POWER CUBE TPC series

PRECISION INDUCTION HEATER WITH INTEGRATED CONTROLLER AND FIELD BUS INTERFACE

- **PW3-32/900-TPC** 2,8 kW
- **PW3-45/900-TPC** 3,5 kW
- **PW3-64/900-TPC** 5,6 kW

- Very compact and integrable
- Incorporated temperature control with Thermal Profile mode
- Management of two optical sensors for control of the heating temperature
- Field Bus Interface (ProfiNet, EtherCat, EtherNet/IP...)
- Dual Alternate, high Power output
- Digital and analog control of the output power
- Miniaturized Heating Heads
- Maintains stable and accurate output power even as working conditions change
- High Safety: all models output isolated from the mains
- Built-in Self-diagnosis
- Compliant with the Regulations on Electrical Safety and Electromagnetic Compatibility
- Supplied with Calibration Certificate

45+ years of experience

CEIA reserves the right to make changes, at any moment and without notice, to the models (including programming), their accessories and options, to the prices and conditions of sale

The new TPC series *devices are high-frequency induction generators with an integrated heating temperature control system and an advanced I/O interface.*

The generators are extremely compact, and combine high levels of stability and repeatability of the power delivered with the speed, accuracy and precision of the temperature control system.

The Power Cube TPC series induction generators are strongly orientated towards integrators and OEM customers. The heart of the device is an extremely compact generator with solid-state technology and state-of-the-art electronics, entirely controlled via microcomputer. This allows operation at maximum efficiency whatever the conditions of the work load, maintaining precise, stable and repeatable power delivery.

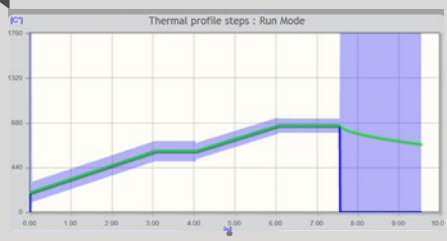
The generator powers up to two miniaturized induction heads, which can therefore be positioned easily in restricted spaces and are also easy to mount on robots and automatic machinery. An original, patented energy transfer solution allows rapid heating of metal components with the minimum absorption of power from the supply network.

ADVANCED CONTROL AND INTERFACE FUNCTIONS

The Power Cube TPC allows operation in thermal profile mode. All the operational parameters of each phase of the heating cycle can be programmed, allowing maximum flexibility in the setting of the heating times, power delivered and operational temperatures for the piece to be heated.

The Field Bus and RS-232 interfaces, in addition to digital and analogical I/O signals, allow connection to a PLC or other external logic for activation, inhibition, control of the power delivered, the operational status of the generator and any excursion from the threshold of the thermal profile set.

THERMAL PROFILE CONTROL

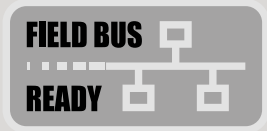


MINIATURIZED HEATING HEAD (2)

POWER CUBE TPC series

COMPACT PYROMETERS (2)

FIELD BUS INTERFACE



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The Power Cube TPC series induction generators are strongly orientated towards integrators and OEM customers.

CHARACTERISTICS OF THE INTEGRATED CONTROLLER

- Digital and analogical control of the power
- Up to 20-step programming of temperature and length of time for each process
- Management of two optical sensors to control the temperature
- Programmable maximum power for each individual segment
- Programmable temperature tolerance for each individual segment

