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Operating manual and adjustment instruction

Digital Measuring Amplifier LP24



Digital Measuring Amplifier LP24



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Appendix:

- Functional scheme
- Terminal diagram

This manual was prepared according to the best of our knowledge and belief. **LIEDTKE** is not liable for possible errors and reserves the right to make technical changes without prior notice.

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Important Safety Instructions

The device may only be installed and connected by an electrically skilled person with the aid of this manual. National standards and safety regulations must be observed (see DIN V VDE V 0100534... or IEC 60364-5 534:...).

The device must be checked for external damage prior to installation. If any damage or other defects are detected in this check, the device must not be installed. Its use is only permitted within the limits shown and stated in these manual. The device and the equipment connected to can be destroyed by loads exceeding the values stated. Opening or otherwise tampering with the device invalidates the warranty.

The manufacturer does not take over any responsibility for any consequences resulting from incorrect or negligent installation, change of existing parameters of the devices or the false combination with peripheral components.

A device-independent power shutdown must be guaranteed. Fuses may only be replaced by fuses of the same type. The operation of the device is only permitted with connected protective conductor.

For reference and actual signals you have to use shielded cable. To this please also note the hints for an EMC-proper installation.

In the devices are used components which are sensitive to electrostatic discharges. During the operation, installation and maintenance, measures have to be taken in order to avoid electrostatic discharges.

Attention:

As a basic principle the device has to be made dead before any contact. In case of non-observance there is the possibility of an electrical shock.



1. Product description Digital Measuring Amplifier LP24

The Digital Measuring Amplifier LP24 serves for the amplification of low voltage signals in the range of only few mV.

It is structured specially for the connection of instrument transformers as load cells, traction bearings or torque measurement with integrated ohmic resistance bridge (Wheatstone-bridge). The resistance bridge is supplied by a short-circuit proof constant voltage sources.

The handling and programming is made by either the foil keys of the front panel or by the provided programming software for Windows®.

The Measuring Amplifier consists of two separate channels that are prompted by separate converters. The measurement takes place simultaneously on both channels.

The signal of the measurement converter does not match the ground (GND). Each measuring channel has a zero point alignment as well as an amplifier adjustment in the range of V = 1...2000.

The Digital Measuring Amplifier LP24 supplies three different output signals:

- 1. The direct amplified bridge signal
- 2. The positive action of this bridge signal
- 3. The amount of this signal

These analogues amounts are shown on the LC-Display in the front panel.

The analogue Exit (Main) can be set up that is gives an output of one of these Signals. This analogue value is shown in the LC- Display. Besides that the signal of both measuring bridges is released at two more outputs.

The output signal ranging from 0 to +10 V can be released by the integrated U-lconverter, also as current signal of 0...20 mA or 4...20 mA. The integrated active attenuation provides a stable output signal of 0...10V, as well as the signal for the attachment of a 1 mA- measuring instrument.



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2. Connecting

The Digital Measuring Amplifier LP 24 needs a supply voltage of 24 VDC at the connecting terminals 30a/c (-) and 32a/c (+), The protective earth conductor is connected to terminal 28a/c. A protective circuit prevents the destruction of the measuring amplifier in the case of false polarization.

For the usage with 230 VAC an external voltage supply with approximately 1 A secondary nominal /rated current is necessary. (An adequate device is optionally available)

Measuring transducer are connected to the terminals 2a (S+), 4a (S-), 6a (UB-) and 8a (UB+) resp. 2c, 4c, 6c and 8c according to the terminal diagram.

The terminals I0a/c are the 0V- reference for analogue signals; 12a provides a reference voltage 10VDC, approximately 10mA. The terminals 16a, 18a and 20a are analogue inputs (0...10V) for the setpoint value, the U-I- converter and the active attenuation. The analogue output signals are available at the terminals 2c to 22c. The controller release takes place via a high- signal at the terminal 22a; signal at the terminals 24s and 26a store and delete measured values, actual and saved respectively. The terminals 24c and 26c are programmable in/ outputs of the processor. These can as free data logger read in analogue signals of 0... I OV or 0...24VDC and release 24V- digital signals (not potential-free) respectively.

