

Electric Vaporisers
Steam Vaporisers

Ambient Vaporisers Smith Pumps

Cylinder Transfer Pumps

Fittings for CO₂ **Jetfreezer™**

Snowpack Pressure Control for CO₂

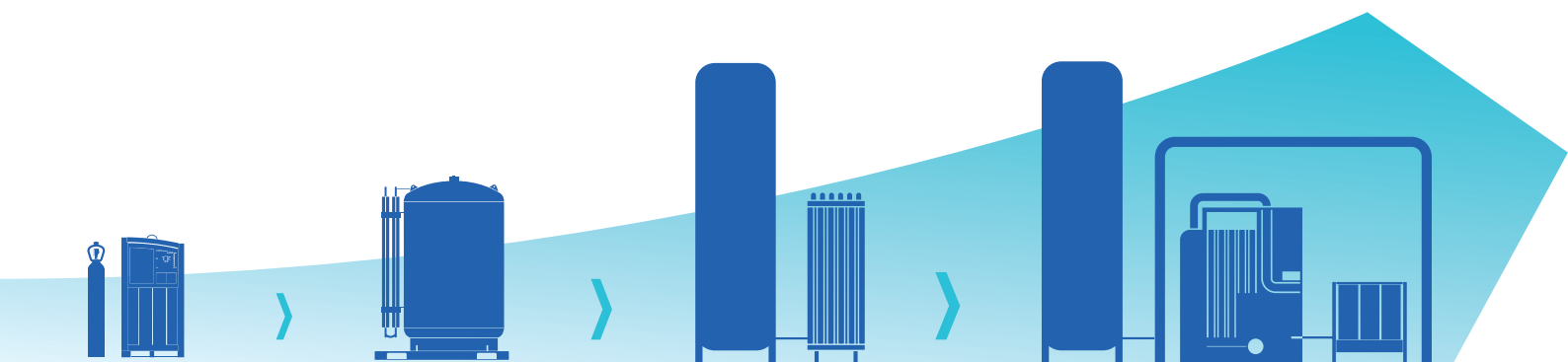
Dry Ice Containers Fittings

Valve Guards

CO₂ Equipment Catalogue 2022

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Electric Vaporisers for CO₂

HP Range

Designed for use with liquid CO₂ stored in large bulk storage tanks at low pressure or in high pressure cylinders with a syphon tube fitted. Our HP range vaporises CO₂ cleanly and effectively.

The vaporisers incorporate high efficiency heating elements and thermal insulation, helping you to keep operating costs to a minimum. The elements are thermostatically controlled to give an even CO₂ gas output temperature which avoids energy wastage when the gas flow is below full vaporiser capacity. Heat fuses are fitted to all vaporisers to protect from overheating in the event of a thermostat failure.

The vaporisers, which have CE marking, comply with the following Directives and Standards:

2004/108/EC	Electromagnetic Compatibility Directive
73/23/EEC	Low Voltage Directive
97/23/EC	Pressure Equipment Directive
BS EN 50081-1 & 2	EMC Emissions
BS EN 50082-1	EMC Immunity
BS EN 60204/1	Safety of Machinery – Electrical Equipment

Specification

		HP1	HP3	HP6	HP12	HP18	HP24
Maximum CO ₂ vapourisation rate (kg/h)	Cylinder	12	34	68	136	204	272
	Bulk Tank	-	25	54	108	162	216
Design pressure (bar)		190	103	103	103	103	103
Connections	Inlet	Rc1/2	Rc3/8	Standard 3/4 in n.b. compression. Adapters are provided to terminate in R3/4			
	Outlet	CO ₂ male	Rc3/8				
Electrical supply		230 volt single phase		400 volt 3 phase 50Hz			
Heating capacity (kW)		1	3	6	12	18	24
IP Rating		23D	55	55	55	55	55
Dimensions	Height (mm)	425	420	492	764	1037	1310
	Width (mm)	125	415	508			
	Depth (mm)	95	272	536 (excluding pipework)			
Net weight (kg)		5.5	41.10	52	97.4	142.8	188.2
Part number		2224.0251	2224.0301	2500.0090	2500.0091	2500.0092	2500.0093

HP1 CO₂ Vaporiser

The HP1 is a high pressure CO₂ electric vaporiser containing a 1 kW cartridge heating element. The unit is designed to be wall mounted and connected to either a single CO₂ syphon cylinder or to a manifold of cylinders by a high pressure hose or length of $\frac{3}{8}$ in o.d. high pressure copper tube.

The HP1 vaporiser has an Rc $\frac{1}{2}$ inlet connection and a BS341 Part 1 No. 8 CO₂ male outlet to take a suitable pressure reducing valve. The HP1 incorporates a safety bursting disc which ruptures at 190 bar.

The heating element is controlled by a thermostat giving a gas outlet temperature of about 70°C. The thermostat is protected by a separate heat fuse. A neon light indicates when the heating element is in operation. The whole assembly is mounted in a sturdy splash proof steel casing.



HP1 CO₂ Vaporiser

HP3 CO₂ Vaporiser

The HP3 is a 3 kW electric vaporiser designed for use with manifolded CO₂ syphon cylinders or with a CO₂ bulk storage tank. Liquid CO₂ enters the HP3 and is vaporised into gas. The CO₂ gas temperature is controllable over a temperature range of 50°C to 80°C. A pressure regulator should be fitted to control output pressure.

The vaporiser is designed to be wall mounted. The inlet and outlet connections are Rc³/₈.

The vaporiser requires a 230 V single phase supply. The 3 off 1 kW elements are protected by a heat fuse.

A pressure relief device must be fitted to protect the vaporiser against over pressure (see item 3).

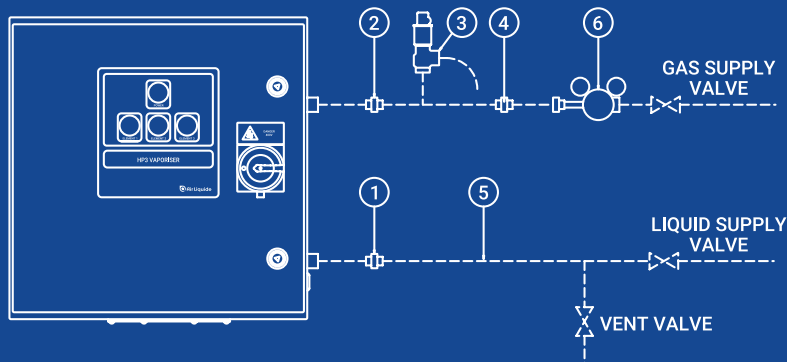
An interlocked switch is fitted to ensure electrical supply is disconnected when the door is opened.



HP3 CO₂ Vaporiser

Interconnecting Fittings

Item	Description	Part Number
With pressure reduction		
1	Adapter R3/8 x 3/8 in o.d.	2222.1302
2	Nipple R3/8 x R1/2	2222.2007
3	Either a) For bulk CO ₂ – relief valve, 29 bar	2223.4801
	+ tee Rc1/2 equal	2222.2302
	or b) For cylinders – relief valve 103 bar	2223.5001
	+ tee Rc1/2 equal	2222.2302
4	Nipple R1/2 male BS 341 No. 8/DIN 477 No. 6	2222.0101
5	Copper tube 3/8 in o.d.	2222.2401
6	Regulator, 0-10 bar, 120mm stem.	0000.1073
Bulk Kit	Items 1, 2, 3a, 4 & 6	2224.0325
Cylinders Kit	Items 1, 2, 3b, 4 & 6	2224.0324
Without pressure reduction		
Bulk Kit	Items 1, 2, 3a & 4	2224.0327
Cylinders Kit	Items 1, 2, 3b & 4	2224.0326



Typical Installation Diagram

(with/without pressure reduction)

HP6, HP12, HP18 & HP24 CO₂ Vaporisers

Redesigned to exacting customer standards the HP6 range of electric vaporisers are designed for connection to CO₂ bulk storage tanks or large manifolds of CO₂ syphon cylinders. Single vaporisers should be mounted on a raised stool (Part Number 2224.0423).

NB: HP12, HP18 & HP24 units include a pre attached stool.

When high CO₂ vaporisation rates are required, the HP6 (6 kW) can be stacked up to 4 high and piped in series, to effectively create HP12 (12 kW), HP18 (18 kW) or HP24 (24 kW) vaporisers. Each HP6 module is self contained, with a separate analog temperature controller and contactor, which ensures that each element only needs to be switched on as demand increases, saving energy when demand is low.

The inlet and outlet connections on the HP6 are 3/4 in n.b. steel pipe compression fittings and are located at the back of the unit. Adapters terminating in R3/4 are also provided. Each HP6 requires a 400 V, 3 phase, 4 wire power supply. Three 2 kW elements are cast within an aluminium heating block, each protected by a thermal heat fuse. A pressure relief device must be fitted to protect the vaporiser against over-pressure.

The heat fuse elements are pure tin links which are connected in the line supply to the

heating elements. In the event of an excessive temperature rise the electrical supply is interrupted.

The analog temperature controller switches the 20 A 3-Phase contactor and is adjustable over a temperature range of 50°C to 80°C.

The normal operating temperature for the unit is 50°C to 70°C.

Three 2 A miniature circuit breakers, located within the equipment, provide short circuit and overload protection.

A light, mounted on the front panel, will signal when the main electrical supply is on. Three LED's, each connected to an element, indicate when that element is functioning. An interlocked isolating switch is fitted to ensure the electrical supply is isolated when the door is opened.





Steam Heated Vaporisers for CO₂

Steam heated vaporisers provide an easy and cost effective method of vaporising large quantities of liquid CO₂ to gas. Designed for direct connection to the outlet of a bulk storage tank, the steam vaporisers are available with nominal vaporisation capacities of 0.5 te/h, 1.0 te/h and 2.0 te/h.

The steam vaporisers are double tube heat exchangers with CO₂ in the inner tube and steam in the outer. The whole assembly is inclined at an angle of 10° from the horizontal. The vaporisers

conform to Pressure Equipment (Safety) Regulations 2016 and vessels are constructed to PD 5500 : 2012 Cat II.

The steam vaporisers are designed to operate with a steam inlet valve and condensate assembly. When large quantities of cool CO₂ gas are required, a cold gas pass can be attached to the vaporiser, which will reduce the outlet temperature of the gas. A pressure relief device must be fitted to protect the vaporiser against over-pressure.

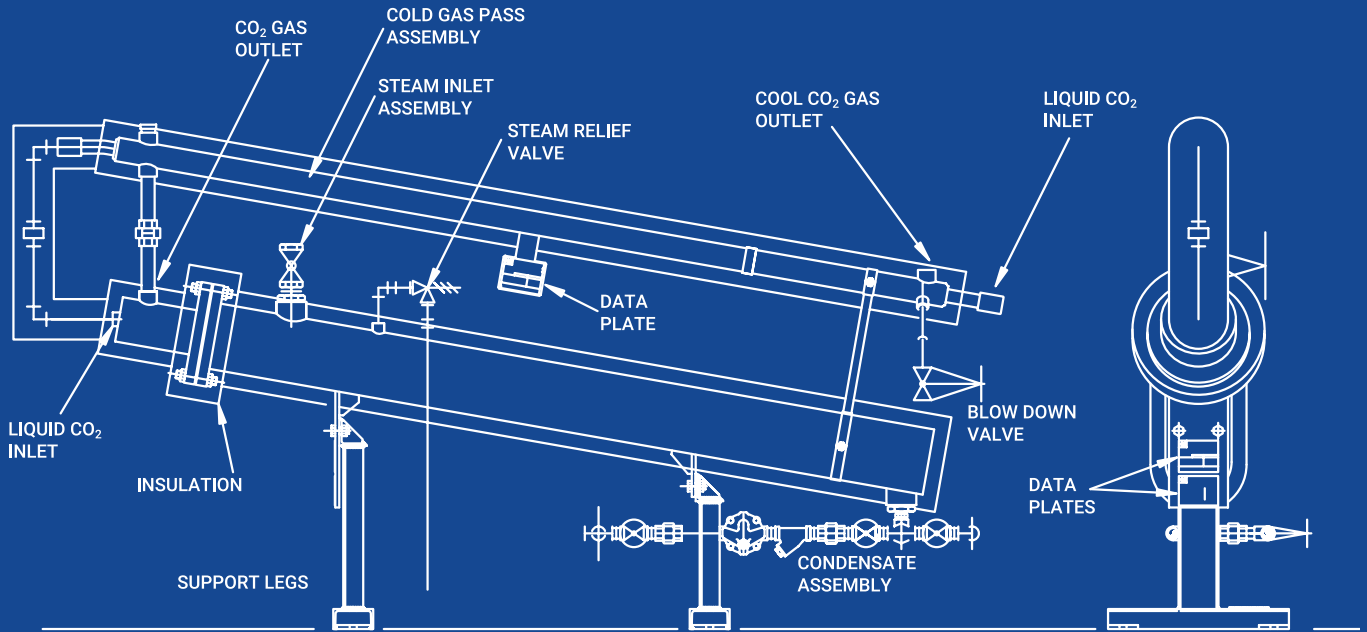
Steam Inlet Assembly

The steam inlet valve controls the flow of steam into the vaporiser. It is a bronze globe valve, sized to suit the capacity of the vaporiser, complete with a nipple to connect the valve to the vaporiser inlet port.

Part Numbers

Vaporiser nominal capacity tonne/h	Steam inlet valve	Part number
0.5	Rc1	2224.2211
1	Rc1 1/2	2224.2212
2	Rc2	2224.2209

Steam heated CO₂ vaporiser with cold gas pass



Steam Relief Valve

The steam side of the steam vaporiser should be protected against over pressure by the steam relief valve, preset to 7.6 bar. This is threaded R1/2 and screws directly into the steam relief valve connection on the vaporiser body - part number 2224.2207.

