



# PROTECTION RELAYS

## DC-PRO

### Protection, control and communication relay for DC substation

DC-PRO is the most complete protection unit able to monitor, protect and control DC substations. It can be used in railway and underground systems together with High Speed Circuit Breaker (HSCB) and measurement transducers.

The protection unit is able to measure current and voltage through current and voltage transducers. Using Microelettrica MHIT transducer is possible to send current and voltage data through fiber optic cable guaranteeing complete electrical isolation. Thanks to the DC-PRO platform flexibility the current measurement can be obtain also using a third-party transducers with a proper isolation capability.

#### IEC61850

Real time values can be read through a display (optional), serial port or ethernet based protocol including IEC61850.

Relay parameters can be programmed with the touch screen HMI (Human Machine Interface) or through the pc using the communication with the unit. Programming logic can help the user to create logic operations through physical inputs, logical variables and outputs.

DC PRO could be mounted in different position and with different configurations:

- Relay Main Body part only, installed inside the switchboard without HMI.
- Front door HMI with the external display directly connected with the RMB.
- Front door HMI with remote connection to one RMB (one to one)
- Front door HMI with remote connection to several RMB (one to many)



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### PLC functionality

Intertripping function could be programmed and used in order to generate and acquire signal through other substations. It is possible to configure intertripping input/output with physical contact or with digital GOOSE messages for IEC61850 protocol.

### Main protections and features

- 4 independent setting groups
- Thermal image protection
- 4 overcurrent protections
- 2 current jump protections (function of di/dt)
- 2 di/dt protections
- 1 minimum impedance protection (function of di/dt)
- 1 overcurrent protection (function of di/dt)
- 2 ground fault voltage and current protections
- 4 automatic reclosures
- 2 undervoltage protections
- Programmable automatic line test (single or double voltage)
- Impulse energy counters
- Circuit breaker lock
- 4 remote tripping functions

### Control

- Opening circuit breaker supervision
- Breaker command (Open/Close)
- Breaker failure
- Maintenance parameter detection (mechanical operations, arc contact...)

### Communications

- Dedicated operating system with an higher level of cyber security
- Modbus RTU and TCP (ethernet based) and IEC870-5-103 (serial based RS485).
- Dedicated RS485 serial port for display communication
- IEC61850 Rev.2, Modbus TCP-IP, time sync (NTP), remote file transfer (FTP), web server
- 3 different RJ45 Ethernet port able to handle all the protocol for SCADA and redundancy
- USB Device 2.0 front connection for relay programming through configuration software
- USB Host 2.0 front connection for USB stick.

### External supply

- Type 1: 24VAC(-20%)-110VAC(+15%), 24VDC(-20%)-125VDC (+20%)
- Type 2: 80VAC(-20%)-220VAC(+15%), 90VAC(-20%)-250VAC(+20%)

### Recordings

- Event recording, rising or falling signals
- Event recording for protection tripping
- Waveform capture of input analog signals with programmable trigger
- Possibility to save event and waveforms on internal hard drive or USB stick
- Possibility to save waveform in COMTRADE format on internal hard drive

### Technical characteristics

- Touch panel 7" for DC-PRO settings, measurement and waveform view
- Multi languages
- 10 programmable LEDs for signalling
- 16 programmable signalling relays
- 24 programmable digital inputs (for standard version, up to 44 for extended version)

### Dimensions



DC-PRO relay main body (WxHxD):

275x110x190 (mm)

DC-PRO HMI (WxHxD): 280x180x33 (mm)

