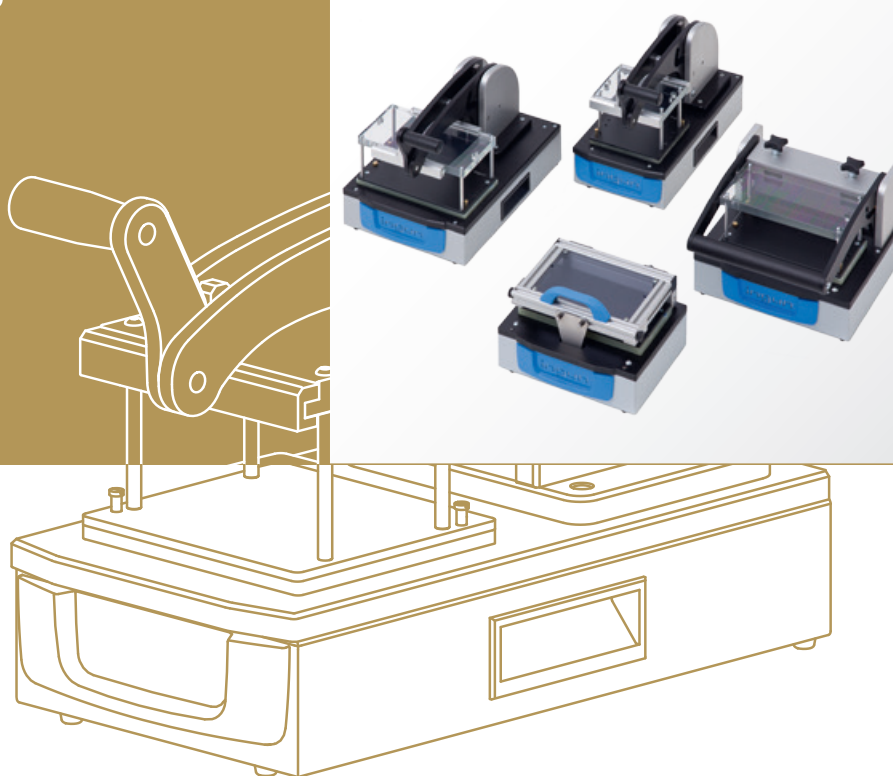


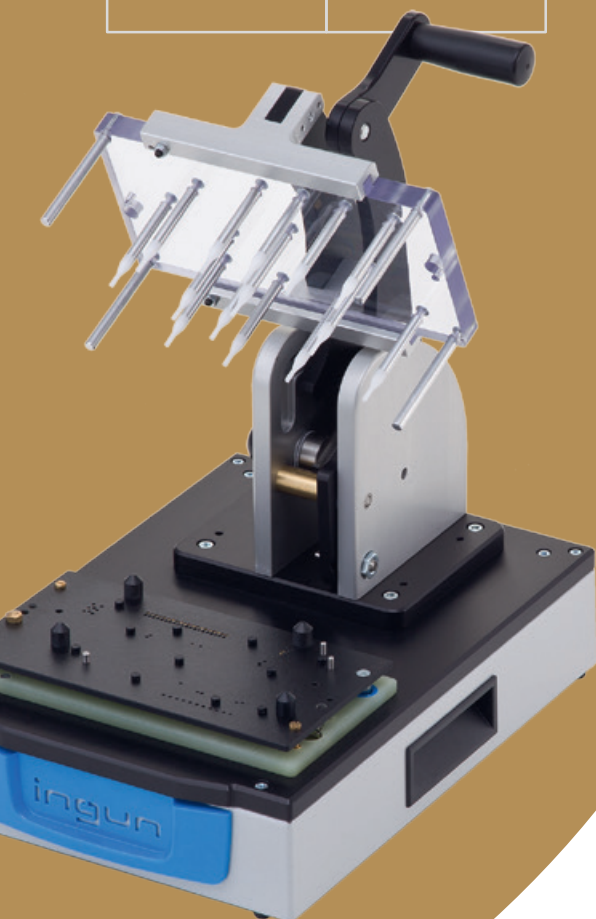
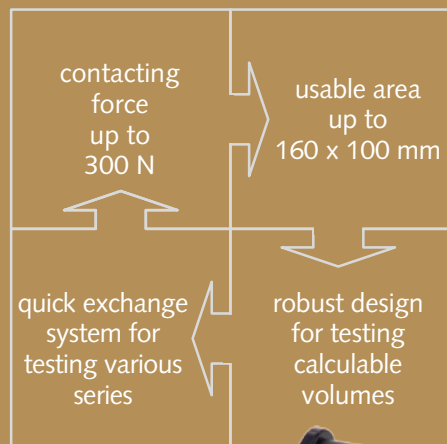


