DRIVE SOLUTIONS FOR COMPRESSORS AND BLOWERS

TORQUE FOR HEAVY DUTIES

VULKAN DRIVE TECH

CONTENTS

REQUIREMENTS

Large and powerful compressors with a high level of efficiency, long service life and a high degree of reliability are used in the oil and gas industry, chemical industry and in special industrial applications.

In general, the requirements of the drive are met either by a powerful electric motor, which is connected with the **compressor** via a coupling or by a combustion or gas-powered engine, which is coupled to the compressor via a coupling and gearbox. This is independent of whether the compressor is a reciprocating one, a screw-type one or a rotary compressor. The most important functions of the coupling are: **Minimisation of torsional vibrations, balancing of the offset** between prime mover and the compressor and torque transmission.

Complementary products such as **resilient mounts** are also used to **minimise structural borne noise** generated by the compressor or the prime mover and the transmission to the surrounding environment.

SOLUTIONS

The main task of **VULKAN Drive Tech** into compressors applications, is to transmit power and torque from either high and low speed shafts, according to the specific torsional vibration requirements of the different type of prime mover (electric motor, turbines, diesel engine) and compressors. These requirements are met by the technical features of both torsional flexible and rigid couplings. The portfolio is then completed with specific resilient mounts designed to minimise dynamic displacement and optimize the structural borne noise isolation. We focus on the following **three major key aspects:**

Efficiency

VULKAN Drive Tech supports the compressor system manufacturer with the determination of the characteristics of the flexible coupling by an in-house developed torsional vibration calculation tool. A mathematical model, which takes the stiffness and inertia of the individual construction elements into consideration, is created for the calculation of the torsional vibration. If desired by the customer, contact-less stress and vibration measurements are carried out for different load cases after installing the coupling. In this manner, the actual vibration-specific characteristics of the system lie within the limits of the torsional vibration calculation and trouble-free operation.

Tailor-made solutions

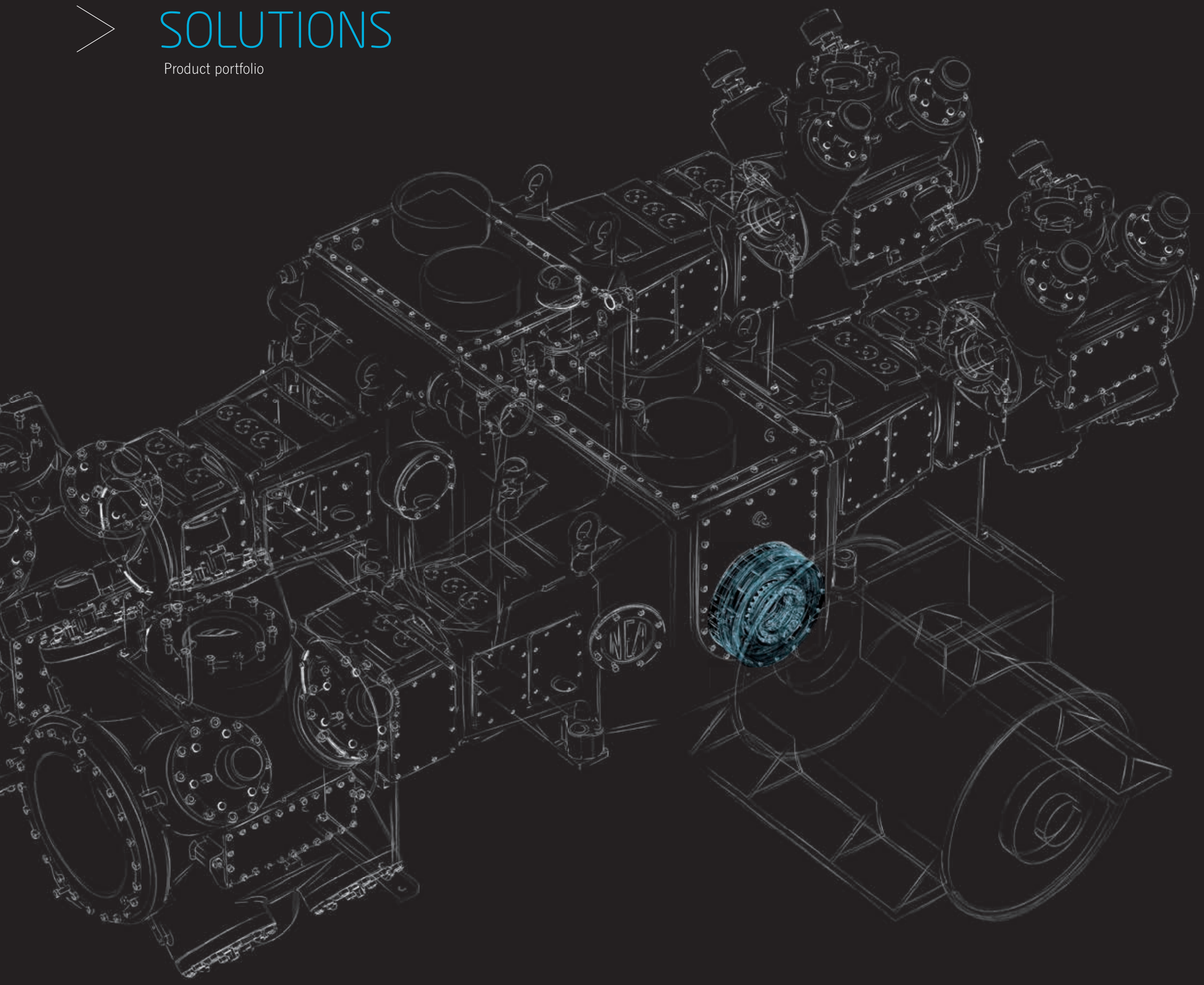
VULKAN Drive Tech offers a comprehensive range of products for compressors intended for use with liquid and gaseous media. The portfolio includes flexible, highly flexible, rigid couplings and resilient mounts. For use in explosion-prone environments, the couplings may be designed based on the area of application and even in accordance with the ATEX guidelines. Custom solutions to fit specific requirements such as: built in length of the coupling, shaft couplings dimensions, etc. are available on demand.

