Instruction manual Type: MARE	Pump controller : S-No.: _____
System controller for pumps with frequency converter	MARE Software Version 1.03 state 12.05.2015

Execution: pressure control
                 limit switch
                 level control
                 temperature controller

Option: GSM

01,50 bar   Auto P1
P1:000Hz, 000,0A

content   **page**

1. Safety Precautions

Before installing and commissioning of the frequency converter controller, please read the product manual carefully and observe all warnings and safety instructions. Keep this manual is always easily accessible in the vicinity of the frequency converter controller.

Definition of Information

Warning !
Disregarding the safety severe to fatal injuries can occur or considerable material damage!

Caution!
Failure to follow these instructions severe to fatal injuries can occur or considerable material damage!

Notice!
Failure to follow these instructions may result in malfunction of the system!

Warning!
The drive controller contains dangerous voltages and controls potentially dangerous rotating mechanical parts. The installation, commissioning and maintenance of this equipment should be performed only by qualified personnel who are familiar with the operation. The installation, commissioning and maintenance of this equipment should be performed only by qualified personnel who are familiar with the operation.
Do you have particular caution if the automatic restart is activated. To avoid injury by possibly unintentional restart of the drive controller after a power failure, turn off the automatic restart in case of doubt. When repairing or servicing this equipment, make sure that the system can not be switched on by others again! **The frequency controller have DC link capacitors, which carry hazardous voltage even after the mains supply is switched off. Therefore, always wait after switching off the mains voltage for at least 5 minutes before working on the machine or turn on the unit again.** It is important to ensure that no live parts are touched when power is applied or the intermediate circuit capacitors are charged.
Do not work on the wiring and check any signals when power is applied.
The Inverter - Regulator has a leakage current.
Ground the frequency controller on the connections provided.

The customer-supplied GFCI should be in the Inverter - Regulator **universal current sensitive / selective RCD (FI) - Circuit breaker type: B, B + be with rated current 300mA.**

Caution! An RCD (FI) - switch can not work sometimes in certain plants (eg. long cable).

It is recommended that the frequency converter - controllers separately fused.

Make sure that the input voltage of the registered on the nameplate voltage.

Caution!
All frequency controllers are tested for dielectric strength and insulation resistance. Before the insulation measurement in the pump station, for example within the scope of the inspection frequency controller must be disconnected!

It is strongly recommended that all electrical equipment conforms to the National Electrical Codes and local regulations.

Factors such as high temperatures, high humidity as well as dust, dirt and corrosive gases. The installation should be a well ventilated, not exposed to direct sunlight place.
Put them no mains voltage to the transducer terminals or to the control terminals. Enter the operating signals Hand/0/ Auto via the selector switch on or about the driving of external contacts and not by switching on and off of a line or drive contactor.
It is strongly recommended that all electrical equipment conforms to the National Electrical Codes and local regulations. Only qualified personnel should perform installation, alignment and maintenance. The manufacturer reserves the right to alter the technical data in order to make improvements or update information.
As these provisions are handled differently, the user must observe the respectively valid for Him requirements. The manufacturer can not release you from the obligation to comply with the latest safety standards the user..

Notice!

The technical data and descriptions in this guide are correct to the best knowledge and belief. Technical improvements have been continuously carried out - that's why the manufacturer reserves the right, without prior notice to carry out such changes.

The manufacturer can not be held liable for errors in the manual.

Warranty is within Germany and within the incorporated statutory warranty period and applies only to the product itself and not for any consequential loss or damage or costs associated with the occurrence of a Warranty claim arise at other plants or plant parts. The operator shall, in each case to ensure that a failure or defect in the product can not lead to further damage.

2. General / Mode of Operation

2.1 MARE speed control

Congratulations on purchasing this high-quality pump control. This product complies with the latest technology and is continually developed and improved. The device was subjected to the production of an extensive examination and therefore functions properly. To read to ensure optimal function and observe these operating instructions.

This frequency inverter controller operates as an automatic pressure regulator, tested.

The speed of the pump will be adjusted continuously. The actual pressure in the system is determined by pressure transducer (sensor). A PI controller regulates the pressure by analogy.

The pressure regulator is programmable and can be adapted to the respective operating conditions. The parameters are displayed on the display in plain text. Commissioning is menu driven. During commissioning, some data must be entered to ensure the smooth operation of the pumping plant. An adjustment of specific parameters (expert mode) requires special knowledge of pump technology. This should be done by a competent person or the manufacturer.
.

2.2 Benefits of speed control

- almost constant pressure
- Continuous adjustment of pump power to the changing operating conditions
- Energy saving
- no large pressure vessel longer required
- low mechanical wear of pumps and maintenance free

2.3 Principles of speed control

To operate a speed control can be accurately and effectively, the following points to consider::

- the pump must be construed in accordance with the plant / Requirement
- the pump shall have power reserves available (80. .90%) = system reserve capacity at rating
- Submersible Pumps in the frequency or operating range between 30. .99 (200) Hz should be restricted (hydrodynamic bearing)
- with submersible pump must be based on an output reduction of about 5. .10%

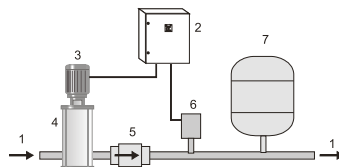## 2.4 Construction of a pressure control system

A back-flow preventer is mandatory and can be used in the suction line before the pump or in the Pressure pipe be installed behind the pump! The expansion vessel must be fitted if required.

⚠️ Caution!	1 Flow direction 5 Non-return valve
	2 Controller 6 Pressure Transducer
	3 Drive 7 Pressure vessel
	4 Pump

Examples

2.5 Note for the operation of the system with Pressure vessel!

If the plant is operated with a pressure vessel, the vessel must be pre-pressed in normally state.

The pre-squeezing pressure should be checked regularly. The amount of pre-squeezing pressure is: Start pressure bar minus 0.50.

| e.g.: | Nominal System Pressure: | 4.00 bar |
| | Vessel Air Pressure: | 3.50 bar |

3. Installation and Mounting

⚠️ **Caution!** Environmental conditions such as high temperatures, high humidity should be avoided as well as dust, dirt and corrosive gases. The installation should be a well-ventilated and not exposed to direct sunlight location.

⚡ **Warning!** Because of convection, the frequency control during installation of at least Be installed 15 cm from side walls or other facilities.

The allowable temperature range of +5 ° C to +30 ° C must not be under-or exceeded
Do not install the Inverter controller near heat-radiating bodies

3.1 Mounting the controller

In the rear contains holes for wall mounting of the cabinet. The sole assembly recommended hung stud to the electrical cabinet. Mounting Dimensions: See manufacturers data sheet MARE

4. Wiring and Connections

⚡ **Attention!** Make sure that the input voltage corresponds to the voltage indicated on the nameplate.
Important: Check the supply voltage and terminal assignment!
USE shielded cable!
For submersible pumps the cable shield connected to ground potential close to the pump.
Never apply mains voltage to the sensor - or control terminals.

ℹ️ **Note!** Connect the pressure sensor 4..20 mA to the appropriate terminals!
The pin assignment, refer to the wiring diagram.
Is the motor cable longer than 80 meters (e.g. 85 yards), is recommended to use a motor choke.
Check the correct connection of power, sensor, and control lines.

