

# DRTS 6

## Advanced Relays, Energy Meters and Transducers Test Set

- Multi-tasking test set designed for testing protection relays, energy meters, transducers.
- Powerful and lightweight.
- High accuracy: better than 0.1% (standard); HP model better than 0,05%.
- IEC61850 Protocol interface.
- Up to 9 current and 6 voltage outputs plus auxiliary DC supply (option).
- Laptop PC or PDA control.
- USB and RS232 interfaces.
- Advanced testing and data management software TDMS.
- Complete library of relays from the major manufacturers.
- Highest quality, safety and reliability.
- Worldwide high quality technical support in 100 countries.

## A P P L I C A T I O N

DRTS 6 can test all the following relays

| RELAY TYPE                       | IEEE NO |
|----------------------------------|---------|
| Distance relay                   | 21      |
| Synchronizing device             | 25      |
| Under/over-voltage relay         | 27/59   |
| Directional Power relay          | 32      |
| Field relay                      | 40      |
| Reverse phase current relay      | 46      |
| Phase sequence voltage relay     | 47      |
| Incomplete sequence relay        | 48      |
| Instantaneous over-current relay | 50      |
| Inverse time over-current relay  | 51      |
| Power factor relay               | 55      |
| Voltage balance relay            | 60      |
| Ground detector relay            | 64      |
| Directional over-current relay   | 67      |
| Phase angle out of step relay    | 78      |
| Automatic reclosing relay        | 79      |
| Frequency relay                  | 81      |
| Pilot wire receiver relay        | 85      |
| Lockout relay                    | 86      |
| Differential protection relay    | 87      |
| Voltage directional relay        | 91      |
| Power directional relay          | 92      |
| Tripping relay                   | 94      |



## DRTS 6 SPECIFICATIONS

### Six phase AC/DC current outputs

#### AC/DC current outputs

|     | CURRENT<br>A | POWER<br>VA | ZMAX<br>Ohm | RESOLUTION |
|-----|--------------|-------------|-------------|------------|
| 6 X | 0...15       | 80          | 0.35        | 1 mA       |
| 6 X | 0...1.5      |             | 0.35        | 0.1 mA     |
| 6 X | 0...0.15     |             | 0.35        | 0.1 mA     |
| 3 X | 0...15       | 100         | 0.44        | 1 mA       |
| 3 X | 0...1.5      |             | 0.44        | 0.1 mA     |
| 3 X | 0...0.15     |             | 0.44        | 0.1 mA     |
| 3 X | 0...30       | 160         | 0.18        | 2 mA       |
| 3 X | 0...3        |             | 0.18        | 0.2 mA     |
| 3 X | 0...0.3      |             | 0.18        | 0.2 mA     |
| 3 X | 0...15       | 160         | 0.71        | 1 mA       |
| 2 X | 0...45       | 240         | 0.12        | 3 mA       |
| 1 X | 0...90       | 480         | 0.06        | 6 mA       |
| 1 X | 0...30       | 320         | 0.35        | 2 mA       |

- . Six independent current sources with a common neutral.
- . Independent adjustment of current outputs.
- . Duty cycle: at 20°C ambient temperature: 3\*15 A continuous; 6\*7.5 A continuous; 6\*15 A 3 minutes.
- . Waveform resolution: 28 bit.
- . Capable of stepping or ramping the current.
- . Rate of change programmable between ± 0.001 A/s and ± 999 A/s.
- . Output accuracy: ± 0.05% typical, ± 0.1% guaranteed.
- . Distortion: 0.1%.
- . Automatic protection for overloads and open circuit.

### Four phase AC/DC voltage outputs

#### AC/DC voltage outputs

|                       | VOLTAGE<br>V | POWER<br>VA | ZMAX<br>Ohm | RESOLUTION |
|-----------------------|--------------|-------------|-------------|------------|
| 4 X                   | 0...125      | 85          | 200         | 1.9 mV     |
| 3 X                   | 0...125      | 100         | 160         | 1.9 mV     |
| 3 X                   | 0...12.5     | 10          | 160         | 190 µV     |
| 3 X                   | 0...1        | 1           | 160         | 19 µV      |
| 1 X                   | 0...250      | 200         | 320         | 3.8 mV     |
| 1 X                   | 0...125      | 200         | 80          | 1.9 mV     |
| OPTIONAL 300 V OUTPUT |              |             |             |            |
| 4 X                   | 0...300      | 85          | 1125        | 4.6 mV     |
| 3 X                   | 0...300      | 100         | 900         | 4.6 mV     |
| 3 X                   | 0...125      | 100         | 160         | 1.9 mV     |
| 3 X                   | 0...12.5     | 10          | 160         | 190 µV     |
| 1 X                   | 0...600      | 200         | 1800        | 9.2 mV     |
| 1 X                   | 0...300      | 200         | 450         | 4.6 mV     |

