between MicroFlow Box and pump Fig. 12.14 Operating faults: Alarm messages (display) failure 13	Pump is being stopped	Transmission of data from the MicroFlow to the pump has been disrupted during operation	Check the connection and replace the MicroFlow if necessary

12.2.1 Deactivating of Dongle Box, OGM^{PLUS}, MicroFlow^{PLUS} in the pump software

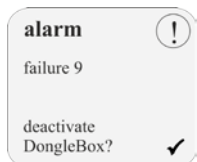
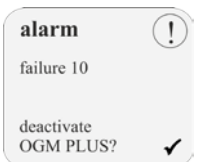
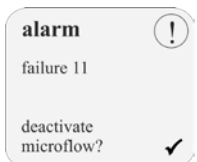
The following procedure is applied to re-disable a peripheral unit (dongle box, OGM^{PLUS}, MicroFlow^{PLUS}), which had previously been connected and has then been removed again, in the pump software.

✂ Cancel the alarm signal which appears by pressing the Start/Stop button.

The following appears in the display unit:

Dongle-Box	OGM ^{PLUS}	MicroFlow ^{PLUS}
 Fig. 12.15 Operating faults: Deactivating of DongleBox in the pump software 1	 Fig. 12.16 Operating faults: Deactivating of OGM^{PLUS} in the pump software 1	 Fig. 12.17 Operating faults: Deactivating of MicroFlow^{PLUS} in the pump software 1

✂ Deactivation can be selected by pressing the ▲ or ▼ button and the following is displayed

Dongle-Box	OGM ^{PLUS}	MicroFlow ^{PLUS}
 Fig. 12.18 Operating faults: Deactivating of DongleBox in the pump software 2	 Fig. 12.19 Operating faults: Deactivating of OGM^{PLUS} in the pump software 2	 Fig. 12.20 Operating faults: Deactivating of MicroFlow^{PLUS} in the pump software 2

✂ The setting is taken over through pressing the Start/Stop button

12.3 Trouble shooting

Fault	Possible cause	Remedy
metering pump does not work, no display indicator	mains power cable damaged	change mains power cable
	incorrect voltage	check mains voltage
pump has no suction despite venting and max. strokes	deposits, adhesions or drying-out of the valves	rinse the metering head through the suction line, if necessary remove and clean or replace the valves
metering head is leaky, medium escapes from the diaphragm breakage outlet	metering head is loose	screw in the metering head fastening screw diagonally
	diaphragm is torn	replace the diaphragm
low-level indicator  appears on the display despite a full container	float of the suction pipe is jammed	unjam the float
	suction pipe plug or strapping plug is loose or not plugged in	tighten the plug, clean the contacts, check whether the strapping plug is plugged in
	suction pipe cable is faulty	replace the empty report device



CAUTION

Prior to repair and maintenance work and metering of dangerous media, always rinse the metering head, relieve the pressure pipe and wear protective clothing (protective goggles, gloves and apron).

Electronics repairs must only be performed by trained electricians, following the safety regulations of the professional association VB G 4 and ZH 1/11)!



CAUTION

When opening the covers or removing parts, except when this is possible without tools, voltage-carrying parts may be exposed. Connection points may also be under live voltages.

Before calibration, maintenance, repairs or replacement of parts, the device must be disconnected from all voltage sources if it is necessary to open up the device.

13 Wearing parts and spare parts (standard version)



NOTE EBS numbers are displayed in brackets, see also chapter [1.1](#).

13.1 Exploded drawing / list of parts type V3014, V3025, 00043, 00048, 00072 and type 00112

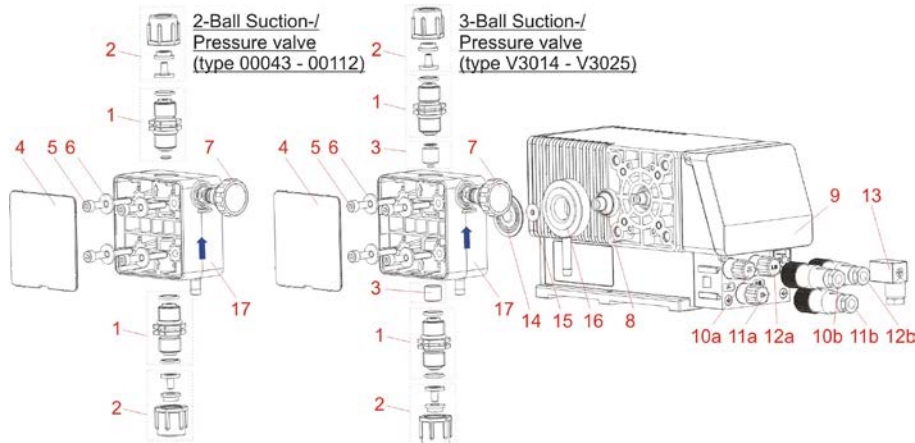


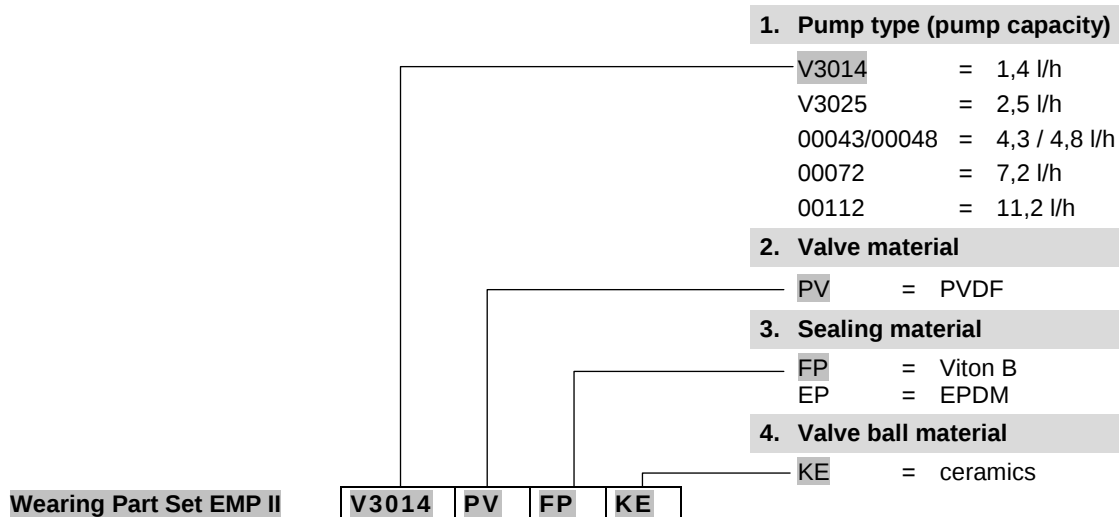
Fig. 13.1 Exploded drawing / list of parts, type V3014, V3025, 00043, 00048, 00072 and type 00112

Pos	Description	V3014	V3025	00043 00048	00072	00112
1	SDV PVFPKE 000 G 3/8 - G 3/8 - 99 Suction-/Pressure valve PVDF/FPM (Viton B)	248405 (10093149)				
	SDV PVEPKE 000 G 3/8 - G 3/8 – 99 Suction-/Pressure valve PVDF/EPDM	248406 (10079847)				
2	Connection set 3/8" PVDF for tube 4/6, 6/8, 6/12 mm	248491 (10002549)				
3	Valve cartridge, V3 FPKEPV	248432 (10039395)	--			
	Valve cartridge, V3 EPKEPV	248433 (on request)				
4	Cover plate /PK-PP	54000188 (on request)				
5	Socket head screw, M 5 x 40, DIN 912, V2A	413031026 (on request)				
6	Disk, B15 x 5.3 x 1.6, DIN9021, ISO7093, V2A	413501720 (10015901)				
7	Vent screw, PVDF/VITON B	243077 (10003132)				
	Vent screw, PVDF/EPDM	243091(on request)				
8	Bellow	34800132 (10003134)				
9	Printed clear cover	34800120 (10015884)				
10a	Dummy connector for empty report input	248186 (10017270)				
11a	Cap for empty report and stroke signal output	34800117 (10020189)				
12a	Dummy connector for pulse and standard signal input	248187 (10019520)				
10b	Plug for 4-terminal (3-terminal) empty report input	418463115 (10003013)				
11b	Plug for 4-terminal, special coding, empty report and stroke signal output	418463117 (10003311)				
12b	Plug for 5-terminal pulse and standard signal input	418463118 (10015224)				
13	Power cable EMP KKS/II E60 Schuko 2m	34860001 (on request)				
14	Diaphragm	34800134 (10015864)	34800155 (on request)	34800156 (10002610)	34800157 (10015863)	
	Diaphragm "higher pressure" (HP)	34800313 (on request)	34800314 (on request)	34800315 (on request)	--	
15	Support disk	34000158 (10015906)	--	34024302 (10003117)	34040110 (10004472)	34000158 (10015906)
16	Sandwich plate	34800133 (on request)	34800150 (10092952)	34800151 (10003064)	34800152 (10099359)	
17	Pump head PVDF	34800324 (on request)	34800325 (on request)	34020106 (10016018)	34020107 (10002560)	

