

more than
CRYOGENICS

CRYOGENIC TRANSFER PUMPS
FOR LIQUEFIED GASES

★ **DISTRIBUTION**
CRYOSTAR



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CRYOGENICS

WORLDWIDE PRESENCE

CRYOSTAR company ensures a local presence for sales and service through its business centres and business partners network.



CRYOSTAR offers solutions to minimise downtime for its machines such as maintenance contracts, spare parts management and remote maintenance.



Product specialists will give you technical assistance by phone, and can launch an urgent intervention where necessary.

CRYOSTAR
CUSTOMER CONTACT

+33 (0)3 89 700 700

support-csf@cryostar.com



INNOVATION

We in CRYOSTAR are at the forefront of innovation in terms of Research & Development as well as equipment design.

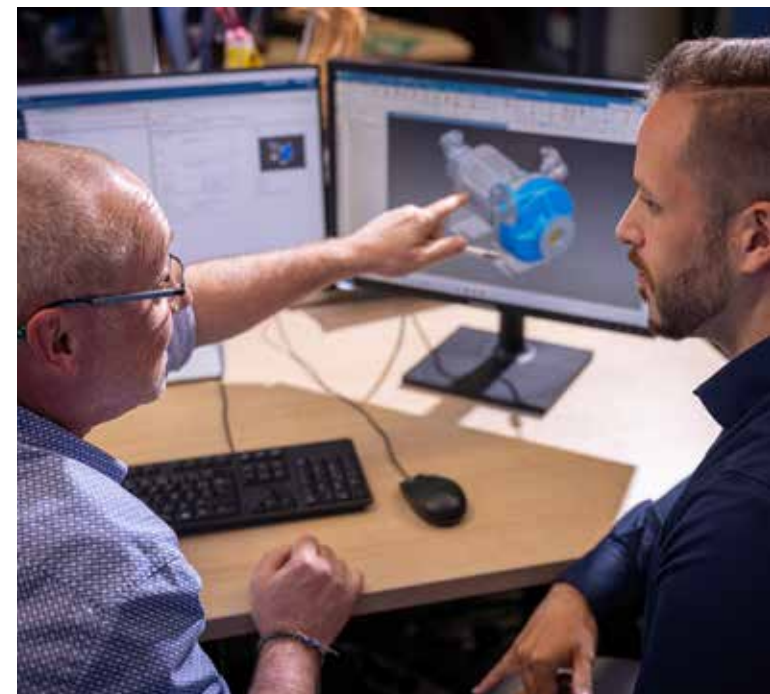
Everyday our engineers, experts and specialists take up challenges with their passion for excellence to provide market-oriented high performance innovative solutions.

TESTING

Each and every product – whether new or recently serviced – is tested on CRYOSTAR cryogenic test facility following CRYOSTAR stringent test protocols.

Performance tests are run with liquid nitrogen to guarantee optimized performances for the customer.

A copy of the performance test is systematically included in the instruction and operating manual delivered together with the equipment.



Test tank capacities	200 m ³ + 54 m ³ + 16m ²
Number of lines	10 + 2 (HP)
Flow rate	up to 20'000 l/min
Operating pressure	up to 700bar
Power	up to 2 MW





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HEALTH, SAFETY, ENVIRONMENT

CRYOSTAR is certified **ISO 9001 (V2015), ISO 14001 (V2015) et ISO 45001 (V2018)**. Continuous improvement is deeply rooted in the company's culture.

Safety and security of people and assets are paramount for CRYOSTAR. All the equipment we deliver are compliant with the most accepted international norms and regulations and can be adapted to specific local regulations upon request from the customer.

CRYOSTAR is committed to achieve responsible human fulfillment for its employees. **Diversity, equilibrium and well-being at work are at the heart of CRYOSTAR human resources policy.**



TRAINING

CRYOSTAR Training Center provides complete training courses on all type of equipment.



Theory combined with practice are at the heart of sessions aiming at teaching technical teams how to install, operate and maintain the different equipment in CRYOSTAR portfolio.

- ★ Best practice operation
- ★ Safe & efficient maintenance
- ★ Optimize and increase the MTBF

QUALITY

The Quality department features a large and highly qualified multidisciplinary team, which is involved in implementing Quality strategy in areas of the utmost importance:

- ★ Metrology / Quality System
- ★ Operational Quality
- ★ Product Safety
- ★ Supplier Quality
- ★ Engineering Quality



PROTECT YOUR PUMP



Cooling down monitoring



Soft start



Dry running protection



Leak detection





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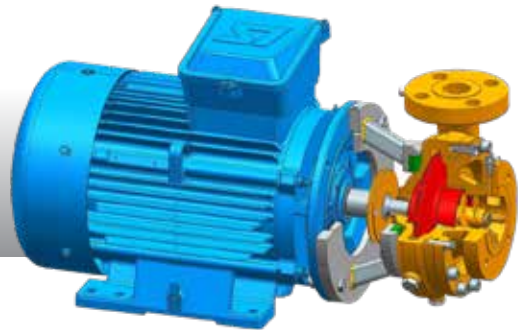
COMPREHENSIVE RANGE OF CENTRIFUGAL PUMPS

CRYOSTAR centrifugal pumps are suitable for any kind of installation and duty for cryogenic fluids such as liquid oxygen, nitrogen, argon, nitrous oxides, carbon dioxide, natural gas or ethylene.

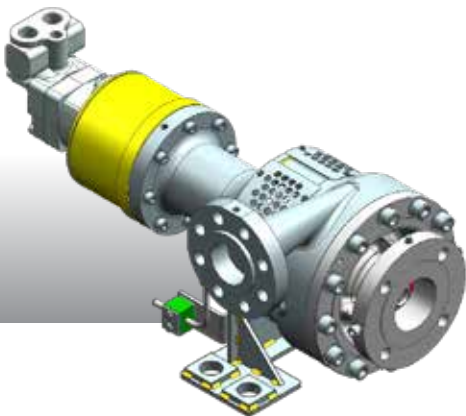
These pumps are available in different constructions and executions to comply with various applications:

- ★ Stationary transfer
- ★ Mobile tanker loading/unloading
- ★ LNG refueling
- ★ LNG bunkering

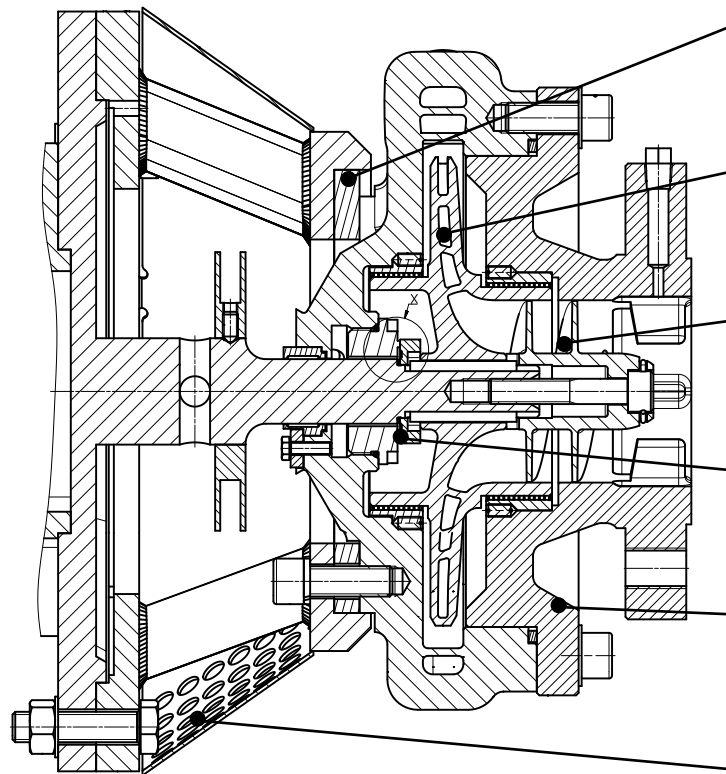
EXTERNAL WITH SHAFT SEAL



Electric driven



Hydraulic driven



Thick **insulation** plate
Reduced radial thrust load

Closed impeller
High efficiency

Helical inducer with increased diameter
Lowest NPSH requirement along the **whole flow range**

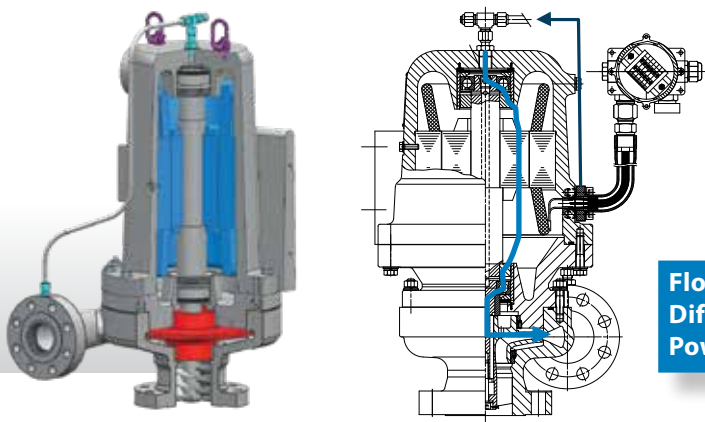
CRYOSTAR **shaft seal**
Extended lifetime



