GmbH

The Sign of Quality

Made in Germany

MotorView®

Abrichtsysteme
Dressing Systems


HIGH QUALITY
100%
MADE IN GERMANY
EXCELENT SERVICE

CONTEN
Issue October 2020

1 Introduction - Overview

In the abrasive industry grinding tools are worn or dull after a certain process time and cannot thus guarantee the precision in machining. In this case, they must be brought in form or sharpened again, which is called "dressing".
This dressing is generally a very important feature because it is controlling directly the quality of the product but on the other hand a lot of process time is lost. The goal is to produce always the most accurate surface precision and simultaneously remove as little material as possible.
When dressing, there are two basic methods, first the use of stationary dressing tools and second the use of rotating tools.
For highest accuracy mostly the latter method is used, and is supported for reconsideration increasing the precision usually also through the use of sensor systems subject. In this case, sensors are installed in the spindle, that are connected to an additional electronic evaluation system.

The ***MotorView***® system as well as the ***DressView***® system is a completely new and innovative system and takes a different approach. It works without sensors and yet allows process precisions of
0.5 - 1 microns, and is thus in a similar capacity range as sensor-prone systems.

The ***DressView***® system of BMR works together with frequency converters of BMR and dressing spindles in a mounting range from 33mm to 72mm and is available in two different versions and performance classes. For capacities up to 3 kW it is available as DressView-0303 and for lower power ratings up to 400VA as DressView-0200.
In contrast, the new ***MotorView*** system works completely independently.
The precise and sensitive sensing of voltage and current in the individual motor phases enables a detailed and sensitive analysis of all motor parameters. Apparent power and motor frequency can be precisely determined over the entire speed range of the motor.The integration of MotorView into existing applications is very easy and risk-free, since only the motor cable from the inverter to the spindle has to be disconnected and the system has to be looped in via robust screw terminals.

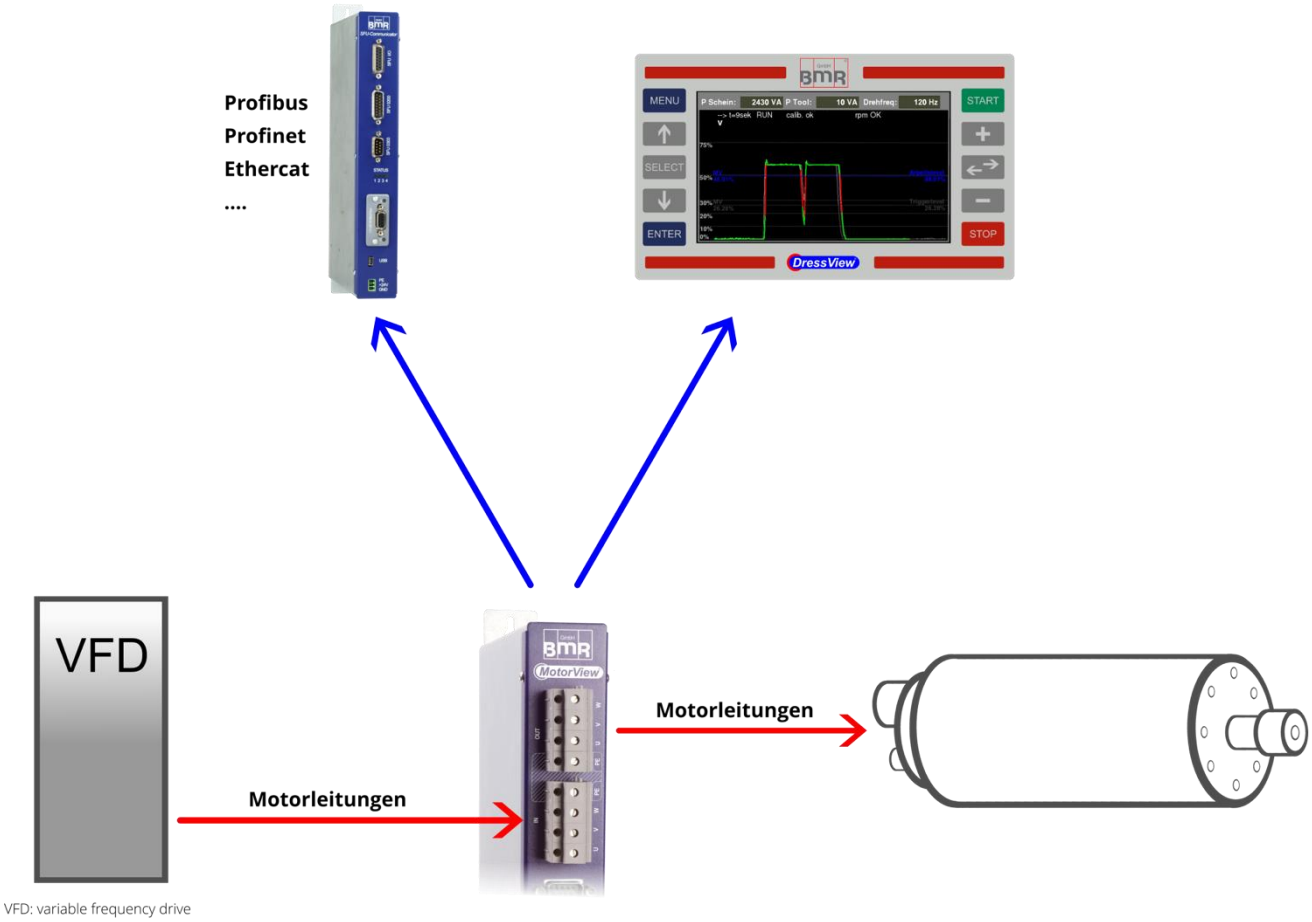
In order to parameterize the system and to evaluate loads visually, we offer a particularly flexible solution with our DressView display, which can be mounted on or in the machine and is only connected to the MotorView or DressView via a single slim cable.

A characteristic control signal is derived, and graphically presented on a LCD display from the operation of the spindle. For signal output to the PLC in each case a limit value for signal detection and, in addition, a higher one can be set to a potential crash detection.

The DressView® system is easily operated and adjusted via laterally arranged membrane keys. Various settings can be made for the dressing process, such as the afterglow of last measurement processes as silhouettes and the time base or the scaling of the display

For communication with the PLC 3 digital inputs, 3 digital outputs and one analog output are available. Using them the system can be started and the current status is indicated. The analog output is derived directly from the measurement signal of the dressing.

With this system BMR has succeeded in creating a bridge between the existing concepts and to combine the best of both worlds. It is a system with a very high resolution with modest cost and low follow-up costs because standard spindles can be used, because - the spindle is the sensor.

