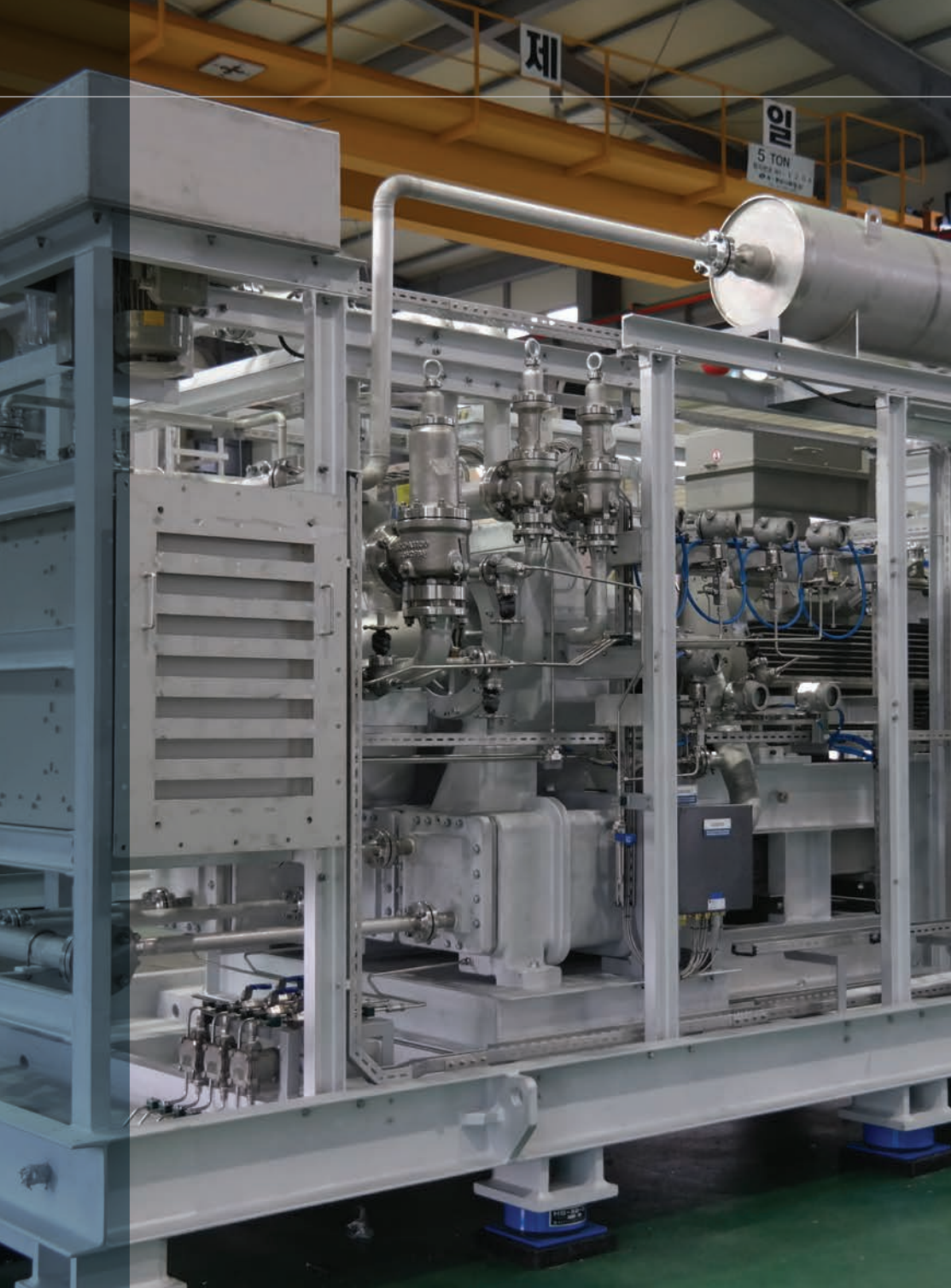


Customized & Unique **FIRSCOMP**



“Providing customized quality products on time to our clients”

Firscomp is a company specialized in engineering, procurement and construction (EPC) projects that require most rigorous specifications and harsh environments for both onshore and offshore.

Our specialized engineers design, manufacture and test all packages as per client's specific requirements and international standards for oil & gas, petrochemical, desalination and power plants.

We have supplied our systems on major EPC projects in Middle East, Asia, South America, Africa and other locations around the world.

Firscomp follow the HSE (Health, Safety and Environment) Policy that make an incident free workplace and also protect environment. We focus on workplace safety and on trying to improve a healthy work environment efficiently.

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About Firscomp

Our Core Value will promote positive attitudes and responsible work ethics in our workforce allowing us to achieve high levels of customer satisfaction by delivering reliable products and superior services in order to become a well-recognized industrial equipment supplier within the industry.

We offer comprehensive compressed air/gas systems and pressurised fluid systems from rotating machinery to stationary systems.

Integrating components of mechanical, electric, instrument and control in one packaged system is our specialty.

Company Profile
Production Capability
HSEQ Policy

Company Profile

2014. 12 Supplied Air Compressor & Dryer Package as per NORSOK requirements

2013. 05 Acquired Achilles JQS Certificate of Qualification

2012. 11 Relocate Head Office in Bucheon-si, Gyeonggi-do, Korea

2012. 10 Acquired ASME U Stamp

2012. 07 Moved to a new production shops (6,340 m²) in Hwaseong-si, Korea

2012. 05 Acquired Venture Business Certificate

2012. 05 Acquired INNO-BIZ Certificate

2010. 12 Acquired ISO9001 Certificate

2010. 12 Acquired ISO14001 Certificate

2010. 07 Established production shops (3,300 m²) in Hwaseong-si, Korea

2007. 03 Introduce Rotor Balancing Facility

2006. 12 Established Firscomp Co., Ltd.



Production Capability

Head Office Space : 500 m² (Engineering Office)

Production Shop Space : 6,340 m²

Production Capacity

■ *Maximum Product Size : 15000L x 5000D x 5300H mm*

■ *Maximum Product Weight : 50 Tons*

■ *Separated Carbon Steel and Stainless Steel Shops*

■ *Separated Steel Works Shops and Assembly / Test Shops*

■ *Available Test Power : up to 11 kV, up to 3000 kW, 50 Hz / 60 Hz*

■ *Available Test Cooling Tower Capacity : 300RT*

HSEQ Policy

Firscomp has a principal and sustainable commitment to perform our activities without incurring quality issues and the risks that could endanger the Health, Safety and Environment.

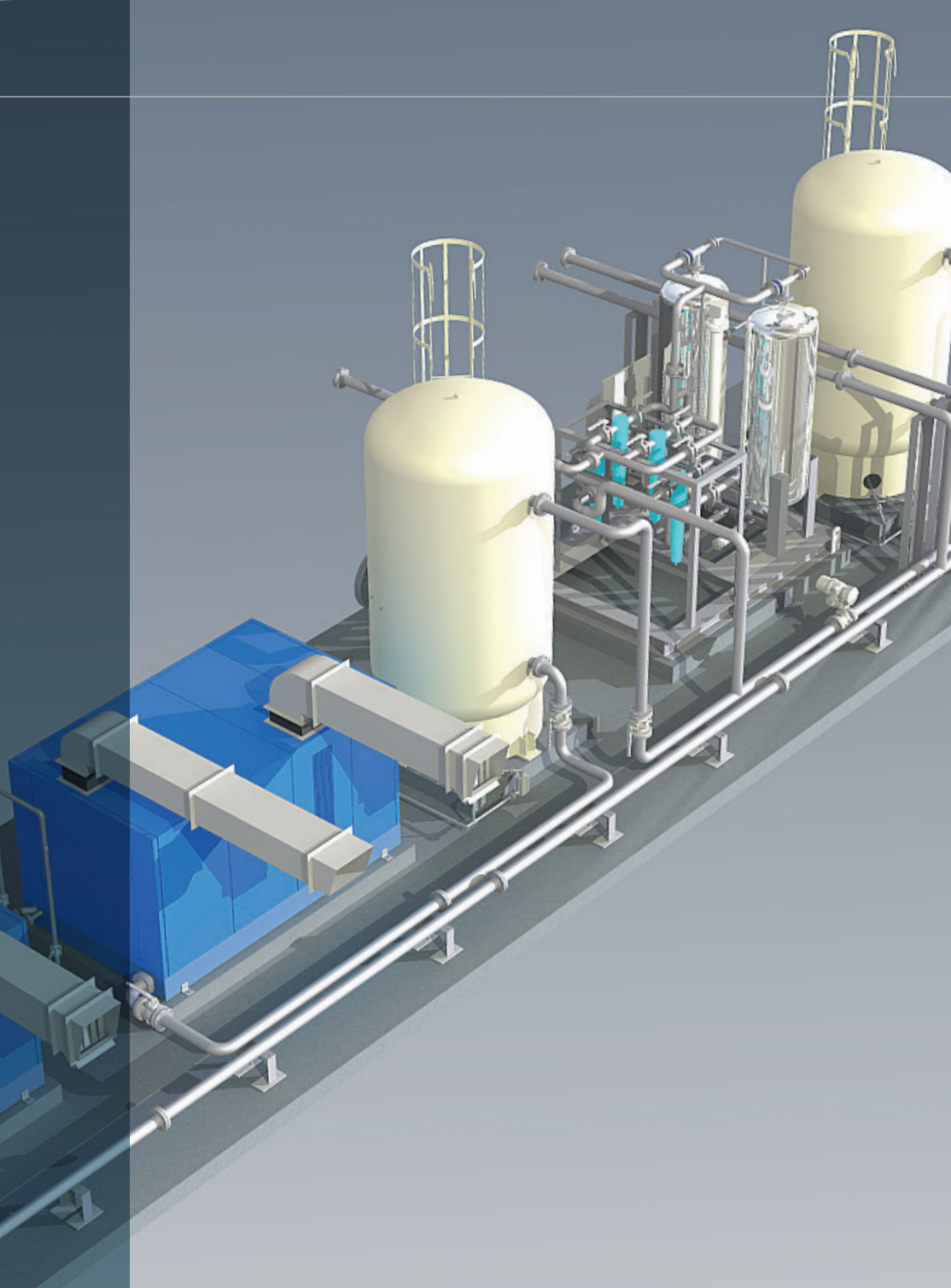
Our HSEQ policy is compliant with applicable laws, regulations and any related international standards.

Firscomp has strong determination to :

- *Give priority to customer satisfaction.*
- *Comply to the all legal requirements related with the Health, Safety, Environment and Quality.*
- *Give priority to health and safety to prevent injuries and illnesses caused by work.*
- *Do continuous improvement to the Quality Management System and HSE.*

Every management staff and employee of Firscomp is responsible for their own behavior in order to achieve the company's objective.

The management line will be assessed its responsibilities in applying the HSEQ program on their area of responsibilities.



