

Quantitymeter M9648

Integration of analog input signals 0/4 ... 20mA and 0/2 ... 10V DC

Features

- LED-Display 14.2mm red
- Indicating range -99999 ... 999999 Digit
- Quantity value zero-voltage stored
- Display refreshing 4/s
- 2 measuring inputs for summation- or difference measurement
- Programmable measuring constant
- Max. 4 outputs SPDT relay or transistor
- Isolated analog output 0/4 ... 20mA and 0/2 ... 10V DC
- Front protection IP65



DIN 96x48mm

General

The Quantitymeter M9648 has been designed to measure quantities in connection with analog input signals (industry standard signals). Applications for example are measurement of flow quantity (L, m³) or electric energy (kWh, MWh).

The two analog inputs of the device make it possible to measure summation and difference values. A wide range of parameters is programmable. These are input signal(s), constant(s) of measuring, decimal points etc...

Short information

Programming	Parameters are programmed via front-side membrane keypad
Inputs	For both inputs its possible to program a different input signal, constant of measuring, decimals and time base. But in any case the measuring unit (e.g. L, m ³ , kW) must be identical.
Constant of measuring	Value of the measuring range in relation to the analog signal from the connected transmitter, sensor or measuring device.
Alarm outputs	Switching performance of the alarm outputs are programmable as minimum or maximum function.
Analog output	Proportional to the display value an isolated analog output signal 0 ... 20mA / 0 ... 10V DC or 4 ... 20mA / 2 ... 10V DC will be provided. Output changed automatically from current signal to voltage signal depending on burden.

Technical data

Power supply

Supply voltage	: 230V AC $\pm 10\%$; 115V AC $\pm 10\%$, 24V AC $\pm 10\%$ oder 24 VDC $\pm 15\%$
Power consumption	: max. 3.5VA, with analog output 5VA
Operating temperature	: -10 ... +55°C
Rated voltage	: 250V~ nach VDE 0110 between input / output / supply voltage Degree of pollution 2, over-voltage categoric III
Test voltage	: 4kV-, between input / output / supply voltage
CE - conformity	: EN55022, EN60555, IEC1000-3/4/5/11/13

Input

Current-input	: $R_i = 10\Omega$ overload 2-times; 4-times max. 5 s
Voltage-input	: $R_i = 100k\Omega$ overload max. 100V
Reset-input	: $R_i = 5k\Omega$ Level $U \leq 3V$ low $U \geq 10V$ high
min. impulse width	: 80ms
Accuracy	: 0.15%
Temperature coefficient	: 0.005% / K
Transmitter-supply	: U_0 appr. 24V, R_i appr. 150 Ω , max.50mA (25mA with 4 relay outputs)

Display

Display range	: -99999...999999 digit , leading zero suppression
Parameter display	: LED 2-digit red, 7mm (parameter and output indicator)

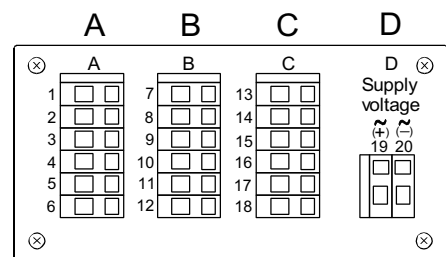
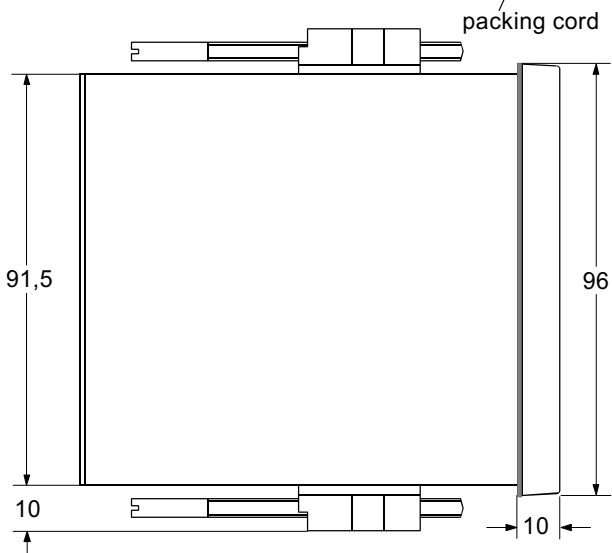
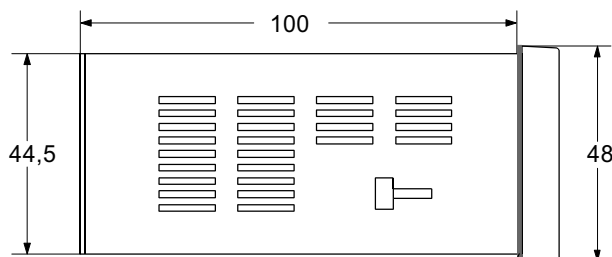
Output