13.2 Wearing part set types V3014, V3025, 00043, 00048, 00072 and type 00112 consisting of (each 1 x):

- Suction valve (pos. 1)
- Pressure valve (pos. 1)
- Connection set for hose 4/6, 6/8, 6/12 mm (pos. 2)
- Vent screw (pos. 7)
- Diaphragm (pos. 14)
- Support disk (excl. type V3025), (pos. 15)
- Bellow (pos. 8)

Description - Wearing Part Set EMP II	Article no.	EBS No.
V3014 PVFPKE	248452	(on request)
V3025 PVFPKE	248453	(on request)
00043/00048 PVFPKE	248478	10109191
00072 PVFPKE	248479	10019515
00112 PVFPKE	248480	10002548
V3014 PVEPKE	248458	(on request)
V3025 PVEPKE	248459	10004488
00043/00048 PVEPKE	248488	(on request)
00072 PVEPKE	248489	(on request)
00112 PVEPKE	248490	(on request)



13.3 Pump head – Service set “Higher pressure” (1.6 MPa / 16 bar) consisting of:

Pos.	Description
1	Suction/pressure valve SDV PVFPKE000 G3/8-G3/8-99
2	Connection set 3/8" PVDF für Schlauch 4/6, 6/8, 6/12 mm (nur für Saugseite)
7	Vent screw, PVDF/VITON B
8	Bellow
14	Diaphragm

Description (Service-set EMP II E60)	Article No.	EBS No.
00014 PVFPKE	(on request)	(on request)
00025 PVFPKE	(on request)	(on request)
00043 PVFPKE	(on request)	(on request)

13.4 Exploded drawing / list of parts, type 00240

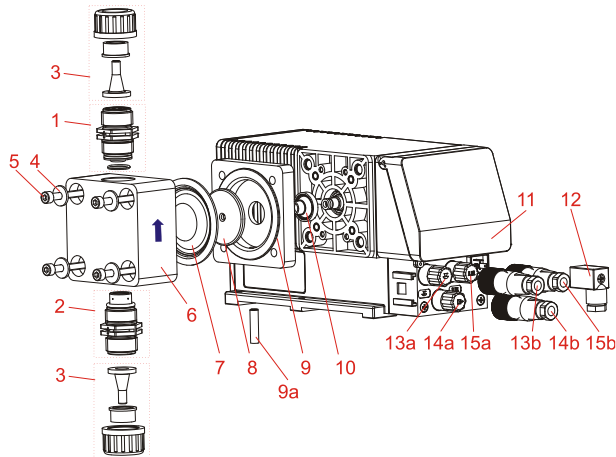


Fig. 13.2 Exploded drawing / list of parts, type 00240

Pos.	Description	Article no. (EBS No.)
1	Pressure valve PVDF/FPM (Viton B), DRV PVFPKE000 G 5/8 - G 5/8 - 99	249494 (10099740)
	Pressure valve PVDF/EPDM DRV PVEPKE000 G 5/8-G 5/8 - 99	249495 (on request)
2	Suction valve PVDF/FPM (Viton B), SAV PVFPKE000 G 5/8 - G 5/8 - 99	249474 (10005334)
	Suction valve PVDF/EPDM SAV PVEPKE000 G 5/8 - G 5/8 - 99	249475 (on request)
3	Connection set, PVDF, G 5/8 i - hose 6/12, 10/16	249216 (10016089)
4	Disc, B15 x 5.3 x 1.6 DIN9021 ISO7093 V2A	413501720 (10015901)

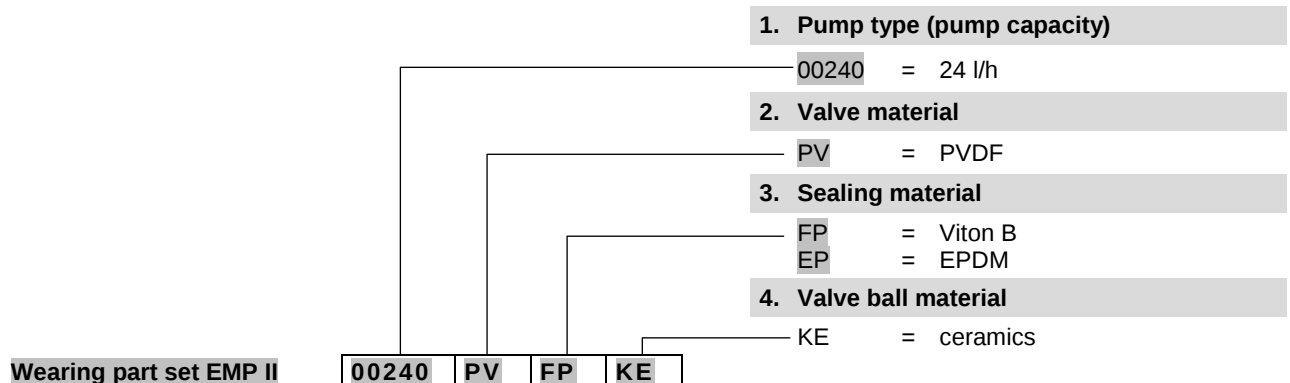
Pos.	Description	Article no.	EBS No.
5	Socket head screw, M5 X 50 DIN 912 V	413031027	(on request)
6	Pump head, 24 L/H PVDF	34500129	(on request)
7	Diaphragm	34500209	(on request)
8	Pressure disk	34500145	10079611
9	Sandwich plate	34500207	(on request)
9a	Pipe section	34004207	(on request)
10	Bellows	34800132	10003134
11	Printed clear cover	34800120	10015884
12	Power cable	34860001	(on request)
13a	Dummy connector for empty report input	248186	10017270
14a	Cap for empty report and stroke signal output	34800117	10020189
15a	Dummy connector for pulse and standard signal input	248187	10019520
13b	Plug for 4-terminal (3-terminal) empty report input	418463115	10003013
14b	Plug for 4-terminal, special coding, empty report and stroke signal output	418463117	10003311
15b	Plug for 5-terminal pulse and standard signal input	418463118	10015224

13.5 Wearing part set – type 00240

consisting of (each 1 x):

- Suction valve (Pos. **2**)
- Pressure Valve (Pos. **1**)
- Connection set for hose 4/6, 6/8, 6/12 mm (Pos. **3**)
- Diaphragm (Pos. **7**)
- Support disk (Pos. **8**)
- Bellow (Pos. **10**)

Description - Wearing Part Set EMP II	Article no.	EBS-No.
00240 PVFPKE	248454	(on request)
00240 PVEPKE	248460	(on request)