Products & Services

Compressor & Blower

Air Dryer

Nitrogen Generator

Hot Water Calorifier

High Pressure Pump System

Bottle Racks & Pressure Vessels

Control System

Services

Our Standard Project Execution Procedure

Design & Engineering

- Feasibility Studies of Customer's Requirements
- Basic Design
- Detail Engineering



Procurement

- Mechanical Components
- Instruments & Electrical Components
- Control Components



Fabrication & Installation

- Steel Structure & Base Frames
- Pressure Vessel & Piping Spool
- Rotating Key Components
- Electrical & Instruments Installation
- Control Panel Fabrication



FAT & Commissioning

- Factory Acceptance Test
- String Test in Factory
- Shipbuilding Yard Commissioning
- Offshore Site Commissioning
- Onshore Site Commissioning

Fabrication and Welding Qualification

Carbon Steel

- ASTM A106 Gr B/C
- ASTM A105
- ASTM A234 Gr WPB
- API 5L Gr B/X42
- ASTM A516 Gr 70/65

Low Temperature Steel

- ASTM A350 LF2
- ASTM A333 Gr 6

Stainless Steel

- ASTM A240 Gr 304/304L/316/316L
- ASTM A312 Gr 304 / 304L / 316 / 316L
- ASTM A182 Gr 304L / 316 / 316L
- ASTM A403 Gr 304 / 316 / 316L

Duplex & Super Duplex

- ASTM A182 F51
- ASTM A240 Gr UNS 31803 / UNS 32550
- ASTM A815 Gr UNS 31803 / UNS 32550
- ASTM A790 Gr UNS 31803 / UNS 32550

High Strength Carbon Steel

- DIN ST 52-3
- ABS AH 36 / DH 36 / EH 36
- API 5L X 52 / 60 / 65 / 70
- ASTM A572 Gr 42 / 50 / 60 / 65
- ASTM A519 Gr 4130, AISI 4130, 4140
- MSS-SP-75 WPHY 60 / 65 / 70

Compressor & Blower

We design whole compressed air systems consisting of compressors, blowers as well as ancillary equipment such as pre coolers, dryers, filters, receiver tanks, closed cooling systems, chilled water systems as per the client's requirements. For the optimum performance of the compressed air system, the package integration is important. Our major experiences are focused on integrating compressors with a structural common skid, dryer & filters, receiver tank, interconnecting piping & valves, tubing, instruments, electric and control system (PLC). All systems come fully assembled, integrated and tested in our shop. Specific performance, size and requirements of products are available upon request.

- Applicable Types**
- Centrifugal Compressor
 - Rotary Compressor (Oil Free / Oil Injection)
 - Reciprocating Compressor (Oil Free / Oil Injection)
 - Blowers (Centrifugal / Positive Displacement Type)
 - Engine Driven Compressor

- Applications**
- Instrument & Utility Air Compressor
 - Bulk Air Compressor for Drilling Unit
 - Breathing Air Compressor
 - Starting Air Compressor
 - Ventilation Air Blower
 - Aeration Blower for Water Treatment

- Key Features**
- Applicable in both Offshore & Onshore
 - Carbon steel / stainless steel for pressure vessel and piping
 - Electric motor available LV, MV and HV (up to 11 kV)
 - Air Cooled / Water Cooled
 - Containerized units
 - Compliance to NORSOK, ATEX, CE, API, IECEx, PED
 - PLC Control / Microprocessor based control
 - ATEX, suitable for Zone 1 / Zone 2 condition
 - Tropicalization ambient temperature up to 55 °C
 - Winterization ambient temperature down to -50 °C
 - Painting (external / internal) as per required specifications
 - ASME or Classification approval
 - Specific flow and pressure

Skid Mounted Instrument Air Compressor & Dryer Package



Application *Instrument Air compressor with dryer for Offshore (FPU)*

Operating Discharge Pressure *8.5 barg at skid edge*

Compressor Type *Air Cooled Oil Free Screw Compressor*

Construction Feature *3 Compressors on common base skid, Wet Air Receiver and 2 Heatless Desiccant Air dryers on common base skid*

Certificates *U-stamp for pressure vessels, DNV for wet air receiver, ATEX certificates for all instrumentations.*

Material *Pressure vessel, Piping and base frame in Carbon Steel and Quiet Enclosure for compressor in Stainless Steel 316L*

Controlled by dedicated LCP *PLC based controller which is configured as redundant CPU, Power Supply and Communication.
The LCP approved with ATEX certificate suitable for use in ZONE 2 hazardous location (Ex 'nA', 'e' IIB T6)*

Skid Mounted Nitrogen Feed Air Compressor & Dryer Package

Application Nitrogen Feed Air compressor with dryer for Offshore (FPU)

Operating Discharge Pressure 10 barg

Compressor Type Water Cooled Oil Free Screw Compressor

Construction Feature 1 Compressor, Wet Air Receiver
and Heatless Desiccant Air dryer on common base skid

Certificates DNV + BKI dual class

Controlled by dedicated UCP Redundant PLC system (CPU, Power supply, Communication)
HART Multiplexer for interfacing with ICSS



Air Compressor & Dryer Package

Application *Startup Air Compressor Package for LNG Plant*

Operating Discharge Pressure *10 barg*

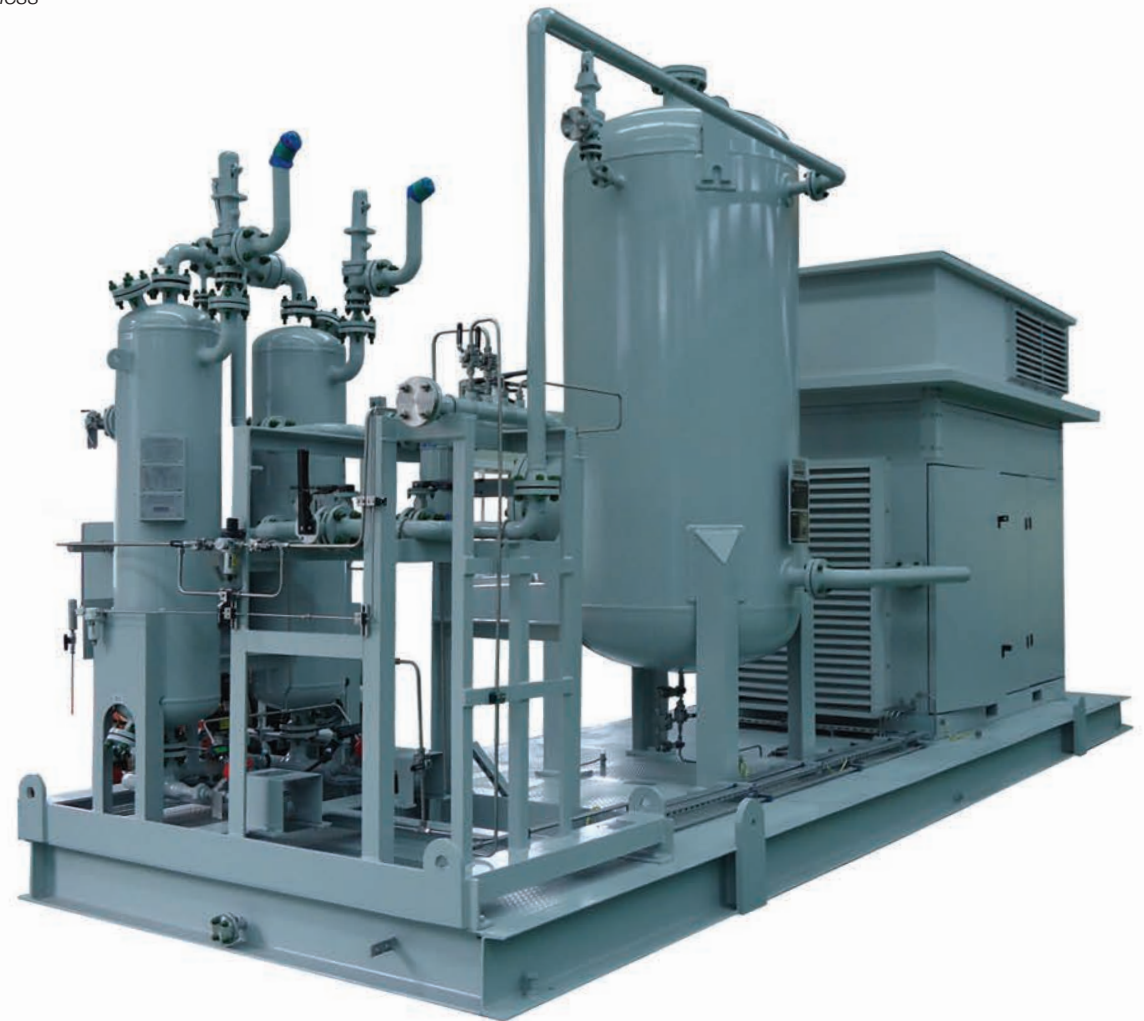
Compressor Type *Air Cooled Oil Free Screw Compressor*

Construction Feature *1 Compressor, Wet Air Receiver and Heatless
Desiccant Air dryer on common base skid*

Applied Codes *ASME Sec. VIII Div.1 for Pressure Vessel*

Skid Size *8200L x 2400W x 3900H mm*

Pressure vessel & Piping material *Carbon Steel*



Skid Mounted Bulk / Service Air Compressed Air System

Application Bulk & Service Air for Offshore Drilling Platform
Construction of 3 base skids catered Two sets of Oil Free Rotary
Screw Compressors on Skid, One set of Wet Receiver Tank with Two
sets of Desiccant Air Dryers on Skid and Three Sets of Dry Receiver Tank on Common Skid

Operating Pressure 10.5 barg

Electric Motor 150 kW, Ex 'nA', IP 55, Class1/ Division 2/
Gas Group C & D / T3 Classified

UCP PLC Based UCP with HMI System

Enclosure IP55 Epoxy powder coated mild sheet Enclosure

Junction Box ATEX Certified (Ex II 2G Ex 'd' IIB), IP 66



Instrument Air Compressor

Application *Instrument Air Compressor (Onshore Refinery Plant)*

Operating Discharge Pressure *10.5 barg*

Compressor Type *Water Cooled Oil Free Screw Compressor*

Construction Feature *API 619 4th Edition*

Lube Oil System *91/368EEC, 98/37/EEC (Machines), ASME Sec. VIII Div.1 (Pressure Equipment)*

