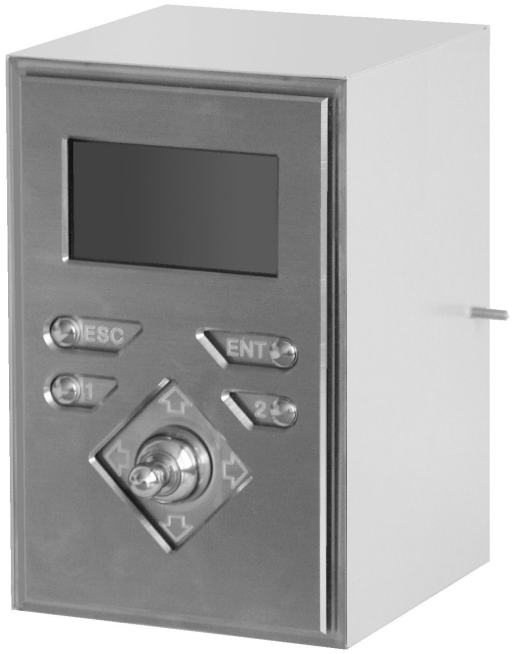
DMV-SP

COMPACT NUMERICAL MOTOR PROTECTION



Field of application

The ***SigmaProt*** type complex protection in respect of hardware and software is a modular device. The modules are assembled and configured according to the requirements, then the functions are determined - within the hardware limitations - by the software. This document describes the individual characteristics of a specific application: the factory configuration ***DMV-SP*** complex motor protection. The general description of the members of the ***SigmaProt*** type complex protection family can be found in document "***SigmaProt*** complex protection, hardware and software description and user's manual".

The numerical motor protection ***DMV-SP*** of PROTECTA Electronics Co. Ltd. can be applied mainly for comprehensive protection of large, medium voltage, three-phase motors in industrial plants and auxiliary systems of electric power stations.

Main features

The ***DMV-SP*** complex motor protection is a member of the ***SigmaProt*** device family of PROTECTA Co. Ltd. It is a fully numerical type, microprocessor-based device.

- the general motor protection functions can be applied in any combinations:
  - three-phase definite time overcurrent protection (I>),
  - zero sequence overcurrent protection high current setting stage ($3I_0$>>),
  - zero sequence overcurrent protection low current setting stage ($3I_0$>),
  - negative phase sequence protection (asymmetry protection),
  - thermal overload protection,
  - overcurrent protection during motor starting,
  - locked rotor protection,
  - protection against low load (loss of load protection),
  - zero sequence overvoltage protection,
  - over/undervoltage protection.
- the generated signals and trip commands of the functions can be marshaled to output relay contacts and LED signals or PROTLOG logic equations;
- application of microprocessor technology;
- simple commissioning by displayed motor operation information;
- simple setting of parameters by local LCD or by a computer connected to one of the serial ports;
- Supervisory and control functions of the device:
  - The supervisory and control functions are performed by a dedicated micro-controller of the CPU module or by an optional control module,
  - The high resolution optional graphic LCD can perform comprehensive local man-machine operator functions,
  - The supervisory and control functions are:
    - Control of the field:
    - by local or remote operation,
    - by interlocking functions,
    - by generation of status signals,
    - by logging of events,
    - by communication with the protection functions,
    - by communication with the intelligent graphic display;
    - Sending messages from the protection functions to the supervisory and control system of the substation;
    - Receiving and performing commands from the supervisory and control system of the substation;
    - Receiving and performing commands from the local LCD.
- The device is programmed to continuous self-monitoring functions, which can be extended to the CB control circuits as well.
- In all versions of the device the same software-configuration is loaded. The individual functions can be enabled and parameterised according to the needs and the hardware version. The versions are determined by the hardware configuration.
- The events are logged by the device, which can store up to 50 evaluated events, and up to 300 digital event sequences with 1 ms time resolution.

- A real-time clock is integrated in the device with battery RAM support. This clock can be synchronised by external PC or by the supervisory and control system. Additionally a Word Time Synchroniser (GPS-OP) device made by PROTECTA Co. Ltd. is available as well.
- The disturbance recorder of the CPU module can store up to 11 disturbances, the total registering time is about 10 s.
- The device realises several measuring functions based on the available analogue signals.
- Up to eight independent parameter packages can be stored and selected in the device.

Technical Data

General technical specification see in **SigmaProt system information sheet**
Type tests see in **SigmaProt system information sheet**
Design and sizes see in **SigmaProt system information sheet**

Setting ranges:	
Motor rated current, I_n in per cent of the main C.T. rated current, In / I_{CT}	30 to 120 %, step 2 %
No load operation minimum threshold current (fixed)	I_{IDLE} / I_n = 15 %
Phase fault O.C. relay starting current, I> / I_{CT} time delay setting, t (I>)	50 to 1500 %, step 10 % 0 to 60000 ms, step 10 ms
Earth fault O.C. relay starting current, 3Io> / I_{CT} time delay setting, t($3I_o$>)	10 to 100 %, step 2 % 0 to 60000 ms, step 10 ms
Motor rated temperature rising related to the ambient temperature when the motor load is the In rated current	Θn = 10 to 125°C, step 1°C
Overheating alarm signal setting value in per cent of the motor rated temperature rising	Θp / Θn=60 to 160 %, step 1 %
Thermal overloading (overheating) trip setting value in per cent of the motor rated temperature rising	Θt / Θn=80 to 180 %, step 1 %
Temperature rising limit to block the restart command in per cent of the motor rated temperature rising	Θb / Θn=60 to 160 %, 1 %
Time constant for rotating motor temperature rising and cooling	T_R = 2 to 200 min., step 1 min.
Standing motor cooling time constant in per cent of the time constant for rotating motor	T_C / T_R (Tcool / Trise) = 100 to 500 %, step 100 %
Negative sequent current weighting	0 to 6, step 1
Asymmetry protection starting value, fixed	I_2 / I_n = 15 %
Asymmetry protection inverse definite minimum time relay, maximum time delay at fixed starting current IDMT type IDMT time multiplier IDMT I_n/I_{nm} IDMT Min. delay	 0, 1, 2 (invz., very invz., ext.invz.) 1 to 256 steps 1 s /20 10 to 104, step 1 % 50 to 500, step 1 ms
Loss of load protection starting current in per cent of the motor rated current	I_t < / In = 30 to 60 %, step 5 %
Loss of load protection time delay	t(I_t) = 1 to 10 s, step 1 s
Starting period setting value	t_{st} = 5 to 100 s, step 5 s
Fault during starting period, setting current	I_{st} / I_{CT}=200 to 1200 %, 10 %
At heavy starting setting, the heating current during the starting period,	I^2 / 2, fixed
Stalled rotor protection at the end of the starting period	2xI_n, (if t > t_{st})
Current relays, resetting ratio	95 %, fixed

Options

- Interface to a SCADA system (see the **SigmaProt system information sheet**)
- Need of output contacts with 4 A DC breaking capability.

Ordering information

- Type of protection [DMV-SP]
- Rated C.T. current [1 A, 5 A]
- C.T. type of zero sequence current [main C.T., toroidal type C.T.]
- In case of toroidal type C.T., its ratio [150/1A or others]
- Auxiliary DC voltage [220 V, 110 V, or other]