

Pre-assembly devices and tools



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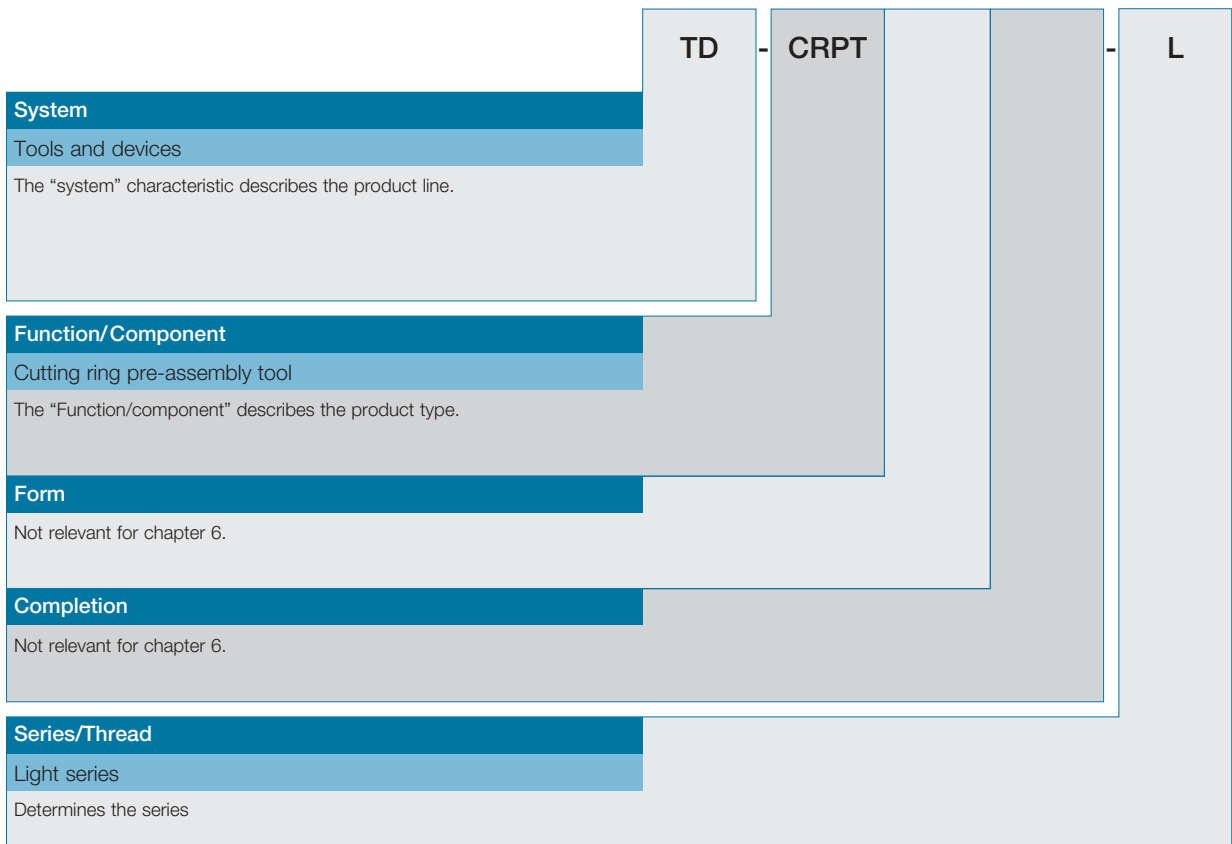
The new designations of Voss products



This catalog contains a new, alphanumerical product designation system based to a large extent on ISO 8434-1. This makes the designation self-explanatory and facilitates identification of the products. Since the structure is based on English, the designation is understood internationally.

Furthermore, the new product designations make it possible to generate customized special solutions by combining variations of the existing VOSS product program.

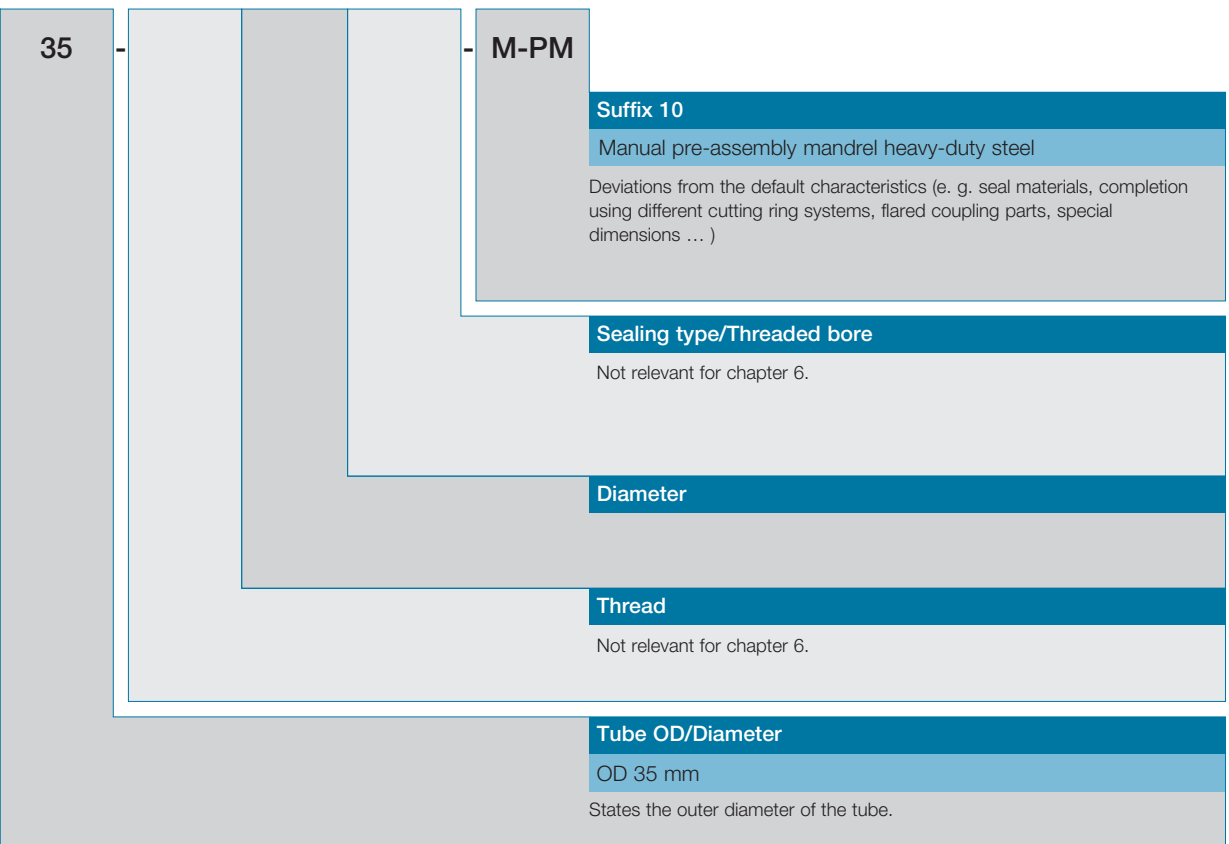
Example: TD-CRPT-L35-M-PM



Manual pre-assembly dies made of heavy-duty steel, for tube OD L35



Examples of how to order items, as well as additional explanations and variation options are given in the respective chapters and in the following pages for the individual product groups.



System	
TD	Tools and devices

Function	
Tools	
BV-10	
BV10CJ	BV-10 Clamping jaws
BV10PT	BV-10 Pre-assembly tools
Cutting rings	
CRCB	Cutting ring counter brackets
CRPT	Cutting ring pre-assembly tools
SQR	
SQRCJ	SQR Clamping jaws
SQRFH	SQR Forming heads
ZAKO	
ZAKOCJ	ZAKO Clamping jaws
ZAKOPP	ZAKO Pressure plates
ZAKOSR	ZAKO Spacer rings
Gauges	
CG	Cone gauges
TGCR	Cutting ring testing gauges
TIB	Thread identification board
Devices	
TBM1	Tube bending manual no. 1
TYPE80N3	Pre-assembly device TYPE 80N3
TYPE85	Pre-assembly device TYPE 85
TYPE90B2	Pre-assembly device TYPE 90B2
TYPE90C2	Pre-assembly device TYPE 90 Comfort
TYPE100	Pre-assembly device TYPE 100
TYPE100C	Pre-assembly device TYPE 100 Compact
DUHY1	Drive unit 1, hydraulic (number consecutively) YALE PY-07
FOOTSWITCH1	Footswitch 1 with protection cover (number consecutively) Wire Plug CA 3 LS
BV10A	BV-10 Attachments

Series/Thread	
Series	
LL	Extra light series
L	Light series
S	Heavy series
L/S	Light and heavy series are identical

	Tube OD/Diameter
6	6 mm
8	8 mm
10	10 mm
12	12 mm
14	14 mm
15	15 mm
16	16 mm
18	18 mm
20	20 mm
22	22 mm
25	25 mm
28	28 mm
30	30 mm
35	35 mm
38	38 mm
42	42 mm
48,3	48,3 mm
50	50 mm
60	60 mm
60,3	60,3 mm
65	65 mm
75	75 mm
76,1	76,1 mm
80	80 mm
88	88 mm
89,9	89,9 mm
101,6	101,6 mm
114,3	114,3 mm
1/2	1/2 inch
3/4	3/4 inch
1	1 inch
1 1/4	1 1/4 inch

Suffix overview

Suffix 6	Differing dimension
Suffix 10	Tool

Suffixes not referred to here are not relevant to this chapter.

Note: For articles having more than one relevant suffix, these are listed in numerical order in the sales designation.

Suffix 6

Differing dimension

	Inner diameter
ID3	Inner diameter 3 mm
...	...

Suffix 10	Tool
BV10A	BV-10 Attachments
DUHY1	Drive unit 1, hydraulic (number consecutively) YALE PY-07
M	Manual pre-assembly mandrel
M-PM	Manual pre-assembly mandrel heavy-duty steel
MT	Mop-top
MT-RFID	Mop-top with RFID
MT-PM-RFID	Mop-top heavy-duty steel with RFID
PA	Pin adapter
PA-PM	Pin adapter heavy-duty steel
RR8	Reserve roll 8 mm
RR10	Reserve roll 10 mm
RR12	Reserve roll 12 mm
RR14	Reserve roll 14 mm
RR15	Reserve roll 15 mm
RR16	Reserve roll 16 mm
RR18	Reserve roll 18 mm
RR20	Reserve roll 20 mm
RR22	Reserve roll 22 mm
SST	Stainless steel applications
TYPE82	pre-assembly device TYPE82
TYPE80	pre-assembly device TYPE80 (all generations)
TYPE85	pre-assembly device TYPE85
TYPE90B2	pre-assembly device TYPE90B2
TYPE90C2	pre-assembly device TYPE90C2 Comfort

Product information VOSS pre-assembly devices and tools



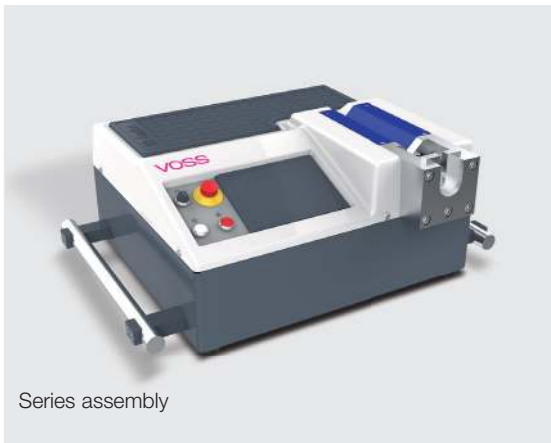
One-off assembly

VOSS pre-assembly devices and tools are specially designed for assembling tube couplings.

For every application, whether for one-off or series-production assembly of cutting rings, *VOSSForm^{SGR}*, BV-10 flared cone rings or ZAKO rings, a variety of tools are available – from simple aids to automatically assembly-force-controlled devices and the associated tool inserts.

