



Clean oil-free, linear, and non-pulsing air supply (ISO 8573-1:2012 Class 0)

Class-leading efficiency and reliability



Automotive design – High resistance to shock/impacts

Immediate start-up and excellent start-stop properties



Ultra-compact modular design, lightweight, and flexible integration

Cost-effective solution



**EK10C compressor**

|                        |                             |
|------------------------|-----------------------------|
| Motor power            | 10kW continuous / 13kW peak |
| Air flow range         | 0.015 – 0.15 kg/s           |
| Pressure ratio range   | 1.2 – 2.3                   |
| Aerodynamic efficiency | Up to 80%                   |



The EK series is our most compact electrical compressors. These units are fully integrated units with built-in motor, traction drive, lubrication, and coolant system.

## GENERAL DESCRIPTION

The EK10 is a unique fuel cell compressor combining the best of both worlds. It includes our proven traction drive to achieve unmatched impeller speeds (continuously). The EK series is specially designed for fuel cell applications with high requirements to system integration and minimal maintenance.

The Rotrex fuel cell compressors are based on our patented class-leading traction drive technology, perfected through decades. Over a decade of experience supplying reliable hardware to the fuel cell industry have led to the thorough development of the EK series fuel cell compressors. The result is a class leading air compressor, that offers unmatched reliability and efficiency.

The EK10 features a specially designed centrifugal compressor, developed for aerodynamic operation points matching many fuel cell applications ranging from 20kW – 100kW output. Resulting in a superior fuel cell compressor applicable in a wide variety of industries:



Forklifts



Automotive



Busses



Stationary



Heavy-Duty



Railroad



Maritime



Aviation

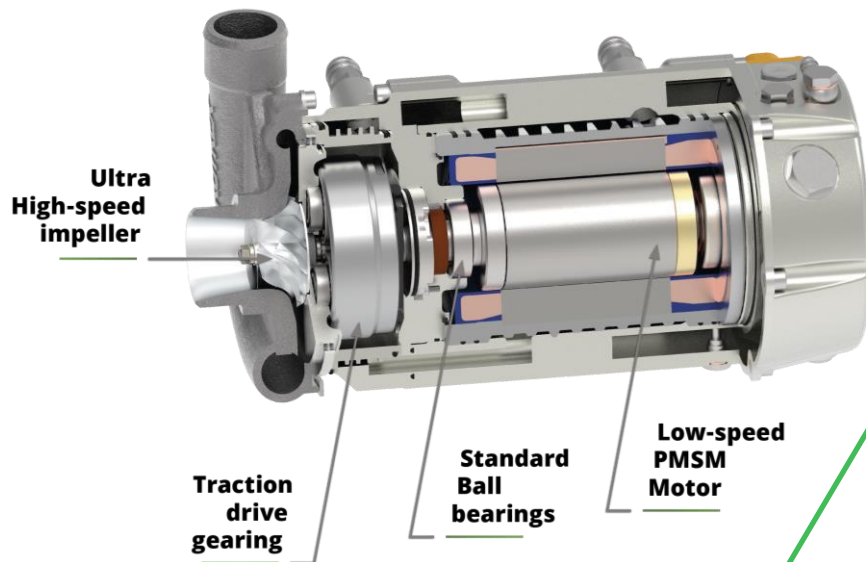
For more information go visit:

[ROTREX-FUEL-CELL-COMPRESSOR.COM](http://ROTREX-FUEL-CELL-COMPRESSOR.COM)



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## System overview



The unique design of the Rotrex fuel cell compressor is operating on a low-speed motor and the patented planetary traction drive. This enables the entire system to run on standard ball-bearings, instead of sensitive ultra-high-speed bearings.

**More robust:** using traction drive technology eliminates any sensitivity towards external shock/vibrations and air contaminants under use in even the most demanding environments.





**More Efficient:** Our traction drives typically run up to 98% efficiency and tested to 240.000 rpm of continuous operation.

**More Scalable:** Our fuel cell air compressors are fully scalable to match any fuel cell application. We can offer tailored solutions beyond 200 kW of continuous compressor power.




## Mobile or industrial inverter

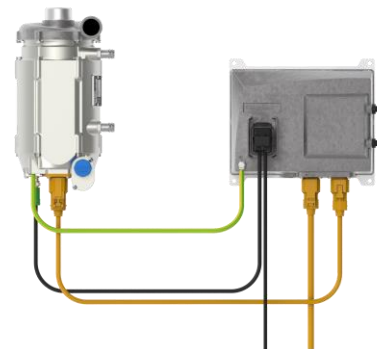
A motor controller, or inverter, is mandatory for operating the EK10 fuel cell compressor, Rotrex offers a range of pre-configured inverters:

### Mobile inverters:

-  Liquid cooled like the EK10.
-  Compact, lightweight, and robust.
-  IP6K9K with connectors mated.
-  Capable of 33 A continuous output current.

