

multi-coupling system



# multi-coupling system

**Plant, components and devices  
for very high and high pressures  
(7000 bar and over)**



## ***HIGH PRESSURE GAS BOOSTER***



ISO 9001

## INTRODUCTION

Multi-coupling system® gas booster operate on the simple but efficient principle of an automatic reciprocating differential area piston. A relatively large air-operated piston (160 mm for the GB series booster) is connected to a smaller high-pressure piston to convert compressed air flow into fluid flow at high pressure.

Multi-coupling system® offers a complete range of single, double acting, double air ratio and double stage gas booster. The single acting booster have one air piston and one high-pressure piston. The double acting booster have one or two air piston and two high-pressure pistons. The double air ratio have two air piston and one or two high pressure piston.

The double stage gas booster have one or two air piston and two high pressure piston, which one feeds the other to reach an higher pressure ratio. Because of the two pressure strokes, double acting booster give a more continuous flow and pressure. Compared with a single acting booster, a double acting booster has almost half the air consumption for the same fluid flow. The double ratio booster have the the same flow of a single acting booster but the double air piston permit to have at higher outlet pressure. The air piston of the single acting and double acting booster have the same diameter. However, the diameter of the high pressure piston varies and determines the ratio of the booster: An higher ratio means a higher outlet pressure but a smaller flow.

Low noise level compared to other air-driven booster with mechanical pilot valves. The high-pressure seal can be replaced within minutes, without dismantling the air drive section. Check valve seats can be replaced within minutes. The check valves have soft peak seats, preventing capacity loss after a certain time of operating. Unlike other air driven booster the air piston sealing and the pilot valve sealing of a Multi-coupling system® air-driven booster is not an O-ring.

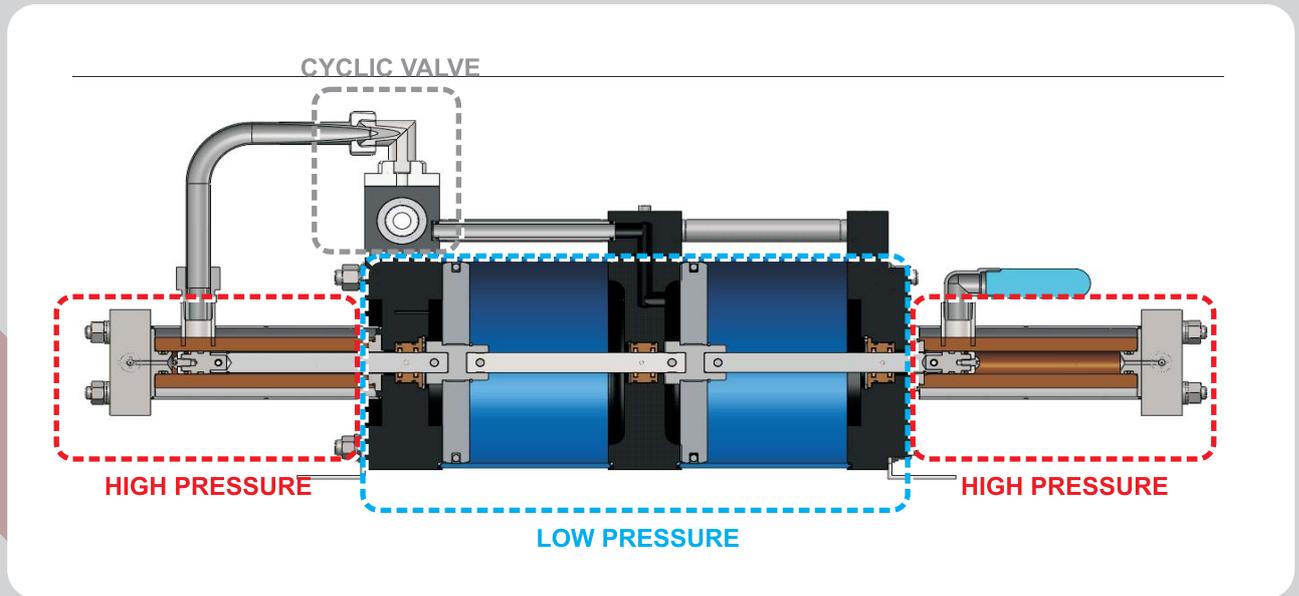
It is provided with PTFE based slydrings (bearings) for excellent wear- and-slide qualities. The slyd-rings increase the service life of the sealing surface (air cylinder/air pilot valve) and the air piston sealing. Excellent control of flow and output pressure due to low frictional resistance of the air piston, even at low air drive pressure. History of proven reliability under severe conditions, for instance in air-bag filling station . All pressure and flow output is based on 6 bar (87 psi) air drive pressure instead of 7 bar ( 101,5 psi). Compressed air used as a power drive offers enormous advantages over use of other power drives: risks of excessive heat, flame, spark or shock are reduced considerably.

