

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

SPECIFICATION

Medical Air Supply System



Description and intended use

The Medical Air Supply System is a modular system consisting of oil-free 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), 700 kPa (7 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 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
Oil free compressors	Class 0 oil free solutions for pure medical air, eliminate any risk of oil contamination
Modular design	Modular design simplifies manoeuvrability on site



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 Modules

Compressors shall be Atlas Copco SF MED single-stage oil free scroll compressors suitable for both continuous and frequent start/stop operation at a nominal outlet pressure of 800 kPa (8 bar) or 1000 kPa (10 bar) gauge. Each compressor shall have at least two individual scroll elements. The air quality shall be 100% oil free, certified ISO8573-1 Class 0 by an independent agency. The compressor shall have a sound insulating enclosure. Compressors shall be supplied with an aftercooler with a dedicated quiet running fan to maximise cooling and efficiency. Totally enclosed air-cooled IP55 Class F electric motors, complying with IE3 and Nema Premium efficiency standards shall be used; motors with lower ratings are not acceptable. The compressor shall be fitted with a high-definition colour display controller and electronic zero-loss water drains. The noise level of the compressor shall be maximum 65dB(A). The compressor shall have the following features as required by HTM02-01/HTM2022:

- Ammeter
- Main switch
- Temperature sensor downstream the aftercooler
- Failed-to-go-on-load feedback pressure switch
- Automatic restart after voltage failure

Variable Speed Compressors

Alternatively, compressors shall be Atlas Copco ZT VSD MED twostage oil free rotary tooth compressors fitted with Variable Speed Drive. 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 35% shall be achievable. The compressor shall operate from 400- 1000kPa (4-10 bar) gauge.

The tooth element shall be stainless steel. The air quality shall be 100% oil free, certified ISO8573-1 Class 0 by an independent agency. The compressor shall have a sound insulating canopy. Compressors shall be supplied with an intercooler and aftercooler with a dedicated radial quiet running fan to maximise cooling and efficiency. Minimum IE3/NEMA Premium electric motors shall be used; motors with lower efficiency ratings are not acceptable. The compressor shall be fitted with a high-definition colour display controller, a dry motor coupling requiring no lubrication and electronic zero-loss water drains.

The noise level of the compressor shall be maximum 72dB(A). The compressor shall have the following features as required by

HTM02-01/HTM2022:

- Ammeter
- Main switch
- Temperature sensor downstream the aftercooler
- Failed-to-go-on-load feedback pressure switch
- Automatic restart after voltage failure

Full VSD air plant shall incorporate VSD controllers on all compressors, cycling the lead compressor to ensure even wear as per HTM02-01 requirements.

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

Parameter	Value
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
Height	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.

Options

The dryer is available with the following options.

Description	Part number
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.

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

Selection tables

Medical Air System Taxonomy

cAIR	-	TGF	-	M1	-	7	-	HTM0201	50Hz
Nomenclature		Description							
cAIR	Plant type:								
	cAIR -combined air,								
	mAir - medical air,								
sAir – surgical air									
TSF	Compressor configuration:								
	DSF-Duplex SF MED fixed speed								
	TSF-Triplex SF MED fixed speed								
	QSF-Quadruplex SF MED fixed speed								
	PSF-Pentaplex SF MED fixed speed								
	DZV-Duplex ZT MED VSD								
	TZV-Triplex ZT MED VSD								
	QZV-Quadruplex ZT MED VSD								
	PZV-Pentaplex ZT MED 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. Selection table
Medical Air Supply System - HTM 2022