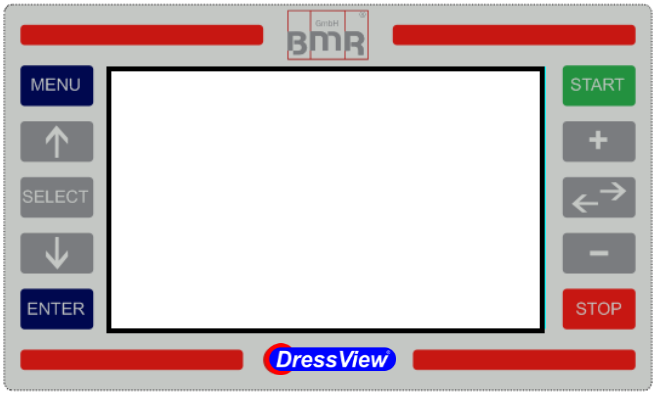


VFD: variable frequency drive

2 Key Functions

Display Control

1
2
3
4
5



Spindle Control

6
7
8
9
10

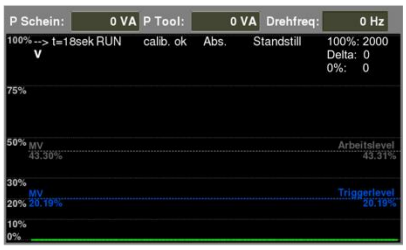
Number	Key	Function
1	MENU	jump one level ahead , back, Open menu
2	↑	Increase value or shifts up (graph menu)
3	SELECT	Jump to the next selectable item
4	↓	Reduce value or shifts down (graph menu)
5	ENTER	confirms a selection
6	START	Spindle Start
7	+	To increase speed of spindle
8	↔	Selects digit, where speed value is to be changed (100, 1.000 or 10.000 digit)
9	-	To reduce speed of spindle
10	STOP	Spindle Stop

In case it is not selected the Terminal- or Dressing Menu, there is the possibility to jump back to the Terminal Menu with the keys of "Spindle Control" in order to start, stop the spindle or change it's rotational speed

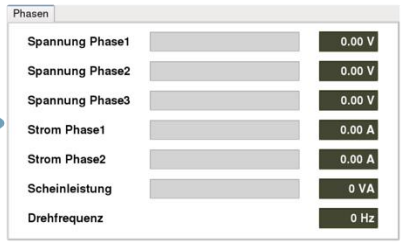
3 Menu Structure

Main Menu

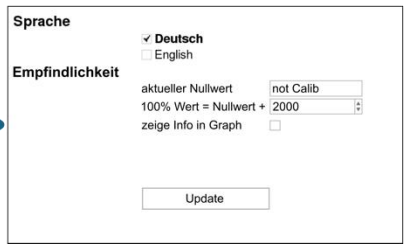
Dressing-Menu



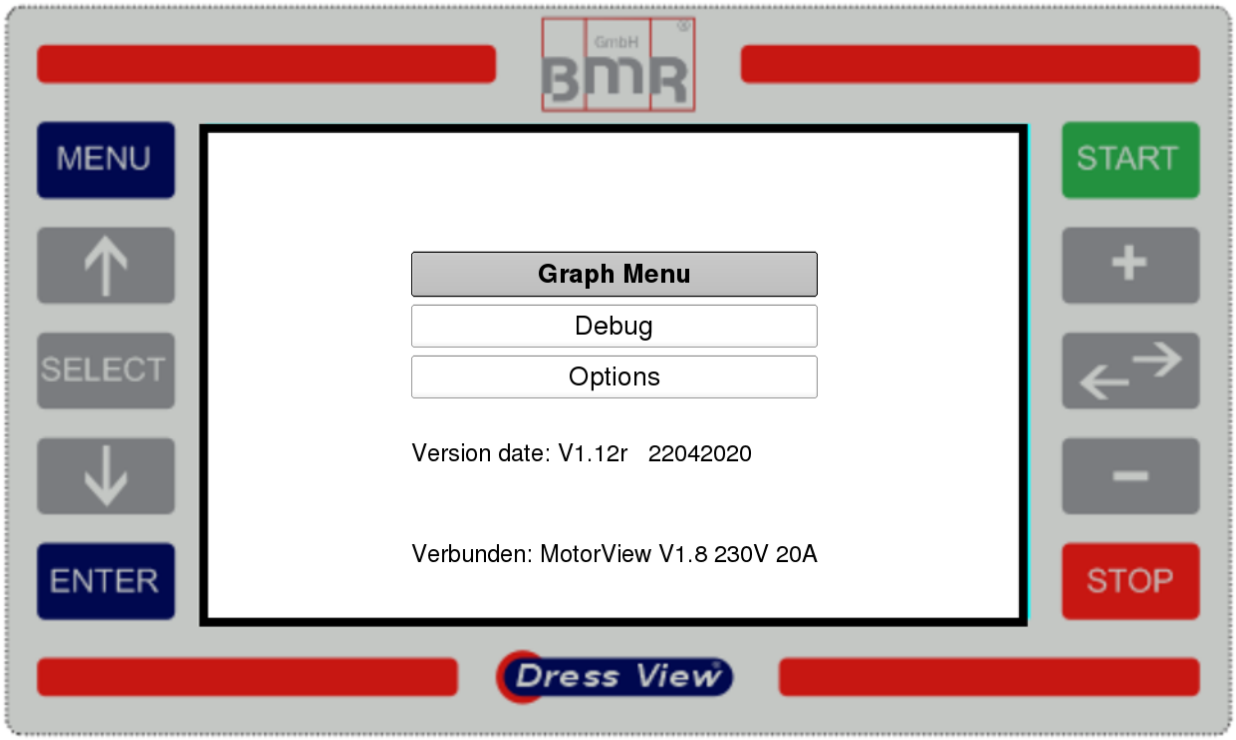
Debug-Menu



Setup-Menu



3.1 Main Menu

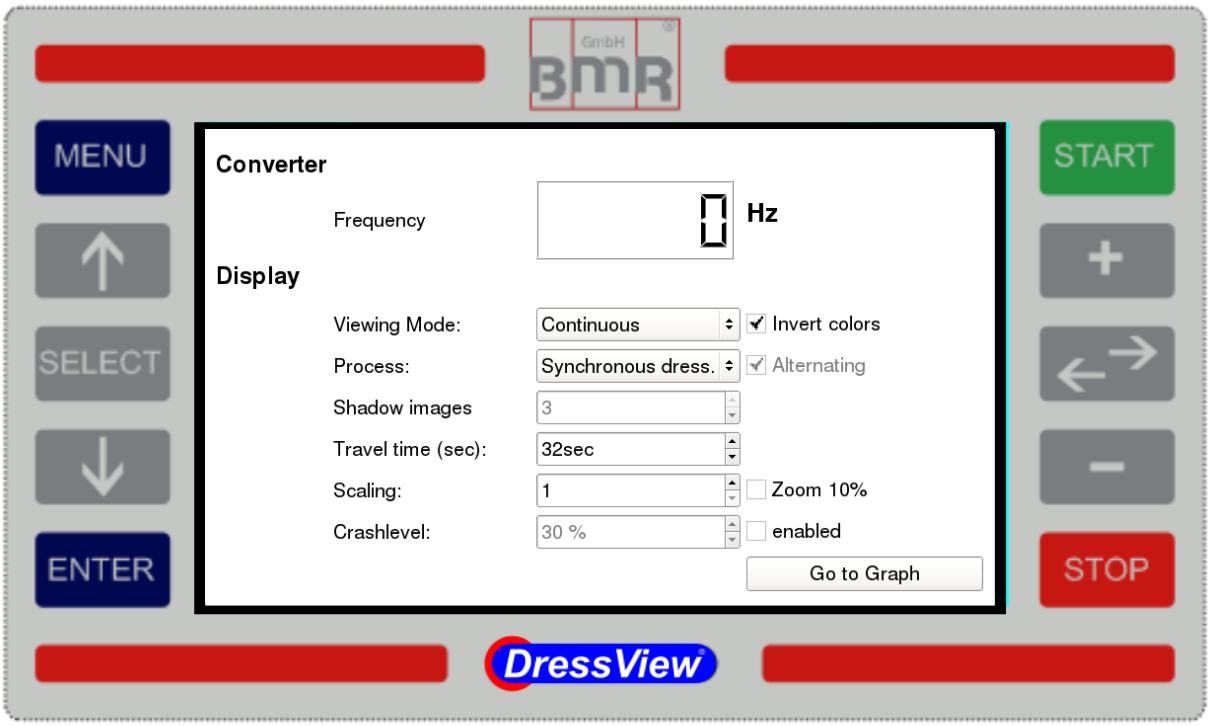


In the Main Menu all functions of the ***MotorView***®-system can be accessed. Moreover it shows the date and number of version, the type of converter being connected and it's number of firmware version.
This menu can be accessed by actuating the **MENU**-key one or several times.

