

CONTROLLER

ZP SPEEDCONTROL COMFORT

OPERATING MANUAL



Processing status: V 1.1 May 2020



For safe and proper application, please carefully read the operating manual and further product-accompanying documents. The operating manual has to be handed over to the final user and kept until product disposal.

You have purchased a high-quality product and we congratulate you on this decision. Prior to delivery, this product was checked for proper condition within the framework of quality controls. Please read and observe this operating manual so that you can enjoy the product for a long time.

The following guidance will make it easier for you to deal with this operating manual:



Useful tips and additional information which facilitate the work



Step-by-step handling instructions



References to further information in this operating manual



Indication of a possibly hazardous situation that can result in property damage if not avoided



Warning against a hazard area which can lead to personal injuries



Warning of hazardous electrical voltage



We continuously work on the further development of all our products. Therefore modifications of the scope of delivery in terms of shape, engineering and equipment are subject to change without notice.

That is why no claims can be made due to information and figures provided in this operating manual.

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1 General aspects

1.1 Introduction



This operating manual is valid for the controller ZP SPEEDCONTROL COMFORT. This operating manual enables safe handling of the controller ZP SPEEDCONTROL COMFORT. This operating manual is an integral part of the electronic pressure regulator and must be kept in close vicinity of the plant and be accessible to the personnel at any time.

In case of any queries about the ZP SPEEDCONTROL COMFORT and this operating manual, please get in touch with:

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Zwönitzer Strasse 19
D-08344 Grünhain-Beierfeld
Tel.: +49 (0) 3774 / 52-100
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info@zehnder-pumpen.de

1.2 Warranty

Basically, the statutory regulations apply to the warranty.

Within this warranty period, we will at our discretion, either by means of repair or replacement, correct free of charge all defects due to material or manufacturing defects of the unit.

The warranty excludes all damage attributable to improper use or wear and tear. We do not assume any liability for consequential damages which occur due to a failure of the device.

For warranty claims it is required to submit a copy of the purchase receipt and to prove proper initial commissioning.

In case of non-observation to the operating manual - in particular the safety instructions - as well as unauthorised modification of the device or the installation of non-original spare parts the warranty claims will automatically become void. The manufacturer assumes no liability for any damage resulting from this!



In case of defects or damages, please initially get in touch with your dealer. They will always be your first point of contact!



Smooth operation is ensured by observing the following notes.

Non-observance can lead to failure of electronics, malfunctions and to shorter service life. The operating company bears the responsibility.






2 Safety



These operating manual contain basic instructions which have to be observed during set-up, operation and maintenance. For this reason, these operating manual must by all means be read before installation and commissioning by the installation technician as well as by the competent specialist staff / user, and must be permanently available at the location of the plant. Not only the general safety instructions mentioned in this chapter on safety have to be observed, but also the special safety instructions mentioned in the other chapters.

2.1 Symbols in this operating manual

In these operating manual, safety warnings are marked by symbols.

Warning signs and signal word		Signification	
	DANGER	Personal injuries	Indication of a dangerous situation which, if not avoided, immediately leads to death or severe injuries.
	WARNING		Indication of a dangerous situation which, if not avoided, might lead to death or severe injuries.
	CAUTION		Indication of a dangerous situation which, if not avoided, might lead to moderate or slight injuries.
	DANGER		All live components are protected against unintentional contact. Prior to opening housing covers, plugs and cables, they have to be disconnected from the power supply. Works on electrical components may be carried out only by qualified staff.
	ATTENTION	Material damages	Indication of a situation, if not avoided, might lead to damages of components, the plant and/or its functions or a thing in its surrounding.



Furthermore, the following must be definitely observed and kept in legible condition:

- Instructions attached directly to the machine, such as the rotation arrow.
- Marks for fluid connections.

2.2 Intended use

The controller ZP SPEEDCONTROL COMFORT is a frequency controller that is traversed by conveyed medium and is intended for automatic water supply purposes, such as:

- Pressure boost
- Rainwater utilization plants
- Irrigation

The controller is connected to the 230V power supply. Pumps with a max. nominal current of 9 A at 1~ 230 V AC motor or a max. nominal current of 10 A at 3~ 230 V three-phase AC current can be connected.

It is possible to connect two controllers with one another to become a control unit.

Switching-ON and control pressure can be adjusted.



The frequency controller ZP SPEEDCONTROL COMFORT has to be operated only in connection with a membrane expansion tank.

Clear to slightly contaminated water without aggressive and abrasive components only must be used as pumping medium.

The controller is permitted for the operation:

- with 230 Volt 50 Hertz alternating voltage on the input
- up to a water temperature of 40 °C
- in the area of residential, commercial and industrial areas; not suitable for open-air installation, installation in wet cells and explosive environments
- maximum system pressure is 15 bar



When determining the maximum system pressure of the pressure boost, it is **absolutely** necessary to observe the maximum permitted pressure of the pump



The following pumping media are not suitable:

- corrosive, combustible and explosive media
- Waste water from urinal installations and lavatories

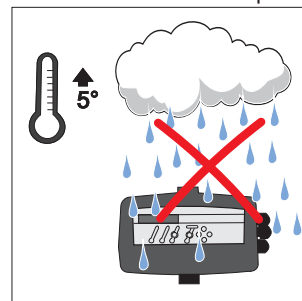


Use in swimming pools, garden ponds and their protected area is permissible only, if built in keeping with VDE 0100/49 D. The ZP SPEEDCONTROL COMFORT must not be placed or submersed in water.

Install the controller free of frost and flood-proof.



According to the Guideline EN 61800-3 (Electromagnetic compatibility of variable-speed electrical drives), the controller ZP SPEEDCONTROL COMFORT belongs to Class C2.



2.3 Selection and qualification of persons

All activities on the plant have to be carried out by qualified persons, unless the activities in this operating manual are explicitly indicated for other persons (owner, user).

Qualified persons are those who know the relevant provisions, valid standards and accident prevention regulations due to their vocational training and experience. They are able to recognise and avoid potential hazards. The staff for operation, maintenance, inspection and installation must have the corresponding qualification for this work.

Works on electrical components may be carried out only by qualified persons trained for these purposes by observing all valid provisions of the accident prevention regulations.






The operating company / owner have to ensure that only qualified personnel take action on the plant. Moreover, the operating company / owner have to ensure that the content of the operating manual is understood completely by the staff.

2.4 Personal protective equipment

For various activities on the plant, personal protective equipment is required, if necessary.

Personal protective equipment has to be provided to the personnel and their use has to be checked by supervisory staff.

If personal protective equipment must be used, this is indicated by the following symbols:

Mandatory signs	Signification	Explanation
	Wear safety shoes	Safety shoes provide good non-slip properties, particularly when wet, as well as a high pierce resistance, for example in case of nails, and the protect your feet against falling objects, e.g. during transport
	Wear a safety helmet	Safety helmets protect against head injuries, e.g. in case of falling objects or impacts
	Wear safety gloves	Safety gloves protect your hands against slight bruises, cut injuries, infections and hot surfaces, particularly during transport, commissioning, maintenance, repair and disassembly
	Wear protective clothing	Protective clothing protects your skin against slight mechanical impacts and infections in case of wastewater leakage
	Wear safety goggles	Safety goggles protect your eyes against wastewaters, particularly during commissioning, maintenance, repair and decommissioning

2.5 Basic hazard potential



If hot or cold machine parts could lead to hazards, these parts have to be protected against touch by the user.



Touch protection for moving parts (such as coupling) must not be removed from plants in operation.



Leakage (of the shaft seal, for example) of hazardous material conveyed (e.g. explosive, toxic, hot) must be removed in such a way that no danger is caused to persons and the environment. Legal regulations have to be observed.



Hazards caused by electric energy must be excluded (for details here, please refer to the country-specific regulations and the regulations of the local energy supply companies).

Basically, work on the machine may be carried out only at standstill. The procedure to shut down the machine described in the operating instructions must be observed by all means.

In case of contact with waste water or contaminated pump components, e.g. when removing blockages, can result in infections. Protective equipment must be worn.

↳ Chapter 2.4 "Personal protective equipment"

Pumps or pump assemblies, which convey media hazardous to health, must be decontaminated.

Immediately after completing the works, all safety and protection devices have to be fitted again and/or have to be made functional again, e.g. the touch protection device for the coupling and the fan wheel.

Before recommissioning, the points listed in the chapter on initial commissioning have to be observed.

2.6 Unauthorised modification and spare parts production

Up to the market launch, the plant was submitted to comprehensive quality controls and all components were checked under high load. Installation of non-approved parts will affect the safety and void the warranty. When replacing parts, only original parts or parts released by the manufacturer have to be used.

