

Medical Air Supply System cAIR Combined Air
EN ISO 7396-1/HTM 02-01 and HTM2022 EurPh with PMA Medical dryer and
Oil Injected Screw Compressors
400V 50Hz

SPECIFICATION

Medical Air Supply System



Description and intended use

The Medical Air Supply System is a modular system consisting of oil-injected rotary screw compressors with fixed or variable speed drive, a duplex air purification module with central controller, and air receivers. The Air System shall conform to EN ISO 7396-1 and NHS Health Technical Memorandum HTM02-01 or HTM2022. Medical quality air to the European Pharmacopoeia monograph shall be delivered at pressures of 400 kPa (4 bar), 700kPa (7 bar) or 1000 kPa (10 bar) gauge for supply of the hospital medical or surgical air systems.

Medical Air Supply System shall be duplexed such that any single functional component failure will not affect the integrity of the medical compressed air supply.

Medical Air Supply System (Surgical air for high pressure application) shall have a duplex air purification module and a simplex compressor. Additional compressors shall be available to duplex the compressors, such that any single compressor failure will not affect the integrity of the air supply.

The Medical Air Supply System are CE-marked with approval from a notified body (currently in the application process, more detailed information available on request)

The Distinctive features of medical compressors:



Features	Customer benefit
Medical software and HTM commanded features	Fit for medical application with full compliancy to HTM and ISO medical standards
State of the art permanent motor with efficiency 94.5% (IE4)	Interior Permanent Magnet (iPM) motor with IE4 high energy efficiency of 94.5%. Fully enclosed IP66 direct drive train. One oil circuit for motor, element, and bearings, eliminates the need for cooling air.
Variable speed drive	Each compressor contains a variable speed drive inverter matched to the permanent magnet motors, with a flow range of 20-100%, to further reduce energy consumption.
Compact Compressor Footprint	Innovative vertical arrangement of compressor element and drive motor minimize footprint, reducing floor space required.



The Distinctive features of the PMA medical dryers:


Features	Customer benefit
Complete Air Purification Package	Everything to clean the air is pre-piped and wired in a fully duplexed package, with a six-step purification process that provides European Pharmacopeia compliant air
Advanced Medical Controls	The advanced master controller monitors and controls both the compressors and the air purification module. Filled with redundancy and medical safety features, the controller operates the system efficiently with a very tight pressure band and equalization of running hours on the compressors and dryers.
MyMedGas Embedded	All parameters of the systems can be seen and stored via MyMedGas
Compact design	With the unique design of the extruded aluminum desiccant dryer towers, the air purification package components are compactly configured to minimize footprint without compromising service access.
Optional Hopcalite catalysator	Less time to assemble and commission, less brazing points, no room for connections
Optional Integrated gas sensor	Combination of gas sensors allows continuous gas quality monitoring with trends stored in MyMedGas

Sources of Supply
HTM02-01/EN ISO 7396-1

The Medical Air Supply System will produce the primary supply with two compressors on standby (unless an Automatic Manifold is used as secondary (HTM02-01) or third (ISO7396-1) supply). For duplex plant, the secondary (HTM02-01) or third (ISO7396-1) supply shall be an Automatic Manifold. For triplex plant, each compressor can supply the total hospital flow. If more than three compressors are installed, the total hospital flow will be split over multiple compressors.

HTM2022

The Medical Air Supply System will produce the primary supply with one compressor on standby. For duplex plant, each compressor can supply the total hospital flow. If more than two compressors are installed, the total hospital flow will be split over multiple compressors. The back-up compressor will form the secondary supply. A third supply shall be from an Automatic Manifold capable of supplying the average hospital demand for 4 hours.

Compressors

Compressors shall be Atlas Copco GA MED single-stage oil injected rotary screw compressors suitable for both continuous and frequent start/stop operation. The compressors can be either fixed speed or equipped with variable speed drive (VSD). To achieve the best performance and energy savings, it is recommended to use VSD compressors.

Variable Speed Compressors

Variable speed compressors shall be Atlas Copco GA VSD+ MED. By including an AC-DC converter, along with associated control hardware and software it will enable the compressor to continuously match its running speed with the flow demand required by the hospital. By using such technology, start currents will be reduced, machine life will be prolonged and energy savings of up to 50% shall be achievable. The compressor shall operate from 700 - 1300kPa (7- 13 bar) gauge. The compressor shall be fitted with a high-definition touch screen and remote monitoring system.

