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EXHAUST GAS TREATMENT DOSING UNIT EGT-1 Automatic

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Uniclean Chemical & Gases Ltd
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EXHAUSTGAS TREATMENT DOSING UNIT

INDEX CHAPTER

1. INSTALLATION SPECIFICATION

LOCATION

Install the unit in a location away from the direct heat sources.

Install the unit on a flat and sturdy location.

READ INSTRUCTION MANUAL COMPLETELY BEFORE TAKING IN OPERATION

ELECTRICAL

Connect a 230 VAC 50/60 Hz maximum current protected SINGLE phase main supply to the mainswitch (left hand side of the cabinet).

See enclosed Electrical diagram.

Electrical specs:	Voltage	230 VAC 1 phase
	Frequency	50/60 Hz
	Nominal Power Consumption	0,10 kW
	Current protection fuses	4 Amp.
	Protection Class	IP 54

DIMENSIONS

Cabinet	Height	600 mm
	Width	500 mm
	Depth	250 mm

SETTINGS

Pressure Settings	Air	1,0 barg
	Water	1,2 barg
Alarm settings	Air	< 0,5 barg
	Water	< 0,5 barg

Dosing time	10 minutes
Dosing interval	24 hours
Air blow through at standstill	5 minutes
Air blow through interval at standstill	55 minutes

Dosing pump settings (8,4 LPH … 1,4 L in 10 Min.)

Stroke length	100 %
Stroke frequency	100 %

2. SYSTEM DISCRIPTION

Description EGT-1 Automatic Dosing System.

This dosing system is executed with one (1) connection for the dosage of exhaust gas treatment product into one exhaust line after the engine and turbocharger.

The controls of the dosing cycle is being handled by a mini DCS system, make Siemens, type LOGO RC 230.
This DCS system is free programmable as well as locally as with Windows supported software on a PC.
The basic cycle which will be set by our company is protected by means of an EPROM. This prevents loss of information of the switching program and settings after loss of power.
Chances can only be executed with a security code. Under normal conditions this will not be necessary.

The front of the dosing cabinet is provided with the following:

- Signal light : Power on (white)
- Signal light : Air Valve Open (green)
- Signal light : Water Valve Open (green)
- Signal light : Low Air Pressure Alarm (red)
- Signal light : Low Water Pressure Alarm (red)
- Signal light : Low Level (red) Alarm product drum

- Selection switch : Dosing OFF - ON

- Push button : Manual Start
- Push Button : Reset Alarm

On the left hand side of the dosing cabinet a Main switch is provided.

Functionality:
At start up (Main Switch) at **ON**, Selection Switch OFF-ON at **OFF**

The system opens the Air Valve and Water Valve. The dosingline and injector are cleaned for 1 min.

In this setting, the system will blow through the dosing line and injector with air for 5 minutes every 60 minutes, to prevent the injector from clogging.

At start up (Main Switch) at **ON**, Selection Switch OFF-ON at **ON**

The system opens the Air Valve and starts the dosingpump for 10 minutes. After these 10 minutes, the dosing pump stops, Water Valve opens. The Air Valve remains open. The dosingline and injector are cleaned for 1 min.

In this setting, the system will blow through the dosing line and injector with air for 5 minutes every 60 minutes, to prevent the injector from clogging.

Automatically the dosing sequence is started up again after 24 hours.

MANUAL START

In case dosage within the interval time of 24 hours is desired, push the Manual Start Button.

RESET ALARM

When an alarm occurs, Low Level product drum, Low Water pressure, Low Air pressure the Red Alarm light illuminates. The system will try to clean and blow trough the dosing line and the injector.

Raise the problem, and push the Reset Alarm button. For starting up the dosing sequence, push Manual Start, or Switch OFF-ON the selection switch.

COMPONENTS

The system is executed with the following components:

- Dosing pump	: Prominent, Beta0708 7 ltr/h at 8 bar, with auxiliary relay to handle the low level contact directly to PLC.
- Suction assembly	: fitting on a 25 litre product container, provided with suction valve, filter and low level switch.
- Couplings	: Serto, brass
- Tubing	: copper and polyethylene
- Solenoid valves	: Gemsol
- System cabinet	: Himel
- Controlbox	: Gewis
- Mainswitch	: Sälzer
- Selection switches	: Telemecanique
- Signal lamps	: Telemecanique
- Powersupply	: 230 VAC single phase; 50/60 Hz.

Dosing injector	: 1 ea. injector; length: 250 mm with ¾" BSPP, connection to stack, AISI 316.
Discharge tubing	: Polyurethane hose 6 x 12 mm (1 x 25 metre.)

For further details see drawings attached.

3. OPERATION

INTRODUCTION

See for instructions, concerning the too be dosed product: The chemical suppliers product information sheet.

OPERATION

After installation of the dosing unit execute following:

READ SAFETY DATA SHEET OF THE PRODUCT TO BE USED AND ACT ACCORDINGLY.

- Place dosing drums in the frame and install suction device in one of the drums.

- Put main switch in position 1.

- Open water and air valves and set the pressure reducer for water on 1,2 bar and for air on 1,0 bar.

- Put the switch dosing OFF-ON in the position ON.

STARTING UP THE SYSTEM FOR FIRST TIME

- Set the pump stroke length (large knob) at 100 %.

- Set the pump stroke frequency (small knob) at 100 %.

- Open the air bleed valve on the pump's dosinghead

- When liquid comes out tighten the air bleed connection.

- Set the Stroke length and the stroke frequency at the desired settings See dosing graph in the attached pump manual.

DOSINGPUMP

The EGT 1 Dosing System consists of an electric driven magnetic pulse dosing pump fitted inside the cabinet.

The pump suction is directly from the product container by means of a special designed suction piece with a LOW LEVEL CUT out switch and a filter fitted on.

The capacity of the pump can be adjusted in two ways:
a) The stroke length is adjustable.
b) The stroke frequency is adjustable. (Number of strokes per minute).
The capacity should be adjusted in that way that the desired amount of EGT product is added to the water flow in the appropriate ratio.

The pump is equipped with following signals lights.

A green LED is the operation signal.
A red light is a failure signal.
An Orange light means that the product drum is nearly empty.

N.B. Stroke length adjusting should only be made when pump is running.

REPLACING THE PUMP MEMBRANE

During running of the pump adjust length of stroke to 0.

Stop the pump and disconnect the suction and discharge lines:

Loosen the bolts of the dosing head. (Pull them out for about 5 mm, do not remove the bolts).

Unscrew the membrane of the pump by turning the dosing head anti-clockwise.

Flush and clean the suction and discharge valves and the dosing head itself.

Place a new membrane into the intermediate disc and place dosing head with the suction valve in the position next to the drain hole in the intermediate disc.

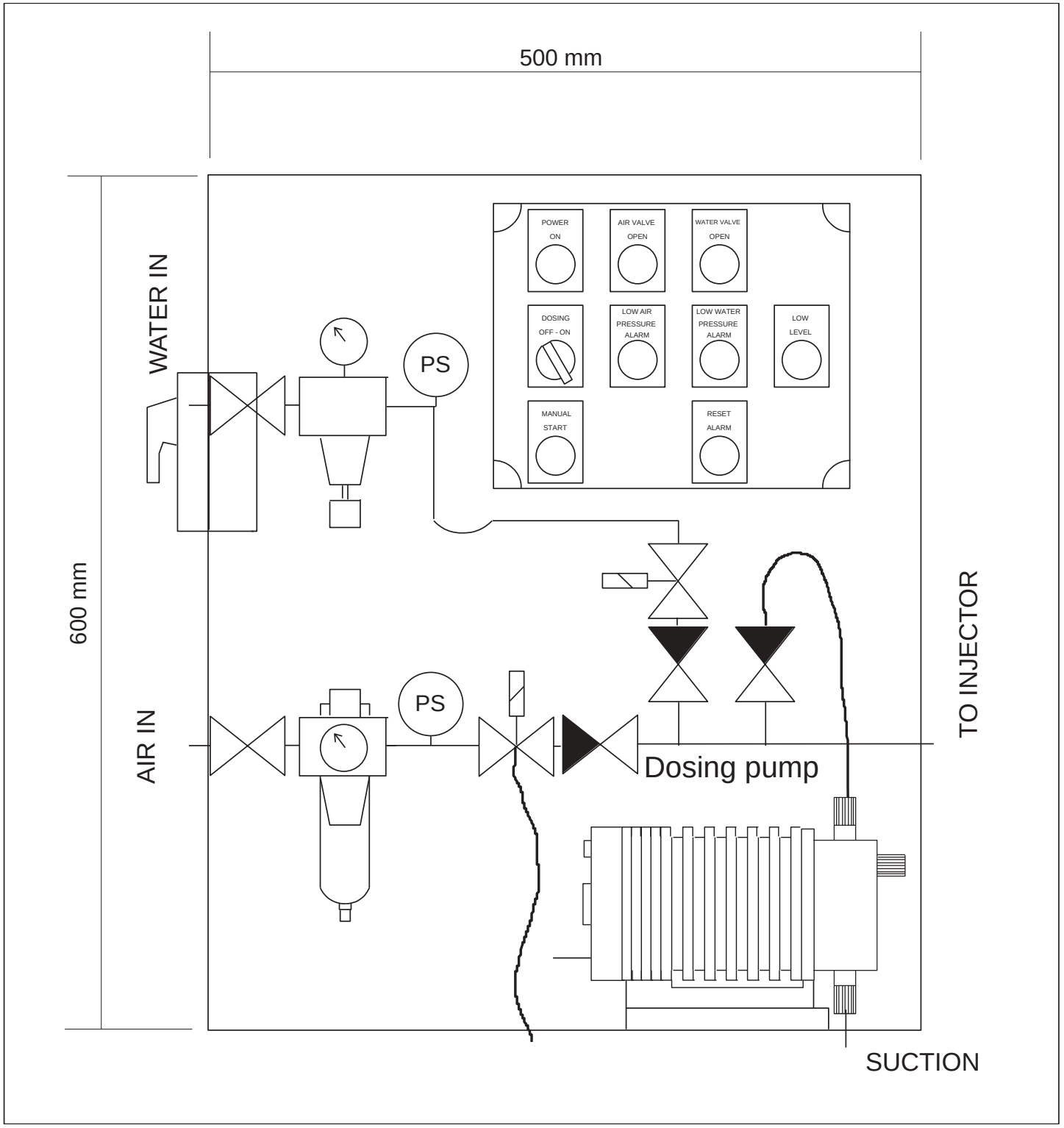
Put the bolts into the dosing head and turn the total assembly clockwise until the membrane is fixed.

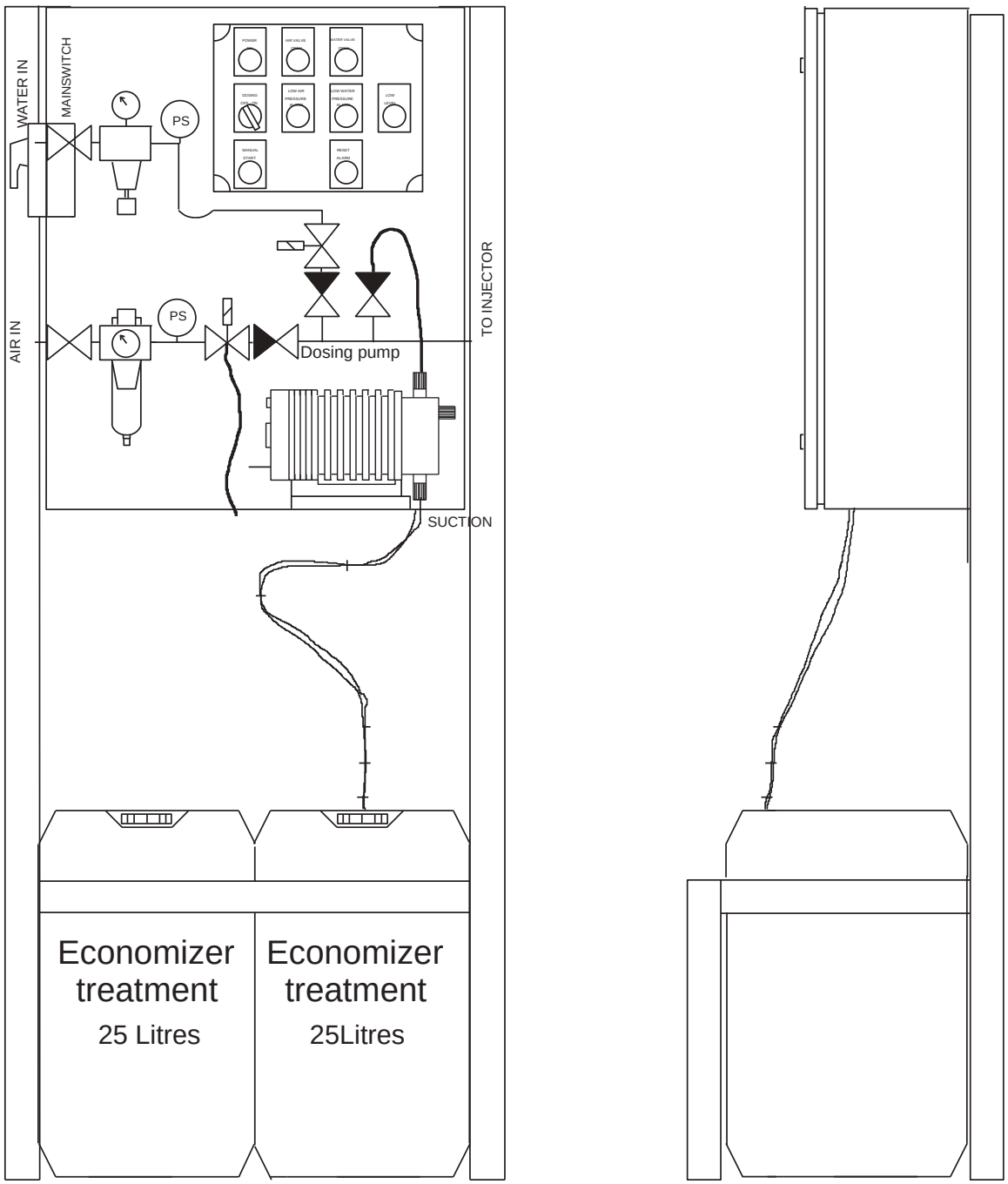
Start the pump with the stroke length at 100% and turn the whole assembly until the suction side of the pump is pointing downwards.

Fasten the dosing head bolts crosswise while pump is still running.

Reconnect suction – and discharge lines and set the stroke length and frequency control in the right position again (vent the pump).

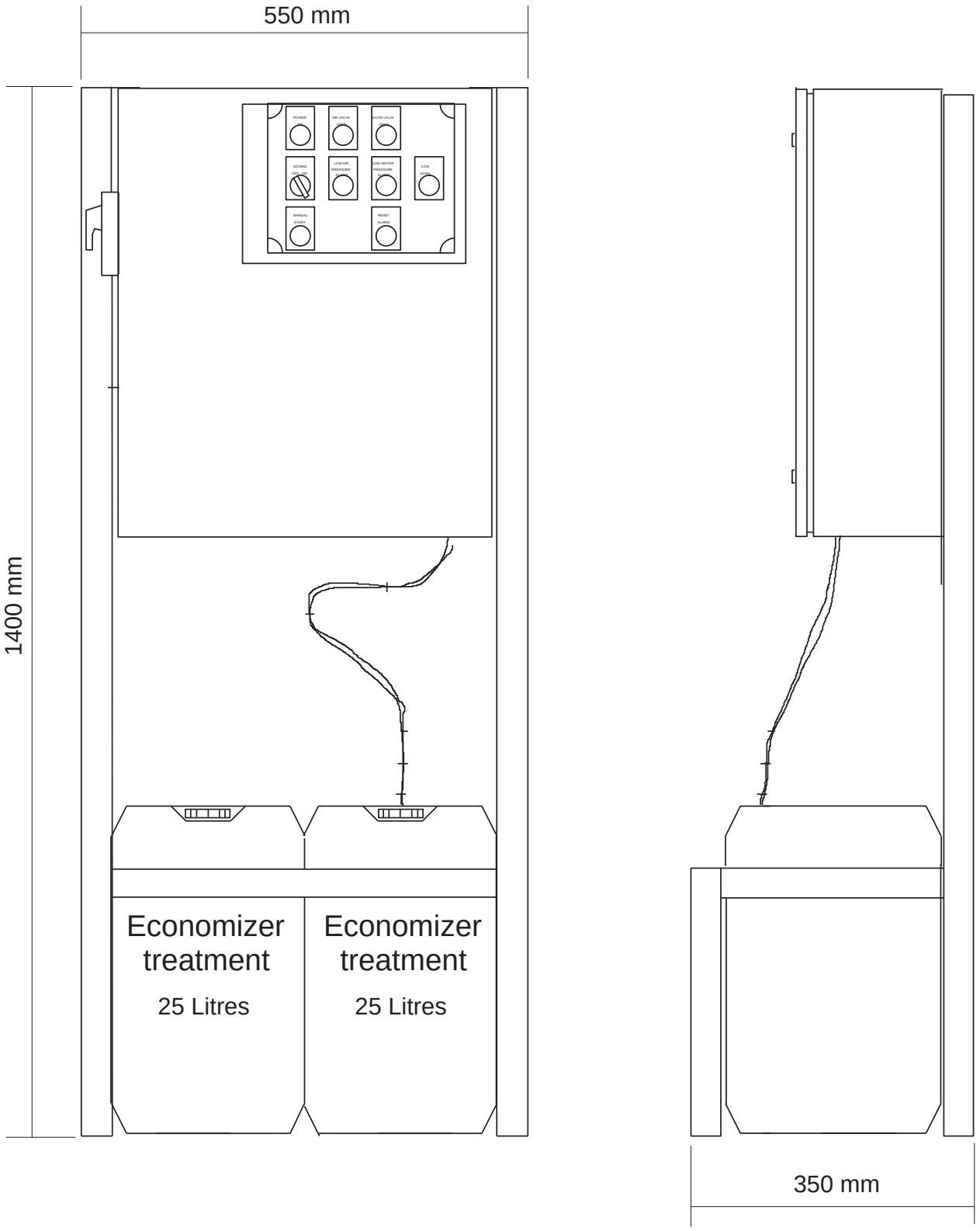
4. MECHANICAL DRAWINGS





THE FRAME IS OPTIONAL

SCHAAL		DATUM	OPMERKING
GET.	V.M. de Vries	18-06-1998	
BENAMING	EGT-1 Automatic Dosing System		
TEKENINGNR.	EGT-1 Auto.020		
REVISIE	0	14-08-2007	



