

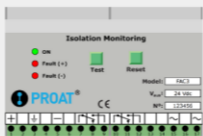
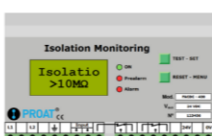


Catalog

Isolation Monitors

Isolation Monitors

Models Summary

MODELS	IT SYSTEMS	RANGE	SELF POWERED	AUTOMATIC RESET	REAL-TIME VISUALIZATION	PROGRAMMABLE PARASITIC CAPACITY	DOUBLE MONITORING	MODBUS
FAC 		DC 9-230 V _{DC}	✓					
FAC3 		DC 200 - 1500 V _{DC}		✓				✓
FACB 		DC 180 - 1500 V _{DC}		✓	✓			✓
FACV 		AC 115 - 7200 V _{AC}	✓	✓	✓			✓
FACDC 		AC+DC 0-1000 V _{AC} 0-1500 V _{DC}		✓	✓	✓		✓
FACDC-2M 		AC+DC 0-700 V _{AC} 0-1500 V _{DC}		✓	✓	✓	✓	✓



DC Isolation Monitor

- ✓ **Detects insulation** faults between the (+) and (-) conductors with regard to ground
- ✓ Potential-free commuted **output relay**, depending on the model
- ✓ **Self-powered** device
- ✓ For IT systems from **9V_{DC} - 230V_{DC}**, depending on the model



Applications

Monitoring of possible ground faults of IT ground isolated DC systems:

- Electrical installations that are isolated from ground
- Battery systems
- Systems with power conversion for components with rectifiers or inverters
- Recreational or military vessels



Function Features

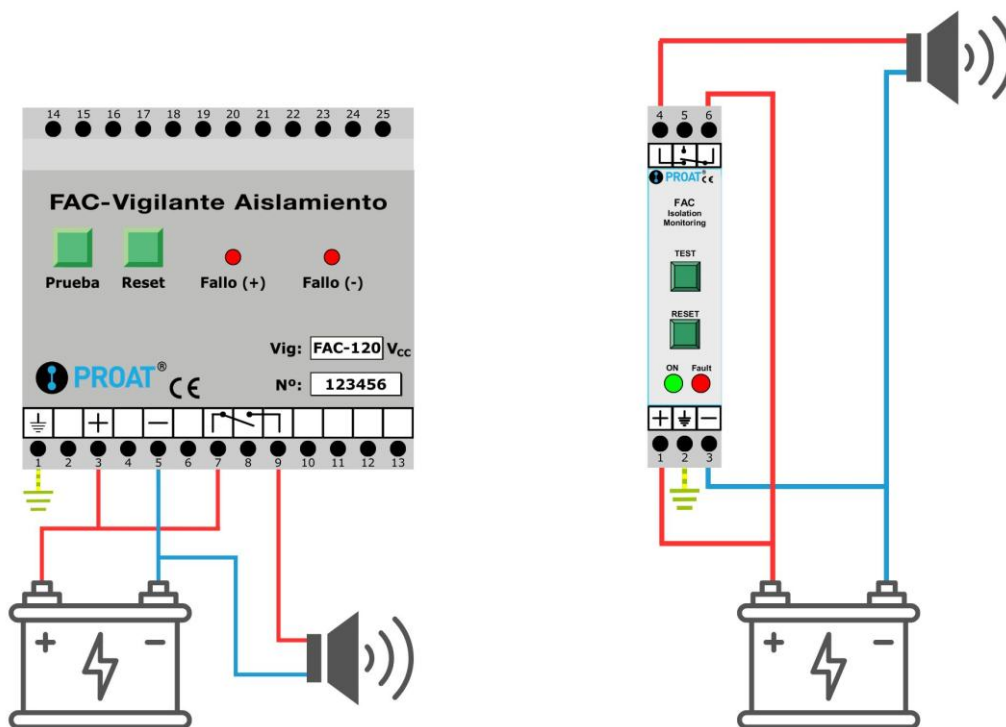
- Potential-free output relay to signal a detected fault
- **TEST** button to simulate a connection between (+) or (-) and ground
- **RESET** button to reset the device and clear the fault
- LED indicators for fault signaling
- Self-powered by the installation

Models

Model	Nominal Voltage U_N	Operating Range	Alarm Level	Power Voltage	DIN Size
FAC-12D	12 V _{DC}	9-18 V _{DC}	1 k Ω	Self-powered	1M – 18,5mm
FAC-24D	24 V _{DC}	18-32 V _{DC}	1 k Ω	Self-powered	1M – 18,5mm
FAC-48D	42 V _{DC}	36-55 V _{DC}	1 k Ω	Self-powered	1M – 18,5mm
FAC-055	48 V _{DC}	24-55 V _{DC}	80 k Ω	Self-powered	4M – 71mm
FAC-120	120 V _{DC}	60-138 V _{DC}	80 k Ω	Self-powered	4M – 71mm
FAC-200	200 V _{DC}	100-230 V _{DC}	80 k Ω	Self-powered	4M – 71mm

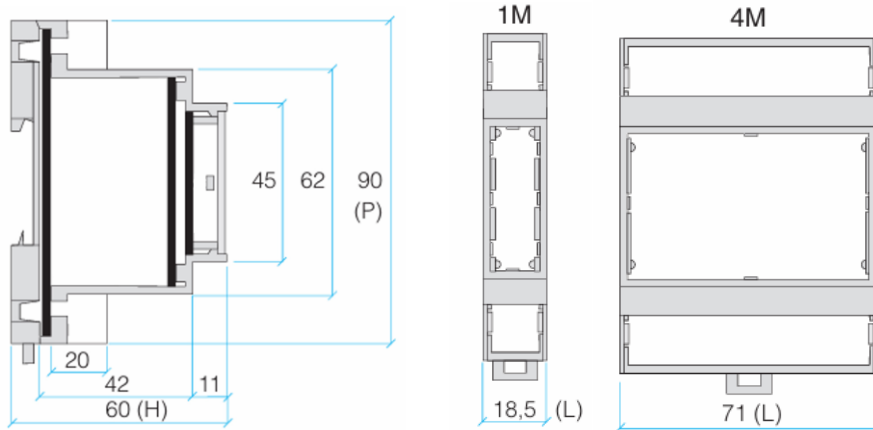
* Other models can be manufactured upon request

Wiring



❶ Constructive Features

- DIN rail mounting
- Front plate terminals
- Class V0 self-extinguishing plastic enclosure



❷ Technical Data

MODEL	FAC-12/24/48	FAC-055/120/200
Voltage Range		
Voltage range U _N	U _N ±20%	U _N /2 - U _N +15%
Power consumption	≤6W	≤6W
Consumption at rest	≤0,5W	≤0,5W
Response Values		
Alarm level	1 kΩ	80 kΩ
Measurement error	±10%	±10%
Response time T _R	< 5 s	<100 ms
Fault detection	Symmetrical	Simple
Measuring Circuit		
Max voltage U _N	U _N +20%	U _N +15%
Internal resistance R+	>10kΩ	>56 kΩ (V _N =120)
Internal resistance R-	>10 kΩ	>56 kΩ (V _N =120)
Ground impedance	>10kΩ	>300 kΩ
Parasitic capacity	<5 μF	<1000 μF
Front View		
ON	Green Led	-
Fault	Red Led	-
Fault (+)	-	Red Led
Fault (-)	-	Red Led
Test button	Yes	Yes
Reset button	Yes	Yes
Dielectric Test		
V _{DC} input - output contacts	3k V _{RMS} – 1min	3k V _{RMS} – 1min

Switching Elements	
Number of switching elements	1
Type of outputs	FAC-12/24/48 – Switched FAC-55/120/200 – Contact
Voltage outputs	Voltage free
Max AC load	250V _{AC} 2A
Max DC load	300V _{DC} 0,1A
Switching time RL	< 10 ms
Number of cycles	20,000,000
General Data	
Operation mode	Continually
Mounting	DIN rail
Connection	Screw M2,5
Screw torque	≤0,4 Nm
Protection grade	IP20
Flammability class	UL94V-0
Weight	310g. approx.
Operating temperature	-20°C...+55°C
Storage temperature	-25°C...+80°C
Relative humidity (without condensation)	<95%
Setting values method	Fixed
Standards	
Electrical safety requirements	UNE-EN 61010-1
Electrical safety requirements	UNE-EN 61010-2-0081
Electromagnetic compatibility (EMC)	UNE-EN 61000-6-1
Electromagnetic compatibility (EMC)	UNE-EN 61000-6-3/A1
European Directive	2006/95/CE
European Directive	2004/108/CE
Standard	IEC-61557-8

FAC3

DC Isolation Monitor with Automatic Reset

- ✓ Detects isolation faults of the (+) and (-) conductors with regard to ground
- ✓ **2 output relays** with potential-free commuted contacts
- ✓ **Instant contact** in reverse logic
- ✓ **Delayed contact** configurable from 1 to 4 seconds
- ✓ **Alarm level configurable** 10 to 80 kΩ
- ✓ **Automatic reset** between 1-60 minutes configurable
- ✓ For IT systems of **200V_{DC} - 1500V_{DC}** depending on the model
- ✓ **Modbus** communications depending on the model



Applications

Monitoring for possible ground faults in IT DC systems isolated from ground:

- Electrical installations isolated from ground
- Photovoltaic Installations
- Battery systems
- Systems with power conversion for components with rectifiers or inverters



Function Features

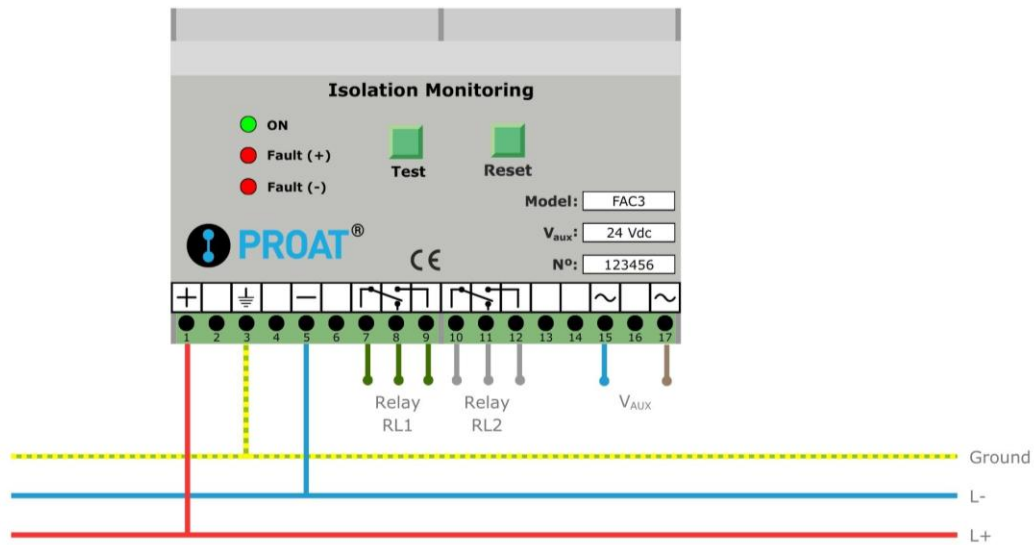
- 2 output relays with potential-free changeover contacts
- Instant contact in reverse logic
- Delayed contact configurable from 1 to 4 seconds
- Automatic reset between 1-60 minutes configurable
- Alarm level configurable between 10-80 kΩ
- **TEST** button to simulate grounding of (+) and (-)
- **RESET** button to reset the equipment and clear the fault
- LEDs (+) and (-) to signal the fault
- Electrically isolated RS-485 interface with Modbus-RTU protocol depending on the model:
 - Instantaneous isolation measurement
 - Relay status
 - View parameters

