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## Технические характеристики на усилители измерения давления серии DMV 622

# **Operating instructions for Pressure Measurement Amplifier DMV 622**

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## 1.0 General Description

The DC Measurement Amplifier DMV 622 is a Measurement Amplifier for use with pressure or force transducers with DMS (strain gauge) full bridge switching (Wheatstone bridge).

The input voltage can be set for sensitivity ranges of 1mV/V, 2mV/V oder 3,3mV/V.

Output voltages are available as one voltage (0...10 V) output and one current (0...20 mA) output.

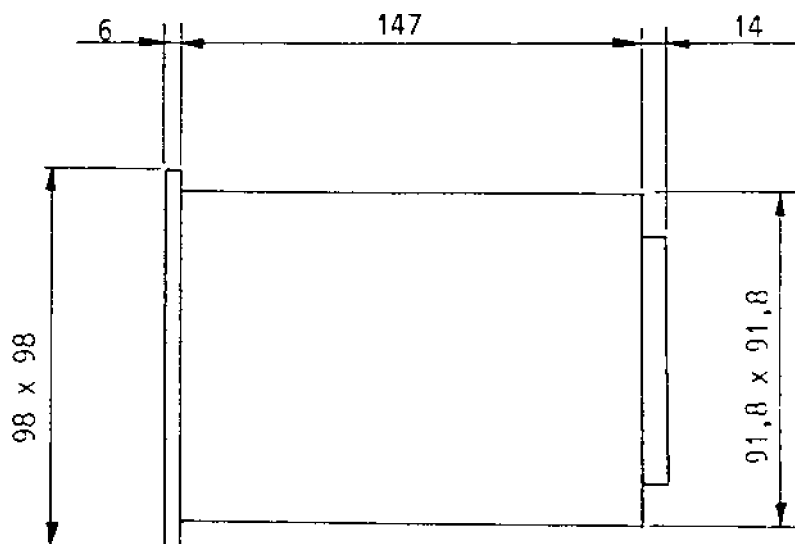
The current or actual measurement value is displayed on a 3 1/2 digit LED display. The measurement ranges can be selected by means of a step switch at the rear of the unit (from 0...50 to 0...1999).

Further, the DMV 622 has 2 limit value switches which can be set at the front of the unit using two 3 digit selectors (between 0-100% in 1% steps). The limit value outputs are potential-free change-over contacts. Their operation is displayed by an LED at the front of the unit. When a limit value is reached, the relays switch, and remain in this position, when in „self-holding“ operation, until the „reset“ key is pressed. This makes it possible to look for the cause of the pressure increase after the pressure has fallen back below the limit value setting. In „non-self holding operation“, the relays switch once again when the actual value falls below the limit value. Should a cable breakage occur (i.e. an interruption in the transducer), the DMV's display changes to „positive overflow“ and the limit value relays switch. This permits the measuring system to be monitored.

### Special notes:

- Do not operate keys or switches with force!
- Do not open the housing of the DMV - the unit could become damaged and you could receive an electrical shock.
- Should you encounter problems, first go through the fault check-list. Should the fault continue, please contact one of our service technicians (tel. (0) 5731 - 5307 -0).
- The supply voltage MUST be observed!

## 1.1 Dimensions:



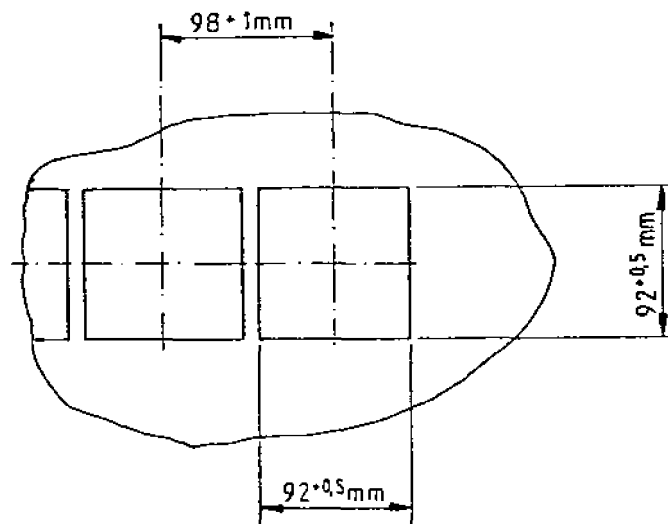
## 2.0 Installation

The DMV 622 is designed for installation in the front panel of a control cabinet. The unit should be fitted, according to the following conditions:

