santé

MIL'S, on-site oxygen production

oxygen

MIL'S

Since 1926

Contents

Main office

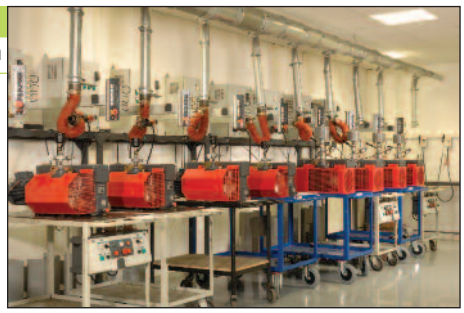
Entrance hall

Machining

Design office

Check room

Testing room



Our company

MIL'S, French vacuum pumps manufacturer, was founded in 1926 and currently employs 90 people on two sites in the outskirts of Lyon and one sales office in the outskirts of Paris.
The company operates over 10 000 sq.m of manufacturing floor space.
From design, through to sale, our understanding and control of the processes involved enables us to offer a high quality product, using :

- State-of-the-art computer assisted design software
- NC-plant and equipment and several assembly facilities
- Product packaging techniques devised in-house
- A dynamic, solutions-oriented sales force
- Field service engineers and maintenance contracts for your plant and equipment
- Our customer training centre to transfer in depth knowledge of our products and their uses.

Designer and manufacturer for healthcare applications

anaesthesia

resuscitation

emergency

neonatalogy

surgery

sterilisation

Our products

From simple vacuum pump or compressor to fully integrated vacuum, oxygen and medicinal air systems, MIL'S is proposing a wide range of possibilities developped for your specific applications

We have been specialised in medical vacuum and air for many years and can boast a satisfied customer base, world-wide of over 3 500 healthcare facilities operating.

Our medical range, meeting 2007/47 directive, carries the CE-mark

PRO$_2$XY® - 5 BAR

- Oxygen available upon request or continuously
- Economic oxygen production
- Simple and reliable production technology
- Constant flow and pressure of oxygen no matter the consumption (MIL'S patent)
- Pressure at 5 bar maxi for single stage network pressure
- PROCOM 2 control device (see page 19)
- Very compact system
- Low maintenance requirements
- Complies with ISO 10083

Characteristics

- Flow from 4 to 14 Nm³/h @ 93%
- Purity maxi. > 95%
- Oxygen exhaust pressure : 5 bar
- O_2 measurement by heated and regulated paramagnetic sensor and with back pressure regulator
- CO / CO_2 monitoring (optional)
- Dew point monitoring of O_2 (optional) and of air (optional)
- Ambient O_2 monitoring (optional)
- Power consumption monitoring (optional)
- Working temperature from 5°C to 45°C
- Continuous running 24 hours (7/7)
- Power supply : 1-phase 230V - 50 / 60 Hz

PRO$_2$XY® without booster	OX 3	OX 5	OX 7	OX 13	OX 26
Flow @ 95% (Nm³/h)	3	4.5	7	13	26
Flow @ 93% (Nm³/h)	4	5	9	14.3	
Air inlet pressure	6.5 bar				
Oxygen exhaust pressure	between 4.5 and 5.5 bar				
Required air flow (Nm³/h)	40	60	93	150	CONSULT US
Oxygen storage tank volume @5 bar	200 litres		500 litres		
Weight (kg)	290	440	640	1320	
Required air plant in 11 bar HOSPITAIR® PACK S	MVA 8	MVB 12	MVB 16	MVD 22	

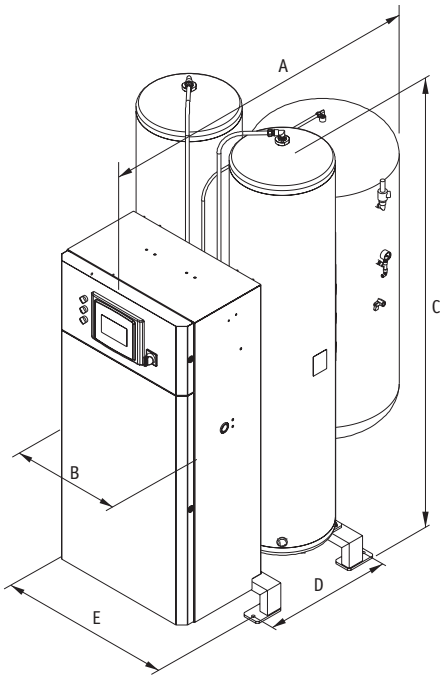
Process sequence

Air is a mixture of different gases with a proportion of 78% nitrogen, 21% oxygen, and 1% argon and others gases. Oxygen Generator separates oxygen from compressed air through a pressure swing adsorption (PSA) process. The synthetic zeolite of the molecular sieve adsorbs nitrogen and concentrates the oxygen up to a level of 95%. Furthermore, the oxygen flow is kept constant thanks to the two cylinders filled with molecular sieve (synthetic zeolite).

CE 0398

Range complying with 2007/47/CE directive

Dimensions (mm)



PRO_2XY® without booster	A	B	C	D	E
OX 3	1210	1000	1890	670	960
OX 5	1240	1000	2015	670	960
OX 7	1480	1000	2140	670	960
OX 13	1580	1010	2295	660	870
OX 26	Consult us				

Configuration

Measurements	O_2	O_2 network pressure	H_2O O_2	CO_2	CO	H_2O air	Air pressure	Ambient O_2	Power consumption
Single line	✓	✓	●	●	●	●	✓	●	●
Multiple-line N°1	✓	✓	●	●	●	●	✓	●	●
Multiple-line N°2	✓							●	●
Multiple-line N°3	✓							●	●

✓ standard equipment ● optional

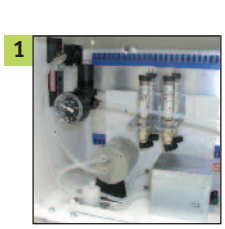
PRO_2XY® without booster references

		OX 3	OX 5	OX 7	OX 13	OX 26
Generator without booster	Single line	920423	920424	920425	921487	923854
Generator without booster multiple-line	Line N°1	922311	922312	922313	922314	923855
	Line N°2	922832	922833	922834	922835	923856
	Line N°3	922948	922949	922950	922951	923857
1 Paramagnetic O_2 sensor *		Foreseen 1 per generator		622272		

* Electrochemical oxygen analyser : consult us.

Optional accessory references

PROCOM 2 extension for generator single line or line N°1 (when an option is selected)	363171
2 CO (electrochemical) / CO_2 (infrared) analyser	361027
CO / CO_2 infrared analyser	363066
3 Air hygrometry monitoring	822284
O_2 hygrometry monitoring	823735
4 Wall-mounting analyser : O_2 / ambient air	622709
Power consumption monitoring	622956
Portable ambient oxygen analyser	622765
Uninterruptible power supply (1 per generator)	332981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PRO$_2$XY® - 12 BAR

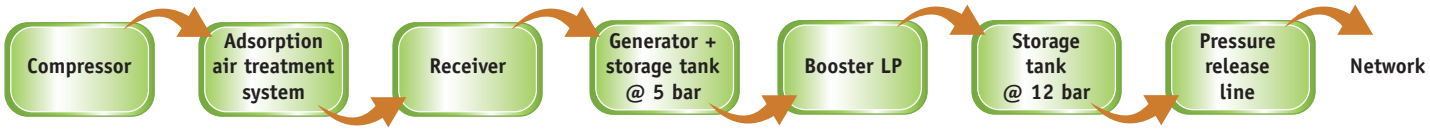
- Oxygen available upon request or continuously
- Economic oxygen production
- Simple and reliable production technology
- Constant flow and pressure of oxygen no matter the consumption (MIL'S patent)
- Pressure at 12 bar maxi for double stage network pressure
- PROCOM 2 control device (see page 19)
- Very compact system
- Low maintenance requirements
- Complies with ISO 10083

Characteristics

- Flow from 4 to 14 Nm³/h @ 93%
- Purity maxi. > 95%
- Oxygen storage pressure: 12 bar / 9 bar : after pressure release on network
- O_2 measurement by heated and regulated paramagnetic sensor and with back pressure regulator
- CO / CO_2 monitoring (optional)
- Dew point monitoring of O_2 (optional) and of air (optional)
- Ambient O_2 monitoring (optional)
- Power consumption monitoring (optional)
- Working temperature from 5°C to 45°C
- Continuous running 24 hours (7/7)
- Power supply : 1-phase 230V - 50 / 60 Hz

PRO$_2$XY® with booster	OX 3 B	OX 5 B	OX 7 B	OX 13 B
Flow @ 95% (Nm³/h)	3	4.5	7	13
Flow @ 93% (Nm³/h)	4	5	9	14.3
Air inlet pressure	6.5 bar			
Oxygen storage pressure	12 bar maxi.			
Required air flow (Nm³/h)	51	77	113	190
Oxygen storage tank volume @5 bar	200 litres		500 litres	
Oxygen storage tank volume @12 bar	500 litres		1000 litres	
Weight (kg)	320	470	670	1350
Required air plant in 11 bar HOSPITAIR® PACK S	MVB 12	MVB 16	MVC18	MVD 30

Process sequence

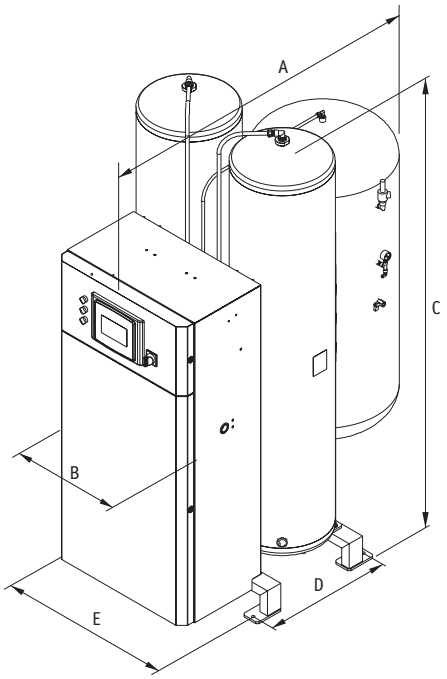


Air is a mixture of different gases with a proportion of 78% nitrogen, 21% oxygen, and 1% argon and others gases. Oxygen Generator separates oxygen from compressed air through a pressure swing adsorption (PSA) process. The synthetic zeolite of the molecular sieve adsorbs nitrogen and concentrates the oxygen up to a level of 95%. Furthermore, the oxygen flow is kept constant thanks to the two cylinders filled with molecular sieve (synthetic zeolite).

CE 0398

Range complying with 2007/47/CE directive

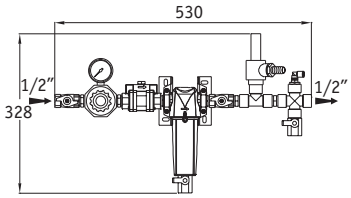
Dimensions (mm)



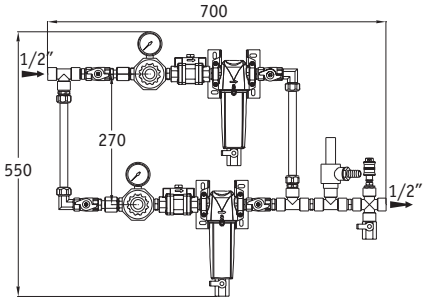
PRO$_2$XY® with booster	A	B	C	D	E
OX 3 B	1210	1000	1890	670	960
OX 5 B	1240	1000	2015	670	960
OX 7 B	1480	1000	2140	670	960
OX 13 B	1580	1010	2295	660	870

Dimensions (mm) of the pressure release lines 9 bar

For single line generator
BP300 + PAROX 36



for multiple-line generators
2 x (BP300 + PAROX36)



Configuration

Measurements	O_2	O_2 network pressure	H_2O O_2	CO_2	CO	H_2O air	Air pressure	Ambient O_2	Power consumption
Single line	✓	✓	●	●	●	●	✓	●	●
Multiple-line N°1	✓	✓	●	●	●	●	✓	●	●
Multiple-line N°2	✓							●	●
Multiple-line N°3	✓							●	●

✓ standard equipment ● optional

PRO$_2$XY® with booster references

		OX 3 B	OX 5 B	OX 7 B	OX 13 B
Generator with booster without storage tank	Single line	921948	921949	921950	921951
Generator with booster multiple-line without storage tank	Line N°1	922307	922308	922309	922310
	Line N°2	922836	922837	922838	922839
	Line N°3	922952	922953	922954	922955
Oxygen storage tank @ 12 bar : 1 per line		500 litres	722291	1000 litres	722293
Pressure release line @ 9 bar	Single line	BP300 + PAROX36		722294	
	Multiple-line	2 x (BP300 + PAROX36)		722295	
1 Paramagnetic O_2 sensor*		Foreseen 1 per generator		622272	

* Electrochemical oxygen analyser : consult us.

