DMPUC
Технические характеристики

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Motor Controllers
DMPUC, DIN-Rail
Motor Protection Unit

DMPUC

- **Controlling motor operation**
- **Motor thermal protection**
- **Phase sequence, phase loss, unbalance, locked rotor, stall, earth fault and earth leakage protection**
- **Alarm set-points adjustable by the user**
- **TRMS measurements of distorted sine waves (voltages/currents)**
- **3-phase current range up to 2000A with external current transformers or pass-through 5A**
- **3-phase voltage range up to 690V**
- **Electrical variables monitoring**
- **Monitoring of operating hours, down time, number of starts**
- **Communication port, included in the main module**
- **Modular motor management system**
- **DIN-rail mounting (expansion module mounted side by side from main module)**
- **Additional I/O expansion modules**
- **Easy connections management and installation**
- **Power Supply: 24 VDC**
- **Event datastamping**
- **Variable datalogging**

Ordering Key

DMPUC-MBT

Model
Type

Product Description

DMPU is a modular electronic motor protection relay that provides protection, monitoring and metering functions for 3-phase, constant or dual speed, AC induction motors. The modular housing is for DIN-rail mounting with IP20 protection degree.
The device, in its basic configuration, is able to measure the electrical motor variables (current, voltage, harmonic distortion, etc), to control the thermal image of the motor, and also its load, operational status (start-stop, star-delta starting, 2 speeds, alarm set-point and other functions adjustable by the user), motor temperature and includes an event data-logger.
The current measurement is carried out by means of 3 external current transformers, or by pass-through holes up to 5 A.
Being provided with a serial communication module, it is possible to gather all the relevant instantaneous values and transmit them to a host control system for data collection and process control. Profibus and Modbus TCP protocols are available for a high connectivity to the most used fieldbus systems.
Through the optional remote display (for panel mounting) it is possible to see the instantaneous values and status and also to modify the set-points and the values of other parameters. The whole programming of the unit is to be performed via configuration software.
Additional optional modules allow the collection of additional PTC and PT100 values for coils and bearing temperature control, and additional input/outputs are used for some local on-board logic functions.

Type Selection

DMPUC-PRB	Main module + Profibus.
DMPUC-MBT	Main module + Modbus TCP/IP.
DMPUC-05	Currents and voltages module (pass-through holes).
DMPUC-65	Currents and voltages module.
DMPUC-R2	I/O module.
DMPUC-EL	Earth leakage current module

CARLO GAVAZZI

DMPUC-MBT and DMPUC-PRB

- **Main module for DMPUC**
- **Communication port for Profibus (DMPUC-PRB) or Modbus TCP (DMPUC-MBT)**
- **Auxiliary dual RS485 communication port (Modbus) to display or PC**
- **RJ 11 connection to measurement module**
- **Internal bus connecting additional modules**
- **3 PTC or PT100 or digital inputs**
- **Data logging and event data stamping**
- **24 VDC ±20% power supply input**
- **Dimensions: 2-DIN module**
- **Protection degree: IP20**

LED Specification DMPUC-MBT and DMPUC-PRB

LED	
Type	Dual color
Status and color	
Green fixed	Communication and power supply ok.
Green flashing	Power supply ok, configuration error.
Red fixed	Communication error, internal bus.

Input Specification DMPUC-MBT and DMPUC-PRB

Digital inputs	
Number of input	Max 3, (no common reference), including the already used thermal inputs.
Working modes	Each input can be configured as a switch or as a toggle.
Switch	When the input is activated the value is ON; when the input is deactivated the value is OFF.
Toggle	Each time the input goes from de-activate to activate the value chages state.
Activation mode	Each input is programmable to be considered active when the contact is closed or when it is open when used as a switch, while only at pressure when used as a button.
Type	Contact resistence or NPN.
Contact reading voltage	3.3VDC
Contact reading current	Max. 0.45mA
Contact resistence	≤ 1kΩ, closed contact; ≥ 20kΩ, open contact.
NPN	V_{ON} <1V, V_{OFF}> 2V.
Acquisition time	≤ 200ms.
Insulation	See the table “Insulation between inputs and outputs”.

Temperature	
Number of input	Max 3, including the already used thermal inputs.
Temperature probe	PT100 or PTC (programmable via DMPU-PS software).
Number of wires	2-wire connection
PT100	Detecting short-circuit (<15Ω) and wire braking (>10kΩ).
Range	-50° to +850°
Resolution	1°C/°F
Accuracy	±(0.5% FS)
PTC (3 in series)	According to EN 60947-7-8
PTC	Setpoint 3.1 kΩ , release 1.65 kΩ, Detecting short-circuits (<0.02 kΩ) and wire breaking (>10kΩ).
Temperature drift	<150 ppm/°C at 850°C FS
Engineering unit	Selectable °C or °F by software (the same in all the temperature inputs).
Insulation	See the table “insulation between inputs and outputs”.

Communication Specification

RS485 port	
Type	Bidirectional (static and dynamic variables and parameters).
Functions	Configuring the device, modifying set-point parameter, digital virtual input and monitoring the measured variables by DMPU-PS software.
Connection	1 x RJ11 soket on the bottom side (on the right) or 2-wires (to reduce the noise use a shielded cable and connect the shield to GND terminal and to the ground, in only one point).
Address	1, selectable by DMPU-PS software.
Protocol	Modbus RTU.
Factory-defined data format	Data bits “8”, parity “none”, stop bit “1”.
Baud-rate	Default: 9.6k. Selectable by software: 9.6k, 19.2k, 38.4k, 115.2k.
Insulation	See the table “insulation between inputs and outputs”.
Note	During the connection by software (through RJ11 connector) the DMPU-HMI display must be disabled (see the display instruction to enable this mode).
Ethernet port (DMPUC-MBT)	
Type	Bidirectional (static and dynamic variables and parameters).
Functions	Configuring the device, modifying set-point parameter, digital virtual input and monitoring the measured variables by DMPU-PS software or supervision system.
Connection	1 x RJ45 soket on the top side.
IP configuration	Fixed IP address (no DHCP), subnet mask, default gateway, port (selectable by DMPU-PS software).
Protocol	Modbus TCP/IP.
Factory-defined values	IP address “192.168.1.2”, subnet mask “255.255.255.0”, default gateway “192.168.1.1”, port “502”.
Insulation	See the table “Insulation between inputs and outputs”.
Profibus port (DMPUC-PRB)	
Function	Digital virtual input and monitoring the measured variables by supervision system.
Connections	1 x DB-9 sochet on the top side.
Address	2-126, selectable by DMPU-PS.
Protocol	Profibus DP-V1.
Factory-defined address	126
Baud-rate	9.6k, 19.2k, 45.45k, 93.75k, 187.5k, 500k, 1.5M, 3M, 6M, 12M. Auto baud rate identification.
Telegram	Max. 255 characters.
Physical layer	RS485
Insulation	See the table “insulation between inputs and outputs”.