- . Four independent voltage sources, with a common neutral.
- . Independent adjustment of voltage outputs.
- . Duty cycle: continuous.
- . Waveform resolution: 28 bit.
- . Capable of stepping or ramping the voltage.
- . Rate of change programmable between ± 0.001 V/s and ± 999 V/s.
- . Voltage accuracy: ± 0.05% typical, ± 0.1% guaranteed.
- . Distortion: 0.1%.
- . Automatic protection for overloads, counter-feed and short circuit.
- . The fourth voltage output can be selected to act as:
  - .. Fourth voltage output V4 (AC/DC);
  - .. Zero-sequence component
$$V_0 = (V_1+V_2+V_3)/3 \text{ or } V_0 = (V_1+V_2+V_3)/1.73.$$

### Battery simulator

Output voltage: 0...260 V DC, program controlled.

Power: 100 W or 2 A; continuous duty.

Accuracy: ± 1%.

Automatic protection for overloads.

Step or ramp control.

### Angles

Phase angle range: 0° - 360°.

Angle resolution: 0.01°.

Angle accuracy: ± 0.1°.

Step or ramp control with a rate of change between ± 0.1°/s and 999°/s.

### Output frequency

Frequency range: from DC (0 Hz) to 2000 Hz. Transient 5 kHz.

Capable of generating different frequencies on any output.

Maximum frequency error: 25 µHz (0.5 ppm).

Resolution: 0.1 mHz.

Possibility of slewing the frequency, with a slope from 0.001 Hz/s to 999.999 Hz/s. Resolution: 0.001 Hz/s.

Capable of generating waveform with superimposed harmonic distortion.

### Binary inputs

10 binary inputs clean or with voltage from 24 to 425 V AC and 4.5 to 600 V DC, separated in two groups of 5, with two common points isolated at 1 kV AC.

Selection of the type of input: Voltage clean; 5 - 24 - 48 - 100 V; software controlled.

Selection of the input debounce duration, from 0  $\mu$ s to 2 ms, in 64 steps of 32  $\mu$ s each, program controlled.  
Timer range: 0 - 999,999.9999 s (277 hours) or, in cycles:  
0 - 50,000,000 cycles (50 Hz);  
0 - 60,000,000 cycles (60 Hz).  
Resolution: 0.1 ms.  
Timer accuracy: 0.025% of reading  $\pm$  0.1 ms.

## Counter inputs

These inputs allow testing energy meters, including high frequency outputs.  
Number of inputs: 2; with no common zero point.  
Frequency range: 0 to 50 kHz.

## Auxiliary outputs

Four timed relay contacts; both normal open and normal closed provided.  
Characteristics of contacts with a resistive load:  
. Maximum voltage: 300 V AC/DC;  
. Maximum current: 8 A.  
Range of programmable delay: from 0 to 999.99 s.

## Low level signal outputs

The purpose of these low voltage outputs is to test protection relays that use transducers such as Rogowsky coils and voltage dividers; for this simulation low voltage inputs are necessary.  
Number of outputs: 6.  
Full range V & I output: 0... 7.26 V rms.  
Frequency: DC to 20 kHz.  
Output current: 5 mA max.  
Resolution: 0.43 mV or 0.043 mV.  
Accuracy: 0.1% of the range.  
Distortion: 0.1% typical.

## Analog Measurements (optional):

### DC Current measuring Input, Low

Measuring range:  $\pm$  20 mA.  
Accuracy: 0.02% of range  $\pm$  0.01% of value.

### DC Voltage measuring Input, Low

Measuring range  $\pm$  10 V.  
Accuracy: 0.02% of range  $\pm$  0.01% of value.

### AC/DC Current measuring Input, High

Measuring range:  $\pm$  20 A.  
AC accuracy: 0.2% of range  $\pm$  0.1% of value.  
DC accuracy: 0.1% of range  $\pm$  0.1% of value.

### AC/DC Voltage measuring Input, High

Measuring range  $\pm$  250 V.  
AC accuracy: 0.1% of range  $\pm$  0.1% of value.  
DC accuracy: 0.05% of range  $\pm$  0.05% of value.

