

- Screwdriving Technology
- Automation
- Air Motors
- Air Tools

## Services





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## Service hotline – your direct line to our service team

The fastest and most cost-effective solution to your service needs is a telephone call between our expert service personnel and a customer staff member responsible for the system, ideally someone who has had training from DEPRAG.

If a solution cannot be reached over the phone, our service centre will immediately initiate further steps to address the issue. Depending on the agreements made, our service team can also be on site at your premises within a short space of time.

The first port of call is the service department at DEPRAG.

Our service technicians are, of course, very happy to help you over the phone. In exceptional cases an appropriate on-call service is also available. Outside business hours our hotline number +49 9621 371 371 will take your calls. Our service department will then get straight back to you the next working day.

In the event of claims for any component deliveries, the product should be returned to the factory for inspection. Our trained personnel can also conduct any outstanding maintenance, updates or modifications and checks on site at your premises on request. Individual service and maintenance contracts can be flexibly tailored to your wishes and requirements.

Alternatively, on our professional training courses we can train your staff members in the fundamentals of our product areas of application. This way, any modification requirements can be flexibly dealt with internally.

We recommend keeping common wear and tear parts on stock in order to minimise production downtime.

## Service department – the main contact for your service needs

Service department | Tel. 09621 371-371 | Email: [service@deprag.de](mailto:service@deprag.de)

## Screwdriving technology services

### General

The realignment of system components gives you the assurance that production resources will provide reliable screwdriving results. In addition to realignment, a machine capability study can verify the suitability of your tool for a specific assembly task.

### Verification and realignment of screwdriving systems

When carrying out realignment on screwdriving systems, the realignment value is identified or verified and then documented in a factory certificate. The realignment value is saved in the screwdriver or controller.

As well as realigning individual components, the whole screwdriving system (consisting of EC-servo screwdriver or EC screwdriver and corresponding sequence controller) can be realigned. In this case, the realignment is valid specifically for this combination of screwdriver and controller. We can, of course, also carry out this verification and realignment directly on your premises. Our technical specialists use mobile equipment to check your production line on-site.

Verification and realignment in-house of EC-servo, EC or MINIMAT-ED screwdrivers	Part no. 000764
of EC-servo, EC or MINIMAT-ED screwdrivers of a sequence controller	Part no. 000782 (deviating from the standard torque range) Part no. 000765
as a screwdriving system (EC-servo screwdriver and sequence controller or EC screwdriver and sequence controller)	Part no. 000766
Verification and realignment on-site of EC screwdrivers, EC-servo screwdrivers	Part no. 000783
of a sequence controller	Part no. 000784

### Maintenance with verification and realignment

In addition to verification and alignment we can provide a **maintenance package including verification and realignment** for our screwdriving systems. Regular maintenance ensures maximum productivity and a long life-span for your product.

Maintenance with verification and realignment of our screwdrivers includes assessment of the current condition of the tool, disassembly and testing of all mechanical parts, cleaning and re-greasing of the gear and reassembly as well as testing the ease of movement of the motor and gear. Maintenance with verification and realignment of our sequence controllers includes assessment of the current condition of the tool, replacement of filters, cleaning (inside and outside) and a software update.

Maintenance with verification and realignment of EC screwdrivers / EC cordless screwdrivers	Part no. 385554A / 109027A
of EC-servo screwdrivers 311E27/311E36/311E42/311E63, 315EWT58	Part no. 109177A/B/C/D, 385568A
a sequence controller AST5/AST6/AST11/AST30-31 / AST12/AST40	Part no. 385531A/387178A/385531B/C / 122007A/109282A

# Screwdriving technology services

## Screw joint analysis

Processing reliability right from the start - due to a comprehensive screw joint analysis during which our experts put your specific screw joint to the test.

### Your advantages:

- Identification of optimal processing parameters
- Processing reliability right from the start
- Analysis of seating conditions
- Recommendations of suitable screwdriving procedures

### Frequently asked questions:

- Which is the ideal torque for my application?
- What speed should I choose?
- What tool best fulfils my requirements?

Torque measurement and screw joint analysis, in conjunction with our measurement electronic, satisfy the highest processing specifications and are an essential part of optimal quality assurance.

