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15. General Information

15.1 Warning!

Before beginning the installation or operation of electrical equipment, please read the following print **"Warnings of hazards..."**

All work on electrical systems or production equipment must be carried out by authorized personnel.
Electrical installation (cables) must be carried out according to the regulations applicable in the respective countries **(Germany VDE 100)**.
Measurement and signal cable must be kept separate from power cables to avoid EMC effects.

If a riskless operation is no longer possible, the equipment must be taken out of service and made safe against accidental operation.

The electronics in the positioner contains components that are susceptible to electric static.
Electric static discharges must be avoided using suitable measures.

16. Technical details

16.1 Electromagnetic compatibility (EMC)

Regarding **EMC** the positioner complies with the following regulations and directives:

Directive 2014/35/EU and EN61010-1:2011-07 for electrical equipment
Directive 2004/108/EEC for electromagnetic compatibility.
Regulations for HF Emission: EN61000-6-4:2007 for industrial environment
Regulations for HF Immunity to interference: EN61000-6-2:2005 for industrial equipment

16.2 Electrical details

data electrical	
Display	128*64 dot graphic display
Input	current 0(4)-20mA/ R_i ca. 10Ω /voltage 0(2)-10V R_i ca. 100kΩ
control output AC version	solid state relays (SSR) max 250V / 50/60Hz 2.5A
control output DC version	high side transistor 24 V dc 100mA max
feedback potentiometer	conductive plastic 1kΩ or angle sensor (U_v 5V)
feedback signal **optional**	current 0(4)-20mA/ R_L ca. 500Ω /voltage 0(2)-10V galvanic isolated
supply	115/230V 50/60Hz or 24V 50/60Hz or 24V dc
power consumption	ca. 3VA
data mechanical	
electrical connection	plug connector supply AWG 24-12 / signal AWG 26-16
screw supply plug	M3 / 0.34Nm
screw signal plug	M2 / 0.34Nm

17. Feedback potentiometer installation and adjustment

17.1 Pre-conditions required for adjustment of the feedback potentiometer

The actuator must be mounted and adjusted on the control valve

Fasten the actuator to the valve body using the pillars.**(2)** Connect the valve plug / spindle with the actuator spindle. **(1)**		
Set the limit switches to the real stroke of the control valve. **i.e**. It must be certain that the actuator switches off when the end position has been reached.**(3)** **<u>pls note cut off modes!!</u>** **<u>(limit or torque switch off)</u>**		

Pictures are **exemplary** und apply for all actuators Type ***REact***

17.2 Required parts

Actuator Type REact

1 x potentiometer-group 1 x potentiometer-pinions 1 x leg spring 1 x screw M3x 12 TX10 1 x nut M3 SW 5.5 2 x washer 1 x distance bush	
Select potentiometer pinion depending on actual valve stroke. **Up to** actual valve stroke **Nr.1** stroke 0-24mm (dk 10.5mm) **Nr.2** stroke 25-29mm (dk 12.6mm) **Nr.3** stroke 30-36mm (dk 16.1mm) **Nr.4** stroke 37-54mm (dk 23.1mm) **Nr.5** stroke 54-65mm (dk 30.1mm) **Nr.6** stroke 65-80mm (dk 37.5mm) **Nr.7** stroke 81-100mm (dk 45.5mm) Actuator with adaption spindle (**REact 60/100)** **Nr.4** Hub 37-54mm (dk 23.1mm)	
Push the selected pinion on the potentiometer shaft.	

Actuator Type REact

Move the actuator in 0% stroke position as shown. ➔ Actuator must be switch off in 0% position via limit / torque switch.		
Install the leg spring as shown.		
Install the potentiometer group as shown. ➔ The leg spring must keep the potentiometer pinion form closed with the teeth of the slide!		
Rotate adjusting ring until the marking **(A)**and**(B)** are aligned as shown. Fasten the pinion securely in place **(C)** by using an Allen key **(size 1.5).**		

Actuator Type REact

Check the potentiometer resistance in 0% position.	 **REact 30/ 60 /100** The value measured between the **grey** and **red** wire should be appx 100Ω.	 **REact 150/ 220/ 300** The value measured between the **grey** and **yellow** wire should be appx 100Ω.

