

METREL test and measurement accessories:



3-phase AktivGT / Machine adapter A1322

Instruction manual

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Mark on your equipment certifies that this equipment meets the requirements of the EU (European Union) concerning safety and electromagnetic compatibility regulations

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1 Preface

Congratulations for purchasing and using METREL A1322 3-phase AktivGT / Machine adapter accessory with METREL test and measuring instruments. The A1322 is an extender for interfacing tested three-phase appliances to test socket of appliance tester for testing and measuring their characteristics.

Features:

- › All tests on 3-phase electrical equipment can be carried, including live leakage tests, power, portable RCD testing and polarity + active polarity test,
- › Simple connection to the PAT tester,
- › Simple test procedures, same as for single phase equipment,
- › Adapter is compatible with most of METREL PATs and machine testers,
- › A1322 can be supplied from both 1-phase or 3-phase earthed power supply systems.

Highlights:



- › The most complete set of function on the market, inclusive PRCD and active polarity,
- › Intelligent adapter: it is automatically detected by the PAT tester, test sequence for 3 phase tests is automatically set on base of entered test code and input voltages.

A1322 three-phase adapter is special accessory intended for using only with METREL appliance testers.

2 Safety and operational considerations

2.1 Warnings and notes

In order to reach high level of operator's safety while carrying out various tests and measurements using commanders as well as to keep the test accessory and equipment undamaged, it is necessary to consider the following general warnings:

- ❑  **Warning on the A1322 means »Read the Instruction manual with special care to safety operation«. The symbol requires an action!**
- ❑ **If the A1322 is used in a manner not specified in this user manual or the manual of target test equipment, the protection provided by the A1322 and equipment may be impaired!**
- ❑ **Read this user manual carefully, otherwise use of the A1322 may be dangerous for the operator, for test equipment or for the tested object!**
- ❑ **Do not use the A1322 if any damage is noticed!**
- ❑ **Consider all generally known precautions in order to avoid risk of electric shock while dealing with hazardous voltages!**
- ❑ **Tested appliance must be disconnected from any supply system and discharged!**
- ❑ **Service intervention is allowed to be carried out only by a competent authorized person!**
- ❑ **Do not touch free male connectors during the (active) polarity test.**
- ❑  **Use only earthed 1-phase or 3-phase mains supply system to power A1322 adapter! PE must have low impedance to earth, recommended is < 0.3 Ω .**
- ❑ **Pay attention that tested appliance can be normally activated when it is connected to test socket of A1322.**

2.2 Standards applied

The instrument is manufactured and tested according to the following regulations, listed below.

Safety (LVD)

EN 61010 - 1	Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements
EN 61010-2-030	Safety requirements for electrical equipment for measurement, control and laboratory use – Part 2-030: Particular requirements for testing and measuring circuits
EB 61326 - 1	Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements

Note about EN and IEC standards:

Text of this manual contains references to European standards. All standards of EN 6xxxx (e.g. EN 61010) series are equivalent to IEC standards with the same number (e.g. IEC 61010) and differ only in amended parts required by European harmonization procedure.

3 A1322 description

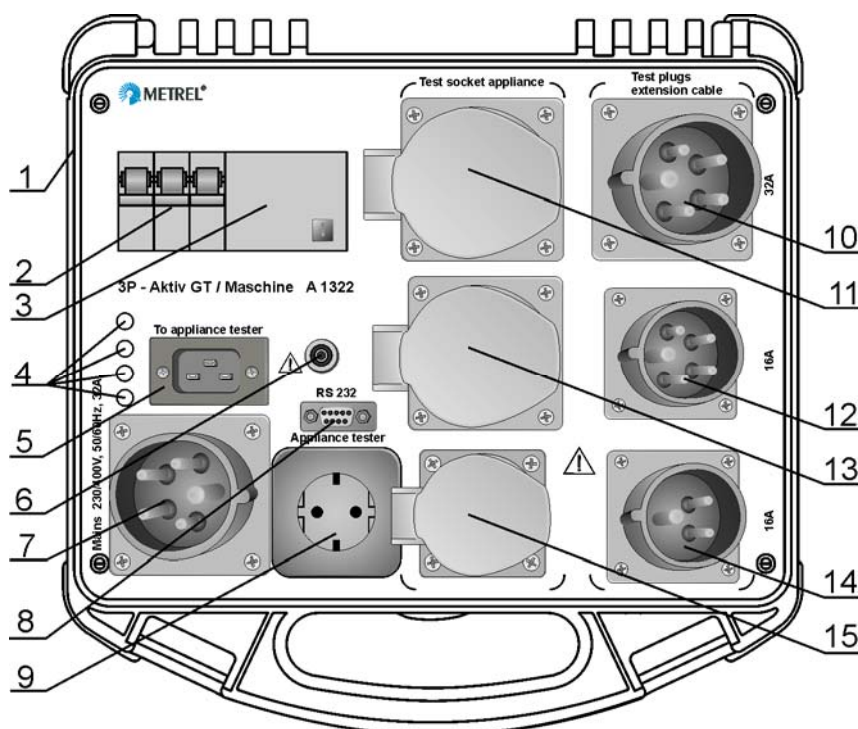




Figure 3.1: A1322 components

Legend:

