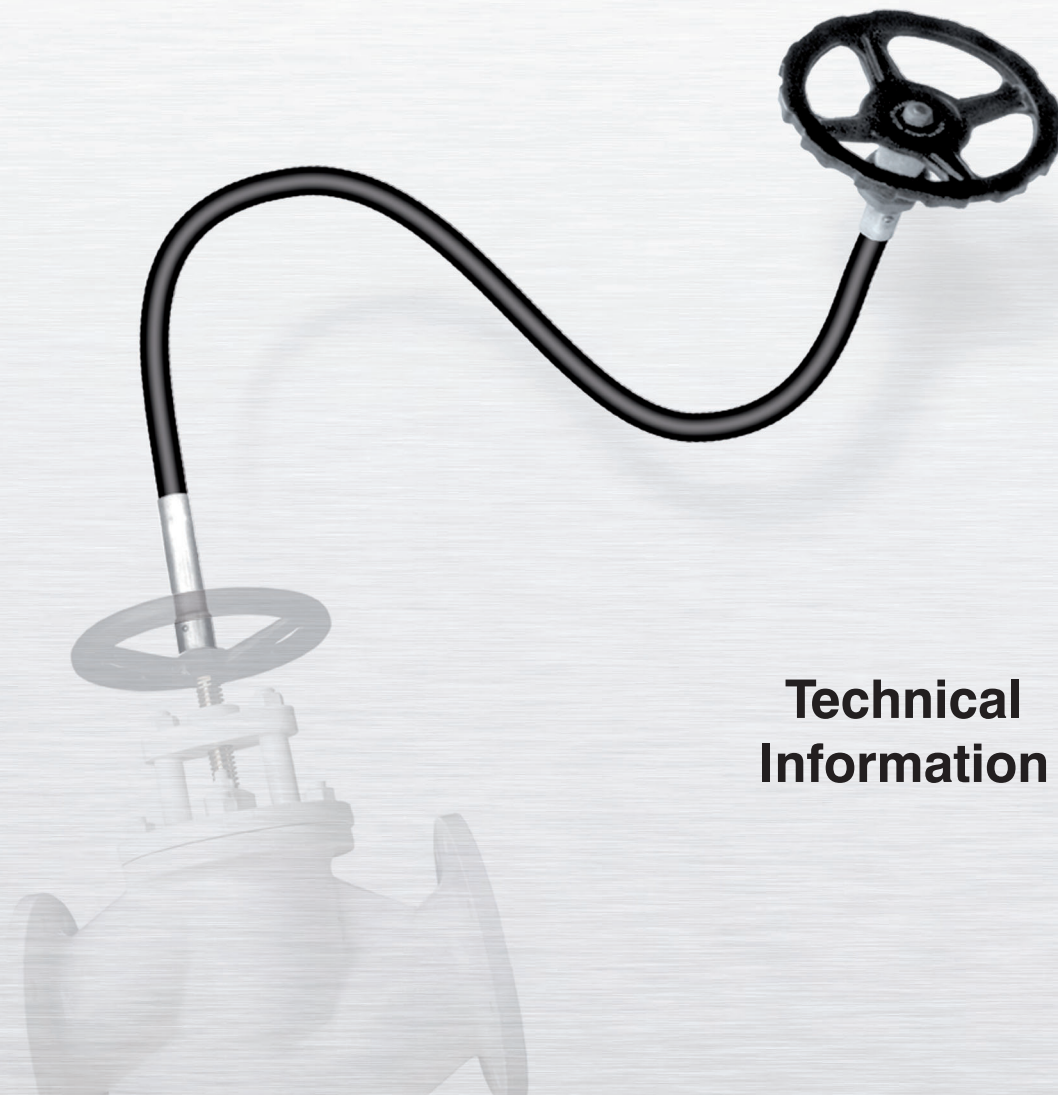




Flexible Reach Rods



**Technical
Information**



tramistec is a brand of

ARMATUREN
WOLFF



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Introduction

General

The Flexible Reach Rod is an advanced development on the basis of the widely known stiff remote control rods, designed for remote operation of valves installed in places difficult to access or in dangerous environment.

Since its market introduction more than 15 years ago, the system has been showing its suitability and effectiveness in numerous installations.

Advantages against conventional stiff remote control rods:

- easy system integration
- low maintenance costs
- corrosion-free stainless steel connections and adapters
- good torque transmission (in both directions)
- long-term greasing
- hermetically contained system
- easy and cost-efficient installation
- uncomplicated handling for refit

Main feature: Flexibility of applications

Example fields of application:

- offshore industry
- chemical industry
- petrochemical plants
- shipbuilding
- tank construction

Example installations:

- at or inside tanks
- in places difficult to access
- in dangerous environment (fire, gases)
- for newbuilding projects
- for modification of existing systems
- medium-tight penetration of tank and vessel shells

Special applications:

The materials and parameters included in this manual refer to our standard design version in air at normal ambient temperature. Depending on the specific application and operating conditions, various alternative materials are possible:

- entirely non-magnetic
- for special medium effects
- for special ambient temperatures

Functional Concept

Overall design:

The principal constructional element, the Reach Rod unit, consists of a flexible and torsionally stiff steel cable, which is encased in a flexible steel sleeve which is rubber coated for protection.

1. Reach Rod Core

Due to its particular design, the Reach Rod core out of specifically wound steel wire is capable of transmitting high torques in both directions, and yet maintains its good flexibility.

2. Reach Rod Protective Coating

The outer protective rubber coating is vulcanized directly onto the flexible steel sleeve, protecting both the Reach Rod unit from external impact and dirt.

3. Connections

The end connections of stainless steel are hydraulically pressed onto the Reach Rod core and therefore not removable.

The metal sleeves are connected at one end with a hydraulically press fitted end bushing, and equipped with a greasing nipple. For the purpose of local fixing, the other end piece is threaded on the outside M30x1.5 and equipped with two fixing nuts. This end piece is fitted onto the coating in a detachable manner with three set screws, allowing the insertion into penetrating ferrules etc. during installation.

In order to use the Flexible Reach Rod for the operation of a valve, it is necessary to establish a connection with the valve on one side, and to provide a possibility for the operator to actually turn it.