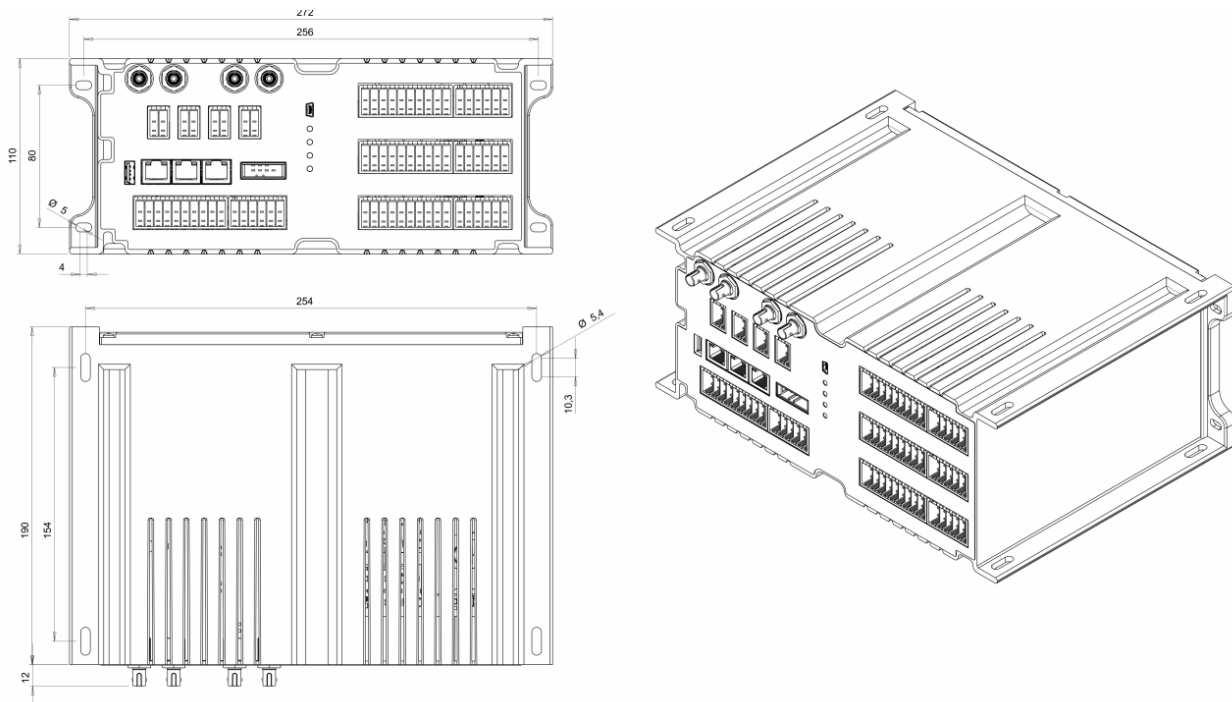
Display could be fixed on the front door or directly to the main unit.

Main unit could be mounted horizontally or vertically.

