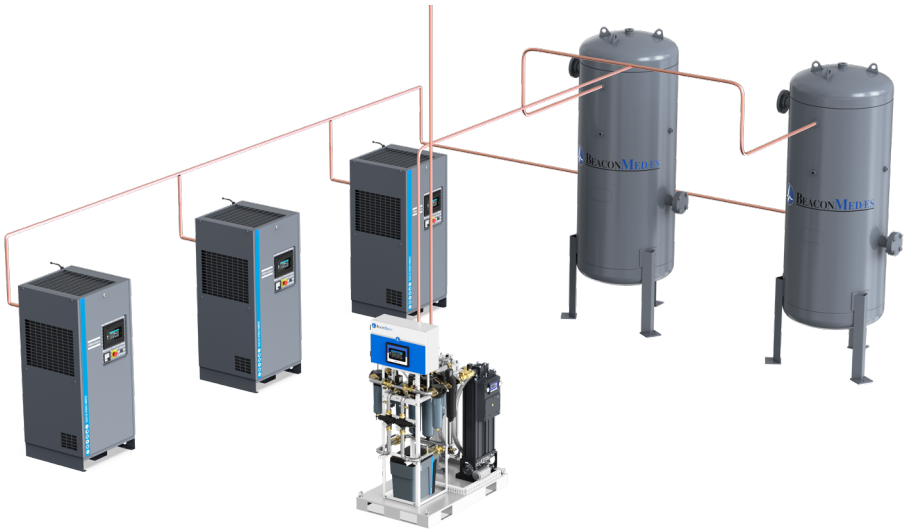
Medical Air Supply System cAIR Combined Air EN ISO 7396-1/HTM 02-01 and HTM2022 EurPh with PMA Medical dryer and Oil Injected Screw Compressors 400 V 50 Hz

Medical Air Supply System



Description

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 duplex air purification modules are CE-marked with approval from a notified body.

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 99.99%, 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 99.97% at MPPS=0.1µm, 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_2O	67 ppm v/v
Dry particulates	Free from visible particulates in a 75 litre sample
Oil (droplet or mist)	0.1 mg/m³
CO	5 ppm v/v
CO_2	500 ppm v/v
SO_2	1 ppm v/v
NO + NO_2	2 ppm v/v
O_2	20.4% - 21.4% 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	≤ 20%
Controllers[1]	MK5s Touch Central controller, two independent dryer controllers
Test point	BS5682
Pressure regulators	Duplex integrated pressure regulators
Connectivity	MyMedGas embedded
Outlet connection	22 mm (S,M)/28 mm (L,XL) copper stub extension
Inlet connection	22 mm (S,M)/28 mm (L,XL) copper stub extension
Voltage/Frequency	230 V/1 phase/50 Hz or 60 Hz; 115 V/1 phase/50 Hz or 60 Hz; one single phase lead for main cubicle
Medical device Certification	MDR Class IIa
Piping material	Stainless steel
Condensate drains	Electronic

1. The MK5s Touch Central Controller is considered as main software.

Dryer Dimensional Data - All types

Platform	S	M	L	XL1	XL2
Length (mm)	1070	1270	1800	1880	2165
Width (mm)	800	800	850	850	900
Hight (mm)	1741	1868	1901	1905	1905
Weight (kg)	293	302	593	850	880

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 Activated carbon	0000066948
PMA OSC Organo clay[1]	0000069349
PMA CO	0000066949
PMA CO+CO_2	0000066950
PMA CO+CO_2+O_2	0000066951
PMA String test	0000069353
Specific voltage for Saudi[2]	0000069350

1. Stronger emulsions: RS Xtend, RS food grade, oil mixtures
2. If need 60 Hz voltage, this option need to be ordered together with PMA machine.

Selection tables

Medical Air Supply System Taxonomy

cAIR	-	TGF	-	M1	-	7	-	HTM0201	50 Hz

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+ QGV - Quadraplex 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.