Model Name	Model Description	System Design Flow	Compressor Model	Compressor Qty	Dryer Model	Vessel Size	Vessel Qty	Vessel Kit Size	Vessel Kit Qty
SF-MED: Medical Air Supply System 4 bar, Fixed Speed Compressors, HTM 2022 (50Hz)									
mAIR-DSF	mAIR-DSF-S1-4-HTM 2022	204	SF-MED2-8 FS	2	PMA-S1-7/4	500L 11 Bar	1	500L 11 Bar KIT	1
mAIR-DSF	mAIR-DSF-S2-4-HTM 2022	462	SF-MED6-8 FS	2	PMA-S2-7/4	500L 11 Bar	1	500L 11 Bar KIT	1
mAIR-DSF	mAIR-DSF-S3-4-HTM 2022	667	SF-MED8-8 FS	2	PMA-S3-7/4	500L 11 Bar	1	500L 11 Bar KIT	1
mAIR-DSF	mAIR-DSF-S4-4-HTM 2022	966	SF-MED11-8 FS	2	PMA-S4-7/4	500L 11 Bar	1	500L 11 Bar KIT	1
mAIR-DSF	mAIR-DSF-M1-4-HTM 2022	1368	SF-MED15-8 FS	2	PMA-M1-7/4	1000L 11 Bar	1	1000L 11 Bar KIT	1
mAIR-DSF	mAIR-DSF-M2-4-HTM 2022	1570	SF-MED17-8 FS	2	PMA-M2-7/4	1000L 11 Bar	1	1000L 11 Bar KIT	1
mAIR-DSF	mAIR-DSF-M3-4-HTM 2022	1932	SF-MED22-8 FS	2	PMA-M3-7/4	1000L 11 Bar	1	1000L 11 Bar KIT	1
mAIR-TSF	mAIR-TSF-L1-4-HTM 2022	2736	SF-MED15-8 FS	3	PMA-L1-7/4	1500L 11 Bar	1	1500L 11 Bar KIT	1
mAIR-TSF	mAIR-TSF-L2-4-HTM 2022	3140	SF-MED17-8 FS	3	PMA-L2-7/4	2000L 11 Bar	1	2000L 11 Bar KIT	1
mAIR-QSF	mAIR-QSF-L3-4-HTM 2022	3904	SF-MED15-8 FS	4	PMA-L3-7/4	2000L 11 Bar	1	2000L 11 Bar KIT	1
mAIR-QSF	mAIR-QSF-L3-4-HTM 2022	4678	SF-MED17-8 FS	4	PMA-L3-7/4	3000L 11 Bar	1	3000L 11 Bar KIT	1
SF-MED: Combined Medical Air Supply System 7 bar, Fixed Speed Compressors, HTM2022 (50Hz)									
cAIR-DSF	cAIR-DSF-S1-7-HTM 2022	288	SF-MED4-10 FS	2	PMA-S1-10/7	500L 11 Bar	1	500L 11 Bar KIT	1
cAIR-DSF	cAIR-DSF-S1-7-HTM 2022	348	SF-MED6-10 FS	2	PMA-S1-10/7	500L 11 Bar	1	500L 11 Bar KIT	1
cAIR-DSF	cAIR-DSF-S2-7-HTM 2022	557	SF-MED8-10 FS	2	PMA-S2-10/7	500L 11 Bar	1	500L 11 Bar KIT	1
cAIR-DSF	cAIR-DSF-S3-7-HTM 2022	710	SF-MED11-10 FS	2	PMA-S3-10/7	500L 11 Bar	1	500L 11 Bar KIT	1
cAIR-DSF	cAIR-DSF-S4-7-HTM 2022	1102	SF-MED15-10 FS	2	PMA-S4-10/7	1000L 11 Bar	1	1000L 11 Bar KIT	1
cAIR-DSF	cAIR-DSF-S4-7-HTM 2022	1156	SF-MED17-10 FS	2	PMA-S4-10/7	1000L 11 Bar	1	1000L 11 Bar KIT	1
cAIR-DSF	cAIR-DSF-M1-7-HTM 2022	1418	SF-MED22-10 FS	2	PMA-M1-10/7	1000L 11 Bar	1	1000L 11 Bar KIT	1
cAIR-TSF	cAIR-TSF-M2-7-HTM 2022	2270	SF-MED15-10 FS	3	PMA-M2-10/7	1500L 11 Bar	1	1500L 11 Bar KIT	1
cAIR-TSF	cAIR-TSF-L1-7-HTM 2022	2835	SF-MED22-10 FS	3	PMA-L1-10/7	1500L 11 Bar	1	1500L 11 Bar KIT	1
ZT-MED: Medical Air Supply System 4 bar, Fixed Speed Compressors - HTM 2022 (50Hz)									
mAIR-DZF	mAIR-DZF-M3-4-HTM 2022	1918	ZT-MED15-7.5 FS	2	PMA-M3-7/4	1000L 11 Bar	1	1000L 11 Bar KIT	1