Analysis of the screw connection is conducted by performing assemblies on an original component. The significant screwdriving process parameters, such as rolling torque, seating point and over-torque are determined using graphic records.

In order to ascertain the way in which a component should ideally be assembled, the component must be subjected to assembly using a higher torque than normal until the joint or component itself is destroyed. In this way the over-torque is determined. This experiment is conducted ten to twenty times using original components.

### Friction losses:

Friction is generated as the screw is assembled. However, it is dependent on the screw geometry and component material. This friction changes the relationship between torque and obtained preload force and is one of the great unknowns when determining a suitable tightening parameter. The technician loosens the assembled screw and then retightens it. By comparing the torque curve progression of the first and second processes, possible frictional losses can be detected.

### Analysis of seating conditions:

Seating conditions can also be detected, for example if a silicone seal is attached to a pump with four screws. Even if the tightening torque is expected to produce 100 percent pre-load force, this can gradually diminish due to the seating characteristics of the silicone. The result: the pump is no longer sealed.

When analysing such a soft joint, the technician first tightens the screw to the established tightening torque and then tightens again after a certain amount of time. The prevail torque reveals the seating conditions and their effect on the pre-load force. In such a case we may recommend carrying out screw assembly in two phases.

### Application-specific characteristics:

If, for example, two sheets of metal should be screwed together but their bore holes are not identical, initially a great deal of force is needed to position the holes correctly over one another. If the holes are situated one above the other at the end of the screwdriving process a low torque will be sufficient for final tightening. However, if assembling with constant high torque on such a task the destructive overload torque would be reached and would destroy the screw or component. A screw joint analysis would recognise this issue and reliable parameters and sequences could be determined to prevent the problem.

At the end of a series of comprehensive tests and precise analysis, the manufacturer receives recommendations of suitable screwdriving parameters and tools to fit their specific screwdriving task.

We offer either standard or specialized analysis.



# Screwdriving technology services

## Screw joint analysis – Standard analysis:

The screw joint analysis can identify a suitable screwdriving procedure and determine the optimal shut-off torque of the screwdriving tool. Parts for assembly are positioned in an almost identical replication of the assembly conditions. Next a screw is assembled with the screwdriver using a higher torque than reasonably expected so that the assembly is overloaded and fails. The torque, screwdriving time and angle are recorded and saved for this procedure. The torque curve progression can be used to analyse the assembly and to determine optimal processing parameters for the assembly screwdriver.

### The standard screw joint analysis includes:

- Examination of ONE screwdriving application for ONE specific screw on the customer's component
- Screw assembly of up to max. 10 screw locations until destruction, each graphically recorded
- Documentation of assembly torques and destructive torques in the form of a table
- Creation of a report (including torque recommendation), as a PDF document in German (as standard) or English (please specify when ordering)

Screw joint analysis standard, part no. 000771

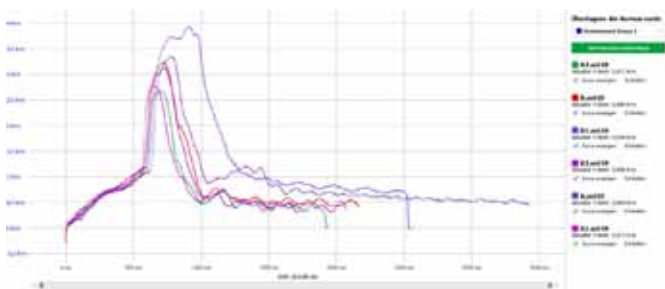
## Screw joint analysis – Specialized analysis:

The specialized screw joint analysis is an expansion of the standard version and includes additional investigations and services relating to the customer-specific application.

