

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

### **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 meets the IE5 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.

#### *Intelligent No-Loss Drain*

Electronic no-loss water drain with integrated manual drain for efficient removal of condensate without loss of compressed air. Tracks drain cycles and maintenance schedules and can detect and reports issues.

#### *Axial Fan*

Compressors are supplied with a block and fin style cooler with a dedicated quiet running fan with 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 CERADES 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.
- High efficiency QD+ activated carbon filter removes oil vapors through adsorption, with maximum remaining oil content of 0.003 mg/m<sup>3</sup>, 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:** Ferrite-Assisted Synchronous Reluctance motor, high efficiency at 94.6%, meets IE5 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 NEOS NEXT 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 ISO8573-1 Air Quality of 1.2.1.
- 5 Long Life Desiccant:** The CERADES ceramic desiccant material is able to absorb large amounts of water vapor and has an extended service interval of 7 years.
- 6 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.
- 7 Advanced Medical Controls:** The advanced master controller monitors and controls both the compressor 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 compressor and dryers.
- 8 Zero Loss Electronic Drains:** Standard within the complete system, efficiently removing moisture without losing compressed air.

### Instrument Air Specifications

| INSTRUMENT AIR SPECIFICATIONS¹ |    |                     |                |                    |              |            |                       |                     |                  |          |     |
|--------------------------------|----|---------------------|----------------|--------------------|--------------|------------|-----------------------|---------------------|------------------|----------|-----|
| System Model No.               | HP | Capacity FAD² (CFM) | System³ BTU/HR | Receiver (gallons) | Noise Level⁴ | System FLA | Compressor FLA (each) | System Weight (lbs) |                  |          |     |
|                                |    |                     |                |                    |              | 460        | 460                   | Compressor Module⁵  | Air Purification | Receiver | OSC |
| DUPLEX SYSTEMS                 |    |                     |                |                    |              |            |                       |                     |                  |          |     |
| IAM07D-200V-D                  | 10 | 12.3-31.1           | 22,900         | 200                | 62           | 38.3       | 18.5                  | 496                 | 645              | 545      | 31  |
| IAM11D-200V-D                  | 15 | 13.3-56.4           | 34,350         | 200                | 67           | 50.3       | 24.5                  | 858                 | 645              | 545      | 31  |
| IAM15D-200V-D                  | 20 | 13.3-68.6           | 45,800         | 200                | 69           | 64.3       | 31.5                  | 520                 | 645              | 545      | 31  |
| IAM18D-400V-D                  | 25 | 5.6-94.7            | 57,250         | 400                | 69           | 90.1       | 44.4                  | 686                 | 700              | 826      | 31  |
| IAM22D-400V-D                  | 30 | 33.2-119.2          | 68,700         | 400                | 63           | 120.1      | 59.4                  | 854                 | 700              | 826      | 33  |
| TRIPLEX SYSTEMS                |    |                     |                |                    |              |            |                       |                     |                  |          |     |
| IAM07T-200V-T                  | 10 | 12.3-62.2           | 45,800         | 200                | 62           | 56.8       | 18.5                  | 496                 | 645              | 545      | 31  |
| IAM11T-240V-T                  | 15 | 13.3-112.8          | 68,700         | 240                | 67           | 74.8       | 24.5                  | 858                 | 700              | 700      | 33  |
| IAM15T-240V-T                  | 20 | 13.3-137.2          | 91,600         | 240                | 69           | 95.8       | 31.5                  | 520                 | 700              | 700      | 33  |
| IAM18T-400V-T                  | 25 | 5.6-189.4           | 114,500        | 400                | 69           | 134.5      | 44.4                  | 686                 | 1100             | 826      | 55  |
| IAM22T-400V-T                  | 30 | 33.2-238.4          | 137,400        | 400                | 63           | 179.5      | 59.4                  | 854                 | 1100             | 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 2024 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

