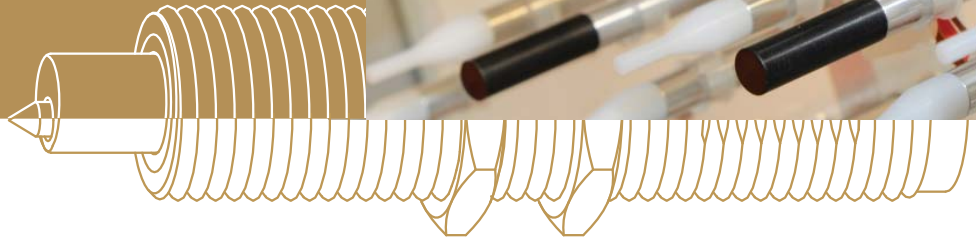


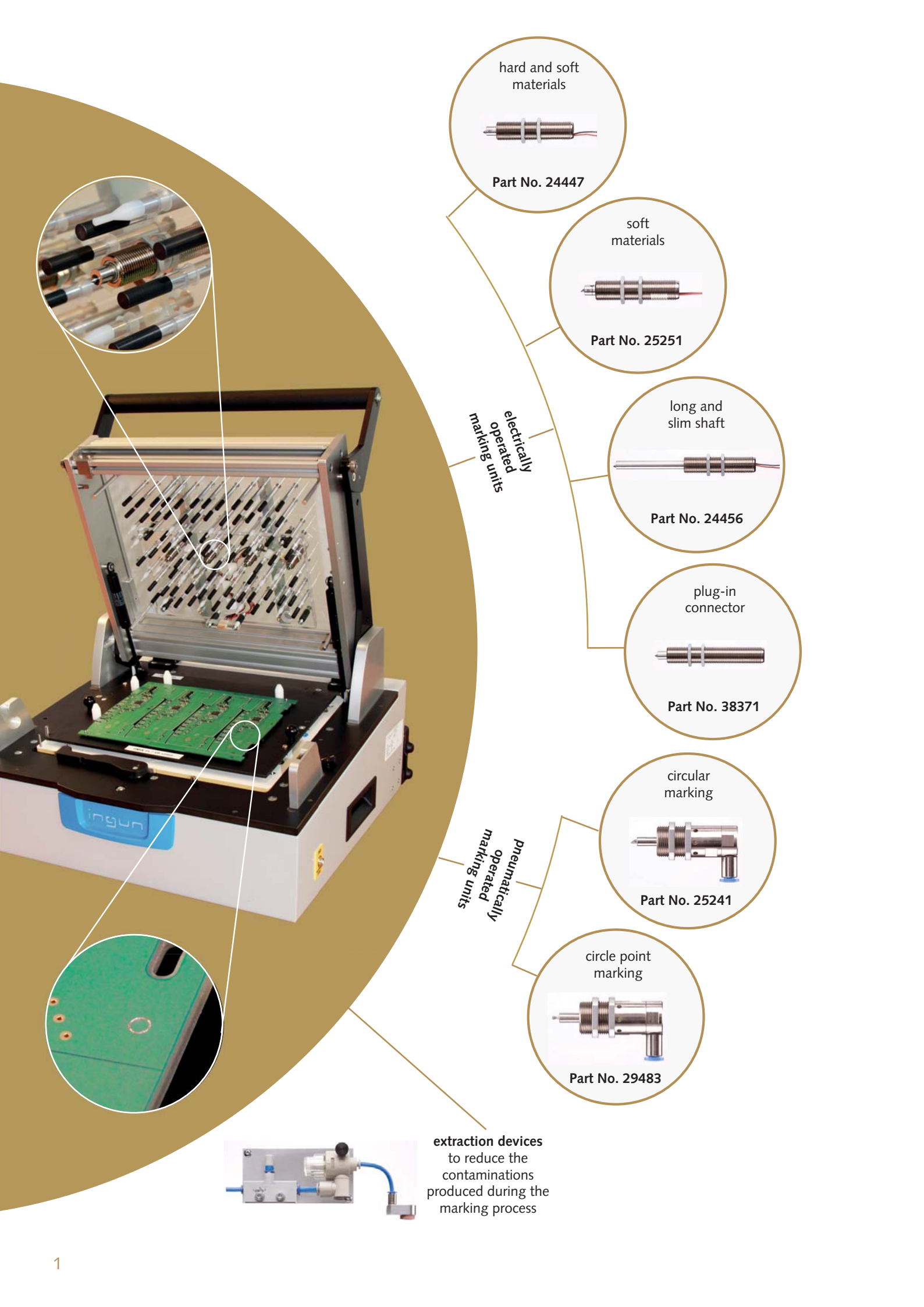
ingun[®]

