



**Evolution™**

# Evolution Series Product Launch

2.2 to 5KW

and

Small Recips

May 2017

Gurunandan Kabad – Product Marketing India

# Agenda



Topic	Duration	Facilitator
Opening Remarks	2 minutes	Boris Takov
Product Unveiling 2.2 to 5 KW Product Specifications Compressor component Support Material	20 minutes	Guru Kabad
Product Unveiling Small Recips Product Specifications Compressor component	20 minutes	Guru Kabad
Route to Market	10 minutes	Jatinder Tiwana
Leader Comments	5 minutes	Jatinder Kaul/ Rajesh Fotedar/Yao xun
Q&A	15 minutes	All
Closing Remarks	2 minutes	Boris Takov

# Evolution Product Launch



## 2.2 to 5 Kw Rotary



## Small Recips



## 2.2 - 5.5 kW Market Trend



### Historically dominated by Reciprocating Technology

- Piston Technology dates back to the early 1900's
- Price Competitive
- Simplistic Design
- Reliability
- Previous lack of Rotary Technology
- Health & Safety was less of an issue



# Evolution Product Launch



## 2.2 to 5 Kw Rotary

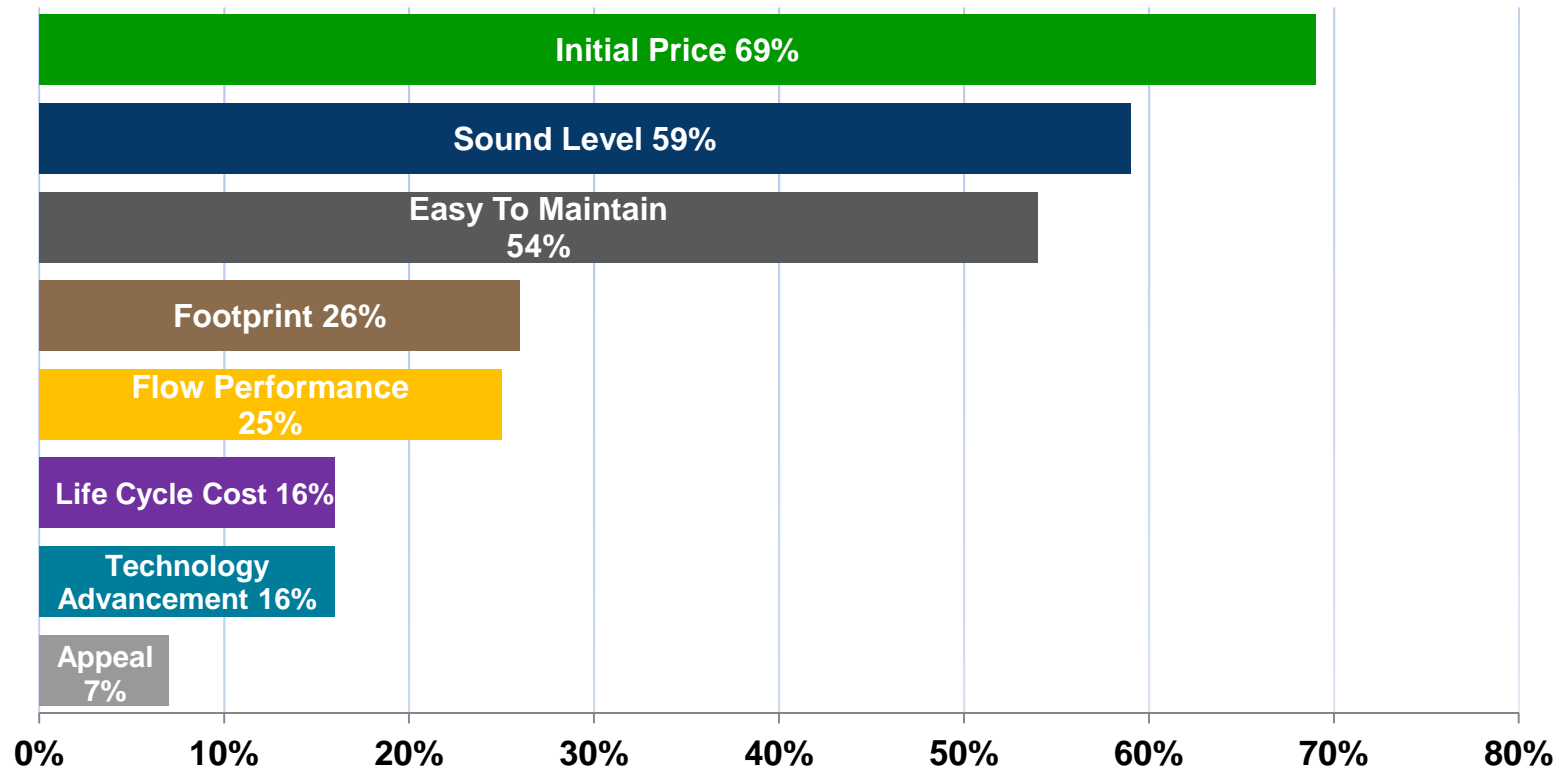


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# Voice of the Customer



The 2.2 - 5.5 kW Rotary Screw Compressor is designed to meet the identified customer values.



# Product Specifications



## Basic Product Specifications

- 2.2, 4 & 5.5 kW power sizes
- 400/3/50 electrics
- All units are 7 or 10 bar(g) rated
- Start/Stop pressure switch control
- Starter
  - 2.2 DOL
  - 4 kW DOL
  - 5.5 kW Star/Delta



# Product Specifications



## Continued

- All units 200L receiver mounted
- Sound levels as low as 64dB(A)
- Ingersoll Rand manufactured airend
- Ultra Coolant
- 46°C ambient temperature
- Dryer option





# Dryer Option



## Dryer Specifications

- ND72IN refrigeration dryer
- Manufactured in Ingersoll Rand, India
- Full feature control panel
- 50°C ambient temperature
- Same footprint of non-dryer model
- Own power supply (230/1/50)



# Quiet Performance



## Reduced Noise Levels vs Reciprocating Unit

- Lower vibration levels
- Enclosed silenced unit
- Panels lined with noise reducing foam
- Rotary as low as 64dB(A) vs recip 80+dB(A)

### Results in:

- Compressor located closer to point of use
- Less disruption to workforce
- Reduced risk of breaking Health & Safety regulations
- More productive & safer working environment