For this purpose, we offer a wide selection of different components and equipment, which can be adapted in a flexible manner to every thinkable specific case of application. These include for instance:

- operating units
- deck connections
- wall, bulkhead and deck penetration units
- gear boxes
- longitudinal compensation elements
- fixing elements
- adapters

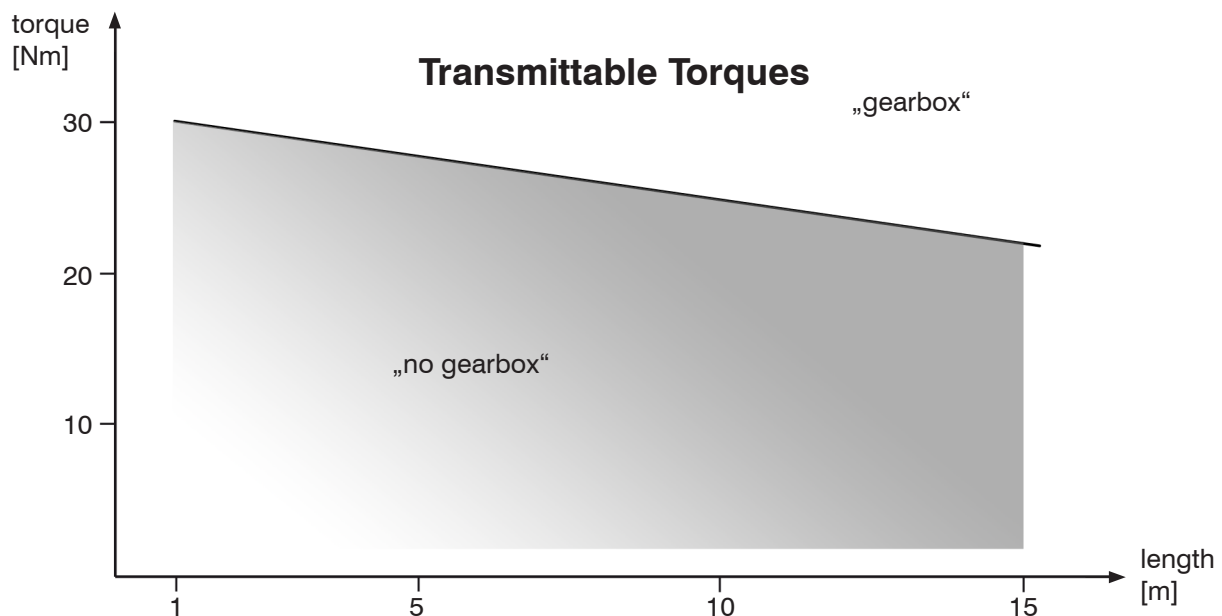
Applicability of the Flexible Reach Rod

The Flexible Reach Rod is suitable for all cases of application where a (basically manual) turning movement with low driving speed is to be transmitted to a valve or the emergency handwheel of a valve actuator. Ideally, the transmission can be up to 25-30 Nm minimum.

The effective torque in a specific case depends however on various influences, such as length of the Flexible Reach Rod, number and radii of bends, the existence of penetrating units as well as the number of fixing points to avoid a twisting of the Flexible Reach Rod. In cases requiring a higher transmission of torque, this is typically achieved with the use of a gear box.

The following diagram shows the general interdependence between the maximum (directly !) transmittable torque and the effective length of the Flexible Reach Rod, under the assumption of "ideal" conditions (single Reach Rod, no bends, no external impact, installation according to these instructions).

Generally, there is no gear box required for situations underneath the dividing line, whereas above, the application requires the use of a torque-reducing gear box. The grey area shows the effective situation with respect of the various possible influences from bends as well as specific conditions and external influences.



Concept

Basic Composition of Flexible Reach Rod Arrangements

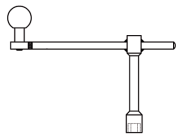
Operating Units

The operating unit is installed in an easily accessible and safe place. This is the location from where the valve will be turned.

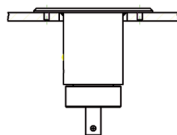
According to the specific conditions and requirements, the operating unit can be installed on the floor, at a wall, bulkhead or handrails and optionally equipped with a position indicator.

The elements for operating include different types of handwheels, cranks and lockable levers, which upon request can also be produced as detachable units.

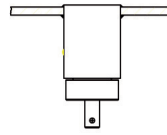
Examples:



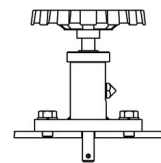
Hand crank
for deck connections



Deck connection,
screw-in type



Deck connection,
weld-in type



Operating unit
with position indicator

Flexible Reach Rod

The Flexible Reach Rod transmits the torque and is fixed and connected by means of adapters, fixing elements and various kinds of accessories. The length is individually configured according to specific customer requirements.

Fixing

For the installation of the functional elements as well as to secure the Flexible Reach Rod against twisting, we offer various kinds of fixing elements and units, which can naturally be adapted to specific conditions and requirements in a specific case.

Example:



Fixing element
single

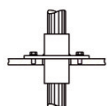
Deck and Wall Penetration

In case the Flexible Reach Rod is planned to pass through a deck, bulkhead or wall, there are different kinds of penetrating units available.

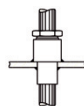
Among other solutions, we offer a deck-penetrating connecting element which can be welded into a deck or bulkhead with an angle of up to 15°, so as to connect two Flexible Reach Rods with each other in a completely watertight way.

The corresponding applications include, in specific cases, even the use at a tank wall, or at a wall between two different safety-rated areas.

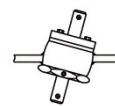
Examples:



Deck penetrating ferrule,
screw-on type



Deck penetrating ferrule,
weld-in type



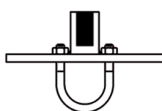
Deck penetrating element,
weld-in type

Adapters

In order to connect the Flexible Reach Rod with the other functional elements and accessories, different kinds of adapters are available for every specific case of application. Apart from a range of standard adapters for frequently recurring tasks, we regularly design tailor-made solutions for every specific case.

This way, adapters cannot only be designed to fit to different valve stems and shafts, but also to allow direct connection to an existing handwheel. For this purpose, basic designs are available for different diameters and number of spokes.

Examples:



Hand wheel adapter



Adapter
male / female



Adapter
male / male



Adapter
female / female

Since the adapters and connection elements are designed and manufactured in-house, we are able to react quickly and in a flexible way to special requirements!

Operating Instruction Flexible Reach Rod

Technical Data

∅ Reach Rod core:	16 mm
∅ Protective hose	29 mm
∅ End bushing	30 mm
∅ End pieces	18 mm
Maximum distance between reach rod fixing points (for reference only, may depend on specific case):	800mm
Minimum bending radius:	375 mm
Breaking torque [Nm]:	52 -57
Torsional twist[10Nm/1m]:	0,41-0,45
Handwheel ∅ [mm]:	175
Weight:	ca. 2,5 kg/m + ca. 1 kg (End bushings)

For special requirements, different core diameters are available upon request.

Layout and Mounting

- Ideally on site, measure the required length from B (point of operation) to A (valve) by means of a flexible rubber hose or rope. Determine the required wall penetrations as well as operating conditions of the installation (submerged under medium, temperature impact, etc.).
- The given minimum bending radii must be observed!
- Please observe that in case of high torques and/or distances, a gearbox has to be used (ref. chapter 1.3 Applicability of the Flexible Reach Rod).
In case a gearbox is required, ARMATUREN-WOLFF will carry out the project-specific layout in respect of frictional loss, torques, etc.
- For manufacturing reasons as well as handling during installation, we recommend that Flexible Reach Rods over 10.0 m should be realized out of two or more sections.

Maintenance

Due to the generally low mechanical stress of the reach rod protective coating, the Flexible Reach Rod remain permanently functional in case of proper handling and use. We recommend to perform general status check-ups and functional tests in regular intervals of maximum 2 years, including an operation of the corresponding valve. During the check-up the Flexible Reach Rod should be greased by means of filling the greasing nipple with normal high-pressure grease.