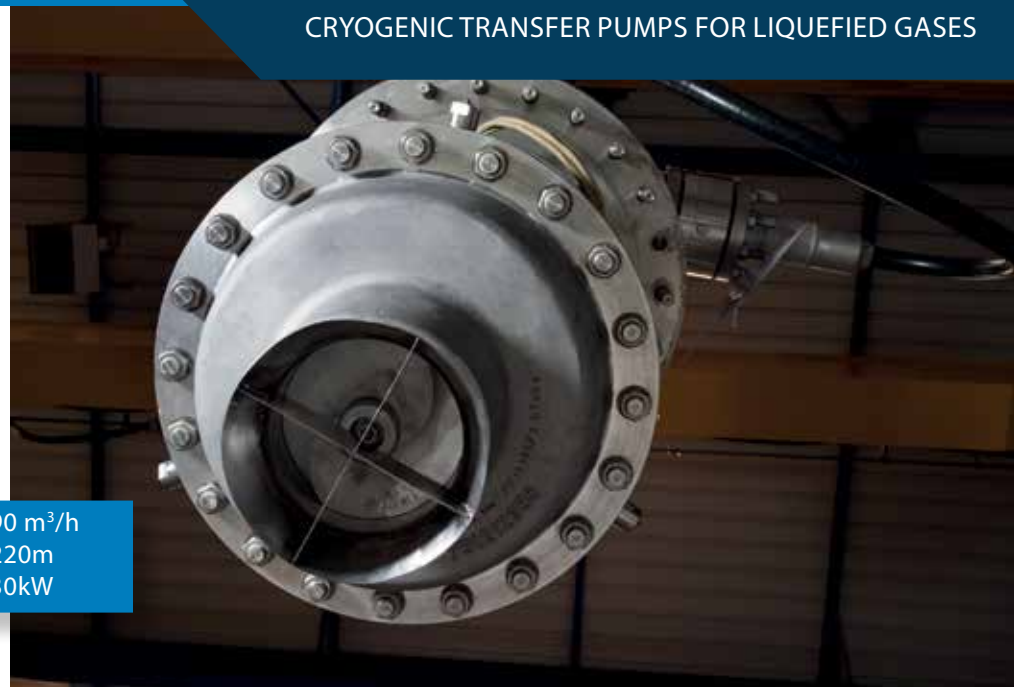
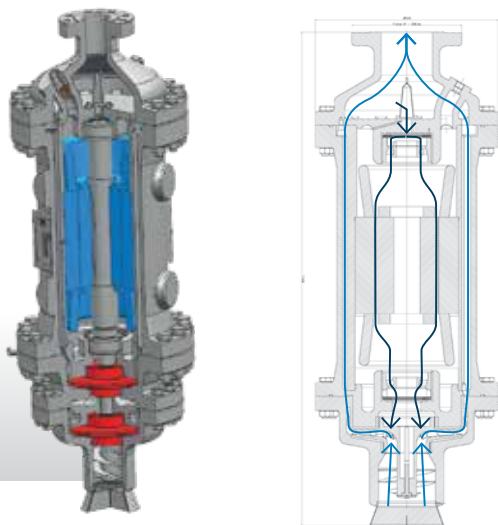
Front opening of housing
Easy maintenance

Safety guard
Compliance with **Machinery Directive 2006/42=EC**

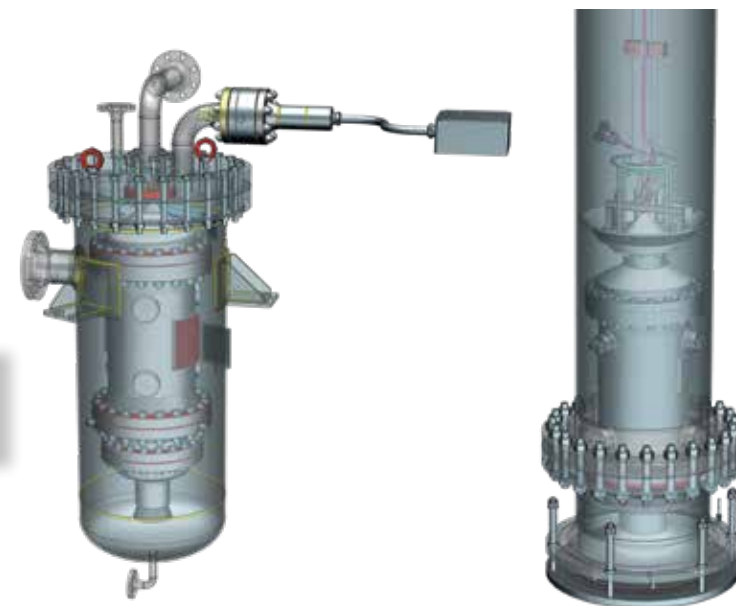
Flow rate	Up to 130 m ³ /h
Differential head	Up to 460m
Power	Up to 90kW

SUBMERGED - ENCAPSULATED SEALESS*(not suitable for O₂ or N₂O)*

Flow rate	Up to 90 m ³ /h
Differential head	Up to 220m
Power	Up to 30kW

**SUBMERGED - IN SUMP OR IN TANK SEALESS***(not suitable for O₂ or N₂O)*

Flow rate	Up to 520 m ³ /h
Differential head	Up to 500m
Power	Up to 200kW



In sump

In tank



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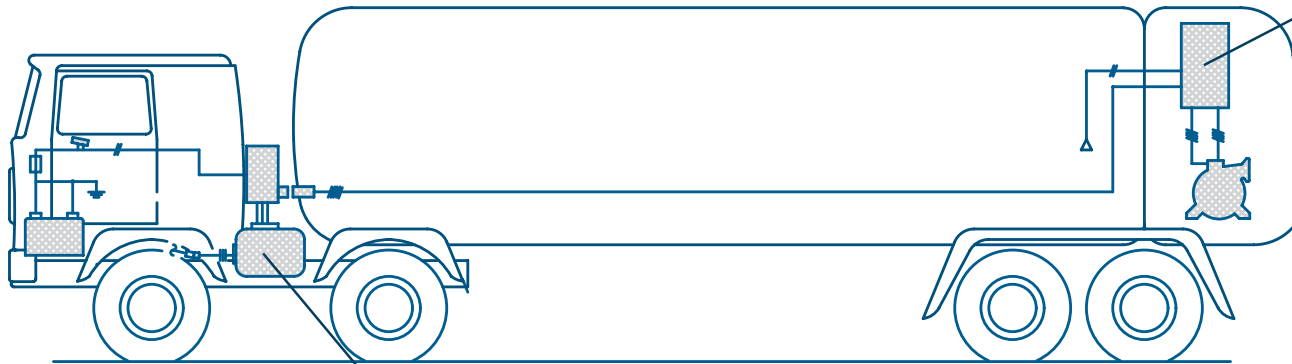
ELECTRIC DRIVEN PUMPS FOR MOBILE TANKER UNLOADING

Electric driven pumps for mobile applications:

- ★ Low weight to maximize the payload
- ★ Compact to fit into restricted space
- ★ Robust design for intensive use

The "Plug'in" system is powered through on site grid.

The "Mixtran" system consists of an electrical generator mounted on the trailer and coupled to the truck Power Take Off (PTO); it supplies power to the pump independently from the grid whenever the latter is not accessible for any reason.



FREQUENCY INVERTER
60-150 Hz



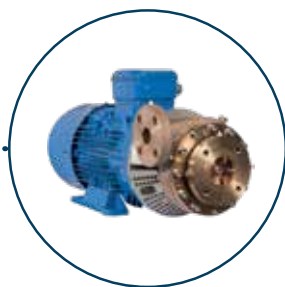
MIXTRAN
Alternator
driven by take off (PTO)
50-60 Hz



PLUG'IN
On site power supply
50-60 Hz

SAFETY

- ★ O2 compatible materials & lubricants
- ★ ATEX certified pumps for hazardous area
- ★ Dry running protection through motor loadloss or differential pressure monitoring



GBSD / CBSD
External pump
Variable speed

Duty



LO ₂ - LN ₂ O	<input checked="" type="radio"/>
LN ₂ - LAr - LCO ₂	<input checked="" type="radio"/>
LNG - LC ₂ H ₄	<input type="radio"/>



VS
Submerged motor
Variable speed

Duty



LO ₂ - LN ₂ O	<input type="radio"/>
LN ₂ - LAr - LCO ₂	<input checked="" type="radio"/>
LNG - LC ₂ H ₄	<input checked="" type="radio"/>

Semi trailer / ISO tank



GBS / CBS
External pump
Fixed speed + gearbox

Duty



LO ₂ - LN ₂ O	<input checked="" type="radio"/>
LN ₂ - LAr - LCO ₂	<input checked="" type="radio"/>
LNG - LC ₂ H ₄	<input checked="" type="radio"/>



VS
Submerged motor
Fixed speed

Duty



LO ₂ - LN ₂ O	<input type="radio"/>
LN ₂ - LAr - LCO ₂	<input checked="" type="radio"/>
LNG - LC ₂ H ₄	<input checked="" type="radio"/>

