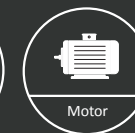
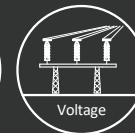




Fast commissioning

FPC 200



Family of multifunctional numerical relays

■ **FPC 200** is a family of current and voltage digital protection relays with easy to use interface meant for variety of solutions in industry and power distribution.

■ Its robust design enables it to be placed in **demanding industrial environments**.

■ Setting can be done completely through **user friendly local display unit**. User experience is enhanced through new edition of interface software **MiQen** featuring real-time display of measurements, statuses and event recorder.

■ **Transferring settings** between different devices has never been easier thanks to special front panel **USB port**. Same settings are simply transferred from one device to another using USB stick which can also be used to **save fault recordings, counters and update firmware**.

■ FPC 200 can be **expanded using external module EX408** for up to **8** temperature sensors.

■ FPC 200 is a member of **NEO3000®** Substation system and can be integrated to any other new or existing substation or automation.

Feeder, busbar, motor or transformer protection

Designed for industrial usage

Up to 4 CT/CTs or VT AC inputs

Up to 10 digital inputs and 8 relay outputs

3 analog outputs

Fault and event recording

Multifunctional front USB port

Local and remote control

User-friendly MiQen PC software included

FPC 200

Family of multifunctional numerical relays

Technical characteristics

Device power supply		
Rated voltage	DC or AC/DC	24 V-60 V 100 V-250 V, 50 Hz, 60 Hz
Permissible tolerance		-20 % to +10 %
Power consumption		≤ 7 VA, typical 3 VA (without external modules)
Voltage loss hold up time		100 ms (100 % drop)
Permanent memory type		EEPROM, FLASH
Permanent registers storing time		permanently
Galvanic isolation	AC	3,5 kV, 50 Hz, 1 min
AC current inputs		
Nominal current	I_n	1 A/5 A (defined by software setting)
Nominal frequency		50 Hz/60 Hz
Measuring range	phase inputs sensitive (earth) input	up to 55 I_n up to 2 I_n
Overvoltage category		CAT III 300 V
Consumption		≤ 0,1 VA (I_n), ≤ 0,1 VA (20 I_n)
Thermal overload	Continuous 10 s 1 s	4 I_n (20 A) 15 I_n (75 A) 100 I_n (500 A)
Galvanic isolation	AC	3,5 kV, 50 Hz
AC voltage inputs		
Nominal voltage	U_n	60 V-500 V (defined by software setting)
Nominal frequency		50 Hz/60 Hz
Measuring range		up to 500 V
Overvoltage category		CAT III 300 V
Input impedance		660 kΩ
Consumption	up to 250 V 250 V-500 V	≤ 0,1 VA ≤ 0,4 VA
Maximum input voltage	Continuous	600 V, 50 Hz-60 Hz
Galvanic isolation	AC	4,35 kV, 50 Hz
Universal digital inputs		
Nominal voltage	DC AC	24 V - 250 V 230 V, 50 Hz-60 Hz
Maximum input voltage	DC AC	275 V 275 V, 50 Hz-60 Hz
Activation voltage	DC AC	> 18 V activation; < 12 V deactivation > 18 V activation; < 10 V deactivation
Galvanic isolation	AC	3,5 kV, 50 Hz
Input current	AC/DC	< 1 mA
Recommended wire dimensions		0,75 mm ² (min. 0,75 mm ² , max. 2,5 mm ²)
High threshold digital inputs		
Nominal voltage	DC AC	110 V - 250 V 230 V, 50 Hz-60 Hz
Maximum input voltage	DC AC	275 V 275 V, 50 Hz-60 Hz
Activation voltage	DC AC	> 83,5 V activation; < 60 V deactivation > 83,5 V activation; < 60 V deactivation
