

## ESD-equipped RF Exchangeable Kits including Service Cover

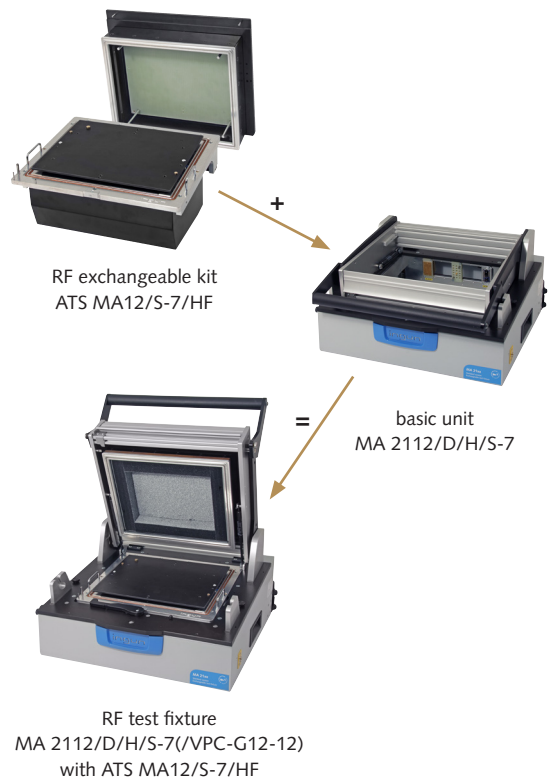
### Reliable measurement of radio frequency signals

Manually operated radio frequency test fixtures are used to precisely and securely contact highly sensitive RF boards, and to measure the radio frequency signals in a reliable way.

The manually operated RF test fixtures are designed as a quick-exchange system and consist of a precision manufactured RF exchangeable kit and of a MA basic unit.

The RF exchangeable kits are available with or without internal interface in the sizes ATS MA11/HF, ATS MA12/HF and ATS MA13/HF and can be installed in seconds without any tools or the need for post-adjustment.

- Precise, secure contacting
- Reliable measurement of RF signals
- Quick-exchange system
- RF exchangeable kits with or without internal interface, can be installed in seconds without any tools or the need for post-adjustment
- ESD-equipped unit, consists of ESD coated RF covers, ESD coated probe plate, ESD-compliant moving plate and integrated ESD discharge button
- Service cover included

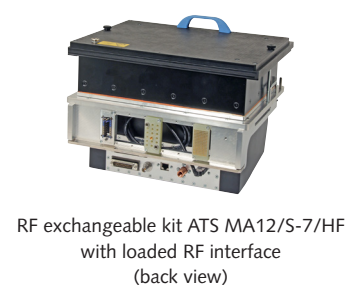
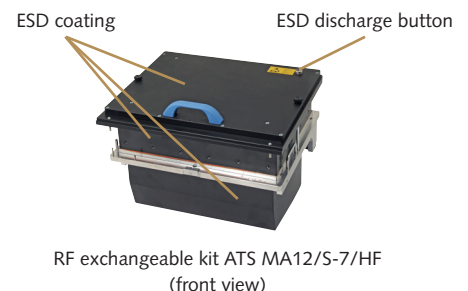


#### Technical information:

- Usable area ATS MA11/HF:	approx. 100 x 160 mm (W x D)
- Usable area ATS MA11/S-5/HF:	approx. 100 x 160 mm (W x D)
- Usable area ATS MA12/HF:	approx. 215 x 180 mm (W x D)
- Usable area ATS MA12/S-7/HF:	approx. 215 x 180 mm (W x D)
- Usable area ATS MA13/HF:	approx. 375 x 240 mm (W x D)
- Usable area ATS MA13/S-10/HF:	approx. 375 x 240 mm (W x D)
- Max. clearance available above PCB:	approx. 58 mm