Attention: When running the Digital Measuring Amplifier with Zener barriers the Digital Measuring Amplifier must be ground lifted. The Zener barriers by STAHL Co. according to our drawing-no. 4.1421 are recommended. (Type 9002/77-093-040-001 for measuring signal, Type 9002/10-187-270-001 for supply)

2.1 Hints for an EMC-suitable installation

In order to observe the electromagnetic compatibility please note the appropriate guidelines and instructions.

This applies especially to:

- installationearthing
- filtration
- shielding

The next user is responsible for the observance of the EMC- guideline in case of industrial use.

If all components / plant components meet the CE- immunity requirement, then no electromagnetic impairments have to be expected.

Wiring tips:

The test leads should be performed with screened cables. The cross section is to be adjusted to the length of the lines. The calculation basis is an electric current of 15 mA with a value of resistance of 390 ohm. The lines should not be passed parallel to the motor lines.



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3. Putting into operation and adjustment instruction

3.1 Preparing start-up

Before switching on the supply voltage it must be checked, whether the Digital Measuring Amplifier is connected correctly.

When the supply voltage is activated, the display shows the starting image.

All upcoming adjustments and programming can be done by either using the keys of the device or with the help of the software (see chapter 4). In the following part is the description of the adjustments using the device.

The **OK**-key opens the editor modus (press the OK-key 4sec.), confirms the choice and opens the parameter input. To get to the different menu levels use the keys < > (< can also be used for the interruption of a procedure.) The different menu items can be chosen via the keys $\blacktriangle \nabla$. The actual choice is marked on the display with a ▶ sign on the left side; an E appears when the parameter input is opened. Parameter values can now be changed using the $\triangleleft \triangleright$ keys. The arrow on the bottom shows a skip into the next picture or starting image right. The display goes back to the starting image when pressing the arrow for

approximately 20 sec.

3.2 Adjustment of the zero point

The adjustment can be done automatically as well as manually.

For the adjustment of the zero point the measuring systems are to be relieved mechanically. The measuring system should get checked if it is assembled correctly. (Tightness etc.)

For an automatic adjustment choose the menu ALIGNMENT -> AUTOMATIC -> ZERO POINT. The adjustment is done on both channels.

For the manual adjustment choose the menu ALIGNMENT-> MANUELL -> ZERO POINT. Press OK, E appears in the left side of the display, adjust the parameter value with $\triangleleft \triangleright$ and confirm with **OK**.

3.3 Adjustment of the amplification

If the loading of the measuring roll cannot be calculated exactly, then we recommend to calibrate the measuring system by putting weights on the measuring roll. To do so, conduct a belt webbing, following the run of the product, centric above the measuring roll and load it with weights up to the maximum tractive force. When measuring both sides, thus each force measurer takes up half of the load. Repeat the adjustment of the zero point and the amplifier alternately until no more deviations can be observed. To adjust the zero point, relieve the load on the measuring roll. A high measuring accuracy can be obtained if the measuring system is calibrated by putting weights on the measuring roll.

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	The measuring system is prepared the ways described ab measuring signal. At the formation of the totals of both mea following this formula is performed:	oove to produce a relevant asuring signals, an addition
	$\frac{\text{channel A}}{2} + \frac{\text{channel B}}{2} = F_{comp}$	
	A formation of both totals following the formula has the ac breakdown of one measuring system one can switch to a with a constant output voltage (no tension decrease). The f automatically deleted and the signal of the particular channel	dvantage, that in case of a a one-sided measurement formula for addition is then el is directly released.
	For an automatic adjustment choose the menu ALIGNM AMPLIFICATION. The adjustment is done on both channels	MENT -> AUTOMATIC -> s.
	For the manual adjustment choose the menu ALIG AMPLIFICATION. Press OK , E appears in the left side parameter value with ◄ ► and confirm with OK .	NMENT-> MANUELL -> of the display, adjust the
	The processor adjusts the measurement signal to +10V. with the load of the measuring system a positive change in Then test the adjustment of the zero point and the ampli necessary align it again.	Hence it is important that voltage occurs. ification once again and if
3.4	Adjustment of the PID-Controller Not yet available	
3.5	 Adjustment of the output value This menu point has the submenus 1. Filter: This parameter causes an average determined values. Here the attenuation of the output signal can be ms) 	ination at unsteady actual adjusted. (Time setting in
	2. Scaling: Here the value is set that corresponds to the 10V/20mA. (Force in N)	e maximum output value of
	3. Signal: Here is set, which analogue value in the disp at the analogue output respectively. (bridge circuit signal/ channel A+B/A/B)	play is shown and lines up positive signal/ amount of
igital M Date: 2	Neasuring Amplifier LP24 22.12.2011	page 7 drawing no.: 1.1447e