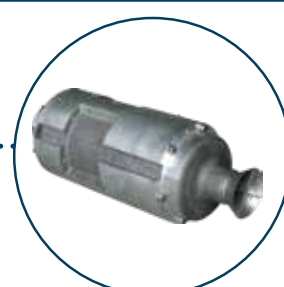


CO120
External pump
Variable speed

Duty



LO ₂ - LN ₂ O	<input checked="" type="radio"/>
LN ₂ - LAr - LCO ₂	<input checked="" type="radio"/>
LNG - LC ₂ H ₄	<input type="radio"/>



SUBTRAN 22
Submerged motor
Variable speed

Duty



LO ₂ - LN ₂ O	<input type="radio"/>
LN ₂ - LAr - LCO ₂	<input checked="" type="radio"/>
LNG - LC ₂ H ₄	<input checked="" type="radio"/>

Micro bulk

LEGEND

Flow	150 450 700 (l/min)
	40 120 185 (gpm)
Pressure	10 20 35 (bar)
	150 300 550 (psi)





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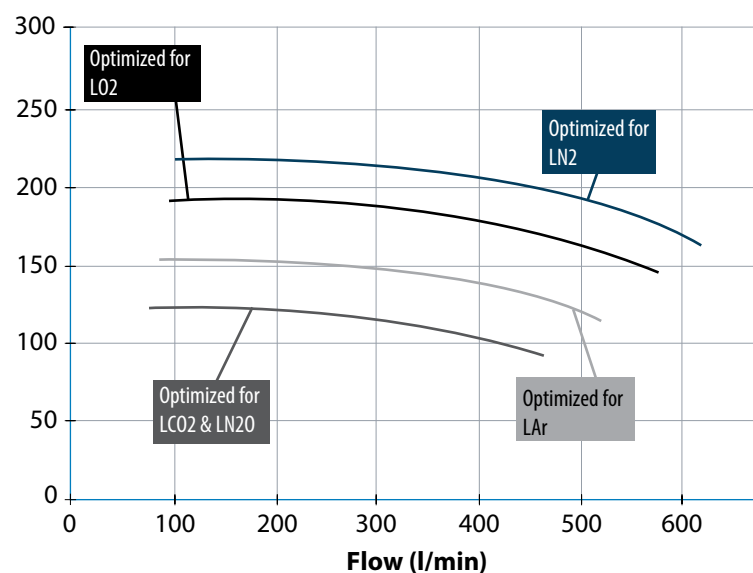
PUMPS WITH GEARBOX* - FIXED SPEED

GBS

11 to 22kW



Head (m)

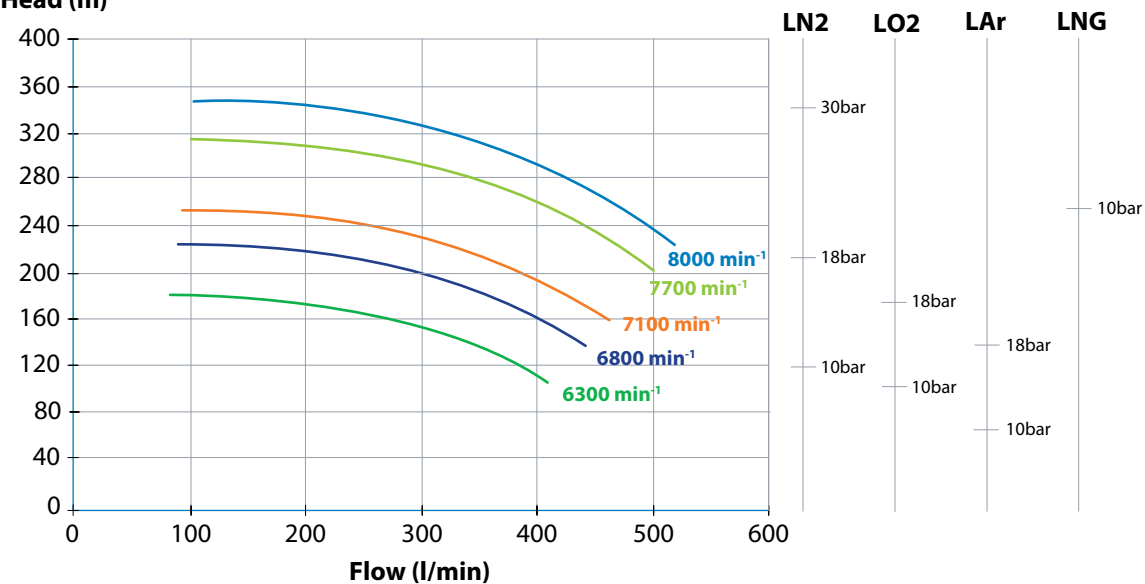


CBS

30 to 37kW



Head (m)

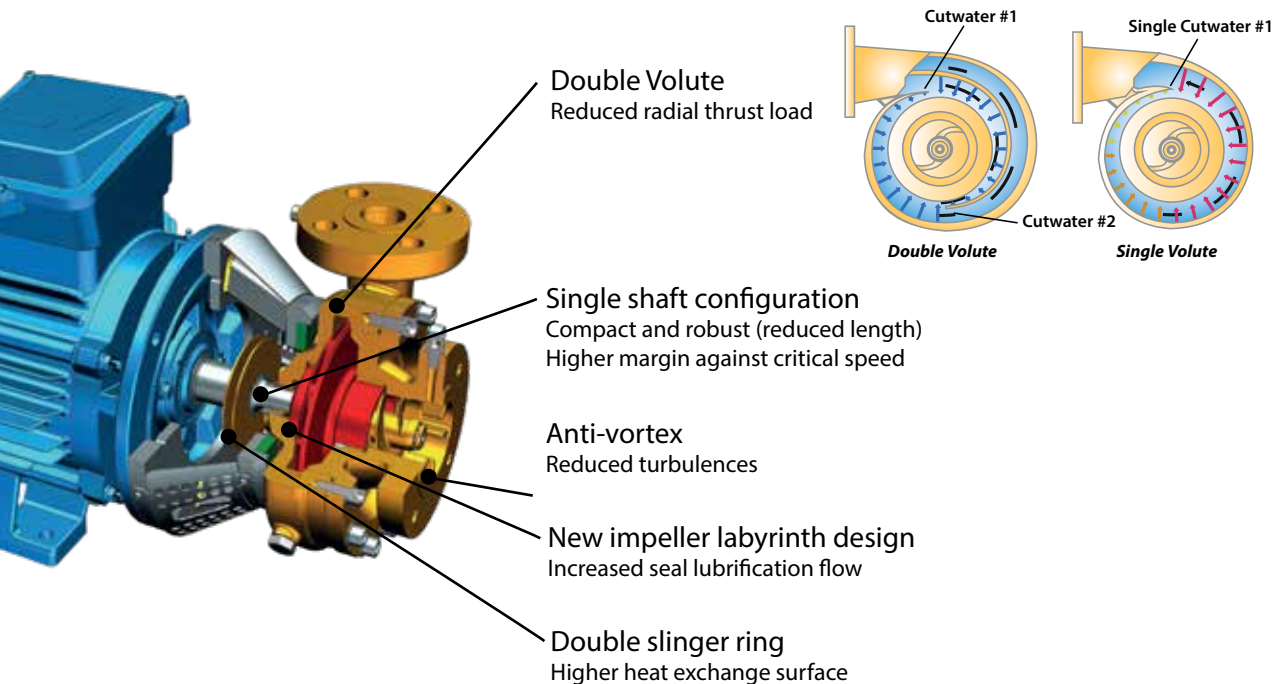
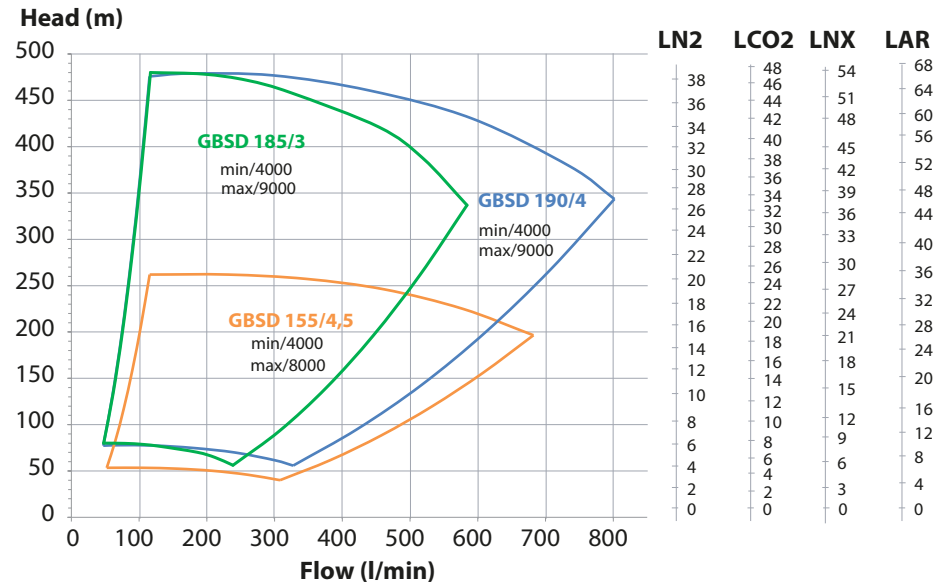
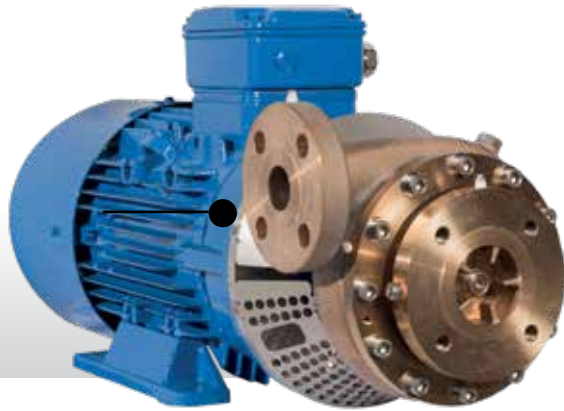