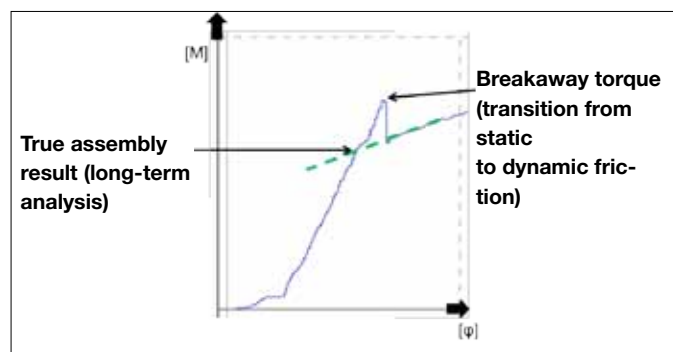
### The specialized screw joint analysis includes e.g.:

- Examination of SEVERAL screwdriving applications and/or INDIVIDUAL screwdriving applications with more than 10 screw locations for VARIOUS specific screws on the customer's component
- Screw assembly until destruction, each graphically recorded
- Identification of optimal processing parameters, such as screwdriving time, speed, torque or angle as control or monitoring variables
- Recommendation for selection of drive type (electric or pneumatic) based on your specific processing requirements (torque accuracy, documentation requirements, etc.)
- Recommendation for determining tightening strategy (torque assembly, friction-dependent assembly, DEPRAG Clamp Force Control, etc.)
- Creation of an application-specific screwdriving program
- Identification of seating conditions: By continuing to tighten a joint which has already been assembled to target torque the true assembly result can be assessed to optimise the screwdriving process
- Creation of a report as PDF document in German (as standard) or English (please specify when ordering)

Specialized analysis, part no. 000772



Curve overlay for stripped screw joint



Torque procedure when retightening a screw joint

# Screwdriving technology services

## Machine capability study (MFU) – processing reliability in screwdriving technology

- MFU certificate for screwdriver with clutch, torque
- MFU certificate for EC / EC-servo screwdriver, angle or torque

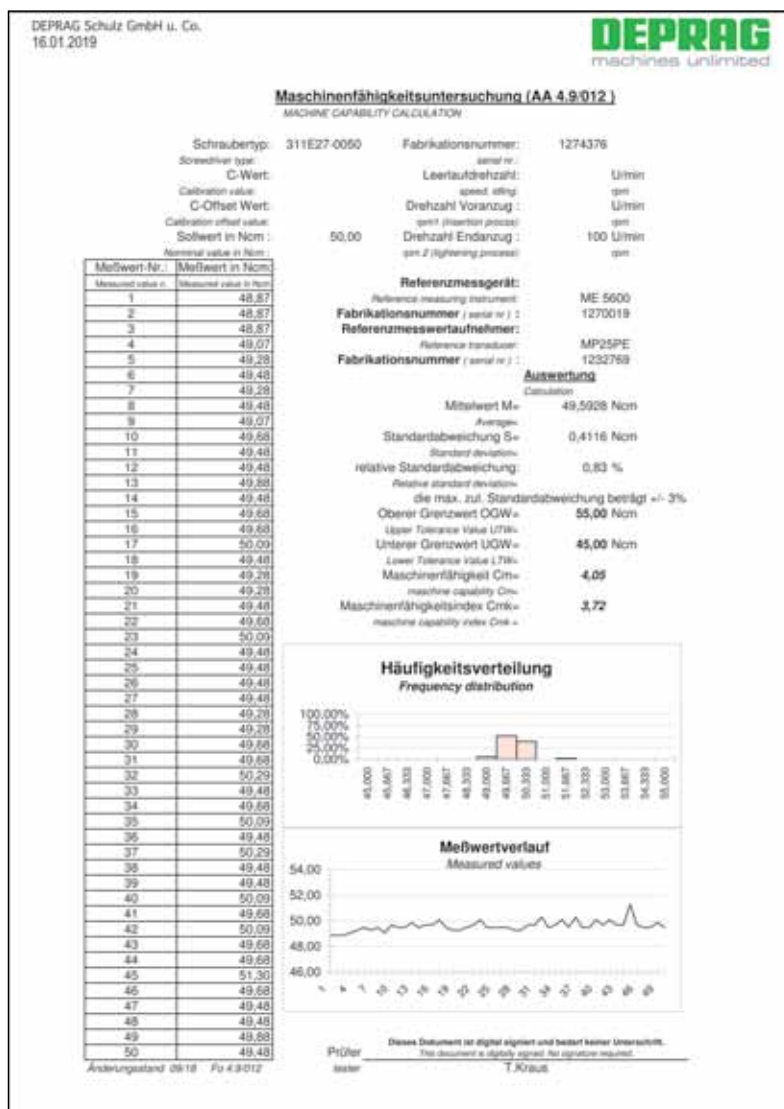
The extensive inspection conducted for an MFU uses traceable calibrated measurement reference equipment. An MFU for angle is also an option for electric tools.

