**Manual**
**Display module**
**DM 57**
**Analogue**

**esitron-electronic GmbH**

## 1. General

### 1.1 How to use this manual

This manual covers technical data and properties of the large display module DM 57 with analogue and counter input interface.

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**Follow these instructions for safe and proper use of the product. Keep this manual for the entire lifetime of the product.**

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### 1.2 Order code

DM 57.y00

y = interface
   0 = Analogue and counter input
   1 = PROFIBUS – DP
   4 = CANopen
   5 = Modbus
   6 = EtherCAT
   7 = PROFINET – I/O

This manual covers the analogue and counter version only.

### 1.3 Changes

All information in this document is subject to changes without proclamation. The manufacturer accepts no liability in case of errors in this manual.

### 1.4 Copyright

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### 1.5 Conclusion

There may be working functions in the controller which are not described in this manual. However, there are no claims to these functions for new delivered or repaired parts.
We have checked this manual with the hard- and software. Yet there might be differences. We appreciate all suggestions for improvement.

## 2. Features of Performance

### 2.1 Basic functions

The large display DM 57.000 is provided with an analogue interface. The measured levels are scaled and shown in the 7-segment display module. The display module is therefore suitable for displaying any process data, such as pressure, temperature, speed, counter values, etc. in a large production environment.

### 2.2 Functional features

- Large display area (5 digits)
- Well readable LED display panel (red, 57 mm height of numbers)
- Galvanic isolation between supply voltage and measuring input
- Display flashes when limit values are exceeded/fallen short of
- Tare function
- Display scaling
- Setting of brightness in 4 steps
- Integrated test function

### 2.3 Code information and picture

| | |
|---|---|
| DM 57 | Display module, 5 digits, 57 mm height of numbers, panel mount unit |
| 000 | Analogue input +/-10V, 0/4…20mA |
| | 3 Counter inputs |

# 3. Installation

## 3.1 Safety advice

| | **DANGER** |
|---|---|
| ⚠ | Wiring and start-up of this module may be done by trained personnel only. Read this instruction manual carefully. Note the mounting instructions and pin connection. Non-attention of the instruction will result in loss of warranty and liability on the part of the manufacturer. |
| | The module monitors internal operating states. Malfunctions caused by defective elements cannot however prevent. |
| | Danger to persons must therefore be prevented by interrupting the operating voltage via the EMERGENCY STOP CHAIN on the system side. |

Follow the instructions in this manual for safe and intended operation of the product.
Please keep this manual throughout the life of the product.

## 3.2 Mounting instructions

The device is intended for use in a metallic housing.
The module must be connected to ground.
The wiring must be routed as close as possible to the housing or mounting plate.
Route signal and power cable separately.
Ground is to be connected directly to the DIN rail / mounting plate with a short cable (1.5 mm2).

The module has been developed for industrial use.
Protect from falling.

