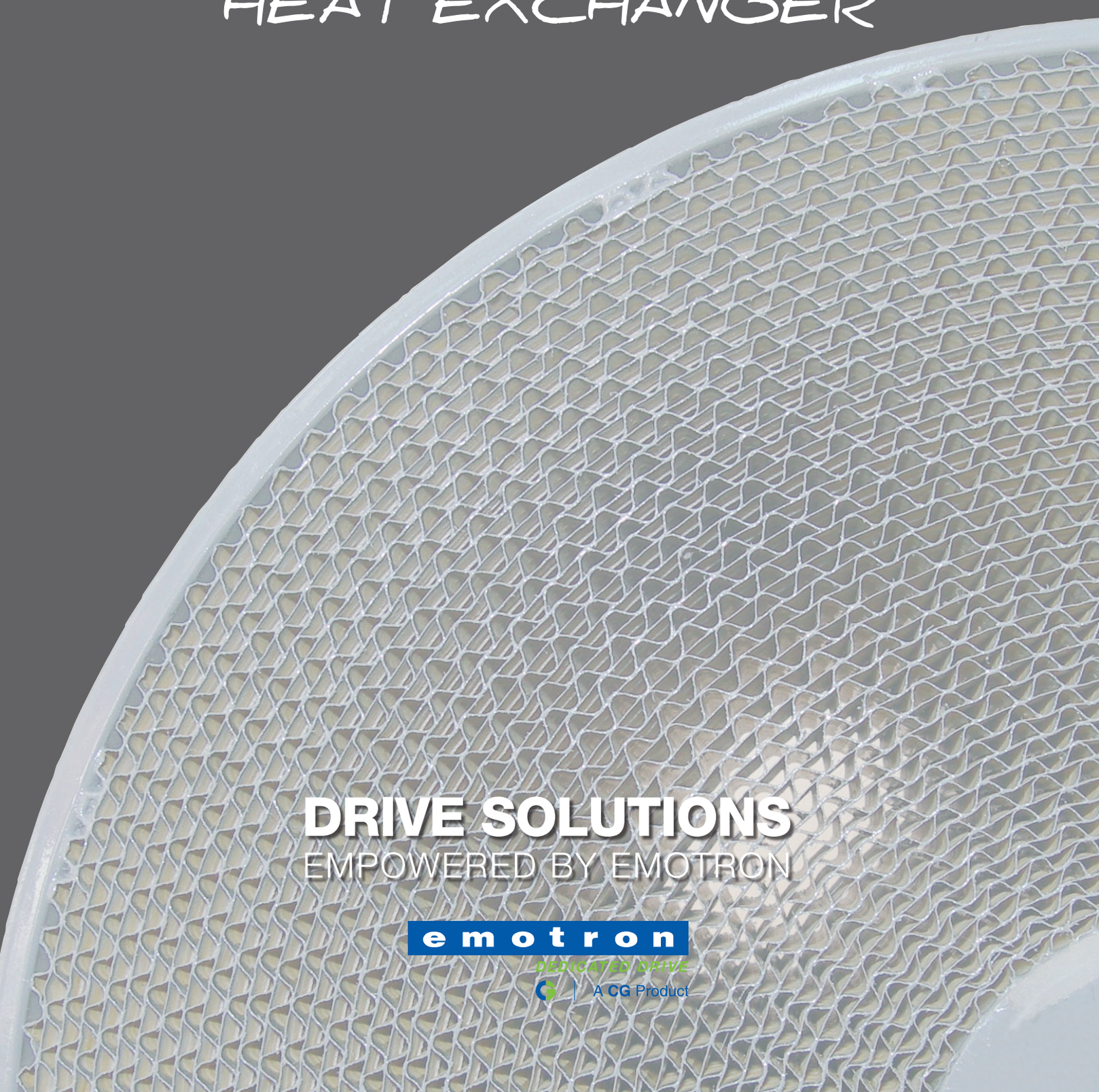
# DRIVE SYSTEM FOR ROTARY HEAT EXCHANGER



## DRIVE SOLUTIONS
EMPOWERED BY EMOTRON

emotron
DEDICATED DRIVE
A CG Product

# **We put all our energy** into saving yours

CG Drives & Automation offers complete drive solutions that ensure the safe and cost-efficient operation of demanding industrial applications. We provide smart solutions to users, operators, system integrators and OEMs around the world. Wherever there are demanding applications.