Apart from that, both output pressure and flow can be controlled by simply regulating the air drive pressure of the air-driven pump. Varying the air inlet pressure will automatically and accurately adjust the gas output pressure. Beside each Multi-coupling system® booster have standard the direct control pilot that permit the start/stop without the use of big air control valve.

The cycling speed is at a maximum when the outlet pressure is low. As the outlet pressure builds up, the cycling speed is reduced until a stall condition is reached at the desired outlet pressure. The stall pressure can be held without any further use of energy. The outlet pressure and flow can be controlled by regulating the air drive pressure with an air pressure regulator. When compressed air of a certain air pressure is applied to the booster, it will cycle at high speed producing high fluid flow.

As the outlet pressure increases, the booster will start to cycle at a lower rate. As long as the total load in the high-pressure cylinder is less than that in the air cylinder, the pump will cycle. When a balance of loads is reached, the gas booster stops and no more air is used. The booster will automatically restart when the balance is disturbed by a pressure drop or by increasing the air drive pressure.

As the frictional resistance of the Multi-coupling system® air-driven piston is very low, only a small pressure drop or air drive pressure increase is required to restart the booster



The booster will deliver their rated capacity at 7 bar (101.5 psi) air drive pressure with the required air flow. The air supply line requires an air pressure regulator to control the output of the.

### COMPATIBLE GAS

The gas booster can be utilise only with the follow gas:Helium,Argon,Nitrogen,Compressed Air. Contact Multi-coupling system technical office to utilise the gas compressor with other media.

Working media must be filtered at least 10 micron.

Max allowable temperature 80°C.

Recommanded temperature 10°C / 60°C.

Recommanded max cycle frequency 40 / min.

### AIR FEEDING

For the compressed air connection must be utilise an air filter (10 micron), water separator, pneumatic oiler (optional), stop valve, pressure controller, manometer and, if necessary, safety valve.

If use a pneumatic oiler set at one drops each 20 gas booster cycles. Pilot air pressure must be at least the same of air supply.

## NPT CONNECTION

NPT threads must be sealed using a high quality PTFE tape and/or paste product. Refer to thread sealant manufacturer's instructions on how to apply thread sealant.

Sealing performance may vary based on many factors such as pressure, temperature, media, thread quality, thread material, proper thread engagement and proper use of thread sealant.

Customer should limit the number of times an NPT fitting is assembled and disassembled because thread deformation during assembly will result in deteriorating seal quality over time.

When using only PTFE tape, consider using thread lubrication to prevent galling of mating parts.

Recommended tightening moment 1/4" NPT 30 – 35 Nm.

## HIGH PRESSURE CONNECTION

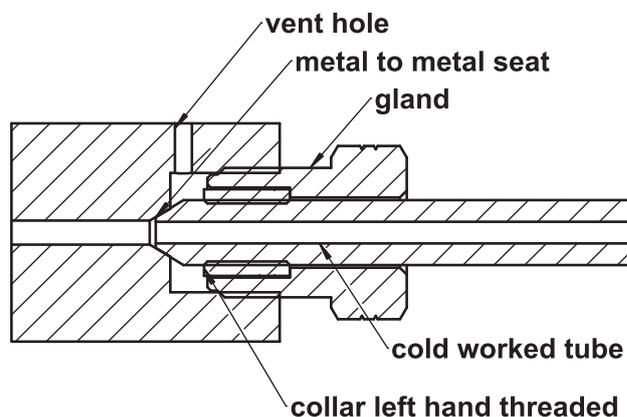
Dissimilar angles between the body and the tube cone provide metal to metal seal along the perimeter of a contact circle.

The sealing contact area is therefore, maintained at its practical minimum for the given tube size and a reliable seal is produced due to high sealing stresses that occur at low sealing loads.

Positive backup support occurs with the collar threaded (left-handed) directly onto the tubing to form a positive integral retaining surface. This allows for a consistent connection make up that is required at higher pressures and temperatures.

When the gland nut is threaded into the connection, the tubing is locked securely in place and the possibility for the ejection of the tubing from a properly assembled and used connection is extremely remote.