Relay	: SPDT <250V AC<250VA<2A, <300V DC<50W<2A
Transistor	: max. 35V AC/DC / 100mA, short circuit protected
Analog output	: 0/4 ... 20mA burden $\leq 500\Omega$; 0/2 ... 10V burden $> 500\Omega$, isolated Automatic output changing (burden dependent)
-Accuracy	: 0.1%; TK 0.01% / K

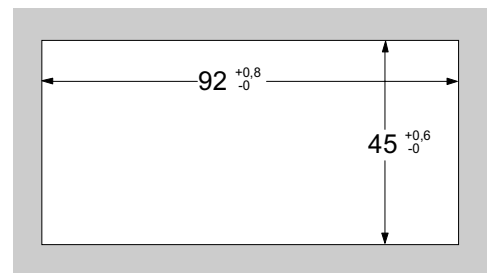
Panel case

Dimensions	: DIN 96x48mm, material PA6-GF; UL94V-0
Weight	: max. 390g
Electrical connection	: Clamp terminals, 2mm ² single wire, 1mm ² flexible wire, AWG14
Protection	: Front IP65, terminals IP20, fingersafe acc. German BGV A2 (old VBG4)

Dimensions



Position terminal strips

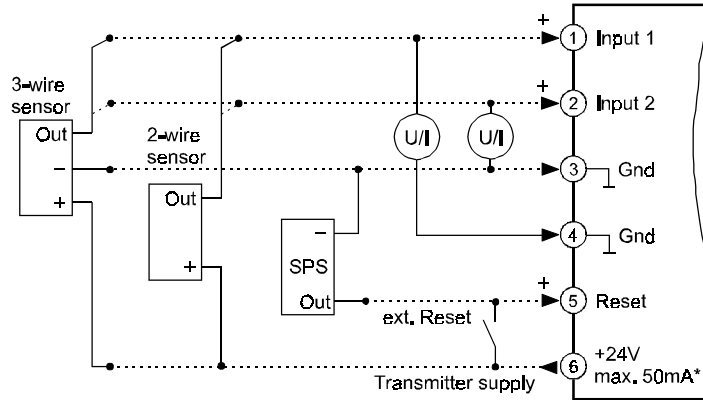


Panel cut-out
acc. to DIN 43700-96x48mm

Connection diagrams

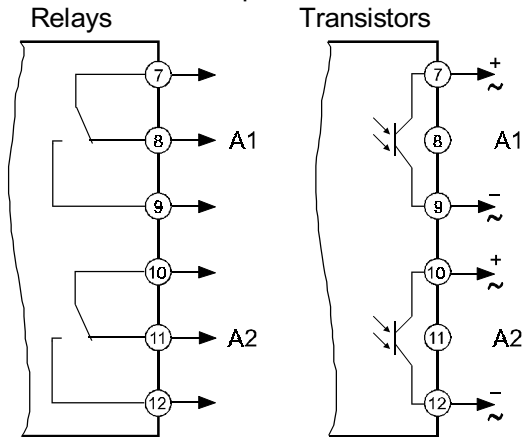
Terminal strip A

Inputs 0/4 ... 20mA or 0/2 ... 10V DC



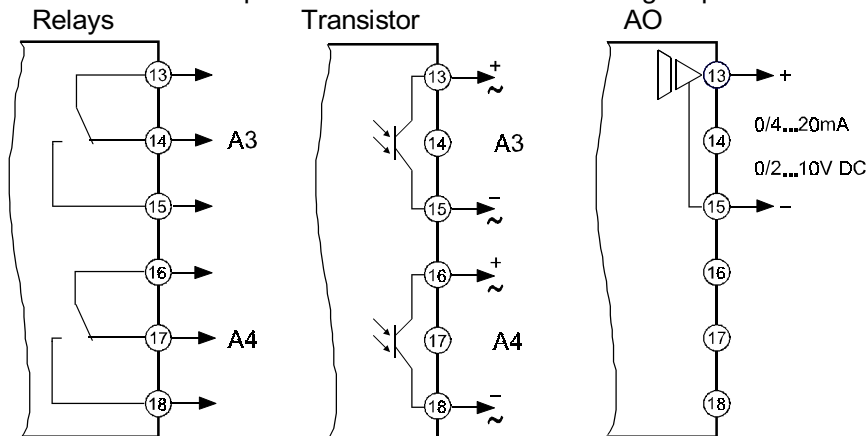
Terminal strip B (varies with version)

2 alarm outputs

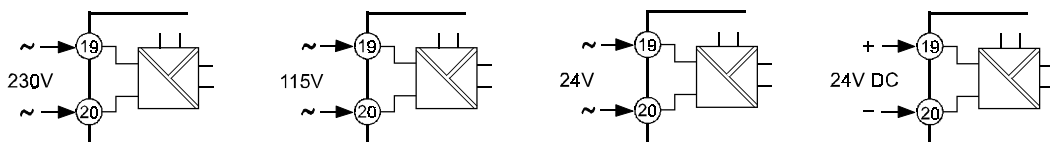


Terminal strip C (varies with version)

