



tīma GPS Master Clocks

- ✓ specifically designed for protection, automation and control applications in power systems
- ✓ 60 ns (99%) maximum time deviation
- ✓ single or dual 10/100Base-T Ethernet port(s)
- ✓ VLAN / IEEE 802.1Q support
- ✓ RS232 and RS422/485 serial port with PPS output, supports most common used time strings
- ✓ timing signal generators for IRIG-B, PPS or PPM signals
- ✓ expansion cards for up to six additional outputs
- ✓ isolated hi-power electrical, isolated open collector, amplitude-modulated, or optical fiber outputs available
- ✓ supports NTP/SNTP
- ✓ built-in SNMP agent, with trap generation
- ✓ dry contact for remote signaling
- ✓ antenna cable delay compensation
- ✓ user-configurable rules for daylight-saving-time (DST)
- ✓ leap second announcement
- ✓ developed and built in Germany

1 available models

				
	tīma 2P 1U	tīma 2P 1.5U	tīma 2R 1U	tīma 2R 1.5U
mounting	panel	panel	19" rack	19" rack
front panel height	44 mm [1.73 in]	66 mm [2.6 in]	44 mm [1.73 in]	66 mm [2.6 in]
isolated electrical outputs	up to 2	up to 2	up to 6	up to 6
open collector outputs	up to 4	up to 4	up to 6	up to 6
amplitude-modulated outputs	up to 2	up to 2	up to 6	up to 6
optical fiber outputs	up to 2	up to 2	up to 6	up to 6
serial port	yes	yes	yes	yes
Ethernet ports	1	1	1 or 2	1 or 2
PRP/HSR support	no	no	yes (option)	yes (option)
S/NTP support	yes	yes	yes	yes
IRIG-B004 signal	yes	yes	yes	yes
PPS signal	yes	yes	yes	yes
PPM signal	yes	yes	yes	yes
alarm dry contact	yes	yes	yes	yes
operating voltages	18–72 Vdc 80–300 Vdc / 85–264 Vac (50/60 Hz)			
redundant power supply	no	no	yes (option)	yes (option)
max power consumption	7 VA	7 VA	10 VA	10 VA
unit dimensions	269 x 141 mm [10.6 x 5.6 in]	269 x 141 mm [10.6 x 5.6 in]	483 x 141 mm [19 x 5.6 in]	483 x 141 mm [19 x 5.6 in]
unit weight	1.4 kg [3.1 lb]	1.4 kg [3.1 lb]	2.3 kg [5.1 lb]	2.3 kg [5.1 lb]
shipping dimensions	400 x 200 x 100 mm [15.7 x 7.9 x 3.9 in]	400 x 200 x 100 mm [15.7 x 7.9 x 3.9 in]	600 x 200 x 100 mm [23.6 x 7.9 x 3.9 in]	600 x 200 x 100 mm [23.6 x 7.9 x 3.9 in]
shipping weight	2.5 kg [5.5 lb]	2.5 kg [5.5 lb]	3.5 kg [7.7 lb]	3.5 kg [7.7 lb]

2 master clock

- GPS Receiver**
- 16-channel GPS receiver
 - L1 (1575.42 MHz) signal, C/A code
 - active antenna, up to 250 m [820 ft] cable length
 - -162 dBm tracking sensitivity
 - single-satellite operation supported
 - 60 ns accuracy (99%)
 - antenna cable delay compensation
 - antenna cable open and short-circuit detection
 - BNC coaxial connector (female)

- backup oscillator**
- digital temperature compensated crystal oscillator (DTCXO)
 - 0.1 ppm typical drift
 - user-defined out-of-bounds alarm

- display**
- 127 x 18 mm [5.0 x 0.7 in] “hyper red” (630 nm) LED dot matrix display
 - user-configurable content: date, time and/or time zone / offset
 - shows number of satellites tracked during acquisition
 - clear text alarm messages

- daylight saving time**
- pre-defined DST rules for Europe, North America and Brazil
 - custom user-defined rules based on relative or fixed dates

