

Torque Transducers

Transducers, measurement platforms and measurement wrenches

- highly accurate measurements
- wide measurement range
- in-process control with the torque transducer

The selection of a suitable torque transducer is a basic requirement for the adjustment, monitoring and inspection of screw-drivers, and also for the testing of screw joints and screw joint analysis.

Measuring Technology



EXAMPLES for the use of the most suitable measurement device for processing reliability requirements

Example 1:

An operator always assembles the same type of screw using a DEPRAG pneumatic screwdriver. Through the driver shut-off when the preset torque is reached, the assembly is controlled and assured to be accurate. In certain intervals, the screwdrivers are cross-checked using torque-transducers and if deviations occur, readjustments can be made. Measurement platforms which are intended for stationary use in a measurement laboratory or on a mobile measurement station are suitable for this test.

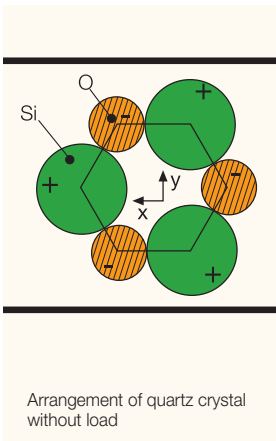
Example 2:

In a fully automatic assembly station, the regular testing of stationary screwdrivers is necessary. The DEPRAG torque wrenches in straight and angle-design, allow the mobile use when testing screwdriver-spindles without their removal from an assembly station. The torque-wrenches can also be used for the re-tightening or loosening of already assembled fastener.

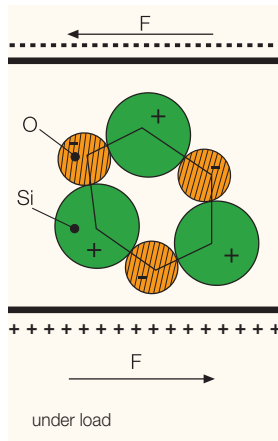
Example 3:

Transducers measure the torque directly on the component. When connected to a DEPRAG measuring instrument, this transducers are ideal for torque acquisition and screw joint analysis and are an important component for the optimum quality assurance.

PHYSICAL PRINCIPLES

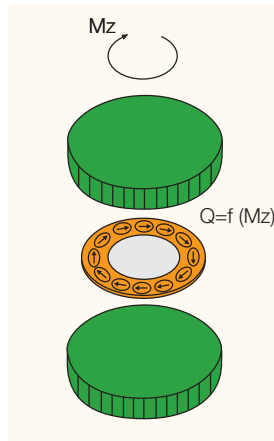


Arrangement of quartz crystal without load



under load

Function principle of the piezoelectric transducers



Torque transducers vary widely in operation and appearance, and work on many different physical principles. The most common of these are:

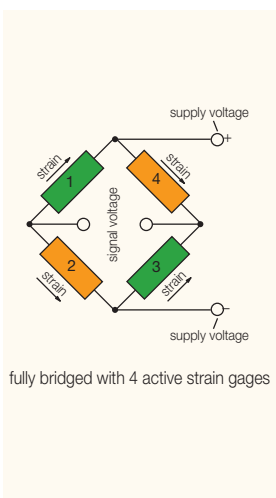
a strain gage wrapped around a torsion bar, an eddy current transducer, a mechanical (spring or hydraulic) element, and a piezoelectric crystal.

To be effective, the torque transducer must have the following attributes. It must support a sampling rate that will allow the measurement of rapidly changing loads, it must be sufficiently stiff to withstand the peak load, it must have a high degree of linearity, it must be stable under varying environmental conditions, and it must have a good operating lifetime.

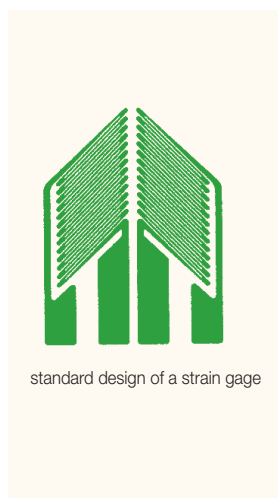
DEPRAG offers torque transducers that work on two different physical principles, both meeting these requirements.