Test Probes · Test Fixtures

IN TESTING SOLUTIONS
No.1
IN DER PRÜFTECHNIK

Test Fixtures for low PCB
volumes MA xxx
Change made easy





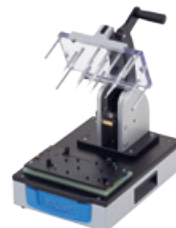
MA 3xx-series

MA 350/F
with customised
ATS MA350



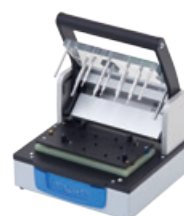
generous and free accessibility

MA 360/F
with customised
ATS MA360



extended usable area,
generous and free accessibility

MA 260/F
with customised
ATS MA260



high stability in regard
to unbalanced loads

MA 160/F
with customised
ATS MA160



reasonable alternative
for PC boards with small components

Reliable testing with compact and robust test fixtures

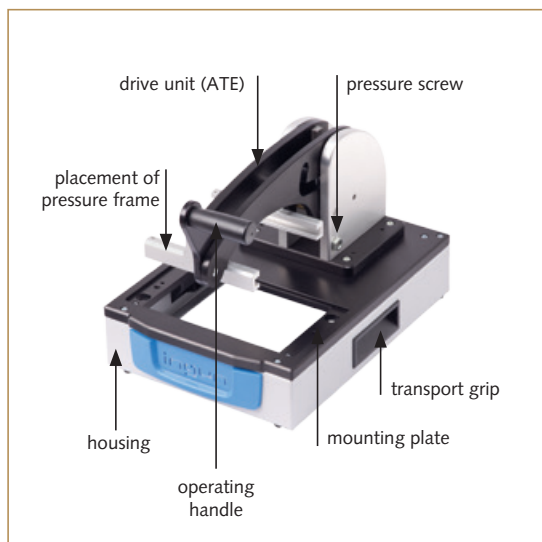
INGUN test fixtures for low PCB volumes are designed for the use in the industrial testing, for contacting or for flash-programming of PC boards with calculable volumes in different series. The test fixtures are designed as quick exchange systems, are connected to an existing test system and operated with exchangeable kits which are especially customised for the PC boards to be tested.

Determinant features

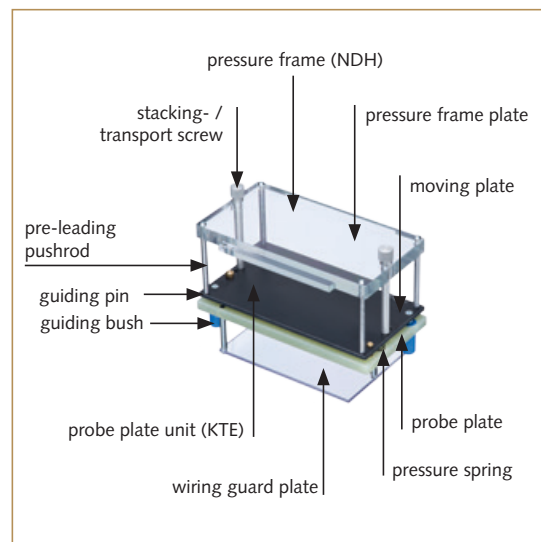
- **compact and robust design**
- **outstanding lifespan**
- **high contacting force**
- **quick exchange system**
- **placement of exchangeable kits without any tools and without post adjustment**
- exchangeable kits available as standard- and ESD version
- probe plate unit and pressure frame can be screwed together with stacking screws to build one unit with protected probe field (for storage / transport)
- sequence contacting of PC boards with multiple panel possible because of laterally open pressure frame
- individual test system interface, optionally via 64-pole or 96-pole VG-strip
- housing open at the bottom and completely removable

Operating- and function elements

Basic Unit:



Exchangeable Kit:



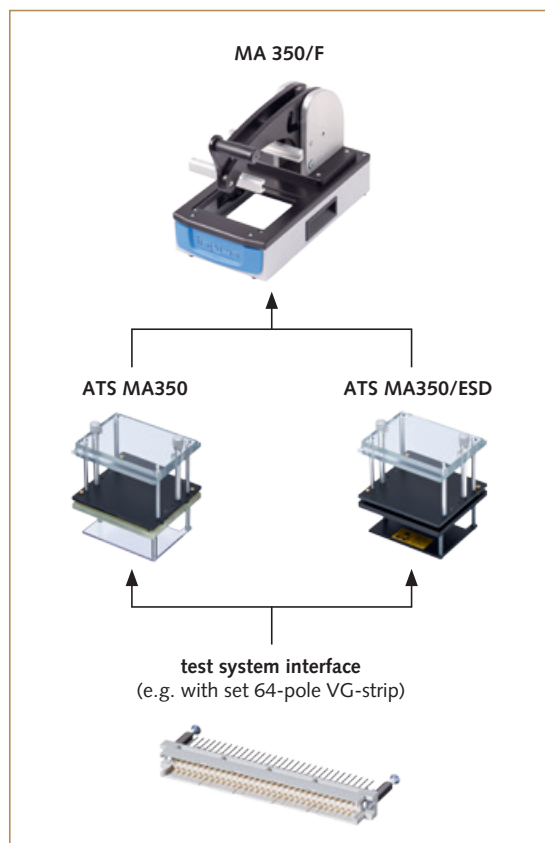
Safety



INGUN test fixtures for low PCB volumes are designed for Safety extra-low Voltage and therefore fulfill the safety protection class III. Equipment of this safety protection class is only allowed to be operated with Safety extra-low Voltage (SELV = Safety Extra-Low Voltage or PELV = Protective Extra-Low Voltage) according to DIN EN 61140.