Models

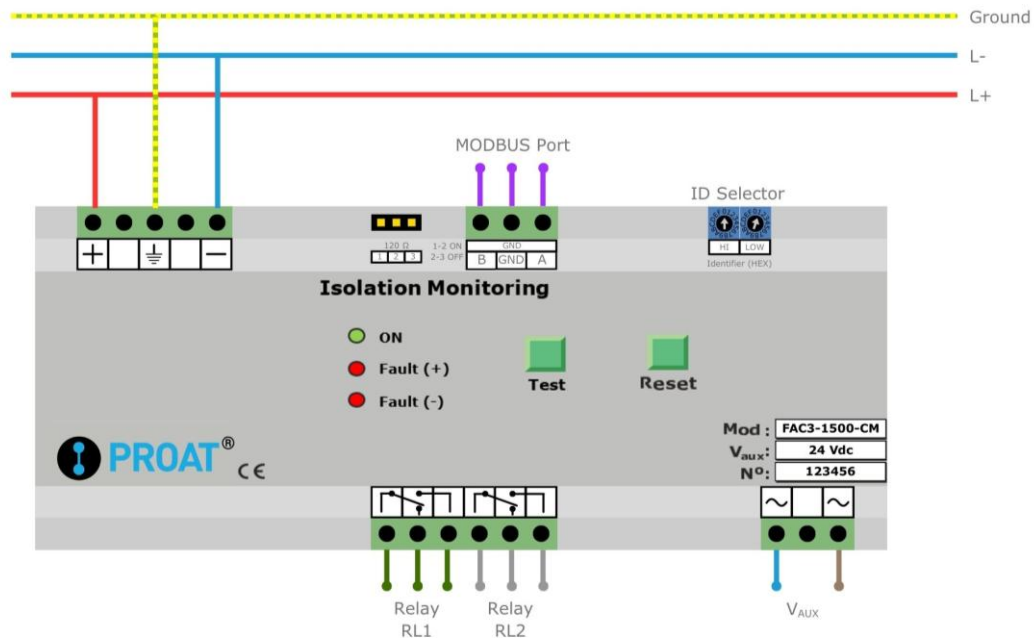
Model	Nominal Voltage U_N	Operating Range	Alarm level	Power Voltage	DIN size	Communications
FAC3-400-C	400 V _{DC}	200-400 V _{DC}	10-80 kΩ	230 V _{AC}	6M - 106mm	-
FAC3-400-C-24	400 V _{DC}	200-400 V _{DC}	10-80 kΩ	24 V _{DC}	6M - 106mm	-
FAC3-600-C	600 V _{DC}	300-600 V _{DC}	10-80 kΩ	230 V _{AC}	6M - 106mm	-
FAC3-600-C-24	600 V _{DC}	300-600 V _{DC}	10-80 kΩ	24 V _{DC}	6M - 106mm	-
FAC3-800-C	800 V _{DC}	400-800 V _{DC}	10-80 kΩ	230 V _{AC}	6M - 106mm	-
FAC3-800-C-24	800 V _{DC}	400-800 V _{DC}	10-80 kΩ	24 V _{DC}	6M - 106mm	-
FAC3-900-C	900 V _{DC}	450-900 V _{DC}	10-80 kΩ	230 V _{AC}	6M - 106mm	-
FAC3-900-C-24	900 V _{DC}	450-900 V _{DC}	10-80 kΩ	24 V _{DC}	6M - 106mm	-
FAC3-1000-C	1000 V _{DC}	500-1000 V _{DC}	10-80 kΩ	230 V _{AC}	6M - 106mm	-
FAC3-1000-C-24	1000 V _{DC}	500-1000 V _{DC}	10-80 kΩ	24 V _{DC}	6M - 106mm	-
FAC3-1500-CM	1500 V _{DC}	450-1500 V _{DC}	10-80 kΩ	230 V _{AC}	9M - 160mm	Modbus-RTU
FAC3-1500-CM-24	1500 V _{DC}	450-1500 V _{DC}	10-80 kΩ	24 V _{DC}	9M - 160mm	Modbus-RTU

* Other models can be manufactured upon request

Wiring FAC3-400/600/800/900/1000

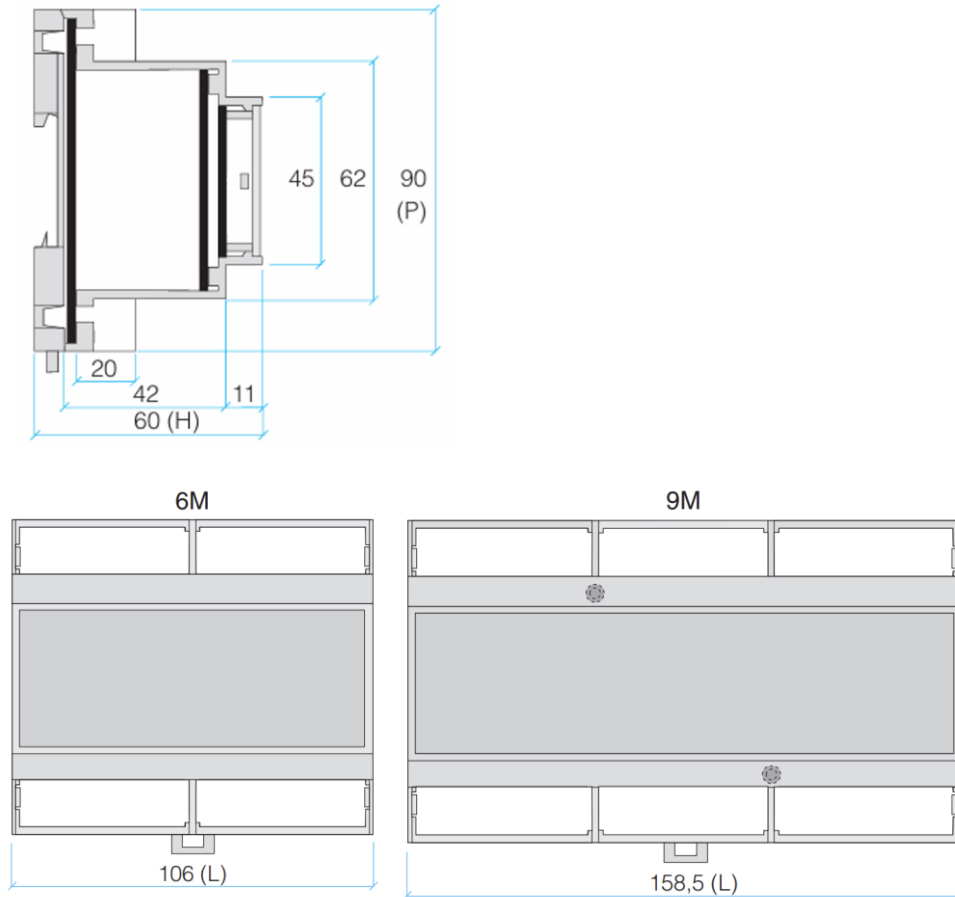


Wiring FAC3-1500-CM



Constructive Features

- DIN rail mounting
- Front plate terminals
- Class V0 self-extinguishing plastic enclosure



Technical Data

MODEL	FAC3-400/1000	FAC3-1500
Voltage Range		
Voltage range U_N	$0.5 \cdot U_N - U_N$	$0.3 \cdot U_N - U_N$
Auxiliary voltage V_{AUX}	24 V _{DC} - 230 V _{AC}	24 V _{DC} - 230 V _{AC}
Consumption at rest	≤0,5W	≤0,5W
Maximum consumption	≤6W	≤12W
Response Values		
Alarm level	10 - 80 kΩ	20 - 80 kΩ
Measurement error	±10%	±10%
Response time T_R	< 1 s	< 1 s
RL1-RL2 Timing	1-4 s	1-2 s
Auto-Reset time	1-60 min	1-2 min
Factory settings		
Alarm level	80 kΩ	80 kΩ
Auto-Reset time	1 minute	1 minute
RL1-RL2 Timing	1 s	1 s
ID Modbus	-	1
Measuring Circuit		
Max voltage U_N	$U_N + 10\%$	$U_N + 10\%$
Internal resistance R+	1 MΩ	1 MΩ
Internal resistance R-	1 MΩ	1 MΩ
Ground impedance	>500 KΩ	>750 KΩ
Parasitic capacity	<500uF	<500uF
Front View		
ON	Green Led	Green Led
Fault (+)	Red Led	Red Led
Fault (-)	Red Led	Red Led
Test button	Yes	Yes
Reset button	Yes	Yes
Dielectric Test		
V _{DC} Input – V _{AUX}	3k V _{RMS} – 1min	3k V _{RMS} – 1min
V _{DC} Input - Output Contacts	3k V _{RMS} – 1min	3k V _{RMS} – 1min
V _{AUX} – Output Contacts	3k V _{RMS} – 1min	3k V _{RMS} – 1min
Communications		
Interface	-	RS-485
Protocol	-	ModBus-RTU
Port parameters	-	19200,8,N,1
ID ModBus	-	1-240
Available features	-	3,4
Operation	-	Slave
Cable length (m)	-	<1200
Connection	-	Terminals A/B

Switching Elements	
Number of switching elements	2
Type of outputs	Switched contact
Voltage outputs	Voltage free
Max AC load	250V _{AC} 2A
Max DC load	300V _{DC} 0,1A
Switching time RL	< 10 ms
Number of cycles	20,000,000