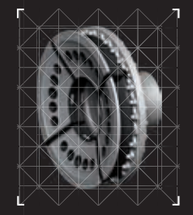
Design

VULKAN Drive Tech flexible couplings elements are available either in construction form “rubber in shear” and “rubber in compression”, to better suit the torsional vibration requirements of the various compressors according to the specific prime moving machine used (electric motor, turbine or diesel engine). Different materials such as natural rubber, silicone, polyurethane and relative different stiffnesses and damping characteristics are design features of critical importance for the successful use and long service life of the VULKAN Drive Tech products. Furthermore the use of modular designed components allow to produce tailor-made products with standard subcomponents.

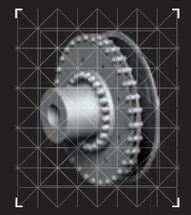
SOLUTIONS

Product portfolio

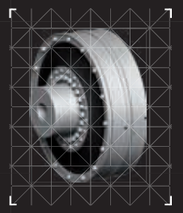




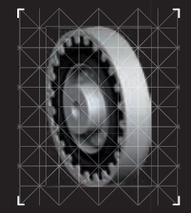
RATO S PAGE 08



RATO R PAGE 10



RATO DS PAGE 12



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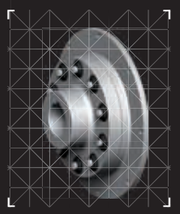

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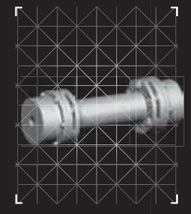
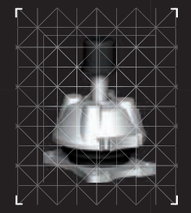


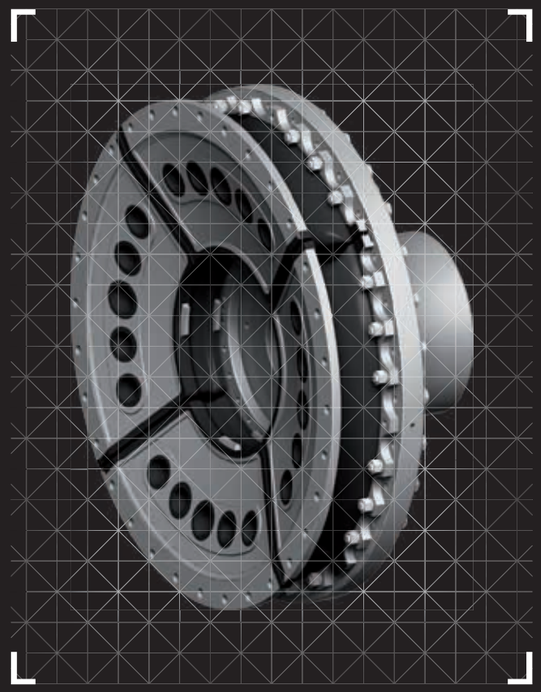
DISCFLEX PAGE 18

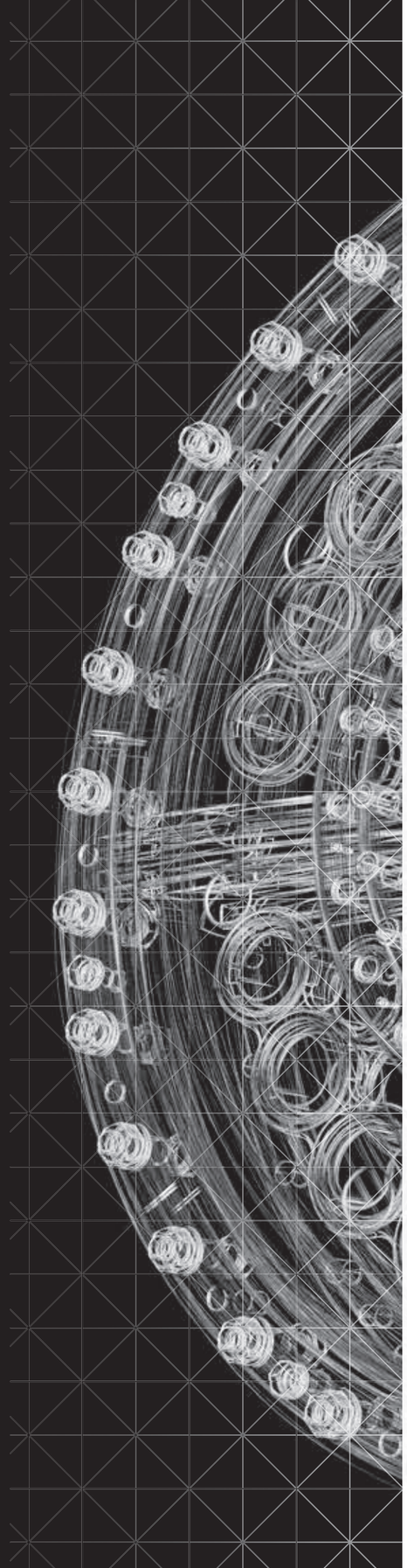


T SERIES PAGE 20

RATO S

Nominal Torque Range: 80.00 – 315.00 kNm





RATO S (1 ROW)

The RATO S coupling is a highly torsional flexible rubber coupling that compensates radial, axial and angular shaft displacements of the connected machinery. The torque is transmitted by elements loaded in shear.