mAIR-DZF	mAIR-DZF-L1-4-HTM 2022	2388	ZT-MED18-7.5 FS	2	PMA-L1-7/4	1500L 11 Bar	1	1500L 11 Bar KIT	1
mAIR-DZF	mAIR-DZF-L2-4-HTM 2022	2936	ZT-MED22-7.5 FS	2	PMA-L2-7/4	1500L 11 Bar	1	1500L 11 Bar KIT	1
mAIR-DZF	mAIR-DZF-L3-4-HTM 2022	3580	ZT-MED30-7.5 FS	2	PMA-L3-7/4	2000L 11 Bar	1	2000L 11 Bar KIT	1
mAIR-DZF	mAIR-DZF-L3-4-HTM 2022	4720	ZT-MED37-7.5 FS	2	PMA-L3-7/4	3000L 11 Bar	1	3000L 11 Bar KIT	1
ZT-MED: Combined Medical Air Supply System 7 bar, Fixed Speed Compressor - HTM 2022 (50Hz)									
cAIR-DZF	cAIR-DZF-M1-7-HTM 2022	1460	ZT-MED15-10 FS	2	PMA-M1-10/7	1000L 11 Bar	1	1000L 11 Bar KIT	1
cAIR-DZF	cAIR-DZF-M1-7-HTM 2022	1838	ZT-MED18-10 FS	2	PMA-M1-10/7	1000L 11 Bar	1	1000L 11 Bar KIT	1
cAIR-DZF	cAIR-DZF-M2-7-HTM 2022	2294	ZT-MED22-10 FS	2	PMA-M2-10/7	1500L 11 Bar	1	1500L 11 Bar KIT	1
cAIR-TZF	cAIR-TZF-L1-7-HTM 2022	3675	ZT-MED18-10 FS	3	PMA-L1-10/7	2000L 11 Bar	1	2000L 11 Bar KIT	1
cAIR-TZF	cAIR-TZF-L2-7-HTM 2022	4589	ZT-MED22-10 FS	3	PMA-L2-10/7	3000L 11 Bar	1	3000L 11 Bar KIT	1
cAIR-QZF	cAIR-QZF-L3-7-HTM 2022	5237	ZT-MED18-10 FS	4	PMA-L3-10/7	3000L 11 Bar	1	3000L 11 Bar KIT	1
cAIR-QZF	cAIR-QZF-L3-7-HTM 2022	6839	ZT-MED22-10 FS	4	PMA-L3-10/7	2000L 11 Bar	2	2000L 11 Bar KIT	2
ZTVSD-MED: Medical Air Supply System 4 bar, VSD compressors, HTM 2022 (50Hz)									
mAIR-DZV	mAIR-DZV-L1-4-HTM 2022	1884	ZT-MED18-8.6 VSD	2	PMA-L1-7/4	1000L 11 Bar	1	1000L 11 Bar KIT	1
mAIR-DZV	mAIR-DZV-L1-4-HTM 2022	2574	ZT-MED22-8.6 VSD	2	PMA-L1-7/4	1500L 11 Bar	1	1500L 11 Bar KIT	1
mAIR-DZV	mAIR-DZV-L3-4-HTM 2022	3574	ZT-MED30-8.6 VSD	2	PMA-L3-7/4	2000L 11 Bar	1	2000L 11 Bar KIT	1
mAIR-DZV	mAIR-DZV-L3-4-HTM 2022	4714	ZT-MED37-8.6 VSD	2	PMA-L3-7/4	3000L 11 Bar	1	3000L 11 Bar KIT	1
mAIR-DZV	mAIR-DZV-L3-4-HTM 2022	5208	ZT-MED45-8.6 VSD	2	PMA-L3-7/4	3000L 11 Bar	1	3000L 11 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
ZTVSD-MED: Combined Medical Air Supply System 7 bar, VSD compressors, HTM 2022 (50Hz)									
cAIR-DZV	cAIR-DZV-M1-7-HTM 2022	1913	ZT-MED18-10 VSD	2	PMA-M1-10/7	1000L 11 Bar	1	1000L 11 Bar KIT	1
cAIR-DZV	cAIR-DZV-M2-7-HTM 2022	2318	ZT-MED22-10 VSD	2	PMA-M2-10/7	1500L 11 Bar	1	1500L 11 Bar KIT	1
cAIR-TZV	cAIR-TZV-L1-7-HTM 2022	3825	ZT-MED18-10 VSD	3	PMA-L1-10/7	2000L 11 Bar	1	2000L 11 Bar KIT	1
cAIR-TZV	cAIR-TZV-L2-7-HTM 2022	4637	ZT-MED22-10 VSD	3	PMA-L2-10/7	3000L 11 Bar	1	3000L 11 Bar KIT	1
cAIR-QZV	cAIR-QZV-L3-7-HTM 2022	5507	ZT-MED18-10 VSD	4	PMA-L3-10/7	3000L 11 Bar	1	3000L 11 Bar KIT	1
cAIR-QZV	cAIR-QZV-L3-7-HTM 2022	7163	ZT-MED22-10 VSD	4	PMA-L3-10/7	2000L 11 Bar	2	2000L 11 Bar KIT	2