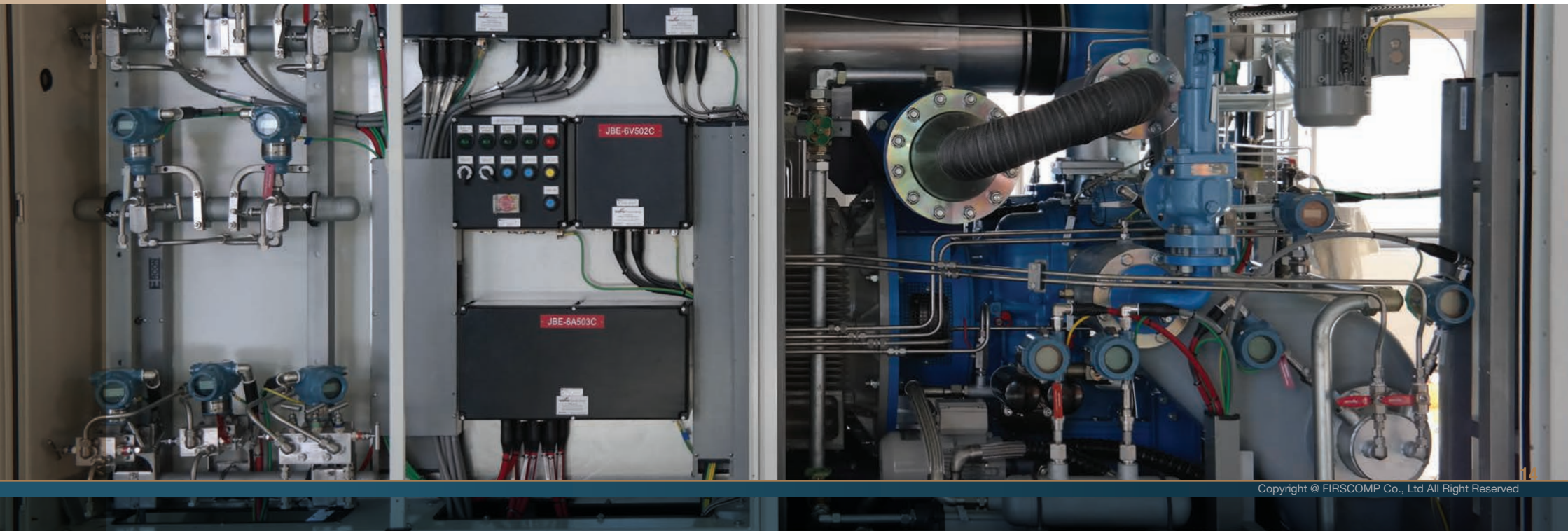
Pressure – Relieving system *API RP 520 Part I - Design of pressure relieving system
API RP 520 Part II - Installation of pressure relieving system
API 521 – Pressure Relieving and De-pressuring Systems*

Electric Motor *300 kW, IP65, II2G Ex 'de' IIC*

Junction Box *GRP, IP66 Ex 'e' IIC T4*

Local Pushbutton Station *GRP, IP66, Ex 'de' IIC T4*

Controlled by DCS *functional control logic integrated into the DCS*



High Ambient Air Compressor

Application *Instrument Air Compressor (Onshore)*

Ambient Temperature *Extreme Condition of -3 °C ~ 55 °C*

Discharge Pressure *8 barg*

Compressor Type *Air Cooled Oil Free Screw (Cooler Applied Heresite Protective Coating)*

Construction Feature *API 619 4th Edition*

Local Pushbutton Station *316LSS, IP66, Ex 'de' IIC T4*

Controlled by dedicated UCP *Fully redundant PLC system (CPU, Power supply, Communication and I/O)
HART Multiplexer for interfacing with Plant AMS*



Water Cooled Centrifugal Air Compressor

Application *Instrument Air for Topside Offshore Platform*

Applied Code *NORSOK, CE Marking (MD- 2006/42/EC, PED-1997/23/EC), ATEX- 1994/9/EC*

Discharge Pressure *11 barg*

Sound Level *75 dBA*

Coating System *TSA Coating on Steel Structure & Compressor Casing*

Air Cooler *Water Cooled 316L Stainless Steel Fin Type*

Piping System *Super Duplex Stainless Steel & 316 Stainless Steel for Air,
316 Stainless Steel for Water and Oil System*

Construction Feature *API 672 4th Edition, EN 13445*

Oil System *API 614, 5th Edition, Chapter 3*

Junction Box *IP 66, Ex II 2 G Ex ia IIC T5 Gb*

Control Panel *RIO Cabinet Class 1 Control System,
Fiber Optic wired to Platform SAS
(Safety and Automation System),
Ex II 3 G Ex d e mb nA [ja] IIC T3*



75 dBA Quiet Enclosure



Air Cooled Centrifugal Air Compressor

Application *Emergency Air for Topside Offshore Platform*

Applied Code *NORSOK, CE Marking (MD- 2006/42/EC, PED-1997/23/EC), ATEX- 1994/9/EC*

Discharge Pressure *11 barg*

Sound Level *75 dBA*

Coating System *TSA Coating on Steel Structure & Compressor Casing*

Air Cooler *Air Cooled 316L Stainless Steel Fin Type*

Piping System *Super Duplex Stainless Steel & 316 Stainless Steel for Air,
316 Stainless Steel for Water and Oil System*

Construction Feature *API 672 4th Edition, EN 13445*

Oil System *API 614, 5th Edition, Chapter 3*

Junction Box *IP 66, Ex II 2 G Ex ia IIC T5 Gb*

Control Panel *RIO Cabinet Class 1 Control System,
Fiber Optic wired to Platform SAS (Safety and Automation System),
Ex II 3 G Ex d e mb nA [ia] IIC T3*



75 dBA Quiet Enclosure



Skid Mounted Reciprocating Air Compressor Package

Application *Instrument / Utility Air for Offshore Platform
Construction of Two sets of Reciprocating Air Compressor Packages on Common Skid*

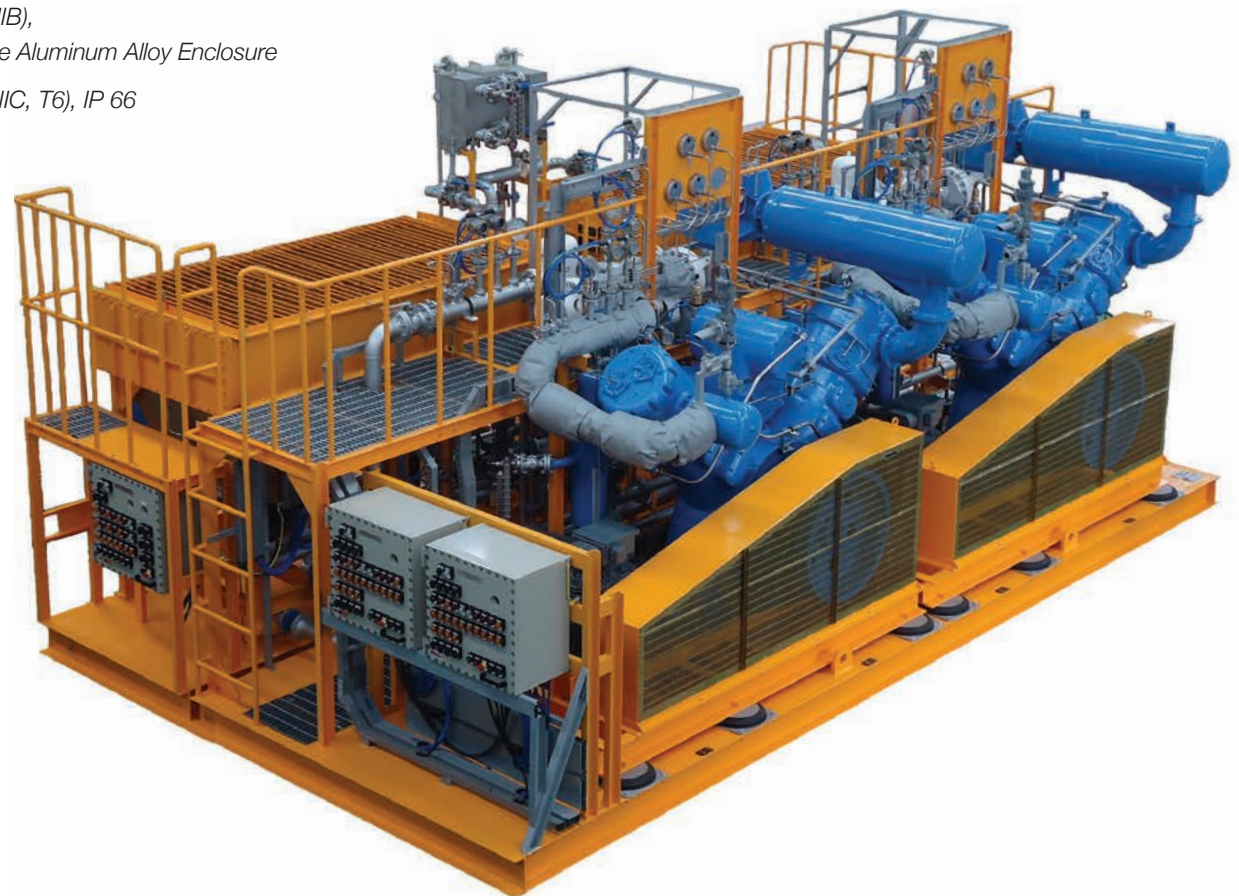
Air Cooled Water Cooler Package (Closed Cooling System) *Max. 52.4 °C inlet / 40 °C outlet water temperature, 104,000 kcal/hr*

Operating Pressure *13 barg*

Electric Motor *150 kW, Ex 'nA', IP 55*

PLC Based Local Control Panel *ATEX Certified (Ex II 2G Ex 'd' IIB),
IP 66 Epoxy coated copper free Aluminum Alloy Enclosure*

Junction Box *ATEX Certified (Ex II 1G Ex 'ia' IIC, T6), IP 66*



Breathing Air Compressor

Application Breathing Air for Offshore Platform

Construction Two sets of Reciprocating Air Compressor,
Two sets of Air Receiver Tank Integrated on Common Skid

Operating Pressure 175 barg

Electric Motor 15 kW, Ex 'nA', IP 55

PLC Based Unit Control Panel with HMI system Located in Safe Area, IP 55 Epoxy powder
Coated mild sheet steel Enclosure

Junction Box ATEX Certified (Ex II 2G Ex 'd' IIB),
IP 66 Epoxy coated



Starting Air Compressor

Application Starting Air for Offshore Platform
One set of Air Compressor &
One set of Air Receiver Tank on Common Skid

Operating Pressure 18 barg

Electric Motor 11 kW, Ex 'nA', IP 55

PLC Based Local Control Panel ATEX Certified (Ex II 2G Ex 'd' IIB),
IP 66 Epoxy coated copper free Aluminium Alloy Enclosure

Winterized Air Compressor

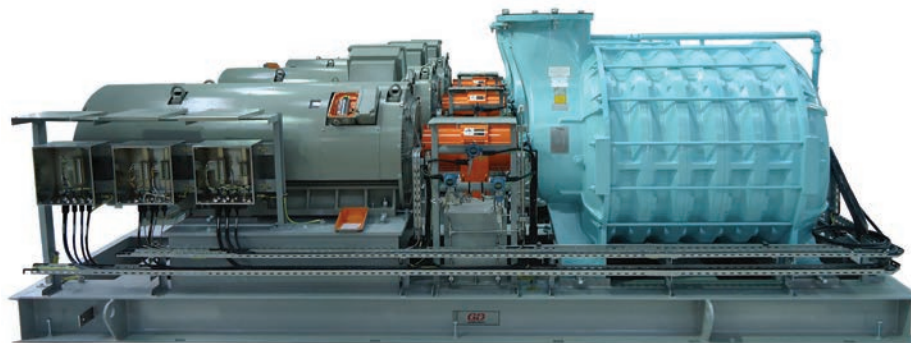
Application *Instrument Air*

Design & Construction *Winterization -28 °C Ambient Temperature
2 Oil Free Rotary Screw Air Compressors on Common Base
Skid Fully Quiet Enclosed with Heaters inside Enclosure*

