Monitoring Relay
Interface protection Relay
Type PI-DIN 0126

CARLO GAVAZZI

- Single and Three phase monitoring relay
- Auxiliary power supply 230Vac or 24Vdc
- ROCOF anti-islanding detection
- Settings, menu and logs navigation by means of a front joystick
- Dual password protected settings
- Dual function alarm LED
- Data logger with 10 last events logging
- RS485 serial communication
- Approved according to VDE-AR-N 4105 2018-11, G98 Issue 1 – Amendment 1 16 May 2018 / G99 Issue 1 – Amendment 3 16 May 2018 and Dansk Energi - Tekniske betingelser LV produktion 1.1
- Compact dimensions, 4 DIN Modules

CE

Product Description

The PI-DIN protection device has been designed and developed for the connection of energy production plants, to the public grid, in countries where compliance to VDE-AR-N 4105 2018-11, G98 Issue 1 – Amendment 1 16 May 2018 / G99 Issue 1 – Amendment 3 16 May 2018 or Dansk Energi - Tekniske betingelser LV produktion 1.1 approvals is required. Voltage and Frequency are constantly monitored and in case the measured values are out of the specified range the grid feeding is interrupted by opening the "interface switch". The interface switch consists of 2 independent electric switching devices connected in series for redundancy. PIDIN 0126 is a single fault fail safe device which ensures safe operation even in case of failure of any of the devices composing the system. The protection concept can be implemented on any energy generating power plant, alternatively, or in addition, to the Integrated interface protection. PI-DIN records all the events and it keeps the last 10 occurred, indicating date and time. This device is also equipped with an RS485 serial communication port. Through the serial port it possible to read the actual data, the events log and to erase the events. The rotary switch is equipped with a slit that allows the application of a padlock or a lead seal to avoid non-authorised access to the setting menu.

Ordering Key

| PI DIN 0126 H I2R2 S1 XX |

Model
Mounting
Norm
Auxiliary voltage
I/O
Serial Communication
Option

Type Selection

Model Interface protection	PI
Mounting	DIN (4 modules)

Approvals
    VDE-AR-N 4105 2018-11;
    G98 Issue 1 –
    Amendment 1 16 May
    2018 / G99 Issue 1 –
    Amendment 3 16 May
    2018;
    Dansk Energi - Tekniske
    betingelser LV produktion
    1.1
	0126

Auxiliary power supply
    230 Vac
    24 Vdc
	H
	L

Inputs 2 digital inputs	I2
Outputs 2 relay outputs	R2
Communication RS485 port	S1
Option None	XX

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Protection parameters

Code/Protection Function	Description	VDE-AR-N 4105 2018-11	ENA EREC G98 1-2-2018-5-16 / G99 1-3-2018-05-16	Dansk Energi - Tekniske betingelser LV produktion 1.1
U<	Voltage drop level 1	0.8 Un 50ms	0.8 Un 2.5s	0.85 Un 50s
U>	Voltage rise level 1	1.10 Un 50ms	1.14 Un 1 s	1.1 Un 60 s
U>>	Rise in voltage protection level 2	1.15 Un 50ms	1.19 Un 0.5s	1.15 Un 0.2s
U<<	Voltage drop level 2	0.45 Un 300ms	- -	0.80 Un 0.2s
f<	Frequency decrease protection	47.5 Hz 50ms	47.5 Hz 20s	47.5 Hz 0.2s
f>	Frequency increase protection	51.5 Hz 50ms	52 Hz 0.5s	51.5 Hz 0.2s
f<<	Frequency decrease protection	- -	47Hz 0.5s	- -
AI Seq	Incorrect phase sequence	- -	- -	- -
ROCOF	Derivative Frequency	2 Hz/s	1 Hz /s	2.5 Hz/s
Recovery	Recovery	0.85 < Un < 1.1 47.5 < f < 50.1 t ≥ 60 s	0.8 < Un < 1.14 47.5Hz < f < 52 Hz t ≥ 20 s	0.85 < Un < 1.1 47.5 < f < 50.5 180s

Note: default editable parameters

Events & Allarms messages

Events	Note
Number registered events	10 - FIFO - with hour and date
Alarms	• Triggered for: U>, U>>, f<, f>, f<<, U<, U<<, AI Seq, ROCOF • Interface switch operation failure • PI-DIN internal fault.

