

Supervising Unit PAN-A1

Operating Manual

version 19th September 2001

Copyright 2001 by **A. Eberle GmbH & Co. KG**. All rights reserved.

Published by

A. Eberle GmbH & Co. KG

Frankenstraße 160

D-90461 Nürnberg

Tel.: +49 911 / 62 81 08 - 0

Fax: +49 911 / 62 81 08 - 96

e-mail: info@a-eberle.de

Internet: www.a-eberle.de

A. Eberle GmbH & Co. KG assumes no responsibility for damages or losses of any kind, resulting from printing errors or changes in this operating manual.

Likewise **A. Eberle GmbH & Co. KG** does not accept any claims beyond the warranty for damages and losses of any kind, resulting from faulty devices or from devices modified by the operator.

Contents:

1	Information and Precautions	4
2	Scope of delivery	5
3	Supervising unit PAN-A1	6
3.1	Connection diagram	6
3.2	Application.	7
3.3	Contact assignments	8
4	Mechanical construction PAN-A1	9
5	Operation of PAN-A1	10
6	Fuse change	17
7	Contents	18

1 Information and Precautions

The supervising unit PAN-A1 has its application exclusively in plants and facilities of electrical engineering where the required work is carried out by qualified personnel. These are people who are familiar with the installation, commissioning and operation of such products. They are trained and qualified to meet the requirements of their job.

The supervising unit PAN-A1 has passed all safety tests prior to delivery. To maintain this condition and to safeguard a smooth and safe operation it is important that the operator pays attention to all information and precautions in this operating manual.

- The supervising unit PAN-A1 is built according to IEC 10110/EN61010 (DIN VDE 0411), protection class I and checked according to these standards prior to delivery.
- The supervising unit PAN-A1 must always be grounded. This requirement is met when connected to an auxiliary voltage system with an earth conductor (European net). However, if the auxiliary voltage net is not grounded, additional connections from the earth conductor terminal to the ground must be made.
- The upper limit for the admissible auxiliary voltage U_H should not be exceeded neither for a short time nor permanently.
- The supervising unit PAN-A1 must be completely disconnected from the auxiliary voltage U_H before fuses should be replaced. Only fuses of the mentioned type and current should be used.
- If the supervising unit PAN-A1 shows visible damage or a significant malfunction it should not be used any more and should be protected against accidental operation.
- Maintenance and repair work inside the supervising unit PAN-A1 should be carried out by authorised experts only.

2 Scope of delivery

1 Supervising unit PAN-A1

1 Operation manual in English

3 Supervising unit PAN-A1

The supervising unit PAN-A1 is used for the supervision of the voltage regulator REG-D.

For this purpose the supervising unit measures the input voltage independently from the regulator and compares it with the given limit values $<U_1$ and $>U_2$. If one of the two limit values are violated the tap commands of the regulator will be inhibited in that direction.

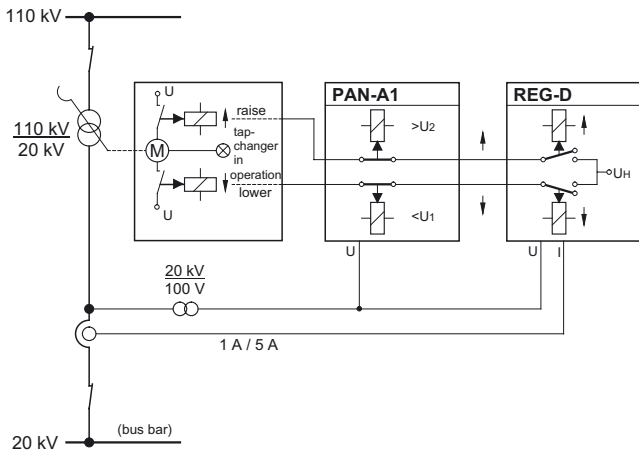
If a violation of the limit value $<U_1$ occurs, the lower command of the regulator will be inhibited. Likewise if a violation of the voltage limit $>U_2$ occurs, the raise command of the regulator will be inhibited.

