CE Switch 5kV
A 1600
Instruction manual

Version 1.1.1, Code No. 20 753 086

METREL®

Distributor:

Manufacturer:

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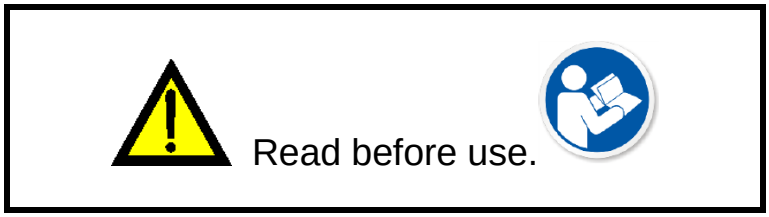
CE Mark on your equipment certifies that this equipment meets requirements of all subjected EU regulations.

TABLE OF CONTENTS

1 General description

The A 1600 CE Switch 5kV combines all features of the CE MultiTesterXA or CE MultiTesterXS and extends them to four HV test ports and two 4-wire continuity ports. It could be used in conjunction with several separate Connection boxes containing various kinds of contacting to tested item. It is designed to be a desktop unit or built in 19” rack.

1.1 Warnings and notes



1.1.1 General safety warnings

In order to reach high level of operator safety while carrying out various measurements using the A 1600 CE Switch 5kV, as well as to keep the test equipment undamaged, it is necessary to consider the following general warnings:

- **Read this Instruction manual carefully, otherwise use of the adapter may be dangerous for the operator, for the adapter itself or for the equipment under test!**
- **Consider warning markings on the adapter!**
- **If the test equipment is used in manner not specified in this Instruction manual the protection provided by the equipment may be impaired!**
- **Do not use the adapter and accessories if any damage is noticed!**
- **Consider all generally known precautions in order to avoid risk of electric shock while dealing with hazardous voltages!**

1.1.2 Safety warnings related to operation of A 1600 CE Switch 5kV

- **Test setups containing A 1600 CE Switch 5kV must strictly follow the requirements of EN 50191!**
- **Any part of test setup shall not be accessible during testing with dangerous voltages, i.e. during any HV test and during testing with mains supply voltage!**
- **Protective bonding terminal on the A 1600 shall be connected to other conductive accessible parts of test set-up and to Protective Earthing (PE) providing strong equipotential protective bonding circuit.**
- **Never touch exposed probe tip, connections, equipment under test or any other energized part during the measurements with hazardous voltage. Make sure that NOBODY can contact them either!**
- **It shall be provided with the mains socket PE properly earthed!**

1.1.3 Markings on the instrument

-  **Read the Instruction manual with special care to safety operation«. The symbol requires an action!**
-  **Protective conductor terminal shall be used for fixed PE connection**
-  **Mark on your equipment certifies that it meets European Union requirements for EMC, LVD, and ROHS regulations.**
-  **This equipment should be recycled as electronic waste.**

1.2 Standards applied

The A 1600 CE Switch 5kV is manufactured and tested according to the following regulations, listed below.

Electromagnetic compatibility (EMC)

EN 61326-1	Electrical equipment for measurement, control and laboratory use - EMC requirements -- Part 1: General requirements

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
EN 61010-031	Safety requirements for electrical equipment for measurement, control and laboratory use – Part 031: Safety requirements for hand-held probe assemblies for electrical measurement and test

2 The A 1600 CE Switch sets and accessories

2.1 Standard set for A 1600 CE Switch 5kV

- A 1600 CE Switch 5kV
- Mains supply cable
- Supplementary protective earth wire 2.5 mm^2, 2 m
- Multi-functional cable A 1645, 1.5 m
- Continuity test lead, 2.5 m, 2 pcs
- HV test lead (red, blue), 1.5 m, 2 pcs
- Screws for mounting to 19” rack, M6 X 12 mm, 4 pcs
- Instruction manual

2.2 Optional accessory

See attached list for available optional accessory.