Reading Input Specifications

Rated inputs		Display +RS485 accuracy (@25°C ±5°C, RH 60%, 45÷60Hz)	
System type	1P, 3P, 3Pn	Voltage	±0.5% RDG +1DGT
Rated voltage	230V$_{LN}$/400V$_{LL}$	Frequency	±0.1Hz
Temperature drift	≤200ppm/°C		
Rated frequency	50Hz		

Specification are subject to change without notice PI-DIN 0126 DS 221119

I/O Segnals Specifications

Digital inputs functions		Output relay type	
Inputs	2 inp. for external contactors	Contact configuration	SPDT
Functions	Safety of operation control (output <= 5VDC)	Contact AC1	8A @ 250Vac
		Contact AC15	2,5A @ 250Vac
Input 1	Feedback Switch2	Contact DC12	5A @ 24 Vdc
	Terminals 1-3 or 1-33	Contact DC13	2,5A @ 24Vdc
Input 2	Feedback Switch1	Mechanical life	>30*10^6ops
	Terminals 42-33 or 42-3	Electrical life	>10*10^5ops
Common terminals	Terminals 3 - 33		@ 8A 250Vac cosϕ1

Output relay function	
Output relay 1	Switch1
	Terminals NO 12, NC 11, COM13
Output relay 2	Switch2
	Terminal NO 9, NC, 8, COM 10

Main Functions

Password 1	4-digit numeric code to prevent non-authorised change of U>, U< time, U<< time, recovery condition, time / clock, reset communication settings
Password 2	4-digit numeric code to select the approval and set protection for parameters not covered by Password 1

System selection	
3Ph +N system	3-phases (4-wires)
3Ph system	3-phases (3-wires)
1Ph system	1-phase (2-wires)

Real time clock	
Functions	Clock and calendar
Time format	Hour: minutes: seconds with format hours
Date format	Day-Month-Year with DD-MM-YY
Battery*	Life: 10 Years Type: 1 Metal-ion non-replaceable Weight: 0.04 g

Note: The device contains metal-ion batteries. For the sending, you must comply with the relevant packaging and labelling regulation.

Insulation Between Inputs and Outputs

	Measuring inputs	Relay outputs	Digital inputs	Communication port	Auxiliary support
Measuring inputs	-	4kV	4kV	4kV	4kV
Relay outputs	4kV	-	4kV	4kV	4kV
Digital inputs	4kV	4kV	-	4kV	4kV
Communication port	4kV	4kV	4kV	-	4kV
Auxiliary supply	4kV	4kV	4kV	4kV	-

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Serial Communication RS485

RS485 Port		Data format	1 bit for start, 8 bit for dates, no parity/odd parity, equal parity, 1 bit for stop.
Type	Multidrop, bidirectional (static and dynamic variables).		
Connection	2 wires, Half Duplex. Max. distance 1000m, termination on instrument.	Communication speed	Selectable: 4,8 k, 9,6k, 19,2 bit/s.
		Network devices	1/5 unit load. Max. 160 devices in the same network.
Address	247, selezionable by frontal.		
Protocol	MODBUS (RTU).		
	Data (bidirectional)		
Dynamic (only reading)	Variables of system and phase		
Static	All configuration parameters.		

General Specifications

Operating temperature	From -20 a +55°C (-4°F to 131°F) (U.R. from 0 to 90% without condensation @ 40°C)	Protection degree	
		Front	IP50
		Screw terminals	IP20
		Pollution degree 2	
Storage temperature	From -30 to +70°C (-22°F to 158°F) (U.R. <90% without condensation @ 40°C)	Coformity standards	
		Safety	EN60255-27
		Approvals	CE
Overvoltage Category	III		VDE-AR-N 4105 2018-11; ENA EREC G98 1-2-2018-05-16 / G99 1-3-2018-05-16; Dansk Energi - Tekniske betingelser LV produktion 1.1
Insulation class	II (Double insulation)		
Insulation (for 1 minute)	According to EN60255-27 Please see "Insulation between inputs and outputs" table.		
		Terminals	Screw
		Cable reference	Max. 2.5mm^2
Dielectric stregth	4kVAC RMS for 1 minute	Tightening torque	Min./Max.: 0.4Nm/1Nm.
Rejection rate		Housing (4 DIN Modules)	
CMRR	100dB, from 48Hz to 62Hz	Dimensions (WxHxD)	90 x 71.6 x 66.3 mm
EMC		Material	Front: ABS Self extinguishing: UL 94 V-0
Immunity	EN61000-6-2		
Emission	EN61000-6-3	Mounting	DIN rail
		Weight	300g (including packaging)