Medical Air Supply Systems. Selection table

Medical Air Supply System - HTM 02-01

Model Name	Model Description	System Design Flow	Compressor Model	Compressor Qty	Dryer Model	Vessel Size	Vessel Qty	Vessel Kit Size	Vessel Kit Qty
SF-MED: Medical Air Supply System 4 bar, Fixed Speed Compressors, HTM 02-01 (50Hz)									
mAIR-TSF	mAIR-TSF-S1-4-HTM 02-01	204	SF-MED2-8 FS	3	PMA-S1-7/4	500L 11 Bar	1	500L 11 Bar KIT	1
mAIR-TSF	mAIR-TSF-S3-4-HTM 02-01	451	SF-MED6-8 FS	3	PMA-S3-7/4	500L 11 Bar	1	500L 11 Bar KIT	1
mAIR-TSF	mAIR-TSF-S3-4-HTM 02-01	667	SF-MED8-8 FS	3	PMA-S3-7/4	500L 11 Bar	2	500L 11 Bar KIT	2
mAIR-TSF	mAIR-TSF-M1-4-HTM 02-01	1002	SF-MED11-8 FS	3	PMA-M1-7/4	500L 11 Bar	2	500L 11 Bar KIT	2
mAIR-TSF	mAIR-TSF-M1-4-HTM 02-01	1368	SF-MED15-8 FS	3	PMA-M1-7/4	500L 11 Bar	2	500L 11 Bar KIT	2
mAIR-TSF	mAIR-TSF-M2-4-HTM 02-01	1570	SF-MED17-8 FS	3	PMA-M2-7/4	500L 11 Bar	2	500L 11 Bar KIT	2
mAIR-TSF	mAIR-TSF-M3-4-HTM 02-01	1932	SF-MED22-8 FS	3	PMA-M3-7/4	500L 11 Bar	2	500L 11 Bar KIT	2
mAIR-QSF	mAIR-QSF-L1-4-HTM 02-01	2736	SF-MED15-8 FS	4	PMA-L1-7/4	1000L 11 Bar	2	1000L 11 Bar KIT	2
mAIR-QSF	mAIR-QSF-L2-4-HTM 02-01	3140	SF-MED17-8 FS	4	PMA-L2-7/4	1000L 11 Bar	2	1000L 11 Bar KIT	2
mAIR-PSF	mAIR-PSF-L3-4-HTM 02-01	3904	SF-MED15-8 FS	5	PMA-L3-7/4	1000L 11 Bar	2	1000L 11 Bar KIT	2
mAIR-PSF	mAIR-PSF-L3-4-HTM 02-01	4678	SF-MED17-8 FS	5	PMA-L3-7/4	1500L 11 Bar	2	1500L 11 Bar KIT	2
SF-MED: Combined Medical Air Supply System 7 bar, Fixed Speed Compressors, HTM 02-01 (50Hz)									
cAIR-TSF	cAIR-TSF-S1-7-HTM 02-01	288	SF-MED4-10 FS	3	PMA-S1-10/7	500L 11 Bar	1	500L 11 Bar KIT	1
cAIR-TSF	cAIR-TSF-S1-7-HTM 02-01	348	SF-MED6-10 FS	3	PMA-S1-10/7	500L 11 Bar	1	500L 11 Bar KIT	1
cAIR-TSF	cAIR-TSF-S2-7-HTM 02-01	557	SF-MED8-10 FS	3	PMA-S2-10/7	500L 11 Bar	2	500L 11 Bar KIT	2
cAIR-TSF	cAIR-TSF-S3-7-HTM 02-01	710	SF-MED11-10 FS	3	PMA-S3-10/7	500L 11 Bar	2	500L 11 Bar KIT	2
cAIR-TSF	cAIR-TSF-S3-7-HTM 02-01	996	SF-MED15-10 FS	3	PMA-S3-10/7	500L 11 Bar	2	500L 11 Bar KIT	2
cAIR-TSF	cAIR-TSF-S4-7-HTM 02-01	1156	SF-MED17-10 FS	3	PMA-S4-10/7	500L 11 Bar	2	500L 11 Bar KIT	2
cAIR-QSF	cAIR-QSF-M1-7-HTM 02-01	1436	SF-MED11-10 FS	4	PMA-M1-10/7	500L 11 Bar	2	500L 11 Bar KIT	2