The compressor shall be fitted with an oil-cooled permanent magnet synchronous motor of minimum IE4 efficiency class and IP66 pressure tight ingress protection. The motor bearings shall be oil-cooled and maintenance free. The motor shall be directly connected to the screw element without gearbox nor belt. The motor and screw element shall be fitted in a vertical position to limit the footprint of the compressor. A multistage oil separator capable of achieving 2ppm oil carry-over shall be fitted to minimize contamination and maintenance. The noise level of the compressor shall be maximum 67dB(A).

The controller shall allow combining the fixed speed with VSD compressor, given that every compressor can provide the nominal Free Air Delivery. This allows achieving the energy savings, and extended life time of the compressors thanks to the VSD drive and would have lower the investment cost compared to the system with all VSD compressors. In such systems the VSD compressor is used as primary source. The running hours of such system will not be equalized among compressors.

The compressors shall be equipped with following HTM mandated features:

HTM code specific features	Function
Aftercooler temperature sensors	To identify the cooling system failure (for example, fan failure) and to prevent hot air going to the dryer, which can cause dryer damage
Separate power lead for central controller	Independent controller electrical supply allows to disconnect any of the compressor lead from the main power supply keeping the plant control operational
Separate power lead for each compressor	Allows to set up the electrical supply redundancy
Ampere meters outside the unit	Allow to monitor the power supply status and the current easily
Failed-to-go-on-load switch	Allows central controller to verify that compressor responded to the controller command and is producing the compressed air
Main power switches on each compressor unit	Allows disconnecting each compressor and safely perform service intervention on one compressor while another compressor is running
Automatic restart after power failure	Resumes medical air supply automatically after power failure or after switching from main to the emergency power supply
Emergency forced local mode	Allows to manually override the automatic unit control and to get the plant running in emergency mode
Separated compressors cubicles	Allows to perform service intervention on one compressor while another unit is running
Back up pressure switch	Automatically overrides control system and activate both primary and secondary supply in case air supply pressure drops below the limit

Air Purification Module



Dryer and filter system

The duplexed air purification module shall incorporate high efficiency water separators, oil coalescing filters, heatless regenerative desiccant dryers, activated carbon filters with optional hopcalite catalyst, bacterial filters and pressure regulators. The performance of the filters shall be according to below specifications:

- Oil coalescing two-in-one high efficiency filter: mass efficiency of 99,991%, tested according to ISO 8573-2 & ISO 12500-1
- Activated carbon filter: max remaining total oil content of 0,003 mg/m³, tested according to ISO 8573-5 & ISO 12500-2
- Bacterial filter: particle count efficiency of 99,98% at MPPS=0.06µm, tested according to ISO 12500-3

Contaminants in the delivered air downstream of the bacterial filters shall be maintained at levels below those shown in the table below :

Contaminant	Threshold
H ₂ O	67 ppm v/v
Dry particulates	Free from visible particulates in a 75 litre sample
Oil (droplet or mist)	0.1 mg/m ³
CO	5 ppm v/v
CO ₂	500 ppm v/v
SO ₂	1 ppm v/v
NO	2 ppm v/v
NO ₂	2 ppm v/v

Plant Control System

The central control system shall have a touch screen and provide an intelligent human machine interface incorporating on board flash memory and real-time clock for recording operational parameters in the event log. The central control system shall operate at low voltage and include BMS connection for plant fault, plant emergency, reserve fault and pressure fault.

The central control unit shall incorporate a user friendly 5" high-definition color touch screen display with clear pictograms and LED indicators, providing easy access to system operational information. The central controller shall be equipped with the remote monitoring function via the cellular network.

Dryer Purge Control

The dryer control system shall incorporate a Purge Saver Energy Management system that freezes the regeneration of the desiccant once adequate dew point is reached in the inactive tower. Only when the dewpoint level in the active tower deteriorates to an unacceptable level will the intelligent controller switch towers.

Dryer General Data - All types

Parameter	Value
Atmospheric Dew point (°C)	-46
Air quality	Meets European Pharmacopeia
Dryer type	Duplex desiccant dryer with purge saver
Purge	16% (maximum, purge saver deactivated)
Controllers	MK5s Touch Central controller, 2 2 (two) independent dryer controllers
Test point	BS341 or DIN
Pressure regulators	Duplex integrated pressure regulators
Connectivity	MyMedGas embedded
Outlet connection	22 mm copper stub extension
Inlet connection	22 mm copper stub extension
Voltage/Frequency	400V±10%/50Hz; one single phase lead for main cubicle
Medical device Certification	MDR Class IIa (in progress)
Piping material	Stainless steel
Condensate drains	Electronic

Dryer Dimensional Data - All types

Platform	S	M	L
Length	1070	1270	1800
Width	800	800	850
Hight	1741	1868	1901
Weight	293	302	593

Receiver Assembly

The air receiver shall be ML approved, supplied with relevant test certificates. Each air receiver shall be fitted with a zero-loss electronic drain valve. Float type drain valves are not acceptable. The receiver assembly shall be fitted with a pressure safety valve, set at 10% receiver overpressure. The receiver shall further include a pressure gauge. The receivers shall be installed separately and sized according to the design guidelines.