## Interface connection

Type of interface: USB and RS232 at 57.6 kbaud.

## Power supply

Mains power supply: 90 to 132 and 180 to 264 V AC, sinusoidal, single phase.  
Frequency: 47 to 63 Hz.  
Power consumption:  
. at rest: less than 150 W;  
. maximum load: 1600 W.

## Case

Aluminum, with carrying handle.

## Weight and dimensions

Weight: 18 kg.  
Dimensions: 170 (h) x 470 (w) x 430 (d) mm.

## Accessories supplied with the unit

Protective carrying bag.  
Set of test leads.  
Power supply cable.  
Serial interface cable and USB cable.  
Ground connection cable.  
Instruction and maintenance manuals.  
TDMS software.

## DRTS 6 HP High Precision option

This option has enhanced characteristics with respect to the standard model. This model is conceived for the test of class 0.2 energy meters. The following table summarizes the performances of the DRTS 6 HP (High Precision) version with respect to the standard one.

| STANDARD DRTS 6 ACCURACY |   |
|--------------------------|---|
| OUTPUT CURRENT           | Typical: $\pm 0.05\% \pm 0.01\%$ of range<br>Maximum: $\pm 0.1\% \pm 0.02\%$ of range |
| OUTPUT VOLTAGE           | Typical: $\pm 0.05\% \pm 0.01\%$ of range<br>Maximum: $\pm 0.1\% \pm 0.02\%$ of range |
| PHASE ANGLE              | Typical: $\pm 0.02^\circ$<br>Maximum: $\pm 0.1^\circ$                                 |
| 3 PHASE POWER            | Typical: $\pm 0.05\%$<br>Maximum: $\pm 0.2\%$   |

| DRTS 6 HP ACCURACY |  |
|--------------------|--|
| OUTPUT CURRENT     | Typical: $\pm 0.02\%$ from 0.1 to 15 A<br>Maximum: $\pm 0.05\%$ from 0.1 to 15 A |
| OUTPUT VOLTAGE     | Typical: $\pm 0.02\%$ from 50 to 300 V<br>Maximum: $\pm 0.05\%$ from 50 to 300 V |
| PHASE ANGLE        | Typical: $\pm 0.01^\circ$<br>Maximum: $\pm 0.02^\circ$                           |
| 3 PHASE POWER      | Typical: $\pm 0.05\%$<br>Maximum: $\pm 0.1\%$                                    |

## ADDITIONAL EXTERNAL AMPLIFIERS FOR DRTS 6

### AMI 99 Three phase current amplifier

The three phase current amplifier AMI 99 is an additional device to the DRTS 6. DRTS 6 in connection with AMI 99 allows to have 9 currents or 6 currents at 30 A per phase or three currents at 60 A per phase.



### AMI 99 with DRTS 6

|     | CURRENT<br>A | POWER<br>VA | ZMAX<br>Ohm | RESOLUTION  |
|-----|--------------|-------------|-------------|-------------|
| 9 X | 6 x 0...15   | 80          | 0.35        | 230 $\mu$ A |
|     | 3 x 0...30   | 160         | 0.18        | 460 $\mu$ A |
| 9 X | 6 x 0...1.5  |             |             | 23 $\mu$ A  |
|     | 3 x 0...3    |             |             | 46 $\mu$ A  |
| 9 X | 6 x 0...0.15 |             |             | 2.3 $\mu$ A |
|     | 3 x 0...0.3  |             |             | 4.6 $\mu$ A |
| 6 X | 0...30       | 160         | 0.18        | 460 $\mu$ A |
| 6 X | 0...3        |             | 0.18        | 46 $\mu$ A  |
| 6 X | 0...0.3      |             | 0.18        | 4.6 $\mu$ A |
| 3 X | 0...60       | 320         | 0.09        | 920 $\mu$ A |
| 3 X | 0...6        |             | 0.09        | 92 $\mu$ A  |
| 3 X | 0...0.6      |             | 0.09        | 9.2 $\mu$ A |
| 1 X | 0...180      | 960         | 0.029       | 2.8 mA      |

### AMI 99 stand alone

|     | CURRENT<br>A | POWER<br>VA | ZMAX<br>Ohm | RESOLUTION  |
|-----|--------------|-------------|-------------|-------------|
| 3 X | 0...30       | 160         | 0.18        | 460 $\mu$ A |
| 3 X | 0...3        |             | 0.18        | 46 $\mu$ A  |
| 3 X | 0...0.3      |             | 0.18        | 4.6 $\mu$ A |
| 1 X | 0...30       | 320         | 0.35        | 460 $\mu$ A |
| 1 X | 0...90       | 480         | 0.06        | 1.38mA      |

### AMI 99 stand alone

- . Three independent current sources, with a common neutral.
- . Automatic range switch and independent range selection.
- . Waveform resolution: 28 bit.
- . Output accuracy:  $\pm 0.1\%$  of the output,  $\pm 0.02\%$  of the range.
- . Distortion: 0.1% total maximum, with any load.
- . Automatic protection for overloads.
- . Angle accuracy:  $\pm 0.05^\circ$ .