Working Pressure *9 barg*

Control *PLC Based Unit Control*

Location *Outdoor*



Multistage Centrifugal Air Blower

Application *Aeration Air for Water Treatment*

Design Flow *15,500 Nm³/hr*

Working Pressure *1.79 bara*

Location *Outdoor*

Multistage Centrifugal Blower

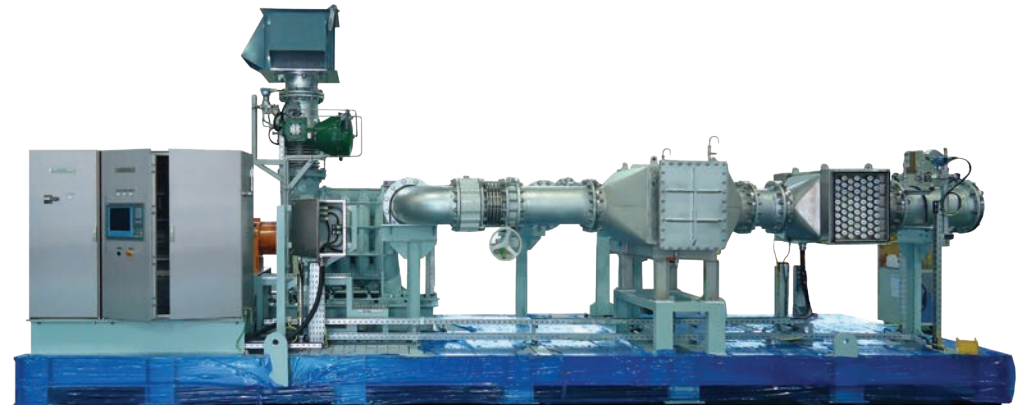
Application *Ventilation & Breathing Air for FLNG Offshore*

Blower *105 kW, 10,000 Nm³/hr at 0.25 barg*

Air Cooler *Shell and Tube in SS316*

Air Heater *50 kW / 690 V, Thyristor module operation by control panel, casing in SS316*

Control *Redundant PLC with HMI touch panel*



Hot Air Heater Blower (Portable Explosion-proof)

Application *Drying control room of offshore drilling platform*

Heater Power *23.1 kW / 690 V*

Air Delivery *5,000 m³/hr*

Heat Dissipation *78,850 BTU/hr*

Electric Construction *Blower Motor – Explosion proof Ex d IIC T4.
Transformer – 690VAC to 400VAC, 3 Ph / 50 Hz.
Enclosure – Ex d with cable gland.*

Location *Outdoor*

Air Dryers

Firscamp provides desiccant heatless/external heater regeneration (adsorption) air dryers suitable for onshore and offshore applications. It eliminates the moisture and prevents corrosion damage to downstream equipment.

Air dryers shall be designed to meet the Customer's request and specifications.



Key Features

- Carbon steel / stainless steel for pressure vessel and piping
- PLC Control based/ Microprocessor based control
- Redundant systems compliance to SIL II & III requirements
- ATEX, suitable for Zone 1 / Zone 2
- Tropicalization ambient temperature up to 65°C
- Winterization ambient temperature down to -50°C
- Painting (external / internal) as per required specifications
- Pressure Dew Point as per ISO 8573
- ASME or Classification approval is available
- Specific flow and dew point is available upon request.
- Ancillaries are included.
 - Prefilter and afterfilter (single or dual)
 - Safety valve
 - Pressure gauge
 - Local control panel (suitable for site conditions)

Heatless Regeneration Desiccant Air Dryer

Application *Instrument Air Dryers for Offshore (Topside)*

Type *Heatless Regeneration Desiccant Type*

Applied Codes *NORSOK, CE Marking in accordance with EU Directives (MD-2006/42/EC, PED-1997/23/EC)*

Construction *2 Dryers with Pre/After filters on common base skid*

Ambient Temperature *35 °C*

Discharge Pressure *10 barg*

Rated Flow *5065 Sm³/hr*

Dew Point *- 40 °C*

Pressure vessel & Piping material *316L Stainless Steel*

Applied Coating System *TSA Coating*

Control Panel *RIO Cabinet with class 1 control system, fiber optic wired to platform SAS, Ex II 3 G Ex d e mb nA [ia] IIC T3*



Heatless Regeneration Desiccant Air Dryer

- Application** *Instrument Air for Onshore Gas Plant | Outdoor*
- Type** *Heatless Regeneration Desiccant Type*
- Applied Codes** *ASME Sec. VIII Div.1 U-stamp*
- Skid Size** *5000L x 3000W x 3300H mm*
- Construction** *Two Dryers on a Common Skid with each dryer consist of two pre/after-filters*
- Design Inlet Air Flow** *1220 Nm³/hr*
- Operating Pressure** *9 barg*
- Inlet Air Temp.** *50 °C*
- Dew Point** *- 40 °C @ 9 barg*
- Desiccant** *Activated Alumina + Molecular Sieve*
- Pressure vessel & Piping material** *Carbon Steel*
- Applied Coating System** *As Per Project Requirement*



Heatless Regeneration Desiccant Air Dryer

Application *Instrument Air for Onshore Gas Plant | Outdoor*

Type *Heatless Regeneration Desiccant Type*

Applied Codes *ASME Sec. VIII Div.1 U-stamp*

Skid Size *3000L x 2500W x 3100H mm*

Construction *Two Dryers on a Common Skid with each dryer consist of two pre/after-filters*

Design Inlet Air Flow *50 Nm³/hr*

Operating Pressure *9 barg*

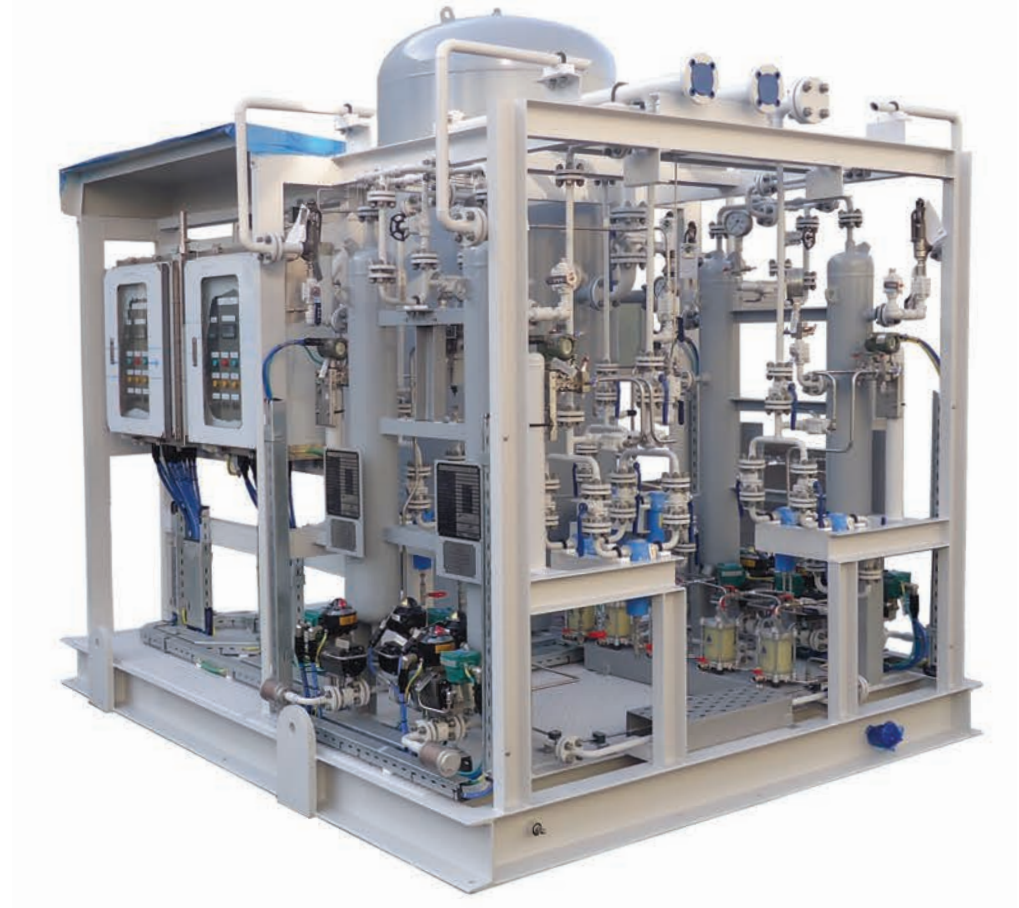
Inlet Air Temp. *50 °C*

Dew Point *- 40 °C @ 9 barg*

Desiccant *Activated Alumina + Molecular sieve*

Pressure vessel & Piping material *Carbon Steel*

Applied Coating System *As Per Project Requirement*



Heatless Regeneration Desiccant Air Dryer

Application *Instrument Air for Onshore Gas Plant | Outdoor*

Type *Heatless Regeneration Desiccant Type*

Applied Codes *ASME Sec. VIII Div.1 U-stamp and DOSH Registration
for Pressure Vessel*

Skid Size *5500L x 3500W x 5400H mm*

Construction *Two Dryers on a Common Skid with Common two pre/after-filters*

Design Inlet Air Flow *3430 Nm³/hr*

Operating Pressure *9.5 barg*

Inlet Air Temp. *46 °C*

Dew Point *-29 °C @ 9.5 barg*

Desiccant *Activated Alumina*

Pressure vessel & Piping material *Carbon Steel & SS316*

Control Panel *Allen Bradley ControlLogix 1765 Family PLC Based
System, IP66, Stainless 316 Panel*

Junction Box *316LSS, IP66, Ex 'e' IIC T5/T6*



Heatless Regeneration Desiccant Air Dryer with Winterized

Application *Instrument Air for Onshore Gas Field Development*

Type *Pressure Swing Heatless Regeneration Desiccant Type*

Applied Codes *ASME Sec. VIII Div.1*

Skid Size *6800L x 3110W x 3300H mm*

Construction *4 dryer towers with 4 pre/after-filters and wet air receiver on common skid.
-28 °C Winterization with Quiet Enclosure*

Design Inlet Air Flow *310 Nm³/hr*

Operating Pressure *9 barg*

Inlet Air Temp. *45 °C*

Dew Point *-40 °C @ 9 barg*

Desiccant *Activated Alumina*

Pressure vessel & Piping material *Carbon Steel*



External Heated Regeneration Desiccant Air Dryer

Application *Instrument Air for Power Plant | Outdoor*

Type *External Heated Regeneration Desiccant Type*

Applied Codes *ASME Sec. VIII Div.1*

Skid Size *3400L x 2400W x 2600H mm*

Construction *Two Dryers on a Common Skid
with Common two pre/after-filters*

Design Inlet Air Flow *240 Nm³/hr*

Operating Pressure *8.6 barg*

Inlet Air Temp. *51 °C*

Dew Point *- 40 °C @ 8.6 barg*

Desiccant *Activated Alumina*

Electric heater capacity *5 kW*

Material *Tower & Heater – Carbon Steel
Piping – Stainless Steel 304*



Heatless Regeneration Desiccant Air Dryer

Application Bulk Air for Offshore Drilling Platform

Type Pressure Swing Heatless Regeneration Desiccant Type

Applied Codes ASME Sec. VIII Div.1

Skid Size 6200L x 3870W x 4530H mm

Construction 4 dryers with two pre/after-filters and wet air receiver on common skid