Test Probes · Test Fixtures

IN TESTING SOLUTIONS
No.1
IN DER PRÜFTECHNIK

INGUN
Marking Units
Permanent Marking





hard and soft materials



Part No. 24447

soft materials



Part No. 25251

long and slim shaft



Part No. 24456

plug-in connector



Part No. 38371

circular marking



Part No. 25241

circle point marking



Part No. 29483

extraction devices to reduce the contaminations produced during the marking process



electrically operated marking units

pneumatically operated marking units

Reliable and permanent marking with compact units

INGUN marking units are designed for the use in the industrial testing to mark "good"-tested PC boards with a permanent marking in the form of a circular marking or circle point marking. Our marking units are available with two different drive systems and are mounted in a test fixture or a replacement kit compactly and precisely.

Advantages

- ✓ compact and robust design
- ✓ outstanding lifespan
- ✓ precise and infinitely variable positioning
- ✓ extremely wear-resistant
- ✓ electrically or pneumatically operated drive
- ✓ permanent marking of various material surfaces, such as:
 - plastics (FR4, CEM1, Adaptonit, ...)
 - untempered metals (copper, brass, aluminium, steel (St-37), ...)
 - paper labels

Electrically operated Marking Units

In our electrically operated marking units, the spring-loaded engraving tool pushes against the surface of the PC board during the testing process. After successful „good“ testing of the PC board the marking unit is typically powered with 12 V DC for around 1.0 second during contacting. Due to the generated rotating movement the PCB is engraved by a scratching tool or cutting tool with a permanent \varnothing 2 mm circle on the surface.

Pneumatically operated Marking Units

In our pneumatically operated marking units, the engraving tool rotates by means of compressed air. At the same time a stroke movement is performed, so that the engraving tool is pressed against the PC board and permanently marks it with either a \varnothing 2 mm circular marking or with a circle point marking of $> \varnothing$ 1,0 mm. As soon as the compressed air is turned off, the engraving tool is moved back to its home position by an internal spring.

Certificate

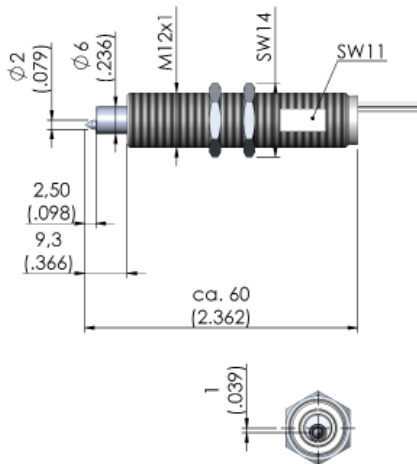
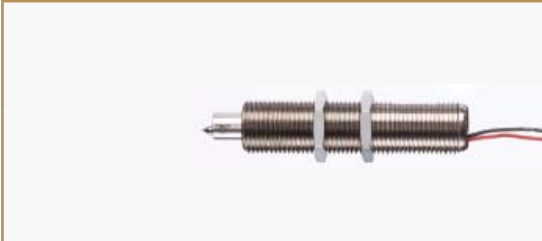


Our standard marking units are RoHS-compliant and are in accordance to the requirements of the EC-Directive 2011/65/EC.



Our standard marking units are designed as incomplete machines and meet the demands of the Machine Directive 2006/42/EG.

