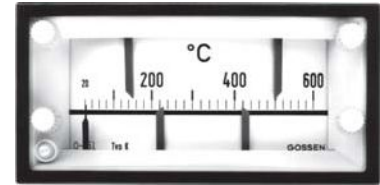


# Vario-Series • Rectangular Indicator/Controllers

For Direct Current or Direct Voltage with 4 Limit Contacts



**Moving-coil movement, edgewise scale**  
**Narrow front frame per DIN 43 718, matt black**



PFN 96 x 48 M

## Technical Data

Front Dimensions mm Type	96 x 48 PFN 96 x 48 M
Scale Length mm	65
Class	1.5
Weight approx. (kg)	0.5
for auxiliary voltage 20 ... 40 V AC / DC	0.2
Sampling	electronic
Relative Switching Speed (max. error as related to scale length)	1 %
Repetition Accuracy (at nom. aux. voltage and 23 °C)	0.1 %
Number of Limits	4
Min. Contact Limit Clearance (of scale length)	3 %
Output Realy	built in
Output Contact	1 changeover per limit
Switching Capacity with Ohmic Load	
Max. Switching Voltage	300 V AC / DC
Max. Switching Current	6 A AC/DC
Nominal Switching Capacity	≤ 1500 VA
Service Life at Nominal Switching Capacity	> 10 <sup>6</sup> switching cycles
Max. Switching Time	500 ms
Auxiliary Voltage (U <sub>H</sub> )	see order information
Power Consumption, AC Aux. Voltage	4 VA
Power Consumption, DC Aux. Voltage	4.5 W
Safety Regulations per IEC/EN 61010-1/A2 VDE 0411-1/A1	
Safety Class	II (total insulation)
Measuring Circuit:	
Over voltage Category	CAT III
Pollution Degree	2
Operating Voltage	300 V
Operating Voltage for Voltage Measuring > 250 V ... ≤ 600 V	600 V
Test Voltage (to Housing)	5.8 kV
Front Panel-Housing Protection	IP 52
Fasteners	screw spindle

### Description

Analog indicator/controller with moving-coil movement for direct current or direct voltage

### Display

Scale Division      Coarse-fine  
 Pointer              Beam pointer with knife-edge for single and double division

### Mechanical Design

Housing Material    Polycarbonate, self-extinguishing and drip-proof per UL 94 V-0  
 Replaceable        Glass windows and front frames  
                          ⇒ May only be replaced under  
                          voltage-free conditions!  
 Terminals           tab connectors (IP 20 protection)  
                          1x 6.3 x 0.8 mm or 2 x 2.8 x 0.8 mm

### Internal Resistance / Voltage Drop / Power Consumption

(Values only apply with zero point at left or at bottom)

Measuring Range	Internal Resistance / Voltage Drop / Power Consumption
≥ 100 μA / ≤ 10 mA	≤ 100 mV
> 10 mA / ≤ 6 A	≤ 100 mV
≥ 60 mV / ≤ 1 V	≥ 1 MΩ
> 1 V / ≤ 50 V	≥ 100 kΩ
> 50 V / ≤ 600 V	≥ 2 kΩ/V
0/4 ... 20 mA	6 Ω <sup>1)</sup>
Connection to shunt	6 mA <sup>2)</sup>

1) Tolerance ± 30 %  
 2) Tolerance ± 20 %

### Reference Conditions

Reference Quantities	Reference Conditions
Ambient Temperature	23 °C ± 2 °C
Position of Use	control panel vertical ± 1 °
Other	DIN EN 60 051

### Ordering Example:

Indicator/Controller 96 x 48 mm for direct voltage, landscape scale,  
 Measuring range 0 ... 100 V, direct voltage,  
 Closed-circuit current model, contacting Min.-Max. /Min.-Max.