The manual pre-assembly die is a simple but necessary tool for manual pre-assembly of cutting rings.

The hardened pre-assembly die guarantees that the taper cuts into the tube reliably without damaging the cone of the actual coupling connecting piece.



Series assembly

For series-production assembly of cutting rings, BV-10 flared cones and ZAKO rings, a wide range of devices ranging from portable hand-pump devices to permanently installed, electrically operated pre-assembly devices for outer tube diameters of 6 – 114.3 mm is available.

Reliability right down to the last detail



We at VOSS, see ourselves not only as manufacturers and suppliers of high-quality connecting components, but also as system partners who guide and support you in the entire field hydraulic tube connecting technology and help your products to be a success – all around the world. We manufacture our own systems, operate our own in-house electroplating plant, and can supply pre-assembly devices, tools and auxiliary equipment for your operations. We

also offer training courses and audits to our customers. Logistics is another important aspect for us – only products that are delivered to you reliably and on time can be used dependably in your processes. Our aim: all tube couplings must be absolutely reliable and safe. The use of VOSS pre-assembly devices which are perfectly matched to the applications and their outstanding, well-conceived features play an essential role towards achieving this aim.

Safe and reliable pre-assembly and final assembly processes

Device designation	Type 80 N3	Type 90 Basic II	Type 90 Comfort	VOSSForm 100	VOSSForm 100 Compact	Type 85
One-off assembly	X	X				
Series assembly			X	X	X	X
Automatic tool recognition			X			
Reverse stroke optimization		X	X	X	X	
Semi-automatic tooling			X	X	X	
Touch screen			X			
Error detection			X			
Error prevention				X	X	
Including calibration service			X			
Free parameter definition acc. to customer requirements			X			
"Countdown" workpiece counter		X				
Freely programmable workpiece counter			X			
Optional pedal switch		X	X	X	X	
Tube OD	6–42 mm	6–42 mm	6–42 mm	6–42 mm	6–42 mm	38–114.3 mm
Bench-top device	X	X	X		X	X
Floor-mounted device				X		
Systems:						
Cutting ring systems	X	X	X			
BV-10 flared cone system	X	X	X			
ZAKO flange system	X	X	X			X
VOSSForm ^{SQR} / VOSSForm ^{SQRVA}				X	X	
VFS 90 (ORFS)						
Electrical connection	–	400 V	400 V	400 V	400 V	400 V
Dimensions (wxhxd) in mm	185x267x590	540x280x480	800x308x615	900x1122x943	800x951x480	340x320x650
Weight	15 kg	66 kg	90 kg	630 kg	380 kg	160 kg

Our pre-assembly devices and tools have been specially designed for one-off and for series production and match our entire coupling system right down to the last detail. We offer appropriate solutions for all requirements – safe and economical pre-assembly for initial production and for

maintenance work. From simple manual assembly tools right up to automatic devices with tool recognition, VOSS offers a wide range of tools for tubes diameters between 6 and 114.3 mm.

Always prepared

Manual pre-assembly studs



For individual cutting ring assembly using a vise.

If a cutting ring has to be replaced on-site or during servicing, a manual pre-assembly die should be used. This allows a connection to be made without subjecting the actual coupling connecting piece to wear.

- for individual manual pre-assembly work
- wear-resistant

Systems

Cutting rings 2S, 2S *plus*, 2SVA, ES-4, ES-4VA:
tube OD 6 mm – 42 mm

Applications

On-site service work requiring a vise.

See page 357 for ordering information.

The star of the construction site

VOSS Type 80 N3



Also suitable for 10° flared coupling systems

Lots of tubing at a lot of different, difficult-to-access places? The handy VOSS Type 80 N3 tool takes on any service work challenge. Its extending side surfaces allow it to be securely gripped in a vise or be bolted directly onto the workbench. Tool sets are easily exchanged and the pressure gauge, in conjunction with the settings printed on the device, ensure precision assembly results. This is THE portable field service device for pre-assembly work if no electric mains power is available.

- pressure gauge, table of settings
- new: operating lever and mounting can be removed to facilitate transportation

Systems

Cutting rings 2S, 2S *plus*, 2SVA, ES-4, ES-4VA:
tube OD 6 mm – 42 mm

BV-10: tube OD 6 mm – 42 mm

ZAKO: tube OD up to – 38 mm

Applications

Mobile device for maintenance and service work, easy assembly, with mounting options.

See page 346 for ordering information.

Serial reproducibility

VOSS Type 90 Basic II



With automatic pre-assembly and workpiece counter

One shop floor, but multiple workplaces? The easily transported VOSS Type 90 Basic II ensures reliable series pre-assembly of cutting ring couplings anywhere and everywhere with reproducible results. The automated pre-assembly process ensures consistently good results and the adjustable working pressure allows the pre-assembly process to be adjusted to match varying assembly parameters. One especially practical feature: system-related setting values are printed directly on the device casing. These can be adjusted individually and are shown clearly on a large display. The built-in count-down workpiece counter makes sure that not a single tube too many or too few is pre-assembled.

- Weighs just 66 kg
- Easy to operate, integrated workpiece counter, easy tool change
- Intelligent controls lead to short cycle times
- Pedal switch available as an option

Systems

Cutting rings 2S, 2S *plus*, 2SVA, ES-4, ES-4VA:
tube OD 6 mm – 42 mm

BV-10 (machine conversion by VOSS service)
tube OD 6 mm – 42 mm

ZAKO (machine conversion by VOSS service)
tube OD up to 38 mm

Applications

Bench-top device for shop-floor use, larger production runs

See page 347 for ordering information.

Maximum process reliability

VOSS Type 90 Comfort



Automatic RFID tool recognition prevents errors and lowers production costs

Pre-assembly work for large series production has its own special requirements. Tools have to be exchanged quickly, cycle times must be extremely short but not a single fault is permitted since this might render an entire lot unusable. The answer to such demands is the VOSS Type 90 Comfort. This device reads the RFID chips integrated in the VOSS tools and then adjusts parameters automatically to suit the tool. In this way, the shortest tooling times possible can be achieved, while effectively preventing operator errors – even when tools have to be exchanged often and fast. Simple, precise, safe and reliable – especially suitable for tight tube bends.

- Automatic pressure settings
- Tool recognition via RFID chip
- Programmable workpiece counter
- Pre-assembly controlled in relation to tool travel
- Touch-panel, intuitive menu guidance
- Including on-site calibration service
- Pedal switch available as an option
- Error detection

Systems

Cutting rings 2S, 2S *plus*, 2SVA, ES-4, ES-4VA:
tube OD 6 mm – 42 mm

BV-10 (machine conversion by VOSS service)
tube OD 6 mm – 42 mm

ZAKO (machine conversion by VOSS service)
tube OD up to 38 mm

Applications

For series production on shop floors, offering maximum process safety and reliability.

See page 348 for ordering information.

Fast, perfect tube forming

VOSSForm 100



Large-series assembly of VOSSForm^{SQR} couplings, safe operation thanks to a stop plate.

Flaring tubes to obtain the VOSSForm^{SQR} contour can be carried out easily and reliably using the VOSSForm 100. The unmistakable markings on both tools minimize assembly errors, and the stop plate for the tube end prevents insertion errors. This ensures that there is always enough tube material for shaping the contour and avoids rejects right from the start. Operating errors are prevented by automatic shaping pressure adjustment and by optical indication of the next operating step. Once the tube has been formed, the device returns to the start position under optical gate control – an ideal solution for fast-cycle mass production. Another feature which helps to achieve this is the design of the VOSSForm 100 as a complete workplace with an integrated magazine for easy-to-change tools and an additional 230 V mains outlet on the back.

- Automatic set-up to match tube size
- Cycle times from 7 (6 – 10 mm OD) to 15 seconds (25 – 42 mm OD)
- Optical gate detects end of work step and causes machine to return to start position
- Ergonomical: tool magazine lock with single-handed operation, extremely simple operation thanks to intuitive concept
- Pedal switch available as an option

Systems

VOSSForm^{SQR} and VOSSForm^{SQR}VA: tube OD 6 mm – 42 mm

Applications

Stationary device, series production, maximum process safety and reliability

See page 350 for ordering information.

The space-saving alternative

VOSSForm 100 Compact



Ready for fork-lift or crane transportation

VOSSForm 100 Compact is an alternative to VOSSForm 100 when smaller dimensions are required. This is a bench-top machine which has been cleverly designed to provide all the same advantages as the floor-standing version. The device is 100 % compatible to its big brother, since it has an identical forming unit. This means that the tools can be used for both the bench-top and the floor-standing machine. Normal steel tubes and stainless steel tubes can be formed equally well. In addition, the device has an integrated stop plate that prevents wrong tube insertion. The intuitive operating concept is user-friendly and easily mastered. The compact model shows its advantages especially when it comes to moving it around in the works: it has a special attachment on the underside, specially designed for fork-lift trucks, as well as sturdy lifting lugs at the top for crane transport.

- Compact bench-top version of Type 100
- Same performance range and operating comfort
- Pedal switch available as an option

Systems

VOSSForm^{SQR} and VOSSForm^{SQR}VA: tube OD 6 mm – 42 mm

Applications

Movable bench-top device, series production; maximum process safety and reliability

See page 351 for ordering information.

Optimum results that can be seen – with ZAKO

VOSS Type 85



No wear and tear; protection against excessive flaring

Type 85 – a compact electro-hydraulic machine is available for pre-assembly mounting of rings for ZAKO flange couplings on tubes with outer diameters up to 114.3 mm. Easy transportation is ensured by the two-part design: separate pre-assembly cylinder plus assembly head, and external hydraulic unit. Another advantage of this construction: the forming process can be visually monitored. The actual ZAKO ring is used directly to flare the tube – there is no “tool” wear as the “tool” is turned into part of the tube coupling by the process. This means that the tube does not have to be flared in advance. As the system is so extremely simple, pre-assembly is very easy and great accuracy is obtained.

- Tool remains in the tube so that there is no tool wear
- Simple operation
- Complete assembly process can be monitored visually

Systems

ZAKO: tube OD 38 mm – 114.3 mm

Applications

Can be transported, one-off and series production

See page 349 for ordering information.

100 % fault-free cutting ring assembly

Pre-assembly studs made of high performance steel



Tool service life extended by more than 20 times plus built-in wear indicator

Two versions of the VOSS pre-assembly tools for cutting rings are available: a basic version and a more sophisticated version made of high performance steel. Normal pre-assembly studs wear faster so that they have to be checked using a gauge after every 50 pre-assembly operations. This is time-consuming, is a potential source of faults and therefore means adhering to a tool test plan. Our solution: durable tools made of high performance steel. Typical tool wear no longer occurs, there are no test and inspection intervals and the service life is very long – up to 20 times that of conventional tools. When the die reaches the usable tolerance limits, its front end breaks off, forcing the user to replace it. This ensures fault-free processes in your company.

- Basic version: accuracy has to be checked using a gauge after every 50 pre-assembly processes
- High performance steel version: no inspection/checking required, service life up to 20 times longer, clear indication when service tolerance limit is reached
- Also available as manual pre-assembly studs for use in a vise
- Version for Type 90 Comfort: contains an integrated RFID chip as well
- All tools have the same mounting and can be used in any corresponding pre-assembly device

See page 360 for ordering information.

Precise checking of gauge accuracy

VOSS Fluid taper gauges for pre-assembly studs



Hardened pre-assembly studs for the coupling of cutting rings are wear-resistant, thus achieving consistent pre-assembly results. To maintain these results, the tools must be checked at regular intervals, since they are nevertheless subject to a certain degree of wear.

In addition to a visual inspection for damage or cracks, the checks must also include verification of the die dimensions using a gauge. This involves checking the internal conical bore of the pre-assembly die after every 50 applications.

VOSS taper gauges are available individually or as a complete set containing all sizes of the light-weight and heavy duty versions in a practical plastic case.

