

hydro[®] motion

Instruction Manual
for the laboratory valve testing device
VTB1-2X



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1. Copyright declaration

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Furthermore, we shall in no way held be liable for any responsibility for the receipt of permits and approvals of third parties, copyrights or products that are in connection with the use of this document.

2. Customs tariff number of device

The customs tariff number of this product is: **90318038**

(Electronic instruments, apparatus and machines for measuring or checking)

3. Disposal of the device

We require, extract and use natural resources in order to manufacture this device.

If you don't dispose this device in an environmentally way, some substances contained in it might be harmful or toxic for the environment or the human body.

To avoid that these substances get released to the outside and to minimize the wasteful consumption of natural resources, we recommend to dispose this device properly and in an environmentally-acceptable way and to recycle most of the materials contained.

Alternatively, each device to be disposed can be returned to our company address.

4. Safety instructions

Please read the following safety instructions thoroughly in order to avoid injuries and to prevent damages on this or any other connected device. Please only use this device for the intended use to prevent potential risks.

Maintenance work may only be performed by authorized, qualified personnel.

Avoid the risks of fire or potential hazards.

Use the supplied mains adapter for the external 24V DC supply or the valve cable socket on the machine of the hydraulic valve to be checked. The supplied main adapter can be connected to a main AC voltage supply of 230V AC/50Hz or 120V AC/60Hz without presetting.

The scope of supply does not include a mains adapter for the country of use.

- **The valve testing device VTB1-2X may only be operated by authorized personnel.**
- **Never operate the device in a wet, humid or explosive environment.**
- **Keep the surfaces of the device clean and dry.**
- **The functions of the hydraulic valve to be checked or the hydraulic drives and the testing device VTB1-2X must be clearly familiar.**
- **The use of the testing device VTB1-2X on a running machine is only permitted if the testing person is aware of the risks of testing.**
- **The setpoint inputs "internal", "external" and "open loop oscillation" do not guarantee any safety-related monitoring concerning the parts of the system to be checked.**
- **The manufacturer of the testing device VTB1-2X assumes no liability for any occurring damage to systems or injuries to persons due to improper or negligent handling of the valve testing device VTB1-2X and due to non-compliance with the machine specific safety regulations.**

If the testing device VTB1-2X is damaged or in case of malfunction, it shall no longer be used.

Attention!! Danger !!

Hydraulic drives can reach very high forces and traversing speeds depending on their dimensions.

As soon as there is a 24V input voltage supply on the valve testing device, an initialization phase is started.

The hydraulic valve on the output side is supplied with electric voltage only after completion of this initialization phase.

When the initialization is completed, there is an acoustic feedback by a threefold melody and visually by the green LED "OUT" on the connecting sides of the device.

The testing device always starts in the diagnostic menu [diag. 1].



5. Overview: Data and technical functions

- shockproof ABS plastic case with safety bar.
- Permissible ambient operating temperature: 0°C .. 40°C
- Protection class IP50 (dust-protected, no water protection)
- Weight: 2.3kg
- All required pre-settings via 7-inch touchscreen configurable.
- Language switching German-English.
- Structured, clear menu navigation.
- Selectable help texts for each menu option.
- Functions that cannot be used and which are excluded by menu configurations are hidden graphically and textually.
- Standard signal assignment of device input connector and valve cable socket (6+PE).
- Supply voltage via valve supply 24V on the machine or ext. mains adapter.
- Polarity protection of the 24V supply voltage.
- Safeguarding of the 24V supply voltage via changeable fuse.
- Monitored and visualized operating voltage: $U_B = >21V\ DC \dots <28V\ DC$
- Support of 10 possible analog valve setpoint signal types.
- Short-circuit proof analog outputs.
- Signal range for valve setpoint and actual value: $\pm 10V ; \pm 20mA$
- Voltage or current differential input for external valve setpoint.
- Resolution of the analog setpoint/actual value signals: 16bit ($\pm 10V ; \pm 20mA$)
- Mixed operation is possible (e. g. setpoint: $+4\dots+12\dots+20mA$; actual value $-10\dots 0\dots+10V$)
- Display of the present current consumption of the proportional valve.
- Additional, standardized valve setpoint display in the unit%.
- Internal valve setpoint set-up via rotary pulse generator with push-button function.
- Loophrough of an external setpoint of a machine control.
- Parametrizable, open loop oscillation profile for endurance test or bleeding function usable.
- Short-circuit proof switching outputs A & B for 24V solenoid switches or PWM.
- Optional drive of a switching shut-off valve or a switching way valve with two 24V-solenoids. (3A current load per channel)
- Switching of the switching function to PWM modulation for direct control of two proportional solenoids.
- Four configurable, analog measuring channels (2x $0\dots 20mA$; 2x $0\dots 10V$) with 10bit resolution.
- Two-channel, graphical trend display with USB memory function for current valve setpoint and actual value.
- Virtual operation with smart device, possible via optionally built-in WLAN router.

6. Introduction

Before using the digital valve testing device VTB1-2X on a hydraulic valve combined with a test of the machine function the first time, it is absolutely mandatory to become acquainted with the device functions.

Read through this instruction manual carefully so that you clearly know the theoretical basics of this device.

Connect the supplied external main adapter to the input side and get some practice in working with the several set-up options of the device menus and the resulting functionalities.

The valve testing device VTB1-2X serves for the functional test of hydraulic proportional valves with integrated valve electronics.

Prerequisite is, that the valve is supplied with 24V DC voltage.

The testing device supports setpoint and actual value signals as voltage interfaces in the range of (+-10V) or optionally current interfaces in the range of (+-20mA).

Mixed signal types within the range of the setpoints and actual values are also supported with this device.

The signal assignment of the device connector as well as the valve cable socket according to **Din EN 175201-804** are corresponding to the usual pin assignment of various valve manufacturers. (see chapter 14 **valve types**)

The valve testing device VTB1-2X can intuitively be operated via touchscreen and several menu levels and offers a number of configuration options.

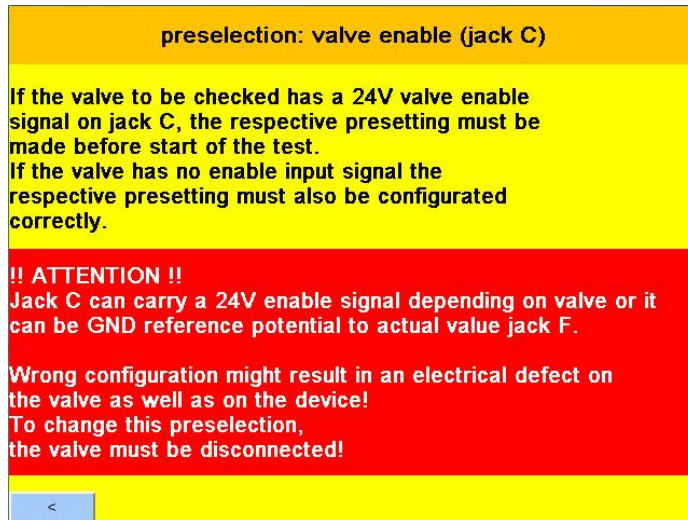
We recommend to electrically connect the hydraulic valve to be checked only upon completion of the initialization phase. The 24V voltage supply to the valve is only actively switched on after completed start-up of the device. The operational readiness is indicated by three consecutive buzzing sounds and the start menu "diagnosis 1" is always displayed as first menu.

Now check, starting from [**settings 1**], all menus for the configuration of device and valve and change the pre-settings so that these fit your valve to be checked.

The device can be integrated into a control circuit with only a few steps and thus, allows a fast diagnosis of your hydraulic engine or cylinder drive.

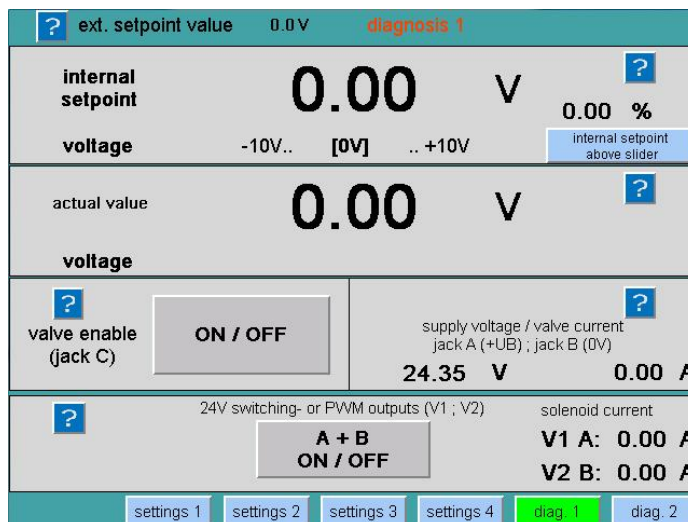
Each function has an additional help text displayed during operation. For this, please press the small buttons with the question mark. To return from the current

help text into the previous menu, you can press the small button bottom left or any point on the current help menu.