14 Technical Specifications

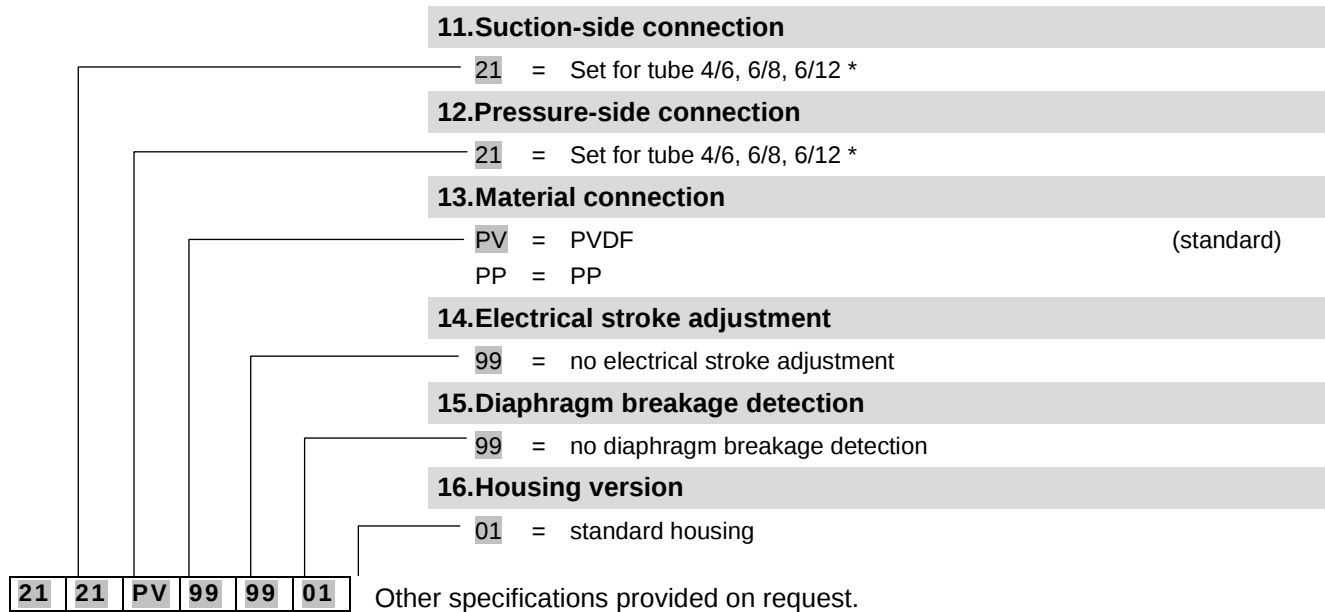
14.1 Pump keys

14.1.1 Pump key 1

										1. Electrical version
										E 60 = (explanation, see chapter 14.1.3)
										2. Pump output 50 Hz (60 Hz)
										V3014 = 1.4 l/h (1.7 l/h)
										V3025 = 2.5 l/h (3.0 l/h)
										00048 = 4.8 l/h (5.7 l/h)
										00043 = 4.3 l/h (5.1 l/h)
										00072 = 7.2 l/h (8.6 l/h)
										00112 = 11.2 l/h (13 l/h)
										00240 = 24 l/h (29 l/h)
										<u>special version: high pressure:</u>
										V3014 = 1.6 MPa (16 bars) = 1,2 l/h (1,4 l/h)
										V3025 = 1.6 MPa (16 bars) = 2,1 l/h (2,5 l/h)
										00043 = 1.6 MPa (16 bars) = 3,7 l/h (4,4 l/h)
										3. Pump head material
										PV = PVDF (Standard)
										PP = PP
										VA = V4A
										4. Metering backpressure (not freely selectable)
										02 = 0.2 MPa (2 bars) (for 24 l/h) (1.6 bar)
										04 = 0.4 MPa (4 bars) (for 4.8 l/h) (3.2 bar)
										05 = 0.5 MPa (5 bars) (for 11.2 l/h) (4 bar)
										06 = 0.6 MPa (6 bars) (for 7.2 l/h) (4,8 bar)]
										10 = 1 MPa (10 bars) (for 1.4 / 2.5 / 4.3 / 7.2 l/h) (8 bar)
										<u>special version: high pressure:</u>
										16 = 16 bar (12,8 bar)
										5. Gasket material
										FP = Viton B (Standard)
										EP = EPDM
										KA = Kalrez
										6. Ball material
										KE = Ceramic (Standard)
										VA = V4A (stainless steel)
										PT = Teflon
										7. Valve material
										PV = PVDF (Standard)
										PP = PP
										VA = V4A (stainless steel)
										8. Valve spring
										99 = without spring (Standard)
										02 = SAV without spring; DRV simply spring-loaded (0.3 bars)
										9. Mains power supply
										17 = Mains power cable 2 m appliance and grounding type plug (E60, 230 V) (standard)
										21 = Mains power cable 3 m appliance plug and cable end sleeves (E60, 115 V)
										10. Voltage/frequency
										01 = 115V / 50 Hz
										02 = 115V / 60 Hz
										03 = 230V / 50 Hz (Standard)
										04 = 230V / 60 Hz
										07 = 24 V / 50 Hz

Other specifications provided on request!

14.1.2 Pump key 2



Example of the complete pump key for a standard pump:

E60	V3025	PV	10	FP	KE	PV	99	01	03	-	21	21	PV	99	99	01
(Pump key 1)											(Pump key 2)					

14.1.3 Pump key definition

1. Electrical version

E 60

- On/Off switch for switching the pump
- mechanical stroke adjustment
- backlit graphical display, 4 control keys
- individual stroke control (each stroke is executed completely)
- metering control via stroke signal output (computed)
or via external metering monitoring system
- collection of operating and consumption data (computed)
- calibration function

configurable operation modes:

Internal operation

Setting of metering quantity/metering frequency in:

- Strokes/min.
- Percentage
- Litres/hr (or gallons/hr)

External operation

- Pulse operation (control via pulses)
 - Pulse multiplication (1 incoming pulse = n metering strokes)
 - Pulse division (n incoming pulses = 1 metering stroke)
- Standard signal operation (control via external standard signal 0/4 - 20 mA or 20 - 0/4 mA)
- Batch operation (a preset quantity is metered after being triggered by external enable pulse)

Inputs:

- low-level monitoring of bundle holder (reserve and empty report)
- pulse
- standard signal
- enabling signal (metering lock)
- metering monitoring

Outputs:

- low-level monitoring of bundle holder / fault (reserve and empty report)
- Fault report
- stroke signal

E 60^{PLUS}

- *similar to E 60*, but with the addition of a **dongle box** for connecting of oval gear meter **OGM^{PLUS}** (expansion unit for the capture of operating data)
- display of the currently measured metering quantity and automatic readjustment of pump output (only in conjunction with an external through flow monitoring system, e.g. oval gear meter **OGM^{PLUS}**)
- automatic calibration function via oval gear meter
- consumption data monitoring via oval gear meter

14.2 Dimensions

14.2.1 Type V3014, V3025, 00043, 00048, 00072 and type 00112

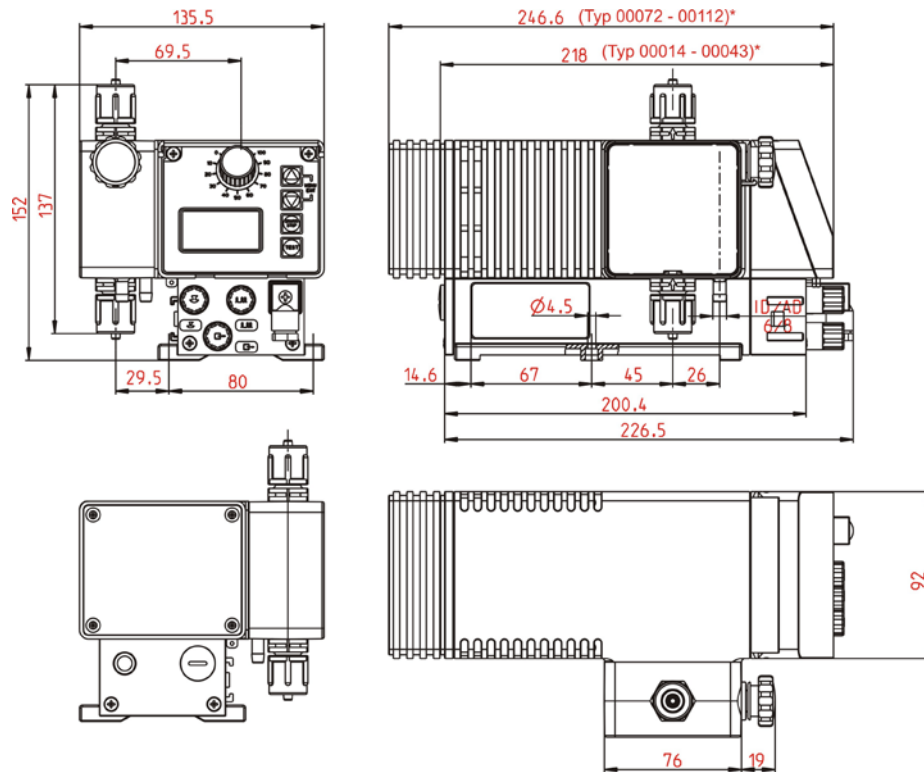


Fig. 14.1 type V3014, V3025, 00043, 00048, 00072 and type 00112

- * linear dimension at type 00072 and 00112 with conventional synchronous motor as shown in figure 14.1 (246,6 mm).
linear dimension at type 00072 and 00112 with BLDC-Motor (visible at the voltage indication 100-240V at identification plate) identical with types 00014 up to 00043 (218 mm).

14.2.2 Type 00240

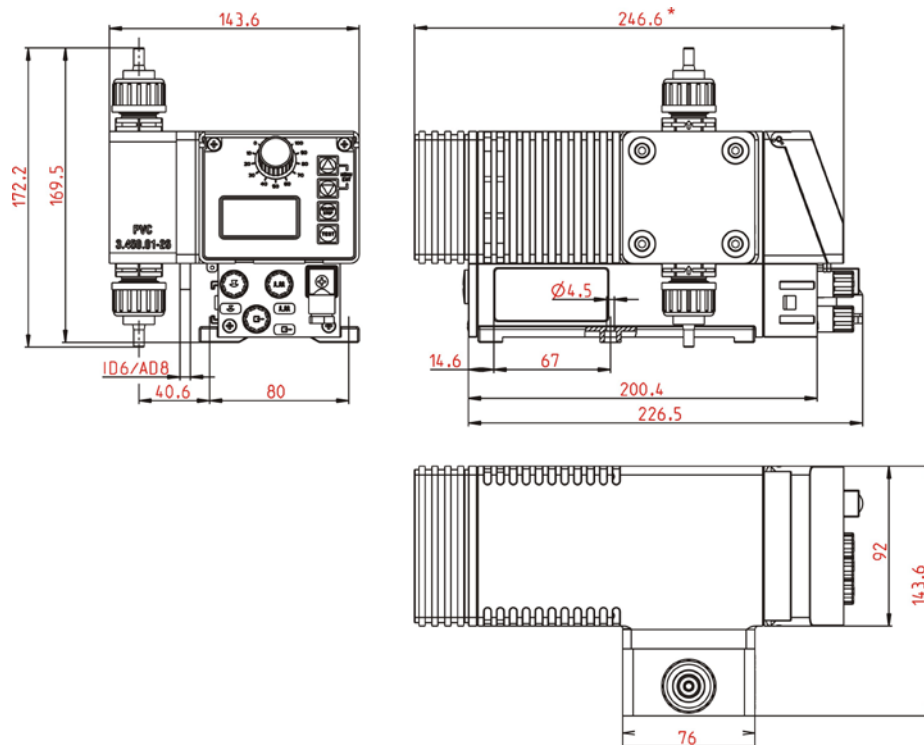


Fig. 14.2 type 00240

- * linear dimension at type 00240 with conventional synchronous motor as shown in figure 14.2 (246,6 mm).
linear dimension at type 00240 with BLDC-Motor (visible at the voltage indication 100-240V at identification plate) identical with types 00014 up to 00043 (218 mm).

