



**BIOGAS COMPRESSION & TREATMENT
STATION MODEL: BVG4.0-7.0 AD INV to
BVG90-7.0ED INV (GTOF)**

Standard & Explosion proof version – Open Frame



MAIN CHARACTERISTICS

- **Completely automatic**
- **Direct coupled**
- **Inverter controlled**
- **Open frame (indoor installation)**
- **Air Cooled**
- **“oil & water free” gas produced**
- **With Siloxane removal**

This open frame biogas compression & treatment station consists of a single skid mounted package containing a rotary screw compressor, oil injected, direct coupled to an electric motor through a flexible coupling, inverter controlled complete with following equipment such as:

- at suction: gas filter with water separator and automatic drainer
- at discharge: after cooler with water separator and automatic drainer, refrigerant type dryer, oil removal filter, active carbon double column, final dust filters for gas contaminants reduction

All mounted onto a single skid inclusive of electric control panel

The standard version is not explosion proof but it is also possible to supply the explosion proof version suitable for zone 2 (EEx nL) (ATEX).

In this case it is necessary an external chiller for refrigerated water and the electric panel to be placed in a safe area.

The unit is air cooled and it is design and built for ambient from 3 to 40 °C and it is also suitable for continuous duty 24/24 hours operation.



Units shown are standard version but without siloxane removal active carbon columns and dust filter





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***Compressor package composition (GTOF) "Gas Treatment Open Frame"
Standard version:***

1 - Gas circuit

- a- Suction filter filtration grade 25 micron complete with automatic drainer type and safety device and pressure differential switch
- b- Screw compressor package direct coupled -air end – electric motor – stainless steel gas/oil receiver with spin on oil separator, minimum pressure valve and final after cooler, cooled by separate fan inverter controlled
- c- Water separator with automatic drainer capacitive type with safety device
- d- Refrigerant dryer complete with capacitive type automatic drainer with safety device
- e- Coalescent type oil removal filter
- f- Non return valve
- g- Twin stainless steel vessel – containing suitable active carbon for the removal of Siloxane and oil residual in compressed gas both complete with pressure gauge and conveyed type gas safety valve and four valves to change manually the duty of two columns and valves for depressurisation.
- h- Dust filter – Filtration grade B (15 micron)
- i- Final dust filter – Filtration grade R (1 micron)

1- Oil circuit

- n - Oil thermostatic valve to maintain correct operating temperature
- p- oil filter
- o- Oil cooler (cooled by separate electric fan inverter controlled (in common with gas final cooler))

2- Electric panel

- p- IP55 enclosure with ventilating fan
- q- Inverter complete with filter
- r- Electronic panel
- s- various electrical components
- u- Modbus RTU hardware
- y- I/O box



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3- Safety devices and gauges

- 4.1 Suction pressure gauge (0-250 mbar)
- 4.2 Pressure differential switch on suction filter
- 4.3 Pressure differential switch on coalescent type oil filter
- 4.4 Vacuum switch at suction
- 4.5 Temperature sensor at compressor gas/oil mixture discharge
- 4.6 Pressure switch at oil receiver (high pressure)
- 4.7 Pressure transducer at gas discharge (to control operating pressure)
- 4.7 Stainless steel conveyed safety valve on oil receiver
- 4.8 Two stainless steel conveyed safety valve on active carbon receiver
- 4.9 PTC on main electric motor
- 4.10 Overload protection for electric motor fan inverter
- 4.11 Overload protection for main motor inverter
- 4.12 Oil pressure gauge
- 4.13 Two pressure gauge on active carbon receiver
- 4.14 Temperature transducer on final discharge pipe
- 4.15 High water level switch on suction filter
- 4.16 High water level switch on after cooler separator
- 4.17 High on refrigerant dryer separator

On compressor display: (always visible)

- a- discharge operating pressure
- b- gas/oil mixture discharge temperature (many more pressing various keys)
- c- indication of faults
- d- indication of maintenance required

On refrigerant dryer display:

- a- Gas dew point
- b- Indication of faults

On Inverters keypad

Choice from:

- a- Absorbed current
- b- Operating frequency
- c- Power absorbed (many more selecting the parameter required)
- d- Indication of faults

At distance it can be visualised and controlled:

- pressure
- temperature

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Capacity and pressure regulation

Within a very narrow limit of about 0.5 bar the following capacity regulation are obtained::

- By variable speed by means of Inverter from 100% to about 50%
- By suction throttling by electro-pneumatic proportional control valve from about 50% to 0%
- Gas by-passing as a safety system
- At maximum set pressure the compressor will be placed on off load and after a set time in this status it will automatically stop.



