

Manual for

DM110



Manual_DM110.Doc



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1 Operation instruction for Explosion protected control panels

Application and Standards

This instruction manual applies to explosion protected control panels of type of protection types below. This apparatus is only to be used as defined and meets requirements of EN 60 079 particularly EN60 079-14 "electrical apparatus for potentiality explosive atmospheres". It can be used in hazardous locations which are hazardous due to gases and vapours according to the explosion group and temperature class as stipulated on the type label. When installing and operating the explosion protected distribution and control panels the respective nationally valid regulations and requirements are to be observed.

General Instructions

The control panel has to have a back-up fuse as stipulated. The mains connection must have a sufficient short circuit current to ensure safe breaking of the fuse. To achieve an impeccable and safety device operation, please take care for adept transportation, storage and mounting, as well as accurate service and maintenance. Operation of this device should only be implemented by authorised persons and in strict accordance with local safety standards. The electrical data on the type label and if applicable, the "special conditions" of the test certificate PTB 98 ATEX 1488 are to be observed.

For outdoor installation it is recommended to protect the explosion protected distribution and control panel against direct climatic influence, e.g. with a protective roof. The maximum ambient temperature is 40°C, if not stipulated otherwise.

Intrinsically Safe Circuits

Erection instructions in the testing certificates of intrinsically safe apparatus are to be observed. The electrical safety values stipulated on the type label must not be exceeded in the intrinsically safe circuit. When interconnecting intrinsically safe circuits it is to be tested, whether a voltage and/or current addition occurs. The intrinsic safety of interconnected circuits is to be ensured. (EN 60079-14, section 12)

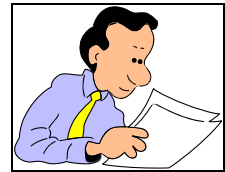


Safety Measures: to read and to comply

Work on electrical installations and apparatus in operation is generally forbidden in hazardous locations, with the exception of intrinsically safe circuits. In special cases work can be done on non-intrinsically safe circuits, on the condition that during the duration of such work no explosive atmosphere exists. Only explosion protected certified measuring instruments may be used to ensure that the apparatus is voltage-free. Grounding and short circuiting may only be carried out, if there is no explosion hazard at the grounding or short circuit connection.



2 DM110



2.1 Short description

The circuit DM 110 is in such a way optimized that the self-current consumption amounts to smaller with 8 V (0.1 mA). By this small power consumption it is possible, the equipment each usual NAMUR and/or DIN 19234-Steuerkreis, interconnected with pertinent feeler to switch parallel without disturbing its function. The switching commands of the feeler arrive thus further unhindered at the controller and can be processed there. If the controller consists e.g. of a number of revolutions guard, then a max. and/or min. a number of revolutions can be supervised.

Within the ex range parallel to the feeler the control instructions outgoing from the feeler it receives and integrates operated digital tachometers DM 110 during a preselectable gate time. The necessary gate time for a number of revolutions-proportional announcement can be computed after the indicated equations and is digitally adjustable in 1000 steps. By this universal attitude an adjustment of the tachometer is possible on practically each number of teeth of a turning wave. Over additional Dil switch at the equipment can be shifted the decimal point to any number.

2.2 Scaling and alignment

1. Computation of the gate time:

$$\text{Gate time}[\text{sec}] = \frac{\text{desired display value}}{\text{Total of teeth} \times \text{rotation speed of the tooth wheel}}$$

2. Computation of the number of teeth of the toothed washer

$$\text{Total of teeth} = \frac{\text{desired display value} \times 60}{\text{Gate time}[\text{sec}] \times \text{rotation speed of the tooth wheel}}$$

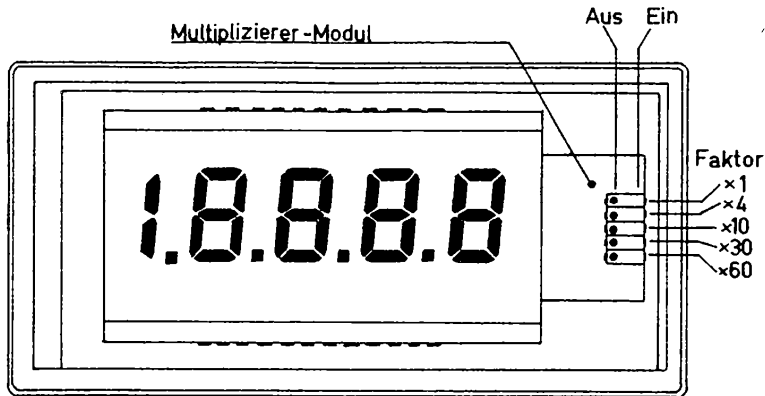
3. It exists to adjust also the possibility after assembly of the system and enterprise with a well-known number of revolutions the announcement by changing the gate time on the desired indicator value. The used feelers must be suitable for the max. arising switching frequency of the system.