Condensate Management Options


If the oil in compressor condensate is not removed before it enters the sewage system, it can cause significant environmental damage. Therefore, condensate treatment is not only the responsible thing to do in most countries it's the law. Thanks to its multi-stage filtration, Atlas Copco's OSC Oil Water Separator removes oil from your compressor's condensate with unmatched precision to achieve an oil content of 10 ppm at outlet. In addition, the OSC offers zero-hassle maintenance thanks to its easily removable filter bags and cartridges.

Options

The dryer is available with the following options.

Description	Part number
PMA OSC	0000066948
PMA CO	0000066949
PMA CO+CO2	0000066950
PMA CO+CO2+O2	0000066951
PMA Hopcalite	0000066952
PMA DIN test Point *	0000066953

* The BS341 test point is standard, if you order the optional DIN test point then the BS point will be changed.

Selection tables
Medical Air Supply System Taxonomy

cAIR	-	TGF	-	M1	-	7	-	HTM0201	50Hz
Nomenclature		Description							
cAIR	Plant type:								
	cAIR -combined air,								
	mAIR - medical air,								
sAIR – surgical air									
TGF	Compressor configuration:								
	TGF – triplex GA fixed speed								
	DGF – Duplex GA fixed								
	DGV - Duplex GA VSD+								
TGV - Triplex GA VSD+									
M1	Dryer Platform								
7	Output pressure (bar)								
HTM0201	Standard: HTM0201, HTM2022, ISO								

The table below give easy guide of how to configure Medical Air Supply System (combined medical and surgical air). For the configuration of the Medical Air Supply Systems (mAIR) or surgical plants or other variants, please refer to the sizing guide in the end of the datasheet.

Condensate Management Options

Description	Type	Part number
Oil Water Separator, 900 l/min	Activated carbon	8102046581
	Organo clay ¹	8102046607
Oil Water Separator, 1860 l/min	Activated carbon	8102046623
	Organo clay ¹	8102046649
Oil Water Separator, 3780 l/min	Activated carbon	8102046664
	Organo clay ¹	8102046730
Oil Water Separator, 6360 l/min	Activated carbon	8102046672
	Organo clay ¹	8102046748
Oil Water Separator, 12780 l/min	Activated carbon	8102046680
	Organo clay ¹	8102046755
Oil Water Separator, 22500 l/min	Activated carbon	8102046698
	Organo clay ¹	8102046763