3 CE Switch 5kV description

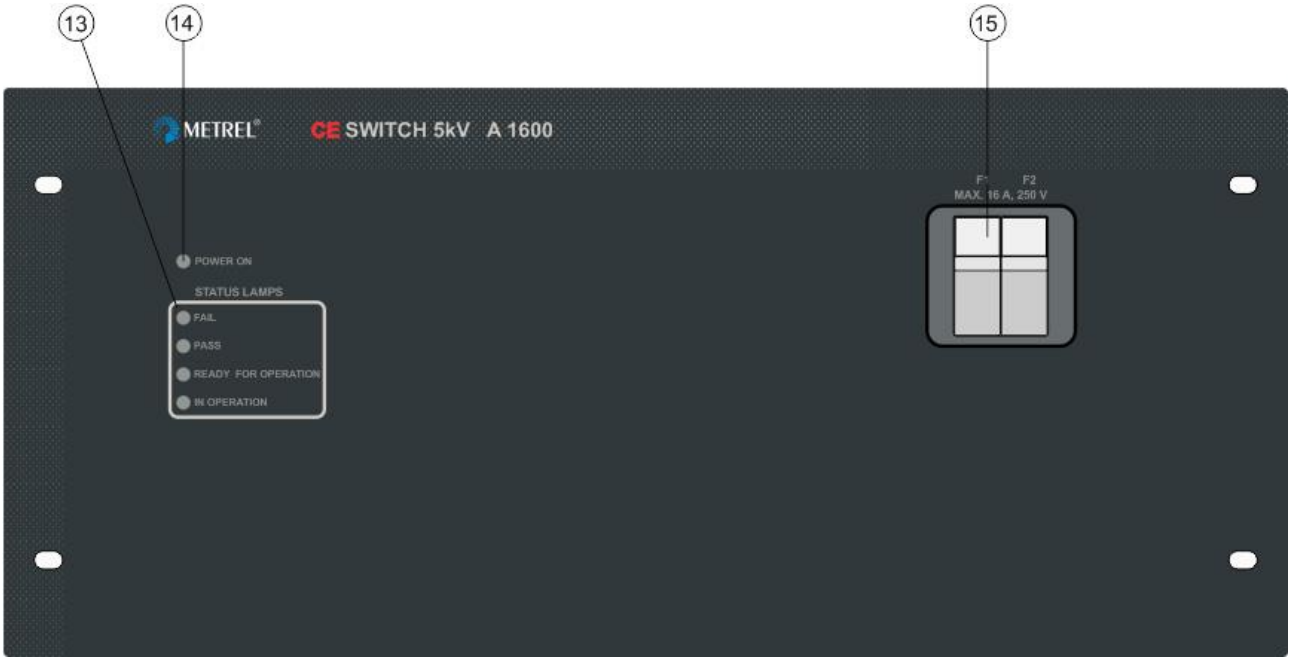


Figure 3.1 Front side

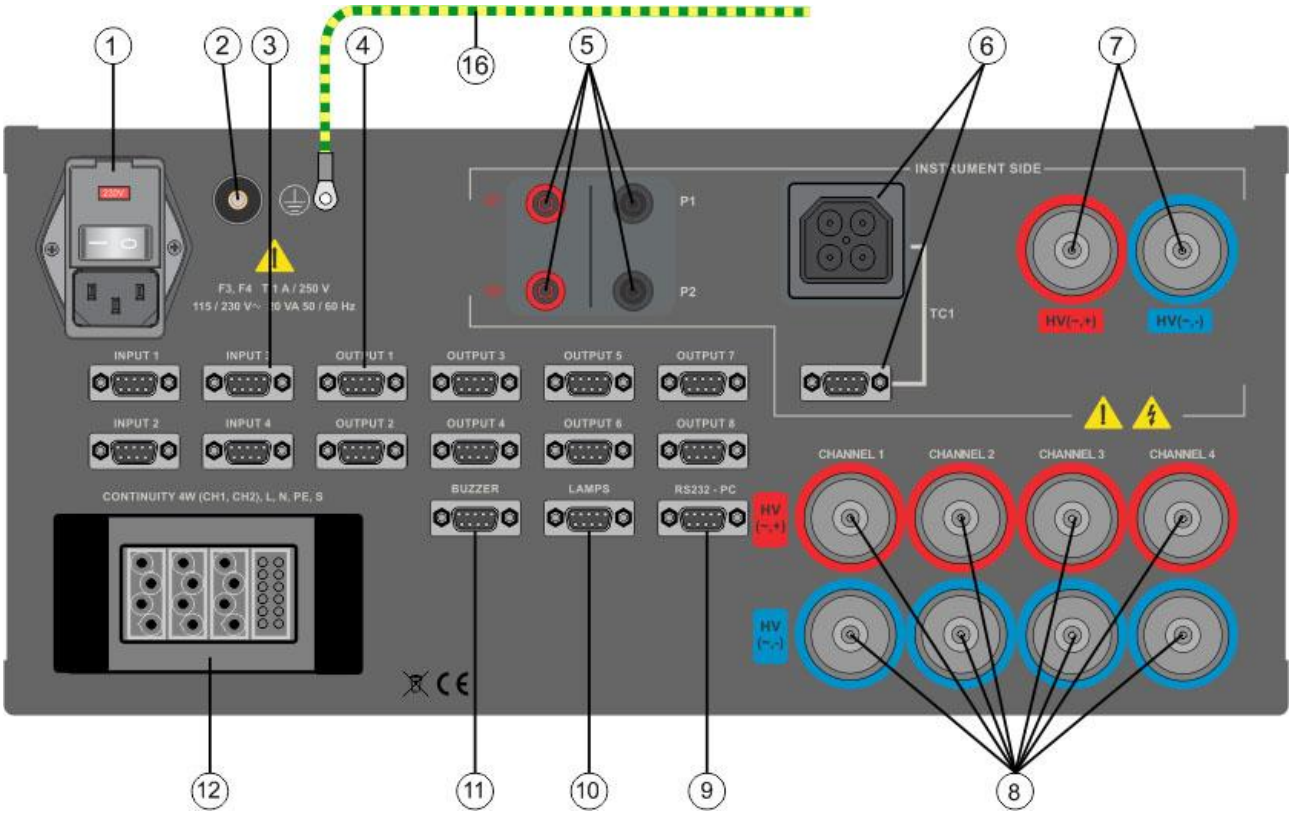


Figure 3.2 Rear (connectors') side

1	Mains supply connector with integrated ON / OFF switch and fuses (F3, F4: T 1 A / 250 V)
2	Screw-type protective earth connector
3	'INPUTs' connectors array

4	'OUTPUTs' connectors array
5	Connection interface to Continuity 4 wire connectors on the instrument
6	Input for connection to TC1 connector on the instrument with - L, N, PE, P/S outputs of the instrument, and A 1600 command control
7	HV inputs for connection to HV outputs on the instrument
8	HV outputs (4 channels)
	RS232-PC connector, for service purpose only
10	LAMPS connector
11	BUZZER connector
12	Test outputs (L, N, PE, P/S, 4-wire Continuity (2 channel)) – intended for connection to various Connection boxes
13	Status of LAMPS outputs
14	Power ON indication
15	Fuse holders with fuses for protection of L and N test conductors (F1, F2: max 16 A / 250 V)
16	Supplementary protective earth wire, 2 m, 2.5 mm^2

4 CE Switch 5kV installation

A 1600 CE Switch can be used as desktop unit or can be installed in a standard 19” rack case. Consider prohibition zone and other requirements of EN 50191 when installing A 1600 into a test system. Use included screws (M6 x 12 mm) or equivalent for mounting of the A 1600 unit. The following figure shows mounting dimensions.