A machine capability study is the inspection of a machine for its suitability to a specific screw assembly task. In contrast to a machine capability study, the processing capability (Cpk) can only be carried out on-site on an assembly line taking all influencing factors into consideration. The Cmk value gives a clear statement of machine capability.

A Cmk value of 1.67 means that 99.99994% of screw assemblies fall within the permissible tolerances.

Our technicians are, of course, also able to conduct a machine capability study directly on your premises in your production line.

Machine capability study, MFU certificate	Part no. 000778
in-house for screwdriver with clutch, torque	Part no. 000717
in-house for EC or EC-servo screwdriver, torque	Part no. 000718
in-house for EC or EC-servo screwdriver, angle	Part no. 000720
on-site for screwdriver with clutch, torque	Part no. 000720
on-site for EC or EC-servo screwdriver, torque	Part no. 000714
on-site for EC or EC-servo screwdriver, angle	Part no. 000715



MFU certificate

## Torque adjustment – upon delivery of your screwdriver with mechanical shut-off clutch

As standard our screwdrivers with mechanical shut-off clutch are set to maximum on delivery.

On request we can set a specific torque for you on delivery in order to guarantee the continued reliable function of your tool.

### Your advantages:

- reliable processing
- comprehensive documentation
- traceable to national norms

You also receive the corresponding measurement protocol.

When taking a counter measurement using a measurement platform (measurement transducer) and measurement device a series of 10 measurements is recorded:

- the individual measurements
- the average
- the absolute and relative standard deviation
- detailed description of the reference equipment



Torque adjustment screwdriver with mechanical shut-off clutch, part no. 000716

<h1>Messprotokoll</h1> <i>Measurement Report</i>		<b>DEPRAG</b> machines unlimited																																																									
<small>DEPRAG SCHULZ GMBH u. CO. Postfach 1352, D-92203 Amberg Carl-Schulz-Platz 1, D-92224 Amberg Tel. (0 96 21) 371-0, Fax (0 96 21) 371-120 Internet: http://www.deprag.com e-mail: info@DEPRAG.de Leiter Qualitätswesen: Herr Heinrich</small>																																																											
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Für die Durchführung der Messungen werden auf nationale Normale rückführbar kalibrierte Messmittel eingesetzt. Die DEPRAG verfügt über ein nach DIN EN ISO/IEC 17025 akkreditiertes Kalibrierlaboratorium (D-K-18255-01-00). Dieses Messprotokoll darf nur vollständig und unverändert weitergegeben werden.  Calibrated measuring instruments traceable to national norms are used to carry out measurements. DEPRAG has a DIN EN ISO/IEC 17025 accredited calibration laboratory (D-K-18255-01-00). This Measurement report may only be shared if it remains complete and unchanged.																																																											
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10 series measurement protocol



# Calibration service

## General

With a calibration from DEPRAG you can always be sure that your measurement equipment provides reliable measurement results – competent and with the requisite traceability to national norms. DEPRAG has an accredited calibration laboratory where various calibration methods can be employed to calibrate with traceability and the lowest measurement uncertainty, covering torques of between 0.01 Nm and 500 Nm.

### How long is the calibration valid?

In principle a calibration is only valid at the time it is conducted. It is normally the responsibility of the user to decide on the length of calibration intervals. The application, i.e. the conditions of the workplace, method of usage of the measurement tool, frequency of use and safety concerns for the workpieces to be assembled are all considerations when determining calibration intervals.

If a measurement tool is used in a running assembly process, it makes more sense to have shorter calibration intervals than if a measurement tool is only used infrequently in a laboratory setting. Verification cycles could then perhaps take place every 3 months or 3 years.

**We recommend recalibrating our measurement system at least once a year.**



## Calibration of torque transducers in DAkkS calibration laboratory, D-K-18255-01-00

### Calibration of DEPRAG torque transducers

In the accredited calibration laboratory DAkkS and factory calibrations of torque measurement transducers are carried out in conformity with validated procedures. The documentation of results is presented in a calibration certificate containing all measurement values and the corresponding measurement uncertainties. Depending on the application and desired measurement uncertainty, the number of calibration procedures conducted can be increased or decreased to differentiate between direction of load, number of installation points, as well as attained measurement uncertainties. Measurement transducers based on strain gauge and piezo technology can also be calibrated.

