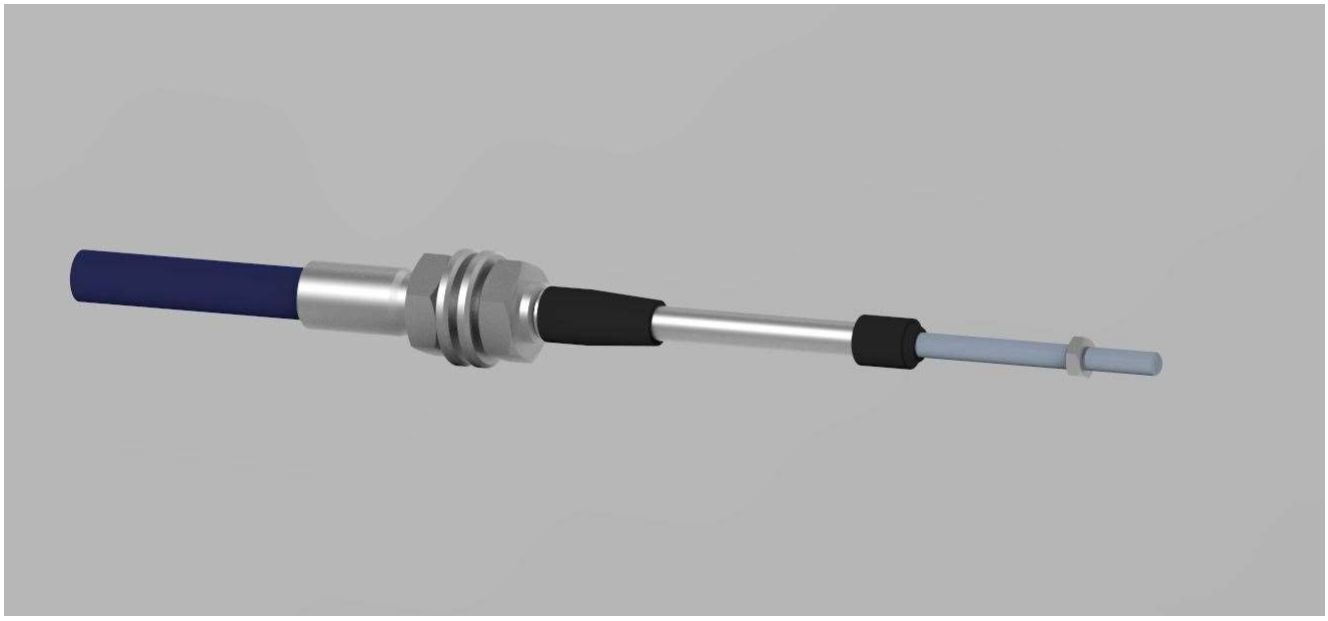
RINGSPANN®
Fernbetätigungen

Installation and operating instructions for push-pull cables

E 07.620



RINGSPANN RCS GmbH

Hans-Mess-Straße 7
61440 Oberursel
Germany

Telephon +49 6172 67 68 50

www.ringspann-rcs.de
info@ringspann-rcs.de

Important

Before installation and commissioning of the product takes place, these installation and operating instructions must be read carefully. Notes of caution and hazard warnings are to be paid particular attention to.

These installation and operating instructions apply on condition that the product meets the selection criteria for its proper use. The selection and dimensioning of the product are not the subject of these installation and operating instructions.

Failure to comply with these installation and operating instructions, or any incorrect interpretation of their content, will invalidate all product liability and warranty claims against RINGSPANN RCS GmbH. This also applies if the product is disassembled, modified or otherwise altered.

These installation and operating instructions are to be kept in a safe place and must, in the event of onward delivery of our product – be it individually or as part of a machine – be passed on along with the product so that the user has access to them.

Safety information

- Use push-pull cables only in applications that are within the given technical data.
- Do not remove seals. RCS® cables cannot be dismantled.
- RCS® push-pull cables are designed for optimum performance and service life and are lubricated for life; **under no circumstances should they be re-lubricated** or processed in any other way.
- RCS® push-pull cables must not under any circumstances come into contact with mineral oils or other lubricants!
- Cables that have absorbed water must be replaced. Moisture that has penetrated cannot be displaced by heating.
- Protect cables from mechanical damage, such as kinking, crushing, vibration, and contamination by water, dirt, or chemicals. Do not paint cable ends under any circumstances.
- A sudden or gradual increase in idling friction or stroke loss is an indication of reduced performance of a cable. We recommend replacing the cable as a precaution.