Optional accessory references

PROCOM 2 extension for generator single line or line N°1 (when an option is selected)	363171
2 CO (electrochemical) / CO_2 (infrared) analyser	361027
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O_2 hygrometry monitoring	823735
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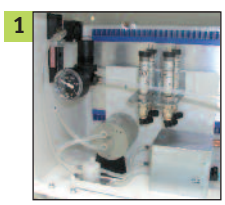
Power consumption monitoring	622956
Portable ambient oxygen analyser	622765
Uninterruptible power supply (1 per generator)	332981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HOSPITAIR® PACK S - 11 bar
SKID S - 11 bar

screw compressors

- Medical air plant with lubricated screw compressor to supply oxygen generator
- Compact design
- Adsorption air dryer and air treatment systems SEC 3A type
- Medicinal air
- Simplified setting
- Ready-to-run plants

Characteristics per air production assembly

HOSPITAIR® PACK S	POWER kW 50 Hz	FLOW RATE * - 50Hz $m^3.h^{-1}$		AIR DRYER TYPE	NOISE LEVEL ** dB(A)	WEIGHT kg	AIR PLANT FOR THE PRO_2XY® GENERATOR
		Compressor	Treatment outlet				
MVA 8	7.5	60.6	53	AD 480	64	260	OX 3
MVB 12	11	101	88	AD 4115	64	370	OX 5 and OX 3B
MVB 16	15	127	111	AD 4180	65	475	OX 5B and OX 7
MVC 18	22	177	155	AD 4180	70	575	OX 7B
MVD 22	22	188	165	AD 4240	66	820	OX 13
HOSPITAIR® SKID S							
MVD 30	30	266	234	AD 4300	69	1060	OX 13B
MVE 37	37	336	295	AD 4400	67	1400	

* Flow rates further to ISO 1217 : 1996 – C Annex

** Noise level further to PN8 NTC 2.3, measured at 1 m in a free area

Process sequence

Standard power supplies

- 3-phase, 400V / 50Hz
- Other tensions on request

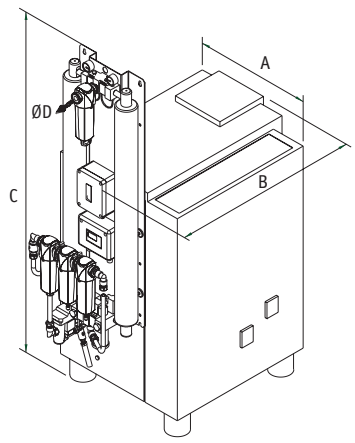
CE 0398

Range complying with 2007/47/CE directive

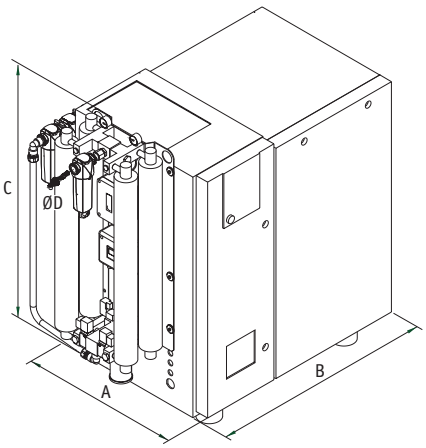
Medical air plants
for oxygen generators

Dimensions (mm)

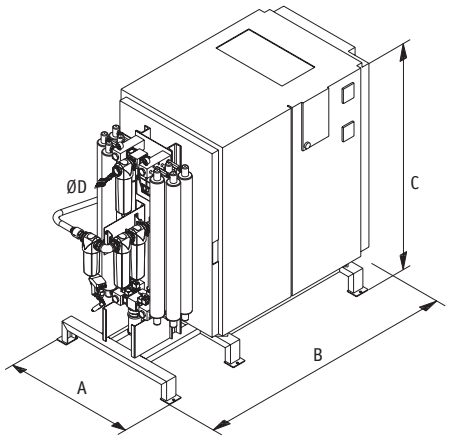
HOSPITAIR® PACK S
MVA 8 / MVB 12 / MVB 16



HOSPITAIR® PACK S
MVC 18 / MVD 22



HOSPITAIR® SKID S
MVD 30 / MVE 37



HOSPITAIR® PACK S	A	B	C	Ø outlet
MVA 8	630	1000	1600	1/2"
MVB 12	750	1250	1350	3/4"
MVB 16	750	1270	1350	1"

HOSPITAIR® PACK S	A	B	C	Ø outlet
MVC 18	915	1485	1360	1"
MVD 22	1200	1765	1600	1"

HOSPITAIR® SKID S	A	B	C	Ø outlet
MVD 30	970	1750	1650	1"1/4
MVE 37	1050	2550	2050	1"1/4

Plant references

	MVA 8	MVB 12	MVB 16	MVC 18	MVD 22	MVD 30	MVE 37
Air treatment system SEC 3A type fixed on the compressor	CY20 PF72- SUB72 AD480 CHA72	CY20 PF109-SUB109 AD4115 CHA109	CY30 PF217-SUB217 AD4180 CHA217	CY30 PF217-SUB217 AD4180 CHA217	CY30 PF217-SUB217 AD4240 CHA217	CY30 PF396-SUB396 AD4300 CHA396	CY30 PF396-SUB396 AD4400 CHA396
HOSPITAIR® PACK S or SKID S	**922280**	**922281**	**922282**	**922299**	**922283**	**922300**	**922980**
Equipped air receiver 11 bar *	1 x 500 litres **1 x 722278**		1 x 1000 litres **1 x 722279**				

* equipment : a safety valve, a pressure gauge, a drain valve and two valves (inlet / outlet)

Optional accessory references

Oil separator for 100% running	OWAMAT 10 (<144 m³/h) **359423**	OWAMAT 11 (<294 m³/h) **362859**	OWAMAT 12 (<438 m³/h) **362860**

Air quality codification according to ISO 8573-1 standard

The ISO 8573-1 standard defines air quality thanks to a codification based on residual contaminants classes :

- ***Solid contaminants classes, from 0 to 7***
- ***Water classes, from 0 to 9***
- ***Oil classes (droplets, aerosols and vapours), from 0 to 4***

Classes are defined by a number. The higher the number, the higher the quantity of residual contaminants concerned.

ISO 8573-1 Class	1st number						2nd number	3rd number
	Solid particles / dust						Humidity	Total oil content
	Maxi particle quantity per m³ Particles with d(µm)						Dew point	
	≤ 0,1	0,1 < d ≤ 0,5	0,5 < d ≤ 1,0	1,0 < d ≤ 5,0	µm	mg/m³	(x = liquid water content g/m³)	mg/m³
1		100	1	0			≤ -70°C	≤ 0,01
2		100 000	1 000	10			≤ -40°C	≤ 0,1
3			10 000	500			≤ -20°C	≤ 1,0
4				1 000			≤ +3°C	≤ 5,0
5				20 000			≤ +7°C	
6				100 000	≤ 5	≤ 5	≤ +10°C	
7				100 000	≤ 40	≤ 10	x ≤ 0,5	
8							0,5 < x ≤ 5,0	
9							5,0 < x ≤ 10,0	

A example : Medical air : quality class air 1 1 1

B example : Compressed air for general use : quality class air 2 4 3

Quality requirements of oxygen (93 per cent) in compliance with the European Pharmacopoeia Oxygen 93 per cent

a)	Oxygen content	93 % ± 3%
b)	Oil concentration	≤ 0.1 mg/m³
c)	Carbon monoxide concentration	≤ 5 ppm V/V
d)	Carbon dioxide concentration	≤ 300 ppm V/V
e)	Water vapor concentration	≤ 67 ppm V/V
f)	Sulphur dioxide concentration	≤ 1 ppm V/V
g)	Nitric oxides concentration (NO + NO_2)	≤ 2 ppm V/V

SEC 3A

Air treatment by filtration and drying by adsorption

- Fixed on the frame Hospitair®
- Dew point at –70°C for delivery air
- 1, 1, 1 sequality class air according to NF ISO 8573-1 standard
- Permissible maximum pressure : 16 bar
- Air dryer with expendable tubes
- Simple and easy maintenance

Filter types

- **CY :** Cyclonic filtration for condensate separation
- **PF :** 1µ micronic filtration to separate oil drops and solid particles (> 1µm). The residual oil aerosol is 0,5 mg/m³ at 21°C.
- **SUB :** 0,01 µm submicronic filter to filter out particles (> 0,01 µm) and oil and water aerosols. The residual oil aerosol is 0,01 mg/m³ at 21°C.
- **CHA :** Activated carbon filter to filter out oil vapours and odours. The residual oil aerosol is less than 0,003 mg/m³ at 21°C.
- **PAROX :** Particles or bacterial filter to avoid solid particles bigger than 0.01 µm.

Process sequence

Schedule for flow rate corrections according to the operation pressure						
bar	7	8	**10**	12	14	16
coeff.P	0,84	0,89	**1**	1,1	1,18	1,26

Schedule for flow rate corrections according to inlet temperature °C						
Inlet temperature °C	+25	+30	**+35**	+40	+45	+50
T coefficient for dew point at –45°C in reduced air	1,25	1,15	**1**	0,85	0,62	0,5

Percentage of regeneration gas taken from the inlet air flow rate according to the pressure, the air temperature and the expected dew point

Percentage of taken air according to the inlet temperature and the operating pressure

Expected dew point	Inlet temperature °C	**+25**			**+30**			**+35** standard			**+40**			**+45**			**+50**		
at reduced pressure	Operating pressure bar	7	10	15	7	10	15	7	10	15	7	10	15	7	10	15	7	10	15
<-25°C	Percentage	11	8	6	11	8	6	14	10	7	18	13	9	23	17	12	29	21	15
<-40°C	Percentage	12	9	7	12	9	7	15	11	8	19	14	10	24	18	13	30	22	16
<-60°C	Percentage	20	14	11	20	14	11	23	16	12	27	19	14	31	23	17	38	27	20

Device fit to 97/23/CE pressure directive - with dessicant – 230V power supply – pneumatic valves

AIR/O_2 COMBINED CONTAINER

1 air plant / 1 PRO$_2$XY® generator

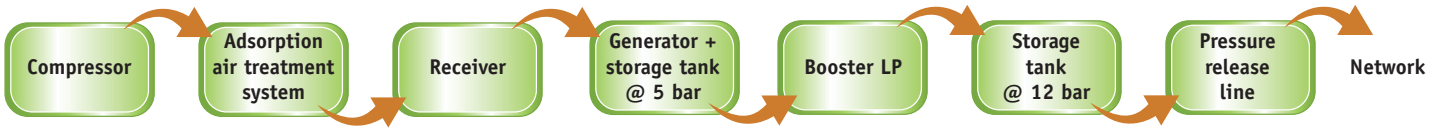
- Two compartments : one for air supply and one for oxygen production
- O_2 measurement by heated and regulated paramagnetic sensor and with back pressure regulator
- Compact design
- Simplified setting
- Ready-to-run plants

Process sequence @ 5 bar

CE 0398

Range complying with 2007/47/CE directive

Process sequence @ 12 bar

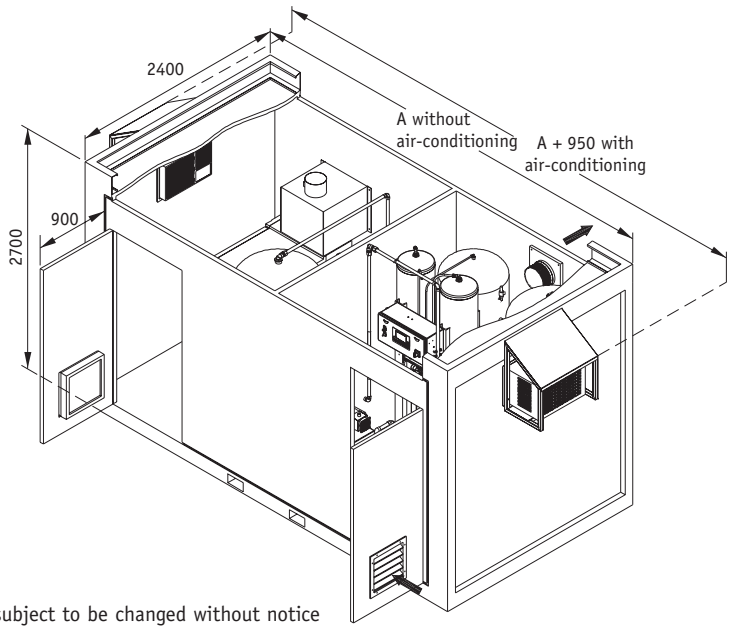


Configuration

Measurements	O_2	O_2 network pressure	H_2O O_2	CO_2	CO	H_2O air	Air pressure	O_2 Ambient	Power consumption
Single line	✓	✓	●	●	●	●	✓	●	●
Multiple-line N°1	✓	✓	●	●	●	●	✓	●	●
Multiple-line N°2	✓							●	●
Multiple-line N°3	✓							●	●

✓ standard equipment ● optional

Dimensions (mm)



	A	Weight (kg)
MVA 8 + OX 3	3500	2500
MVB 12 + OX 5	3500	2500
MVB 12 + OX 3B	4000	2700
MVB 16 + OX 5B	4000	2700
MVB 16 + OX 7	4000	3000
MVC 18 + OX 7B	4700	3200
MVD 22 + OX 13	5000	4000
MVD 30 + OX 13B	5000	4200

Standard power supplies

- 3-phase, 400V / 50Hz
- Other tensions on request

PSA oxygen production plants

Plant references

AIR/O_2 combined container SINGLE LINE	MVA 8 + OX 3	MVB 12 + OX 3B	MVB 12 + OX 5	MVB 16 + OX 5B	MVB 16 + OX 7	MVC 18 + OX 7B	MVD 22 + OX 13	MVD 30 + OX 13B
1 compressor	MVA 8	MVB 12	MVB 12	MVB 16	MVB 16	MVC 18	MVD 22	MVD 30
1 air treatment system	CY20 PF72-SUB72 AD480 CHA72	CY20 PF109-SUB109 AD4115 CHA109	CY20 PF109-SUB109 AD4115 CHA109	CY30 PF217-SUB217 AD4180 CHA217	CY30 PF217-SUB217 AD4180 CHA217	CY30 PF217-SUB217 AD4180 CHA217	CY30 PF217-SUB217 AD4240 CHA217	CY30 PF396-SUB396 AD4300 CHA396
1 air receiver	500 litres				1000 litres			
1 generator	OX 3	OX 3B	OX 5	OX 5B	OX 7	OX 7B	OX 13	OX 13B
1 x O_2 storage tank volume @ 5 bar	200 litres				500 litres			
1 x O_2 storage tank volume @ 12 bar	---	500 litres	---	500 litres	---	1000 litres	---	1000 litres
Without air-conditioning	922693	922694	922695	922696	922697	922698	922699	922700
With air-conditioning	922842	922843	922844	922845	922846	922847	922848	922849

