

Instrument Air Modular Systems Duplex-Triplex (10 - 30 Hp)

SPECIFICATION

Modular System Design

The Instrument Air system is a modular base mounted design consisting of two or three oil injected rotary screw compressor modules with variable speed drive, an air purification module with central controller, an air receiver module, and a condensate management unit. Each module and the complete system are fully compliant with the latest edition of NFPA 99.

Compressor Module

Each compressor module includes the compressor, drive motor with variable speed drive, oil system, and a compressor control system.

- Compressors are air-cooled and fully enclosed in sound-insulated steel panels with full access doors for maintenance and inspection.
- The compressors are single-stage, oil-injected rotary screw compressors suitable for continuous operation at a nominal outlet pressure of 13 bar (188 psig).

Interior Permanent Magnet Motor

The motor is an interior-type permanent magnet (IPM) synchronous motor.

- The oil cooled, IP66 (NEMA4X) high efficiency motor exceeds the IE4 efficiency threshold.
- Fully enclosed, oil-cooled drivetrain, one oil circuit for motor, element, and bearings.

Element

The element features asymmetric profile male and female rotors, designed for optimal combination of maximized free air delivery with low power consumption.

- Direct drive motor drives the male rotor of the element directly, allows for a pressure tight drive train through which the oil flows from the motor to the element.
- Vertical arrangement of compressor element and direct drive motor to minimize footprint.

Sentinel Valve

Intake is equipped with an air intake filter and integral Sentinel inlet valve, a mechanical polymer valve. With no unloader, the element remains under pressure with no loss of energy.

Oil Separation

A high efficiency 2-step air-oil separator system capable of achieving 2ppm oil carry over is fitted to minimize contamination and maintenance. The oil filter cleans the oil continuously from particles bigger than 25 micron with 99% efficiency.

Electronic Drain

Electronic no-loss water drain with integrated manual drain for efficient removal of condensate without loss of compressed air.

Axial Fan

Compressors are supplied with a block and fin style cooler with a dedicated quiet running fan with biomimetic, serrated fan blades to maximize cooling and efficiency.

Compressor Controller

High-tech compressor controller with warning indications, compressor shut-down and maintenance scheduling.

- High-definition color touch screen with clear pictograms
- Standard medical features include automatic restart after voltage failure and emergency forced local control

Variable Speed Drive (VSD)

Standard on each compressor, by including AC-DC converter, along with associated control hardware and software, the VSD enables the compressor to match its running speed with the flow demand required by the hospital. The compressor operates from 4-13 bar gauge (58-188 psig).

- Dedicated drive for iPM technology motors
- Heat dissipation of inverter in separate compartment

Air Purification Module

The duplexed air purification module is duplexed such that any single functional component failure does not affect the integrity of the instrument air supply. All components are factory piped and wired in accordance with NFPA 99. Each desiccant dryer is individually sized for peak calculated demand and capable of producing a -40°F (-40°C) pressure dew point.

Control System

The mounted and wired central control system is rated for 115V single phase electrical service with the following features:

- Automatic alternation of all compressors based on a first-on/first-off principle with provisions for simultaneous operation if required, with rotation of the lead compressor to maximize life and ensure even wear.
- Visual and audible reserve unit alarm with isolated contacts for remote alarm.
- An intelligent human machine interface incorporating on board flash memory and real-time clock for recording operational parameters in the built-in event log.
- User friendly high-definition color display with clear pictograms and LED indicators, providing easy access to system operational information.
- Control system consists of a main controller and two independent dryer controllers to ensure the unit will continue to operate in the event of a control system malfunction.

Dryer/Filter System

The duplexed filter and dryer module incorporates high efficiency water separators, oil coalescing filters, heatless regenerative desiccant dryers, activated carbon filters, and particle filters.

- Highly efficient Nautilus UD+ coalescing filter on the inlet to remove solid particles, liquid water and oil aerosol. Two-in-one design reduces installation space and pressure drop compared to conventional two filter configuration. Mass efficiency of 99.99%, tested according to ISO 8573-2 and ISO 12500-1.
- Activated carbon tower removes oil vapors through adsorption, with maximum remaining oil content of 0.003 mg/m³, tested according to ISO 8573-5 & ISO 12500-2.
- High efficiency PDP+ particle filter on the outlet for dust protection, with particle count efficiency of 99.98% at MPPS=0.06µm, tested according to ISO 12500-3.
- Compact extruded aluminum dryer towers with top loading desiccant cartridges and externally fitted silencers for ease of service.

