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TECHNICAL MANUAL

POWER TEST SIMULATOR

Three-phase Current / Voltage Supply

IMA95



Engineered and manufactured by:
MEGACON

The MEGACON policy is one of continuous improvement, consequently equipment supplied may vary in detail from this publication



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ELECTRONIC CONTROL AND INSTRUMENTATION

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INTRODUCTION

IMA95 is one in a range of Megacon's transportable test simulators. This unit is specifically designed for testing of Megacon's or other brands range of protective guards, controllers and regulators for marine generator and power plant automation systems (current, current differential, overcurrent and short circuit, active (kW) and reactive (VAR) power, power overload, reverse power, load sharing, voltage, earth fault etc).

IMA95 is used for general testing and calibration of AC ammeters and voltmeters, watt-, VAR- and cos phi-meters, measuring converters (transducers) for AC current, AC voltage, single phase or three phase 3-wire balanced and unbalanced active (W) and reactive power (VAR), energy (Wh), power factor, etc.

IMA95 has input over-voltage protection. Its phase sequence monitor verifies that all voltage and current outputs have correct R-S-T sequence, configuration and phase relationship. All current outputs are galvanically isolated from the mains supply. Voltage outputs are **NOT** isolated from the mains supply.

3- and 4-wire **isolated** outputs are optionally available, using **POTENTIAL ISOLATOR IMA133**. (see page 5/5)

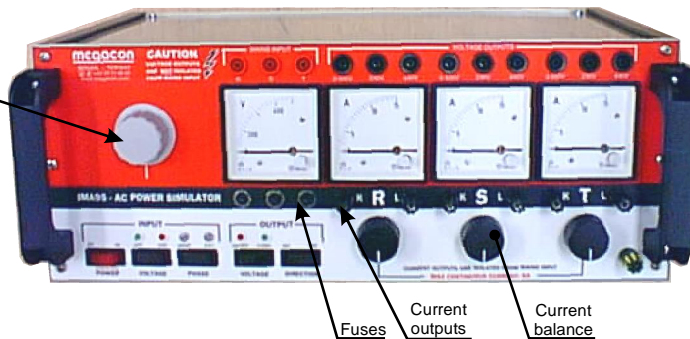
Three phase line voltage input : 200-240V and 380-460V, 50/60Hz
(115V and 690V optional with the IMA133 transformer)

Three phase current outputs : Individually adjustable 0-15A
(depending on setting of the adjustable voltage knob)

3-wire line voltage outputs : Variable 0-250V or 250-500V range
(All values given for zero load)
Maximum output voltage depends on the input voltage:
Example 1: I/P: 220V or 440V gives app. range of 0-265V and 225-485V output
Example 2: I/P: 380V gives app. range of 0-225V and 190-417V

:Fixed 230 and 440V output. (Also depending on input voltage)
For input range 200-240V the fixed outputs will be: 230V = I/P x 1, 440V = I/P x 2
For input range 380-460V the fixed outputs will be: 440V = I/P : 1, 230V = I/P : 2
Example 1: I/P: 220V gives fixed 220V and 440V output
Example 2: I/P: 400V gives fixed 200V and 400V output

Variable
Voltage Adjust
OR
Nominal
Current Adjust

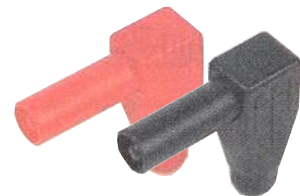


Dimensions: H: 180mm, W: 460mm, D: 245mm, weight: 18kgs



All **current** outputs are galvanically separated from mains supply and may be grounded. The **voltage** outputs are **NOT** isolated from mains supply. Accordingly, only skilled personnel must operate **IMA95**. The input leads from mains to input terminals "R - S - T" must only be handled and connected when the input supply source is not live.

For connection to **the supply input and the voltage output** terminals only fully shrouded safety plugs with insulated connector tip, as supplied together with **IMA95**, must be used to avoid personnel accidental contact with voltage exposed metal parts.



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1.0 GENERAL

- 1.1 Fuses: 3 x 5x20mm 1A ceramic fuses on unit front protect the supply inputs
- 1.2 When power is supplied to **IMA95** and switch POWER is set to ON the lamp "440V" is lit, indicating that unit is set to 440V input. Push switch INPUT VOLTAGE to select 230V input operation. Whenever switch is set to "OFF" the function of switch INPUT VOLTAGE default to "safe level" operation. (see 2.1 & 3.1)

2.0 INPUT

2.1 200-240 V and 380-460V Input

Power input to IMA95 is to be provided from a nominal 50/60Hz 3-phase, 3-wire supply system. As a safety precaution the unit automatically selects the **highest** input voltage (440V) when power is switched on. It must **manually** be switched to 230V operation by pushing switch INPUT VOLTAGE.