4.1 Drive Protection

The MARE inverter has a monitoring function for the drive current..
The motor current is set via the controller menu. In addition, PTC thermistor for monitoring the temperature can be used. This monitoring is set via the controller menu.
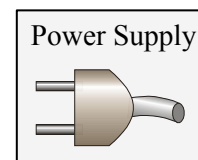
4.2 connection terminals

In the lower part of the switch box MARE is the terminal strip.
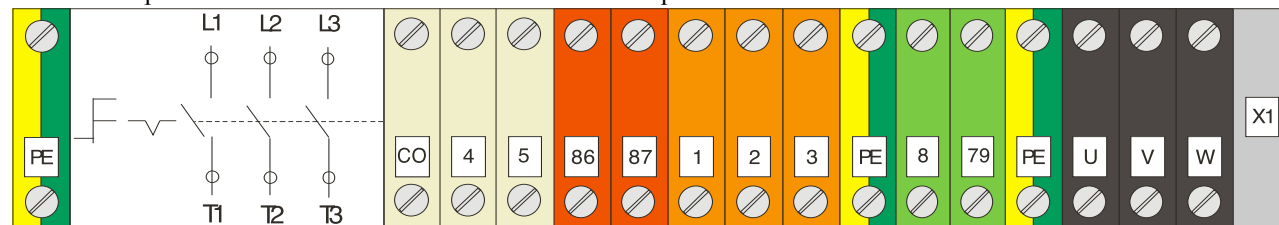
4.3 Power Supply

Clamp	Function	Description
L1		L1 Phase
L2	**look**	L2 Phase
L3	**Type plate**	L3 Phase
N		N Neutral
PE	**Power Supply**	PE Ground
or:		
PE	**Power Supply**	PE Ground
L1	**look**	L1 Phase
N	**Type plate**	N Neutral
PE	**Power Supply**	PE Ground

Power Supply

4.4 terminals for the fault signal relay per inverter

Function	Description	
Alarm relay	Alarm contact	1
changer	Alarm contact	2
230V 1 A limit	Alarm contact	3

Power On, no failure   Power Off or failure
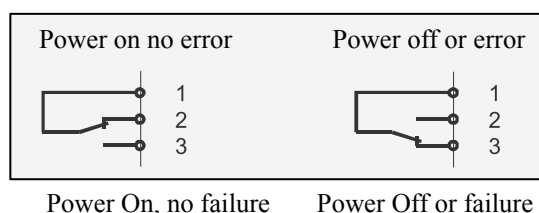
4.5 terminals for the external inputs

terminal	function	description		
4	Ext. on / off	Ext. Input 1		
5	Ext.low water	Ext. Input 2		
08	PTC	+	**drive**	
79	PTC	-	**drive**	

external input PTC
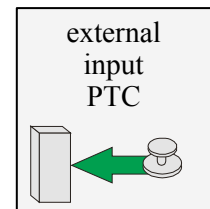
The digital input and outputs can be parameterized. Function see "Messages" menu.

4.6 transducer connection

terminal	function	description		
86	1x Transducer signal	OI	4-20mA	
87	1x Reference voltage	L	VDC -	
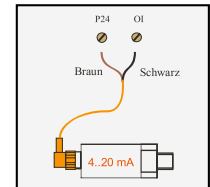
4.7 terminals for the drive / pump

| Clamp	Function	description
U	**3 phase drive**	U
V	**look**	V
W	**wiring diagram**	W

Drive
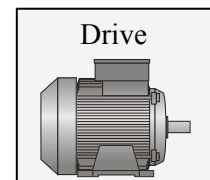
Caution!

When disturbances to the notes under 9.2 Troubleshooting note!

4.8 Connection of the GSM Modem

Connect the controller to the GSM modem (terminal) with the appropriate cable. Connect the antenna and power cord. Pay attention to a good alignment of the antenna for proper cellular data connection. Set the power is always active together safely with the MAR-controller.

GSM Modem Kit

5
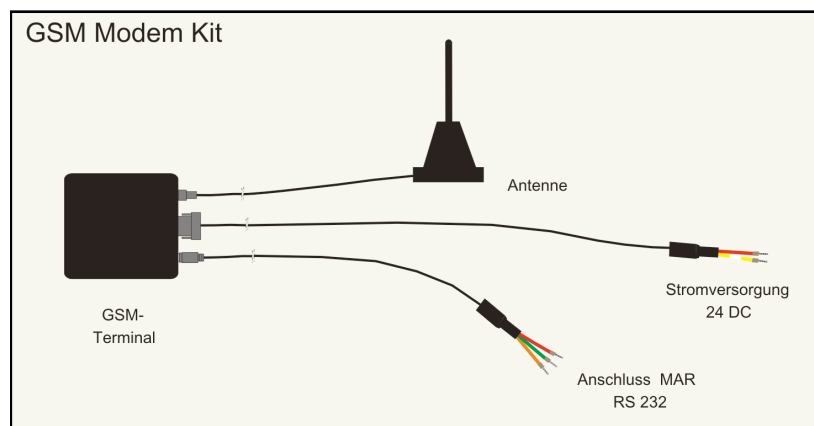
4.9 SIM card

You need a registered SIM card. Put the SIM card into the modem. Turn on the modem / plant on.
If you activate the "GSM / User" menu GSM, they can set the phone book and the GSM - Modem use.

Notice! There are currently 3 users allowed as phonebook entry.
User 3 has permission for the remote adjustment.. A remote adjustment of the set points
is possible.A separate operating instructions for Card reader is supplied with the GSM modem.
At any time you a SIM card from the manufacturer can be preset.
If you have questions or special solutions, please contact to the manufacturer.

Caution! When setting the SIM card, ensure that you disable the PIN code!
In case of wrong input of data, the SIM card is not detected correctly!
The power supply from the GSM modem must always be active together with the EDR-1!
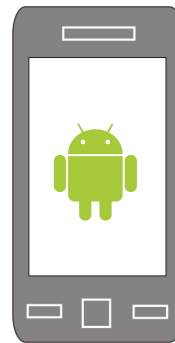Pay attention to proper cellular data connection!

Set only with the MARE menu the SIM card!

SMS commands: see 8.11
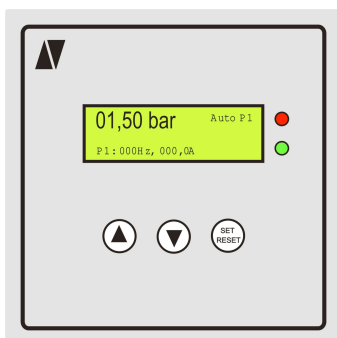
A smartphone app for Android from: 4.xx

stands for simple SMS service available.

Contact the manufacturer.

5. panel description MARE

Control panel with towline **LCD display** for parameters and operating data:

The **arrow keys**
Select the functions (scrolling)
Enter / change data.

The **SET / RESET - keys**
Storing input data,
Error acknowledgment

The red LED lights when the disorder.
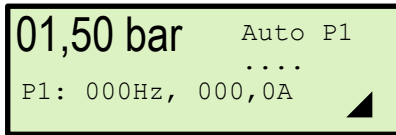The green LED lights when active control.
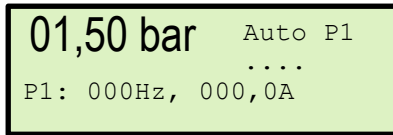
MARE-display:

Active main display

Is the communication set to analog, this is displayed with the appropriate icon.

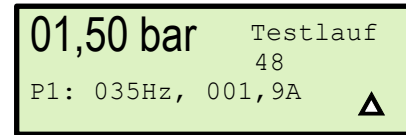After initialization is complete, the power indicator appears:

Display at "Poti" Setpoint	Display at "internal" setpoint	Display with active test run

```
01,50 bar    Auto P1
             ....
P1: 000Hz, 000,0A    ◣
```

```
01,50 bar    Auto P1
             ....
P1: 000Hz, 000,0A
```

```
01,50 bar    Testlauf
                48
P1: 035Hz, 001,9A    △
```

These icons are displayed depending on the function in the display.

GSM is active: a mobile network connection.

GSM is inactive: There are no cellular network connection.
In addition, the alarm lamp will light and the display show a "no network" message.

Analog set-point: The set-point values are given by the analog input.

Test mode is active: All monitoring functions are disabled!

6. Programming instructions / operation / startup messages

6.1 General operation of the displays

If operated from the output side of the ▼ arrow key so you can access the setpoints
Here the nominal values of the system are set.
If the ▼ arrow key is pressed again, we come to the operating parameters.
Here, the operating parameters of the system are set.

If operated from the output side of the ▲ arrow key so you can access the various operational indicators.
Pressing the ▲ arrow key the next operation screen appears.

