Integrated electronic controller
Type EP-tronic

with bayonet connector

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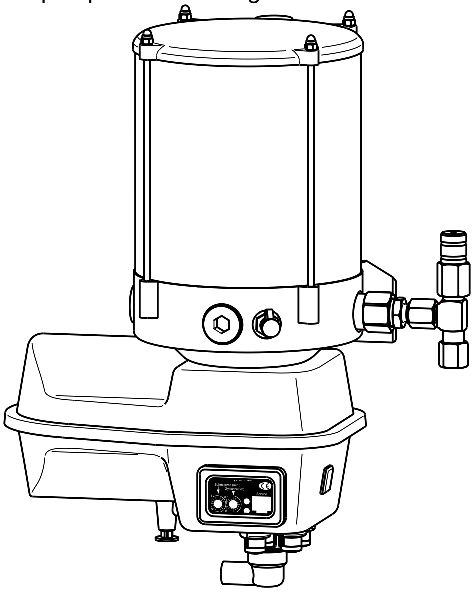
1. General Information:

The EP-tronic controller generation is a new design of units in an integrated mould for the EP family of pumps.

The controlling device is fitted with an operation database, which saves the following values:

- Controlling type
- Controller version
- Serial Number
- Manufacturing date
- RTC (Real-Time-Clock) adjustable date and time also for other time zones
- Method of operation (controlling according to time, stroke or revolution)
- Current values (time, strokes, regulation, faults...)
- Hours of operation
- Pump running time
- Number of interim lubrications
- Number of fill level errors
- Number of excess pressure errors
- Number of stroke regulation errors
- Number of revolution regulation errors
- Date and time of last diagnosis
- Number of total diagnosis
- Error log of last 100 errors with type of error entry, as well as time and date entry
- Incident log of last 100 set-up amendments with date and time entry

Electronic pump EP-1 with integrated controller EP-tronic



The following types of controlling can be chosen for the electronic pump EP-1 with integrated controller EP-tronic:

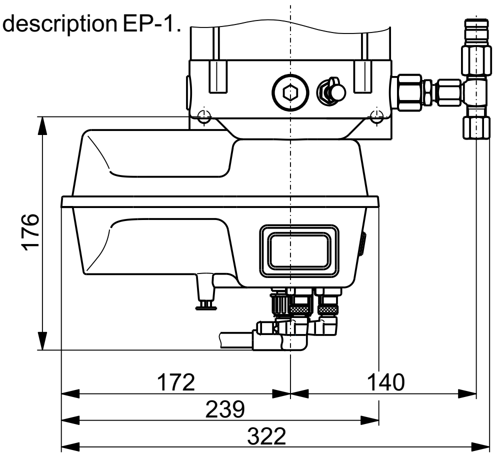
- A) Time controlling
- B) Stroke controlling
- C) Revolution controlling

These activation modes permit the following supplementary functions:

- Grease level controller
- Excess pressure valve with micro switch
- Starter enabling relay or collective error notification

Installation dimensions:

The electrical pump EP-1 with integrated controller EP-tronic can be equipped with various reservoir versions. For the installation dimensions of the reservoir versions, see the description EP-1.



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2. Function sequence

Whatever program is being used, once the ignition has been switched on the green and the red LED or the green and the red signal lamp (optional) lights up on the control panel for 1.5 sec. and shows that the controller is operational (activation control).

Every time the controller is activated for the first time, a lubrication process begins. The green LED in the control half shell is lit during the entire lubrication procedure.

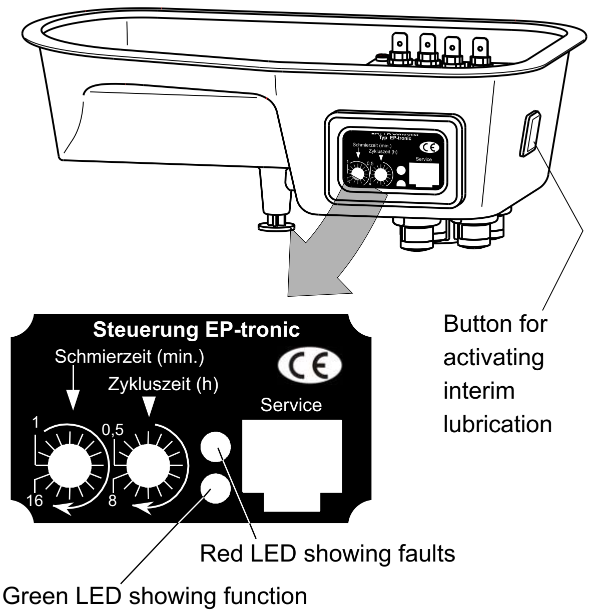
The EP-tronic integrated electronic controlling device has memory at its disposal. This also serves to keep a record of parameters elapsed. Should the ignition be switched off during lubrication or cycle times occur, then the time is stopped and recorded. Once the ignition is switched on again the remaining lubrication or cycle time is read from the memory and the sequence will be resumed where it was interrupted.

At any time when the ignition is on, an interim lubrication occurs when the button on the side of the pump motor housing or the illuminated button on the control panel is activated, this serves as a check of functionality. The pump then immediately starts its lubrication cycle, the lubrication or cycle duration recorded up to that point is reset and starts from the beginning.