Tightening moment HP  
Pipe 1/4" HP up to 4200 bar 30 – 35 Nm (ex. 17 mm)



# **AIR DRIVEN GAS BOOSTER**

## **CHOOSING GAS BOOSTER**

To choose the correct gas booster you always need to know the follow parameter:

PL = Air drive (Max PL 7 bar 101.5 psi)

PA = Gas inlet minimum pressure (to begin compression at least 5 bar)

PB = Gas outlet maximum pressure

For single stage gas booster  $P_b/P_a$  must be  $< 20$  (compression ratio, we suggest for continuous working  $< 15$  to limit heating)

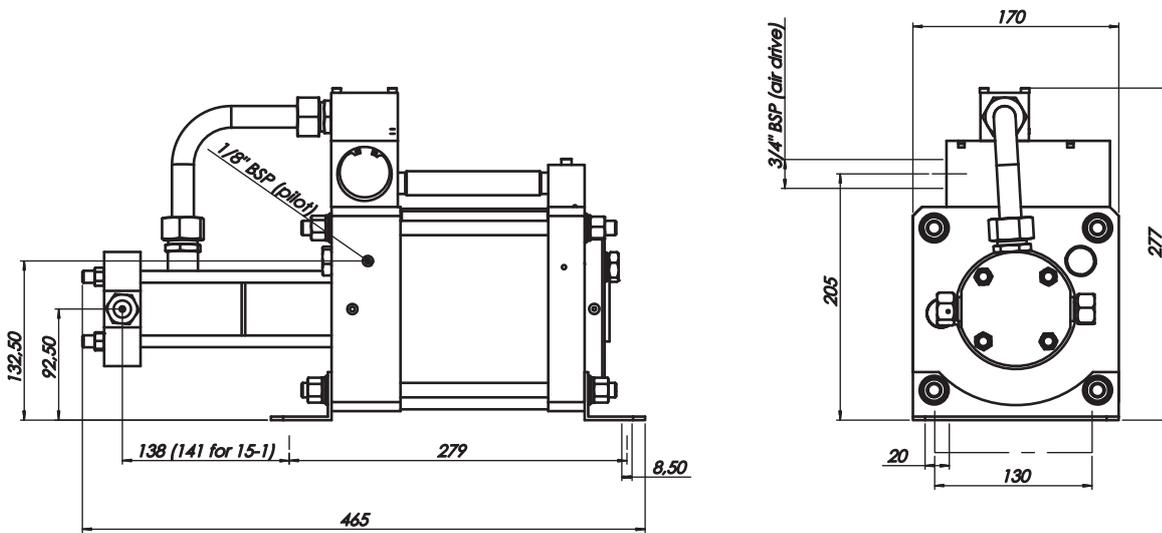


## Single stage, single acting, single air drive

Stall pressure PB = N x PL

Model	Ratio N	Max W.P. PB	Volume per cycle	Min. Inlet pressure (Pa) to reach Ma.W.P. (PB)	Min. Inlet pressure (Pa)	Inlet port	Outlet port
GB-15-1	1:15	105 bar (1523 psi)	125 cm <sup>3</sup> (7.62 inch <sup>3</sup> )	6 bar (87 psi)	5 bar (72.5 psi)	1/2" BSP	1/2" BSP
GB-40-1	1:40	280 bar (4061 psi)	49 cm <sup>3</sup> (2.99 inch <sup>3</sup> )	18 bar (261 psi)	7 bar (101 psi)	1/4" NPT*	1/4" NPT *
GB-50-1	1:50	350 bar (5076 psi)	38 cm <sup>3</sup> (2.32 inch <sup>3</sup> )	20 bar (290 psi)	10 bar (145 psi)	1/4" NPT*	1/4" NPT *
GB-75-1	1:75	525 bar (7614 psi)	25 cm <sup>3</sup> (1.53 inch <sup>3</sup> )	30 bar (435 psi)	15 bar (218 psi)	1/4" NPT*	1/4" NPT *

\* (9/16" - 18 UNF coned and threaded high pressure connection on request)