- PE (Piezo Electric) Transducer
- DMS (Strain Gage) Transducer

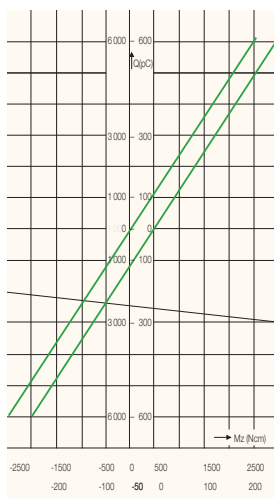
When connected to the correct measuring instrument, each type of torque transducer has applications in the screwdriving technology. The familiar DEPRAG piezoelectric transducer offers a large measuring range and a robust design. For less demanding applications, the strain gage transducer offers an economical alternative.



fully bridged with 4 active strain gages



standard design of a strain gage



Linearity diagram

Torque transducers are available as stationary platforms as well as in portable version of straight and angular torque wrenches. Depending on piezo-electric, strain gage or non-contact version the transducers are built to be connected to the relative electronic torque meters (see brochure D3022E).

TECHNICAL DATA

Transducer (DMS, non-contact)

| | Type Part no. | V002-E6.3/F6.3 385481B | V005-E6.3/F6.3 385481C | V010-E6.3/F6.3 385481D | V020-E6.3/F6.3 385481E |
|----------------------------|------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| Calibrated measuring range | Nm | 0.2 - 2 | 0.5 - 5 | 1 - 10 | 2 - 20 |
| | in.lbs | 2 - 18 | 4 - 40 | 9 - 88 | 18 - 177 |
| Permissible overload | % | 100 | 100 | 100 | 30 |
| Speed max. | rpm | 10,000 | 10,000 | 10,000 | 10,000 |
| Weight approx. | kg / lbs | 0.3 / 0.66 | 0.3 / 0.66 | 0.3 / 0.66 | 0.3 / 0.66 |

Required Accessories

| | |
|--|--|
| Measuring Instrument | Type ME5000, ME5400, ME5600 or type ME6000 (see brochure D3022E) |
| Connector Cable (for transducer to measuring instrument ME 5...) Length 2 m / 4 m / 6 m 6.6' / 13' / 20' | Part no. 385486A/B/C |
| Power Supply for transducer connected to measuring instrument ME 5000 | Part no. 800827 |
| Power Supply Cable 220 V / 110 V | Part no. 812587 / 812295 |

When connected to a DEPRAG measuring instrument, this transducer is ideal for torque acquisition and documentation of all acquired results of screw joints and assembly requirements.

During the actual assembly process, performing torque acquisition and screw-joint analysis is possible. This feature fulfills most or all assembly-process requirements and assures even the highest quality demands.



TECHNICAL DATA

Piezoelectric (PE) transducers: measuring platforms

| | Type | MP1PE | | MP25PE | MP200PE | MP1000PE |
|-------------------------------|----------|-------------|--|----------------|-------------|----------------|
| | Part no. | 408000C | | 360850A | 373205A | 408000A |
| Calibrated measuring range *) | Nm | 0.1 - 1 | | 2.5 - 25 | 20 - 200 | 50 - 500 |
| | in.lbs | 0.88 - 8.85 | | 22.12 - 221.25 | 177-1770 | 442.5 - 4425 |
| Permissible overload | % | 20 | | 20 | 20 | 20 |
| Sensibility | pC / Ncm | 21.7 | | 2.4 | 1.7 | 1.0 |
| Frequency response | kHz | > 53 | | approx. 15 | approx. 3.5 | approx. 11 |
| Linearity | ≤ % | ± 0.2 | | ± 1 | ± 1 | ± 0.5 |
| Diameter D | mm / in. | 109.5 / 4.3 | | 105 / 4 1/8 | 140 / 5 1/2 | 200 / 7 7/8 |
| Weight | kg / lbs | 1.3 / 2.9 | | 1.3 / 2.9 | 3.5 / 7.7 | 16 / 35.2 |
| Connecting plug | type | BNC, neg. | | BNC, neg. | BNC, neg. | 10-32 UNF neg. |