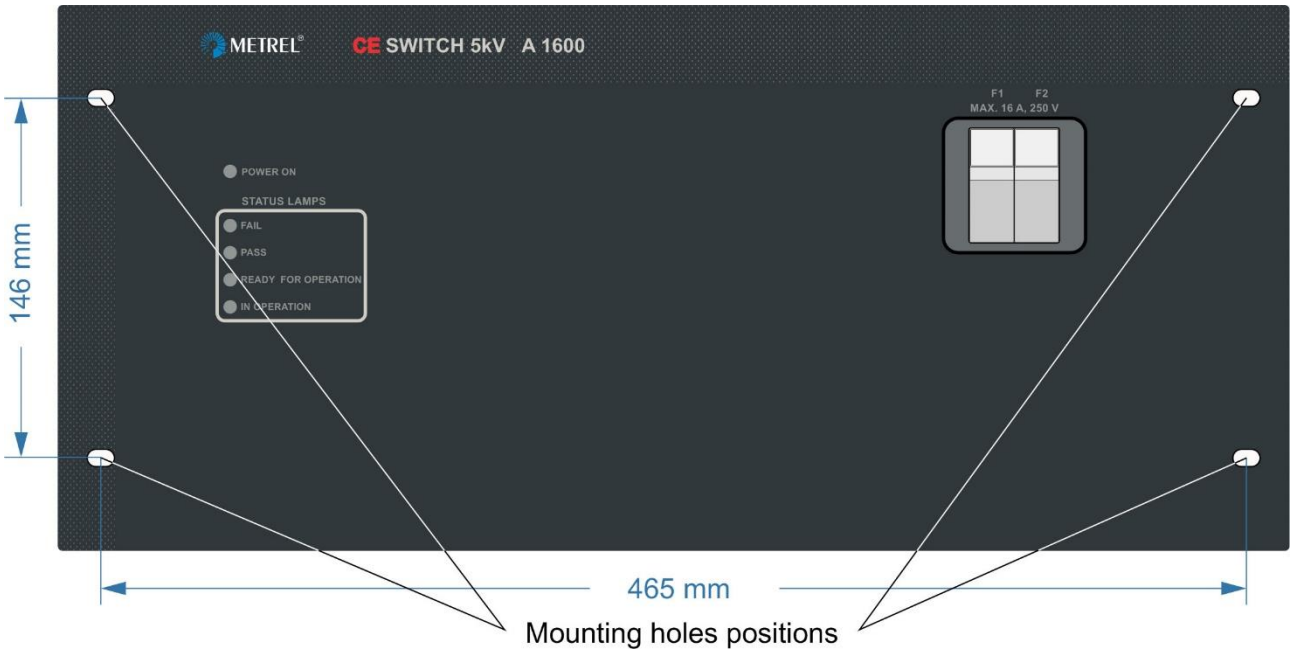


Figure 4.1 Mounting holes positions

Warning!

- **Safety of any system incorporating the equipment is the responsibility of the assembler of the system.**

5 Operation of the A 1600 CE Switch 5kV

A 1600 CE Switch 5kV is intended to support Auto tests for testing electrical equipment (tested item) with the Metrel MI 3394 XS CE MultiTesterXS. It is applied as controlled extension test and measuring ports to the MI 3394 XS. The A 1600 CE Switch internal switches are remote controlled and therefore the A 1600 offers additional auto test commands for preparing Auto Sequences for running auto tests with the MI 3394 XS.
The best possibility is to apply Metrel MESM SW for generating proper auto test sequences with required channels enabled. Note that for preparing auto test sequences using the A 1600, the ticker A 1600 CE Switch 5kV shall be enabled (Select adapter: A 1600 CE Switch 5kV ☑). This enables possibility to programmatically select A 1600 channels in some measuring functions (i.e. Continuity, HV tests)

5.1 Connection of the A 1600 CE Switch 5kV

The following figure shows typical application of the A 1600 CE Switch 5kV. The complete setup shall be located in access protected area as required by EN 50191 to prevent electric shock during testing of tested item with hazardous live voltages.

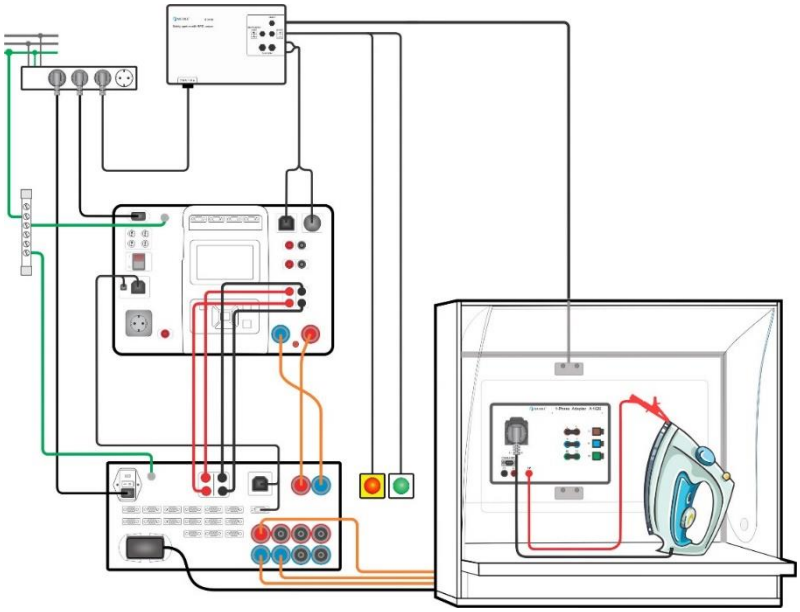


Figure 5.1 Typical connection of the A 1600 CE Switch 5kV with the measuring instrument MI 3394 XS, Safety system S 2109 and connection box A 1626

For testing simple equipment with mains supply input only, the A 1626 or A 1627 connection box should be applied as is shown on the figure above. For more information see Instruction manual *A 1626_A 1627 Connection box 1-Phase_3-Phase*.