- Ambient operating temperature: 10-50° C
- Installation as far away as possible from strongly inductive sources of interference (transformers, motors etc.)
- Protection from vibration, dust, heat, cold and humidity.

The electrical connection should be carried out as described under point 3.0

## 2.1 Control panel cut-out



## 3.0 Electrical Connection

The electrical connection should be carried out according to the terminal diagram (3.1) and the local regulations. Important: check the supply voltage of the unit.

Before connecting the supply voltage, re-check all the connections.

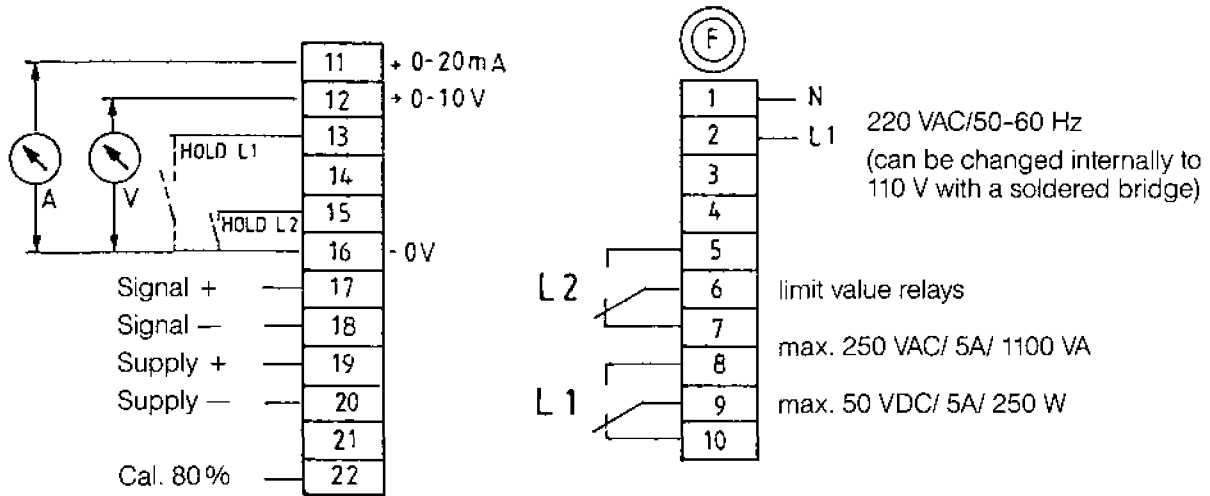
Signal cables should be located as far away as possible from supply and switch cables.

Only use screened cables (5 x 0,25 mm<sup>2</sup>) for connecting the transducer(s). Observe the maximum load with which the limit value relays can be run (250 VAC/5A). Should heavier loads than 50 VA need to be switched, the limit value relay contacts should be fitted with RC link contactors.

**IMPORTANT!**

- Short-circuits, and swapping of the connector strips **MUST** be avoided!

