

SUPPORTING
PARTS SECURELY.

SUPPORT
ELEMENTS.



THE PRINCIPLE: AS FLEXIBLE AS THE JOB DEMANDS.



KOSTYRKA® support element in cartridge form

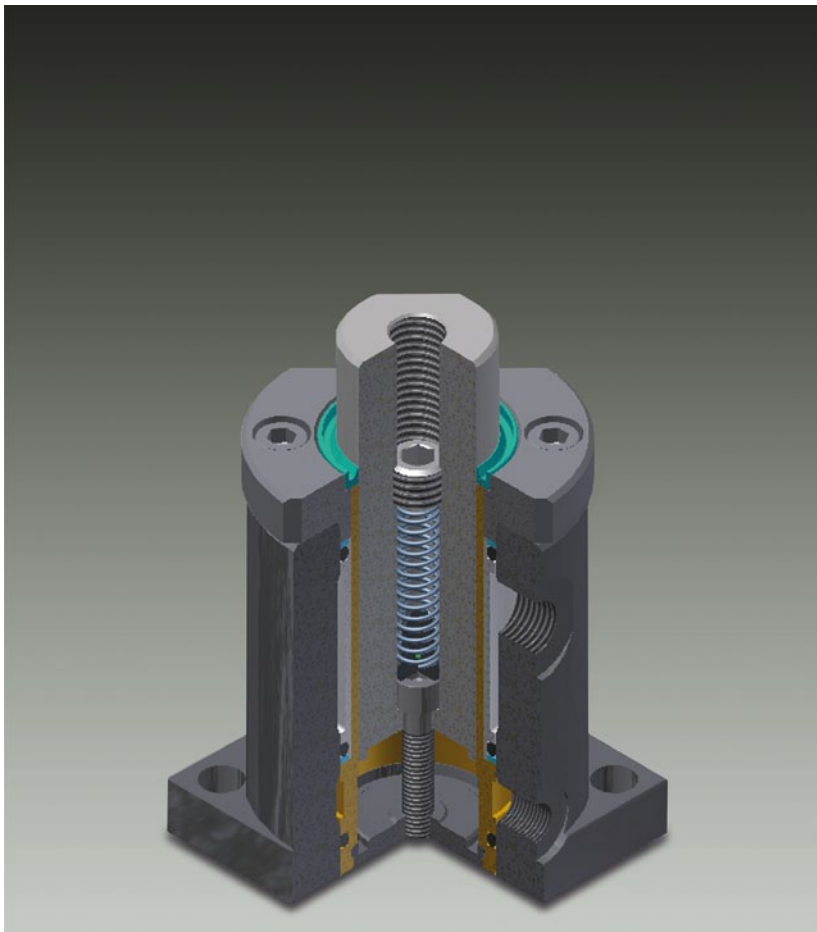
KOSTYRKA® support elements have been used reliably since 1969. They stabilise workpieces during the work process and help to minimise vibrations. This improves product quality and increases the tool's service life.

KOSTYRKA® support elements are available in many different versions. Hydraulic support elements in compact cartridge form enable direct installation in a fixture frame. Off-the-shelf hydraulic support elements have supporting bolts with diameters from 10 to 40 mm (0,39 to 1,57 inches), can withstand axial shifting forces of up to 28 kN and work with pressures from 50 to 450 bars (700 to 6500 psi).

Their operation is absolutely reliable

The core of every KOSTYRKA® support element is the KOSTYRKA® clamping sleeve. It guarantees that the clamped supporting bolt is not axially displaced or twisted during the clamping operation. This is regardless of whether the advancing of the supporting bolt to the workpiece is pneumatic, hydraulic or via spring force: The special design of the KOSTYRKA® hydraulic support element always allows secure positive locking and adherence-actuated connection from the clamped supporting bolt into the machine table and the fixture.

*KOSTYRKA®
support element,
universal version*



*Cartridge support
element with
housing = universal
version support
element (here:
Support bolt,
spring-loaded,
5310.10 series).*

KOSTYRKA® – HYDRAULIC SUPPORT ELEMENT IN CARTRIDGE FORM.



KOSTYRKA® hydraulic support elements in cartridge form are pushed directly into prepared holes in the fixture body and secured by screws onto the flange, thereby forming a part of the fixture.

The flange flattened on both sides enables these support elements to be placed very close to each other. To supply the elements with pressure oil and – if so – compressed air, only through boreholes are required.

