

DIGEM f 96 x 48 CK

3-349-001-03
1/7.98

- Front panel dimensions: 96 x 48 mm
- LED display: red or green, 14 mm high
- Max. display range: -19 999 to + 32 765
- Modular connectors for flexible use
- Simple adjustments at front panel keys
- Up to 4 limit values possible as option
- Adaptable to customer specific characteristic curves
- Addition or subtraction of 2 measurement values
- Multiplication or division of 2 measurement values
- Automatic taring
- Automatic balancing for pressure measurements
- Storage of minimum and maximum measurement values
- Power supply electrically isolated from measuring circuit
- Complies with IEC 1010
- Housing suitable for rack mounting
- Interface and analog output available as options



Applications

The DIGEM f 96 x 48 CK is designed for use where the monitoring, analysis and, if required, the transmission of measurement values via an analog output or serial interface are required.

The modular design and the wide variety of functions simplify adaptation of the instrument to your specific application.

The instrument can be equipped for the performance of the following measurements:

- Direct current and direct voltage
- Sinusoidal alternating current and alternating voltage
- Alternating current and alternating voltage, RMS
- Temperature
- Frequency and r.p.m.
- Pressure
- Pulse counting
(see page 3, chapter 11 for function and mode of operation)
- Display in $\cos \varphi$
- Non-linear input quantities

Description

The DIGEM f 96 x 48 CK is a programmable rack mount measuring instrument with extremely high resolution. The maximum display range is -19 999 to + 32 765. The display can be expanded to 99 990 for positive values by means of an adjustable multiplier. The basic instrument is comprised of a precision DC voltmeter. Each instrument can be adapted to specific measuring tasks through the use of modules at the measuring input. Digital linearization is accomplished with an integrated microcomputer for temperature measurements.

The keys at the front panel allow for simple, accurate adjustment of limit values and set-points. The safeguarding of data against unauthorized changes can be assured with a switch at the back-side of the front panel, or alternatively with an external contact. The following functions can also be adjusted at an additional programming level with the keys at the front panel:

- Zero point shifting over the entire range
- Adjustment of the measuring span
- Matching of non-linear input quantities
- Additional measurement value tendency display
- Storage of minimum and maximum measurement values
- Automatic taring
- Mean value calculation for several measurements
- Rounding of the last place
- Multiplication of the display value by a factor of 10

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The settings for these functions are secured at the factory against change with a separate switch at the backside of the front panel. Preset values remain in storage even if a mains failure occurs.

The MESSCONTACTER model provides for the selection of a maximum of four limit values. The alarm circuit is equipped with relays.

The switching condition of relays LOL1 and HIL1 is also indicated by means of LEDs. Indication of an alarm condition can be indicated optically by means of a blinking display for all limit values.

This model also includes the following features:

- Adjustable switching hysteresis
- Adjustable response delay for limit values
- Storage of alarm messages

Each DIGEM f 96 x 48 CK can be optionally expanded with a floating analog output and an RS 232 or RS 485 serial interface.

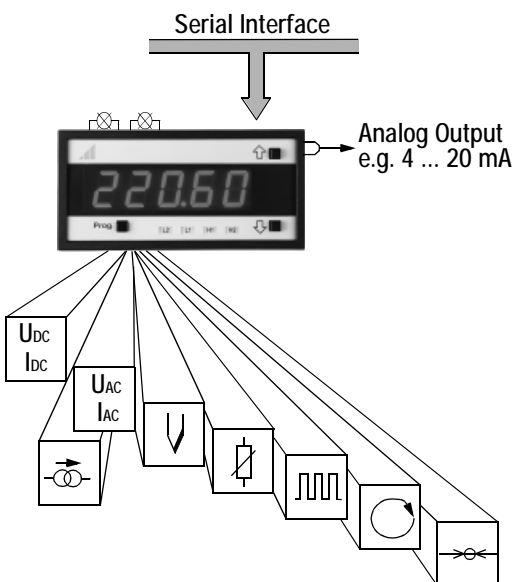
Applicable Regulations and Standards

IEC 1010-1	Safety requirements for electrical equipment for measurement, control and laboratory use
EN 50022	Class B interference suppression
IEC 801-2 through 5	EMC interference immunity
DIN 40040	Utilization category and reliability data for telecommunications and electronic components

Programming

Each measuring instrument is programmed at the factory according to customer requirements. Subsequent reprogramming is also possible without removing the instrument from its rack.