Progress is  greener with Ingersoll Rand

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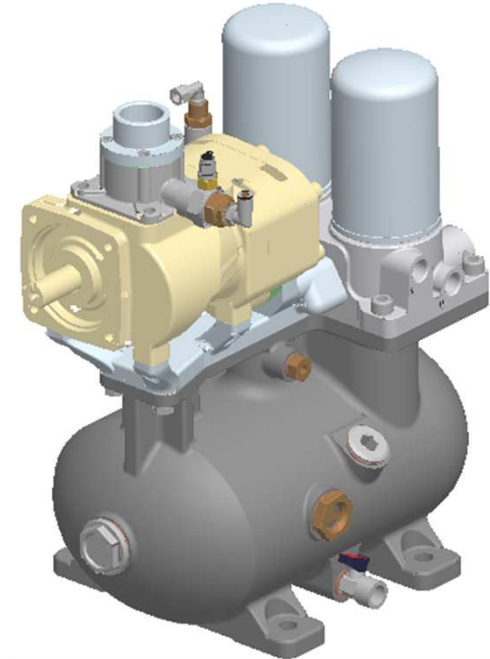
# Integrated Airend/Separation Unit



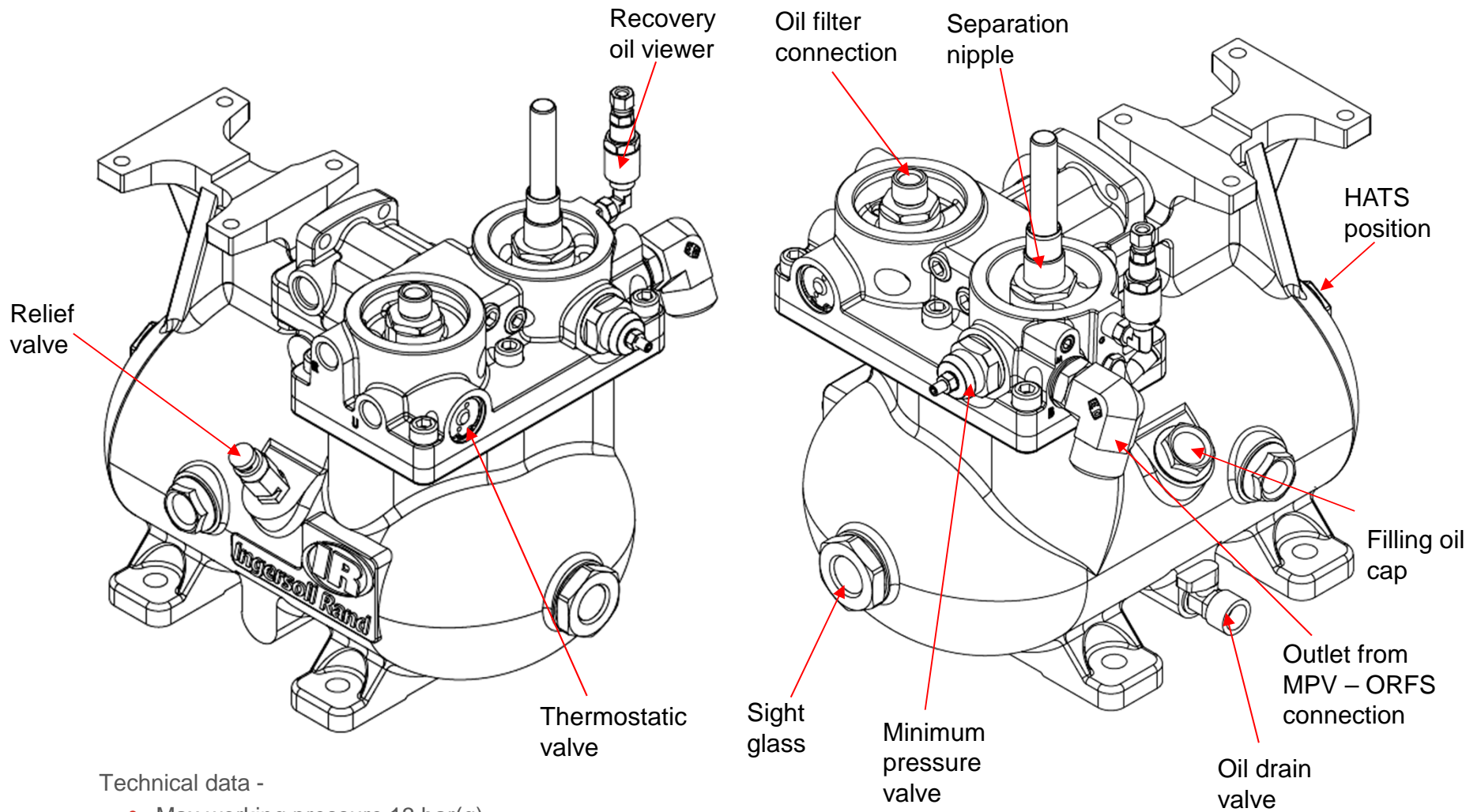
## Includes

- Airend connected directly to separator tank
- Common manifold
  - MPV Minimum Pressure Valve
  - Thermostatic valve
  - Oil filter
  - Separator element
- Intake valve and blowdown arrangement
- HATS High Air Temperature Switch

Advantages: Minimal joints and leak paths  
Package is clean and free from pipes, etc.  
Space reduction  
Proven design



# Integrated Airend/Separation Unit



Technical data -

- Max working pressure 13 bar(g)
- MPV @ 4 bar(g)

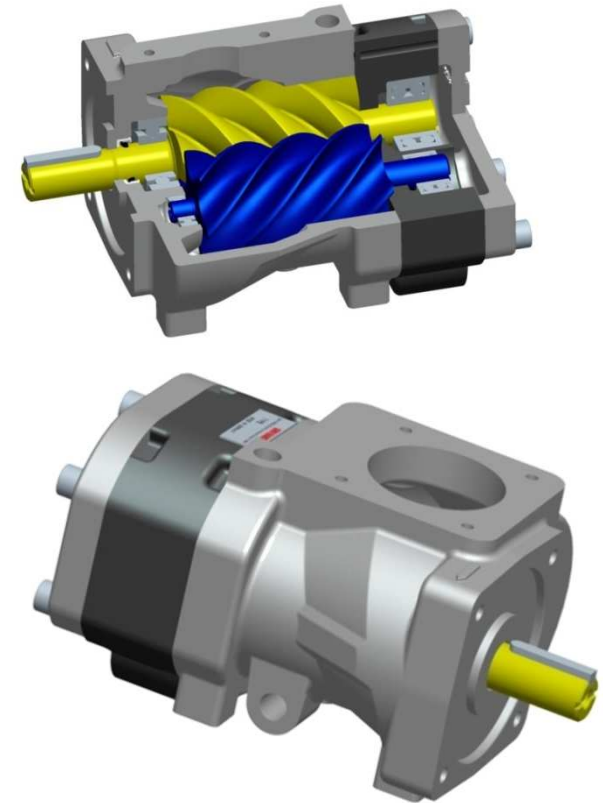
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# Airend