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1. General notes

This operating manual is valid for push-pull cables of the series 380, 280, 270 and 770.

On the push-pull cable there is a type plate with a 16-digit material number.
This material number defines the exact design of the cable.

RINGSPANN RCS® push-pull cables are delivered ready for installation.

1.1 Distinguishing features (pictures show sample)



Fig. 1.11

Cable series 383/384, blue conduit with red marking



Fig. 1.12

Cable series 283/284, blue conduit with yellow marking



Fig. 1.13

Cable series 275/274, blue conduit without marking



Fig. 1.14

Cable series 775/774, black conduit without marking

1.2 Rules of application

Push-pull cables contain thermoplastic materials, e.g. conduit, seals, inserts and inliners. Materials can include polyethylene, polypropylene, polyacetal, polyamide, PTFE and others. When used properly, these materials are completely harmless.



Caution!

The thermoplastic materials of RCS® push-pull cables can develop toxic gases if the cables are exposed to temperatures well above specification (e.g. by fire)!



Caution!

Use RCS® push-pull cables only within the specification, overload can lead to damage and destruction!



Caution!

If RCS® push-pull cables are damaged, they must be replaced. Repairing RCS® push-pull cables is not possible!



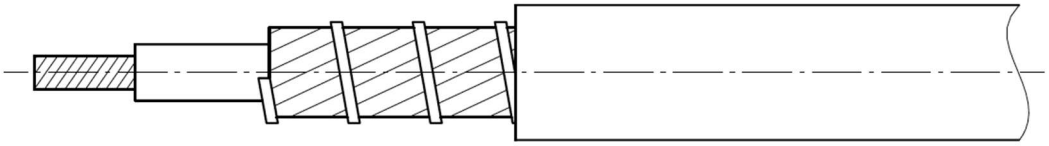
Information!

RCS® push-pull cables are lubricated for life and maintenance-free.
Do not disassemble or re-lubricate!

2. Design and function

2.1 Design

A flat wire reinforced core is located in a guide tube, which is formed by an internal guide tube and specifically arranged longitudinal wires (longitudinal wire stranding). The longitudinal wires are in turn fixed (with the exception of types 770) by a support wire winding, which enables tight installation radii. A plastic extrusion is applied as the outer shell. Galvanised or stainless steel end parts are pressed in for universal fixation of the core and guide hose elements in the applications. The push-pull cables are designed to glide smoothly (280 and 380 series with PTFE coating of the cores) and are supplied with low-friction permanent lubrication. Effective seals protect the push-pull cables from external influences such as splash water, dust and dirt.