FEATURES

HIGHLY FLEXIBLE COUPLINGS > RATO S (1 ROW), RATO S (2 ROWS)

The different torsional stiffnesses and damping factors available provide the possibility to satisfactorily tune the torsional vibration behaviour of the drive system. The essential parts of the coupling are: the torsional flexible element, the membrane package to absorb the axial displacements and the connecting parts to the drive and driven machinery. The torsional flexible element can be arranged in single or multiple rows respectively, in order to be tuned to the application's requirements in terms of torsional vibration isolation. The flexible elements are formed by several segments; which guarantee easy installation and maintenance of the coupling.

PRODUCT KEY FACTS

Efficiency

- The segmented construction assures easy handling at installation and maintenance.
- High flexibility to minimize torsional vibration.
- High axial, angular and radial misalignment capacity with minimum reaction forces.

Tailor-made solutions

- Different torsional stiffnesses provide satisfactory tuning of the torsional vibration behaviour of the drive system.
- Custom built in length of the coupling available on demand.
- ATEX Certification available on demand.

Design

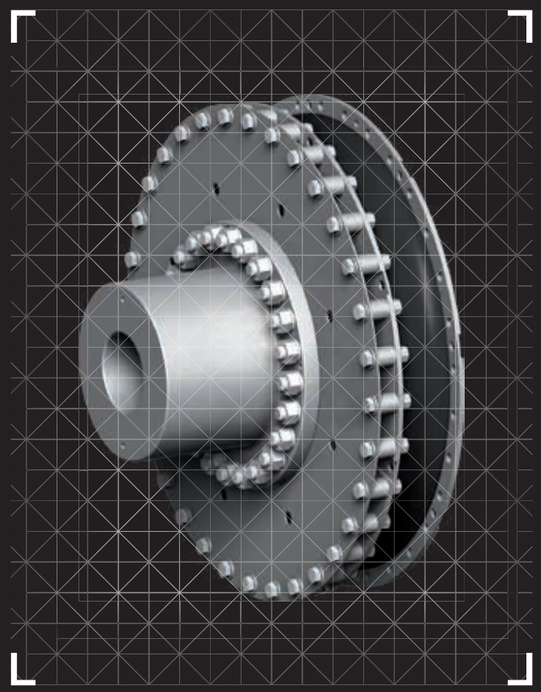
- Segmented design, displaced arrangement in case of multi-row design and ventilation holes guarantee for good ventilation of the elements.

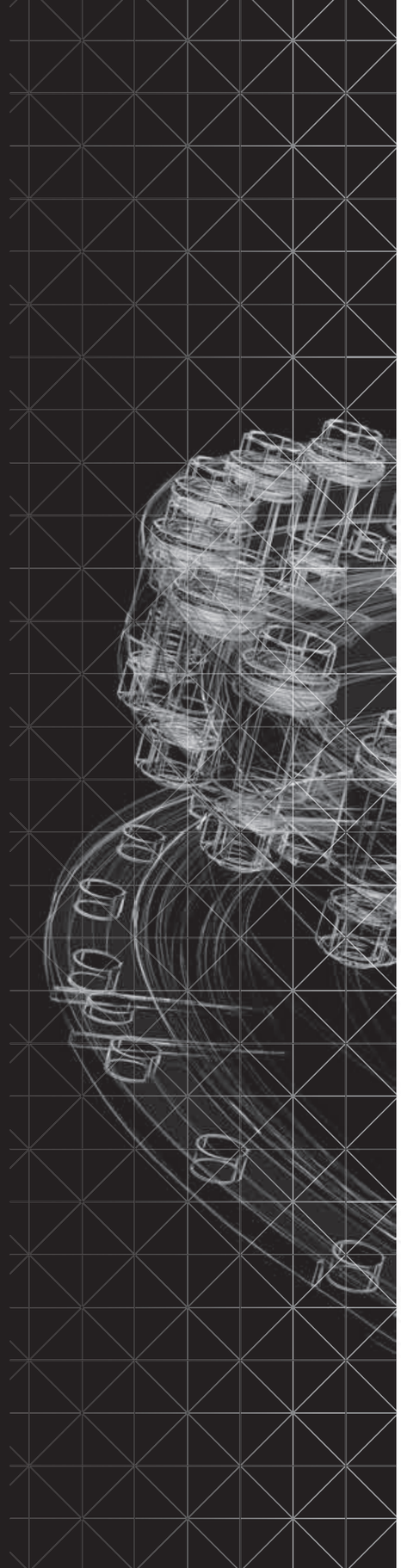
More products of this series:

RATO S (2 ROWS)

RATO R

Nominal Torque Range: 20.00 – 100.00 kNm





RATO R

Complementary to the all-round RATO S coupling the highly flexible RATO R coupling has been specially designed for use in installations requiring a high level of torsional flexibility and misalignment capacity.

FEATURES

Inherent features of the design include the high dynamic load capacity and good rotational dynamic properties due to the low rotating inertias. The area of application is primarily high-speed main or auxiliary systems driven by a diesel engine or electric motor.