3.2 Dressing-Menu

In case it is intended to carry out a dressing with the system, it has to be moved from the current window to the Main-Menu with the **MENU**-Key and the menu point **Dressing** to be selected. From there it is entered the ***DressView***®-configuration menu.

3.2.1 DressView-Configuration menu



In the ***DressView***®-Configuration menu all basic settings of the dressing window can be set up being required in advance for dressing operation.
All settings will be saved and after reentering automatically reloaded.

3.2.1.1 Adjusting the rotational speed

The topmost item shows the current rotation frequency. To get the resulting rotation speed of the connected motor, you have to know how many poles it has.
Convert rotation frequency into rotation speed:

Motor poles	Calculation
2 poles	Hz x 60 = rpm
4 poles	Hz x 30 = rpm
6 poles	Hz x 20 = rpm
8 poles	Hz x 15 = rpm

3.2.1.2 Display mode / changing the function

The display mode field can be entered with pressing on the **SELECT**-key. The respective setting between "Continuous", "In Blocks" or "Controlled" can be selected with ↑ and ↓

Display Mode	Behaviour	Use
Continuous	The display runs continuously. In case the graph exceeds the trigger level, it is output on OUT3	Manual operation
In Blocks	The display runs continuously. As soon as the graph reaches the display border, it restarts and continues. Possibility for enabling shadow lines for the last 3 graphs. Output function same as with Continuous mode.	Semi automized procedure with fixed time base and constant feed
Controlled	Similar to "InBlocks". Display starts if a start signal is detected at IN3. As soon as a further signal is detected, thegraph runs back or restarts, even if the display border is not reached, yet.(siehe 2.4.1.3)	Full automized operation

3.2.1.3 Alternating

This option is only available in "Controlled" Mode.
In case it is selected, the graph runs from left to right and reverses the direction with reaching the display border or with repetition of the start signal.
It is displayed the direction of movement and if display is active or in a wait state. (see 2.4.2).

3.2.1.4 Invert colors

This checkbox inverts the colors of the dressing window. The background color changes to black respectively dark grey and the text color to white.

3.2.1.5 Process

Universal
All values that are currently measured are displayed here. Thus, values larger and smaller than the zeroed value (see 3.4.2.1) are displayed. This might be a bit confusing, because only the arrow in the upper left corner of the display (see 3.2.2) shows whether the value just seen was positive or negative.

Counter-rotating dressing
This option can be selected for counter-direction dressing, since only positive values occur here. If the value falls below 0% (due to the absence of a coolant jet or extended running of the spindle), the line is limited to 0%.

Synchronous Dressing
If synchronous dressing is used, this must be selected because only negative values can occur during the dressing process. It is important here that it is absolutely necessary to calibrate the system (see 3.4.2.1) in idle speed, but with factors that are a load, such as e.g. coolant jet, etc.

3.2.1.6 Shadow or Ghost images

This function is only available in the display modes "In Blocks" and "Controlled"
Up to 3 previous graphs can be displayed as gray lines behind the current colored one. With reaching the number of lines being setup, the oldest line is deleted.

3.2.1.7 Time base

This is the setting of the time which the regulation value takes to run on the display once (see 2.4.2) equally to the feed rate of the dressing spindle across the grinding tool. The default value is 10s and can be adjusted between 3 to 60s.

3.2.1.8 Automatic scaling the time base

The system has the possibility, to adjust the time base of the display according to the feed rate across the work space of the workpiece.

To achieve this, the "Controlled" mode has to be selected and the work space has to be covered in the teach-in mode one time.
The teach-in mode is activated with applying a HI-signal to the inputs IN1 and IN2 simultaneously, and as start point is defined the left border of the display.
As soon as this signal is switched to LO, it marks the end of the work space and defines the elapsed time as right hand border.
Now the width of the display is calibrated according to the elapsed time of feeding across the work space.

3.2.1.9 Scaling

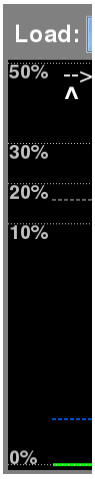
With this setting it is possible, to expand the display range of the dressing display.
By default this value is 1, representing a display range of 0-100%

Scaling	Value
1	0 - 100 %
2	0 - 50 %
3	0 - 35 %
4	0 - 25 %
5	0 - 20 %
6	0 - 15 %

Important: The accuracy is not affected by the scaling factor, but the display area is expanded accordingly.

Higher values of scaling give the opportunity to setup the trigger level with a finer grade

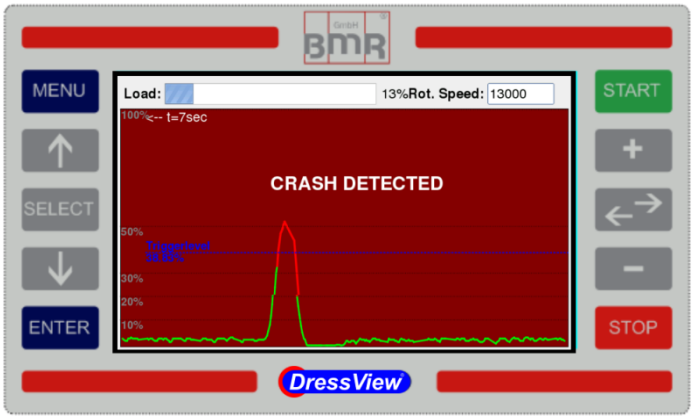
3.2.1.10 Zoom 10%



If Zoom 10% is selected, the scaling option is set to 1 automatically and its setup menu is disabled.
In this setting a display range up to 50% is possible, where the area up to 10% is expanded highly. This makes possible a very sensitive detection besides a capability to display signals up to 50%, equally.
This setup is especially useful for a sensitive and quick contact detection with a following firm dressing process. Additionally it could be useful for a work process with highly changing load conditions, either.

3.2.1.11 Crash level

The Crash level is the value where the ***DressView***®system detects a crash event because of machine or operating failures.



This value can be adjusted in the range from 0 to 100% of the measure value
This function is not activated at once with moving to the dressing window (see 2.4.1.9), but only after having carried out a calibration (see 2.4.2.1).

As soon as the system has detected that the measure value has exceeded the crash level, the display will be colored into red and the message "Crash detected" is displayed.
Additionally the **READY-** output **OUT1** is switched to LOW

Acknowledging of the event
The error message can be acknowledged by several possibilities:
1. Stopping the spindle with **STOP**-Key or applying a signal on input **IN3**
2. Actuating the **ENTER**-Key

Important
With acknowledging the error message with the **ENTER**-Key the **READY-** output **OUT1** is switched immediately on HIGH. A recalibration is not necessary
In difference to acknowledging with **STOP** or via **IN3**, where the spindle stops, it has to be carried out a calibration as usual after a restart.

3.2.1.12 enabled

Activates or deactivates the crash detection.