KOSTYRKA® hydraulic support elements in cartridge form were originally developed for use in the aircraft industry, where they are used in large numbers to support light metal moulded parts.

Attention had to be paid to the following criteria for this:

- high density of support points
- the lowest possible contact force
- great reliability through self-cleaning

Pneumatic advancing pays great attention to the last point in particular: The low air flow passing the supporting bolt keeps away impurities and chips.

Supporting bolt, pneumatically advanced, without retaining spring, 5315 series

KOSTYRKA® hydraulic support elements of the 5315 series are supplied with a pneumatically advanced supporting bolt. This means that the supporting bolt is retracted in the resting position. The advancing and support operations can be dosed to an unusually precise degree via the air control. The contact force of the supporting bolt can be less than 1 N when the support elements are arranged horizontally. The supporting bolt is clamped hydraulically after being advanced against the workpiece.

The supporting bolts of this series maintain their position after the advancing and clamping forces are removed. However, they can be pushed back again very easily by the workpiece for example.

Important: For this series we urgently recommend that the compressed air used to advance the supporting bolt be refined via an air service unit.

Supporting bolt, spring-loaded, 5316 series

KOSTYRKA® hydraulic support elements of the 5316 series are supplied with a spring-loaded supporting bolt. Here, the supporting bolt is extended in the resting position. It is pushed by the workpiece into the required support position and is then clamped hydraulically.

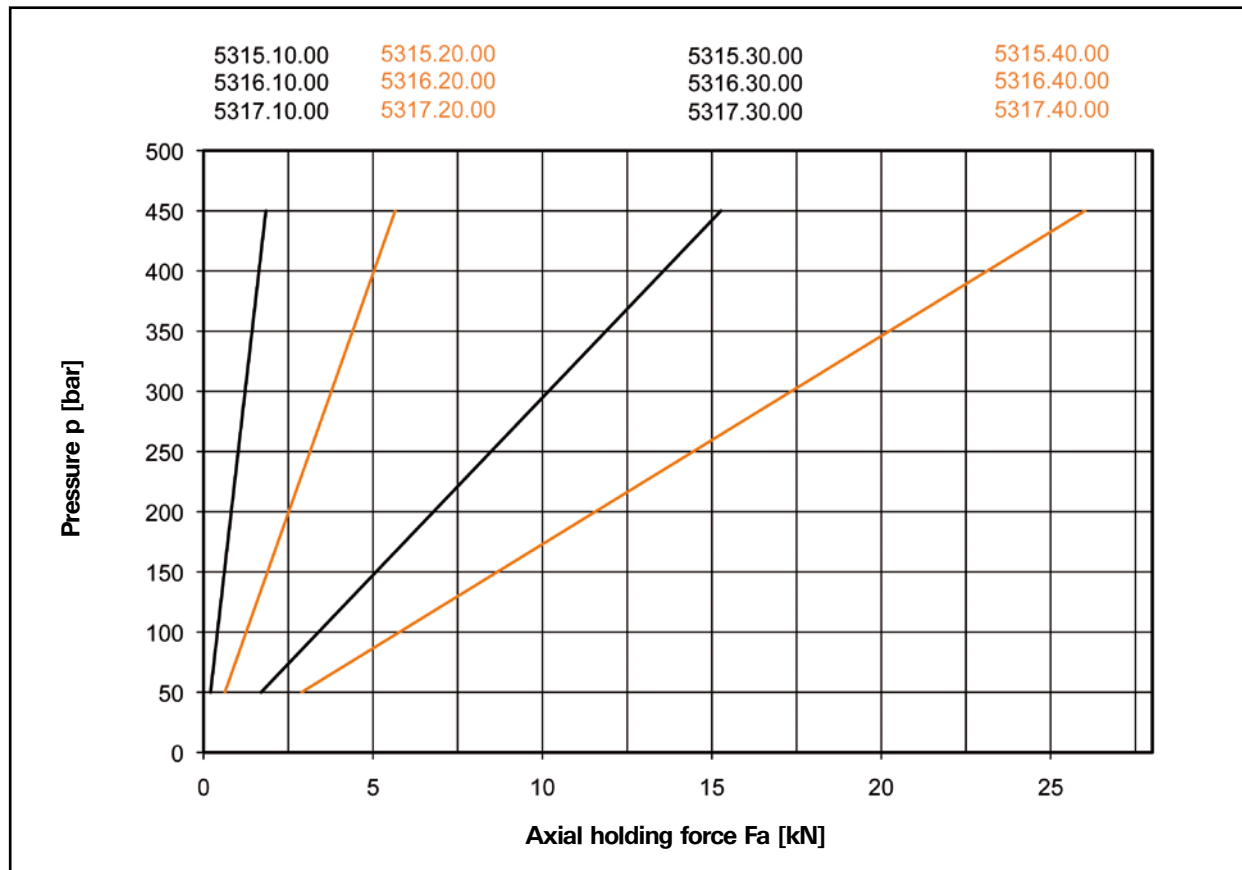
Supporting bolt, pneumatically advanced, with retaining spring, 5317 series

