ЭНЕРГОМЕТРИКА

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PHA-F DC System Monitor Datasheet

V2.17

Product brief introduction

PHA-F DC monitor products mainly used in DC transmission, power distribution and other occasions, such as PV combiner box, DC cabinet, telecommunications room, telecommunications base station etc. Its main function is to monitor each string current, busbar voltage, temperature of the combiner box, the state of SPD, the state of DC breaker in real time, detecting whether there is harmful arc in direct current circuit in real time, once there is some harmful arc, an alarm signal will be sent immediately and drive the tripping device on the dc breaker, cut off the fault circuit, effectively prevent fire and other safety hazards caused by the arc.RS485 or PLC(Power Line Carrier Communication) is used for the communication between the monitor and SCADA.

PHA-F DC monitor feature:

- Support 600VDC, 1000VDC, 1200VDC, 1500VDC, 1700VDC system;
- Support two communication modes: RS485, Power Line Carrier Communication;
- Modular design, support up to 32 channels;
- Arc fault detection and protection;
- Local pixels graphic LCD display, the current of each channel be displayed in histogram;
- Abnormal alarm of each channel (Over voltage, under voltage, over current, under current, unbalanced current, etc);
- Drive shunt trip device directly, no external circuit is required;
- Remote alarm,the state of arc alarm can be read by MODBUS;
- Telecommunication:RS485 Modbus-RTU
- The arc and current are measured   through perforated isolation, Strong isolation ability
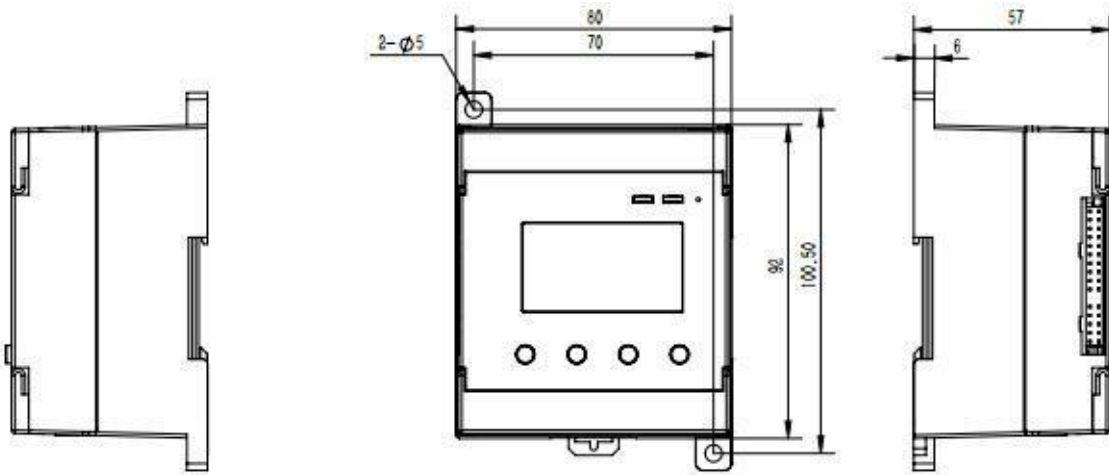- Arc and current sensors have large hole sizes, the diameter up to 10mm
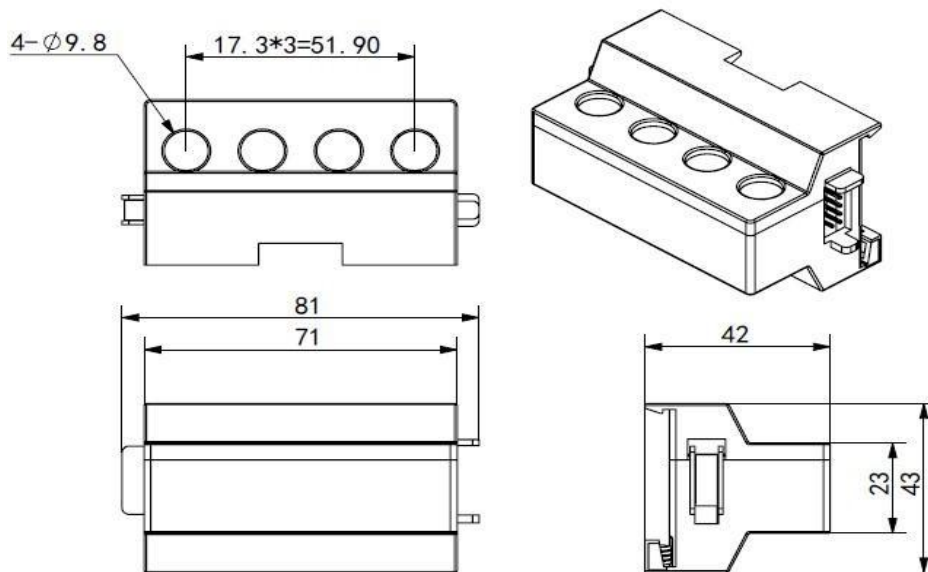
Typical Application
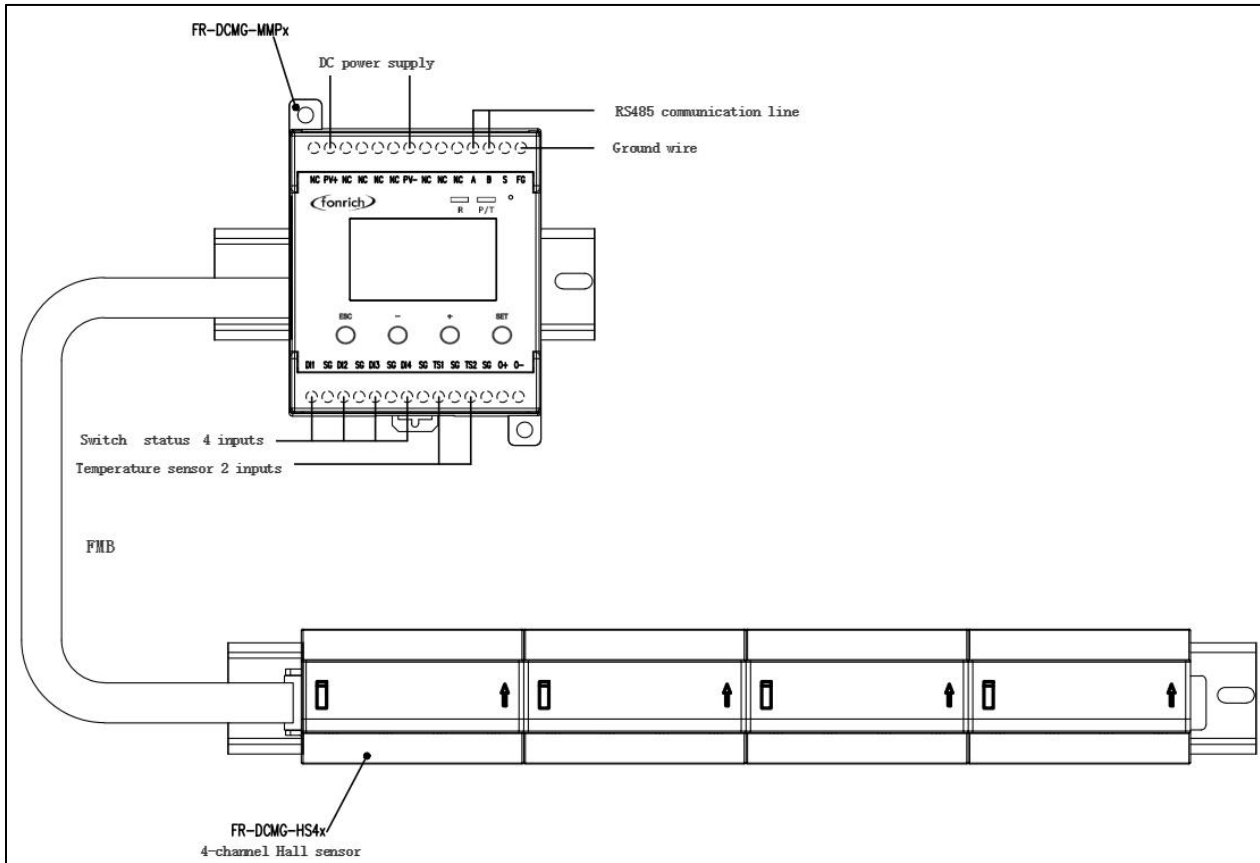
Typical application example: Intelligent combiner box monitoring system