### Power supply

Mains power supply: 90 to 264 V AC, single phase.

Frequency: 47 to 63 Hz.

Power consumption:

- . at rest: less than 100 W;
- . maximum load: 1000 W.

### Weight and dimensions

Weight: 16 kg.

Dimensions: 170 (h) x 470 (w) x 430 (d) mm.

## Case

Case: aluminium, with carrying handle.

## Accessories supplied with the unit

- . Protective plastic bag.
- . Mains supply cable to DRTS 6.
- . Interconnecting cable to DRTS 6.

## AMIV 66

### Three phase current and two phase voltage amplifier

The three phase current and two phase voltage amplifier AMIV 66 is an accessory for the DRTS 6 for tests that require nine independent currents at the same time (two secondary differential transformers), or six voltages at the same time (synchronising devices), or six currents and six voltages.

The three current outputs of AMIV 66 can be generated together with DRTS 6: this also allows paralleling current outputs, thus increasing output current and power.



### Three phase current generator

AMIV 66 with DRTS 6

|     | CURRENT<br>A | POWER<br>VA | ZMAX<br>Ohm | RESOLUTION  |
|-----|--------------|-------------|-------------|-------------|
| 9 X | 0...15       | 80          | 0.35        | 230 $\mu$ A |
| 9 X | 0...1.5      |             |             | 23 $\mu$ A  |
| 9 X | 0...0.15     |             |             | 2.3 $\mu$ A |
| 3 X | 0...45       | 240         | 0.12        | 690 $\mu$ A |
| 3 X | 0...4.5      |             |             | 69 $\mu$ A  |
| 3 X | 0...0.45     |             |             | 6.9 $\mu$ A |
| 1 X | 0...135      | 720         | 0.04        | 2 mA        |

### AMIV 66 stand alone

|     | CURRENT  | POWER | ZMAX | RESOLUTION  |
|-----|----------|-------|------|-------------|
| 3 X | 0...15   | 80    | 0.35 | 230 $\mu$ A |
| 3 X | 0...1.5  |       | 0.35 | 23 $\mu$ A  |
| 3 X | 0...0.15 |       | 0.35 | 2.3 $\mu$ A |
| 1 X | 0...15   | 160   | 0.71 | 230 $\mu$ A |
| 1 X | 0...45   | 240   | 0.12 | 0.69 mA     |

### AMIV 66 stand alone

- . Three independent current sources, with a common neutral.
- . Automatic range switch and independent range selection.
- . Waveform resolution: 28 bit.
- . Output accuracy:  $\pm 0.1\%$  of the output,  $\pm 0.02\%$  of the range.
- . Distortion: 0.1% total maximum, with any load.
- . Automatic protection for overloads.
- . Angle accuracy:  $\pm 0.05^\circ$ .

### Two phase voltage generator

AMIV 66 with DRTS 6

|                       | VOLTAGE<br>V | POWER<br>VA | ZMAX<br>Ohm | RESOLUTION  |
|-----------------------|--------------|-------------|-------------|-------------|
| 6 X                   | 0...125      | 85          | 185         | 1.9 mV      |
| 6 X                   | 0...12.5     | 8           | 185         | 190 $\mu$ V |
| 6 X                   | 0...1        | 1           | 185         | 19 $\mu$ V  |
| 1 X                   | 0...250      | 400         | 200         | 3.8 mV      |
| 1 X                   | 0...125      | 400         | 50          | 1.9 mV      |
| OPTIONAL 300 V OUTPUT |              |             |             |             |
| 6 X                   | 0...300      | 85          | 1060        | 4.6 mV      |
| 6 X                   | 0...125      | 85          | 185         | 1.9 mV      |
| 6 X                   | 0...12.5     | 8           | 185         | 190 $\mu$ V |
| 1 X                   | 0...600      | 400         | 200         | 9.2 mV      |
| 1 X                   | 0...300      | 400         | 50          | 4.6 mV      |