## Strong relationships

We use our personal commitment to make our solutions work according to your requirements. Saving energy is not just about your electricity bill – we let you put your own energy into your core business. We build long-term relationships based on stability and strong ownership – as well as our excellent track record on delivering what we promise.

## Simplicity and reliability

We use our know-how to create robust and reliable, yet simple drive solutions – resulting in lower operating costs and a longer service life. Our experience is based on decades of product development and thousands of customer installations – as well as recent advances in control technology.

Our production plants in Helsingborg, Sweden and Mandideep, India carry out manufacturing, in-house assembly and testing with short lead times, even on customised solutions. We operate a global supply chain of components, under lean and flexible production methods that are ISO 9001 certified.

## We are a greentech company

We put all of our energy into saving yours. This slogan isn't just our attitude. It reflects the core of our operations – improving energy efficiency to reduce electric energy consumption – and reducing the overall carbon footprint of industrial processes. Our Emotron solutions save energy and reduce dependence on fossil fuels, thereby reducing environmental impact and contributing to sustainable operations. They also enable significant savings in kilowatt hours and carbon emissions, reducing costs for our customers and for society.

## Energy recycling in ventilation systems

All major buildings, use of ventilation systems to maintain a good indoor environment. By re-using the energy of the heated air, indoor air, before it is sent back out again, you reduce energy consumption and carbon dioxide emissions. And save money!

CG Drives & Automation has manufactured drive systems for rotary heat exchangers in ventilation systems for more than 35 years.

# **Complete drive system** for rotary heat exchanger

Emotron EMX drive systems are specially designed for speed control of rotary heat exchangers. They offer full control over a wide speed range and ensure smooth and powerful operation. You will also benefit from unique built-in functionality and easy installation.

## Features

- Complete motor & drive combination.
- Advanced user interface for complete control of settings and operation.
- High switching frequency for quiet operation.
- The control signal is proportional to the efficiency of the heat exchanger rotor.
- Selectable direction of rotation.
- Extensive protection against short circuit motor, overloading etc.
- Flexible design makes the drive system prepared for future demands.
- Integrated electronic rotor sensor.
- 16 selectable speeds.
- Can be used for both heating and cooling.

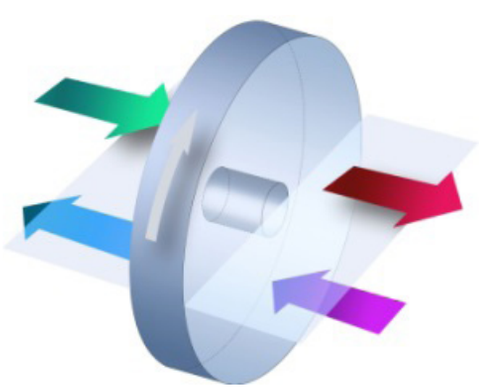
## Built-in linearity function

The drive system has a built-in linearity function that gives a linear relationship between the control signal and the efficiency of the heat exchanger rotor, rather than having the speed of rotation proportional to the control signal. This provides good conditions for stable temperature control.

## Easy mounting

Both the motor and the control unit are usually mounted in the heat exchanger housing. In this way, they do not occupy any space outside of the heat exchanger housing and are well protected during transport. Furthermore, it is often advantageous from the point of view of interference (EMC) to place the motor and control unit in the rotor housing.

The motor is usually mounted on a sprung motor support when a belt is used. In this way, problems arising if noncircular rotors are used can be prevented. Vibration  dampers should be mounted between the motor and the motor support so that any vibration from the motor is not transmitted to the rotor housing.