Dryer Purge Control

Dryer purge flow is minimized through an integral demand-based purge saving control system, Purge Saver Energy Management, that freezes the regeneration of the desiccant once adequate dew point is reached in the inactive tower. The drying towers switch only when the dewpoint level in the active tower deteriorates to an unacceptable level.

Dew Point Monitoring

The dryer incorporates a dew point hygrometer that is mounted, pre-piped, and wired with an accuracy of $\pm 3^{\circ}\text{C}$ in the range 20 to -100°C pressure dew point and 4-20mA analog output.

- High dew point condition triggers on the dryer control panel if the dew point exceeds -30°C pressure set point, indicated with visual and audible alarm.
- Voltage free contacts enable the connection of dew point alarm signal to the medical gas master alarm.
- Remotely connected hygrometer downstream of the dryer via micro-bore tube enables periodic calibration of the dew point sensor element.

Zero Loss Electronic Drains

Provided for each water separator and high efficiency oil coalescing filter, the zero loss electronic water drains are mounted to the package and remove moisture efficiently with no compressed air losses.

Air Receiver Module

Corrosion resistant, ASME Coded, National Board Certified vertical air receiver rated for minimum 250 PSIG design pressure. The air receiver assembly includes:

- Zero loss electronic drain valve, liquid level gauge glass, safety relief valve, and manual drain valve
- Piped 3-valve bypass assembly with flange-fitted valves
- Pressure gauge

Condensate Management

The OSC range uses patented technology to separate compressed air condensate.

- The multi-stage separation process, with buoyant oleophilic filters and activated carbon, ensure exceptional performance
- Outlet oil content of 15 ppm



- 1 Compact Compressor Footprint:** Innovative vertical arrangement of compressor element and drive motor minimize footprint, reducing valuable floor space required.
- 2 State of the Art Compressor Motor:** Interior Permanent Magnet Motor (iPM) high efficiency at 94.5%, exceeds IE3 and NEMA premium efficiency. Fully enclosed direct drive, one oil circuit for motor, element, and bearings, eliminates the need for cooling air.
- 3 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.
- 4 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 ISO 8573-1 Air Quality of 1.2.1.
- 5 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.
- 6 Ease of Service:** The top loading desiccant cartridges and externally fitted components make servicing the air purification package quick with easy access for all service parts.
- 7 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 run hours on the compressors and dryers.
- 8 Zero Loss Electronic Drains:** Standard within the complete system, efficiently removing moisture without losing compressed air.

Instrument Air Specifications

INSTRUMENT AIR SPECIFICATIONS ¹											
System Model No.	HP	Capacity FAD ² (CFM)	System ³ BTU/HR	Receiver (gallons)	Noise Level ⁴	System FLA	Compressor FLA (each)	System Weight (lbs)			
						460	460	Compressor Module ⁵	Air Purification	Receiver	OSC
DUPLEX SYSTEMS											
IAM07D-200V-D	10	15.5-30.1	22,900	200	62	38.3	18.5	459	485	545	31
IAM11D-200V-D	15	16.1-49.8	34,350	200	63	50.3	24.5	466	530	545	31
IAM15D-200V-D	20	15.5-59.1	45,800	200	64	64.3	31.5	472	530	545	31
IAM18D-400V-D	25	34.4-91.1	57,250	400	67	90.1	44.4	854	706	826	31
IAM22D-400V-D	30	35.7-113.2	68,700	400	67	120.1	29.4	854	706	826	33
TRIPLEX SYSTEMS											
IAM07T-200V-T	10	15.5-60.2	45,800	200	62	56.8	18.5	459	530	545	31
IAM11T-240V-T	15	16.1-99.6	68,700	240	63	74.8	24.5	466	706	700	33
IAM15T-240V-T	20	15.5-118.2	91,600	240	64	95.8	31.5	472	706	700	33
IAM18T-400V-T	25	34.4-182.2	114,500	400	67	134.5	44.4	854	1125	826	55
IAM22T-400V-T	30	35.7-226.4	137,400	400	67	179.5	59.4	854	1125	826	55

1. Normal operating conditions at a maximum ambient of 105°F. Consult factory for higher ambient conditions.
2. All capacities shown as compressor capacities (reserve compressor on standby). Reference conditions: absolute inlet pressure 1 bar (14.5 psi); intake air temperature 20°C (68°F); 13 bar (189 psi) max. working pressure. NOTE: System delivery pressure is per table 5.1.11, NPFA 99 2018 edition. System capacity does not account for losses due to dryer or other system losses.
3. All system BTU/HR are shown with reserve compressor on standby.
4. All noise levels are shown in dB(A) and reflect one compressor running.
5. Module weight represents one compressor module.