3.6 Configuration of the optional inputs, U-I- converter

Alignment of the optional inputs

The optional inputs (terminal 18a and 20a) can be adjusted to different signals with jumpers on the main circuit board. There is the possibility to either *read* in an analogue signal of 0...10V or 0...24V or to *release* a potential-afflicted 24 VDC signal.

Adjustment of the Jumper	Option 1	l (18a)	Option 2 (20a)		
	JP1	JP3	JP2	JP4	
Analogue input signal 010V	1	2	1	2	
Analogue input signal 024V	2	3	2	3	
Digital output signal 24VDC	3	1	3	1	

Alignment U-I-converter

The initial value of the electricity signal can be adjusted with a jumper at the exit of the U-I- converter.

Adjustment of the Jumper	JP7	JP8
Analogue signal 020mA	1-2	1-2
Analogue signal 420mA	2-3	2-3



4. Programming software for Windows©

Requirements for the system:

Operating system Windows 98/2000/XP/Vista/Windows 7 (32 bit version), serial connection (RS- 232), USB –RS232 only with delivered interface, free hard- disc storage unit, keyboard, mouse

Note:

The connection to the USB- Port of a computer via a USB- serial- adapter is only possible with the USB-RS232 interface which includes this delivery!

Installation:

Before installation the software LP24 first install the USB Driver/ Ksetup which you find on the CD.

🗿 KMTec	Setup-Informationen	2 KB	Nein	8 KB	83%
🚳 KMTec.dll	Anwendungserweiterung	285 KB	Nein	726 KB	61%
KMTec.sys	Systemdatei	240 KB	Nein	768 KB	69%
💷 Ksetup	Anwendung	246 KB	Nein	588 KB	59%

After that you can start the installation of LP24

The serial connection between the Digital Measuring Amplifier LP24 and the computer has to be established before the ignition of the program.

Functions like *read*, *save as*, *print* etc. can be selected via the pull- down menus of the program window (*Data, serial, Extras*).

The menu pages and their functions are described in the following paragraphs.

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Adjustment language	
Start up the PC Software LP24 the first step should be the adjust of the language english:	ment
V Liedtke-System LP24	
status COM Port > Graphic diagnose Password	
LP 24 Title PC software Language → German Concent Vertice 2.0.6.20.07.20.11	MC software
Verson 2.05 20.02.2011	
Measuring amplifier MC AD-converter MC AD-converter Channel A 0	Versions
zero point offset A 0 channel B 0	negate option 2 Sollwert = Kanal B
zero point offset B 0 setpoint 0	negate setpoint
2. zero point offset A 0 option 2 0	Hardware calibration PID contoller locked
gain A 0 MC DA-converter	filter option 1
gain B 0 output AB 0	filter setpoint
filter 0	Switch input PID
Wi-scaling 0	Input option 1
preamplifier 0 output B 0	Input option 2
PID-controller - P-component val. 0 I-component scal. P-component - I component val. 0 output PID scal. I-component - D-component val. 0 setpoint fix D-component - - input setpoint input setpoint	0
After adjustment of language it is necessary tu restart program.	
igital Measuring Amplifier I P24	naga 10



4.1 Status

This page serves to display the data of the Digital Measuring Amplifier LP24. Fist of all choose CONNECTION to build up the online connection. Now all the values generated by the Digital Measuring Amplifier LP24 can be seen online.

settings calibration Graph	c diagnose					
24				PC software		MC software
Connect		Disconnect		Version	2.0.6 20.02.2011	•
suring amplifier				MC AD-converter		Versions
Mode				channel A	0	2. zero point
7610	point offset A	0		channel B	0	negate option 2
	point officiat P	0		setpoint	0	Sollwert = Kanal B
2610	point onset b	U		option 1	0	negate setpoint
2. zero	point offset A	0		option 2	0	Hardware calibration
2. zero	point offset B	0				filter option 1
	gain A	0		MC DA-converter		filter Option 2
	gain B	0		output AB	0	filter setpoint
	filter	0				Switch input PID
0	VN-scaling	0		output A	0	Input channel AB
		•		output B	0	Input option 1
	preampriner	U		osque o		Input option 2
-controller						
PID-controller		-	P-component val	0	I-component scal.	0
P-component		-	I-component val	0	output PID scal.	0
I-component		-	D-component val	0	setpoint fix	
D-component					input setpoint	