# Our **total** range

We offer different Emotron EMX drive systems for rotary heat exchangers.

| SPECIFICATIONS | EMX-P10 | EMX-B15/ 25/ 35 | EMX-R15/ 25/ 35 | EMX-D |
|---|---|---|---|---|
| Speed range rpm | Typically 1:25 (cont) or 1:60 (intermittent) | 4-500 | 5-250 | 8-200 / 5.5-135 |
| Continous torque Nm | 1-1.2 | 1.3/ 3.3/ 8.2 | 1.5 / 4 / 6 | 26 / 39 |
| Starting/ Max torque Nm | 1.5 | 1.5/ 4 / 10 | 2.2 / 6 / 9 | |
| Rotating direction | Fixed | Selectable | Selectable | Selectable |
| Selected maximum speed | By gear motor selection | Yes | 150 / 200 / 250 | Up to 200 rpm (gear motor) |
| Soft starting/stopping | Yes | Yes | Yes | Yes |
| Purging mode | Yes | Yes | Yes | Yes |
| Cooling recovery | Yes | Yes | Yes | Yes |
| Holding torque | Only by gear | Yes | Yes | Yes |
| Rotation & belt sensing | External sensor | Yes, intenal or external | RotoSens™ or External | External sensor |
| Summer / Winter mode | No | No | Option | No |
| Motor termal protection | No | Yes | Yes | Yes |
| Motor short circuit protection | No | Yes | Yes | Yes |
| Controller protection | Yes | Yes | Yes | Yes |
| Control signals | 0-10 V, 2-10 V, 0-20 mA, 4-20 mA | 0-10 V, 2-10 V, 0-20 mA, 4-20 mA | 0–10 V, 2–10 V, 0–20 mA, 4–20 mA, 0-20V phase cut | 0-10V, 4-20mA |
| Communication | No | Yes (Modbus) | No | Option |
| Test button | No | Yes | Yes | Yes |
| Alarm relay | Yes | Yes | Yes | Yes |
| Analogue output vs speed | No | No | Option | Yes |
| Status indication | LED | LED | LED or optional display | LCD text display |
| Supply voltage | 230 VAC +/-15%, 1 ph | 230 VAC +/-15%, 1 ph | 230 VAC +/-15%, 1 ph | 230 VAC +/-15%, 1 ph |
| Protection class | IP00 or IP54 | IP54 | IP54 | IP54 |
| Ambient temperature | -30 to +40 deg C | -30 to +40 deg C | -30 to +40 deg C | -30 to +40 deg C |

## Emotron EMX-B

The Emotron EMX-B drive system is the latest in our range of speed controlled drive systems for rotary heat exchangers. Equipped with Modbus RTU communication via RS485 for both control and status information.

## Emotron EMX-P

Our alternative for small rotors. Cost efficient one-phase electronic controller. Gives 1-1.2 Nm with standard 1-phase AC gear motor. A small and flexible control unit specially adapted for speed regulations of smaller rotary heat exchangers.

## Emotron EMX-R

Equipped with an integrated electronic rotation sensor, which eliminates the need for a mechanical sensor.
Three models R15/R25/R35 (1.5 - 6 Nm).
Based on sensorless and brushless switched reluctance motor for high efficiency and reliable operation.
Patented belt and rotation sensing - RotoSens™.

## Emotron EMX-D

Especially designed for the largest rotary heat exchangers,
AC drive + asynchronous gear motor (26 or 39 Nm).

New!

# Emotron EMX-B

The EMX-B drive system is based on the EC and PM motor technology. This motor technology is more efficient than asynchronous motor and stepper motor. It allows the Emotron EMX-B motor to run heat exchanger wheels with diameters up to 3,5 meters without any need for a gearbox or fan. Uniquely, EMX-B is equipped with communication Modbus RTU via RS485, for both control and status information. Each system consists of a motor and a corresponding electronic controller and have the same features as the previous EMX versions.