## Summary

- Ingersoll Rand manufactured
- Proven design
- Been in production since 2005
- Over 5,000 units in the field
- 2009 YTD zero failures
- Profile 4/6 lobes

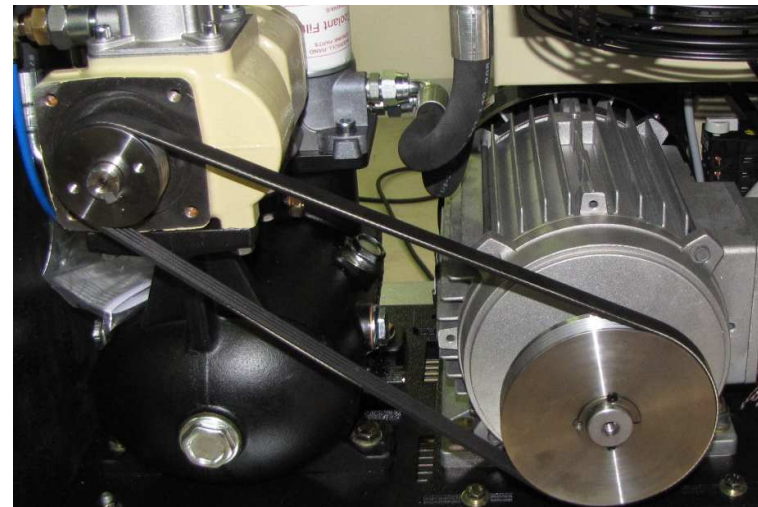
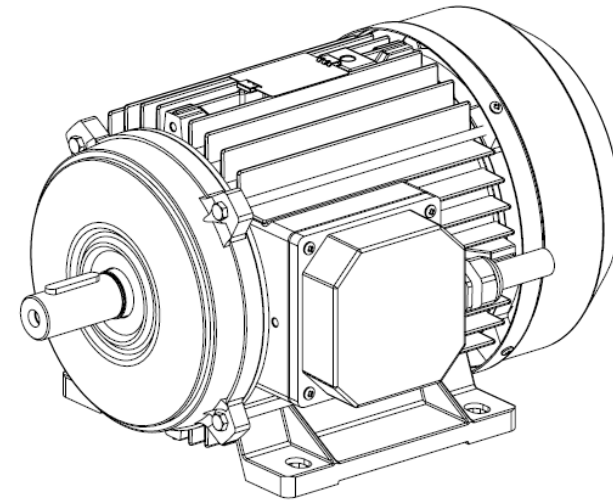


# Main Motor



## Highlights

- Sizes 2.2, 4 & 5.5 kW
- Voltage 400v ( $\pm 10\%$ )
- IP55
- 'F' class insulation
- S1 duty (continuous duty)
- Motor service factor 1.15
- Proven in the field



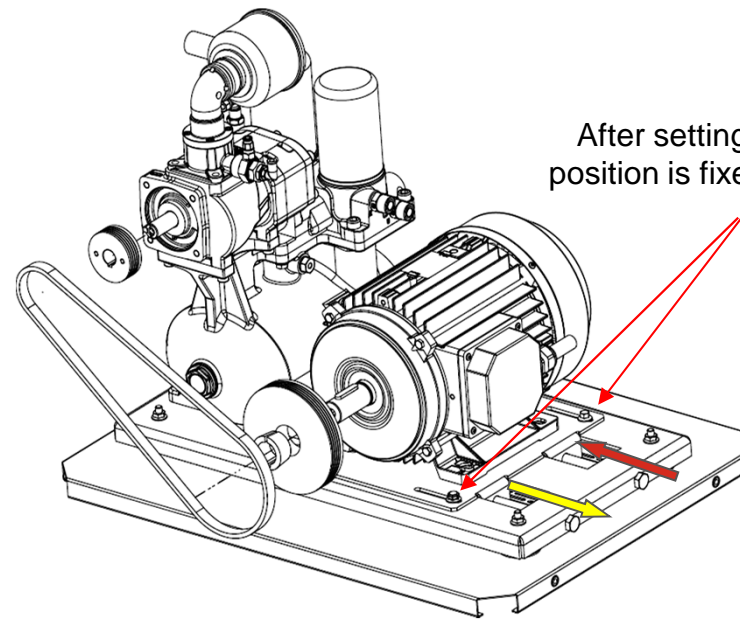
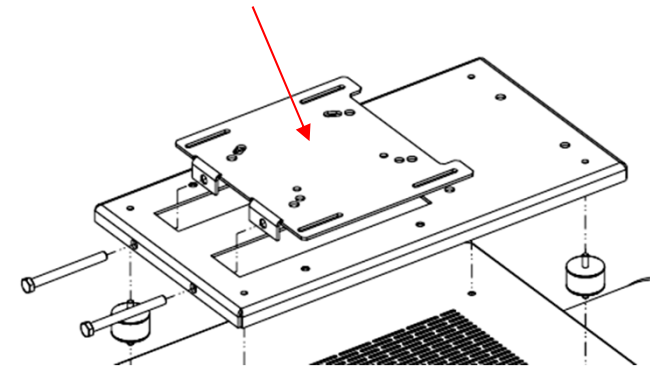
# Drive & Belt Tension



## Basic Details

- Easy motor positioning
- One motor support for all range
- Precise transmission ratio
- Accurate belt alignment
- Minimum new parts
- Reduced noise & vibration