MINIATURIZED HEATING HEADS

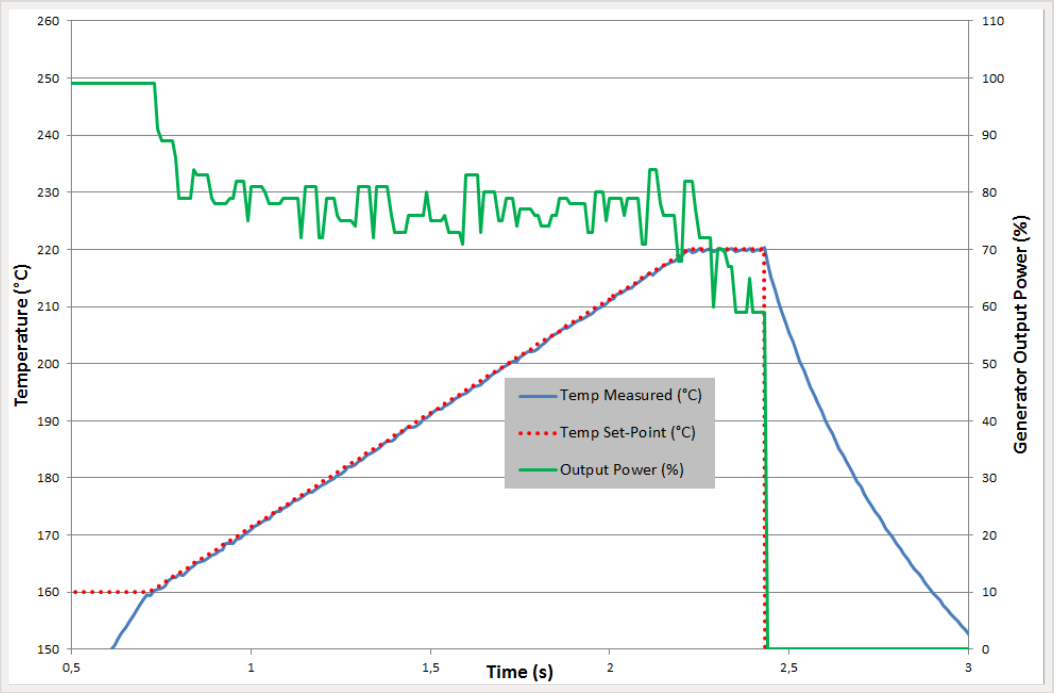
The Power Cube TPC generator can be used to connect to various heating heads:

- ***model HH10 standard***
  for the Power Cube 32/900 and 45/900
- ***model HH11***
  for the Power Cube 64/900

- ***model HH15 miniaturized***
  only for the Power Cube 32/900 and 45/900

** Inductors shown in the pictures as example only*

PW3-45/900-TPC CLOSED LOOP THERMAL PROFILE



- *The very fast response time of the Integrated Controller (=0.5 ms), in combination with the accuracy of CEIA SH15/SLE Pyrometers, allows a very precise and sharp temperature control.*

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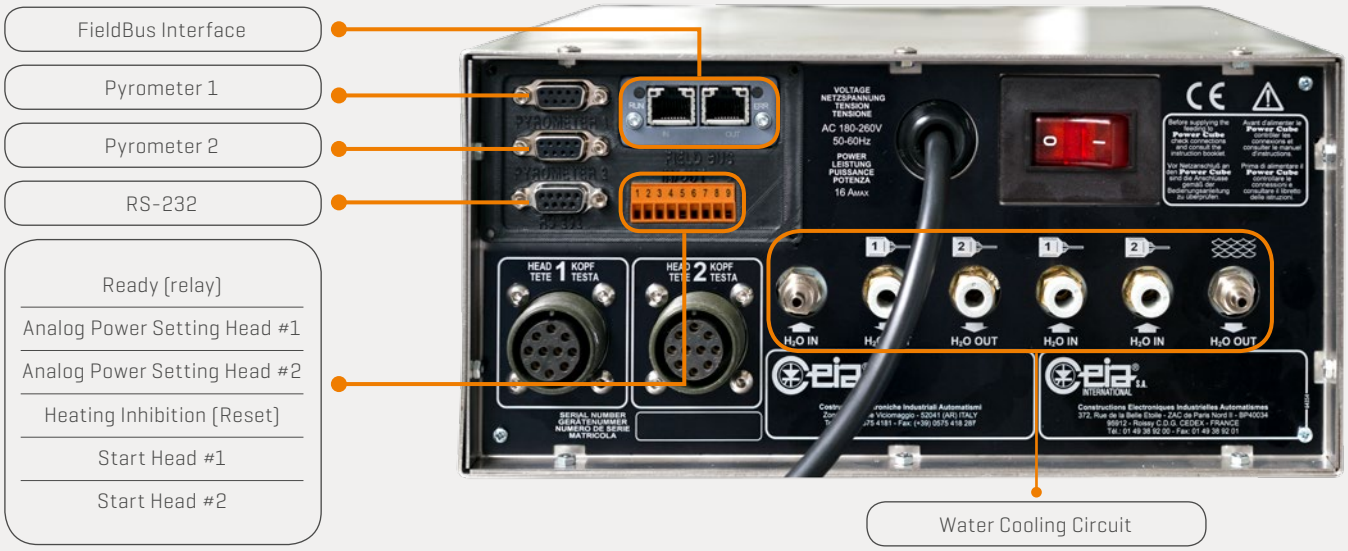
The Field Bus and RS-232 interfaces *allow* ***connection to a PLC*** *or other external logic for activation, inhibition, control of the output power, the operational status of the generator and any excursion from the thresholds of the thermal profile set.*