Power Supply Specification

DMPUC-MBT and DMPUC-PRB	
Power supply	24VDC ± 20% from screw terminals.
Power consumption	2W; startup peak current <1.8A.
Suggested power supply	SPM3241

Modules Configuration

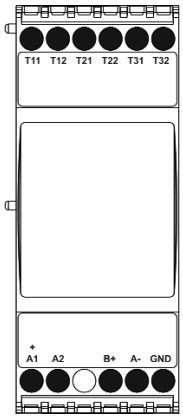
Minimal configuration	1 main module (DMPUC-MBT or DMPUC-PRB). 1 measurement module (DMPUC-05 or DMPUC-65).
Maximum configuration	
With DMPUC-EL	1 main module (DMPUC-MBT or DMPUC-PRB). 1 measurement module (DMPUC-05 or DMPUC-65). 9 I/O modules (DMPUC-R2). 1 earth leakage current module (DMPUC-EL).
Without DMPUC-EL	1 main module (DMPUC-MBT or DMPUC-PRB). 1 measurement module (DMPUC-05 or DMPUC-65). 10 I/O modules (DMPUC-R2).

Connections

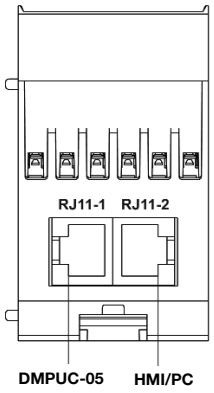
DMPUC-MBT and DMPUC-PRB	
Power supply connections	Screw-type, 2 x 1.5 mm^2 terminal blocks.
Input connection	Screw-type, 6 x 1.5 mm^2 terminal blocks for 3 x P100/PTC (2 wires) or 3 digital inputs.
Communication connection RS485	One port with two twins terminals: 1 x RJ11 (on the right of the bottom side) for PC connection and screw type 3x1.5 mm^2 Terminal box for DMPUC-HMI display connection.
Modbus TCP/IP	1 x RJ45 (DMPUC-MBT)
Profibus	1 x DB-9 (DMPUC-PRB)
Measurement module connection	1 x RJ11
Screw tightening torque	0.4 Nm / 0.8 Nm (min./max.).

Wiring Diagrams DMPUC-MBT and DMPUC-PRB

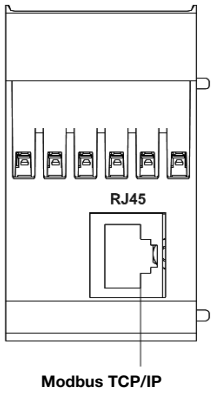
Front view



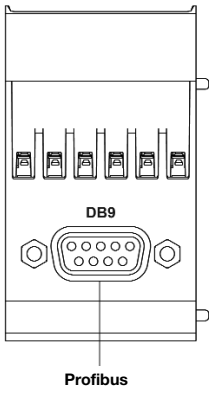
Bottom view



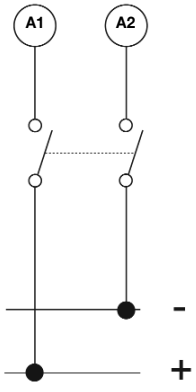
Top view (DMPUC-MBT)



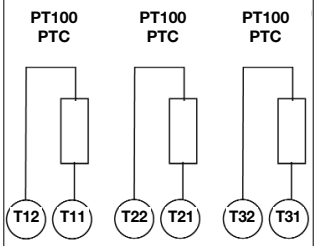
Top view (DMPUC-PRB)



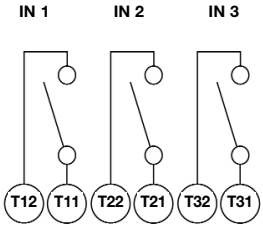
Power supply



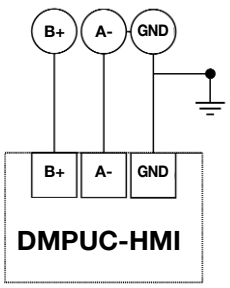
Temperature inputs



Digital inputs



RS485 input



DMPUC-05 and DMPUC-65

- **Measures 3-phase current, 3-phase voltage with neutral**
- **RJ 11 connection to main module**
- **Pass-through version up to 5A or 65A**
- **2 relay outputs**
- **Split core housing for 5A version**
- **Dimensions: 3-DIN module**
- **Protection degree: IP20**

Input Specification DMPUC-05 and DMPUC-65

Measurement system		3-phases (with or without neutral). Aron connection: only with DMPUC-05 and proper wiring.
Working frequency		45 to 65 Hz
Current inputs		TRMS measurement of distorted waves. The sampling frequency is automatically calculated.
Connection type	(DMPUC-05)	3-phase split-core pass-through.
	(DMPUC-65)	3-phase pass-through
Current range	(DMPUC-05)	100mA - 6A
	(DMPUC-65)	600mA - 65A
Hole size	(DMPUC-05)	9 mm
	(DMPUC-65)	12 mm
Max selectable primary current		CT programmable from 1 to 9999.
Harmonic distortion		THD, up to 32nd harmonic.
Voltage inputs		
Voltage range		3-phase, 100 to 690 VLL (±15%).
Max selectable voltage ratio		VT programmable from 1 to 9999.
Neutral connetion		Available
Harmonic distortion		THD, up to 32nd harmonic.
Accuracy		Relevant to control function, serial communication data (@25°C ±5°C, R.H. @60%, 48 to 62 Hz).
Current		±(0.5% FS)
Current resolution		0.2% FS
Phase-neutral voltage		±(0.5% FS)
Phase-phase voltage		1% FS
Voltage resolution		0.1% FS
Frequency		±0.1Hz (45 to 65Hz)
Active power		±(1% FS)
Active power resolution		0.5% FS
Power factor		±[0.002+1.5%(1.000 - "PF RDG")]
Reactive power		±(2% FS)
Reactive power resolution		1% FS
Harmonic distorsion		±1% FS (FS=100%)
Active Energy		Class1
Reactive Energy		Class2
Leakage current		±(1% FS)
Leakage current resolution		1mA
Temperature drift		≤ 200ppm/°C
Sampling rate		3200 samples/s @ 50Hz; 3840 samples/s @ 60Hz.
Measurements refresh time		100ms
Measurements Method		TRMS
Digital filter		
Filter operating range		0 to 99.9% of the input electrical scale
Filtering coefficient		Filtering coefficient 1 to 255
Filter action		Display, alarm, analogue and serial outputs (all the variables).
Crest factor		≤ 3
Current overload		
Continuos		
	DMPUC-05	6A
	DMPUC-65	65A
For 20s		
	DMPUC-05	40A (accuracy 5%)
	DMPUC-65	400A (accuracy 5%)
For 500ms (DMPUC-05)		200A Max @50Hz
For 10ms (DMPUC-65)		1950A Max @50Hz
Voltage overload		
Continuos		1.2 Un
For 500ms		2 Un
Input impedance		
Volatge input		> 1MΩ

Output Specification DMPUC-05 and DPMUC-65

Digital output	
Number of outputs	2
Type	SPST NO relay (NE or ND programmable by software).
AC1	5AAC @ 250VAC
DC12	5ADC @ 24VDC
AC15	1.5AAC @ 250VDC
DC13	1.5ADC @ 24VDC
Function	Programmable by software
Activation delay	≤100ms
Insulation	See the table “insulation between inputs and outputs”.

