E-T-A Adjustable Digital Process Instrument MDK480

Description

The adjustable Digital Process Instrument MDK480 is designed to measure and display process variables in industrial applications.The instrument is panel mounted with front frame dimensions of 96 mm x 48 mm and a mounting depth of 166 mm. It is available with a 3 1/2 digit 7-segment LED display.
Input signal and display range as well as decimal points may be easily set by means of internal jumpers. Fine adjustment is possible by means of the potentiometer accessible from the front.
Different supply voltages can be provided for a wide spread of applications. The instrument is also available with optional analogue output, or with 2 setpoints with output relays.
A Hold input is included as standard.

MDK480

Measuring range/Input signals

Measuring range	Input resistance	Overload protection cont.	5 sec.	Pin -		+
Standard signals 0...5/10 V or 0/4...20 mA						
5/10 V	20 MΩ	500 V	-	1	-	2
10 V	20 MΩ	500 V	-	1	-	2
20 mA	10 Ω	160 mA	300 mA	3	-	4

Full scale range: 200...3000 Digits (= Endwert-Anfangswert)
Initial value: -1000...+1000
User selectable decimal point.
Specify measuring unit when ordering

Technical data

Accuracy of display (at 23 °C)
0.1 % of reading ± 1 digit
Input:: potential free differential input
common mode range ± 1 V
common mode rejection > 60 dB

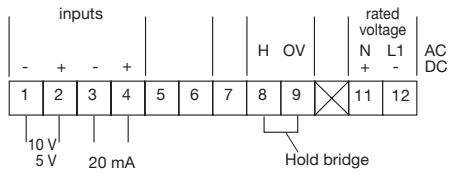
Display Red 7-segment LED display, 3 1/2 digit, 13 mm high
Full scale range: ± 1999 Digits
Overload indication: The last 3 digits will extinguish
Hold signal via terminal strip on the rear

Reading characteristics: Integrating dual slope
Count rate: 2.5 readings/s
Setting time for a 100 % reading change: < 3 s

Environmental requirements
Temperature drift: ≤ 0.01 % span/K
Warm-up to full accuracy: ≤ 15 minutes
Operating temperature range: 0...+50 °C
Storage temperature range: -20...+70 °C
Application class: KWF to DIN 40 040
Relative humidity: 0...75 % annual average, 95 % max. (without condensation)
Shock test: 10 g (11 ms), to IEC 68-2-29/ DIN 40 046, part 26
3 shocks in 3 planes
Vibration test: on duty: 2 g (0.15 mm), 10...55 Hz
on transport: 5 g (0.35 mm), 10...150 Hz
to IEC 68-2-6/DIN 40 046, page 8

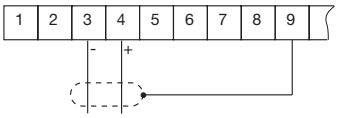
Voltage supply (voltage rating):
AC 230 V ±10 % 48...62 Hz
other voltages: AC 240 V, 120 V, 115 V ±10 % 48...62 Hz
(optional) AC 48 V, 24 V, ±10 % 48...62 Hz
DC 12 V...28 V* physically isolated
Max. allowed residual ripple 10 %, but not less than the minimum voltage or more than the maximum voltage.
Power consumption: ≤ 9 VA/6,5 W

Connector pin assignment



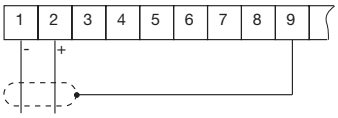
Connections for standard signals

Current



0 ... 20 mA or 4 ... 20 mA

Voltage



0 ... 10 V or 0 ... 5 V

Case

Fig. 1 Side view

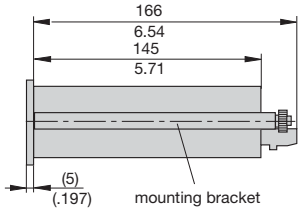


Fig. 2 Front view

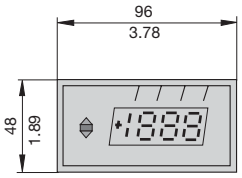


Fig. 3 Rear view

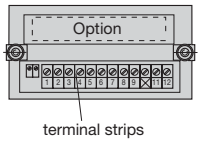
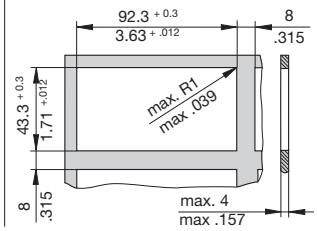


Fig. 4 Panel cut-out



This is a metric design and millimeter dimensions take precedence (mm / inch)

Caution:
If several instruments are to be fitted, a minimum of 8 mm between each cut-out must be provided for correct removal of front glass (fig. 4).

