adicomp
ADVANCED AIR & GAS SOLUTIONS

Termomeccanica Group Company

VG *Technical Description*

OIL-INJECTED ROTARY SCREW GAS COMPRESSORS AND TREATMENT SYSTEMS FOR DRY METHANE OR NATURAL GAS

Capacity up to 3000Nm^3/h
Available discharge pressures from 3.5bar(g) to 25bar(g)
Nominal power from 3.0 to 400kW

Adicomp's experience,
gas compression and treatment.

Adicomp during the last 15 years has gained a lot of experience in compression and treatment of Biogas, Landfill gas, Natural gas, Nitrogen, Argon, Hydrogen and Syngas also supplying several hundred installations everywhere around the world.
The VG compression stations with direct coupling constitute the industrial compressor excellence thanks to the efficiency of the power transmission system by means of a mechanical elastomer joint which limits vibrations to a minimum.
These gas compression stations are innovative solutions because of their compact dimensions, noiselessness and suitability for uses in the most varied industrial sectors working in temperatures range between -20°C and 40°C.
In extreme environmental contexts the WEATHER PROOF solution (which envisages a cataphoresis treatment of the metal structural work, the use of automatic ''louvres'' for closing the radiant parts for managing the temperature inside the station as well as the use of stainless steel) makes possible for these units to be installed in extreme climatic situations.
VG gas compression stations are also suitable for installations in environments that are classified in accordance with the ATEX95 directive for zones 1&2 or in accordance with EN1127-1:2011 ANNEX B for not classified zones.

WE ARE LEADER IN COMPRESSION AND TREATMENT SOLUTIONS

Thanks to its own peculiar type of oil injected rotary screw gas compressor and to the well proven technology for the removal of gas contaminants like water, dust and siloxanes, Adicomp is proud to affirm that we are leader in Europe for supplying a "TURNKEY" installations for gas compression and treatment in cogeneration plants.
Adicomp systems can compress gases at the required pressure and treat them to the right quality for feeding gas turbines and gas engines, cogenerating heat and power.
Adicomp technology can compress gas even if the presence of hydrogen sulfide (H_2S) is up to 1000mg/m^3 as standard, while in case of higher concentrations, alternative solutions are available.

VG series,
dry methane and natural gas applications.

MAIN FEATURES

- Completely automatic by an electronic control system.
- Direct coupled.
- VSD (Variable Speed Drive) by inverter technology.
- Suitable for ATEX Zone 1&2 and for not classified zones.
- Air cooled standard, water cooled system is also available as option.
- For various optional see by page 6.

Dry methane compression and treatment station all included into an easy handling skid composed of an oil-injected rotary screw gas compressor, directly coupled to an electric motor through a flexible coupling, inverter controlled and completed with the following feature:

- **At the suction**: gas tight filter.
- **At the discharge**: gas after-cooler cooled by separate 4pole electric motor fans.

The dry methane is aspired through a coarse type suction filter then the gas pass through a suction control valve.
During the gas compression process, oil is injected inside the rotary screw chamber to perform three main functions: lubrication, sealing and heat absorption.
Working in a closed circuit from a gas/oil receiver, oil is pressurized to flow through an oil cooler, then filtered before being injected again into the screw compression chamber.
The gas goes through the minimum pressure/no-return valve into an air-cooled after cooler and finally through a series of coalescent gas filters with automatic oil drainers (if CF option is present) for removing the oil down to 0,01mg/m^3 and before leaving the package.
Normally a mechanical by-pass valve is used to recirculate the gas in excess into suction to reduce the capacity from the value achieved at minimum speed of the electric motor, down to 0%.
Sometimes it's necessary to install a pneumatic controlled by-pass valve to have a more accurate control.
When the system stops the gas is depressurized by feeding the gas into a specific expansion receiver or bleeding it out into the atmosphere.