¹Stronger emulsions: RS Xtend, RS foodgrade, Oil mixtures



Medical Air Supply Systems. Selection table

Model Name	Model Description	System Design Flow	Compressor Model	Compressor Qty	Dryer Model	Vessel Size	Vessel Qty	Vessel Kit Size	Vessel Kit Qty
G-MED: Combined Air 7 bar - HTM 2022 (50Hz)									
cAIR-DGF	cAIR-DGF-M1-7-HTM 2022	1802	G15 MED 10 bar	2	PMA-M1-10/7	1000L 11 Bar	1	1000L 11 Bar KIT	1
cAIR-DGF	cAIR-DGF-M2-7-HTM 2022	2300	G18 MED 10 bar	2	PMA-M2-10/7	1500L 11 Bar	1	1500L 11 Bar KIT	1
cAIR-DGF	cAIR-DGF-M3-7-HTM 2022	2600	G22 MED 10 bar	2	PMA-M3-10/7	1500L 11 Bar	1	1500L 11 Bar KIT	1
G-MED: Combined Air 10 bar - HTM 2022 (50Hz)									
cAIR-DGF	cAIR-DGF-S4-10-HTM 2022	1508	G15 MED 13 bar	2	PMA-S4-13/10	1000L 14 Bar	1	1000L 14 Bar KIT	1
cAIR-DGF	cAIR-DGF-M1-10-HTM 2022	1788	G18 MED 13 bar	2	PMA-M1-13/10	1000L 14 Bar	1	1000L 14 Bar KIT	1
cAIR-DGF	cAIR-DGF-M1-10-HTM 2022	2238	G22 MED 13 bar	2	PMA-M1-13/10	1500L 14 Bar	1	1500L 14 Bar KIT	1
GAVSD-MED: Combined Air 7 bar - HTM 2022 (50Hz)									
cAIR-DGV	cAIR-DGV-S3-7-HTM 2022	890	GA 7 VSD+ MED	2	PMA-S3-10/7	500L 14 Bar	1	500L 14 Bar KIT	1
cAIR-DGV	cAIR-DGV-S4-7-HTM 2022	1333	GA 11 VSD+ MED	2	PMA-S4-10/7	1000L 14 Bar	1	1000L 14 Bar KIT	1
cAIR-DGV	cAIR-DGV-M1-7-HTM 2022	1766	GA 15 VSD+ MED	2	PMA-M1-10/7	1000L 14 Bar	1	1000L 14 Bar KIT	1
cAIR-DGV	cAIR-DGV-M3-7-HTM 2022	2666	GA 18 VSD+ MED	2	PMA-M3-10/7	1500L 14 Bar	1	1500L 14 Bar KIT	1
cAIR-DGV	cAIR-DGV-L1-7-HTM 2022	3183	GA 22 VSD+ MED	2	PMA-L1-10/7	2000L 14 Bar	1	2000L 14 Bar KIT	1
cAIR-DGV	cAIR-DGV-L2-7-HTM 2022	3821	GA 26 VSD+ MED	2	PMA-L2-10/7	2000L 14 Bar	1	2000L 14 Bar KIT	1
cAIR-DGV	cAIR-DGV-L2-7-HTM 2022	4253	GA 30 VSD+ MED	2	PMA-L2-10/7	3000L 14 Bar	1	3000L 14 Bar KIT	1
cAIR-DGV	cAIR-DGV-L3-7-HTM 2022	4769	GA 37 VSD+ MED	2	PMA-L3-10/7	3000L 14 Bar	1	3000L 14 Bar KIT	1
cAIR-DGV	cAIR-DGV-L3-7-HTM 2022	6851	GA 45 VSD+ MED	2	PMA-L3-10/7	2000L 14 Bar	2	2000L 14 Bar KIT	2
GAVSD-MED: Combined Air 10 bar - HTM 2022 (50Hz)									
cAIR-DGV	cAIR-DGV-S2-10-HTM 2022	698	GA 7 VSD+ MED	2	PMA-S2-13/10	500L 14 Bar	1	500L 14 Bar KIT	1
cAIR-DGV	cAIR-DGV-S3-10-HTM 2022	1170	GA 11 VSD+ MED	2	PMA-S3-13/10	1000L 14 Bar	1	1000L 14 Bar KIT	1
cAIR-DGV	cAIR-DGV-S4-10-HTM 2022	1352	GA 15 VSD+ MED	2	PMA-S4-13/10	1000L 14 Bar	1	1000L 14 Bar KIT	1
cAIR-DGV	cAIR-DGV-M1-10-HTM 2022	2148	GA 18 VSD+ MED	2	PMA-M1-13/10	1500L 14 Bar	1	1500L 14 Bar KIT	1
cAIR-DGV	cAIR-DGV-M2-10-HTM 2022	2686	GA 22 VSD+ MED	2	PMA-M2-13/10	1500L 14 Bar	1	1500L 14 Bar KIT	1
cAIR-DGV	cAIR-DGV-M3-10-HTM 2022	3226	GA 26 VSD+ MED	2	PMA-M3-13/10	2000L 14 Bar	1	2000L 14 Bar KIT	1
cAIR-DGV	cAIR-DGV-M3-10-HTM 2022	3381	GA 30 VSD+ MED	2	PMA-M3-13/10	2000L 14 Bar	1	2000L 14 Bar KIT	1
cAIR-DGV	cAIR-DGV-L1-10-HTM 2022	4278	GA 37 VSD+ MED	2	PMA-L1-13/10	3000L 14 Bar	1	3000L 14 Bar KIT	1
cAIR-DGV	cAIR-DGV-L2-10-HTM 2022	5780	GA 45 VSD+ MED	2	PMA-L2-13/10	3000L 14 Bar	1	3000L 14 Bar KIT	1





