

# P50 Agile P154 / P253

## Feeder and Motor Protection Relay

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

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.

### Applications

#### Feeder Protection for:

- 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

#### Motor Protection for:

- Small and medium size induction motors
- MV industrial installations



## Protection & Control

- Optimised protection for feeder/motor applications
- Measurement / protection / monitoring in one box
- Diagnostic / maintenance facilities

## Monitoring & Metering

- Accurate metering for feeder applications including phase & neutral current, thermal state, positive & negative sequence current
- Circuit Breaker monitoring including operation counter, trip counter, and operating time
- Metering for motor applications including load current, time to thermal trip, total motor running hours
- Motor start monitoring including number of starts, number of emergency starts

## Communications

- Front USB port for local communication
- Rear RS 485 port for SCADA communications
- Flexible SCADA communication options supporting Modbus / IEC 60870-5-103 (user selectable) or DNP3.0 (ordering option)

## Application Flexibility

- Universal, wide-range auxiliary supply
- Identical form factor for feeder / motor relays



## 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
<b>Protection</b>		<b>P154</b>	<b>P253</b>
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)	•	•
<b>Control Functions</b>			
74	Trip circuit supervision	•	•
	Watchdog function	•	•
	Self monitoring & diagnostics	•	•
	Test/Commissioning facilities	•	•
	Emergency restart		•
<b>HMI</b>			
	Back-lit LCD display	•	•
	8 x Touch keys	•	•
	8 x Status LEDs	•	•
<b>Communication</b>			
	USB port	•	•
	Modbus/IEC 60870-5-103 (RS485) (or) DNP 3.0 (RS485)	•	•
<b>Binary Input / Output</b>			
	Binary Input	6	6
	Binary Output	6 (C/O)	6(C/O)
	• <i>Standard</i>		

## Protection and Control

### General

- Timed and instantaneous phase and earth fault protection (3 independent stages)
- Wide range of IEC/IEEE curves
- Thermal overload
- Cold load pickup (P154 only)
- 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)
- 1 A/5 A CTs selection
- SEF option
- Latching of output contacts
- Universal auxiliary power supply range
- 2 Setting groups
- Password protection
- Self-supervision & internal diagnostics

### Motor Specific

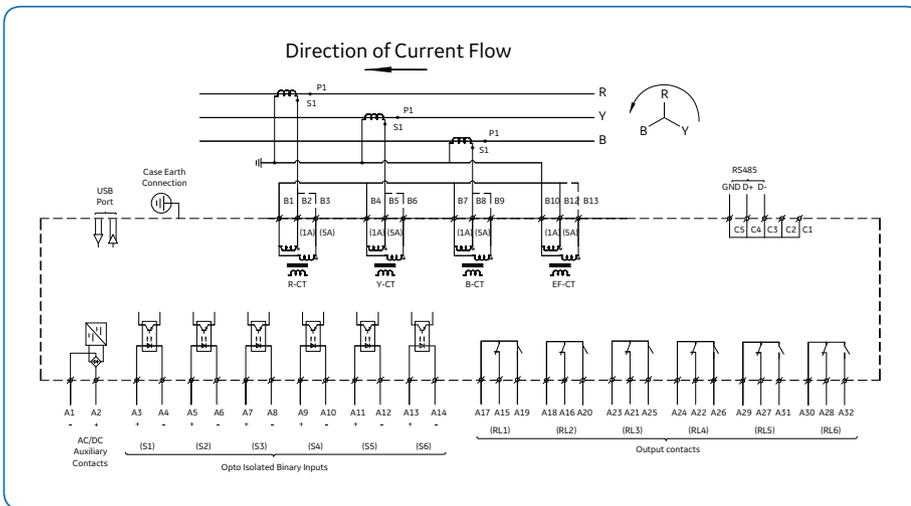
- Thermal overload
  - ▶ RMS and negative sequence current elements taken into account
  - ▶ Different time constants according to the machine cycles (heating, cooling or start-up), in order to provide the optimum protection
- Speed switch input
- Prolonged start (excessive long start)
- Locked rotor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

### Recording and 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)

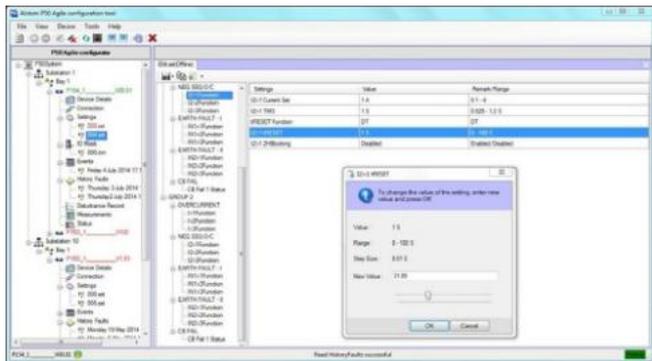
Protection	P154	P253
<b>Analogue input</b>		
Phase current input	3x 1 ph	•
Earth current input	1x 1 ph (or)	•
SEF current input	1x 1 ph	•
<b>General</b>		
Setting groups	2	2
Measurements	•	•
Event records	•	•
Fault records	•	•
Disturbance records	•	•
Starting current record		•
Configurable BI/BO/LEDs	•	•
<b>Hardware</b>		
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



## Relay Configuration Software

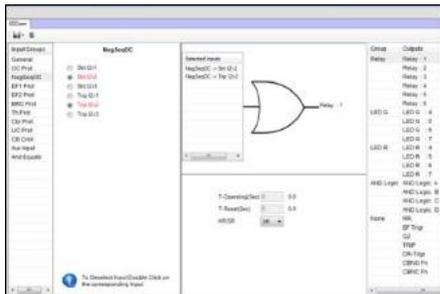
(For setting, viewing & parameterisation)



## Binary Inputs/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

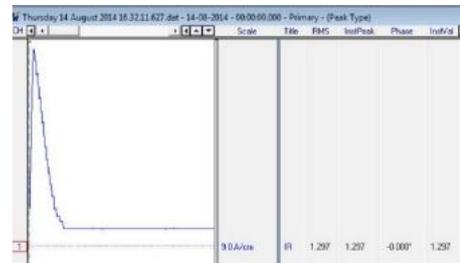
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Phone: +44 (0) 1785 250 070

## 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. 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 / IEC 60870-5-103 (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

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