One support for all motors



After setting, the correct position is fixed by 4 screws

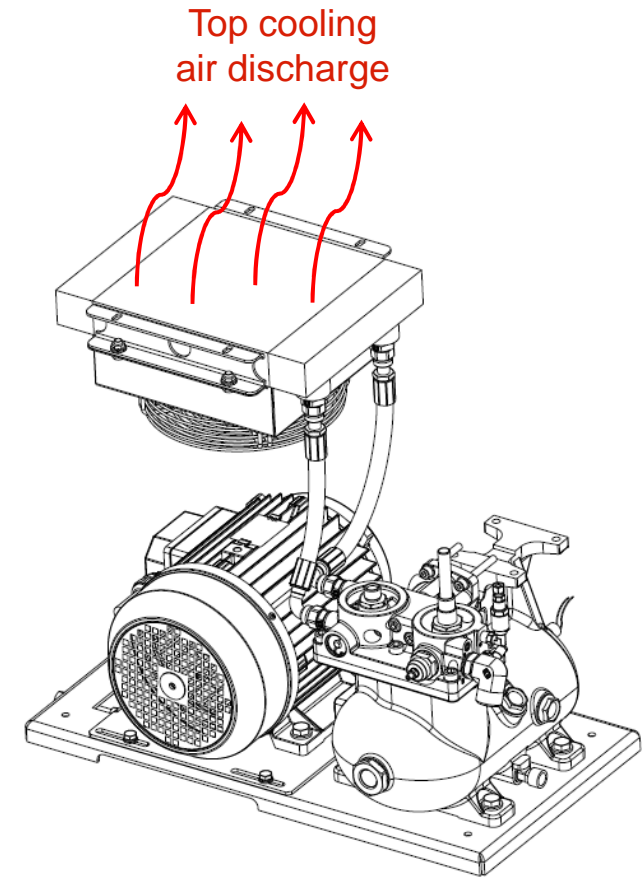
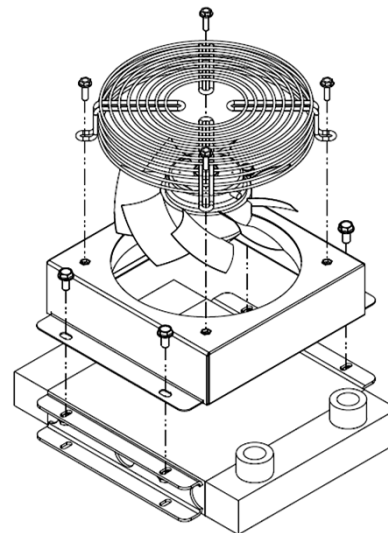
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# Cooling



## Overview

- 46°C ambient temperature
- Oil Cooler
- Pack of cooler with shroud and 400V fan
- Common parts
  - same hose for oil in/oil out
  - connections
- Serviceability
- 2.5 litres of coolant



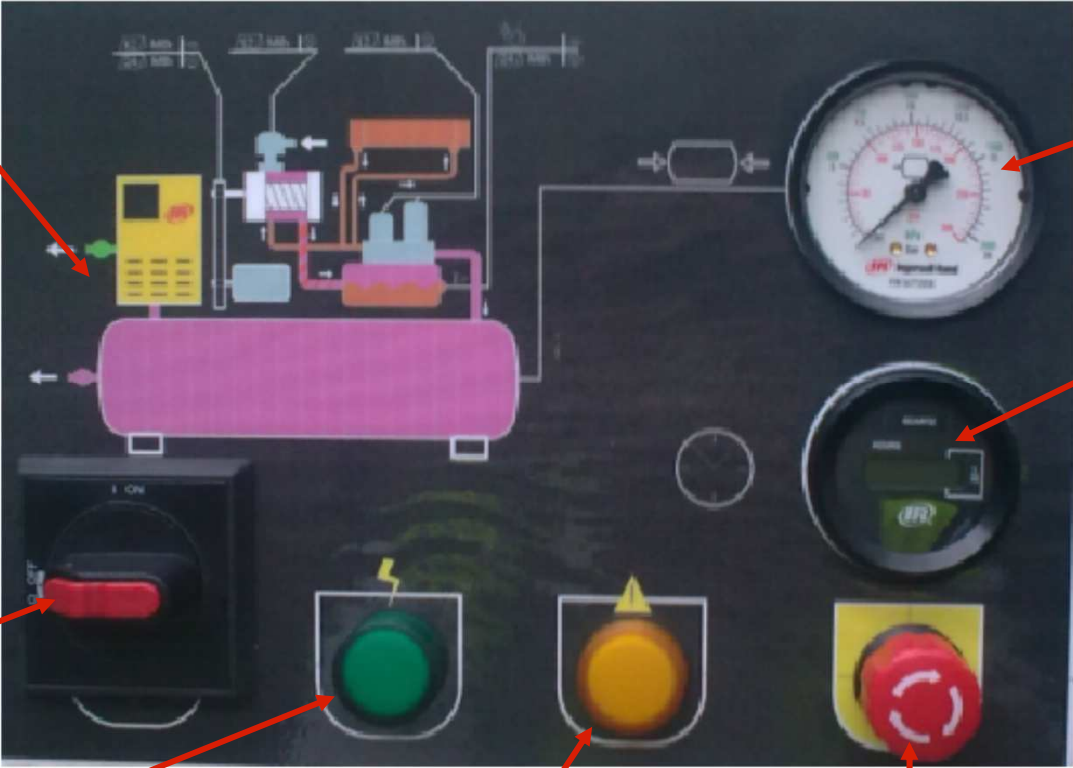
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# Control Panel



