

## CURRENT REGULATED RESISTIVITY AND INDUCED POLARIZATION TRANSMITTER

### TIP 12000 MAJOR BENEFITS AND FEATURES

- The TIP 12000 is a **12 kW current regulated transmitter** designed for time domain IP and deep resistivity surveys. It will generate up to 3000 V to work with high contact resistance and up to 25 amperes for low contact resistances.
- **High current stability:** the TIP 12000 generates a constant current with a very good stability (typ. 6 mA) ensuring high accuracy for resistivity measurement.
- **High efficiency:** Used in the Auto mode, the TIP 12000 computes for the operator the optimal current to be injected. Starting the injection requires two key presses. The TIP 12000 features an automatic Motor Generator (MG) power test. On startup, it automatically limits the maximal power to the maximal power of the MG without any adjustment from the operator. In case of large instability of the contact resistance during the injection, the TIP 12000 continues injecting in voltage regulation avoiding losing time.
- **GPS synchronization** for synchronous injections using several TIP connected to different pairs of C1 and C2 electrodes, allowing to increase the reception signal.
- **Self-tests** performed at the start of the system checking the proper operating of main components. Messages and warnings are displayed for a better identification of trouble and a quicker instruments servicing.
- **Limit values** of voltage, current or power can be introduced manually in the system.
- **Automatic recording of injections parameters.** Data can be retrieved from the system or downloaded to a computer.
- **ON-TIME IP acquisition mode** to revolutionize your productivity (see next page)



- **12000 W - 3000 V - 25 A**
- **OUTSTANDING CURRENT REGULATION**
- **EASY OF USE & HIGHLY EFFICIENT**
- **AUTOMATIC INPUT POWER DETECTION**
- **ROBUSTNESS**

### TECHNICAL SPECIFICATIONS

12000 W OUTPUT POWER  
 3000 V OUTPUT VOLTAGE  
 25 A OUTPUT CURRENT  
 THREE-PHASE MG  
 230 VAC, 50 OR 60 HZ, AVR

### TIME DOMAIN MODE

WAVEFORM:  
 IP SQUARE (ON+,OFF,ON-,OFF)  
 SQUARE (ON+,ON-)  
 TIME: 0.25, 0.5, 1, 2, 4 AND 8 S

### PROTECTION

SHORT CIRCUIT  
 OPEN LOOP  
 THERMAL  
 INPUT OVERVOLTAGE  
 INPUT UNDERVOLTAGE  
 EMERGENCY STOP BUTTON

### DIMENSIONS (L\*W\*H)

52 X 40 X 55 CM  
 FIBERGLASS WEATHERPROOF CASING

**WEIGHT:** 45 KG

**OPERATING TEMP:** -40°C TO +60°C



**DECREASE YOUR ACQUISITION TIME AND INCREASE YOUR DATA QUALITY WITH THE ON-TIME IP ACQUISITION MODE**

The On-time IP measurement is a new way to measure IP developed by IRIS Instruments. It can be used with the TIP 12000 transmitter combined with the Elrec Terra receiver. This new feature will revolutionize IP measurement productivity without changing your habits :