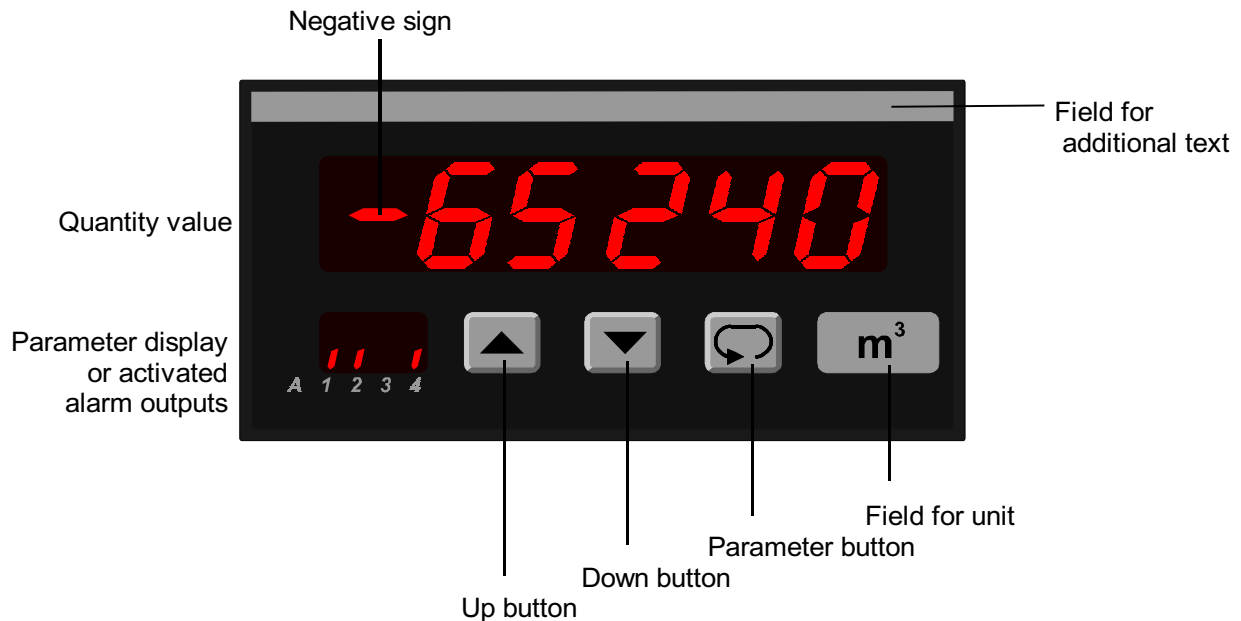
2 alarm outputs



Terminal strip D supply voltage (varies with version)



Controls and indicators



Description

Operating of the device is arranged in 2 levels. The requested parameter can be called by button. Selection within a parameters or entering data, use buttons and . Parameters are stored zero-voltage safe in the EEPROM.

After switching on the supply voltage, the device initializes itself. The display shows the message *init*. When the initializing procedure is finished, the device works in the **Working level**. Setpoints of the alarm outputs can be programmed and an internal reset of the display can be achieved. Activating the button for more than 2 seconds, the program is jumping into the **Configuration level**. Now all the parameters defining the function of the quantitymeter can be programmed. Pressing buttons and at the same time, the display jumps one parameter back.

After finishing the configuration or when longer than 2 minutes no button was pushed, the program jumps back to the working level. Leaving the configuration level is possible at any time when pushing the button for 2 seconds.

Error codes:

Display flashes Overflow of the indicating range (-99999 ... 999999). This condition will be stored and can only be deleted with an internal or external reset.

Error! EEPROM test. Reading this message, a program error has been occurred. When pushing the button a copy of the EEPROM will be reloaded and the device will work with factory settings. If this copy does not work, please ship the quantitymeter to factory for repair service.

Loc Programming locked. See configuration page 7.

