

# IMM8000

## Numerical Motor Protection



Forming part of the PROCOM range of modular equipment, the IMM8000 range is designed to protect medium to high power MV motors.



- Multifunction
- Measurement
- Recording / event log
- Disturbance recording
- Local MMI

In addition to the standard protection functions, the IMM8000 relays include monitoring, measurement and recording of the electrical quantities of the network. The IMM8002 also allows the connection of three temperature sensors (RTDs). Parameter setting is possible locally either by the keyboard and screen or via an RS232 connection. Setting is also possible remotely via an RS485 link or current loop. The calculation of the electrical quantities is carried out using Fourier transforms. The functions of adjustment, reading, measurement and recording are all available in local or remote mode.

### Protection functions

- Short-circuits between phases [50]
- Earth-fault [51N]
- Locked rotor [51LR]/[51STALL]
- Under-voltage [27]/[27ST]
- Re-acceleration [27RC]
- Over-voltage [59]
- Thermal Overload [49]
- Over-temperature (IMM8002) [26] (IMM 8002 option)
- Pump un-priming [37P]/[37I]
- Imbalance, loss-of-phase or phase reversal [46]
- Too Long Starting [48]
- Starting inhibited by temperature [5-49] or abnormal voltage [5-27] [5-59]
- Number of starts protection [5-66]

#### OUR TRADEMARKS



## GENERAL CHARACTERISTICS

<b>Auxiliary Supply</b> <ul style="list-style-type: none"> <li>• Auxiliary supply ranges</li> <li>• Burden</li> </ul>	19 to 70 – 85 to 255 / Vdc or Vac 50 or 60 Hz 10 W (DC), 15 VA (AC)
<b>Measuring inputs</b> <ul style="list-style-type: none"> <li>• Phase CTs (<math>I_n=1A</math> and 5 A)</li> <li>• Earth-fault CT (<math>I_{n_0}=1A</math> and 5A)</li> <li>• CBCTs 50/1 or 100/1 <math>I_{n_0}</math></li> <li>• Display of primary currents (I1, I3)</li> <li>• Display class</li> <li>• Recommended CTs</li> <li>• VTs 100, 110, 120 or 240 V</li> <li>• Rated frequency</li> </ul>	Measurement from 0 to 20 $I_n$ - burden at $I_n < 0.2VA$ Rating (permanent) = $3 \times I_n$ (Transient) = $100 \times I_n$ for 1 second Measures primary currents from 10A to 10kA Measurement from 0 to 2.4 $I_{n_0}$ - burden at $I_n < 0.2VA$ Permanent rating = $I_{n_0}$ Transient rating = 50 $I_{n_0}$ for 1second Measures primary currents from 10A to 10kA Display of the primary current from 50 to 100A Permanent withstand = 100A Transient withstand = 12,500A for 1 second on 100/1 CBCT 0 to 200kA class 2 5VA 5P15 Permanent withstand 1.5 $U_n$ ; transient withstand = 2 $U_n$ for 10s Burden < 0.2VA Primary voltage setting of 0.10 kV to 100kV 50 or 60 Hz measurement from 40 to 70 Hz, precision 0.02 Hz
<b>Logical inputs</b> <ul style="list-style-type: none"> <li>• Activation</li> </ul>	Contact with internal or external voltage (24VDC)
<b>Output Contacts</b> <ul style="list-style-type: none"> <li>• Relay WD</li> <li>• Relays P, T, A, B</li> <li>• Ratings</li> </ul>	NC contact, 10A / 250 Vac rated currents 20 A for 1mn Changeover contact, 10A/250 Vac rated currents 20 A for 1mn DC breaking capacity = 50W (at L/R = 40 ms) AC breaking capacity=1,250VA; $I < 3A$ (at $\cos\phi = 0.4$ )
<b>MODBUS® Communication</b> <ul style="list-style-type: none"> <li>• Transmission</li> <li>• Speed transmission</li> </ul>	Asynchronous series, 2 wires RS485 or 4 wires 0-20 mA current loop 1,200 to 19,200 bauds (limited to 4,200 bauds for current loops)
<b>Consignment of state</b>	
<b>Programming</b> <ul style="list-style-type: none"> <li>• Display</li> <li>• Configuration software</li> </ul>	French, English Windows® 95, 98, 2000 French, English
<b>Environment</b> <ul style="list-style-type: none"> <li>• Transient impulse</li> <li>• Shock</li> <li>• Dielectric withstand</li> <li>• Catch of communication</li> <li>• Resistance isolation</li> <li>• EMC</li> <li>• Susceptibility</li> <li>• Operating temperature</li> <li>• Vibrations</li> <li>• The rung of protection</li> </ul>	IEC 801.4 classifies 4 (equivalent IEC 1000-4-4 classifies 4) IEC 255-5 (5 kV - 1.2/50 $\mu s$ ) IEC 255-5 (2 kV - 1 min) IEC 255-5 (500 V - 1 min) IEC 255-5 (> 1,000 M $\Omega$ under 500V) EN 55022 IEC 255-22 (1/2/3/4) -10 to + 55 °C (IEC 68-2) IEC 255.21.1 classifies 2 IP 51 (CEI 529)
<b>Dimension</b> <ul style="list-style-type: none"> <li>• Height, length and depth overall</li> <li>• Weight</li> </ul>	173x186x275mm (flush mounted) 206x186x275mm (rack mounted) 5 kg
<b>Thermal image [49]</b> <ul style="list-style-type: none"> <li>• Thermal Threshold pick-up <math>I_{ref}</math></li> <li>• Thermal Alarm Pick-up</li> <li>• Heating time constant <math>C_{YOU}</math></li> <li>• Cooling time constant <math>C_{TR}</math></li> <li>• Factor for negative sequence current</li> </ul>	1.07 $I_n$ , equivalent to a thermal state $\theta_N$ of 114% 80 to 100% $\theta_N$ 4 to 180 min 4 to 1,080 min 3 for $I_{neg} \geq 0.3 I_n$ and 9 for $I_{neg} < 0.3 I_n$