- power supply**
- operating voltages: 18–72 Vdc or 80–300 Vdc / 85–264 Vac (50/60 Hz)
 - less than 7 VA (tīma 2P) / 10 VA (tīma 2R) power consumption

- alarm dry contact**
- normally closed (opens to signal alarm)
 - breaking capacity: 300 mA @ 300 Vdc (resistive load)

- isolated electrical outputs**
- 5 V and RS422/RS485 signal levels
 - 200 mA drive capability at 5 V level
 - up to 50 m [160 ft] cable
 - 15 Ω output impedance
 - fully-isolated from remaining outputs
 - protected against short-circuit and overload
 - BNC coaxial and pin header connectors (option ‘1’, single output)
 - pin header connector only (option ‘2’, dual output)

- open collector outputs**
- 250 V max load voltage
 - 100 mA max load current
 - current limit protection
 - fully-isolated from remaining outputs
 - pin header connector

- fiber-optic outputs**
- 820 nm wavelength
 - optical power: -15.8 dBm into 50/125 μ m fiber (-12 dBm into 62.5/125 μ m fiber)
 - up to 1500 m [1600 yards] multimode optical fiber
 - ST or FC connectors

- amplitude-modulated outputs**
- IRIG-B124 encoding
 - 5 Vpp (no load) / 3.2 Vpp (50 Ω load) output voltage
 - 25 Ω output impedance
 - BNC connectors

- Ethernet**
 - 10/100 Mbps port(s) for configuration, monitoring and time-based protocols
 - VLAN IEEE 802.1Q support
 - embedded NTP/SNTP server (protocol version 4), configurable access restrictions and strata levels
 - SNMP agent, including trap generation (protocol versions v1, v2c and v3)
 - RJ45 connector(s)

- serial port**
 - RS232 and RS422/485 signal level
 - 1200, 2400, 4800, 9600, 19200, 38400 bps
 - 7 or 8 data bits, 1 or 2 stop bits
 - none, even or odd parity
 - supports most common used time strings (NMEA, Meinberg, SEL, Truetime, Kinematics, among others)
 - includes PPS signal on the same connector

- environmental**
 - rated for operation from -40 to +85 °C [-40 to +185 °F]
 - 5 to 95%, non-condensing relative humidity
 - IP40-rated enclosure protection

- type tests**
 - IEC 61000-4-2: Electrostatic discharge immunity test
 - IEC 61000-4-3: Radiated, radio-frequency, electromagnetic field immunity test
 - IEC 61000-4-4: Electrical fast transient/burst immunity test
 - IEC 61000-4-5: Surge immunity test
 - IEC 61000-4-6: Immunity to conducted disturbances, induced by radio-frequency fields
 - IEC 61000-4-11: Voltage dips, short interruptions and voltage variations immunity tests
 - IEC 60255-5: Insulation coordination for measuring relays and protection equipment

3 antenna



20149

- GPS L1, Glonass G1 active antenna
- 50 Ω impedance
- +28 $\pm$ 3 dB typical gain
- 3.0 to 5.0 $\pm$ 0.3 V supply voltage
- 15 mA typical current consumption (at 5.0 V)
- temperature range: -55 to +85 °C [-67 to +185 °F]
- relative humidity: up to 95%
- water-proof (IP67 rated)
- UV resistant
- weight: 100 g [3.5 oz]
- 0.5 m [20 in] coaxial cable with BNC connector (female)