* gearbox with O₂ compatible oil (optional: N₂ purge ; oil heating cartridge for extreme cold temperature)

DIRECT DRIVEN PUMPS - VARIABLE SPEED

GBSD

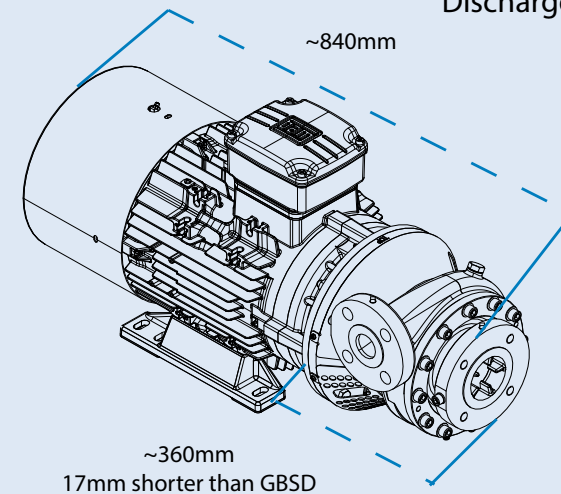
27kW (@125Hz)
40kW (@150Hz)



Pump flanges, size and position
identical to GBSD 185/3

Suction: 2"1/2 150lbs

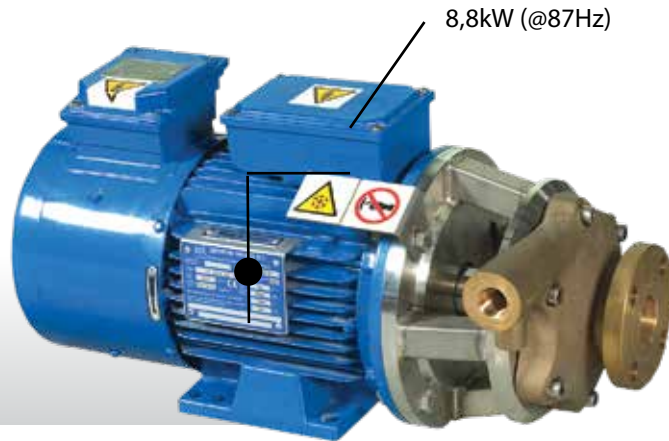
Discharge: 1"1/2 300lbs



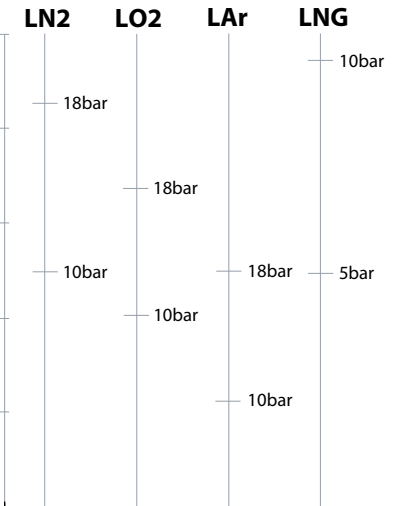
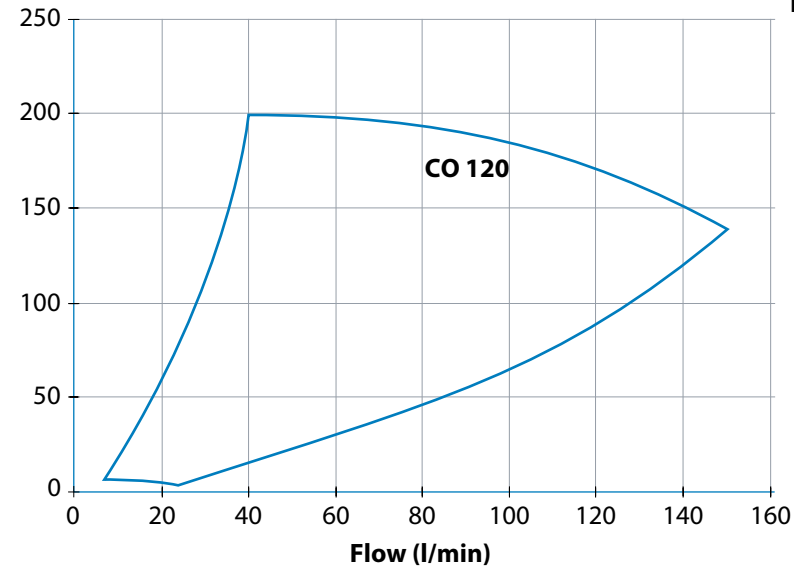


CO (FOR MINIBULK)

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Head (m)



FREQUENCY INVERTER & CONTROL BOX



Powered through electric network or alternator

IP 66 / Type 4x

Resistance to vibration up to 3G

Traceability with default codes record (up to 40)

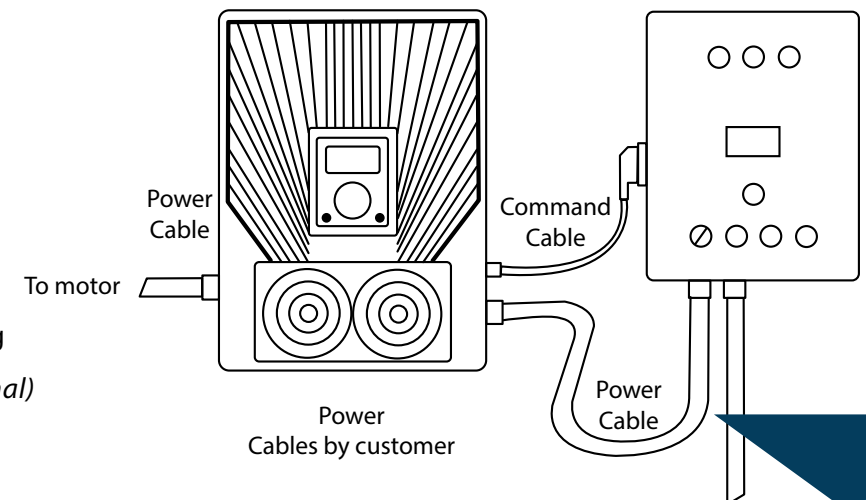
Instrumentation ready

Motor loadloss for **dry running** monitoring

PTC winding protection for **motor overloading** monitoring

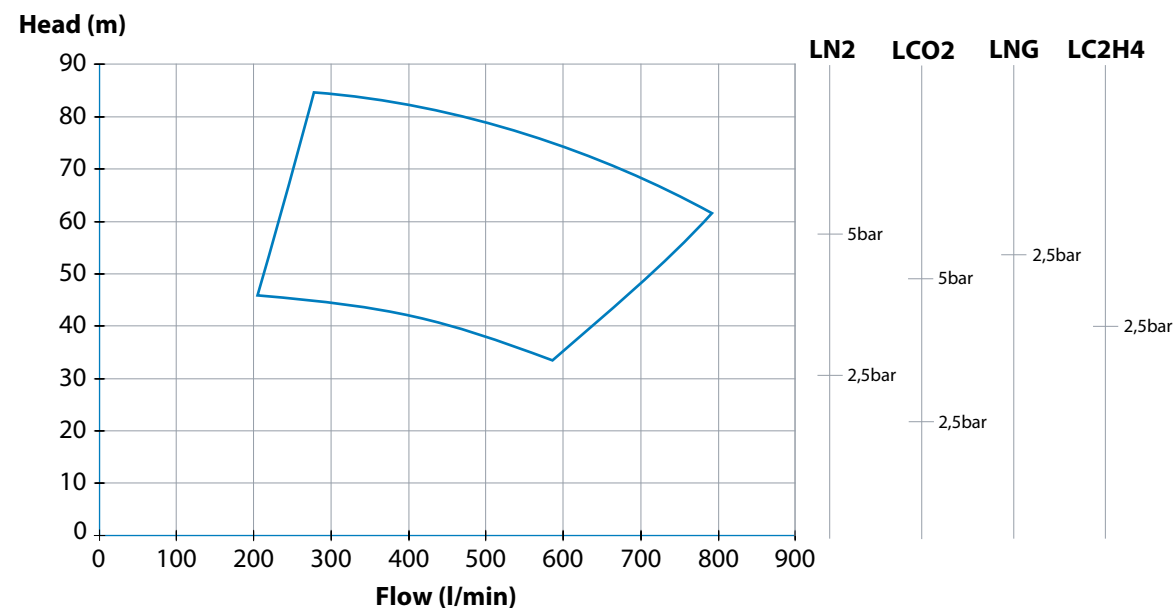
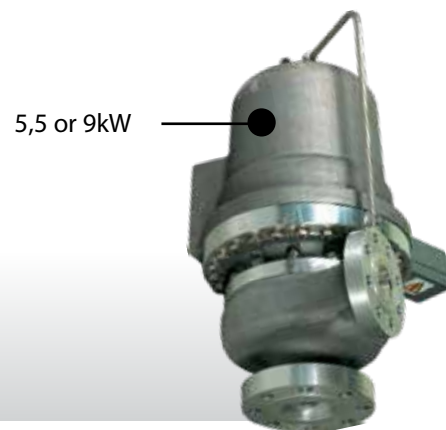
PT100 temperature probe for cooling down monitoring (optional)