2.7 Hazards caused by non-observation of safety instructions



The non-observation of the safety instructions may endanger persons as well as the environment, and may have consequences for the environment and machine. The non-observation of the safety instructions will result in the loss of all claims for damages.

In detail, the non-observation of safety instructions may cause the following hazards, for example:

- Malfunction of important functions of the machine / plant
- Malfunction of the mandatory methods of maintenance and repair
- Danger to persons caused by electrical, mechanical and chemical effects
- Danger to the environment caused by leakage of dangerous substances

2.8 Safety-conscious work

In addition to the safety instructions in this operating manual, the accident prevention regulations and possibly internal work, operational and safety instructions of the operating company / owner must be observed.

2.9 Responsibility of the operating company / owner

Compliance with the following points is the responsibility of the operating company / owner:

- The plant has to be operated for the intended use only when it is in proper condition.
↳ Chapter 2.2 "Intended use"
- The function of the protection devices, e.g. touch protection device of coupling and fan wheel, must not be impaired.
- Maintenance intervals have to be adhered to and malfunctions have to be immediately removed. Malfunctions have to be removed on ones own only if measures are described in this operating manual. Qualified persons are in charge of all other measures – contact the factory service, if necessary.
- The type plate of the plant has to be checked for completeness and readability.
↳ Chapter 8.1 "Type plate"
- Personal protective equipment must be sufficiently available and be worn.
↳ Chapter 2.4 "Personal protective equipment"
- The operating manual has to be made available at the place of operation in a readable and complete way.
- Only qualified and authorised personnel may be employed. ↳ Chapter 2.3 "Selection and qualification of persons"

3 Transport and storage

3.1 Transport

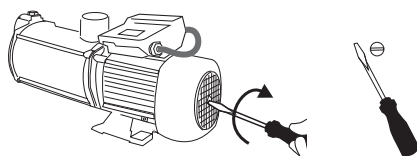
During transport, it has to be made sure that the plant cannot be knocked into and is not dropped.

3.2 Temporary storage / conservation

When decommissioning, the water has to be completely drained from the pressure booster. For intermediate warehousing and conservation, it is sufficient to store the plant at a cool, dark and frost-proof place. The controller has to be protected against humidity.

In case of long-term storage (more than 3 months), all blank metal parts that were not manufactured from stainless steel have to be treated with preserving agent. Then the preservation has to be checked every 3 months and replaced, if necessary.

After longer storage of pumps, they have to be checked prior to putting them into operation (again). To do so, the freedom of movement of the shaft has to be checked by rotating it by hand



4 Product description

The ZP SPEEDCONTROL COMFORT contains an electronic control device with a frequency converter. In automatic mode, this enables independently of the respective flow rate, to keep the pressure within the plant constant at a target pressure that had been set before. The power consumption of the pump is thereby clearly minimised.

The ZP SPEEDCONTROL COMFORT switches on the pump once the measured plant pressure (P-LINE) falls below the set target pressure (P-SET) by more than the set differential pressure (P-DIFFERENTIAL PRESSURE). The control then regulates the speed of the pump in such a way that the plant pressure (P-LINE) keeps being as constant as possible. Once the plant pressure (P-LINE) has reached the set target pressure (P-SET) and the control does not recognise any flow rate, the ZP SPEEDCONTROL COMFORT will stop the pump after a time period (TIMER STOP) that was set before.

The ZP SPEEDCONTROL COMFORT protects the pump against:

- Dry-running
- Overcurrent
- too high water temperature
- Frost
- Short circuit
- Overvoltage / undervoltage
- ART function (Automatic Reset Test)
Should the device be at standstill, because the protection system against dry operation has been set in motion, the ART function will try with the pre-programmed frequency to switch the pressure booster back on again in order to restore the water supply.
- AIS function (Anti-ice System) - integrated temperature sensor
Below 5°C, the control will automatically switch the pump to frost protection mode in order to prevent freezing inside the pump.

4.1 Operating principle in case of assembly mounting (*Master / Slave*)



It is possible to couple two controllers with one another.

With it, a controller is formally defined as main device (*Master*). The second control must then be set up as secondary device (*Slave*).

During initial commissioning in automatic mode, the pump will start first that has been set up as *Master*. In the subsequent work cycle, the starting pump will swap - now the pump defined as *Slave* will start at first.

Due to constant change of the starting pumps, an equal load of the pumps as possible shall be achieved.

Should both pumps be required in case of a large flow rate (peak load), the speed of the second pump will also be adjusted so that the total system will achieve the pre-set target pressure as good as possible.

4.2 Scope of delivery

- ZP SPEEDCONTROL COMFORT , with 230 V plug, one 4-wire connecting cable for the pump to be connected and one enclosed 4-wire communication cable for assembly mounting



Required for a single system on the part of the building site, e.g.:

• Connection set CPN ZP SPEEDCONTROL COMFORT

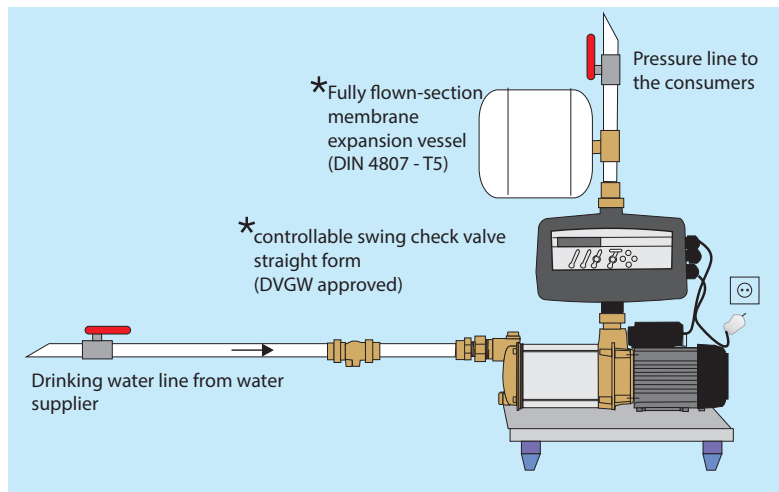
Article No. 20237 consisting of:

- **Membrane expansion tank**
Fully flown-section (DIN 4807-T5)
RFLEX DD 12 litres, 10 bar, 3/4"
- **Flow fitting**
REFLEX Flowjet 3/4"
- **Swing check valve**
in straight form according to
DIN EN 1717 Type EA as well as
DIN EN 13959 and valid DIN/DVGW test number.
Model range RV 281 1" IG Honeywell Braukmann
- **T-piece**
1" x 3/4" x 1"



