

Operating Manual

Automatic top-up device

Code No. 99-97-2844 GB

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1 System description

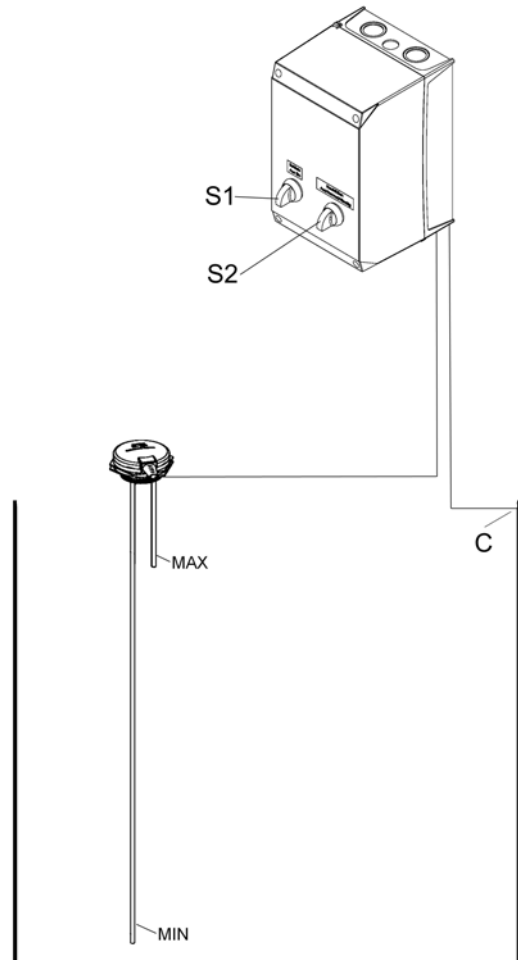
1.1 Operation

Using the automatic top-up device, the volume of a liquid in a vessel can be kept at a certain level automatically. If the minimum content of the vessel is undercut then automatic topping up takes place.

The **MIN / MAX / 0** selector switch enables the user to specify the desired level in the tank.

Features:

- ON/OFF switch for operation
- MIN / MAX / 0 selector switch
- Level monitoring of conductive liquids
- Determination of level by means of sensor probes
- Switch-on delay
- Release delay

