Electronic potentiometer type EPN-110DN

uni-line
4189340132G (UK)
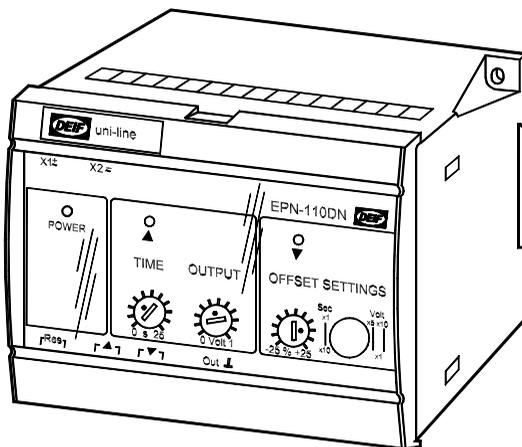
- • *Control of electronic governors*

- • *Setting of integrating time*

- • *Adjustment of output signal*

- • *Offset adjustment*

- • *LED indication for activated input*

- • *35 mm DIN rail or base mounting*

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DEIF A/S

1. Description

This electronic potentiometer type EPN-110DN forms part of a complete DEIF series (the *uni-line*) of relays for protection and control of generators.

The EPN-110DN is an electronic unit to replace normal motor potentiometers, converting the relay output of a PI step controller – e.g. one of the DEIF load sharing units type LSU… or one of the DEIF synchronisers type FAS…, or any other type of PI step controller provided with relay outputs – to a control voltage for the speed governor/AVR.

2. Label

The potentiometer is provided with a label with the following data:
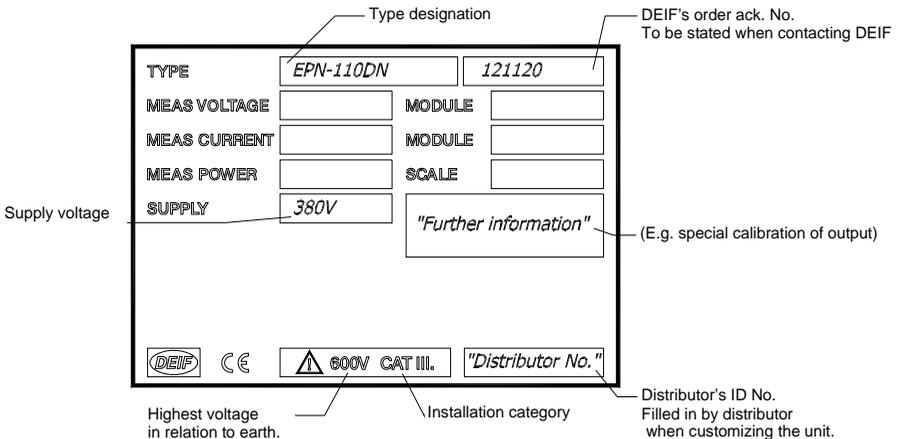
3. Mounting instructions

The EPN-110DN is designed for panel mounting.
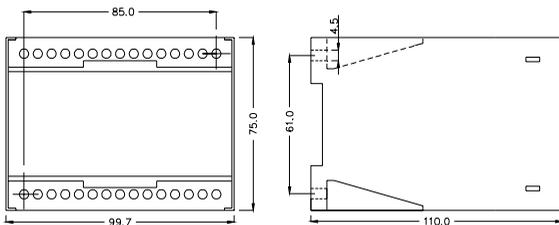
It may, however, be mounted in a 35 mm DIN rail by means of two 4-mm screws.

Weight: Approx. 0.650 kg

The design of the potentiometer makes mounting of it close to other *uni-line* units possible, however make sure there are min. 50 mm between the top and bottom of this relay and other relays/units. The DIN rail must always be placed horizontally when several relays are mounted on the same rail.

4. Connection diagram
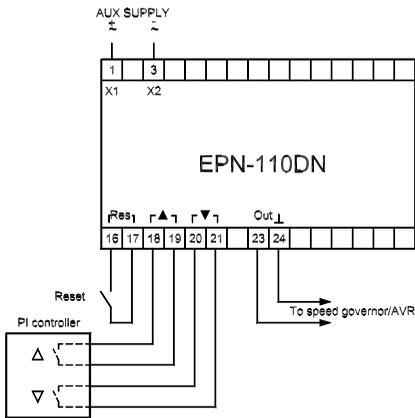
A 2A fuse may protect the auxiliary supply connection.

The potentiometer is protected against ESD (electrostatic electricity), and further special protection against this during the mounting of the potentiometer is not necessary.