Power Supply Specification

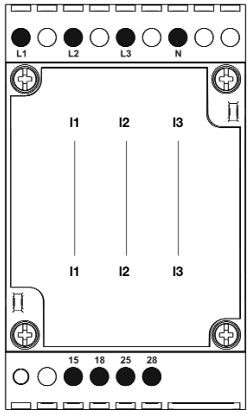
DMPUC-05 and DMPUC-65	
Power supply	Self-power supplied through the communication bus.
Power consumption	2W

Connections

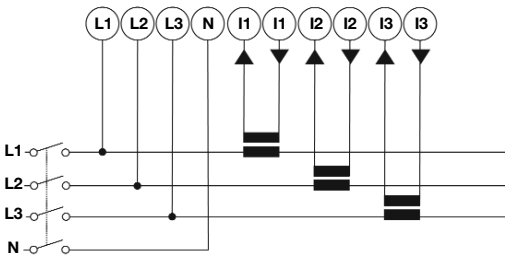
DMPUC-05 and DMPUC-65	
Connection to main module	Supplied cable (60 cm), 1 x RJ11 for power supply and communication of measured data.
Output connection	Screw-type, 4 x 1.5 mm^2 terminal blocks.
Screw tightening torque	0.4 Nm / 0.8 Nm (min./max.)

Wiring Diagrams DMPUC-05 and DMPUC-65

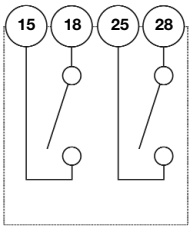
Front view



Measurement connection



Relay outputs



DMPUC-R2

- **2 PTC or PT100 or digital inputs**
- **2 relay outputs**
- **Dimensions: 1-DIN module**
- **Protection degree: IP20**
- **Internal bus connecting main and additional modules**
- **24 VDC ±20% power supply input via internal bus**

LED Specification DMPUC-R2

LED			
Type	Dual color	Status and color	
		Green fixed	Communication and power supply OK.
		Red fixed	Communication error.

Input Specification DMPUC-R2

Digital inputs		**Temperature**	
Number of inputs	Max 2 (no common reference), including the already used thermal inputs.	Input	Max 2, including the already used thermal inputs.
Working modes	Each input can be configured as a switch or as a toggle.	Temperature probe	PT100 or PTC (programmable via DMPUC-PS software).
Switch	When the input is activated the value is ON; when the input is deactivated the value is OFF.	Number of wires	2 or 3-wire connection.
Toggle	Each time the input goes from de-activate to activate the value changes state.	PT100	Detecting short-circuits (<15Ω) and wire breaking (>10kΩ).
Activation mode	Each input is programmable to be considered active when the contact is closed or when it is open when used as a switch, while only at pressure when used as a button.	Range	-50° to +850°C
		Resolution	1°C/°F
		Accuracy	±(0.5%FS)
		PTC (3 in series)	According to EN 60847-7-8
		PTC	Setpoint 3.1kΩ, release 1.65kΩ. Detecting short-circuits (<0.02kΩ) and wire breaking (>10kΩ).
Type	Voltage free contact or PNP.	Temperature drift	<150 ppm/°C at 850°C FS.
Contact reading voltage	3.3VDC	Engineering unit	Selectable °C or °F by software (the same in all the temperature inputs).
Contact reading current	Max. 0.45mA	Insulation	See table “insulation between inputs and outputs”.
Contact resistance	≤1kΩ closed contact ≥20kΩ open contact		
NPN	V_{ON} <1V, V_{OFF}>2V		
Acquisition time	≤200ms		
Insulation	See the table “insulation between inputs and outputs”.		

Output Specification DMPUC-R2

Digital output	
Number of output	2
Type	SPST NO relay (NE or ND programmable by software).
AC1	5 AAC@250VAC
AC15	1 AAC@250VAC
DC12	5 ADC@30VDC
Function	Programmable by software
Activation delay	<500ms
Insulation	See the table “insulation between inputs and outputs”.

Power Supply Specification

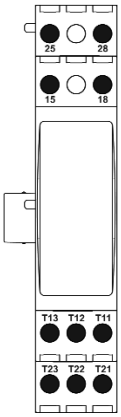
DMPUC-R2	
Power supply	Self-power supplied through the communication bus.
Power consumption	0.8W

Connections

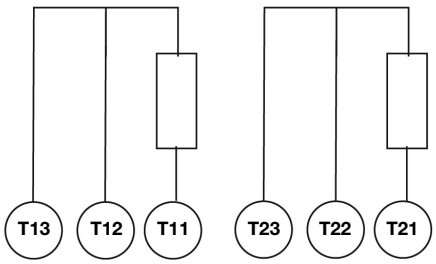
DMPU-R2	
Connection to main module	By internal bus.
Input-output connection	Screw-type, 4 x 1.5 mm^2 terminal blocks.
Screw tightening torque	All outputs 0.4 Nm / 0.8 Nm (min./max.).

Wiring Diagrams DMPUC-R2

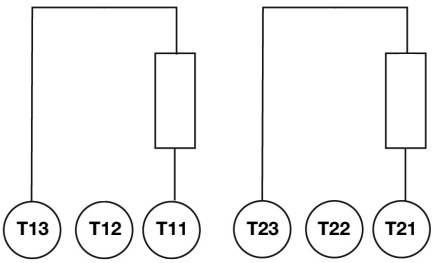
Front view



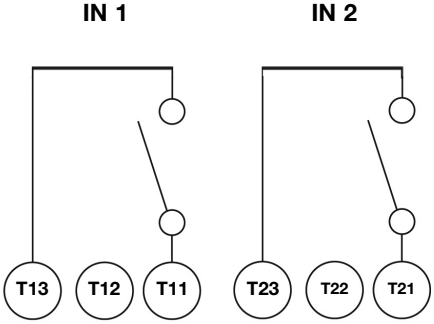
Temperature inputs



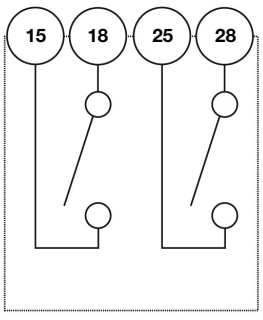
Temperature inputs



Digital inputs



Relay outputs



DMPUC-EL

- **Core balance transformer input 1/250 to 1/1000 ratio**
- **1 relay output dedicated to earth leakage alarm**
- **3 digital inputs**
- **0.03A to 30A set-point**
- **AC and A type protection (50/60Hz)**
- **Dimensions: 1-DIN module**
- **24 VDC ±20% power supply input via internal bus**

LED Specification DMPUC-EL

LED		Status and color	
Type	Dual color	Green fixed	Communication and power supply OK.
		Red fixed	Communication error.