Thus it is avoided that the regulator controls the voltage in an invalid range.

The supervising unit PAN-A1 has its own power supply and its own facility for the voltage control like mentioned before and can therefore be called an autonomous supervising relay.

3.1 Connection diagram

Regulation with the autonomous supervising unit PAN-A1



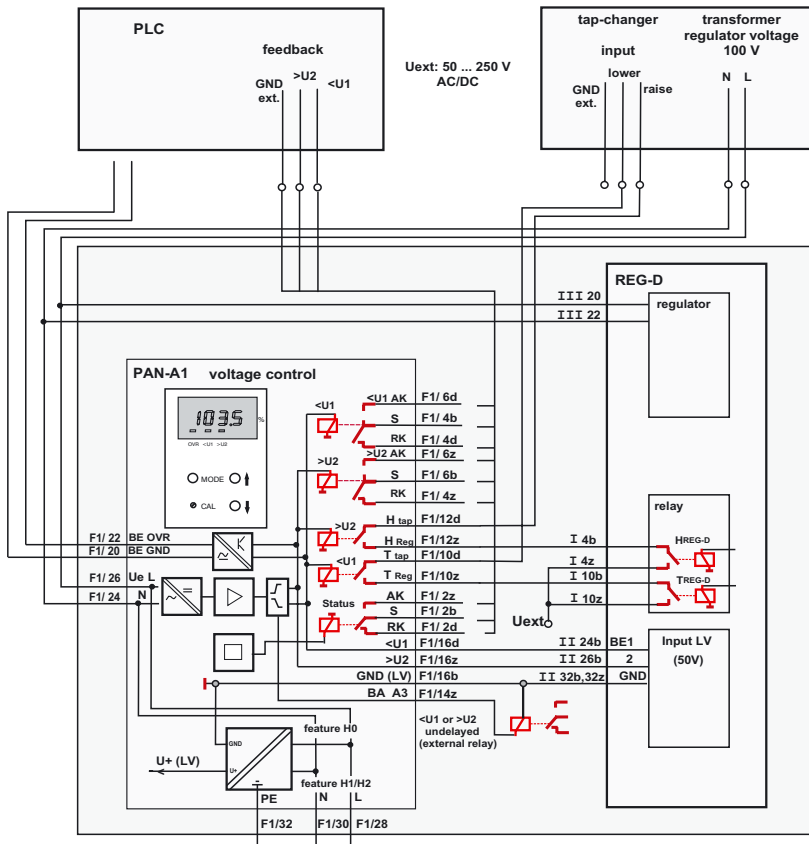
3.2 Application

The example of the application diagram below shows the operation of the supervising unit PAN-A1 together with the voltage regulator REG-D.

Possible connections to the regulator and to the tap-changer are shown as well as the transmission way of binary signals <U1 and >U2 to a PLC.

The position of the two blocking relays <U1 and >U2 will be transferred to the regulator via the two binary inputs E8 and E9.

If it is worked in a serial connection the regulator will also be able to sense the logical situation of the supervising unit PAN-A1.



19" rack

3.3 Contact assignments

The supervising unit PAN-A1 is equipped with a connector block of the type M (F24 + H7 form)

Contact assignments (characteristic U4: <U1, >U2 for each make contact + break contact).

connector block 'F1' "MH" 24+7p.	z	b	d
2	AK rel. Stat.	S rel. Status	RK rel. Stat.
4	RK rel. >U2	S rel. <U1	RK rel. <U1
6	AK rel. >U2	S rel. >U2	AK rel. <U1
10	input T _{regulator}		output T _{tap} *
12	input H _{regulator}		output H _{tap} **
14	A3		
16	BA >U2	GND	BA <U1
20	binary input BE GND		
22	binary input BE OVR		
24	input voltage U _e N		(H0: with U _h N/+)
26	input voltage U _e L		(H0: with U _h L/-)
28	power supply U _h AC/DC		(H1, H2 only)
30	power supply U _h AC/DC N / -(H1, H2 only)		
32	PE		