The status LED's at the bottom left of the window indicated the status of the driver, port and online connection. All three indicators are green while the connection exists. MC- software: State of the version of the processor in the measuring amplifier PC- Software: Stand of the version of the PC program The switch DISCONNECT stops the online connection.



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4.2 Settings

Here the presetting of the Digital Measuring Amplifier LP24 is conducted. At first read the actual settings from the LP24 with the switch READ DATA. The online connection needs to be established.

	syriose			
LP 24				
Data read Data write				
PID-controller				
on / off		controller	scaling	setpoint
PID-controller		P-component 0,00	I-component 0,0 % 🚖	internal fixed value 0,00 V
I-component		D-component 0,00 s	PiD output 0,0 %	Sepont warpotentioneter
D-component				
output				Extras
Measure channel A + B	channel A + B positive	absolute value channel A + B		filter 0
Measure channel A	channel A positive	absolute value channel A		10 Volt -> 0,00
Measure channel B	channel B positive	absolute value channel B		preamplifier
u tput value: He	ere is set, which analogue	value is to be sho	wn on the	display and
utput value: He ned up at the a nount of the cha Iter: This paran ere the attenuati	ere is set, which analogue nalogue output respective nnel A+B/A/B) neter causes an average on of the output signal is a	value is to be sho ely. (bridge circuit s determination at ur idjusted. (Time sett	wn on the signal /pos nsteady ac ing in ms)	display and sitive signal, ctual vatues
utput value: He ned up at the a mount of the cha ilter: This param ere the attenuati alculation/ Scal DV/20mA is set. (ere is set, which analogue nalogue output respective nnel A+B/A/B) neter causes an average on of the output signal is a ing: Here the value corre (Force in N) see Chapter 3	value is to be sho ely. (bridge circuit s determination at ur idjusted. (Time sett sponding to the ma 3.5	wn on the signal /pos nsteady ac ing in ms) aximum ini	display and sitive signal, stual vatues itial value of
Putput value: He ined up at the a mount of the cha ilter: This param ere the attenuati alculation/ Scal 0V/20mA is set. (re-amplifier: Act	ere is set, which analogue nalogue output respective nnel A+B/A/B) neter causes an average on of the output signal is a ing: Here the value corre (Force in N) see Chapter 3 tivate when little measurer	value is to be sho ely. (bridge circuit s determination at ur adjusted. (Time sett sponding to the ma 3.5 nent signal occur.	wn on the signal /pos nsteady ac ing in ms) aximum ini	display and sitive signal, etual vatues itial value of
Putput value: He ined up at the a mount of the cha ilter: This param ere the attenuati alculation/ Scal 0V/20mA is set. (re-amplifier: Ac ID-controller: Th Description is not	ere is set, which analogue nalogue output respective nnel A+B/A/B) neter causes an average on of the output signal is a ing: Here the value corre (Force in N) see Chapter 3 tivate when little measurer ne access is possible with yet available)	value is to be sho ely. (bridge circuit s determination at ur digusted. (Time sett sponding to the ma 3.5 nent signal occur. enabled PID- contr	wn on the signal /pos nsteady ac ing in ms) aximum ini oller	display and sitive signal stual vatues



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4.3 Alignment

In this window the alignment of the measurement device is carried out

Liedtke-System LP24	_	~				_						- 🗆 🗙
ile Serial Extra Help												
status settings calibration Graphic diagno	se											
manual calibration												
channel A	2 -						2 -					
zero point +/- 50%	1 -						<u>n</u> 1-					
§	0-						Ĕ (
gain	-2 -						-2 -					
channel B	Ŋ						IJ					
zero point +/- 50%							F a I					
	1-											
gain	0-						5					
	-1						5 -1 -					
	-2 -						ද ු -2 –					
A B	1											
zero point	10						10					
output	5 -						<u>س</u> 5 –					
	0-						₫ 0- <u> </u>					
đ	-5						d -5 -					
	-10						-10					
	0	20	40	60	80	100	0	20	40	60	80	100
LP 24												
Start		s	itop				Stop / EEPROM			Clear		
automatic zero point A		automatic	zero point B			a	utomatic gain A			automatic ga	in B	

Automatic alignment:

1. Relieve the measuring system; choose START, and then AUTO. ZERO POINT. The zero point is adjusted.

2. Load the measuring system with the maximum Load, and then choose AUTOM. AMPLIFYING

The amplifier is set.