Input Specification DMPUC-EL

Digital inputs	
Number of inputs	Max 3 (no common reference).
Working modes	Each input can be configured as a switch or as a toggle.
Switch	When the input is activated the value is ON; when the input is deactivated the value is OFF.
Toggle	Each time the input goes from de-activate to activate the value changes state.
Activation mode	Each input is programmable to be considered active when the contact is closed or when it is open when used as a switch, while only at pressure when used as a button.
Type	Voltage free contact or NPN.
Contact reading voltage	3.3VDC
Contact reading current	Max. 2mA
Contact resistance	≤300kΩ closed contact ≥10kΩ open contact
NPN	V_{ON} <1V, V_{OFF}>2V
Acquisition time	≤200ms
Activation delay	≤1s

Earth current input	
Earth current set points	30mA, 50mA, 100mA, 300mA, 500mA, 1A, 3A, 5A, 10A, 30A.
External toroid CT ratio	From 250 to 1000
Input impedance	51Ω (with C-C1 terminals); 1Ω (with C-C2 terminals).
System frequency	50Hz or 60Hz; measured by measurement module. If voltage measurement is not available it must be set via programming software.
Time of non-intervention	60 ms
Current overload	
Continuous	On terminals C-C1: 50mA On terminals C-C2: 430mA
For 1 s	On terminals C-C1: 150mA On terminals C-C2: 1A
Accuracy	Relevant to control function, serial communication data (@25°C ± 5° C R.H. ≤60%, 48 to 62 Hz).
Earth leakage current	±2.5% of the set-point
Current resolution	0.1uA with C-C1 terminals, 0.01mA with C-C2 terminals.

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Output Specification DMPUC-EL

Digital output	
Number of output	1
Type	SPST NO relay (NE or ND programmable by software).
AC1	5 AAC@250VAC
AC15	1 AAC@250VAC
DC12	5 ADC@30VDC
Function	Programmable by software
Activation delay	<0.150ms
Insulation	4kV against inputs and internal bus.

Power Supply Specification

DMPUC-EL	
Power supply	Self-power supplied through the communication bus.
Power consumption	0.8W

Connections

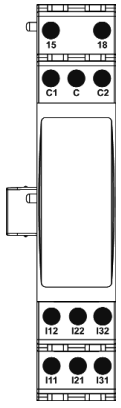
DMPUC-EL	
Connection to main module	By internal bus.
Input-output connection	Screw-type, 8 x 1.5 mm^2 terminal blocks.
Screw tightening torque	All outputs 0.4 Nm / 0.8 Nm (min./max.).

Wiring Diagrams DMPUC-EL

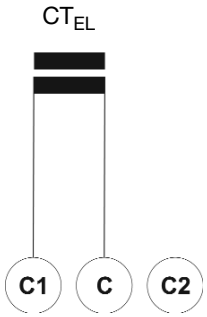
The wiring diagram for core balance transformer depends on the earth leakage curren setpoint (I_{SEL}) and the transformer ratio (R_{CTEL}); calculate the P value according of the following formula to define when to use the wiring diagram (P<694) or (P≥694).

$$P = \frac{I_{SEL}}{R_{CTEL}} \times 5 \times 10^5$$

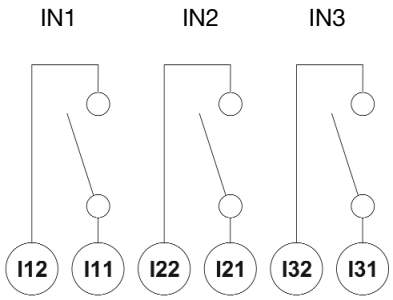
Front view



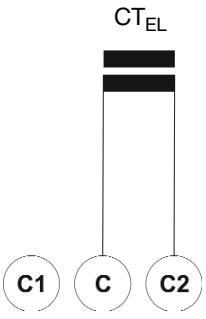
Core balance transformer with P<694



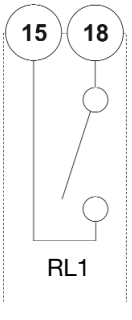
Digital Inputs



Core balance transformer with P≥694



Relay output



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General Specifications

Operating temperature	-25° to +55°C (-13°F to 131°F) (R.H. < 90% non-condensing @ 40°C).
Storage temperature	-30° to +70°C (-22° to 140°F) (R.H. <90% non-condensig @ 40°C).
Installation category	Cat. III (IEC60664, EN60664)
Insulation (for 1 minute)	See the table "Insulation between inputs and outputs".
EMC	According to EN62052-11
Electrostatic discharges	15kV air discharge.
Immunity to irradiated Elettromagnetic fields	Test with current: 10V/m from 80 to 2000MHz. Test without current: 30V/m from 80 to 2000MHz.
Immunity to burst	On current and voltage measuring inputs circuit: 4kV.
Immunity to conducted disturbances	10V/m from 150kHz to 80MHz.
Surge	On current and voltage measuring inputs circuit: 4kV.
Radio frequency suppression	According to CISPR 22

Standard compliance	
Safety	IEC60664, IEC61010-1 IEC60664, EN61010-1 EN62052, EN61000-6-2 EN60255-26, EN5002
Termal protection	IEC947
Earth leakage	IEC60947-2 parts related to the tripping characteristic of DMPUC-EL output.
Approvals	CE, cUL (UL508) [UL up to 600 V], C-TIC.
Housing	
Dimensions (WxHxD)	
DMPUC-MBT	35.5 x 90 x 63.2 mm
DMPUC-PRB	35.5 x 90 x 63.2 mm
DMPUC-05	53.5 x 90 x 63.2 mm
DMPUC-65	53.5 x 90 x 92 mm
DMPUC-R2	17.5 x 90 x 63.2 mm
DMPUC-EL	17.5 x 90 x 63.2 mm
Material	Noryl, self-extinguishing: UL 94 V-0
Mounting	DIN-rail
Protection degree	IP20
Weight	(carton box included)
DMPUC-MBT	Approx. 172g
DMPUC-PRB	Approx. 176g
DMPUC-05	Approx. 280g
DMPUC-65	Approx. 350g
DMPUC-R2	Approx. 119g
DMPUC-EL	Approx. 120g