Instrument Air Grouping

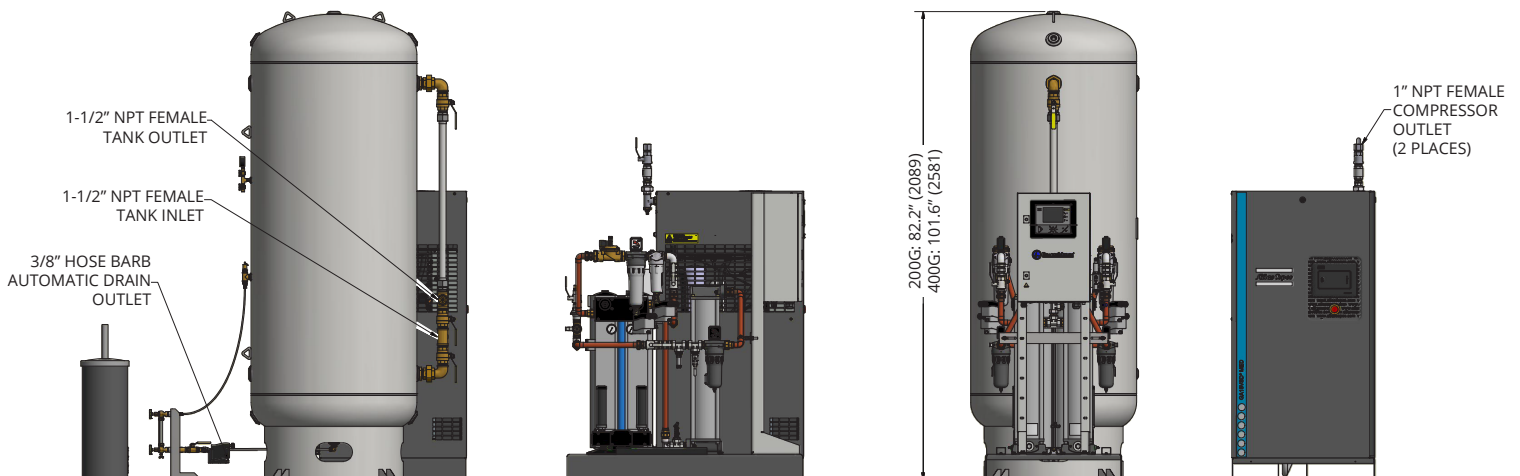
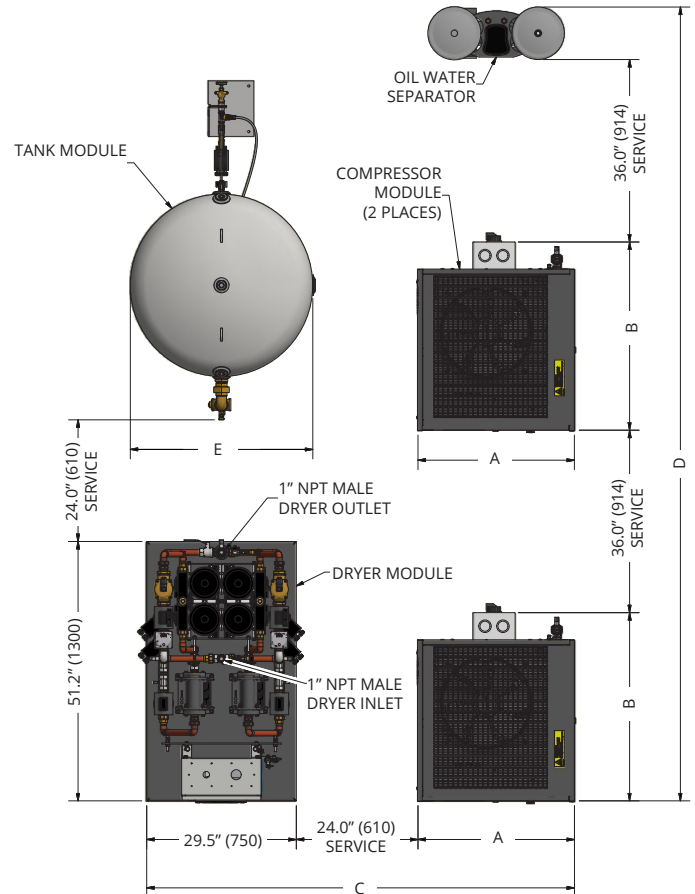
INSTRUMENT AIR SPECIFICATIONS ¹					
System Model No.	Compressor Type	Air Purification Type	Receiver	Condensate	Accessory Kit
DUPLEX SYSTEMS					
IAM07D-200V-D	GA7VSD+ MED NFPA	dMED 25 NFPA	200G	OSC 95	(2) 1" Flex Hose, (2) Sets Vibration Isolators
IAM11D-200V-D	GA11VSD+ MED NFPA	dMED 35 NFPA	200G	OSC 95	
IAM15D-200V-D	GA15VSD+ MED NFPA	dMED 35 NFPA	200G	OSC 95	
IAM18D-400V-D	GA18VSD+ MED NFPA	dMED 75 NFPA	400G	OSC 95	
IAM22D-400V-D	GA22VSD+ MED NFPA	dMED 75 NFPA	400G	OSC 145	
TRIPLEX SYSTEMS					
IAM07T-200V-T	GA7VSD+ MED NFPA	dMED 35 NFPA	200G	OSC 95	(3) 1" Flex Hose, (3) Sets Vibration Isolators
IAM11T-240V-T	GA11VSD+ MED NFPA	dMED 75 NFPA	240G	OSC 145	
IAM15T-240V-T	GA15VSD+ MED NFPA	dMED 75 NFPA	240G	OSC 145	
IAM18T-400V-T	GA18VSD+ MED NFPA	dMED 110 NFPA	400G	OSC 355	
IAM22T-400V-T	GA22VSD+ MED NFPA	dMED 150 NFPA	400G	OSC 355	