Setup of the conduit, depicted with the inner member

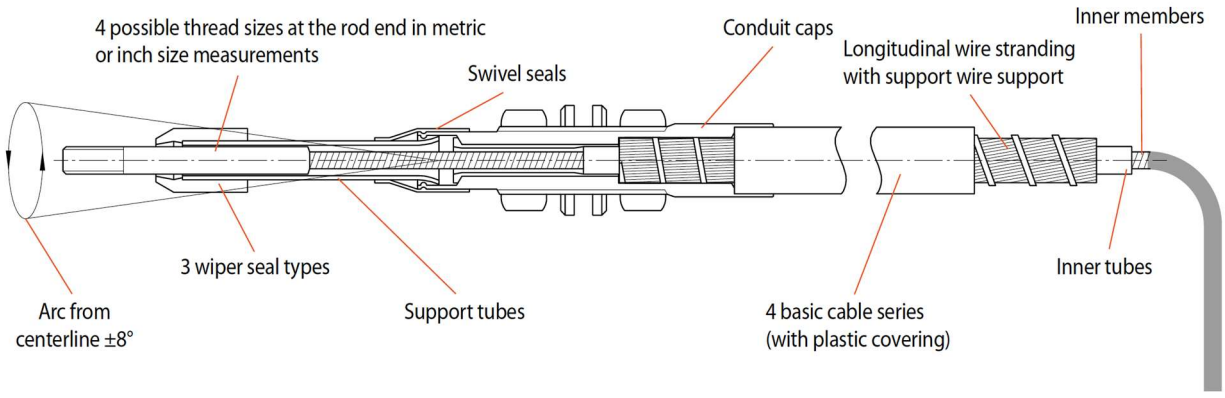


Fig. 2.11

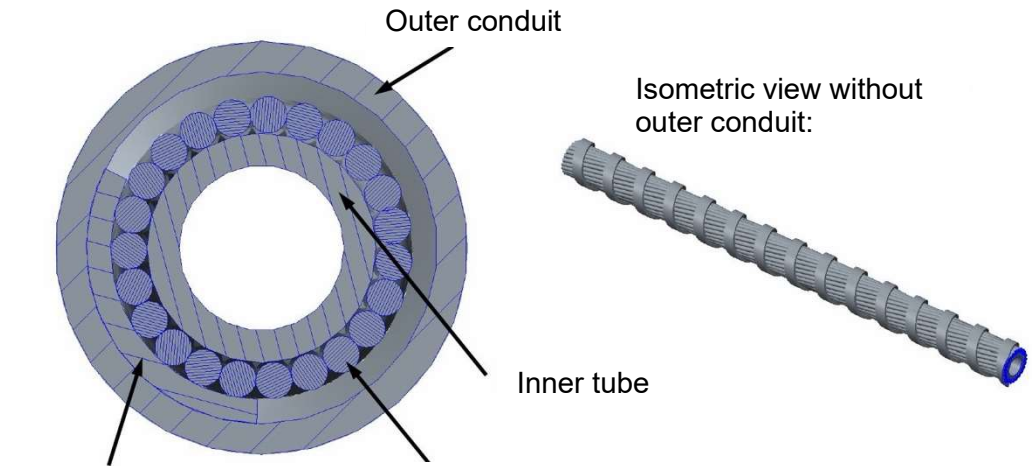


Fig. 2.12

2.2 Degree of efficiency

The efficiency of a push-pull cable (the ratio of the required input force to a given output force) is influenced by the number of bends laid in the cable and the length of the cable. The required input force can be determined approximately according to the following formula:

Actuating force (F_B) = Output force (F_A) x Efficiency factor (α)

α (alpha) is the sum of all cable bends in degrees, 15° must be added for every 1 meter of cable length.

	Efficiency factor for α				
Series	180°	360°	540°	720°	900°
383/384	1,17	1,36	1,59	1,85	2,16
283/284	1,17	1,36	1,59	1,85	2,16
275/274	1,31	1,72	2,26	2,96	3,88
775/774	1,31	1,72	2,26	2,96	3,88

Example efficiency factor $F_B = F_A \times \alpha$:

Required output force: 400 N

Cable series 284
Cable size H
Cable length 12 m
Total bends 180°

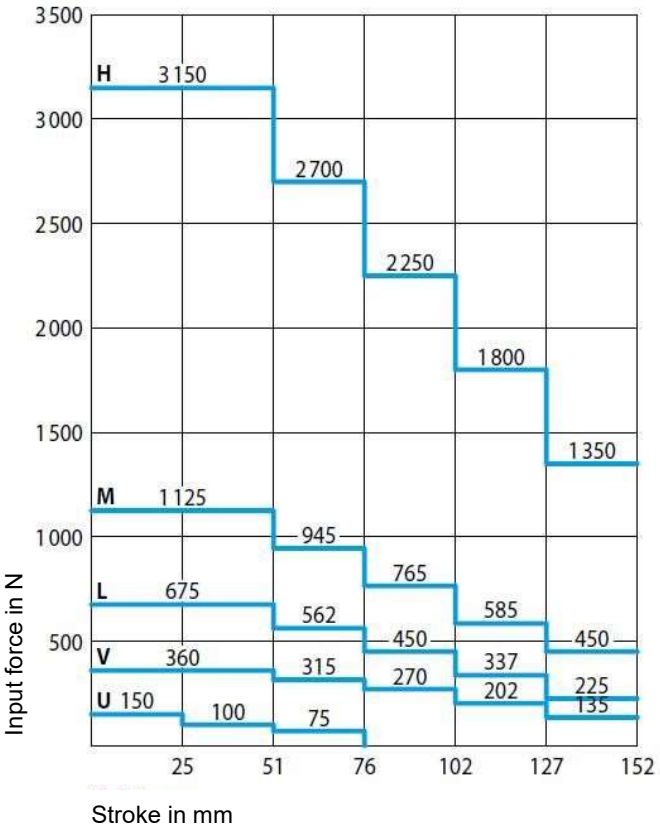
α = 180° + 12 x 15° = 360°
Efficiency factor for α : 1,36 → $F_B = F_A \times \alpha$ = 400N x 1,36 = **544 N**

An actuating force of 544 N is required to obtain an output force of 400 N with this cable size, length and routing.

2.3 Compressive and tensile forces depending on the cable stroke

The specified forces according to the following tables are valid for use in continuous operation with a long service life. In the event of short-term overloading of the tensile forces, a safety factor of 1.5 can be calculated.