Design Inlet Air Flow 1517 Nm³/hr

Operating Pressure 7.5 barg

Inlet Air Temp. 40 °C

Dew Point - 40 °C @ 7 barg

Desiccant Activated Alumina

Material Pressure Vessel - Carbon Steel / Piping - LTCS,
Quiet Enclosure – Stainless Steel 316



Heatless Regeneration Desiccant Air Dryer

Application *Instrument Air Package for Offshore Floating Production Unit.*

Type *Pressure Swing Heatless Regeneration Desiccant Type*

Applied Codes *ASME Sec. VIII Div.1*

Skid Size *3400L x 2000W x 2900H mm*

Construction *4 dryer towers with two pre/after-filters on common skid*

Design Inlet Air Flow *320 Nm³/hr*

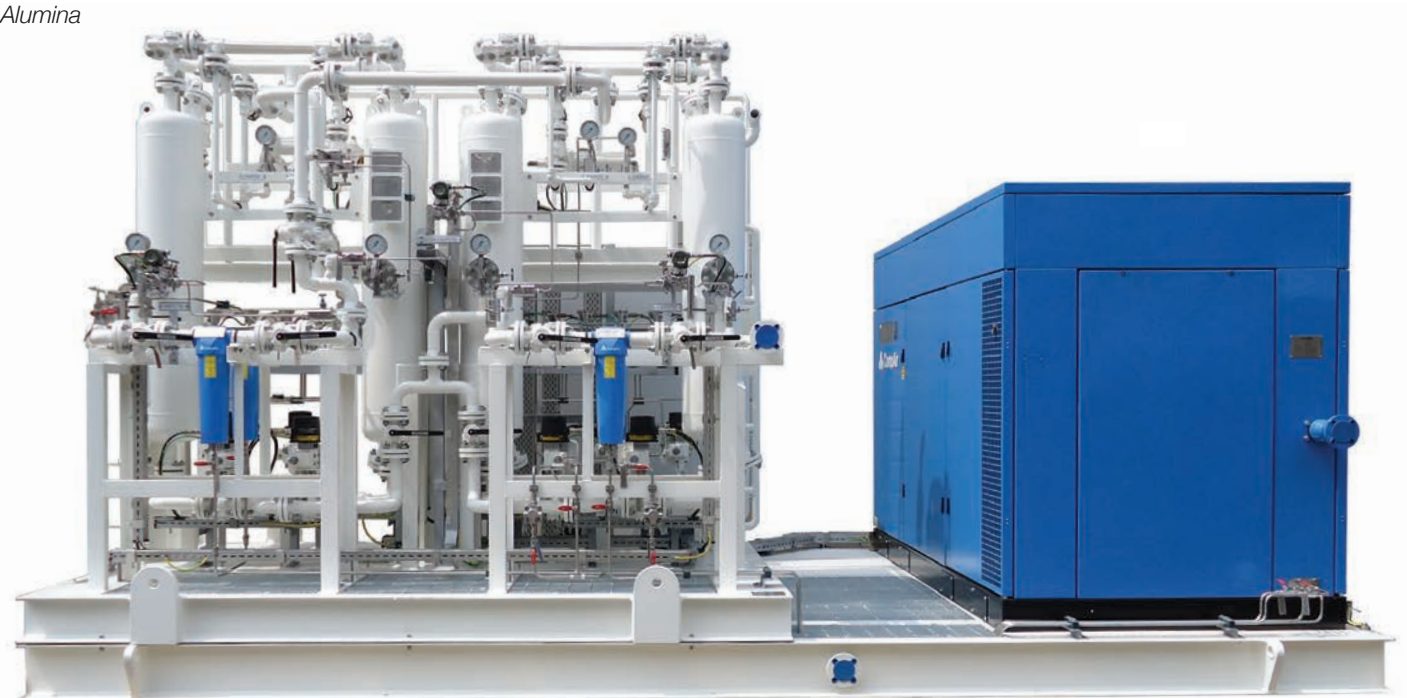
Operating Pressure *9 barg*

Inlet Air Temp. *50 °C*

Dew Point *- 40 °C @ 9 barg*

Desiccant *Molecular Sieves + Activated Alumina*

Pressure vessel & Piping material *Carbon Steel*



Heatless Regeneration Desiccant Air Dryer

Application *Instrument Air for Onshore Oil Field Development*

Type *Pressure Swing Heatless Regeneration Desiccant Type*

Applied Codes *ASME Sec. VIII Div.1*

Skid Size *2690L x 2310W x 2200H mm*

Construction *4 dryer Towers with 2 pre/after-filter dryer package,
oil injected screw compressor and wet air receiver on common skid*

Design Inlet Air Flow *340 Nm³/hr*

Operating Pressure *7.5 barg*

Inlet Air Temp. *60 °C*

Dew Point *- 40 °C @ 7 barg*

Desiccant *Activated Alumina*

**Pressure vessel &
Piping material** *Carbon Steel*



Heatless Regeneration Desiccant Air Dryer

Application *Instrument Air for Offshore Floating Production Unit*

Type *Pressure Swing Heatless Regeneration Desiccant Type*

Applied Codes *ASME Sec. VIII Div.1*

Skid Size *7500L x 18000W x 4700H mm*

Construction *4 dryer towers with two pre/after-filters & one wet air receiver on common skid*

Inlet Air Flow *2280 Sm³/hr*

Operating Inlet Pressure *9.5 barg*

Inlet Air Temp. *45 °C*

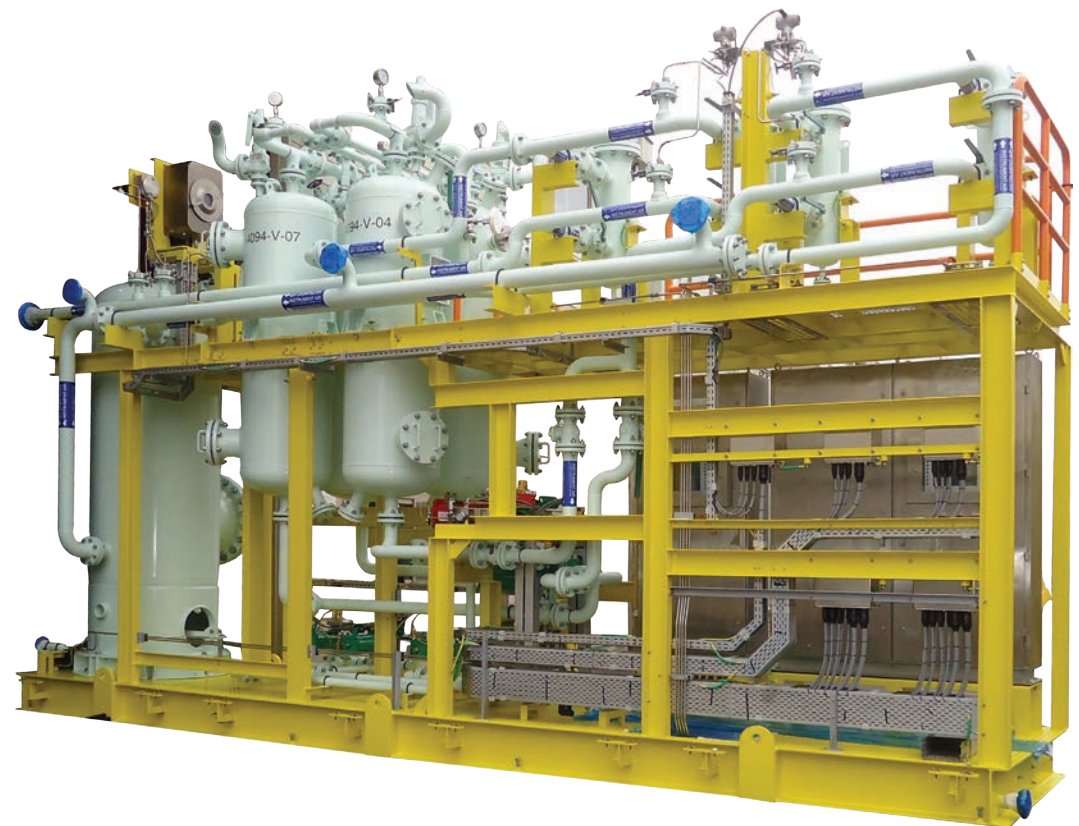
Dew Point *11.1 °C @ 10 barg*

Desiccant *Activated Alumina*

Pressure vessel & Piping material *Carbon Steel*

Certificates *U-stamp for pressure vessels
ATEX certificates for all instrumentations*

Controlled by dedicated LCP *Redundant PLC system
(CPU, Power supply, Communication)
LCP is suitable for Zone 2*



Nitrogen Generators

We provide both types of nitrogen generators; PSA (Pressure Swing Adsorption) type and Hollow Fiber Membrane type. As per the client's specific performance requirements, we offer the products with purities from 95% up to 99.9995% fulfilling mechanical, electrical and control specifications with international codes as well.