#### Ordering information:

- RF exchangeable kit ATS MA11/HF:	Part no.: <b>54011</b>
- RF exchangeable kit ATS MA11/S-5/HF:	Part no.: <b>54111</b>
- RF exchangeable kit ATS MA12/HF:	Part no.: <b>54012</b>
- RF exchangeable kit ATS MA12/S-7/HF:	Part no.: <b>54112</b>
- RF exchangeable kit ATS MA13/HF:	Part no.: <b>54013</b>
- RF exchangeable kit ATS MA13/S-10/HF:	Part no.: <b>54113</b>



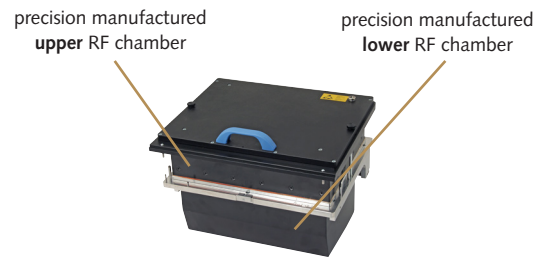
## ESD-equipped RF Exchangeable Kits including Service Cover

### Reliable measurement of radio frequency signals

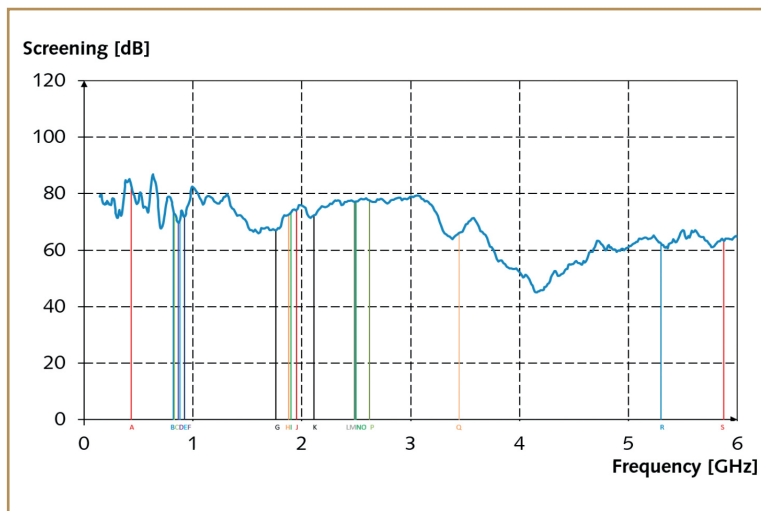
#### Screening attenuation

The RF chambers (copper housings) are manufactured with a high level of precision and provide an outstanding screening attenuation in the range of up to 6 GHz. Therefore, they ensure not only RF-compatible screening of the highly sensitive RF boards against signal interference from the outside, but also the protection of the operating personnel against RF fields emitted from the inside.

- Outstanding screening attenuation in the RF range up to 6 GHz
- RF-compatible screening of RF boards against external signal interference
- Protection of the operating personnel against RF fields emitted from the inside



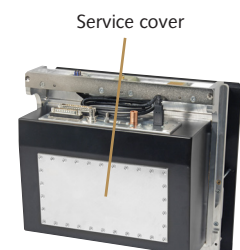
RF exchangeable kit ATS MA12/S-7/HF  
 (front view)



Radio Service	f <sub>min</sub> [MHz]	f <sub>max</sub> [MHz]	Screening attenuation min [dB]	
A	ISM	433	435	83
B	LTE (Downlink)	791	821	74
C	LTE (Uplink)	832	862	73
D	RFID	865	868	70
E	GSM 900 (Uplink)	880	915	71
F	GSM 900 (Downlink)	925	960	72
G	GSM 1800, LTE (Uplink)	1710	1785	67
H	GSM 1800, LTE (Downlink)	1805	1880	72
I	DECT	1880	1900	73
J	UMTS (Uplink)	1920	1980	74
K	UMTS (Downlink)	2110	2170	72
L	WLAN-1	2400	2485	77
M	ISM, ZigBee	2400	2500	77
N	Bluetooth	2402	2480	77
O	LTE (Uplink)	2500	2570	77
P	LTE (Downlink)	2620	2690	75
Q	WiMAX	3410	3594	66
R	WLAN-2	5150	5725	62
S	ISM	5725	5875	61

#### Service Cover

The service cover is located at the bottom side of the precision manufactured lower RF chamber. By unscrewing the service cover the interior of the lower RF chamber can be accessed, without removing the PCB specific assemblies mounted on the top side. This enables easy debugging of the mounted and contacted PCB.