3.2.1.13 Save changes

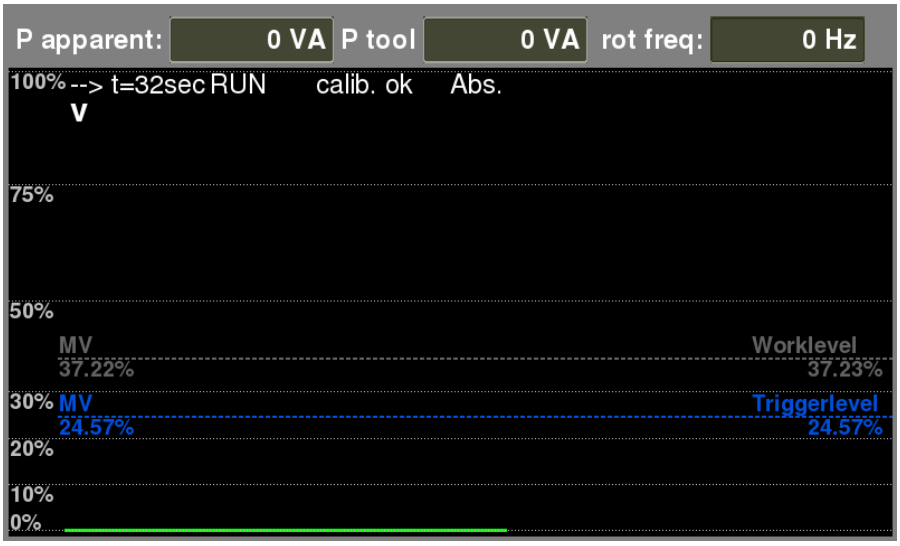
As soon as a value was changed, the "Save changes" button appears. When selecting the button with SELEC and activate it with ENTER, all date will be stored in the device and will be available after power off. The data will also be saved, if you leave this window.

3.2.1.14 Graph-Button

After entering the Graph-Button (see Pic. 2.4.1) and pressing **ENTER** the Dressing-Menu is opened, where the ***DressView***® regulation value is displayed as graphic.

With leaving the DressView configuration menu, all settings are stored.

3.2.2 Dressing



The Dressing window shows:

P Apparend Current apparent power of the motor

P Tool Is set to zero during calibration.
Roughly shows the power which is needed for processing

Rotational Frequency :
Current frequency with which the motor is operated, if this cannot be determined “n.d.” (not detected) is displayed

(--> / <--): Feed direction via the screen.

(^ / v): Arrow direction indicates if the values are within positive (^) or the negative (v) area. Negative values might come up during synchronous dressing, since there the dressing spindle can be accelerated.

t: Time base of the display representing the feed time (see 2.4.1.4) Additionally displaying the feed direction and the indication of "RUN" or "STOP" state (in "Controlled mode, only)

Spindle state: "rpm OK" Target speed reached

Calibration status:"calib. ok" or "not calib." indicates whether the system has been zeroed/calibrated or not.

Work level: Threshold above which the dressing process takes place

Trigger level: Level which represents contact detection (see 2.4.2.1)

MV values at trigger level and work level:
These numbers show the value of the respective level stored in the MotorView. If the stored value does not match the current one, it is displayed in red.
To transfer the values into the MotorView the system has to be calibrated.

Graphic: Graph, which draws the regulation value of the converter as measure of its load state

3.2.2.1 Basics

Before starting the dressing operation the items below have to be regarded:

1. **Starting the spindle**
   After a long time of standstill of the spindle, it has to be carried out a warm up and run in procedure according its specifications (min. 10 Min)

2. **System calibration (Zeroing) with SELECT or IN2**
   Important*:* This has to be carried out after every change of speed and in advance of feeding across the grinding wheel to be dressed, by using the **SELECT**-key or input **IN2**.If coolant is sprayed onto the dressing spindle while dressing, this must also be calibrated out.

3. Adjusting the **Trigger- and Work level** according to the required value with ↑ and ↓ keys

If the dressing spindle is strained (comes into contact with the grinding wheel), the regulation value of the converter increases accordingly. In case the load increases further, it may exceed the **Trigger level**. The **Trigger level** represents a threshold, where the system detects a cutting event and the **Work level** which helps to qualify the dressing result. This level has to be adjusted and setup by the operator according to the application. As soon as the **Trigger level** is exceeded, the graph of the **regulation value** beyond the limit changes the colour from green to red or from grey to black in case of shadow images are activated.

3.2.2.2 Additional display functions

Additional display functions are available in the dressing window which can be activated with key combinations using ENTER (ENTER must always be pressed first):

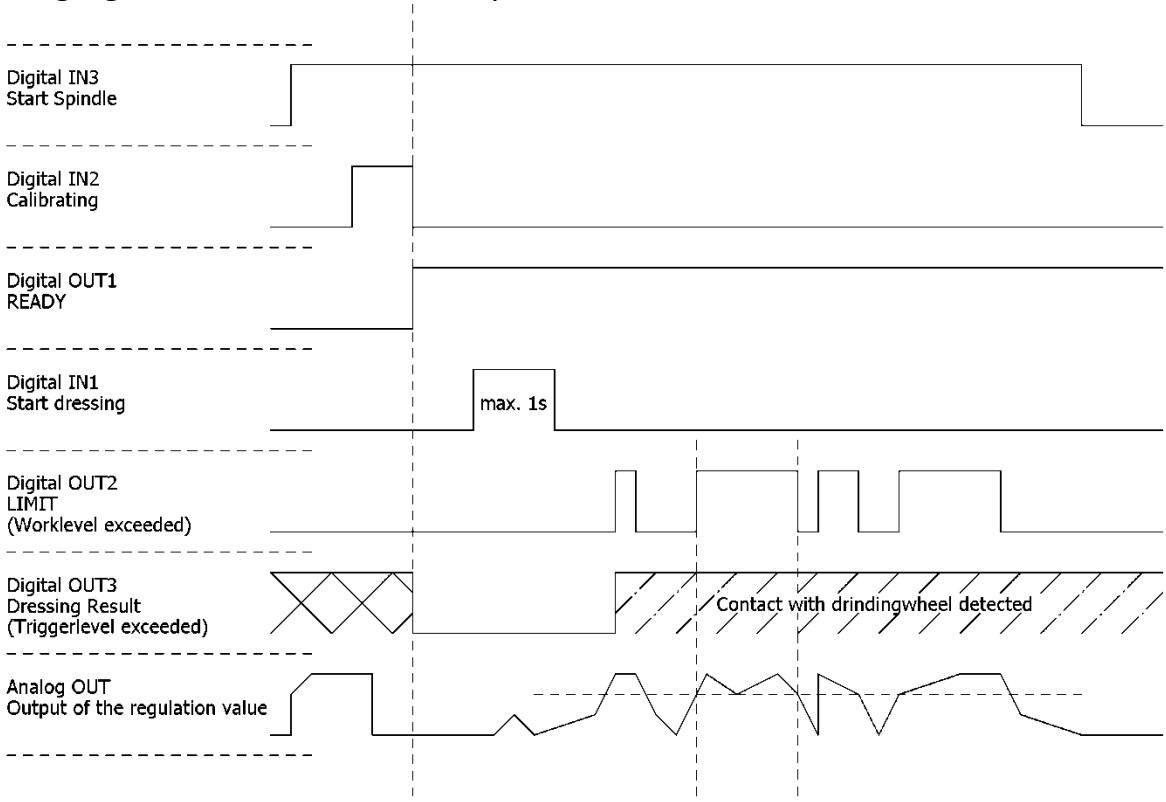
ENTER + **STOP** Stops the display. Thus, work results can be viewed in peace.