In the low to middle torque ranges where the handling and installation of a complete element is practical the RATO Ring coupling is an additional alternative. This is predominantly possible with small to medium sizes. By selecting the torsional stiffnesses available or element designs, you can minimise the torsional vibrations in the drive system.

PRODUCT KEY FACTS

Efficiency

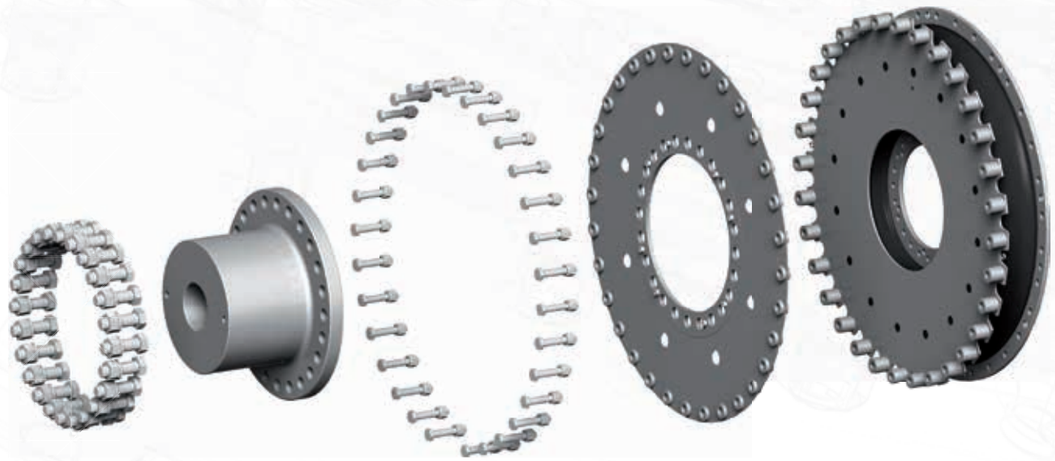
> Specially designed for the use in installations requiring a high level of torsional flexibility and misalignment capacity.

Tailor-made solutions

> Inherent features of the design include high dynamic load capacity and good rotational dynamic properties due to the low rotating inertias.
> ATEX Certification available on demand.

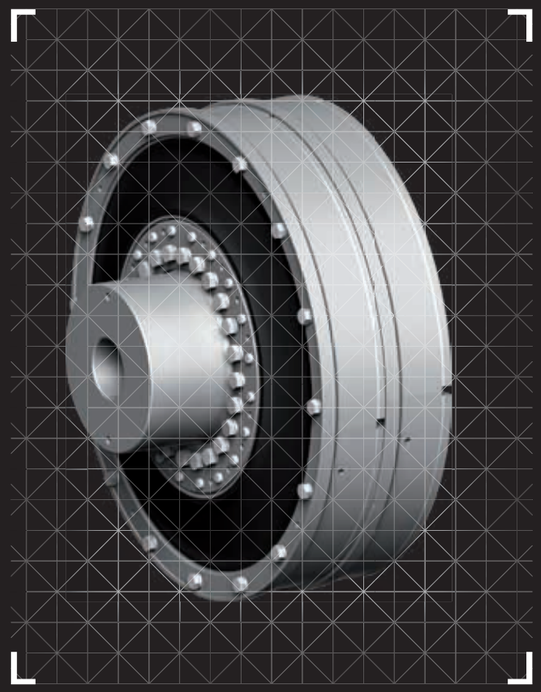
Design

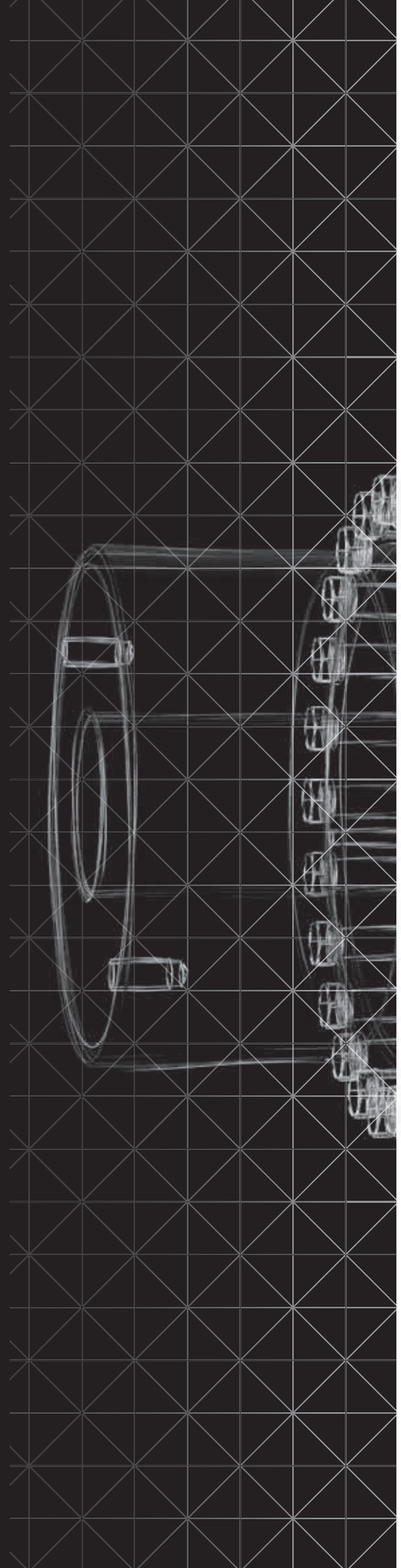
> The radial, axial and angular flexibility, with the shortest possible installation length, enables good compensation of shaft misalignments.



