



COSMODYNE

A Cryogenic Industries Company

POPLAR SERIES

OXYGEN, NITROGEN, ARGON GENERATING SYSTEMS

POPLAR is a standard air separation plant that produces high purity liquid oxygen (LOX), liquid nitrogen (LIN), and liquid argon (LAR) suitable for all industrial sectors, including medical applications. Cosmodyne's 50 years of experience with cryogenic plants is reflected in the design and durability of the POPLAR series.

Capacities range from just over 1500 Nm³/hr (52 tonnes per day) to under 6,000 Nm³/hr (192 tonnes per day) of high purity product.

Energy efficient plants, with specific power as low as 0.89 kw-hr/Nm³.

Prefabricated modules – cold box, turboexpander, air chiller, heater skid, and adsorbent vessels are shipped installation ready, minimizing the time and cost of installation.

Proven design and durable. The component selection and arrangement of the plant use the latest in technology resulting in the design for simplicity and ease of operation.

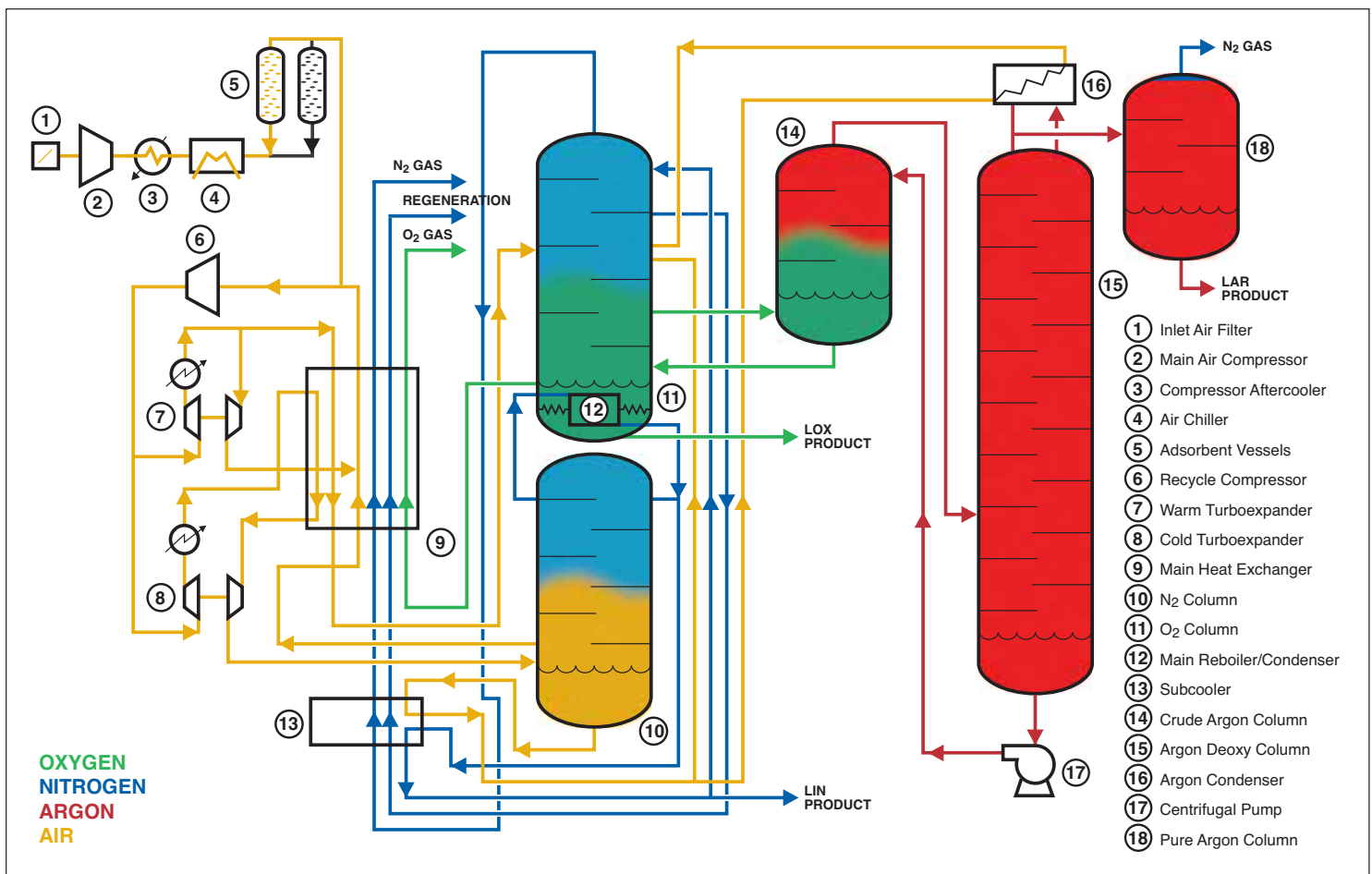
Factory tested - the modules are tested for pressure, strength, tightness, and control functionality. Interconnecting piping and electrical are also carefully designed to minimize field work.