Model Name	Model Description	System Design Flow	Compressor Model	Compressor Qty	Dryer Model	Vessel Size	Vessel Qty	Vessel Kit Size	Vessel Kit Qty
G-MED: Combined Air 7 bar - HTM 02-01 (50Hz)									
cAIR-TGF	cAIR-TGF-S3-7-HTM 02-01	824	G 7 MED 10 bar	3	PMA-S3-10/7	500L 11 Bar ML	2	500L 11 Bar ML KIT	2
cAIR-TGF	cAIR-TGF-S4-7-HTM 02-01	1204	G 11 MED 10 bar	3	PMA-S4-10/7	500L 11 Bar ML	2	500L 11 Bar ML KIT	2
cAIR-TGF	cAIR-TGF-M1-7-HTM 02-01	1802	G 15 MED 10 bar	3	PMA-M1-10/7	500L 11 Bar ML	2	500L 11 Bar ML KIT	2
cAIR-TGF	cAIR-TGF-M3-7-HTM 02-01	2234	G 18 MED 10 bar	3	PMA-M3-10/7	1000L 11 Bar ML	2	1000L 11 Bar ML KIT	2
cAIR-TGF	cAIR-TGF-M3-7-HTM 02-01	2600	G 22 MED 10 bar	3	PMA-M3-10/7	1000L 11 Bar ML	2	1000L 11 Bar ML KIT	2
G-MED: Combined Air 10 bar - HTM 02-01 (50Hz)									
cAIR-TGF	cAIR-TGF-S2-10-HTM 02-01	632	G 7 MED 13 bar	3	PMA-S2-13/10	500L 14 Bar ML	2	500L 14 Bar ML KIT	2
cAIR-TGF	cAIR-TGF-S3-10-HTM 02-01	960	G 11 MED 13 bar	3	PMA-S3-13/10	500L 14 Bar ML	2	500L 14 Bar ML KIT	2
cAIR-TGF	cAIR-TGF-S4-10-HTM 02-01	1508	G 15 MED 13 bar	3	PMA-S4-13/10	500L 14 Bar ML	2	500L 14 Bar ML KIT	2
cAIR-TGF	cAIR-TGF-M1-10-HTM 02-01	1788	G 18 MED 13 bar	3	PMA-M1-13/10	500L 14 Bar ML	2	500L 14 Bar ML KIT	2
cAIR-TGF	cAIR-TGF-M2-10-HTM 02-01	2140	G 22 MED 13 bar	3	PMA-M2-13/10	1000L 14 Bar ML	2	1000L 14 Bar ML KIT	2
GAVSD-MED: Combined Air 7 bar - HTM 02-01 (50Hz)									
cAIR-TGV	cAIR-TGV-S3-7-HTM 02-01	890	GA 7 VSD+ MED	3	PMA-S3-10/7	500L 14 Bar ML	2	500L 14 Bar ML KIT	2
cAIR-TGV	cAIR-TGV-M1-7-HTM 02-01	1268	GA 11 VSD+ MED	3	PMA-M1-10/7	500L 14 Bar ML	2	500L 14 Bar ML KIT	2
cAIR-TGV	cAIR-TGV-M1-7-HTM 02-01	1766	GA 15 VSD+ MED	3	PMA-M1-10/7	500L 14 Bar ML	2	500L 14 Bar ML KIT	2
cAIR-TGV	cAIR-TGV-L1-7-HTM 02-01	2487	GA 18 VSD+ MED	3	PMA-L1-10/7	1000L 14 Bar ML	2	1000L 14 Bar ML KIT	2
cAIR-TGV	cAIR-TGV-L1-7-HTM 02-01	3183	GA 22 VSD+ MED	3	PMA-L1-10/7	1000L 14 Bar ML	2	1000L 14 Bar ML KIT	2
cAIR-TGV	cAIR-TGV-L2-7-HTM 02-01	3821	GA 26 VSD+ MED	3	PMA-L2-10/7	1000L 14 Bar ML	2	1000L 14 Bar ML KIT	2
cAIR-TGV	cAIR-TGV-L3-7-HTM 02-01	4769	GA 37 VSD+ MED	3	PMA-L3-10/7	1500L 14 Bar ML	2	1500L 14 Bar ML KIT	2
GAVSD-MED: Combined Air 10 bar - HTM 02-01 (50Hz)									
cAIR-TGV	cAIR-TGV-S2-10-HTM 02-01	698	GA 7 VSD+ MED	3	PMA-S2-13/10	500L 14 Bar ML	2	500L 14 Bar ML KIT	2
cAIR-TGV	cAIR-TGV-S3-10-HTM 02-01	1170	GA 11 VSD+ MED	3	PMA-S3-13/10	500L 14 Bar ML	2	500L 14 Bar ML KIT	2
cAIR-TGV	cAIR-TGV-S4-10-HTM 02-01	1352	GA 15 VSD+ MED	3	PMA-S4-13/10	500L 14 Bar ML	2	500L 14 Bar ML KIT	2
cAIR-TGV	cAIR-TGV-M1-10-HTM 02-01	2148	GA 18 VSD+ MED	3	PMA-M1-13/10	1000L 14 Bar ML	2	1000L 14 Bar ML KIT	2
cAIR-TGV	cAIR-TGV-M2-10-HTM 02-01	2686	GA 22 VSD+ MED	3	PMA-M2-13/10	1000L 14 Bar ML	2	1000L 14 Bar ML KIT	2
cAIR-TGV	cAIR-TGV-M3-10-HTM 02-01	3226	GA 26 VSD+ MED	3	PMA-M3-13/10	1000L 14 Bar ML	2	1000L 14 Bar ML KIT	2
cAIR-TGV	cAIR-TGV-L1-10-HTM 02-01	4278	GA 37 VSD+ MED	3	PMA-L1-13/10	1500L 14 Bar ML	2	1500L 14 Bar ML KIT	2
cAIR-TGV	cAIR-TGV-L2-10-HTM 02-01	5780	GA 45 VSD+ MED	3	PMA-L2-13/10	1500L 14 Bar ML	2	1500L 14 Bar ML KIT	2