Techn. Data Type: PFN 96 x 48 M	Order No. 2596P, AM40, DC100
------------------------------------	---------------------------------

# Vario-Series • Rectangular Indicator/Controllers

For Direct Current or Direct Voltage with 4 Limit Contacts



## General Issues

Indicator/controllers are meters with adjustable limits.  
 The accuracy of the limits are not influenced by the contacts.  
 Our meters and indicator/controllers comply with the regulations of the European Guidelines 73/23/EWG. This is proven by the compliance with the following standards:  
 IEC 61010-1/A2 / EN 61010-1/A2 VDE 0411-1/A1 (Safety Regulations)  
 IEC 60051/EN 60051/DIN EN 60051 (Meters with Scale Display)  
 EN 50081-2: 1993 EMV (Emitted Interference, Industries)  
 EN 50082-2: 1995 EMV (Emitted Interference, Industries)  
 To protect the movable part of the indicator/controller against shocks, the bearings are spring mounted.

## Application

Indicator/controllers display the actual value and energise with the help of one or more limits one or more relays. Their contacts can be used for monitoring, operating or controlling.  
 Indicator/controllers are also available with logic output (transistor output).

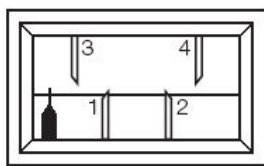
## Sampling

The sampling of the indicator/controllers works contact-free.  
 When the pointer reaches the limit the switching operation will be disengaged.

## Contacting

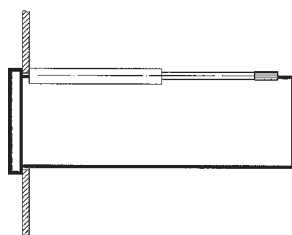
The max. contact disengages the switching operation when it overshoots the adjusted scale value. The min. contact disengages the switching operation when it undershoots the adjusted scale value.

## Position of Limits

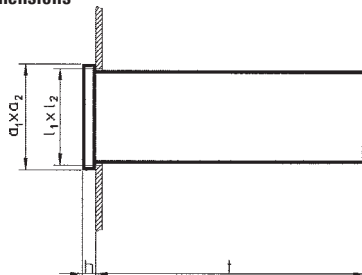


## Fasteners

Screw spindle  
 (control panel thickness 1 ... 40 mm)



## Basic Dimensions



All indicators/controllers cause a permanent contact. This means that the output signal is held up as long as the pointer does not overrun the adjusted limit. The indicators/controllers are available as closed-circuit current model or working current model (see different Order No.).

**Closed-Circuit Current Model:** When the indicator/controller is not-operated a voltage is impressed on the relays (output signal H, logic output). The voltage drops as soon as one of the contact marks is undershot or overshoot. The same happens when a power breakdown or an electronic breakdown occurs and no limit is overshoot or undershot (self supervision). A short-term power failure leads to the same effect.

**Working Current Model:** When the indicator/controller is not-operated the relays are in zero current condition (output signal L, logic output). As soon as one of the limits is overshoot or undershot the relays pick up (output signal H).

## Contact Assignments

Measuring Input	-	12-
	+	11+
Auxiliary Voltage	20 ... 40 VAC/DC	L1 L2
	90 ... 127 VAC	L
	198 ... 264 VAC	N
Relay Output	Logic Output	
Limit Contact 1		
Limit Contact 2		
Limit Contact 3		
Limit Contact 4		
The output contacts are shown in the wiring diagram in the zero current condition		+ terminals are electrically connected within the instrument

Front Dim. mm	Nominal Dimensions		Cutout Dimensions $l_1 \times l_2$	Installation Depth (t) Relay Output	Installation Depth (t) Logic Output
	$a_1 \times a_2$	h			
96 x 48	96 x 48	5	$92^{+0.8} \times 45^{+0.6}$	146	126

# Vario-Series • Rectangular Indicator/Controllers

For Direct Current or Direct Voltage with 4 Limit Contacts



Moving-coil movement, edgewise scale

Narrow front frame per DIN 43 718, matt black

'N' = Standard Version · 'A' = Extra Charge · '+' = Available without extra Charge · '-' = Not available