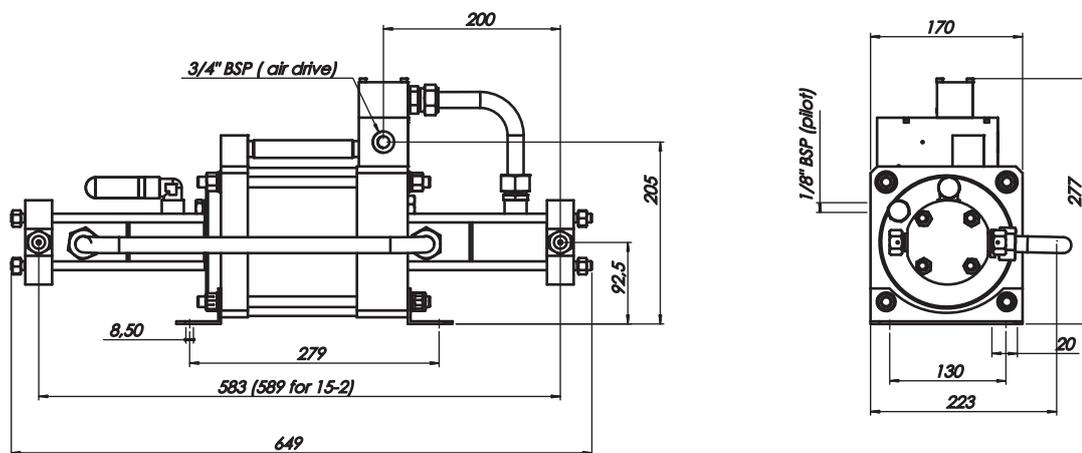


## Single stage, double acting, single air drive

$$\text{Stall pressure PB} = N \times \text{PL} + \text{PA}$$

Model	Ratio N	Max W.P. PB	Volume per cycle	Min. Inlet pressure (Pa) to reach Ma.W.P. (PB)	Min. Inlet pressure (Pa)	Inlet port	Outlet port
GB-15-2	1:15	200 bar (2900 psi)	250 cm <sup>3</sup> (15.24 inch <sup>3</sup> )	95 bar (1378 psi)	6 bar (87 psi)	1/2" BSP	1/2" BSP
GB-40-2	1:40	600 bar (8702 psi)	98 cm <sup>3</sup> (5.98 inch <sup>3</sup> )	320 bar (4641 psi)	7 bar (101 psi)	1/4" NPT*	9/16"-18 UNF coned and threaded high pressure connection
GB-50-2	1:50	750 bar (10810 psi)	76 cm <sup>3</sup> (4.63 inch <sup>3</sup> )	400 bar (5801 psi)	10 bar (145psi)	1/4" NPT*	9/16"-18 UNF coned and threaded high pressure connection
GB-75-2	1:75	1050 bar (15230 psi)	50 cm <sup>3</sup> (3.05 inch <sup>3</sup> )	510 bar (7397 psi)	15 bar (218 psi)	1/4" NPT*	9/16"-18 UNF coned and threaded high pressure connection

\* (9/16" - 18 UNF coned and threaded high pressure connection on request)