Cold Gas Pass

The cold gas pass is an energy-efficient attachment to the steam vaporiser which will cool the out-flowing CO₂ gas and reduce steam consumption. The cold gas pass is a single pass tube heat exchanger, arranged so that the incoming low temperature liquid CO₂ cools the warm outgoing gas, resulting in cool gas at the outlet point of the assembly.

Condensate Assembly

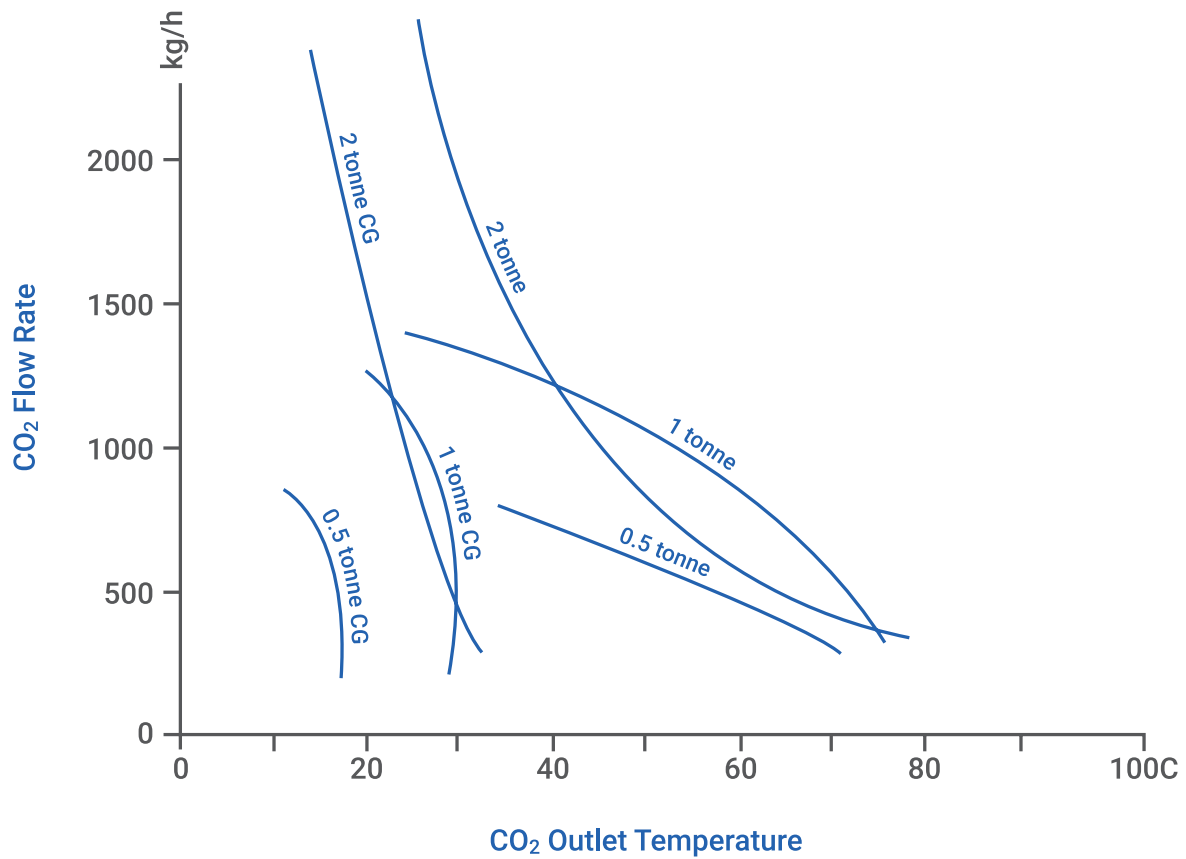
The condensate assembly is connected to the condensate outlet port on the steam vaporiser and removes water from the system by means of a steam trap. The assembly contains a by-pass, allowing quick drainage before vaporiser start up and continuous use even when the assembly is being maintained. Two sizes are available to suit the three capacities of steam vaporiser.

Specification

Vaporiser nominal capacity tonne/h	0.5 & 1	2
Inlet connection	R3/4	R1
Outlet connection	Rp3/4	Rp1
Max working pressure (bar)	7	7
Length (mm)	990	1004

Outline performance curves

for steam heated CO₂ vaporisers with a CO₂ inlet pressure of 20.7 bar and a steam inlet pressure of 2.7 bar.



Specification

Nominal vaporisation capacity (tonne/h)	Max CO ₂ design pressure (bar)	Approx min CO ₂ outlet temperature (inlet at -17°C)		Steam consumption (dry saturated) at 2.7 bar (kg/h)	CO ₂ connections		Steam connections	
		without	with		Inlet	Outlet	Inlet	Condensate
		cold gas pass						
0.5	29	40°C	15°C	84	Rc1	Rc1	Rc1	Rc3/4
1	29	40°C	20°C	168	Rc1	Rc1	Rc11/2	Rc3/4
2	29	25°C	15°C	304	Rc1	Rc11/2	Rc2	Rc1

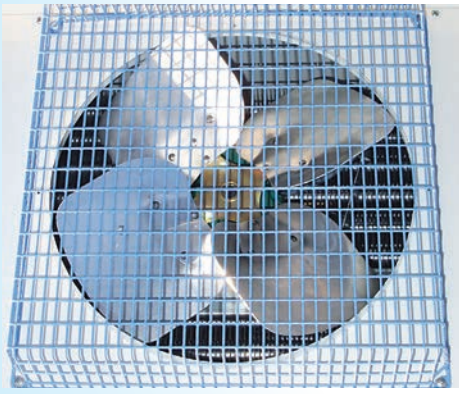
Dimensions (excluding insulation)				Approx net weights (excluding insulation)		
Vaporiser nominal capacity (tonne/h)	Length of body (mm)	Diameter of vaporiser body (mm)	Max vaporiser height when mounted on supports (mm)	Vaporiser and supports (kg)	Vaporiser, supports steam inlet and condensate assembly (kg)	Vaporiser, supports steam inlet, condensate assembly and cold gas pass (kg)
0.5	1735	114	842	61	72	90
1	2090	168	978	119	134	152
2	2895	219	1177	243	263	295

Part numbers for vaporisers and accessories

Vaporiser nominal capacity (tonne/h)	Vaporiser body	Vaporiser support legs		Steam inlet valve	Condensate assembly	steam relief valve 7.6 bar	Cold gas pass body	Support for cold gas pass
		Front	Rear					
0.5	2224.2001	2224.2319	2224.2320	2224.2211	2224.2201	2224.2207	2224.2101	2224.2316
1	2224.2002	2224.2319	2224.2320	2224.2212	2224.2201	2224.2207	2224.2101	2224.2317
2	2224.2003	2224.2319	2224.2320	2224.2209	2224.2202	2224.2207	2224.2102	2224.2318

Vaporiser with Cold Gas Pass

Capacity (tonne/h)	Insulated	Uninsulated
0.5	2224.2010	2224.2009
1	2224.2014	2224.2013
2	2224.2018	2224.2017

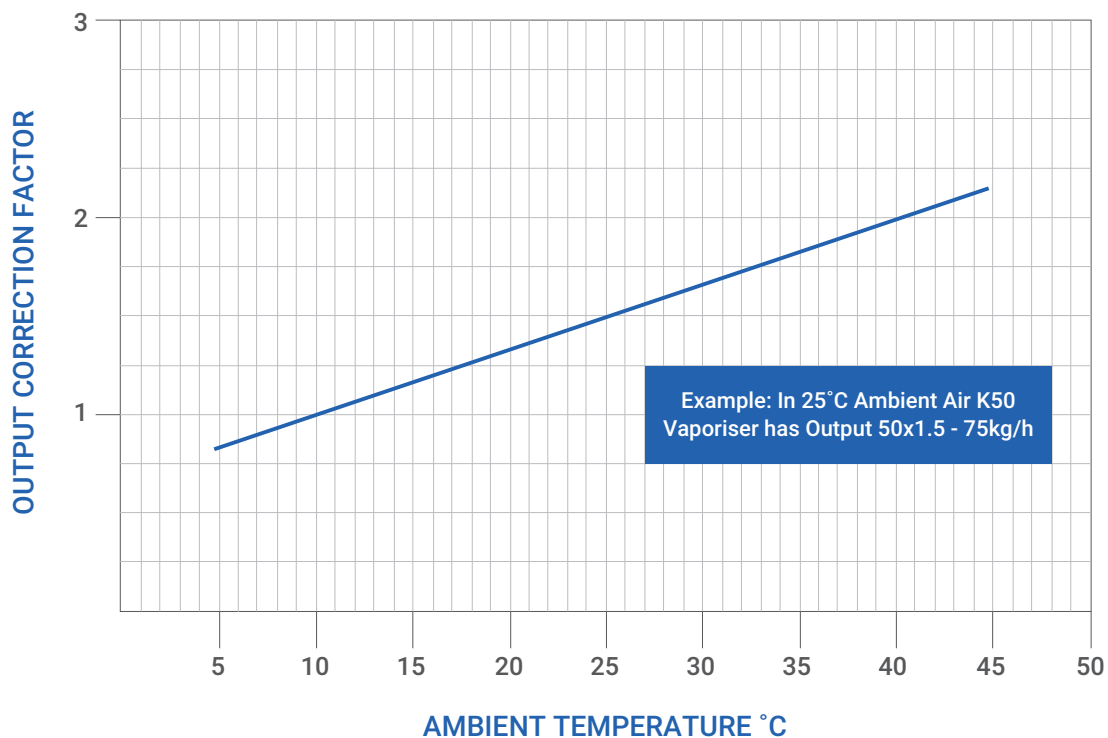


Ambient Vaporisers for CO₂

Ambient vaporisers have been developed so that low grade heat sources may be used to vaporise liquid CO₂ from bulk storage vessels. Typical waste heat sources which may be used include ambient air in boiler houses, air exchange from occupied buildings, heat producing processes and outside ambient air, provided it is normally above 5°C.

Vaporisation capacities are available between 50 kg/h and 750 kg/h at 10°C ambient air temperature.

At higher ambient temperatures the flow rate would be increased - see graph.



Description

Each ambient vaporiser consists of two units – the heat exchanger assembly and the electrical control box. The heat exchanger element consists of finned copper tubing to maximise heat transfer, designed and tested to the maximum bulk liquid CO₂ storage vessel operating pressure of 24 bar.

The separate electrical control unit is usually wall mounted adjacent to the heat exchanger assembly.

Each of the two heat exchangers is controlled by a solenoid valve on the inlet. Only one exchanger vaporises CO₂ at any one time allowing the other to defrost for maximum efficiency. The switching time is controlled by a timer, enabling the vaporiser to operate 24 hours a day.

The whole assembly is enclosed in a galvanised steel cover with powder coated paint finish. Detachable end covers give easy access to the control valves and electrical connections. A rigidised aluminium drain tray collects condensate for piping away.

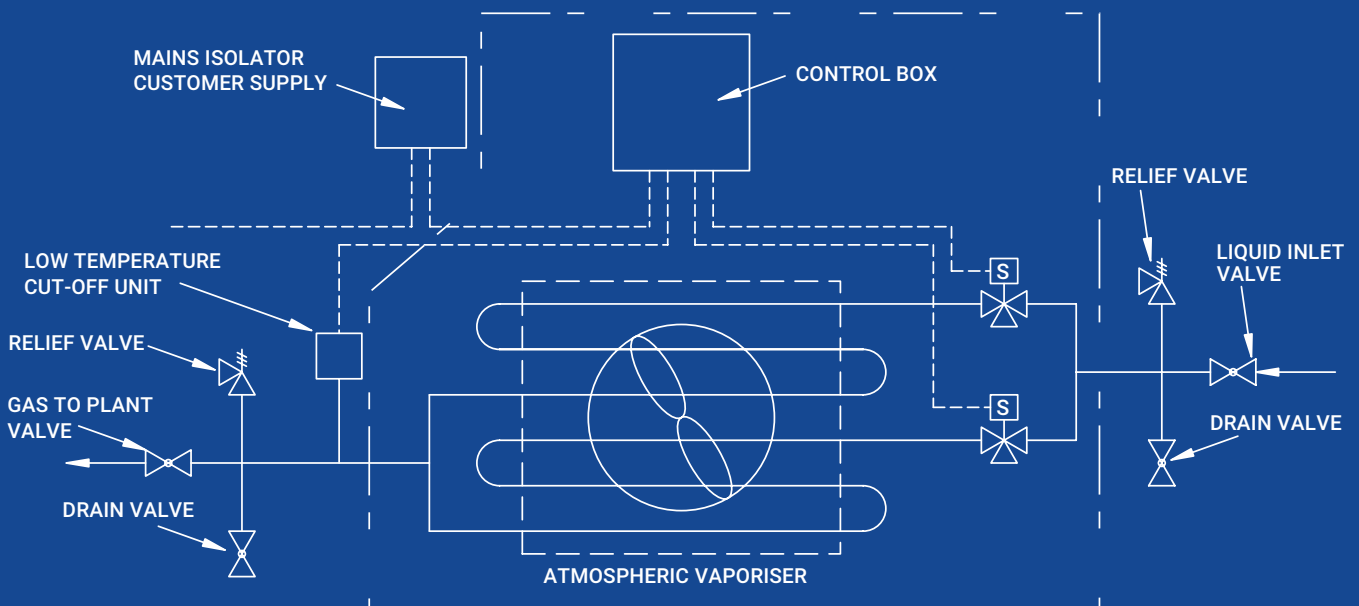
Defrost heaters are available as an option to allow operation of the vaporiser at low temperatures.

The heat exchanger assemblies can either be suspended from the ceiling, mounted on a framework, or floor standing using optional legs (25000031 or 25000032 for Model L700).

Overloading

A low temperature cut-off control unit should always be installed with the vaporiser to safeguard downstream equipment from the effects of liquid CO₂ carry-over. The unit isolates the flow of CO₂ automatically and so prevents freezing of the vaporiser or damage to reducing valves or process plant. A pressure relief device must be fitted to protect the vaporiser against over-pressure.