	Type	PFN 96 x 48 M
	Order No. ⇒	2596P
	+ ↓	
<b>Landscape</b>	<b>HQ1</b>	N
<b>Portrait</b>	<b>HQ2</b>	+
<b>Contacting <sup>1)</sup></b>		
Min. - Max. / Min. - Max. closed current	<b>AM40</b>	+
Min. - Max. / Max. - Max. closed current	<b>AM41</b>	+
Min. - Max. / Min. - Min. closed current	<b>AM42</b>	+
Min. - Min. / Min. - Min. closed current and		
Max. - Max. / Max. - Max. working current	<b>AM43</b>	+
Max. - Max. / Max. - Max. closed current and		
Min. - Min. / Min. - Min. working current	<b>AM44</b>	+
Min. - Max. / Min. - Max. working current	<b>AM45</b>	+
Min. - Max. / Max. - Max. working current	<b>AM46</b>	+
Min. - Max. / Min. - Min. working current	<b>AM47</b>	+
<b>Zero Pint - left / bottom</b>		
<b>Direct Current</b>		
<b>Range</b>	0 ... 100 $\mu$ A	<b>CA100</b> A
	0 ... 150 $\mu$ A	<b>CA150</b> A
	0 ... 250 $\mu$ A	<b>CA250</b> A
	0 ... 400 $\mu$ A	<b>CA400</b> A
	0 ... 600 $\mu$ A	<b>CA600</b> A
	> 100 $\mu$ A ... < 1 mA <sup>2)</sup>	<b>CA...</b> A
	0 ... 1 mA	<b>CB1</b> +
	0 ... 1.5 mA	<b>CB1.5</b> +
	0 ... 2.5 mA	<b>CB2.5</b> +
	0 ... 4 mA	<b>CB4</b> +
	0 ... 5 mA	<b>CB5</b> +
	0 ... 6 mA	<b>CB6</b> +
	0 ... 10 mA	<b>CB10</b> +
	0 ... 15 mA	<b>CB15</b> A
	0 ... 20 mA	<b>CB20</b> A
	0 ... 25 mA	<b>CB25</b> A
	0 ... 40 mA	<b>CB40</b> A
	0 ... 50 mA	<b>CB50</b> A
	0 ... 60 mA	<b>CB60</b> A
	0 ... 100 mA	<b>CB100</b> A
	0 ... 150 mA	<b>CB150</b> A
	0 ... 250 mA	<b>CB250</b> A
	0 ... 400 mA	<b>CB400</b> A
	0 ... 600 mA	<b>CB600</b> A
	> 1 mA ... < 1 A <sup>2)</sup>	<b>CB...</b> A
<b>Electr. suppressed</b>	0/4 ... 20 mA landscape	<b>BC25</b> A
	0/4 ... 20 mA portrait	<b>BC27</b> A
	0 ... 1 A	<b>CC1</b> A
	0 ... 1.5 A	<b>CC1.5</b> A
	0 ... 2.5 A	<b>CC2.5</b> A
	0 ... 4 A	<b>CC4</b> A
	0 ... 6 A	<b>CC6</b> A
	> 1 A ... < 6 A <sup>2)</sup>	<b>CC...</b> A

1) Number of contacts - specify in clear text

2) Specify in clear text

# Vario-Series • Rectangular Indicator/Controllers

For Direct Current or Direct Voltage with 4 Limit Contacts



Moving-coil movement, edgewise scale

Narrow front frame per DIN 43 718, matt black

'N' = Standard Version · 'A' = Extra Charge · '+' = Available without extra Charge · '-' = Not available