All programmed values remain in memory even if a mains failure occurs.

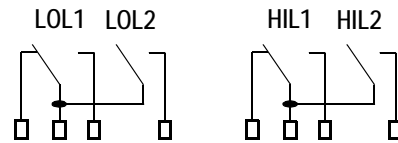


Function and Mode of Operation

1. Limit Values

Each MESSCONTACTER can be ordered with two or four limit values designated LOL1 and HIL1 (as well as LOL2 and HIL2 for the third and fourth limit values).

Limit values LOL1 and HIL1 are each provided with a changeover contact for alarm messages. Relays LOL2 and HIL2 are each equipped with a normally open contact. The LOL2 contact is connected to the LOL1 contact as shown in the following diagram. The same applies to the HIL2 and HIL1 contacts.



The MESSCONTACTER can be configured either for load current or closed-circuit current.

If the measurement value enters the alarm range, an alarm message is read out from the appropriate relay. All violations of limit values LOL1 and HIL1 are simultaneously indicated in an unambiguous fashion by means of LEDs as well.

If the measurement value drops back to below the alarm range, the alarm message is automatically cancelled. This function can be overridden with the alarm memory if required. In this case the alarm message remains active even after the measurement value has fallen below the alarm range, until cancellation has been acknowledged by pressing a key, or with an external signal applied at the hold input.

2. Storage of Minimum and Maximum Values for Measuring Instruments without Limit Values

The three different versions of this instrument are programmed as follows:

- a) MIN-MAX Memory
Display of current measurement value and storage of minimum and maximum values to memory
- b) Maximum Value Display
Display of the maximum value and storage of the minimum value to memory
- c) Minimum Value Display
Display of the minimum value and storage of the maximum value to memory

Stored values can be queried by activating the \uparrow and \downarrow keys.

3. Automatic Taring

An input quantity is measured and stored to memory by pressing the program key. The measuring instrument displays the difference of the current measurement value minus the stored input quantity.

4. Addition and Subtraction of Measurement Values

The measuring instrument can be equipped at the factory with two measurement inputs for DC measuring ranges. Depending upon which option has been selected, this version of the instrument displays either the sum or the difference of the two measurement values.

5. Multiplication and Division of Measurement Values

The measuring instrument can multiply or divide two values from the DC measuring ranges. This version of the instrument is equipped at the factory with two measuring inputs.

The following value is displayed for multiplication: $U_1 \times \left(\frac{U_2}{20000}\right)$.
The following value is displayed for division: $\frac{(U_1 \times 20000)}{U_2}$.

6. Rounding and Mean-Value Generation

If legibility of the display is impaired by continuously fluctuating input quantities, the last place of the measurement value can be rounded in steps of either 2, 5 or 10. Mean-value generation can also be selected.

7. Tendency Display

The function of the two LEDs used for alarm signals can be re-configured such that rising or falling tendencies for gradually changing measurement values can be detected and indicated (e.g. temperature).

8. Calibration

Matching of the display range to the input quantity can be accomplished in two different ways:

- Digital selection of an offset quantity and a scaling factor.
- By applying the lower and upper range values to the measurement input and directly adjusting the corresponding display. The display range can be conveniently matched to a non-linear input signal by selecting one of the ten break points.

9. Switching Hysteresis and Response Delay with the MESSCONTACTER

Switching hysteresis can be adjusted for the relay tripping limit values in steps of 1 from 0 to ± 127 digits. Alternatively, a response delay ranging from 0 ... 120 s can be selected. The mean value of the measurement values is calculated and compared with the limit values during this delay time.

10. Automatic Balancing for Pressure Measurement

If frequent balancing is required during operation, automatic balancing can be programmed. After the program key has been activated, the measuring instrument balances the lower limit of the effective range (e.g. zero). If the program key is activated again, the measuring span is also automatically balanced. The new values are stored to memory, and remain in memory even if a mains failure occurs.