RF exchangeable kit ATS MA12/S-7/HF  
 (bottom view)

## ESD-equipped RF Exchangeable Kits including Service Cover Reliable measurement of radio frequency signals

### Contacting and interface connection

Contacting of RF board is mainly done with geometrically aligned INGUN RF probes, which provide the best possible semi-anechoic, non-dissipative transfer of the RF signals to be measured.

EMC-compatible RF connectors, for mounting on the **RF interface** to transfer signals to and from the screened area, are available to connect the RF board to the measurement system.

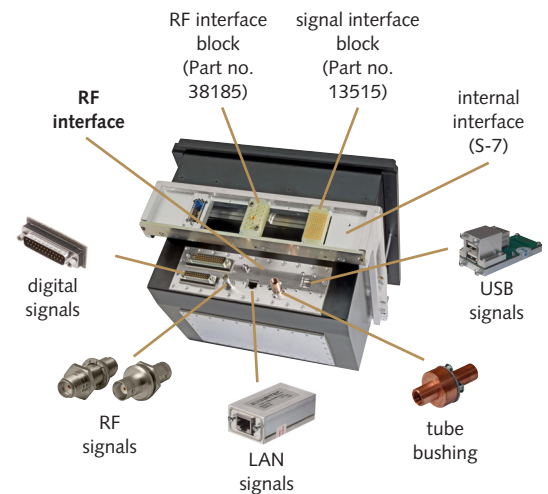
- Standardised contacting with geometrically aligned INGUN RF probes for the best possible semi-anechoic transfer
- Numerous EMC-compatible RF connectors for connecting the RF board to the measurement system

### RF signals

By using coaxial RF transfer components, radio frequency signals can be transferred with almost no loss between the RF chamber and the exterior housing. Depending on the type of interface, the transfer is carried out with an impedance of 50 Ω or 75 Ω up to 18 GHz.

### Ordering information:

- HF-U-SMA-18GHz-50Ohm-F-F:	Part no.: <b>41661</b>
- HF-U-MCX-06GHz-50Ohm-F-F:	Part no.: <b>33800</b>
- HF-U-N-18GHz-50Ohm-F-F:	Part no.: <b>43462</b>
- HF-U-BNC-04GHz-50Ohm-F-F:	Part no.: <b>43460</b>
- HF-U-BNC-03GHz-75Ohm-F-F:	Part no.: <b>43461</b>



RF exchangeable kit ATS MA12/S-7/HF  
 with loaded interfaces  
 (RF interface and internal interface)

### Low-voltage and serial signals (e.g. RS-232)

Low-voltage and serial signals are transmitted using a sub-D transfer with integrated inference filter (frequency limit 3 dB: 8 MHz). The C-filter has a capacity of 830 pF and ensures that unwanted signals cannot pass through the screened area.

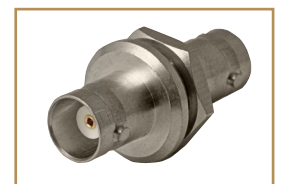
### Ordering information:

- HF-U-SUBD-09-830pF-WW:	Part no.: <b>53087</b>
- HF-U-SUBD-15-830pF-WW:	Part no.: <b>53083</b>
- HF-U-SUBD-25-830pF-WW:	Part no.: <b>53084</b>
- HF-U-SUBD-37-830pF-WW:	Part no.: <b>53085</b>
- HF-U-SUBD-50-830pF-WW:	Part no.: <b>53086</b>

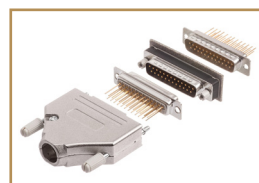
Delivery includes: Sub-D connector, RF seal, connector plugs, housing