$$f_{\text{max}} = \frac{\text{total of teeth} \times \text{rotation speed tooth wheel}[\text{U} / \text{min}]}{60}$$

The maximum incoming frequency of the tachometer DM 110 amounts to 5 kHz. The equipment remarks DM110.1/4/6 do not possess a gate timing generator, whereby all detailed impulses are counted and indicated. These event counters can be put back over a key to the front side.

2.3 Options: Multiplier module DM 110 []. IN

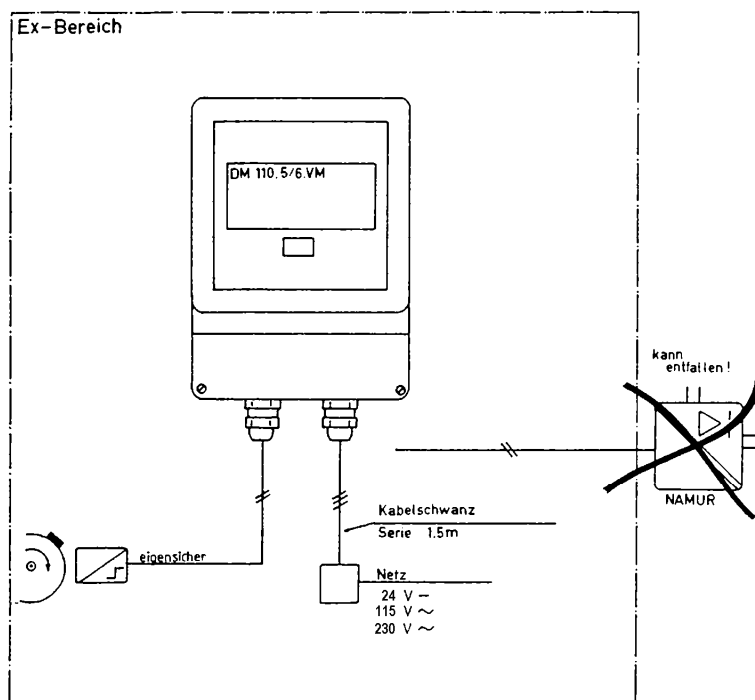
The multiplier module offers the possibility of multiplying the entrance impulses of the sensor by a preselectable factor. Thus it becomes possible, also with low Impulse rates, e.g. with only one impulse per revolution and a multiplier factor of 60, gate time 1 second. to realize a direct RPM indication.



With the multiplier module the factors 1x, 4x, 10x, 30x, 60x are right beside the LCD announcement, adjustable after reduction of the front framework. The initially frequency range amounts to 1... 5000 cycles per second.

2.4 Option: Supplying module DM 110. []. VM

The supplying module is integrated in DM 110. It produces the intrinsically safe NAMUR necessary for the supply of the sensor and the tachometer from supply voltage (230 V, 115 V, 24V -) food circle. Thus its own measuring system within the ex range without complex wiring results to the non ex range, since no more additional food circle is needed.



3 Assembly and connection



3.1 Assembly



Hint

When assembling the local installation regulations are to consider in particular the regulations the EN 60079-14.