- | | |
|---|---|
| 1 | Plastic case |
| 2 | Circuit breaker. |
| 3 | Contactor for enabling testing under mains supply (functional, power, leakage, PRCD). |
| 4 | Status indicators, see chapter 4.3, <i>A1322 generated messages</i> . |
| 5 | Connector for connection to appliance tester test socket.
⚠ Never connect it to mains supply socket! |
| 6 | EB/S connection to the master instrument. See chapter 4, <i>A1322 Operation</i> for application of EB/S connection. |
| 7 | Power supply entry plug connector, for power supply possibilities see chapter 4.1, <i>Power supply considerations</i> .
⚠ Never operate the A1322 outside supply options as defined in chapter 4.1 and supply outside voltage limits as defined in chapter 6.1. |
| 8 | RS 232 connector for communication with master instrument and machine tester. Supply socket for master instrument. Its L output is controlled via circuit breaker (2) |
| 9 | Note: The master instrument can be supplied from the socket of the A1322 or directly from any other wall socket with proper voltage and grounding. |

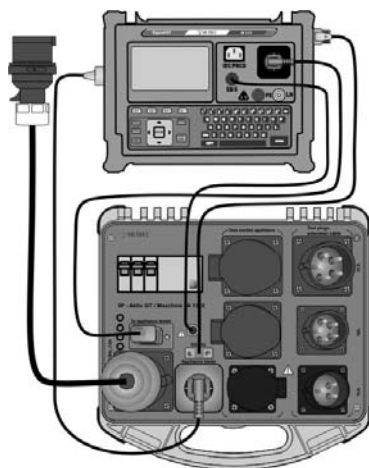
-
- | | |
|----|---|
| 10 | Connections for testing various appliances, |
| 11 | - 11 : 3-phase 32 A appliance; 10 + 11 : 32 A 3-phase cord, |
| 12 | - 13 : 3-phase 16 A appliance; 12 + 13 : 16 A 3-phase cord, |
| 13 | - 15 : single phase 16 A appliance; 14 + 15 : 16 A single phase cord. |
| 13 |  Sockets 11, 13, 15 are intended for test purpose only! Never use the |
| 14 | A1322 for power supply distribution! |
| 15 |  Do not connect external supply to any of test sockets and/or plugs. |
-

4 A1322 operation

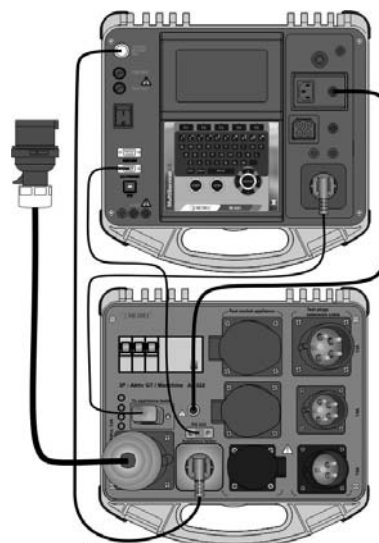
The A1322 operates in conjunction with its master PAT or Machine tester. Following is the list of applicable testers; in the manual, they are referred as a master instrument:

- MI 3310 SigmaPAT and
- MI3321 MultiservicerXA.

Required and optional connections between A1322 and the master instrument are shown in the following figure.



Connecting MI3310 instrument to A1322



Connecting MI3321 instrument to A1322

Required connections are:

- Measuring connection between appliance coupler (5) and test socket of the master instrument, and
- RS232 communication interface between the A1322 (8) and PC/Printer connector on the master instrument.

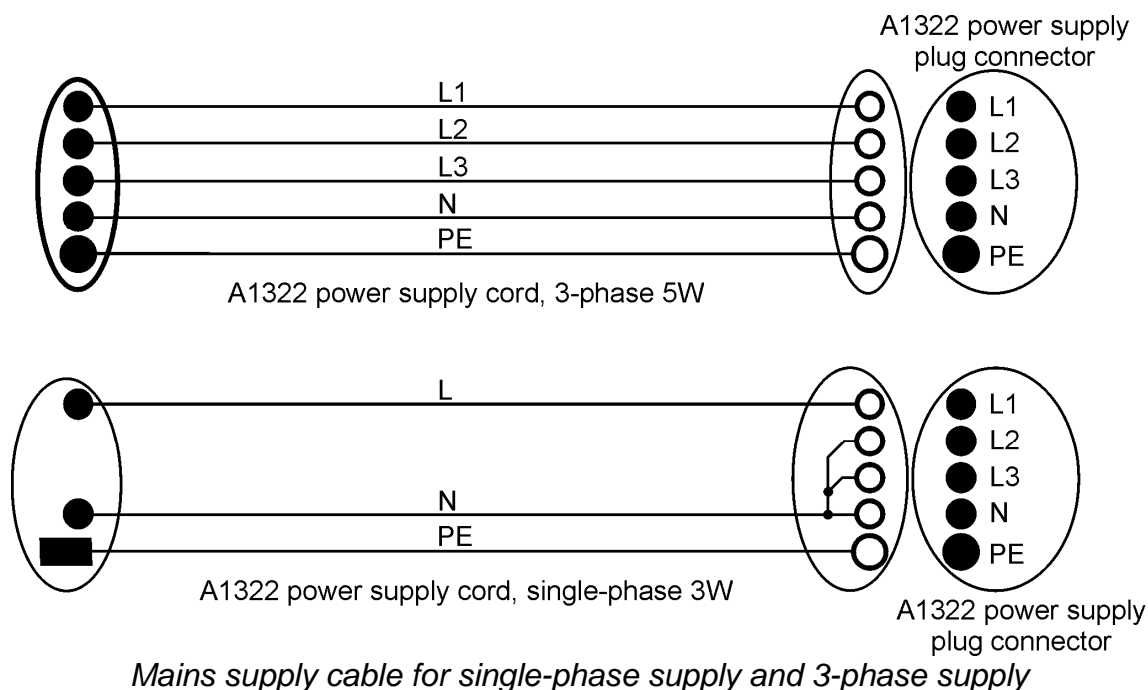
Optional connection EB/S (6) is intended as measuring connection from the master instrument:

- For measurement of earth bond during (active) polarity test the EB/S of the master instrument shall be connected to the EB/S socket of the A1322.
- For measuring resistance to PE connection and CLASS II parameters (touch current, insulation resistance S, substitute leakage current S), the EB/S of the master instrument shall be used as touching electrode and the EB/S socket on the A1322 shall be opened.