Relay and time lag for DPS monitoring (optional)



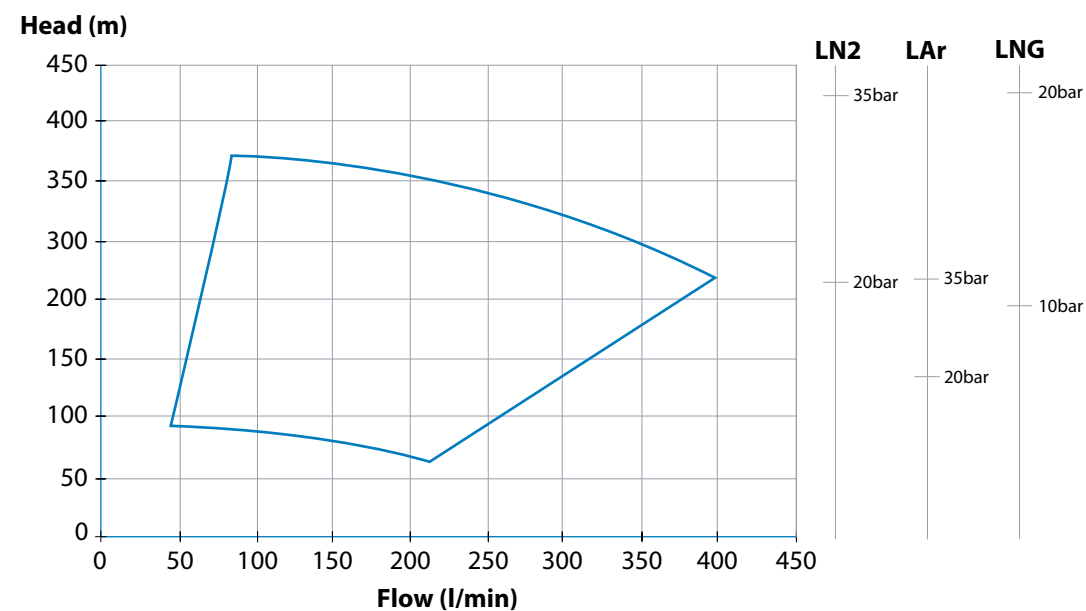
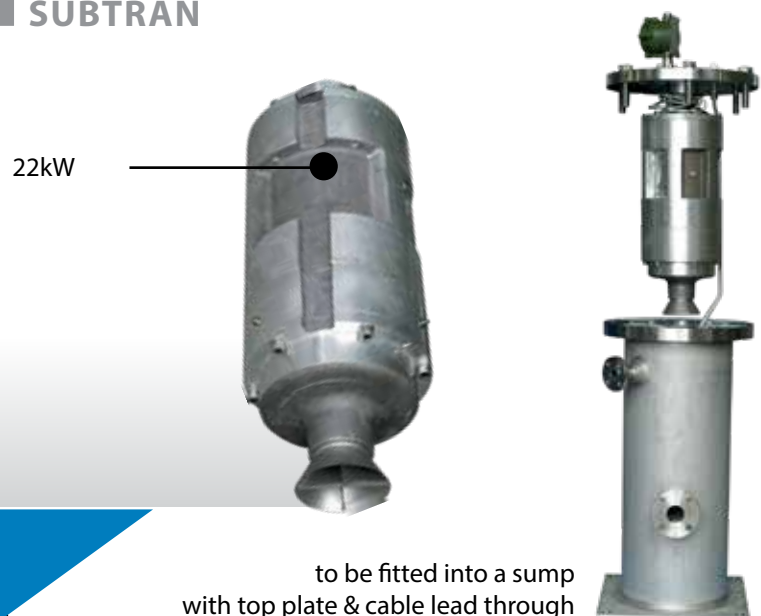
SUBMERGED ENCAPSULATED PUMPS - FIXED OR VARIABLE SPEED

VS 3x2x7



SUBMERGED IN SUMP OR IN TANK PUMPS - FIXED OR VARIABLE SPEED

SUBTRAN





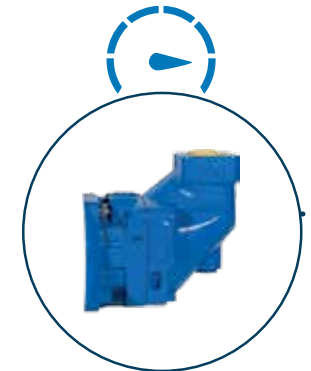
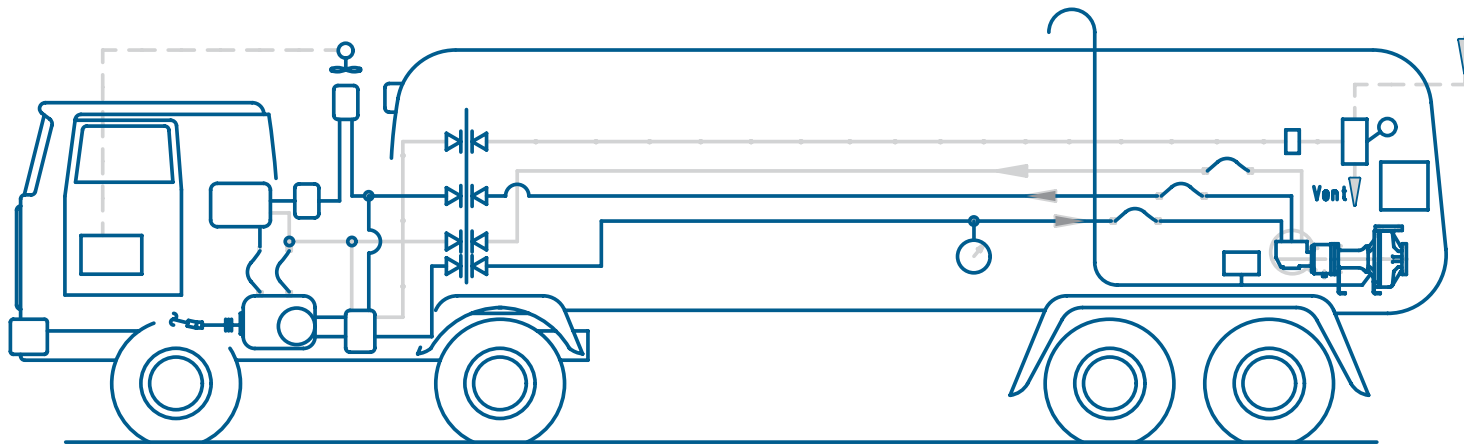
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HYDRAULIC DRIVEN PUMPS FOR MOBILE TANKER UNLOADING

Hydraulic driven pumps for mobile applications:

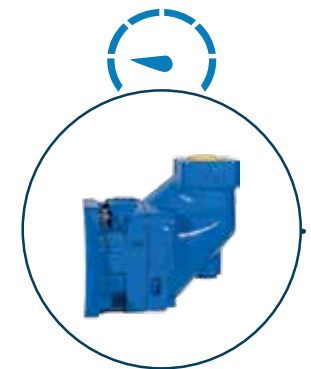
- ★ Low weight to maximize the payload
- ★ Compact to fit into restricted space
- ★ Robust design for intensive use

The “Hytran” system consists of a complete hydraulic package powered through truck Power Take Off (PTO) providing higher power than electric systems and offering a standalone operation.



HYTRAN-H

High speed hydraulic system
driven by power take off (PTO)
up to 8'000 rpm



HYTRAN-L

Low speed hydraulic system
driven by power take off (PTO)
up to 2'500 rpm



CSH
Grease lubricated
Variable speed

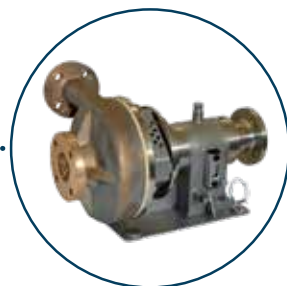
Duty



LO₂ - LN₂O

LN₂ - LAr - LCO₂

LNG - LC₂H₄



CSH OL
Oil lubricated
Variable speed

Duty



LO₂ - LN₂O

LN₂ - LAr - LCO₂

LNG - LC₂H₄

Semi trailer / ISO tank



P4
Grease lubricated
Variable speed

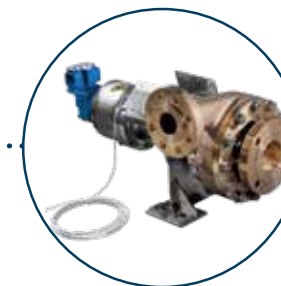
Duty



LO₂ - LN₂O

LN₂ - LAr - LCO₂

LNG - LC₂H₄



CSH
Grease lubricated
Variable speed

Duty

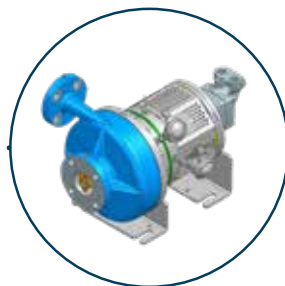


LO₂ - LN₂O

LN₂ - LAr - LCO₂

LNG - LC₂H₄

Micro bulk



MAGSTAR 260/5-H
Magnetic coupling
Variable speed

Duty



LO₂ - LN₂O

LN₂ - LAr - LCO₂

LNG - LC₂H₄

LEGEND

Flow	150	450	700 (l/min)
	40	120	185 (gpm)
Pressure	10	20	35 (bar)
	150	300	550 (psi)