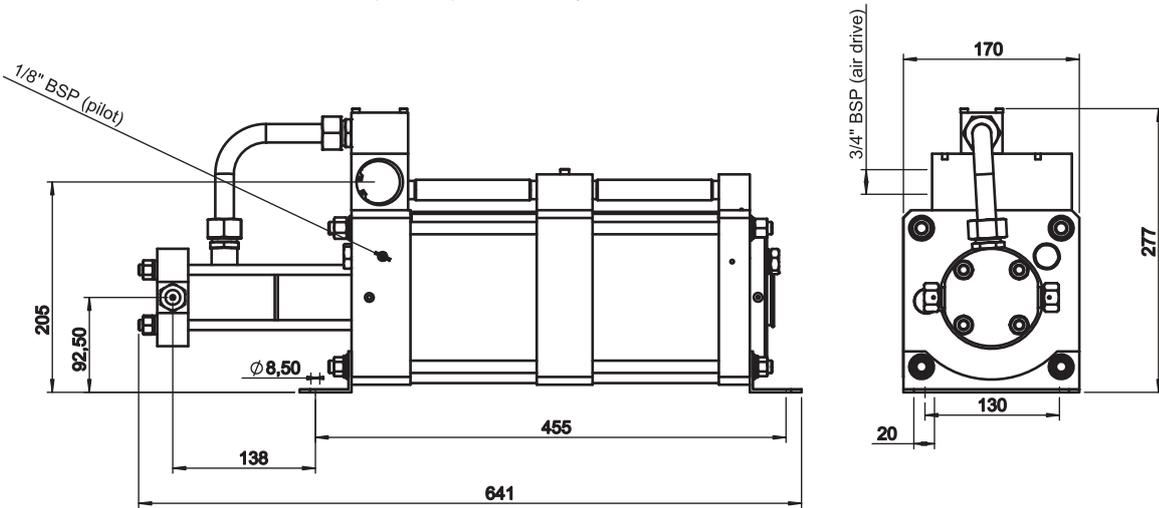


### Single stage, single acting, double air drive

Stall pressure  $PB = N \times PL$

Model	Ratio N	Max W.P. PB	Volume per cycle	Min. Inlet pressure (Pa) to reach Ma.W.P. (PB)	Min. Inlet pressure (Pa)	Inlet port	Outlet port
GB-80-1	1:80	560 bar (8702 psi)	49 cm <sup>3</sup> (2.99 inch <sup>3</sup> )	30 bar (435 psi)	7 bar (101 psi)	9/16"-18 UNF* coned and threaded high pressure connection	9/16"-18 UNF coned and threaded high pressure connection
GB-100-1	1:100	700 bar (10810 psi)	38 cm <sup>3</sup> (2.32 inch <sup>3</sup> )	35 bar (508 psi)	10 bar (145psi)	9/16"-18 UNF* coned and threaded high pressure connection	9/16"-18 UNF coned and threaded high pressure connection
GB-150-1	1:150	1050 bar (15230 psi)	25 cm <sup>3</sup> (1.53 inch <sup>3</sup> )	55 bar (798 psi)	15 bar (218 psi)	9/16"-18 UNF* coned and threaded high pressure connection	9/16"-18 UNF coned and threaded high pressure connection

\* (1/4" NPT threaded connection on request up to 700 bar)

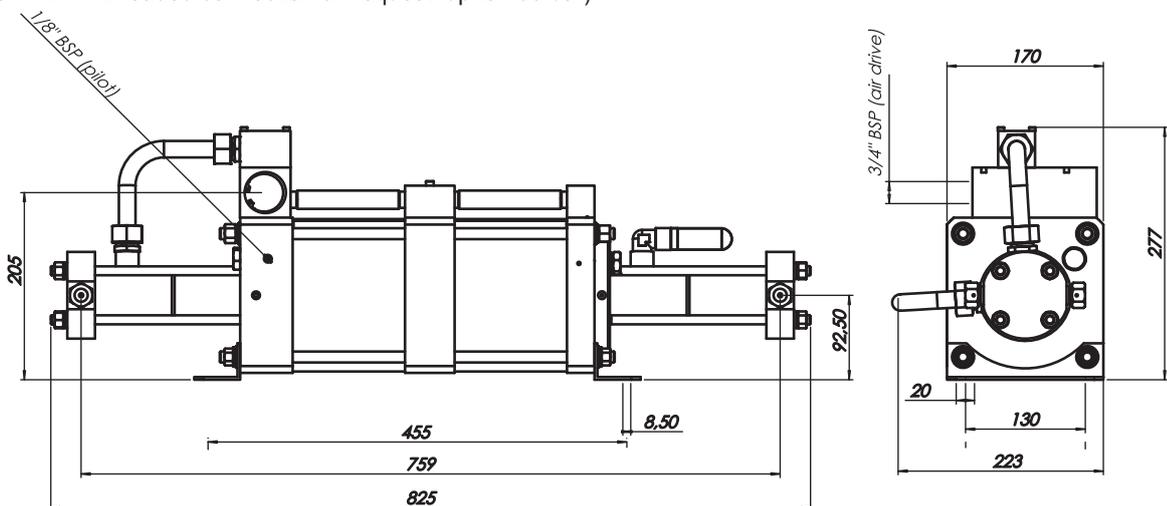


### Single stage, double acting, double air drive

Stall pressure  $PB = N \times PL + PA$

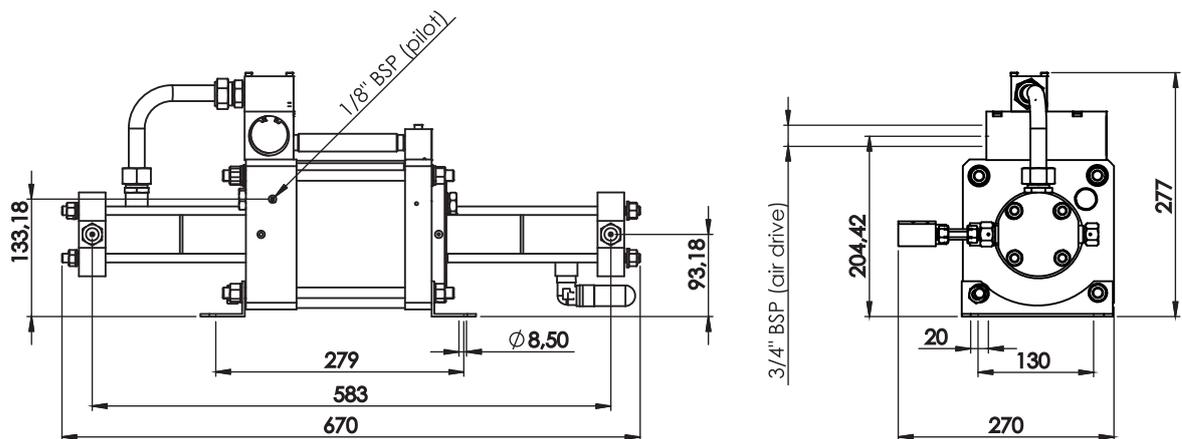
Model	Ratio N	Max W.P. PB	Volume per cycle	Min. Inlet pressure (Pa) to reach Ma.W.P. (PB)	Min. Inlet pressure (Pa)	Inlet port	Outlet port
GB-80-2	1:80	600 bar (8702 psi)	98 cm <sup>3</sup> (5.98 inch <sup>3</sup> )	40 bar (580 psi)	7 bar (101 psi)	9/16"-18 UNF* coned and threaded high pressure connection	9/16"-18 UNF coned and threaded high pressure connection
GB-100-2	1:100	750 bar (10810 psi)	76 cm <sup>3</sup> (4.63 inch <sup>3</sup> )	50 bar (725 psi)	10 bar (145 psi)	9/16"-18 UNF* coned and threaded high pressure connection	9/16"-18 UNF coned and threaded high pressure connection
GB-150-2	1:150	1050 bar (15230 psi)	50 cm <sup>3</sup> (3.05 inch <sup>3</sup> )	55 bar (798 psi)	15 bar (218 psi)	9/16"-18 UNF* coned and threaded high pressure connection	9/16"-18 UNF coned and threaded high pressure connection