14.3 Technical specifications "Overview tables"

Description	Pump type							
	V3014	V3025	00048	00043	00072 0,6 MPa	1 MPa	00112	00240
Supply voltage	230 V / 50/60 Hz ± 10 % (special voltages on request)							
max. current input	115V 50/60 Hz 230V 50/60 Hz	0.12 A 0.06 A		0.20 A 0.21 A	0.09 A	0.29 / 0.33 A (0.7 A)* 0.14 / 0.16 A (0.7 A)*		
Motor Power	115/230V 50/60 Hz	10.4 / 11.5 W		18.7 W	19.8 W	30 / 34.5 W (25 W)*		
Fuse rating	115 V 230 V	315 mA (1A)*						
Type of protection	IP 65							
Breaking capacity at circuit with 24 V	Empty report output: 24 V 3 A AC/DC stroke signal output: 24 V 0.3 A DC							
Breaking capacity at circuit with 230 V	Empty report output: 230 V / 3 A AC/DC stroke signal output: connection according to VDE is not permitted							

* The values at brackets refer to types 00072, 00112, 00240 with BLDC- Motor
(visible at the voltage indication 100- 240V at identification plate)

14.3.1 General data - Standard pumps

Description	Pump type						
	V3014	V3025	00048	00043	00072 0,6 MPa	1 MPa	00112 00240
Pump output [l/h]* / **	1.4	2.5	4.8	4.3	7.2	11.2	24
max. metering backpressure [MPa (bar)]**	0.1 (10)	0.4 (4)	1 (10)	0.6 (6)	1 (10)	0.5 (5)	0.2 (2)
Number of strokes [1/min] at 50 Hz	122						
Metering quantity/stroke [ml] 50 Hz/60 Hz	0.19	0.34	0.65	0.57	0.98	1.5	3.28
Metering accuracy [see chapter 14.4]	< $\pm$ 3%						
max. conveyable viscosity [mPas]	200						
Permitted ambient temperature	5-40°C						
Suction height [mWs] at 100 % stroke***	2						
max. pre-pressure suction sided [MPa (bar)]	0.08 (0.8)				0.05 (0.5)	0.02 (0.2)	
Noise level [DBA] at 1 m distance (acc. to DIN EN 12639/ EN ISO 9614-2)	54						
Recommended minimum diameter of suction/pressure connector [ID mm]	4				6		
Weight [kg]	2		2.4		3.1	3.3	

* All data relate to water at 20 °C

** At mains power frequency of 60 Hz, the delivery capacity increases by 20%, while metering backpressure decreases by 20%.

*** Suction heights with clean, moistened valves at 100% metering stroke and max. stroke frequency

14.3.2 Deviant general data - Pumps in the "Higher Pressures (HP)" version

Description	Pump type		
	V3014	V3025	00043
Pump output [l/h]*	1.2	2	4
max. metering backpressure [MPa (bar)]	1.6 (16)		
Metering quantity/stroke [cm ³]	0.16	0.27	0.55

* all data relate to water at 20 °C

14.3.3 Materials

Pump head:	PVDF, optionally PP, stainless steel 1.4571
Diaphragm:	PTFE-EPDM composite diaphragm
Seals:	FPM (Viton B), optionally EPDM, Kalrez
Valves:	PVDF, optionally PP or stainless steel 1.4571
Ball valves:	Ceramic, optionally stainless steel 1.4401, PTFE
Housing:	thermoplastic polyester
Colour:	Blue RAL 5007

Special versions available on request.

14.3.4 In-/ and output circuit

14.3.4.1 Connector I

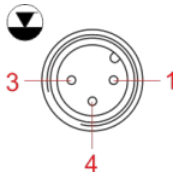


Fig. 14.3 Connector I

input	allocation	external circuit
empty report	1 (brown) +	voltage-free contact Warning: do not connect any external voltages!
reserve	4 (black) 3 (blue) +	
	4 (black)	

14.3.4.2 Connector II

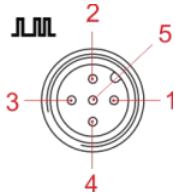


Fig. 14.4 Connector II

input	allocation	external circuit	declaration of value
pulse	2 (white) +	voltage-free contact Note: do not connect any external voltages!	minimum power-on and power-off time 15 ms
metering lock/ batch/ metering monitoring	4 (black) 3 (blue) +		
	4 (black)		
standard signal	5 (grey) +	external current Note: Observe polarity of the connected signal!	0/4-20 mA, load approx. 50 ohm
	4 (black)		
output	allocation	external circuit	declaration of value
external power supply	1 (brown) +	voltage-free contact Note: do not connect any external voltages!	Power supply for ext. devices Outputs: 5VDC; max. 50mA
	4 (black)		

14.3.4.3 Connector III

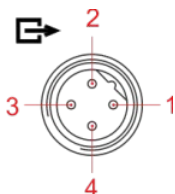


Fig. 14.5 Connector III

output	allocation	external circuit	declaration of value
empty/reserve/ fault report	1 (brown) +	external current	max. external volt. 230 VAC/DC max. 3 A <u>with reserve report:</u> contact approx. 500 ms closed contact approx. 500 ms opened
	2 (white)		
stroke signal	3 (blue) +	external current Note: Observe the polarity of the connected signal!	max. external voltage 24 V DC, max 0,3 A when stationary: Contact open at 50 Hz mains power: <u>at 100 % run:</u> contact approx. 310 ms closed contact approx. 180 ms opened <u>at 50 % run:</u> contact approx. 310 ms closed contact approx. 660 ms opened at 60 Hz mains power: <u>at 100 % run:</u> contact approx. 260 ms closed contact approx. 150 ms opened <u>at 50 % run:</u> contact approx. 260 ms closed contact approx. 550 ms opened
	4 (black)		

14.3.5 Connector assignments

14.3.5.1 Pin assignment / conductor coloring Connector I (3-terminal)

Connector for low-level advance warning or empty report

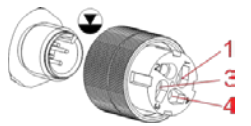


Fig. 14.6 Connector I (3-terminal)

Pos.	Conductor coloring (cable connection)	Assignment
1	brown	low-level advance warning
3	blue	empty report
4	black	GND

see also chapter: [7.2.2](#) „Connector assignments of Slot I (3-terminal)“



WARNING

In the event that the empty report is not used, contact 3/4 must always be bridged! The protective cap provided for this (see chapter [7.2.1](#)) creates the bridge between the contacts and must be attached in this case.



NOTE

The empty and reserve report input can be inverted in the "Configuration / Low-level contact" menu. (see chapter [10.3.8](#))

14.3.5.2 Pin assignment / conductor coloring Connector II (5-terminal)

Connector for pulse / standard signal input and metering lock

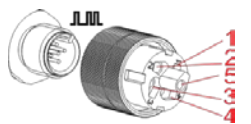


Fig. 14.7 Connector II (5-terminal)

Pos.	Conductor coloring (cable connection)	Assignment
1	brown	Output 5 V, DC
2	white	Pulse input
3	blue	Input metering lock
4	black	GND
5	grey	Input standard signal 0/4 ... 20 mA

see also chapter [7.2.3](#) "Connector assignment of slot II (5-terminal)"



NOTE

The metering lock input is only active if it has been previously set in "Configuration / metering lock" menu. (see chapter [10.3.7](#)) The batch function (see chapter [10.3.15](#)) and metering monitoring (see chapter [10.3.13](#)) must also be configured.