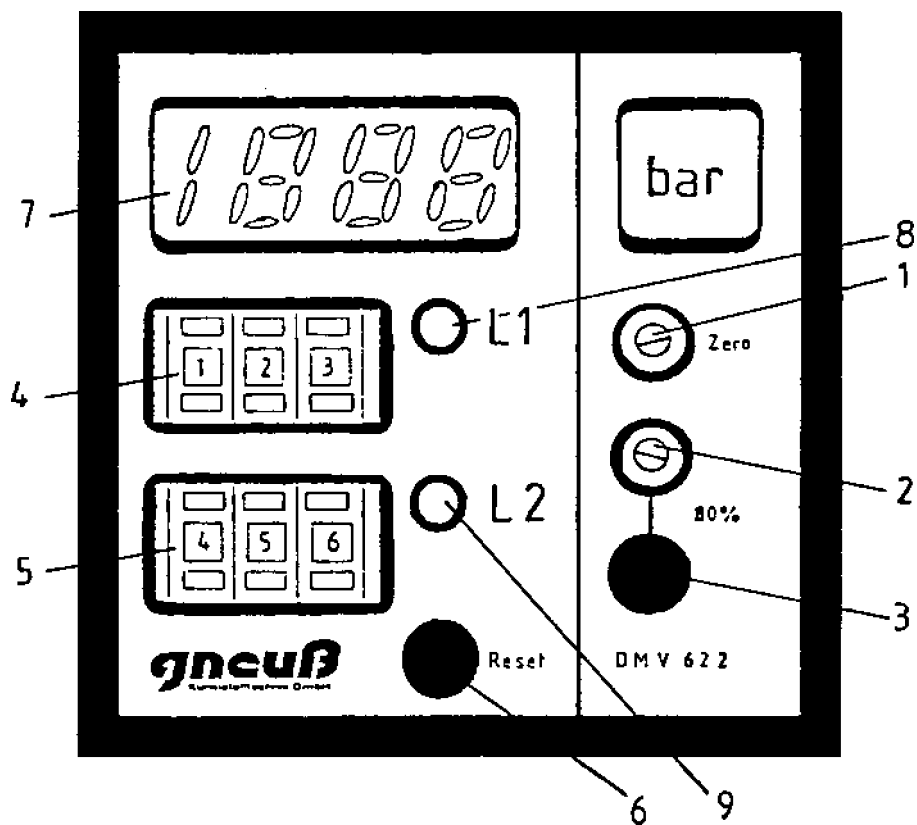
### 3.1. Terminal diagram



Terminal DMV	Cable colour	Terminal DA
17	Yellow	A
18	White	B
19	Brown	C
20	Green	D
22	Grey	F

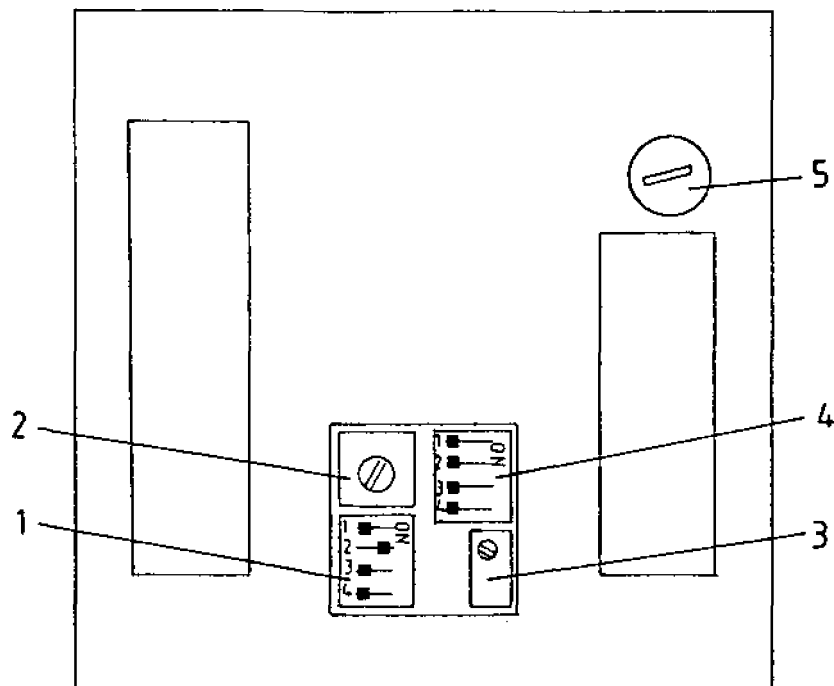
## 4.0 Controls

### 4.1 Front panel



- 1 - Trimmer „Zero“ (zero point)
- 2 - Trimmer „80%“ (display-fine)
- 3 - Trimmer „80%“ (Calibration)
- 4 - Code switch for limit value 1 (L1)
- 5 - Code switch for limit value 2 (L2)
- 6 - Reset key
- 7 - Digital display
- 8 - LED display-limit value 1 (L1)
- 9 - LED display-limit value 2 (L2)