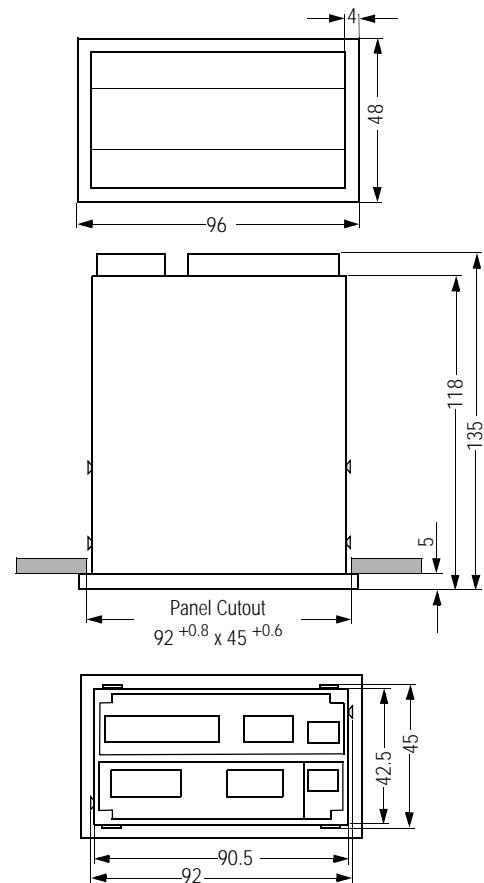
11. Pulse Counter

If the "counter" function has been selected for the measuring instrument the overflow display "----" appears when the instrument is switched on.

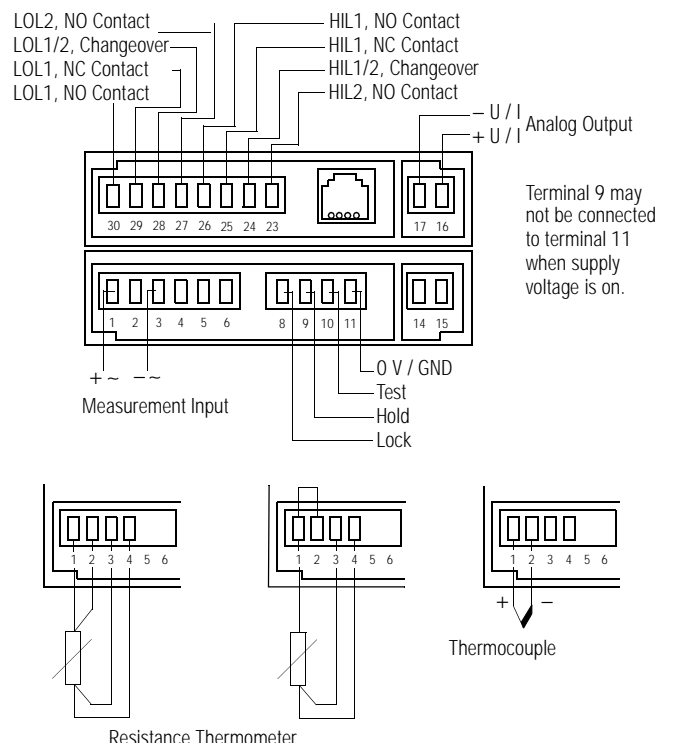
The counter can be reset with the help of the \uparrow and \downarrow keys.

All pulses which occur at the measurement input are counted and stored to memory. The instrument can count up to 32,762 pulses. The value is displayed which results from multiplying the value in memory with the selected multiplication factor (0.0001 to 1.9999). The contents of the memory are deleted when the measuring instrument is switched off.