Instrument Air - Duplex Arrangement

System	A	B	C	D	E
IAM07D-200V-D	24.8"	29.3"	78.2"	138.4"	30.0"
IAM11D-200V-D	24.8"	29.3"	78.2"	138.4"	30.0"
IAM15D-200V-D	24.8"	29.3"	78.2"	138.4"	30.0"
IAM18D-400V-D	30.9"	37.2"	84.4"	156.6"	36.0"
IAM22D-400V-D	30.9"	37.2"	84.4"	156.6"	36.0"

Notes:

1. This is a modular system, bring high voltage power to each compressor (2 places) and 120V power to the central control panel and receiver drain.
2. Flexible discharge connections ship loose.
3. No special foundation or inertia pad is required (housekeeping pad is optional). No vibration pads are necessary.
4. Additional drawings/diagrams available for download at www.beaconmedaes.com.
5. Consult manuals shipped with each system for pertinent installation details.



Instrument Air - Triplex Arrangement

System	A	B	C	D
IAM07T-200V-T	82.0"	51.2"	24.8"	29.2"
IAM11T-240V-T	94.1"	51.2"	24.8"	29.2"
IAM15T-240V-T	94.1"	51.2"	24.8"	29.2"
IAM18T-400V-T	101.6"	51.2"	30.9"	37.2"
IAM22T-400V-T	101.6"	63"	30.9"	37.2"

System	E	F	G
IAM07T-200V-T	30"	77.9"	205.8"
IAM11T-240V-T	30"	77.9"	205.8"
IAM15T-240V-T	30"	77.9"	205.8"
IAM18T-400V-T	36"	84.4"	239.7"
IAM22T-400V-T	36"	84.4"	239.7"

Notes:

1. This is a modular system, bring high voltage power to each compressor (3 places) and 120V power to the central control panel and receiver drain.
2. Flexible discharge connections ship loose.
3. No special foundation or inertia pad is required (housekeeping pad is optional). No vibration pads are necessary.
4. Additional drawings/diagrams available for download at www.beaconmedaes.com.
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