



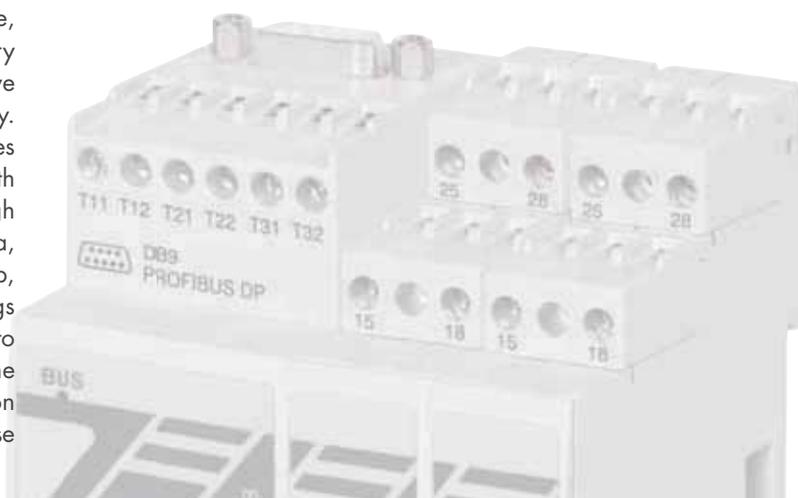
Motor Protection Relay DMPU

Switches

DMPU

Motor Protection Unit DMPU

DMPU is a modular electronic motor protection relay to control, monitor and meter the performances of 3-phase, constant or dual speed, AC induction motors. It is very effective for the motors which are located in very sensitive positions in the applications making any failure very costly. The device is able to measure the electrical motor variables (current, voltage, harmonic distortion, power, energy, earth leakage current, etc.), to monitor motor overload through the thermal image, control it (i.e. start and stop, start-delta, 2 speeds, stop it in case some critical alarm pops up, ...), and measures other variables like motor or bearings temperature. Finally it includes data-logger functions to measure the quality of the performances of the motor in the application. Additional optional modules allow the collection of additional temperature values, and input/outputs to use inside the control logic of DMPU for a full hi-end control.



Modular installation

DMPU modularity allows to select the necessary features for the specific application. This means minimal space requirements for basic installations as well as huge I/O potential.

Full variables monitoring

DMPU monitors all the electrical variables: voltages, currents, power, power factor, voltages and current asymmetry and the total harmonic distortion. The motor control system is ready for plant energy management.

Variables trend storage

The device stores the trend of the selected variables and the device status changes (as power ON/OFF, motor start and stop, digital inputs, alarm trips, ...). DMPU also has a fast datalogger for start-ups for fast troubleshooting.

How to increase the lifetime of the motor

DMPU allows to protect the motor against damage due to thermal effects taking place in overload conditions. The protection function trips when motor heating, i.e. the heat quantity in the motor, (represented by the TCU

parameter-Thermal Capacity Used) reaches 100% of the maximum one for that specific motor. This is calculated starting from the motor plate parameters and the electrical variables measured to estimate how long an

overload condition can be sustained before motor overheats and fails.

The user can also monitor the motor temperature, through PT100 or PTC probes, and warn or trip if the temperature is too high.



How to monitor energy consumption

The measurement module measures all the instantaneous electric variables as voltages, currents, harmonic distortions, power factors, active, reactive and apparent powers, and the respective energies. Each of these variables can be monitored to signal (for instance to the supervision system, or in the worst cases stopping the motor) a potentially dangerous situation.

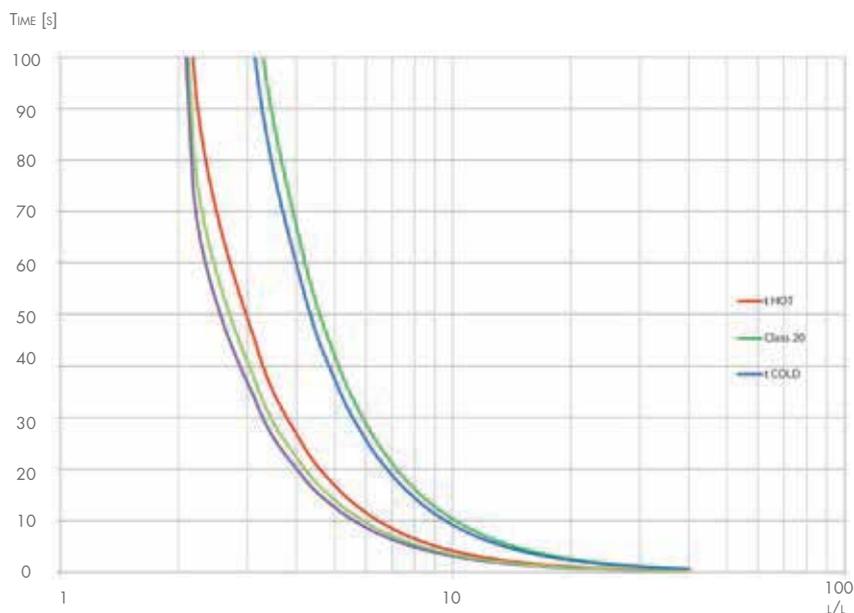


How to prevent the malfunction or trip for failure

DMPU implements several ANSI (American National Standard Institute) functions to protect the motor from operations that may damage it. They are the most used for highend motor protection.