Electrical Marking Unit ME-E-R2,0-12-060-K12V for hard and soft material surfaces



Dimensions Part No. 24447

Ordering Information:

- electrical marking unit
ME-E-R2,0-12-060-K12V: Part No.: **24447**

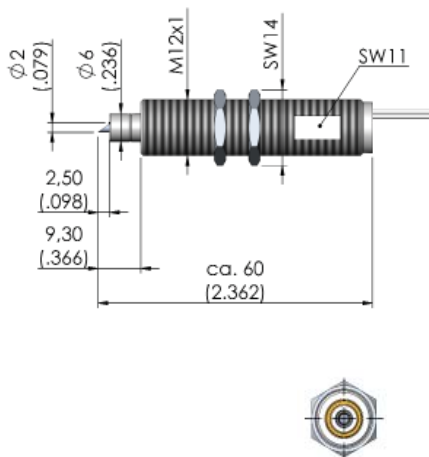
Recommended optionally available accessories:

- spare part engraver kit: Part No.: **27316**
- extraction device **ASV-ME-E-WK-EC:** Part No.: **36797**

Technical Information:

- outside dimensions: approx. $\phi 12 \times 60$ mm (d x l)
- outside thread: M12 x 1
- counter nut: SW 14
- weight: approx. 0.040 kg
- temperature range: -20 °C to +65 °C
- drive connection via: cable
- recommended working stroke: approx. (-) 1.5 mm
- maximum stroke: approx. (-) 2.0 mm
- recommended marking impulse: approx. 1.0 s
- force at working stroke: approx. 3.0 N
- marking head: scratching engraver
- engraver material: solid carbide
- engraver tool hardness: approx. 1.600 HV
- spare part engraver kit: ✓
- marking: circle approx. $\phi 2.0$ mm
- material surfaces: hard and soft materials, e.g.
 - plastics
 - non-hardened metals
- RoHS-compliant (2011/65/EC): ✓

Electrical Marking Unit ME-E-S2,0-12-060-K12V for soft material surfaces



Dimensions Part No. 25251

Ordering Information:

- electrical marking unit
ME-E-S2,0-12-060-K12V: Part No.: **25251**

Recommended optionally available accessories:

- extraction device **ASV-ME-E-WK-EC:** Part No.: **36797**

Technical Information:

- outside dimensions: approx. $\phi 12 \times 60$ mm (d x l)
- outside thread: M12 x 1
- counter nut: SW 14
- weight: approx. 0.040 kg
- temperature range: -20 °C to +65 °C
- drive connection via: cable
- recommended working stroke: approx. (-) 1.5 mm
- maximum stroke: approx. (-) 2.0 mm
- recommended marking impulse: approx. 1.0 s
- force at working stroke: approx. 3.0 N
- marking head: cutting engraver
- engraver material: solid carbide
- engraver tool hardness: approx. 1.600 HV
- spare part engraver kit: ✗
- marking: circle approx. $\phi 2.0$ mm
- material surfaces: soft materials, e.g.
 - plastics
 - paper labels
- RoHS-compliant (2011/65/EC): ✓

Electrical Marking Unit ME-E-R2,0-12-100-K12V with long and slim shaft

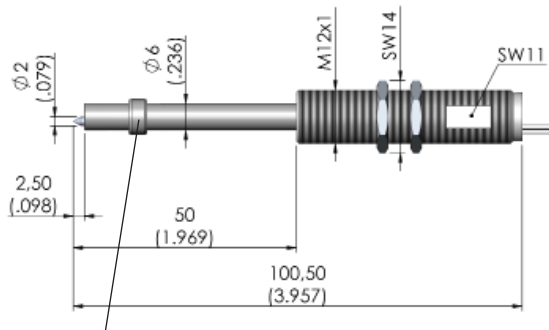


Ordering Information:

- electrical marking unit
ME-E-R2,0-12-100-K12V: Part No.: **24456**

Recommended optionally available accessories:

- spare part engraver kit: Part No.: **27316**
- extraction device **ASV-ME-E-WL-EC:** Part No.: **37021**



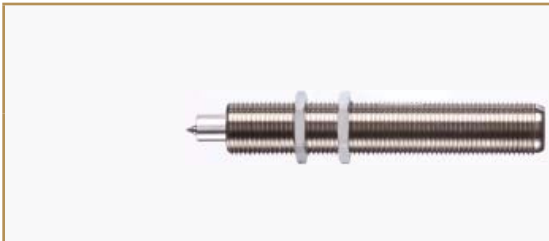
Recommendation:
In order to achieve an optimal marking result, the engraving shaft with $\varnothing 6$ mm should be guided at the front section with included slide bearing (Part No. 38377).