Terminals Nos. 16 + 18 + 20 are internally connected to each other.

The EPN-110DN may be connected to speed governors/AVR's designed for 2 or 3-point connection of the external potentiometer.

For 3 point connections mounting the normally applied external potentiometer is recommended, and then to connect the EPN-110DN in series with the wiper of the potentiometer for the speed governor/AVR.

The relay contacts shown in the above diagram are coupled as normally de-energised contacts.	On activation of	Relay contact	LED on the front
	Input "Δ",	"▲" is activated	"▲" is lit
	Input "∇".	"▼" is activated	"▼" is lit

These 2 relay outputs may e.g. be applied for remote indication of activation of the "Δ" and "∇" inputs.

5. Start up instructions

5.1 Setting and indication
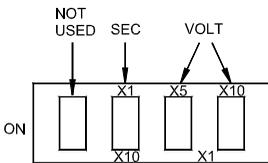
Output signal: Potentiometer "OUTPUT"
The maximum and minimum change of the frequency/voltage of the connected speed governor/AVR, controlled by the EPN-110DN.
Both "Volt" DIP switches set to x1: range –1…0…1VDC.
"Volt" DIP switch x5 set to x5 and x10 set to x1: range –5…0…5VDC.
"Volt" DIP switch x10 set to x10 and x5 set to x1: range –10…0…10VDC.
The DIP switches are accessible from the front of the relay.

Integrating time: Potentiometer "TIME"
How quickly the output integrates from the minimum to the maximum setting (or vice versa).
This setting thus determines how quickly e.g. a load sharing will be carried out.

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DIP switch "Sec" set to "1": range 2.5 s… 25 s, set to "x 10": range 25…250 s. The DIP switch is accessible from the front of the relay.

Offset: Potentiometer "OFFSET" (range: -25…0…25% of output)
The point where the control loop starts. This setting determines e.g. to which frequency the generator should be reset instantaneously during power-up or on activation of the reset input.

LED	Light
"▲" (increase)	Yellow, when relay is activated
"▼" (decrease)	Yellow, when relay is activated

1. As a starting point set "OUTPUT" potentiometer DIP switch mrk. "Volt" to "x 1" and the scale to "1", corresponding to a voltage output of ±1V.
2. Set the potentiometer "TIME" DIP switch "Sec" to "x 1" and scale to "0".
3. Short-circuit terminals Nos. 18 and 19 ("▲", increase), and check that the speed governor/AVR increases the frequency/voltage of the generator.
   If the frequency/voltage is decreased instead, the connection wires to terminals Nos. 23 and 24 respectively are interchanged. Keep the connection terminals short-circuited for min 2.5 s!

A suitable control range should now have been obtained. If not:

4. Fine adjust the "OUTPUT" potentiometer (alternatively: set its DIP switches to "x 5" or to "x10"). To obtain a stable control, the setting of the "OUTPUT" potentiometer should ensure that overcontrol of the connected speed governor/AVR will not occur. When connecting the EPN-110DN to the speed governor/AVR, the normal set point of this will normally be slightly changed, which may be corrected by adjusting the "OFFSET" potentiometer.
5. Set the DIP switch mrk. "Sec" to "x 10" and the "TIME" potentiometer to "12.5" (the approximate scale centre), corresponding to an integrating time of 125 s.

The control system should then be tested under various load conditions.

If a shorter control time is required:
6. Try reducing the integrating time ("TIME" potentiometer), until the control loop becomes unstable, and then select a value at least twice the setting at which the control loop became unstable.
   To obtain a stable control, the "TIME" potentiometer should be set to a longer integrating time than the control time of the system (the diesel generator) itself.

6. Technical specifications

Relay inputs:	Potential-free relay contacts. Open: 15V DC. Closed: 4mA.
Analog output:	0…± 1V DC (DIP switches set to "x 1"), or:
	0…± 5V DC (DIP switches set to "x 5"), or:
	0…±10VDC (DIP switches set to "x10")
output resistance:	0…500Ω potentiometer
Offset adjustment:	-25…0…25% of output
Ripple:	Max. 5mV RMS.
Resolution:	5mV DC (12-bit D/A converter)
Contact rating:	250V-8A-2000A (AC), 24V-8A-200W (DC)
Response time:	<100 m, input to output
Galv. separation:	Supply voltage to other circuits, and relay outputs mutually and to other circuits: 3250V-50Hz-1 min.
Consumption:	(Aux. supply) 3.5VA/2W