### Industrial inverters:

-  AC grid powered.
-  Display and buttons for easy control.
-  Wide range of control add-on options.



## EK10 fuel cell air compressor specifications

| Parameter                            | EK10C-0822   | EK10C-1220       |
|--------------------------------------|--|------------------|
| Recommended Air Mass Flow Range      | 0.025-0.08 kg/s  | 0.05 – 0.12 kg/s |
| Recommended Pressure Ratio Range     | 1.4 – 2.2  | 1.4 – 2.0        |
| Aerodynamic efficiency               | Up to 79%  | Up to 80%        |
| E-Charger Physical Dimensions        | 310 x 156 x 188 mm   |                  |
| Inlet Air Connection Diameter        | 47 mm (1.85")  |                  |
| Discharge Air Connection Diameter    | 38.5 mm (1.5")   |                  |
| Weight Incl. Fluid                   | ≈ 11,3 kg (0,88 Kg / Kw)   |                  |
| Discharge Angle                      | Fully adjustable, 360°   |                  |
| Internal Drive Ratio                 | 1:8.44   |                  |
| Bearing type                         | Bearing-less high-speed shaft  |                  |
| Maximum Motor Shaft Speed            | 16,600 RPM   |                  |
| Maximum Impeller Speed               | 140,000 RPM  |                  |
| Acceleration Rate (T <sub>90</sub> ) | < 2 sec  |                  |
| Motor Type                           | Permanent Magnet Synchronous Motor (PMSM)  |                  |
| Motor Power                          | 10kW continuous / 13kW peak  |                  |
| Rated Motor Current                  | 25 A   |                  |
| Maximum Motor Winding Temp.          | 130 °C   |                  |
| Cooling Method                       | 50/50 Glycol/Water mix   |                  |
| Min Coolant Flow Rate                | 10 lpm   |                  |
| Maximum Cooling Water Temp           | 65°C   |                  |
| Recommended Cooling Water Temp.      | 35°C   |                  |
| Max Allowable Coolant Pressure       | 1.0 Bar Gauge  |                  |
| Regulatory compliance                | ISO 8573-1:2012 Class 0 (air purity)<br>IP67 Enclosure Rating<br>IEC 60068-2-27 (shock),<br>IEC 60068-2-6 (vibrations) |                  |

3D model of the EK10 is available in STEP upon request.