Reliability - PLC based control system, with a user-friendly graphic interface. After start up, the plant operation is fully automated with provision for local or remote access via telephone line or the internet.

Simple battery limits - power to each of the two compressors, power to the medium voltage distribution, instrument air (for start up only), and LIN, LOX, LAR connections.

Nitrogen gas stream is available for pipeline application or future liquefaction. Our ELM liquefier series is suitable for additional liquid product of the extra nitrogen gas production of the POPLAR series.

Service – Worldwide 24 hours service from installation to after care of the plant.



Simplified process flow diagram

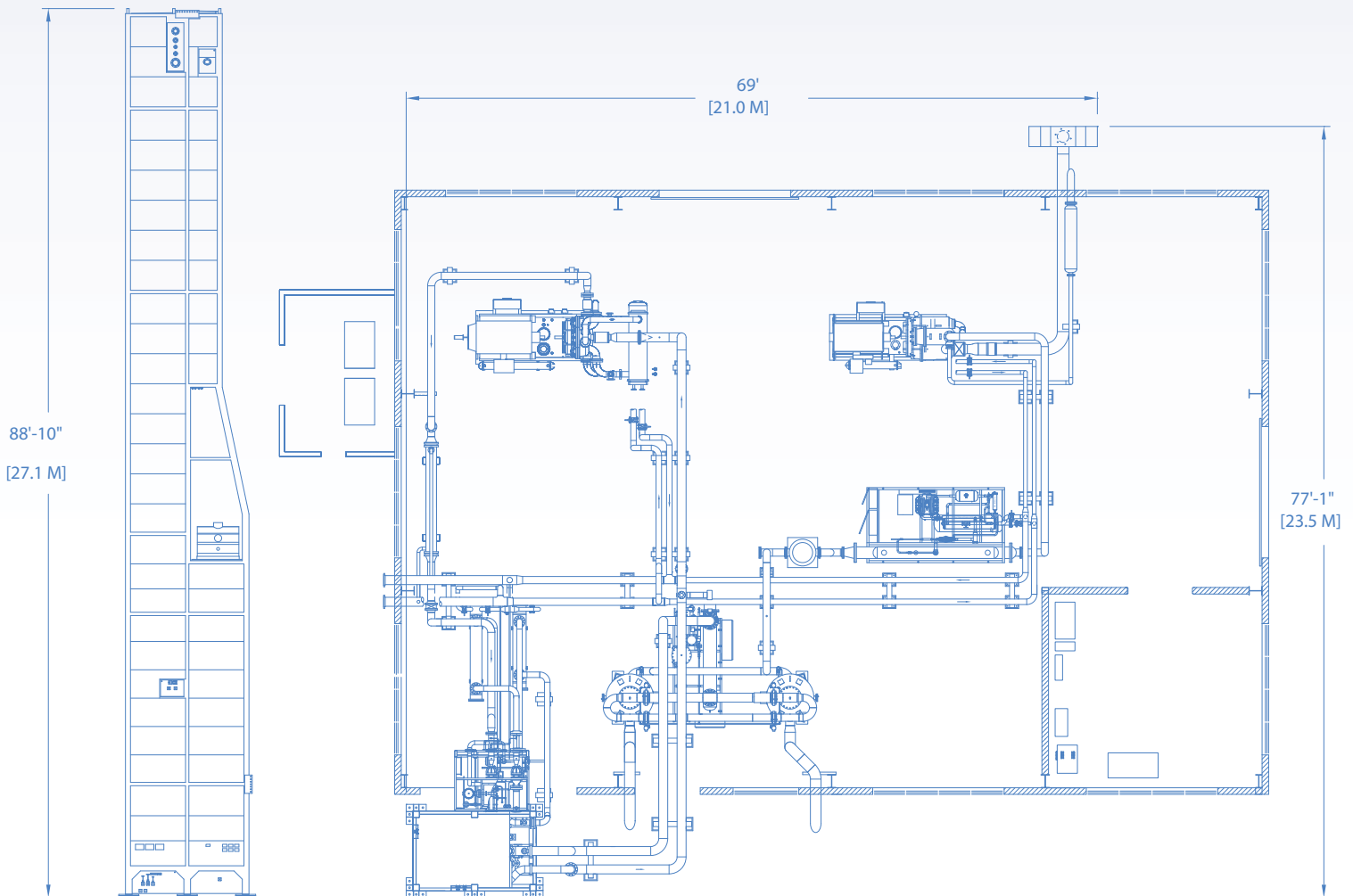
Atmospheric air goes through the inlet air filter (1), then to the main air compressor (2) and aftercooler (3). After initial cooling in the air chiller (4) and purification by adsorption (5) the air, joins the recycle stream, which is compressed in the recycle compressor (6) and again in both turboexpander booster compressors (7) and (8). The boosted recycle gas provides energy to drive both turboexpanders which provide the necessary refrigeration for liquefaction. Output from the cold turboexpander (8) provides feed to the nitrogen column (10)