- Key Features**
- *Types : PSA and Membrane*
 - *Nitrogen purity : 95% up to 99.9995%*
 - *Applicable in both Offshore & Onshore*
 - *Carbon steel / stainless steel for pressure vessel and piping*
 - *Custom design as per the requirements*
 - *Containerized units available upon request*
 - *Compliance to Norsok, ATEX, CE, API, IECEx, PED*
 - *PLC Control / Microprocessor based control*
 - *ATEX suitable for Zone 1 / Zone 2 condition*
 - *Tropicalization ambient temperature up to 60°C*
 - *Winterization ambient temperature down to -50°C*
 - *Painting (external / internal) as per required specifications*
 - *ASME or Classification approval*
 - *Specific flow and pressure*



Nitrogen Generator

Application Nitrogen Generator for Onshore Gas Terminal | Outdoor

Type Pressure Swing Adsorption Type

Applied Codes ASME Sec. VIII Div.1 U-stamp and DOSH Registration for Pressure Vessel

Skid Size 7000L x 3500W x 5400H mm

Construction Two set of N2 generator, Two off Buffer receiver (2 m³)
and Two off after filter on common skid. (2 x 100%)

Design Inlet Air Flow 1246 Nm³/hr

Design Outlet N2 Flow 420 Nm³/hr (35%)

Production Purity 98 % (N2)

Operating Pressure 7.5 barg

Inlet Air Temp. 46 °C

Desiccant Carbon Molecular Sieve

**Pressure vessel &
Piping material** Carbon Steel

Control Panel Allen Bradley ControlLogix 1765 Family PLC Based System,
IP66, Stainless 316 Panel

Junction Box 316LSS, IP66, Ex 'e' IIC T5/T6



Nitrogen Generator

Application *Nitrogen Generator for Onshore Oil Field Development*

Type *Pressure Swing Adsorption*

Applied Codes *ASME Sec. VIII Div. 1*

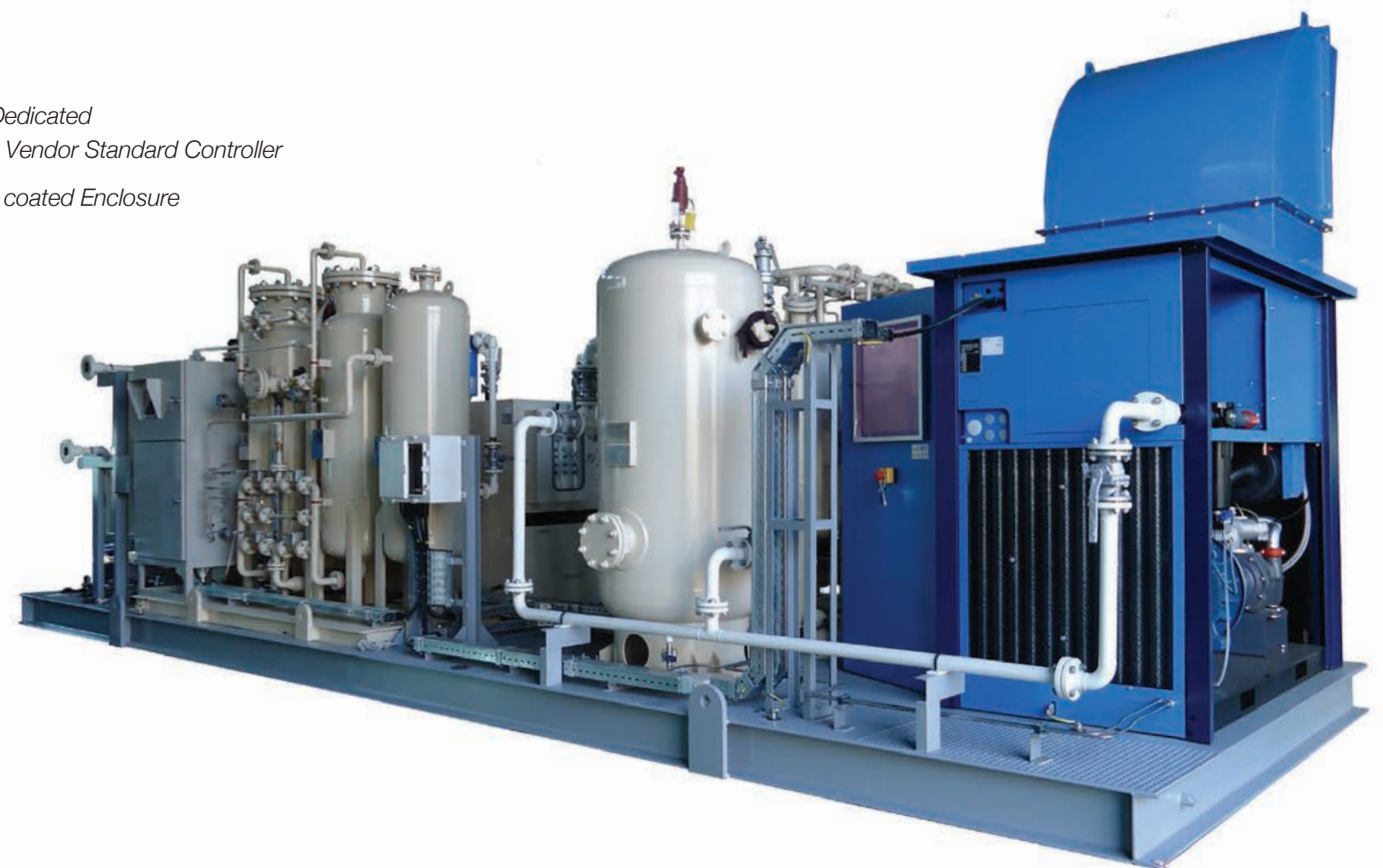
Construction *N₂ generation module with one set of Oil Flooded Rotary Screw Air Compressor, one set of Air Dryer, one set of Trim Cooler and one set of Receiver Tank integrated on Common Skid*

Operating Pressure *11 barg*

Product Purity % *99.5 N₂*

Compressor Electric Motor *75 kW, IP56
Microprocessor Based Dedicated
Local Control System as Vendor Standard Controller*

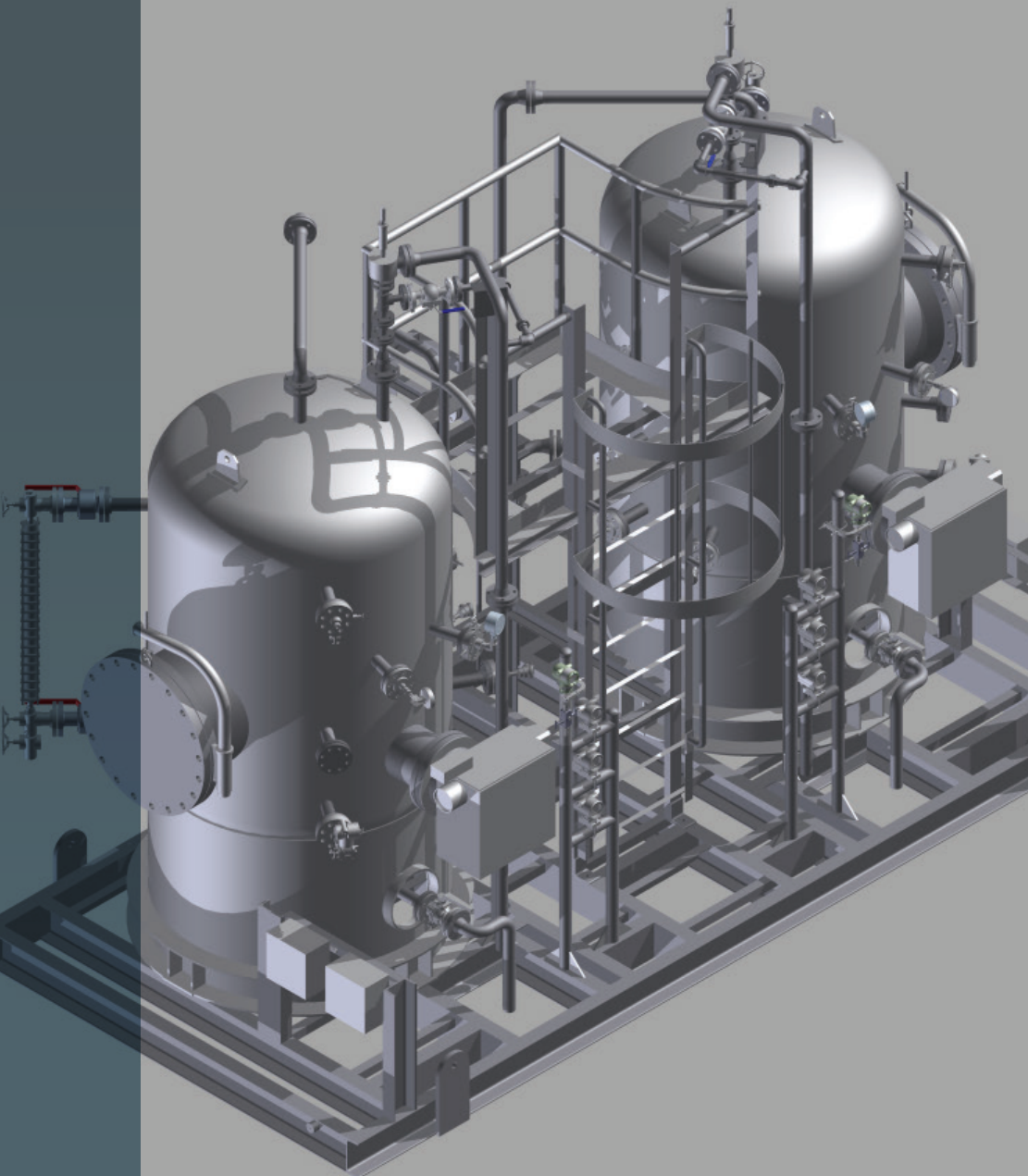
Junction Box *NEMA4X Epoxy Powder coated Enclosure*



Hot Water Calorifier

A Calorifier is a stationary water heater that supplies hot water for showers, washing and other various utilities to the offshore living quarters.

Firscamp offers custom designed hot water calorifiers for the use both in Hazardous and Safe areas. All products are designed, manufactured and shop tested as per the specific project requirements. The entire skidded system is comprised of vessels, electrical heaters, interconnecting piping/valves, control panel and safety features for safe and stable operation.



- Key Features**
- *Stainless steel for pressure vessel and piping*
 - *PLC based UCP/LCP*
 - *Redundant systems compliance to SIL II & III requirements
ATEX suitable for Zone 1 / Zone 2*
 - *Painting (external / internal) as per required specifications*
 - *Thermal Insulation*
 - *ASME or Classification approval*
 - *Circulation pumps can be integrated in the complete package*
 - *Integration of Electrical & Instrument components*

Hot Water Calorifier

- Application** *Portable Water Heating Unit for Living Quarter of Offshore Platform*
- Size** *5200L x 2500W x 4300H mm*
- Ambient Temperature** *21.1 °C ~ 35.8 °C*
- Design Temperature** *100 °C*
- Operating Temperature** *70 °C*
- Operating Discharge Pressure** *6.0 barg*
- Flow Rate** *5 Nm³/hr*
- Capacity per Vessel** *2.99 m³*
- Applied Coating System** *As per project specification of painting on stainless steel 316L vessels*
- Heating Medium** *Water*
- Construction Feature** *ASME SEC VIII DIV.1 2013 EDITION*
- Heater Power** *400 V / 50 Hz / 3 Phase, 180 kW (per Vessel)*
- Area Classification** *Zone 2, Gas Group IIB, T3*
- Local Control Station** *IP 66, SS316 Enclosure*



Hot Water Calorifier

Application *Portable Water Heating Unit for Living Quarter of Offshore Platform*

Size *6000L x 3100W x 5200H mm*

Ambient Temperature *21.1 °C ~ 35.8 °C*

Design Temperature *80 °C*

Operating Temperature(Min./Max.) *21.1 °C / 60 °C*

Operating Discharge Pressure(Min./Max.) *4 barg / 7 barg*

Flow Rate *6.8 m³/hr*

Capacity per Vessel *8.37 m³*

Applied Coating System *As per project specification of painting on stainless steel 316L vessels*