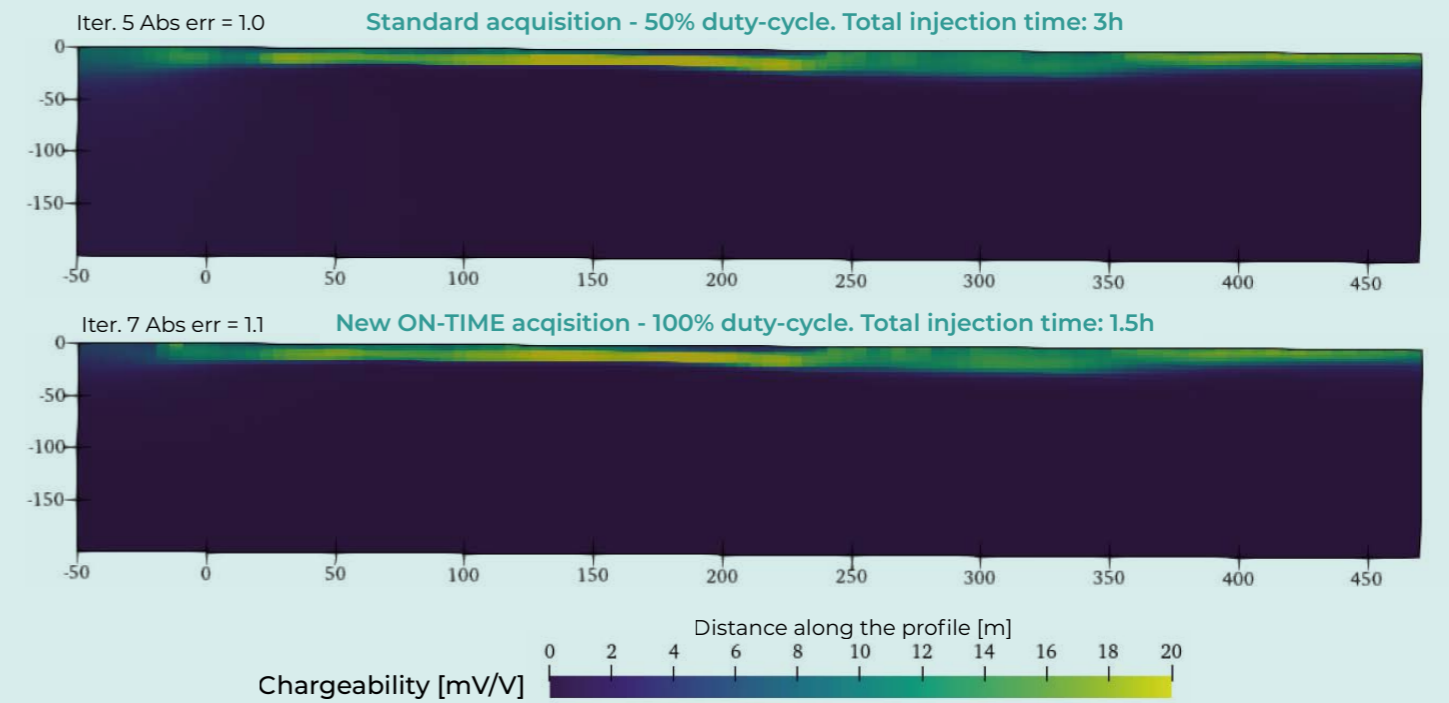
Divide by two the measurement time

Multiply by two the IP signal

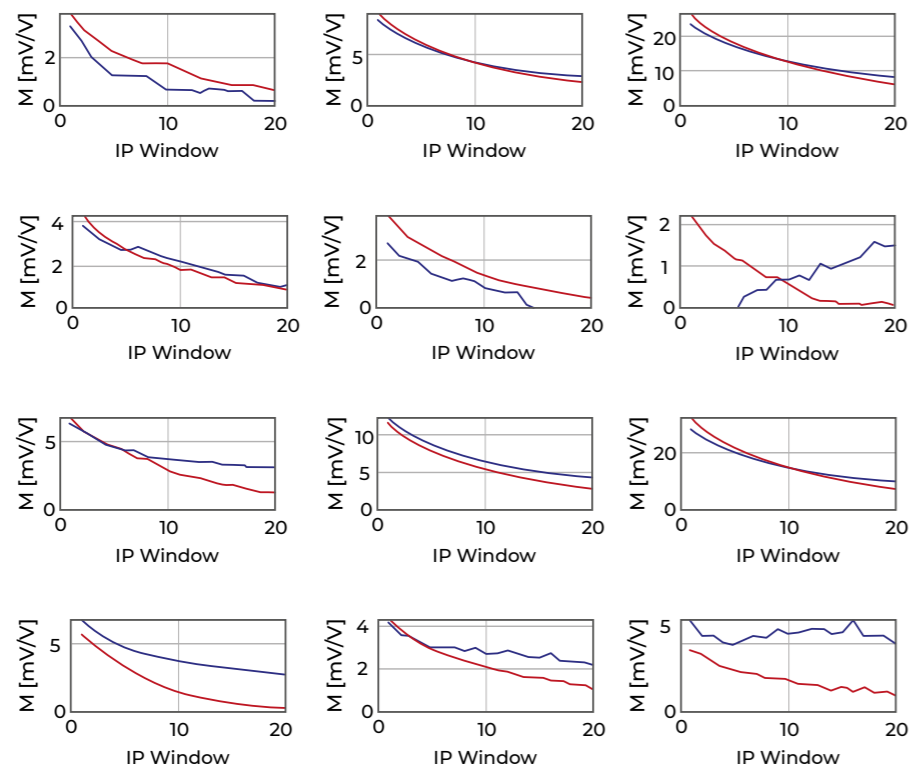
Suppress the motor generator's jerks due to the change of regime

Same procedure on the field as standard IP

The following figure shows two inversion results of an IP survey performed with a standard off-time acquisition (50% duty-cycle, top figure) and with the new the on-time acquisition (100% duty-cycle, bottom figure). The survey has been realized voluntarily on a conductive geology (max. 50 Ω.m) with low IP values (most < 3 mV/V) to prove the reliability of the method on difficult contexts.