Strain gage (DMS) transducers: measuring platforms

| | Type | MP2DMS | MP7DMS | MP25DMS | MP160DMS | MP500DMS |
|-------------------------------------|----------|-------------|--------------|----------------|--------------|--------------|
| | Part no. | 385200B | 385200A | 385200C | 385200D | 408088A |
| Calibrated measuring range *) | Nm | 0.2 - 2 | 1.05 - 7 | 2.5 - 25 | 16 - 160 | 50 - 500 |
| | in.lbs | 1.77 - 17.7 | 9.29 - 61.95 | 22.12 - 221.25 | 141.6 - 1416 | 442.5 - 4425 |
| Permissible overload | % | 20 | 20 | 20 | 20 | 20 |
| Accuracy class | | 1 | 1 | 1 | 1 | 1 |
| Sensibility | mV/V | 1.5 | 1.8 | 1.8 | 1.8 | - |
| Operational temperature range | °C | 0 to + 60 | 0 to + 60 | 0 to + 60 | 0 to + 60 | 0 to + 60 |
| | °F | 32 to 140 | 32 to 140 | 32 to 140 | 32 to 140 | 32 to 140 |
| Parameter temperature coefficient | % / K | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Zero signal temperature coefficient | % / K | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |
| Supply voltage (DC) | V | 5 | 5 | 5 | 5 | 12 |
| Diameter D | mm / in. | 105 / 4 1/8 | 105 / 4 1/8 | 105 / 4 1/8 | 140 / 5 1/8 | 229 / 9 1/64 |
| Weight | kg / lbs | 1 / 2.2 | 1 / 2.2 | 1 / 2.2 | 2 / 4.4 | 18 / 39.6 |
| Connecting plug | | 4-pole | 4-pole | 4-pole | 4-pole | 12-pole |

*) Calibrated measuring range (standard calibration - part no. 3855285 - included in delivery) according to VDI/VDE2646, optional calibration, see page 7.
Calibrations for other measuring ranges upon request!

Required Accessories:

Measuring Instrument (see brochure D3022E).
Connection Cable and **Screwplates** see page 6.

The measuring platforms are well suited for the installation into a calibration laboratory, as well as for the construction of a mobile measuring waggon. The robust and sturdy platform design guarantees permanent high measuring accuracies. As an optional accessory, we offer a clamping plate, which allows the temporary fasten-

ing of the platform into a vice. For specially high accuracy demands, or for the obtaining of extremely small torque values, we recommend to mount the platform with its polished lower surface to a table top, which has been treated in a similar fashion.

Because of such an extreme high grade installation, even the smallest measuring-errors, created by lateral force, deflection, vibration, or misalignment, can be completely avoided.

To ensure optimal measurement conditions we offer screwdriver adapters in combination with linear stands or parallelogram arms (see brochure D3345E).



MP1PE



MP25PE



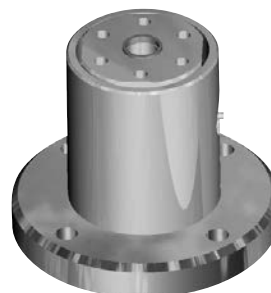
MP200PE



MP2DMS - MP25DMS



MP160DMS



MP1000PE



MP500DMS

Piezoelectric (PE) transducer: E-torque wrench

| | Type | | | MS25PE-W | MS25PE-WS |
|-------------------------------|----------|--|--|--|--|
| | Part no. | | | 346217A | 346217C |
| Calibrated measuring range *) | Nm | | | 2.5 - 25 | 2.5 - 25 |
| | in.lbs | | | 22.12 - 221.25 | 22.12 - 221.25 |
| Permissible overload | % | | | 20 | 20 |
| Sensibility | pC / Ncm | | | 2.4 | 2.4 |
| Frequency response | kHz | | | approx. 15 | approx. 15 |
| Linearity | ≤ % | | | ± 1 | ± 1 |
| Length L | mm / in. | | | 442 / 17 ¹³ / ₃₂ | 297 / 11 ¹¹ / ₁₆ |
| Weight | kg / lbs | | | 1.1 / 2.4 | 0.9 / 1.98 |
| Connecting plug | type | | | BNC, neg. | BNC, neg. |