A error can be reset by pressing the interim lubrication button and the pump starts the lubrication process anew.

The lamp on the illuminating button (green) shows the functionality of the controller and the current lubrication sequence.

EP-tronic integrated electronic controller:



Technical data for the controller:

Operating voltage:	10 to 60 V DC
Maximum current load:	I = 6,0 A
Fuse (not included in device):	F 6,3 A (5x20) medium slow-blow fuse
Signal lamp outlet:	I = 0,4 A
Temperature range:	-35°C to +75°C
Degree of protection:	IP 65

Before the electrical connection:
Observe the voltage of the pump motor.

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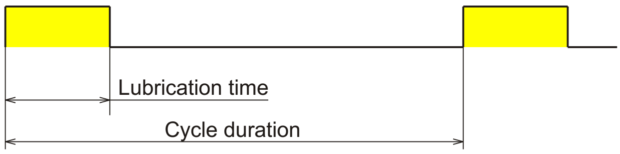
3. Method of operation

A) Time controller:

When the central lubrication processor is time controlled, the cycle duration and the lubrication time can be adjusted. Cycle duration means the period from the beginning of one lubrication process to the beginning of another lubrication process.

Diagram of cycle sequence:



B) Stroke controller:

With the EP-tronic integrated electronic controller, the lubrication duration can also be defined with the help of the number of lubricating strokes on the progressive distributor.

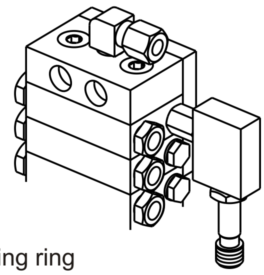
For this purpose, it is necessary to calculate the number of piston strokes of a progressive distributor. If lubricant is supplied through a progressive distributor, this brings the pistons into permanent and continual motion. A proximity switch is build in to one of these pistons in the progressive distributor, which sends a signal to the controller on each piston stroke.

As soon as the pump begins to supply lubricant to the system, the pistons in the progressive distributor start to move and the controller counts the impulses detected by the proximity switch. If the proximity switch detects no signals for 12 minutes after the lubrication process has begun, the controller indicates an error. The green and red LEDs on the controller display on the pump´s motor housing or the green and red signal lamps, if attached, start to flash.

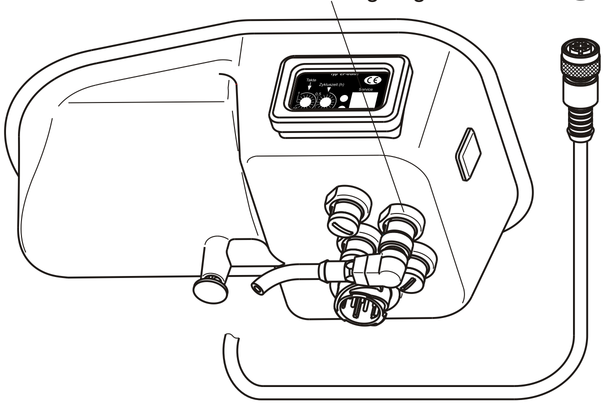
The proximity switch on the progressive distributor cannot be installed subsequently. Retrofitting is possible by replacement of a distributor shim (see description MX-F or SXE-2).
The proximity switch attached to the progressive distributor is supplied without connector and cable, these must be ordered separately (see description MX-F or SXE-2).

Connection to the controller is effected via the four-pole plug-and-socket connector marked with a blue ring, to the pump motor´s lower casing; to this effect, the contact plug cover must be removed.

Proximity switch built in to the progressive distributor:



Connection to the controller:



<u>**Inductive proximity switch on the progressive distributor:**</u>

Operating voltage:	10 to 60 V DC
Type of circuit:	PNP turnkey
Power rating:	200 mA
Connection:	4 pol. / M12x1 plug-in
Function display:	LED yellow
Housing material:	stainless steel
Degree of protection from switch:	IP 67
Ambient temperature:	-40°C to +85°C

Before the electrical connection:
Observe the voltage of the pump motor.

If an existing proximity switch M8x1 is to be connected to the controller, an adapter can be ordered (see description MX-F).

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3. Method of operation

C Revolution controller:

In the case of revolution fluctuations at lower temperatures or high torque, the lubricating duration for the EP-tronic integrated electronic controller is determined by the number of pump motor revolutions.
The pump motor is connected to the controller via sliding contacts. With every engine revolution a signal is sent to the controller, which counts the incoming signals.

If no signal is received from the pump motor for longer than the adjustable monitoring time (standard 30 sec.) after the lubricating process has begun, then the controller will indicate a fault.
The red LED in the pump´s lower motor casing display or an externally attached signal lamp (optional) will start to flash.

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4. Adjusting the parameters

The cycle time and lubrication time, the number of strokes and the number of revolutions can be set by means of graduating switches in the controller's sight glass.