MA 350/F

Manual Test Fixture with generous and free accessibility



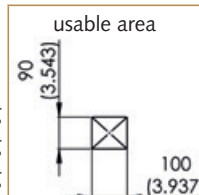
Ordering information:

- manual test fixture MA 350/F:
- exchangeable kit ATS MA350:
- ESD-exchangeable kit ATS MA350/ESD:

Part No.: 46100
Part No.: 46480-KIT
Part No.: 46490-KIT

Technical information:

- outside dim. MA 350/F (closed): approx. 170x365x251 mm (wxdxh)
- outside dim. MA 350/F (opened): approx. 170x330x381 mm (wxdxh)
- max. usable area ATS MA350: approx. 100x90 mm (wx d)
- max. usable area ATS MA350/ESD: approx. 100x90 mm (wx d)
- max. contacting force: up to 300 N (symmetrical customising)
- guided parallel stroke: approx. 20 mm
- max. component height on PCB: approx. 55 mm
- pressure frame opening angle: approx. 65°
- installation height GKS: 10.5 mm
- weight MA 350/F: approx. 4.52 kg
- weight ATS MA350: approx. 0.74 kg
- weight ATS MA350/ESD: approx. 0.75 kg



Operation:

The contact stroke is generated by the operator closing the operating handle.

Customising:

Our customising schemes are part of delivery and enable a professional customising of our test fixtures for low PCB volumes. The exchangeable kits for the MA 350/F have to be customised according to scheme **info1591**.



Drive Unit:

The drive unit ATE MA350 is separately available and can easily be used for any other manual testing tasks.

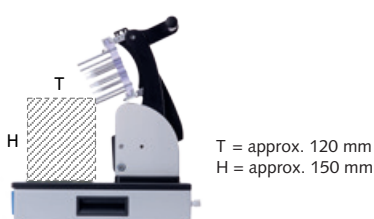
Ordering information:

- drive unit ATE MA350:

Part No.: 41570



MA 350/F and customised ATS MA350



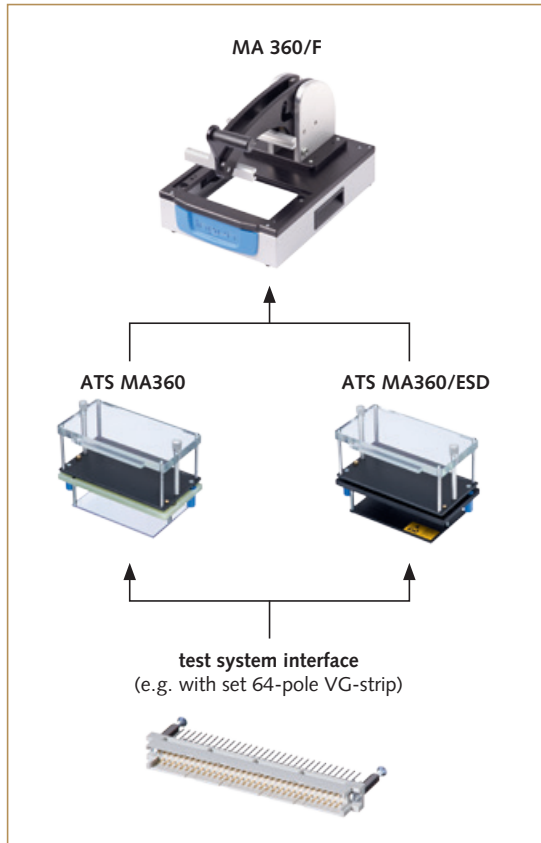
Free accessibility MA 350/F

Additional features:

- generous and free accessibility
- adjustable pressure screw to safeguard the opened pressure frame
- adjustable handle for right or left operation
- latching pressure frame unit
- open back panel
- easy removal of drive unit and suitability for alternative application
- single-sided (bottom) or double-sided contacting possible

Recommended accessories (Page 8, 9):

- Set 64-pole or 96-pole VG male connector for linking to the test system.
- Start-up kit SK-A-60-10,5 small (...-medium, ...-large) for self-customising.