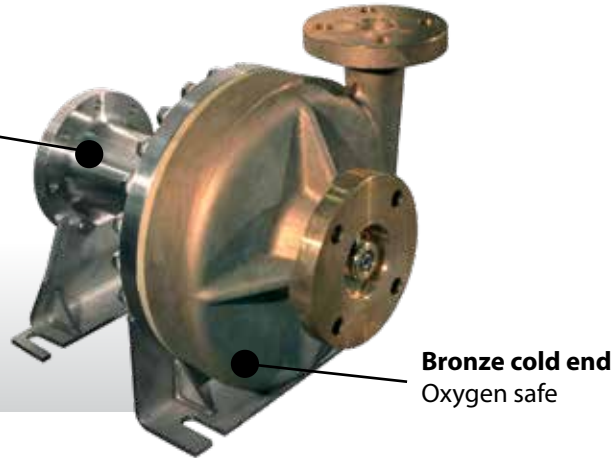


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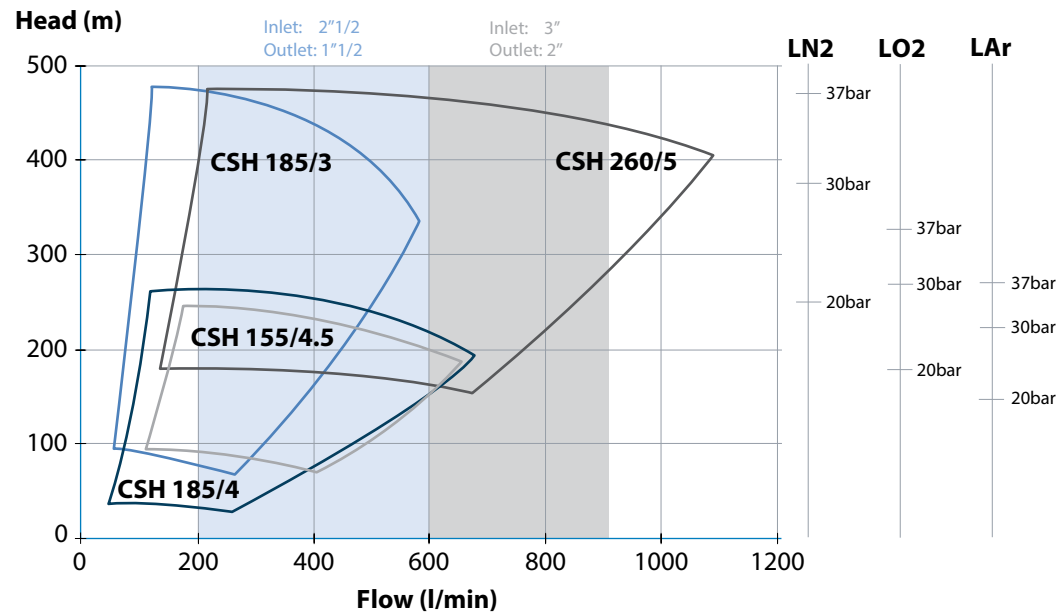
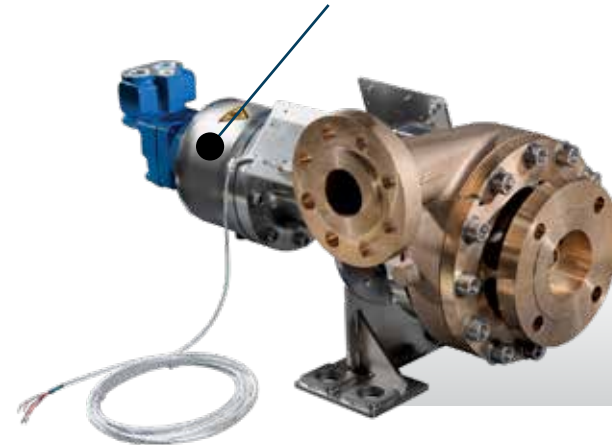
DIRECT COUPLED PUMPS – HIGH SPEED HYDRAULIC MOTOR

CSH

Grease lubricated bearing
Life lubricated

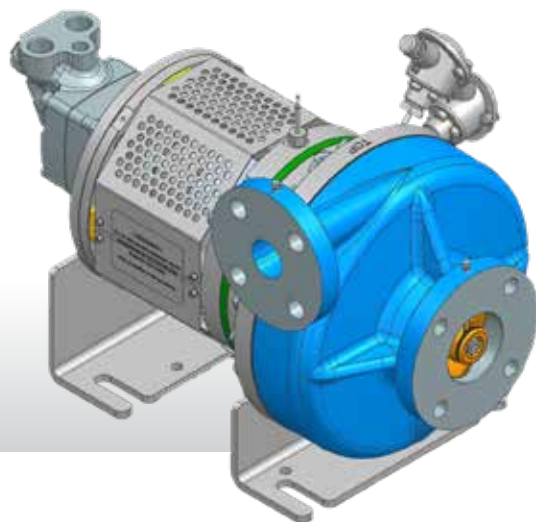
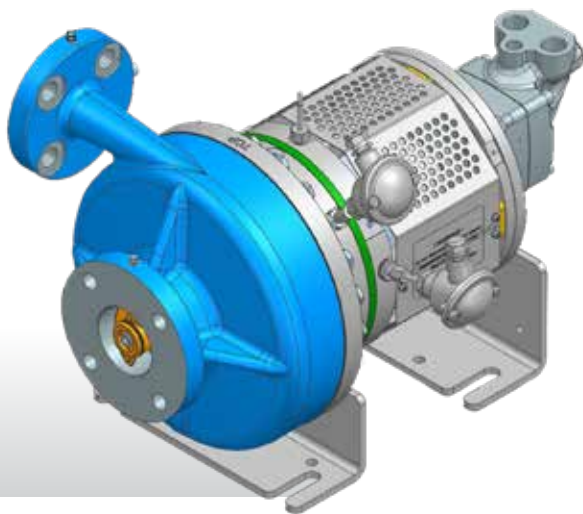


Elastic coupling
Absorbing torsion vibration

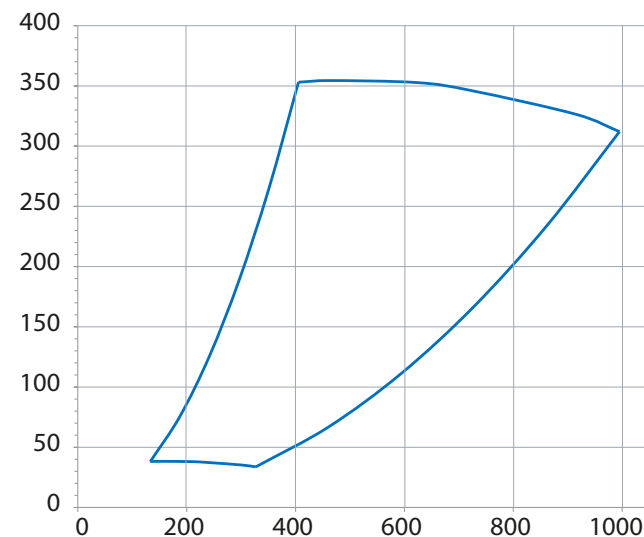


MAGNETICALLY COUPLED CENTRIFUGAL PUMP - HYDRAULIC MOTOR

MAGSTAR 260/5-H



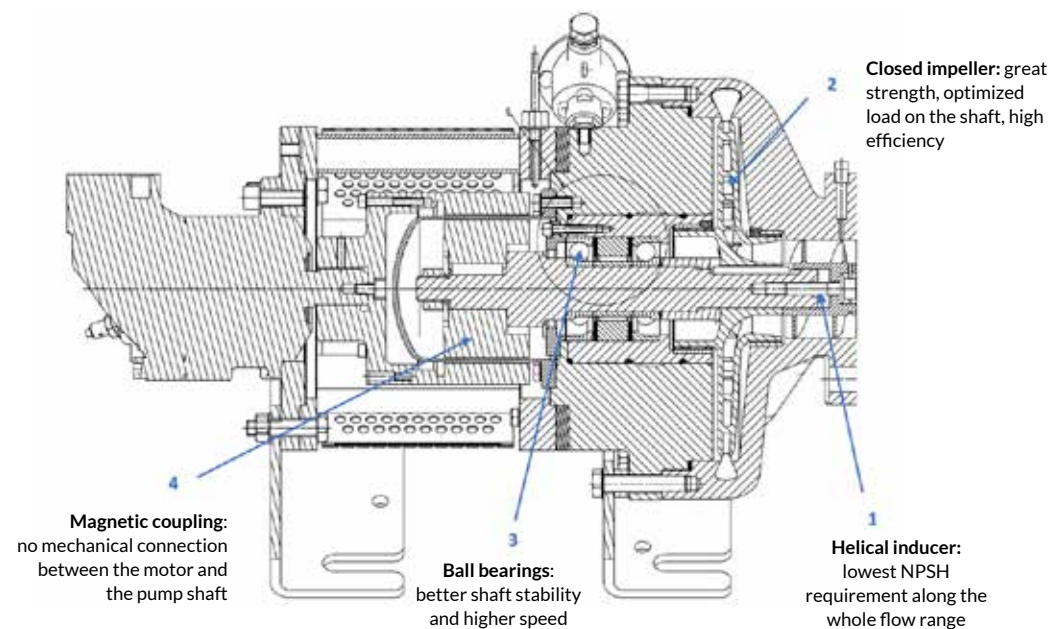
Head (m)