Heating Medium *Water*

Construction Feature *ASME SEC VIII DIV.1*

Heater Power *400V / 50Hz / 3Phase, 110 kW (per Vessel)*

Area Classification *Zone 2, Gas Group IIA, T3*

Local Control Station *IP 66, SS316*





HP Pump System / HP Wash Down Unit

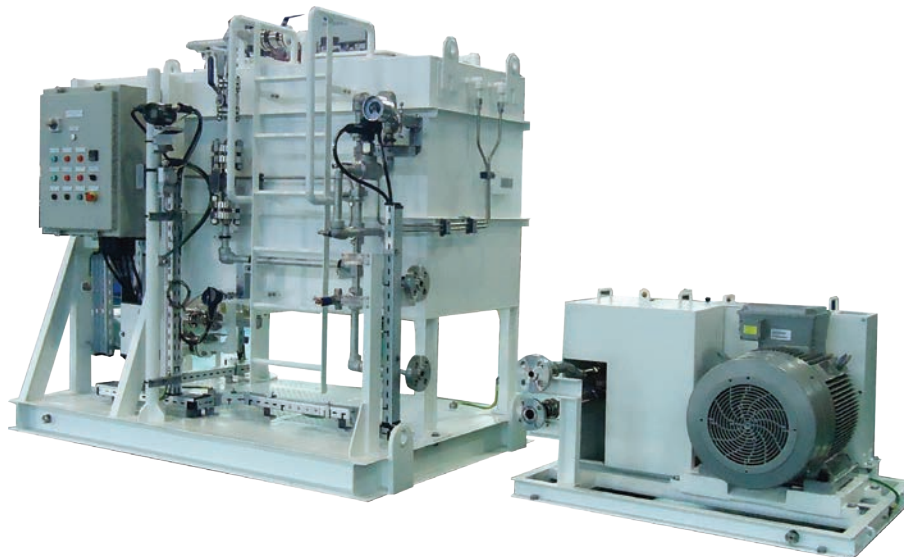
Firscomp provides a wide range of high pressure washing units for the use in hazardous and safe areas in both offshore and onshore. We design complete packages for the specific requirements compliant to international codes and standards. For meeting the required water temperature, we can offer both electric heaters and steam heaters as per the client's requisition.

Typical applications are removal of mud, dirt, grease, and oil, parts washing, sidewalks and maintenance area washing, They are suitable for locations with the harshest of environments including oil refineries, petrochemical plants, mills and mines.

- Applications**
- *Operating pressure upto 500 barg @ flow rate as per requirements*
 - *Meeting the required atmosphere condition with hot, warm and cold water*
 - *Compliance to EN,PED, ATEX, NORSOK, API, IECEx*
 - *Acoustic Enclosure or containerized unit*
 - *Service water tank*
 - *Local Control Panel*

Explosion-proof Cold Wash Down Unit (ATEX-Zone 2)

- Application** *Mud Removal at Offshore Drilling Platform*
- Main Motor Power** *7.5 kW / 690 V / 50 Hz / 3 Ph*
- Operating Pressure** *207 barg*
- Flow Rate** *15.2 LPM*
- Operating condition** *Cold wash down*
- Construction** *Plunger Pump with 8 liters water tank and LCP on common skid*
- Electric, Instrument & Control feature** *Manual Start Stop, Local Pressure Gauge, Floating valve for water tank
Motor Starter Unit – Ex d IIB T4
Electric Motor – Ex de IIC T3, IP56*

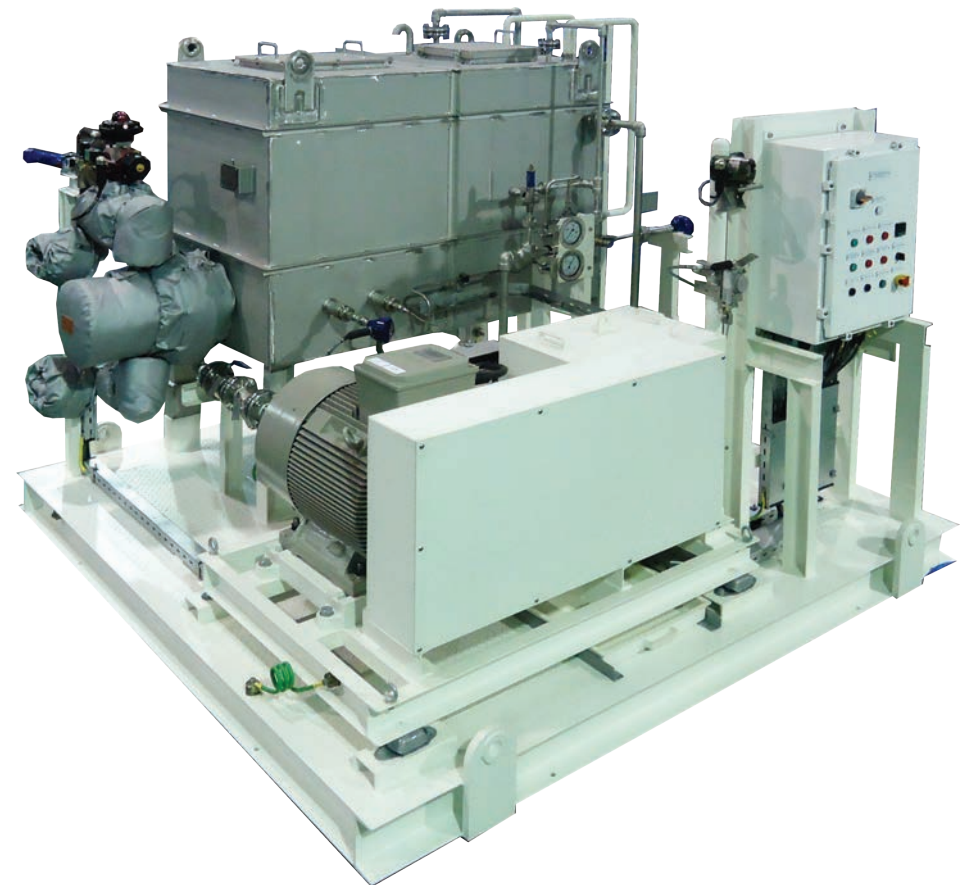


Warm Wash Down Unit

- Application** *Mud Removal at Offshore Drilling Rig*
- Applied Code** *NORSOK and project specification*
- Main Motor Power** *30 kW / 690 V / 60 Hz / 3 Ph, IP54*
- Electric Heater** *35 kW / 690 V / 60 Hz / 3 Ph including heater controller thyristor*
- Operating Pressure** *200 barg*
- Flow Rate** *50 LPM*
- Operating condition** *Warm wash down (60 °C)*
- Construction** *1500 Liters Water Tank skid with LCP
Pump skid with motor
Local Control Panel with Motor Starter
Enclosure of IP44
Local start/stop*

Warm Wash Down Unit

- Application** *Mud Removal at Offshore Drilling Rig*
- Applied Code** *NORSOK (S-002 & S-005) and project specification*
- Main Motor Power** *30 kW / 690 V / 60 Hz / 3 Ph, IP54*
- Electric Heater** *35 kW / 690 V / 60 Hz / 3 Ph including heater controller thyristor*
- Operating Pressure** *200 barg*
- Flow Rate** *50 LPM*
- Operating condition** *Warm wash down (60 °C)*
- Construction** *Complete package on common skid
1500 Liters water tank in stainless steel 316L with floating valve
HP Plunger Pump with motor
Heater and piping insulation
Local Control Panel with Motor Starter
Enclosure of IP44
Local start/stop*



Air & Gas Bottle Racks

We supply gas bottle racks for safe storage and transportation for various offshore and onshore applications. All gas bottles and instruments are sourced by Firscomp and interconnected by piping or tubing with instruments such as pressure gauges, valves, pressure switches, pressure control valves and pressure safety valves as per the client's requirements. Our engineers perform a compact design of common rack catering to all bottles, instruments and control features to minimize the footprint due to space restrictions. Pressure control valves maintain the required gas operating pressure (outlet pressure of rack) accurately and safely up to 350 barg.



Air Storage Bottle Rack

- Application** *Breathing Air Storage for Offshore Platform*
- Charging Pressure** *250 barg*
- Operating Pressure** *7 barg Outlet*
- Bottle Capacity** *50 Liters water capacity*
- Construction** *Two racks, each rack catering 4 Bottles per rack with instruments and interconnecting tubing*
- Instruments** *Pressure Gauge with manifold valve for monitoring bottle gas pressure*
Pressure Reducing Regulator valve for constant discharge gas pressure at outlet of common header



Nitrogen Gas Bottle Rack

- Application** *Blanket Gas for Offshore Platform (TLP)*
- Charging Pressure** *200 barg*
- Operating Pressure** *7 barg and 103 barg Outlet*
- Bottle Capacity** *50 Liters water capacity*
- Construction** *Six racks, each rack catering 12 Bottles with instruments and interconnecting tubing*
Lifting lugs and manual pork lift holes
Gas discharge and refilling available
- Instruments** *Pressure Gauge with DBB valve for monitoring bottle gas pressure*
Pressure Transmitter for monitoring bottle outlet header pressure
Pressure Reducing Regulator valve for constant discharge gas pressure at outlet of common header

Propane Bottle Rack

- Application** *Propane Gas to Flare Stack for Offshore Platform (FPU)*
- Charging Pressure** *12 barg*
- Operating Pressure** *No Pressure Reducing*
- Bottle Capacity** *108.4 Liters water capacity*
- Construction** *One rack catering 5 Bottles with instruments and interconnecting tubing*
Lifting lugs and manual fork lift holes
- Instruments** *Pressure Gauge with SBB valve for monitoring bottle gas pressure,*
and Pressure Transmitter for monitoring bottle outlet header pressure



Nitrogen Bottle Rack

- Application** *Blanket Gas for Offshore Platform (FPU)*
- Charging Pressure** *200 barg*
- Operating Pressure** *7.3 barg Outlet*
- Bottle Capacity** *50 Liters water capacity*
- Construction** *One rack catering 16 Bottles with instruments and interconnecting tubing*
One rack catering 2 Bottles with instruments and interconnecting tubing
Lifting lugs and manual fork lift holes
- Instruments** *Pressure Gauge with DBB valve for monitoring bottle gas pressure*
Pressure Transmitter for monitoring bottle outlet header pressure
Pressure Reducing Regulator valve for constant discharge gas pressure at outlet of common header

Nitrogen Gas Bottle Rack

Application *Nitrogen Gas for Emergency Air Horn of Offshore Platform (PGA)*

Charging Pressure *200 barg*

Operating Pressure *7 barg Outlet*

Bottler Capacity *50 Liters with water capacity*

Construction *1 Rack catering 8 Bottles with instruments and interconnecting tubing
Lifting lugs and manual fork lift holes*

Instrument & Control *Pressure Indicating Switch with DBB valve for monitoring bottle gas pressure
Pressure Gauge with DBB valve for monitoring bottle outlet header pressure*

*Pressure Reducing Regulator valve for constant
discharge gas pressure at outlet of common header*

*Pressure Safety Valve and High pressure direct operating
Solenoid Valve at outlet of common header*

Instrument Junction box for Solenoid valves

Emergency Push Button Box for releasing solenoid valves

ATEX and SIL approved instruments



Control System

Designing and integration control systems for a wide range of applications for all types of compressors as well as other packaged machinery.