RATO DS

Nominal Torque Range: 16.00 – 200.00 kNm





RATO DS (2ROWS)

The highly flexible RATO DS coupling is one that has been developed especially for application in drive systems with the demand for greater torsional flexibility and average misalignment flexibility.

FEATURES

HIGHLY FLEXIBLE COUPLINGS > RATO DS (1 ROW), RATO S (2 ROWS)

The RATO DS coupling was developed to supplement the all-round coupling RATO S in order to be able to provide an application-specific coupling variant particularly for rigidly installed compressor drives. The three available stiffnesses enable a good tuning of the system with respect to both the transient and steady-state torsional vibration response.

Typical to the tradition of VULKAN Couplings, a backlash-free torque transmission is achieved. When required a torque limiting device can be fitted. The flexibility of the RATO DS coupling in the radial, axial and angular directions provide favourable compensation for the shaft misalignments.

PRODUCT KEY FACTS

Efficiency

- Compact dimensions lead to significant weight savings and therefore increase the efficiency of the drive system and reduce operating costs.

Tailor-made solutions

- Specially designed for the use in installations requiring a high level of torsional flexibility and medium level of misalignment capacity.
- ATEX Certification available on demand.

Design

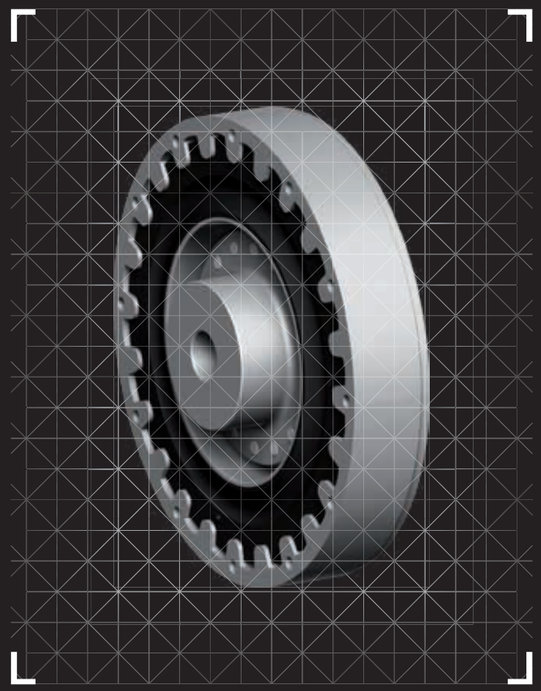
- The available stiffnesses enable a customised tuning of the system with respect to transient and steady-state torsional vibration response.

More products of this series:

RATO DS (1 ROW)

VULASTIK L

Nominal Torque Range: 0.50 – 40.00 kNm



VULASTIK L

The VULASTIK L coupling is suitable when the prime mover is a diesel engine. The plug-in design of the coupling into the external tooth flange allows the VULASTIK to be particularly indicated to the machinery with large axial shaft displacement. The modular design also permits the use of a single or double row elastic element to double the torque transmission capacity.

FEATURES

The main parts of the VULASTIK L coupling are the hub and flanged casing, in between which the disc-shaped element is arranged. This disc element is connected by vulcanisation at its inner radius, while the outer radius is connected to the flanged casing by a plug-in toothing, which provides the axial plug-in feature and compensation of shaft displacements.

The VULASTIK L is a highly torsional flexible coupling that compensates axial, angular and radial misalignments of the connected machinery. The permissible angular coupling displacement is 0.5°. The VULASTIK L elements are made from heat-resistant rubber for an operating permissible ambient temperatures range of -45°C to +90°C. Alternative elements in silicone are available for operating ambient temperatures ranging from -45°C to +120°C.

VULASTIK L is available in seven versions and features more than 70 sizes with different torsional stiffness characteristics that better suit the torsional vibrations behaviour of the machinery. VULKAN Drive Tech also provides full Torsional Vibration Calculation to predict the performances of the coupling and a natural frequencies spectrum in relation to the specific project for which the coupling is to be installed.

PRODUCT KEY FACTS

Efficiency

- The toothing profile of the elastic element allows high axial misalignment displacement capacity.
- Different elastic material such as rubber and silicone, allow the coupling to properly resists environmental high temperatures.

Tailor-made solutions

- The low torsional stiffness allows to reduce the torsional virbations transmission and ensures long life of the connected machinery.
- Possibility to radial remove the element without moving the adjacent machinery.

Design

- Plug-in design to minimize the length of the coupling.
- Designed to fit into bellhousing configurations.

PINOFLEX

Nominal Torque Range: 1.30 – 8.70 kNm

PINOFLEX

The PINOFLEX is a pin coupling with a modular design. By changing the number of pins and the application force diameter, it is possible to design several sizes with different torque transmission capacity. The PINOFLEX is available for either shaft to shaft connection with electric motors or with shaft to J620 flywheel connection with a small diesel engine.

FEATURES

The PINOFLEX is composed of one hub (or flange) where the elastic pins are fixed and another hub where specific seats accommodate the elastic pins. The torque transmission is made through the elastic pins, which guarantees torsional vibration isolation and axial, radial and angular misalignment capacity. The stiffness of the pins has also been designed to compensate shock loads. The PINOFLEX design is very compact and particularly suitable for all machinery that requires short installation length. Furthermore, it is possible to remove the single pins without disassembling the coupling from the connected machinery.