Layout



Specification

Model	K50	K150	L300	L500	L700	
Part Number	22000029	22000031	22000033	22000035	25000021	
Model	K50L defrost	K150L defrost	L300L defrost	L500L defrost	L700L defrost	
Part Number	22000028	22000030	22000032	22000034	25000022	
Maximum Working Pressure	24	24	24	24	24	
Output (approx.) Gaseous CO₂ from Bulk Liquid CO₂ at 20.7 bar (-17°C) and at 10°C Ambient Air Temperature (kg/h)	50	150	300	550	860	
Minimum Ambient Operating Temperature	10°C (may be reduced by addition of defrost heater)					
Electrical Supply	230 V - 1 ph 50 Hz	230 V - 1 ph 50 Hz	230 V - 1 ph 50 Hz	230 V - 1 ph 50 Hz	400 V - 3 ph 50 Hz	
Electrical Load	1 x 70 W motor	1 x 190 W motor	2 x 190 W motors	4 x 190 W motors	2 x 600 W motors	
Dimensions	Height (mm) Width (mm) Depth (mm)	416 876 524	575 1007 536	575 1682 536	1575 2732 536	1125 2357 636
Weight (kg)	35	88	144	231	435	
Mounting	Ceiling, with floor option, indoors or outdoors					
Connections CO₂ (in o.d.)	3/8 stub	3/8 stub	inlet 3/8 stub outlet 5/8 stub	inlet 3/8 stub outlet 5/8 stub	inlet 7/8 stub outlet 13/8 stub	
Drain	G1	G1	G11/2	G11/2	G11/2	
Control Box - Non Defrosted Model	25000023	25000023	25000025	25000027	25000029	
Control Box - Defrost Model	25000024	25000024	25000026	25000028	25000030	

This equipment meets the requirements of EC Low Voltage Directive 73/23/EEC.



Sirocco CO₂ Vaporiser

Sirocco Vaporiser for CO₂

The Sirocco is designed to vaporise liquid carbon dioxide from syphon type CO₂ cylinders where a greater flow rate is required than is available from standard gas off-take cylinders.

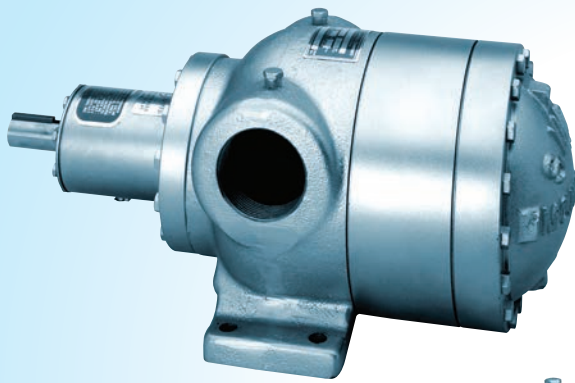
The Sirocco screws directly onto the cylinder valve by means of a loose CO₂ nut and sealing washer. The outlet is threaded CO₂ male to accept a CO₂ pressure regulator.

A thermostatically controlled element protected by a heat fuse ensures that the Sirocco provides gas on demand and cuts out during rest periods. A neon indicator is incorporated to show when the element is heating.

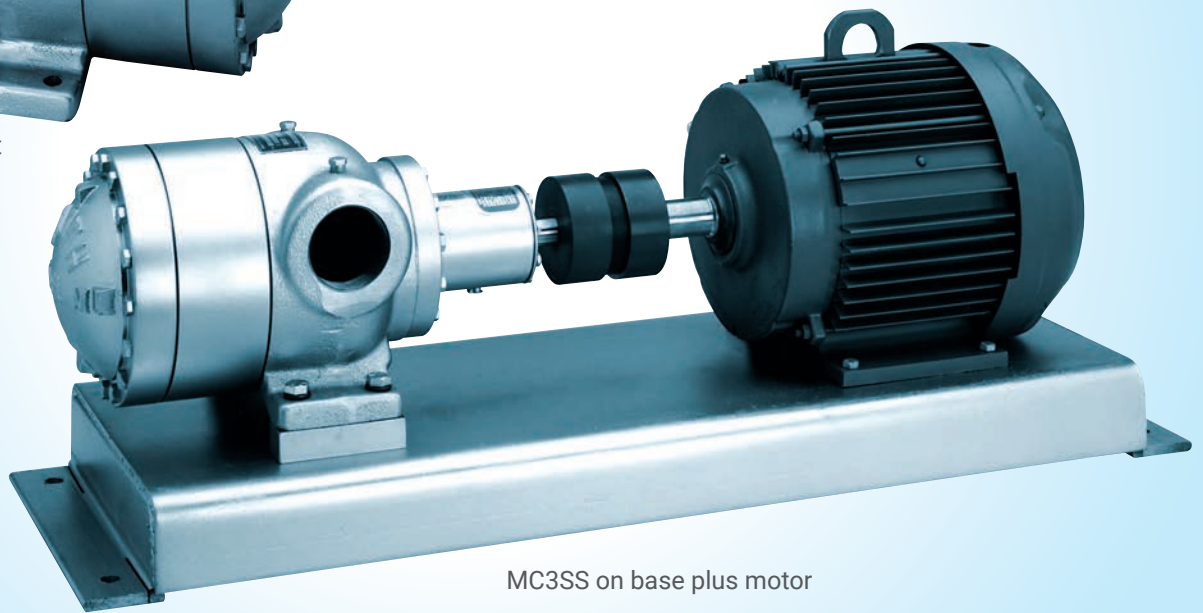
Specification

Maximum flow rate (kg/h)		3.2 (28 litre/min)
Design pressure (bar)		190
Connections	Inlet Outlet	BS 341 Part 1 No. 8, female/DIN 477 No. 6 BS 341 Part 1 No. 8, male/DIN 477 No. 6
Dimensions	Length (mm) Width (mm) Height (mm)	170 100 70
Net weight (kg)		1.1
Enclosure rating		IP21
Power supply	Part number 2232.0104 Part number 2232.0105	230 V AC 200 W 50 Hz 110 V AC 200 W 50 Hz

This equipment meets the requirements of EC Directives 2004/108/EC (EMC) and 73/23 EEC (LVD) where applicable.



MC3SS bare shaft



MC3SS on base plus motor

Low Pressure Transfer Pumps for CO₂

The liquid CO₂ transfer pumps manufactured by Smith Precision Products of California are designed for moving large quantities of bulk carbon dioxide between two low pressure vessels, where the differential pressure does not exceed 4.8 bar, typically between a road tanker and a CO₂ bulk storage tank. The complete range includes pumps with CO₂ transfer capacities between 0.5 te/h and 35 te/h.

The Smith pumps use precision-cut, interlocking gears to propel the liquid carbon dioxide. The gears are lubricated by the liquid CO₂ and hence run oil free. The shaft seal assembly which turns the drive gears is connected directly by means of a coupling to the electric motor and can be run at speeds of up to 1800 rev/min, although a slower running speed is recommended to prolong pump life.

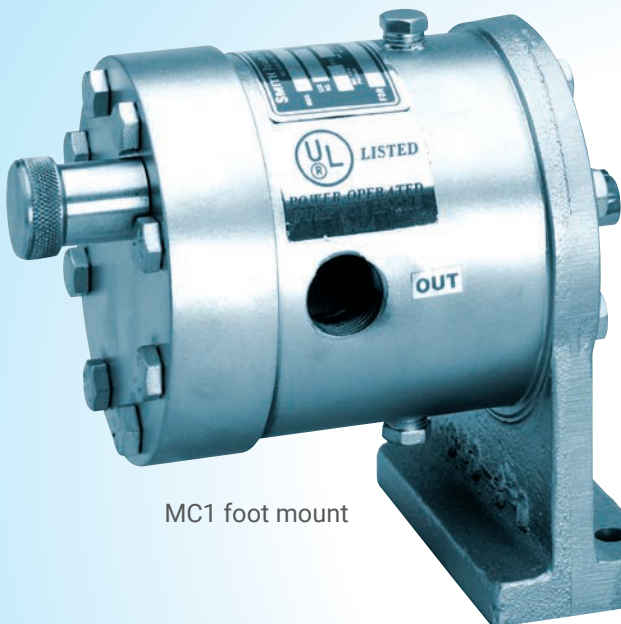
The recommended shaft seal assembly contains a 'Superseal' sealing ring, which minimises seal wear. This 'Superseal' option on the pump is denoted by the addition of the letters 'SS' after the pump model number, e.g. Smith pump MC2SS.

Many of the Smith pump models are reversible, avoiding the need for cumbersome loading and discharge pipework arrangements. The inlet and outlet ports on the standard pumps have NPT female threads, although bodies with flange connections can also be supplied.

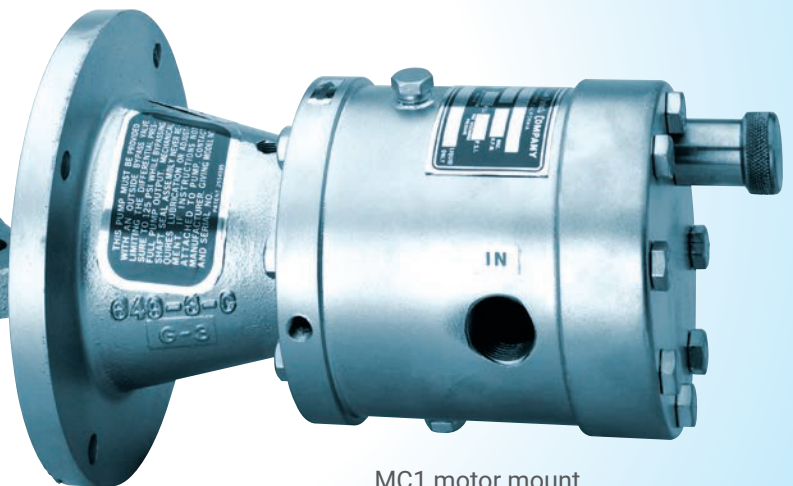
Pumps can be supplied with or without motor, baseframe, coupling and separate by-pass valve, if required.

Smith CO₂ Transfer Pump Model Specifications

Model	Differential Pressure (bar)	Recommended Motor Size (kW)	Recommended Coupling Size	Port Size Threads NPT Female (inch)	Reversible	Net Weight Pump Only (kg)	Recommended By-pass Valve	By-pass Valve Threads NPT Female (inch)
MC1SS	0 1.4 3.5	0.55 0.55 0.55	VC-20	3/4	No	9	WW 120	1/2
MC1044SS	0 1.4 3.5	1.1 1.1 1.5	VC-35	1 1/2	Yes	23	WW 100	1
MC1044HSS	0 1.4 3.5	1.1 1.1 2.2	VC-35	1 1/2	Yes	23	WW 100	1
MC2SS	0 1.4 3.5	2.2 2.2 4.0	VC-35 VC-35 VC-40	2 1/2	Yes	34	WW 114	1 1/4
MC3SS	0 1.4 3.5	4.0 4.0 5.5	VC-40	2 1/2	Yes	45	WW 112	1 1/2
MC4SS	0 1.4 3.5	5.5 5.5 7.5	VC-40 VC-40 VC-50	Inlet 4 Outlet 2 1/2	No	61	WW 200	2
MC5SS	0 1.4 3.5	7.5 7.5 11.0	VC-50	Inlet 4 Outlet 2 1/2	No	77	WW 212	2 1/2



MC1 foot mount



MC1 motor mount

Smith Pump Transfer Capacities

Pump Type	Actual Shaft Speed (rpm)	Differential Pressure (bar)	Actual Capacity (kg/h)
MC1SS	700	0	449
	900	0	577
	1400	0	898
	700	1.4	384
	900	1.4	513
	1400	1.4	834
	700	3.5	287
	900	3.5	416
	1400	3.5	737

MC1044SS	700	0	1796
	900	0	2310
	1400	0	3593
	700	1.4	1538
	900	1.4	2051
	1400	1.4	3334
	700	3.5	1150
	900	3.5	1663
	1400	3.5	2946

MC1044HSS	700	0	3144
	900	0	4042
	1400	0	6287
	700	1.4	2691
	900	1.4	3589
	1400	1.4	5835
	700	3.5	2012
	900	3.5	2910
	1400	3.5	5156

MC2SS	700	0	4491
	900	0	5774
	1400	0	8982
	700	1.4	3844
	900	1.4	5127
	1400	1.4	8335
	700	3.5	2874
	900	3.5	4157
	1400	3.5	7365

MC2HSS	700	0	5389
	900	0	6929
	1400	0	10778
	700	1.4	4742
	900	1.4	6282
	1400	1.4	10131
	700	3.5	3772
	900	3.5	5312
	1400	3.5	9161

MC3SS	700	0	8982
	900	0	11548
	1400	0	17964
	700	1.4	7688
	900	1.4	10255
	1400	1.4	16670
	700	3.5	5748
	900	3.5	8315
	1400	3.5	14730

Pump Type	Actual Shaft Speed (rpm)	Differential Pressure (bar)	Actual Capacity (kg/h)
MC3HSS	700	0	10778
	900	0	13858
	1400	0	21556
	700	1.4	9485
	900	1.4	12564
	1400	1.4	20263
	700	3.5	7545
	900	3.5	10624
	1400	3.5	18323

MC4SS	700	0	13473
	900	0	17322
	1400	0	26945
	700	1.4	11533
	900	1.4	15382
	1400	1.4	25005
	700	3.5	8623
	900	3.5	12472
	1400	3.5	22095

MC4HSS	700	0	16167
	900	0	20786
	1400	0	32334
	700	1.4	14227
	900	1.4	18846
	1400	1.4	30394
	700	3.5	11317
	900	3.5	15936
	1400	3.5	27484

MC5SS	700	0	17964
	900	0	23096
	1400	0	35927
	700	1.4	15377
	900	1.4	20509
	1400	1.4	33340
	700	3.5	11497
	900	3.5	16629
	1400	3.5	29460

MC5HSS	700	0	21556
	900	0	27715
	1400	0	43113
	700	1.4	18970
	900	1.4	25129
	1400	1.4	40526
	700	3.5	15089
	900	3.5	21248
	1400	3.5	36646

Capacities listed assume inlet conditions are as recommended and will vary with liquid CO₂ temperature.