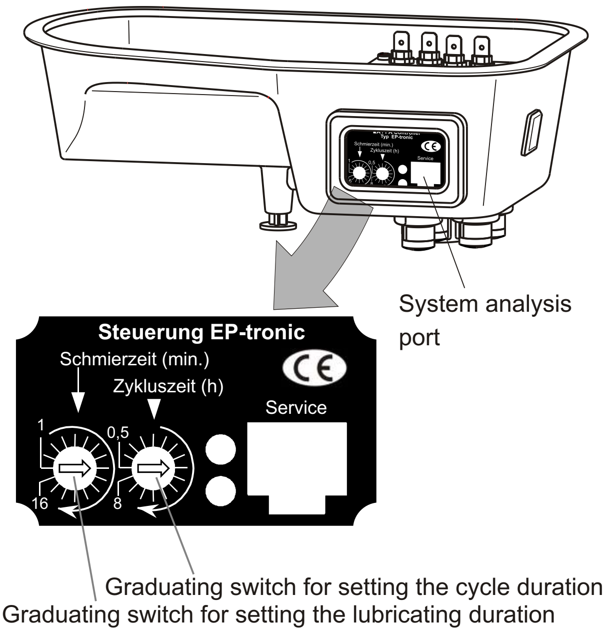
To adjustment the parameters setting, remove the red frame on the pump's motor housing using a flat screwdriver, loosen the four Phillips screws and remove the transparent protective cover.
The cycle during and lubrication during can be adjusted using a flat screwdriver.

If the cover plate is not replaced properly, water may enter the controller and damage it. In this case, the guarantee is no longer valid.

The modes and the adjusting ranges can be changed over by means of the diagnostic software BEKA-DiSys, even on site the controller has already been operated before at the customer´s.

All adjusting ranges for the lubrication period and all cycle time ranges can be combined at random.

EP-tronic integrated electronic controller:



Adjusting the parameters:

Lubrication times:
1 to 16 min. (16 grades every 1 min.)
2 to 32 min. (16 grades every 2 min.)
2 to 32 sec. (16 grades every 2 sec.)

Strokes:
1 to 16 strokes (16 grades every 1 stroke)
17 to 32 strokes (16 grades every 1 stroke)
33 to 48 strokes (16 grades every 1 stroke)

Revolutions of pump:
1 to 16 revolutions (16 grades every 1 revolution)
10 to 160 revolutions (16 grades every 10 revolutions)
170 to 320 revolutions (16 grades every 10 revolutions)

When changing the activation modes and the adjusting ranges, the label in the controller window must be replaced.

To this effect, a label kit consisting of 27 different label versions is available; these can also be ordered individually afterwards.
Ref. no. for label kit: 0490000317

Cycle duration:
0.5 to 8 h (16 grades every 0.5 h)
2 to 32 min. (16 grades every 2 min.)
2 to 32 h (16 grades every 2 h)

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5. Excess pressure valve with micro switch

With the EP-tronic integrated electronic controller, the maximum operating pressure of the progressive lubrication system can be monitored.
For this purpose a micro switch has been attached to the excess pressure valve of pump element.
Should a fault occur in the system, e.g. a blockage at the point of lubrication, a pressure of more than 250 bar builds up. A micro switch in the excess pressure valve is activated and sends a signal to the controller. This switches the pump off and the fault is indicated by the flashing red LED and permanent illumination of the green LED or the externally attached signal lamps.

Technical data for the micro switch:

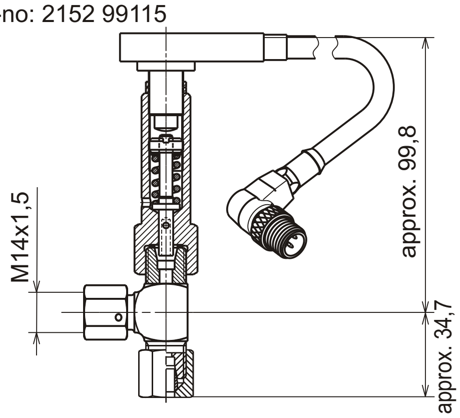
Operating voltage:	10 to 60 V DC
Maximum current load:	I = 1,7A
Contact type:	1 changer
Temperature range:	-25°C to +85°C
Degree of protection:	IP 67
Connection:	Cable, length 0.5 m, heat-sealed with 4-pole right-angle plug

Specify in the order whether the microswitch is to be delivered connected to the controller.
If the micro-switch is to be connected to another control unit, e. g. PLC, an additional cable can be ordered in different lengths (see description EP-1). It can be connected to the cable heat-sealed to the micro-switch.

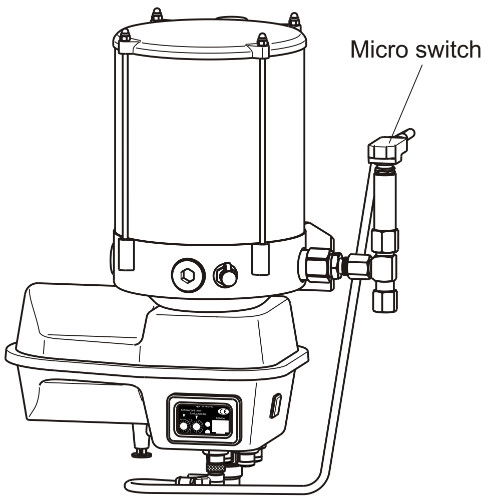
The pressure monitoring system can be attached to the EP-tronic controller with any selected program.

Excess pressure valves with micro-switches can be retrofitted and connected to the controller.

