DESCRIPTION AND OPERATING INSTRUCTIONS FOR THE BACK-FLUSHING FILTER TYPE 6.60.1

==========

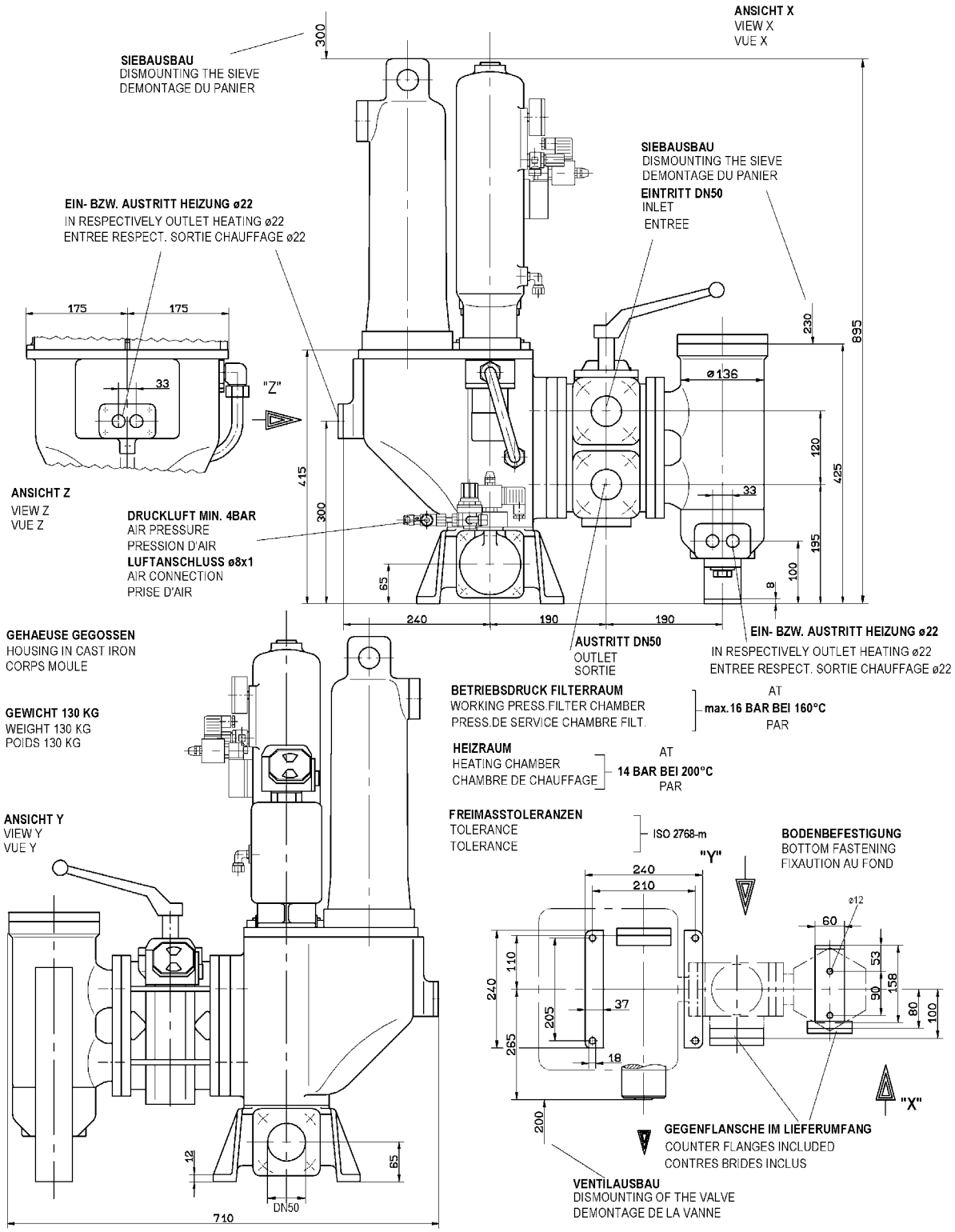
Commission No.:

C O N T E N T S

1. Type Sheet
2. General Information on the Automatic Filter
3. Filter Installation
4. Commissioning
5. Filtration Phase
6. Back-Flushing Operation
7. Description of the EL.-Control System
8. Circuit Diagram
9. Equipment List for EL.-Control System
10. Servicing
11. Servicing Tools
12. Cleaning Agents for Candle Elements
13. Manual Cleaning of Candle Elements
14. Maintenance instructions bypass filter
15. Spare Part Drawing for Type 6.60.1 and 6.60
16. Spare Part List for Type 6.60.1
17. Type Sheet for the Differential Pressure Indicator with Electrical Contacts
18. Spare Part Drawing for the Differential Pressure Indicator

BOLLFILTER
Protection Systems
Marine & Power

Z32570
TYP6.60.1
07.07.04



SUBJECT TO ALTERATIONS!

AENDERUNGEN VORBEHALTEN!

MODIFICATIONS RESERVEES!

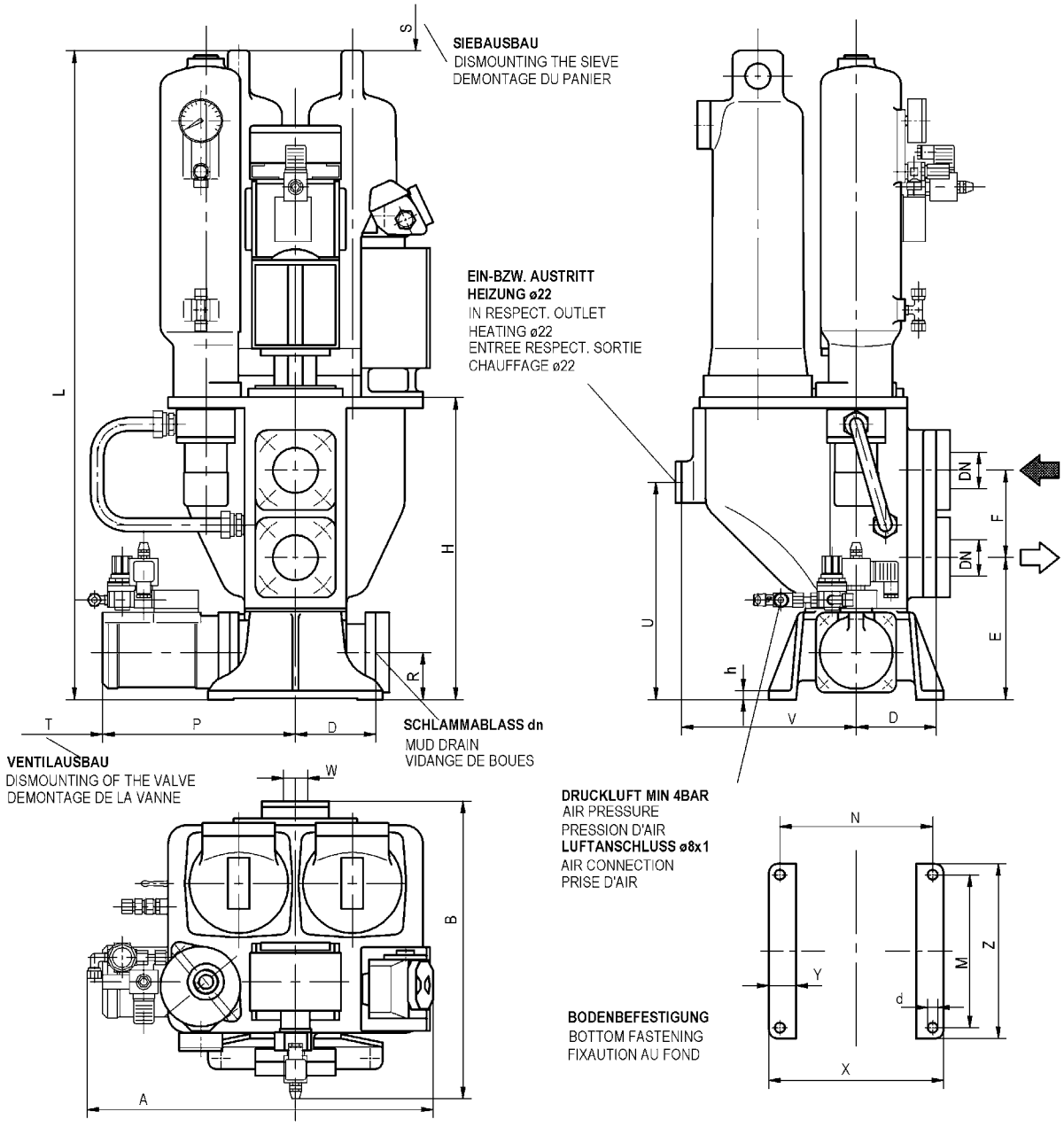
FILTER COMBINATION

FILTERKOMBINATION
TYP 6.60.1 GR.05

COMBINAISON DE FILTRES

BOLLFILTER
Protection Systems
Marine & Power

Z100813
TYP6.60
21.06.04



BETRIEBSDRUCK FILTERRAUM
WORKING PRESS.FILTER CHAMBER
PRESS.DE SERVICE CHAMBRE FILT.
AT **max.16 BAR BEI 160°C** PAR

HEIZRAUM
HEATING CHAMBER
CHAMBRE DE CHAUFFAGE
AT **14 BAR BEI 200°C** PAR

GEHAEUSE GEGOSSEN
HOUSING IN CAST IRON
CORPS MOULE

FREIMASSTOLERANZEN
TOLERANCE
TOLERANCE
DIN ISO 2768-m

GEGENFLANSCHE IM LIEFERUMFANG
COUNTER FLANGES INCLUDED
CONTRES BRIDES INCLUS

GR.	DN	KAMMER-ANZAHL	A	B	D	E	F	H	L	M	N	P	R	S	T	U	V	W	X	Y	Z	h	d	dn	GEWICHT KG	INHALT LTR
05	50 65	2	475	410	110	195	120	415	895	205	210	265	65	300	200	300	240	33	240	37	240	12	18	50	100	15

SUBJECT TO ALTERATIONS!

FULLY AUTOMATIC BACK FLUSHING FILTER

AENDERUNGEN VORBEHALTEN!

VOLLAUTOMATISCHER RUECKSPUELFILTER TYP 6.60

MODIFICATIONS RESERVEES!

FILTRE AUTOMATIQUE

2. General

The fully automatic back-flushing filter is used to filter a variety of fluids, but chiefly for the filtration of fuels, lubricating oils, caustic solutions and emulsions. The filter element assemblies are cleaned automatically by compressed air assisted back-flushing without causing interruption to the filtration process. One clean chamber is always held in reserve.

This self-cleaning filter consists basically of the following parts:

The lower housing with connection flange for the removal of flushing fluid (sludge discharge).

The change-over system housing with the filter inlet and outlet flanges.

The automatically vented filter chambers containing the candle elements.

In the centre of the housing is the shut-off plug with refill bore.

The pneumatic swivel drive with attached control valve and end position switch.

The air supply with non-return valve, shut-off valve and pressure regulator.

The safety valve.

The differential pressure indicator $\Delta p1$.

The flushing valve with manual initiation.

The EL.-control system in its own switch box separate from the filter.

3. Installation of the Filter

Care must be taken during installation of the filter that the pipelines attached to the filter inlet and outlet are clean and not under tension.

The pipeline selected for the sludge discharge is to be no smaller than the size indicated on the type sheet. In order to prevent back-pressure arising in the pipe, it is to be laid on a gradient and vented.

The terminal board on the filter is to be connected to the terminal board in the switch cabinet by means of the control system cable (see circuit diagram).