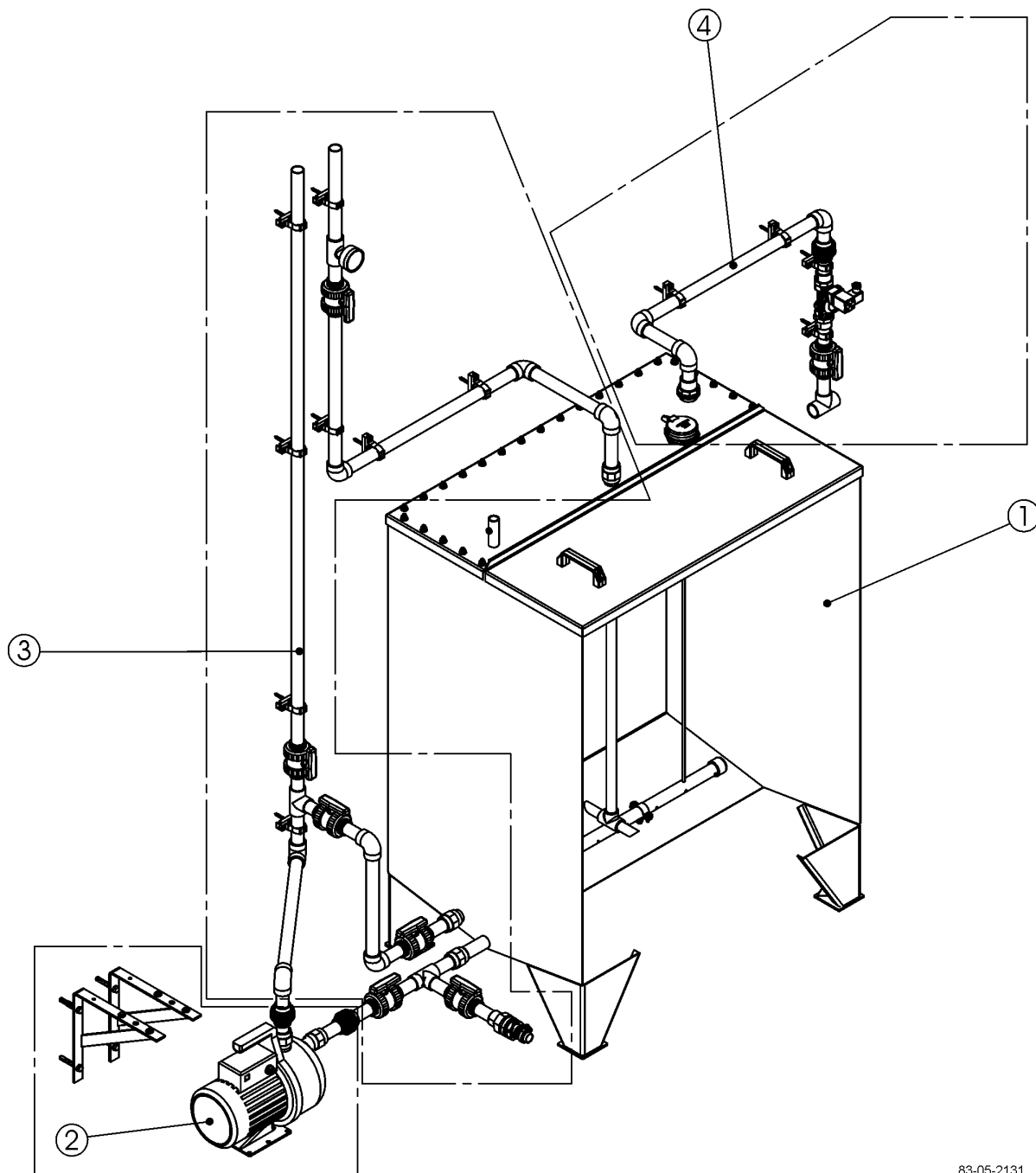


1.2 Technical data

Dimensions (W x L x H)	240 mm x 190 mm x 160 mm
Protection class per EN60529	IP56
Supply voltage	230V AC
Max. power consumption	4 A
Ambient temperature	0 - 40 °C
Housing material	ABS
Code no.	83-05-4438

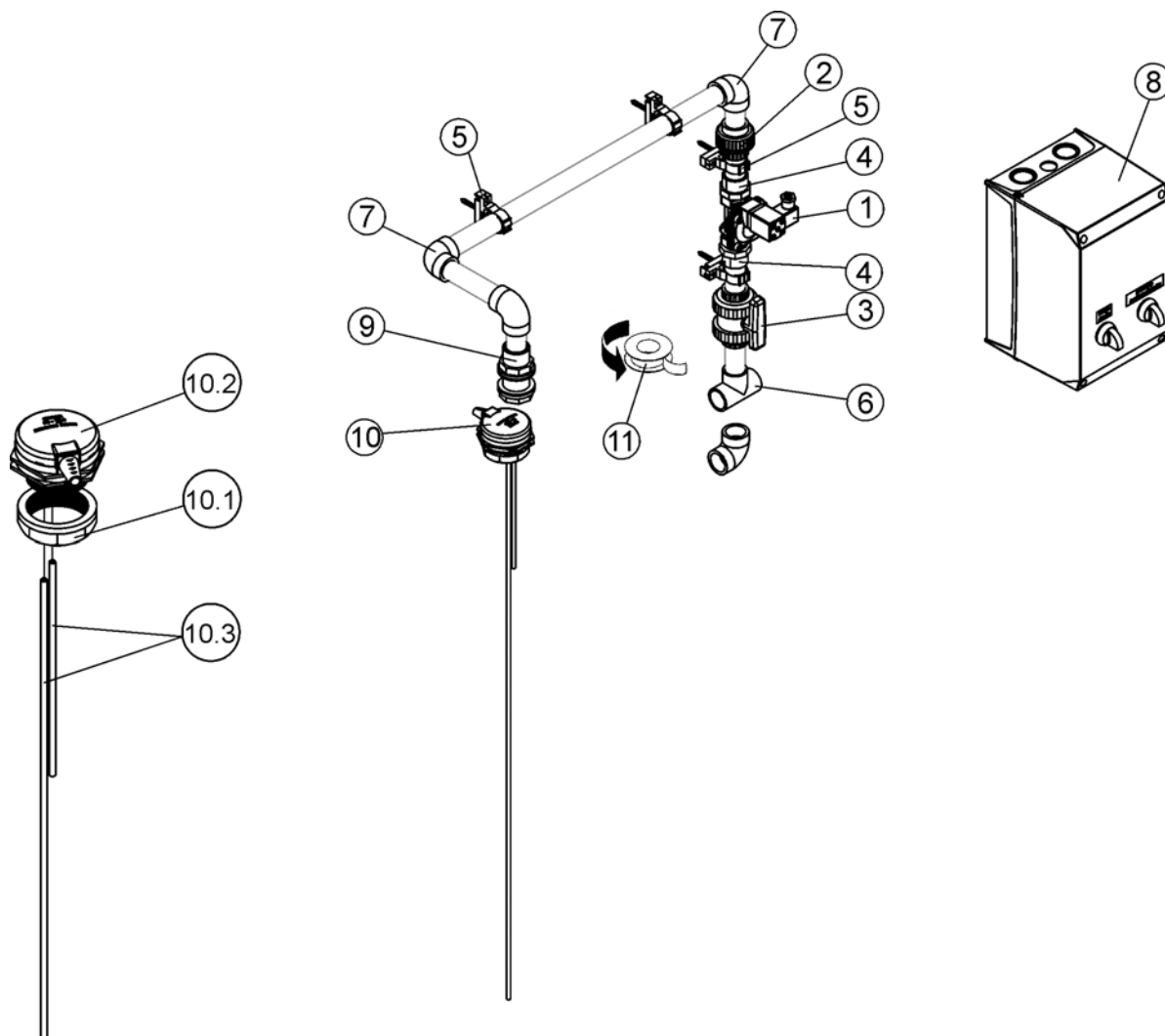
2 Assembly

The automatic top-up device (4) is installed in a water tank (1).