ATEX

principal characteristics

COMPRESSOR ELEMENT AND TRANSMISSION

The lubricated single-stage oil-injected rotary screw compressor is composed of two rotors: a 5-lobe male and a 6-slot female one with asymmetrical profiles. Rotation of the rotors produces compression of the gas with continuity and without pulsations. The compressor element is driven directly by an electric motor through a flexible elastomer joint. The direct transmission represents an important characteristic of Adicomp machines as it makes possible to drive the compressor element with the best results and maximum reliability.
The compression is developed in a single stage and the heat of the compression is removed by the oil injected between the two rotors. Furthermore the oil lubricates the rotating mechanical parts and ensures the seal between the rotors.

GAS CIRCUIT

The gas circuit is composed as follows:

- Gas tight suction filter complete;
- Carbon steel gas/oil receiver with oil separators;
- Minimum pressure/no-return valve;
- Gas cooler with large exchange surface cooled by separate fans

OIL CIRCUIT

The oil is kept in circulation exclusively by the differential pressure of the gas between the gas/oil receiver and the compressor element at suction.
The oil circuit is composed as follows:

- Gas/oil receiver with an high efficiency oil separator cartridges;
- High-efficiency type oil filters;
- Oil cooler with large exchange surface cooled by separate fans;

GAS/OIL COOLING CIRCUIT

The cooling circuit is composed of the oil cooler and by the final compressed gas cooler combined into a single radiator air-cooled by separate axial electric motor fans. Water-cooled oil cooler and final water-cooled gas cooler are also available to be installed as option.

MAIN ELECTRIC MOTOR

The electric motor used is from IE1 to IE3 efficiency with F class of insulation and shielded bearings, over a certain size to withstand to class B over temperatures and with a degree of protection IP55. We usually install (Ex nA) motors for ATEX zone 2 and (Ex de) motors for ATEX zone 1, standard electric motors are used for no-classified zones.

SAFETY DEVICES AND GAUGES:

- Suction pressure gauge.
- Pressure/Vacuum switch at suction.
- Temperature sensors at the compressor's gas/oil mixture discharge.
- Pressure switch onto oil receiver for high pressure
- PTC on main electric motor.
- Conveyed safety valve in the gas/oil receiver.
- Overload protection for electric motors.
- Overload inverter protection.
- EMC filter inverter on-board protection.
- Oil pressure gauge.
- Temperature gauge on the final discharge pipe.

CAPACITY AND PRESSURE REGULATION

Adicomp VG compression stations are based on reliable and proven frequency converter (Inverter technology) to control the capacity precisely of the gas demand.
This means that the rotation speed of the compressor block is matched exactly to the requirement and the result is the constant pressure on the network all time. This feature minimize the power consumption and reduces the wear and tear on the compressor also.
With a speed range of the compressor block from 100% down to 50%, the VG gas compression stations feature the market widest turn-down range and quickest adaptation to the gas demand changes.
Within a very narrow limit of 0.7bar(g) the following capacity regulations are obtained:

- By the variable speed of the main electric motor controlled by the inverter from 100% down to about 50% of the speed range;
- By passing the gas into suction with a mechanic or pneumatic special by-pass valve from about 50% down to 0% of the nominal capacity;
- When the system stops the gas is depressurized by feeding the gas into a specific expansion receiver or bleeding it out into the atmosphere;

ELECTRIC & ELECTRONIC CONTROL PANEL

All various CE&UL switches and protection devices are fitted into a special control panel that is supplied separately by the compressor station.
The S1-20 electronic control system is also fitted into the panel and it is capable of processing the requested pressure, temperature and signals in real time as well as the functional parameters by means of transducers inside the station and in combination with the inverter.
Regulation of the off-load/loaded operation with timed automatic stopping for greater operating economy. A correct program of the operations guarantees the constant gas flow requested without any pressure jumps.
The electronic system makes possible to:

- Control the operating conditions of the main components of the compression station;
- Change the programmed working conditions;
- Determine any maintenance work in an automatic manner, as regards the environmental and operating conditions of the station, thereby rendering service more secure and less onerous;

