

Reason RT430

GPS grandmaster clock

The RT430 Grandmaster Clock is the universal precision time synchronising unit for all digital substation applications.



Precision-timing for digital substation intelligent devices: 100 nanosecond accurate GPS clock

Today's smarter grids deploy solutions within substations for wide-area stability, to digitise measurements and system operation, and to assist in post-disturbance analysis. In order to yield the best accuracy and granularity from such applications, the use of a common, precision-time reference is essential.

The Reason RT430 GPS Grandmaster Clock takes a GPS (Global Positioning System) reference and generates time-synchronising outputs for substation IEDs, according to IEEE 1588 Precision Time Protocol (PTP) v2. The RT430 offers 100 ns accuracy, providing the PTP reference for a digital substation using an Ethernet connection to the station and/or process buses. Advanced holdover stability allows hours of accurate free-running if satellite communication is lost.

CUSTOMER BENEFITS

- Robust design for the substation environment
- Highest accuracy: suitable for PMU, merging units, travelling wave fault location and correction of comms path mismatches in SDH/SONET current differential schemes
- Excellent free-running stability during GPS satellite signal outages
- Isolated outputs: no IIRIG-B ground-loop issues
- IEEE 1588 PTP

FEATURE	RT430
Ethernet ports	2 x 10/100 Base-T
IEEE 1588 Precision Time Protocol	0 or 1 port
PTP accuracy	100 ns
NTP or SNTP	0, 1 or 2 ports
Electrical outputs (IRIG-B004, PPx, DFC77)	4 (2 with screw terminals, 2 with BNC)
Open collector outputs (IRIG-B004, PPx, DFC77)	2 (screw terminals) – high voltage outputs up to 400 V
Fibre optic outputs (IRIG-B004, PPx, DFC77)	2 x 850 nm with ST connectors
PPx support	100 pulses per second up to 1 pulse per day
Other pulse modes	Pulse on time, pulse on date
Amplitude modulated output (IRIG-B124)	1 x BNC
Serial port	1 x RS232 or RS485
Daylight-saving time rules	USA, Europe and user-configurable
GPS antenna cable delay compensation	•
Web-browser configuration	•
Status monitoring over SNMP	•
Redundant power supply	(•) Optional
“Locked” dry contact relay output	•
Form factor	19” rack 80TE width, 1U height

Table 1 Principal features offered by the RT430 GPS Grandmaster Clock

The RT430 is extremely versatile in the output formats for time, such that IEEE 1588 and NTP/SNTP are supported for Ethernet topologies, avoiding the need to overlay a separate time-synchronising network. Such protocols can share the same physical links as IEC 61850-8-1, IEC 61850-9-2, DNP3 over Ethernet etc.

Other electrical and optical formats are supported, such as IRIG-B and pulsed outputs, distributed by hardwiring or with 850nm fibres. The RT430 is the time-synchronising unit for all devices in the entire substation.

High drive capacity outputs allow the use of long IRIG-B electrical cables, such that routing of signals to all extremities of the substation is not an issue. Programming of custom datagrams facilitates compatibility with legacy equipment too.

HUMAN MACHINE INTERFACE

Principal information concerning the time and health of the system is signalled via LEDs and in the menu system:

- The LCD display annunciates the real-time information
- The “Locked” LED and dry contact indicate when 4 or more GPS satellites are being tracked
- Antenna monitoring verifies correct positioning and functioning of the antenna
- A watchdog alarm LED signals any issue detected by self-monitoring
- The latitude, longitude and elevation of the RT430 is measured, along with the number of satellites currently tracked, their azimuth, elevation and signal quality

ACCESSORIES AND ASSOCIATED DEVICES

The RT time synchronising range offers exceptional versatility, scalable to all substation applications, using the sister products as listed in Table 2:

ACCESSORIES	DESCRIPTION
Q006	Active GPS antenna
Antenna cables	Q001 (15 m), Q002 (25 m), Q003 (40 m), Q004 (75 m), Q005 (100 m)
Q010	20 kA lightning surge arrester
RT411	Time signal distributor for large substation applications
RT412	Optical transceiver, fibre-copper and copper-fibre. Economical DIN-rail device which extends the synchronising connection across the substation, and multiplies the output to accommodate multiple client devices
RT431	Ethernet PTP slave to IRIG-B converter. DIN-rail device to accommodate legacy IEDs
RT1400	Real-time digital display annunciator

Table 2



Rear view of RT430 GPS grandmaster clock



RT412 transceiver RT431 time-code generator



RT1400 Annunciator

For more information
please contact Alstom Grid:

Alstom Grid Worldwide Contact Centre
www.alstom.com/grid/contactcentre/
Phone: +44 (0) 1785 250 070

Visit us online: www.alstom.com