Contact assignments (feature U3) like above, deviation:

4	AK2 rel. >U2	S2 relay	AK2 Rel. <U1
6	AK1 rel. >U2	S1 relay	AK1 Rel. <U1

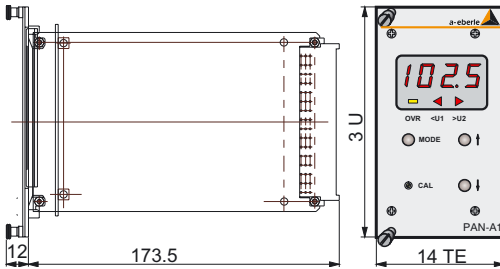
legend: RK = break contact
 AK = make contact

* T: lower

** H: raise

4 Mechanical construction PAN-A1

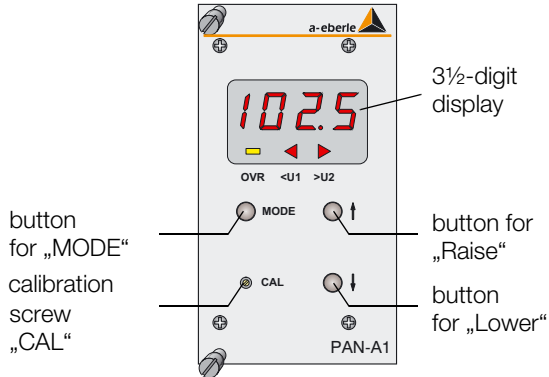
front panel	aluminium, RAL 7035 light grey
height	3 U (128.5 mm)
width	14 T (71.1 mm)
weight	≤ 0.5 kg
protection type	
plug-in card	IP 00
female connector block	IP 00
mounting	according to DIN 41494 part 5
plug-in connectors	DIN 41612



dimensions

5 Operation of PAN-A1

front view PAN-A1



The actual value of the voltage in % is normally shown on the 3½ digit display.

The PAN-A1 display shows only the applied voltage in %; an indication in V or kV is not possible.

LEDs < U1 and > U2 are activated when either one of the two limits are violated or when the instrument has been put into parameter mode for <U1 and >U2.

The conditions for OVR (override) are described on page 11 (override mode).

Via the calibration screw "CAL" the percentage display on PAN-A1 can be adjusted to the regulator display.

Procedure:

- ⇨ Connect an input voltage to the unit, which corresponds to 100% (for example 100V).
- ⇨ Adjust the Cal-potentiometer with a screwdriver until the display shows 100%.

Adjustment of the band to be supervised

The band to be supervised is defined by two limit values for the voltage $< U1$ and $> U2$.

Both limit values can be adjusted in 0.5% steps via the "raise" or "lower" buttons.

For the input of the limits change into parameter mode.
Press the "Mode" button to activate parameter mode.

By pressing the button once, a red arrow (pointer to the left) appears which signals that the device is ready for the setting of the limit value $<U1$.

By pressing the button once more a red arrow (pointer to the right) appears which signals that the device is ready for the setting of the upper limit value $>U2$.

Via the buttons "raise" and "lower" the desired limit value can be adjusted in 0.5 % steps

By pressing the button a third time a horizontal yellow bar appears in the display which indicates that the device is in override mode (OVR).

The input voltage and all setting commands of the regulators are ignored by the PAN-A1 in this mode.

Override Mode

When the unit is put into operation (transformer without voltage or transformer connected to voltage, but power switch open) it may be necessary to put the transformer through the whole setting range, without the supervising unit PAN-A1 blocking all setting commands.

In case of "transformer without voltage" PAN-A1 changes automatically into the "OVR mode". The input voltage is the triggering criteria for this automatic function.

If the input voltage falls below 30%, the device puts itself automatically into the "OVR mode".

In case of "transformer without voltage" PAN-A1 changes automatically into the "OVR mode". The input voltage is the triggering criteria for this automatic function.

If the input voltage falls below 30%, the device puts itself automatically into the "OVR mode".

In case of "transformer under voltage", but power switch opened", the device can be switched into "OVR mode" via the Mode button.