See page 355 for ordering information.

Cutting ring geometry at a glance

VOSS Fluid taper gauges for pre-assembly studs



VOSS supplies inspection gauges to check the results of cutting ring pre-assembly and which can be used to evaluate pre-assembly in conjunction with visual inspection of the pushed-up tube material. To establish a permanently leak-tight cutting ring coupling, the pre-assembled end of the tube must contact the screw coupling connecting piece and the cutting ring must be inserted securely into the 24° conical recess. A closed force transmission path and the resulting safe connection can only be achieved by the interaction of this geometry with a strong ring of raised tube material. The VOSS taper gauge is used as an auxiliary device for evaluating cutting ring pre-assemblies and summarizing the geometry situation in the form of legible values.

Operating principle:

The results are checked by measuring the pre-assembled tube end. This is done by pushing the tube end into the conical opening of the taper gauge and screwing on the union nut manually, hand-tight, without a spanner. The pointer of the dial will move until the cutting ring cone is in contact with the tapered hole in the gauge. The indicated value must be within specified limits. If the value is below the specified range, the assembly is probably faulty and the cutting ring is too near the end of the tube. If the value is higher than the specified range, it must be assumed that the cutting ring is too far from the end of the tube.

Applications:

- Series production of tubing Incoming goods
- Inspection of preconfigured tubing

Caution!

Use of the gauge does not eliminate the need to visually check for excessive or too little pre-assembly pressures (by checking the height of tube material pushed up by the first cutting ring edge)

See page 356 for ordering information.

Prevent size confusion

VOSS thread gauge board to determine threaded stud sizes



The VOSS thread gauge board facilitates the determination of metric and imperial threaded stud sizes and prevents mistakes during assembly

The similarity of some metric and imperial threads makes it hard to distinguish between them. Furthermore, some threads can even be screwed into tapped holes which have been mistakenly assumed to have the correct thread. As such mistakes can endanger workers and the environment, we recommend that the cautionary notes in the respective standards be observed.

The VOSS thread gauge board allows the threads to be verified once more before the studs are used.

See page 354 for ordering information.

Reliable radii

VOSS tube-bending equipment



Light-weight manual bending device, vise-mounting, for accurate bending of tubes with ODs of 8 mm – 22 mm.

- For tubes with outer diameters of 8, 10, 12, 14, 16, 18, 20 and 22 mm
- Including a sturdy metal case
- Degree graduation marks on the bending templates make accurate bending of tubes easier
- Highly suitable for on-site use as the device can be simply held in a vise.

See page 353 for ordering information.

Pre-assembly devices

Type 80 N3

Manual pump pre-assembly device



Type	Order-No.	Designation
For manual pre-assembly of cutting rings on tubes with OD 6 – 42 mm, and for manual pre-assembly of flared cones and ZAKO rings up to 1 1/4".	5991080400	TD-TYPE80N3

Dimensions

Width: 190 mm

Height: 267 mm

Depth: 590 mm

Weight: 15 kg

Pre-assembly devices

Type 90 Basic II

Device for electrical mains power
400 V / 50 Hz / 3 Ph



Type	Order-No.	Designation
For machine-assisted pre-assembly of cutting rings on tubes with OD 6 – 42 mm, and for machine-assisted pre-assembly of flared cones and ZAKO rings, by means of a conversion kit (not part of standard delivery package).	5992892000	TD-TYPE90B2
Dimensions		
Width:	681 mm	
Height:	260 mm	
Depth:	520 mm	
Weight:	66 kg	
Noise level:	60 dBA	
Conversion kit	9799600140	TD-BV10A-TYPE90B2
Other power supply ratings upon request.		

Pre-assembly devices

Type 90 Comfort

Device for electrical mains power
400 V / 50 Hz / 3 Ph



Type	Order-No.	Designation
For machine-assisted pre-assembly of cutting rings on tubes with OD 6 - 42 mm, and for machine-assisted pre-assembly of flared cones and ZAKO rings, by means of a conversion kit (not part of standard delivery package).	5992893000	TD-TYPE90C2
Dimensions		
Width:	800 mm	
Height:	308 mm	
Depth:	615 mm	
Depth (with conversion kit):	636 mm	
Weight:		
Weight:	90 kg	
Noise level:		
Noise level:	70 dBA	
Conversion kit	9799600141	TD-BV10A-TYPE90C2
Other power supply ratings upon request.		

Pre-assembly devices

Type 85

Device for electrical mains power
400 V 16 A AC
3 Ph / N / PE / 50 Hz / 0.75 kW



Type	Order-No.	Designation
For machine-assisted pre-assembly of ZAKO rings for tubes with outer diameters 38 mm – 114.3 mm incl. drive unit and high-pressure hose.	5991085000	TD-TYPE85-DUHY1
Pre-assembly cylinder Type 85 without drive unit. Device for connection to a drive unit. $P_A = \text{max. } 700 \text{ bar}$ $V = \text{min } 3\text{l}$ with hydraulic plug coupling (NW 10 coupling sleeve YALE CFY-10-10).	5991085100	TD-TYPE85
Dimensions Width: 340 mm Height: 320 mm Depth: 650 mm		
Weight: 160 kg		
Drive unit (Electric hydraulic power pack YALE PY-07).	5992361000	TD-DUHY1
Other power supply ratings upon request.		

Forming machines

VOSSForm 100

Forming machine for electrical mains power supply
400 V 16 A AC
3Ph / N / PE 50 Hz / 4 kW



Type	Order-No.	Designation
For machine-assisted forming of the VOSSForm ^{SQR} contour on steel and stainless steel tubes with ODs 6 – 42 mm.	5991008000	TD-TYPE100

5-pin CEE plug

Dimensions

Width: 900 mm

Height: 1122 mm

Depth: 943 mm

Weight: 630 kg

Noise level: < 74 dBA

Other power supply ratings upon request.

Forming machines

VOSSForm 100 Compact

Forming machine for electrical mains power supply
 400 V 16 A AC
 3Ph / N / PE 50 Hz / 3 kW



Type	Order-No.	Designation
For machine-assisted forming of the VOSSForm ^{SOB} contour on steel and stainless steel tubes with OD 6 – 42 mm.	5992895000	TD-TYPE100C

5-pin CEE plug

Dimensions

Width: 800 mm
 Height: 480 mm
 Depth: 951 mm

Weight: 380 kg
 Noise level: < 74 dBA

Other power supply ratings upon request.

Foot switch for pre-assembly devices

Connector: CA 3 LS
Protection class: IP65



Type	Order-No.	Designation
Safety foot switch with accident-prevention hood and safety interlock.	9799600139	TD-FOOTSWITCH1

For operating pre-assembly devices:

Typ 90 Basic II

Typ 90 Comfort

VOSSForm 100

VOSSForm 100 Compact

Min. cable length 3 m

Dimensions

Width: 156 mm

Height: 146 mm

Depth: 250 mm

Tube bending device

Mobile manual unit for producing precision tube bends



Type	Order-No.	Designation
Tube bending device for manual precision bending of tubes. Can be used to bend tubes with OD of 8 to 22 mm.	5994060000	TD-TBM1

The delivery package includes the following 9 bending templates:

Tube OD	Order-No.	Designation
8	5994059900	TD-TBM1-RR8
10	5994059800	TD-TBM1-RR10
12	5994059700	TD-TBM1-RR12
14	5994059600	TD-TBM1-RR14
15	5994059500	TD-TBM1-RR15
16	5994059400	TD-TBM1-RR16
18	5994059300	TD-TBM1-RR18
20	5994059200	TD-TBM1-RR20
22	5994058900	TD-TBM1-RR22

Thread gauge board

For determining thread sizes of threaded studs



Type	Order-No.	Designation
Can be used to determine following thread sizes: Metric fine thread, parallel M 10 x 1 – M 48 x 2 Inch-size Whitworth pipe thread, parallel G 1/8" – G 1 1/2"	5993571149	TD-TIB



Cone gauges for pre-assembly studs

For checking the 24° cone of a stud



Series Tube OD	Order-No.	Designation
L 6	5991001000	TD-CG-L/S6
L 8	5991001100	TD-CG-L/S8
L 10	5991001200	TD-CG-L/S10
L 12	5991001300	TD-CG-L/S12
L 15	5991001400	TD-CG-L15
L 18	5991001500	TD-CG-L18
L 22	5991001600	TD-CG-L22
L 28	5991001700	TD-CG-L28
L 35	5991001800	TD-CG-L35
L 42	5991001900	TD-CG-L42
S 6	5991001000	TD-CG-L/S6
S 8	5991001100	TD-CG-L/S8
S 10	5991001200	TD-CG-L/S10
S 12	5991001300	TD-CG-L/S12
S 14	5991002000	TD-CG-S14
S 16	5991002100	TD-CG-S16
S 20	5991002200	TD-CG-S20
S 25	5991002300	TD-CG-S25
S 30	5991002400	TD-CG-S30
S 38	5991002500	TD-CG-S38

Inspection gauges

For inspection of cutting ring pre-assemblies

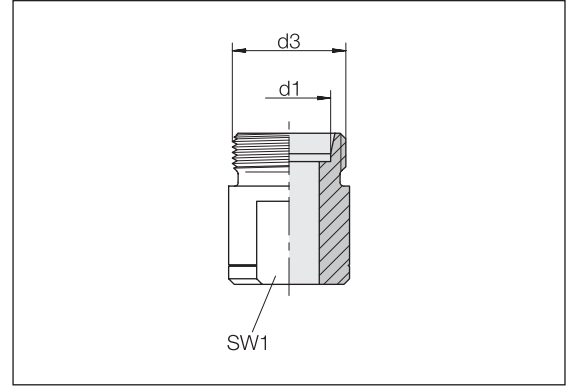
Including union nut and test pin in a handy suitcase



Series	Order-No.	Designation
Tube OD		
LL 16	5994503649	TD-TGCR-LL16
L 6	5994502249	TD-TGCR-L6
L 8	5994502349	TD-TGCR-L8
L 10	5994502449	TD-TGCR-L10
L 12	5994502549	TD-TGCR-L12
L 15	5994502649	TD-TGCR-L15
L 18	5994502749	TD-TGCR-L18
L 22	5994502849	TD-TGCR-L22
L 28	5994503749	TD-TGCR-L28
L 35	5994503849	TD-TGCR-L35
L 42	5994503949	TD-TGCR-L42
S 6	5994502949	TD-TGCR-S6
S 8	5994503049	TD-TGCR-S8
S 10	5994503149	TD-TGCR-S10
S 12	5994503249	TD-TGCR-S12
S 14	5994503349	TD-TGCR-S14
S 16	5994503449	TD-TGCR-S16
S 20	5994503549	TD-TGCR-S20
S 25	5994504049	TD-TGCR-S25
S 30	5994504149	TD-TGCR-S30
S 38	5994504249	TD-TGCR-S38