Auxiliary Power Supply Specifications

PINDIN0126HI2R2S1XX		PINDIN0126LI2R2S1XX	
Input voltage	115Vac or 230Vac -20% / +15%	Input voltage	24Vdc -20% / +20%
		Consumption	2W
Consumption	7VA	Recommended fuse*	2 x T 0.25A L250V
Recommended fuse*	2 x T 0.16A L250V		
		*Both supply poles must be fused	

Display, LEDs and Commands

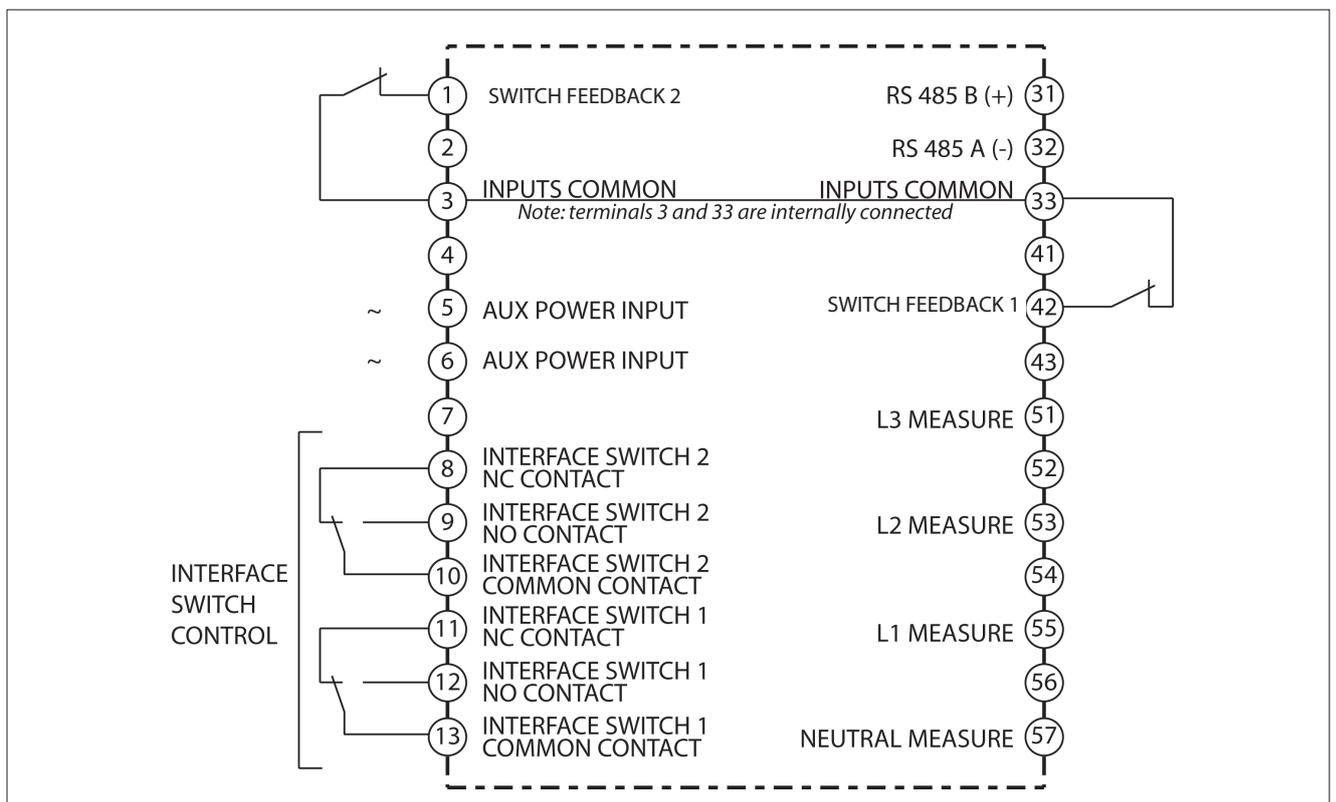|			
Display refresh time	≤ 100 ms		parameters, system, etc...
Display	3 lines, 4 DGT		Selector is provided with a
Model	LCD		slit for lead seal locking.
Digit dimension	h 7mm	LED on front panel	Dual function RED LED
Joystick	Variables reading selection, operating parameters settings, triggered events list.		Lit: alarm triggered. Flashing: when the alarm condition is present during the fixed delay time
Rotary switch	programming menus access: password, date & time, interface protection		