Optional power supply connection (9) for the master instrument is intended to supply the master instrument via A1322. It is recommended for operation to apply this connection, especially in places without applicable 230 V wall sockets. With the fuse/circuit breaker (2), the A1322 including its output supply socket (9) can be turned on/off.


4.1 Power supply considerations

The A1322 contains 3-phase 32 A socket (7) for connection to mains supply. There exist two connection options; single-phase and 3-phase. The figure below shows required connection for both possibilities.



Various power supply options can exist in live working with 3-phase appliances. The A1322 including its master instrument will operate only in TN/TT type supply system with distributed N and/or NPE and rated supply voltages U_{L-N} / U_{L-L} 230/400 V and/or 120/208 V.

For successful testing and safety operation, the following requirements shall also be met for supplying the A1322 plus its master instrument:

-  **PE must have low impedance to earth, recommended is $< 0.3 \Omega$.**
- Impedances Z_{L-N} / Z_{L-L} shall be low enough to keep low voltage drop when operating with high power tested appliances, e.g. $0.2/0.35 \Omega$ for 32 A appliance and 3 % voltage drop in steady state operation.

Power supply considerations on 3-phase system without N conductor

The A1322 can also be supplied in 3-phase 4W system (without N conductor). In this case the master instrument can not be supplied from the A1322 and shall be connected to a proper 1-phase wall socket.

Some tests can not be performed successfully:

- Active tests/measurements (differential and touch leakages, active polarity, PRCD testing and functional test) on 16 A (3 pole: L+N+PE) test socket
- Active polarity test on 5 pole (L1+L2+L3+N+PE) 16 A and 32 A test sockets.
- PRCD testing on all test sockets.

4.2 Working with A1322

How to enable/disable working A1322 3-phase AktivGT / Maschine instrument on selected master PAT instrument:

Step no.	Description
1	Press and hold the ESC key on alpha-numeric keyboard and switch on the PAT instrument.
2	Enter password A1322 and press the ENTER key for confirmation.
3	From SET A1322 menu select A1322 ON option to enable working with 3-phase AktivGT / Maschine instrument on selected PAT instrument. Press the ENTER key for confirmation. To disable A1322 support on PAT instrument, use A1322 OFF option.
4	Master PAT instrument can now be used with A1322 instrument.

For using the A1322, the following procedure shall be applied:

Item	Comment
<ul style="list-style-type: none"> Connect the A1322 and the master instrument via RS232 interface. 	See <i>chapter 4</i> .
<ul style="list-style-type: none"> Connect the masters test socket with the A1322 appliance coupler. 	See <i>chapter 4</i> .
<ul style="list-style-type: none"> Connect power cord of the master instrument to the output power supply socket on the A1322. 	See <i>chapter 4</i> .
<ul style="list-style-type: none"> Connect the A1322 to mains supply. 	
<ul style="list-style-type: none"> Turn on fuse/circuit breaker on the A1322. 	The A1322 beeps.
<ul style="list-style-type: none"> Turn on the master instrument. 	
<ul style="list-style-type: none"> Select test function. 	See user manual of the master instrument.
<ul style="list-style-type: none"> Press Start on the master instrument to accept selection 	On the upper left corner appears indication of connected A1322: 3PH

System is ready for testing.

Connect tested equipment to the proper test socket/plug.

Some tests are carried by the master instrument with A1322 applied as measuring interface to tested equipment. Some tests, typical for 3-phase appliances are carried by the A1322 only. In this case, the A1322 sends results to the master instrument.

The A1322 has possibility to execute the following tests:

- Differential leakage current,
- Polarity/active polarity,
- Functional,
- 3-phase PRCD.

When A1322 3P AktivGT/Maschine is used with MI 3321 MultiservicerXA, the following tests / measurements in all operating modes can not be performed using A1322:

- › Continuity
- › Clamp current
- › RCD test (supported only PRCD)
- › Functional test
- › HV-test
- › Z LINE
- › Z LOOP
- › Voltage
- › Discharge time

Note:

- › A1322 enables testing of all possible single to 3-phase appliances. For other connector types, optional interface connections can be used.

General data of the A1322 adapter

Instrument data of A1322 are available when

- › working with the A1322 adapter is enabled on master PAT instrument and
- › A1322 adapter is connected to master PAT instrument via RS232 communication cable.

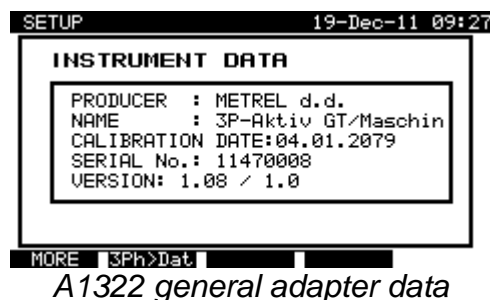
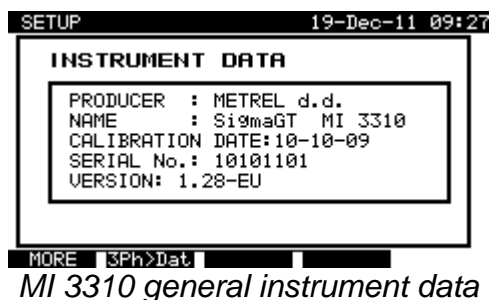
General data of the A1322 adapter are available from Setup / Instrument data menu of the master PAT instrument.

