



Level controllers for rainwater utilisation systems



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Level controllers for rainwater utilisation systems, FNR range

Operating principle

The components of the FNR range are an **FNR fresh water refill controller** and one or more **suspension electrodes**.

The **FNR 5** and **FNR 7** fresh water refill controllers operate according to the conductive measuring principle.

In combination with an **LWZ suspension electrode**, the **FNR 5** is used for purposes such as the controlled refilling of fresh water into a rainwater tank.

If the level in the rainwater tank falls below the minimum fill level, a relay output activates refilling of fresh water (e.g. via a solenoid valve). Once the minimum fill level has been reached again, the switching status of the relay output is maintained for the duration of the delay time of approx. 10 seconds (standard) and the refill function is then switched off again. This time delay serves to suppress multiple switching actions in the event of wave motion and results in a level hysteresis whose magnitude depends on the tank dimensions and the strength of liquid inflow.

If, during the refilling cycle, the minimum fill level is not reached again within the monitoring time of approx. 30 seconds (standard), the relay output for refilling is switched off, and a second relay output is activated to issue an alarm due to time-out. This feature is designed to prevent uncontrolled refilling in the event of tank rupture or inflow defects, as well as in the case of electrode cable break, if there is ice on the electrode or if the electrode has been removed. The various switching statuses are indicated by LEDs.

In addition to the features described above, the version **FNR 7** is also equipped with 4 LEDs to indicate the tank fill level, and these LEDs are individually controlled via 4 **EH** or **EHK** suspension electrodes.

Functions \ Types	FNR range	
	FNR 5	FNR 7
Regulation of refill valve, time-controlled and time-monitored	●	●
Level indicator, 4-stage	—	●



Suspension electrodes

Use of suspension electrodes with a FNR 5 or FNR 7 fresh water refill controller

Electrode \ Controller	FNR 5	FNR 7
LWZ	1 piece	1 piece
EH or EHK	—	up to max. 4 pieces

If the FNR 7 fresh water refill controller is only to be used as a liquid level indicator, an LWZ suspension electrode still has to be used for ground reference purposes; alternatively, a further EH or EHK suspension electrode can be connected to terminal 1 (E0).



Technical data	LWZ	EH	EHK
Design	1 control electrode and 1 ground electr.	1 control electrode or 1 ground electrode	
Sensitive element(s)	2 electrode rods, made of stainless steel 316 Ti, each with 5 mm Ø	1 electrode rod,	1 electrode rod,
Housing	PP and Duroplast 2 x 27 mm Ø x approx. 210 mm	PP 27 mm Ø x approx. 145 mm	PP 27 mm Ø x approx. 145 mm
Electrical connection	cable 2X0.75, length: 2 m, longer on request	connection terminal	cable 1X1.5, length: 1 m, longer on request
Mounting orientation	vertical		
Temperature range	max. + 60°C		
Pressure resistance	for pressureless applications only, use only under atmospheric conditions		