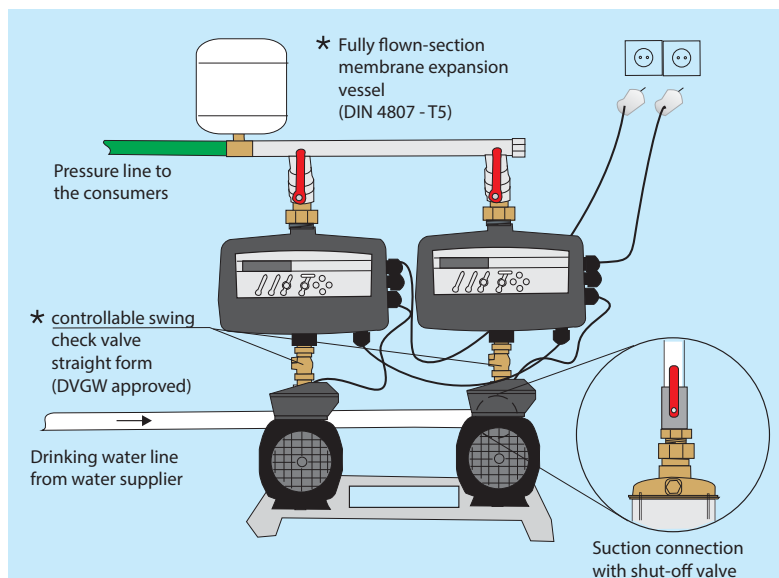
4.3 Application examples

4.3.1 Individual mounting



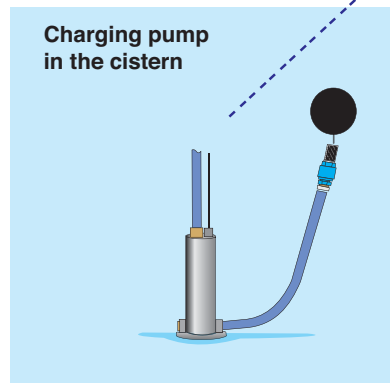
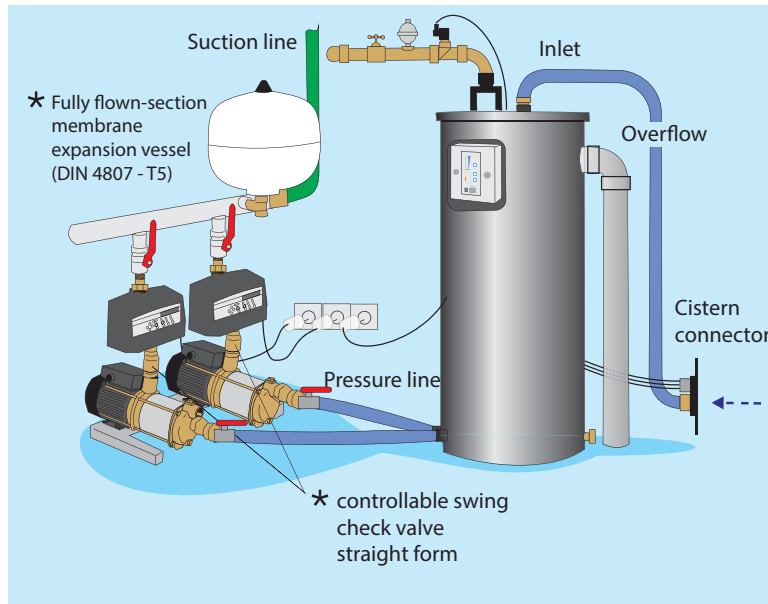
4.3.2 Assembly mounting

4.3.2.1 With direct (immediate) connection to the drinking water line



**) not included in scope of delivery - must be provided on the part of the building site*

4.3.2.2 Indirect connection to the collection tank



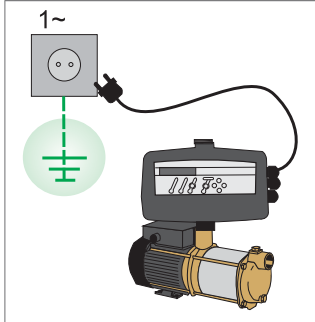
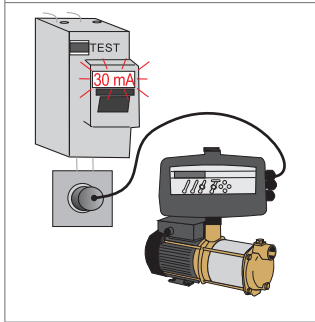
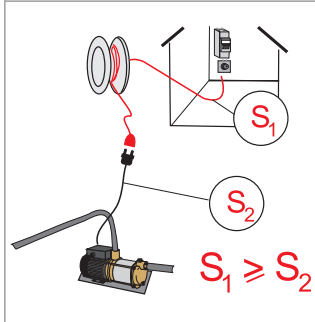
**) not included in scope of delivery - must be provided on the part of the building site*

5 Installation

5.1 Preparations

Check whether according to the packaging the plant is suitable for the power system (230 V / 50 Hz). Make sure that all safety rules are observed. Check to make sure that the requirements in ↪ Chapter 2.2 “Intended use“ are complied with.

1. Remove the controller from the package.
2. Check for perfect external condition (transport damage).

Safety instructions	
	<p>The electric connection must be made via a socket with grounding (mandatory provision according to DIN VDE 100)</p>
	<p>Should the power supply not take place by a mandatory FI operator protection circuit breaker with a rated residual current with max. 30 mA, then the pump must be connected to the socket via a separate FI operator protection circuit breaker (mandatory provision according to EN 60 335-2)</p> <p>Basically, a separate FI circuit breaker with own supply cable to the controller is recommended so that potential interaction with other parts of the electrical installation can be excluded</p>
	<p>Extension cables must have at least the same cable cross section as the connecting cable of the pump</p> <p>$S_1 \geq S_2$</p>

5.2 Hydraulic installation

The controller can be mounted directly to the pressure socket of the pump.

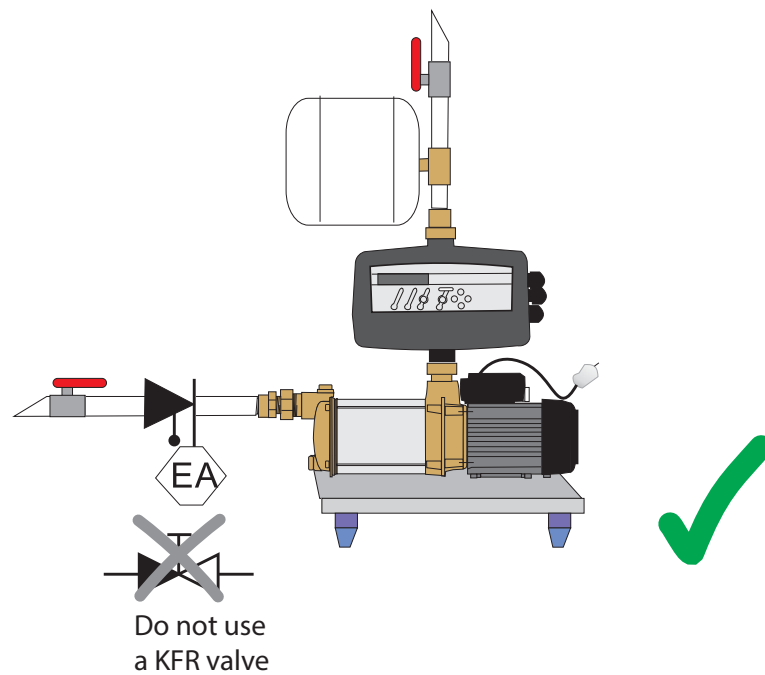
We recommend to make the connection between pump and controller readily removable, e.g. with a connecting coupling. That way, an inspection or maintenance can be easily carried out.

During mounting, the following has to be basically observed:

- the pump/controller system requires a shut-off on the pressure and suction side
- the swing check valve has to be preferably mounted on the suction side. Alternatively, it can also be mounted between pump and controller.



In case of assembly mounting, each pump must be equipped with a shut-off and swing check valve.





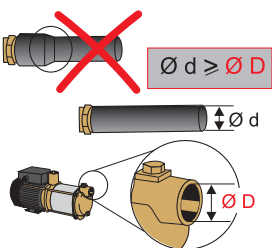
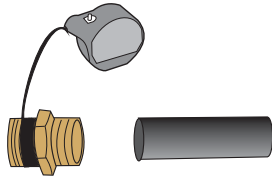
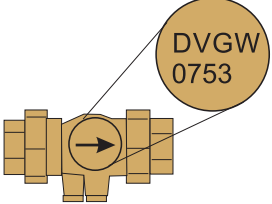
The controller ZP SPEEDCONTROL COMFORT must be mounted with a readily removable pump connecting coupling (not included in the scope of delivery) so that it can be easily removed at later maintenance and service works.

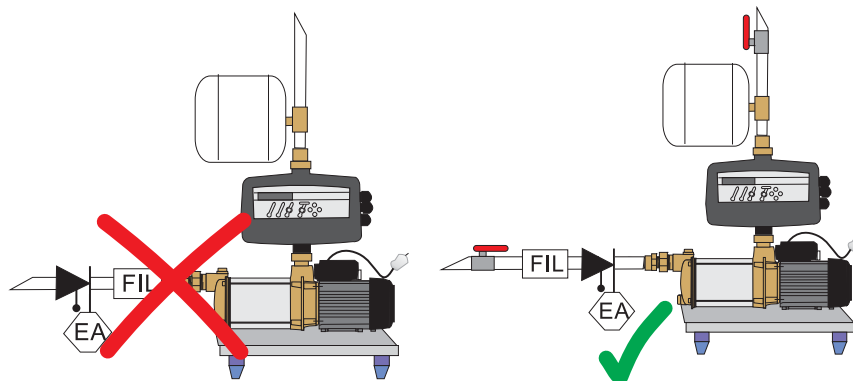
1. Controller ZP SPEEDCONTROL COMFORT
2. Pump
3. Connecting coupling, pump-side with union nut, flat sealing (the controller has an 1¼" connection thread)
4. Connecting coupling, pressure-side with union nut, flat sealing (the controller has an 1¼" connection thread)



Mounting the controller using a readily removable connecting couplings

5.3 Suction line

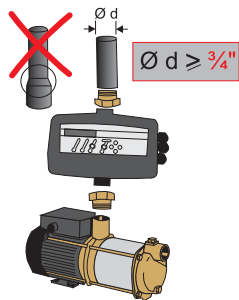
Connecting the suction line	
	<ul style="list-style-type: none"> • The suction line has to be installed from vacuum-resistant material • The inside diameter of the suction line must be at least as big as the inside diameter of the suction connector
	<ul style="list-style-type: none"> • The suction connection by the customer at the pump should preferably sealed using thread sealing. Alternatively, Teflon tape can be used
	<ul style="list-style-type: none"> • In the suction line, a controllable swing check valve in straight form according to DIN EN 1717 Type EA as well as DIN EN 13959 and a valid DIN/DVGW test number must be installed. The model range RV 281 from Honeywell has proven itself