First enter Instrument data from Setup menu.



In the Instrument data menu the general data of the master PAT instrument are available first.

Use F1 (MORE) and F2 (3Ph>Dat) function keys to switch between instrument data of PAT instrument and A1322 adapter.




4.3 A1322 generated messages

Message	Description
PAT – 3P connection failed!	Wiring between master PAT test socket and A1322 PAT test socket (5) was broken! Check connection / cable.
Communication failed!	Serial (RS232) communication between PAT and A1322 was broken. Check serial cable and its connection to both instruments.

Status indicators

LED indicator	Description
OK	Continuous: The A1322 is ready for use.
	Blinking: Hardware error. The instrument detects a serious failure.
1P	<p>Single-phase supply system status</p> <p>Continuous: Single-phase supply voltage is applied.</p> <p>Blinking: Warning for improper power supply voltage condition: Possible causes are:</p> <ul style="list-style-type: none"> - L and N wire crossed, - No earth connection or other wiring problem on supply socket, - Incorrect mains voltage. <p>Warning:</p> <ul style="list-style-type: none"> • The A1322 must be properly earthed! See 4.1 Power supply considerations.
3P	<p>3-phase supply system status</p> <p>Continuous: 3-phase supply voltage is applied (phase rotation 1-2-3).</p> <p>Blinking: Warning for improper power supply voltage condition: Possible causes are:</p> <ul style="list-style-type: none"> - No earth connection or other wiring problem on supply socket, - L and N wire crossed when instrument is connected to 1-phase supply system, - Incorrect mains voltage. <p>Blinking at start-up 3-phase supply voltage is applied. Check phase rotation.</p> <p>Warning:</p> <ul style="list-style-type: none"> • The A1322 must be properly earthed! See 4.1 Power supply considerations.
N	<p>Power supply Neutral conductor status</p> <p>Light on: Power supply system with N conductor.</p> <p>Light off: No N conductor in the incoming power supply system.</p>

4.4 Earth bond resistance measurement

 Refer to chapter **Measurements**, paragraphs **Earth bond resistance** in master PAT user manual for detailed information.

Procedure:

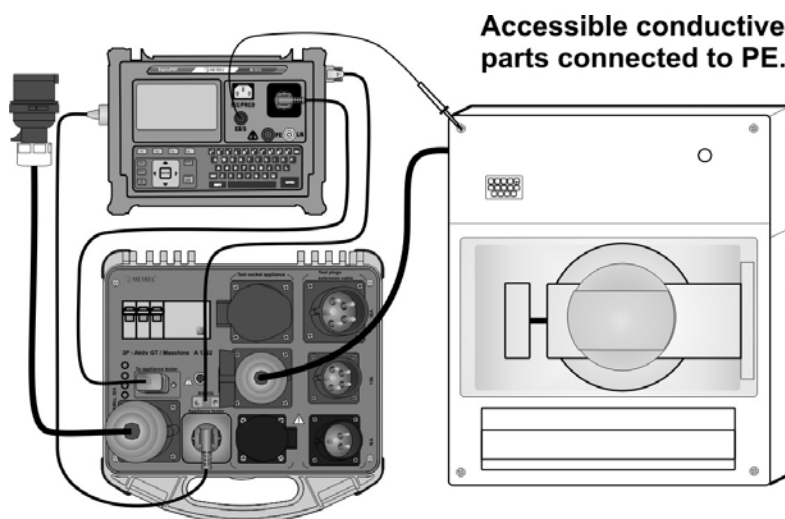
Item

- › Prepare test system.
- › Connect power supply plug of tested appliance into proper test socket.
- › Prepare and start measurement on the master instrument.
- › Wait until measurement is finished or stop the measurement.
- › Check result(s).
- › Store result(s).

Comment

See *chapter 4.2*.
See *figure below*.

Optional



Note:

- › Consider displayed warnings before starting measurement!

Compensation of test leads resistance

Test leads compensation is required to eliminate the influence of test leads resistance and instrument's internal resistance. If a compensation value is stored this is indicated in the message **C** on PAT instrument.

Compensation of test leads resistance procedure

Item	Comment
<ul style="list-style-type: none">Prepare test system.Connect test lead to EB/S probe on PAT instrument.Connect test lead from PAT EB/S probe to the PE pin of the test socket (32A 5p, 16A 5p or 16A 3p).Select Earth bond function from Single test.Press the CAL (F3) key for measurement.If the calibration was performed successfully, 0.00 Ω is displayed.Wait until measurement is finished.Check result.	<p>See <i>chapter 4.2</i>.</p> <p>Regarding the type of cord.</p>

Notes:

- 5 Ω is the limit value for resistance compensation. If the resistance is higher then the calibration value is reset to the default value and the message disappears.
- Both 10 A and 200 mA continuity functions are compensated at the same time.
- The lead compensation is very important to obtain correct result especially if long test leads are used.

4.5 Insulation resistance and substitute leakage current measurements

- Refer to chapter **Measurements**, paragraph **Insulation resistance** in master PAT user manual for detailed information.
- Refer to chapter **Measurements**, paragraph **Substitute leakage current** in master PAT user manual for detailed information.

