TICRO 100

Technical Data

1 Technical Data

1.1 Timing performance

Characteristic	Specification
PTP time stamping resolution	8 ns
PTP locking speed	Locked after approximately 30 seconds (overall accuracy better than 200 ns)
Supported timing protocol	PTP according to IEEE 1588 (version 2)
PTP features (IEEE 1588)	Default profiles according to IEEE 1588, Annex J: • End-to-end (multicast) and peer-to-peer delay mechanisms • PTP over UDP/IPv4, UDP/IPv6 and Ethernet/IEEE 802.3 (IEEE 1588, Annex D, E, and F) Power profile according to IEEE C37.238-2011 (IEEE profile for use of IEEE 1588 Precision Time Protocol in power system applications) Power profile according to IEEE C37.238-2017 (IEEE profile for use of IEEE 1588 Precision Time Protocol in power system applications) Power Utility profile according to IEC 61850-9-3:2016 (Precision Time Protocol profile for power utility automation)
Hold-over performance	Hold-over drift in 24 hours at constant temperature, after 48 hours of operation, and with high-precision oscillator OCXO-25: < 25 µs (measured values < 4 µs)

1.2 Power supply

Characteristic	Specification
Power over Ethernet (PoE)	Max. power consumption: 13 W Class 3 powered device (PD) according to IEEE 802.3 Operates as PSE (power sourcing equipment) according to IEEE 802.3 when powered via the front or rear panel DC input. Capable of supplying class 1 powered devices (< 4 W).
Front panel DC input	MC 1.5/2-STF-3.81, terminal block supplied on delivery Supply voltage: 18 … 57 VDC Max. power consumption: 15 W Max. conductor cross section: 1.5 mm^2

Characteristic	Specification
	WARNING **Death or severe injury caused by high voltages possible.** ► If product safety according to IEC 61010-1 is required, use a power supply unit that complies with SELV according to IEC 60950-1. The plug-in power supply unit supplied on delivery complies with SELV according to IEC 60950-1.
Rear panel DC input	Standard DC barrel jack 2.5 × 5.5 × 11 mm, center pin positive Barrel connector for power supply unit supplied on delivery Supply voltage: 18 … 57 VDC Max. power consumption: 15 W **WARNING** **Death or severe injury caused by high voltages possible.** ► If product safety according to IEC 61010-1 is required, use a power supply unit that complies with SELV according to IEC 60950-1. The plug-in power supply unit supplied on delivery complies with SELV according to IEC 60950-1. **NOTICE** **Equipment damage caused by overvoltage possible.** The rear panel DC input does not fulfill the surge requirements of IEC 60255-26. ► Use the front panel DC input if IEC 60255-26 compliance is required.

1.3   Frequency outputs and time codes

 WARNING

Death or severe injury caused by high voltages possible.
All inputs and outputs of *TICRO 100* are electrically connected to the SELV insulation group of the device.

► Only connect voltages that are SELV compliant to all inputs and outputs.

1.3.1   Electrical specifications

Output	Specification
10 MHz	BNC connector
	Sinusoidal
	50 Ω output impedance
	4 dBm ± 2 dB at 50 Ω load
	Short-circuit protected
	Ground connected to housing
Out 1, Out 2	BNC connector
	Configurable
	50 Ω output impedance
	Unmodulated time codes: 2.5 V at 50 Ω load, 5 V at open circuit, TTL compatible
	Modulated IRIG-B: 3 V amplitude (peak) at 50 Ω load, 6 V amplitude at open circuit
	Short-circuit protected
	Ground connected to housing
Out 3	Screw terminal
	Configurable Optocoupler Darlington output
	Maximum collector-emitter voltage: 30 V
	Maximum current: 100 mA
	Pulse delays: tON < 3 µs (at all load impedances) tOFF < 20 µs (at 30 VDC, load impedance < 1 kΩ)
	Supports digital (unmodulated) time codes only
Out 4, Out 5	Optical fiber output
	ST connector
	820 nm wave length
	Compatible with 50/125 µm, 62.5/125 µm, 100/140 µm fibers, and 200 µm plastic-clad silica (PCS) fibers
	Supports digital (unmodulated) time codes only