General Data	
Operation mode	Continually
Mounting	DIN rail
Connection	Screw M2,5
Screw torque	≤0,4 Nm
Protection grade	IP20
Flammability class	UL94V-0
Weight	310 gr
Operating temperature	-20°C...+55°C
Storage temperature	-25°C...+80°C
Relative humidity (without condensation)	<95%
Setting values method	Front opening

Standards	
Electrical safety requirements	UNE-EN 61010-1
Electrical safety requirements	UNE-EN 61010-2-0081
Electromagnetic compatibility (EMC)	UNE-EN 61000-6-1
Electromagnetic compatibility (EMC)	UNE-EN 61000-6-3/A1
European directive	2006/95/CE
European directive	2004/108/CE
European directive	2006/95/CE

FACB

DC Isolation Monitor with Automatic Reset and Real-Time Display

- ✓ Detects **symmetrical and asymmetrical** insulation faults of the (+) and (-) conductors with regard to ground
- ✓ **2 independent potential-free** output commuted contacts, with programmable actuation levels and time delays: pre-alarm and alarm
- ✓ **Pre-alarm:** actuation level of 1 - 8 MΩ and actuation delay of 10-30 seconds
- ✓ **Alarm:** actuation level of 100 kΩ - 8 MΩ and actuation delay of 10-30 seconds
- ✓ Alarm with **automatic reset** configurable between 1-60 minutes
- ✓ **Real-time display** of the installation's insulation level. Measurement range: 1 kΩ - 10 MΩ
- ✓ For IT systems of **180V_{DC} - 1500V_{DC}** depending on the model
- ✓ **Modbus** Communications



Applications

Monitoring for possible ground faults in IT DC systems isolated from ground:

- Electrical installations isolated from ground
- Photovoltaic installations
- Electric car chargers
- Battery systems
- Systems with power conversion for components with rectifiers and inverters



Function Features

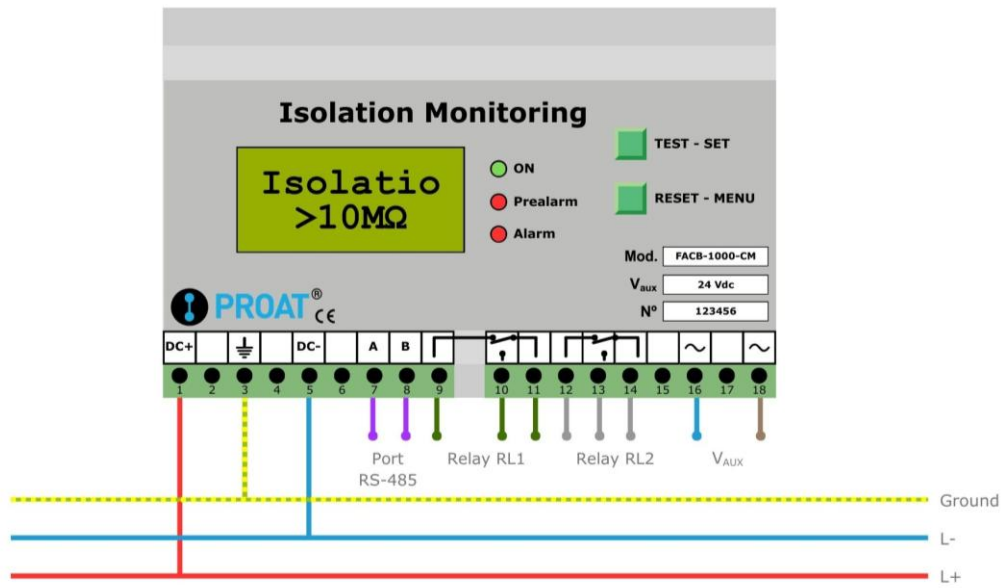
- 2 output relays with independent potential-free commuted contacts, with programmable actuation levels and timings: Pre-alarm and Alarm
- Programming adjustment values using the SET-MENU buttons on the front of the device:
 - Pre-alarm action level
 - Alarm action level
 - Pre-alarm timing
 - Alarm Timing
 - Automatic Reset Time
 - Alarm Memory – Yes/No
 - ID Modbus
 - Language: Spanish/English
- Real-time display of ground resistance measurement
- Front Display 2x8 characters
- **TEST** button to simulate ground fault (+) and (-)
- **RESET** button to restart the equipment and clear the fault
- LEDs to signal Pre-alarm and Alarm faults
- Electrically isolated RS-485 interface with Modbus-RTU protocol depending on the model:
 - Instant isolation measure
 - Relay Status
 - View ModBus map

Models

Model	Nominal Voltage U_N	Operating Range	Alarm level	Power Voltage	DIN size	Communications
FACB-600-CM	600 V _{DC}	180-600 V _{DC}	100 kΩ - 1 MΩ	86-264V _{AC} 96-370V _{DC}	6M - 106mm	ModBus-RTU
FACB-600-CM-24	600 V _{DC}	180-600 V _{DC}	100 kΩ - 1 MΩ	24 V _{DC}	6M - 106mm	ModBus-RTU
FACB-800-CM	800 V _{DC}	240-800 V _{DC}	100 kΩ - 1 MΩ	86-264V _{AC} 96-370V _{DC}	6M - 106mm	ModBus-RTU
FACB-800-CM-24	800 V _{DC}	240-800 V _{DC}	100 kΩ - 1 MΩ	24 V _{DC}	6M - 106mm	ModBus-RTU
FACB-1000-CM	1000 V _{DC}	300-1000 V _{DC}	100 kΩ - 1 MΩ	86-264V _{AC} 96-370V _{DC}	6M - 106mm	ModBus-RTU
FACB-1000-CM-24	1000 V _{DC}	300-1000 V _{DC}	100 kΩ - 1 MΩ	24 V _{DC}	6M - 106mm	ModBus-RTU
FACB-1500-CM	1500 V _{DC}	450-1500 V _{DC}	100 kΩ - 1 MΩ	86-264V _{AC} 96-370V _{DC}	9M - 160mm	ModBus-RTU
FACB-1500-CM-24	1500 V _{DC}	450-1500 V _{DC}	100 kΩ - 1 MΩ	24 V _{DC}	9M - 160mm	ModBus-RTU

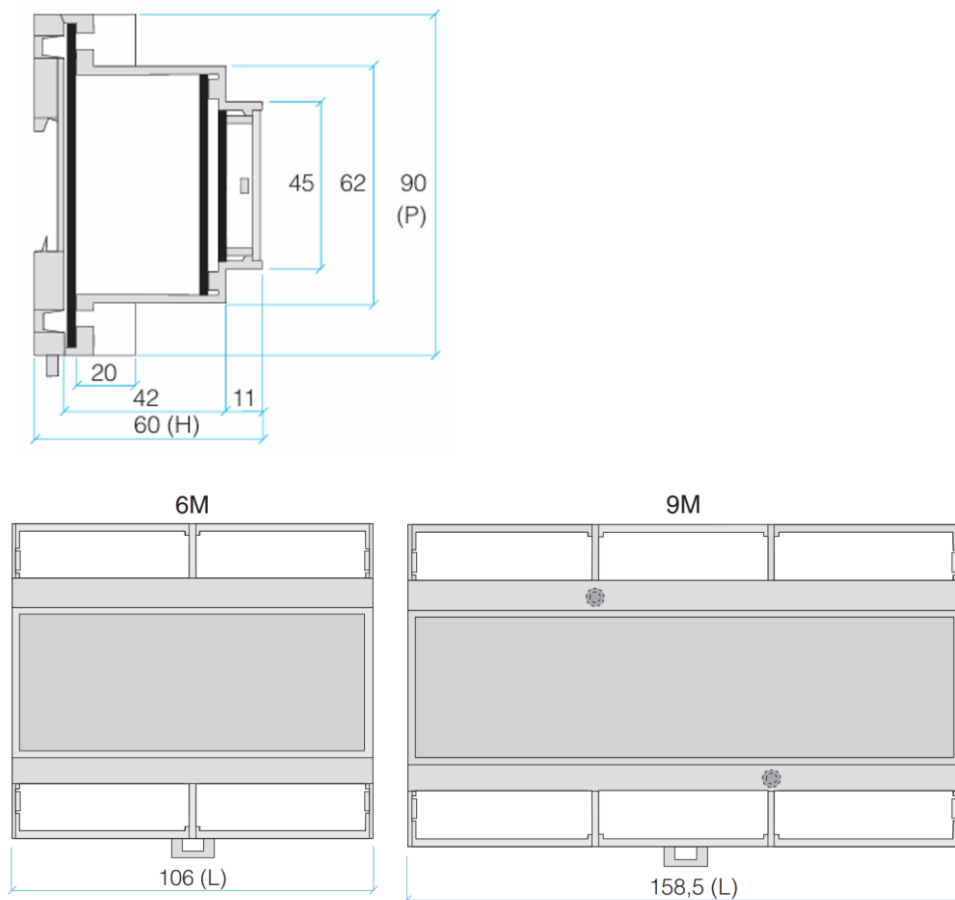
* Other models can be manufactured upon request

Wiring



Constructive Features

- DIN rail mounting
- Front plate terminals
- Class V0 self-extinguishing plastic enclosure



Technical Data

MODELO	FACB
Voltage Range	
Voltage Range U_N	$0,3 \cdot U_N - U_N$
	86 – 264 V _{AC}
Auxiliary Voltage V_{AUX}	96 – 307 V _{DC}
	24 V _{DC}
Consumption at rest	≤1W
Maximum consumption	≤12W
Response Values	
Pre-Alarm Level	1 - 8 MΩ
Alarm Level	100 kΩ - 1 MΩ
Measurement Range	1 kΩ - 10 MΩ
Measurement error	±10 %
Pre-alarm timing	10-30 s
Alarm Timing	10-30 s
Auto-Reset time	1-60 min
Factory settings	
Pre-Alarm Level	1 MΩ
Alarm Level	150 kΩ
Pre-alarm timing	10 seg.
Alarm Timing	5 seg.
Auto-Reset time	1 min.
ID Modbus	1
Alarm Memory	Si
Measuring Circuit	
Max voltage U_N	$U_N + 10\%$
Internal resistance R+	2,1 MΩ
Internal resistance R-	2,1 MΩ
Ground impedance	>750 KΩ
Max parasitic capacity	<5uF
Type of faults detected	Symmetrical and Asymmetrical
Front View	
ON	Green led
Pre-Alarm	Red led
Alarm	Red led
Test button	Si
Reset button	Si
Screen	LCD 2x8 charac.
Display	Isolation level
Dielectric Test	
V _{DC} Input – V _{AUX}	3k V _{RMS} – 1min
V _{DC} Input - Output Contacts	3k V _{RMS} – 1min
V _{AUX} – Output Contacts	3k V _{RMS} – 1min