Procedure:

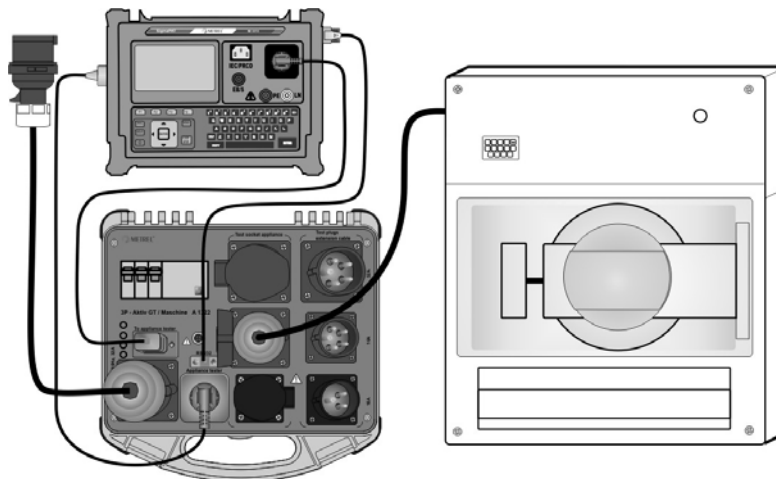
Item

- Prepare test system.
- Connect power supply plug of tested appliance into proper test socket.
- Prepare and start measurement on the master instrument.
- Wait until measurement is finished or stop the measurement.
- Check result(s).
- Store result(s).

Comment

See *chapter 4.2*.
See *figure below*.

Optional



Insulation resistance and substitute leakage current measurements on class I device under test

Notes:

- Consider any warning on the display before starting the measurement!
- When EB/S probe is connected during the test then the current through it is also considered.
- The DUT should be de-energized before the insulation resistance measurement!
- Do not touch or disconnect the DUT during the insulation resistance measurement or before it is fully discharged! The message »Discharging...« will be displayed while the voltage on the DUT is higher than 20 V!
- Substitute leakage current may differ substantially from that of conventional leakage current test because of the way the test is performed. For example, the difference in both leakage measurements will be affected by the presence of neutral to earth noise suppression capacitors.

4.6 Insulation resistance (S-probe) and substitute leakage current (S-probe) measurements

- Refer to chapter **Measurements**, paragraph **Insulation resistance (S-probe)** in master PAT user manual for detailed information.
- Refer to chapter **Measurements**, paragraph **Substitute leakage current (S-probe)** in master PAT user manual for detailed information.

Procedure:

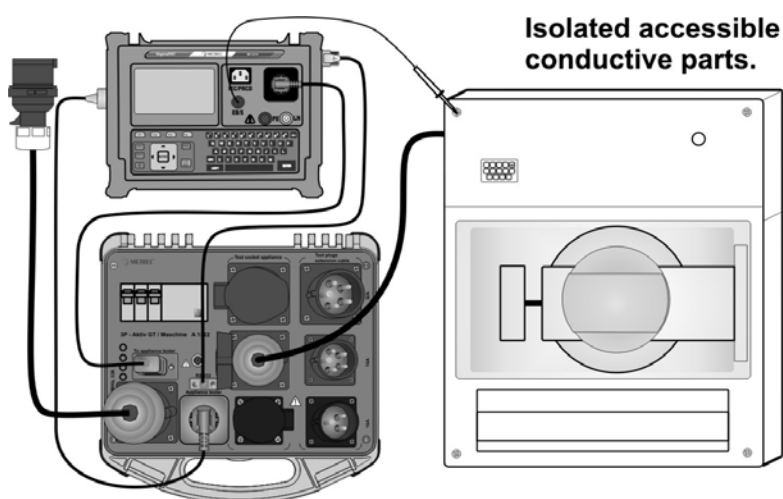
Item

- Prepare test system.
- Connect power supply plug of tested appliance into proper test socket.
- Prepare and start measurement on the master instrument.
- Wait until measurement is finished or stop the measurement.
- Check result(s).
- Store result(s).

Comment

See chapter 4.2.
See figure below.

Optional



Insulation resistance (S-probe) and substitute leakage current (S-probe) measurements on class II device under test

Notes:

- Consider any displayed warning before starting measurement!
- The DUT should be de-energized before the insulation resistance measurement!
- Do not touch / disconnect the DUT during the insulation resistance measurement or before it is fully discharged! The message »Discharging...« will be displayed while the voltage on the DUT is higher than 20 V!

4.7 Touch leakage current measurement

 Refer to chapter **Measurements**, paragraph **Touch leakage current** in master PAT user manual for detailed information.

Procedure:

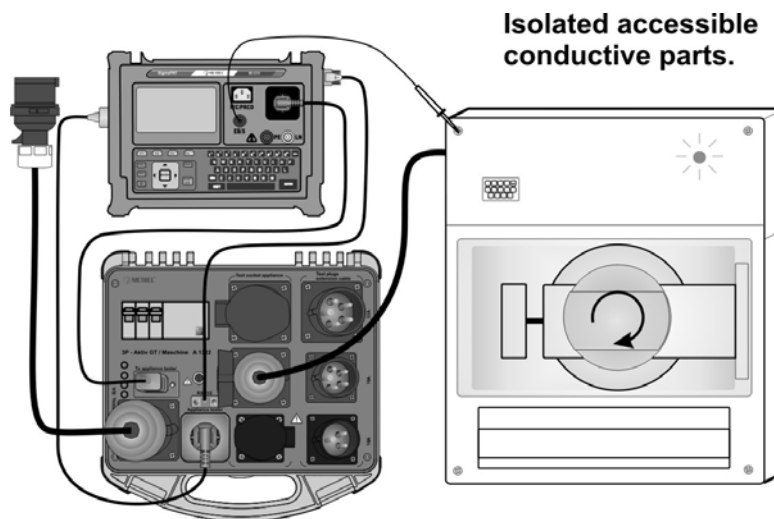
Item

- › Prepare test system.
- › Connect power supply plug of tested appliance into proper test socket.
- › Prepare and start measurement on the master instrument.
- › Wait until measurement is finished or stop the measurement.
- › Check result(s).
- › Store result(s).

