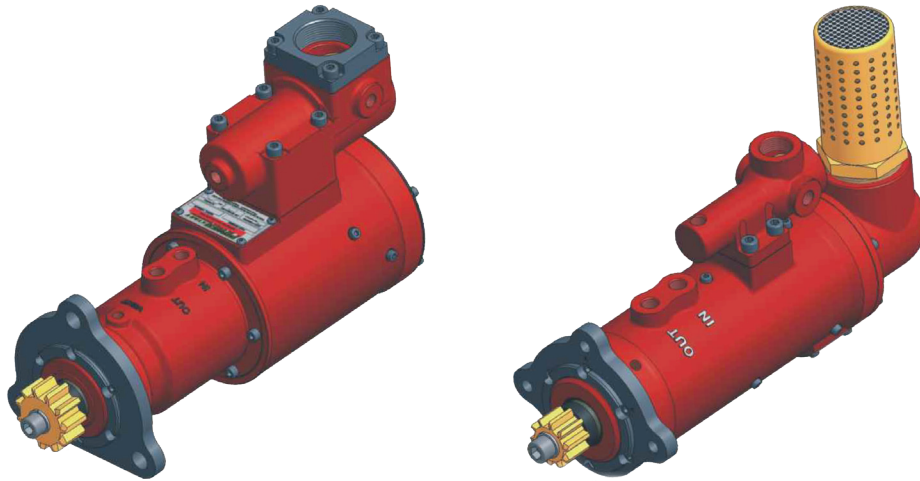


The first air turbine to start diesel engines at low or high pressure.



The First Turbine Designed for High Pressure Starting

Jetstream is unique in its ability to start at low or high pressures. Costly and bulky pressure reduction valves are no longer required to operate the starter at pressures up to 30 bar (435 psi). Jetstream starters can be ordered to operate as low as 3 bar (45 psi) or as high as 30 bar (435 psi).

How does it work?

The turbine starter works by allowing a stream of compressed air to enter the casing of the unit which is guided via the inlet nozzles to strike the primary turbine wheel. On impact with the primary wheel, the energy transfer makes the wheel rotate at very high speed. This effect is repeated as the air exits the first wheel, is redirected by the stator wheel and strikes the secondary wheel, with the turbine finally reaching speeds of 25 to 40 thousand rpm. This high speed is reduced by approximately 10 times inside a precision planetary gearbox and the resultant speed reduction and torque magnification then drives the pinion gear to start the engine.



Making Installation Easier

Jetstream is the only turbine starter designed from the ground up with an integral relay valve option for both Jetstream 4 and 5 starters. This option, along with exhaust adapters and mufflers, can be ordered pre-installed and configured as part of the starter, thus making installation quicker, easier and less expensive. There are no fittings to seal and tighten, so the starter can be unpacked and bolted straight onto the engine.



Why Jetstream turbine air starter?

Jetstream turbine air starters offer many advantages over electric starting which may vary depending on applications and environments:

- Jetstream turbine starters require no electricity and therefore are non-sparking and this makes them ideal for flameproof applications.
- Jetstream turbine starters offer more power and torque per kilogram than electric starters. The entire starting system is far lighter than an electric starter with its heavy batteries.
- Jetstream turbine starters are relatively immune to air contamination as opposed to older vane motors.
- Jetstream turbine starters offer faster cranking than electric starters. This means higher compression, in turn raising combustion temperatures and improving starting ability.
- Very rapid recharge of air tank (even with a small compressor). It would take minutes to charge an air reservoir compared with the hours required to fully recharge a bank of batteries.
- Jetstream turbine starters require no in-line lubrication and are therefore very environmentally friendly, with only air being emitted from the exhaust. This is far cleaner than the oil mist being expelled from vane starters or the environmental unfriendliness of batteries and their associated chemical reactions.
- All Jetstream starters can be fitted with optional beryllium copper pinions for more stringent non-sparking applications where this is a requirement.
- Jetstream turbine elements feature a proprietary wear-resistant coating for extended service life and greater protection from contaminated and dirty air.
- Jetstream turbine starters are available with or without integral relay valves.
- Jetstream pre-engaged starters are compliant with the European ATEX directive.

Jetstream Starter Options and Accessories



The Pre-engaged Outboard Bearing Starter

Outboard bearing starters have a nose cone and the drive shaft is supported at both ends. Because of this support they can be made shorter and more robust than overhung starters, which have a cantilevered pinion.