4 surge arrester



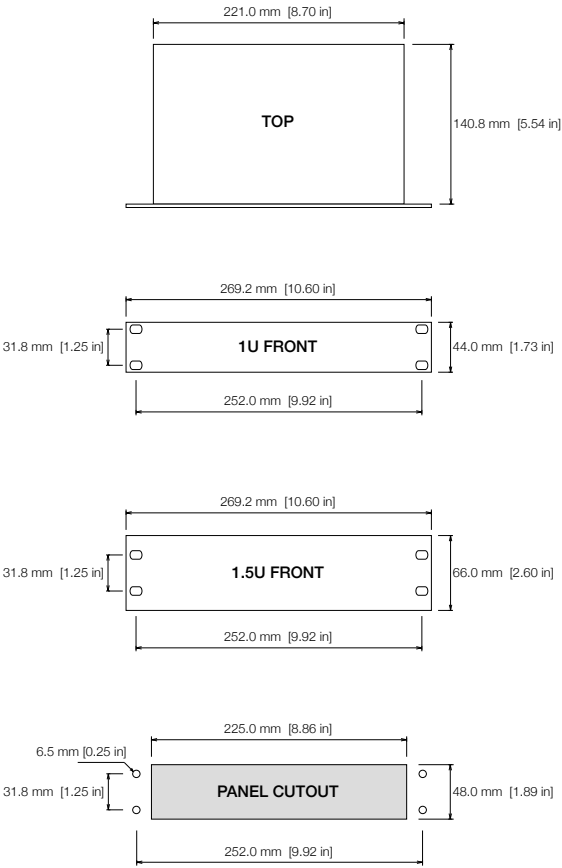
20115

- type: gas discharge
- spark-over voltage: 90 V
- maximum discharge current: 20 kA
- insertion loss: less than 0.2 dB
- temperature range: -55 to +85 °C [-67 to +185 °F]
- relative humidity: 5 to 95%, non-condensing
- weight: 100 g [3.5 oz]
- BNC coaxial connectors (female)

5 antenna cables

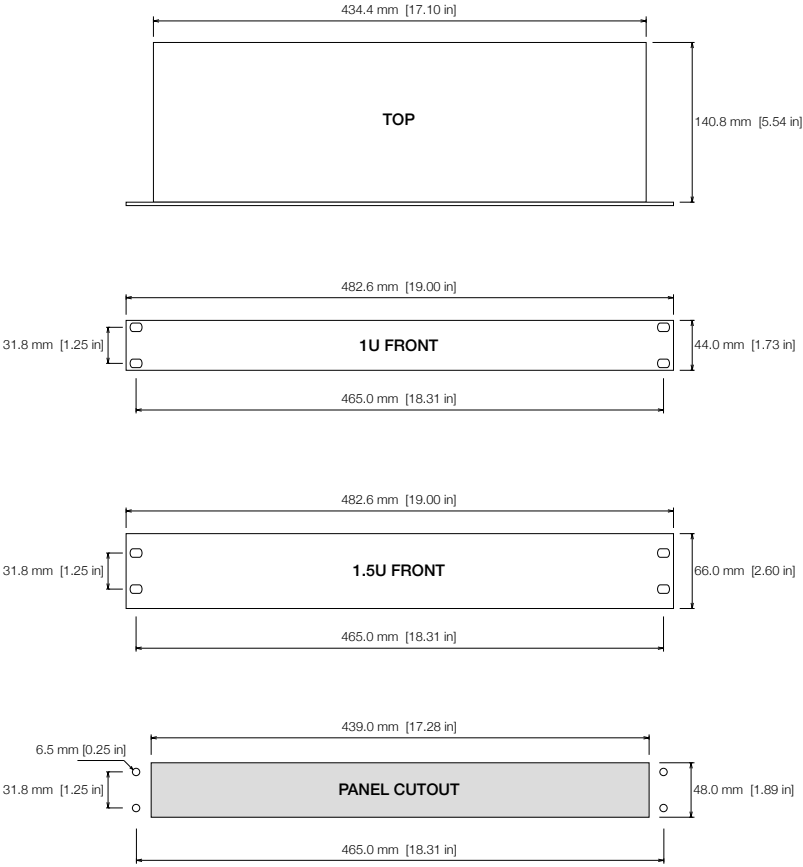
	RG58 C/U	Aircell 5	Aircell 7	LMR-400
maximum length	40 m	100 m	150 m	250 m
external diameter	5mm	5 mm	7.3 mm	10.3 mm
attenuation @ 1.5GHz	100 dB/100 m	39 dB/100 m	27 dB/100m	17 dB/100 m
min bending radius	25 mm	25 mm	25 mm	25 mm
weight	36 g/m	36 g/m	72 g/m	100 g/m
pulling strength	56 daN	12 daN	2 daN	7 daN
DC resistance	53 Ω /km	34 Ω /km	17 Ω /km	10 Ω /km
velocity factor	0.66	0.82	0.83	0.85
connectors	BNC (male)	BNC (male)	BNC (male)	BNC (male)
temperature range	-35 to +80 °C [-31 to +176 °F]	-55 to +85 °C [-67 to +185 °F]	-30 to +80 °C [-22 to +176 °F]	-40 to +85 °C [-40 to +185 °F]