## AMIV 66 stand alone

|                       | VOLTAGE<br>V | POWER<br>VA | ZMAX<br>Ohm | RESOLUTION  |
|-----------------------|--------------|-------------|-------------|-------------|
| 2 X                   | 0...125      | 100         | 160         | 1.9 mV      |
| 2 X                   | 0...12.5     | 10          | 160         | 190 $\mu$ V |
| 2 X                   | 0...1        | 1           | 160         | 19 $\mu$ V  |
| 1 X                   | 0...250      | 200         | 320         | 3.8 mV      |
| 1 X                   | 0...125      | 200         | 80          | 1.9 mV      |
| OPTIONAL 300 V OUTPUT |              |             |             |             |
| 2 X                   | 0...300      | 100         | 900         | 4.6 mV      |
| 2 X                   | 0...125      | 100         | 160         | 1.9 mV      |
| 2 X                   | 0...12.5     | 10          | 160         | 190 $\mu$ V |
| 1 X                   | 0...600      | 200         | 1800        | 9.2 mV      |
| 1 X                   | 0...300      | 200         | 450         | 4.6 mV      |

## AMIV 66 stand alone

- . Two independent voltage sources, with a common neutral.
- . Output frequency: from 0 Hz to 2000 Hz; transient 5 kHz.
- . Waveform resolution: 28 bit.
- . Output accuracy:  $\pm 0.1\%$  of the value,  $\pm 0.02\%$  of the range.
- . Distortion: 0.1% total maximum, with any load.
- . Automatic protection for overloads and counter-feed.
- . Angle accuracy:  $\pm 0.05^\circ$ .

## Power supply

Power supply voltage: 90 to 264 V AC single phase.

Frequency: 47 to 63 Hz.

Power consumption:

- . at rest: less than 100 W;
- . maximum load: 500 W.

## Case

Aluminium, with carrying handle.

## Accessories supplied with the unit

- . Power supply cable.
- . Relay connection cables kit.
- . Interconnecting cable to DRTS.6.
- . Plastic carrying bag.

## Weight and dimensions

Weight: 18 kg.

Dimensions: 170 (h) x 470 (w) x 360 (d) mm.

## AMV 66

### Two phase voltage amplifier

The two phase voltage amplifier AMV 66 is an accessory for the DRTS 6, for tests that require six voltages at the same time (synchronising devices).



### Two phase voltage generator

#### AMV 66 with DRTS 6

|                       | VOLTAGE<br>V | POWER<br>VA | ZMAX<br>Ohm | RESOLUTION  |
|-----------------------|--------------|-------------|-------------|-------------|
| 6 X                   | 0...125      | 80          | 195         | 1.9 mV      |
| 6 X                   | 0...12.5     |             | 195         | 190 $\mu$ V |
| 6 X                   | 0...1        |             | 195         | 19 $\mu$ V  |
| 1 X                   | 0...250      | 320         | 195         | 3.8 mV      |
| 1 X                   | 0...125      | 320         | 50          | 1.9 mV      |
| OPTIONAL 300 V OUTPUT |              |             |             |             |
| 6 X                   | 0...300      | 80          | 1125        | 4.6 mV      |
| 6 X                   | 0...125      | 80          | 195         | 1.9 mV      |
| 6 X                   | 0...12.5     |             | 195         | 190 $\mu$ V |
| 1 X                   | 0...600      | 320         | 195         | 9.2 mV      |
| 1 X                   | 0...300      | 320         | 50          | 4.6 mV      |

## AMV 66 stand alone

|                       | VOLTAGE<br>V | POWER<br>VA | ZMAX<br>Ohm | RESOLUTION |
|-----------------------|--------------|-------------|-------------|------------|
| 2 X                   | 0...125      | 80          | 195         | 1.9 mV     |
| 2 X                   | 0...12.5     |             | 195         | 190 µV     |
| 2 X                   | 0...1        |             | 195         | 19 µV      |
| 1 X                   | 0...250      | 160         | 390         | 3.8 mV     |
| 1 X                   | 0...125      | 160         | 97          | 1.9 mV     |
| OPTIONAL 300 V OUTPUT |              |             |             |            |
| 2 X                   | 0...300      | 80          | 1125        | 4.6 mV     |
| 2 X                   | 0...125      | 80          | 195         | 1.9 mV     |
| 2 X                   | 0...12.5     |             | 195         | 190 µV     |
| 1 X                   | 0...600      | 160         | 390         | 9.2 mV     |
| 1 X                   | 0...300      | 160         | 97          | 4.6 mV     |

## AMV 66 stand alone

- . Two independent voltage sources, with a common neutral.
- . Output frequency: from 0 Hz to 2000 Hz; transient 5 kHz.
- . Waveform resolution: 28 bit.
- . Output accuracy:  $\pm 0.1\%$  of the output,  $\pm 0.02\%$  of the range.
- . Distortion: 0.1% total maximum, with any load.
- . Automatic protection for overloads and counter-feed.
- . Angle accuracy:  $\pm 0.05^\circ$ .