THE FRAME IS OPTIONAL

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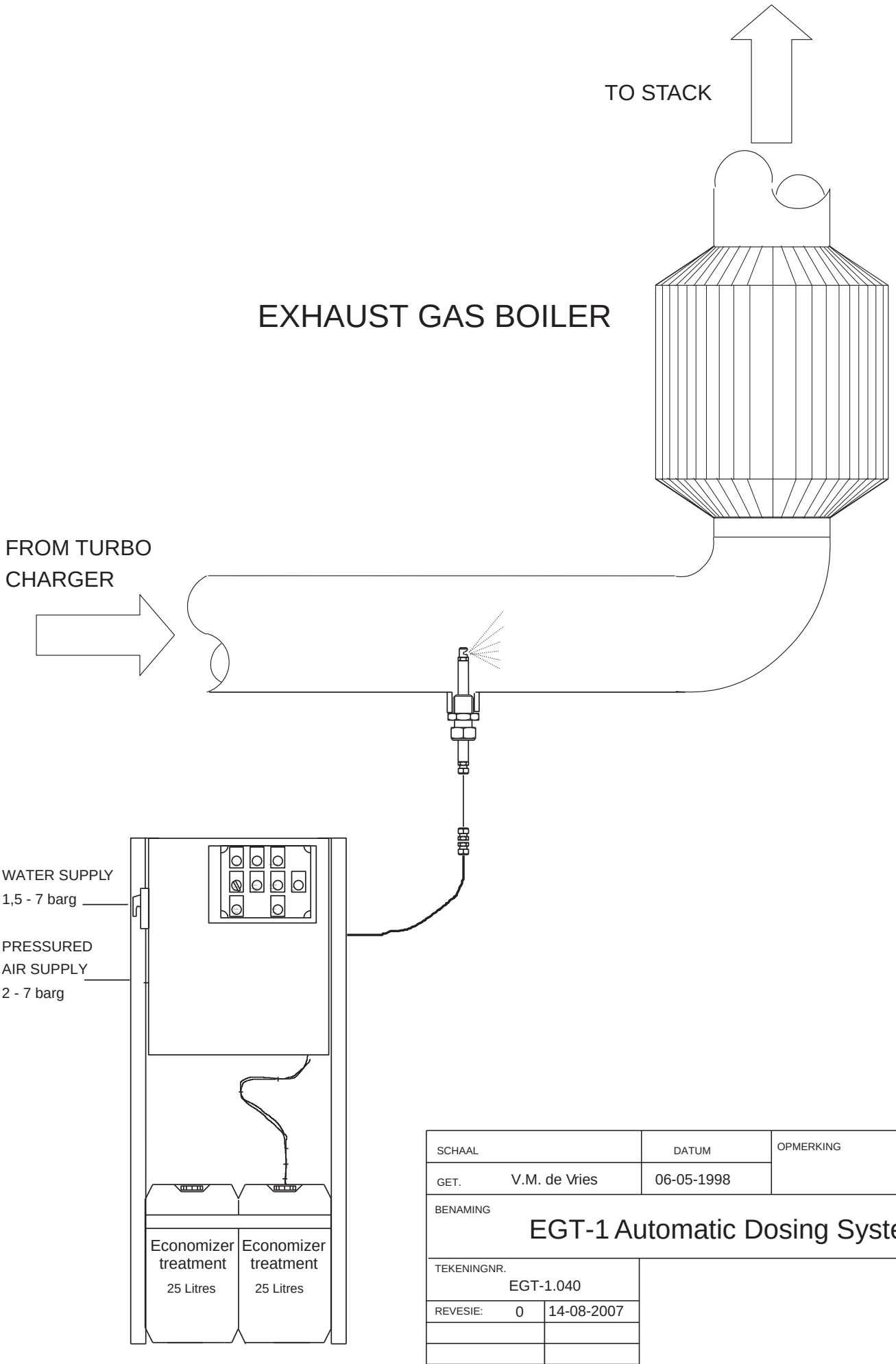
TEKENINGNR.	EGT-1 Auto.030		
REVISIE	0	14-08-2007	



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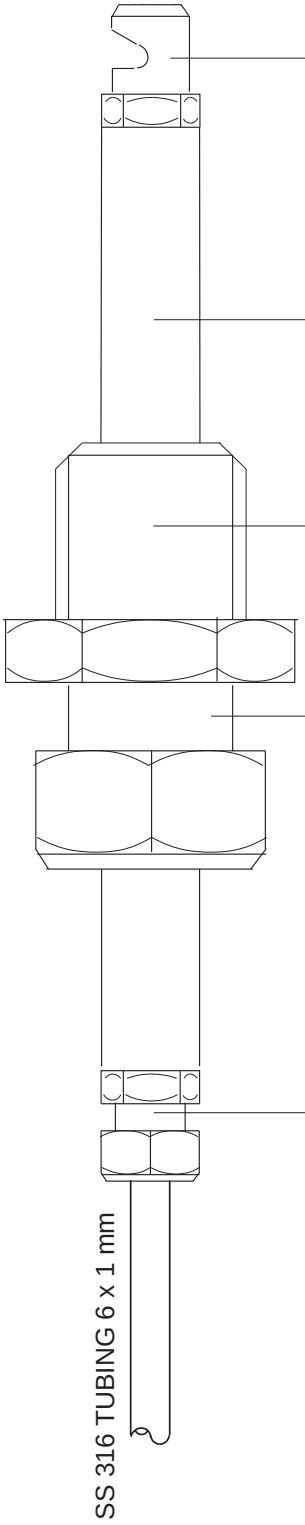
BENAMING	EGT-1 Automatic Dosing System		
TEKENINGNR.	EGT-1.040		
REVESIE:	0	14-08-2007	

EGT-1 NOZZLE "MARK-1" (from 01-05-1998)



ALL MATERIALS STAINLESS STEEL 316

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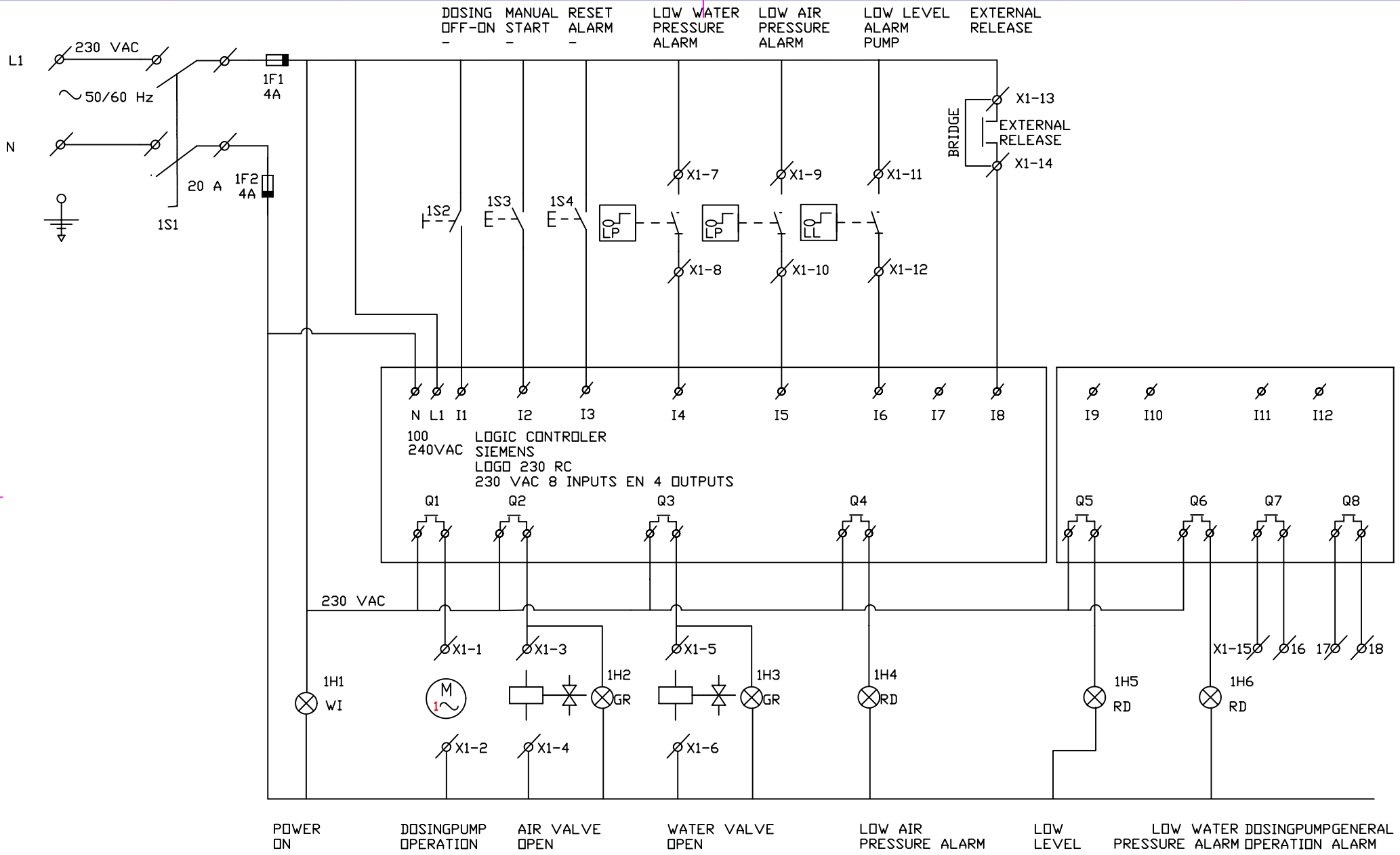
GET.	V.M. de Vries	06-05-1998	
BENAMING	EGT Dosing System		
TEKENINGNR.	EGT-1.050		
REVESIE:	0	14-08-2007	

5. ELECTRICAL DRAWINGS



Itemref	Quantity	Title/Name, designation, material, dimension etc			Article No./Reference
Designed by	Checked by	Approved by - date	Filename	Date	Scale
VdV		10-05-07		10-05-07	NON

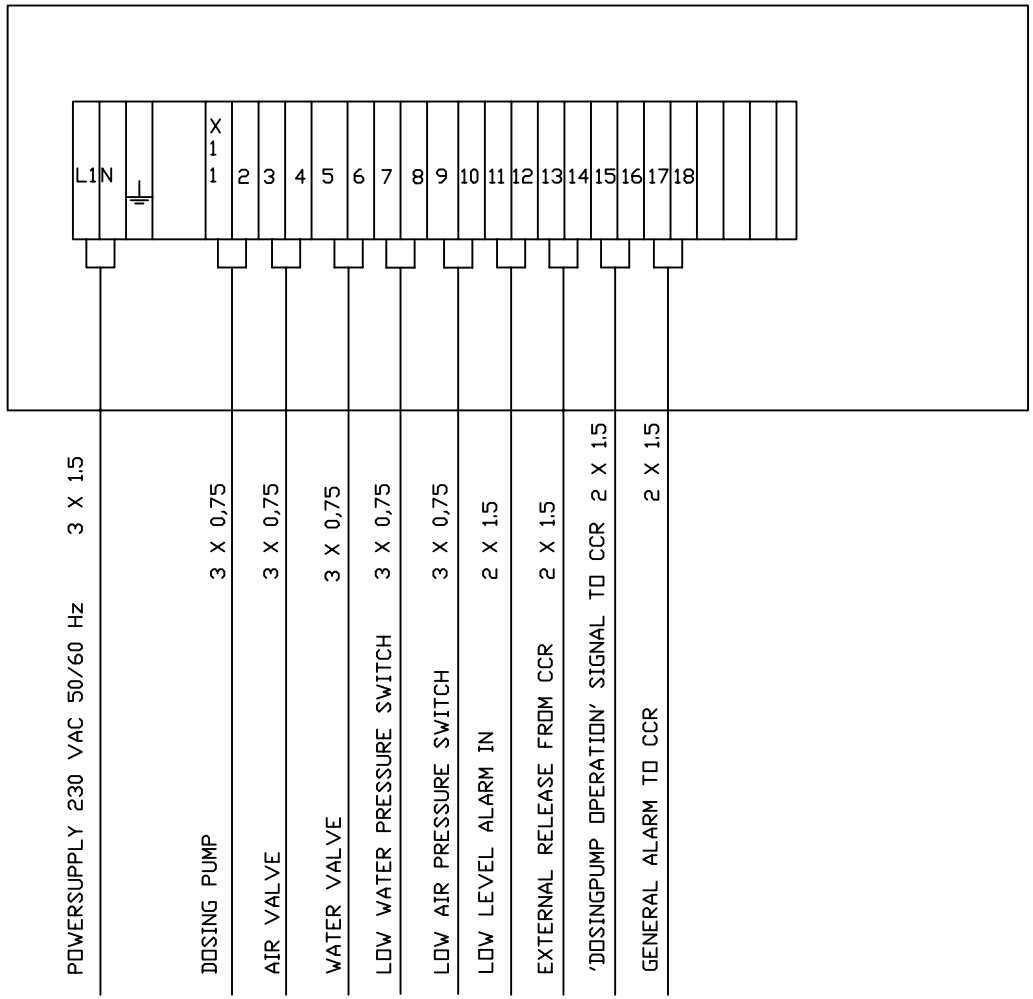
CONTROL DIAGRAM
EGT-1 Automatic Dosing System
EXHAUSTGAS TREATMENT

27.0435.010

Edition 0

Sheet 1 OF 2

MADXX



RevNo	Revision note	Date	Signature	Checked

Itemref	Quantity	Title/Name, designation, material, dimension etc	Article No./Reference
	25	TERMINALS WEIDMULLER	WDU 2,5/35
	1	CABINET GEWIS	GW44218+44616
	1	LOGO EXT. 230 4I/4O	6ED1055-1FB00-0BA0
	1	LOGO 230RC 8I/4O	6ED1052-1FB00-0BA5
1H6	1	SIGNALLAMP RD TELEMECANI	XB4BVM4
1H5	1	SIGNALLAMP RD TELEMECANI	XB4BVM4
1H4	1	SIGNALLAMP RD TELEMECANI	XB4BVM4
1H3	1	SIGNALLAMP GR TELEMECANI	XB4BVM3
1H2	1	SIGNALLAMP GR TELEMECANI	XB4BVM3
1H1	1	SIGNALLAMP WI TELEMECANI	XB4BVM1
1F2	1	FUSE TERMINAL WEIDM	101100
1F1	1	FUSE TERMINAL WEIDM	101100
1S4	1	PUSHBUTTON-TELEM	XB4-BA21
1S3	1	PUSHBUTTON-TELEM	XB4-BA21
1S2	1	SELECTIONSWITCH-TELEM	ZB4-BJ2/BZ101
1S1	1	MAINSWITCH-SALZER	M220-61192-077N4

Designed by	Checked by	Approved by - date	Filename	Date	Scale
VdV		10-05-07		10-05-07	NON