Technical Information:

- outside dimensions: approx. $\varnothing 12 \times 100$ mm (d x l)
- outside thread: M12 x 1
- counter nut: SW 14
- weight: approx. 0.050 kg
- temperature range: -20 °C to +65 °C
- drive connection via: cable
- recommended working stroke: approx. (-) 1.5 mm
- maximum stroke: approx. (-) 2.0 mm
- recommended marking impulse: approx. 1.0 s
- force at working stroke: approx. 3.0 N
- marking head: scratching engraver
- engraver material: solid carbide
- engraver tool hardness: approx. 1.600 HV
- spare part engraver kit: ✓
- marking: circle approx. $\varnothing 2.0$ mm
- material surfaces: hard and soft materials, e.g.:
 - plastics
 - non-hardened metals

Dimensions Part No. 24456

Electrical Marking Unit ME-E-R2,0-12-080-S12V with plug-in connector

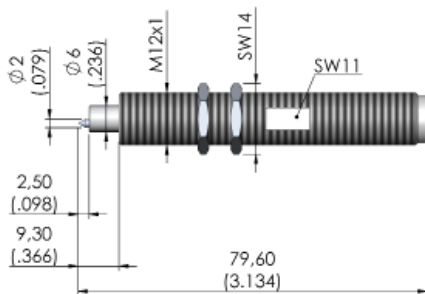


Ordering Information:

- electrical marking unit
ME-E-R2,0-12-080-S12V: Part No.: **38371**

Recommended optionally available accessories:

- plug connector (angular, 2 m cable) *: Part No.: **43637**
- spare part engraver kit: Part No.: **27316**
- extraction device **ASV-ME-E-WK-EC:** Part No.: **36797**



Marking Unit (Part No. 38371) with Plug Connector (Part No. 43637)

Technical Information:

- outside dimensions: approx. $\varnothing 12 \times 80$ mm (d x l)
- outside thread: M12 x 1
- counter nut: SW 14
- weight: approx. 0.050 kg
- temperature range: -20 °C to +65 °C
- drive connection via: plug connector
- recommended working stroke: approx. (-) 1.5 mm
- maximum stroke: approx. (-) 2.0 mm
- recommended marking impulse: approx. 1.0 s
- force at working stroke: approx. 3.0 N
- marking head: scratching engraver
- engraver material: solid carbide
- engraver tool hardness: ca. 1.600 HV
- spare part engraver kit: ✓
- marking: circle approx. $\varnothing 2.0$ mm
- material surfaces: hard and soft materials, e.g.:
 - plastics
 - non-hardened metals

Dimensions Part No. 38371

- RoHS-compliant (2011/65/EC): ✓

* plug connector: version RoHS-compliant (2011/65/EC)

Pneumatic Marking Unit ME-P-S2,0-16-054-QS4 for circular marking

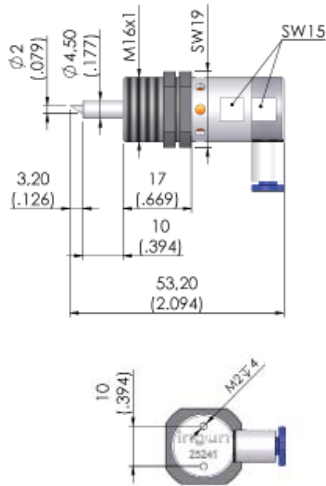


Ordering Information:

- pneumatic marking unit
ME-P-S2,0-16-054-QS4: Part No.: **25241**

Recommended optionally available accessories:

- magnetic valve (MHE2-M1H-3/2G-QS-4-K): Part No.: **32680**
- pneumatic tube (PUN-4x0.75-BL) *: Part No.: **26707**
- extraction device **ASV-ME-P-WK-EC:** Part No.: **36792**



Dimensions Part No. 25241

Technical Information:

- outside dimensions: approx. $\phi 16 \times 54$ mm (d x l)
- outside thread: M16 x 1
- counter nut: SW 19
- weight: approx. 0.070 kg
- temperature range: -30 °C to +80 °C
- drive connection via: compressed air connection
- recommended working stroke: approx. (+) 2.0 mm
- maximum stroke: approx. (+) 3.5 mm
- recommended marking impulse: approx. 0.5 s bis 1.0 s
- force at working stroke: approx. 2.0 N
- marking head: cutting engraver
- engraver material: solid carbide
- engraver tool hardness: approx. 1.600 HV
- spare part engraver kit: **X**
- marking: circle approx. $\phi 2.0$ mm
- material surfaces: hard and soft materials, e.g.:
 - plastics
 - paper labels
- RoHS-compliant (2011/65/EC):