AIR/O_2 combined container MULTIPLE-LINES	MVA 8 + OX 3	MVB 12 + OX 3B	MVB 12 + OX 5	MVB 16 + OX 5B	MVB 16 + OX 7	MVC 18 + OX 7B	MVD 22 + OX 13	MVD 30 + OX 13B
Line N°1 without OX HP								
Without air-conditioning	922701	922702	922703	922704	922705	922706	922707	922708
With air-conditioning	922850	922851	922852	922853	922854	922855	922856	922857
Line N°1 with OX HP 3								
Without air-conditioning	922858	922859	922860	922861	922862	922863	922864	923177
With air-conditioning	922865	922866	922867	922868	922869	922870	922871	923178
Line N°2								
Without air-conditioning	922992	922993	922994	922995	922996	922997	922998	922999
With air-conditioning	923000	923001	923002	923003	923004	923005	923006	923007
Line N°3								
Without air-conditioning	923008	923009	923010	923011	923012	923013	923014	923015
With air-conditioning	923016	923017	923018	923019	923020	923021	923022	923023

Optional accessory references

	PROCOM 2 extension for generator single line or line N°1 (when an option is selected)	363171
1	CO (electrochemical) / CO_2 (infrared) analyser*	361027
	CO / CO_2 infrared analyser*	363066
2	Air hygrometry monitoring*	822284
	O_2 hygrometry monitoring*	823735
3	Wall-mounting analyser : O_2 / ambient air**	622709
	Power consumption monitoring	622956
	Ambient O_2 portable detector	622765
	Uninterruptible power supply (1 per generator)	332981

* to install on the line N°1 (of multiple-lines)
** to install in each shelter

1

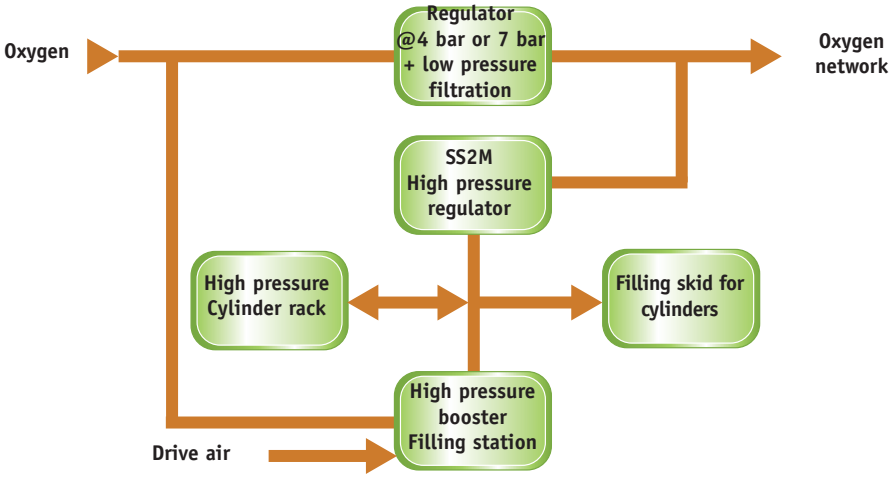

2


3


Oxygen high pressure cylinder filling station

- Oil-free piston pneumatic booster(s)
- Multi-stage compression
- Simple and robust compression technology
- No pollution of O_2 during compression
- Low maintenance requirements
- PROCOM 2 regulation device
- Supply with pressure release line at 4 bar or 7 bar on the O_2 network
- Possible association with filling skid design for gas cylinders
- Maximum pressure : 200 bar

Process sequence



Oxygen high pressure cylinder rack 12 x B50

Standard power supply

- 1-phase, 230V – 50 / 60 Hz

Characteristics

		OX HP 3		OX HP 6		OX HP 12	
Number of boosters		1		2		3	
Number of compression stages		2		3		3	
O_2 inlet pressure	bar	4	5	4	5	4	5
O_2 inlet average flow rate	(Nm³/h)	3.31	3.91	6.2	7.1	12.4	14.2
O_2 outlet average flow rate	(Nm³/h)	2.6	3	5.2	6.1	10.5	12.1
B50 at 180 bar filling time	(minutes)	212	180	105	89	53	45
Motor air maximum capacity	(Nm³/h)	120	122	140	142	165	169

(mm)	W	D	H	Weight
6 x B50	530	760	1790	460 kg
9 x B50	790	800	1880	720 kg
12 X B50	780	1000	1880	900 kg
20 x B50	1060	1360	1880	1550 kg

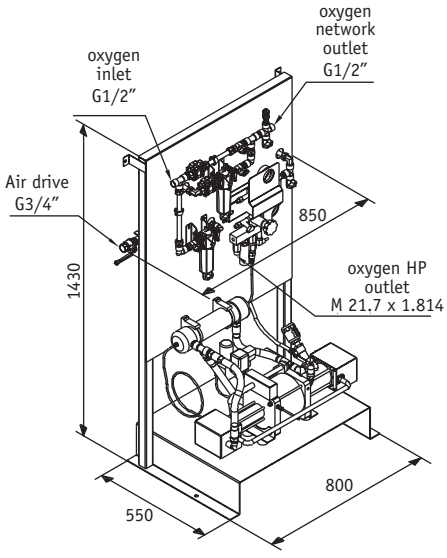
Optional accessory references

Oxygen high pressure cylinder rack	6 x B50 **722974**	9 x B50 **722975**	12 x B50 **722976**	20 x B50 **722977**
Cylinder rack connection hose	**722978** (F type / 3 m)			
Copper connection for cylinder rack	**332930** (F type / 3 m)			
Cylinder + valve + guard	B5 **723874**	B20 **723889**		B50 **722979**
Cylinder connection hose	**362087** (F type / 1,5 m)			
Copper connection cylinder	**363147** (F type / 1,5 m)			

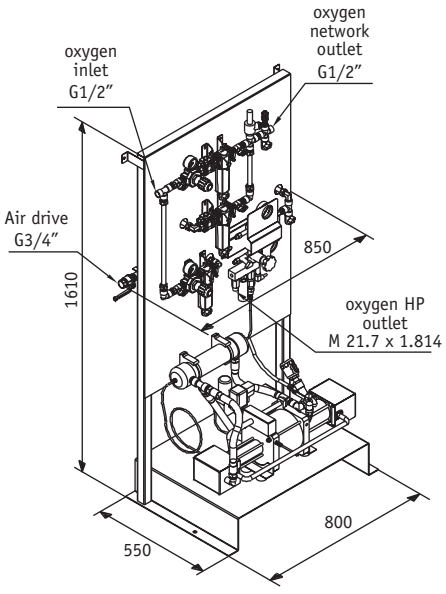
O_2 cylinder filling and supply system reference

	OX HP 3
SS2M – backup 4 bar + network connection 5 bar	923851
SS2M – backup 7 bar + simple pressure release line	923852
SS2M – backup 7 bar + duplex pressure release line	923853

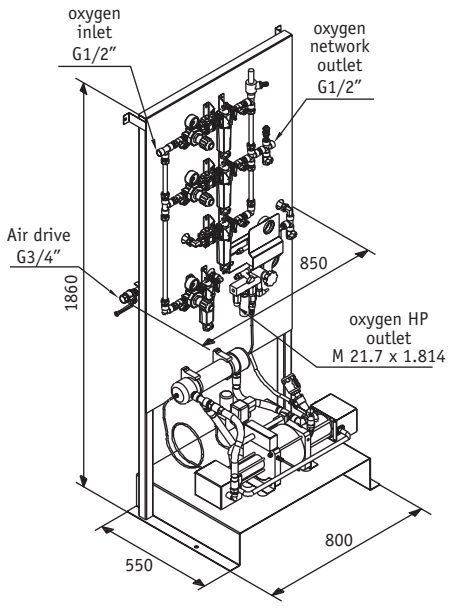
Dimensions (mm)



OX HP 3 - oxygen high pressure cylinder filling station with connection to 5 bar network



OX HP 3 - oxygen high pressure cylinder filling station with simple pressure release line



OX HP 3 - oxygen high pressure cylinder filling station with duplex pressure release line

OX HP 6 / OX HP 12

OX HP 6 / OX HP 12

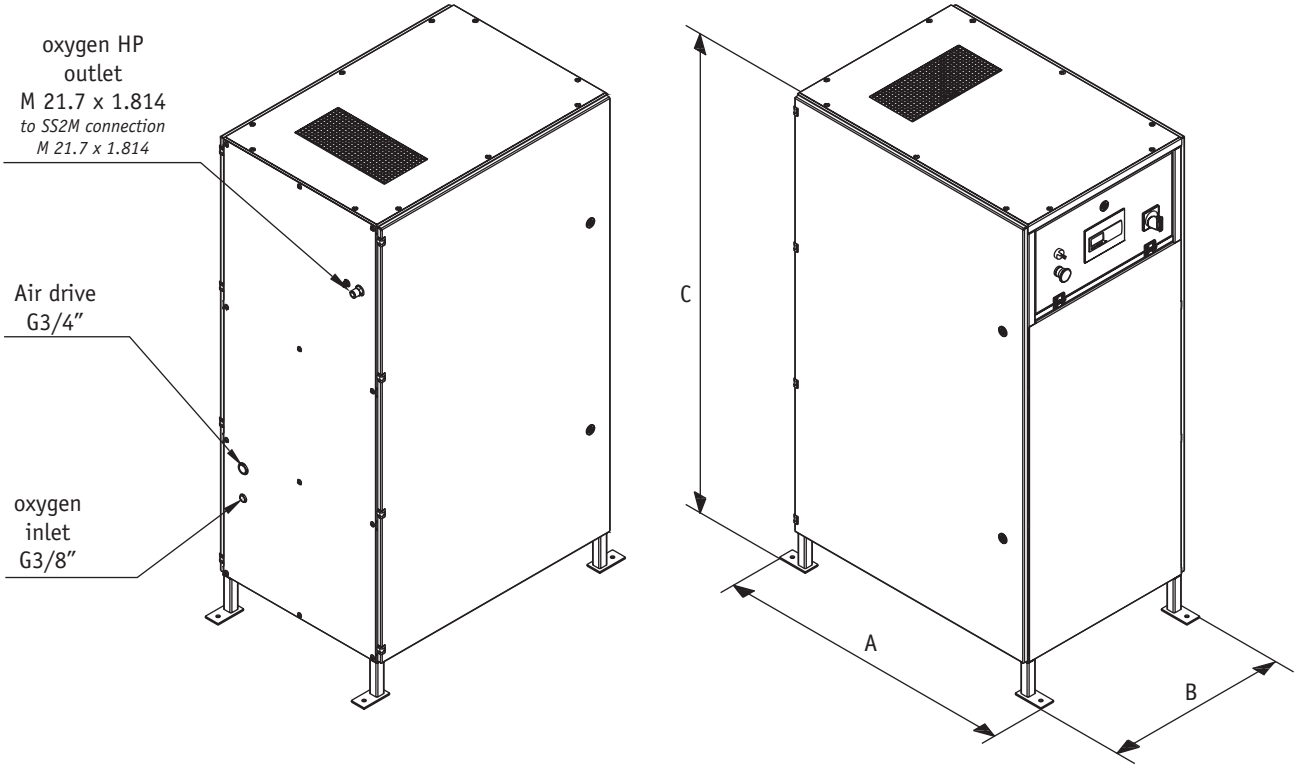
Intérieur OX HP 12

O_2 cylinder filling and supply system reference

	OX HP 6
SS2M – backup 4 bar + network connection 5 bar	923709 + 823761
SS2M – backup 7 bar + simple pressure release line	923709 + 823762
SS2M – backup 7 bar + duplex pressure release line	923709 + 823763

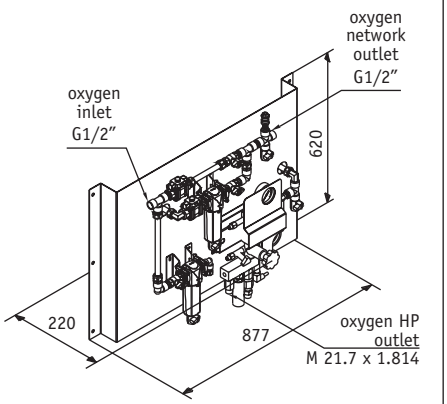
	OX HP 12
SS2M – backup 4 bar + network connection 5 bar	923708 + 823761
SS2M – backup 7 bar + simple pressure release line	923708 + 823762
SS2M – backup 7 bar + duplex pressure release line	923708 + 823763

Dimensions (mm)

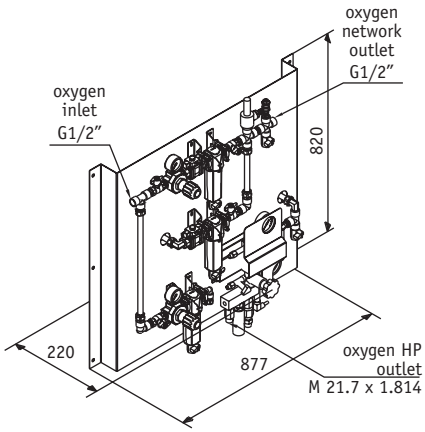


	OX HP 6	OX HP 12
A	1020	1020
B	620	620
C	1300	1600

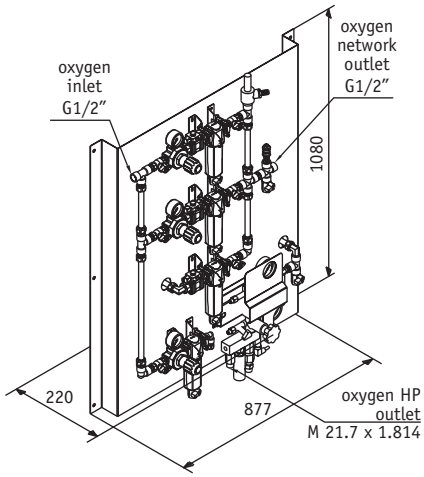
SS2M assembly dimensions (mm)