Example for help text

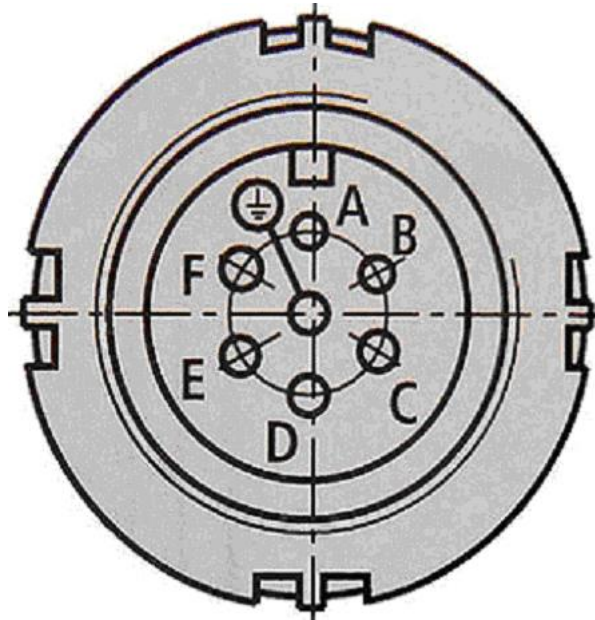
The graphical display always starts with "diagnosis menu 1" after a completed phase of initialization.



Diagnosis menu 1

7. Electrical pin assignment "6+PE" (according to EN 175201-804)

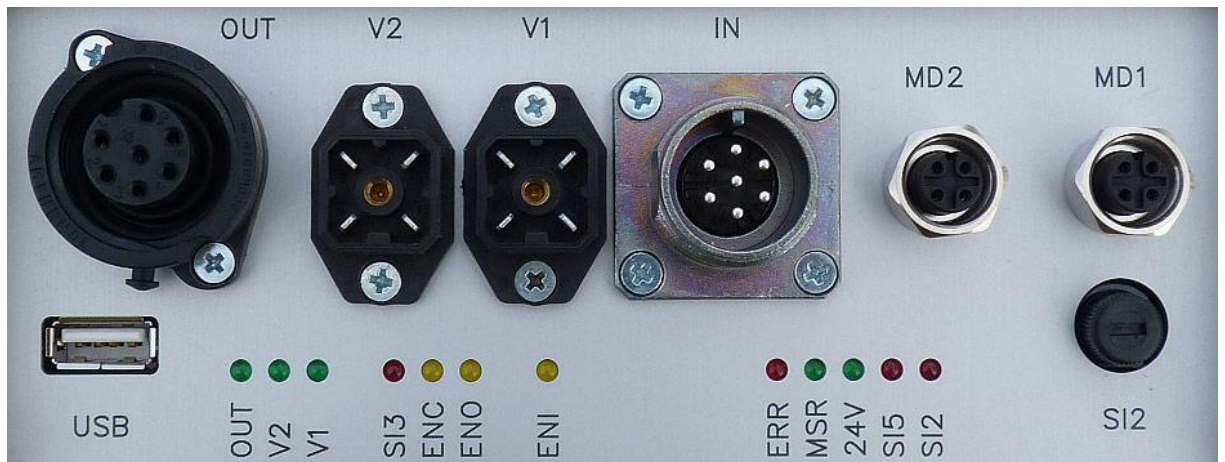
- With the electrical connection of the testing device to a hydraulic valve it has to be taken into account that the line socket on the valve has the following



- A: +24V DC (Power Supply)
- B: 0V Gnd (Power Supply)
- C: Actual value- Gnd / 24V enable
- D: Setpoint+ (+-10V ; +-20mA)
- E: Setpoint- Gnd
- F: Actual value+ (+-10V ; +-20mA)

View: Soldered contacts in the line socket housing

- **The supply voltage on the output side of the valve is only switched on after completion of the initialization phase of the valve testing device VTB1-2X. When the initialization phase was without problems there is an acoustic feedback of 3 subsequent buzzing sounds and a blinking green LED light (OUT) on the connection side of the testing device.**
- **The setpoint signal on jack D (setpoint+) and E (setpoint-) on the input is operated as differential input in the voltage or current configuration of the hardware. That means that a signal polarity does not result in signal short-circuit.**
- **With a valve configuration of 24V enable signal on jack C, the reference potential of the valve actual value (jack F) is on Gnd potential of the voltage supply (jack B).**
- **With a valve configuration without enable signal, jack C is reference point (0V) of the valve actual value (jack F) and electrically connected to jack B (0V).**



View: Electrical connection side

OUT: Connector socket for connection to valve

V2: Device plug for connection solenoid B

V1: Device plug for connection solenoid A

IN: Device plug for connection from mains adapter or valve

MD2: Connector socket for connection to external pressure sensors

MD1: Connector socket for connection to external pressure sensors

USB: Connection for USB stick for saving the trend records

The colored LEDs are used to feedback internal operation modes.

Attention:

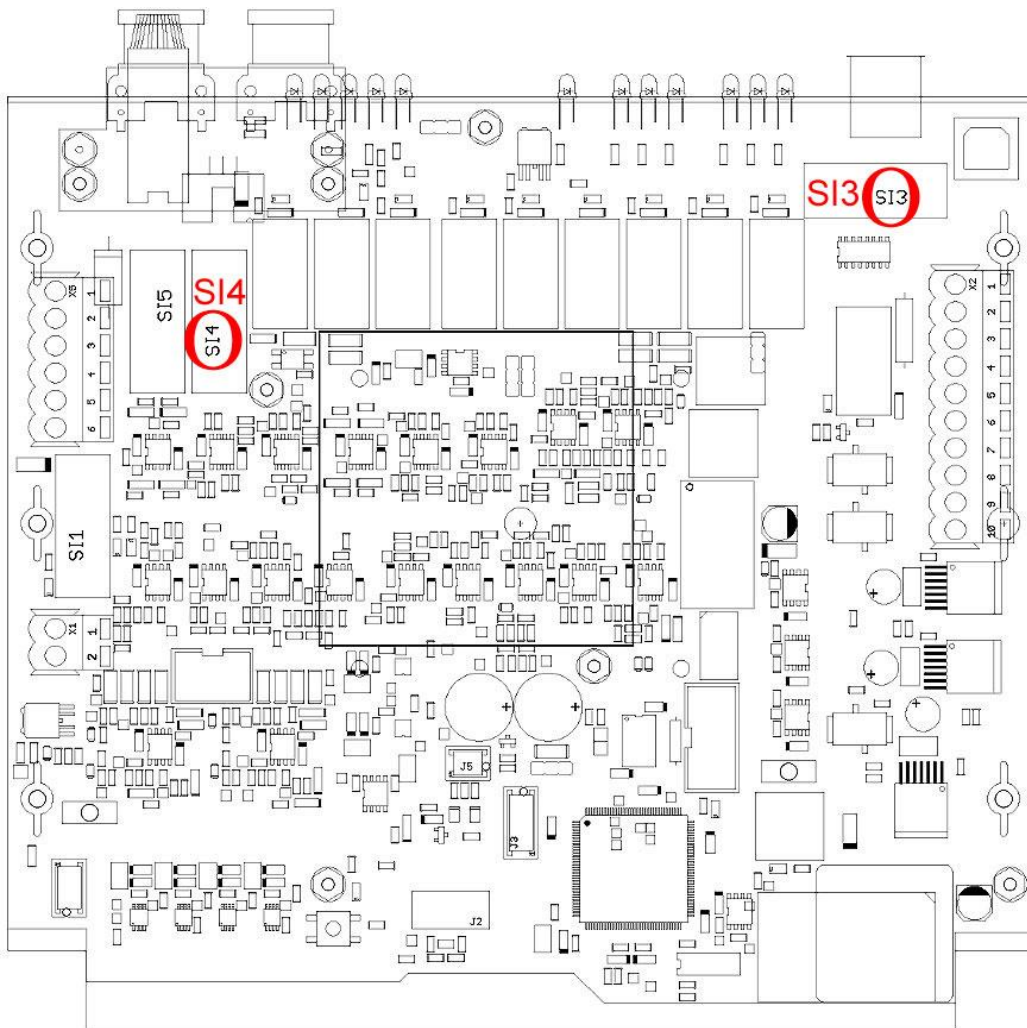
- **Handling the signal connection jack C requires the utmost care.**
This electric connection can have two electrically different signal meanings dependent on the valve type to be checked.