The swing check valve should be built in directly upstream the pump. Suction-side fine filters **must** be installed upstream the swing check valve

5.4 Pressure line

Connecting the pressure line



- The pressure outlet of the ZP SPEEDCONTROL has to be preferably provided with a flat-sealing connecting coupling. That way, the pump can be easily mounted and dismantled later (e.g. for maintenance purposes).
- The inside diameter of the pressure line must be at least $\frac{3}{4}''$
- Seal the construction-side pressure line and connect it with the connecting coupling of the pressure socket

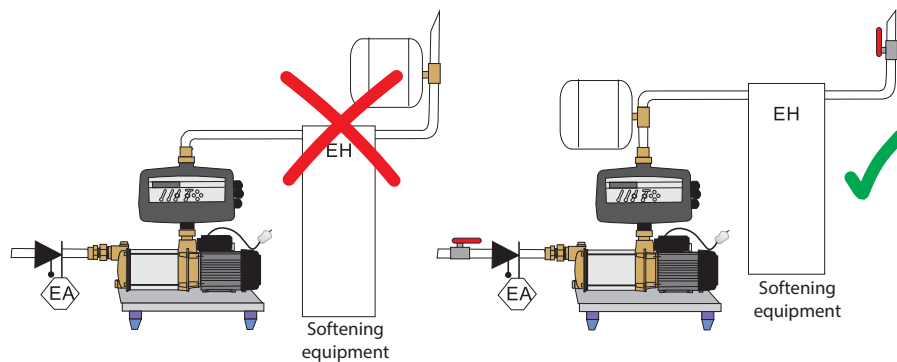


It is recommended to use a block fitting on the pressure-side for maintenance and service purposes.

5.4.1 Note on installation of the membrane expansion tank



In case of an application as water supply or pressure boost with automatic switch-off, a membrane expansion tank according to DIN 4807-5 must be provided. The membrane expansion tank is absolutely necessary for the function of the frequency control. No consumers may be built in between pump and membrane.

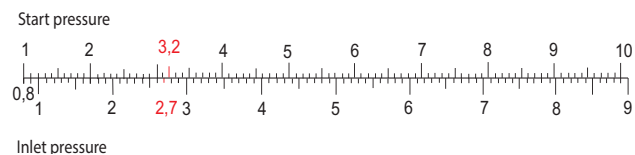


No check valve or pressure reducer may be built in between the membrane expansion tank and the ZP SPEEDCONTROL COMFORT.

The membrane expansion tank should have a storage volume of least 10% of the maximum flow capacity (in l/min) of the pump being used.



The inlet pressure of the membrane expansion tank must be set depending on the required target pressure of the pump in accordance with the following scale. The inlet pressure must be set in unpressurised condition of the system.



Example:

Target pressure (P-SET) 3.5 bar
- Differential pressure 0.3 bar

= start pressure 3.2 bar

Inlet pressure of membrane expansion tank

= 2.7 bar



The inlet pressure of the membrane expansion tank must be checked and corrected, if necessary, in usual intervals (see manufacturer documents, but at least once a year).

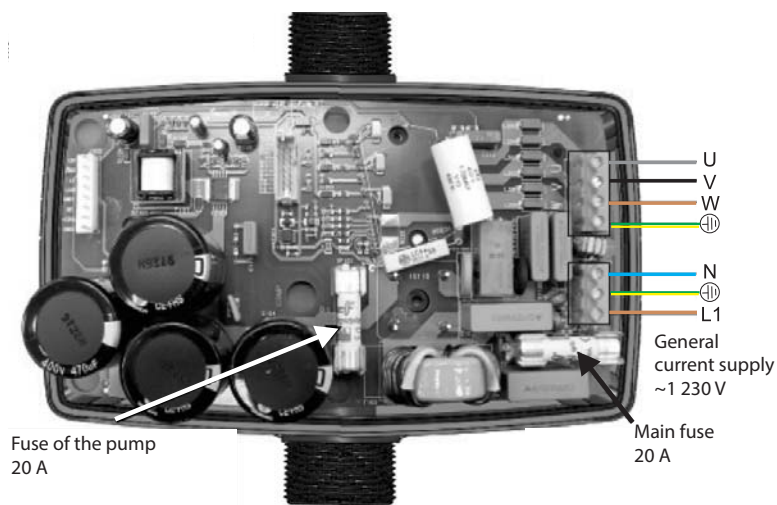
5.5 Electrical connection of the controller ZP SPEEDCONTROL COMFORT



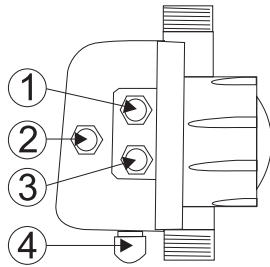
Electrical connection must be carried out by a qualified specialist taking into consideration the appropriate local regulations. Prior to carrying out changes inside the housing, the device must be disconnected from the mains. Wrong connections can lead to damages to the electronic circuit. The manufacturer does not assume any responsibility for damages that have occurred due to any wrong connection of the device.



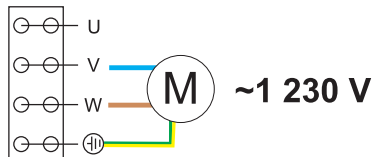
For works inside the controller, it must always be disconnected from the mains. The controller has capacitors which are carrying hazardous high voltages even after disconnection from the mains. Therefore please wait for at least two minutes also after switching off the mains voltage before starting work on the device.



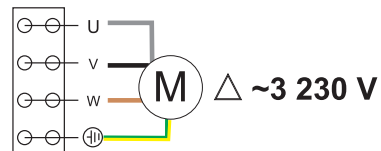
When connecting the pump, observe the connection diagram of the main circuit board (in the bottom of the controller)!



1. Connecting cable of the pump
2. external switching circuit, e.g. Float switch as dry-run protection
3. Mains connection
4. Connection of the connection cable in case of assembly mounting (Master/Slave)



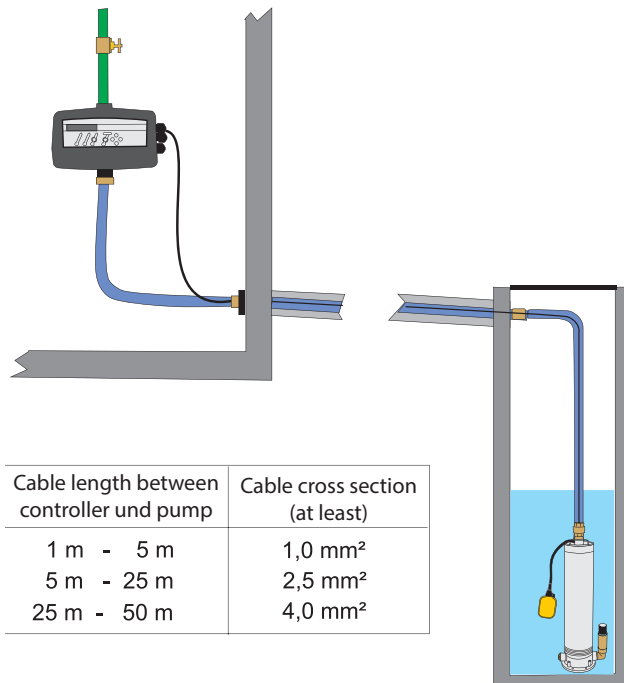
Connection of single-phase motor



Connection of three-phase motor

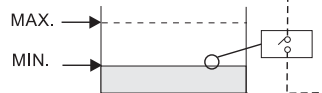


The direction of rotation of the motor is determined by the controller. The direction of rotation can be adjusted in the menu.