Strain gage (DMS) transducers: E-torque wrench

| | Type | MS2DMS | MS7DMS | MS7DMS-W | MS25DMS-W |
|-------------------------------------|----------|--------------------------------------|--------------------------------------|---------------------------------------|--------------------------------------|
| | Part no. | 387798B | 387798A | 388050A | 388050C |
| Calibrated measuring range *) | Nm | 0.2 - 2 | 1.05 - 7 | 1.05 - 7 | 2.5 - 25 |
| | in.lbs | 1.77 - 17.7 | 9.29 - 61.95 | 9.29 - 61.95 | 22.12 - 221.25 |
| Permissible overload | % | 20 | 20 | 20 | 20 |
| Accuracy class | | 1 | 1 | 1 | 1 |
| Sensibility | mV/V | 1.5 | 1.8 | 1.8 | 1.8 |
| Operational temperature range | °C | 0 to + 60 | 0 to + 60 | 0 to + 60 | 0 to + 60 |
| | °F | 32 to 140 | 32 to 140 | 32 to 140 | 32 to 140 |
| Parameter temperature coefficient | % / K | 0.01 | 0.01 | 0.01 | 0.01 |
| Zero signal temperature coefficient | % / K | 0.02 | 0.02 | 0.02 | 0.02 |
| Supply voltage (DC) | V | 5 | 5 | 5 | 5 |
| Length L | mm / in. | 186 / 7 ⁵ / ₁₆ | 186 / 7 ⁵ / ₁₆ | 268 / 10 ⁹ / ₁₆ | 423 / 16 ⁵ / ₈ |
| Weight | kg / lbs | 0.5 / 1.1 | 0.5 / 1.1 | 0.5 / 1.1 | 0.7 / 1.5 |
| Connecting plug | | 4-pole | 4-pole | 4-pole | 4-pole |

*) Calibrated measuring range (standard calibration - part no. 3855285 - included in delivery) according to VDI/VDE2646, optional calibration, see page 7.
 Calibrations for other measuring ranges upon request!

| | |
|------------------------------|--|
| Required Accessories: | Measuring Instrument (see brochure D3022E). Connection Cable and Screwplates see page 6. |
|------------------------------|--|

The E-torque wrenches allow the testing of screwdriver spindles without their removal from an assembly station.

In connection with the corresponding torque measuring instrument, the E-torque wrenches can also be used for the testing of a screw connection already, by either tightening or loosening the connection.

The E-torque wrench combines the application variety of conventional torque wrenches with the precision and the possibilities of up-to-date electronic torque measurement.