1. Jack C = valve enable 24V DC - valves with enable signal

2. Jack C = actual value reference potential 0V - valves without enable signal

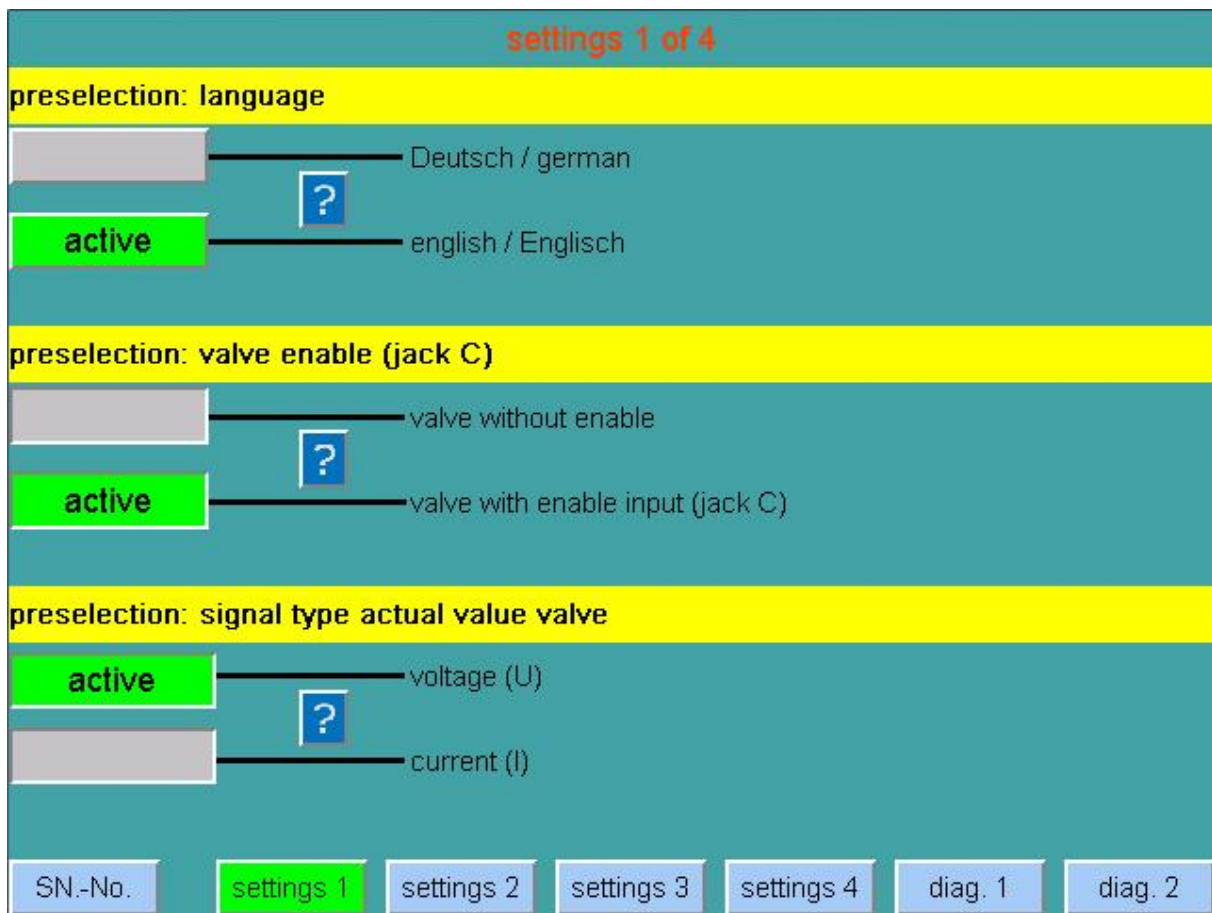
Attention:

- If accidentally switched 24V to jack C with a device configuration "valve without enable", subject to a signal short-circuit on the input and/or on the output separate mini fuses (SI4; SI3 -2A-) respond in each case. These fuses are installed in two separate fuse holders on the internal control board of the device. If there is no plausible valve actual value displayed or if the enable signal is without function, one or both protective fuses are defect. In that case, the device must be sent to the manufacturer for repair and subsequent functional test.



View: Internal control electronics with fuses SI4 and SI3
for the safeguarding of valve enable on the
input and output

8. Menu "settings 1 of 4"



The following pre-settings can be made in the menu [setting 1]:

- Preselection: Language

All menu texts can be displayed in different national languages.

After a voltage reset, the last setting remains active.

- Preselection: Valve enable (jack C)

If a valve with a separate enable input signal is to be driven, the corresponding default setting is required.

Valves without enable signal require the setting „valve without enable“. In that case, jack C is reference potential to the valve actual value jack F.

Attention: Jack C carries a voltage signal of 24V with valves with enable.

For valves without enable jack C is carried out from jack F as reference potential 0V for the feedback signal valve actual value.

This means that the 24V enable signal against the reference potential 0V might cause a signal short circuit in case of wrong configuration.

In order to prevent damages on the device or the valve due to a potential misconfiguration or misconnection, jack C is secured both on the input and on the output side with two fuses internally.

After a voltage reset, the last setting remains active.

- Preselection: Signal type valve actual value

Here you set the signal type of the valve actual value of the valve to be checked.

With voltage actual values a voltage range of +-10V is supported.

With current actual values a current range of +-20mA is supported.

If a valve is to be actuated without actual value signal, the actual value display in menu **[diag. 1]** can be switched off by pressing the selected signal variant once more.

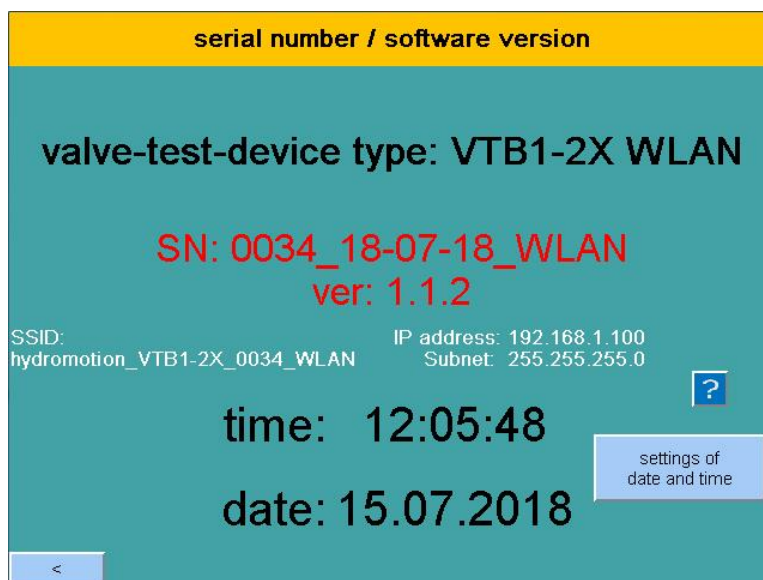
After a voltage reset, the last setting remains active.

- [SN no.] Display serial number and set system time / date

As additional function the serial number of the valve testing device VTB1-2X can be read out in the menu **[setting 1]**. Press the bottom left button for this function **[SN no.]**

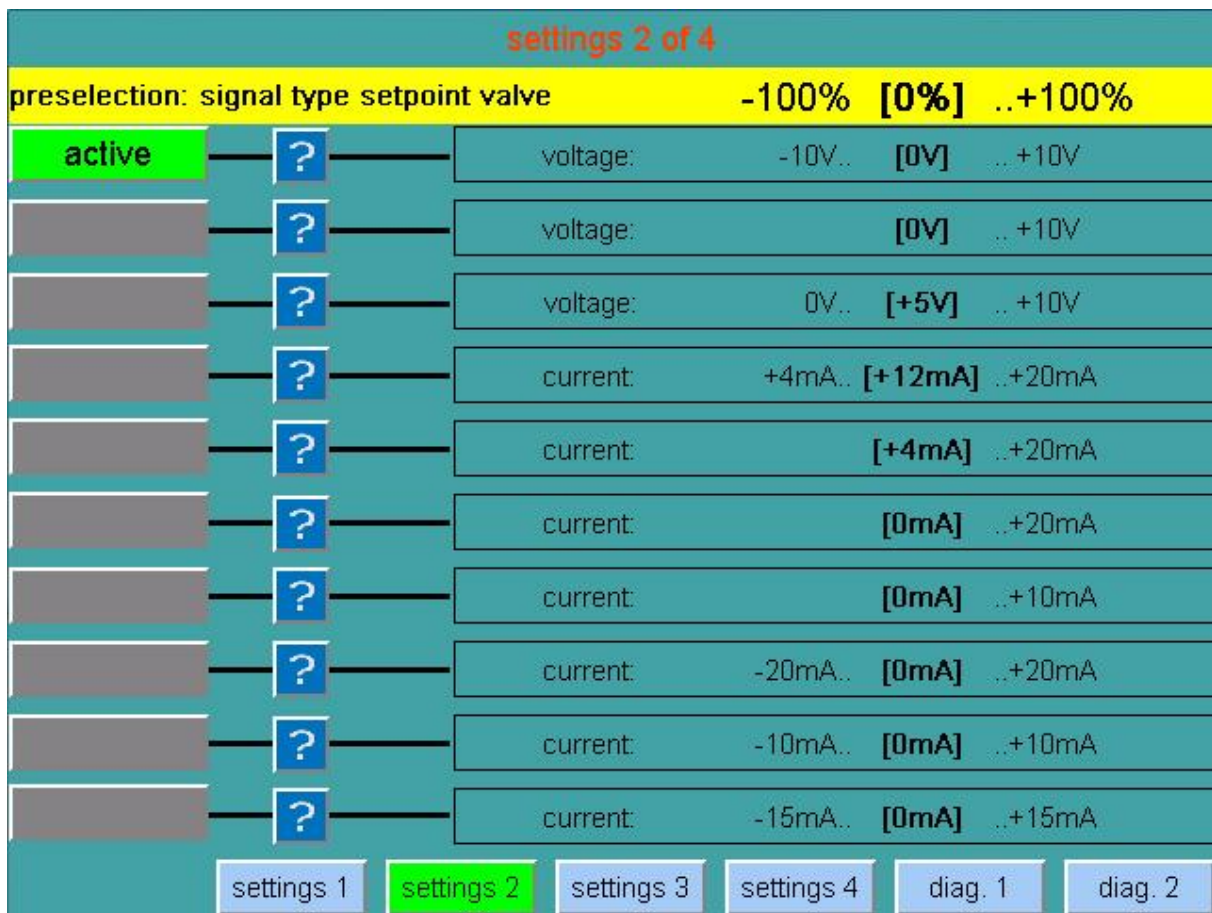
In the menu "serial number", the current system time and system date are displayed additionally. This data is used to give the saved file of the trend function a clear identification.

If time and date displays should not indicate the current values, another menu can be activated by pressing **[set time and date]**, where some input fields serve to update this data.



If the valve testing device is optionally equipped with a WLAN router, this menu additionally displays the SSID with the network-related settings.

9. Menu "settings 2 of 4"



The following pre-settings can be made in the menu [setting 2]:

- Preselection: Signal type valve setpoint

Currently, 10 signal types for the valve setpoint configuration are available.