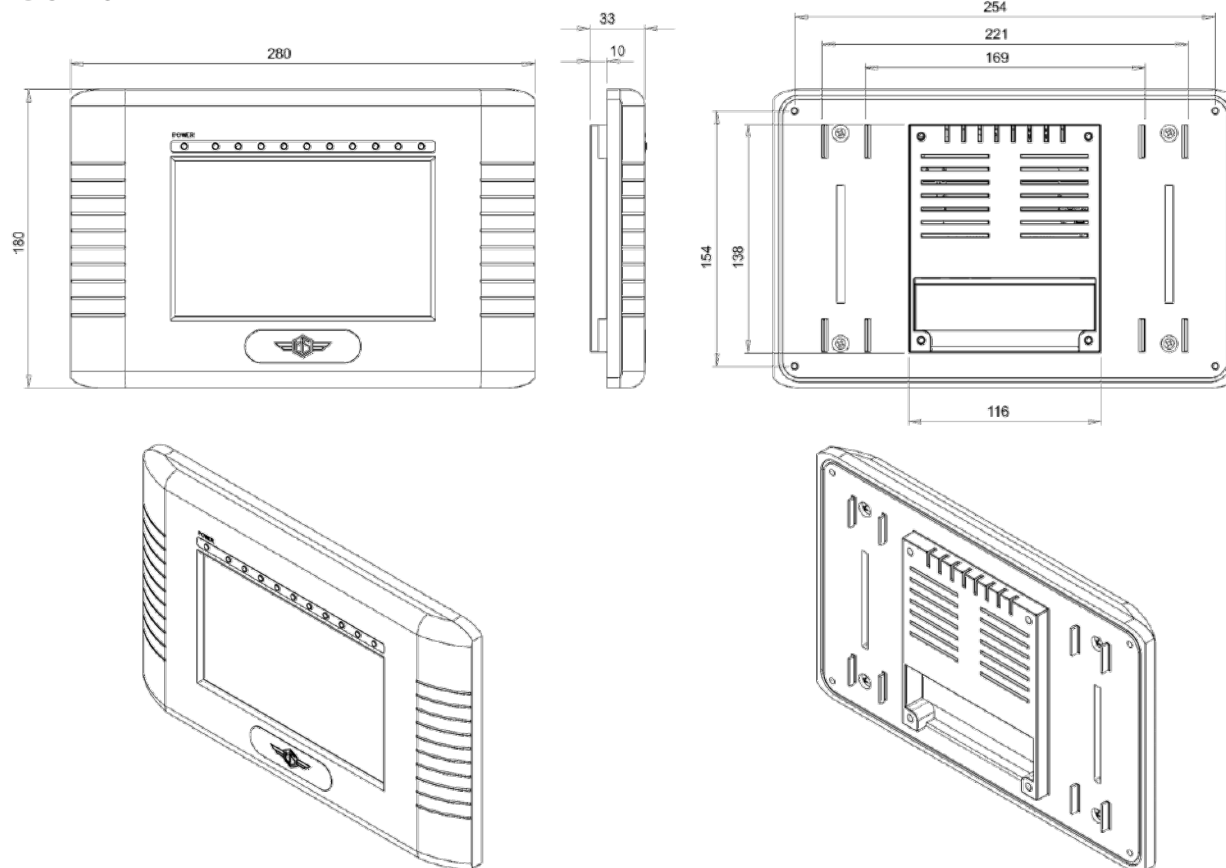
### Software

- Commissioning tool MSCom2
- CFG Goose
- CID Builder (Base)

## DC-PRO relay main body



## DC-PRO HMI



**Approval: CE**  
**Standard compliance IEC 60255 - EN50263 - CE Directive - EN/IEC61000 - IEEE C37**

Insulation voltage	IEC 60255-5	2kV, 50/60Hz, 1 min.
Impulse voltage	IEC 60255-5	5kV (c.m.), 2kV (d.m.) – 1,2/50µs
Isolation resistance	> 100MΩ	

Environmental characteristics (IEC 60068)				
Working temperature		-10°C / +55°C		
Storage temperature		-25°C / +70°C		
Environmental test	(Cold)	IEC60068-2-1		
	(Dry heat)	IEC60068-2-2		
	(Thermal shock)	IEC60068-2-14		
	(Dump heat)	IEC60068-2-78	RH 93% no condensation at 40°C	
CE EMC Compatibility (EN50081-2 - EN50082-2 - EN50263)				
Electromagnetic radiated and conducted emission	EN55022	industrial environment		
Radiated electromagnetic field immunity test	IEC61000-4-3	level 3	80-2000MHz	10V/m
	ENV50204		900MHz/200Hz	10V/m
Conducted disturbances immunity test	IEC61000-4-6	level 3	0.15-80MHz	10V
Electrostatic discharge test	IEC61000-4-2	level 4	6kV contatto / 8kV aria	
Power frequency magnetic test	IEC61000-4-8		1000A/m	50/60Hz
Pulse magnetic field	IEC61000-4-9		1000A/m, 8/20µs	
Damped oscillatory magnetic field	IEC61000-4-10		100A/m, 0.1-1MHz	
Common-mode disturbances in the frequency range 0Hz to 150Hz	IEC61000-4-16	level 4		
Electrical fast transient/burst immunity test	IEC61000-4-4	level 3	2kV, 5kHz	
HF disturbances test with damped oscillatory wave (1MHz burst test)	IEC60255-22-1	class 3	400pps, 2,5kV (m.c.), 1kV (d.m.)	
Oscillatory waves (Ring waves)	IEC61000-4-12	level 4	4kV(c.m.), 2kV(d.m.)	
Surge immunity test	IEC61000-4-5	level 4	2kV(c.m.), 1kV(d.m.)	
Voltage interruptions	IEC60255-4-11			
Resistance to vibrations and shocks	IEC60255-21-1 - IEC60255-21-2 10-500Hz 1g			
Characteristics				
Accuracy	1% In		Measurement	
	2% + to (to=20÷30ms @ 2xIs)		Time	
Current input	0 - ±20mA (±25) = 0 - In (2In)			
Voltage input	0 - 20mA (40) = 0 - Vn (2Vn)			
Auxiliary supply power consumption	< 20 VA			
Output relay	Max current 5 A; Vn = 380 V			
	Max switching power (resistive load) AC = 1100W (380V max) Max closing current= 30 A (picco) 0,5 sec.			
	Max switching current = 0.3 A, 110 Vcc, L/R = 40 ms (100.000 ops)			

The technical specifications reported are not binding and they should be agreed in the contract.

For further technical information on our products visit [www.microelettrica.com](http://www.microelettrica.com)

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