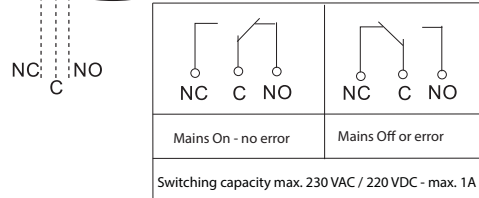
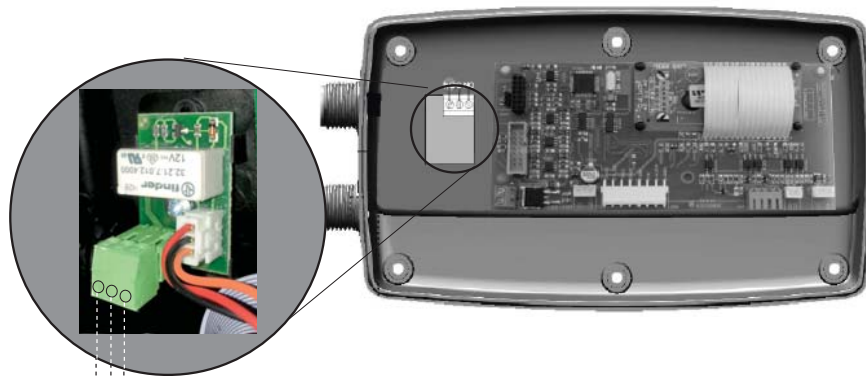
Cable length between controller und pump	Cable cross section (at least)
1 m - 5 m	1,0 mm ²
5 m - 25 m	2,5 mm ²
25 m - 50 m	4,0 mm ²

5.5.1 Connection of the external release (e.g. float switch)



To the switching contact on the cover circuit board for the external release, a float switch can be connected, for example. The reference voltage of this digital input is 15 VDC.

5.5.2 Connection of the potential-free alarm contact (Fault indication relay)



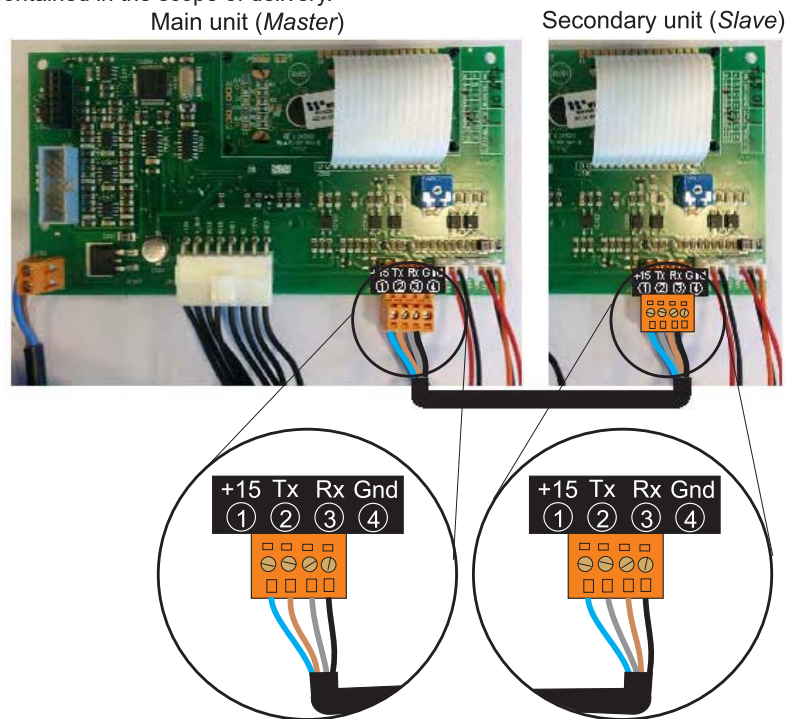
Connection and function of the potential-free alarm contact

5.5.3 Linking of two controllers in case of assembly mounting

With assembly mounting, each pump has to be initially connected to the corresponding controller, just as well as with individual mounting. Each controller has its own power supply with the same requirements as with the individual mounting.

Additionally, the following special features have to be observed:

1. Connections for external release (e.g. float switch and alarm contact) need to be carried out only to the main device (*Master*).
2. The two controllers have to be connected to the 4-wire communication cable contained in the scope of delivery.



Main unit (<i>Master</i>)				Secondary unit (<i>Slave</i>)		
1	+15 VDC	Blue	↔	Blue	+15 VDC	1
2	Tx	Brown	↔	Grey	Tx	2
3	Rx	Grey	↔	Brown	Rx	3
4	Gnd	Black	↔	Black	Gnd	4



With assembly mounting, the button ON/OFF AUTOMATIC is active only on the main device (*Master*).

6 Commissioning

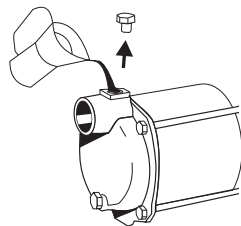


Before commissioning, all connections have to be checked again for correct installation. It must have been made sure that the safety regulations have been complied with. Commissioning may only be performed by authorised qualified staff.

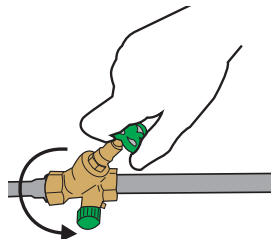
Before you connect the ZP SPEEDCONTROL COMFORT to the power supply, the pressure boost pump must have been mounted in accordance with the operating manual. The water connections have to be carried out in a professional way.

6.1 Initial commissioning

1. ▷ Make sure that voltage and frequency of the power supply and unit (see type plate) match.
2. ▷ Make sure that the pump shaft can rotate freely.
3. ▷ The pump must be filled with water.



or



4. ▷ **Never put the pump into operation in a dry state!**
5. ▷ Open all existing closure units.
6. ▷ Open at least one permanent consumer, e.g. tapping point.
7. ▷ When the pump is switched off, check the inlet pressure in the membrane expansion tank and adjust it, if necessary, according to Chapter 5.4.1 "Note on installation of the membrane expansion tank".
8. ▷ All preparatory measures are now completed, and the plant can be put into operation electrically.



The controller has been prepared by the factory for the connection of a three-phase pump. If a single-phase pump shall be connected, it must be set up in the expert menu Chapter 6.5 „Expert settings“ before making any other settings.

```
MOTOR
1-PHASE    U W
```

The ZP SPEEDCONTROL COMFORT has been pre-set by the factory and can be directly used for many application cases!

As soon as you insert the power plug of the ZP SPEEDCONTROL COMFORT, it will carry out an initialisation on its own. The following will appear briefly on the display:

```
Zehnder
1010- THP x 10A
```

in order to switch to the standard display on the display:

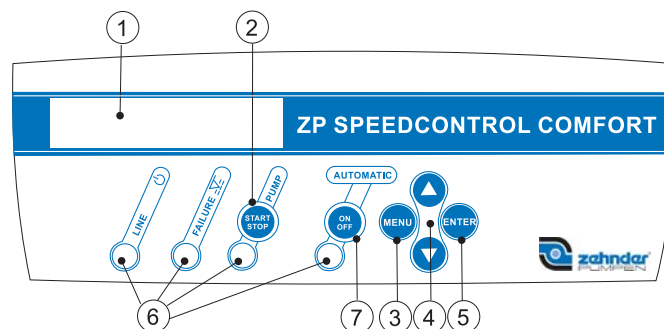
```
PLINE PSET
0.1 bar 3.5 bar
```

The plant is now ready for operation with the green LED LINE illuminating.



9. ▷ Closing permanent consumers.

6.2 Control panel of the ZP SPEEDCONTROL COMFORT

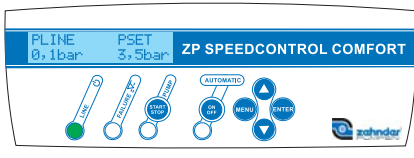
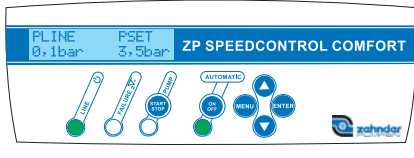
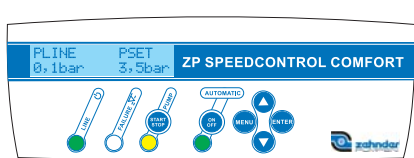
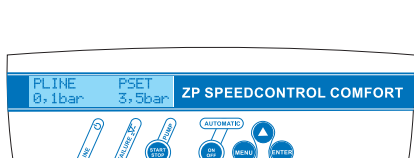
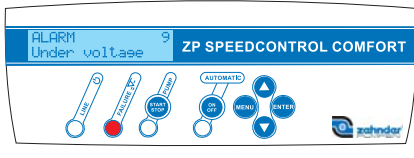


1. Display for showing the operating condition
2. Manual START/STOP button
3. Access / Leave MENU
4. UP / DOWN button
Increase or decrease of values in the menu when programming
5. ENTER button
6. LED displays:
 - LINE green: Display illuminates when the device has been connected to the mains
 - FAILURE red: In case of an error, the diode permanently illuminates or flashes
 - PUMP yellow: Pump is in operation
 - AUTOMATIC green: Automatic operating mode
7. ON/OFF AUTOMATIC button
Using this button, you can switch between the automatic or manual operating mode