83-05-2131

Code no.	Pos.	Description
83-05-2088	1	Water tank 750 L stainless steel
30-61-3660	2	Water pump JP5 with mounting material
83-05-4396	3	Connection set with supply/return and rinsing pipe for MEDI tank
83-05-4438	4	Automatic refilling system for 750 and 1000 L stainless steel tank



Pos.	Qty.	Code no.	Description
	1	83-05-4438	Automatic top-up device for 750L and 1000L stainless steel tank
1	1	30-00-1259	Solenoid valve 1" Int.thr. for water line 230V 50Hz
2	1	99-40-3703	Coupling 32-32 PVC ND16
3	1	99-40-3984	Ball valve 32mm PVC ND16
4	2	99-40-4005	Adaptor nipple 32/40x1"A PVC with round solvent cement sockets
5	4	83-04-9838	Pipe clamp 32 compl. for wall
6	1	99-40-3706	T-piece 32x32x32 PVC ND16
7	4	99-40-3705	Angle 32 - 90 deg. PVC ND16
8	1	83-05-2116	Controller for automatic top-up device stainless steel
9	1	99-40-4039	Bolted tank connection 1 1/4" x 32I PVC
10	1	83-05-2926	Level indicator compl. for 750L and 1000L stainless steel tank
10.1	1	21-00-0528	Octagonal nut, PVC, 2"
10.2	1	83-05-2120	Level indicator for stainless steel tank
10.3	1	83-06-9688	Measuring rods for level indicator stainless steel tank / Set of 2 units.
11	0.30 RO	30-00-3846	Fabric sealing tape 0.1mm/12m HDF

3 Operation



Installations and work on the electric components/structural groups may only be carried out by qualified personnel according to electro-technical regulations (e.g. EN 60204, DIN VDE 0100/0113/0160).



Dangerous electric tensions are bare in case of open control equipment. Please be aware of the danger and keep workers of other professions away from the danger zone !

1. Check that the device is connected according to specifications and ensure that the cable connections are laid correctly.
2. Set the S1 switch to "0".
3. Open the housing and switch the **F1** fuse on. Once you have switched the fuse on, you must close the housing once again.

4 Operation

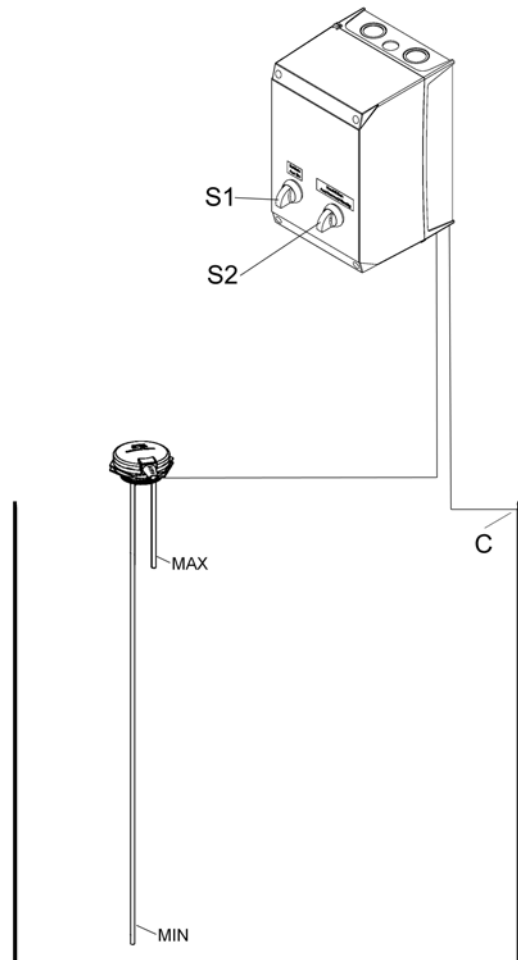
4.1 Level setting - switch position "MAX"

With the aid of the "MAX" function it is possible to refill a vessel automatically.

1. Set the S2 switch to "MAX".
2. Set the S1 switch to "1".

The solenoid valve is switched on immediately and the vessel is topped up until the liquid establishes a connection between **C** and the **MAX** sensor (see figure).

3. The vessel is full and the valve is closed.
4. The valve now remains closed until the liquid level in the vessel has dropped to below the (**MIN**) sensor.
5. As soon as the connection between **C** and the (**MIN**) sensor is lost, the solenoid valve is switched on once more. The vessel is now topped up until the liquid establishes a connection between the **C** contacts and **MAX** once again.