14.3.5.3 Pin assignment / conductor coloring Connector III (4-terminal)

Connector for empty report, fault and stroke signal output:

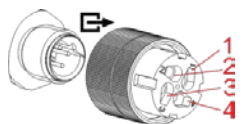


Fig. 14.8 Connector III (4-terminal)

Pos.	Conductor coloring (cable connection)	Assignment
1	brown	Output low level warning, empty report, fault (+)
2	white	Output low level warning, empty report, fault (-)
3	blue	Output stroke signal (+)
4	black	Output stroke signal (-)

see also chapter [7.2.4](#) "Connector assignments of slot III (4-terminal)"



WARNING

At 115V/230 V, a simultaneous connection of contact 1+2 (alarm output) and 3+4 (stroke signal output) is generally not permitted.

14.4 Metering rates

The reproducible metering accuracy is approx. $\pm 3\%$ at a minimum 30 % stroke length under invariable conditions. Due to the characteristics of the pump, higher output can be produced until the operating temperature is reached.

Accurate metering can be achieved by observing the following points:

- All metering output data refer to measurements with water at 20 °C as well as a constant supply voltage and a warmed-up operating condition of the metering pump.
- If there is pre-pressure on the suction side, the pressure difference between the suction and the pressure sides must be at least 0.1 MPa (1 bar). The water column on the metering pump must be protected by an appropriate valve arrangement.



NOTE

A pressure control valve or a metering valve is not an absolutely hermetically sealing shutoff device.



WARNING

Metering stroke adjustment may only be performed with the pump running if the stroke adjusting screw is released.

14.5 Delivery capacity depending on the backpressure and stroke setting

Setting accuracy + 15 % - 5 % of the nominal value; all data relate to water at 20 °C and comply with the notes in the operating instructions.

14.5.1 Delivery capacity type V3014 / 1 MPa (10 bar)

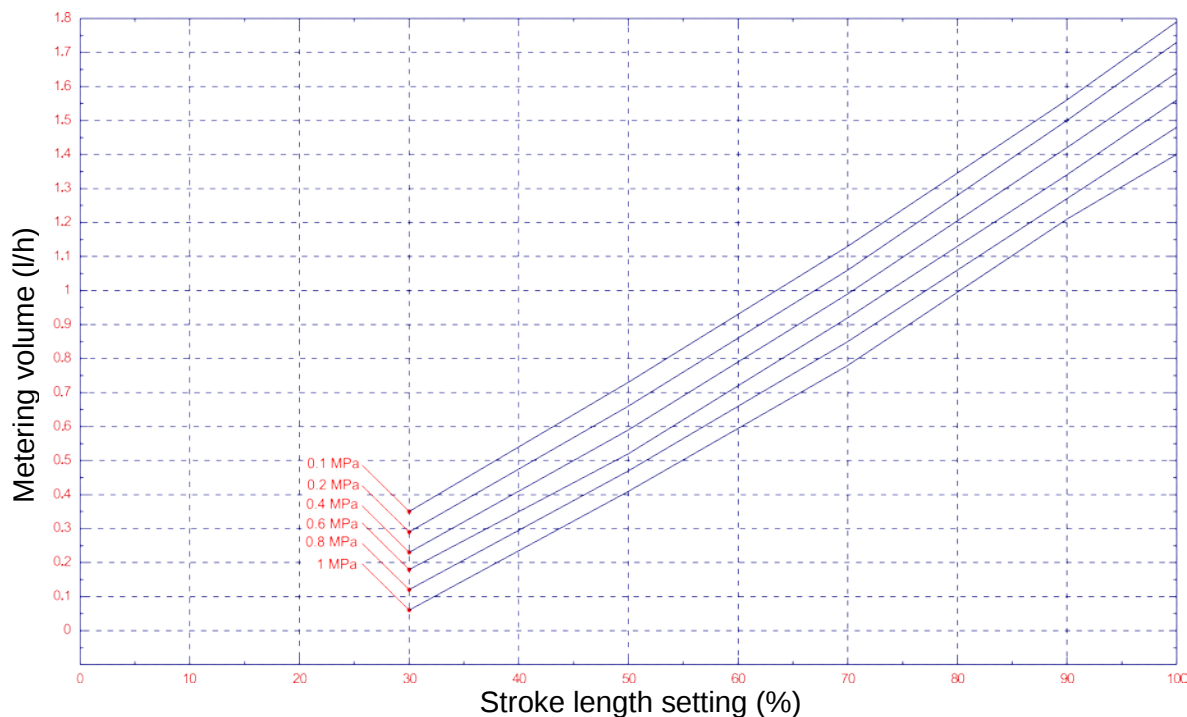


Fig. 14.9 Delivery capacity type V3014 / 1 MPa (10 bar)

14.5.2 Delivery capacity type V3014 / 1,6 MPa (16 bar) (special version: higher pressures)

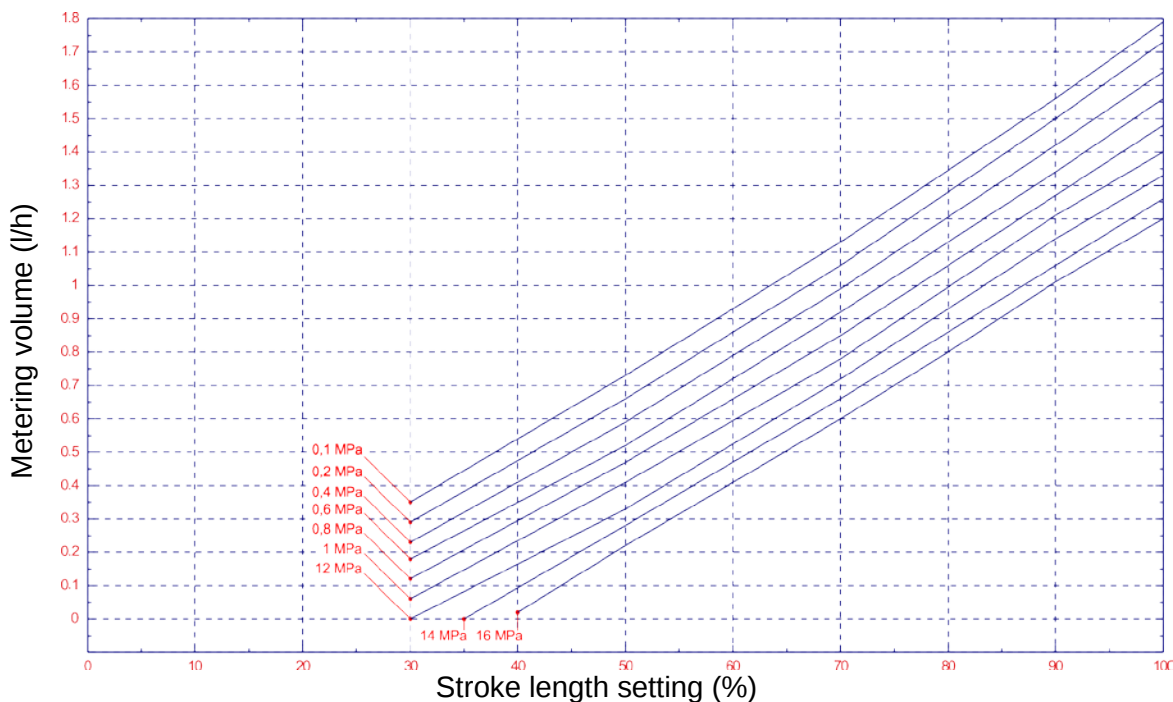


Fig. 14.10 Delivery capacity type V3014 / 1,6 MPa (16 bar) / (special version: higher pressures)

14.5.3 Delivery capacity type V3025 / 1 MPa (10 bar)

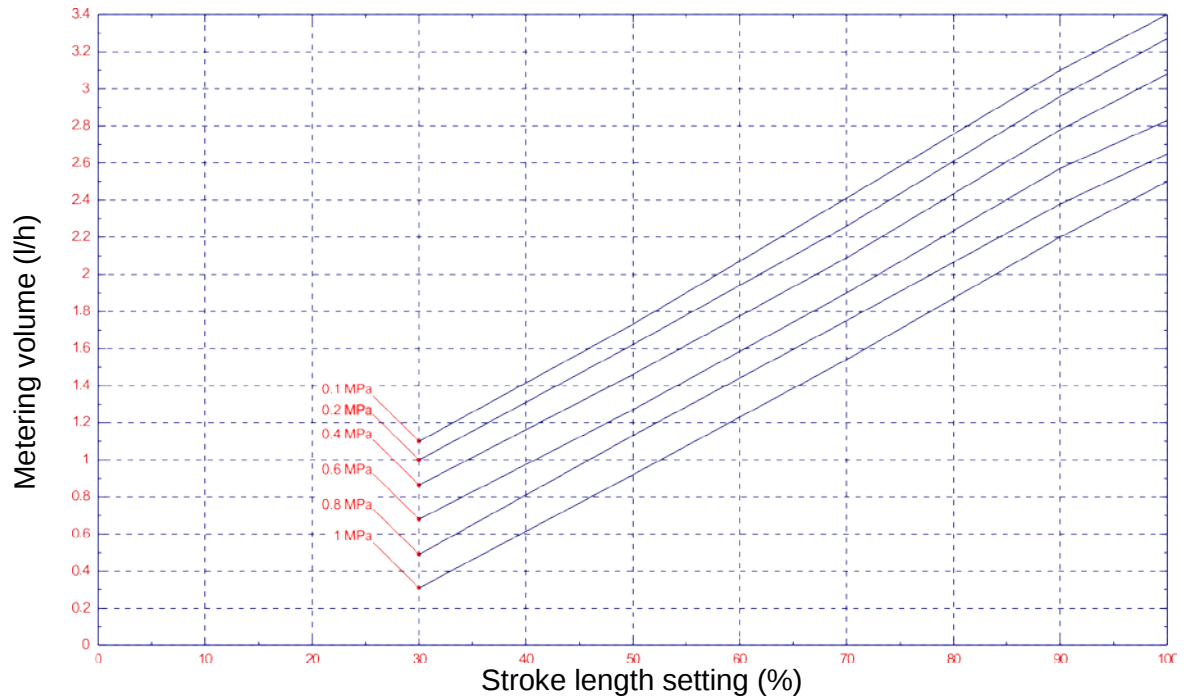


Fig. 14.11 Delivery capacity type V3025 / 1 MPa (10 bar)