SS2M - 4 bar assembly
with network connection 5 bar



SS2M - 7 bar assembly
with simple pressure release line



SS2M - 7 bar assembly
with duplex pressure release line

Filling skid for 8 gas cylinders

- Filling skid for 1 to 8 gas cylinders - Maximum working pressure 200 bar
- 8 adjustable positions: 8 x B50 type, 2 x B15/B20 type, 2 x B5 type – type F
- Before filling operation, proceed to cylinder cleaning process using a special vacuum pump EVISA design for O_2 (flow rate 40 m³/h)
- Equipment connected (dia.6) to a high pressure compression system

Standard power supply

- 1-phase, 230V – 50 / 60 Hz

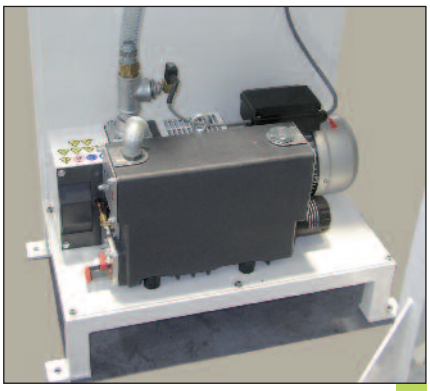
Dimensions (mm)

- 1930 (H) x 730 (W) x 1802 (D)

Reference

Filling skid for 8 gas cylinders	**723112**

Filling skid for 8 gas cylinders



EVISA E40 Oxygen special type

High pressure hose connected to the cylinder

Plug base

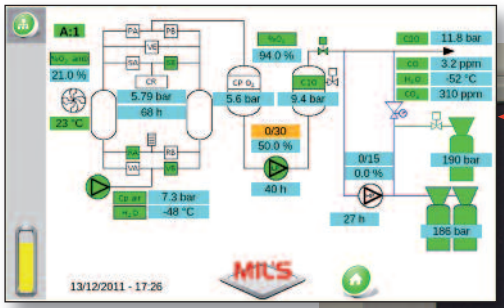
Control and regulation device

PROCOM 2

- Up-to-date technology, PROCOM 2 touch-screen computer brings a big change in human/machine interaction.It perfectly matches the running of a oxygen production plant equipped with oxygen generators, automatic compressed air plants and air treatment units.
- Remote monitoring with RS485/Modbus or Ethernet.
- USB key for data gathering : curves, parameters and events.

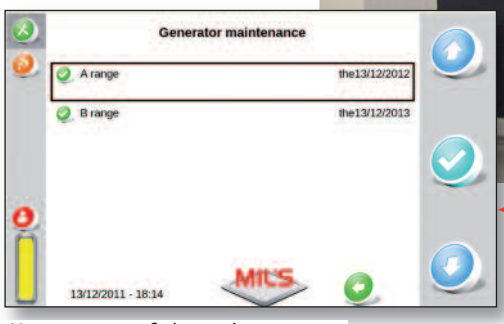
Available curves :

- *Oxygen concentration,*
- *Air or regulation or network pressure,*
- *Cylinder pressure,*
- *CO or CO_2 or ambient O_2 content,*
- *Oxygen hygrometry and air hygrometry*

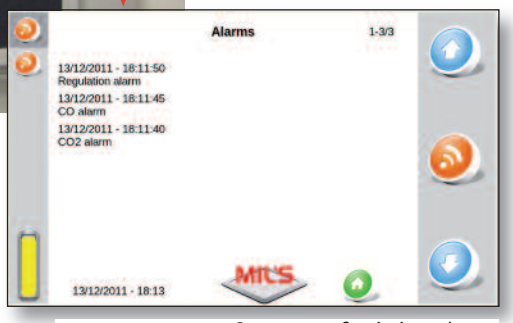


Synoptic screen to match in a wink the complete running of the oxygen production plant

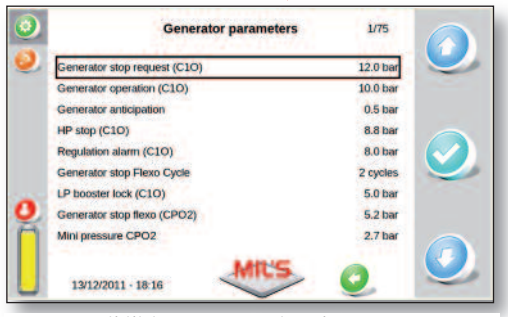
Screen display for alarm, regulation and maintenance events



Management of the maintenance schedule of the generators, the compressors, the dryers and the oxygen sensor.



Summary of existing alarms

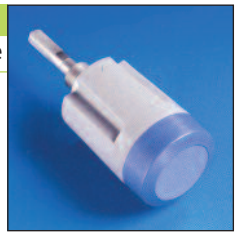


Many possibilities to customize the oxygen production plant running

Hygrometry probe Hygro 2000V

- Continuous measurement of gas dew point
- Dew point measurement range: -80°C to +20°C at atmospheric pressure
- Great stability over time even with a low dew point
- Polymeric thin-layer sensor with automatic calibration
- Fast response time
- Insensitive towards condensation, particle contamination, oil vapours and most of chemicals
- Alarm on dry contact adjustable on the whole measurement range (250V - 4A maxi)
- Available output : 4 – 20 mA
- The probe included in the cabinet can be delivered separately
- Power supply 200/260V - 50/60 Hz

Bare probe



Dew point temperature

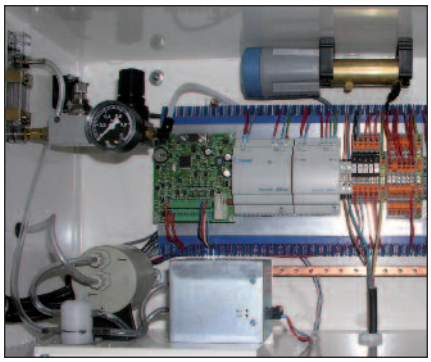
• Measurement range	-80°C...+20°C	
• Dew point precision up to -60°C	± 2°C	
• Response time of 63% (90%) with a gas temperature at 20°C, a flow rate higher than 1l/min and a pressure of 1 bar	-60 -> -20°C Td	5 sec (10 sec)
	-20 -> -60°C Td	45 sec (10 min)

Operating conditions

• Temperature	0...+60°C
• Relative humidity	0...100% HR
• Pressure	0...20 bar
• Sample flow rate	no effect

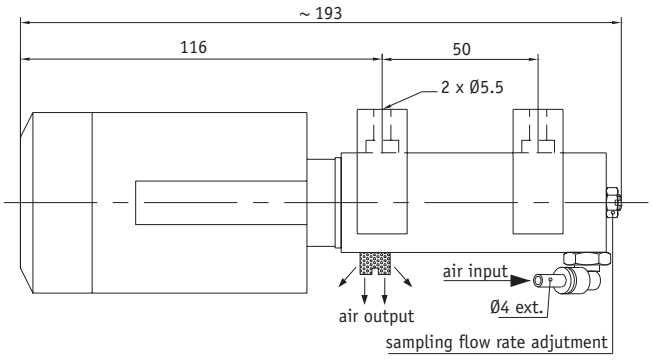
Probe characteristics

• Analogical output	4...20 mA
• Operating voltage	17-35 V DC
	20/28 V AC
• Sink current at 24V DC	220 mA max.
• External charge for analogical output	500 Ω max.
• Sensor protection	Sintered stainless steel filter
• Protection level	PF 65 (NEMA 4)
• Storage temperature	-40...+70°C
• Delivered with 1,5 meter-long cable	



Dimensions (mm)

Probe with sampling probe carrier

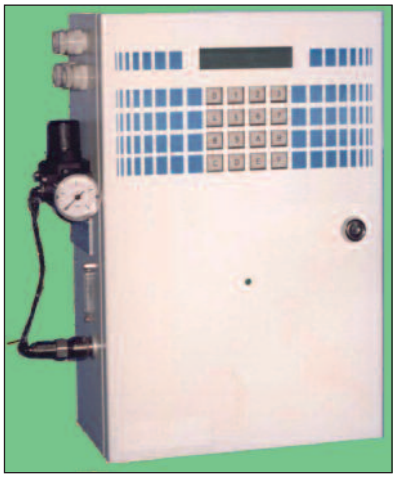


References

Air hygrometry monitoring	**822284**
O_2 hygrometry monitoring	**823735**

CO/CO_2 analyser
for oxygen quality control

- The CO/CO_2 analyser was designed to give a mean to ensure the conformity to oxygen following the oxygen 93 pharmacopeia
- Studies in Universities and Laboratories have shown that CO_2 was the first of the air pollutant breaking through the molecular mesh used to purify the ambient air for medical use. Continuous measurement of CO_2 ensures the quality of O_2
- CO, which is not stopped by the molecular mesh, has to be measured to ensure a good operation of the oxidation module installed before the air purifier.



Principle

- CO_2 measurement is based on the absorption of infra-red radiation by a molecule of CO_2.
- CO measurement uses an electrochemical cell.
- Sample to be analysed under pressure (2000 HPa mini)

Outstanding features

- No drift thanks to automatic zero and internal generation of CO limiting need for calibration to every 3 to 6 months.
- Reduced maintenance.
- Control of set points by keypad and integrated microprocessor with data transmission facility.
- Wall mounted compact cabinet, easy to install.
- Direct connection onto medical air line.

Main technical specifications

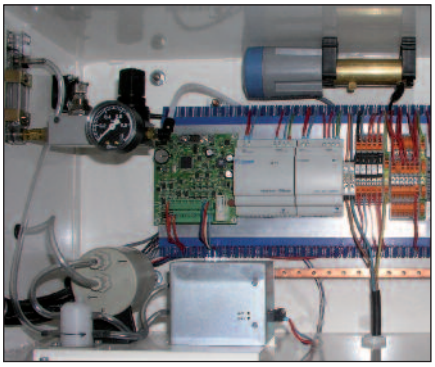
- **Measuring ranges** — 0 - 10 ppm for CO / 0 - 500 ppm for CO_2 / other ranges on request
- **Accuracy** — ± 1 ppm CO / ± 20 ppm CO_2
- **Measurement** — continuous measurement of CO and CO_2 on dry air
- **Display** — alphanumerical 2 x 20 characters
- **Zero** — automatic every 30 minutes
- **Output signal** — 4-20 mA → CO / 4-20 mA → CO_2 / RS232 current loop
- **Dry contacts** — analyser failure, servicing and set points exceeded
- **Thresholds** — factory set at: 4 ppm → CO and 320 ppm → CO_2
- **Electric power supply** — 230V AC - 50 Hz - 200 VA
- **Cabinet construction** — metal epoxy painted housing 375 x 250 x 135 mm (H x W x D) – 12 kg

References

CO (electrochemical) / CO_2 (infra-red) analyser	**361027**
Annex housing for hopcalite cartridge and humidifier	**consult us**

O_2 analyser and monitoring

Paramagnetic oxygen analyser 80 – 100%

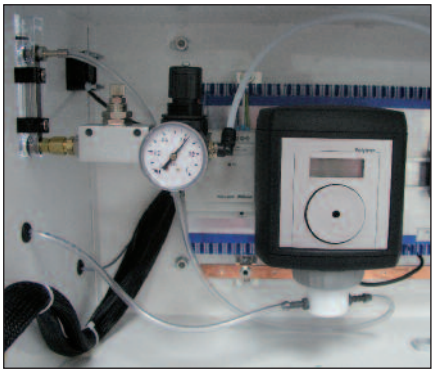


Range 80 – 100%

- Monitoring of oxygen concentration of generator.
- Oxygen has a relatively high magnetic susceptibility as compared to other gases. The paramagnetic oxygen sensor consists of two glass spheres filled with nitrogen gas, they are suspended with strong metal. The spheres are kept in balance in an inhomogeneous magnetic field. The oxygen molecules are attracted to the stronger of the two magnetic fields. This causes a displacement of the dumbbell which results in the dumbbell rotating. When oxygen molecules having a large magnetic susceptibility flow there, the molecules are pulled toward the stronger magnetic field zone and the spheres are moved away from the zone. The resulting deviation of the spheres is detected with the light source, reflecting mirror and light receiving element, and a current is flowed through the feedback loop to control so that the spheres can return to the initial balanced state. The current required to maintain the dumbbell in it normal state is directly proportional to the partial pressure of oxygen and is represented electronically in percent oxygen. The paramagnetic cell is thermostated and is equipped with a barometric compensator in order to carry out measurement without impact of the room temperature nor of the atmospheric pressure.

Paramagnetic oxygen analyser (foresee one per generator)	**622272**

Electrochemical oxygen analyser 0 – 100%



Range 0 – 100%

- Monitoring of oxygen concentration of generator.
- The measuring gas diffuses through a membrane to a thin layer of electrolyte. At the cathode the oxygen reduces. The free flowing electrons are drifting to the Anode. This generates an electrical current which is direct proportional to the oxygen concentration of the measuring gas.

Electrochemical oxygen analyser (foresee one per generator)	**623931**

Electrochemical oxygen analyser 0 – 25%

Range 0 – 25%

- Monitoring of ambient oxygen concentration
- The measuring gas diffuses through a membrane to a thin layer of electrolyte. At the cathode the oxygen reduces. The free flowing electrons are drifting to the Anode. This generates an electrical current which is direct proportional to the oxygen concentration of the measuring gas.
- Connected to the PROCOM 2, high and low ambient oxygen alarm are managed. The calories exhaust fan is also controlled according to the ambient oxygen concentration.