\* (1/4" NPT threaded connection on request up to 700 bar)



## Double stage, double acting, single air drive

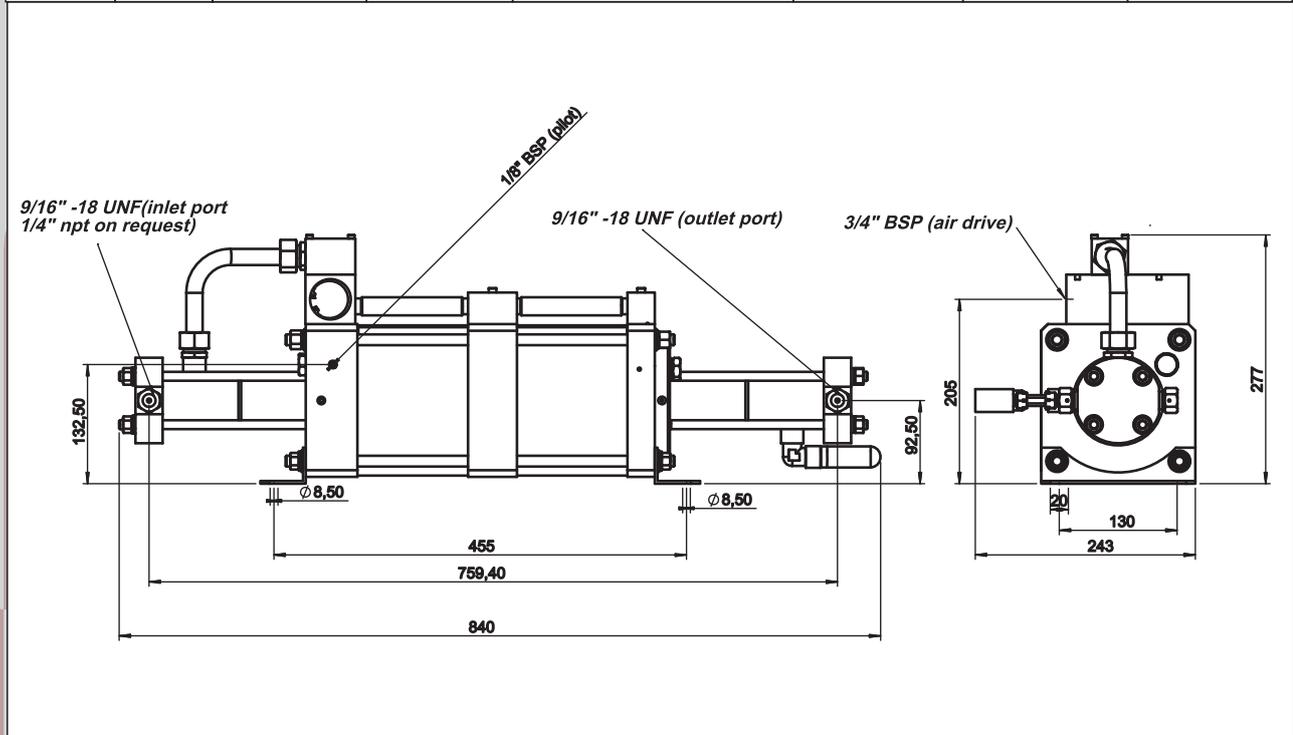
Model	Ratio N	Max W.P. PB	Volume per cycle	Min. Inlet pressure (Pa) to reach Ma.W.P. (PB)	Min. Inlet pressure (Pa)	Inlet port	Outlet port
GB-40-15	1:40 1:15	280 bar (4061 psi)	174 cm <sup>3</sup> (10.62 inch <sup>3</sup> )	10 bar (145 psi)	6 bar (87 psi)	1/2" BSP	1/4" NPT
STALL PRESSURE: PB = 40 x PL + PA x 40/15 - Max inlet pressure 7 X PL							
GB-50-15	1:50 1:15	350 bar (5076 psi)	163 cm <sup>3</sup> (9.95 inch <sup>3</sup> )	10 bar (145 psi)	6 bar (87 psi)	1/2" BSP	1/4" NPT
STALL PRESSURE: PB = 50 x PL + PA x 50/15 - Max inlet pressure 5 X PL							
GB-75-15	1:75 1:15	525bar (7614 psi)	150 cm <sup>3</sup> (9.15 inch <sup>3</sup> )	10 bar (145 psi) 2,5 PL	6 bar (87 psi)	1/2" BSP	1/4" NPT
STALL PRESSURE: PB = 75 x PL + PA x 75/15 - Max inlet pressure 2 X PL							
GB-75-40	1:75 1:40	700bar (70810 psi)	74 cm <sup>3</sup> (4.51 inch <sup>3</sup> )	94 bar (2175 psi) 107 PL	6 bar (87 psi)	1/4" NPT	9/16"-18 UNF
STALL PRESSURE: PB = 75 x PL + PA x 75/40 - Max inlet pressure 10 X PL							