Spare Parts

Since the Flexible Reach Rod is subject to a relatively low wear we cannot recommend that spare parts to be kept in storage permanently. Many years of experience show that there are virtually no failures that justify the storage of spares.

The enquiry or specification form allows an easier and more effective establishment of an offer.
Please complete the form with all known parameters for your enquiry accordingly.

Flexible Reach Rods

Enquiry Form/Specification

ARMATUREN-WOLFF • Friedrich H. Wolff GmbH & Co. KG
Oehleckerling 29 • 22419 Hamburg - Germany
Tel. +49 (40) 532 87 30 • Fax +49 (40) 532 87 329
E-Mail: aw@armaturen-wolff.de • Internet: www.armaturen-wolff.de



1) General

Company (shipyard, customer):		Project / hull no.:	
Address:		addtl. reference:	
		Delivery time:	
Person in charge (commercial):		addtl. remarks:	
Phone, Fax:			
Email:			
Person in charge (technical):			
Phone, Fax:			
Email:			

2) Specification

Classification society		Documentation	
Flag state			

3) Technical Specification / Design

Type of valve ¹	
Size of the valve	
Operating mode (direct oder indirect)	
Distance operating unit / valve [m]	
Closing direction (clockwise/counter-clockwise)	
Torque at the valve (regular + maximum) [Nm]	
Requested minimum radius	
Deck and bulkhead penetrations (number)	
Ambient temperature (if <-10°C or >90°C)	
Medium impact (specific details) ²	
Required fire resistance (specific details)	
Addtl. remarks and special requirements:	
Sketch:	

System / valve no. / place of installation	
→ AW no.	
→ reference drawing no. (if applicable)	

Remarks:






¹: Globe or SDNR valve, ball valve, gate valve, butterfly valve, etc.




²: liquid medium, gas, steam, etc.

Please observe the corresponding datasheets and operating manuals!




Terminology of Flexible Reach Rod Items








	T0. Flexible Reach Rod					
THT	Ø Core					
Tramistec High Torque	13 mm		16 mm		19 mm	
	T0.3		T0.6		T0.9	
	Reinforcement Rings					
	without	with	without	with	without	with
T0.1	T0.30	T0.31	T0.60	T0.61	T0.90	T0.91




T1. Operating Unit				
Type				
Deck connenction		Operating unit with position indicator		
T1.1		T1.2		
Connection				
weld-in type	screw-on type (with flange)	weld-in type	screw-on type (with flange)	screw-in typet (without flange)
				
T1.11	T1.12	T1.21	T1.22	T1.23





T2. Operating Device									
Type									
for flexibel reach rod or operating unit					for deck connection				
hand wheel	hand wheel with ball knob	crank	detent lever		socket wrench with crank		socket wrench with T-handle		
									
T2.1	T2.2	T2.3	T2.4		T2.5		T2.6		
Size					Wrench Size				
Ø 125	Ø 175	Ø 225			12	14	17	19	22
T2.x1	T2.x2	T2.x3			T2.x1	T2.x2	T2.x3	T2.x4	T2.x5

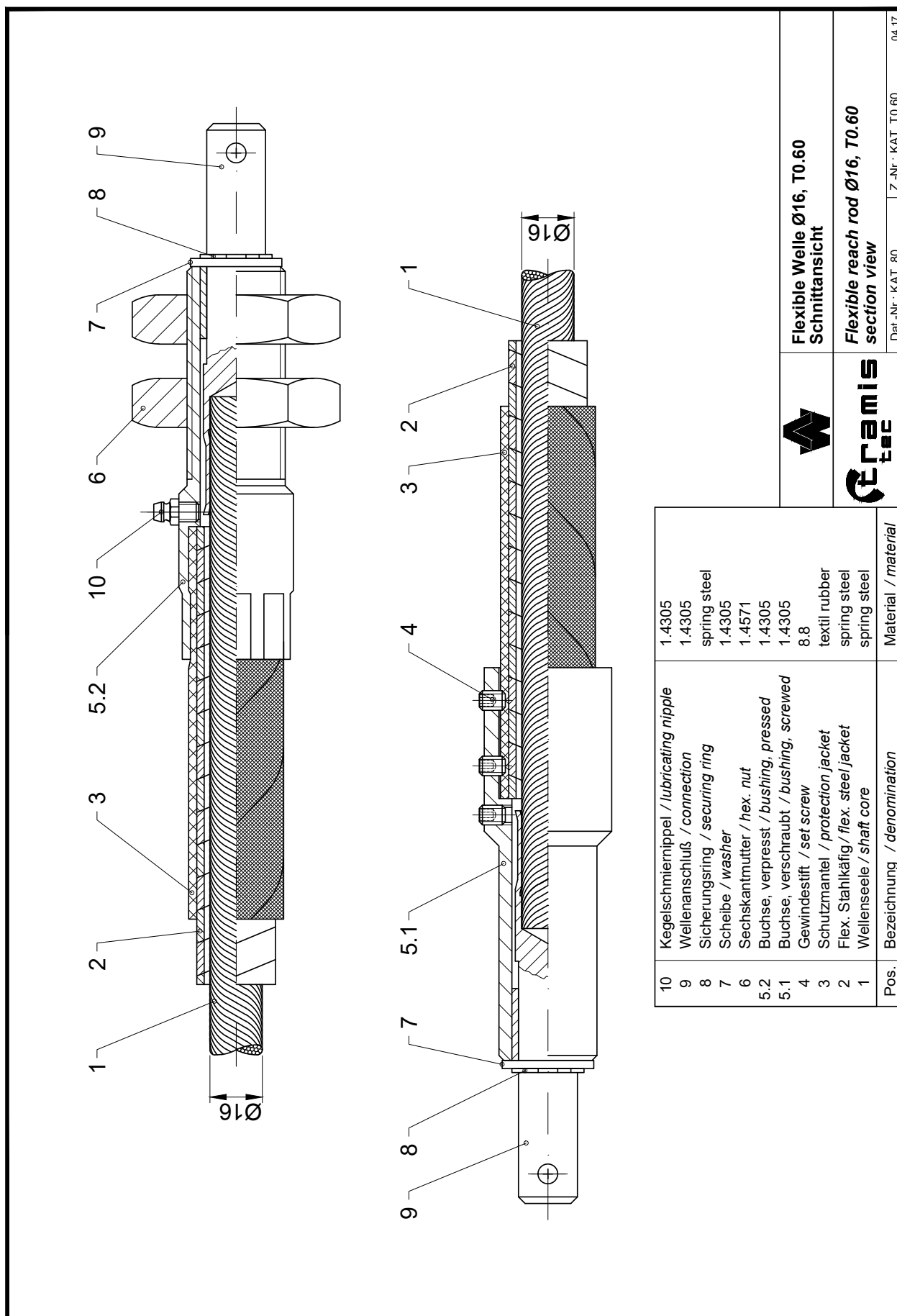
T7. Rigid Connection	
longitudinal compensation	
without	with
T7.00	T7.01

T3. Penetration			
Art			
splashwater tight		not waterproof	
T3.1		T3.2	
Connection			
welded	screwed	welded	screwed
T3.11	T3.12	T3.21	T3.22
Form			
vertical	inclinable waterproof		
			
T3.110	T3.111		

T6. Mount / Guide / Bearing							
Mount				Guide		Bearing	
reach rod ends			reach rod		reach rod		T7
T6.1			T6.2		T6.3		T6.4
Type							
plate with hole	bracket with hole	console with hole	clamp + plate + bolts 1 reach rod	clamp + plate + bolts 2 reach rods	pipe straight	pipe bent	...
							