Compressive forces diagram



Tensile force diagram

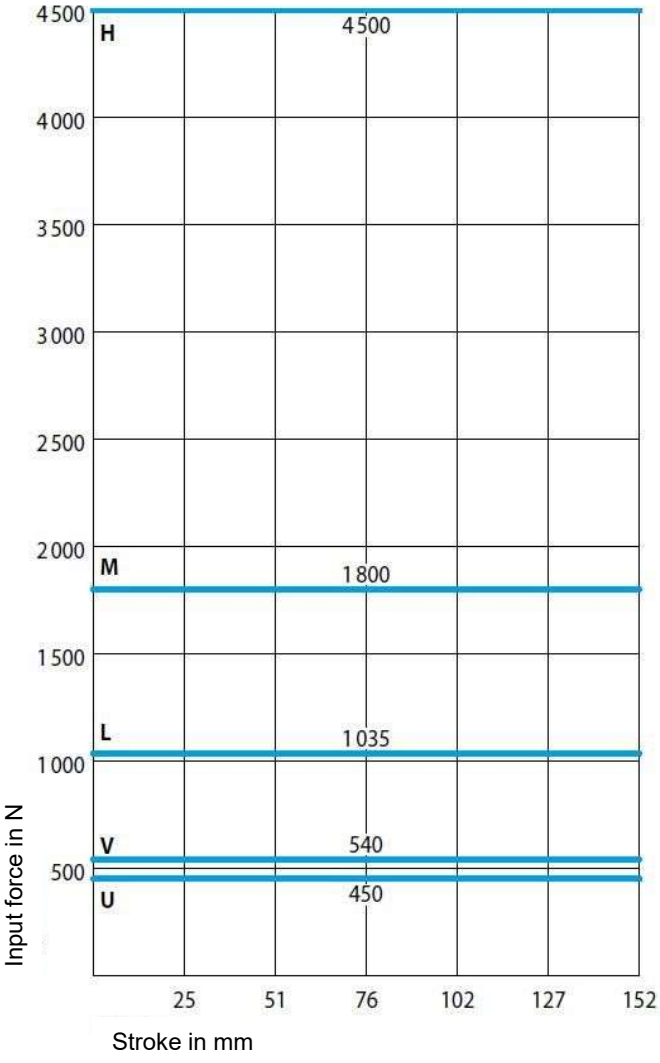


Fig. 2.3

3. Installation and safety instructions

3.1 General instructions

- Before installation, the cable must be visually inspected to ensure that it is in perfect condition.
- When laying the cable, the minimum bending radius must be taken into account.
- The greater the sum of the bending angles and the length of the cable, the more idle stroke (input movement without output effect) will occur in the cable.
- The guide hose must not be crushed at any point along its entire length.
- The push-pull cable is fixed with nuts on the T- and S-types and clamping brackets (e.g. round steel brackets DIN3570) on the G-type.
- Care must be taken to ensure that the brackets to which the hose conduit are attached provide sufficient stability. The fastening must not give way under the load influence!
- If a push-pull cable is connected to a lever that describes a circular arc, it must be mounted at right angles to the lifting centre position and at half the circular arc height of the lever. The articulated end parts (mounting types G and T) allow a deflection of ± 8°.