14.5.4 Delivery capacity type V3025 / 1,6 MPa (16 bar) (special version: higher pressures)

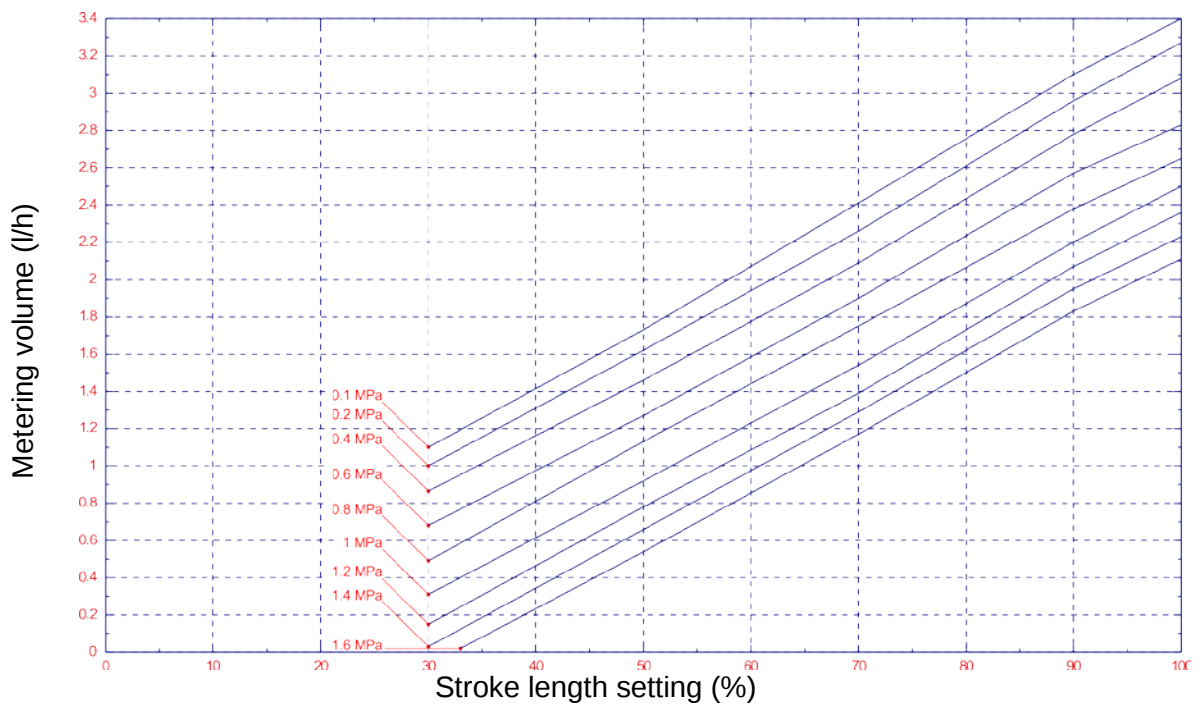


Fig. 14.12 Delivery capacity type V3025 / 1,6 MPa (16 bar) / (Special version: higher pressures)

14.5.5 Delivery capacity type 00043 / 1 MPa (10 bar)

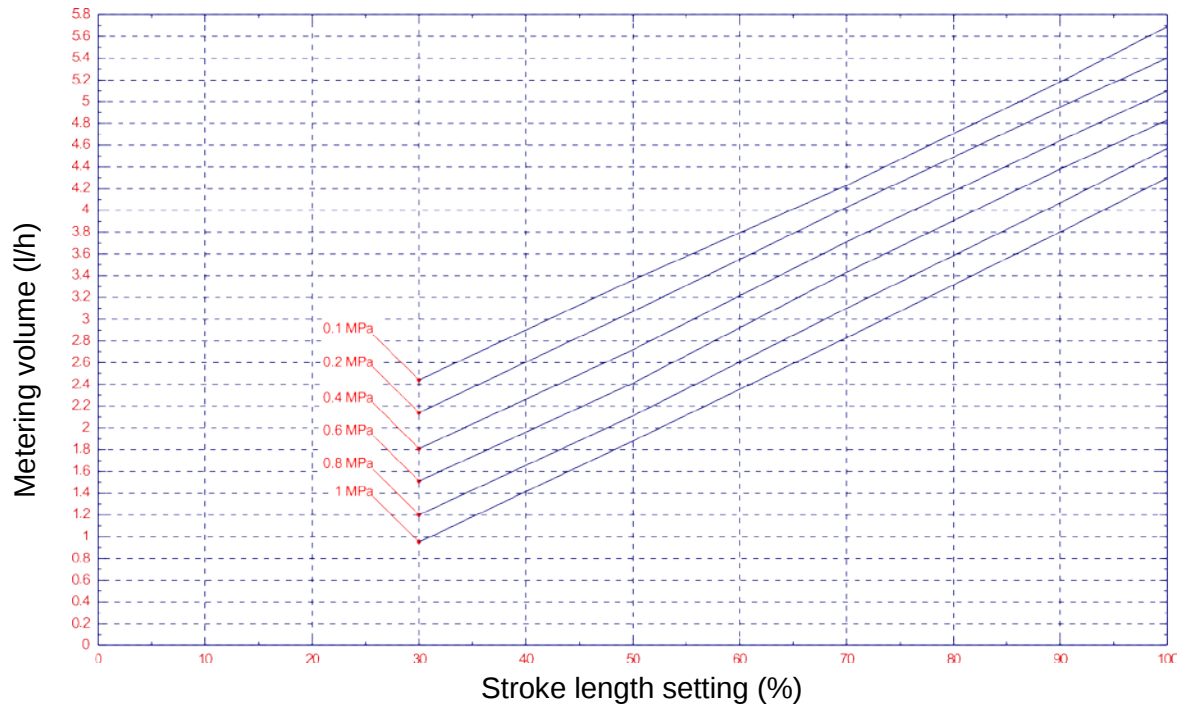


Fig. 14.13 Delivery capacity type 00043 / 1 MPa (1 bar)

14.5.6 Delivery capacity type 00043 / 1,6 MPa (16 bar) / (special version: higher pressures)

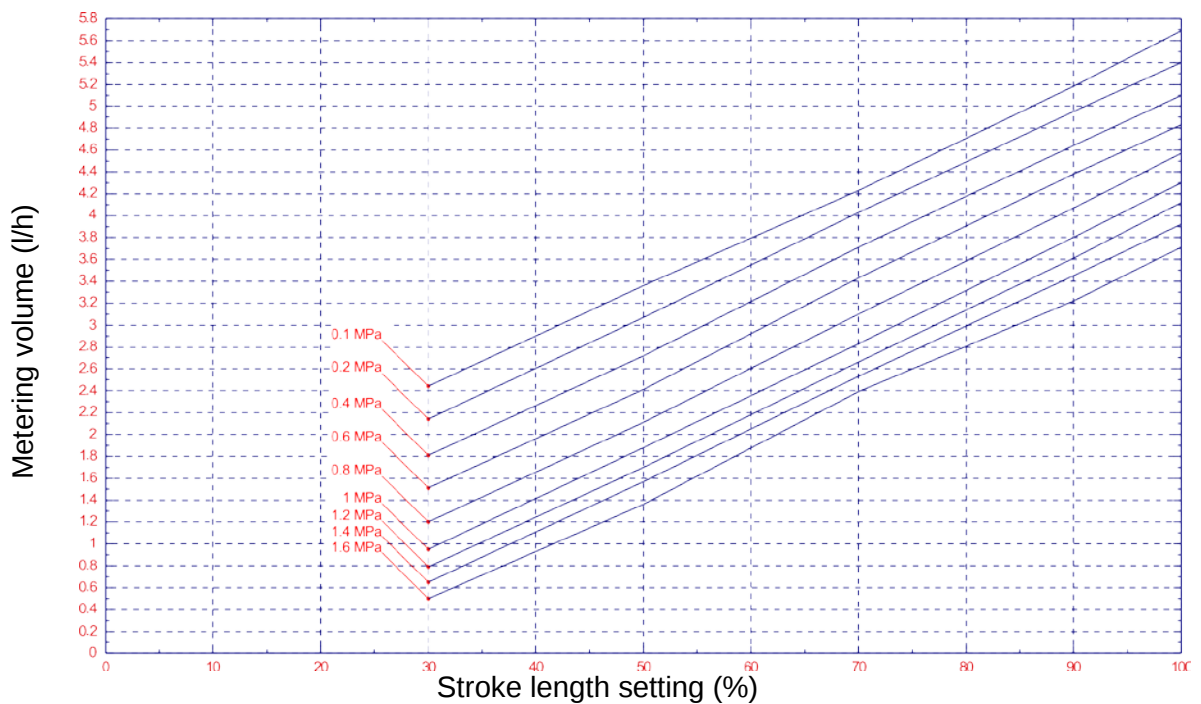


Fig. 14.14 Delivery capacity type 00043 / 1,6 MPa (16 bar) / (special version: higher pressures)