Dryer Selection table
Dryer Taxonomy

PMA	-	M1	-	10	/	7
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Nomenclature	Description
PMA	Model name
M1	Platform size
10	Inlet pressure (bar)
7	Output pressure (bar)

Model	Part Number	Maximum Inlet Flow (l/min)	Maximum Outlet Flow (l/min)	Maximum Inlet Pressure (Bar)	Minimum Outlet Pressure (Bar)
PMA-S1-7/4	4109004760	300	252	7	4
PMA-S2-7/4	4109004761	550	462	7	4
PMA-S3-7/4	4109004762	859	722	7	4
PMA-S4-7/4	4109004763	1150	966	7	4
PMA-M1-7/4	4109004764	1650	1386	7	4
PMA-M2-7/4	4109004765	2000	1680	7	4
PMA-M3-7/4	4109004766	2300	1932	7	4
PMA-L1-7/4	4109004767	3300	2772	7	4
PMA-L2-7/4	4109004768	4000	3360	7	4
PMA-L3-7/4	4109004769	6200	5208	7	4
PMA-S1-10/7	4109004770	414	348	10	7
PMA-S2-10/7	4109004771	759	638	10	7
PMA-S3-10/7	4109004772	1186	996	10	7
PMA-S4-10/7	4109004773	1587	1333	10	7
PMA-M1-10/7	4109004774	2277	1913	10	7
PMA-M2-10/7	4109004775	2760	2318	10	7
PMA-M3-10/7	4109004776	3174	2666	10	7
PMA-L1-10/7	4109004777	4554	3825	10	7
PMA-L2-10/7	4109004778	5520	4637	10	7
PMA-L3-10/7	4109004779	8556	7187	10	7
PMA-S1-13/10	4109004780	525	441	13	10
PMA-S2-13/10	4109004781	963	809	13	10
PMA-S3-13/10	4109004782	1503	1263	13	10
PMA-S4-13/10	4109004783	2013	1691	13	10
PMA-M1-13/10	4109004784	2888	2426	13	10
PMA-M2-13/10	4109004785	3500	2940	13	10
PMA-M3-13/10	4109004786	4025	3381	13	10
PMA-L1-13/10	4109004787	5775	4851	13	10
PMA-L2-13/10	4109004788	7000	5880	13	10
PMA-L3-13/10	4109004789	10850	9114	13	10

Compressor Selection Table
Fixed Speed -G MED Screw - 50Hz

Model Name	G7 MED	G11 MED	G15 MED	G18 MED	G22 MED
Output flow (litres/minute) 7.5 bar variant *	1218	1746	2622	3318	3750
Output flow (litres/minute) 10 bar variant *	1014	1458	2166	2742	3108
Output flow (litres/minute) 13 bar variant *	786	1200	1830	2250	2700
Footprint L x W x H (mm)	767 x 623 x 972	767 x 623 x 972	1002 x 750 x 1175	1002 x 750 x 1175	1002 x 750 x 1175
Compressor weight (kg)	221	238	378	406	421
Service connection (mm)	22	22	28	28	28
Noise level/pump (dB[A])	66	67	71	71	72
Max ambient temperature (°C)	46	46	46	46	46
Supply voltage (v)	400	400	400	400	400
Supply frequency (Hz)	50	50	50	50	50
Nominal motor rating (kW)	7	11	15	18	22
Full load current per compressor (A)	20.4	29.4	43.8	54.8	63
Approx. starting current (A)	61	88	110	138	180
Customer fuse rate (A) **	25	40	50	63	80
Cooling air flow per compressor (m ³ /s)	0.8	1	0.5	0.7	1.1
Part Number - 7.5 bar ML (HTM)	4109000100	4109000103	4109000106	4109000109	4109000112
Part Number - 10 bar ML (HTM)	4109000101	4109000104	4109000107	4109000110	4109000113
Part Number - 13 bar ML (HTM)	4109000102	4109000105	4109000108	4109000111	4109000114

* Output flow stated at reference conditions.