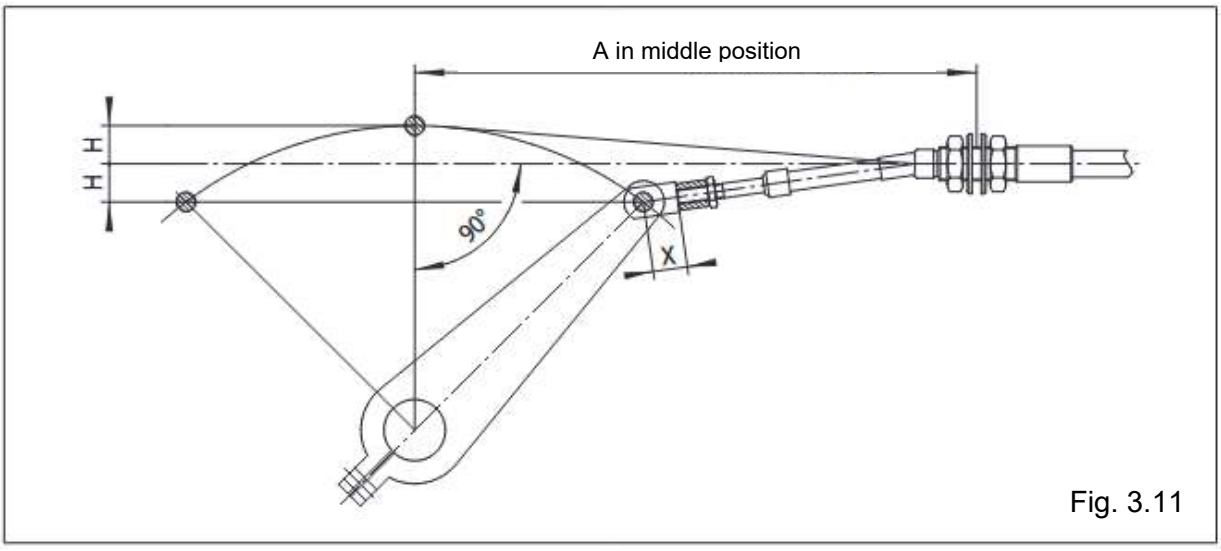


Fig. 3.11

- Only professional assembly and installation can guarantee problem-free operation. End parts must be securely fastened so that they cannot move or even twist under load. Hose clamps for cable laying should be attached at a distance of about one meter; they should fasten the cable, but not constrict it, with bends, the push-pull cable may only be fastened at the ends of a bend.

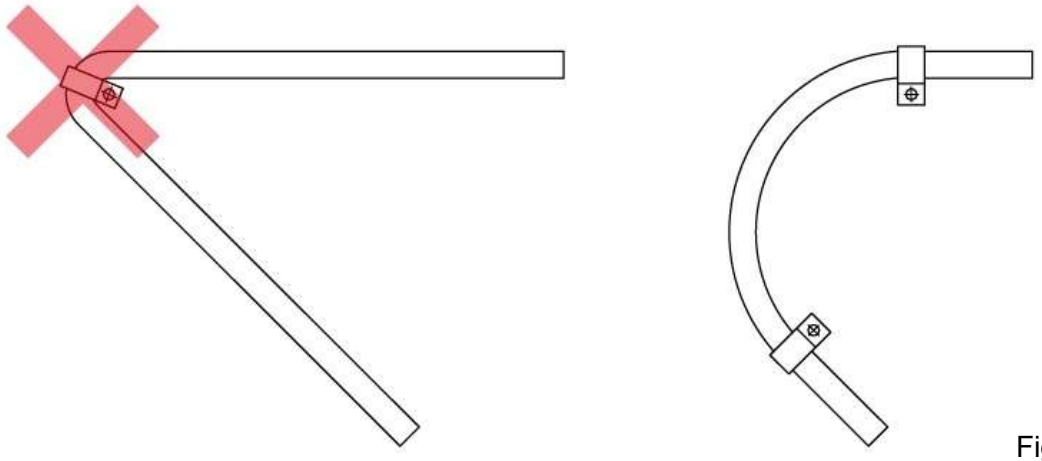
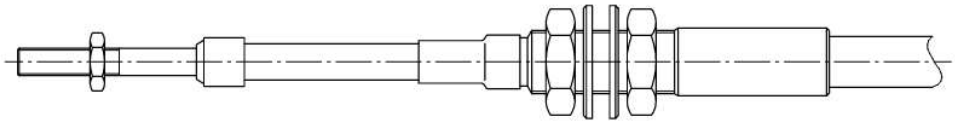


Fig. 3.12

Caution!

Check that the rod ends on the cable can move freely.

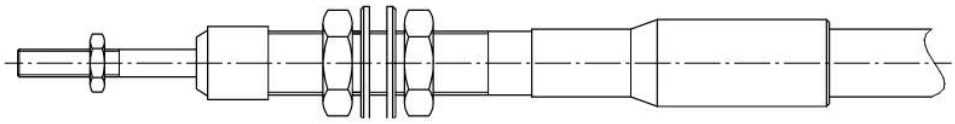
3.2 Fasteners



Swiveled bulkhead endfitting type T



Swiveled clamp endfitting type G



Rigid screw type endfitting type S and R

Bild 3.2

3.3 Max. tightening torques of the hexagonal nuts on the cable end parts

Thread	Nm	Cable size	Fastener type
7/16-20 UNF	15	U+V	T
M16x1,5	40	L	T
M18x1,5	52	M	T
M22x1,5	85	H	T
M10x1	15	U+V	S
7/16-20 UNF	15	L	R
M12x1	20	M	S
M16x1,5	40	H	S

(See the RINGSPANN RCS catalogue for details of cable sizes)

4. Condition as delivered

On delivery, RCS® push-pull cables are rolled up to save space and partly secured with cable ties. The cables are ready for immediate use.