Case material:	black Noryl SE 1, glass-fibre reinforced
Degree of protection:	IP 50 (front), IP 20 (rear)
Applicable specification:	VDE 0411 part 100
Pollution degree 3 to IEC 664 and 664 A	
Mass:	approx. 500 g (without option)

Terminations

Plug-in screw-terminal strip for max. 1.5 mm² cables.

Analogue output (AA and AB options)

Description
The instrument accepts a current and a voltage analogue output. The voltage output is a differential output which depends on the negative supply voltage; the current output is ground-related. There is no physical isolation between the analogue outputs and the measuring input.

Technical data

Current output:
Output current: 0...20 mA corresponding to a 0...100 % measuring range
or 4...20 mA corresponding to a 0...100 % measuring range
Load resistance: $R_L \leq 300\ \Omega$

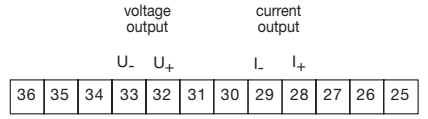
Voltage output:
Output voltage: 0...10 V corresponding 0...100 % measuring range
Load resistance: $R_L \geq 10\ k\Omega$

Overload protection: continuous short-circuit or no load

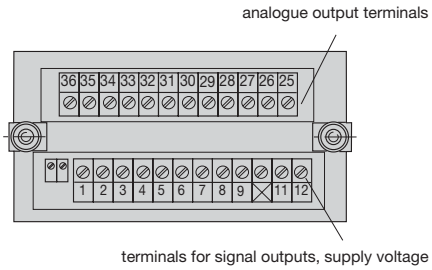
Caution!
Do not electrically connect the inputs and outputs simultaneously when several instruments with analogue outputs are connected, as this will cause ground loops short-circuiting the internal supply across the analogue outputs. Otherwise provide additional interface couplers with physical isolation at the outputs.

Terminations:
12 pole plug-in screw-terminal strip for max. 1.5 mm² cables

Connector pin assignment



Rear view with analogue output option:

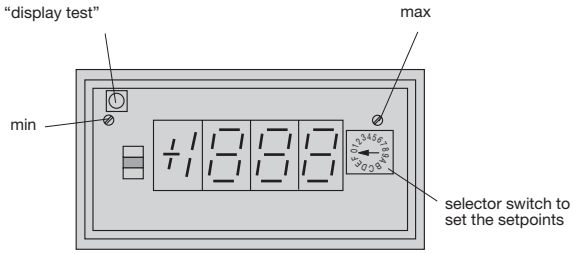


Setpoints

Description
The instrument may be fitted with setpoints. The setpoints are with output relays to provide physical isolation. The response threshold may be set with a potentiometer after removing the front glass. Fade-in reading of the set values with a selector switch accessible from the front.

2 Setpoints (option G1)

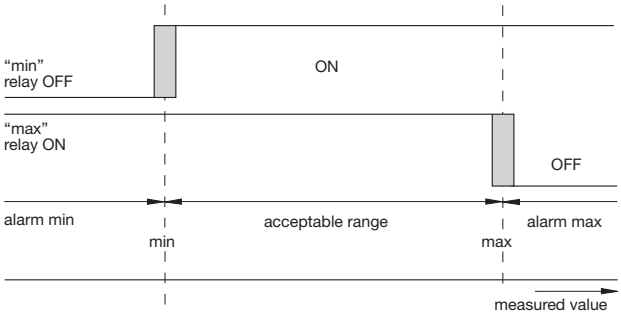
Setting the setpoints (after removal of front glass)



Switch position	Readout
or 8	measuring value
1 or 9	min
3 or B	max
All other switch positions	overflow

Setting accuracy: = accuracy of readout
Accuracy of response: ≤ 0.2 % span ± 1 digit
Hysteresis: ≤ 0.5 % span ± 1 digit
Response: ca. 0.5 s

Switching performance (here "relay de-energized" = self-protection)

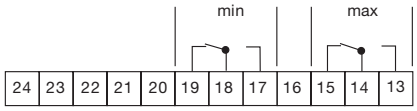


All relay switching conditions are inverted with "relay de-energized".