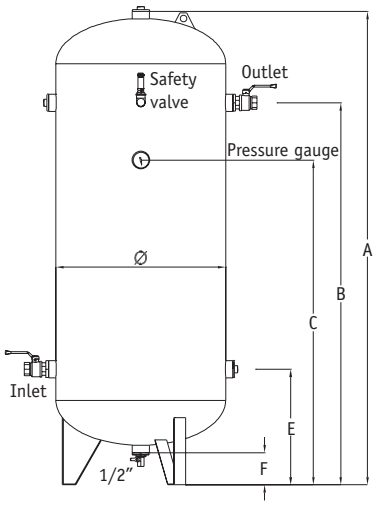
Electrochemical oxygen analyser (foresee one per generator)	**622709**

Vertical air receivers

- Vertical air receiver equipped with a safety valve, a pressure gauge, a drain valve and two valves (inlet / outlet).

References

Vertical air receivers	500 litres	1000 litres
Working pressure in bar	11 bar	12 bar
Reference	722278	722279



Dimensions (mm)

Vertical Air receiver	Ø	A	B	C	E	F
500 litres	600	2081	1655	--	785	173
1000 litres	800	2350	1680	1480	740	150

Vertical oxygen receivers

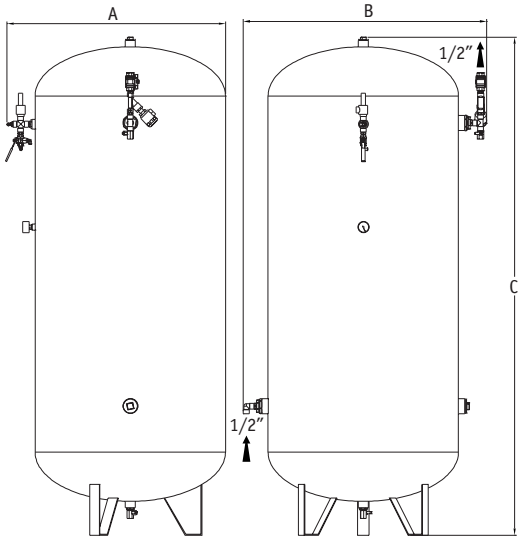
- Vertical oxygen receiver equipped with an isolating valve, an analysis connection for the paramagnetic sensor and information connections for sensors.
- The oxygen storage receiver is necessary with the PRO$_2$XY 12 bar type generator.

References

Vertical oxygen receivers	500 litres	1000 litres
Working pressure in bar	12 bar	12 bar
Reference	722291	722293

Dimensions (mm)

Oxygen receiver 12 bar	A	B	C
500 litres	825	890	1850
1000 litres	985	1090	2225



Water condensing separator for clean effluent discharge

- Oil gravimetric condensate separation
- Oil less effluent discharge
- Reduced maitenance

OWAMAT 10

OWAMAT 11

Choice according to the flow rate

Standard Type	screw with oil injection from 7,5 to 15 bar (for loading at 100%) in $m^3.h^{-1}$
OWAMAT 10	144
OWAMAT 11	294
OWAMAT 12	438
OWAMAT 14	852
OWAMAT 15	1758

References

	OWAMAT 10	OWAMAT 11	OWAMAT 12	OWAMAT 14	OWAMAT 15
Complete standard type	**359423**	**362859**	**362860**	**362861**	**362862**

Accessory and option references

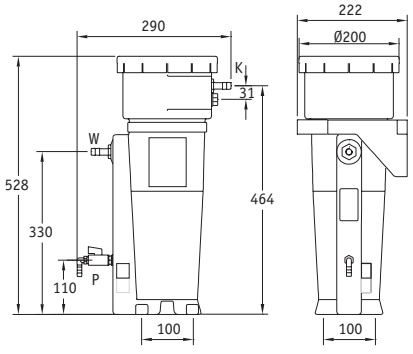
	OWAMAT 10	OWAMAT 11	OWAMAT 12	OWAMAT 14	OWAMAT 15
Filter for standard type	**362721**	**362478**	**362479**	**362480**	**362481**
Turbidity set (1 test tube for sampling and 1 test tube for reference)			**357578**		
Oil level alarm indicator			**357579**		
Heater		**362863**		**362864**	

Dimensions (mm)

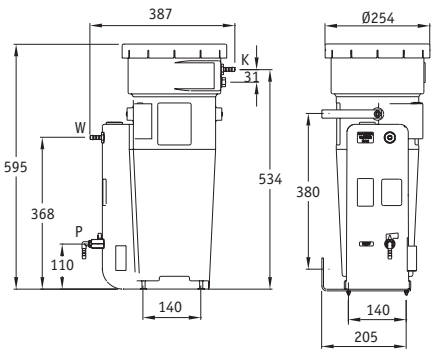
Type	A	B	C	F	G	H
OWAMAT 12	719	350	397	320	340	200
OWAMAT 14	892	410	461	420	460	240
OWAMAT 15	1118	520	573	505	550	270

K : condensate inlet - W : water outlet
P : water test - O : oil outlet

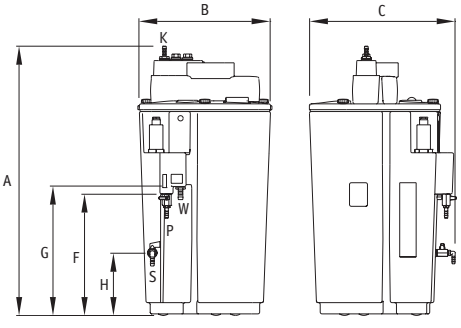
OWAMAT 10



OWAMAT 11

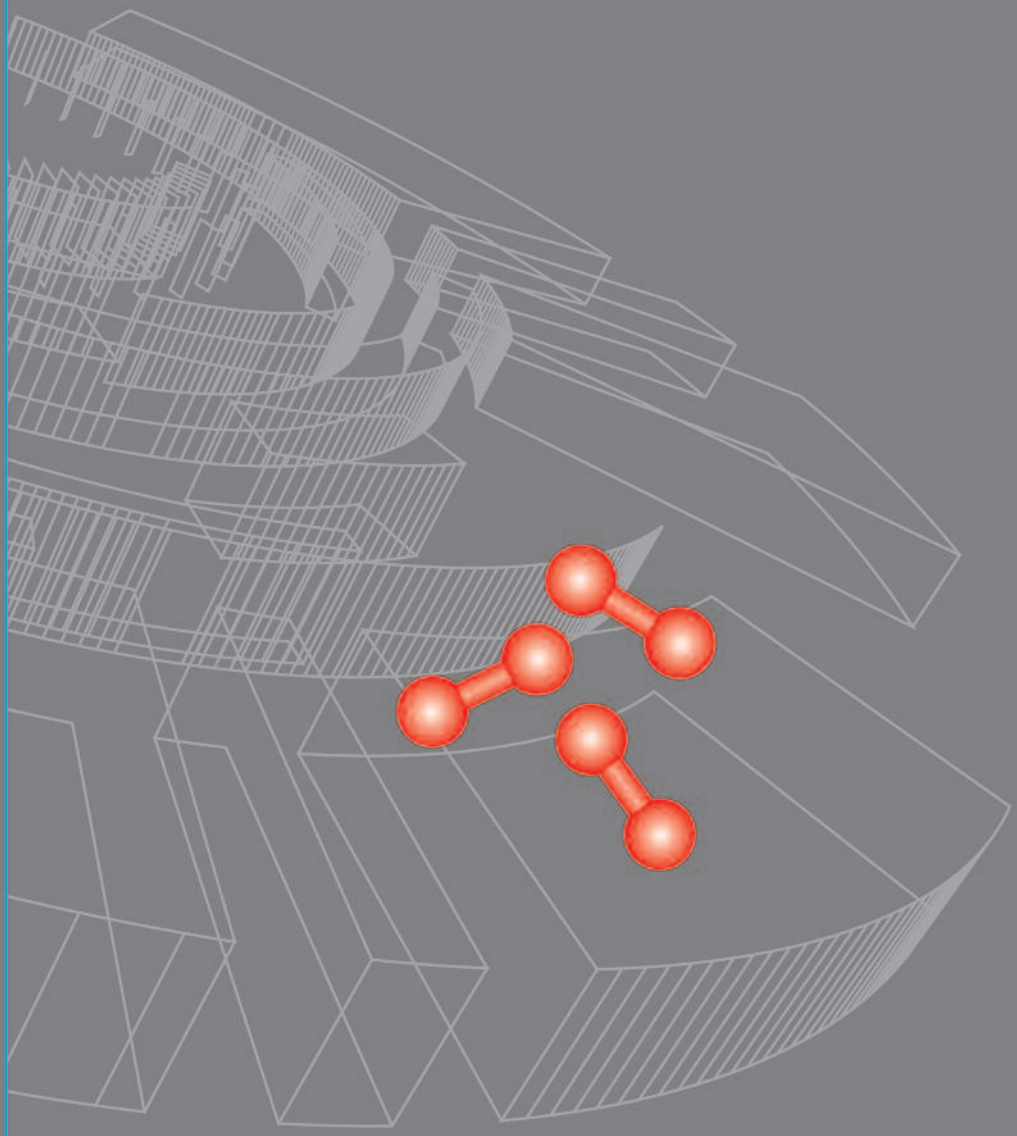


OWAMAT 12 to 15



oxygen

Instructions for maintenance



MIL'S

Since 1926

PRO$_2$XY Generator 5 bar (without LP booster) / 12 bar (with LP booster)

'A' range : Usual maintenance : every 4 000 hours

- Inspection / cleaning / checking the sensor values
- Cartridge replacement of the SUB filter
- Silencer replacement
- Membrane replacement of 'D1' regulator + seals

Parts in the 'A' range :

- 1 cartridge of the SUB filter
- 1 or 2 silencer(s)
- 1 regulator set for replacement

	OX3 / OX 3 B	OX 5 / OX 5 B	OX 7 / OX 7 B	OX 13 / OX 13 B
Cartridge replacement for SUB filter	SUB 109 430042		SUB 396 430044	
Silencer	PV G1" 362728		2 x PV G1"1/2 2 x 362730	
Regulator set for replacement	YM 1228 (for BP300) 360636	YM 1267 (for BP500) 360738	YM 1250 (for BP800) 360739	
Set reference 'A' range	**624005**	**623119**	**623120**	

'B' range : Usual maintenance : every 8 000 hours

- Obturator replacement
- PAROX 36 filter replacement

Parts in the 'B' range :

- Obturators
- 1 PAROX 36 filter

	OX3 / OX 3 B	OX 5 / OX 5 B	OX 7 / OX 7 B	OX 13 / OX 13 B
Obturators	622989 x 7		623118 x 7	
PAROX 36 filter	623135			
Set reference 'B' range	**723121**		**723122**	

'C' range : Preventive maintenance : every 16 000 hours

- Unit of 6 solenoid valves replacement
- 2 solenoid valves 'CR' replacement

Parts in the 'C' range :

- 1 unit of 6 solenoid valves
- 2 'CR' solenoid valves

	OX3 / OX 3 B	OX 5 / OX 5 B	OX 7 / OX 7 B	OX 13 / OX 13 B
Unit of 6 solenoid valves	363081 x 1			
'CR' solenoid valve	362739 x 2			
Set reference 'C' range	**623123**			

NB : *maintenance for Low Pressure booster and High Pressure Booster, see next page*

Maintenance for 10 years

Year	0	1	2	3	4	5	6	7	8	9	10
2000 h/year	---	---	A	---	A+B	---	A	--	A+B+C	---	
4000 h/year	---	A	A+B	A	A+B+C	A	A+B	A	A+B+C	A	
6000 h/year	A	A+B	2A+B	A+C	2A+B	A+B	2A+B+C	A	2A+B+C	A+B	
8000 h/year	A	2A+B	2A+B+C	2A+B	2A+B+C	2A+B	2A+B+C	2A+B	2A+B+C	2A+B	

LOW PRESSURE BOOSTER *PRO$_2$XY Generator*

Auxiliary components : **OX 3 B : every 8 000 hours** **OX 7 B : every 3 500 hours**
OX 5 B : every 5 000 hours **OX 13 B : every 2 000 hours**

- 'D3' regulator (air drive booster LP) and proportional solenoid valve replacement
- Adjustable Pressure switch (operating speed) replacement

'D3' regulator + proportional solenoid valve	**622812**
Adjustable Pressure switch (operating speed)	**623124**

Low Pressure Booster

Distributor – maintenance kit	**363162**
Pneumatic motor – maintenance kit	**363163**
2 x O_2 compressor heads – maintenance kit	**363164**

PRESSURE RELEASE LINE for 12 bar version *PRO$_2$XY Generator*

Usual maintenance : every 8 000 hours

- Inspection / cleaning / checking of setting
- PAROX filter replacement
- Membrane replacement of the regulator + seals

		OX 3 B	OX 5 B	OX 7 B	OX 13 B
PAR-OX36 filter		PAROX 36			
		623135			
Regulator set for replacement		YM 1228 (for BP300)			
		360636			
Reference set	**Simple pressure release line**	**723125 x 1**			
Reference set	**Duplex pressure release line**	**723125 x 2**			

Hygrometry probe

Calibration of the hygrometry sensor – every 2 years

Bare probe for standard exchange - AIR	**715795ES**
Bare probe for standard exchange - OXYGEN	**723890ES**
Probe filter	**360585**

CO/O_2 electrochemical sensors

Unit replacement once a year

	CO cell	O_2 Cell
Reference - OLD type	**361525**	**361524**
Reference - DRA type	**362309**	**362473**

CO_2 infrared sensor

Standard exchange every 2 years

	CO_2 unit for standard exchange
Reference	**361246ES**

HIGH PRESSURE BOOSTER

Auxiliary components: every 2 000 hours

- 'D3' regulator (air drive booster LP) and proportional solenoid valve replacement
- Adjustable Pressure switch (operating speed) replacement

	OX HP 3	OX HP 6		OX HP 12		
		Booster A	Booster B	Booster A	Booster B	Booster C
'D3' regulator + proportional solenoid valve	**624009**	**624011**	**624009**	**624011**	**624009**	**624010**
Adjustable Pressure switch (operating speed)	**623124**	**623124** (1 per Booster)		**623124** (1 per Booster)		

High Pressure Booster

	OX HP 3	OX HP 6		OX HP 12		
		Booster A	Booster B	Booster A	Booster B	Booster C
Distributor – maintenance kit	**363162**	**363162**	**363162**	**363162**	**363162**	**363162**
Pneumatic motor maintenance kit	**332988**	**363165**	**363165**	**363165**	**363165**	**332988**
1st stage HP O_2 Kit *	**363166**	**332983**	**332985**	**332983**	**332987**	**332985**
1st stage HP O_2 valve Kit *	**363167**	**332984**	**332986**	**332984**	**332984**	**332986**
2nd stage HP O_2 Kit *	**363168**					
2nd stage HP O_2 valve Kit *	**363169**					

* These parts being in direct contact with O_2, a return to MIL' S company is very strongly recommended in order to have a guarantee for an O_2 operation, all the precautions of cleanliness and degreasing O_2 must be respected.