Galvanic isolation	AC	3,5 kV, 50 Hz
Input current	AC/DC	< 1 mA
Recommended wire dimensions		0,75 mm ² (min. 0,75 mm ² , max. 2,5 mm ²)
Digital (relay) outputs		
Switching capacity	AC DC 30 V DC 48 V DC 110 V DC 220 V	8 A, UL: 10 A, 15 A (max. 4 s) 8 A (resistive load) 2 A (resistive load) 0,4 A (resistive load) 0,28 A (resistive load)
Limiting making current breaking capacity		15 A; max. 4 s, duty factor 10 %; max. 2000 VA
Number of switching cycles		electrical 100 k, mechanical 1 M
Maximum switching voltage	AC/DC	250 V, 50 Hz-60 Hz
Maximum number of simultaneously activated relays		8
Power supply burden of each active relay		0,5 W
Protection		dustproof
Galvanic isolation	AC	3,5 kV, 50 Hz
Communication – RS485		
Connector		rear, screw connector
Cable		120 Ω STP or UTP (twisted pair)
Transfer speed		1200 bit/s-115,200 bit/s
Range		approx. 1200 m (according to EIA-485)
Galvanic isolation	AC	3,5 kV, 50 Hz
Communication – RS232		
Connector		rear, DB9F
Transfer speed		1200 bit/s-115,200 bit/s
Range		approx. 15 m (according to EIA-232)
Galvanic isolation	AC	3,5 kV, 50 Hz
Communication – ETH		
Connector		rear, RJ45
Transfer speed		10/100BASE-T
Range		approx. 100 m (according to EIA-568)
Galvanic isolation	AC	0,5 kV, 50 Hz
Communication – Fiber Optic		
Connector		rear, ST
Cable		multi-mode, 62,5/125 μm, 50/125 μm, 100/140 μm, 200 μm
Wavelength		820 nm
Transfer speed		1200 bit/s-115,200 bit/s
Range		approx. 1700 m
Transmitter optical power		-15 dBm
Receiver sensitivity		-34 dBm
Allowed optical loss		≤ 6,8 dB (62,5/125 μm, 1700 m, -15 dBm/-34 dBm)
Communication – EXT (for extended modules only)		
Connector		rear, screw connector
Galvanic isolation	AC	0,5 kV, 50 Hz
Communication – USB		
Connector		front, type A
Supported type		1.0, 2.0
Supported storage size		≤ 32 GB
Supported file system		FAT32
Transfer rate		≈ 1,2 Mbit/s
Bridgeable distance		< 6 m
Mechanical characteristics		
Dimension (W x H x D)		150 x 176 x 125 mm
Weight		2080 g
Material	Housing	Stainless steel
IP protection level	Front Rear	IP 54 IP 40
Environment		
Degree of pollution	IEC 60255-27	2
Maximum altitude above sea level		2000 m (6561.68 ft)
Operation temperature range		-25 °C to +70 °C
Measuring & protection tolerances		
Current		
Accuracy - measurements	phase inputs	≤ ±0,5 % I_n (0,1 I_n ≤ I ≤ 4 I_n ; 50 Hz; 25 °C) ≤ ±3 % I_m (4 I_n ≤ I ≤ 55 I_n ; 50 Hz; 25 °C)
Accuracy - protections	phase inputs sensitive (earth) input	≤ ±3 % I_n (0,1 I_n ≤ I ≤ 4 I_n ; 50 Hz; 25 °C) ≤ ±3 % I_m (4 I_n ≤ I ≤ 55 I_n ; 50 Hz; 25 °C) ≤ ±0,1 % I_n (0,001 I_n ≤ I ≤ 2 I_n ; 50 Hz; 25 °C)
Accuracy - harmonics amplitude		≤ ±0,2 % I_n (0,01 I_n ≤ I ≤ 0,5 I_n)
Temperature stability	Amplitude	≤ ±0,1 % / 10 °C
Voltage		
Accuracy		≤ ±0,1 % U_n (1 V ≤ U ≤ 250 V; 50 Hz; 25 °C) ≤ ±0,5 % U_m (250 V ≤ U ≤ 600 V; 50 Hz; 25 °C) $U_{(m_min)} = 0,4 V$; 50 Hz; 25 °C
Temperature stability		≤ ±0,25 % / 10 °C
Frequency		
Accuracy - measurements	Current inputs Voltage inputs Current reference Voltage reference	0,02 Hz (0,1 I_n ≤ I ≤ 4 I_n ; 50 Hz; 25 °C) 0,02 Hz (0,1 U_n ≤ U ≤ 4 U_n ; 50 Hz; 25 °C) 0,02 Hz (20 Hz ≤ f ≤ 80 Hz; I_n ; 25 °C) 0,02 Hz (20 Hz ≤ f ≤ 80 Hz; U_n ; 25 °C)
Accuracy - protections	Phase inputs	0,02 Hz (0,1 U_n ≤ U ≤ 4 U_n ; 50 Hz; 25 °C)
Temperature stability		≤ ±0,005 Hz / 10 °C