MS25PE-W



MS2DMS
MS7DMS



MS7DMS-W
MS25DMS-W

ACCESSORIES

Required Accessories on special request

| For Piezoelectric (PE) transducers: measuring platforms | | | Type | MP1PE | | | MP25PE | MP200PE | MP1000PE |
|---|--------------|----------|---------|---------|---------|----------|-------------|----------|----------|
| For Piezoelectric (PE) transducer: E-torque wrench | | | Type | | | | MS25PE-W(S) | | |
| Connection cable to measuring instrument | 5 m/16.4 ft. | Part no. | | 810675 | | | 810675 | 810675 | |
| Connection cable to measuring instrument | 1 m/3.3 ft. | Part no. | | | | | | | 810629 |
| For Strain gage (DMS) transducers: measuring platforms | | | Type | | MP2DMS | MP7DMS | MP25DMS | MP160DMS | MP500DMS |
| For Strain gage (DMS) transducers: E-torque wrenches, angle head design | | | Type | | | MS7DMS-W | MS25DMS-W | | |
| For Strain gage (DMS) transducers: E-torque wrenches, straight design | | | Type | | MS2DMS | MS7DMS | | | |
| Connection cable to measuring instrument | 2 m/ 6.6 ft. | Part no. | | 385493A | 385493A | 385493A | 385493A | 385493A | 385486A |
| Connection cable to measuring instrument | 4 m/13.2 ft. | Part no. | | 385493B | 385493B | 385493B | 385493B | 385493B | 385486B |
| Connection cable to measuring instrument | 6 m/19.8 ft. | Part no. | | 385493C | 385493C | 385493C | 385493C | 385493C | 385486C |
| Screwplate M1.6: 0.8-2 Ncm (for above allen bit AF1.5) | right | Part no. | 120422A | | | | | | |
| | left | Part no. | | | | | | | |
| Screwplate M1.6: 2-6 Ncm (for above allen bit AF1.5) | right | Part no. | 120422B | | | | | | |
| | left | Part no. | | | | | | | |
| Screwplate M2.5: 6-16 Ncm (for above allen bit AF2) | right | Part no. | 120424A | | | | | | |
| | left | Part no. | | | | | | | |
| Screwplate M2.5: 16-40 Ncm (for above allen bit AF2) | right | Part no. | 120424B | | | | | | |
| | left | Part no. | | | | | | | |
| Screwplate M4: 40-100 Ncm (for above allen bit AF3) | right | Part no. | 120426E | | | | | | |
| | left | Part no. | | | | | | | |
| Screwplate M1.6: 0.06-0.12 Nm (for above allen bit AF1.5) | right | Part no. | | 120571A | 120571A | 120571A | | | |
| | left | Part no. | | | | | | | |
| Screwplate M2: 0.12-0.25 Nm (for above allen bit AF1.5) | right | Part no. | | 120572A | 120572A | 120572A | | | |
| | left | Part no. | | 120572B | 120572B | 120572B | | | |
| Screwplate M2.5: 0.25-0.5 Nm (for above allen bit AF2) | right | Part no. | | 120573A | 120573A | 120573A | | | |
| | left | Part no. | | 120573B | 120573B | 120573B | | | |
| Screwplate M3: 0.5-0.9 Nm (for above allen bit AF2.5) | right | Part no. | | 120574A | 120574A | 120574A | 120574A | | |
| | left | Part no. | | 120574B | 120574B | 120574B | 120574B | | |
| Screwplate M4: 0.9-2.2 Nm (for above allen bit AF3) | right | Part no. | | 120575A | 120575A | 120575A | 120575A | 120575A | |
| | left | Part no. | | 120575B | 120575B | 120575B | 120575B | 120575B | |
| Screwplate M5: 2.2-5 Nm (for above allen bit AF4) | right | Part no. | | | 120576A | 120576A | 120576A | 120576A | |
| | left | Part no. | | | 120576B | 120576B | 120576B | 120576B | |
| Screwplate M6: 5-8 Nm (for above allen bit AF5) | right | Part no. | | | 120577A | 120577A | 120577A | 120577A | |
| | left | Part no. | | | 120577B | 120577B | 120577B | 120577B | |
| Screwplate M8: 8-25 Nm (for above allen bit AF6) | right | Part no. | | | | 120578A | 120578A | 120578A | |
| | left | Part no. | | | | 120578B | 120578B | 120578B | |
| Screwplate M10: 17-35 Nm (for above socket AF17) | right | Part no. | | | | | 120579A | | |
| | left | Part no. | | | | | 120579B | | |
| Screwplate M12: 35-60 Nm (for above socket AF19) | right | Part no. | | | | | 120580A | | |
| | left | Part no. | | | | | | | |
| Screwplate M14: 60-100 Nm (for above socket AF22) | right | Part no. | | | | | | 120446C | |
| | left | Part no. | | | | | | | |
| Screwplate M16: 100-200 Nm (for above socket AF24) | right | Part no. | | | | | | 120446D | |
| | left | Part no. | | | | | | | |

More Accessories on special request

| | | | | | | | |
|---|----------|---------|---------|---------|---------|---------|--|
| Bit adapter, hex. drive female DIN ISO 1173 F6.3 (1/4") | Part no. | | 120489A | 120489A | 120489A | 120489A | |
| Socket adapter, square drive male DIN 3121 E12.5 (1/2") | Part no. | | 120488A | 120488A | 120488A | 120488A | |
| Clamping plate for clamping the torque dynamometer into a vice | Part no. | 120436A | 120436A | 120436A | 120436A | 120436A | |



Screwplate



Bit adapter



Socket adapter

Clamping
plate

Calibration of DEPRAG measurement transducer or factory calibration of a measurement device or measurement electronic - for special order

| | |
|---|---|
| <p>DAkKS-calibration in accordance with DIN 51309 Strain gauge measurement transducer Load right/left 3 mounting positions 8 measurement points DAkKS-calibration certificate Part no. 3855281</p> | <p>Factory calibration in accordance with DIN 51309 Strain gauge or piezo measurement transducer Load right/left 3 mounting positions 8 measurement points Factory calibration certificate Part no. 3855282</p> |
| <p>Factory calibration in accordance with DIN 51309 Strain gauge or piezo measurement transducer Load right 3 mounting positions 8 measurement points Factory calibration certificate Part no. 3855283</p> | <p>Factory calibration in accordance with VDI/VDE 2646 Strain gauge or piezo measurement transducer Load right/left 2 mounting positions 8 measurement points Factory calibration certificate Part no. 3855284</p> |
| <p>Factory calibration (Standard) in accordance with VDI/VDE 2646 Strain gauge or piezo measurement transducer Load right 2 mounting positions 8 measurement points Factory calibration certificate Used for first calibration Standard for recalibration Part no. 3855285</p> | <p>Factory calibration of measurement device or measurement electronic Inspection and calibration of a torque measurement device or measurement electronic in accordance with DIN ISO 9001, as well as the creation of a corresponding measurement protocol with proof of traceability to national standards. Part no. 000768</p> |
| <p>Factory calibration of torque transducers DMS non-contact Documentation by factory certificate Part no. 000769</p> | |