7

## 3.3 Pin connection



View on backside
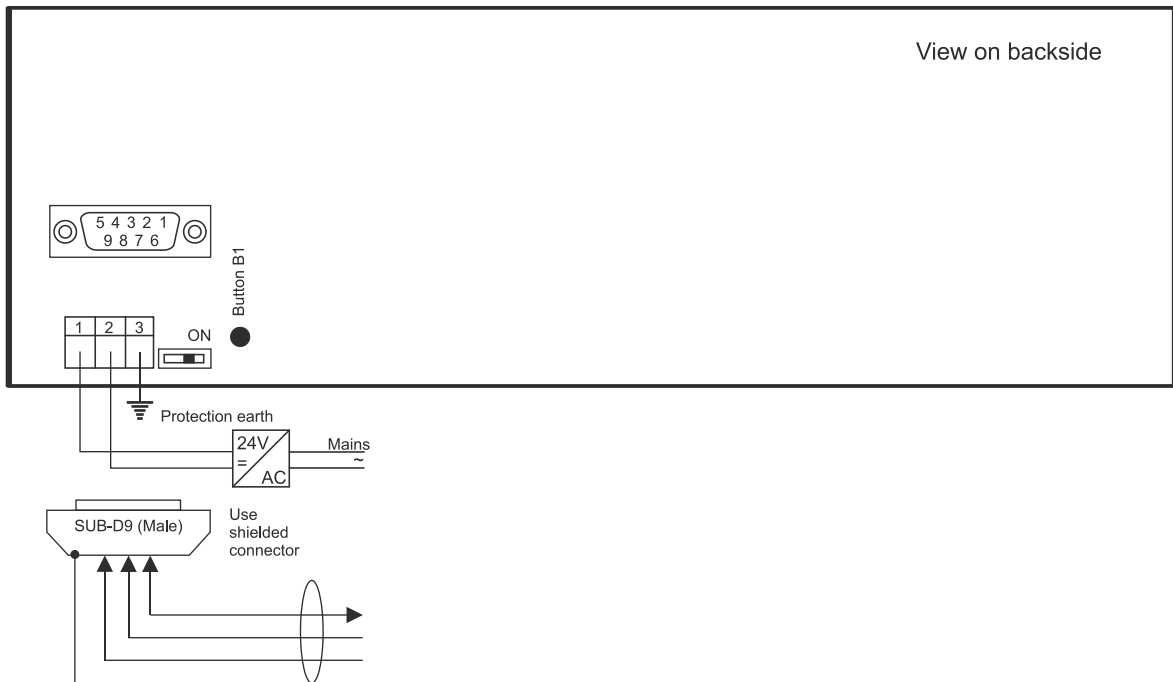
### 3.3.1 24V Supply

| Pin-no. | Function | Remarks |
|---------|----------|---------|
| 1 | +24V DC | |
| 2 | 0V GND | |
| 3 | PE | |

### 3.3.2 Inputs

Sub-D9, cable-side pin

| Pin-no. | Function | Remarks |
|---------|----------|---------|
| 1 | U+ | Differential voltage input |
| 2 | U- | |
| 3 | I+ | Differential current input |
| 4 | I- | |
| 5 | - | Not in use |
| 6 | Input 1 (+24V) | Digital counter inputs |
| 7 | Input 2 (+24V) | Galvanically isolated from Vcc |
| 8 | Input 3 (+24V) | |
| 9 | GND | |

## 3.4 Mounting
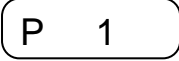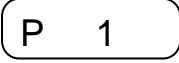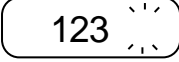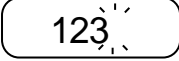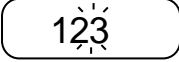
Mounting clip

# 4. Parameter

## 4.1 Parameter-Input

On the back of the case are a slide switch and a push button. To set the parameters, please put the slide switch to "ON".

| | | | |
|---|---|---|---|
| Note: | P   1 | ⬤ | Tap the T1 button and set the parameter number. |
| Note: | P   1 | ⬤ | Press and hold the button T1. |
| Note: | 123 | ⬤ | Tap the T1 button and set the flashing position. Press and hold the T1 button to acknowledge the flashing position and switch to the next position. |
| Note: | 123 | ⬤ | Tap the T1 button and set the flashing position. Press and hold the T1 button to acknowledge the flashing position and switch to the next position. |
| Note: | 123 | ⬤ | Tap the T1 button and set the flashing position Press and hold button T1 to save parameter value. |
| Note: | P   1 | | Set the slide switch to "OFF" to exit parameter input. |

Note: Display value

## 4.2 Parameter for both modes of operation

| Parameter number | Input | Meaning | Factory setting | User setting |
|---|---|---|---|---|
| P  1 | 0 – 1 | Mode<br>0 = Analogue input<br>1 = Numerator | 0 | |
| P  10 | 0 – 3 | Display brightness<br>0 = 25 % brightness<br>1 = 50 % brightness<br>2 = 75 % brightness<br>3 = 100 % brightness | 3 | |
| P  11 | 0,0 – 10,0 | Refresh time of the display in s | 0 | |

## 4.3 Parameter for analogue mode

### 4.3.1 Type of analogue input

| Parameter number | Input | Meaning | Factory setting | User setting |
|---|---|---|---|---|
| P 100 | 0 - 4 | Type of analogue input<br>0 = +/- 10V<br>1 = 0 … 20mA<br>2 = 4 … 20mA<br>3 = Sensor voltage<br>4 = Sensor current | 0 | |

Explanation:

P100 = 0, 1, 2: The lower and upper measured values are programmed via P140 and P141. The values to be displayed for these two limits are programmed with P111 and P112.
P100 = 3, 4: Two smaller and larger measured values that are as different as possible are to teach in via P140 and P141. The values to be displayed for these two measured values are programmed with P111 and P112.