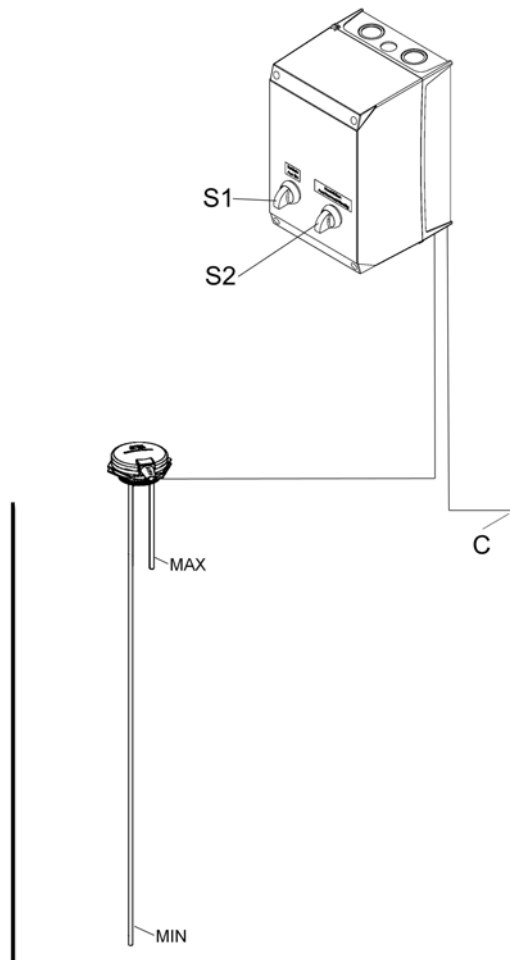
4.2 Level setting - switch position "MIN"

With the aid of the "MIN" function it is possible to keep the volume of liquid in a vessel at the minimum level. Select this switch setting in order to avoid filling the vessel completely, and to protect the pump from dry running.

1. Set the S2 switch to "MIN".
2. Set the S1 switch to "1".

The solenoid valve is switched on immediately and the vessel is topped up until the liquid establishes a connection between the **C** contacts and **MIN** (see figure).

3. The valve is closed
4. The valve now remains closed until the liquid level in the vessel has dropped below the **MIN** sensor.
5. As soon as the connection between **C** and the (**MIN**) sensor is lost, the solenoid valve is switched on once more. The vessel is now topped up until the liquid establishes a connection between the **C** contacts and **MIN** once again.



4.3 Level setting - switch position "0"

If you set the selector switch **MIN / MAX / 0** to "0" then the vessel will no longer be topped up.



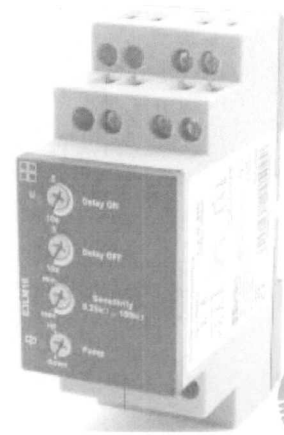
If the switch is set to position "0" then there is a risk of the pump dry running.

5 Annex

5.1 Technical instructions for the monitoring relay

5.2 Circuit diagram

- ▶ Level monitoring of conductive liquids
- ▶ Multifunction
- ▶ Secure isolation of the measuring circuit
- ▶ 1 change over contacts
- ▶ Width 35mm
- ▶ Installation design



Technical data

1. Functions

Level monitoring of conductive liquid, timing for tripping delay and turn-off delay separately adjustable and the following functions (selectable by means of rotary switch):

Pump up pump up or minimum monitoring
 Pump down pump down or maximum monitoring

2. Time ranges

	Adjustment range
Tripping delay (Delay ON):	0.5s to 10s
Turn-off delay (Delay OFF):	0.5s to 10s

3. Indicators

Green LED ON: indication of supply voltage
 Yellow LED ON/OFF: indication of output relay

4. Mechanical design

Self-extinguishing plastic housing, IP rating IP40
 Mounted on DIN-rail TS 35 according to EN 50022
 Mounting position: any
 Shockproof terminal connection according to VBG 4 (PZ1 required), IP rating IP20
 Tightening torque: max. 1Nm
 Terminal capacity:
 1 x 0.5 to 2.5mm² with/without multicore cable end
 1 x 4mm² without multicore cable end
 2 x 0.5 to 1.5mm² with/without multicore cable end
 2 x 2.5mm² flexible without multicore cable end

5. Input circuit

Terminals: A1-A2
 Rated voltage Un: see table ordering information or printing on the unit
 Tolerance: -15% of +10% of Un
 Rated consumption: 2VA (1.0W)
 Rated frequency: AC 48 to 63Hz
 Duty cycle: 100%
 Reset time: 500ms
 Hold-up time: -
 Drop-out voltage: >30% of supply voltage
 Overvoltage category: III (in accordance with IEC 60664-1)
 Rated surge voltage: 6kV

6. Output circuit

1 potential free change over contact
 Rated voltage: 250V AC
 Switching capacity:
 1250VA AC1 B300/P300
 (in accordance with IEC 60947-5-1)
 therm. constant current 5A
 Fusing: 5A fast acting
 Mechanical life: 20 x 10⁶ operations
 Electrical life:
 2 x 10⁵ operations
 at 1000VA resistive load
 Switching frequency: max. 6/min at 1000VA resistive load
 (in accordance with IEC 60947-5-1)
 Overvoltage category: III. (in accordance with IEC 60664-1)
 Rated surge voltage: 6kV

7. Measuring circuit

Measuring input: conductive probes
 (Type SK1, SK2, SK3)
 Terminals: E1-E2-E3
 Sensitivity: 0,25 to 100kΩ (4mS to 10μS)
 Sensor voltage: 12V AC
 Sensor current: max. 7mA
 Wiring distance (capacity of cable 100nF/km):
 max. 1000m (set value <50%)
 max. 100m (set value 100%)
 Overvoltage category: III (in accordance with IEC 60664-1)
 Rated surge voltage: 6kV