CONNECTION DIAGRAM
EGT-1 Automatic Dosing System
EXHAUSTGAS TREATMENT

27.0435.010

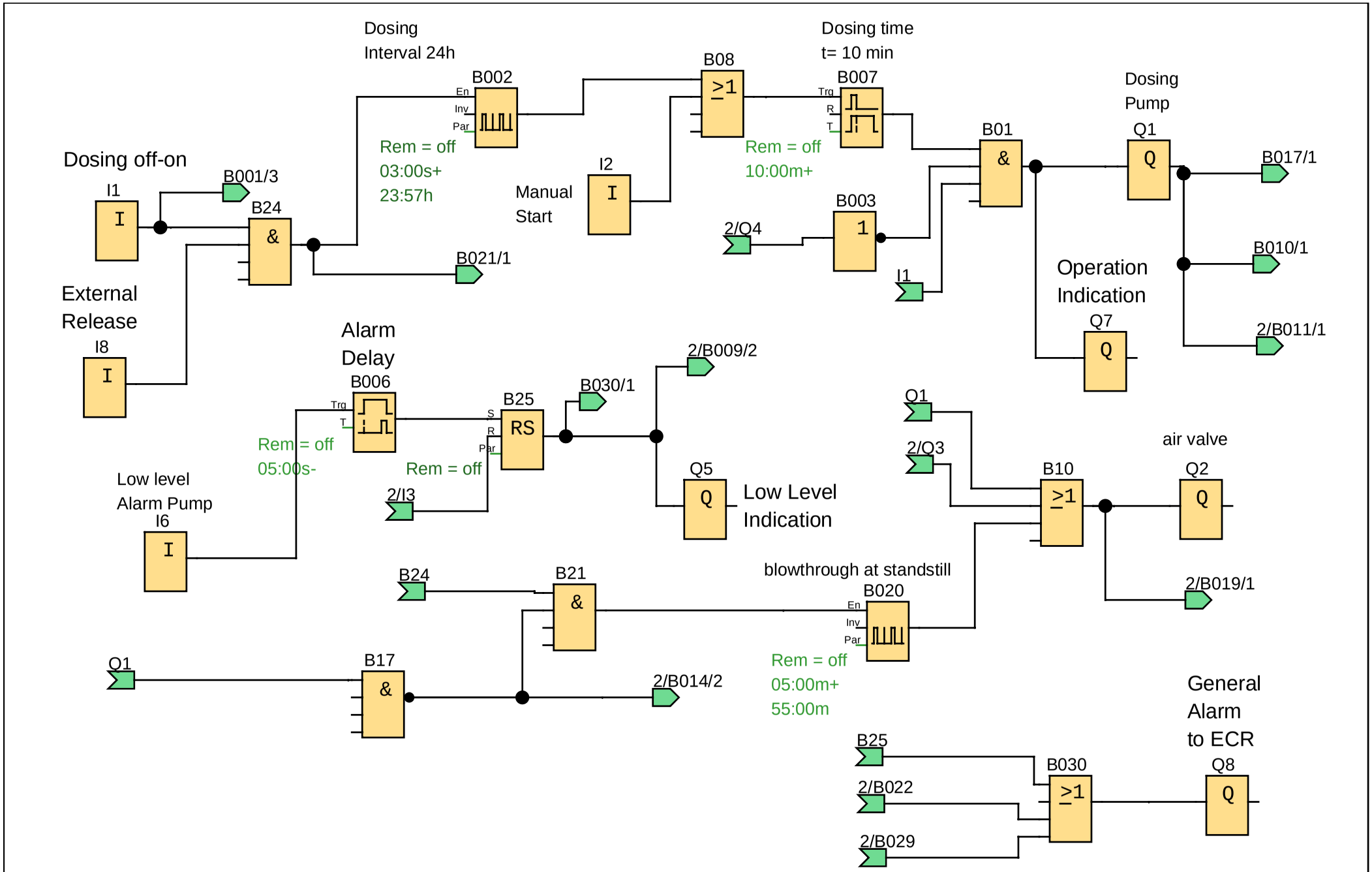
Edition 0

Sheet 2 OF 2

MADXX

6. PARTS LIST (MAIN COMPONENTS)

Amount	Artikelnumber	Description
1	ALA-56114006	Pressure Gauge 0-6 bar
2	ALA-74401017	Kogelkraan knel 10 x male 3/8
1	ALA-FM40-03W	Pressure reducer Air, 0-10 bar complete
1	ALA-GAAB7XBV560	Solenoidvalve 2/2 NC 1/4" 230 VAC
1	ALA-GSCD71BN06	Solenoidvalve 3/2 NC 1/2" 230 VAC
1	AQ-10300011	EGT-1 Aisi 316 nozzle L=300
1	AQ-10300014	EGT black hose 30 mtr 6x12
1	CAL-D22-3/8-38A	Pressure reducer Water 3/8
1	CAL-M39KD63	Manometer onderaansl 0-6 bar k
1	PRO-1002526	Fault indicating relais card Beta/GammaL
1	PRO-7510036.6	Dosingpump Bt4a 0708 PPB
1	PRO-802278	Suction Assembly 3pol LN D50 8x5 PPE
1	SOL-1001814	Siemens LOGO! 230 VAC 4I/4O
1	SOL-1002808	Siemens LOGO! 230 RC 8I/4O
2	SOL-2570115	Push button, including contact NO
1	SOL-2570158	Signallight White
2	SOL-2570159	Signallight Green
3	SOL-2570160	Signallight Red
1	SOL-2570250	Selection Switch OFF-ON
1	SOL-2577425	Contactor for Selection Switch NO
1	SOL-5960892	Mainswitch complete
2	SOL-7966201	Pressure switch 0,2-2 bar
3	TEE-22011580	Checkvalve 8 MS 0,2 bar



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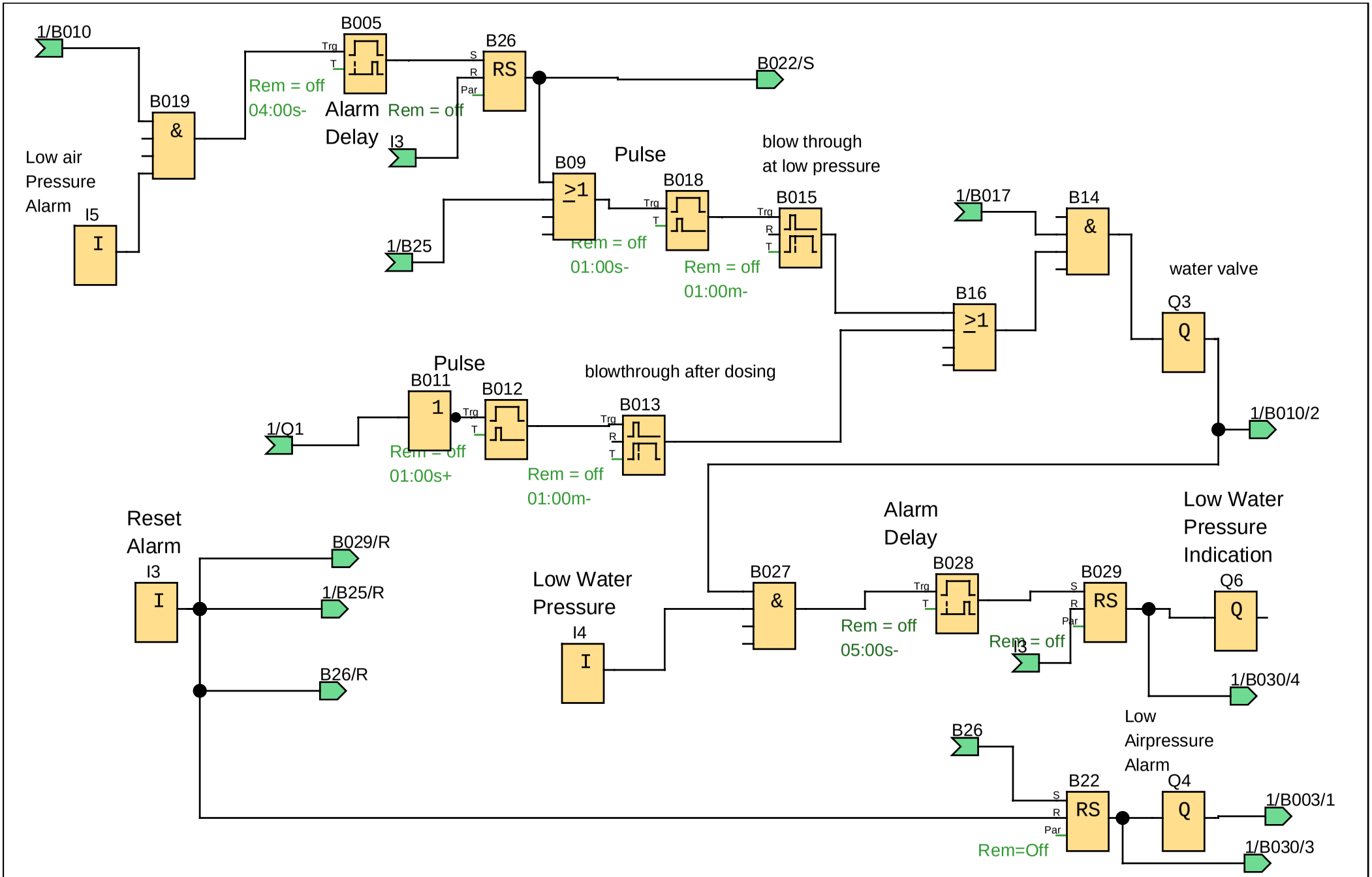
Gecontroleerd:			Installatie:	EGT-1	Schemanr.:	27.0215
Aangemaakt/Gewijzigd:	20-3-01 13:02/14-5-07 14:37		Bestand:	User_software_EGT-1_27.0215.lsc	Pagina:	1 / 2



Aangemaakt:			Project:	EGT-1	Klant:	
Gecontroleerd:			Installatie:	EGT-1	Schemanr.:	27.0215
Aangemaakt/Gewijzigd:	20-3-01 13:02/14-5-07 14:37		Bestand:	User_software_EGT-1_27.0215.lsc	Pagina:	2 / 2

Bloknummer(type)	Parameter
B002(Asynchrone impulsgever) :	Rem = off 03:00s+ 23:57h
B005(Vertraagde inschakeling) : Alarm Delay	Rem = off 04:00s-
B006(Vertraagde inschakeling) : Alarm Delay	Rem = off 05:00s-
B007(Vertraagde uitschakeling) : Dosing time t= 10 min	Rem = off 10:00m+
B012(Sleepcontact - impulsuitvoer) : Pulse	Rem = off 01:00s+
B013(Vertraagde uitschakeling) : blowthrough after dosing	Rem = off 01:00m-
B015(Vertraagde uitschakeling) : blow through at low pressure	Rem = off 01:00m-
B018(Sleepcontact - impulsuitvoer) : Pulse	Rem = off 01:00s-
B020(Asynchrone impulsgever) : blowthrough at standstill	Rem = off 05:00m+ 55:00m
B022(Houdrelais) :	Rem = off
B25(Houdrelais) :	Rem = off
B26(Houdrelais) :	Rem = off
B028(Vertraagde inschakeling) : Alarm Delay	Rem = off 05:00s-
B029(Houdrelais) :	Rem = off
I1(Ingang) : Dosing off-on	
I2(Ingang) : Manual Start	

Bloknummer(type)	Parameter
I3(Ingang) : Reset Alarm	
I4(Ingang) : Low Water Pressure	
I5(Ingang) : Low air Pressure Alarm	
I6(Ingang) : Low level Alarm Pump	
I8(Ingang) : External Release	
Q1(Uitgang) : Dosing Pump	
Q2(Uitgang) : air valve	
Q3(Uitgang) : water valve	
Q4(Uitgang) : Low Airpressure Alarm	
Q5(Uitgang) : Low Level Indication	
Q6(Uitgang) : Low Water Pressure Indication	
Q7(Uitgang) : Operation Indication	
Q8(Uitgang) : General Alarm to ECR	

Aansluiting	Opschrift
I1	
I2	
I3	
I4	
I5	
I6	
I7	
I8	
I9	
I10	
I11	
I12	
I13	
I14	
I15	
I16	
I17	
I18	
I19	
I20	
I21	
I22	
I23	
I24	
C1▲	
C2▼	
C3◀	
C4▶	
S1	
S2	
S3	
S4	
S5	
S6	
S7	

Aansluiting	Opschrift
S8	
AI1	
AI2	
AI3	
AI4	
AI5	
AI6	
AI7	
AI8	
Q1	
Q2	
Q3	
Q4	
Q5	
Q6	
Q7	
Q8	
Q9	
Q10	
Q11	
Q12	
Q13	
Q14	
Q15	
Q16	
AQ1	
AQ2	
X1	
X2	
X3	
X4	
X5	
X6	
X7	
X8	

Aansluiting	Opschrift
X9	
X10	
X11	
X12	
X13	
X14	
X15	
X16	

7. OTHER MAUFACTURERS MANUALS

Dosing pump

Pressure switches

Solenoid valves

Operating Instructions Manual

Solenoid Dosing Pump

ProMinent® Beta®

BT4a and BT5a

BT4A	___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
BT5A	___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

Please enter ident code of the device here.

Please read the Operating Instructions manual through completely before commissioning this equipment.
Do not discard! Any part which has been subject to misuse is excluded from the warranty!

Major Components

1 Control unit

1a Stroke length adjustment knob
1b Red LED display, fault indicator
1c Yellow LED display, warning indicator
1d Green LED display, operating status
1e Multifunction switch
1f Mains connector
1g External operating terminal
1h Float switch connector

2 Power end

2a Relay insertion point
2b Optional relay

3 Liquid end

3.1 Liquid end without bleed valve, with/without valve spring
3.2 Liquid end without bleed valve, with/without valve spring
3.3 Liquid end with bleed valve, with/without valve spring (PP-version)
3.4 Liquid end with bleed valve, with/without valve spring (NP-version)
3.5 Self-degassing liquid end

3a Liquid end back plate
3b Liquid end
3c Suction connection
3d Discharge connection
3e Bleed valve connection (self degassing liquid ends)
3f Bleeding/fine bleeding valve
3g Bypass tubing nozzle

General User Information:

This operating instructions manual contains the product descriptions in the main text.

- main points
- ➤ instructions

and safety information are indicated by pictograms:

WARNING

Ignoring safety information can endanger life or result in serious injury!

CAUTION

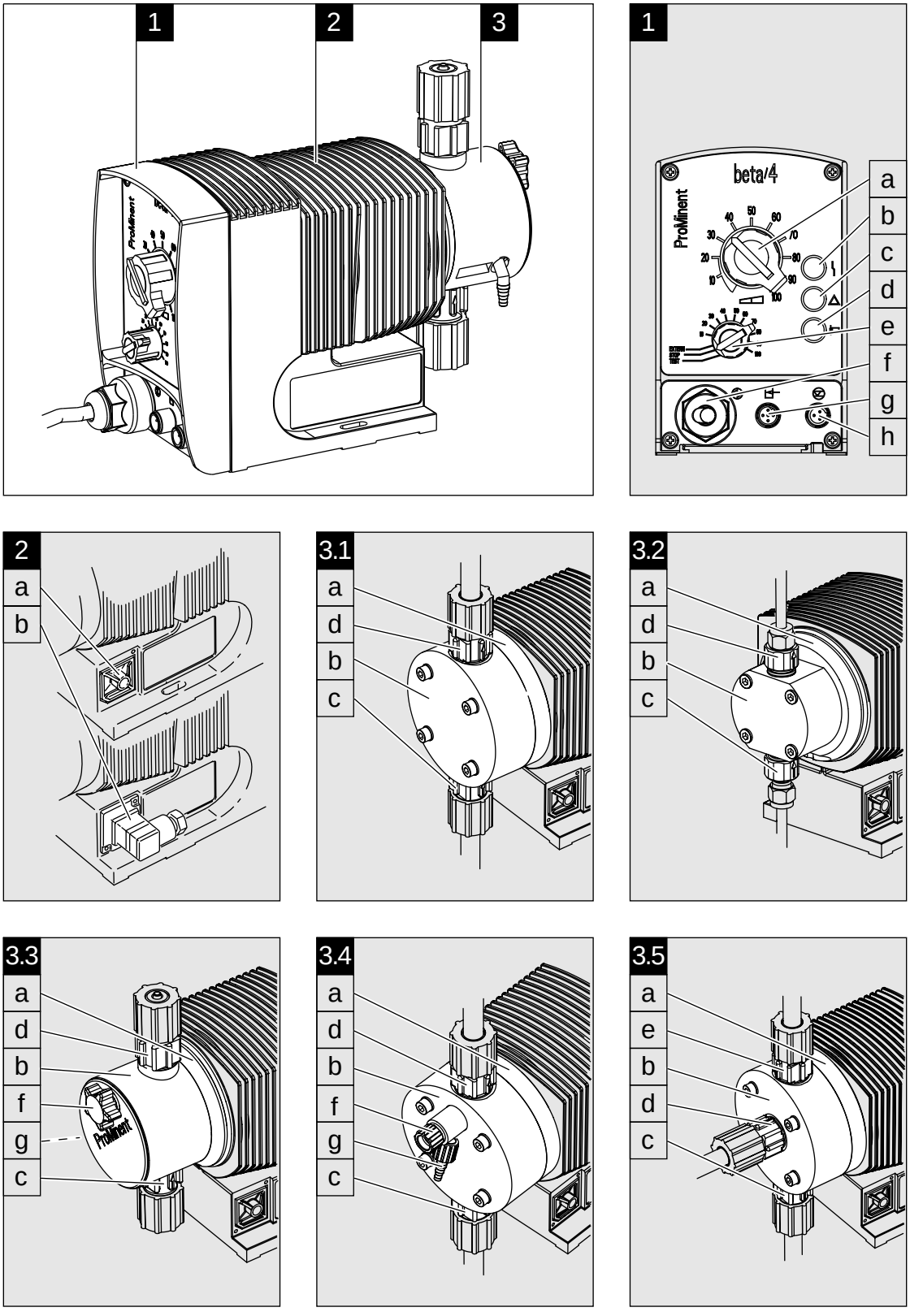
Ignoring safety information can result in injury to persons or damage to machinery or other materials!

IMPORTANT

Ignoring safety information can result in damage to machinery or other materials!

NOTE

Working guidelines.