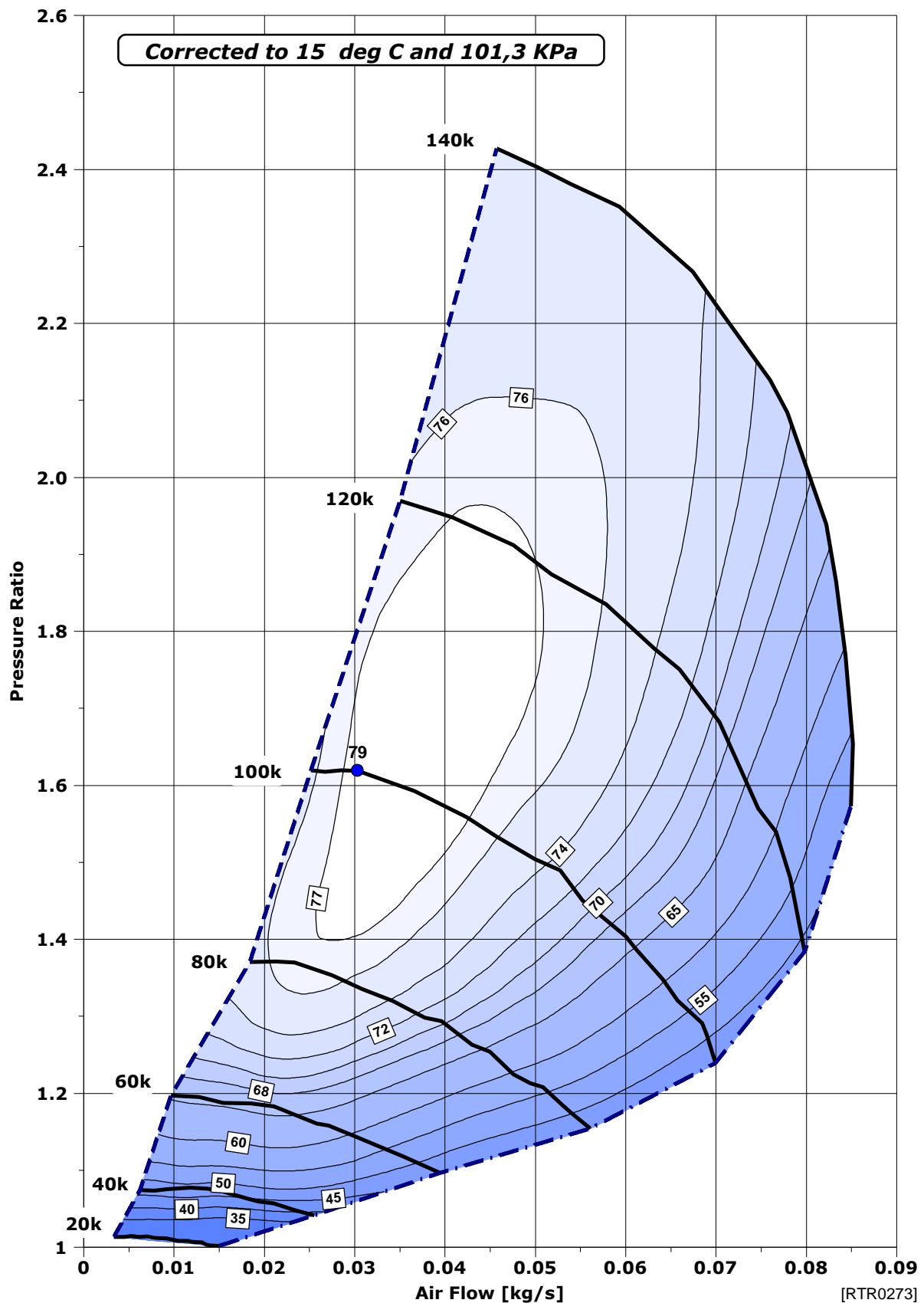
## Sevcon HVLP-20 Mobile Inverter (Motor Controller)

| Parameter                       | HVLP-20, Liquid Cooled   |
|---------------------------------|--|
| Physical Dimensions             | 255 x 223 x 88 mm (4,3L)   |
| Weight, Dry                     | ≈ 2.3 kg   |
| Operating voltage range         | 200-800 VDC (min 400V for full operation)                                |
| Control Power Supply            | 12/24 VDC ≈ 6W   |
| Output Current                  | 33A continuous / 53A peak  |
| Commutation Method              | Closed loop, sinusoidal position feedback                                |
| E-Charger Control Method        | CAN J1939 (optional analog)  |
| Cooling Method                  | 50/50 glycol/water mix   |
| Operating Coolant Temperature   | Coolant temperature: -25°C to +65°C no current derating                  |
| Minimum Coolant Flow Rate       | 6 lpm  |
| Max. Allowable Coolant Pressure | 1.0 bar gauge  |
| Motor Winding Overheat Shutdown | torque cutback at 125°C, shutdown at 130°C                               |
| Vibration Tolerance             | 3 g, 5 Hz to 500 Hz  |
| Shock Tolerance                 | 40 g peak, 6 ms, 1000 bumps in each direction repetition rate 1 to 3 Hz. |
| Ingress protection              | IP6K9K with connectors mated   |