8. Accuracy

Base accuracy: -
 Adjusting accuracy: -
 Repetition accuracy: -
 Voltage influence: -
 Temperature influence: -

9. Ambient conditions

Ambient temperature: -25 to +55°C
 Storage temperature: -25 to +70°C
 Transport temperature: -25 to +70°C
 Relative humidity: 15% to 85%
 (in accordance with IEC 60721-3-3
 class 3K3)
 Pollution degree: 2, if built in 3
 (in accordance with IEC 60664-1)

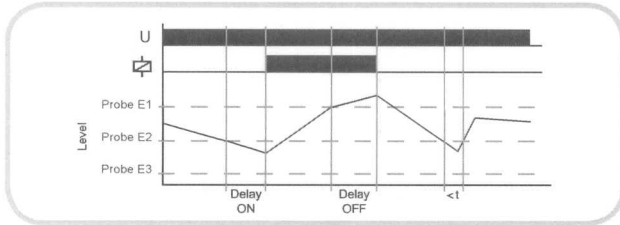
10. Weight

Single packing: 140g

Functions

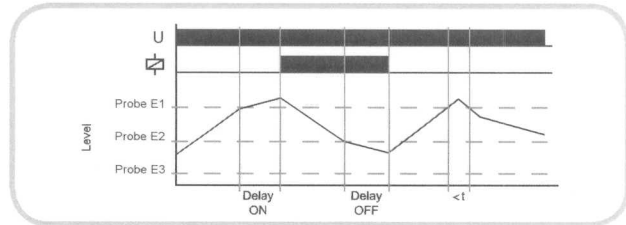
Pump up

Connection of the probe rods E1, E2 and E3. Alternatively the electrically conducting container can be connected in lieu of the test probe E3. When the air-fluid level falls below the minimum probe E2 the set interval of tripping delay (Delay ON) begins. After the expiration of the interval, the output relays R switches into on-position (yellow LED illuminated). When the air-fluid level again rises above the maximum probe E1, the set interval of turn-off delay (Delay OFF) begins. After the expiration of the interval the output relays R switches into off-position (yellow LED not illuminated).



Pump down

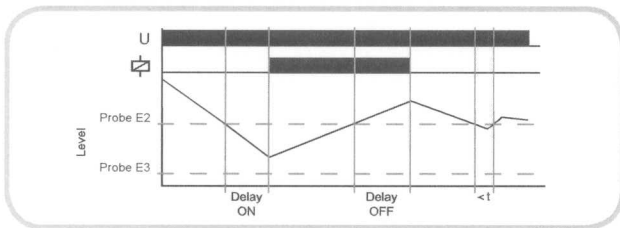
Connection of the probe rods E1, E2 and E3. Alternatively the electrically conducting container can be connected in lieu of the test probe E3. When the maximum probe E1 gets moistened the set interval of tripping delay (Delay ON) begins. After the expiration of the interval the output relays R switches into on-position (yellow LED illuminated). When the air-fluid level falls below the minimum probe E2, the set interval of turn-off delay (Delay OFF) begins. After the expiration of the interval, the output relays R switches into off-position (yellow LED not illuminated).



Minimum monitoring (Pump up)

Connection the probe rods E2 and E3 (bridge E1-E3). Alternatively the electrically conducting container can be connected in lieu of the test probe E3.

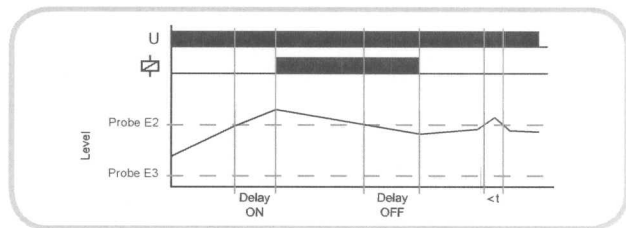
When the air-fluid level falls below the probe E2 the set interval of tripping delay (Delay ON) begins. After the expiration of the interval, the output relays R switches into on-position (yellow LED illuminated). When the air-fluid level again rises above the probe E2, the set interval of turn-off delay (Delay OFF) begins. After the expiration of the interval the output relays R switches into off-position (yellow LED not illuminated).



Maximum monitoring (Pump down)

Connection of probe rods E2 and E3 (bridge E1-E3). Alternatively the electrically conducting container can be connected in lieu of the test probe E3.

When the probe E2 gets moistened the set interval of tripping delay (Delay ON) begins. After the expiration of the interval the output relays R switches into on-position (yellow LED illuminated). When the air-fluid level sinks below the probe E2, the set interval of turn-off delay (Delay OFF) begins. After the expiration of the interval the output relays R switches into off-position (yellow LED not illuminated).