FPC 200

Family of multifunctional numerical relays

Type tests

Electromagnetic Compatibility	Standard	Level/Class
Emission		
Conducted Disturbance Emission	IEC 60255-26 CISPR 22 EN 55022 IEC 61000-6-4	A A
Radiated emission (below 1 GHz)	IEC 60255-26 CISPR 11 EN 55022 IEC 61000-6-4	A A
Radiated emission (above 1 GHz)	IEC 60255-26 CISPR 22 EN 55022 IEC 61000-6-4	A A
Immunity		
Electrostatic Discharge	IEC 60255-26 IEC 61000-4-2	Level 4
Radiated immunity	IEC 60255-26 IEC 61000-4-3 ENV 50204 (GSM)	3 3
Fast transient / burst immunity	IEC 60225-26 IEC 61000-4-4	4
Surge immunity	IEC 60255-26 IEC 61000-4-5	3,4
Conducted immunity	IEC 60255-26 IEC 61000-4-6	3
Power frequency magnetic field immunity	IEC 60255-26 IEC 61000-4-8	4
Pulse magnetic field immunity	IEC 61000-4-9	5
Damped oscillatory magnetic field immunity	IEC 61000-4-10	4
Oscillatory transient immunity – Ring wave	IEC 61000-4-12	4
Oscillatory transient immunity – Slow damped oscillatory wave	IEC 60255-26 IEC 61000-4-18 ANSI/IEEE Std C37.90.1	3
Voltage dips	IEC 60255-26 IEC 61000-4-11 IEC 61000-4-29	
Voltage interruptions	IEC 60255-26 IEC 61000-4-11 IEC 61000-4-29	
Ripple	IEC 60255-26 IEC 61000-4-17	
Mechanical durability	Standard	Level/Class
Energized		
Seismic	IEC 60255-27 IEC 60255-21-3 IEC 60068-2-6	Class 1
Sinusoidal vibration response	IEC 60255-27 IEC 60255-21-1 IEC 60068-2-6	Class 1
Shock response	IEC 60255-27 IEC 60255-21-2 IEC 60068-2-27	Class 1
De-energized		
Sinusoidal vibration endurance	IEC 60255-27 IEC 60255-21-1 IEC 60068-2-6	Class 1
Shock withstand	IEC 60255-27 IEC 60255-21-2 IEC 60068-2-27	Class 1
Bump	IEC 60255-27 IEC 60255-21-2 IEC 60068-2-27	Class 1

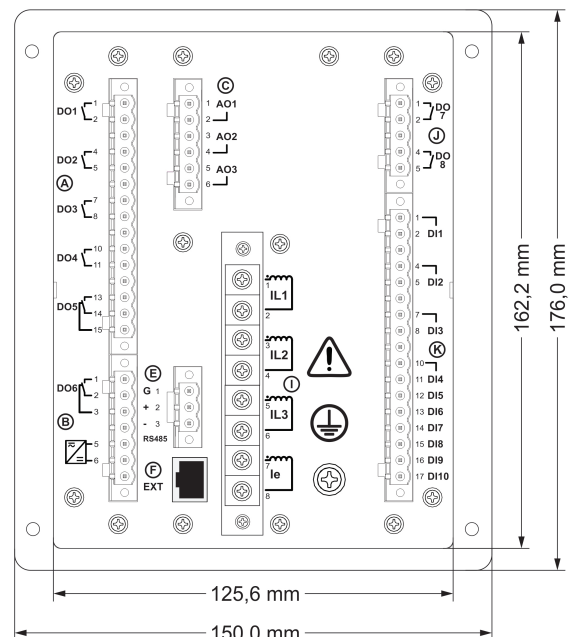
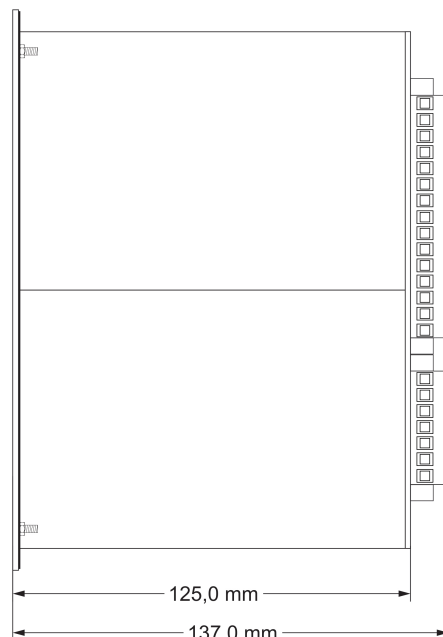
Ordering code