Pre-assembly tools for cutting ring assemblies

Manual pre-assembly stud

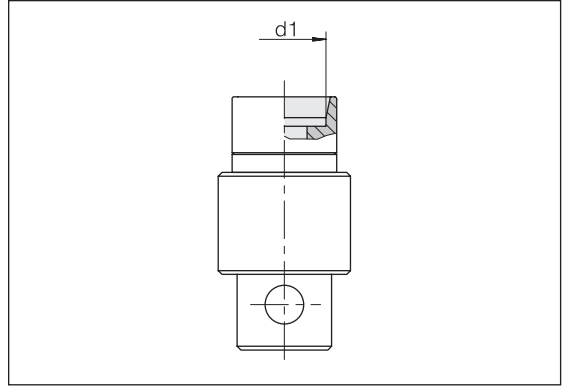


Series	d3	SW1	Order-No.	Designation	Order-No.	Designation
Tube OD				Manual pre-assembly stud		Manual pre-assembly stud
d1				Standard		High-performance steel
LL 4	M 8 x 1	7	5993950000	TD-CRPT-LL4-M	5993993000	TD-CRPT-LL4-M-PM
LL 6	M 10 x 1	9	5993952000	TD-CRPT-LL6-M	5993993200	TD-CRPT-LL6-M-PM
LL 8	M 12 x 1	11	5993953000	TD-CRPT-LL8-M	5993993300	TD-CRPT-LL8-M-PM
L 6	M 12 x 1,5	11	5993954000	TD-CRPT-L6-M	5993993400	TD-CRPT-L6-M-PM
L 8	M 14 x 1,5	12	5993955000	TD-CRPT-L8-M	5993993500	TD-CRPT-L8-M-PM
L 10	M 16 x 1,5	14	5993956000	TD-CRPT-L10-M	5993993600	TD-CRPT-L10-M-PM
L 12	M 18 x 1,5	17	5993957000	TD-CRPT-L12-M	5993993700	TD-CRPT-L12-M-PM
L 15	M 22 x 1,5	19	5993958000	TD-CRPT-L15-M	5993993800	TD-CRPT-L15-M-PM
L 18	M 26 x 1,5	24	5993959000	TD-CRPT-L18-M	5993993900	TD-CRPT-L18-M-PM
L 22	M 30 x 2	27	5993960000	TD-CRPT-L22-M	5993994000	TD-CRPT-L22-M-PM
L 28	M 36 x 2	32	5993961000	TD-CRPT-L28-M	5993994100	TD-CRPT-L28-M-PM
L 35	M 45 x 2	41	5993962000	TD-CRPT-L35-M	5993994200	TD-CRPT-L35-M-PM
L 42	M 52 x 2	46	5993963000	TD-CRPT-L42-M	5993994300	TD-CRPT-L42-M-PM
S 6	M 14 x 1,5	12	5993964000	TD-CRPT-S6-M	5993994400	TD-CRPT-S6-M-PM
S 8	M 16 x 1,5	14	5993965000	TD-CRPT-S8-M	5993994500	TD-CRPT-S8-M-PM
S 10	M 18 x 1,5	17	5993966000	TD-CRPT-S10-M	5993994600	TD-CRPT-S10-M-PM
S 12	M 20 x 1,5	17	5993967000	TD-CRPT-S12-M	5993994700	TD-CRPT-S12-M-PM
S 14	M 22 x 1,5	19	5993968000	TD-CRPT-S14-M	5993994800	TD-CRPT-S14-M-PM
S 16	M 24 x 1,5	22	5993969000	TD-CRPT-S16-M	5993994900	TD-CRPT-S16-M-PM
S 20	M 30 x 2	27	5993970000	TD-CRPT-S20-M	5993995000	TD-CRPT-S20-M-PM
S 25	M 36 x 2	32	5993971000	TD-CRPT-S25-M	5993995100	TD-CRPT-S25-M-PM
S 30	M 42 x 2	36	5993972000	TD-CRPT-S30-M	5993995200	TD-CRPT-S30-M-PM
S 38	M 52 x 2	46	5993973000	TD-CRPT-S38-M	5993995300	TD-CRPT-S38-M-PM

Pre-assembly tools for cutting ring assemblies

Type 80 N2

Pre-assembly stud

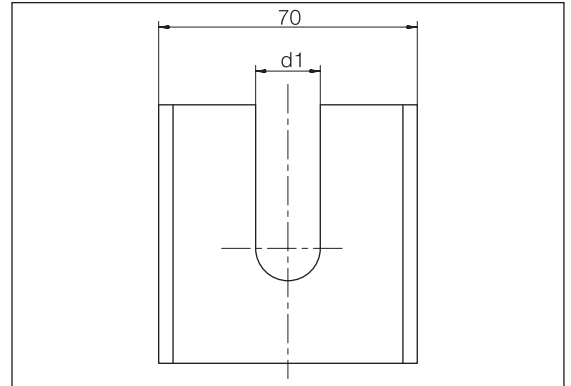


Series	Order-No.	Designation	Order-No.	Designation
Tube OD		Pre-assembly stud		Pre-assembly stud
d1		Standard		High-performance steel
LL 6	5991102000	TD-CRPT-LL6-PA		
LL 8	5991103000	TD-CRPT-LL8-PA		
L 6	5991207100	TD-CRPT-L6-PA	5993863400	TD-CRPT-L6-PA-PM
L 8	5991208100	TD-CRPT-L8-PA	5993863600	TD-CRPT-L8-PA-PM
L 10	5991209100	TD-CRPT-L10-PA	5993863800	TD-CRPT-L10-PA-PM
L 12	5991210100	TD-CRPT-L12-PA	5993864000	TD-CRPT-L12-PA-PM
L 15	5991211100	TD-CRPT-L15-PA	5993864300	TD-CRPT-L15-PA-PM
L 18	5991212100	TD-CRPT-L18-PA	5993864500	TD-CRPT-L18-PA-PM
L 22	5991213100	TD-CRPT-L22-PA	5993864700	TD-CRPT-L22-PA-PM
L 28	5991214100	TD-CRPT-L28-PA	5993864900	TD-CRPT-L28-PA-PM
L 35	5991215100	TD-CRPT-L35-PA	5993865100	TD-CRPT-L35-PA-PM
L 42	5991216100	TD-CRPT-L42-PA	5993865300	TD-CRPT-L42-PA-PM
S 6	5991217100	TD-CRPT-S6-PA	5993863500	TD-CRPT-S6-PA-PM
S 8	5991218100	TD-CRPT-S8-PA	5993863700	TD-CRPT-S8-PA-PM
S 10	5991219100	TD-CRPT-S10-PA	5993863900	TD-CRPT-S10-PA-PM
S 12	5991220100	TD-CRPT-S12-PA	5993864100	TD-CRPT-S12-PA-PM
S 14	5991221100	TD-CRPT-S14-PA	5993864200	TD-CRPT-S14-PA-PM
S 16	5991222100	TD-CRPT-S16-PA	5993864400	TD-CRPT-S16-PA-PM
S 20	5991223100	TD-CRPT-S20-PA	5993864600	TD-CRPT-S20-PA-PM
S 25	5991224100	TD-CRPT-S25-PA	5993864800	TD-CRPT-S25-PA-PM
S 30	5991225100	TD-CRPT-S30-PA	5993865000	TD-CRPT-S30-PA-PM
S 38	5991226100	TD-CRPT-S38-PA	5993865200	TD-CRPT-S38-PA-PM

Pre-assembly tools for cutting ring assemblies

Type 80 N2 / N3

Support plate

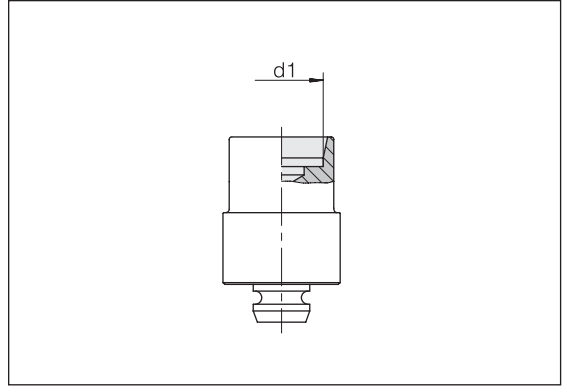


Series	Order-No.	Designation
Tube OD		Support plate
d1		Type 80 N2 / N3
LL 6	5991327100	TD-CRCB-L/S6-TYPE80
LL 8	5991328100	TD-CRCB-L/S8-TYPE80
L 6	5991327100	TD-CRCB-L/S6-TYPE80
L 8	5991328100	TD-CRCB-L/S8-TYPE80
L 10	5991329100	TD-CRCB-L/S10-TYPE80
L 12	5991330100	TD-CRCB-L/S12-TYPE80
L 15	5991331100	TD-CRCB-L15-TYPE80
L 18	5991332100	TD-CRCB-L18-TYPE80
L 22	5991333100	TD-CRCB-L22-TYPE80
L 28	5991334100	TD-CRCB-L28-TYPE80
L 35	5991335100	TD-CRCB-L35-TYPE80
L 42	5991336100	TD-CRCB-L42-TYPE80
S 6	5991327100	TD-CRCB-L/S6-TYPE80
S 8	5991328100	TD-CRCB-L/S8-TYPE80
S 10	5991329100	TD-CRCB-L/S10-TYPE80
S 12	5991330100	TD-CRCB-L/S12-TYPE80
S 14	5991337100	TD-CRCB-S14-TYPE80
S 16	5991338100	TD-CRCB-S16-TYPE80
S 20	5991339100	TD-CRCB-S20-TYPE80
S 25	5991340100	TD-CRCB-S25-TYPE80
S 30	5991341100	TD-CRCB-S30-TYPE80
S 38	5991342100	TD-CRCB-S38-TYPE80