The possible signal types consist of three voltage and seven current signal types.

1. Voltage -10V .. 0V .. +10V with 0V for the hydraulic zero position
2. Voltage 0V .. +10V with 0V for the hydraulic zero position
3. Voltage 0V .. +5V .. +10V with +5V for the hydraulic zero position
4. Current +4mA .. +12mA ..+20mA with 12mA for the hydraulic zero position
5. Current +4mA .. +20mA with 4mA for the hydraulic zero position
6. Current 0mA .. +20mA with 0mA for the hydraulic zero position
7. Current 0mA .. +10mA with 0mA for the hydraulic zero position
8. Current -20mA .. 0mA .. +20mA with 0mA for the hydraulic zero position
9. Current -10mA .. 0mA .. +10mA with 0mA for the hydraulic zero position
10. Current -15mA .. 0mA .. +15mA with 0mA for the hydraulic zero position

After a voltage reset, the last setting remains active.

After selection of an analog voltage or current range for the desired valve setpoint, the signal value corresponding to the hydraulic zero position of the valve to be checked is output promptly.

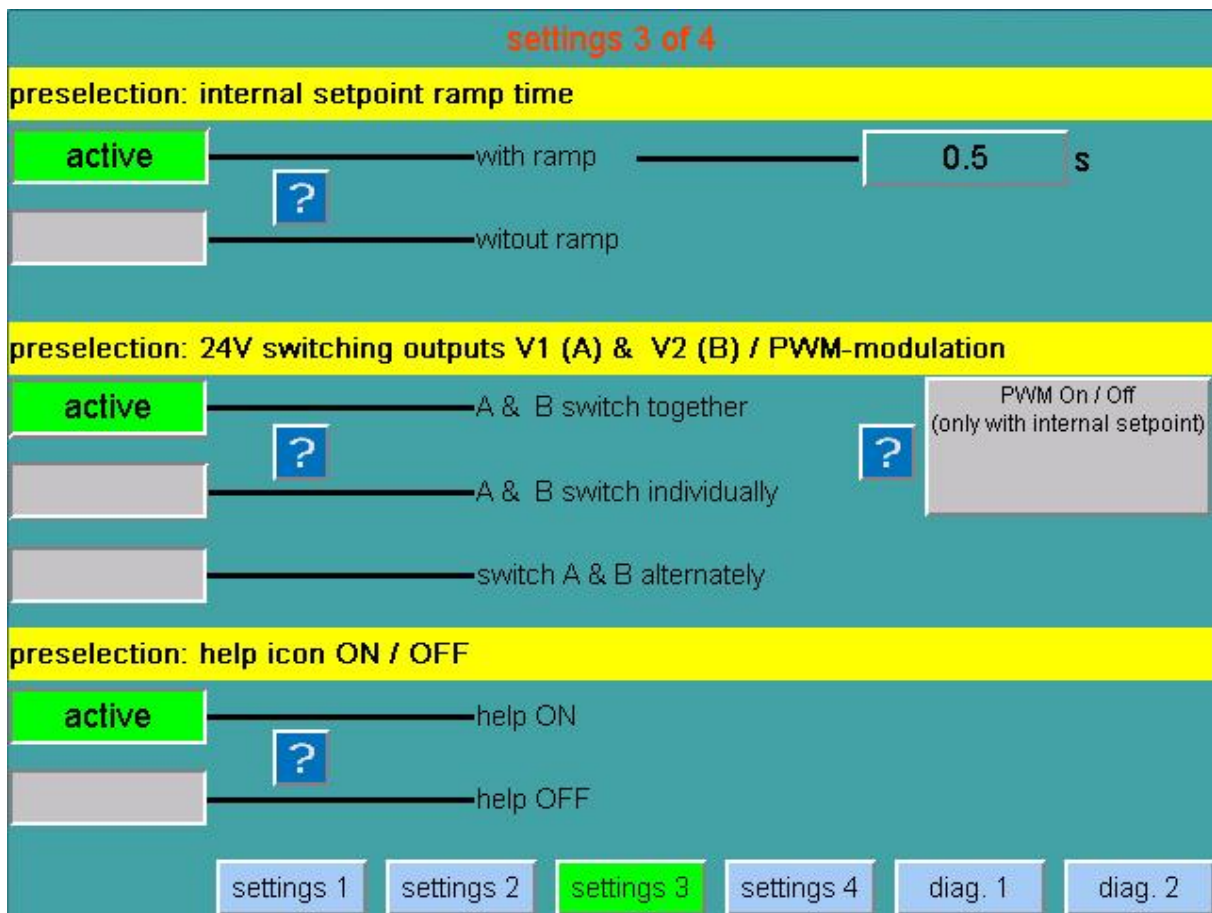
For example, the way valve has a setpoint current interface of 4..12..20mA, immediately after the preselection a current setpoint of 12mA compliant with the hydraulic zero point is output to the valve.

The setpoint signal types are manufacturer-specific.
Not all valve manufacturers offer all kinds of signal types for their hydraulic proportional valves with integrated valve electronics.

Attention:

- **The preselection for valve enable, valve actual value and valve setpoint can only be changed when there is no valve connected on the output (OUT) of the testing device.**

10. Menu "settings 3 of 4"



The following pre-settings can be made in the menu [setting 3]:

- Preselection: internal setpoint ramp time

Internal setpoint inputs are created by the rotary encoder in rasterized single steps. In order to give these rasterized single steps a harmonic, continuous transition, a ramp time for these transitions can be activated and preset. If rapid, rasterized setpoint transitions are desired, the ramp time can be deactivated.

After a voltage reset, the last setting remains active.

- Preselection: 24V switching outputs V1 (A) & V2 (B) / PWM

There is the option to switch both switching outputs A & B together, individually or alternately. Depending on the selection, the menu [diagnosis 1] displays the corresponding push buttons.

"Switching together" of the switching outputs A & B can be used for the driving of a shut-off valve with one or two magnets.

"Switching individually" allows for operating both switching outputs independently.

The function "switch alternately" can be used for driving a switching way valve with two solenoids, whereas always only one solenoid can be driven.

Each 24V switching output can be loaded with a DC current amounting to **max. 3A**.

After a voltage reset, the last setting remains active.

The switching outputs are always switched off after a voltage reset or a function change.

- PWM ON / OFF

Alternatively, the two switch outputs can be switched over to pulse width modulated switch outputs (PWM). In this setting, 2 proportional solenoids can be directly controlled.

A positive setpoint controls output V2 (solenoid B).

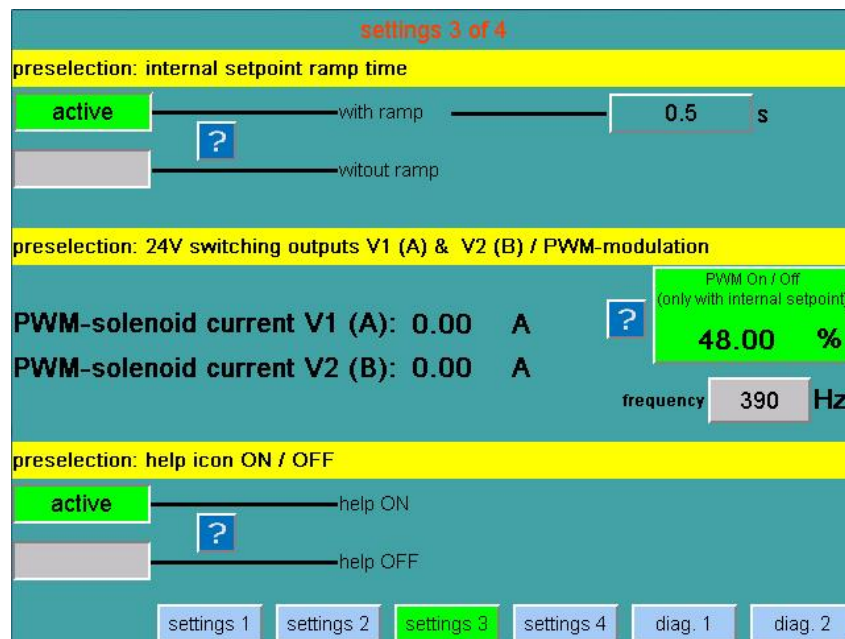
A negative setpoint controls output V1 (solenoid A).

The modulation frequency can be set between 100Hz and 3000Hz.

The maximum current may not exceed 3A per channel.

The PWM control is **only** selectable in mode "internal setpoint" and is **always** works parallelly to the internal, analog setpoint output.

After a voltage reset, the last setting remains active.