The pump control is made by turning the switch Hand/0/Auto- in operation.
If the system is via an external command, the external contact must also be started to be closed.

i	The pump control MA .... can optimally be adapted to all possible operating conditions by adjusting various functions and operating parameters in individual cases. The system is programmed at the time of delivery to keep the cost of commissioning as low as possible. To enter the necessary data, a menu item can be called at any operating parameters. The menu items can be called as described below. Each parameter has a setting in which selected either an option or a range of values can be set.
Notice!	

6.2 Requirements for the commissioning of the Controller

Before the control is put into operation, the following requirements must be met:
Plant / pump suction and pressure side is connected to the pipe! Piping and pumps are vented!
Electrical connection is made and checked!

6.3 First turn on the Controller
Caution!
When the safely start is chosen, it comes after turning on the power or after a power failure, automatic restart of the pump!
Switch on the power! After turning on the main switch / the mains voltage, the stored operating data in the drive controller are compared.

The following message appears on the display:

```
Molitor
Antriebstechnik GmbH
EDR2-MARH S-Nr.xxxxx
Version: 1.xx[x-xxx]
```

The controller searches the GSM query image
according to a GSM modem and tries to establish a connection.

The wait time is about 30 seconds.

```
   -- GSM-INIT --

   wait !
```

Message if no modem is connected!

```
   -- GSM-INIT --
No modem
connected !
```

If there is no modem connected,
changes the EDS 2 to this main:

```
            Hand P1
            ....
P1: 000Hz, 000,0A
```

The wait time is about 30 seconds.

```
   -- GSM-INIT --

   wait !
```

Message when an error has occurred!

```
   -- GSM-INIT --
Error
SIM / phone book !
```

If an error occurred during the modem,
change the EDS-2 to this main:

```
            Error
            modem !
P1: 000Hz, 000,0A
```

6.4 Correct connection from the modem with / without network coverage
The MA-regulator starts up after the splash screen! with the GSM query image:
It will attempt to connect to the GSM module. The wait time is about 30 seconds.

```
   -- GSM-INIT --

   wait !
```

Message when the modem is connected correctly! The modem sends the status.

```
   -- GSM-INIT -- OK !
sample system
phone number
+49160xxxxxxx
```

```
   -- GSM-INIT -- OK !
Mobil 1
phone number
+49150xxxxxxx
```

```
   -- GSM-INIT -- OK !
Mobil 2
phone number
+49170xxxxxxx
```

```
   -- GSM-INIT -- OK !
Mobil 3
phone number
+49171xxxxxxx
```

If a modem connected to network coverage,
changes of the MARE-regulator for this main:

```
01,50 bar    Hand P1
             ....
P1: 048Hz, 017,0A
```

If the modem is connected without network,
changes of the MARE-regulator for this main

```
01,50 bar    no
             network!
P1: 048Hz, 017,0A
```

7. Operating messages

7.1 Select MARE operating indicators

⚠ **Caution!**

ℹ **Notice!**

With the ▲ arrow key, the next screen is displayed.
Pressing the same arrow key the next screen is displayed.
Use the ▼ arrow key, the previous screen is displayed.
If the display is "hours of operation" is displayed and the ▲ arrow key is pressed, so you get to the error memory.
From the fault memory of the **SET / RESET** button must be pressed to return to the initial display.

MARE active messages

Operating Status: time, pressure, frequency, current P1/P2 ... , equipment temperature

```
01,50 bar    Auto P1
P1: 048Hz, 015,0A
```

```
01,50 bar    Auto P1
P1: 048Hz, 015,0A
```

```
01,50 bar    Auto P1
P1: 048Hz, 015,0A
```

```
01,50 bar    Auto P1
P1: 048Hz, 015,0A
```

```
01,50 bar    Auto P1
P1: 048Hz, 015,0A
```

```
01,50 bar    Auto P1
P1: 048Hz, 015,0A
```

▲▼

Expertpage:

```
T 00 LF  00  50
3.00 DF  00  50
P1: 048Hz,015,0A,29C
```

▲▼

memory messages

Memory status: Hour meter BST, P1
Memory status: day run - counter TLZ, P1

```
BST Pumpe 1 0:00:00
...
TLZ Pumpe 1 0:00:00
...
```

▲

Error memory: 1 - x with date stamp P1 last 1-8 error
For each error, the pressure and the pump status is stored on a separate page.
Switch for 2 seconds press the SET button.

```
ER01 15-01-13 13:59
ER04 16-01-13 11:59
...
```

▲▼ SET/RESET

7.2 Select the manual mode

Operating Status MARE: manual mode, pressure, speed, current.

```
01,50 bar    Hand P1
P1: 035Hz, 015,0A
```

H 0 A

==When disturbances to the notes under 9.2 Troubleshooting note!==

7.3 information Messages

pumps off
The controller is turned off. The message "pump off".

```
            Pump
            off
 P1: ....
```

external off
The controller is connected via an external input. If the connection is open, the message "External Off" appears. The respective pump are stopped. The red LED lights. The alarm relay does not switch.

```
            Extern
            off
 P1: ....
```

external water shortage
The controller is connected via an external input. If the connection is open, the message "Low water" appears. The respective pump are stopped. The red LED lights. The alarm relay switches.

```
            low-
            water
 P1: ....
```

fill active
If the "underpressure" to be active, the controller operates in the fill mode to the pressure is the first time offset. The red LED lights. The alarm relay does not switch.

```
            Fill
            mode
 P1: ....
```

safestart active
If the function "Safestart" to be selected, the controller is operated in the fill mode. The pump is active. The red LED lights. The alarm relay does not switch.

```
            Save-
            start
 P1: ....
```

top pressure
The current pressure is greater than the set Top pressure. The controller regulates off to prevent a further rise in pressure. The message "Top pressure". The red LED lights. The alarm relay does not switch.

```
            Ober-
            druck
 P1: ....
```

stopped plant
The controller is connected via an external emergency stop. It appears the message "Stopped plant". The pump isrstopped. The red LED lights. The alarm relay switches. "Restart" via GSM or reset - function.

```
            Stopped
            plant
 P1: ....
```

Between the displays operation can be changed with the arrow keys ▲ and ▼.

7.4 Time / Date

MARH Set time:
Press **SET / RESET button** for 5 seconds at the operating display time / date.
If the cursor is flashing, the time and date using the
Arrow ▲ button, arrow ▼ button and the **SET / RESET button** can be set.
After confirming "OK", the change is adopted.

```
14:59:17    Auto P1
15.01.13    Auto P2
P1: 048Hz, 015,0A
```

```
14:59:17    Auto P1
15.01.13    Auto P2
P1: 048Hz, 015,0A
```

```
15:59:17    Auto P1
15.01.13    Auto P2
P1: 048Hz, 015,0A
                  OK
```

7.5 Option page GSM:

GSM modem:
You can use the "Communication" menu, activate a GSM modem
and set in the phonebook, the system and the user and provide input or output.
On this page you can change the Contract, see the signal strength (0-30), to interrogate their accounts and each user
(Be.x) "A" or turn "off". When the credit card contract is always at € 99.99.
If the cursor is flashing, the value using the **arrow ▲ button, arrow ▼ button** and the **SET / RESET button**
can be set. After confirming "OK", the change is adopted.

```
contract:P S12
credit  : 15,25€
Be.1 : E   Be.2 : E
Be.3 : E
```

```
contract:P S12
credit  : 15,25€
Be.1 : E   Be.2 : E
Be.3 : E
```

```
contract:P S12
credit  : 11,17€
Be.1 : A   Be.2 : E
Be.3 : E          OK
```

7.6 Option Page Counter:

Set Counter / Counter Delay:
You can configure via the menu "Messages" inputs as counter
To put the meter on, press **SET / RESET button** for 5 seconds when displaying water meter.
If the cursor is flashing, the value using the **arrow ▲ button, arrow ▼ button** and the **SET / RESET button**
can be set. After confirming "OK", the change is adopted.

```
water-counters:
Z1 /1000l : 154qm
Z2 /100 l : 100,0qm
Z3 /10  l : 10,00qm
Z4 /10  l : 10000 l
Zählerverzög.: 5s
```

```
water-counters:
Z1 /1000l : 154qm
Z2 /100 l : 100,0qm
Z3 /10  l : 10,00qm
Z4 /10  l : 10000 l
```

```
water-counters:
Z1 /100 l : 15,4qm
Z2 /100 l : 100,0qm
Z3 /10  l : 10,00qm
Z4 /10  l : 10000 l
                  OK
```

Reset the counter:
To reset the counters to **00000** , the following procedure:
Go to the page "water meter" and hold the **SET / RESET button** for about 10sec. pressed!

