

P154 / P253

Feeder and motor protection relay

P154 and P253 protection relays are the latest offering from Alstom's P50 Agile series serving the distribution and industrial markets.



P50 Agile - Compact range of protection

The P154 and P253 Agile relays represent the ideal choice for optimised protection and monitoring of feeders and motors respectively.

The P154 is an economical choice, designed for deployment in volume, in lower-voltage systems. It offers non directional overcurrent and earth fault protection, with its functions designed to cover a wide range of applications in the protection of cables and overhead lines deployed in industrial installations, public distribution networks, and substations.

The P253 is designed to protect motors in industrial networks and power plants. It offers essential protection functions for motors deployed in installations from LV to MV voltage levels. The P253 relay performs an important role in many industrial processes with its diagnostic features improving asset health monitoring.

The P154 and P253 relays offer supervision features such as measurement, monitoring and recording functions. Communication protocols are available for transmitting relay data to a supervisory control system via communication networks. The operator interface allows reading of measured values and simple configuration of the relay. The setting software facilitates configuration and access to all the stored information for monitoring, maintenance and troubleshooting purposes. P154 and P253 relays are housed in a robust metal case suitable for panel mounting.

CUSTOMER BENEFITS

- Optimised protection for feeder/motor applications
- Cost effective
- Measurement / protection / monitoring in one box
- Front USB port for local communication
- Flexible SCADA communication options
- Diagnostic/maintenance facilities
- Universal, wide-range auxiliary supply
- Identical form factor for feeder/motor relays



APPLICATION

The P154 provides a wide range of feeder protection functions and can be applied for the following applications:

- Cables and Overhead lines deployed in MV/LV networks
- Backup in HV systems
- Different types of earthing systems
- MV industrial installations, public distribution networks and substations

The P253 provides a wide range of motor protection functions and can be applied for the following applications:

- Small and medium size induction motors
- MV industrial installations

MEASUREMENTS

- Metering of Phase currents
- Metering of Neutral currents-derived and measured
- Measurement of thermal state
- Positive and negative sequence current
- Ratio of negative to positive sequence current
- Breaker operation counter
- Breaker trip counter
- Breaker operating time

MEASUREMENTS (Motor specific)

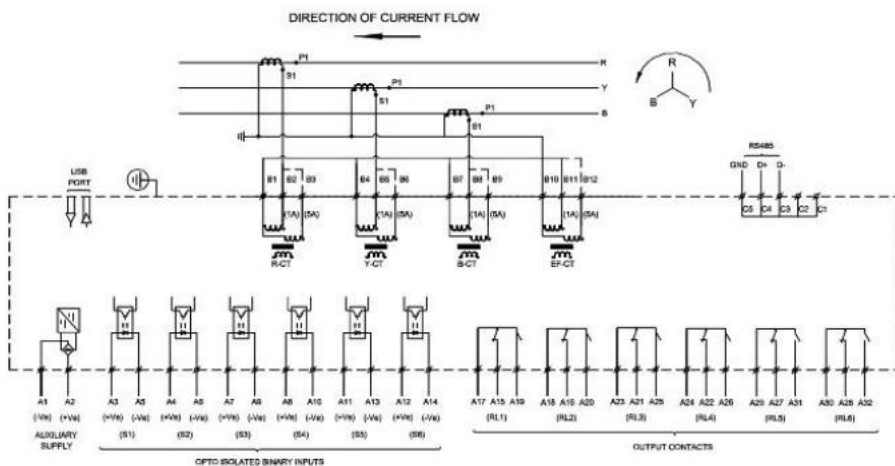
- Load current
- Time to thermal trip
- Authorised start number
- Time before another start authorisation
- Last start current
- Last start time
- Number of starts
- Number of emergency starts
- Total motor running hours

FUNCTIONAL OVERVIEW

ANSI	FUNCTION OVERVIEW	FEEDER	MOTOR
		P154	P253
PROTECTION			
50	Definite time overcurrent	•	•
50N	Neutral/Earth definite time overcurrent	•	•
51	IDMT overcurrent	•	•
51N	Neutral/Earth IDMT overcurrent	•	•
68	Inrush blocking	•	•
49	Thermal overload	•	•
37	Undercurrent detection/Loss of load	•	•
46	Negative sequence overcurrent	•	•
46BC	Broken conductor	•	
50BF	Circuit breaker fail	•	•
CLP	Cold load pick-up	•	
64R	Restricted earthfault	•	•
14	Speed switch input		•
48	Prolonged start (excessive long start)		•
51S	Locked rotor (during starting)		•
51LR	Locked rotor (during normal running)		•
66	Excessive number of starts		•
86	Latching of output contacts (Lock out)	•	•
Control Functions			
74	Trip circuit supervision	•	•
	Watchdog function	•	•
	Self monitoring & diagnostics	•	•
	Test/Commissioning facilities	•	•
	Emergency restart		•
HMI			
	Back-lit LCD display	•	•
	8 x Touch keys	•	•
	8 x Status LEDs	•	•
Communication			
	USB port	•	•
	Modbus/IEC 60870-5-103 (RS485) (or) DNP 3.0 (RS485)	•	•
Binary Input / Output			
	Binary Input	6	6
	Binary Output	6 (C/O)	6(C/O)
	• Standard		