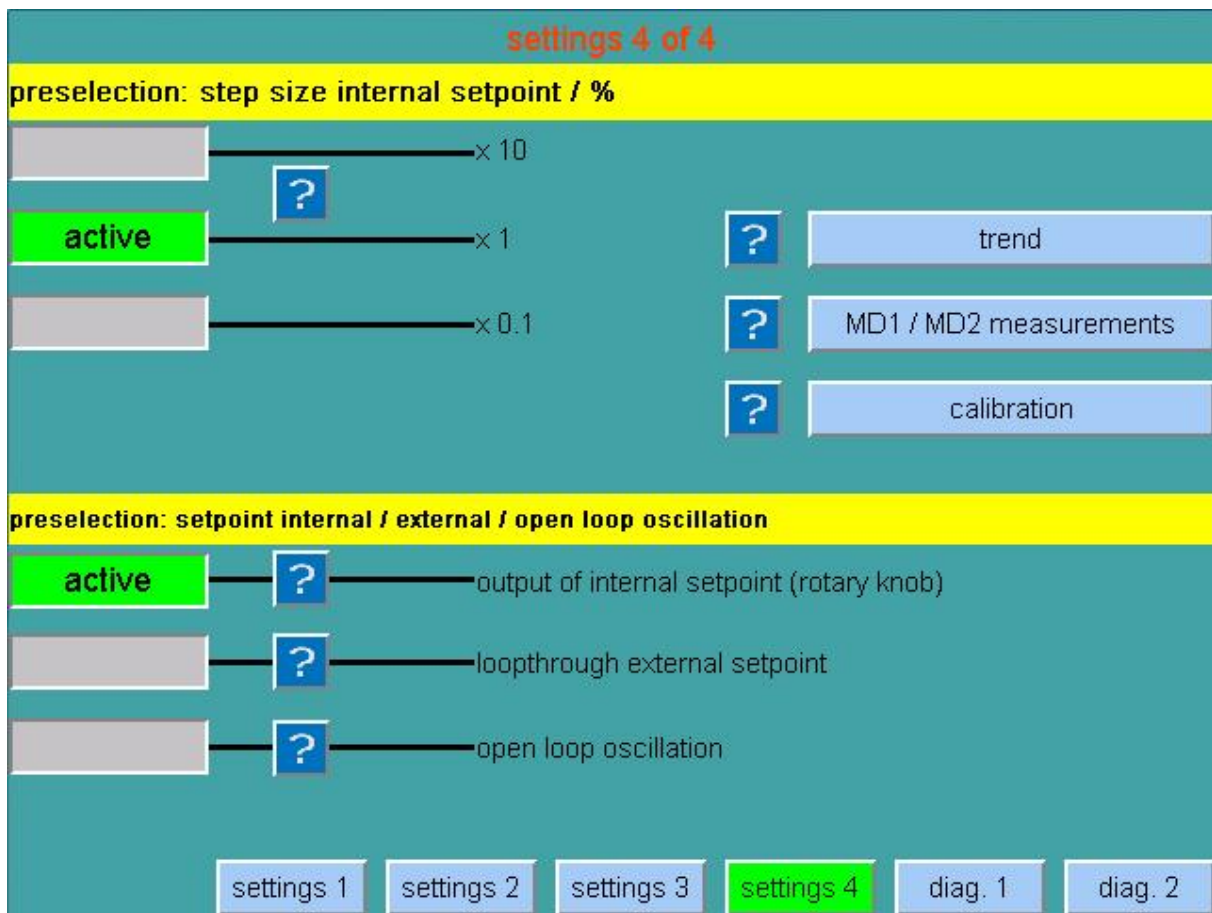
- Preselection: Help icon ON / OFF

Each menu point has a detailed help text displayed when pressing the help icon (question mark).

If the help texts are not needed, the help icons can be hidden in all menus.

After a voltage reset, the last setting remains active.

11. Menu "settings 4 of 4"



The following pre-settings can be made in the menu [setting 4]:

- Preselection: Step size internal setpoint / %

One of four step sizes for the internal setpoint can be set as required.

Every step of the rotary encoder results in an increasing setpoint (turn to the right) or a decreasing setpoint (turn to the left).

The step sizes have the unit% and apply to all 10 valve setpoint types.

Thus, the step size for a voltage setpoint of [0V.. +10V] in combination with a selected step size of [x10] is exactly 1V (10%).

As the rotary encoder has 20 steps on one rotation, 100% setpoint or +10V would be reached after a half rotation (10 steps).

With higher step sizes and an adjusted setpoint ramp time from the menu [setting 3] you reach a smooth setpoint transition between the individual rotary encoder steps.

The valve setpoint selected in the menu **[setting 2]** determines the minimum and maximum setpoint that can be reached via the rotation of the rotary encoder. Thus, an internal valve setpoint is always limited and cannot be outside the determined setpoint limits by overwinding or underwinding the rotary encoder.

After each changed selection of the valve setpoint in menu **[setting 2]**, the valve setpoint starts with its hydraulic zero point.

If e.g. a voltage setpoint of 0V .. +10V is set for a pressure control valve, the analog setpoint output automatically is 0V which is corresponding to the hydraulic zero position of the valve.

Is the internal valve setpoint set to any value it can be reset to 0% valve setpoint via a short pressing (between 0.1s and 0.3s) of the rotary encoder knob.

The reset speed (reset ramp) is preset by the "internal setpoint ramp time" in the menu **[setting 3]**.

If the rotary encoder knob is pressed longer than 0.3s and then released, the current internal valve setpoint is output inverted via the preconfigured ramp time.

Thus, a manually controlled oscillation between two valve setpoints of the same amount is possible without using the rotary function.

This function is only possible with valves with a bipolar, hydraulic characteristic. (pressure valves with unipolar behaviour cannot be inverted)

A hydraulic zeroing via a short pressure pulse on the rotary encoder knob is possible at any time even when the inversion is active.

- Preselection: Setpoint internal / external / open loop oscillation

Here you can set one of three basic operating modes.

[output internal setpoint]

With this operating mode the selected valve setpoint in the menu **[setting 2]** can solely be manipulated via the rotary encoder.

After a voltage reset, the last setting remains active.

[Loopthrough external setpoint]

With this operating mode the external valve setpoint on the input is transmitted through the valve testing device VTB1-2X directly to the output side.

Manipulation via the rotary encoder is not possible.

This function serves to monitor external valve setpoints which are output by an external, analog setpoint source (e.g. machine control).

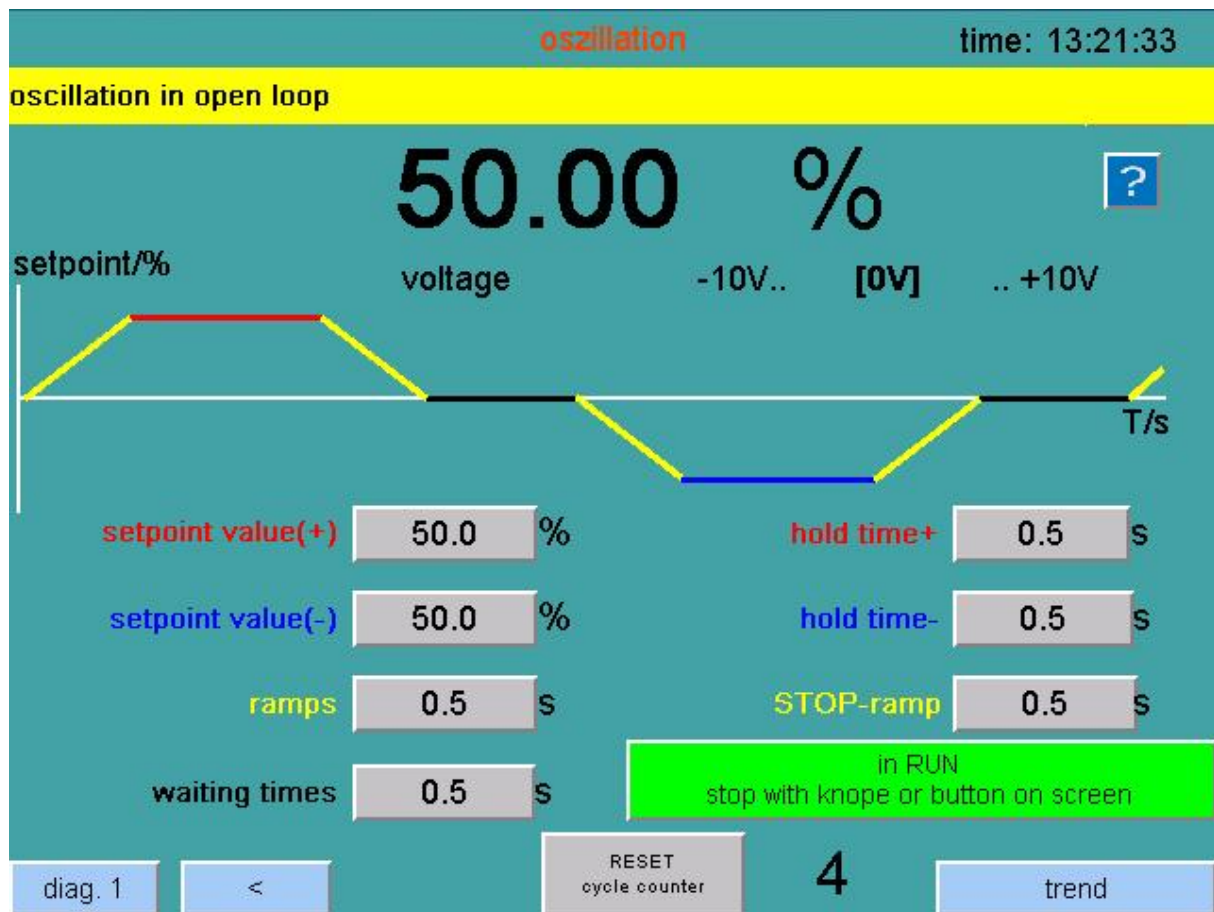
After a voltage reset, the last setting remains active.

[Open loop oscillation]

When the operating mode is "open loop oscillation", the same menu displays the button [open loop oscillation] in the upper right screen.

After a voltage reset, the last setting remains active.

By activating the field [open loop oscillation], it is switched over to the configuration menu for the settings of the open loop oscillation.



The open loop oscillation can be used for endurance tests or time-limited movement cycles, e.g. for system ventilation.

The time-controlled linear movement profile can be configured via six parameter settings.