All functions are controlled through dipswitch or modems which makes the operation and troubleshooting very easy. The motor can run in both directions and to further support an easy installation, no adjustments and settings are required to get the drive system into operation.

For maximum performance and efficiency in rotary heat exchanger low- and high speed is required. The EMX-B system therefore offers full control over a wide speed range. The EMX-B have a maximum rating 10-500 rpm, for maximum usage of the heat exchanger rotor. To prevent involuntary heat recovery, holding torque can be activated in the motor to hold a rotor still.

- Specially designed for driving rotary heat exchangers
- Based on the EC and PM motor technology, a technology more efficient than both asynchronous motor and stepper motor
- Run heat exchanger wheels with diameters up to 3,5 metres without any need for a gearbox or fan

| SPECIFICATIONS | EMX-B15 | EMX-B25 | EMX-B35 |
|---|---|---|---|
| Motor frame | B42 | B48 | B48 |
| Controller version | Type 1 | Type 2 | Type 3 |
| Motor shaft diameter | 14 mm | 14 mm | 14 mm |
| Speed range (rpm) | 4-500 | 4-500 | 4-500 |
| Continous torque (Nm) | 1.3 Nm @ 300 rpm<br>0.8 Nm @ 500 rpm | 3.3 Nm @ 300 rpm<br>2.0 Nm @ 500 rpm | 8.2 Nm @ 300 rpm<br>5.0 Nm @ 500 rpm |
| Continous power (W) | 42 | 100 | 262 |
| Starting & max torque (Nm) | > 1.8 Nm | > 4.8 Nm | > 12 Nm |
| Soft starting/stopping | Yes, 15 s | Yes, 25 s | Yes, 35 s |
| Rotation direction | Selectable by DIP switches or Modbus | | |
| Selectable maximum speed | Yes, by 4 X DIP or communication, selectable 40%,-, 100%, 16 presets | | |
| Purging mode | Yes | | |
| Alternative continous purging mode | Yes, continous minimum speed purging selectable by DIP or communication | | |
| Control signal | 0/2-10 V, 0/4 - 20 mA | | |
| Protection class - motor and control unit | IP54 | | |
| Ambient temperature - motor and control unit | -30 to +40°C | | |

# Emotron EMX-P


Emotron EMX-P is a small and flexible control unit specially adapted for speed regulation of smaller rotary heat exchangers. A motor with gear and tachometer from Panasonic or Oriental Motor (25 W or 40 W and max 0.7A) are intended to be connected to the control unit. Both the motor and the control unit are easily placed inside the heat exchanger housing.

In addition, the control unit's built-in soft start and soft stop function ensures less equipment wear. During intermittent operation start-up is adaptive to provide a fast and smooth start.

Automatic blow clean operation is another built-in function. When the control signal drops below a certain value, the heat exchanger's rotor rotates approximately 30 degrees every 10 minutes to keep it clean. The system can easily be supplied with a rotation monitor that triggers an alarm if the belt comes off, for example. If the motor is equipped with overload protection (e.g. Panasonic) an alarm is also triggered when the protection trips.

EMX-P enables the type of speed control to be selected. In continuous operation, the speed is varied down to 1/25 of the maximum speed, whilst continuous operation with intermittent operation during low control signals, the speed is varied down to 1/50 of the maximum speed.

- No tuning
- Less wear– soft start/soft stop
- Less temperature oscillation– large speed range
- Automatic purging operation
- Rotation monitor with external rotation sensor
- Full control of speed with tachometer feedback
- Selectable types of speed control
- Linearization function – control signal contra rotor efficiency
- Control inputs have common galvanic insulation from the mains supply