### 4.3.2 Number of decimal places

| Parameter number | Input | Meaning | Factory setting | User setting |
|---|---|---|---|---|
| P 110 | 0 … 2 | Number of decimal places | 1 | |

### 4.3.1 Smallest display value

| Parameter number | Input | Meaning | Factory setting | User setting |
|---|---|---|---|---|
| P 111 | -999 … 9999 | Smallest display value | 0,0 | |

The set value is displayed at the lowest analogue value (e.g., 0V).

If the analogue value has a zero-point shift, the desired display value can be set here.

e.g.: $V_{Min}$ = 1V, desired display value = 0.0 => P111 = 0.0

### 4.3.2 Largest display value

| Parameter number | Input | Meaning | Factory setting | User setting |
|---|---|---|---|---|
| P 112 | -999 … 9999 | Largest display value | 100,0 | |

The set value is displayed at the largest analogue value (e.g. 10V).

If the anole value does not reach 10V, the desired display value can be set here.

e.g.: $V_{Max}$ = 9.2V, desired display value = 10.0 => P112 = 10.0

### 4.3.1 Zero-point offset

| Parameter number | Input | Meaning | Factory setting | User setting |
|---|---|---|---|---|
| P 113 | -999 … 9999 | Zero-point shift | 0 | |

The set value is added to the smallest display value (P 111) and the entire range is shifted accordingly.

### 4.3.2 Function zero-setting input

| Parameter number | Input | Meaning | Factory setting | User setting |
|---|---|---|---|---|
| P 120 | 0 - 4 | Zero-setting<br>0 = positive edge<br>1 = negative edge<br>2 = both edges<br>3 = high-level<br>4 = low-level | 0 | |

Input 3 (Pin no. 7) is the zero-setting input.

### 4.3.3 Lower alert limit

| Parameter number | Input | Meaning | Factory setting | User setting |
|---|---|---|---|---|
| P 130 | -999 … 9999 | Lower alert limit | 0,0 | |

The display flashes at all display values below the set alarm limit. The limit value is the display value resulting from the scaling and eventually from zero-point shift.

To deactivate the lower alarm limit, set a value below the measuring range.

Example:

Measuring range: -10.0 ... + 10.0

Lower alarm limit: -11.0

When programming, type through the leftmost digit until "-" appears.

### 4.3.4 Upper alert limit

| Parameter number | Input | Meaning | Factory setting | User setting |
|---|---|---|---|---|
| P 131 | -999 … 9999 | Upper alert limit | 0,0 | |

The display flashes at all display values above the set alert limit. The limit value is the display value resulting from the scaling and eventually from zero-point shift.

To deactivate the upper alarm limit, set a value above the measuring range.

Example:

Measuring range: -10,0 … + 10,0

Upper alarm limit: 11,0

### 4.3.1 Alert hysteresis

| Parameter number | Input | Meaning | Factory setting | User setting |
|---|---|---|---|---|
| P 132 | -999 … 9999 | Alert hysteresis | 0,0 | |

In order to prevent the constant change of the alarm state at the limit value, this is dynamically shifted by the setting value P 132.

Example:

Lower alert limit P 130 = 6.0

Alert hysteresis P 132 = 0.2

If the display value rises e.g. from 4.9 to 6.1, the display flashes until 6.0 is exceeded. At 6.1, the flashing stops.

If the display value drops from 6.1 to 5.7, the indicator flashes only start at 5.7. At 5.8, the hysteresis 6.0 – 0.2 still works.

### 4.3.2 Scaling

| Parameter number | Input | Meaning | Factory setting | User setting |
|---|---|---|---|---|
| P 140 | -999 … 9999 | Lower analogue value | 0,00 (P 100 = 0/1) <br> 4,00 (P 100 = 2) | |
| P 141 | -999 … 9999 | Upper analogue value | 10,00 (P 100 = 0) <br> 20,00 (P 100 = 1/2) | |

In standard mode (P 100 = 0, 1 or 2):

Use P 140 to set the analogue value for which the smallest display value P 111 is displayed.

Use P 141 to create the analogue value for which the largest display value, P 112, is displayed.

In sensor mode (P 100 = 3 or 4):

To discontinue P 140 & P 141, follow these steps:

1. Create lower analogue value. The measured value is displayed. Press the reset input, save parameters.

2. Create upper analogue value, the measured value is displayed. Press the reset input, save parameters.
3. Exit programming mode.