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Model (With gas treatment GTOF)		BVG4.0-7.0 LD INV	BVG5.5-7.0 AD INV	BVG7.5-7.0 AD INV	BVG11- 7.0BD INV	BVG15- 7.0CD INV	BVG18.5-7.0CD INV
Suction pressure	Mbar(g)	20-100	20-100	20-100	20-100	20-100	20-100
Suction gas temperature (min.-max)	°C	3-40	3-40	3-40	3-40	3-40	3-40
Relative Humidity	% max.	100	100	100	100	100	100
H2S (Hydrogen Sulphide)	ppm max	2500	2500	2500	2500	2500	2500
Siloxane	ppb max	3000	3000	3000	3000	3000	3000
Operating pressure	Bar(g)	5.2 -5.9	5.2-5.9	5.2 -5.9	5.2-5.9	5.2-5.9	5.2-5.9
OPERATIVE LIMITS:							
Max .operating pressure	Bar(g)	7.0	7.0	7.0	7.0	7.0	7.0
Min. operating pressure	Bar(g)	4.5	4.5	4.5	4.5	4.5	4.5
Min/Max. ambient temperature	°C	3-40	3-40	3-40	3-40	3-40	3-40
PERFORMANCES:							
Free gas delivery at above conditions	Nm3/h	0-17-30	0-35-45	0-35-62	0-75-92	0-90-125	0-90-155
Compressed gas delivery temperature (above dew point)	°C	10 -15	10-15	10 -15	10 -15	10-15	10 -15
Gas dew point (at pressure)	°C	3-5	3-5	3-5	3-5	3-5	3-5
Air end rotation speed	r.p.m.	2900-5000	2600-3300	2600-4900	2500-3300	1800-3000	1800-3700
Oil capacity	Litre	4	6	6	8	8	12
Oil residual in the gas after treatment)	Mg/m ³	0.1	0.1	0.1	0.1	0.1	0.1
Siloxane residual (after treatment)	ppb	5	5	5	5	5	5
Powder filtration	micron	1	1	1	1	1	1
Noise level	dB (A)	70	70	70	70	70	70
Absorbed power at full load	KW	3.3	5.3	7.2	10.5	14.8	18.2
ELECTRICAL DATA " Main Motor"							
Manufacturer		Siemens	Siemens	Siemens	Siemens	Siemens	Siemens
Nominal power electric motor	kW	4.0	5.5	7.5	11	15	18.5
Efficiency	%/IP	86.0/55	86.5/55	88,5/55	89.5/55	90.0/55	89.8/55
Electric supply	V/ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Nominal speed	rpm	2905	2925	2940	2950	2950	2960
ELECTRICAL DATA "Fan motor"							
Manufacturer		EBM	EBM	EBM	EBM	EBM	EBM
Nominal power	kW	0.285	0.285	0.285	0.45	0.45	0.45
Nominal speed	r.p.m.	1400	1400	1400	1400	1400	1400
Quantity of ventilating air flow	M3/h	1500	1500	1500	3500	3500	3500
INVERTER							
Manufacturer/model		Fuji/FRN4.0	Fuji/FRN5.5	Fuji/FRN7.5	Fuji/FRN11	Fuji/FRN15	Fuji/FRN18.5
REFRIGERANT DRYER							
Model		DR6G	DR9G	DR13G	DR19G	DR24G	DR32G
Total power installed	KW	0.200	0.270	0.350	0.440	0.490	0.740
Electrical supply	V/ph/Hz	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50
Refrigerant gas	type	R134A	R134A	R134A	R134A	R134A	R404A
DIMENSION of Package							
Length	mm	1700	1700	1850	1850	1850	2400
Width	mm	1000	1000	1000	1000	1000	1200
Height	mm	1700	1700	1850	1850	1850	2100
Inlet /Outlet	DN	1"-1/2"	11/4"-1/2"	1 1/4"-1/2"	11/2"-3/4"	11/2"-3/4"	2" -1"
Active carbon column capacity	litre	2x50	2x50	2x100	2x100	2x100	2x200



