

Operating Instruction Booklet

Torque Transducer (external rotary type)

V002-E6,3/F6,3	385481 B
V005-E6,3/F6,3	385481 C
V010-E6,3/F6,3	385481 D
V020-E6,3/F6,3	385481 E

Dear Customer,

You have selected this Torque Transducer from the extensive product line manufactured by DEPRAG- SCHULZ GMBH u. Co.

In addition, we offer you a complete line of air-operated machines, such as Drills, Tappers, Polishing-Machines, Screwdrivers, Impact- and Pulse-Tools, Sheet Metal-Machines and Hammers. As your competent partner, we offer solutions for all jobs in the area of screwdriving technology, from the simple Hand-Tool up to the complete Screwdriving-Robot.

Please read this operating-instruction booklet carefully, so that you can work safely with the Torque Transducer for a long time to come. If you require further information, please contact your local Representative or DEPRAG direct.

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1 General Information

1.1 General Safety-Related Information

All relevant instructions in regards to accident-prevention, as well as general acknowledged safety-rules and workers-protection regulations must be adhered to.

If the user opens the device during the warranty period, any liability by the manufacturer is voided.

Specially trained personnel may only operate the device.

1.2 General Design Information

Torque transducers are designed for the use in the screwdriving technology as parts of a machine (for example to control and/or supervision of torque tools).

Please observe that these transducers, because of their high measuring sensitivity, are not constructed with the general safety factors (1..... 20) used with standard machine-constructions.

Please pay attention to the declared overload-factors.

The torque transducer is not approved for the use in an EX-area.

1.3 Introduction

This rotary-type transducer has been designed with different tool drives to correspond with different available measuring ranges. The transducer measures torque values in Nm or KNm.

1.4 Area of Usage and Application Selection

The transducer is capable to measure in right- as well as left rotation. When used on right-rotation tools, the output signal is a plus (+). The maximum measuring range is indicated on the model number tag.

The transducer is able to measure both static and dynamic torque values. The transducer's low mass and the high turn stiffness are of particular advantage for those types of measurements.

Please pay attention to the signal-increase of the transducer, as stated in the data-page.

The torque-receivers are maintenance-free because of the touch-free transfer of the measuring signal. Their electric measuring-signals can be communicated to remote measuring locations and be displayed, registered, processed and used for controlling- and adjustment tasks.

As any precision measuring instrument, the torque transducer demand careful handling during the transportation and the installation, since impacts to the transducer or even dropping it will cause major damage.



Attention:

Using the transducer with torque values that spike over the allowable upper limit, will cause damage to the drive shaft. If those types of upper limits cannot be excluded, the next larger transducer has to be used.

The limits for the allowable mechanical, thermal and electrical loads are shown in the data-page. Those limits cannot be overshoot. Those limitations have to be taken into account early in the selection process, during installation and again during operation.

2 Construction and Function

2.1 Drive Shaft

The drive shaft is made from hardened steel. Within its elastic range, the proportional torque is interpreted by the applicable strain gauge (DMS). The DMS is directed to a Wheatstone bridge-circuit. The traction occurs on the drive or the output of the hex or square.

2.2 Housing

The housing of the torque-transducer is made from highly solid aluminum; its surface is anodized. The drive shaft is dual-suspended in the housing by ball bearings. The torque evaluation electronic is installed on the housing.

2.3 Measuring Process

Because of the torsion-strength, the drive shaft and with it the strain gauge, is elastically distorted. The DMS alters its ohm-resistance proportionally to the longitudinal change. The signal from the strain gauge bridge is converted into a modulated frequency that is proportional to the measured torque. The signal is transferred from a rotating coil to a static coil for processing by the on-board amplifier.

A proportional change to an analog voltage takes place due to the frequency adjustment. The analog voltage is being made available as a DC-isolated signal for further processing.

2.4 Interference and its compensation

Flexing, axial- and radial forces cause interference and should therefore be avoided.

Please use shielded cables for the electrical connection.

The transducers have been tested in regards to their electro-magnetic compatibility (EMC) according to the following norms: EN 55011/03.91 (DIN VDE 0875-11/07.92) or EN 50082-2/1993 (E DIN EN 50082-2/03.94).

3 Installation Conditions

3.1 Temperature

The nominal temperature range must be kept in order to achieve optimal results.