Decal with schematic view and service intervals



Pressure gauge

Hour meter

On-Off switch

Machine ready

Machine fault

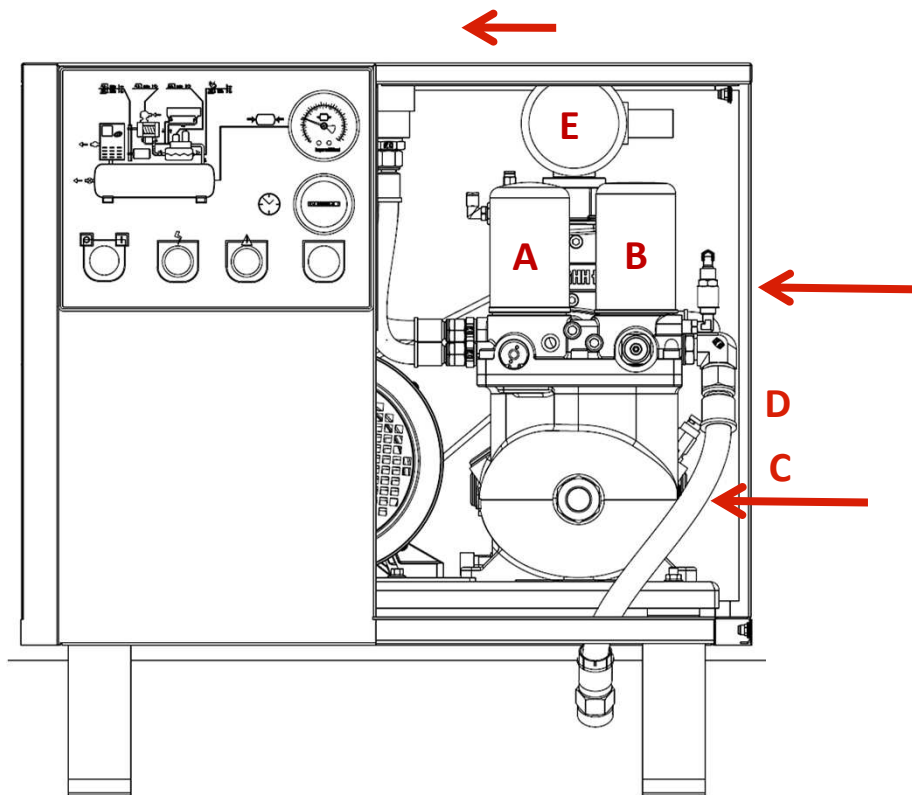
Emergency stop

# Ease of Maintenance



## Routine Service & Maintenance Easy to Perform

- Quick access through easily removeable panels
  - spin on oil filter (A)
  - separator element (B)
  - coolant level check (C)
  - coolant top up or change (D)
  - quick change air filter (E)
- Rear panel access
  - belt
  - motor



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# Performance & Nomenclature



Model	Capacity		Operating Pressure		CCN
	m <sup>3</sup> /min	ft <sup>3</sup> /min	bar(g)	psi(g)	
<b>Non-TAS</b>					
N 2-7-200	0.26	9.5	7.5	110	47555350001
N 2-10-200	0.24	8.5	10	145	47555351001
N 4-7-200	0.61	22	7.5	110	47555352001
N 4-10-200	0.46	17	10	145	47555353001
N 5-7-200 SD	0.76	27	7.5	110	47555354001
N 5-10-200 SD	0.62	22	10	145	47555355001
<b>TAS</b>					
N 2-7-200-D	0.26	9.5	7.5	110	47557554001
N 2-10-200-D	0.24	8.5	10	145	47557555001
N 4-7-200-D	0.61	22	7.5	110	47557556001
N 4-10-200-D	0.46	17	10	145	47557557001
N 5-7-200 SD-D	0.76	27	7.5	110	47557558001
N 5-10-200 SD-D	0.62	22	10	145	47557559001

**N                    5 -                    10                    -                    200                    SD                    -                    D**

Rotary N Series

5 kW size

10 bar(g)

200L Receiver

Star/Delta Starter  
5.5 kW standard

Dryer Option

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# Support Material

- Updated Price Pages
- Electronic Brochures
- Quote Formats
- Streetfighters
- Presentation (pdf)
- Engineering Material



## Evolution™

### Evolution, for easy and reliable air supply

Evolution™ rotary screw air compressors are designed to provide ease of operation, low maintenance and reliable air supply. When you choose Evolution, you have selected the compressor rated highly for its performance and reliability.

### 2.2 – 11 kW Rotary Screw Air Compressors

Model	Power (kW)	Capacity (l/min)	Pressure (bar)	Dimensions (mm)	Weight (kg)	Total (kg)			
	Line	Off-line	Standard	Width	Height	Depth			
N2-7-200	2.2	9.5	100	110	1403	560	1134	174	200
N2-10-200	2.2	8.5	145	152	1403	560	1134	174	200
N4-7-200	4	21.4	100	110	1403	560	1134	182	200
N4-10-200	4	16.5	145	152	1403	560	1134	182	200
N5-7-200SD	5.5	27	100	110	1403	560	1134	188	200
N5-10-200SD	5.5	22	145	152	1403	560	1134	188	200
N2-7-200-D	2.2	9.5	100	110	1403	560	1134	216	200
N2-10-200-D	2.2	8.5	145	152	1403	560	1134	218	200
N4-7-200-D	4	21.4	100	110	1403	560	1134	227	200
N4-10-200-D	4	16.5	145	152	1403	560	1134	227	200
N5-7-200SD-D	5.5	27	100	110	1403	560	1134	250	200
N5-10-200SD-D	5.5	22	145	152	1403	560	1134	250	200
N7-7	7	37.4	95	102	850	790	810	280	-
N7-8	7	35.3	109	116	850	790	810	280	-
N7-10	7	30	138	145	850	790	810	280	-
N11-7	11	54.4	95	102	850	790	810	280	-
N11-8	11	51.2	109	116	850	790	810	280	-
N11-10	11	44.1	138	145	850	790	810	280	-
N7-7-272	7	37.4	95	102	850	1470	1550	450	272
N7-8-272	7	35.3	109	116	850	1470	1550	450	272

### Features

**Value for Money**  
Designed with advanced technology to produce more volume of air, makes it a cost-effective solution.

**Long Life Synthetic Ultra Coolant**  
Biodegradable synthetic ultra coolant

**Introduction**  
The ideal choice for duty requirements of automotive, paint shop, fabrication shops and general light industrial applications is the Ingersoll Rand 2.2 to 5.5 kW rotary screw compressor range.

We listened to our customer's needs and the following design considerations, amongst others, were of paramount importance: cost effectiveness, a quiet performance, easy to maintain, a high performance and a compact size.

**Cost Effective**  
It was a market traditionally dominated by reciprocating compressors due to cost constraints. However, advances in technology have help close the gap in cost, making the rotary screw a cost effective offering. The rotary screw uses lower energy costs to produce the same volume of air, giving additional savings.

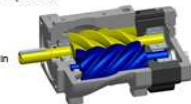
**Quiet Performance**  
The range has sound levels as low as 64dB (A), allowing the compressors to be located closer to point of use without disrupting the workplace or risking any health and safety regulations. The low vibrations and the sound proof, foam lined panels help keep noise levels to a minimum. The result of this lower sound level is a more productive and safer working environment.

**Easy to Maintain**  
The units are designed to be easily maintained and the routine maintenance points are easily accessible. Access is quick and simple through easy access panels, allowing the user to check or change:

- Coolant (includes oil sight level glass)
- Air filter element
- Spin on oil filter
- Separator element
- Belt

The clear but simple and effective control panel includes:

- Emergency stop button
- Receiver pressure gauge
- Hour meter



**Performance and Reliability**  
The 2.2 – 5.5kW rotary screw compressor offers a reliable compressed air solution, with a performance to match. The use of high quality components eliminates any possible disruption to the end user.