T6.11	T6.12	T6.13	T6.21	T6.22	T6.31	T6.32	

T4. Gear		
Type		
direct mounting		with mounting base
T4.1		T4.2
Form		
straight	angle	swiveling
		
T4.x1	T4.x2	T4.23

T5. Adapter													
Forms to Connect													
male with cross-hole / male	male / external square	male / male with feather key	male / multitooth	male / square drive	male / female also for welded conn.	male / handwheel	female / female						
T5.0	T5.1	T5.2	T5.3	T5.4	T5.5	T5.6	T5.7						
													
longitudinal compensation													
without	with	without	with	without	with	without	with	without	with	without	with	without	with
T5.00	T5.01	T5.10	T5.11	T5.20	T5.21	T5.30	T5.31	T5.40	T5.41	T5.50	T5.51	T5.60	T5.71



Pos.	Bezeichnung / denomination	Material / material
10	Kegelschmiernippel / lubricating nipple	1.4305
9	Wellenanschluß / connection	1.4305
8	Sicherungsring / securing ring	spring steel
7	Scheibe / washer	1.4305
6	Sechskantmutter / hex. nut	1.4571
5.2	Buchse, verpresst / bushing, pressed	1.4305
5.1	Buchse, verschraubt / bushing, screwed	1.4305
4	Gewindestift / set screw	8.8
3	Schutzmantel / protection jacket	textil rubber
2	Flex. Stahlkäfig / flex. steel jacket	spring steel
1	Wellenseele / shaft core	spring steel



Flexible Welle Ø16, T0.60
Schnittansicht



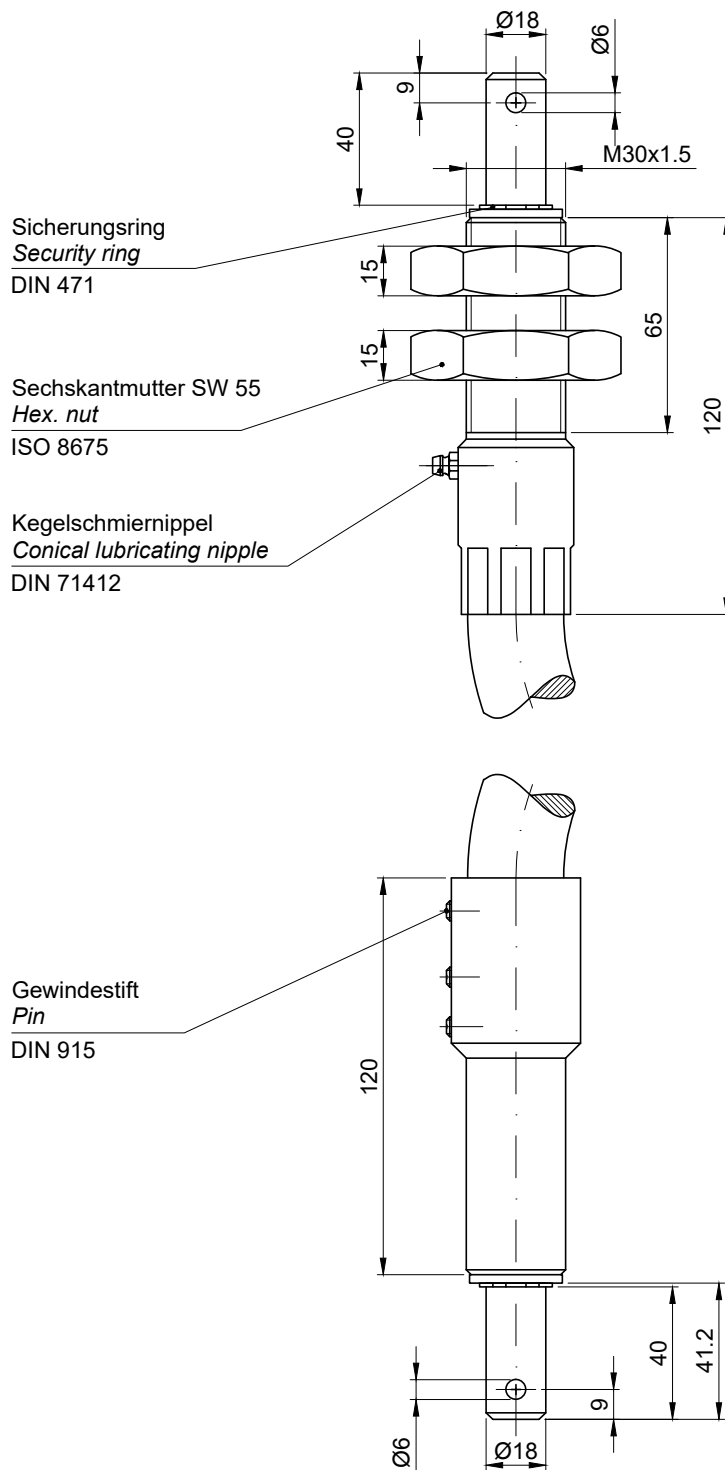
Flexible reach rod Ø16, T0.60
section view