The best is a constant, or only slowly variable temperature.

The stated temperature errors are only valid, if the temperature does not change faster than 5 K/h.

Radiated single-sided heat or cooling is to be avoided and may require corresponding measures for avoidance.

3.2 Humidity and Dust

The transducers correspond to the protection criteria IP40 according to the norm: DIN 40050.



Attention:

No moisture may penetrate into the connector of the transducer.

3.3 Chemical Interference

The torque-transducers are not protected against chemical influences. They may not be used in aggressive environments.

3.4 Residue

Dust, dirt and other foreign particles may not accumulate on the transducer, so that integration of such particles into the bearings or the connector can be avoided.

4 Mechanical Construction

4.1 Precaution during Installation

- If necessary, install a torsion-protection for the housing.
- Handle transducers with the utmost care.
- Assure that all connections are secure.
- When using high-speed tools or where Operators may be injured due to parts coming loose, proceed with the installation according to Form F of the norm DIN3121.

4.2 General Installation Guidelines

Flexing, axial- and radial forces cause interference and will result into measuring errors.

5 Structure of a Measuring Chain

In order to measure with the receiver, a complete measuring chain is necessary. This measuring chain consists of:

- Transducer
- Cable
- Power Supply and Processing Controller
- Printer (if required)

A power supply is necessary to supply the transducer with the necessary operating voltage.

The transducer has an on-board amplifier, so that no additional amplification equipment is necessary.

The measuring-signal can be processed directly (for example with a PC) or it can be displayed using a Processing Controller.

6 Connection

6.1 Tips for cabling

Electric and magnetic fields often cause errors within the measuring circle. These errors start primarily from the power cable and move in parallel to the measuring cables; errors may also originate from nearby relays or electric motors.

Furthermore, noise voltage may be caused through galvanization, especially when grounding the measuring chain on several areas, so that potential-differences occur.

Please observe the following connection tips:

- Use only shielded and low-capacity measuring cables.
- Do not lay measuring cables parallel to power transmission cables or other control cables.
- Scattering fields from transformers, motors and relays should be avoided.
- Transducers, processing and display equipment should not be grounded repeatedly. All electrical devices of the measuring chain should be connected to the same protective circuit.

6.2 Connector

The transducers are equipped with a 12-pole connector made by Binder.

6.3 Pin layout of the Connector

The connection layout of the connector is shown under paragraph *Connection Layout*.

The transducer generates an internal, DC-isolated measuring signal.



NOTE:

The analog-mass should not be bridged directly on the transducer, since this will cause – dependent on the cable length - message errors on the power- and processing device. If so needed, bridging is possible on the power/processing unit.

The “Transducer-Control Feature“ will test the transducer. The transducer outputs its maximum signal of +5V (at right rotation). The control-level amounts to 4.5V up to the power voltage; the reference mass is the analog mass.

It is recommended to terminate all connections (except for speed or angle) on the power- and processing device with 100nF against the housing mass.

6.4 Cable Extension

Extension cables need to be shielded and low capacity.

We recommend the use of cables offered by DEPRAG, since those cables correspond with those requirements.



NOTE:

Any cable extension has to be solid and insulated.

The cable diameter has to be large enough to allow a sufficient supply voltage for the transducer.

It is not necessary to recalibrate the transducer if a cable extension is added.

6.5 Supply Voltage

The time increase of the supply voltage of 12V should be less than 1 ms, otherwise it is possible that the DC/DC-converter of the external electronic cannot start to oscillate.

7 Measuring Signals

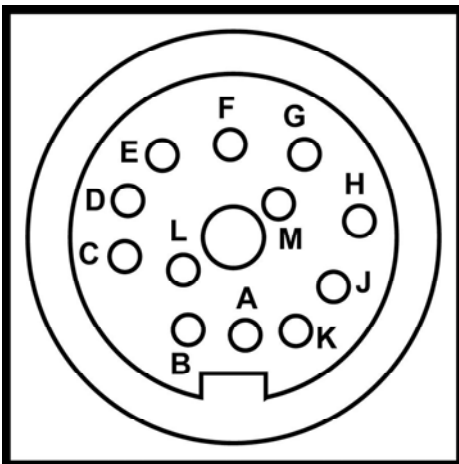
The Transducer outputs a torque-proportional DC-voltage of 0-5 V or 0-10 V.