PROTECTION	P154	P253
Analogue input		
Phase current input	3x 1 ph	•
Earth current input	1x 1 ph (or)	•
SEF current input	1x 1 ph	•
General		
Setting groups	2	2
Measurements	•	•
Event records	•	•
Fault records	•	•
Disturbance records	•	•
Starting current record		•
Configurable BI/BO/LEDs	•	•
Hardware		
Auxiliary supply	24-230 V AC/DC	24-230 V AC/DC
Climatic conditions	Operating : - 25°C to + 55 °C Storage : -25°C to + 70 °C	Operating : - 25°C to + 55 °C Storage : -25°C to + 70 °C
Housing	Front IP52 Rear IP20	Front IP52 Rear IP20

CONNECTION DIAGRAM P154/P253



PROTECTION & CONTROL

- Timed and instantaneous phase and earth fault protection (3 independent stages)
- Wide range of IEC/IEEE curves
- Thermal overload
- Cold load pickup
- Inrush blocking
- Undercurrent/Loss of load detection
- Negative sequence overcurrent
- Broken conductor (P154 only)
- Circuit breaker Fail
- Restricted earth Fault
- Trip circuit supervision
- 6 Digital inputs
- 6 Digital output (c/o)
- 1A/5A CTs selection
- SEF option
- Latching of output contacts
- Universal auxiliary power supply range
- 2 Setting groups
- Password protection
- Self-supervision & internal diagnostics

PROTECTION & CONTROL (Motor Specific)

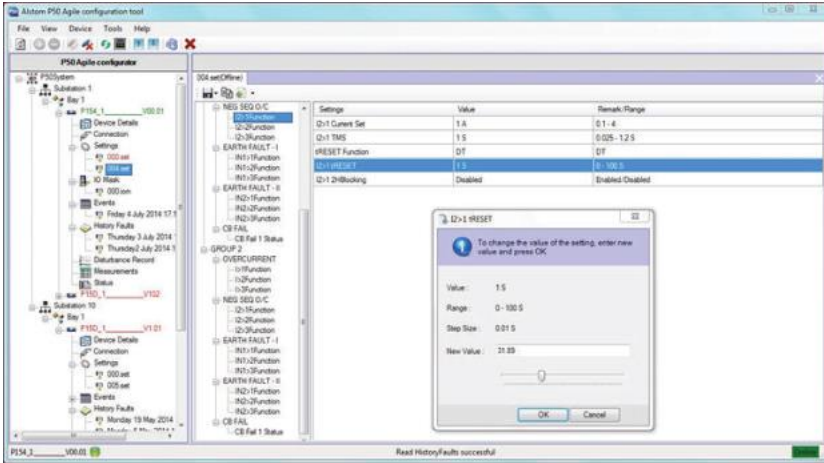
- Thermal overload
- RMS and negative sequence current elements taken into account
- Different time constants according to the machine cycles (heating, cooling or start-up), in order to provide the optimum protection
- Speed switch input
- Prolonged start (excessive long start)
- Locked rotor (during starting)
- Locked rotor (during normal running)
- Excessive number of starts
- Emergency restart

RECORDING & POST FAULT ANALYSIS

- Up to 5 fault records
- Up to 512 time tagged event records
- Up to 5 disturbance records
- One starting current record (P253 only)

RELAY CONFIGURATION SOFTWARE

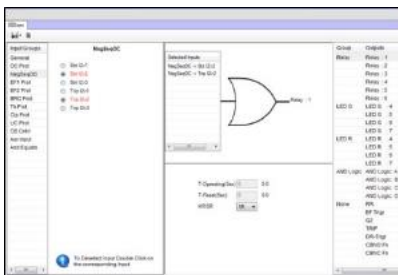
(For setting, viewing & parameterisation)



BINARY INPUT/OUTPUT/ LED ASSIGNMENT

P154 and P253 support 6BI/6BO and 4 programmable LEDs and the facility exists to assign any of the logical/physical statuses to BI/BO and programmable LEDs. This provides user the flexibility to program the relay as per the application requirements.

All the output contacts are changeover type and can be configured as SR (self-reset) or HR (hand reset) through the I/O configuration setting from the front panel or through relay setting software.



FRONT PANEL INTERFACE

- Eight LEDs for status indication
- Back-Lit LCD display (16x2)
- Eight navigation keys for setting and interrogation

MOTOR STARTING RECORD (P253 Only)

The P253 relay records the starting current for maximum 200 seconds duration. The record can be downloaded using the P50 configurator. It is very helpful in monitoring motor performance during the critical starting period.



LOGIC EQUATIONS

P154 and P253 support up to 4 independent Boolean equations. Each equation offers the possibility to use an AND logical gate. Up to 12 parameters can be used for each equation. Every result of equation can be time delayed, reused in another equation and assigned to any output relays, trip, trip latching and/or HMI LEDs. This function facilitates customisation of the product based on the customer's application.

CIRCUIT BREAKER COMMAND

P154 and P253 support a menu option to allow the operator to issue open/close command to the circuit breaker through the relay HMI.

COMMUNICATIONS

- Front USB port for viewing, parameter setting, downloading.
- Rear RS 485 port for SCADA communication
- Multiple protocol - Modbus / IEC60870-5-103 (user selectable) or DNP3.0 (ordering option)

COMMISSIONING

P154 and P253 provide facility to test relay operation during commissioning/maintenance activity. Facilities include :

- Binary inputs /output status monitoring
- Test mode- allows secondary injection testing to be performed on the relay without operation of the trip contacts
- Binary output contacts test
- LED test

For more information please contact Alstom Grid:

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