When the filter is used in aqueous media, it is imperative to observe the following:

3.1 It must be ensured that the filter does not run dry even after the supply pump has been switched off (owing to hardening of dirt).

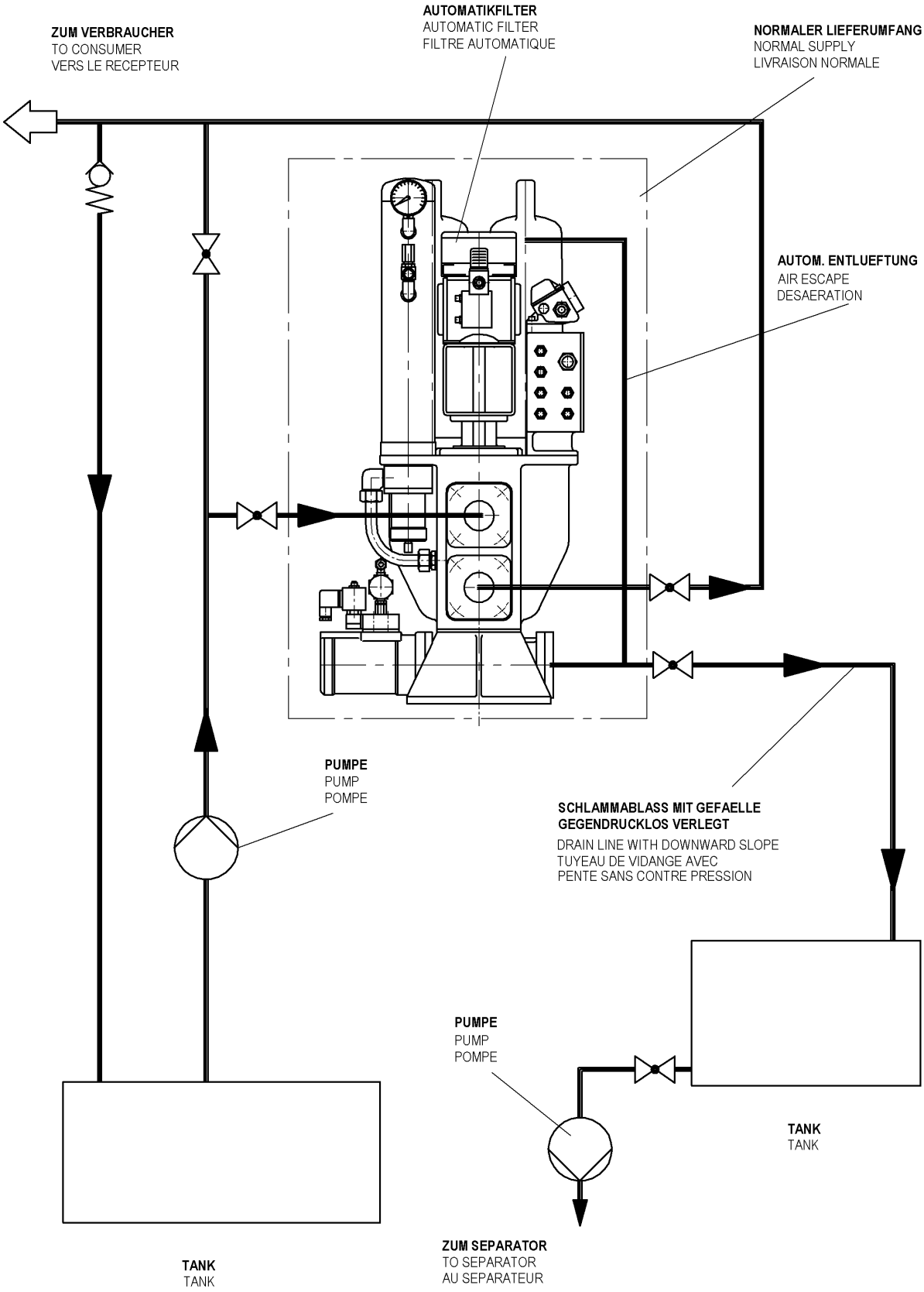
3.2 If this condition cannot be fulfilled, at least the EL.-control must be designed so that, even when the supply pump is switched off, back-flushing is initiated every 2 hours by a time relay.

Flushing operations into a completely empty chamber for test purposes are permitted without any restrictions. Flushing into a partially filled chamber results in increased loading of the filter candles. Back-flushing for installation (pipe) or control reasons into a filter chamber which is only partially filled is therefore inadmissible.

The filter housings are only designed for internal overpressure in accordance with the AD Information Sheets. Additional external forces and moments at the filter connection flanges are to be avoided (possibly by supporting the supply lines).

When installing the filters, make sure that any oil or fuel which leaks due to improper handling cannot result in a fire or injury.

Z36528
TYP6.60
01.01.93



SCHEMA INSTALLATION

EINBAUSCHEMA

TYP 6.60

SCHEMA D INSTALLATION

4. Commissioning

The following requirements must be met for the commissioning of the filter:

4.1 Clean and dry compressed air for the control system at between 4 and 10 bar operating pressure, must be available at the open shut-off valve.

4.2 Switch on the electricity using the "Main Switch" on the switch box. The „Power" lamp respectively LED-operating display lights up. (Activation of the main switch initiates a back-flushing cycle.)

4.3 To check the EL.-control system a back-flushing cycle should now be performed by activating the "Manual" trip on the switch box.

4.4 Open the slide valve at the filter outlet. Slowly open the slide valve at the filter inlet (avoiding pipe hammer). A further back-flushing cycle is to be performed using the "Manual" trip on the switch box. Once the back-flushing operation is completed, the "Flushing" respectively the display "SP.1" lamp goes out. If these conditions are met, the filter is in the start position and is therefore ready for operation.

After completion of a back-flushing cycle, the next backflushing operation can only be initiated (manually or by means of the differential pressure indicator) after a time delay.

This time delay corresponds to the time preset on the time relay "K1A" or the preselected time "PA.5" in the electronic control. It is needed to guarantee that the cleaned filter chamber is filled.

NOTE: **Possible time interval calculation for time-dependent back-flushing**

Let the filter run for 24 hours using the differential pressure and establish the number of back-flushing operations (flushing cycle counter or display). Calculate the average flushing interval.

Set the flushing interval (shortened by 30%) on the time relay or PA.2.

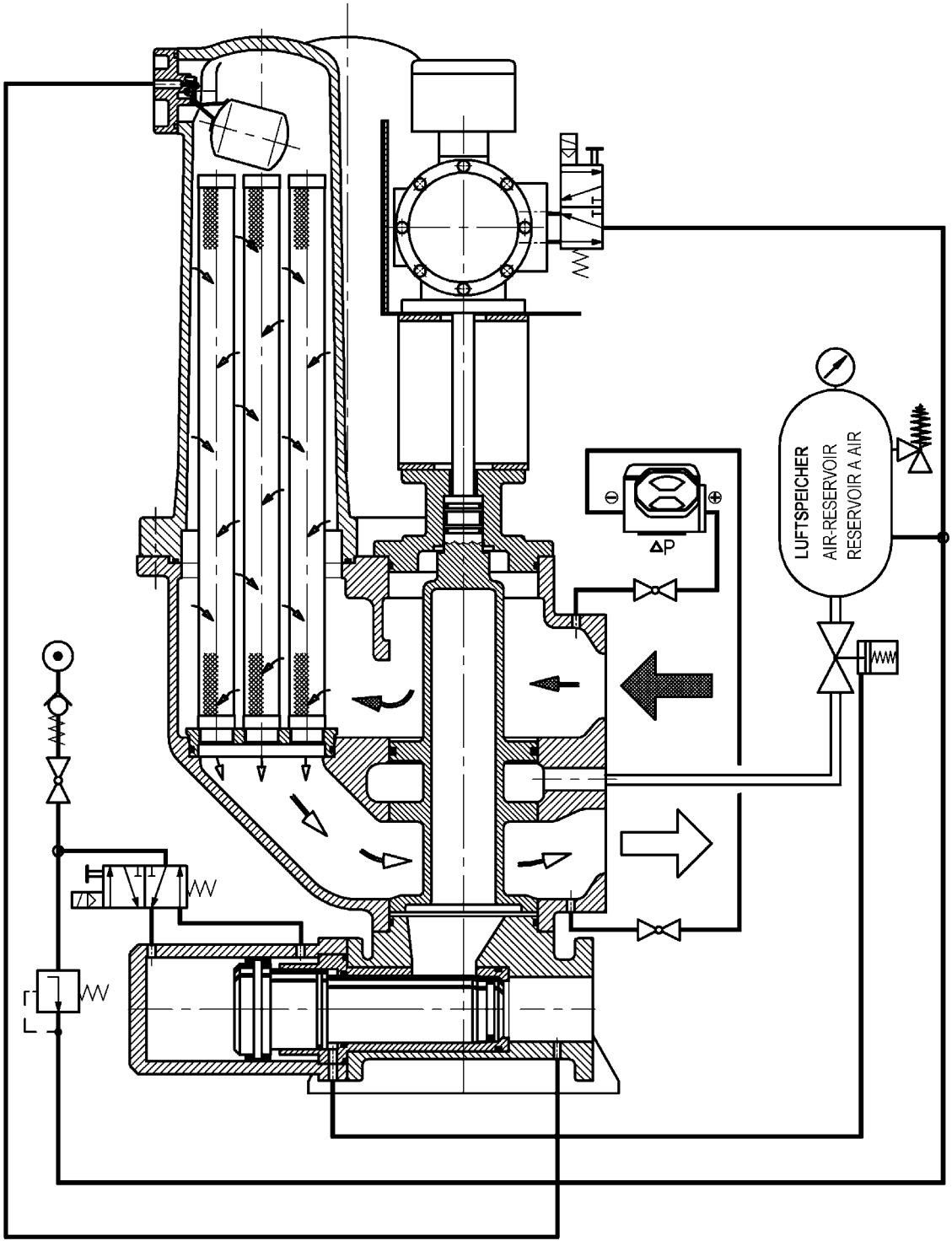
5. Filtration Phase

(see Drawing Z 32330 p. 1 or Z 33703 p. 1)

The medium to be filtered flows down into the change-over system housing and passes from there through the chamber inlet and the connected filter chambers to the candle elements. The medium flows through the filter elements from the outside to the inside and the contamination in the medium is retained on the filter mesh of the candle elements. The cleaned fluid passes to the filter outlet.

In this position the air supply (by means of the solenoid valve) keeps the sludge discharge closed and compressed air is maintained in the air receiver ready for the next backflushing cycle.

Z32330 BL.1
TYP6.60
12.02.98



TYP 6.60

FILTRATIONSPHASE
FILTRATION-PHASE
PHASE DE FILTRATION

6. Back-Flushing Operation

(See Drawing Z 32330 p. 2 or Z 33703 p. 2)

The contamination retained on the candle elements produces an increasing pressure differential between the filter inlet and outlet. This difference in pressure is indicated optically on the differential pressure indicator when a set value is reached and an electrical contact initiates the back-flushing.

When the back-flushing cycle is initiated, the pneumatic swivel drive is switched by the attached control valve and the plug rotates from the chamber held in reserve to the filter chamber to be cleaned. The connection of the reserve chamber, with its clean candle elements, causes an immediate reduction in the pressure differential. When the stop plug reaches the filter chamber to be cleaned the turning motion of the pneumatic swivel drive is stopped by means of the attached end position switch.

The solenoid valve (mounted on the sludge discharge) is then switched electrically and air from the air supply passes to the rear side of the sludge discharge valve shaft. The sludge discharge valve opens and pressure is released from the chamber now shut off. (See Note!)

This allows the compressed air in the upper region of the plug to immediately expand and thus creates additional space for the fluid displaced (by the air) in the backflushing cycle.