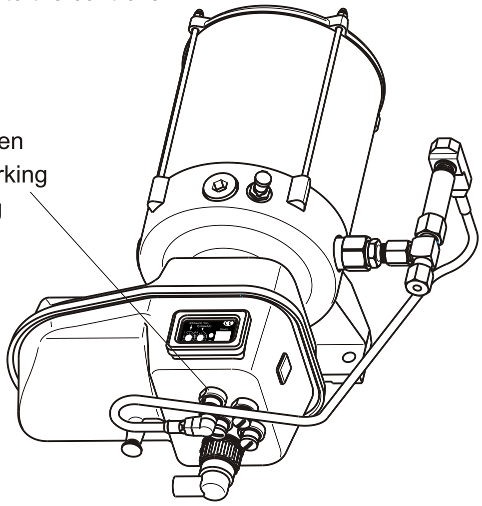
Excess pressure valves with micro-switches required for replacement or retrofitting can be ordered individually (see description EP-1).
Pressure relief valve with microswitch for PE-120:
Order-no: 2152 99115



Excess pressure valve with micro switch on the pump element, built into electronic pump EP-1:

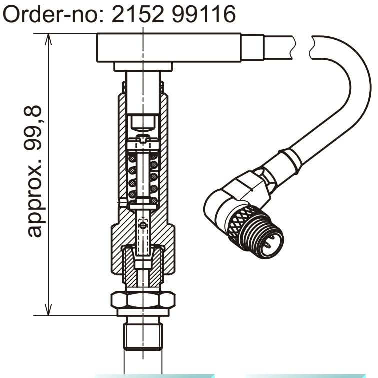


Connection to the controller:



Connection to the controller is effected via the four-pole plug-and-socket connector marked with a green ring, to the pump´s motor casing; to this effect, the contact plug cover must be removed.

Pressure relief valve with microswitch for PE-120 V:
Order-no: 2152 99116



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6. Grease level controller

A grease level controller can be attached to the EP-tronic integrated electronic controller.

For this purpose a capacitive proximity switch has been built in to the pump´s reservoir.
As long as there is enough grease available in the reservoir, the proximity switch sends a signal to the controller. If the grease level sinks below minimum the proximity switch turns the signal off.
If the signal remains off for more than 10 sec. then the controller switches the pump off, so that no air is pumped into the system.

The red LED on the controller display, situated on the pump´s motor housing or a built-in red signal lamp, if available, starts to illuminate.
Once the grease has been refilled, the controller restarts itself.

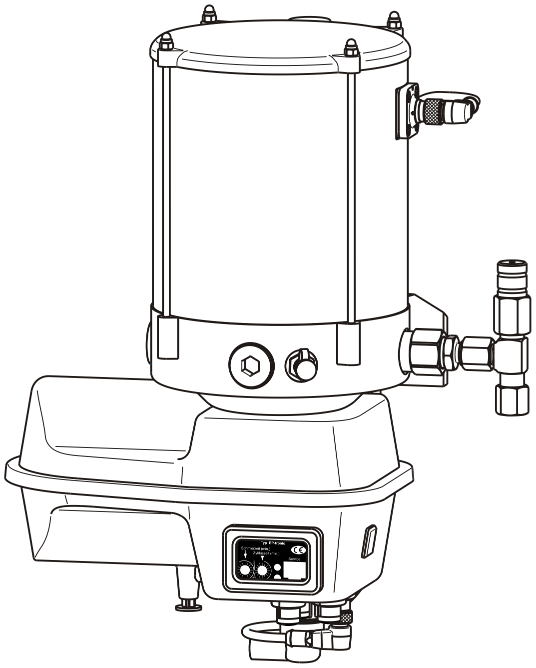
The grease level controller can be ordered connected to the controller; in this case, a connecting cable, length 0,6 m, with a right-angle plug M12x1 for connection to the plug-and-socket connector of the grease level controller and a right-angle plug M12x1 for connection to the controller is included in the scope of supplies.
If the grease level control is to be connected to an external control unit, e. g. PLC, a cable with a socket M12x1 for connection to the contact plug of the grease level controller must be ordered separately (see description EP-1).

The grease level controller can be retrofitted and connected to the control unit. In this case, the function must be activated by means of the software BEKA-DiSys. The function must not be activated if no grease level controller is connected, as this would produce a permanent error.
The cable must also be ordered separately if the grease level controller is to be retrofitted (see drawing on the right).
Connection to the controller is effected via the four-pole plug-and-socket connector marked with a red ring, to the pump motor´s lower casing; to this effect, the contact plug cover must be removed.