ENTER + **START** Restarts the display.

ENTER + **SELECT** Creates a shadow image of the current screen

3.2.2.3 Behaviour of the inputs and outputs

In case the system is operated in the "Controlled" mode, it needs and delivers the following signals on the I/Os after a spindle start via **START**-button or via **IN1**:



After the duty speed is confirmed, this is indicated with a green check-symbol in the speed field of the configuration-window.
With the **SELECT**-key or by remote via **IN2** the system is calibrated (zeroed). By this also the output **OUT3** is resetted, which might has been set by a previous dressing cycle.
After that, the system is ready for a dressing cycle, which is indicated at the output **OUT1** as a LOW state.

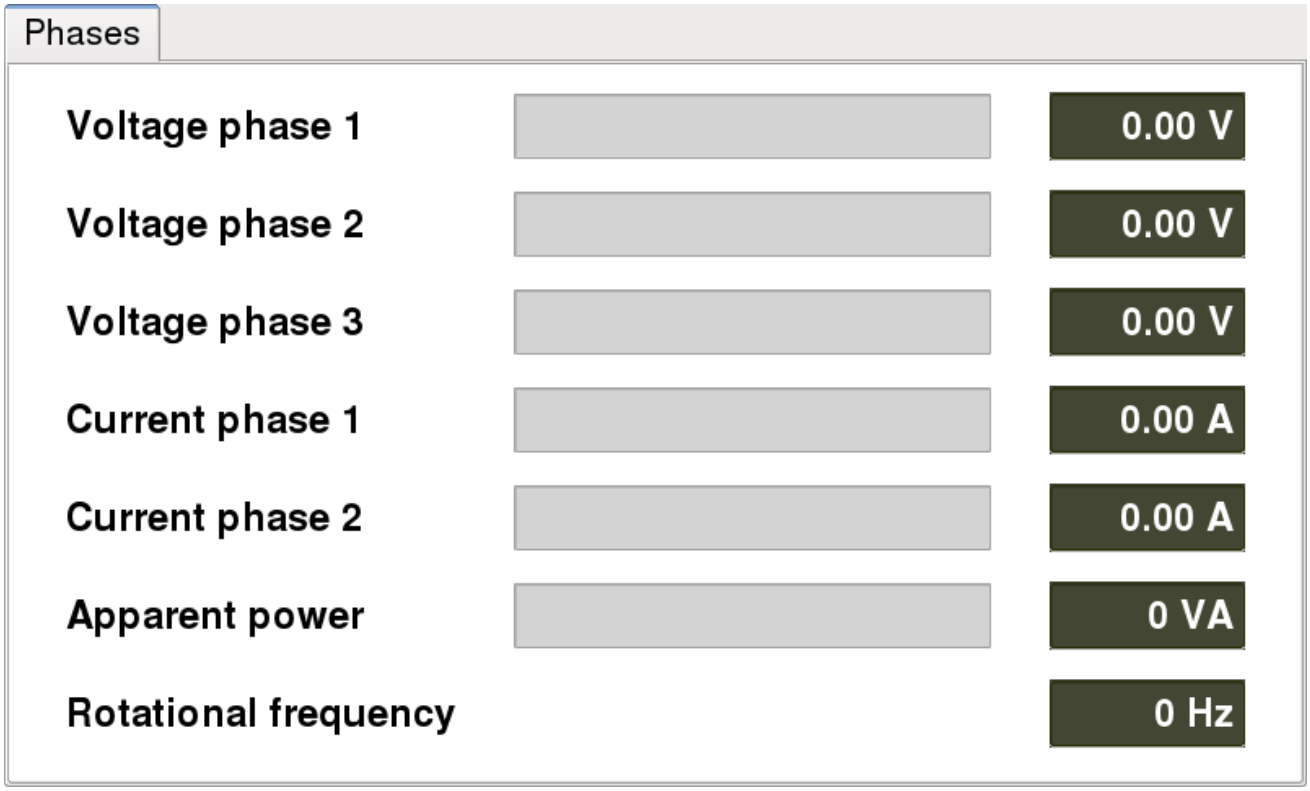
With applying a HI to **IN1**, the system starts drawing the regulation value. The display continues drawing, even if IN3 is reset, but as soon as the border of the display is reached, it will stop.
If **IN1** is set again while drawing is active, it restarts drawing or it changes the direction of drawing in case the **Alternating** mode is selected (see 2.4.1.3).
As soon as the Trigger-level is exceeded, **OUT2** is set and at the first time of this event **OUT3** is set additionally.

Hint:
In the operating modes "**Continuously**" and "**In Blocks**", there will be no output signal for "**Dressing result**" on **OUT3**, because the system cannot detect if a new dressing cycle is initiated. Additionally input signals at input **IN1** "**Dressing start**" will be ignored. All other functions will work as described previously.

3.3 Debug-Menu

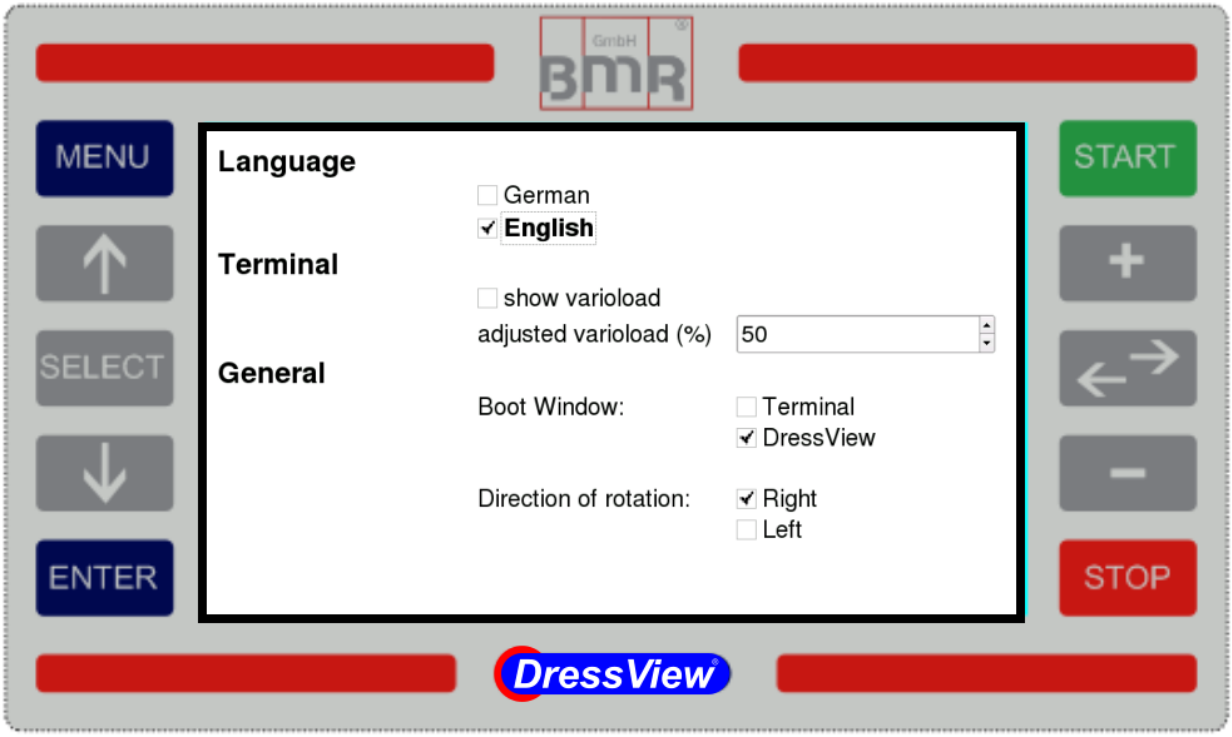
The debug menu offers the possibility to read out various parameters from the phases in order to get to the bottom of possible malfunctions or to configure a connected machine correctly.
These parameters include

1. phase voltage
2. phase current
3. apparent power
4. rotational frequency



The voltage and current bars are based on the maximum values the MotorView system can handle.
In detail, this means that a MotorView version designed for 20A has a bar graph range from 0A to 20A. If these values are exceeded, the measuring system will be damaged. We therefore kindly ask you to contact us if you need a differently configured system from us.