Smith CO₂ Pump Options

High Capacity

Pump life can be considerably extended by the use of the high capacity ('H') range of pumps operated at a reduced speed. Utilising a larger gear set the pump can achieve required transfer rates at lower speeds. In addition to a reduction in noise levels, operating the pump at half the recommended speed can extend the life of the pump by up to three times.

Continuous Duty

Standard Smith CO₂ pumps are designed for intermittent duty and generally should not be operated for more than two hours at any one time.

Special pumps (NSSA Option) are available for use in installations requiring extended operating periods (for example in continuous re-circulation) or where higher than normal differential pressures

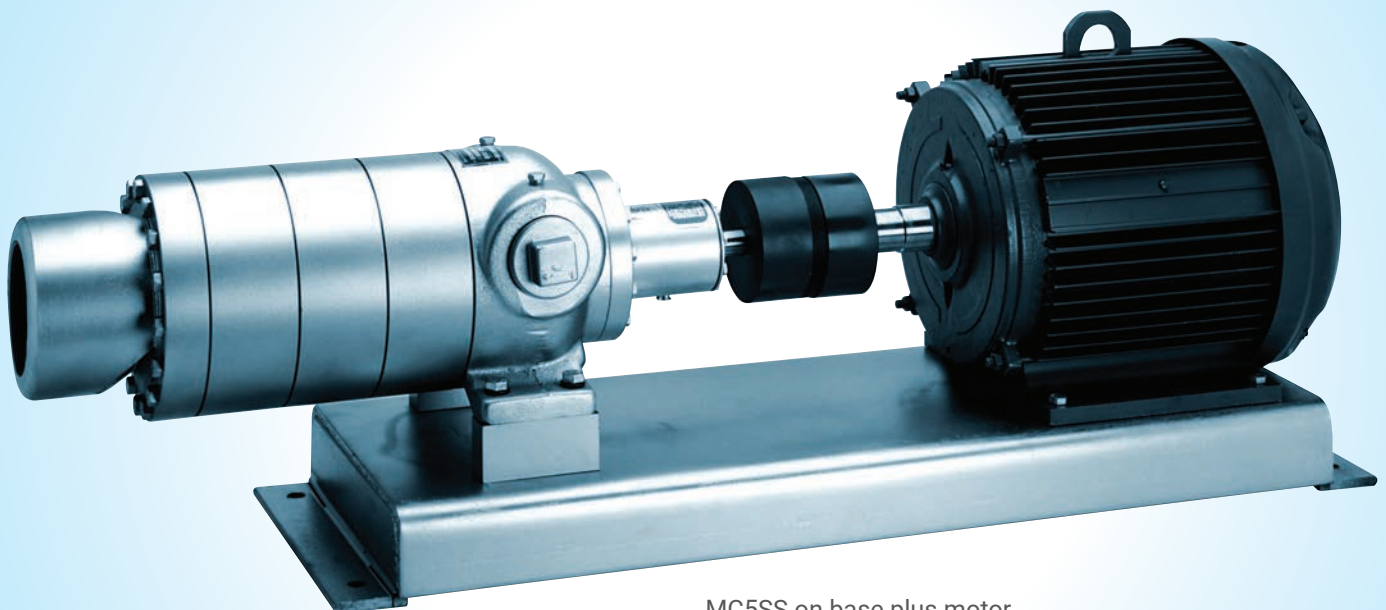
are encountered. In these cases a larger pump running at a lower speed would be recommended to maximise pump life.

The NSSA option features gear sets made from aircraft quality steel (Nitalloy 135MOD) hardened with a special nitriding process to provide a very hard wearing surface. Special Tungsten Carbide idler gear shafts are fitted to provide rigidity under high load conditions.

Pump Connections

Standard Smith CO₂ pumps feature an ANSI standard female NPT thread connection. Installation must be made with a compatible sealant to produce a pressure tight joint.

An option is available to provide either screwed or butt weld companion connection which may improve access for maintenance.



MC5SS on base plus motor

Smith CO₂ Pump Ancillaries

By-pass Valves

The Smith by-pass valves can safely control and limit excessive differential pressure without cavitating the pump. A by-pass valve properly installed provides a safe automatic product return through a separate circuit which allows generated heat and vaporisation to dissipate before the liquid CO₂ passes once again to the pump inlet.

All Smith by-pass valves incorporate a unique flow plate to evenly dissipate flow when the valve opens. This eliminates chatter and minimises overpressure even at higher flow rates. The valve is designed for continuous flow applications and can be used to meter flow if desired. Each valve is adjustable for a differential pressure of between 1.7 bar and 8.6 bar. Unless otherwise specified valves are factory set at 2.75 bar.

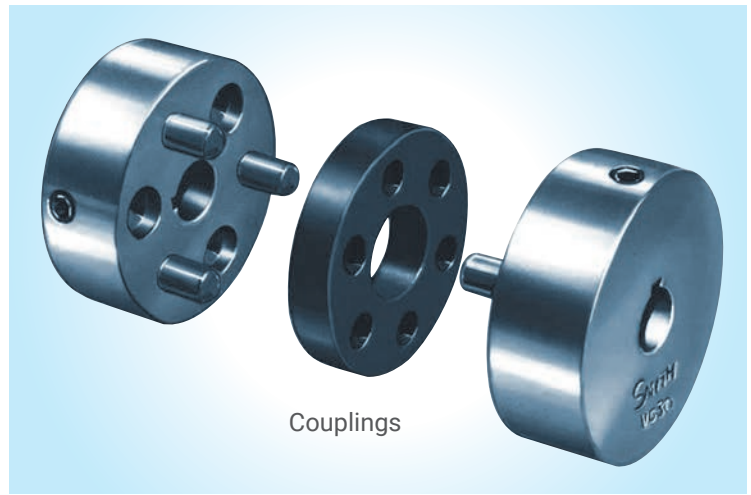


Valve Selection Table

By-pass Valve	Port Size NPT/API Female (in)	Weight (kg)	Rated Capacity (kg/h)	Pump
WW 120	1/2 x 1/2	4	2300	MC1SS
WW 100	1 x 1	5.35	8000	MC1044SS
WW 114	1 1/4 x 1 1/4	5.35	11500	MC2SS
WW 112	1 1/2 x 1 1/2	11.40	23000	MC3SS
WW 200	2 x 2	11.40	34600	MC4SS
WW 212	2 1/2 x 2 1/2	10.70	57000	MC5SS

Couplings

Flexible drive couplings are used for Smith CO₂ pumps whether mounted on steel baseframes with motors or engines or for pumps mounted directly onto electric motors. Recommended couplings consist of two metal flanges and one flexible rubber vibration damping insert disc. Custom sized bores for metric and unusual motor shaft sizes can be supplied on request.



Couplings Fitted to Standard Installations

Part Number	Coupling	Insert Number	Pump	Motor Size (1500 rpm)		
				Standard Bore Diameters (in)	(hp)	(kW)
	VC-20	FD20	MC1SS	5/8, 3/4	0.5	0.55
2226.1360	VC-35	FD35	MC1044SS	7/8, 1, 1 1/8	2	1.5
2226.1360	VC-35	FD35	MC2SS	7/8, 1, 1 1/8	3	2.2
2226.1361	VC-40	FD40	MC2SS	1, 1 1/8, 1 1/4, 1 3/8	5	4
2226.1361	VC-40	FD40	MC3SS	1, 1 1/8, 1 1/4, 1 3/8	7.5	5.5
	VC-50	FD50	MC4SS	1, 1 3/8, 1 5/8	10	7.5
	VC-50	FD50	MC5SS	1, 1 3/8, 1 5/8	15	11

NOTE: There is an additional charge for couplings with non-standard or metric-sized bores.

Table to Select Correct Coupling related to hp and rpm

hp of Motor	rpm of Motor	Coupling
1 1/2	1500	VC-30
	1000	VC-35
	750	VC-35
2	1500	VC-35
	1000	VC-35
	750	VC-40
3	1500	VC-35
	1000	VC-40
	750	VC-40
5	1500	VC-40
	1000	VC-40
	750	VC-50

hp of Motor	rpm of Motor	Coupling
7 1/2	1500	VC-40
	1000	VC-50
	750	VC-50
10	1500	VC-50
	1000	VC-50
	750	VC-50
15	1500	VC-50
	1000	VC-50
	750	VC-50
20	1500	VC-50
	1000	VC-50
	750	VC-50

Strainers

With a maximum allowable working pressure of 34 bar the Smith strainer is perfectly suited to remove particulate matter in the inlet of Smith CO₂ pumps.

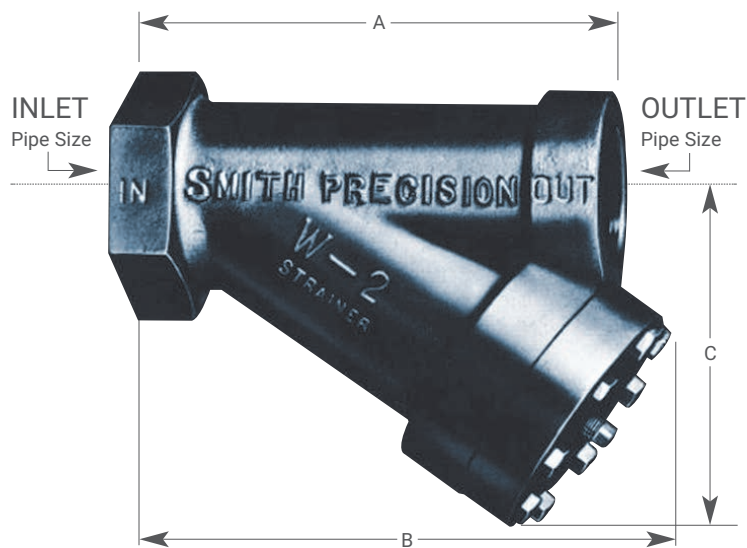
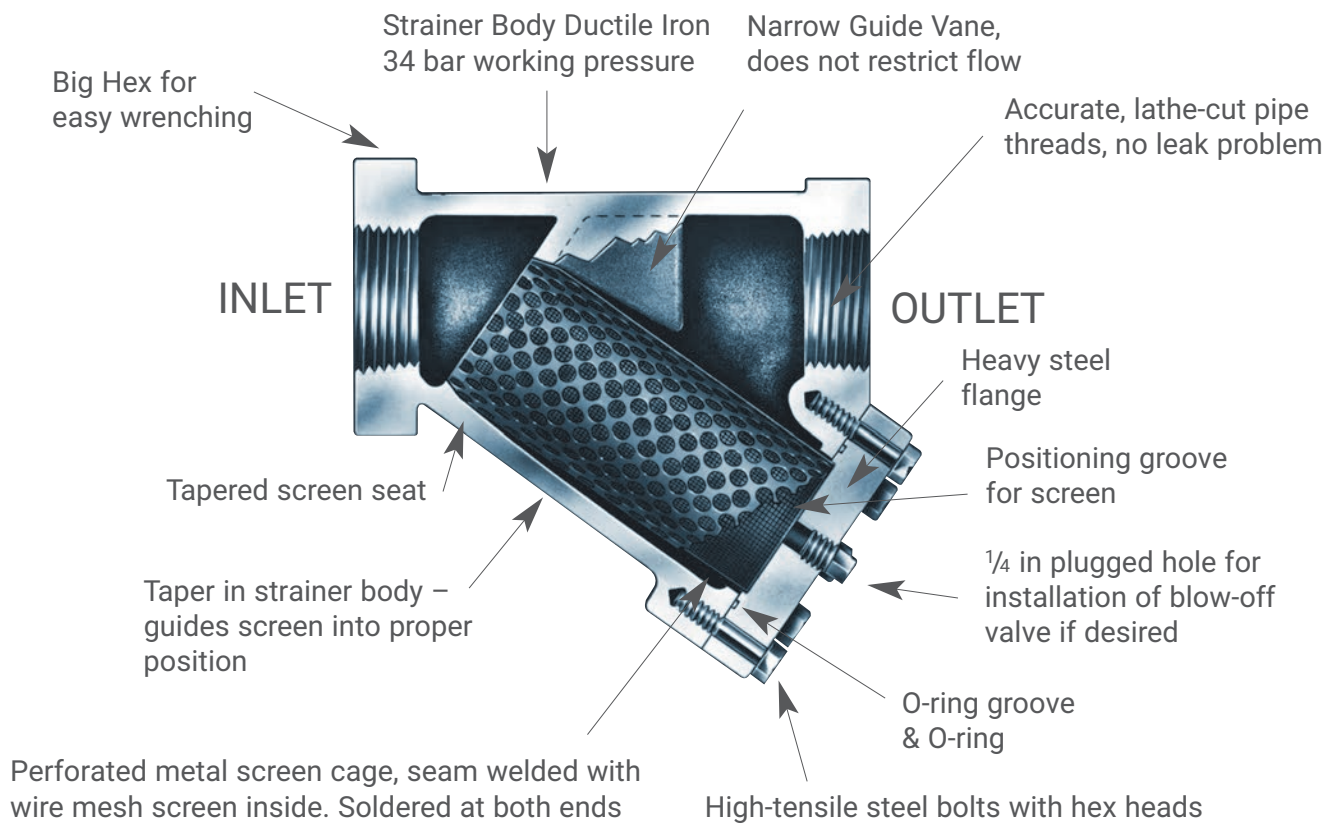
Improved safety and reduced costs can be achieved by the use of strainers with reducing sizes eliminating extra fittings or bushings.