The DAkkS calibration is only available for strain-gauge measurement transducers. Calibrations can be conducted either in conformity with DIN 51309 or VDI/VDE 2646 (calibration procedures). The calibration is usually spread over 8 torque steps in a span of 10%-100% of the measurement range. Calibration equipment is available for the torque range 0.01 Nm – 500 Nm.

All measurement transducers from DEPRAG are calibrated in the standard measurement range on delivery (see product catalogue D3020E). Specialized calibrations for atypical measurement ranges are available on request.

### Calibration service for torque transducers from other manufacturers

All calibration procedures mentioned are also available for the calibration of torque measurement transducers from other manufacturers. To verify the suitability and determine a suitable procedure, we require information relating to the technical implementation of the transducer, the application conditions and required measurement uncertainty.

We will be pleased to answer any questions you have regarding the calibration of torque transducers from other manufacturers.

DAkkS calibration according to DIN 51309 for strain-gauge measurement transducers (load right/left)	Part no. 3855281
Factory calibration according to DIN 51309 for strain-gauge or piezo-electric measurement transducers (load right/left)	Part no. 3855282
Factory calibration according to DIN 51309 for strain-gauge or piezo-electric measurement transducers (load right)	Part no. 3855283
Factory calibration according to VDI/VDE 2646 for strain-gauge or piezo-electric measurement transducers (load right/left)	Part no. 3855284
Factory calibration according to VDI/VDE 2646 for strain-gauge or piezo-electric measurement transducers (load right)	Part no. 3855285
Calibration of torque transducers from other manufacturers	on request

## Measurement system analysis (MSA) in the calibration laboratory

To analyse the capability of a measurement system consisting of torque transducer and measurement electronic, we conduct measurement system analyses in conformity with procedure 1 in our DAkkS accredited calibration laboratory (DIN EN ISO/IEC 17025). The result confirms the suitability of a measurement system for a specific application by determining the capability values.

The measurement system analysis is conducted using the specified test torque.

Measurement system analysis	Part no. 385789
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## Calibration of measurement electronics

In essence all components of the measurement chain are calibrated separately. Measurement devices for the piezo transducer are subjected to a comparison measurement and realigned if required using a charge calibration device and measurement devices for the strain gauge transducer with a strain gauge calibrator. The standards used for DAkkS and factory calibrations follow national norms and therefore fulfil the highest quality requirements. The measurement transducers are calibrated and documented in our own calibration laboratory in conformity with standardised calibration procedures.

### Factory calibration of measurement devices / measurement electronics

The measurement devices or measurement electronics are function tested. At the same time, the calibration value is determined for the measurement cell. The results are documented in a protocol, the manufacturer's verification certificate. Calibration activities are based on currently valid norms, in particular DIN EN ISO/IEC 17025 (General requirements for the competence of testing and calibration laboratories).

Calibration of measurement electronics	Part no. 000768
Calibration of torque transducers	Part no. 000769

## Automation

### Service relating to assembly systems – for the most advanced industry standards

Beginning with optimal project planning, we provide support to our customers and assembly systems with the benefit of our extensive technical support and engineering experience.

The integration of your specifications, a preliminary inspection in our house as well as turnkey installation on your production site are, of course, all part of the service. Over the years if maintenance or modifications are required, our experienced service technicians are swiftly at your side.

Specific reaction times can even be agreed upon in advance if required.

Our extensive remote maintenance modules and service hotline are advantages which speak for themselves.

#### Project planning

With great care and in close collaboration with you, we can develop the most technically suitable and cost-effective solution for your production task. This care begins in the project planning stage where a carefully designed system concept is created:

1. We can advise you extensively of the most varied automation steps from manual to fully automatic assembly concepts. Furthermore, in the initial consultation meetings you will learn all the advantages and disadvantages of diverse automation concepts and technologies available on the market. We place special emphasis on innovative and efficient system solutions based on tried and tested standard modules or innovative new designs.
2. Together with you, we analyse the feasibility of your assembly task in its preliminary stages and support you with assembly-oriented product design. Using feasibility analyses we pave the way for a successful collaborative project.
3. We can support you in the initial phase with trial series and screw joint analyses for the reliable and efficient design of your machine components.