1
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g
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beta/4
ProMinent
2
a
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3.1
a
d
b
c
3.2
a
d
b
c
3.3
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d
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g
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3.4
a
d
b
f
g
c
3.5
a
e
b
d
c

Fig. 01

2.5 EC Declaration of Conformity

EC Declaration of Conformity

We,

ProMinent Dosiertechnik GmbH
Im Schuhmachergewann 5 - 11
D - 69123 Heidelberg

hereby declare that, on the basis of its functional concept and design and in the version brought into circulation by us, the product specified in the following complies with the relevant, fundamental safety and health stipulations laid down by EC regulations
Any modification to the product not approved by us will invalidate this declaration

Product description :	***Metering pump, series Beta /_a***
Product type	***BT4a .... , BT5a ....***
Serial number :	***see type identification plate on device***
Relevant EC directives :	***EC - machine directive 98/37/EC*** ***EC - low voltage directive 73/23/EEC*** ***EC - EMC - directive (89/336/EEC) subsequently 92/31 EEC***
Harmonised standards used, in particular :	***DIN EN 292-1, DIN EN 292-2, DIN EN 809*** ***DIN EN 60335-1, DIN EN 60335-2-41, DIN EN 50106*** ***DIN EN 50081-1/2, DIN EN 55014, DIN EN 60555-2/3*** ***DIN EN 50082-1/2, DIN EN 61000-4-2/3/4/5/6/8/11***
National standards and other technical specifications used, in particular :	***VDE 0700 T1*** ***VDE 0700 T41*** ***VDE 0700 T500*** ***IEC 1000-3-3, IEC 1000-4-2/3/4/5/6/11*** ***CSA Standard C22.2 No.108-M89 (115Vu. 230V USA)*** ***UL Standard 778 (115V u. 230V USA)***
Date/manufacturer s signature	***June 5, 2001***
The undersigned :	*Dr.Rainer V. Dulger Executive Vice President R&D and Production*

3 Design and Function

Main components

Operating panel
Power end
Liquid end

Operating Principle

Chemical feed occurs as a result of pulsed deflections of the dosing diaphragm within the liquid end, which causes pressure differentiation between the suction side, the liquid end cavity and the discharge side. The pressure differentiation causes the suction and discharge self-acting valves to open and close, resulting in chemical feed.

The dosing diaphragm is driven by an electromagnet, which is stimulated and controlled by a microprocessor.

Pump Capacity

The feed rate is determined by the stroke length and stroking rate.

The stroke length is adjustable between 0 % and 100 % using the stroke length adjustment knob. However reproducibility is only technically practicable in the adjustment range of between 30 % and 100 %.

Stroking rate is adjustable in 10 % steps between 0 % and 100 % using the multifunction switch. This gives a higher rate of reproducible metering accuracy.

Operating Modes

Operating modes are selected using the multifunction switch.

Three LED displays indicate operating and fault status.

Internal operating mode: ”Manual“:

Stroking rate is manually adjustable in 10 % steps via the multifunction switch.

”External“ operating mode:

Allows adjustment of individual strokes via the external operating mode terminal by means of contact or semi-operating devices.

Functions

”Auxiliary Frequency“ function:

Enables activation of optionally selectable and programmable stroking rate, controlled via the external operating mode terminal. This stroking rate overrides ”Manual“ and ”External“ operating modes.
In the standard version the ”Auxiliary Frequency“ function is programmed to 100 % stroking rate.

”Pause“ function:

The external operating terminal can be used to operate a remote pump stop function.

”Stop“ function:

This function allows the pump to be deactivated without disconnecting from the power supply.

”Test“ function:

This function checks the priming function of the pump. The switch setting ”Test“ on the multifunction switch is self-locking.

Self-degassing

Self-degassing metering pumps are used in closed discharge lines to create suction and to direct trapped air to bypass lines, and/or remove gas emitted by gaseous chemicals during operation, independently of existing back pressure.
Installing a back pressure valve ensures precise chemical feed can be achieved, even when operating under atmospheric pressure.

Options

The float switch connector can be used to connect a two stage float switch.
There is also optionally available a relay terminal for an alarm indicating relay, and a switch output which is synchronised to each stroke.

4 Technical Data

4.1 Identcode

Please enter the identcode on the device label into the grey box below.

Series	Type	
BT4A	1000, 1601, 1602, 1005, 0708, 0413, 0220	☐ Custom version ....
BT5A	1605, 1008, 0713, 0420, 0232	

Material		
PP	Polypropylene	☐ Custom version ....
NP	Acrylic/PVC	
PV	PVDF	
TT	PTFE with carbon	
SS	stainless steel	

Diaphragm and Seal		
E	standard with EPDM seals	☐ Custom version ....
B	standard with FPM seals	
T	standard with PTFE flat seals	

Liquid end Version		
0	no bleed valve, no valve springs	☐ Custom version ....
1	no bleed valve, with valve springs	
2	with bleed valve, no valve springs for PP, NP and PV only	
3	with bleed valve, with valve springs for PP only	
4	no-vent with valve springs for highly viscous media	
9	self-degassing for PP and NP	

Hydraulic Connections		
0	standard connections	☐ Custom version ....

Version		
0	with ProMinent® logo	☐ Custom version ....

Electrical Connections		
A	200–230 V, ±10 %	☐ Custom version ....
B	100–115 V, ±10 %	
U	100–230 V, ±10 %	
M	12....24 V DC (only BT4a)	
N	24 V DC (only BT5a)	
P	24 V AC	

Cable and Plug		
A	2 m European	☐ Custom version ....
B	2 m Swiss	
C	2 m Australian	
D	2 m USA	
1	2 m open end	

Relay	
0	no relay
1	fault indicating relay (N/C)
3	fault indicating relay (N/O)
4	as 1 + pacing relay
5	as 3 + pacing relay
	☐ Custom version ....

Accessories	
0	no accessories
1	with foot and delivery valve, 2 m PVC tubing, 5 m PE tubing
	☐ Custom version ....

Control type	
0	no lock
1	with lock; manual operation locked when external cable plugged in

Options on request		Custom version
0	no options	☐ ....
0	no options	☐ ....
0	no options	☐ ....
0	no options	☐ ....

______ ____ __ _ _ _ _ _ _ _ _ _ _ _ _ _

FPM = Fluorine Rubber

Fig. 02

- Version: 100-115 V ±10 %, 50/60 Hz

115 V/AC Version	Beta® / 4	Beta® / 5
Nominal capacity:	17 W	22 W
Peak current:	4.0 A	6.5 A
Peak switching current:	15 A for < 1 ms	15 A for < 1 ms
Fuse:	0.8 AT	0.8 AT

- Version: 100-230 V ±10 %, 50/60 Hz

100-230 V/AC Version	Beta® / 4	Beta® / 5
Nominal capacity:	17 W	22 W
Peak current:	4.2 - 1.3 A	5.9 - 2.3 A
Peak switching current:	15 A for < 1 ms	15 A for < 1 ms
Fuse:	0.8 AT	0.8 AT

Note Only use fuses carrying VDE, UL and CSA authorisation, e.g. type 19195 from Fa. Wickmann as given in IEC publication 127 - 2/3.

4.8 Environmental Conditions

Temperatures Storage and transport temperature: –10 °C ... +50 °C

Maximum dosing media temperatures depending on material:

Material Type:	PP	PVC	Acrylic	PVDF	PTFE	Stainless steel
Permissible temperature continuous operation at max. back pressure:	50 °C	45 °C*	45 °C	50 °C	50 °C	50 °C
Permissible temperature short term, max. 15 min. operation at max. back pressure of 2 bar:	100 °C	60 °C	60 °C	120 °C	120 °C	120 °C
Minimum dosing media temperature:	-10°C					
ambient temperature during operation:	-10 through +45°C*					

*for material acrylic glass

Under extreme conditions such as max. medium temperature, max. stroke rate and max. backpressure leaks may occur at the liquid end at ambient temperatures above 35 °C.

Climate Permissible relative humidity: 92 % non-condensing
Corresponding to humidity and fluctuations in climate: FW 24 according to DIN 50016

Enclosure rating Contact and humidity enclosure: IP 65 according to IEC 529, EN 60529, DIN VDE 0470 part 1

Noise level Noise level: < 70 dB(A) within 1 m distance according to EN 12639

Electrical safety requirements Safety class 1 – mains connector with earth lead

5 Removal of Packaging

Removal of packaging

- ▶ Retain the packaging. It can be used to return the pump in case of repair or for guarantee purposes.
- ▶ Compare delivery note with contents of packaging.
- ▶ Check that the details given on the metering pump device label correspond with your ordering details!
- ▶ Should you experience any problems, contact your ProMinent branch or supplier!
- ▶ Give the identity code and serial number, which you will find on the device label, in the event of goods returns or when ordering replacement parts. This will ensure correct identification of the pump type and material version.

Included in Delivery

- Metering pump with mains cable
- Operating instructions manual with conformity declaration, with accessories if applicable

6 Electrical Installation

WARNING

- **WARNING – Risk of electric shock – This pump is supplied with a grounding conductor and grounding-type attachment plug. To reduce the risk of electric shock, be certain that it is connected only to a properly grounding-type receptacle.**
- **Observe the relevant national regulations when installing the pump outside Germany!**
- **Do not connect power supply to external terminals!**
- **Make sure that the power supply corresponds to the details on the device label! When connecting in parallel with inductive consumers a separate switch contact, e.g. relay or coutactor should be fitted!**

IMPORTANT

- **The universal signal cable, the external/contact cable and the liquid level monitoring cable may not be less than 1.20 m. Cable recognition will otherwise be lost.**

Mains connection

The pump is connected via the fixed mains cable to the correct power supply.

ON/Off switching

The pump should only be able to be disconnected from the power by

- removing the plug from the socket
- via the ”stop“ setting on the multifunction switch
- remote stop via an external cable (see 7.1).

Connecting in parallel

If the pump is connected to the power in parallel with inductive consumers, e.g. (solenoid valve, motor), they must be electrically isolated from these items to prevent damage from induction voltages when switching off.

▶ Fit separate contacts, power supply via contacter relay or relay.

If this is not possible, then:

▶ Parallel connection via varistor (order number 710912) or an RC circuit (0.22 µF/220 Ω, order number 710802).

Leistungsteil (im Pumpenfuß)

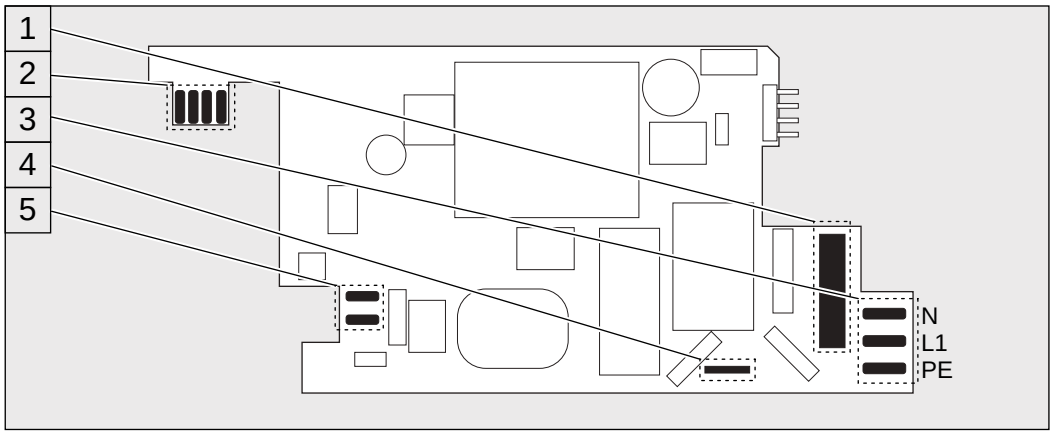


Fig. 06

1 Fuse
2 Optional relay connector
3 Mains connector
4 Solenoid earth lead
5 Solenoid connector

Option fault indicating relay

Contact	VDE-cable	CSA-cable
NO	white	white
NC	green	red
C	brown	black

Option fault indicating and pacing relay

NO (fault indicating relay)	yellow	–
C (fault indicating relay)	green	–
NO (pacing relay)	white	–
C (pacing relay)	brown	–

7 Operation and Settings

7.1 Operating Components and Functions

Stroke length adjustment knob The stroke length is continuously adjustable between 0 % and 100 % via the stroke length adjustment knob. Reproducibility is only technically practicable in the adjustment range of between 30 % and 100 % however.

Multifunction switch The multifunction switch (1e) is used to select the operating mode and to set the stroking rate. The following operating modes are selected using the multifunction switch:

- Stop
- External
- Manual (to set stroking rate in 10 % steps)
- Test (priming suction function)

External operating terminal The ”terminal for external operating“ is a five channel connector. It is compatible with two and four channel signal cables used previously. The ”auxiliary frequency“ function can be used only with the five channel cable, however.

Pump configuration

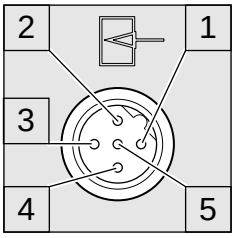


Fig. 07

Electrical Interface:

- Open contact voltage: approx. +5 V
- Input resistance: 10 kΩ
- Control: volt free contact (0.5 mA at +5 V).
  or: semi conductor switch (residual voltage < 0.7 V)
- minimum contact duration: ≥ 20 ms

Plug configuration

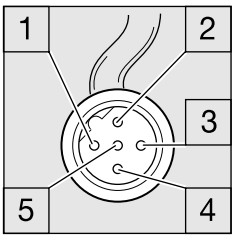


Fig. 08

Function		2channel cable	4channel cable	5channel cable
pin 1	pause	bridge to pin 4	brown	brown
pin 2	external	brown	white	white
pin 3	not configured	–	blue	blue
pin 4	reference potential earth)	white	black	black
pin 5	auxiliary frequency	–	–	grey

”Pause“ Function

The pump runs when

- There is no cable connected (e.g. pin 1 free)
- The cable is connected and the contact is earthed (pins 1 and 4 connected).

The pump does not run when

- The cable is connected and the contact is open (pins 1 and 4 not connected).

”External“ Operating Mode

A dosing stroke is triggered when a contact is made for a minimum of 20 ms with pin 2 (external) and pin 4 (earth), and the ”pause“ input is at pin 4 (earth).

Operating Characteristic Variations: Changing from ”External“ to ”Manual“

The operation of the Beta® pump when changing from ”external“ to ”manual“ options (when external cable is connected) takes two forms:

Identity code: ”control type“

- 0: no lock
  ”External“ and ”manual“ operating modes can be activated at any time. All pump functions correspond to the texts on the multifunction switch and the pre set operating mode. The pump operates in ”manual“ mode even when external cable is connected. This is the standard version.
- 1: with lock
  The ”external“ operating mode is only available when external cable is connected.
  The ”manual“ function is only available when the cable is removed.

Altering External Frequency Function (Auxiliary Frequency)

This function switches the pump over to a pre-programmed frequency, as long as the correct input is connected to pin 4 (reference potential) and the pump is not in ”pause“ or ”stop“ modes. The ”auxiliary frequency“ function overrides a manually set operating frequency and also ”external“ operating mode.
If the ”auxiliary frequency“ function and the ”pause“ function are both active the pump stops. In the standard version this function is programmed to 100 % stroking rate.

Connecting float switch

It is possible to fit a two stage float switch to activate early warning and limit switch functions.

Pump configuration

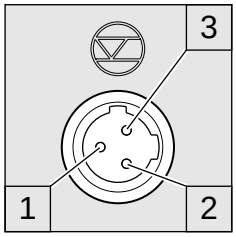


Fig. 09

Electrical Interface:

- Open contact voltage: approx. +5 V
- Input resistance: 10 kΩ
- Control: volt free contact (0.5 mA at +5 V).
  or: semi conductor switch (residual voltage < 0.7 V)

Plug configuration

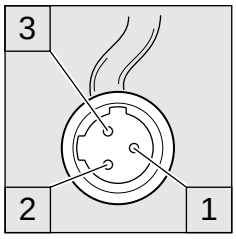


Fig. 10

Function		3channel cable
pin 1	reference potential (earth)	black
pin 2	minimum warning indication	blue
pin 3	minimum fault (switches off)	brown

Function and fault indicators

A signal is sent to the pump (minimum warning or minimum fault) when the liquid level in the chemical feed tank drops below specific levels.

Three LED displays act as the function and fault indicators.

Green LED indicator, operating display
This LED illuminates briefly when a discharge stroke is activated.

Yellow LED indicator, warning indicator

This LED lights up when the liquid level drops below the first float switch triggering level.

Red LED indicator, fault indicator
This LED lights up when liquid levels reach the fault indicating level (20 mm remaining in chemical feed tank)
It also flashes to indicate undefined operating status.

Relay

Relay output, fault indicating

An optional fault indicating relay is available to order.
It is used to relay processor fault and ”level fault“ signals.
The selection of NC/NO relay status is indicated by the identity code. The basic setting is as NC.
The basic version can be retrofitted, and is ready to operate after plugging in relays.
The connector cable is plugged in.

Electrical interface:

- Contact load: 250 V/2 A 50/60 Hz
- Operating life: > 200.000 switch functions

VDE cable	CSA cable	Contact
white	white	NO (normally open)
green	red	NC (normally closed)
brown	black	C (common)

Fault signal output and pacing signal output

Two semi conductor switches are available to order as signal output and pacing relay.
These outputs are electrically isolated by optical couplers.
The pulse output of the pump drives an open collector transistor interfaced to the input device.
This option may be retrofitted, the connector cable is plugged in.