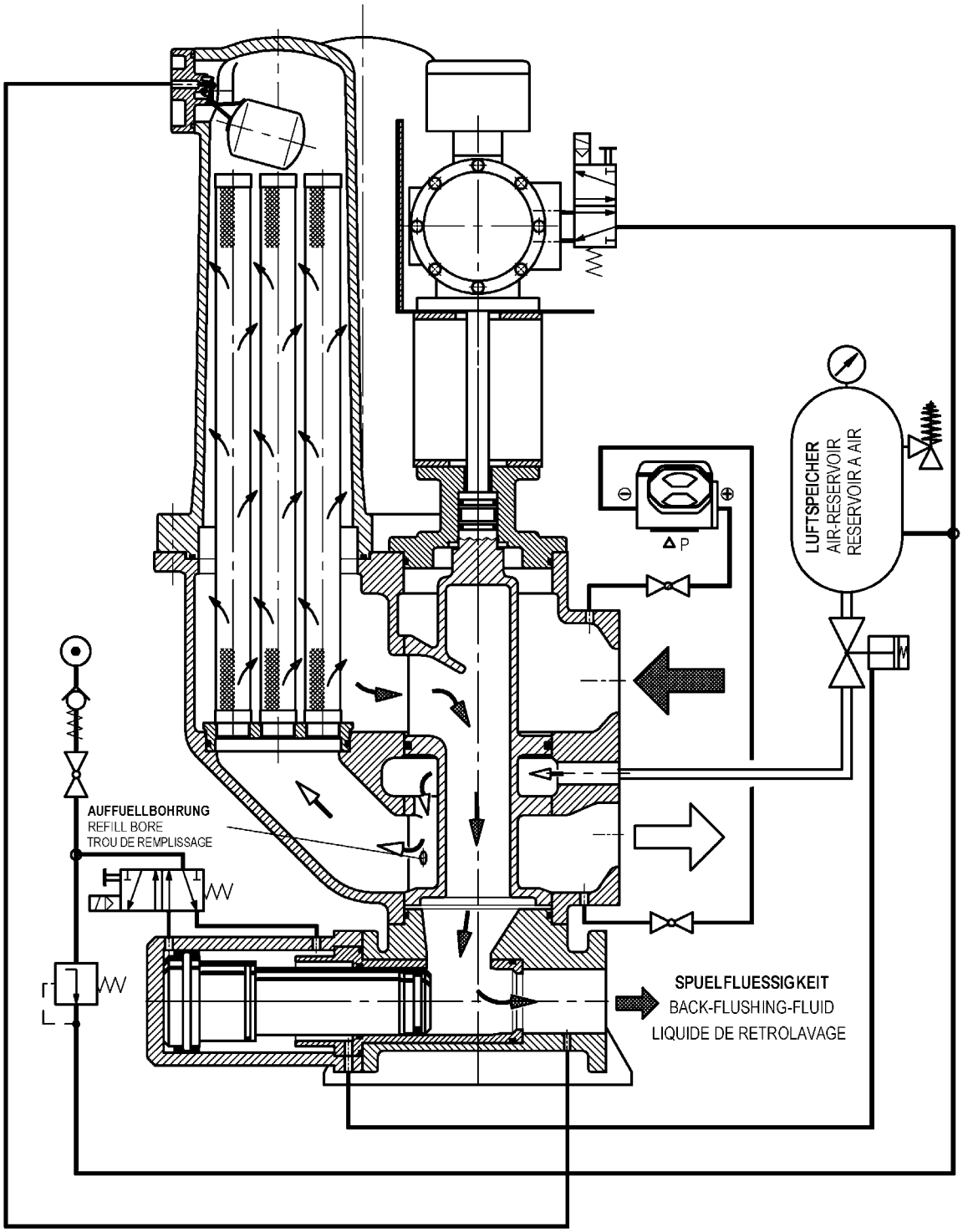
While the sludge discharge valve shaft is opening, the control system air reaches the attached flushing valve (once the pressure has been released on the filter chamber). The flushing valve opens and the compressed air from the air receiver dispatches the clean fluid present and pushes it in the counter current direction through the mesh of the screw-in candle elements. The pressure drop thus generated flushes off the contamination deposited on the mesh and washes it out of the filter housing via the open sludge discharge valve.

The air flow is continued for a short period (flushing period) before the solenoid valve (on the sludge discharge) is electrically switched over, causing the sludge discharge valve to close. At the same time the flow of air from the control system to the connected flushing valve is interrupted and thus also stops the flow of the stored back-flushing air.

The back-flushed filter chamber is now refilled with clean medium through the refill bore until operating pressure is achieved.

Only then is the delay of the electric control cancelled for the next back-flushing operation.

Z32330 BL.2
TYP6.60
12.02.98



TYP 6.60

RUECKSPUELPHASE
BACK-FLUSHING-PHASE
POSITION DE LAVAGE A
CONTRE-COURANT

ELECTRONIC CONTROL FOR BACK-FLUSHING FILTERS FROM BOLL & KIRCH TYPE 2100

Terminal diagrams version 1 (ser. No. 4302597):

Fil.-1	Type 6.61.07		Z 37811
Fil.-2	Type 6.61		Z 37810
Fil.-3	Type 6.61	Alarm Δp activation	Z 37877
Fil.-5	Type 6.60	Alarm Δp activation	Z 37879
Fil.-6	Type 6.14/6.17/6.18/6.19/6.44		Z 37793
Fil.-8	Type 6.61.07	Alarm Δp activation	Z 40299
Fil.-9	Type 6.62		Z 40181
Fil.-10	Type 6.62	Alarm Δp activation	Z 40182

Terminal diagrams version 2 (ser. No. 4303608):

Fil.-4	Type 6.60	Z 37878
Fil.-7	Type 6.23/6.24/6.23.1/6.24.4	Z 37795

SPECIAL FEATURES:

- Display in housing cover with 5-place, 7-segment display
- Display of the back-flushing phase "Flushing"
- Display of the number of back-flushing cycles
- Display of faults in code
- An LED in the display indicates the mains power supply
- 3 keys for operating the control
- CPU card with non-volatile E-Eprom and Eprom as program memory
- I.O. card in control box

A T T E N T I O N !

Subject: **El. control type 2100**

The transformer type and the terminal designation of the transformer had to be changed owing to the introduction of the European voltage of 400 V.

Old type designation: 4AM 8095-OAR70-ON
New type designation: 4AM 8095-OAXOO-ON

The primary and secondary voltages of 220 V were previously at the terminals 1 and 3; with the new transformer now at terminals 1 and 2.

Note: If the transformer is exchanged, it is imperative to assign the terminals correctly according to the transformer nameplate. Incorrect terminal assignment results in damage to the coils of the solenoid valves.

GENERAL

BOLL & KIRCH manufactures back-flushing filters for industry and shipbuilding.

The back-flushing filters are able to determine the degree of contamination of the filter elements during operation and, if a limit value is exceeded, to automatically clean the filter elements.

The electronic control described here will replace the relay control and improve operation and servicing functions.

The electronic control type 2100 is rated for a 3-phase primary voltage of 220 V, 380 V, 440 V and 500 V with a tolerance of ± 10 %.

The following must be observed before commissioning:

During mounting or installation of the control type 2100 attention must be paid to precise earthing of the control box especially in view of the EMC
Moreover, no additional live cables > 220 V should be laid within a distance of about 1 m from the power supply cables.

Note: The desired primary voltage / operating voltage must be checked and selected by re-arranging the FASTON lug on the transformer. The jumpers are as follows:

Jumper 1 - 31	=	550 V; AC; 3 ” operating voltage
Jumper 1 - 6	=	500 V; AC; 3 ” operating voltage
Jumper 1 - 5	=	440 V; AC; 3 ” operating voltage
Jumper 1 - 4	=	380 V; AC; 3 ” operating voltage
Jumper 1 - 3	=	220 V; AC; 3 ” operating voltage

The control voltage for the solenoid valves is always **220 V.**
The frequency is 50 Hz or 60 Hz.

The power supply line is laid to terminals 1, 2 and 3 with 3-phase voltage.
The protective earth conductor "PE" of the power supply line must be laid to the 10-pin "PE" terminal strip or to the earth screw inside the control box.

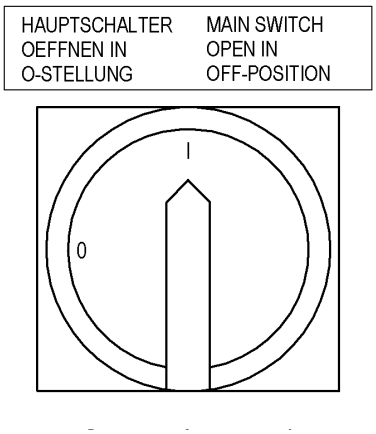
Now all the electric components on the filter are to be wired according to the relevant wiring diagram.

Note: The control is designed for a max. rated current of 1.0 A - and a starting current of 3.0 A . Therefore, the control is unsuitable for a 1-phase operating voltage network.

COMMISSIONING OF THE ELECTRONIC CONTROL

Note: The main switch is designed with an additional auxiliary contact "N". Potential-free use to indicate "Control in operation" is possible via the routing of the contact "N".

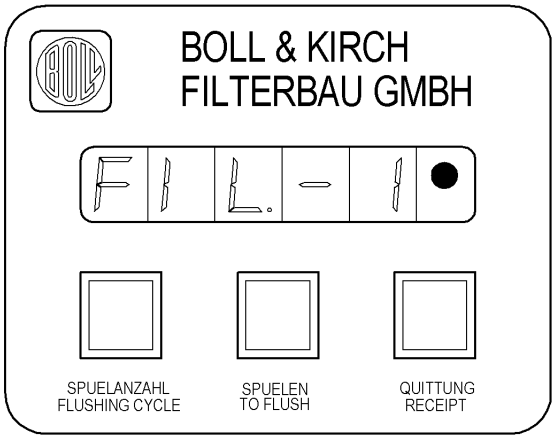
When the control is turned on with the main switch, the relevant control version including the LED operating light appear in the display.



Z37779 v. 09.05.95

Possible control versions:

Fil.-1	for type 6.61.07
Fil.-2	for type 6.61/6.61.1
Fil.-3	for type 6.61 with alarm Δp activation
Fil.-4	for type 6.60
Fil.-5	for type 6.60 with alarm Δp activation
Fil.-6	for type 6.14/6.17/6.18/6.19/6.44
Fil.-7	for type 6.23/6.24/6.23.1/6.24.4
Fil.-8	for type 6.61.07 with alarm Δp activation
Fil.-9	for type 6.62
Fil.-10	for type 6.62 with alarm Δp activation



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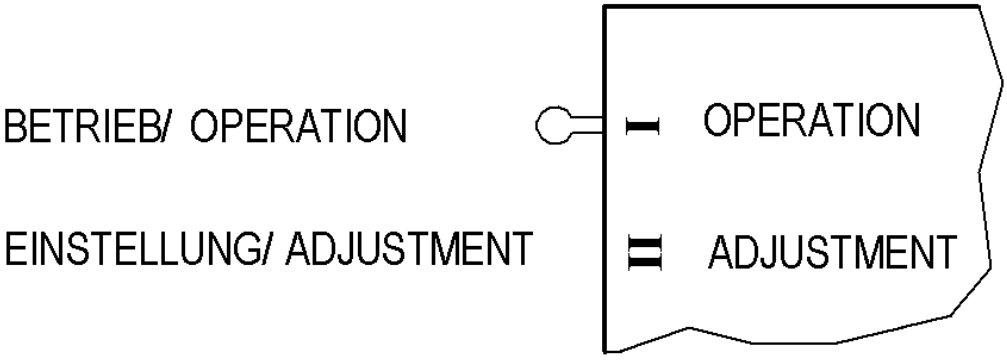
There are 3 keys under the display to operate the electronic control.