Pre-assembly tools for cutting ring assemblies

Type 80 N3
Type 90 Basic II
Type 90 Comfort

Pre-assembly stud

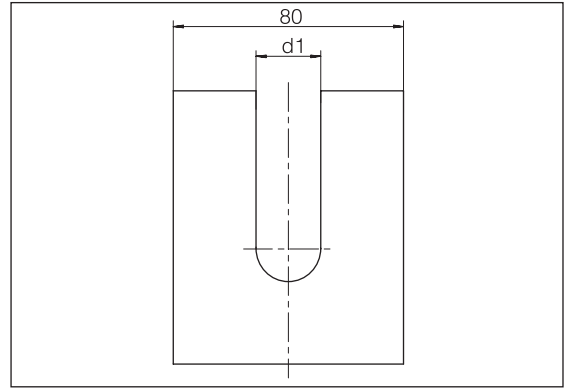


Series	Order-No.	Designation	Order-No.	Designation	Order-No.	Designation	Order-No.	Designation
Tube OD		Pre-assembly stud		Pre-assembly stud		Pre-assembly stud		Pre-assembly stud
d1		Standard		Standard with RFID (Type 90 Comfort)		High-performance steel		High-performance steel with RFID (Type 90 Comfort)
LL 6	5991102100	TD-CRPT-LL6-MT			5993867400	TD-CRPT-LL6-MT-PM	5993992500	TD-CRPT-LL6-MT-PM-RFID
LL 8	5991103100	TD-CRPT-LL8-MT			5993867300	TD-CRPT-LL8-MT-PM	5993992600	TD-CRPT-LL8-MT-PM-RFID
L 6	5991207300	TD-CRPT-L6-MT	5993850700	TD-CRPT-L6-MT-RFID	5993861400	TD-CRPT-L6-MT-PM	5993870700	TD-CRPT-L6-MT-PM-RFID
L 8	5991208300	TD-CRPT-L8-MT	5993850900	TD-CRPT-L8-MT-RFID	5993861600	TD-CRPT-L8-MT-PM	5993870900	TD-CRPT-L8-MT-PM-RFID
L 10	5991209300	TD-CRPT-L10-MT	5993851100	TD-CRPT-L10-MT-RFID	5993861800	TD-CRPT-L10-MT-PM	5993871100	TD-CRPT-L10-MT-PM-RFID
L 12	5991210300	TD-CRPT-L12-MT	5993851300	TD-CRPT-L12-MT-RFID	5993862000	TD-CRPT-L12-MT-PM	5993871300	TD-CRPT-L12-MT-PM-RFID
L 15	5991211300	TD-CRPT-L15-MT	5993851600	TD-CRPT-L15-MT-RFID	5993862300	TD-CRPT-L15-MT-PM	5993871600	TD-CRPT-L15-MT-PM-RFID
L 18	5991212300	TD-CRPT-L18-MT	5993851800	TD-CRPT-L18-MT-RFID	5993862500	TD-CRPT-L18-MT-PM	5993871800	TD-CRPT-L18-MT-PM-RFID
L 22	5991213300	TD-CRPT-L22-MT	5993852000	TD-CRPT-L22-MT-RFID	5993862700	TD-CRPT-L22-MT-PM	5993872000	TD-CRPT-L22-MT-PM-RFID
L 28	5991214300	TD-CRPT-L28-MT	5993852200	TD-CRPT-L28-MT-RFID	5993862900	TD-CRPT-L28-MT-PM	5993872200	TD-CRPT-L28-MT-PM-RFID
L 35	5991215300	TD-CRPT-L35-MT	5993852400	TD-CRPT-L35-MT-RFID	5993863100	TD-CRPT-L35-MT-PM	5993872400	TD-CRPT-L35-MT-PM-RFID
L 42	5991216300	TD-CRPT-L42-MT	5993852600	TD-CRPT-L42-MT-RFID	5993863300	TD-CRPT-L42-MT-PM	5993872600	TD-CRPT-L42-MT-PM-RFID
S 6	5991217300	TD-CRPT-S6-MT	5993850800	TD-CRPT-S6-MT-RFID	5993861500	TD-CRPT-S6-MT-PM	5993870800	TD-CRPT-S6-MT-PM-RFID
S 8	5991218300	TD-CRPT-S8-MT	5993851000	TD-CRPT-S8-MT-RFID	5993861700	TD-CRPT-S8-MT-PM	5993871000	TD-CRPT-S8-MT-PM-RFID
S 10	5991219300	TD-CRPT-S10-MT	5993851200	TD-CRPT-S10-MT-RFID	5993861900	TD-CRPT-S10-MT-PM	5993871200	TD-CRPT-S10-MT-PM-RFID
S 12	5991220300	TD-CRPT-S12-MT	5993851400	TD-CRPT-S12-MT-RFID	5993862100	TD-CRPT-S12-MT-PM	5993871400	TD-CRPT-S12-MT-PM-RFID
S 14	5991221300	TD-CRPT-S14-MT	5993851500	TD-CRPT-S14-MT-RFID	5993862200	TD-CRPT-S14-MT-PM	5993871500	TD-CRPT-S14-MT-PM-RFID
S 16	5991222300	TD-CRPT-S16-MT	5993851700	TD-CRPT-S16-MT-RFID	5993862400	TD-CRPT-S16-MT-PM	5993871700	TD-CRPT-S16-MT-PM-RFID
S 20	5991223300	TD-CRPT-S20-MT	5993851900	TD-CRPT-S20-MT-RFID	5993862600	TD-CRPT-S20-MT-PM	5993871900	TD-CRPT-S20-MT-PM-RFID
S 25	5991224300	TD-CRPT-S25-MT	5993852100	TD-CRPT-S25-MT-RFID	5993862800	TD-CRPT-S25-MT-PM	5993872100	TD-CRPT-S25-MT-PM-RFID
S 30	5991225300	TD-CRPT-S30-MT	5993852300	TD-CRPT-S30-MT-RFID	5993863000	TD-CRPT-S30-MT-PM	5993872300	TD-CRPT-S30-MT-PM-RFID
S 38	5991226300	TD-CRPT-S38-MT	5993852500	TD-CRPT-S38-MT-RFID	5993863200	TD-CRPT-S38-MT-PM	5993872500	TD-CRPT-S38-MT-PM-RFID

Pre-assembly tools for cutting ring assemblies

Type 90 Basic II
Type 90 Comfort

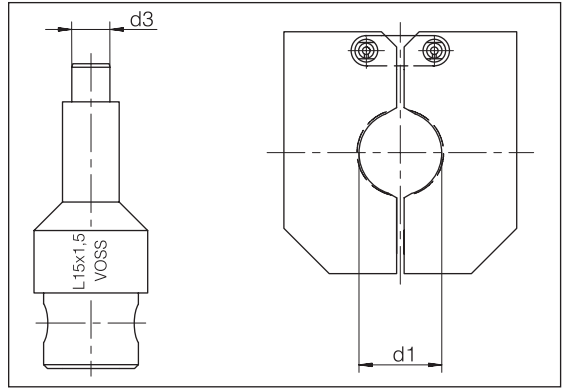
Support plate



Series	Order-No.	Designation
Tube OD		Support plate
d1		
LL 6	5991327300	TD-CRCB-L/S6
LL 8	5991328300	TD-CRCB-L/S8
L 6	5991327300	TD-CRCB-L/S6
L 8	5991328300	TD-CRCB-L/S8
L 10	5991329300	TD-CRCB-L/S10
L 12	5991330300	TD-CRCB-L/S12
L 15	5991331300	TD-CRCB-L15
L 18	5991332300	TD-CRCB-L18
L 22	5991333300	TD-CRCB-L22
L 28	5991334300	TD-CRCB-L28
L 35	5991335300	TD-CRCB-L35
L 42	5991336300	TD-CRCB-L42
S 6	5991327300	TD-CRCB-L/S6
S 8	5991328300	TD-CRCB-L/S8
S 10	5991329300	TD-CRCB-L/S10
S 12	5991330300	TD-CRCB-L/S12
S 14	5991337300	TD-CRCB-S14
S 16	5991338300	TD-CRCB-S16
S 20	5991339300	TD-CRCB-S20
S 25	5991340300	TD-CRCB-S25
S 30	5991341300	TD-CRCB-S30
S 38	5991342300	TD-CRCB-S38

Pre-assembly tools for BV-10 flared coned assembly

Type 80 N
Type 80 N2

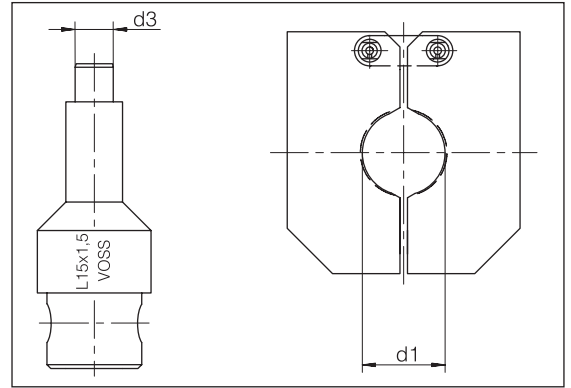


Series	d3	Order-No.	Designation	Order-No.	Designation
Tube OD			Pre-assembly stud		Clamping jaws
d1 x s					
L 6 x 1	2,9	5993050000	TD-BV10PT-L6x1-PA	5993000000	TD-BV10CJ-L/S6
L 8 x 1	4,9	5993050100	TD-BV10PT-L8x1-PA	5993001000	TD-BV10CJ-L/S8
L 10 x 1	6,3	5993050200	TD-BV10PT-L10x1-PA	5993002000	TD-BV10CJ-L/S10
L 10 x 1,5	5,5	5993050300	TD-BV10PT-L/S10x1,5-PA	5993002000	TD-BV10CJ-L/S10
L 12 x 1	8,0	5993050400	TD-BV10PT-L12x1-PA	5993003000	TD-BV10CJ-L/S12
L 12 x 1,5	7,5	5993050500	TD-BV10PT-L/S12x1,5-PA	5993003000	TD-BV10CJ-L/S12
L 15 x 1,5	10,2	5993050600	TD-BV10PT-L15x1,5-PA	5993004000	TD-BV10CJ-L15
L 15 x 2	9,1	5993050700	TD-BV10PT-L15x2-PA	5993004000	TD-BV10CJ-L15
L 18 x 1,5	13,0	5993050800	TD-BV10PT-L18x1,5-PA	5993005000	TD-BV10CJ-L18
L 18 x 2	12,0	5993050900	TD-BV10PT-L18x2-PA	5993005000	TD-BV10CJ-L18
L 22 x 1,5	16,2	5993051000	TD-BV10PT-L22x1,5/22x2-PA	5993006000	TD-BV10CJ-L22
L 22 x 2	16,2	5993051000	TD-BV10PT-L22x1,5/22x2-PA	5993006000	TD-BV10CJ-L22
L 28 x 2	21,0	5993051100	TD-BV10PT-L28x2/28x2,5-PA	5993007000	TD-BV10CJ-L28
L 28 x 2,5	21,0	5993051100	TD-BV10PT-L28x2/28x2,5-PA	5993007000	TD-BV10CJ-L28
L 28 x 3	19,5	5993051200	TD-BV10PT-L28x3-PA	5993007000	TD-BV10CJ-L28
L 35 x 2	28,5	5993051300	TD-BV10PT-L35x2-PA	5993008000	TD-BV10CJ-L35
L 35 x 3	26,5	5993051400	TD-BV10PT-L35x3/35x3,5-PA	5993008000	TD-BV10CJ-L35
L 35 x 3,5	26,5	5993051400	TD-BV10PT-L35x3/35x3,5-PA	5993008000	TD-BV10CJ-L35
L 42 x 3	33,5	5993051600	TD-BV10PT-L42x3-PA	5993009000	TD-BV10CJ-L42

Locking plate available upon request.

Pre-assembly tools for BV-10 flared coned assembly

Type 80 N
Type 80 N2

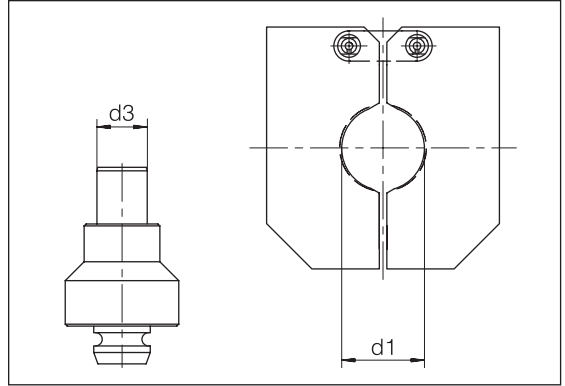


Series	d3	Order-No.	Designation	Order-No.	Designation
Tube OD			Pre-assembly stud		Clamping jaws
d1 x s					
S 8 x 1,5	4	5993051800	TD-BV10PT-S8x1,5-PA	5993001000	TD-BV10CJ-L/S8
S 8 x 2	3	5993051900	TD-BV10PT-S8x2-PA	5993001000	TD-BV10CJ-L/S8
S 10 x 1,5	5,5	5993050300	TD-BV10PT-L/S10x1,5-PA	5993002000	TD-BV10CJ-L/S10
S 10 x 2	4,5	5993052000	TD-BV10PT-S10x2/12x3-PA	5993002000	TD-BV10CJ-L/S10
S 12 x 1,5	7,5	5993050500	TD-BV10PT-L/S12x1,5-PA	5993003000	TD-BV10CJ-L/S12
S 12 x 2	6,5	5993052100	TD-BV10PT-S12x2-PA	5993003000	TD-BV10CJ-L/S12
S 12 x 3	4,5	5993052000	TD-BV10PT-S10x2/12x3-PA	5993003000	TD-BV10CJ-L/S12
S 14 x 2	8,5	5993052200	TD-BV10PT-S14x2/16x3-PA	5993014000	TD-BV10CJ-S14
S 14 x 3	6	5993052300	TD-BV10PT-S14x3-PA	5993014000	TD-BV10CJ-S14
S 16 x 2	10,5	5993052400	TD-BV10PT-S16x2-PA	5993015000	TD-BV10CJ-S16
S 16 x 2,5	9,5	5993052500	TD-BV10PT-S16x2,5-PA	5993015000	TD-BV10CJ-S16
S 16 x 3	8,5	5993052200	TD-BV10PT-S14x2/16x3-PA	5993015000	TD-BV10CJ-S16
S 20 x 2	13,5	5993052600	TD-BV10PT-S20x2/20x2,5-PA	5993016000	TD-BV10CJ-S20
S 20 x 2,5	13,5	5993052600	TD-BV10PT-S20x2/20x2,5-PA	5993016000	TD-BV10CJ-S20
S 20 x 3	12,5	5993052700	TD-BV10PT-S20x3-PA	5993016000	TD-BV10CJ-S20
S 20 x 3,5	11	5993052800	TD-BV10PT-S20x3,5-PA	5993016000	TD-BV10CJ-S20
S 20 x 4	10	5993057800	TD-BV10PT-S20x4-PA	5993016000	TD-BV10CJ-S20
S 25 x 2,5	18	5993053000	TD-BV10PT-S25x2,5-PA	5993017000	TD-BV10CJ-S25
S 25 x 3	17	5993053100	TD-BV10PT-S25x3/30x5-PA	5993017000	TD-BV10CJ-S25
S 25 x 4	15	5993053200	TD-BV10PT-S25x4-PA	5993017000	TD-BV10CJ-S25
S 30 x 3	22	5993053300	TD-BV10PT-S30x3-PA	5993018000	TD-BV10CJ-S30
S 30 x 4	20	5993053400	TD-BV10PT-S30x4-PA	5993018000	TD-BV10CJ-S30
S 30 x 5	17	5993053100	TD-BV10PT-S25x3/30x5-PA	5993018000	TD-BV10CJ-S30
S 38 x 3	30	5993053500	TD-BV10PT-S38x3-PA	5993019000	TD-BV10CJ-S38
S 38 x 4	27	5993053600	TD-BV10PT-S38x4-PA	5993019000	TD-BV10CJ-S38
S 38 x 5	26	5993053700	TD-BV10PT-S38x5-PA	5993019000	TD-BV10CJ-S38
S 38 x 6	23	5993053800	TD-BV10PT-S38x6-PA	5993019000	TD-BV10CJ-S38

Locking plate available upon request.