## GENERAL CHARACTERISTICS

<b>Temperature sensors (IMM8002) [26]</b> <ul style="list-style-type: none"> <li>• Number and type</li> <li>• Alarm threshold</li> </ul>	3 probes Pt100, Ni100, Ni120 or Cu10 2 to 200°C
<b>Number of starts protection [5-49] [5-27] [5-59] [5-66]</b> <ul style="list-style-type: none"> <li>• Number of authorized starts (N)</li> <li>• Time during N starts are authorized</li> <li>• Time during new start is inhibited</li> <li>• Hot starting control</li> </ul>	from 1 to 8 15 to 60 min 15 to 60 min 40 to 100% $\theta_N$ / $U >$ : 70% to 150 % $U_n$ / $U <$ : 20% to 120 % $U_n$ Number of authorised starts exceeded
<b>Too long starting [48]</b> <ul style="list-style-type: none"> <li>• Operating parameter</li> <li>• Threshold running</li> <li>• Start time</li> </ul>	$I >$ at extremely inverse (EI) time 2 to 10 $I_n$ 1 to 240 seconds
<b>Locked rotor after starting [51STALL]</b> <ul style="list-style-type: none"> <li>• Operating parameter</li> <li>• Threshold locked rotor</li> <li>• Locked rotor time</li> </ul>	$I >$ at independent time (inhibited during starting) 2 to 5 $I_n$ 1 to 100 seconds
<b>Locked rotor during starting [51LR]</b> <ul style="list-style-type: none"> <li>• Operating parameter</li> <li>• Threshold locked rotor</li> <li>• Locked rotor time</li> </ul>	$I >$ at independent time 1.5 $I_n$ 1 to 100 seconds
<b>Imbalance, loss of phase or inversion of phase [46]</b> <ul style="list-style-type: none"> <li>• Operating parameter</li> <li>• Threshold</li> </ul>	$I_{neg} >$ at extremely reverse time 0.15 to 0.50 $I_n$
<b>Phase fault [50]</b> <ul style="list-style-type: none"> <li>• Operating parameter</li> <li>• Threshold</li> <li>• Release time</li> </ul>	$I_n >$ at instantaneous time 1.4 $I_{ST}$ 70 ms +/- 30 ms with 1.5 $I_{set}$
<b>Earth fault [51N]</b> <ul style="list-style-type: none"> <li>• Operating parameter</li> <li>• Low-set and high-set thresholds</li> </ul>	$I_0 >$ with inverse time $I_0 >>$ at independent time: 0.1 to 1s/0.25s if [50] out of order 0.1 to 1.6 $I_n$ (residual connection) / 0.01 to 0.16 $I_{n_0}$ (CBCT)
<b>Pressure loss [37P] [37I]</b> <ul style="list-style-type: none"> <li>• Operating parameter</li> <li>• Threshold <math>S_n</math></li> <li>• Current threshold</li> <li>• Starting time</li> <li>• Release time</li> </ul>	$I <$ or $P <$ at independent time 10 to 50% $S_n$ 15 to 70% $I_n$ 1 to 1,000 seconds 1 to 100 seconds
<b>Minimum of tension [27ST] [27]</b> <ul style="list-style-type: none"> <li>• Operating parameter</li> <li>• Thresholds</li> <li>• Operating time</li> </ul>	$U_{ST} <$ or $U <$ at independent time 20% to 120% $U_n$ 0.1 to 100 seconds
<b>Re-acceleration [27RC]</b> <ul style="list-style-type: none"> <li>• Operating parameter</li> <li>• Threshold</li> <li>• Operating time</li> </ul>	$U_{RC} <$ at independent time 20 to 120% $U_n$ 0.1 to 100 seconds
<b>Overvoltage [59]</b> <ul style="list-style-type: none"> <li>• Operating parameter</li> <li>• Thresholds</li> <li>• Operating time</li> </ul>	$U >$ and $U >>$ at independent time 70 to 150% $U_n$ 0.1 to 100 seconds
<b>Tripping circuit failure</b> <ul style="list-style-type: none"> <li>• Operating parameter</li> <li>• Time delay</li> </ul>	tripping order 0.1 to 1 second
<b>Counters</b> <ul style="list-style-type: none"> <li>• Number of starts</li> <li>• Number of trippings</li> <li>• Active &amp; reactive power</li> </ul>	0 to 100,000 0 to 100,000 0 to 1,000 GWh and -1,000 to +1,000 GVARh