The following description is only relevant when the lever position of the selector switch on the CPU card on the inside of the door is at "Operation".



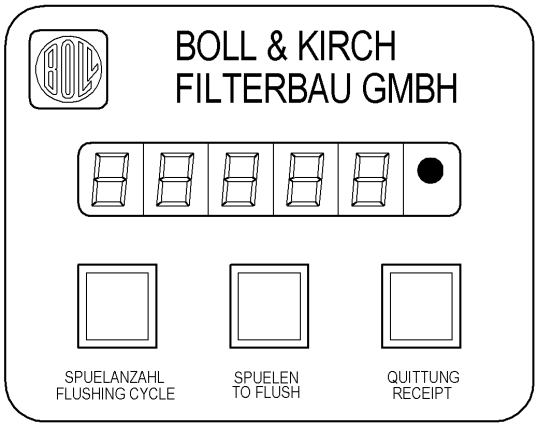
Z37779 v. 09.05.95

KEYBOARD:

On activation of the key **"Flushing cycle"** the number of back-flushing cycles of the filter is displayed. This display is protected against power failure.

On activation of the key **"Flush"** a back-flushing operation is initiated by the electronic control and the message "Sp. 1" appears in the display.

On activation of the key **"Acknowledge (Reiceipt)"** any fault messages are deleted but only if the cause of the fault has been remedied.



Z37779 v. 09.05.95

FAULT MESSAGES IN THE DISPLAY

The following faults can be shown in the display in code:

Note: In the event of any fault relating to EMC no memory contents are deleted in controls supplied after 1 January 1998.

For type 6.61.07 (Fil.-1)

Fe. 0	means	overcurrent tripping or motor not wired
Fe. 1	means	max. differential pressure reached
Fe. 2	means	flushing oil cartridge is saturated

For type 6.61/6.61.1 (Fil.-2)

Fe. 0	means	overcurrent tripping or motor not wired
Fe. 1	means	max. differential pressure reached

For type 6.60 (Fil.-4)
For type 6.23/6.24/6.23.1/6.24.4 (Fil.-7)
For type 6.62 (Fil.-9)

Fe. 1	means	max. differential pressure reached

For type 6.14/6.17/6.18/6.19/6.44 (Fil.-6)

Fe. 0	means	overcurrent tripping or motor not wired
Fe. 1	means	max. differential pressure reached

For type 6.61 (Fil.-3) with alarm Δp activation
For type 6.61.07 (Fil.-8) with alarm Δp activation

Fe. 0	means	overcurrent tripping or motor not wired
Fe. 1	means	max. differential pressure reached
Fe. 3	means	Δp alarm "Back-flushing activation by differential pressure"

For type 6.60 (Fil.-5) with alarm Δp activation
For type 6.62 (Fil.-10) with alarm Δp activation

Fe. 1	means	max. differential pressure reached
Fe. 3	means	Δp alarm "Back-flushing activation by differential pressure"

In the case of the fault messages Fe.0 (overcurrent tripping or motor not wired) and Fe. 1 (max. differential pressure reached) the potential-free alarm contacts 11, 12 and 13 are also activated as change-over contacts at the same time.

In the case of the fault message Fe. 3 (Back-flushing activation by differential pressure) the potential-free alarm contacts 14, 15 and 16 are activated as change-over contacts.

The fault message Fe.2 (flushing oil cartridge is saturated) is only shown on the display.
No routing via potential-free contact.

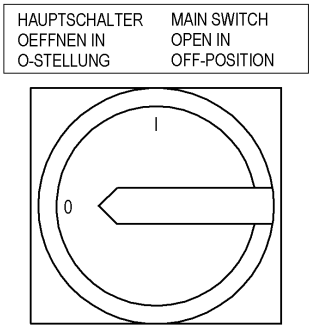
The fault message in the display cannot be deleted by activating the "Acknowledge (Receipt)" key until the fault has been remedied.

For the reliable orientation of the software after deletion of the fault message, it is recommended to turn off the control with the main switch for about 10 seconds and then turn it on again.

If the control is not switched off with the main switch (reset function), the time-dependent back-flushing activation is no longer automatically triggered although the fault has been remedied.

ADAPTION (IN MODE PA. ...) BY THE OPERATOR FOR TYPE 2100

In order to adapt the operating data during filter operation, the main switch must be turned to the "0" position.



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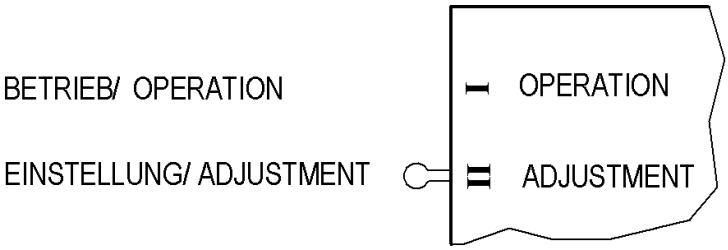
A selector switch is located on the CPU card on the inside of the door.



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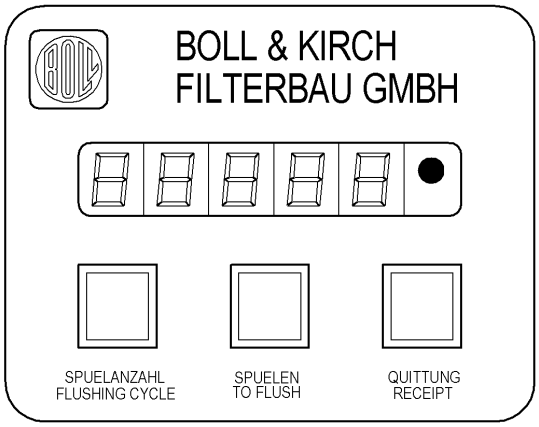
Turn the selector switch to the bottom position "Adjustment II".
Turn the main switch on the door front ON.
"Fil.-..." now appears in the display, depending on the filter type, and the LED operating light comes on.



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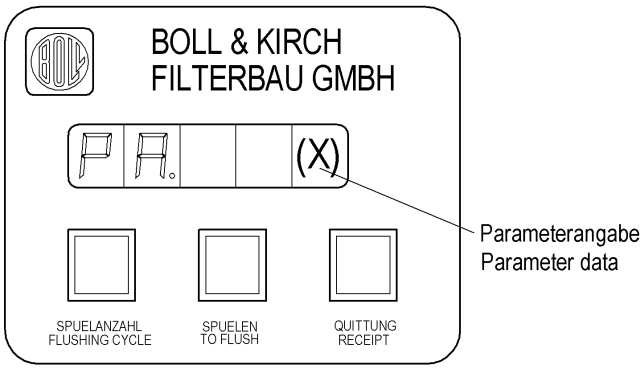
If none of the three control keys is activated, the display is switched over after a short period to the display PA. ...

The numbers in the parameter display "PA. ..." depend on the filter type in question and can vary between "PA.1" and "PA.10".



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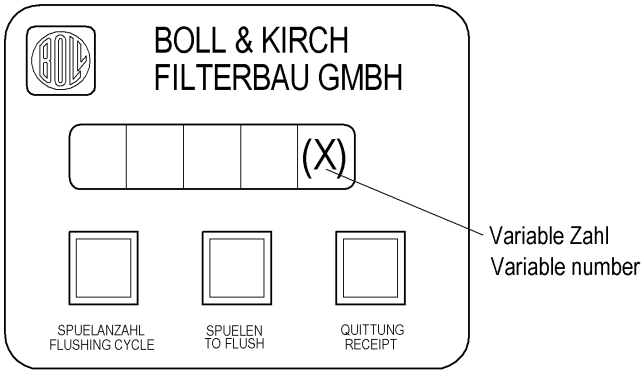
The operator may only adapt the operating data of the parameters PA.2, PA.3, PA.4 and PA.8 to the prevailing operating conditions.

After activation of the "Acknowledge (Receipt)" key a variable number appears in the display.
This number must now be adapted to suit the operating conditions.



Z37779 v. 09.05.95

PA.2 Time-dependent back-flushing activation in hours from 0-59 h.
Adjustable in 1 h increments.
In all control versions

PA.3 Time-dependent back-flushing activation in minutes from 0-59 min.
Adjustable in 1 min. increments.
In all control versions

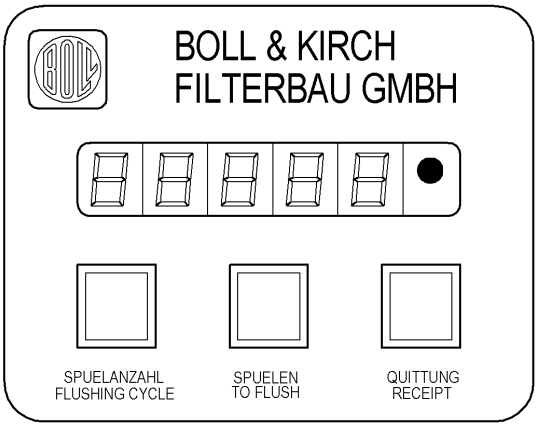
PA.4 Back-flushing time from 5 sec. to 100 sec.
Adjustable in 1 sec. increments
In all filter types apart from 6.23/6.24/6.23.1/6.24.4

PA.8 Flushing frequency monitoring
0 = Off; 1 = On
With filter type 6.60 alarm Δp activation
With filter type 6.61 alarm Δp activation
With filter type 6.61.07 alarm Δp activation
With filter type 6.62 alarm Δp activation

The number is increased with the key **"Flushing cycle"**.

The number is reduced with the key **"Flush"**.

When the right number has been reached, it must be acknowledged with the **"Acknowledge (Receipt)"** key.



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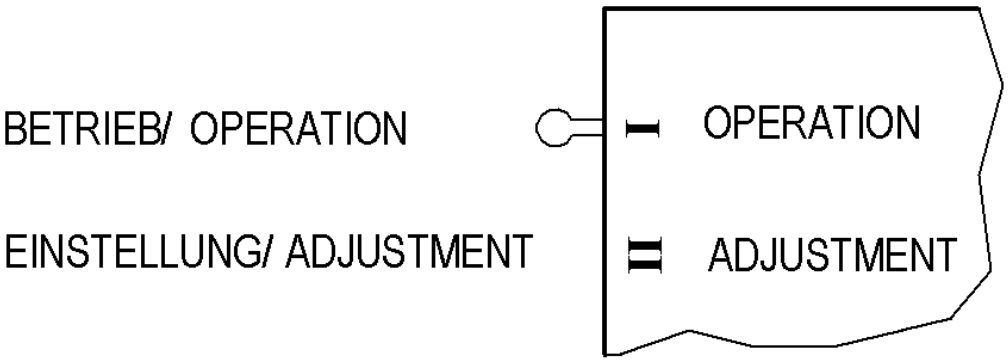
On completion of the entries it is imperative for the "Acknowledge (Receipt)" key to be activated at least twice for software reasons (The display also changes to the next parameter display).
Now turn the selector switch back into the top position "Operation".