Front Panel Description
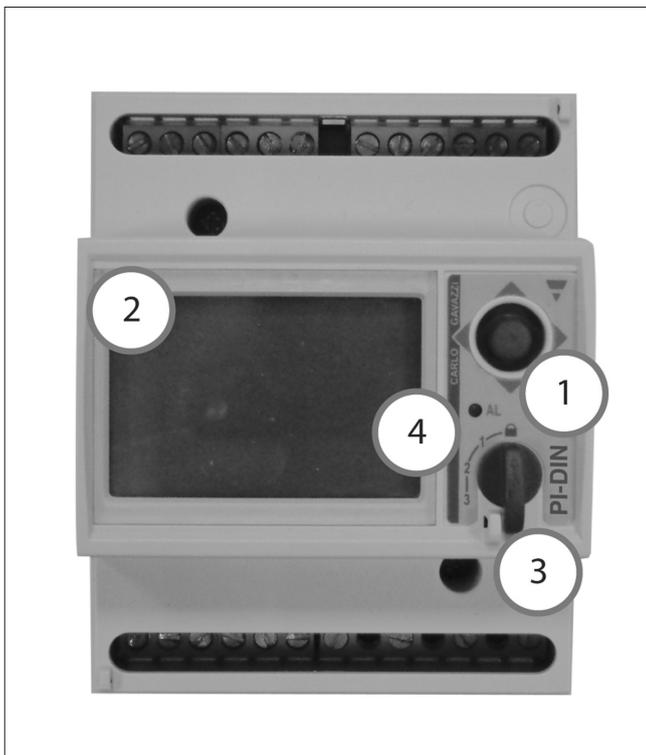
1. Joystick
Programming menus parameters configuration and navigation. Events and variables scrolling.

2. Display
LCD with alphanumerical indications:
 - Display configuration parameters;
 - Dispaly all the measured variables;
 - Display logged events.

3. Programming menu selector
With the Rotary selector (lead seal lockable) it is possible to select the main menu, the setting menu or the configuration menu.