Pneumatic Marking Unit ME-P-F1,0-16-054-QS4 for circle point marking

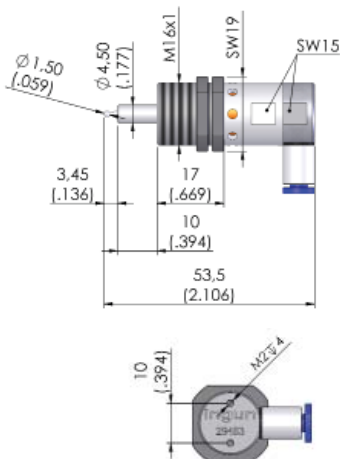


Ordering Information:

- pneumatic marking unit
ME-P-F1,0-16-054-QS4: Part No.: **29483**

Recommended optionally available accessories:

- magnetic valve (MHE2-M1H-3/2G-QS-4-K): Part No.: **32680**
- pneumatic tube (PUN-4x0.75-BL) *: Part No.: **26707**
- extraction device **ASV-ME-P-WK-EC:** Part No.: **36792**



Dimensions Part No. 29483

Technical Information:

- outside dimensions: approx. $\phi 16 \times 54$ mm (d x l)
- outside thread: M16 x 1
- counter nut: SW 19
- weight: approx. 0.070 kg
- temperature range: -30 °C to +80 °C
- drive connection via: compressed air connection
- recommended working stroke: approx. (+) 2.0 mm
- maximum stroke: approx. (+) 3.5 mm
- recommended marking impulse: approx. 0.5 s bis 1.0 s
- force at working stroke: ca. 2.0 N
- marking head: milling engraver
- engraver material: stainless steel, diamond-coated
- engraver tool hardness: approx. 80 HRC
- spare part engraver kit: **X**
- marking: circle point approx. $> \phi 1.0$ mm
- material surfaces: hard and soft materials, e.g.:
 - plastics
 - paper labels
- RoHS-compliant (2011/65/EC):

* Pneumatic tube: Length on request, charged by the meter




Extraction devices – Contaminations reduced to a minimum by the marking process

With the extraction devices for our standard marking units unwanted contaminations during the marking procedure on the PC board, the spring-loaded test probes or on the mechanism of the test fixture can be reduced to a minimum.

Throughout the procedure the resulting shavings are pneumatically extracted via a suction head based on the approved Venturi principle. By means of a specially designed vacuum suction nozzle the shavings are then collected in a collection vessel with a filter insert. The collection vessel can be removed without tools and emptied with minimum effort. The extraction devices for our standard marking units, which are also installed in interchangeable fixtures with internal intermediate interface are available as follows (marking unit and magnet valve are not included in the delivery):

Advantages

- ✓ quick and easy assembly of the extraction device
- ✓ removable collection vessel without tools
- ✓ use in interchangeable fixtures with internal intermediate interface

	<p>Ordering Information:</p> <ul style="list-style-type: none"> • extraction device ASV-ME-E-WK-EC: Part No. 36797 (suitable for the electrical marking units Part No. 24447, 25251 and 38371) <p>Technical Information:</p> <ul style="list-style-type: none"> • outside dimensions: approx. 120 x 37 x 80 mm (w x d x h) • suction head: approx. 16 x 28 mm (w x d) • operating pressure: 0.6 MPa
	<p>Ordering Information:</p> <ul style="list-style-type: none"> • extraction device ASV-ME-E-WL-EC: Part No. 37021 (suitable for the electrical marking units Part No. 24456) <p>Technical Information:</p> <ul style="list-style-type: none"> • outside dimensions: approx. 120 x 37 x 80 mm (w x d x h) • suction head: approx. 16 x 28 mm (w x d) • operating pressure: 0.6 MPa
	<p>Ordering Information:</p> <ul style="list-style-type: none"> • extraction device ASV-ME-P-WK-EC: Part No. 36792 (suitable for the pneumatic marking units Part No. 25241, 29483) <p>Technical Information:</p> <ul style="list-style-type: none"> • outside dimensions: approx. 120 x 37 x 80 mm (w x d x h) • suction head: approx. 16 x 31 mm (w x d) • operating pressure: 0.6 MPa