5.2 Description of connections

5.2.1 Inputs (INPUT 1, INPUT 2, INPUT 3, INPUT 4)

The DB9 connectors INPUT1, INPUT2, INPUT3 and INPUT4 are intended for connection of external control signals.

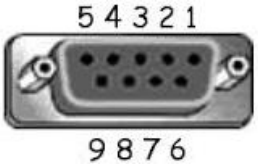


Figure 5.2: INPUT connector - pin layout

Pin	Description	Hardware	Function in regard to flow commands
1	+5 V voltage for inputs	5 V via 2.4 kΩ pull-up resistor	
2	External input	Input low: < 1 V d.c. against earth Input high: > 4.5 V d.c. against earth Umax: 24 V a.c, d.c. against earth	WAIT INPUT mode: IN_2 (connector INPUT 1) IN_3 (connector INPUT 2) IN_4 (connector INPUT 3) IN_5 (connector INPUT 4)
6	Input for Remote control pedal* **Only at connector INPUT4**		EXTERNAL OK KEY mode
5	GND for inputs		

*Requires A 1495 P adapter.

5.2.2 Outputs (OUTPUT1, OUTPUT 2, ... OUTPUT 8)

Via the DB9 connectors OUTPUT 1, OUTPUT 2, … OUTPUT 8, general outputs can be driven via output relays.

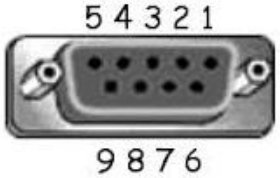
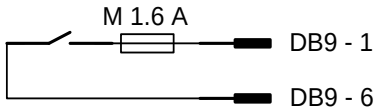


Figure 5.3: OUTPUT connector - pin layout

Pin	Description	Hardware	Function in regard to flow commands
1,6		NO relay, Umax: 24 V, Imax: 1.6 A Output low: open contact Output high: closed contact	OUTPUT STATE: OUT_1 (connector OUTPUT 1) OUT_2 (connector OUTPUT 2) OUT_3 (connector OUTPUT 3) OUT_4 (connector OUTPUT 4) OUT_5 (connector OUTPUT 5) OUT_6 (connector OUTPUT 6) OUT_7 (connector OUTPUT 7) OUT_8 (connector OUTPUT 8)
5	+5 V voltage for outputs		
9	GND for outputs		

5.2.3 Status Lamps

Via the DB9 connector LAMPS up to four lamps can be driven, or up to four general outputs can be driven via output relays. LAMP mode has priority.

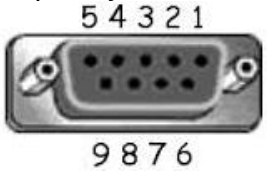
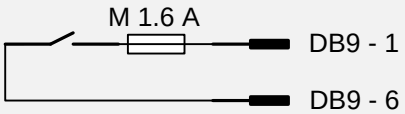
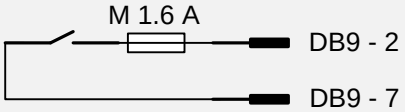
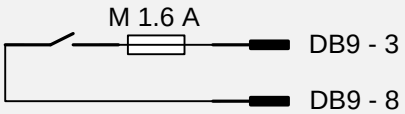
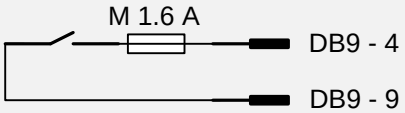


Figure 5.4: LAMP connector - pin layout

Pin	Description	Hardware	Meaning in regard to flow commands
1,6		**NO relay, Umax: 24V, Imax: 1.6 A Lamp On: closed contact Lamp Off: open contact Output low: open contact Output high: closed contact**	**LAMPS Pass/Fail mode: Fail OUTPUT STATE: OUT_4**
2,7			**LAMPS Pass/Fail mode: Pass OUTPUT STATE: OUT_3**
3,8			**LAMPS HV mode: Ready for operation OUTPUT STATE: OUT_2**
4,9			**LAMPS HV mode: In operation OUTPUT STATE: OUT_1**
5	**+5 V supply**		

Note
Following settings of this command are ignored:

- OUT_1 and OUT_2 while Lamps HV mode is enabled.
- OUT_3 and OUT_4 while Lamps Pass / Fail mode is enabled.