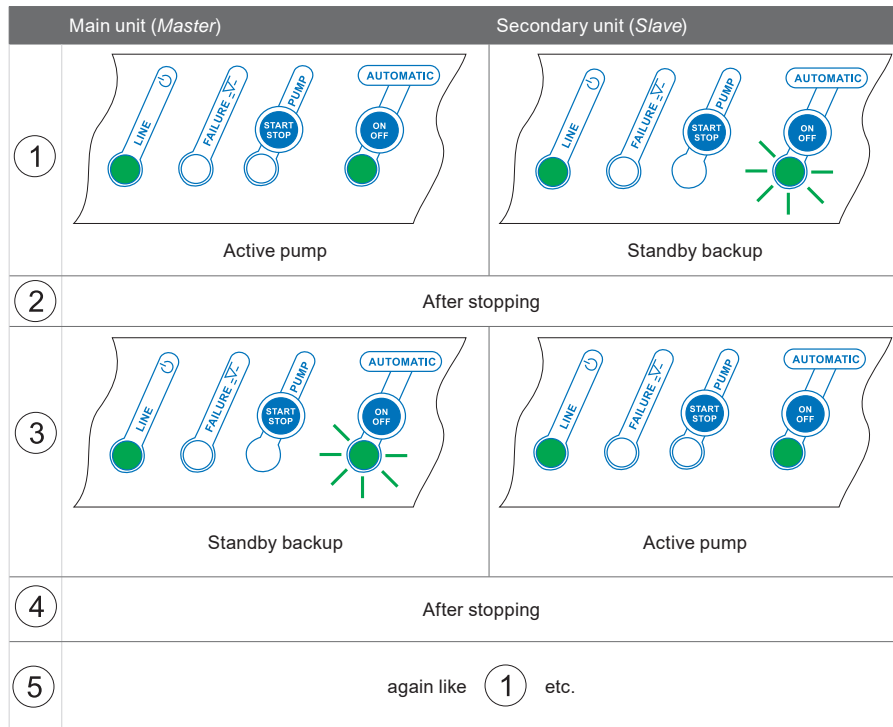
6.3 Display of operating conditions

The ZP SPEEDCONTROL COMFORT offers a wide range of setting options that will be further detailed in the following. First of all, however, the basic functions and main operating elements are described.

With the ZP SPEEDCONTROL COMFORT, the following operating modes can be present:

Display	Explanation
	<p>The green LED LINE illuminates. Power supply has been established. The plant is ready for operation, but the pump does not convey any water yet.</p>
	<p>By pressing the button ON/OFF AUTOMATIC, the plant is in automatic mode; the two green LEDs LINE and AUTOMATIC illuminate. The pump is in standby mode, because the target pressure has been reached.</p>
	<p>One consumer was opened, the pump is running and the LED PUMP illuminates yellow. When the consumer is closed, the pump recognizes this and stops after the set TIMER STOP; then the yellow LED goes out. LED LINE AND LED AUTOMATIC permanently illuminate green.</p>
	<p>Manual mode: It can be reached only if automatic mode has been switched off (green LED AUTOMATIC has gone out). To start the pump in manual mode, the button START/STOP must be pressed continuously. The yellow LED PUMP shows that the pump is running. The pump is running with its maximum frequency - that is 50 Hz. After releasing the START/STOP button, the pump will stop immediately and the yellow LED goes out. The button START/STOP is intended for control purposes (e.g. to check the rotation direction of the pump motor).</p>
	<p>An error has occurred. Take a look in Chapter Error message for what has to be done.</p>

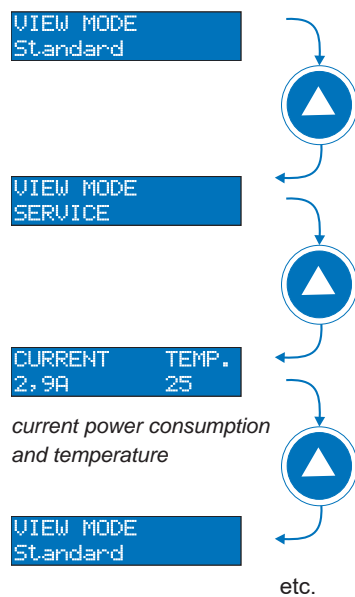
6.3.1 Special features of the operating display in case of assembly mounting



i The two pumps run alternately and the relevant backup pump is switched on in case of big water withdrawal.

6.3.2 Switching the display indication

While the connected pump is running, the display indication can be changed by means of the button ▲.



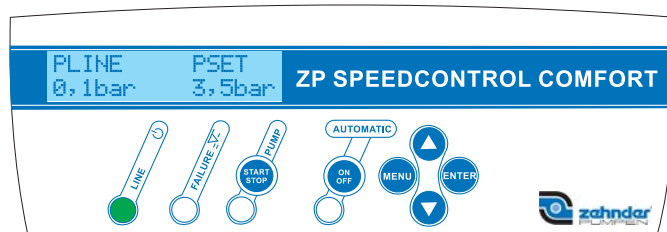
The display indication that was immediately active before stopping keeps being “frozen” until the next start and cannot be changed when the pump has been stopped.

6.4 Indication of parameters

In many application cases, no additional programming is necessary for the normal operation of the ZP SPEEDCONTROL COMFORT. If the plant operating company wants to adjust the function of the control to individual requirements anyway, this can be done via the parameters of the menu. The characteristics of the parameters as well as their setting are described in the following.

In order to get into the parameters menu, the automatic mode must have been switched off (green LED AUTOMATIC button is Off):

- 1.▷ Press the ON/OFF AUTOMATIC button so that the green LED LINE goes out.



- 2.▷ Press the button for about



- 3.▷ It appears briefly on the display



- 4.▷ and automatically switches to







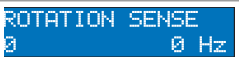





- 5.▷ Via the arrow keys ▲▼, you can change the settings. With the button,









- 6.▷ If you do not want to make any changes, you will get to the next parameter via the button.



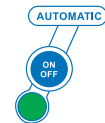
6.4.1 Sequence of parameters in the menu

Display indication		Factory setting
	<p>From the standard display, you get to the menu when automatic mode has been switched off. In order to start, you must press the MENU button for about 3 seconds.</p>	
	<p>This screen area shows that access to the menu level is being carried out. The display will disappear shortly thereafter.</p>	
	<p>You can choose between the following languages: "SPRACHE DEUTSCH", "LINGUA ITALIANA", "LANGUE FRANÇAISE", "LANGUAGE ENGLISH", "IDIOMA ESPAÑOL".</p>	Deutsch
	<p>Here the value of the motor limiting current [A] is entered at which the motor protection shall be triggered. 3~ max. 10 A 1~ max. 9 A</p>	
	<p>Here the direction of rotation could be reversed. Normally, this is not required. Using the button Enter, confirm the rotation direction pre-set by the factory. Only appears if "Motor 3~ UVW" has been set in the expert menu (as factory-set).</p>	Clockwise direction of rotation (clockwise)
	<p> We recommend to take over the factory setting of 28 Hz. A frequency of 25 Hz may never be undercut!</p>	15 Hz
	<p>For plants with a collection tank, the pump can be protected against dry-running by using a float switch, for example, when the minimum water level is undercut in the collection tank. (↪ Chapter 6.5.1). If such a dry-running protection is available, the factory setting must be changed from NO to YES. This switching input can also be used as enabling contact, for example in case of a irrigation system.</p>	YES
	<p>This screen area shows that an other level is reached in the menu.</p>	
	<p>Here the output-side target pressure of the pump is set. For plants with a collection tank, the factory setting of 3.5 has proven. For plants with direct connection to the drinking water line, it has to be taken into consideration that the target pressure consists of the flow pressure of the water supply and the pressure generated by the pump. The target value to be set must orientate to the fact that in case of little water withdrawal (e.g. hand basin), which is common in a household, the pump keeps on running permanently and does not swap into a steady start-stop operation (↪ Chapter 5.4.1).</p>	3.5 bar

Display indication		Factory setting
	<p>The system will deduct this pressure value from the target pressure in order to specify the start pressure of the pump.</p> <p>Example:</p> <ul style="list-style-type: none"> - Target pressure (P-SET) 3.5 bar - Differential pressure 0.3 bar = Start pressure 3.2 bar <p>This value is 0.3 bar by default.</p> <p>With in-house facilities it is recommended to keep this value between 0.2 bar and 0.5 bar.</p> <p>With irrigation systems, it may be sensible to select a lower start pressure.</p>	0.3 bar
	<p>If the control of the pump has detected that no consumer is opened any more (flow detection FL = 0), the pump will be stopped after the set TIMER STOP. The TIMER STOP must not be selected to be too short so that the pump keeps on running also in case of little water withdrawal and does not change into a steady start-stop operation.</p>	15 sec.
	<p>In the standard display shows the following information:</p>	Standard
	<ul style="list-style-type: none"> • P LINE = measured system pressure • P SET = selected setting pressure 	
	<p>The display SERVICE is available for displaying additional operating states of the ZP SPEEDCONTROL COMFORT controller. Here the following is shown:</p>	
	<ul style="list-style-type: none"> • Hz = current operating frequency • PSET = selected setting pressure • PLINE = measured system pressure • FL = Flow detection 1 Flow 0 No flow 	

Display indication		Factory setting
SERIAL CONTROL SLAVE	Basically, the ZP SPEEDCONTROL COMFORT controller could be connected to a second ZP SPEEDCONTROL COMFORT controller. Only then, the setting Secondary Device may be changed.	Secondary device
	SERIAL CONTROL MASTER <ul style="list-style-type: none"> In case of assembly mounting, one controller must be defined as main device (<i>Master</i>) and one controller as secondary device (<i>Slave</i>). 	
PLINE PSET 0.1bar 3.5bar	After pressing ENTER, all parameters will be saved. The entered values are permanently saved and keep being available also in case of a power failure. After a power failure, only the display indication changes back into the standard display.	