SS2M device

Usual maintenance : every 5 years

- Inspection / cleaning / checking of setting

Set reference (regulator + high pressure valve + relief valve 8.5/10 bar)	**624006**

High pressure hoses for cylinder and rack

Usual maintenance

- Inspection / cleaning / checking of setting

Hose to replace *	**363204**

* one a year (if 24/24 under pressure), every 3 years (if 8/24 under pressure), every 5 years (if less under pressure)

Pneumatic and manual high pressure valve CYLINDER FILLING SKID

Usual maintenance : every 5000 cycles or 1 year

- Inspection / cleaning / checking of setting / Replacement set if required

	VM3 valve	VEM6 valve	VEP6 valve	VEM12 valve
Set of seals	**332996**	**332995**	**332995**	**332994**
Complete set (set of seals + seat + rod)	**332993**	**332992**	**332992**	**332991**

EVISA – lubricated rotary vane vacuum pump *Special for O_2*

Usual maintenance (EC) : 3 000 hours or 24 months

- Inspection / cleaning
- Oil change
- Oil filter replacement
- Oil separating cartridge(s) change
- Suction valve overhaul
- Gas ballast filter change
- Coupling ring overhaul

Parts in the usual maintenance (EC) :

- Can(s) of special oil for oxygen + oil filling plug gasket
- Oil filter
- Oil separating cartridge(s) + gasket
- Suction flange gasket + suction valve
- Gas ballast filter
- Coupling ring

Preventive maintenance (MP) : 12 000 hours

- Radial shaft seals change
- Sliding rings change
- Vanes replacement*
- End cover gaskets replacement
- Automatic drain + gaskets replacement
- Rubber feet replacement

Parts in the preventive maintenance (MP) :

- Radial shaft seals
- Sliding rings + gaskets
- Set of vanes
- End cover gaskets
- Automatic drain + gaskets
- Rubber feet

* Service life of vanes depends on the regulation mode. As more as the vacuum pump will be switched on / switched off, as less as the service life will be

Operating hours of the vacuum pump per year

	Year	0	12 months	24 months	36 months	48 months	5 years	RESULT
1500h /year	Total hours		1500	3000	4500	6000	7500	**2 EC**
	Maintenance type			EC		EC		
3000h /year	Total hours		3000	6000	9000	12000	15000	**5 EC + 1 MP**
	Maintenance type		EC	EC	EC	EC + MP	EC	
4500h /year	Total hours		4500	9000	13500	18000	22500	**7 EC + 1 MP**
	Maintenance type		EC	2EC	EC + MP	2EC	EC	
6000h /year	Total hours		6000	12000	18000	24000	30000	**10 EC + 2 MP**
	Maintenance type		2EC	2EC + MP	2EC	2EC + MP	2EC	

Usual maintenance (EC) : 3 000 hours or 24 months

	E40
Reference	**723244**

Preventive maintenance (MP) : 12 000 hours

	E40
Reference	**723891**

MVA8 –11 bar – Screw compressors

'A' range : 3 000 hours * or once a year

- Inspection / cleaning
- Oil change
- Air inlet foam and control cabinet foam replacement **
- Air filter replacement
- Oil filter replacement
- Oil separator replacement

** *The replacement can be anticipated according to the ambient air quality*

Parts in the 'A' range :

- 1 can of oil (4 litre can)
- 1 filter foams set
- 1 air filter element
- 1 oil filter element
- 1 oil separator

'C' range : 6 000 hours *

- Thermostatic valve overhaul
- Unloading valve overhaul
- Air inlet valve overhaul
- Minimum pressure valve overhaul
- Belts replacement

Parts in the 'C' range :

- 1 thermostatic valve overhaul
- 1 unloading valve overhaul
- 1 air inlet valve overhaul
- 1 minimum pressure valve overhaul
- 1 belts set

Operating hours of the compressor per year

	Year	0	1 year	2 years	3 years	4 years	5	RESULT
≤ 2000h/an	Total hours	2 000	4 000	6 000	8 000	10 000		**5A + 1C**
	Total hours	A	A	A + C	A	A		
2000h/year to 4000h/year	Total hours	3 000	6 000	9 000	12 000	15 000		**5A + 2C**
	Total hours	A	A + C	A	A + C	A		
4000h/year to 6000h/year	Total hours	6 000	12 000	18 000	24 000	30 000		**10A + 5C**
	Total hours	A + A + C	A + A + C	A + A + C	A + A + C	A + A + C		

'D' range : 36 000 hours *

- Pulleys replacement
- Motor overhaul (refer to a specialist of electric motor)
- Complete screw bloc exchange
- Thermostatic valve - repair kit
- Unloading valve - repair kit
- Air inlet valve - repair kit
- Minimum pressure valve - repair kit

***** Maintenance intervals are recommendations only and should be adjusted to suit the installation and operating conditions

Parts for maintenance - MVA8

'A' range : 3 000 hours or once a year

	MVA 8
Air inlet foam	413161
Control cabinet filter foam	413014 x2
Air filter cartridge	413162
Oil filter cartridge	413025
Oil separator	413163
1 can of oil (4 litre can)	413028
Reference	**413495**

'C' range : 6 000 hours

	MVA 8
Thermostatic valve – maintenance kit 75°C	413037
Unloading valve – maintenance kit	413044
Air inlet valve – maintenance kit	413046
Mini pressure valve – maintenance kit	413166
Belt	413170
Reference 11 bar	**620241**

'D' range : 36 000 hours

	MVA 8
Compressor pulley 11 bar	413173
Motor pulley	413176
Screw bloc exchange	413177
Thermostatic valve – repair kit 75°C	413179
Unloading valve – repair kit	413106
Air inlet valve – repair kit	413109
Mini pressure valve – repair kit	413180

Other parts

	MVA 8
Pressure sensor	413118
'PT100' temperature sensor	413181
Inlet safety pressure switch	413121
Unloading solenoid valve	413321

MVB12 / MVB16 – 11 bar– Screw compressors

'A' range : 3 000 hours * or once a year

- Inspection / cleaning
- Oil change
- Air inlet and control cabinet foam replacement **
- Air filter replacement
- Oil filter replacement
- Oil separator replacement

** *The replacement can be anticipated according to the ambient air quality*

Parts in the 'A' range :

- 2 cans of oil : 4 litres
- 1 filter foams set
- 1 air filter element
- 1 oil filter element
- 1 oil separator

'C' range : 6 000 hours *

- Thermostatic valve overhaul
- Unloading valve overhaul
- Air inlet valve overhaul
- Minimum pressure overhaul
- Belts replacement

Parts in the 'C' range :

- 1 thermostatic valve overhaul
- 1 unloading valve overhaul
- 1 air inlet valve overhaul
- 1 minimum pressure valve overhaul
- 1 belts set

Operating hours of the compressor per year

	Year	0	1 year	2 years	3 years	4 years	5	RESULT
≤ 2000h/an	Total hours	2 000	4 000	6 000	8 000	10 000		**5A + 1C**
	Total hours	A	A	A + C	A	A		
2000h/year to 4000h/year	Total hours	3 000	6 000	9 000	12 000	15 000		**5A + 2C**
	Total hours	A	A + C	A	A + C	A		
4000h/year to 6000h/year	Total hours	6 000	12 000	18 000	24 000	30 000		**10A + 5C**
	Total hours	A + A + C	A + A + C	A + A + C	A + A + C	A + A + C		

'D' range : 36 000 hours *

- Pulleys replacement
- Motor overhaul (refer to a specialist of electric motor)
- Complete screw bloc exchange
- Thermostatic valve - repair kit
- Unloading valve - repair kit
- Air inlet valve - repair kit
- Minimum pressure valve - repair kit

* Maintenance intervals are recommendations only and should be adjusted to suit the installation and operating conditions

Parts for maintenance - MVB12 / MVB16

'A' range : 3 000 hours or once a year

	MVB 12	MVB 16
Air inlet foam 570 x 370	413450	
Control cabinet filter foam 112 x 112	413014 x2	
Air filter cartridge	413019	
Oil filter cartridge	413025	
Separator	413031	
2 cans of oil : 4 litres	413028 x2	
Reference	**413449**	

'C' range : 6 000 hours

		MVB 12	MVB 16
Thermostatic valve maintenance kit 70°C		413476	
Unloading valve - maintenance kit		413044	
Air inlet valve - maintenance kit		413457	
Mini pressure valve - maintenance kit		413053	
Belt	11 bar	413458	413185
Reference	**11 bar**	**623757**	**623758**

'D' range : 36 000 hours

	MVB 12	MVB 16
Compressor pulley	413460	413463
Motor pulley	413463	413468
Screw bloc exchange	413469	
Thermostatic valve – repair kit 70°C	413471	
Unloading valve - repair kit	413106	
Air inlet valve - repair kit	413473	
Minimum pressure valve - repair kit	413115	

Other parts

	MVB 12	MVB 16
Pressure sensor	413474	
'PT100' temperature sensor	413475	
Inlet safety pressure switch	413121	

MVC18 – 11 bar - Screw compressors

'A' range : 3 000 hours * or once a year

- Inspection / cleaning
- Oil change
- Air inlet foam and control cabinet foam replacement **
- Air filter replacement
- Oil filter replacement
- Oil separator replacement

** *The replacement can be anticipated according to the ambient air quality*

Parts in the 'A' range :

- 3 cans of oil : 4 litres
- 1 filter foams set
- 1 air filter element
- 1 oil filter element
- 1 oil separator

'C' range : 6 000 hours *

- Thermostatic valve overhaul
- Unloading valve overhaul
- Air inlet valve overhaul
- Minimum pressure valve overhaul
- Belts replacement

Parts in the 'C' range :

- 1 thermostatic valve overhaul
- 1 unloading valve overhaul
- 1 air inlet valve overhaul
- 1 minimum pressure valve overhaul
- 1 belts set

Operating hours of the compressor per year

	Year	0	1 year	2 years	3 years	4 years	5	RESULT
≤ 2000h/an	Total hours	2 000	4 000	6 000	8 000	10 000		**5A + 1C**
	Total hours	A	A	A + C	A	A		
2000h/year to 4000h/year	Total hours	3 000	6 000	9 000	12 000	15 000		**5A + 2C**
	Total hours	A	A + C	A	A + C	A		
4000h/year to 6000h/year	Total hours	6 000	12 000	18 000	24 000	30 000		**10A + 5C**
	Total hours	A + A + C	A + A + C	A + A + C	A + A + C	A + A + C		

'D' range : 36 000 hours *

- Pulleys replacement
- Motor overhaul (refer to a specialist of electric motor)
- Complete screw bloc exchange
- Thermostatic valve - repair kit
- Unloading valve - repair kit
- Air inlet valve - repair kit
- Minimum pressure valve - repair kit

***** Maintenance intervals are recommendations only and should be adjusted to suit the installation and operating conditions

Parts for maintenance - MVC18

'A' range : 3 000 hours or once a year

	MVC 18
Air inlet foam	413015
Control cabinet filter foam	413014 x2
Air filter cartridge	413020
Oil filter cartridge	413026
Oil separator	413032
3 cans of oil : 4 litres	413028 x3
Reference	**413497**

'C' range : 6 000 hours

		MVC 18
Thermostatic valve – maintenance kit	75°C	413037
Unloading valve - maintenance kit		413044
Air inlet valve - maintenance kit		413048
Mini pressure valve - maintenance kit		413053
Belt		413067
Reference	**11 bar**	**618776**

'D' range : 36 000 hours

		MVC 18
Compressor pulley	11 bar	413077
Motor pulley	11 bar	413077
Screw bloc exchange		413088
Thermostatic valve – repair kit	75°C	413101
Unloading valve - repair kit		413106
Air inlet valve - repair kit		413111
Minimum pressure valve - repair kit		413115

Other parts

	MVC 18
Pressure sensor	413118
'PT100' temperature sensor	413120
Inlet safety pressure switch	413121
Unloading solenoid valve	413321

MVD22 / MVD30 –11 bar – Screw compressors

'A' range : 4 000 hours * or once a year

- Inspection / cleaning
- Oil change
- Filter foams replacement **
- Air filter replacement
- Oil filter replacement

** *The replacement can be anticipated according to the ambient air quality*

- Coupling check

Parts in the 'A' range :

- 1 can of oil : 20 litres
- 1 filter foams set
- 1 air filter element
- 1 oil filter element

'B' range : 4 000 hours * or every 2 years or $\Delta p \geq 1$ bar

- Oil separator replacement

Parts in the 'B' range :