The device is ready again by pressing the Mode button once more.

PAN-A1 can also be put into the OVR mode via a binary input (AC/DC 50...250V).

The normal operating condition is reached when the connected voltage lies within the given tolerance band and when OVR is off.

In this case only the actual value display is active.

If the parameter setting mode is concluded or interrupted without having returned to the operation mode via the "Mode" button, the PAN-A1 will switch itself automatically back into the operation mode after approximately 20 minutes counted from the last input.

Thus it is prevented that an operation error puts the supervising function of the device permanently out of order.

Beside the settings via buttons, some additional parameters can be adjusted via DIP switch.

For this purpose the supervising unit PAN-A1 must be removed.

With the help of the switching positions the following features of the device can be influenced:

- ⇔ hysteresis for $<U_1$ and $>U_2$
- ⇔ signal delay $<U_1$ and $>U_2$
- ⇔ protection against unauthorised changes of the limit values

Possible settings

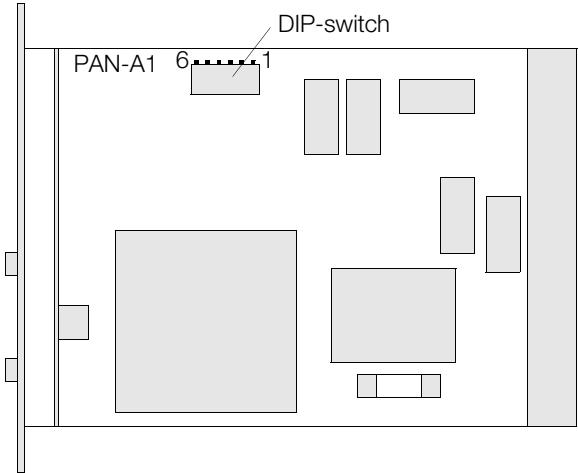
(for positions of the DIP switches refer to page 14)

switch no.		1	2	3	4	5	6
relay delay	2 s	○	●	×	×	×	×
	4 s	●	○	×	×	×	×
	8 s	○	○	×	×	×	×
hysteresis	0.5 %	×	×	●	●	×	×
	1.0 %	×	×	○	●	×	×
	2 %	×	×	●	○	×	×
protection against unauthorised change of limit values	on	×	×	×	×	×	●
	off	×	×	×	×	×	○
Description of symbols: ○ switch off (knob up) ● switch on (knob down) × without any function							

Standard parameters prior to delivery

switching delay	2 s
hysteresis	1 %
protection against unauthorised changes of the limit value	off

Position of the DIP switch



Function matrix

The function scope of the supervising unit can also be shown as a function matrix. The following table shows the versatile functional logic operations.

device-state	input Ue [%]	H _{regulator} T _{regulator}	display	LED OVR	<U1	>U2	outout BA<U1	BA >U2	BA A3	relay <U1	AK >U2	AK raise	AK lower	AK static	RK static
standard mode	...30%	-	Ue	o	-	-	0	0	0	0	0	0	0	1	0
Ue OVR	...30%	0/H/T	./	o	-	-	0	0	0	0	0	0/H	0/T	1	0
M.ovr, (</>)	...30%	0/H/T	Ue(U1/2)	o	(<)	(>)	0	0	0	0	0	0/H	0/T	1	0
regular operation mode	30 ..<U1	-	Ue	-	<	-	1	0	1	1	0	0	0	1	0
	30 ..<U1	H	./	-	<	-	1	0	1	1	0	H	0	1	0
	30 ..<U1	T	./	-	<	-	1	0	1	1	0	0	0	1	0
	U1...U2	-	./	-	-	-	0	0	0	0	0	0	0	1	0
	U1...U2	H	./	-	-	-	0	0	0	0	0	H	0	1	0
	U1...U2	T	./	-	-	-	0	0	0	0	0	0	T	1	0
	>U2 ...	-	./	-	-	>	0	1	1	0	1	0	0	1	0
	>U2 ...	H	./	-	-	>	0	1	1	0	1	0	0	1	0
	>U2 ...	T	./	-	-	>	0	1	1	0	1	0	T	1	0
mode: <U1	xxx	xx	U1	-	<	-	x	x	0	x	x	xx	xx	1	0
>U2	xxx	xx	U2	-	-	>	x	x	0	x	x	xx	xx	1	0
OVR	xxx	0/H/T	Ue	o	-	-	0	0	0	0	0	0/H	0/T	1	0
BE OVR	xxx	0/H/T	Ue(U1/2)	o	(<)	(>)	0	0	0	0	0	0/H	0/T	1	0
error, <Uj	xxx	xx	x	-	-	-	0	0	x	0	0	0	0	0	1