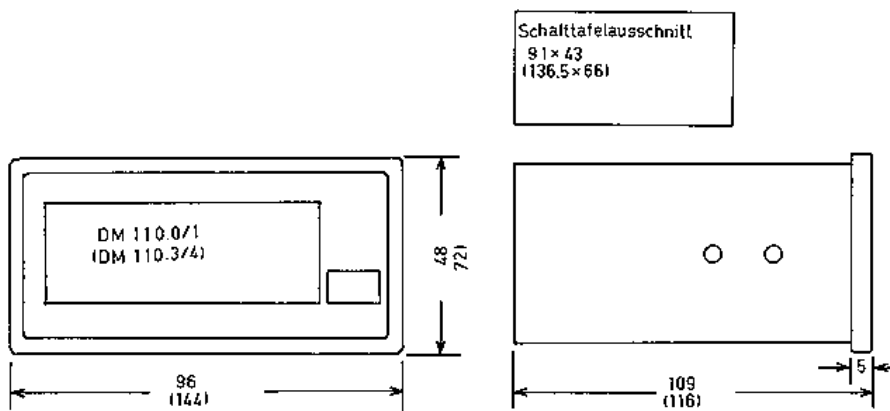


Illustration1: Dimensions instrument panel housing

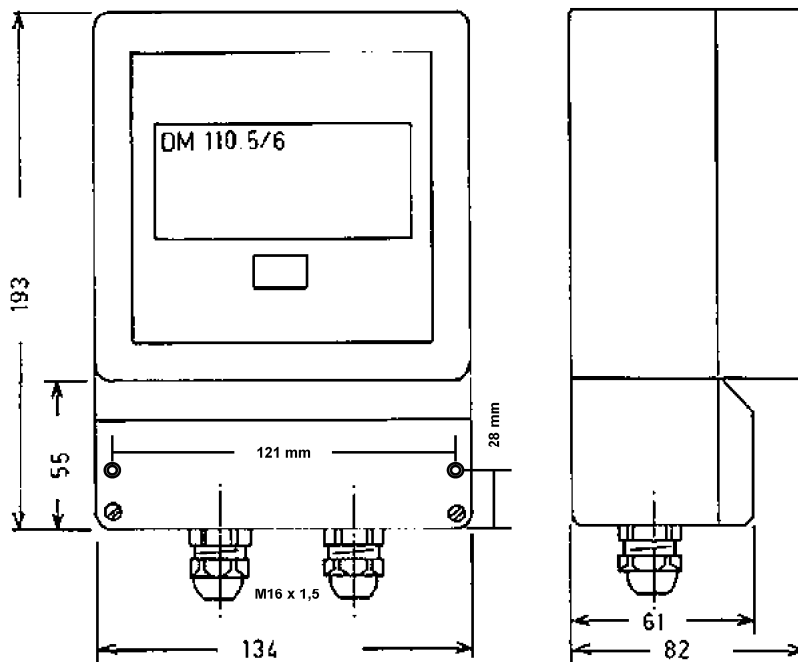


Illustration2: Dimensions field housing

3.2 Electrical connections



Hint

The limit values at the respective clamps must be absolutely kept.

The limit values are to be taken from the table of the clamp limit values in the appendix or the EC- type certificate.