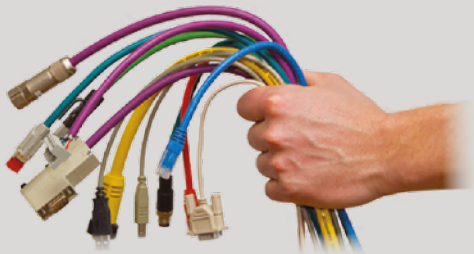
EQUIPMENT CONNECTION



FIELD BUS MANAGEMENT

FIELD BUS READY

- Management and control of the heating process via Field Bus protocol:
  - Profinet
  - EtherCAT
  - EtherNet / IP
  - Others upon request (DeviceNet, Profibus, CANopen, CC-Link, CompoNet, ControlNet, Modbus-RTU or TCP, SERCOS III)
- Field Bus and Network compliance certification available upon request



MAIN PROCESS DATA					
INPUT		OUTPUT			
1	START: 1= Activation Head #1 2= Activation Head #2 0= Stop (working on both sections)	1	Real-Time Reading Temperature, Pyrometer #1	6	Real-Time Generator Output Power, Head #2
		2	Set Point Temperature, Head #1	7	Thermal Profile, Step in progress, Head #1
2	Abort / Reset	3	Real-Time Reading Temperature, Pyrometer #2	8	Thermal Profile, Step in progress, Head #2
3	Generator Set Point Power, Head #1 (10-99%)	4	Set Point Temperature, Head #2	9	Diagnosis Section #1
4	Generator Set Point Power, Head #2 (10-99%)	5	Real-Time Generator Output Power, Head #1	10	Diagnosis Section #2

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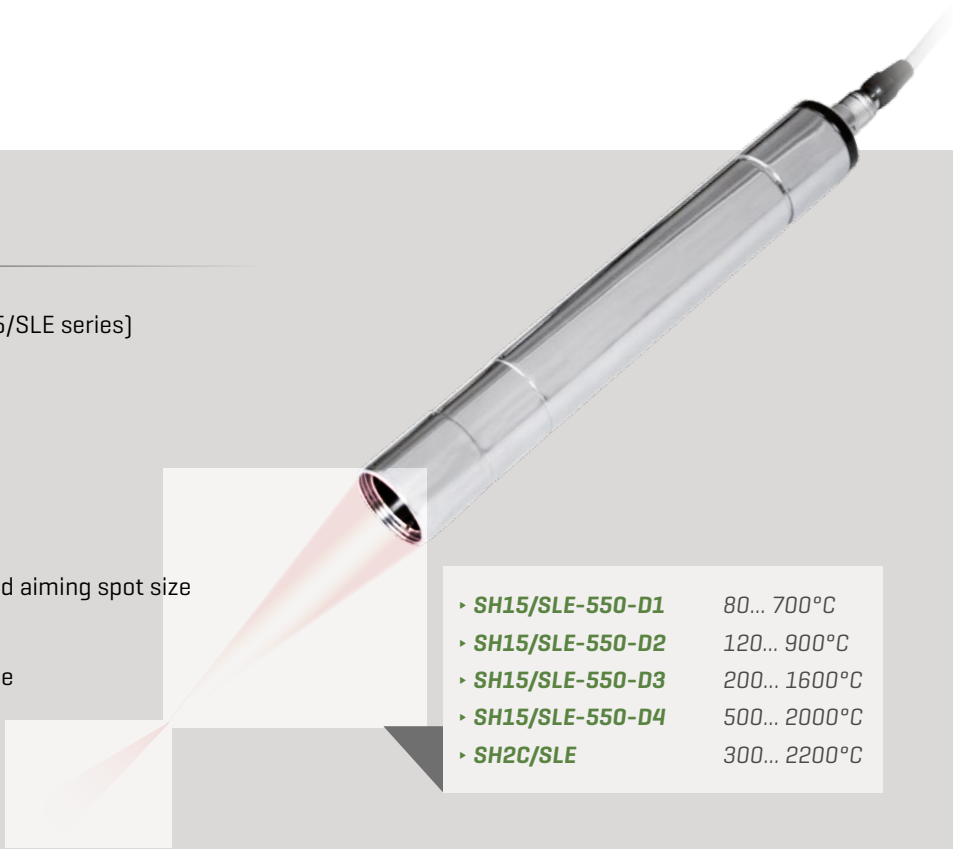
SH/SLE *COMPACT OPTICAL PYROMETERS*