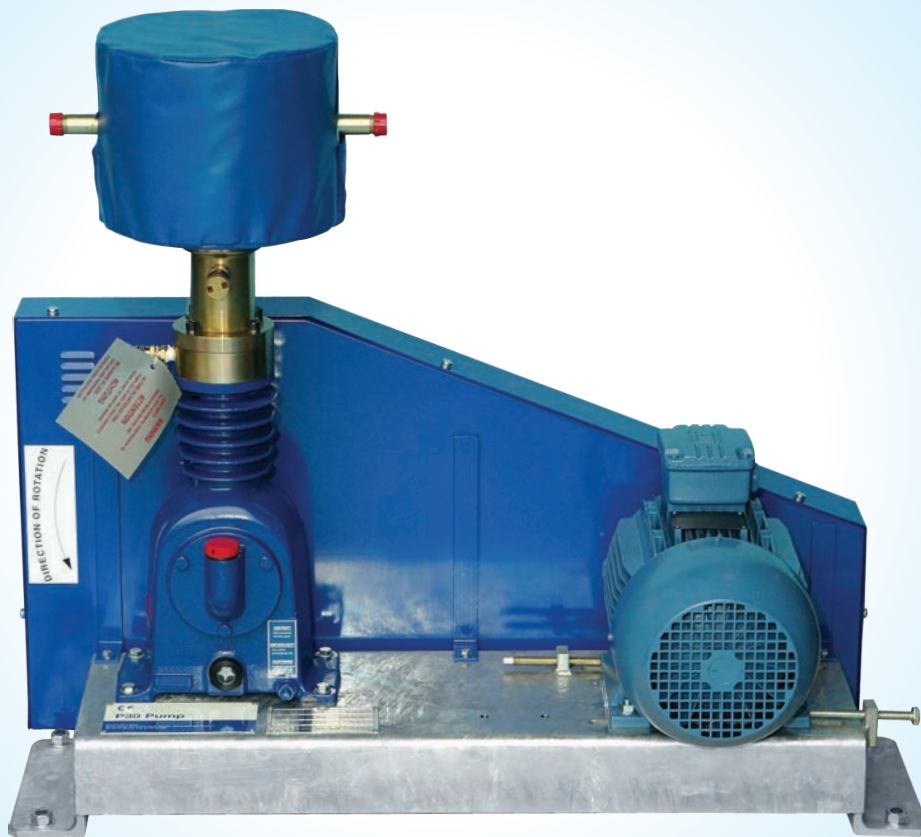
The screen is very easy to replace due to the exclusive narrow guide vane and a taper in the strainer body. The screen glides easily into position preventing breakage or buckling which

otherwise could allow foreign matter to pass through. The reinforced mesh screen provides superior efficiency compared with inferior perforated metal screens. Screens are available in either brass 40 mesh or 300 series stainless steel 80 mesh.

Specification

Strainer Type Number	Pipe Sizes (NPT/API)		A (mm)	B (mm)	C (mm)
	Inlet (in)	Outlet (in)			
W-1	1	3/4	162	178	114
W-1B-100	1	1	162	178	114
W-1	1 1/4	3/4	162	178	114
W-1	1 1/4	1	162	178	114
W-1	1 1/4	1 1/4	162	178	114
W-1B-112	1 1/2	1 1/2	162	178	114
W-2	2	1 1/2	208	228	168
W-2B-200	2	2	208	228	168
W-3	2 1/2	2 1/2	260	286	191
W-3	3	2 1/2	260	286	191
W-3	3	3	260	286	191





P30 Pump

Cylinder Filling Pumps for CO₂ - P30, P50 & P100

We offer a range of high pressure CO₂ cylinder filling pumps with capacities from 300 kg/h to 1200 kg/h. The P30 is designed to fill cylinders from either bulk liquid CO₂ storage vessels or from cylinder supply. The P50 & P100 pumps are designed to fill cylinders from bulk liquid CO₂ storage vessels only. Where a bulk liquid CO₂ tank is used as a supply source, refrigeration is required in the tank. The pumps may also be used where a high pressure source of liquid CO₂ is required for a particular process.

Pumps are either supplied as a basic pump on a base with motor, pulleys, drive belts and guard or alternatively as a recharging unit with automatic revert system to re-circulate CO₂ back to the storage tank during periods of no demand.

For efficient pumping of liquid CO₂ stored in a bulk storage vessel, the head of the pump must be maintained at a temperature as near that of the liquid CO₂ as possible. This is achieved by pumping continuously and re-circulating liquid CO₂ back to the storage tank during periods of no demand. The recharging unit has a revert system local to the pump to enable pipe runs to be kept short, thereby reducing heat load to a minimum.

As the pumps have a positive displacement, it is essential that a relief valve is installed on the discharge line to protect against inadvertent closure of valves etc.

The P30 Recharging Unit is supplied as the basic pump plus an auto revert system comprising isolating and filling valves, solenoid operated revert valve, non return valve, relief valves, starter/isolator, control box, pressure indicator, pressure revert valve, all interconnecting pipework and high pressure hoses. Each unit is supplied suitable for cylinder to cylinder transfer. Modification of the pipework and fitting of head insulation (supplied) will be necessary when taking CO₂ from a bulk tank.

The P50 and P100 Recharging Units are supplied as the basic pump plus an auto revert and pressure damping system comprising pneumatically operated auto revert valve, non return valve, pressure switch, pressure indicator, control box, pressure damping buffer vessel with temperature controlled heater, relief valve, blow down valve and all interconnecting pipework on a common baseframe. The pressure pulse damping system is a feature of the larger recharging units. It effectively reduces fluctuations in CO₂ flow caused by the action of the plunger.

Transfer Capacity

P30	Pump and Recharging Unit	300 kg/h
P50	Pump and Recharging Unit	600 kg/h
P100	Pump and Recharging Unit	1200 kg/h

Legislation

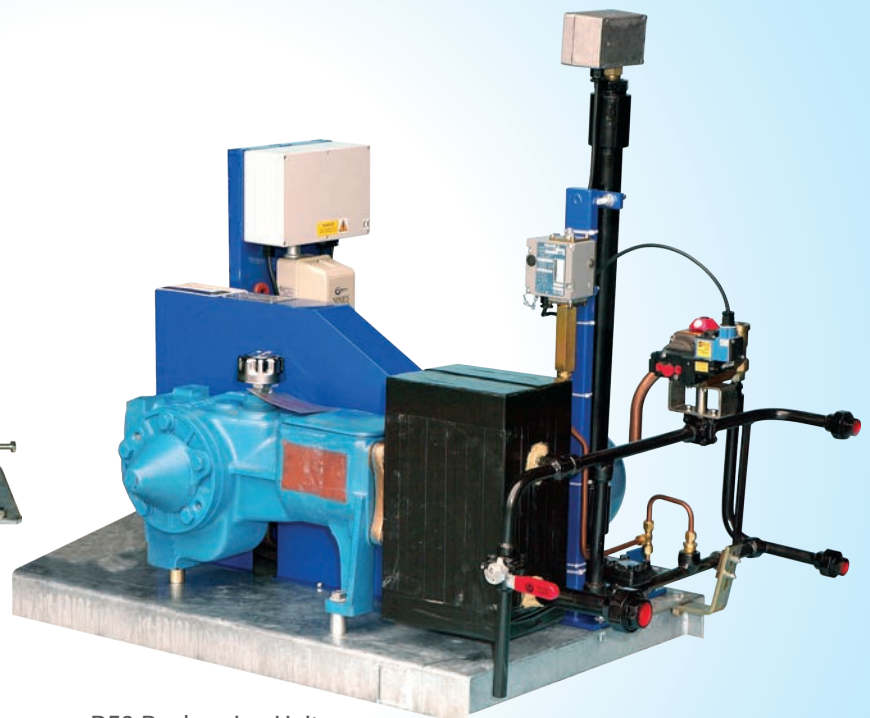
Basic pumps are CE marked to comply with European Machinery Directive 98/37/EC and Low Voltage Directive 73/23/EC. Recharging Units comply with Pressure Equipment Directive 97/23/EC.

Installation

When pumping liquid CO₂ into cylinders, adequate suction conditions are critical. The pump should be installed as low as possible in relation to the liquid CO₂ source to ensure maximum positive suction head on the pump. For a bulk liquid CO₂ source the suction line should be insulated with at least 50 mm expanded polyurethane foam (or similar) and must not exceed 3 metres in length.



P30 Recharging Unit

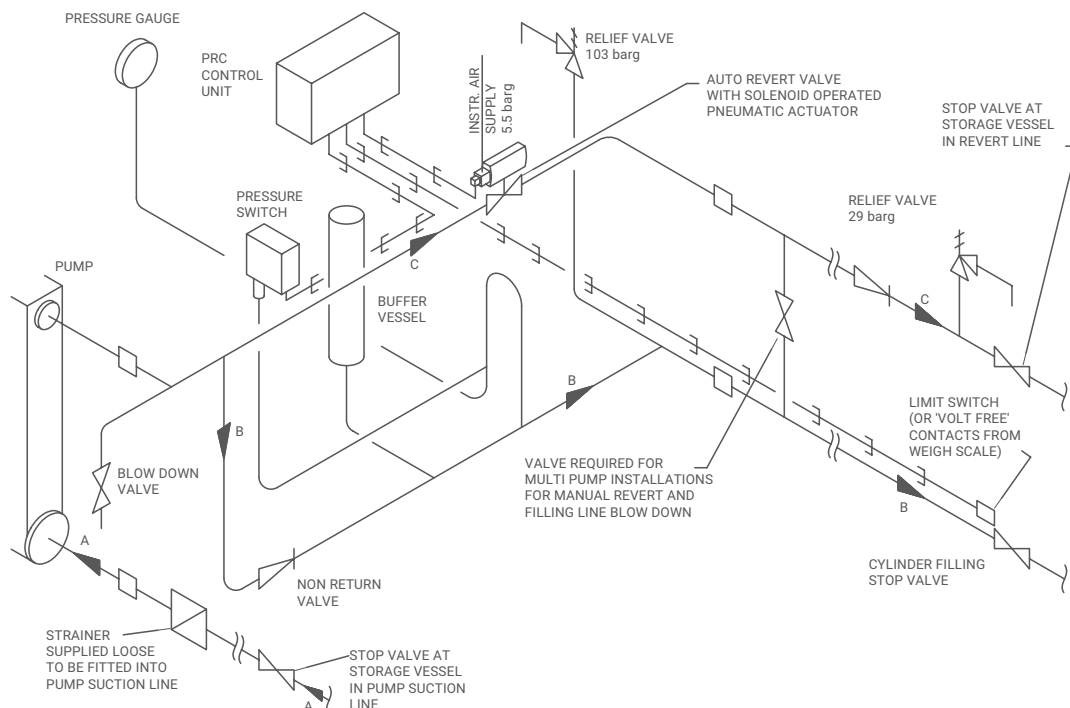


P50 Recharging Unit

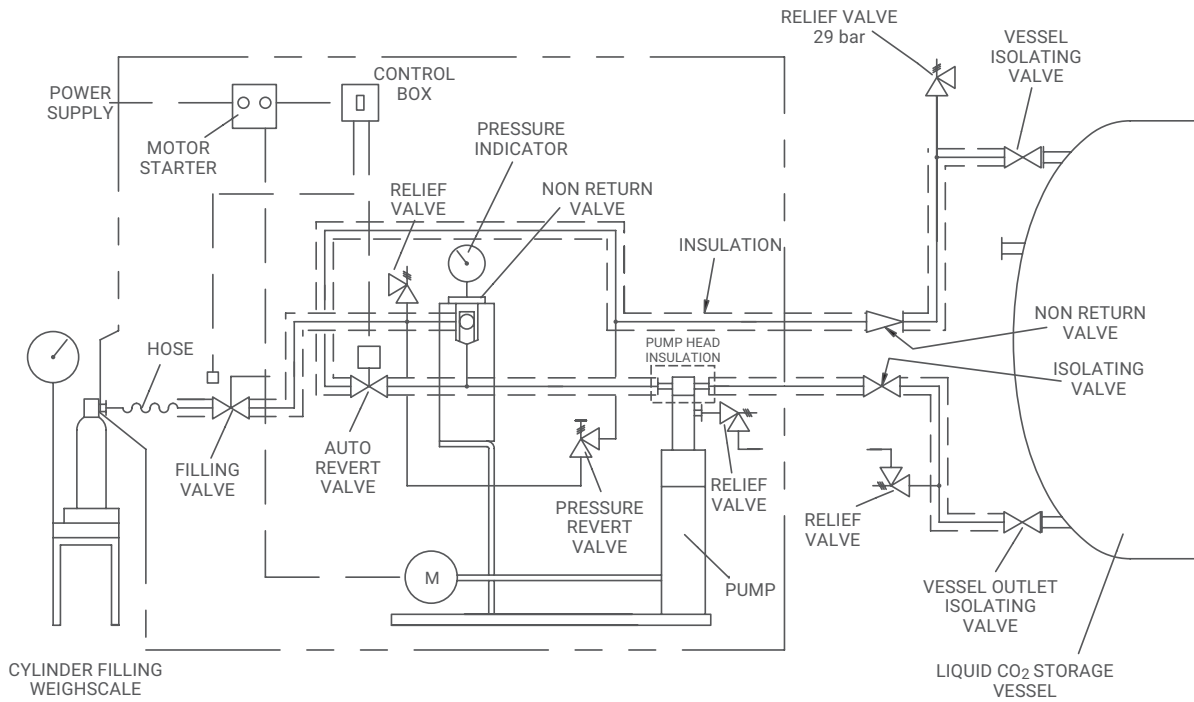
Specification

	P30 Pump	P30 Recharging Unit	P50 Pump	P50 Recharging Unit	P100 Pump	P100 Recharging Unit
Performance Maximum design pressure (bar) Nominal throughput (kg/h) (bulk CO ₂ at 20 bar -17°C)	103.5 300	103.5 300	103.5 600	103.5 600	103.5 1200	103.5 1200
Mechanical CO ₂ suction connection CO ₂ discharge connection Pump speed (rpm)	R1/2 R1/2 400	Rc1/2 Rc1/2 400	2 in NPT 1 in NPT 350	Rc1 Rc1/2 350	2 in NPT 1 in NPT 350	Rc11/2 Rc11/2 350
Electrical Motor T.E.F.C. Motor frame size Motor speed (rpm) Supply	2.2 kW D.100L 1420 400 V AC, 3 Phase, 50 Hz	2.2 kW D.100L 1420 400 V AC, 3 Phase, 50 Hz	4 kW D.112M 1420 400 V AC, 3 Phase, 50 Hz	4 kW D.112M 1420 400 V AC, 3 Phase, 50 Hz	7.5 kW D.132M 1440 400 V AC, 3 Phase, 50 Hz	7.5 kW D.132M 1440 400 V AC, 3 Phase, 50 Hz
Dimensions/Weight Length (mm) Width (mm) Height (mm) Net weight (approx. kg) Gross packed weight (approx. kg)	912 394 770 91 105	912 417 770 106 123	940 780 540 177 242	1160 780 1130 229 310	940 882 540 270 330	1160 882 1030 326 400
Shipping Dimensions Length (cms) Width (cms) Height (cms)	97 49 85	97 49 85	113 88 78	133 90 130	113 108 78	133 108 130
Part number with motor	2226.0580	2226.0584	2226.0621	2226.0601	2226.0721	2226.0731