| SPECIFICATIONS | EMX-P |
|---|---|
| Mains voltage | 230 VAC +/-15 % , 50/60 Hz, 1 ph |
| Current | Max 0.7 A |
| Motor | Connection for motor with gear and tachometer ** |
| Control signal | 0/2 - 10 V, 0/4 - 20 mA |
| Speed range, operation choice | 1:25 during continuous operation. 1:50 during combination of continuous operation and intermittent operation |
| Rotation monitor | See accessories |
| Indication | Operation status, alarm |
| Alarm output | Change-over contact, max 5 A, 230 VAC, AC1 |
| EMC, Emission | EN50081-1 |
| EMC, Immunity | EN50082-2 |
| Ambient temperature | -30 – +40 °C |
| Protection class | IP54 in enclosed version, with appropriate glands. IP00 in circuit card version. |
| Weight | 0.4 kg, enclosed version |
| Dimensions W x H x D | 122 x 120 x 55 mm excl. glands *** |

# Emotron EMX-R

The EMX-R drive system is a range of speed controlled drive systems for rotary heat exchangers. A system consists of a motor and a corresponding electronic controller. Uniquely, EMX-R is equipped with an integrated electronic rotation sensor, RotoSens™, which eliminates the need for a mechanical sensor.

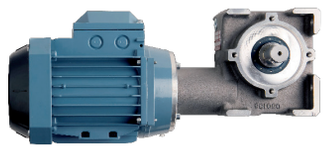
The SR technology allows the EMX-R motor to drive heat exchanger wheels with diameters up to 3.5 m without any need for a gearbox. The motor can run in both directions and has a permanently attached motor cable for easier installation. To further support an easy installation, no adjustments and settings are required to get the drive system into operation.
For maximum performance and efficiency in a rotary heat exchanger, low speed as well as high speed is required.

- Robust motor without gear or fan.
- Integrated electronic rotation sensor – eliminates the need for mechanical sensors.
- High efficiency - No gearbox losses.
- A wide speed range for maximum usage of the high efficiency in the exchanger wheel.
- Easy handling since no adjustments or settings are required. Selectable direction of rotation.
- Integrated motor cable.
- Extensive protection against short circuit, overloading etc.
- Holding torque – prevents involuntary heat transference.

| SPECIFICATIONS MOTOR | EMX-R -15M | EMX-R -25M | EMX-R -35M |
|---|---|---|---|
| Max diameter of exchanger wheel with max. 10-12 rpm[1] | 1500 mm | 2500 mm | 3500 mm |
| Speed | 5 - 250 rpm (Speed range 1:50) | | |
| Direction of rotation | Freely selectable | | |
| Torque | 1.5 Nm | 4 Nm | 6 Nm |
| Motor cable (Integrated) | 2 m | 2.5 m | 2.5 m |
| Weight | 5 kg | 8 kg | 11 kg |
| Dimensions (L x Diam.) | 115 x 110 mm | 115 x 160 mm | 140 x 160 mm |

| SPECIFICATIONS CONTROLLER | EMX-R-15S | -15E | -25S | -25E | -35S | -35E |
|---|---|---|---|---|---|---|
| Indication | Operation status, alarm | Wheel speed, operation status, alarm | Operation status, alarm | Wheel speed, operation status, alarm | Operation status, alarm | Wheel speed, operation status, alarm |
| Analogue output -proportional to speed | No | Yes | No | Yes | No | Yes |
| Summer/Winter switch | No | Yes | No | Yes | No | Yes |
| Alarm relay | Max 5 A, 250 VAC | | | | | |
| Supply voltage | 230 VAC +/-15% , 50/60 Hz, 1 ph | | | | | |
| Weight | 1.7 kg | | | | | |
| Dimensions (H x Wx D) | 150 x 200 x 60 mm | | | | | |

# Emotron EMX-D



The Emotron EMX-D drive system is a range of speed controlled drive systems especially designed for rotary heat exchangers. Each system consists of a motor and a corresponding electronic controller. Emotron EMX-D has the same functions as the previous versions but the design is based on the advanced AC drive Emotron FDU giving a flexible product prepared for future demands.

All functions are controlled with the built in LCD. This makes operation and troubleshooting very easy.

The motor can run in both directions and to further support an easy installation, no adjustments and settings are required to get the drive system into operation.