Pre-assembly tools for BV-10 flared coned assembly

Type 80 N3
Type 90 Basic II
Type 90 Comfort

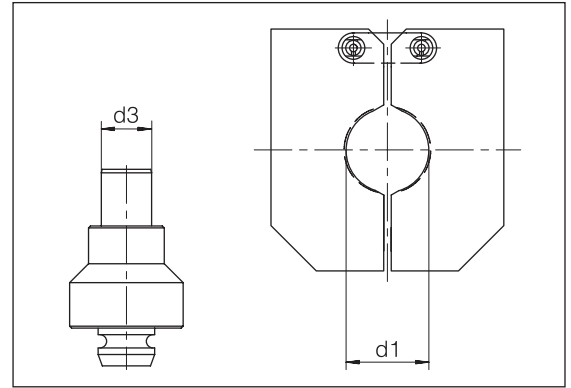


Series	d3	Order-No.	Designation	Order-No.	Designation
Tube OD			Pre-assembly stud		Clamping jaws
d1 x s					
L 6 x 1	2,9	5993020100	TD-BV10PT-L6x1-MT	5993000000	TD-BV10CJ-L/S6
L 8 x 1	4,9	5993020200	TD-BV10PT-L8x1-MT	5993001000	TD-BV10CJ-L/S8
L 10 x 1	6,3	5993020300	TD-BV10PT-L10x1-MT	5993002000	TD-BV10CJ-L/S10
L 10 x 1,5	5,5	5993020400	TD-BV10PT-L/S10x1,5-MT	5993002000	TD-BV10CJ-L/S10
L 12 x 1	8,0	5993020500	TD-BV10PT-L12x1-MT	5993003000	TD-BV10CJ-L/S12
L 12 x 1,5	7,5	5993020600	TD-BV10PT-L/S12x1,5-MT	5993003000	TD-BV10CJ-L/S12
L 15 x 1,5	10,2	5993020700	TD-BV10PT-L15x1,5-MT	5993004000	TD-BV10CJ-L15
L 15 x 2	9,1	5993020800	TD-BV10PT-L15x2-MT	5993004000	TD-BV10CJ-L15
L 18 x 1,5	13,0	5993020900	TD-BV10PT-L18x1,5-MT	5993005000	TD-BV10CJ-L18
L 18 x 2	12,0	5993021000	TD-BV10PT-L18x2-MT	5993005000	TD-BV10CJ-L18
L 22 x 1,5	16,2	5993021100	TD-BV10PT-L22x1,5/22x2-MT	5993006000	TD-BV10CJ-L22
L 22 x 2	16,2	5993021100	TD-BV10PT-L22x1,5/22x2-MT	5993006000	TD-BV10CJ-L22
L 28 x 2	21,0	5993021200	TD-BV10PT-L28x2/28x2,5-MT	5993007000	TD-BV10CJ-L28
L 28 x 2,5	21,0	5993021200	TD-BV10PT-L28x2/28x2,5-MT	5993007000	TD-BV10CJ-L28
L 28 x 3	19,5	5993021300	TD-BV10PT-L28x3-MT	5993007000	TD-BV10CJ-L28
L 35 x 2	28,5	5993021400	TD-BV10PT-L35x2-MT	5993008000	TD-BV10CJ-L35
L 35 x 3	26,5	5993021500	TD-BV10PT-L35x3/35x3,5-MT	5993008000	TD-BV10CJ-L35
L 35 x 3,5	26,5	5993021500	TD-BV10PT-L35x3/35x3,5-MT	5993008000	TD-BV10CJ-L35
L 42 x 3	33,5	5993021700	TD-BV10PT-L42x3-MT	5993009000	TD-BV10CJ-L42

Locking plate available upon request.

Pre-assembly tools for BV-10 flared coned assembly

Type 80 N3
Type 90 Basic II
Type 90 Comfort

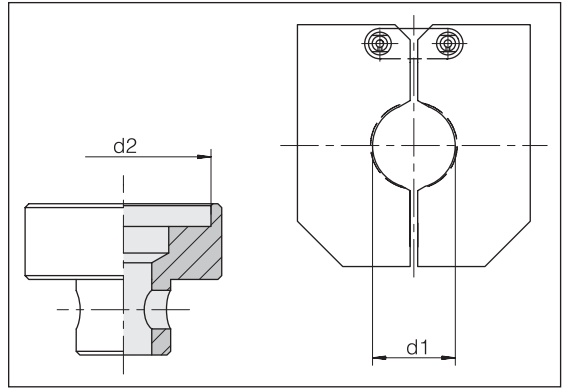


Series	d3	Order-No.	Designation	Order-No.	Designation
Tube OD			Pre-assembly stud		Clamping jaws
d1 x s					
S 8 x 1,5	4	5993021800	TD-BV10PT-S8x1,5-MT	5993001000	TD-BV10CJ-L/S8
S 8 x 2	3	5993021900	TD-BV10PT-S8x2-MT	5993001000	TD-BV10CJ-L/S8
S 10 x 1,5	5,5	5993020400	TD-BV10PT-L-S10x1,5-MT	5993002000	TD-BV10CJ-L/S10
S 10 x 2	4,5	5993022000	TD-BV10PT-S10x2/12x3-MT	5993002000	TD-BV10CJ-L/S10
S 12 x 1,5	7,5	5993020600	TD-BV10PT-L-S12x1,5-MT	5993003000	TD-BV10CJ-L/S12
S 12 x 2	6,5	5993022100	TD-BV10PT-S12x2-MT	5993003000	TD-BV10CJ-L/S12
S 12 x 3	4,5	5993022000	TD-BV10PT-S10x2/12x3-MT	5993003000	TD-BV10CJ-L/S12
S 14 x 2	8,5	5993022200	TD-BV10PT-S14x2/16x3-MT	5993014000	TD-BV10CJ-S14
S 14 x 3	6	5993022300	TD-BV10PT-S14x3-MT	5993014000	TD-BV10CJ-S14
S 16 x 2	10,5	5993022400	TD-BV10PT-S16x2-MT	5993015000	TD-BV10CJ-S16
S 16 x 2,5	9,5	5993022500	TD-BV10PT-S16x2,5-MT	5993015000	TD-BV10CJ-S16
S 16 x 3	8,5	5993022200	TD-BV10PT-S14x2/16x3-MT	5993015000	TD-BV10CJ-S16
S 20 x 2	13,5	5993022600	TD-BV10PT-S20x2/20x2,5-MT	5993016000	TD-BV10CJ-S20
S 20 x 2,5	13,5	5993022600	TD-BV10PT-S20x2/20x2,5-MT	5993016000	TD-BV10CJ-S20
S 20 x 3	12,5	5993022700	TD-BV10PT-S20x3-MT	5993016000	TD-BV10CJ-S20
S 20 x 3,5	11	5993022800	TD-BV10PT-S20x3,5-MT	5993016000	TD-BV10CJ-S20
S 20 x 4	10	5993023900	TD-BV10PT-S20x4-MT	5993016000	TD-BV10CJ-S20
S 25 x 2,5	18	5993023000	TD-BV10PT-S25x2,5-MT	5993017000	TD-BV10CJ-S25
S 25 x 3	17	5993023100	TD-BV10PT-S25x3/30x5-MT	5993017000	TD-BV10CJ-S25
S 25 x 4	15	5993023200	TD-BV10PT-S25x4-MT	5993017000	TD-BV10CJ-S25
S 30 x 3	22	5993023300	TD-BV10PT-S30x3-MT	5993018000	TD-BV10CJ-S30
S 30 x 4	20	5993023400	TD-BV10PT-S30x4-MT	5993018000	TD-BV10CJ-S30
S 30 x 5	17	5993023100	TD-BV10PT-S25x3/30x5-MT	5993018000	TD-BV10CJ-S30
S 38 x 3	30	5993023500	TD-BV10PT-S38x3-MT	5993019000	TD-BV10CJ-S38
S 38 x 4	27	5993023600	TD-BV10PT-S38x4-MT	5993019000	TD-BV10CJ-S38
S 38 x 5	26	5993023700	TD-BV10PT-S38x5-MT	5993019000	TD-BV10CJ-S38
S 38 x 6	23	5993023800	TD-BV10PT-S38x6-MT	5993019000	TD-BV10CJ-S38

Locking plate available upon request.

Pre-assembly tools for ZAKO ring assembly

Type 80 N
Type 80 N2

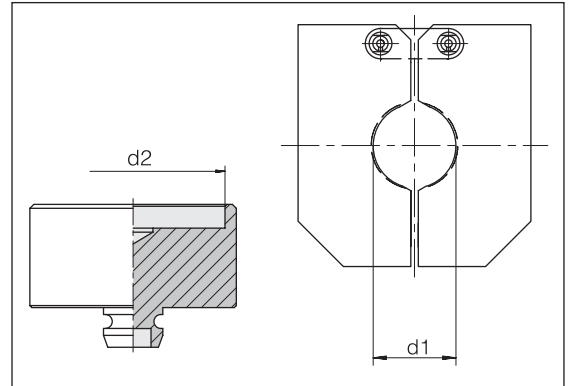


Flange size NW	d2	Order-No.	Designation Pre-assembly stud	Tube OD d1	Order-No.	Designation Clamping jaws
1/2"	30,3	5993065100	TD-ZAKOPP-1/2-PA	16	5993015000	TD-BV10CJ-S16
3/4"	38,3	5993066100	TD-ZAKOPP-3/4-PA	20	5993016000	TD-BV10CJ-S20
1"	46,3	5993067100	TD-ZAKOPP-1-PA	25	5993017000	TD-BV10CJ-S25
1 1/4"	52,3	5993068100	TD-ZAKOPP-1 1/4-PA	30	5993018000	TD-BV10CJ-S30
				38	5993019000	TD-BV10CJ-S38

Locking plate available upon request.