Between the displays operation can be changed with the arrow keys ▲ and ▼.

8. Operating Indicators / Main Menu / Setup

8.1 Using the Menu

Example set-points

```
setpoints
limits
times
base setting
pump/drive
transducer
controller
safety
messages
communication
intern
```
▼ SET/RESET

```
Code List:

setpoints        Code: 174
limits           Code: 174
times            Code: 174
base setting     Code: 815
pump/drive       Code: 815
transducer       Code: 815
controller       Code: 815
safety           Code: 815
messages         Code: 815
communication    Code: 815
intern           Code: xxx
```

```
set-points

(Select a menu)
```
SET/RESET

```
set-points   xxx

(Enter the password)
```
▲ ▼ SET/RESET

```
top pressure:    05,90bar

(select the parameter)
```
▲ ▼ SET/RESET

```
top pressure:    05,85bar

(set the value)
```
▲ ▼ SET/RESET

```
target pressure: 04,00bar

(select new parameters)
```
▲ ▼ SET/RESET

```
save:   Y

(save all parameters)
```
▲ ▼ SET/RESET

The menus are the same for all.

8.1.1 Adjust set-points

⚠️ **Caution!** The set-points are set for the plant. The code (____), see page 12.

The set-points menu is in limits "GW" inactive!

ℹ️ **The set-points are inactive with external set-point!**

Note: By pressing the 🔘 (SET/RESET) - button for 5 seconds, the menu can be interrupted.

set-points	set-points Password Code:xxx	top press. : 05,00bar target press: 04,00bar start press : 03,50bar diff.press : 00,10bar overrun time: 5s s-p.adjust : 1,00 l.delay time: 10s bridge time : 99Min
▲ ▼ (SET/RESET)	▲ ▼ (SET/RESET)	

Explanation of parameters:

low off pressure   :04,00bar   - 0,01bar - 99,99bar
Enter the low OFF pressure at which the system will turn off.

low test pressure (-)   :00,50bar   - 0,01bar - 09,99bar
Enter the low test pressure at which the system will turn off when the pressure drops.

top off pressure   :09,00bar   - 0,01bar - 99,99bar
Enter the top OFF pressure at which the system will turn off.

top test pressure (+)   :00,50bar   - 0,01bar - 09,99bar
Enter the top test pressure at which the system will turn off when the pressure rises.

overrun time   :5s   - 0s - 999s
Enter the delay time until the pump to stop.

set point adjustment   :1,0   - 0,2 - 2,0 / 1,0=Off
Enter the set-point adjustment, in which the target pressure should be adjusted to the pipe.
Small 1 = target pressure drop; Larger 1 = target pressure increase.

If the Limits menu is active, the MA must - regulator after every shutdown
by the "limits" to reboot with the external command. With this function, they prevent the irrigation a "fizzle" of the pump after the end of irrigation.
Monitoring for broken pipe or gas shortage is active after the bridging time.
The pressure limit for the water shortage are 50% of the upper limit pressure.

limit delay time   :60s   - 9s - 199s
Enter the limit delay time until the plant is to go to "standby".

bridging time   :1   - 1Min - 99Min
Enter the bridging time until the pressure monitoring is active.

8.2 adjust times

```
times



 ▲  ▼  SET/
         RESET
```

```
times
Password
Code:xxx



 ▲  ▼  SET/
         RESET
```

```
reduction   : 000%
r-time On   : 20:00h
r-time Off  : 23:00h

test time   : 10:00h
duration    : 99s
T.Intervall : 0 days

timer       : A/E/T
On time     : 10:00h
Off time    : 14:00h
expir. time : 10Min
```

Explanation of parameters:

pressure reduction   :0   - 0 - 100 % / 0=off
Enter the percentage of the set pressure for the pressure drop, at which the system is to operate.
This feature gives you the ability to reduce the energy consumption of the pump.

Reduction time on   :xx:xx h   - 00:00 - 23:59 h
Reduction time off   :xx:xx h   - 00:00 - 23:59 h

test time   :10:00h   - 00:00 - 23:59 h
Select the test run for the pump. This feature gives you the ability to run the pump once every 24 hours with manual frequency.
This function can prevent seizing of the pump.

duration   :20s   - 0 - 999s with manual frequency
T.Intervall   :0 days   - 0 - 30 days (0 days = Off)

Timer - A/E/T   :0   - 0 - 100 % / 0=off
Enter the mode for the timer, at which the system is to operate.
    A   **=**   **off**   **System operates without timer**
    E   **=**   **on**   **System operates with timer**
    T   **=**   **on**   **exp.**   **System operates with expiration time (egg timer)**

On time   :xx:xx h - 00 - 23 h
Off time   :xx:xx h - 00 - 23 h
Enter the values for the timer. This feature gives you the ability to control the pump by time. The timer is active every day.

expiration time   :10 Min - 001 - 999 Min
Enter the values for the expiry timer (egg timer). This feature gives you the ability to control the pump after time. The countdown timer is always active with the start command. **With an additional button "Timer Set", which is activated via a digital input "TIS", the set time let's count up.** Example: base time T = 10min. Briefly press the key: new time: 20min; Button press: new time now 30min. A longer press and hold the button, the timer value is reset to the base setting eg. 10min. reset. The set time is active only once. Thereafter, the base is always active time. The time base can be set "times" in the menu.

8.3 Base Setting

```
Base Setting              Base Setting              setpoints    :   1
                          Password                  exp.-vessel  :   Y
  ▲  ▼  SET/              Code:xxx                  operating mode:  DR
         RESET
                            ▲  ▼  SET/
                                   RESET
```

Explanation of parameters:

Enter the number of the set-points, at which the system is to operate.

Number of set-points   :1/2   - 2-MAR-Input 1.1 - S1

Select whether the system works with or without expansion vessel.

Expansion vessel.   :Y   - no / yes

Turn the limit function by the irrigation systems as required.
If the limit function is active, the system turns off and has to be restarted with the external command.

Select the operating mode of the system.

operating mode   :DR   - (DR) pressure control

DR	**=**	**Pressure**	**The system works as a pressure regulator / pressure switch (bar)**
DF	**=**	**Pressure + fire**	**Extinguishing fire extinguishing special function**
DG	**=**	**Pressure + limit**	**The system operates as a pressure regulator with restart (bar)**
GW	**=**	**Limit control**	**The system operates as a limit control with restart interlock**
ME	**=**	**Volume**	**The system operates as a flow regulator (l / min)**
ST	**=**	**Flow**	**The system operates as a flow regulator (%)**
TH	**=**	**Heating**	**The system operates as a temperature controller / thermostat (° C)**
TK	**=**	**Cooling**	**The system operates as a temperature controller / thermostat (° C)**
NF	**=**	**Level Filling**	**The system operates as a level controller / float switch (cm)**
NL	**=**	**Level Empty**	**The system operates as a level controller / float switch (cm)**
VR	**=**	**Vacuum regulator**	**The system operates as a vacuum regulator (mbar)**
DD	**=**	**Differential pressure**	**The system works as a differential pressure regulator (bar)**

8.4 Set electric pump / electric drive

```
Pump/motor
FU

 ▲  ▼  SET/
         RESET
```

```
Pump/motor   1
Password
Code:xxx

 ▲  ▼  SET/
         RESET
```

```
read INV   :   P1
rotating   :   R
accelerate :   01,0s
decelerate :   02,0s
rated curr.:   015,0A
rated volt :   400V
rated freq.:   050Hz
min freq.  :   020Hz
max freq.  :   050Hz
hand freq. :   035Hz
fix freq.  :   050Hz
drive char.:   K
boost      :   04%
carr. freq.:   05,0kHz
vario freq.:   A
drive prot.:   A
ph.er.outp.:   A
```