Dimensional Drawing



Connector Pin Assignments



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Characteristic Values

Display		Temperature Measuring Ranges:	
Type	7 segment LED	with PT100	
Color	red / optionally green	Max. Error	< 0.5°C
Character Height	14 mm	Temperature Coefficient	< 150 ppm / K
Display Range	-19 999 to 32 765	Offset Drift	< 0.1 digit / K
Polarity	"-" is automatically displayed	with Thermocouples	
Decimal Point	Programmable	Linearization Error	< 1 K
Overflow Display	"-----"	Temperature Coefficient	≤ 150 ppm / K
		Offset Drift	< 0.1 digits / K
		Cold Spot Compensation Error (10 ... 50°C)	≤ 2 K/10 K
		Broken Cable Display	"-----"
Input		Frequency and R.P.M. Measuring Ranges:	
1 measuring range dependent upon measuring module	see Order Information / ID Number	for Ranges to 500.0 Hz	± 0.1 Hz
Max. voltage between measure- ment input and housing	< 380 V _{eff}	Max. Resolution	0.1 Hz
for Voltage Measurement: Input Resistance	> 1 MΩ	for Ranges > 500.0 Hz	± 1 digit
for Current Measurement: Voltage Drop	max. 2 V	Time Base	± 50 ppm
for Pt100 Temp. Measurement: Current at Sensor	2 mA	Temperature Coefficient	± 1.5 ppm / K
for Pressure Measurement: Bridge Voltage	10 V DC	Pressure Measurement	
Current	40 mA	Control Commands	
Measuring Signal Balancing	min. 2 mV / V max. 20 mV / V automatic via key activation	Storage of Display Value	externally controlled
		Reset	externally controlled
		Lock Settings	externally controlled
Error Limits		Power Supply	
Direct Voltage and Direct Current Measuring Ranges:	± (0.05 % + 1 digit)	depending upon model	230 / 115 V AC and 90 V ... 260 V DC
Temperature Coefficient	< 80 ppm / K	or	12 V / 24 V AC and 10 V ... 60 V DC
Series-Mode Rejection Ratio (SMRR)	> 35 dB at 50 Hz	Power Consumption	max. 5 VA
Common-Mode Rejection Ratio (CMRR)	> 120 dB (with reference to 200.00 mV meas. range at 50 Hz)	Outputs	
Alternating Voltage and Alternating Current Measuring Ranges (sinusoidal):		Relay Contacts	
arith. 45 ... 65 Hz	± (0.2% + 0.2% of meas. range)	for LOL1 and HIL1	1 changeover contact each
30 Hz ... 1 kHz	additional ± (0.2% + 0.2% of measuring range)	for LOL2 and HIL2	1 normally open contact each
Temperature Coefficient	± (0.01% + 0.01 mV) / K	Operating Time	
Alternating Voltage and Alternating Current Measuring Ranges (non-sinusoidal):		at 3 measurements/s	max. 400 ms
TRMS 45 ... 65 Hz	± (0.2% + 0.2% of meas. range)	at 16 measurements/s	max. 100 ms
20 Hz ... 1 kHz	additional ± (0.2% + 0.2% of measuring range)	Switching Hysteresis	adjustable from ± 0 digits to ± 127 digits
Crest Factor	6 (additional 0.5%)	Delay Time	adjustable from 0 s to 120 s
Temperature Coefficient	± (0.01% of measurement value + 0.01 mV) / K	Switching Capacity	5 A / 240 V
Frequency and R.P.M. Measuring Ranges:		Serial Interface	RS232 or RS485 electrically isolated from other circuit
a) for Ranges to 500.0 Hz		Baud Rate	200 ... 19200 (adjustable)
Max. Resolution	0.1 Hz	Max. Volt. to other Circuits	70 V
b) for Ranges > 500.0 Hz		Transmission Protocol	DIN draft 19 244
Time Base	± 50 ppm	Analog Output	electrically isolated from other circ.
Temperature Coefficient	± 1.5 ppm / K	Max. Volt. to other Circuits	70 V
		Resolution	16 bit
		Ranges	only up to max. digital display resolution
		or	0 ... 20 mA, 4 ... 20 mA / 500 Ω
		Balancing	0 ... 10 V
			digital at front panel keys

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Ambient Conditions

Operating Temperature Range	0 ... 50°C
Storage Temperature Range	- 20 ... + 70°C
Relative Humidity	max. 85%

Housing

Material	metal half-shells
Front Dimensions	96 x 48 mm
Panel Cutout	45 + 0.6 x 96 + 0.8 mm
Bezel Height	5 mm
Bezel Color	black, options: gray, light gray, pebble gray or dark beige
Installation Depth	max. 125 mm
Weight	basic unit approx. 0.4 kg, max. 0.6 kg
Terminal Connectors	screw terminal blocks