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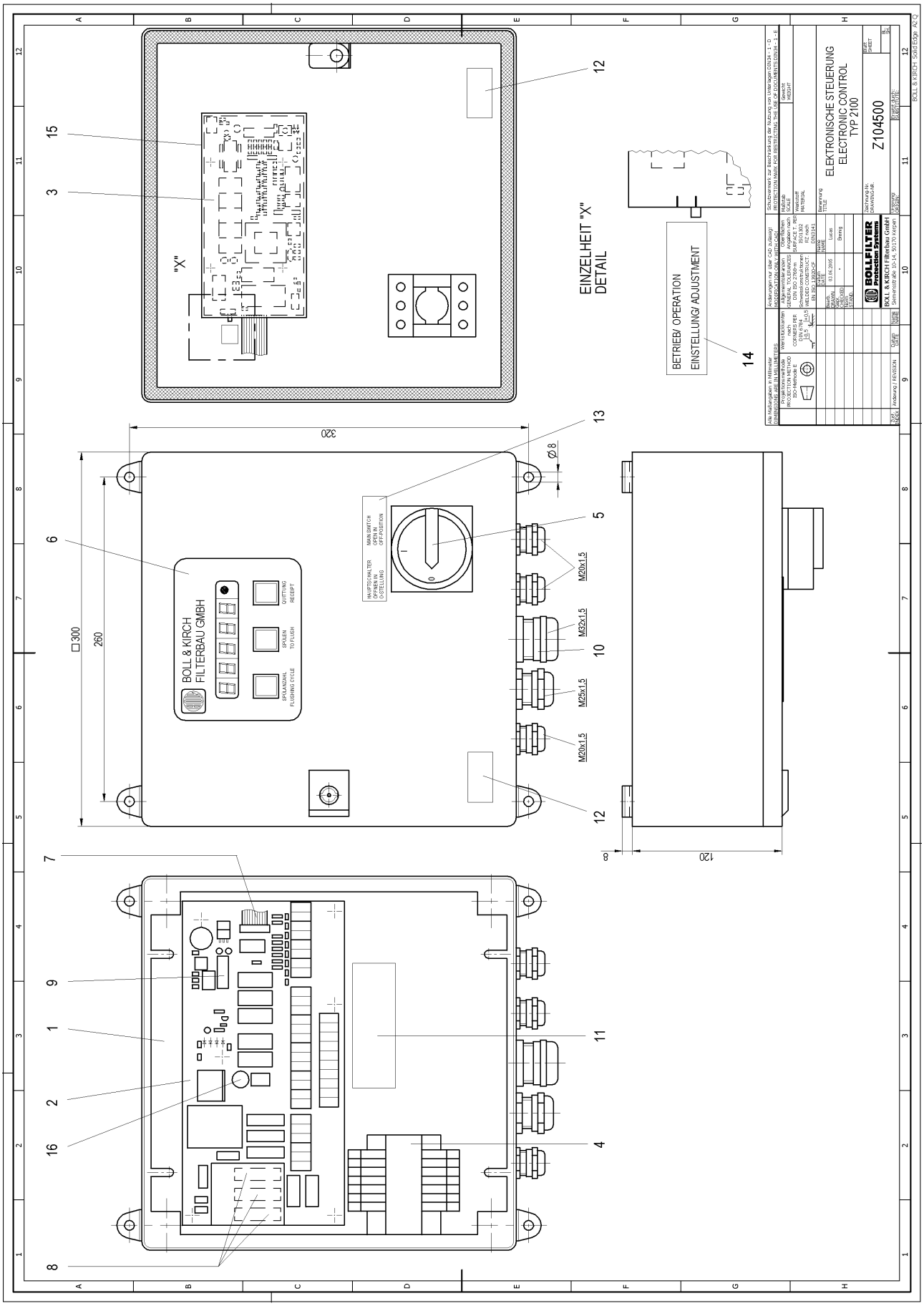
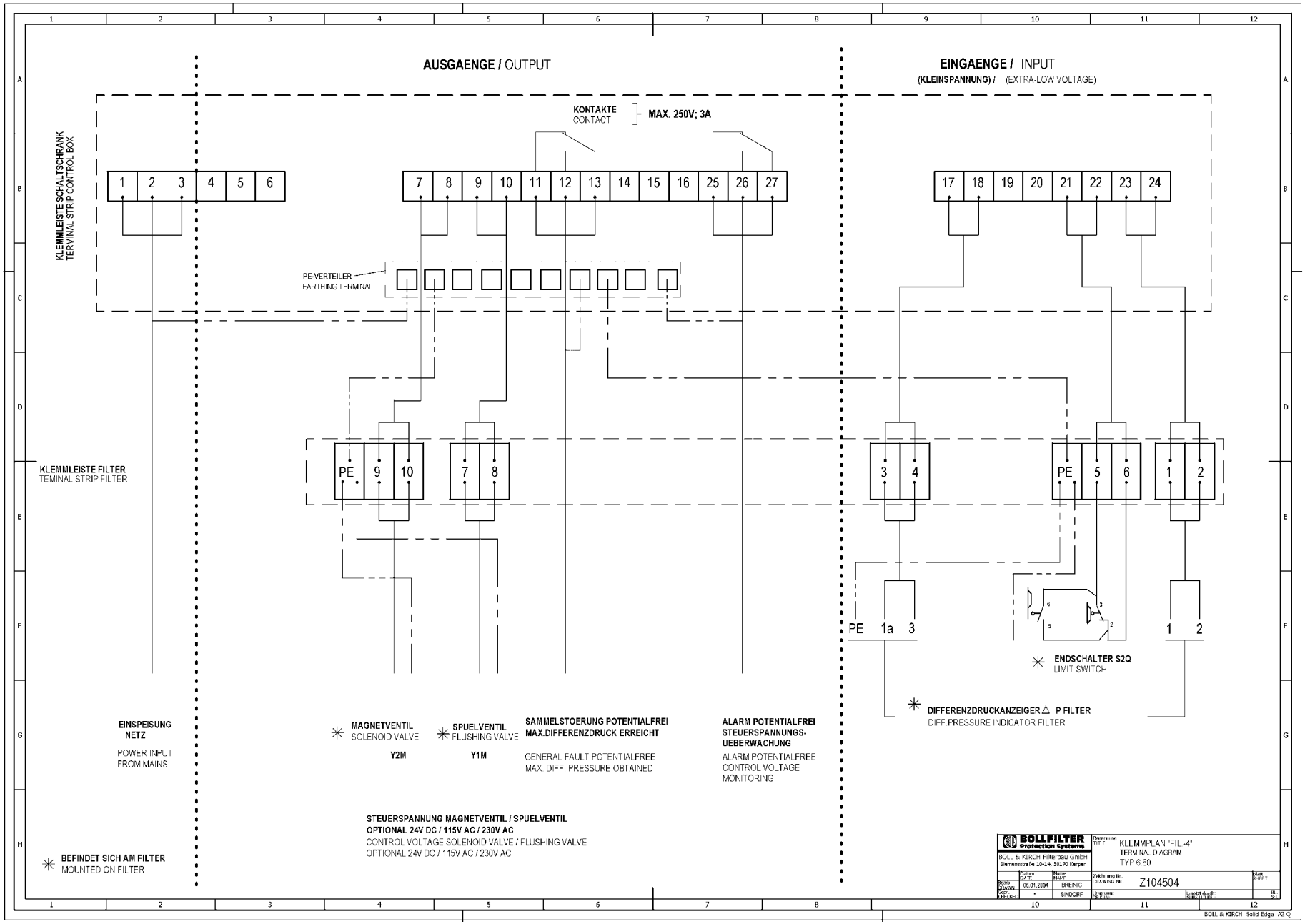
The abbreviation of the filter control selected, Fil.- ..., now appears in the display.


"X"
EINZELHEIT "X"
DETAIL
BETRIEB/ OPERATION
EINSTELLUNG/ ADJUSTMENT
BOLL & KIRCH
FILTERBAU GMBH
320
300
260
120
M20x1.5
M32x1.5
M25x1.5
M20x1.5
ELEKTRONISCHE STEUERUNG
ELECTRONIC CONTROL
TYP 2100
Z104600


AUSGAENGE / OUTPUT
EINGAENGE / INPUT
(KLEINSPANNUNG) / (EXTRA-LOW VOLTAGE)
KONTAKTE
CONTACT
MAX. 250V; 3A
KLEMMLEISTE SCHALTSCHRANK
TERMINAL STRIP CONTROL BOX
1 2 3 4 5 6
7 8 9 10 11 12 13 14 15 16 25 26 27
17 18 19 20 21 22 23 24
PE-VERTEILER
EARTHING TERMINAL
KLEMMLEISTE FILTER
TEMINAL STRIP FILTER
PE 9 10
7 8
3 4
PE 5 6
1 2
PE 1a 3
1 2
ENDSCHALTER S2Q
LIMIT SWITCH
DIFFERENZDRUCKANZEIGER △ P FILTER
DIFF.PRESSURE INDICATOR FILTER
EINSPEISUNG NETZ
POWER INPUT FROM MAINS
MAGNETVENTIL
SOLENOID VALVE
Y2M
SPUELVENTIL
FLUSHING VALVE
Y1M
SAMMELSTOERUNG POTENTIALFREI MAX.DIFFERENZDRUCK ERREICHT
GENERAL FAULT POTENTIALFREE MAX. DIFF. PRESSURE OBTAINED
ALARM POTENTIALFREI STEUERSPANNUNGS-UEBERWACHUNG
ALARM POTENTIALFREE CONTROL VOLTAGE MONITORING
STEUERSPANNUNG MAGNETVENTIL / SPUELVENTIL
OPTIONAL 24V DC / 115V AC / 230V AC
CONTROL VOLTAGE SOLENOID VALVE / FLUSHING VALVE
OPTIONAL 24V DC / 115V AC / 230V AC
BEFINDET SICH AM FILTER
MOUNTED ON FILTER
BOLLFILTER Protection Systems
BOLL & KIRCH Filterbau GmbH
Siemensstraße 32-34, 50170 Kerpen
KLEMMPLAN "FIL -4"
TERMINAL DIAGRAM
TYP 8.60
Z104504
06.01.2004
BRENING
SINDORF

DOCUMENTATION PARTS LIST Date 22.04.04

Page 1

Document 4300047

Description
Electronic Control
Typ 2100 Variante 2

Assembly Drawing: Z104500
Terminal Diagram
Fil.-4 Typ 6.60 Z104504
Fil.-7 Typ 6.23/6.24/6.23.1/6.24.4 Z104502

Item	ID no.	Description	Qty	Unit
00001	4306540	control box	1,00	Stück
00001	4507593	wall fastening support	1,00	Stück
00002	4800003	IO-Board	1,00	Stück
00003	4800004	CPU-Board	1,00	Stück
00004	4200079	Transformer	1,00	Stück
00005	4205076	main switch	1,00	Stück
00006	4201002	display	1,00	Stück
00007	4101010	Ribbon Cable Connector	1,00	Stück
00008	4201111	fuse unit	3,00	Stück
00009	4201120	fuse unit	1,00	Stück
00010	7002	cable gland	3,00	Stück
00010	7003	cable gland	1,00	Stück
00010	7004	cable gland	1,00	Stück
00011	7006	label	1,00	Stück
00012	7007	label	1,00	Stück
00013	7008	label	1,00	Stück
00014	7009	label	1,00	Stück
00015	7011	covering sheet	1,00	Stück
00016	4201571	fuse unit	1,00	Stück

Erstellt / Prepared: 19.04.04 Breinig
Geprüft / Approved: 19.04.04 Sindorf

10. Servicing

Even automatic filters require inspection and servicing at regular intervals. It is to be noted in particular that despite regular back-flushing the filter mesh can become clogged in the course of time, depending on the quality of the medium and the by-pass cleaning available. Contamination on the mesh can be removed by cleaning the candle element manually using an appropriate solvent (see Section 13). An increase in the clogging on the mesh can be inferred from the progressively shorter intervals between back-flushing cycles. The number of back-flushing cycles can be seen on the "Flushing Cycle Counter" respectively display on the switch box.