cAIR-QSF	cAIR-QSF-M2-7-HTM 02-01	2270	SF-MED15-10 FS	4	PMA-M2-10/7	1000L 11 Bar	2	1000L 11 Bar KIT	2
cAIR-QSF	cAIR-QSF-L1-7-HTM 02-01	2835	SF-MED22-10 FS	4	PMA-L1-10/7	1000L 11 Bar	2	1000L 11 Bar KIT	2
ZT-MED: Medical Air Supply System 4 bar, Fixed Speed Compressors - HTM 02-01 (50Hz)									
mAIR-TZF	mAIR-TZF-M3-4-HTM 02-01	1918	ZT-MED15-7.5 FS	3	PMA-M3-7/4	500L 11 Bar	2	500L 11 Bar KIT	2
mAIR-TZF	mAIR-TZF-L1-4-HTM 02-01	2388	ZT-MED18-7.5 FS	3	PMA-L1-7/4	1000L 11 Bar	2	1000L 11 Bar KIT	2
mAIR-TZF	mAIR-TZF-L2-4-HTM 02-01	2936	ZT-MED22-7.5 FS	3	PMA-L2-7/4	1000L 11 Bar	2	1000L 11 Bar KIT	2
mAIR-TZF	mAIR-TZF-L3-4-HTM 02-01	3580	ZT-MED30-7.5 FS	3	PMA-L3-7/4	1500L 11 Bar	2	1500L 11 Bar KIT	2
mAIR-TZF	mAIR-TZF-L3-4-HTM 02-01	4720	ZT-MED37-7.5 FS	3	PMA-L3-7/4	1500L 11 Bar	2	1500L 11 Bar 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
ZT-MED: Combined Medical Air Supply System 7 bar, Fixed Speed Compressors - HTM 02-01 (50Hz)									
cAIR-TZF	cAIR-TZF-M1-7-HTM 02-01	1460	ZT-MED15-10 FS	3	PMA-M1-10/7	500L 11 Bar	2	500L 11 Bar KIT	2
cAIR-TZF	cAIR-TZF-M1-7-HTM 02-01	1838	ZT-MED18-10 FS	3	PMA-M1-10/7	500L 11 Bar	2	500L 11 Bar KIT	2
cAIR-TZF	cAIR-TZF-M2-7-HTM 02-01	2294	ZT-MED22-10 FS	3	PMA-M2-10/7	1000L 11 Bar	2	1000L 11 Bar KIT	2
cAIR-QZF	cAIR-QZF-L1-7-HTM 02-01	3675	ZT-MED18-10 FS	3	PMA-L1-10/7	1000L 11 Bar	2	1000L 11 Bar KIT	2
cAIR-QZF	cAIR-QZF-L2-7-HTM 02-01	4589	ZT-MED22-10 FS	3	PMA-L2-10/7	1500L 11 Bar	2	1500L 11 Bar KIT	2
cAIR-PZF	cAIR-PZF-L3-7-HTM 02-01	5237	ZT-MED18-10 FS	5	PMA-L3-10/7	1500L 11 Bar	2	1500L 11 Bar KIT	2
cAIR-PZF	cAIR-PZF-L3-7-HTM 02-01	6839	ZT-MED22-10 FS	5	PMA-L3-10/7	2000L 11 Bar	2	2000L 11 Bar KIT	2
ZTVSD-MED: Medical Air Supply System 4 bar, VSD compressors, HTM 02-01 (50Hz)									
mAIR-TZV	mAIR-TZV-L1-4-HTM 02-01	1884	ZT-MED18-8.6 VSD	3	PMA-L1-7/4	500L 11 Bar	2	500L 11 Bar KIT	2
mAIR-TZV	mAIR-TZV-L1-4-HTM 02-01	2574	ZT-MED22-8.6 VSD	3	PMA-L1-7/4	1000L 11 Bar	2	1000L 11 Bar KIT	2
mAIR-TZV	mAIR-TZV-L2-4-HTM 02-01	3360	ZT-MED30-8.6 VSD	3	PMA-L2-7/4	1000L 11 Bar	2	1000L 11 Bar KIT	2
mAIR-TZV	mAIR-TZV-L3-4-HTM 02-01	4714	ZT-MED37-8.6 VSD	3	PMA-L3-7/4	1500L 11 Bar	2	1500L 11 Bar KIT	2