Switching Elements	
Number of switching elements	2
Type of outputs	Switched contact
Voltage outputs	Voltage free
Max AC Load	250V _{AC} 2A
Max DC Load	300V _{DC} 0,1A
Switching time RL	< 10 ms
Number of cycles	20,000,000

General Data	
Operation mode	Continually
Mounting	DIN rail
Connection	Screw M2,5
Screw torque	≤0,4 Nm
Protection grade	IP20
Flammability class	UL94V-0
Weight	350 gr
Operating temperature	-5°C...+60°C
Storage temperature	-20°C...+80°C
Relative humidity (without condensation)	<95%
Setting values method	Front opening

Standards	
Electrical safety requirements	UNE-EN 61010-1
Electrical safety requirements	UNE-EN 61010-2-0081
Electromagnetic compatibility (EMC)	UNE-EN 61000-6-1
Electromagnetic compatibility (EMC)	UNE-EN 61000-6-3/A1
European Directive	2006/95/CE
European Directive	2004/108/CE
Standard	IEC-61557-8

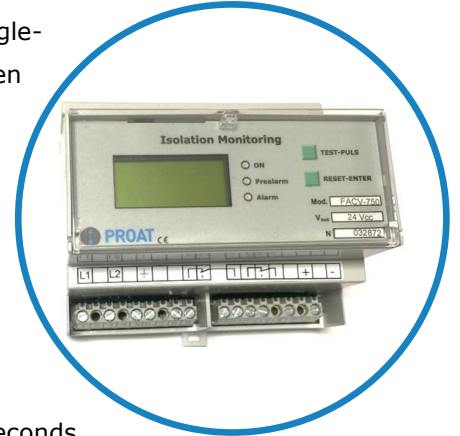
Communications	
Interface	RS-485
Protocol	ModBus-RTU
Port parameters	9600,8,0,1
ID ModBus	1-248
Available Features	3,4
Operation	Slave
Cable length (m)	<1200
Connection	Terminals A/B



AC Insolation Monitor

with Automatic Reset and Real-Time Display

- ✓ Detects **symmetrical and asymmetrical** insulation faults in single-phase and three-phase AC systems in any of the phases, or between the neutral point and ground.
- ✓ **2 independent potential-free output** commuted contacts, with programmable actuation levels and time delays: pre-alarm and alarm.
- ✓ **Pre-alarm:** actuation level of 50 - 100 k Ω and actuation delay of 10-30 seconds.
- ✓ **Alarm:** actuation level of 1 - 45 k Ω and actuation delay of 1-10 seconds
- ✓ Alarm with **automatic reset** configurable between 1-60 minutes
- ✓ **Real-time display** of the installation's isolation level. Measurement range: 1 k Ω - 1000 k Ω
- ✓ For IT systems from **115VAC - 7200VAC** depending on model and coupler
- ✓ **Modbus** Communications



Applications

Monitoring of possible isolation failures in AC systems isolated from IT ground:

- Railway Facilities
- Power Plants
- Mobile Power Generators
- Lighting Installations
- Elevators



Function Features

- 2 output relays with independent potential-free commuted contacts, with programmable actuation levels and timings: Pre-alarm and Alarm.
- Programming adjustment values using the **SET-MENU** buttons on the front of the device:
 - Pre-alarm action level
 - Alarm action level
 - Pre-alarm time delay
 - Alarm time delay
 - Automatic reset time
 - Alarm memory – Yes/No
 - Modbus ID
 - Language: Spanish/English
- Real-time display of ground resistance measurements
- 2x8-character front display
- **TEST** button to simulate ground faults (+) and (-)
- **RESET** button to reset the device and clear the fault
- LEDs to signal pre-alarm and alarm faults
- Electrically isolated RS-485 interface with Modbus-RTU protocol, depending on the model:
 - Instantaneous isolation measurement
 - Relay status
 - View ModBus map

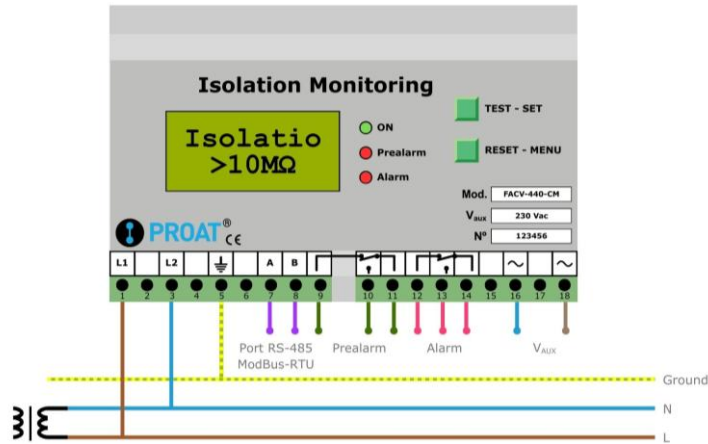
Models

Model	Nominal Voltage U_N	Operating Range	Alarm Level	Power Voltage	DIN Size	Communications
FACV-115-M	115 V _{AC}	0-115 V _{AC}	50-150kΩ y 5-45kΩ	60-264V _{AC} 80-300V _{DC}	9M - 160mm	ModBus-RTU
FACV-115-M-24	115 V _{AC}	0-115 V _{AC}	50-150kΩ y 5-45kΩ	24 V _{DC}	9M - 160mm	ModBus-RTU
FACV-230-M	230 V _{AC}	0-230 V _{AC}	50-150kΩ y 5-45kΩ	60-264V _{AC} 80-300V _{DC}	9M - 160mm	ModBus-RTU
FACV-230-M-24	230 V _{AC}	0-230 V _{AC}	50-150kΩ y 5-45kΩ	24 V _{DC}	9M - 160mm	ModBus-RTU
FACV-440-M	440 V _{AC}	0-440 V _{AC}	50-150kΩ y 5-45kΩ	60-264V _{AC} 80-300V _{DC}	9M - 160mm	ModBus-RTU
FACV-440-M-24	440 V _{AC}	0-440 V _{AC}	50-150kΩ y 5-45kΩ	24 V _{DC}	9M - 160mm	ModBus-RTU
FACV-750-M	750 V _{AC}	0-750 V _{AC}	50-150kΩ y 5-45kΩ	60-264V _{AC} 80-300V _{DC}	9M - 160mm	ModBus-RTU
FACV-750-M-24	750 V _{AC}	0-750 V _{AC}	50-150kΩ y 5-45kΩ	24 V _{DC}	9M - 160mm	ModBus-RTU
FACV-440E-M + AC-1000	1000 V _{AC}	0-1000 V _{AC}	50-150kΩ y 5-45kΩ	60-264V _{AC} 80-300V _{DC}	9M - 160mm + Coupler	ModBus-RTU
FACV-440E-M-24 + AC-1000	1000 V _{AC}	0-1000 V _{AC}	50-150kΩ y 5-45kΩ	24 V _{DC}	9M - 160mm + Coupler	ModBus-RTU
FACV-440S-M + ADP-4200	7200 V _{AC}	0-7200 V _{AC}	50-150kΩ y 5-45kΩ	60-264V _{AC} 80-300V _{DC}	9M - 160mm + Coupler	ModBus-RTU
FACV-440S-M-24 + ADP-4200	7200 V _{AC}	0-7200 V _{AC}	50-150kΩ y 5-45kΩ	24 V _{DC}	9M - 160mm + Coupler	ModBus-RTU
FACV-440S-M + ADP-7200	1000 V _{AC}	0-1000 V _{AC}	50-150kΩ y 5-45kΩ	60-264V _{AC} 80-300V _{DC}	9M - 160mm + Coupler	ModBus-RTU
FACV-440S-M-24 + ADP-7200	1000 V _{AC}	0-1000 V _{AC}	50-150kΩ y 5-45kΩ	24 V _{DC}	9M - 160mm + Coupler	ModBus-RTU

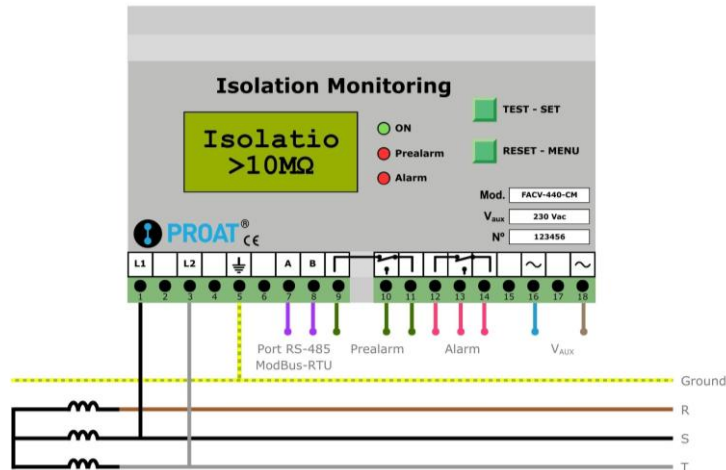
* Other models can be manufactured upon request