Pre-assembly tools for ZAKO ring assembly

Type 80 N3
Type 90 Basic II
Type 90 Comfort

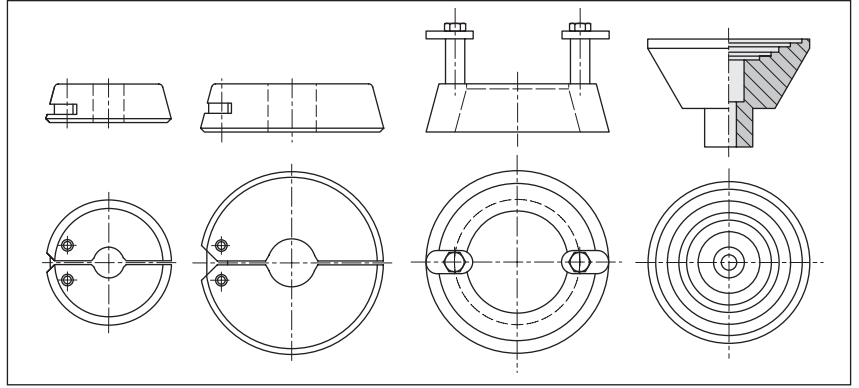


Flange size	d2	Order-No.	Designation	Tube OD	Order-No.	Designation
NW			Pre-assembly stud	d1		Clamping jaws
1/2"	30,3	5993065300	TD-ZAKOPP-1/2-MT	16	5993015000	TD-BV10CJ-S16
3/4"	38,3	5993066300	TD-ZAKOPP-3/4-MT	20	5993016000	TD-BV10CJ-S20
1"	46,3	5993067300	TD-ZAKOPP-1-MT	25	5993017000	TD-BV10CJ-S25
1 1/4"	52,3	5993068400	TD-ZAKOPP-1 1/4-MT	30	5993018000	TD-BV10CJ-S30
				38	5993019000	TD-BV10CJ-S38

Locking plate available upon request.

Pre-assembly
tools for
ZAKO ring
assembly

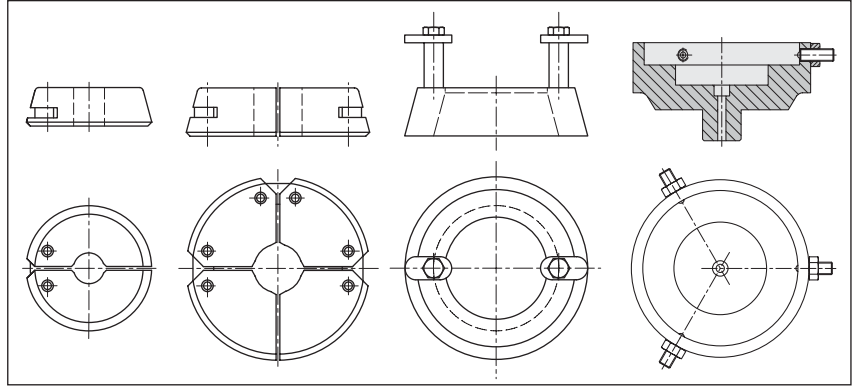
Typ 82



Tube OD	Order-No.	Designation	Order-No.	Designation	Order-No.	Designation	Order-No.	Designation
		Clamping jaws		Clamping jaws		Spacer ring		Pressure plate
16	5514963100	TD-ZAKOCJ-16-TYPE82			5514978000	TD-ZAKOSR-TYPE82	5514980000	TD-ZAKOPP-16-65-TYPE82
20	5514964100	TD-ZAKOCJ-20-TYPE82			5514978000	TD-ZAKOSR-TYPE82	5514980000	TD-ZAKOPP-16-65-TYPE82
25			5514965200	TD-ZAKOCJ-25-TYPE82			5514980000	TD-ZAKOPP-16-65-TYPE82
30			5514966200	TD-ZAKOCJ-30-TYPE82			5514980000	TD-ZAKOPP-16-65-TYPE82
38			5514967200	TD-ZAKOCJ-38-TYPE82			5514980000	TD-ZAKOPP-16-65-TYPE82
50			5514968100	TD-ZAKOCJ-50-TYPE82			5514980000	TD-ZAKOPP-16-65-TYPE82
60			5514968249	TD-ZAKOCJ-60-TYPE82			5514980000	TD-ZAKOPP-16-65-TYPE82
65			5514969100	TD-ZAKOCJ-65-TYPE82			5514980000	TD-ZAKOPP-16-65-TYPE82

Pre-assembly tools for ZAKO ring assembly

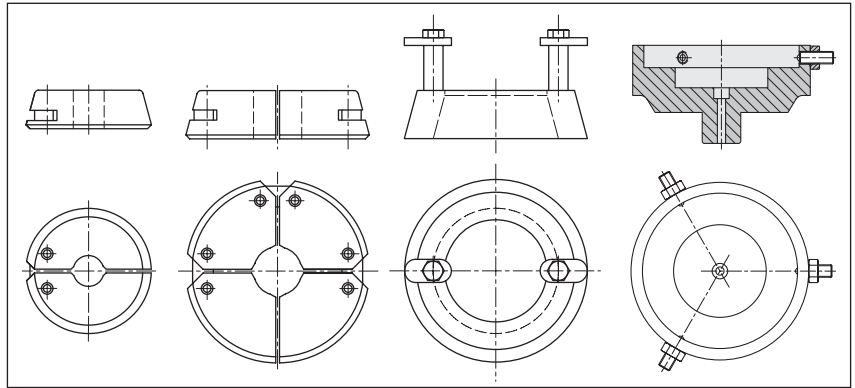
Type 85



Tube OD	Order-No.	Designation	Order-No.	Designation	Order-No.	Designation	Order-No.	Designation
		Clamping jaws		Clamping jaws		Spacer ring		Pressure plate
38	5514940049	TD-ZAKOCJ-38-TYPE85			5514978100	TD-ZAKOSR-TYPE85	5993802749	TD-ZAKOPP-38-TYPE85
50	5514940149	TD-ZAKOCJ-50-TYPE85			5514978100	TD-ZAKOSR-TYPE85	5993801849	TD-ZAKOPP-48,3/50-TYPE85
60	5514940249	TD-ZAKOCJ-60-TYPE85			5514978100	TD-ZAKOSR-TYPE85	5993801949	TD-ZAKOPP-60-TYPE85
65	5514940349	TD-ZAKOCJ-65-TYPE85			5514978100	TD-ZAKOSR-TYPE85	5993802049	TD-ZAKOPP-65-TYPE85
75			5514940949	TD-ZAKOCJ-75-TYPE85			5993802149	TD-ZAKOPP-75-TYPE85
80			5514940449	TD-ZAKOCJ-80-TYPE85			5993802249	TD-ZAKOPP-76,1/80-TYPE85
88			5514940549	TD-ZAKOCJ-88-TYPE85			5993802349	TD-ZAKOPP-88-TYPE85
101,6			5514940649	TD-ZAKOCJ-101,6-TYPE85			5993802449	TD-ZAKOPP-88,9/101,6-TYPE85
114,3			5514940749	TD-ZAKOCJ-114,3-TYPE85			5993802549	TD-ZAKOPP-114,3-TYPE85

Pre-assembly
tools for
ZAKO LP ring
assembly

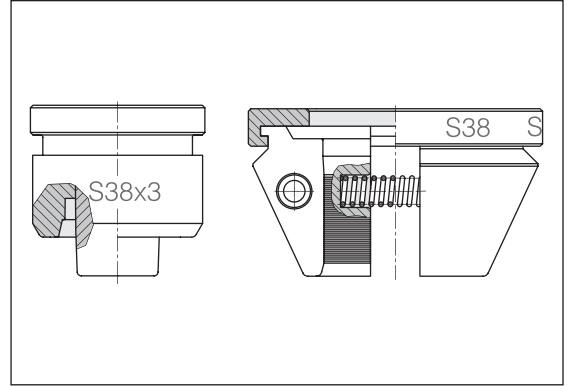
Type 85



Flange size	Tube OD	Order-No.	Designation	Order-No.	Designation	Order-No.	Designation	Order-No.	Designation
		Clamping jaws		Clamping jaws		Spacer ring		Pressure plate	
1 1/2"	48,3	5514941049	TD-ZAKOCJ-48,3-TYPE85			5514978100	TD-ZAKOSR-TYPE85	5993801849	TD-ZAKOPP-48,3/50-TYPE85
2"	60,3	5514941149	TD-ZAKOCJ-60,3-TYPE85			5514978100	TD-ZAKOSR-TYPE85	5993397949	TD-ZAKOPP-60,3-ID72,5-TYPE85
2 1/2"	60,3	5514941149	TD-ZAKOCJ-60,3-TYPE85			5514978100	TD-ZAKOSR-TYPE85	5993802949	TD-ZAKOPP-60,3-ID85,5-TYPE85
3"	76,1			5514941249	TD-ZAKOCJ-76,1-TYPE85			5993802249	TD-ZAKOPP-76,1/80-TYPE85
3 1/2"	88,9			5514941349	TD-ZAKOCJ-88,9-TYPE85			5993802449	TD-ZAKOPP-88,9/101,6-TYPE85
4"	114,3			5514940749	TD-ZAKOCJ-114,3-TYPE85			5993802849	TD-ZAKOPP-114,3-ID150,5-TYPE85

Pre-assembly tools VOSSForm^{SQR} (steel)

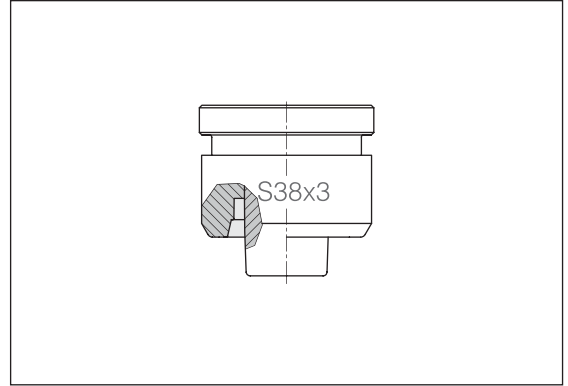
Type 100 / Type 100 Compact



Tube OD	Order-No.	Designation	Tube OD	Order-No.	Designation
Forming head			Clamping jaws		
L/S 6 x 1	5993290690	TD-SQRFH-L/S6x1	L/S 6	5993090149	TD-SQRCJ-L/S6
L/S 6 x 1,5	5993290691	TD-SQRFH-L/S6x1,5	L/S 8	5993092949	TD-SQRCJ-L/S8
L/S 6 x 2	5993290692	TD-SQRFH-L/S6x2	L/S 10	5993093649	TD-SQRCJ-L/S10
L/S 8 x 1	5993293490	TD-SQRFH-L/S8x1	L/S 12	5993094349	TD-SQRCJ-L/S12
L/S 8 x 1,5	5993293491	TD-SQRFH-L/S8x1,5	L 15	5993096049	TD-SQRCJ-L15
L/S 8 x 2	5993293492	TD-SQRFH-L/S8x2	L 18	5993096749	TD-SQRCJ-L18
L/S 8 x 2,5	5993293493	TD-SQRFH-L/S8x2,5	L 22	5993097449	TD-SQRCJ-L22
L 10 x 1	5993294190	TD-SQRFH-L10x1	L 28	5993098149	TD-SQRCJ-L28
L 10 x 1,5	5993294191	TD-SQRFH-L10x1,5	L 35	5993098849	TD-SQRCJ-L35
L 10 x 2	5993294192	TD-SQRFH-L10x2	L 42	5993092249	TD-SQRCJ-L42
L 12 x 1	5993294890	TD-SQRFH-L12x1	S 14	5993099549	TD-SQRCJ-S14
L 12 x 1,5	5993294891	TD-SQRFH-L12x1,5	S 16	5993090849	TD-SQRCJ-S16
L 12 x 2	5993294892	TD-SQRFH-L12x2	S 20	5993091549	TD-SQRCJ-S20
L 15 x 1,5	5993296591	TD-SQRFH-L15x1,5	S 25	5993100349	TD-SQRCJ-S25
L 15 x 2	5993296592	TD-SQRFH-L15x2	S 30	5993101049	TD-SQRCJ-S30
L 15 x 2,5	5993296593	TD-SQRFH-L15x2,5	S 38	5993101749	TD-SQRCJ-S38
L 18 x 1,5	5993297291	TD-SQRFH-L18x1,5			
L 18 x 2	5993297292	TD-SQRFH-L18x2			
L 18 x 2,5	5993297293	TD-SQRFH-L18x2,5			
L 18 x 3	5993297294	TD-SQRFH-L18x3			
L 22 x 1,5	5993297991	TD-SQRFH-L22x1,5			
L 22 x 2	5993297992	TD-SQRFH-L22x2			
L 22 x 2,5	5993297993	TD-SQRFH-L22x2,5			
L 22 x 3	5993297994	TD-SQRFH-L22x3			
L 28 x 2	5993298692	TD-SQRFH-L28x2			
L 28 x 2,5	5993298693	TD-SQRFH-L28x2,5			
L 28 x 3	5993298694	TD-SQRFH-L28x3			
L 35 x 2	5993299392	TD-SQRFH-L35x2			
L 35 x 2,5	5993299393	TD-SQRFH-L35x2,5			
L 35 x 3	5993299394	TD-SQRFH-L35x3			
L 35 x 4	5993299396	TD-SQRFH-L35x4			
L 42 x 2	5993292792	TD-SQRFH-L42x2			