The engagement principle is similar to overhung starters in that they only begin to rotate once fully engaged.

Available on Jetstream 5 only.



The Inertia Starter

With inertia starters, the sudden impulse of the pinion shaft as it begins to rotate causes the gear to move forward along a helix shaft. This in turn engages the pinion with the ring gear and continues rotating to start the engine.

As soon as firing speed has been reached, centrifugal weights move outwards enabling the engine to kick the pinion gear backwards to its disengaged position. This method of engagement is simple, reliable and well proven.

Available on Jetstream 4 only.



The Overhung Pre-engaged Starter

Overhung starters have no outboard bearing or nose cone and as such pocket depth or starter indexing is not an issue.

Being pre-engaged, they first engage into the ring gear whilst stationary and only once they are fully engaged do they begin to rotate. This system ensures that the starter cannot rotate prior to being engaged with the ring gear, thus reducing wear and the risk of sparking.

Pre-engaged starters are a requirement of the European ATEX directive.

Available on Jetstream 4 and 5.

Available accessories for all starters



Exhaust Muffler greatly reduces noise



Exhaust Adapters (straight and 90°) for piping away air and connecting mufflers

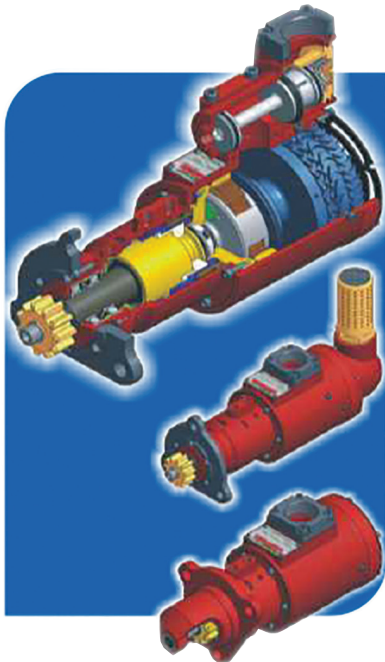
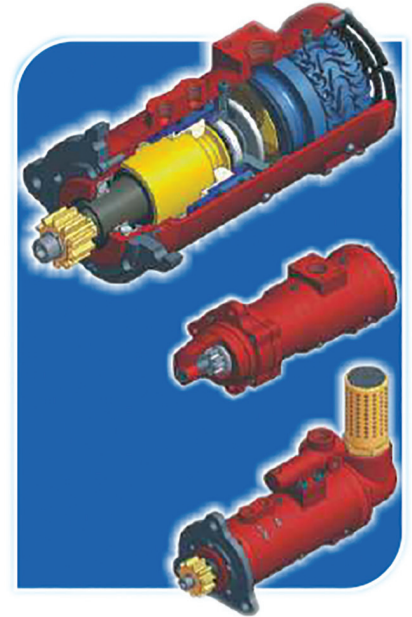


Integrated Relay Valves fit directly onto the starters

Jetstream 4

Key features:

- Available as PRE-ENGAGED with overhung pinion or INERTIA DRIVE with outboard bearing
- Suitable for engines up to 12 litres (730 cubic inches)
- Jetstream inertia starters use heavy-duty spring drives proven in hydraulic starters for over 30 years
- Can be ordered complete with integral relay valve and exhaust adapters or mufflers, reducing fitting and installation time
- Available in 3 pressure configurations:
 - Low pressure for 3 - 5 bar (45 – 75 psi) applications
 - Medium pressure for 5 - 8 bar (75 –120 psi) applications
 - High pressure for 25 - 30 bar (360 – 435 psi) applications
- Exhaust options: Simple guard, straight or 90 degree threaded adapters to suit piping or mufflers