At the end of the project planning phase you have a concept which, despite fluctuating production numbers, ensures flexibility, efficiency and economy of production.



#### Maintenance and remote maintenance

Individual service and maintenance contracts can be flexibly tailored to your wishes and requirements. Remote maintenance enables us to respond quickly to any issues and extends the options for direct customer care and support.

#### Replacement part service

The permanent, smooth operation of your system is of primary importance to us. We are therefore continuously optimising our replacement part and maintenance services. We can make a flexible agreement with you for the guarantee of free replacement parts for up to two years and can commit to the option of providing replacement and wear parts for your system for up to 10 years after delivery.

Standard parts are delivered promptly. Special parts can be prepared in our in-house production on a rapid production schedule which is unrivalled. Particularly advantageous: our wide range of in-house production methods (e.g. laser welding or eroding) means that time is saved in procurement and transportation.

#### Training

We offer a specialized individual training program for your assembly system: at your premises or at our Academy, we are flexible to your needs. Our professional training courses provide your employees with the necessary basics relating to maintenance, processing documentation, troubleshooting and replacement of products so that any modifications can be flexibly dealt with internally.

## Air motors

### Performance testing – on our computer-controlled performance test station

Our freely programmable function stand enables fast, comprehensive identification and selection of a suitable drive system up to 22 kW for almost any application case from up to 500 Nm and up to 12,000 rpm in four quadrant operation. Checks include performance, speed and torque, as well as measurement of operating pressure and air consumption. Each tool to be checked can be moved individually over 3 axes and the system can be set to the specific tool.

Fast analyses can be realised with the minimum of effort.

Our function stand can test a wide range of air tools (air motors, electric motors, hydraulic drives, grinders, drills etc.), either from our own production or from other manufacturers. Depending on requirements, either torque or speed characteristic curves can be determined. (torque / performance, speed/ performance).



## Air motors

### Torque regulation

The characteristic curves are determined using torque regulation. From one torque  $M = 0$  (corresponds with the idle speed of the tool being checked), the torque is then increased in stages to a max. of 500 Nm.

### Speed regulation

The characteristic curves are determined using speed regulation. For each process a maximum speed, a minimum speed and a maximum torque, according to preference, are defined. A test protocol with the characteristic curve of the tool is produced and delivered with the tool as documentation.

Some technical data as a guide:

Tool speeds:	Tool torques:	Characteristic torque:
0 - 12000 1/min	0.1 - 500 Nm	500 Nm from 0 to 400 1/min 10 Nm at 12000 1/min

If special adaptors or fixtures are required when testing tools from other manufacturers, we will be happy to provide you with a quotation.

Performance testing on the performance test station, part no. 000773

## DEPRAG Academy – the partner for all your training needs

The growing complexity of our products, such as cordless communicative electric tools, necessitates continuous training for your employees. Software is becoming increasingly more significant in special machines. The fourth industrial revolution, Industry 4.0, not only provides great opportunities but also challenges for the operator. Products are becoming even more complex and non-self-explanatory and this means that qualified training and continued further education is vital.

The training courses offered in our new building – the DEPRAG Academy – are designed for your employees.

### Technical training topics at the DEPRAG Academy:

- Maintenance and repair of pneumatic screwdrivers
- Maintenance and repair of feeding systems
- User training for EC and EC servo screwdriving systems
- Maintenance and repair of air motors
- Maintenance and repair of air tools
- Essential principles of screwdriving technology

As well as the topics mentioned above, we can also design seminars based on your specific requirements.

### Training courses on-site:

Our service technicians will, of course, also be happy to hold training courses at your site. When completing the registration form please state that the training should take place on your premises. Our service technicians also train your staff in the start-up and commissioning of your machine. With solid training and the specialist knowledge provided by our service personnel, you can achieve optimum system efficiency. We take pride in providing the best possible support throughout the entire commissioning phase.

Have we sparked your interest? Our service department will be happy to help you further. You can find the contact details on page 4 of this brochure.

# DEPRAG

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