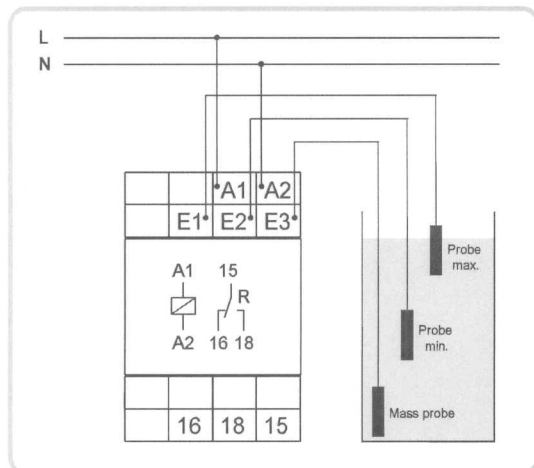
Note

Use cables with low capacity for wiring the probes especially with extended wiring length.

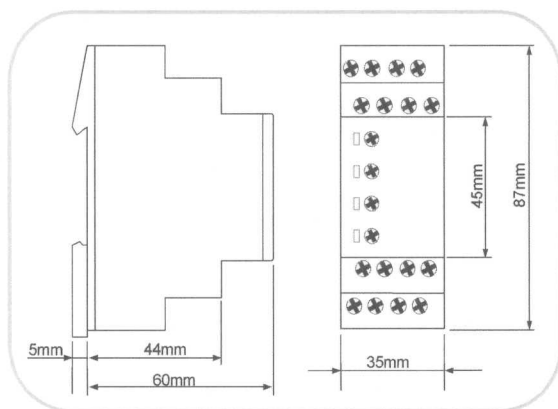
Following processes are suggested for the adjustment:

- The existent time delay should be to minimum (0,5s).
- The function selector switch must be in position pump down.
- Turn the sensitivity controller slowly clockwise from min to max until the relays switches into on-position. (probes must be in dipped state)
- The moistened probes should be taken out of the liquid to control if the relays switches into off-position.
If the relays doesn't switch into off-position, turn the sensitivity controller slightly back to min. (counter clockwise)
- Set the existent time delay to desired value to fade out a short term moisten the probes by waves in the liquid.
- Set the function selector switch to desired position. (either pump up or pump down)

Connections



Dimensions



Ordering informations

Type	Rated voltage Un	Delay ON	Delay OFF	Part Nr. (PQ 1)
E3LM10	230V AC	0,5s to 10s	0,5s to 10s	1341500

Professional Solutions.



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project description	CONTROL AUTOMATIC REFILL
	LEVEL – CONTROL
customer	
CODE NO.	83-05-2116
order number	
drawing number	21-00027-02
date	09.08.11
Total number of pages	9
norm	



Observe the national directives and the respective safety regulations!

Administer safety measures according to the currently applicable directives IEC60364-4- 41 / VDE0100 Part 410.

Observe the currently applicable EMC regulations! (2004/108/EG)

Observe the directive IEC 60364-7-705 / VDE 0100-705 "Requirements for manufacturing facilities, premises and plants of particular type – electric plants of agricultural and horticultural facilities".

The installation, connection and initiation of the switchboard may be carried out by a certified electrician only.
(EN50110-1 / VDE0105 Part 1 + 100)

The nominal current of the rotary current motors are to be tested at side and adjusted at the protective motor switch resp. the excess current-release.

The carrying out of the routine check test at the manufacturer does not release the erector from the duty to check the switching appliance combination after the transport and the erection e.g. as regards transport damages, loosening of screws and that sotr of thing. (VDE 0660 part 500 § 8.1.2. / EN 60439)

Check the cable cross section of all cables connected to external components according to their method of installation and length

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drawn	date	name	Big Dutchman Pig Equipment Auf der Lage 2 49377 Vechta Tel. +49 (0)4447/801-0 Fax. .../801-237 www.bigdutchman.de	project description CONTROL AUTOMATIC REFILL	Chapter A
	09.08.11	jtepe			
chkd.				drawing number 21-00027-02	sheet: 1 of: 4