3.4 Setup menu



In the settings menu you can change the system language and parameterize the sensitivity of the MotorView measuring system.

3.4.1 System language

For changing the system language, the desired language has to be selected with the **SELECT**-key. After confirming with **ENTER,** the system reboots and jumps directly into the selected start window. (see 2.6.3)

3.4.2 Sensitivity

3.4.2.1 Current zero value

The current zero value is the value determined in the graph after a calibration of the system. Together with the 100% value it forms the basic conditions of the display

3.4.2.2 100% Value

The 100% value is comparable to the "full scale" of the display. Since our MotorView system, unlike our DressView system, cannot determine this value on its own, this topmost value can be changed here. By default a value of 2500 is sufficient for most cases. If you have a machine on which only very fine dressing processes are run and never really high loads occur, the value can be reduced step by step.

If, on the other hand, you have a machine that is used for drilling or milling, it is advisable to raise the value in order to be able to see the entire load curve in the graph.

3.4.2.3 Show infos in Graph

If the check mark is set here, three values are displayed in the graph in the upper right corner:

100%: The set maximum value
Delta: Current measured value
0%: Zeroed (calibrated) value

As you can see in the example picture on the right, the system has not yet been zeroed. You can clearly see that the 100% value here is 2000 greater than the zero value. This difference can then be set in the settings menu. When the motor is no longer driven, 0 appears for the delta value as in the example image.

3.4.3 Update

When choosing "Update" the software reboots itself and searchs for an attached update-qualified USB stick which contains a firmware newer than the device itself.

If an update-qualified USB stick is detected, a message box appears, which shows the version date of the newer firmware as well as the version date of the device.
Now there is the option to cancel this message box with pressing "ENTER" or choosing "OK" with pressing "SELECT", "Arrow up" or "Arrow down". As soon as "OK" is chosen and "ENTER" is pressed, the update process starts. After having finished. the software immediately restarts with the newer firmware.

Update-qualified USB stick and Firmware

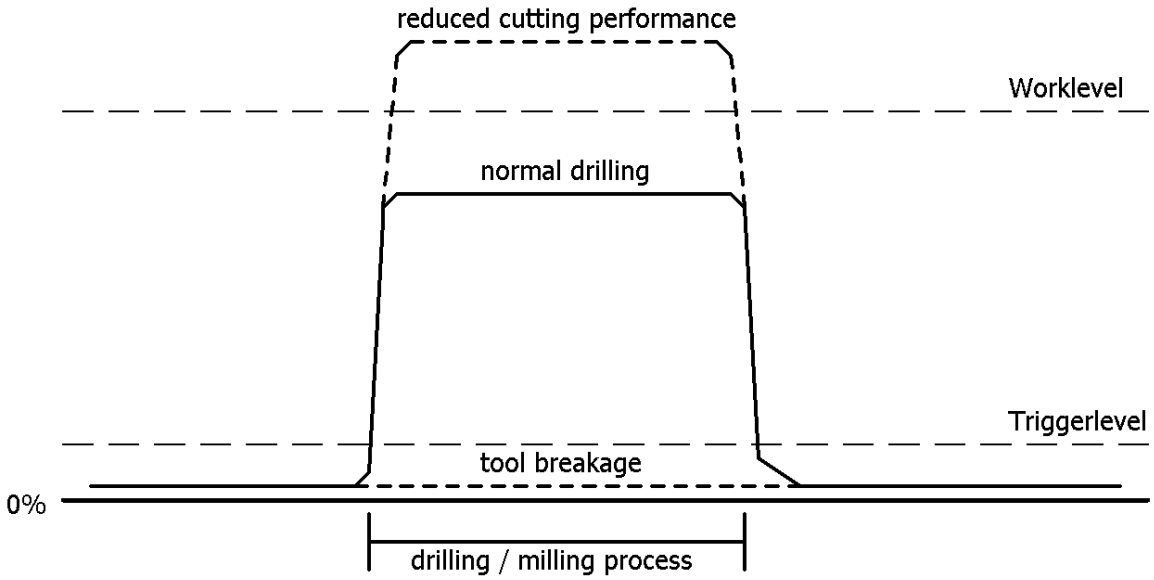
A preconfigured and update-qualified USB stick with the latest firmware can be ordered by BMR on a charge.
As a second option there is the possibility to create an own update-qualified USB stick. This stick has to fulfill the following criteria:
Name: BMR
File format: ext2, ext3, ext4 or MS-DOS-FAT

In general, the latest firmware is available by BMR on request. It can be downloaded and copied on an USB stick, which can plugged into the USB jack on the back of the desktop device or direct at the ***DressView*** Operating Terminal.

4 Use of the system in the drilling / milling

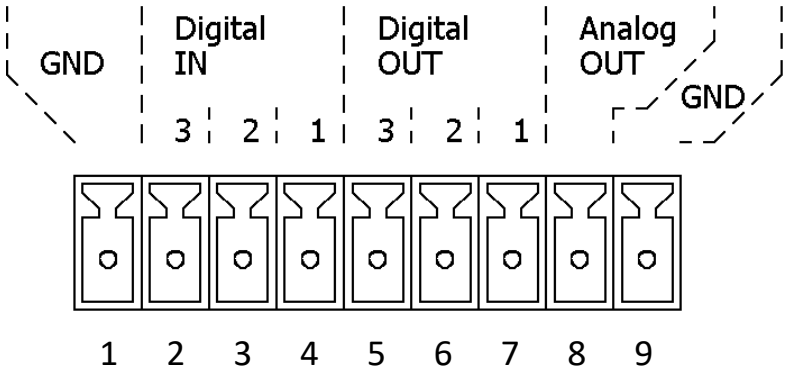
Additionally to dressing applications, the system can also be used very easily in other applications, such as automated drilling and milling. The resulting benefits are, that the current signal of the regulation value can steadily be compared to a nominal value.
So, for example, the **detection of tools getting dull** or having reduced sharpness can be detected very early. This would result in an increase of the regulation value in comparison to the value of the sharp state. This gives the chance to notify the operator to change the tool before the quality of the surface gets too bad or the tool breaks.
Another possibility is the **detection of broken tool**, because here is the value significantly low during operation. So in this case the automated process can be interrupted immediately, and it is not wasted time while working without tool.

For this purpose also the dressing menu must be called and the "in blocks" or "controlled" display mode can be set.