FPC200 F3 - 1 H 1 A - A 0

- Software type**
 - Feeder current protection **F1**
 - Feeder current protection with AR **F3**
 - Voltage and frequency protection with ROCOF **B2**
 - Motor current protection with TOP **M3**
 - Transformer current protection with TOP **T3**
- Housing layout**
 - Small housing - flush mount **1**
- Auxiliary supply voltage**
 - High (100V - 250 V AC/DC) **H**
 - Low (24 V - 60 V DC) **L**
- AC analog inputs configuration**
 - 3CT + 1CTs (1A/5A*) with fixed connector **1**
 - 3CT + 1CTs (1A/5A*) with removable connector **2**
 - 3CT + 1CTs (1A/5A*) with short circuit connector **3**
 - 4VT (150V/300V) with removable connector **4**
- Digital IO options**
 - 6 Outputs, Power Supply **O**
 - 6 Outputs + (2 Outputs, 10 Universal Inputs) **A**
 - 6 Outputs + (2 Outputs, 10 High threshold Inputs) **B**
- Communication**
 - None **O**
 - Modbus RTU (2-wire RS485 with 3-pin screw connector) **A**
 - Modbus RTU (RS232 with DB9 Female connector) **B**
 - Modbus RTU (Fiber Optic with ST connector) **C**
 - IEC60870-5-103 (2-wire RS485 with 3-pin screw connector) **G**
 - IEC60870-5-103 (RS232 with DB9 Female connector) **H**
 - IEC60870-5-103 (Fiber Optic with ST connector) **I**
 - Modbus (over) TCP/IP (Ethernet with RJ45 connector) **J**
 - Modbus (over) TCP/IP, IEC60870-5-104 (Ethernet with RJ45 connector) **K**
- Product options**
 - None **O**
 - 3 Analog outputs **1**

** defined by software setting*

Environmental Tolerances	Standard	Level/Class
Operation		
Cold operation	IEC 60255-27 IEC 60255-1 IEC 60068-2-1	Ad
Dry heat operation	IEC 60255-27 IEC 60255-1 IEC 60068-2-1	Bd
Damp heat (static)	IEC 60255-27 IEC 60255-1 IEC 60068-2-78	55°C 93% R.H.
Cyclic temperature with humidity (damp heat cyclic)	IEC 60255-27 IEC 60255-1 IEC 60068-2-30	
Relative humidity	IEC 60068-2-30	95%
Absolute humidity	IEC 60068-2-30	
Temperature gradient (change of temperature)	IEC 60068-2-14	-25°C .. 70°C
Storage (must be stored in its original packing)		
Exposure to Cold	IEC 60255-27 IEC 60255-1 IEC 60068-2-1	-25°C
Dry heat storage	IEC 60255-27 IEC 60255-1 IEC 60068-2-2	70°C
Safety	Standard	Level/Class
Electrical		
Insulation resistance	IEC 60255-27	100 MΩ
Impulse voltage	IEC 60255-27	5 kV
Power frequency dielectric withstand	IEC 60255-27	3,5 kV 50 Hz
Enclosure		
Dust/ water ingress	IEC 60255-27 IEC 60529	