** Fuse type aM is recommended, but gG/gL type is also allowed.



Variable Speed Drive - GA VSD+MED Screw - 50Hz

Model Name	GA7 VSD+ MED	GA11 VSD+ MED	GA15 VSD+ MED	GA18 VSD+ MED	GA22 VSD+ MED	GA26 VSD+ MED	GA30 VSD+ MED	GA37 VSD+ MED	GA45VSD+ MED
Output flow (litres/minute) 7 bar, 10 bar and 13 bar variants *	1302/1080/852	1950/1632/1410	2508/2130/1674	3750/3216/2610	4506/3912/3246	5148/4704/3870	5844/5136/4320	6900/6138/5202	9420/8220/6900
Footprint L x W x H (mm)	630/610/1420	630/610/1420	630/610/1420	811/780/1590	811/780/1590	811/780/1590	811/780/1590	811/780/1590	1100/1153/1968
Compressor weight (kg)	193	196	199	367	363	373	396	396	860
Service connection (mm)	28	28	28	28	28	28	28	28	54
Noise level/pump (dB[A])	62	63	64	67	67	67	67	67	67
Max ambient temperature (°C)	46	46	46	46	46	46	46	46	46
Supply voltage (v)	380-460	380-460	380-460	380-460	380-460	380-460	380-460	380-460	380-460
Supply frequency (Hz)	50	50	50	50	50	50	50	50	50
Nominal motor rating (kW) (1900 rpm - 5250 rpm full load)	2.9 - 7.9	2.9 - 12.1	3 - 17.1	5 - 20.1	5.1 - 24	5.5 - 29	5.5 - 34.3	5.4-41.0	8.4-45.5
Full load current per compressor (A)	18.4	24.4	31.4	44	59	59.4	72.5	88.7	98.2
Cooling air flow per compressor (m³/s)	0.8	0.8	0.8	1.3	1.3	1.6	1.6	1.76	50
Part Number - (ISO)	4109004012	4109004014	4109004016	4109004038	4109004040	4109004042	4109004044	4109004046	4109004860
Part Number - (HTM)	4109004851	4109004852	4109004853	4109004854	4109004855	4109004856	4109004857	4109004858	4109004859

* Output flow stated at reference conditions.

Receiver Selection Table

Receiver Capacity (litres)	300	500	1000	1500	2000	3000
Maximum working pressure (bar)	11	11	11	11	11	11
Individual Receiver Dimensions (diameter, height, mm)	500/1750	590/1982	800/2480	900/2872	1000/3075	1200/3548
Receiver Weight (kg)	155	178	380	600	800	1000
Receiver pipe size (mm)	28	28	42	42	42	42
Receiver Part Number	4109500506	4109500507	4109500508	4109500531	4109500509	4109500528
Receiver Accessory Kit *	4109400407	4109400408	4109400409	4109400436	4109400410	4109400434

Receiver Capacity (litres)	300	500	1000	1500	2000	3000
Maximum working pressure (bar)	14	14	14	14	14	14
Individual Receiver Dimensions (diameter, height, mm)	500/1750	590/1982	800/2480	900/2872	1000/3075	1200/3548
Receiver Weight (kg)	155	178	380	600	800	1000
Receiver pipe size (mm)	28	28	42	42	42	42
Receiver Part Number	4109500526	4109500527	4109500524	4109500532	4109500525	4109500529
Receiver Accessory Kit *	4109400430	4109400431	4109400432	4109400437	4109400433	4109400435

* Accessory kit for medical air receiver complete with data plate, pressure safety valve, zero-loss electronic drain valve (with isolation and bypass valve), pressure gauge (with isolation valve), copper inlet and outlet connection pipes (each with isolation valve).

Combined Air Plant Sizing Guide

In HTM02-01, the relative size of receiver capacity and compressor capacity on surgical air or combined medical/surgical air systems changes according to the design flow rate. In order to correctly calculate the receiver capacity and compressor capacity, both the medical and surgical design flow-rates (DF's) are required. It should be noted that for all combined air systems, an additional duplex regulating station (ordered separately) is needed to supply the medical air pipeline.