mAIR-TZV	mAIR-TZV-L3-4-HTM 02-01	5208	ZT-MED45-8.6 VSD	3	PMA-L3-7/4	1500L 11 Bar	2	1500L 11 Bar KIT	2
ZTVSD-MED: Combined Medical Air Supply System 7 bar, VSD compressors, HTM 02-01 (50Hz)									
cAIR-TZV	cAIR-TZV-M1-7-HTM 02-01	1913	ZT-MED18-10 VSD	3	PMA-M1-10/7	500L 11 Bar	2	500L 11 Bar KIT	2
cAIR-TZV	cAIR-TZV-M2-7-HTM 02-01	2318	ZT-MED22-10 VSD	3	PMA-M2-10/7	1000L 11 Bar	2	1000L 11 Bar KIT	2
cAIR-QZV	cAIR-QZV-L1-7-HTM 02-01	3825	ZT-MED18-10 VSD	3	PMA-L1-10/7	1000L 11 Bar	2	1000L 11 Bar KIT	2
cAIR-QZV	cAIR-QZV-L2-7-HTM 02-01	4637	ZT-MED22-10 VSD	3	PMA-L2-10/7	1500L 11 Bar	2	1500L 11 Bar KIT	2
cAIR-PZV	cAIR-PZV-L3-7-HTM 02-01	5507	ZT-MED18-10 VSD	3	PMA-L3-10/7	1500L 11 Bar	2	1500L 11 Bar KIT	2
cAIR-PZV	cAIR-PZV-L3-7-HTM 02-01	7163	ZT-MED22-10 VSD	5	PMA-L3-10/7	2000L 11 Bar	2	2000L 11 Bar 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	Maximum Inlet Pressure (Bar)	Minimum Outlet Pressure (Bar)	Maximum Inlet Flow (l/min)	Maximum Outlet Flow (l/min)	Part Number
PMA-S1-7/4	7	4	300	252	4109004760
PMA-S2-7/4	7	4	550	462	4109004761
PMA-S3-7/4	7	4	859	722	4109004762
PMA-S4-7/4	7	4	1150	966	4109004763
PMA-M1-7/4	7	4	1650	1386	4109004764
PMA-M2-7/4	7	4	2000	1680	4109004765
PMA-M3-7/4	7	4	2300	1932	4109004766
PMA-L1-7/4	7	4	3300	2772	4109004767
PMA-L2-7/4	7	4	4000	3360	4109004768
PMA-L3-7/4	7	4	6200	5208	4109004769
PMA-S1-10/7	10	7	414	348	4109004770
PMA-S2-10/7	10	7	759	638	4109004771
PMA-S3-10/7	10	7	1186	996	4109004772
PMA-S4-10/7	10	7	1587	1333	4109004773
PMA-M1-10/7	10	7	2277	1913	4109004774
PMA-M2-10/7	10	7	2760	2318	4109004775
PMA-M3-10/7	10	7	3174	2666	4109004776
PMA-L1-10/7	10	7	4554	3825	4109004777
PMA-L2-10/7	10	7	5520	4637	4109004778
PMA-L3-10/7	10	7	8556	7187	4109004779
PMA-S1-13/10	13	10	525	441	4109004780
PMA-S2-13/10	13	10	963	809	4109004781
PMA-S3-13/10	13	10	1503	1263	4109004782
PMA-S4-13/10	13	10	2013	1691	4109004783
PMA-M1-13/10	13	10	2888	2426	4109004784
PMA-M2-13/10	13	10	3500	2940	4109004785
PMA-M3-13/10	13	10	4025	3381	4109004786
PMA-L1-13/10	13	10	5775	4851	4109004787
PMA-L2-13/10	13	10	7000	5880	4109004788
PMA-L3-13/10	13	10	10850	9114	4109004789