Start-up note:

Before the device can be used, it must be configured for the intended use

⇒ see page 6

Notes to representation



Parameter is only displayed when configured




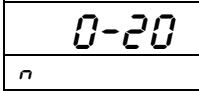

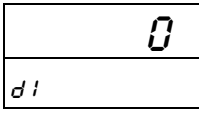

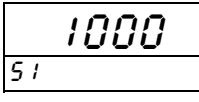

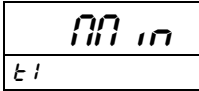

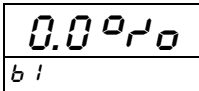

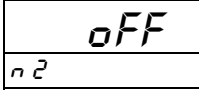

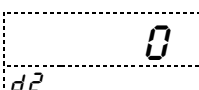


Parameter is only displayed when feature is included (see order code)

Please note: All parameters can be called if they are not blocked by other programmed parameters and if they are available. Factory settings are shown in [].

Working level

Button	Display	Description	[Factory setting]
		Actual quantity value (zero-voltage safe stored) Output indication (only if installed and activated).	
		Display input 1, actual time based quantity (no control with front buttons)	
		Display input 2, actual time based quantity (no control with front buttons)	
		Internal reset Pressing button for more than 3 s , the display will be reseted to the programmed value. (⇒ page 7) (Feed back of the action with display donE).	
		Setpoint output A1. Setting possible from $5t \dots En$ with buttons and . $5t$ (start value) ... En (end value)	
		Setpoint output A2. Setting possible from $5t \dots En$ with buttons and . $5t$ (start value) ... En (end value).	
		Setpoint output A3. Setting possible from $5t \dots En$ with buttons and . $5t$ (start value) ... En (end value).	
		Setpoint output A4. Setting possible from $5t \dots En$ with buttons and . $5t$ (start value) ... En (end value).	