KOSTYRKA® hydraulic support elements of the 5317 series are supplied with a supporting bolt that has a retaining spring. Here, the supporting bolt is retracted in the resting position, is advanced pneumatically against the workpiece and is then clamped hydraulically. After the advancing and clamping forces are removed, the supporting bolt is automatically pushed back into its resting position.

Important: For this series we urgently recommend that the compressed air used to advance the supporting bolt be refined via an air service unit.

Supporting forces

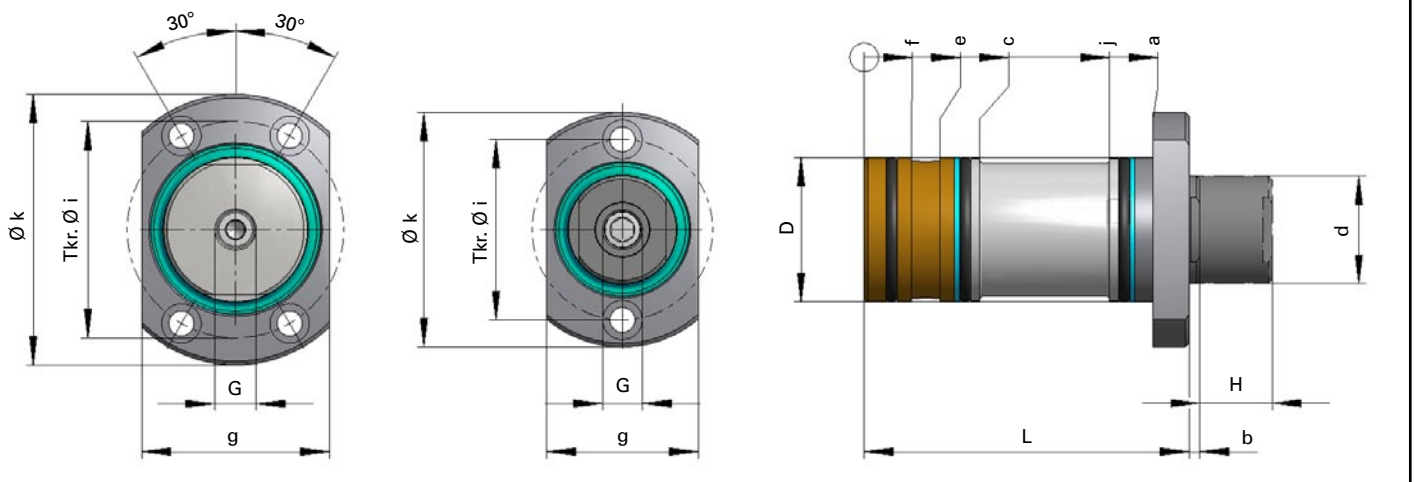
The diagram shows the load-bearing capacity of the KOSTYRKA® hydraulic support elements in cartridge form as a function of the clamping pressure.



Holding forces of hydraulic support elements (standard)

Dimensions

The dimensions apply to the standard series of KOSTYRKA® hydraulic support elements in cartridge form.



Series		5315.10	5315.20	5315.30	5315.40
		5316.10	5316.20	5316.30	5316.40
		5317.10	5317.20	5317.30	5317.40
Supporting bolt diameter	d	10	20	30	40
Supporting bolt stroke	H	10	15	20	20
Screw-in thread	G	M6	M12	M12	M12
Shank diameter	D	20	30	40	50
Total length	L	60	70	90	100
Bolt projection	b	2	3	3	4
Insertion length	a	52	62	80	90
Flange dimensions	g	21	31	42	52
	k	40	54	65	75
Securing with cylinder head screws	n	2 x M5	2 x M6	2 x M6	4 x M6
Pitch circle ± 0.1	i	28	40	50	60
Space for oil infeed	c	43	50,5	68	78
and venting	j	30	30,5	32	32
Space for air infeed	e	20	20	21	21
	f	12	12	13	13

Subject to change

Installation instructions

To prevent an impermissible load on the material in the flange area, KOSTYRKA® hydraulic support elements in cartridge form must be supported by a shoulder in the locating hole or must be installed in a blind hole. Please refer to the point „Design of the locating hole“.