Insulation Between Inputs and Outputs

Module		DMPUC-05 / 65			DMPUC-PRB/MBT						DMPUC-R2		
	Type of input/output	Measuring Input	Internal bus	Relay	Power supply	RS485 port	Profibus	Ethernet	Digital Input/Temperature	Internal bus	Digital Input/Temperature	Relay	Internal bus
DMPUC-05 / 65	Measuring input	-	2.7kV	4kV	2.7kV	2.7kV	2.7kV	2.7kV	2.7kV	2.7kV	2.7kV	4kV	2.7kV
	Internal bus	2.7kV	-	4kV	0V	0.5kV	0.5kV	0.5kV	0V	0V	0V	4kV	0V
	Static output	4kV	4kV	-	4kV	4kV	4kV	4kV	4kV	4kV	4kV	4kV	4kV
DMPUC-PRB/MBT	Power supply	2.7kV	0V	4kV	-	0.5kV	0.5kV	0.5kV	0V	0V	0V	4kV	0V
	RS485 port	2.7kV	0.5kV	4kV	0.5kV	-	0V	0.5kV	0.5kV	0.5kV	0.5kV	4kV	0.5kV
	Conn Profibus	2.7kV	0.5kV	4kV	0.5kV	0V	-	-	0.5kV	0.5kV	0.5kV	4kV	0.5kV
	Conn Ethernet	2.7kV	0.5kV	4kV	0.5kV	0.5kV	-	-	0.5kV	0.5kV	0.5kV	4kV	0.5kV
	Digital Input/Temperature	2.7kV	0V	4kV	0V	0.5kV	0.5kV	0.5kV	-	0V	0V	4kV	0V
	Inernal bus	2.7kV	0V	4kV	0V	0.5kV	0.5kV	0.5kV	0V	-	0V	4kV	0V
DMPUC-R2	Digital Input/Temperature	2.7kV	0V	4kV	0V	0.5kV	0.5kV	0.5kV	0V	0V	-	4kV	0V
	Relay	4kV	4kV	4kV	4kV	4kV	4kV	4kV	4kV	4kV	4kV	-	4kV
	Internal bus	2.7kV	0V	4kV	0V	0.5kV	0.5kV	0.5kV	0V	0V	0V	4kV	-

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Functions Description (cont.)

Block management		Each variable defined as "Block" in the table "Variable List" is associated with a monitoring variable function. This function defines the ON or OFF block status. Each block can be connected to each other if the function depends on other block status. The function parameters are set through the DPMU-PS software configuration. Up to 32 blocks defined as "Block status" are available.
Monitoring functions		
Input		
	Digital input	Monitors the contact or PTC status. Each input is programmable to be considered active when the contact is closed or when it is open when used as a switch, while only at pressure when used as a button.
	Temperature input	Monitors the PT100 temperature. It is based on two set-point. 4 different configuration with under /over level (with hysteresis) or in/out window (without hysteresis) are available.
Istantaneous variables		Monitors the selected instantaneous variable. It is based on two set-point. 4 different function configuration with under /over level (with hysteresis) or in/out window (without hysteresis) are available.
ANSI functions		
	ANSI49	Allows to protect the motor against damage due to thermal effects wich take place in overload conditions, starting from current measurement. 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.
	ANSI46	Monitors inverse current which is one of the main causes of motor heating.
	ANSI50	Monitors if any of the phase currents measured is too high.
	ANSI64	Measures the vector sum of the three phase current (neutral isn't present). The sum is earth fault current.
	ANSI66$_{SH}$	Monitors that the number of starts during the last set time period is lower than max starts set point.
	ANSI66$_{MTBS}$	Monitors the time since previous start.
	ANSI66$_{MTFLS}$	Monitors the time since previous stop.
	ANSI64EL	Monitors if the earth leakage current is above the set-point during a set-point time.
	ANSI48	Prevents the locked rotor condition at motor start by monitoring the current.
	ANSI51LR	Prevents the locked rotor condition during motor running by monitoring the current.
	ANSI37	Monitors if any of the phase currents measured is below the set-point current during a set point time.
	ANSI27S	Monitors if any of the phase - phase voltages is too low during the set time.
	ANSI59	Monitors if any of the phase - phase voltage is too high during a set-point time.
	ANSI47	Monitors if the phase sequence is L1-L2-L3 or L1-L3-L2.
	ANSI27D	Monitors if at least one phase - phase voltage drops below the 70% of mains voltage.
Counters/timers		Based on one set-point (in seconds with the timer, in counts with the counter). This function depends on other blocks status. Connect two blocks to start/increase the timer/counter and reset it.
Internal counter		It is based on one set- point. The block status is activated when the internal counter goes above the set-point.
Output		
	Relay output	This function depends on other blocks status. Connect one or more blocks to open / close the relay (the output is activated when at least one of the selected block status is activated). NE or ND programmable.

Functions Description (cont.)

Latch reset	Internal output to reset all the active block status which have been set for latching. Each variable defined as “variable list” could be set for latching.
Logic functions	This function depends on other blocks status (up to 6). This block status depends on the state of up to 6 other blocks. This dependence is set through elementary logic functions (OR, AND and NOT).
Variable monitoring	The software allows to monitor in real time the variables value or/and the used blocks status of the listed variables in the “Variable list” table (see the “Monitor” columns).
Label	A label (defined by user) could be associated at each variable defined as ”label” in the table “variable list”.

Data Logger Functions

Data base logging	
Available variables	See table “Variable List”.
Max number of variables	Up to 20.
Memory capacity	Max 9999 data with date/hour reference based on FIFO storage.
Variable type	Average values on time windows.
Time window	Programmable, from 60s to 3600s.
Fast data logger	
Available variables	See table “Variable List”.
Max number of variables	Up to 20
Memory capacity	Max 9999 data with progressive number based on STACK storage.
Variable type	Instantaneous values from the start event.
Time window	Fixed, 100 ms.
Data event logging	
Available variables	See table “Dataevent variable list”; each listed variable can be enabled or disabled for data-event storing.
Memory capacity	Max 9999 data with date/hour reference based on FIFO storage.
Trigger	By event.
Event timing resolution	<1s (if more than one event take place in 1s they are registered but the correc sequence isn’t guaranteed).

Data Event Variable List

Variables	Description
START	Start up Motor
RUN/STOP	Run/Stop Motor
ERR_{CONF}	Module configuration Error
RST_{DB}	Data base logging reset
RST_{FS}	Fast data logger reset
RST_{EV}	Data event logging reset
RST	Reset command (latch)
PW_{ON}	Power OFF
PW_{OFF}	Power ON
IN_1 to IN_{23}	Digital input (23 available)
OUT_1 to OUT_{22}	Relay outputs (22 available)
BLK_1 to BLK_{32}	Used blocks status (32 available)