Dat.-Nr.: KAT 80

Z.-Nr.: KAT T0.60

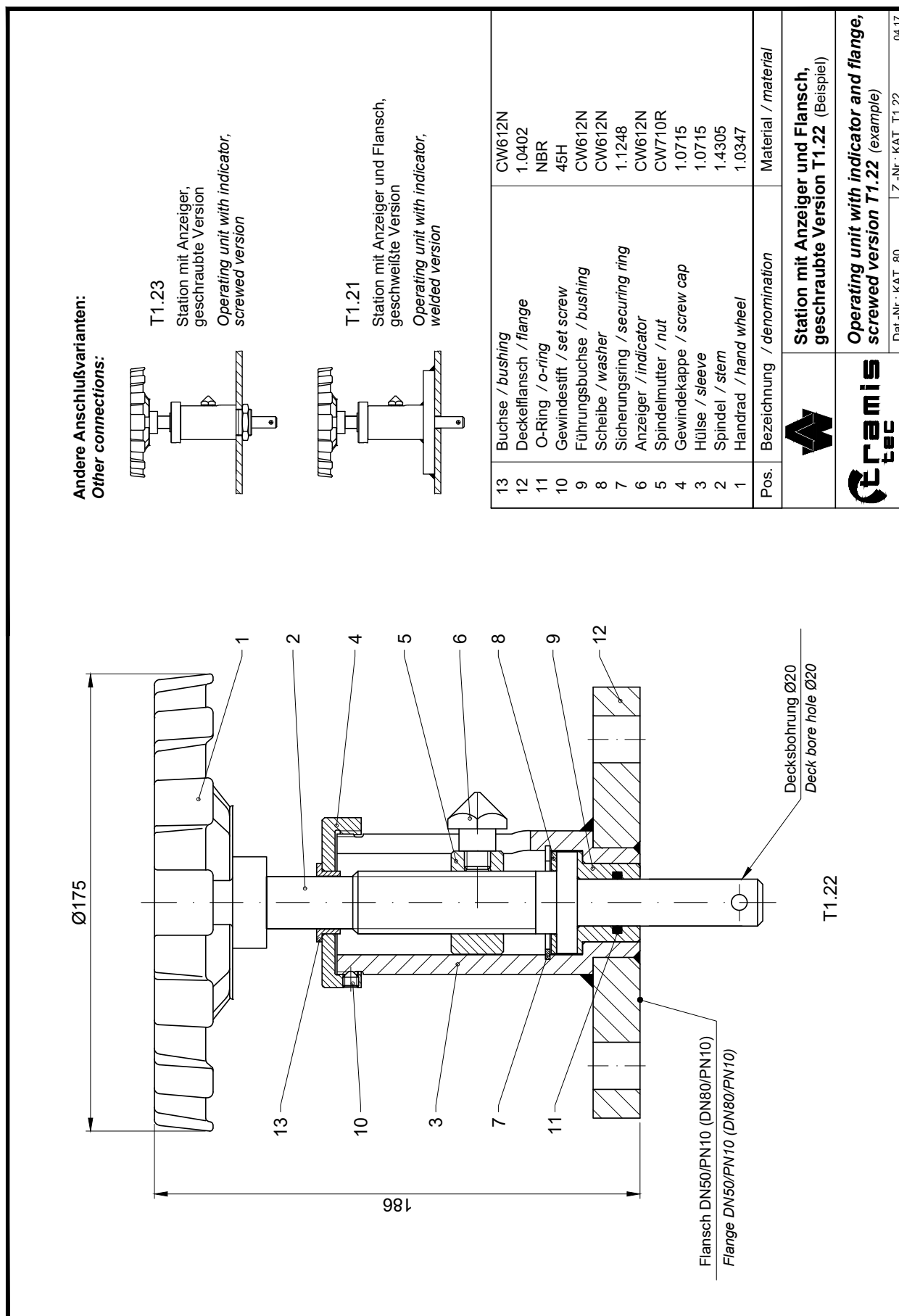
04.17



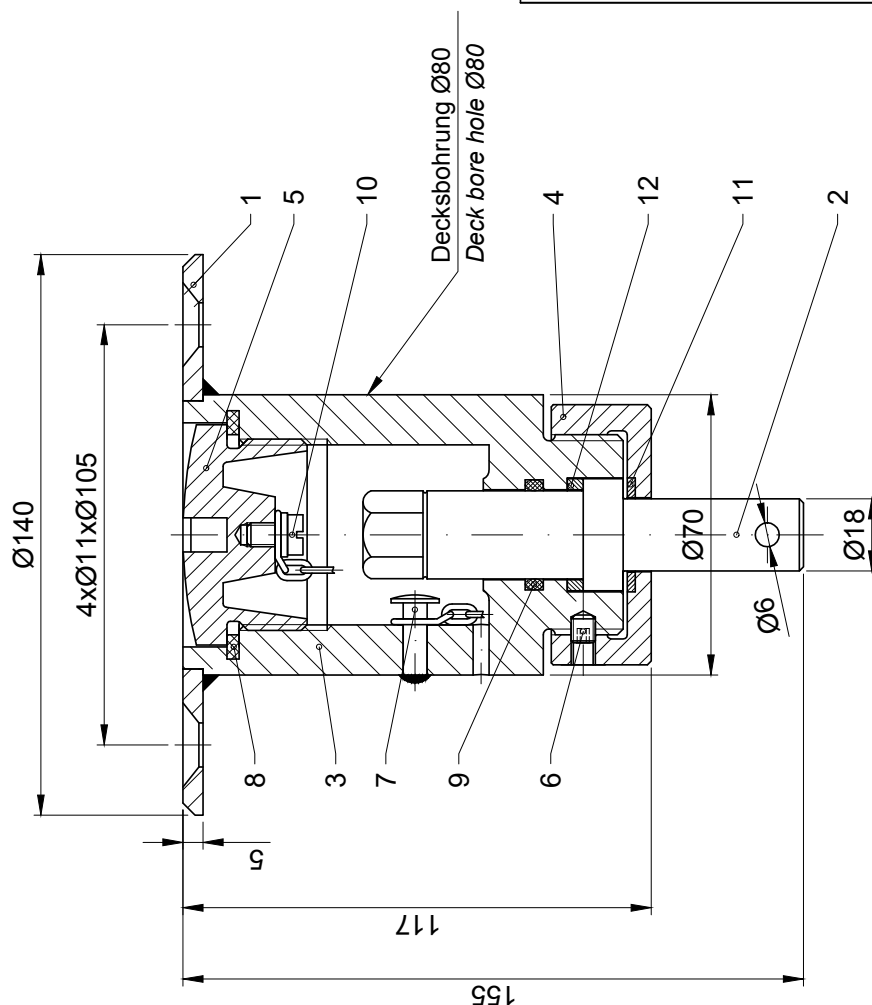
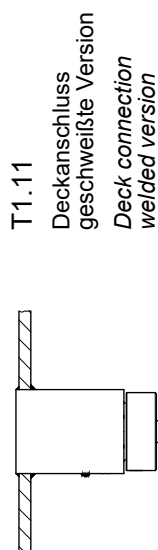


	Flexible Welle Ø16, T0.60 Wellenenden	
	Flexible reach rod Ø16, T0.60 reach rod end ferrules	
	Dat.-Nr.: KAT_80	Z.-Nr.: KAT_T0.60