Surgical Air Compressors	
Design Flow (l/min)	Value 'A' FAD (l)
<500	0.33 x DF
500-3500	0.66 x DF
>3500	0.5 x DF

Table 1: Surgical Air Plant Flow Rate Multiplier Value 'A'

Steps on ordering Air Plant:

1. Determine total flow (l/min) required from dryer outlet and at what pressure (bar)
2. Select dryer model at what outlet pressure (bar)
3. Select compressor model at what outlet pressure (bar)
4. Select vessel(s) size with proper pressure relief valve

Example 1 - Small Day Treatment Centre (Upgrade)

Flow Rate and Dryer Sizing

Medical Air DF = 555 l/min (FAD) (4 Bar)
 Surgical Air DF = 1138 l/min (FAD) (7 Bar)
 Combined/total DF = 1693 l/min (FAD)
 (7 Bar high pressure system)

A dryer greater than 1693 l/min outlet flow should be selected (outlet flow is the inlet flow minus purge losses)

= PMA-M1-10/7 inlet flow 2277 l/min, outlet flow 1913 l/min

Flow Rate and Compressor Sizing

From **Table 1**, surgical air DF is between 500-3500 l/min, so the multiplying factor 'A' = 0.66

Compressor flow rate = Med. DF + (Surg. DF x A)
 = 555 + (1138 x 0.66)
 = 555 + 751
 = 1306 l/min

We also need to add the purge losses to the compressor output. For additional purge consumption use

PMA inlet - PMA outlet = purge losses l/min
 = 2277 - 1913 = 364 l/min

Compressors should be selected with a flow rate greater than 1306 l/min + 364 l/min = 1670 l/min

Example: G15-MED at 2166 l/min (10 bar output), or
 GA15 VSD+ MED at 2130 l/min (10 bar output)

Receiver Sizing

Surgical Air Compressors	
Design Flow (l/min)	Value 'B' Receiver water capacity (l)
<500	1 x 200% x DF
500-2000	2 x 66.6% x DF
2001-3500	2 x 50% x DF
>3500	3 x 33.3% x DF

Table 2: Surgical Air Receiver Multiplier Value 'B'

From **Table 2**, surgical air DF is between 500-2000 l/min, so the multiplying factor 'B' = 2 x 66.6%

Capacity = (Med. DF x 0.5) + (Surg. DF x B)
 = (555 x 0.5) + (1138 x 2 x 0.66)
 = 278 + 1502
 = 1780 litres

A combination of receivers with a minimum number of 2 should be selected.

Selected receiver capacity = 2000 litres (2 x 1000 litre)

Plant System Selection

Selected plant capacity should be above calculated sizing value.

If no standard model is available for selection from the standard range a bespoke configuration of dryer, compressors and receivers are available and can be quoted by our sales and sales support teams.

Plant Ordering Example #1

HTM02-01 Combined Air Plant capable for 1693 l/min, to serve 4 bar for patient and 7 bar for surgical tools, with fixed speed oil-lubricated screw compressors.

Note: Duplex reducing sets are required when dual pipeline systems are supplied by one medical air plant system.

Plant selection:

cAIR-TGF-M1-7-HTM 02-01 50Hz
 (1802 l/min at 7 bar dryer output)

Item	Description	Part No.	Qty
Compressor	G15 MED 10 bar	4109000107	3
Purifier	PMA-M1-10/7	4109004774	1
Receiver	1000L 11 Bar	4109500508	2
Receiver kit	1000L 11 bar kit	4109400409	2

Example 2 - Large District Hospital

Flow Rate and Dryer Sizing

Medical Air DF = 3920 l/min (FAD) (4 Bar)
 Surgical Air DF = 1138 l/min (FAD) (10 Bar)
 Combined/total DF = 5058 l/min (FAD)*
 (10 Bar high pressure system)

*Similar calculations applied as in Example 1

Plant Ordering Example #2

HTM2022 Combined Air Plant capable for 5058 l/min, to serve 4 bar for patient and 10 bar for surgical tools, with variable speed (VSD) oil-lubricated screw compressors.

Note: Duplex reducing sets are required when dual pipeline systems are supplied by one medical air plant system

Plant selection:

cAIR-DGV-L2-10-HTM 2022 50Hz
 (5780 l/min at 10 bar dryer output)

Item	Description	Part No.	Qty
Compressor	GA45 VSD+ -MED 13 bar	4109004860	2
Purifier	PMA-L2-13/10	4109004788	1
Receiver	3000L 14 bar	4109500529	1
Receiver kit	3000L 14 bar kit	4109400435	1