14.5.7 Delivery capacity type 00048 / 0,4 MPa (4 bar)

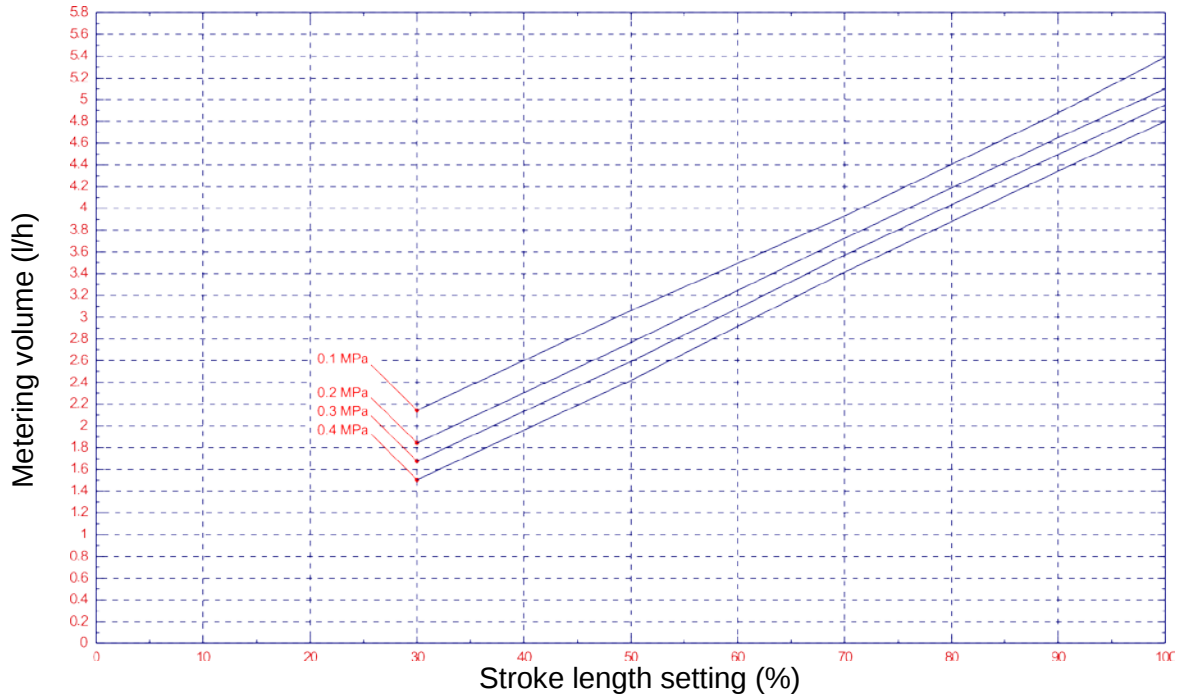


Fig. 14.15 Delivery capacity type 00043 / 0,4 MPa (4 bar)

14.5.8 Delivery capacity type 00072 / 0,6 MPa (6 bar)

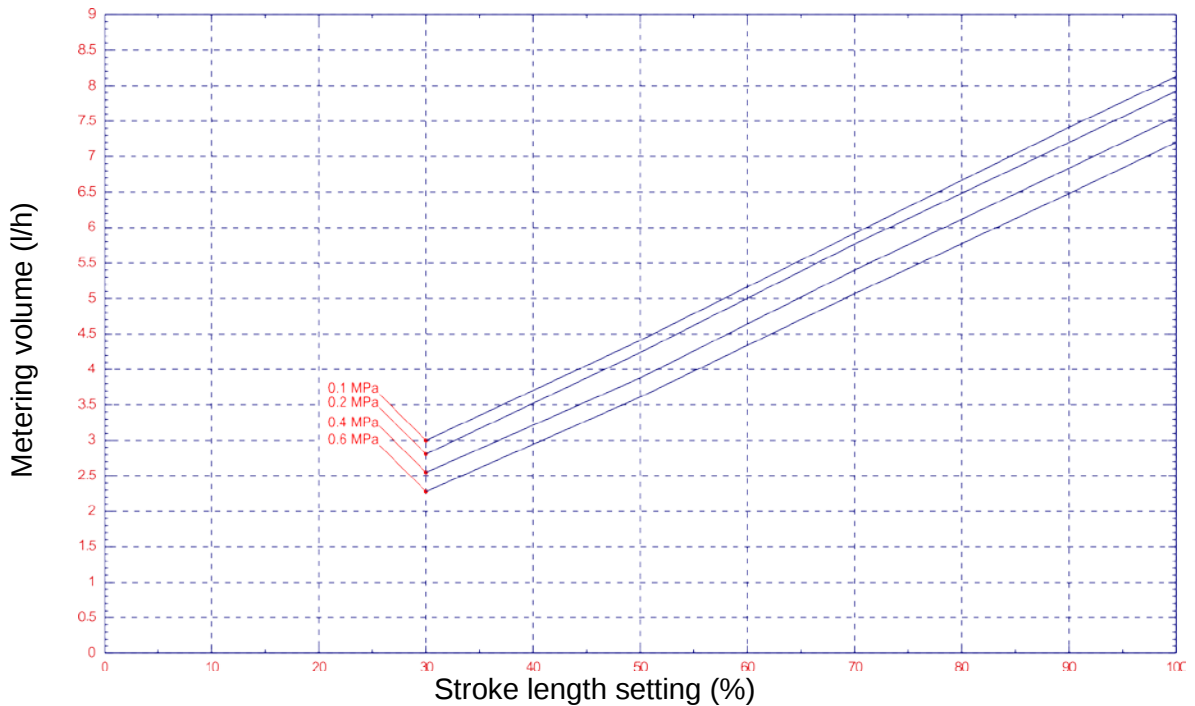


Fig. 14.16 Delivery capacity type 00043 / 0,6 MPa (6 bar)

14.5.9 Delivery capacity type 00072 / 1 MPa (10 bar)

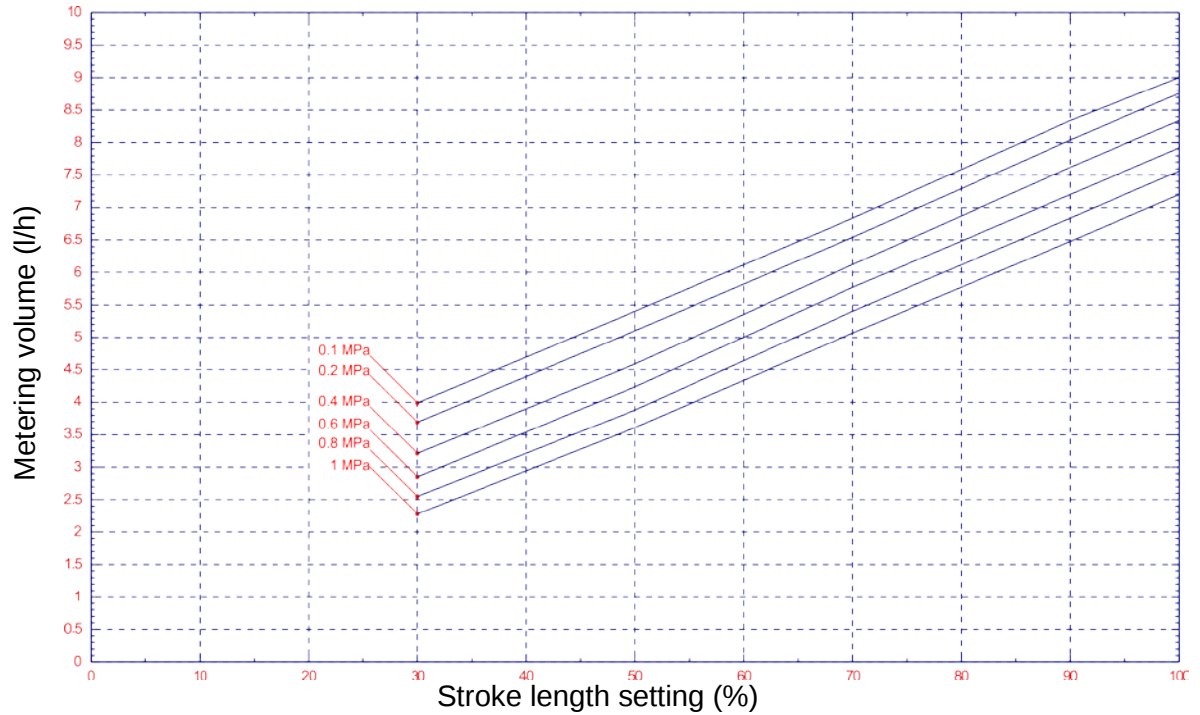


Fig. 14.17 Delivery capacity type 00072 / 1 MPa (10 bar)