By a luminous monitor of the electronic panel S1-20 and the inverter keypad on the control board panel, it's possible to display the working conditions of the machine and the triggering of any of the alarm and blocking devices provided, more specifically:

- Display indicating the working pressure.
- Display indicating the working temp.
- Symbol LEDs.
- Failure and status messages.
- Maintenance messages.
- Main and auxiliary switches.
- Start button.
- Programmed stop button.
- Emergency stop button.
- IP55 enclosure with ventilating fan and heaters.
- Operating motor frequency (inverter display).
- Current absorbed.
- Power absorbed.
- Motor speed or operating frequency.
- Many more functions selecting the parameters requested.

options available

(OF) - OPEN FRAME (STANDARD VERSION)

Open frame version suitable for indoor installation

(S) - SILENCED & (SS) SUPER SILENCED

Sound proof enclosure, suitable for indoor installation (no weather proof) with a noise level from 70dB to 80dB at 1m. With the super silenced option we also install soundproofing air conveyors and increased sound absorbing materials.

(WS) - WEATHER PROOF

The compressor station is designed and built for an ambient temperature from -20°C to +40° C, with a special roof and the cataphoresis painting treatment of the canopy that make the station suitable for outdoor operations.

(CF) - FINE FILTRATION

When the quality of the standard compressed gas is not acceptable with the residual content of oil (3-5mg/m^3), before leaving the package the compressed gas goes through a set of high efficiency coalescent type filters which are fitted down-stream the after-cooler to reduce the residual amount of oil content into the gas down to (0,01mg/m^3).

(EV) - EXPANSION VESSEL

Expansion vessel for depressurization is normally used for smaller capacity models and indoor installations.

(BV) - BLEED VALVE

Normally for bigger capacity models and outdoor installations it's used to pressurize the system by blowing the gas into atmosphere through the vent line.

(HR) - HEAT RECOVERING

Almost all the heat generated by a rotary screw compressor can be recovered and used to reduce energy general costs. Saving Energy means automatically reducing CO_2 emissions which is not only beneficial for the environment but also for the health. Our unit can be equipped with a heat recovering system to achieve the maximum Energy saving benefit from the compressor. It consists in a water/oil heat exchanger capable to transfer the heat from the compressor oil to sanitary, central heating or industrial process water. It is thermostatically controlled both at the oil as well as at the water side. Up to 80% of the compressor's heat energy can be recovered by this system.

(MB) MODBUS & (PB) PROFIBUS REMOTE CONTROL SYSTEMS

Every Adicomp compressor can be connected through a Modbus or a Profibus gateway for data transmission. Modbus and Profibus added to the S1-20 main controller, can perform the following operations:

- Read any parameter inside the table from P01 to P10.
- Write on any settable parameter inside the table from P01 to P10. Usually it is used to modify the working pressure PU and PL.
- There are 3 working inputs (start – stop – reset).
- "Get": Get the value or the information.
- "Set": Set the value of a function.
- "Cmd": Give the command.

As option an I/O Box provides additional general purpose I/O (input/output) connections, in particular n°8 digital and n°4 analog inputs.
These connections can be used to monitor sensor devices and better manage the alarms. A single alarm for each channel allows an improved fault remote monitoring.
Four analog devices like PT100 or pressure transducers can be added and "read" via Modbus or Profibus systems.

some customized solutions

VG160-5.0FD INV (WS)
Developed as a dry methane rotary screw gas compressor. Designed for ATEX zone 2 classified zone, sound proof and weather proof equipped.

SPECIFICATIONS:
Power: 200kW (de-rated)
Inlet pressure: 100mbar(g)
Outlet pressure: 5.0bar(g)
Capacity: 0<800<1700Nm³/h

VG5.5-6.0AD INV (OF)
Developed as a dry methane rotary screw gas compressor. Designed for ATEX zone 2 classified zone, open frame on skid mounted for indoor installations.