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Variable List

Variables	Block	Block status	Latch function	Label	Data logger functions	Monitor		Description
						Value	Block status	
Inputs								
IN_1 to IN_{23}	✓	✓	✓	✓	✓	✓	✓	Digital input (up to 23 available)
TIN_1 to TIN_{23}	✓	✓	✓	✓	✓	✓	✓	Temperature input (up to 23 available)
VIN_1 to VIN_9	✓	✓	✓	✓	✓	✓	✓	Virtual digital input (up to 9 available)
Istantaneous variable								
V_{1-N}	✓	✓	✓	✓	✓	✓	✓	L1-N voltage
V_{2-N}	✓	✓	✓	✓	✓	✓	✓	L2-N voltage
V_{3-N}	✓	✓	✓	✓	✓	✓	✓	L3-N voltage
$V_{L-N}\sum$	✓	✓	✓	✓	✓	✓	✓	Average value of phase-neutral voltages
V_{1-2}	✓	✓	✓	✓	✓	✓	✓	L1-L2 voltage
V_{2-3}	✓	✓	✓	✓	✓	✓	✓	L2-L3 voltage
V_{3-1}	✓	✓	✓	✓	✓	✓	✓	L3-L1 voltage
$V_{L-L}\sum$	✓	✓	✓	✓	✓	✓	✓	Average value of phase-phase voltages
I_1	✓	✓	✓	✓	✓	✓	✓	Phase 1 current
I_2	✓	✓	✓	✓	✓	✓	✓	Phase 2 current
I_3	✓	✓	✓	✓	✓	✓	✓	Phase 3 current
I_{Earth}	✓	✓	✓	✓	✓	✓	✓	Calculated neutral current
W_1	✓	✓	✓	✓	✓	✓	✓	Phase 1 active power
W_2	✓	✓	✓	✓	✓	✓	✓	Phase 2 active power
W_3	✓	✓	✓	✓	✓	✓	✓	Phase 3 active power
W_{TOT}	✓	✓	✓	✓	✓	✓	✓	Total active power
VA_1	✓	✓	✓	✓	✓	✓	✓	Phase 1 apparent power
VA_2	✓	✓	✓	✓	✓	✓	✓	Phase 2 apparent power
VA_3	✓	✓	✓	✓	✓	✓	✓	Phase 3 apparent power
VA_{TOT}	✓	✓	✓	✓	✓	✓	✓	Total apparent power
VAR_1	✓	✓	✓	✓	✓	✓	✓	Phase 1 reactive power
VAR_2	✓	✓	✓	✓	✓	✓	✓	Phase 2 reactive power
VAR_3	✓	✓	✓	✓	✓	✓	✓	Phase 3 reactive power
VAR_{TOT}	✓	✓	✓	✓	✓	✓	✓	Total reactive power
PF_1	✓	✓	✓	✓	✓	✓	✓	Phase 1 power factor
PF_2	✓	✓	✓	✓	✓	✓	✓	Phase 2 power factor
PF_3	✓	✓	✓	✓	✓	✓	✓	Phase 3 power factor
PF_{TOT}	✓	✓	✓	✓	✓	✓	✓	Total power factor
HZ	✓	✓	✓	✓	✓	✓	✓	Frequency
$AsyV_{L-N}$	✓	✓	✓	✓	✓	✓	✓	Asymmetry L-N%
$AsyV_{L-L}$	✓	✓	✓	✓	✓	✓	✓	Asymmetry L-L%
PSQ	✓	✓	✓	✓	✓	✓	✓	Phase sequence
I_{IMB}	✓	✓	✓	✓	✓	✓	✓	Current Imbalance
I_+	✓	✓	✓	✓	✓	✓	✓	Positive Sequence Component of Motor Current
I_-	✓	✓	✓	✓	✓	✓	✓	Negative Sequence Component of Motor Current
THD V_{1-N}	✓	✓	✓	✓	✓	✓	✓	Total harmonic distortion of V_{1-N}
THD V_{2-N}	✓	✓	✓	✓	✓	✓	✓	Total harmonic distortion of V_{2-N}
THD V_{3-N}	✓	✓	✓	✓	✓	✓	✓	Total harmonic distortion of V_{3-N}
THD V_{1-2}	✓	✓	✓	✓	✓	✓	✓	Total harmonic distortion of V_{1-2}
THD V_{2-3}	✓	✓	✓	✓	✓	✓	✓	Total harmonic distortion of V_{2-3}
THD V_{3-1}	✓	✓	✓	✓	✓	✓	✓	Total harmonic distortion of V_{3-1}

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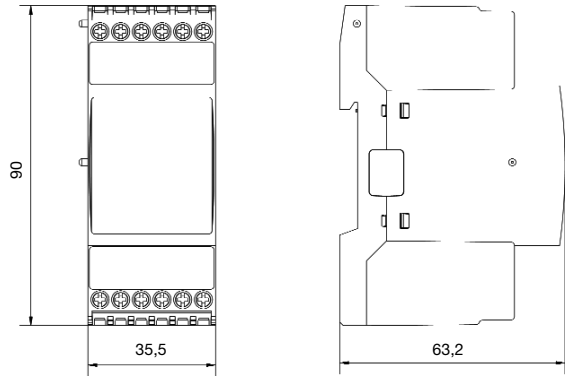
Variable List

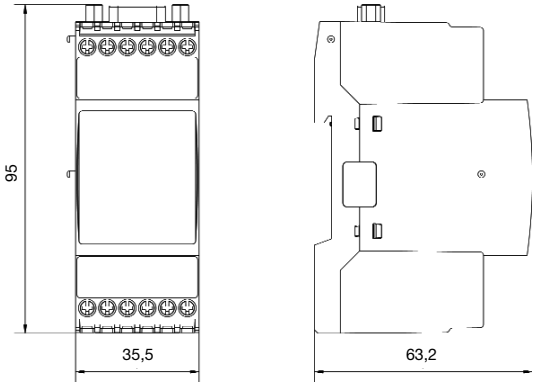
Variables	Block	Block status	Latch function	Label	Data logger functions	Monitor		Description
						Value	Block status	
THD I_1	✓	✓	✓	✓	✓	✓	✓	Total harmonic distortion of I_1
THD I_2	✓	✓	✓	✓	✓	✓	✓	Total harmonic distortion of I_2
THD I_3	✓	✓	✓	✓	✓	✓	✓	Total harmonic distortion of I_3
TCU	✓	✓	✓	✓	✓	✓	✓	Thermal Capacity Used [%]
ANSI functions								
ANSI 49	✓	✓	✓	✓	✓	●	✓	Thermal Image ANSI
ANSI 46	✓	✓	✓	✓	✓	●	✓	Max inverse sequence current ANSI
ANSI 50	✓	✓	✓	✓	✓	●	✓	Overcurrent ANSI
ANSI 64	✓	✓	✓	✓	✓	●	✓	Earth fault ANSI
ANSI 66_{SH}	✓	✓	✓	✓	✓	●	✓	Starts per hours ANSI
ANSI 66_{MTBS}	✓	✓	✓	✓	✓	●	✓	Minimum time between starts ANSI
ANSI 66_{MTFLS}	✓	✓	✓	✓	✓	●	✓	Minimum time from last stop ANSI
ANSI 64EL	✓	✓	✓	✓	✓	●	✓	Leakage current ANSI
ANSI 48	✓	✓	✓	✓	✓	●	✓	Locked rotor at start-up ANSI
ANSI 51LR	✓	✓	✓	✓	✓	●	✓	Stalled rotor ANSI
ANSI 37	✓	✓	✓	✓	✓	●	✓	Undercurrent ANSI
ANSI 27S	✓	✓	✓	✓	✓	●	✓	Undervoltage ANSI
ANSI 59	✓	✓	✓	✓	✓	●	✓	Overvoltage ANSI
ANSI 47	✓	✓	✓	✓	✓	●	✓	Phase sequence ANSI
ANSI 27D	✓	✓	✓	✓	✓	●	✓	Phase loss ANSI
Counters/timers								
CT_1	✓	✓	✓	✓	✓	✓	✓	Counter #1
CT_2	✓	✓	✓	✓	✓	✓	✓	Counter #2
TM_1	✓	✓	✓	✓	✓	✓	✓	Timer #1
TM_2	✓	✓	✓	✓	✓	✓	✓	Timer #2
Internal counter								
kWh_{TOT}	●	●	●	●	●	✓	●	Active energy [kWh]
$kVARh_{TOT}$	●	●	●	●	●	✓	●	Reactive energy [kVARh]
N_S	●	●	●	●	✓	●	●	Number of Starts
N_{SH}	✓	✓	✓	✓	✓	✓	✓	Starts per hour (ANSI 66)
T_{RTOT}	●	●	●	●	✓	✓	●	Total running hours
T_{RPAR}	●	●	●	●	✓	✓	●	Partial running hours
T_{BT}	✓	✓	✓	✓	✓	✓	✓	Estimated time before trip (associated with ANSI 49)
T_{BR}	✓	✓	✓	✓	✓	✓	✓	Estimated time before restart (associated with ANSI 66)
Outputs								
OUT_1 to OUT_{22}	✓	●	●	✓	●	●	●	Relay outputs (up to 22 available)
TLC	✓	●	●	●	●	●	●	Latch reset
Logic functions								
TT_1 to TT_9	✓	✓	✓	✓	✓	●	✓	6IN/1OUT Truth table (up to 9 available)