It is a low-maintenance product that comes in three different versions and seven sizes with torque transmission capacity of up to 8.70 Nm and shafts accommodation up to ø 130 mm and flywheel SAE 18" J620.

PRODUCT KEY FACTS

Efficiency

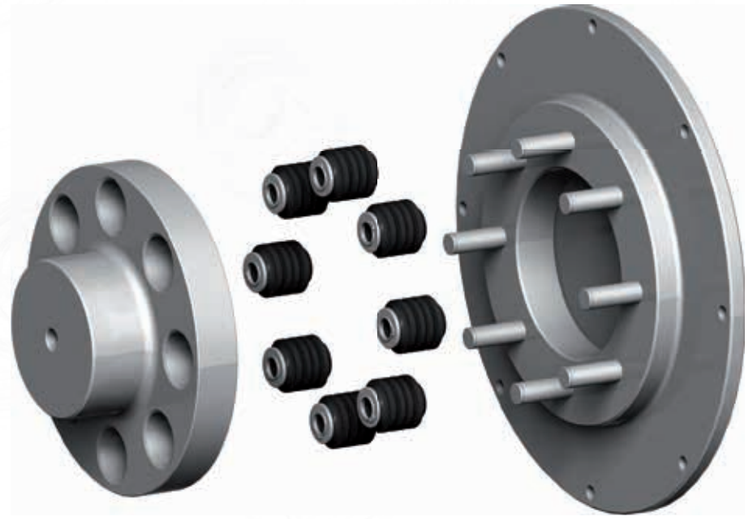
- Plug-in design with minimum built in length of the coupling.
- Possibility to remove the elastic elements without disconnecting the machinery.
- High shock loads damping capacity.

Tailor-made solutions

- Shaft to shaft, or shaft to flange connection design available on demand.
- Shaft to flywheel J620 SAE 8-14 inches available on demand.
- Extra short installation design available on demand.

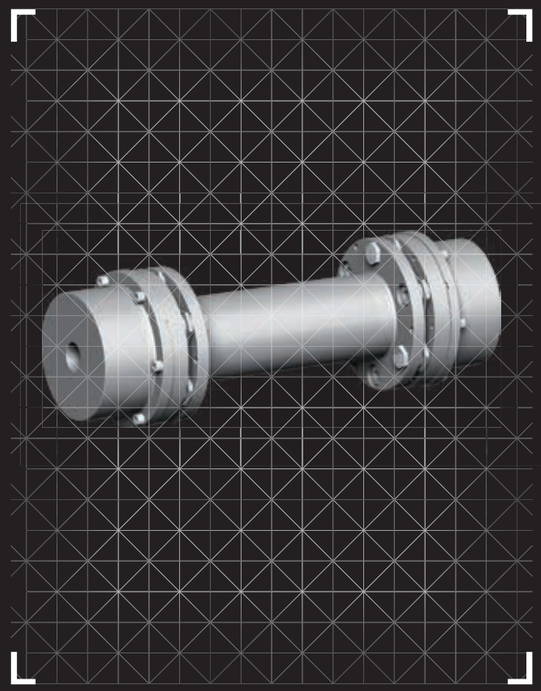
Design

- Low number of components.
- Modular design of the elastic elements.
- Easy installation.



DISCFLEX

Nominal Torque Range: 0.12 – 13.00 kNm



DISCFLEX

The DISCFLEX coupling is suitable for those applications where a turbine is used as the prime mover. High rotational speed and torque transmission capacity within limited dimensions and weight are the major advantages of this product.

FEATURES

DISCFLEX is also suitable when machinery is subjected to reversals and synchronous torque transmission requirements. It is a valid alternative to torsional flexible couplings in cases where environments are harsh on elastomers. Furthermore, DISCFLEX can withstand operating temperatures ranging from -40°C to 280°C. Finally, the DISCFLEX coupling complies with the API 610 Standard.

The DISCFLEX coupling is characterised by high torsional stiffness without backlash, high rotational speed capacity, high power transmission within limited dimensions and weight, and low axial and radial reaction forces. Furthermore, it is suitable for extreme and hostile environments. The flexible elements of the coupling are composed with stainless steel AISI 301 membranes packages, which are engineered by state-of-the-art FEM Analysis to guarantee the highest rate of misalignment capacity and torque transmission within the smallest dimensions and minimum reaction forces. Its modular design allows a wide range of customisations, which include and are not limited to the use of GFRP spools to guarantee the electrical isolation of the coupling itself. When the DISCFLEX is subjected to a nominal rotational speed over 3,800 rpm then the balancing of the coupling is according to API 671 and AGMA 9000.

The DISCFLEX coupling is available in nine versions and features 11 sizes with different spool length to properly fit the requirements of any application as regards DBSE.

PRODUCT KEY FACTS

Efficiency

- Suitable for high speed shaft applications up to 25,000 rpm.
- Synchronous torque transmission without back lash.
- High torque transmission capacity, within limited dimensions and inertias.