Electrical interface:

For semi-conductor switch

- Residual voltage: < 0.4 Volt at I_C = 1 mA
- Maximum current: < 100 mA
- Max. voltage: 24 V DC
- Pacing relay pulse length approx. 100 ms

For relay output

- Contact load: 24 V/100 mA 50/60 Hz
- Operating life: > 200.000 switch functions

VDE cable	Contact	Relay
yellow	NO (normally open)	Fault indicating relay
green	C (common)	Fault indicating relay
white	NO (normally open)	Pacing relay
brown	C (common)	Pacing relay

7.2 Beta® Relay Retrofit Kit

Part No. 1002526 - Alarm relay Beta®

Part No. 1002528 - Alarm and pacing relay Beta®

1 complete relay board with 2 fastening screws
2 additional fastening screws
1 complete relay cable with socket
1 seal

Press-out relay opening

WARNING

Disconnect Beta® from the mains power supply and rinse liquid end before commencing work!

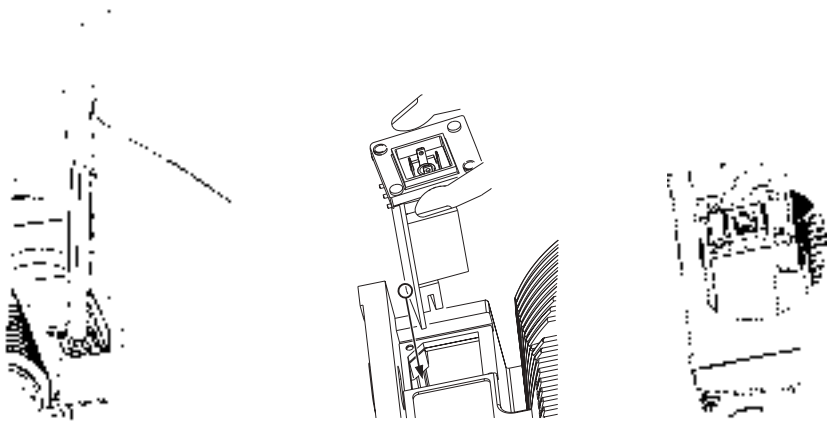
IMPORTANT

When preparing the opening, ensure that the punch is not forced through the entire pump base!
Pump circuits may become damaged.

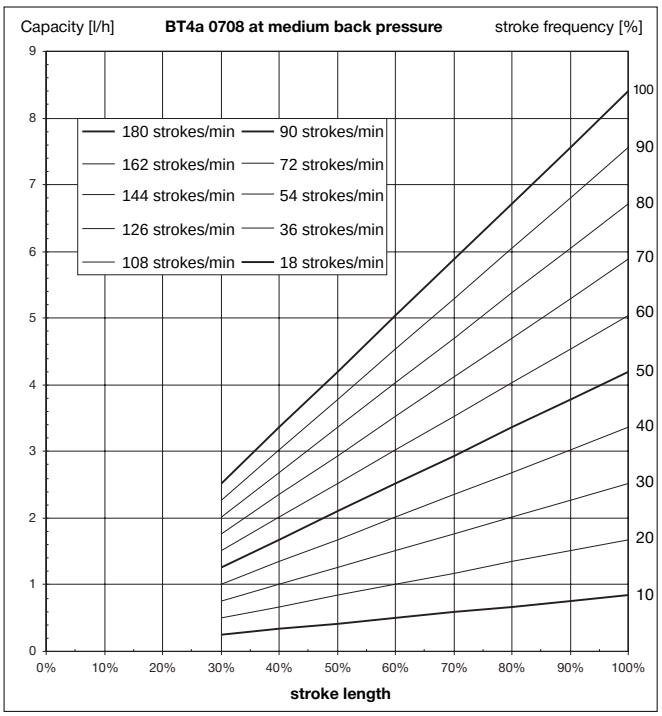
- ▶ Place the Beta® on a firm surface with the relay opening press-out section at the top. (see fig. 11a)
- ▶ Place a punch (dia. 8-15 mm) in the centre of the relay opening press-out section, and strike briefly and sharply with a hammer (approx. 250 g).
- ▶ If necessary clean up the edges of the opening.
- ▶ Remove the pressed out section from the Beta® .

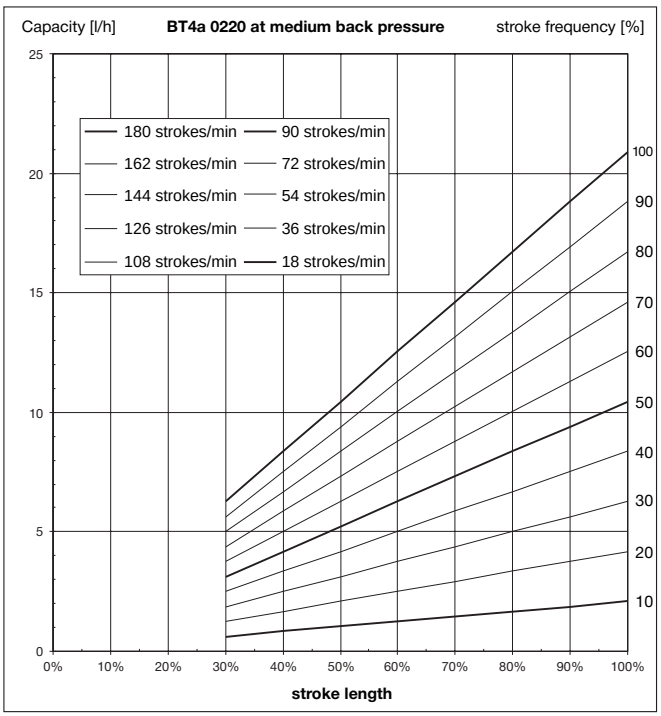
Inserting the relay component

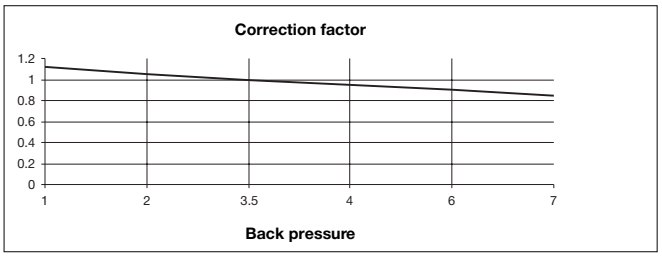
- ▶ Hold the relay component with your right hand gripping the left and right hand edges of the relay cover, and tilt the front end slightly to the left (see fig. 11b)
- ▶ Push the relay component through the relay opening, holding the upper corner of the lower edge against the guide rail on the pump base, until the contact of the relay component has reached the controller contact. (See fig. 11b test: can you still move the end of the circuit back and forth?)
- ▶ Gently push the relay component right into the opening.
- ▶ Screw the relay cover firmly onto the housing using the screws provided.
- ▶ Insert the relay cable plug seal into the relay cover and screw on the plug (see IIc).
- ▶ The pump is programmed ex factory to “alarm relay drop-out action” and, if fitted, “pacing relay pick-up action“. The pump can be reprogrammed at the Heidelberg plant if any other switching function is required.

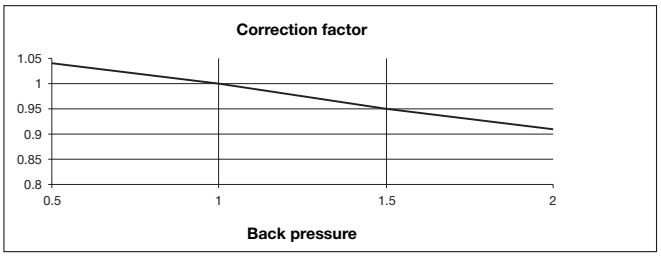


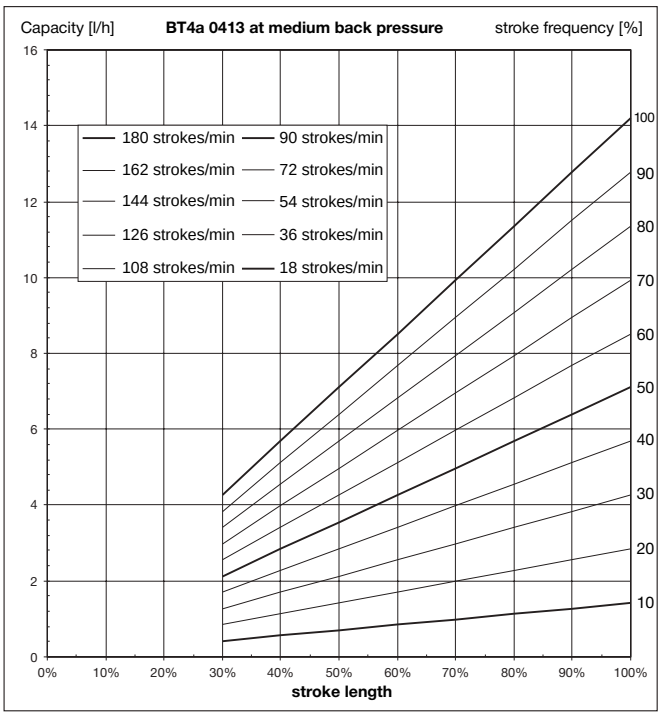
a Fig. 11 b c

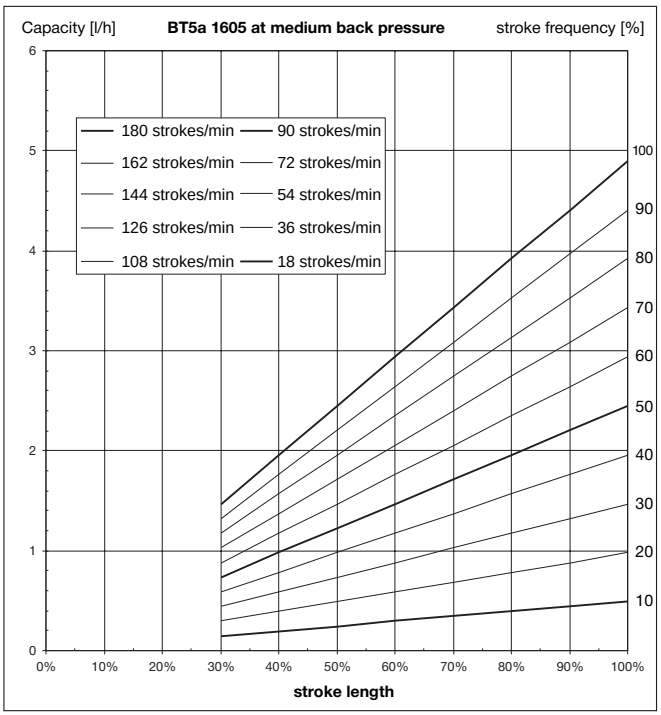

Capacity [l/h]
BT4a 0708 at medium back pressure
stroke frequency [%]
180 strokes/min
90 strokes/min
162 strokes/min
72 strokes/min
144 strokes/min
54 strokes/min
126 strokes/min
36 strokes/min
108 strokes/min
18 strokes/min
stroke length

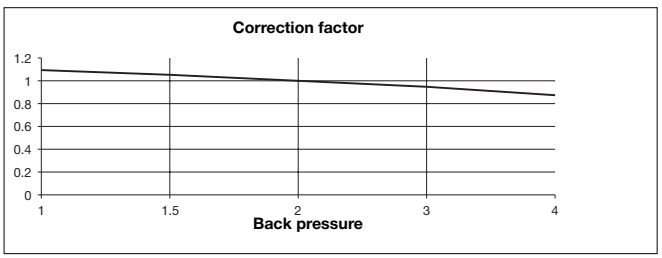

Capacity [l/h]
BT4a 0220 at medium back pressure
stroke frequency [%]
180 strokes/min
90 strokes/min
162 strokes/min
72 strokes/min
144 strokes/min
54 strokes/min
126 strokes/min
36 strokes/min
108 strokes/min
18 strokes/min
stroke length

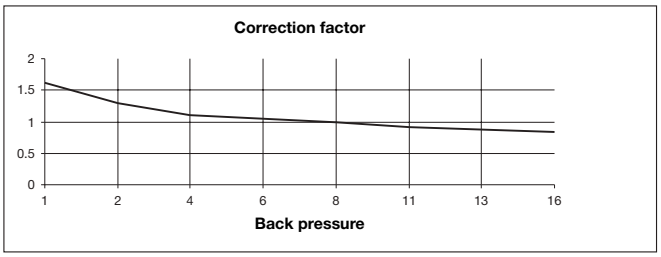

Correction factor
Back pressure


Correction factor
Back pressure


Capacity [l/h]
BT4a 0413 at medium back pressure
stroke frequency [%]
180 strokes/min
90 strokes/min
162 strokes/min
72 strokes/min
144 strokes/min
54 strokes/min
126 strokes/min
36 strokes/min
108 strokes/min
18 strokes/min
stroke length


Capacity [l/h]
BT5a 1605 at medium back pressure
stroke frequency [%]
180 strokes/min
90 strokes/min
162 strokes/min
72 strokes/min
144 strokes/min
54 strokes/min
126 strokes/min
36 strokes/min
108 strokes/min
18 strokes/min
stroke length


Correction factor
Back pressure


Correction factor
Back pressure

8 Maintenance

Maintenance intervals

- Every quarter, when subject to normal usage (continuous operation - approx. 30 %).
- Shorter intervals when subject to heavier usage (e.g. continuous operation).

Maintenance actions

Standard liquid ends:

▶ Check the diaphragm for damage (see section 9).
▶ Check chemical seepage at vent hole.
▶ Check that the discharge tubing is connected firmly to the liquid end.
▶ Check that discharge and suction valves are firmly fixed.
▶ Check that the liquid end is generally watertight (especially vent hole! See fig. 13).
▶ Check for correct feed: run the Beta® run for a short period (press both arrow keys together).
▶ Check electrical connections for wear.
▶ Check that liquid end screws are fastened tightly (on coarse/fine bleeding versions, first remove knob and cover.

Screw fastening torque: 4.5 to 5 Nm

NOTE

- **For PP liquid end, check fastening torque every quarter!**

Additionally, for liquid ends with coarse/fine bleed function and SEK type:

- Check that the bypass tubing is connected firmly to the liquid end
- Check that the bleed valve is firmly fixed in place
- Examine the discharge and bypass tubing for kinks
- Check that the coarse/fine bleed function is working correctly

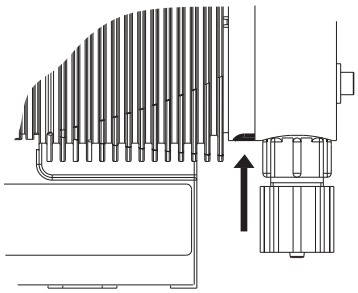


Fig. 13

Vent hole

9 Repairs

NOTE

Repair work that may be carried out by authorised personnel only, or on factory premises:

- **Replacement of damaged mains cables.**
- **Replacement of fuses and electronic controller.**

Please contact your nearest ProMinent branch or representative!

When sending the pump for repair make sure it is clean and that the liquid end has been thoroughly rinsed out! If, despite careful emptying and cleaning, safety precautions are still required for handling the Beta® , the necessary information must be entered in the safety declaration!

The safety declaration is a component of the inspection/repair order.

An inspection or repair can only be carried out when a safety declaration has been correctly and completely filled out by an authorised and qualified member of staff from the company operating the pump.

A form is included in the “General Operating Instruction Manual ProMinent® Solenoid Metering Pumps”.

WARNING

Pumps used for radioactive materials cannot be returned to ProMinent after use! They will not be accepted by ProMinent!

Repairs: These should only be carried out by qualified personnel (in accordance with Safety section):

- **Cleaning the valve**
- **Changing the diaphragm**

WARNING

- **Always take suitable precautions when using hazardous chemicals!**
- **Ensure equipment is de-pressurised.**

NOTE

Take the exploded drawings annexed to the help.

Cleaning the discharge valve (PP, NP) for types 1000, 1005, 1605, 1601, 1602

NOTE

- **Discharge and suction valves are different! Dismantle one after the other to avoid confusion.**
- **Only use new parts, which fit your valve (in shape and chemical resistance)!**
- **The pump must be reset after replacing a valve.**
- **Insert an Allen key or similar into the smaller hole of the pressure connector and push out the valve inserts.**

Cleaning the suction valve (PP, NP) for types 1000, 1005, 1605, 1601, 1602

Dismantling, cleaning and reassembly of the suction valve is practically the same as for a discharge valve.

Take care however that:

- both valve inserts are actually identical,
- an additional spacer is found under the valve inserts,
- in the liquid end a shaped seal 1 is used instead of an O-ring,
- the flow direction of the suction connection is reversed as for the pressure connector.

Cleaning the discharge valve (PP, PC, NP) for types 0708, 1008, 0220, 0420, 0413, 0713, 0232

NOTE

- **Discharge and suction valves are different! Dismantle one after the other to avoid confusion!**
- **Only use new parts, which fit your valve (in shape and chemical resistance)!**
- **The pump must be reset after replacing a valve.**
- **Insert an Allen key or similar into the smaller hole of the pressure connector and push out the valve inserts.**

Cleaning the suction valve (PP, NP) for types 0708, 1008, 0220, 0420, 0413, 0713, 0232

Dismantling, cleaning and reassembling of a suction valve is practically the same as for a discharge valve. Please ensure, however, that:

- the shaped seal is placed in the suction connector,
- only the O-ring is inserted into the liquid end and not the shaped seal,
- the flow direction for the suction connector is reversed as for the pressure connector.