Dimensions

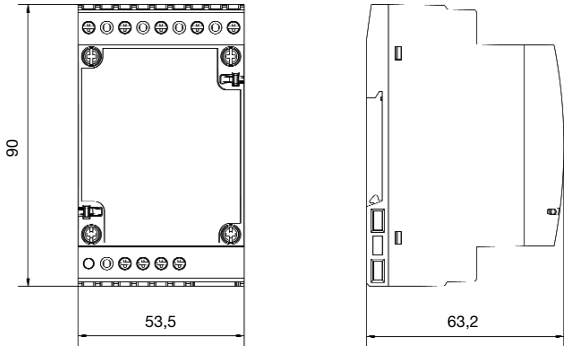
DMPUC-MBT



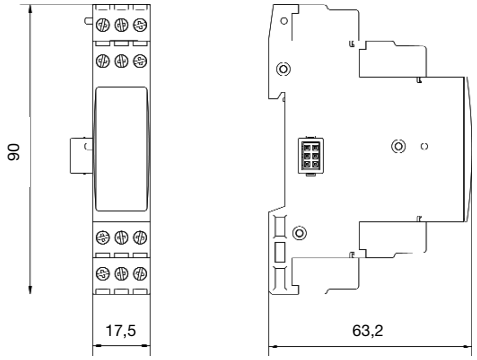
DMPUC-PRB



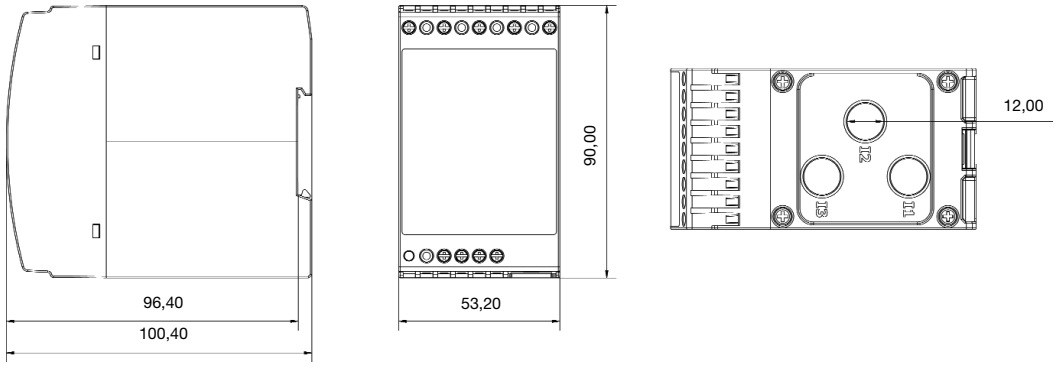
DMPUC-05



DMPUC-R2 and DMPUC-EL



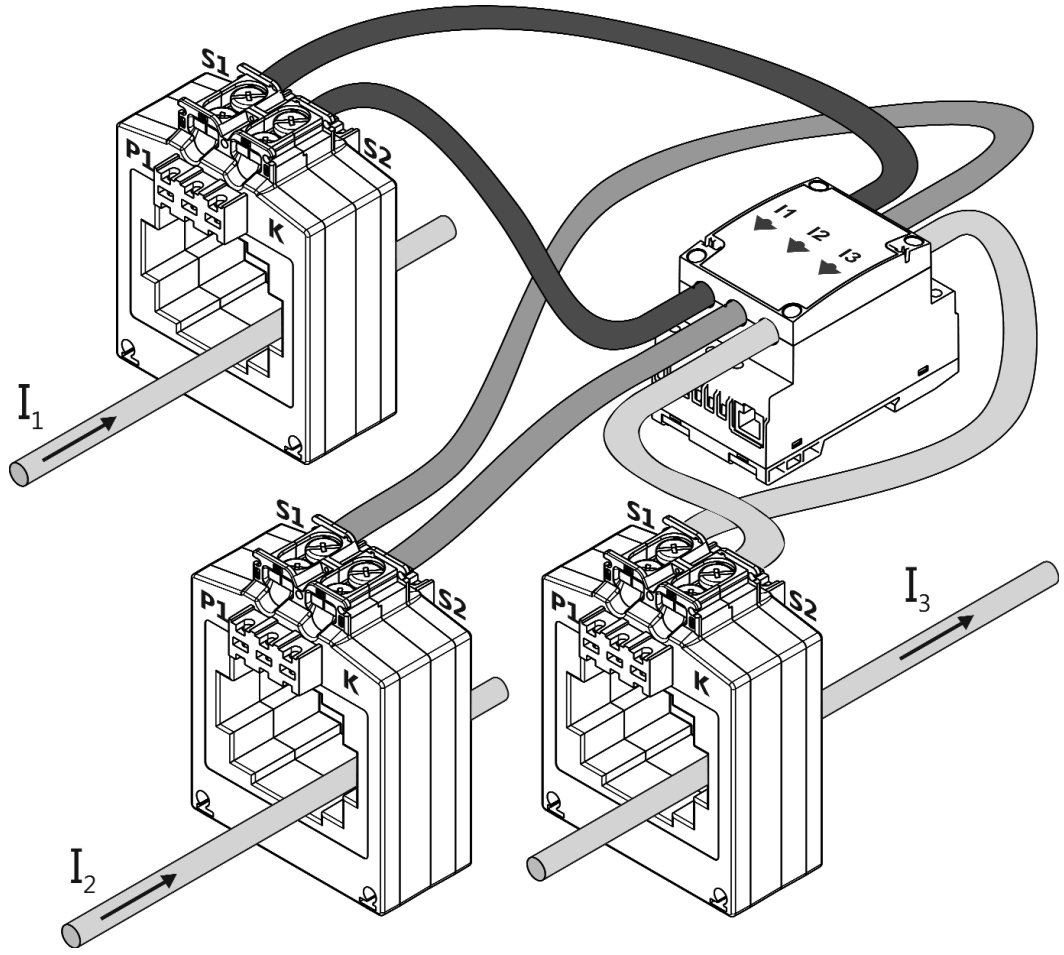
DMPUC-65



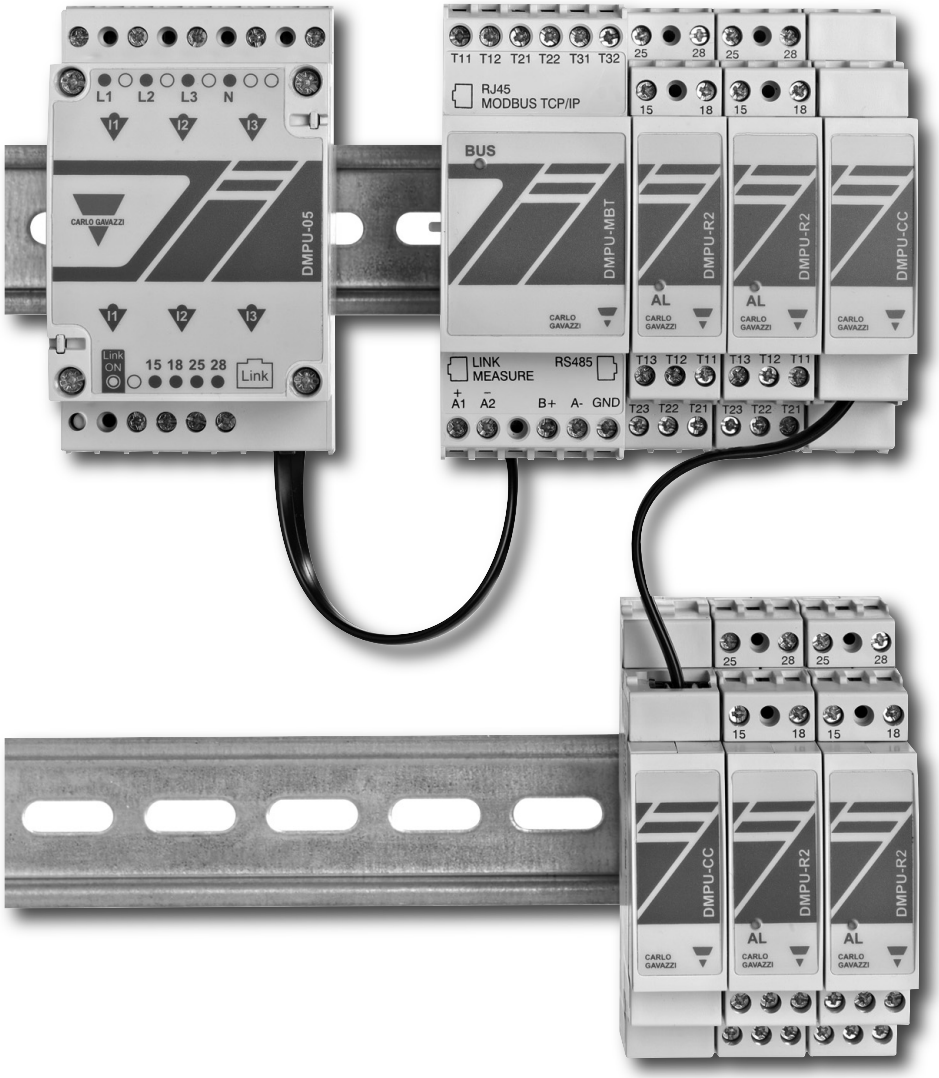
Current Transformer Selection

Motor power [kW]	Items			
	@230V	@400V	@480V	@600V
1.5	CTD3X1505A	-	-	-
2.2	CTD3X1505A	-	-	-
3.7	CTD3X1505A	CTD3X1505A	CTD3X1505A	-
5.5	CTD3X1505A	CTD3X1505A	CTD3X1505A	CTD3X1505A
7.5	CTD3X2005A	CTD3X1505A	CTD3X1505A	CTD3X1505A
11	CTD3X2005A	CTD3X1505A	CTD3X1505A	CTD3X1505A
15	CTD3X4005A	CTD3X2005A	CTD3X1505A	CTD3X1505A
18.5	CTD3X5005A	CTD3X2505A	CTD3X2005A	CTD3X1505A
22	CTD3X6005A	CTD3X3005A	CTD3X2505A	CTD3X2005A
30	CTD3X7005A	CTD3X4005A	CTD3X3005A	CTD3X2505A
37	CTD4X10005A	CTD3X5005A	CTD3X4005A	CTD3X3005A
45	CTD4X12005A	CTD3X6005A	CTD3X5005A	CTD3X4005A
55	CTD4X15005A	CTD3X7005A	CTD3X6005A	CTD3X5005A
75	CTD8V20005A	CTD4X10005A	CTD3X7505A	CTD3X6005A
90	CTD8V25005A	CTD4X15005A	CTD4X10005A	CTD3X7505A
110	CTD8V30005A	CTD4X16005A	CTD4X15005A	CTD4X10005A

These current transformers are suggested according to the nominal and locked rotor currents; for particular needs see the other current transformer types provided by Carlo Gavazzi (eg. current transformers with different mounting or housing).



Mounting and Positioning



Connect all module (except DMPUC-05) side by side according to the order defined while configuring the device. The first module must be DMPUC-MBT or DMPUC-PRB (main module). If it's used more than one DIN-rail use the internal bus adaptor DMPUC-CC to connect the different groups of modules.

Accessories

Code	Description
DMPU-PS	DMPUC-MBT/DMPUC-PRB programming software (included with DMPU-CPC cable or downloadable from the WEB)
DMPUC-HMI	DMPUC programmable display interface
DMPU-PSHMI	DMPUC-HMI programming software (included with DMPU-PS software)
DMPUC-CC	DMPUC Adaptor to internal bus-to-RJ connector
DMPU-CPAN	DMPUC cable for panel connector
DMPU-CPC	DMPUC cable for PC connection (included with the DMPU-PS software)

По вопросам продаж и поддержки обращайтесь:

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