To maintain trouble-free operation the following points are to be noted:

a) All connections are to be regularly checked for leaks.
b) Candle elements are to be dismantled and inspected initially after 500 flushing cycles, then after 5.000 and later every 10.000 flushing cycles. If, however, a sharp reduction in the intervals between back-flushing cycles should occur, inspection and cleaning should be carried out sooner. If sudden lengthening of the intervals between back-flushing cycles should occur all candle elements must be inspected without fail for damage.

Before the cartridge elements are dismantled, the automatic filter must be completely drained by automatic back-flushing (i.e. all filter chambers). "Manual" activation on the control box. Care must be taken to ensure that the liquid level is below the cartridge element before the element is dismantled.

The candles are subjected to wear through reciprocal loading. It is therefore recommended that a complete candle filter element, the number of candle elements depending on the size of the filter, be kept in stock.

It is expedient to renew all seals when overhauling the filter.

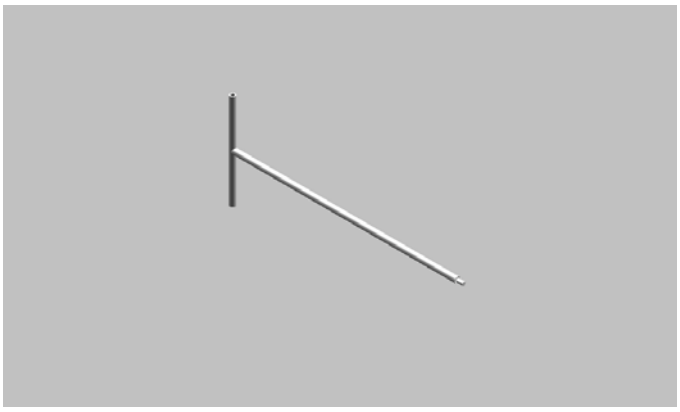
Check the sludge discharge for leaks every 10.000 flushing cycles. No medium should run from the end of the sludge discharge line during the filtration phase (except during the flushing cycle).

10.1 You must close the compressed air supply valve (item 127), then starting a manual back flushing, before you are allowed to removed the manometer (item 72). This well ensure that the compressed air reservoir (item 13) is pressure released.

11. Servicing Tools

The following special tools are supplied for servicing the filter:

11.1 Special key with SW 10 or 14 for dismantling the filter chamber.



11.2 Special key for unscrewing the candle elements from the candle holder.

11.3 Key for opening the switch box and hand crank for operation during a power failure.

12. Candle Element Cleaning Agent "BOLL CLEAN 2000"

The choice of cleaning medium depends on the type of the contamination. With fuels precipitation of paraffin and asphalt or with lubricating oils mixing of different types of oil can form solid encrustations on the mesh. Effective cleaning of fine meshes is achieved by soaking in "BOLL CLEAN 2000" followed by blasting with compressed air using a cleaning gun.

PRODUCT DESCRIPTION:

BOLL CLEAN 2000 is a fluid cleaning and degreasing agent with a wide range of application. It can be used for practically all cleaning and degreasing purposes.

BOLL CLEAN 2000 cleans rapidly, thoroughly and extremely economically.

Use of BOLL CLEAN 2000 renders safety precautions superfluous.

BOLL CLEAN 2000 has these outstanding characteristics without exhibiting the disadvantages of solvent cleaners.

BOLL CLEAN 2000 is non-flammable
does not require special marking
does not have an irritating odour
is not caustic
is physiologically unobjectionable
is biologically degradable
is registered with the Federal Office
for the Environment, Reg.-No. 04860019

BOLL CLEAN 2000 can be undercooled or overheated during storage but remains fully usable when returned to normal temperature.

MESH CONTAMINATED WITH HEAVY OIL:

Elements contaminated with heavy oil must be soaked in a standard commercial solvent. After soaking the elements are cleaned in the BOLL & KIRCH Type 5.04

Cleaning Device using BOLL CLEAN 2000 and high pressure pump.

INSTRUCTIONS FOR USE:

Use of BOLL CLEAN 2000 is not restricted to a particular method of cleaning. Depending on the operating conditions, BOLL CLEAN 2000 can be used in a dip bath, in a spraying plant, in steam jetting or in manual application using a cloth, brush or sponge. It can be used warm or cold. BOLL CLEAN 2000 is miscible with water - even seawater.

Concentration for mesh cleaning: 1 : 2,5

Temperature: up to a maximum of 60 °C

The concentration depends on the type and thickness of the adhesive substance to be removed. When used in concentration below 1 : 30 rinsing is usually not required.

No visible film remains on the surface.

13. Manual Cleaning of the Candle Filter Elements

Before the cartridge elements are dismantled, the automatic filter must be completely drained by automatic back-flushing (i.e. all filter chambers). "Manual" activation on the control box. Care must be taken to ensure that the liquid level is below the cartridge element before the element is dismantled.

13.1 Remove the whole filter element assembly. Then soak the filter element assembly, with the opening of the candle elements facing down, in a suitable tank filled with solvent. Detached contaminants can then sink downwards out of the candle.

13.2 The soaking time and the relevant solvents are:

a) In cold BOLL CLEAN 2000 cleaner the maximum soaking time is 24 hours.

b) In Filterclean (Vecom) the maximum soaking time is 12 hours.

c) In Reiniger B85 (Vecom) the maximum soaking time is 12 hours.

d) In gas oil the maximum soaking time is 48 hours.

13.3 After soaking remove the whole filter element assembly from the tank and place it on a suitable stand (e.g. perforated sheet metal) with the candle element opening pointing down and allow the solvent to drain.

13.4 Now with the cleaning gun supplied blow compressed air through the candles from the inside to the outside.

13.5 After this procedure the complete filter element assembly should be immersed in fresh cleaner, with the candle element opening downwards, and rinsed through with an up and down motion.

The washing procedure described in Section 13.5 should only be carried out in a separate tank using clean solvent. The solvent can then be used again for the next soaking procedure.

13.6 Allow the element assembly to drain again and dry it by blowing compressed air through it again from the outside to the inside. The manual cleaning procedure described here has produced adequate results (ca. 60 % clean) in similar applications.

13.7 Almost 100 % cleaning is only possible manually, in our experience, by using the Type 5.04 High Pressure Cleaning Unit with BOLL CLEAN 2000.

See the separate description "Filter Cleaning Unit Type 5.04".

14. Maintenance instructions (bypass filter)

Take the bypass filter out of operation before carrying out maintenance work on it!

To remove the screen insert, proceed as follows:

1. Slacken venting screw (item 332) of the cover retaining arrangement and in this way check that the filter housing is not pressurized.

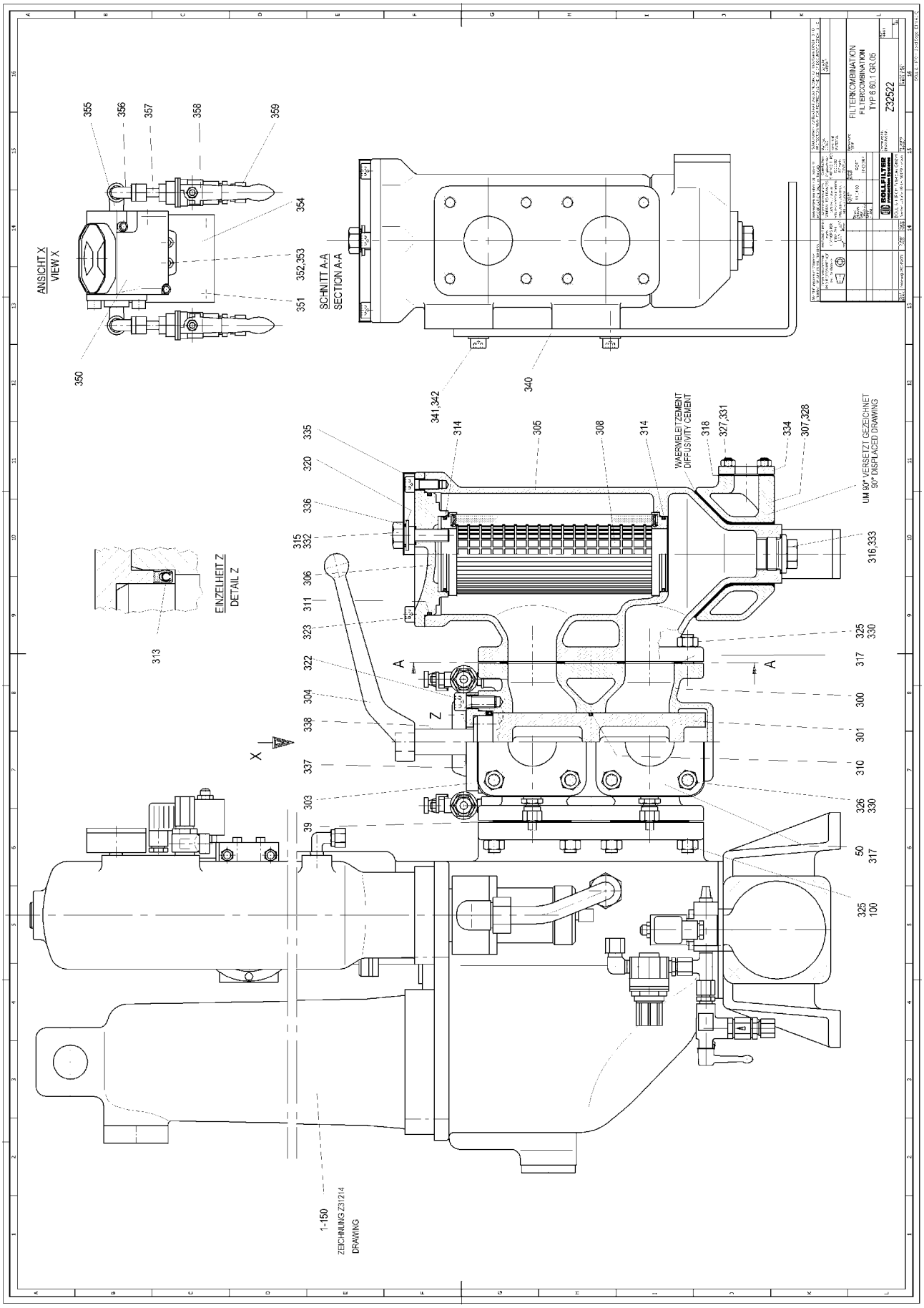
2. Unscrew the venting screw until the cover panel (item 335) over the concealed cover screws (item 323) can be swivelled.

