HV-TURBO[®] compressor range

EGR turbo compressor technology





Our company was initially founded in 1882 as 'Helsingoer Shipyard', and since 1973 we developed and established the HV-TURBO compressor brand. Since 2012 the manufacturing of compressors has taken place in our modern production facilities in Frankenthal/Germany, while the HV-TURBO competence centre remains located in the historical buildings of the former shipyard in Helsingoer, Denmark.



EGR compressor technology for integration into IMO Tier III compliant two-stroke diesel engines

Exhaust Gas Recirculation (EGR) is a method to significantly reduce the formation of Nitrogen Oxides (NOx) in marine diesel engines. By using this technology, vessels are able to meet with the International Maritime Organisation (IMO) NOx Tier III standard emission limits applying to the North American and United States Caribbean Sea as well as any new NOx Emission Control Areas (NECA).

Principle of the EGR system

In the EGR system, after a cooling and cleaning process, part of the exhaust gas is recirculated to the scavenge air receiver. In this way, part of the oxygen in the scavenge air is replaced by CO_2 from the combustion process.

This replacement decreases the O_2 content and increases the heat capacity of the scavenge air, thus reducing the temperature peak of the combustion and the formation of NOx. The NOx reduction is almost linear to the ratio of recirculated exhaust gas.

The EGR module for the two-stroke diesel engine includes the following main components:

Scrubber.	
Cooler.	
Water mist-catcher.	
EGR turbo compressor.	

Up to 4 compressors are integrated into 1 diesel engine.

Compressor design

The EGR compressor is a single-stage turbo compressor with oil lubricated bearings, direct driven with an asynchronous motor and a Variable Frequency Drive (VFD). The design features the unique flow optimisation mechanism, utilising Inlet Guide Vanes (IGVs) to optimise efficiency for a given motor rating.

The core compressor features an impeller with backward leaning blades angled according to regulation and milled from a solid, forged piece of duplex stainless steel with an optimal weight/strength ratio.

All parts in contact with the medium are made of corrosion resistant steel. The compressor is equipped with a contact-free carbon floating ring sealing to ensure that no exhaust gas can escape from the compressor casing. shaft and is supported by oil lubricated journal bearings.

The impeller is mounted directly onto the

Oil, sealing air and cooling water supply pathways are integrated into the compressor structure, thus avoiding the use of internal or external pipe work.

Consequently, the integrated and compact design provides excellent mechanical properties in hostile environments. The compressor inlet is prepared for flange mounting allowing the compressor to be operated without any supporting structure.

EGR-5, 10 and 22 compressor series







EGR-5, 10 and 22 compressor series

Impeller made of forged duplex stainless steel (W. No. 1.4462 EN 10088) with a geometry customised for low pressure conditions.

Hydrodynamic journal bearings for reliable operation.

Compressor housing machined from casted stainless steel.

(AISI316), all components in the air path are made of the same material.

Carbon floating ring sealing, external air supply.

Pre-set fixed IGVs adapting the EGR frame capacity to the individual engine size for improved efficiency and flexibility.

External lube oil supply and water cooling supply.

Terminal box for connection of power supply (400 V/ 440 V) and instrument sockets.

Flange mounted for minimal space requirements.

Compact, mechanical design.

Compressor housing

EGR turbo compressor selection - Frame size and IGV pre-setting

Frame	IGV Position		Min (m³/s)	Max (m³/s)	Selected product type
EGR22	V06		3,44	6,33	EGR22-G1-XXXX-V06
	V05		3,16	6,13	EGR22-G1-XXXX-V05
	V04		2,89	5,53	EGR22-G1-XXXX-V04
	V03		2,62	4,92	EGR22-G1-XXXX-V03
	V02		2,34	4,32	EGR22-G1-XXXX-V02
	V01		2,07	3,81	EGR22-G1-XXXX-V01
	V00		1,80	3,31	EGR22-G1-XXXX-V00
EGR10	V06		1,95	3,60	EGR10-G1-XXXX-V06
	V05		1,80	3,31	EGR10-G1-XXXX-V05
	V04		1,64	3,03	EGR10-G1-XXXX-V04
	V03		1,49	2,74	EGR10-G1-XXXX-V03
	V02		1,33	2,45	EGR10-G1-XXXX-V02
	V01		1,18	2,17	EGR10-G1-XXXX-V01
	V00		1,02	1,88	EGR10-G1-XXXX-V00
EGR5	V06		1,21	2,22	EGR5-G1-XXXX-V06
	V05		1,11	2,05	EGR5-G1-XXXX-V05
	V04		1,01	1,87	EGR5-G1-XXXX-V04
	V03		0,92	1,69	EGR5-G1-XXXX-V03
	V02		0,82	1,52	EGR5-G1-XXXX-V02
	V01		0,73	1,34	EGR5-G1-XXXX-V01
	V00		0,63	1,16	EGR5-G1-XXXX-V00
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Note: Volume flow based on inlet conditions, specified in 3099474 - 3: Requirement specification for Exhaust Gas Recirculation



For further information contact

Howden, a Chart Industries Company Allegade 6, 3000 Helsingoer Denmark Tel: +45 49 21 14 00 Fax: +45 49 21 52 25 Email: howdenturbo-dk@howden.com

EGR turbo compressor – advantages in brief

Experienced supplier

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Product design & development

The right design and engineering team is critical to our customer's success. With our unique skills and services, our dedicated R&D team members are specialists in developing high performance compressors and creating solutions to complement our customer's design team. Our design and engineering expertise includes soft- and hardware engineering and mechanical engineering.

Thoroughly tested

The advanced test rig, incl. mechanical and functional testing and performance simulation, provides verification that all technical requirements have been met before the compressor leaves the factory.

Proven in operation

Since its development, in cooperation with MAN Diesel & Turbo, our EGR compressors have been integrated into numerous twostroke diesel engines, making these compliant with the IMO NOx Tier III standard emission levels on vessels already in operation.

Service set-up

An extremely reliable, mechanical design guarantees a long service life. Should an incident unexpectedly occur leading to a failure, a swop service set-up for fast replacement is possible. Concept: a similar refurbished compressor will immediately be available from one of our certified repair shops. It is then possible to return the exchanged unit.

Certified supplier

Our EGR turbo compressors have been developed in accordance with the international standards below:

ISO 5389 2005-12-15 (Compressor)

DIN EN ISO 5167-1,-2:2003 (Flow measurement)

IEC 60034-1 & 2 (Electric)

DIN EN ISO 9614:2009 (Sound measurement)

ISO 10816 -1: 1995 (Vibration)

ISO 9001:2008 (Quality management System)

ISO 14001:2004 (Environmental management system)

OHSAS 18001:2007, DIN EN 1012-3:2014 (Health & safety management system)

Complies with the regulations set by the International Association of Classification Societies (IACS) dedicated to safe ships and clean seas.