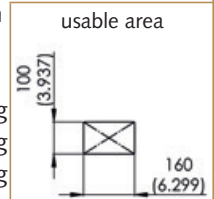


Ordering information:

- | | |
|---------------------------------------|----------------------------|
| – manual test fixture MA 360/F: | Part No.: 45650 |
| – exchangeable kit ATS MA360: | Part No.: 45669-KIT |
| – ESD-exchangeable kit ATS MA360/ESD: | Part No.: 46200-KIT |

Technical information:

- | | |
|-----------------------------------|---------------------------------------|
| – outside dim. MA 360/F (closed): | approx. 230x365x251 mm (wxdxh) |
| – outside dim. MA 360/F (opened): | approx. 230x330x381 mm (wxdxh) |
| – max. usable area ATS MA360: | approx. 160 x 100 mm (wxd) |
| – max. usable area ATS MA360/ESD: | approx. 160 x 100 mm (wxd) |
| – max. contacting force: | up to 300 N (symmetrical customising) |
| – guided parallel stroke: | approx. 20 mm |
| – max. component height on PCB: | approx. 55 mm |
| – pressure frame opening angle: | approx. 65° |
| – installation height GKS: | 10.5 mm |
| – weight MA 360/F: | approx. 4.89 kg |
| – weight ATS MA360: | approx. 1.10 kg |
| – weight ATS MA360/ESD: | approx. 1.11 kg |



Operation:

The contact stroke is generated by the operator closing the operating handle.

Customising:

Our customising schemes are part of delivery and enable a professional customising of our test fixtures for low PCB volumes. The exchangeable kits for the MA 360/F have to be customised according to scheme info1591.

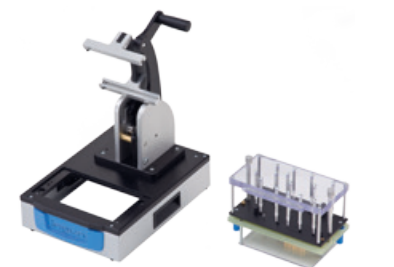


Drive Unit:

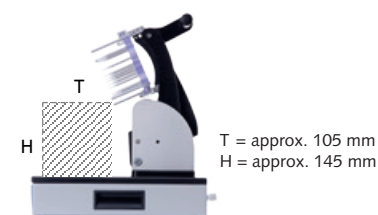
The drive unit ATE MA360 is separately available and can easily be used for any other manual testing tasks.

Ordering information:

- | | |
|-------------------------|------------------------|
| – drive unit ATE MA360: | Part No.: 45668 |
|-------------------------|------------------------|



MA 360/F and customised ATS MA360



Free accessibility MA 360/F

Additional features:

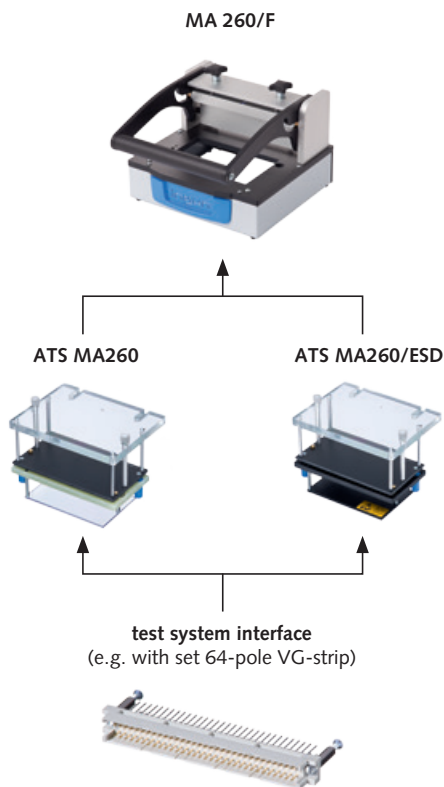
- extended usable area
- generous and free accessibility
- adjustable pressure screw to safeguard the opened pressure frame
- adjustable handle for right or left operation
- latching pressure frame unit
- open back panel
- easy removal of drive unit and suitability for alternative application
- single-sided (bottom) or double-sided contacting possible

Recommended accessories (Page 8, 9):

- Set 64-pole or 96-pole VG male connector for linking to the test system.
- Start-up kit SK-A-60-10,5 small (...-medium, ...-large) for self-customising.

MA 260/F

Manual Test Fixture with high stability
in regard to unbalanced loads

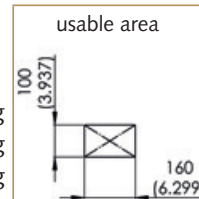


Ordering information:

- manual test fixture MA 260/F: **Part No.: 40600**
- exchangeable kit ATS MA260: **Part No.: 41220-KIT**
- ESD-exchangeable kit ATS MA260/ESD: **Part No.: 41225-KIT**

Technical information:

- outside dim. MA 260/F (closed): approx. 260x300x200 mm (wxdxh)
- outside dim. MA 260/F (opened): approx. 260x260x320 mm (wxdxh)
- max. usable area ATS MA260: approx. 160x100 mm (wxd)
- max. usable area ATS MA260/ESD: approx. 160x100 mm (wxd)
- max. contacting force: up to 300 N (symmetrical customising)
- guided parallel stroke: approx. 15 mm
- max. component height on PCB: approx. 55 mm
- pressure frame opening angle: approx. 50°
- installation height GKS: 10.5 mm
- weight MA 260/F: approx. 3.57 kg
- weight ATS MA260: approx. 1.26 kg
- weight ATS MA260/ESD: approx. 1.27 kg



Operation:

The contact stroke is generated by the operator closing the operating handle.