Fit matching, cartridge/locating hole

The fit matching of shaft diameter g6 and standard bore H7 has proved to be a clearance fit with good low-friction properties. The outside diameters of all types and sizes of KOSTYRKA® hydraulic support elements in cartridge form are therefore adapted to this fit matching.

The following applies:

Shank diameter D of the cartridge: g6

Internal diameter of the locating hole: H7

Design of the locating hole of KOSTYRKA® hydraulic support elements in cartridge form

To prevent damage to the seals of KOSTYRKA® clamping sleeves during installation, it is essential to provide rounded 20° lead chamfers of a sufficient size on the locating hole and in the area of the hollow. The openings of the oil infeed and venting holes must also be carefully deburred and rounded. The surface roughness of the locating hole in the area of the sleeve seals must not exceed $R_{\max} = 6 - 10 \mu\text{m}$ ($R_a \leq 1.6 \mu\text{m}$).

The roundness in the area of the sealing surfaces should be 0.02 mm or better.

The adjacent table shows the production dimensions for the locating holes of all series of KOSTYRKA® hydraulic support elements in cartridge form.

Subject to change

Series	5315.10 5316.10 5317.10	5315.20 5316.20 5317.20	5315.30 5316.30 5317.30	5315.40 5316.40 5317.40
D H7	20	30	40	50
d1	21,5	31,5	41,5	51,5
d2	20,5	30,5	40,5	50,5
d3	3	3	4	4
d4	4	4	4	4
d5	2 x M5	2 x M6	2 x M6	4 x M6
d6	10	20	30	40
$\varnothing \pm 0,1$	28	40	50	60
L + 0,05	52	62	80	90
L1	40	50	67	77
L2	32	42	59	69
L3	22	31,5	48	58
L4	9	11,5	12	12
L5	13,5	16	16,5	16,5
L6	17,5	27	43,5	53,5
L7	36	46	63	73

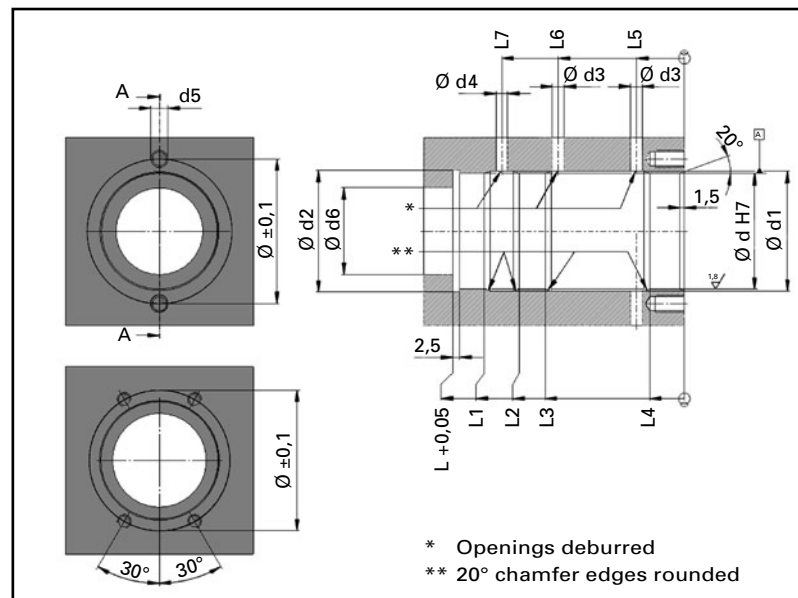
Installation

Installation and removal of KOSTYRKA® hydraulic support elements in cartridge form

Before installing the cartridge, the seals as well as the lead chamfers and the fit of the locating hole have to be greased. Then carefully push the cartridge into the hole without tilting it. To remove the cartridge, carefully pull it out of the locating hole without tilting it.

Venting after installing KOSTYRKA® hydraulic support elements in cartridge form

Compression heats air to such a degree that plastic and seals of the cartridge can be burned. For this reason it must be ensured that air traps cannot form either in the pressure oil supply lines or in the installation space of the cartridge. The venting hole must always be provided at the highest point of the respective arrangement of the support element. The screw plug of the venting hole must be kept open until the pressure oil emerges without any bubbles.