Explanation of parameters:

read INV   :P1   - P1
Select whether you want to read the data from the respective frequency inverter.

rotating direction   :R / L   - Right / Left
Enter the rotation direction of the pump. AC phase angle does not matter!

acceleration time   :03,0s   - 0,01s - 99,9s / only manual operation
Enter the Acceleration time of the pump. Recommendation: 1-3 seconds.

deceleration time   :05,0s   - 0,01s - 99,9s / only manual operation
Enter the deceleration time of the pump. Recommendation: 2-10 seconds.

rated current   :xxx,0A   - 0,01A - 199,9A
Enter the drive rated current of the pump. Data: See nameplate.

rated voltage   :400V   - 200V - 480V
Enter the drive voltage to the pump. The setting they found on the nameplate of the drive.

rated frequency   :50Hz   - 1Hz - 200Hz
Enter the rated frequency of the pump. Data: See nameplate. With this function, the nominal frequency of the pump is set.

min frequency   :25Hz   - 1Hz - 200Hz
Enter the minimum frequency of the pump. This feature gives you the option of the minimum frequency of the pump for operation entered. This way of setting the pump power can be limited.

max frequency   :50Hz   - 1Hz - 200Hz
Enter the maximum frequency of the pump. This feature gives you the option to enter the maximum frequency of the pump for operation. This way of setting the pump power can be limited.

hand frequency   :35Hz   - 1Hz - 200Hz
Enter the hand frequency in Hz, a hand, in which the respective engine in manual mode is to move up and down.

fix frequency   :50Hz   - 1Hz - 200Hz
Enter the fixed frequency for the respective pump with the limit switch is to operate. This rate can be expressed by SMS - command (option) for the current operation to change. If a SMS - start command sent without a value, the system works with the fixed frequency.

drive characteristic   :K   - Constant / quadratic / specific
Select the drive characteristic (Constant / quadratic / specific) of the pump. With this function, the power consumption of the pump can be changed. Recommendation: Square for centrifugal pump; constant for submersible pump; specifically at frequency inverter problems.

Boost   :04%   - 00% - 20%
Enter the value of the boost pump. This function is needed to better run the pump for heavy start-up.

16

carrier frequency :5000Hz - 2000Hz - 9999Hz
Enter the carrier frequency of the pump. Low carrier frequencies result in higher engine noise. This function is used to tune the carrier frequency to use with different cable lengths between pump and drive.

vario - carrier frequency :A - off / on
Select the Vario - carrier frequency of the pressure control. The Vario - carrier frequency cause changes in engine noise to the soundscape for people to improve.

drive protection :A / K - off / PTC / (PT100)
Select the drive protection function.

phase error output :A - off// on
Select the phase failure detection output of the pressure control. The phase loss detection protects the drive cable against interruption.

8.5 Adjustment of transducer

Transducer	Transducer Password Code:xxx	Sensor 1 : ED Sens.val. 1 : 10,0 Sensor mA/V : mA

Explanation of parameters:

Enter the type of sensor for the pressure control.
sensor 1 **:A…..EM**

A =	**Off**	**transducer does not function!**
ED =	**On pressure**	**transducer works as a main sensor pressure (bar)**
EN =	**On level**	**transducer works as a main sensor level (cm)**
ET =	**On temperature**	**transducer operates as main sensor temperature (° C)**
EM =	**On volume**	**transducer works as a main sensor pressure flow (l / min)**

sensor value 1 bar /m :10,0 - 0,00 - 99,99
Enter the operating range for the transducer 1 / 2. Data: See type plate sensor.

sensor input :mA - mA / V / mA=AI1 V=AI2
Select the signal input for the transducer. Data: See type plate sensor. This feature lets you choose the option signal between 0-10V and 4-20mA. (See special connection diagram)

8.6 adjust controller

```
Controller
```

```
Controller
Password
Code:xxx
```

```
PID P gain      :    0,50
PID I time      :    0,50s
control ramp    :    1,0s
actual tolerance :   05%
verification ph. :   050%
load factor     :    050%
speed factor    :    050%
switch-off freq. :  035Hz
switch-off delay :   02s
```

Explanation of parameters:

PID P gain   :0,50   - 0,01 - 9,99
Enter the PID P gain of pressure control.
Ensures the rapid adjustment of the pump to the desired value.

PID-I time   :0,50s   - 0,1s - 9,99s
Enter the integration time of the PID controller.
Ensures the rapid adjustment of the pump to the desired value.

control ramp   :1,0s   - 0,1s - 99,99s
Enter the control ramp of pressure control.
The control ramp changes the adjustment of the pump.

actual tolerance   :05%   - 1% - 10%
Enter the setpoint tolerance for zero amounts shutdown.

verification phase   :50%   - 1% - 100% = 0,1- 1,00bar absolutely
Enter the verification phase for zero amounts shutdown. Recommendation: 20%. See also "zero flow cutoff"

load factor   :50   - 1% - 99% from Inverter
Enter the load factor for the null sets shutdown. Recommendation: 50%. See also "zero flow cutoff"

speed factor   :50   - 1% - 99% from Inverter
Enter the speed factor for the null sets shutdown. Recommendation: 50%. See also "zero flow cutoff"

switch-off frequency   :35Hz   - 1Hz - 200Hz
Enter the cutoff frequency for the zero quantities shutdown.

switch-off delay   :2s   - 1s - 99s
Enter the time delay for the zero quantities shutdown.

8.7 Setting the safety

```
┌─────────────────────┐ ┌─────────────────────┐ ┌─────────────────────────────┐
│ safety              │ │ safety              │ │ sensor limit : 095%         │
│                     │ │ Password            │ │ limit delay  : 30s          │
│                     │ │ Code:xxx            │ │ auto reset   : A            │
│                     │ │                     │ │ save start   : 00Min        │
│  (▲)(▼)(SET/RESET)  │ │  (▲)(▼)(SET/RESET)  │ │ Save freq.   : 035Hz        │
│                     │ │                     │ │ dry run      : I            │
│                     │ │                     │ │ low water    : I            │
│                     │ │                     │ │ under press. : K            │
│                     │ │                     │ │ under press. : 050%         │
│                     │ │                     │ │ lack delay   : 180s         │
│                     │ │                     │ │ pump guard   : A            │
│                     │ │                     │ │ guard freq.  : 030Hz        │
│                     │ │                     │ │ guard time   : 30s          │
│                     │ │                     │ │ leak. ctrl.  : 00           │
│                     │ │                     │ │ runt. ctrl.  : 000Min       │
└─────────────────────┘ └─────────────────────┘ └─────────────────────────────┘
```

Explanation of parameters:

limit pressure   :95%   - 0,01bar - 99,99bar
limit delay   :30s   - 1s - 99s
Enter the limit pressure value for the MARE-regulator and the delay time at which the plant is off.
The limit pressure monitoring is always active.

Note: The system restarts automatically!
Auto Reset   :A   - A=off / E=On / 3x in 20 Min
Select the reset function for the MARE-regulator.
This feature gives you the option at fault automatically to let **3 times in 20 minutes**, start up again.