Change diaphragm

WARNING

- **Always take suitable precautions when using hazardous chemicals!**
- **Ensure that the equipment is de-pressurised!**

▶ Empty the liquid end (turn the unit upside down and let the feed chemical run out, rinse with a suitable material: rinse the liquid end thoroughly after use with hazardous materials!).

▶ When Beta® is running set the stroke length to 0 % (the drive axis is then set).

▶ Switch off the Beta® .

▶ Unscrew the hydraulic connectors from the discharge and suction side.

▶ For versions with coarse/fine bleed function: firstly pull out the coarse/fine bleed (knob), then lift off the cover from the liquid end using a screwdriver.

▶ Remove the screws (1).

For pump types 0220, 0232 and 0420 see the following page (4 holes on the diaphragm rim)!

Standard types

▶ Loosen the liquid end (2) and the top plate (4) from the pump housing (6) (loosen only!).

▶ Hold the housing (6) in one hand and with the other, clamp the diaphragm (3) between the liquid end (2) and the top plate (4); release the diaphragm (3) from the drive spindle with a light anticlockwise turn of the liquid end (2) and top plate (4).

▶ Unscrew the diaphragm (3) completely from the drive spindle.

▶ Remove the top plate (4) from the housing (6).

▶ Check the condition of the safety diaphragm (5) and replace if necessary.

▶ Push the safety diaphragm (5) onto the drive axle until the outer edge is flush with the pump housing (6) - do not push further!

▶ Screw the new diaphragm (3) carefully up to the stop on the drive axis – this must be exact to ensure correct metering!

▶ Screw the diaphragm (3) tight once more.

▶ Position the top plate (4) on the pump housing (6).

IMPORTANT

- **The leakage hole must point downwards when the pump is fully assembled (see fig. 13)**
- **Position the top plate correctly on the pump housing. Do not distort the top plate on the pump housing, otherwise the safety diaphragm (5) will not fit.**

▶ Lay the diaphragm (3) into the top plate (4).

▶ Hold the top plate and screw the diaphragm (3) in a clockwise direction until it is firmly in position (you will feel the resistance of the return spring).

IMPORTANT

- **Do not overtighten the diaphragm (particularly on type 1601).**
- **The top plate must remain in position to prevent the safety diaphragm (5) from distorting.**

▶ Adjust the stroke to 100 %.

▶ Position the liquid end (2) with the screws (1) on the diaphragm (3) and the top plate (4) (the priming connector must point downwards once the pump is fully assembled). Screw on screws (1) lightly and tighten (starting torque, see below).

▶ For versions with coarse/fine bleed function, ensure that the liquid end cover engages in the liquid end, then push the coarse/fine bleed vent (knob) into the liquid end.

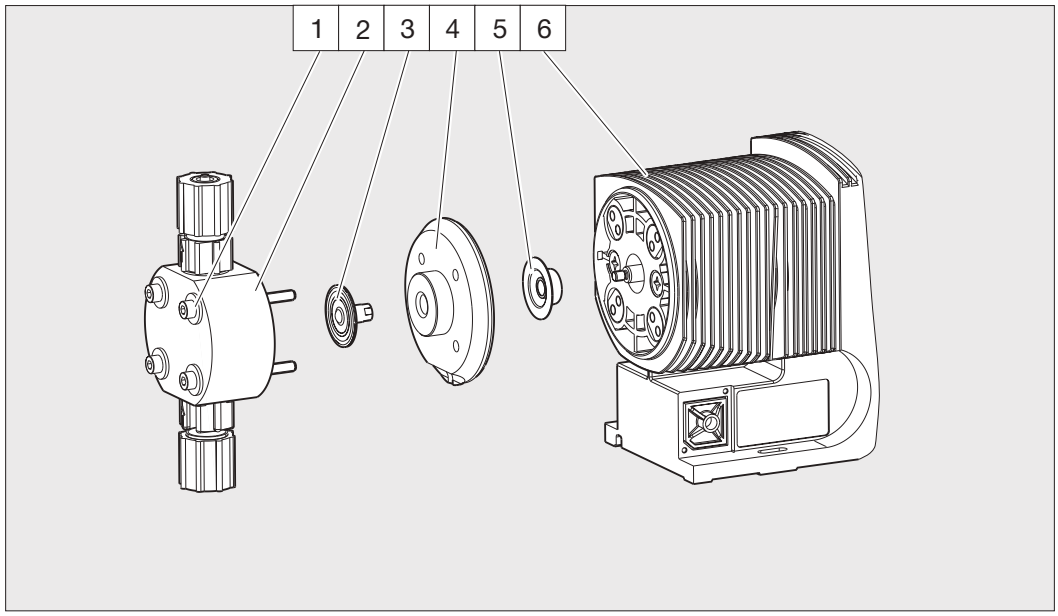


Fig. 18

1 Screws
2 Liquid end
3 Diaphragm
4 Top plate
5 Safety diaphragm
6 Pump housing

NOTE

- **Check the screw torques after 24 hours in operation.**
- **For PP liquid ends check the screw torques again after three months.**

Screw torques: 4.5 to 5 Nm

Liquid ends - types 0220, 0232 and 0420

▶ Remove liquid end (2) from the pump by unscrewing screws (1) (see Fig. 30).
Type 0230 only: remove the screws from the back plate (4) below the diaphragm (3).
Screw liquid end (2) back on – the screws (1) should still project into the holes of the diaphragm (3) but not into the liquid end.

▶ Take hold of the pump housing (6) and use the other hand to clamp the diaphragm (3) between the liquid end (2) and the back plate (4). Loosen the diaphragm (3) from the drive axis by lightly turning the liquid end (2) and the back plate (4) anticlockwise.

▶ Draw the liquid end (2) with the screws (1) out of the diaphragm (3) and unscrew it completely from the drive axis.

▶ Remove the back plate (4) from the housing (6).

▶ Check the condition of the safety diaphragm (5) and replace it if necessary.

▶ Push the safety diaphragm (5) onto the drive axle until the outer edge is flush with the pump housing (6) - do not push further!

▶ Screw the new diaphragm (3) carefully up to the stop on the drive axis – this must be exact to ensure correct metering!

▶ Check whether the holes in the diaphragm (3) are flush with the holes in the pump housing (6).

▶ If not, start the pump and set the stroke length to 100 %.

▶ When the pump is running, turn the diaphragm (3) slowly in a clockwise direction until the four holes in the diaphragm are flush with those on the pump housing (6).

▶ Hold the diaphragm (3) in this position, set the stroke length to 0 % and stop the pump.

▶ Screw the diaphragm (3) tight once more.

▶ Position the top plate (4) on the pump housing (6).
Only for Type 0232: Screw down the head disk (4) with the screws.

IMPORTANT

- **The leakage hole must point downwards when the pump is fully assembled (see fig. 13).**
- **Position the top plate correctly onto the pump housing. Do not distort the top plate on the pump housing, otherwise the safety diaphragm will not fit.**

▶ Adjust the stroke to 100 %.

▶ Lay the diaphragm (3) into the top plate (4).

▶ Hold the top plate and screw the diaphragm (3) in a clockwise direction until it is firmly in position (you will feel the resistance of the return spring).

IMPORTANT

- **Do not overtighten the diaphragm.**
- **The top plate must remain in position to prevent the safety diaphragm from distorting.**

▶ Position the liquid end (2) with the screws (1) on the diaphragm (3) and the top plate (4) (the priming connector must point downwards once the pump is fully assembled). Screw on screws (1) lightly and tighten (starting torque, see above).

▶ For coarse/fine bleed versions: ensure the liquid end cover engages in the liquid end, then push the coarse/fine bleed (knob) into the liquid end.

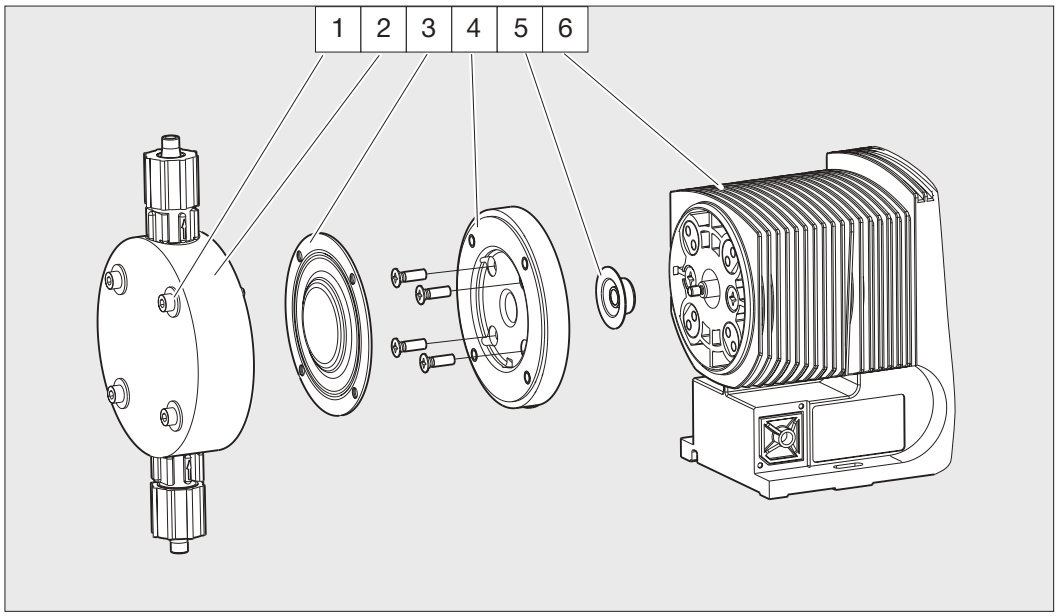


Fig. 19

1 Screws
2 Liquid end
3 Diaphragm
4 Top plate
5 Safety diaphragm
6 Pump housing

NOTE

- **Check the screw torque after 24 hours in operation!**
- **For PP liquid ends recheck the screw torque after three months!**

Screw torques: 4.5 to 5 Nm

10 Troubleshooting

IMPORTANT

- **Wear protective goggles and clothing when working with hazardous chemicals!**
- **Please observe the safety information sheets for dosing media!**
- **Always de-pressurise the liquid end prior to working on a pump!**

Pump is not priming even at full stroke length, and open bleed valve.

Reason Crystalline deposits on the ball seat because valve has dried out.

Remedy ▶ Detach suction tubing from chemical feed container and rinse liquid end thoroughly.

▶ If this fails, dismantle valves and clean.

Green LED display (operating display) not lit

Reason Power supply not connected, or incorrect power supply.

Remedy ▶ Connect to correct power supply according to the details on the device label.

Reason Fuse is defective.

Remedy ▶ Contact your ProMinent branch or supplier!

Yellow LED display (warning indicator) is lit

Reason Liquid level in the feed tank has reached the first float-switch trigger level.

Remedy ▶ Refill chemical tank.

Red LED display (fault indicator) is lit

Reason Liquid level in the feed tank has reached the fault float-switch trigger level (20 mm from empty).

Remedy ▶ Refill chemical tank.

Red LED display (fault indicator) is flashing

Reason Pump operating mode is undefined.

Remedy ▶ Select the required operating mode.

Liquid is leaking from back plate

Reason There is a faulty seal between the liquid end and the diaphragm.

Remedy ▶ Tighten screws in the liquid end.

▶ If this fails, replace diaphragm.

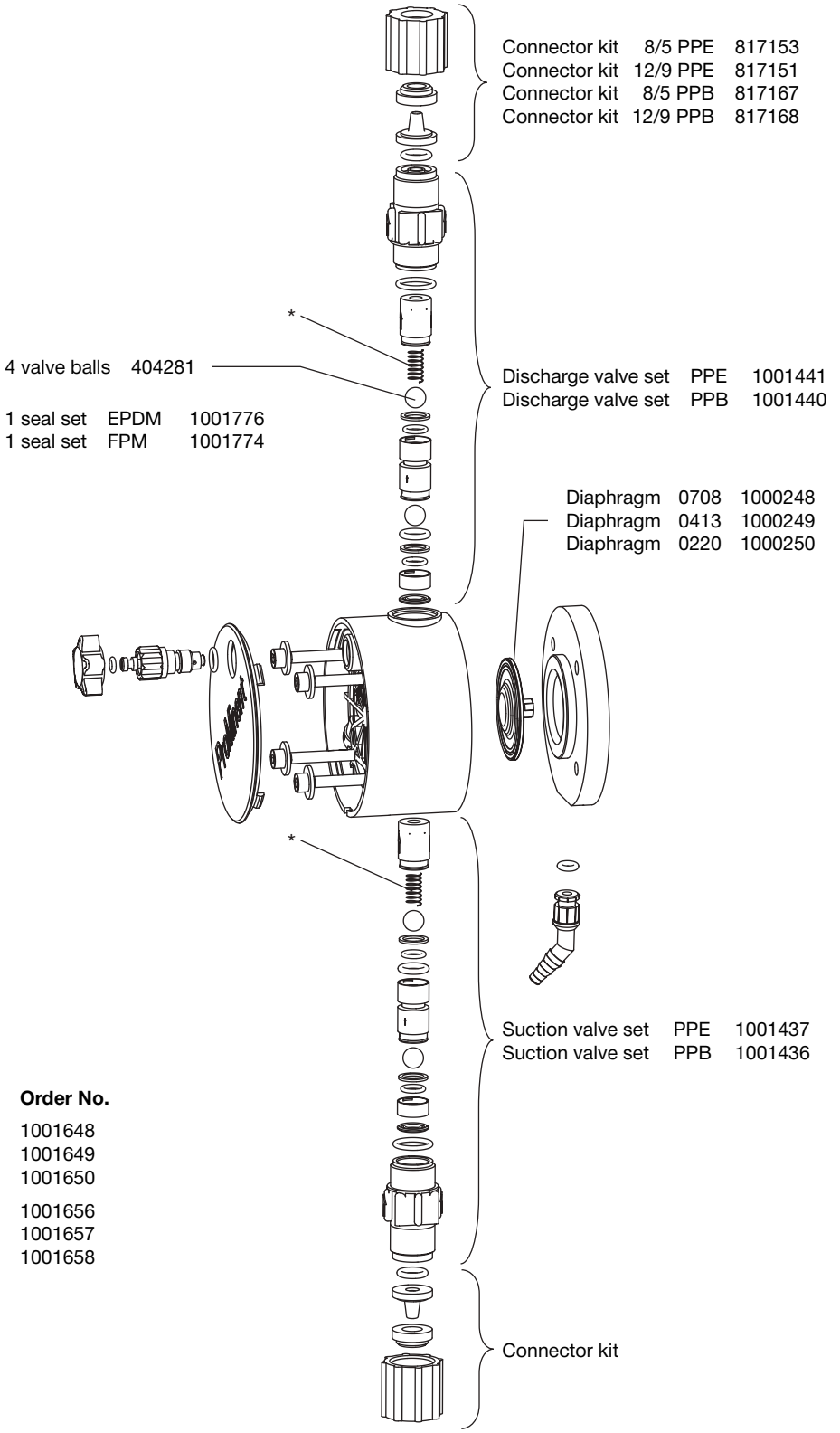
11 Decommissioning, Dismantling and Disposal

NOTE

- **When dismantling a pump, clean thoroughly, paying particular attention to the liquid end in order to remove all traces of chemicals and dirt.**
- **When disposing of a pump it must be broken down into separate material types. All parts must be sent for recycling or for correct disposal according to current legal waste disposal requirements.**

Cleaned, chemical-free pumps may be returned to your ProMinent branch for disposal.

Liquid end 0708 (1008) - 0220 (0420)
PP with coarse/fine bleed



Spare parts kits for:

Type	Material	Order No.
0708 (1008)	PPE	1001648
0413 (0713)	PPE	1001649
0220 (0420)	PPE	1001650
0708 (1008)	PPB	1001656
0413 (0713)	PPB	1001657
0220 (0420)	PPB	1001658

The listed items are included in the spare parts kit.
*** Customer accessories**

Subject to technical alterations.

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Bedienungsanleitung

Für künftige Verwendung bitte aufbewahren

Membran-/ Kolbendruckschalter Baureihe 0159

D

Einbau und Inbetriebnahme sind nach dieser Bedienungsanleitung und nur von autorisiertem Fachpersonal vorzunehmen.

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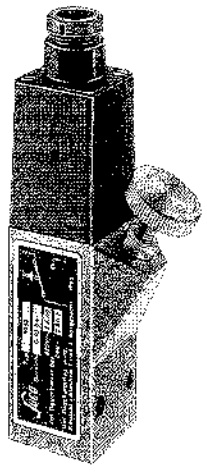

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Funktion und Anwendung

Die Baureihe 0159 öffnet oder schließt einen elektrischen Stromkreis beim Erreichen eines einstellbaren Druckwerts. Durch das Ansteigen des Drucks wird eine Membrane bzw. ein Kolben bewegt. Die Auslenkung der Membrane bzw. der Hub des Kolbens hängt von der Druckkraft und der einstellbaren Federvorspannung ab. Bei einer definierten Auslenkung der Membrane bzw. einem definierten Hub des Kolbens wird ein Mikroschalter betätigt, der die elektrischen Kontakte öffnet bzw. schließt (Wechsler).