The actual values are displayed as graphic and numeric values.

Manual alignment:

The parameters can be changed as you like by the sliding controls in the upper left part of the window, also after the automatic alignment.

With STOP the process is interrupted.

To end the alignments choose STOP/EEPROM. Thereby the Settings are transferred to the memory of the Digital Measuring Amplifier LP24. With CLEAR the display values are reset.



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4.4 Graphic

This is the protocol modus for the evaluation of all analogue signals. Shown on the right side are the three analogue input signals (setpoint value, option 1 and 2) and on the left side the scales of the chosen output values.



Press START, then the logging starts; STOP ends this process. With CLEAR the data in the display is deleted.



PARAMETERS

With SET PARAMETERS the window with the choices of parameters opens up. On the left the desired display values can be chosen, the colour of the line can be changed. The labelling, scaling and the zero point of the y-axes on the right can be respectively adjusted. With the sliding control 'measurement values' the splitting of the x-axis changes. In the array 'header' the labelling of the diagram can be carried out. BACK closes the window and the data is saved.





igital Measuring Amplifier LP24 Date: 22.12.2011





4.5 Diagnosis

This area is secured by a password. Here the factory settings of the hardware and software can be adjusted. Under EXTRAS -> ENTER PASSWORD the password for this area can be entered. The password can be obtained at LIEDTKE Services.

4.6 Software Installation/ Update

Systemvoraussetzung:

Windows XP

Installation:

Softwareinstallation

Deinstallation/ Update:

Erase the software LP24 under system adjustments Additional erase the driversoftware KMTecDeviceDrive