## Power supply

- Power supply voltage: 90 to 264 V AC single phase.
- Frequency: 47 to 63 Hz.
- Power consumption, maximum load: 500 W.

## Case

- Aluminium, with carrying handle.

## Accessories supplied with the unit

- . Power supply cable.
- . Interconnecting cable to DRTS 6.
- . Plastic carrying bag.

## Weight and dimensions

- Weight: 7 kg.
- Dimensions: 170 (h) x 230 (w) x 360 (d) mm.

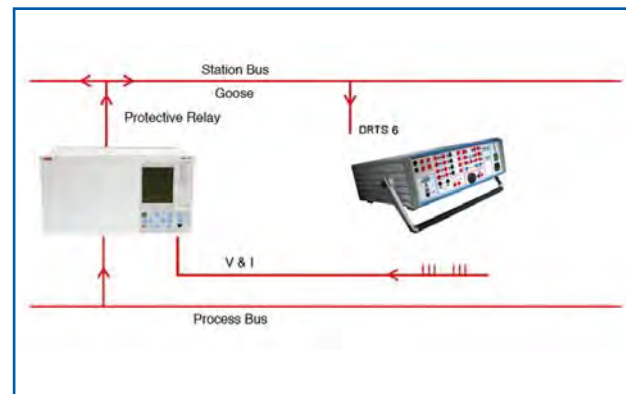
## OPTIONAL ACCESSORIES

### IEC61850 INTERFACE

The standard IEC61850 describes the communication of devices in substations. IEC61850 messages coming from the devices connected to the substation network (such as a relay) are also called GOOSE. GOOSE messages describe binary status signals over the substation network and are also used for relays tripping. For relay testing applications within IEC 61850 substations it is necessary to access to these data. This new feature is performed by ISA Automatic Relay Test Set DRTS 6 and with the TDMS software.

By means of a dedicated hardware and the TDMS software, ISA DRTS 6 can expand his testing capabilities by handling those IEC61850 messages.

The IEC61850 Interface option for DRTS 6 is required for relay testing with Ethernet-based substation communication protocol. The IEC61850 Interface is mounted directly on the front panel of the DRTS 6.



### IN2-CDG CURRENT BOOSTER FOR 1 A RATED HIGH BURDEN RELAYS

With DRTS 6 the full power of 100 VA is available only at the current of 15 A. The option IN2-CDG by means of a set of three current transformers, with the following characteristics:

- Primaries: 12.5 A and 15 A;
- Secondaries: 0.5 A; 1 A; 2.5 A; 5 A;
- Nominal power: 100 VA;
- Current ratio error: 0.2.
- Case: plastic.

For the single phase test of the CDG relay it is possible to have three times the above power, connecting current outputs in series.

## 1100A CURRENT BOOSTER

The option I100A is a set of six current transformers, that allows to perform the following tests:

- With DRTS 6, 3x50 A;
- With DRTS 6 and AMI 99, 6X50 A (differential relays) or 3x100 A (over-current relays).

Characteristics:

Primary: 3x(2x15) +3x30 A;

Secondary: 6x50 A, that can be put in parallel, to form 3x100 A;

Nominal power: 6x120 VA @ 50 A, or 3x240 VA, steady;

Current ratio error: 0.5;

Frequency range: 40 Hz to 2 kHz.

Case: plastic.

Dimensions: 400 x 300 x 175 mm.

Weight: 12 kg.

Inputs from DRTS 6 are put in parallel inside the option: all transformers have 30 A on the primary and 50 A on the secondary.

The option includes twelve connecting cables to DRTS 6 and AMI 99 current outputs.

## GPS SYNCHRONIZER

The GPS synchronizer is an external module that allows to synchronize the test start of two DRTS 6.



Features:

- . 1 digital output 0-24 V DC, for synchronization.
- . 1 selector to program the following pulse intervals: 5 s; 10 s; 20 s; 30 s; 40 s; 60 s.