Tailor-made solutions

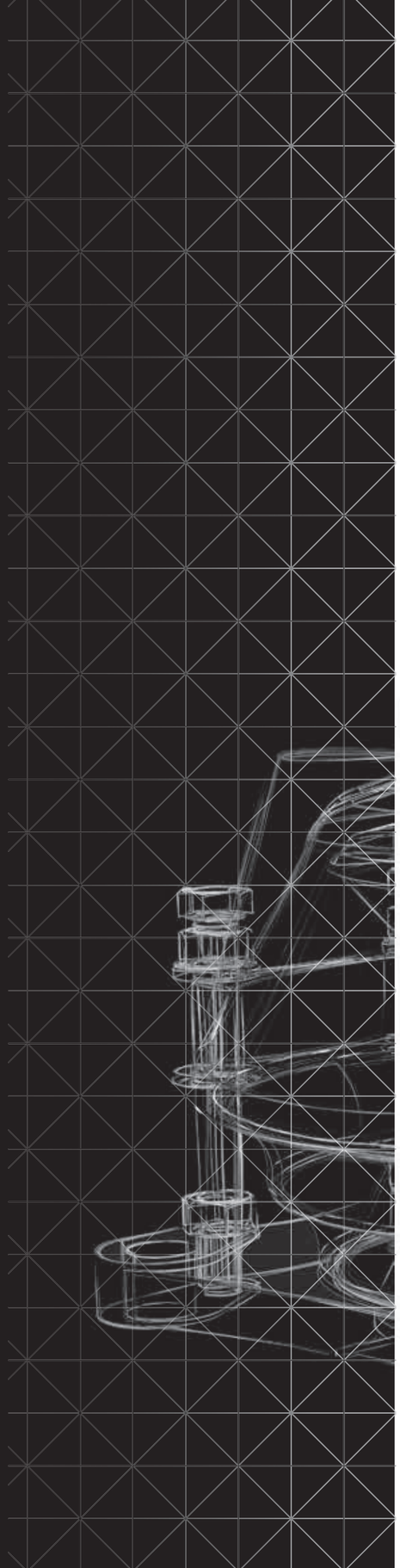
- Intermediate spool available in different length to cover any DBSE requirement.
- Custom balancing of the parts according to international standards requirements.
- Windage protection rings and shearing rings available on demand.

Design

- Compliant to API 610 standard.
- Stainless steel membrane packages optimize lifetime of the coupling and minimize service operation.
- Suitable to operate within temperature range of -40° to +280°C.

T SERIES

Nominal Load: 0.05 – 175.00 kN



T SERIES

VULKAN Drive Tech Resilient Mounts are available in both elastomeric or metal versions, in order to better suit the most demanding applications in terms of structural borne noise isolation.

FEATURES

With the help of the special rubber mix that uses an optimal combination of pull and push modes, the elastic mounts of VULKAN Drive Tech provide the ideal damping for vibrations for all conceivable machines and drive components: power take-off systems, generator units, compressors or even exhaust gas pipes. The conical and highly elastic mounts of the T SERIES have been developed especially for excellent vibration insulation and ease of installation.

PRODUCT KEY FACTS

Efficiency

- High structural borne noise isolation within limited dynamic displacements.
- Internal adjustable stud to prevent shock loads to the elastic element and to guarantee the mechanical fixing of the machinery to its foundation.
- Elastic element protected by environmental contamination.

Tailor-made solutions

- Elastic element available in different stiffness to better suit the vibration isolation requirements of the application.
- Height adjustment device available on demand.
- Preload setting of the mount to minimize creeping at installation.

Design

- Linear stiffness characteristic to ensure best structural borne noise isolation.
- Conical shape of the rubber element for better stability of the suspended machinery.
- Elastic elements in different stiffness and with different number of vulcanised steel cones, in order tune the mount´s stiffness to the specific needing of the application.

More resilient mounts are available:

VD SERIES

VDM SERIES

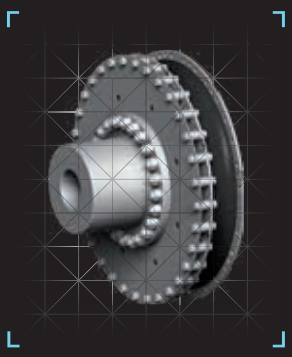
CV 2000 SERIES

NOTES

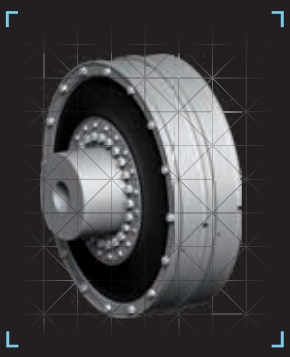
PRODUCT RANGE

For Compressors and Blowers

1 **RATO S**
PAGE 08



2 **RATO R**
PAGE 10



3 **RATO DS**
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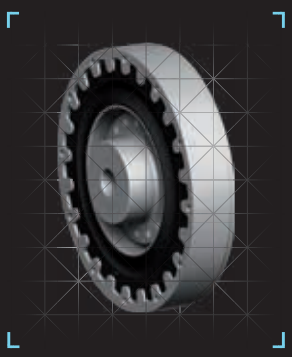
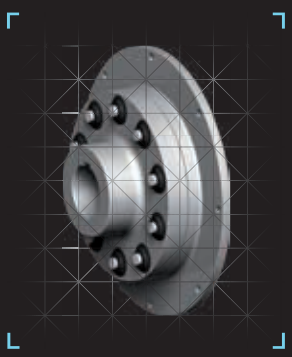


5 **VULASTIK L**
PAGE 14



15 **PINOFLEX**
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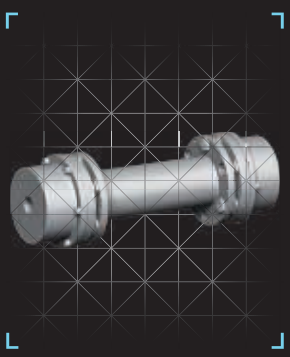