Three LEDs indicate the switching position of the setpoints:

lighted:	above max. limit (max)	(red LED)
lighted:	"acceptable range"	(green LED)
lighted:	below min limit (min)	(red LED)

Connector pin assignment: 2 setpoints



Contact position shown in the "acceptable range" condition with version "relay de-energized".

Outputs:
Switching capacity
max: 2-way contact 250 V/ 3 A/660 VA/100 W
min: 2-way contact 250 V/ 3 A/660 VA/100 W

Terminations:
12 pole plug-in screw-terminal strip for max. 1.5 mm² cables.

2 Setpoints + Analogue output

2 setpoints + analogue output 0...20 mA
2 setpoints + analogue output 4...20 mA
2 setpoints + analogue output 0...10 V
See page 27 for setpoint description

Analogue output:
The voltage or current analogue output is designed as a differential output which depends on the internal negative supply voltage; the current output is ground related.
There is no physical isolation between the analogue output and the measuring input.

Current output:
Output current 0...20 mA corresponding to a 0...100 % measuring range
or 4...20 mA corresponding to a 0...100 % measuring range
Load resistance $R_L \leq 300\ \Omega$

Voltage output:
Output voltage 0...10 V corresponding to a 0...100 % measuring range
Load resistance: $R_L \geq 10\ k\Omega$

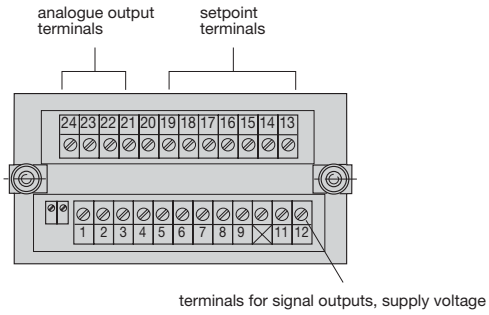
Overload protection: continuous short-circuit or no-load
Caution!
Do not electrically connect the inputs and outputs simultaneously when several instruments with analogue outputs are connected, as this will cause ground loops short-circuiting the internal supply across the analogue outputs. Otherwise provide additional interface couplers with physical isolation at the outputs.

Terminations:
12 pole plug-in screw-terminal strip for max. 1.5 mm² cables.

Connector pin assignment:

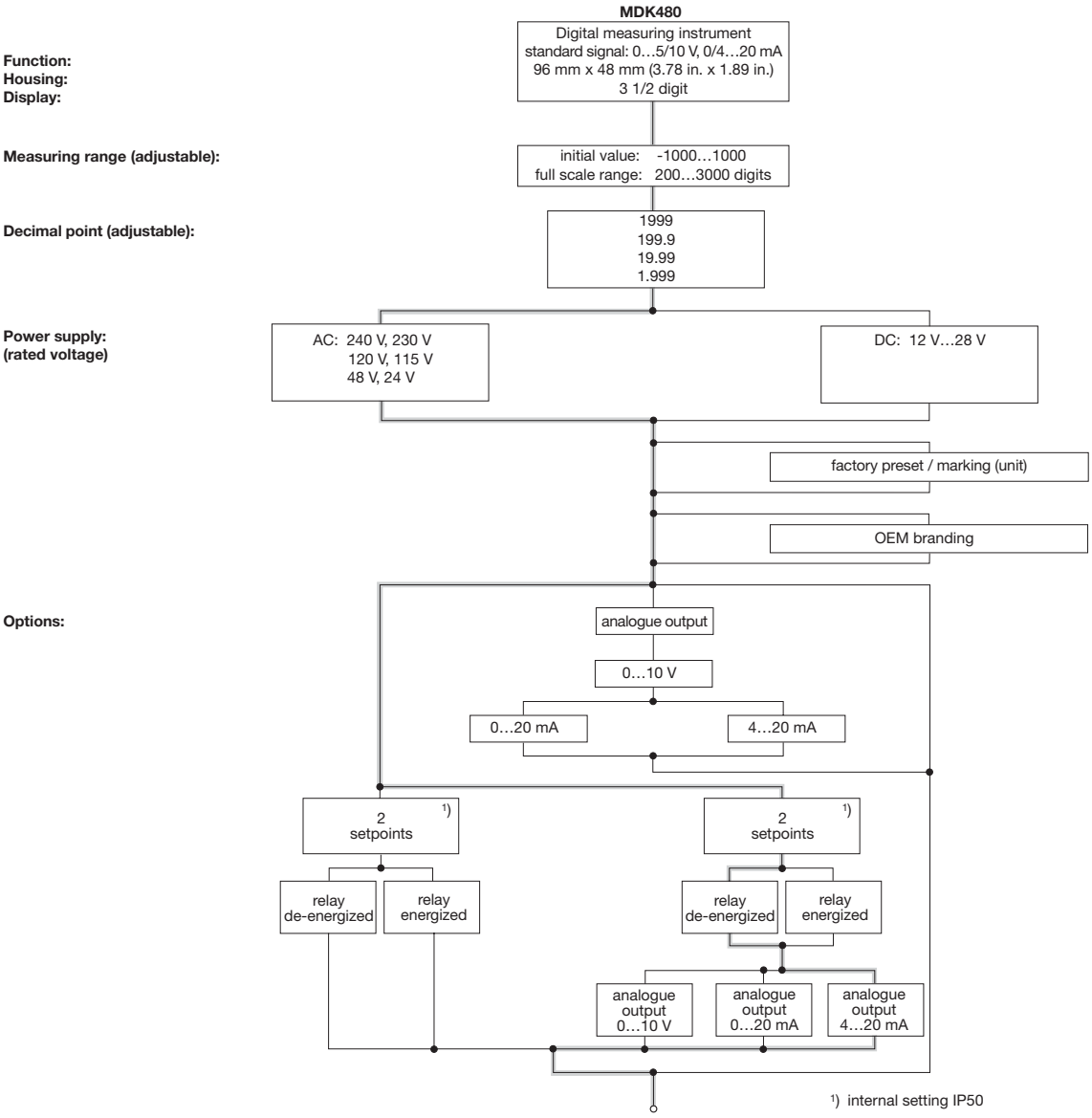
Contact position shown in the “acceptable range” condition with version “relay de-energized”.