2.2 Overvoltage Protection

An input overvoltage protective relay automatically disconnects power if input voltage exceeds set safe levels. When this protective function is active the red lamp OVERVOLTAGE in switch POWER is lit.

NOTE!

The input power to **IMA95** must be completely disconnected to reset the overvoltage protection circuit.

2.3 Phase Sequence

Is the phase sequence of the voltage supply to **IMA95** reversed lamp PHASE ERROR is lit. Push switch PHASE to provide correct phase sequence "R-S-T" of all outputs. Correct phase sequence is a precondition for measurement of active power (W), reactive power (VAr) apparent power (VA) and power factor (cos phi). Each output terminal's phase reference (R-S-T) and the direction of current flow (K: supply, L: load) is clearly marked.

3.0 OUTPUT

3.1 Variable Voltage Output Range

The variable output voltage can be selected by switch OUTPUT VOLTAGE for range "0V to 250V" or "250V to 500V". (See page 2 for details)

The large knob to the left is used to either adjust the 3-phase output voltage level (0-250V or 250-500V range), or to adjust the nominal level of each of the three current outputs. (See page 2 for details).

3.2 Variable Current Output

The maximum current to be drawn from any of the current outputs largely depends on the ohmic resistance of the external current loop. The black current terminals are rated 30A, and 4mm plugs may be flipped into the center of the terminal. Use large size wires for high current levels to reduce ohmic losses. Terminal tops are castellated to add torque when clamping wires.

3.3 Direction of Current Flow

Directions of all output currents are reversed (180 degrees) by holding the switch DIRECTION to position "REV". The switch goes automatically back to position "FWD" for normal direction of the current flow when switch DIRECTION is released.

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OPERATION

Testing of voltage:

IMA95 has separate three-phase 3-wire voltage outputs. One output is adjustable 0-250 or 250-500V, the two other outputs are fixed at nominal 230V and 440VAC. (See page 2 for details)

There is no galvanic separation between supply input and voltage outputs. The "S"-phase terminals of all voltage outputs are internally connected in parallel. Have this fact in mind as a safety precaution if more than one of the voltage outputs are loaded simultaneously.

The adjustable 3-phase output line voltage level (R-S) is read on the moving iron voltmeter (FSD 500V). Turn the large knob to the voltage level required. For output voltage range above 250V set switch OUTPUT VOLTAGE to position "250-500V".

⚠ None of the voltage outputs are isolated from the mains supply, and must NOT be grounded!

Testing of current:

The adjustable level of each phase current output is read on a 0-15A moving iron ammeter.

Turn the large knob to the required current level, adjust each of the current fine adjustment knobs for balance as required.

Maximum continuous output current is 6A, up to 15A for max 5 minutes. Current levels **must not exceed** 15A for more than 15 seconds.

Each current output is isolated from each other and from the mains supply, and can be grounded or connected to any system voltage up to 690VAC.

Current output "S" can be loaded to a higher level than the other outputs, accordingly output "S" should be used to simulate short circuit condition etc.

Testing of active and reactive power, amp meter etc.:

Connect the unit under test strictly as specified for the product. Connect voltage inputs in correct phase sequence (R/S/T) and the configuration specified. Connect also current inputs in correct sequence (R/S/T) with specified direction of current flow (K= Supply, L= Load).

For calibration of wattmeters, VAR-meters etc. use the **fixed** nominal 230V or 440V voltage outputs, and adjust current levels as required.

Testing of reverse power:

Connect the unit under test as advised above. To reverse direction of the current outputs (180 degrees) spring loaded switch DIRECTION must be held in position "REV". Adjust current levels as required.

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Separate units available to provide:

POTENTIAL ISOLATOR IMA133

- ✓ Full safety-transformer isolation of **ALL IMA95** outputs
- ✓ 3-wire (delta) and 4-wire (star) voltage outputs with phase-linear neutral
- ✓ Available for 115, 230V, 440V or 690V supply voltage

IMA133 is inserted between the supply and **IMA95** input terminals.

Dimensions: H: 180mm, W: 100mm, D: 150mm, weight: 3,5kgs



Transit / Storage Container

IMA95 is optionally available inserted into a heavy-duty aluminium container. The container has robust handles at each end, toggle catches with wire seal facility, and its interior is lined with high density foam.

Dimensions: L: 580mm, W: 385mm, H: 350mm, weight: 6,5kgs



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