Measured Quantity Designations: Table EM

Measured Quantity	Order Number
%	EM 11
mV	EM 12
V	EM 13
kV	EM 14
mA	EM 15
A	EM 16
Hz	EM 17
μA	EM 19
°C	EM 18
W	EM 21
kW	EM 22
MW	EM 23
var	EM 24
ms	EM 31
min ⁻¹	EM 32

Order Information

Features		ID Number
DIGEM f 96 x 48 CK	Measuring Instrument	A1192
LED Display	red (standard)	•
	green	A1
Limit Values		
2 Limit Values		
Load Current Version	min.-max. contact	C1
	min.-max. contact	C2
	min.-max. contact	C3
Closed-Circuit Current Version	min.-max. contact	C4
	min.-max. contact	C5
	min.-max. contact	C6
4 Limit Values		
Load Current Version	min. min.-max. max. contact	C7
	min. min.-min. min. contact	C8
	max. max.-max. max. contact	C9
Closed-Circuit Current Version	min. min.-max. max. contact	C10
	min. min.-min. min. contact	C11
	max. max.-max. max. contact	C12
Input Quantities		
Direct Current 1 Measurement Value	± 2 mA	D001
	± 20 mA	D002
	± 200 mA	D003
	0 ... 20 mA	D004
	4 ... 20 mA	D005
	± 1 A	D006
	± 2 A	D007
	± xx mA, as requested	D900
	0 ... xx mA, as requested	D901
4...20 mA with power supply for 2-wire measuring transducers	D008	
Direct Voltage 1 Measurement Value	± 2 V	D010
	± 20 V	D011
	± 200 V	D012
	0 ... 10 V	D013
	± xx V, as requested (min. 2 V, max. 250 V)	D910
	0 ... xx V, as requested (min. 2 V, max. 250 V)	D911
At Shunt Resistor	± 60 mV (max. display 6000)	D015
	± 150 mV (max. display 15000)	D016
Direct Voltage 2 Measurement Values	U1: ± xx V; U2: xx V (min. 2 V, max. 20 V)	D960
Direct Current 2 Measurement Values	I1: ± xx mA; I2: xx mA (min. 2 mA, max. 20 mA)	D961
	I1 = I2 = 4 ... 20 mA	D962
Alternating Current, Sinusoidal	0 ... 2 mA	D021
	0 ... 20 mA	D022
	0 ... 200 mA	D023
	0 ... 1 A	D027
	0 ... 5 A	D028
	0 ... xxx mA (max. 200 mA)	D920
Alternating Voltage, Sinusoidal	0 ... 2 V	D031
	0 ... 20 V	D032
	0 ... 200 V	D037
	0 ... 700 V	D038
	0 ... xx V (min. 2 V, max. 250 V) ¹⁾	D923

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Features	ID Number
Measuring Ranges	
Alternating Current, True RMS	
0 ... 2 mA	D200
0 ... 20 mA	D201
0 ... 200 mA	D202
0 ... 1 A	D207
0 ... 5 A	D208
0 ... xxx mA (max. 200 mA)	D930
Alternating Voltage, True RMS	
0 ... 2 V	D210
0 ... 20 V	D211
0 ... 200 V	D212
0 ... 700 V	D213
0 ... xx V (min. 2 V, max. 200 V) ¹⁾	D933
Temperature, Pt100	
3-wire connection	- 200.0 ... + 800.0 °C - 328 ... + 1473 °F D062 D064
2 / 4-wire connection	- 200.0 ... + 800.0 °C - 328 ... + 1473 °F D063 D065
Thermocouples	
Type J (Fe-CuNi)	- 0 ... + 760 °C - 32 ... + 1260 °F D310 D311
Type K (NiCr-Ni)	- 190 ... + 1300 °C - 310 ... + 2300 °F D320 D321
Type R (Pt13 Rh-Pt)	0 ... 1600 °C 32 ... 2900 °F D330 D331
Type S (Pt10 Rh-Pt)	0 ... 1600 °C 32 ... 290 °F D340 D341
Resistance	
0 ... 10,000 Ω	2-wire connection 3-wire connection 4-wire connection D081 D082 D083
0 ... 2000 Ω	2-wire connection 3-wire connection 4-wire connection D084 D085 D086
0 ... 200 Ω	2-wire connection 3-wire connection 4-wire connection D087 D088 D089
Frequency	
5.0 ... 100.0 ... 500.0 Hz, voltage level 5 ... 30 V	D052
0 ... 2.000 kHz, voltage level 5 ... 30 V	D054
0 ... 20.000 kHz (5 ... 30 V)	D056
0 ... 200.00 kHz (5 ... 30 V)	D058
5.0 ... 100.0 ... 500.0 Hz 90 - 360 V	D050
0 ... 2000.0 Hz (90 ... 360 V)	D051
5.0 ... 100.0 ... 500.0 Hz (open collector)	D053
0 ... 2000.0 Hz (open collector)	D055
0 ... 20.000 kHz (open collector)	D057
For Pressure Sensors	
xx, x mV / V (min. 2 mV / V, max. 20 mV / V)	D990
Pulse Counter - Voltage Level 5 ... 30 V_{ss}	
Up-counter – xxx pulses per digit	D950
Down-counter – xxx pulses per digit	D951