FEATURES

- Emissivity adjustable from 0.1 to 1 (SH15/SLE series)
- Temperature measurement independent from metal emissivity (SH2C/SLE series)
- High Accuracy
- High-Speed
- Very Compact design
- Available with different focus distance and aiming spot size
- LED aiming light
- Supplied with Calibration Report traceable to Certified International Standards
- AISI 304 Stainless Steel Construction



SH15/SLE-550-D1	*80... 700°C*
SH15/SLE-550-D2	*120... 900°C*
SH15/SLE-550-D3	*200... 1600°C*
SH15/SLE-550-D4	*500... 2000°C*
SH2C/SLE	*300... 2200°C*

	SH15/SLE	*SH2C/SLE*	
		Single-color mode	*Dual-color mode*
TEMPERATURE RANGE	80... 2000°C	300... 2200°C	600... 2200°C
TEMPERATURE RESOLUTION	0.1 °C (up to 999.9 °C) / 1 °C (above 1000 °C)	0.1 °C (up to 999.9 °C) / 1 °C (above 1000 °C)	0.1 °C (up to 999.9 °C) / 1 °C (above 1000 °C)
EMISSIVITY RANGE	0.1-1.0	0.1-1.0	N/A
READING SPOT DIAMETER	see table	see table	see table
FOCUS DISTANCE	see table	see table	see table
RESPONSE TIME	100 uS Time Constant		
UNCERTAINTY	± 0,3% of reading in °C. All Pyrometers are supplied with calibration report traceable to certified International Standards		
MEASUREMENT SPOT AIMING	High Definition, 620 nm wavelength led beam		
INTERNAL DIGITAL CONTROLS	Offset and Range Calibration Parameters		
	Environmental Temperature Measurement and Correction		
	Automatic Gain Range Selection		
POWER SUPPLY	+/-15 V - +10/-5 mA, directly supplied by CEIA Controllers		
CONNECTION CABLE	Diameter 4.8 mm x Length 5 ... 1.5 ... 4 m		
HOUSING	AISI 304 Stainless Steel		
WEIGHT	100 g		
HOUSING PROTECTION CLASS	IP65		
OPERATING TEMPERATURE	0 °C to + 65 °C		
STORAGE TEMPERATURE	- 25 °C to + 70 °C		
CONFORMITY	Complies with international standards currently applicable for Electrical Safety and Electromagnetic Compatibility (EMC)		

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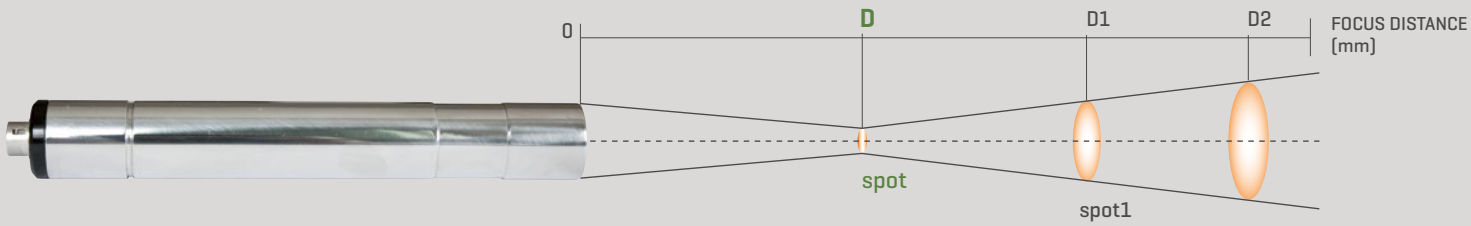
The SH/SLE sensors allow high quality management of the heating process *according to the set temperature values. The reduced overall dimensions allow an easy integration of the pyrometer in automatic production systems. Up to two optical sensors for temperature measurement can be connected to the generator.*