- . Maximum timing error with respect to nominal: 2  $\mu$ s.
- . Lights to confirm: power-on; Locked; Pulse available.
- . 1 START and STOP push-button.
- . Power supply: 110/220 V AC.

The option includes:

- . the antenna;
- . an extension cable for the antenna, 20 m long;
- . two cables, red and black, 2 m long, with banana terminations, for the connection to the test set trip input;
- . the power supply cable.

Weight: 1.7 kg.

Dimensions: 150 (w) x 100 (h) x 240 (d) mm.

Case: aluminium.

Two test sets synchronized with GPS produce the maximum error of 50  $\mu$ s.

## SH 2003 ENERGY METERS UNIVERSAL SCANNING HEAD

SH 2003 is a scanning head that eases the test of energy meters. It is an universal scanning head because it can be used both with LED impulse electronic meters and Ferraris rotating disk meters. With rotating disk the sensor uses a green light beam that optimizes the recognition of any type of mark.



With LED recognition the following specification applies:

- . Impulse duration: more than 60  $\mu$ s.;
- . Impulse frequency: less than 500 Hz;
- . Light wavelength: 500 to 960 nm (red).

The option includes:

- . A support to keep the scanning head in front of the energy meter;
- . The cable, 2 m long, from the scanning head to the DRTS 6;
- . The power supply transformer, for the power of 220 V AC, to supply the scanning head.
- . Two safety banana plugs for the connection to DRTS 6.



## IO-6432 DIGITAL INPUT AND OUTPUT EXPANSION

The option IO-6432 increases the number of logic inputs and outputs that can be monitored by the DRTS 6. The option adds to inputs and outputs that are located in the DRTS 6. The IO-6432 is fitted internally in the DRTS 6 unit.

### IO-6432 SPECIFICATION

#### Inputs

Number of inputs: 64, by 4 groups of 16.

Inputs: logic, voltage from 5 to 130 V DC; maximum load current 3 mA.

Input and output groups are isolated from each other; they are also isolated from the rest of the instrument, from the mains supply and from the ground.

It is possible to separately program each input as Normally Open or Normally Closed or Disabled.

It is possible to separately program the timer stop of each programmed input as Trip or Reset.

Logic input time measurement resolution: 1 ms.

Logic input time measurement accuracy: 2 ms.

#### Outputs

Number of outputs: 32, in 4 groups of 8.

Type of outputs: open collector; maximum voltage 130 V; minimum current capability 15 mA.

It is possible to separately program each logic output as Normally Open or Normally Closed.

It is possible to separately delay each logic output with respect to currents and voltages.

Logic output time accuracy: 1 ms.

This option is to be specified at order.

### OUT32 FOR THE IO-6432 OPTION

IO-6432 outputs drive the load to zero. If the output must be driven with the voltage, or if the current is not sufficient, it is available the module OUT32, that has the following characteristics:

Inputs: 32, from IO-6432 of DRTS 6.

Outputs: 32 relay contacts (both ends), with the following characteristics.

- . Vmax: 250 V;
- . Imax: 0.5 A;
- . Outputs protected against over-voltage;
- . Time delay: less than 10 ms.
- . Connection to DRTS 6: with a cable 1 m long, provided.
- . Lights that turn on when the relay is closed.
- . Output connection: by two 50-way connectors.
- . Power supply: from the mains; 220 V 50 Hz.
- . Weight: 3 kg.
- . Dimensions: 25 x 19 x 11 cm.
- . Case: plastic, with graved front face.

### TRANSIT CASE

Three options are available:

- . Heavy duty transit case (Discovery type) in black plastics, with handle and wheels.
- . Heavy duty transit case in aluminium, with handle and wheels.
- . Soft carrying bag.

### TESTING CABLES

This option includes 28 cables, with different colours.

### SEI OPTION FOR THE SERIES CONNECTION OF CURRENTS

This option is made of a set of three burdens that equalize the load for current outputs of DRTS 6. Each burden includes two resistors rated 22 Ohm 1 W; at maximum load it causes an error of – 1.6 %. The burden is easily connected to current outputs by means of three safety banana sockets plus plugs, that ease connections.

### PAV OPTION FOR THE PARALLEL CONNECTION OF VOLTAGES

The option includes small resistors to be connected in series to voltage outputs of DRTS 6 and of AMV 66 or AMIV 66 options. Burden is 1 Ohm for tests up to 125 V and 5.7 Ohm for tests at 300 V; at maximum load it causes an error of – 0.5%.