<u>**Technical data for the capacitive proximity switch:**</u>

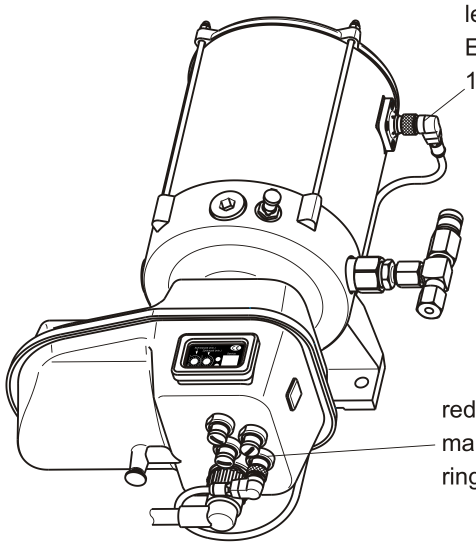
Operating voltage:	10 to 60 V DC
Switching type:	PNP-turnkey
Maximum current load:	250 mA
Degree of protection:	IP 67
Ambient temperature range:	-25°C to +70°C
Connection:	4-pole, M12x1 pluggable

Grease level controller built in to the 2,5 kg reservoir of an EP-1 central greasing pump:



Connection to the controller:

Connection cable
length 0.6 m
EDP-no.:
1000912998



red
marking
ring

The grease level controller can be attached to the EP-tronic controller with any selected program.

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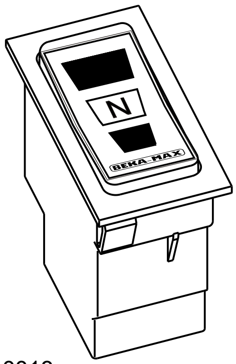
7. Adjusting for application conditions

Without a system analysis device the following controller functions may come into play:

- Activation of interim lubrication, also externally
- Selectable application conditions:
  - Light 125 %
  - Normal 100 %
  - Heavy duty 75 %

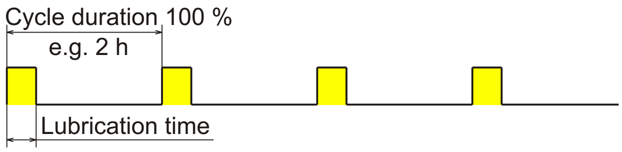
3-grade switch for setting the application conditions:



Order-no.: 1000 95 0018

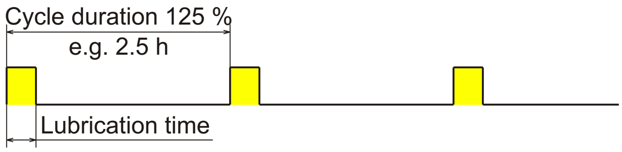
The normal setting should be selected for normal load, the lubricating time or cycle duration will be implemented as set.

Medium setting:



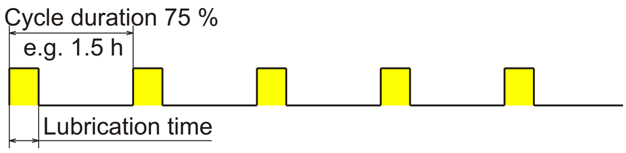
The light setting should be selected for lighter load. For this setting the cycle duration selected is increased by 25 %, i.e. a cycle duration of 2 h will be increased by 0.5 h to 2.5 h.

Light setting:



The heavy-duty setting should be selected for particularly heavy load, like, for example, for use in quarries. The cycle duration is decreased by 25 %, i.e. a cycle duration of 2 h will be reduced by 0.5 h to 1.5 h.

Heavy-duty setting:



The application conditions are selected with the help of a switch with three graduated settings, which is built in to the dashboard of the vehicle, within the first 30 sec. after the ignition has been switched on.
Once the application conditions have been changed the ignition must be turned off and on again or an interim lubrication must be activated.

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8. Starter enabling relay or collective error notification

A starter enabling relay or collective error notification device, as required, can be attached to the EP-tronic integrated electronic controller. The connection must be started when ordering or can be selected later with the analysis software BEKA-DiSys.

The starter enabling relay prevents the vehicle from being started as long as an error, indicated by the controller, has occurred,
e.g.,
a stroke error with stroke control,
a revolution error with revolution control,
a grease level error,
excess pressure in the main system.

The vehicle´s engine may be restarted when the error has been reset.

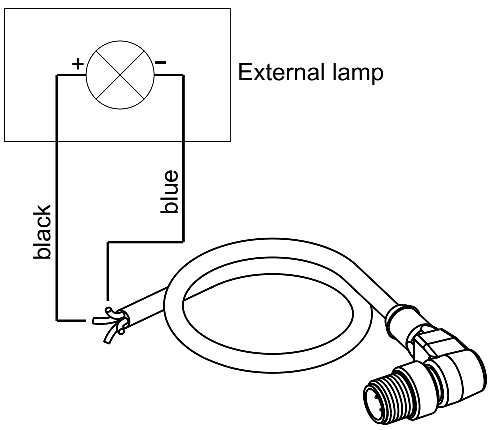
The starter enabling relay is delivered without a cable and must be built in to the vehicle in a dry area.

Connecting to the controller is effected via the four-pole plug-and-socket connector marked with a yellow ring, to the pump motor´s lower casing; to this effect, the contact plug cover must be removed.