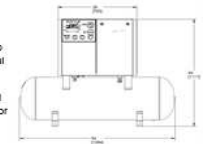
- The unit contains an integrated air-end/separation module that contains:
- The proven design of an Ingersoll Rand GHM manufactured air-end is connected directly to the separator tank
  - A common manifold containing MPV, thermostatic valve, oil filter, separator element
  - HATS
  - Oil sight level glass and coolant drain point fill

The design reduces the number of joints, leak paths and pressure drops to a minimum, ensuring the package is clean and uncluttered. It is a space saving, proven design with many modules in the field. The main motor comes in power sizes of 2.2, 4.0 and 5.5kW. Standard electric are 400V/50 and the motors are rated S1 duty, IP55, with a F class insulation. Start/stop pressure switch control is standard. The 2.2kW unit is direct on line starting, with the 4kW unit having the option of either direct on line or star/delta. The 5.5kW unit comes complete with star/delta.

**Compact Size**  
The units are designed to have a minimum footprint. All units are receiver mounted on a 200 litre receiver tank to help maintain the small footprint of the offering. The optional dryer models don't increase this footprint, saving vital floor space in the workplace. The top cooling air discharge also saves the user additional space due to the fact that an area around the compressor for ventilation is not required.

**Environmental**  
The Ingersoll Rand 2.2 – 5.5kW rotary compressors can be classed as environmental to a couple of ways. The low noise compressor package, with sound levels as low as 64 dB (A), improves the working environment and allows installation virtually anywhere and closer to point of use.

Utilizing the now standard Ultra Coolant allows easy condensate separation, therefore reducing maintenance costs by lasting longer between changes. Further coolant replacement costs are minimized due to the superior separation system of the Ultra Coolant.



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# Portfolio



	kW							
Product Family	1.1	1.5	2.2	3.0	4.0	5.5	7.5	11
Piston Direct Drive	Yellow	Yellow						
Piston Belt Drive		Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	
Small Recip (2 stage lubricated)			Blue	Blue	Blue	Blue	Blue	Blue
R 2.2-5.5 kW Fixed Speed			Red	Grey	Red	Red		

- Ingersoll Rand has now a complete product portfolio in this power range
- Broader Rotary Fix Speed product offering
- Prices are set to be competitive

# Summary



## Value Proposition

- Low initial price
- Low sound level
- Easy to maintain
- Minimal footprint
- Competitive flow/performance
- Evolution - Ingersoll Rand brand

Competitive  
Advantage



Market  
Share



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# Evolution Product Launch



## Small Recips

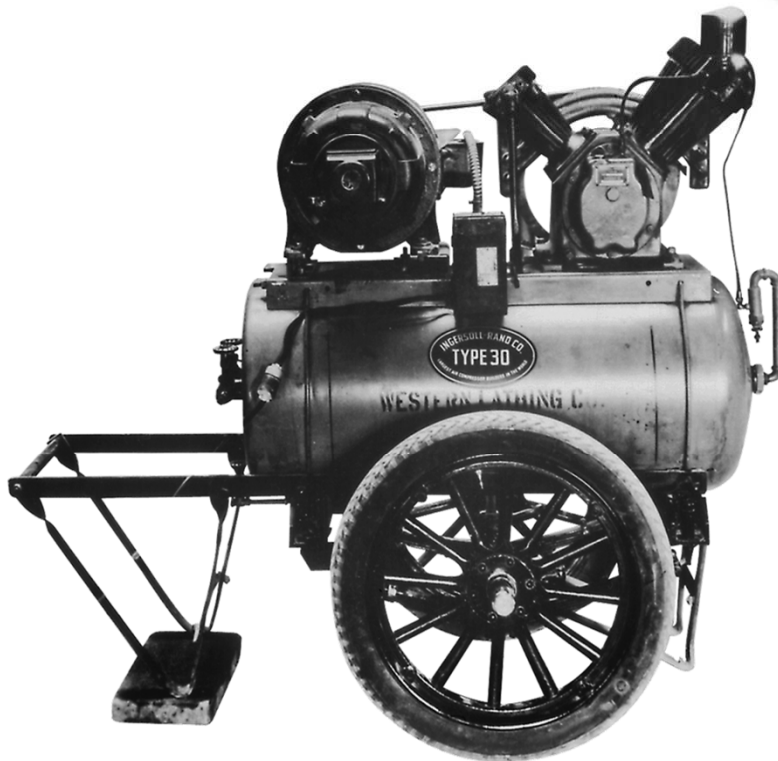


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# Commercial Industry Products



## *Compressed Air*



**Putting Air To Work for  
More Than  
100 Years**

Since 1872, Ingersoll-Rand air compressors have been valued as reliable workhorses for industry.



# Evolution Product Launch



This is the original.

Powerful, durable, reliable, built to last. A legend from the very beginning.

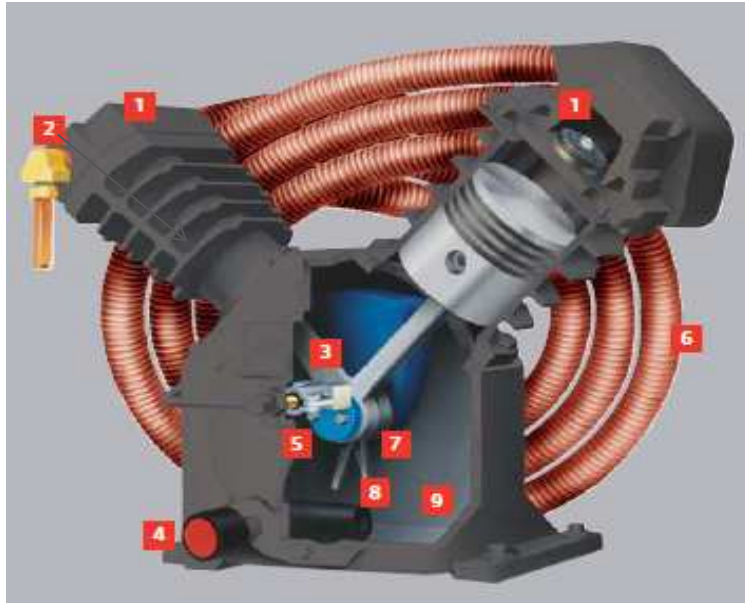


# Compressor Assembly



## Quality Engineered, Two Stage, Cast-Iron Pump for Unmatched Reliability

- 1 Cast iron cylinder head ensures pump reliability at high operating temperatures
- 2 Radial fin design provides even 360° cooling and improves reliability by eliminating hot spots. Individually cast cylinder design also reduces maintenance effort and time