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Mechanical Dimension:

PHA-F:

PHA-F

Product Model List:

Product	Model	Brief description
Combiner box monitoring host	PHA-F-MMPU	Main control module of combiner box monitoring, used in 1500V or below 1500V PV system. Support up to 24 current channels
	PHA-F-MMPP	On the basis of PHA-F-MMPL, integrated circuit breaker shunt trip drive is used for arc protection. It can also be used without expansion module and RS485 communication.
	PHA-F-MMPY	Main control module of combiner box monitoring, used in 1500V or below 1500V PV system, Support up to 32 current channels
	PHA-F-MMPZ	Main control module of combiner box monitoring, used in 1700V or below 1700V PV system. Support up to 24 current/ARC channels
	PHA-F-MMPQ	Combiner box monitoring host, used for systems of 1700V and below, supports up to 24 current channels, and supports RS485 communication
	PHA-F-MMPS	Combiner box monitoring host, used for systems of 1700V and below, supports up to 24 current channels, and DC 24V power supply
Current Sensor Arc Fault Detector	PHA-F-HS4A	Four channel hall current sensor, current range: - 20A~20A
	PHA-F-AS4A	Four channel hall current and arc fault detecting sensor
	PHA-F-HS4P	Four channel hall current sensor, current range: - 30A~30A
	PHA-F-HS4Q	Four channel hall current sensor, current range: - 40A~40A
	PHA-F-HS4R	Four channel hall current sensor, current range: - 60A~60A

Key Technical Specifications:

Classification	Item	Parameter
Arc detection (PHA-F-AS4A)	Channel quantity	Multiple of 4
	Current range	±15A
	Maximum channel voltage	DC1500V
	Arc type	UL1699B(Type 1)
Current Measurement (PHA-F-HS4A, PHA-F-AS4A)	Channel quantity	Multiple of 4
	Current range	-20A~+20A
	Rated current	-10A~+10A
	Imbalance offset	≤ ±0.1A
	Temperature drift	≤±0.005A/℃
	Linearity	≤1%FS
Current Measurement （PHA-F-HS4P）	Channel quantity	Multiple of 4
	Current range	-30A~+30A
	Rated current	-15A~+15A
	Imbalance offset	≤±0.2A
	Temperature drift	≤±0.01A/℃
	Linearity	≤1%FS
Current Measurement （PHA-F-HS4Q）	Channel quantity	Multiple of 4
	Current range	-40A~+40A
	Rated current	-20A~+20A
	Imbalance offset	≤±0.2A
	Temperature drift	≤±0.01A/℃
	Linearity	≤1%FS
Current Measurement （PHA-F-HS4R）	Channel quantity	Multiple of 4
	Current range	-60A~+60A

	Zero drift	≤±0.3A
	Temperature drift	≤±0.01A/℃
	Linearity	≤1%FS
Voltage measurement (PHA-F-MMPL, PHA-F-MMPU, PHA-F-MMPY, PHA-F-MMPP)	Input voltage range	450~+1500V
	Voltage measurement accuracy	0.5%
	Voltage resolution	1V
	Temperature drift	≤0.1V/℃

Voltage measurement (PHA-F-MMPZ)	Input voltage range	450~+1700V
	Voltage measurement accuracy	0.5%
	Voltage resolution	1V
Temperature measurement	Quantity of temperature input	Two inputs
	Sensor type	NTC
	Measurement range	-40℃~+125℃
	Measurement accuracy	±2℃
	Temperature resolution	0.1℃
Monitor switch status	Input quantity of switch status	Four inputs
	Input type	Dry Contact Input
	Input Voltage	DC5V