## 4.2 Rear of unit



1. - DIP-switch block „sensitivity“
  - 1 = 1 mV/V
  - 2 = 2,2 mV/V
  - 3 = 3,3 mV/V
  - 4 = -/-
2. - Step switch „display-coarse“
3. - Trimmer „amplification“ (calibration)
4. - DIP switch block "decimal point"
  - 1 = -/-
  - 2 = 10
  - 3 = 10
  - 4 = 10
5. - Fuse 0,1 A inactive (220 VAC)  
inactive (110 VAC)

## 5.0 Adjusting the Pressure Measurement Amplifier

All units are supplied adjusted and calibrated, as far as possible. If this was not possible, the units are supplied, adjusted as follows:

- Sensitivity: 2 mV/V
- Measurement range: 0...1000 bar
- Limit values: 10% (100 bar)
- Calibration at 80%: (= 800 bar)

### 5.1 Fine Adjustment

Although the unit will have been adjusted before it left our works, fine adjustment will be necessary once the unit has been connected. The fine adjustment should be repeated every 10.000 operating hours, or at least every 6 months, to compensate for the ageing process of the components.

The following will be necessary:

- 1 Pressure/force transducer
- 1 Voltmeter 0-10 V or;
- 1 Ammeter 0-20 A.

The fine adjustment should be carried out as follows:

- Carry out the connection as described under 3.0
- Connect the Volt or Ammeter (terminals 16 and 12 and 11 respectively).
- Connect the pressure or force transducer. The transducer must not be under pressure or load, and should be at its normal operating temperature (temperature of the machine).
- Connect the power supply
- Allow the unit approximately 15 minutes to warm up.
- Press the „Reset“ key once.

#### 5.1.1. Zero-point calibration

- Use the „Zero“ trimmer located at the front of the unit, to adjust the display to „0“ and the voltage/current output to 0/2 V or 0/4 A respectively.

#### 5.1.2. 80% calibration

- Press the „80%“ key and keep it depressed.
- Using the „amplifier“ trimmer at the rear of the unit, adjust the analog output to 8 V or 16 mA respectively (independently) from the display!).
- Using the trimmer „display-fine“ at the front of the unit, set the display to 80% of the pressure range (e.g. measuring range 0...400 bar, 80% = 320 bar).
- Release the 80% key - the calibration process has been completed.

### 5.2. New Adjustment

Should the unit have been supplied without having been completely calibrated, or should a pressure transducer with a different pressure range, or a different transducer need to be used, the unit will need to be calibrated to the relevant transducer.

The following will be necessary:

- 1 pressure/force transducer with relevant data sheet
- 1 Voltmeter 0 - 10 V or.
- 1 Ammeter 0 - 20 A.

The new adjustment should be carried out as follows:

- Carry out the connection as described under point 3.0,
- Connect the Volt or Ammeter (terminals 16 and 12, and 11 respectively).
- Connect the pressure or force transducer. The transducer must not be under pressure or load, and should be at its normal operating temperature (temperature of the machine).
- Connect the power supply.
- Allow the unit approximately 15 minutes to warm up.
- Press the „Reset“ key once.



## 5.2.1. Setting the sensitivity (amplification)

The sensitivity setting to be adjusted can be obtained from the data sheet for the relevant transducer. According to this information, set the relevant switch of the DIP switch block „amplification“ to „on“ and „1“. The remaining switches should be set „0“ or „OFF“.