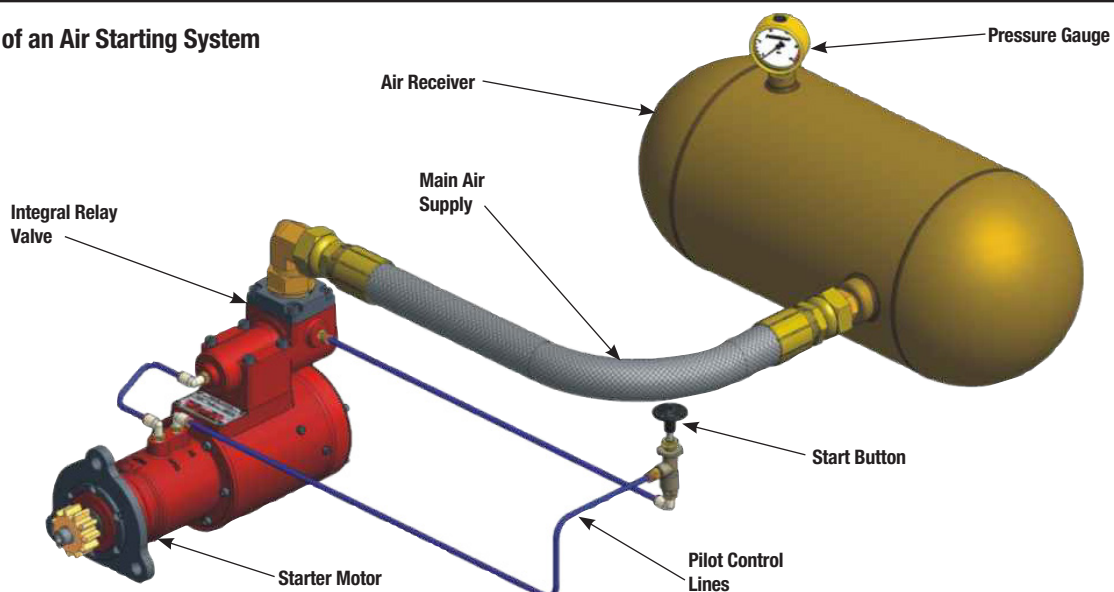


Jetstream 5

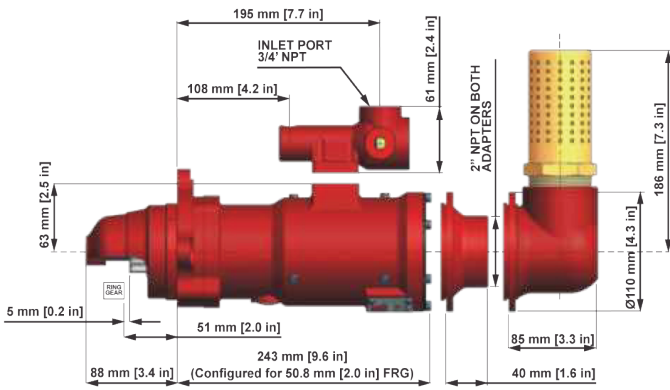
Key features:

- Available as PRE-ENGAGED with overhung pinion or compact pre-engaged with OUTBOARD BEARING and nose cone
- Suitable for engines up to 80 litres (5000 cubic inches)
- Multiple starters can be used to start larger engines
- Can be ordered complete with integral relay valve and exhaust adapters or mufflers, reducing fitting and installation time
- Available in 3 pressure configurations:
 - Low pressure for 3 - 5 bar (45 – 75 psi) applications
 - Medium pressure for 5 - 10 bar (75 –150 psi) applications
 - High pressure for 25 - 30 bar (360 – 435 psi) applications
- Exhaust options: Simple guard, straight or 90 degree threaded adapters to suit piping or mufflers
- Sealed-for-life turbine section eliminates maintenance
- Easily-removable pinion and flange for simple change-over depending on engine applications. No starter disassembly required to change pinion or flange
- Bolt-on inlet adapters simplify the removal of the starter without affecting the pipe work and add the flexibility of using different thread connections
- Bolt-on inlet adapters also prevent distortion of the starter housing and eliminate the risk of cracking it if over tightened

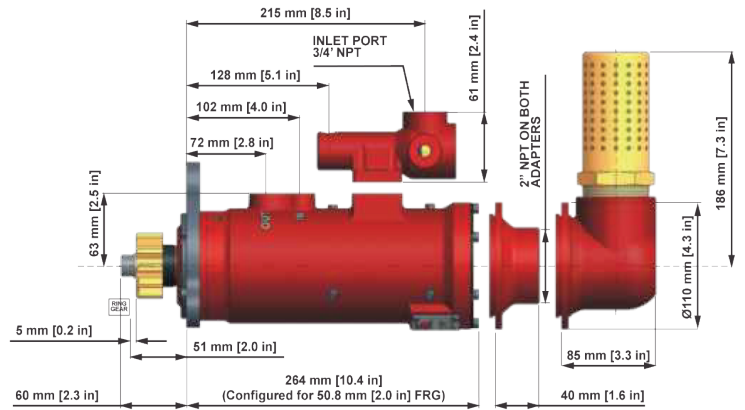
Typical layout of an Air Starting System