04.17

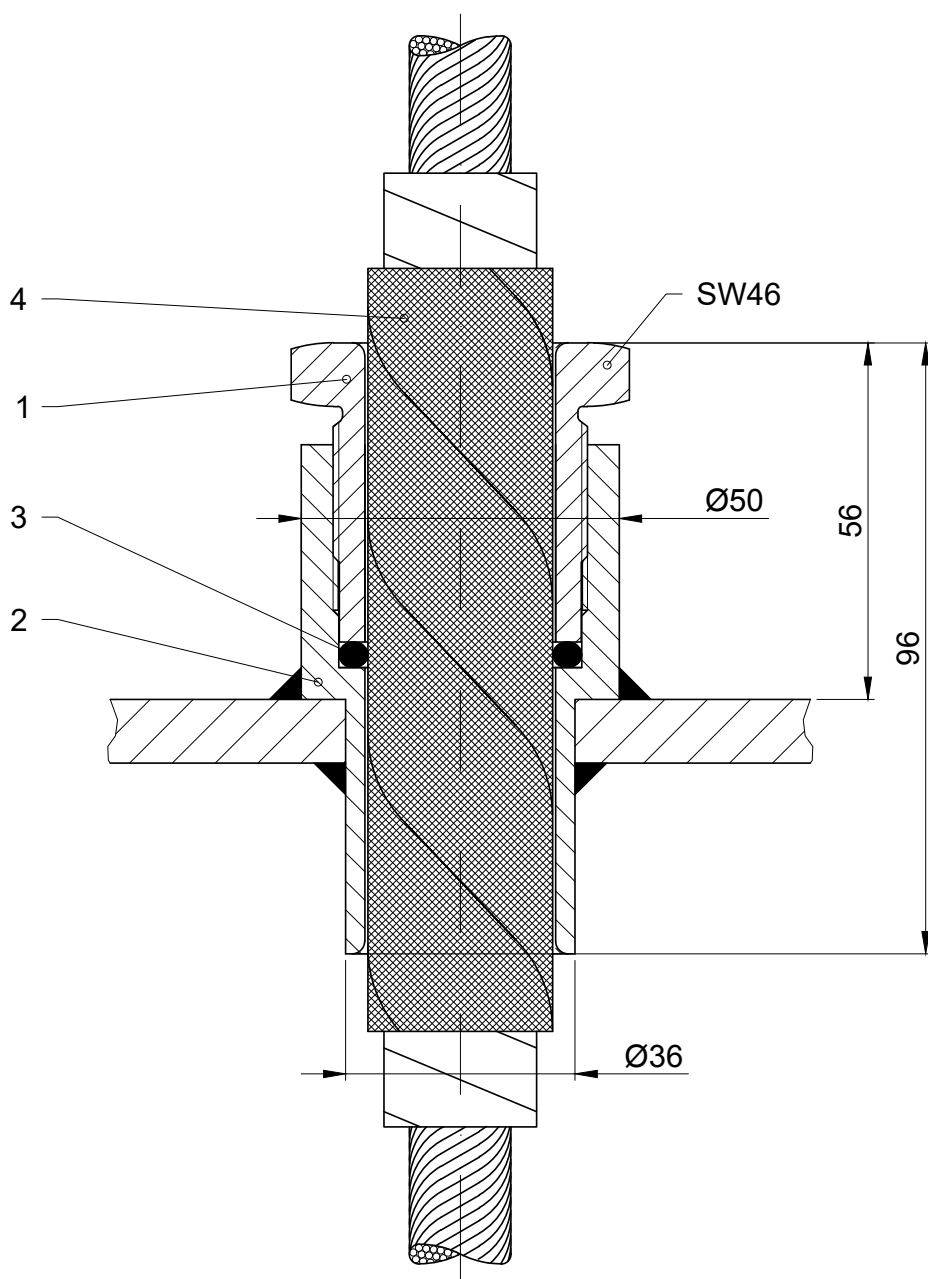




**Andere Anschlußvarianten:
Other connections:**

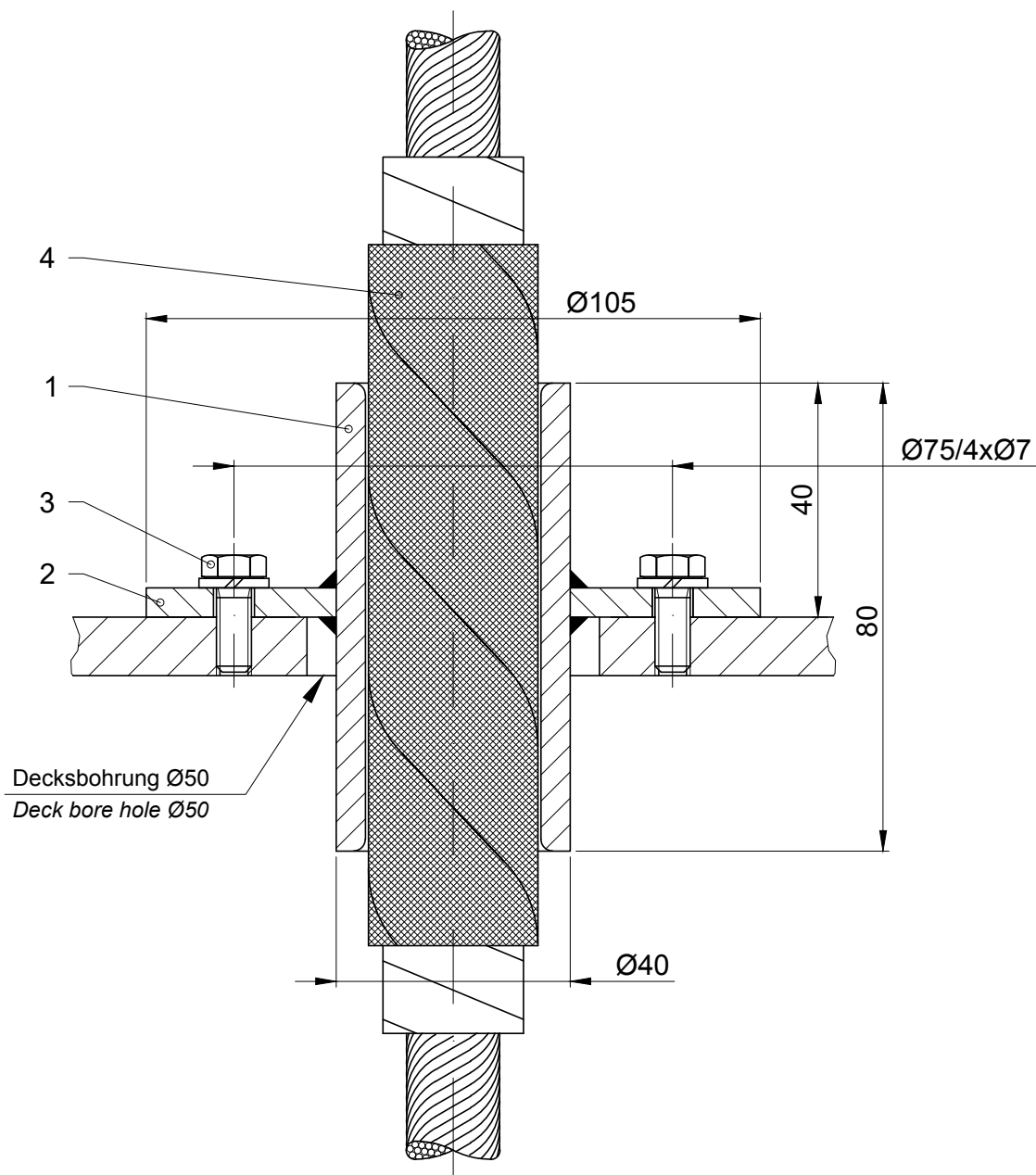




12	Scheibe 2 / washer 2	CW612N
11	Scheibe 1 / washer 1	CW612N
10	Zyl.-Schraube mit Schlitz / cyl. head screw with slot	45H
9	O-Ring / o-ring	NBR
8	Gewindestift / set screw	8.8
7	Stift / pin	1.4571
6	Gewindestift / set screw	8.8
5	Verschlussdeckel / closing lid	CW710R
4	Gewindekappe / screw cap	1.0715
3	Hülse / sleeve	1.0715
2	Spindel / stem	1.4305
1	Deckflansch / flange	1.0402