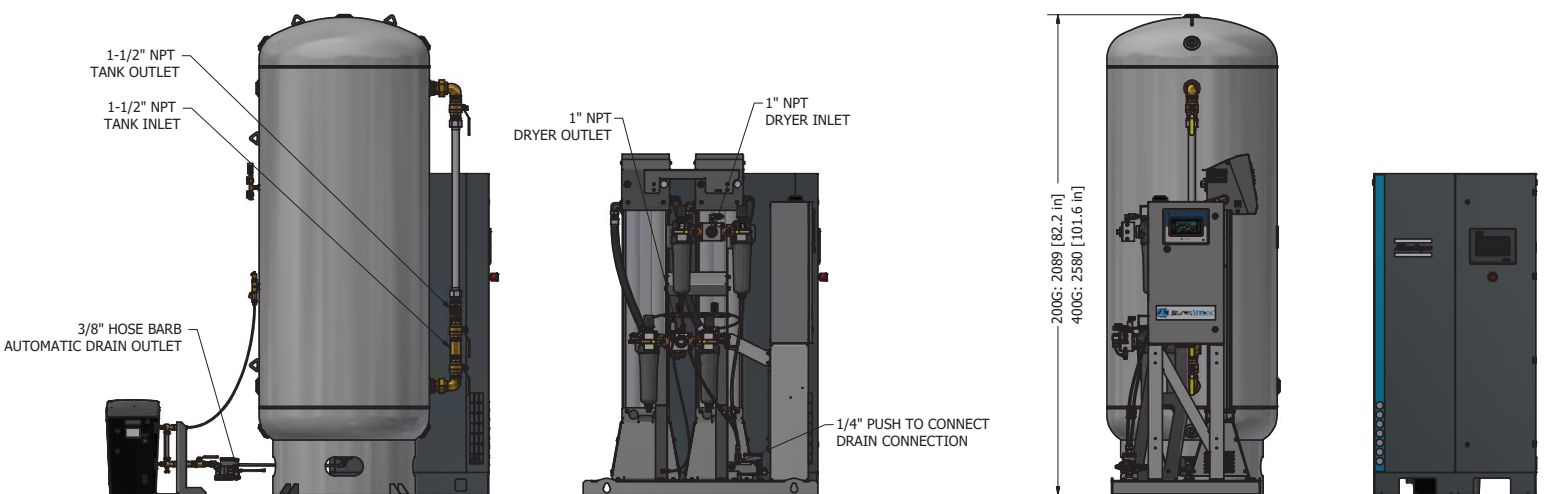
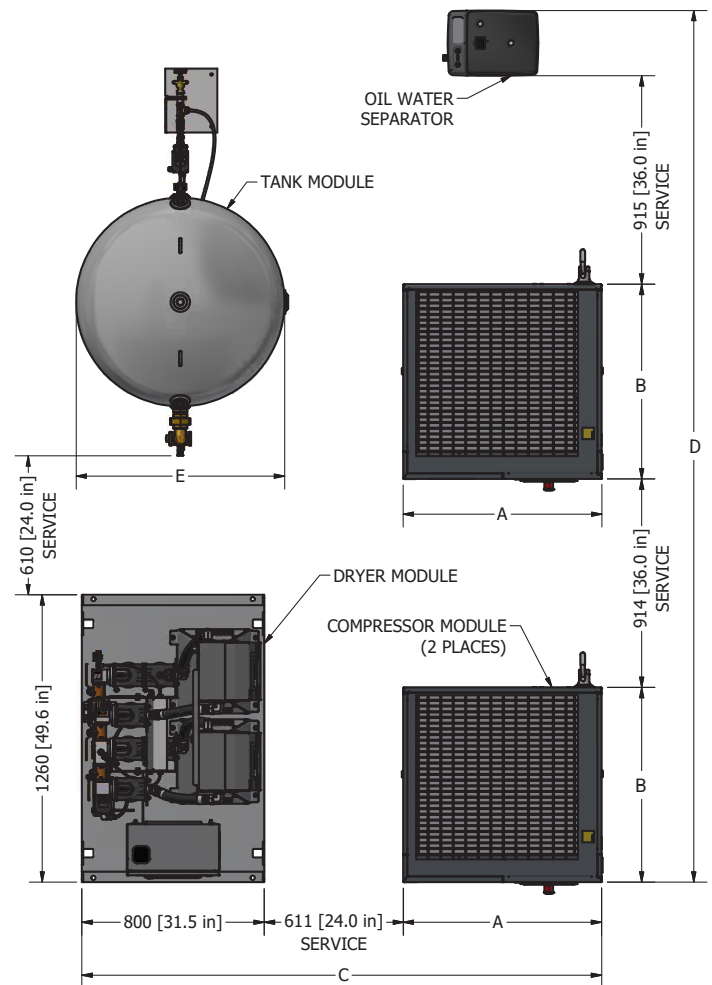
| INSTRUMENT AIR SPECIFICATIONS <sup>1</sup> |                   |                       |          |            |                                                   |
|--------------------------------------------|-------------------|-----------------------|----------|------------|---------------------------------------------------|
| System Model No.                           | Compressor Type   | Air Purification Type | Receiver | Condensate | Accessory Kit                                     |
| DUPLEX SYSTEMS                             |                   |                       |          |            |                                                   |
| IAM07D-200V-D                              | GA7VSDs MED NFPA  | CD20+                 | 200G     | 85         | (2) 1" Flex Hose,<br>(2) Sets Vibration Isolators |
| IAM11D-200V-D                              | GA11VSDs MED NFPA | CD20+                 | 200G     | 85         |                                                   |
| IAM15D-200V-D                              | GA15VSDs MED NFPA | CD20+                 | 200G     | 85         |                                                   |
| IAM18D-400V-D                              | GA18VSDs MED NFPA | CD30+                 | 400G     | 85         |                                                   |
| IAM22D-400V-D                              | GA22VSDs MED NFPA | CD30+                 | 400G     | 170        |                                                   |
| TRIPLEX SYSTEMS                            |                   |                       |          |            |                                                   |
| IAM07T-200V-T                              | GA7VSDs MED NFPA  | CD20+                 | 200G     | 85         | (3) 1" Flex Hose,<br>(3) Sets Vibration Isolators |
| IAM11T-240V-T                              | GA11VSDs MED NFPA | CD30+                 | 240G     | 170        |                                                   |
| IAM15T-240V-T                              | GA15VSDs MED NFPA | CD30+                 | 240G     | 170        |                                                   |
| IAM18T-400V-T                              | GA18VSDs MED NFPA | CD65+                 | 400G     | 300        |                                                   |
| IAM22T-400V-T                              | GA22VSDs MED NFPA | CD65+                 | 400G     | 300        |                                                   |