Pre-assembly tools VOSSForm^{SQR} (steel)

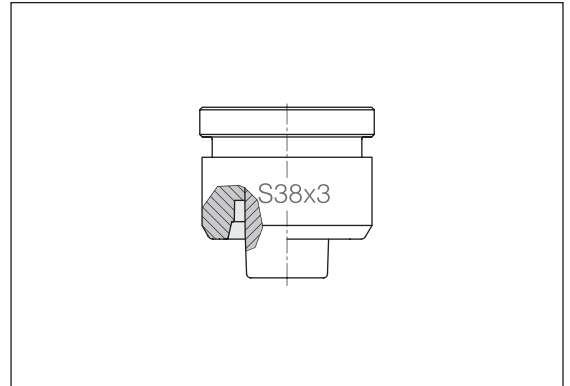
Type 100 / Type 100 Compact



Tube OD	Order-No.	Designation
		Clamping jaws
L 42 x 2,5	5993292793	TD-SQRFH-L42x2,5
L 42 x 3	5993292794	TD-SQRFH-L42x3
L 42 x 4	5993292796	TD-SQRFH-L42x4
S 10 x 1,5	5993295391	TD-SQRFH-S10x1,5
S 10 x 2	5993295392	TD-SQRFH-S10x2
S 10 x 2,5	5993295393	TD-SQRFH-S10x2,5
S 12 x 1,5	5993295891	TD-SQRFH-S12x1,5
S 12 x 2	5993295892	TD-SQRFH-S12x2
S 12 x 2,5	5993295893	TD-SQRFH-S12x2,5
S 12 x 3	5993295894	TD-SQRFH-S12x3
S 14 x 1,5	5993300191	TD-SQRFH-S14x1,5
S 14 x 2	5993300192	TD-SQRFH-S14x2
S 14 x 2,5	5993300193	TD-SQRFH-S14x2,5
S 14 x 3	5993300194	TD-SQRFH-S14x3
S 16 x 1,5	5993291391	TD-SQRFH-S16x1,5
S 16 x 2	5993291392	TD-SQRFH-S16x2
S 16 x 2,5	5993291393	TD-SQRFH-S16x2,5
S 16 x 3	5993291394	TD-SQRFH-S16x3
S 16 x 4	5993291396	TD-SQRFH-S16x4
S 20 x 2	5993292092	TD-SQRFH-S20x2
S 20 x 2,5	5993292093	TD-SQRFH-S20x2,5
S 20 x 3	5993292094	TD-SQRFH-S20x3
S 20 x 3,5	5993292095	TD-SQRFH-S20x3,5
S 20 x 4	5993292096	TD-SQRFH-S20x4
S 25 x 2	5993300892	TD-SQRFH-S25x2
S 25 x 2,5	5993300893	TD-SQRFH-S25x2,5
S 25 x 3	5993300894	TD-SQRFH-S25x3
S 25 x 4	5993300896	TD-SQRFH-S25x4
S 30 x 2	5993301592	TD-SQRFH-S30x2
S 30 x 2,5	5993301593	TD-SQRFH-S30x2,5
S 30 x 3	5993301594	TD-SQRFH-S30x3
S 30 x 4	5993301596	TD-SQRFH-S30x4

Pre-assembly tools VOSSForm^{SQR} (steel)

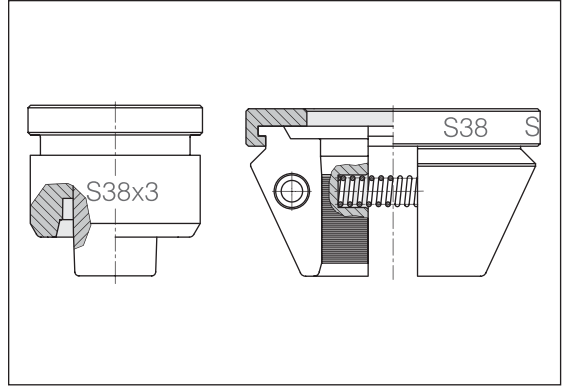
Type 100 / Type 100 Compact



Tube OD	Order-No.	Designation
		Clamping jaws
S 30 x 5	5993301597	TD-SQRFH-S30x5
S 30 x 6	5993301598	TD-SQRFH-S30x6
S 38 x 2,5	5993302293	TD-SQRFH-S38x2,5
S 38 x 3	5993302294	TD-SQRFH-S38x3
S 38 x 4	5993302296	TD-SQRFH-S38x4
S 38 x 5	5993302297	TD-SQRFH-S38x5
S 38 x 6	5993302298	TD-SQRFH-S38x6
S 38 x 7	5993302299	TD-SQRFH-S38x7

Pre-assembly tools VOSSForm^{SQRVA} (stainless steel)

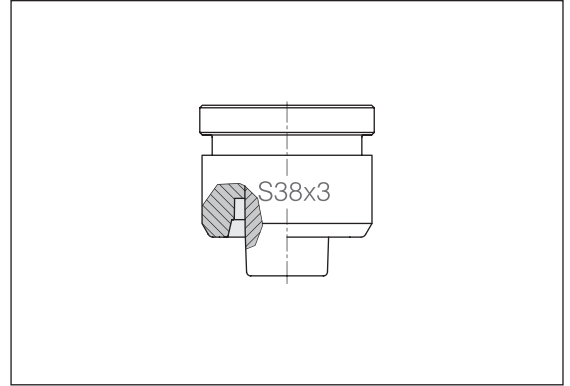
Type 100 / Type 100 Compact



Tube OD	Order-No.	Designation	Tube OD	Order-No.	Designation
Forming head			Clamping jaws		
L/S 6 x 1	5993145000	TD-SQRFH-L/S6x1-SST	L/S 6	5993090149	TD-SQRCJ-L/S6
L/S 6 x 1,5	5993145100	TD-SQRFH-L/S6x1,5-SST	L/S 8	5993092949	TD-SQRCJ-L/S8
L/S 6 x 2	5993145200	TD-SQRFH-L/S6x2-SST	L/S 10	5993093649	TD-SQRCJ-L/S10
L/S 8 x 1	5993145300	TD-SQRFH-L/S8x1-SST	L/S 12	5993094349	TD-SQRCJ-L/S12
L/S 8 x 1,5	5993145400	TD-SQRFH-L/S8x1,5-SST	L 15	5993096049	TD-SQRCJ-L15
L/S 8 x 2	5993145500	TD-SQRFH-L/S8x2-SST	L 18	5993096749	TD-SQRCJ-L18
L/S 8 x 2,5	5993145600	TD-SQRFH-L/S8x2,5-SST	L 22	5993097449	TD-SQRCJ-L22
L 10 x 1	5993145700	TD-SQRFH-L10x1-SST	L 28	5993098149	TD-SQRCJ-L28
L 10 x 1,5	5993145800	TD-SQRFH-L10x1,5-SST	L 35	5993098849	TD-SQRCJ-L35
L 10 x 2	5993145900	TD-SQRFH-L10x2-SST	L 42	5993092249	TD-SQRCJ-L42
L 12 x 1	5993146000	TD-SQRFH-L12x1-SST	S 14	5993099549	TD-SQRCJ-S14
L 12 x 1,5	5993146100	TD-SQRFH-L12x1,5-SST	S 16	5993090849	TD-SQRCJ-S16
L 12 x 2	5993146200	TD-SQRFH-L12x2-SST	S 20	5993091549	TD-SQRCJ-S20
L 15 x 1,5	5993146300	TD-SQRFH-L15x1,5-SST	S 25	5993100349	TD-SQRCJ-S25
L 15 x 2	5993146400	TD-SQRFH-L15x2-SST	S 30	5993101049	TD-SQRCJ-S30
L 15 x 2,5	5993146500	TD-SQRFH-L15x2,5-SST	S 38	5993101749	TD-SQRCJ-S38
L 18 x 1,5	5993146600	TD-SQRFH-L18x1,5-SST			
L 18 x 2	5993146700	TD-SQRFH-L18x2-SST			
L 18 x 2,5	5993146800	TD-SQRFH-L18x2,5-SST			
L 18 x 3	5993146900	TD-SQRFH-L18x3-SST			
L 22 x 1,5	5993147000	TD-SQRFH-L22x1,5-SST			
L 22 x 2	5993147100	TD-SQRFH-L22x2-SST			
L 28 x 2	5993147200	TD-SQRFH-L28x2-SST			
L 28 x 2,5	5993147300	D-SQRFH-L28x2,5-SST			
L 28 x 3	5993147400	TD-SQRFH-L28x3-SST			
L 35 x 2	5993147500	TD-SQRFH-L35x2-SST			
L 35 x 2,5	5993147600	TD-SQRFH-L35x2,5-SST			
L 35 x 3	5993147700	TD-SQRFH-L35x3-SST			
L 42 x 2	5993147800	TD-SQRFH-L42x2-SST			
L 42 x 3	5993147900	TD-SQRFH-L42x3-SST			

Pre-assembly tools VOSSForm^{SQRVA} (stainless steel)

Type 100 / Type 100 Compact



Tube OD	Order-No.	Designation
Forming head		
S 10 x 1,5	5993148000	TD-SQRFH-S10x1,5-SST
S 10 x 2	5993148100	TD-SQRFH-S10x2-SST
S 10 x 2,5	5993148200	TD-SQRFH-S10x2,5-SST
S 12 x 1,5	5993148300	TD-SQRFH-S12x1,5-SST
S 12 x 2	5993148400	TD-SQRFH-S12x2-SST
S 12 x 2,5	5993148500	TD-SQRFH-S12x2,5-SST
S 12 x 3	5993148600	TD-SQRFH-S12x3-SST
S 14 x 1,5	5993148700	TD-SQRFH-S14x1,5-SST
S 14 x 2	5993148800	TD-SQRFH-S14x2-SST
S 14 x 2,5	5993148900	TD-SQRFH-S14x2,5-SST
S 14 x 3	5993149000	TD-SQRFH-S14x3-SST
S 16 x 1,5	5993149100	TD-SQRFH-S16x1,5-SST
S 16 x 2	5993149200	TD-SQRFH-S16x2-SST
S 16 x 2,5	5993149300	TD-SQRFH-S16x2,5-SST
S 16 x 3	5993149400	TD-SQRFH-S16x3-SST
S 20 x 2	5993149500	TD-SQRFH-S20x2-SST
S 20 x 2,5	5993149600	TD-SQRFH-S20x2,5-SST
S 20 x 3	5993149700	TD-SQRFH-S20x3-SST
S 25 x 2	5993149800	TD-SQRFH-S25x2-SST
S 25 x 2,5	5993149900	TD-SQRFH-S25x2,5-SST
S 25 x 3	5993150000	TD-SQRFH-S25x3-SST
S 25 x 4	5993150100	TD-SQRFH-S25x4-SST
S 30 x 2,5	5993150200	TD-SQRFH-S30x2,5-SST
S 30 x 3	5993150300	TD-SQRFH-S30x3-SST
S 30 x 4	5993150400	TD-SQRFH-S30x4-SST
S 38 x 2,5	5993150500	TD-SQRFH-S38x2,5-SST
S 38 x 3	5993150600	TD-SQRFH-S38x3-SST
S 38 x 4	5993150700	TD-SQRFH-S38x4-SST