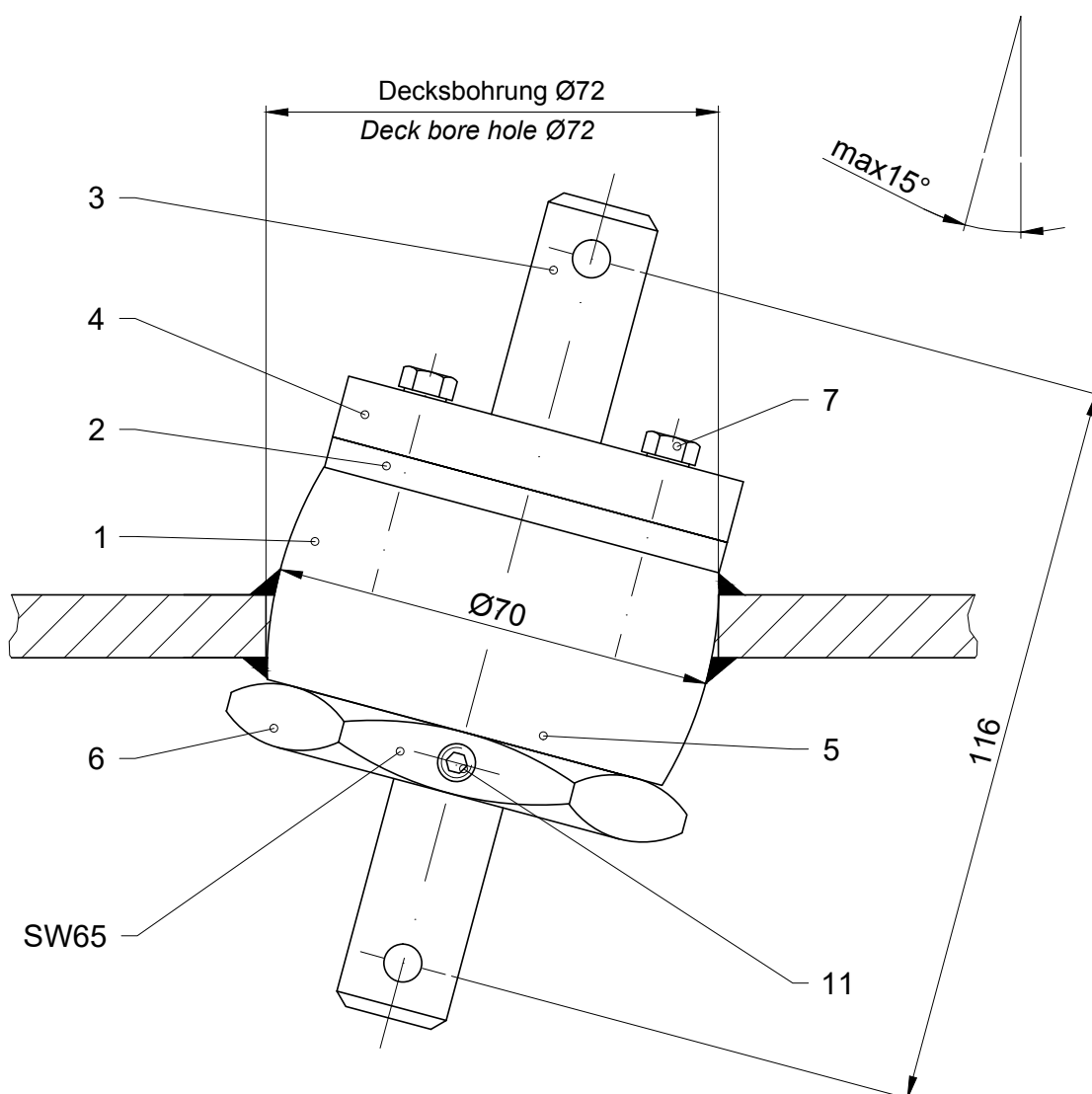
Pos.	Bezeichnung / denomination	Material / material
		
Deckanschluss für flexible Welle geschraubte Version T1.12 (Beispiel)		
Deck connection for flexible reach rod screw version T1.12 (example)		
Dat.-Nr.: KAT_80		Z.-Nr.: KAT_T1.12
		04.17





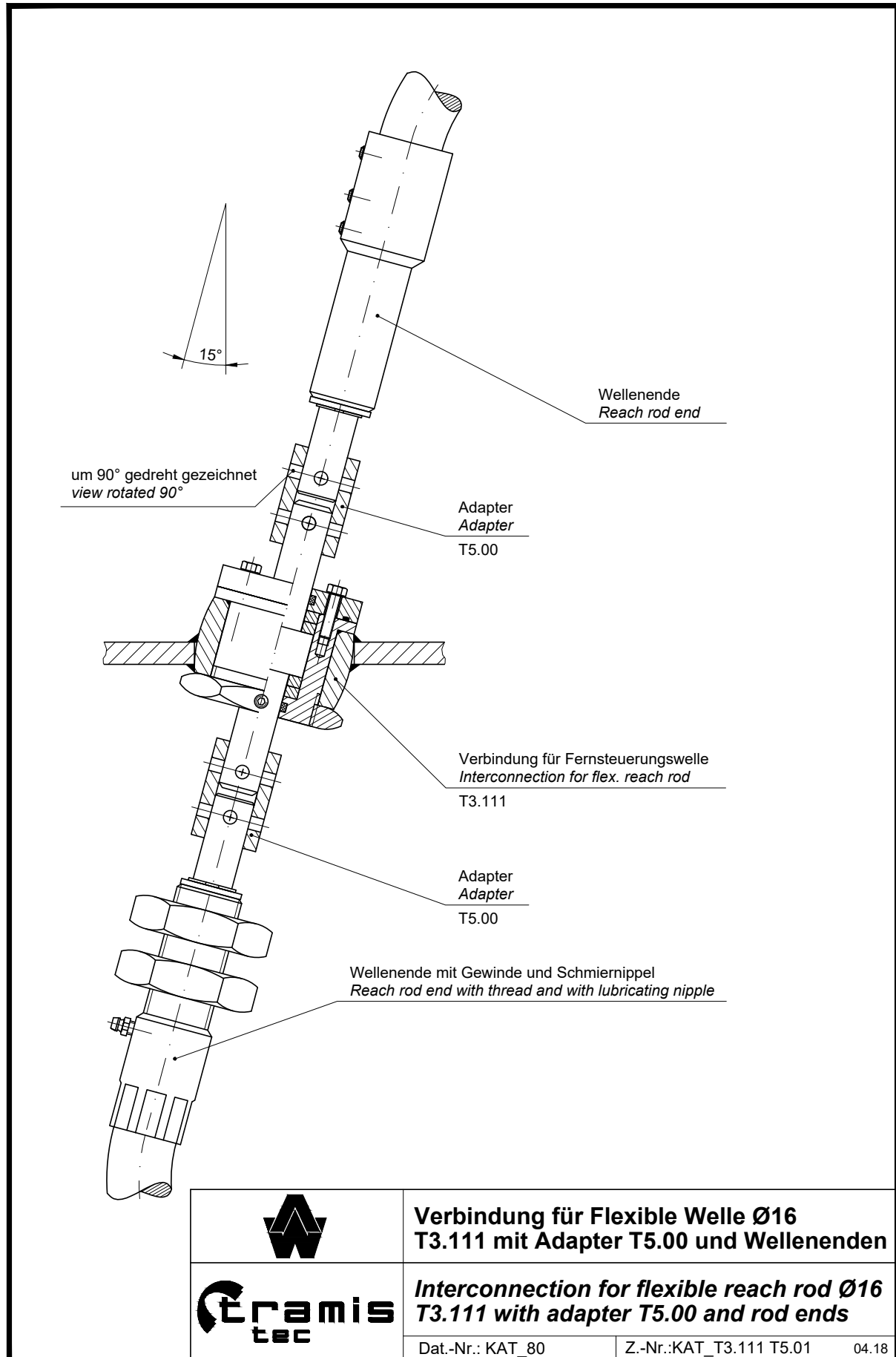
4	Flexible Welle / <i>flexible reach rod</i>	spring steel, NIRO, rubber
3	O-Ring / <i>o-ring</i>	NBR
2	Hülse / <i>sleeve</i>	1.0037
1	Mutter / <i>nut</i>	1.0037
Pos.	Bezeichnung / <i>denomination</i>	Material / <i>material</i>
 Durchdringungshülse, Spritzwasserdicht geschweißte Version T3.110 (Beispiel)		
 Deck penetrating sleeve, splashwater-tight welded version T3.110 (example)		
Dat.-Nr.: KAT_80		Z.-Nr.: KAT_T3.110 07.17