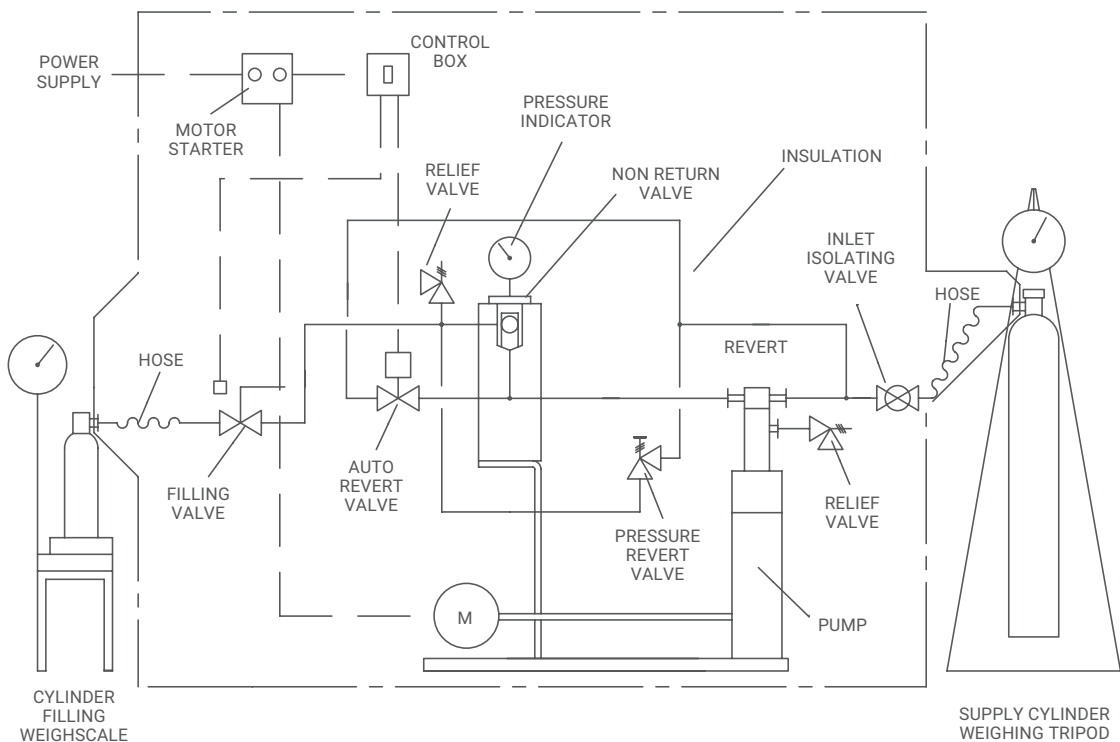
CO₂ Cylinder Recharging Unit P50 & P100 Flow Diagram

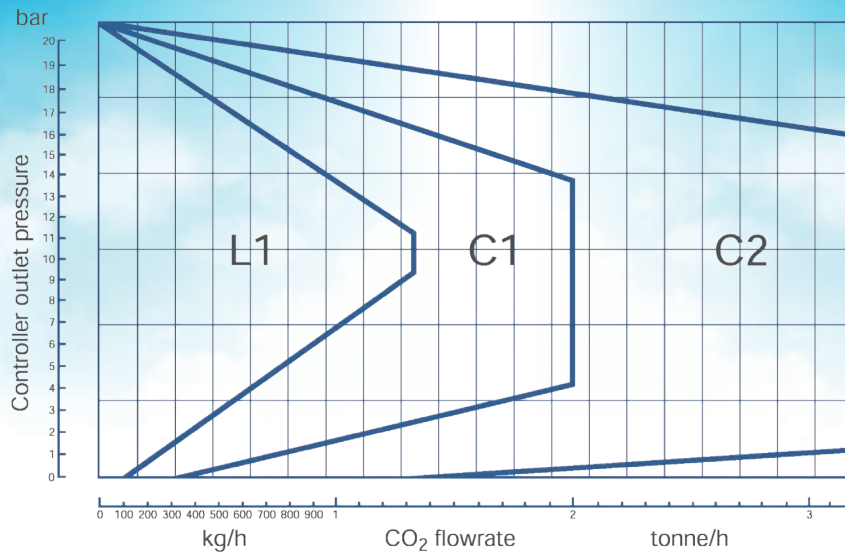


CO₂ Cylinder Recharging Unit P30 Flow Diagram - Bulk Supply



CO₂ Cylinder Recharging Unit P30 Flow Diagram - Cylinder Supply





Pressure Control for CO₂

A range of pressure control valves are available for gaseous CO₂ use in high flow applications.

The CO₂ source can be a bulk liquid CO₂ storage tank, a high pressure tank or manifold of cylinders.

Inlet pressures of up to 86 bar and outlet pressures up to 65 bar are available.

Choosing your pressure controller

The pressure control valves are also available built into single or dual reducing valve stations incorporating isolating valves, filters and gauges.

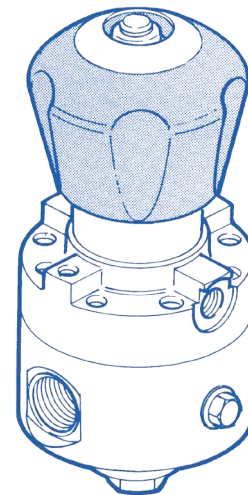
The pressure control flow sizing chart above is useful to decide which pressure controller is suitable for any given application.

L Type Pressure Control Valve

The L type pressure control valves are designed for gas flow rates of 70 kg/h to 500 kg/h, with CO₂ from a low pressure bulk storage tank (model

L1) or from a high pressure tank or manifold of cylinders (model L2). The outlet pressure is normally in the range 0 - 5 bar. Alternative springs and diaphragms are available to give pressure ranges 5 - 10 bar and 10 - 31 bar.

The pressure control valves are spring loaded and manually adjustable, giving a continuously smooth flow of gas at the set pressure. The controller incorporates a safety relief device; should the outlet pressure rise above the set pressure, the diaphragm will lift and vent excess pressure through a relief port in the valve body.

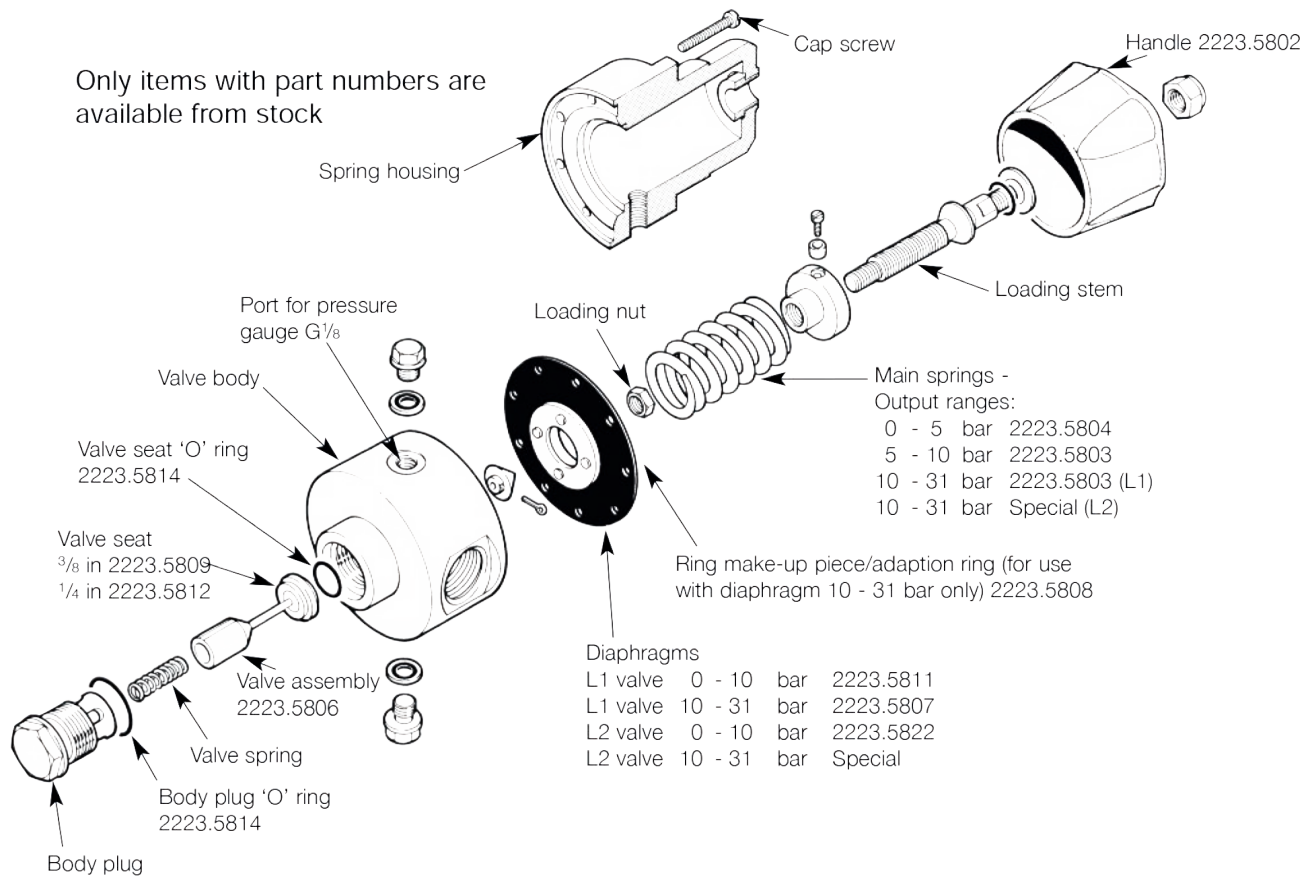


L Type Pressure Control Valve

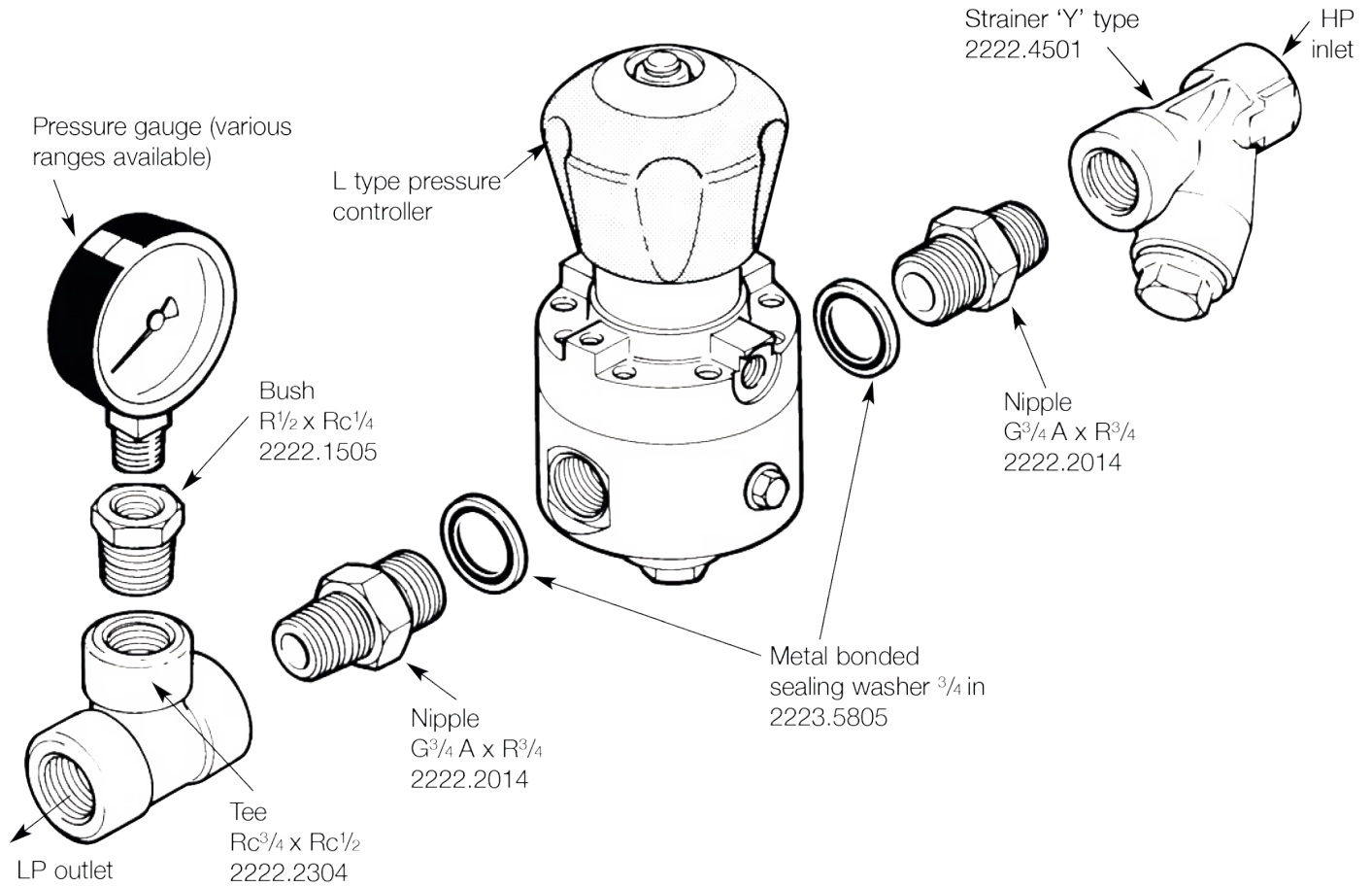
Part Numbers

Pressure Controller		Pressure Range (bar)	Spring Part No.	Diaphragm Part No.	Valve Seat	
Model	Part No.				Size (inch)	Part No.
L1	2223.5801	0.3-5	2223.5804	2223.5811	3/8	2223.5809
		5-10	2223.5803	2223.5811		
		10-31	2223.5803	2223.5807 + Ring 2223.5808		
L2	2223.5821	0.3-5	2223.5804	2223.5822	1/4	2223.5812
		5-10	2223.5803	2223.5822		
		10-31	Special	Special		