TECHNICAL DATA

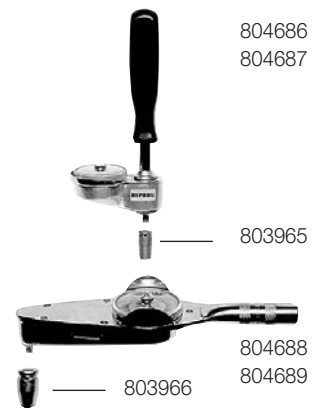
Mechanical torque wrenches

| | Part no. | 804686 | 804687 | 804688 | 804689 |
|---------------------------|-----------|--------------|--------------|--------------|--------------|
| Measuring range | Nm/in.lbs | 0 - 3.4 / 30 | 0 - 8.4 / 74 | 0 - 17 / 150 | 0 - 60 / 531 |
| Increment | Nm/in.lbs | 0.1 / 0.89 | 0.2 / 1.77 | 0.5 / 4.43 | 1 / 8.85 |
| Drive (square male) | | 1/4" | 1/4" | 3/8" | 3/8" |
| Optional equipment | | | | | |
| Bit adapter *) | Part no. | 803965 | 803965 | 803966 | 803966 |

*) Inserting tools see leaflet D 3320 E

The mechanical torque wrenches (manual indicator design) can be used for simple adjustment or control tasks. To obtain the torque of a screw connection, simply re-

tighten the fastener. The use of a mechanical torque wrench allows the fast appraisal of tightening torque values.



804686
804687

803965

804688
804689

803966

Possible Combinations

Measuring principle: PIEZO-ELECTRIC

Measuring Instrument

type ME5000, type ME5400,
type ME5600 or type ME6000

Connection Cable:

Length 5 m Part no. 810675

Torque Transducer

Measuring type MP1PE, type MP25PE,
Platforms: type MP200PE
E-Torque-Wrenches: type MS25PE-W
type MS25PE-WS

Measuring Instrument

type ME5000, type ME5400,
type ME5600 or type ME6000

Connection Cable:

Length 1 m Part no. 810629

Torque Transducer

Measuring Platform: type MP1000PE

Measuring principle: STRAIN GAGE

Measuring Instrument

type ME5000, type ME5400,
type ME5600 or type ME6000

Connection Cable:

Connection Measuring Instrument ME... to
Measuring Platforms or Torque Wrenches

Length 2 m Part no. 385493A
Length 4 m Part no. 385493B
Length 6 m Part no. 385493C

Torque Transducer

Measuring Platforms: type MP2DMS
type MP7DMS
type MP25DMS
type MP160DMS

E-Torque Wrenches: type MS2DMS
type MS7DMS
type MS7DMS-W
type MS25DMS-W

Measuring principle: STRAIN GAGE OR DMS NON-CONTACT

Connection Cable, Length 2 m / 4 m / 6 m

Measuring Instrument

type ME5000, type ME5400,
type ME5600 or type ME6000

Connection Cable:

Connection Measuring Instrument ME... to
Non-contact Transducer or Measuring Platforms

Length 2 m Part no. 385486A
Length 4 m Part no. 385486B
Length 6 m Part no. 385486C

Additionally required when connected with ME5000:
Power Supply Part no. 800827 and
Power Supply Cable 230 V Part no. 812587
115 V Part no. 812295

Torque Transducer

Non-contact Transducer
type V002-E6.3/F6.3
type V005-E6.3/F6.3
type V010-E6.3/F6.3
type V020-E6.3/F6.3

Measuring Platform
type MP500DMS

DEPRAG

DEPRAG SCHULZ GMBH u. CO.

ARSAM

SUMINISTROS ARSAM, S.A.

www.arsam.es - b2b@arsam.es



CERTIFIED AS PER DIN EN ISO 9001