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18. Installation REpos

18.1 Required parts

1x mounting bracket 4x screw M4 x10 (TX20) 1x power-board 4x distance bolt (5,5x20mm) self-cutting 1x CPU-board (Display) 4x screw M3 x6 (TX10) **optional** signal feedback -module 4x screw 3x6 self-cutting (TX10)	

18.2 Required parts REact150/220/300 (power supply REpos)

1x mounting bracket 1x power-board (DC/DC4824) 2x screw M3 x6 (TX10) 2x screw M4 x10 (TX20) 1x wire set (short/ long)	
Fasten mounting bracket as shown. 2x screw M4 x 10 (TX20)	
Fasten **DC/DC4824** board as shown. 2x screw M3 x 6 (TX10)	

Connect **DC/DC4824** board with **NG481**. (short cable) wire red -> **+** wire blue -> **-**	
Connect **DC/DC4824** board with **REpos**. (long cable) wire red -> **+** wire blue -> **-**	

Fasten mounting bracket as shown. 4x screw M4 x 10 (TX20)	
Fix the power-board. 4x distance bolt (5,5x20mm) self-cutting	
optional Connect feedback module with CPU-board as shown.	

Connect CPU-board with power board.

⚠

Pay attention that plug in connector is connected correctly.

Plug and socket connection OK

Plug and socket connection **not OK**

Fasten the CPU-board.
4x screw M3 x6 (TX10)

optional Fix feedback module. 4x screw 3x6 self-cutting(TX10)	
Connect pre adjusted feedback potentiometer. Yellow wire→terminal 61 Grey wire →terminal 62 Red wire →terminal 63	
Connect positioner output with actuator. Grey wire terminal **K4** to terminal **A1** Red wire terminal **K5** to terminal **A2** Yellow wire terminal **K6** to terminal **A3** **pls note!** For REact60-**170** and REact100-**90** (S3 50% operation) Observe the wiring of the thermal contact (Th)! see wiring diagram attached.	

19. Electrical connections

20. Operation

Display 1 indicates the current position (0-100%) in manual / automatic operation and the parameter name at configuration level.

Display 2 indicates the in manual / automatic operation the target position (0-100%) and the parameter value at configuration level.

Decrement Key ▼ serves to navigate through the parameter menu and to decrease the selected parameter values. or to move the actuator in manual mode

Increment Key ▲ serves to navigate through the parameter menu and to increase the selected parameter values or to move the actuator in manual mode

Interface(micro USB) for RTK internal use only!
⚠ Improper use can lead to the destruction of the device!

20.1 Operation

The ***REpos*** is operated by the three key switches.

The **A/M** Key serves to switch over the operating modes and select the menu items.

The decrement key ▼ serves to navigate through the parameter menu, and to decrease the selected parameter value.

The increment key ▲ serves to navigate through the parameter menu and to increase the selected parameter value.

20.2 Automatic mode operation

Key function:

Key		Description
A/M	single press (1s)	switch to manual mode
	long press (>4s)	switch to diagnostic/configuration/command mode
▼	press	no effect
▲	press	no effect

20.3 Manual mode operation

Key function

Key	Action	Description
A/M	single press (1s)	switch to automatic mode
	long press (>4s)	switch to diagnostic/configuration/command mode
▼	press	close output actuated
▲	press	open output actuated

20.4 Menu navigation

Key function

Key	Action	Description
A/M	press (1s)	menu item selection
	long press (>4s)	exit menu
▼	press	next menu item
▲	press	previous menu item

20.5 Editing parameter

Key function

Key	Action	Description
A/M	press (1s)	confirm the value and proceed to next item
	long press (>4s)	exit the menu and discard value change
▼	press	decrease value / go to next parameter
▲	press	increase value / go to previous parameter