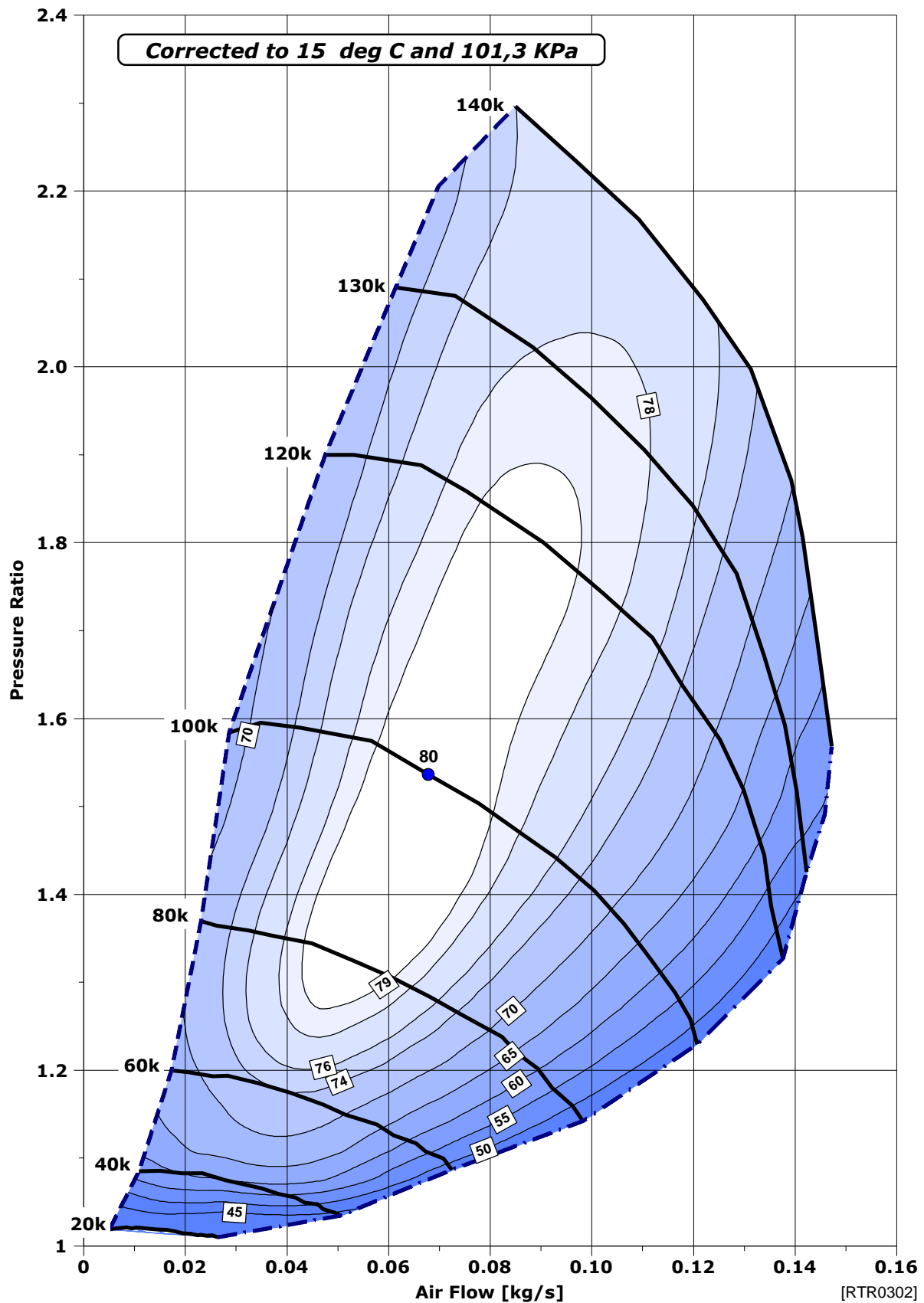
3D model of the HVLP-20 mobile inverter is available in STEP and IGES upon request.

| Conversion Toolbox   |
|--|
| $^{\circ}\text{C} = \frac{5}{9} \times (^{\circ}\text{F} - 32) \quad \text{OR} \quad ^{\circ}\text{F} = \frac{9}{5} \times ^{\circ}\text{C} + 32$                      |
| $\text{CFM} = \frac{\text{kg}}{\text{s}} \times 1731.8 \quad \frac{\text{kg}}{\text{s}} = \frac{\text{CFM}}{1731.8} \quad @15^{\circ}\text{C and } 0.1013 \text{ MPa}$ |
| $\frac{\text{kg}}{\text{s}} = 0.0075 \frac{\text{lb}}{\text{min}} \quad \frac{\text{lb}}{\text{min}} = \frac{\text{kg}}{\text{s}} \times 0.0075$                       |
| $\text{Pressure Ratio} = \frac{P_{\text{out}}}{P_{\text{in}}}$   |