☞ Der Druckschalter überwacht einen eingestellten Druckwert.

Voraussetzungen für den Produkteinsatz

Allgemeine, stets zu beachtende Hinweise für den ordnungsgemäßen und sicheren Einsatz des Druckschalters:

☞
- Halten Sie die angegebenen Grenzwerte wie z.B. Drücke, Kräfte, Momente und Temperaturen ein!
- Berücksichtigen Sie die vorherrschenden Umgebungsbedingungen (Temperatur, Luftfeuchte, Luftdruck etc.)
- Beachten Sie die Vorschriften der Berufsgenossenschaften, des Technischen Überwachungsvereins (TÜV) oder die entsprechenden nationalen Bestimmungen.
- Beachten Sie unbedingt die Warnungen und Hinweise in der Bedienungsanleitung.
- Setzen Sie den Druckschalter niemals starken Stößen oder Vibrationen aus.
- Verwenden Sie das Produkt nur im Originalzustand. Nehmen Sie keine eigenmächtige Veränderung vor.
- Entfernen Sie alle Transportvorkehrungen wie Schutzfolien, Kappen oder Kartonagen.

♻ ● Die Entsorgung der oben genannten Werkstoffe in Recycling-Sammelbehältern ist möglich.

Betriebsbedingungen

Bei Medientemperaturen außerhalb der Raumtemperatur (20°C):

⚠ ● Extreme Temperatureinflüsse (abweichend von der Raumtemperatur) können zu einer starken Schaltpunktabweichung oder zum Ausfall des Druckschalters führen.

Schutzart IP 65:

Die Typenprüfung ist nicht uneingeschränkt auf alle Umweltbedingungen übertragbar.
Die Überprüfung, ob die Steckverbindung anderen als den angegebenen Bestimmungen und Vorschriften entspricht bzw. ob diese in speziellen, von uns nicht vorgesehenen Anwendungen eingesetzt werden kann, obliegt dem Anwender.

Sauerstoffeinsatz:

Membrandruckschalter:
Beim Einsatz von Sauerstoff sind die einschlägigen Unfallverhütungsvorschriften zu beachten. Außerdem empfehlen wir, einen maximalen Betriebsdruck von 10 bar nicht zu überschreiten.

Kolbendruckschalter:
Kolbendruckschalter sind für gasförmige Medien, insbesondere für Sauerstoff, **nicht** geeignet.

Überdrucksicherheit:

In den Technischen Daten ist die statische Überdrucksicherheit angegebenen. Sie bezieht sich auf den hydraulischen bzw. pneumatischen Teil des Druckschalters. Der dynamische Wert ist 30 bis 50% niedriger.

Technische Daten

Bemessungsbetriebsspannung U_e	Bemessungsbetriebsstrom I_e	Gebrauchskategorie
250 Volt AC 50/60 Hz	2,5 Ampere	AC 12
250 Volt AC 50/60 Hz	1 Ampere	AC 14
30 Volt DC	2 / 2 Ampere	DC 12 / DC 13
50 Volt DC	1 / 0,5 Ampere	DC 12 / DC 13
75 Volt DC	0,75 / 0,4 Ampere	DC 12 / DC 13
125 Volt DC	0,3 / 0,2 Ampere	DC 12 / DC 13
250 Volt DC	0,3 / 0,2 Ampere	DC 12 / DC 13

Bemessungsisolationsspannung U_i:	300 Volt
Bemessungsstoßspannungsfestigkeit U_{imp}:	2,5 kV
Konventioneller thermischer Strom I_{the}:	5 Ampere
Schaltüberspannung:	< 2,5 kV
Bemessungsfrequenz:	DC und 50/60 Hz
Nennstrom der Kurzschlußschutzeinrichtung:	bis 5 Ampere
Bedingter Kurzschlußstrom:	< 350 Ampere

Bitte wenden

Zeichenerklärung:

⚠ Achtung ☞ Hinweis, Bemerkung ♻ Recycling Gefahr

Art.-Nr.: 1-1-59-628-010 7/02

Operating Instructions

(Please keep carefully for future use)

Diaphragm-/ Piston Pressure Switch Series 0159

GB

Installation and commissioning must be carried out in accordance with these Operating Instructions and by authorized, qualified personnel only.

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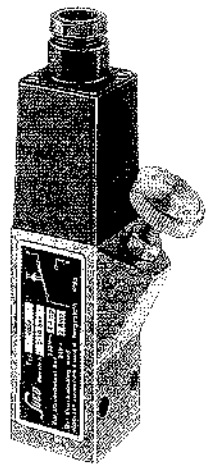

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Operation and use

The series 0159 switch opens or closes an electrical circuit when a certain (adjustable) pressure is reached. A diaphragm or piston is moved by the increase in pressure. The amount of diaphragm deflection or piston travel depends on the force of the pressure applied and the (adjustable) spring tension. At a predetermined deflection of the diaphragm or movement of the pluger, a microswitch is actuated which opens or closes the electrical contacts (changeover).

☞ The pressure switch monitors a preset pressure.

Conditions governing the use of the product

The following general instructions are to be observed at all times to ensure the correct, safe use of the pressure switch:

☞
- Do not exceed the specified limits for e.g. pressures, forces, moments or temperatures under any circumstances.
- Give due consideration to the prevailing ambient conditions (temperature, atmospheric humidity, atmospheric pressure, etc.).
- Observe the applicable safety regulations laid down by the regulatory bodies in the country of use.
- Observe without fail the warning notices and other instructions laid down in the operating instructions.
- Never expose the pressure switch to severe side impacts or vibrations.
- Use the product only in its original condition. Do not carry out any unauthorized modifications.
- Remove all items providing protection in transit such as foils, caps or cartons.

♻ ● Disposal of the above-named materials in recycling containers is permitted.

Operating conditions

Media temperatures other than room temperature (20°C):

⚠ ● The effects of extreme temperatures (relative to room temperature) can lead to pronounced variations in the switching point or the failure of the pressure switch.

Type of protection IP 65:

Type testing does not apply to all ambient conditions without limitations. The user is responsible for verifying that the plug-and-socket connection complies with the specified rules and regulations of CE, or whether it may be used for specialized purposes other than those intended by us.

Use with oxygen:

Diaphragm Pressure Switch:
If oxygen is used, the applicable accident prevention regulations must be observed. In addition, we recommend a maximum operating pressure of 10 bar, which should not be exceeded.

Piston Pressure Switch:
Piston Pressure Switches are not suitable for gaseous media, particulary oxygen..

Protection against overpressure:

The statistical overpressure safety is included in the technical data. The overpressure safety corresponds to the hydraulic, pneumatic part of the pressure switch. The dynamic rating of the overpressure safety is smaller than 30 to 50%.

Technical data

Rated operating voltage U_e	Rated operating current I_e	Utilization category
250 Volts AC 50/60 Hz	2,5 Amps	AC 12
250 Volts AC 50/60 Hz	1 Amp	AC 14
30 Volts DC	2 / 2 Amps	DC 12 / DC 13
50 Volts DC	1 / 0,5 Amp	DC 12 / DC 13
75 Volts DC	0,75 / 0,4 Amp	DC 12 / DC 13
125 Volts DC	0,3 / 0,2 Amp	DC 12 / DC 13
250 Volts DC	0,3 / 0,2 Amp	DC 12 / DC 13

Rated insulation voltage U_i:	300 Volts
Rated surge capacity U_{imp}:	2,5 kV
Rated thermal current I_{the}:	5 Amps
Switching overvoltage:	< 2,5 kV
Rated frequency:	DC and 50/60 Hz
Rated current of short-circuit protective device:	Up to 5 Amps
Rated short-circuit current:	< 350 Amps

PTO

Key to drawings:

⚠ Caution ☞ Note ♻ Recycling Danger

Art.-No.: 1-1-59-628-010 7/02

Mode d'emploi

(A conserver pour toute utilisation ultérieure.)

Manocontacts à membrane / ou à piston Series 0159

F

Montage et mise en service sont à entreprendre d'après le présent mode d'emploi et par le personnel autorisé seulement.

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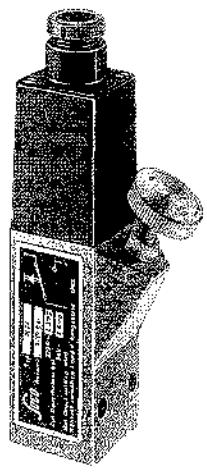

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Fonctionnement et applications

La série 0159 ouvre ou ferme un circuit électrique dès qu'une valeur de pression pré-réglée est atteinte. La montée en pression agit sur une membrane ou une tige de piston. L'ampleur de la déformation subie par la membrane ou la course de la tige de piston dépend de la pression exercée et de la précontrainte pré-réglée sur un ressort. Pour une déviation de la membrane ou une course du piston donnée, le microrupteur est actionné; il ouvre ou il ferme le circuit électrique (inverseur).

☞ Le manocontact contrôle une valeur de pression pré-réglée.

Préalables à l'utilisation du produit

Remarques d'ordre général, mais dont il faut toutefois toujours tenir compte, pour obtenir un fonctionnement fiable et sûr du manocontact

☞
- Respecter les valeurs seuils indiquées (pressions, forces, moments, températures, par exemple).
- Tenir compte des conditions environnantes rencontrées (température ambiante, humidité relative, pression atmosphérique, etc.).
- Toujours respecter les prescriptions et directives des Chambres syndicales, des Services de contrôle technique ainsi que les dispositions légales nationales.
- Impérativement respecter les avis et les remarques données dans le mode d'emploi.
- Veillez à ce que le manocontact ne soit jamais soumis à des fortes accélérations ou des vibrations.
- N'utiliser le produit que dans son état original. Ne jamais entreprendre des modifications quelconques sur celui-ci.
- Enlever au préalable tous les appareils et sécurité de transport (calottes, pellicules de protection, cartonnages, etc.).

♻ ● Tous les matériaux susmentionnés sont recyclables et peuvent être déposés dans des conteneurs prévus à cet effet!

Conditions d'utilisation

En présence de températures des fluides autres que la température ambiante (20°C):

⚠ ● Des températures ambiantes extrêmes peuvent provoquer une forte dérive du point de commutation ou une défaillance du manocontact.

Indice de protection IP 65:

L'homologation de type ne s'applique pas sans restriction à toutes les conditions environnantes.
L'utilisateur est tenu de vérifier si le connecteur répond aux prescriptions et réglements autres que ceux indiqués dans la notice, ou s'il peut être utilisé pour des applications non prévues par nous.

Utilisation d'oxygène:

Manocontact à membrane:
Pour la manipulation d'oxygène, la réglementation afférente à la Sécurité de Travail et à la Prévention d'Accidents devra impérativement être respectée. Nous conseillons en outre de ne pas excéder une pression de service de 10 bars maximum.

Manocontact à tige de piston:
Fondamentalement, les manocontacts à tige de piston ne sont pas appropriés à la manipulation de fluides gazeux, l'oxygène en particulier.

Soupape de surpression:

La valeur admise de surpression statique est exprimée dans les caractéristiques techniques. Elle se réfère à la valeur hydraulique ou pneumatique du manocontact. La valeur dynamique est de 30% jusqu'à 50% inférieure.

Caractéristiques techniques

Tension de service de référence U_e	Intensité de service de référence I_e	Catégorie de service
250 V CA 50/60 Hz	2,5 A	CA 12
250 V CA 50/60 Hz	1 A	CA 14
30 V CC	2 / 2 A	CC 12 / CC 13
50 V CC	1 / 0,5 A	CC 12 / CC 13
75 V CC	0,75 / 0,4 A	CC 12 / CC 13
125 V CC	0,3 / 0,2 A	CC 12 / CC 13
250 V CC	0,3 / 0,2 A	CC 12 / CC 13

Tension d'isolement de référence U_i:	300 V
Résistance de référence aux ondes de surtension U_{imp}:	2,5 kV
Intensité thermique conventionnelle I_{the}:	5 A
Surtension de commutation:	< 2,5 kV
Fréquence de référence:	CC et 50/60 Hz
Courant nominal de la protection contre les court-circuits:	j.q. 5 A
Courant de court-circuit conditionnel:	< 350 A

T.s.v.p.

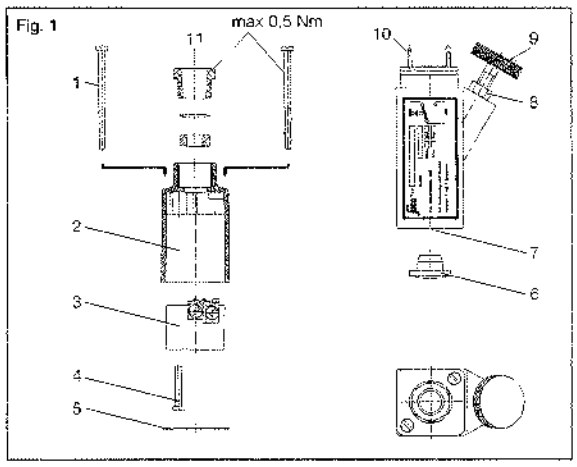
Explication des symboles:

⚠ Attention ☞ Nota, remarque ♻ Recyclable Danger

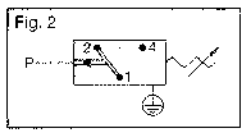
Référence: 1-1-59-628-010 7/02

Protection IP selon EN 60 529:1991:	IP 65 avec connecteur
Couple de serrage des vis de branchement:	< 0,5 Nm
Section de branchement:	0,5 à 1,5 mm²
Fréquence de commutation:	< 200 min⁻¹
Durée de vie mécanique	
Version à membrane:	10^6 cycles de manœuvre (pour des pressions de commutation j.q. 40 bars)
Version à piston:	10^6 cycles de manœuvre
Boîtier:	AlMgSi¹ F28
Tenue à la température:	NBR -30°C à +100°C EPDM -30°C à +100°C FKM -5°C à 120°C
Sécurité de surpression	
Manocontacteur à membrane:	200 bars
Manocontacteur à piston:	600 bars

Eléments de manœuvre et de raccordement



(1) Vis de fixation
(2) Boîtier du connecteur
(3) Embase de montage
(4) Vis de fixation
(5) Joint plat
(6) Bouchon
(7) Branchement hydraulique / pneumatique
(8) Contre-écrou
(9) Vis de réglage
(10) Branchement électrique
(11) Raccord Pg



Montage

Mécanique, pneumatique, hydraulique:

Retirer le bouchon (6) du raccord de pression (7).

Brancher le manocontact sur le raccord de pression (7) (couple de serrage env. 50 Nm).

L'étanchéité du système est assurée par une bague en cuivre, aux dimensions correspondantes.

Attention: ne jamais serrer le manocontact en le saisissant par ses parties en plastique! Risque de détérioration!

Electrique:

N'utiliser que le connecteur fourni par nos services.
S'assurer que le câble électrique soit exempt
- d'écrasements,
- de coudes trop prononcés
- et soit installé de manière à ne pas pouvoir s'allonger.

Câblage avec le connecteur:

1. Dévisser les vis de fixation (1) jusqu'à ce que le connecteur (2) puisse être retiré.
2. Retirer le connecteur (2) et dévisser la vis de fixation (4).
3. Démonter l'embase de montage (3) ainsi libérée.
4. Raccorder les conducteurs (section maxi: 1,5 mm²) sur les bornes prévues à cet effet (Fig. 2).
5. Réintroduire la plaque de branchement (3) dans le connecteur (2) remettre la vis de fixation (4). Introduire le connecteur (2) sur le manocontact, remonter la vis de fixation (1) et la serrer.
6. Procéder aux vérifications suivantes:
   - le câblage correspond-il au schéma de la figure 2?
   - Les câblages sont-ils posés sans risque d'écrasement?
   - Les couples dynamométriques (Fig. 1) sont-ils respectés?

Veiller à ce que la garniture plate (5) soit correctement positionnée et à ce que le raccord PG (11) soit en place comme il faut, faute de quoi l'indice de protection spécifié (IP 65) ne serait pas obtenu.

Mise en service

1. Dévisser la vis de fixation (1) et retirer le connecteur (2).
2. Ponter les bornes 1 et 4 avec un contrôleur de passage (Fig. 2).

Si l'on se sert d'une lampe en tant que contrôleur de passage, il faut veiller à respecter la puissance de commutation maximale admise (voir caractéristiques techniques).

3. Débloquer le contre-écrou (8), puis serrer à fond la main la vis de réglage (9).

Tenir compte du fait que la vis de réglage (9) n'a une butée que pour le serrage.

4. Alimenter le manocontact avec la pression de commutation souhaitée (un manomètre de contrôle est nécessaire).
5. Dévisser la vis de réglage (9) jusqu'à ce que le manocontact (le contrôleur de circulation réagit).
6. Corriger le cas échéant la pression de réaction en agissant en conséquence sur la vis de réglage (9).
7. Procéder au réglage et rebloquer le contre-écrou (8) replacer le connecteur (2) et revisser la vis de fixation (1).

A la mise en service du manocontact, tenir compte des prescriptions et directives correspondantes données par les Chambres syndicales concernées, ainsi que les dispositions nationales respectives.