Wiring FACV

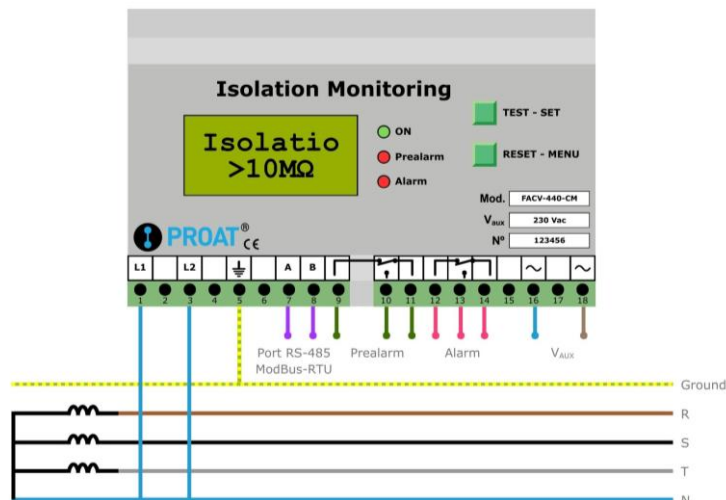
- Single-phase



- Three-phase without neutral

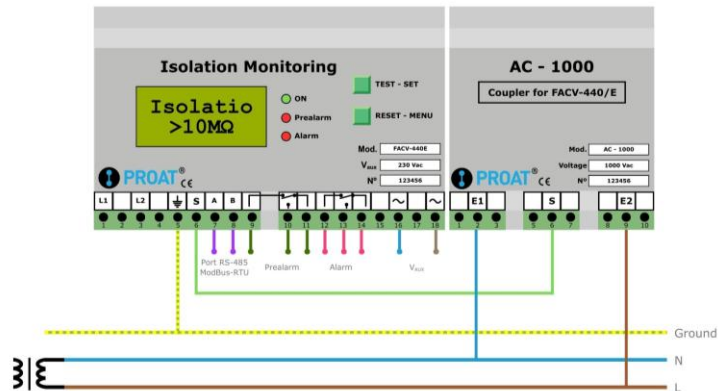


- Three-phase with neutral

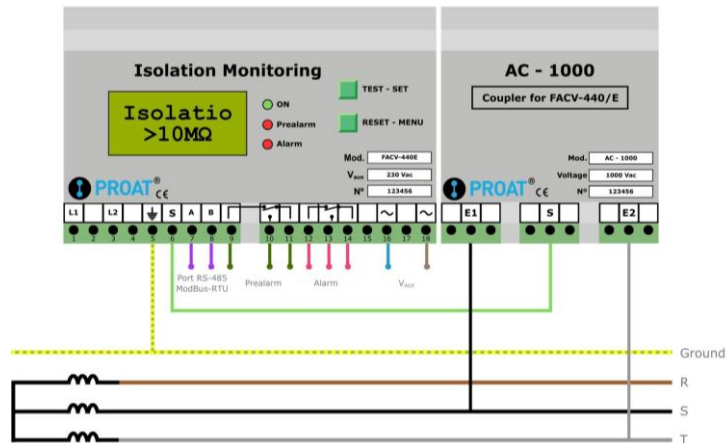


Wiring FACV + AC-1000

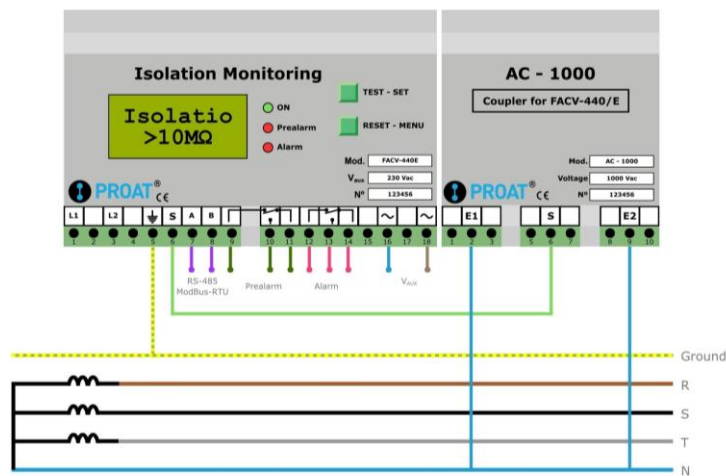
- Single-phase



- Three-phase without neutral

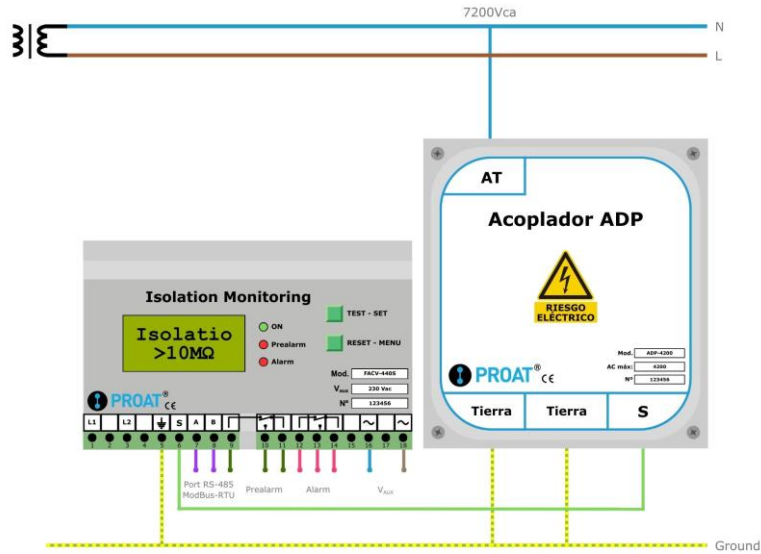


- Three-phase with neutral



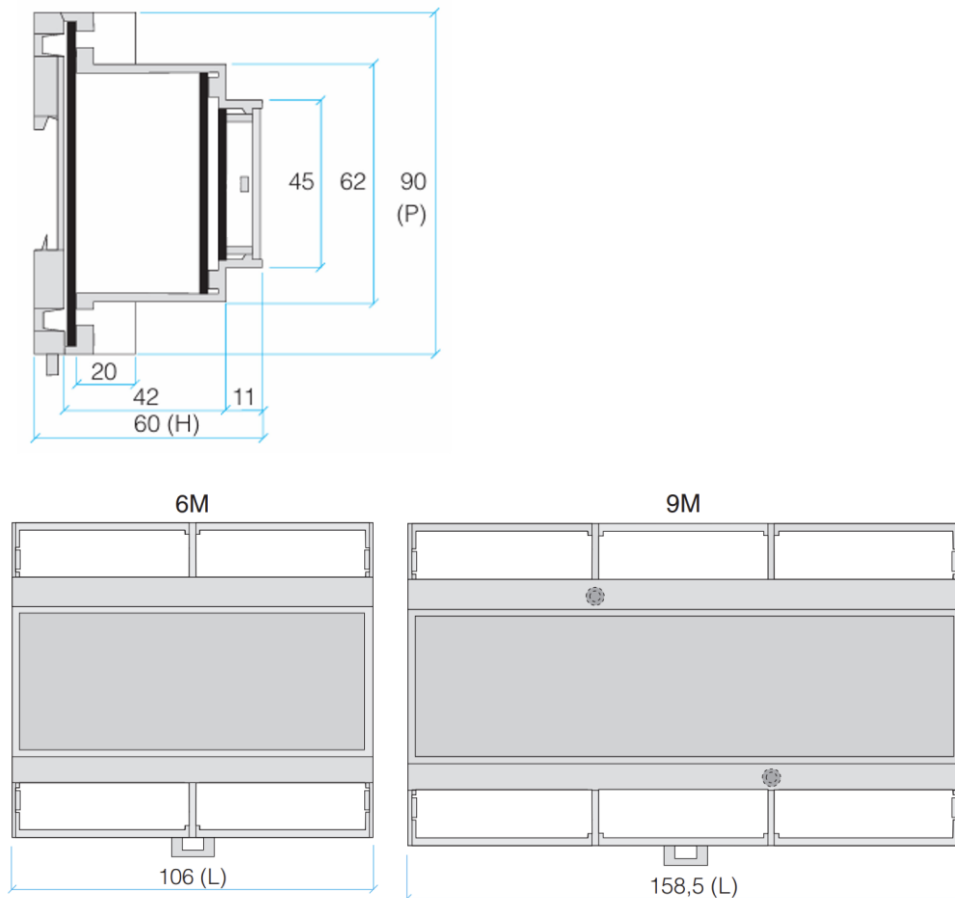
❶ Wiring FACV + AC-4200/7200

- Single-phase



❷ Constructive Features

- DIN rail mounting
- Front plate terminals
- Class VO self-extinguishing plastic enclosure



Technical Data

MODEL	FACV
Voltage Range	
Voltage range U_N	0 - $U_N V_{AC}$
Nominal frequency F_N	40-300Hz
Auxiliary voltage V_{AUX}	60 – 264 V_{AC} 80 – 300 V_{DC} 24 V_{DC}
Consumption at rest	≤6W
Maximum consumption	≤12W
Response Values	
Pre-alarm level	50 kΩ - 150 kΩ
Alarm level	1 kΩ - 45 kΩ
Measurement range	1 kΩ - 1000 kΩ
Measurement error 1-10 kΩ/10-200 kΩ	±1 kΩ / ±10%
Hysteresis	25%
Response time with $R_F=0,5 \cdot R_{AL}$	≤5 s
Pre-alarm time delay	10-30 s
Alarm time delay	1-10 s
Reset time	1-60 min
Factory settings	
Pre-alarm level	100 kΩ
Alarm level	10 kΩ
Pre-alarm time delay	10 seg.
Alarm time delay	5 seg.
Reset time	1 min
Modbus ID	1
Alarm memory	No
Language	ESP
Measuring Circuit	
Measurement voltage	+12 V_{DC}
Internal resistance	>132 kΩ
Impedance at 50Hz	>132 kΩ
Measurement current with $R_F=0$	≤300μA
Parasitic capacity	<5uF
Type of faults detected	Symmetrical and Asymmetrical
Vista Frontal	
ON	Green Led
Fault (+)	Red Led
Fault (-)	Red Led
Test button	Yes
Reset button	Yes
Screen	LCD 2x8 charac.
Dielectric Test	
V_{DC} Input – V_{AUX}	3k V_{RMS} – 1min
V_{DC} Input - Output Contacts	3k V_{RMS} – 1min
V_{AUX} – Output Contacts	3k V_{RMS} – 1min

Switching Elements	
Number of switching elements	2
Type of outputs	Switched relay
Voltage outputs	Voltage free
Max AC load	250 V_{AC} 2A
Max DC load	300 V_{DC} 0,1A
Switching time R_L	< 10 ms
Number of cycles	20,000,000

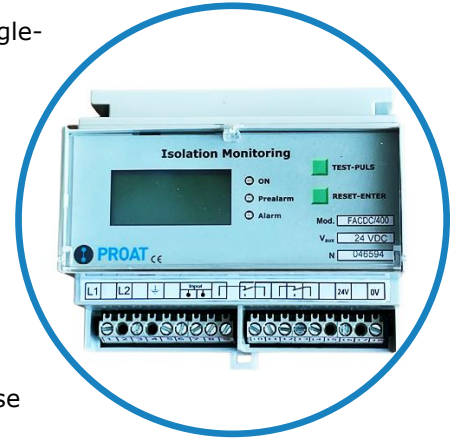
General Data	
Operation mode	Continually
Mounting	DIN rail
Connection	Screw M2,5
Screw torque	≤0,4 Nm
Protection grade	IP20
Flammability class	UL94V-0
Weight	350 gr
Operating temperature	-5°C...+60°C
Storage temperature	-20°C...+80°C
Relative humidity (without condensation)	<95%
Setting values method	Front opening