5.2.4 Buzzer / Voltage

Via the DB9 connector external buzzer can be driven. In addition, supply voltage for accessories is available.

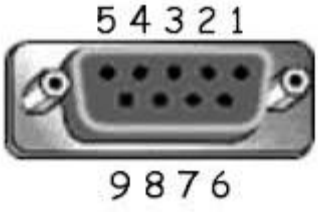


Figure 5.5: Buzzer / Voltage connector - pin layout

Pin	Description	Hardware	Function in regard to flow commands
1	LED_R		
2,3		NO relay, Umax: 24V, Imax: 1.6 A	BUZZER mode: ON: closed contact OFF: open contact

	DB9 - 2 DB9 - 3		
4	GND for accessories		
5	+ 12 V supply for accessories	Imax: 0.5 A	
6	+ 24 V supply for accessories	Imax: 0.5 A	
7	LED_G		
8	LED_B		
9	LED_Y		

5.2.5 Segmented connector

This connector is intended for interfacing to the connection box, like A 1626 and/or A 1627 for the following: Continuity 4W (channel 1, channel 2) and L, N, PE, S.

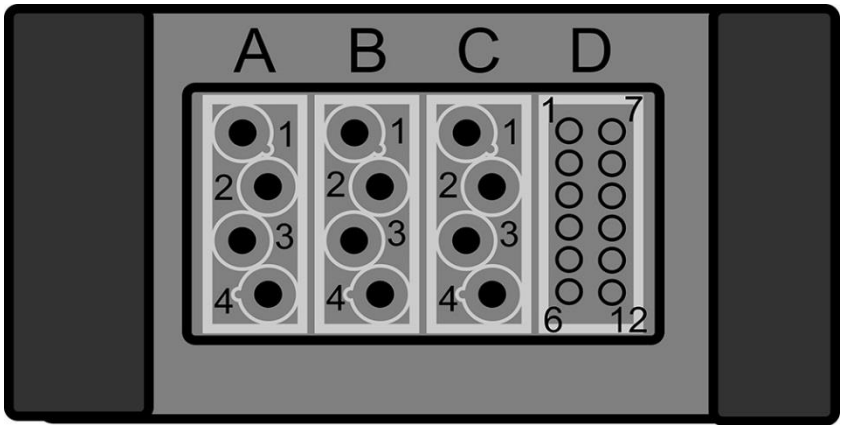


Figure 5.6: Segmented connector - pin layout

Pin	Description	Hardware	Function in regard to flow commands
A/1	Continuity C2, Channel 2		
A/2	Continuity C1, Channel 1		
A/3	L on test socket		
A/4	N on test socket		
B/1	Continuity C1, Channel 2		
B/2	Continuity P2, Channel 2		
B/3	Continuity P1, Channel 1		
B/4	P/S		
C/1	Continuity C2, Channel 1		
C/2	Continuity P2, Channel 1		
C/3	PE on test socket		
C/4	Continuity P1, Channel 2		
D/1	Output for illumination LEDs on commander	Current sinks 10 mA	
D/2	Output for illumination LEDs on commander	Current sinks 10 mA	
D/3	CODE 1		
D/4	CODE 2		
D/7	+ 5V supply for commander	Imax: 100mA	
D/8	Outputs for illumination LEDs on commander	Current sinks 10 mA	

D/9	Input for commander	Input low: < 1 V d.c. against earth Input high: > 4.5 V d.c. against earth Umax: 24 V a.c, d.c.	EXTERNAL OK KEY mode
D/10	GND supply for commander		

5.2.6 HV connections

The A 1600 offers distribution of HV for withstanding test to up to 4 channels. Apply as many as required, e.g. as can be seen in connection circuit example in chapter 4.1, the HV channels 1 and 2 shall be enabled providing withstanding test between PE and supply lines N+L of tested item. Following is an example figure for enabling channels using Metrel MESM SW.