Démontage

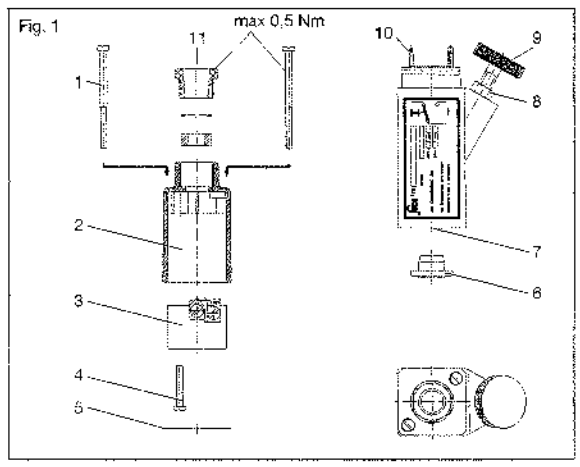
Avant de démonter le manocontact il est très important de tenir compte des points suivants:

- Il est impératif que le système sur lequel le manocontact est à monter soit au préalable mis hors pression.
- De même, les prescriptions inhérentes à la sécurité doivent impérativement être respectées.

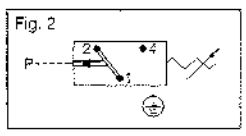
Ne jamais dévisser le manocontact en le saisissant par ses parties en plastique, faute de quoi on encourt le risque de l'endommager.

IP protection to EN 60 529:1991:	IP 65 with plug
Tightening torque for terminal screws:	< 0,5 Nm
Conductor size:	0,5 to 1,5 mm²
Operating frequency:	< 200 per min⁻¹
Mechanical life	
Diaphragm type:	10^6 operating cycles (at trip pressures up to 40 bar)
Piston type:	10^6 operating cycles
Body material:	AlMgSi1 F28
Temperature range:	NBR -30°C to +100°C EPDM -30°C to +100°C FKM -5°C to 120°C
Overpressure safety	
Diaphragm Pressure Switch:	200 bar
Piston Pressure Switch:	600 bar

Operating controls and connections



(1) Fastening screw
(2) Covering flap
(3) Terminal board
(4) Mounting screw
(5) Gasket
(6) Plug
(7) Hydraulic / pneumatic connection
(8) Lock nut
(9) Adjusting screw
(10) Electrical connection
(11) Pg screw coupling



Installation

Mechanical / pneumatic / hydraulic:

Remove the plug (6) from the pressure connection (7).

Connect the pressure switch to the pressure connection (7) (tightening torque approx 50 Nm).

For sealing the system, use a standard copper gasket of the appropriate dimensions.

Caution: Do not secure the pressure switch by means of the plastic components under any circumstances, otherwise they may be damaged beyond further use.

Electrical:

Use the connector supplied.
Take care to ensure that the cable is laid in such a way that it is not:
– pinched
– kinked
– under tension.

Connection to the connector:

1. Release the fastening screws (1) to a sufficient extent to allow the plug housing (2) to be revoved.
2. Remove the plug housing (2) an release fastening screw (4).
3. Remove the released terminal board (3).
4. Connect the cable (max. lead cross-section 1,5 mm²) to the screw terminals provided (Fig. 2).
5. Reinstall the terminal plate (3) in the plug housing (2) and secure with fastening screw (4). Place the plug housing (2) on the pressure switch, then install and tighten the fastening screw (1).
6. Pay attention to the following points:
– Wiring in accordance with connecion diagram (Fig. 2)
– Cabling laid free of pinching, chafing, etc.
– Torque specifications (Fig. 1)

Take care to ensure that the gasket (5) and PG screw coupling (11) are correctly installed, otherwise the conditions specified for protection category IP 65 will not be met.

Entry into service

1. Release fastening screw (1) and remove the plug housing (2).
2. Using a continuity tester, wire up the electrical connecitons 1 and 4 (Fig. 2).

If using a testing lamp as a continuity tester, observe the maximum permissible switching capacity (see Technical Data).

3. Release the lock nut (8) and screw in the adjusting screw (9) by hand as far as it will go.

Take care to ensure that the adjusting screw (9) dose not seize at any point other than when it is fully tightende down.

4. Adjust the pressure switch to the desired actuating pressure (a test pressure gauge is required).
5. Ease off the adjusting screw (9) to a sufficient extent to cause the pressure switch to trip (continuity tester reacts).
6. If necessary, adjust the trip pressure setting by turning the adjusting screw (9).
7. On the completion of the adjusting process, re-tighten the lock nut (8), install the plug housing (2) and re-tighten the fastening screw (1).

When putting the pressure switch into service, please observe the applicable safety regulations laid down by the governing bodies in the country of use.

Removing the pressure switch

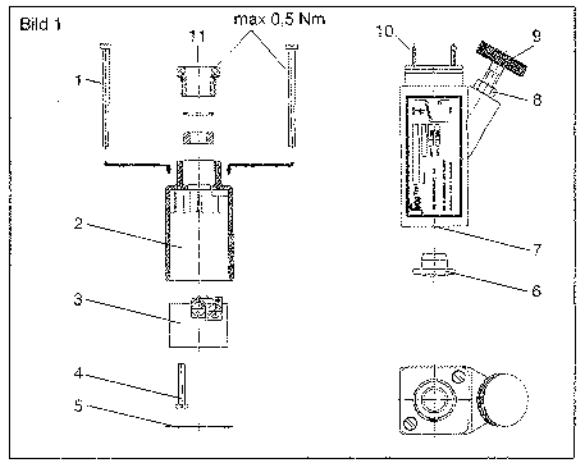
When removing the pressure switch, observe the following important instructions:

- The pressurized system form which the pressure switch is intended to be removed must be entirely relieved of pressure.
- All the relevant safety regulations must be observed.

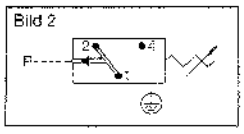
Do not attempt to turn the switch by means of the plastic collars, otherwise it could be damaged beyond further use.

IP-Schutzart nach EN 60 529:1991:	IP 65 mit Stecker
Anzugsdrehmoment der Anschlußschrauben:	< 0,5 Nm
Anschlußquerschnitt:	0,5 bis 1,5 mm²
Schalthäufigkeit:	< 200 min⁻¹
Mechanische Lebensdauer	
Membranausführung:	10^6 Schaltspiele (bei Schaltdrücken bis 40 bar)
Kolbenausführung:	10^6 Schaltspiele
Gehäusewerkstoff:	AlMgSi1 F28
Temperaturbeständigkeit:	NBR -30°C bis +100°C EPDM -30°C bis +100°C FKM -5°C bis 120°C
Überdruckssicherheit	Membrandruckschalter: 200 bar Kolbendruckschalter: 600 bar

Bedienteile und Anschlüsse



(1) Befestigungsschraube
(2) Steckergehäuse
(3) Anschlußplatte
(4) Befestigungsschraube
(5) Flachdichtung
(6) Stopfen
(7) Hydr./Pneumatischer Anschluß
(8) Sicherungsmutter
(9) Einstellschraube
(10) Elektrischer Anschluß
(11) Pg-Verschraubung



Einbau

Mechanisch, pneumatisch, hydraulisch:

Entfernen Sie den Stopfen (6) aus dem Druckanschluß (7).

Schließen Sie den Druckschalter an den Druckanschluß (7) an (Anzugsdrehmoment ca. 50 Nm).

Achtung: niemals den Druckschalter an den Kunststoffteilen festdrehen. Zerstörungsgefahr!

Zum Abdichten des Systems verwenden Sie einen Standard-Kupferdichtring mit den entsprechenden Abmessungen.

Elektrisch:

Verwenden Sie die mitgelieferte Gerätesteckdose.
Stellen Sie sicher, daß das Kabel
– quetschfrei,
– knickfrei,
– dehnungsfrei verlegt ist.

Verkabelung der Gerätesteckdose:

1. Lösen Sie die Befestigungsschrauben (1) so weit, daß sich das Steckergehäuse (2) abziehen läßt.
2. Ziehen Sie das Steckergehäuse (2) ab, und lösen Sie die Befestigungsschraube (4).
3. Demontieren Sie die gelöste Anschlußplatte (3).
4. Schließen Sie die Kabel (max. Leitungsquerschnitt 1,5 mm²) an den dafür vorgesehenen Schraubklemmen an (Bild 2).
5. Anschlußplatte (3) wieder in das Steckergehäuse (2) schieben und mit Befestigungsschraube (4) montieren. Steckergehäuse (2) auf den Druckschalter stecken und Befestigungsschraube (1) montieren und anziehen.
6. Achten Sie auf folgende Punkte:
– Verkabelung nach Anschlußbild (Bild 2)
– Quetschfreie Kabelführung
– Anzugsdrehmomente (Bild 1)

Achten Sie auf die ordnungsgemäße Lage der Flachdichtung (5) und auf eine sachgemäße Montage der Pg-Verschraubung (11), da sonst die Schutzart IP65 nicht erreicht wird.

Inbetriebnahme

1. Lösen Sie die Befestigungsschrauben (1), und ziehen Sie das Steckergehäuse (2) ab.
2. Verkabeln Sie die elektrischen Anschlüsse 1 und 4 mit einem Durchgangsprüfer (Bild 2).

Bei Verwendung einer Prüflampe als Durchgangsprüfer: Achten Sie auf die max. zulässige Schaltleistung (siehe technische Daten).

3. Lösen Sie die Sicherungsmutter (8), und drehen Sie die Einstellschraube (9) von Hand zunächst ganz ein.

Beachten Sie bitte, daß die Einstellschraube (9) nur beim Eindrehen einen Anschlag besitzt.

4. Beaufschlagen Sie den Druckschalter mit dem gewünschten Schaltdruck (Kontrollmanometer erforderlich).
5. Drehen Sie die Einstellschraube (9) so weit heraus, bis der Druckschalter umschaltet (Durchgangsprüfer reagiert).
6. Korrigieren Sie gegebenenfalls den Schaltdruck durch Verdrehen der Einstellschraube (9).
7. Ziehen Sie die Sicherungsmutter (8) nach Beendigung des Einstellvorgangs wieder an, setzen Sie das Steckergehäuse (2) auf und ziehen Sie die Befestigungsschraube (1) wieder an.

Bei der Inbetriebnahme des Druckschalters beachten Sie bitte die entsprechenden Sicherheitsvorschriften der Berufsgenossenschaft oder die entsprechenden nationalen Bestimmungen.

Ausbau

Beachten Sie folgende wichtigen Punkte beim Ausbau des Druckschalters.

- Das Drucksystem, aus dem der Druckschalter ausgebaut werden soll, muß sich im drucklosen Zustand befinden.
- Es müssen alle relevanten Sicherheitsbestimmungen beachtet werden.

Drehen Sie den Druckschalter niemals an den Kunststoffansätzen heraus, da Zerstörungsgefahr für den Druckschalter besteht.

Geva Sol bv

Operating instructions for direct acting solenoid valves

It is essential to follow these installation and operating instructions. To ensure perfect functioning and long service life, the limit values for pressures and temperatures must be observed, as must the information contained in the data sheet and delivery note.

You must also comply with national regulations when in use in safety areas. Failure to follow these instructions will exempt us from all liability and will invalidate the warranty on equipment and accessories.

Function:

Standard direct acting solenoid valves are always closed when de-energised (NC). If the solenoid is energised by applying a voltage, the plunger is lifted opening the valve. In the de-energised position the plunger is forced onto the valve seat by a spring, closing the valve. With a larger seat diameter, the permitted operating pressure decreases and the magnet strength must be increased.

Storage and transportation:

The valves must be properly protected and stored in a clean, dry area. For the handling of heavy valves, only use the eye bolts provided for this purpose and/or suitable certified slings on the valve body. Never use the actuator as a carrying handle or lever!!!

Installation:

When installing, the direction of the medium which flows through the valve, must be taken into consideration. The valve is designed to function in a specific direction only, and its function is defined. If the valve is not correctly installed, it will not function. To prevent the risk of this happening, the valve is engraved with permanently legible markings on the connections. P for input, A for output and R for return flow or , in the case of 3/2-way valves, for the second output. Install the valve only with upright actuator in horizontal direction unless there is the opposite indicated in other documents like data sheet or quotation. Always take into consideration the direction of the arrows or the connection marking (P, A, R) on the housing, in respect to the flow of the medium.

Before installation, rinse through pipes with pressure intervals. In accordance with DIN 3394 and DIN EN 161, a strainer must be fitted upstream of every shutoff valve so as to ensure smooth functioning with neutral media. Dirt may cause blockage of small orifices such as the pilot or reduction orifice, and may restrict or prevent functions such as closing/ opening the valve.

If a valve is installed with a sleeve connection, please do not use the solenoid as a lever. Connection flanges, inclusive of sealing material and connection elements, conform to the standards from pipeline manufacturing and are the responsibility of the system engineer.

Putting into operation:

Depending on the area of use, surface temperatures higher or lower than the ambient temperatures may occur on the valve housing. In system
engineering, pipes with large temperature differences relative to the ambient temperature are usually insulated accordingly to save energy. This insulation should also include the housing of the industrial fittings. The solenoid must not be insulated both for thermal reasons (heat build-up) and also to permit easy maintenance. Insulating the housing excludes the possible risk of burns.

The decision regarding insulation is taken by the system engineer and is thus his responsibility. Finally, there is a small residual risk caused by high temperature on the solenoid, which depends on the frequency of operation.

Caution: surface temperature can be above 100°C! **Attention:** Coils with alternating voltage are only to be operated when they are fitted to a solenoid tube. The operation without such a tube could lead to a higher flow of voltage through the coil than approved and therefore leading to a thermic self-destruction of the coil.

Some valves are equipped with adjustable closing regulation, which is set at the factory for reliable valve functioning with regard to closing time at a viscosity of the medium of up to 22 mm2/s. The setting is made using a locked adjustment screw and can, if required, be changed and readjusted by the customer to suit the particular system. This entails the risk that, if handled incorrectly, the adjustment screw might be removed completely and the medium
would be able to escape to the outside through the control orifice.

Furthermore, the closing time is set at the factory so that up to the stated viscosity of the medium no, or only minimal, pressure surges occur in the pipe system. Adjustment by the customer/system operator may, however, be necessary (depending on the viscosity of the medium).

For this reason, the adjustment screw must not be fixed. It is therefore the responsibility of the system operator to have the adjustment made by expert staff when the system is put into operation and thereby prevent the risk of the adjustment screw being removed completely.

When operating the industrial valve within a system, electrostatic charges may occur due to the flow of the medium. These charges are normally
discharged to earth via a cable connection or via the electrically conductive pipe system. The industrial valve has a threaded hole in the housing to permit
connection of a cable.
Depending on the area of use, and for reasons of energy consumption, there are also NO valves that are open when de-energised, i.e. in the event of a
power failure these valves open. These valves can optionally be equipped with additional manual operation to allow them to be closed manually during a
power failure, or to allow opening in the case of NC valves.
The choice of the open or closed position during power failure must be made according to the particular system and with safety in mind. This decision is
therefore the responsibility of the system engineer.

Electrical connection:
The solenoid systems in the standard range have either a plug-in connection or a terminal box on the solenoid.
Before connecting the power supply, check the specified type of current and voltage on the rating plate and delivery note.
Voltage tolerance +5%/-10%. The valves are designed for continuous duty. The operating time is the function in which the solenoid remains energised until
the load temperature is reached. Protect electrical connections against continuous moisture.
If installed outdoors, provide adequate covering. IP 65 enclosure protection means that the unit is only designed for short exposure to moisture. Electrical
connections must only be made by qualified staff. In the case of solenoids that only operate with accompanying rectifier or switching electronics, it is
obligatory for these to be connected.

Possible malfunctions:
Check the direction of flow, voltage, place of use and operating pressure!
• Valve does not close
- dirt in the control orifices
- plunger is sticking
- rated voltage is not present
- incorrect installation position
- direction of arrow is not identical with direction of flow
• Valve does not open
- diaphragm or plunger is defective
- load relief orifice is blocked (inspect the seal or screw connection in the output)
- plunger does not rise (audible knocking or "clicking")
- connection voltage has been interrupted or is insufficient
- solenoid or rectifier is defective
- plunger is sticking in a blocked tube. (When the anchor does not reach the stroke end position,
this causes the coil to fail (thermal overload) after a short time if the alternating current solenoid is energised)
rated voltage and coil voltage are different

Action:
Action must only be taken by qualified staff and using suitable tools. If the valve is still under warranty, you must consult GEVA SOL before taking any action, failure
to do this will result in the termination of the warranty. When added options are present and the valve differs from the standard, due to the different
possibilities and/or of the valves special functions, please follow the technical data as shown in the delivery note or preceding offer. In this case these
operating instructions only apply with limitations.

Information about the Pressure Equipment Directive:
All valves are designed and manufactured in accordance with the EU Directive 97/23/EC (Pressure Equipment Directive). Equipment that has no CE mark on
the housing comes under Article 3 Paragraph 3 of the directive. They are designed and manufactured on the basis of "good engineering practice" and are
not allowed to carry a CE mark.
State 08/2003 – no responsibility is accepted for the accuracy of this information

Operating instructions for direct acting solenoid valves
Diagrams of Standard Types

Type A
Type L
Type U
Type V
Type N
Type H
Type C
Type R
Type S
Type X
Type O, OL