Standards	
Electrical safety requirements	UNE-EN 61010-1
Electrical safety requirements	UNE-EN 61010-2-0081
Electromagnetic compatibility (EMC)	UNE-EN 61000-6-1
Electromagnetic compatibility (EMC)	UNE-EN 61000-6-3/A1
European directive	2006/95/CE
European directive	2004/108/CE
Standard	IEC-61557-8

Communications	
Interface	RS-485
Protocol	ModBus-RTU
Port parameters	9600,8,0,1
ID ModBus	1-248
Available features	3,4
Operation	Slave
Cable length (m)	<1200
Connection	Terminals A/B

 FACDC
AC+DC Insolation Monitor
with Automatic Reset and Real-Time Display

- ✓ Detects **symmetrical and asymmetrical** isolation faults in single-phase and three-phase AC+DC systems in any of the phases or between the neutral and ground points
- ✓ **Two** independent potential-free output **commuted contacts**, with programmable actuation levels and time delays: pre-alarm and alarm
- ✓ **NA or NC contacts**. Selectable forward/reverse logic
- ✓ **Pre-alarm**: threshold adjustable from 50 to 150 k Ω and response time delay from 10 to 30 seconds
- ✓ **Alarm**: threshold adjustable from 5 to 45 k Ω and response time delay from 1 to 10 seconds
- ✓ **Automatic reset** when measurements are within normal parameters and there is no insulation fault
- ✓ **Real-time display** of the installation's isolation level. Measurement range between 1 k Ω - 3000 k Ω depending on the model
- ✓ **Programmable maximum parasitic capacitance**, up to 20 μ F and up to 500 μ F in GN versions
- ✓ **External input** to activate/deactivate the device in GN versions
- ✓ For IT systems up to **1000 V_{AC} – 1500 V_{DC}** depending on the model
- ✓ **Modbus** communications



Applications

Monitoring of possible isolation faults in AC+DC systems isolated from IT ground:

- Photovoltaic Installations (Inverters)
- Power Plants
- Rectifier Systems
- Lighting Installations
- AC+DC Auxiliary Power Systems



Function Features

- 2 output relays with independent potential-free commuted contacts, with programmable actuation levels and timings: Pre-alarm and Alarm.
- Programming adjustment values using the **SET-MENU** buttons on the front of the device:
 - Pre-alarm action level
 - Alarm action level
 - Pre-alarm time delay
 - Alarm time delay
 - Automatic reset time
 - Parasitic capacity
 - Alarm memory – Yes/No
 - Modbus ID
 - Language: Spanish/English
- Real-time display of ground resistance measurements
- 2x8-character front display
- **TEST** button to simulate ground faults (+) and (-)
- **RESET** button to reset the device and clear the fault
- LEDs to signal pre-alarm and alarm faults
- Electrically isolated RS-485 interface with Modbus-RTU protocol, depending on the model:
 - Instantaneous isolation measurement
 - Relay status
 - View ModBus map



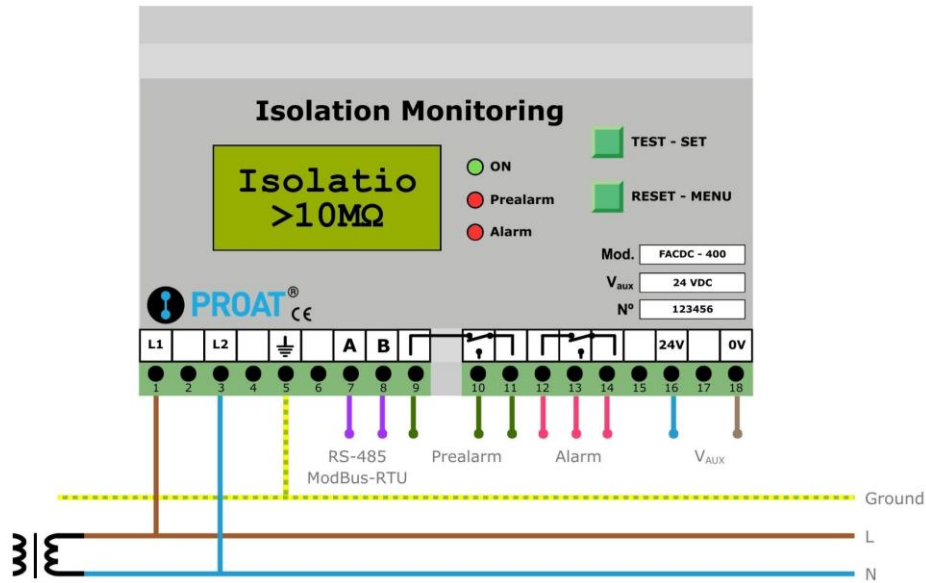
Models

Model	Nominal Voltage U_N	Operating Range	Alarm Level	Power Voltage	DIN Size	Communications
FACDC-250	250 V _{AC} 400V _{DC}	0-250 V _{AC} 0-400 V _{DC}	50-150kΩ y 5-45kΩ	86-264 V _{AC} 90-370 V _{DC}	6M - 106mm	-
FACDC-250-M	250 V _{AC} 400V _{DC}	0-250 V _{AC} 0-400 V _{DC}	50-150kΩ y 5-45kΩ	86-264 V _{AC} 90-370 V _{DC}	6M - 106mm	ModBus-RTU
FACDC-250-24	250 V _{AC} 400V _{DC}	0-250 V _{AC} 0-400 V _{DC}	50-150kΩ y 5-45kΩ	24 V _{DC}	6M - 106mm	-
FACDC-250-M-24	250 V _{AC} 400V _{DC}	0-250 V _{AC} 0-400 V _{DC}	50-150kΩ y 5-45kΩ	24 V _{DC}	6M - 106mm	ModBus-RTU
FACDC-400	400 V _{AC} 600V _{DC}	0-400 V _{AC} 0-600 V _{DC}	50-150kΩ y 5-45kΩ	86-264 V _{AC} 90-370 V _{DC}	6M - 106mm	-
FACDC-400-M	400 V _{AC} 600V _{DC}	0-400 V _{AC} 0-600 V _{DC}	50-150kΩ y 5-45kΩ	86-264 V _{AC} 90-370 V _{DC}	6M - 106mm	ModBus-RTU
FACDC-400-24	400 V _{AC} 600V _{DC}	0-400 V _{AC} 0-600 V _{DC}	50-150kΩ y 5-45kΩ	24 V _{DC}	6M - 106mm	-
FACDC-400-M-24	400 V _{AC} 600V _{DC}	0-400 V _{AC} 0-600 V _{DC}	50-150kΩ y 5-45kΩ	24 V _{DC}	6M - 106mm	ModBus-RTU
FACDC-700-GN	700 V _{AC} 1000V _{DC}	0-700 V _{AC} 0-1000 V _{DC}	50-150kΩ y 5-45kΩ	86-264 V _{AC} 90-370 V _{DC}	9M - 160mm	ModBus-RTU
FACDC-700-GN-24	700 V _{AC} 1000V _{DC}	0-700 V _{AC} 0-1000 V _{DC}	50-150kΩ y 5-45kΩ	24 V _{DC}	9M - 160mm	ModBus-RTU
FACDC-800-GN	800 V _{AC} 1500V _{DC}	0-800 V _{AC} 0-1500 V _{DC}	50-150kΩ y 5-45kΩ	86-264 V _{AC} 90-370 V _{DC}	9M - 160mm	ModBus-RTU
FACDC-800-GN-24	800 V _{AC} 1500V _{DC}	0-800 V _{AC} 0-1500 V _{DC}	50-150kΩ y 5-45kΩ	24 V _{DC}	9M - 160mm	ModBus-RTU
FACDC-1000-GN	1000 V _{AC} 1500V _{DC}	0-1000 V _{AC} 0-1500 V _{DC}	50-150kΩ y 5-45kΩ	86-264 V _{AC} 90-370 V _{DC}	9M - 160mm	ModBus-RTU
FACDC-1000-GN-24	1000 V _{AC} 1500V _{DC}	0-1000 V _{AC} 0-1500 V _{DC}	50-150kΩ y 5-45kΩ	24 V _{DC}	9M - 160mm	ModBus-RTU

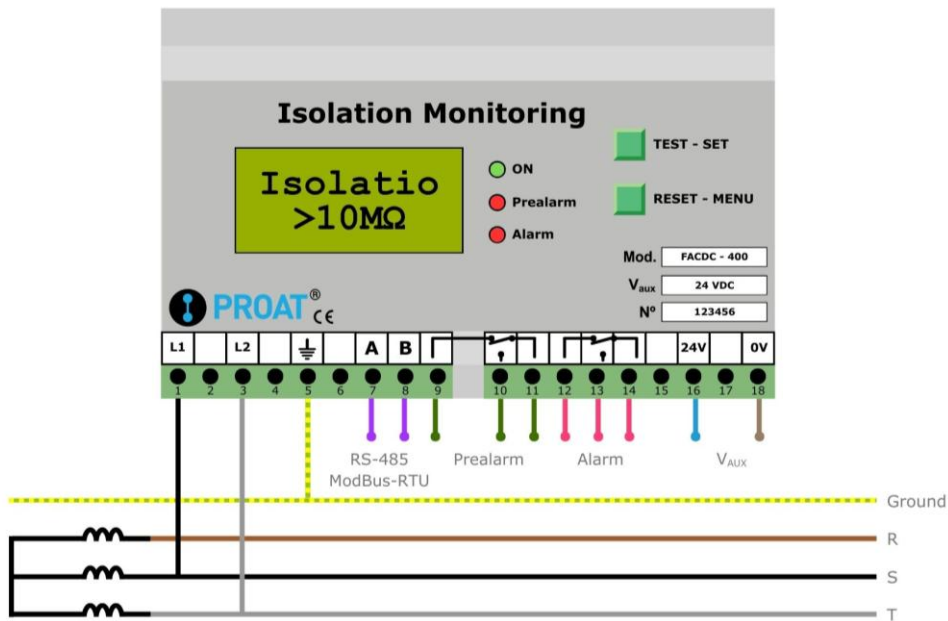
*Other models can be manufactured upon request