Medical Air Supply Systems - Typical Combination

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 (50 Hz)									
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 (50 Hz)									
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 (50 Hz)									
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
cAIR-TGV	cAIR-TGV-XL1-7-HTM 2022	7668	GA26 VSD+ MED	3	PMA-XL1-10/7	2000L 14 Bar	2	2000L 14 Bar KIT	2
cAIR-TGV	cAIR-TGV-XL2-7-HTM 2022	7668	GA26 VSD+ MED	3	PMA-XL2-10/7	2000L 14 Bar	2	2000L 14 Bar KIT	2
GAVSD-MED: Combined Air 10 bar - HTM 2022 (50 Hz)									
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
cAIR-QGV	cAIR-QGV-XL1-10-HTM 2022	9390	GA26 VSD+ MED	4	PMA-XL1-13/10	3000L 14 Bar	2	3000L 14 Bar KIT	2
cAIR-QGV	cAIR-QGV-XL2-10-HTM 2022	9390	GA26 VSD+ MED	4	PMA-XL2-13/10	3000L 14 Bar	2	3000L 14 Bar KIT	2
cAIR-TGV	cAIR-TGV-XL1-10-HTM 2022	11580	GA45 VSD+ MED	3	PMA-XL1-13/10	3000L 14 Bar	2	3000L 14 Bar KIT	2
cAIR-TGV	cAIR-TGV-XL2-10-HTM 2022	11580	GA45 VSD+ MED	3	PMA-XL2-13/10	3000L 14 Bar	2	3000L 14 Bar KIT	2
G-MED: Combined Air 7 bar - HTM 02-01 (50 Hz)									
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 (50 Hz)									
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 (50 Hz)									
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
cAIR-QGV	cAIR-QGV-XL1-7-HTM 02-01	7668	GA 26 VSD+ MED	4	PMA-XL1-10/7	2000L 14 Bar	2	2000L 14 Bar ML KIT	2
cAIR-QGV	cAIR-QGV-XL2-7-HTM 02-01	7668	GA 26 VSD+ MED	4	PMA-XL2-10/7	2000L 14 Bar	2	2000L 14 Bar ML KIT	2
GAVSD-MED: Combined Air 10 bar - HTM 02-01 (50 Hz)									
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

Model Name	Model Description	System Design Flow	Compressor Model	Compressor Qty	Dryer Model	Vessel Size	Vessel Qty	Vessel Kit Size	Vessel Kit Qty
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
cAIR-QGV	cAIR-QGV-XL1-10-HTM 02-01	8184	GA 37 VSD+ MED	4	PMA-XL1-13/10	3000L 14 Bar	2	3000L 14 Bar ML KIT	2
cAIR-QGV	cAIR-QGV-XL2-10-HTM 02-01	8184	GA 37 VSD+ MED	4	PMA-XL2-13/10	3000L 14 Bar	2	3000L 14 Bar ML KIT	2
cAIR-QGV	cAIR-QGV-XL1-10-HTM 02-01	11580	GA 45 VSD+ MED	4	PMA-XL1-13/10	3000L 14 Bar	2	3000L 14 Bar ML KIT	2
cAIR-QGV	cAIR-QGV-XL2-10-HTM 02-01	11580	GA 45 VSD+ MED	4	PMA-XL2-13/10	3000L 14 Bar	2	3000L 14 Bar ML KIT	2

Note - This list just shows typical combinations of medical air supply system. The combinations are not released as a package. The compressor, PMA dryer and vessel still need to be ordered via separate part numbers.

Dryer Selection Table

Dryer Taxonomy

PMA	-	M1	-	10	/	7

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

Model Description	Maximum Inlet Pressure (Bar)	Minimum Outlet Pressure (Bar)	Maximum Inlet Flow (l/min)	Maximum Outlet Flow (l/min)	Part Number Without Hopcalite	Part Number With Hopcalite
PMA-S1-7/4	7	4	300	252	4109004760	4109006000
PMA-S2-7/4	7	4	550	462	4109004761	4109006001
PMA-S3-7/4	7	4	859	722	4109004762	4109006002
PMA-S4-7/4	7	4	1150	966	4109004763	4109005785
PMA-M1-7/4	7	4	1650	1386	4109004764	4109006003
PMA-M2-7/4	7	4	2000	1680	4109004765	4109006004
PMA-M3-7/4	7	4	2300	1932	4109004766	4109006005
PMA-L1-7/4	7	4	3300	2772	4109004767	4109006006
PMA-L2-7/4	7	4	4000	3360	4109004768	4109006007
PMA-L3-7/4	7	4	6200	5208	4109004769	4109006008
PMA-XL1-7/4	7	4	8520	7158	4109005095	–
PMA-XL2-7/4	7	4	8520	7158	–	4109005096
PMA-S1-10/7	10	7	414	348	4109004770	4109006009
PMA-S2-10/7	10	7	759	638	4109004771	4109006010
PMA-S3-10/7	10	7	1186	996	4109004772	4109006011
PMA-S4-10/7	10	7	1587	1333	4109004773	4109006012
PMA-M1-10/7	10	7	2277	1913	4109004774	4109006013
PMA-M2-10/7	10	7	2760	2318	4109004775	4109006014
PMA-M3-10/7	10	7	3174	2666	4109004776	4109006015
PMA-L1-10/7	10	7	4554	3825	4109004777	4109006016
PMA-L2-10/7	10	7	5520	4637	4109004778	4109006017
PMA-L3-10/7	10	7	8556	7187	4109004779	4109006018
PMA-XL1-10/7	10	7	11040	9276	4109005107	–
PMA-XL2-10/7	10	7	11040	9276	–	4109005108
PMA-S1-13/10	13	10	525	441	4109004780	4109006019
PMA-S2-13/10	13	10	963	809	4109004781	4109006020
PMA-S3-13/10	13	10	1503	1263	4109004782	4109006021
PMA-S4-13/10	13	10	2013	1691	4109004783	4109006022
PMA-M1-13/10	13	10	2888	2426	4109004784	4109006023
PMA-M2-13/10	13	10	3500	2940	4109004785	4109006024
PMA-M3-13/10	13	10	4025	3381	4109004786	4109006025