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Model (With gas treatment GTOF)		BVG22-7.0 CD INV	BVG30-7.0 HD INV	BVG45-7.0 DD INV	BVG55-7.0 MD INV	BVG75-7.0 MD INV	BVG90-7.0 ED INV
Suction pressure	Mbar(g)	20-100	20-100	20-100	20-100	20-100	20-100
Suction gas temperature (min.-max)	°C	3-40	3-40	3-40	3-40	3-40	3-40
Relative Humidity	% max.	100	100	100	100	100	100
H2S (Hydrogen Sulphide)	ppm max	2500	2500	2500	2500	2500	2500
Siloxane	ppb max	3000	3000	3000	3000	3000	3000
Operating pressure	Bar(g)	5.2-5.9	5.2 -5.9	5.2-5.9	5.2-5.9	5.2-5.9	5.2-5.9
OPERATIVE LIMITS:							
Max .operating pressure	Bar(g)	7.0	7.0	7.0	7.0	7.0	7.0
Min. operating pressure	Bar(g)	4.5	4.5	4.5	4.5	4.5	4.5
Min/Max. ambient temperature	°C	3-40	3-40	3-40	3-40	3-40	3-40
PERFORMANCES:							
Free gas delivery at above conditions	Nm3/h	0-75-170	0-110-250	0-180-370	0-325-450	0-325-620	0-450-750
Compressed gas delivery temperature (above dew point)	°C	10-15	10 -15	10-15	10-15	10 -15	10-15
Gas dew point (at pressure)	°C	3-5	3-5	3-5	3-5	3-5	3-5
Air end rotation speed	r.p.m.	1870-4400	1600-3400	1700-3150	1480-2000	1480-3000	1700-2100
Oil capacity	Liter	20	30	45	45	80	80
Oil residual in the gas after treatment)	Mg/m ³	0.1	0.1	0.1	0.1	0.1	0.1
Siloxane residual (after treatment)	ppb	5	5	5	5	5	5
Powder filtration	micron	1	1	1	1	1	1
Noise level	dB (A)	73	75	75	75	75	75
Absorbed power at full load	KW	20.5	27	42	52	73	87
ELECTRICAL DATA " Main Motor"							
Manufacturer		Siemens	Siemens	Siemens	Siemens	Siemens	Siemens
Nominal power electric motor	kW	22	30	45	55	75	90
Efficiency/Protection	%/IP	91.7/55	92.3/55	93.6/55	94.2/55	94.8/55	95.3/55
Electric supply	V/ph/hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Nominal speed	rpm	2940	2945	2960	1450	1450	1450
ELECTRICAL DATA "Fan motor"							
Manufacturer		EBM	EBM	EBM	EBM	EBM	EBM
Nominal power	kW	0.45	1.20	1.20	2.20	2.20	2.20
Nominal speed	r.p.m.	1400	1400	1400	1400	1400	1400
Quantity of ventilating air flow	M3/h	3000	7000	7000	16000	16000	16000
INVERTER							
Manufacturer/model		Fuji/FRN22	Fuji/FRN30	Fuji/FRN45	Fuji/FRN55	Fuji/FRN75	Fuji/FRN90
REFRIGERANT DRYER							
Model		DR42G	DR57G	DR85G	DR110G	DR131G	DR152G
Total power installed	KW	0.890	1.050	1.250	1.460	1.900	2.050
Electrical supply	V/ph/Hz	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50
Refrigerant gas	type	R404A	R404A	R404A	R404A	R404A	R404A
Active carbon column capacity	litre	2x200	2x400	2x400	2x800	2x800	2x800
DIMENSION of Package							
Length	mm	2800	3000	3000	3600	3600	3600
Width	mm	1300	1500	1500	1500	1500	1500
Height	mm	2100	2100	2100	2100	2100	2100
Inlet /Outlet	DN	DN65/DN32	DN80/DN40	DN80/DN40	DN100/DN50	DN125/DN50	DN125/DN50
Active carbon column capacity	litre	2x200	2x400	2x400	2x800	2x800	2x800