Safe Start   :0   - 0 - 99 Min 0 Min = off
Safe frequency   :35   - 0 -200Hz
If necessary, select the security start for the MARE-regulator. If the Safe Start is selected, the pipe is after turning on the power or after a power failure, slowly and gently to fill. The Safe Start mode, only one pump operates at fixed speed for the time set. This function should be set by an expert, or after consultation with the manufacturer.

dry run   :I   - A=off / E=On / always
If necessary, select the dry run protection, in which the system will shut down when running dry.
If the pressure / level below or the corresponding digital input is operated, shut down due to "dry run".
If "Always" is selected, the dry run is also active in manual mode. No automatic restart after dry run!

low water   :I   - A=off / E=On / always
If necessary, select the low water protection, in which the system will shut down if the water shortage.
If the pressure / level below or the corresponding digital input is operated, shut down due to "low water". If "Always" is selected,
the water shortage is also active in manual mode. Automatic restart after water shortage.

low- pressure   :E   - A=off / E=On/ always / Complete
low- pressure   :50%   - 0% - 100% 0% = off
lack delay   :180s   - 1s - 999s delay
Enter the % value of the pressure monitoring, in which the system will shut down if the pressure deficiency. The % value refers to the set pressure value. Example: 50% of 4.0 bar. The under-pressure is from <2.0 bar active and switches to 3 minutes delay the pump. If "0%" is set, the under-pressure monitoring is disabled.
In addition, the electronic protection against dry running, in which the system will shut down if the dry run, are elected to do so. If the pressure of at least 0.5 bar is not reached after 30 seconds, it will shut down due to "dry run".
The dry run is also active in manual mode. No automatic restart after a under-pressure / dry run.
A =   off   low- pressure has no function
E =   on   low- pressure is active in automatic
I =   always   low- pressure is active in automatic and manual
K =   Complete   low- pressure is in automatic and manual active plus
                        electronic dry run (<0.5 bar in 30s)

submersible pump guard   :A   - A=off / E=On
Guard frequency   :25Hz   - 25Hz - 200Hz
Guard time   :99s   - 9s - 99s

The submersible pump guard ensures the safe shutdown of the pump at low speed. The function is important to protect submersible drives. Turn the U-pump guard with a submersible pump operation.

leakage control   :0   - 0-99 per hour
The leakage control ensures the safe shutdown of the pump at to higher switching frequency. The function is important for example, To protect submersible pumps from overheating. The switching frequency refers to one hour..

Runtime control   :0   - 0-999 Min / 0=off
Ensures the safe shutdown of the pump if running too long time. The function is important for example, To protect the pump against leakage.
Select the type of the runtime control.

8.8 adjust messages


```
messages
```

```
messages
Password
Code:xxx
```

```
Digital 4  :    EAS
Digital 5  :    WMS
Relais-123 :    ALO
```
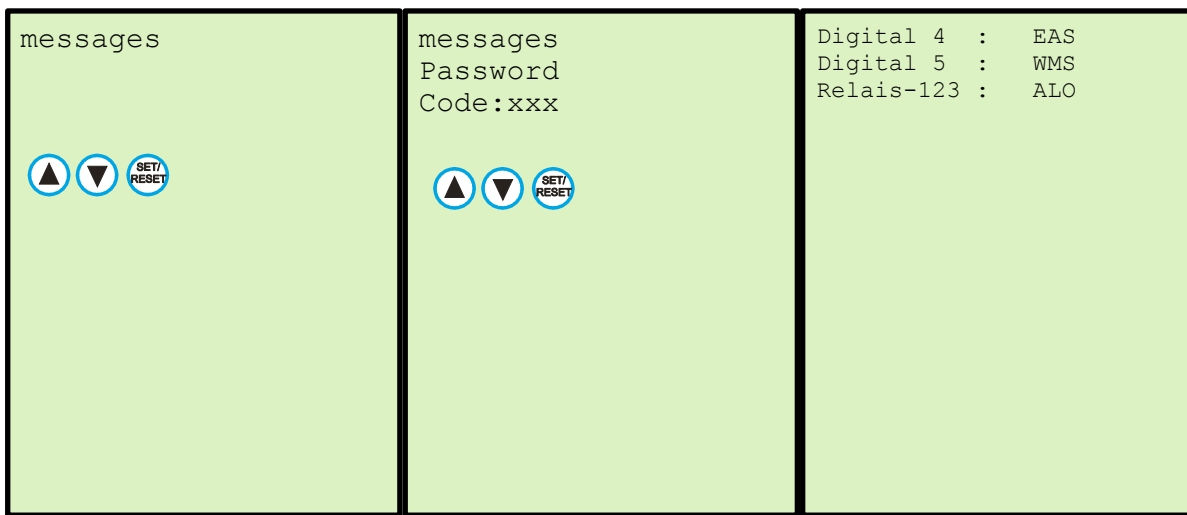
Explanation of parameters: EDR2 inputs and outputs (Picture above: example)

Digital inputs:
The digital inputs MARE-Dig. 4 - 5 are adjustable.

external inputs 4-5	:xxx	- no function
external inputs 4-5	:STS	- extern Trip (closer)
external inputs 4-5	:ANS	- AUTO mode for feeding output (closer)
external inputs 4-5	:HNS	- MANUAL mode for feeding output (closer)
external inputs 4-5	:THS	- Overtemperature for bypass (closer)
external inputs 4-5	:TIS	- set timer (closer)
external inputs 4-5	:SRS	- start/stop/reset (only limit function)
external inputs 4-5	:SDS	- Start/Stop (closer) switch function
external inputs 4-5	:SPS	- Start/Stop (closer) pulse function
external inputs 4-5	:ZW2	- counter input (closer)
external inputs 4-5	:ZW1	- counter input (closer)
external inputs 4-5	:SO2	- set-point 2 (closer)
external inputs 4-5	:SO1	- set-point 1 (closer)
external inputs 4-5	:EPS /EPO	- extern on / off pump 1-4(2) (closer/opener)
external inputs 4-5	:SIS /SIO	- Failed main fuse (Closer/opener)
external inputs 4-5	:GFS /GFO	- Limit Switches extinguisher (Closer/opener)
external inputs 4-5	:EHS /EHO	- extern Hand (closer/opener)
external inputs 4-5	:TRS /TRO	- dry run (closer/opener)
external inputs 4-5	:RSS /RSO	- Reset (closer/opener)
external inputs 4-5	:NAS /NAO	- Not-stop (closer/opener)
external inputs 4-5	:HRS /HRO	- Hunter relay only automatic (Closer/opener)
external inputs 4-5	:EAS /EAO	- extern on /off (Closer/opener)
external inputs 4-5	:WMS /WMO	- low water (closer/opener)
external inputs 4-5	:MSS /MSO	- drive protection (closer/opener)

Relais:
The alarm relay 1-2-3 are preset as an opener and turn on power to "On".

Relais 123   :ALO /ALS   - alarm (can be changed closer/opener)

8.9 adjust communication

communication	communication Password Code:xxx	setpoint : I GSM/users : A
▲ ▼ SET/RESET	▲ ▼ SET/RESET	▲ ▼ SET/RESET

Explanation of parameters:

Select the input for the set-point of the pressure control.
This feature gives them the ability to set pressure "I" on the keyboard or "G" over GSM - pretend modem or select valid combinations.

setpoint   :I   - I-Intern / A-Analog

Select the GSM - to function.
This function returns them to use the GSM function the way. SMS commands, refer to 8.11.

GSM / users   :A   - (A) on / (E) off

8.10 Setting the Phone Book

For a new phone card, enter the PIN.

```
plant name    :
irrigation

plant number :
+49155xxxxxxxxx

user     1 :  on
+49150xxxxxxxxx
user     2 : off
+49160xxxxxxxxx
user     3 : off
+49170xxxxxxxxx
user     4 : off
+49177xxxxxxxxx

------------------
credit        :
*100#

card Contract :
Prepaid
```

Set the phone book on the SIM - card:
Enter the plants - the names and the facilities - telephone number by one overwrite.With this name, the system reports via SMS.
plant name   :irrigation (z.B.)
plant number : +49155123456789 (z.B.)

Switch the user x "On" or "Off" and
enter the phone number of the user.
If this user is "on" he is entitled to operate the system.
user x   : Aus (Off) / Ein (On)   :+49150123456789 (e.g.)

Change it if necessary free balance inquiry - phone number.
credit: :e.g. *100#   (Germany)

Select the SIM - card Contract.
With this, the SIM card - a management.
SIM - card   :Prepaid / contract

To set the system name or phone number, press **SET / RESET button** on the Pad.Use the **arrow key▲ button, arrow key▼ button** and the **SET / RESET button** to change the letters or numbers. After confirming "OK", the change is accepted and the cursor jumps to the next field. To complete the name or phone number you provide a "!" And press "OK".