### Instrument Air - Duplex Arrangement

| System        | A      | B      | C     | D      | E     |
|---------------|--------|--------|-------|--------|-------|
| IAM07D-200V-D | 27.56" | 27.56" | 83.1" | 138.1" | 30.0" |
| IAM11D-200V-D | 27.56" | 27.56" | 83.1" | 138.1" | 30.0" |
| IAM15D-200V-D | 27.56" | 27.56" | 83.1" | 138.1" | 30.0" |
| IAM18D-400V-D | 27.56" | 27.56" | 83.1" | 138.1" | 36.0" |
| IAM22D-400V-D | 34.25" | 33.22" | 89.8" | 154.8" | 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](http://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"  | 49.6" | 27.6" | 27.6" |
| IAM11T-240V-T | 94.1"  | 49.6" | 27.6" | 27.6" |
| IAM15T-240V-T | 94.1"  | 49.6" | 27.6" | 27.6" |
| IAM18T-400V-T | 101.6" | 84"   | 27.6" | 27.6" |
| IAM22T-400V-T | 101.6" | 84"   | 34.3" | 33.6" |

| System        | E   | F     | G      |
|---------------|-----|-------|--------|
| IAM07T-200V-T | 30" | 83.1" | 198.6" |
| IAM11T-240V-T | 30" | 83.1" | 200.6" |
| IAM15T-240V-T | 30" | 83.1" | 200.6" |
| IAM18T-400V-T | 36" | 85.6" | 206.2" |
| IAM22T-400V-T | 36" | 92.3" | 224.4" |

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