1.3.2 Supported time codes

Time code	Description
IRIG-B	TAI, UTC or local time base
	IRIG-B 00x (unmodulated) or IRIG-B 12x (modulated on 1 kHz carrier)
	Coded expressions: control functions, straight binary seconds, BCD_{year}
DCF77	Unmodulated DCF77 time code
	CET/CEST time base
PPX	TAI, UTC or local time base
	1, 10, 100 or 1000 PPS (pulses per second), 1 PPM (pulse per minute), 1 PPH (pulse per hour), 1 PPX, or custom pulse frequency
	Custom pulse frequency between
	• 10 MHz (at output 1 and output 2) and 2.048 MHz with "Enable high frequency PPX mode" option enabled
	• 10 MHz and 10 kHz (at output 3) sine wave, 4 dBm ± 2 dB
	Custom pulse width (> 10 ns)
	Time reference: falling or rising edge
	Can be combined with Trigger
Trigger	TAI, UTC or local time base
	Absolute trigger date and time programmable with 1 s resolution
	Can be combined with PPX

1.4 Networking and management

Characteristic	Specification
Networking	Twisted-pair (10BaseT/100BaseTX, RJ45) and optical (100BaseFX, LC multimode, fiber, full duplex) Ethernet connectors. One network interface useable at a time.
	IPv4 and IPv6 support
	Power over Ethernet according to IEEE 802.3
	DHCP
	Zeroconf (MDNS/DNS-SD)
USB	USB 2.0 (type B)
	USB network gadget (RNDIS)
	Allows network connection to *TICRO 100* and devices connected to the Ethernet interface of *TICRO 100* (with USB, only IPv4 is supported)
Management	Web Interface (HTTP/HTTPS)
	TFTP, FTP and SSH access

Characteristic	Specification
	Automated configuration via SSH, SOAP and XML files
	Failsafe software upgrade in the field
	Email notifications
	Syslog (local and remote)

1.5   Environmental conditions

Characteristic	Specification
Temperature range	Operating: –20 °C … +50 °C (–4 °F … +122 °F)
	Storage: –40 °C … +85 °C (–40 °F … +185 °F)
Climate	Tested according to IEC 60068-2-30, Test Db, damp heat, cyclic (6 cycles, 55 °C)
Humidity	5 % … 95 % relative humidity; no condensation

1.6   Mechanical specifications

Characteristic	Specification
Housing type	IP40 according to IEC 60529
Dimensions H × W × D	54.6 × 171.6 × 121 mm (2.15 " × 6.75 " × 4.76 ") (without connectors and without DIN rail clip)
Weight	< 750 g (< 1.65 lb

1.7   Standards

1.7.1   Electromagnetic compatibility (EMC)

This Product adheres to the electromagnetic compatibility (EMC) directive 2014/30/EU (CE conform).

Electromagnetic compatibility (EMC)	
Radiated immunity	IEC 60255-22-3 80 MHz … 3 GHz, AM 1 kHz, m=0.8, 10 V/m
Conducted immunity continuous wave	IEC 60255-22-6 150 kHz … 80 MHz, AM 1 kHz, m=0.8, 10 V, spot measurements at 27 MHz, 68 MHz
Radiated emission	IEC 60255-26
Conducted emission	IEC 60255-26 150 kHz … 30 MHz
Electrostatic discharge	IEC 60255-22-2 Contact discharge: ±6 kV Air discharge: ±8 kV
Electrical fast transient/ burst	IEC 60255-22-4 At 5/5 ns, 5 kHz, 1 minute: • Front and rear panel DC inputs: ±2 kV • Ethernet port (RJ45): ±4 kV • 10 MHz, Out 1, Out 2, Out 3: ±4 kV • USB port: ±1 kV
Surge	IEC 60255-22-5 Front panel DC input: Line-Line ±1 kV, Line-PE ±2 kV Rear panel DC input: Line-PE ±0.5 kV Ethernet port (RJ45): Line-PE ±1 kV

NOTICE

Equipment damage caused by overvoltage possible.

The rear panel DC input does not fulfill the surge requirements of IEC 60255-26.

► Use the front panel DC input if IEC 60255-26 compliance is required.

NOTICE

Equipment damage caused by overvoltage possible.

The USB port was not tested against surge levels because it is not a permanently connected port.

1.7.2   Safety standards

Certified safety standards:

- IEC 61010-1
- IEC 60255-27