14.5.10 Delivery capacity type 00112 / 0,5 MPa (5 bar)

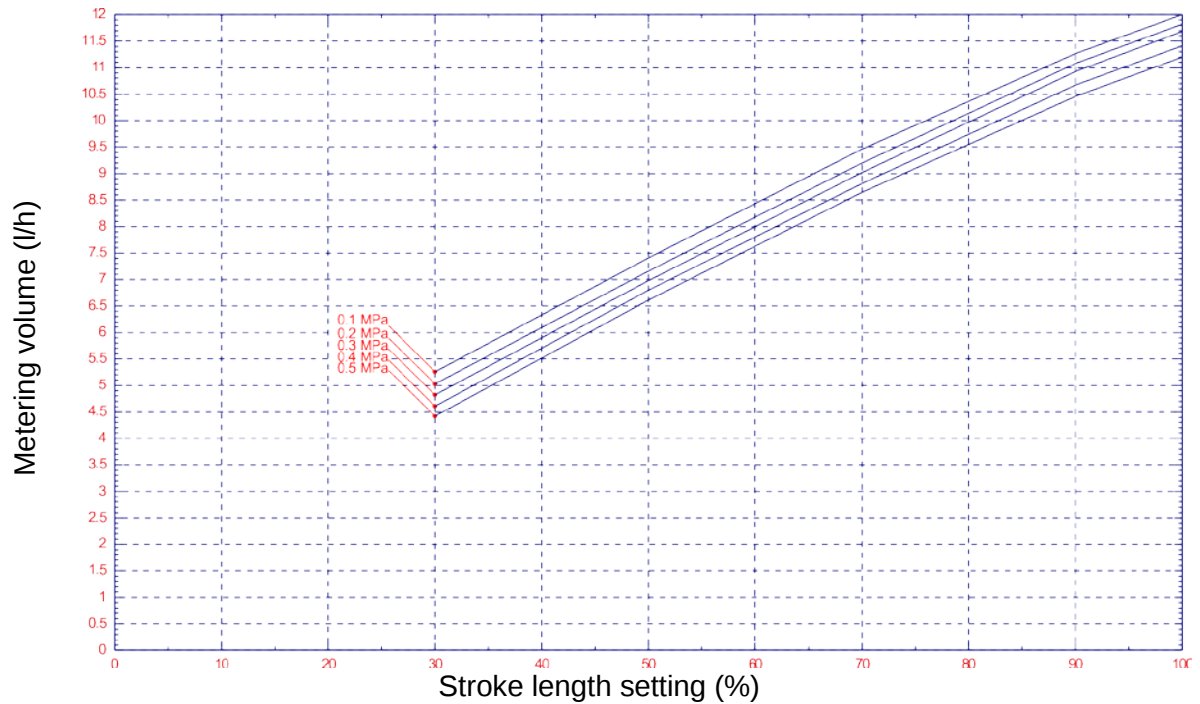


Fig. 14.18 Delivery capacity type 00112 / 0,5 MPa (5bar)

14.5.11 Delivery capacity type 00240 / 0,2 MPa (2 bar)

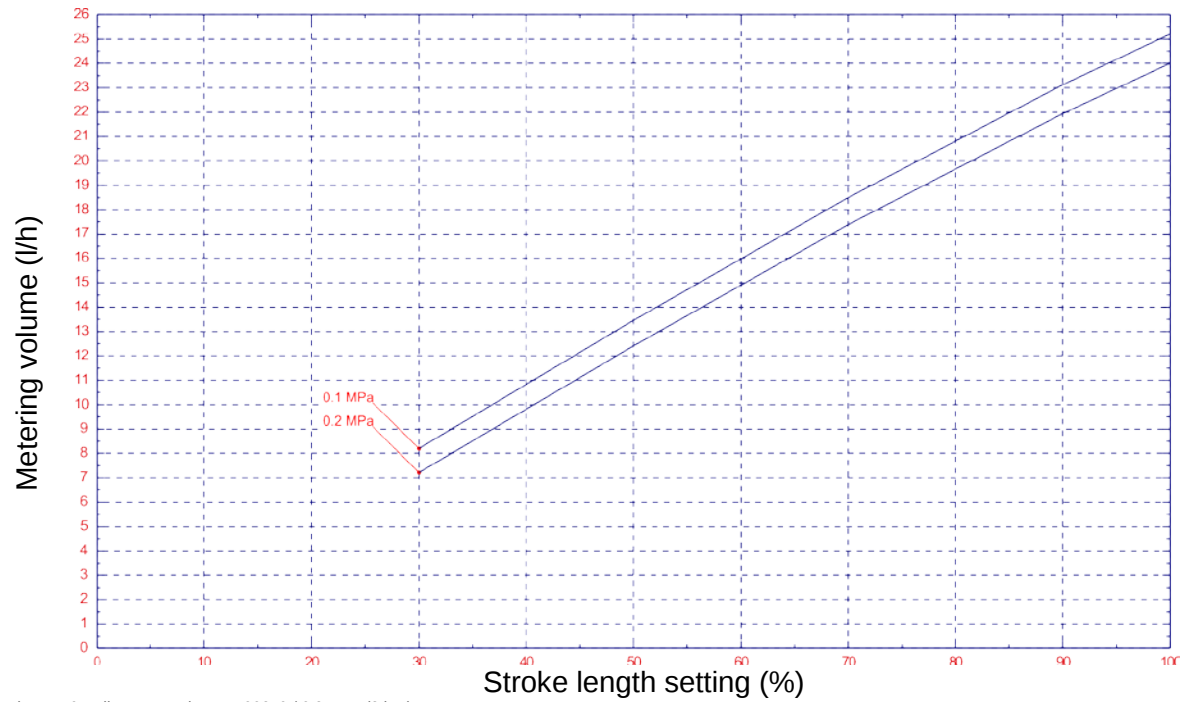
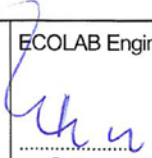


Fig. 14.19 Delivery capacity type 00240 / 0,2 MPa (2 bar)

15 Declaration of Conformity

			EG-Konformitätserklärung (2006/42/EG, Anhang II A) Declaration of Conformity (2006/42/EC, Annex II A) Déclaration de Conformité (2006/42/CE, Annexe II A) Dokument/Document/Document: KON029335	
Wir	We	Nous		
ECOLAB Engineering GmbH Postfach 11 64 D-83309 Siegsdorf				
Name des Herstellers, Anschrift	supplier's name, address	nom du fournisseur, adresse		
erklären in alleiniger Verantwortung, dass das Produkt	declare under our sole responsibility that the product	déclarons sous notre seule responsabilité que le produit		
ELADOS TYP EMP				
Gültig ab / valid from / valable dès: 01.01.2010				
auf das sich diese Erklärung bezieht, mit der/den folgenden Norm(en) oder normativen Dokument(en) übereinstimmt:	to which this declaration relates is in conformity with the following standard(s) or other normative document(s):	auquel se réfère cette déclaration est conforme à la (aux) norme(s) ou autre(s) document(s) normatif(s)		
DIN EN 809	EN 60335-1+A11+A12+A2 EN 6100-6-2 (2005-08) EN 6100-6-3+A11 (2004-07)			
Gemäß den Bestimmungen der Richtlinie	following the provisions of directive	conformément aux dispositions de directive		
2006/42/EG 2004/108/EG				
Bevollmächtigter für die Zusammenstellung der technischen Unterlagen: Authorised person for compiling the technical file: Personne autorisée pour constituer le dossier technique:		Ecolab Engineering GmbH Postfach 1164 D-83309 Siegsdorf		
D-83313 Siegsdorf, 15.12.2009		ECOLAB Engineering GmbH  Rutz		
Ort und Datum der Ausstellung Place and date of issue Lieu et date		Name/Unterschrift des Befugten name/signature of authorized person nom/signature du signataire autorisée		

Anlage 1 zur AA04AEKO04

11 / 2009