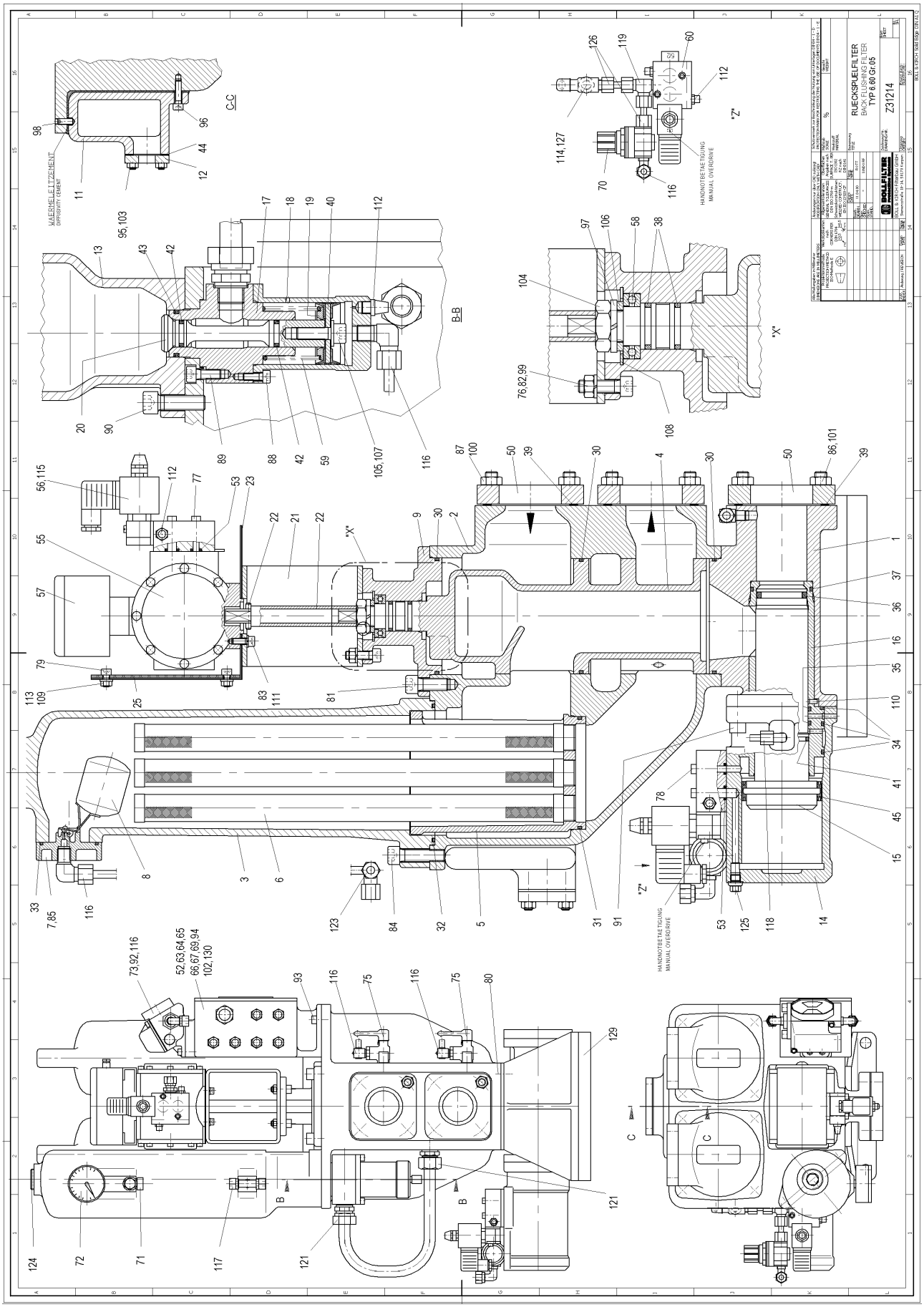
3. Remove cover (item 306) after slackening the cover screws and pull screen insert out of the filter housing.

4. Clean screen insert with suitable solvents (see KV349) and then blow through with compressed air from the inside to the outside.

5. Check seals and replace any damaged seals.

6. Assemble filter in the reverse order.


FILTERKOMBINATION
FILTERCOMBINATION
TYP 8.60.1 GR.05
Z32522
ANSICHT X
VIEW X
SCHNITT A-A
SECTION A-A
EINZELHEIT Z
DETAIL Z
UM 90° VERSETZT GEZEICHNET
90° DISPLACED DRAWING
WAERMELEITZEMENT
DIFFUSIVITY CEMENT
1-150
ZEICHNUNG Z31214
DRAWING


RUECKSPUELFILTER
BACK FLUSHING FILTER
TYP 6.60 Gr.05
Z31214
C-C
B-B
"X"
"Z"
HANDNOTBETAETIGUNG
MANUAL OVERDRIVE
WAERMELEITZEMENT
DIFFIGVITY CEMENT

BOLLFILTER
Protection Systems
Marine & Power

DOCUMENTATION PARTS LIST

Date 23.02.05
Page 1

Document 0639320

Description
automatic filter combination
6.60.1 Gr.05 DN50

Material EN-JS1030
EN-GJS-400-15
EN 1563
Assembly Z32522+Z31214
Dimension drawing Z32570

Filter room:
max. allowable pressure : 16 bar
max. allowable temperature : 160°C
Heating room:
max. allowable pressure: 14 bar
max. allowable temperature : 200°C
Test pressure : 2 x Calculation pressure

Item	ID no.	Description	Qty	Unit
00001	6530355	housing lower part	1	pcs.
00002	6530354	change-over housing	1	pcs.
00003	6537759	filter chamber	2	pcs.
00003	2000004	stud bolt	4	pcs.
00004	6335469	cock plug	1	pcs.
00005	5007847	candle support	2	pcs.
00006	1104422	filter candle according to order	16	pcs.
00007	5906594	cover	2	pcs.
00007	5218298	nozzle	2	pcs.
00007	6712641	bow	2	pcs.
00007	2000266	slotted cheese head screw	4	pcs.
00008	2610023	float	2	pcs.
00008	2611123	pin	2	pcs.
00008	3530032	threaded pipe fitting	2	pcs.
00009	6530356	cover switchover housing	1	pcs.
00011	6530357	heating chamber	1	pcs.
00012	5000011	counter flange	1	pcs.
00013	6533516	air reservoir	1	pcs.
00014	5229568	valve housing	1	pcs.
00015	5000486	valve ram	1	pcs.
00016	5005528	valve face	1	pcs.
00017	5005609	housing	1	pcs.
00018	5006510	valve cover	1	pcs.
00019	5007512	disc	1	pcs.
00020	5006512	valve ram	1	pcs.
00021	5700156	distance piece	1	pcs.
00022	5701532	rectangular tube	1	pcs.
00022	2300011	Spring Type Straight Pin	1	pcs.
00022	5701533	square bar steel	1	pcs.
00023	5700158	mounting sheet	1	pcs.
00025	4101224	isolation plate	1	pcs.
00030	3030066	o-ring	3	pcs.
00031	3030661	o-ring	2	pcs.
00032	3030761	o-ring	2	pcs.
00033	3132369	o-ring	2	pcs.

DOCUMENTATION PARTS LIST Date 23.02.05
Page 2

0639320 automatic filter combination
6.60.1 Gr.05 DN50

Item	ID no.	Description	Qty	Unit
00034	3038188	o-ring	3	pcs.
00035	3096894	o-ring	2	pcs.
00036	3096995	o-ring	1	pcs.
00037	3030063	o-ring	1	pcs.
00038	3094563	o-ring	2	pcs.
00039	3380001	high pressure gasket	3	pcs.
00040	2785451	seal piston	1	pcs.
00041	3038126	o-ring	1	pcs.
00042	3098361	o-ring	2	pcs.
00043	3038361	o-ring	1	pcs.
00044	3380049	high pressure gasket	1	pcs.
00045	3437135	double grooved ring	1	pcs.
00050	2800062	square counter flange	3	pcs.
00052	3380199	flat gasket	1	pcs.
00053	3040224	o-ring	4	pcs.
00055	4500016	double piston slewing gear	1	pcs.
00056	2656655	solenoid valve	1	pcs.
00056	4206553	coil	1	pcs.
00056	4105912	connector plug	1	pcs.
00056	2614072	sound absorber	1	pcs.
00057	4200143	limit switch	1	pcs.
00058	2708947	deep groove ball bearing	1	pcs.
00059	2307427	pressure spring	1	pcs.
00060	2656655	solenoid valve	1	pcs.
00060	4206553	coil	1	pcs.
00060	4105912	connector plug	1	pcs.
00060	2614072	sound absorber	1	pcs.
00063	5950196	connection box	1	pcs.
00064	8450198	cover for connection box	1	pcs.
00065	4105616	clamp	12	pcs.
00065	4105617	clamp	5	pcs.
00065	4100015	distance plate	3	pcs.
00066	2000258	slotted cheese head screw	2	pcs.
00067	4105805	mounting rail	1	pcs.
00069	4160350	cable gland	8	pcs.
00069	4160349	reducing ring	8	pcs.
00069	4100104	cable gland	1	pcs.
00069	4870017	plug	1	pcs.
00070	2650017	high pressure control device	1	pcs.
00071	2660005	safety valve	1	pcs.
00072	2602689	pressure gauge	1	pcs.
00073	9902572	differential pressure indicator acc. t	1	pcs.
00075	2560063	angle ball valve	2	pcs.
00076	2200235	spring ring	4	pcs.
00077	2002155	hexagon socket head cap screw	2	pcs.
00078	2002155	hexagon socket head cap screw	2	pcs.
00079	2000121	hexagon socket head cap screw	2	pcs.
00080	2000482	stud bolt	4	pcs.
00080	2100011	hexagon nut	4	pcs.
00081	2000155	hexagon socket head cap screw	4	pcs.
00082	2000132	hexagon socket head cap screw	4	pcs.
00083	2000122	hexagon socket head cap screw	4	pcs.

DOCUMENTATION PARTS LIST Date 23.02.05
Page 3

0639320 automatic filter combination
6.60.1 Gr.05 DN50

Item	ID no.	Description	Qty	Unit
00084	2000158	hexagon socket head cap screw	8	pcs.
00085	2100006	hexagon nut	4	pcs.
00086	2009095	stud bolt	4	pcs.
00087	2000036	hexagon screw	8	pcs.
00088	2000122	hexagon socket head cap screw	4	pcs.
00089	2000131	hexagon socket head cap screw	3	pcs.
00090	2000157	hexagon socket head cap screw	2	pcs.
00091	2000144	hexagon socket head cap screw	4	pcs.
00092	2000122	hexagon socket head cap screw	2	pcs.
00093	2000131	hexagon socket head cap screw	2	pcs.
00094	2000261	slotted cheese head screw	2	pcs.
00095	2000001	stud bolt	4	pcs.
00096	2000132	hexagon socket head cap screw	1	pcs.
00097	2209969	spring ring	1	pcs.
00098	2004354	stud bolt	1	pcs.
00099	2100047	hexagon nut	4	pcs.
00100	2100006	hexagon nut	8	pcs.
00101	2100006	hexagon nut	4	pcs.
00102	2003587	threaded flange screw	4	pcs.
00103	2100004	hexagon nut	4	pcs.
00104	2110593	hexagon nut	1	pcs.
00105	2004715	hexagon screw	1	pcs.
00106	5006107	disc	1	pcs.
00107	2200007	disc	1	pcs.
00108	5000243	ring	1	pcs.
00109	2200005	disc	2	pcs.
00110	2001578	headless screw	1	pcs.
00111	2209799	spring ring	4	pcs.
00112	2614171	sound absorber	5	pcs.
00113	2100003	hexagon nut	2	pcs.
00114	2608775	non return valve	1	pcs.
00115	2500024	screwing	1	pcs.
00116	2500025	screwing	2	pcs.
00116	2500025	screwing	6	pcs.
00117	2505496	screwing	1	pcs.
00118	2500029	screwing	2	pcs.
00119	2507461	screwing	1	pcs.
00121	2508115	screwing	2	pcs.
00123	2507808	screwing	1	pcs.
00124	2001772	screwed sealing plug	1	pcs.
00124	3275525	gasket	1	pcs.
00125	2000186	screwed sealing plug	1	pcs.
00125	3270001	gasket	1	pcs.
00126	2500083	screwed socket	2	pcs.
00127	2560356	angle ball valve	1	pcs.
00128	0602645	tubing set	1	pcs.
00130	9401690	type plate	1	pcs.
00131	9407569	label: "in / out"	1	pcs.
00131	9400997	label: "on / off"	1	pcs.
00131	9407396	label: "mud drain"	1	pcs.
00131	9402898	label	1	pcs.
00131	9405704	label: " ... 2 lugs ... "	1	pcs.