The settings for the positive and negative setpoint are parameterized as percentage values.

The analog voltage or current setpoints are calculated automatically in the menu **[setting 2]** dependent on the preselected valve setpoint.

Setpoint+ (red line): 0% .. 100%

Hold time+ (red line): 0s .. 100s

Setpoint- (blue line): 0% .. 100%

Hold time- (blue line): 0s .. 100s

Ramps (yellow lines): 0s .. 100s

Waiting time (black lines): 0s .. 100s

Stop ramp: 0s .. 100s

After a voltage reset, the last setting remains not active.

All setpoints are reset to 0.1 after a voltage reset!

The open loop oscillation can be started and stopped via pressing the rotary encoder knob or pressing the red or green button.

The configured setpoint cycle always starts with the ramp time to the first positive setpoint+.

STOP is possible at any time and it is carried out with the preset STOP ramp time.

The STOP feedback with red window is only displayed after completion of the ramp time.

It is possible to change the profile setpoint parameters also when the open loop oscillation is active.

The relevant line segment of the graphic setpoint display flashes dependent on the current setpoint output.

The lower central screen shows a resettable cycle counter. Counting starts with the first start and displays the current running setpoint cycle.

The count value always starts with 0 after a voltage reset.

Changes subject to the valve enable, "signal type valve actual value" in menu 1 **[setting 1]** and configuration changes of the "valve setpoints" in menu 2 **[setting 2]** are not possible when "open loop oscillation" in menu 4 **[setting 4]** is selected.

[Trend]

A 2-channel, oscilloscope-related recording function can be activated via the button **[trend]** at any time.



Valve setpoint and valve actual value are always displayed as line graphics without units with identical graphics scaling.

When pressing **[START]** cyclical data logging is activated.

When pressing **[STOP]** data logging stops.

The horizontal time axis can be changed via the buttons **[Zoom+]** and **[Zoom-]**.

When the graphical data logging is stopped, the display field can be moved to the right and to the left to display a centered section of the graphic on the screen.

When pressing the green field **[save to USB]** the currently recorded data set of the data logging is saved to an USB storage medium that can be plugged in on the connection side. It is saved with date and timestamp as Excel-readable CSV file.

You can exit the menu of the trend function via the button **[<]** on the bottom left side and return to the menu **[setting 4]**.

Alternatively, you can skip to the corresponding menu via the button **[open loop oscill.]** on the bottom right if this selection in the menu **[setting 4]** was activated in advance.

[-MD1 / MD2 measurement channels-]

Via the two 4-pole M12 connector sockets MD1 and MD2, **four** analog sensors can be connected simultaneously.

Each M12 connection has an analog current input, with a measuring range of 0..20mA and an analog voltage input, with a measuring range of 0..10V.

For the voltage supply of the external sensors, a 24V voltage supply with 250mA current carrying capacity on both connections is provided.

Measurement channel MD1

Contact 1: **24V** (voltage supply for external sensors)

Contact 2: current input 0..20mA (**MD1/I** analog current input channel)

Contact 3: **0V** (GND)

Contact 4: 0..10V (**MD1/U** analog voltage input channel)

Measurement channel MD2

Contact 1: **24V** (voltage supply for external sensors)

Contact 2: current input 0..20mA (**MD2/I** analog current input channel)

Contact 3: **0V** (GND)

Contact 4: 0..10V (**MD2/U** analog voltage input channel)

The analog signal resolution of all measurement channels is 10bit (1024 steps).

MD1 / MD2 measurements						
Scaling and display of four analog measurement channels (0..10V / 0..20mA)						
analog inputs MD1 / MD2	lower scaling values		upper scaling values		measured values	
MD1/I (pin2): 0.00 mA	4.00 mA	0 unit	20.00 mA	315 unit	-78.7 unit	
MD's invisible in diag. 1						
MD1/U (pin4): 0.00 V	0.00 V	0 unit	10.00 V	315 unit	0.0 unit	
MD2/I pin2): 0.00 mA	4.00 mA	0 unit	20.00 mA	315 unit	-78.7 unit	
MD2/U (pin4): 0.00 V	0.00 V	0 unit	10.00 V	315 unit	0.0 unit	

< pin1: 24V(UB) / pin2: 0..20mA (I_in) / pin3: 0V (GND) / pin4: 0..10V (U_in)

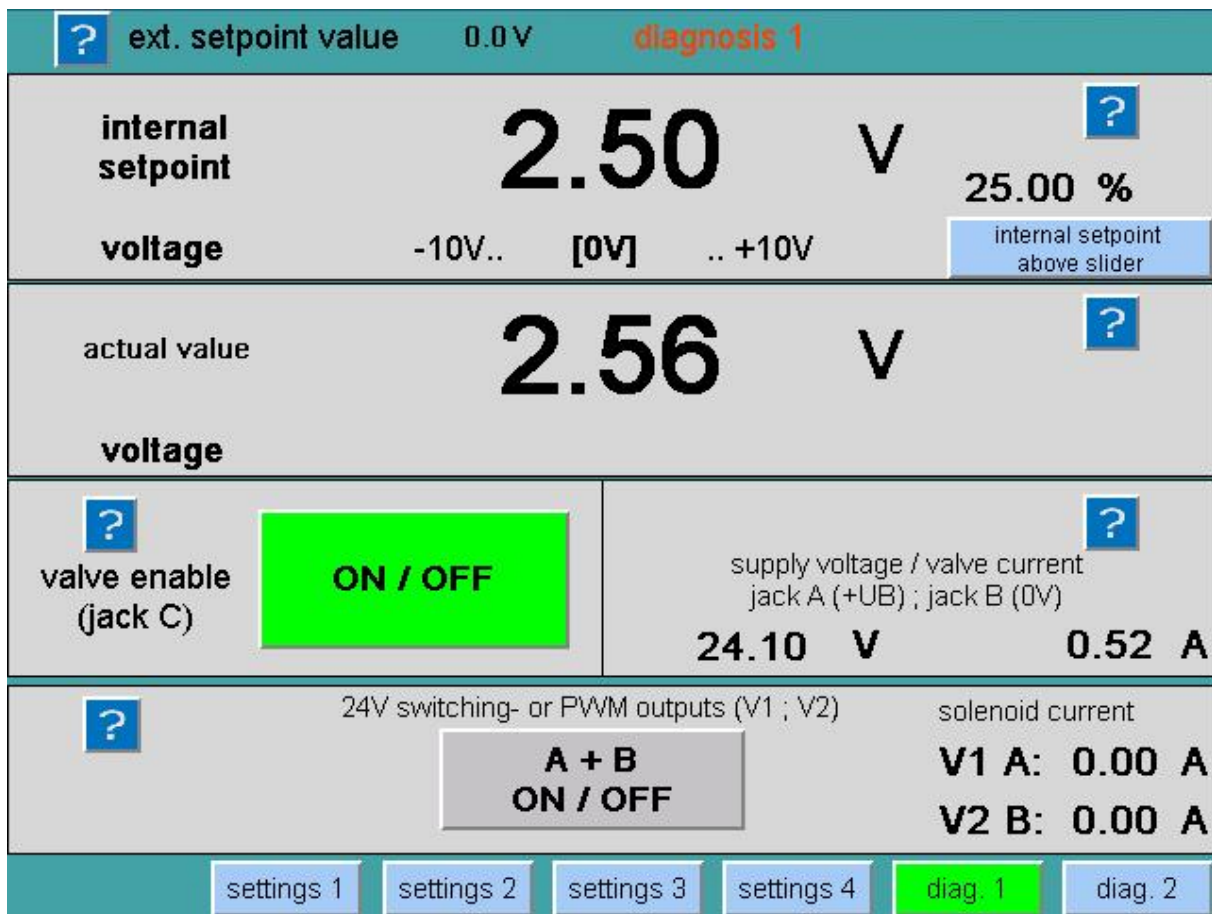
The analog input values are scaled into the desired, physical units by the lower and upper scaling settings.

[-Calibration-]

This menu contains only manufacturer-specific system settings which are not freely accessible for the device user.

After pressing this button, a password is requested to enter the menu **[calibration]**.

12. Menu "diagnosis 1"



In the menu [diag. 1] analog valve values can be monitored and switching functions for a possible valve enable as well as switching valve outputs V1(A) & V2(B) can be carried out:

- First display block "valve setpoint"

The current valve setpoint in the unit V or mA is displayed centered in the first upper display block. The possible signal range dependent on the valve which was selected in the menu [setting 2] always appears below this display.

The value shown in square brackets in this information display is the value that corresponds to the hydraulic neutral state and is output as valve setpoint after a short press on the rotary encoder knob.

The internal setpoint via the rotary knob is always generated in percentage steps (x10, x1 or x0.1). In order to have a better overview in terms of the hydraulic setpoint, it is additionally displayed as percentage.

On the left side of the display block you get the information which signal source generated the displayed valve setpoint.