Flow (l/min)

LN LN LA

17	32	52
15	30	48
13	28	44
11	26	40
9	24	36
7	22	32
5	20	28
3	18	24
1	16	20
	14	16
	12	12
	10	8
	8	4
	6	
	4	
	2	



LOADING & TRANSFER PUMPS

LO2
LN2O

Oxidising gases
(Oxygen / Nitrous oxide)

LN2
LAr

Inert Gases
(Nitrogen / Argon)



CS / CBSD



MCP

LCO2

Carbon dioxide



CS



VS

LCH4
LC2H4
LC2H6

Explosive gases
(LNG / Ethylene / Ethane)



CS



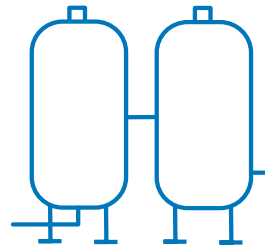
VS



SUBTRAN



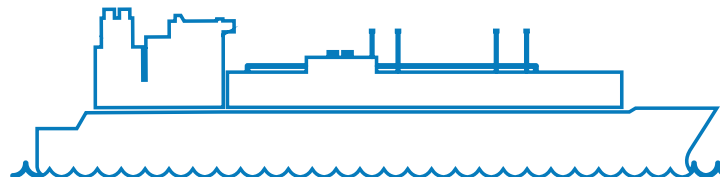
Mobile tanker loading



Tank to tank



Customer application



Bunkering



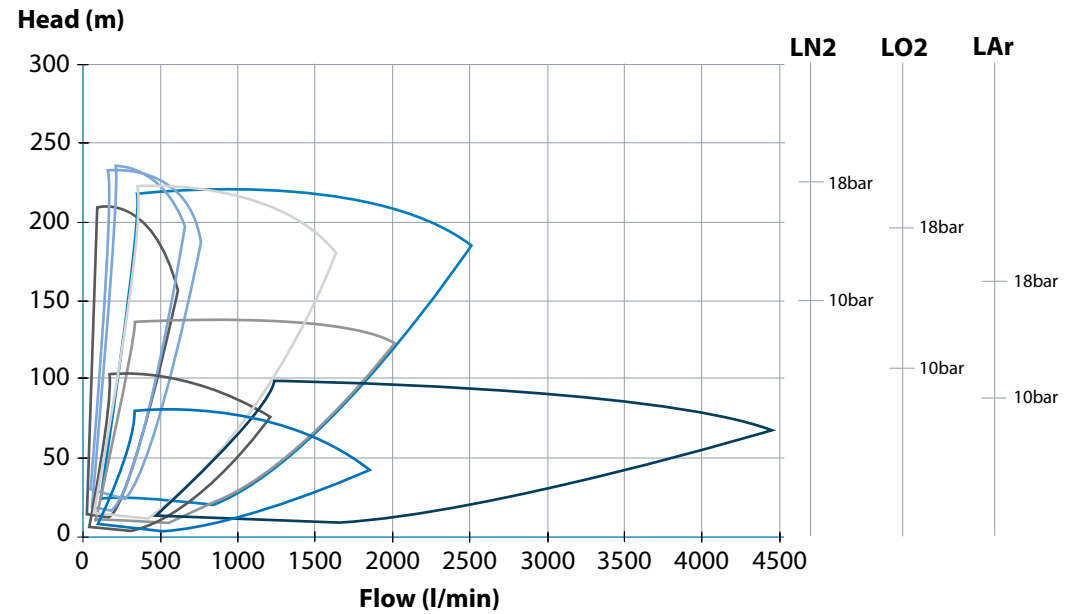
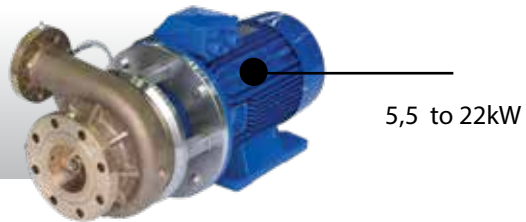
Refueling



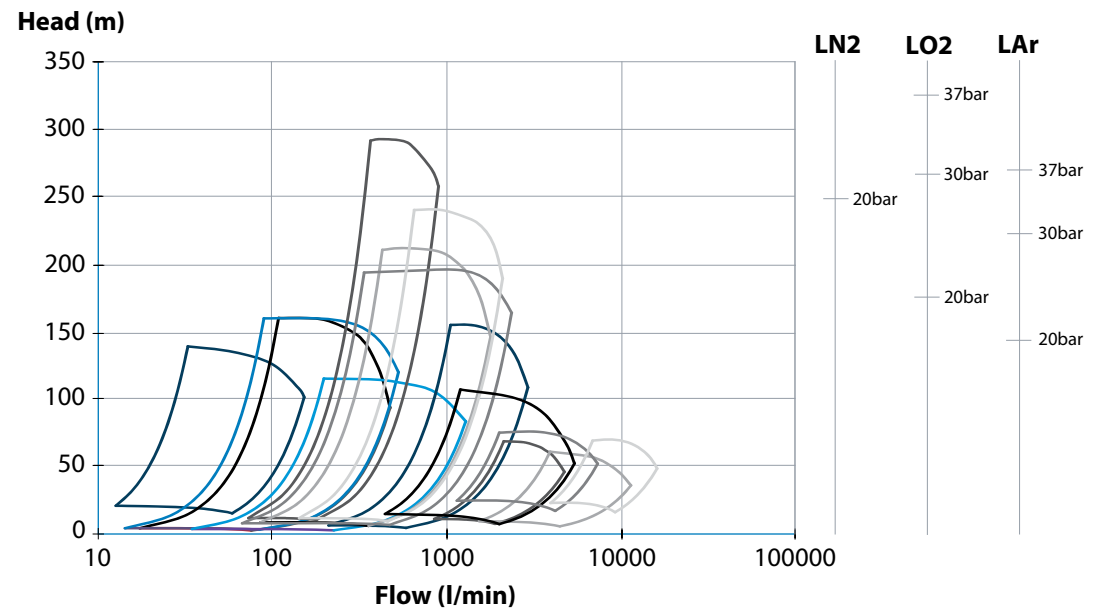
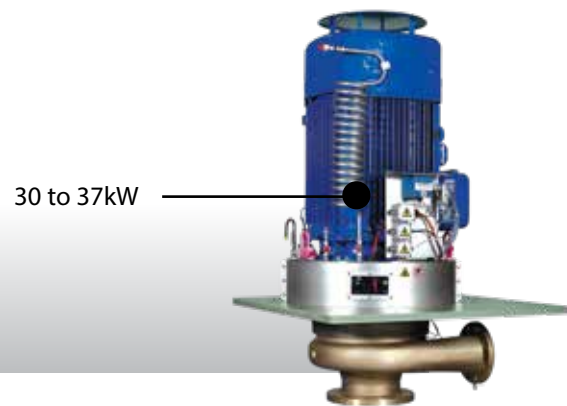
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LOADING & TRANSFER PUMPS