## Double stage, double acting, double air drive

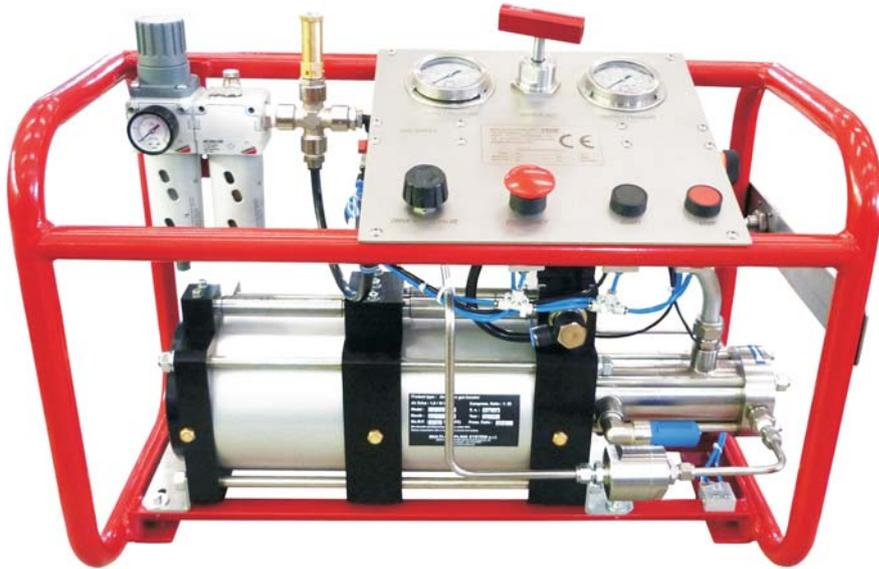
Stall pressure  $PB = 150 \times PL + PA \times 150 / 80$

Model	Ratio N	Max W.P. PB	Volume per cycle	Min. Inlet pressure (Pa) to reach Ma.W.P. (PB)	Min. Inlet pressure (Pa)	Inlet port	Outlet port
GB-80-150	1:40 1:75	1050 bar (15230 psi)	74 cm <sup>3</sup> (4.51 inch <sup>3</sup> )	7 bar (101 psi)	7 bar (101 psi)	9/16"-18 UNF coned and threaded high pressure connection	9/16"-18 UNF coned and threaded high pressure connection



## Gas portable test unit

Code	Max W.P. (bar)	Air connection	Inlet connection	Outlet connection	Gauge range
GPTU-040-1	280 bar	1/2" GAS	1/4" GAS	1/4" GAS	0:600 bar
GPTU-050-1	350 bar	1/2" GAS	1/4" GAS	1/4" GAS	0:600 bar
GPTU-075-1	525 bar	1/2" GAS	1/4" GAS	1/4" GAS	0:600 bar
GPTU-080-1	480 bar	1/2" GAS	1/4" GAS	1/4" GAS	0:600 bar
GPTU-100-1	700 bar	1/2" GAS	1/4" GAS	1/4" GAS	0:1000 bar
GPTU-150-1	1050 bar	1/2" GAS	1/4" GAS	1/4" GAS	0:1600 bar