- Case: plastic.
- Dimensions: 22 x 45 x 85 mm.
- Connections to the instrument: two wires 0.2 m long, with safety banana plugs.
- Connection to the load: by a safety banana plug.
- 125 V or 300 V selection: by switch.

## PAI OPTION FOR THE USE AT 30 A, THREE PHASE

The option PAI is made of four jumpers, that ease the paralleling of output sockets: I1 and I4; I2 and I5; I3 and I6, and of the two IN sockets: this eases the connection to the relay under test.

## MAINS SYNCHRONISER

The option is made of a plug that fits into the mains, and that has two banana sockets for the connection to the test set counting input. The purpose is to synchronize the outputs of two test sets to the mains: as the synchronisation is repeated every 2 minutes, the test set stays locked to the mains for the infinity. The option includes a circuit that squares the sinusoidal mains waveform; the isolated output is a square-wave with an amplitude of 18 V nominal, running at the mains frequency.

There are two instances where the option can be necessary:

- . Generating a current or voltage into a device that is also taking a signal from the mains;
- . Synchronising two test sets to the mains, and then using them to test line differential relays.

## STAND UP SUPPORT

The stand-up support allows using the test set in a stand-up position. This is very useful in case of too small room or no support for the test set. There is enough room for the power supply cord, and for the cooling air to flow in.

## APPLICABLE STANDARD

The test set conforms to the EEC directives regarding Electromagnetic Compatibility and Low Voltage instruments.

### A) Electromagnetic Compatibility:

Directive 2004/108/EC (CE conform). Applicable standard: EN 61326:2006.

### B) Low Voltage Directive:

Directive 2006/95/EC (CE conform).

. Applicable standards, for a class I instrument, pollution degree 2, Installation category II: CEI EN 61010-1.

In particular:

- . Inputs/outputs protection: IP 2X - CEI EN 60529.
- . Operating temperature: 0°C to 55°C;  
storage: -25°C to 70°C.
- . Relative humidity: 5 - 95% without condensing.

## ORDERING INFORMATION

| CODE  | MODULE   |
|-------|--|
| 10156 | DRTS 6<br>6 x I 0...15 A - 4 x V 0...125 V<br>1 x VDC output 0...260 V at 100 W<br>Standard set of test cables<br>Soft carry bag<br>TDMS - Test & Data Management Software |

## OPTIONAL ACCESSORIES FOR EXTERNAL AMPLIFIERS

| CODE  | MODULE                   |
|-------|--------------------------|
| 15156 | Set of testing cables    |
| 18156 | Aluminium Transport Case |

## OPTIONAL ACCESSORIES

| CODE  | MODULE  |
|-------|---|
| 19153 | Analog AC/DC Measurement Module   |
| 33156 | Voltage outputs 0 - 300 V   |
| 23156 | High Precision (HP) outputs; 0.05% accuracy outputs with SIT laboratory certificate (EU accredited) |
| 81156 | IEC61850 Interface, hardware and software   |
| 98156 | IN 2 CDG - Option for High Burden Relays  |
| 47156 | I 100 - 100 A Current Booster   |
| 10161 | GPS synchronizer  |
| 20162 | SH 2003 energy meter universal scanning head  |
| 14150 | Input/Output Expansion Module IO6432  |
| 19150 | OUT32 for the IO6432 option   |
| 15156 | Additional set of test cables   |
| 77156 | Heavy duty transport case (Discovery type)  |
| 18156 | Aluminium transport case  |
| 48156 | Soft carrying bag   |
| 35150 | SEI option to put in serie the current outputs  |
| 34150 | PAV option for the parallel connection of voltages  |
| 36156 | PA-I option to put in parallel the current output (3 x 30A)   |
| 24156 | Mains synchronizer  |
| 29170 | Stand up support  |



Heavy duty transport case



Heavy duty transport case in aluminium



Soft bag

## EXTERNAL AMPLIFIERS

| CODE  | MODULE  |
|-------|---|
| 27156 | AMI-99 (3 x I - 0 ... 30 A at 160 VA)                                   |
| 63156 | AMV-66 (2 x V - 0 ... 125 V at 80 VA)                                   |
| 28156 | AMV-66 (2 x V - 0 ... 300 V at 80 VA)                                   |
| 13156 | AMIV-66 (3 x I - 0 ... 15 A at 80 VA)<br>(2 x V - 0 ... 125 V at 80 VA) |



Standard set of testing cables

Optional set of testing cables



IN 2 CDG - Option for High Burden Relays



Stand up support