Features	ID Number
Measurement Value Logic Operations	
Only possible with 2 measurement inputs	
Display = U1 + U2 or I1 + I2	DV1
Display = U1 – U2 or I1 – I2	DV2
Display = (U1 x 20 000) / U2	DV3
Display = U1 x (U2 / 20 000)	DV4
Display Range	
Same as measuring range at max. resolution (standard)	•
± xxxxx, as requested	E91
0 ... xxxxx, as requested	E92
xxx ... xxxxx, as requested	E93
1: xxx ... xxx 2: xxx ... xxx, as requested	E94
Display	
With linear relationship to input quantity (standard)	•
non-linear relationship to input quantity (as requested, max. 10 break points)	EA9
cos φ	EA1
with automatic taring (display = current measurement value – tare value)	EA2
Decimal Points	
Same as measuring range at max. resolution (standard)	•
no decimal point	ED1
xxxx . X	ED2
xxx . XX	ED3
xx . XXX	ED4
x . XXXX	ED5
Measured Quantity Designation	
Same as measuring range (standard)	•
with no measured quantity labelling	EM1
see table EM on page 5 for measured quantities	EM . .
measured quantity labelling as requested	EM90
Supply Voltage	
230 / 115 V AC and 90 ... 260 V DC	H1
12 / 24 V AC and 10 ... 60 V DC	H3
Outputs	
No analog output (standard)	•
0 ... 20 mA	K90
4 ... 20 mA	K91
0 ... 10 V	K92
1 ... 5 V	K93
as requested	K99
Interface	
Without serial interface (standard)	•
RS232	L1
RS485 (2-wire)	L2
Mean Value Display	
No mean value generation (standard)	•
mean value from 2 measurements	M1
mean value from 4 measurements	M2
mean value from 8 measurements	M3
mean value from 16 measurements	M4
mean value from 32 measurements	M5
Rounding of the Last Place	
No rounding (standard)	•
round in steps of 2	MA1
round in steps of 5	MA2
round in steps of 10	MA3

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Features	ID Number
Limit Value Switching Hysteresis (only with designation C)	
No switching hysteresis (standard)	•
with switching hysteresis (enter max. number of digits in clear text)	MX91
with response delay (enter max. number of seconds in clear text)	MX92
Memory	
No memory (standard)	•
storage of minimum and maximum values	NX1
maximum value display	NX2
minimum value display	NX3
store alarm messages to memory	NX4
Bezel	
Black, matt (standard)	•
gray, matt RAL 7037	P1
pebble gray, matt RAL 7032	P2
light gray, matt RAL 7035	P3

Features	ID Number
Front Panel	
GOSSEN-METRAWATT design (standard)	•
Design as requested	PD..
Mounting	
DIN screw clamps (standard)	•
manual slot-mount	RM1
Rear Panel Identification	
No identification (standard)	•
with identification (enter in clear text)	T9
Additional Labelling	
No additional labelling (standard)	•
with labelling at top (max. 15 characters, enter in clear text)	TA92

¹⁾ max. 50 V for models with analog output

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