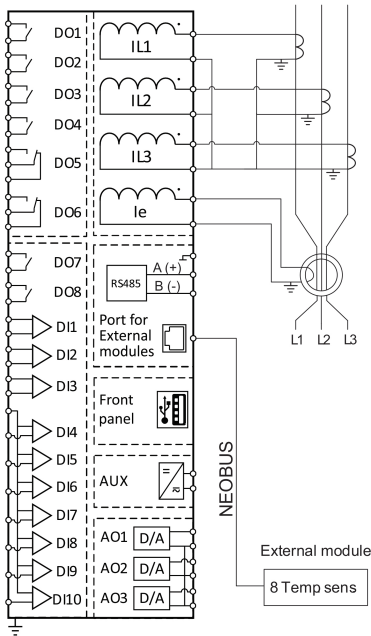


FPC 200

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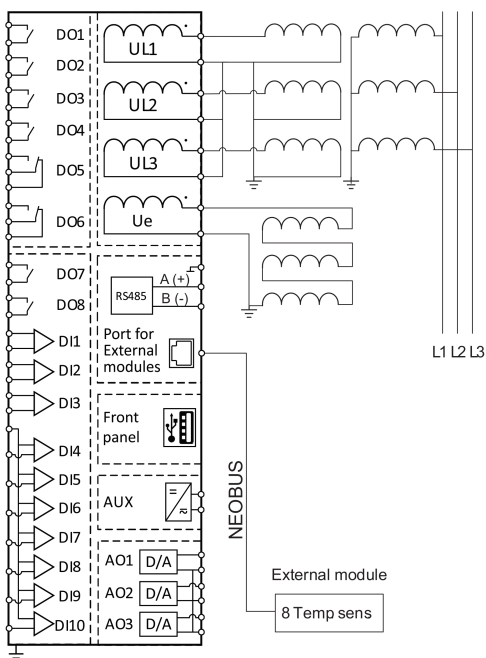
Current application:

- F1 - Feeder current protection
- F3 - Feeder current protection with AR
- M3 - Motor current protection with TOP
- T3 - Transformer current protection with TOP



Voltage application

- B2 - Busbar protection



Product type comparison	F1	F3	B1	B2	M1	M3	T1	T3
Current protection								
Overcurrent IDMT with inrush restraint and Cold Load Pick-up	50/51/51B	3	4		3	4	3	4
Earth fault overcurrent IDMT with inrush restraint and Cold Load Pick-up	50/51N Gs	3	4		3	4	3	4
Restricted earth-fault	64REF							2
Negative sequence/unbalance overcurrent/phase reversal	46/46R	1	1		1	2	1	1
Phase undercurrent	37				1	1		
Voltage protection								
Phase-to-phase undervoltage	27			2	2			
Remanent undervoltage	27R			1	1			
Positive sequence undervoltage	27D			2	2			
Phase-to-phase overvoltage	59			2	2			
Overvoltage earth/Residual overvoltage	59N			2	2			
Overfrequency	81H			2	2			
Underfrequency	81L			2	2			
Rate of change of frequency (df/dt)	81R					1		
Power and machine protection and diagnostic								
3 phase thermal overload (feeders, cables, tr. opt.)	49F		✓			✓		✓
3 phase thermal overload (motors, generators, transformers)	49M/G/T				✓	✓		
Temperature monitoring (up to 8 sensors)*	38/49T				✓	✓	✓	✓
Locked rotor, excessive starting time	48/51LR/14				✓	✓		
Starts per hour	66				✓	✓		
Thermostat / Buchholz switch	26/63						✓	✓
External trip		2	2	2	2	2	2	2
Automation and diagnostic								
Circuit breaker control and monitoring	94/69	✓	✓	✓	✓	✓	✓	✓
Circuit breaker failure	50BF	✓	✓	✓	✓	✓	✓	✓
Trip circuit supervision (TCS)	74	✓	✓	✓	✓	✓	✓	✓
Auto-reclosure	79		✓					
Lockout relay	86/94	✓	✓	✓	✓	✓	✓	✓
Programmable logic		✓	✓	✓	✓	✓	✓	✓
Machine control, Running hours					✓	✓		
Metering								
Phase current, RMS, THD, Harmonics, Residual current 3I ₀		✓	✓		✓	✓	✓	✓
Earth current sensitive		Opt.	Opt.		Opt.	Opt.	Opt.	Opt.
Ph. & PPV voltages, RMS, THD, Harmonics				✓	✓			
Frequency		✓	✓	✓	✓	✓	✓	✓
Communication								
IEC61850 MMS	Ethernet							Optional
IEC 60870-5-101	Serial							Optional
IEC 60870-5-103	Serial	✓	✓	✓	✓	✓	✓	✓
IEC 60870-5-104	Ethernet	✓	✓	✓	✓	✓	✓	✓
DNP3	Eth., Serial							Optional
Modbus RTU	Serial	✓	✓	✓	✓	✓	✓	✓
Modbus TCP/IP	Ethernet	✓	✓	✓	✓	✓	✓	✓
mA/10V Analog output	mA, V							Optional (3 when product option "1" in ordering)
External modules								
EX 40B (8 x PT100, 2 or 3 wires, powered from FPC)								Optional
Accessories								
Surface mount kit								Optional

✓ included, 1...4 number of functions, (3) Optional.
* With optional external temperature module EX 40B.