6 tīma 2P dimensional drawings / panel cutout



1007

7 tīma 2R dimensional drawings / panel cutout



10025

8 tīma 2P ordering codes

		T I M A 2 P ☐ — ☐ A ☐ — ☐ ☐ ☐ ☐ ☐									
Front panel height	1U	0									
	1.5U	5									
Power supply	18–72 Vdc	L									
	80–300 Vdc / 85–264 Vac	H									
Expansion card	none	0									
	single isolated output (coax and pin header connectors)	1									
	dual isolated outputs (pin header connector)	2									
	dual open collector outputs (pin header connector)	3									
	quad open collector outputs (pin header connector)	4									
	dual amplitude modulated outputs (coax connector)	A									
	dual fiber outputs (ST connectors)	F									
	dual fiber outputs (FC connectors)	G									
Antenna	no antenna	X									
	3.3 V active antenna	A									
Antenna cable	no antenna cable	000									
	15 m [50 ft] antenna cable	015									
	20 m [66 ft] antenna cable	020									
	25 m [80 ft] antenna cable	025									
	40 m [130 ft] antenna cable	040									
	45 m [147 ft] antenna cable	045									
	65 m [210 ft] antenna cable	065									
	100 m [328 ft] antenna cable	100									
Surge arrester	250 m [820 ft] antenna cable	250									
	no surge arrester	X									
Antenna mounting kit	20 kA surge arrester	S									
	no antenna mounting kit	X									
	antenna mounting kit (wall)	W									

9 tīma 2R ordering codes

		T I M A 2 R ☐ - ☐ ☐ A ☐ ☐ ☐ - ☐ ☐ ☐ ☐													
Front panel height	1U	0													
	1.5U	5													
Power supply 1	18–72 Vdc	L													
	80–300 Vdc / 85–264 Vac	H													
Power supply 2	none	0													
	18–72 Vdc	L													
	80–300 Vdc / 85–264 Vac	H													
Ethernet ports	single port (copper, RJ45 connector)	A													
	additional port (copper, RJ45 connector)	B													
Expansion card 1	none	0													
	single isolated output (coax and pin header connectors)	1													
	dual isolated outputs (pin header connector)	2													
	dual open collector outputs (pin header connector)	3													
	dual amplitude modulated outputs (coax connectors)	A													
	dual fiber outputs (ST connectors)	F													
	dual fiber outputs (FC connectors)	G													
Expansion card 2	none	0													
	single isolated output (coax and pin header connectors)	1													
	dual isolated outputs (pin header connector)	2													
	dual open collector outputs (pin header connector)	3													
	dual amplitude modulated outputs (coax connectors)	A													
	dual fiber outputs (ST connectors)	F													
Expansion card 3	dual fiber outputs (FC connectors)	G													
	none	0													
	single isolated output (coax and pin header connectors)	1													
	dual isolated outputs (pin header connector)	2													
	dual open collector outputs (pin header connector)	3													
Antenna	no antenna	X													
	3.3 V active antenna	A													
	no antenna cable	000													
	15 m [50 ft] antenna cable	015													
Antenna cable	20 m [66 ft] antenna cable	020													
	25 m [80 ft] antenna cable	025													
	40 m [130 ft] antenna cable	040													
	45 m [147 ft] antenna cable	045													
	65 m [210 ft] antenna cable	065													
	100 m [328 ft] antenna cable	100													
	250 m [820 ft] antenna cable	250													
Surge arrester	no surge arrester	X													
	20 kA surge arrester	S													
Antenna mounting kit	no mounting kit	X													
	antenna mounting kit (wall)	W													