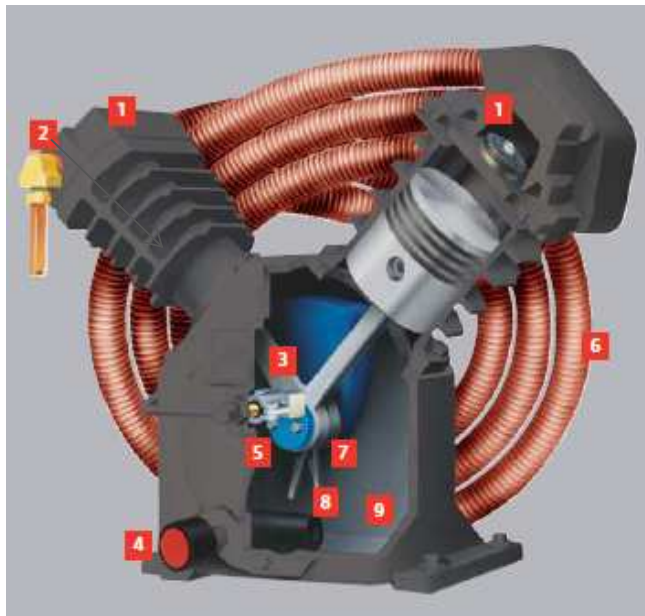
**Evolution™ 26**

# Compressor Assembly



## Quality Engineered, Two Stage, Cast-Iron Pump for Unmatched Reliability

- 3** One-piece connecting rod simplifies maintenance and reduces wear due to fewer parts
- 4** Slot for oil sight glass or low oil level switch
- 5** Centrifugal Unloader (10,15 and 20HP only) ensures loadless starts, for maximum starter protection



One-piece connecting rod

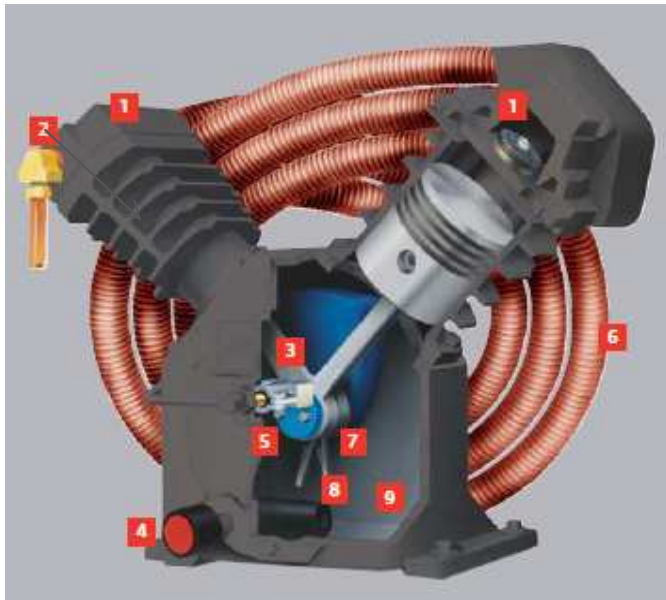
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# Compressor Assembly



**Quality Engineered, Two Stage, Cast-Iron Pump for Unmatched Reliability**

- 6** Finned copper intercooler provides increased cooling between 2 stages resulting in higher efficiency
- 7** Precision balanced crankshaft reduces noise and vibration. Overhung design simplifies maintenance and wear-sleeve replacement



Overhung crankshaft



Finned intercooler

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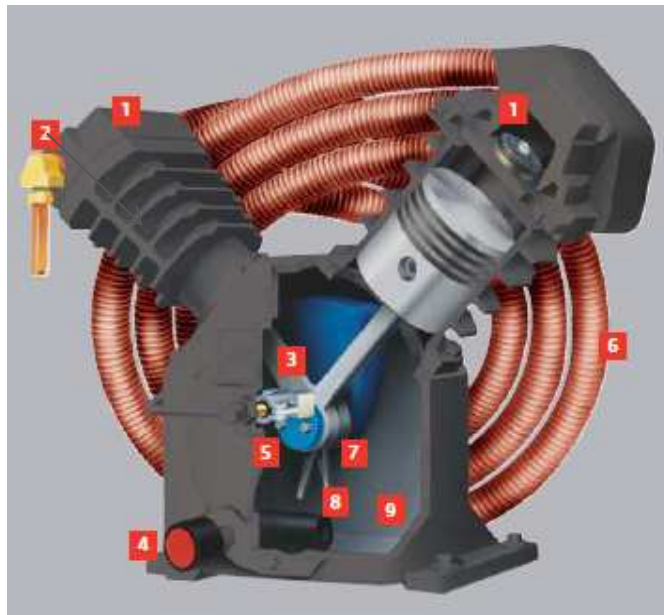
# Compressor Assembly



**Quality Engineered, Two Stage, Cast-Iron Pump for Unmatched Reliability**

**8** Simple and reliable splash lubrication

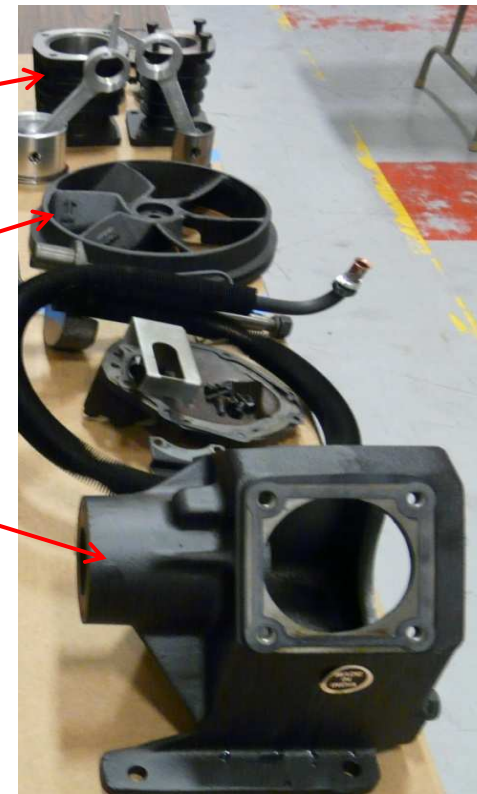
**9** Rugged cast iron pump construction (cylinders, heads, crankcase and flywheel) for improved reliability in continuous duty applications