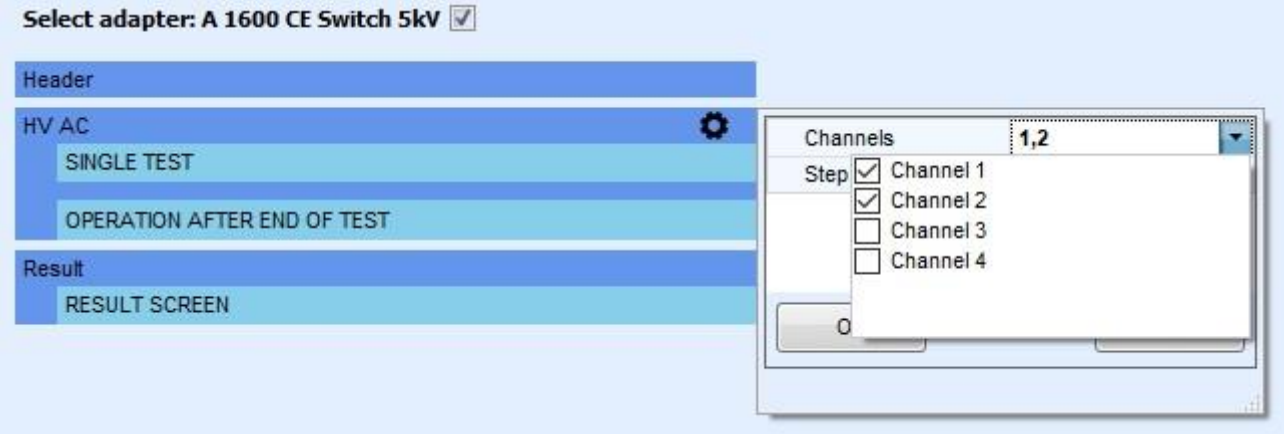


Figure 5.7: A 1600 and Channel setting in MESM SW

6 Maintenance

6.1 Fuses

There are two fuses on the front side:

F1, F2: max 16 A, gG, 500 V, 10 mm × 38 mm

They are intended for protection of tested item supply circuit. Insert fuses with lower current if required. For position of fuses refer to Figure *3.1 Front side* (16).

Two fuses are on rear side of the A 1600 and integrated in mains connector:

F3, F4: T 1 A / 250 V, 5 mm × 20 mm, 1500 A

They are intended for protection of A 1600.
For position of fuses refer to Figure *3.2 Rear side* (1).

Warnings!

- **Switch off the instrument and disconnect all test accessories and mains cord before replacing the fuses.**
- **Replace blown fuses with the same type as defined in this document.**

6.2 Service

For repairs under or out of warranty please contact your distributor for further information.

Unauthorized person is not allowed to open the A 1600 CE Switch. There are no user replaceable parts inside this adapter.

6.3 Cleaning

Use a soft, slightly moistened cloth with soap water or alcohol to clean the surface of A 1600 CE Switch 5kV. Leave the adapter to dry totally before using it.

Notes:

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

7 General data

Mains supply
Supply voltage, frequency..... 115 V / 230 V a.c., 50 Hz / 60 Hz
Supply voltage tolerance..... ±10 %
Max. power consumption ..... 20 VA
Mains supply overvoltage category ..... CAT II / 300 V

Parameter	A 1600 CE Switch 5kV
Max. continuous load current	16 A, PF = 1
Max. continuous reactive load	1.5 kVA, PF = 0.9
Max. a.c. withstanding voltage	5 kV
Max. d.c. withstanding voltage	7 kV
Max. continuity resistance measuring current	25 A
Max. Riso measuring voltage	1000 V
Supported measurements	Continuity Riso Power Sub-Leakage Differential Leakage IPE Leakage Touch Leakage Leaks & Power HV-AC HV-DC HV-AC programmable HV-DC programmable Discharging time

Protection classifications
Power supply…… ..... Class I, mains supply
Altitude..... ≤ 2000 m
Pollution degree..... 2
Degree of protection ..... IP 20

Dimensions (w×h×d): ..... 50 cm × 23 cm × 45 cm
Weight ..... 8.3 kg

Built-in housing requirements..... 19” rack
Fastening openings dimensions (w×h)..... 46.5 cm × 14.6 cm
Preferred fastening screws ..... M6 × 12 mm or equivalent

Note:

- Screws shall be compatible with nuts in rack.

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)