Customising:

Our customising schemes are part of delivery and enable a professional customising of our test fixtures for low PCB volumes. The exchangeable kits for the MA 260/F have to be customised according to scheme **info1591**.

Drive Unit:

The drive unit ATE MA260 is separately available and can easily be used for any other manual testing tasks.

Ordering information:

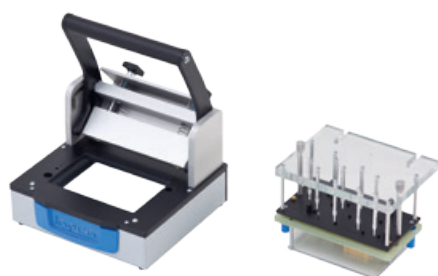
- drive unit ATE MA260: **Part No.: 44120**

Additional features:

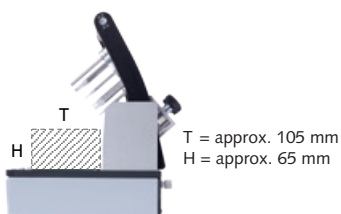
- high stability against unbalanced loads
- removable back panel
- easy removal of drive unit and suitability for alternative application
- single-sided (bottom) or double-sided contacting possible

Recommended accessories (Page 8, 9):

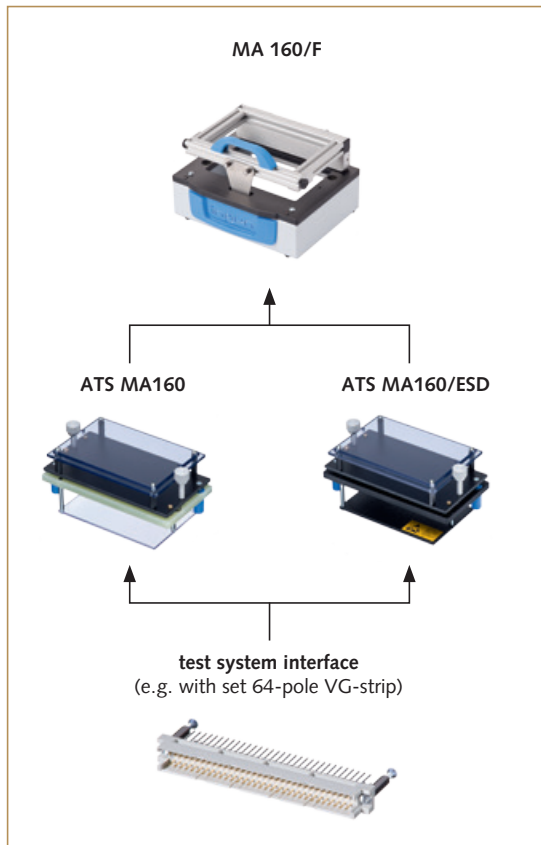
- Set 64-pole or 96-pole VG male connector for linking to the test system.
- Start-up kit SK-A-60-10,5 small (...-medium, ...-large) for self-customising.



MA 260/F and customised ATS MA260



Free accessibility MA 260/F:

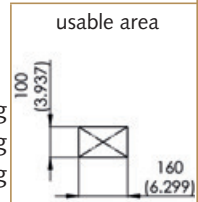


Ordering information:

- | | |
|---------------------------------------|----------------------------|
| – manual test fixture MA 160/F: | Part No.: 44430 |
| – exchangeable kit ATS MA160: | Part No.: 28385-KIT |
| – ESD-exchangeable kit ATS MA160/ESD: | Part No.: 30800-KIT |

Technical information:

- | | |
|-----------------------------------|---------------------------------------|
| – outside dim. MA 160/F (closed): | approx. 230x185x155 mm (wxdxh) |
| – outside dim. MA 160/F (opened): | approx. 230x270x285 mm (wxdxh) |
| – max. usable area ATS MA160: | approx. 160 x 100 mm (wxd) |
| – max. usable area ATS MA160/ESD: | approx. 160 x 100 mm (wxd) |
| – max. contacting force: | up to 100 N (symmetrical customising) |
| – guided parallel stroke: | approx. 15 mm |
| – max. component height on PCB: | approx. 15 mm |
| – pressure frame opening angle: | approx. 105° |
| – installation height GKS: | 10.5 mm |
| – weight MA 160/F: | approx. 1.86 kg |
| – weight ATS MA160: | approx. 0.96 kg |
| – weight ATS MA160/ESD: | approx. 0.97 kg |



Operation:

The contacting stroke is generated by the operator by pushing down the pressure frame.

Customising:

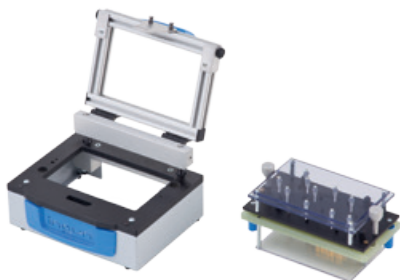
Our customising schemes are part of delivery and enable a professional customising of our test fixtures for low PCB volumes. The exchangeable kits for the MA 160/F have to be customised according to scheme **info1591**.