which distills recycle gas into pure nitrogen gas. Liquid nitrogen (LIN) product is formed in the main reboiler/condenser (12). Crude oxygen from the nitrogen column (10) feeds the oxygen column (11), which purifies the crude oxygen into liquid oxygen (LOX) product. At an optimum point in the oxygen column (11), a stream is diverted to the crude argon column (14), where it is refined into crude argon gas, then sent to the argon deoxy column (15), condensed in the argon condenser (16), and delivered to the pure argon column (18) producing liquid argon (LAR) product.

PERFORMANCE SPECIFICATIONS

		P1500		P2000		P2500		P10		P12		P14	
		OPERATING MODE		OPERATING MODE		OPERATING MODE		OPERATING MODE		OPERATING MODE		OPERATING MODE	
		Max. O ₂	Max. N ₂	Max. O ₂	Max. N ₂	Max. O ₂	Max. N ₂	Max. O ₂	Max. N ₂	Max. O ₂	Max. N ₂	Max. O ₂	Max. N ₂
Production													
Liquid oxygen	Nm ³ /hr	1300	40	1,770	60	2,230	80	2,700	100	3,969	120	4,605	150
Liquid nitrogen	Nm ³ /hr	200	1,520	315	2,112	443	2,725	500	3,287	801	4,930	921	5,686
Liquid argon	Nm ³ /hr	40	0	45	0	76	0	85	0	130	0	140	0
Total Liquid	Nm ³ /hr	1,540	1,560	2,130	2,172	2,749	2,805	3,285	3,387	4,900	5,050	5,666	5,836
Gaseous nitrogen	Nm ³ /hr	1,850	0	3,000	0	3,200	0	4,200	0	7,000	0	8,000	0
Purity													
Liquid oxygen	% O ₂ , min	99.6%		99.6%		99.6%		99.6%		99.6%		99.6%	
Liquid nitrogen	ppm O ₂ max	5.0		5.0		5.0		5.0		5.0		5.0	
Pure Liquid argon	% Ar, min	99.999%		99.999%		99.999%		99.999%		99.999%		99.999%	
Crude Liquid argon	ppm O ₂ max	2.0		2.0		2.0		2.0		2.0		2.0	
Gaseous nitrogen	ppm O ₂ max	5.0		5.0		5.0		5.0		5.0		5.0	
Utilities													
Power	kW	1,636	1,600	2,150	2,085	2,644	2,608	3,120	2,961	4,654	4,520	5,380	5,220
Cooling water circulation rate	lpm	4,600		6,000		7,300		8,690		12,750		14,340	
Specific Power	kW-hr./Nm ³	1.06	1.02	1.01	0.96	0.96	0.93	0.95	0.89	0.95	0.89	0.95	0.89

Plant performance is based on standard atmospheric conditions (ambient temperature 20° C, relative humidity 50%, cooling water temperature 19° C, 1.0 atm barometric pressure)
 Specific power excludes cooling water power.



ELEVATION VIEW

PLAN VIEW

Cosmodyne has been a world leader in the design and manufacture of modular air separation plants since 1958 with over 400 plants operating around the world.

Each Cosmodyne system is designed and built to rigorous standards of quality and workmanship developed from more than forty years of specific experience. From initial customer contact through on-site installation and commissioning, and well beyond, our sales, engineering, manufacturing and field service personnel continually demonstrate our commitment to customer satisfaction. Our worldwide service network stands by ready to serve you 24 hours a day.

OTHER FEATURES OF THE POPLAR SERIES

- Cosmodyne **PLC based** control system provides efficient, user-friendly graphic interface for remote, local or unattended operation
- Automatic control of all primary plant functions
- State-of-the-art analytical instrumentation package
- Dual, high performance turbocompressors with removable cartridge style rotating elements
- Proven molecular sieve type air clean-up system

OPTIONS AND ACCESSORIES

- Crude Argon Production
- Refined Liquid Argon Production
- Nitrogen Liquefier – ELM Series
- Closed Loop Evaporative Cooling System
- 50 or 60 Hertz Electrical System
- Product Storage Tanks
- Cylinder Charging Systems
- Liquid Transfer Pump Systems



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