21. General menu map

21.1 Diagnostic menu map

21.2 Diagnostic data

Diagnose data				
#	**Display**	**Description**	**Range**	**Function**
1	**TrTm**	Motor travel time	0….9999	Detected motor travel time during Init procedure
2	**S0**	Potentiometer value at 0%	0….100%	Potentiometer value at 0% stroke
3	**S100**	Potentiometer value at 100%	0….100%	Potentiometer value at 100% stroke
4	**Hyst**	Dead band	0.5….5.0%	Detected dead band during Init procedure
5	**WHrs**	Working hours	0….999k	Working hours total
6	**TStr**	Strokes	0….999k	Operating commands total
7	**Str1**	Strokes within 0..25%	0….999k	Operating commands within 0-25% of real stroke
8	**Str2**	Strokes within 25..50%	0….999k	Operating commands within 25-50% of real stroke
9	**Str3**	Strokes within 50...75%	0….999k	Operating commands within 50-75% of real stroke.
10	**Str4**	Strokes within 75...100%	0….999k	Operating commands within 75-100% of real stroke
11	**iErr**	Input error	0….999k	Total count input signal out of range
12	**SErr**	Potentiometer error	0….999k	Total error Potentiometer input
13	**CErr**	Communication error	0….999k	Total error communication
14	**Temp**	Temperature	-5°C….80°C	Current „on board“ temperature
15	**Tmin**	min. temperature	-5°C….80°C	min. „on board“ temperature
16	**Tmax**	max. temperature	-5°C….80°C	max. on board“ temperature
17	**HrT1**	Hours in temp. range T1	0….999k	Operating hours in range < 0°C
18	**HrT2**	Hours in temp. range T2	0….999k	Operating hours in range 0°C….30°C
19	**HrT3**	Hours in temp. range T3	0….999k	Operating hours in range 30°C….50°C
20	**HrT4**	Hours in temp. range T4	0….999k	Operating hours in range 50°C….70°C
21	**HrT5**	Hours in temp. range T5	0….999k	Operating hours in range > 70°C
22	**Wlif**	Instrument life hours	0….999k	Operating hours total **non-resettable**

21.3 Configuration menu map

21.4 Configuration parameter

Configuration parameter				
#	**Display**	**Description**	**Parameter Value**	**Function**
1	**Ainp**	Analog Input	0-20mA / 4-20mA 0-10V / 2-10V	Setpoint Input type current/ voltage
2	**SpRv**	Setpoint Inversion	Dir (Direct) Rev (Reverse)	Changes the direction of the setpoint e.g. 4mA actuator spindle extended **or** 4mA actuator retraced ☞ **chapter 33**
3	**Aout**	Analog Output Type	0-20mA / 4-20mA 0-10V / 2-10V	**Optional** Select feedback signal output type
4	**Rinv**	Feedback signal Inversion	Dir (Direct) Rev (Reverse)	Changes the direction of the feedback signal e.g. 4mA actuator spindle extended **or** 4mA actuator retraced
5	**SplM**	Split range mode	None, High, Low	☞ **chapter 34**
6	**SplT**	Split range Threshold	20…80%	Split point
7	**Safe**	Safety Position	Off Open Close	Actuator position in error mode e.g. Input signal fault.....
8	**DBnd**	Dead band	0.5…5.0%	neutral Zone between operation commands open ->close or close->open
9	**MnTT**	Minimum Travel Timeout	0……1000s	Minimum delay to enter in position error .☞ **chapter 37**
10	**CITe**	Close Tight Enable	En (Enabled) Dis (Disabled)	Close Tight Function enabling .☞ **chapter 36**
11	**CITB**	Close Tight Band	0.5….5.0%	Close Tight value for open /close limits
12	**SpLn**	Setpoint Linearization Enable	En (Enabled) Dis (Disabled)	Setpoint Linearization with max. 21 Interpolation-points .☞ **chapter 35**
13	**SL0**	Interpolation point **0** (0%)	0….100%	Parameters are displayed if **SpLn** is enabled
..	**……**	……..	……	……..
33	**SL20**	Interpolation point **20** (100%)	0….100%	……
34	**RM.SP**	Remote Setpoint Fieldbus	0….100%	If Fieldbus operation is active, the value of the digital setpoint received is displayed.
35	**RSP.H**	Remote Setpoint High Limit	0….100%	max. Setpoint value accepted from fieldbus
36	**RSP.L**	Remote Setpoint Low Limit	0….100%	min Setpoint value accepted from fieldbus
37	**PW.GL**	Password Global Access	-1999….9999	Password for Config and CMD menu access
38	**PW.CF**	Password Config Access	-1999….9999	Password for Config menu only
39	**FL.cl**	Force Local Control	En (Enable) Dis (Disable)	If Enable remote control from fieldbus is inhibited
40	**CBus**	Fieldbus selection	None CAN open Profibus DP	**optional** Fieldbus selection **(Proper optional hardware required)**
41	**Addr**	Node Address	1….127	Fieldbus Node Address -> Parameter displayed only if fieldbus is active
42	**Baud**	Baud Rate (Kbit/s)	20,50,100,125,250, 500,1000	Only for CAN open Profibus baud rate auto selected

21.5 General operation commands menu map

22. Commands

Commands			
#	Display	Description	Function
1	**Auto**	Perform Auto Initialization	Enter to the Initialization procedure
2	**RsCl**	Restore Last Autocalib Data	Restore the dead band to the value calculated by the last auto-Initialization procedure, user changes are cancelled
3	**InCl**	Perform Input Calibration	Enter to the analogue input calibration procedure
4	**DRes**	Reset Diagnostic Data	Reset of the diagnostic counters

22.1 Auto Initialization Procedure

The **Auto** item move to the sub-menu that manages the Initialization procedure, the user can select two auto initialization modes:

Full Auto: **(Go Auto)**
The user has just to move the actuator (by ▼ and ▲ key switches) round to middle of the total stroke.
The procedure moves the actuator to the full open and close limits and operates a series of movements in order to evaluate the characteristic of the actuator.