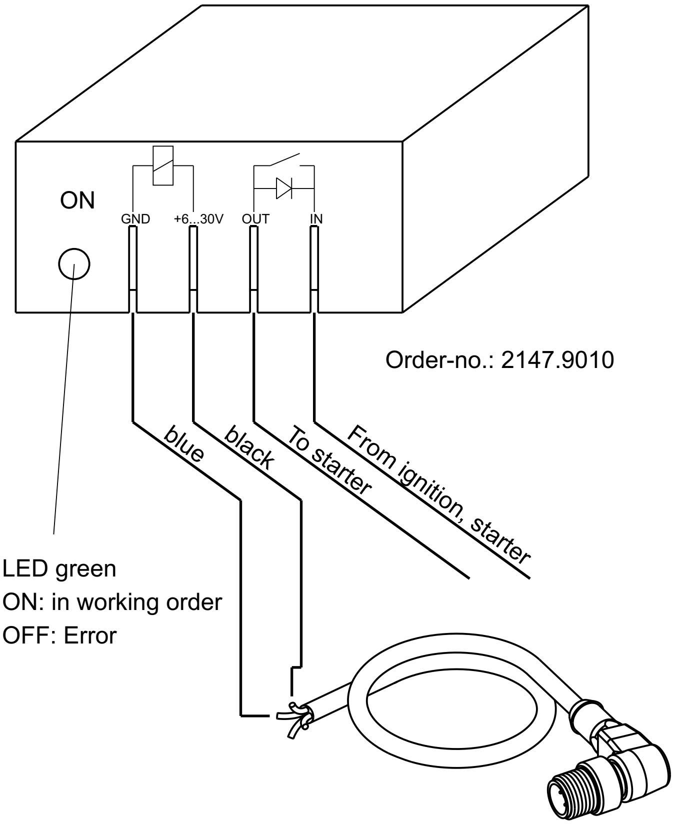
Instead of the starter enabling relay, a collective error notification device can also be attached. With the help of an external lamp or an audible indicator, a constant signal is given as soon as an error, as described above, occurs in the system.
If an external lamp is built in, e.g. in the driver´s cab, this will illuminated until the error has been corrected.
If an audible signal is built in, a constant sound can be heard until the error has been corrected.

Lamps and cables are not included in delivery.

Terminal diagram:



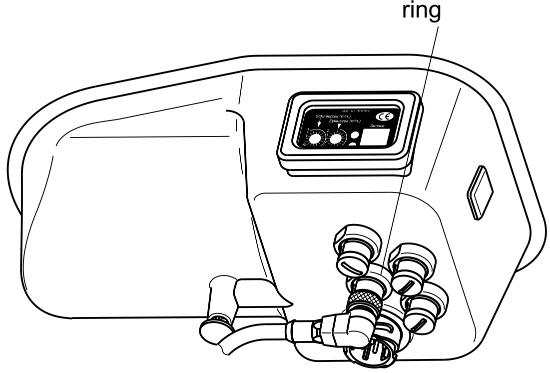
Starter enabling relay:



Order-no.: 2147.9010

Cable for connection to the controller, length 5 m
Order-no.: 1000913278

yellow
marking
ring



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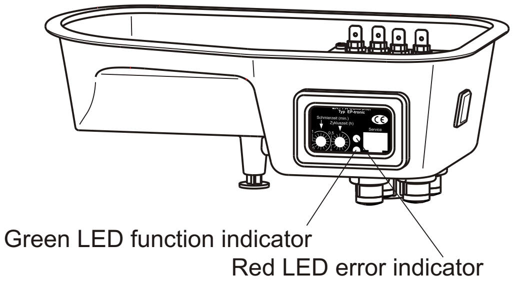
9. Summary of Signal Indicators

The pump´s functions are indicated via two control LEDs (green/red) in the display on the pump´s motor casing, where the red LED always indicates an error in the program sequence.

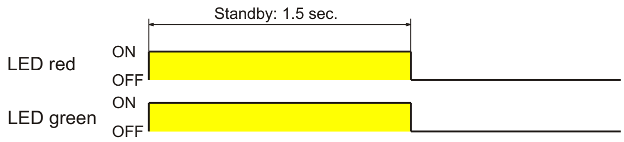
These control LED functions may be indicated in the driver´s cap of the vehicle via built-in signal lamps. These must be specially ordered.

EP-tronic integrated electronic controller:



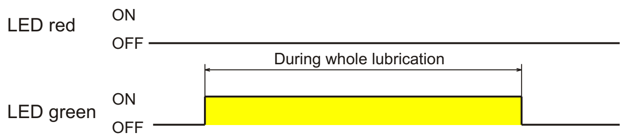
a) Standby

Standby indicator:



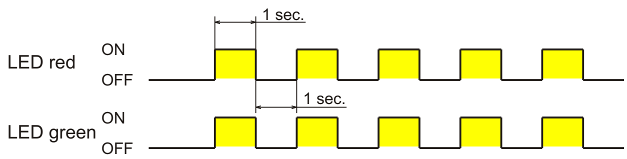
b) Lubrication activated

Lubrication sequence:



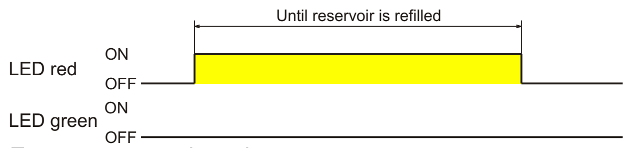
c) Stroke fault

Stroke error on progressive distributor:



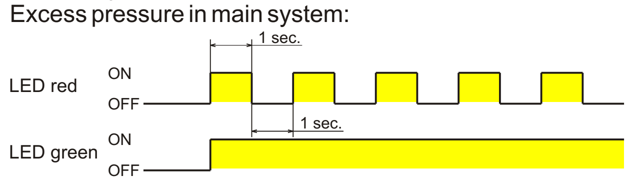
d) Grease level error

Grease level too low:



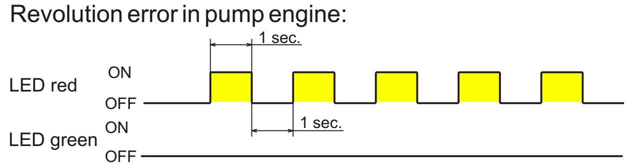
e) Excess pressure error

Excess pressure in main system:



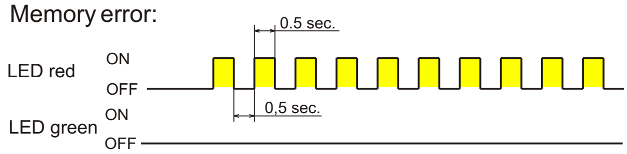
f) Revolution and engine driver error

Revolution error in pump engine:



g) Memory error

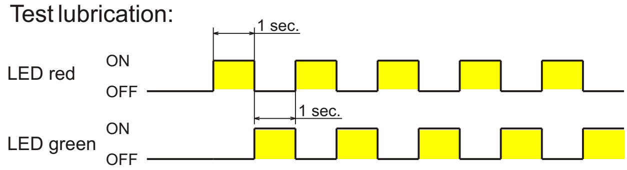
Memory error:



h) Test lubrication (constant lubrication)

To adjust the time controlling to continual lubrication for servicing purposes, the lubrication time must be set to a higher value than the cycle duration.

Test lubrication:



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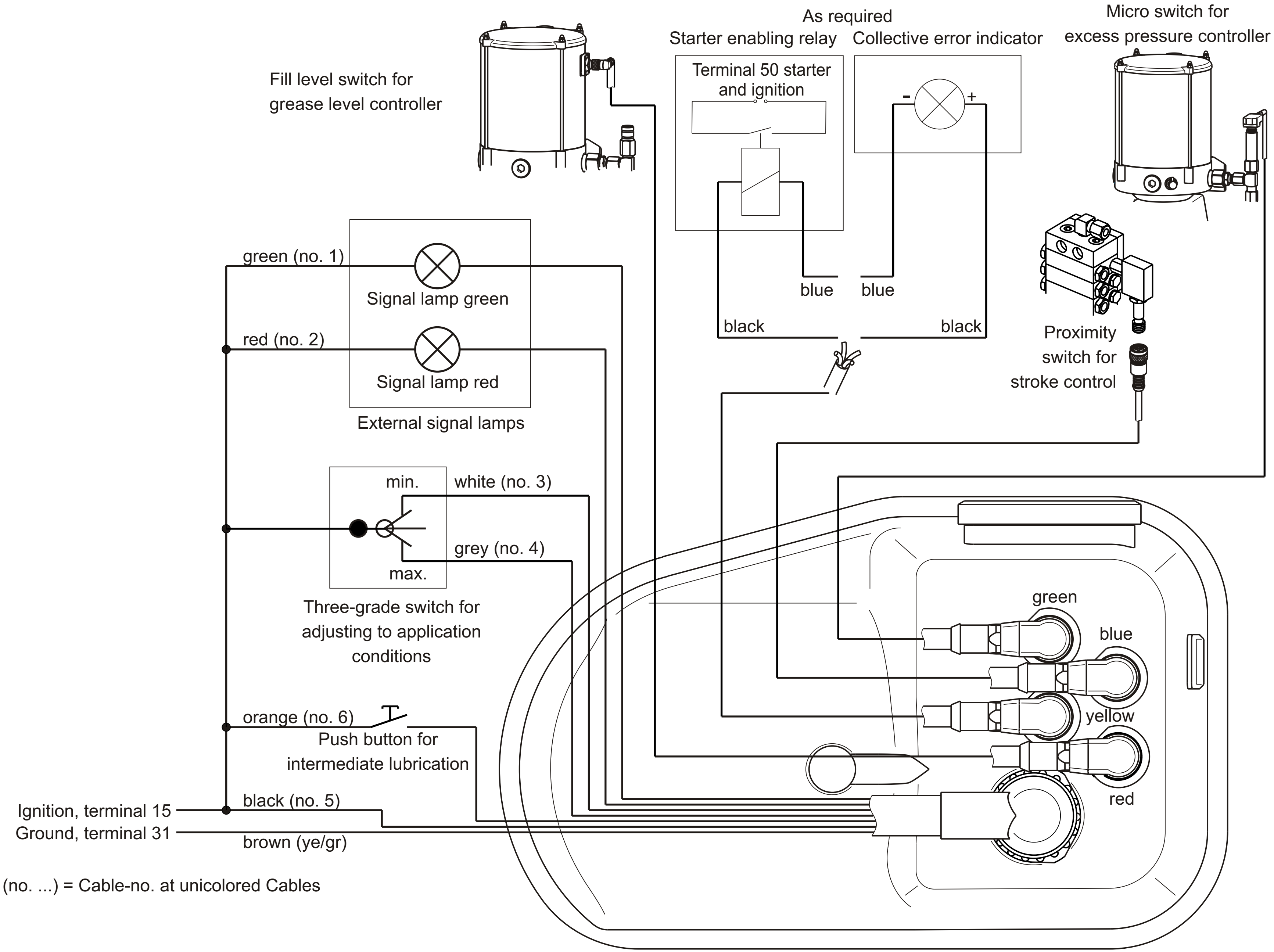
EP-tronic