In order to put the plant back into operation, press the button



With assembly mounting, the button ON/OFF AUTOMATIC has to be operated on the main device (*Master*).

6.5 Expert settings

In expert settings, it is possible to specifically adjust the frequency converter to particular plants. Before changing factory settings here, the manufacturer has to be consulted, if necessary.

By simultaneously pressing the buttons MENU and ENTER for about 3 seconds, you will get to the expert settings.

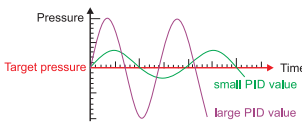
i Press the ON/OFF AUTOMATIC button so that the green LED LINE goes out.





MENU + **ENTER** 3" *simultaneously press for 3 seconds*

SET UP MENU
EXPERT REV 38 *illuminates briefly and changes to* **INTEGRAL GAIN**
20

Changing and scrolling in the menu analogous to the parameter settings!

Display indication	Description	min.	max.	Factory setting
PID CONTROLLER 20	<p>This value determines the maximum deviation of the target pressure during operation.</p>  <p>This setting depends on the pipe system and the pump. Too small a setting can lead to the fact that the pump will react too slowly when opening a consumer. Too large a setting can cause a volatile system pressure and lead to restrictions in the consumer comfort.</p>	10	40	20
ACCELERATION 10	<p>The acceleration value indicates how fast the pump will react during start and quick pressure changes.</p> <p>Too high a value can effect an overpressure during start or in case of quick changes in consumption. The user will perceive too high a value as a kind of "roaring" of the pump motor during acceleration.</p>	1	20	10

Display indication	Description	min.	max.	Factory setting	
BRAKE 10	<p>The brake value states how the pump will behave when the set target pressure has been achieved.</p> <p>The higher the set deceleration, the faster the pump will "regulate off" after reaching the target pressure, which can certainly lead to a "pressure drop". Too little deceleration values can lead to overpressure during operation, because the pump reacts too slowly to the closing of a consumer.</p>	1	20	10	
MOTOR Threephase U V W	Must be confirmed by pressing "ENTER".				
or MOTOR Monophase U W					
UNITS bar	The units can be optionally displayed in bar of psi.			bar	

6.6 Error messages

Display indication	Description	Reaction of the system	Solution
ALARM 1 Dry running	No water flow to the pump	After detection of an error as a result of water shortage, the pump operation will be automatically stopped. After that, the system will try to restart the pump. 4 start attempts will be carried out. If, after that, the system detects that the malfunction continues, then the pump will be finally decommissioned.	<ul style="list-style-type: none"> The water supply is interrupted and the safety system has started: The supply of the hydraulic circuit must be checked. If it was necessary to fill up the pump, the button START/STOP must be pressed for manual start. While doing so, it has to be made sure that the LED display AUTOMATIC has been switched off. Special case: If a higher target pressure has been programmed than the pump can deliver, then the device will construe this also as an error due to water shortage.
ALARM 2 Overintensity	Overcurrent on the motor side of the electric pump	After detection of an error as a result of overcurrent, the pump operation will be automatically stopped. After that, the system will try to restart the pump. 4 start attempts will be carried out. If, after that, the system detects that the malfunction continues, then the pump will be finally decommissioned.	<ul style="list-style-type: none"> The condition of the pump must be checked and looked up if the rotor, for example, is blocked et cetera. It has to be also verified if the correct data regarding the nominal current of the pump have been entered.
ALARM 3 Disconnected P.	The safety fuse for the pump in the controller is defective	The controller has mains voltage, but the pump is not controlled	<ul style="list-style-type: none"> Call in an electrician or customer service

Display indication	Description	Reaction of the system	Solution
ALARM 4 MIN Pressure	The pressure of the system does not reach the target value	The pump will be stopped and protected against dry-running.	<ul style="list-style-type: none"> No water on the suction side of the pump: check the filling level or pressure of the water, Pump not fully filled, fill the pump. The piping on the pressure side of the pump is broken. The water flow is too high. The pump (impeller, diffusor) is damaged. Contact the technical customer service. The motor is damaged and must be replaced
ALARM 5 Transducer	The pressure sensor is defective.	Operation of the system will be interrupted.	<ul style="list-style-type: none"> Inform the technical customer service.
ALARM 6 Excessive Temp.	The alarm indicates overheating of the controller's electronics.	If the permissible temperature is exceeded, the system will put the ZP SPEEDCONTROL COMFORT and, consequently also the pump, out of operation.	<ul style="list-style-type: none"> It must have been made sure that the permissible temperatures: Water max. 40°C Ambient air max. 50°C are not exceeded. Inform the technical customer service.
ALARM 7 Short circuit	The alarm indicates a motor short-circuit on the power supply side.	Pump operation is stopped for 10 seconds, then the pump is restarted. 4 start attempts will be carried out. If the problem is not solved, it comes to a final standstill.	<ul style="list-style-type: none"> The pump must be checked. If the problem persists, inform the manufacturer.
ALARM 8 Over voltage	The appliance is equipped with an electronic protection system against overvoltage.	In the event of an occurring overvoltage, the system will be stopped for some seconds. The operation will be restored.	<ul style="list-style-type: none"> Problems with the power line: contact the energy supply company. For systems with more than one pump, the electrical pump with converter acts as power generator if the check valve of the hydraulic system is defective. The water flows through the check valve in the opposite direction. The DC bus electric circuit of the converter is defective.

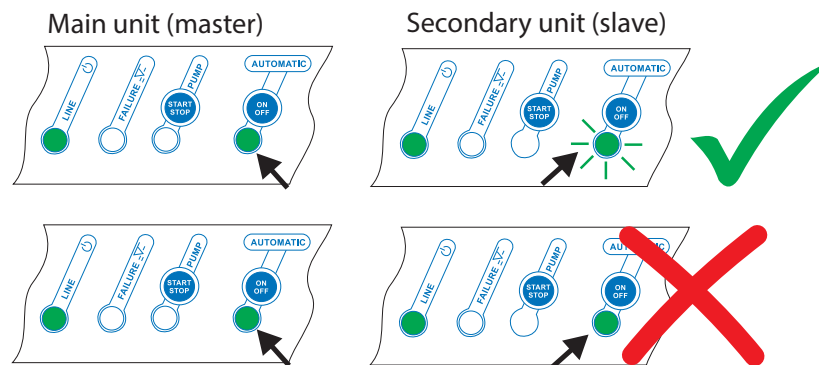
Display indication	Description	Reaction of the system	Solution
ALARM Under voltage	The controller is equipped with an electronic protection system against too low voltages of the power supply.	In the event of too low voltages, the operation of the system is stopped. If the appropriate voltage value is restored, then the operation will automatically be restarted.	<ul style="list-style-type: none"> The power grid has to be checked. The cross-section of the power supply cable for the converter is too small. Replace the cable with one with a suitable cross-section. While doing so, take into consideration the voltage drop on the controller's supply point. The power supply cable for the controller is too long. Replace the cable with one with a bigger cross-section. While doing so, take into consideration the voltage drop on the controller's supply point.
	No indication		<ul style="list-style-type: none"> It has to be made sure that a power supply of 230 V is available. If there are normal power supply conditions, then the fuse (20 A) located on the main circuit board has to be checked. ↪ Chapter 5.5 "Electrical connection of the controller ZP SPEEDCONTROL COMFORT"

6.6.1 Additional error messages in case of assembly mounting

With assembly mounting, each of the two devices basically show exactly the same errors as with single mounting, e.g. in the event of a mains failure the error message “UNDERVOLTAGE” is shown on both displays - possibly slightly different in terms of time - before the display finally goes out.