17 **DISCFLEX**
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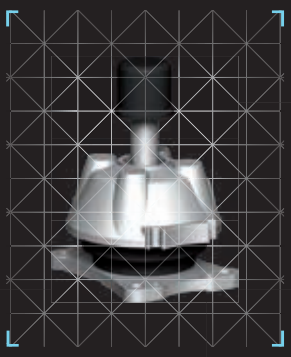
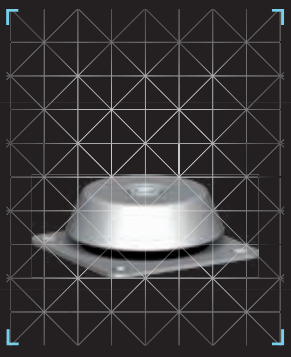
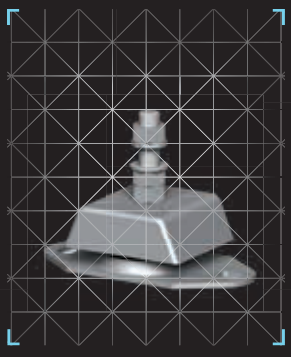


27 **T SERIES**
PAGE 20



28 **VD SERIES**
PAGE 20



29 **VDM SERIES**
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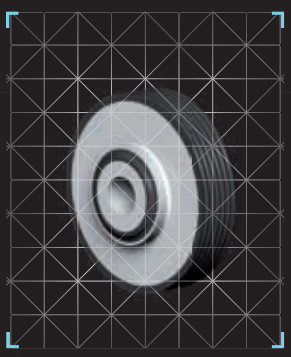

30 **CV 2000 SERIES**
PAGE 20

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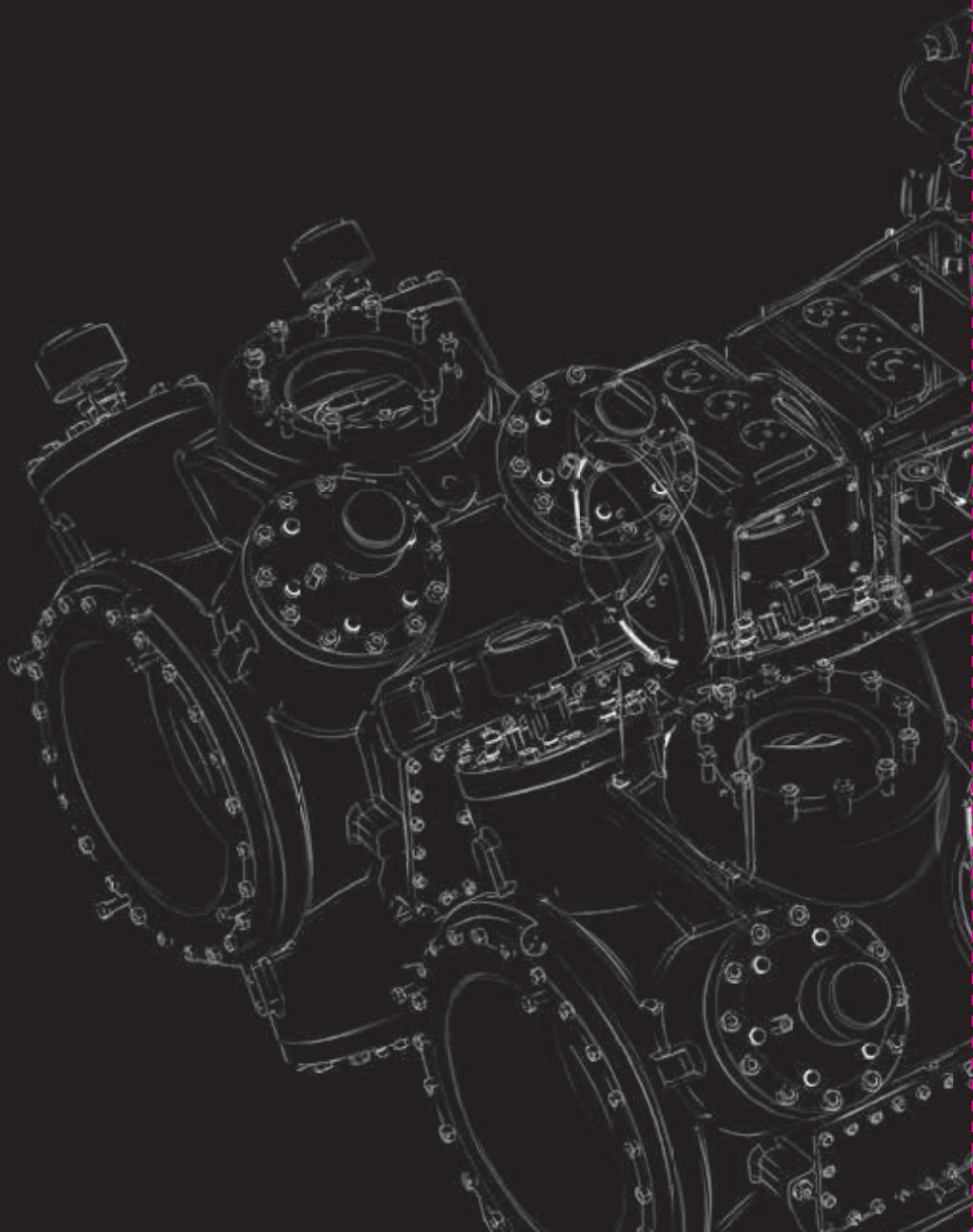

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STATUS: 09/2013