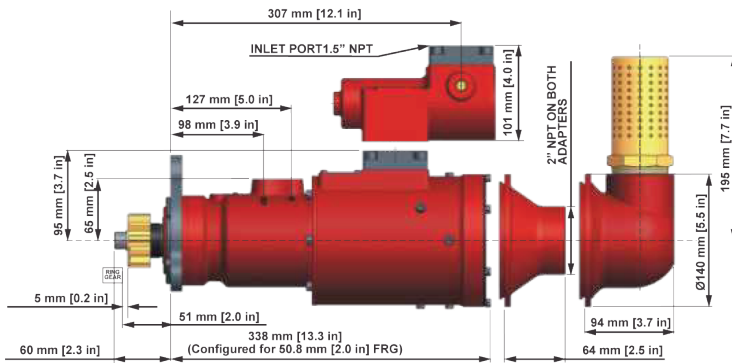
Jetstream 4 Inertia



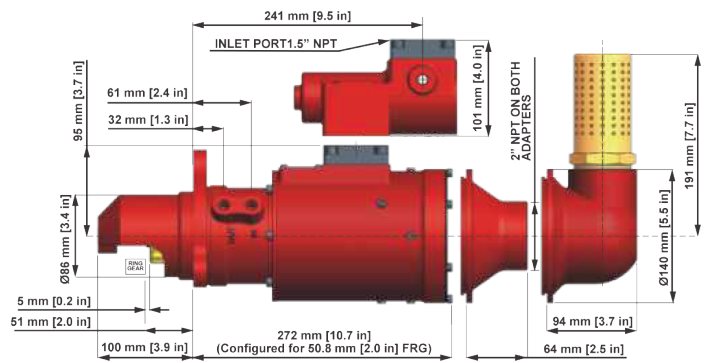
Jetstream 4 Pre-engaged



Jetstream 5 Overhung Pre-engaged



Jetstream 5 Outboard Bearing Pre-engaged



Performance, Consumption and Product Weights

	Pressure Rating	Nozzles	Inlet Pressure		Breakaway Nm	Torque		Max Power		Consumption	
			bar	psi		lb.ft	kW	HP	m³/sec	scfs	
Jetstream 4	High	1	30	435	78	57	7.8	10.5	0.37	13.1	
	Medium	5	8	116	95	70	12	16.1	0.29	10.3	
			5.5	80	63	46	7.5	10.1	0.20	7.1	
Low	12	4	58	100	74	9.5	12.7	0.27	9.4		
		2.5	36	60	44	4.5	6.0	0.20	6.9		

Jetstream 5	High	2	30	435	230	169	25	33.5	0.54	19.2
	Medium	6	10	145	180	132	17	22.8	0.35	12.5
			8	116	147	108	12.5	16.8	0.27	9.6
			6	87	103	76	8.2	11.0	0.19	6.6
	Medium	10	10	145	300	221	30.8	41.3	0.54	19.0
			8	116	233	171	23.7	31.8	0.42	15.0
	Medium	14	6	87	194	143	16.5	22.1	0.33	11.5
8			116	338	249	26.4	35.4	0.55	19.4	
6			87	260	191	19.6	26.3	0.43	15.2	
			3	44	120	88	8.4	11.3	0.22	7.8

Component	Mass	
	kg	lb.
Inertia starter	10.0	22.0
Pre-engaged starter	10.0	22.0
Relay valve	1.0	2.2
Exhaust adapter, straight	0.6	1.3
Exhaust adapter, 90°	1.4	3.1
Exhaust muffler	0.8	1.8

Overhung starter	17.0	37.4
Outboard bearing starter	16.0	35.2
Relay valve	3.0	6.6
Exhaust adapter, straight	1.3	2.9
Exhaust adapter, 90°	2.1	4.6
Exhaust muffler	0.8	1.8

Above masses are nett product masses excluding packaging.

All performance tests conducted with exhaust guard configuration.

These products may not be stock items. Please speak to our sales representative about lead times. Lead times, price and availability can only be determined on receipt of an official quote from our supplier. This can sometimes take up to 3 days.

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