(Internal setpoint, external setpoint or oscillating setpoint)

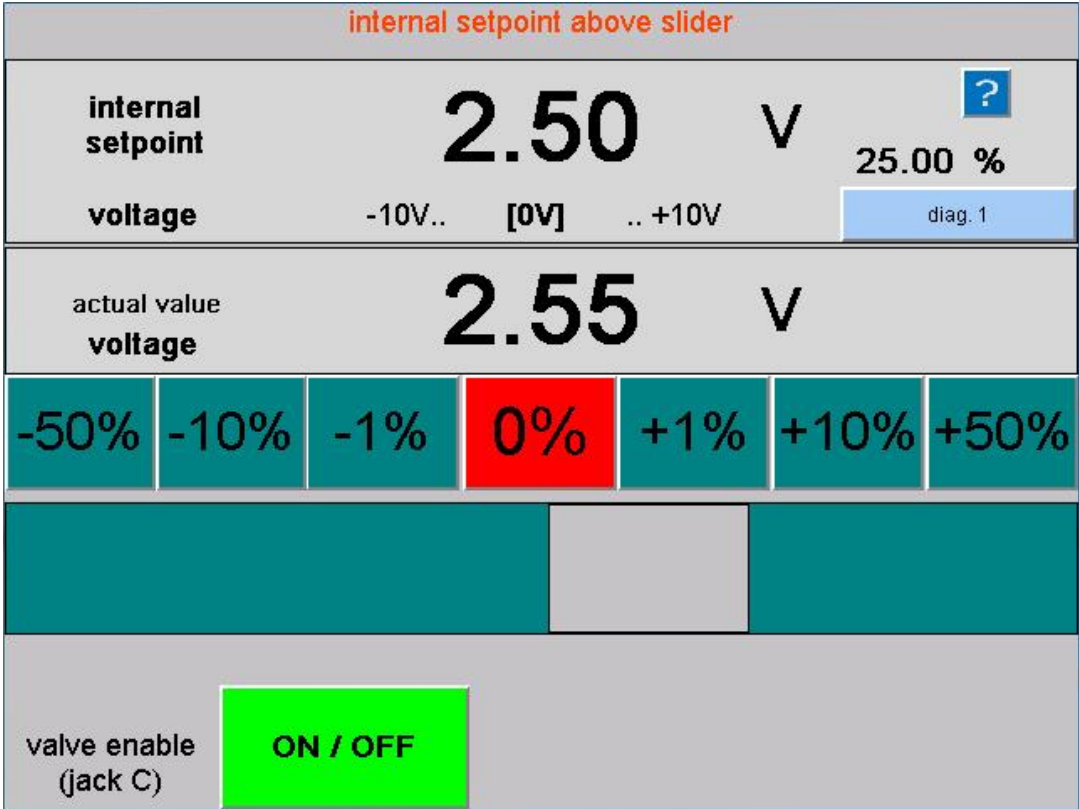
The current „external setpoint“ is displayed above the upper display block during the output of [internal setpoint] or [open loop oscillation].

This function serves the functional safety in order to inform the device user what analog setpoint signal is provided by a potential external active control.

For technical reasons, this additional display function is only available with valve setpoints as voltage signal.

When switching over to [loophrough external setpoint] during an active internal setpoint generation, a possible external setpoint is output directly on the output without ramp control.

Via the optionally available remote accesses Remote-Client or WLAN, an internal setpoint value setting is possible without actuating a rotary knob. When pressing the button [setpoint via slide control], the display switches to the menu "setpoint via slide control. Here, the internal setpoint can be manipulated using the percent keys, with fixed step sizes - or via the lower slide control. When pressing the red button 0%, the internal setpoint is switched back to the hydraulic zero position of the proportional valve.



This virtual setpoint value setting is only possible in the mode [internal setpoint].

- Second display block "valve actual value"

The current valve actual value (jack F) is displayed centered in the second display block with its physical unit. The valve actual value is directly read back from the connected valve and displayed in the menu **[setting 1]** dependent on the preselected signal type of the valve actual value.

The valve actual value is output as measurement signal on jack F on the input side as measured value V or mA dependent on its signal type (voltage or current) so that this analog actual value signal also can be read on a machine control.

- Third operating and display block "enable and supply voltage"

In the third display block, the external supply voltage on the input side and the present current consumption of the valve to be checked are always displayed on the right.

Should the supply voltage fall below 21V or exceed 28V, a ticker in the display shows error details. At the same time, a repeated acoustic signal is output.

If the error persists the signal can be switched off by pressing the ticker output field.

The basic device function is not manipulated by this monitoring function.

When a valve with enable signal is selected in the menu **[setting 1]**, a button for manual operation of the valve enable (jack C) appears in the left area of the third display block.

When pressing this button the 24V valve enable can be switched on and off randomly.

Should an external voltage signal on the input side be switched via jack C for the purpose of valve enable the button turns into an input field with flashing text information "enable from external ACTIVE".

On removal of the external enable signal, the enable signal to the valve is always reset.

- Forth operating and display block "switching valve A & B"

Depending on the pre-configuration in the menu **[setting 3]**, the last lower display block displays one or two buttons for the switching of 2 solenoids.

When preselecting **[switch A & B together]**, a centered button appears which switches both switching outputs A & B on or off simultaneously.

This function is destined for switching valves that operate with one or two simultaneously switched solenoids.

When preselecting **[switch A & B individually]** two buttons appear which can drive both switching outputs A & B independently.

In this mode it is possible to switch on both switching outputs simultaneously.

When preselecting [**switch A & B alternately**] two buttons appear which can drive both switching outputs A & B interdependently.

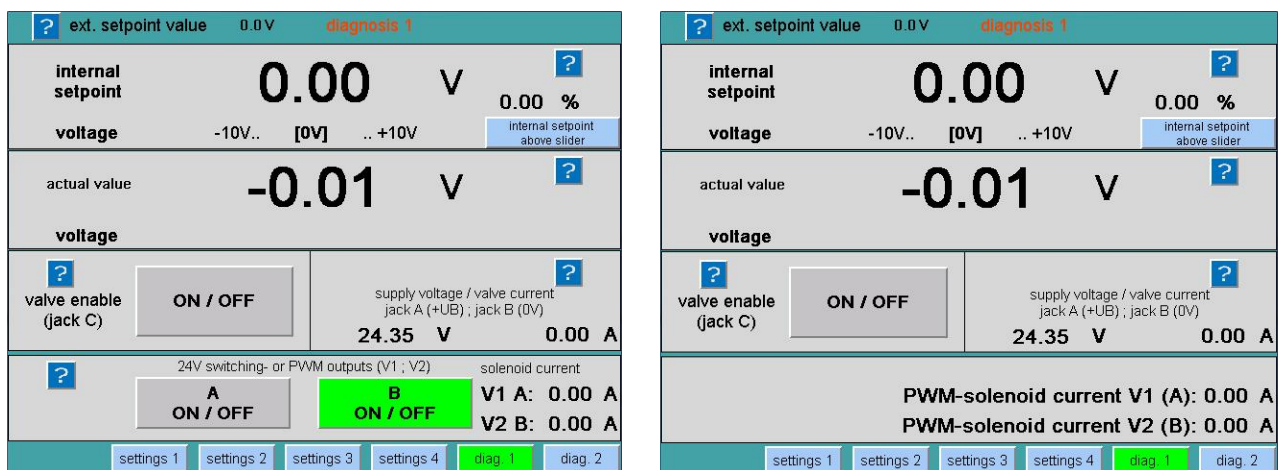
In this mode it is not possible, that both switching outputs are switched on simultaneously.

After changing the switching function the switching outputs are reset automatically.

In addition, the two coil currents of the solenoid switches are currently displayed on the right side of this display block.

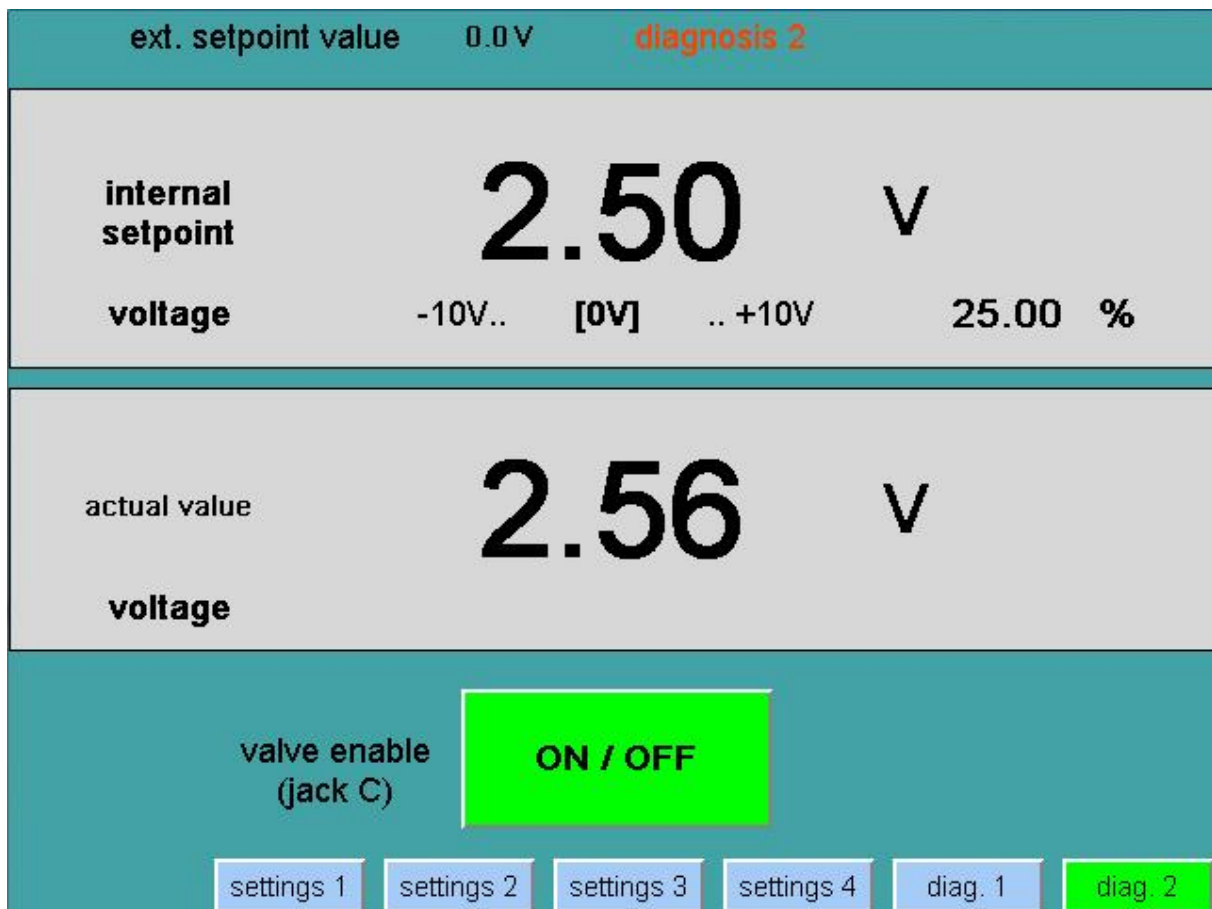
Both switching outputs output a DC voltage of 24V and can be loaded with 3A.