CS & CBSD

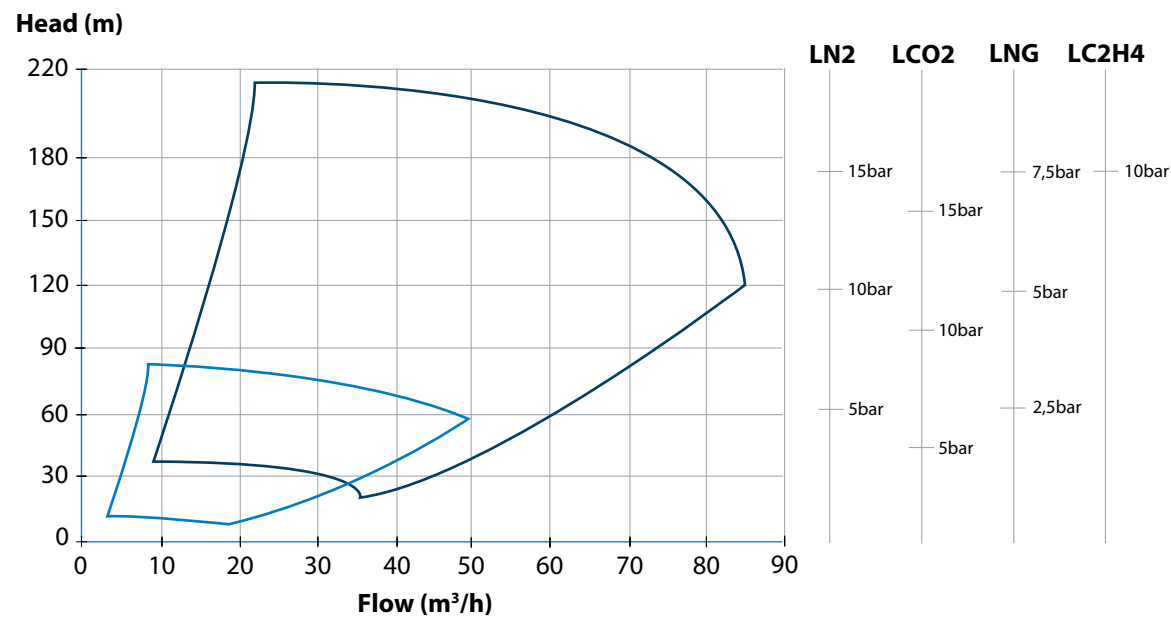
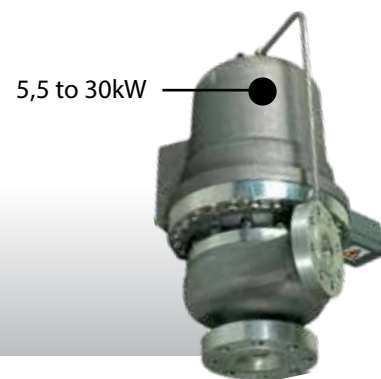


MCP



SUBMERGED ENCAPSULATED PUMPS – FIXED OR VARIABLE SPEED

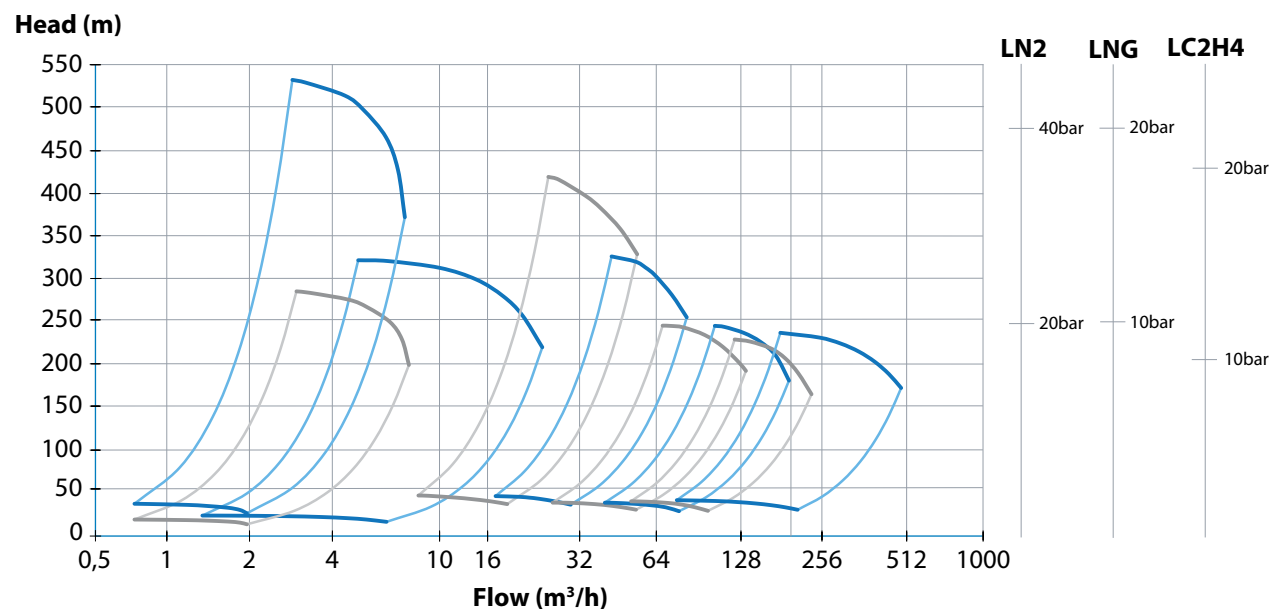
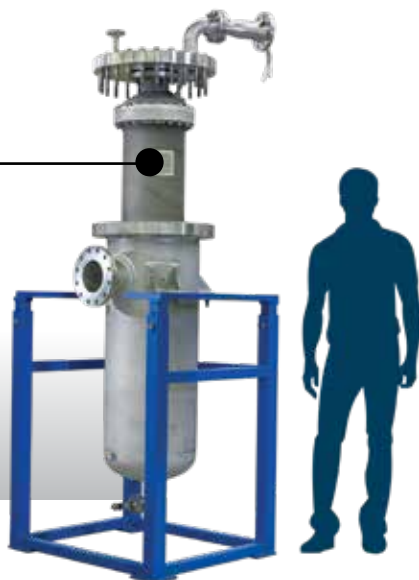
VS



SUBMERGED IN SUMP OR IN TANK PUMPS – FIXED OR VARIABLE SPEED

SUBTRAN

45 to 175kW



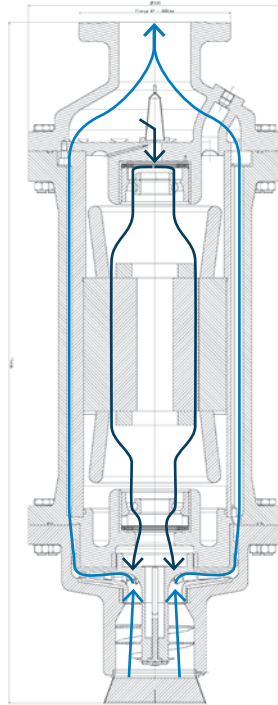


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CRYOGENICS

SUBSTRAN

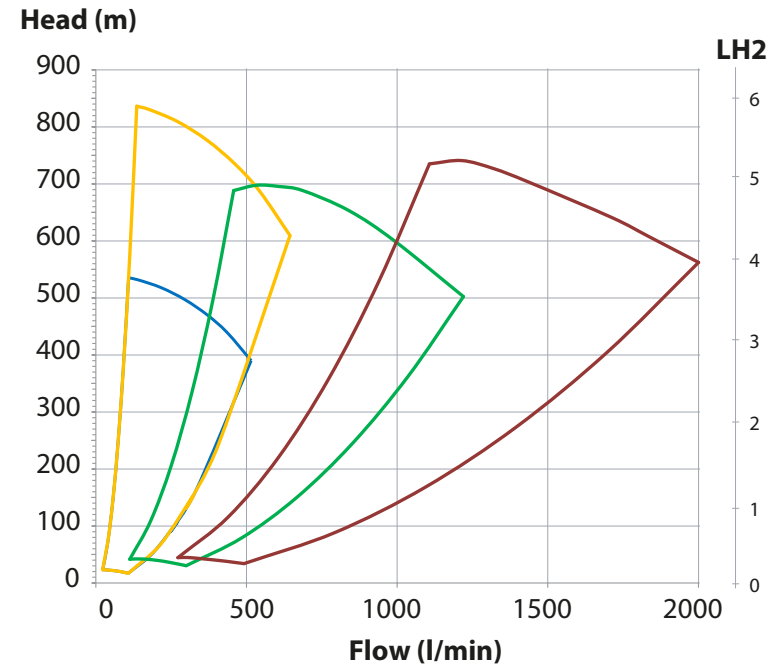
HYDROGEN TRANSFER PUMP

- ★ Leak free pump designed for LH2 use
- ★ Intank or remote sump installation
- ★ Standalone or on a skid
- ★ Variable speed
- ★ Wide flow range



Liquid H2 Applications

- ★ Semi-trailer loading / unloading mobile or stationary systems
- ★ Industrial vehicles fueling
- ★ Train fueling system
- ★ Bunkering



— Subtran 6,6-2/24 - max/7200

— Subtran 15-2/35 - max/6000

— Subtran 26-2/70 - max/6100

— Subtran 26-2/110 - max/6100

TURNKEY SKIDDED UNITS

CRYOSTAR offers standard or tailor made skidded units as a turnkey solution for any kind of process applications.

SAFE

- ★ Degreased for oxygen use
- ★ Safety valves
- ★ Compliance with pressure equipment directive
- ★ ATEX certified for installation in explosive area

MODULAR

- ★ Manual or automatic execution
- ★ Movable
- ★ Wide range of options
- ★ Up to 3 pumps on one skid

TURNKEY

- ★ Pre-tested & pre-cabled => ready to be connected
- ★ Pre-settled control panel (when supplied)
- ★ Complete package for easy operation
- ★ Limited on site piping and welding work



Single pump skid - Manual
Manual cryogenic valves
Ex « d » electric control panel
Dry Running Protection Panel



Dual pump skid – Full automatic
Manifold on suction, bypass and delivery
Pneumatic actuated cryogenic valves
Complete package suitable for cold climate



Submerged pump skid with sump
Vacuum insulated suction & discharge lines
Junction box
Dry Running Protection panel



Cold box pump skid for cold standby
Cold box with visit trap on base frame
Electric Control panel with Frequency
Inverter in remote location



more than
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BRAZIL

CHINA

FRANCE

INDIA

SINGAPORE

UK

USA

For contact and address of the CRYOSTAR
locations worldwide, please go to
www.cryostar.com/locations

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