Now the display value from P 111 is displayed for the lower analogue value, and the display value from P 112 for the upper analogue value. Interpolation takes place in between.

In sensor mode (P 100 = 3 or 4), the P 140 cannot be programmed by push-button, but is only to teach in.

Example:

The exact sensitivity of a pressure cell of a scale is not known.

- Load the scale with a small, known weight. Enter the weight value in P 111 and program P 140 with the zero-setting input.

- Load the scale with a large, known weight. Enter the weight value in P 112 and program P 141 with the zero-setting input.
The areas outside the two known weight points are also displayed with the scale found.

## 4.4 Parameter for counter mode

### 4.4.1 Type of counter

| Parameter number | Input | Meaning | Factory setting | User setting |
|---|---|---|---|---|
| P 200 | 0 – 1 | Type of counter<br>0 = Clock (I1)<br>    Direction (I2)<br>1 = Upwards (I1)<br>    Downwards (I2) | 0 | |

### 4.4.1 Edge detection input 1

| Parameter number | Input | Meaning | Factory setting | User setting |
|---|---|---|---|---|
| P 210 | 0 – 2 | Flank evaluation counter input 1<br>0 = raising edge<br>1 = falling edge<br>2 = both edges | 0 | |

### 4.4.1 Edge detection input 2

| Parameter number | Input | Meaning | Factory setting | User setting |
|---|---|---|---|---|
| P 211 | 0 – 2 | Flank evaluation counter input 2<br>0 = raising edge<br>1 = falling edge<br>2 = both edges | 0 | |

### 4.4.1 Counting direction input 1

| Parameter number | Input | Meaning | Factory setting | User setting |
|---|---|---|---|---|
| P 220 | 0 – 1 | Invert counting direction input 1<br>0 = not inverted<br>1 = inverted | 0 | |

### 4.4.2 Counting direction input 2

| Parameter number | Input | Meaning | Factory setting | User setting |
|---|---|---|---|---|
| P 221 | 0 – 1 | Invert counting direction input 2<br>0 = not inverted<br>1 = inverted | 0 | |

### 4.4.1 Zero-setting input 3

| Parameter number | Input | Meaning | Factory setting | User setting |
|---|---|---|---|---|
| P 230 | 0 – 4 | Zero-setting<br>0 = positive edge<br>1 = negative edge<br>2 = both edges<br>3 = high-level<br>4 = low-level | | |

### 4.4.1 Lower alert limit

| Parameter number | Input | Meaning | Factory setting | User setting |
|---|---|---|---|---|
| P 240 | -999 … 9999 | Lower alert limit | inactive | |

The set limit does not yet flash.

Values less than the lower alarm limit are flashing.

If the lower alarm limit is higher than the upper one, all values between the two alarm limits will flash.

### 4.4.2 Upper alert limit

| Parameter number | Input | Meaning | Factory setting | User setting |
|---|---|---|---|---|
| P 241 | -999 … 9999 | Upper alert limit | inactive | |

The set limit does not yet flash.

Values greater than the upper alarm limit are flashing.

If the upper alarm limit is smaller than the lower one, all values between the two alarm limits flash.

Alarm limits are deactivated by setting them to the same value.

P 240 = P 241

### 4.4.3 Alert hysteresis

| Parameter number | Input | Meaning | Factory setting | User setting |
|---|---|---|---|---|
| P 242 | -999 … 9999 | Alert hysteresis | 0 | |

To prevent the constant change of the alarm state at the limit value, this is dynamically shifted by the setting value P 242.

## 5. Display test

⬤ DIP switch to "OFF"
Press the button T1 and hold it.
All segments are displayed.

```
8.8.8.8.8.
```

## 6. Error messages

| Notification | Cause of error | Corrective actions |
|---|---|---|
| E − − − − | Display value too large | Check the transferred value. e.g.: 100000 or – 10000 for "signed long" (operating mode 3) (5-digit display) |
| E 01 | Incorrect parameter checksum | Switch off the device, activate parameter input (DIP switch to "ON") and switch on the device again. Correct and save parameters. If it occurs repeatedly, the device is defective. |
| E 11 E 12 E 13 E 14 E 15 | Internal error | Switch the device off and on again, if it occurs repeatedly, the device is defective. |