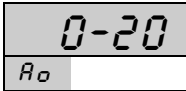




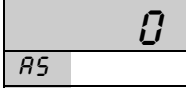




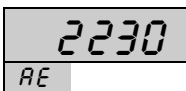




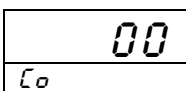


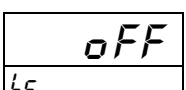



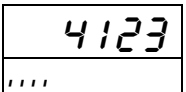
Configuration level

Button	Display	Description	[Factory setting]
 press 2s		Measuring signal input 1 (varies with version) 0-20 mA (0-10 V), 4-20 mA (2-10 V DC) Selection with buttons ▲ and ▼ .	[0-20]
 ↓		Decimals input 1 (for best result choose number of decimals to get a with 4-digit value of the measuring constant) 0.0 00 000 Selection with buttons ▲ and ▼ .	[0.]
 ↓		Time based measuring constant, input 1 (sign -) subtraction Setting possible from -9999 ... -1000 / 0 / 1000 ... 9999 digit with buttons ▲ and ▼ .	[1000]
 ↓		Time base input 1 00in, minutes; hour, hours Selection with buttons ▲ and ▼ .	[00 in]
 ↓		Dead band input 1 Setting possible from 0.0 ... 9.9 % of the input range with buttons ▲ and ▼ .	[0.0]
 ↓		Measuring signal, input 2 (varies with version) OFF, 0-20 mA (0-10 V), 4-20 mA (2-10 V DC) Selection with buttons ▲ and ▼ .	[OFF]
 ↓		Decimals input 2 (for best result choose number of decimals to get a with 4-digit value of the measuring constant) 0.0 00 000 Selection with buttons ▲ and ▼ .	[0.]
 ↓		Time based measuring constant, input 2 (sign -) subtraction Setting possible from -9999 ... -1000 / 0 / 1000 ... 9999 digit with buttons ▲ and ▼ .	[1000]

continue
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Button	Display	Description	[Factory setting]
↓ ↺		Time base input 2 <i>mm</i> , minutes; <i>hour</i> , hours Selection with buttons ▲ and ▼.	[00:00]
↓ ↺		Dead band input 2 Setting possible 0.0 ... 9.9 % of the input range with buttons ▲ and ▼. ⇒ page 9	[0.0]
↓ ↺		Decimals of quantity value <i>0. 0 00 000</i> Selection with buttons ▲ and ▼. ⇒ page 9	[0.]
↺		Note: Programmed values of analog output and alarm setpoints will be converted to the actual decimals automatically.	
↓ ↺		Reset; start value after reset Setting possible from -99999...999999 digit with buttons ▲ and ▼. ⇒ page 9	[0]
↓ ↺		Switching performance output A1. Function <i>OFF</i> ; <i>on L</i> (min); or <i>on H</i> (max). Selection with buttons ▲ and ▼.	[OFF]
↓ ↺		Setpoint alarm output A1 Setting possible from -99999...999999 digit with buttons ▲ and ▼.	[0]
↓ ↺		Hysteresis A1 Setting possible 1 ... 999999 digit with buttons ▲ and ▼.	[10]
↺		Note: Programming of switching performance and setpoint of the alarm outputs A1 to A4 are identical.	

continue
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Button	Display	Description	[Factory setting]
↓ 		Analog output. 0 - 20 mA (0 - 10 V DC) or 4 - 20 mA (2 - 10 V DC). Changing from current to voltage output is load-dependent ($\leq 500\Omega$ = current output, $> 500\Omega$ = voltage output). Selection with buttons  and  .	[0 - 20]
			
↓ 		Start value analog output Setting possible from -99999 ... 999999 digit with buttons  and  .	[0]
			
↓ 		End value analog output Setting possible from -99999 ... 999999 digit with buttons  and  .	[0]
		If $S_t > E_n$, the output works with a decreasing characteristic.	
↓ 		Code for factory setting.	[00]
			
↓ 		Program lockout. oFF = no lock LcOnF. = configuration level locked ALL = all parameters locked Selection with buttons  and  .	[oFF]
			
		Return to the working level.	