For maximum performance and efficiency in a rotary heat exchanger, low speed as well as high speed is required. The Emotron EMX-D system therefore offers full control over a wide speed range.

To prevent involuntary heat recovery, holding torque can be activated in the motor to hold a rotor still.

- Advanced user interface for complete control of settings and operation.
- High switching frequency for quiet operation.
- A wide speed range for maximum usage of the high efficiency in the heat exchanger rotor.
- Easy handling since no adjustments or settings are required.
- The control signal is proportional to the efficiency of the heat exchanger rotor.
- Selectable direction of rotation.
- Extensive protection against short circuit, overloading etc.
- Holding torque – prevents involuntary heat recovery.
- Flexible design makes the drive system prepared for future demands.

| SPECIFICATIONS MOTOR/ GEARBOX UNIT | STANDARD | SPECIAL |
|---|---|---|
| Reduction | 10.3:1 | 15.5:1 |
| Max diameter of heat exchanger wheel with max 10-12 rpm[1)] | 5500 mm | 3500 mm |
| Speed of rotation | 8 - 200 rpm | 5.5 - 135 rpm |
| Direction of rotation | Selectable | |
| Torque | 26 Nm | 39 Nm |
| Motor power | 750 W | |
| Weight | 9.5 kg | |
| Dimensions, L x D | 410 x 194 mm | |
| **SPECIFICATIONS CONTROL UNIT** | | |
| Indication | Heat exchanger rotor speed, operation status, alarm | |
| Analogue output proportional to speed | Yes | |
| Weight | 12.5 kg | |
| Dimensions (H x Wx D) | 351 x 203 x 203 mm | |

1) Higher rotor speed or tight air sealings could result in need for a larger drive system.

# “Reliability is our top priority – that’s why we chose Emotron”

ÖsTek AB is our Swedish partner offering everything for rotary heat exchangers. When their customer Sandvik Coromant AB in Gimo needed to replace their old drive systems, they chose to continue with Emotron. “Operational reliability is our top priority when we choose drive systems,” says Jan-Olov Olsson, operational technician at Sandvik Coromant.

Sandvik Coromant AB in Gimo manufactures boring bars and inserts for users in the manufacturing industry. Since the 1990s, they have been using Emotron drive systems in their DesiCool units.  When it was time to replace the old drive systems, Olsson worked in close cooperation with ÖsTek and CG Drives & Automation. The first Emotron EMX-D product to be released was therefore tested in Gimo.

“Since CG Drives & Automation offers the smartest solution for drying and heat exchanger rotors, continuing with Emotron products was the obvious choice,” says Olsson. “The main benefit is that we avoid pulse operation, we achieve smoother running, and it’s gentler on motors and rotors.”

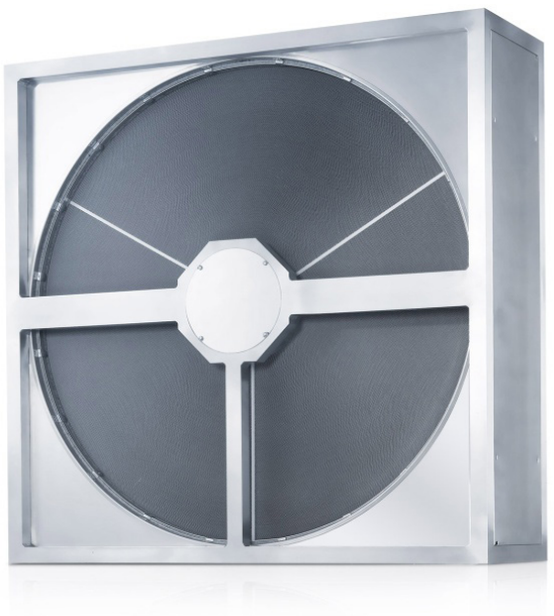
Since Sandvik Coromant aims to be as energy-efficient as possible in its plants, continual improvement projects are under way, and Olsson looks forward to continued cooperation with CG Drives & Automation.