# 7. Technical data

## 7.1 General

| | |
|---|---|
| Display: | LED 7-segment display module, red<br>5 digits, digit height of 57 mm,<br>brightness adjustable in 4 stages |
| Ambient temperature: | 0 up to 50°C |
| Storage temperature: | −20 up to +70°C |
| Humidity: | max. 90 %, non-condensing |
| Weight: | ca. 0,85 kg |
| Protection class: | IP 51 (front side with vertical front panel) |
| EMC Emission: | EN 61000-6-4 |
| EMC Interference: | EN 61000-6-2 |
| Safety requirements: | EN 50178, EN 60204-1 |
| Dimensions: | accordingly to DIN IEC 61554 |

cut-out: $292^{+1,1}$ x $92^{+0,8}$

mounting via mounting clip
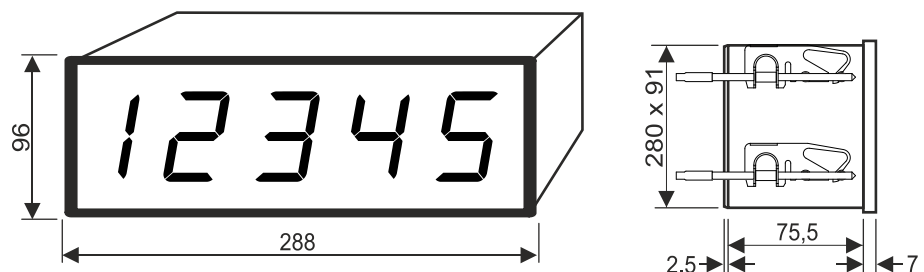


## 7.2 Supply voltage

| | |
|---|---|
| Face value: | 24 VDC |
| Allowable range: | 18 – 32 VDC |
| Input current: | ca. 0,25 A |
| Reverse polarity protection: | with diode |
| Potential separation: | galvanically separate from measuring range |
| Connection: | screw connectors<br>conductor cross-section up to 1.5 mm² |

## 7.3 Analogue input

### 7.3.1 Voltage input

| | |
|---|---|
| Type: | Differential input, galvanically isolated |
| Measuring range: | +/- 10V |
| Resolution: | 20 Bit |
| Input impedance: | 50 kOhm |
| Measuring error: | 0,1%, +/-1 digit |
| Max. temperature drift: | 8 ppm / K |
| Max. potential difference to the supply voltage: | 500V |

### 7.3.1 Current input

| | |
|---|---|
| Type: | Differential input, galvanically isolated |
| Measuring range: | +/- 20mA |
| Resolution: | 20 Bit |
| Burden resistor: | 100 Ohm |
| Measuring error: | 0,1 %, +/-1 Digit |
| Max. temperature drift: | 8 ppm / K |
| Max. input current: | 25 mA |
| Max. potential difference to the supply voltage: | 500 V |

## 7.4 Counter inputs

| | |
|---|---|
| Quantity: | 3 |
| Rated value: | +24 V |
| Maximum voltage: | +30 V |
| High-level threshold: | +12 V |
| Low-level threshold: | +3 V |
| Minimum voltage: | -30 V |
| Input current at nominal voltage: | typ. 2,5 mA |
| Delay time low – high | 5 µs |
| Delay time high – low | 20 µs |
| Cut-off frequency asymmetrical control, push-pull driver | 25 kHz |

## 8. Shipment, Storage, Disposal

### 8.1 Shipment

The product must be transported shock protected. Use original packaging if available. The packaging must ensure that the display face is not to be exposed to strokes or blows.

### 8.2 Storage

Stock product within the specified permissible ambient conditions for temperature and humidity. Please see technical data specifications.
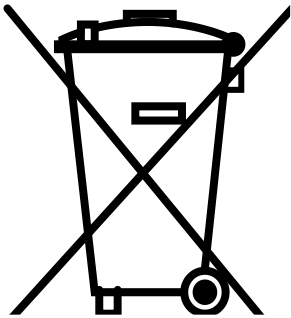
Protect from dust and dirt.

### 8.3 Disposal

This product must be disposed or recycled at the end of its useful life in accordance with local regulations.

§
| **NOTICE** |
| --- |
| Dispose the appropriate materials in accordance with the valid environmental protection laws. |



| |
| --- |
| Don't throw hazardous substances in domestic waste! |