GENERAL INSTRUCTION

TECHNICAL DATES

YEAR OF PRODUKTION _____

POWER SUPPLY _____

CONTROL VOLTAGE _____

VAC VDC

TOTAL NOMINAL PERFORMANCE _____

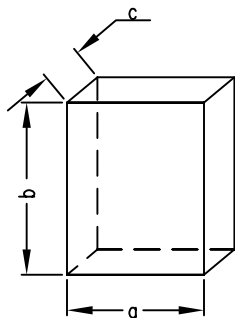
approx. KW

MAX . MAIN SUPPLY FUSE _____

A

PANEL DIMENSIONS

TYP _____



a = _____ mm

b = _____ mm

c = _____ mm

LIST OF CONTENTS

GENERAL CHAPTER A

CIRCUIT DIAGRAM CHAPTER B

I/O – LIST CHAPTER C

PLC CHAPTER D

PARTSLIST CHAPTER E

TERMINAL PLAN CHAPTER F/G

BLOCK DIAGRAMM CHAPTER H

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Chapter A

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GENERAL INSTRUCTION

WIRING-COLORS

MAIN-CIRCUITS

L1 / L2 / L3 BLACK

N BLUE

PE GREEN/YELLOW

CONTROL-CIRCUITS

ALARM-CONTACTS WHITE

SENSORS WHITE

RELEASE-CONTACTS

INTERNAL GREY

POTENTIAL FREE ORANGE

WIRING-COLORS

CONTROL-CIRCUITS

AC : PHASE 230V RED

NEUTRAL 230V RED / WHITE

PHASE 24V RED OR RED / YELLOW

NEUTRAL 24V RED / WHITE OR RED / BLACK

DC : + 24 V BLUE / RED

GND 24V BLUE / BLACK

+ 15 V BROWN

GND 15V VIOLET

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Chapter A

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TEST RECORD

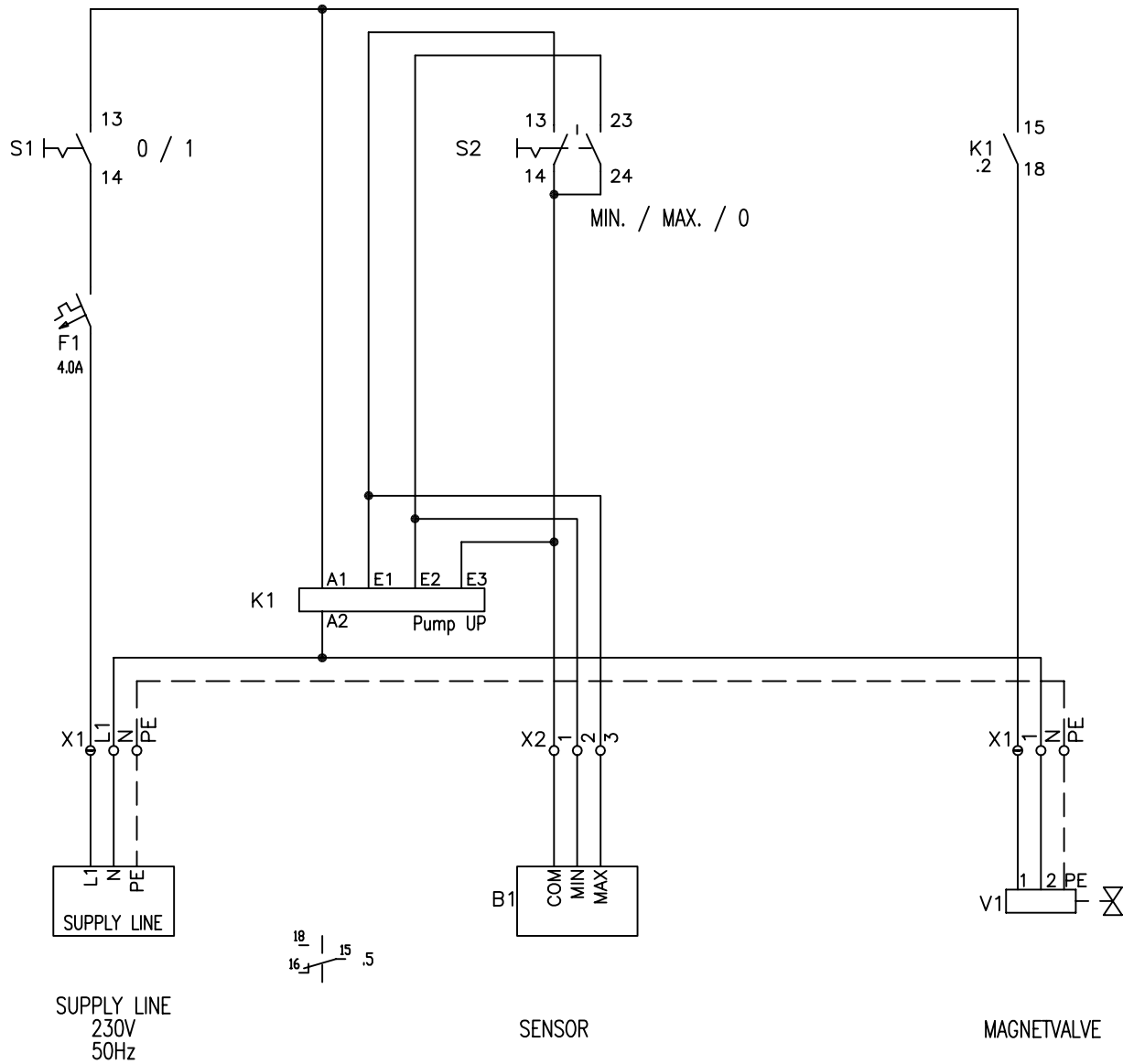
Examination according to VDE 011 T. 600

o.k.	<i>Checking and general examination</i>	o.k.	<i>Test safety control</i>
<input type="checkbox"/>	Visual inspection	<input type="checkbox"/>	Examination of the measurements for the protection against dangerous ground current (FI) (according VDE 0100 part 410)
<input type="checkbox"/>	Type of control box or housing as well as colours	<input type="checkbox"/>	Examination of the measurements for the protection in case of direct contact Arrangement of actuating elements (according to VDE 0106, part 100/VBG4)
<input type="checkbox"/>	appliance inscription / marking / name tags (fixing)	<input type="checkbox"/>	Examination of the measurements for protection in case of indirekct contact Testing protective conductor tracks and their connections, particulary at conductive structural parts, control elements, etc.
<input type="checkbox"/>	appliance equipment according to drawing / parts list / list		
<input type="checkbox"/>	conductor colours main circuits		
<input type="checkbox"/>	conductor colours control circuits		