MODEL CONFIGURATION AND OPTICS DATA



MODEL	Close-up lens	D distance (mm)	Spot diameter (mm)	D1 distance 1 (mm)	Spot 1 diameter (mm)	D2 distance 2 (mm)	Spot 2 diameter (mm)
SH15/SLE-550-D1 80... 700°C	Included	550	12.5	1000	36	2000	86
	CL240/SH15	240	4.5	500	24	1000	63
	CL120/SH15	120	2.5	250	19	500	52
	CL60/SH15	60	0.5	150	18.5	300	51
SH15/SLE-550-D2 120... 900°C	Included	550	4.5	1000	21	2000	57
	CL240/SH15	240	1.5	500	18	1000	51
	CL120/SH15	120	1	250	17	500	46
	CL60/SH15	60	<0.4	150	19	300	50
SH15/SLE-550-D3 200... 1600°C	Included	550	2	1000	16.5	2000	47
	CL240/SH15	240	0.6	500	16	1000	47
	CL120/SH15	120	<0.4	250	15	500	44
SH15/SLE-550-D4 500... 2000°C	Included	550	2	1000	16.5	2000	47
	CL240/SH15	240	0.6	500	16	1000	47
	CL120/SH15	120	<0.4	250	15	500	44
SH2C/SLE 300... 2200°C	Included	550	12.5	1000	36	2000	86
	CL240/SH15	240	4.5	500	24	1000	63
	CL120/SH15	120	2.5	250	19	500	52

SH15/SLE MODEL APPLICATIONS

- ANNEALING
- BONDING
- BRAZING
- CAP SEALING
- CURING
- FORGING
- HARDENING
- HOT FORMING
- LOCALIZED HEATING
- MELTING
- METAL GLASS SEALING
- NORMALIZING
- PREHEATING
- SINTERING
- SHRINK FITTING
- TEMPERING
- TIN SOLDERING

SH2C/SLE MODEL APPLICATIONS

- HARDENING, FORGING, BRAZING, SOLDERING
- NOBLE METALS MELTING AND PURIFYING
- WIRE/ROD MILL
- SILICON PROCESSING
- GLASS INDUSTRY - GOB TEMPERATURE MEASUREMENT
- CEMENT INDUSTRY - CLINKER TEMPERATURE IN ROTARY KILNS

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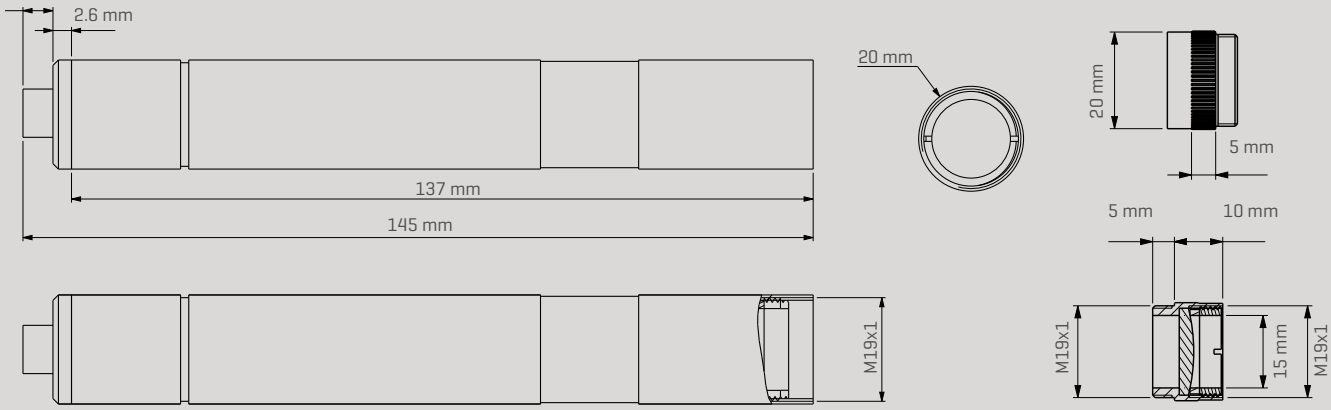
ACCESSORIES