All cubicles, housings and panels are assembled and tested according to international standard codes and project specifications in our own facility by our own staff.

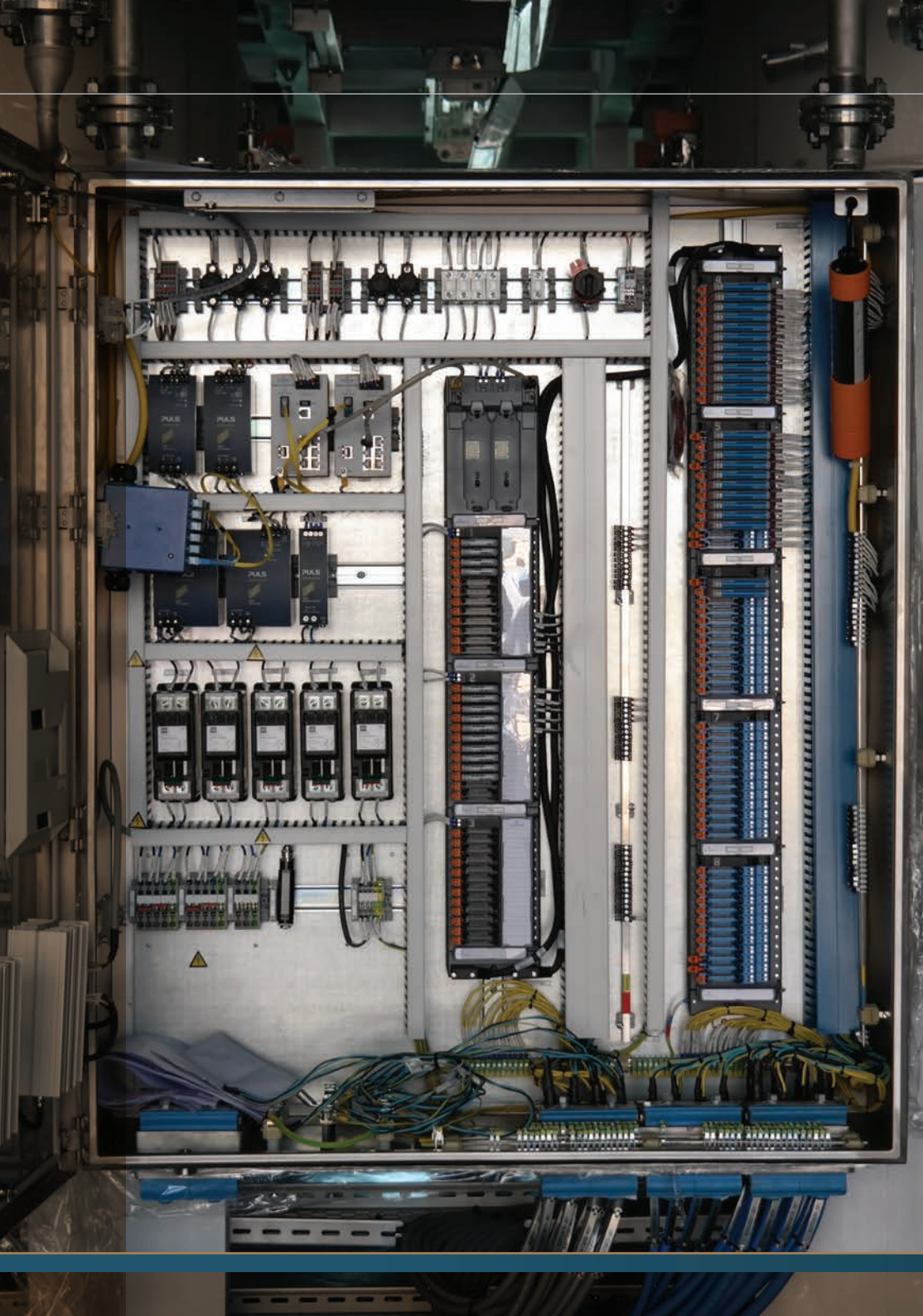
All Control systems are integrated according to project specifications and required international codes.

Executing the whole process of control system design, material selection, programming the control logic and the integration of PLC.

Control system and instrumentation can be enhanced by integrating Safety Integration Level (SIL) and system redundancy.

Suitable for use in harsh and hazardous environment by that is in conformance to international standard codes.

- Applications**
- *Anti-Surge Control panels fully integrated*
 - *Chiller system control panels*
 - *Centrifugal, Screw and Reciprocating compressor control panels and monitoring system*
 - *Explosion proof panels*
 - *Purged control panels*
 - *Monitoring and supervisory control systems*
 - *Redundant system*
 - *Gas dryer and Air dryer package panels and monitoring system*
 - *Pressure, temperature, level, flow, transmitters and gas detectors*



Unit Control Panel (Based on PLC)

Application *Oil Free Rotary Screw Compressors for Offshore Platform*

UCP Comprised of *Allen-Bradley Control Logix platform*

Redundancy : CPU, Power Supply and Communication

Communications : Interface via MODBUS RTU with ICSS

I.S barriers for connecting with I.S type field instruments have been provided

HMI 12'1 colored TFT LCP

Enclosure ;

** 800x800x2100mm including plinth/base 100mm*

** Sheet steel with painting, IP54 for indoor*

** free standing, front accessible only*

Feature *Capacity load/unload controls*

Monitoring/surveillance and safeguarding during operation



Local Control Panel (Based on PLC)

Application Oil Free Reciprocating Air Compressors of offshore fixed platform

LCP Comprised of Siemens S7-300 system platform
Communications : interface via MODBUS RTU over RS-485 with DCS.
Signal lamps, switches to interface with operator furnished on enclosure door instead of HMI

Enclosure ;

- 730x730x465mm
- Aluminium alloyed (seawater resistant according to EN 13195-1) with painting
- ATEX Ex 'd' flame proof approved, IP66

Features Capacity load/unload controls
Monitoring/surveillance and safeguarding during operation



Application Closed Cooling System for Offshore Fixed Platform

LCP Comprised of Siemens S7-300 system platform
Communications : interface via MODBUS RTU over RS-485 with DCS.
Signal lamps, switches to interface with operator furnished on enclosure door instead of HMI

Enclosure ;

- 730x730x465mm
- Aluminium alloyed (seawater resistant according to EN 13195-1) with painting
- ATEX Ex 'd' flame proof approved, IP66

Features Fan and Circulation Pump Control
Monitoring/surveillance and safeguarding during operation

Unit Control Panel (Based on PLC)

Application *Oil Free Rotary Screw Air Compressors of Revamping Gas Plant*

UCP Comprised of *Siemens S7-400H platform and ET200M remote distributed system*

Redundancy :

- CPU, Power Supply, Communication and I/O Modules

Communications :

- Interface via PROFINET among four(4) nos.

UCPs and via MODBUS TCP/IP with DCS

HMI 12.1" colored TFT LCP

Enclosure :

- 800x800x2100mm including plinth/base 100mm

- Sheet steel with painting, IP54 for indoor

- free standing, front and rear accessible through doors

Features *Capacity load/unload controls*

Monitoring/surveillance and safeguarding during operation

Time synchronization of PLC via NTP has been provided

Sequence control by Lead/Lag selection

Machine monitoring and protection through input of

GE-Bently Nevada's Seismic transmitters



Unit Control Panel (Based on PLC)

Application *Portable Water Heating System (Hot Water Calorifier) for Offshore Platform*

UCP Comprised of *Allen-Bradley, Control Logix platform*

Redundancy :

- CPU, Power Supply and Communication

Communications :

- Interface via MODBUS RTU with ICSS
- Signal Lamps and actuated switches/buttons instead of HMI

Enclosure ;

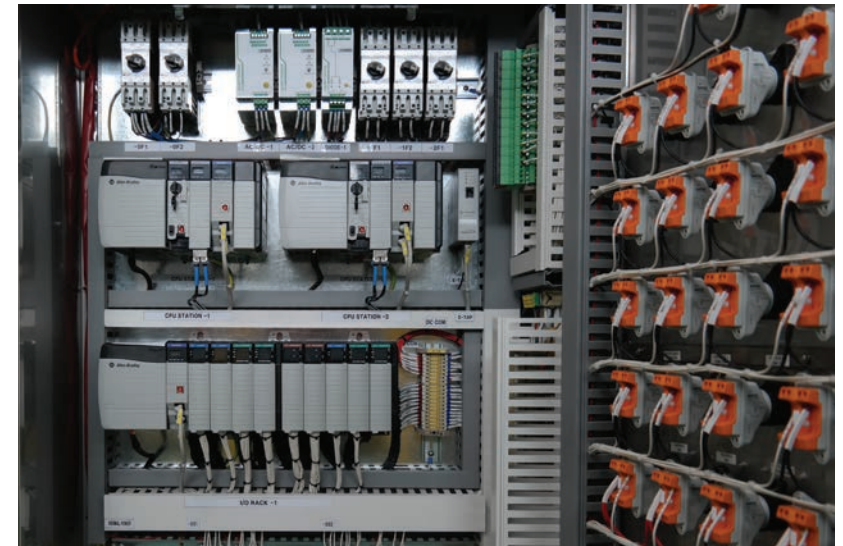
- 800x300x1200mm, St.st. 316L without painting
- Wall mounting, front accessible only
- ATEX Ex 'e' approved enclosure

Features *Electric Heaters control*

Monitoring/surveillance and safeguarding during operation

Declaration of Conformity (DOC) certification suitable for used in ZONE 2 hazardous location

II 3G Ex nA nC e IIC T4





Services

Firscamp provides various kinds of services from technical assistance to site aftersales services to satisfy customer's needs. We have dedicated engineers and technicians with extensive experience and expertise for each service. All of our service staff are certified through our internal training courses.

We have a special service organization for shipyards Punch Clear works that begins after equipment delivery at shipyards for our own products and equipment supplied by other vendors as well. If needed we can transport all equipment to our shop to correct the critical punch items.

- Major Services**
- *Commissioning services*
 - FAT at Shop (Including String Test)*
 - Yard Commissioning (Korean major shipyards)*
 - Site Commissioning (Offshore and Onshore)*
 - *Weighing Test (at Shop)*
 - *Spare Parts*
 - *Punch Clear service (at major Korean shipyards)*
 - Mechanical Completion (MC) Punches*
 - FAT Punches*
 - Shipyard Punches (at major Korean shipyards)*
 - Other Vendor's Equipment punches at shipyard*
 - *Warranty Claim*
 - *Customer Training*

Contact Us

www.firscomp.co.kr

HEAD OFFICE

Address : 301-808, Bucheon Technopark Ssangyong 3 Cha, 397, Seokcheon-ro, Ojeong-gu, Bucheon-si, Gyeonggi-do, KOREA 14449

Phone : +82-32-624-4292 / Fax : +82-32-232-7172

Email : info@firscomp.co.kr

HWASEONG SHOP

Address : 14, Barangongdan-ro, Hyangnam-eup, Hwaseong-si, Gyeonggi-do, KOREA 18608

Phone : +82-31-354-7140 / Fax : +82-32-232-7172