Comment

See *chapter 4.2*.
See *figure below*.

Optional



Touch leakage measurement

Notes, warnings:

- › Consider any displayed warning before starting measurement!
- › During the test, DUT is powered as for normal operation. Pay attention on possible electric shock, and danger of rotating/moving parts!

4.8 Differential leakage current measurement

Leakage current is measured via power supply cord of tested appliance.

Procedure:

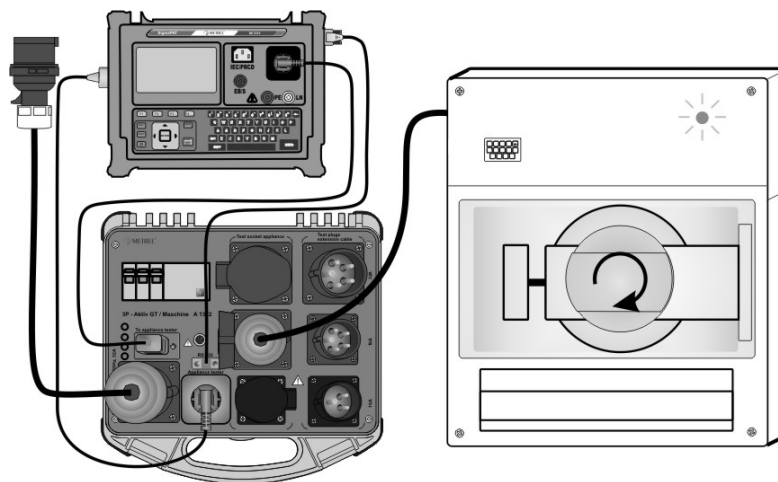
Item

- › Prepare test system.
- › Connect power supply plug of tested appliance into proper test socket.
- › Start measurement on the master instrument.
- › Wait until measurement is finished or stop the measurement.
- › Check result(s).
- › Store result(s).

Comment

See chapter 4.2.
See figure below.

Optional



Differential leakage current measurement

Notes, warnings:

- › Consider any displayed warning before starting measurement!
- › During the test, DUT is powered as for normal operation. Pay attention on possible electric shock, and danger of rotating/moving parts!

4.9 Polarity / active polarity test

Polarity test verifies integrity of extension cords, cable reels with distribution sockets and similar.

Standard (normal) polarity test is enough for cords without built-in protection. In case that tested item is equipped with protection (RCD or similar) that requires voltage for normal operation, the active polarity test shall be applied.

Use EB/S connection between the master instrument and A1322.

Procedure:

Item

- › Prepare test system.
- › Connect tested power supply cord to proper connector combination.
- › Select test type [standard/active].
- › Start measurement on the master instrument.
- › If Active polarity, turn on switch on protected cord.
- › Wait until measurement is finished.
- › Check result(s).
- › Store result(s).

Comment

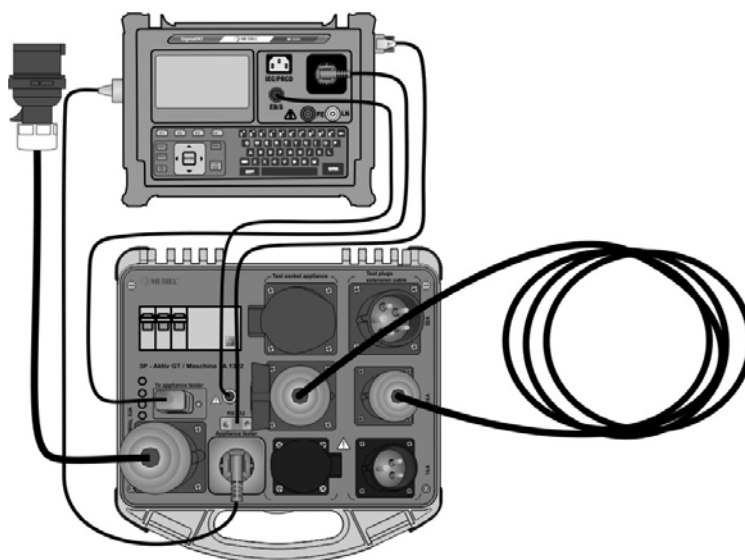
See *chapter 4.2*.

See *figures below*.

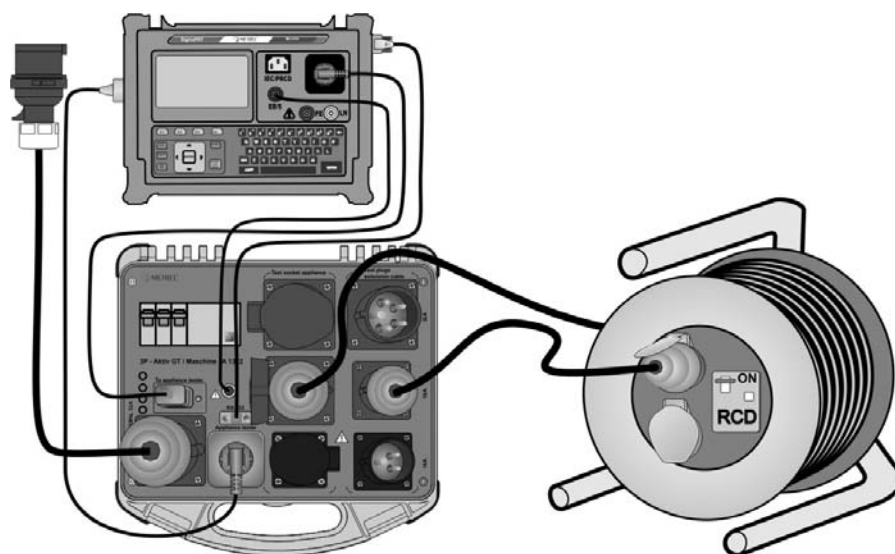
Regarding the type of cord.