	Description		Focus distance	Code
	CLOSE-UP LENS SH15-FOCUS		240 mm	CL240/SH15
			120 mm	CL120/SH15
			60 mm	CL60/SH15
	COOLING JACKET UNIT WITH INTEGRATED AIR PURGE			SLE-PURGE-COOL
	90° VIEW MIRROR SYSTEM			SLE-90D-BD
	AIR PURGE UNIT			SLE-PURGE
	CONNECTION CABLE	FOR SH15/SLE	LENGTH: 1.5 m	49438
			LENGTH: 4 m	49439
		FOR SH2C/SLE	LENGTH: 1.5 m	63272
			LENGTH: 4 m	63273
	ES3M MICROMETRIC OPTICAL SENSOR BASE			23497
	SH23 OPTICAL SENSOR BASE			21871

DIMENSIONS



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POWER CUBE TPC series TECHNICAL DATA

POWER SUPPLY	Supply voltage	180-260V~, monophase - 50/60 Hz	
COOLING	Water cooling system	Direct connection to tap water	
		External tank of 200dm3 with 0.4 Hp pump	
		External chiller	
	Pressure	From 150 to 600 kPa (suggested 300 kPa)	
	Allowed water type	Tap water with PH between 7 and 9; hardness lower than 6°F	
		Deionized or demineralized water, with addition of glycol (with the minimum suggested concentration)	
	Input water temperature	From environmental temperature to a maximum of 45°C (without condense)	
OPERATIONAL MODE	Continued activation of one head		
	Alternated activation over two heads		
FUNCTIONING MODES	Functioning with thermal profile and manual		
MANAGEMENT AND CONTROLS	Cycle activation by means of pedal or external control		
	Analogic regulation of the heating power through 0 ÷ 10 V input		
	Heating power automatically stabilized (not influenced by variations in the power supply)		
	Temperature control	Through optical pyrometer	
	SH15/SLE Control loop time	0.5 milliseconds	
	Digital regulation of the heating power	10 - 99 %	
	SH15/SLE time constant	0.1 milliseconds	
SELF-DIAGNOSIS	Any malfunctioning is indicated by a display signal and a buzzer	Monitors of the temperature and pressure of the cooling water	Monitors of that the coil size is correct
		Monitors of possible short-circuit of the heating coil	Monitors of head connection
		Internal malfunctioning	Monitors of the power supply voltage value
		Monitors of the correct connection between the Main Unit and the Slave Unit (PowerCube 64)	
GENERATOR	Type	Container in stainless steel	
	Dimensions (W x D x H)	275 mm x 265 mm x 140 mm (the PowerCube 64 comprises two control units of the same dimensions)	
	Power supply cable	2.6 m	
	Hydraulic connection to and from the cooling unit	1/8" connections by 6/4 mm rubber tube (PowerCube 32 and 45) 1/8" connections by 8/6 mm rubber tube (PowerCube 64)	
	Hydraulic connection to and from the heating heads	1/8" connections by 6/4 mm rubber tube	
CONTROL INPUTS	1 RS232 asynchronous serial port for connection with external PLC or Controller		
	2 inputs for the CEIA optical pyrometers SH15/SLE		
	2 isolated digital inputs for the thermal cycle activation switches		
	1 isolated digital input for heating inhibition		
	2 analog inputs for output power control		
	1 plug for a Field Bus module (accessory)		
OUTPUTS FOR EXTERNAL DEVICES ACTIVATION	1 outputs (relay 24 Vdc / 24 Vac 0,5 A max) for "Alarm" signal		
SAFETY FEATURES	Power supply feed galvanically insulated;		
	Low operational voltage: no danger to the operator		
	Conforms to the international standards currently applicable for electrical safety and E.M.C.		
OPERATING CONDITIONS	Working temperature	+15° to +55°C	
	Storage temperature	-25° to +70°C	
	Relative humidity	20-95% (without condensation)	
CERTIFICATIONS AND CONFORMITY	Complies with EC Regulations and International Standards relating to Electrical Safety and Electromagnetic Compatibility.		
	Complies with 2004/108/CE regulation for industrial applications.		

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