Compressor Selection Table
Fixed Speed -SF-MED - 50Hz

Model Name	SF2 MED	SF4 MED	SF6 MED	SF8+ MED	SF11+ MED	SF15+ MED	SF17+ MED	SF22+ MED
Output flow (litres/minute) 8 bar variant *	252	402	588	804	1266	1632	1890	2466
Output flow (litres/minute) 10 bar variant *	204	354	456	678	900	1356	1410	1782
Footprint L x W x H (mm)	750 X 640 X 835	750 X 640 X 835	750 X 640 X 835	1628 X 750 X 1230	1628 X 750 X 1230	1628 X 750 X 1844	1628 X 750 X 1844	1628 X 750 X 1844
Compressor weight (kg)	110	124	144	372	418	580	573	687
Service connection (mm)	15	15	15	28	28	28	28	28
Noise level/pump (dB[A])	55	57	59	63	63	63	64	65
Max ambient temperature (°C)	46	46	46	46	46	46	46	46
Supply voltage (v)	400	400	400	400	400	400	400	400
Supply frequency (Hz)	50	50	50	50	50	50	50	50
Nominal motor rating (kW)	2.2	3.7	5.5	7.4	11	14.8	16.5	22
Full load current per compressor (A)	3.6	7.2	10.8	17.7	22.5	35	38	50
Part Number - 8 bar (ISO)	4109004096	4109004098	4109004100	4109004862	4109004864	4109004866	4109004868	4109004870
Part Number - 10 bar (ISO)	4109004097	4109004099	4109004101	4109004863	4109004865	4109004867	4109004869	4109004871
Part Number - 8 bar (HTM)	4109004892	4109004894	4109004896	4109004898	4109004900	4109004902	4109004904	4109004906
Part Number - 10 bar (HTM)	4109004893	4109004895	4109004897	4109004899	4109004901	4109004903	4109004905	4109004907

* Output flow stated at reference conditions.