Using the trimmer „Zero“ at the front of the unit, set the display to 0 and the analog output to 0 V or 0 mA.

## 5.2.2. Setting the measurement range

Using the control knob at the rear of the unit „display coarse“, the required measuring unit can be selected. The measuring ranges are as follows:

	measuring range
0	0 ..... 50,0 bar
	0 ..... 500 bar
1	0 ..... 100,0 bar
	0 ..... 1000 bar
2	0 ..... 200 bar
3	0 ..... 400 bar
4	0 ..... 600 bar
5	0 ..... 700 bar
6	0 ..... 800 bar
7	0 ..... 1999 bar (= 2000)
8	not in use
9	not in use

Using the DIP block switch at the rear of the unit „decimal point“, the measuring ranges are subdivided as follows:

Setting of the turn switch	Setting of the DIP switch 10°	Measuring range
0	0	0 - 500 bar
0	1	0 - 50,0 bar
1	0	0 - 1000 bar
1	1	0 - 100,0 bar
2	0	0 - 200 bar
2	1	0 - 20,0 bar
3	0	0 - 400 bar
3	1	0 - 40,0 bar
4	0	0 - 600 bar
4	1	0 - 60,0 bar
5	0	0 - 700 bar
5	1	0 - 70,0 bar
6	0	0 - 800 bar
6	1	0 - 80,0 bar
7	0	0 - 1999 bar
7	1	0 - 199,9 bar

### Important!

The measuring range set on the DMV 622 must always correspond to that of the pressure transducer to which it is connected. All switches which are not required should be set to „0“ or „Off“.

The measuring ranges can be altered further by using the DIP switches 10 and 10. For example:

Measuring range at 10°, 10, 10 at „0“, or „Off“:	0 - 1999 bar
Measuring range at 10° at „1“, or „On“:	0 - 199,9 bar
Measuring range at 10 <sup>1</sup> at „1“, or „On“:	0 - 19,9 bar
Measuring range at 10 <sup>2</sup> at „1“, or „On“:	0 - 1,9999 bar

The measuring ranges which can be set using „10<sup>1</sup>“ and „10<sup>2</sup>“ are rare for pressure transducers. With respect to force transducers, the settings should be clarified with one of our technicians.

### 5.2.3. Calibration

a) Zero point:

- Using the trimmer „Zero“ at the front of the unit, set the display to 0 and the analog to 0/2 V or 0/4 mA.

b) 80% calibration

- Press the „80%“ key, and keep it depressed.
- Using the „amplification“ trimmer at the rear of the unit, adjust the analog output to 8V or 16 mA respectively. (independently from the display).
- Using the „80%“ trimmer at the front of the unit, set the display to 80% of the measuring range (e.g. measuring range 0...400 bar, 80% = 320 bar).
- Release the 80% key - the calibration process has been completed.

## 5.3. Setting the limit values

The setting of the limit values L1 and L2 is carried out using the 2 code-switches from 0-999 bar, located at the front of the unit.

After having set the required limit values L1 und L2, press the "Reset" key.

### 5.3.1. Operating with/without self-holding of limit values

By connecting the 16 (0 V) terminal with terminal 13 (L1) and terminal 15 (L2) respectively, the limit values can be switched to "self-holding" condition (see 3.1). This can be achieved by using wire bridges, or by fitting switches to the front panel of the control cabinet (1 closing switch each). This has the advantage, that the mode of operation can be altered while running, without having to open the control cabinet. Should operation without self-holding of the limit values be required, the bridges should not be fitted (i.e. the terminals should be left as they were).

Finally, the functions of the pressure measurement amplifier should be checked by means of a suitable simulator.

(A pressure transducer simulator is also available from Gneub).