Furthermore, the following special features apply:

- CONNECTION ERROR: If the communication cable has not been correctly connected, each controller will react like a single device. No error message is displayed. A communication error can be recognised by the fact that the ON/OFF AUTOMATIC LED does not flash on the secondary device.



When assembly mounting has been correctly configured, the ON/OFF AUTOMATIC LED of the relevant MASTER must be illuminating permanently and the LED of the respective SLAVE must be flashing ↪ Chapter 6.3.1 “Special features of the operating display in case of assembly mounting”

- **WATER SHORTAGE:** If water shortage is detected in one of the two pumps, then the respective other pump will take over the role of the main device. If there is too high a demand, then the plant will try to restart the failed device. Should the water shortage have been solved, the alternating operation will be automatically restored. Should water shortage be detected in both devices, then the ART system ↘ Chapter 4 "Product description" will switch on in the MASTER device.
- **EXTERNAL RELEASE MISSING** (e.g. too low water level in the collection tank): In this case, the warning message will be triggered due to water shortage and the device will be switched off.

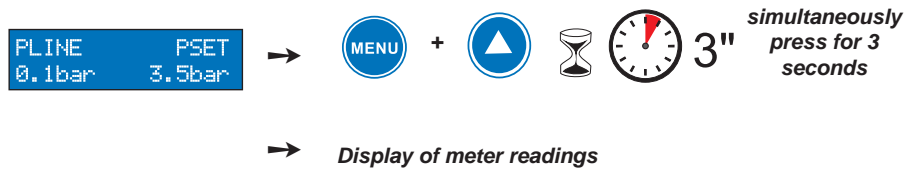
```
ALARM 1  
Dry running
```

Operation will be automatically restarted if sufficient water is in the collection tank again or the pump run is allowed due to external release.

- **REMAINING WARNING MESSAGES:** If the warning message has been triggered due to an error in only one device, then the other one will take over the function of the *Masters* . Only in the event of too high a demand, the plant will try to switch back on again the device that was put out of operation. After 4 consecutive unsuccessful trials, the device will be definitely switched off and must be manually reset. Should warning messages be triggered in both devices, then the plant will carry out 4 trials to restart it once again. Should this be unsuccessful, the plant will be finally switched off. For a renewed manual restart of a device that was switched off because of a warning message, you must press the button AUTOMATIC ON/OFF and then ENTER.









6.7 Counter and alarm log

When pressing the buttons MENU + ▲ for three seconds, you get to the memory in which the meter readings and error messages are stored.



You can get to the next menu item in the counter and alarm log by pressing the button



Display indication	Description	
RUNNING TIME HOURS 2	Number of operating hours of the pump.	
REGISTER CYCLES 2	Number of switch-on and switch-off processes of the pump.	
REGISTER POWER ON 10	Number of stops due to mains failure.	
MAX. PRESSURE 0.1 bar	The maximum pressure to which the plant was exposed. Enables the detection of pressure surges.	
ALARM COUNT. SHORTCIRC. 0	Total number of triggering processes of the alarm "motor short-circuit".	
ALARM COUNT. OVERCURR. 0	Total number of triggering processes of the alarm "overcurrent".	
ALARM COUNT. OVERTEMP. 0	Total number of triggering processes of the alarm "Power section over-temperature".	
ALARM COUNT. DRY-RUN 0	Total number of triggering processes of the alarm "water shortage" due to the digital input.	
PLINE PSET 0.1bar 3.5bar	Standard display.	

The records will keep being available in the device if it disconnected from the mains!

6.8 Handing over the plant to the user

When handing over the plant to the user:

- Explain the functionality of the plant.
- Hand over the plant when it is fully functional.
- Deliver the handover report with essential data of commissioning (e.g. changes to the factory settings).
- Hand over the operating manual.

6.9 Operation



The plant may be operated for its intended use. ↪ Chapter. 2.2 “Intended use”



The plant works automatically. Apart from regular maintenance, only occasional visual inspections have to be carried out. In case of irregularities, skilled persons have to be called in, e.g. customer service partners authorised by the manufacturer.



For repair and maintenance works on the pressure switch and/or pump, always disconnect the power plug from the power socket.

7 Maintenance and repair

Under normal use, the pressure switch ZP SPEEDCONTROL COMFORT requires only a minimum of maintenance. We recommend that the plant operating company carries out a monthly visual inspection.

The proper functionality and quiet performance of the pump should be inspected regularly. This can help prevent bigger disruptions.

Dry-running of the pump should be avoided, because the lubricating ring seal cools down with the liquid. The motor is maintenance-free. Empty the pump if there is a risk of freezing through the drain plugs.

During the cold season and with a longer standstill of the plant, the pump body and the control should be emptied. If the plant is not used at all for a longer period of time, the pump and control must be cleaned and stored in a dry, well-ventilated area.

Inspection: Examine the pressure, impermeability, pump and flow noises as well as functionality. If defects are determined, contact your contract partner/merchant.

Period of time: Every 6 months

Execution: Operating company

Maintenance: Replace end-face mechanical seal / bearing.

Period of time: Every 10,000 operating hours or 10 years or in case of premature wear and tear.

Execution: Installation company, manufacturer



Additionally, the operating manuals of the pump and membrane expansion tank have to be observed.

8 Technical data

ZP SPEEDCONTROL COMFORT	
Maximum system pressure	15 bar
Adjustment range	0.5 - 12 bar
Maximum flow rate [m³/h]	15
Suction connection	1¼" AG
Pressure connection	1¼" AG
Water temperature	0° - 40° C
Ambient temperature	0° - 50° C
Protection class	IP 55
Motor cable length	Standard 1.5 m, use a shielded cable (Extension is possible) Cross-section: ↪ Chapter 5.5 "Electrical connection of the controller SPEEDCONTROL COMFORT"
Mains connection	~1x 230 ± 20 % V 50/60 Hz
max. nominal current [A] of the pump	9 A (1~ 230 V) / 10 A (3~230 V)
max. current spikes	20 % 10 Sec
Mains filter (EN 61800-3)	C 2 integrated
Overcurrent protection	+ 20 % of the max. power consumption over a period of 10 seconds
Main fuse	Safety fuse 10 x 38 mm - characteristic gG (nimble) Nominal current 20 A Nominal voltage 500 VAC Cut-off current capability 120 KA
Motor protection	Safety fuse 10 x 38 mm - characteristic gG (super quick) Nominal current 20 A Nominal voltage 690 VAC Cut-off current capability 100 KA
Consumption in standby mode	4W

8.1 Type plate

A type plate containing all essential technical data is attached to the controller.



ZP Speedcontrol Comfort

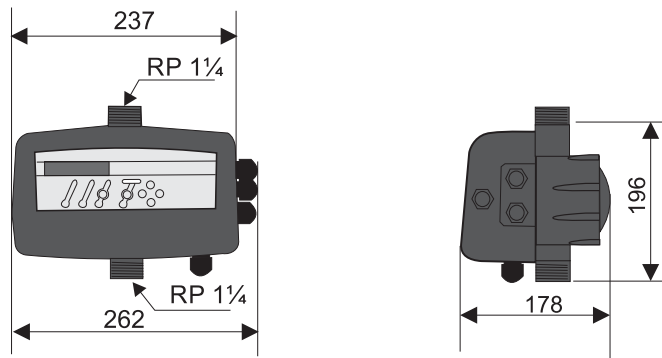
U_f : 230 V, 50/60 Hz Q_{max} : 10 m³/h

I_N : max. 9 A t_{max} : 40°C

P_{max} : 15 bar IP : 55

G : 1 1/4" Serie: V38 -02/2019 003422 **Serial number**

8.2 Dimensions [mm]



9 Environmental notes

The cardboard packaging is recyclable and to be supplied to waste paper recycling. Please make the polystyrene cushions available for removal by the dual system (yellow bag).

Waste electric and electronic equipment often contain materials which can be reused. But they also include harmful substances which were necessary for the function and safety of the device. In residual waste, or in case of false treatment, these substances can damage human health and the environment. Therefore, in no case, do not put your old device to the residual waste!

Please use the municipal collection points which were set up at your place of residence to dispose of electrical or electronic devices.



10 Declaration of conformity

We herewith declare that, on account of its conception and construction type, the device designated in the following complies with the essential requirements relating to the following guidelines:

- Machinery Directive 2006/42/EG
- Low-Voltage Directive 2014/35/EU
- Electromagnetic Compatibility 2014/30/EU
- RoHS Directive 2011/65/EU

Product designation: **ZP SPEEDCONTROL**

Type designation: COMFORT

Applicable EN standards: - EN 809
- EN 60 335-1
- EN 60 335-2-41
- EN 50 081-1
- EN 50 082-1

The mounting and operating manuals have to be observed and followed.

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Grünhain, 6th November 2019



Matthias Kotte, Product Development