FNR 5 and FNR 7 fresh water refill controllers

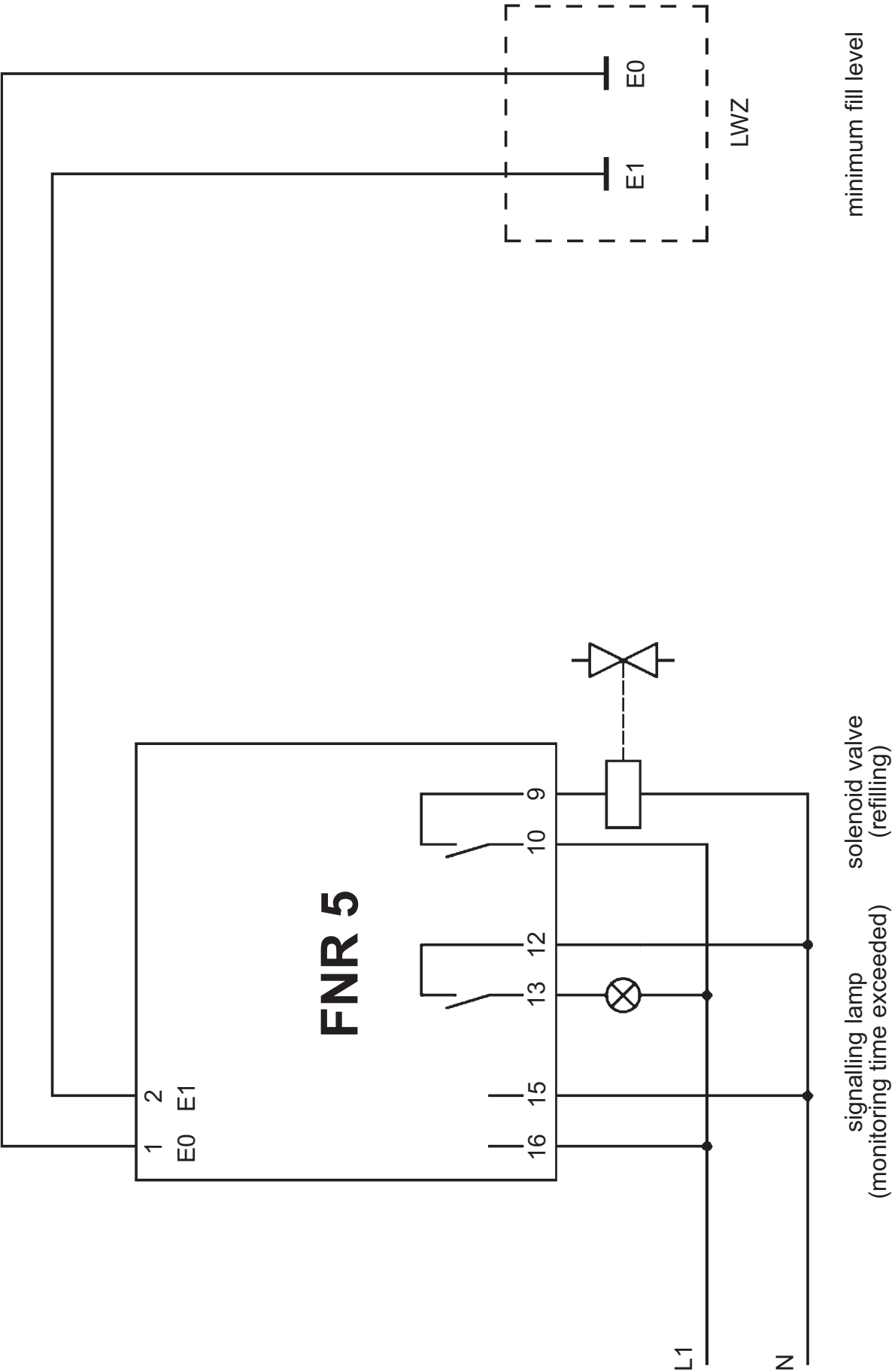
Electronical water level controllers based on the conductive measuring principle, for DIN rail mounting, with connection terminals on top of the housing for cable cross-sections of max. 4 mm² and with built-in LEDs for signalling the operating statuses.

These units are designed for switch cabinet mounting or installation in a suitable protective housing and may therefore only be mounted / installed in these locations. They are suitable for use in clean environments only.