## 6.0. Technical Data

Input:	Resistance-strain gauge (Wheatstone bridge) 350 (200 ... 5000 $\Omega$ )
Transducer supply:	$\pm 2 \dots 5$ VDC Standard: $\pm 3$ VDC
Input sensitivity:	1 mV/V, 2 mV/V, 3,3 mV/V- selectable
Analog outputs:	- 0 ... 10 V, load 0 ... 1000 $\infty \Omega$ - 0 (4) ... 20 mA, load 0 ... 500 $\Omega$
Remaining wave/ fluctuation:	0,5% of max. value with 2mV/V.
Display:	3 1/2 digit LED display (red).
Limit values:	2, adjustable via 2 code-switches Limit value switchover relay contacts. DC: 250 W with adequate spark protection. AC: 1100 VA - Memory of limit values (selectable) - Display via 2 LEDs. - Switching delay 1 ms.
Measuring ranges (adjustable) (see 5.2.2.)	0 - 50.0/500 bar 0 - 100.0/1000 bar 0 - 200 bar 0 - 400 bar 0 - 600 bar 0 - 700 bar 0 - 800 bar 0 - 1999 bar
Linear error:	< 0,1 %
Zero point drift:	0,2 $\mu$ V/K at input
Amplifier drift:	0,01 % from measuring range
Frequency range:	0-1 kHz/-3 dB
Storage temperature range:	-10 ... + 60 $^{\circ}$ C
Operating temperature range:	0 ... + 50 $^{\circ}$ C
Max. permissible air humidity:	< = 65 % without condensation build-up
Measuring speed (display):	< 1/5
Power supply:	110/220 V, 50 - 60 Hz
Power consumption:	30 mA/7W

## **7.0. Fault Check-List**

### **7.1. General**

The faults listed in this check list are those which experience has shown us to be the most common. These are as follows:

- Faulty wiring
- Cable breakage
- Short circuits

Should the detection of a fault according to the check list be unsuccessful, a more thorough check of the measuring equipment should be undertaken. We recommend that the connecting cable to the transducer, the transducer itself and the soldered connections on the plugs and sockets are checked. The behaviour of the digital display and the voltage output indicates the fault - i.e. short-circuits and cable breakages in the connecting cable to the transducer, or fault(s) in the transducer itself. The leaflet „transducer connections“ should be consulted, together with the data sheet and instruction manual for the relevant transducer.

Should the above indicate a fault in the transducer or DMV 622, we request that the unit be returned to us for repair, with a description of the fault.

Repairs must be carried out by Gneuß if the validity of the guarantee is to be maintained.

Damage to the probe heads of force transducers, and to the membranes of pressure transducers are not covered by guarantee. In such cases, the cause of damage must be ascertained individually, otherwise, our current terms and conditions for repair work shall apply.

### **7.2. Connecting/testing the Pressure Measurement Amplifier**

Where possible, the complete measuring system should be checked. Should this not be possible (pressure or force transducer fitted to the machine), an identical transducer should be used for testing. By far the best way of testing the Pressure Measurement Amplifier is by using a pressure transducer simulator (also available from Gneuß). This has the advantage, that it enables the Pressure Measurement Amplifier to be tested across its full measuring range.

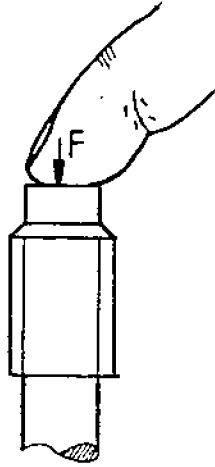
Connections (if no plugs are fitted) should be carried out according to point 3.0.

## 7.2.1. Applying test pressure

- Pressure transducer

### Important!

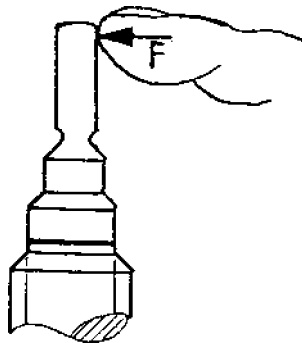
The test pressure of approx. 4 bar on the membrane should be applied **only with the fingertip!** Do not use hard objects (wood, metal screwdriver etc.), or damage to the sensitive membrane could result.



