



## LEADING SUBSTATION CLOCK

## TCG 01-G

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The TCG 01-G is a highly accurate, full featured Global Navigation Satellite System (GNSS) clock for use in electricity protection and control systems. The TCG 01-G supports IEEE 1588 v2 and conforms to IEC 61850.

The TCG 01-G can reference signals from either or both the GPS and GLONASS satellite networks. The clock synchronizes multiple IEDs (Intelligent Electronic Devices) within a network, including protection relays and remote telemetry units, and provides time-stamps to all electronic data being generated by the IEDs.

## KEY FEATURES

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- References GPS and GLONASS networks
- Multi-level password protection
- Independently isolated outputs
- Isolated power supply
- High power line drivers
- Low noise characteristics due to balanced pair distribution
- UTC and LST with user defined DST options
- Remote configuration over Ethernet
- Configuration Security
- Enhanced security and encryption that exceeds NERC CIP requirements
- Remote firmware upgrades

## SUPPORTS

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- IEEE 1588 (PTP C37-238, Telecom Slave only profile, ITU G.8265.1, Telecom Full profile ITU G-8275.1)
- DC IRIG-B or Modified Manchester
- AM IRIG-B (Modulated)
- Serial Strings
- User defined pulses
- DCF77
- NTP/ SNTP (IEC 61850)
- Event Recording

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## PHYSICAL

(W) 160 mm x (D) 155 mm x (H) 40 mm, 0.8 kg  
1U 19" rack mount bracket accessory included  
IP40 (Ingress Protection rating)

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## FRONT PANEL

The TCG 01-G has a 2 line x 16 character FSTN LCD display and two LEDs indicating multiple statuses, including:

- Sync Status
  - Antenna cable fault
  - Satellite acquisition mode
  - Display mode button
  - Alarm
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## GNSS RECEIVER

L1, C/ A code, 32 Channel Parallel-tracking receiver

Frequency: 1598 MHz  
Sensitivity:  
Acquisition -155 dBm  
Tracking -160 dBm

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## OSCILLATOR - TCXO

Holdover characteristics operating at 25 degrees C;  
- TCXO 1PPS drifts 0.55 ms over a 24 hour period.  
- Drift rate: 7 ppb per second

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Front Panel



Back Panel

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## INPUTS AND OUTPUTS

2 x independently programmable outputs, either:

- TTL 0 - 5 V, 150 mA (BNC or 2-pin)
- RS422/RS485 +/- 5 V, 50 unit loads (2-pin)
- HV switch MOSFET 300 V 1 A (2-pin)
- Fiber TX ( 62.5/ 125  $\mu$ m,  $\lambda$  820 nm), compatible with multi-mode fiber (ST Fiber connectors)

Timing accuracy: <100 ns to UTC

### Plus:

1 x RS232/ RS422 serial port, DCE wired (DB9)

RS232: Signals are +/- 9 V, 15 mA.

Serial time messages can be configured to be output at 1200, 2400, 4800, 9600, 19200 and 38400 baud.

Programmable pulse or IRIG-B available on pin 1

Timing accuracy of RS232/ RS422 port:

Serial Message <1 bit time

Pulse/or IRIG-B time code <1.5  $\mu$ s to UTC

### Plus:

1 x AM IRIG-B, 8 Vpp, 120 ohm (BNC)

Timing accuracy: <2  $\mu$ s to UTC

### Plus:

2 x Event recording inputs/ DC IRIG-B inputs (2 pin)

Input rating: 5 V, 7 mA (10 V, 20 mA also accepted)

Timing accuracy <100 ns

### Plus:

1 x Antenna fail alarm (2 pin - Form A contact)

Contact rating: 200 V, 150 mA DC or 150 V, 100 mA AC

### Plus:

1 x Sync relay (2 pin - Form A contact) Contact rating:

200 V, 150 mA DC or 150 V, 100 mA AC

### Plus:

1 x RJ45 10/100 Mbps UTP connector

Timing stamp accuracy: <100 ns to UTC (NTP/SNTP + PTP)

Protocols Supported:

ARP, UDP, ICMP, TFTP, DHCP, SNMP v1, v2c & v3; VLAN.

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## OPTIONS

### NTP

Stratum-1 NTP & SNTP time server  
Multicast & Broadcast server capability  
Optional MD5 authentication

### IEEE 1588 v2 (PTP v2) Support

As per Network Time Server above plus:-  
PTP (IEEE1588) v2 operation  
GrandMaster (GNSS) or ordinary clock functions  
Profile selection:

- Default
- Power Profile (full support IEEE C37.238)
- Telecom Profile (slave only, ITU G.8265.1)
- Telecom Profile (Full Support, ITU G-8275.1)

1-step tx, 1-step/ 2-step rx  
Layer 2 or Layer 3 mapping

Peer to Peer and End to End delay support  
Timing accuracy <100 ns

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## ENVIRONMENTAL AND ELECTRICAL

Power supply:	L = 14-36 Vdc M = 20-75 Vdc H= 90-300 Vdc
Power Drain:	6 W max
Operating temperature:	-10 to +65° C
Humidity:	To 95% non-condensing
Isolation	
Outputs to base unit:	2.5 kV
Power supply to I/O:	3.5 kV

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## OPTIONAL ACCESSORIES

### Physical

- GNSS antenna
- Antenna cable
- Adjustable antenna mount
- Lightning protection kit

Refer to [tekron.com](http://tekron.com) for full technical specifications.

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## CONFIGURATION SOFTWARE

Windows based configuration software is available to be downloaded from the Tekron website. Remote configuration over Ethernet includes the following user-adjustable features:

- Multi-level access control
- Privacy & authentication methods equivalent to SNMP USM
- "Supervisor-mode" prevents non-approved changes
- Test mode
- Commissioning tool

### Timing & Synchronization

Worldwide daylight savings and local time configuration using rule based or fixed date methods. Options that allow equipment checks prior to full installation and adjustable hold-over times to increase reliability in the case of poor GNSS coverage. Adjustments to compensate for installation parameters such as delay of GNSS signal through antenna cable.

### Programmable Outputs

IRIG-B (B00x / B22x) time code with selectable C37.118.1 and AFNOR S87-500 extensions  
DCF77 time code 1 kHz square wave  
User defined pulse sequences:  
Repetition rates from 20 ms to 24 hours  
Offsets and durations from 10 ms to 24 hours  
Resolution is 10 ms; timing accuracy is 100 ns

### Serial Strings

NMEA-0183 ZDA  
NMEA-0183 RMC  
IRIG J-17  
Tekron A - H (Eight protocols for plug and play compatibility with a wide range of equipment).

### SNMP

v1, v2c & v3 support can be independently enabled  
Configurable v1, v2c community names & security groups  
Fully configurable via SNMP  
v3 User-based Security Module (USM) support  
USM authentication methods: MD5, SHA  
USM privacy methods: DES, AES  
USM MIB support and C37.238 MIB Notifications  
SNMP trap generation v1, v2c & v3  
SNMPv3 traps can be authenticated & privatized via USM  
Syslog (RFC-3164 & 5424 varieties)

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## ABOUT TEKRON

Tekron is a leading developer of accurate GPS/GLONASS clocks and time synchronisation solutions for use in industrial applications.



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## CONTACT US

**Web:**  
[www.tekron.com](http://www.tekron.com)

**Phone No:**  
+64 4 566 7722

**Sales Freephone: (Australia)**  
1800 608 572

**Sales Freephone: (North America)**  
1800 256 2309

**Note:**  
The quickest and most effective method to request a quote is through the online quote request form on the Tekron website.