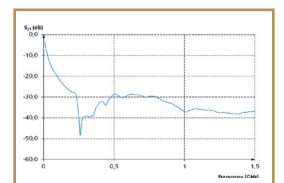
HF-U-SMA-18GHz-50Ohm-F-F  
 Part no. 41661



HF-U-BNC-04GHz-50Ohm-F-F  
 Part no. 43460



HF-U-SUBD-25-830pF-WW  
 Part no. 53084



S<sub>21</sub> parameter

## ESD-equipped RF Exchangeable Kits including Service Cover

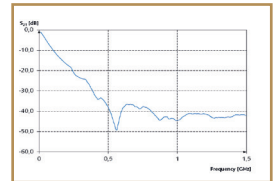
### Reliable measurement of radio frequency signals

#### Bus- and HSD signals (e.g. I<sup>2</sup>C) up to 150 Mbps

Bus, HSD, 10/100 Ethernet and USB1.x signals are transmitted using a sub-D transfer with integrated inference filter (frequency limit 3 dB: 30 MHz). The C-filter has a capacity of 100 pF and ensures that unwanted signals cannot pass through the screened area.

#### Ordering information:

- HF-U-SUBD-09-100pF-WW:	Part no.: <b>51358</b>
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Delivery includes: Sub-D connector, RF seal, connector plugs, housing

HF-U-SUBD-09-100pF-WW  
 Art. 51358

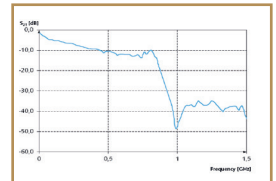
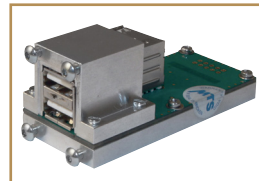
S<sub>21</sub>-Parameter

#### USB signals

All applications with standards USB1 and USB2 require additional transfer filters. For transfers of the standard USB3, however, no filtering is necessary. This is to avoid any negative influence on the theoretically achievable bit rate of 5 Gbit/s.

#### Ordering information:

- HF-U-USB2.0-AF-AF-2-SF (filtered):	Part no.: <b>43488</b>
- Type of filter:	LC circuit
- Attenuation (1 - 6 GHz):	> 30 dB (typical)
- Current rating:	max. 500 mA at 5 VDC
- Max. data rate:	480 Mbit/s
- HF-U-USB3.0-AF-AF-2 (not filtered):	Part no.: <b>43489</b>



Delivery includes: USB filter (2x A female jack onto 2x A female jack), screws

HF-U-USB2.0-AF-AF-2-SF  
 Art. 43488

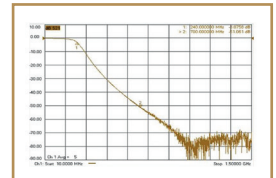
S<sub>21</sub>-Parameter

#### LAN signals

Feedthru filters are used to transfer LAN signals with 10, 100 or 1000 Mbit/s to and from the screened area. Optimal attenuation of interfering signals with > 50 dB (typical) in the range 700 MHz to 6 GHz.

#### Ordering information:

- HF-U-RJ45-LAN1000-F-F-SF:	Part no.: <b>48392</b>
- Type of filter:	LC circuit
- Attenuation (0.7 - 6 GHz):	> 50 dB (typical)
- Max. data rate:	1000 Mbit/s



Delivery includes: LAN filter (RJ45 female jack onto RJ45 female jack), screws

HF-U-RJ45-LAN1000-F-F-SF  
 Art. 48392

S<sub>21</sub>-Parameter

## ESD-equipped RF Exchangeable Kits including Service Cover Reliable measurement of radio frequency signals

### Tube bushings

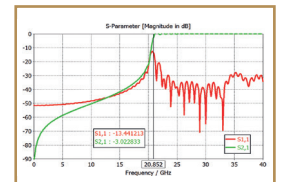
To install cables and tubing, a specialised tube bushing is used. This allows optical wave guides and compressed air tubing, among others, to be laid in the RF chamber without any negative influence on the screening attenuation below 8 GHz.