Model Description	Maximum Inlet Pressure (Bar)	Minimum Outlet Pressure (Bar)	Maximum Inlet Flow (l/min)	Maximum Outlet Flow (l/min)	Part Number Without Hopcalite	Part Number With Hopcalite
PMA-L1-13/10	13	10	5775	4851	4109004787	4109006026
PMA-L2-13/10	13	10	7000	5880	4109004788	4109006027
PMA-L3-13/10	13	10	10850	9114	4109004789	4109006028
PMA-XL1-13/10	13	10	13980	11742	4109005119	-
PMA-XL2-13/10	13	10	13980	11742	-	4109005120

* PMA-XL1 is equipped with QD+ filter, which does not have hopcalite catalysator. PMA-XL2 is equipped with QDT+ filter, which has hopcalite catalysator.

* The standard inlet temperature condition of PMA is 35°C. If the actual inlet temperature is higher than 35°C, correction factor should be considered.

* The maximum outlet flow is calculated base on 16% purge loss.

Inlet Temperature (°C)	25	30	35	40	45	50
Correction Factor	1	1	1	0.97	0.88	0.73

Compressor Selection Table

Fixed Speed - G MED Screw - 50 Hz

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)	20.6	30.3	45.6	58.5	67.9
Approx. starting current (A)	93	136	205	263	305
Customer fuse rate (A) **	32	50	63	80	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
Part Number - 7.5 bar MOM (HTM)	4109000115	4109000118	4109000121	4109000124	4109000127
Part Number - 10 bar MOM (HTM)	4109000116	4109000119	4109000122	4109000125	4109000128
Part Number - 13 bar MOM (HTM)	4109000117	4109000120	4109000123	4109000126	4109000129

* Output flow stated at reference conditions.

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

Fixed Speed - G MED Screw - 60 Hz

Model Name	G7 MED	G11 MED	G15 MED	G18 MED	G22 MED
Output flow (litres/minute) 100 psi variant	1218	1746	2610	3120	3816
Output flow (litres/minute) 150 psi variant	1014	1458	2094	2634	3318
Output flow (litres/minute) 175 psi variant	786	1200	1800	2286	2922
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])	67	68	72	72	73
Max ambient temperature (Â°C)	46	46	46	46	46
Supply voltage (v)	380	380	380	380	380
Supply frequency (Hz)	60	60	60	60	60
Nominal motor rating (kW)	7.5	11	15	18.5	22
Full load current per compressor (A)	22.3	32.6	47.7	61.2	70.9
Approx. starting current (A)	100	147	215	275	319
Customer fuse rate (A) **	40	50	63	80	80
Cooling air flow per compressor (m³/s)	0.4	0.4	1.1	1.15	1.2
Part Number - 100 psi ML (HTM)	4109000160	4109000163	4109000166	4109000169	4109000172
Part Number - 150 psi ML (HTM)	4109000161	4109000164	4109000167	4109000170	4109000173
Part Number - 175 psi ML (HTM)	4109000162	4109000165	4109000168	4109000171	4109000174
Part Number - 100 psi ASME (HTM)	4109000205	4109000208	4109000211	4109000214	4109000217
Part Number - 150 psi ASME (HTM)	4109000206	4109000209	4109000212	4109000215	4109000218
Part Number - 175 psi ASME (HTM)	4109000207	4109000210	4109000213	4109000216	4109000219

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

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

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
Cooling air flow per compressor (m^3/s)	0.8	0.8	0.8	1.3	1.3	1.6	1.6	1.76	50
Part Number - ML (ISO)	4109004012	4109004014	4109004016	4109004038	4109004040	4109004042	4109004044	4109004046	4109004860
Part Number - ML (HTM)	4109004851**	4109004852**	4109004853	4109004854**	4109003956	4109004856	4109004857**	4109004858**	4109004859**
Part Number - MOM (ISO)	4109004000	4109004002	4109004004	4109004018	4109004020	4109004022	4109004024	4109004026	n/a

* Output flow stated at reference conditions.

** These part numbers have not been released yet. If there is demand, please contact with Wuxi product company.

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 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 Kit *	4109400430	4109400431	4109400432	4109400437	4109400433	4109400435

* Receiver 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 50 Hz
(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 50 Hz
(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

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