Spares



Typical Installation



Specification

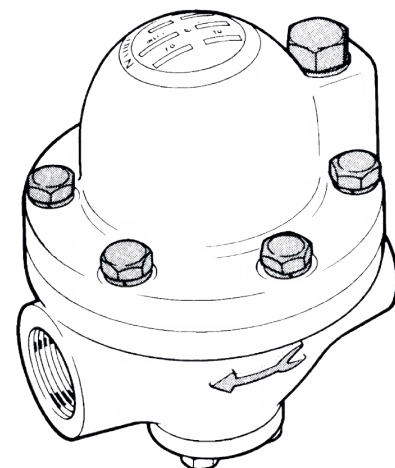
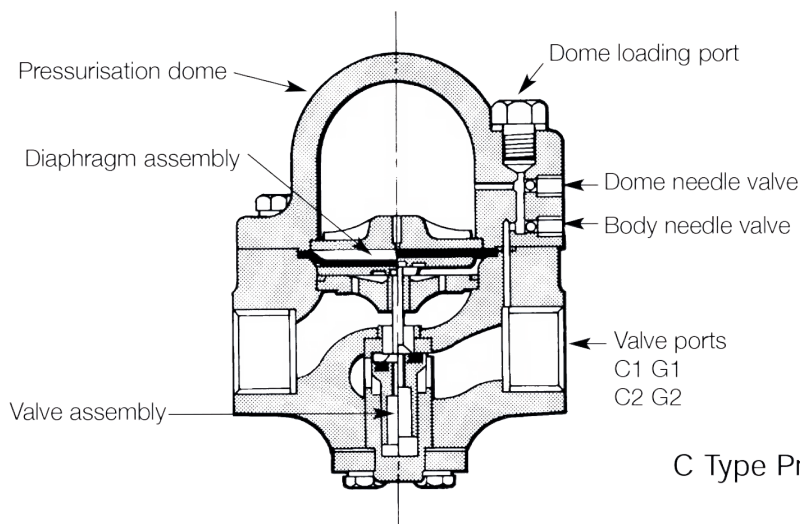
Flow rate (kg/h)		70 to 500
Maximum inlet pressure (bar)	L1: L2:	41 86
Threaded ports	Inlet & Outlet: Relief Outlet: Pressure Gauge:	G _{3/4} G _{1/4} G _{1/8} (supplied plugged)
Materials	Body: Springs, Valve Seat & Assembly: Diaphragm, 'O' Rings & Seals:	Aluminium alloy Stainless steel Synthetic rubber
Working temperature		-10°C to 60°C
Dimensions (mm)	Height: Width port to port:	197 83
Net weight (kg)		1.8
Part No.	L1: L2:	2223.5801 2223.5821

C Type Pressure Controller

The C type pressure controllers are designed for CO₂ gas flow rates of 0.5 te/h to 3 te/h. The C1 and C2 controllers are dome-loaded types, operated by a control pressure in the dome being balanced against the main pressure under the diaphragm. The outlet pressure is fully variable between 1 - 65 bar simply by changing the pressure in the dome.

The outlet set pressure can be fixed or adjustable. For a fixed set pressure, the dome is charged by means of both the body and dome needle valves, taking gas from the controller inlet port. Alternatively, it may be charged using an external gas supply through the dome loading port with the body needle valve kept closed.

The pressure in the dome is then vented down to set the required outlet pressure. For an adjustable outlet pressure, a loading pressure regulator is needed to control the pressure in the dome. The regulator should be connected to the dome loading port which has a G¼ thread. The dome loading port is sealed with a plug on despatch. Ensure that adequate relief valve protection is provided downstream to protect piping/equipment from excessive pressure in the event of regulator failure.



C Type Pressure Controller

Specification

	C1	C2
Maximum gas inlet pressure (bar)	69	69
Outlet pressure range (bar)	1-65	1-65
Inlet and outlet ports	G1	G2
Dome loading port	G¼	G¼
Internal valve orifice (mm)	13	25
Materials - Body:	Meehanite	
Valve seat and trim:	Stainless steel	
Valve pad, diaphragm and seals:	Synthetic rubber	
Dimensions - Height (mm):	168	267
Width (mm) port to port:	127	227
Gross weight (kg)	6	20
Valve part no.	2223.5831	2223.5841
Spares kit part no.	2223.5832	2223.5842

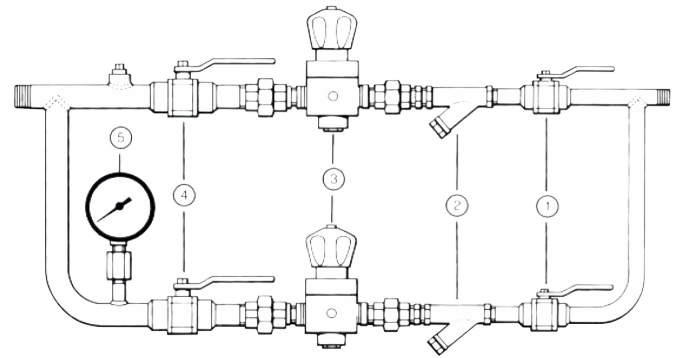
Dual Reducing Valve Station (DRVS)

The DRVS is designed to reduce the primary carbon dioxide gas pressure from a bulk tank and CO₂ vaporiser. The arrangement allows the gas to flow continuously to the plant, without interruption, even when one side of the station is being overhauled.

The DRVS with L1 pressure controllers (nominal capacity 0.5 tonne/h) comprises:

1. 2 x ball valves ¾ in n.b. for gas input isolation
2. 2 x strainers Y type, with 100 mesh screen, for protecting the pressure controllers from swarf and grit
3. 2 x L1 type pressure controllers for reducing the gas pressure to 0-5 bar, 5-10 bar and 10-31 bar pressure range also available
4. 2 x ball valves 1 in n.b. for gas output isolation
5. 1 x pressure gauge 100 mm diameter, 0 -17 bar.

The pressure controllers are union-mounted to facilitate easy removal for servicing. The screen in the strainers and the seats and seals in the ball valves can be removed for cleaning or renewal simply and easily without dismantling any pipework. There is a Rc½ connection on the output side of the assembly to take a relief valve. A correctly sized relief valve must be fitted to ensure there is adequate protection for downstream piping/equipment.



Nominal capacity (kg/h)	500
Maximum inlet pressure (bar)	41
Outlet pressure range (bar)	0-5 standard 5-10 optional 10-31 optional
Inlet connection	R¾
Outlet connection	R1
Length (mm)	1225
Height (mm)	584
Depth (mm)	127
Unpacked weight (kg)	19
Part No.	2223.5701

Also available to special order:

Single reducing valve station (with one L1 pressure controller, omitting by-pass arrangement):

Part No.

2223.5702

Dual reducing valve station with C1 pressure controllers (nominal capacity 1 tonne/h):

2223.5705

Dual reducing valve station with C2 pressure controllers (nominal capacity 2 tonne/h):

2223.5706



Fittings for CO₂

Fittings for CO₂

Pipe Threads

Pipe thread references quoted in this catalogue conform with the requirements specified in the latest issue and amendments of the following ISO Standards:

ISO 7-1 (BS21) Pipe threads for tubes and fittings where pressure-tight joints are made on the threads (requires PTFE sealing tape or liquid sealant).

ISO 228-1 (BS2779) Pipe threads for tubes and fittings where pressure-tight joints are not made on the threads (requires a sealing washer such as a bonded seal or 'O' ring).

References to pipe threads are in accordance with ISO 7 as follows:

BS 21	BS 2779
Rc* = BSP Taper Female	G* = BSP Parallel Female
R* = BSP Taper Male	G*A = BSP Parallel Male
Rp = BSP Parallel Female	

*Nominal pipe diameter (inches)

These thread systems should not be mixed as it may lead to a failure of the pressure connection.

CO₂ Threaded Fittings

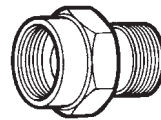
Throughout the world, carbon dioxide cylinder valves have a special thread. In Europe, Africa and much of Australasia, the thread conforms to British Standard BS 341 Part 1 No. 8 (0.860 in x 14 TPI) or the direct European equivalent (DIN 477 No. 6). These threads are in effect interchangeable.

American CGA 320 and Japanese JIS B 8246 CO₂ threads are different and are not compatible with each other nor with BS or DIN CO₂ threads.

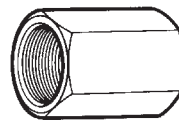
The following fittings have threads to BS 341 Part 1 No.8. The material is brass.

Maximum working pressure 240 bar.

CO₂ Female Fittings

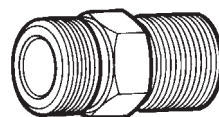


Adapter CO₂ female x R1/2
2222.0102



Coupling CO₂ female x G1/2
2222.0103

CO₂ Male Fittings

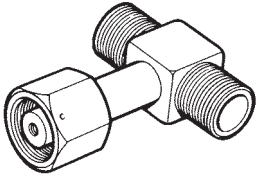


Nipple CO₂ male x R1/2
2222.0101

Nipple CO₂ male x G1/4A cone
2222.0107

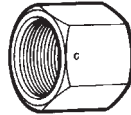
Nipple CO₂ male x R1/4
2222.0108

CO₂ Tee Piece



Tee CO₂ female x CO₂ male x CO₂ male
2233.0601

CO₂ Coupling Nuts for use with Tailpieces

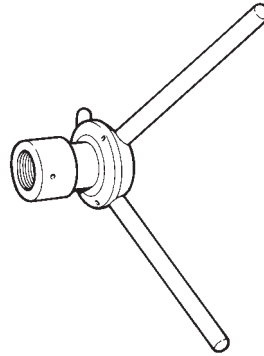


Hexagonal CO₂ female coupling nut
2222.0301

Tailpieces for CO₂ Coupling Nuts



Tailpiece short (70 mm) G1/4A cone
2222.0504



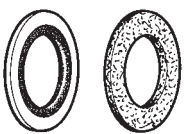
Spoked CO₂ female coupling nut
2222.0303



Tailpiece long (120 mm) G1/4A cone
2222.0503

Washers

Sealing washers are held in stock for CO₂ couplings and other duties.



Sealing washers for CO₂ female connections

CO₂ metal bonded sealing washer (reusable)
2222.0601

CO₂ fibre washer (non-reusable)
2222.0602

Sealing washers for BSP parallel male threads

3/8 in metal bonded
2222.0602

1/2 in fibre
2232.0208

3/4 in metal bonded
2232.0604

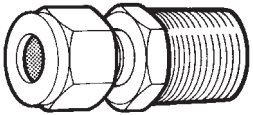
1 in metal bonded
2223.5805

Compression Fittings

Using thick walled copper tube 3/8 in o.d., Part number 2222.2401, is a convenient way of running small flows of liquid carbon dioxide or CO₂ gas between equipment items. Compression fittings are a reliable and simple method of joining together sections of 3/8 in o.d. tube and connecting the tube to other threaded items.

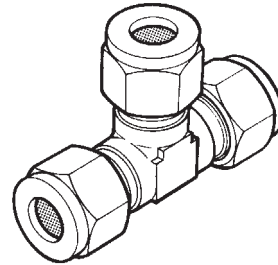
Material	Brass
Maximum Working Pressure (bar)	103

Adapter 3/8 in o.d. Compression x Male Thread



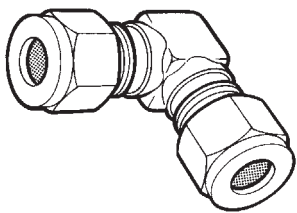
Adapter 3/8 in o.d. x R1/2	2222.0701
Adapter 3/8 in o.d. x R1/4	2222.0704
Adapter 3/8 in o.d. x G1/4A	2222.0705
Adapter 3/8 in o.d. x G3/8A	2222.0706
Adapter 3/8 in o.d. x 1/8 in NPT/API	2222.0707
Adapter 3/8 in o.d. x 1/4 in NPT/API	2222.0709

Tee 3/8 in o.d. Compression



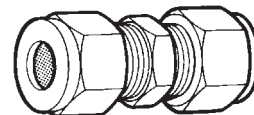
Tee 3/8 in o.d. 2222.1201

Elbow 90° 3/8 in o.d. Compression



Elbow 3/8 in o.d. 2222.0901

Coupling 3/8 in o.d. Compression



Coupling 3/8 in o.d. 2222.0801



Jetfreezer™

Portable Pipe Freezing Equipment

The efficient way to freeze pipework

Jetfreezer™ reduces downtime and cost by eliminating the need to drain down pipework before maintaining, repairing or extending a system. Utilising the intensely cold properties of solid carbon dioxide, Jetfreezer™ rapidly and economically creates a positive ice plug in the required work area. Natural convection melts the ice plug restoring supply in minutes when the work is complete.