Additional features:

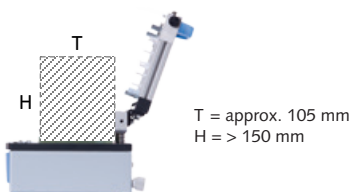
- reasonable alternative for PC boards with small-sized parts
- open back panel
- single-sided contacting (bottom) possible

Recommended accessories (Page 8, 9):

- Set 64-pole or 96-pole VG male connector for linking to the test system.
- Start-up kit SK-A-20-10,5 for self-customising.



MA 160/F and customised ATS MA160



Free accessibility MA 160/F

Start-up kits for self-customising of the exchangeable kits

The customising of the exchangeable kits can be done by INGUN or by the customers themselves. We offer matching start-up kits with all common components for the individual customising, suitable for different installation heights of our exchangeable kits – from the pre-centering pin to the spring-loaded test probe.

Start-up kits for exchangeable kits of series MA 350, MA 360 and MA 260

<p>Start-up kit (SK-A-60-10,5-small)</p> 	<p>Ordering information:</p> <ul style="list-style-type: none"> – start-up kit SK-A-60-10,5-small: Part No.: 34730 – start-up kit SK-A-60-10,5-medium: Part No.: 34731 – start-up kit SK-A-60-10,5-large: Part No.: 34732 <p>-> Start-up kits for exchangeable kits with installation heights ≤ 60 mm</p>
---	---

SK-A-60-10,5-small	SK-A-60-10,5-medium	SK-A-60-10,5-large	Description (pieces)
5	10	15	pushrod Ø 6.0 x 60 mm
10	20	30	pushrod Ø 2.5 x 60 mm
3	3	3	pre-centering pin Ø 12 x 22 mm
3	3	3	cross-head screw pin M4x12
15	30	45	PCB support disk Ø 5.0 x 2.8 mm (antistatic)
2	2	2	tooling pin Ø 4.0 x 7 mm
100	200	300	receptacle KS-100 47 05 (wire-wrap post)
100	200	300	spring-loaded test probe GKS-100 291 130 A 2000 (dagger)

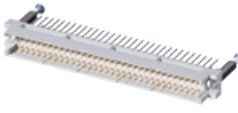

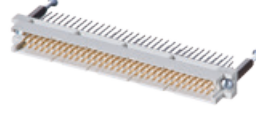

Start-up kits for exchangeable kits of series MA 160

<p>Start-up kit (SK-A-20-10,5)</p> 	<p>Ordering information:</p> <ul style="list-style-type: none"> – start-up kit SK-A-20-10,5: Part No.: 29070 <p>-> Start-up kits for exchangeable kits with installation heights ≤ 20 mm</p>
---	--

SK-A-20-10,5	Description (pieces)
10	cap for push-rods Ø 2.5 x 20 mm
10	rounded head screw M3x10
10	washer DIN 9021-3,4
4	pre-centering Ø 10 x 12.5 mm
4	countersunk screw with Allen screw recess M4x10
10	PCB support pin Ø 5.0 x 2.8 mm (antistatic)
2	tooling pin Ø 2.9 x 7 mm
2	tooling pin Ø 4.0 x 7 mm
50	receptacle KS-100 30 05 (solder connection)
25	spring-loaded test probe GKS-100 291 090 A 2000 (dagger)
25	spring loaded test probe GKS-100 214 150 A 2000 (crown)

Test system interface

The linking of the manual test fixtures for low PCB volumes to the test system is freely definable and is carried out individually e.g. with an optionally available 64-pole or 96-pole VG-strip.

Set 64-pole VG-male connector   64-pole female connector	Set 96-pole VG-male connector   96-pole female connector	Ordering information VG-connector (DIN 41612): <ul style="list-style-type: none"> – set 64-pol. VG-male connector Part No.: 43135 – set 96-pol. VG-male connector Part No.: 47910 – 64-pol. VG-female-connector Part No.: 8256 – 96-pol. VG-female-connector Part No.: 8257 Technical data VG-connector (DIN 41612): <ul style="list-style-type: none"> – type: C – version: straight – post length: 13 mm – rated current: 2 A – grid: 2,54 mm – loaded rows: a/c (64-pole) or a/b/c (96-pole)
--	--	---

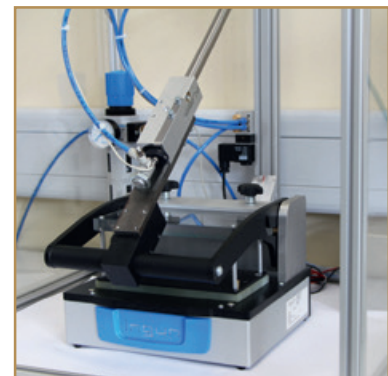
Set 64-pole VG-male connector	Set 96-pole VG-male connector	Description (pieces)
1	1	64- or 96-pole male connector
2	2	hexagonal bolt M2,5x15
2	2	cylinder head-slotted screw M2,5x10
2	2	countersunk screw with cross slotted head M2,5x16

Lifespan

To determine the lifespan of our manual test fixtures for low PCB volumes, life cycle tests with fully automatic, computerised test standards are carried out. Thus we ensure long-term high quality and performance of our products.