Wiring

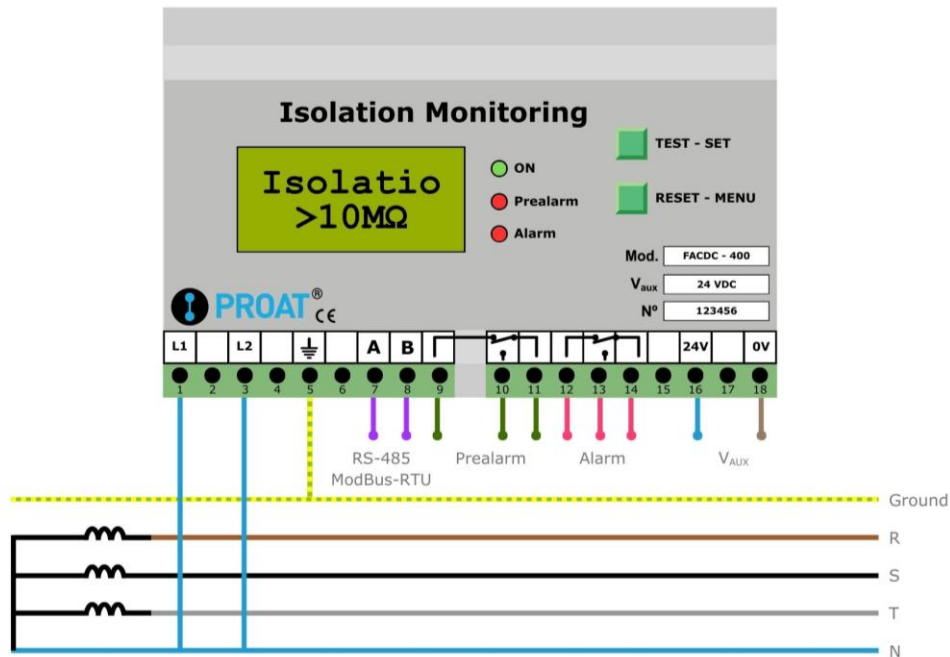
- Single-phase



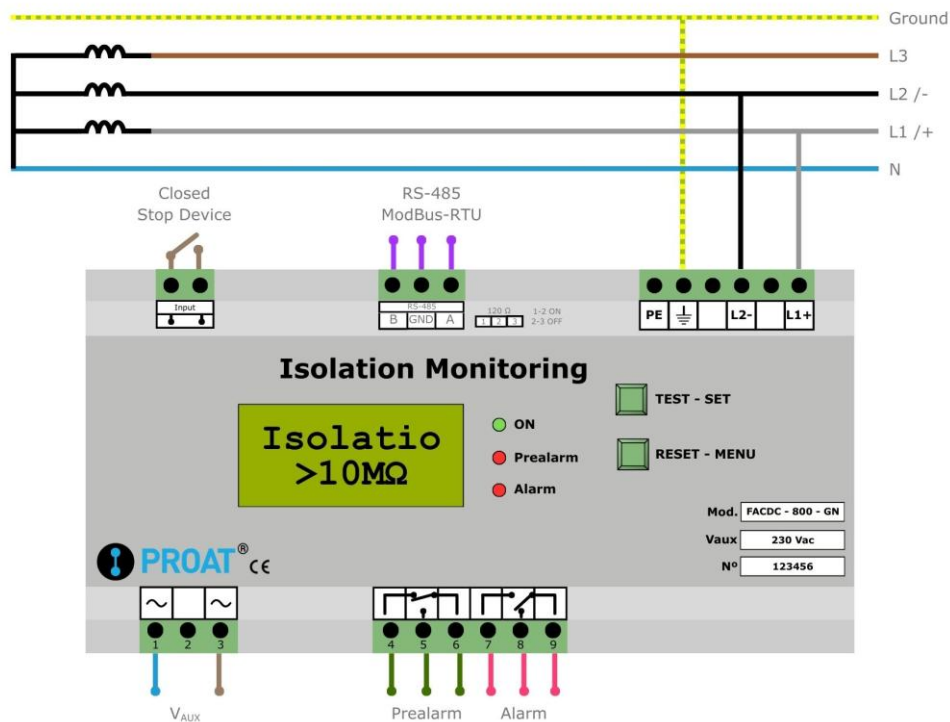
- Three-phase without neutral



- Three-phase with neutral

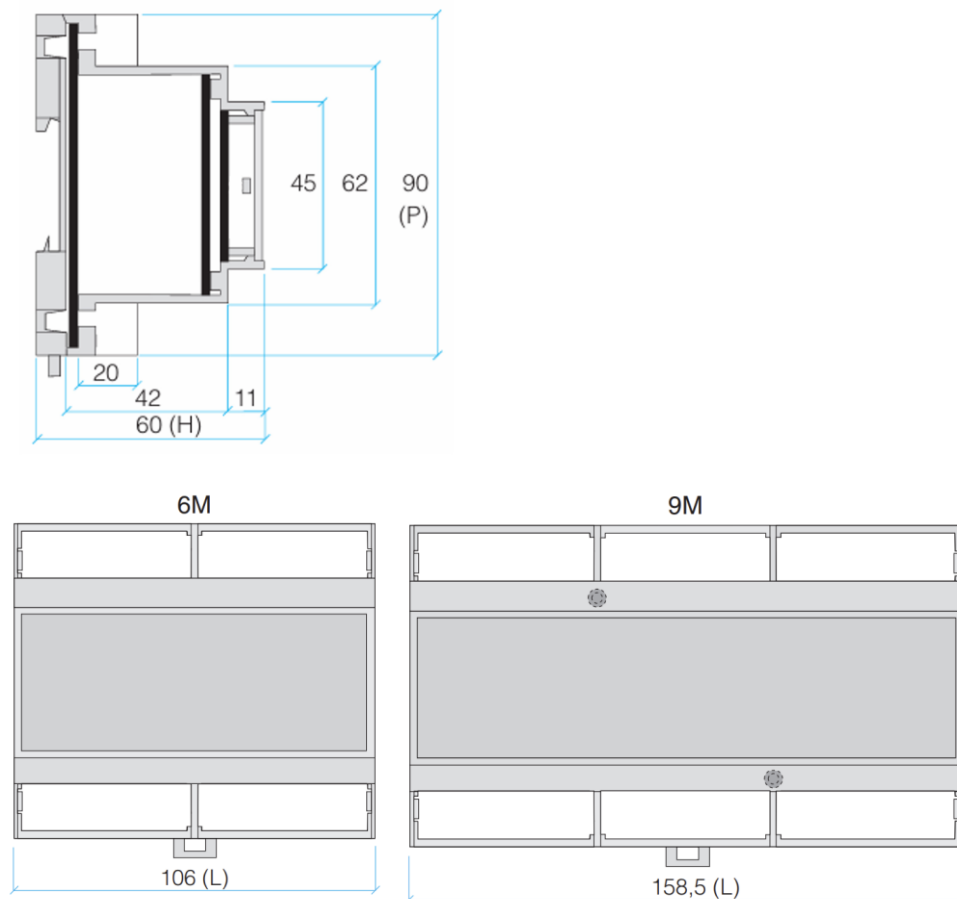


- GN Version



❶ Constructive Features

- DIN rail mounting
- Front plate terminals
- Class V0 self-extinguishing plastic enclosure



Technical Data

MODEL	FACDC	GN Version
Voltage Range		
Voltage range U_N	0 - $U_N V_{AC}$	
Nominal frequency F_N	0-300Hz	
Auxiliary voltage V_{AUX}	$86 - 264 V_{AC}$	
	$90 - 370 V_{DC}$	
	$24 V_{DC}$	
Consumption at rest	$\leq 6W$	
Maximum consumption	$\leq 12W$	
Response Values		
Pre-alarm level	50 k Ω - 150 k Ω	
Alarm level	5 k Ω - 45 k Ω	
Measurement range	1 k Ω - 1 M Ω	1 k Ω - 3 M Ω
Measurement error 1-10 k Ω /10-200 k Ω	± 1 k Ω / $\pm 10\%$	
Hysteresis	25%	
Response time with $R_F=0,5 \cdot R_{AL}$	≤ 5 s	
Pre-alarm time delay	10-30 s	
Alarm time delay	1-10 s	
Reset time	1-60 min	
Factory settings		
Pre-alarm level	100 k Ω	
Alarm level	10 k Ω	
Pre-alarm time delay	10 s	
Alarm time delay	5 s	
Reset time	1 min	
Modbus ID	1	
Alarm memory	YES	
Language	ESP	
Parasitic capacity	1 μF	
Measuring Circuit		
Measurement voltage	$\pm 15 V_{DC}$	$\pm 24 V_{DC}$
Internal resistance	> 196 k Ω	> 294 k Ω
Impedance at 50Hz	> 196 k Ω	> 294 k Ω
Measurement current with $R_F=0$	≤ 2600 μA	
Parasitic capacitance	< 20 μF	< 500 μF
Type of faults detected	Symmetrical and Asymmetrical	
Front View		
ON	Green Led	
Fault (+)	Red Led	
Fault (-)	Red Led	
Test button	Yes	
Reset button	Yes	
Screen	LCD 2x8 charac.	
Dielectric Test		
V_{DC} Input – V_{AUX}	3k V_{RMS} – 1min	
V_{DC} Input - Output Contacts	3k V_{RMS} – 1min	
V_{AUX} – Output Contacts	3k V_{RMS} – 1min	

Switching elements	
Number of switching elements	2
Type of outputs	Switched relay
Voltage outputs	Voltage free
Max AC load	250 V_{AC} 2A
Max DC load	300 V_{DC} 0,1A
Switching time R_L	< 10 ms
Number of cycles	20,000,000

General Data	
Continually	Continually
Mounting	DIN rail
Connection	Screw M2,5
Screw torque	$\leq 0,4$ Nm
Protection grade	IP20
Flammability class	UL94V-0
Weight	350 gr
Operating temperature	-5°C...+60°C
Storage temperature	-20°C...+80°C
Relative humidity (without condensation)	$< 95\%$
Setting values method	Front opening

Standards	
Electrical safety requirements	UNE-EN 61010-1
Electrical safety requirements	UNE-EN 61010-2-0081
Electromagnetic compatibility (EMC)	UNE-EN 61000-6-1
Electromagnetic compatibility (EMC)	UNE-EN 61000-6-3/A1
European directive	2006/95/CE
European directive	2004/108/CE
Standard	IEC-61557-8

Communications	
Interface	RS-485
Protocol	ModBus-RTU
Port parameters	9600,8,N,1
ID ModBus	1-248
Available features	3,4
Operation	Slave
Cable length (m)	< 1200
Connection	Terminals A/B

External Input Blocking	
Activation	Closed contact
Deactivation	Open contact

FACDC-2M

AC+DC Insolation Monitor with Dual Monitoring with Automatic Reset and Real-Time Display