- 1 oil separator

'C' range : 12 000 hours *

- Thermostatic valve overhaul
- Unloading valve overhaul
- Air inlet valve overhaul
- Minimum pressure valve overhaul
- Coupling replacement

Parts in the 'C' range :

- 1 thermostatic valve overhaul
- 1 unloading valve overhaul
- 1 air inlet valve overhaul
- 1 minimum pressure valve overhaul
- 1 coupling

Operating hours of the compressor per year

	Year	0	1 year	2 years	3 years	4 years	5	RESULT
≤ 2000h/year	Total hours	2 000	4 000	6 000	8 000	10 000		**5A + 2B**
	Maintenance type	A	A+B	A	A+B	A		
2000h/year to 4000h/year	Total hours	4 000	8 000	12 000	16 000	20 000		**5A + 5B + 1C**
	Maintenance type	A+B	A+B	A+B+C	A+B	A+B		
4000h/year to 6000h/year	Total hours	4 000	8 000	12 000	16 000	20 000	24 000	28 000	**7A + 7B + 2C**
	Maintenance type	A+B	A+B	A+B+C	A+B+C	A+B	A+B+C	A+B	

'D' range : 36 000 hours *

- Motor overhaul (refer to a specialist of electric motor)
- Complete screw bloc exchange
- Thermostatic valve - repair kit
- Unloading valve - repair kit
- Air inlet valve - repair kit
- Minimum pressure valve - repair kit

***** Maintenance intervals are recommendations only and should be adjusted to suit the installation and operating conditions

Parts for maintenance - MVD22 / MVD30

'A' range : 4 000 hours or once a year

	MVD 22	MVD 30
Filter foams	413014 x2	
Air filter cartridge	413021	
Oil filter cartridge	413026	
Can of oil : 20 litres	413029	
Reference	**618779**	

'B' range : 4 000 hours or every 2 years or $\Delta p \geq 1$ bar

	MVD 22	MVD 30
Oil separator	**413033**	

'C' range : 12 000 hours

	MVD 22	MVD 30
Thermostatic valve - maintenance kit 75°C	413037	
Unloading valve - maintenance kit	413044	
Air inlet valve - maintenance kit	413049	
Minimum pressure valve - maintenance kit	413054	
Coupling	413097	
Reference 11 bar	**623098**	

'D' range : 36 000 hours

	MVD 22	MVD 30
Screw bloc exchange	413089	413091
Thermostatic valve - repair kit 75°C	413101	
Unloading valve - repair kit	413106	
Air inlet valve - repair kit	413112	
Minimum pressure valve - repair kit	413116	

Other parts

	MVD 22	MVD 30
Pressure sensor	413118	
'PT100' temperature sensor	413120	
Inlet safety pressure switch	413121	
Unloading solenoid valve	413321	

MVE37 – 11 bar – Screw compressors

'A' range : 4 000 hours * or once a year

- Inspection / cleaning
- Oil change
- Filter foams replacement **
- Air filter replacement
- Oil filter replacement

** *The replacement can be anticipated according to the ambient air quality*

Parts in the 'A' range :

- 1 filter foams set
- 1 air filter element
- 1 oil filter element
- 1 can of oil (20 litre can)
- 1 can of oil (4 litre can)

'B' range : 4 000 hours * or every 2 years or Δp ≥ 1 bar

- Oil separator replacement

Parts in the 'B' range :

- 1 oil separator

'C' range : 12 000 hours *

- Thermostatic valve overhaul
- Unloading valve overhaul
- Air inlet valve overhaul
- Minimum pressure valve overhaul
- Drain valve overhaul
- Coupling replacement

Parts in the 'C' range :

- 1 thermostatic valve overhaul
- 1 unloading valve overhaul
- 1 air inlet valve overhaul
- 1 minimum pressure valve overhaul
- 1 drain valve overhaul
- 1 coupling

Operating hours of the compressor per year

	Year	0	1 year	2 years	3 years	4 years	5	RESULT
≤ 2000h/year	Total hours	2 000	4 000	6 000	8 000	10 000		**5A + 2B**
	Maintenance type	A	A+B	A	A+B	A		
2000h/year to 4000h/year	Total hours	4 000	8 000	12 000	16 000	20 000		**5A + 5B + 1C**
	Maintenance type	A+B	A+B	A+B+C	A+B	A+B		
4000h/year to 6000h/year	Total hours	4 000	8 000	12 000	16 000	20 000	24 000	28 000	**7A + 7B + 2C**
	Maintenance type	A+B	A+B	A+B+C	A+B+C	A+B	A+B+C	A+B	

'D' range : 36 000 hours *

- Motor overhaul (refer to a specialist of electric motor)
- Complete screw bloc exchange
- Thermostatic valve - repair kit
- Unloading valve - repair kit
- Air inlet valve - repair kit
- Minimum pressure valve - repair kit

***** Maintenance intervals are recommendations only and should be adjusted to suit the installation and operating conditions

Parts for maintenance - MVE37

'A' range : 4 000 hours or once a year

	MVE 37
Air inlet foam	413016
Control cabinet filter foam	413014 x2
Air filter cartridge	413017
Oil filter cartridge	413027
Can of oil : 20 litres	413029
Can of oil : 4 litres	413028
Reference	**618783**

'B' range : 4 000 hours or every 2 years or $\Delta p \geq 1$ bar

	MVE 37
Oil separator	**413034**

'C' range : 12 000 hours

		MVE 37
Thermostatic valve – maintenance kit	75°C	413039
Unloading valve – maintenance kit		413045
Air inlet valve – maintenance kit		413050
Minimum pressure valve - maintenance kit		413055
Drain valve – maintenance kit		413069
Coupling		413098
Reference	**11 bar**	**623100**

'D' range : 36 000 hours

		MVE 37
Screw bloc exchange	11 bar	413093
Thermostatic valve – repair kit	75°C	413104
Unloading valve – repair kit		413107
Air inlet valve – repair kit		413113
Minimum pressure valve - repair kit		413117

Other parts

	MVE 37
Pressure sensor	413118
'PT100' temperature sensor	413120
Inlet safety pressure switch	413121

SEC 3A – AD 4xxx air treatment units for HOSPITAIR PACK S

'A' range : every 4 000 hours

- Inspection / cleaning / running check / hygrometry level
- Cartridge replacement of the PF filter + mechanical drain
- Cartridge replacement of the SUB filter + mechanical drain
- Silencer replacement

Parts in the 'A' range

- Cartridge of the PF filter
- Cartridge of the SUB filter
- Silencer

'B' range : every 8 000 hours

- Cartridge replacement of the carbon filter (CHA)

Parts in the 'B' range

- Cartridge of the CHA filter

'C' range : every 12 000 hours

- BEKO 12 drain maintenance
- High ramp non-return valves change
- Line and regeneration valves replacement

Parts in the 'C' range

- 1 maintenance kit
- High ramp non-return valves
- Line and regeneration valves

'D' range : every 20 000 hours

- Molecular tube replacement

Parts in the 'D' range

- Molecular tubes

Usual maintenance for 10 years

Year	0	1	2	3	4	5	6	7	8	9	10
2000 h/year	---	---	A	---	A+B	---	A+C	--	A+B	---	
4000 h/year	---	A	A+B	A+C	A+B	A+D	A+B+C	A	A+B	A+C	
6000 h/year	A	A+B	2A+B+C	A+D	2A+B+C	A+B	2A+B+C+D	A	2A+B+C	A+B	
8000 h/year	A	2A+B+C	2A+B+D	2A+B+C	2A+B+C	2A+B+D	2A+B+C	2A+B+C+D	2A+B	2A+B+C	

Spare parts according to dryer type

'A' range : every 4 000 hours

	AD 480	AD 4115	AD 4180	AD 4240	AD 4300	AD 4400
Débit sous 10 bar	**60 m³/h**	**90 m³/h**	**140 m³/h**	**180 m³/h**	**230 m³/h**	**288 m³/h**
PF cartridge replacement	PF72 430032	PF109 430033	PF217 430034		PF396 430035	
Drain with float	430082					
SUB cartridge replacement	SUB72 430041	SUB109 430042	SUB217 430043		SUB396 430044	
Drain with float	430082					
Silencer	G3/8"	G3/4"				
	360780	360782				
Set reference	**721507**	**721509**	**721510**		**721511**	

'B' range : every 8 000 hours

	AD 480	AD 4115	AD 4180	AD 4240	AD 4300	AD 4400
Capacity for 10 bar	**60 m³/h**	**90 m³/h**	**140 m³/h**	**180 m³/h**	**230 m³/h**	**288 m³/h**
CHA cartridge replacement	CHA72 **430085**	CHA109 **430088**	CHA217 **430086**		CHA396 **430089**	

'C' range : every 12 000 hours

	AD 480	AD 4115	AD 4180	AD 4240	AD 4300	AD 4400
Kit for BEKO12	KA12 - 360692					
C1 and C2 valves	361417 x 2				361455 x 2	
NO valves V1/V3	DN20 - 361291 x 2				DN32 - 361294 x 2	
NC valves R2/R4	DN20 - 361290 x 2				DN32 - 361293 x 2	
Set reference	**623133**				**623134**	

'D' : Molecular tube replacement every 20 000 hours

	AD 480	AD 4115	AD 4180	AD 4240	AD 4300	AD 4400
Molecular tubes	T50 x 2	T40 x 4	T40 x 6	T40 x 8	T50 x 8	T50 x 10
Replacement	**717578 x 2**	**708988 x 4**	**708988 x 6**	**708988 x 8**	**717578 x 8**	**717578 x 10**

Safety precautions regarding oxygen use

Whilst oxygen is classified as a non-inflammable gas, it facilitates combustion. It is an active element that combines directly or indirectly with all elements except rare gases. Oxygen is a gas without colour, odour or taste.

Oxygen is an oxidant, and vigorously accelerates any combustion process. In an oxygen-rich atmosphere, or when materials come into contact with oxygen, some materials that are non-inflammable in air can instantaneously become flammable.

Keep any combustible materials - such as petrol, kerosene, oil, grease, paint, rags and wood – away from the oxygen generator.

Oxygen is heavier than the air, it can accumulate in low points (pits, gutters, basement,…) and the risk from oxygen enrichment is high and dangerous.

Any equipment installed after the oxygen generator – such as connection systems, tubing and receivers – should be oxygen-compatible and completely degreased.
Use an oxygen-compatible detector to check that all connections are leak-free.

Handle the material with clean hands, without grease.

Never use oxygen in place of another gas (such as air or nitrogen).
It is forbidden to smoke, go near a flame or make sparks close by the oxygen generator or near the place where the oxygen is being used.

Any modification of the generator or its components without MIL'S agreement will mean the specification and purity of the oxygen produced will not be guaranteed.

Damages appear during storage and moving of the oxygen high pressure cylinders, so recommendations are:
- take care with oxygen cylinders or cylinder racks to prevent them from falling over and shocks,
- keep cylinders chained or clamped in vertical position,
- do not edge-roll cylinders over discontinuous or soft surfaces, never roll a cylinder horizontally along the ground.
- do not raise cylinders by their valve.

Handling high pressure valve - general safety to avoid adiabatic compression and violent explosion:
- Never open the high pressure valve of a cylinder in horizontal position,
- Open gradually the HP valve, never use force when opening or closing valve,
- Use care when opening cylinder valve, never be placed in front of the HP valve outlet,
- Ejected particles and resultant noise can also injure adjacent personnel,
- Do not proceed to several successive pressurizations,
- Do not over-tighten the high pressure valve, never use force when opening or closing valves.

Use suitable personal protective equipment, wear safety footwear and leather gloves, to handle cylinders of 20 litres and more.
Never transport cylinders which the valve is not protected by a protection cap.
Use a regulator with flow-meter, designed to admit a pressure at least equal to 1.5 times working pressure of the cylinder (200 bar).

Never introduce oxygen into a cylinder unless it has been designed for oxygen. Oxygen can react explosively with oils and greases.
Soap or liquids that may contain grease should not be used to clean oxygen equipment.
Never attempt to repair a damaged HP valve.
Do not tighten with the grip the regulator on the cylinder or the hose on the rack, to avoid the damage of the joint.
In case of leaks, close the defective valve or the defective supply valve. Never use a cylinder with a leakage defect.
Never empty completely a cylinder or a rack.
The empty cylinders or rack must be stored with their valve turned off (closed) in order to avoid corrosion.
Never transfer gas to another cylinder.
Ensure that ventilation is adequate.

Services

Main office

MIL'S,
aware of your imperatives and requirements, offers all kind of services to enhance the use you make of your equipments.

Training

Training
Compose your program from the numerous available modules, whether theoretical or practical, on air, on vacuum, on oxygen and of course,the standard and regulated environments for our products.

After-sales service

After-Sales Service
From intervention on your premises to servicing in our factories, from troubleshooting to maintenance contract, our technicians will help you to maintain the performance of your equipment and will advise you on their optimisation.

Useful formulae

Flow rate calculation further to altitude

The after-specified formula allows to calculate the pressure further to the altitude.
Mind, this formula is valid up to 50 km altitude.