**IN BRIEF**

| | |
|---|---|
| **Customer** | **Sandvik Coromant AB in Gimo, Sweden** |
| **Application** | **DesiCool unit** |
| **Products** | **Replacing Emotron EMX-D with Emotron VVX-6 and Emotron EMX-R with Emotron VVX-2/VVX-4** |
| **Result** | **Reliable operation, Longer plant service life** |
| **Benefits** | **Smooth running, Gentle on motors and rotors** |

COOPERATION PARTNER

# We offer a complete program of drive systems for rotary heat exchangers



## The EMX-B drive system is delivered as a unique, complete assembly kit

Each kit is delivered as a complete package including a suitable motor with mounting plate, control unit, belt, pulley and other accessories. When ordering, please state the diameter of the heat exchanger so that we can offer a customised drive system for your heat exchanger.
Contact us for a quote.
Immediate delivery from warehouse.

## Rotors

Replacement rotors – for all makes
Heat exchangers – manufactured to customer's specifications
Contact us for a quote.


ÖsTek AB
Energiåtervinning

Phone +46 295 - 211 15
info@ostek.se
www.ostek.se

# We put all our energy into saving yours

At CG Drives & Automation we use our know-how to create technical solutions that fit your requirements, and our personal commitment to make them work in practice – on your site, with your personnel. Simplicity and reliability are keywords applying to our products and solutions, as well as the service and support that our committed professionals provide. This will save you energy in every sense of the word!

CG Drives & Automation, formerly Emotron, has developed, manufactured and delivered efficient and reliable motor control equipment for 35 years. Since 2011 we form a part of Crompton Greaves (CG), a global pioneering leader in the management and application of electrical energy. With more than 15,000 employees in around 85 countries, CG provides electrical products, systems and services for utilities, power generation, industries, and consumers.

**DRIVE SOLUTIONS**
EMPOWERED BY EMOTRON

CONTACT US


SWEDEN (Head office)
CG Drives & Automation
Mörsaregatan 12, Box 222 25
SE-250 24 HELSINGBORG

Phone: +46 (0)42 169900
Fax: +46 (0)42 169949
Mail: info.se@cgglobal.com

www.emotron.se

GERMANY
CG Drives & Automation
Gießerweg 3
D-38855 WERNIGERODE

Phone: +49 (0)3943-92050
Fax: +49 (0)3943-92055
Mail: info.de@cgglobal.com

www.emotron.de

THE NETHERLANDS
CG Drives & Automation
Polakkers 5
5531 NX BLADEL

Phone: +31 (0)497 389 222
Fax: +31 (0)497 386 275
Mail: info.nl@cgglobal.com

www.emotron.nl

INDIA
CG Power and Industrial Solutions Limited
Drives & Automation Division
Plot. No. 09, Phase II,
New Industrial Area,
Mandideep – 462046

Phone 1 : + 91-7480 42 6433,
Phone 2 : + 91-7480 42 6440
drives.mktg@cgglobal.com

CHINA
CG Drives & Automation
Shanghai Rep. Office
21B, Cross Region Plaza, No.899
Lingling Road, Xuhui district, Shanghai,
P.R, China. PC:200030

Phone: +86 21 64401635
Mobile:+86 1376 111 8962
Fax: +86 21 64401637
Mail: linda.hu@cgglobal.com

www.emotron.com

LATIN AMERICA
CG Drives & Automation
Calle Nueva 1890, Huechuraba
Santiago-Chile
Postal Code 8050000

Phone: +56 2 27604100
Mobile: +56 9 42459798
rene.rodriguez@cgglobal.com

www.emotron.com

NORTH AMERICA
CG Drives & Automation
2875 N. Berkeley Lake Road NW,
Suite 2, Duluth, GA 30096
USA

Mobile: 314-604-6990
Fax: 470-448-4957
www.emotron.com


For global information visit
www.cgglobal.com

CG Product brochure Emotron EMX 01-6232-01, 2018-03