10. Terminal diagram of all connections



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EP-tronic

11. Ordering key for EP-1 with integrated controller

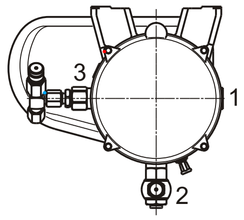
Construction type — **2157 . 3 . 1 . 2 . 0 . A . 0 . 0000**

Motor voltage	
with bayonet connector	
12V	24V
3	4

	Fig.				
1	1	2	3	4	0
2	1	2	3	4	0
3	1	2	3	4	0
Outlet position	PE-120	PE-120 V	PE-60	PE-170	without

Fig.	Code	Fig.	Code	Fig.	Code	Fig.	Code
001	G	002	K	003	N	004	R
010	H	020	L	030	P	040	S
011	J	022	M	033	Q	044	T
100	1	200	4	300	V	400	D
110	2	220	5	330	B	440	E
111	3	222	6	333	C	444	F
120	7	021	9	122	8	123	U
102	W	Special variants					Z

Other combinations of pump elements on demand!



Order example:

Outlet position:	1	2	3
Fig.:	0	2	1
Code:		9	

			2 Parts		1 Part
Size of reservoir (kg)	1.9	4	8	2.5	8
Code	1	2	3	4	8
With grease level controller		5	6	7	9

Additional equipment	
not attached to controller	0
Attached to controller	
System pressure $P_{max.}$	1
Grease level monitoring	2
System excess pressure monitoring and grease level controller	3

Parameter		Cycle duration		
Lubricating time		0.5 to 8 h	2 to 32 min.	2 to 32 h
I	1 to 16 min.	1	A	J
II	2 to 32 min.	2	B	K
III	2 to 32 sec.	3	C	L
Strokes				
I	1 to 16 Strokes	4	D	M
II	17 to 32 Strokes	5	E	N
III	33 to 48 Stokes	6	F	O
Pump revolutions				
I	1 to 16	7	G	P
II	10 to 160	8	H	Q
III	170 to 320	9	I	R

With collective error notification (stat. error)	1
With starter enabling device	2
without	0

Special models	0000

All additional functions respectively time periods can be activated respectively set later with the system analysis software on PC.

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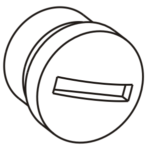
EP-tronic
12. Retrofitting and spare parts

The integrated controller EP-tronic can be retrofitted to the electric pump EP-1, i. e. to pumps which have been delivered without controller and to replace existing controllers.
However, retrofitting to pumps without controller is only possible after the year of construction 2004.

Controllers delivered for retrofitting or replacement are not provided with connection cable, as this is normally available. If the controller is to be installed in a pump which has not been equipped with a controller so far, or to be replaced by a controller with another connector, the connecting cable must be ordered separately.

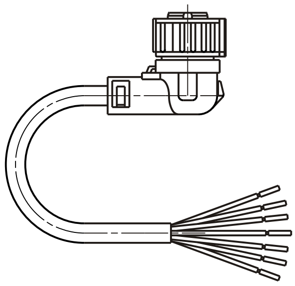
The connecting cables for any supplementary features available must also be ordered separately.
To connect the proximity switch for cycle control, see the description MX-F or SXE-2.
To connect the micro-switch for pressure monitoring, see the description EP-1.
To connect the grease level controller, see description EP-1.
To connect the starter enabling device or the collective error notification, see page 9 of this description.

Plug-and-socket connectors which are not used must be closed using a cover.
Cover to close an unused plug-and-socket connector for the supplementary functions of the integrated electronic controller EP-tronic:



Order-no.: 1000913004

7-wire connecting cable, length 10 m, with bayonet connector:



Order-no.: FAZ02499-21

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EP-tronic

13. Ordering key for EP-tronic controller

Construction type — **2157 . 90 . 10 . 0 . A . 1 . 00**

Connector version	
with bayonet connector	10

Additional equipment	
Not attached to controller	0
Attached to controller	
System pressure $P_{max.}$	1
Grease level monitoring	2
System excess pressure monitoring and grease level controller	3

Parameter		Cycle duration		
Lubricating time		0.5 to 8 h	2 to 32 min.	2 to 32 h
I	1 to 16 min.	1	A	J
II	2 to 32 min.	2	B	K
III	2 to 32 sec.	3	C	L
Strokes				
I	1 to 16 Strokes	4	D	M
II	17 to 32 Strokes	5	E	N
III	33 to 48 Strokes	6	F	O
Pump revolutions				
I	1 to 16	7	G	P
II	10 to 160	8	H	Q
III	170 to 320	9	I	R

With collective error notification (stat. error)	1
With starter enabling device	2
without	0

Special models	00

All additional functions of time periods can be activated or set later with the analysis software on PC!

Subject to alterations!

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