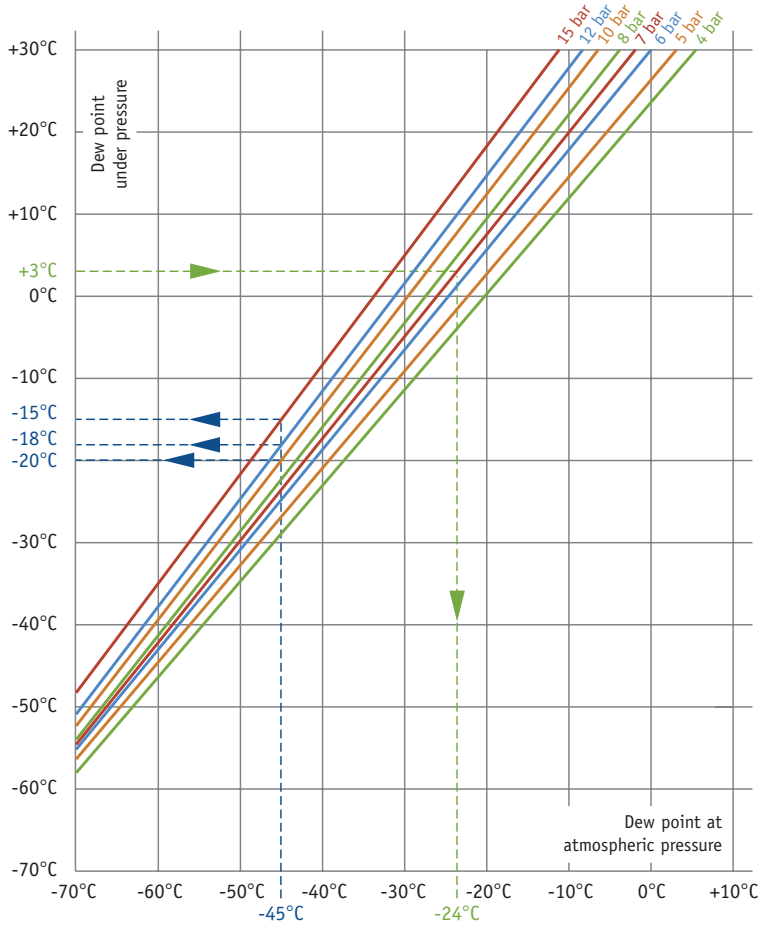
$$p = 1013\ e^{-h / 7,5}$$

with : p : pressure in hPa
h : altitude in km

	Altitude (km)	Pressure (hPa)
At sea level	0	1013
At Mont Blanc mountaintop	4,8	560
At Everest mountaintop	8,8	320
At average plane flight altitude	15	120

Dew point conversion chart

This chart allows to convert a dew point expressed at atmospheric pressure into a dew point at compressed air pressure



Conversion tables

Vacuum / Pressure		
1 mbar	= 0,0295 in Hg	
1 bar	= 14,50 psi	
1 kPa	= 10 mbar	= 0,01 bar

Dimensions		
1 mm	= 0,039 in	
1 m	= 3,281 ft	= 39,37 in

Power	
1 kW	= 1,341 hp

Weight	
1 kg	= 2,205 lb

Flow rate	
1 $m^3.h^{-1}$	= 16,667 $L.min^{-1}$ = 0,5886 cfm
1 $L.min^{-1}$	= 0,2642 $gal.min^{-1}$

Temperature	
t(°F)	= 1,8 x t(°C) + 32

Water vapour pressure

The following table gives vapour pressure at water level for temperatures included between 0 and 100° C

Temperature °C	Pressure mbar
0	6,11
5	8,72
10	12,28
15	17,05
20	23,38
25	31,67
30	42,43
35	56,23
40	73,77
45	95,84
50	123,35
55	157,39
60	199,17
65	250,05
70	311,60
75	385,47
80	473,47
85	578,13
90	701,01
95	845,20
100	1013,33

Dew point : definition

Temperature of a cold wall plunged into a humid chamber at which the condensation of humidity present in air appears.

Air humidity

Values indicated in the table hereafter correspond to dew points i.e. to the weights of saturating water vapour per m^3 beyond which water condenses into a liquid at the considered temperature.

Dew point °C	ppm (volume) in air	ppm (weight) in air	Partial vapour tension mg/m^3	Relative humidity at 21°C %
- 84	0,263	0,16	0,189	0,00107
- 82	0,382	2,24	0,288	0,00155
-80	0,526	0,33	0,399	0,00214
-78	0,737	0,46	0,558	0,00300
- 76	1,01	0,63	0,765	0,00412
- 74	1,38	0,82	1,040	0,00562
- 72	1,88	1,17	1,420	0,00765
- 70	2,55	1,64	1,930	0,0104
- 68	3,43	2,13	2,60	0,0140
- 66	4,59	2,84	3,48	0,0187
- 64	6,10	3,71	4,61	0,0248
- 62	8,07	5,01	6,15	0,0328
- 60	10,8	6,59	8,00	0,0433
- 58	13,9	8,21	10,6	0,0567
- 56	18,2	11,6	13,8	0,0738
- 54	23,4	14,5	17,8	0,0952
- 52	30,2	18,8	23,0	0,126
- 50	38,8	24,2	29,5	0,160
- 48	49,7	30,7	37,8	0,202
- 46	63,2	39,3	48	0,257
-44	80,1	49,7	61	0,325
- 42	101	61,7	77	0,410
- 40	127	79,1	97	0,516
- 38	159	98,6	122	0,646
- 36	197	123	151	0,804
- 34	246	156	188	1,01
- 32	305	189	232	1,24
- 30	376	234	288	1,55
- 28	462	287	352	1,88
- 26	566	351	430	2,30
- 24	692	431	527	2,81
- 22	842	524	640	3,42
- 20	1021	635	790	4,14
- 18	1236	766	940	5,01
- 16	1489	925	1140	6,06
- 14	1791	1110	1360	7,29
- 12	2147	1340	1640	8,75
- 10	2566	1590	1950	10,40
- 8	3061	1900	2300	12,8
- 6	3638	2260	2780	14,8
- 4	4316	2680	3300	17,5
- 2	5105	3170	3900	20,7
0	6025	3800	4600	24,1

General conditions of sale and guarantee - Sales contract

GENERAL POINTS
The orders noted and the commitments taken by the Representatives or Agents, are only binding on our company after its WRITTEN ACCEPTANCE.
The orders only become final after forwarding of an acknowledgment of receipt. They imply the acceptance of the present general conditions of sale notwithstanding any contrary clauses of our customers that have not been expressly accepted in writing.
The role of our company consists in manufacturing the equipment. It is not for it to appreciate the appropriateness of the choice of any equipment as regards its final destination or the use to which it is allocated.
Any information that we may be led to provide is only given in the framework of our productions and for information, and does not consist of indications regarding the choice of the equipment or the final use for which it is destined. In no case can our liability be incurred if there is no sale of equipment.
Our activity consists in manufacturing products ordered by our customers and it is not for us to appreciate the appropriateness of an order for the use to which it is destined by the purchaser.
The present general conditions and the special conditions insofar as the latter are not contrary to the present general conditions and still comply with general contract law and competition law can be completed by the Customer general conditions of purchase expressly accepted by the Supplier.
Any derogation to the present general conditions is subject to our express and written acceptance.

TRANSFER OF OWNERSHIP – RESERVATION OF OWNERSHIP TRANSFER OF RISK
The merchandise shall remain our property up until the full payment of its price in principal and interest. Failing the payment of the price on the agreed due date, we shall be able to take back the merchandise, the sale being declared void if this seems proper to us, and the deposits already paid shall remain acquired by us in return for the enjoyment of the merchandise from which the purchaser will have benefited.
The purchaser becomes responsible for the merchandise as soon as it is collected from our factory, the transfer of possession leading to the transfer of risks. The purchaser undertakes, consequently, to take out, as at present, an insurance contract covering the risks of loss, theft or destruction of the merchandise.

INTELLECTUAL PROPERTY AND KNOW-HOW FOR DOCUMENTS AND PRODUCTS
All intellectual property rights as well as know-how incorporated into forwarded documents, delivered products and provided services shall remain the exclusive property of our company.

STUDIES AND PROJECTS
The studies and documents of any nature passed on or sent remain entirely our property. They cannot lead to communication or to execution by a third party.

CANCELLATION OF A CONFIRMED ORDER
The cancellation or termination of an order in the course of execution for a cause outside our control, including force majeure, shall render the customer the debtor in respect to Mil's of compensation that, in no case, shall be less than 20% of the amount of the order, whatever may be its state of advancement, and any deposit already paid shall be kept as cover.

RETURNS
No merchandise can be returned to the Company Mil's without the agreement of the latter.

DELIVERY AND PRICE
THE DELIVERY IS DEEMED MADE IN OUR FACTORIES OR STORES.
It is made by the direct handing-over to the customer, by simple notice of availability, or by handing-over to a shipper or to a carrier appointed by the customer or, failing such appointment, chosen by us.
The delivery times are given for information and are not guaranteed. Delivery delays do not give the purchaser the right to cancel the sale or to refuse the merchandise. They cannot give rise to retention, compensation, penalty or damages.

THE PRICES ARE UNDERSTOOD TO EXCLUDE TAX FOR THE EQUIPMENT NOT PACKED TAKEN IN OUR FACTORIES OR STORES, THOSE PRICES ARE IN EUROS.

CONDITIONS OF USE
All equipment is delivered accompanied by technical instructions that we recommend should be followed. If these instructions are not attached, they will be immediately forwarded on simple request.

PAYMENT CONDITION
In case of no negotiation before ordering, the payment term is by swift transfer at reception of invoice, with minimum of 60 € net. (Payments are made in euros unless otherwise stipulated in the agreement).
It is expressly agreed and failing timely request for postponement and granted by us, the failure to pay our invoices by the date indicated on the said invoices and by the date resulting from the application of our general sales conditions, if it is after the first date, shall lead to :

1. the immediate payability on the amounts remaining due,
2. the interests calculated at a rate equal to 10% per year and any legal costs.

We do not grant discount for early payment, unless it has been negotiated at the time of the order.

Notification of the customer situation :
In case the deterioration of the customer situation is noticed by any means and/or certified by a significant delay in payment or when the financial situation is appreciably different from the available data, the delivery will be made only in compensation for an immediate payment.

TRANSPORT
ALL TRANSPORT OPERATIONS, insurance, customs, handling carried out ARE PAYABLE BY AND AT THE RISKS OF THE PURCHASER who is responsible for checking the shipments on arrival and for taking action, if appropriate, against the carriers.
In the case of dispatch ensured by us, this shall be made carriage due, full responsibility resting with the purchaser.
Our company, at the request of the customer, shall insure the merchandise against transport risks, and shall invoice, as a supplement, the cost of this insurance.

GUARANTEE OF THE EQUIPMENT
OUR MERCHANDISE IS GUARANTEED ONE YEAR, as from the date IT IS MADE AVAILABLE, against any construction defect or any fault in the material.
In all cases, if the equipment is used by several teams, the period of the guarantee is necessarily reduced by half. For the components that are not of our manufacture, we are not substituted in the conditions of guarantee of the supplier constructor.

The guarantee does not apply to replacements or to repairs that could result from normal wear of the instruments, deterioration or accidents due to a defect in surveillance or installation and improper use. Likewise are excluded from the field of application of the guarantee, deteriorations resulting from damage during transport, falls, or violent shocks.
The guarantee is limited to the free replacement, in our workshops, of the machine pieces or parts recognised as defective due to material fault or manufacturing defect, with the exclusion of labour. The pieces replaced remain our property.

The transport costs, the outward as the return journey, are to be paid by the customer.
The guarantee ceases if the instruments are modified or repaired outside our workshops. The passage through our workshops does not lead to the extension of the period of initial guarantee of the machine. Replacement parts or remade pieces are guaranteed 6 months, as from the delivery date after our intervention. The guarantee shall not apply in the event of non-payment by the customer and he cannot take advantage of it or postpone his payments.

LOAN OF EQUIPMENT
Our company may have to lend some material for a determined duration under conditions defined in a loan contract. At the end of the agreed period, the customer shall notify if the material on loan will be returned or ordered. In the absence of any notification within this period, the sale shall be deemed to be effective, as the customer will be presumed to have accepted the delivered product.

ELIMINATION OF WASTE
"In accordance with article 18 of the decree N° 2005-829 of July 20th, 2005 relating to the composition of the electrical and electronic equipment, the customer will be responsible for the financing and organisation of the elimination of waste from this equipment under the conditions defined in articles 21 and 22 of the said decree. In case of control, the producer may ask his customer to send him the documents establishing he fulfils, as regard this equipment, all the obligations transferred with the sales contract.
If the customer fails to forward these documents, he will be presumed to be liable for non-fulfilment of the obligations he is responsible for and the manufacturer reserves the right to ask him compensation for any damage that he could suffer thereby".

INSURANCE COVERING OUR LIABILITY
Our company has taken out an insurance policy covering the pecuniary consequences of our legal liability and this in the following way :

1. Before delivery of the products :
   - Bodily injuries 6 100 000 €
   - Consequential moral prejudice and damage to property 1 530 000 €

with the exception of the following
   - Damage to entrusted goods 76 300 €
   - Thef 30 500 €
   - Non-consequential moral prejudice 305 000 €

2. After delivery of the products :
   - For all damage, combined single limit 1 530 000 €

without it being possible to exceed for the following damage :
   - Non-consequential moral prejudice, along with removing and reinstalling costs 305 000 €

The fact of placing an order with us leads, on the part of our customers, to the express acceptance of these limits to liability and to the abandon of the right to take legal action against us for higher amounts.
Of course, we remain at the disposal of our customers to take out, the expenses to be borne by them, additional cover in the event that they find our cover insufficient.

DISPUTES
In the case of disagreement relating to a delivery or its payment, the Lyon Commercial Court is the sole competent, whatever may be the sales conditions and the method of payment chosen, even in the case of proceedings against the guarantor or more than one defendant.

SPECIAL CONDITIONS
The special conditions and those that may be indicated in the documentations, quotes or prices forwarded only modify the sales conditions on the precise points to which they relate.
The general sales and guarantee conditions of our company are those accepted by the Fédération des Industries Mécaniques et Transformatrices de Métaux (Federation of Mechanical Industries and Metal Transformers), on condition that they are not contrary to what precedes.
The FIM professional business conditions are registered in the Commercial Court in Paris under N° 2005048625.

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