KOSTYRKA® HYDRAULIC SUPPORT ELEMENT

UNIVERSAL VERSION



KOSTYRKA supplies a complete set of universal support elements in the shape of the 5310 to 5312 series. They consist of a cartridge support element and a matching housing. This enables the support elements to be used as independent elements in fixtures or directly on the machine table. It is merely necessary to connect the pressure oil supply and, if necessary, the compressed air line.

As with the cartridge support elements, the following variants are available:

- 5310.10 – 5310.40: Spring-loaded supporting bolt
- 5311.10 – 5311.40: Supporting bolt, pneumatically advanced, with retaining spring
- 5312.10 – 5312.40: Supporting bolt, pneumatically advanced, without retaining spring

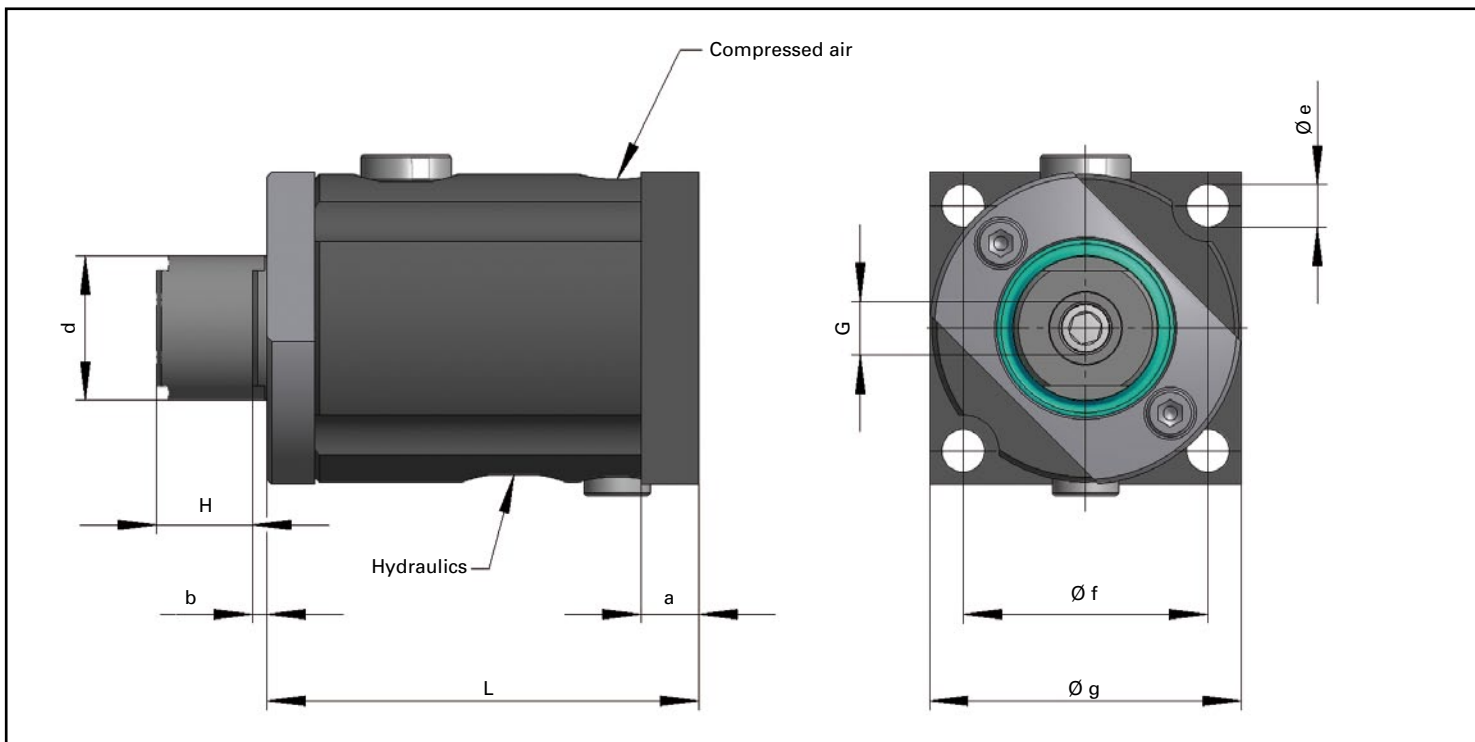
Note: The order number includes in each case the housing and the already installed cartridge support element.