### STANDARD FEATURE

AIR FILTER AND AIR LUBRICATOR
INLET FILTER
"CE" MARKING
GAS INLET GAUGE

### OPTION

BATTERY GAUGE RECORDER (up to 2000 bar)
TRANSPORT CART
HP TRANSDUCER
STAINLESS STEEL STRUCTURE
HIGH PRESSURE FILTER ON DISCHARGE VALVE
GAS INLET ISOLATING BALL VALVE
HIGH PRESSURE INLET RELIEF VALVE

Max air consumption for HF-GPTU is 2400 NL/min.  
All units max air feeding is 7 bar

## High flow gas portable test unit

Code	Max W.P. (bar)	Air connection	Inlet connection	Outlet connection	Gauge range	Displacement per stroke
GPTU-040-2	480 bar	1/2" GAS	1/4" GAS	1/4" GAS	0:600 bar	98 cm <sup>3</sup>
GPTU-050-2	550 bar	1/2" GAS	1/4" GAS	1/4" GAS	0:1000 bar	72 cm <sup>3</sup>
GPTU-075-2	725 bar	1/2" GAS	1/4" GAS	1/4" GAS	0:1000 bar	51 cm <sup>3</sup>
GPTU-080-2	600 bar	1/2" GAS	1/4" GAS	1/4" HP	0:1000 bar	98 cm <sup>3</sup>
GPTU-100-2	750 bar	1/2" GAS	1/4" GAS	1/4" HP	0:1000 bar	72 cm <sup>3</sup>
GPTU-150-2	1050 bar	1/2" GAS	1/4" GAS	1/4" HP	0:1600 bar	51 cm <sup>3</sup>



### STANDARD FEATURE

GAS INLET GAUGE

HIGH PRESSURE INLET RELIEF VALVE

GAS INLET ISOLATING BALL VALVE

GAS INLET FILTER

AIR FILTER AND AIR LUBRICATOR

GAS BOOSTER PRESSURE AIR REGULATOR

"CE" MARKING

GRAPHIC SYNOPTIC

HIGH PRESSURE DISCHARGE VALVE

HIGH PRESSURE OUTLET RELIEF VALVE

MAIN GAUGE SIZE 100 MM

HIGH PRESSURE BULKHEAD EXAGON BLOCK

## COMPANY PROFILE

MULTI-COUPPLING SYSTEM S.r.l. plans and produces hydrodynamic and hydraulic units and plants for the most various industrial fields and for specific applications.

The factory was born in Legnano but because of its development it was necessary its transferring in Canegrate and following in Villa Cortese in a bigger productive plant.

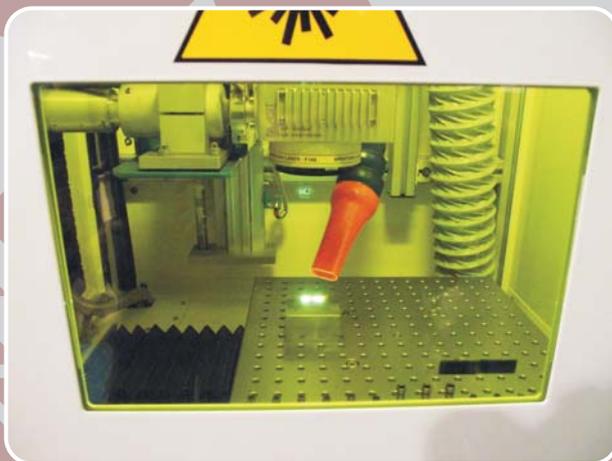
Multi-Coupling System was born in 1992 and thanks to the experience made in the very high and high pressures (5000 bar and over), it plans and supplies distribution and power supply plants, test benches, devices for quality controls, submarine applications, standard or special pipes and components according to the customers' requests.

The special components are produced directly of its own through stainless steel semi-finished products workings.

Therefore, with new devices, the factory has been able to modern the production cycles getting a better finished product for the national small, medium and big industry, both of builder than users which require a special fluidic technology in the productive process.

In fact, its products and flexibility allow to satisfy all the customers' requirements.

In 2002 Multi-Coupling makes HIGH PRESSURE mark, that is a production line of high pressure devices and components.



# HIGH PRESSURE GAS BOOSTER



**COMPONENTS**



**PRESSURE GENERATORS**



**TEST BENCHES**



**OEM SYSTEMS**



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