SPECIFICATIONS:
Power: 7.5kW (de-rated)
Inlet pressure: 25mbar(g)
Outlet pressure: 6.0bar(g)
Capacity: 0<22<48Nm³/h

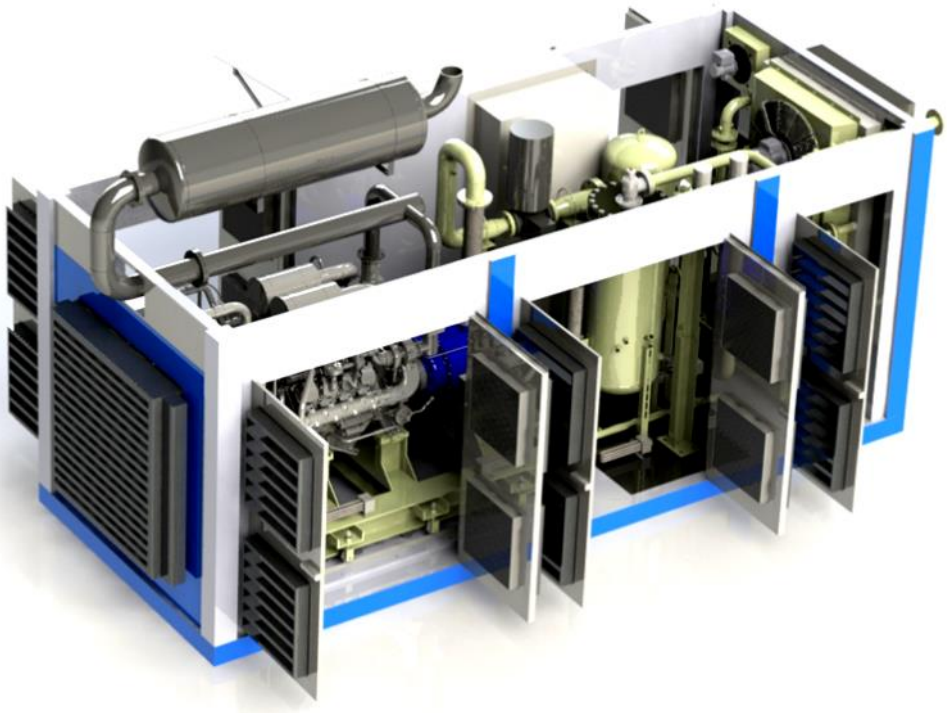
Adicomp's overview,
other products available.

ELECTRIC DRIVEN OIL-INJECTED ROTARY SCREW BOOSTER

For natural gas, bio-methane and well-head gas with suction pressure up to ***8bar(g)*** and discharge pressure up to ***25bar(g).*** Full range of power up to ***400kW.*** They are also available in containerized versions for extreme climate conditions.

GAS-ENGINE DRIVEN OIL-INJECTED ROTARY SCREW BOOSTER

For natural gas and well-head gas with suction pressure up to ***8bar(g)*** and discharge pressure up to ***25bar(g).*** Full range of power up to ***400kW.*** These versions are also available in containerized versions for extreme climate conditions.



Adicomp's overview,
other products available.

TWO-STAGE OIL-INJECTED ROTARY SCREW COMPRESSOR

Electric motor driven compressors for gas and air applications with suction pressure from atmospheric up to ***1bar(g)*** and discharge pressure up to ***40bar(g).*** Full range of power up to ***400kW.***

FULL RANGE OF MULTISTAGE RECIPROCATING PISTON COMPRESSORS

Electric motor driven compressors for several different kind of gas applications like nitrogen, natural gas, bio-methane process gas etc., available in container or open frame versions with a discharge pressure up to ***350bar(g).*** Full range of power up to ***400kW.***

FULL RANGE OF DRYING AND BOOSTING PACKAGES

For biogas treatment, drying and boosting systems that are suitable to be installed outdoor and with a capacity up to ***2000m³/h*** and a pressure up to ***200mbar(g).***

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