Specific technical drive information

Electrically operated marking units *

- drive: electric gear motor
- rated voltage: 12 V DC **
- rated output: 0.75 W
- idle current: 3.68 mA
- start-up current: 106 mA
- connecting resistance: 114 Ω
- max. constant load current: 81 mA
- max. torque: 54 mNm
- idle speed: approx. 180 U/min
- noise emission: not relevant

Pneumatically operated marking units

- drive: compressed air motor
- operating pressure: 0.6 MPa
- operating medium: filtered, non-lubricated, compressed air
- compressed air connection: compressed air tube on QS-4 S push-in screw with e.g. PUN-4x0.75
- filter mesh: ≤ 40 μm
- normal rated flow: ≥ 100 l/min
- idle speed: approx. 27.000 U/min
- noise emission: high frequency (approx. 90 dB)

* Current limit:

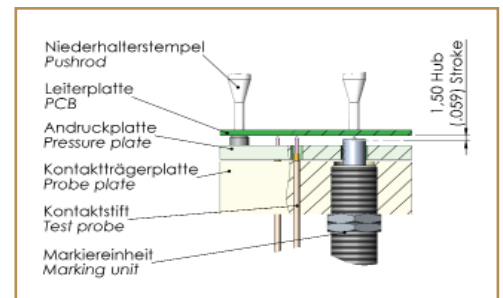
To avoid damaging the drive of the electrical marking units by electrical overload, we recommend setting a current limit on approx. 100 mA as a precaution.

** 24 V DC operation of the electrically operated marking units:

Although 12 V DC is specified, the operation of the electrically operated marking units with 24 V DC is also possible. However, it should be noted that on the gear as well as on the drive the wear and tear clearly increases, and thus reduces the lifespan of the total system by at least a factor of 4. The reasons for this lie primarily in the increased brush sparking of the Start/Stop operation, the doubled torque of the drive in the end position (marking) and the increased inertia that has a multiplying affect on the total system.

Assembly of electrically operated marking units

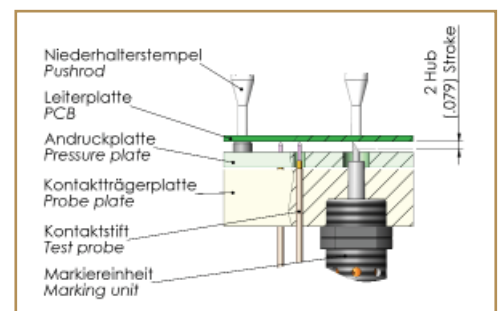
The electrically operated marking units can be installed in any position (e.g. facing upwards or downwards). When contacting the PC board, the marking units are mounted so that the spring-loaded engraving tool is pushed in approx. 1.5 cm on the working stroke vertically to the surface to be marked. The maximum stroke of approx. 2.0 mm must not be exceeded in order to avoid damage to the drive gear. The assembly is carried out at the infinitely variable height on the outside thread M12 x 1.



Assembly (PC board contacted)

Assembly of pneumatically operated marking units

The pneumatically operated marking units can be installed in any position (e.g. facing upwards or downwards). When contacting the PC board, the marking units are mounted so that the engraving tool has a distance of 2.0 mm and is vertically aligned to the surface to be marked. The boreholes for the air outlets must not be covered in order to allow an uninterrupted airflow. The assembly is carried out at the outside thread M16 x 1, at the shaft with Ø 4.5 mm or at the two threaded holes on the top side of the housing.



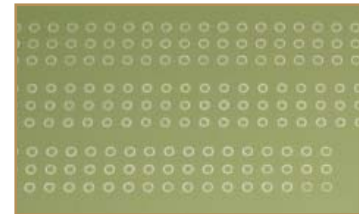
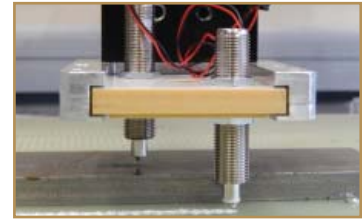
Assembly (PC Board contacted)

Lifespan

To determine the lifespan of our marking units, life cycle tests with fully automatic, computerised test standards are carried out. Thus we ensure longterm high quality and performance of our products.