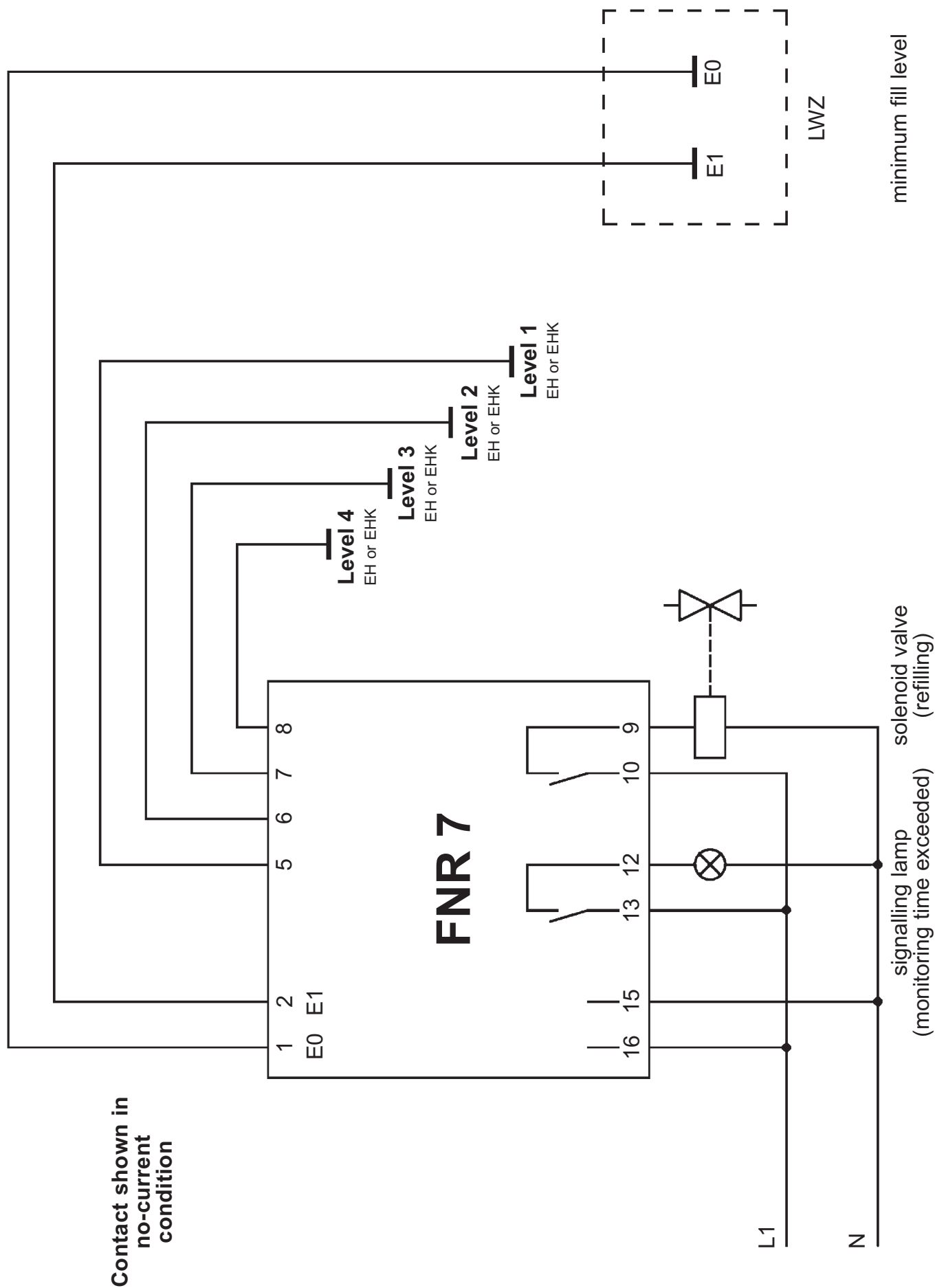
Technical data	FNR 5	FNR 7
Supply voltage (AC-versions: terminals 15 and 16; DC-versions: • terminal 15: – • terminal 16: +)	AC 230 V, on request: AC 240 V, AC 115 V, AC 24 V, DC 24 V, } for connection to a low safety voltage DC 12 V } according to the safety regulations relating to the application or further supply voltages	
Power input	approx. 3 VA	
Electrode circuit(s) (terminals 1 and 2) (terminal 1 with terminals 5, 6, 7, 8)	2 terminals (under safety extra low voltage SELV) acting on 2 output relays in a time-controlled manner 5 terminals (under safety extra low voltage SELV) for electrodes for tank fill indication	
No-load voltage	9 V _{eff}  10 Hz (safety extra low voltage SELV)	
Short-circuit current	max. 0.5 mA _{eff}	
Response sensitivity for • fresh water refilling • level indication	100 kΩ or 10 μS (conductance) 500 kΩ or 2 μS (conductance)	
Controlled circuits	2 potential-free normally open contacts based on the working current principle, both non-activated in standby status	
Terminals 9,10 - relay 1	<u>• output relay 1 (for refilling):</u> switches on when the level falls below the minimum fill level. It either switches off after the minimum fill level has been reached again with a switch-off delay of approx. 10 s (standard) or it switches off when the monitoring time of approx. 30 s (standard) is exceeded due to the fact that the minimum fill level has not been reached	
Terminals 12,13 - relay 2	<u>• output relay 2 (for fault signalling):</u> switches on when the monitoring time of approx. 30 s (standard) is exceeded due to the fact that the minimum fill level has not been reached	
Switch-off delay - relay 1	approx. 10 s (tolerance +/- 20 %), other delay time on request	
Monitoring time - relay 2	approx. 30 s (tolerance +/- 20 %), other monitoring time on request	
Switching status indication	<u>via a bicolour LED:</u> green = standby flashing red = monitoring time exceeded <u>via a red LED:</u> permanently lit = refill	
Tank fill indication	via 4 red LEDs for the limit levels at the electrodes of the terminals 5, 6, 7 and 8	
Switching voltage	max. AC 250 V	
Switching current	max. AC 4 A	
Switching capacity	max. 500 VA	
Housing	insulating material, 75 x 55 x 110 mm	
Connection	terminals on top of housing for cable cross-sections of max. 4 mm ² IP20	
Protection class	on DIN rail or via two boreholes	
Mounting	any	
Mounting orientation	any	
Temperature range	– 20°C to + 60°C	
Length of the connection cable of the electrode	max. 300 m	max. 100 m
EMC	• for interference emission in accordance with the appliance-specific requirements for households, business and commerce as well as small companies • for interference immunity in accordance with the appliance-specific requirements for industrial companies	

Connection diagram FNR 5



Contact shown in no-current condition

Connection diagram FNR 7



**The units described in this documentation
may only be installed, connected,
started up, serviced and replaced
by suitably qualified personnel!**

**Subject to deviations from the diagrams
and technical data.**

**The details in this brochure are product
specification descriptions and do not
constitute assured properties in the legal
sense.**