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Local Display	Display voltage, current,temperature, etc	Dot matrix display (LCD)
	Working status indicator	2 LED, Represents power supply and communication status respectively
Local operation	Operation content	Operation status display and parameter setting
	Keys of local operation	4
RS-485	Communication protocol	Modbus-RTU
	Communication rate	2400/4800/9600/19200/38400 bps
	Byte format	8N1, 8O1, 8E1
Break Shunt Trip (only for PHA-F-MMPP)	Drive voltage	24V
	Drive capability	80W * 10ms
Main control module power supply parameters (PHA-F-MMPU PHA-F-MMPY PHA-F-MMPP)	Input voltage	450~1500VDC
	Maximum of input current	0.1A
	Power dissipation	<10W
Main control module power supply parameters (PHA-F-MMPZ PHA-F-MMPQ)	Input voltage	450~1700VDC
	Maximum of input current	0.1A
	Power dissipation	<10W
Main control module power supply parameters (PHA-F-MMPS)	Input voltage	24VDC
	Maximum of input current	0.1A
	Power dissipation	<10W
Environment	Work Ambient Temperature	-30℃ ~ +70℃
	Storage temperature	-40℃ ~ +85℃

	Operating humidity	$0 \sim 95\%$
Mechanical properties	Terminal torque	Minimum torque 2kgf.cm
		Standard torque 4kgf.cm
		Maximum torque 5.1kgf.cm
EMC	Please refer to dedicated EMC/EMS testing report	

Document Revision History

Revision	Description	Time
0.1	Initial version, draft	2013-12-26
0.2	1. Change the main unit wiring diagram and diagram 2. Add industrial Ethernet interface	2014-1-20
0.3	1. Add leakage current sensor support 2. External temperature measurement changed to 1 channel	2014-5-20
0.4	1. Add 1 circuit relay output with fault alarm function	2014-10-28
2.0	1. Add arc detection function 2. Add tripping power supply 3. Remove relay output and Ethernet interface	2015-06-10
2.1	Update 25V shunt tripper operating power output capacity parameters, update model FR - PVMG-SHTPB, can drive more power trip	2015-07-31
2.2	1. Add 1500 system parts 2. Add typical product application diagrams	2015-11-11
2.3	Modify the aperture of 1500V sensor	2015-11-12
2.4	Added PHA-F-MxPD	2016-10-21
2.5	Added PHA-F-MMPU	2016-12-02
2.6	Added the description arc sensor approved by UL	2017-01-12
2.7	Added product model description of silk-screen	2017-04-12
2.8	Added product PHA-F-HS4P	2018-06-14
2.9	1. Remove the phaseout product models: FR-PVMG-xxx, PHA-F-MxPA, PHA-F-MxPB, PHA-F-MWPx 2. Add two new product model: PHA-F-MMPE, PHA-F -MMPY 3. Modify the boot voltage of main control modules, to 150V and 300V up to 350V and 450V 4. Modify the spec of PHA-F-HS4P	2019-02-22
2.10	1. Add new main control model PHA-F-MMPZ, work upto 1700V	2019-04-01
	2. Improve the voltage measure accuracy to 0.2%	

2.11	PLC support, two model: PHA-F-MMPL and PHA-F-PLCD	2019-06-17
2.12	Modify the voltage measure accuracy; Modify the work ambient temperature; Remove model PHA-F-MMPF; New model PHA-F-PLCU	2019-10-20
2.13	PHA-F-HS4T phased out	2019-12-27
2.14	- Remove models PHA-F-MMPD, PHA-F-MMPF - New model PHA-F-MMPP - Remove the shunt trip power driver in PHA-F-MMPU and PHA-F-MMPL	2020-2-10
2.15	-Update system wiring diagram -Added the description of MMPP to eliminate the misunderstanding that PLCx is necessary -Add PHA-F-MMPQ, PHA-F-HS4Q, PHA-F-MMPS models -Increase voltage offset drift	2020-8-5
2.16	-Increase torque data of terminal	2020-10-9
2.17	- Add PHA-F-HS4R - Remove PHA-F-MMPL, PHA-F-PLCx	2021-5-24