5 *DressView* ®-specific inputs and outputs

The ***DressView*** ® specific interface is located on the back panel of ***DressView* 0200** or ***DressView* 0303** and on the front panel of ***DressView* SSE.**
It is realized with a pluggable screw terminal. It's functions are described in 2.4.2.2



PIN	Function	Decription	Type
GND		Ground	
Digital IN 1	Dressing start	starts drawing the regulation value into the dressing graph in "Controlled" mode	0-24V
Digital IN 2	Zeroing	Zeroing or Calibration of the system	0-24V
Digital IN 3	Custom Input	Special Functions	0-24V
Digital OUT 3	Dressing result	delivers depending on usage a result for cutting detection or for dressing	Logic "0" = 0V Logic "1" = 24V / 25mA
Digital OUT 2	Limit	Delivers a HI-signal when exceeding the trigger level during activated dressing	Logic "0" = 0V Logic "1" = 24V / 25mA
Digital OUT 1	Ready	Indicates, if the system is ready or if it is on error	Logic "0" = 0V Logic "1" = 24V / 25mA
Analog OUT	Regulation value	Analogue value, corrosponding to the graph line in the dressing window	0...10V
GND / Uh		Ground or auxilary voltage on option	12V / 20mA

✓ Switch level of digital inputs: "0" = 0...7V / "1" = 13....24V PLC Standard Level

✓ Voltage range analogue output: 0...10V

5.1 Serial Communication

In addition to the digital inputs and outputs, a serial interface is available on the MotorView. This interface is used to establish a connection to the SFU-Communicator, which then provides access to all field buses.
In addition, this RS232 interface can also be used directly.

The user must always send 1 byte or 3 byte commands to the MotorView. Requests are always answered with 3Byte, starting with 0xcc followed by the Lo-Byte and Hi-Byte of the requested value.
When requesting the type (1st Line), 16 bytes are always transmitted, as written in the example.

Communication commands:

Function	Send command	Receive
Type and version number max Voltage, max Current	0x06	ASCII String e.g.: „MV V1.5 230V 20A“
Sensing value	0x0c 90 0c	0xcc *Lo Hi*
Current 100% value	0x0c ba 0b	0xcc *Lo Hi*
Value to calculate the 100% Value	0xca *Lo Hi*	0xcc *Lo Hi* (Echo)
Set zero value	0xab *Lo Hi*	0xcc *Lo Hi* (resultierender 100% Wert)
Set Triggerlevel (x10000)	0xac *Lo Hi*	0xcc *Lo Hi* (Echo)
Get Triggerlevel (x10000)	0xbb	0xcc *Lo Hi*
Set Arbeitslevel (x10000)	0xad *Lo Hi*	0xcc *Lo Hi* (Echo)
Get Arbeitslevel (x10000)	0xbd	0xcc *Lo Hi*
Triggerlevel Flag (0 / 1)	0xcc	0xcc *Lo Hi*
Arbeitslevel Flag (0 / 1)	0xcd	0xcc *Lo Hi*
Real performance value	0x40	0xcc *Lo Hi*
Current Frequency	0x41	0xcc *Lo Hi*
Phase voltage 1 (x100)	0x42	0xcc *Lo Hi*
Phase voltage 2 (x100)	0x43	0xcc *Lo Hi*
Phase voltage 3 (x100)	0x44	0xcc *Lo Hi*
Phase current 1 (x100)	0x45	0xcc *Lo Hi*
Phase current 2 (x100)	0x46	0xcc *Lo Hi*

5.2 Led´s on MotorView

In addition to the digital outputs, the die display, and the data interface, the device also has six LEDs for quick functional testing in the control cabinet.

Name	Function
Power	24V are applied
Data	The device receives data from the DressView display
Calib.	The system is calibrated at the current rotation frequency
T-Level	Set trigger level was exceeded
RPM ø	Rotation frequency is zero
RPM OK	Constant rotational frequency detected

7 Connection

The sketch shown in section 3.4.2.2 may be used as an example for connecting.

7.1 Connecting the SSE-System

The MotorView system is very easy to integrate into existing machines. Only the motor cables have to be disconnected from the existing inverter and connected to the MotorView screw terminals. Then connect the MotorView to the existing inverter with the supplied or your own second cable so that the spindle is connected to the inverter via the MotoView again. After that, only plug in the power supply and, if necessary, a DressView display.

<u>It must be ensured at all times to have the shield of the motor cables neatly connected to the housing via the grounding clip and also that the housing is neatly connected to the PE of the machine.</u>

Screw terminals Connection of the motor cables
The shield must be placed on the bracket

Data Interface Digital interface for direct data output to the machine control, or for connecting our SFU-Communicator (commands at 5.1)

DressView OT: Plug for the connecting cable to the DressView Operating Terminal

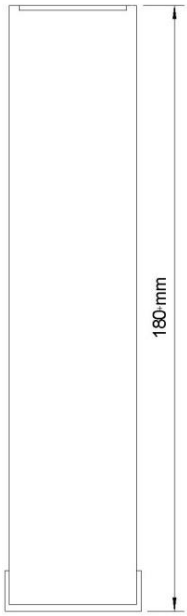
I/O Interface: Interface as specified in section 5.