The first is applying voltage that active switch can operate normally.

Optional



Normal polarity test



Active polarity test

Notes, warnings:

- Consider any displayed warning before starting measurement!

4.10 Functional test

Functional test is intended for testing operation of the appliance and measurement of power consumption plus leakage currents (optional).

Procedure:

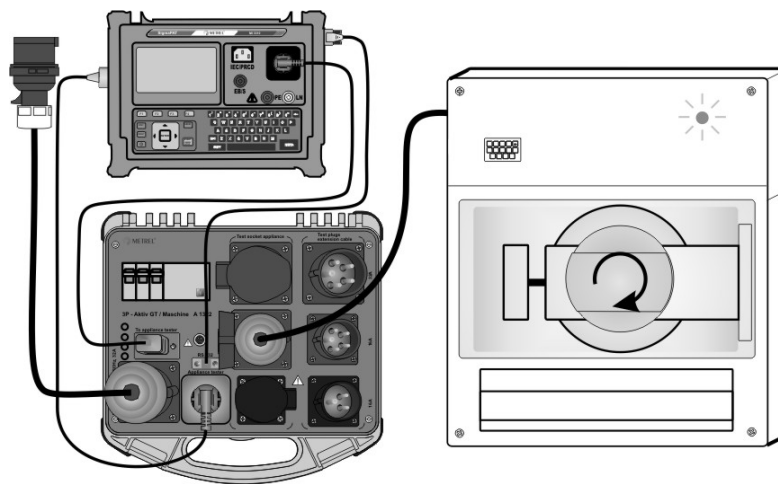
Item

- › Prepare test system.
- › Connect power supply plug of tested appliance into proper test socket.
- › Start measurement on the master instrument.
- › Wait until measurement is finished or stop the measurement.
- › Check result(s).
- › Store result(s).

Comment

See chapter 4.2.
See figure below.

Optional



Functional test

Notes, warnings:

- › Consider any displayed warning before starting measurement!
- › During the test, DUT is powered as for normal operation. Pay attention on possible electric shock, and danger of rotating/moving parts!

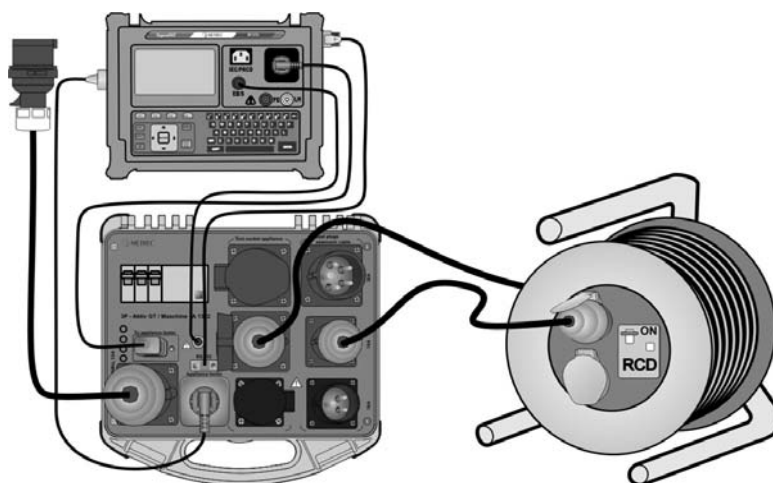
4.11 3-phase RCD test

This test verifies that the protection with PRCD is proper. In case the PRCD requires supply for normal operation, the principle at the beginning is similar to active polarity test.

Use EB/S connection between the master instrument and A1322.

Procedure:

Item	Comment
<ul style="list-style-type: none"> Prepare test system. 	See <i>chapter 4.2</i>
<ul style="list-style-type: none"> Connect power supply plug of tested appliance into proper test socket. 	See <i>figure below</i>
<ul style="list-style-type: none"> Start measurement on the master instrument. 	The first is applying voltage for normal operation of active switch / RCD
<ul style="list-style-type: none"> If Active protection, turn on RCD on protected cord. 	
<ul style="list-style-type: none"> Wait until measurement is finished. 	Optional
<ul style="list-style-type: none"> Check result(s). 	
<ul style="list-style-type: none"> Store result(s). 	



3-phase RCD testing

Notes, warnings:

- Consider any displayed warning before starting measurement! Do not touch free male connectors during the test.

5 Maintenance

Unauthorized person is not allowed to open the A1322 instrument. There are no user replaceable components inside the instrument.

5.1 Cleaning

No special maintenance is required for the housing. To clean the surface of the instrument use a soft cloth slightly moistened with soapy water or alcohol. Then leave the A1322 to dry totally before use.

Warnings:

- Do not use liquids based on petrol or hydrocarbons!
- Do not spill cleaning liquid over the adapter!

5.2 Service

For repairs under warranty, or at any other time, please contact your distributor.

6 Technical specifications


6.1 Test functions

6.1.1 Earth bond resistance

 Refer to chapter **Technical specifications**, paragraph **Earth bond resistance** in master PAT user manual for detailed information.

Test lead compensation..... up to 5 Ω

6.1.2 Insulation resistance (including S-probe)

 Refer to chapter **Technical specifications**, paragraphs **Insulation resistance** and **Insulation resistance S-probe** in master PAT user manual for detailed information.

6.1.3 Substitute leakage current (including S-probe)

 Refer to chapter **Technical specifications**, paragraphs **Substitute leakage current** and **Substitute leakage current S-probe** in master PAT user manual for detailed information.