We have successfully completed the latest life cycle tests under laboratory conditions, on our electrically operated marking units after approx. 500.000 marking cycles and on our pneumatically operated marking units after approx. 150.000 marking cycles, without detecting wear and tear which would limit the function of the marking units.

As the lifespan depends on various incalculable factors, especially largely on individual use and because the actual operation life can differ, we can't provide any guarantees.



Spare part engraver kit

There is a spare part engraver kit (Part No. 27316) with the following components available for the electrically operated marking units (Part No. 24447, 24456 and 38371). No spare part engraver kit for the pneumatically operated marking units (Part No. 25241 and 29483) is available because of the geometrical alignment of the compressed air motor to the engraving tool and the collinearity of the total system.

	<p>Ordering Information:</p> <ul style="list-style-type: none"> spare part engraver kit for electrical marking units Part No. 24447, 24456 and 38371: Part No. 27316 (incl. graving tool, slide bearing, spring)
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Spare part engraver kit (Part No. 27316) for electrically operated marking units

Ordering Index

The structured and logical constellation of the individual numbers e.g. drive, engraving tool, overall size, overall length and connection to drive allows clear identification and classification of our standard marking units.

ME		E		R2,0		12		060		K12V	
Name		Drive		Engraving tool		Overall size		Overall length		Connection to drive	
ME	ME = marking unit	E	E = electrical drive	RX,X	R = scratching engraver X,X = diameter of marking in [mm] e.g. R2,0	XX	diameter e.g. - 12 at M12 x 1 - 16 at M16 x 1 - 36 at Part 19504	XXX	length (always 3 characters) e.g. 060	KXV	K = cable X = rated voltage in [V] e.g. K12V
		P	P = pneumatic drive	SX,X	S = cutting engraver X,X = diameter of marking in [mm] e.g. S2,0					SXV	S = plug X = rated voltage in [V] e.g. S12V
				FX,X	F = milling engraver X,X = diameter of marking in [mm] e.g. F1,0					LXV	L = solder lug X = rated voltage in [V] e.g. L2V
										QS4	outer diameter of compressed air tube (only at ME-P-...)


Standard Marking Units Overview

INGUN Standard marking units			
Part No.:	24447	25251	24456
Name:	electrical marking unit ME-E-R2,0-12-060-K12V	electrical marking unit ME-E-S2,0-12-060-K12V	electrical marking unit ME-E-R2,0-12-100-K12V
Outside dimensions:	approx. \varnothing 12 x 60 mm (d x l)	approx. \varnothing 12 x 60 mm (d x l)	approx. \varnothing 12 x 100 mm (d x l)
Outside thread:	M12 x 1	M12 x 1	M12 x 1
Counter nut:	SW 14	SW 14	SW 14
Weight:	approx. 0.040 kg	approx. 0.040 kg	approx. 0.050 kg
Temperature range:	-20 °C to +65 °C	-20 °C to +65 °C	-20 °C to +65 °C
Drive connection via:	cable	cable	cable
Recommended working stroke:	approx. (-) 1.5 mm	approx. (-) 1.5 mm	approx. (-) 1.5 mm
Maximum stroke:	approx. (-) 2.0 mm	approx. (-) 2.0 mm	approx. (-) 2.0 mm
Recommended marking impulse:	approx. 1.0 s	approx. 1.0 s	approx. 1.0 s
Force at working stroke:	approx. 3.0 N	approx. 3.0 N	approx. 3.0 N
Marking head:	scratching engraver	cutting engraver	scratching engraver
Engraver material:	solid carbide	solid carbide	solid carbide
Engraving tool hardness:	approx. 1600 HV	approx. 1600 HV	approx. 1600 HV
Spare part engraver kit:	✓ (Part No. 27316)	X	✓ (Part No. 27316)
Marking:	circle approx. \varnothing 2.0 mm 	circle approx. \varnothing 2.0 mm 	circle approx. \varnothing 2.0 mm 
Material surfaces:	hard and soft materials, e.g. plastics, non-hardened metals, ...	soft materials, e.g. plastics, paper labels, ...	hard and soft materials, e.g. plastics, non-hardened metals, ...
Extraction device:	✓ (Part No. 36797)	✓ (Part No. 36797)	✓ (Part No. 37021)
RoHS-conformity (2011/65/EC):	✓	✓	✓
Drive:	electric gear motor*	electric gear motor*	electric gear motor*
Rated voltage/Operating pressure:	12 V DC **	12 V DC **	12 V DC **
Rated output/Operating medium:	0.75 W	0.75 W	0.75 W
Idle current/Compressed air connection:	3.68 mA	3.68 mA	3.68 mA
Start-up current/Filter mesh:	106 mA	106 mA	106 mA
Connecting resistance/Normal rated flow:	114 W	114 W	114 W
Max. constant load current:	81 mA	81 mA	81 mA
Max. torque:	54 mNm	54 mNm	54 mNm
Idle speed:	approx. 180 U/min	approx. 180 U/min	approx. 180 U/min
Noise emission:	not relevant	not relevant	not relevant