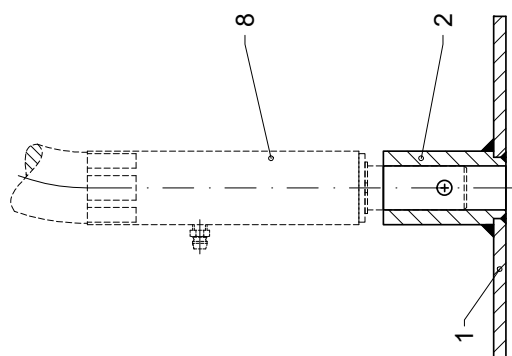


4	Flexible Welle / flexible reach rod	spring steel, NIRO, rubber
3	O-Ring / o-ring	NBR
2	Hülse / sleeve	1.0037
1	Mutter / nut	1.0037
Pos.	Bezeichnung / denomination	Material / material
 Durchdringungshülse, geschraubte Version T3.22 (Beispiel)		
 Deck penetrating sleeve, screwed version T3.22 (example)		
Dat.-Nr.: KAT_80		Z.-Nr.: KAT_T3.22
		04.17



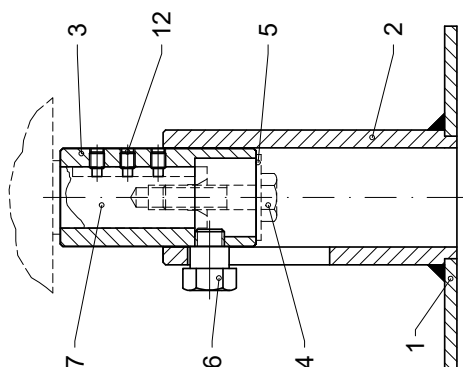
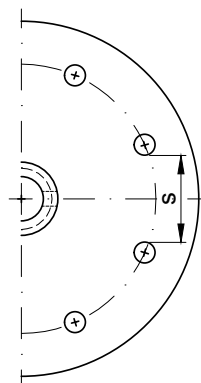
7	Sechskantschraube / hex. screw	1.0037
6	Sechskantmutter / hex. nut	CW612N
5	Scheibe / washer	CC493K
4	Deckel / cover	CC493K
3	Spindel / stem	CW710R
2	Hülse / sleeve	1.4605
1	Gehäuse / body	1.4571
Pos.	Bezeichnung / denomination	Material / material
		geneigte Durchdringung, wasserdicht geschweißte Version T3.111 (Beispiel)
		inclined penetration, waterproof welded version T3.111 (example)
Dat.-Nr.: KAT_80		Z.-Nr.: KAT_T3.111
		0717





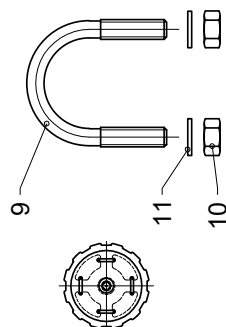
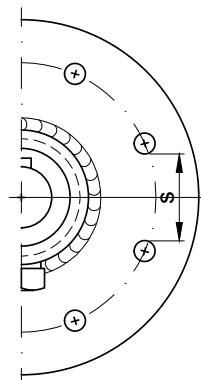
T5.61

ohne Längenausgleich / without length adjustment

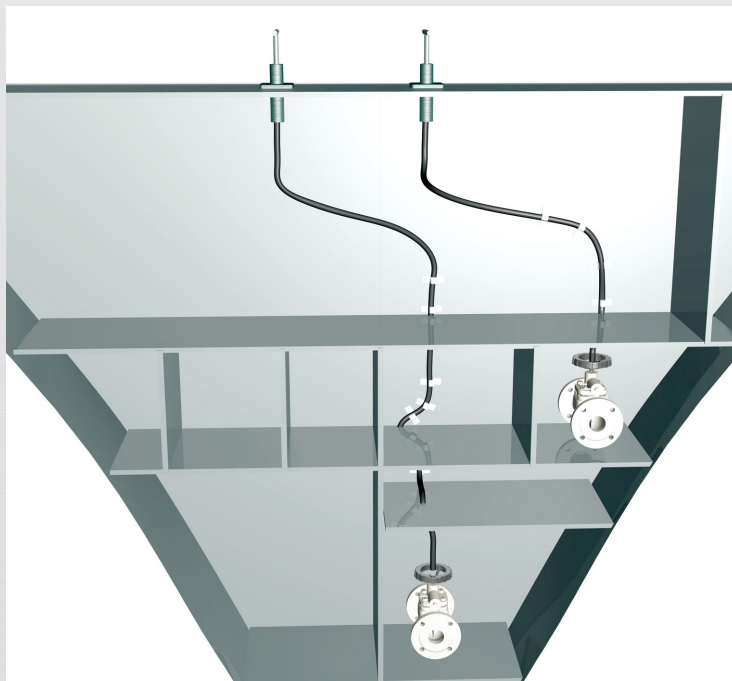


T5.62

mit Längenausgleich / with length adjustment



Pos.	Bezeichnung / denomination	Material / material
12	Gewindestift m. Innenskt. u. Zapfen / socket set screw with dog point	8.4
11	Unterlegscheibe / washer	8.4
10	Sechskantmutter / hex. nut	8
9	Befestigungsschelle / clamp collar	1.0037
8	flexible Welle / flex. reach rod	spring steel, NIRO, rubber
7	Getriebewelle / gear shaft	1.4305
6	Führungsschraube / lead screw	1.0037
5	Scheibe / washer	1.0037
4	Sechskantschraube / hex. screw	8.8
3	Buchse 2 / bushing 2	1.0037
2	Buchse 1 / bushing 1	1.0037
1	Teller / plate	1.0037
Handradadapter T5.6x (Beispiele)		
Handwheel adapter T5.6x (examples)		
Dat.-Nr.: KAT_80		Z.-Nr.: KAT_T5.6x
07.17		



Maritime Industrie
Maritime Industry



Verarbeitende Industrie
Processing Industry



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