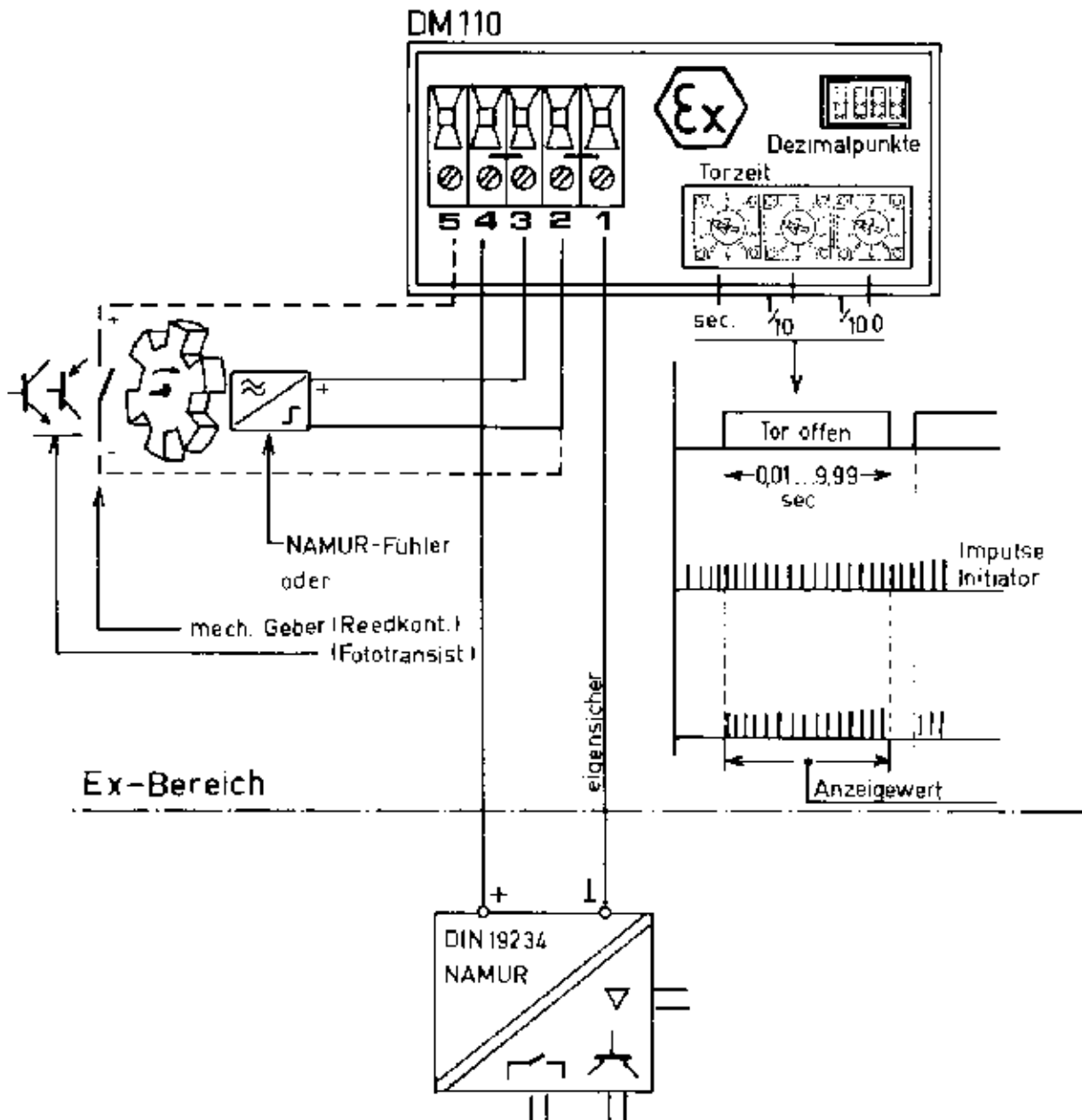


Illustration3: Diagram of connections

4 Appendix

4.1 Technical data and clamp limit values

	4 ½ - digit LCD seven segment display
Number height	20.5 mm DM 110,3/4/5/6 13.6 mm DM 110,0/1
Normal range	19999
Decimal points	over Dil switch
Control circuit	intrinsically safe control circuit according to NAMUR and/or DIN 19234
Explosion protection	E ex ib IIC T6, and/or E ex ib IIC T5 Internal effective inductance and capacity are negligibly small
Limit values of the control circuit	Open circuit voltage $U_i \leq 60 \text{ V}$ Prospective current of a circuit $I_i \leq 160 \text{ mA}$
Self-power input	$< 0.1 \text{ mA}$ with 8 V $< 0.3 \text{ mA}$ with 3 V
Measuring error	$\leq 0.2\% \pm 3$ digit
Temp. Coefficient	$\leq 0.02\%/K$
Housing	according to instrument panel standard DIN 43700 H x B x T = 48 x 96 x 109 mm DM 110,0/1 H x B x T = 72 x 114 x 116 mm DM 110,3/4 H x B x T = 193 x 134 x 82 mm DM 110,5/6
Material	Noryl DM 110.0-4. ABS DM 110,5/6
Enclosure	IP 65 DM110.5/6 Front to IP 55 DM 110.0-4
Ambient temperature	- 10° C... +45° C with T6 - 10° C... +60° C with T5

4.2 Type code

DM110	.X	.X	.X
Execution:			
Tachometer, housing 48x96 .....	.0		
Event counter, housing 48x96 .....	.1		
Tachometer, housing 72x144 .....	.3		
Event counter, housing 72x144 .....	.4		
Tachometer, field housing .....	.5		
Event counter, field housing .....	.6		
Impulse multiplier module:			
Without impulse multiplier module .....	.0		
With impulse multiplier module .....	.1		
Supplying module:			
Without supplying module .....			.0
With supplying module .....			.1

Accessories: View door with lock for housing 72 x 144 mm, enclosure IP 55