EJECTORS

INCREASED EFFICIENCY AT A HIGH LEVEL

Ejectors can increase plant efficiency. They are a kind of jet pump and work according to the Venturi principle where the propellant mass flow enters the mixing chamber on the high pressure side through a jet and generates a vacuum at the suction port. This is then used to transport a gas or liquid medium from the suction pressure level to the medium pressure level. The work done in this process can be used in different ways:

- **Gas ejectors** compress the suction gas by transporting it from the suction pressure level to the highest medium pressure level. The pre-pressed gas is then transported to the high pressure level by means of a second compressing stage (parallel compressor). The parallel compressor works more efficiently than a refrigerator compressor because it has a lower pressure difference to overcome.

- **Liquid ejectors** enable the partially flooded operation of cold locations that leads to increased performance of the cold location evaporator. The increased performance means that the suction pressure level can be raised (~3% higher efficiency per K increase). The task of the liquid ejector is to transport the liquid that is generated in the suction gas to the medium pressure container.

With the HCO2-G4, plant concepts can be realized with both stepped and continuous systems for transporting gas and liquid.

EFFICIENT PROCESS CONTROLLING OF CO2 PLANTS

FRIGOLINK HCO2-G4
Natural refrigerants are becoming increasingly significant as a replacement for F-gases, which are harmful to the ozone layer and the climate. One of these is R744 (CO2), which has become a significant as a replacement for F-gases, which are harmful to the ozone layer and the climate. We started for our environment and the climate. As a company, we bear a special responsibility for the environment and the climate. We started with the control of transcritical CO2 plants as far back as 2005. Since then, we have continuously monitored and driven the technological development of transcritical CO2 technology. This also, of course, applies to control systems such as operation and integral systems. So far, over 1,500 transcritical CO2 plants have been equipped with Wurm control systems.

The sum of all these experiences has been incorporated into the development of the new HCO2-G4 in order to provide a comprehensive solution for the efficient control of transcritical CO2 plants.

The HCO2-G4 is a highly scalable system and can be tailored to your requirements. Whether it is simple temperature control, or complex heat recovery or air-conditioning operations, the HCO2-G4 can always provide a fitting solution to all these tasks.

### FOR THE CHALLENGES WITH CO2

### THE HCO2-G4

#### BASIC AND ADDITIONAL FUNCTIONS AT A GLANCE

**High-pressure, medium-pressure**
- Process control depending on equipment plant efficiency
- Automatic making-up of low-vacuum refrigeration capacity for peak load operation
- Operation of recirculation units
- Multi-compression according to operating time (step-wise)

**Gas cooler fan**
- Control of up to 5 gas coolers
- Stop or continuous shutdown for a reconstruction of the system

**Parallel compressors**
- Control of up to 7 gas coolers
- Start or continuous shutdown for a reconstruction of the system

**Ejectors**
- Control of up to 7 gas coolers
- Start or continuous shutdown for a reconstruction of the system

**Heat recovery**
- 7-step operation for the needs-based recovery for CO2 refrigerators
- Stop or continuous operation
- Option to deactivate

**Heat volume calculation**
- Integrated calculation of heat outputs, external cooling, and heating
- Analysis and simulation of the heat outputs with FRIGODATA ONLINE using a scoring method

**Heat generation**
- Control of heat pumps for recovery of heat from gas coolers
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**Air conditioning**
- Air conditioning system with an optimized pressure drop between the condenser and the compressor
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**Extraction, communication**
- Integrated measurement and control of the extracted gas pressure
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**Peripheral functions**
- Collector making-up level control
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### HEAT MANAGEMENT

A heat recovery unit is integrated into the HCO2-G4 in order to provide an additional source. Only the information already available in the control system is required to be in combination with our web platform, FRIGODATA ONLINE, the heat recovery is analyzed and evaluated using a scoring method.

### 7 STEPS TO THE PERFECT HEAT VOLUME

1. **Heat recovery**
   - The HCO2-G4 makes an HR solution available that is highly scalable and can be tailored to your requirements. Whether it is simple temperature control, or complex heat recovery or air-conditioning operations, the HCO2-G4 can always provide a fitting solution to all these tasks.

2. **Heat volume calculation**
   - A heat volume index is integrated into the HCO2-G4 that requires no additional source. Only the information already available in the control system is required.

3. **Heat generation**
   - The information already available in the control system is required to be in combination with our web platform, FRIGODATA ONLINE, the heat recovery is analyzed and evaluated using a scoring method.