Benefits

- Fast - Jetfreezer™ freezes water in a 15 mm diameter copper pipe in 3.5 minutes
- Reliable - Jetfreezer™ ice plugs last up to 45 minutes
- Rapid - Jetfreezer™ freezes copper pipes twice as fast as leading aerosol products
- Effective - Jetfreezer™ will rapidly freeze pipes, even in restricted areas
- Versatile - Jetfreezer™ will freeze both metal and plastic pipes from 15 mm to 100 mm diameter containing water, heavy fuel oils, alcohol solutions and many other liquids
- Economic - A 6.35 kg CO₂ cylinder will supply enough CO₂ for up to 17 freezes on a 15 mm diameter pipe
- Mobile - Jetfreezer™ requires no external power supply
- Available - Jetfreezer™ equipment and refills are available nationwide through our extensive network of agents



Jetfreezer™ Kits

Jetfreezer™ is available in a range of competitively priced kits to meet the needs of all users. Each kit contains all equipment necessary to carry out single or double freezes.

Safety

Protective gloves (part no. 2233.0401) should always be worn when handling dry ice to prevent the possibility of frost bite or 'cold burns' arising when dry ice is in contact with the skin.

Outside diameter of pipe to freeze (mm)

Jetfreezer™ Kits	Part No.	8-15	16-22	23-42
Jetfreezer™ Mini	2233.0608	+		
Jetfreezer™ Senior	2233.0609	+	+	
Jetfreezer™ Senior Plus*	2233.0610	+	+	
Jetfreezer™ Professional	2233.0611	+	+	+
Jetfreezer™ Professional Plus*	2233.0612	+	+	+

*Double Freeze Kits

Jetfreezer™ Jackets and Accessories

Jetfreezer™ jackets freeze up to 100 mm diameter pipes.

Jacket	Part No.	Accessories	Part No.
Jacket 8-15 mm	2233.0105	2.4 m high pressure hose	2222.4309
Jacket 10-22 mm	2233.0101	Tee piece	2233.0601
Jacket 23-42 mm	2233.0102	Jetfreezer™ grip bag	2233.0505
Jacket 43-80 mm	2233.0103	Protective gloves	2233.0401
Jacket 81-100 mm	2233.0104	Spring balance	2233.0830
		Metal bonded washer	2222.0601

Jetfreezer™ Carbon Dioxide Cylinders

For fast effective pipe freezing with Jetfreezer™, CO₂ is available in 6.35 kg capacity cylinders - up to 17 freezes can be achieved on a 15 mm diameter pipe.

Cylinder	Part No.
6.35 kg cylinder complete	2233.0306

Snowpack

Dry Ice Pellet Maker

The Snowpack makes individual pellets of dry ice from a carbon dioxide syphon cylinder, which has an internal dip tube.

The Snowpack allows small pellets of dry ice (50mm x 25mm or 100mm x 75mm diameter, depending on model) to be made on the spot, whenever and wherever they are required. The Snowpack can be used in schools, hospitals, laboratories and research centres, where small quantities of dry ice are frequently required.

The Snowpack is screwed onto the outlet of a CO₂ syphon cylinder and is operated by opening and closing the valve. Once the pellet is made, the cylinder valve is closed, the nylon wrapper on the Snowpack is peeled back, revealing the dry ice pellet, which can be removed wearing protective gloves.

There are two sizes of Snowpack available - 30 gram and 500 gram.

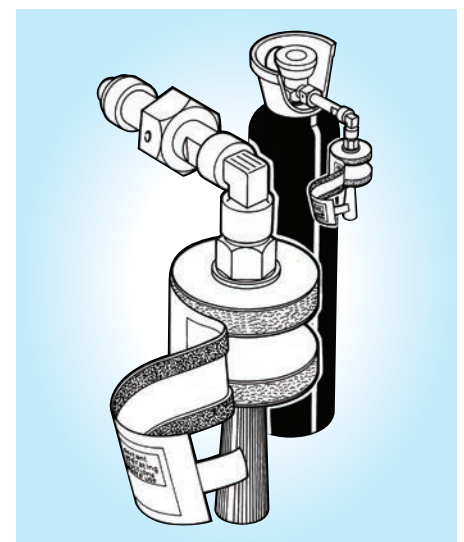


Safety

We strongly recommend that protective gloves (part number 2233.0401) should always be worn when handling dry ice to prevent the possibility of frost bite or 'cold burns' arising when dry ice is in contact with the skin.

Specification

Model	Snowpack 30	Snowpack 500
Approx. pellet weight (gram)	30	500
Pellet size (mm)	Ø50 x 25	Ø100 x 75
Injection time	1 minute	2.5 minutes
Approx. no. of pellets from 10 kg CO ₂ syphon cylinder	45	3
Net weight of Snowpack (gram)	400	780
Part number	2233.0107	2233.0108





Dry Ice Containers

Air Liquide UK Limited offer a range of three high quality containers for Cardice (dry ice) storage. All three containers are rotomoulded from food-grade polyethylene, which ensures compliance with hygiene requirements for food contact and corrosion resistance.

- Hygienic construction from food-grade materials
- Top quality polyurethane insulation better than $0.4 \text{ W/m}^2/\text{°C}$
- Storage loss of 3-4% per day or less
- Flush fittings, clean lines, no protrusions
- Wide range of sizes to suit all users
- Durable construction from rotomoulded polyethylene
- Rust-proof passivated steel fittings



Construction

The insulation is in-situ injected expanded polyurethane foam (free of both CFCs and HCFCs) which exceeds the requirements of ATP Heavily Insulated Class C standard, having thermal coefficients of less than 0.4 W/m²/°C. Depending on environmental conditions (temperature, wind, etc.) loss rates of 3% to 4% per day or even less can be achieved.

Container lids are fitted with special low-temperature silicone seals to prevent the ingress of moisture but readily allow excess carbon dioxide gas to escape.

The design of all three containers includes integral, moulded-in flush handles and flush-fitted lid catches to present a smooth box shape with no protrusions.

The 50K has a single cantilever catch and integral moulded-in feet and handles. For mobility a castor base can be supplied as an extra (Part No. 2231.0306).

The 160K has a single cantilever catch and is supplied fitted with four tubular steel feet to allow

fork lift truck access, if required. A set of castors (two fixed and two steerable with brakes) is supplied loose with the 160K, so it can be converted into a mobile unit. The lid opens to 110° so it is stable when in the open position. A pair of stand-off brackets is supplied to allow the unit to be placed hard up against a wall without danger of the lid falling on users. A drain plug is fitted to facilitate cleaning.

The 330K has two cantilever catches and is supplied fitted with four tubular steel feet to allow fork lift truck access, if required. A set of castors (Part No. 2231.0407) (two swivel and two swivel with brakes) can be supplied as an extra. The lid is fitted with two gas struts to assist opening and to prevent the lid falling when open. The 330K is also fitted with a drain plug to facilitate cleaning.

Both the 160K and the 330K are fitted with passivated steel base plates and lid inserts to allow stacking. Two 160Ks can be stacked on one 330K, if required.

Safety

Protective gloves (part number 2233.0401) should always be worn when handling dry ice to prevent the possibility of frost bite or 'cold burns' arising when dry ice is in contact with the skin.

Specification

Type	Part Number	Height (mm)	Width (mm)	Depth (mm)	Empty Weight (kg)
50K	2231.0305	580 (410)	600 (415)	500 (315)	16
160K	2231.0401	1050 (695)	800 (580)	590 (370)	46
330K	2231.0403	1050 (700)	1200 (1000)	800 (600)	90



Castor Base for a 50 kg container

Capacity for different forms of Dry Ice

Type	Blocks	Bags of Pellets	Loose Pellets (kg)
50K	4	4	50
160K	14	10	160
330K	30	25	330

NOTE: Both blocks and bags of pellets have a nominal weight of 11.5 kg.



Cylinder Valve Guards

The plastic cylinder valve guard protects valves from accidental damage and is for use on all Industrial Gas cylinders up to 50 kg gross filled weight (Nylon) and 35 kg (ABS plastic).

The permanent valve guard provides a strong carrying handle, yet gives full, open access to the cylinder valve for easy connection to system fittings.

Material strength and design of the valve guard have been rigorously tested to ensure that maximum valve protection is achieved under all environmental conditions.

The guards are manufactured and tested in accordance with ISO 11117 which ensures safe cylinder transportation, handling and storage.

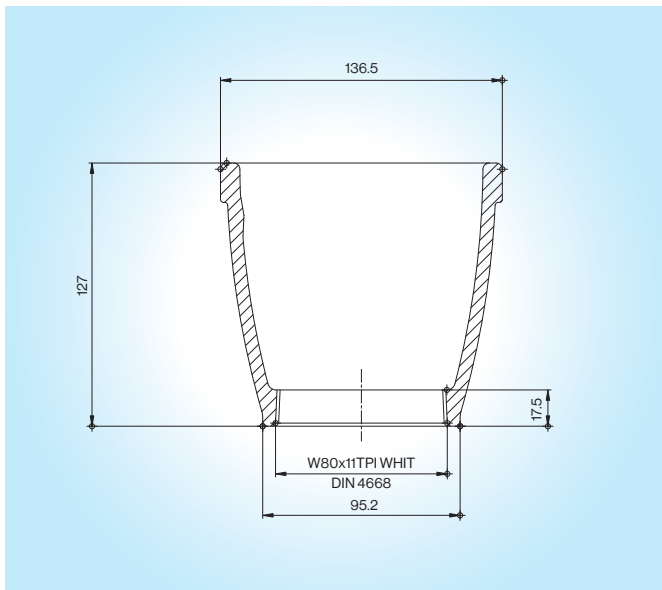
Durable valve guard printing improves cylinder identification and allows safety instructions to be prominently displayed.

Valve guards can be moulded in a wide range of colours allowing colour coding for particular gases or customers. This can considerably speed up cylinder identification during sorting, filling and delivery.

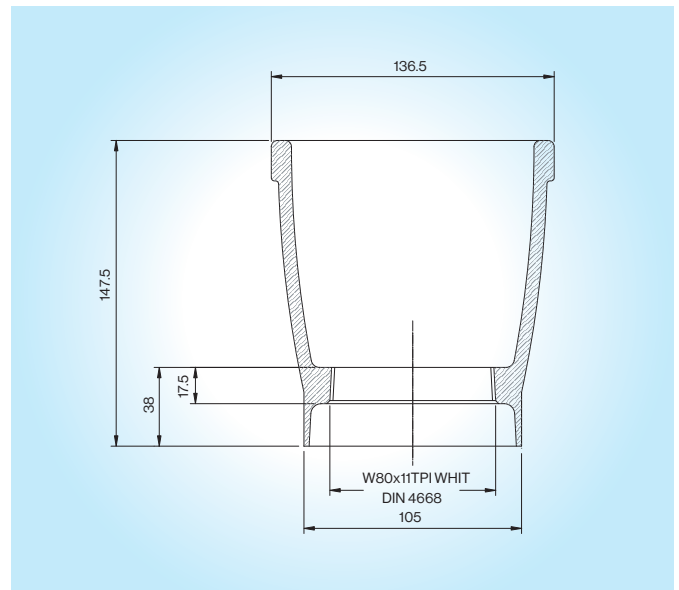
Manufactured in tough ABS plastic or nylon the valve guard can be moulded to fit a wide range of neck ring sizes both threaded and plain, fitted using strong moulded threads or a metal circlip.

The guard is manufactured in two heights, 127 mm and 114 mm, threads available include BSP, DIN, SI and ANC with diameters between 52 mm and 83 mm.

Typical Format Without Base Extension



Typical Format With Base Extension



Valve Guard Printing

The two outer faces of the cylinder valve guard and skirt (where available) can be durably printed during production, for example with your company name and logo to give clear indication of ownership and with safety warning instructions to comply with all local safety requirements.

Unskirted	Skirted
83 mm (3.26 in) x 11 TPI DIN 4668 Whitworth	83 mm (3.26 in) x 11 TPI DIN 4668 Whitworth
82 mm (3.22 in) x 11 TPI DIN 4668 Whitworth	80 mm (3.14 in) x 11 TPI DIN 4668 Whitworth
80 mm (3.14 in) x 11 TPI DIN 4668 Whitworth	63.5 mm (2.5 in) x 11 TPI DIN 4668 Whitworth
63.5 mm (2.5 in) x 11 TPI DIN 4668 Whitworth	Plain bore Ø76 mm
Plain bore Ø77 mm	Plain bore Ø57 mm
Plain bore Ø75 mm	Plain bore Ø52 mm
Plain bore Ø63 mm	23/4 in BS 2779
Plain bore Ø60 mm	13/4 in BS 2779
Plain bore Ø57 mm	
Plain bore Ø51 mm	
78 mm SI thread	
66 mm SI thread	
23/4 in BS 2779	
13/4 in BS 2779	
31/8 in x 11 TPI ANC	

Instructions for the Assembly of Threaded Plastic Valve Guards

Valve Guard Preparation Prior to Assembly

The guard must be placed in a thermostatically controlled hot water bath with the threaded portion totally immersed and soaked at 80°C for 10 minutes. Avoid immersion periods of over one hour to prevent colour fading.

Procedure for Fitting Guards

The guard should be fitted after the valve has been inserted in the cylinder. The guard should be removed from the hot water bath, immediately screwed fully onto the cylinder collar thread and positioned so that the valve outlet is centrally placed in the valve guard opening.

Lubricants or adhesives must not be used in fitting the guard onto the cylinder.



Contact us

We are happy to count you among our customers and to support all your gas activities.

If you have any questions, don't hesitate to contact our experts.

You can get in touch with our customer service from 8AM to 5PM:

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