Now they can use the **arrow key ▼ button** to the next user or go to the end..
All values are only active when they are stored in the "Communication" menu.

Select these characters and numbers in circles: AB....YZ...ab...yz..._0123456789..+*#..<.!..AB..YZ...

Special function: < = delete   **Special function:** ! = finish

Enter phone number Example:

Station number: Number 1 is selected and confirmed with "OK".
+491

Station number: Number 5 is selected and confirmed with "OK".
+4915

Station number: Delete "<" is selected and the number "5" is deleted.
+4915<

Station number: Number 6 is selected and confirmed with "OK".
+4916

...

Station number: End "!" Selected to complete the entry
+491621234578!   and confirm with "OK".

Station number: Entry ended.
+491621234578

Name and other users can be set as well.

Example User Off - On - Switch:

user x : off   „OK"
user x : off   „OK"
user x : on   „▲" or „▼"
user x : on   „OK"

8.11 SMS commands

commands	Send SMS → ✆::
SMS commands MARE - control mode	
system start	START
stop system	STOPP
system reset and start	RESTART
Status query	STATUS
system reset	RESET
Check values	WERTE
delete values	WRESET
Log on the system	ONLINE
Log off the system	OFFLINE
system emergency stop	NOTSTOPP
Start test run	TEST
SMS commands MARE - control mode + "Pressure control + limit"	
Start system with setpoint 1	START S1
Start system with setpoint 2	START S2
Start system for 40 minutes	START T40
Start system for 40 minutes with setpoint 1	START S1 T40
Start system for 40 minutes with setpoint 2	START S2 T40
SMS commands MARE - control mode + "Adjustable frequency limit"	
system starting with 45Hz	START F45
system starting with 45Hz for 40 minutes	START F45 T40

8.12 adjust Internal

```
Intern                    Intern                    overheating   :   55C
                          Password                  Temp. warning :   45C
                          Code:xxx                  cab.fan On    :   35C
                                                    cab.fan Off   :   30C
                                                    Frost warning :    0C
                                                    Heating On    :    5C
                                                    Heating Off   :   10C

                                                    frame         :    A
                                                    Language      :    E
                                                    Dy.Threshold  : 000%
                                                    e-protect     :    5%
                                                    e-delay       :   30s
                                                    Version       :    0
                                                    Inverter Type :    1
                                                    OPH Reset     :    0
                                                    Inverter Reset:    A
                                                    Debug         :    0
```

Explanation of parameters:

overheating On	:55C	- 55°C - 70°C (99°C=Off)
Temperature warning On	:30C	- 20°C - 30°C

If the values for the control cabinet temperature monitoring. This function protects the cabinet from overheating.

cab.fan On	:35C	- 25°C - 35°C
cab.fan Off	:30C	- 20°C - 30°C

The cabinet fan is at the set temperature and off. This function depends on prior to the frequency line.

Frost warning On	:0C	- 0°C - 8°C (9°C = Off)

If the values for the control cabinet frost monitoring. This function protects the cabinet against frost or condensation.

Heating On	: 5C	- 1°C - 15°C
Heating Off	:10C	- 6°C - 20°C

The cabinet heater is at the set temperature and off. This function depends on prior to installation.

frame	:A	- E / A

To the frame on the display appears around the display foil stick better (active until power „Off").

Language	:E	- German / English

Set the menu language.

Dynamic Threshold	:0%	- 0 - 100%

The dynamic threshold is active when the pressure switch operation. Special mode without conservator.

electronic protection	:0%	- 0 - 50%
electronic delay	:0s	- 0 - 99s

The electronic protection monitoring for dry running. Special function in target guardian.

Version	:O	- O / S

Enter the type of the DS board.

Inverter Type	:2	- 1 - 9

Enter the inverter type. (Ask the manufacturer for the type)

operating hours reset	:0	- 0 „Code"

Enter to clear the total hours of the code. (Code: Ask the manufacturer)

Inverter reset	:A	- E / A

The inverter reset resets the drive to the underlying assets.

Debug	:0	- internal use only

The MB-debug-S status indicates internal error. There is no setting.

9. Error Messages

9.1 Error indications on the display

In case of failure, the controller switches off and the pump is running freely.

Error messages can be acknowledged by prolonged pressing the ⊙ - button.

Error communication to external devices
The MARE controller is connected via a serial link with an external device via the Modbus or the GSM modem. If the connection is interrupted or disturbed the pump is not stopped.
The corresponding plain text error message appears on the display. The red LED lights. The alarm relay switches.
Display examples:

Error	Error	no
Modbus	Modem	Network
....	....	....

Error Connection
The MARE controller is connected via a serial connection with the drive.
If the connection is interrupted or the relevant frequency is disturbed stopped.
The error message "Er51" appears in the display. The red LED lights. The alarm relay switches.
Display examples:

Hand P1	Er51 P1	Er51 P1
Er51 P2	Hand P2	Er51 P2
....	....	....

Error Transducer
The MARE controller is connected via a cable to the sensor. If the connection is interrupted, the error message "sensor open". If the connection is disrupted, the error message "Sensor broken".
The respective pump is stopped. The red LED lights. The alarm relay switches.
Display examples:

open	Error
Sensor	Sensor
....	....

Error printing, switching game, borehole pump, dry run, lack of water, drive protection
These error messages are software-related shutdowns. The respective error code is displayed, alternating with the plain text message in the display. The respective pump is stopped. The red LED lights. The alarm relay switches.
Display examples:

Dry-	low	PTC P1
Run	Water	PTC P2
....	....	....

Temp.-	Sensor	over-
alarm	deviate	heating
....	....	....

extern	MS P1	low
Alarm	MS P2	pressure
....	....	....

9.2 Error Messages

The error "Er01" to "Er99" are error messages. The red LED lights. The alarm relay switches. Display examples:

Error messages by pressing the 🔵 -button or by short external control of the Terminal "manual mode / Reset" reset.

`              Auto P1`	
`              Er51 P2`	
`....`	

`              Er51 P1`	
`              Hand P2`	
`....`	

`              Er51 P1`	
`              Er51 P2`	
`....`	

error Er04   : Inverter overload (O.C.)
>   overload tripping. Reduce pump performance. enlarge Inverter!

error Er05   : Over-voltage in the DC link(O.E.)
>   Generator operation, power surge, check valves. Call service!

error Er06   : Phase error power input (P.F1)
>   Phase failure. Check the fuses. Check mains voltage.

error Er07   : Overload inverter (O.L1)
>   Check inverter power; reduce pump performance. Set the parameters!

error Er08   : under-voltage (L.U.)
>   Grid voltage fault. Check fuses, check mains voltage.

error Er09   : Inverter over temperature (O.H.)
>   Inverter is too hot. Reduce carrier frequency. Cooling broken??

error Er10   : Overload Drive (O.L2)
>   Check inverter power; reduce pump performance. Set the parameters!

error Er11   : under load inverter (Err) ?
>   Drive load too low during operation. Increase engine power! Pumps deliver too scant?

error Er13   : External fault ESP
>   Enter Wrong password on the frequency

error Er14   : incorrect password inverter (ERR1)
>   Frequency broken. FU exchange. Call service!

error Er15   : Error drive parameters ERR2
>   Inverter set at the factory setting! Call service!

error Er16   : current overload at standstill ERR3
>   Drive load at a standstill too high. Pump is blocked! Call service!

error Er17   : Fault current measurement ERR4
>   Frequency broken. FU exchange. Call service!

error Er18   : Drive overload (OC1)
>   Drive protection tripping. Reduce pump performance. Set drive protection!

error Er19   : Phase error drive (PF0)
>   Drive phase interrupted. Check drive cable, check drive

error Er20   : Broken wire analog signal (AErr)
>   Inverter set at the factory setting! Call service!

error Er21   : Under load frequency (EP3)
>   Drive load too low during operation. Increase engine power! Pumps deliver too little?