6.1.4 Differential leakage current

Differential leakage current readout

Range	Resolution	Accuracy
0.00 mA ÷ 9.99 mA	0.01 mA	$\pm(5\% \text{ of reading} + 5 \text{ digits})$

Frequency response complies to EN61010 – Figure A1.

Pass levels* 0.25 mA, 0.50 mA, 0.75 mA, 1.00 mA, 1.50 mA, 2.25 mA,
2.50 mA, 3.00 mA, 3.50 mA, 5.00 mA, 9.90 mA

Test duration..... 2 s, 3 s, 5 s, 10 s, 30 s, 60 s, 120 s, 180 s, none

Test terminals Test socket (A 1322: 16A-5p, 32A-5p or 16A-3p)

Additional error 0.01 mA / A

*) Pass levels depends on used master PAT instrument.

6.1.5 Power, functional test

Apparent power readout

Range	Resolution	Accuracy
0.00 kVA ÷ 24.29 kVA	0.01 kVA	$\pm(5\% \text{ of reading} + 5 \text{ digits})$

Active power readout

Range	Resolution	Accuracy
0.00 kW ÷ 24.29 kW	0.01 kW	±(5 % of reading + 5 digits)

Reactive power readout


Range	Resolution	Accuracy
0.00 kVAr ÷ 24.29 kvar	0.01 kvar	±(5 % of reading + 5 digits)

Power factor readout

Range	Resolution	Accuracy
0.00 ÷ 1.00	0.01	±(5 % of reading + 5 digits)

Test terminals Test socket (A 1322: 16A-5p, 32A-5p or 16A-3p)

6.1.6 Touch leakage current

 Refer to chapter **Technical specifications**, paragraphs **Touch leakage current** in master PAT user manual for detailed information.

6.1.7 Polarity / active polarity

Standard test

Test voltage < 60 V (AC and DC)

Fault detections PASS, L1open / L1-PE shorted / L1-PE crossed, L2 open / L2-PE shorted / L2-PE crossed, L3 open / L3-PE shorted / L3-PE crossed, L1-N shorted, L2-N shorted, L3-N shorted, L1-N crossed, L2-N crossed, L3-N crossed, L1-L2 shorted, L1-L3 shorted, L2-L3 shorted, L1-L2 crossed, L1-L3 crossed, L2-L3 crossed, PE fault, N open, N-PE shorted, Multiple fault

Test terminals Test socket (A 1322: 16A-5p, 32A-5p or 16A-3p), test plug (A 1322: 16A-5p, 32A-5p or 16A-3p)

Active test

Test voltage Mains supply voltage, over-current protection

Fault detections PASS, L1open / L1-PE shorted / L1-PE crossed, L2 open / L2-PE shorted / L2-PE crossed, L3 open / L3-PE shorted / L3-PE crossed, L1-N shorted, L2-N shorted, L3-N shorted, L1-N crossed, L2-N crossed, L3-N crossed, L1-L2 shorted, L1-L3 shorted, L2-L3 shorted, L1-L2 crossed, L1-L3

crossed, L2-L3 crossed, PE fault, N open, N-PE shorted,
Multiple fault
Test terminals Test socket (A 1322: 16A-5p, 32A-5p or 16A-3p), test plug
(A 1322: 16A-5p, 32A-5p or 16A-3p)

6.1.8 3-phase portable RCD

Portable RCD trip-out time readout (AC and A type PRCD)

Range	Resolution	Accuracy
0 ms ÷ 300 ms ($\frac{1}{2} \times I_{\Delta N}$, $I_{\Delta N}$)	1 ms	±3 ms
0 ms ÷ 150 ms ($2 \times I_{\Delta N}$)	1 ms	
0 ms ÷ 40 ms ($5 \times I_{\Delta N}$)	1 ms	

Portable RCD trip-out current readout (B type portable RCD)

Range	Resolution	Accuracy
$0.2 \times I_{\Delta N} \div 2.2 \times I_{\Delta N}$	$0.05 \times I_{\Delta N}$	$\pm 0.1 \times I_{\Delta N}$

Test currents ($I_{\Delta N}$) 10 mA, 15 mA, 30 mA, 100 mA, 300 mA

Test current multipliers $\frac{1}{2} \times I_{\Delta N}$, $I_{\Delta N}$, $2 \times I_{\Delta N}$, $5 \times I_{\Delta N}$ (AC, A)

Test current shape sine-wave (AC), pulsed (A), smooth DC (B)

Test modes single, autotest

Test terminals Test socket (A 1322: 16A-5p, 32A-5p or 16A-3p), test plug
(A 1322: 16A-5p, 32A-5p or 16A-3p)

Misc DC offset for pulsed (A) test current typical 6 mA

6.2 General data

Supply voltage single-phase	230 V ± 10 %
Supply voltage 3-phase	230/400 V ± 10 %
	120/208 V ± 10 %
Maximum test current	32 A, 40 A max (10 min)

Overvoltage category.....	300 V CAT II
Protection classification	I
Pollution degree.....	2
Protection degree	IP 20 (connectors)
Protection degree	IP 66 (closed and locked cover)
Case	Shock proof plastic, portable
Dimensions (w × h × l)	335 mm × 160 mm × 335 mm
Weight	7,2 kg

Reference conditions

Reference temperature range..... 15 °C ÷ 35 °C
Reference humidity range..... 35 %RH ÷ 65 %RH

Operation conditions

Working temperature range 0 °C ÷ 40 °C
Maximum relative humidity 85 %RH (0 °C ÷ 40 °C), non-condensing

Storage conditions

Temperature range -10 °C ÷ +60 °C
Maximum relative humidity 90 %RH (-10 °C ÷ +40 °C)
80 %RH (40 °C ÷ 60 °C)