### Ordering information:

- HF-U-D-8,5:	Part no.: 43490
- HF-U-D-8,5-QS4:	Part no.: 43665



HF-U-D-8,5  
 Art. 43490

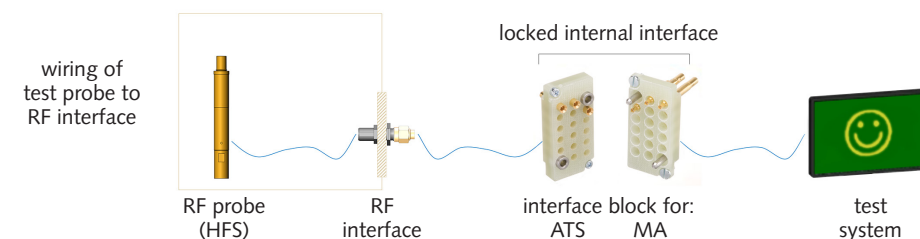
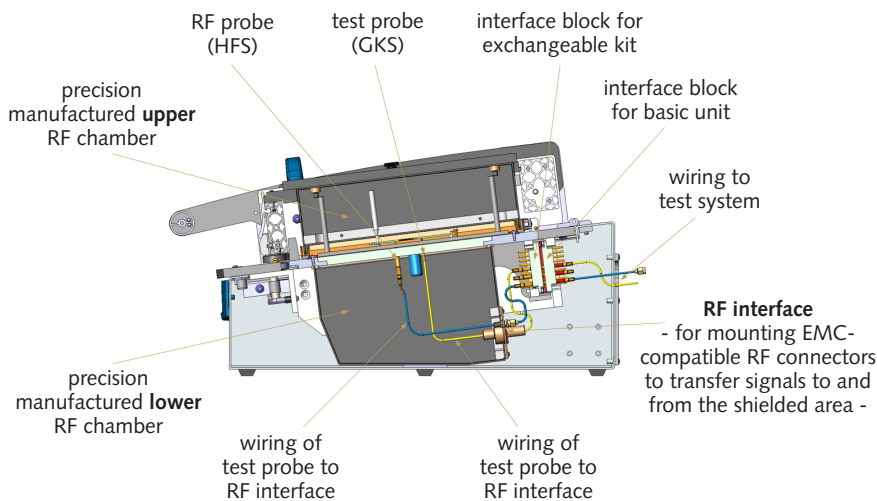


S<sub>21</sub>-Parameter  
 S<sub>11</sub>-Parameter

Delivery includes: tube bushing, RF seal, screws

### Connection of contacts to test system

The RF boards contacts are connected to the test system via the RF interface within the shielded area, and to the internal interface outside the shielded area.

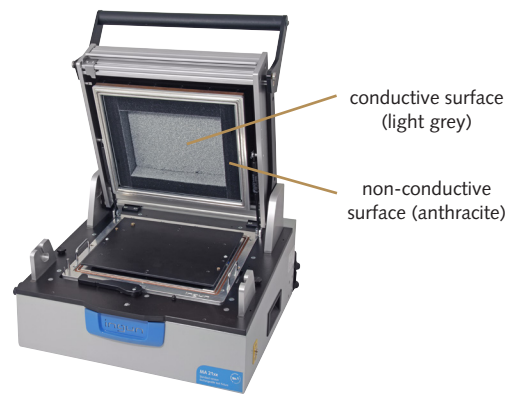


## ESD-equipped RF Exchangeable Kits including Service Cover Reliable measurement of radio frequency signals

### Customisation with absorber to create an internal radio network

Absorbers are used to clad the inside walls to avoid unwanted reflection of radio signals within the RF chamber. The absorber sets used for this purpose are chosen depending on the frequency being used and the size of the exchangeable kit. When customising the exchangeable kits with absorbers, the original useable area and the maximal possible component height on the RF board are reduced. In this case, additional customisation of the RF exchangeable kits for RF boards with higher components is generally possible.