**IP CURVES COMPARISON**



— ON-TIME (100% DUTY-CYCLE) — OFF-TIME (50% DUTY-CYCLE)

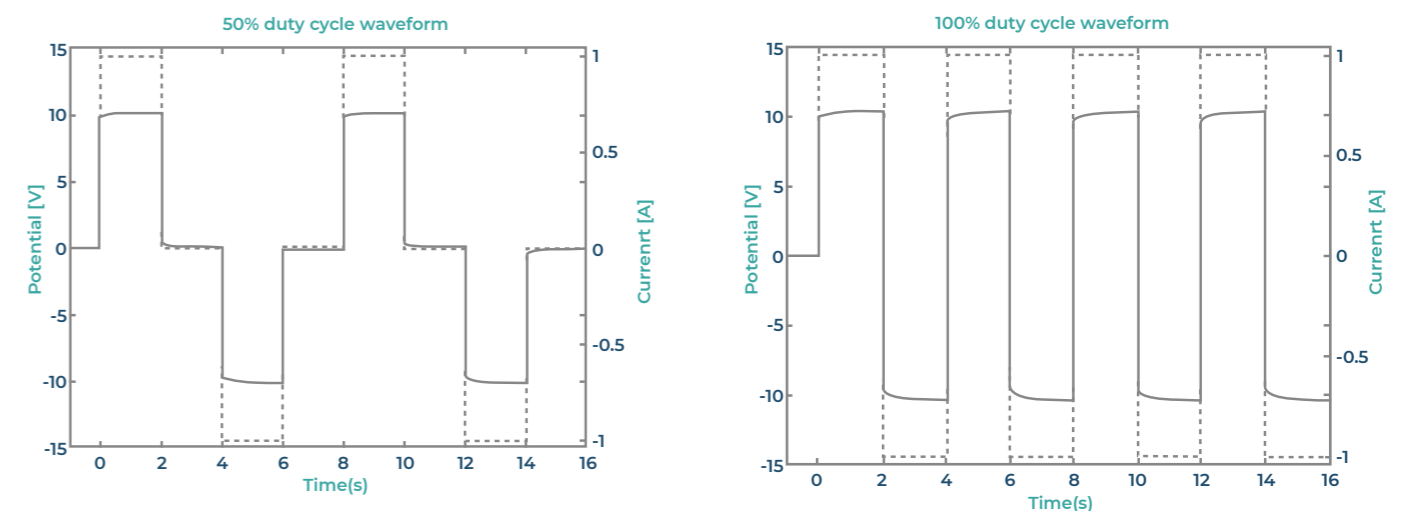
**HOW DOES IT WORK ?**

Standard IP is standardly measured with a 50% duty-cycle current. Each injection time is followed by an off-time of the same duration. The IP is measured during this off-time while the electric potential progressively goes back to zero. IP has traditionally been measured in this way for several decades.

It has been recently showed that IP could also be measured during the on-time (ie. during the injection, Olsson et al. 2015). This possibility allows to measure the IP with a 100% duty-cycle current, dividing by two the total time of measurement and multiplying by two the electric potential measured (as the current variation is 2 x I).

This type of measurement requires a very good current stability of the current injected. The TIP 6000 and TIP 12000 (IRIS Instruments) is the only high power system in the world able to do that !

Used with the Elrec Terra, it is now easily possible for you to measure on-time IP.



Specification	TIP 12000
Maximum output power	12000 W
Maximum output voltage	3000 V
Maximum output current	25 A
Regulation	Current regulation (ability to inject a stable current on a variable resistance with a variable input voltage) Voltage regulation (ability to inject a stable voltage on a variable resistance with a variable input voltage). Most of the competitor's transmitters do not regulate neither current nor voltage.
Current stability (in current regulation mode on variable resistance with variable input voltage)	Typ. 6 mA
Current reading accuracy	1 %
Display	Alphanumeric liquid crystal display
Output connectors	Connectors accept bare wires up to 10 mm <sup>2</sup>
Parameters displayed	Resistance, voltage, power, current, temperature, actual regulation, pulse polarity, number of stacks since the starting of the injection
Automatic storage of injection parameters	Automatic recording and storage of injection parameters (with date and time). Can be visualized on the screen or in a dedicated software after data download
Automatic mode	In this mode, the TIP 12000 computes automatically for the operator the optimal current to be injected. With this mode the injection of the optimal current can be done in two key presses without requiring increasing the current step by step.
Intelligent current regulation	The TIP 12000 regulates the current on variable contact resistance. If the resistance is very unstable, the TIP 12000 continues injecting in voltage regulation, allowing to finish the measurement without stopping and having to decrease the contact resistance
Motor generator input power test	The TIP 12000 features an automatic detection of the optimal input power coming from the motor generator. At the first injection, the TIP 12000 takes some seconds to define the maximal input power of the motor generator. This features will preserve your motor generator.
Intelligent temperature regulation	In addition to the overheat protection, the TIP 12000 features an automatic gradual adaptation of the power after 32 stacks to not overpass maximal temperature, allowing to inject for hours.
Waveform	IP Square (+/OFF/-/OFF) or Square (+/-). Additional waveform can be created and uploaded from a dedicated software.
Contact resistance range	10 $\Omega$ to 75 k $\Omega$ (max 15 k $\Omega$ in current regulation mode)
Power source specification	230 VAC, three-phase motor generator, 50 or 60 Hz with an automatic voltage regulator (AVR).
Dimension (L x W x H)	52 x 40 x 55 cm
Weight	45 kg
Protections	Emergency stop, input overvoltage, input undervoltage, thermal protection, output overcurrent, open-line and short circuit
Operating temperature	-40 to +60°C