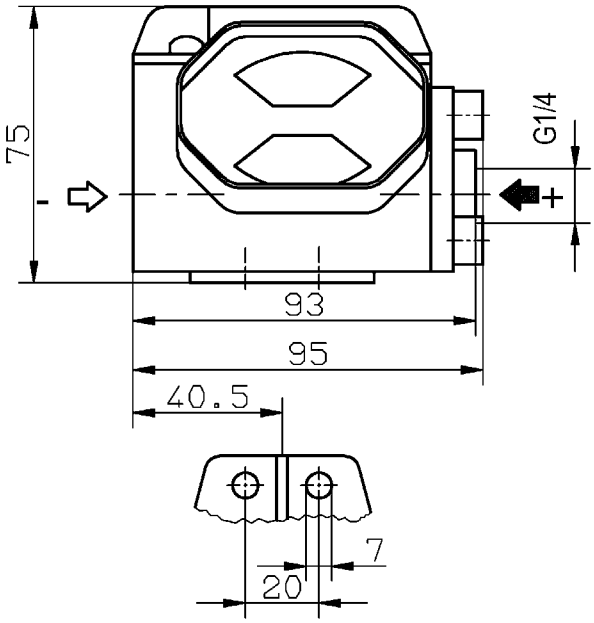
DOCUMENTATION PARTS LIST Date 23.02.05
Page 4

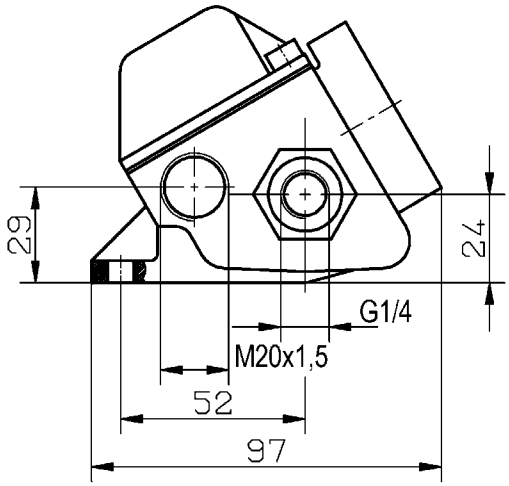
0639320 automatic filter combination
6.60.1 Gr.05 DN50

Item	ID no.	Description	Qty	Unit
00131	9403614	label: "compressed air connection"	1	pcs.
00131	9404642	label: "Delta P differential pressure	1	pcs.
00140	4300000	control box according to order	1	pcs.
00150	6705030	key	1	pcs.
00150	6705032	key for unscrewing the filter element	1	pcs.
00150	5700721	guiding bolt	2	pcs.
00300	6235819	cock casing	1	pcs.
00301	6329196	cock plug	1	pcs.
00303	6406236	cover	1	pcs.
00304	8650098	key	1	pcs.
00305	6436188	housing	1	pcs.
00306	6432960	cover	1	pcs.
00307	6532077	heating chamber	1	pcs.
00308	1174632	pleated filter element	1	pcs.
00310	3031222	o-ring	1	pcs.
00311	3034299	o-ring	1	pcs.
00313	3421241	tec-ring	1	pcs.
00314	3031525	o-ring	2	pcs.
00315	3270002	gasket	1	pcs.
00316	3270006	gasket	1	pcs.
00317	3380001	high pressure gasket	4	pcs.
00318	3380049	high pressure gasket	1	pcs.
00320	2307145	quick fixing device	1	pcs.
00322	2000156	hexagon socket head cap screw	2	pcs.
00323	2000143	hexagon socket head cap screw	6	pcs.
00325	2000004	stud bolt	16	pcs.
00326	2000004	stud bolt	8	pcs.
00327	2000001	stud bolt	4	pcs.
00328	2004354	stud bolt	2	pcs.
00330	2100006	hexagon nut	16	pcs.
00331	2100004	hexagon nut	4	pcs.
00332	5204517	screw for air escape	1	pcs.
00333	2000191	screwed sealing plug	1	pcs.
00334	5000011	counter flange	1	pcs.
00335	6706685	tab washer	1	pcs.
00336	3039056	o-ring	1	pcs.
00337	9401114	label: "cock position"	1	pcs.
00338	9400220	label	1	pcs.
00340	6709832	holding device	1	pcs.
00341	2000143	hexagon socket head cap screw	2	pcs.
00342	2200007	disc	2	pcs.
00350	9902572	differential pressure indicator acc. t	1	pcs.
00351	2000121	hexagon socket head cap screw	2	pcs.
00352	2000123	hexagon socket head cap screw	2	pcs.
00353	2100003	hexagon nut	2	pcs.
00354	5700108	mounting	1	pcs.
00355	2500008	angle	2	pcs.
00356	2500025	screwing	2	pcs.
00357	2500083	screwed socket	2	pcs.
00358	2560770	ball cock	2	pcs.
00359	2500024	screwing	2	pcs.

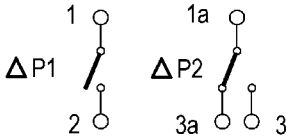
Überarbeitet am : 25.06.04
Überarbeitet von : Bogda

Z45550
TYP4.36.2
17.03.03





CIRCUIT DIAGRAM



SPECIFICATION:
PROTECTION CLASS: IP 65

ELECTR. DATA:	SWITCHING VOLTAGE	V≅	MAX.=	250	220
	FREQUENCY	HZ	MAX.=	0-60	0-60
	SWITCHING CURRENT	A	MAX.=	1	0.8
	MAKING AND/OR BREAKING CAPACITY	W/VA	MAX.=	60/60	40/60

MATERIAL : GD - ALUMINIUM
RATING : MAX. PRESSURE 100 BAR
MAX. TEMPERATURE 150°C

RANGES OF PRESSURE DIFFERENTIAL: DELTA P =
- 0 - 0.5 BAR
- 0 - 0.8 BAR
- 0 - 1.2 BAR
- 0 - 2.0 BAR
- 0 - 3.0 BAR

TO BE SPECIFIED WHEN ORDERING

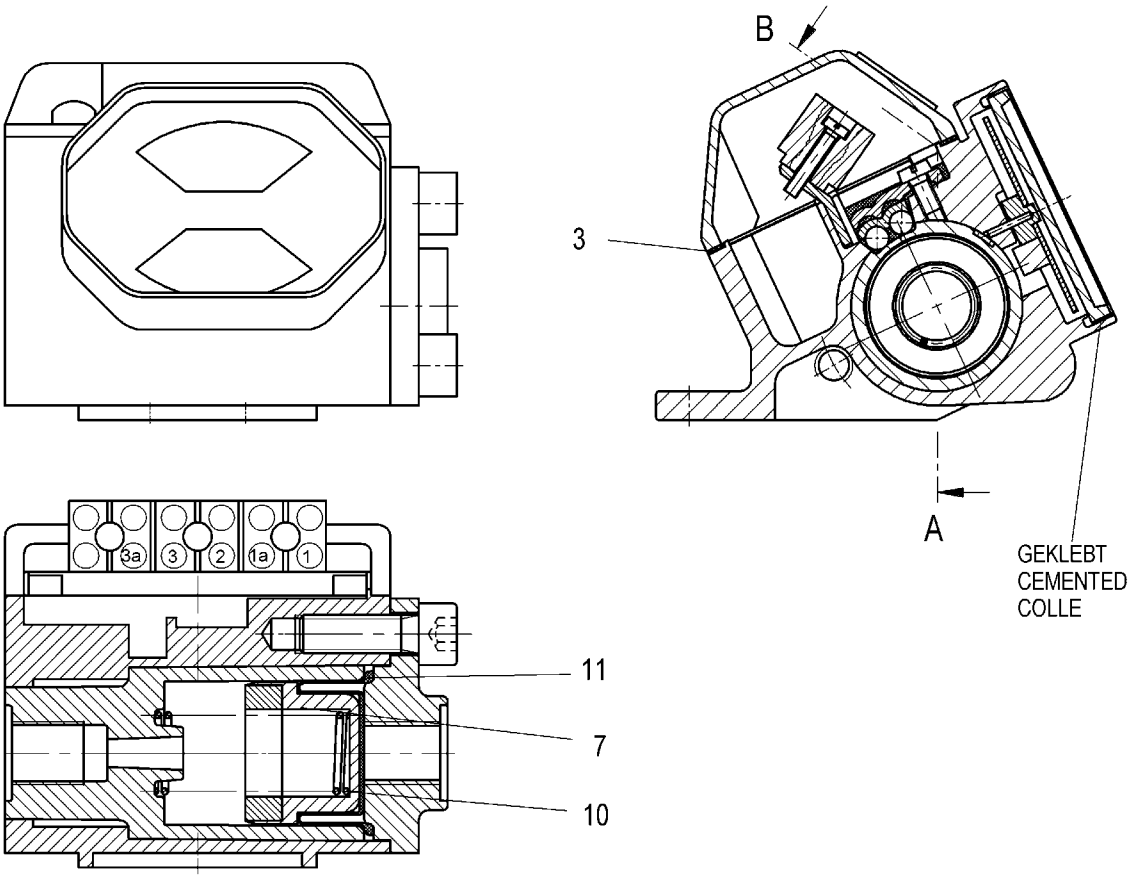
DESCRIPTION:
THE PURPOSE OF THIS DEVICE IS THE MEASUREMENT, AND VISUAL INDICATION OF THE DIFFERENCE IN PRESSURE BETWEEN TWO POINTS, AND THE ESTABLISHMENT OF AN ELECTRICAL CONTACT WHEN THE PRESSURE DIFFERENTIAL ATTAINS A SPECIFIED FIGURE.

METHOD OF OPERATION:
A PLUNGER SEALED BY A DIAPHRAGM SEPARATES THE SPACE UNDER PRESSURE INTO TWO CHAMBERS. A PRE-LOADED SPRING CAUSES THE PLUNGER TO TAKE UP ITS ZERO POSITION WHEN THE PRESSURE DIFFERENCE DELTA P IS ZERO. AS THE PRESSURE DIFFERENCE INCREASES (DELTA P > 0), THE PLUNGER IS FORCED TO MOVE AGAINST THE SPRING. AT THE SAME TIME, AN INDICATOR DISC IS MOVED MAGNETICALLY, AND THEREFORE VIRTUALLY WITHOUT FRICTION, AND THE TWO REED CONTACTS ARE ACTUATED.

THE RED SEGMENT OF THE INDICATOR DISC IS VISIBLE OVER A PRESSURE RANGE EQUAL TO APROX.50-100% DELTA P . THE FIRST REED CONTACT IS ACTUATED AT 75% DELTA P1, AND THE SECOND AT 100% DELTA P2.

DIFFERENTIAL PRESSURE CONTACT INDICATOR TYPE 4.36.2

Z21434
TYP4.36.2+4.46.2
11.02.94



A - B

BEI BESTELLUNG ANGEBEN
TO BE MENTIONED IN CASE OF ORDER
A MENTIONNER LORS DE LA COMMANDE

AUFTR.NR.:
ORDER NO.
NO DE COMMANDE

TYP 4.36.2

11	ROLLMEMBRAN	DIAPHRAGM	DIAPHRAGME	
10	FEDER	SPRING	RESSORT	
7	KOLBEN	PISTON	PISTON	
3	DICHTUNG	GASKET	JOINT	
POS.NR.	BEZEICHNUNG	DESIGNATION	DESIGNATION	

SPARE PARTS
DRAWING

ERSATZTEILZEICHNUNG
ZUM TYP 4.36.2 UND 4.46.2

PLAN DES PIECES
DE RECHANGE

BOLLFILTER
Protection Systems
Marine & Power

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If you need service or spares for our products please contact our head office or our branch-offices, agencies or service-stations.

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