For example:

- Monitors motor inverse current (current imbalance) which is one of the main causes of motor heating (ANSI 46).
- Prevents the locked or stalled rotor conditions (ANSI 51 LR and ANSI 48).
- Estimates earth fault current from the vector sum of the currents (ANSI 64) and monitors the earth leakage current through a core balance transformer (ANSI 64 EL).
- Monitors the number of starts per hour or the time since previous start or stop to limit overheating caused by frequent restarts (ANSI 66).



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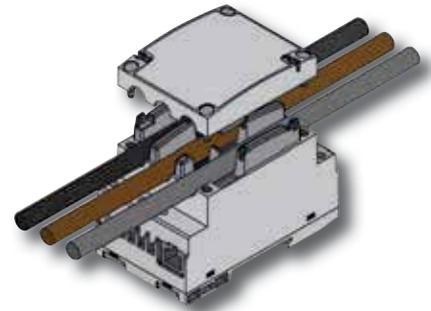
How to control motor operation

All control and monitoring functions are provided by DMPU:

- Start, Stop and alarm reset from local physical buttons or via software commands from the Modbus or Profibus network.
- Motor Reverse or Star-delta controls.
- Motor stop for major problems identification.

- Alarm display to the supervision system or using properly located lights or buzzers on site.

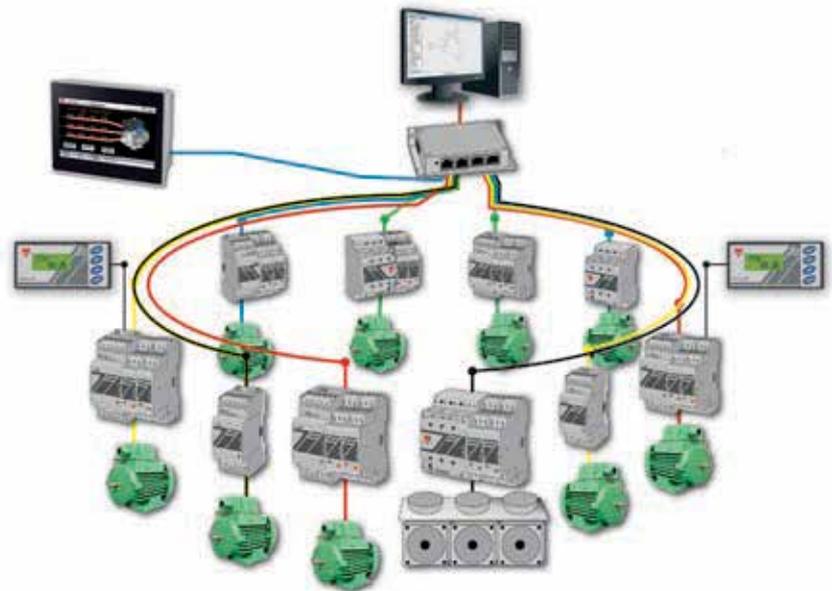
The module DMPUC-05 has a 3-phase split-core connection for current measurement to allow easy setup in case of maintenance or refurbishment.



How to manage a control system

Through the communication features, it is possible to transmit all the relevant instantaneous values to a supervision control system for data collection and process control.