	Type	PFN 96 x 48 M
	Order No. ⇒	2596P
	+ ↓	
Landscape	HQ1	N
Portrait	HQ2	+
<b>Limits <sup>1)</sup></b>		
Min. - Max. / Min. - Max. closed current	AM40	+
Min. - Max. / Max. - Max. closed current	AM41	+
Min. - Max. / Min. - Min. closed current	AM42	+
Min. - Min. / Min. - Min. closed current and		
Max. - Max. / Max. - Max. working current	AM43	+
Max. - Max. / Max. - Max. closed current and		
Min. - Min. / Min. - Min. working current	AM44	+
Min. - Max. / Min. - Max. working current	AM45	+
Min. - Max. / Max. - Max. working current	AM46	+
Min. - Max. / Min. - Min. working current	AM47	+
<b>Zero Point - left / bottom</b>		
<b>Connection to Shunt (Direct Current )</b>		
... A / 60 mV	BE3 <sup>2)</sup>	A
... A / 150 mV	BE4 <sup>2)</sup>	A
... A / ... > 60 mV <sup>3)</sup>	BE981 <sup>2)</sup>	A
<b>Scale:</b>		
1 A	CG1	+
1.5 A	CG1.5	+
2.5 A	CG2.5	+
4 A	CG4	+
5 A	CG5	+
6 A	CG6	+
10 A	CG10	+
15 A	CG15	+
20 A	CG20	+
25 A	CG25	+
30 A	CG30	+
40 A	CG40	+
50 A	CG50	+
60 A	CG60	+
75 A	CG75	+
100 A	CG100	+
150 A	CG150	+
200 A	CG200	+
250 A	CG250	+
300 A	CG300	+
400 A	CG400	+
500 A	CG350	+
600 A	CG600	+
0 ... > 1 A ... < 1 kA <sup>3)</sup>	CG...	+
1 kA	CH1	+
1.5 kA	CH1.5	+
2.5 kA	CH2.5	+
4 kA	CH4	+
5 kA	CH5	+
6 kA	CH6	+
10 kA	CH10	+
15 kA	CH15	+
> 1 kA <sup>3)</sup>	CH...	+

1) Number of limits - specify in clear text

2) Complement with CG... or CH...

3) Specify in clear text

# Vario-Series • Rectangular Indicator/Controllers

For Direct Current or Direct Voltage with 4 Limit Contacts



Moving-coil movement, edgewise scale

Narrow front frame per DIN 43 718, matt black

'N' = Standard Version · 'A' = Extra Charge · '+' = Available without extra Charge · '-' = Not available

	Type Order No. ⇒	PFN 96 x 48 M 2596P
<b>Limits</b> <sup>1)</sup>	Landscape Portrait	+ ↓ N +
	Min. - Max. / Min. - Max. closed current	AM40 +
	Min. - Max. / Max. - Max. closed current	AM41 +
	Min. - Max. / Min. - Min. closed current	AM42 +
	Min. - Min. / Min. - Min. closed current and Max. - Max. / Max. - Max. working current	AM43 +
	Min. - Min. / Min. - Min. working current	AM44 +
	Min. - Max. / Min. - Max. working current	AM45 +
	Min. - Max. / Max. - Max. working current	AM46 +
	Min. - Max. / Min. - Min. working current	AM47 +
<b>Zero Point - left / bottom</b>		
<b>Direct Voltage</b>		
<b>Range</b>		
0 ... 60 mV	DB60	A
0 ... 100 mV	DB100	A
0 ... 150 mV	DB150	A
0 ... 250 mV	DB250	A
0 ... 400 mV	DB400	A
0 ... 600 mV	DB600	A
0 ... > 60 mV ... < 1 V <sup>2)</sup>	DB...	A
0 ... 1 V	DC1	A
0 ... 1.5 V	DC1.5	A
0 ... 2.5 V	DC2.5	A
0 ... 4 V	DC4	A
0 ... 5 V	DC5	A
0 ... 6 V	DC6	A
0 ... 10 V	DC10	A
0 ... 15 V	DC15	A
0 ... 20 V	DC20	A
0 ... 25 V	DC25	A
0 ... 40 V	DC40	A
0 ... 50 V	DC50	A
0 ... 60 V	DC60	A
0 ... 100 V	DC100	A
0 ... 150 V	DC150	A
0 ... 250 V	DC250	A
0 ... 400 V	DC400	A
0 ... 500 V	DC500	A
0 ... 600 V	DC600	A
0 ... > 1 V ... < 600 V <sup>2)</sup>	DC...	A
<b>Measuring Inputs</b>		
for thermocouple J, K, S ... / Pt100		
Ranges and versions on request		