4. Alarm
Status LED
 - OFF, no alarms
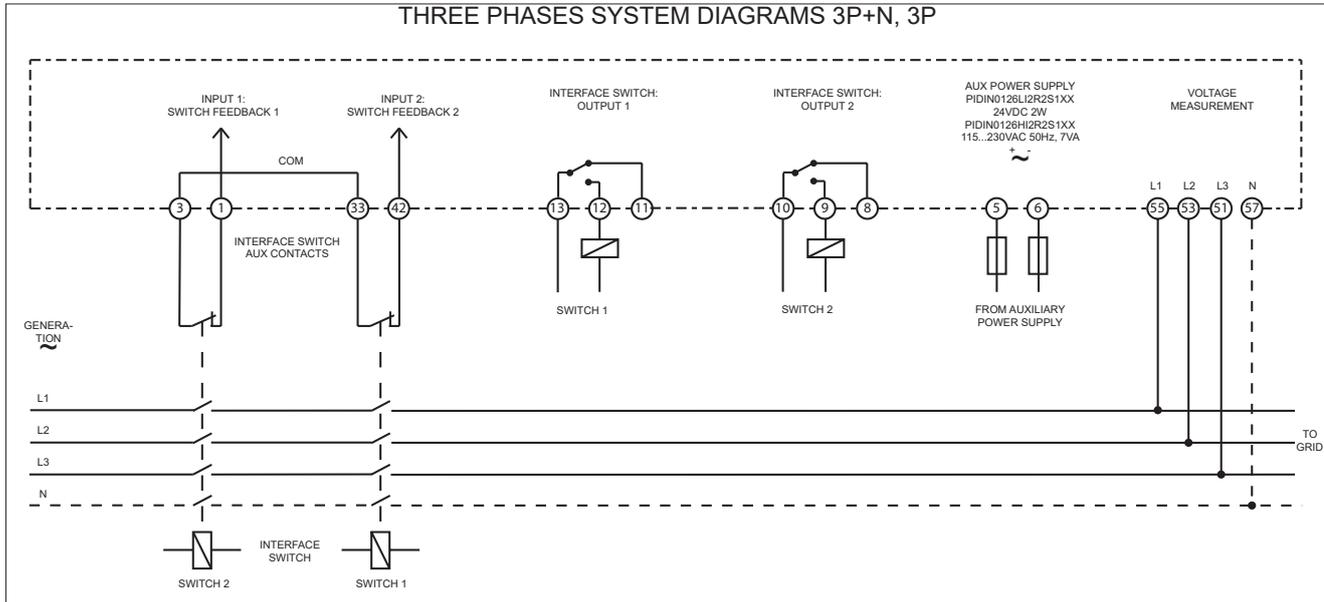 - ON, triggered alarm protection tripped
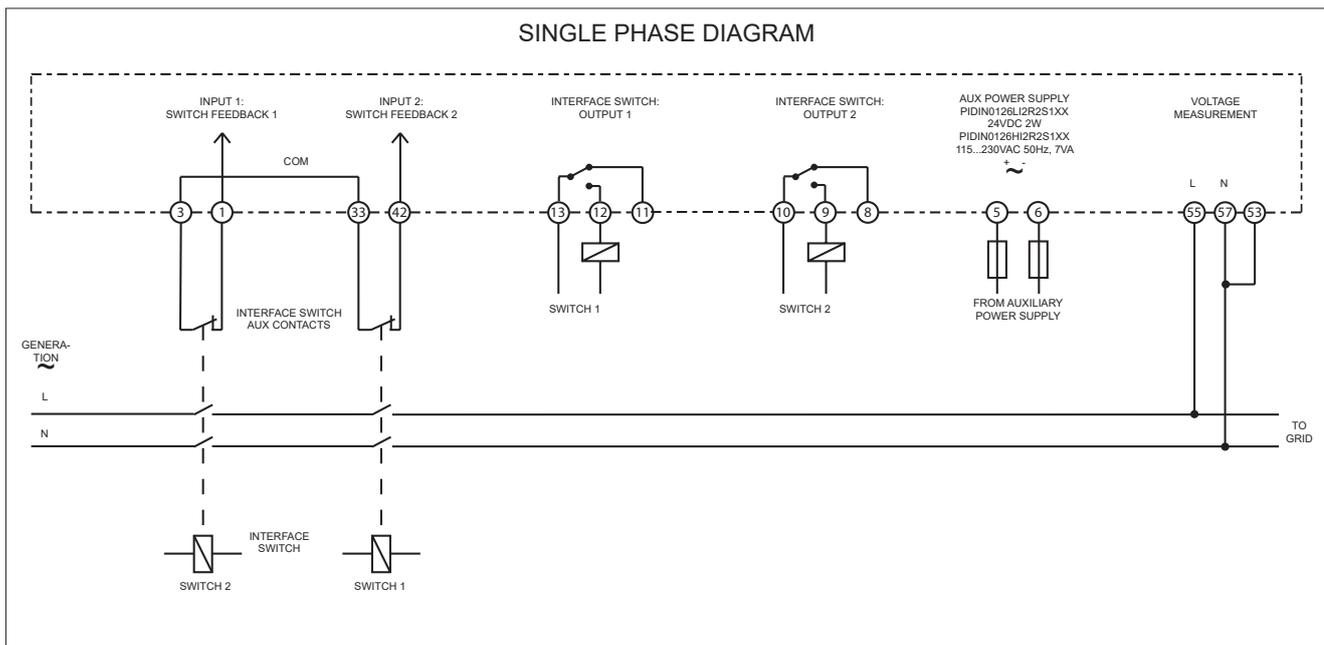
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Terminal Board Layout (back view)

IMPORTANT NOTICE:
Apply the ferrite filter contained in the box to the PI-DIN interface.

A ferrite filter is provided in the box. The ferrite shall be used in order to eliminate possible disturbances on the digital inputs. In order to do that it is suggested to position it around the the cables connected to the digital inputs: both inputs and both common terminals. The ferrite has to be placed as close as possible to the device.

Input/Output pinout

① SWITCH FEEDBACK 2	RS 485 B (+) ㉛
②	RS 485 A (-) ㉜
③ INPUTS COMMON	INPUTS COMMON ㉝
	Note: terminals 3 and 33 are internally connected
④	㊶
⑤ AUX POWER INPUT	SWITCH FEEDBACK 1 ㊷
⑥ AUX POWER INPUT	㊸
⑦	L3 MEASURE ㊿ 51
⑧ INTERFACE SWITCH 2 NC CONTACT	52
⑨ INTERFACE SWITCH 2 NO CONTACT	L2 MEASURE 53
⑩ INTERFACE SWITCH 2 COMMON CONTACT	54
⑪ INTERFACE SWITCH 1 NC CONTACT	L1 MEASURE 55
⑫ INTERFACE SWITCH 1 NO CONTACT	56
⑬ INTERFACE SWITCH 1 COMMON CONTACT	NEUTRAL MEASURE 57

INTERFACE SWITCH CONTROL

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Three Phases System Wirings

THREE PHASES SYSTEM DIAGRAMS 3P+N, 3P

Single Phases System Wirings

SINGLE PHASE DIAGRAM

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Dimensions (mm)