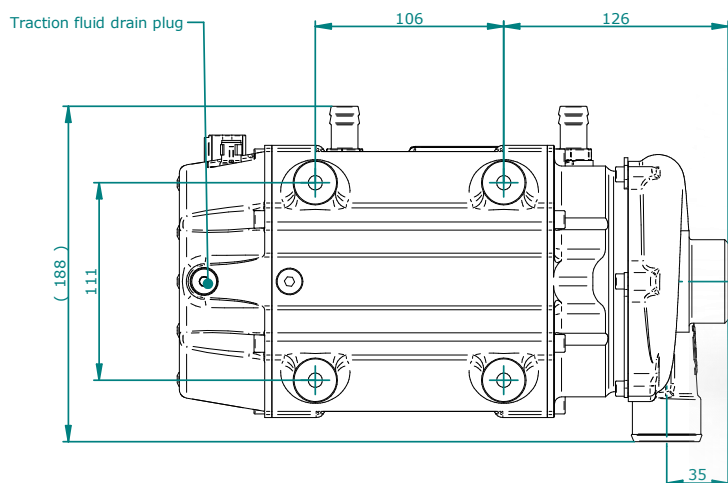
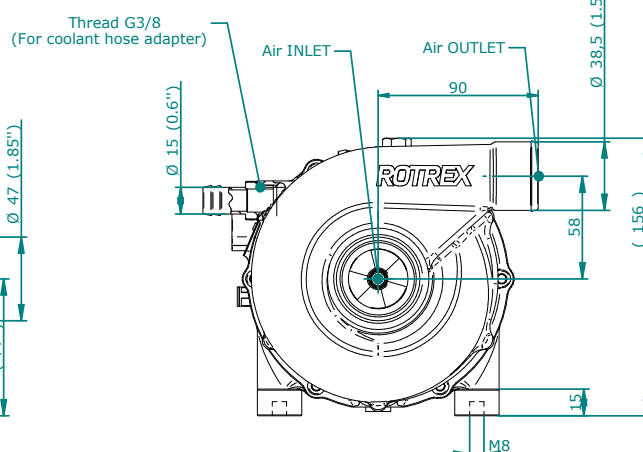
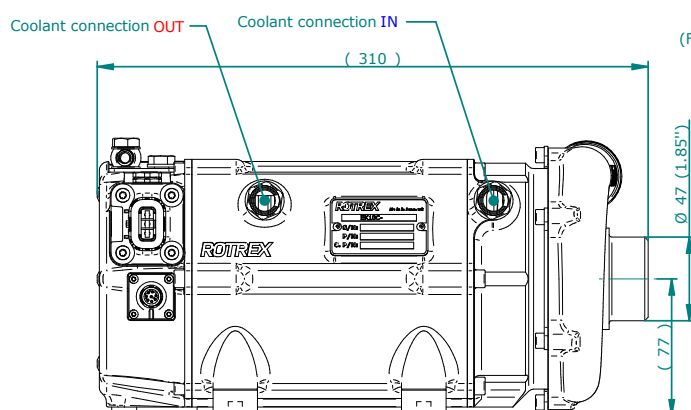
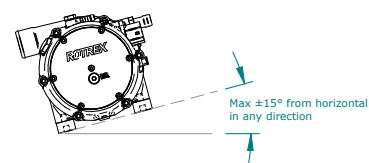
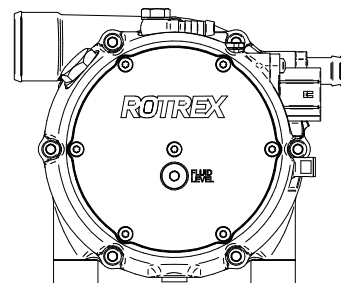
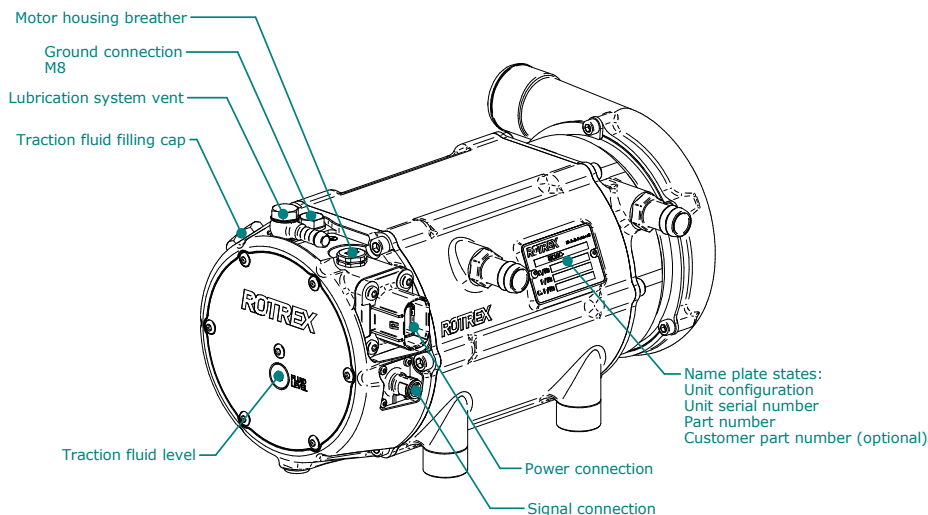
EK10C-0822 Compressor Map



EK10C-1220 Compressor Map



## EK10C Dimensions



All dimensions are in mm unless otherwise specified



**ROTREX™**