Parameter description

5 1, 5 2 Measuring constant

Value of the measuring range in relation to the analog signal from the connected transmitter, sensor or measuring device.

Programming examples for measuring constant:

1. Flow through device 0 ... 10.5L/min = 4...20mA (sensor data)
 - ⇒ Input: 4-20
 - ⇒ Decimals: 2 (for 4-digit)
 - ⇒ Measuring constant: 10.50
 - ⇒ Time base: min
2. Flow through device 0 ... 400m³/h = 4...20mA (sensor data)
 - ⇒ Input: 4-20
 - ⇒ Decimals: 1 (for 4-digit)
 - ⇒ Measuring constant: 400.0
 - ⇒ Time base: hour
3. True power transmitter (with current transformer) 0 ... 60kW = 0...20mA (transmitter data)
 - ⇒ Input: 0-20
 - ⇒ Decimals: 2 (for 4-digit)
 - ⇒ Measuring constant: 60.00
 - ⇒ Time base: hour (electric energy always hour)

b 1, b 2 Dead band (input 1, 2):

Indicates, up to which percentage of the input signal is to be detected as invalid. For example it will prevent any measurement of the M9648 if flow transmitter provide a leakage signal without any flow.

Programming example for dead band parameter:

Flow through = 0

- ⇒ Input: measuring range 0 ... 10.5L/min
- Working level display input 1 = 0.08L/min ⇒ dead band 0.08L/min = 0.76%
(depends on the measuring range 0-10.5L/min)
- ⇒ Dead band:0.8%

d P Decimals of the quantity value (displayed in the working level)

r E Start value after reset.

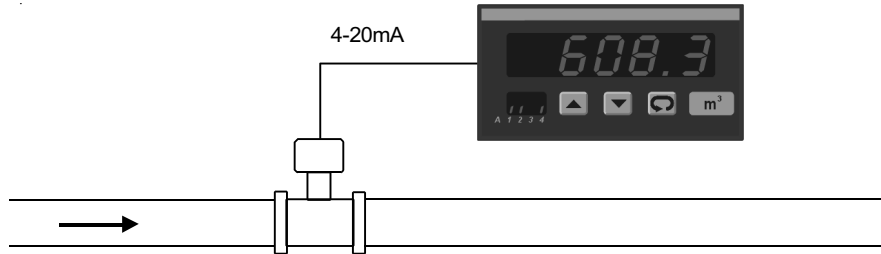
Display value after executed reset. Any value within the indicating range can be setted. While reset signal is applied, no measurement of input signal is possible (status-controlled).

Programming examples for reset parameter:

1. For filling a tank, $rE = 0$ should be programmed and measurement of filling operation can begin.
2. A filled tank with 15.000 litres of petrol, $rE = 15000$ should be programmed and measurement of emptying of operation can begin.
3. In case of electrical energy, $rE = 0$ should be programmed and measurement of the electrical work can begin.