- Force transducer

### Important!

Apply test pressure only with the finger! Do not use unsuitable devices or too high a force, or damage to the force transducer could result.



- Pressure/force transducer simulator

Using a suitable simulator (available from Gneuß) avoids the risk of damaging the transducer. Please observe the operating instructions for the simulator.

## 7.2.2. Testing process

Adjust the unit as described under point 5.2., check and correct as far as possible.

Exceptions: - Pressure/force transducer must be at room temperature  
- only connect a voltmeter.

Check the defect using the checklist, and rectify the fault.

Proceed in the following order (as far as possible):

Check the zero-point

Check the 80% calibration

Apply test-pressure

Check the operation of the limit values.

When carrying out the above checks, observe the voltage output and the digital display. Should no clear result be obtained, carry out the checking process once more.

# 7.3. Fault Check List

	Pressurress (0-point)	with test pressure	80 % cal. (key pressed)	Function limit value relay	Cause of malfunction
Display	not illuminated	not illuminated	inoperative	inoperative	No power supply - check supply cable - check 0,1 A fuse
UA	0 V	0 V	0 V		
Display	> 1000	> 1000	inoperative		Supply to terminal 17 and/or 18 interrupted
UA	> 10 V	> 10 V	> 10 V		
Display	0 < X < 50	0 < X < 50	inoperative	inoperative	Supply to terminal 19 interrupted
UA	0 V < X < 2 V	0 V < X < 2 V	0 V < X < 2 V		
Display	X < < 0	X < < 0	X < 0	inoperative	Supply to terminal 20 interrupted
UA	X < < 0 V	X < < 0 V	X < 0 V		
Display	0	X	inoperative	inoperative	Supply to terminal 22 interrupted
UA	0 V	X V	0 V		
Display	X < 0	X < < 0	X = - 80 %	switches at X = - X	Supply to terminals 17/18 swapped
UA	X < 0 V	X < < 0 V	X = - V		
Display	X < 0	X < < 0	normal	switches at X = - X	Supply to terminals 19/20 swapped
UA	X < 0 V	X < < 0 V	8 V		
Display	0 < X < 50	0 < X = 50	X reduces	inoperative	Supply to terminals 18 and 19 swapped
UA	0 V < X < 2 V	0 V < X < 2 V	X reduces		
Display	(80%)	80% + X	inoperative	inoperative	short-circuit terminals 20/22
UA	8 V	8 V + X	8 V		
Display	-(80%)	-80% · X		O. K.	short-circuit terminals 19/22
UA	- 8 V	- 8 V	X < 0 V		
Display	10 < X < 100	10 < X < 100	inoperative	inoperative	short-circuit terminals 17/18
UA	ca. 4 V	ca. 4 V	ca. 4 V		
Display	X < < 0	X < < 0	inoperative	inoperative	short-circuit terminals 18/19
UA	X < < 0 V	X < < 0 V	X < < 0 V		
Display	not illuminated	not illuminated	inoperative	inoperative	short-circuit terminals 19/20
UA	X < - 10 V	X < - 10 V	X < - 10 V		
Display	X	X	-X	O. K.	short-circuit terminals 17/22
UA	X	X	- 50 %		

## **7.4. Special Notes**

### **7.4.1. Zero point shift**

- Where the Zero point shift is within the range of  $\pm 10$  digits: probably ageing affect (see 5.1.).
- Where the Zero point shift is greater than  $\pm 10$  digits: check the transducer for damage.

### **7.4.2. No measurement possible**

- DMV Pressure Measurement Amplifier is faulty (see 7.1.)
- Transducer is defective (checking: see 7.2.)

### **7.4.3. Erroneous measurement values**

- Check that the measurement value range of the transducer corresponds to the setting of the DMV 622.
- Check the sensitivity setting (see 5.2.1. and 4.2.)
- Check the calibration (see 5.2.3.)

## **8.0 Maintenance**

Apart from the occasional fine adjustment of the unit (see 5.1.), the DMV 622 is maintenance-free.

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