- absorber with various frequencies for customising an internal radio network

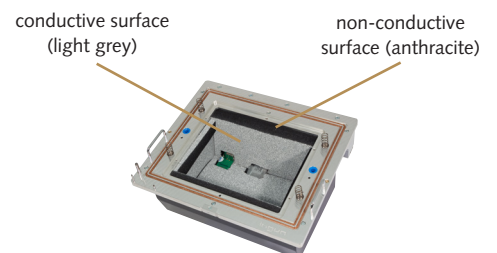


RF test fixture MA 2112/D/H/S-7/VPC-G12-12  
 with ATS MA12(/S-7)/HF and  
 absorber HF-A-2.4GHz-ATSMA12

RF-Absorber (HF-A)		HF-A-x.xGHz-ATSMA11	HF-A-x.xGHz-ATSMA12	HF-A-x.xGHz-ATSMA13
Suitable for:		ATS MA11(/S-5)/HF Art. 54011   54111	ATS MA12(/S-7)/HF Art. 54012   54112	ATS MA13(/S-10)/HF Art. 54013   54113
from 2.4 GHz	Part no.:	51373	51436	51447
	Usable area (W x D):	77 x 130 mm	212 x 137 mm	349 x 212 mm
	Max. device height:	35 mm	35 mm	35 mm
from 3.5 GHz	Part no.:	51374	51437	51448
	Usable area (W x D):	97 x 141 mm	218 x 157 mm	374 x 233 mm
	Max. device height:	45 mm	45 mm	45 mm
from 7.5 GHz	Part no.:	51376	51438	51449
	Usable area (W x D):	97 x 158 mm	218 x 175 mm	374 x 240 mm
	Max. device height:	54 mm	54 mm	54 mm

### Mounting:

Absorber mats have a conductive surface (light grey) and a non-conductive surface (anthracite). When mounting, please ensure that the light grey side is aligned with the RF board and the anthracite side is aligned with the copper cover.



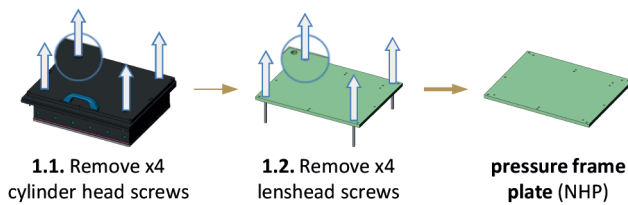
precision manufactured lower RF chamber  
 with absorber HF-A-2,4GHz-ATSMA12  
 (and RF connectors)

## ESD-equipped RF Exchangeable Kits including Service Cover Reliable measurement of radio frequency signals

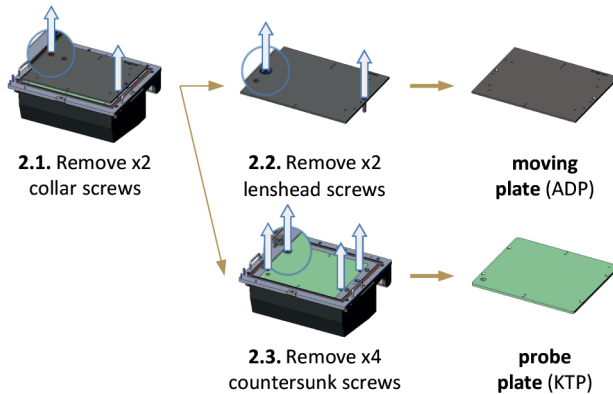
### Dismantling RF exchangeable kits

The RF exchangeable kits are delivered fully assembled and have to be dismantled to machine the plates (ADP, KTP, NHP) for PCB specific customisation.

#### 1. Dismantling upper RF chamber:



#### 2. Dismantling lower RF chamber:



Please contact us for further information.  
 Prices and delivery time on request.  
 Technical changes possible without prior notification.

Further innovative products can be found on our home-page and in our catalogue. Don't miss our manual test fixture series MA xxxx.