We have successfully completed the latest life cycle tests under laboratory conditions on our manual test fixtures for low PCB volumes after approx. 300.000 cycles without detecting wear and tear which would limit the function of the manual test fixtures for low PCB volumes.

As the lifespan depends on various incalculable factors, especially largely on individual testing use we can't provide any guarantees regarding the actual life cycle determined by the laboratory.



Ordering Index

The structured and logical constellation of the individual numbers, the ordering index, allows clear identification and classification of our manual test fixtures for low PCB volumes.

Manual test fixture for low PCB volumes - basic unit (MA xxx)

MA		350		/		F	
product group	type	overall size		version			
MA	1	test fixture for low PCB volumes for single-sided contacting	usable area 100 x 90 mm (w x d)	50	F	flat housing	
	2	test fixture for low PCB volumes for double-sided contacting	usable area 160 x 100 mm (w x d)	60			
	3	test fixture for low PCB volumes (hand-level) for double-sided contacting					

Manual test fixture for low PCB volumes - exchangeable kit (ATS MA xxx)



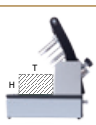
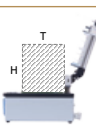
ATS MA		350		/		ESD	
product group	type	overall size		version			
ATS MA	1	test fixture for low PCB volumes for single-sided contacting	usable area 100 x 90 mm (w x d)	50	ESD	ESD-version	
	2	test fixture for low PCB volumes for double-sided contacting	usable area 160 x 100 mm (w x d)	60			
	3	test fixture for low PCB volumes (hand-level) for double-sided contacting					

Test Fixtures for low PCB volumes MA xxx	 <p>MA 350/F with customised ATS MA350</p>	 <p>MA 360/F with customised ATS MA360</p>
Product group	Manual Test Fixture	Manual Test Fixture
Product name	MA 350/F	MA 360/F
Part No. MA	46100	45650
Part No. ATS MA	46480-KIT	45669-KIT
Part No. ATS MA/ESD	46490-KIT	46200-KIT
Outside dim. (closed)	approx. 170x365x251 mm (wxdxh)	approx. 230x365x251 mm (wxdxh)
Outside dim. (opened)	approx. 170x330x381 mm (wxdxh)	approx. 230x330x381 mm (wxdxh)
Max. usable area ATS MA	approx. 100x90 mm (wxd)	approx. 160x100 mm (wxd)
Max. usable area ATS MA/ESD	approx. 100x90 mm (wxd)	approx. 160x100 mm (wxd)
Max. contacting force	up to 300 N (symmetrical customising)	up to 300 N (symmetrical customising)
Guided parallel stroke	approx. 20 mm	approx. 20 mm
Max. component height on PCB	approx. 55 mm	approx. 55 mm
Pressure frame opening angle	approx. 65 °	approx. 65 °
Free accessibility (w x d)	approx. 120x150 mm	approx. 105x145 mm
Installation height GKS	10.5 mm	10.5 mm
Weight MA	approx. 4.52 kg	approx. 4.89 kg
Weight ATS MA	approx. 0.74 kg	approx. 1.10 kg
Weight ATS MA/ESD	approx. 0.75 kg	approx. 1.11 kg
Part No. ATE MA	41570	45668
Optional linking to test system	✓ (e.g. Part No.43135)	✓ (e.g. Part No.43135)
Optional start-up kit	✓ (e.g. Part No.34730)	✓ (e.g. Part No.34730)
Exchangeable kit system	✓	✓
Laterally opened pressure frame	✓	✓
Single-sided contacting (bottom)	✓	✓
Dopple-sided contacting (bottom and top)	✓	✓
Dual-stage contacting	---	---
ESD-customising possible	✓	✓
Guide plate customising possible	✓	✓
Electrical saftey protection class 	Saftey class III (25 VAC / 60 VDC)	Saftey class III (25 VAC / 60 VDC)

You will find further information about the safe and intended use of the test fixtures for low PCB volumes in the respective operating instructions which is attached to delivery.