<input type="checkbox"/>	PE- und N- type conductor, conductor colour, guide (do not loop PE)		
<input type="checkbox"/>	Mechanical test		
<input type="checkbox"/>	locking / locking device /lock	o.k.	<i>Final inspection</i>
<input type="checkbox"/>	Screw connection / Appliance installation (spot check)	<input type="checkbox"/>	system cleaned
<input type="checkbox"/>	Arrangement of the Wiring / Fastening (not over edges)	<input type="checkbox"/>	circuit diagrams, operating instructions enclosed
<input type="checkbox"/>	Electrical connections / Appliances and busbar system (spot check)	<input type="checkbox"/>	type plate Big Dutchman
<input type="checkbox"/>	Electrical performance check with nominal voltage	<input type="checkbox"/>	information sign high-voltage protector
<input type="checkbox"/>	Circuit / Control / Locking		
<input type="checkbox"/>	residual current operation device (if required with fault current)		
		Fitter : _____ Examiner : _____	
o.k.	<i>Insulation test</i>	date _____ date _____	
<input type="checkbox"/>	Proof of the insulation resistance (insulation measuring appliance with min. 500V) Examination of the insulation resistance (>1000 Ohm/V per electric circuit)	stamp of the manufacturer	
<input type="checkbox"/>	Phase against Cage/Ground		
<input type="checkbox"/>	Phase against Phase (L1-L2, L1-L3, L2-L3)		
<input type="checkbox"/>	stand-by circuits to housing / ground		
<input type="checkbox"/>	N to PE (only in case of 5-conductor system)		

The carrying out of the routine check test at the manufacurer does not release the erector from the duty to check the switching appliance combination after the transport and the erection e.g. as regards transport damages, loosening of screws and that sotr of thing.

(VDE 0660 part 500 § 8.1.2. / EN 60439)

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drawing number 21-00027-02	

Chapter B
sheet: 1 of 1

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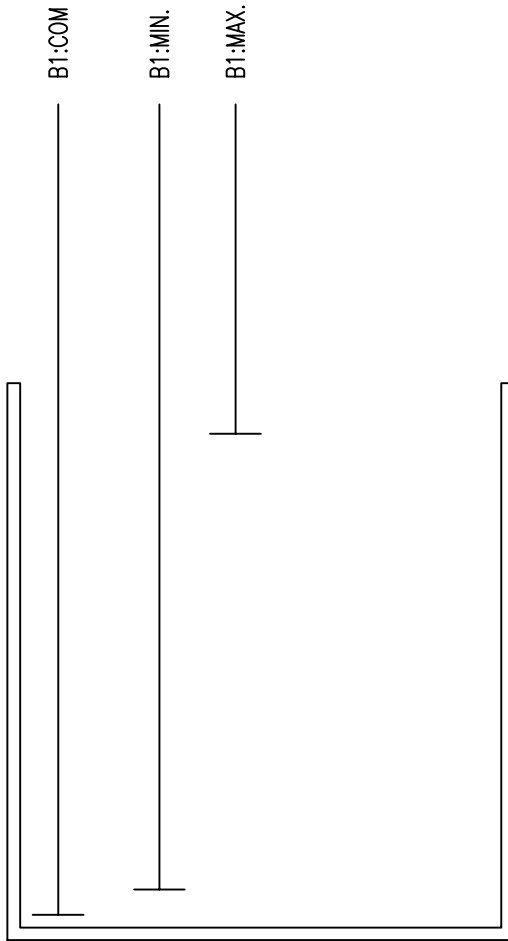
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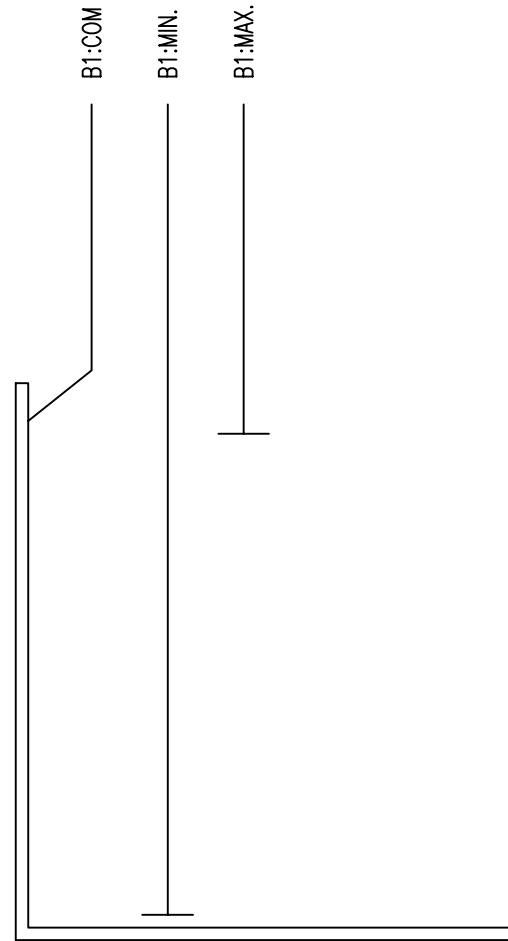
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7

8



TANK (SYNTHETIC MATERIAL)



TANK (STAINLESS STEEL)

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drawing number 21-00027-02	

Chapter H

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