Ue	input voltage in % rated value AC 100V
U1, U2	limits in % from Ue
BE	binary input ON for AC 50 ... 250V
BA	binary output on REG-D (LV 10 ... 50V) 0/1 corresponds to 0V/>10V DC
AK	relay AK (make contact, break contact RK 0: corresponds to OPEN 1: CLOSED 1: H, T _{regulator} transmit
A3	binary output for special applications (12 V, 0.5 W)
OVR	Override: Ue < 30%, or binary input override active, or OVR mode adjustable via buttons ➔: raise or lower setting commands of the regulator are not blocked no output <U1, >U2 to relay B i.e. BA
mode button	operation mode, adjustable mode <U1, >U2 OVR mode

Trouble shooting

If the auxiliary voltage is connected, but no LED is activated in the display, a change of fuses is recommended fuse change - described on page 17.

The device is equipped with a slow blowing fuse of 0.5A

Should the unit still not be working after a fuse change, please return the unit to the manufacturer for repair.

6 Fuse change

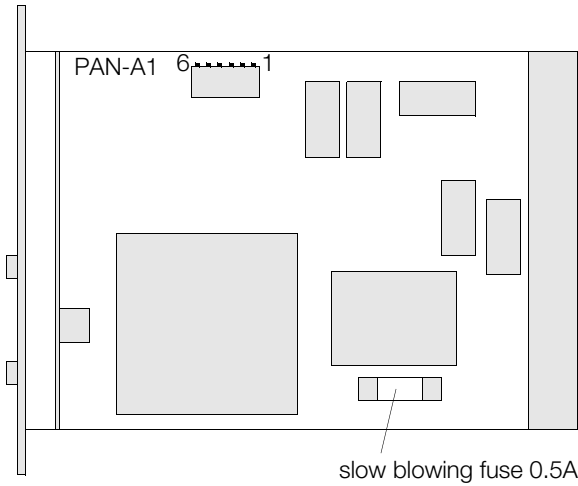
Caution! 

Disconnect the supervising unit PAN-A1 from the power supply before you change the fuse.



Required fuse: fine-wire fuse T (slow blowing fuse) 250V, 0.5A

Position of the fuse



7 Contents

- A**
actual value of the voltage 10
Application 7
auxiliary voltage 4, 16
- B**
band to be supervised 11
- C**
calibration screw 10
connectors 9
contents 3
Copyright 2
- D**
damage 4
Description of symbols 13
dimensions 9
DIN VDE 0411 4
DIP switch 14
display 10
- E**
EN61010 4
- F**
fine-wire fuse 17
front panel 9
fuse 4, 16
Fuse change 17
- H**
height 9
hysteresis 12, 13
- I**
IEC 10110 4
Information and Precautions 4
- M**
Maintenance and repair work 4
malfunction 4
Mechanical construction 9
mounting 9
- O**
operation error 12
override mode 10, 11
OVR 8, 10, 11, 12, 15
- P**
parameter mode 10
plug-in card 9
power switch 11, 12
protection type 9
- R**
red arrow 11
responsibility for damages or losses 2
- S**
Scope of delivery 5
Supervising unit PAN-A1 6
- T**
tolerance band 12
triggering criteria 11, 12
Trouble shooting 16
- V**
violation of the limit value 6
- W**
weight 9
width 9
- Y**
yellow bar 11