Rear view: 2 setpoints and analogue output



Selector chart

Please select the required type by following the chart below.



Example: MDK480-X 3 0 X X A9 G9 N
Digital measuring instrument 96 x 48 mm / 3.78 in. x 1.89 in., 3 1/2 digit, for standard signals 0…5/10 V; 0/4…20 mA, user selectable initial value, full scale range and decimal point, AC 230 V supply, E-T-A, trademark, 2 setpoints, internal setting, IP50, relay de-energized, analogue output 0…20 mA, marking m^3/h

Ordering information

Please check that combining the options is possible (see Selector Chart on the previous page).

Type No.

Physical dimension
- **K** standard signal

Case
- **480** 96 mm x 48 mm

Input
- **X** standard signal 0...5 V, 0...10 V, 0...20 mA, 4...20 mA (to be set by user)
- **0** special measuring range *)

Display
- **3** 3 1/2 digit

Initial value of display
- **0** user selectable between -1000 and 1000 digits

Full scale range
- **X** user selectable between 200 and 3000 digits

Decimal point
- **X** user selectable decimal point

Voltage supply (voltage rating)
- **A1** 240 V AC
- **A3** 120 V AC
- **A6** 48 V AC
- **A7** 24 V AC
- **A8** 115 V AC
- **A9** 230 V AC (standard)
- **D8** 12...28 V DC

K factory pre-set*)
- standard marking (see below)*)
- special marking as requested by customer*)

F OEM branding *)

Options
- **AA** analogue output: 0...20 mA + 0...10 V
- **AB** analogue output: 4...20 mA + 0...10 V
- **G1** 2 setpoints, internal setting, IP50
- **G6** 2 setpoints, internal setting, IP50 + analogue output 0...20 mA
- **G7** 2 setpoints, internal setting, IP50 + analogue output 0...10 V
- **G9** 2 setpoints, internal setting, IP50 + analogue output 4...20 mA

N Relay de-energized, standard
I Relay energized

MD	**K**	**480**	**-**	**X**	**3**	**0**	**X**	**X**	**A9**	**.**	**.**	**G9**	**N**	ordering example

*) Clearly add desired specifications

Standard markings:
V, mV, kV, MV, A, mA, kA, kW, MW, °F, °C, %, % r.F., ms, Stück, Ohm, pH, µs, l, N, kN, kg, t, lbf, Ncm, Nm, m, cm, mm, km, inch, bar, mbar, Pa, hPa, psi, kg/cm^2, mmWs, mWs, N/m^2, N/mm^2, Hz, kHz, U/min, min^{-1}, sec^{-1}, rpm, l/h, l/min, kg/h, m^3/h, m/min, m/sec, t/h