The switching outputs are always switched off after a voltage reset.



If the PWM function is enabled in menu [**setting 3**], only the corresponding solenoid currents are displayed instead of the operating functions for the switching outputs.

13. Menu "diagnosis 2"



In the menu [diagnosis 2] only the analog valve signals and the switching status of the enable signals are displayed.

Both display blocks display valve setpoint and actual value like in the menu [Diag. 1].

Additional buttons and functions are not displayed for reasons of clarity.

Depending on the configuration of the valve enable in the menu [setting 1], the button for the enable is optionally displayed.

14. Valve types

The following valve types can be tested with the valve testing device VBT1-2X. (For valves with connector plug according to DIN EN 175201-804)

Atos (Proportional pressure control valve):

RZMO-A*-010	RZMO-A*-030
RZMO-TERS(AERS)-010	HZMO-A*-030
RZGO-A*-010	RZMO-TERS(AERS)-030
RZGO-TERS(AERS)-010	RZGO-A*-033
AGMZO-A*	HZGO-031
AGMZO-TERS(AERS)	HZGO-033
AGRCZO-TERS(AERS)	RZGO-TERS(AERS)-033

Atos (Proportional way valve):

DHZE-A	DHZO-T*	DLHZO-T*
DKZE-A	DKZOR-T*	DLKZOR-T*
DHZO-A*	DPZO-A*	
DKZOR-A*	DPZO-T*	
	DPZO-L*	

Atos (Proportional integrated valve):

LICZO-A*	LICZO-TERS(AERS)
LIMZO-A*	LIMZO-TERS(AERS)
LIRZO-A*	LIRZO-TERS(AERS)

Bosch Rexroth (proportional way valve, directly driven)

4WRAE6...	4WREEM10...	4WRBAE6...
4WRAE10...		4WRBAE10...
4WREE6...	4WREF6...	
4WREE10...	4WREF10...	

Bosch Rexroth (proportional way valve, pilot-operated)

4WRZE10...	4WRKE10...	4WRBKE10...	4WRZEM10...
4WRZE16...	4WRKE16...	4WRBKE16...	4WRZEM16...
4WRZE16...	4WRKE25...	4WRBKE27...	4WRZEM25...
4WRZE32...	4WRKE27...	4WRBKE35...	
4WRZE52...	4WRKE32...	4WRKE35...	

Bosch Rexroth (2-way proportional throttle valve)

FEE16... (only with suitable adapter)

FESE25... (only with suitable adapter)

FESE32... (only with suitable adapter)

FESE40... (only with suitable adapter)

FESE50... (only with suitable adapter)

FESE63... (only with suitable adapter)

FESXE...

Bosch Rexroth (proportional current regulation valve)

3FREEZ6...

3FREEZ10...

Bosch Rexroth (proportional pressure relief valve, directly driven)

DBETA... DBETBEX...

DBETE...

Bosch Rexroth (proportional pressure relief valves, pilot-operated)

DBEBE6...

DBEBE10...

(Z)DBEE6...

DBEME10...

DBEME20...

DBEME30...

Bosch Rexroth (proportional pressure relief valves, directly driven):

3DREPE6...

Bosch Rexroth (proportional pressure reducing valve, pilot-operated):

ZDREE6... (only with suitable adapter)

DREE6... (only with suitable adapter)

DREE10... DREBE6X...

DRE(M)E10... DREBE10Z...

DRE(M)E20...

DRE/M)E30)...

Bosch Rexroth (Regulating way valve, directly driven):

4WRPEH6...	4WRSE6...	4WESEH6...
4WRPEH10...	4WRSE10...	4WRSEH10...

Bosch Rexroth (Regulating way valve, pilot-operated):

4WRLE10...	4WRTE10...	4WRDE10...
4WRLE16...	4WRTE16...	4WRDE16...
4WRLE25...	4WRTE25...	4WRDE25...
4WRLE27...	4WRTE27...	4WRDE27...
4WRLE35...	4WRTE32...	4WRDE32...
	4WRTE35...	4WRDE35...

4WRVE10...	4WRGE10...
4WRVE16...	4WRGE16...
4WRVE25...	4WRGE25...
4WRVE27...	

Bosch Rexroth (Regulating way valve, pilot-operated):

2WRCE32... (only with supply voltage UB=24V)
2WRCE40... (only with supply voltage UB=24V)
2WRCE50... (only with supply voltage UB=24V)
2WRCE63... (only with supply voltage UB=24V)
2WRCE80... (only with supply voltage UB=24V)
2WRCE100... (only with supply voltage UB=24V)
2WRCE125... (only with supply voltage UB=24V)
2WRCE160... (only with supply voltage UB=24V)

3WRCE32... (only with supply voltage UB=24V)
3WRCE40... (only with supply voltage UB=24V)
3WRCE50... (only with supply voltage UB=24V)
3WRCE63... (only with supply voltage UB=24V)
3WRCE80... (only with supply voltage UB=24V)
3WRCE100... (only with supply voltage UB=24V)
3WRCE125... (only with supply voltage UB=24V)
3WRCE160... (only with supply voltage UB=24V)

3WRCBEE25...
3WRCBEE32...
3WRCBEE50...

Bosch Rexroth (servo way valve)

4WSE3E16... (only with supply voltage UB=24V)

4WSE3E25... (only with supply voltage UB=24V)

4WSE3E32... (only with supply voltage UB=24V)

Duplomatic (proportional pressure valve):

PRE*G...

PRE*J...

PRED3G...

PRED3J...

Duplomatic (proportional way valve):

DSE3G... DSE3J...

DSE5G... DSE5J...

DSPE*G...

EMG:

Servo valve SV1-06

EATON 4-way Servo-Performance proportional directional valve:

AxisPro

KBS*-3-... (only Local mode « Level 1 », analog interface)

KBS*-5-... (only Local mode « Level 1 », analog interface)

EATON Vickers (pressure relief valve):

KBCG-3

KBCG-6

KBCG-8

KBX(C) G-6

KBX(C) G-8

EATON Vickers (poportional way valve):

KBFDG5V-5 KBD/T-3 KBFD/TG4V-3 KBHDG5V-7

KBFDG5V-7 KBDG5V5 KBSDG4V-3 KBHDG5V-8

KBFDG5V-8 KBDG5V7 KBFD/TG4V-5 KBHDG5V-10

KBFDG5V-10 KBDG5V8 KBSDG4V-5

 KBDG5V10 KBHDG5V-5

Grieger (proportional pressure valve) :

DBV OBE NG06

DBV OBE NG10

Grieger (poportional way valve) :

OBE NG06

OBE NG10

OBE NG16

HYDAC (poportional way valve):

P4WEE6...

P4WEE10...

Moog (directly-driven servo valve):

D633...

D634...

Moog (directly-driven servo valve with optional field bus interface):

D636...

D637...

Moog (pilot-operated proportional valve):

D661...

D662...

D663...

D664...

D665...

Moog (pilot-operated servo valve with optional field bus interface):

D671...

D672...

D673...

D674...

D675...

Moog (pilot-operated proportional valve):

D681... D684...

D682... D685...

D683...

Parker Hannifin: (proportional way valve):

“standard”	“high precision”	“for controlled applications”
D1FB...	D31FH...	D1FP...
D3FB...	D41FH...	D3FP...
D31FB...	D81FH...	D30FP...
D41FB...	D91FH...	D31FP...
D91FB...	D111FH...	D41FP...
D111FB...	D31FE...	D91FP...
D1FV*3...	D41FE...	D111FP...
	D81FE...	
	D91FE...	
	D111FE...	

Parker Hannifin (proportional pressure relief valves):

RE06M*T...

R4V...

R6V...

RE*E*T...

Parker Hannifin (proportional throttle valve):

TDP...

TEP...

TPQ...

Tiefenbach:

Directly driven

2/2-way seat valve NG (NW)10

EMG Automation:

Servo valve NG6

SV1-06...E

Schneider Kreuznach:

HVM 025

HVM 061 (NG6)

HVM 062 (NG6)

HVM 063 (NG6)

HVM 064 (NG6)

HVM 057 (NG10)

HVM 067 (NG10)

HVM 090 (NG10)

HVM 188 (NG25)

HVM 250 (NG25)

With special hole pattern HVM 106

HVM 107

Yuken (proportional way valve):

ELDFG-01EH

ELDFG-03EH

Yuken (servo valve):

LSVHG-03EH

LSVHG-04EH

LSVHG-06EH