## GENERAL CHARACTERISTICS

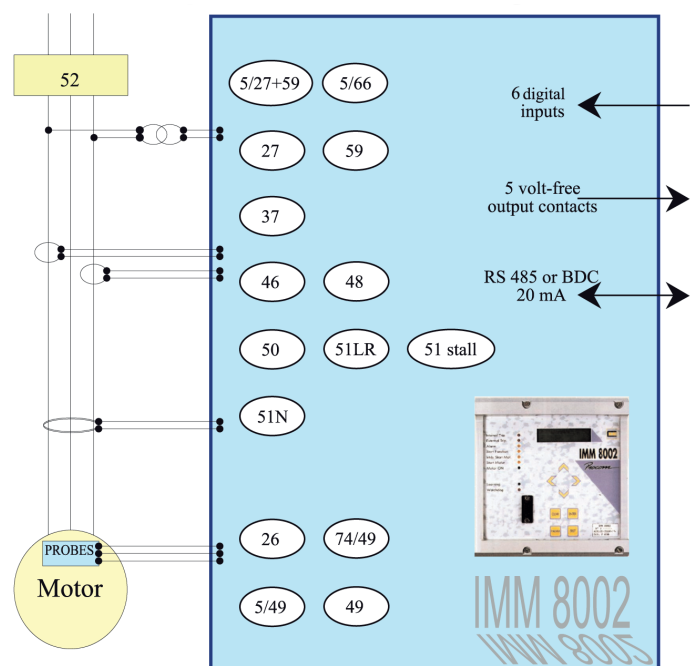
### Characteristics

- 2 ranges of auxiliary voltage (AC or DC)
- Configuration and setting by local operator or local or remote PC
- Reading and safeguard of the configuration on PC
- Measurement of various electrical quantities :
  - Average and instantaneous values of I1, I3 and Io, values expressed in primary currents
  - Phase-phase voltages
- Measurement of the starting current
- Recording running and starting time
- Measurement of the duration of the last start carried out
- Measurement of the negative sequence current
- Measurement of the thermal state
- Measurement of the active and reactive power
- Power-factor
- Temperature measurement (option)
- Indication of the number of authorised starts
- Measurement of the frequency
- One of two settings groups can be selected locally or remotely
- Too long start and locked rotor protection
- Assistance with motor maintenance (counting of the numbers of starts, trips, and operating hours)
- Easy Modbus® Communication
- Software of configuration and communication under Windows® 95, 98, NT, 2000
- Event logging with 10 ms resolution
- Remote reading of measurements, metering, alarms and the parameter settings
- Event reporting
- Self-diagnosis : RAM, ROM, EEPROM, output contacts, A/D converter, auxiliary voltage, software execution or hardware anomaly
- Cut-off temperature detection connection sensor

### Presentation

- Height 4U
- User interface with access to all the functions
- Backlight display (2 lines of 16 characters)
- 5 volt-free output contacts : self-monitoring, start authorisation, tripping and 2 indications
- 6 digital inputs : motor starting sensor, external trip, re-acceleration, speed, emergency restarting, thermal overcurrent state
- 1 watchdog LED
- 7 indicator LEDs
- 1 LED displaying the parameter setting mode

### Simplified functional diagram



The specifications and drawings given are subject to change and are not binding unless confirmed by our specialists.