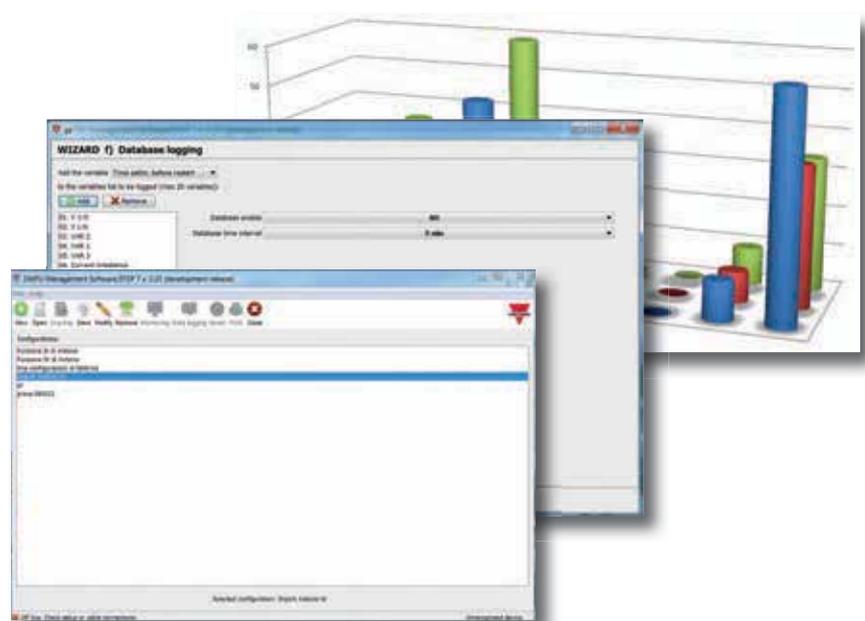
Profibus and Modbus TCP/IP protocols are available to easy insert DMPU in the majority of the plants. The operator interface are freely programmable and can show instantaneous values, display the alarm situations with customized messages and start-stop the motor.



How to see the historical trend of variables

DMPU is provided with three dataloggers to store the trend over time of:

- Up to 20 variables at the choice of the user (like voltages, temperatures, TCU, ...).
- Fast track up to 20 variables at every start (again at the choice of the user).
- Record events like starts and stops, system power ON/OFF, change of status of physical as well as network inputs and outputs, alarm trips, ...



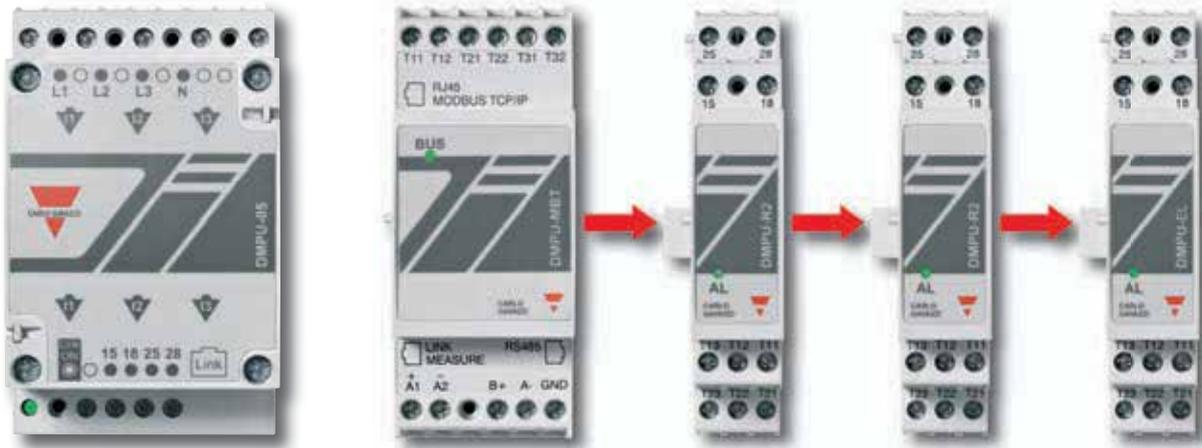
Versatile, a characteristic that makes work easier

Versatile mounting

DMPU, in its minimal configuration is just 90x63.2x90 mm (WxHxD). It includes 3 inputs and 2 outputs (if 7 inputs and 6 outputs are needed then it is just 126x63.2x90).

Even in this case it is also split into two parts to be located freely inside the drawer.