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

Product finder

 <p>MA 260/F with customised ATS MA260</p>		 <p>MA 160/F with customised ATS MA160</p>	
Manual Test Fixture		Manual Test Fixture	
MA 260/F		MA 160/F	
40600		44430	
41220-KIT		28385-KIT	
41225-KIT		30800-KIT	
approx. 260x300x200 mm (wxdxh)		approx. 230x185x155 mm (wxdxh)	
approx. 260x260x320 mm (wxdxh)		approx. 230x270x285 mm (wxdxh)	
approx. 160x100 mm (wxd)		approx. 160x100 mm (wxd)	
approx. 160x100 mm (wxd)		approx. 160x100 mm (wxd)	
up to 300 N (symmetrical customising)		up to 100 N (symmetrical customising)	
approx. 15 mm		approx. 15 mm	
approx. 55 mm		approx. 15 mm	
approx. 50 °		approx. 105 °	
approx. 105x65 mm		approx. 105x > 150 mm	
10.5 mm		10.5 mm	
approx. 3.57 kg		approx. 1.86 kg	
approx. 1.26 kg		approx. 0.96 kg	
approx. 1.27 kg		approx. 0.97 kg	
44120		---	
✓ (e.g. Part No.43135)		✓ (e.g. Part No.43135)	
✓ (e.g. Part No.34730)		✓ (e.g. Part No.29070)	
✓		✓	
✓		✓	
✓		✓	
✓		---	
---		---	
✓		✓	
✓		✓	
Safety class III (25 VAC / 60 VDC)		Safety class III (25 VAC / 60 VDC)	

Delivery condition exchangeable kit (ATS):

The exchangeable kits are delivered demounted. This enables easy and immediate customising. Delivery of mounted exchangeable kits is possible on request.

Product name	Part No.	Page
Drive Unit ATE MA350	41570	4
Drive Unit ATE MA360	45668	5
Drive Unit ATE MA260	44120	6
Exchangeable kit ATS MA160	28385-KIT	7
Exchangeable kit ATS MA160/ESD	30800-KIT	7
Exchangeable kit ATS MA260	41220-KIT	6
Exchangeable kit ATS MA260/ESD	41225-KIT	6
Exchangeable kit ATS MA350	46480-KIT	4
Exchangeable kit ATS MA350/ESD	46490-KIT	4
Exchangeable kit ATS MA360	45669-KIT	5
Exchangeable kit ATS MA360/ESD	46200-KIT	5
Female connector 64-pole	8256	9
Female connector 96-pole	8257	9
Manual test fixture MA 160/F	44430	7
Manual test fixture MA 260/F	40600	6
Manual test fixture MA 350/F	46100	4
Manual test fixture MA 360/F	45650	5
Set 64-pol. VG-male connector	43135	4, 5, 6, 7, 9
Set 96-pol. VG-male connector	47910	9
Start-up kit SK-A-20-10,5	29070	7, 8
Start-up kit SK-A-60-10,5-Large	34732	8
Start-up kit SK-A-60-10,5-Medium	34731	8
Start-up kit SK-A-60-10,5-Small	34730	4, 5, 6, 8

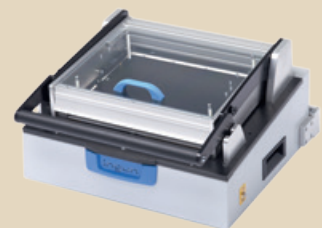
More by INGUN

Do you need test fixtures:

- for testing high PCB volumes
- with special test system interface
- with larger usable areas
- with higher contacting forces
- for testing higher voltages
- ...

we recommend the manual test fixture series

- **MA 21xx-series** (all-rounder)
- **MA 32xx-series** (ultra-robust)



Please contact us.

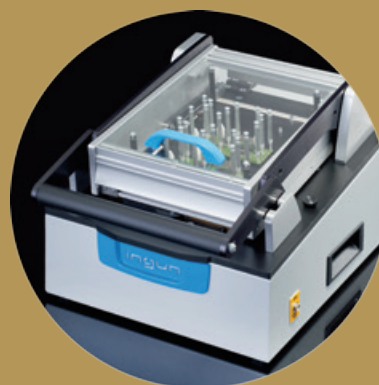
You would like more information about our manual test fixtures and further innovative products? Please visit our website www.ingun.com or ask for our latest catalogue:

Tel +49 7531 8105-0
info@ingun.com





**Test Probes
and
Test Fixtures
by
INGUN**



Headquarters

INGUN Germany

Subsidiaries

INGUN Benelux
INGUN China
INGUN India
INGUN Korea
INGUN Mexico
INGUN España
INGUN Switzerland
INGUN Türkiye
INGUN UK
INGUN USA

Europe

Austria
Benelux
Bosnia-Herzegovina
Croatia
Czech Republic
Denmark
Estonia
Finland
France
Germany
Hungary
Italy
Norway
Poland
Portugal
Romania
Serbia
Slovenia
Slovak Republic
Spain
Sweden
Switzerland
Turkey
United Kingdom

Asia

China
Hongkong
Indien
Israel
Japan
Korea
Malaysia
Taiwan
Thailand
Vietnam

Africa

South Africa
Tunisia

Australia

Australia
New Zealand

America

Argentina
Brazil
Canada
Mexico
USA

The addresses of our
international agencies
can be found under
www.ingun.com

ingun®

INGUN Prüfmittelbau GmbH

Max-Stromeyer-Straße 162

78467 Konstanz

Germany

Tel. +49 7531 8105-0

Fax +49 7531 8105-65

info@ingun.com

www.ingun.com