⚠ **Pre- conditions required to start the Full Auto Initialization:**
The actuator must be mounted and adjusted complete on the control valve. Limit switches open/ close must be adjusted regarding the real stroke of the control valve.
☞ **pls. note cut off modes (limit or torque switch)**

⚠ **During the initialization, the limits of the actuator/ valve will be reached!!**
It must be ensure that this can be performed without any risks.

Manual Limit Setting: (Go Man)

☞ **pls. note**: By using the **Manual Limit Setting** Function, the user has to ensure that the **Close Tight** Functions is disabled, otherwise an positioning error will be occurred, caused by over traveling the actuator limits. (up/down)

The user has to move the valve first to the full open position (by ▼ and ▲ key switches), confirm (by **A/M** key switch) in order to store the position, then the same for the full close position. On the full close position confirm (by **A/M** key switch), the automatic procedure to evaluate the characteristic of the valve is started.

On completion of the procedure the result is prompted to the user (Success or Failure) and the device waits for user acknowledge; pressing the **A/M** key switch the unit stores the new calibration data and exits to the normal operation mode if the procedure was successful, or back to the first step of the procedure.

⚠ Anytime long press (more than 4 sec) of the **A/M key switch** aborts the procedure and exits to the normal operation mode; no new data is stored.

22.2 Auto initialization procedure menu map

22.3 Input calibration procedure menu map

23. Setpoint vs Effective Actuator Direction (SpRv)

24. Split Range Mode (SplM)

Display Split Range Mode

25. Setpoint vs Valve Stroke Characteristic (SpLn)

Input 4-20mA	Valve Stroke
SL0(0%) 4mA	=0%
SL1(5%) 4.8mA	=1,5%
SL2(10%) 5,6mA	=2%
SL3(15%) 6,4mA	=2,5%
SL4(20%) 7,2mA	=3%
SL5(25%) 8mA	=3,5%
SL6(30%) 8,8mA	=4%
SL7(35%) 9,6mA	=4,5%
SL8(40%) 10,4mA	=5%
SL9(45%) 11,2mA	=6%
SL10(50%) 12mA	=7%
SL11(55%) 12,8mA	=9%
SL12(60%) 13,6mA	=11%
SL13(65%) 14,4mA	=12%
SL14(70%) 15,2mA	=13%
SL15(75%) 16mA	=15%
SL16(80%) 16,8mA	=17%
SL17(85%) 17,6mA	=22%
SL18(90%) 18,4mA	=37%
SL19(95%) 19,2mA	=50%
SL20(100%) 20mA	=100%

26. Close Tight Function (CITe)

The Close Tight Function (default disabled) ensured that the actuator securely reached the limit positions up /down - (actuator switched off via limit or torque switch). Adjustable range: **0.5%...5.0%.**
The Close Tight Function operates always in both limit positions (up / down).

☞ **pls**. **note**: By using the **Manual Limit Setting** Function, the user have to be ensure that the **Close Tight** Functions is disabled, otherwise an positioning error will be occurred, caused by over traveling the actuator limits. (up/down)

27. Minimum Travel Time Out (MnTT)

42. Verdrahtungspläne, wiring, Schéma de câblage

REact15E

REact15DC

+24V
GND
PE
Rückmeldesignal
Feedback signal
Eingangssignal
Input signal
POT1
I/Y
REpos
Limit switch REact 15E
REdrive
Motor Plug type
Power Supply
Input
Kunde:
Projekt:
Auftrag:
Version 0.0
Anlage
Ort
Blatt-Nr. 1
Bl von Anz 1/1
Datum 17.08.2016
Bearb. Michael Burkhardt
Gepr.
Norm
Urspr.
Ers. für
16.03.2021 Lothar Hetrich
Datum
Name
Änderung
Zustand

REact30E/ 60E/ 100E

REact60E-170 / REact100E-90

REact30DC/ REact60DC/ REact100DC

REact30DC/ REact60DC/ REact100DC int. power supply

REact150/ 220/ 300_1Ph 230Vac

REact150/ 220/ 300_3Ph 380-480Vac