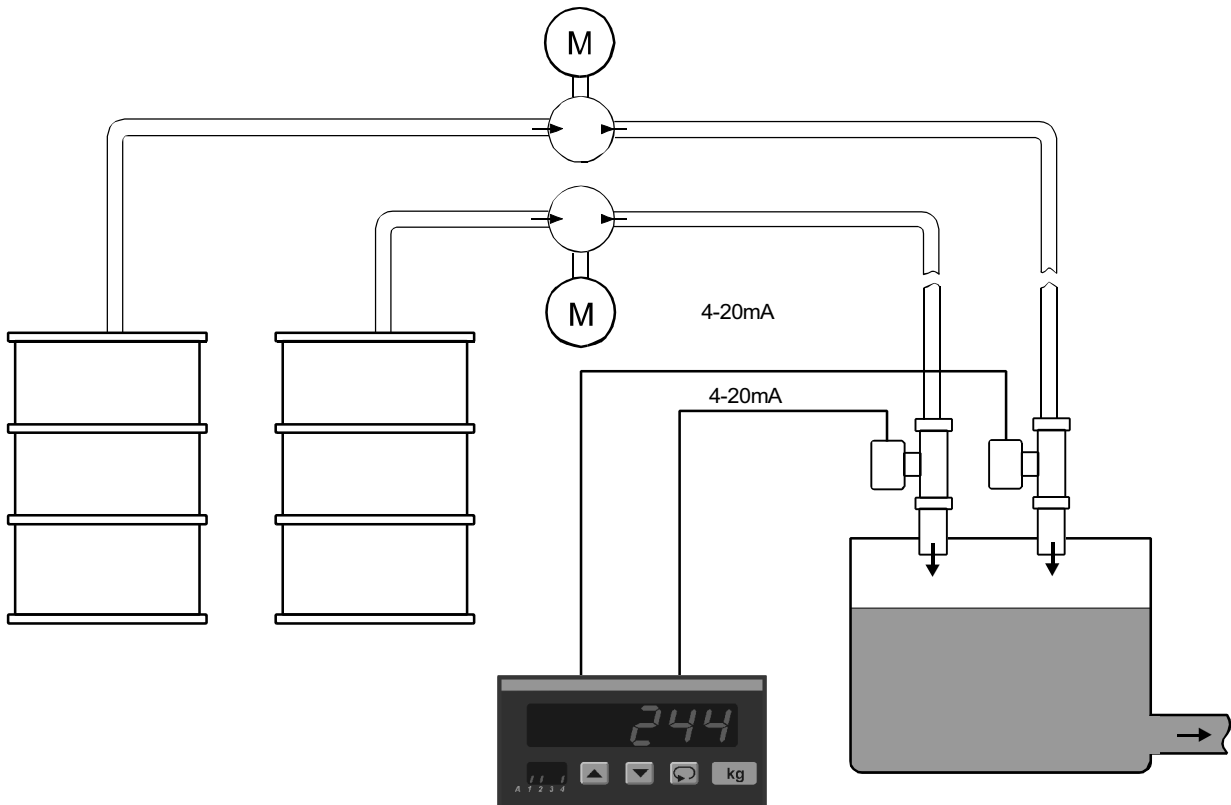
Installation examples

Flow through-quantity measurement

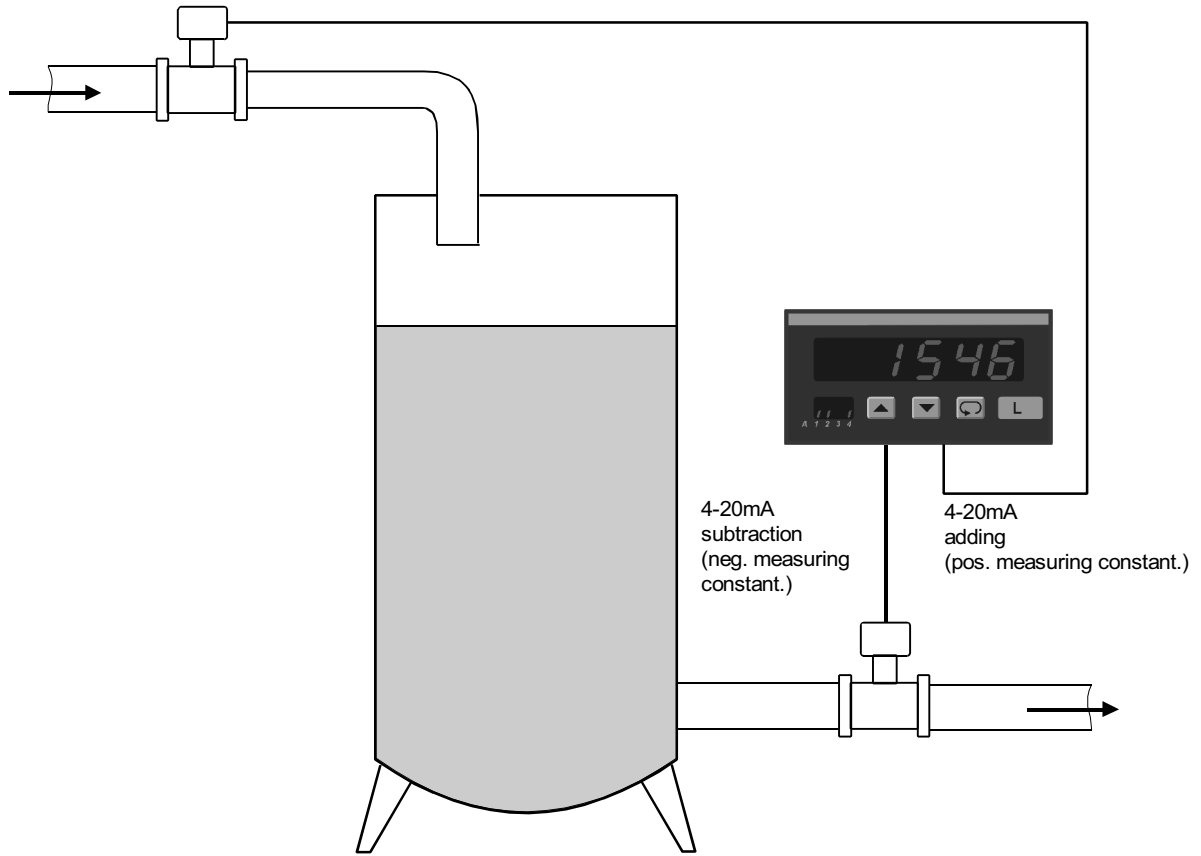


Note: If large quantities are to be measured over a longer period with small run performance, it can be necessary to select the measuring constant of the flow measuring device in m^3/h . If sensor constant is specified in l/min , it must be converted to m^3/h (e.g. $20\text{l}/\text{min} = 1.200\text{m}^3/\text{h}$). Then the display shows measured quantity in m^3 .

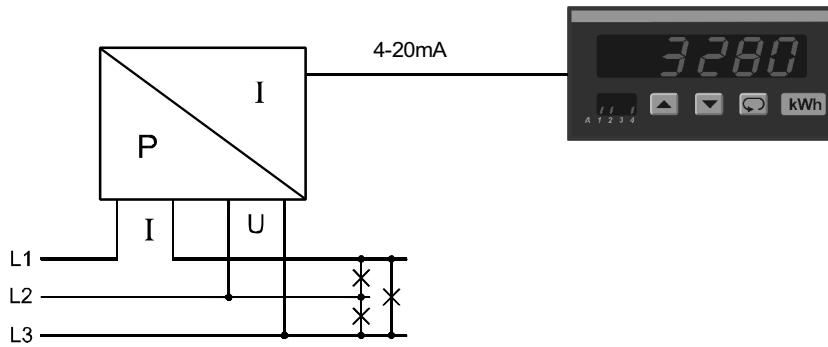
Summation measurement of the total quantity of filling.



Difference-quantity measurement



Measurement of the electrical energy with an active power transmitter (e.g. WM500)



Order code:

M9648 - 1. - 2. - 3. - 4. - 5. - 6. - 7.

1. Terminal strip A

12 inputs 0/4 ... 20mA
integrated transmitter-supply 24V DC max. 50mA
22 inputs 0/2 ... 10V DC
integrated transmitter-supply 24V DC max. 50mA

2. Terminal strip B

00 not installed
2R 2 alarm outputs relay
2T 2 alarm outputs transistor

3. Terminal strip C

00 not installed
2R 2 alarm outputs relay
2T 2 alarm outputs transistor
AO Analog output 0/4 ... 20mA and 0/2 ... 10V DC, isolated

4. Terminal strip D Supply voltage

0 230V 50/60Hz ±10%
1 115V 50/60Hz ±10%
4 24V 50/60Hz ±10%
5 24V DC ±15%

5. Option

00 without option

6. Unit (appears on the unit field)

7. Additional text (appears on the face plate in the field for additional text
max. 3mm x 90mm H x W)