- ✓ Detects **symmetrical and asymmetrical** isolation faults in single-phase and three-phase AC+DC systems on both sides of the switch
- ✓ **2 independent potential-free** commuted contacts with programmable trip levels and time delays: Alarm M1 and Alarm M2
- ✓ **Alarm M1:** threshold adjustable from 5 to 1000 kΩ and response time delay from 10 to 30 seconds
- ✓ **Alarm M2:** threshold adjustable from 5 to 1000 kΩ and response time delay from 10 to 30 seconds
- ✓ **Automatic reset** when measurements are within normal parameters and there is no insulation fault
- ✓ **Real-time display** of the installation's isolation level. Measuring range: 1 kΩ - 2000 kΩ
- ✓ **Switch status** displayed on the device screen
- ✓ For IT systems up to **800 V_{AC} – 1500 V_{DC}**, depending on the model
- ✓ **Modbus** Communications



Applications

Monitoring of possible isolation failures in AC+DC systems isolated from IT ground:

- Photovoltaic Installations (Inverters)
- Power Plants
- Rectifier Systems
- Lighting Installations
- AC+DC Auxiliary Power Systems



6 Function Features

- 2 output relays with independent potential-free commuted contacts, with programmable actuation levels and timings: Alarm M1 and Alarm M2.
- Programming adjustment values using the **SET-MENU** buttons on the front of the device:
 - Alarm M1 Actuation Level
 - Alarm M2 Actuation Level
 - Alarm M1 Time Delay
 - Alarm M2 Time Delay
 - Automatic reset time
 - Parasitic Capacity
 - Alarm memory – Yes/No
 - Modbus ID
 - Language: Spanish/English
- Real-time display of ground resistance measurements
- 2x8-character front display
- **TEST** button to simulate ground faults (+) and (-)
- **RESET** button to reset the device and clear the fault
- LEDs to signal Alarm M1 and Alarm M2 faults
- Electrically isolated RS-485 interface with Modbus-RTU protocol, depending on the model:
 - Configured Parameters
 - Instantaneous insulation measurement
 - Relay status
 - View ModBus map

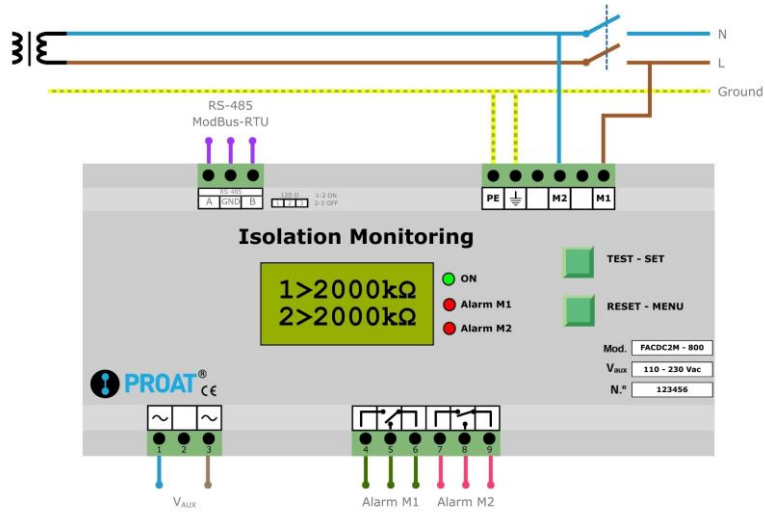
6 Models

Model	Nominal Voltage U_N	Operating Range	Alarm Level	Power Voltage	DIN Size	Communications
FACDC-2M-700	700 V _{AC} 1080 V _{DC}	0-700 V _{AC} 0-1080 V _{DC}	5-1000 kΩ y 5-1000 kΩ	86-264V _{AC} 90-370V _{DC}	9M - 160mm	ModBus-RTU
FACDC-2M-700-24	700 V _{AC} 1080 V _{DC}	0-700 V _{AC} 0-1080 V _{DC}	5-1000 kΩ y 5-1000 kΩ	24 V _{DC}	9M - 160mm	ModBus-RTU
FACDC-2M-800	800 V _{AC} 1500 V _{DC}	0-800 V _{AC} 0-1500 V _{DC}	5-1000 kΩ y 5-1000 kΩ	86-264V _{AC} 90-370V _{DC}	9M - 160mm	ModBus-RTU
FACDC-2M-800-24	800 V _{AC} 1500 V _{DC}	0-800 V _{AC} 0-1500 V _{DC}	5-1000 kΩ y 5-1000 kΩ	24 V _{DC}	9M - 160mm	ModBus-RTU

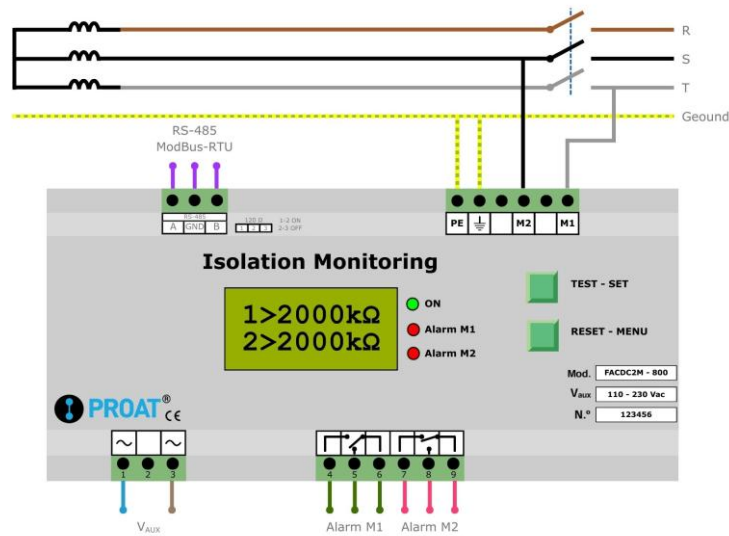
* Other models can be manufactured upon request.

Wiring

- Single phase

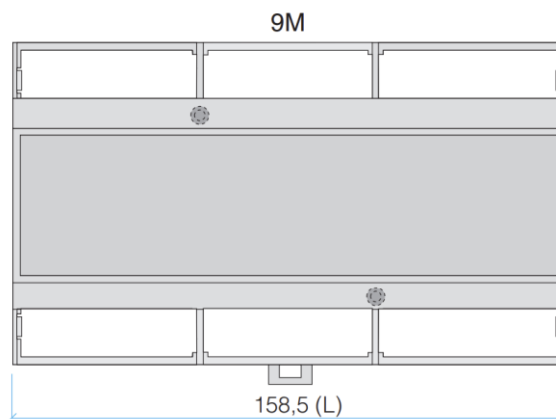
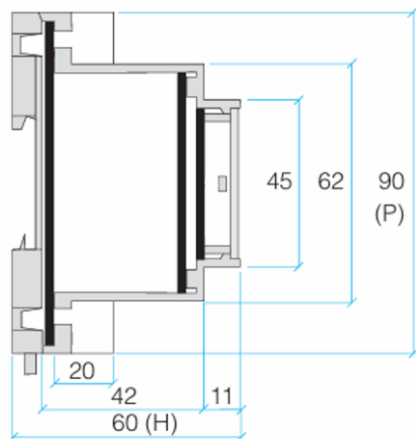


- Three-phase



Constructive Features

- DIN rail mounting
- Front plate terminals
- Class V0 self-extinguishing plastic enclosure



Technical Data

MODEL	FACDC-2M
Voltage Range	
Voltage range U_N	0 - $U_N V_{AC}$
Nominal frequency F_N	0-300Hz
Auxiliary voltage V_{AUX}	86 – 264 V_{AC} 90 – 370 V_{DC} 24 V_{DC}
Consumption at rest	≤6W
Maximum consumption	≤20W
Response Values	
Alarm Level M1	5 kΩ - 1000 kΩ
Alarm Level M2	5 kΩ - 1000 kΩ
Measurement Range	1 kΩ – 2000 kΩ
Measurement Error 1-10 kΩ/10-200 kΩ	±1 kΩ / ±10%
Hysteresis	25%
Response Time with $R_F=0.5 \cdot R_{AL}$ $C_p=1 \mu F$	≤10 s
Response Time with $R_F=0.5 \cdot R_{AL}$ $C_p=20 \mu F$	≤60 s
Alarm Time Delay M1	10-30 s
Alarm Time Delay M2	10-30 s
Reset Time	1-60 min
Factory settings	
Alarm Level M1	100 kΩ
Alarm Level M2	100 kΩ
Alarm Time Delay M1	10 s
Alarm Time Delay M2	10 s
Reset time	1 min
Modbus ID	1
Alarm memory	No
Language	ESP
Parasitic capacity	1 μF
Measuring Circuit	
Measurement voltage	±24 V_{DC}
Internal resistance	>392 kΩ
Impedance at 50Hz	>392 kΩ
Measurement current with $R_F=0$	≤2600 μA
Parasitic capacitance	<20 μF
Type of faults detected	Symmetrical and Asymmetrical
Front View	
ON	Green Led
Fault (+)	Red Led
Fault (-)	Red Led
Test button	Yes
Reset button	Yes
Screen	LCD 2x8 charac.
Dielectric Test	
V_{DC} Input – V_{AUX}	3k V_{RMS} – 1min
V_{DC} Input - Output Contacts	3k V_{RMS} – 1min
V_{AUX} – Output Contacts	3k V_{RMS} – 1min

Switching elements	
Number of switching elements	2
Type of outputs	Switched relay
Voltage outputs	Voltage free
Max AC load	250 V_{AC} 2A
Max DC load	300 V_{DC} 0,1A
Switching time RL	< 10 ms
Number of cycles	20,000,000
General Data	
Continually	Continually
Mounting	DIN rail
Connection	Screw M2,5
Screw torque	≤0,4 Nm
Protection grade	IP20
Flammability class	UL94V-0
Weight	350 gr
Operating temperature	-5°C...+60°C
Storage temperature	-20°C...+80°C
Relative humidity (without condensation)	<95%
Setting values method	Front opening
Standards	
Electrical safety requirements	UNE-EN 61010-1
Electrical safety requirements	UNE-EN 61010-2-0081
Electromagnetic compatibility (EMC)	UNE-EN 61000-6-1
Electromagnetic compatibility (EMC)	UNE-EN 61000-6-3/A1
European directive	2006/95/CE
European directive	2004/108/CE
Standard	IEC-61557-8
Communications	
Interface	RS-485
Protocol	ModBus-RTU
Port parameters	9600,8,N,1
ID ModBus	1-248
Available features	3,4
Operation	Slave
Cable length (m)	<1200
Connection	Terminals A/B