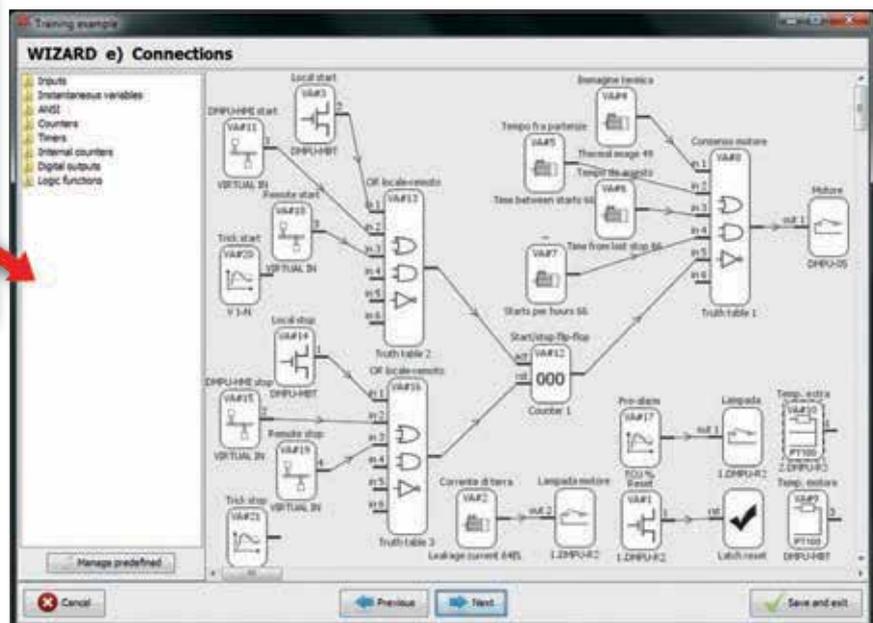
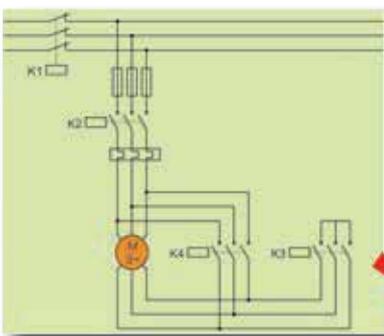
When using additional I/O's the main unit can be divided into two parts on different DIN-rails (for instance with 15 inputs and 14 outputs the split can be 54x63.2x90 + 90x63.2x90 + 54x63.2x90, and there are more options).



Easy configuration

Plant design is made straightforward through graphic blocks configuration and connection, where the blocks are all the variables that can be used, as inputs, outputs, ANSI functions, electrical or temperature values, logical functions,

timers or counters. DMPU-PS configuration software is also provided with monitoring functions for faster setup before releasing the motor to the supervision system.



DMPU

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DMPU-MBT and DMPU-PRB main modules



- Communication port for Profibus (DMPUC-PRB) or Modbus TCP/IP (DMPUC-MBT).
- RS485 port (Modbus) to connect the operator interface or the PC when programming the unit.
- Connection to plug-in additional modules.

- 3 PTC or PT100 or digital inputs.
- Data logging and event data stamping functions.
- 24VDC power supply voltage.
- Dimensions: 2-DIN modules.



Modbus®

DMPU-05 and DMPU-65 measurement modules

- Measures 3-phase currents and voltages.
- 5A and 65A module versions.
- Split-core current measurement up to 5A (then external CT's).
- 2 relay outputs.
- Connected to the main module via cable to allow free location into the drawer.
- Power supply from the main module (no need of further connections).
- Dimensions: 3-DIN modules.



DMPU-R2 I/O module



- 2 PTC or PT100 or digital inputs.
- 2 relay outputs.
- Dimensions: 1-DIN module.
- Plugged to the main module and supplied through it.

DMPU-EL Earth leakage current module and CTG core balance transformers



- Core balance transformer input, from 250 to 1000 ratio.
- 1 relay output dedicated to earth leakage alarm.
- 3 digital inputs.
- 0.03A to 30A set-point.

- Dimensions: 1-DIN module.
- Plugged to the main module and supplied through it.
- CTG core balance transformer with internal diameter from 35 to 210mm.

DMPU-HMI operator panel

- Displays the instantaneous variables.
- LED and display alarm warning.
- Four programmable keys.
- Freely configurable pages.
- 2 lines LCD.



BTM-T4/17 touchscreen



- 7" and 4.3" color touchscreen.
- Displays the instantaneous variables (currents, voltages, powers energy, etc.), virtual alarms, and inputs status.
- Remote motors control using the virtual inputs.
- 2 TCP/IP ports, 1 RS485 port to connect one or more DMPUs.

Main specifications

Measured voltages	Direct up to 690V, then through external VT's
Measured currents	Direct up to 5A or 65A, then through external CT's
Inputs	Up to 23 (three on the main module, two for each expansion module). Each configurable as contact, PT100 (2 or 3 wires) or PTC.
Measured earth leakage current	Through external core balance transformer, alarm set-point from 0.03 to 30A
Relay outputs	Up to 22 (two on the measurement module, two for each expansion module)
DMPU-PS software	To configure the device; monitor the system; download the logged values
Communication protocols	Modbus RTU, Modbus TCP/IP, Profibus
Operating temperature	-25 to +55°C (-13°F to 131°F) (R.H from 0 to 90% non condensing @ 40°C)
Installation category	Cat. III (IEC60664, EN60664)
Approvals	CE, cUL (UL508) [UL up to 600V]
Mounting	DIN-rail
Dimensions	Basic configuration: 90x63.2x90 mm (WxHxD) Full configuration: 270x63.2x90 mm (WxHxD) Other intermediate configurations available
DMPU-HMI operator panel	Dimension: 96x48x88 (WxHxD) Power supply 24VDC ± 20% Twin RS485 port (1 for programming, 1 for communication)

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