1) Number of limits - specify in clear text

2) Specify in clear text

# Vario-Series • Rectangular Indicator/Controllers

For Direct Current or Direct Voltage with 4 Limit Contacts



Moving-coil movement, edgewise scale

Narrow front frame per DIN 43 718, matt black

Please note when ordering:

Only one Identification No. with the same letter sequence may be chosen. Order No. with Identification No. N (standard model) can be left out.

'N' = Standard Version · 'A' = Extra Charge · '+' = Available without extra Charge · '-' = Not available

	Type Order No. ⇒	PFN 96 x 48 M 2596P
Landscape Portrait	+ ↓ HQ1 HQ2	N +
<b>GENERAL VARIANTS</b>		
<b>Zero Point</b>		
Zero point at left (landscape)	BC1	N
Zero point at bottom (portrait)	BC4	+
Zero point at the center	BC2	A
Zero point between bottom and center of scale <sup>1)</sup>	BC21	A
<b>Position of Use</b>		
Control panel vertical	LA1	N
Control panel horizontal	LA2	+
Other	LA999	A
(Please specify angle between scale and horizontal)		
<b>OUTPUT VARIANTS</b>		
Relay output	AU1	N
Logic output (open collector)	AU2	+
H = + 24 V (electrically isolated from U <sub>H</sub> ) L < + 1 V, I ≤ 25 mA at U <sub>H</sub> 20 ... 40 V DC/AC I ≤ 10 mA at U <sub>H</sub> 90 ... 127 V AC u+ and U <sub>H</sub> 198 ... 267 V AC		
<b>AUXILIARY VOLTAGE VARIANTS</b>		
20...40 V DC / AC, 45...65 Hz	IV62	N
90...127 V AC, 45...65 Hz	IV60	A
198...267 V AC, 45...65 Hz	IV61	A
<b>SCALE VARIANTS</b>		
<b>Division and Pointer</b>		
Single division	GD1	N
Double division <sup>1)</sup>	GD2	A
<b>Additional Imprint</b>		
Second numbering, black <sup>1)</sup>	SK982	A
Second numbering, red (RAL 2002) <sup>1)</sup>	SK983	A
<b>Inscription</b>		
Without additional inscription	SM99	N
Inscription ≤ 15 characters German <sup>1)</sup>	SM991	A
Inscription ≤ 15 characters other language <sup>1)</sup> (Latin lettering)	SM993	A
Coloured mark red RAL 2002 <sup>1)</sup>	ST981	A
Coloured sector red (RAL 2002) <sup>1)</sup>	SU981	A
Coloured sector green (RAL 6018) <sup>1)</sup>	SU982	A
<b>HOUSING VARIANTS</b>		
<b>Application</b>		
Standard version	LB99	N
Tropic resistant	LB1	A
<b>Protection</b>		
Standard (see technical data)	LH99	N
Housing panel IP 54, connections IP 20	LH22	A
<b>Front Frame Colour</b>		
Matt black	MA2	N
Matt grey, RAL 7037	MA11	A
<b>Glass Window</b>		
Standard version	MG99	N
Anti-glare glass	MG1	A
<b>Identification</b>		
Without identification	MZ99	N
Identification on the back <sup>1)</sup>	MZ998	A

<sup>1)</sup> Specify in clear text