The exit voltage is positive when used in right-rotation and negative, when used in left-rotation.

8 Connection Layout

8.1 12-pole Plug

A	Black	Not used
B	Red	Not used
C	Brown	Torque Output
D	White	Torque Mass
E	Yellow	Supply Mass
F	Purple	Supply
G	Green	Not used
H	Pink	Not used
J	Grey	Not used
K	Grey / Pink	Calibration Input
L	Blue / Red	Not used
M	Blue + Shield	Shield



Picture: Connection on the transducer, as seen from the top



NOTE:

PIN D (Torque Mass) and PIN E (Supply Masse) are internally DC-isolated; if needed please bridge at the supply source, NOT on the transducer.

8.1.1 Installed EMC-protective circuitry

A ceramic capacitor 100 nF / 50 V is soldered between the Pins C – D, E – F, E – K .

We recommend to repeat this procedure on the bushing housing of the supply line as well.

9 Dimensions and Technical Data

TECHNISCHE DATEN				
Typ	V002-E6,3/F6,3	V005-E6,3/F6,3	V010-E6,3/F6,3	V020-E6,3/F6,3
Bestell-Nr.:	385481 B	385481 C	385481 D	385481 E
Messbereich	0,2 - 2 Nm	0,5 - 5 Nm	1,0 - 10 Nm	2,0 - 20 Nm
Mech. Überlastbarkeit	100 %	100 %	100 %	30 %
Drehzahl max.	10000 1/min	10000 1/min	10000 1/min	10000 1/min
Gewicht ca.	0,3 kg	0,3 kg	0,3 kg	0,3 kg

TECHNICAL DATA				
Type	V002-E6,3/F6,3	V005-E6,3/F6,3	V010-E6,3/F6,3	V020-E6,3/F6,3
Order-No.	385481 B	385481 C	385481 D	385481 E
Measurement Range	0,2 - 2 Nm	0,5 - 5 Nm	1,0 - 10 Nm	2,0 - 20 Nm
Mech. Overload	100 %	100 %	100 %	30 %
Speed max.	10000 1/min	10000 1/min	10000 1/min	10000 1/min
Weight approx.	0,3 kg	0,3 kg	0,3 kg	0,3 kg

Spindelaussensechskant
DIN 3126 E6,3 (1/4")

drive hex male
DIN 3126 E6,3 (1/4")

Anschluß für Meßelektronik
Connection to electronic
torquemeter

Spindelinnensechskant
DIN 3126 F6,3 (1/4")

drive hex female
DIN 3126 F6,3 (1/4")

Dimensions: 31, 115, 62, 22, 16, 51, 32

construction sheet
400182

DEPRAG

MAßBLATT
400182

Änderungsstand

10 Accessories - Optional Equipment

NAME	PART No.
Connection cable DME200PC-V 2m	385480 A
Connection cable DME200PC-V 4m	385480 B
Connection cable DME200PC-V 6m	385480 C

11 Disposal

Completely disassemble the machine into individual components. Observe local and environmental regulations for the component separation and recycling of materials.

12 EC-Conformity Declaration

EC-Conformity Declaration according to the EC-Machine Guidelines 98/37/EC, Amendment II A

We,

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hereby confirm, that the design of
the torque transducer

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V005-E6,3/F6,3
V010-E6,3/F6,3
V020-E6,3/F6,3

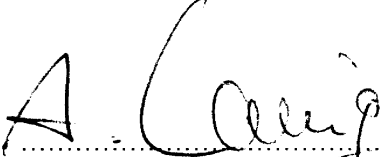
conforms to the following, relevant regulation:

- EC-Machine Guidelines, Version 98/37/EG, Amendment No. 1. and No. 2.2.

Applicable Standard

- EN 55011/03.91
- DIN VDE 0875-11/07.92
- Pr.EN 50082-2/1993
- E DIN EN 50082-2/03.94

Amberg, 16.04. 2008


Dipl. Ing. (FH) A. Langig
Mr. Design Dept.

13 Service Locations and Authorized Partners

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ZERTIFIZIERT NACH DIN EN ISO 9001

Jul-06 Änderungen vorbehalten / Technical alterations reserved