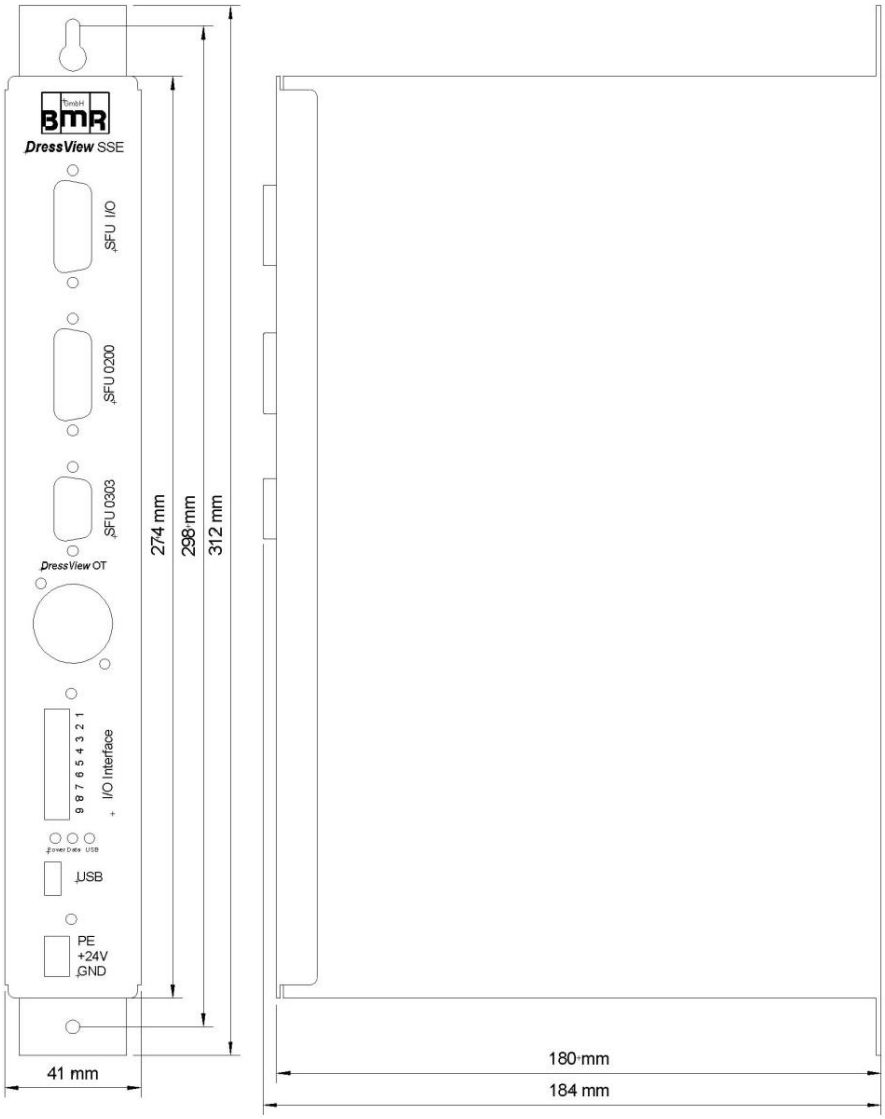
Power supply: 24VDC 2.5A

8 Delivery contents

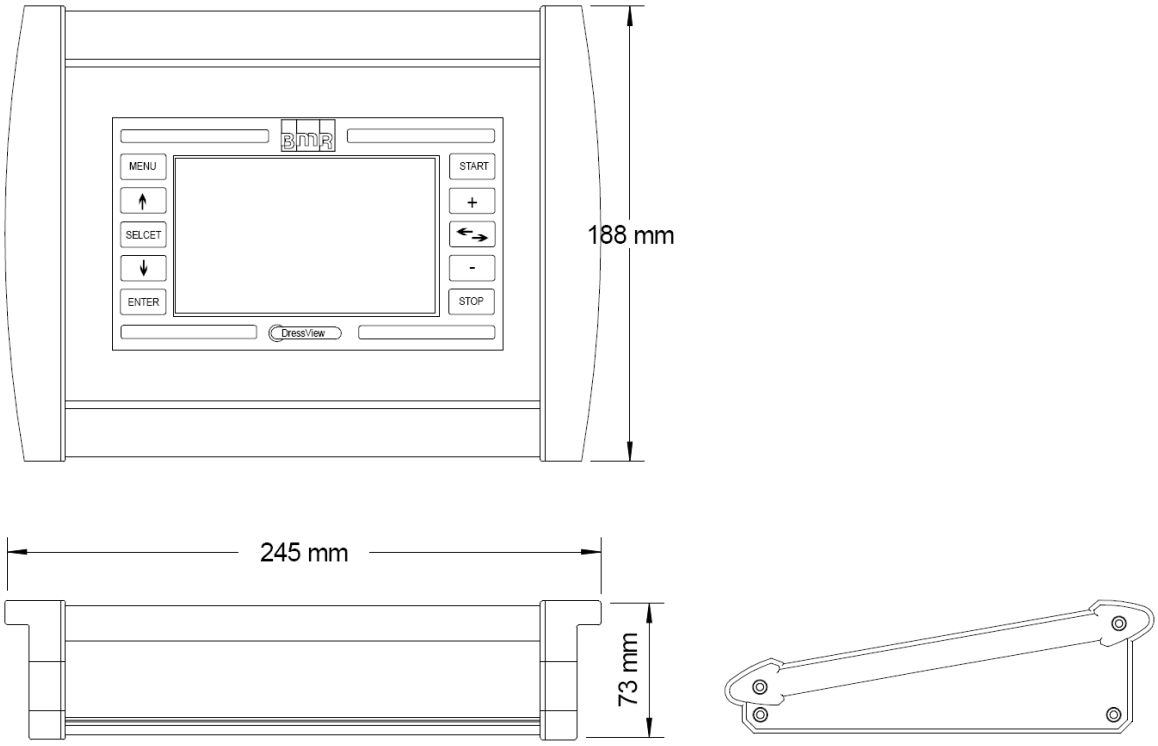
9 Dimensions and Mounting

SSE

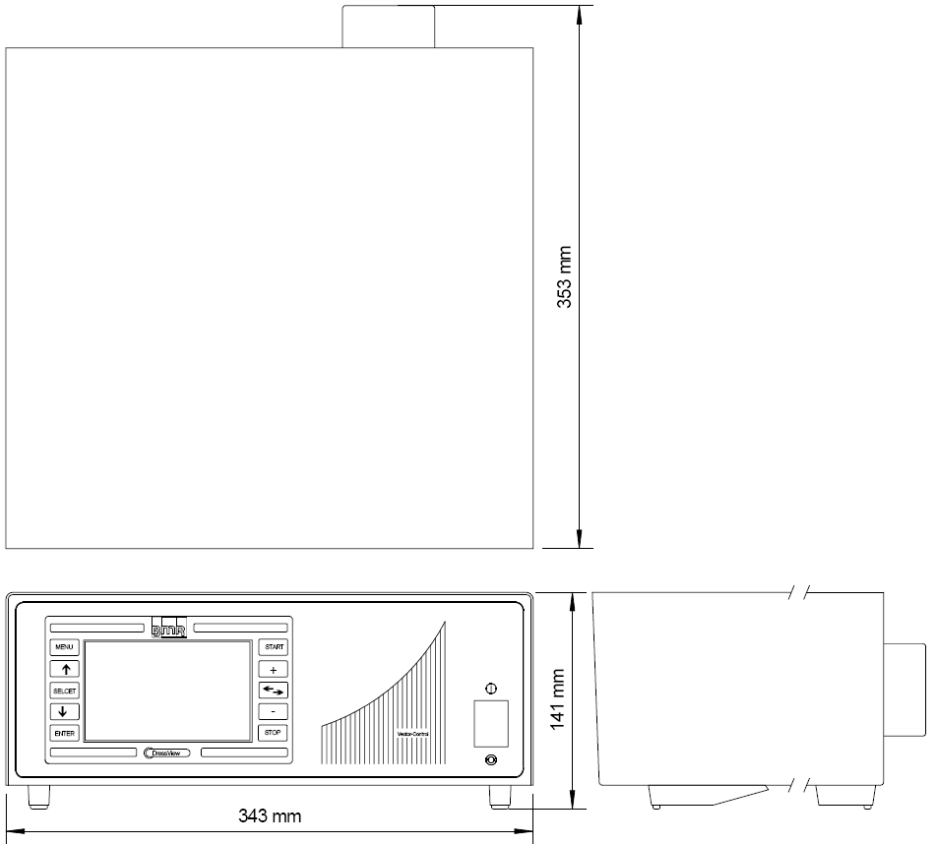




Operating Terminal



Desktop



OUR QUALITY COMMITMENT

100%	„Made in Germany“
100%	precision
100%	reliability
100%	support
100%	flexibility

Subject to technical alterations.
October 2020

www.bmr-gmbh.de

ANSPRECHPARTNER
CONTACT

FON +49 9122 / 631 48 - 0
FAX +49 9122 / 631 48 - 29

BMR GmbH
elektrischer & elektronischer Gerätebau

Walpersdorfer Straße 38
91126 Schwabach

E-Mail info@bmr-gmbh.de
Homepage www.bmr-gmbh.de

GESCHÄFTSFÜHRUNG
MANAGEMENT

Susanne Brittling
s.brittling@bmr-gmbh.de

Stephan Brittling
stephan.brittling@bmr-gmbh.de

ENTWICKLUNGSABTEILUNG
DEVELOPMENT DEPARTMENT

entwicklung@bmr-gmbh.de

EINKAUF
PURCHASE

Anja Lämmermann
a.laemmermann@bmr-gmbh.de

VERTRIEB
SALES

Michael Lämmermann
m.laemmermann@bmr-gmbh.de

Annette Farbulleh
a.farbulleh@bmr-gmbh.de