Error Messages

error Er22   **: Under load frequency (EP)**
Drive load too low during operation. Increase engine power! Pumps deliver too little?

error Er23   **: Under load frequency (EP2)**
Drive load too low during operation. Increase engine power! Pumps deliver too little?

error Er24   **: Sleep mode nP**
Inverter set at the factory setting! Call service!

error Er25   **: Inverter parameter incorrect (ERR5)**
Inverter set at the factory setting! Call service!

error Er37   **: Error PTC tripping (O.H1)**
The PTC thermistor has tripped. Reduce engine power. Improve cooling.

error Er47   **: Communication error with the frequency inverter (CE)**
ModBus address wrong; ModBus connection faulty. Check connection or address?

error Er51   **: Communication error with the inverter**
ModBus address wrong; ModBus connection faulty. Check connection or address?

error Er52   **: Transducer 1 open**
The transducer connection is open. Check cable connection!

error Er53   **: Error Transducer 1**
The transducer value is out of tolerance. . The transducer is broken?

error Er54   **: Transducer 2 open**
The transducer connection is open. Check cable connection!

error Er55   **: Error Transducer 2**
The transducer value is out of tolerance. . The transducer is broken?

error Er56   **: Error sensor difference**
The values between transducer 1 and transducer 2 are outside the set tolerance. The transducer is broken?

error Er57   **: Error low pressure**
The internal pressure failure triggered .. Check water level setting or the water supply!

error Er58   **: Error dry run electrical**
The run-dry protection has tripped .. Check water supply!

error Er59   **: Error low water externally**
The external low water protection has tripped .. Check water level setting or the water supply!

error Er60   **: Error dry run externally**
The external dry-running protection has tripped .. Check water supply!

error Er61   **: Error limit pressure**
The limit pressure is exceeded. Check system. Setting the limit pressure!

error Er62   **: Error emergency stop (SMS)**
The plant was set via SMS to emergency stop. A reset is only possible on the system

error Er63   **: Error lower limit**
The set lower limit value is exceeded. Check system. Setting the limit!

error Er64   **: External fault (Dig. Input)**

error Er65   **: Over-temperature control (Inverter)**
The control is too hot. Reduce carrier frequency. Cooling broken?

Error Messages

error Er66   **: On / Off Inverter missing (software))**
Dig. Inverter input is missing, broken, or not configured. Call service!

error Er67   **: Error Modem**
An error has occurred for a modem connection. Call service!

error Er68   **: free**

error Er69   **: Error switching**
The switching frequency has been exceeded; stroke operation. Check non-return valves. Call service!

error Er70   **: Error maximum runtime**
The maximum runtime is exceeded. Check the running time setting, or leakage, or non-return valves.

error Er71   **: Error submersible pump**
The submersible pump monitor has tripped. Increase water consumption. Check non-return valves.

error Er72   **: overheating switch cabinet**

error Er73   **: Temperature warning transducer 2**

error Er74   **: Error PTC tripping (software)**   **PTC**
The PTC thermistor has tripped. Reduce engine power. Improve cooling.

error Er75   **: Error over temperature PT100 (Software)**   **PT100**
The PT100 has tripped. Reduce engine power. Improve cooling.

error Er76   **: Error external drive protection**
External drive protection tripping. Reduce pump performance. Set drive protection!

error Er77   **: Error failed main fuse**
External fuse failure. Check the main fuse!

error Er78   **: Error test run**
The test run has not been completed without error. Check the system!

error Er79   **: free**

error Er80-85   **: special error fire extinguishing systems**

error Er90   **: free**

error Er91-Er99: SW-ERR (Call customer service!))

9.3 Reset the daily hours of operation

To the daily operating hours (TLZ) to "0" to reset the following procedure:
Go to the page "operating hours" and hold the SET / RESET button for about 10sec. pressed!

Messages in the display:

```
OPH Pump   1 1:17:08
DOH Pump   1 1:17:08
...
```

It appears this message after deleting the display:

```
OPH Pump   1 1:17:08
DOH Pump   1 0:00:00
...
```

If unsuccessful, repeat the process.

9.4 Reset the fault memory

To reset the fault memory, proceed as follows:
Go to the page "error memory" and hold the SET / RESET button for about 60sec. pressed!

Messages in the display:

```
ER01 18-01-13 13:59
ER04 19-01-13 11:59
...
```

It appears this message after deleting the display:

```
  -- ERR1 --
  -- ERR2 --
...
```

If unsuccessful, repeat the process.

9.5 Troubleshooting

The displays is dark
Mains voltage is present and turned on? If one or more fuses blown?

Plant does not start
The selector switch is not in operation! Set the selector switch to "Manual" or "Automatic"!
Is properly closed when operating from an external input cable?

It does not restart, even though the switch is set to "Automatic"..
Sensor not connected? (Message: "Sensor error")
The actual pressure is reached or exceeded the target pressure? The starting pressure is not set or too small?

Pumps do not switch to standby
If the set pressure is set too high (pumps create the pressure does not)? Is the pipeline of investment not vented properly? Non-return valve incorporated in the pressure line upstream of the sensor?
Zero flow cutoff is not set correctly? ***See: cut-off, test mode, load factor, speed factor!***
If the back-flow preventer leaking? In short rigid pipes, expansion vessel into the pressure line downstream of the back-flow preventer installed (pre-charge pressure check: starting pressure - 0.5 bar)!

Pressure indicator does not indicate the actual pressure
Pressure sensor type does not match the pressure sensor used (eg. 10 bar - Sensor; 25 bar - sensor)?
Sensor or sensor plug is wet? Sensor cable is broken or connected incorrectly?

The control is too warm
Check ambient temperature! If necessary. provide cooling! Reduce carrier frequency!

Display shows no data and pump does not start
Connected pumps have the "power" switch on already ground fault.
Check frequency without pumps connected to function

10. Expert mode

10.1 zero flow shut-off

The zero flow shut-off ensures safe shutdown output "0".
The zero flow cutoff requires when setting some experience and detailed knowledge of the operation of the controller.
If the system with the factory setting of zero flow cutoff does not operate satisfactorily,
please contact your dealer or the manufacturer.

The **test phase**:	1 - 99%	50%	Recommendation: 50%.

manipulates the desired pressure while the pump is operating to constantly check whether it delivers.
The larger the test phase, the safer switches on the pump when pumping "0".

The **speed factor**:	1 - 99%	50%	Recommendation: 60%.
and **the load factor**:	1 - 99%	50%	Recommendation: 50%.

form a mathematical combination.

The logic of mathematical logic is to say:
Actual pressure = set pressure + speed value <+ speed factor load value <= load factor standby.

i
Notice!

This setting can be reproduced very well on the expert page.
For the setting of the system with load and speed factor expertise is required!

example:
Pump operates at 45% load (LF). The rotational speed (DF) is 82%. The pressure is controlled.
The test phase (T) increases with current value 78

```
T 78 LF  45   50
3.00 DF  82   50
P1: 041Hz, 017,2A, 34C
```

10.2 cutoff frequency

The cutoff frequency is the lowest operating frequency in the pressure control. If the cutoff frequency is reached,
waiting for the pressure regulator to minimise delay from before the particular pump into "Standby" is activated.
The cutoff frequency should be adjusted so that just no longer promotes the particular pump.
The power-off should be set so that does not get the pump at this operating point to oscillate.
This feature supports the zero flow cutoff.

10.3 expert site

The expert page helps in determining the speed and load factor:

T	= Test phase value = 1-99	=	0,1 - 1 bar absolute,
LF	= Load factor current / comparison	=	values 0- 200% / Setting compared with 1-99%
DF	= Speed factor Current / comparison	=	values 0- 100% / Setting compared with 1-99%

P1	= Actual pump status: Output frequency, drive current, frequency temperature

T 000 = testing phase currently 0.00 = current pressure	T 00 LF 00 50 0.00 DF 00 50 P1: 000Hz, 000,0A, 27C	LF 00 = Current 50 = comparison DF 00 = Current 50 = comparison
T 075 = testing phase currently 3.92 = current pressure	T 75 LF 32 50 3.92 DF 78 50 P1: 039Hz, 011,2A, 32C	LF 32 = Current 50 = comparison DF 78 = Current 50 = comparison