Variable Speed Drive - ZT VSD-MED - 50Hz

Model Name	ZT18 VSD MED	ZT22 VSD MED	ZT30 VSD MED	ZT37 VSD MED	ZT45 VSD MED	ZT55 VSD MED
Output flow (litres/minute) 8 bar variants *	n/a	n/a	2472-4746	2472-5706	2466-6762	2484-8328
Output flow (litres/minute) 10 bar variants *	1182-2292	1182-2844	n/a	n/a	n/a	n/a
Footprint L x W x H (mm)	2195 X 1026 X 1621	2195 X 1026 X 1621	2440 X 1026 X 1880	2440 X 1026 X 1880	2440 X 1026 X 1880	2440 X 1026 X 1880
Compressor weight (kg)	1127	1120	1400	1430	1481	1485
Service connection (mm)	42	42	42	42	42	42
Noise level/pump (dB[A])	72	72	74	74	75	75
Max ambient temperature (°C)	46	46	46	46	46	46
Supply voltage (v)	380	380	380	380	380	380
Supply frequency (Hz)	50	50	50	50	50	50
Nominal motor rating (kW)	18	22	30	37	45	55
Full load current per compressor (A)	32.5	39.7	54.1	66.8	81.2	99.2
Part Number - 8.6 bar (ISO)	n/a	n/a	4109004153	4109004154	4109004155	4109004156
Part Number - 10 bar (ISO)	4109004151	4109004152	n/a	n/a	n/a	n/a
Part Number - 8.6 bar (HTM)	n/a	n/a	4109004960	4109004961	4109004962	4109004963
Part Number - 10 bar (HTM)	4109004958	4109004959	n/a	n/a	n/a	n/a

* Output flow stated at reference conditions.

Fixed Speed - ZT-MED - 50Hz

Model Name	ZT15 MED	ZT18 MED	ZT22 MED	ZT30 MED	ZT37 MED	ZT45 MED
Output flow (litres/minute) 7.5 bar variant *	2286	2916	3576	4572	5712	6840
Output flow (litres/minute) 8.6 bar variant *	2130	2784	3240	4230	5460	6534
Output flow (litres/minute) 10 bar variant *	1824	2202	2736	n/a	n/a	n/a
Footprint L x W x H (mm)	1760 X 1026 X 1621	1760 X 1026 X 1621	1760 X 1026 X 1621	2005 X 1026 X 1880	2005 X 1026 X 1880	2005 X 1026 X 1880
Compressor weight (kg)	1025	1050	1065	1280	1355	1385
Service connection (mm)	42	42	42	42	42	42
Noise level/pump (dB[A])	68	70	72	69	71	73
Max ambient temperature (°C)	46	46	46	46	46	46
Supply voltage (v)	400	400	400	400	400	400
Supply frequency (Hz)	50	50	50	50	50	50
Nominal motor rating (kW)	15	18	22	30	37	45
Full load current per compressor (A)	27.1	32.5	39.7	54.1	66.8	81.2
Part Number - 7.5 bar (ISO)	4109004121	4109004124	4109004127	4109004139	4109004141	4109004143
Part Number - 8.6 bar (ISO)	4109004122	4109004125	4109004128	4109004140	4109004142	4109004144
Part Number - 10 bar (ISO)	4109004123	4109004126	4109004129	n/a	n/a	n/a
Part Number - 7.5 bar (HTM)	4109004970	4109004973	4109004976	4109004979	4109004981	4109004983
Part Number - 8.6 bar (HTM)	4109004971	4109004974	4109004977	4109004980	4109004982	4109004984
Part Number - 10 bar (HTM)	4109004972	4109004975	4109004978	n/a	n/a	n/a

* 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