Cast iron cylinder

Cast iron flywheel

Cast iron crankcase



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# Compressor Assembly



## Stainless Steel Valves

- Stainless steel finger valve design built for high performance environment
- Exclusive edge processing design for increased reliability in continuous duty applications
- Optimized valve design for increased volumetric efficiency
- Easily accessible and simple design for quick scheduled maintenance
- Poke – yoke design for error proof assembly during scheduled maintenance and regular cleaning

Cast iron cylinder head



Stainless steel finger valves

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# Compressor Assembly



- **100% Cast Iron:** Durable heavy duty construction that lasts
- **V-Block Configuration:** Provides even 360 degree cooling around each head, eliminating hot spots leading to longer life.
- **Two-Stage Design:** Standard 175 psi durable operation with 250 psi as an option.
- **Finger Valves:** Stainless steel construction, simple design for easy maintenance
- **Finned Copper Intercooler:** Ensure cooler operation even in the most demanding applications
- **Overhung Crankshaft:** Precision balanced to ensure dependable smooth, low vibration operation.
- **One-Piece Connecting Rod:** Fewer wearing parts
- **Splash Lubrication:** Simple and reliable.

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## Ingersoll-Rand Design

- **"V" Block Design**
- **100% Cast Iron Design for Durability**
- **100% Continuous Duty Operation**
- **2/5 Year Extended Warranty**
- **15,000+ hour design life**

## Advantage:

- **Longer life and increased durability**
- **Increased durability & reliability**
- **Longer run time than competitive offerings**
- **Guaranteed reliability & performance**
- **Less maintenance, longer life.**

# Product Performance



## Small Recip performance

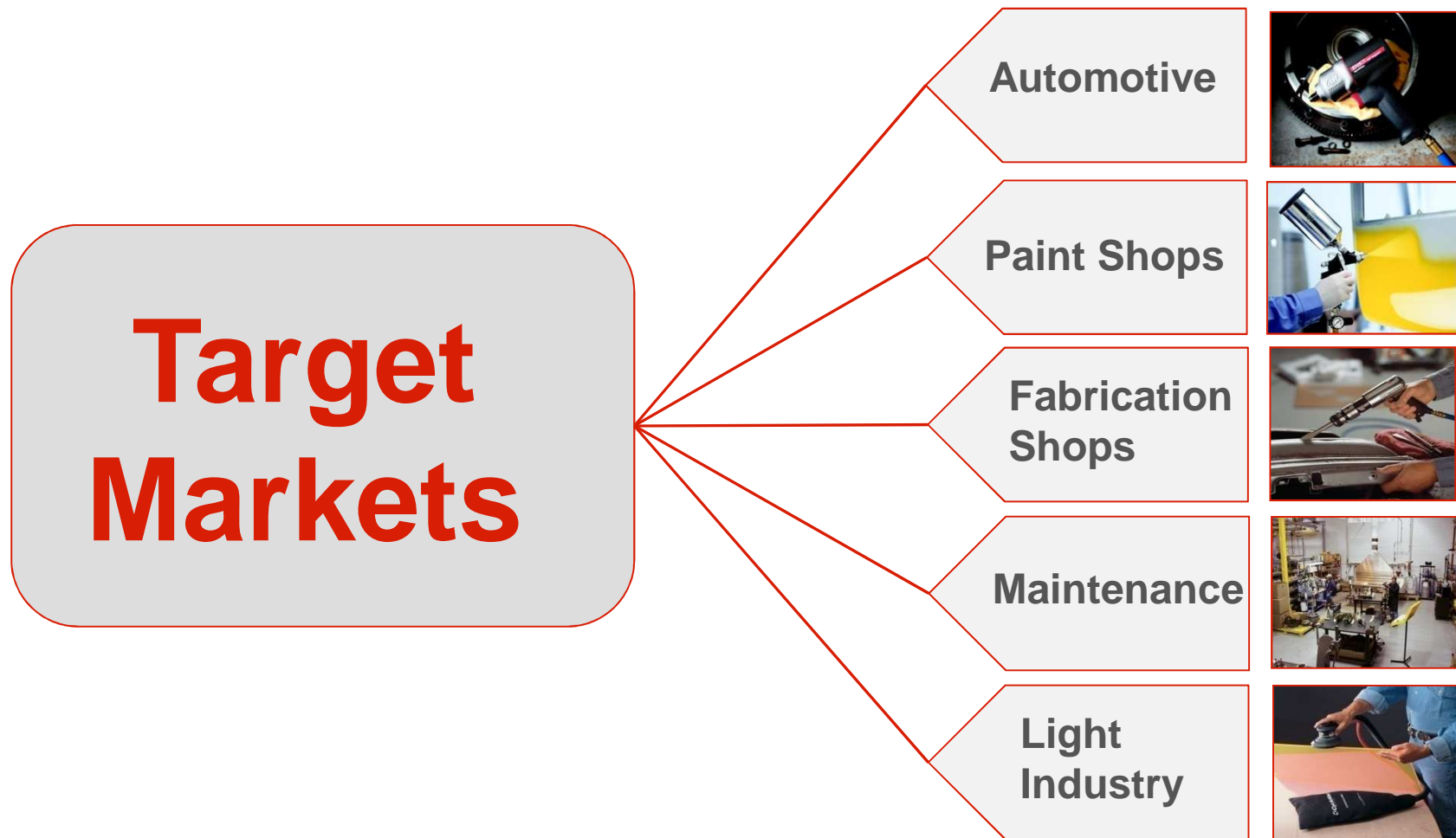
Description	RPM	Max Pr. In psig	Mounting	HP	CFM	Control
2340F3 Evolution	1000	175	150	3	8.65	ASSC
2475C5 Evolution	866	175	225	5	13.99	ASSC
2475C7.5 Evolution	1100	175	225	7.5	17.77	ASSC
2545D10 Evolution	750	175	300	10	24.64	ASSC
2545E 10 Evolution	950	175	500	10	30.00	ASSC
2545E 12.5 Evolution	1050	175	500	12.5	35.2	CSC
15T 350 Evolution	800	350	500	20	50	ASSC



# Target Markets



Duty requirements for a wide range of applications



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# Target Markets



## How to reach the Target Market

- Wholesalers
- Specialized Shop
- Retailers
- Dealers
- Agents

**Market Coverage is the KEY !**

**Leaders Opinion**



Next Generation R-Series



## Q&A session