Advice desired?

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

* Current limit: see page 7
** 24 V DC operation: see page 7

		
38371	25241	29483
electrical marking unit	pneumatic marking unit	pneumatic marking unit
ME-E-R2,0-12-080-S12V	ME-P-S2,0-16-054-QS4	ME-P-F1,0-16-054-QS4
approx. \varnothing 12 x 80 mm (d x l)	approx. \varnothing 16 x 54 mm (d x l)	approx. \varnothing 16 x 54 mm (d x l)
M12 x 1	M16 x 1	M16 x 1
SW 14	SW 19	SW 19
approx. 0.050 kg	approx. 0.070 kg	approx. 0.070 kg
-20 °C to +65 °C	-30 °C to +80 °C	-30 °C to +80 °C
plug connector	compressed air connection	compressed air connection
approx. (-) 1.5 mm	approx. (+) 2.0 mm	approx. (+) 2.0 mm
approx. (-) 2.0 mm	approx. (+) 3.5 mm	approx. (+) 3.5 mm
approx. 1.0 s	approx. 0.5 s to 1.0 s	approx. 0.5 s to 1.0 s
approx. 3.0 N	approx. 2.0 N	approx. 2.0 N
scratching engraver	cutting engraver	milling engraver
solid carbide	solid carbide	stainless steel, diamond-coated
approx. 1600 HV	approx. 1600 HV	approx. 80 HRC
✓ (Part No. 27316)	X	X
circle approx. \varnothing 2.0 mm 	circle approx. \varnothing 2.0 mm 	circle point approx. $> \varnothing$ 1.0 mm 
hard and soft materials, e.g.	hard and soft materials, e.g.	hard and soft materials, e.g.
plastics, non-hardened metals, ...	plastics, paper labels, ...	plastics, paper labels, ...
✓ (Part No. 36797)	✓ (Part No. 36792)	✓ (Part No. 36792)
✓	✓	✓
electric gear motor*	compressed air motor	compressed air motor
12 V DC **	0.6 MPa	0.6 MPa
0.75 W	filtered, non-lubricated compressed air	filtered, non-lubricated compressed air
3.68 mA	compressed air tube at QS-4 connector	compressed air tube at QS-4 connector
106 mA	$\leq 40 \mu\text{m}$	$\leq 40 \mu\text{m}$
114 W	$\geq 100 \text{ l/min}$	$\geq 100 \text{ l/min}$
81 mA	-----	-----
54 mNm	-----	-----
approx. 180 U/min	approx. 27.000 U/min	approx. 27.000 U/min
not relevant	high frequency (ca. 90 dB)	high frequency (ca. 90 dB)

Foreseeable misuse

The following is not allowed:

- operation with not specified rated voltage / constant load current / operating pressure
- not vertical alignment of marking units to the surface to be marked
- marking on voltage leading surfaces
- marking between different materials at e.g. change from PC to conducting path or at the edge of the PC

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extraction device ASV-ME-P-WK-EC	36792	5, 6
electrical marking unit ME-E-R2,0-12-060-K12V	24447	3
electrical marking unit ME-E-R2,0-12-080-S12V	38371	4
electrical marking unit ME-E-R2,0-12-100-K12V	24456	4
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pneumatic marking unit ME-P-F1,0-16-054-QS4	29483	5
pneumatic marking unit ME-P-S2,0-16-054-QS4	25241	5
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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 homepage and in our catalog. Please note especially the series of our Manual Test Fixtures MA 21xx and MA 32xx.





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