Dimensions

Since there are virtually no limits to the configuration possibilities of these elements, we constantly have a selection of sizes in stock as standard. Special dimensions are available to meet customer-specific requirements. The table lists the standard stocked sizes. These are available at short notice.

Series		5310.10	5310.20	5310.30	5310.40
		5311.10	5311.20	5311.30	5311.40
		5312.10	5312.20	5312.30	5312.40
Supporting bolt diameter	d	10	20	30	40
Supporting bolt stroke	H	10	15	20	20
Screw-in thread	G	M6	M12	M12	M12
Housing length	L	60	70	90	100
Bolt projection	b	2	3	3	4
Side length	g	45	55	65	80
Flange thickness	a	6	10	12	15
Fixing hole spacing	f	35	43	51	64
Fixing hole	e	5,5	6,6	9	9
Pneumatic connection		G1/8	G1/8	G1/8	G1/8
Hydraulic connection		G1/8	G1/4	G1/4	G1/4

Subject to change



Operating conditions

KOSTYRKA® support elements are normally used with hydraulic oil, but water can also be added to them. Talk to our Development Department.

The operating pressure for KOSTYRKA® support elements is normally 50 to 450 bars (700 to 6500 psi). Operating pressures outside this range are possible by request.

The standard version of the plastic jacket of the KOSTYRKA® clamping sleeves is resistant to mineral oils, brake fluids and flame-retardant hydraulic fluids up to a temperature of 100°C (212°F). For higher operating temperatures, special versions are made using suitable plastics. The seals of the sleeves are resistant to hydraulic fluids and petroleum-based lubricants, transmission oils and also animal and vegetable fats in the range -35°C to +100°C (-31°F to 212°F). They can also be made for higher operating temperatures by request.

Venting following installation

Compression heats air to such a degree that plastic and seals of the internal KOSTYRKA® clamping sleeve can be burned. For this reason it must be ensured that air traps cannot form either in the pressure oil supply lines or in the installation space of the clamping sleeve. It must therefore be ensured that in the universal version, the KOSTYRKA® hydraulic support element is always vented at the highest point of the respective arrangement. The screw plug of the venting hole must be kept open until the pressure oil emerges without any bubbles.

VARIANTS AND EXAMPLES OF USE.



On the illustrated fixture of Geiger + Haag GmbH, the workpiece is clamped in a bore via the clamping mandrel and is scanned on the workpiece support. The hydraulic support elements are advanced to the workpiece via another circuit.

Hydraulic support elements, special versions

At KOSTYRKA, partnership with the customer means finding individual solutions and accompanying development processes right from the start. KOSTYRKA® hydraulic support elements can of course be adapted to the customer's needs. Contact our Development Department.

Different variants of support elements in cartridge form



Universal version in stainless steel

**Extract from the customer list**

ABB Robotics GmbH
Boeing Company, USA
Carl Zeiss Gruppe
Daimler AG
Deckel Maho Pfronten GmbH
Dörries Scharmann Technologie GmbH
Dr. Ing. h.c. F. Porsche AG
F. Zimmermann GmbH
FIBRO GmbH
Gebr. Heller Maschinenfabrik GmbH
General Electric Canada Inc., Kanada
GKN Aerospace GmbH
Hilti Aktiengesellschaft, Liechtenstein
Hyundai Motor Company, Süd Korea
INA Tooling Technique Pvt. Ltd., Indien
INDEX-Werke GmbH & Co. KG Hahn & Tessky
Israel Aerospace Industries Ltd., Israel
Japan Machinery Company Ltd., Japan
Lindauer DORNIER GmbH
MAN Nutzfahrzeuge Vertrieb GmbH
Maschinenfabrik Berthold Hermle AG
Robert Bosch GmbH
Romheld Automation Pty. Ltd., Australien
Schott AG
Siemens AG
StarragHeckert GmbH
Steinway & Sons Pianoforte-Fabrikanten
Swarovski AG, Österreich
ThyssenKrupp AG
Traub Drehmaschinen GmbH & Co. KG
TRUMPF GmbH + Co. KG
Waldrich Siegen Werkzeugmaschinen GmbH
ZF Friedrichshafen AG

KOSTYRKA GmbH

Dieselstraße 6
70839 Gerlingen
Germany

Phone +49 (0) 71 56 - 1 76 73-0
Fax +49 (0) 71 56 - 1 76 73-30

info@kostyrka.com
www.kostyrka.com