Bocklerstrass 1 D-31789 Hameln Tel::::49 5151 9889-0 Fax::::49 5151 67312 Fax:::49 5151 67312 S. Summaries: Imput for positive bridge signal channel B (S-1) a-Side (S-1) (S-1) 2a Input for positive bridge signal channel B (S-1) 4a Input for negative bridge signal channel B (S-1) 6a GND for channel B (UB-) 6a GND for electronic (UB+) 10a GND for electronic (UB+) 10a GND for electronic (UB-) 2a Controller enable (PID-controller 0+10 VDC (UB+) 10a CAnalogue input, U-l-converter 0+10 VDC (UB+) 2a Controller enable (PID-controller) (UB+) 24a Store (Sa) (Votage supply 24 VDC (-) 25a Vottage supply 24 VDC (-) (UB+) (UB+) 2c Analogue output channel A (UB+) 2c Analogue output channel A (UB+) 2c Input for positive bridge signal channel A (UB+) 2c Controller enable (PID-controller) (Sa)	- a l//	// LIE	DTKE Magnetpulverkupplungen und -brei	msen GmbH & Co. KG
Provide email: liedtike @liedtike-antriebstechnik.de Fax: +49 5151 67312 Fax: +49 5151 67312 5. Summaries 5.1 Connections Terminal Function a-Side 2a Input for positive bridge signal channel B (S+) 4a Input for negative bridge signal channel B (UB+) 6a GND for channel B (UB+) 6a Constant current feeding for channel B (+5VDC) (UB+) 10a GND for cleatronic (UB+) 12a 10 VDC (Ba 12a 10 VDC (Ba Analogue input, active damping 0+10 VDC 12a 10 VDC (UB+) (UB+) 16a Analogue input, active damping 0+10 VDC (2a 20a Analogue input, active damping 0+10 VDC (2a 22a Controller enable (PID-controller) (24a) (S+) 24a Store (Sa) (S-) 26a Reset (2b) (UB+) 26a Reset (2b) (UB+) 26c Input for positive bridge signal channel A (Boeck	lerstrasse 1 D-31789 Hameln T	el.: +49 5151 9889-0
5. Summaries S. Su		e-mai	: liedtke@liedtke-antriebstechnik.de F	ax: +49 5151 67312
2a Input for positive bridge signal channel B (S+) 4a Input for negative bridge signal channel B (S-) 6a GND for channel B (UB-) 8a Constant current feeding for channel B (+5VDC) (UB+) 10a GND for electronic (UB+) 12a 10 VDC (Ha Reserve 16a Analogue input, setpoint value 0+10 VDC (DA 26a Analogue input, active damping 0+10 VDC (DA 27a Controller enable (PID-controller) (DA 24a Store (DA 26a Reset (DA 27a Voltage supply 24 VDC (-) (DA 27a Constant current feeding for channel A (UB-) 27a Constant current feeding for channel A (UB-)	5. <u>Su</u> 5.1	Connecti Terminal	ons Function	
c-Side 2c Input for positive bridge signal channel A (S+) 4c Input for negative bridge signal channel A (S-) 6c GND for channel A (UB-) 8c Constant current feeding for channel A (UB-) 10c GND for electronic 12c Analogue output channel A 010 VDC 14c Analogue output sum signal channel A+B 010 VDC 16c Analogue output sum signal channel A+B 010 VDC 18c Analogue output U-I-converter 0(4)20 mA 20c Analogue output for 1mA measuring instrument 24c IO Option 1 (free processor port) 26c IO Option 2 (free processor port) 28c Protective conductor PE 30c Voltage supply 24 VDC (-) 32c Voltage supply 24 VDC (+)		2a 4a 6a 8a 10a 12a 14a 16a 18a 20a 22a 24a 26a 28a 30a 32a	Input for positive bridge signal channel B Input for negative bridge signal channel B GND for channel B Constant current feeding for channel B (+5VDC) GND for electronic 10 VDC Reserve Analogue input, setpoint value 0+10 VDC Analogue input, U-I-converter 0+10 VDC Analogue input, active damping 0+10 VDC Controller enable (PID-controller) Store Reset Protective conductor PE Voltage supply 24 VDC (-) Voltage supply 24 VDC (+)	(S+) (S-) (UB-) (UB+)
		c-Side 2c 4c 6c 8c 10c 12c 14c 16c 18c 20c 22c 24c 26c 28c 30c 32c	Input for positive bridge signal channel A Input for negative bridge signal channel A GND for channel A Constant current feeding for channel A GND for electronic Analogue output channel A 010 VDC Analogue output channel B 010 VDC Analogue output sum signal channel A+B 010 V Analogue output U-I-converter 0(4)20 mA Analogue output active damping 0+10 VDC (ma Analogue output for 1mA measuring instrument IO Option 1 (free processor port) IO Option 2 (free processor port) Protective conductor PE Voltage supply 24 VDC (-) Voltage supply 24 VDC (+)	(S+) (S-) (UB-) (UB+) DC x. 10 mA)
igital Measuring Amplifier LP24page 19Date: 22.12.2011drawing no.: 1.1447e	igital M Date: 2	easuring Am 2.12.2011	plifier LP24	page 19 drawing no.: 1.1447e



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5.2 Technical data

Bridge resistance
Supply voltage of the bridge
Influence of temperature on bridge feed
Compensation of resistances
Signal amplification
Input resistance
Linearity error
Range of measurement frequency
Load resistance at
voltage output 010 V
Load resistance at
current output 020 mA
Zero suppression
Mains connection
Input power
Current load switch output option 1+2

120...800Ω appr. 15 mA or appr. 1 mA < 2,1mV / K by voltage regulation 1...2000 (12000) ≥ 1 MΩ < 0,1 % 0...5 Hz R > 1 kΩ

 $\begin{array}{l} {\sf R} < 500 \ \Omega \\ \underline{+} \ 15 \ mV \\ 24 \ VDC \\ max. \ 8 \ VA \\ max. \ 20 \ mA \end{array}$

5.3 Jumper, Potentiometer

Jumper

JP1+3 Adjustment Analogue Input Option 1 JP2+4 Adjustment Analogue Input Option 2 Configuration see Pt. 3.6

JP5+6 Switchover current output position 1-2 0...20 mA position 2-3 4...20 mA

5.4 Cable RS232

Assignment				
TxD	Pin 2			
RxD	Pin 3			
GND	Pin 6			



Position of the jumper